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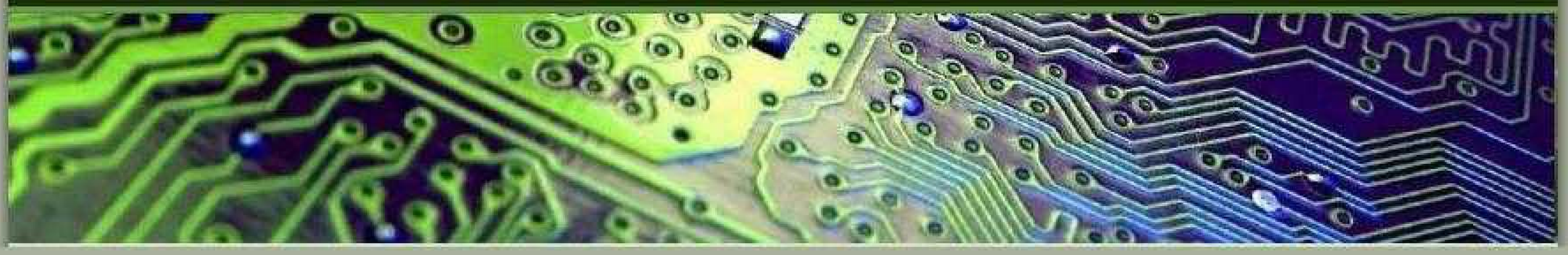

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1935
✦ Official ✦
Radio Service Manual

Complete Directory of all 1934-1935 Radio Receivers

FULL RADIO SERVICE GUIDE

Vol. No. 5

HUGO GERNSBACK
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Associate Editor

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. . . Introduction . . .

IN the preparation of this volume unusual care has been taken to supply all information which will be of service to the radio technician and Service Man in repairing radio receivers. Not only the latest sets, but a good many older models which were not included in previous volumes of the OFFICIAL RADIO SERVICE MANUAL will be found here.

It will be noted that there are numerous innovations included in this book which were not covered in previous editions. For example, the socket connections for all the tubes are included directly on the page with the circuit to facilitate point-to-point testing and voltage measurements. Also, wherever possible servicing hints are included directly with the diagram to aid the Service Man in quickly locating the source of trouble.

As in the 1934 edition the page on which a circuit appears is indicated by a Roman numeral following the page number. Thus page 196V indicates the one-hundred and ninety-sixth page in the 1935 Manual. In preparing the cumulative index to this book, great care has been taken to cross-index all circuits so that a set of one manufacturer which is sold under another trade number by a different concern can be identified. This has also been done for a number of circuits which appeared in previous volumes and if you find references in the index which do not correspond to the titles on the pages in question (especially in volumes I to IV), this indicates that the set in question is identical with the one appearing on that page. A careful notation of this point will prevent apparent discrepancies in the index from being encountered.

At the back of the volume, some interesting service information such as a complete tube chart; a list of intermediate frequencies for superheterodyne receivers; the resistance values of voltage dividers for many commercial sets and other tabulations are included. These sections of the Manual will be of great service to the professional radio man.

—THE EDITORS.

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1931, 1932, 1933, 1934 and 1935 Manuals

THIS INDEX includes material printed in the 1931, 1932, 1933 and 1934 Manuals, as well as the present volume. To differentiate between the various volumes, a Roman numeral follows the page number of each set listed. Thus the numeral I refers to the 1931 issue, II refers to the 1932 issue, etc. The small "s" following some of the Roman numerals specifies that the particular page is in one of the supplements of the 1931 or 1932 Manuals.

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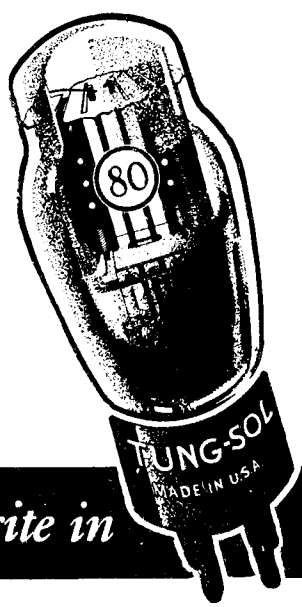

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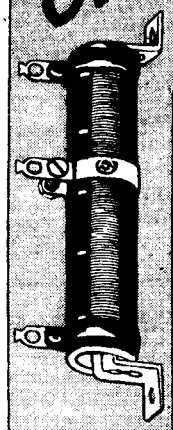

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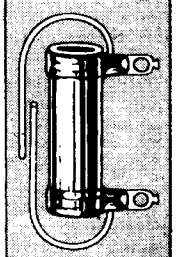

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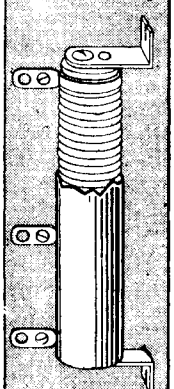

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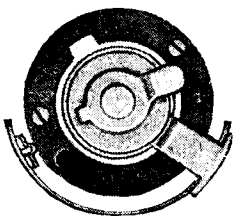
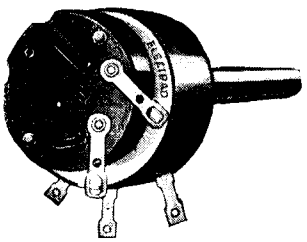


Contact glides over resistance element in straight path.

Standard Replacement Volume Control with power-switch attached.



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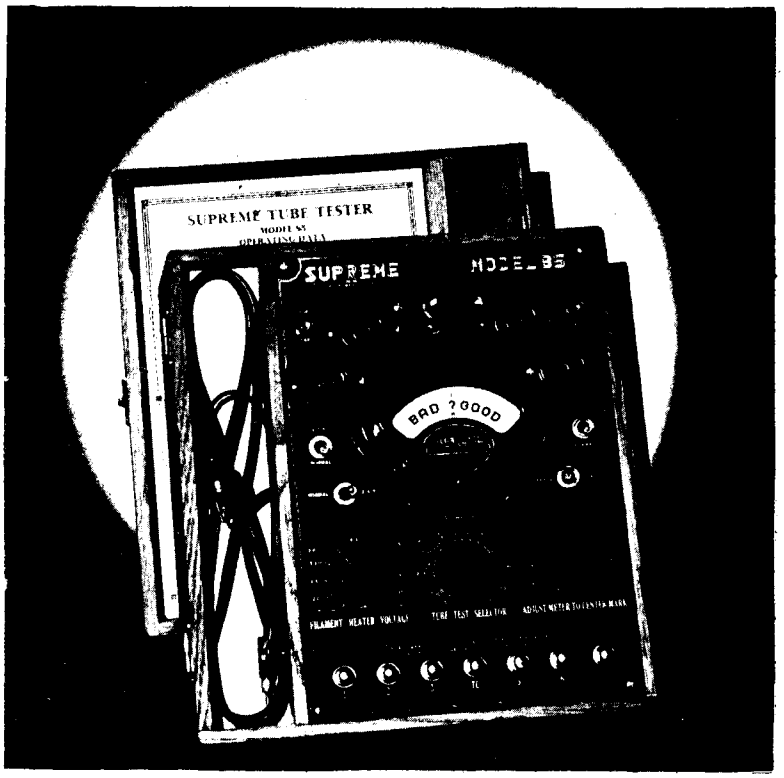

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Very truly yours,
E. R. Arnold
RADIO SERVICE SHOP

MANY THANKS MR. ARNOLD
NEVER MIND THE "EXTRA $25"

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FOR RADIO DEALERS and P.A. MEN

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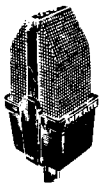

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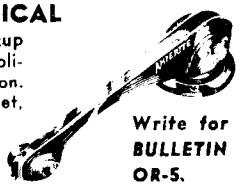

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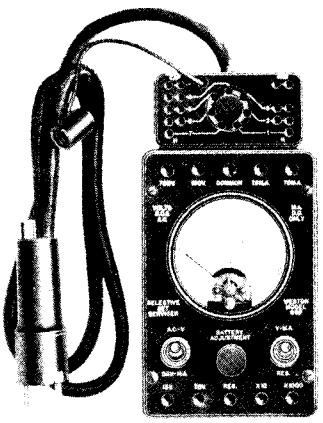

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—Includes socket selector set. leads, carrying case, etc.

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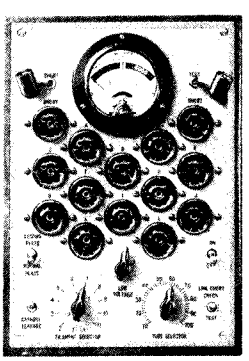

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113 Police Car Radio 877-V
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PLEASE NOTE: A Roman numeral follows the page number of each set listed, to differentiate between the various volumes. Thus, the numeral I refers to the 1931 issue, II to the 1932 issue, III to the 1933 issue, and V to the present volume. The small "s" following some of the Roman numerals specifies that the particular page is in one of the supplements to the 1931 or 1932 Manuals.

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See also Gulbransen Co. and Montgomery Ward & Co.

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534 Tube Checker (Jewell) 940-V
538 Tube Checker (Jewell) 941-V
560 Oscillator (Jewell) 942-V
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566 (Type 3) Set Tester 944-V
660 (Type 3) Set Analyzer 945-V
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See Brunswick Radio Corp.

WILCOX-GAY CORP.

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See also All-American Mohawk Corp.

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ZANEY GILL CO.

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ZENITH RADIO CORPORATION

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CHART OF INTERMEDIATE FREQUENCIES

National Union Radio Corp. 984-V, 985-V
Frequencies used in Superheterodynes 632 III, 633 III

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VACUUM TUBE CHART

RCA Radiotron Co.

992-V, 993-V, 994-V, 996-V, 998-V

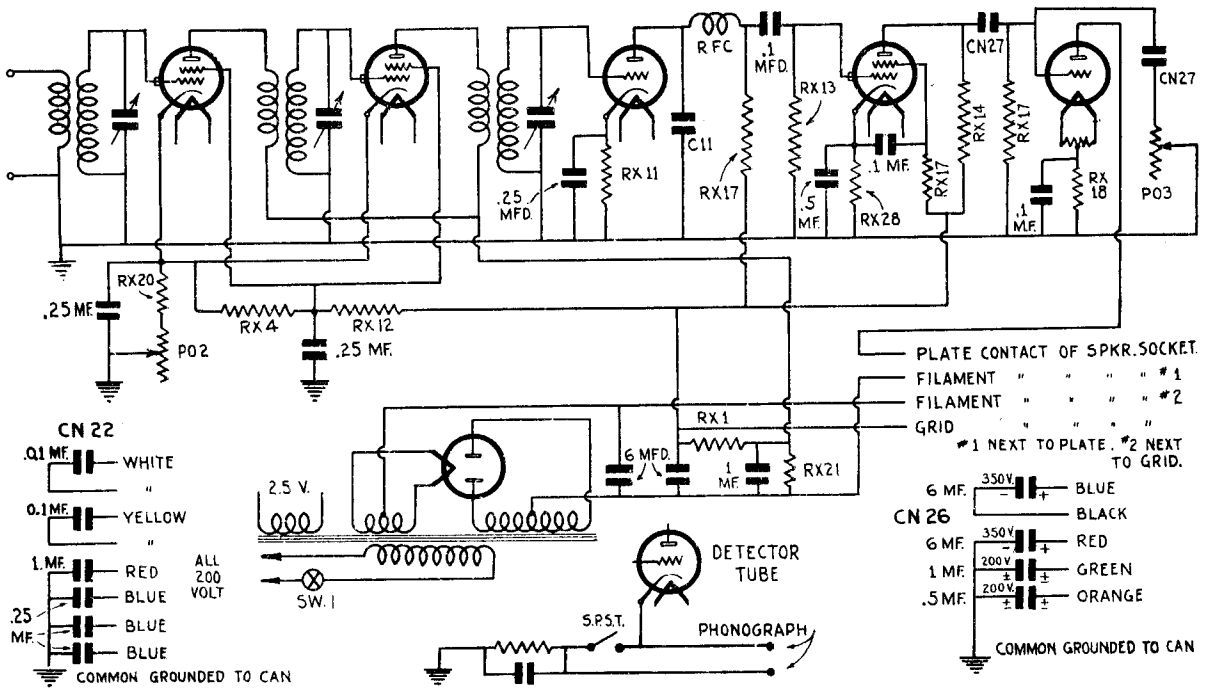
VOLTAGE DIVIDER CHART

National Union Radio Corp.

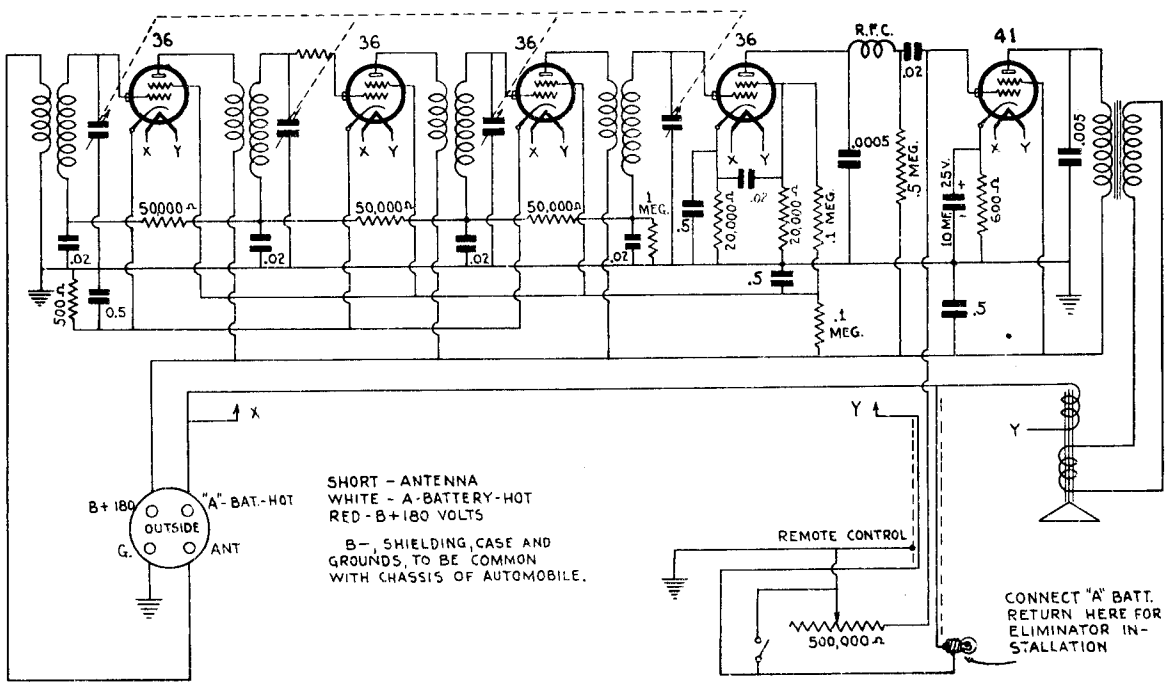
1000-V, 1002-V, 1004-V, 1006-V

ADVANCE ELECTRIC CO.

MODELS 77-88-89

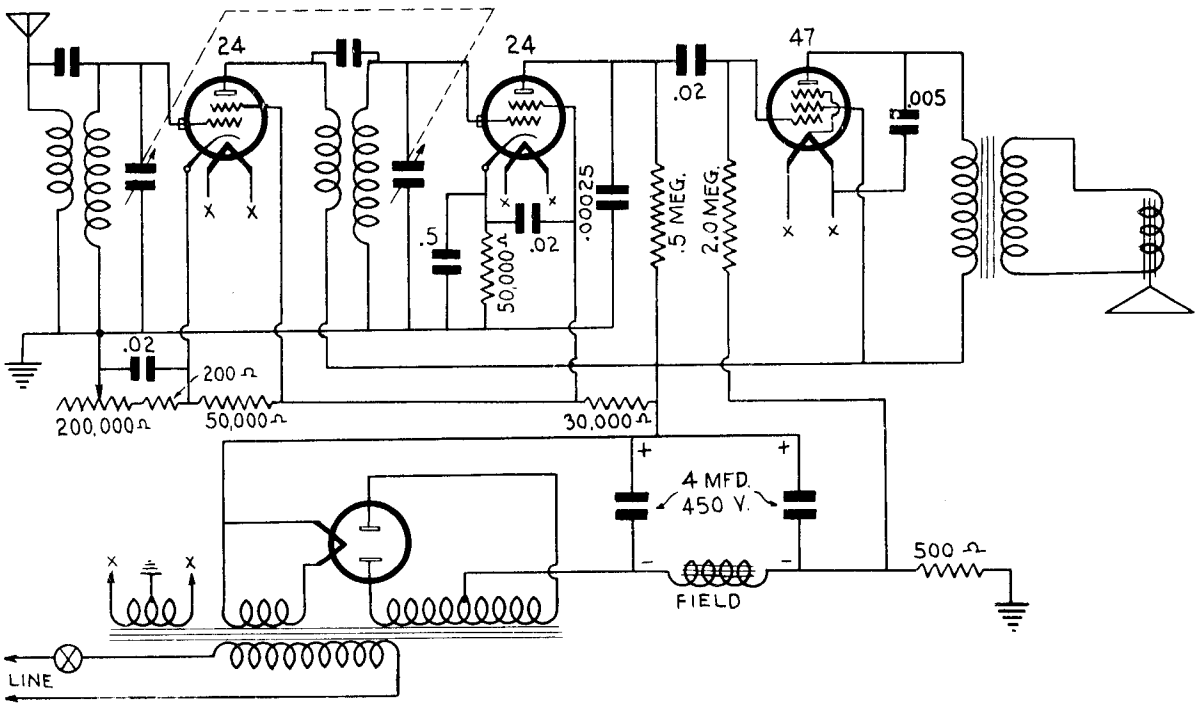


MODEL A AUTOMOBILE RECEIVER



ADVANCE ELECTRIC CO.

FALCK - MODEL E



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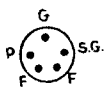
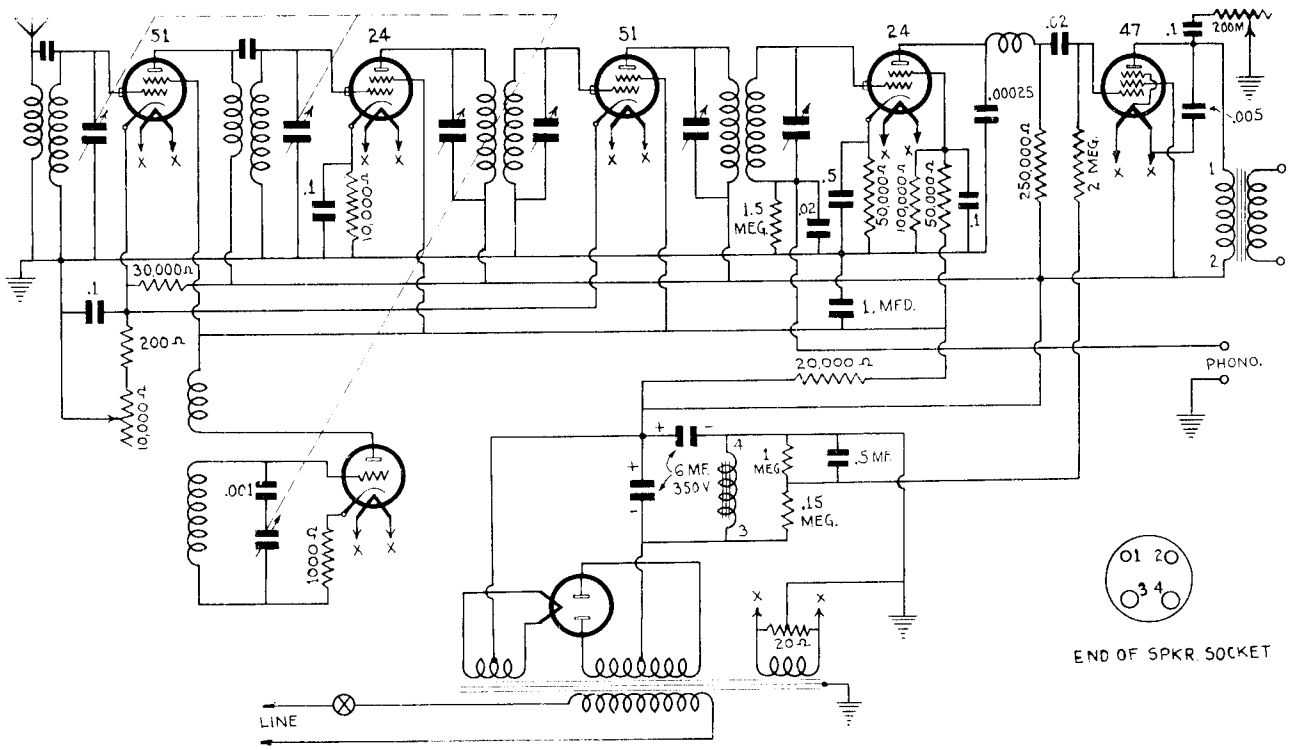


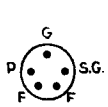
47

80

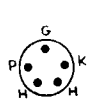
FALCK "B" SUPERHETERODYNE



51 & 24



47

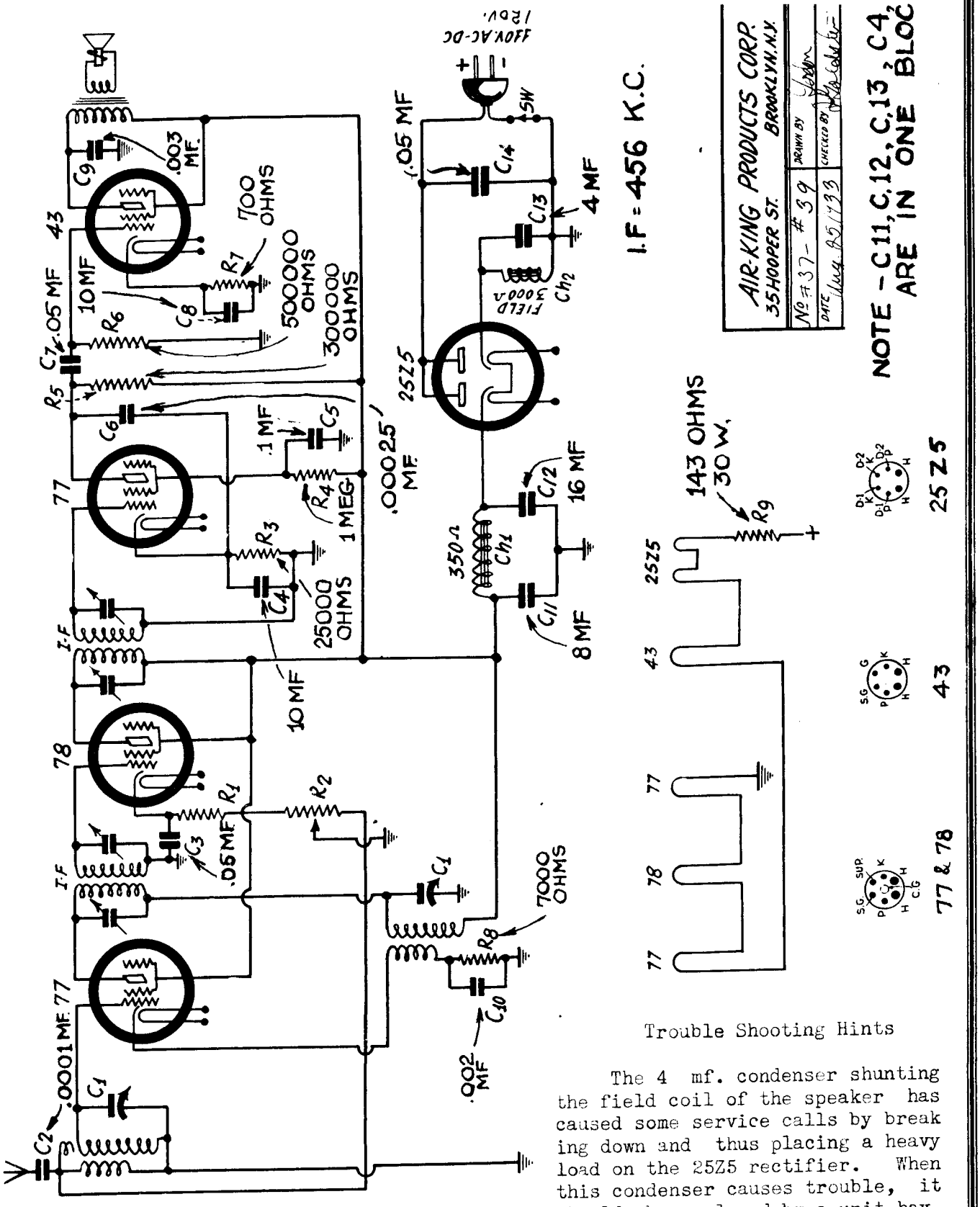


27

80

AIR KING PRODUCTS CO., Inc.

MODEL 37-39

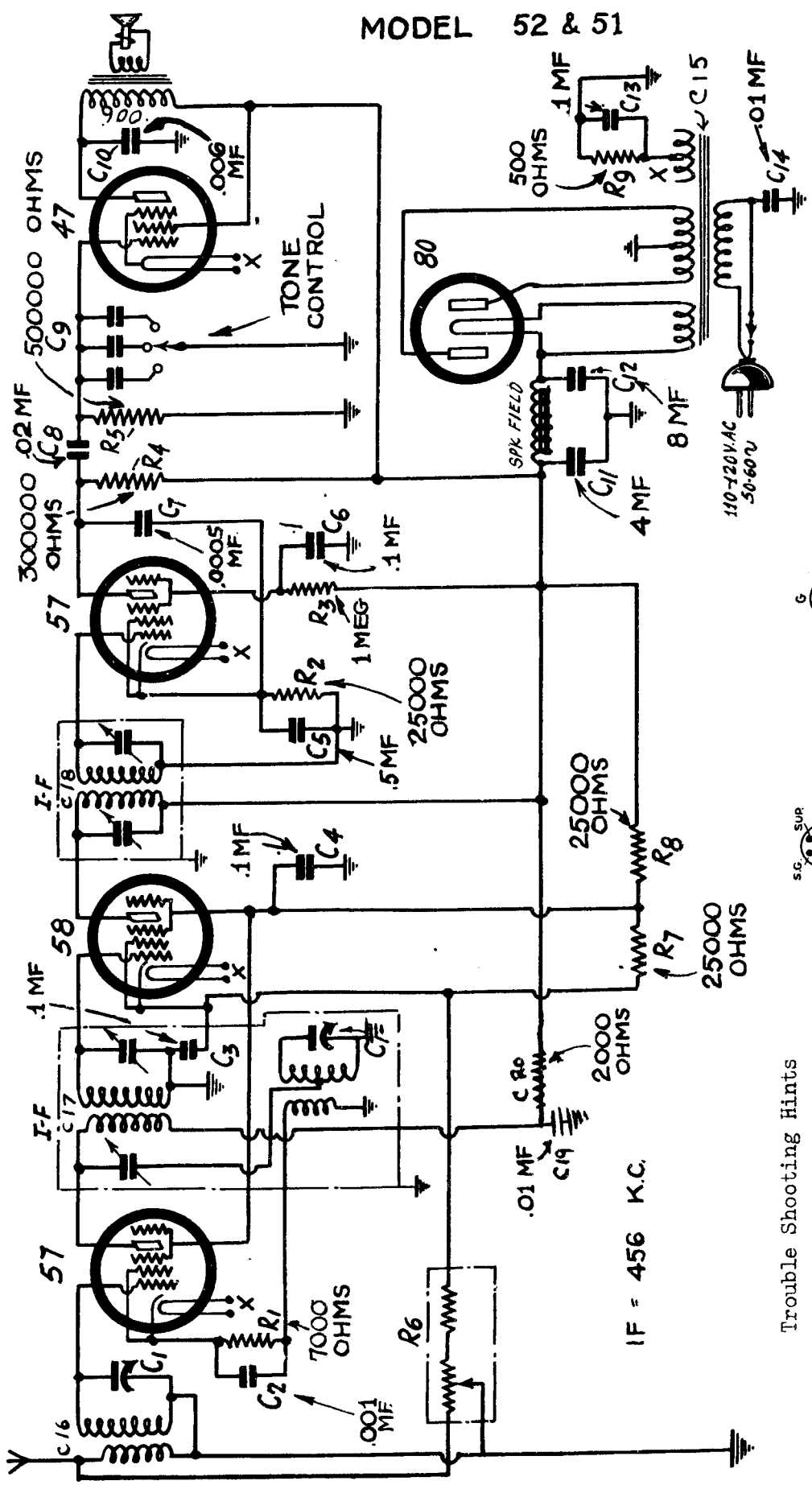


Trouble Shooting Hints

The 4 mf. condenser shunting the field coil of the speaker has caused some service calls by breaking down and thus placing a heavy load on the 25Z5 rectifier. When this condenser causes trouble, it should be replaced by a unit having a higher voltage rating. The rectifier must also be replaced.

AIR KING PRODUCTS CO., Inc.

MODEL 52 & 51



AIR-KING PRODUCT CORP.	
35 HOOPER ST. BROOKLYN, N.Y.	
DRAWN BY M. London	DATE Jan. 22-1933
CHECKED BY M. Bratkin	No. MODEL 52-54

47

80

57 & 58

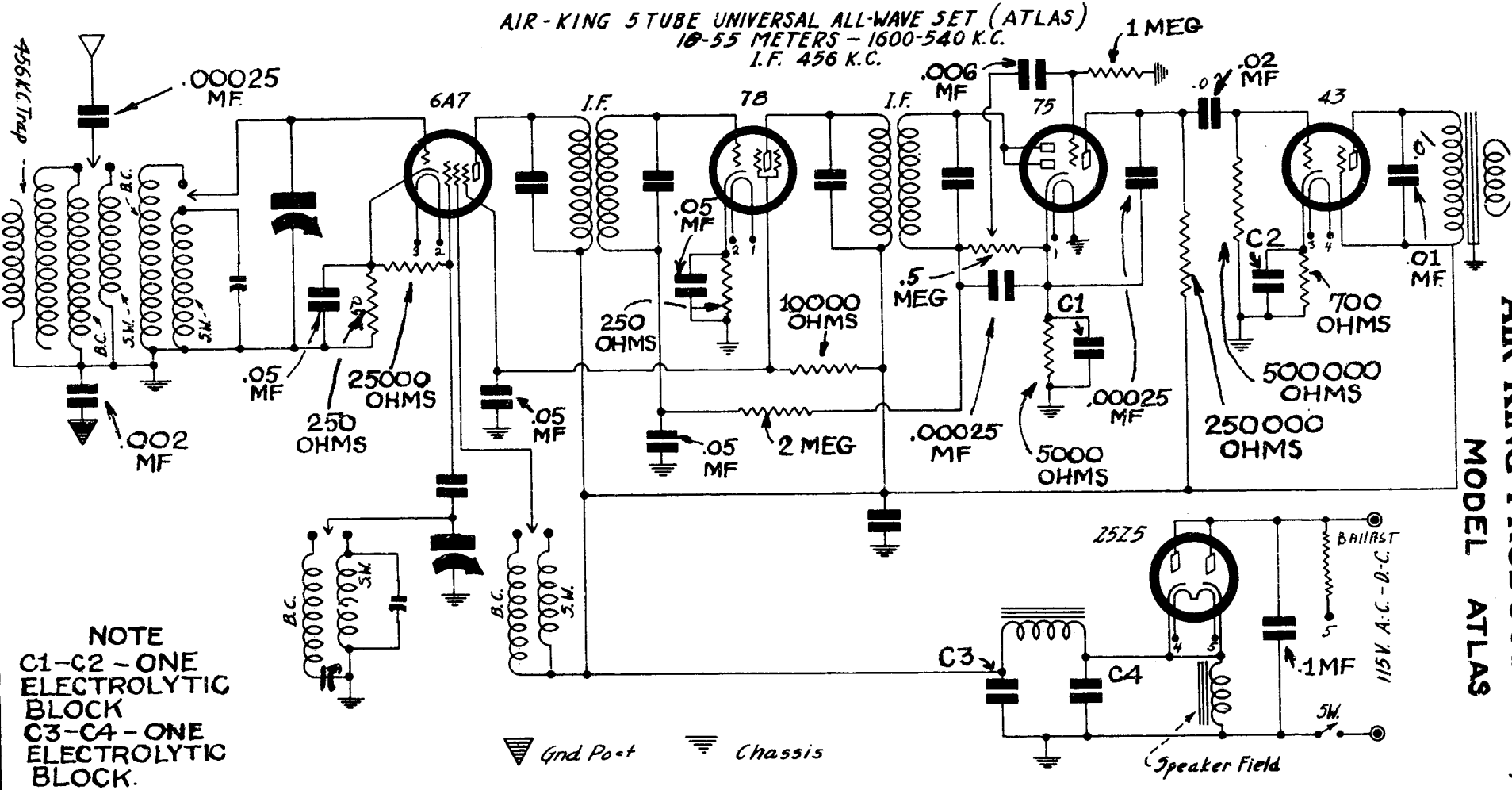
Trouble Shooting Hints

If poor quality is encountered in this set the .006 mf. condenser in the plate circuit of the 47 should be tested. When the complaint is excessive background noise the electrolytic filter condensers should be suspected first, then tubes, and finally all by pass condensers should be tested for leakage.

AIR KING PRODUCTS CO., Inc.

MODEL ATLAS

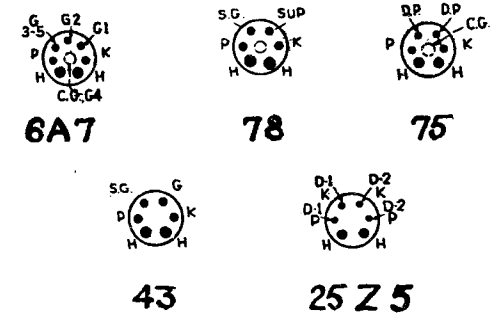
AIR-KING 5 TUBE UNIVERSAL ALL-WAVE SET (ATLAS)
18-55 METERS – 1600-540 K.C.
I.F. 456 K.C.



NOTE
C1-C2 - ONE ELECTROLYTIC BLOCK
C3-C4 - ONE ELECTROLYTIC BLOCK.

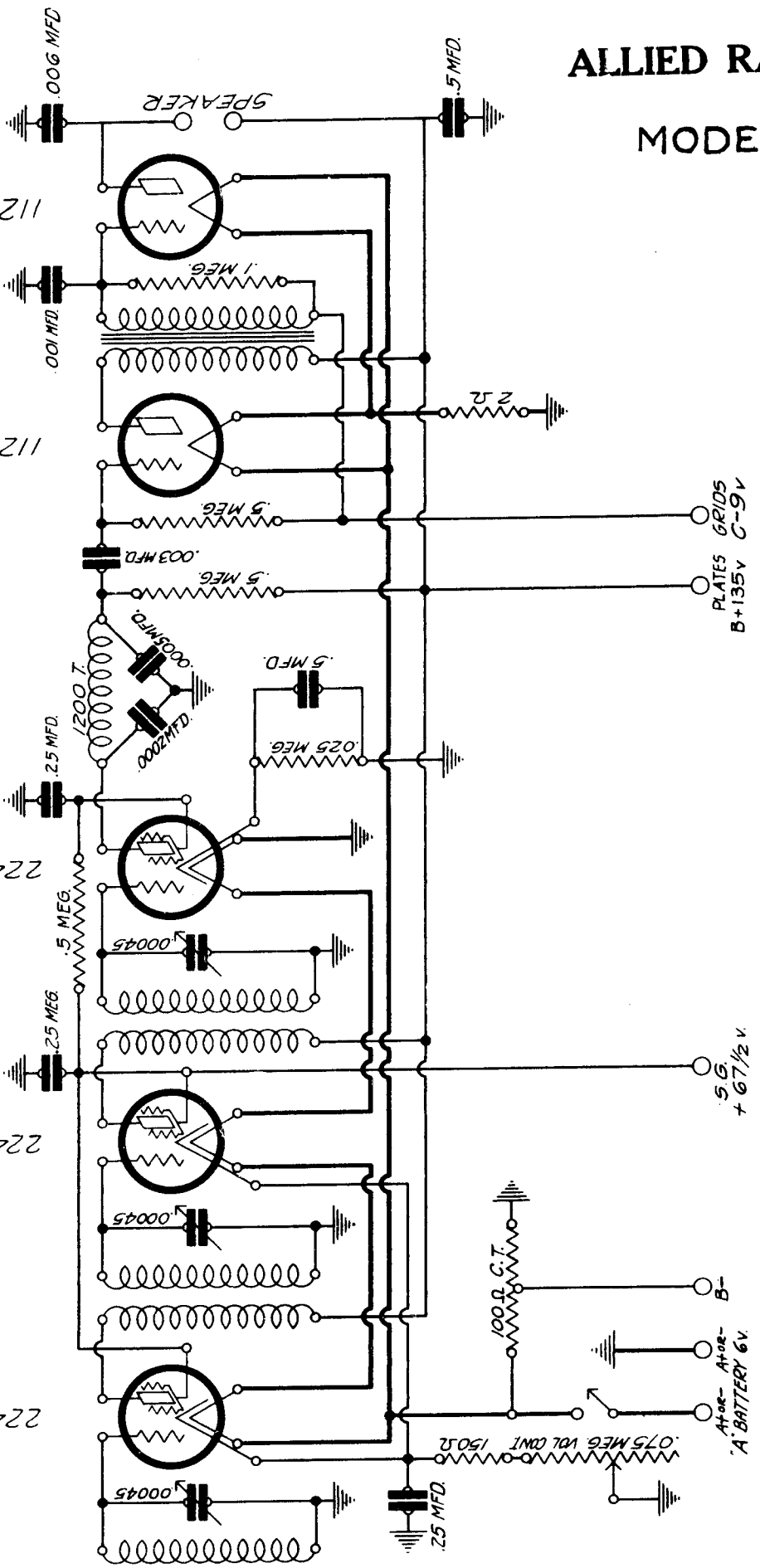
Trouble Shooting Hints

If whistles are encountered on certain parts of the wave-bands, it is almost sure proof that either the trap circuit or the I.F. amplifier have shifted in frequency and it will be necessary to re-ad just the I.F. trimmers to 456 K.C. If the latter is necessary, it may also be essential to adjust the padding of the oscillator on both the broad cast and short wave bands. This should be done with a good service oscillator.



ALLIED RADIO CORP.

MODEL AS 30 SG



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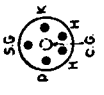


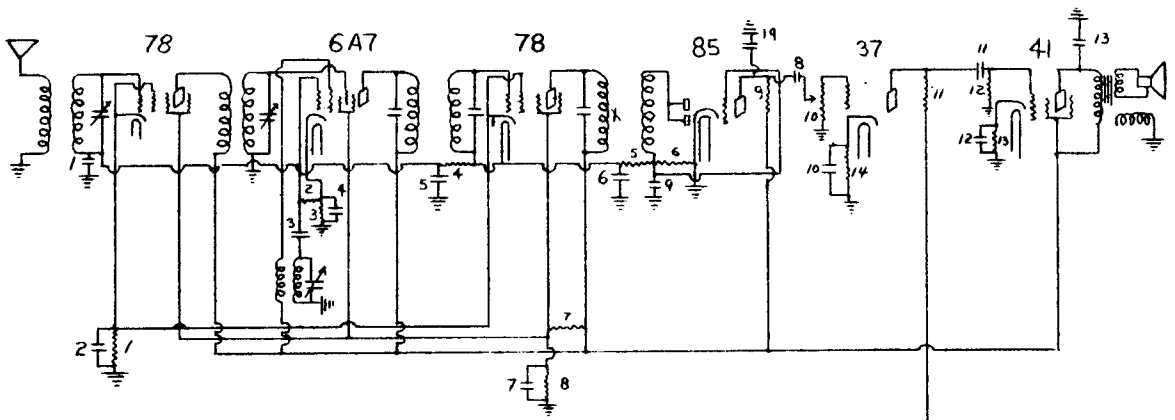
24

Trouble Shooting Hints

Complete cessation of this model is usually caused by an open circuit in the volume control or the limiting resistor connected in series with it. As this resistor supplies the bias for the R. F. tubes no signal will pass through if the circuit becomes open. An audio whistle may be due to the one megohm resistor shunted across the secondary of the A. F. transformer. This resistor is necessary for stability in the audio amplifier and it is sometimes necessary to use a lower value in order to prevent audio feed back from the second A.F. to the detector.

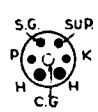
ALLIED RADIO CORP.

MODEL F-9551-53 (7 TUBE AUTO SET)



	Resistors	Condensers
1	250	.1
2	25000	.1
3	250	.0002
4	200 000	.1
5	500 000	.1
6	250 000	.1
7	25000	.1
8	25 000	.01
9	100 000	.001
10	200 000	10 MFD.
11	100 000	.01
12	100 000	10 MFD.
13	1000	.01
14	2000	1. MFD.
15	1000	.1
16	50000	1. MFD.
17		8 MFD.
18		16 MFD.
19		.0002

ALLIED RADIO
Engineering Division
DESIGNED BY PAR
DRAWN BY MB
APPROVED CAR
DATE 12/26/33



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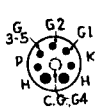

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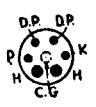

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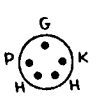

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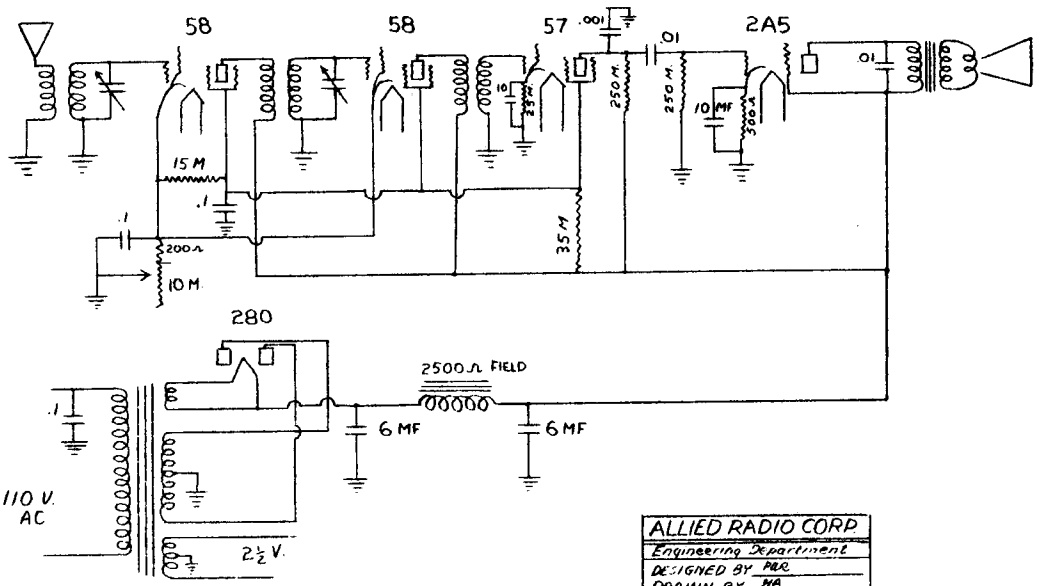
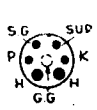
MODEL F-9555

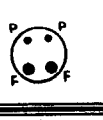


ALLIED RADIO CORP
Engineering Department
DESIGNED BY PAR
DRAWN BY MB
APPROVED CR
DATE 12/20/33
TYPE F9555



57 & 58

2A5



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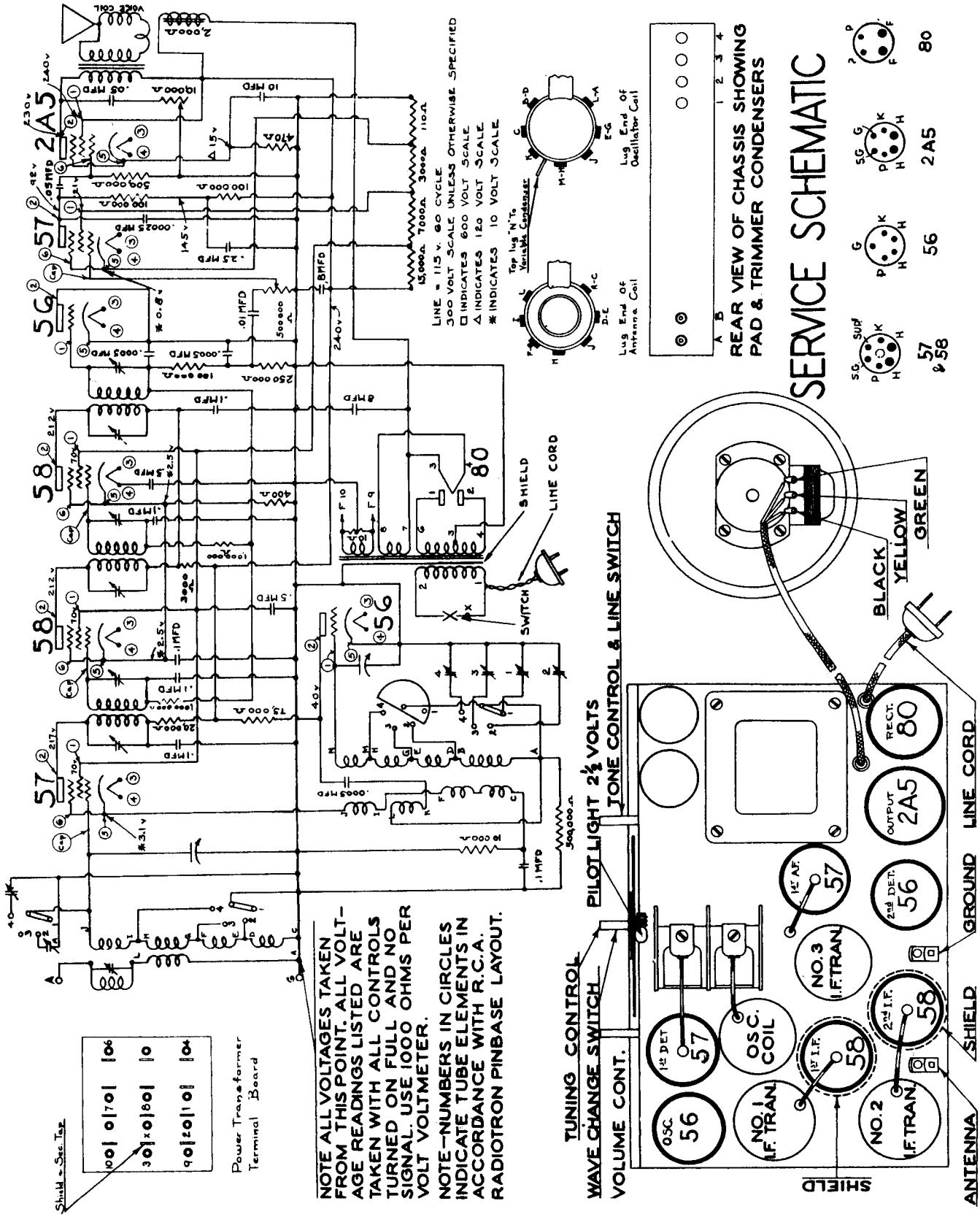
ALLIED RADIO CORP.

MODEL F 9612-13



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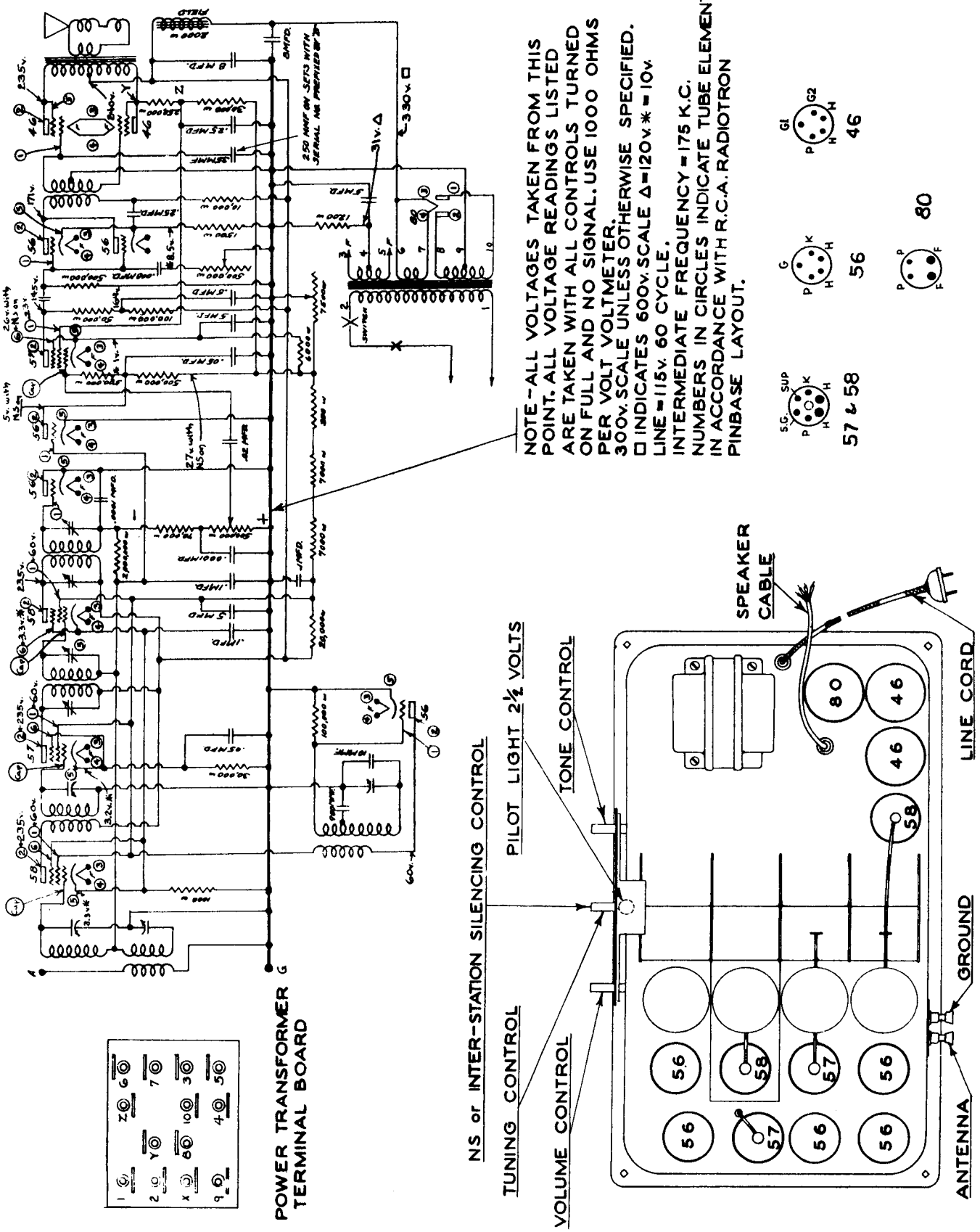
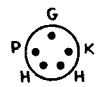
MODEL F 9618 -19



ALLIED RADIO CORP.

MODEL F-9630-31
F-9632-33
F-9634-35



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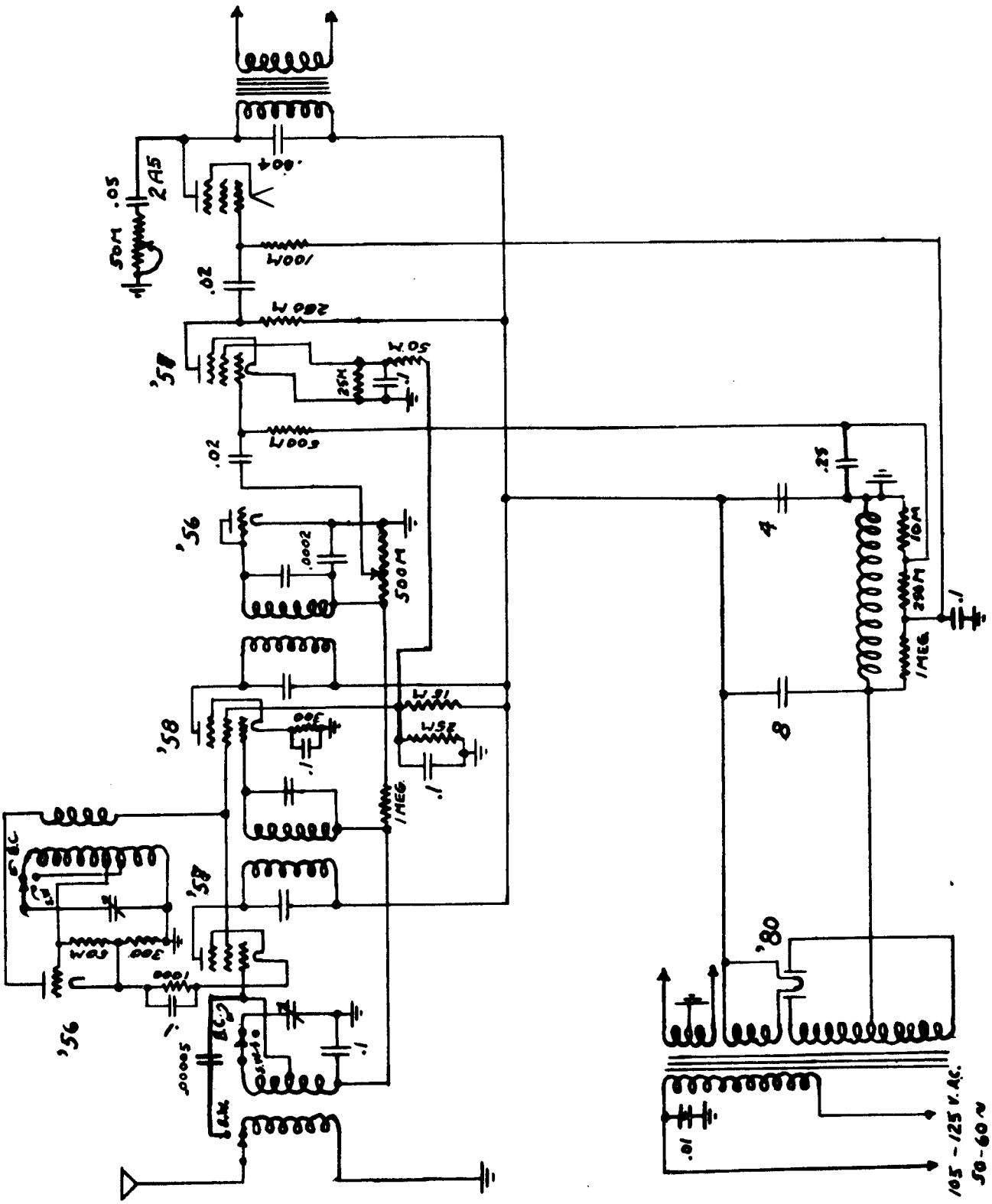
57 & 58

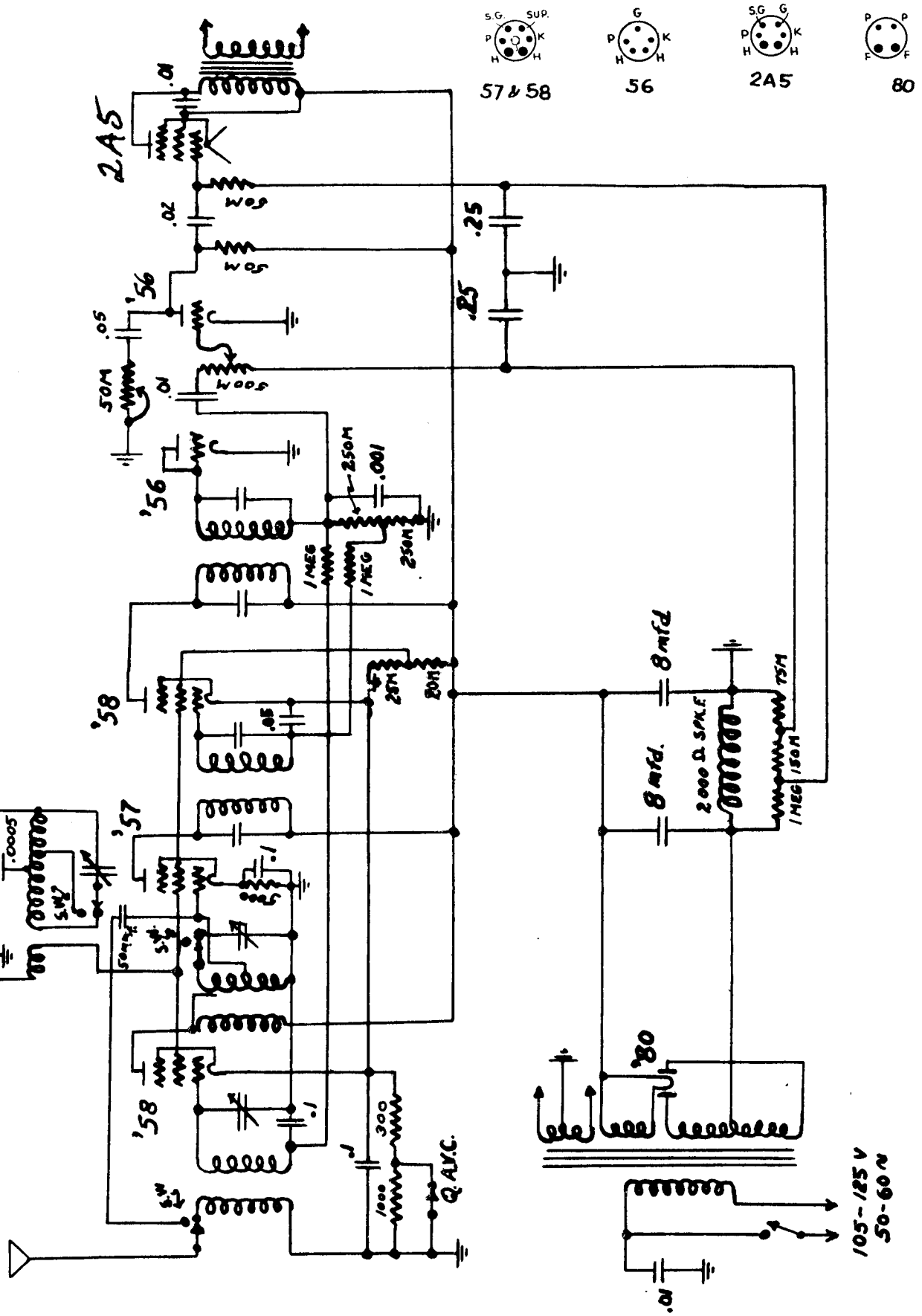
2A5

80



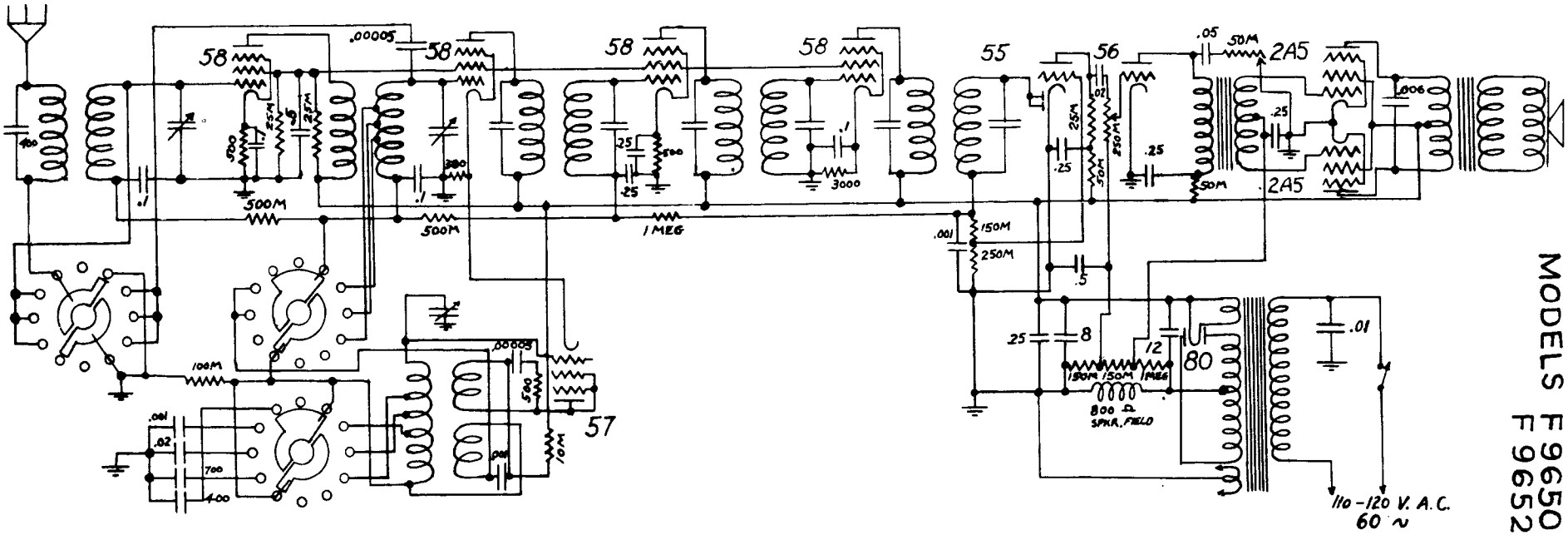
ALLIED RADIO CORP.

MODELS F9640-41, F9642-43, F9644-45



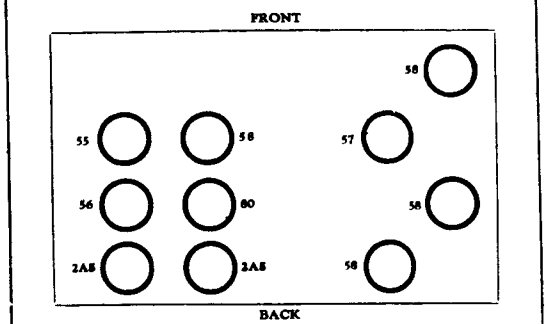
ALLIED RADIO CORP.

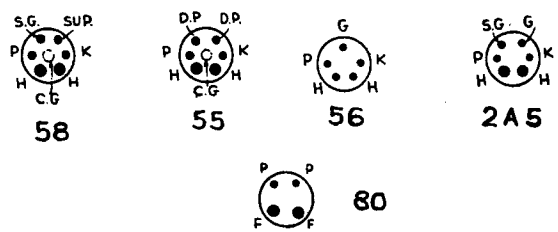
MODELS F 9650-51
F 9652-53



INSTRUCTION SHEET— 102333

10 TUBE SHORT-WAVE SUPERHETERODYNE





OPERATING INSTRUCTIONS FOR TEN TUBE SHORT WAVE SUPERHETERODYNE

A drawing is included showing correct placement and type of tubes.

This receiver covers a frequency range of 540 to 20,000 kilocycles (555 to 15 meters) by the use of four overlapping wave bands, each selected by means of the band switch as indicated.

When the band switch is in extreme left position, set covers band No. 1, which is the broadcast band, and subsequent positions cover the other three bands.

Band No. 1 readings may be converted to kilocycles by adding two ciphers (multiplying by 100). Bands Nos. 2, 3, and 4 are calibrated in megacycles and may be converted into kilocycles by adding three ciphers (multiplying by 1000).

Too much emphasis cannot be placed on the desirability of tuning the set extremely slowly when tuning on bands Nos. 2, 3, and 4. Due to extreme sharpness and selectivity in these positions, stations would be otherwise passed by unless the tuning operation is done slowly. The foregoing is especially true when "tuning in" weak and far-distant stations.

Under the right conditions of time, location, and weather, one may reasonably expect to tune in distant or foreign stations. We do not make unsubstantiated claims that it is possible to tune in foreign stations at will.

There is very little "static" in the short wave bands, but due to the extreme sensitivity, all sorts of electrical disturbances may be heard if conditions are not correct. Even the ignition system of a passing car may impair reception. Practice proper handling and tuning of the short wave bands and you will be rewarded with many interesting and entertaining broadcasts.

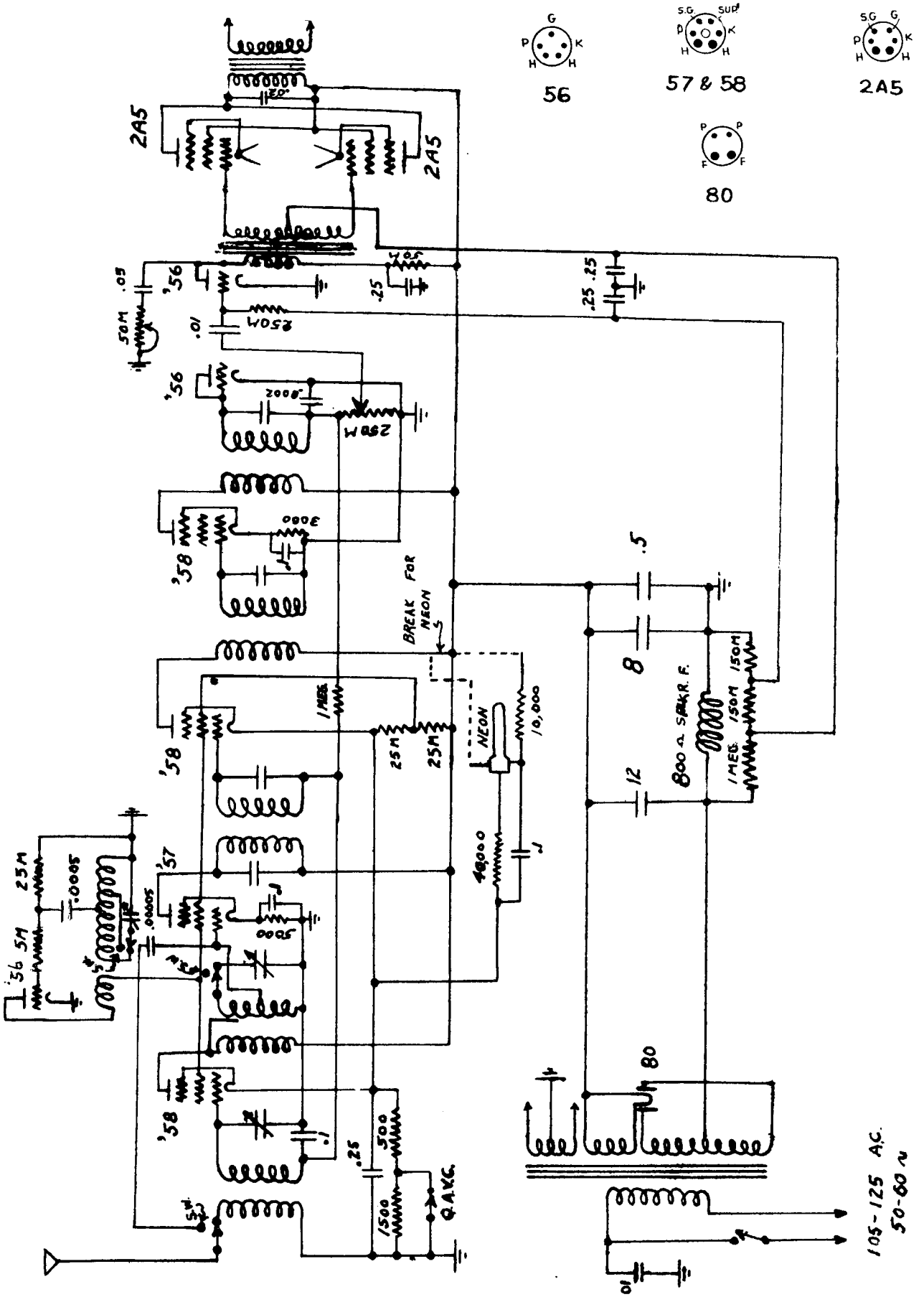
Always bear in mind the difference in time in different parts of the world when tuning for foreign stations. For example, when it is seven o'clock in the evening in Chicago, it is two o'clock in the morning in most of Europe.

The majority of reliable United States and Canadian short wave broadcasting stations may be found around 6 and 7 (6000 and 7000 kilocycles) on band No. 3, and around 9 and 10 (9000 and 10,000 kilocycles) on band No. 4.

A good aerial and good ground are necessary if the best results are to be secured.

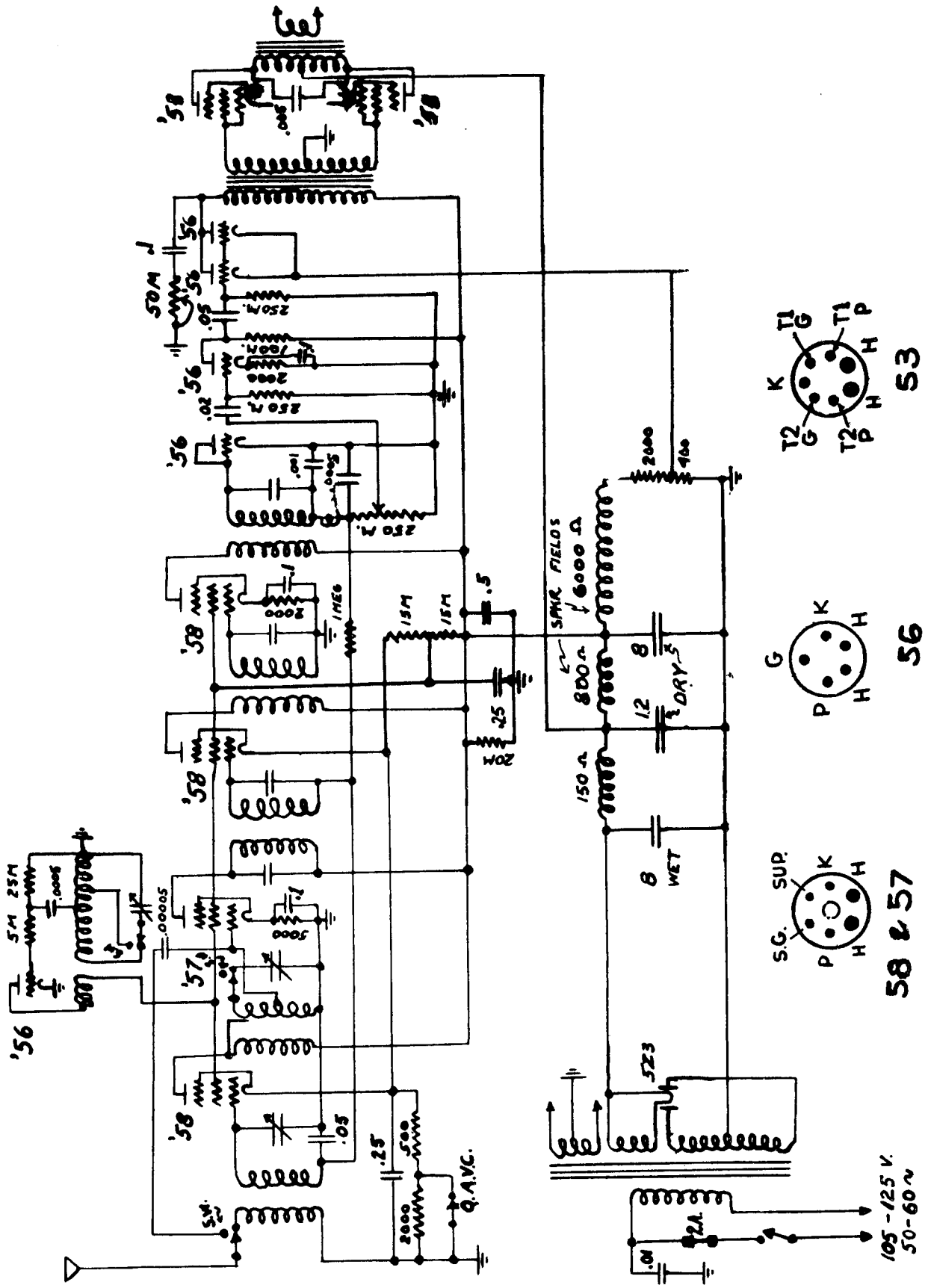
ALLIED RADIO CORP.

MODELS F-9660-61, F 9662-63, F 9664-65



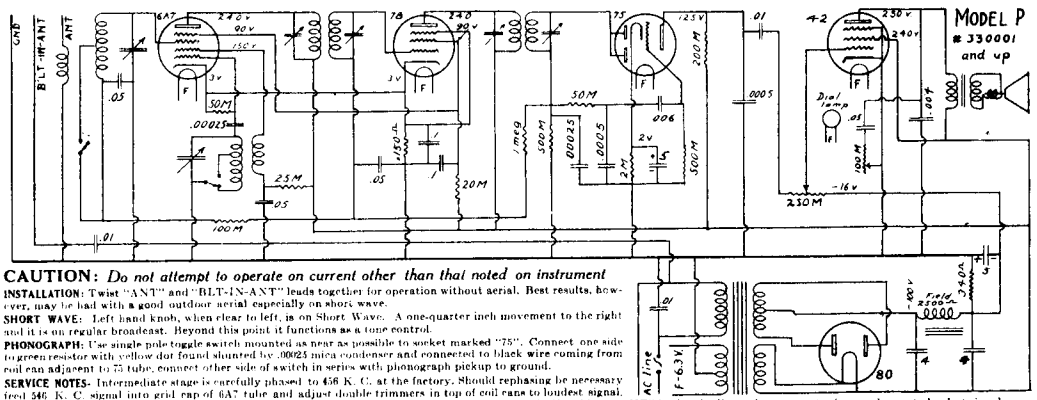
ALLIED RADIO CORP.

MODELS F-9670-71 AND F-9672-73



ALLIED RADIO CORP.

MODELS P-F9505 · F9751



CAUTION: *Do not attempt to operate on current other than that noted on instrument*

INSTALLATION: Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial especially on short wave.

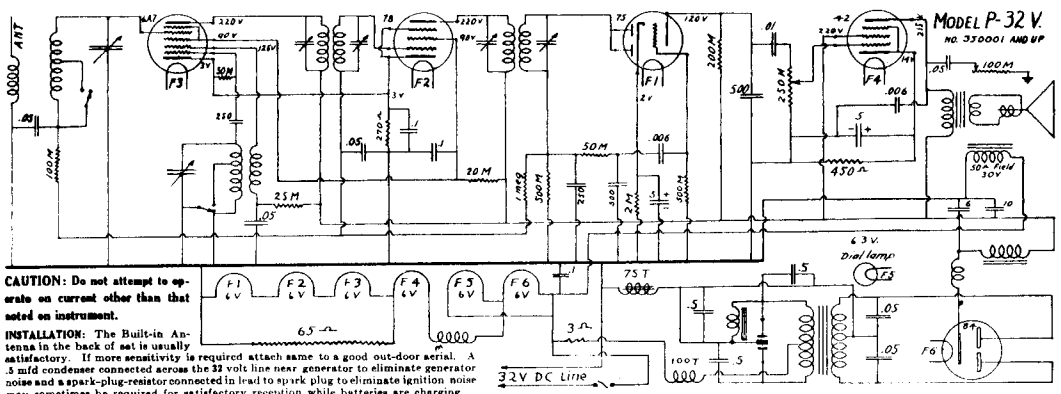
SHORT WAVE: Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.

SERVICE NOTES: Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 546 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

GUARANTEE: This instrument is guaranteed for sixty days, within which period any part showing electrical or mechanical defects will be replaced without charge when returned prepaid to the factory, but if the complete instrument is returned a nominal charge will be made for such labor as may be necessary to install the defective part.

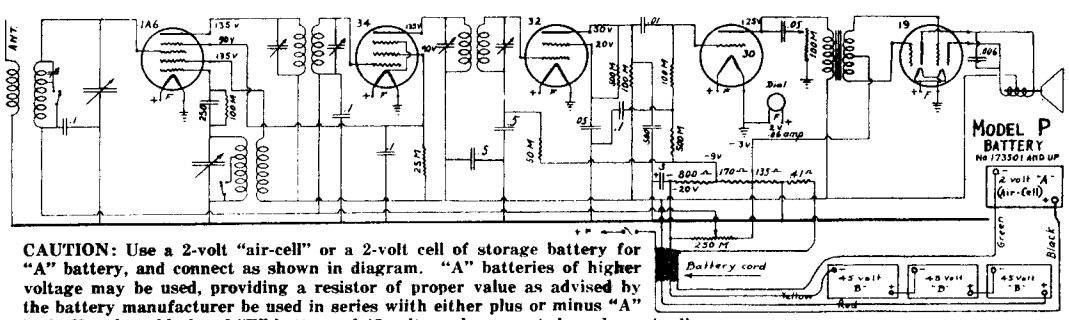
MODELS P-32V. -F9515 · F9777



CAUTION: Do not attempt to operate on current other than that noted on instrument.

INSTALLATION: The Built-in Antenna in the back of set is usually satisfactory. If more sensitivity is required attach same to a good out-door aerial. A .5 mfd condenser connected across the 32 volt line near generator to eliminate generator noise and a spark-plug-resistor connected in lead to spark plug to eliminate ignition noise may sometimes be required for satisfactory reception while batteries are charging. USE NO GROUND CONNECTION ON SET. **SHORT WAVE:** Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control **PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground. **SERVICE NOTES:** Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 456 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal **GUARANTEE:** This instrument is guaranteed for sixty days, within which period any part showing electrical or mechanical defects will be replaced without charge when returned prepaid to the factory, but if the complete instrument is returned a nominal charge will be made for such labor as may be necessary to replace the defective part.

MODELS P-BATTERY -F9511-13 · F9775-77



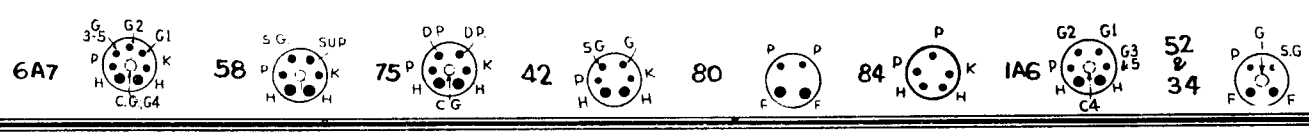
CAUTION: Use a 2-volt "air-cell" or a 2-volt cell of storage battery for "A" battery, and connect as shown in diagram. "A" batteries of higher voltage may be used, providing a resistor of proper value as advised by the battery manufacturer be used in series with either plus or minus "A" lead. Use three blocks of "B" battery of 45 volts each, connected as shown in diagram.

INSTALLATION: A good outdoor aerial will give best results, especially on short wave. No ground wire is usually required.

PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "32." Cut black wire coming from bottom of coil can adjacent to this tube and connect across switch. Connect phonograph pickup across switch.

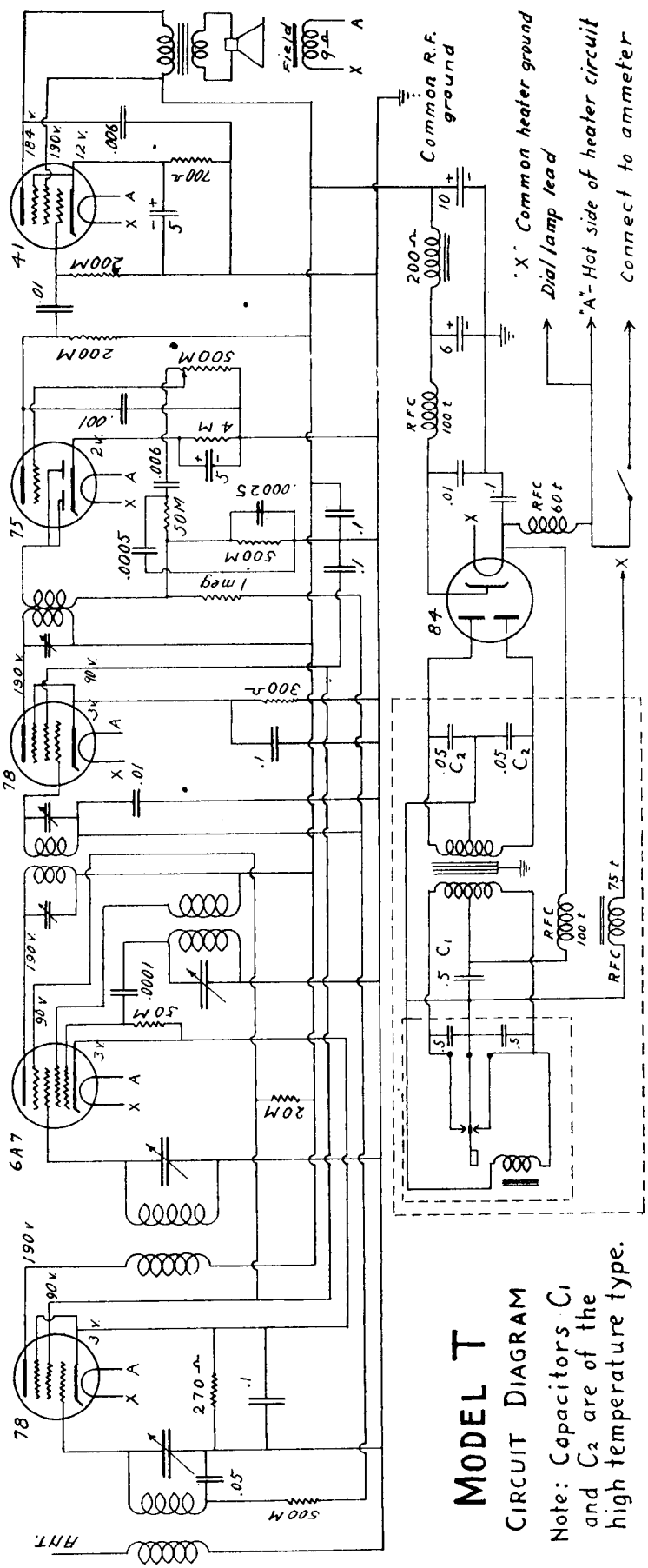
SERVICE NOTES: Intermediate stage is carefully phased to 456 k.c. at the factory. Should rephasing be necessary, feed 456 k.c. signal into grid cap of "1A6" tube, and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400 k.c., carefully remove chassis from cabinet, feed 1400 k.c. signal into antenna lead and adjust trimmers on tuning condenser to loudest signal.

GUARANTEE: This instrument is guaranteed for sixty days, within which period any part showing electrical or mechanical defects will be replaced without charge when returned prepaid to the factory, but if the complete instrument is returned a nominal charge will be made for such labor as may be necessary to replace the defective part.



ALLIED RADIO CORP.

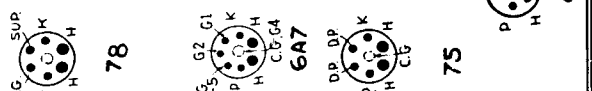
MODEL "T" AUTO SET, F-9541



MODEL T

CIRCUIT DIAGRAM

Note: Capacitors C_1 and C_2 are of the high temperature type.



SERVICE NOTES

The Circuit Diagram accompanying above gives all necessary resistance and capacity values for servicing the set.

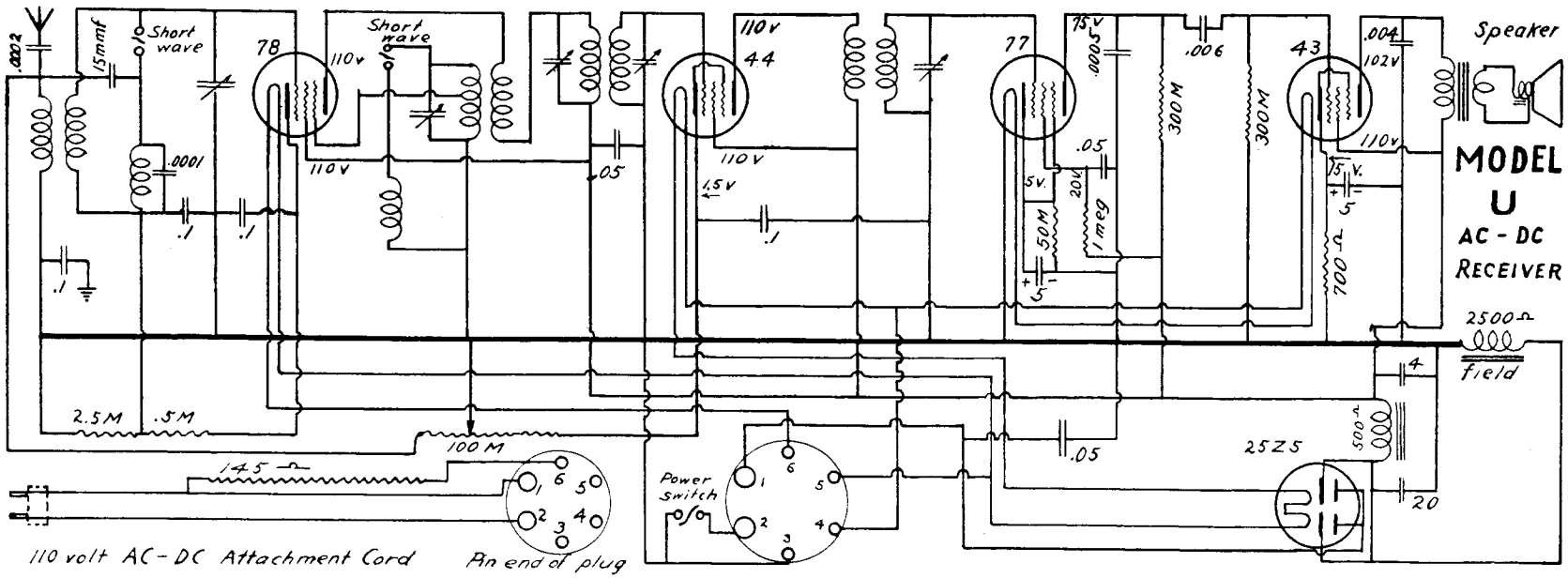
Balancing Intermediate Frequency Coils. These are peaked to 175 K. C. and are trimmed through the top of the tall cans by means of a small screwdriver and a 5-16" socket wrench. Chassis must first be removed from cabinet and signal from test oscillator fed into grid cap of the 6A7 tube.

Balancing R. F. Coils. The tuning control must first be attached to tuning condenser shaft with pointer set to 530 when tuning condenser is turned to maximum. Tune in a weak signal at its proper dial marking near 1400 and adjust first and second trimmers on variable from front of chassis for loudest signal. If signal does not come at proper dial setting carefully adjust rear trimmer on variable to shift signal to its proper location and then readjust first and second trimmers. After reinstalling set in car slightly readjust first trimmer through hole in top of cabinet.

Ignition Noise. Fouled plugs or plugs with improperly adjusted gaps will affect the operation of the set. Burned or improperly adjusted breaker points will also impair the performance. In some cases a .5 mfd. or 1 mfd. condenser connected from ammeter to car frame will be required. Also, in some installations using a roof antenna, a .5 mfd. condenser connected from car frame to dome lamp lead at point where it leaves bulkhead will be required.

Tubes should be tested at regular periods and replaced if necessary in order to maintain best performance. Each tube may be checked by comparison with a new one of the same type in its place.

"B" Power Supply should require little or no attention. A full wave vibrator in connection with the primary of a transformer and the 6-volt storage battery furnishes the means of obtaining the proper "B" voltage. With the power turned on a slight buzz should be heard which indicates proper operation of vibrator. Failure to observe this buzz, accompanied by repeated fuse burnout, will denote a faulty condition, in which case the complete set should be taken to the dealer for inspection.



OPERATING INSTRUCTIONS

Model U Long and Short Waye

CAUTION:

This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost, for operating this receiver on automobiles, 32 volt farm light plants and 220 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out along the floor or hung outside a window and is ordinarily all the aerial required. No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to a radiator or other ground connection or to an outside aerial.

TO OPERATE:

Turn left hand knob to right as far as it will go. Wait a few moments for tubes to heat. Turn right hand knob slowly back and forth till a station is heard. Numbers on the dial correspond to kilocycle of station when one zero is added. Adjust this knob carefully to secure best tone and adjust left hand knob to volume desired. When left knob is turned entirely to left a click is heard and power is turned off. When operating on D. C. current and set fails to operate after waiting a reasonable time for tubes to heat up, reverse power supply plug.

TO RECEIVE SHORT WAVES:

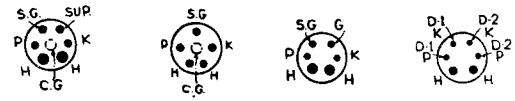
Push handle of switch in rear toward end of cabinet for short wave position. Local police calls, etc., will then be heard at approximately 65 and 100 on the dial, and amateurs, etc., at various other positions. Often local conditions make short wave reception difficult unless the aerial wire is grounded or attached to outside aerial. Reception of short wave requires a good aerial and more careful adjustment of both knobs than is necessary on the broadcast band.

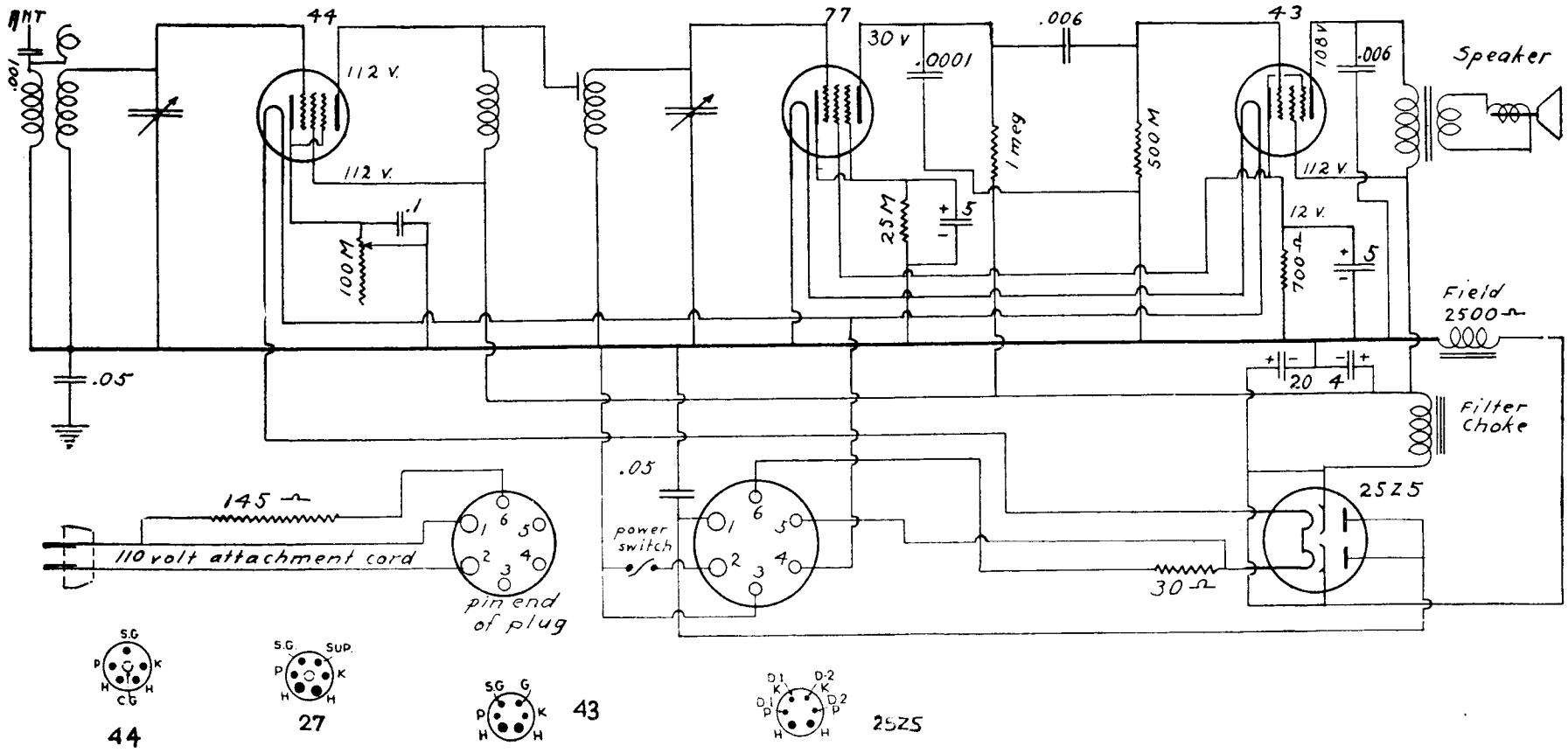
PHONOGRAPH:

Trace wire from cap of tube in left rear socket to where it solders to bracket in chassis. Note that a black wire connects between the adjacent bracket and chassis. Disconnect black wire at the bracket, inserting small single pole switch between wire and bracket. Solder phonograph pick-up leads to switch terminals.

TO REMOVE SET FROM CABINET:

Disconnect from power supply, pull off knobs, remove back, and unscrew the four felt-headed screws on bottom of cabinet.





ALLIED RADIO CORP.

MODEL V-F 9525-27

SERVICE NOTES:

To remove set from cabinet, disconnect from power supply, remove knobs, remove back if compact model, and unscrew the four felt headed screws on bottom of cabinet.

To balance set remove from cabinet, turn tuning condenser plates completely out, attach a test oscillator delivering 1712 K. C. to antenna of set and adjust trimmers on tuning condenser to loudest signal. Change test oscillator signal to 1400 K. C., turn tuning condenser until signal is tuned in and check trimmers again without moving tuning condenser.

If used in automobiles antenna stage should be trimmed to the car antenna at time of installation.

CAUTION:

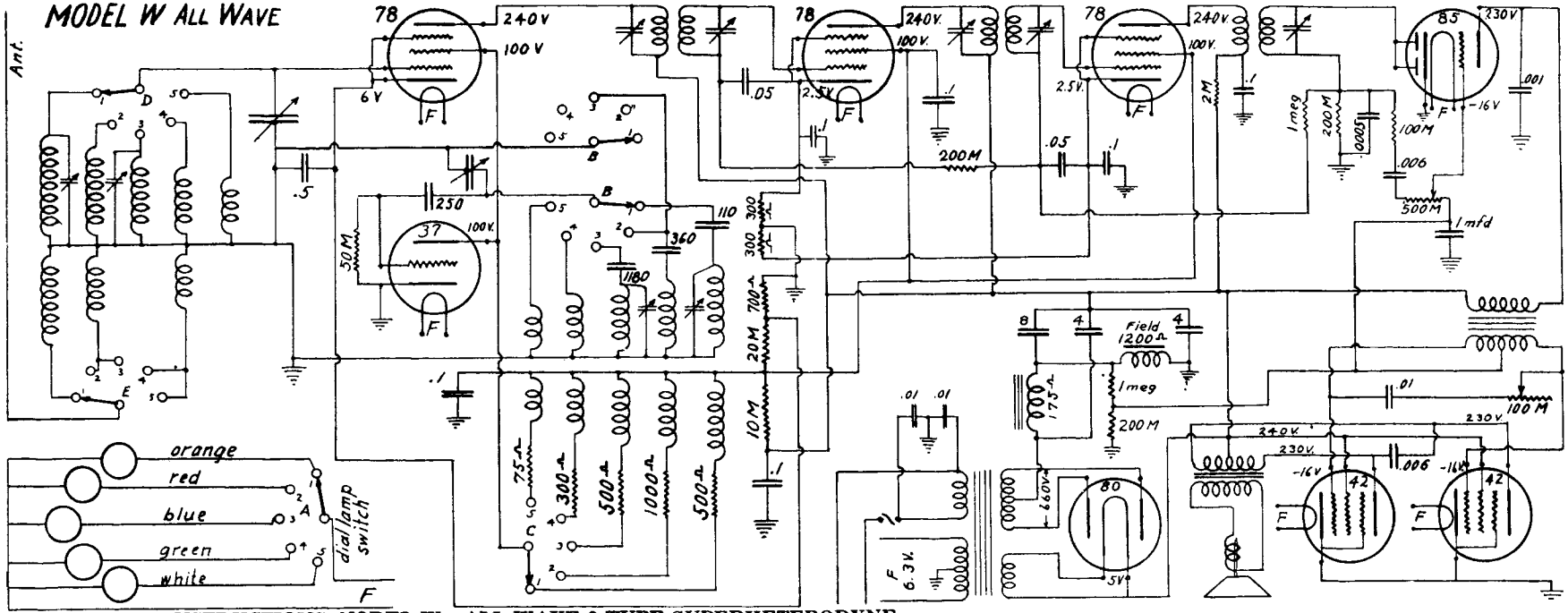
This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost, for operating this receiver on automobiles, 32 volt farm light plants and 200 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately, as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out along the floor or hung outside a window and is ordinarily all the aerial required. No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to a radiator or other ground connection or to an outside aerial.

PHONOGRAPH:

Connect pick-up leads to single pole toggle switch, which may be mounted in large hole in rear flange of set. Unsolder black wire and 5 mfd condenser from ground lug of coil on under side of chassis and resolder to one side of toggle switch. Solder other side of switch to ground lug of coil.

ALLIED RADIO CORP.

MODEL W - F9761-67



OPERATING INSTRUCTIONS MODEL W—ALL WAVE 8-TUBE SUPERHETERODYNE

CAUTION: Do not attempt to operate on current other than that noted on the instrument.

INSTALLATION:

The built-in aerial at the back of the set usually gives satisfactory sensitivity when stretched around the edge of the floor or along the picture moulding of the room. A good outside aerial connected to the built-in aerial sometimes increases sensitivity. Power noise interferes especially with short-wave reception. If set is located where power noise is prevalent it may be necessary to install an aerial high above the street and use a "transposition" lead-in to the set. Any radio dealer can supply such an aerial kit with full instructions for installing.

CONTROL KNOBS:

The lower middle knob is for selecting the various frequency bands as indicated on the dial. The upper middle knob is tuning control. The right-hand knob is power switch and volume control and the left-hand knob is tone control.

PHONOGRAPH:

Mount a single pole toggle switch and two insulated pin jacks in the rear of the chassis near the tube socket marked "85," connect one side of the switch to one pin jack, the remaining pin jack to one outside terminal of the volume control and the remaining switch terminal to the other outside terminal of the volume control. Plug the phonograph pickup leads into the pin jacks.

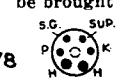
SERVICE NOTES:

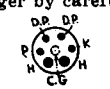
The intermediate stages are carefully phased to 456 kilocycles at the factory. Should rephasing be necessary, feed a 456 kilocycle signal from a test oscillator to the grid cap of the tube marked "78," located at the rear end of the tuning condenser, then adjust the double trimmers in the top of the coil cans nearest this tube, also the single trimmer in the top of the coil can near the "85" tube, to loudest volume, being sure to keep the oscillator signal at a low volume level. In trimming the frequency bands, first set the dial to the third group of figures from the right-hand end. Trim the "red" band first by adjusting the trimmers on the top of the tuning condenser until a signal of the proper frequency applied to the built-in aerial is heard at its loudest. Next, trim the "orange" band by adjusting the three-plate trimmers, located on the underside of the chassis, to loudest volume with proper signal frequency applied to the antenna. Next, trim the "blue" band by adjusting the two-plate trimmers located adjacent to the three-plate trimmers, to loudest volume with the proper signal frequency applied to the antenna. In trimming the various bands be sure that the band switch is set to the proper band as indicated by the color of the dial lamp. Also, keep the oscillator signal to as low volume level as possible for accuracy.

NOTE: Should it be necessary to write to the factory for parts or information, always give the serial number of the set as stamped on the back of the chassis.

SHORT WAVE TIPS:

In listening for short-wave broadcast DON'T forget to consider the difference in time between the location of the broadcaster and the receiver. DON'T expect to hear a station because it is on the air, as many things govern short-wave reception. DON'T get discouraged if reception is poor one night; it may be fine the next. DON'T expect stations to tune broadly; most stations tune sharply. DON'T tune below 10,000 kilocycles (above 30 meters) for distant stations in daylight. DON'T tune above 12,000 kilocycles (below 25 meters) for distant stations after dark. DON'T expect to find stations on all parts of the dial. Short-wave stations are widely separated, except in a few instances. DON'T skim over the dial. It requires some knowledge of tuning to get good results. Tune very slowly. DON'T pass up any weak signal, as it may often be brought in stronger by careful tuning.

78 

85 

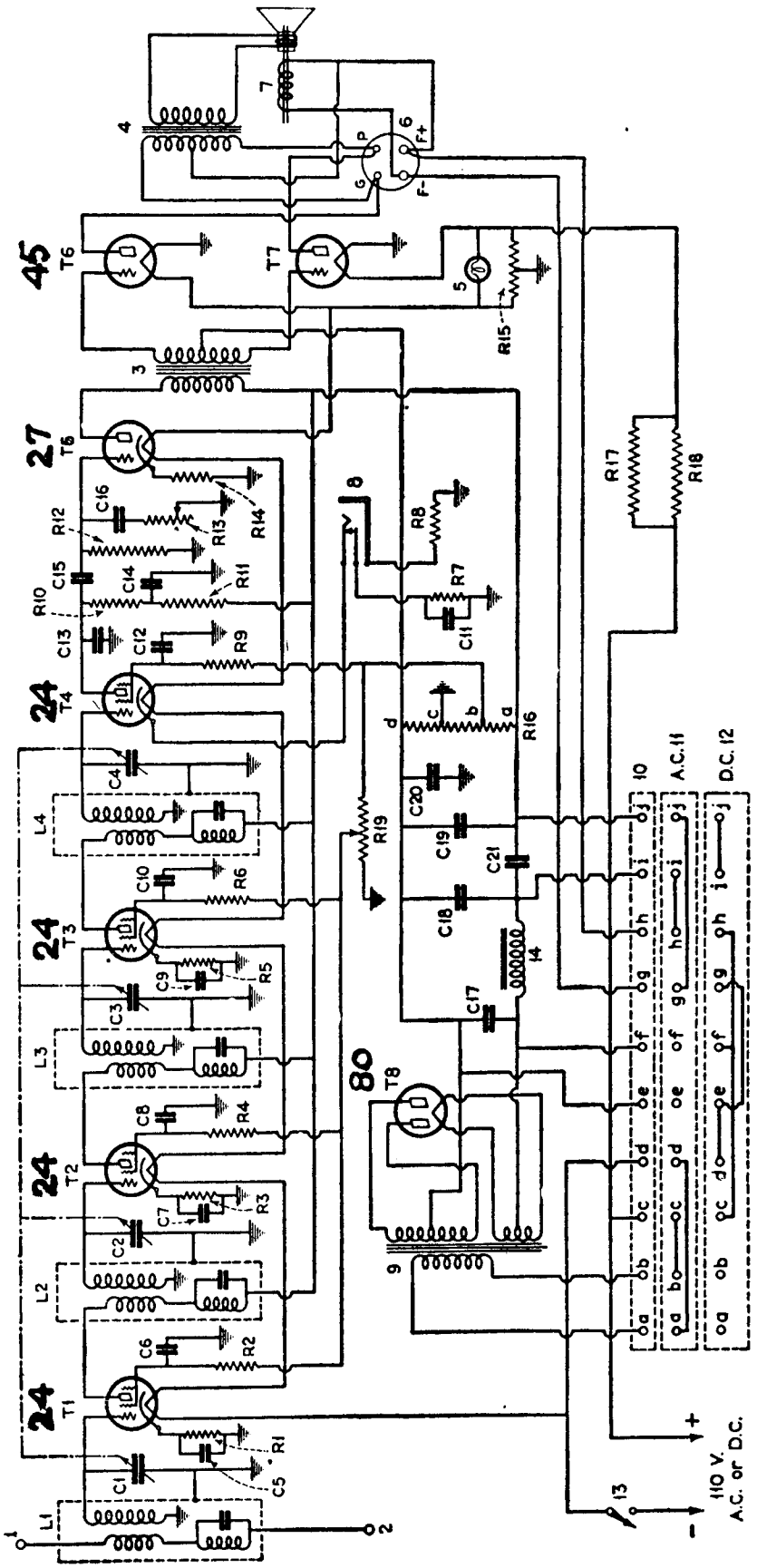
80

42

37

ANSLEY RADIO CORP.

MODEL V-1



Parts List

C1, C2, C3, C4—Four-section gang condenser, .00035 mfd. each section, with dial and dial light (5)

C5, C6, C7, C8, C9, C10, C11, C12, C14, C20, C21—By-pass condenser block (15) including the following capacities, respectively, .1 mfd., .1 mfd., .1 mfd., .1 mfd., .1 mfd., .1 mfd., .1 mfd., .25 mfd., 1 mfd., 1 mfd., .25 mfd.

C17, C18, C19—Dry electrolytic condenser block with capacities, respectively, of 4 mfd., 8 mfd. and 2 mfd.

L1, L2, L3, L4—R.F. coil assembly, mounted in shields on a common base

R1, R3, R5, R8—Flexible wire-wound resistors, 1000 ohms each

R2, R4, R6, R7, R11, R12, C13, C15, C16—Resistor-condenser assembly with resistance and capacity values of, respectively, 20,000 ohms, 20,000 ohms, 20,000 ohms, 10,000 ohms, 50,000 ohms, 500,000 ohms and .001 mfd., .006 mfd. and .006 mfd.

R13—Tohe control resistor, 200,000 ohms.

R14—Flexible resistor, 1500 ohms.

R15—Wire-wound resistor, 20 ohms, center-tapped

R16—Tapped voltage divider, 8000 ohms

R17, R18—Enameled resistors, 110 ohms, 200-watt rating.

R19—Volume control resistor, 25,000 ohms, with switch (13)

Dynamic speaker, 2500-ohm field, with built-in push-pull output transformer (4)

24

27

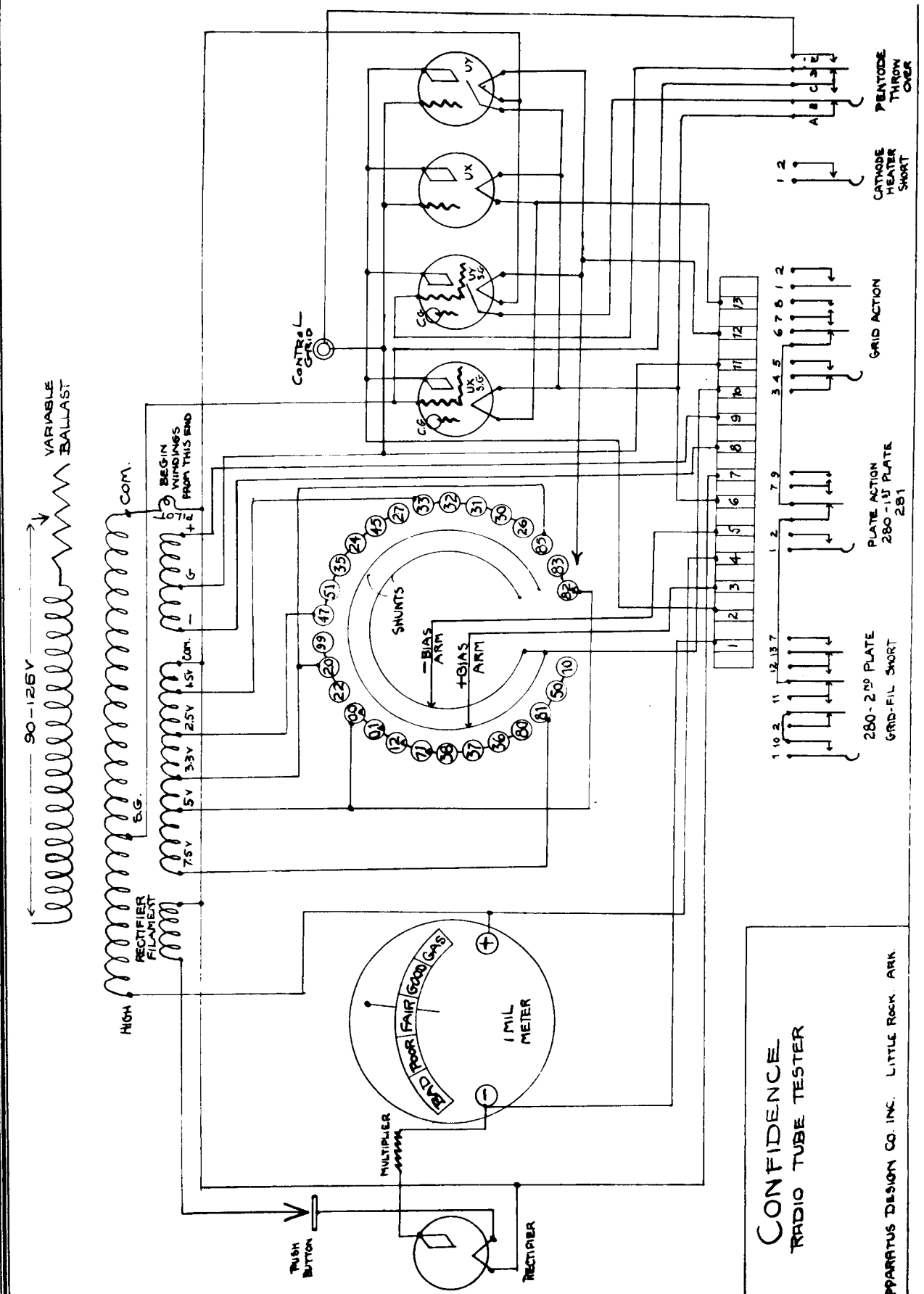
45

80

Trouble Shooting Hints

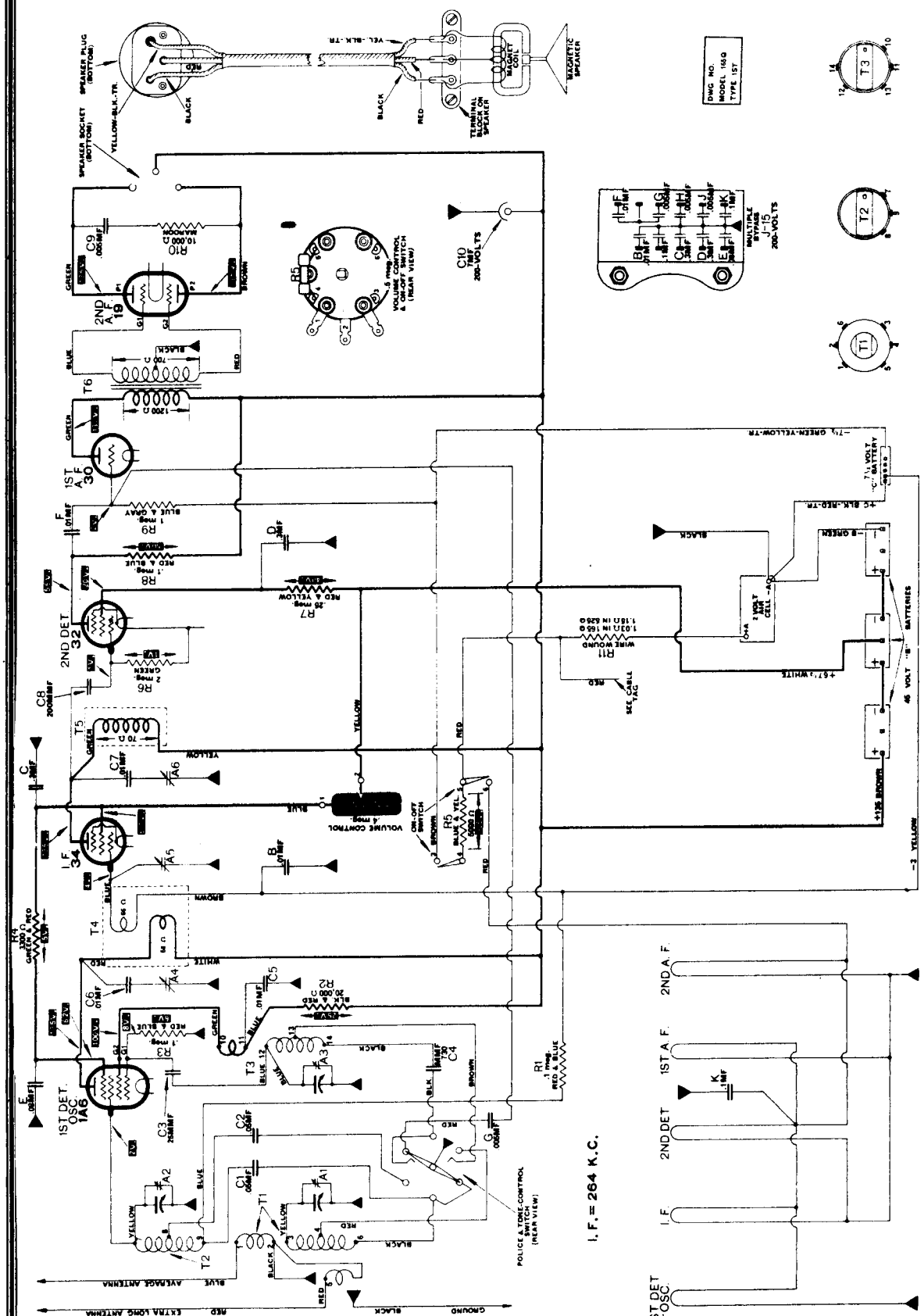
When this set is used on the 110 volt A. C. line, the most common cause of trouble is broken down electrolytic condensers in the filter circuit. These should be checked by replacing them with new units. On D. C. the usual cause for trouble is open wiring in the power connector strip.

APPARATUS DESIGN CO.



ATWATER KENT MFG. CO.

MODELS 165Q & 525Q

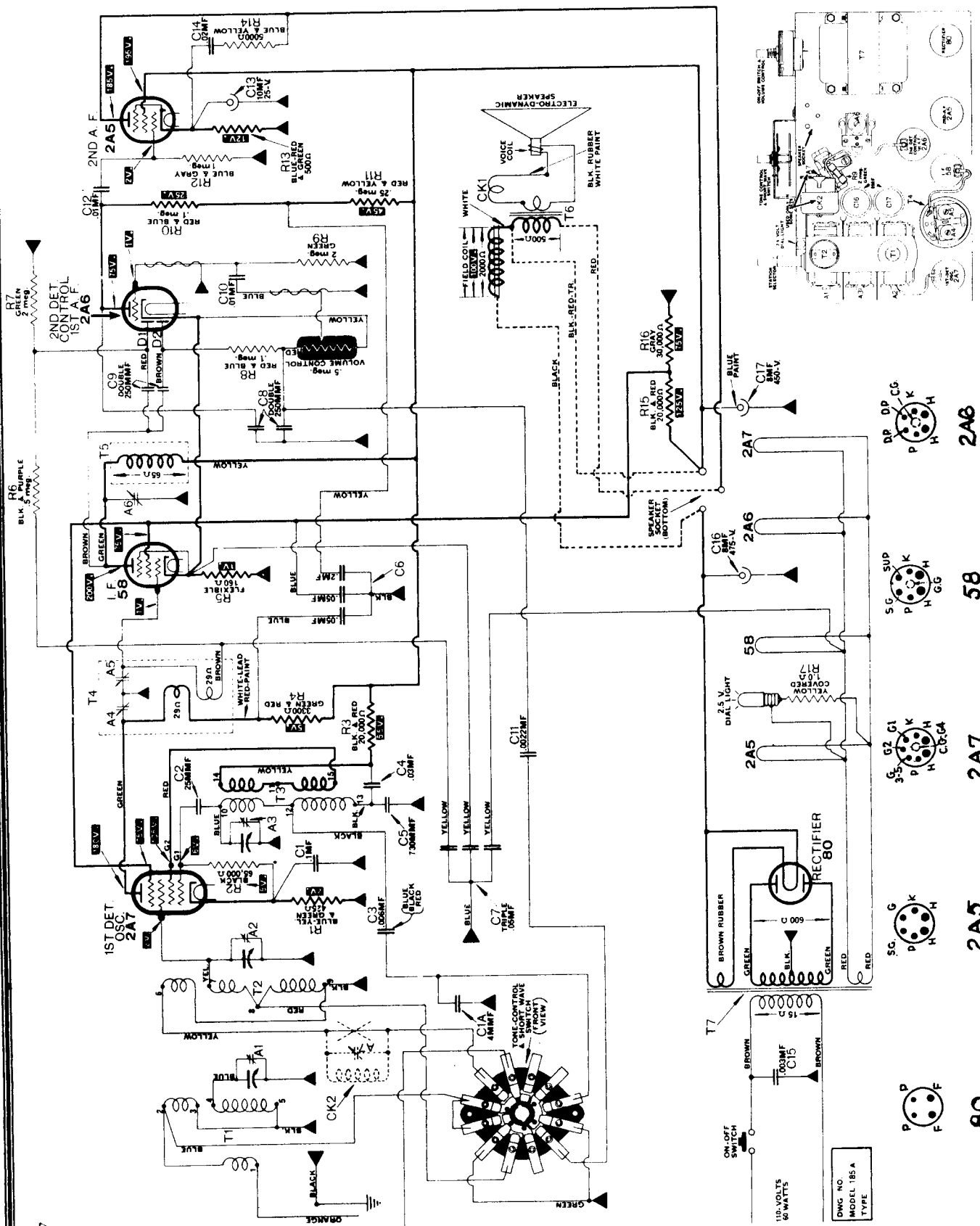


Trouble Shooting Hints

Rattling in the speaker of this set is usually caused by the armature rubbing against the pole-pieces of the electro magnet motor unit. The armature and cone must be centered, by the use of shims and an adjusting wrench to eliminate the rattle.

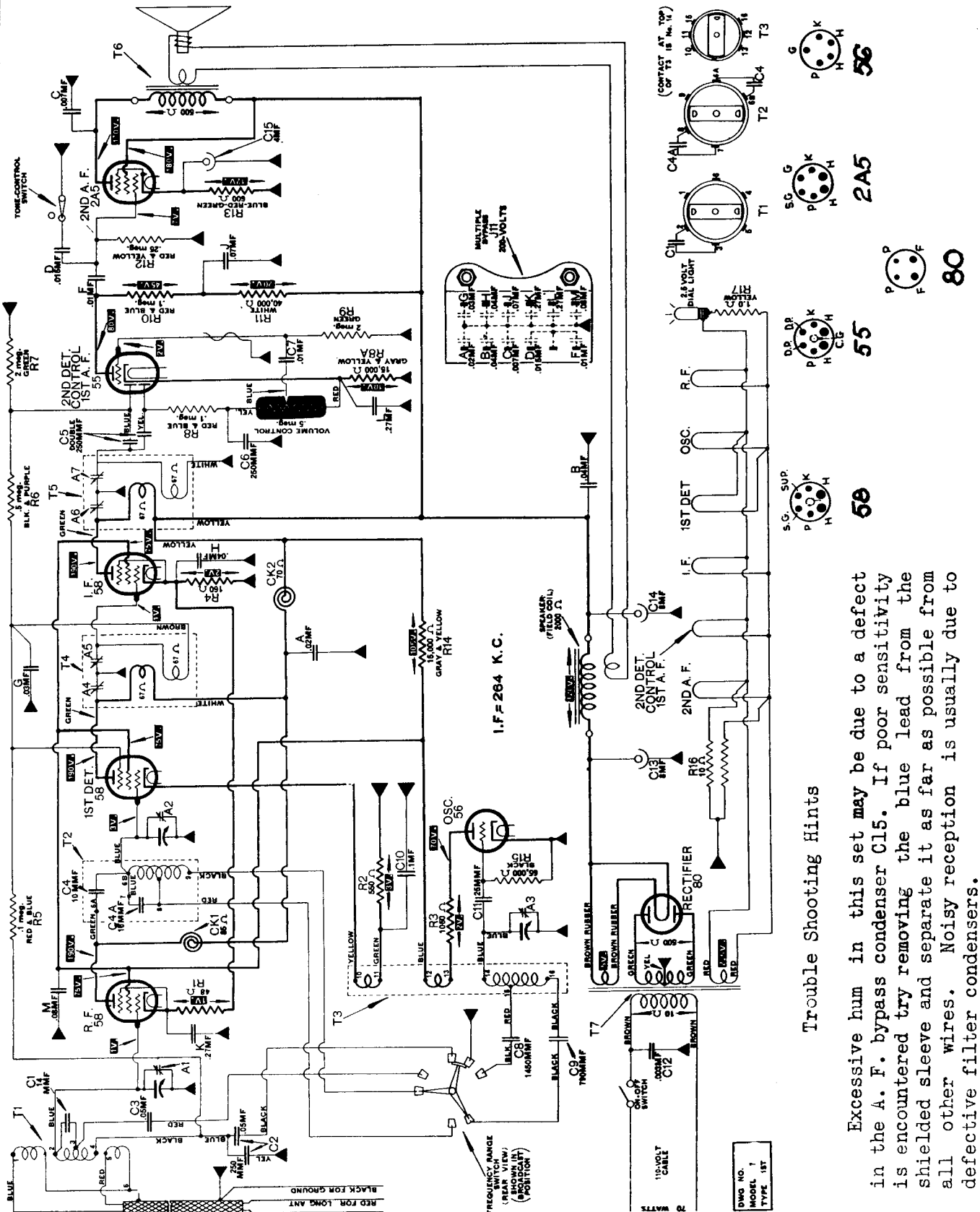
ATWATER KENT MFG. CO.

MODEL 185 A



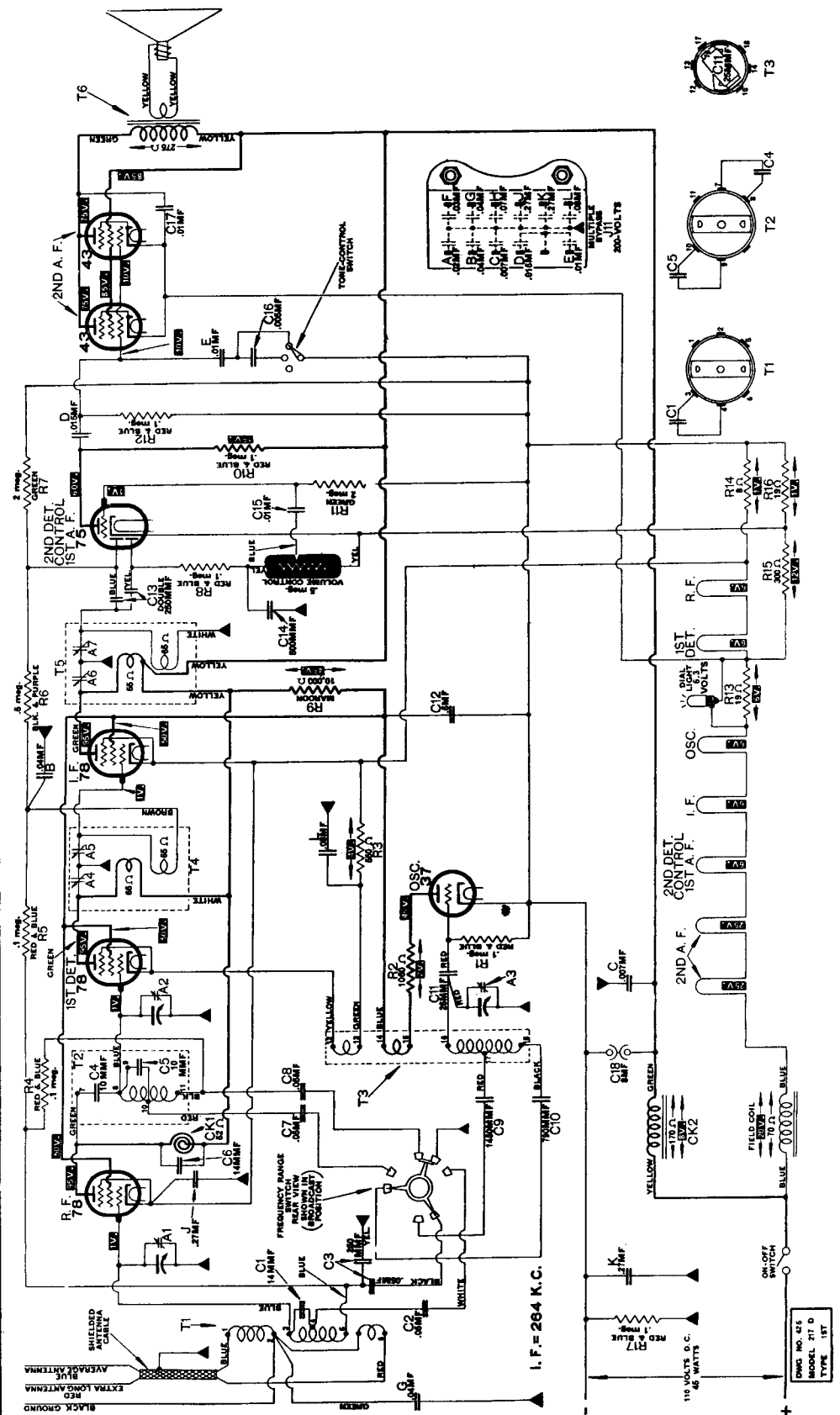
ATWATER KENT MFG. CO.

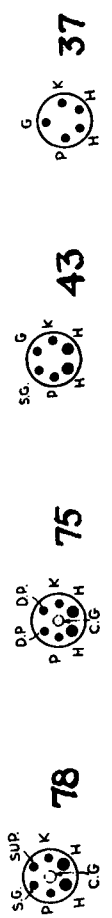
MODELS 217-427 & 667



ATWATER KENT MFG. CO.

MODELS 217D, 427D & 667D





VOLTAGES

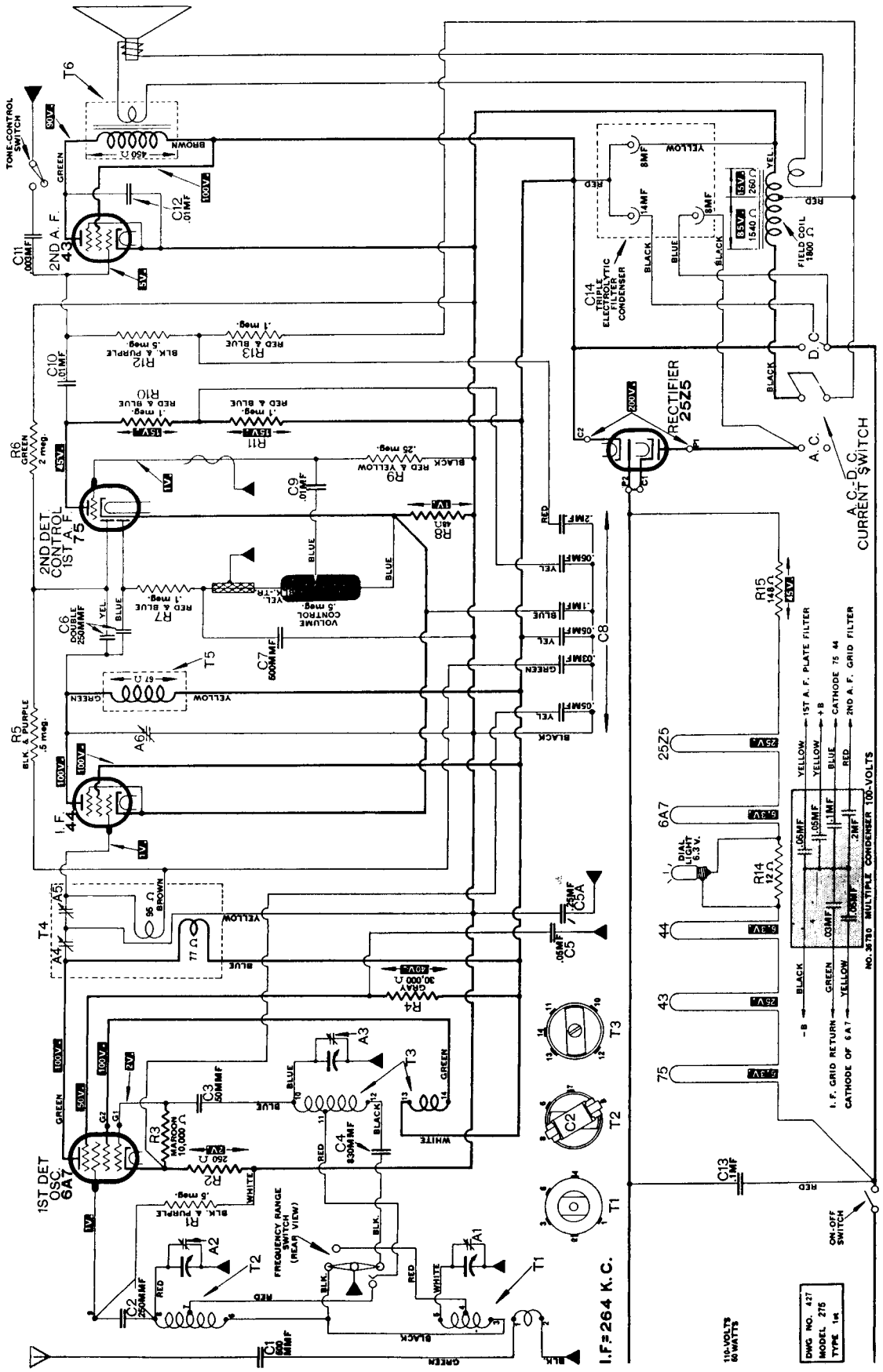
	PLATE	S.G.	C.G.	HEATER
R.F. =	95V.	50V.	1V.	6.3V.
DET.1 =	95V.	50V.	1V.	6.3V.
IF =	95V	50V.	1V.	6.3V.
DET.2 & A.F.1.) =	60V.	—	1V.	6.3V.
AF.2 =	75V.	8.5V	10V.	2.5V.
OSC. =	45V.	—	—	6.3V.

Trouble Shooting Hints

A common cause for trouble in this set is a defect of the condensers in the multiple by-pass unit, J11. If one or more of the condensers in this unit become open-circuited or shorted, it is not necessary to replace the entire assembly as small tubular units can be fixed directly to the wire.

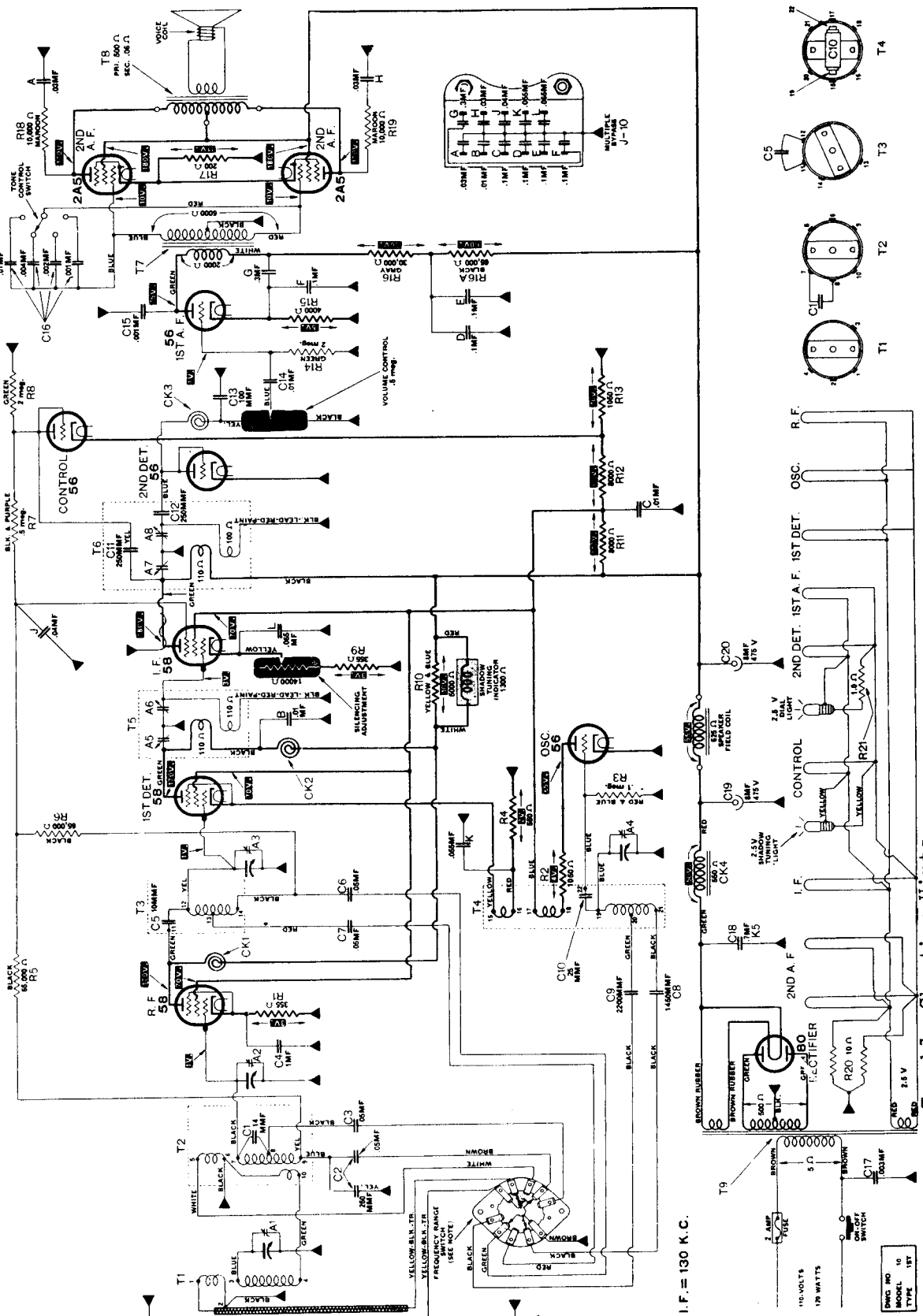
ATWATER KENT MFG. CO.

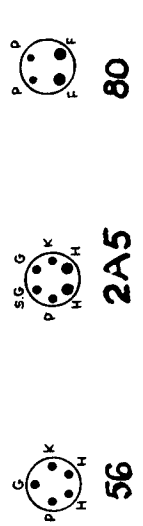
MODEL 275



ATWATER KENT MFG. CO.

MODELS 310 & 510





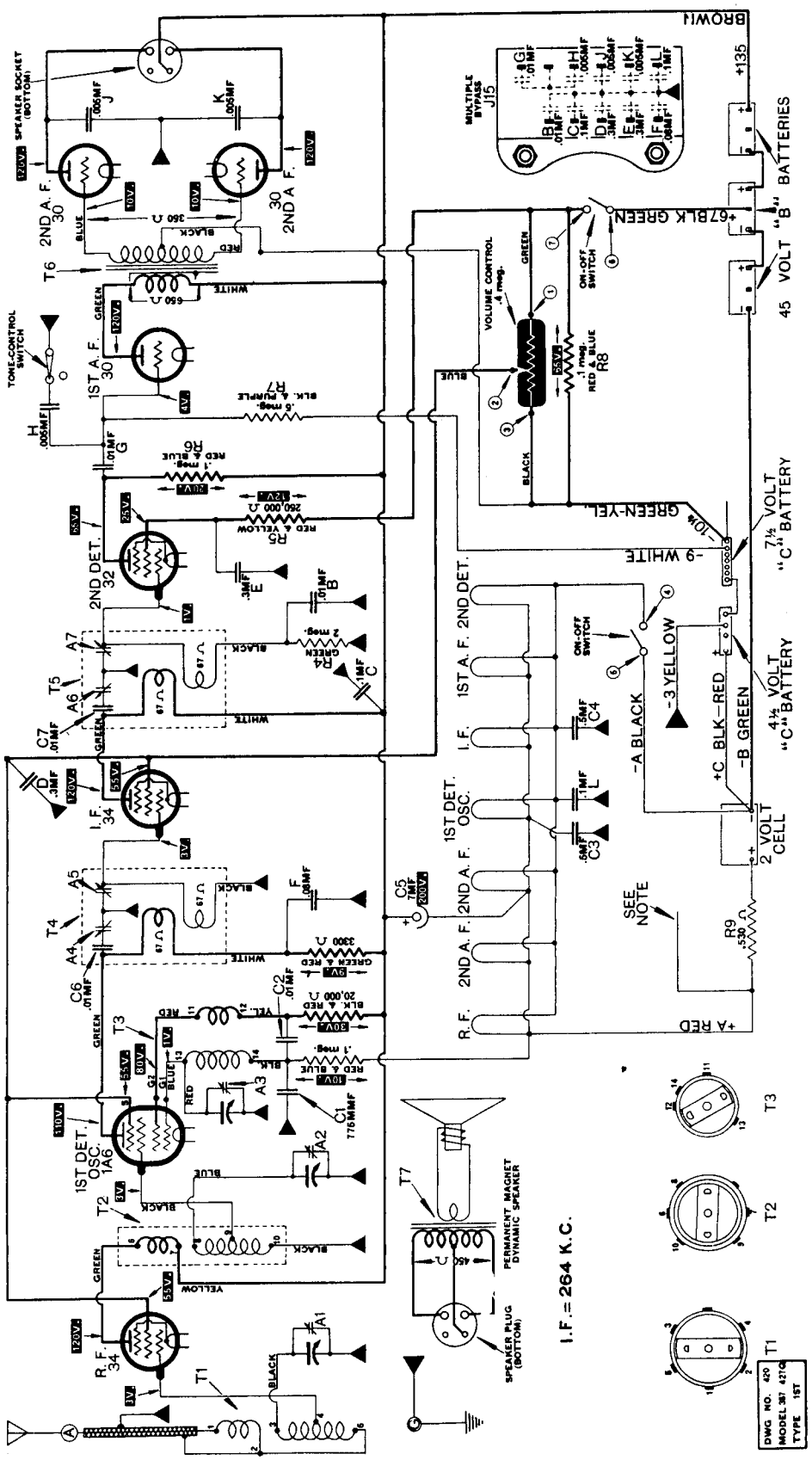
Trouble Shooting Hints

310

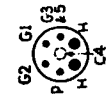
If the 2A5 tubes in this receiver are not matched fairly closely, audio oscillation may result. In this case, it is necessary either to replace the tubes, or remove the oscillation by reducing the screen voltage with a resulting loss in gain in the power stage.

ATWATER KENT MFG. CO.

MODELS 387 & 427Q



30



1A6

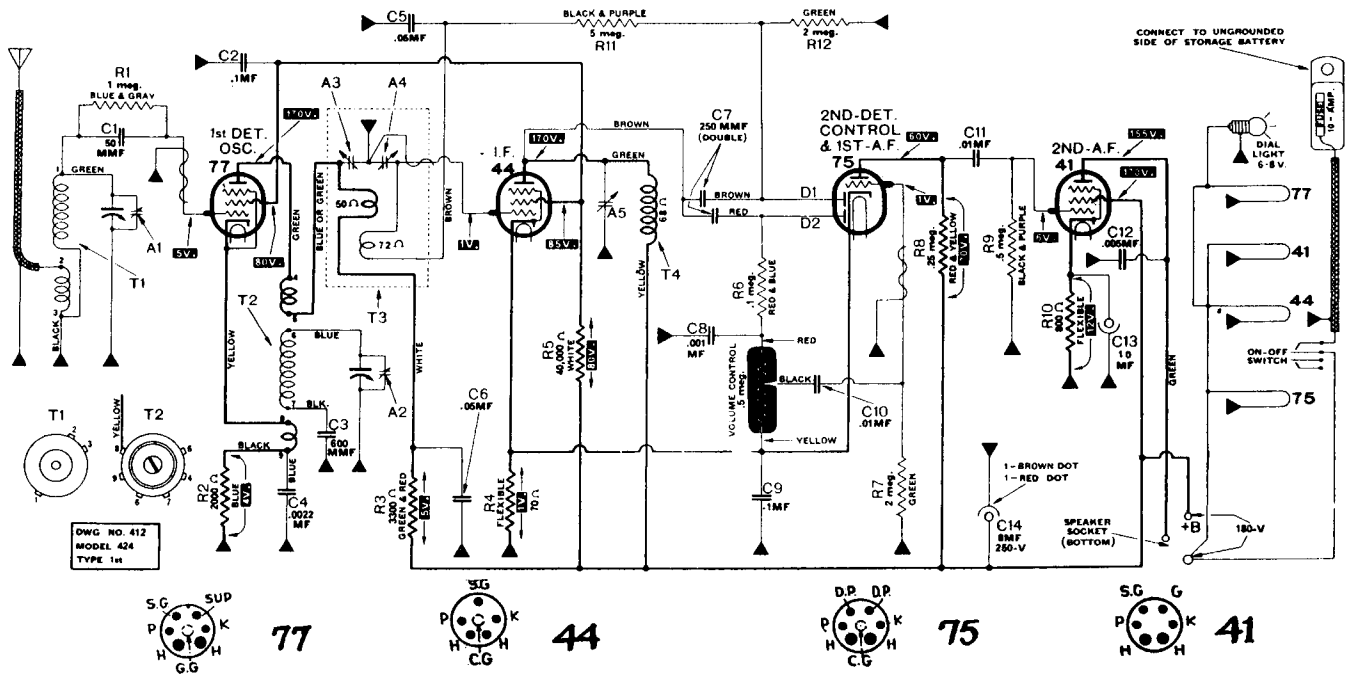
32 & 34

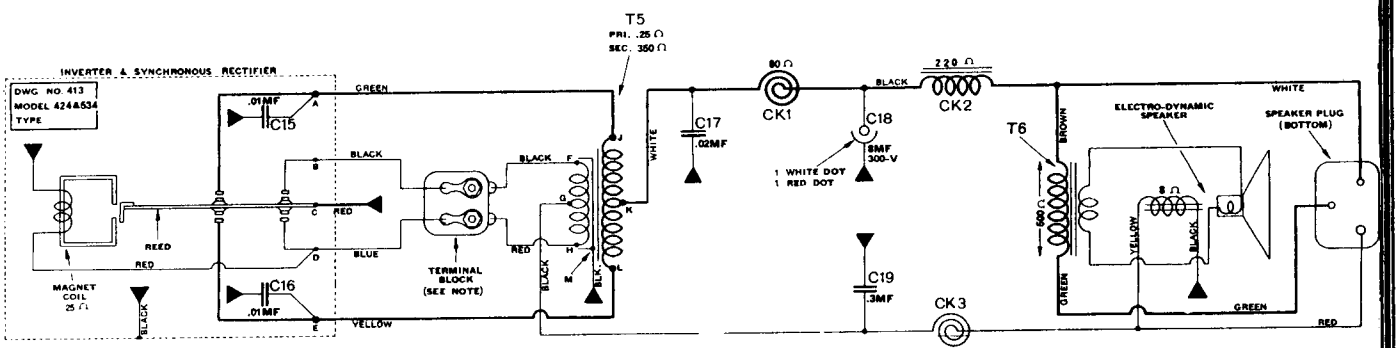
Trouble Shooting Hints

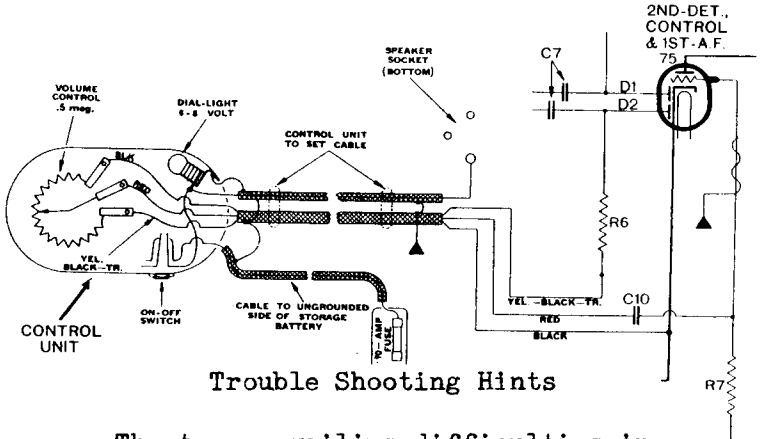
A sudden loss in sensitivity in this battery receiver is probably due to defects in the tubes, caused by a filament overload, when the "A" battery was replaced with a new one. If this set fails completely test the continuity of the volume control potentiometer which varies the screen potential on the R. F. translator and R. F. tubes.

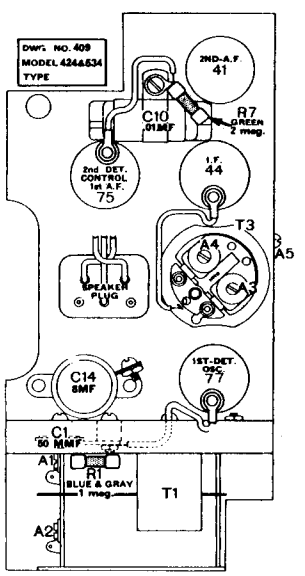
ATWATER KENT MFG. CO.

MODEL 424







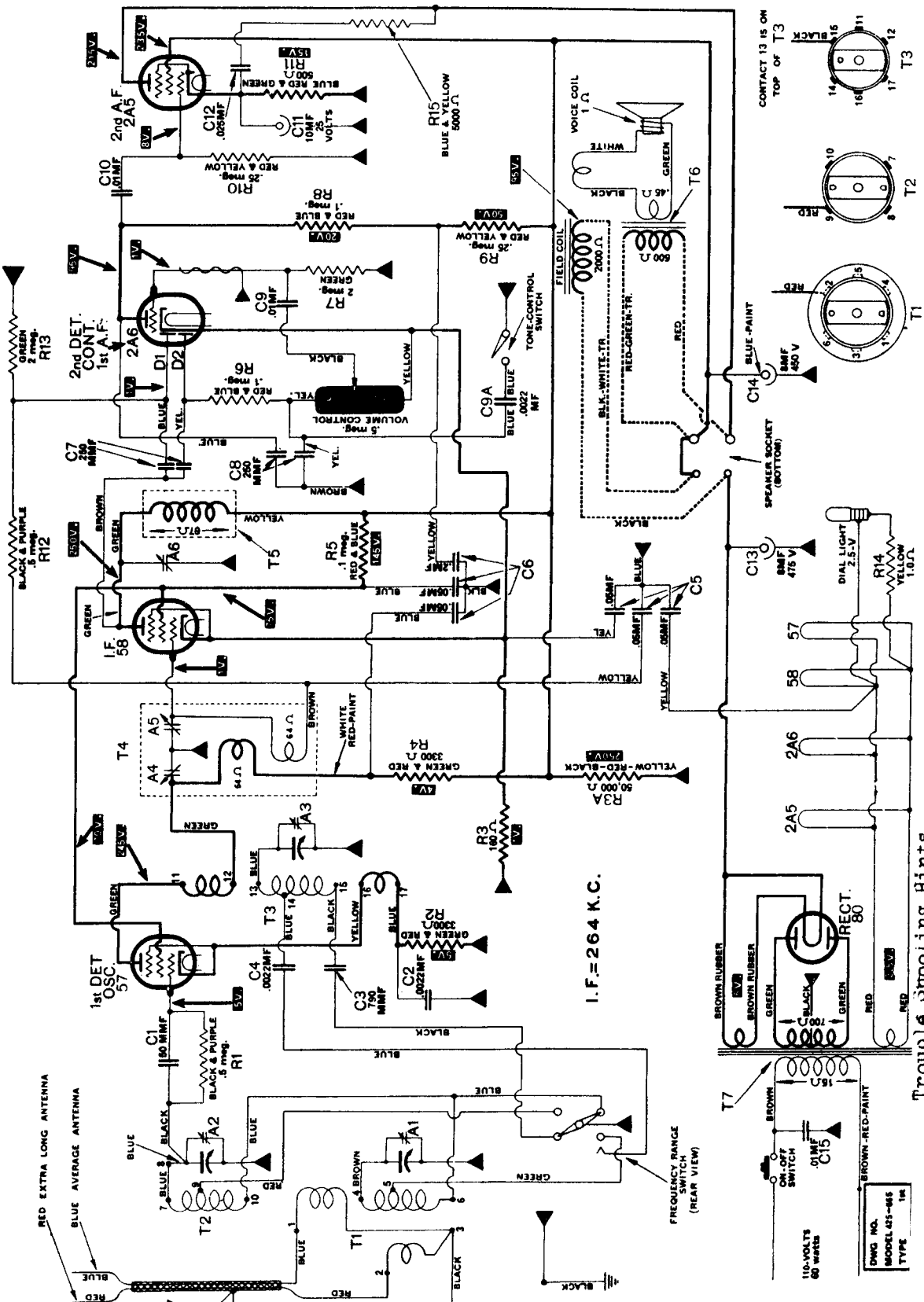


Trouble Shooting Hints

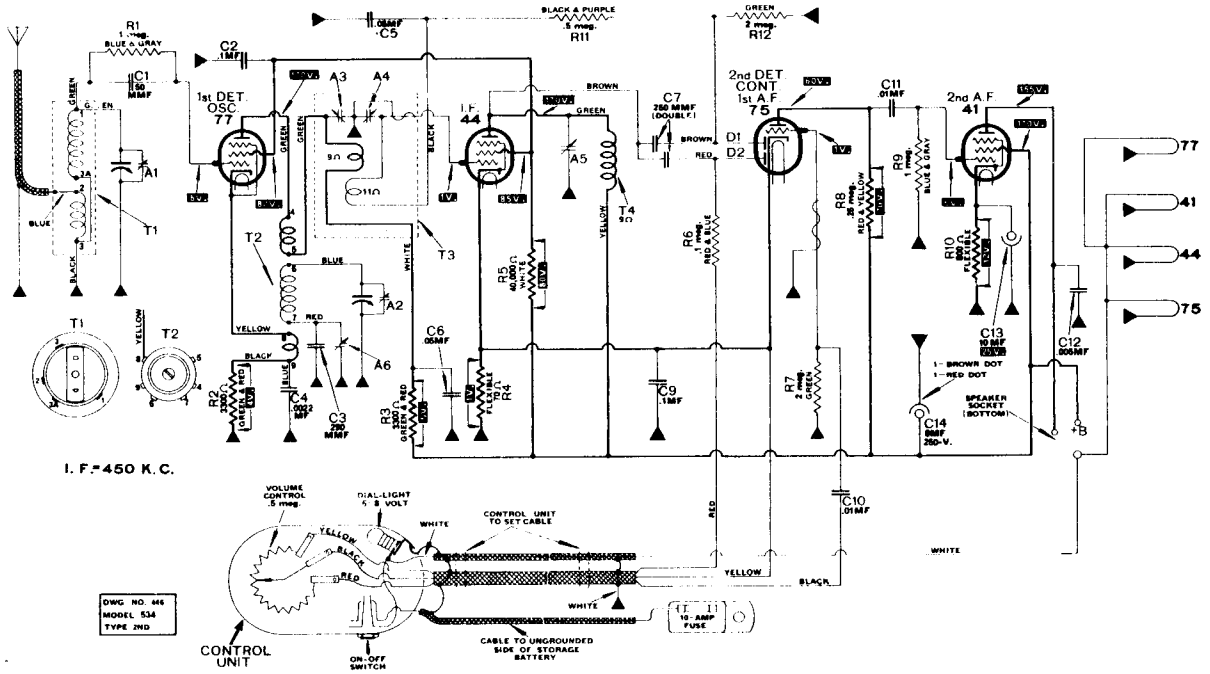
The two prevailing difficulties in this set are difficulties in the synchronous vibrator and lack of sensitivity. Replace the entire vibrator and check the shielded lead from the antenna to the set if the second defect is encountered.

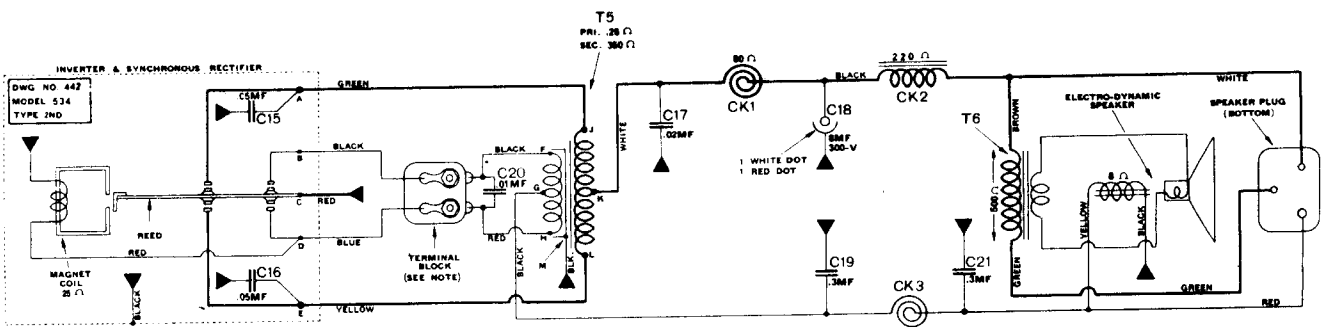
ATWATER KENT MFG. CO.

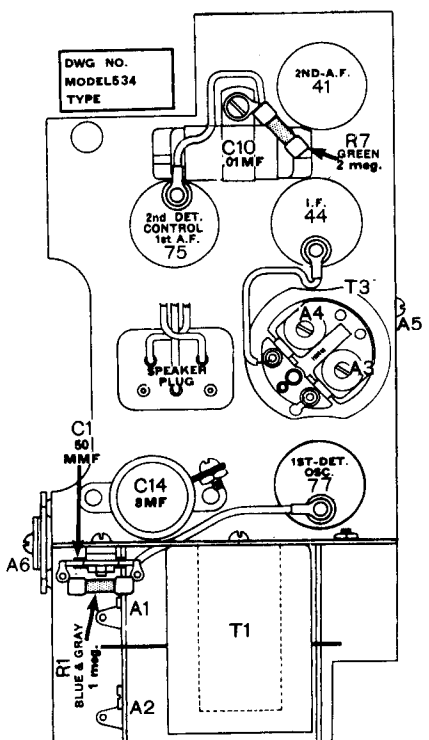
MODELS 425 & 665

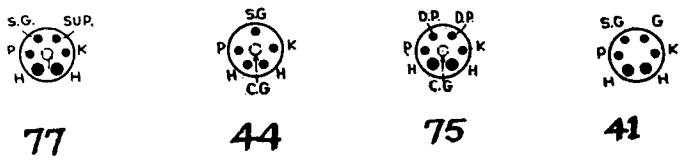


ATWATER KENT MFG. CO.
MODEL 534









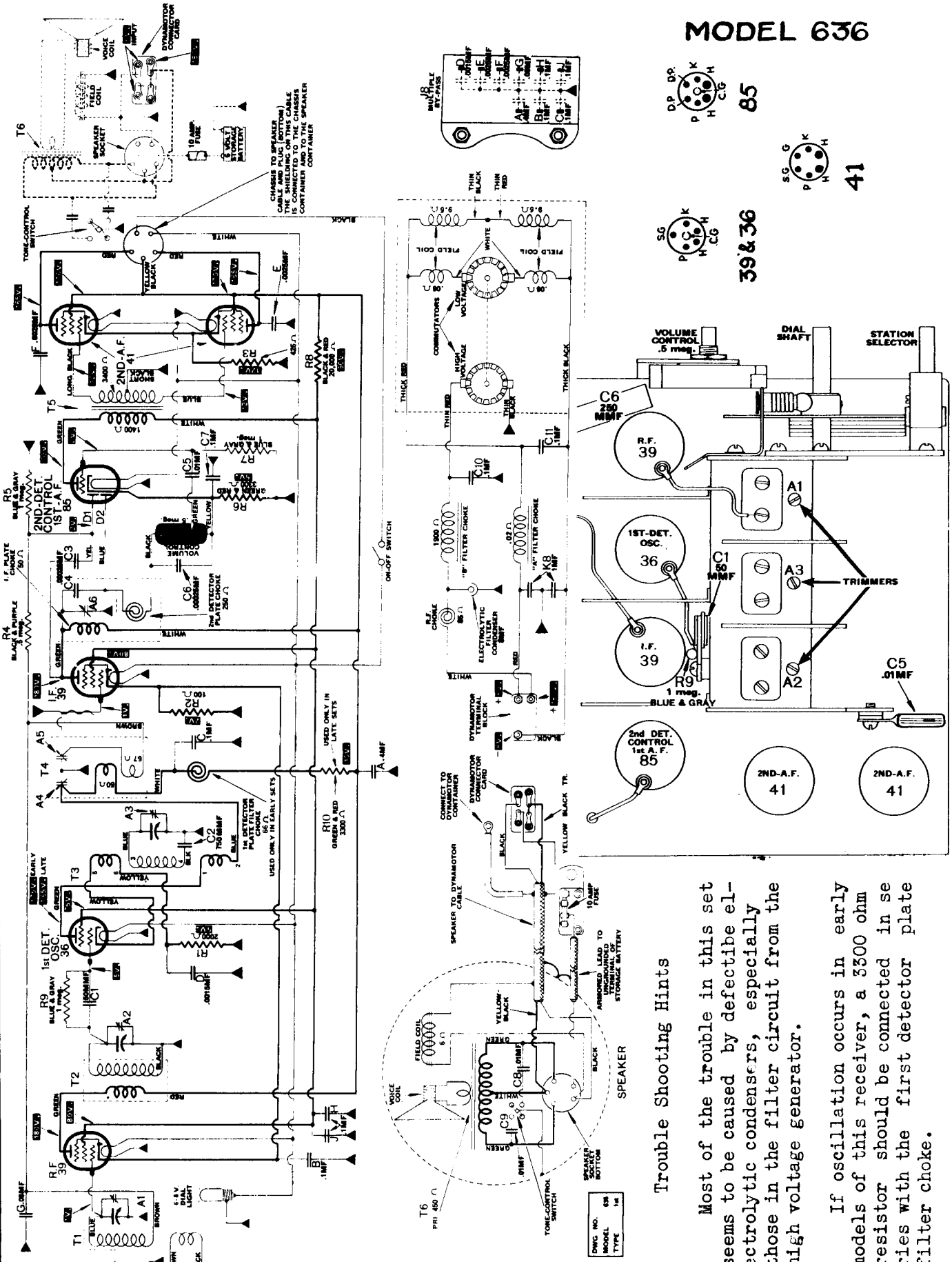
Trouble Shooting Hints

If this set oscillates, check the position of the twisted lead around the control grid of the 75 second detector and first A. F. tube. This twisted lead controls the feed back in this tube and should be adjusted until oscillation ceases. If this adjustment does not remove oscillation, the set is probably out of alignment and should be readjusted with a good service oscillator.

A number of service calls for this receiver have been necessitated by short circuits between the switch and the control unit and the leads from the volume control. The short usually occurs between the yellow lead and the live connection on the pilot light socket.

ATWATER KENT MFG. CO.

MODEL 636



Trouble Shooting Hints

Most of the trouble in this set seems to be caused by defectibe electrolytic condensers, especially those in the filter circuit from the high voltage generator.

If oscillation occurs in early models of this receiver, a 3300 ohm resistor should be connected in series with the first detector plate filter choke.

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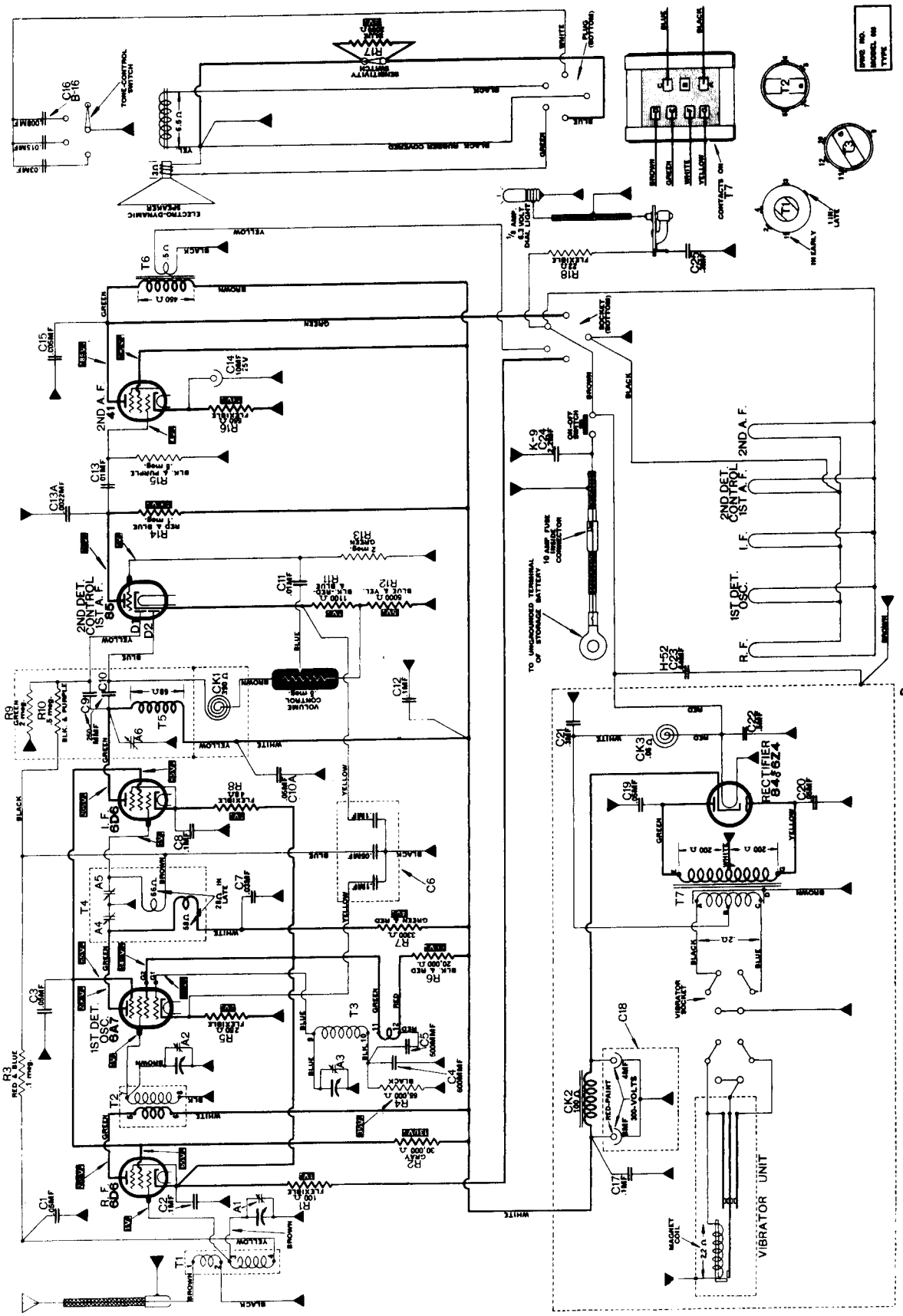
MODEL 666 MOTOR CAR

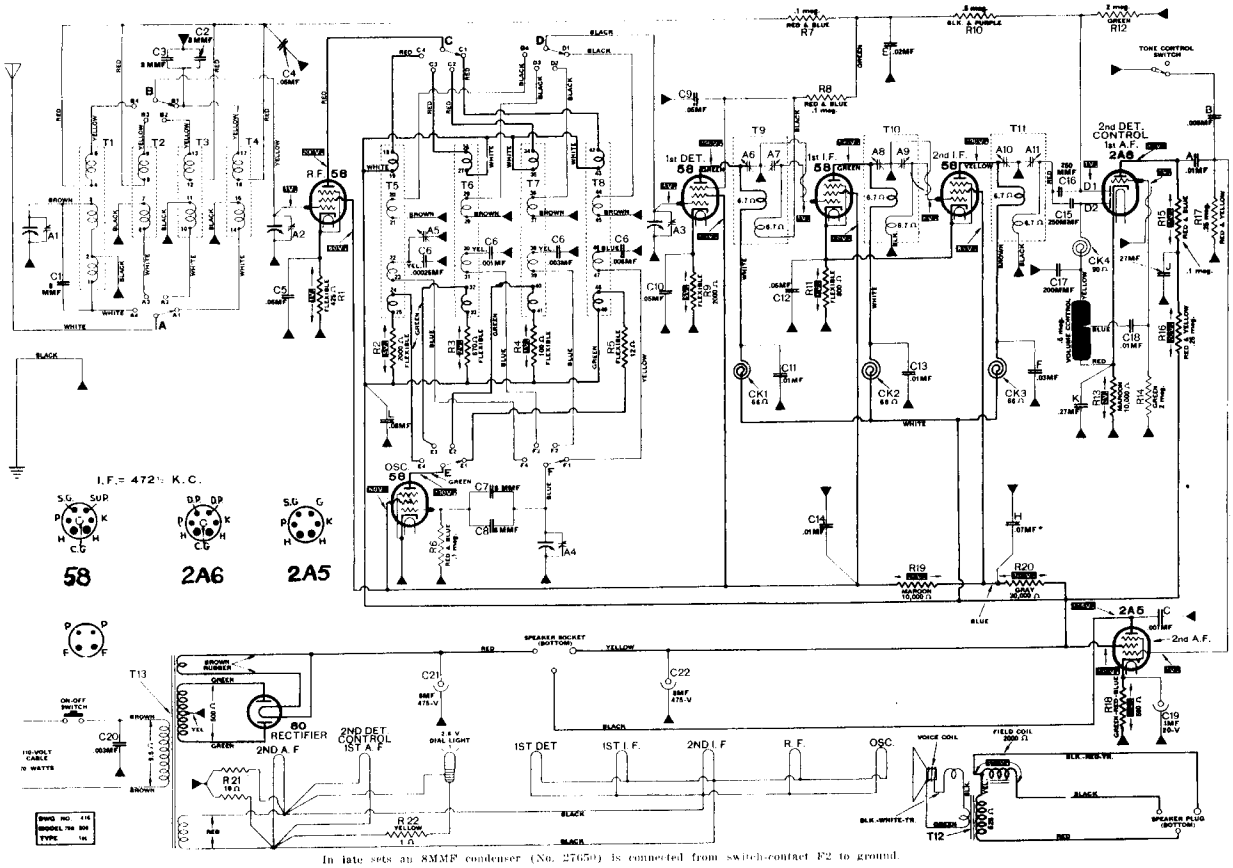


Trouble Shooting Hints

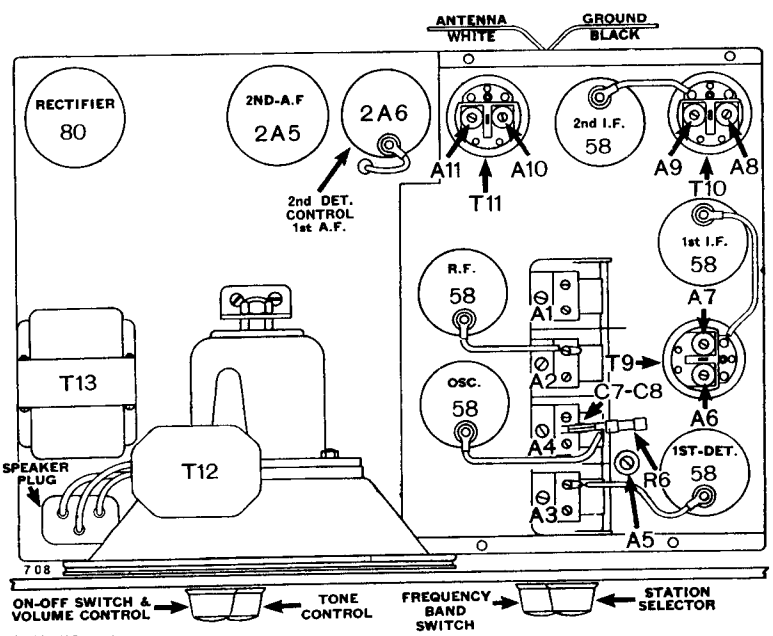
The vibrator in this set plugs into a socket in the power supply unit and is easily replaced **when the contacts become** pitted or stick-test 84 at the same time.

ATWATER KENT MFG. CO.

MODELS 708 & 808



In late sets an 8MMF condenser (No. 27650) is connected from switch-contact F2 to ground.



Voltages: Voltages are printed on the diagram of the set on page 3. Readings are made from the cathode of each tube with the 250-volt scale of a 1000-ohm-per-volt D. C. voltmeter, and a line supply of 110 volts. Readings are made with the set in operation, no antenna, with the dial turned to a quiet point, and with the frequency-range switch in the broadcast position.

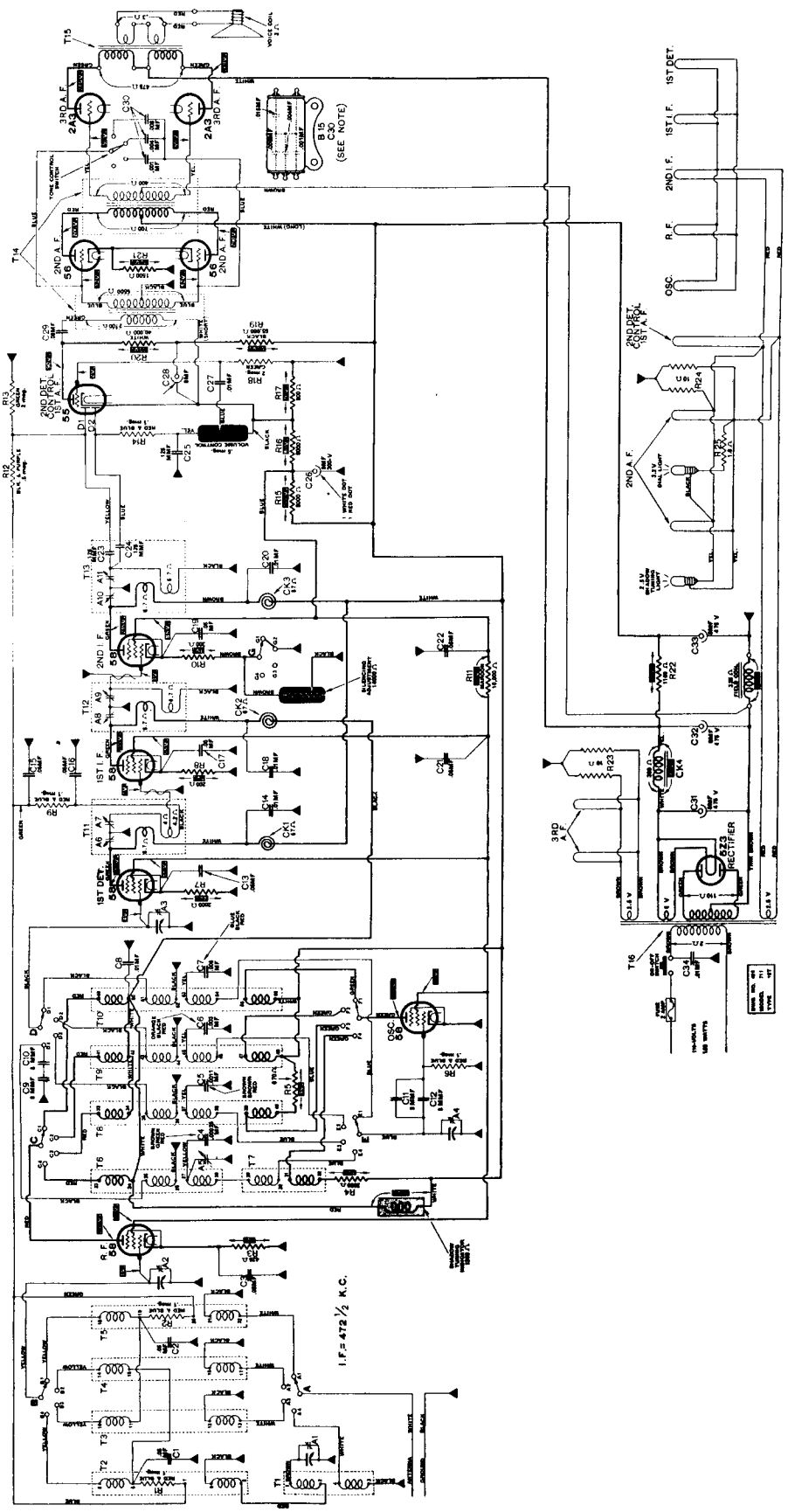
As the socket contacts of the R. F., 1st-detector, oscillator, and I. F. tubes are not accessible from the bottom for testing, we suggest use of a 58 tube with eight-inch leads soldered to the plate, screen, and cathode contacts. (Use green for plate, blue for screen, and yellow for cathode.) Insert this tube alternately in the different sockets and measure the voltages by making contact to the leads with the voltmeter prongs.

Trouble Shooting Hints

If this set does not work on one or more of the wave bands, resolder all connection to the wave-change switch and test the continuity of each circuit.

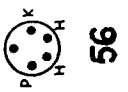
ATWATER KENT MFG. CO.

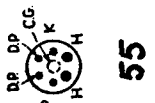
MODEL 711



Trouble Shooting Hints

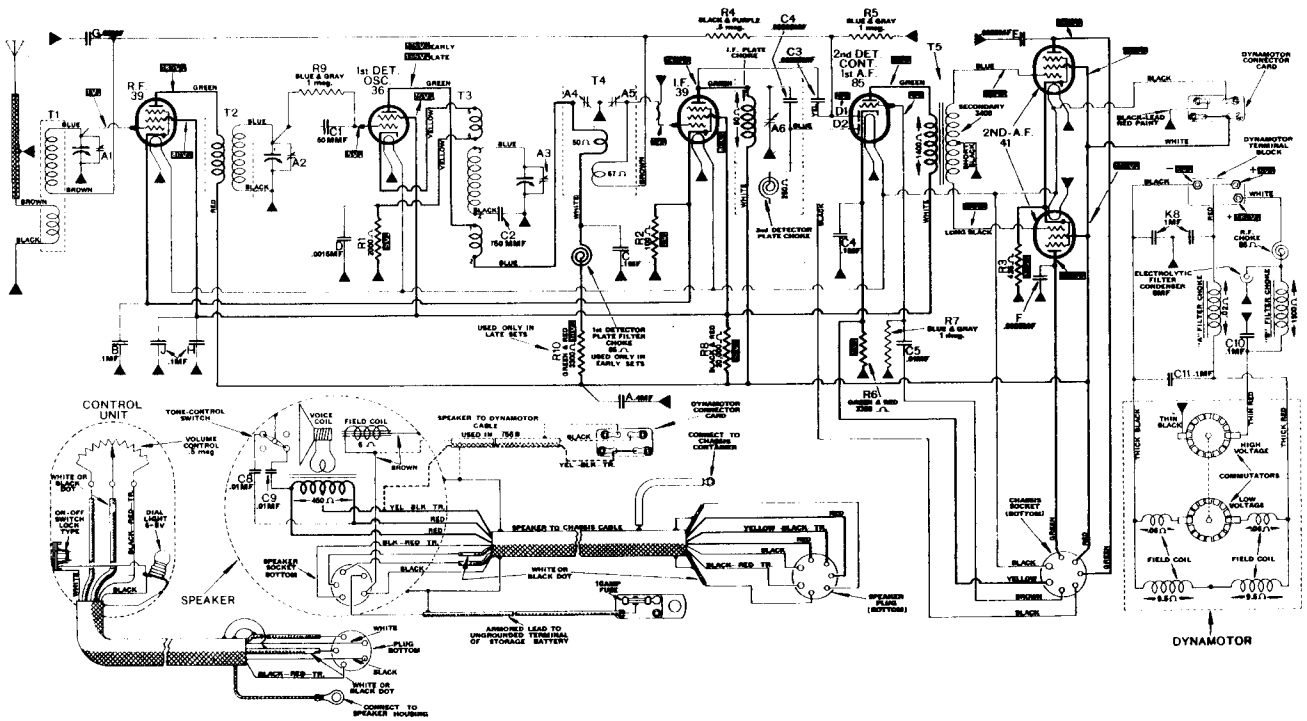
The usual causes for trouble in this set are defective tubes, defects in the wave-change switch and defective condensers in the order mentioned. A number of cases have been recorded of defects in the silencing adjustment resistor.

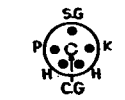




ATWATER KENT MFG. CO.

MODEL 756 & 756 B

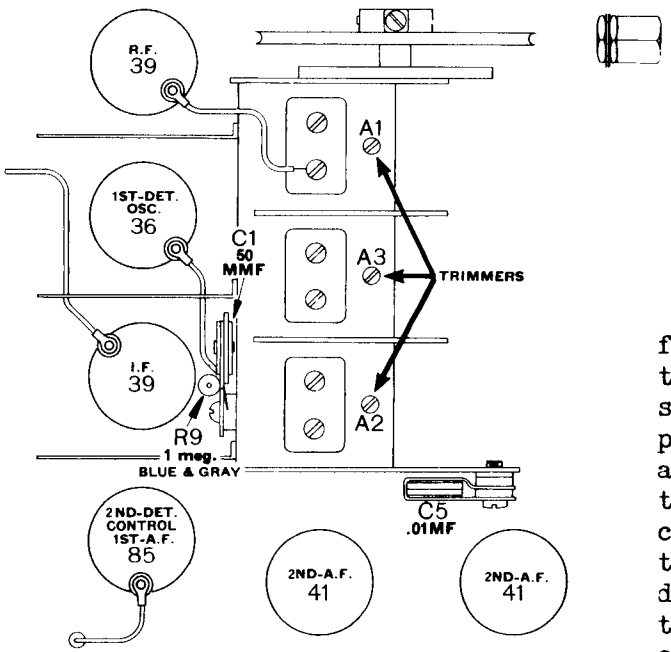




39 & 36

85

41

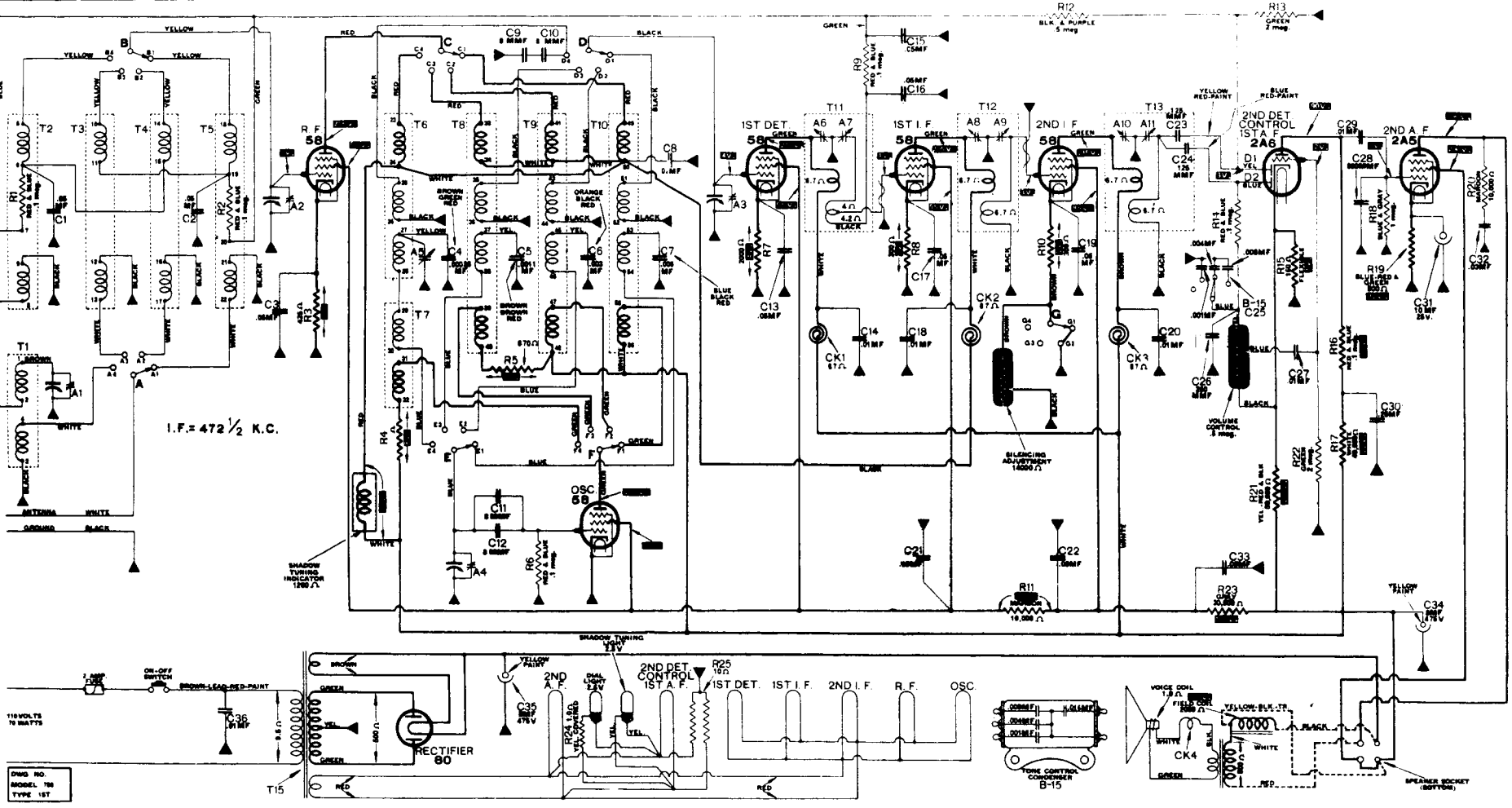


Trouble Shooting Hints

If the tone control on this set fails to function when the switch is turned to the bass position, condensers C 8 and C 9 in the speaker compartment should be checked for leakage and the switch itself should be tested for continuity. If this receiver becomes insensitive, replace the 85 second detector and if this does not remedy the trouble, realign the oscillator and intermediate circuits. If oscillation is encountered in early models of this receiver add a 3300 ohm resistor in series with the first detector plate filter choke as shown in the diagram.

ATWATER KENT MFG. CO.

MODEL 788



Trouble Shooting Hints

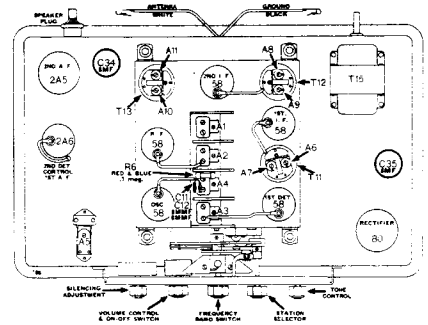
The usual complaint in this set is noisy operation and no signals on the short waves. First check location then realign the set using a wide frequency oscillator and output meter. Also check the wave-change switch for continuity and resolder any doubtful connections.

58

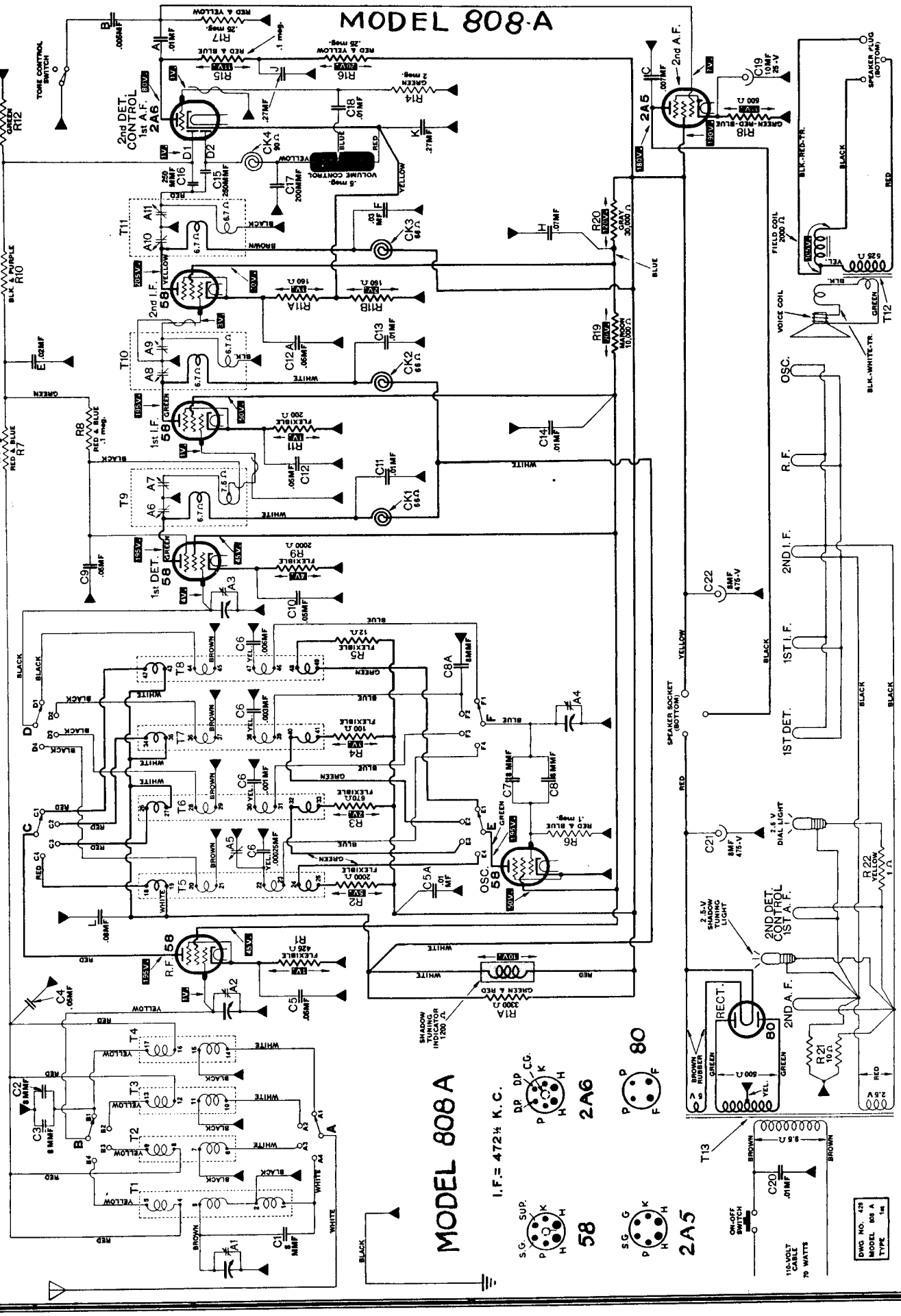
2A6

2A5

80

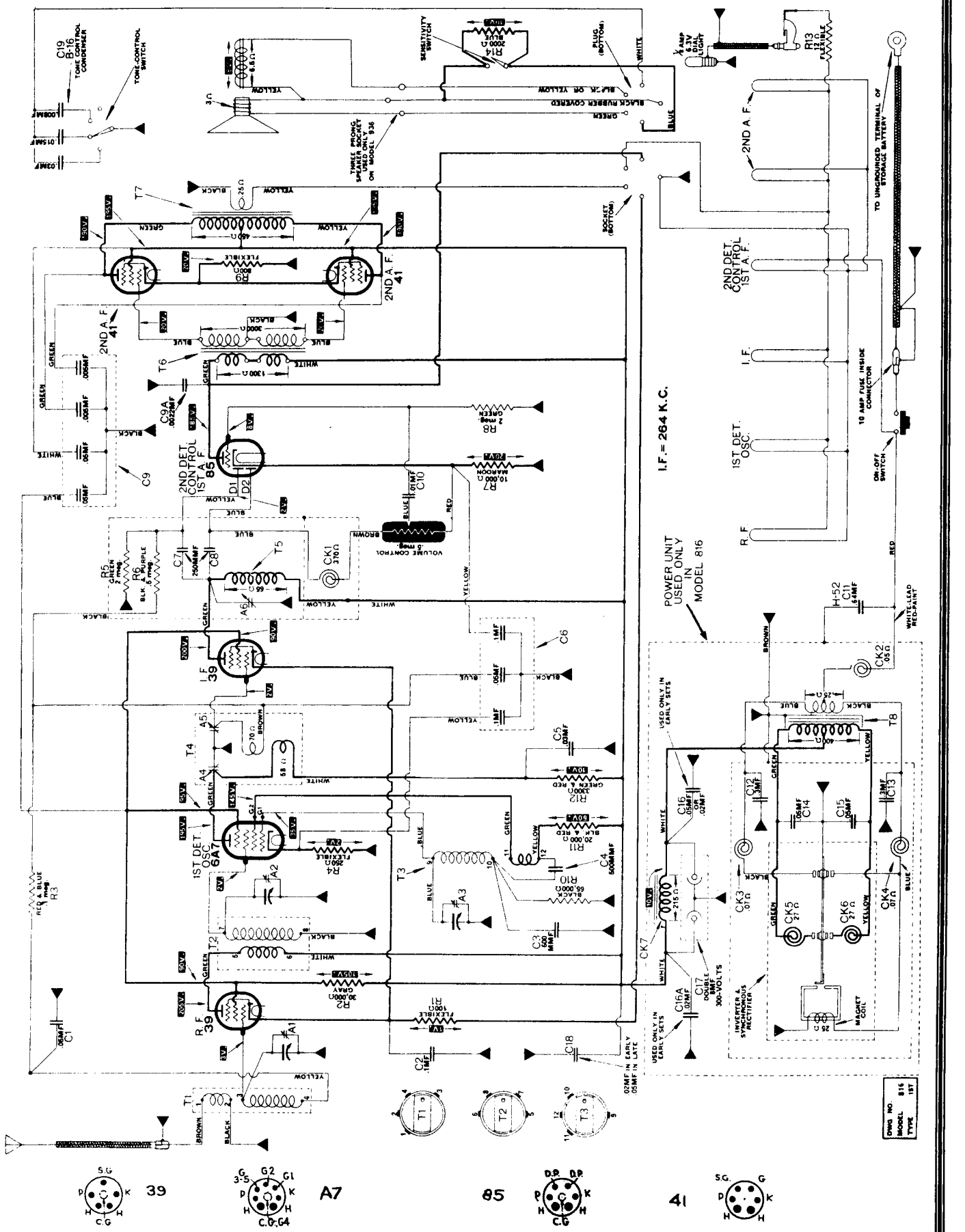


ATWATER KENT MFG. CO.



ATWATER KENT MFG. CO.

MODEL 816, 926 & 936



APPROX. VOLTAGES, USING 120 V. LINE

TYPE TUBE	POSITION IN SET	FILAMENT VOLTAGE	PLATE VOLTAGE	CONTROL-GRID VOLTAGE	SCREEN VOLTAGE
'24	1st-Det.	2.4	150	3	12
'27	Oscillator	2.3	100	10*	—
'24	1st-I. F.	2.3	150	3	75
'24	2nd-I. F.	2.3	145	3	85
'27	2nd-Det.	2.3	100	13**	—
'27	1st-A. F.	2.3	65	2	—
'45	2A	2.5	250	55*	—
'45	2Aa	2.5	250	55*	—
'80	Rectifier	4.7	—	—	—

With the volume control at minimum, the intermediate-frequency plate voltage is reduced to about 15 volts, and the I. F. screen voltage is reduced to about 10 volts.

* Use 250-volt scale.

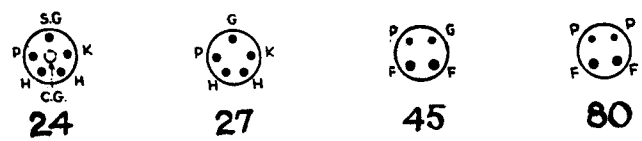
** This is the voltage across the detector bias resistor; when measuring from grid to cathode, the voltage reading is only 2.

All readings made from cathode in heater-type tubes, and from —F in plain-filament-type tubes.

I. F. Trimmers

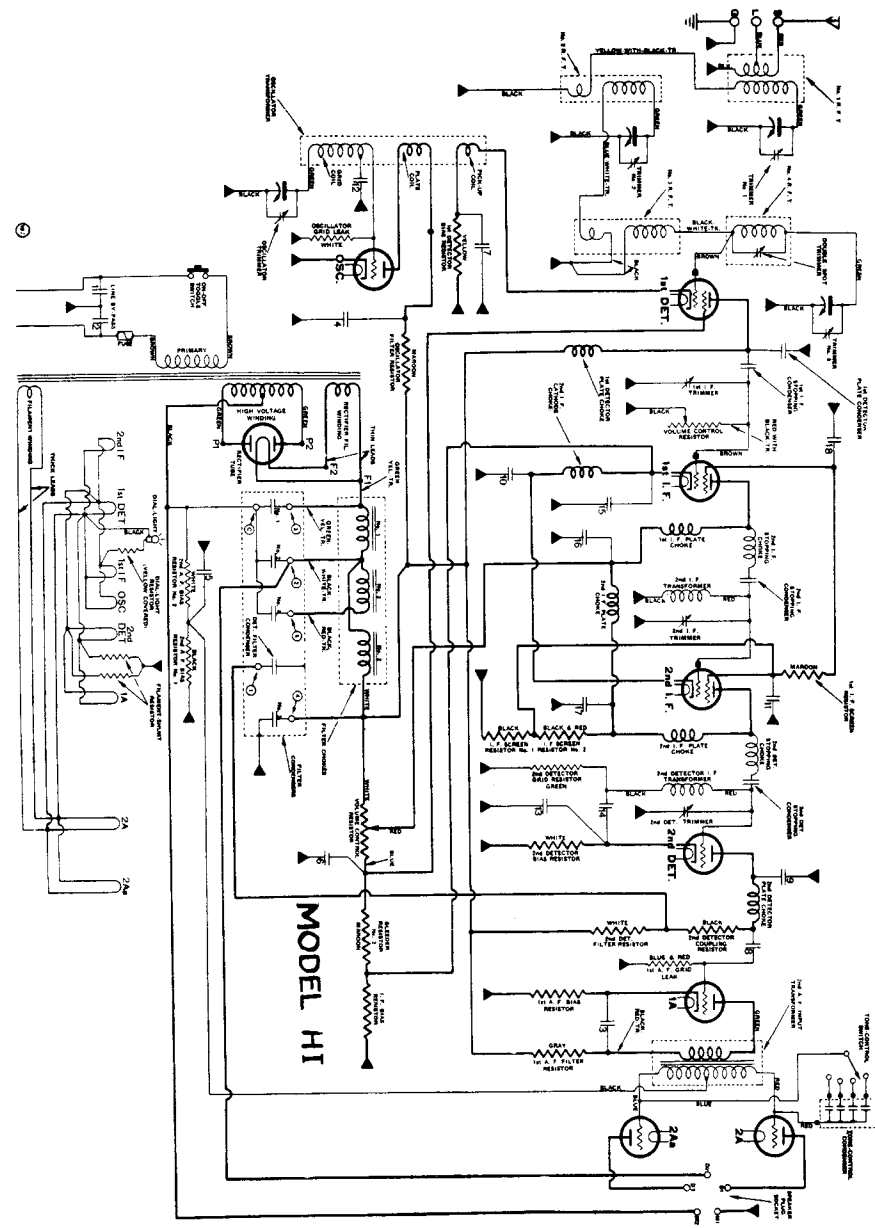
Switch on the set and the 130 K. C. oscillator. Adjust the 2nd-I. F. trimmer for maximum output. Keep meter reading about 50 by regulating volume control on set.

Adjust the 2nd-detector trimmer for maximum output. Do not touch the 1st-I. F. trimmer unless the I. F. amplifier is unstable. In this case, turn the adjusting screw of this trimmer anti-clockwise until the amplifier becomes stable. Turn off the 130 K. C. oscillator.



Trouble Shooting Hints

Most of the difficulties in this set occur in the power supply unit. Open filter condensers and choke coils cause either a loud hum or complete failure of the set to operate.



ATWATER KENT MFG. CO.

APPROX. VOLTAGES, USING 120 V. LINE

TYPE TUBE	POSITION IN SET	FILAMENT VOLTAGE	PLATE VOLTAGE	CONTROL-GRID VOLTAGE	SCREEN VOLTAGE
'24	1st-Det.	2.3	150	4	15
'27	Oscillator	2.5	130	10*	—
'24	1st-I. F.	2.3	150	3.5	100
'24	2nd-I. F.	2.3	150	3.5	85
'27	2nd-Det.	2.3	100	14**	—
27	1st-A. F.	2.3	70	2	—
'45	2A	2.5	250	55*	—
'45	2Aa	2.5	250	55*	—
'80	Rectifier	4.7	—	—	—

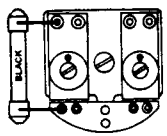
With the volume control at minimum, the I. F. screen voltage is reduced to about 15 volts.

* Use 250-volt scale.

** This is the voltage across the detector bias resistor; when measuring from grid to cathode, the voltage reading is only 2.

All readings made from cathode in heater-type tubes, and from —F in plain-filament-type tubes.

I. F. Trimmers



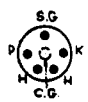
Switch on the set and the 130 K. C. oscillator. Connect the black resistor across the 2nd-detector grid trimmer (see small illustration at left) and adjust the 2nd-I. F. plate trimmer for maximum output.

Connect the resistor across the 2nd-I. F. plate trimmer and adjust the 2nd-detector grid trimmer for maximum output.

Connect the resistor across the 2nd-I. F. grid trimmer and adjust the 1st-I. F. plate trimmer for maximum output.

Connect the resistor across the 1st-I. F. plate trimmer and adjust the 2nd-I. F. grid trimmer for maximum output.

Adjust the volume control to keep the output meter reading about 50 during these operations.
Turn off the 130 K. C. oscillator.

24 

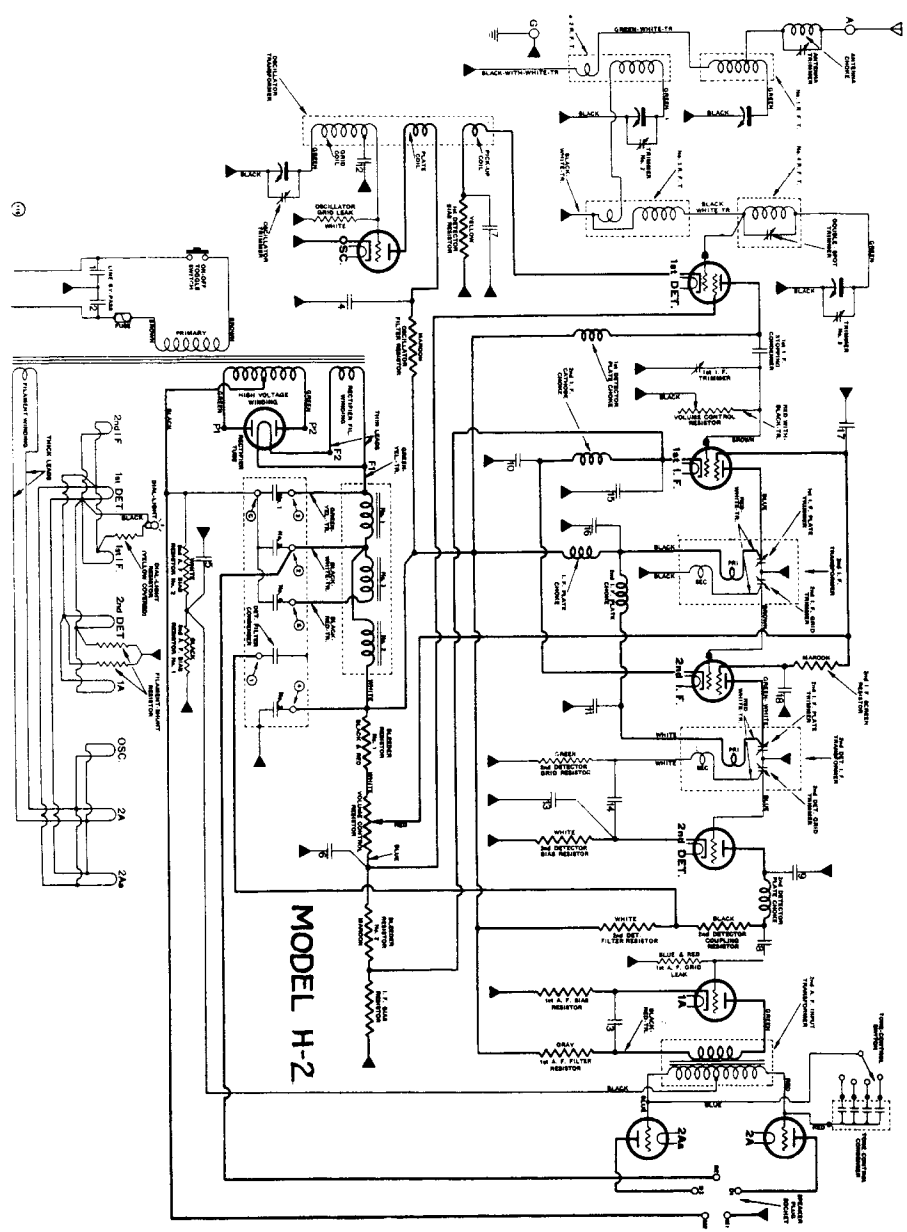
27

45

80

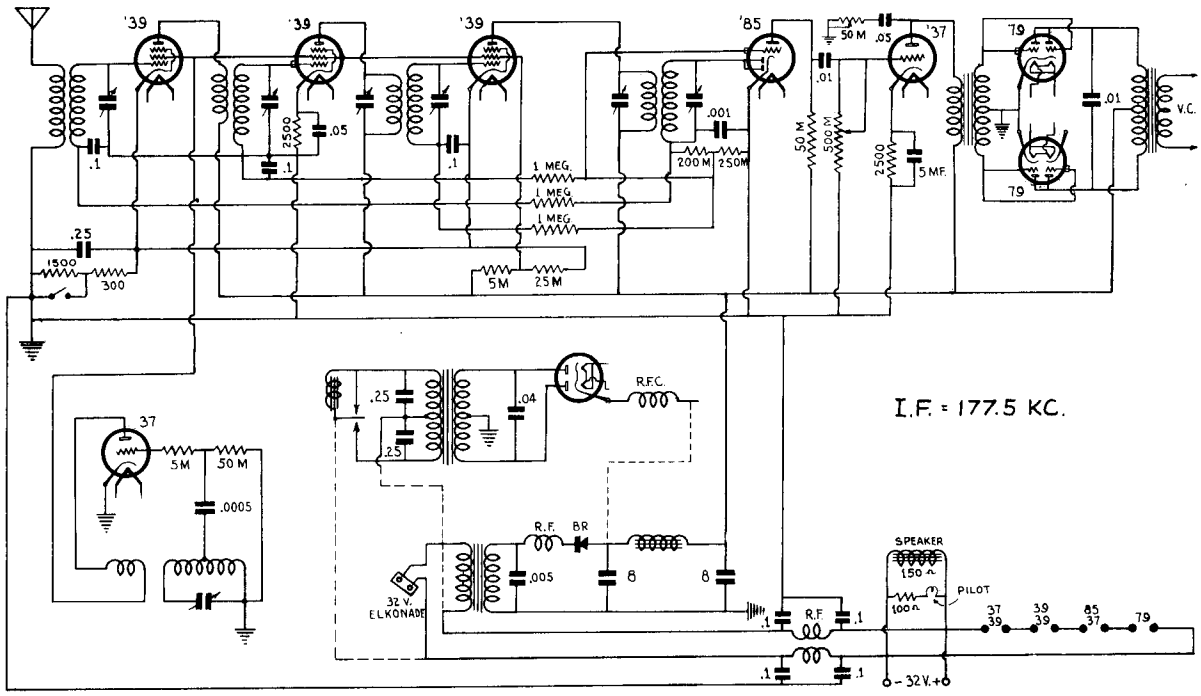
Trouble Shooting Hints

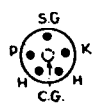
Short circuits in the I.F. trimmers cause a complete failure in this set. It is best to replace the entire I.F. transformer and realign the set.



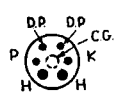
AUDIOLA RADIO CO.

MODEL 33S8 32 V





36 & 39



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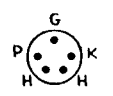

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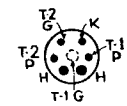
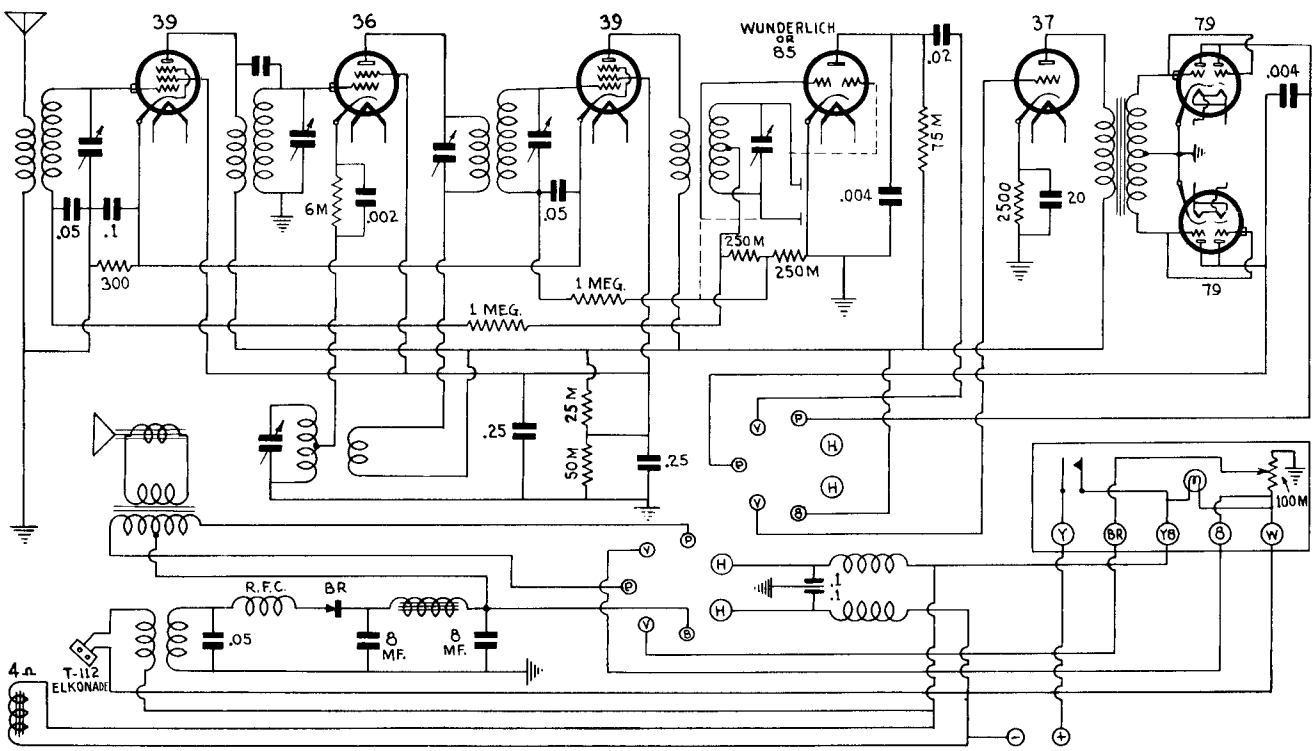


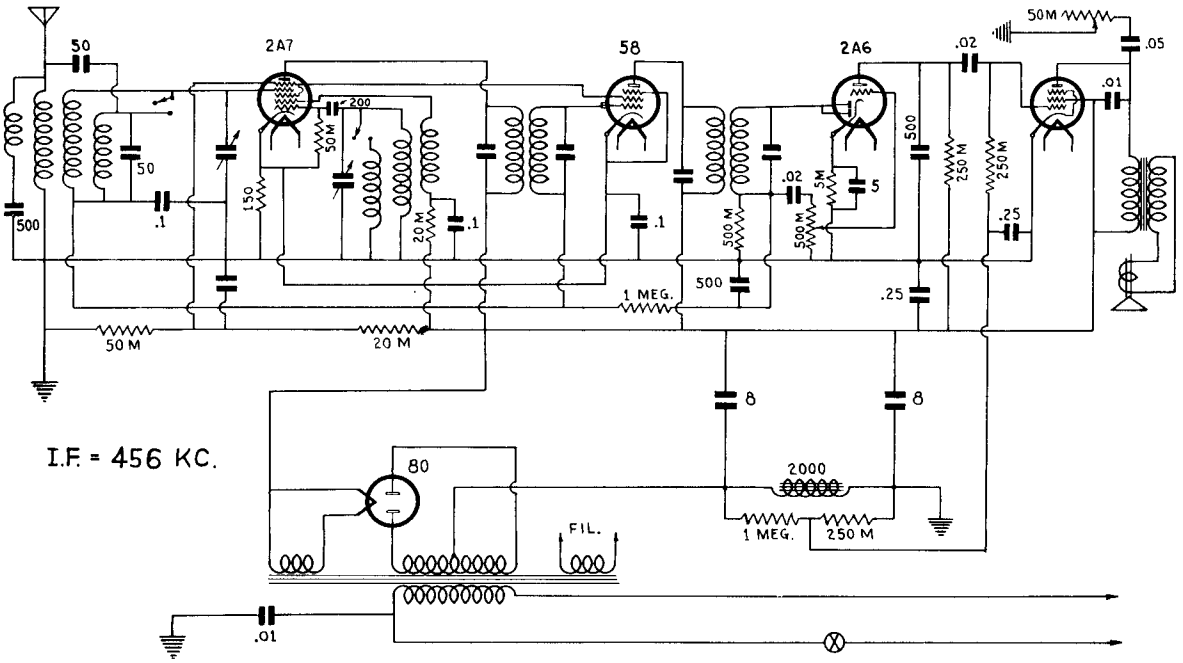
79

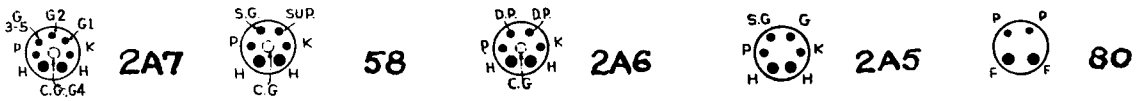
MODEL 23S7 AUTO



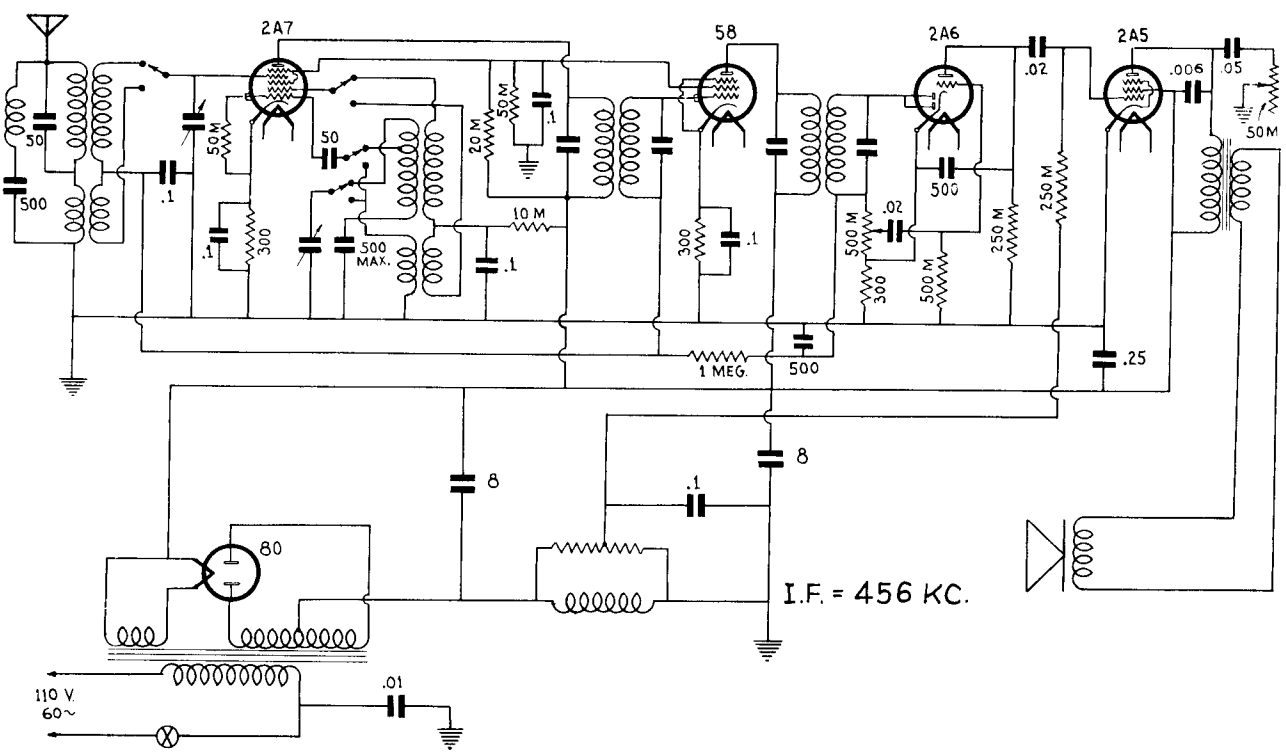
AUDIOLA RADIO CO.

MODEL 52



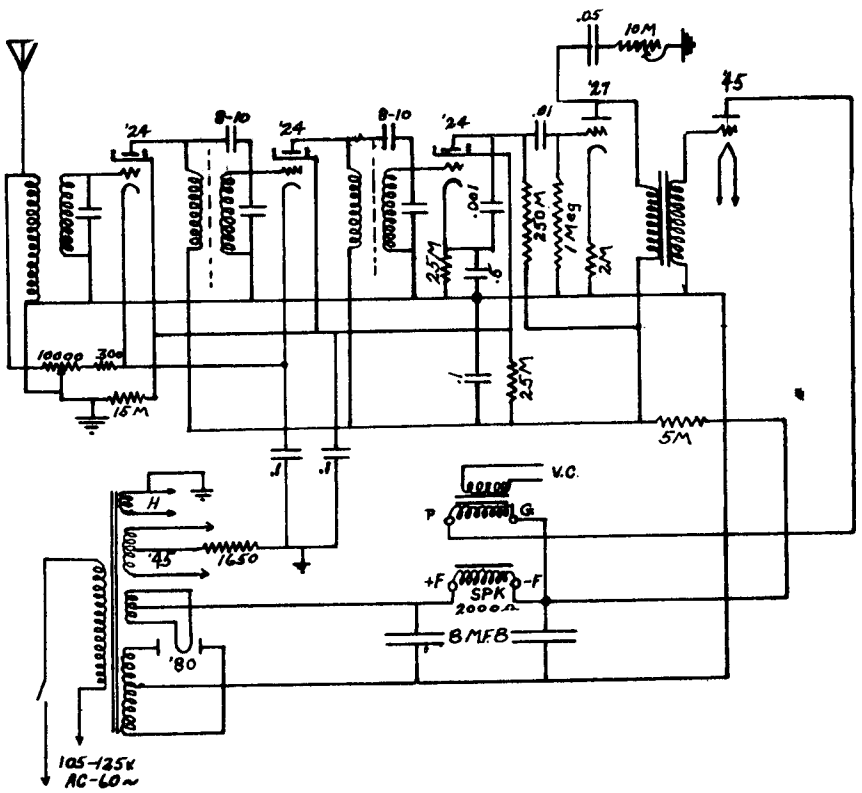


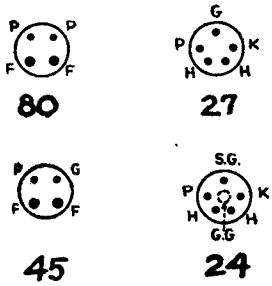
MODEL 53



AUDIOLA RADIO CO.

MODEL 6T JR #2

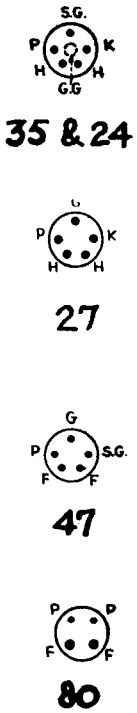


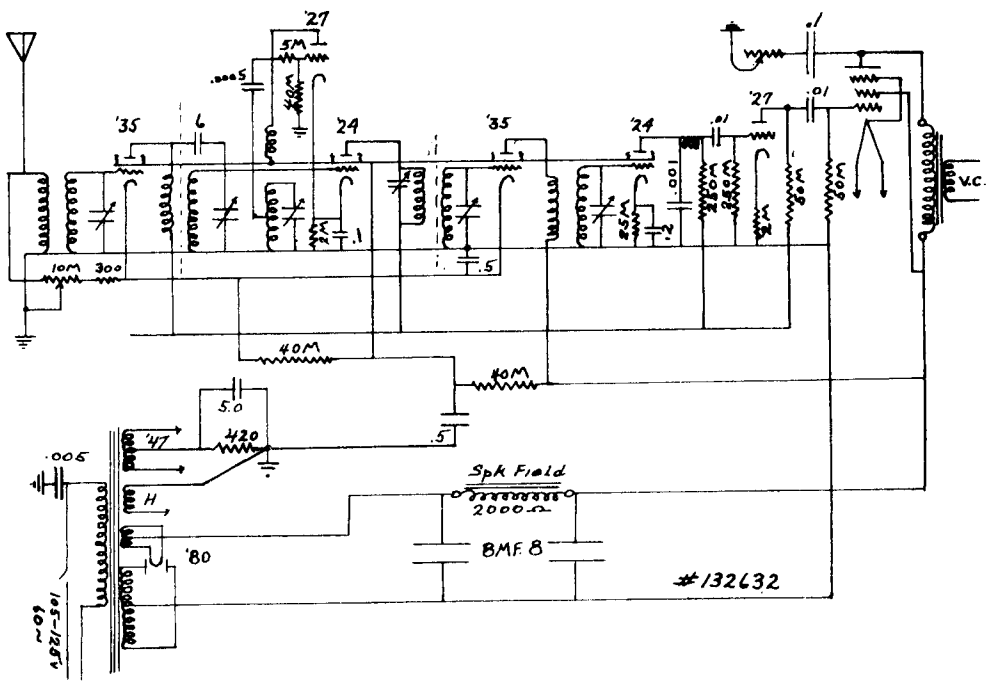


Trouble Shooting Hints

Defective resistors, especially the 1650 ohm bias resistor and the 10,000 ohm volume control seem to cause the most trouble in this model. A defect in the bias resistor will often ruin the 45 power tube through excessive voltage.

MODEL 23S8



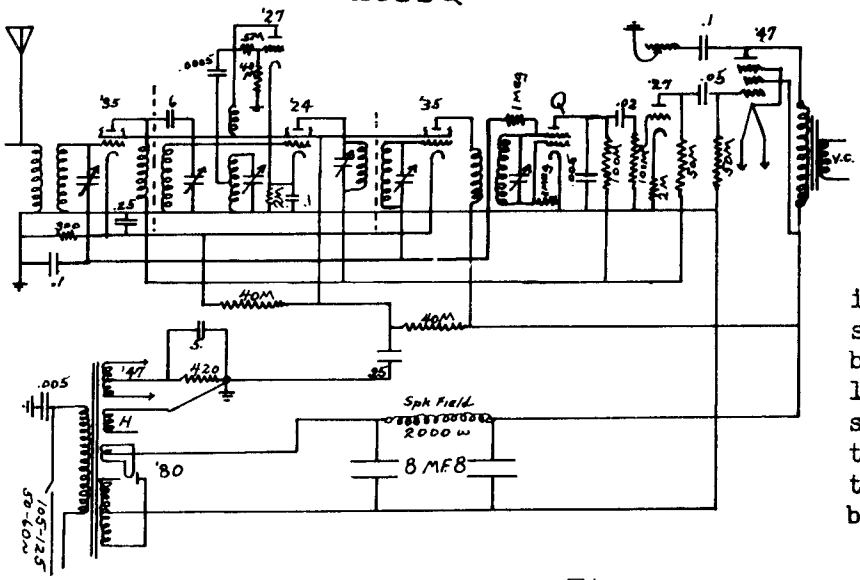


Trouble Shooting Hints

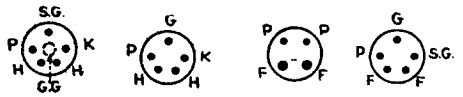
The common cause for complaint in this set is a "block oscillator". Replace the tube; test 40,000 ohm resistor and all connections.

AUDIOLA RADIO CO.

23S8Q



MODEL 23S8Q

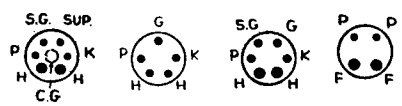


35&24 27 80 47

Trouble Shooting Hints

The one megohm resistor in the grid circuit of the second detector tube should be checked if the volume is low. If an intermittent scratching noise is heard, the 1/10 mf. condenser in the plate of the 47 should be tested for leakage.

MODEL 23S10

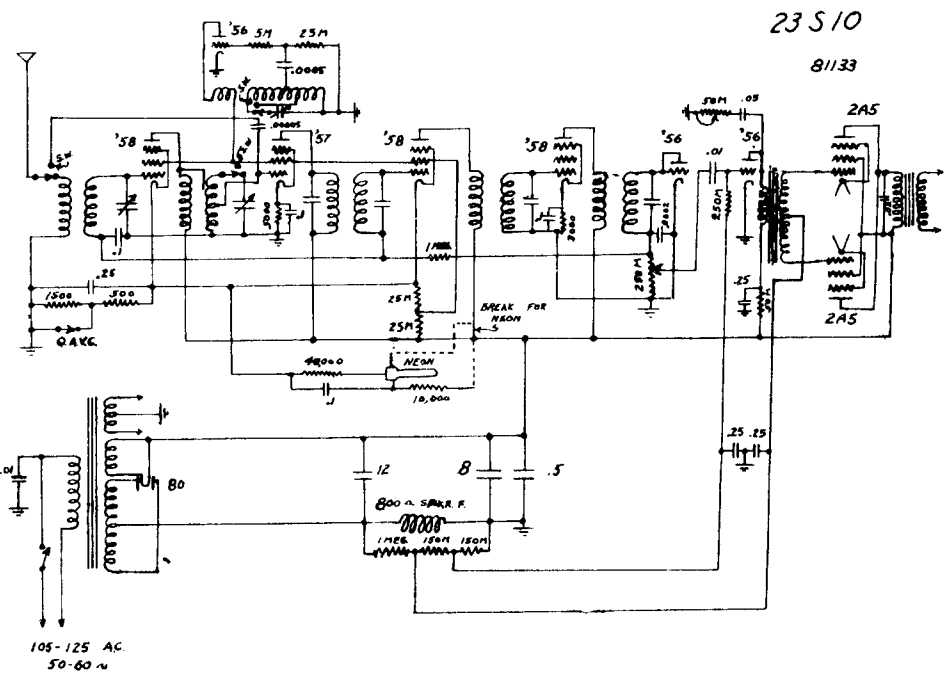


57&58 56 2A5 80

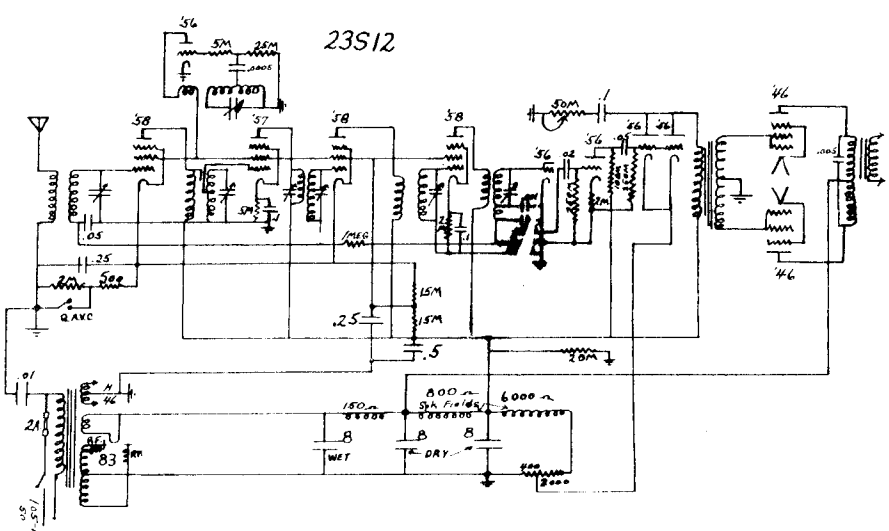
Trouble Shooting Hints

The sets which contain a neon tuning indicator and Q.AVC are subject to loss of sensitivity due to a change in the value of the 10,000 ohm resistor connected to this neon tube.

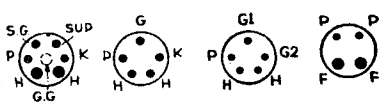
23S10



23S12



MODEL 23S12



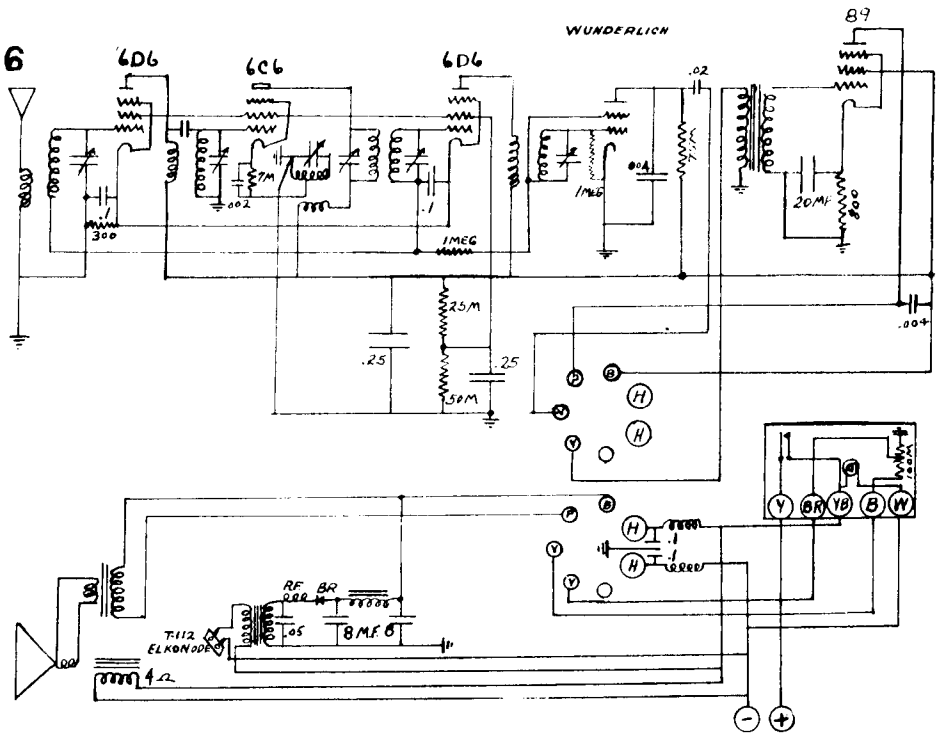
58&57 56 46 83

Trouble Shooting Hints

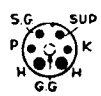
If this receiver continually blows-out line fuses, check the .01 mf. condenser in the primary circuit and also the type 83 rectifier tube.

AUDIOLA RADIO CO.

MODEL 33S6 AUTO

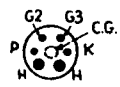


6D6 & 6C6

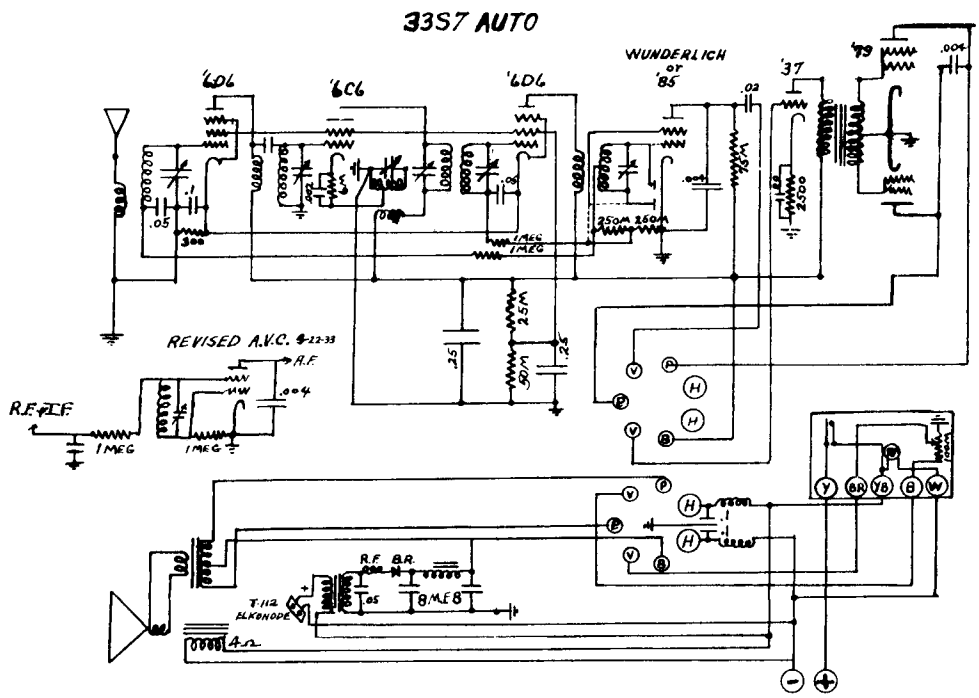


WUNDERLICH

89



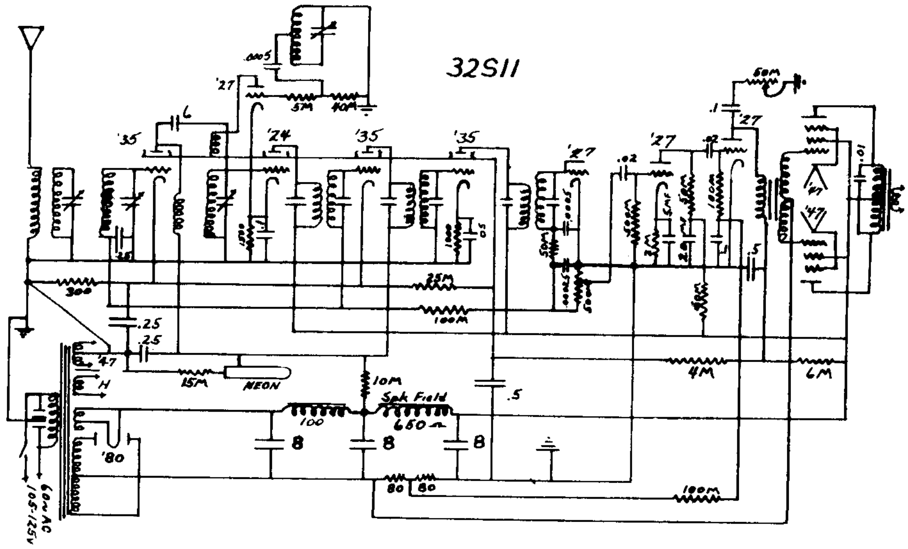
MODEL 33S7 AUTO



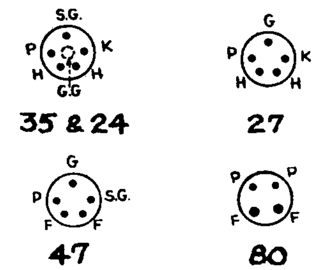
Trouble Shooting Hints

Defective AVC, causing motor-boating or insensitivity is usually due to the Wunderlich second detector tube

AUDIOLA RADIO CO.



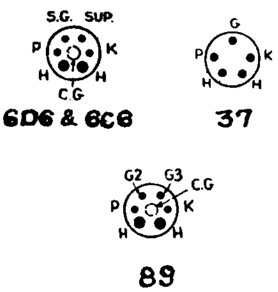
MODEL 32S11

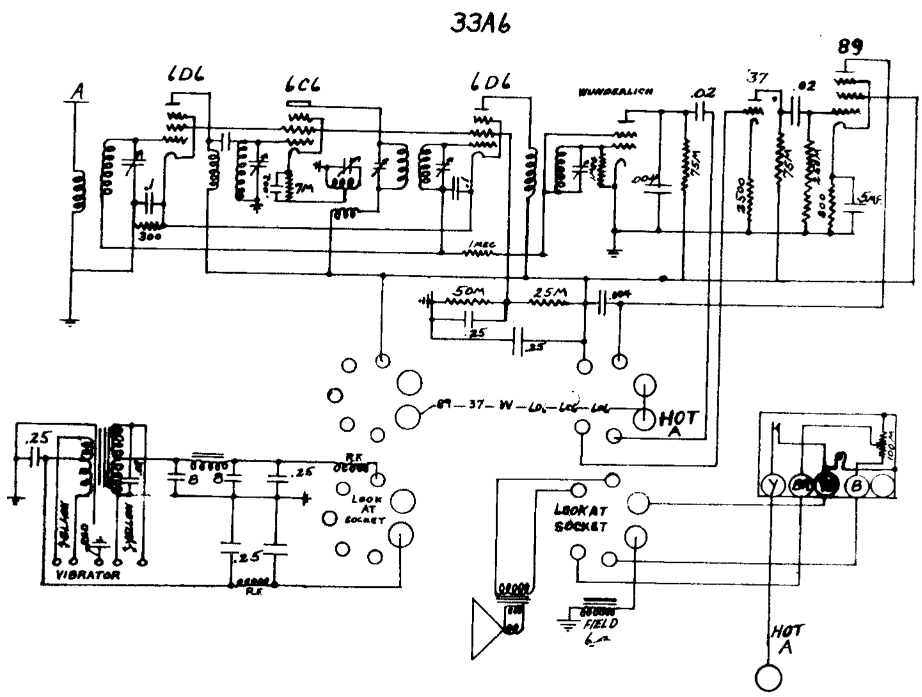


Trouble Shooting Hints

Electrolytic condenser breakdown is often the cause of trouble in this model.

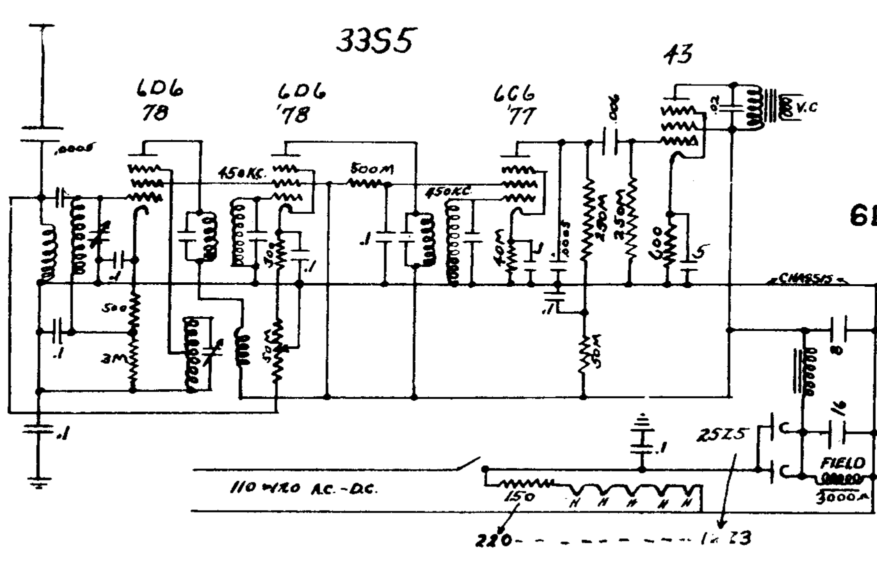
MODEL 33A6



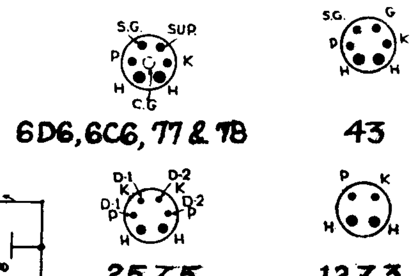


Trouble Shooting Hints

The vibrator in this set is a synchronous unit which is very difficult to repair without special tools. Replace it if it sticks or becomes noisy.



MODEL 33S5

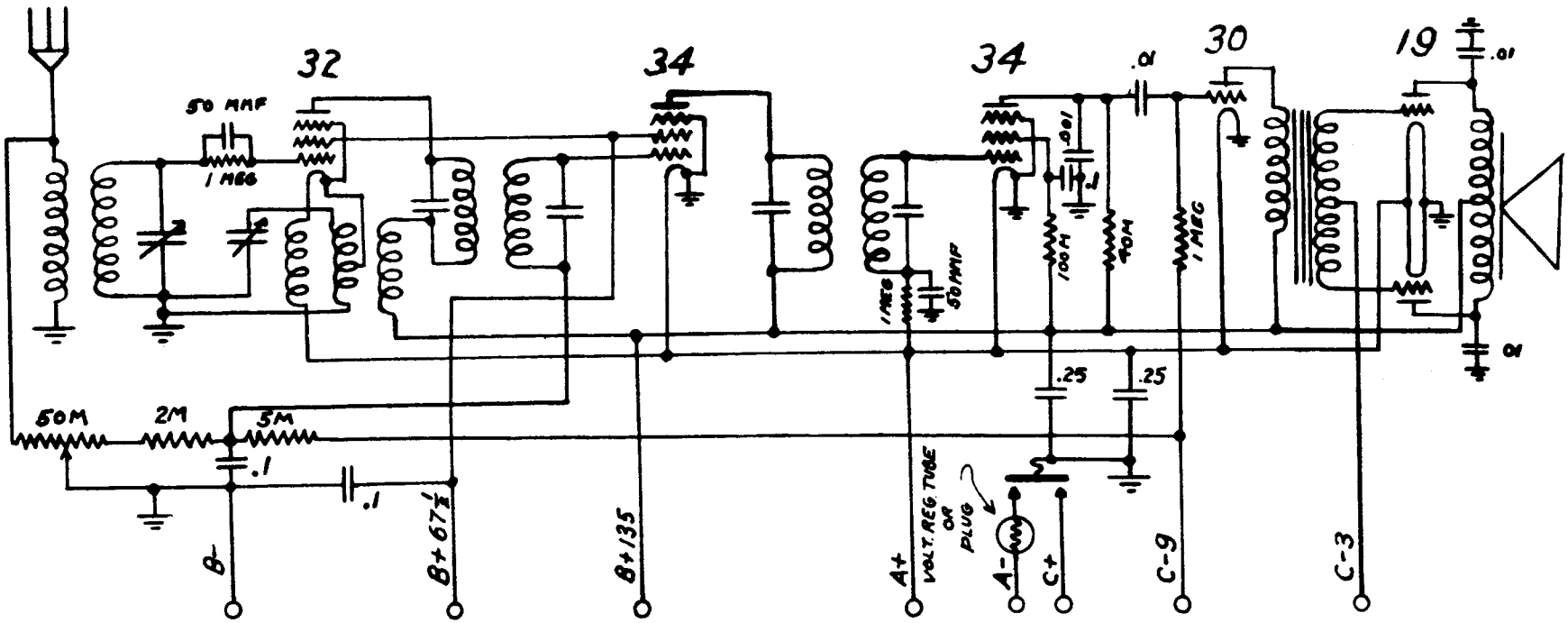


Trouble Shooting Hints

For an audible whistle, replace the 43; test the .02 mf. condenser and reduce the screen voltage.

AUDIOLA RADIO CO.

MODEL 3356B

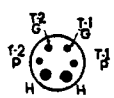


I.F = 175 K.C.

516-2V BATTERY SET

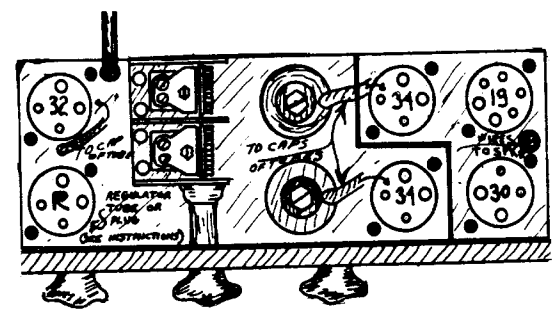
32 & 34

30



19

This AudiolA receiver may be used either with an air cell "A" battery or a 3 volt dry battery. Where an air cell "A" battery is used, a plug is furnished which is inserted in the socket marked "R" on drawing. In the case where a 3 volt dry battery is used, an Amperite volt regulator tube is furnished and it must be inserted in socket marked "R".

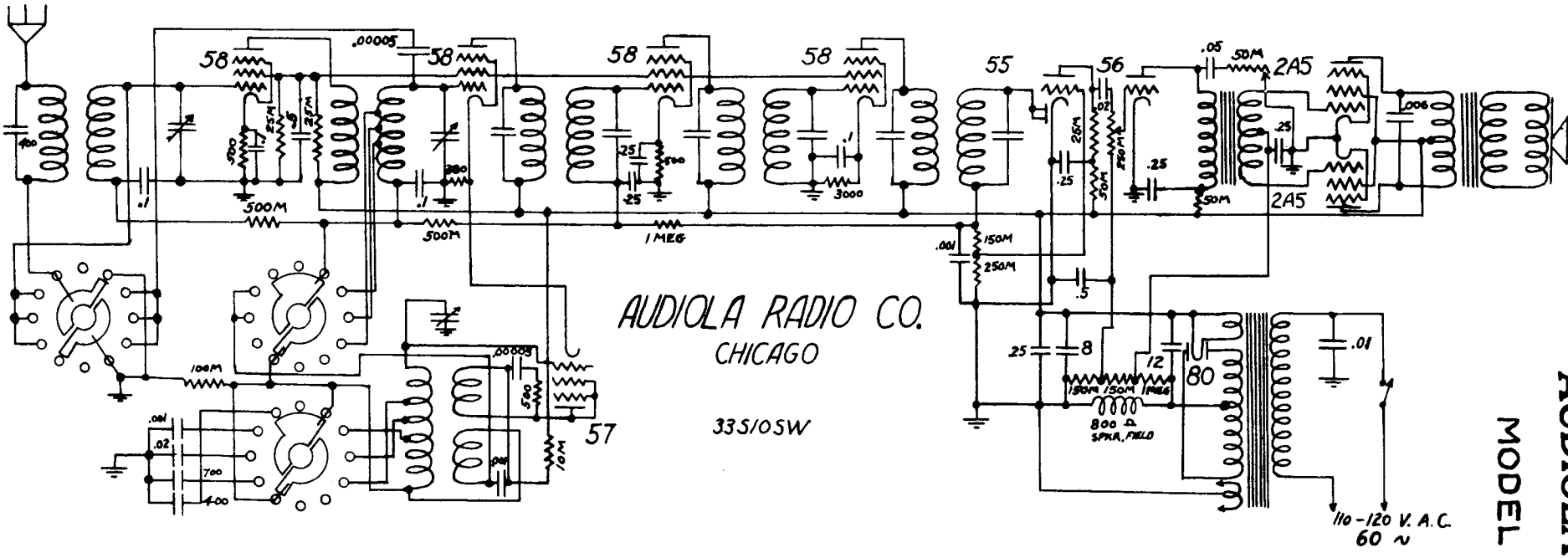


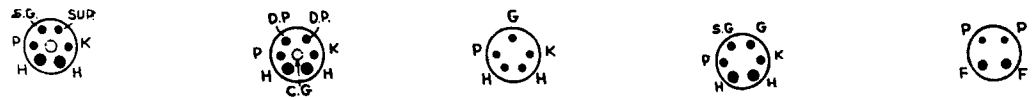
Trouble Shooting Hints

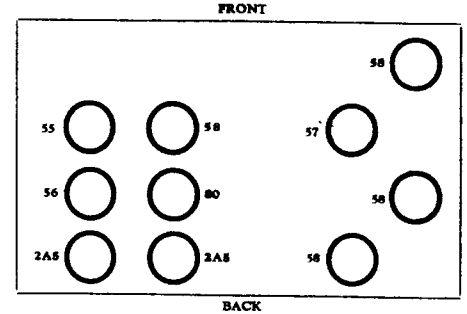
Oscillation is particularly difficult to remove from this set unless the intermediate frequency amplifier is tuned to the exact frequency specified. Be sure that the grid caps are spaced as far apart as possible and that old shields are well grounded.

AUDIOLA RADIO CO.

MODEL 33S10 SW





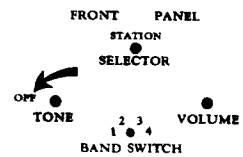


A. C. - 60 CYCLES
105 - 125 VOLTS

RED WIRE - ANTENNA
BLACK WIRE - GROUND

USE GOOD OUTSIDE AERIAL AND GROUND

10 TUBES REQUIRED
1 - 55
1 - 56
1 - 57
4 - 58
2 - 2A5
1 - 80



This receiver covers a frequency range of 540 to 20,000 kilocycles (555 to 15 meters) by the use of four overlapping wave bands, each selected by means of the band switch as indicated.

When the band switch is in extreme left position, set covers band No. 1, which is the broadcast band, and subsequent positions cover the other three bands.

Band No. 1 readings may be converted to kilocycles by adding two ciphers (multiplying by 100). Bands Nos. 2, 3, and 4 are calibrated in megacycles and may be converted into kilocycles by adding three ciphers (multiplying by 1000).

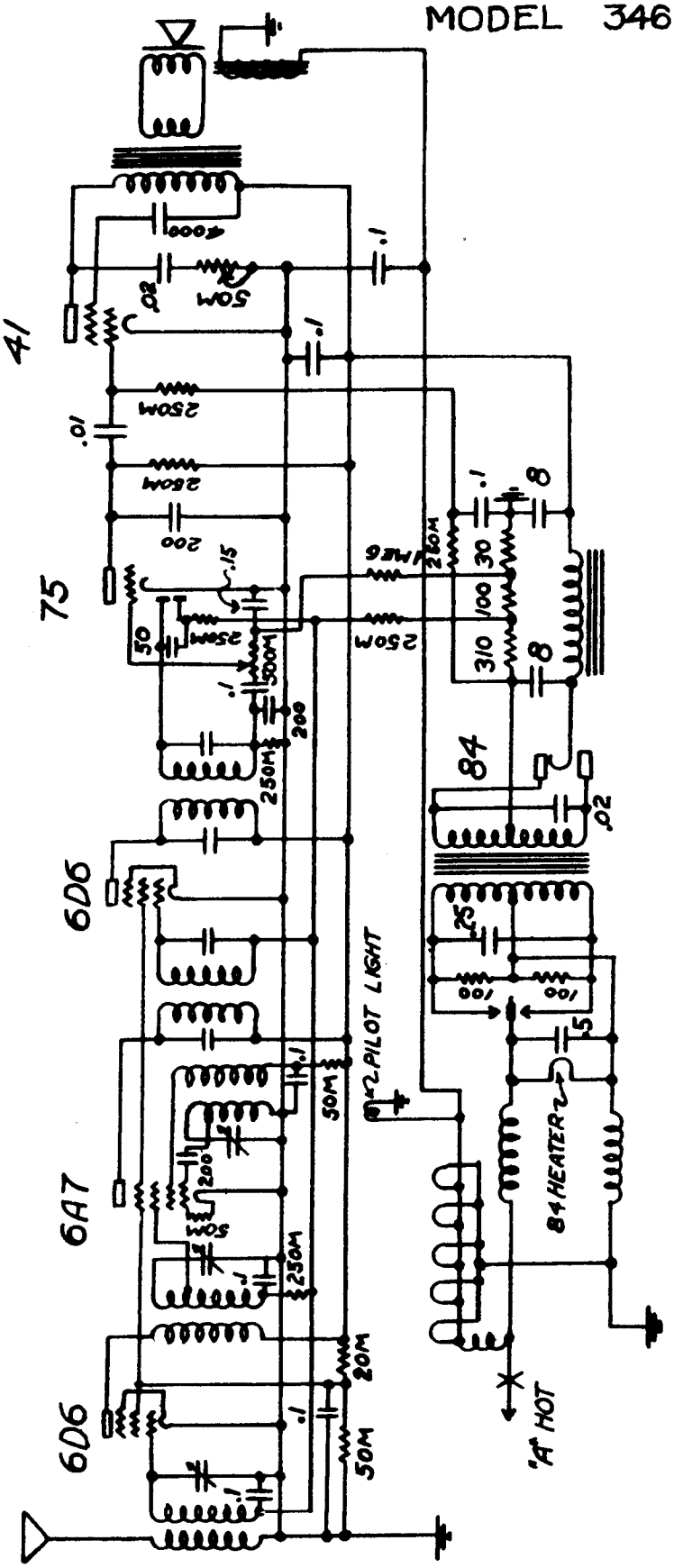
The majority of reliable United States and Canadian short wave broadcasting stations may be found around 6 and 7 (6000 and 7000 kilocycles) on band No. 3, and around 9 and 10 (9000 and 10,000 kilocycles) on band No. 4.

Trouble Shooting Hints

If this set has intermittent oscillation on certain parts of the wave bands, check the connections to the 55 tube and also test this tube. If motor-boating is encountered check the values of resistors in the AVC section. Test all by-pass condensers for leakage.

AUDIOLA RADIO CO.

MODEL 346, 6B, 6S, 6M



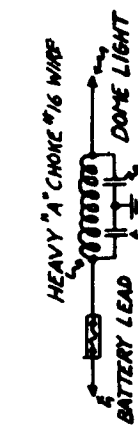


DIAGRAM #1

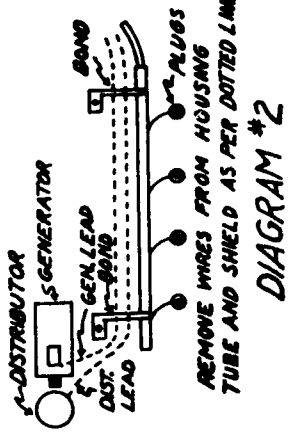
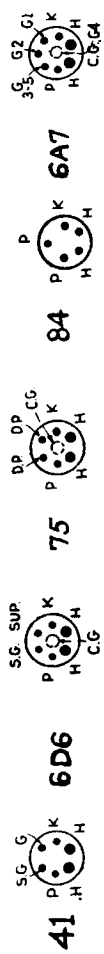


DIAGRAM #2



This receiver is a six tube superheterodyne using the most modern circuit design and tubes. Tubes used are: one 6D6 R.F. Amplifier; one 6A7 combination 1st detector and oscillator; one 6D6 I.F. Amplifier; a 75 diode detector with delayed A.V.C. and one stage audio; one 41 power output tube; and one 84 rectifier tube.

Shield antenna lead-in and bond the shield to frame at center post. If antenna comes down front post, shield as high as possible and also ground the shield to dash.

In case of antenna pick-up, use heavy "A" choke and double condenser as in diagram #1.

In case of chassis pick-up, separate primary and high tension ignition wires, shield and ground the shield at both ends.

In Chevrolets, it is sometimes necessary to shield the floorboards on the right hand side and ground with floorboard screws.

In Ford V8 shield primary and "A" lead to generator separately and ground shields to spark plug housing brackets as in diagram #2.

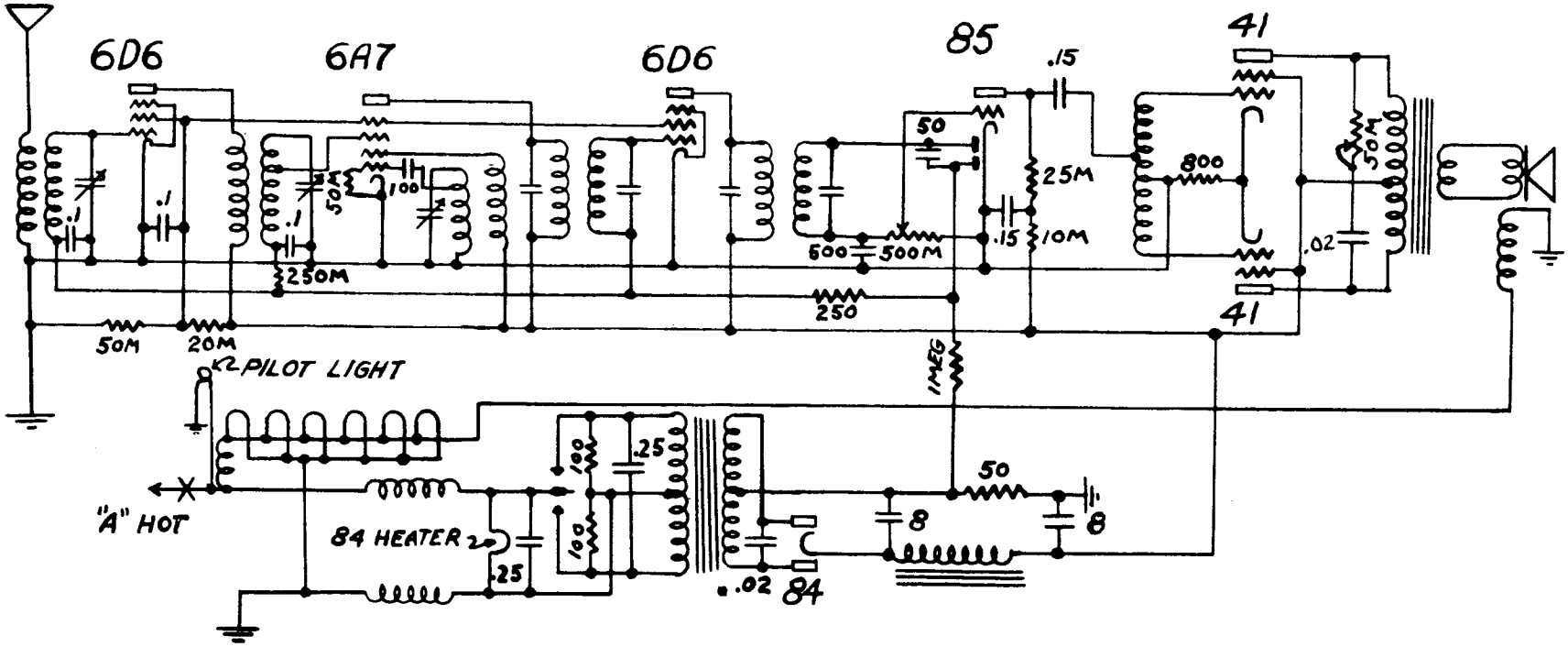
In case of floating power, bond center bolt on Audiola set to motor block.

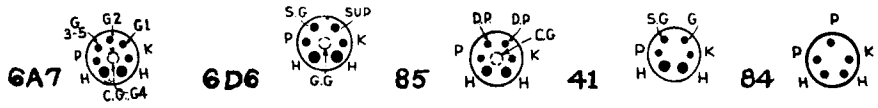
Trouble Shooting Hints

The 84 rectifier tube in this set seems to break down very frequently. It is advisable to test the .02 mf. and the two 8 mf. condensers for leakage before replacing the old tube.

AUDIOLA RADIO CO.

MODEL 347





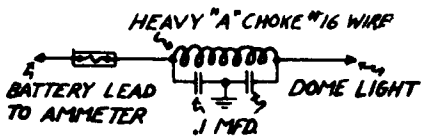


DIAGRAM #1

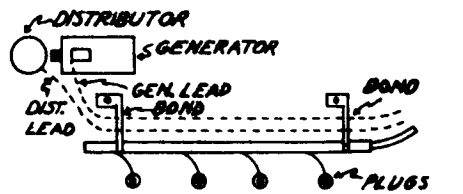


DIAGRAM #2

After installation is completed, adjust antenna trimmer on some distant station around 1400 to 1500 K.C. turn in either direction for loudest signal. The antenna trimmer is directly under the serial number on the top of the set. The front cover screws must always be tight.

The gang condenser control (tuning) must run very freely and have not less than 1/32 of an inch end play.

Trouble Shooting Hints

Although the manufacturer of this set does not advocate the use of spark plug suppressors, certain cars, especially the Ford V8 require some means of "killing" the high frequency disturbances.

Shield antenna lead-in and bond the shield to frame at center post. If antenna comes down front post, shield as high as possible and also ground the shield to dash.

In case of antenna pick-up, use heavy "A" choke and double condenser as in diagram #1.

In case of chassis pick-up, separate primary and high tension ignition wires, shield and ground the shield at both ends.

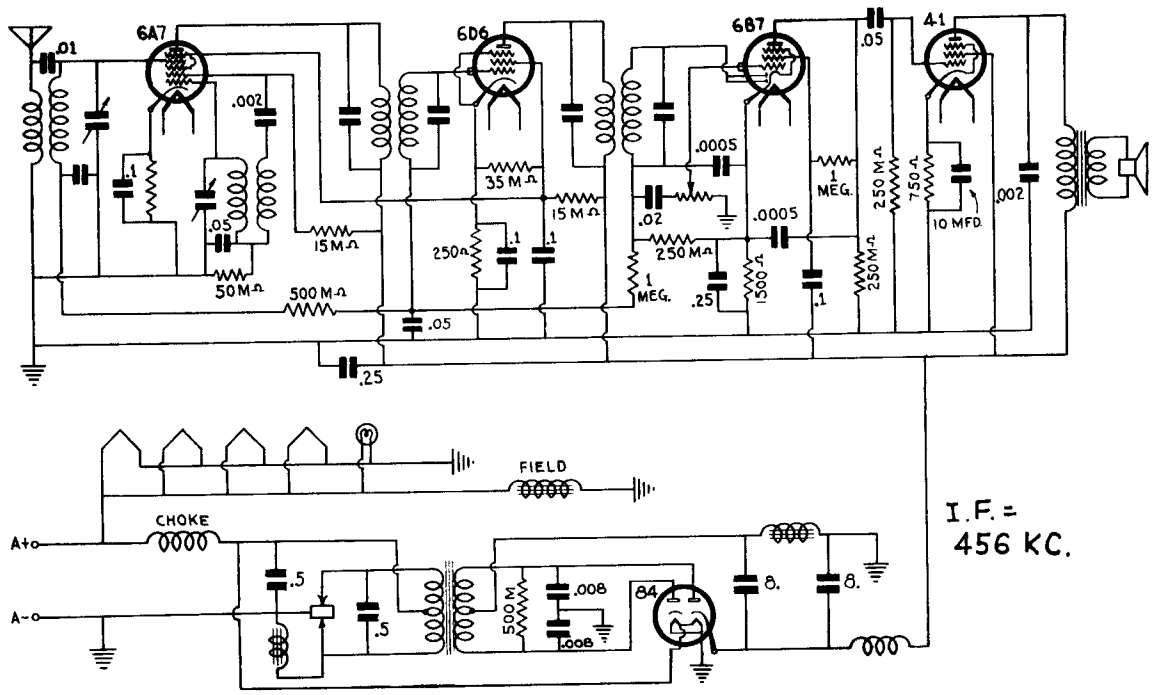
In Chevrolets, it is sometimes necessary to shield the floorboards on the right hand side and ground with floorboard screws.

In Ford V8 shield primary and "A" lead to generator separately and ground shields to spark plug housing brackets as in diagram #2.

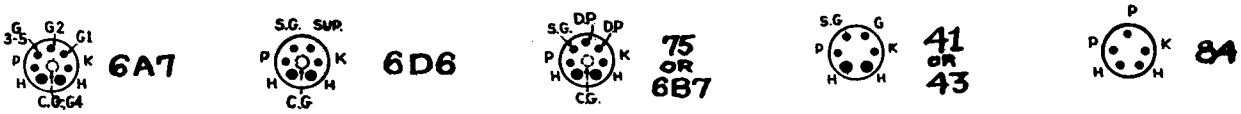
In case of floating power, bond center bolt on Audiola set to motor block.

AUTOCRAT RADIO CO.

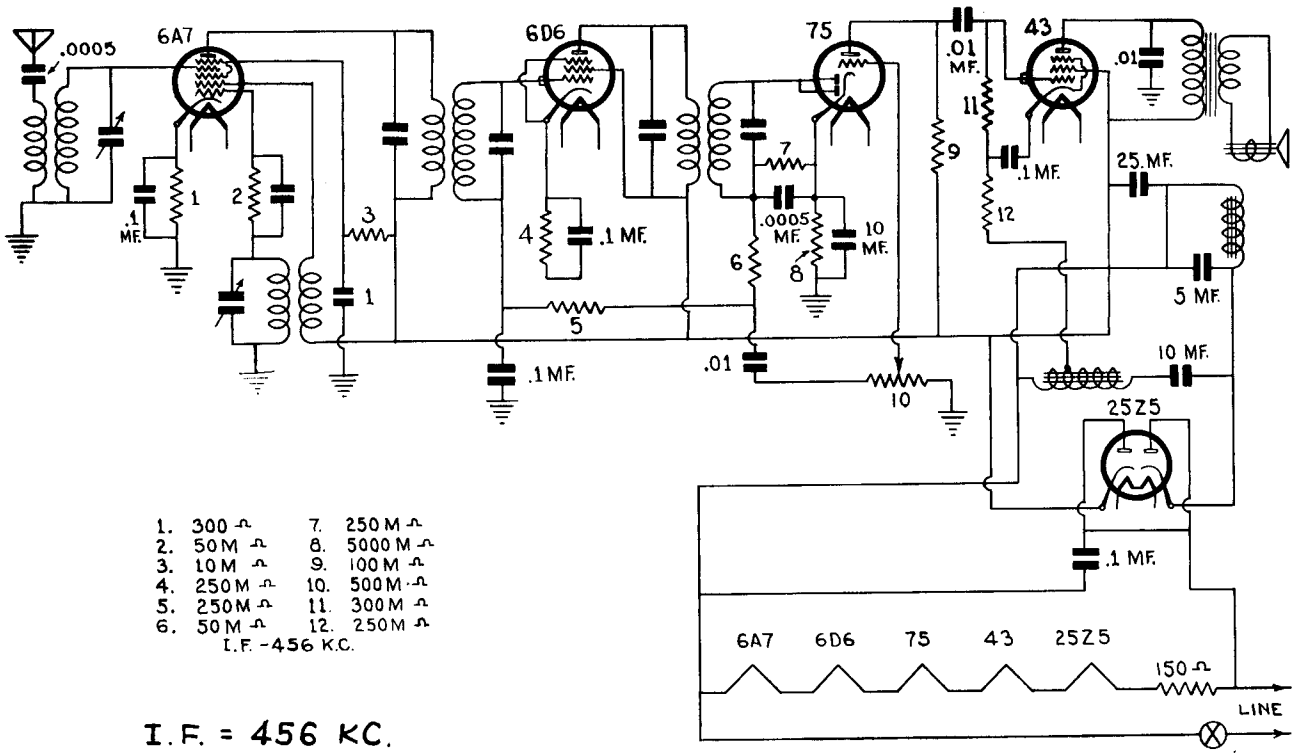
MODEL S



I.F. = 456 KC.



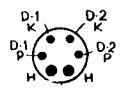
MODEL 55 S A



1. 300 Ω
2. 50 M Ω
3. 10 M Ω
4. 250 M Ω
5. 250 M Ω
6. 50 M Ω
7. 250 M Ω
8. 5000 M Ω
9. 100 M Ω
10. 500 M Ω
11. 300 M Ω
12. 250 M Ω

I.F. - 456 K.C.

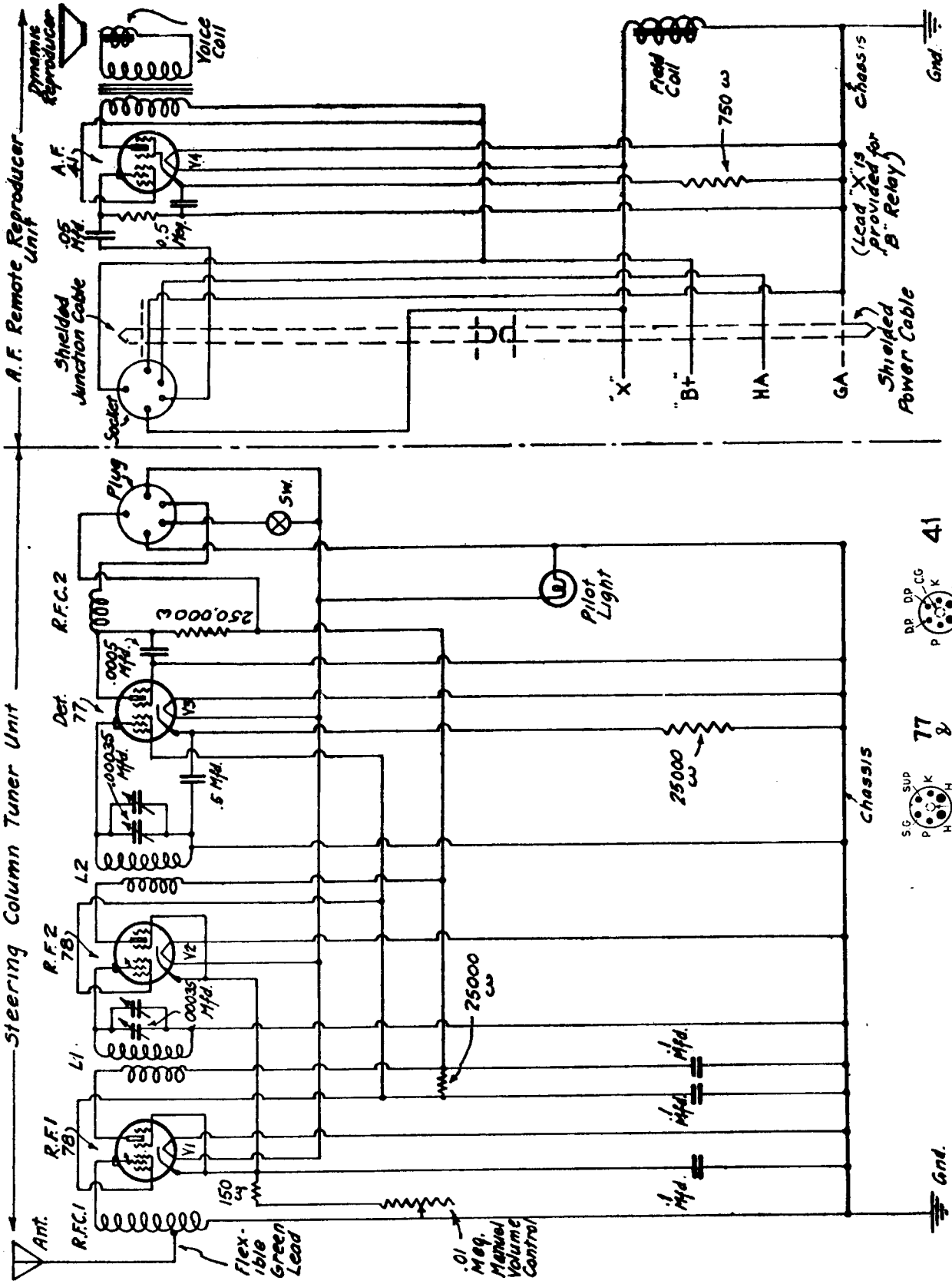
I.F. = 456 KC.



25Z5

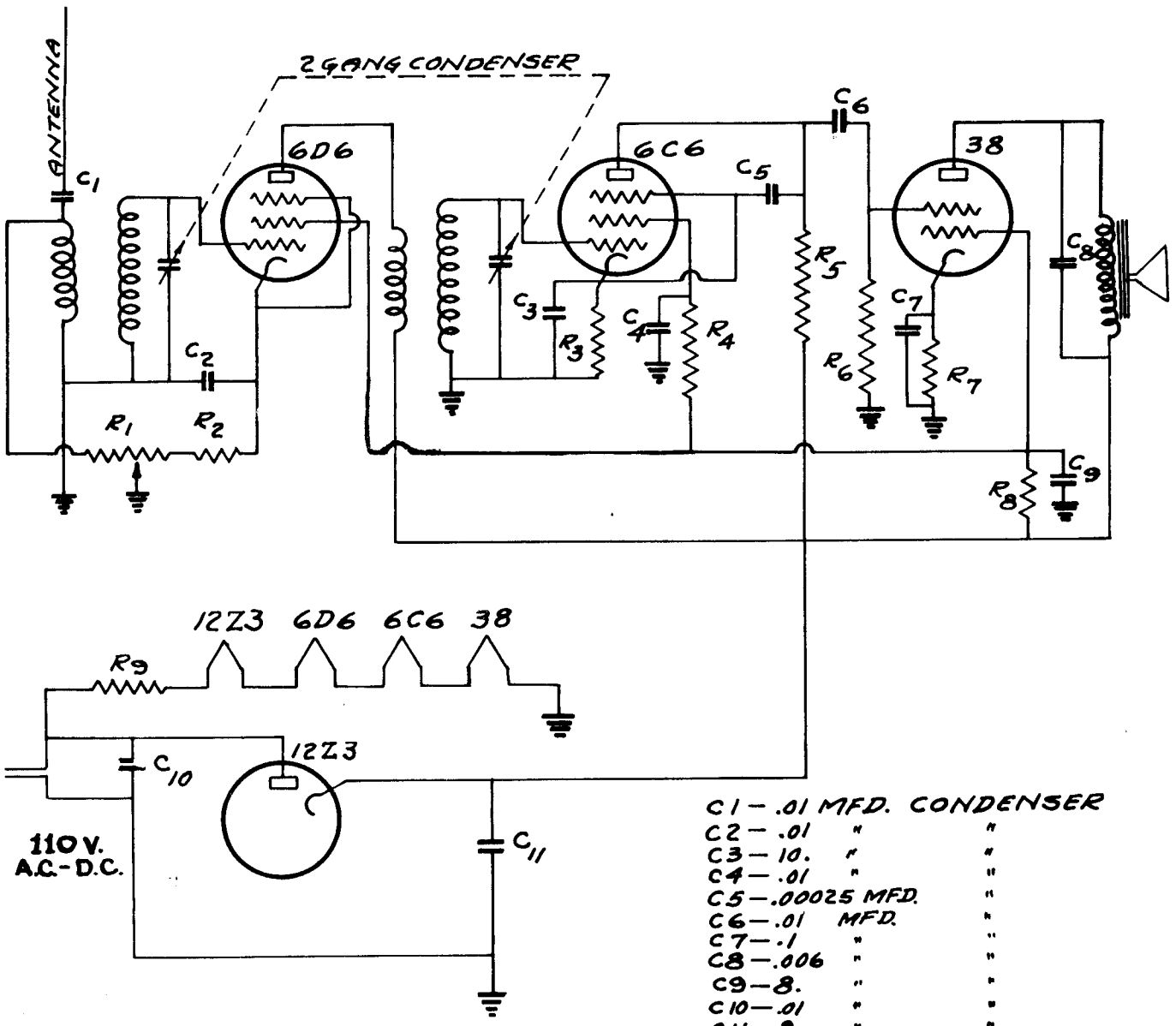
AUTOMATIC RADIO

TOM THUMB AUTO RADIO



BALKEIT RADIO CO.

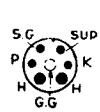
MODEL 38



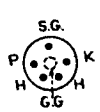
C1 — .01 MFD. CONDENSER
C2 — .01 " "
C3 — 10. " "
C4 — .01 " "
C5 — .00025 MFD. "
C6 — .01 MFD. "
C7 — .1 " "
C8 — .006 " "
C9 — 8. " "
C10 — .01 " "
C11 — 8. " "

NOTE:- SYMBOL ⏚ INDICATES CHASSIS OF RECEIVER. NO GROUND CONNECTION SHOULD BE MADE TO CHASSIS.

R1 — 300 M OHM VOLUME CONTROL
R2 — 250 OHM FIXED IN VOLUME CONTROL.
R3 — 15 M OHM RESISTOR
R4 — 2 MEG. " "
R5 — 500 M. " "
R6 — 1 MEG. " "
R7 — 1500 " "
R8 — 15 M " "
R9 — 280 OHM RESISTANCE IN LINE CORD



6D6 & 6C6



38

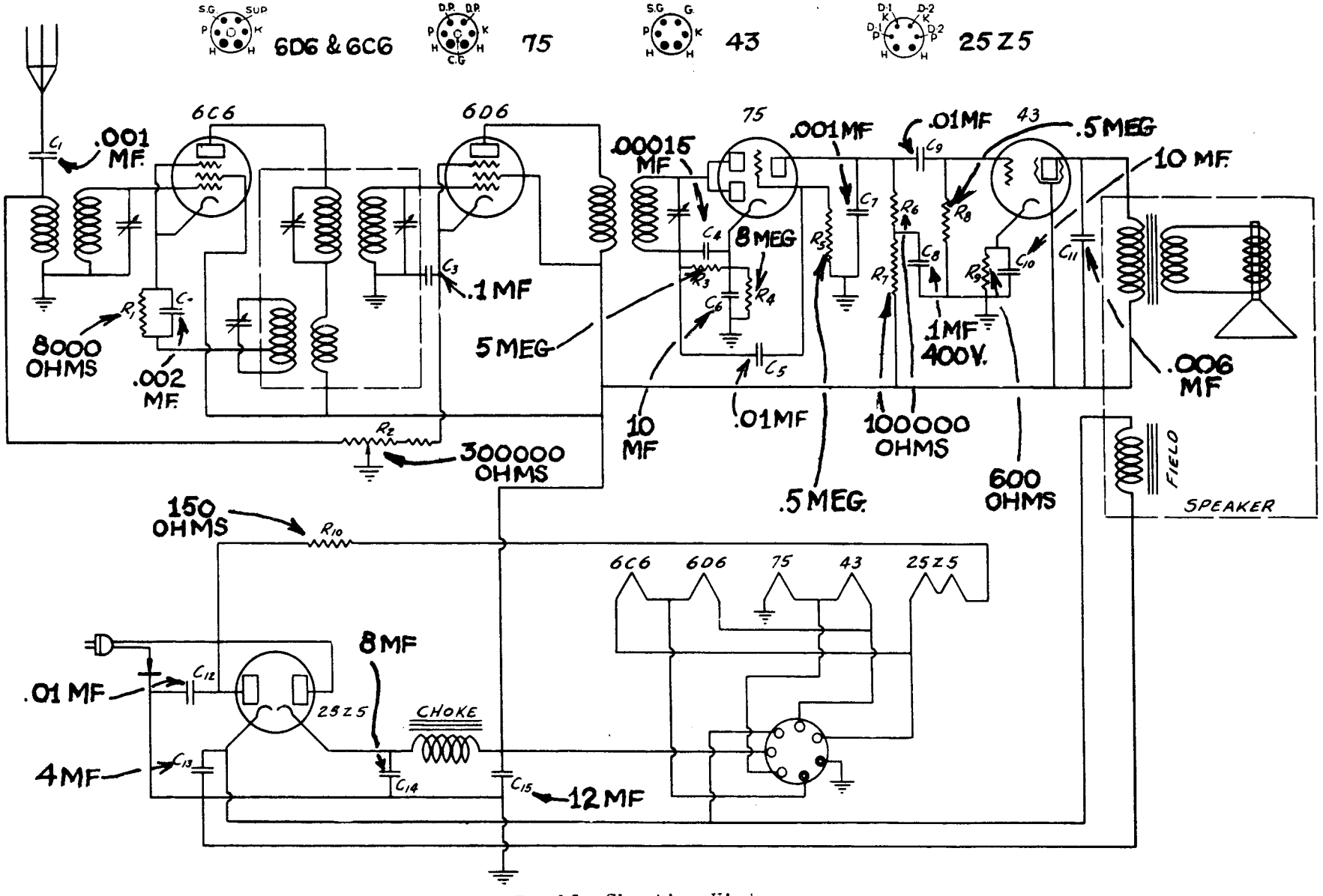
12Z3

Trouble Shooting Hints

Defective by-pass and filter condensers cause the majority of service calls for this set. The condenser coupling the detector to the 38 power tube must have a low leakage factor or poor quality will result. "Speaker rattle" is ordinarily due to a defective type 38 tube.

BALKEIT RADIO CO.

MODEL 41 A

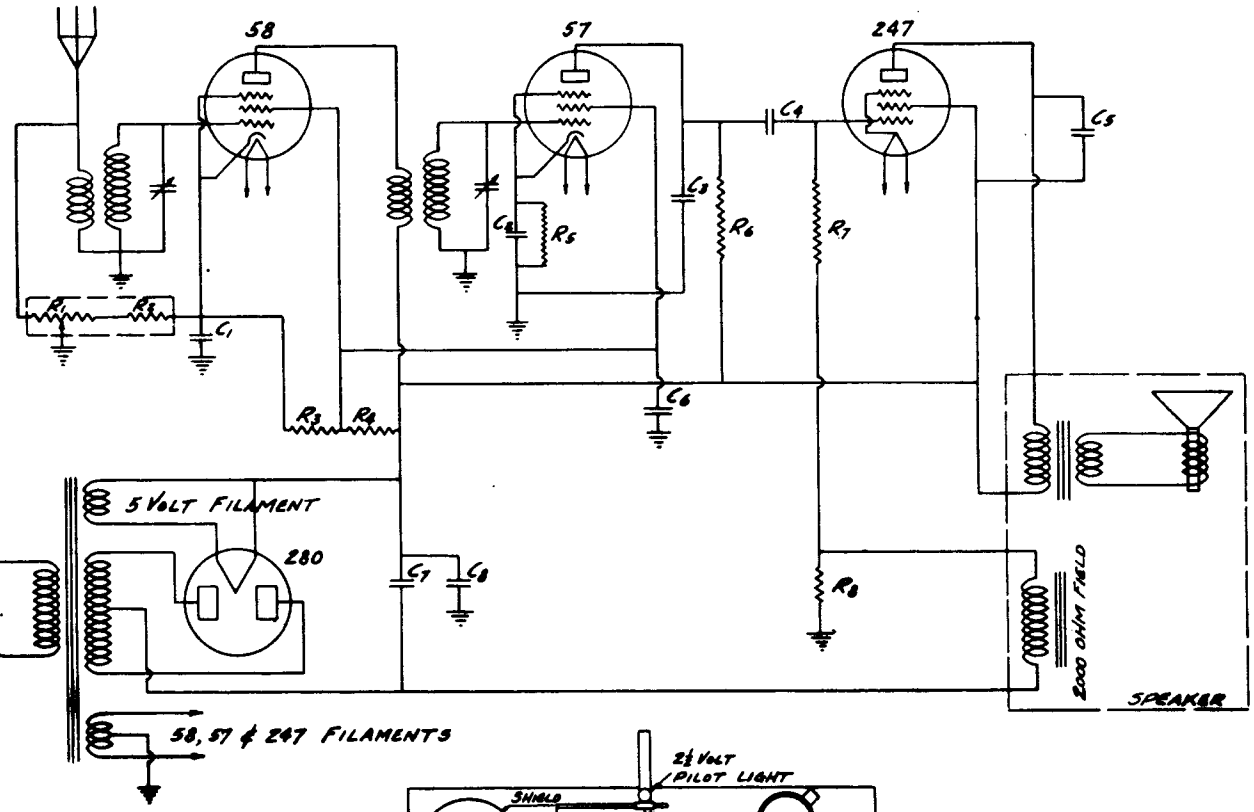


Trouble Shooting Hints

If oscillation is encountered with this receiver the trouble is probably located in the second detector circuit. It is necessary that the tube shields on all tubes be firmly seated and the connection between the control grid and the diode plates of the 75 tube must be as great as possible. If a loud hum is heard check condensers C14 and C15, and try a new 25Z5.

BALKEIT RADIO CO.

MODELS 42E & 42G

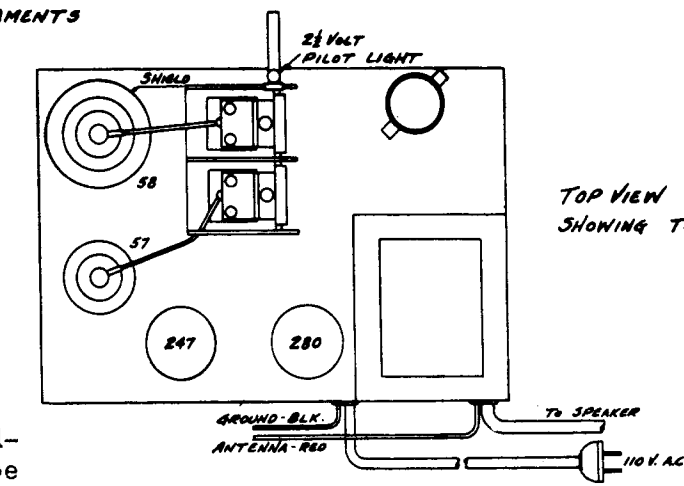


RESISTOR VALUES

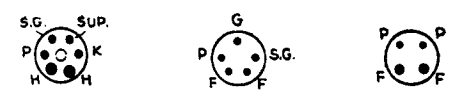
	OHM	WATT
R_1 - 10,000	.	.
R_2 - 250	.	.
R_3 - 50,000	.	½
R_4 - 25,000	.	½
R_5 - 25,000	.	.
R_6 - 500,000	.	.
R_7 - 1 MEG	.	.
R_8 - 450	.	.

CONDENSER CAPACITIES

C_1 - .1 MFD. CONDENSER -	200 VOLT
C_2 - .25	. .
C_3 - .001	. .
C_4 - .05	. .
C_5 - .002	. .
C_6 - .1	. .
C_7 - 4	400 VOLT
C_8 - 4	. .



TOP VIEW OF CHASSIS SHOWING TUBE LOCATION.

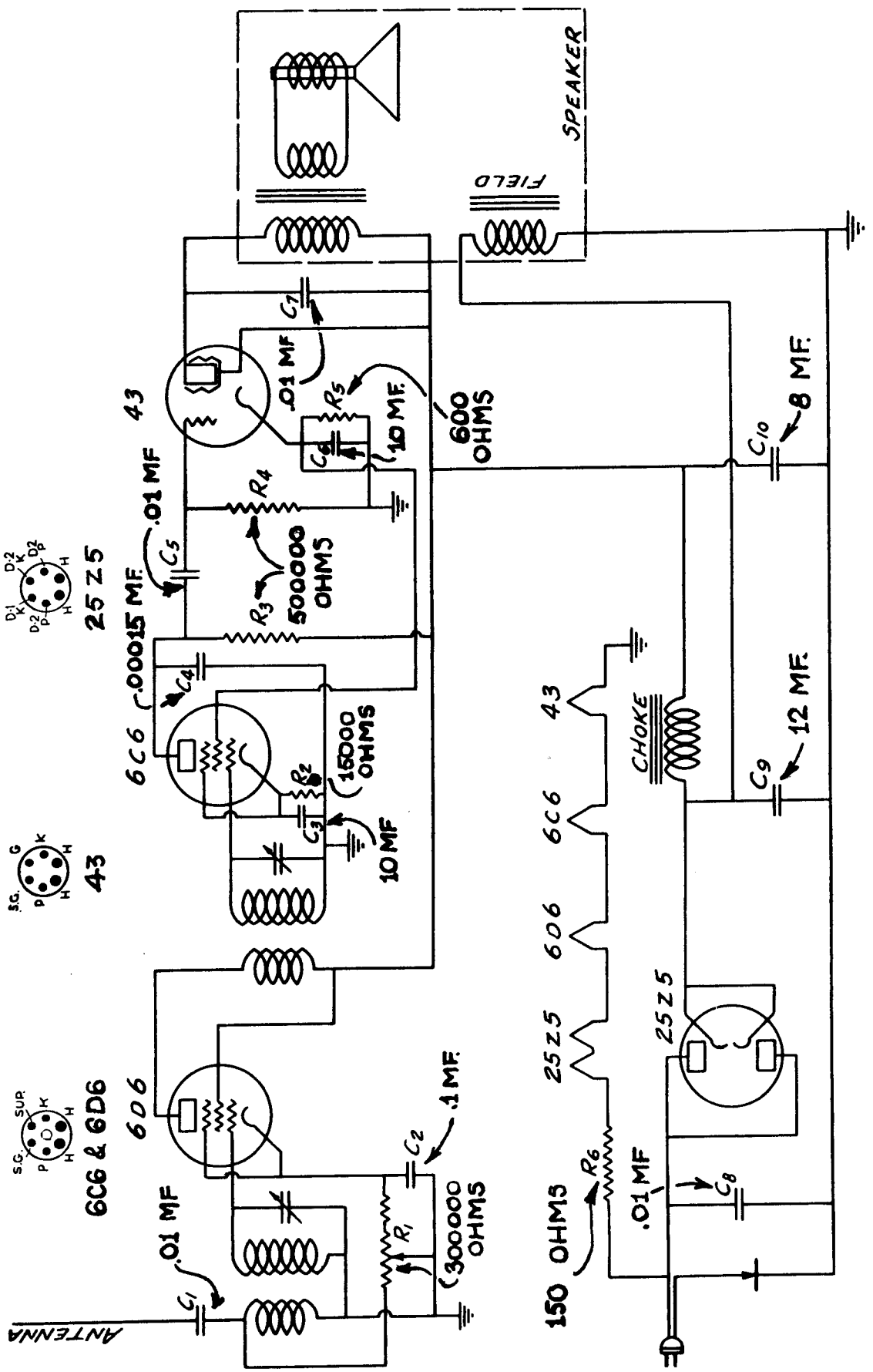


58 & 57 47 80

Trouble Shooting Hints

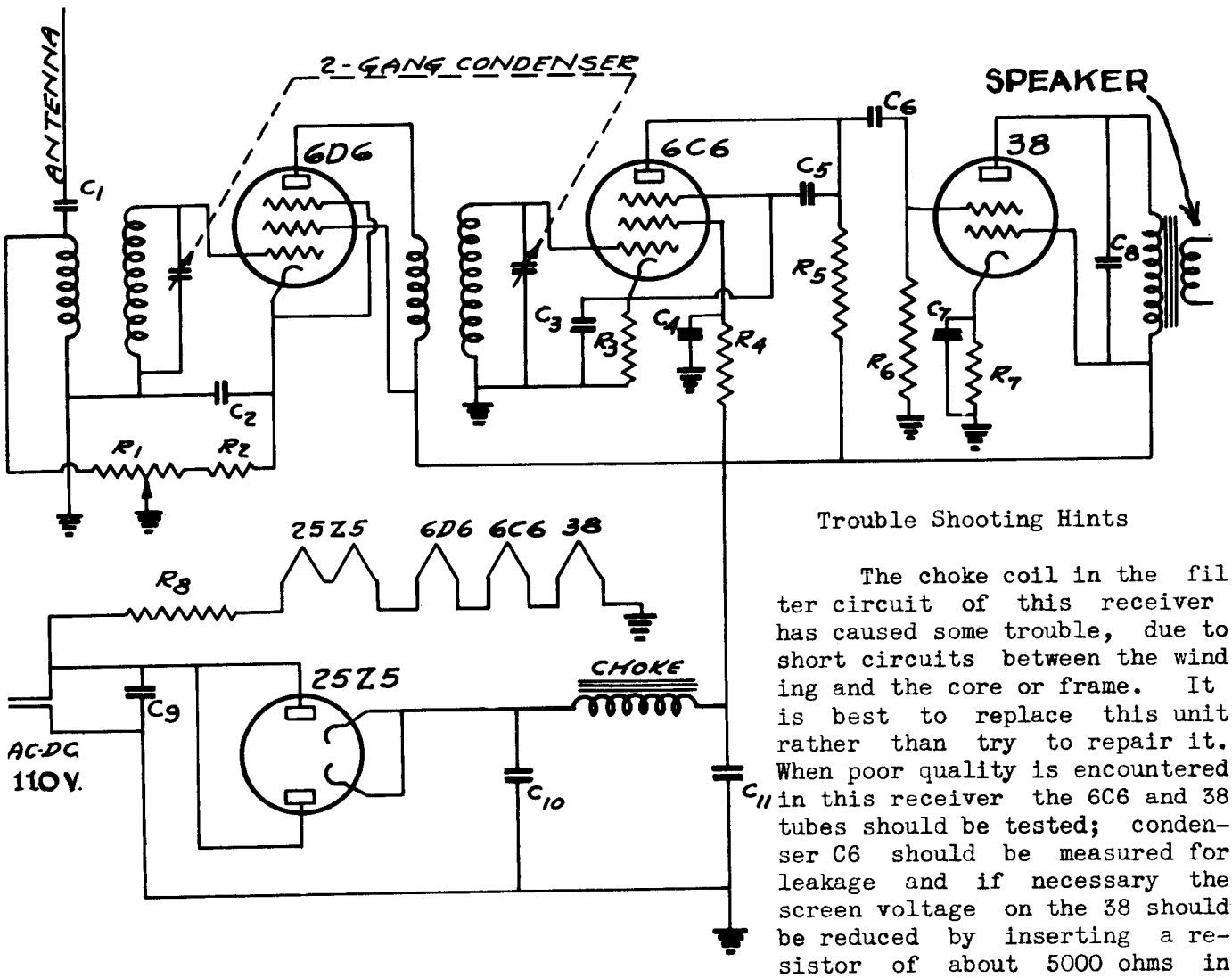
If oscillation occurs in this set the grounding of the tube shield on the 58 tube should be checked, as well as the connection between the chassis and the frame of the tuning condenser. Lack of sensitivity is usually due to defective tubes.

BALKEIT RADIO CO.
MODEL 45



BALKEIT RADIO CO.

MODEL 48



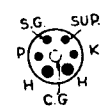
Trouble Shooting Hints

The choke coil in the filter circuit of this receiver has caused some trouble, due to short circuits between the winding and the core or frame. It is best to replace this unit rather than try to repair it. When poor quality is encountered in this receiver the 6C6 and 38 tubes should be tested; condenser C6 should be measured for leakage and if necessary the screen voltage on the 38 should be reduced by inserting a resistor of about 5000 ohms in the screen lead.

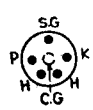
NOTE:- SYMBOL ⏚ INDICATES CHASSIS OF RECEIVER. NO GROUND CONNECTION SHOULD BE MADE TO CHASSIS.

R1 — 300M OHM VOLUME CONTROL.
R2 — 250 OHM FIXED IN VOLUME CONTROL.
R3 — 15M OHM RESISTOR
R4 — 2 MEG. " "
R5 — 500 M. " "
R6 — 1 MEG. " "
R7 — 1500 " "
R8 — 240 OHM RESISTANCE IN LINE CORD.

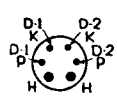
C1 — .01 MFD. CONDENSER
C2 — .01 " "
C3 — 10. " "
C4 — .1 " "
C5 — .00025 " "
C6 — .01 " "
C7 — 10. " "
C8 — .01 " "
C9 — .01 " "
C10 — 16. " "
C11 — 12. " "



6D6 & 6C6



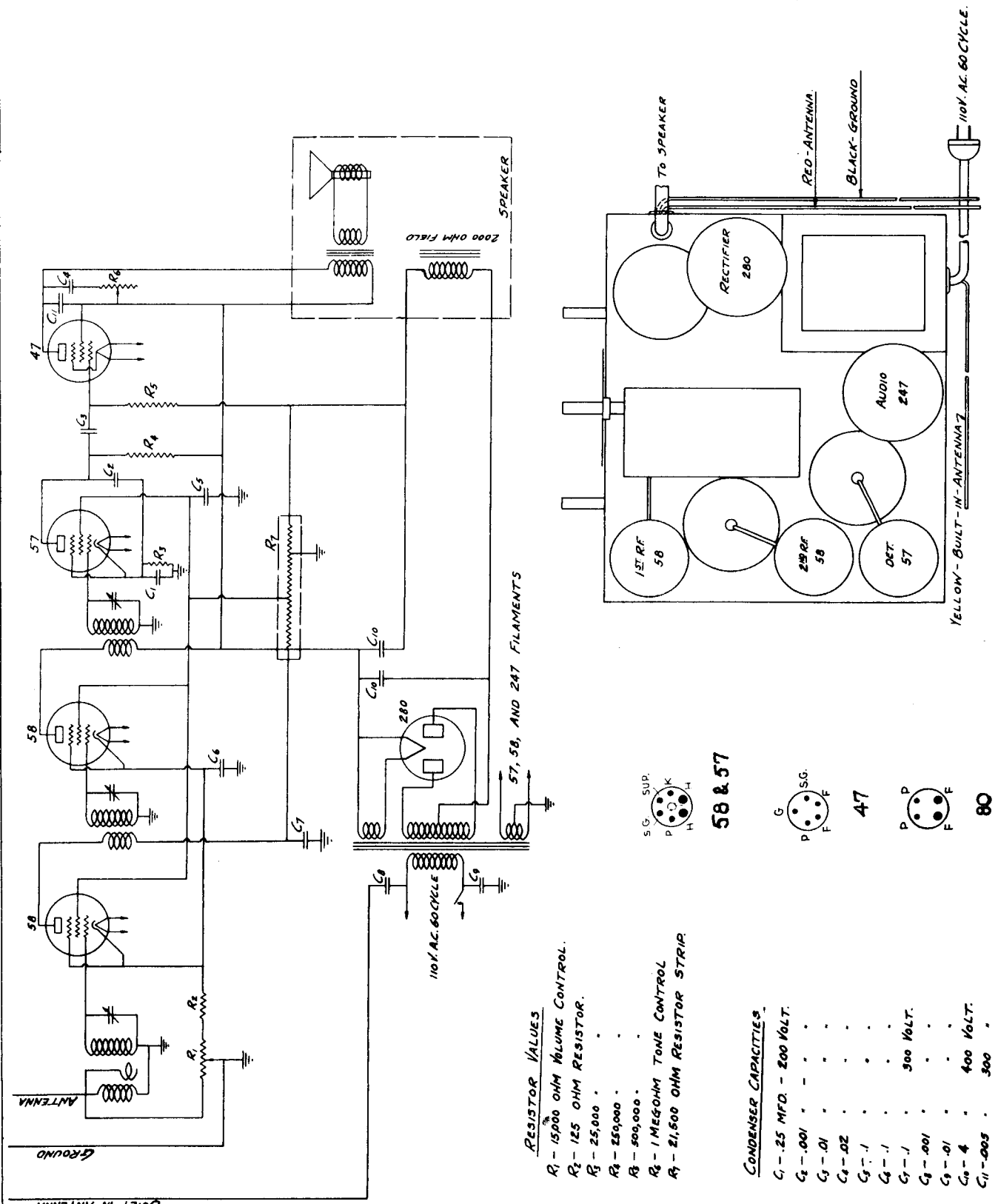
38



25Z5

BALKEIT RADIO CO.

MODEL 52-1



RESISTOR VALUES

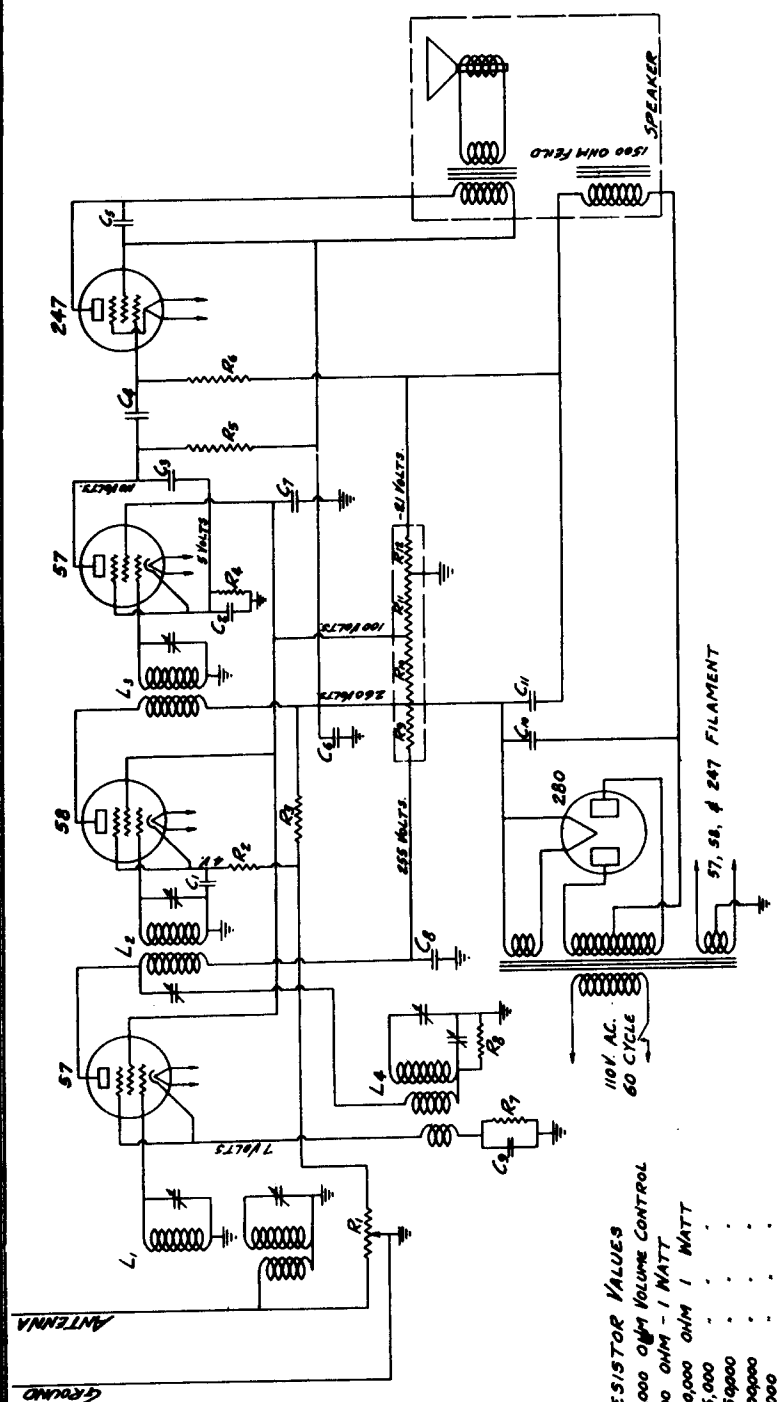
- R_1 - 15,000 OHM VOLUME CONTROL.
- R_2 - 125 OHM RESISTOR.
- R_3 - 25,000 .
- R_4 - 250,000 .
- R_5 - 500,000 .
- R_6 - 1 MEGOHM TONE CONTROL
- R_7 - 21,500 OHM RESISTOR STRIP

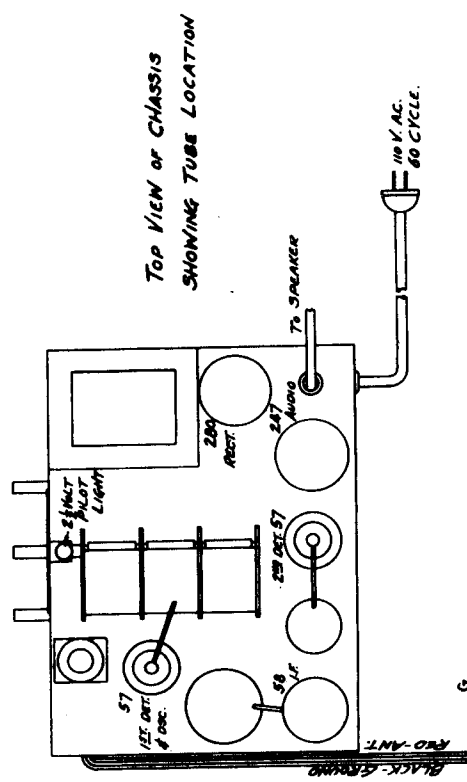
CONDENSER CAPACITIES.

- C_1 - .25 MFD. - 200 VOLT.
- C_2 - .001 . - . .
- C_3 - .01 . . .
- C_4 - .02 . . .
- C_5 - .1 . . .
- C_6 - .1 . . .
- C_7 - .1 . 300 VOLT.
- C_8 - .001 . . .
- C_9 - .01 . . .
- C_{10} - 4 . 400 VOLT.
- C_{11} - .005 . 300 .

BALKEIT RADIO CO.

MODEL 55





RESISTOR VALUES

R1 - 15,000 OHM VOLUME CONTROL
R2 - 700 OHM - 1 WATT
R3 - 100,000 OHM 1 WATT
R4 - 25,000 . . . . .
R5 - 250000 . . . . .
R6 - 500000 . . . . .
R7 - 5000 . . . . .
R8 - 25000 . . . . .
R9 - 1000 . . . . .
R10 - 12500 . . . . . } 12500 OHM TAPPED RESISTOR
R11 - 9000 . . . . .
R12 - 500 . . . . .

CONDENSER CAPACITIES

C1 - .1 MFD. - 200 VOLT
C2 - 25 . . . . .
C3 - .001 MFD. 200 VOLT
C4 - .01 . . . . .
C5 - .005 . . . . .
C6 - .1 . . 300 . .
C7 - .25 . . 200 . .
C8 - .05 . . . . .
C9 - .004 . . . . .
C10 - 4 . . 400 . .
C11 - 4 . . . . .

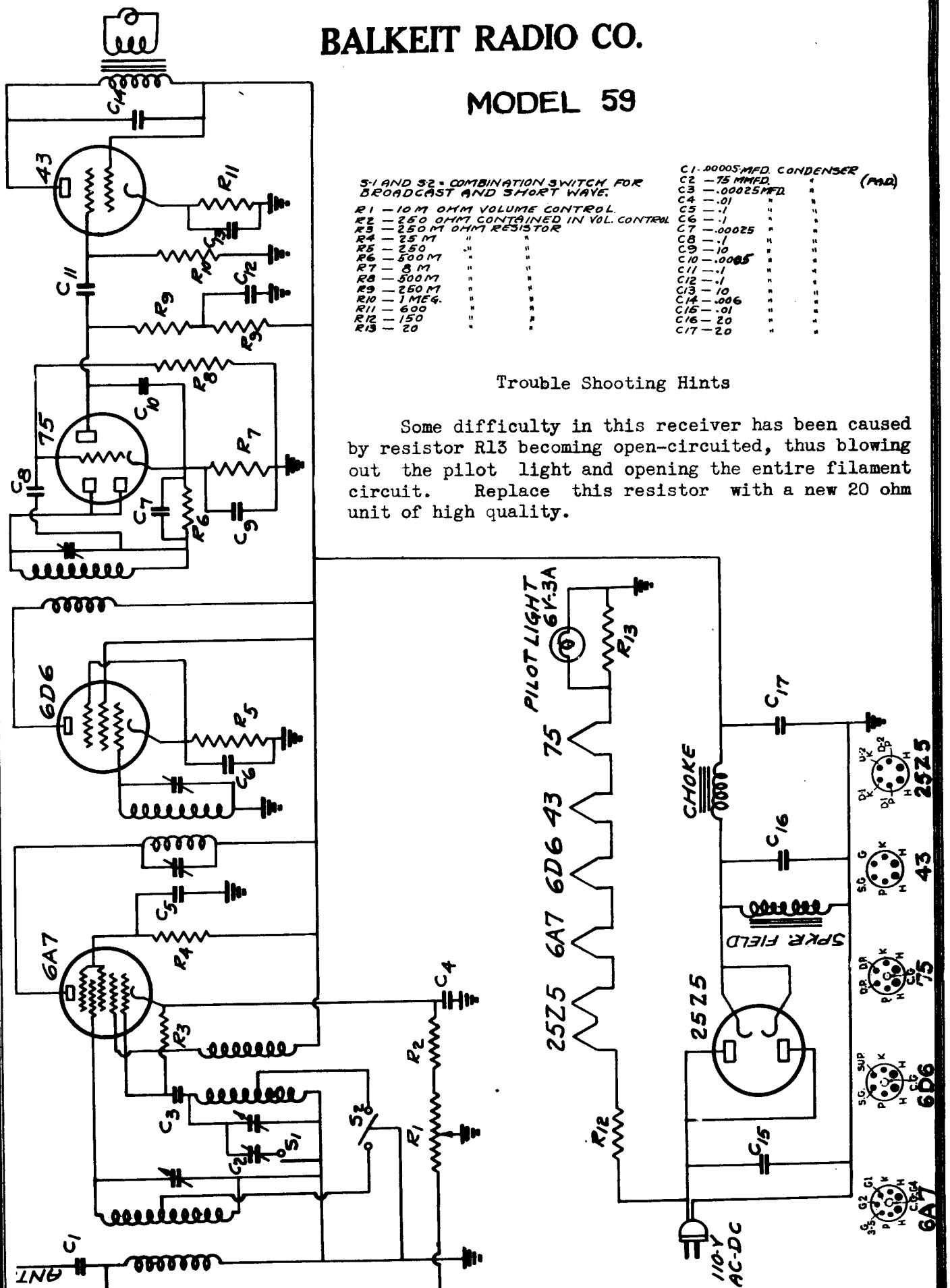
Trouble Shooting Hints

The various voltages for the screen grids and the control grid of the 47 are obtained from a tapped voltage divider. An open circuit in this resistor causes complete failure.

L1 - ANTENNA AND PRE-SELECTOR COIL ASSEMBLY
L2 - 1ST I.F. ASSEMBLY.
L3 - 2ND . . .
L4 - OSCILLATOR COIL ASSEMBLY.

BALKEIT RADIO CO.

MODEL 59



BALKEIT RADIO CO.

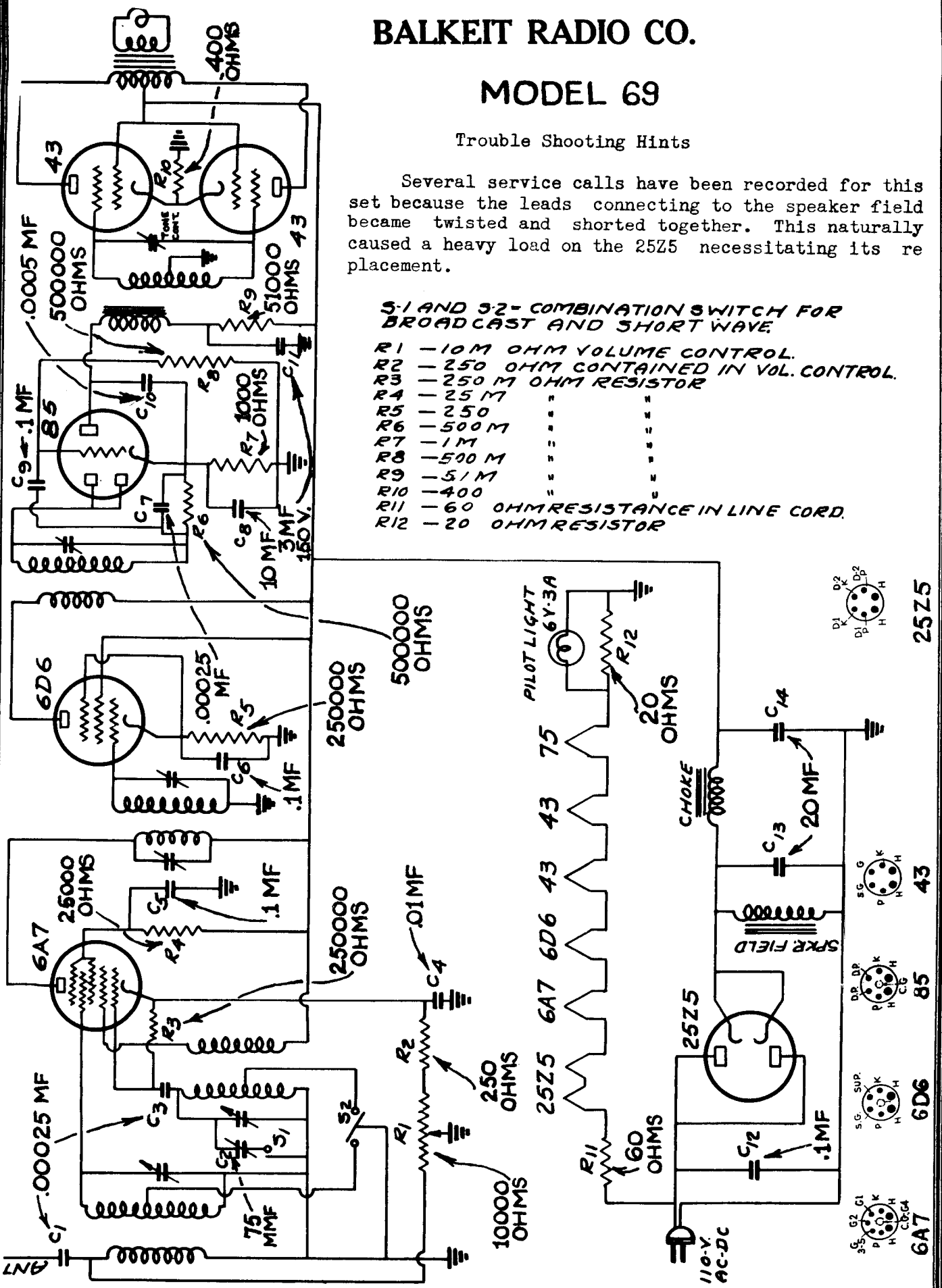
MODEL 69

Trouble Shooting Hints

Several service calls have been recorded for this set because the leads connecting to the speaker field became twisted and shorted together. This naturally caused a heavy load on the 25Z5 necessitating its re placement.

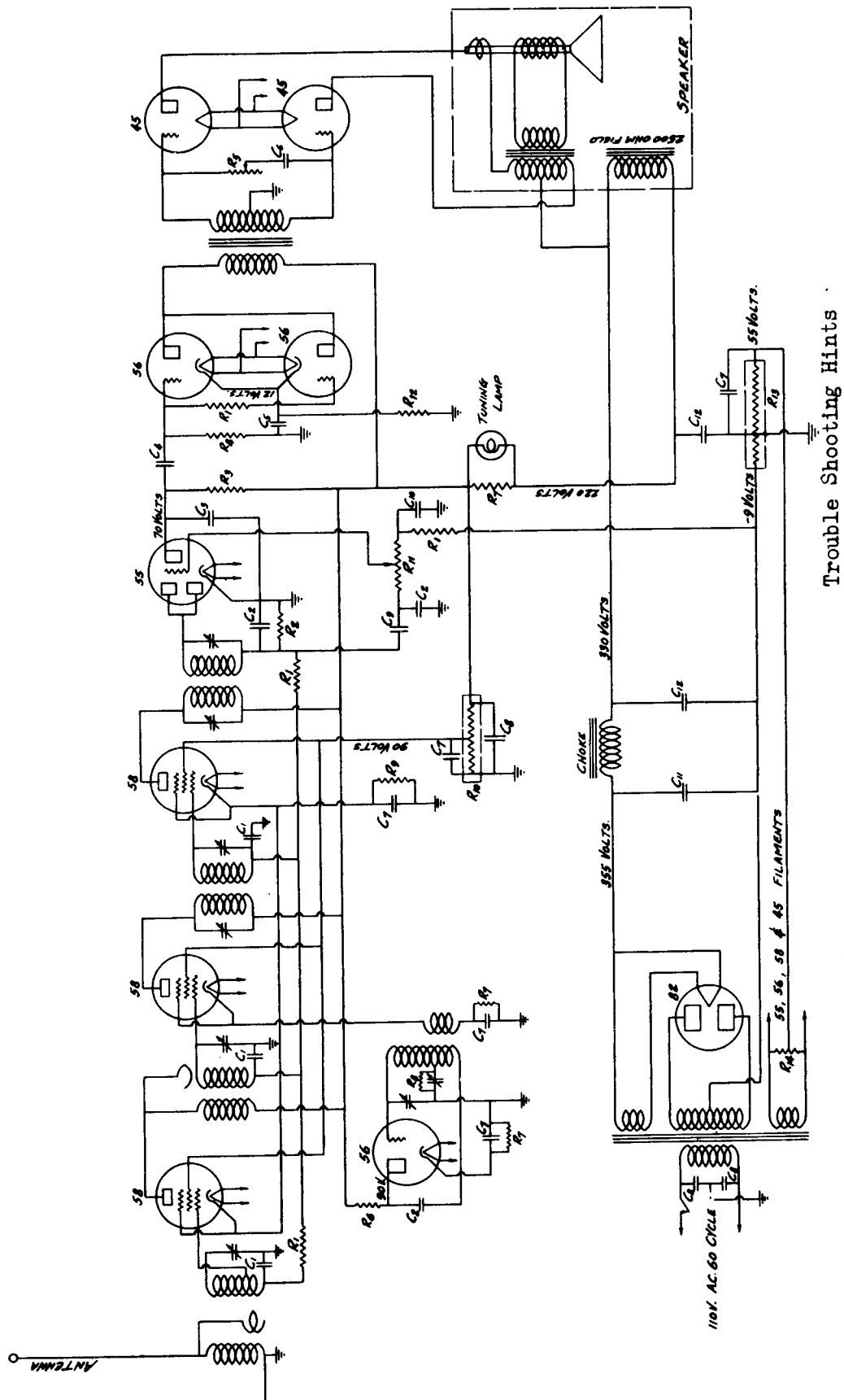
S-1 AND S-2 - COMBINATION SWITCH FOR BROADCAST AND SHORT WAVE.

R1 — 10 M OHM VOLUME CONTROL.
R2 — 250 OHM CONTAINED IN VOL. CONTROL.
R3 — 250 M OHM RESISTOR
R4 — 25 M
R5 — 250
R6 — 500 M
R7 — 1 M
R8 — 500 M
R9 — 5 1 M
R10 — 400
R11 — 60 OHM RESISTANCE IN LINE CORD.
R12 — 20 OHM RESISTOR



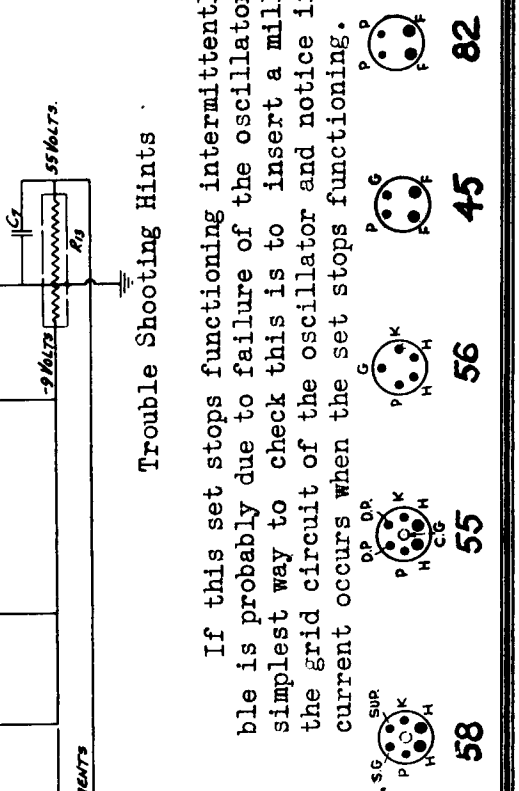
BALKEIT RADIO CO.

MODEL 100



Trouble Shooting Hints

If this set stops functioning intermittently, the trouble is probably due to failure of the oscillator tube. The simplest way to check this is to insert a milliammeter in the grid circuit of the oscillator and notice if a change in current occurs when the set stops functioning.



R_1 - 250,000 OHM RESISTOR
R_2 - 250,000 " "
R_3 - 100,000 " "
R_4 - 800,000 " "
R_5 - 1 MEG. TONE CONTROL
R_6 - 25,000 OHM RESISTOR
R_7 - 5000 " "
R_8 - 8000 " "
R_9 - 100 " "
R_{10} - 10,000 " TAPPED RESISTOR
R_{11} - 1 MEG. VOLUME CONTROL
R_{12} - 1200 OHM RESISTOR
R_{13} - 892 " TAPPED RESISTOR
R_{14} - 20 " C.T.

C_1 - .05 MFD. 200 VOLT CONDENSER
C_2 - .0001 " " "
C_3 - .001 " " "
C_4 - .02 " 300 "
C_5 - .5 " 200 "
C_6 - .002 " " "
C_7 - .1 " 300 "
C_8 - .004 " 200 "
C_9 - 20 " 20 "
C_{10} - 4 " 600 "
C_{11} - 4 " 400 "

BALKEIT RADIO CO.

MODEL C

Trouble Shooting Hints

Failure in this set is ordinarily due to defective filter or by-pass condensers. If whistles are heard when tuning, adjust the neutralizing condensers.

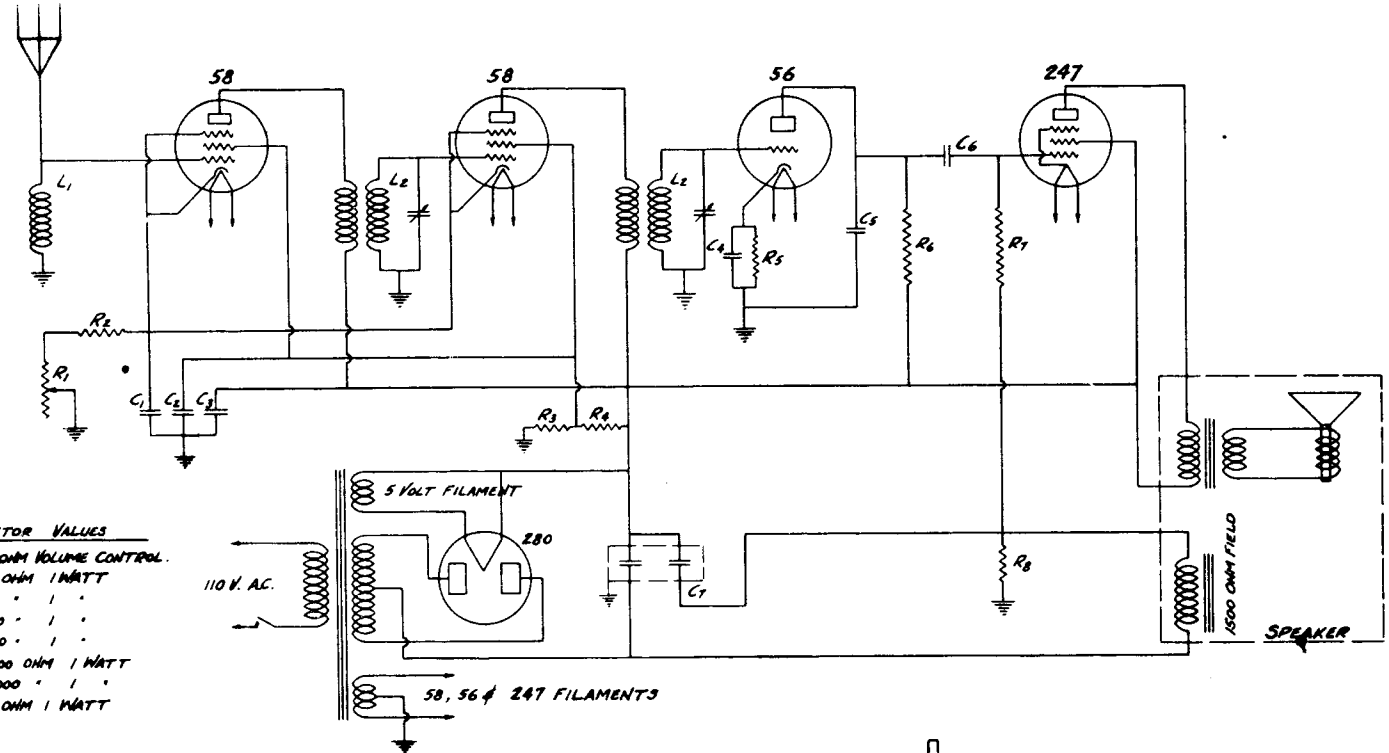
Place all good type 227 tubes in proper sockets, connect aerial and ground and tune in a strong nearby station on a frequency of between 900 and 1400 kilocycles. A local oscillator may be used very satisfactorily if such a device is available. Adjust the receiver so that signal is received at maximum volume. Remove the 227 tube in the first RF socket and replace with dummy tube. If no signal is heard, this stage is properly neutralized. If a signal is heard even though of decreased volume, the neutralizing condenser associated with that tube which is to the left (viewing the set from the rear) must be adjusted. Use a neutralizing tool (not a screw driver) and carefully adjust the screw until minimum signal is heard. Do not press on the tool when making this adjustment, as the capacity may then change when the tool is removed. It is also to be noted that if a neutralizing tool having a heavy metal tip is used the capacity of neutralizing condenser may change when the tool is removed. In this event, the neutralizing condenser should be so adjusted that minimum signal is heard when tool is removed.

Table of Standard Readings Balkeit Model C Receiver

LINE VOLTAGE	A.C. FILAMENT VOLTAGE	PLATE VOLTAGE						GRID BIAS VOLTAGE				PLATE CURRENT MILLIAMPERES			
Control Switch		180	DetAF 227	DetRF 227	Det 227	DetAF 245	280	RF 227	Det 227	DetAF 227	DetAF 245	RF 227	Det 227	DetAF 227	DetAF 245
LO	HI						A.C.								
105															
110															
115															
120															
125															
105															
110															
115															
120															
125															

BALKEIT RADIO CO.

MODEL D-5



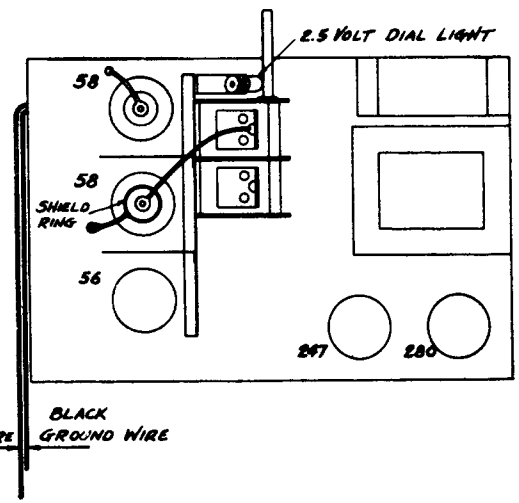
Resistor Values

R_1 - 40000 OHM VOLUME CONTROL.
R_2 - 300 OHM 1 WATT
R_3 - 9000 " 1 "
R_4 - 12,500 " 1 "
R_5 - 10,000 " 1 "
R_6 - 100,000 OHM 1 WATT
R_7 - 500,000 " 1 "
R_8 - 500 OHM 1 WATT

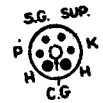
Condenser Capacities

C_1 - .1 MFD. COND. - 200 VOLT.
C_2 - .1 " " " "
C_3 - .1 " " " "
C_4 - .1 " " " "
C_5 - .002 MFD. COND. " "
C_6 - .01 " " " "
C_7 - 8 MFD. FILTER COND. - 2 - 4 MFD. SECTIONS - 400 VOLT.

L_1 - ANTENNA COIL
L_2 - R.F. COIL.

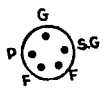


TOP VIEW OF CHASSIS SHOWING TUBE LOCATION.



58

56



47

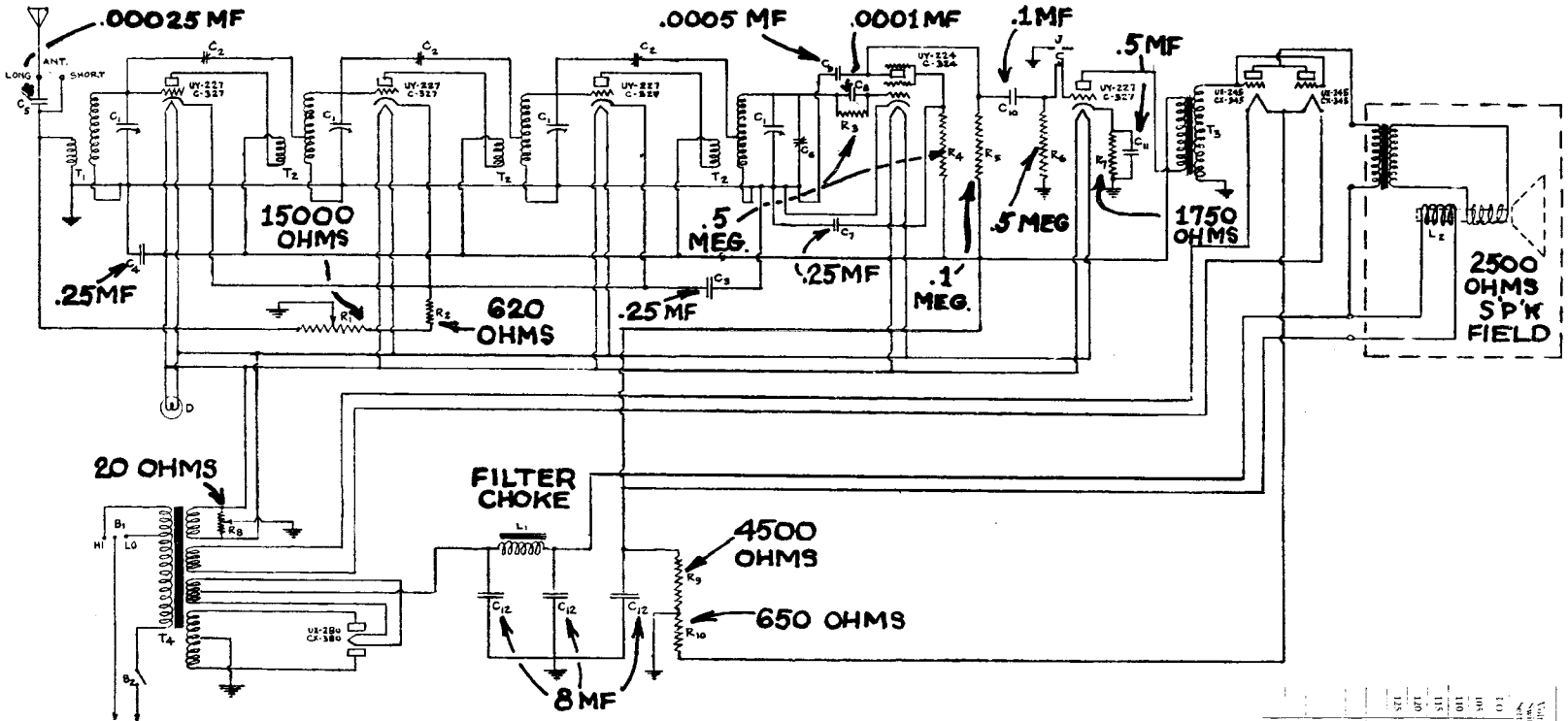
80

Trouble Shooting Hints

Cross talk in this set may be due either to defective shielding, caused by insufficient grounding of the tube shields, etc., or it may be due to misalignment of the tuning circuits and the use of too long an antenna. Connect a small semivariable cond. in the aerial lead.

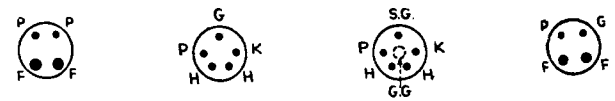
BALKEIT RADIO CO.

MODEL F



Trouble Shooting Hints

Oscillation in this receiver is ordinarily caused by defects in the neutralization. If a new type 27 tube is inserted in the R.F. sockets it is usually necessary to adjust the neutralizing condensers.



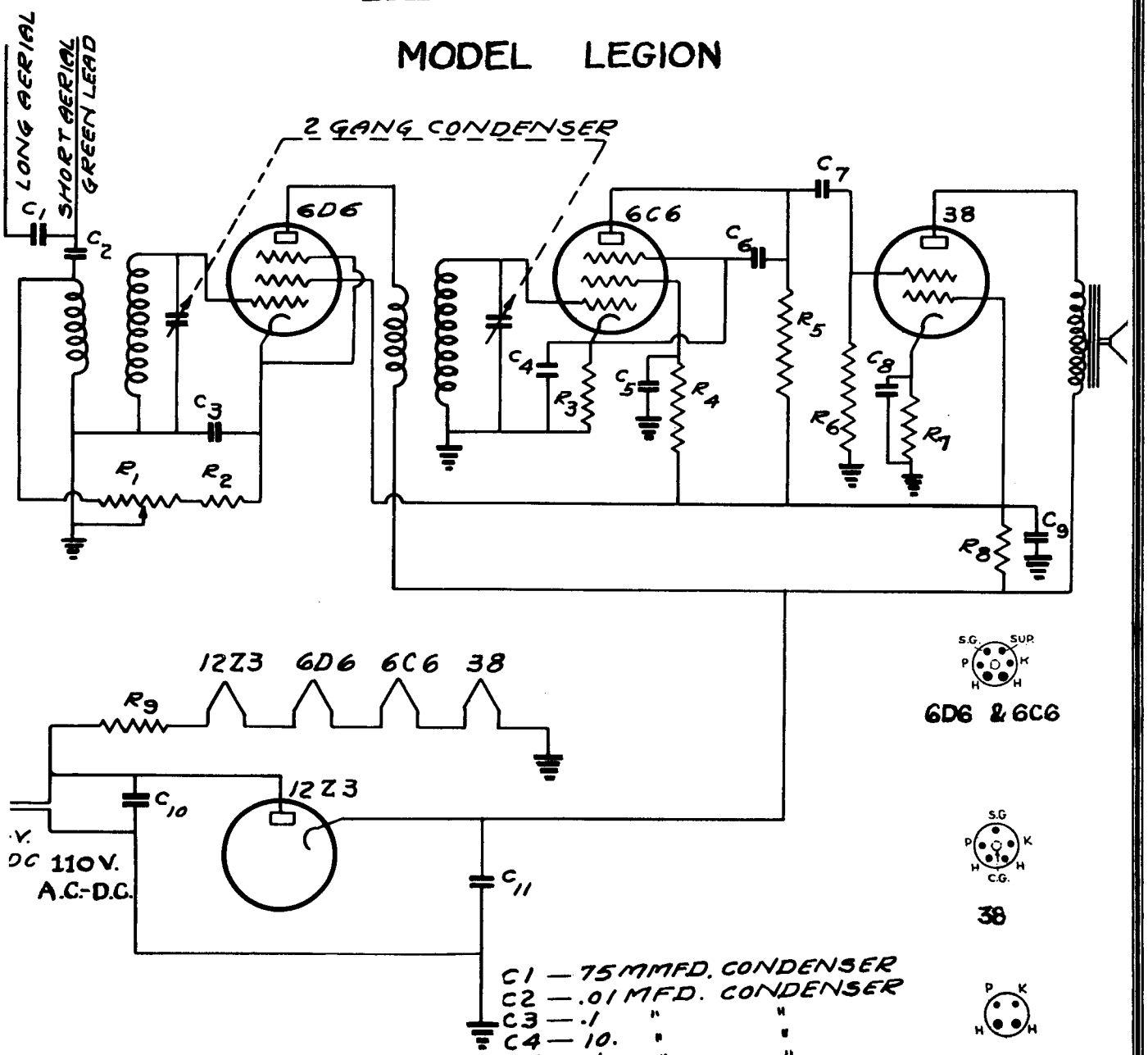
Place all good type 227 tubes in the proper sockets, connect aerial and ground and tune in a strong nearby station on a frequency of between 900 and 1400 kilocycles. A local oscillator may be used very satisfactorily if such a device is available. Adjust the receiver, so that the signal is received at maximum volume. Remove the 227 tube in the first R. F. socket and replace with the dummy tube. If no signal is heard, this stage is properly neutralized. If a signal is heard, even though of decreased volume, the neutralizing condenser associated with that tube which is front of that patricular socket, must be adjusted. Use a neutralizing tool (not a screw driver) and carefully adjust the screw until minimum signal is heard. Do not press on the tool when making this adjustment, as the capacity may then change when the tool is removed. It is also to be noted that if a neutralizing tool having a heavy metal tip is used, the capacity of the neutralizing condenser may change when the tool is removed. In this event, the neutralizing condenser should be so adjusted that minimum signal is heard when the tool is removed.

Standard Readings Model "F" Receiver

LINE VOLTAGE		ALTERNATING VOLTAGE		PLATE VOLTAGE								GRID BIAS VOLTAGE				PLATE CURRENT MILLIAMPERES					
Voltage Switch Setting		227	245	280	1st A.F. 227	R.F. 227	1st A.F. 224	2nd A.F. 245	280	1st A.F. 224	Screen Grid 227	R.F. 227	1st A.F. 224	2nd A.F. 245		R.F. 227	1st A.F. 224	2nd A.F. 245		1st A.F. 227	2nd A.F. 245
100	100	2.4	2.45	4.8	119	122.5	48	193	400	9.0	9.0	8.2	6.5	12		2.9	0.8	4.0	38		
105	105	2.46	2.6	5.0	123	128	50	202	425	9.2	9.0	7.0	7.5	14.5		3.0	0.8	4.2	40		
110	110	2.58	2.7	5.3	130	135	52	211	440	9.5	9.0	7.5	8.0	16.5		3.2	0.9	4.5	42		
115	115	2.7	2.8	5.5	134	141	54	220	462	10.0	10.0	8.0	8.5	19		3.5	1.0	4.8	43		
120	120	2.82	2.93	5.7	141	148	54	232	480	10.5	10.5	8.5	9.0	21.5		3.5	1.0	5.0	45		
125	125	2.55	2.65	5.2	127	143	51	208	435	9.5	9.5	7.5	8.0	16		3.1	0.9	4.5	41		

BALKEIT RADIO CO.

MODEL LEGION



6D6 & 6C6

38

12Z3

C1 — 75 MMFD. CONDENSER
C2 — .01 MFD. CONDENSER
C3 — .1 " "
C4 — 10. " "
C5 — .1 " "
C6 — .0005 " "
C7 — .01 " "
C8 — .1 " "
C9 — 8. " "
C10 — .1 " "
C11 — 8. " "

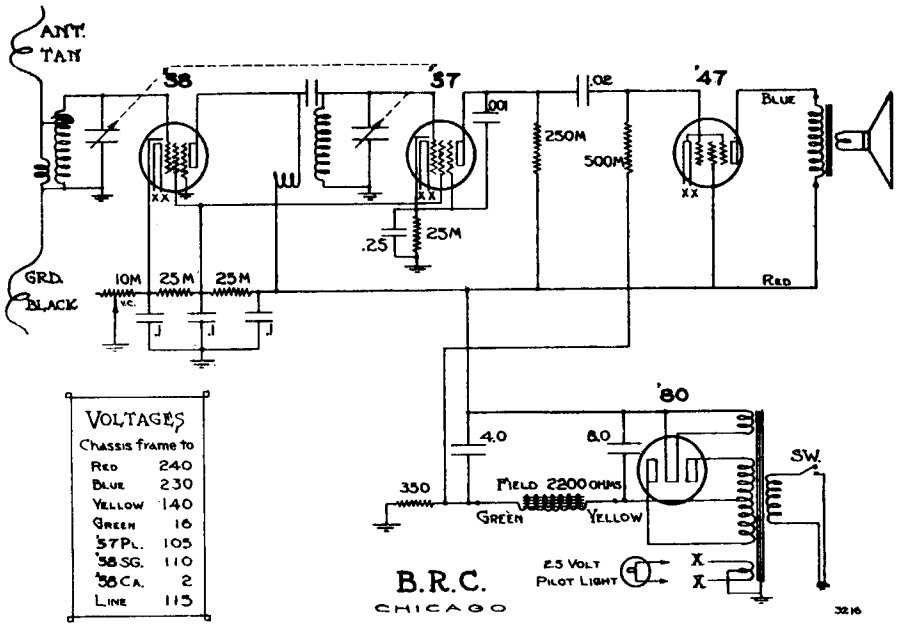
R1 — 300 M OHM VOLUME CONTROL
R2 — 250 OHM FIXED IN VOLUME CONTROL
R3 — 15 M OHM RESISTOR
R4 — 1 MEG. " "
R5 — 500 M " "
R6 — 1 MEG. " "
R7 — 1500 " "
R8 — 15 M " "
R9 — 280 OHM RESISTANCE IN LINE CORD

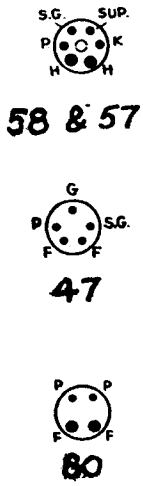
Trouble Shooting Hints

A rattling noise, sounding very much like the armature of the magnetic speaker is often due to incorrect bias on the 38 power tube which causes a blocking. If this occurs check the values of the resistors R6 and R7 and test the power tube to be sure that its characteristics are near to normal. If a loud hum is heard in this set condensers C8 and C11 should be suspected first. If C11 becomes shorted the rectifier tube should be replaced.

BELMONT RADIO CORP.

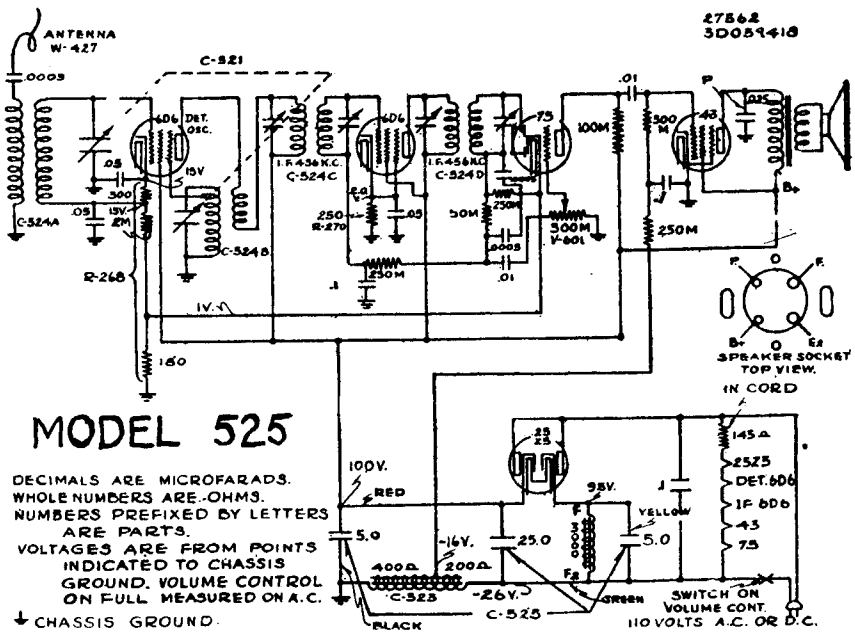
MODELS 40 A 41 A & 42 A

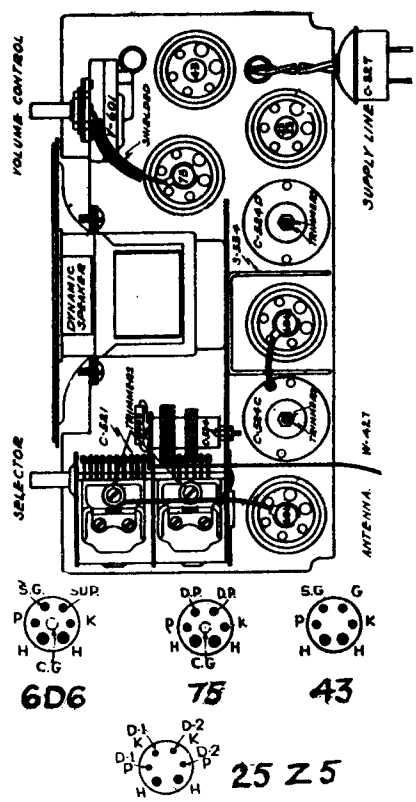




Trouble Shooting Hints

When the plate voltage on the 58 and 57 is high and no plate voltage appears on the 47, suspect the primary of the output transformer.





If the tubes in this set do not light, the continuity of the 145 ohm resistor in the power cord should be tested in addition to the tube filaments.

OPERATING INSTRUCTIONS

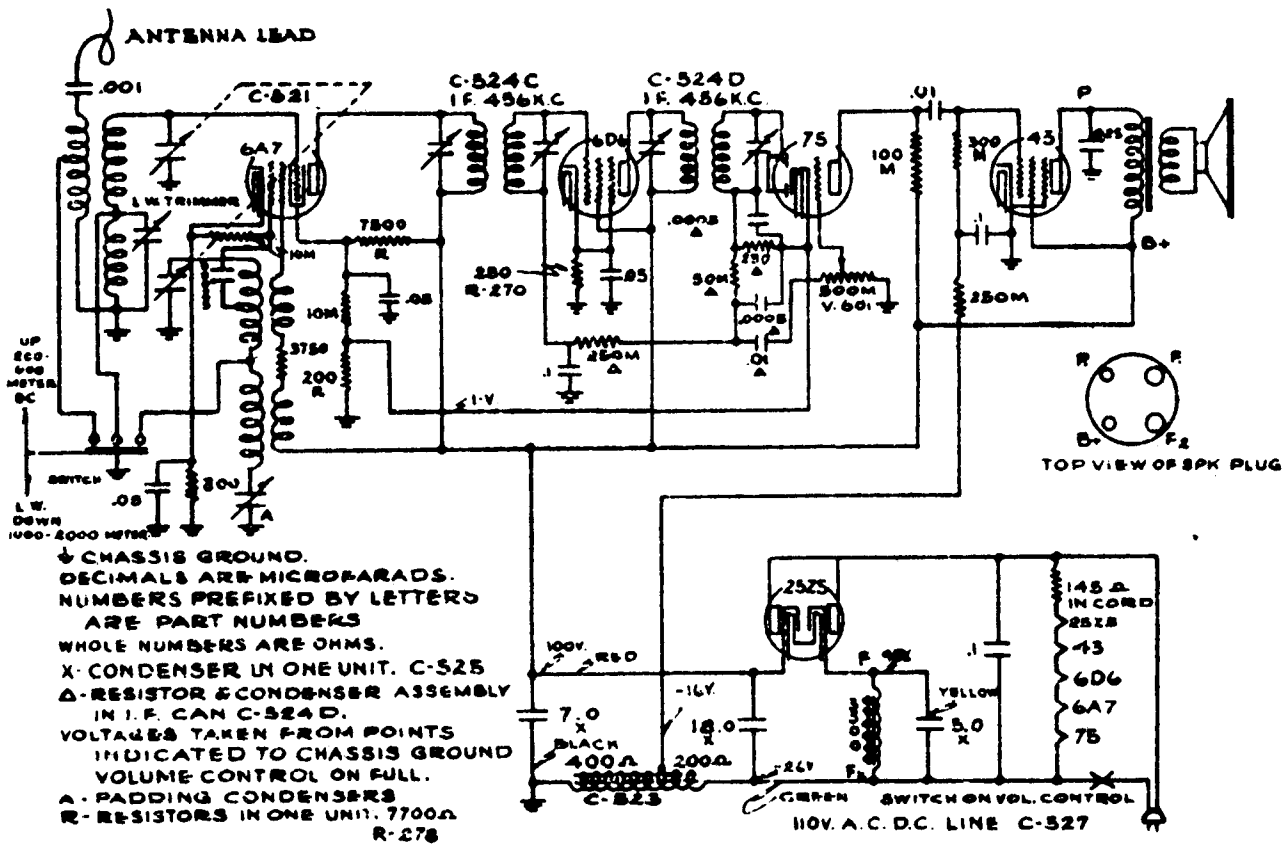
1. Carefully remove antenna wire from its compartment and stretch out full length. A properly erected well insulated outdoor antenna about 75 feet in length, including lead-in is recommended for permanent installations. A GROUND IS NOT REQUIRED.
2. After making certain that power supply is 110 volts, insert plug in receptacle.
3. Rotating VOLUME control clockwise (right) from off position turns power switch on, continued rotation increases volume. IF SET DOES NOT OPERATE IN ONE MINUTE ON DIRECT CURRENT REVERSE PLUG IN RECEPTACLE.
4. Advance volume control three-quarter turn, then select the desired station. Tune this station to the loudest point on the scale, then raise or lower volume with VOLUME control. Never regulate volume by detuning station selector, always adjust VOLUME control.

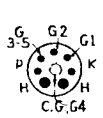
FIVE TUBES, 2—6D6, 1—75, 1—43, 1—25Z5.

BELMONT RADIO CORP.

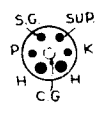
MODEL-53

30135
5F066001



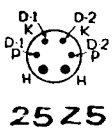


6A7



6D6

75



25Z5

OPERATING INSTRUCTIONS

1. Carefully remove antenna wire from its compartment. A properly erected well insulated outdoor antenna about 75 feet in length, including lead-in is recommended. A GROUND IS NOT REQUIRED.
2. After making certain that power supply is 110 volts, insert plug in receptacle.
3. Rotating VOLUME control clockwise (right) from off position turns power switch on, continued rotation increases volume. IF SET DOES NOT OPERATE IN ONE MINUTE ON DIRECT CURRENT REVERSE PLUG IN RECEPTACLE.
4. Advance volume control three-quarters turn, then select the desired station. Tune this station to the loudest point on the scale, then raise or lower volume with VOLUME control. Never regulate volume by detuning station selector, always adjust VOLUME control.

FIVE TUBES. 1—6A7. 1—6D6. 1—75. 1—43. 1—25Z5.

SERVICE SUGGESTIONS

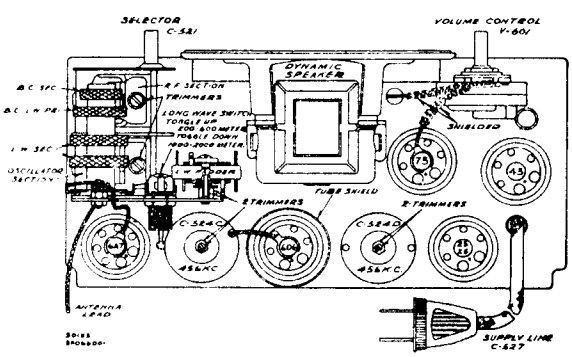
NOTE—CONNECTING CORD OF SET GETS WARM IN NORMAL OPERATION. DO NOT BECOME ALARMED.

Make sure that all tubes are pushed firmly in their proper sockets and that the clips are securely fastened to the caps on the tops of the tubes.

That the aerial is stretched out and that the connections to an outdoor antenna (if used) are good.

If necessary to change tubes or service chassis, UNDER NO CIRCUMSTANCES REMOVE BACK OR CHASSIS WITHOUT FIRST REMOVING PLUG FROM LIGHT SOCKET.

To remove chassis from cabinet, pull off knobs from front, remove back (held with screws to case). Remove four mounting screws, then chassis can be slipped out of case.



Should it be necessary, at any time, to rebalance this set the procedure is as follows: Attach a 456 kilocycle oscillator to the grid of the 6A7 tube in back of the variable condenser and adjust the trimming condensers of the I. F. transformers to maximum deflection on an output meter connected across the primary of the speaker input transformer. While adjusting these trimmers, the variable condenser should be at the maximum capacity position—at the extreme right of its rotation.

With switch lever up in 200-600 meter position, disconnect the antenna wire and connect an oscillator in series with a 250 mfd. condenser to the antenna coil, rotate the condenser plates to the minimum capacity position, extreme left turn, and adjust trimmer condenser of the oscillator and rear section of the variable to resonance with the oscillator set at 200 meters, adjust the front section to resonance at 215 meters, align at 250—300—400—500 meters and bend slotted plates of variable condenser if necessary. To adjust long wave, 1000-2000 meters, with switch lever down, set variable at maximum capacity, extreme right turn, and tune generator to maximum output, then peak long wave padder (hexagon nut of L. W. Padder), at the same time tuning oscillator until maximum output is attained. Attach oscillator leads to grid of 6A7 ground, set variable condenser at minimum capacity, extreme left turn, and adjust oscillator to resonance with set. Remove oscillator lead from grid of 6A7 and attach to antenna lead, then adjust long wave R.F. trimmer to maximum output (set screw adjustment of L. W. Padder). Do not disturb either oscillator or variable condenser while making this adjustment.

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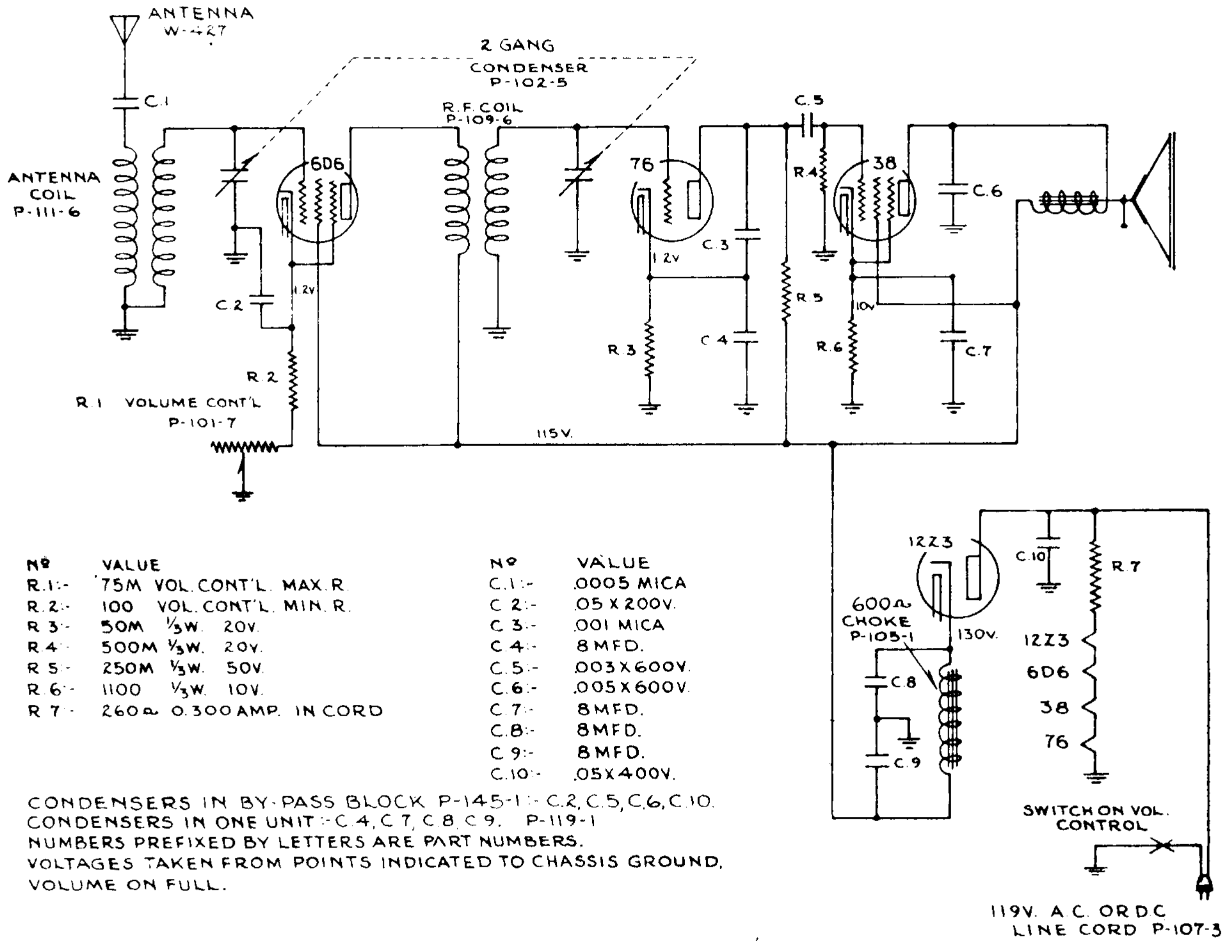
1257 Fullerton Avenue CHICAGO, ILLINOIS

BELMONT RADIO CORP.

MODEL 420



Nº	VALUE
R.1:-	75M VOL. CONT'L. MAX. R.
R.2:-	100 VOL. CONT'L. MIN. R.
R.3:-	50M ⅓W. 20V.
R.4:-	500M ⅓W. 20V.
R.5:-	250M ⅓W. 50V.
R.6:-	1100 ⅓W. 10V.
R.7:-	260Ω 0.300 AMP. IN CORD

Nº	VALUE
C.1:-	.0005 MICA
C.2:-	.05 X 200V.
C.3:-	.001 MICA
C.4:-	8 MFD.
C.5:-	.003 X 600V.
C.6:-	.005 X 600V.
C.7:-	8 MFD.
C.8:-	8 MFD.
C.9:-	8 MFD.
C.10:-	.05 X 400V.

CONDENSERS IN BY-PASS BLOCK P-145-1:- C.2, C.5, C.6, C.10.
CONDENSERS IN ONE UNIT:- C.4, C.7, C.8, C.9. P-119-1
NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND.
VOLUME ON FULL.

34103 R.

OPERATING INSTRUCTIONS - READ CAREFULLY

1. Carefully remove antenna wire from its compartment. A properly erected well insulated outdoor antenna about 75 feet in length, including lead-in is recommended. A GROUND IS NOT REQUIRED.
2. After making certain that power supply is 110 volts, insert plug in receptacle.
3. Rotating VOLUME control clockwise (right) from off position turns power switch on, continued rotation increases volume. IF SET DOES NOT OPERATE IN ONE MINUTE ON DIRECT CURRENT REVERSE PLUG IN RECEPTACLE.
4. Advance volume control three-quarter turn, then select the desired station. Tune this station to the loudest point on the scale, then raise or lower volume with VOLUME control. Never regulate volume by detuning station selector, always adjust VOLUME control.

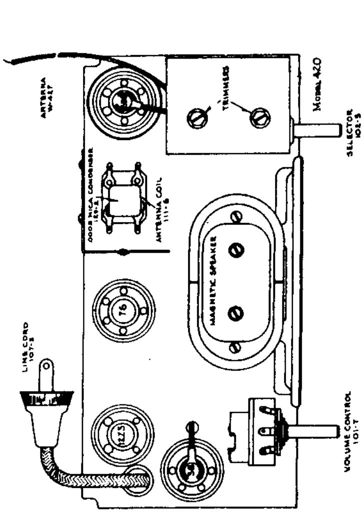
MODEL 420 AC -- DC RECEIVER

FOUR TUBES 1-6D6, 1-76, 1-38, 1-12Z3

USE ONLY ON 105-115 VOLTS ALTERNATING (any cycles) or DIRECT CURRENT—35 WATTS.

CIRCUIT DIAGRAM AND PARTS LIST SUPPLIED ON REQUEST—mention serial and model number and enclose stamped, self addressed envelope.

For use on 220 volts an external resistor is required



SERVICE SUGGESTIONS:

NOTE—CONNECTING CORD OF SET GETS WARM IN NORMAL OPERATION. DO NOT BECOME ALARMED.

Make sure that all tubes are pushed firmly in their proper sockets and that the clips are securely fastened to the caps on the tops of the tubes.

That the aerial is stretched out and that the connections to an outdoor antenna (if used) are good.

If necessary to change tubes or service chassis, UNDER NO CIRCUMSTANCES REMOVE BACK OR CHASSIS WITHOUT FIRST REMOVING PLUG FROM LIGHT SOCKET.

To remove chassis from cabinet, pull off knobs from front, remove back (held with screws to case). Remove four mounting screws, then chassis can be slipped out of case.

—PATENTED—

Licensed only for radio amateur, experimental and broadcast reception. The manufacture and/or sale of this apparatus does not imply any license under any patent relating to the structure or manufacture of radio tubes.
1,201,270—1,231,764—1,239,852—1,251,377—1,273,627—1,282,439—1,297,188—1,313,094—1,329,283—1,342,885
1,349,252—1,377,405—1,398,665—1,408,475—1,403,932—1,426,754—1,459,412—1,465,332—1,465,961—1,484,805
1,491,774—1,507,016—1,507,017—1,508,151—1,537,708—1,544,081—1,558,437—1,573,374—1,611,848—1,631,646
1,639,713—1,702,833—1,707,617—1,714,149—1,734,038—1,734,132—1,770,838—1,795,214—1,811,095—1,849,861
1,852,068—1,868,443—1,869,089—1,880,323—1,876,841—Re-14,967—Re-18,579

Also licensed under the following patents of the Hazeltine and Latour Corporations:
1,648,808—1,755,114—1,755,115—1,852,710—1,710,035—1,823,331—1,680,424—1,873,837—1,878,863—1,855,064
1,855,065—Re-18,481—1,382,738—1,405,523—and pending applications

STANDARD WARRANTY

This receiver and tubes were carefully tested and inspected; it was packed in an approved container and left our factory in perfect condition. Should it arrive in a damaged condition, file claim with carrier at once.

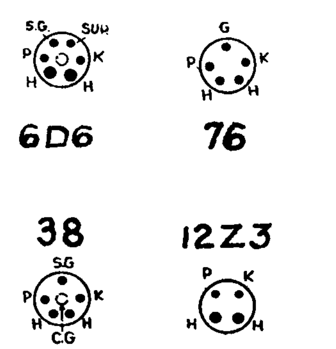
We warrant each new radio receiver manufactured by us to be free from defects in material or workmanship under normal use, our obligation under this warranty being limited to making good at our factory any part or parts thereof which shall within ninety days from date of shipment be returned to our factory, carefully packed and transportation charges prepaid.

This warranty will not apply if this card is not returned with set, or if serial number has been effaced or tampered with, or if in our judgment set has been misused, abused or connected otherwise than in accordance with these instructions.

BELMONT RADIO CORPORATION

1257 Fullerton Avenue — CHICAGO, ILLINOIS

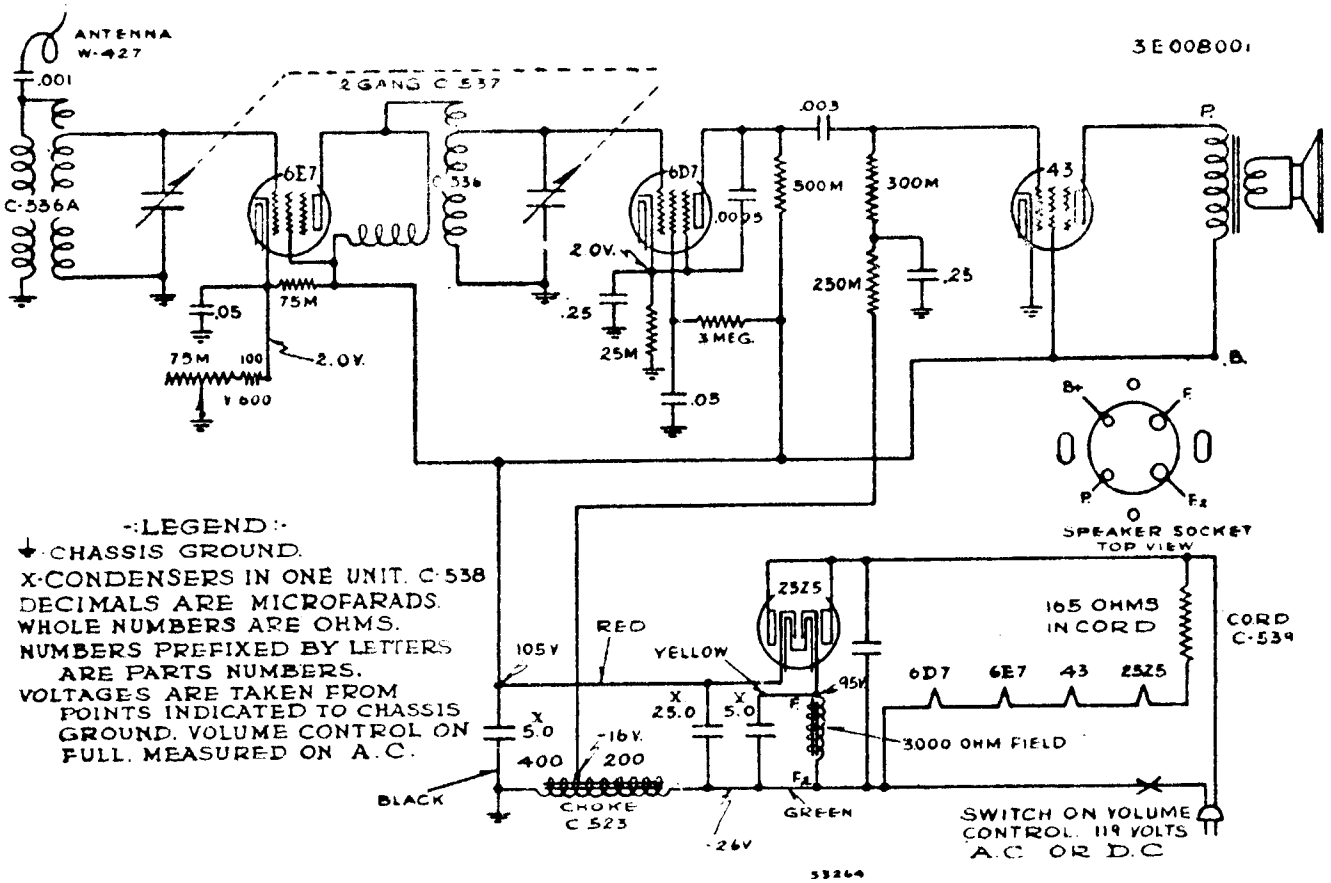
3-14-34-30



Trouble Shooting Hints

A continuous whistle in this set indicates oscillation in the 38 power tube. A new tube should be tried in the socket first and if this does not remove the trouble the resistance values of R 4 and R 6 should be checked.

BELMONT RADIO CORP.
MODEL 425



SERVICE SUGGESTIONS

NOTE—CONNECTING CORD OF SET GETS WARM IN NORMAL OPERATION. DO NOT BECOME ALARMED.

Make sure that all tubes are pushed firmly in their proper sockets and that the clips are securely fastened to the caps on the tops of the tubes.

That the aerial is stretched out and that the connections to an outdoor antenna (if used) are good.

If necessary to change tubes or service chassis, UNDER NO CIRCUMSTANCES REMOVE BACK OR CHASSIS WITHOUT FIRST REMOVING PLUG FROM LIGHT SOCKET.

To remove chassis from cabinet, pull off knobs from front, remove back (held with screws to case). Remove four mounting screws, then chassis can be slipped out of case.

IF CABINET IS METAL CAREFULLY NOTE POSITION OF FIBRE WASHER AND THIS CARD AND REASSEMBLE IN THE SAME MANNER, INSULATING CHASSIS FROM CASE.

CIRCUIT DIAGRAM AND PARTS LIST SUPPLIED ON REQUEST—mention serial and model number and enclose stamped, self addressed envelope.

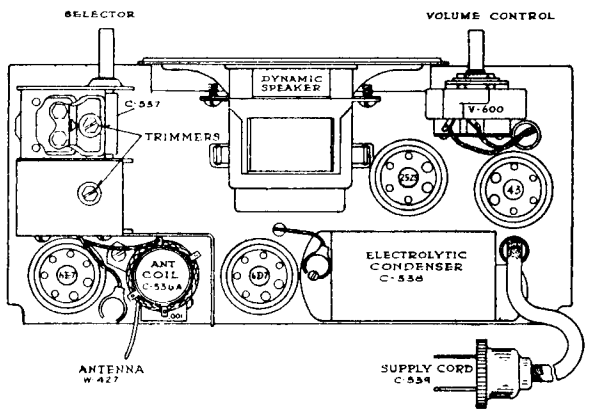
Model 425 AC-DC RECEIVER.

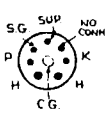
USE ONLY ON 105-115 VOLTS ALTERNATING (any cycles) or DIRECT CURRENT—35 WATTS.

Schematic circuit diagram Model 425 AC-DC Radio Receiver.

Should it be necessary at any time to rebalance this set the procedure is as follows:

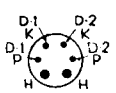
Disconnect antenna wire and attach an oscillator in series with a 50 mmfd. condenser to the antenna coil. With variable condenser at its minimum capacity position—at the extreme left of its rotation-touch trimmer condensers for maximum deflection on an output meter connected across the primary of the speaker input transformer, check trimmer adjustment at 1400 kilocycles, then align at 1200-1000-800-600-540 kilocycles, bend slotted plates of variable condenser if necessary.





6E7
6D7

43



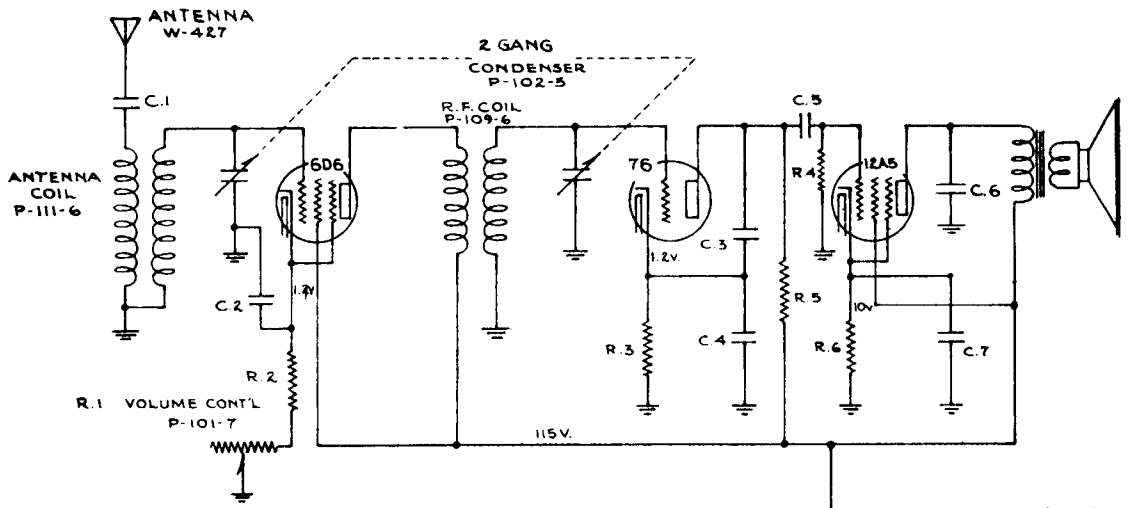
25 Z 5

Trouble Shooting Hints

Broken-down condensers, especially electrolytic filter condensers necessitate the most repairs on this model. If an electrolytic condenser has broken down, it is best to replace the 25 Z5 tube which may have "flashed" due to excess current. If the complaint is poor quality, the 13 tube should be suspected first. If this tube oscillates, it may be necessary to replace a resistor in the screen lead to suppress this cause for poor quality. If cross-talk takes place on a part of the band, the .001 mf. condenser should be replaced with a smaller one.

BELMONT RADIO CORP.

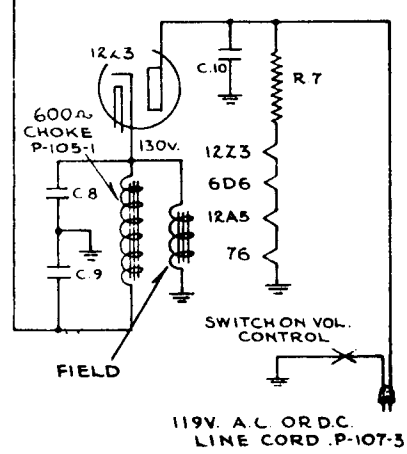
MODEL 430



Nº	VALUE
R.1:-	75M VOL. CONT'L. MAX. R.
R.2:-	100 VOL. CONT'L. MIN. R.
R.3:-	50M 1/3W. 20V.
R.4:-	500M 1/3W. 20V.
R.5:-	250M 1/3W. 50V.
R.6:-	1100 1/3W. 10V.
R 7:-	260Ω 0.300 AMP. IN CORD

Nº	VALUE
C.1:-	.0005 MICA
C.2:-	.05 X 200V.
C.3:-	.001 MICA
C.4:-	5MFD.
C.5:-	.003 X 600V.
C.6:-	.005 X 600V.
C.7:-	5 MFD.
C.8:-	8MFD.
C.9:-	16MFD.
C.10:-	.05 X 400V.

CONDENSERS IN BY-PASS BLOCK P-145-1 :- C.2, C.5, C.6, C.10.
CONDENSERS IN ONE UNIT :- C.4, C.7, C.8, C.9. P-119-3
NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND.
VOLUME ON FULL.



OPERATING INSTRUCTIONS -READ CAREFULLY

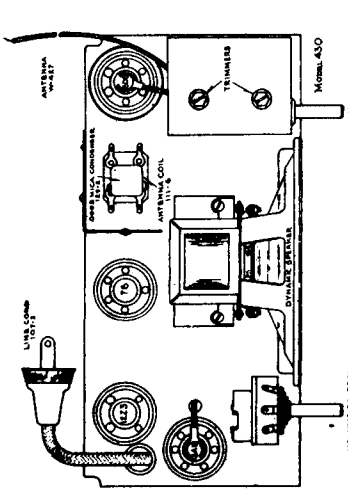
1. Carefully remove antenna wire from its container. A greatly erected, well insulated outdoor antenna about 75 feet in length is ideal for long distance reception. An indoor antenna is not required.
2. Attach antenna lead-in to the terminal marked "ANTENNA" on the back of the chassis.
3. Rotate VOLUME control knob clockwise (right) from OFF position until you hear station, increasing volume. IF SET DOES NOT OPERATE IN ONE MINUTE OR DIRECT CURRENT REVERSE PLUG TO RECEPTACLE.
4. After you control three-quarter turn, then adjust the desired station. Tune this station to the loudest point on the dial, then rock for best volume with VOLUME control. Never regulate volume by detuning station selector, always adjust VOLUME control.

MODEL 430 AC -- DC RECEIVER

FOUR TUBES 1-6D6, 1-76, 1-12A5, 1-12Z3

USE ONLY ON 105-115 VOLTS ALTERNATING (60 cycles) or DIRECT CURRENT—25 WATTS.
CIRCUIT DIAGRAM AND PARTS LIST SUPPLIED ON REQUEST—mention serial and model number and cabinet changed, self addressed envelope.

For use on 220 volts an external resistor is required.



SERVICE

SUGGESTIONS:
NOTE—CONNECTING CORD IN RECEPTACLE WRONG WAY WILL PREVENT OPERATION. DO NOT BECOME ALARMED.
Make sure that all tubes are seated properly and that prong contacts in the sockets are not bent. Be sure that all tubes are securely fastened to the cage on the top of the chassis. Be sure that all screws are tightened out and that all connections to an outdoor antenna (if used) are good.
Before removing chassis, tube or service chassis UNDER NO CIRCUMSTANCES REMOVE BAND CHANGE KNOB WITHOUT FIRST REMOVING PLUG FROM LIGHT SOCKET.
When replacing dials from front, remove dial (held with screws to panel). Remove four screws and dial will slipped out of way.

—PATENTED—
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1,887,190—1,915,997—1,926,440—1,942,890
1,887,191—1,915,998—1,926,441—1,942,891
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1,887,231—1,916,038—1,926,481—1,942,931
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1,887,257—1,916,064—1,926,507—1,942,957
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1,887,299—1,916,106—1,926,549—1,942,999
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1,887,304—1,916,111—1,926,554—1,943,004
1,887,305—1,916,112—1,926,555—1,943,005
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1,887,320—1,916,127—1,926,570—1,943,020
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1,887,322—1,916,129—1,926,572—1,943,022
1,887,323—1,916,130—1,926,573—1,943,023
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1,887,356—1,916,163—1,926,606—1,943,056
1,887,357—1,916,164—1,926,607—1,943,057
1,887,358—1,916,165—1,926,608—1,943,058
1,887,359—1,916,166—1,926,609—1,943,059
1,887,360—1,916,167—1,926,610—1,943,060
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1,887,362—1,916,169—1,926,612—1,943,062
1,887,363—1,916,170—1,926,613—1,943,063
1,887,364—1,916,171—1,926,614—1,943,064
1,887,365—1,916,172—1,926,615—1,943,065
1,887,366—1,916,173—1,926,616—1,943,066
1,887,367—1,916,174—1,926,617—1,943,067
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1,887,369—1,916,176—1,926,619—1,943,069
1,887,370—1,916,177—1,926,620—1,943,070
1,887,371—1,916,178—1,926,621—1,943,071
1,887,372—1,916,179—1,926,622—1,943,072
1,887,373—1,916,180—1,926,623—1,943,073
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1,887,376—1,916,183—1,926,626—1,943,076
1,887,377—1,916,184—1,926,627—1,943,077
1,887,378—1,916,185—1,926,628—1,943,078
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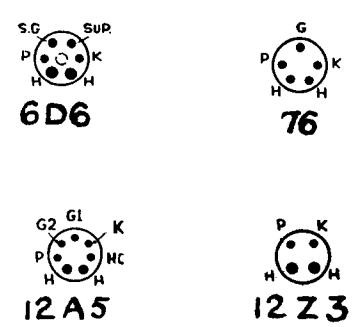
1,887,380—1,916,187—1,926,630—1,943,080
1,887,381—1,916,188—1,926,631—1,943,081
1,887,382—1,916,189—1,926,632—1,943,082
1,887,383—1,916,190—1,926,633—1,943,083
1,887,384—1,916,191—1,926,634—1,943,084
430

This receiver and tubes are carefully tested and inspected; it was found to be in perfect condition and left our factory in perfect condition. If it does not operate properly, notify us at once, stating the trouble. Defects in material or workmanship under normal use and service will be corrected by us at our factory without charge, provided such defects shall within ninety days from date of shipment be returned to our factory, carefully packed and transportation charges prepaid.

If this receiver is not sold by the dealer to whom it was originally shipped, it must be returned with all tubes and accessories with which it was originally packed and shipped. Any receiver returned to us for repairs must be accompanied by a statement showing the name and address of the person from whom it was purchased, and the date of purchase. This warranty is void if the serial number has been altered or removed from the receiver, or if the receiver has been altered or repaired by any one other than an authorized service station, or if in our judgment the set has been misused, abused or connected otherwise than in accordance with these instructions.

STANDARD WARRANTY

BELMONT RADIO CORPORATION
1257 Fullerton Avenue CHICAGO, ILLINOIS

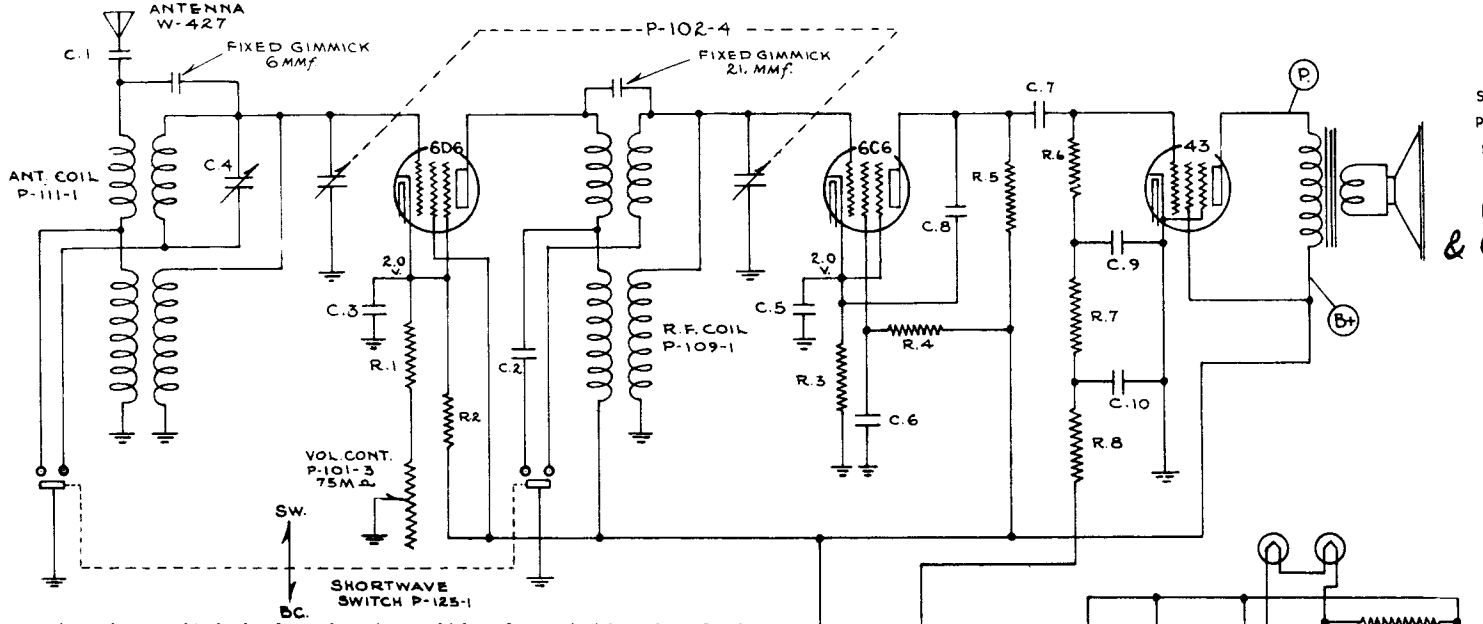


Trouble Shooting Hints

The switch in the volume control in this receiver is frequently the cause of service calls. The contact arm on this switch does not make complete contact after it has been in use for some time and the entire volume control should be replaced.

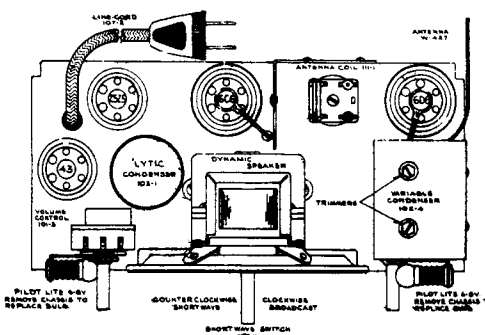
BELMONT RADIO CORP.

MODEL 440



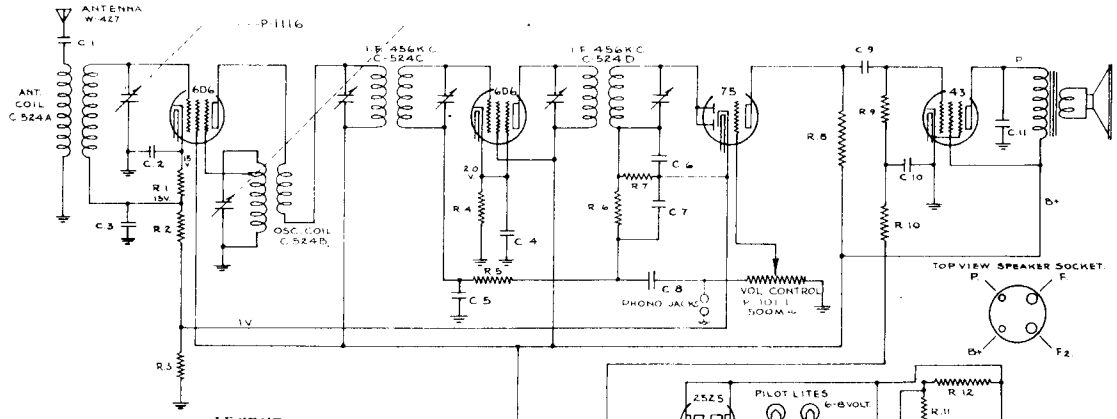
1. Set wave changing switch in broadcast position by rotating in clockwise (right) direction.
2. With gang condenser in its minimum capacity position, plates entirely out of mesh, extreme left of its rotation, and with volume control full on, make the following adjustments:
   (a) Connect an oscillator set at 1500 kilocycles in series with a 50 mmfd. condenser to the antenna terminal of the coil (from which antenna lead has been removed) and to ground (chassis), adjust both antenna and R.F. trimmers of the variable condenser to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).
   (b) Reset oscillator to 1400 kilocycles, adjust variable condenser to pick up oscillator and re-align antenna trimmer (rear section of variable condenser) to resonance.
   (c) Check output at 1200-1000-800-600 kilocycles. Bend plates only at 1200 and 1000 kilocycles to increase output, and then only if necessary. No bending is necessary at 600 or 800 kilocycles.

RESISTORS - VALUE	CONDENSER - VALUE	CONDENSER - VALUE
R-1 - 100 OHM IN VOL. CONTROL	C-1 - .001 MMF	C-13 - .25 MF
R-2 - 75000 OHMS	C-2 - .003 MF (600 V.)	C-14 - .1 MF (400 V.)
R-3 - 25000 "	C-3 - .05 MF (200 V.)	
R-4 - 3 MEG.	C-4 - VARI. GIMMICK - 13 MMF	NOTE.
R-5 - 500000 "	C-5 - .25 MF (200 V.)	C-3 & C-6 IN DUAL CONDENSER UNIT.
R-6 - 300000 "	C-6 - .05 MF (200 V.)	C-5 & C-10 - IN DUAL CONDENSER UNIT
R-7 - 40000 "	C-7 - .003 MF (600 V.)	C-11, C-12, C-13 IN ONE UNIT
R-8 - 101000 "	C-8 - .0005 MMF	
R-9 - 156 "(IN CORD)	C-9 - .1 MF (200 V.)	
R-10 - 40 ~ 300 M.A. - 0.36 W.	C-10 - .25 MF (200 V.)	
	C-11 - 5 MF	
	C-12 - 25 MF	



BELMONT RADIO CORP.

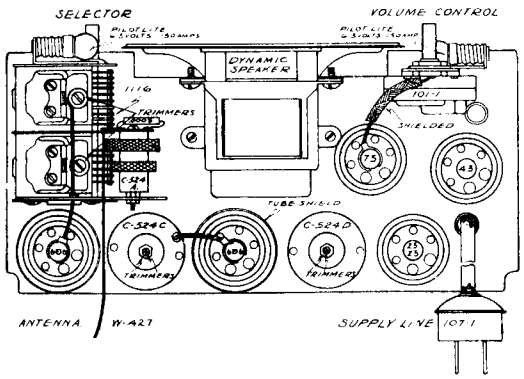
MODEL 540

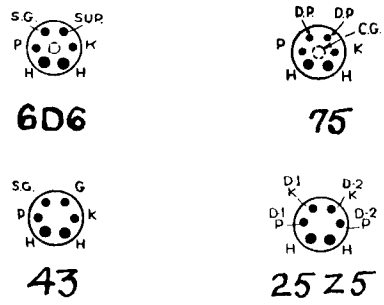


LEGEND

RESISTORS			CONDENSERS		
Nº	VALUE		Nº	VALUE	
R-1	500	*	C-1	.0005	MICA
R-2	2M	*	C-2	.05	200V
R-3	180	*	C-3	.05	200V
R-4	250 R-270		C-4	.05	200V
R-5	250M		C-5	.1	200V
R-6	50M		C-6	.0005	MICA
R-7	250M		C-7	.0005	MICA
R-8	100M		C-8	.01	400V
R-9	300M		C-9	.01	400V
R-10	250M		C-10	.1	200V
R-11	40-A-300M.A. 0.36W P-106-1		C-11	.025	300
R-12	126 IN CORD P-107-1		C-12	5.0 MFD. C-525D	
			C-13	25.0 MFD.	*
			C-14	.1	400V.
			C-15	5.0 MFD.	*

NOTE:-
*R-1, R-2 & R-3 IN ONE UNIT PART NUMBER R-268.
*C-13 AND C-15 IN ONE UNIT PART NUMBER C-525 C
NUMBERS PREFIXED BY LETTERS ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL. MEASURED ON A.C. CURRENT.





Should it be at any time necessary to rebalance this set, the correct procedure is as follows:

1. Volume control on full during all alignment.
2. Variable condenser in minimum capacity position, plates open, at start of all aligning.

I.F. ALIGNMENT

1. To peak I.F. transformers, connect oscillator set at 456 kilocycles to the grid of the 6D6 tube directly in back of the variable condenser and adjust the trimming condensers of the I.F. transformers to resonance (Maximum deflection on an output meter connected across the primary of the speaker input transformer).

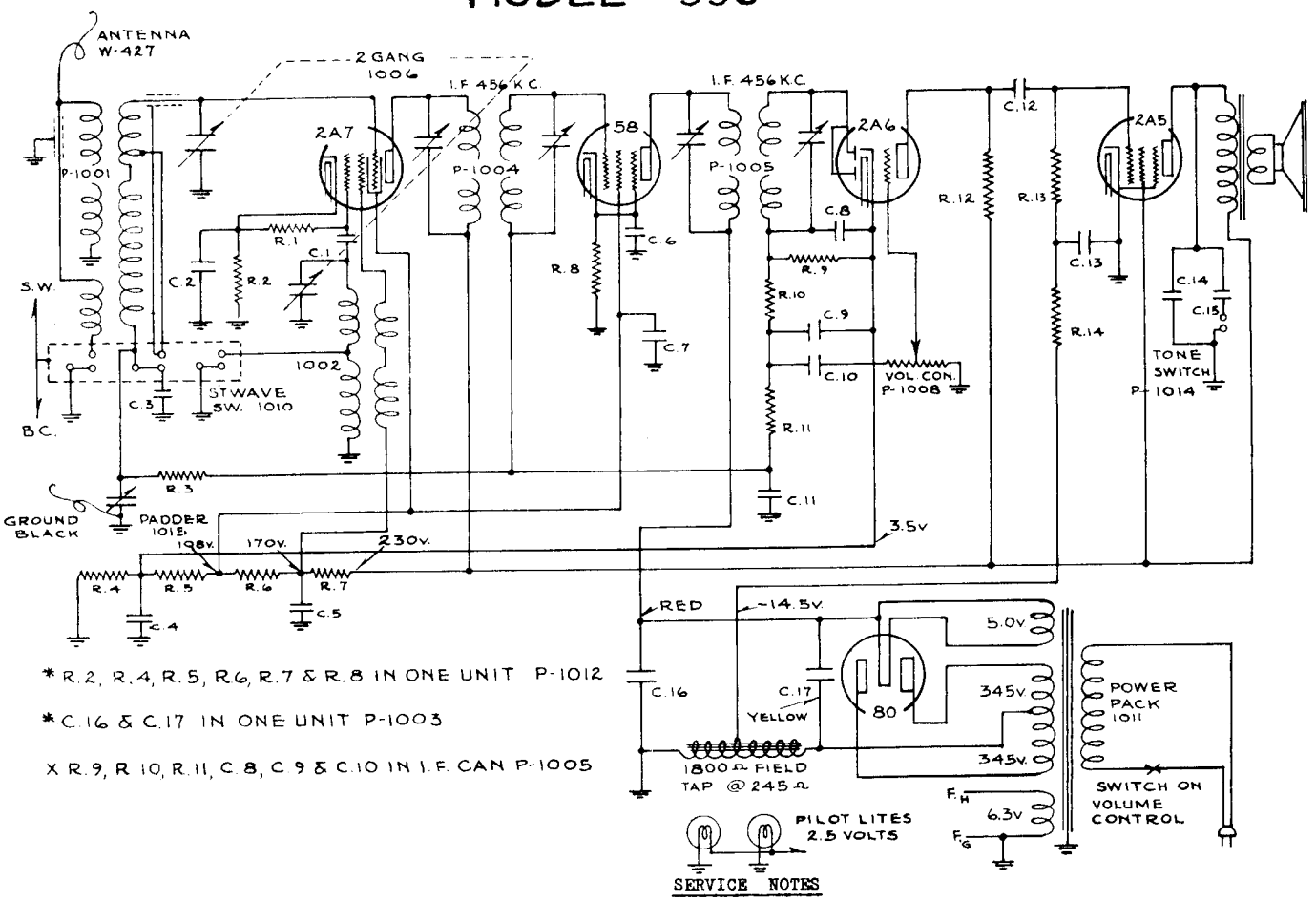
   Each I.F. trimmer has two adjustments, one nut and one screw, both of which are adjustable from the top.

BROADCAST BAND ALIGNMENT

1. Disconnect antenna wire and connect oscillator in series with a 75 mmfd. condenser to the antenna coil. With the variable condenser set at its minimum capacity position, at the extreme right of its rotation, and with an oscillator output adjusted to 1720 kilocycles, adjust trimmer of oscillator section of variable condenser (rear section) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer). Next adjust the trimmer condenser of the front section of the variable condenser to resonance.
2. Check alignment at 1400-1200-1000-800-600-530 kilocycles, bending the slotted plates of the front section of the variable condenser only if absolutely necessary.

BELMONT RADIO CORP.

MODEL 550



* R.2, R.4, R.5, R6, R.7 & R.8 IN ONE UNIT P-1012

* C.16 & C.17 IN ONE UNIT P-1003

X R.9, R 10, R.11, C.8, C 9 & C.10 IN I.F. CAN P-1005

LEGEND

RESISTORS

N°	VALUE	N°	VALUE
R 1	50M	R 8	300 *
R 2	500 *	R 9	250M X
R 3	250M	R 10	50M X
R 4	250 *	R 11	250M X
R 5	20M *	R 12	250M
R 6	6M *	R 13	300M
R 7	4M *	R 14	250M

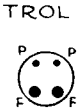
CONDENSERS

N°	VALUE	N°	VALUE
C 1	250MMF	C 9	500MMF X
C 2	.05	C 10	.01 X
C 3	.05	C 11	1
C 4	.05	C 12	.01
C 5	.05	C 13	.05
C 6	.05	C 14	.01
C 7	1	C 15	.02
C 8	500MMF X	C 16	8MF *
		C 17	8MF *

NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.

VOLTAGES WITH 119V. A.C. LINE



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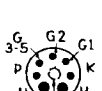
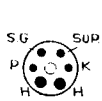
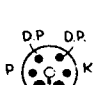


2A7



58

2A5



2A6

SERVICE NOTES

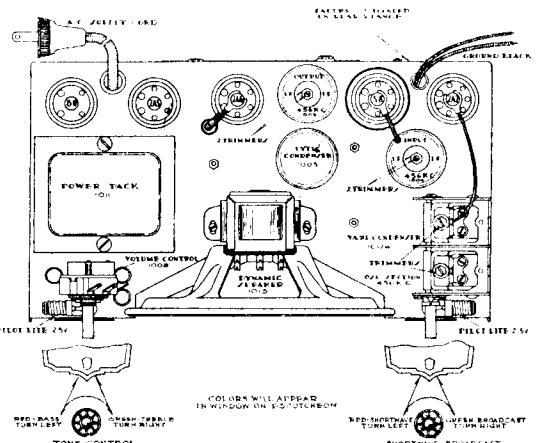
Should it be at any time necessary to rebalance this set, the correct procedure is as follows:

To peak I.F. transformers connect oscillator (set at 456 KC) to grid of 2A7 tube and (Black) ground wire. With variable condenser set at minimum capacity, (extreme left of its rotation) adjust four trimmers (one nut and one screw on each transformer trimmer) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).

To align Broadcast band, set wave changing switch to Green (right turn) and with variable condenser at minimum capacity disconnect antenna wire and connect 1550 KC oscillator to antenna coil in series with a 75 MMFD condenser. Adjust oscillator (front) section trimmer to resonance. Set oscillator to 1400 KC, rotate variable condenser until signal is tuned in, then adjust R.F. (rear) section trimmer to resonance. Check output at 1200, 1000, 800, and 600 Kilocycles if necessary bend plates (of rear R.F. section of variable only).

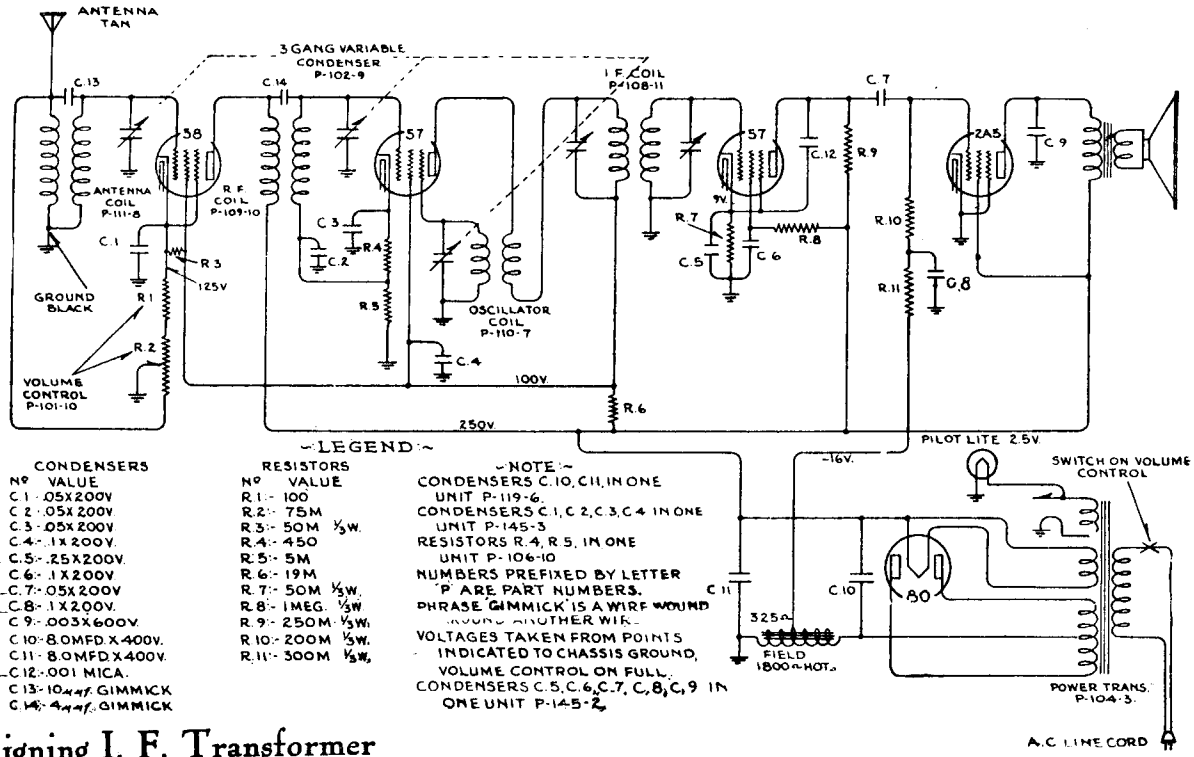
To align Short wave band, set wave changing switch to RED (left turn) and with input oscillator connected as above and set at 1720 KC, tune in signal, adjust padding condenser on rear of chassis to resonance. Check for output at 1550 KC and at harmonies of 1000 KC (2000 KC), of 1200 KC (2400 KC), of 1400 KC (2800 KC), and of 1720 KC (3440 KC). DO NOT BEND PLATES.

For failure to operate over both bands check 2A7 tube and connections to and contacts of wave changing switch.



BELMONT RADIO CORP.

MODEL 575



~LEGEND~

CONDENSERS		RESISTORS	
Nº	VALUE	Nº	VALUE
C.1	.05X200V.	R.1	100
C.2	.05X200V.	R.2	75M
C.3	.05X200V.	R.3	50M ½W.
C.4	.1X200V.	R.4	450
C.5	.25X200V.	R.5	5M
C.6	.1X200V.	R.6	19M
C.7	.05X200V.	R.7	50M ½W.
C.8	.1X200V.	R.8	1MEG. ½W.
C.9	.003X600V.	R.9	250M ½W.
C.10	8.0MFD.X400V.	R.10	200M ½W.
C.11	8.0MFD.X400V.	R.11	300M ½W.
C.12	.001 MICA.		
C.13	10 μμf. GIMMICK		
C.14	4 μμf. GIMMICK		

~NOTE~

CONDENSERS C.10, C.11, IN ONE UNIT P-119-6.
CONDENSERS C.1, C.2, C.3, C.4 IN ONE UNIT P-145-3
RESISTORS R.4, R.5, IN ONE UNIT P-106-10
NUMBERS PREFIXED BY LETTER 'P' ARE PART NUMBERS.
PHRASE 'GIMMICK' IS A WIRE WOUND [illegible] ANOTHER WIRE.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL.
CONDENSERS C.5, C.6, C.7, C.8, C.9 IN ONE UNIT P-145-2.

Aligning I. F. Transformer

1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme right of its rotation) make the following adjustments:

(a) Connect an external oscillator adjusted to 175 kilocycles, in series with a .1 mfd. condenser, to the control grid cap of the type 57 tube located between the R. F. coil (part numbers 109-10) and the I. F. transformer (part number 108-11) and chassis.

(b) Adjust trimming condensers of I. F. transformer (part number 108-11) to resonance. See top view of chassis. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or between the plate and screen terminals of the type 2A5 tube, by means of an adapter. Maximum deflection of the meter indicates resonance. Care must be taken to use only enough signal to give a readily readable output, as excessive input will result in overload and a false resonance point.

NOTE: The two trimmer condensers which tune the primary and secondary of the I. F. transformer are adjusted by set screws accessible from the back of the chassis.

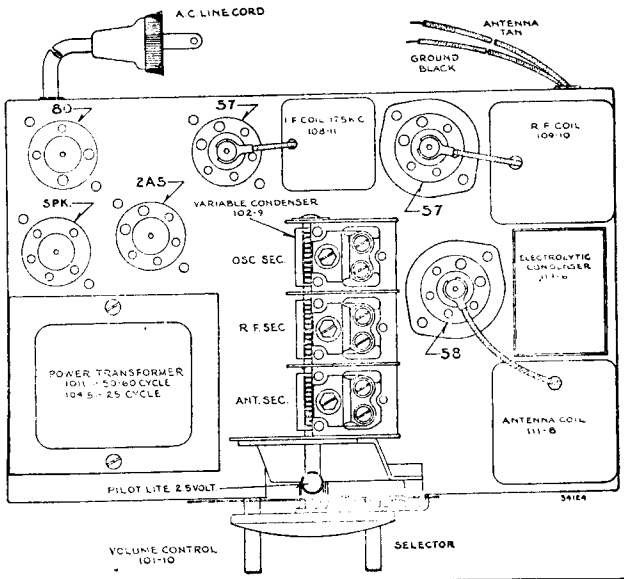
Aligning R. F. and Oscillator Circuits

1. Connect the external oscillator set at 1720 kilocycles and in series with a 200 Mfd. condenser, between the antenna (tan) and ground (black) leads.

(a) With volume control full on and variable condenser plates in minimum capacity position, plates entirely out of mesh (extreme left of its rotation), adjust trimmer of rear oscillator section of variable condenser to resonance.

(b) Shift external oscillator frequency from 1720 to 1400 kilocycles, pick up signal by rotating variable condenser and peak R. F. (center) and antenna (front) section trimmers of variable condenser to resonance.

(c) Check tracking at 1500, 1200, 1000, 800, 600 and 530 kilocycles by changing external oscillator frequency and rotating variable condenser to pick up signal. Adjust slotted end plates of R. F. (center) and antenna (front) sections to increase output, if necessary. DO NOT BEND OSCILLATOR PLATES.

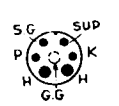


SERVICE SUGGESTIONS:

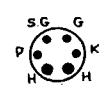
Make certain of the following: That all tubes are pushed firmly in their proper sockets and that the clips are securely fastened to the caps. That the aerial connection is good and not short-circuited to ground. (Pilot lights illuminate when set is turned on.)

PILOT LIGHT:

The pilot light used is 2.5 volt Mazda. No. T41-G3½. To replace, remove receptacle clipped to top of the variable condenser.



57 & 58

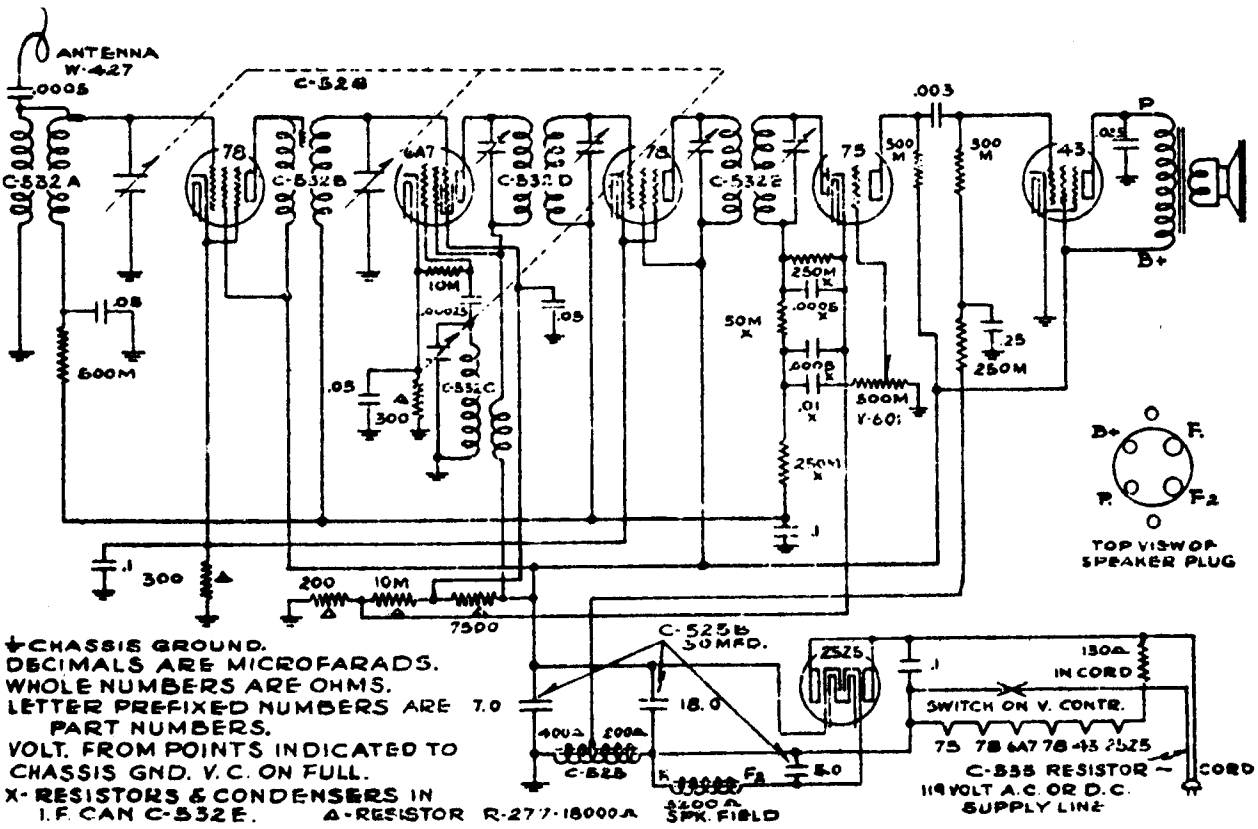


2A5

80

BELMONT RADIO CORP.

MODEL 625



78 6A7 75 43

OPERATING INSTRUCTIONS

1. Carefully remove antenna wire from its compartment. A properly erected well insulated outdoor antenna about 75 feet in length, including lead-in is recommended. A GROUND IS NOT REQUIRED.
2. After making certain that power supply is 110 volts, insert plug in receptacle.
3. Rotating VOLUME control clockwise (right) from off position turns power switch on, continued rotation increases volume. IF SET DOES NOT OPERATE IN ONE MINUTE ON DIRECT CURRENT REVERSE PLUG IN RECEPTACLE.
4. Advance volume control three-quarters turn, then select the desired station. Tune this station to the loudest point on the scale, then raise or lower volume with VOLUME control. Never regulate volume by detuning station selector, always adjust VOLUME control.

SIX TUBES, 1—6A7, 2—78, 1—75, 1—43, 1—2525.

SERVICE SUGGESTIONS

NOTE—CONNECTING CORD OF SET GETS WARM IN NORMAL OPERATION. DO NOT BECOME ALARMED.

Make sure that all tubes are pushed firmly in their proper sockets and that the clips are securely fastened to the caps on the tops of the tubes.

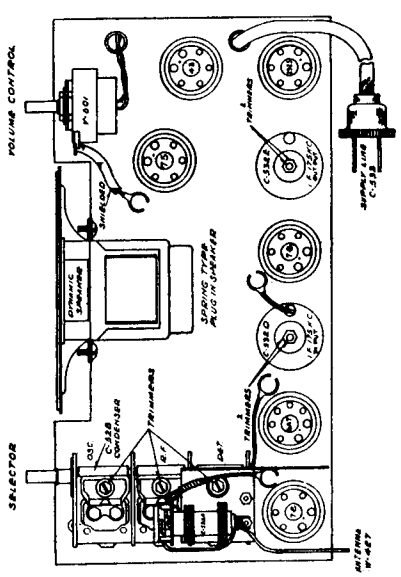
That the aerial is stretched out and that the connections to an outdoor antenna (if used) are good.

If necessary to change tubes or service chassis, UNDER NO CIRCUMSTANCES REMOVE BACK OR CHASSIS WITHOUT FIRST REMOVING PLUG FROM LIGHT SOCKET.

To remove chassis from cabinet, pull off knobs from front, remove back (held with screws to case). Remove four mounting screws, then chassis can be slipped out of case.

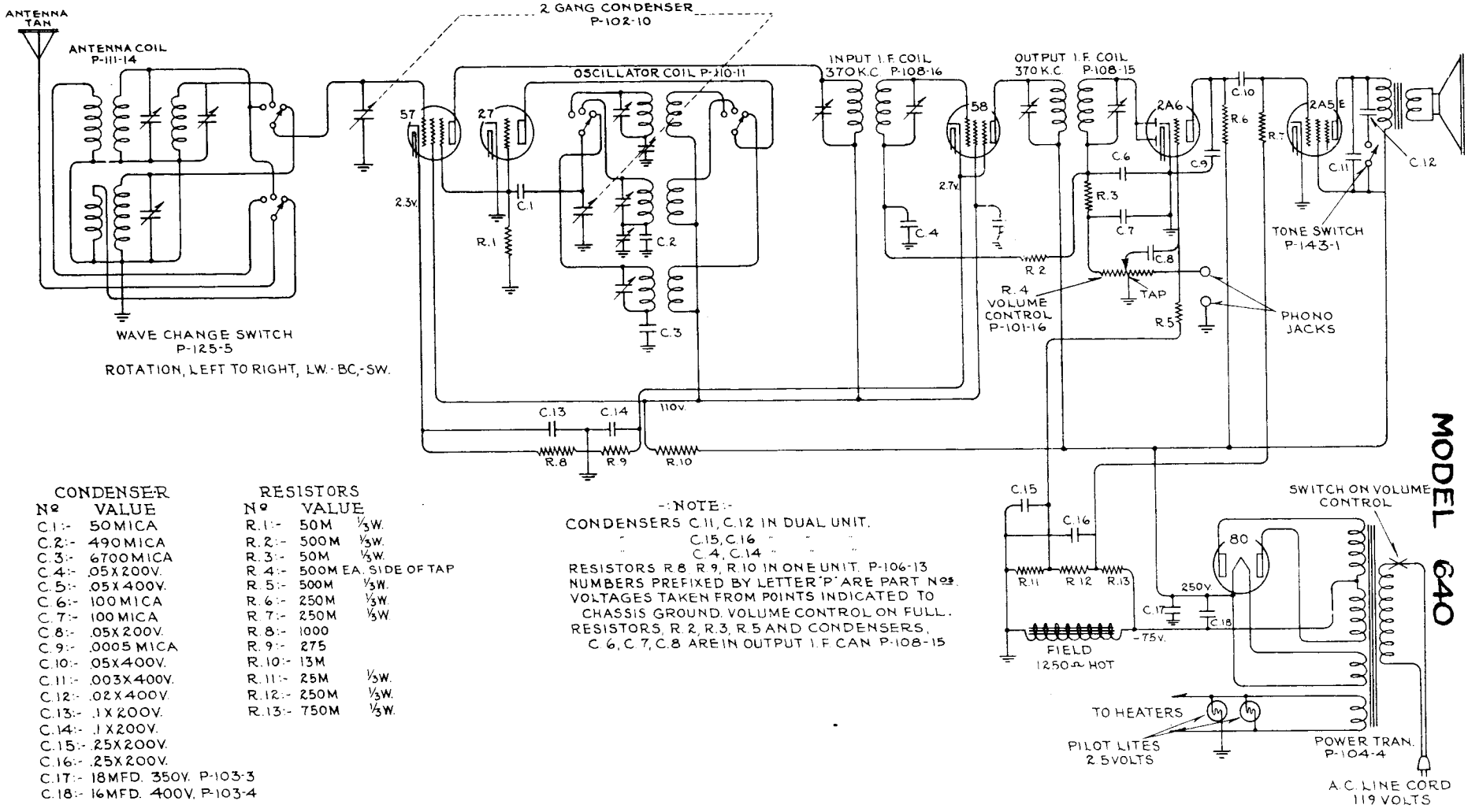
USE ONLY ON 105-115 VOLTS ALTERNATING (any cycles) or DIRECT CURRENT—40 WATTS.

SERVICE NOTES: Should it be necessary at any time to rebalance this set, the procedure is as follows: Disconnect antenna wire and attach an oscillator in series with a 50 mmfd. condenser to the antenna coil. With the variable condenser at its minimum capacity position, at the extreme right of its rotation, and oscillator set at 1720 kilocycles, adjust condenser trimmer of oscillator section (shaft end section) for maximum deflection on an output meter connected across the primary of the speaker input transformer, then adjust antenna and R.F. trimmers at 1400 kilocycles, align at 1200-1000-800-600-530 kilocycles, bend slotted plates of variable condenser if necessary. To align intermediate frequency transformers, proceed as follows: with variable condenser at its maximum capacity position, connect a 175 kilocycle oscillator in series with a .1 mfd. condenser to grid cap of 6A7 tube, peak four I.F. trimmers at 175 kilocycles, an output meter should be used to indicate resonance. NOTE: Both transformers are double tuned, one trimmer is adjusted with a screw driver, the other with a hexagon wrench, see figure 1.



BELMONT RADIO CORP.

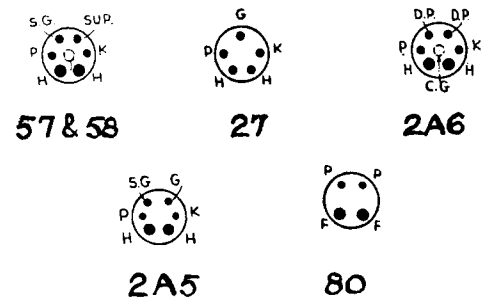
MODEL 640



CONDENSER		RESISTORS		
Nº	VALUE	Nº	VALUE	
C.1:-	50 MICA	R.1:-	50M	½W.
C.2:-	490 MICA	R.2:-	500M	½W.
C.3:-	6700 MICA	R.3:-	50M	½W.
C.4:-	.05 X 200V.	R.4:-	500M EA. SIDE OF TAP	
C.5:-	.05 X 400V.	R.5:-	500M	½W.
C.6:-	100 MICA	R.6:-	250M	½W.
C.7:-	100 MICA	R.7:-	250M	½W.
C.8:-	.05 X 200V.	R.8:-	1000	
C.9:-	.0005 MICA	R.9:-	275	
C.10:-	.05 X 400V.	R.10:-	13M	
C.11:-	.003 X 400V.	R.11:-	25M	½W.
C.12:-	.02 X 400V.	R.12:-	250M	½W.
C.13:-	.1 X 200V.	R.13:-	750M	½W.
C.14:-	.1 X 200V.			
C.15:-	.25 X 200V.			
C.16:-	.25 X 200V.			
C.17:-	18 MFD. 350V. P-103-3			
C.18:-	16 MFD. 400V. P-103-4			

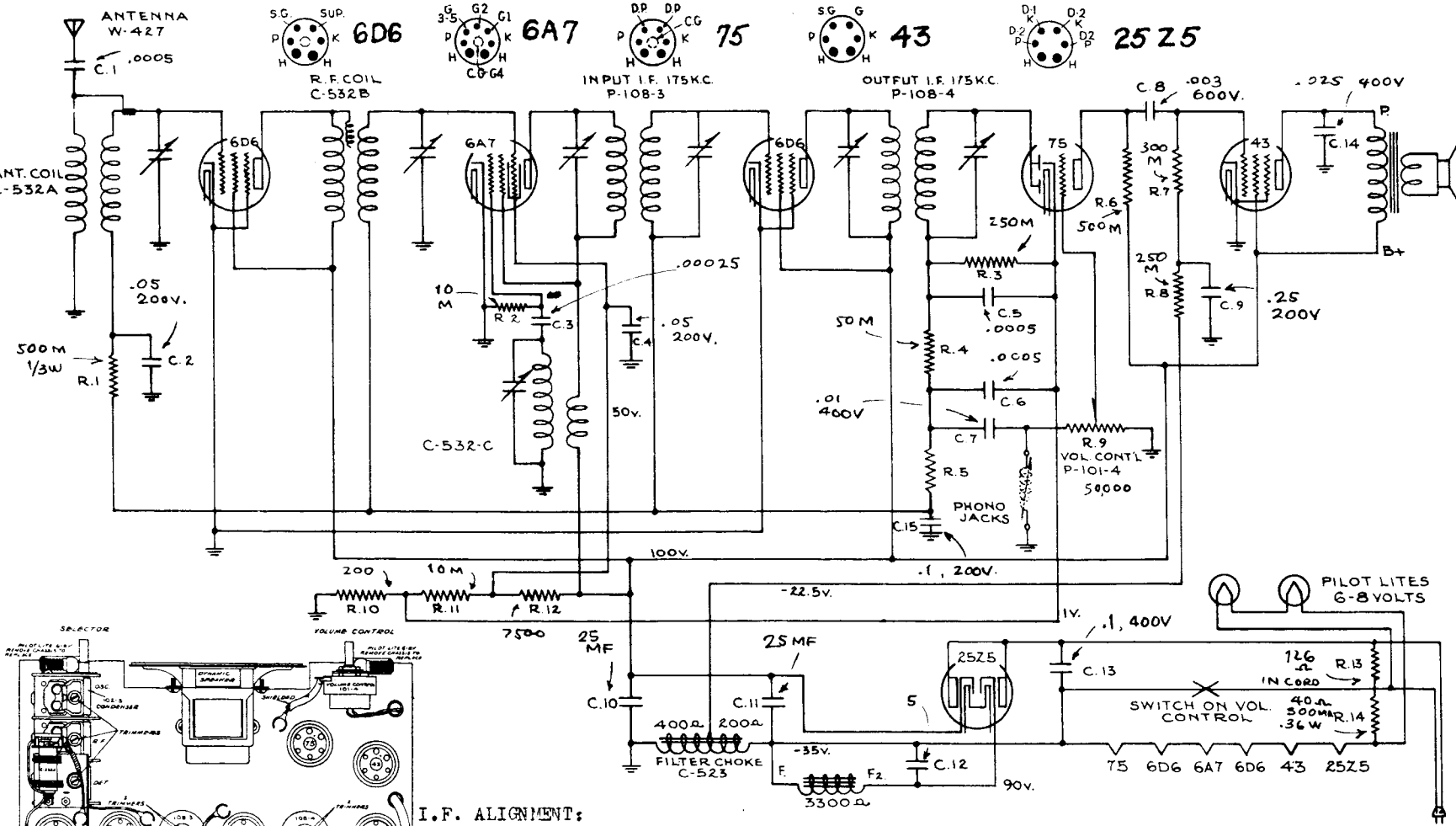
-:NOTE:-
CONDENSERS C.11, C.12 IN DUAL UNIT.
" C.15, C.16 " " "
" C.4, C.14 " " "
RESISTORS R.8, R.9, R.10 IN ONE UNIT. P-106-13
NUMBERS PREFIXED BY LETTER 'P' ARE PART Nos.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.
RESISTORS, R.2, R.3, R.5 AND CONDENSERS, C.6, C.7, C.8 ARE IN OUTPUT I.F. CAN P-108-15

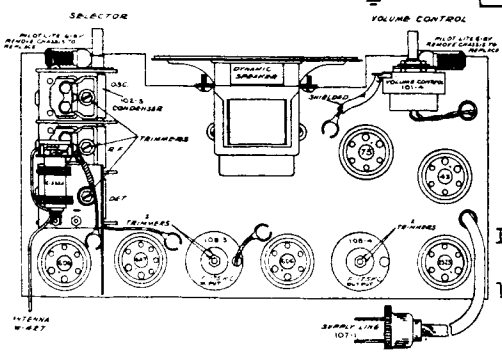
1. With volume control full on, at extreme right of its rotation, and with wave changing switch in the long wave position, extreme left of its rotation, and with variable condenser at its minimum capacity position, extreme left of its rotation, plates entirely out of mesh, adjust the I.F. transformers, parts number 108-15 and 108-16, in the following manner:
   (a) Connect an external oscillator which has been adjusted to 370 kilocycles, in series with a .1 mfd. condenser to the control grid cap of the type 57 first detector tube (see diagram and chassis).
   (b) Adjust trimming condensers of both I.F. transformers (parts number 108-15 and 108-16) to resonance Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between plate and screen terminals of type 2A5E output tube. Maximum deflection of the meter indicates resonance. Care should be taken to use only enough signal to give a readily readable output.



BELMONT RADIO CORP.

MODEL 650





Trouble Shooting Hints

Electrolytic condensers C11 and C12 should be tested if the 25Z5 tube fails to operate. Also if these condensers break down it is advisable to replace the rectifier tube as it may have "flashed."

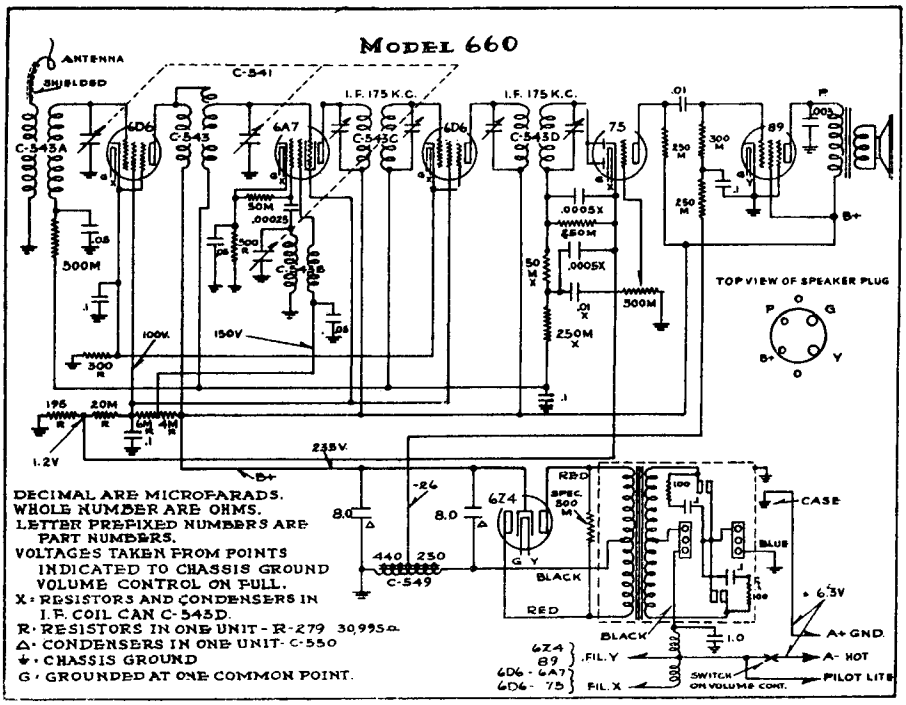
I.F. ALIGNMENT:

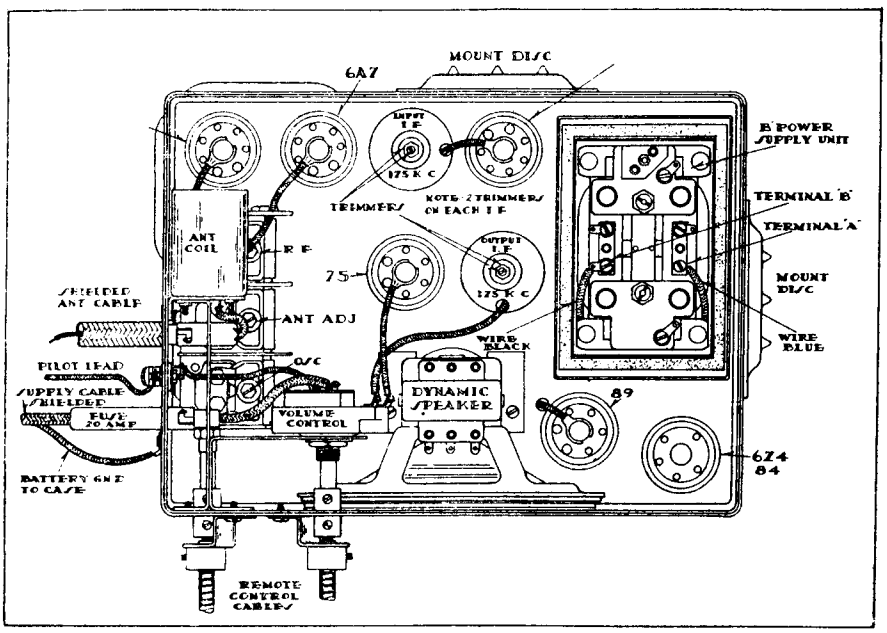
1. With volume control on full, at the extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme left of its rotation) make the following adjustments:
   (a) Connect an oscillator set at 175 kilocycles in series with a .1 mfd. condenser to the control grid (cap at top of type 6A7 oscillator first detector tube).
   (b) Adjust trimming condensers of both input and output I.F. transformers, parts number 108-3 and 108-4, (see top view of chassis) to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer. Maximum deflection on the meter indicates resonance.

Note: Each I.F. transformer trimmer has two adjustments, one nut and one screw, both of which are adjustable from the top.

BELMONT RADIO CORP.

MODEL 660





SCHEMATIC CIRCUIT DIAGRAM

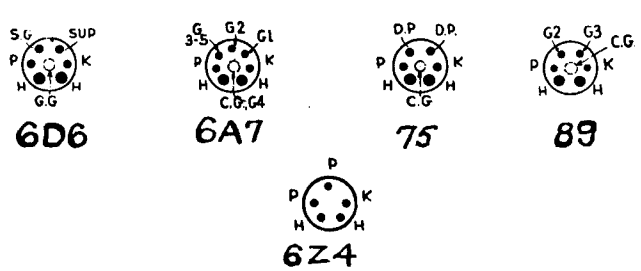
MODEL 660 AUTORADIO

PARTS LIST

Part No.	Description	List Price Each
A 660	Battery Cable—Plug Type.	1.75
B 104	Cable Shaft Brackets.....	.35
B 660	Antenna Cable—Plug Type	.80
C 106	Shaft Couplings	.35
C 117	"A" Choke—Small	.25
C 118	"A" Choke—Large	.35
C 144	Dual .1-200 Volt Condenser	.35
C 152	.00025 Mica Condenser..	.20
C 155	.0005 Mica Condenser....	.20
C 522	.01-400 Volt Condenser...	.25
C 531A	Dual .05 Condenser.....	.30
C 535	Dual .1—200 Volt Condenser	.35
C 541B	3 Gang Condenser	3.75
C 543	R.F. Coil	.80
C 543A	Antenna Coil	.80
C 543B	Oscillator Coil	.70
C 543C	Input I.F. Transformer...	1.25
C 543D	Output I.F. Transformer with Parts	2.50
C 547	.1-200 Volt Condenser....	.30
C 549	690 Ohm Choke	1.40
C 550	8-8 Mfd. Electrolytic Condenser	2.25
C 551	1 Mfd.—120 Volt Condenser	.35
C 553	.05-200 Volt Condenser...	.25
C 554	.5 Mfd. Generator Condenser	.50
R 232A	Special 500M Ohm Resistor Identified with 2 Yellow Dots	.35
R 279	30,995 Ohm Resistor.....	.60
R 281	100 Ohm Resistor.....	.20
S 338	18" Volume Control Shaft.	1.25
S 339	18" Selector Control Shaft	1.25
S 338S	Special 24" Volume Control Shaft	1.50
S 339S	Special 24" Selector Control Shaft	1.50
V 660	Complete "B" Unit—OAK	8.00
V 603	Volume Control	1.50
660	Remote Control Head Complete Less Shafts.....	5.00
	20 Ampere Fuses.....	.10
	Mounting Bolts	.10
	All carbon resistors.....	.20
	All sockets	.20
	Dynamic speakers	5.00

BELMONT RADIO CORP.
1257 Fullerton Avenue
Chicago, Illinois

Made in U. S. A.

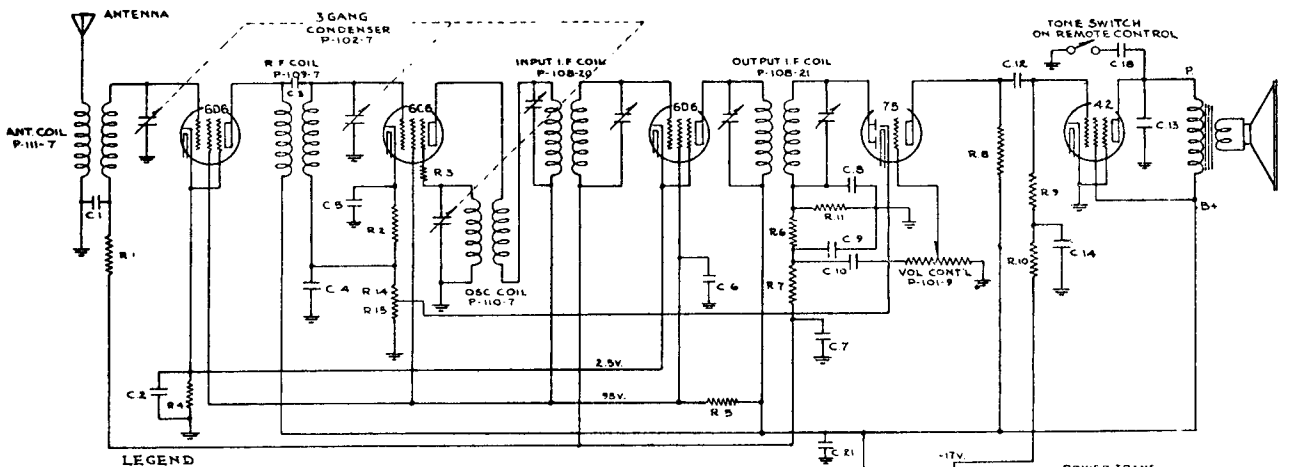


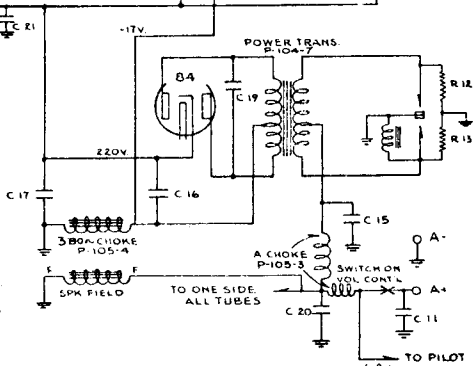
Trouble Shooting Hints

When this set fails, first make sure that the tubes are firmly seated in their sockets then remove the battery shielded cable and test the 20 amp. fuse. Next, test the "B" unit vibrator and rectifier tube and finally test all by-pass condensers.

BELMONT RADIO CORP.

MODEL 670 & 670 A





RESISTORS		CONDENSERS	
Nº	VALUE	Nº	VALUE
R.1	250M 1/3W	C.1	.05 X 200V.
R.2	450Ω	C.2	1 X 200V.
R.3	1500Ω	C.3	11.5 mmf GIMMICK
R.4	150Ω	C.4	.05 X 200V.
R.5	25M 1W.	C.5	.05 X 200V.
R.6	50M 1/3W	C.6	1 X 200V.
R.7	250M 1/3W	C.7	1 X 200V.
R.8	250M 1/3W	C.8	.0005 MICA
R.9	200M 1/3W	C.9	.0005 MICA
R.10	300M 1/3W	C.10	.01 X 400V
R.11	250M 1/3W.	C.11	.002 MICA
R.12	100Ω	C.12	.01 X 400V.
R.13	100Ω	C.13	.003 X 600V.
R.14	5M	C.14	1 X 200V.
VAR RESISTOR (VOL CONT'L)	500M	C.15	.5 MFD. X 120V.
R.15	200Ω	C.16	8 MFD. X 350V.
		C.17	8 MFD. X 350V.
		C.18	.01 X 400V.
		C.19	.015 X 1400V
		C.20	.5 MFD. X 120V.
		C.21	.01 X 400V

- NOTE -

NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND VOLUME CONTROL ON FULL
THE PHRASE GIMMICK MEANS, A WIRE WOUND AROUND ANOTHER WIRE
RESISTORS IN ONE UNIT, P-106-14, - R. 2.4.14.15
CONDENSERS IN ONE UNIT, P-119-4 - C. 16. 17
CONDENSERS C.2, C.4, C.5 C.6, C.7 ARE IN ONE UNIT P-145-5.
RESISTORS AND CONDENSERS IN OUTPUT I.F CAN, P-108-21, - C. 8, 9, 10 AND R. 6, 7, 11.
CONDENSER, C.1, IN ANT. COIL CAN P-111-12.
CONDENSERS C.15, - C.20 IN ONE UNIT P-148-4

I.F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.
2. Adjust trimming condensers of both input and output I.F. transformers, parts number 108-5 and 108-6 (see top view of chassis) to resonance with oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer. Maximum deflection on the meter indicates resonance.

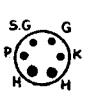
6D6 & 6C8

Note: Each I.F. transformer trimmer has two adjustments, one nut and one screw, both of which are adjustable through the top of the can.

FREQUENCY ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (shaft end) to resonance.
2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna and R.F. trimmers to resonance.
3. Check alignment at 1200-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.
4. Bend slotted plates of antenna and R.F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

75



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BALANCING SET TO ANTENNA:

When this set has been installed and is ready for operation, it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 130 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug button from the top of the case.

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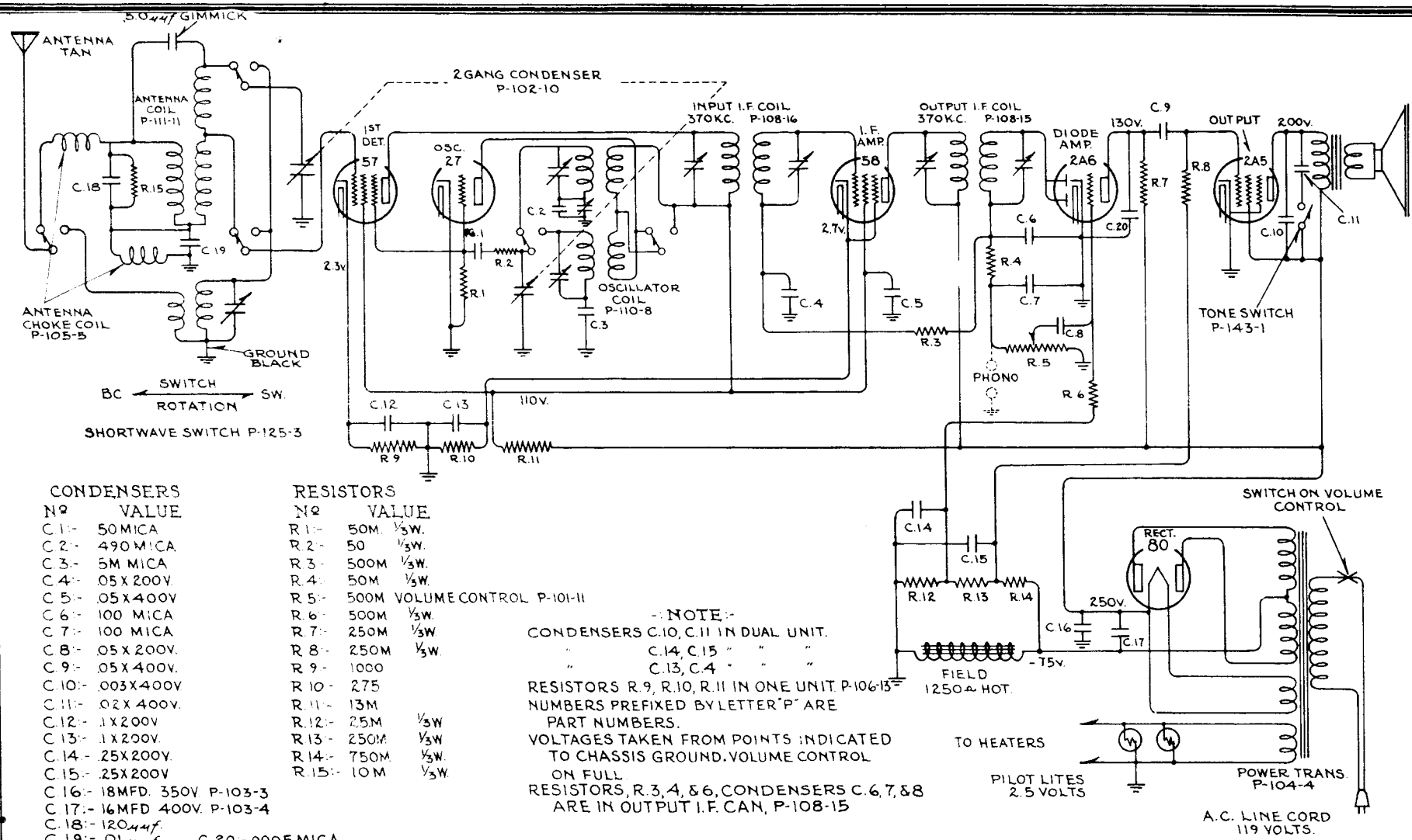
Trouble Shooting Hints

The vibrator unit in the power supply for this set causes the most service calls. If the vibrator reed ceases to work, it should be replaced since the adjusting and filing points is only a temporary remedy. Oscillation is most commonly caused by the second detector grid circuit wiring coming too close to other R.F. leads. If the set loses sensitivity, first adjust the antenna trimming and then align the entire oscillator padding.

BELMONT RADIO CORP.

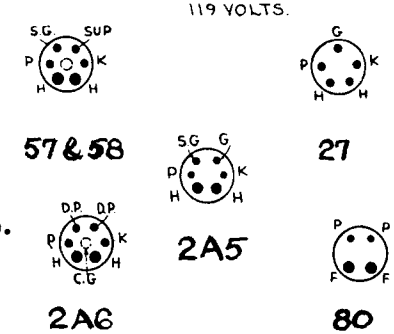
MODEL 675



CONDENSERS		RESISTORS		
Nº	VALUE	Nº	VALUE	
C.1	50 MICA	R.1	50M	1/3W.
C.2	490 MICA	R.2	50	1/3W.
C.3	5M MICA	R.3	500M	1/3W.
C.4	.05 X 200V.	R.4	50M	1/3W.
C.5	.05 X 400V	R.5	500M	VOLUME CONTROL P-101-11
C.6	100 MICA	R.6	500M	1/3W.
C.7	100 MICA	R.7	250M	1/3W.
C.8	.05 X 200V.	R.8	250M	1/3W.
C.9	.05 X 400V.	R.9	1000	
C.10	.003 X 400V	R.10	275	
C.11	.02 X 400V.	R.11	13M	
C.12	.1 X 200V	R.12	25M	1/3W
C.13	.1 X 200V.	R.13	250M	1/3W
C.14	.25 X 200V.	R.14	750M	1/3W.
C.15	.25 X 200V	R.15	10M	1/3W.
C.16	18MFD. 350V P-103-3			
C.17	16MFD 400V. P-103-4			
C.18	120 μμf.			
C.19	.01 μf.	C.20	.0005 MICA.	

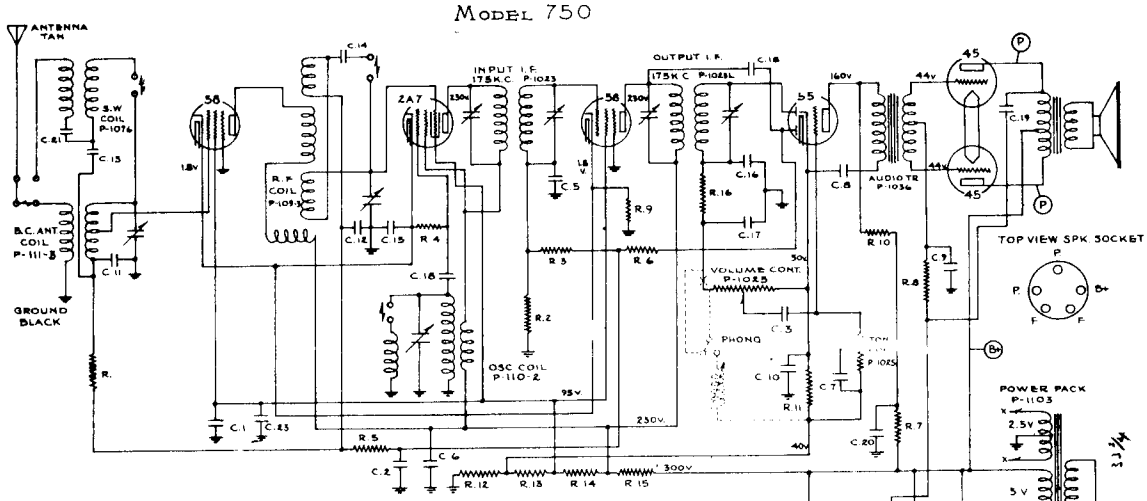
NOTE:-
CONDENSERS C.10, C.11 IN DUAL UNIT.
" C.14, C.15 " " "
" C.13, C.4 " " "
RESISTORS R.9, R.10, R.11 IN ONE UNIT P-106-13
NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL
RESISTORS, R.3, 4, & 6, CONDENSERS C.6, 7, & 8 ARE IN OUTPUT I.F. CAN, P-108-15

1. With volume control full on, at the extreme right of its rotation, and with wave selector switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, extreme left of its rotation, plates entirely out of mesh, adjust the I.F. transformers (parts number 108-15 and 108-16) in the following manner:
   (a) Connect an external oscillator which has been adjusted to 370 kilocycles, in series with a .1 mfd. condenser to the control grid cap of the type 57 first detector tube (see diagram and chassis).
   (b) Adjust trimming condensers of both I.F. transformers (Parts number 108-15 and 108-16) to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between plate and screen terminals of type 2A5 output tube. Maximum deflection of the meter indicates resonance. Care should be taken to use only enough signal to give a readily readable output.



BELMONT RADIO CORP.

MODEL 750



LEGEND

RESISTORS

No	VALUE		No	VALUE	
R.1	250M	1/5W.	R.11	5M	1/5W.
R.2	"	"	R.12	2300	.7W. *
R.3	500M	"	R.13	4500	.85W.*
R.4	50M	"	R.14	4500	2.3W.*
R.5	250M	"	R.15	1250	2.9W.*
R.6	"	"	R.16	50M	1/5W. X
R.7	30M	"			
R.8	100M	"			
R.9	50	.1W.*			
R.10	30M	1/5W.			

CONDENSERS

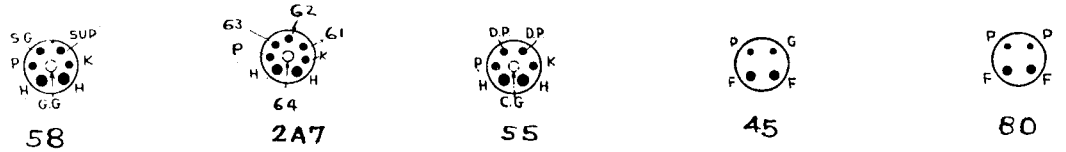
No	VALUE		No	VALUE
C.1	.1 x 200V	DUAL	C.12	.02 x 200V
C.2	.05 x 200V		C.13	.003 x 600V.
C.3	.05 x 200V.		C.14	.003 x 600V.
C.4	8MFD. 490V.		C.15	.25 x 200V.
C.5	.05 x 200V.		C.16	.0001 MICA X
C.6	.25 x 300V		C.17	.0001 MICA X
C.7	.004 x 400V		C.18	.000020 MICA
C.8	.25 x 200V		C.19	.003 x 600V.
C.9	.25 x 200V	DUAL	C.20	.50 x 300V.
C.10	.25 x 200V		C.21	.00025 MICA
C.11	.015 x 200V		C.22	8MFD. 490V
			C.23	5MFD. 150V

*R 9, R 12, R 13, R 14 & R 15 IN ONE UNIT P-1104

XRESISTOR, R 16 & CONDENSERS C16, C 17 IN OUTPUT I.F. CAN.

NOTE:-NUMBERS PREFIXED BY LETTER 'P' ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL WITH 119V A.C. LINE.

NOTE:- PHONO PICK UP SHOULD HAVE IMPEDENSE > 25M OHMS. OUTPUT IN EXCESS OF 2 VOLTS.



I.F. ALIGNMENT

The intermediate frequency of model 750 is 175 kilocycles, and is aligned as follows:

1. Connect oscillator (set at 175 kilocycles) to I.F. grid (second 58 tube) and adjust both trimmers of second I.F. transformer (underneath chassis) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).
2. Connect oscillator output to converter grid (2A7 tube) and adjust both trimmers of first I.F. transformer to resonance. Under no conditions touch the trimmers of the second I.F. transformer after adjusting them (see No. 1).

The four trimmers of the two I.F. transformers are all adjusted from the bottom of the chassis (one nut and one screw adjustment on each I.F. transformer trimmer).

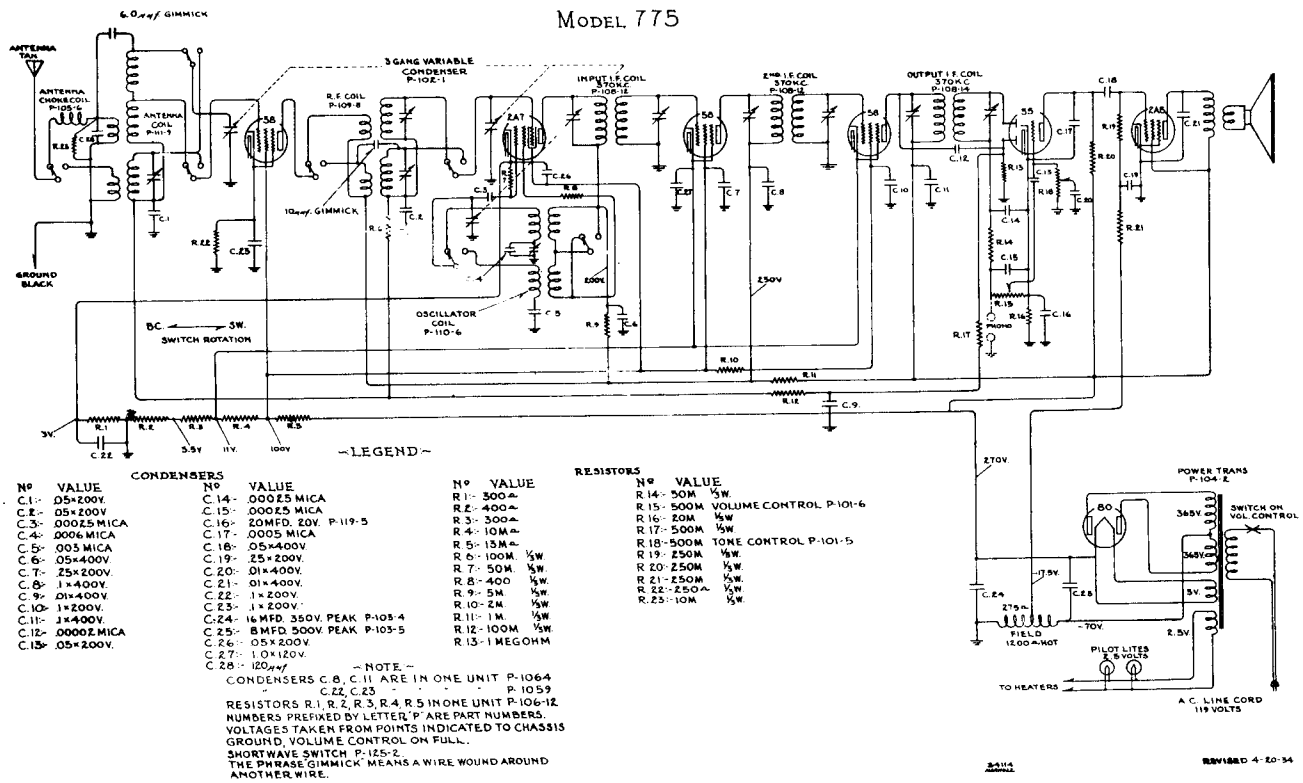
BROADCAST BAND ALIGNMENT

Wave changing switch in clockwise (right) position.

1. Connect an oscillator in series with a 200 mmfd. condenser to the Tan (antenna) lead and Black (ground) lead. With the oscillator set at 1720 kilocycles and the variable condenser at its minimum position (extreme right of its rotation), adjust trimmer of oscillator (rear) section to resonance.
2. Change oscillator to 1400 kilocycles, rotate variable to this frequency and adjust R.F. and antenna trimmers (center and front trimmers respectively) to resonance. Do not touch the oscillator trimmer.
3. Check tracking at the following points only: 1200-1000-800-600-534 kilocycles. NOTE: This receiver will be slightly out of track at 534 kilocycles - do not bend plates in an attempt to track it at this frequency. Rotor plates of condensers should not be bent, except if absolutely necessary, and then only on the center and front sections.

BELMONT RADIO CORP.

MODEL 775



~LEGEND~

CONDENSERS

Nº	VALUE
C.1	.05×200V.
C.2	.05×200V.
C.3	.000Z5 MICA
C.4	.0006 MICA
C.5	.005 MICA
C.6	.05×400V.
C.7	.25×200V.
C.8	1×400V.
C.9	.01×400V.
C.10	1×200V.
C.11	1×400V.
C.12	.0000Z MICA
C.13	.05×200V.
C.14	.000Z5 MICA
C.15	.000Z5 MICA
C.16	20MFD. 20V. P-119-5
C.17	.0005 MICA
C.18	.05×400V.
C.19	.25×200V.
C.20	.01×400V.
C.21	.01×400V.
C.22	.1×200V.
C.23	.1×200V.
C.24	16 MFD. 350V. PEAK P-105-4
C.25	8 MFD. 500V. PEAK P-105-5
C.26	.05×200V.
C.27	1.0×120V.
C.28	120 mmf

RESISTORS

Nº	VALUE
R.1	300Ω
R.2	400Ω
R.3	300Ω
R.4	10MΩ
R.5	15MΩ
R.6	100M. ½W.
R.7	50M. ½W.
R.8	400 ½W.
R.9	5M ½W.
R.10	2M ½W.
R.11	1M ½W.
R.12	100M ½W.
R.13	1 MEGOHM
R.14	50M ½W.
R.15	500M VOLUME CONTROL P-101-6
R.16	2M ½W.
R.17	500M ½W.
R.18	500M TONE CONTROL P-101-5
R.19	250M ½W.
R.20	250M ½W.
R.21	250M ½W.
R.22	250Ω ½W.
R.23	10M ½W.

~NOTE.~

CONDENSERS C.8, C.11 ARE IN ONE UNIT P-1064
" C.22, C.23 " " " P-1059

RESISTORS R.1, R.2, R.3, R.4, R.5 IN ONE UNIT P-106-12.
NUMBERS PREFIXED BY LETTER 'P' ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.
SHORTWAVE SWITCH P-125-2.
THE PHRASE 'GIMMICK' MEANS A WIRE WOUND AROUND ANOTHER WIRE.

REVISED 4-20-34

I.F. ALIGNMENT:

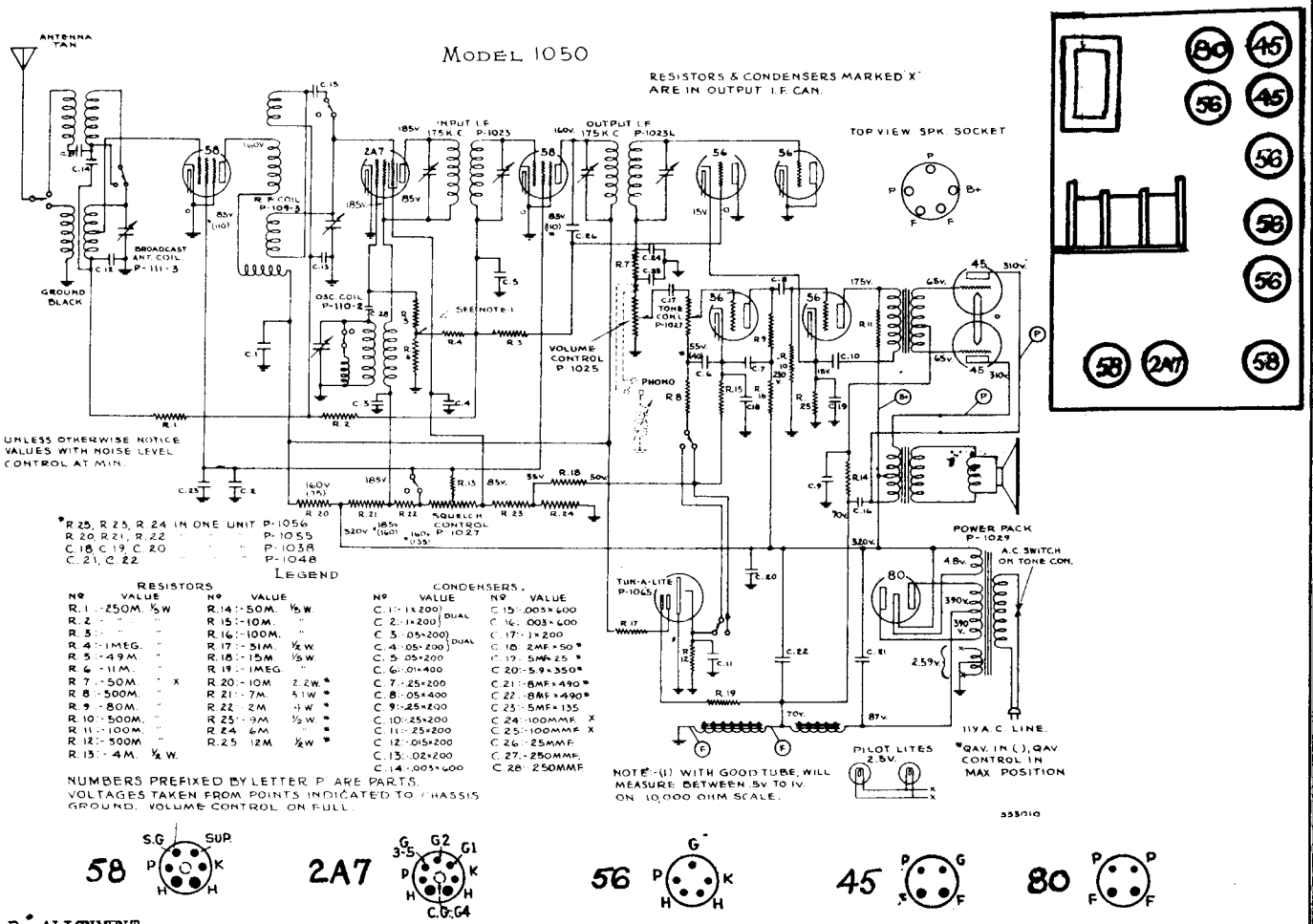
1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (plates entirely in mesh) and with band selector switch in broadcast position, left (counter-clockwise), make the following adjustments:
   (a) Connect an oscillator set at 370 kilocycles in series with a .1 mfd. condenser to the control grid of the first detector (cap at top of 2A7 tube), and connect the ground side of the test oscillator to the ground lead of the set (black wire).
   (b) Adjust trimming condensers of all three I.F. transformers, part number 108-12 input I.F., 108-12 second I.F. and 108-14 output I.F. to resonance.
2. Adjustments are provided on each transformer and are accessible from the back of the chassis (see top view of chassis).

BROADCAST BAND FREQUENCY ALIGNMENT:

1. With volume control full on and the gang condenser set to its minimum capacity:
   (a) Re-set test oscillator to 1712 kilocycles.
   (b) Adjust broadcast oscillator shunt trimmer to resonance. This trimmer is the one nearest the top of the oscillator coil and can assembly, part number 110-6.
   (c) Re-set test oscillator to 1400 kilocycles and shift the test oscillator lead from grid cap of the oscillator tube to the grid cap of the R.F. tube (type 58).
   (d) Tune the gang condenser to resonance with the test signal (1400 k.c.)
   (e) Adjust the R.F. tuned circuit to resonance by bending adjustable condenser plate of the R.F. (rear) section of the gang condenser.
   (f) Shift test oscillator lead to the antenna lead (tan wire) and substitute a 200 mmfd. condenser for the .1 mfd. condenser which is in series with the test lead.
   (g) Adjust the antenna tuned circuit to resonance by bending the adjustable condenser plate of the antenna (front) section of the gang condenser.
   (h) Turn the gang condenser to maximum capacity.
   (i) Adjust the broadcast series trimmer (located to the left of the gang condenser and accessible through the top of the chassis) to resonance with the test oscillator, with the test oscillator set at 535 kilocycles.
   (j) Check alignment at 1400, 1000 and 800 kilocycles, bending plates of the R.F. (rear) and antenna (front) sections of the variable condenser if necessary. DO NOT BEND PLATES OF OSCILLATOR (CENTER) SECTION UNDER ANY CIRCUMSTANCES.

BELMONT RADIO CORP.

MODEL 1050



I.F. ALIGNMENT

The intermediate frequency of model 1050 is 175 kilocycles, and is aligned as follows:

1. Connect oscillator (set at 175 kilocycles) to I.F. grid (second 58 tube) and adjust both trimmers of second I.F. transformer (underneath chassis) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).
2. Connect oscillator output to converter grid (2A7 tube) and adjust both trimmers of first I.F. transformer to resonance. Under no conditions touch the trimmers of the second I.F. transformer after adjusting them (see No. 1).

The four trimmers of the two I.F. transformers are all adjusted from the bottom of the chassis (one nut and one screw adjustment on each I.F. transformer trimmer).

BROADCAST BAND ALIGNMENT

Wave changing switch in clockwise (right) position.

1. Connect an oscillator in series with a 200 mmfd. condenser to the Tan (antenna) lead and Black (ground) lead. With the oscillator set at 1720 kilocycles and the variable condenser at its minimum position (extreme right of its rotation), adjust trimmer of oscillator (rear) section to resonance.
2. Change oscillator to 1400 kilocycles, rotate variable to this frequency and adjust R.F. and antenna trimmers (center and front trimmers respectively) to resonance. Do not touch the oscillator trimmer.
3. Check tracking at the following points only: 1200-1000-800-600-534 kilocycles. NOTE: This receiver will be out of track at 534 kilocycles - do not bend plates in an attempt to track it at this frequency. Rotor plates of condensers should not be bent, except if absolutely necessary, and then only on the center and front sections.

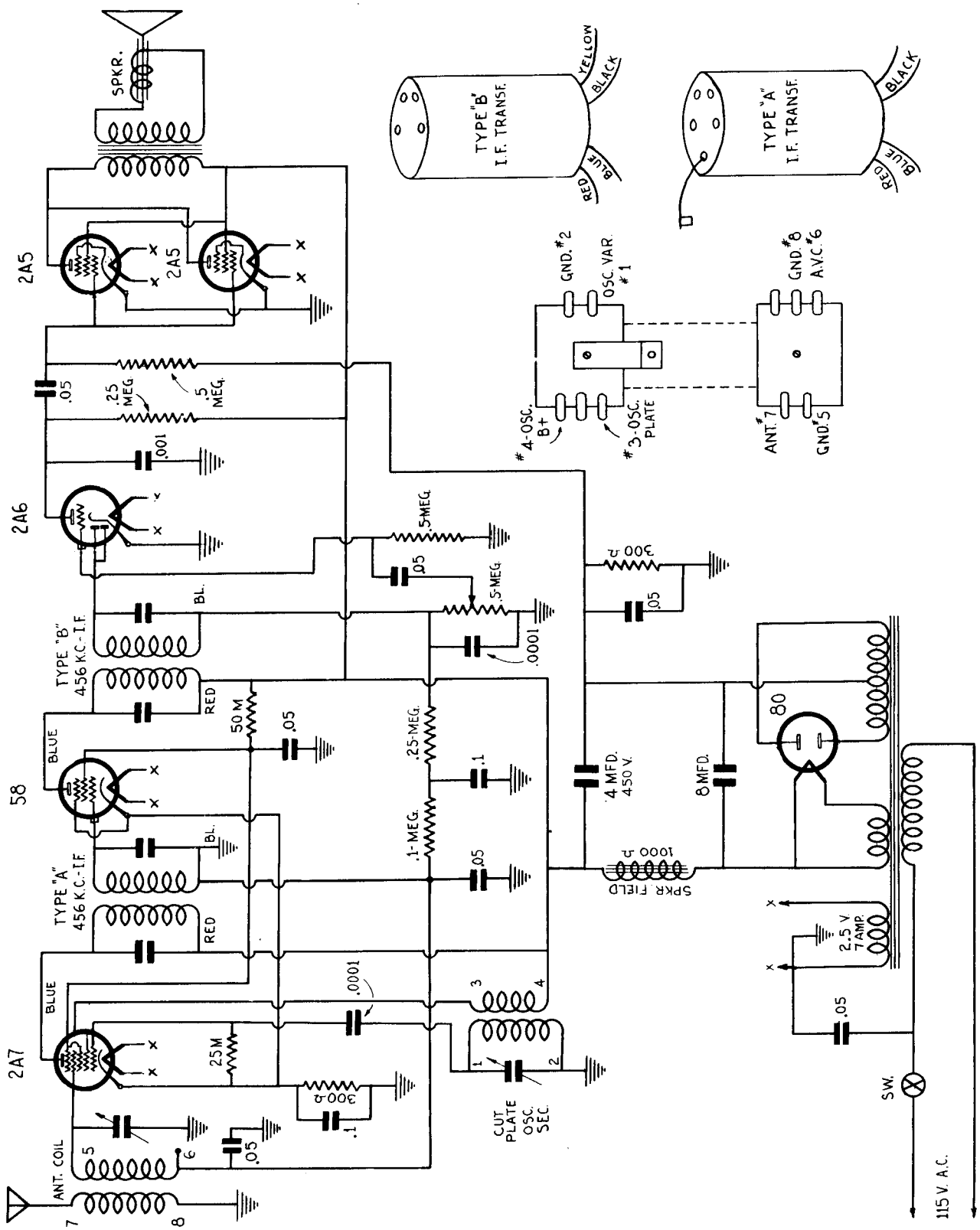
SHORT WAVE BAND ALIGNMENT

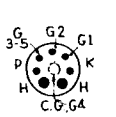
Wave changing switch in counter-clockwise (left) position.

1. The frequency range of this short wave band is approximately 1700 to 4500 kilocycles.
2. Peak short wave antenna coil to resonance with oscillator set at 1720 kilocycles by slipping primary.
3. Check for sensitivity at the following frequencies only: 1720 and 3700 kilocycles - under no conditions touch trimmers or plates of variable condenser while checking short wave band.

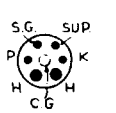
BOND RADIO CO.

MODELS 34-33 & 6TA





2A7



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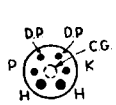
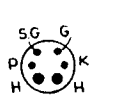
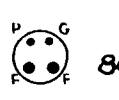


2A6



2A5



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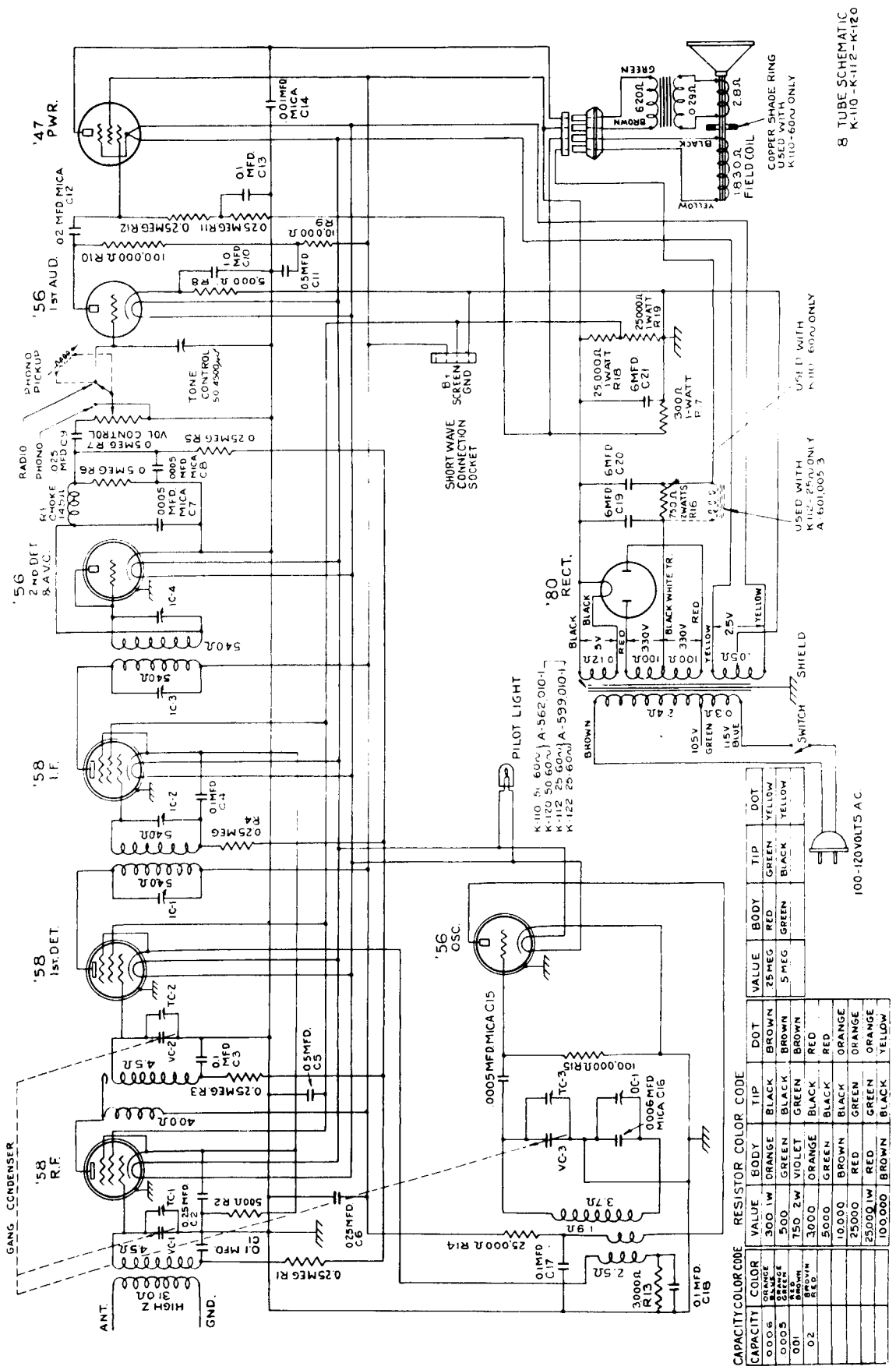
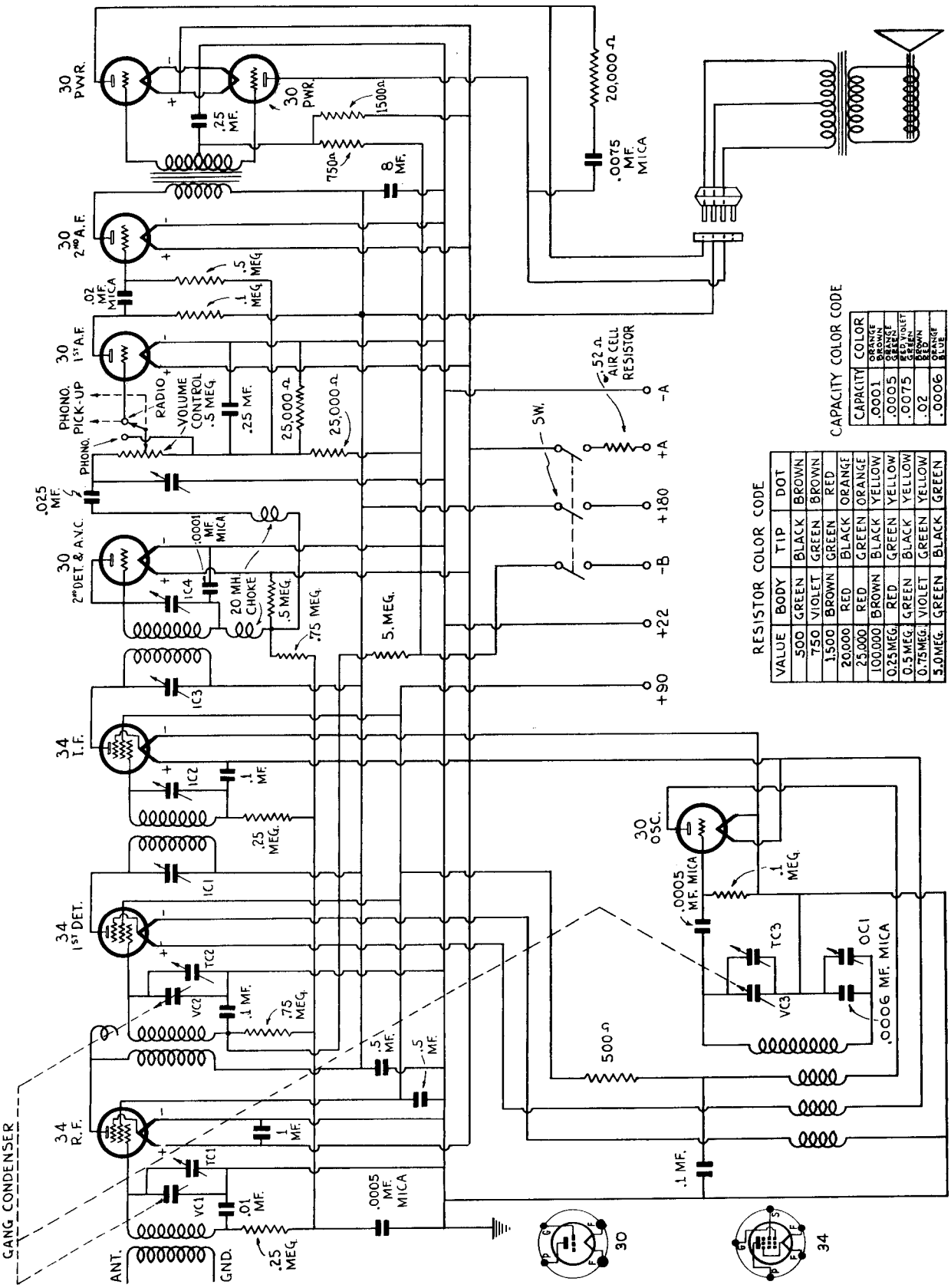
BRANDES PRODUCTS CORP.

MODELS K110, K112, K120



BRANDES PRODUCTS CORP.

MODEL K114 BATTERY



RESISTOR COLOR CODE

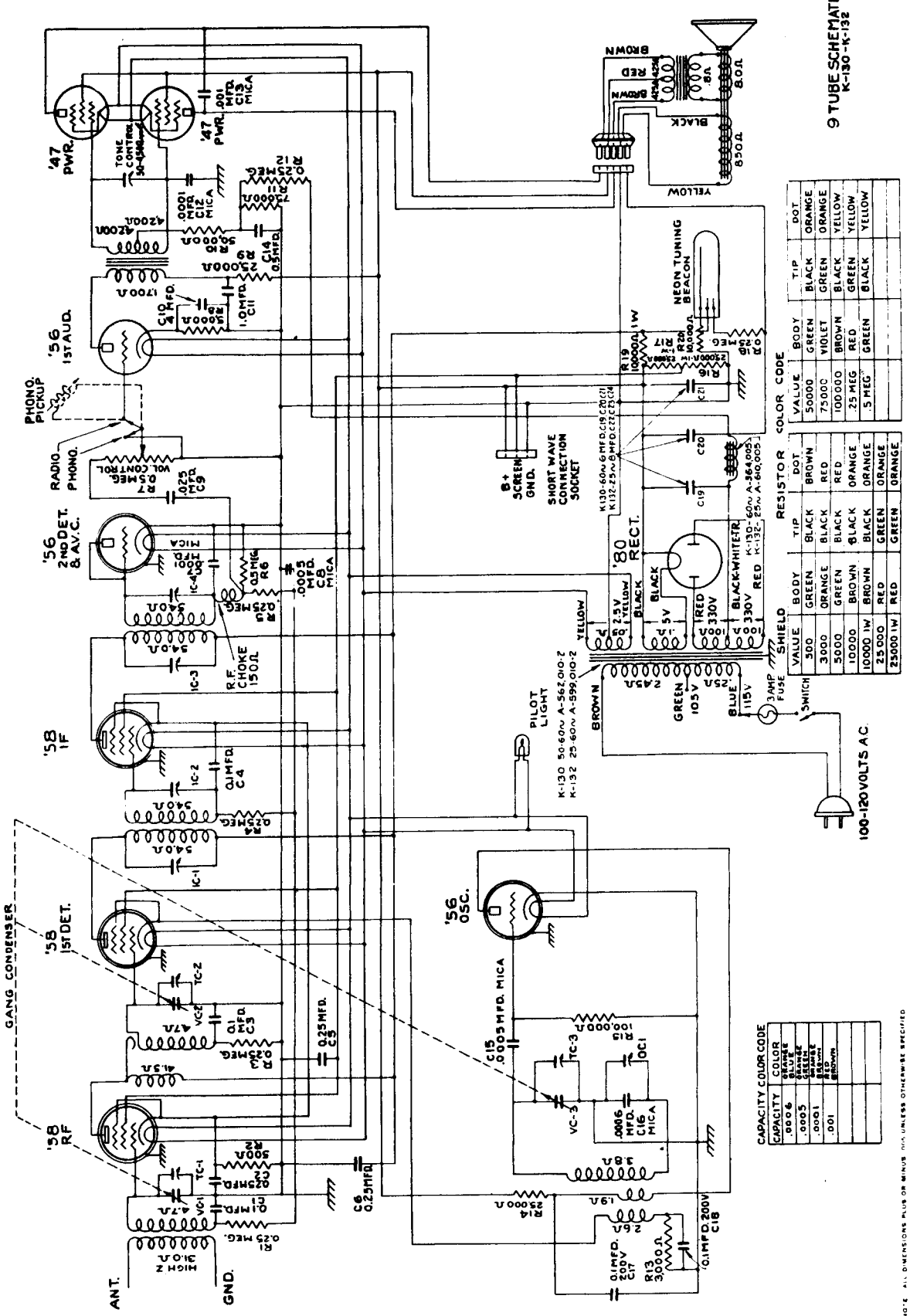
VALUE	BODY	TIP	DOT
500	GREEN	BLACK	BROWN
750	VIOLET	GREEN	BROWN
1,500	BROWN	GREEN	RED
20,000	RED	BLACK	ORANGE
25,000	RED	GREEN	ORANGE
100,000	BROWN	BLACK	YELLOW
0.25 MEG.	RED	GREEN	YELLOW
0.5 MEG.	GREEN	BLACK	YELLOW
0.75 MEG.	VIOLET	GREEN	YELLOW
5.0 MEG.	GREEN	BLACK	GREEN

CAPACITY COLOR CODE

CAPACITY	COLOR
.0001	ORANGE BROWN
.0005	ORANGE GREEN
.0075	RED VIOLET GREEN
.02	BROWN RED BLACK
.0006	ORANGE BLUE

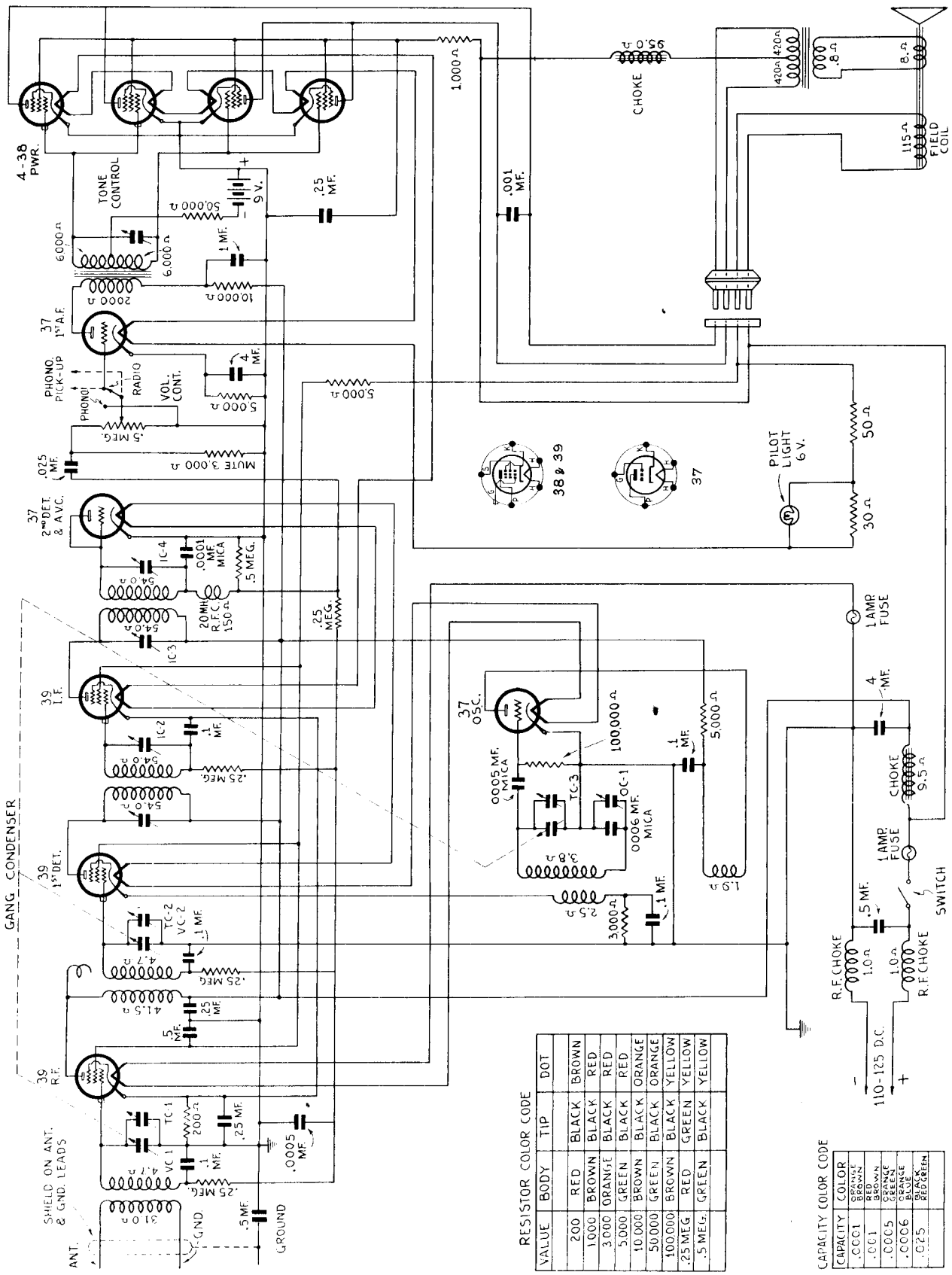
BRANDES PRODUCTS CORP.

MODEL K-130 , K132



BRANDES PRODUCTS CORP.

MODEL K133-K143 D.C. SET



RESISTOR COLOR CODE

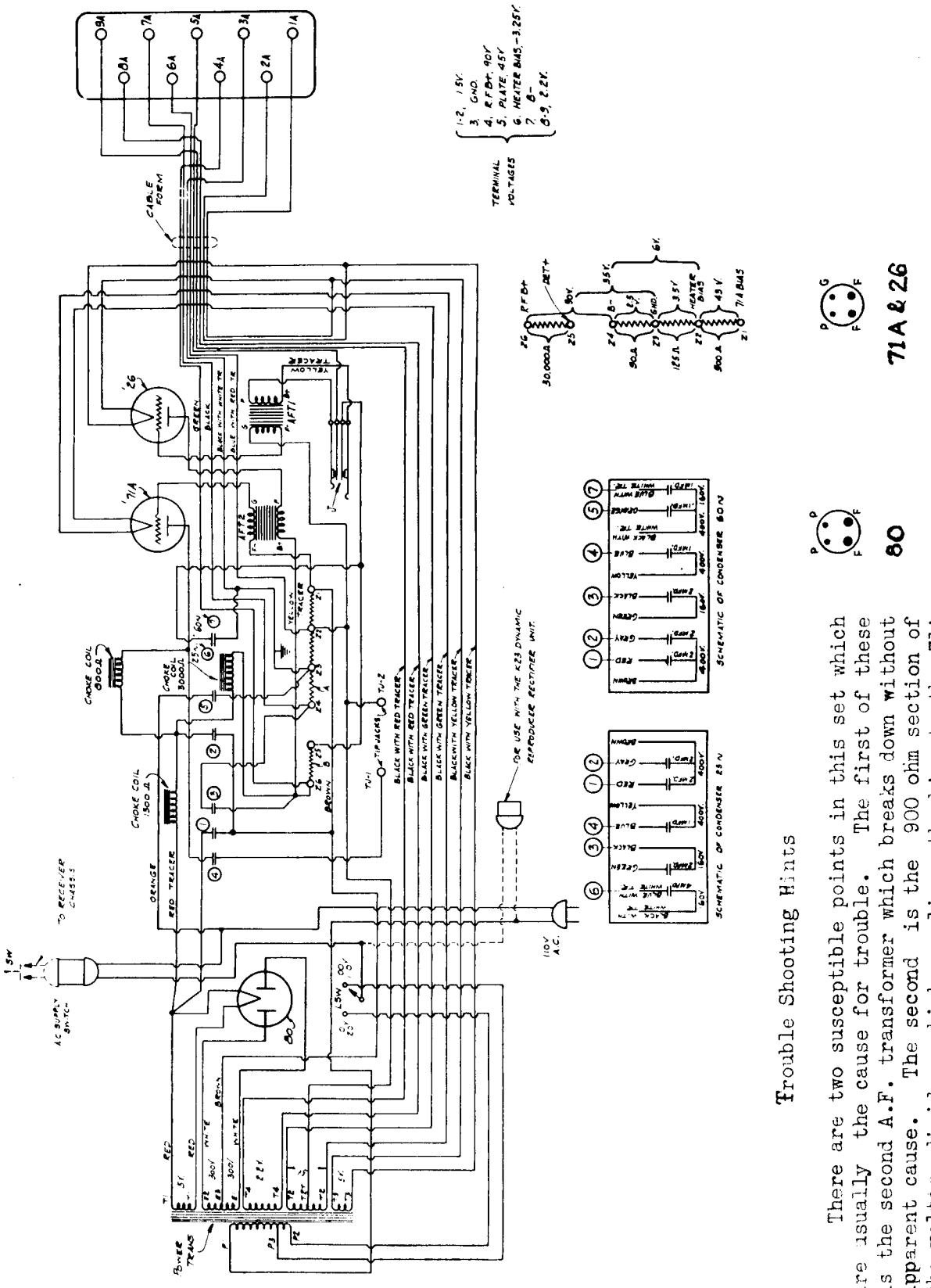
VALUE	BODY	TIP	DOT
200	RED	BLACK	BROWN
1000	BROWN	BLACK	RED
3,000	ORANGE	BLACK	RED
5,000	GREEN	BLACK	RED
10,000	BROWN	BLACK	ORANGE
50000	GREEN	BLACK	ORANGE
100000	BROWN	BLACK	YELLOW
.25 MEG	RED	GREEN	YELLOW
.5 MEG.	GREEN	BLACK	YELLOW

CAPACITY COLOR CODE

CAPACITY	COLOR
.0001	ORANGE ORANGE BROWN
.001	RED RED BROWN
.005	ORANGE ORANGE GREEN
.006	BLUE BLUE ORANGE
.025	BLACK RED GREEN

BRANDES PRODUCTS CORP.

7 TUBE POWER PACK & AUDIO AMPLIFIER

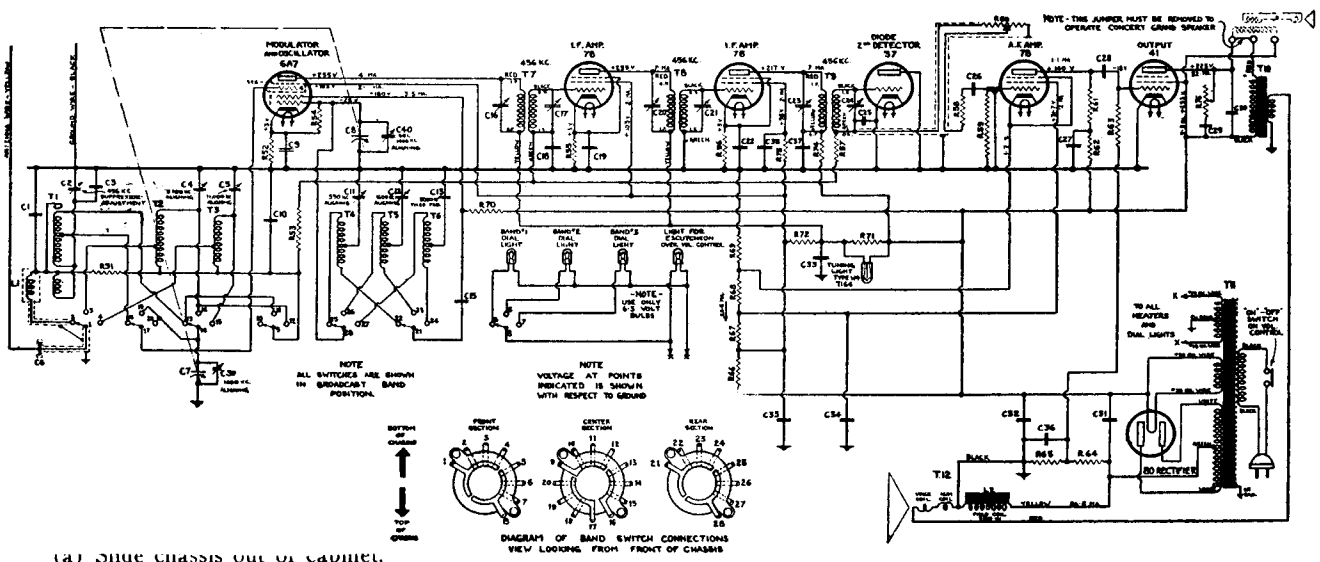


Trouble Shooting Hints

There are two susceptible points in this set which are usually the cause for trouble. The first of these is the second A.F. transformer which breaks down without apparent cause. The second is the 900 ohm section of the voltage divider which supplies the bias to the 71A grid. It is advisable to replace the entire voltage divider if this section becomes open circuited.

CANADIAN RADIO CORP., Ltd.

MODEL 505

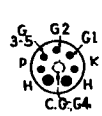


(a) Slide chassis out of cabinet.
(b) Connect output meter across speaker voice coil terminals.
(c) Connect service oscillator to grid cap of 6A7 tube allowing grid connection to remain in position. Ground oscillator to receiver chassis. Tune receiver to approximately 1,400 kilocycles with band selector switch at broadcast or #1 position. Adjust volume control to full-on position.
(d) Adjust service oscillator for a 456 kilocycle signal. This is the intermediate frequency used in the type 505 chassis.
(e) Adjust I. F. aligning condensers C24, C23, C21, C20, C17 and C16 in that order for maximum increase in reading of output meter. (See Note 1.)
(f) Transfer service oscillator connections to antenna and ground leads of receiver. Adjust service oscillator and receiver in tune at 1,400 kilocycles.
(g) Align C39 and C40 in that order for maximum increase in output meter reading. (See Note 2.)
(h) Adjust service oscillator and receiver in tune at 550 kilocycles. Align C11 for increase in output meter reading, rocking tuning control in usual manner during this adjustment.
(i) Tune receiver to 540 kilocycles. Adjust service oscillator for a 456 kilocycle signal. Adjust C2 for **minimum** signal. Do this audibly.
(j) Adjust selector switch to #2 short-wave position. Tune receiver and oscillator to 3.7 megacycles. Adjust C4 for maximum increase in output meter reading.
(k) Tune receiver and oscillator to 1.6 megacycles. Adjust C12 for maximum increase in output meter reading. Rock the gang condenser during this adjustment.
(l) Adjust selector switch to #3 short-wave position. Tune receiver and oscillator to 11.0 megacycles. Adjust C5 for maximum increase in output meter reading.
(m) Tune receiver and oscillator to 1,400 kilocycles and recheck C39 and C40.

NOTE 1: Keep output of service oscillator low in value; allowing just enough signal to give readable indication on output meter. If output of service oscillator is too high in value when starting alignment, the increase in gain, resulting, may cause overload of a tube or tubes and result in false aligning peaks being obtained.

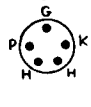
NOTE 2: When aligning oscillator stage, double peaks may be encountered. The proper peak of alignment is the one at which adjusting screw is farthest out or where condenser is at **minimum** capacity.

NOTE: "Seal Shielded" tubes with ground connectors may be used. Equip as follows: 6A7S; 78S; 78S; 37S; 78S and 41S.

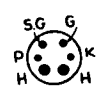


6A7

78



37



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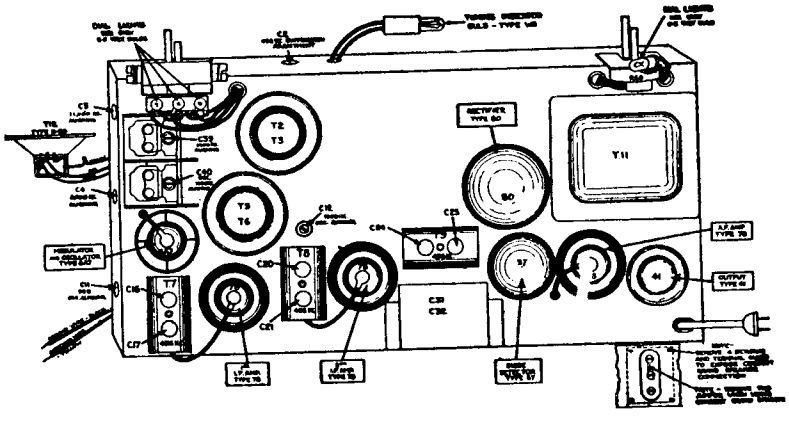
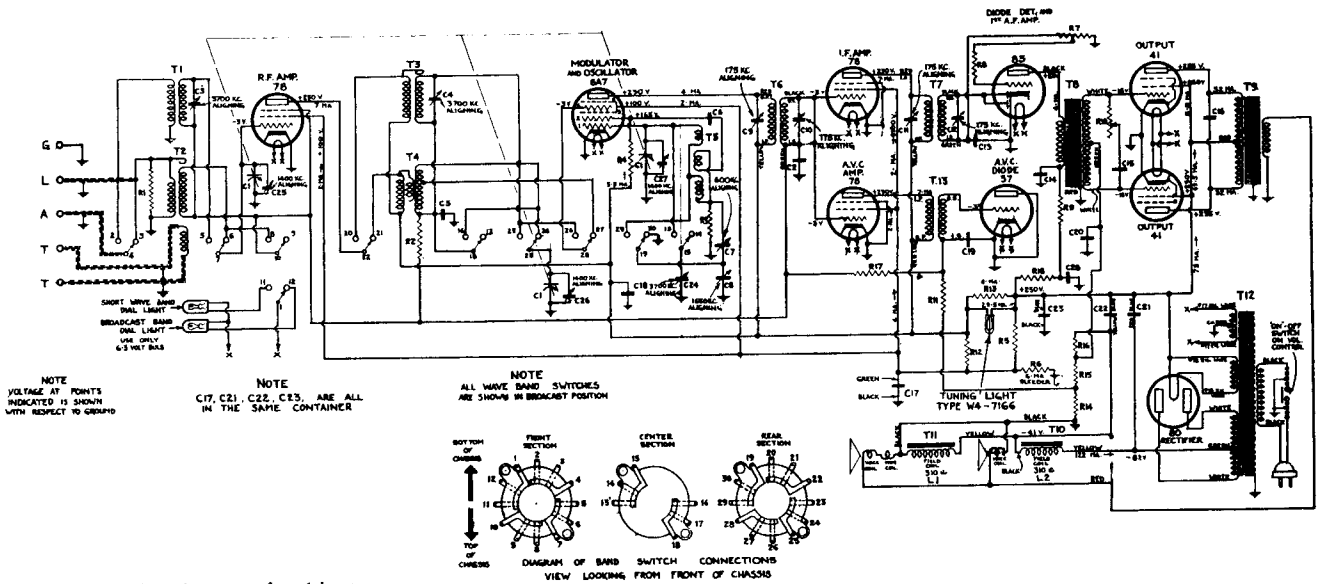
80



C1	Condenser, .00045 mfd. (M)	
C2	Condenser, R.F. Suppression (V)	
C3	Condenser, .003 mfd. (400)	
C4	Condenser, R.F. Altern. (V)	
C5	Condenser, R.F. Altern. (V)	
C6	Condenser, .02 mfd. (400)	
C7	Condenser, Tuning	
C8	Condenser, Tuning	
C9	Condenser, .1 mfd. (400)	
C10	Condenser, .02 mfd. (200)	
C11	Condenser, Osc. Align. (V)	
C12	Condenser, Osc. Align. (V)	
C13	Condenser, .00022 mfd. (M)	
C15	Condenser, .000 mfd. (M)	
C16	First I. F.	
C17	Condenser, .02 mfd. (200)	
C19	Condenser, .1 mfd. (200)	
C20	Second I.F.	
C21	Condenser, .1 mfd. (200)	
C22	Third I.F. Assembly	
C23	Condenser, .0005 mfd. (M)	
C24	Condenser, .02 mfd. (400)	
C25	Condenser, .5 mfd. (400)	
C26	Condenser, .25 mfd. (400)	
C27	Condenser, .02 mfd. (400)	
C28	Condenser, .1 mfd. (400)	
C29	Condenser, .005 mfd. (600)	
C30	Condenser, .5 mfd.(425)(D)	
C31	Condenser, .12 mfd.(425)(D)	
C32	Condenser, .1 mfd. (400)	
C34	Condenser, .3 mfd. (200)	
C35	Condenser, .5 mfd. (200)	
C36	Condenser, .1 mfd. (200)	
C38	Condenser, .25 mfd. (200)	
C39	Condenser, .5 mfd. (400)	
C40	Condenser, .75 mfd. (400)	
C37	Condenser, .05 mfd. (400)	
C38	Condenser, .05 mfd. (200)	
C39	Tuning Condenser	
C40		
R51	Resistor, 5,000 ohms (W)	
R52	Resistor, 300 ohms (W)	
R53	Resistor, 50,000 ohms (W)	
R54	Resistor, 50,000 ohms (W)	
R55	Resistor, 300 ohms (W)	
R56	Resistor, 300 ohms (W)	
R57	Resistor, 1,000,000 ohms (W)	
R58	Resistor, 100,000 ohms (W)	
R59	Resistor, 1,000,000 ohms (W)	
R60	Resistor, 500,000 ohms (VC)	
R61	Resistor, 50,000 ohms (W)	
R62	Resistor, 50,000 ohms (W)	
R63	Resistor, 250,000 ohms (W)	
R64	Resistor, 150,000 ohms (W)	
R65	Resistor, 100,000 ohms (W)	
R66	Resistor, 13,000 ohms (2)	
R67	Resistor, 3,400 ohms (1)	
R68	Resistor, 1,460 ohms (1)	
R69	Resistor, 78 ohms (W)	
R70	Resistor, 20,000 ohms (W)	
R71	Resistor, 3,440 ohms (2)	
R72	Resistor, 9,000 ohms (2)	
R74	Resistor, 2,500 ohms (W)	
R75	Resistor, 2,500 ohms (2)	
R76	Resistor, 50,000 ohms (EC)	
L1	Choke, Antenna	
L2	Cont. Speaker Field (D20) 550 ohms	
L3	Choke, R.F. (See "Service Information")	
T1	Transformer, #1 Broadcast, Ant. Stage	
T2	Transformer, #2 Short-Wave, Ant. Stage	
T3	Transformer, #3 Short-Wave, Ant. Stage	
T4	Transformer, #1 Broadcast, Osc. Stage	
T5	Transformer, #2 Short-Wave, Osc. Stage	
T6	Transformer, #3 Short-Wave, Osc. Stage	
T7	Transformer, 1st I. F.	
T8	Transformer, 2nd I. F.	
T9	Transformer, 3rd I. F.	
T10	Transformer, Output	
T11	Transformer, Power	

CANADIAN RADIO CORP., Ltd.

MODEL 507



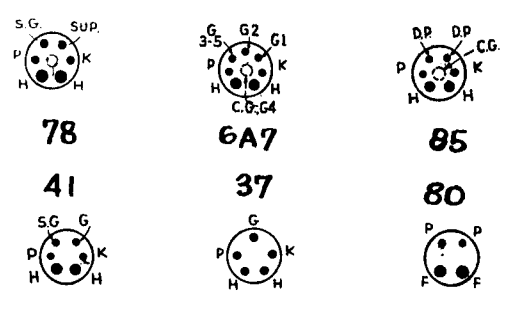
(a) Slide chassis out of cabinet.
(b) Connect a suitable output meter across voice coil terminals of either speaker.
(c) Connect service oscillator to grid cap of 6A7 tube, allowing grid clip to remain in position. Ground service oscillator to receiver chassis. Set selector switch for "broadcast".
(d) Turn receiver "on" and tune to 530 kilocycles, and adjust volume control to "full on" position.
(e) Adjust service oscillator to exactly 175 kilocycles, the intermediate frequency used in the type 507 chassis.
(f) Adjust C12, C11, C10 and C9 in that order for maximum increase in reading of output meter. See Note 1. This aligns the I. F. stages.
(g) Transfer service oscillator lead to antenna terminal "A". Tune receiver and service oscillator to 1,400 kilocycles.
(h) Adjust C27, C26 and C25 in that order for maximum increase in output meter reading. See Note 1. This aligns the R. F. and Osc.-Mod. stages.
(i) Adjust service oscillator and receiver in tune at 600 kilocycles.
(j) Adjust C7 for maximum increase in output meter reading. Rock the tuning control in the usual manner during this adjustment. This adjusts the series osc. pad.
(k) Re-tune service oscillator and receiver to 1,400 kilocycles and recheck adjustment of C27, C26 and C25. This completes adjustments for the broadcast band.

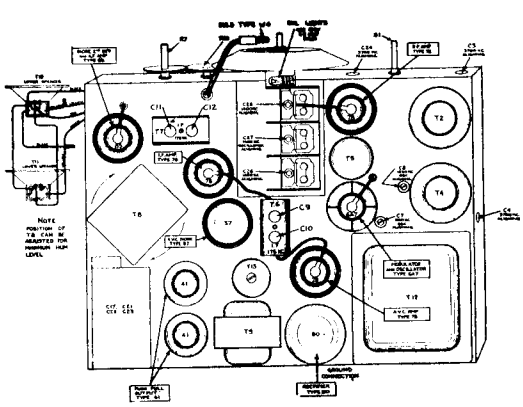
NOTE 1: Keep output of service oscillator at a low value. Excessive values of output may bring about tube or circuit overloads, resulting in false indications of aligning peaks.

NOTE 2: When adjusting C4, it will be found to peak at near minimum capacity.

NOTE 3: Both C3 and C24 will be found to peak at near maximum capacity.

NOTE 4: When adjusting C24 two peaks may be encountered. Select the peak at which least capacity is in circuit.

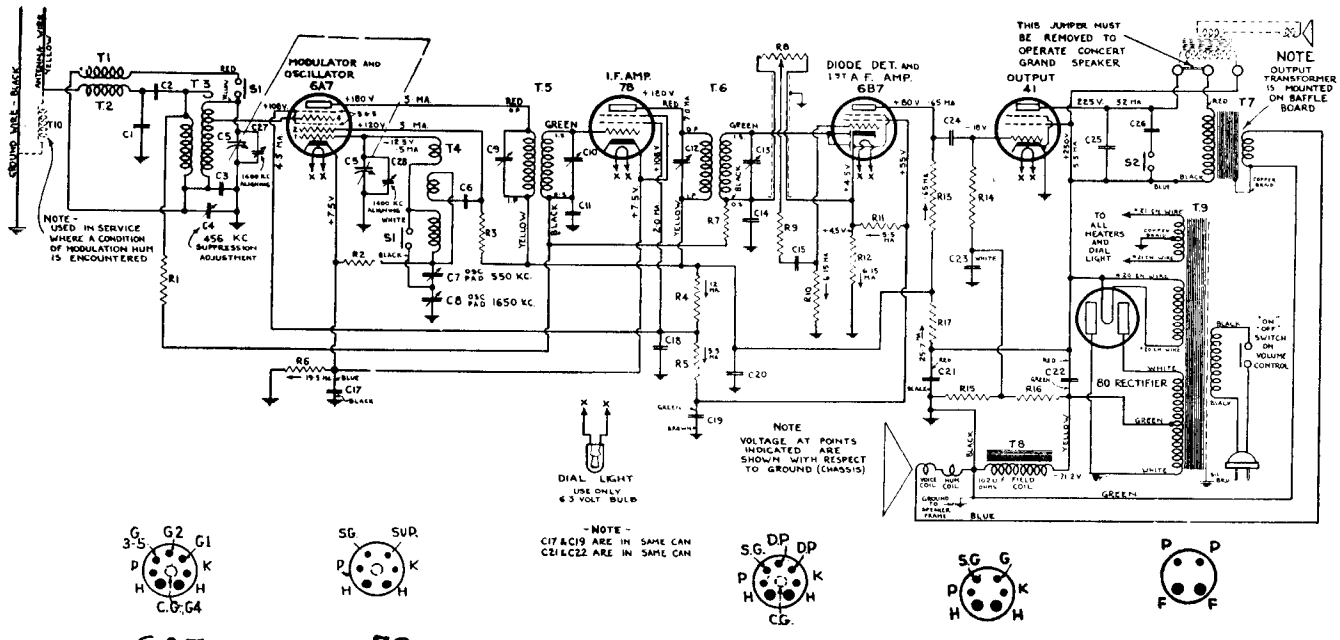




C1	Condenser, Tuning (V)	
C2	Condenser, .05 mfd. (200)	
C3	Condenser, R.F. Align. (V)	
C4	Condenser, R.F. Align. (V)	
C5	Condenser, .05 mfd. (200)	
C6	Condenser, .00075 mfd. (M)	
C7	Condenser, Osc. Align. (V)	
C8	Condenser, Osc. Align. (V)	
C9 }	Part of 1st I. F. Assembly; Part	
C10 }		
C11 }	Part of 2nd I. F. Assembly; Part	
C12 }		
C13	Condenser, .0002 mfd. (M)	
C14	Condenser, .25 mfd. (600)	
C15	Condenser, .003 mfd. (M)	
C16	Condenser, .0025 mfd. (1000)	
C17	Condenser, 4 mfd. (350) (D) See 21, 22, 23	
C18	Condenser, .1 mfd. (600)	
C19	Condenser, .02 mfd. (200)	
*C20	Condenser, 3. mfd. (200)	
*C20	Condenser, 5 mfd. (200)	
C21 }	Condenser, 8. mfd.(600) (D)	
C22 }	Condenser, 8. mfd.(600) (D)	
C23 }	Condenser, 8. mfd.(600) (D)	
C24	Condenser, Osc. Align. (V)	
C25 }	Part of 507-15 (C1)	
C26 }		
C27 }		
C28	Condenser, .25 mfd. (600)	
R1	Resistor, 10,000 ohms (¼)	
R2	Resistor, 50,000 ohms (¼)	
R3	Resistor, 50,000 ohms (¼)	
R4	Resistor, 20,000 ohms (½)	
R5 }	Resistor, 19,000 ohms (W)	
R6 }	Resistor, 16,600 ohms (W)	
R7	Resistor, 250,000 ohms (V.C.)	
R8	Resistor, 100,000 ohms (¼)	
*R9	Resistor, 50,000 ohms (½)	
*R9	Resistor, 50,000 ohms (1)	
R10	Resistor, 1,500,000 ohms (T.C.)	
R11	Resistor, 1,000,000 ohms (¼)	
R12	Resistor, 21,500 ohms (W)	
R13	Resistor, 3,400 ohms (W)	
R14	Resistor, 15,000 ohms (¼)	
R15	Resistor, 75,000 ohms (¼)	
R16	Resistor, 115,000 ohms (¼)	
R17	Resistor, 500,000 ohms (¼)	
R18	Resistor, 50,000 ohms (½)	
L1	Coil, Speaker Field (D21) 310 ohms	
L2	Coil, Speaker Field, (D22) 310 ohms	
S1	Switch, Band Selector	
T1	Transformer, Short-Wave, Antenna Stage	
T2	Transformer, Broadcast, Antenna Stage	
T3	Transformer, Short-Wave, Interstage	
T4	Transformer, Broadcast, Interstage	
T5	Transformer, Oscillator	
T6	Transformer, 1st I. F.	
T7	Transformer, 2nd I. F.	
T8	Transformer, Push-Pull Input	
T9	Transformer, Output	
T10	(See Speaker D22)	
T11	(See Speaker D21)	
T12	Transformer, Power	
T13	Transformer, Untuned I.F.	

CANADIAN RADIO CORP., Ltd.

MODEL 508



To carry out complete re-alignment, adjustments should be made as follows, making reference to illustration 1:

(a) Slide the chassis out of cabinet.

(b) Connect suitable output meter across speaker voice coil terminals or across the two outside terminals of the connection strip provided for operation of "Concert Grand Speaker".

(c) Connect service oscillator to grid cap of type 6A7 tube allowing grid connection to remain in position. Tune receiver to 1,400 kilocycles with wave-band selector switch in broadcast position. Adjust the volume control to nearly full-on position.

(d) Adjust service oscillator to exactly 456 kilocycles, the intermediate frequency used in the type 508 chassis.

(e) Adjust I. F. aligning condensers C13, C12, C10 and C9 in that order for maximum increase in reading of output meter. (See Note (a).)

(f) Transfer service oscillator connections to antenna and ground leads of receiver. Adjust receiver and service oscillator in tune at 1,400 kilocycles.

(g) Align C27 and C28 in that order for maximum increase in reading of output meter. (See Note (a).)

(h) Adjust receiver and service oscillator in tune at 550 kilocycles. Adjust C7 for maximum increase of output meter rocking tuning control in the usual manner during this adjustment.

(i) Tune receiver to 540 kilocycles. Adjust service oscillator to exactly 456 kilocycles. Adjust C4 for minimum signal. Do this audibly.

(j) Adjust wave selector switch to short-wave position. Adjust service oscillator and receiver in tune at approximately 1,650 kilocycles. Adjust C8 for maximum increase reading of output meter.

(k) Return wave selector switch to "broadcast" position. Adjust receiver and service oscillator in tune at 550 kilocycles and recheck adjustment of C7.

(l) Tune receiver and service oscillator to 1,400 kilocycles and recheck adjustment of C27 and C28.

NOTE (a): If output of service oscillator is too high in value when starting alignment adjustments, increase in gain resulting from re-alignment may cause overload of a tube or tubes and result in false aligning peaks being obtained. It is, therefore, very essential that the output of the service oscillator be kept low enough to give a readable indication only of output meter.

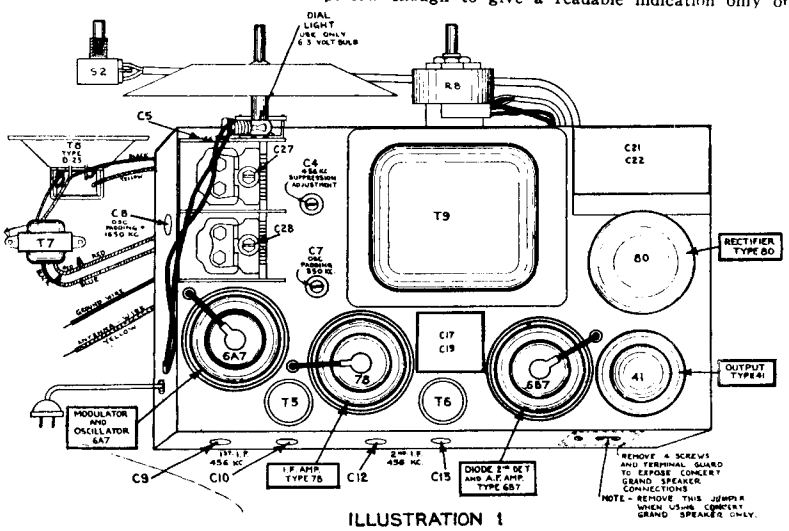
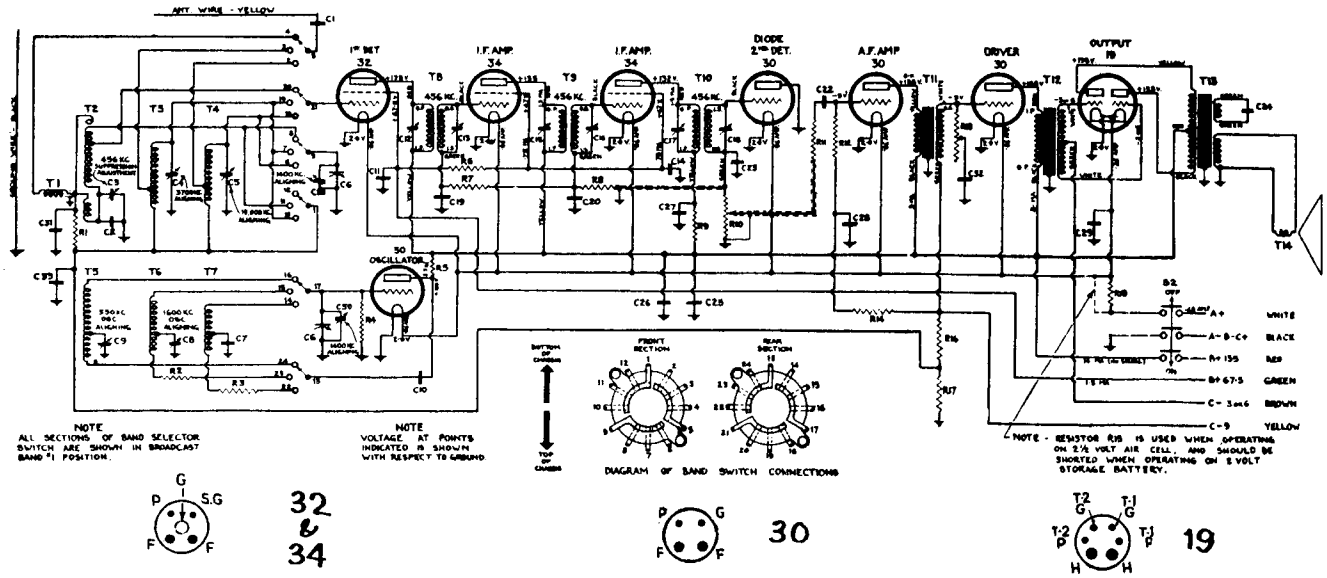


ILLUSTRATION 1

C1	Condenser, .0025 mfd. (M)	R12	Resistor, 730 ohms (5%)
C2	Condenser, .02 mfd. (400)	R13	Resistor, 150,000 ohms (5%)
C3	Condenser, .0042 mfd. (400)	R14	Resistor, 250,000 ohms (5%)
C4	Condenser, R. F. Suppression (V)	R15	Resistor, 150,000 ohms (5%)
C5	Condenser, Tuning (V)	R16	Resistor, 500,000 ohms (5%)
C6	Condenser, .0001 mfd. (M)	R17	Resistor, 27.20 ohms (2)
C7	Condenser, Oscillator Aligning (V)	S1	Switch, Band Selector
C8	Condenser, Oscillator Aligning (V)	S2	Switch, Tone Control
C9	Condenser, I. F. Aligning (V)	T1	Transformer, Antenna (Short-Wave)
C10	Condenser, I. F. Aligning (V)	T2	
C11	Condenser, .05 mfd. (200)	T3	Transformer, Antenna (Broadcast)
C12	Condenser, I. F. Aligning (V)	T4	Transformer, Oscillator
C13	Condenser, I. F. Aligning (V)	T5	Transformer, 1st I. F.
C14	Condenser, .0005 mfd. (M)	T6	Transformer, 2nd I. F.
C15	Condenser, .02 mfd. (400)	T7	Transformer, Output Console
C16	Condenser, .25 mfd. (200)	T8	See Speaker, D23
C17	Condenser, .5 mfd. (400)	T9	Transformer, Power
C18	Condenser, .1 mfd. (400)	T10	Choke, R. F.
C19	Condenser, .1 mfd. (500)		Speaker, D23
C20	Condenser, 12. mfd. (300)		Speaker, D23 Cone, Voice Coil Assembly
C21	Condenser, 8. mfd. (400)		Speaker, D23 Field Coil, 1,020 ohms
C22	Condenser, 8. mfd. (200)		Speaker, D23 Hum Coil
C23	Condenser, .05 mfd. (500)		Base, Tube Shield
C24	Condenser, .005 mfd. (400)		Base, Chassis
C25	Condenser, .021 mfd. (400)		Bulb, Dial, 6.3 volt
C26	Condenser, R. F. Aligning (V)		Clips, Grid
C27	Condenser, Oscillator Aligning (V)		Cabinet, Console
C28	Resistor, 5,000 ohms (5%)		Chassis, 508
R1	Resistor, 40,000 ohms (5%)		Knob, Switch
R2	Resistor, 20,000 ohms (5%)		Knob, Volume and Tone Control
R3	Resistor, 6,000 ohms (1)		Knob, Tuning
R4	Resistor, 9,100 ohms (2)		Plate, Escutcheon
R5	Resistor, 385 ohms (5%)		Scale, Dial and Drum
R6	Resistor, 1,000,000 ohms (5%)		Shield, Tube
R7	Potentiometer, 500,000 ohms (V. C.)		Socket, Dial Light
R8	Resistor, 100,000 ohms (5%)		Socket, Tube, 6 pin
R9	Resistor, 1,000,000 ohms (5%)		Socket, Tube, 7 pin
R10	Resistor, 9,100 ohms (2)		Socket, Tube, 4 pin

CANADIAN RADIO CORP., Ltd.

MODEL 511



32 & 34

30

19

To carry out re-alignment, adjustments should be made as follows, making reference to illustration 1: (See Notes 1 and 2.)

(a) Slide chassis out of cabinet.

(b) Connect output meter across speaker voice coil terminals.

(c) Connect service oscillator to grid cap of 32 first detector tube allowing grid connection to remain in position. Ground oscillator to receiver chassis. Tune receiver to approximately 1,400 kilocycles with band selector switch at broadcast or No. 1 position. Adjust volume control to full-on position.

(d) Adjust service oscillator for a 456 kilocycle signal. This is the intermediate frequency used in the type 511 chassis.

(e) Adjust I. F. aligning condensers C18, C17, C16, C15, C13 and C12 in that order for maximum increase in reading of output meter. (See Note 1.)

(f) Transfer service oscillator connections to antenna and ground leads of receiver. Adjust service oscillator and receiver in tune at 1,400 kilocycles.

(g) Align C30 and C21 in that order for maximum increase in output meter reading. (See Note 2.)

(h) Adjust service oscillator and receiver in tune at 550 kilocycles. Align C9 for increase in output meter reading, rocking tuning control in usual manner during this adjustment.

(i) Tune receiver to 540 kilocycles. Adjust service oscillator for a 456 kilocycle signal. Adjust C3 for **minimum** signal. Do this audibly.

(j) Adjust selector switch to No. 2 short-wave position. Tune receiver and oscillator to 3.7 megacycles. Adjust C4 for maximum increase in output meter reading.

(k) Tune receiver and oscillator to 1.6 megacycles. Adjust C8 for maximum increase in output meter reading. Rock the gang condenser during this adjustment.

(l) Adjust selector switch to No. 3 short-wave position. Tune receiver and oscillator to 11.0 megacycles. Adjust C5 for maximum increase in output meter reading.

(m) Tune receiver and oscillator to 1,400 kilocycles and recheck C30 and C21.

Note 1: Keep output of service oscillator low in value; allowing just enough signal to give readable indication on output meter. If output of service oscillator is too high in value when starting alignment, the increase in gain, resulting, may cause overload of a tube or tubes and result in false aligning peaks being obtained.

Note 2: When aligning oscillator stage, double peaks may be encountered. The proper peak of alignment is the one at which adjusting screw is farthest out or where condenser is at **minimum** capacity.

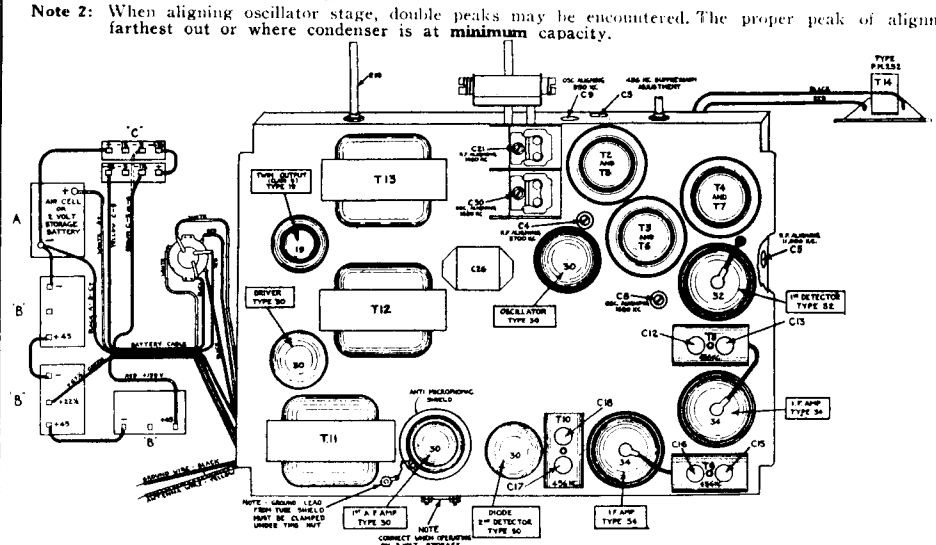
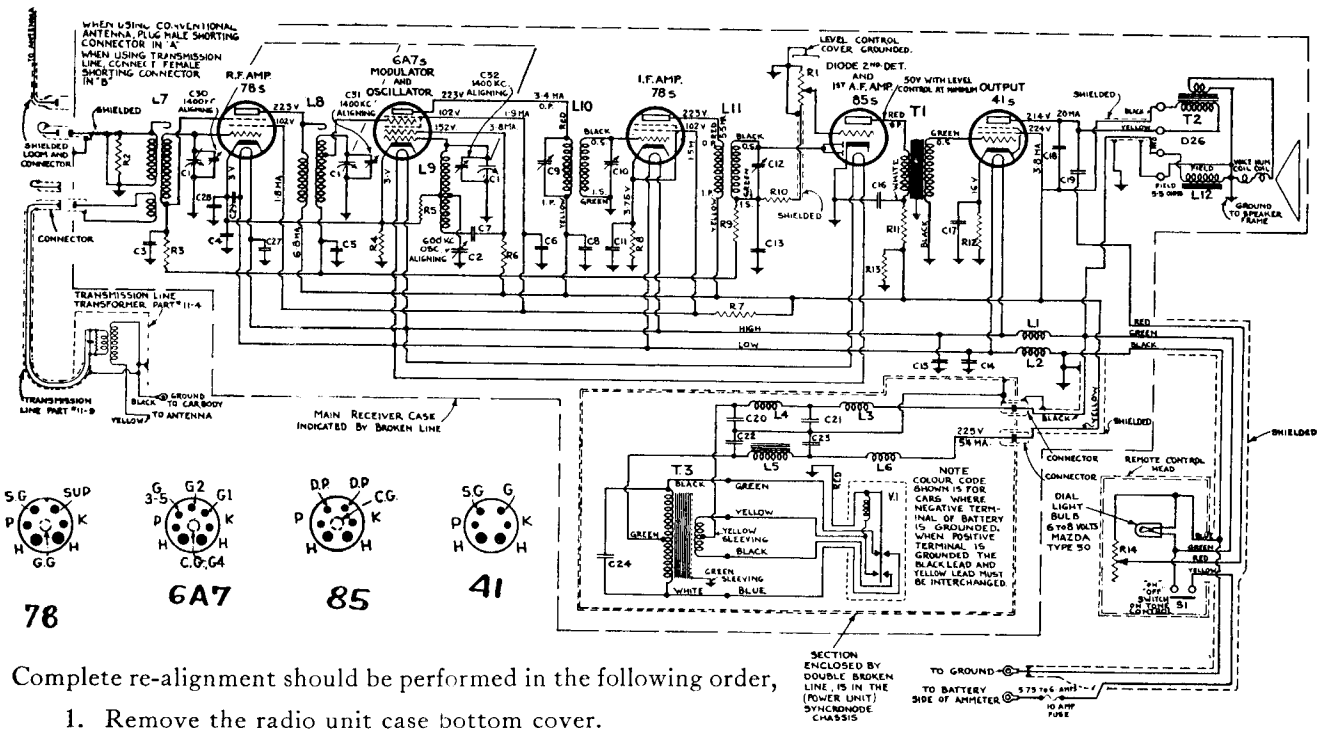


ILLUSTRATION 1

CANADIAN RADIO CORP., Ltd.

MODEL 513 C



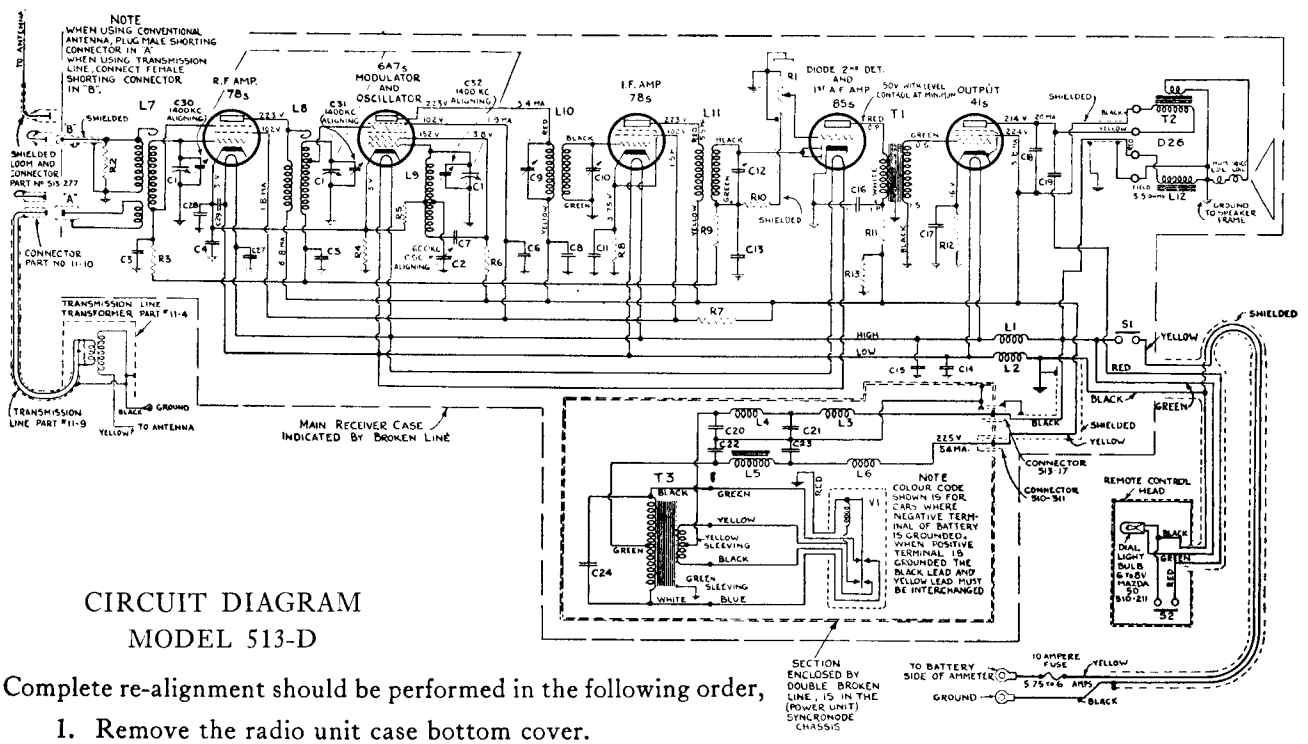
Complete re-alignment should be performed in the following order,

1. Remove the radio unit case bottom cover.
2. Connect the output meter across the speaker voice-coil terminals or between the plate and screen grid of the type 41 output tube (yellow and black speaker leads). (Speaker must be connected).
3. Connect the service oscillator to the grid cap of the type 6A7 tube, allowing the tube grid connection to remain in position. Tune the receiver to 1,400 kilocycles. Disconnect the antenna, if necessary, to reduce the noise level. Adjust the volume control to nearly the "full on" position.
4. Adjust the service oscillator to exactly 175 kilocycles as this is the frequency to which the intermediate frequency transformers are tuned.
5. Adjust the intermediate frequency aligning condensers, C12, C10 and C9, in that order, for maximum reading of the output meter
6. Transfer the service oscillator output connections to the antenna (connector "B" of Figure 2) and the chassis of the radio unit. Adjust the radio unit and the service oscillator in tune at 1,400 kilocycles.
7. Adjust aligning condensers C32, C31 **and C30 in** that order, for maximum reading of the output meter

C1 Condenser, Tuning (V)
C2 Condenser, Oscillator Aligning (V).
C3 Condenser, .025 mfd. (100) } Block, See C8
C4 Condenser, .1 mfd. (100) }
C5 Condenser, .025 mfd. (100) Block, See C8
C6 Condenser, .1 mfd. (400) Block, See C8
C7 Condenser, .001 mfd. (M)
C8 Condenser, 8. mfd. (D) Block
C9 Condenser, I. F. Tuning (V)
C10 Condenser, I. F. Tuning (V)
C11 Condenser, .05 mfd. (100)
C12 Condenser, I. F. Tuning (V)
C13 Condenser, .0003 mfd. (M)
C14 Condenser, .0025 mfd. (M)
C15 Condenser, .0025 mfd. (M)
C16 Condenser, .5 mfd. (400) } Block, See C19
C17 Condenser, 16. mfd. (D) }
C18 Condenser, .004 mfd. (750) Block
C19 Condenser, .06 mfd. (750) Block, See C23
C20 Condenser, .25 mfd. (100) Block, See C23
C21 Condenser, 12. mfd. (D) } Block
C22 Condenser, .1 mfd. (400) }
C23 Condenser, .012 mfd. (1000)
C24 Condenser, .0025 mfd. (M)
C25 Condenser, .0025 mfd. (M)
C26 Condenser, .0025 mfd. (M)
C27 Condenser, .0025 mfd. (M)
C28 Condenser, .0025 mfd. (M)
C29 Condenser, .0025 mfd. (M)
C30 } Aligning Condensers, Part of C1—Part No. 513-35.
C31 }
C32 }
L1 } Power Supply Double Choke
L2 }
L3 R. F. Choke "A" Unit
L4 R. F. Choke "A" Unit
L5 Choke, Filter "B" Unit
L6 R. F. Choke "B" Unit
L7 Transformer, R. F. Antenna Stage.
L8 Transformer, R. F. Detector Stage.
L9 Transformer, R. F. Oscillator Stage.
L10 Transformer, I. F. First Stage.
L11 Transformer, I. F. Second Stage.
L12 Coil, Field, 5.5 ohms
R1 Potentiometer, 500,000 ohms (V. C.)
R2 Resistor, 10,000 ohms (¼)
R3 Resistor, 25,000 ohms (¼)
R4 Resistor, 165 ohms (¼)
R5 Resistor, 50,000 ohms (½)
R6 Resistor, 20,000 ohms (½)
R7 Resistor, 21,000 ohms (1½)
R8 Resistor, 335 ohms (¼)
R9 Resistor, 750,000 ohms (¼)
R10 Resistor, 100,000 ohms (¼)
R11 Resistor, 50,000 ohms (Special)
R12 Resistor, 750 ohms (1)
R13 Resistor, 50,000 ohms (Special)
R14 Rheostat, 50,000 ohms (T. C. and Switch)
T1 Transformer, Audio
T2 Transformer, Output
T3 Transformer, Power
V1 Vibrator Assembly
Bulb, 6-8 volt
Cable, Power Supply (513-C)
Cable, Volume Control (513-C)
Cable, Tuning Control (513-C)
Case, Chassis (less top and bottom cover)
Clips, Grid
Cone and Voice Coil Assembly (D26)
Cover, Control Head with Emblem.
Cover, Top

CANADIAN RADIO CORP., Ltd.

MODEL 513 D

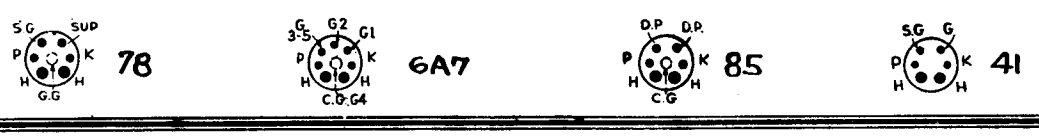


CIRCUIT DIAGRAM
MODEL 513-D

Complete re-alignment should be performed in the following order,

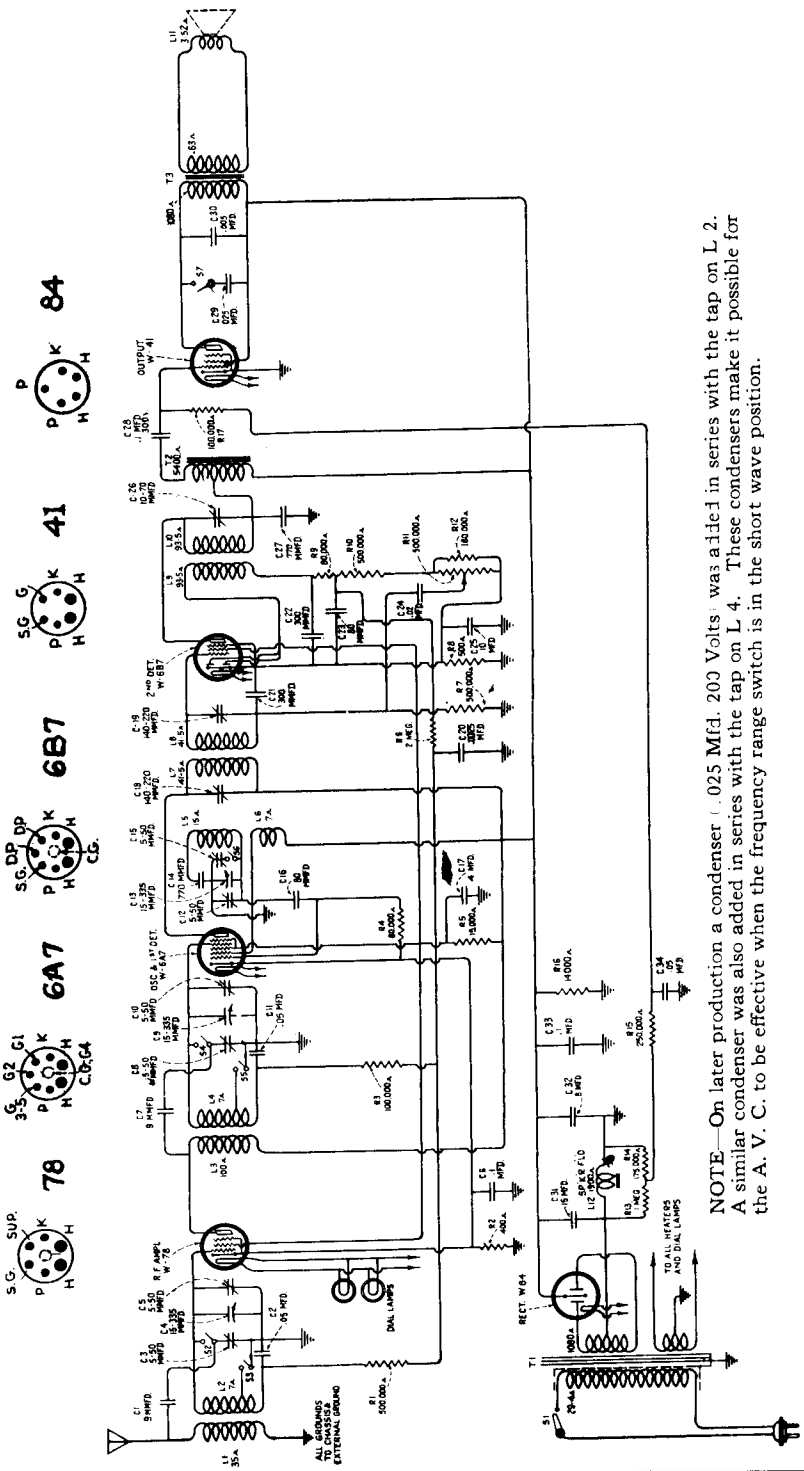
1. Remove the radio unit case bottom cover.
2. Connect the output meter across the speaker voice-coil terminals or between the plate and screen grid of the type 41 output tube (yellow and black speaker leads). (Speaker must be connected).
3. Connect the service oscillator to the grid cap of the type 6A7 tube, allowing the tube grid connection to remain in position. Tune the receiver to 1,400 kilocycles. Disconnect the antenna, if necessary, to reduce the noise level. Adjust the volume control to nearly the "full on" position.
4. Adjust the service oscillator to exactly 175 kilocycles as this is the frequency to which the intermediate frequency transformers are tuned.
5. Adjust the intermediate frequency aligning condensers, C12, C10 and C9, in that order, for maximum reading of the output meter
6. Transfer the service oscillator output connections to the antenna (connector "B" of Figure 2) and the chassis of the radio unit. Adjust the radio unit and the service oscillator in tune at 1,400 kilocycles.
7. Adjust aligning condensers C32, C31 and C30 in that order, for maximum reading of the output meter

C1	Condenser, Tuning (V)	
C2	Condenser, Oscillator Aligning (V)	
C3	Condenser, .025 mfd. (100)	Block, See C8
C4	Condenser, .1 mfd. (100)	
C5	Condenser, .025 mfd. (100)	
C6	Condenser, .1 mfd. (400) Block, See C8	
C7	Condenser, .001 mfd. (M)	
C8	Condenser, 8. mfd. (D) Block	
C9	Condenser, I. F. Tuning (V)	
C10	Condenser, I. F. Tuning (V)	
C11	Condenser, .05 mfd. (100)	
C12	Condenser, I. F. Tuning (V)	
C13	Condenser, .0005 mfd. (M)	
C14	Condenser, .0025 mfd. (M)	
C15	Condenser, .5 mfd. (400)	Block, See C19
C16	Condenser, 16. mfd. (D)	
C17	Condenser, .004 mfd. (750) Block	
C18	Condenser, .06 mfd. (750) Block, See C23	
C19	Condenser, .25 mfd. (100) Block, See C23	
C20	Condenser, .25 mfd. (100)	
C21	Condenser, 12. mfd. (D)	Block
C22	Condenser, 1 mfd. (400)	
C23	Condenser, .012 mfd. (1000)	
C24	Condenser, .0025 mfd. (M)	
C25	Condenser, .0025 mfd. (M)	
C26	Condenser, .0025 mfd. (M)	
C27	Condenser, .0025 mfd. (M)	
C28	Aligning Condensers, Part of C1—Part No. 513-35.	
C29		
C30		
C31		
C32		
L1	Power Supply Double Choke	
L2		
L3	R. F. Choke "A" Unit	
L4	R. F. Choke "A" Unit	
L5	Choke, Filter "B" Unit	
L6	R. F. Choke "B" Unit	
L7	Transformer, R. F. Antenna Stage.	
L8	Transformer, R. F. Detector Stage.	
L9	Transformer, R. F. Oscillator Stage.	
L10	Transformer, I. F. First Stage	
L11	Transformer, I. F. Second Stage	
L12	Coil, Field, 5.5 ohms	
R1	Potentiometer, 500,000 ohms (V. C.)	
R2	Resistor, 10,000 ohms (¼)	
R3	Resistor, 25,000 ohms (¼)	
R4	Resistor, 165 ohms (¼)	
R5	Resistor, 50,000 ohms (¼)	
R6	Resistor, 20,000 ohms (½)	
R7	Resistor, 21,000 ohms (1½)	
R8	Resistor, 335 ohms (¼)	
R9	Resistor, 750,000 ohms (¼)	
R10	Resistor, 100,000 ohms (¼)	
R11	Resistor, 50,000 ohms (Special)	
R12	Resistor, 750 ohms (1)	
R13	Resistor, 50,000 ohms (Special)	
R14	Rheostat, 50,000 ohms (T. C. and Switch)	
T1	Transformer, Audio	
T2	Transformer, Output	
T3	Transformer, Power	
V1	Vibrator Assembly	
	Bulb, 6-8 volt	
	Cable, Power Supply (513-C)	
	Cable, Volume Control (513-C)	
	Cable, Tuning Control (513-C)	
	Case, Chassis (less top and bottom cover)	
	Clips, Grid	
	Cone and Voice Coil Assembly (D26)	
	Cover, Control Head with Emblem.	
	Cover, Top	



CANADIAN WESTINGHOUSE CO., Ltd.

MODELS 54 & 534



NOTE—On later production a condenser (.025 Mfd. 200 Volts) was added in series with the tap on L 2. A similar condenser was also added in series with the tap on L 4. These condensers make it possible for the A. V. C. to be effective when the frequency range switch is in the short wave position.

SOCKET READINGS

All voltages except heater A.C. volts are taken with respect to cathode. All voltages are actual operating values. Measured values will depend on meter resistance.	Cap Volts	Pin 1 Volts	Pin 1 M.A.	Pin 2 Volts	Pin 2 M.A	Pin 3 Volts	Pin 4 Volts	Pin 5 M.A.	Pin 6 Volts	Pin 6 M.A.	Pin 7 Volts	Pin 7 M.A.	Heater Volts A.C.
1.—W-78 R.F. Amplifier	-2.8	95	1.4	170	6.0	-6.5	-6.5	-7.4	0	0			6.6
	Control Grid	Screen	2.2	Plate			Heater	K	Suppressor				
2.—W-6A7 First Detector Oscillator	-2.8	95	2.2	170	3.5	-6.5	-6.5	-9.0	.....	.....	.....	.....	6.6
	Control Grid	Screen		Det. Plate			Heater	K	Osc. Grid		170	3.2	
3.—W-6B7 I.F. and A.F. Amplifier Second Detector and A.V.C.*	-3.3	95	1.2	155	5.5	-3.3	-3.3	-7.0	0	0	Osc. Plate		6.6
	Control Grid	Screen		Plate	18		Heater	K	Diode		0	0	
4.—W-41 Power Amplifier		180	30	160				-21	-13		Diode		6.6
		Screen		Plate	30		Heater	K	Control Grid		.....	.....	
5.—W-84 Rectifier		-280		-280		-180	-180	-60	.....	.....	.....	.....	6.6
		Plate	30	Plate			Heater	K					

Trouble Shooting Hints

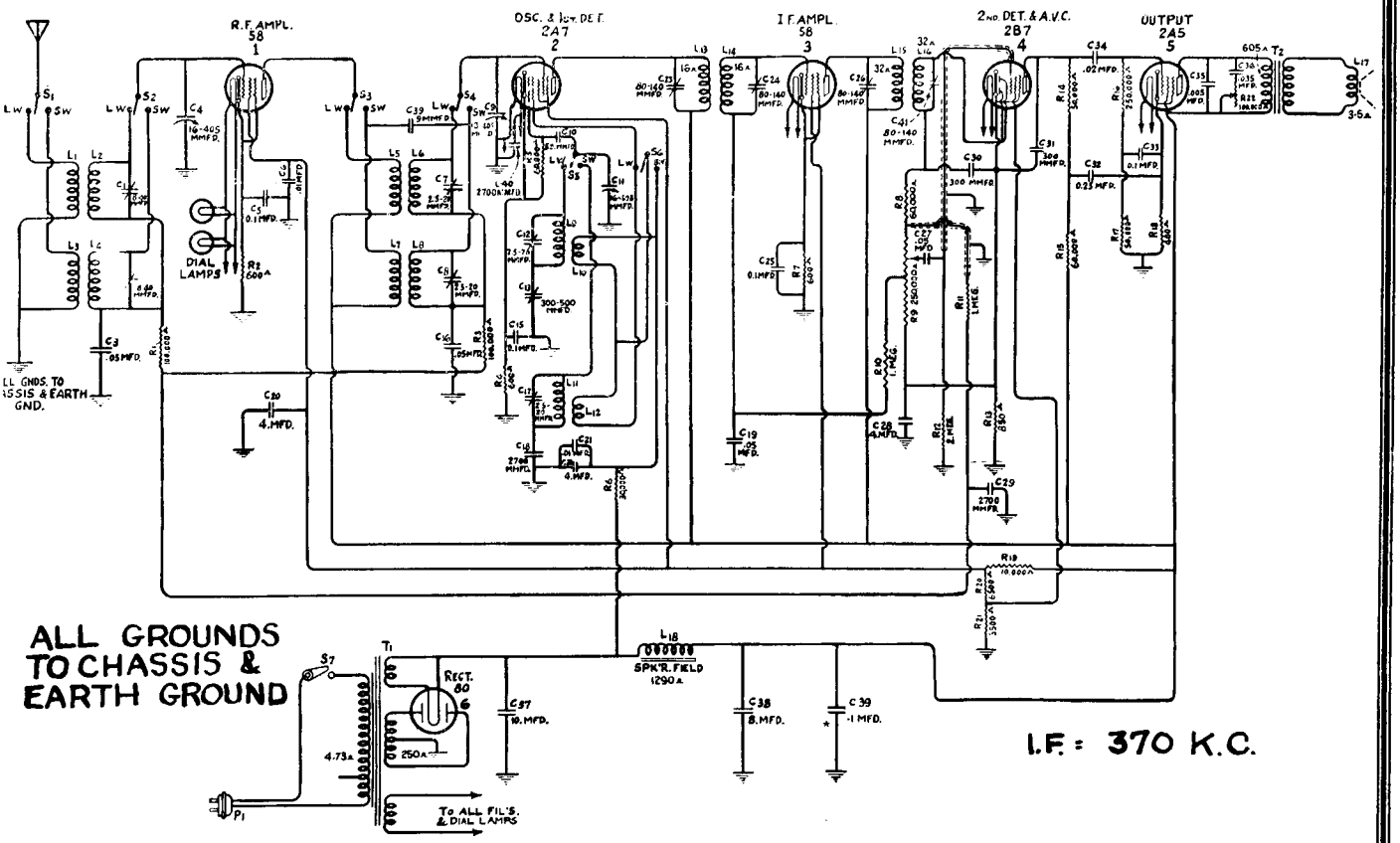
A frequent cause for complaint in this set is fading of short wave stations. In the early production sets the AVC was not operative and series condensers must be added to L2 and L4, as explained on the circuit. Insufficient sensitivity in this set is usually due to changes in resistance values in the oscillator and second detector circuits.

Trimmer Markings	Oscillator Frequency	Receiver Dial Setting	Oscillator Connected To:	Antenna and Ground Wires connected to:	Range Switch Position
175	175	55	W-6A7 Control Grid & Gd.	Shorted	Broadcast
1400	1400	140	Antenna and Ground	Oscillator	Broadcast
2440	2440	244	Antenna and Ground	Oscillator	High Frequency

Set volume control at loud position. Use minimum oscillator output necessary for suitable output meter reading.
This receiver should not be confused with other manufacturer's low-priced models. It is capable of 10 K.C. separation of broadcast stations and the service man's job is not complete unless adjustment is carried through to this point.

CANADIAN WESTINGHOUSE CO., Ltd.

MODELS 64 & 634

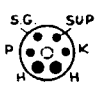


I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 370 K.C. and the adjustment screws are accessible as shown in Figure B. Proceed as follows:

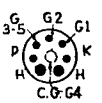
(a) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

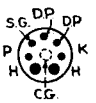
(c) Adjust the primary of the second, and the secondary and primary of the first I.F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I.F. adjustments.



58



2A7



2B7

2A5

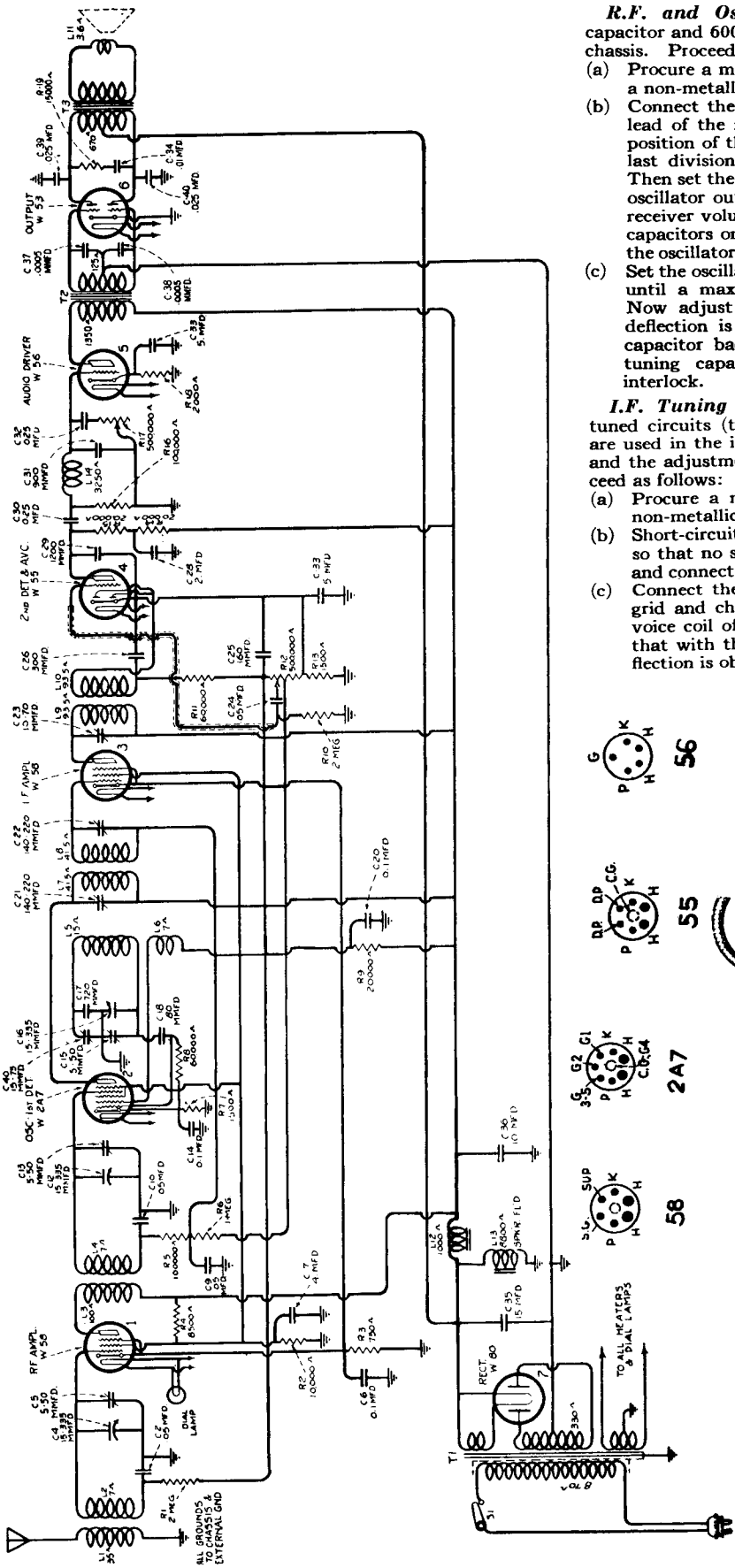
80

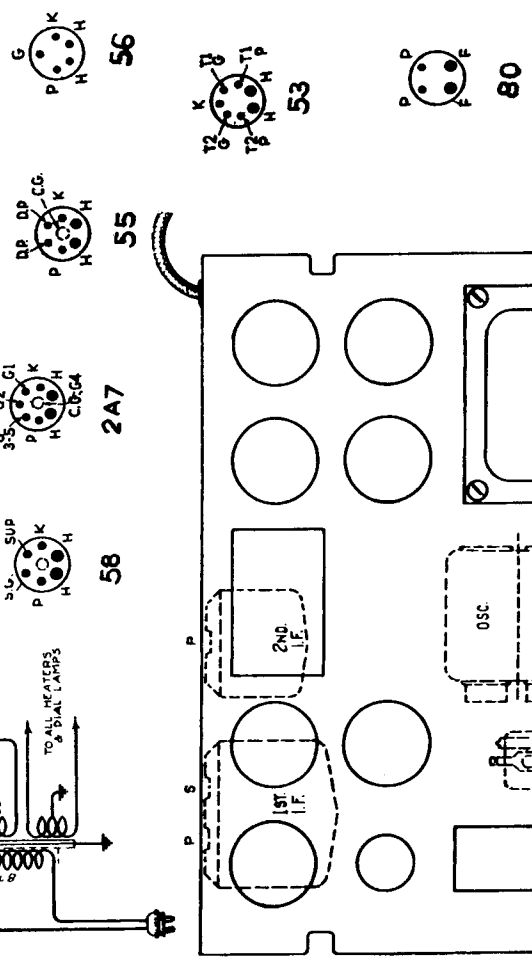
All voltage except heater A.C. volts are taken with respect to cathode. All voltages are actual operating values. Measured values will depend on meter resistance. Antenna and Ground Shorted. Pins are numbered according to R.M.A. standards.	SOCKET READINGS 115 VOLTS A.C. LINE								
	Cap Volts	Pin 1 Volts M.A.	Pin 2 Volts M.A.	Pin 3 Volts	Pin 4 Volts	Pin 5 M.A.	Pin 6 Volts M.A.	Pin 7 Volts M.A.	Heater Volts A.C.
1. W-58, R.F. Amplifier*	—3.0 C.G.	100 2.0 Screen	265 6.0 Plate	4.5 Heater	4.5	8.0 K	0 0 Suppressor		2.3
2. W-2A7 First Detector Oscillator*	—3.0 Det. G.	100 4.0 Screen	265 2.0 Plate	4.5 Heater	4.5	—8.0 K	0 0 Osc. Grid.	200 2.0 Osc. Plate	2.3
3. W-58 I.F. Amplifier*	—3.0 C.G.	100 2.0 Screen	265 6.0 Plate	—4.5 Heater	—4.5	—8.0 K	0 0 Suppressor		2.3
4. W 2B7 A.V.C. & 2nd Detector*	—1.5 C.G.	35 0.2 Screen	100 1.5 Plate	—1.5 Heater	—1.5	—1.8 K	0 0 Diode	0 0 Diode	2.3
5. W-2A5 Power Amplifier		250 5.0 Screen	240 35 Plate	—16 Heater	—16	—40 K	—16 0 C. Grid.		2.4
6. W-80 Rectifier		—360 40 Plate	—360 40 Plate	0 Fila	0 ment				4.8

*Necessary to ground control grid cap through small capacitor to prevent oscillation while testing.

CANADIAN WESTINGHOUSE CO., Ltd.

MODEL 73





R.F. and Oscillator Adjustments—The three gang variable capacitor and 600 K.C. trimmer screws are accessible at the top of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 600, 1400 K.C., a non-metallic screw driver and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Connect the output meter across the cone coil. Then set the dial at 140, the oscillator at 1400 K.C. and adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum. Align all three trimmer capacitors on the variable capacitor to maximum output keeping the oscillator output as low as possible.

(c) Set the oscillator at 600 K.C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K.C. series capacitor, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

I.F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K.C. and the adjustment screws are accessible as shown in Figure 3. Proceed as follows:

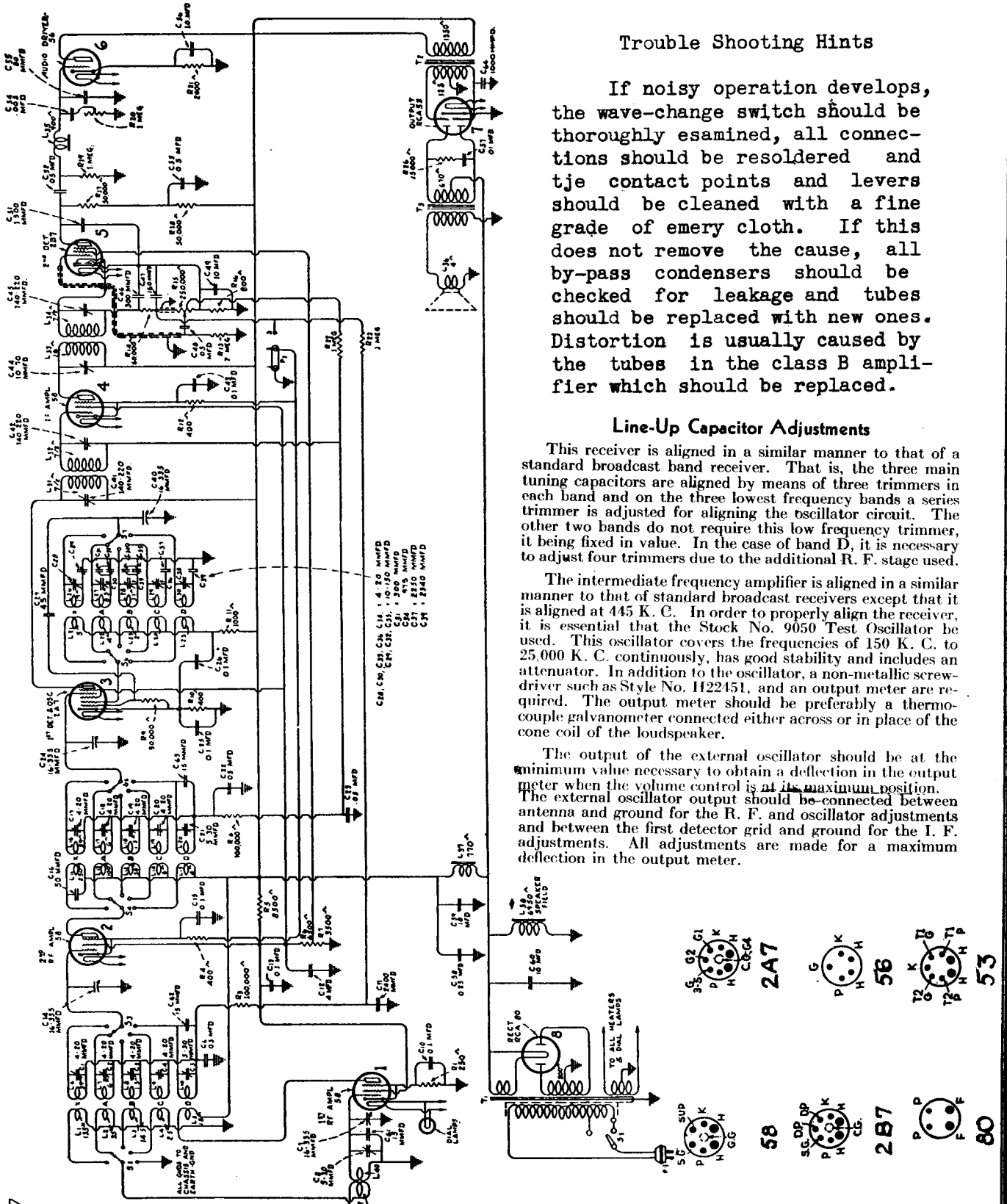
(a) Procure a modulated oscillator giving a signal at 175 K.C., a non-metallic screw driver and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

CANADIAN WESTINGHOUSE CO., Ltd.

MODEL 83



Trouble Shooting Hints

If noisy operation develops, the wave-change switch should be thoroughly esamined, all connections should be resoldered and tje contact points and levers should be cleaned with a fine grade of emery cloth. If this does not remove the cause, all by-pass condensers should be checked for leakage and tubes should be replaced with new ones. Distortion is usually caused by the tubes in the class B amplifier which should be replaced.

Line-Up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and on the three lowest frequency bands a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers due to the additional R. F. stage used.

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 25,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screwdriver such as Style No. H22451, and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position. The external oscillator output should be connected between antenna and ground for the R. F. and oscillator adjustments and between the first detector grid and ground for the I. F. adjustments. All adjustments are made for a maximum deflection in the output meter.

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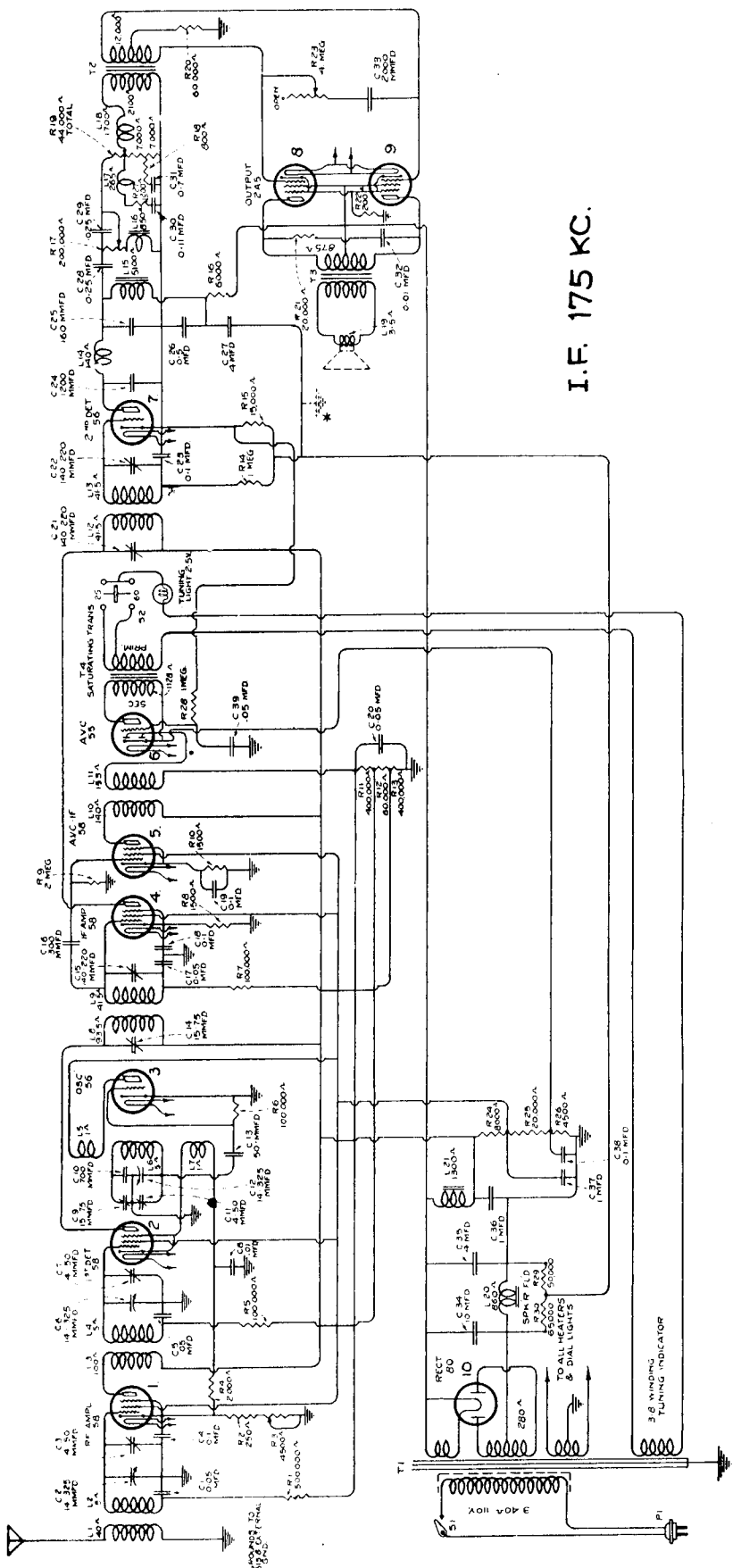
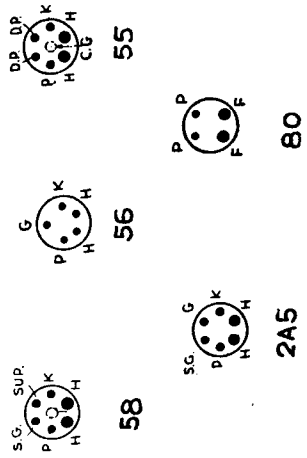
MODEL 103





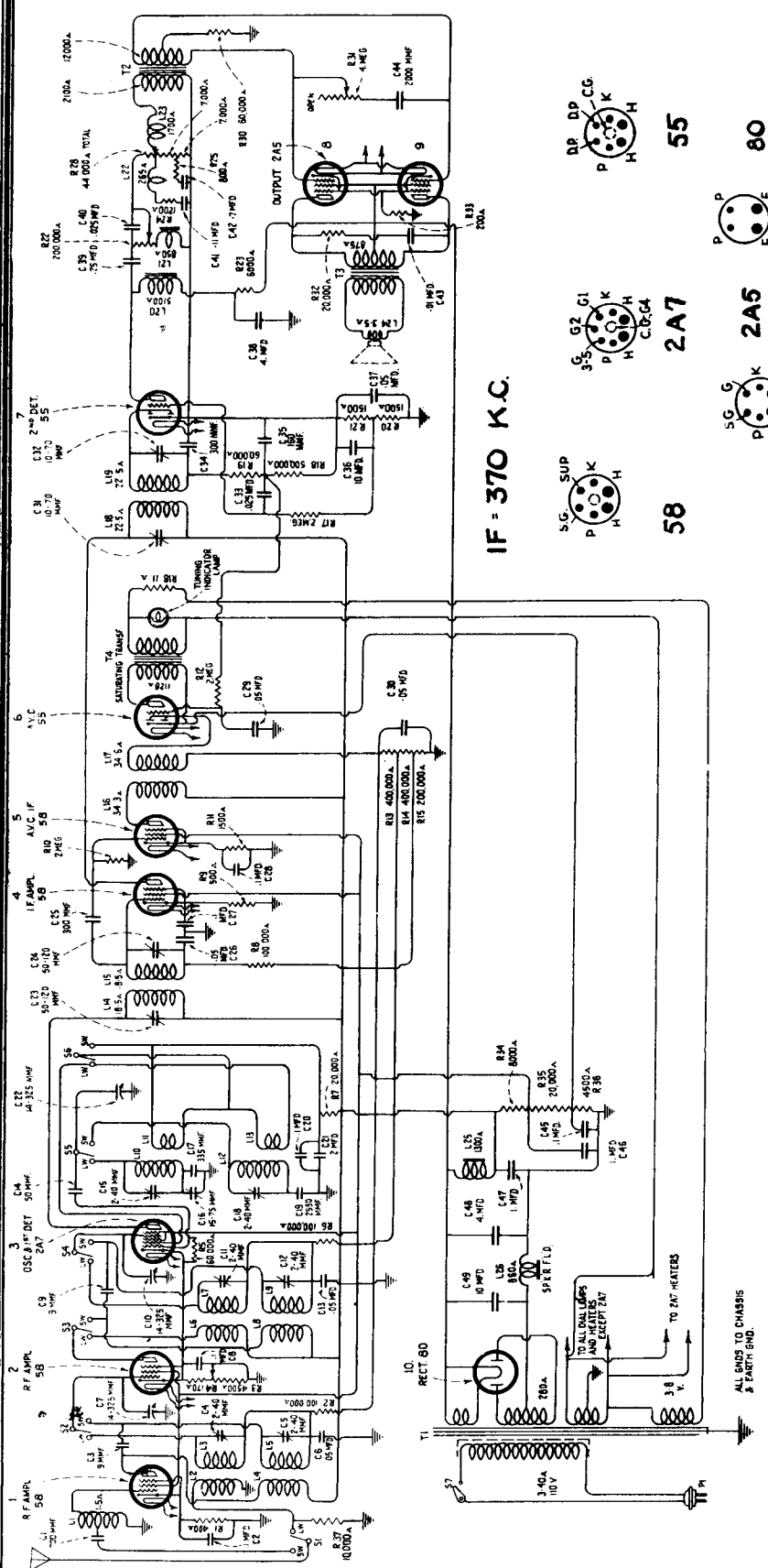
RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line—No signal being received—Noise barrier at Minimum.

Radiotron No.	Cathode to Control Grid Volts, D.C.	Cathode or Filament to Screen Grid Volts, D.C.	Cathode or Filament to Plate Volts, D.C.	Plate Current M.A.	Heater or Filament Volts, A.C.
1. R. F.	3.0	100	230	7.0	2.4
2. 1st Detector	8.0	93	220	2.5	2.4
3. Oscillator	.....	.....	105	6.0	2.4
4. I. F.	7.5	100	225	2.5	2.4
5. A. V. C.—I. F.	7.5	100	225	2.5	2.4
6. A. V. C.	20.0	.....	0	.....	2.4
7. 2nd Detector	17.0	.....	280	1.2	2.4
8. Power	15.0	255	270	33.0	2.4
9. Power	15.0	255	270	33.0	2.4

CANADIAN WESTINGHOUSE CO., Ltd.

MODEL 104



Trouble Shooting Hints

Complete failure of this set can often be traced to the audio filament connected between the second detector and the output stage. Also poor quality may be due to leakage in the condensers associated with this filter circuit. It is necessary to use the correct tuning indicator lamp in this set because of the method of operation.

All voltage except heater A.C. volts are taken with respect to cathode. All voltages are actual operating values. Measured values will depend on meter resistance.
Antenna and Ground Shorted.
Pins are numbered according to R.M.A. standards.

	Cap Volts	Pin 1 Volts	Pin 1 M.A.	Pin 2 Volts	Pin 2 M.A.	Pin 3 Volts	Pin 4 Volts	Pin 5 M.A.	Pin 6 Volts	Pin 6 M.A.	Pin 7 Volts	Pin 7 M.A.	Heater Volts A.C.
1. W-58, S.W., R.F. Amplifier	—3.6	90	1.5	200	7.5	—3.6	—3.6	—9.0	0	0			2.3
	C.G.	Screen		Plate	8.5	Heater	—3.0	K	Suppressor	0			
2. W-58, R.F. Amplifier	—3.0	90	2.0	200	8.5	—3.0	—3.0	—11.0	0	0			2.3
	C.G.	Screen		Plate	4.5	Heater	—3.0	K	Suppressor	0			
3. W-2A7 First Detector Oscillator	—3.0	90	3.0	200	6.0	—3.0	—3.0	—11	0	0	110	3.5	2.5
	Det. G.	Screen		Plate		Heater		K	Osc. Grid.		Osc. Plate		
4. W-58 I.F. Amplifier	—3.5	90	1.5	200	6.0	—3.5	—3.5	—7.5	0	0			2.3
	C.G.	Screen		Plate		Heater		K	Suppressor	0			
5. W-58 A.V.C., I.F. Amplifier	—6.7	90	0.7	200	3.5	—6.7	—6.7	—4.5	0	0			2.3
	C.G.	Screen		Plate		Heater		K	Suppressor	0			
6. W-55, A.V.C.	0	—18	0	—2	2.0	—18	—18	—2.0	—18	0			2.3
	C.G.	Diode	P.	Plate		Heater		K	Diode	P.			
7. W-55 Second Detector	—9.0	0		150	6.0	—18	—18	—6.5	0	0			2.3
	C.G.	Diode	P.	Plate		Heater		K	Diode	P.			
8 or 9. W 2A5 Push Pull Power Amplifiers		240	4.5	225	30	—14	—14	—35	—14	0			2.4
		Screen		Plate		Heater		K	C. Grid.				
10. W-80 Rectifier		—360	65	—360	65	0	0						5.2
		Plate		Plate		Filament							

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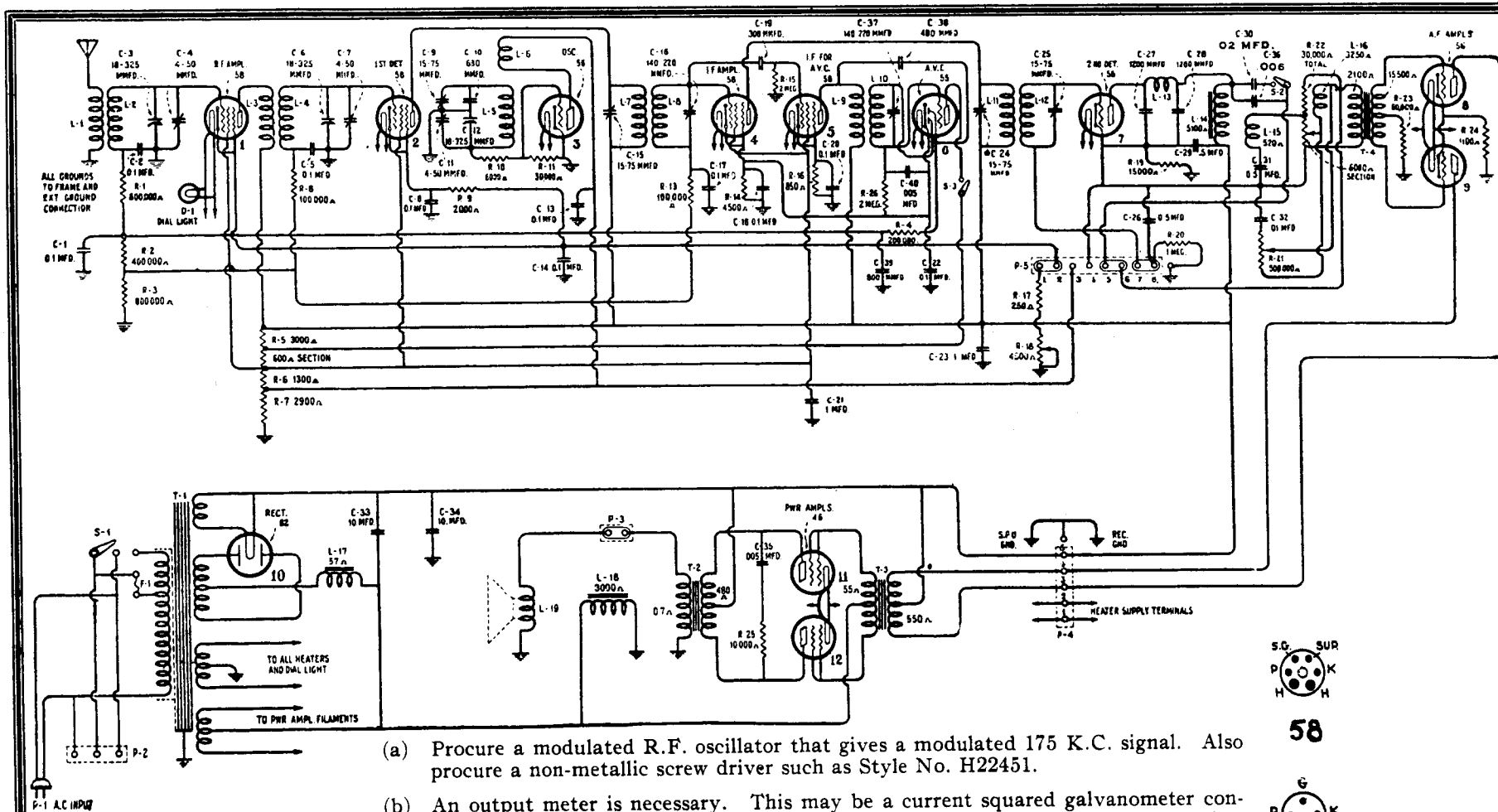
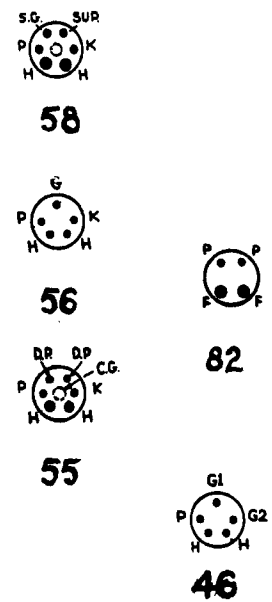
MODEL 122 A





Trouble Shooting Hints

Shifting of the oscillator padding and I. F. tuning is a frequent cause for lack of sensitivity in this model. Adjustments should be carefully made, first the I. F. and then the padding using exceptionally low input from the test oscillator.

(a) Procure a modulated R.F. oscillator that gives a modulated 175 K.C. signal. Also procure a non-metallic screw driver such as Style No. H22451.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, or a low range A.C. voltmeter connected across the reproducer unit cone coil.

(c) Remove the oscillator tube and make a good ground connection to the chassis. Place the test oscillator in operation and couple its output from the control grid of the first detector to ground. With the receiver volume control at maximum, the noise suppressor control at its extreme counter-clockwise position and the noise suppressor switch open, adjust the oscillator output until a deflection is obtained in the output meter.

(d) Adjust the secondary and primary of the second and then the first I.F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

(e) Then close the noise suppression control switch by advancing slightly clockwise, but do not advance the control beyond the snapping of the switch. The single noise suppressor circuit should then be adjusted for maximum output.

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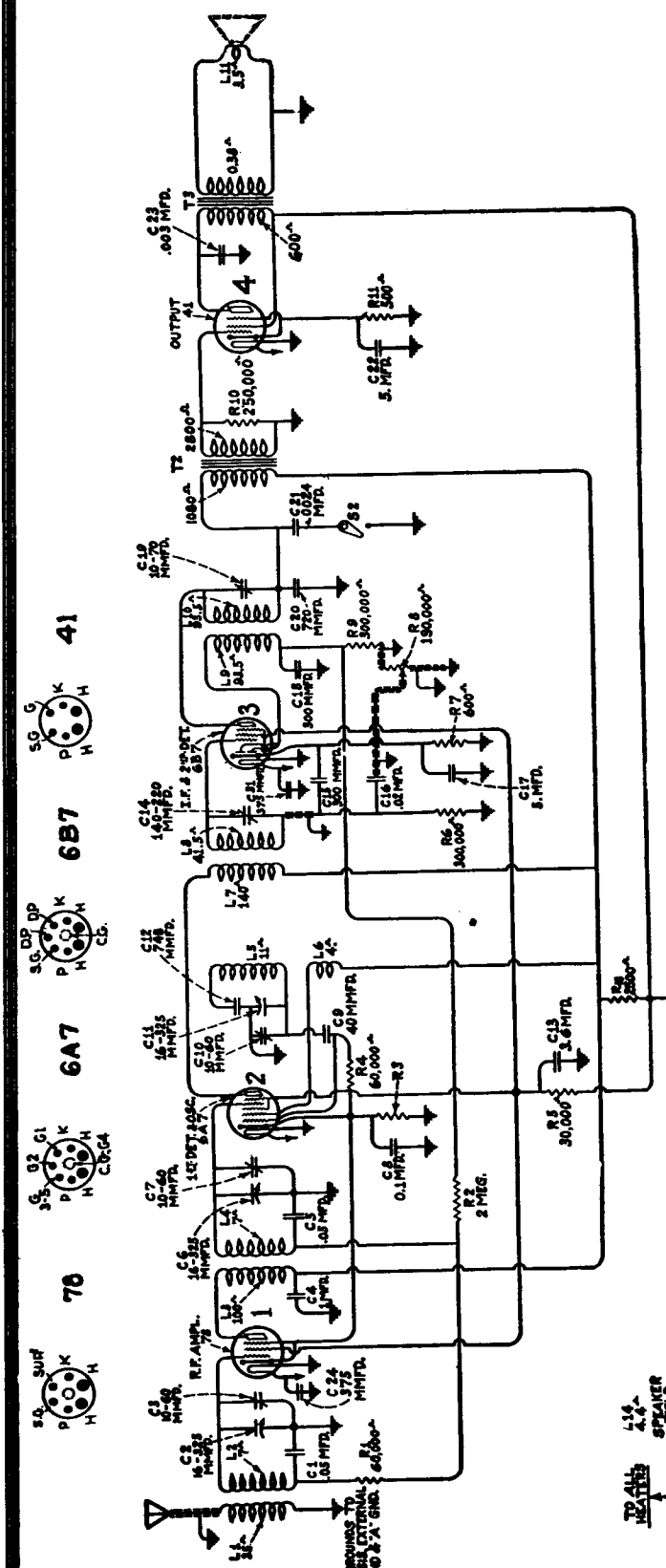
MODEL A-44



I. F. Adjustments

In order to make the I. F. adjustments, it is necessary to remove the rear cover, due to the fact that the external oscillator must be connected between the control grid of the first detector and ground. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K.C., a non-metallic screw driver and an output meter.

(b) Remove the receiver from its case, shield the transformer and Radiotrons as described under R. F. adjustments, place the receiver in operation and connect the oscillator output between the first detector grid and ground. Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(c) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output.

Trouble Shooting Hints

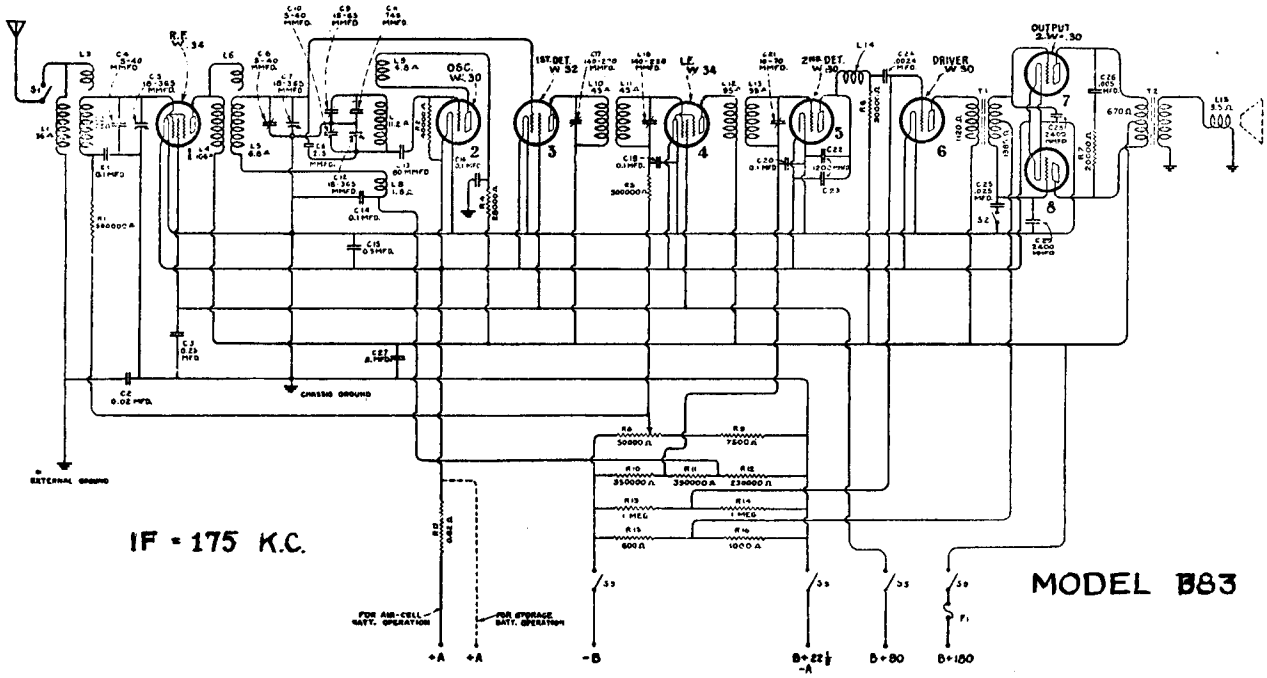
The input circuit to the **second** detector is quite critical; the shielded leads must be well grounded to prevent oscillation. If the set fails the vibrator unit should be checked and if the contacts are pitted the entire unit must be replaced.

RADIOTRON SOCKET VOLTAGES
6.3 Volt Battery—No Signal

Radiotron No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
W-78 R. F.		4.42	83	180	5.25	6.0
W-6A7	First Detector	4.42	83	180	11.0	6.0
	Oscillator	4.42	—	180	Total	
W-6B7 Second Detector		3.22	84	176	5.25	6.0
W-41 Power		13.0	214	200	26.0	6.0

NOTE—Resistance of R-3 is 80 ohms.

CANADIAN WESTINGHOUSE CO., Ltd.



I. F. Adjustments: Two transformers comprising three tuned circuits and one untuned circuit are used in the intermediate amplifier. These circuits are all tuned to 175 K.C. The screws are accessible from the rear of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K.C., a non-metallic screw driver, such as Style No. H22451, and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and ground. Connect the output meter across the voice coil of the loud-speaker and adjust the oscillator output so that a slight deflection is obtained in the output meter.

(d) Adjust the secondary of the second and then the primary and secondary of the first I. F. transformers until a maximum deflection is obtained. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments: The three gang capacitor screws and 600 K.C. oscillator trimmer are accessible from beneath the receiver chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K.C. and 600 K.C., a non-metallic screw driver, and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should point toward the small arrow at the edge of the dial. Then set the dial at 1400 K.C., the oscillator at 1400 K.C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained.

(c) With a non-metallic screwdriver, adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K.C. and tune the signal. Then adjust the 600 K.C. capacitor, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K.C. This completes the adjustments.

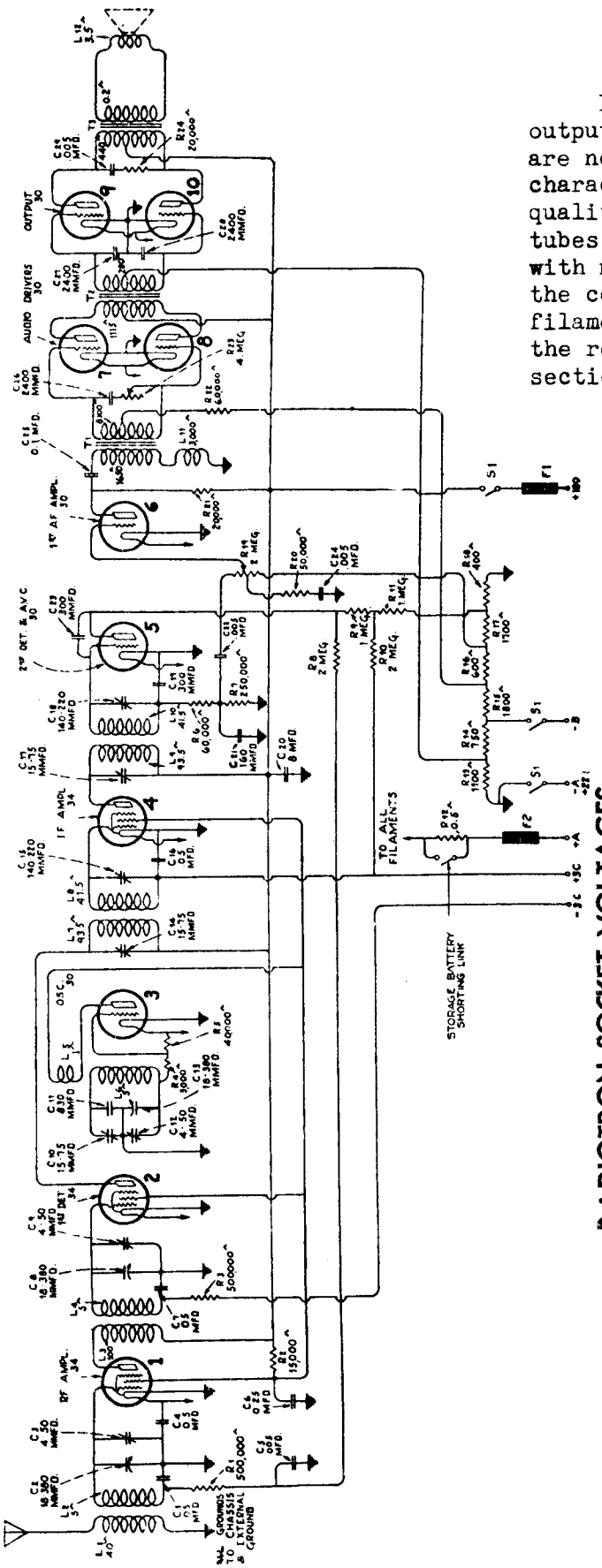
34 &32 30

Trouble Shooting Hints

The grid bias voltages for the tubes in this set are obtained from a network of voltage dividers, connected across a 22½ volt "B" battery. Changes in the values of these resistors due to overloads or changes due to age may cause a difference in the operation of the set. Also a run-down "B" battery will reduce the sensitivity of the receiver to a very marked degree and it is advisable to check these two points if the set fails to function properly. If cross talk is encountered, the adjustment of the condensers tuning the aerial and R.F. coils should be checked for "tracking."

CANADIAN WESTINGHOUSE CO., Ltd.

MODEL B103 BATTERY OPERATED SUPERHET



RADIOTRON SOCKET VOLTAGES
New "A" and "B" Batteries—No Signal Received

Radiotron No.	Control Grid to Filament Volts	Screen Grid to Filament Volts	Plate to Filament Volts	Plate Current M.A.	Filament Volts
R. F.—W-234	2.0	65.0	157.5	3.0	2.15
Oscillator—W-230	——	——	65.0	4.0	2.15
First Detector—W-234	5.0	65.0	157.5	1.0	2.15
I. F.—W-234	2.0	65.0	157.5	3.0	2.15
Second Detector—W-230	0	——	—2.0	0	2.15
First A. F.—W-230	10.5	——	130.0	1.25	2.15
Driver A. F.—W-230	13.5	——	150.0	1.5	2.15
Driver A. F.—W-230	13.5	——	150.0	1.5	2.15
Power—W-230	13.5	——	150.0	1.5	2.15
Power—W-230	13.5	——	150.0	1.5	2.15

Trouble Shooting Hints

If the tubes in the driver stage or output stage of the class B amplifier are not matched properly or have changed characteristics in service, very poor quality may result. Try shifting the tubes around or replace the A F tubes with new ones. If the set fails test the continuity of both fuses, both the filament and plate units. Then test the resistors R 14 and R 18 and the three sections of the on-off switch.

LINE-UP ADJUSTMENTS

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K.C. and the adjustment screws are accessible from the rear of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K.C., a non-metallic screw driver and an output meter.

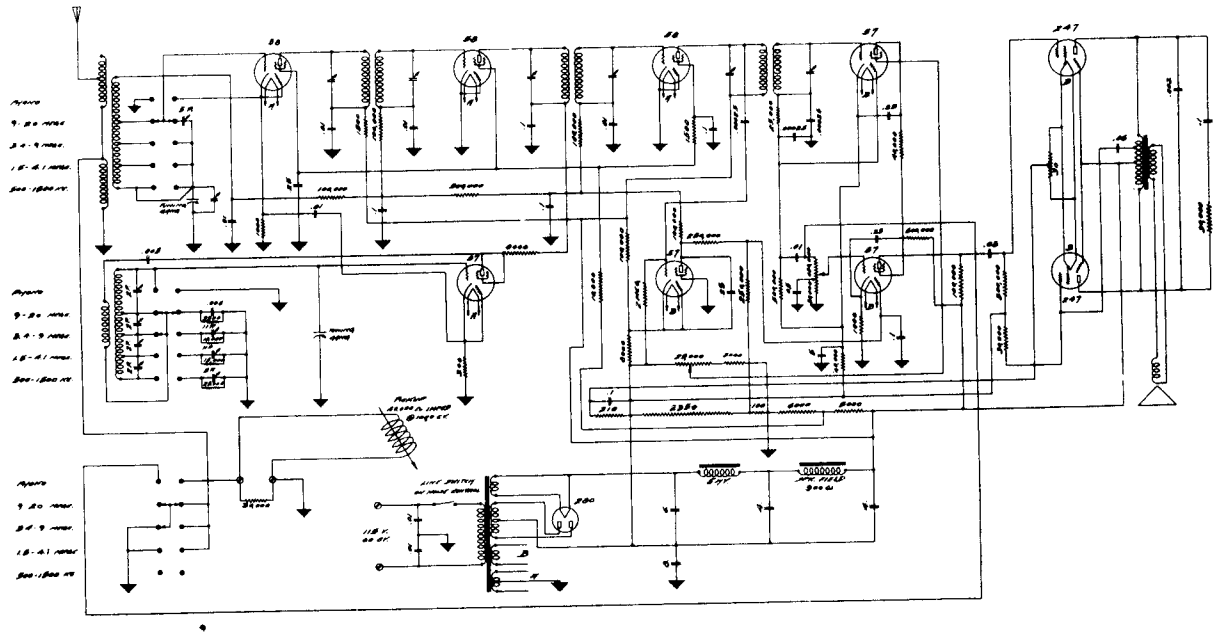
(b) Remove the oscillator tube and connect a ground to the chassis. A tube base with a 16000 ohms resistor connected between one filament prong and the plate prong must be substituted for the oscillator tube.

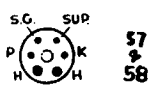
(c) Connect the oscillator output between the first detector control grid and the negative terminal on the 4.5 volt bias battery. Connect the output meter across the voice coil of the loud-speaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

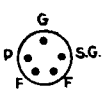
CAPEHART CORP.

MODEL 400 B SERIES





57 & 58



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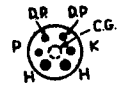

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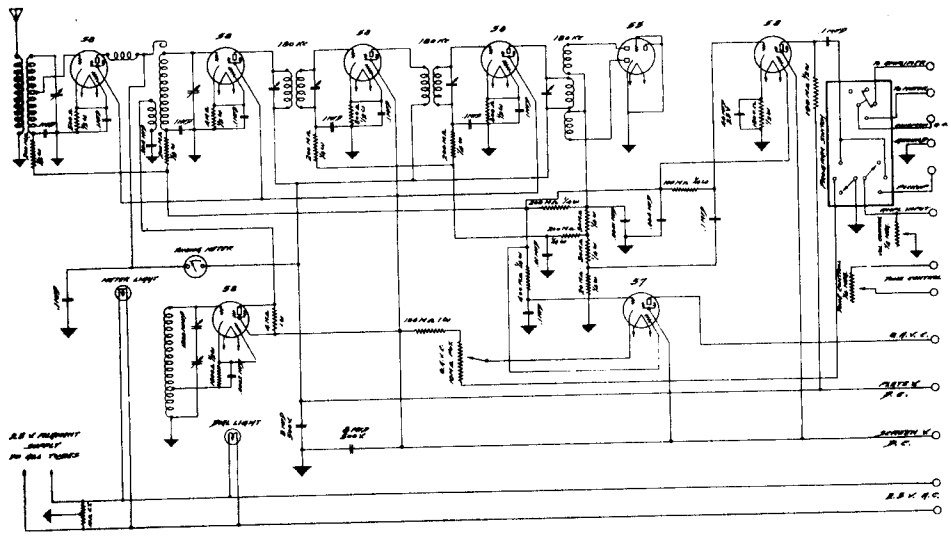
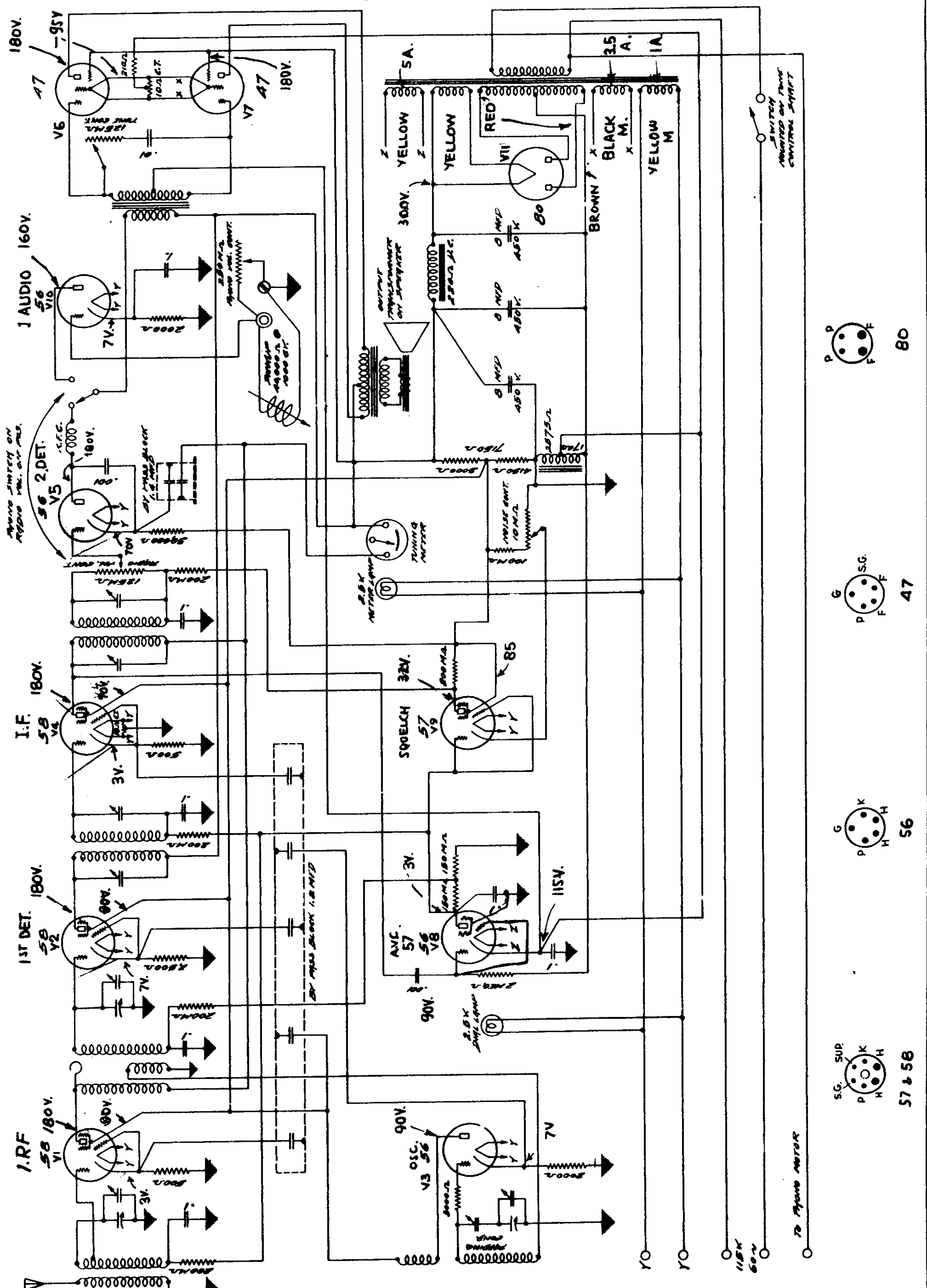


VOLTAGE READINGS 400-B TUNER AND AMPLIFIER

TUBE	P TO GND B-----#1		P TO CATH. B------#1		SCR TO GND B-------#1		SCR TO CATH. B--------#1		CATH. TO GND B---------#1		GRID TO CATH. B---------#1		DIODES TO G
1 RF 58	212	190	208	185	107	91	99	88	4.5	3.5	1	1	
1 DET 58	217	190	205	183	107	91	92	82	10.6	9.4	2.5	2	
OSC 58	78	69	55	50	107	91	83	75	18.	15.5	18.5	15.75	
QAVC 57	122	113	108	100	107	91	89	78	10.2	9.25	1.75	1.5	
1 IF 58	217	190	212	187	107	91	99	88	4.5	3.75	1	1	
2 IF 58	217	190	212	187	107	91	99	88	4.5	3.75	1	1	
2 DET 55													.5
1 AF 58	13.	12	9	8.5	107	91	97	86	5.8	5	1.5	1.5	
2 AF 56	4.5		2.5						3.5		3.5		
3 AF 56	230		128						97		5.5		
4 AF 2A5	270		157		280		262		16.5		4.2		
RECT 5Z3	415												

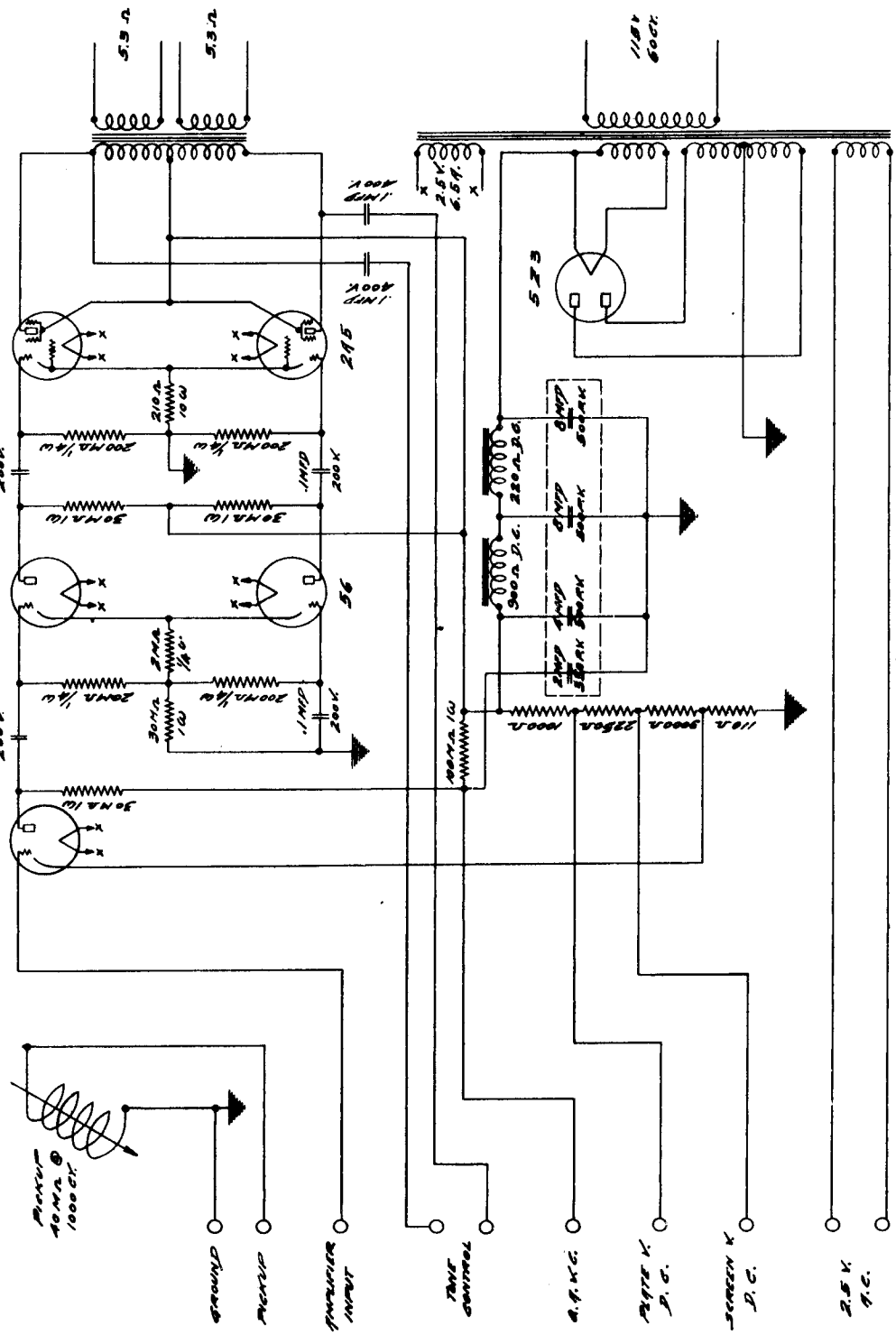
CAPEHART CORP.

MODEL "CK"



CAPEHART CORP.

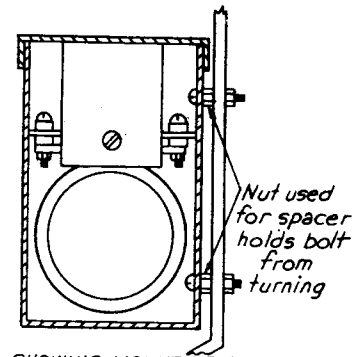
STANDARD AMPLIFIER



Trouble Shooting Hints

This is a balanced amplifier in which resistance values as well as tubes on alternate sides must be correct in order to obtain correct.operation. If poor quality is encountered match tubes and test all resistors for correct value.

Radio sets having only two B. wires do not require an intermediate tap at the Eliminator as the necessary resistors are in the set. Sets having three B wires require an intermediate tap. This tap is set at the factory at 90 volts on 180 volt output and 67½ volts on 135 volts output. Usually this is the proper setting for the average set, and should not be varied unless the set fails to operate properly. To change the intermediate tap voltage, loosen the screw that holds the contact on the resistance unit. The tap may be moved to a position where best results are obtained. Then tighten screw. When Eliminators with intermediate tap are used with set having 2 B wires disregard the intermediate tap, connect the 2 B wires from the set to B- and B on the Eliminator. Some sets work better if the B- terminal on the Eliminator is grounded to frame. Others require a small by-pass condenser from B- to ground, or a 4 or 8 MFD. Electrolytic condenser from Intermediate tap to B+ On some sets the condenser works better if connected reversed.



SHOWING MOUNTING ON BULKHEAD UNDER THE COWL. CAN BE MOUNTED ON MOTOR SIDE OF BULKHEAD IF DESIRED

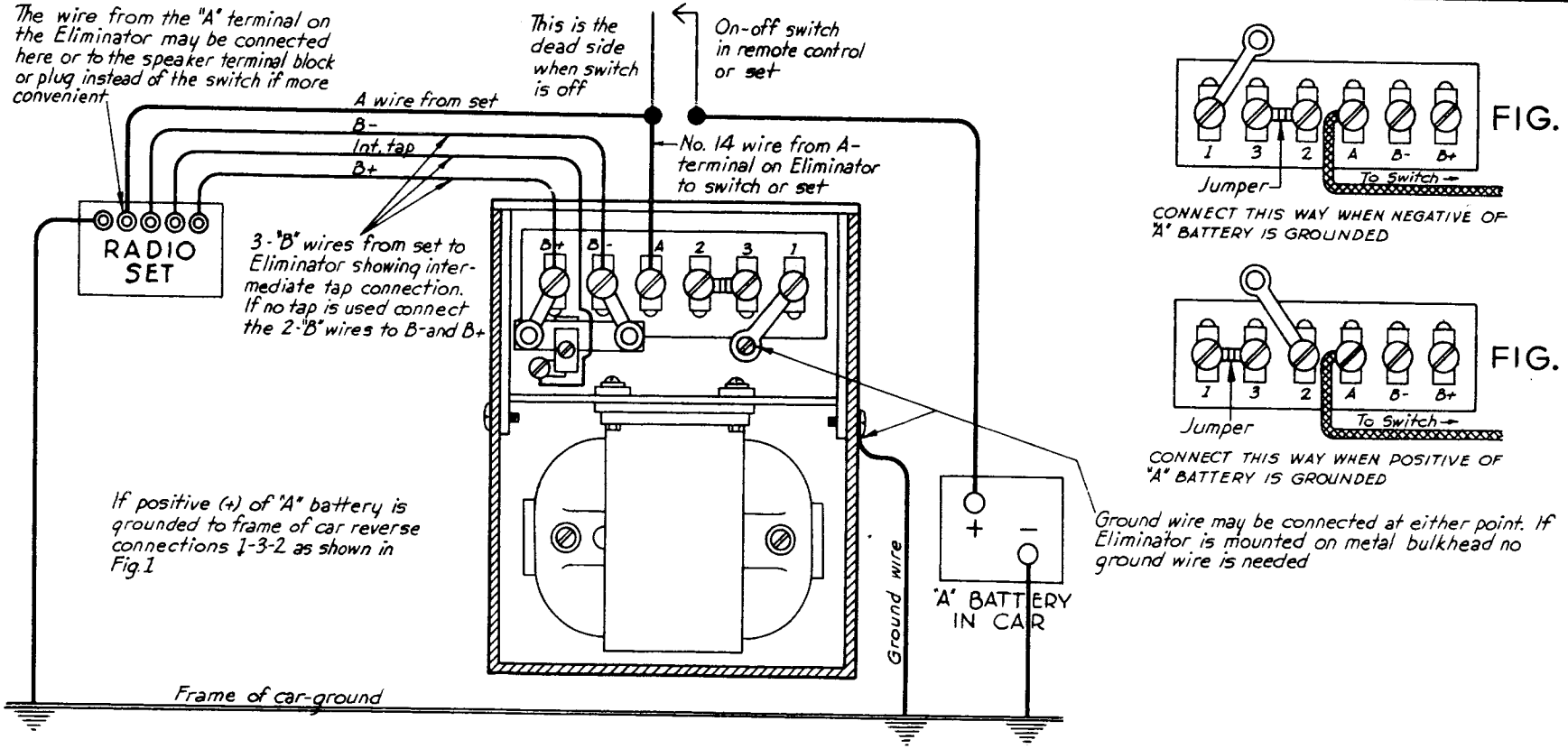


FIG. 2

CONNECT THIS WAY WHEN NEGATIVE OF "A" BATTERY IS GROUNDED

FIG. 1

CONNECT THIS WAY WHEN POSITIVE OF "A" BATTERY IS GROUNDED

CARTER MOTOR CO.

GENEMOTOR INSTRUCTIONS

COLONIAL RADIO CORP.

MODEL 56 (SEARS ROEBUCK MODELS 1560-1562-1564)

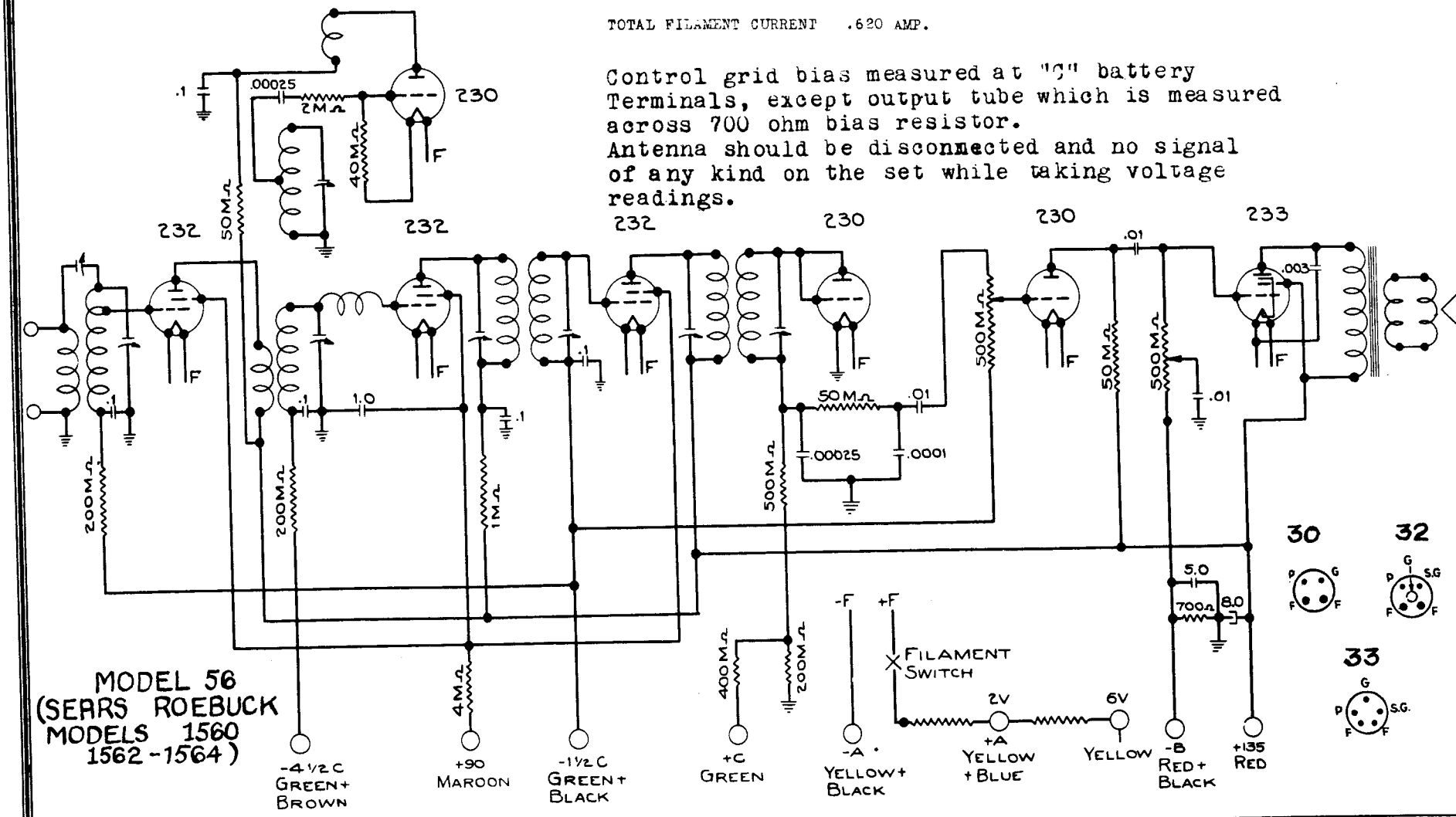
Trouble Shooting Hints

Paralyzed tubes seem to cause the most trouble in this set. This is usually due to filament voltage overloads when new batteries are in stalled. Install voltage control tube to prevent reoccurence.

	R.F.	OSC.	TRANS.	I.F.	DET-AVC	1stAUDIO	OUTPUT
PLATE VOLTAGE	125	35	123	125	---	50	122
PLATE CURRENT (MA)	1.5	2.0	.5	1.5	---	.5	14.0
SCREEN VOLTAGE	67.5	---	67.5	67.5	---	---	125
FILAMENT VOLTAGE	2	2	2	2	2	2	2
CONTROL GRID VOLTAGE	1.5	---	4.5	1.5	---	1.5	13.5

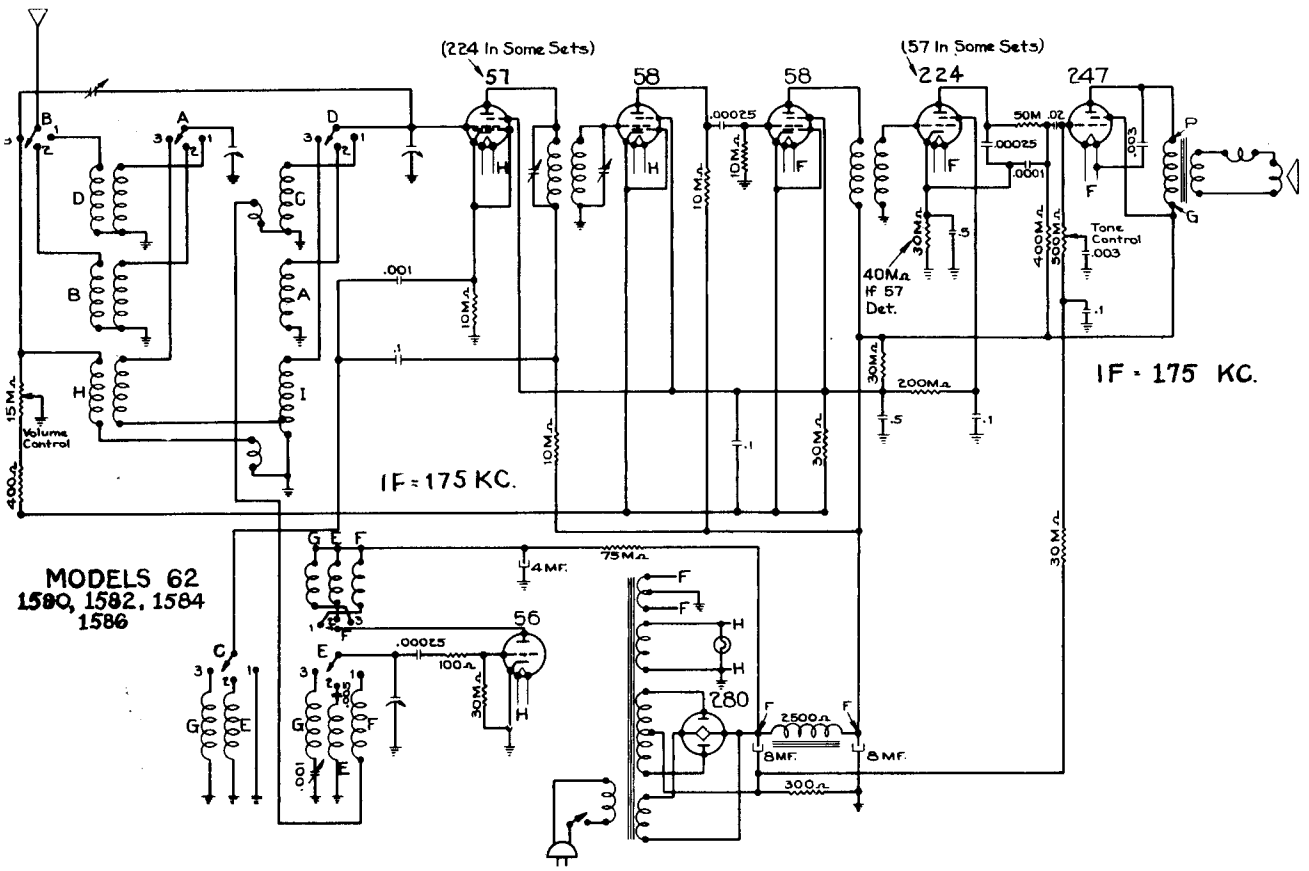
TOTAL FILAMENT CURRENT .620 AMP.

Control grid bias measured at "C" battery Terminals, except output tube which is measured across 700 ohm bias resistor.
Antenna should be disconnected and no signal of any kind on the set while taking voltage readings.



COLONIAL RADIO CORP.

MODELS 62, 1580, 1582, 1584, 1586



SILVERTONE RADIO MODELS 1580 - 1582 - 1584

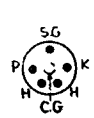
VOLTAGE and CURRENT CHART

TUBE	Fil. Volt.	Plate Volt. Vol. Max.	Plate Volt. Vol. Min.	Screen Volt. Vol. Max.	Screen Volt. Vol. Min.	Control Grid V. Vol. Max.	Control Grid V. Vol. Min.	Plate Current Vol. Max.	Plate Current Vol. Min.	Screen Current Vol. Max.	Screen Current Vol. Min.
224 - Translator ***	2.5	215	215	75	125	-6	-10	.5	.8	.2	.2
57 - Translator	2.5	215	215	75	125	-5	-7.5	.5	.5	.25	.25
58 - First I.F.	2.5	175	175	75	75	-4	-45	3.5	0	1	0
58 - Second I.F.	2.5	220	180	80	80	-4	-45	4.5	0	1	0
57 - Second Detector***	2.5	75	75	40	70	-3	-5	.1	.1	.06	.06
224 - Second Detector	2.5	64	64	40	70	-3.6	-4.6	.25	.25	.06	.06
247 - Output	2.5	215	225	250	260	**	**	26.5	32	5.5	6.75
56 - Oscillator	2.5	40 - 60 *						4			
280 - Rectifier	4.8	Max. DC Volts - 350						25 M.A. Each Plate			

* 40 Volts when not oscillating; 60 Volts when oscillating. Stop from oscillating by touching finger to grid. Line - 117 Volts; Watts - 65.

** 530,000 ohms in series.

*** Some of these sets have a 224 translator and a 57 detector. Others have a 57 translator and a 224 detector.



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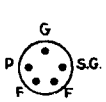
57 & 58



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56

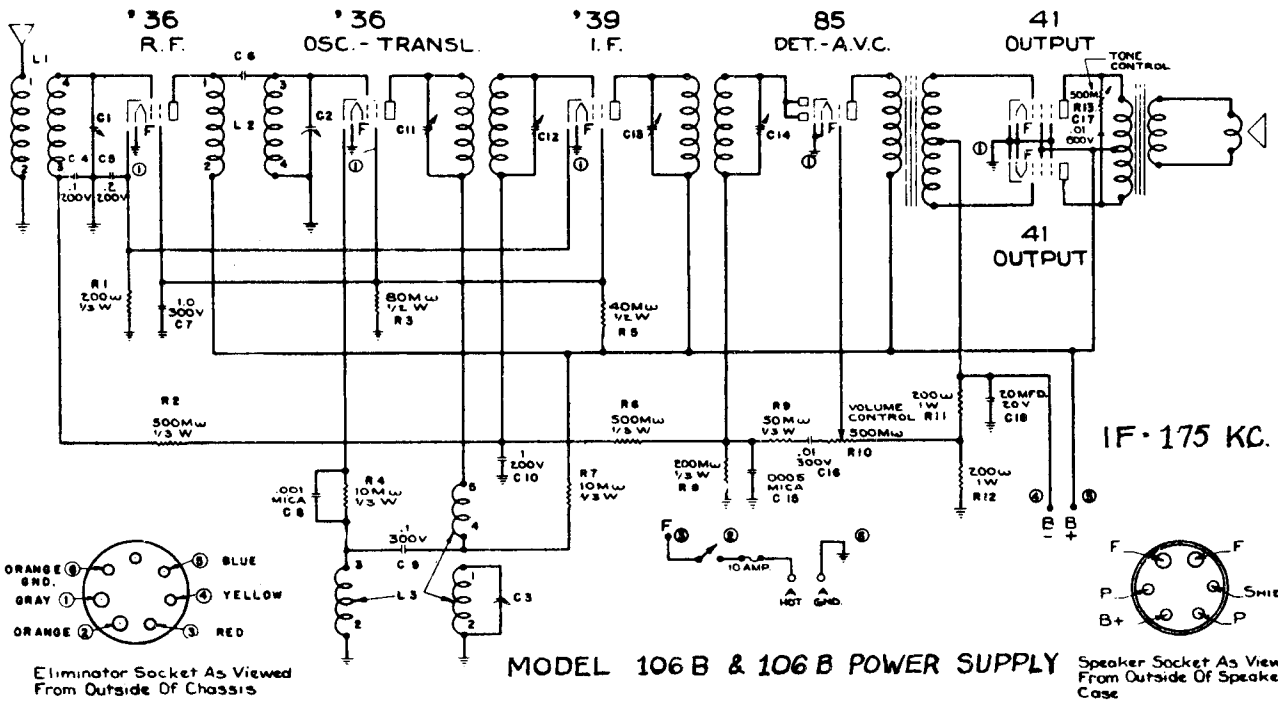
80

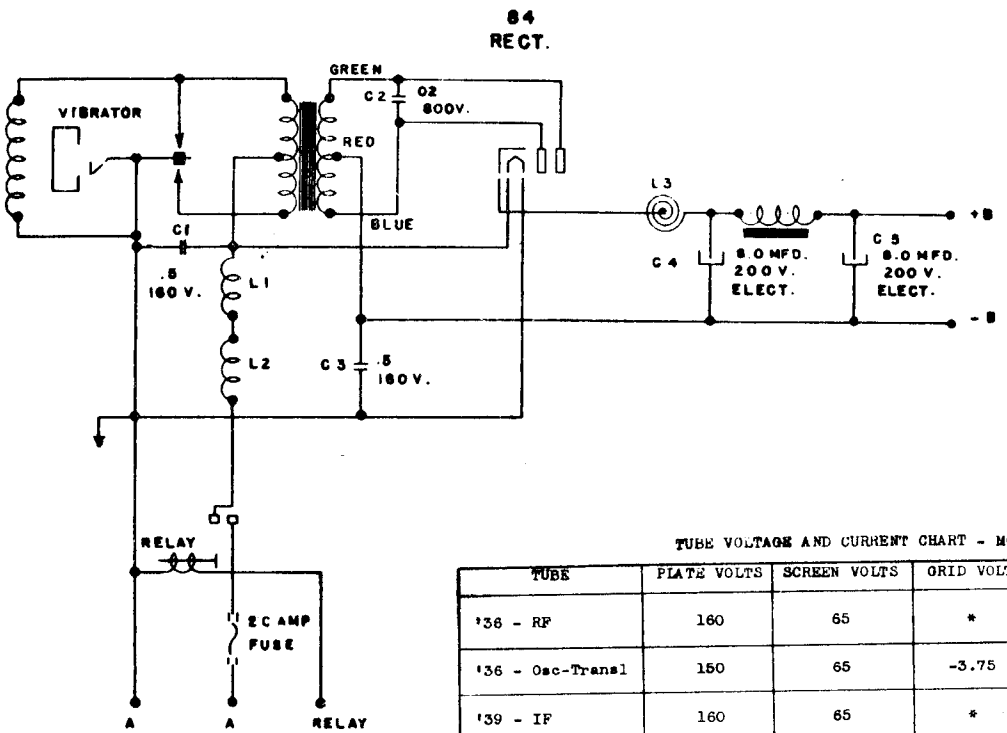
Trouble Shooting Hints

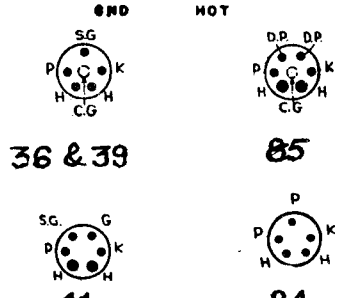
Failure of the 56 oscillator tube after being in use for some time causes failure of the entire set. Replace the tube and check the resistance of the 30,000 ohm grid resistor and grid condenser.

COLONIAL RADIO CORP.

MODEL 106 B & 106B POWER SUPPLY







Trouble Shooting Hints

Shifting of the I. F. due to vibration causes lack of sensitivity. Test the tubes and then adjust I.F. trimmers without touching the padding. Adjust latter only if necessary.

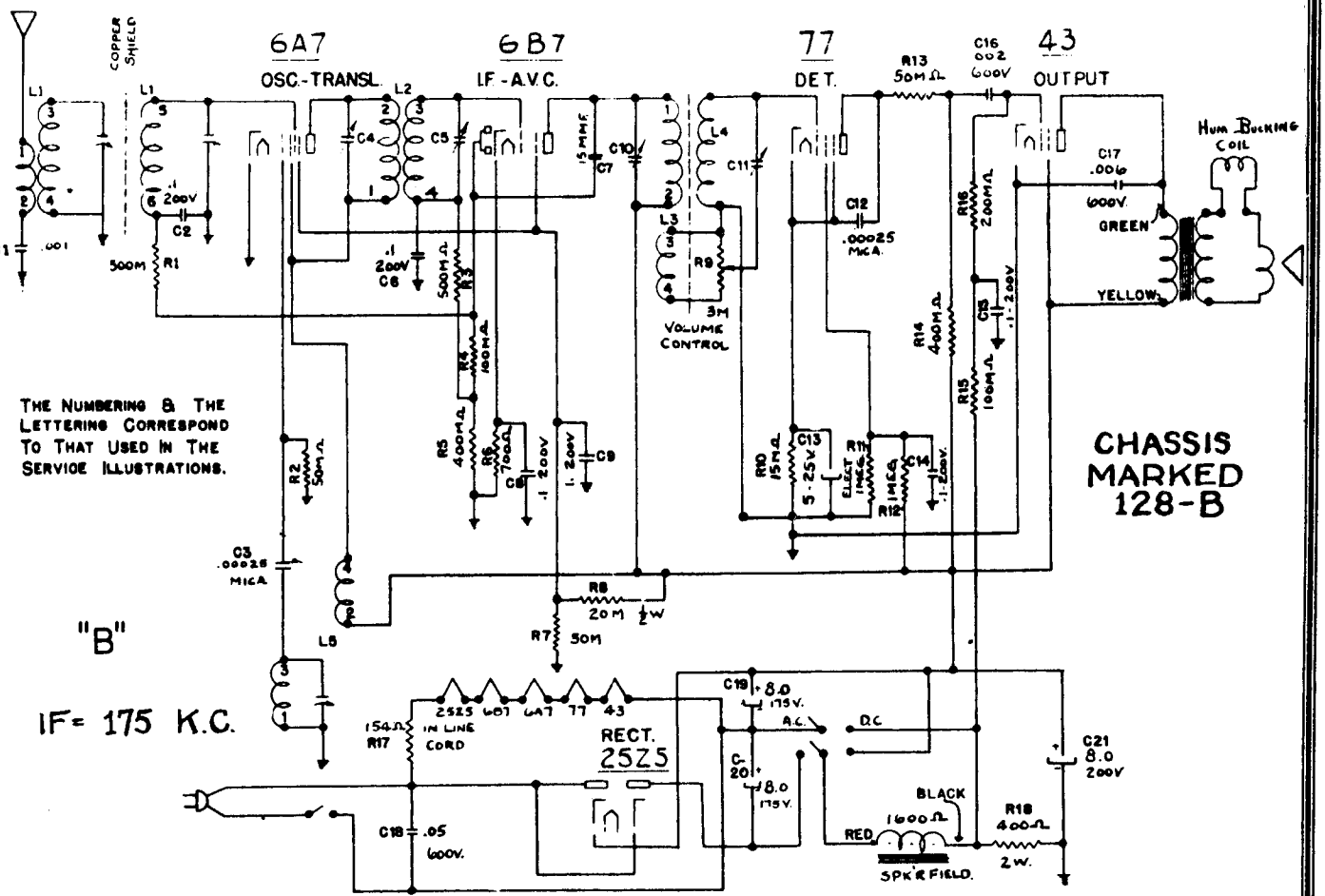
TUBE VOLTAGE AND CURRENT CHART - MODEL 106B

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
'36 - RF	160	65	*	2.5	.6
'36 - Osc-Transl	150	65	-3.75	.4 to 2(a)	0 to .5(a)
'39 - IF	160	65	*	1.3	.6
41 - Output	160	160	-15	8	1.25
85 - AVC-Det-AF	155		-7.5 volume control off		

* - High series resistance.
(a) - Dependent upon station selector setting.
Total current drawn by receiver, power supply and speaker - 5.4 amps. Total plate current - 40m.a. (180 volts) with 6.3 volt input.

Readings taken with antenna disconnected and no signal received. Care should be used if readings are taken with an analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate will stop oscillation. If an analyzer is not used, voltage readings may be taken from the cathode to the respective element of each tube.

COLONIAL RADIO CORP.

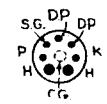


ALL RESISTORS ARE 1/3 WATT UNLESS OTHERWISE MARKED

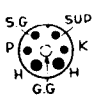
TUBE VOLTAGE AND CURRENT CHART

MODELS 250 - 279 - 300

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
6B7 - IF-AVC	110	55	-7*	.4	.2
77 - Detector	50	22	-1.5	.1	.04
43 - Output	100	120	-10*	26	5
6A7 - Osc-Transl	Ep=105v; Eg#1=-5v; Eg#2=105v; Eg#3&5=55v; Eg#4=*; Ip=2ma Ig#2=1.3ma; Ig#3&5=1.2ma				
25Z5- Rectifier	Plate Current = 40m.a. per plate				



6B7



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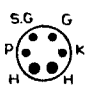

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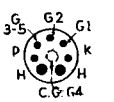
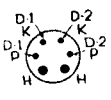


6A7



25Z5

Speaker Field Voltage = 70v.
* - Indicates high series resistor.
Tube heaters are in series so that if one burns out, none will light. These measurements were made with a 500 volt, 1000 ohms per volt meter. Power supply 118 volts A.C. Measurements made with set detuned, and speaker field hot. Care should be used when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation.

Receivers which are rubber stamped "128 A" on the chassis just above condenser C11 are wired as shown in Schematic "A". Those stamped "128 B" are wired as in Schematic "B".

All metal parts of the chassis (including the AC-DC Switch) are at high potential to ground. Do NOT attempt to attach a ground connection to the chassis. Do NOT touch the chassis while the line cord is plugged into an outlet.

COLONIAL RADIO CORP.

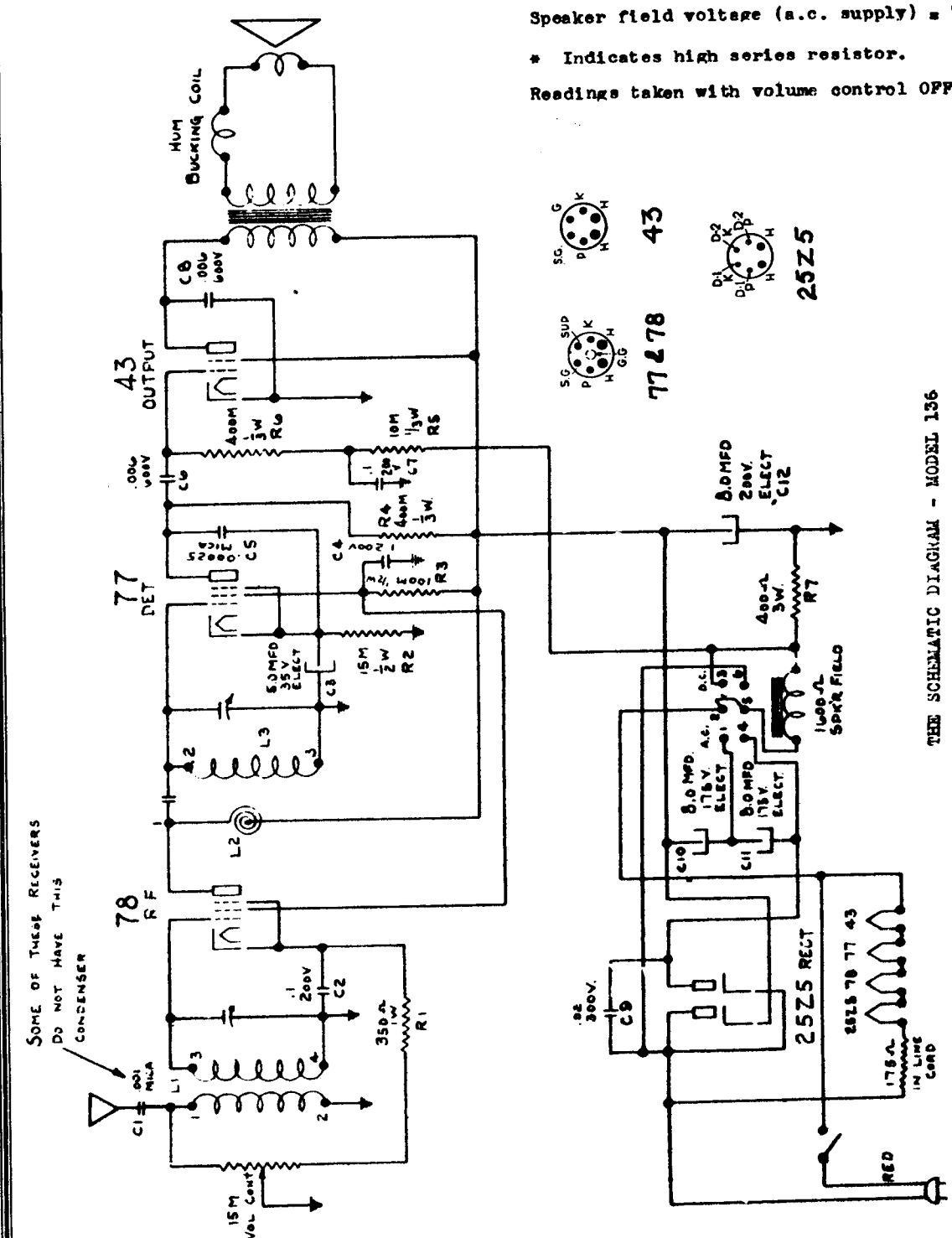
MODEL 136

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - RF	110	70	-10	.7	.2
77 - Detector	30*	75	-3.5	.2	.1
43 - Output	105	120	*	30	6
25Z5 - Rect.	Doubled voltage = 200V. Plate current = 36m.s.				

Speaker field voltage (a.c. supply) = 70 V.

* Indicates high series resistor.

Readings taken with volume control OFF.

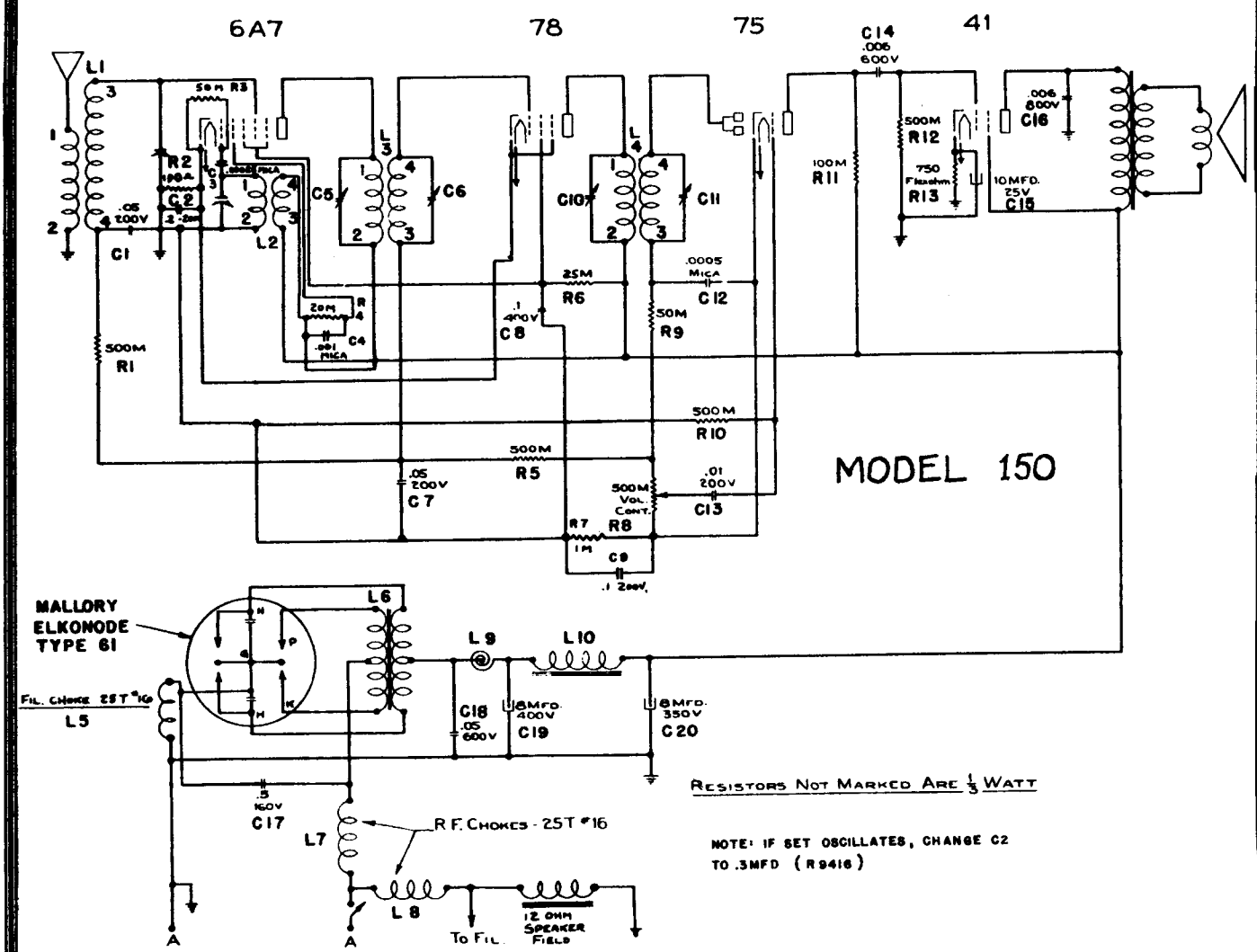


THE SCHEMATIC DIAGRAM - MODEL 136

Trouble Shooting Hints

Loud crackling noises in this set are often caused by momentary breakdown of condenser C12. Replace the condenser with a higher voltage unit.

COLONIAL RADIO CORP.

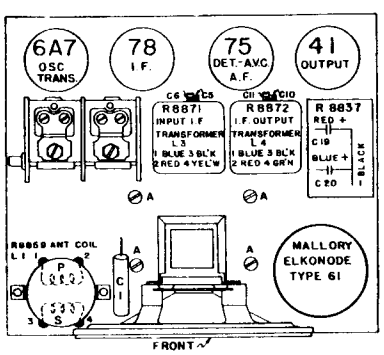


RESISTORS NOT MARKED ARE 1/3 WATT

NOTE: IF SET OSCILLATES, CHANGE C2 TO .3MFD (R9416)

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
78 - IF	200	120	*	2	.8
75 - AVC-Det-AF	145		*	.3	
41 - Output	175	190	-2.5*	13	1.5
6A7- Osc-Transl	Ep=200v; Eg #1=-6.5v; Eg #2=205v; Eg #3&5=115v; Eg #4=*; Ip=4ma; Ig #2=2.5ma; Ig #3&5=1.8ma				

* - Indicates high series resistor.

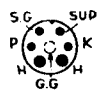


The COLONIAL Model 150 is a completely self contained four tube superheterodyne automobile receiver.

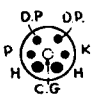
A 6A7 tube combines the functions of oscillator and translator (1st detector). The 480 kc IF signal it creates in its plate circuit is coupled to the 78 IF tube and then to the 75 AVC - Detector - AF stage. A 41 output pentode feeds the dynamic speaker.

Because the 6A7 performs both as oscillator and translator and because the 75 tube fills three functions, the circuit is the equivalent of a seven tube one, were a separate tube used for each function.

6A7



78



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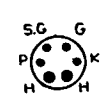
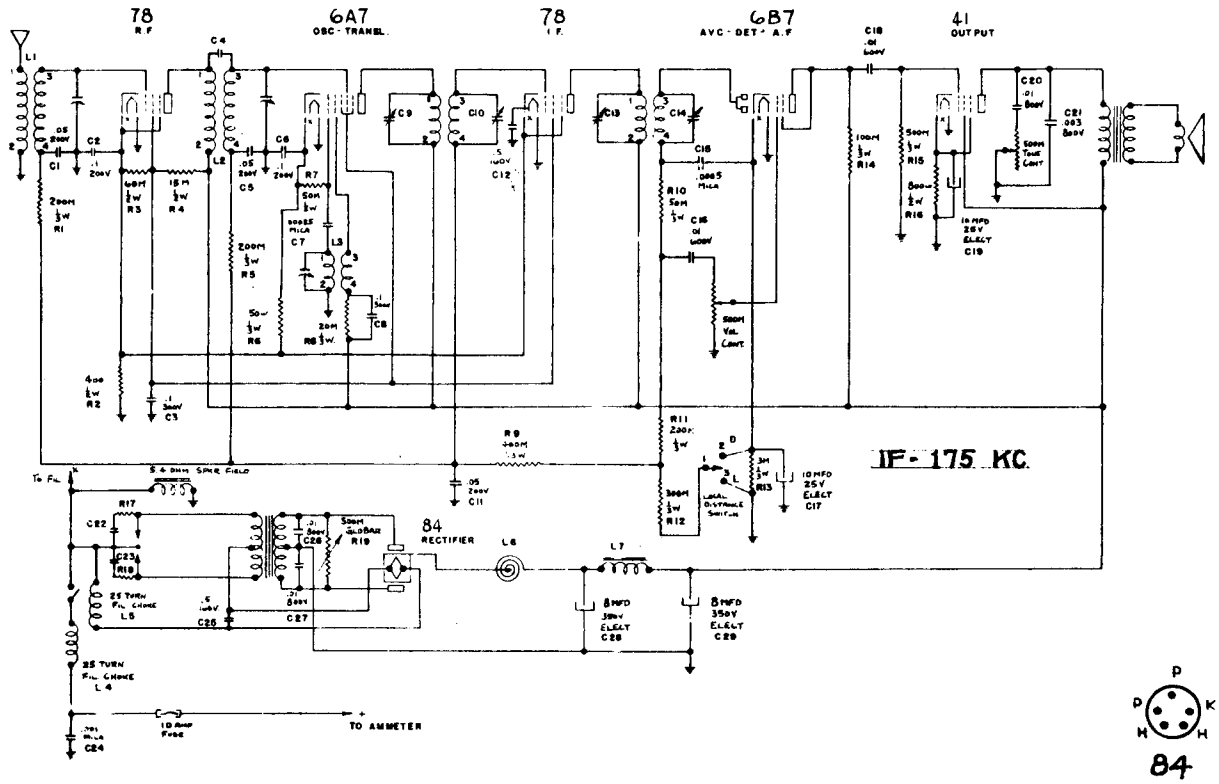
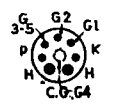
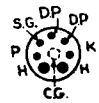


41

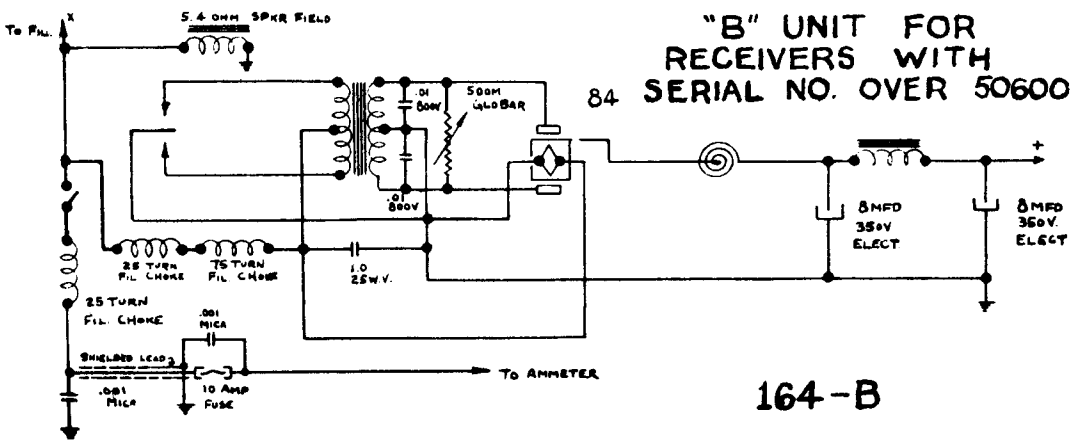
COLONIAL RADIO CORP.
MODEL 164



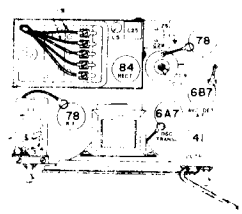




TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M.A.	SCREEN M.A.
78 - RF	230	100	4.5	1
78 - IF	230	100	4.5	1
6B7 - AVC-Det-AF	65	65	1.25	.4
41 - Output	205	215	20	3.25
6A7 - Osc-transl.	Ep=230v; Eg#2=135v; Eg#3&#5=100v; Ip=4ma; Ig#2=3ma; Ig#3&#5=3.2ma.			
84 - Rect.	20 m.a. per plate			



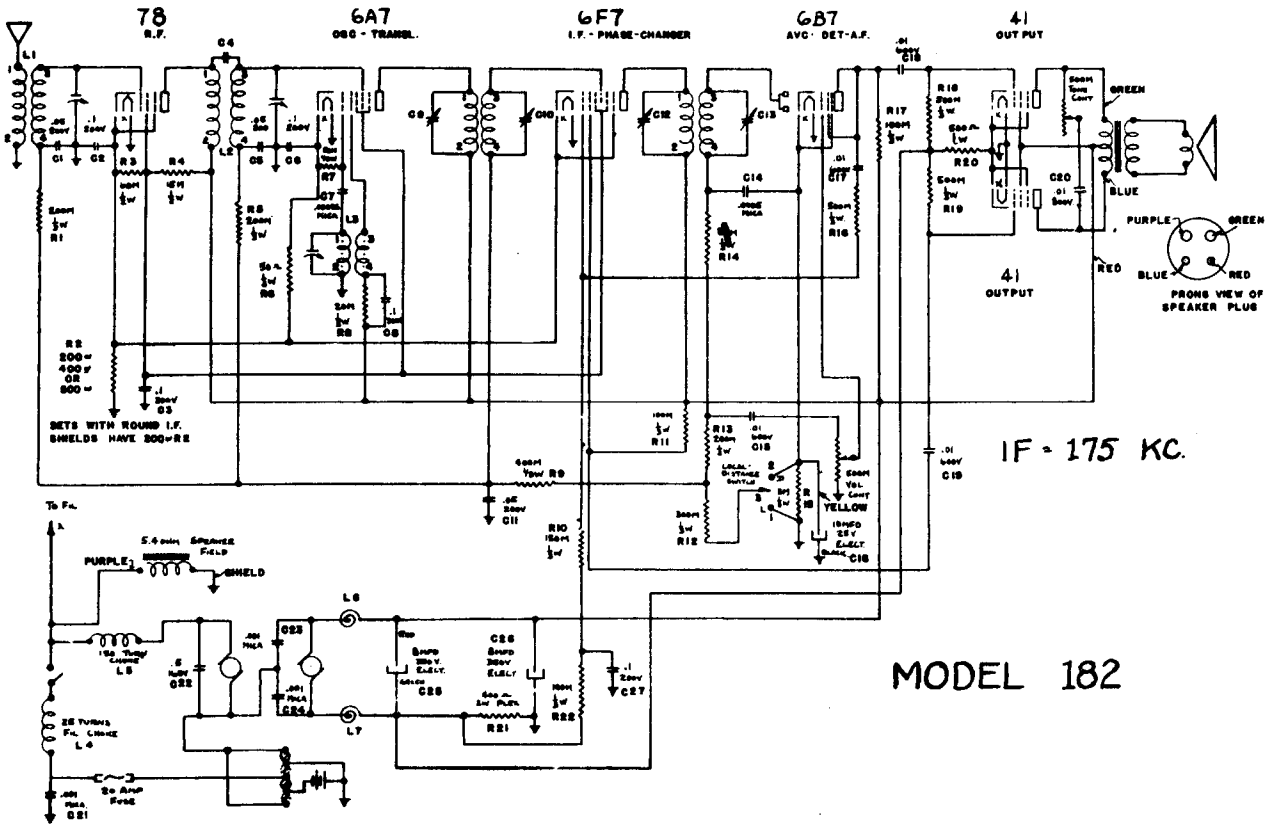
"B" UNIT FOR RECEIVERS WITH 84 SERIAL NO. OVER 50600



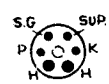
164-B

A different power supply unit is employed in these receivers, using a plug-in type of vibrator, making replacement of it very simple. Its construction is such that no attention need be paid to polarity. Accordingly, provision for changing polarity is omitted from this model.

COLONIAL RADIO CORP.

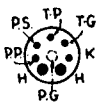


TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M.A.
78 - RF	200	95	8	2.25
6B7 - AVC-Det-AF	60	60	1.25	.3
42 - Output	205	208	14	2.5
6A7 - Osc-Transl.	Ep=200v; Eg#2=125v; Eg#3&#5=95v; Ip=3.5ma; Ig#2=3ma; Ig#3&#5=3.5ma;			
6F7 - IF & AF	Ep=200v; Eg#2=75v; Eg#3&#5=95v; Ip=5ma. Ig#2=3ma; Ig#3&#5=1ma.			



78

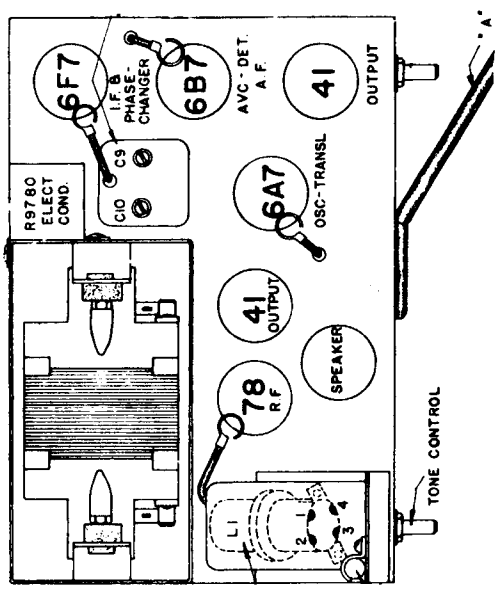
6A7



6F7

6B7

41



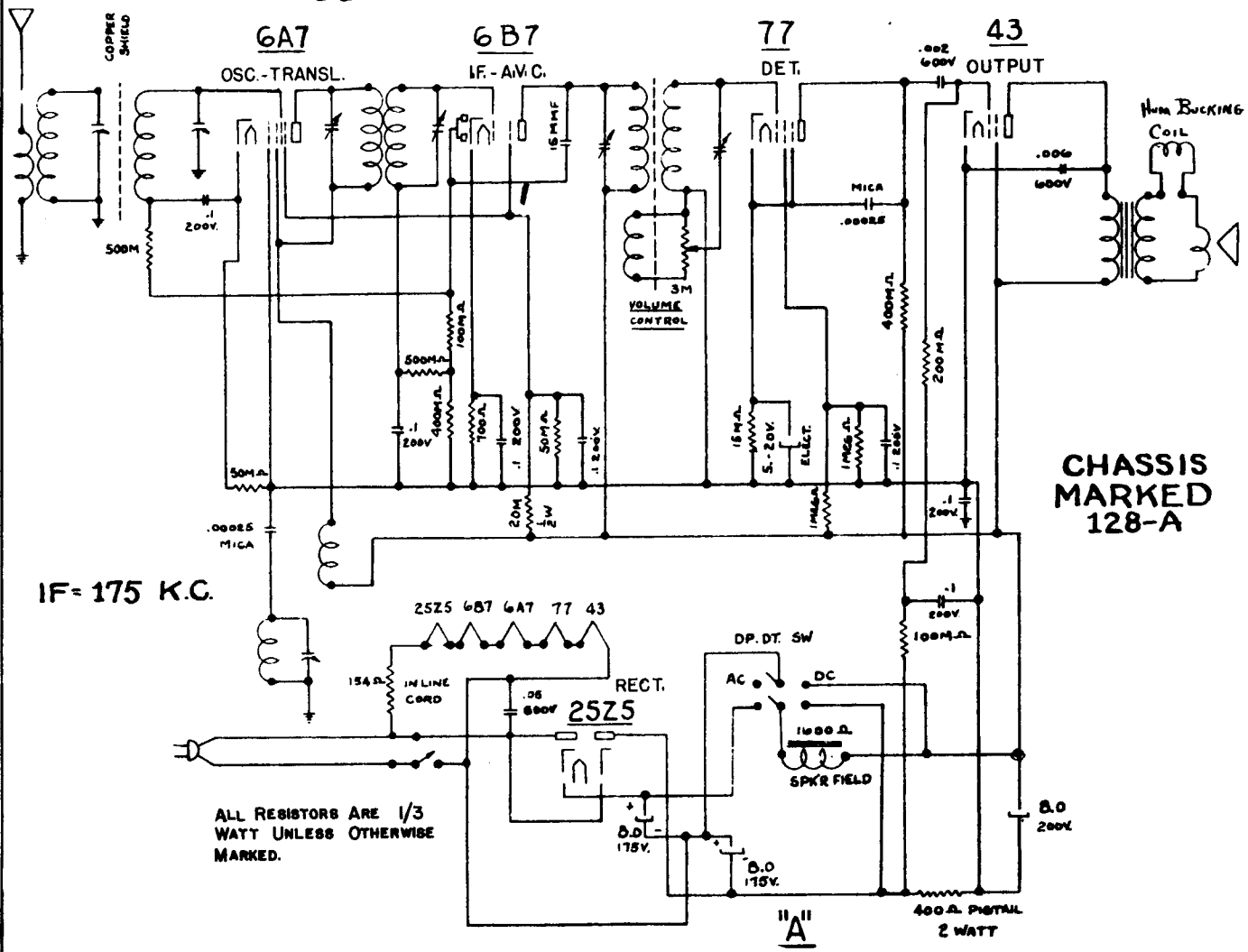
The 175 kc output of the 6F7 IF stage is impressed between the cathode and diode plates of the 6B7, in series with R12, R13, R14. The diode current flowing causes a voltage drop across these resistors. Only the drop across R12 is used for AVC. Since the grid returns of the 6A7, 78 and 6F7 are connected to R12, the negative bias across it is impressed upon the grids of these tubes. Increases in signal strength are offset by decreases in tube amplification resulting from this increased negative grid bias. The effect is to tend to maintain the output of the 6F7 IF at a constant value.

Trouble Shooting Hints

Poor sensitivity in these sets is usually caused by drifting of the I. R. or R. F. adjustments. When aligning, turn sensitivity control either full clockwise or counter-clockwise. Trimming condensers are at the back of the chassis.

COLONIAL RADIO CORP.

MODELS 250-279-300-301-500

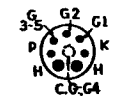


The COLONIAL Models 250, 279 and 300 receivers are five tube superheterodyne compacts embodying the most advanced of design features. They can be operated from direct current or from alternating current of any frequency. The rectifier tube, the newly developed 25Z5, is so connected that it doubles the voltage supplied by the A.C. line. Because the 6A7 tube is used as a combination oscillator-translator and because the 6B7 provides I F amplification as well as AVC action, the circuit is the equivalent of a seven tube one, were a separate tube used for each function.

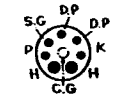
TUBE VOLTAGE AND CURRENT CHART

MODELS 250 - 279 - 300

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
6B7 - IF-AVC	110	55	-7*	.4	.2
77 - Detector	50	22	-1.5	.1	.04
43 - Output	100	120	-10*	26	5
6A7 - Osc-Transl	Ep=105v; Eg#1=-5v; Eg#2=105v; Eg#3&5=55v; Eg#4=*; Ip=2ma Ig#2=1.3ma; Ig#3&5=1.2ma				
25Z5- Rectifier	Plate Current = 40m.a. per plate				



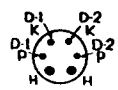
6A7



6B7

77

43

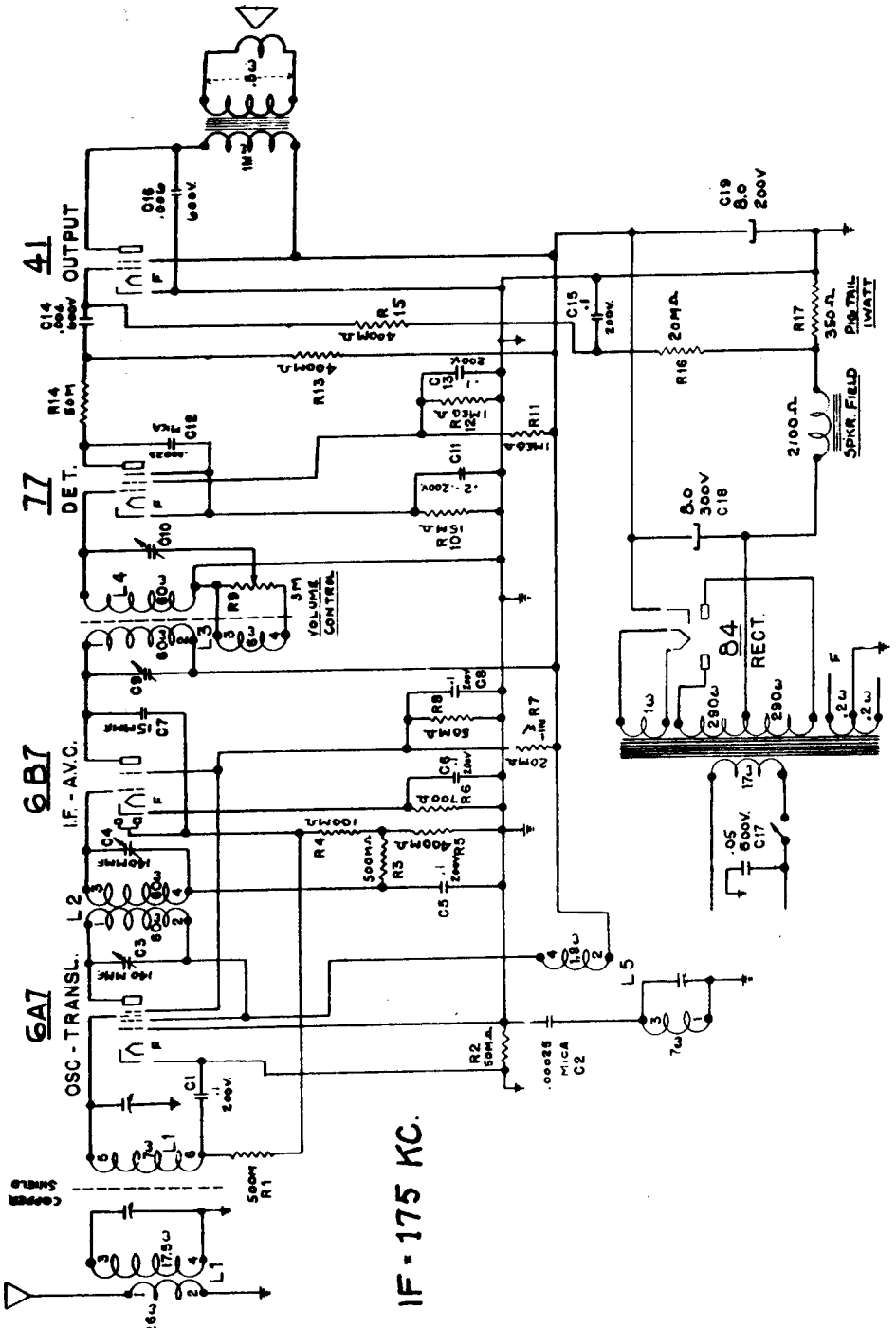


25Z5

Speaker Field Voltage = 70v.
* - Indicates high series resistor.
Tube heaters are in series so that if one burns out, none will light. These measurements were made with a 500 volt, 1000 ohms per volt meter. Power supply 118 volts A.C. Measurements made with set detuned, and speaker field hot. Care should be used when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation.

COLONIAL RADIO CORP.

MODELS 250 AC.-279 A.C.-300 A.C-301 A.C.

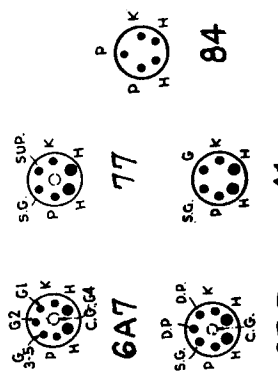


WATT SIZE OF RESISTORS NOT MARKED IS ½ WATT.

To render the AVC action ineffective, when peaking the IF stage, adjust the test oscillator to as low an output as possible -- just enough to get audible signal or readable deflection on the output meter. The volume control of the receiver should be on full. If the oscillator is not equipped with an attenuator, its output lead should be connected in series with a very small capacity in order to reduce its output. Twisting two pieces of wire, insulated from each other, for a few inches will serve.

Trouble Shooting Hints

If the set fails check the continuity of resistor R17. If the volume control does not work check connections from R9 to L3.



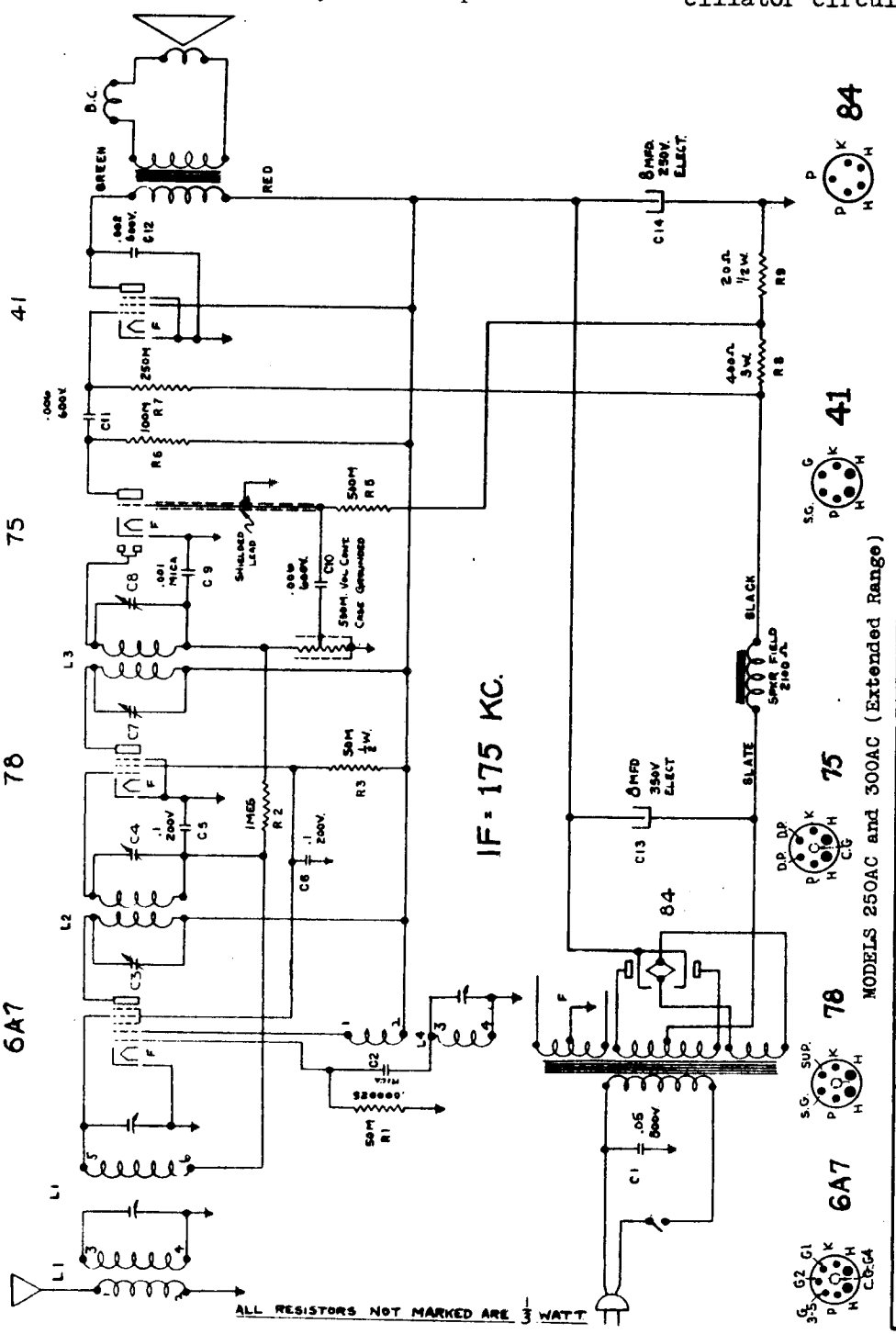
TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
6B7 - IF	165	80	*	.9	.23
77 - Det	50	45	*	.15	.05
41 - Output	150	165	*	16	2.3
6A7 - Osc-Transl	Ep=165; Eg #1=-4v; Eg #2=165v; Eg #3&5=76v; Eg #4=*; Ip=3.75ma; Ig #2=2.2ma; Eg #3&5=3.5ma.				
84 - Rect	Plate Current = 17m.a. per plate				

COLONIAL RADIO CORP.

MODEL 250A.C. & 300A.C. (EXTENDED RANGE)

Trouble Shooting Hints

If the plate voltage is zero when the set is turned on, check the speaker field coil and the 8mf. elec trolytic condenser. If the set does not function, check resistors R8 and R9 which frequently become open-circuited. If the set oscillates violently check the grounding of the shielded lead running to the type 75 tube. Also check the alignment of the intermediate frequency and oscillator circuits.

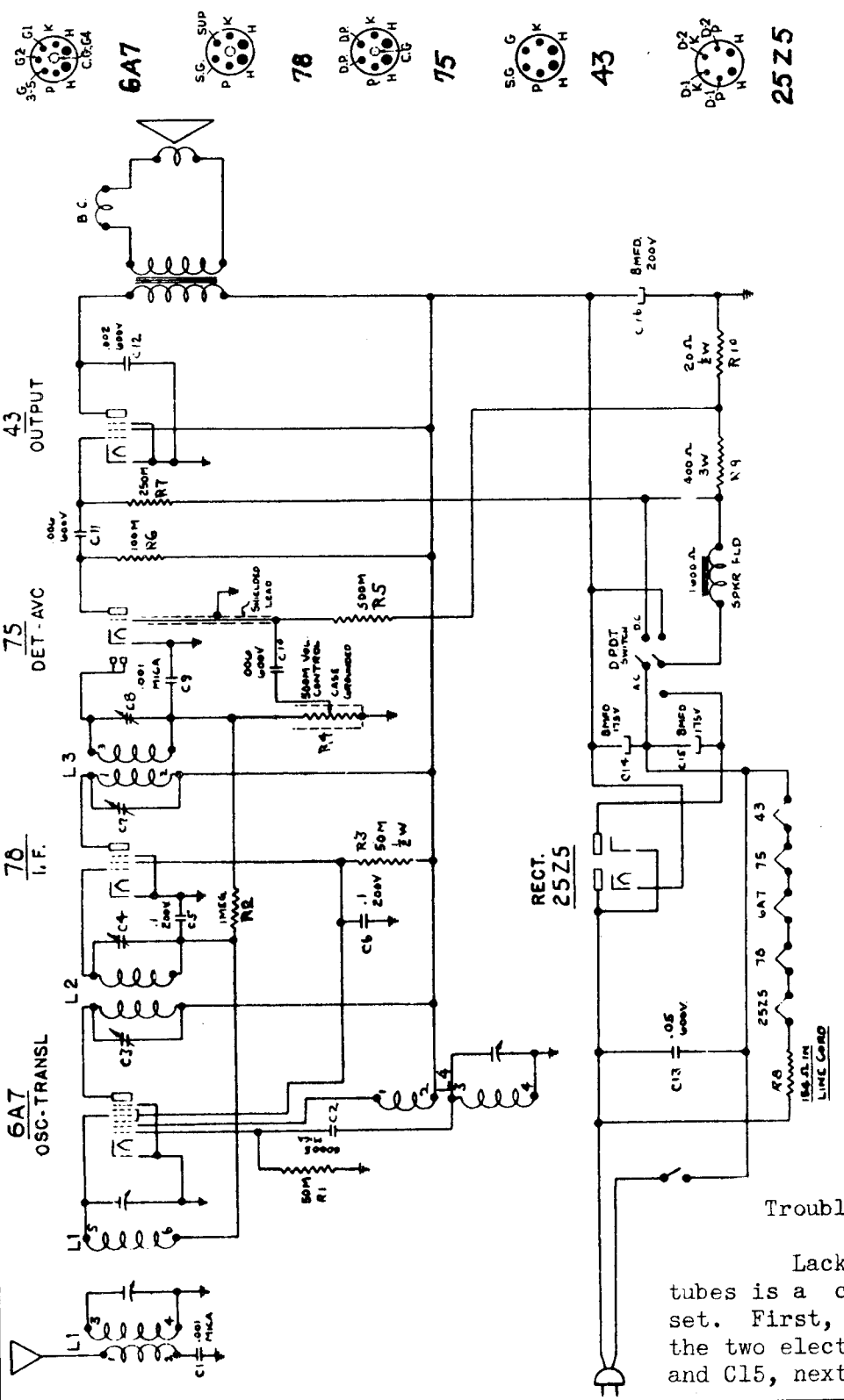


MODELS 250AC and 300AC (Extended Range)

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
78 - IF	185	65	*	4	1
75 - AVC-Det-AF	105		*	.75	
41 - Output	175	185	-10*	17	2.5
6A7 - Osc-Trans'	Ep=185v; Eg #2=185v; Eg #3&5=60v; Eg #4=*; Ip=2.5ma; Ig #2=2.75ma; Ig #3&5=1.75ma.				
84 - Rect	Plate current = 15m.a. per plate; DC voltage = 275.				

COLONIAL RADIO CORP.

MODEL 250 & 300 A.C.-D.C. (EXTENDED RANGE)



RESISTORS ARE 1/2 WATT UNLESS OTHERWISE MARKED

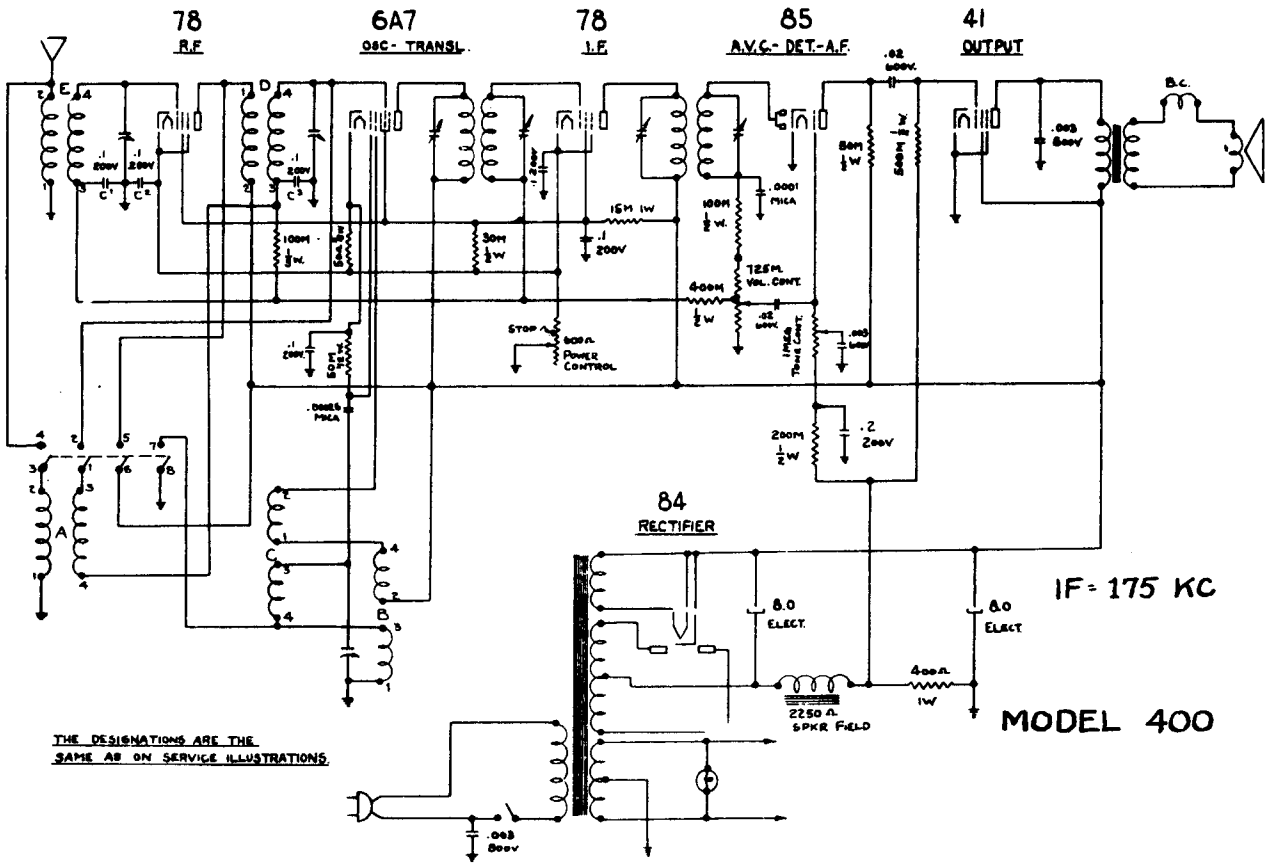
TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
78 - IF	105	40	*	2.5	1
75 - AVC-Det-AF	55		*	.2	
43 - Output	90	105	-6*	19	3
6A7 - Osc-Transl	Ep=105v; Eg #2=105v; Eg #3&5=32v; Eg #4=*; Ip=.8ma; Ig #2=1.1ma; Ig #3&5=1ma.				
25Z5- Rect	Plate current - 38m.a. per plate				

Trouble Shooting Hints

Lack of plate voltage on the tubes is a common complaint for this set. First, test the 25Z5 tube, next the two electrolytic condensers C14, and C15, next the speaker field coil.

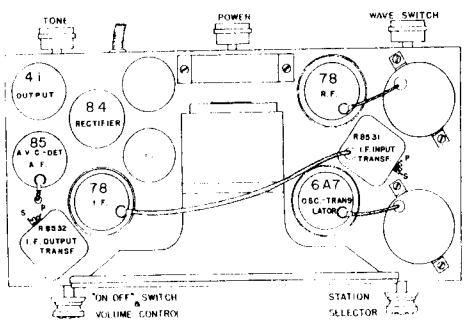
COLONIAL RADIO CORP.

MODEL 400



TUBE VOLTAGE AND CURRENT CHART

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
78 - RF	155	70	*	4.25	1
78 - IF	155	85	*	5	1.25
85 - AVC-Det-AF	120		*	.75	
41 - Output	155	160	*	12	1.75
6A7 - Osc-Transl	Ep=155v; Eg #2=155v; Eg #3&5=65v; Eg #4=*; Ip=2ma; Ig #2=3.5ma; Ig #3&5=2.5ma.				
84 - Rect	Plate current = 17m.a. per plate				

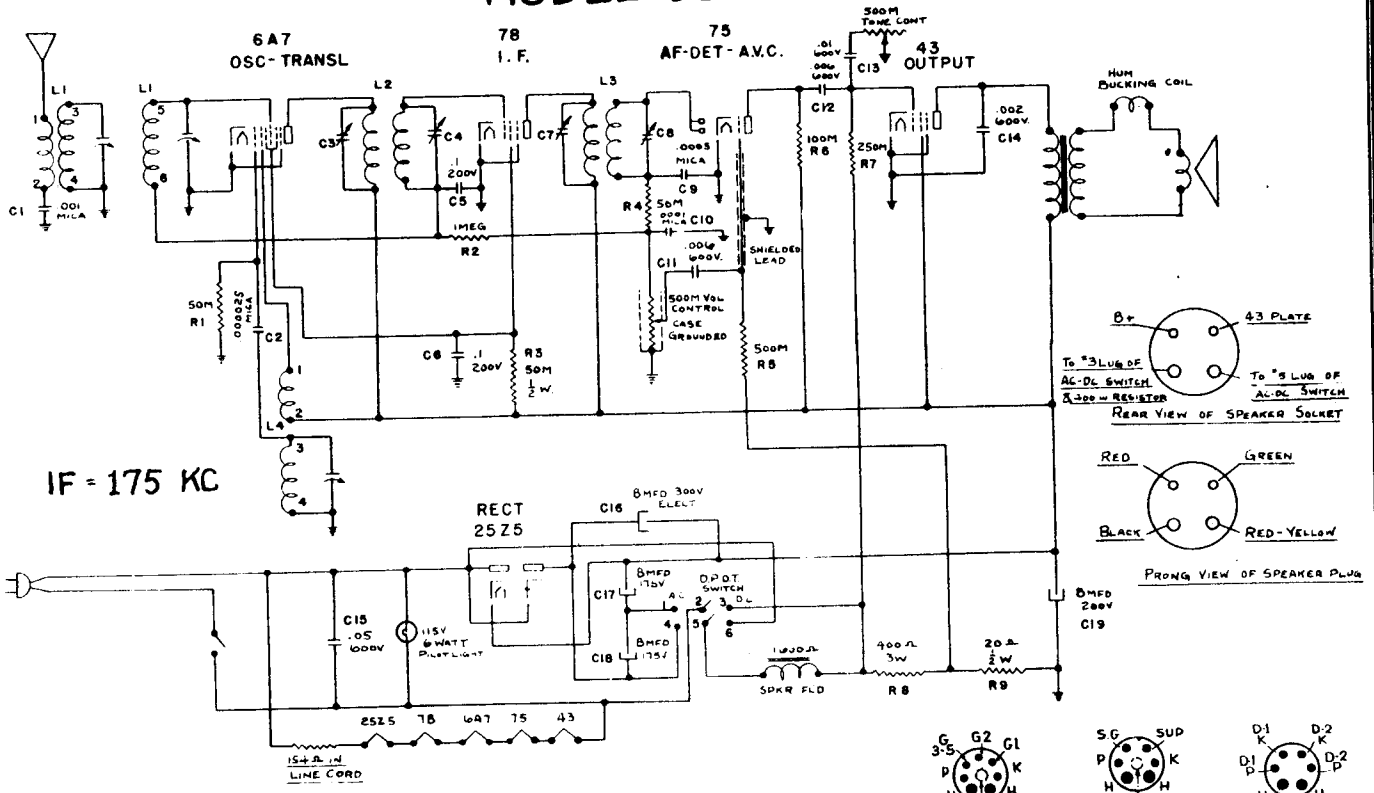


Trouble Shooting Hints

When hum is the complaint, first test the 84 and 41 tubes and then try shifting the control grid wires, especially the one from the I. F. input transformer to the 78 I. F. tube. Keep this wire as far from the speaker as possible. Clean the wave-change switch contacts.

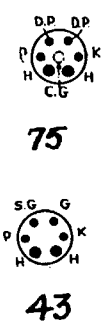
COLONIAL RADIO CORP.

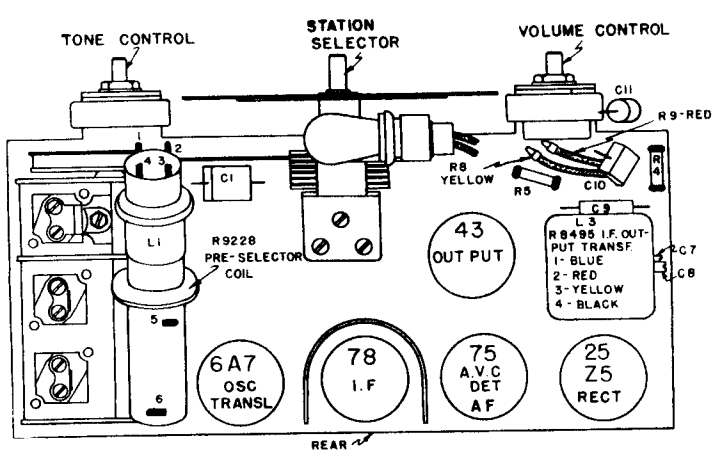
MODEL 501



TUBE VOLTAGE AND CURRENT CHART

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - IF	125	40	2.6	.6
75 - AF-DET-AVC	80		1	
43 - Output	110	125	28	5.5
6A7 - Osc-transl	Ep=125v; Eg #2=125v; Eg #3&#5=30v; Ep=1.7m.a.; Ig#2=2.5m.a.; Ig#3&#5=1.5m.a.			
25Z5 - Rect.	Doubled voltage = 200v. D.C. Plate current = 40m.a.			



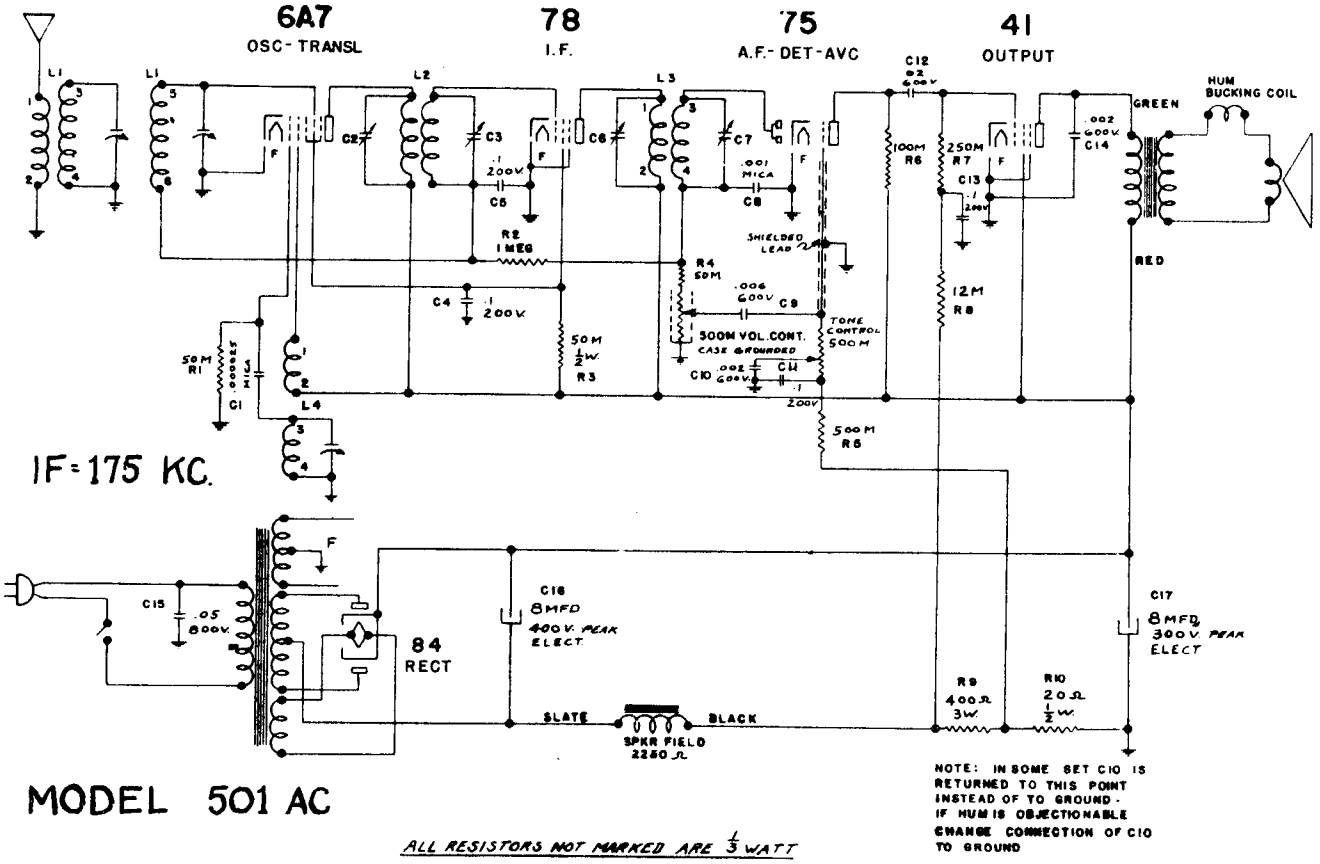


The Model 501 is a five tube AC-DC superheterodyne. It uses a 6A7 oscillator - translator, which creates a 175 kc signal to be amplified by the 78 IF stage. A type 75 tube provides AVC, diode detection and audio amplification. The audio output of the 75 tube is fed to a 43 power output pentode and then to the dyanmic loudspeaker. A 25Z5 acts as a voltage doubling rectifier (on a.c. only). The tube heaters are in series so that if one burns out, none will light. It is necessary, of course, to replace only the burned out tube. The others then will light. A 154 ohm resistor built into the line cord drops the line voltage by approximately 46 volts, leaving the difference to be applied to the tube heaters.

Trouble Shooting Hints

When filaments do not light first test tubes and then check connections to the 154 ohm line cord resistor.

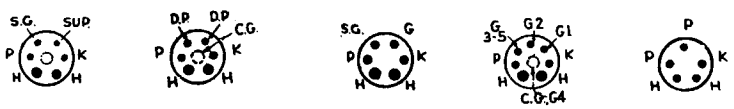
COLONIAL RADIO CORP.
MODEL 501 AC



TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - IF	210	70	6.5	1.5
75 - AF-DET-AVC	75		1.5	
41 - Output	200	210	22	3.4
6A7 - Osc-Transl	Ep=210v; Eg#2=210v; Eg#3&#5=70v; Ip=3.6m.a.; Ig#2=3.1 m.a.; Ig #3&#5=1.9m.a.;			
84 - Rect.	D.C. voltage =315v. Plate current = 22 m.a. per plate.			

The Model 501 AC is the corresponding AC Model. It has a 41 output pentode and an 84 rectifier.

The 75 AVC - Detector - AF circuit is the same for both receivers. The IF signal is impressed between the diode plates and the cathode of the 75 tube. in series with the 500 M ohms of the volume control. Diode current flows, creating a voltage drop across the volume control with the grounded end at a positive potential to the other, the grid return end. Any increase in signal increases the voltage drop across the volume control and so increases the negative grid bias on the 6A7 and 78 tubes since their cathodes connect to the grounded end of the control and their grid returns to the other end Since increases in signal strength are offset by decreases in tube amplification due to the increased negative grid bias, the input to the detector tends to remain at a constant value.

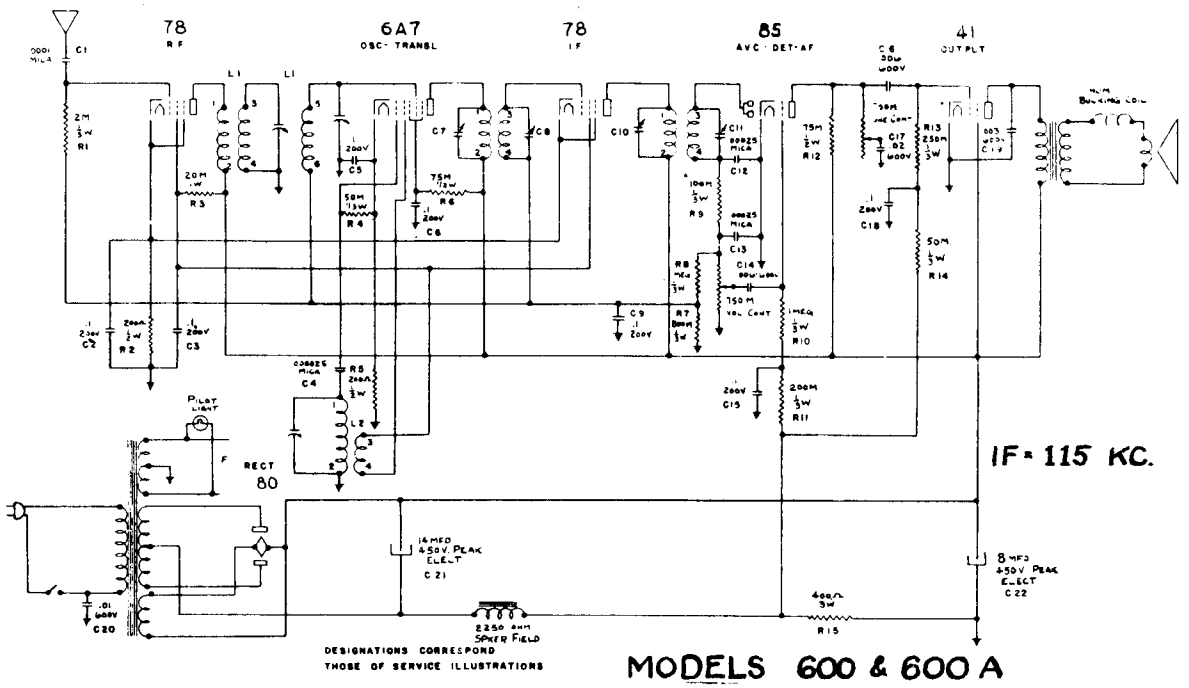


Trouble Shooting Hints

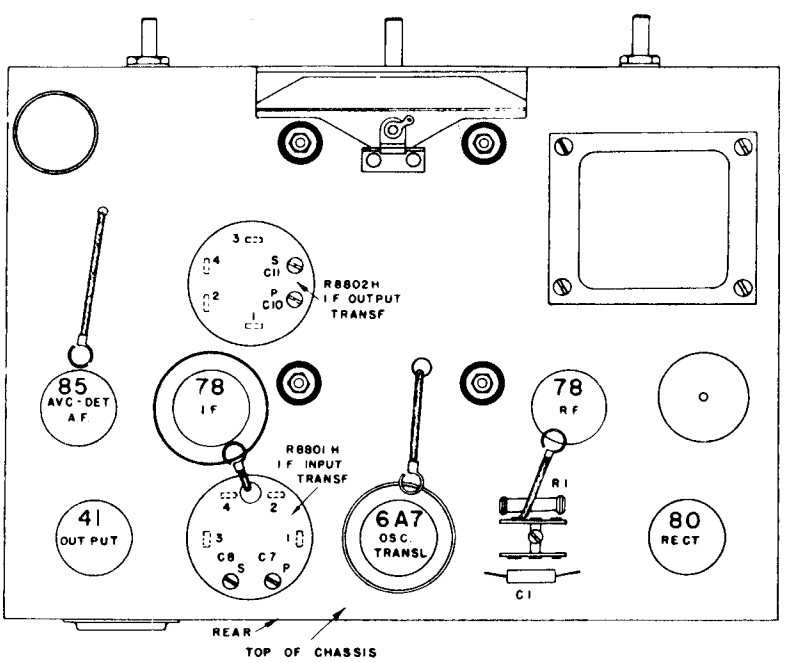
It is an invariable rule that if condenser C10 is not returned to ground, that the hum will be excessively loud. In all of these sets the condenser should be connected as shown in this diagram. Positions of the wires running to the grid caps are quite critical and oscillation may result if they are not correctly placed.

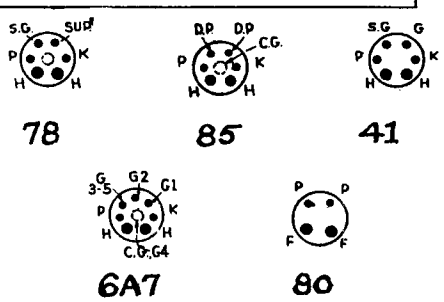
COLONIAL RADIO CORP.

MODELS 600 & 600A



TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M.A.	SCREEN M. A.
78 - RF	225	105	7	1.6
78 - IF	225	105	7	1.6
85 - AVC-Det-AF	165		3.5	
41 - Output	220	230	21	3.5
6A7 - Osc-Transl	Ep=225v; Eg#2=105v; Eg#3&#5=70v; Ip=2m.a.; Ig#2= 2m.a.; Ig#3&#5=2m.a.;			
80 - Rect.	Max. d.c. voltage = 370 volts. Plate current = 28 m. a. per plate.			



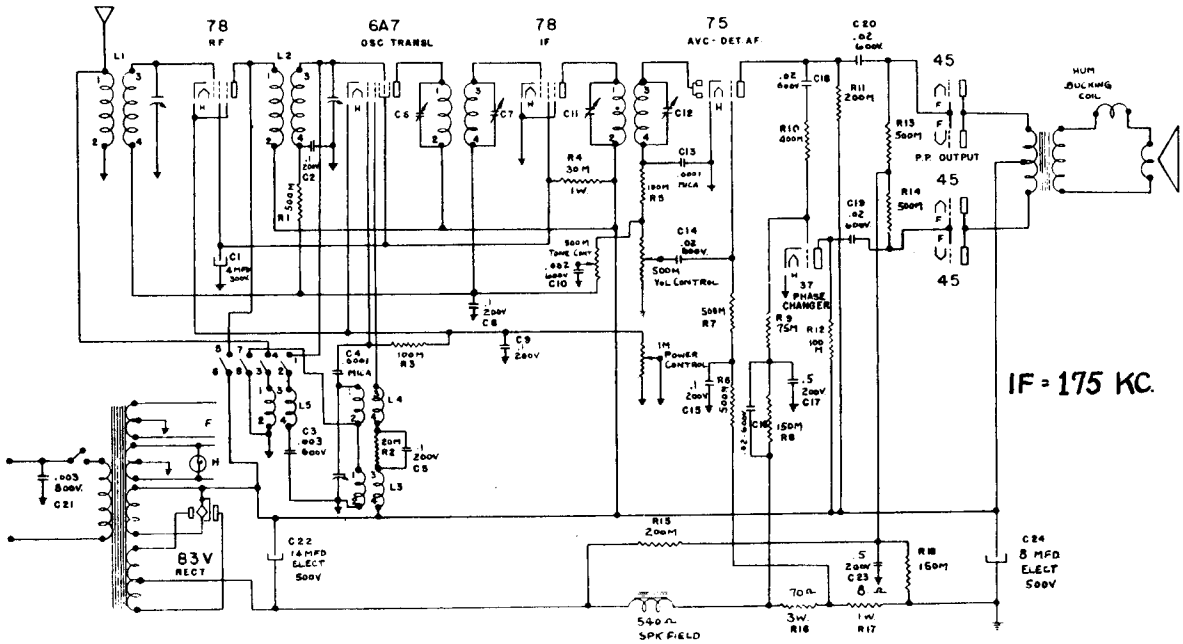


Trouble Shooting Hints

Changes in the value of resistors associated with the AVC seem to cause most of the trouble in these sets. The drop in resistance on these units, notably R7 causes insufficient AVC control and often poor sensitivity.

COLONIAL RADIO CORP.

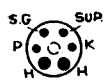
MODEL 601



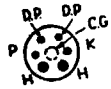
MODEL 601

RESISTORS ARE ½ WATT SIZE UNLESS OTHERWISE SPECIFIED

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M.A.	SCREEN M. A.
78 - R F	255	100	8	2
78 - I F	255	100	8	2
75 - AVC-Det-AF	125		.5	
'37 - Phase Changer	190		1.5	
'45 - Output	245		32	
6A7 - Osc-Transl	Ep = 255v; Eg#1 = -10v; Eg#2 = 200v; Eg#3&#5 = 82v; Ip = 3.75m.a.; Ig#2 = 3.5m.a.; Ig#3&#5 = 2.25m.a.			
83-V - Rect.	Maximum d.c. volts = 390v. Plate current = 84m.a. per plate			



78



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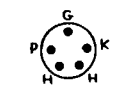

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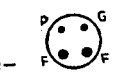
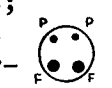
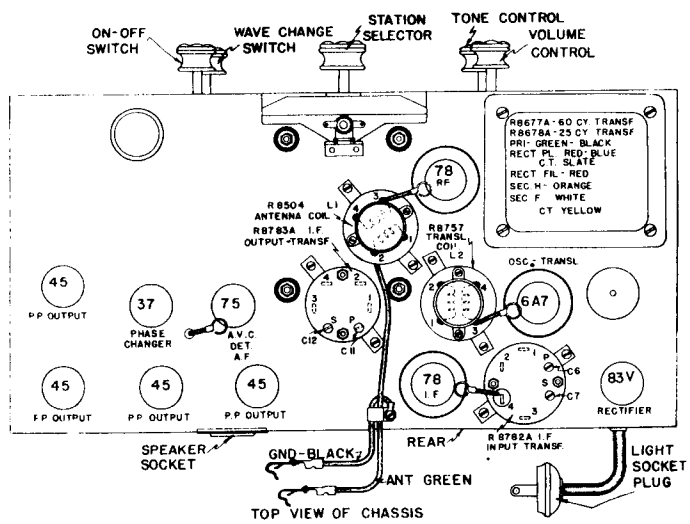


45

6A7



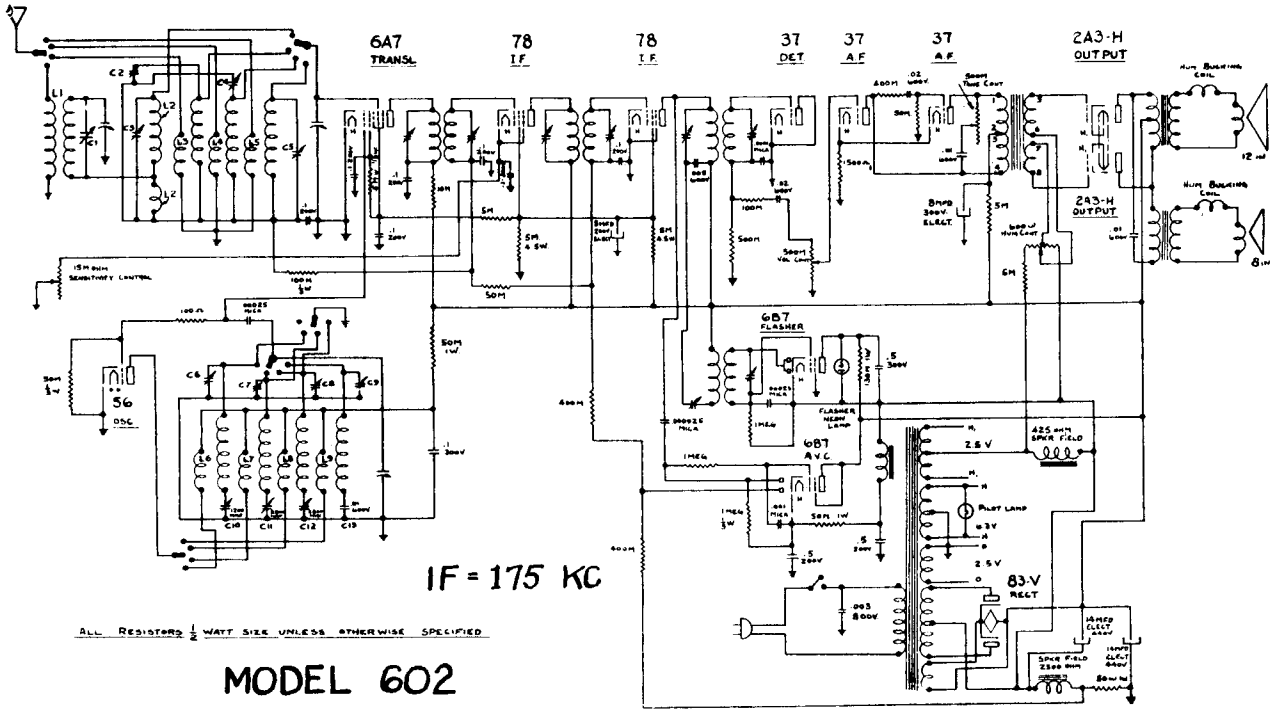
83V



Trouble Shooting Hints

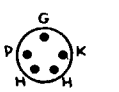
Failure of the phase-changer tube or its associated resistors is often the cause for distortion in this set. Complete failure of the receiver may be due to the following causes in order of their importance. Flashing of the 83 rectifier due to overloads; breakdown of electrolytic filter condensers; open circuit in speaker field coil; breakdown of voltage divider resistors or failure of the wave-change switch.

COLONIAL RADIO CORP.
MODEL 602

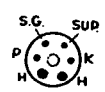


MODEL 602

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
56 - Osc.	70		4	
78 - 1st. IF	215	110	8	1.5
78 - 2nd. IF	215	110	8	1.5
37 - AF	165		4	
37 - AF	165		4	
2A3H - Output	265		60	
6B7 - AVC	60	60	4	1
6B7 - Flasher	7 - No. sig. 90 - With sig.			
83V - Rect	DC volts = 350. Plate current = 87ma. per plate.			
6A7 - Transl	Ep = 180; Eg#2 = 80; Eg#3 & #5 = 95. Ip = 4ma; Ig#2 = 2ma; Ig #3 & #5 = 4ma.			

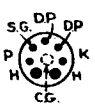


56 & 37



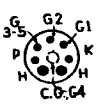
78

2A3-H



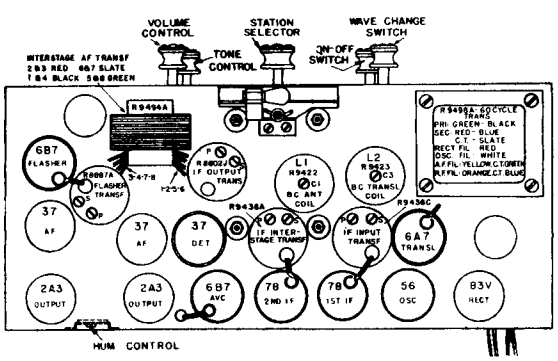
6B7

83 V



6A7

Readings taken with 1000 ohms per volt voltmeter, sensitivity control on full, no signal received.

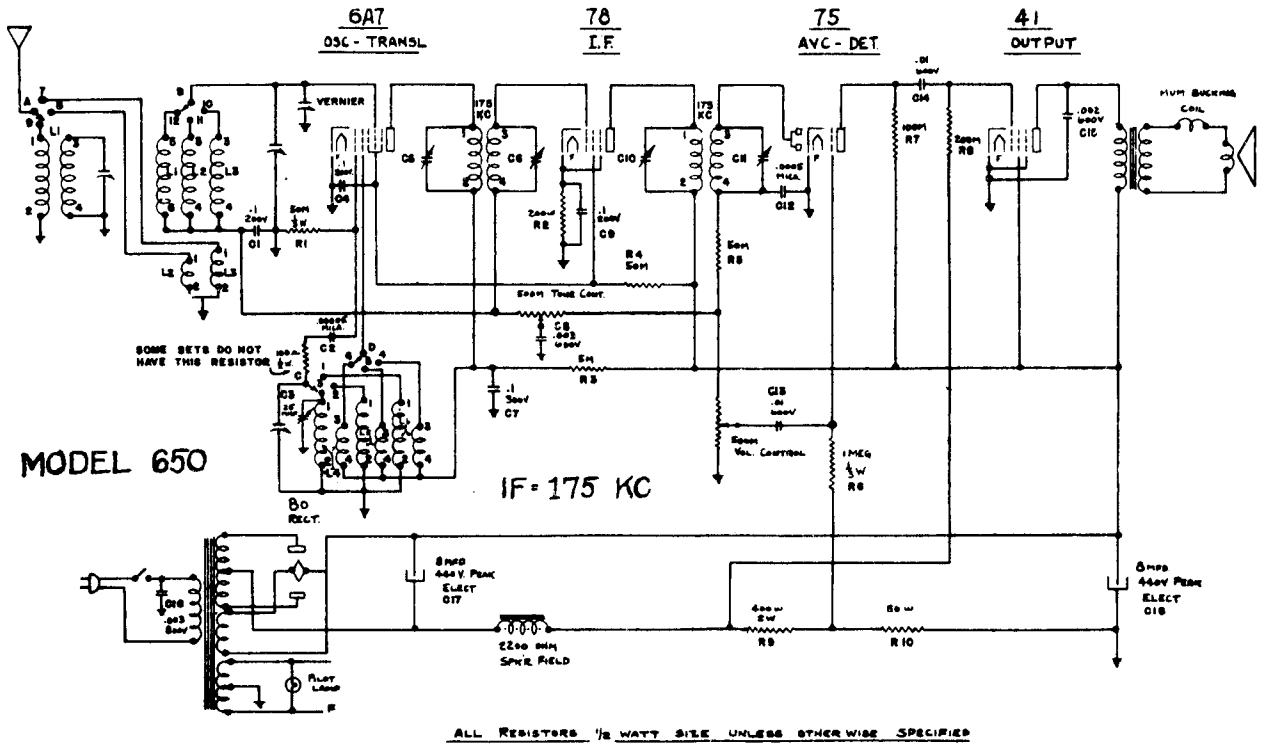


Trouble Shooting Hints

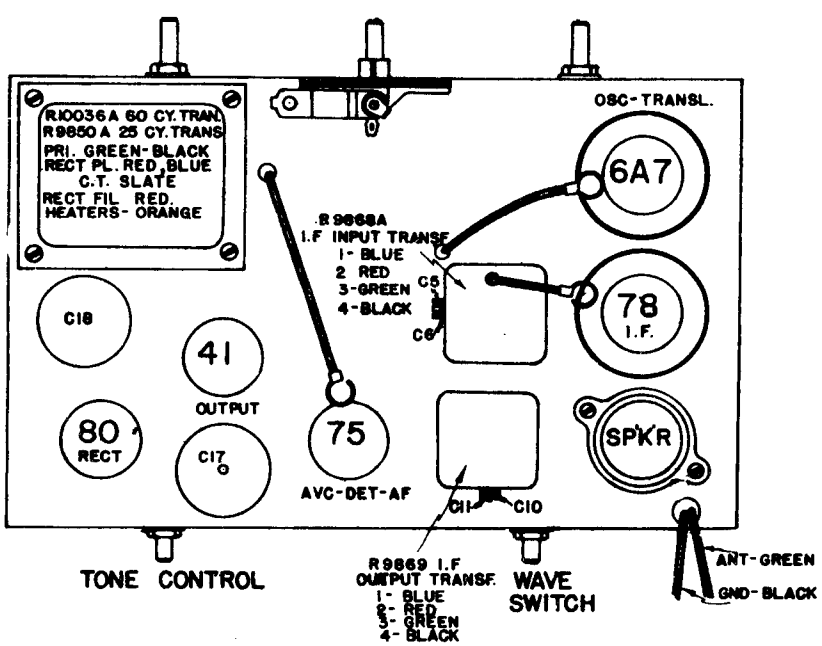
In realigning this set connect a .00025 mf. condenser between the aerial and ground. Peak C1, C3 and C6 and the high frequency end of the broadcast band. Then peak C10. For the 100 meter range adjust C7, C2 and C11. For the 40 meter range tune C8, C4 and C12. Peak C9, C5 and C13 for the 20 meter range.

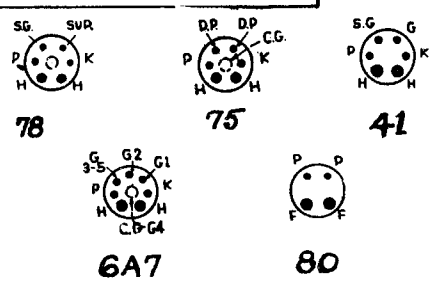
COLONIAL RADIO CORP.

MODEL 650



TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M.A.	SCREEN M. A.
78 - IF	190	65	4.5	1
75 - AVC-Det-AF	130		.3	
41 - Output	175	190	18.5	3
6A7 - Osc-Transl.	Ep=160v.; Eg#2=160v.; Eg#3&5=65v.; Ip=3m.a.; Ig#2=2.25m.a.; Ig#3&#5=1.7m.a.			
80 - Rectifier	Max d.c. voltage=285v. Plate current=17 m.a. per plate			



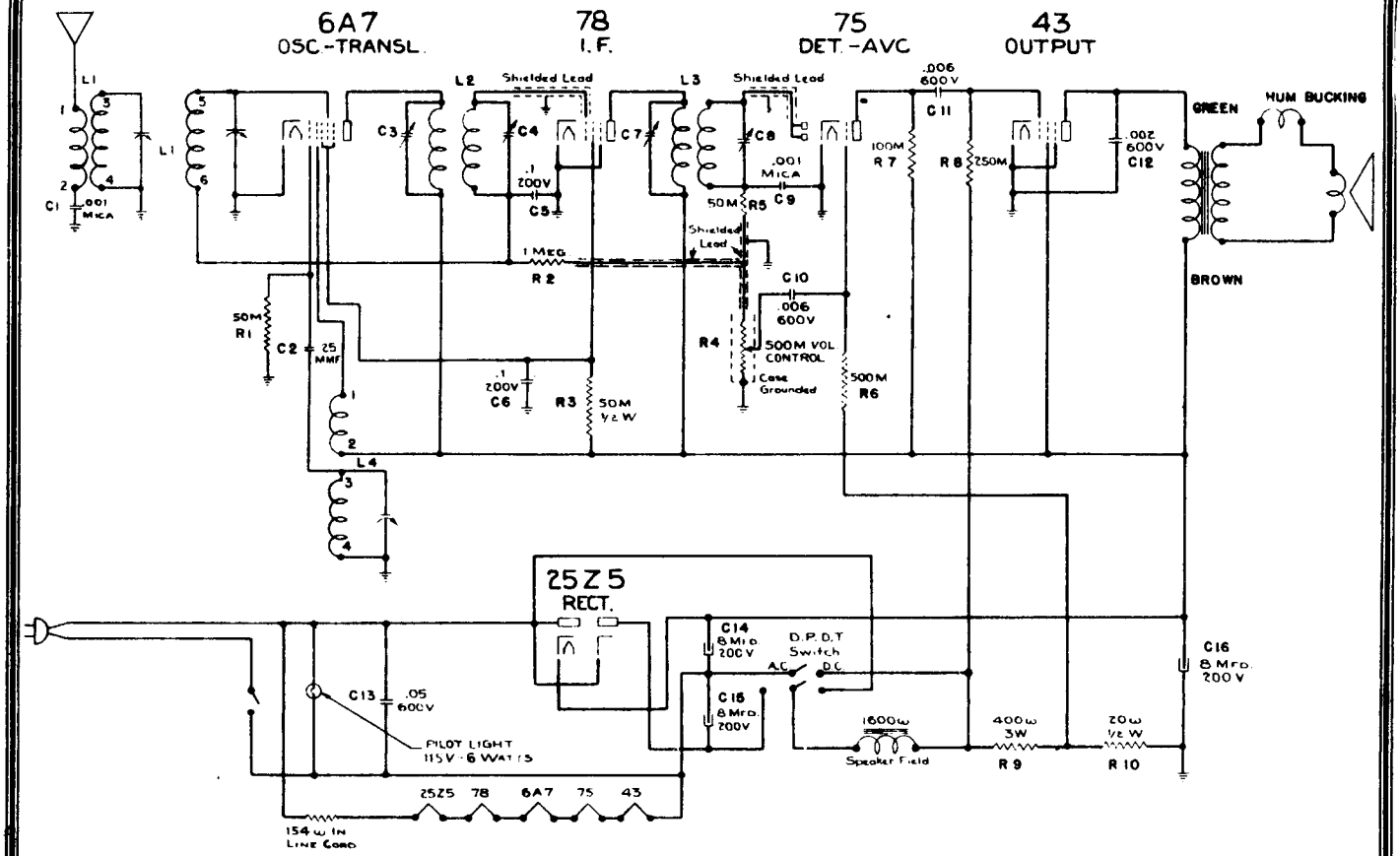


Trouble Shooting Hints

When the complaint is lack of sensitivity on the short wave bands, check the alignment of the oscillator padding circuits. The three positions of the wave-change switch are lettered A, B, C, corresponding to the dial scales. Place the vernier tuning condenser at its center position when aligning.

COLONIAL RADIO CORP.

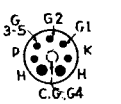
MODELS 700-701-702



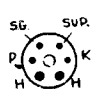
Resistors Are ½ WATT Unless Otherwise Marked.

TUBE VOLTAGE AND CURRENT CHART

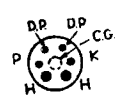
TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M. A.	SCREEN M. A.
78 - IF	105	40	*	2.5	1
75 - AVC-Det-AF	55		*	.2	
43 - Output	90	105	-6*	19	3
6A7 - Osc-Transl	Ep=105v; Eg #2=105v; Eg #3&5=32v; Eg #4=*; Ip=.8ma; Ig #2=1.1ma; Ig #3&5=1ma.				
25Z5 - Rect.	Plate current - 38m.a. per plate				



6A7

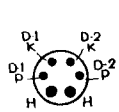


78



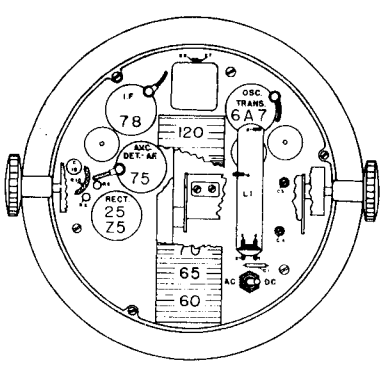
75

43



25Z5

* - Indicates high series resistance



A 6A7 serves as oscillator and as translator. The 175 kc signal created by the combination of the oscillator signal and the broadcast signal, in its plate circuit, is transformer coupled to the 78 IF stage, amplified, and then transformer coupled to the 75 AVC-Detector-AF tube. The audio output of the 75 is fed to the 43 output tube and then to the dynamic loudspeaker. A 25Z5 is used as a voltage doubling rectifier (on a.c. only).

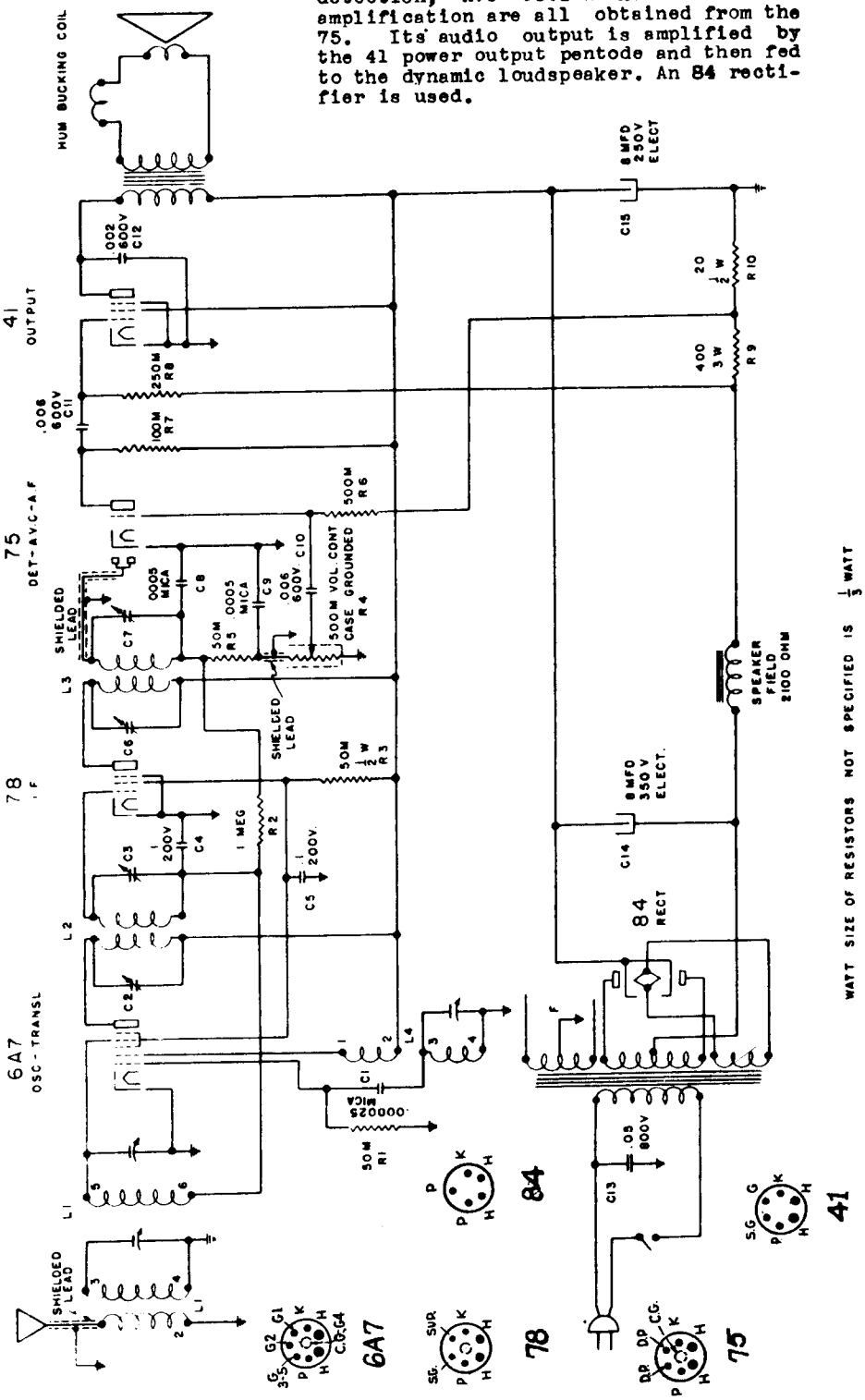
Trouble Shooting Hints

Open circuits in the power cord resistor seems to be a common cause for complaint when tubes fail to light.

COLONIAL RADIO CORP.
MODEL 700 A.C.-701 A.C-702 A.C.

Care should be used when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used,the voltage readings can be taken with a 1000 ohms per volt voltmeter, from cathode to the respective elements of each tube. Ordinarily, a 20% deviation from the chart value may be allowed.

A 6A7 pentagrid converter fills the function of oscillator and of translator. The 175 kc signal created in its plate circuit is amplified by the 78 IF stage and then coupled to the 75 tube. Diode detection, AVC action and hi mu audio amplification are all obtained from the 75. Its audio output is amplified by the 41 power output pentode and then fed to the dynamic loudspeaker. An 84 rectifier is used.



TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M. A.	SCREEN M. A.
78 - IF	185	65	*	4	1
75 - AVC-Det-AF	105		*	.75	
41 - Output	175	185	-10*	17	2.5
6A7 - Osc-Transl	Ep=185v; Ig #2=2.75ma;	Eg #2=185v;	Eg #3&5=60v;	Eg #4=*;	Ip=2.5ma;
84 - Rect	Plate current = 15m.a. per plate; DC voltage = 275.				

WATT SIZE OF RESISTORS NOT SPECIFIED IS 1/2 WATT

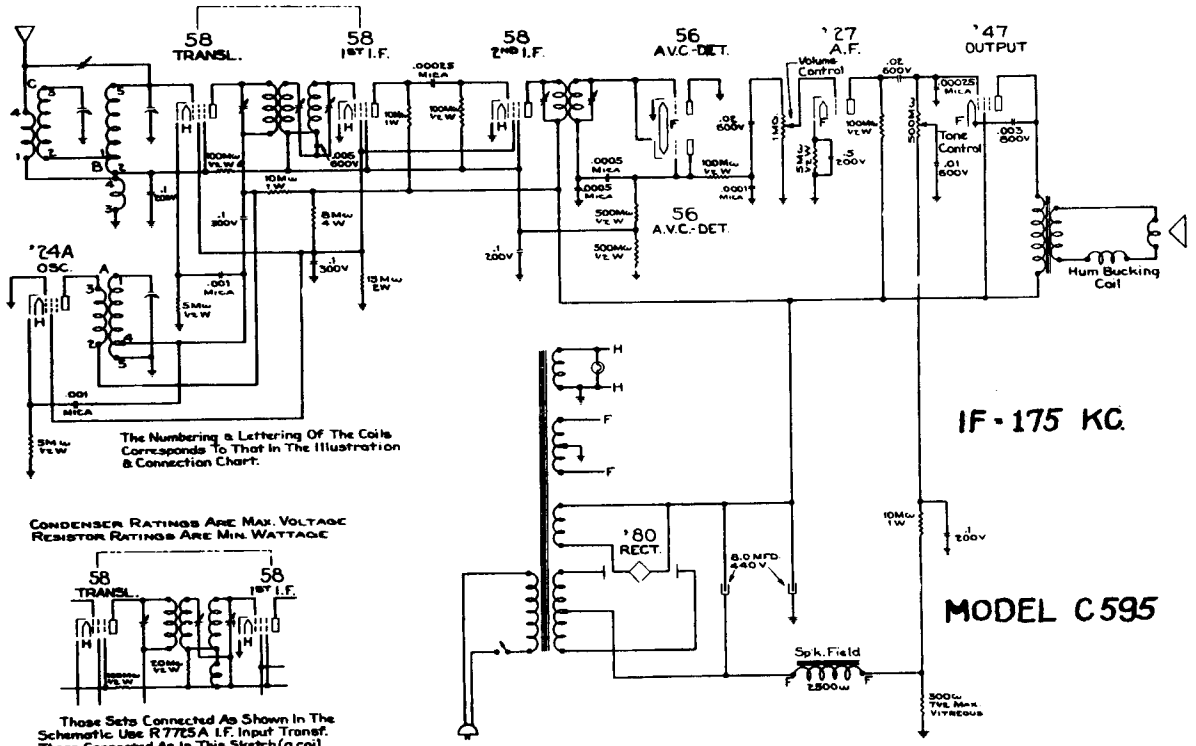
* - Indicates high series resistance.

Trouble Shooting Hints

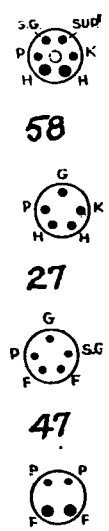
Oscillation on parts of the tuning bands may be caused by shielded leads which are not completely grounded or to ground contacts on the variable condensers. In cases of poor sensitivity first check the 75 second detector and AVC tube.

COLONIAL RADIO CORP.

MODEL C-595



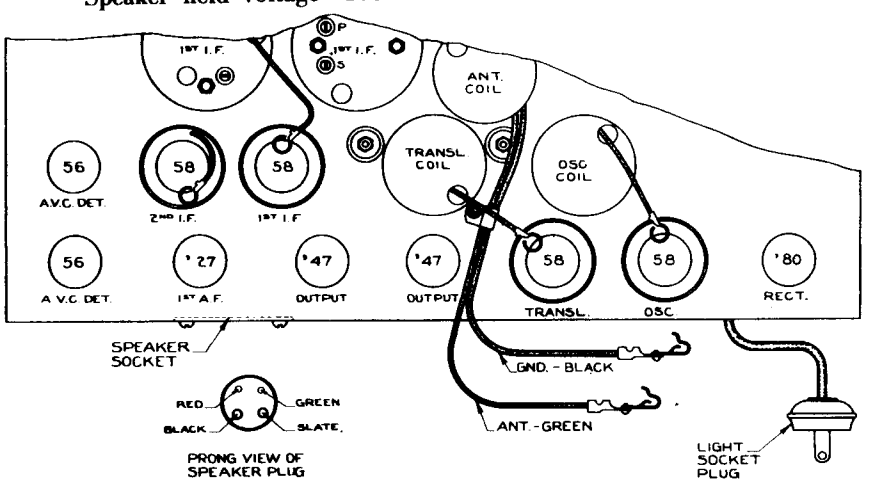
TUBE	Plate Voltage	Screen Voltage	Grid Voltage	Plate m. a.	Screen m. a.
58—Oscillator	80	185	−12	9	3.5
58—Translator	180	70	− 9*	1	.3
58—1st IF	125	75	*	9	2
58—2nd IF	205	75	*	9	2
'27—AF	75		−6 (Vol. Control at Min.)	1.2	
'47—Output	200	210	− 5* (−18 Actual)	15	3
'80—Rectifier	Max. d.c.=380 v.			Plate Current=32 m.a. per plate.	



Watts=85.

Speaker field voltage=170 v.

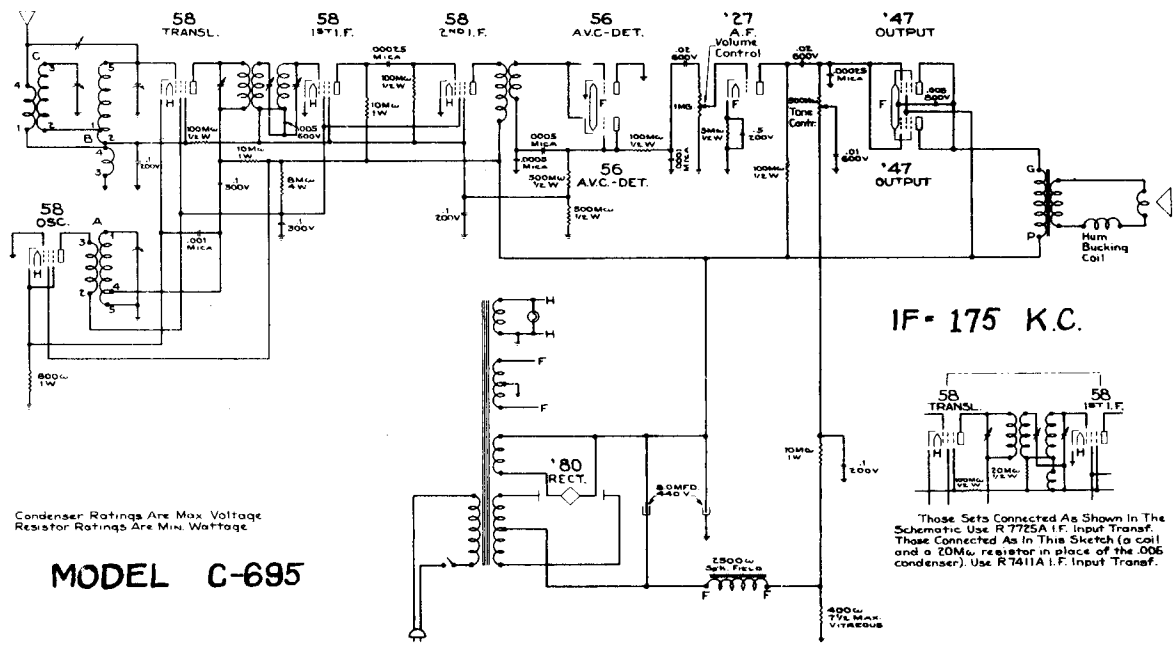
(*) Reading low because of high series resistance.



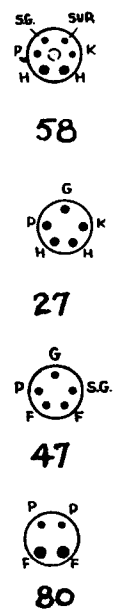
Trouble Shooting Hints

Severe hum, which becomes louder when a station is tuned in, is definite indication of faulty type 56 detector tube. Interchange the tubes or replace them with new ones. To increase sensitivity replace R7411 A I. F. coil with type R7725 A.

COLONIAL RADIO CORP.



TUBE	Plate Voltage	Screen Voltage	Grid Voltage	Plate m. a.	Screen m. a.
58—Oscillator	90	200	−12.5	8	3
58—Translator	190	90	− 6*	.9	.3
58—1st IF	115	95	*	7.5	2
58—2nd IF	210	95	*	8	2
'27—AF	70		−6 (Vol. Control at Min.)	1.3	
'47—Output	200	210	− 7* (−24 Actual)	6.5	1.1
'80—Rectifier	Max. d.c.=365 v.			Plate Current=25 m.a. per plate.	

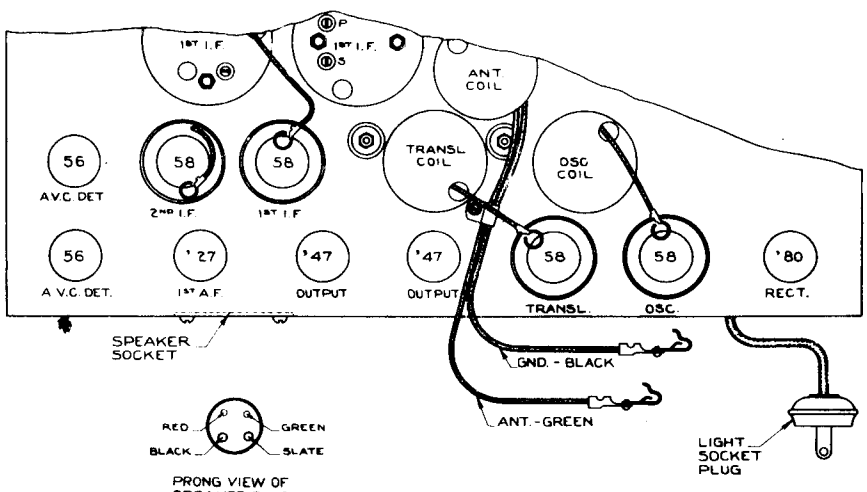


Watts=85.

Speaker field voltage=135 v.

(*) Reading low because of high series resistance.

Control grid readings taken on 150 volt scale of 1000 ohms per volt meter; others on 750 volt scale. Readings taken with antenna and ground shorted together and no signal received. These are average values.

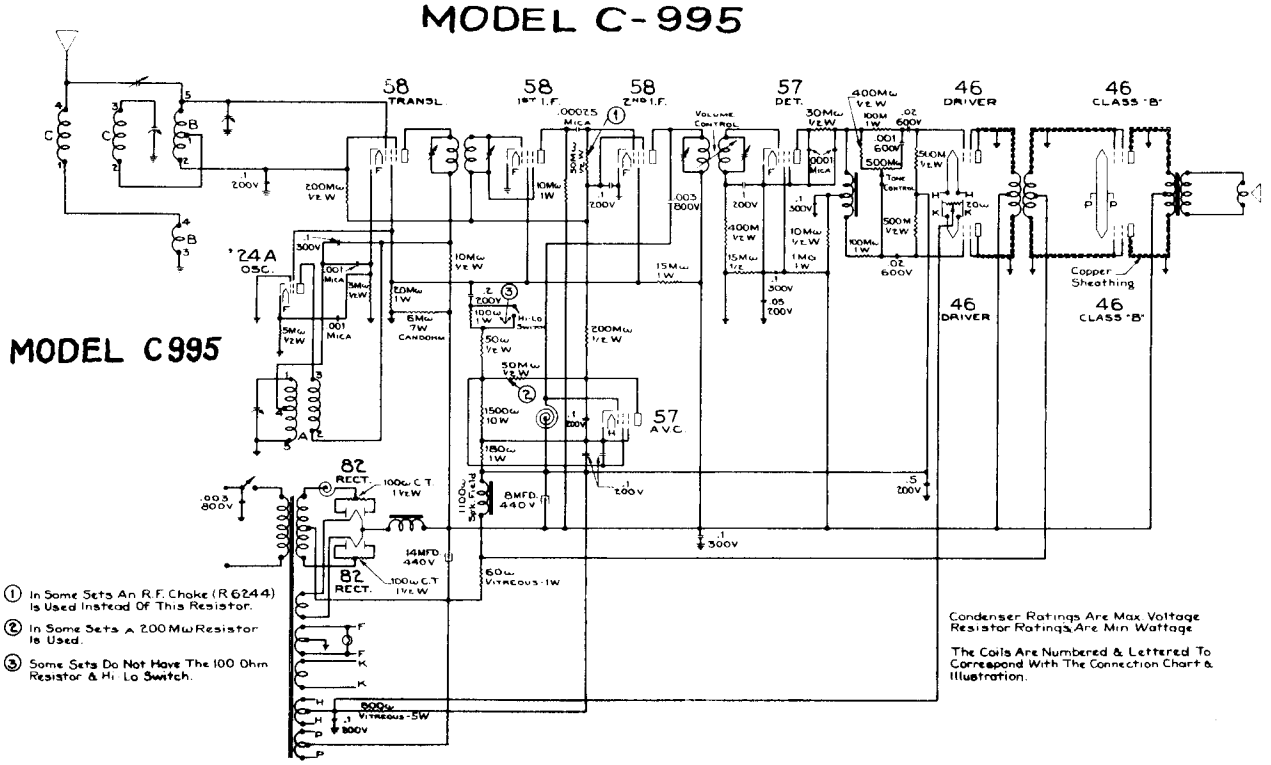


Trouble Shooting Hints

Continuous audio howl usually indicates either a defective 47 tube or an open circuit in the .003 mf. condenser in the plate circuits of these two tubes. Try shifting the tubes in their sockets and connect a resistor between the screengrids and their voltage supply.

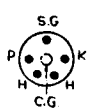
COLONIAL RADIO CORP.

MODEL C-995

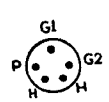


TUBE	Plate Voltage	Screen Voltage	Grid Voltage	Plate m. a.	Screen m. a.
58—Translator	160	70	−3*	1.4	.3
'24A—Oscillator	160	70	−6	.8	.3
58—1st IF	145	75	−4	4	.9
58—2nd IF	185	75	−4	4	1
57—Detector	160	65	*	.3	.1
57—A. V. C.	50	70	−9	0	0
46—Driver	240	240	−10* (−30 actual)	17	3.5
46—Class "B"	365	+4.5	+4.5	18–70 (a)	1.7–13 (a)(b)
82—Rectifier	Max. d.c.=365 v.			Plate Current=32 m.a. per plate per tube. (c).	

58 & 57



24A



46

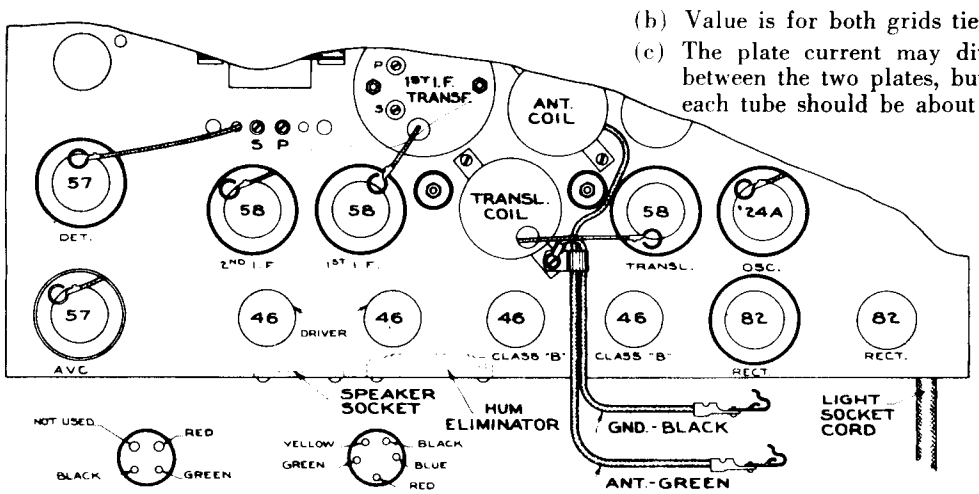
82

(*) Reading low because of high series resistance.

(a) The latter value on a strong signal.

(b) Value is for both grids tied together.

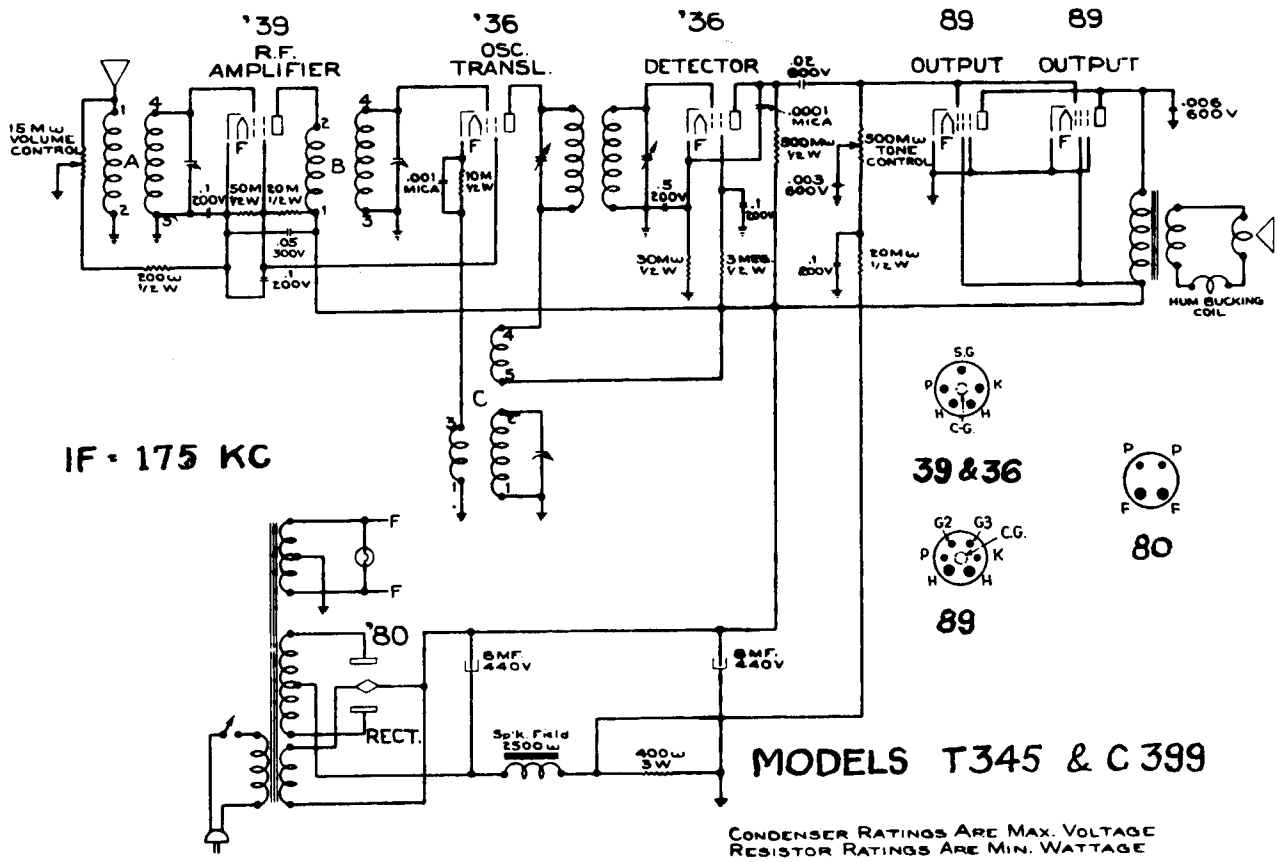
(c) The plate current may divide unevenly between the two plates, but the total for each tube should be about 65 m.a.



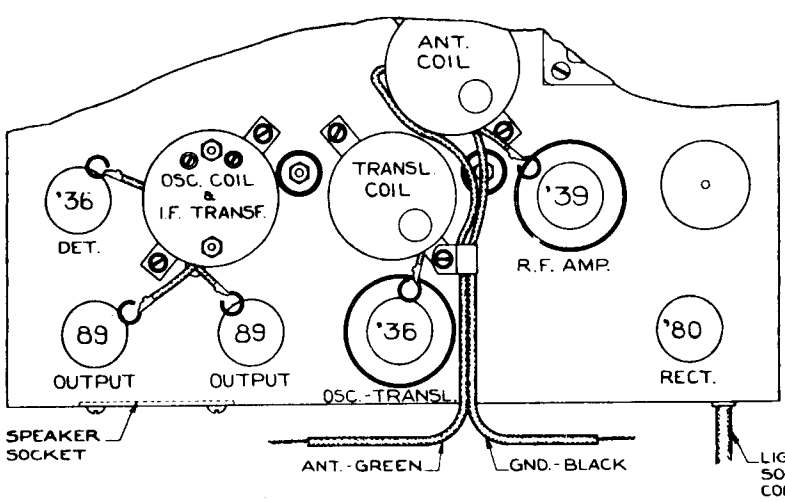
Trouble Shooting Hints

If the power transformer appears burned out, test the continuity of wires from the coils to the terminal lugs. In case of excessive hum shift the type 46 tubes around.

COLONIAL RADIO CORP.



TUBE	Plate Voltage Vol. Cont. at Max.	Min.	Screen Voltage Vol. Cont. at Max.	Min.	Grid Voltage Vol. Cont. at Max.	Min.	Plate m. a. Vol. Cont. at Max.	Min.	Screen m. a. Vol. Cont. at Max.	Min.
'39—R. F.	160	140	90	95	−2	−30	6	.0	1.6	0
'36—Osc.-Transl.	160	160	85	115	−5	−6.7	.5	.65	.1	.15
'36—Dectector	75	75	30	30	−5* (−15 actual)	−5* (−15 actual)	.2	.2	(a)	(a)
89—Output	150	155	165	170	* (−18 actual)	* (−18 actual)	15.5	18	3	3
'80—Rectifier	Max. d.c.=295 v.						Plate current=22 m.a. per plate.			



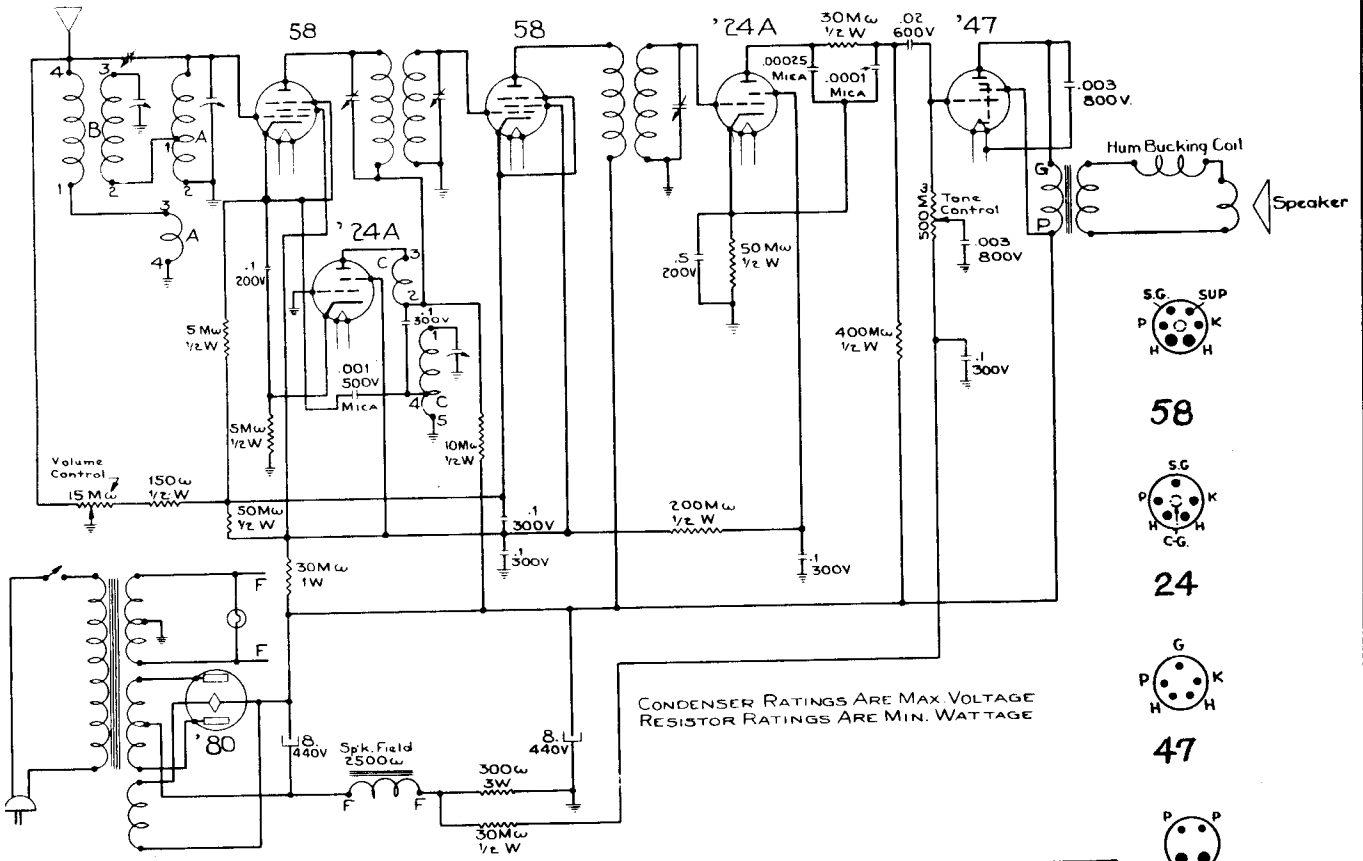
If it becomes necessary to align the oscillator-translator and R.F. stages, it should be done at about 1250 kc and then "touched up" at about 1600 kc. Trouble may be experienced if an attempt is made to secure alignment at 1600 kc without having obtained approximate alignment at 1250 kc. At 1600 kc the capacity of the oscillator trimmer may be sufficient to tune the oscillator-translator stage to the same frequency as the R.F. stage, resulting in feedback and violent oscillation.

Trouble Shooting Coils

If whistles are encountered in this set, it is sometimes advisable to move the antenna wire to the opposite side of the translator coil.

COLONIAL RADIO CORP.

MODEL T-397 & C-495



TUBE	Plate Voltage Vol. Cont. at Max.	Plate Voltage Vol. Cont. at Min.	Screen Voltage Vol. Cont. at Max.	Screen Voltage Vol. Cont. at Min.	Grid Voltage Vol. Cont. at Max.	Grid Voltage Vol. Cont. at Min.	Plate m. a. Vol. Cont. at Max.	Plate m. a. Vol. Cont. at Min.	Screen m. a. Vol. Cont. at Max.	Screen m. a. Vol. Cont. at Min.
'24A—Oscillator	185	205	90	130	— 8	—13	1.1	1.9	.4	.7
58—Translator	185	170	80	95	—11	—37	1.6	.2	.36	0
58—IF	220	195	85	95	— 2	—37	6	.2	1.7	0
'24A—Dectector	135	125	60	95	— 9*	—11*	.1	.2	(a)	(a)
'47—Output	215	225	230	240	(a)* (actual —14)	(a)* (actual —13)	28	33	6	7
'80—Rectifier	Max. d.c.=365 v.						Plate Current=25 m.a. per plate.			

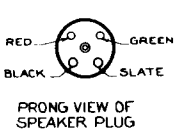
Watts=70

Speaker field voltage=120 v.

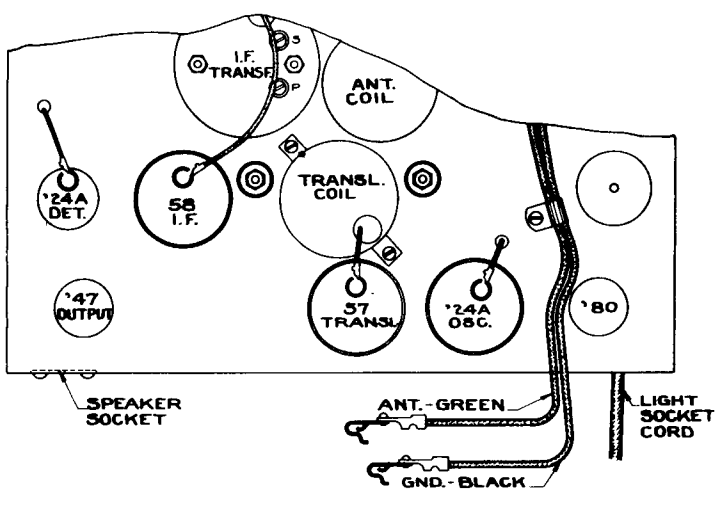
(a)—Too low to read.

(*)—Reading low because of high resistance in series.

Control grid readings taken on 150 volt scale of 1000 ohms per volt meter; others on 750 volt scale. Readings taken with antenna and ground shorted together and no signal received. These are average values.



PRONG VIEW OF SPEAKER PLUG

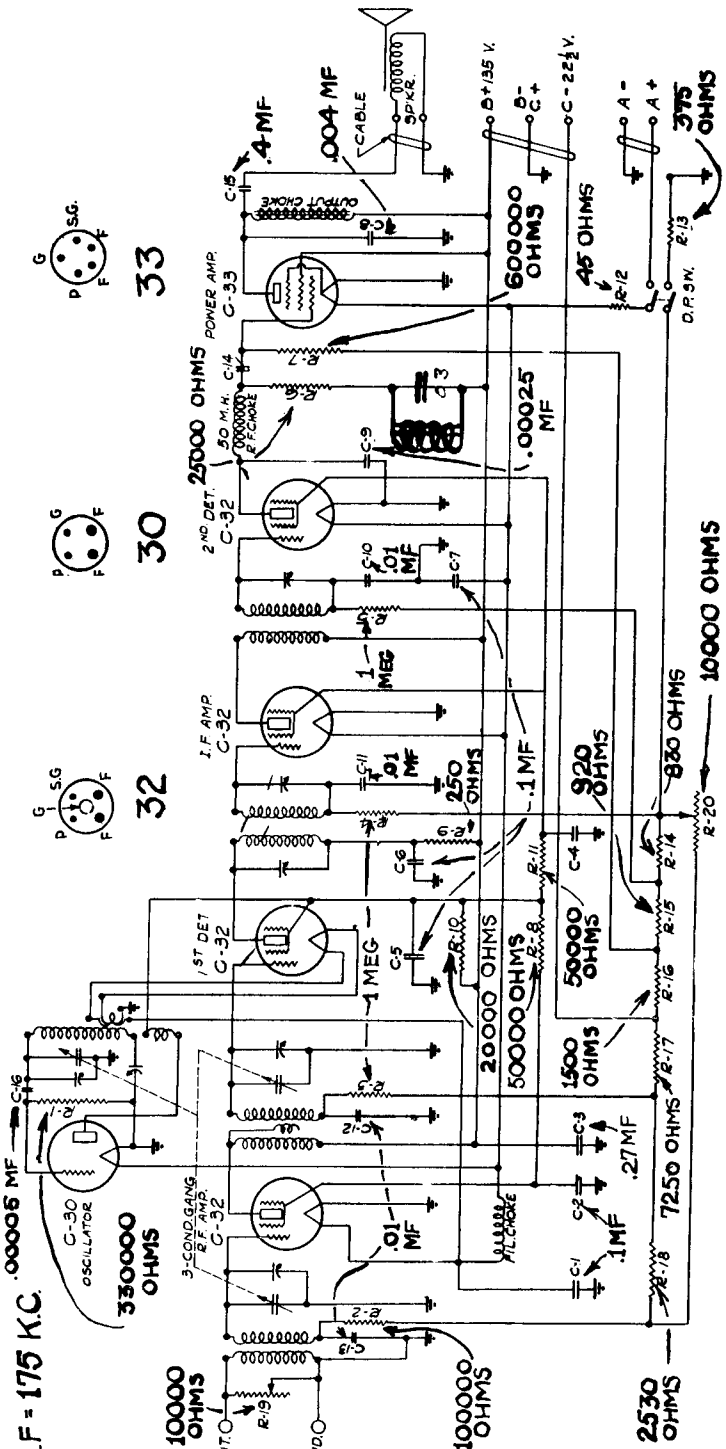


COLUMBIA PHONO. & RADIO CORP.

MODEL C-120 B CHASSIS

Trouble Shooting Hints

In this set motor-boating in the audio amplifier seems to cause the most trouble. The early models did not contain the A.F. choke and condenser in the detector plate supply lead. This filter is important to the correct operation of the set and should be inserted.

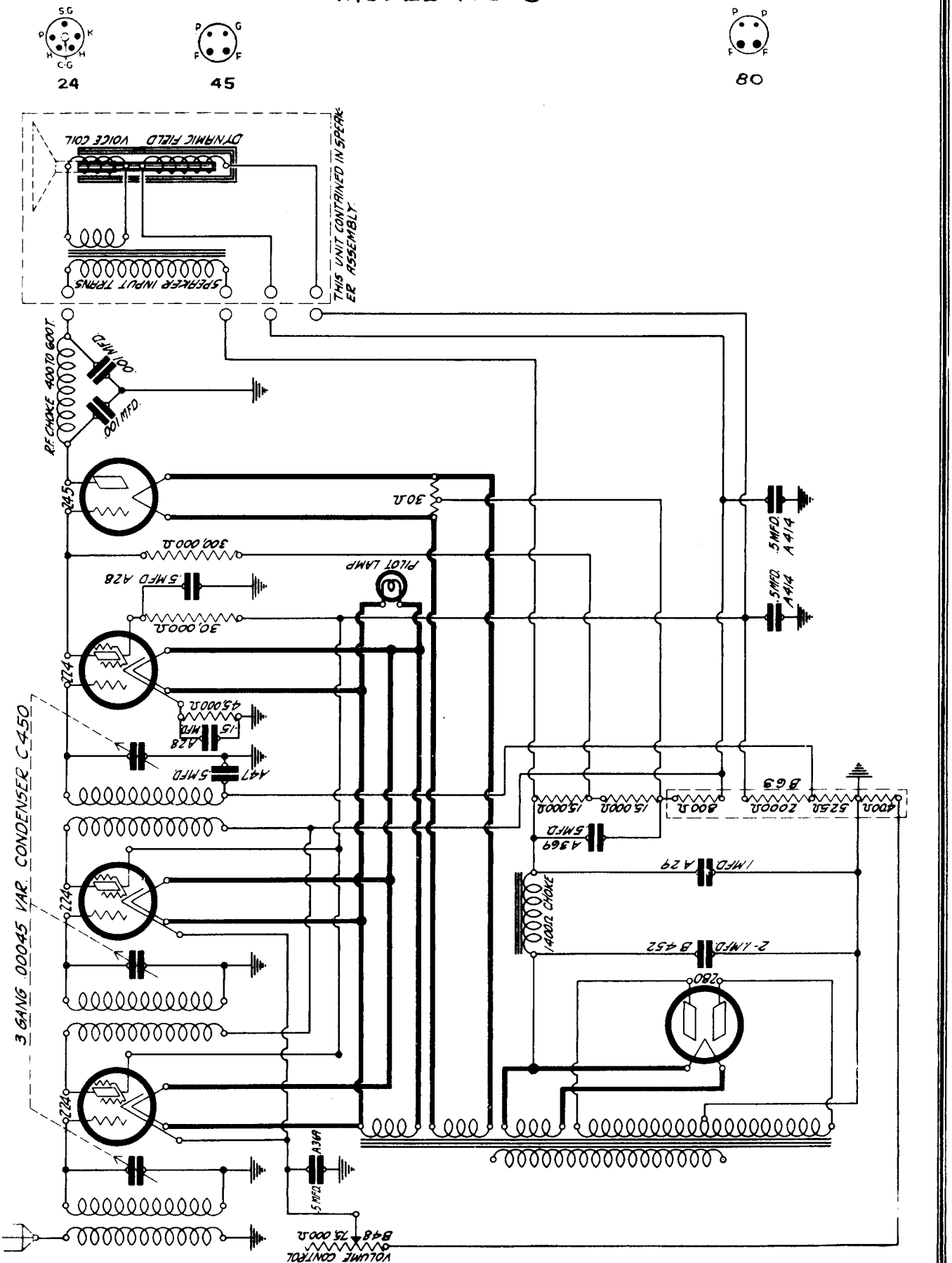


Tube Purpose	Type Tube	Fil. Volts D.C.	Plate Volts D.C.	Plate Current M.A. - D.C.	Screen Volts D.C.	Screen Current M.A. - D.C.
R.F. Amp.	C-32	2.0	135	1.2	40	.3
Oscil.	C-30	2.0	55	3.0	-	-
1st Det.	C-32	2.0	135	.2	55	.2
I.F. Amp.	C-32	2.0	135	.3	22	.3
2nd Det.	C-32	2.0	20	*	22	.4
Pentode	C-33	2.0	130	12	135	2.6

* Less than .1 M.A.

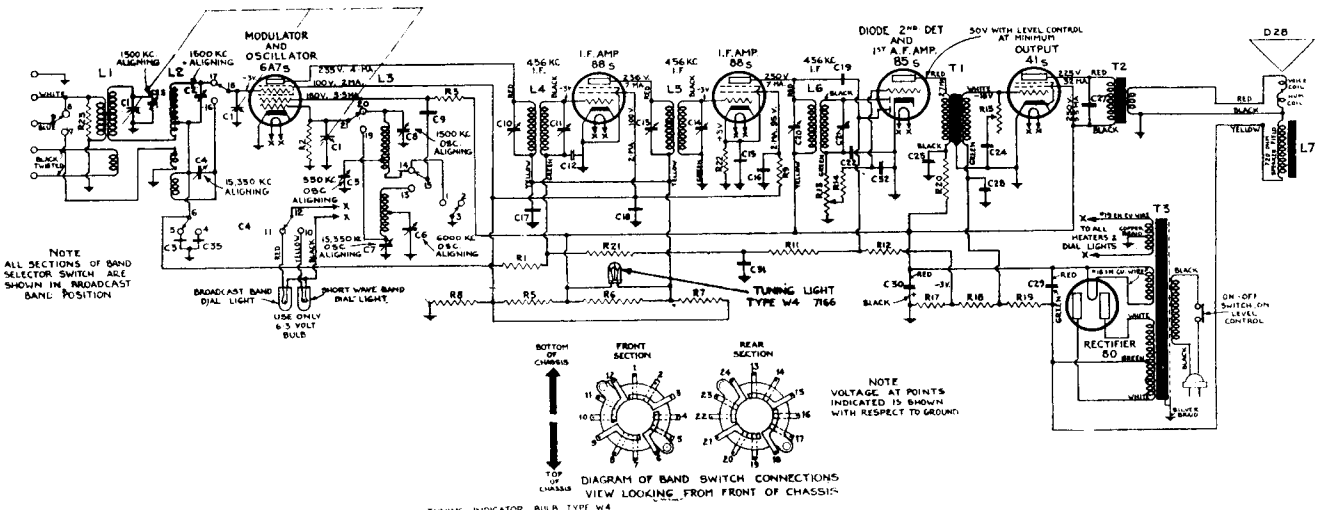
COLUMBIA RADIO CORP.

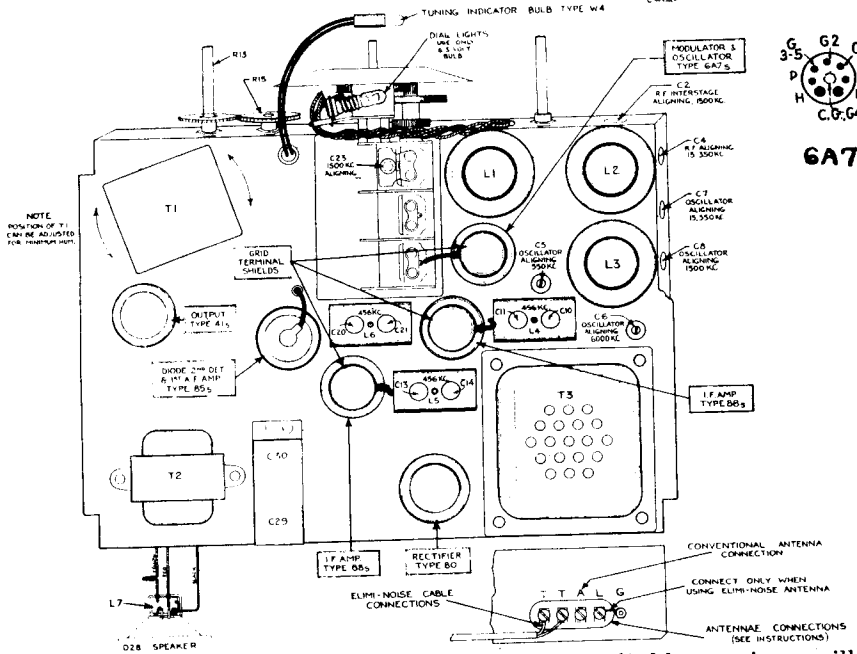
MODEL AC-5

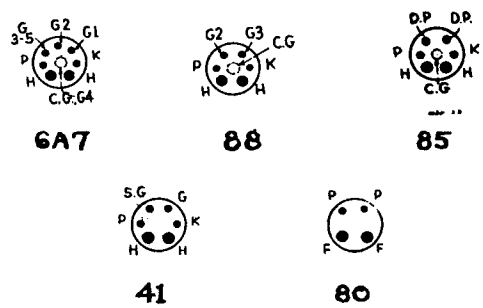


CONSOLIDATED INDUSTRIES PRODS., Ltd.

MODEL 514







Trouble Shooting Hints

The position of transformer T1 is critical and background hum can often be reduced considerably by swinging this unit on its mounting. Re-adjustment after some use is often necessary.

To align the intermediate frequency stages, a suitable service oscillator should have its output terminal connected to the control grid cap of the type 6A7S tube and the oscillator tuned to exactly 456 kc. An output meter or other visual means of indicating output should be connected across the voice coil of the speaker or as an alternative between plate and screen contacts of the 41S output socket. It is recommended that I. F. alignment commence at the second detector stage, that is, that the first I. F. adjustment to be made should be that of C21, followed by C20, C14, C13, C11 and C10 in that order.

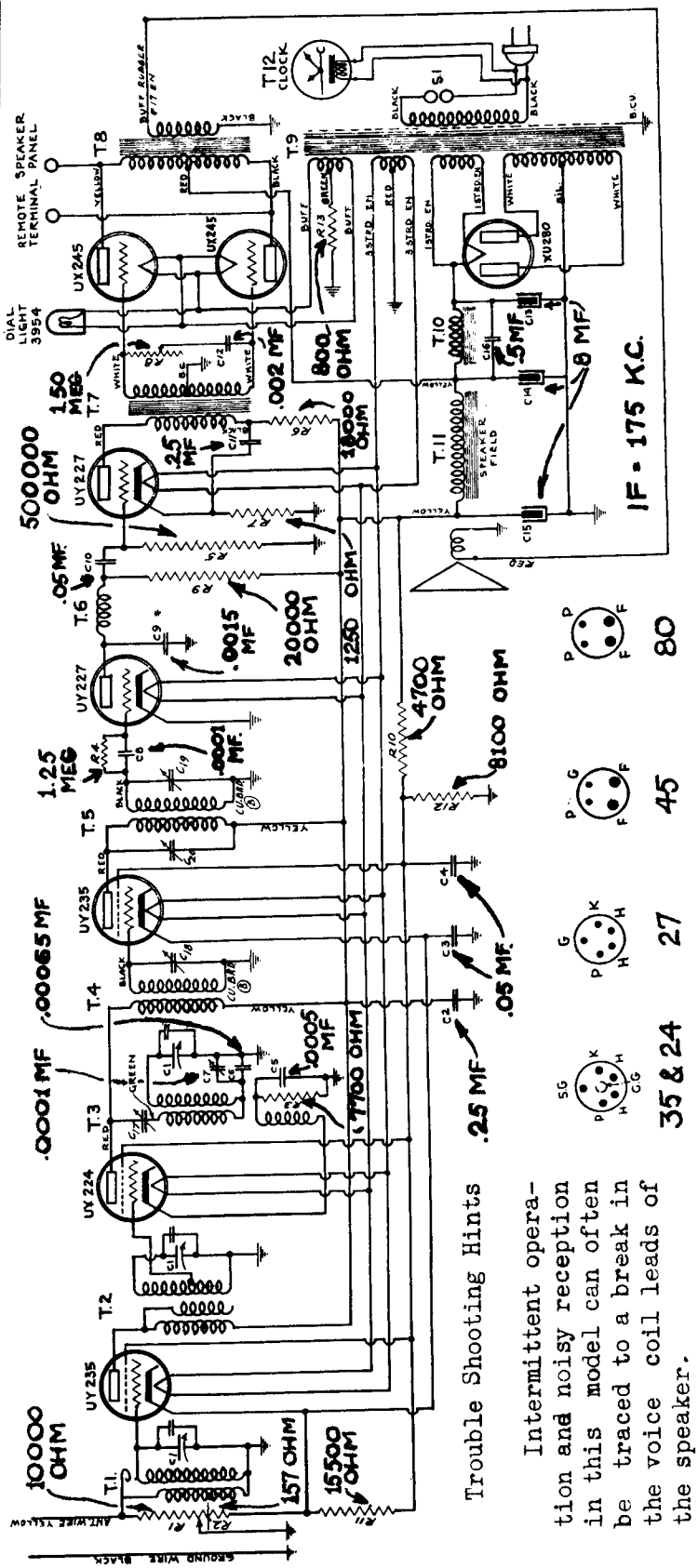
Adjustment of the pre-selection and modulator-oscillator stages is as follows. Connect the service oscillator to the terminal "A" on the back of the chassis and adjust receiver and service oscillator in tune at 1,500 kc. Adjust aligning condensers C8, C2 and C23 in that order for maximum increase of output meter reading. Adjust receiver and service oscillator in tune at 550 kc. and adjust oscillator series pad C5, rocking the tuning control in the usual manner during this latter adjustment.

It is of special importance, of course, in the event that double peaks are encountered when aligning either C8 at 1,500 kc. or C5 at 550 kc., that the minimum capacity setting of the aligning condenser be used, that is to say; the point at which the oscillator alignment will be 456 kc. higher than the incoming signal.

With service oscillator still connected to the terminal "A", adjust the band selector switch for short-wave operation. Adjust the service oscillator 15.35 megacycles (15,350 kc.) and adjust C7 and C4 in that order for maximum increase in reading of output meter.

CONSOLIDATED INDUSTRIES PRODS., Ltd.

MODELS 840-850 & 853



Trouble Shooting Hints

Intermittent operation and noisy reception in this model can often be traced to a break in the voice coil leads of the speaker.

(1) Connect the output meter across the voice coil terminals of the speaker. These terminate at two lugs on the speaker frame to which the chassis leads are attached. See Symbol "Y" in Illustration.

(2) Connect oscillator output lead to control grid cap of autodyne tube at point indicated by "X" in Illustration. Control grid lead should be left in position on tube. Connect shield of oscillator lead to chassis ground.

(3) Set receiver tuning at point near *550 kilocycles* which is entirely free from interference or incoming signals.

(4) Place set in operation and set volume control at maximum.

(5) Adjust service oscillator to *175 kilocycles* (exactly) and place in operation.

(6) Align adjusting screws "A", "B", "C" and "D" in that order for maximum reading on output meter. *

(7) Connect oscillator output lead to antenna wire of chassis.

(8) Adjust both receiver and oscillator in tune at *1400 kilocycles*. If difficulty is encountered in securing sufficient attenuation with service oscillator output control directly connected to antenna lead, a 100,000 ohm resistance connected in series with antenna lead will reduce the signal sufficiently.

(9) Adjust autodyne trimming condenser indicated by symbol "E" in Illustration. This condenser peaks at a point approximately three-quarters of minimum capacity setting, (i.e., the adjusting screw turned almost "full out").

(10) Align adjusting screws "F" and "G" in that order for maximum reading on output meter. "F" is the R.F. stage trimming or aligning condenser and "G" is a similar unit for adjusting the antenna stage.

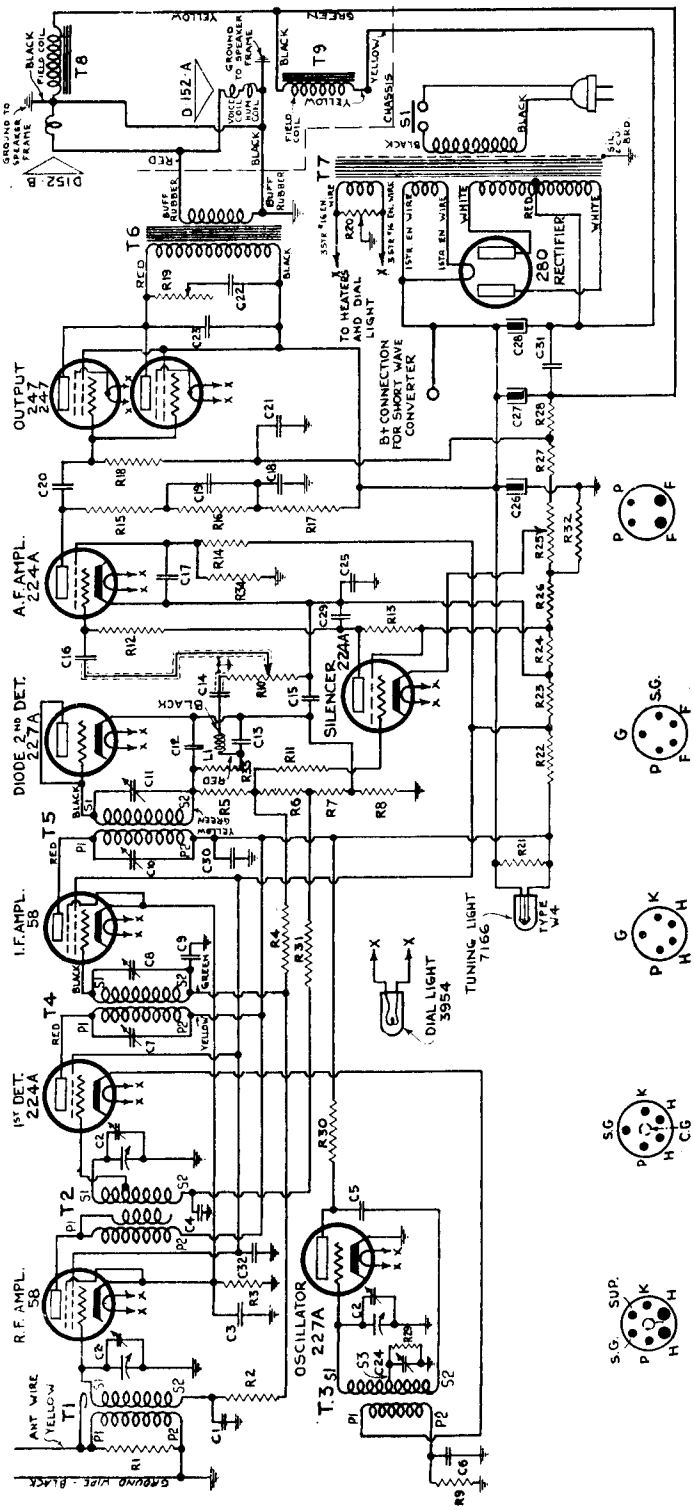
(11) Adjust service oscillator and receiver in tune at *600 kilocycles*. Adjust the padding condenser "H" for maximum indication on output meter.* The tuning condenser should be varied slightly while peaking this padding condenser (H). If the gang condenser is left stationary a false peak will be obtained and the receiver will be weak at or near *550 kilocycles*.

CONSOLIDATED INDUSTRIES PRODS., Ltd.

MODEL 902-A-F-B

Trouble Shooting Hints

Blocking of the 27 oscillator tube seems to be a common trouble in this set. The tube should be replaced and all connections checked. It is advisable also to readjust the I.F. amplifier to 175KC.



ALIGNMENT

It is essential, of course, in aligning the various chassis to have available a calibrated service oscillator capable of producing a signal at points throughout the broadcast band as well as at 175 kilocycles, which is the frequency of the intermediate frequency stages.

The following is the recommended method of making alignment adjustments on the type 902 chassis and should be closely adhered to, to avoid the probability of mis-alignment.

(1) Connect the output meter across the voice coil terminals of the speaker. These terminate at two lugs on the speaker frame to which the chassis leads are attached. See symbol "Y" in Illustration 1.

(2) Connect oscillator output lead to control grid cap of first detector tube at point indicated by "X" in Illustration 1. Control grid lead should be removed Connect shield of oscillator lead to chassis ground.

(3) Set receiver tuning at point near 550 kilocycles which is entirely free from interference or incoming signals.

(4) Place set in operation and set volume control at maximum. Adjust the silencer lever to full counter-clockwise position (no silencer action).

(5) Adjust service oscillator to 175 kilocycles (exactly), and place in operation.

(6) Align adjusting screws C11, C10, C8 and C7 in that order for maximum reading on output meter.*

(7) Transfer oscillator output lead to antenna wire of chassis.

(8) Reconnect grid clip to first detector tube cap.

(9) Adjust both receiver and oscillator in tune at 1400 kilocycles. If difficulty is encountered in securing sufficient attenuation with service oscillator output control directly connected to antenna lead, a 100,000 ohm resistance connected in series with antenna lead will reduce the signal sufficiently.

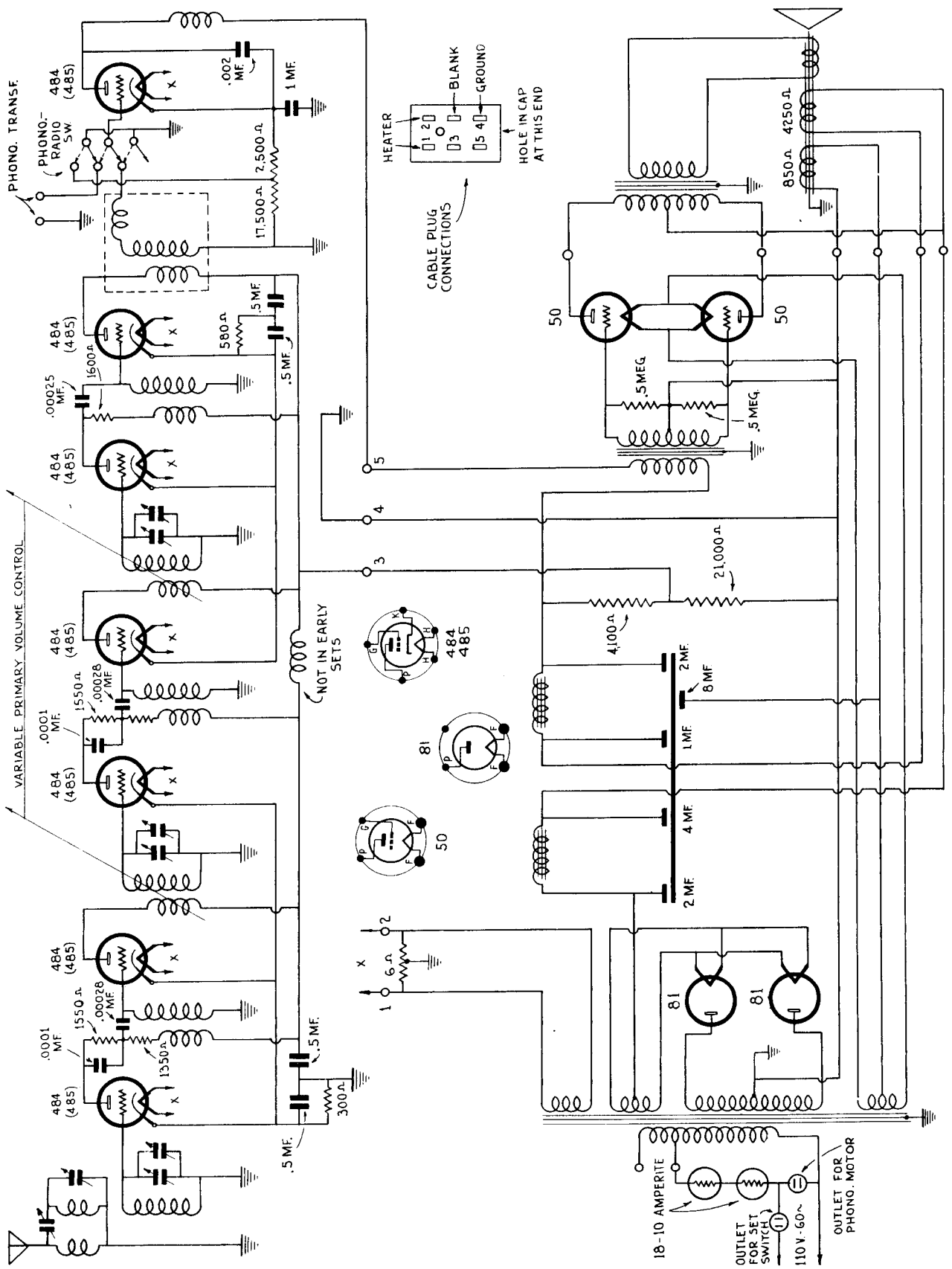
(10) Adjust oscillator trimming condenser indicated by symbol "C" in Illustration 1 or 2. This condenser peaks at a point approximately three-quarters of minimum capacity setting, (i.e., the adjusting screw turned almost "full out").

(11) Align adjusting screws "B" and "A" in that order for maximum increase on output meter. "B" is the R.F. stage trimming or aligning condenser and "A" is a similar unit for adjusting the antenna stage.

(12) Adjust service oscillator and receiver in tune at 600 kilocycles. Adjust the padding condenser "D" (Illustration 1) for maximum indication on output meter.* The tuning condenser should be varied slightly while peaking this padding condenser "D." If the gang condenser is left stationary a false peak will be obtained and the receiver will be weak at or near 550 kilocycles.

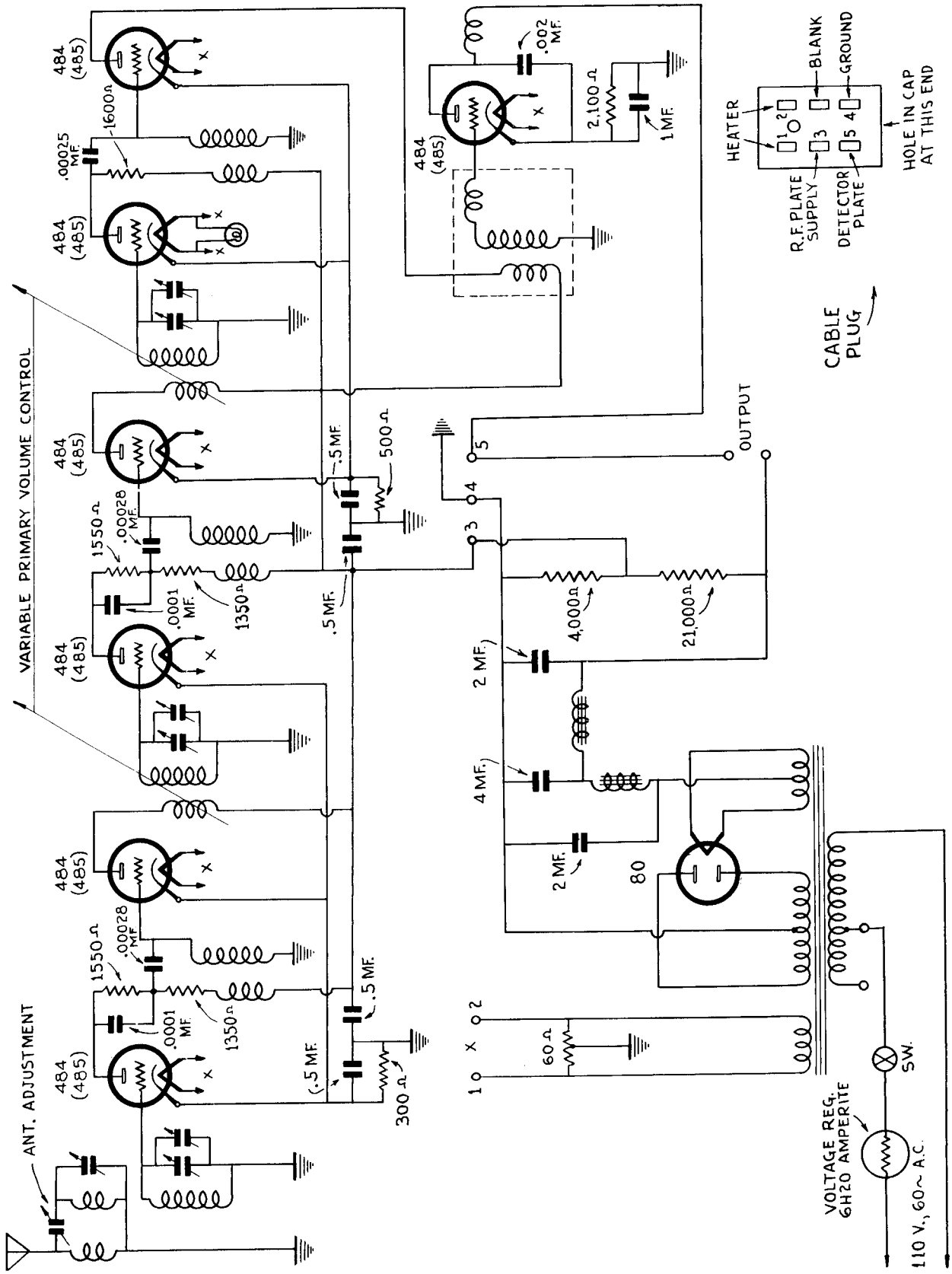
CONTINENTAL

MODELS R-20, R-25, R-30 & RP40



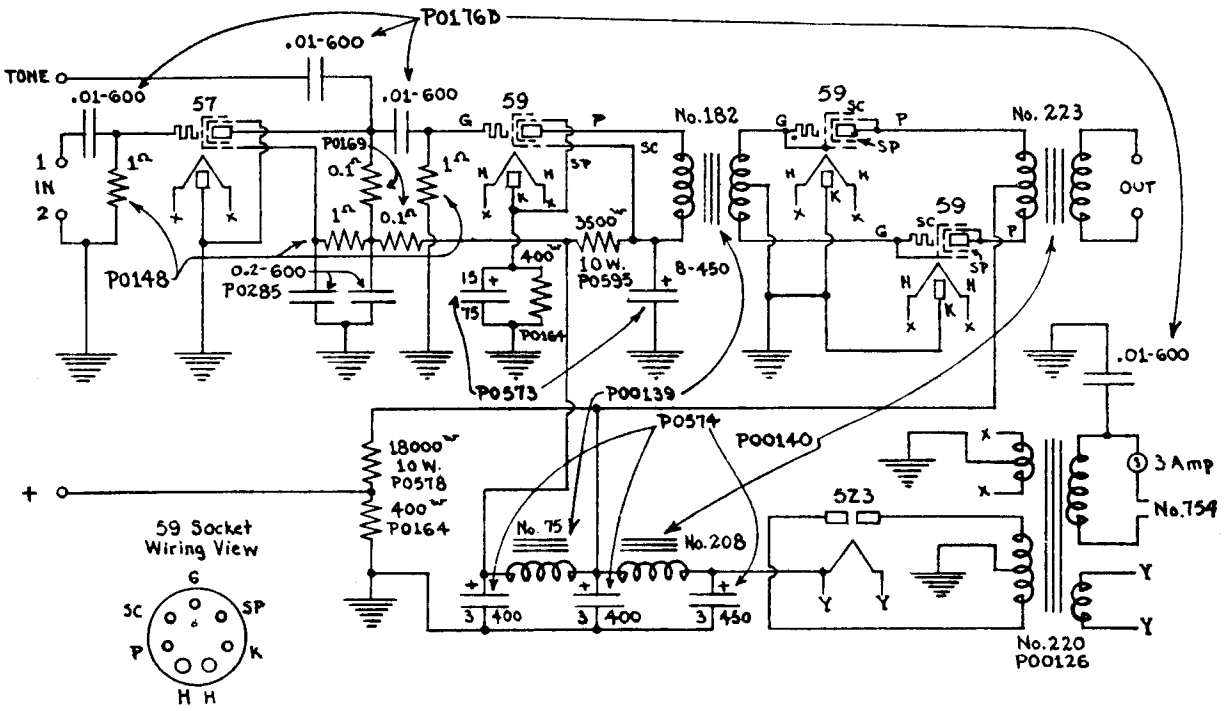
CONTINENTAL RADIO CORP.

MODEL TAM TUNER

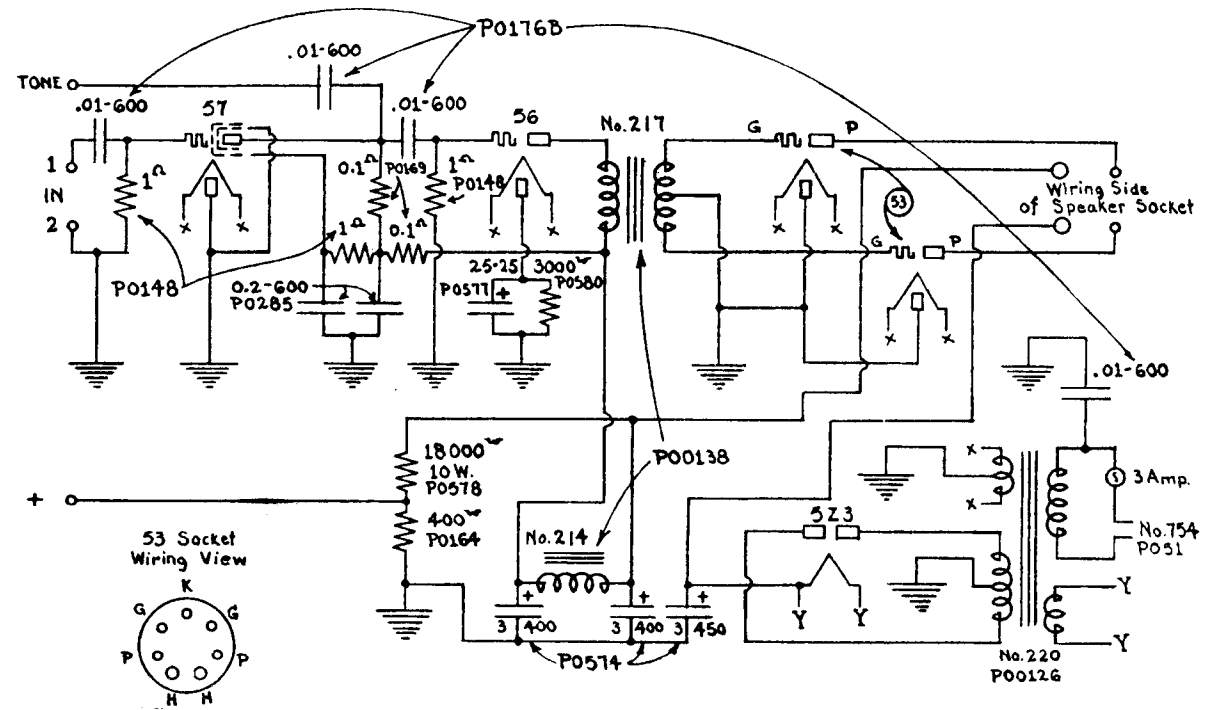


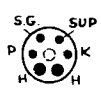
S. H. COUCH CO., Inc.

MODEL 410



MODEL 430





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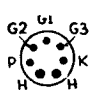

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5Z3

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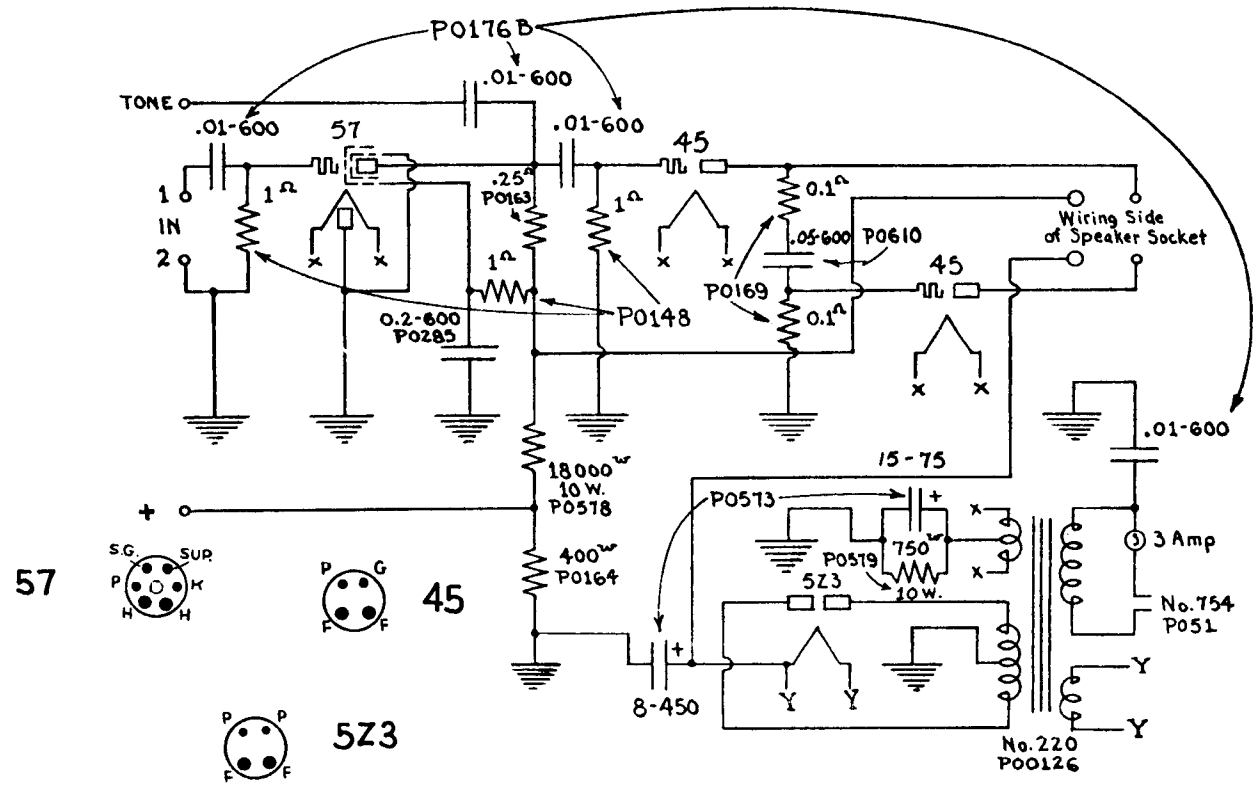
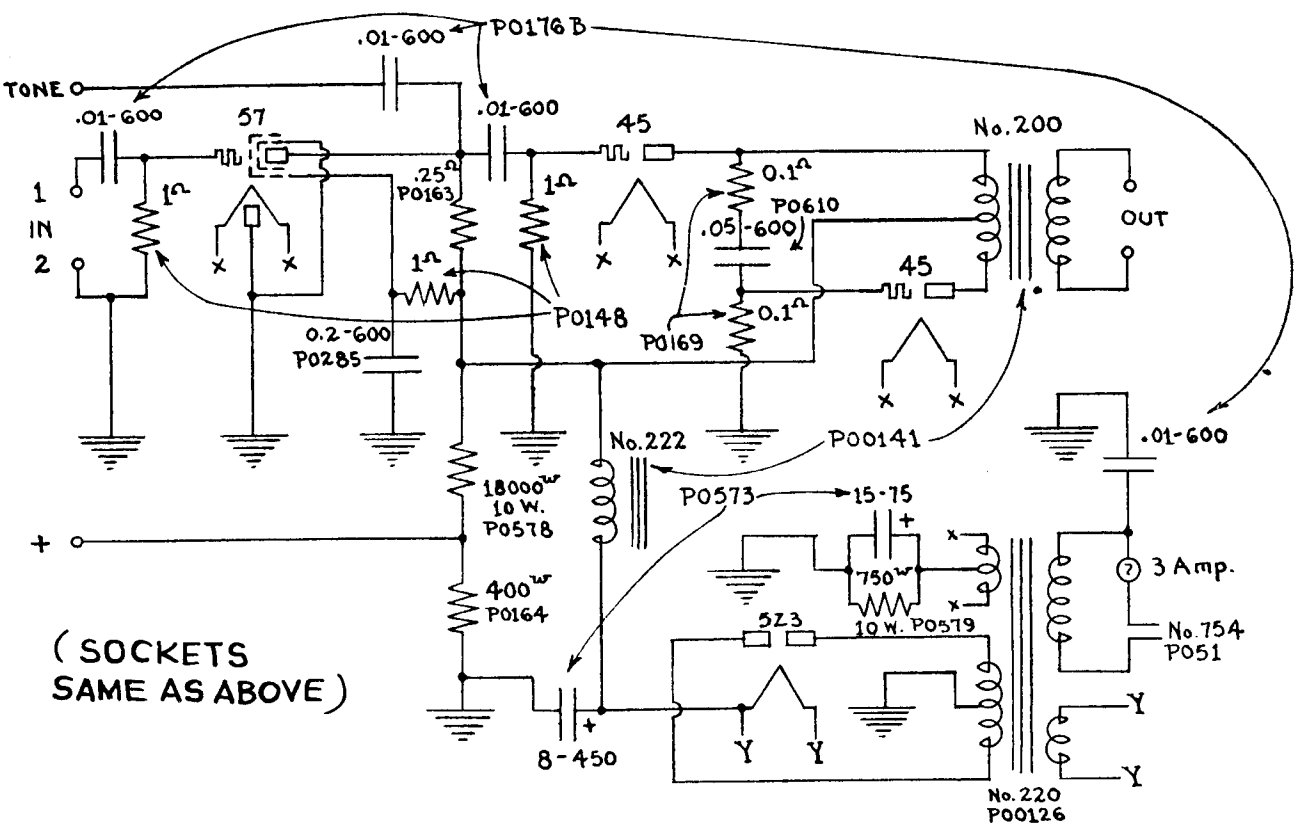
S. H. COUCH CO., Inc.

MODEL 470



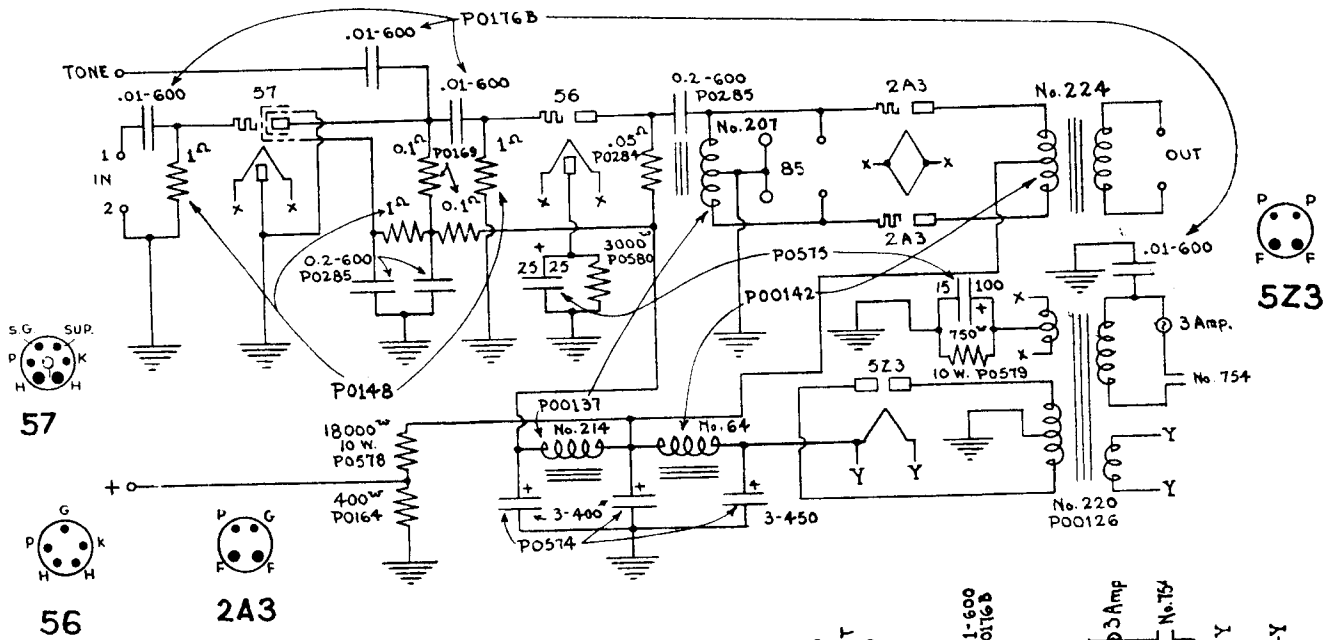
MODEL 475



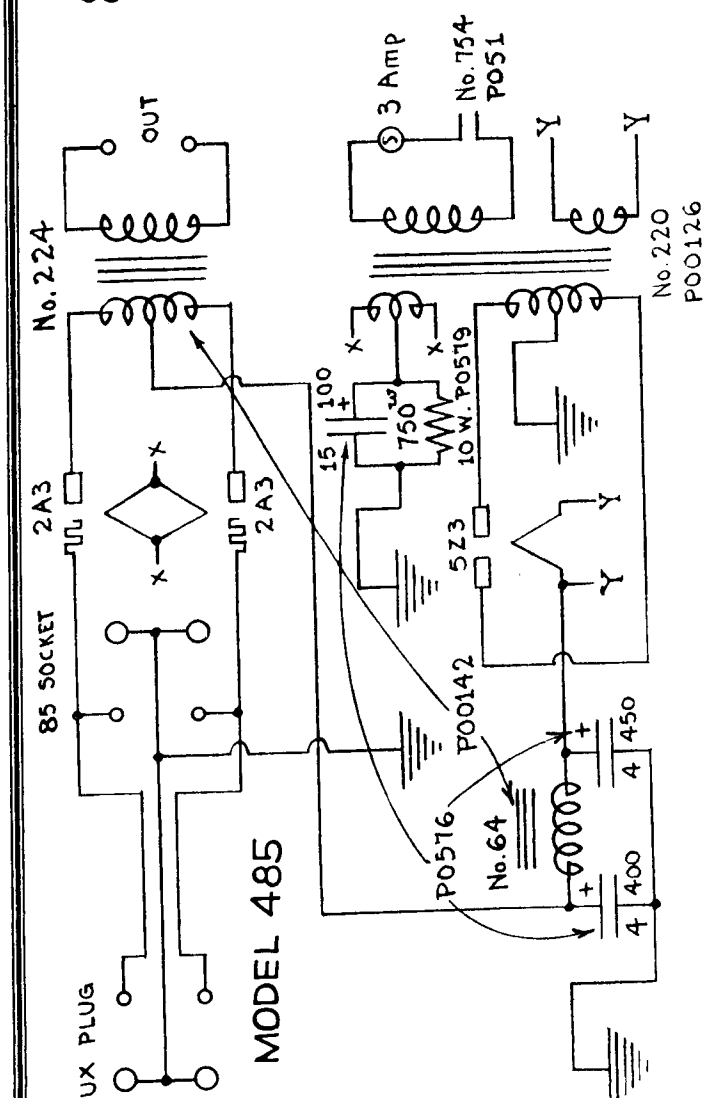
(SOCKETS SAME AS ABOVE)

S. H. COUCH CO., Inc.

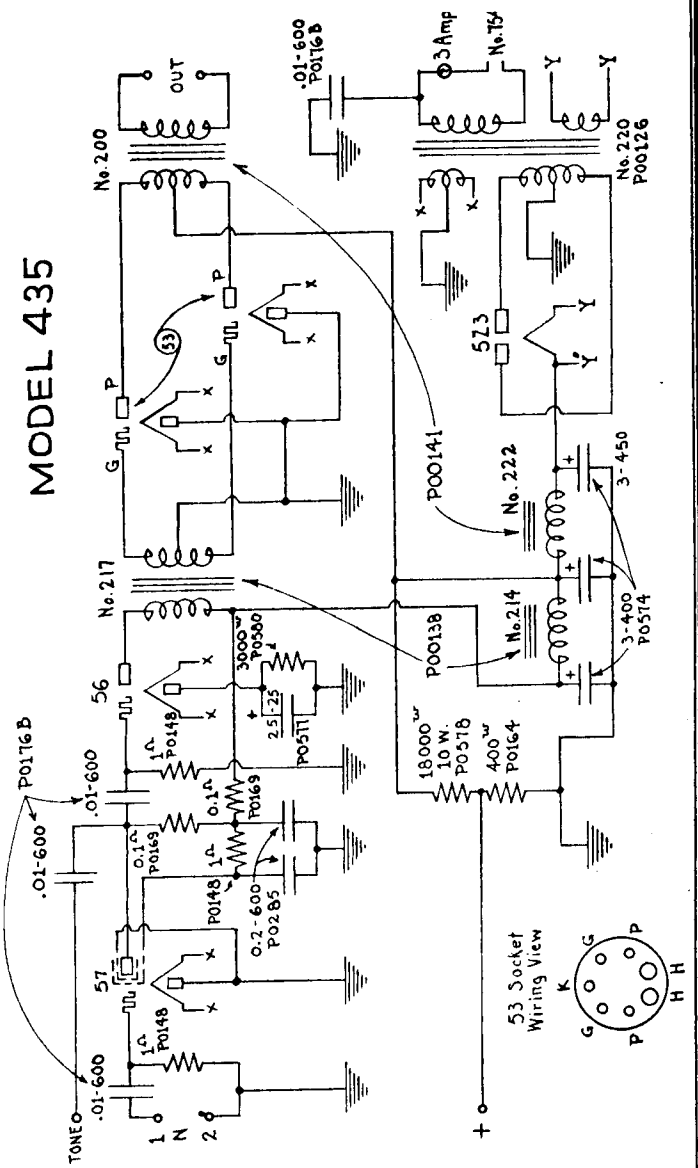
MODEL 480



MODEL 485

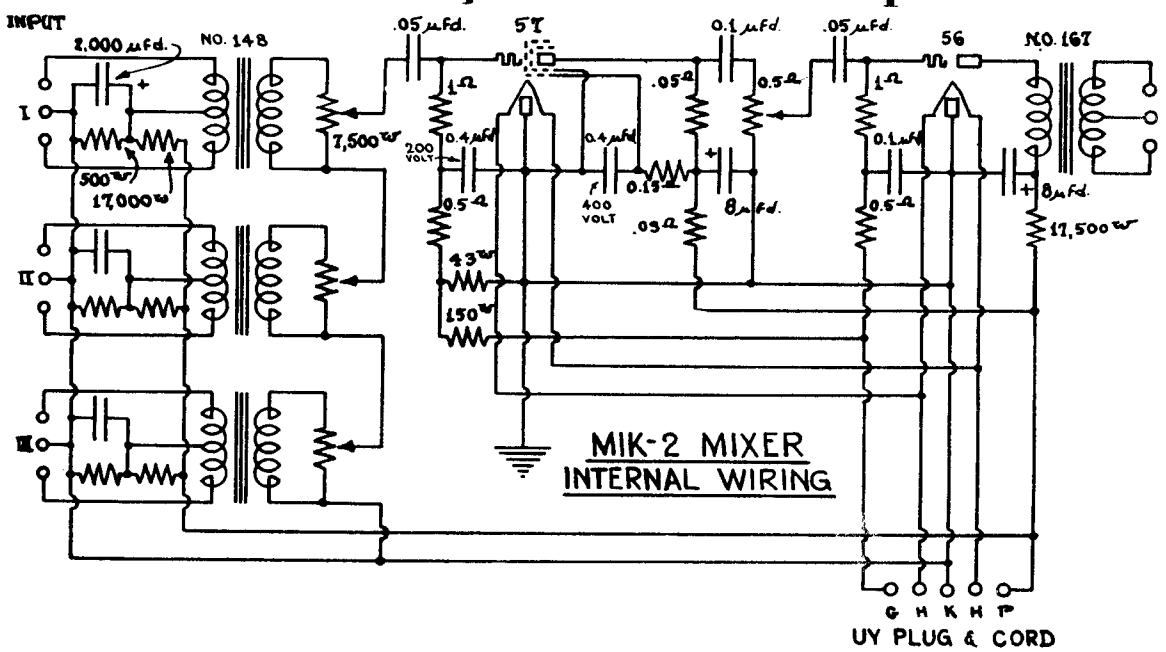


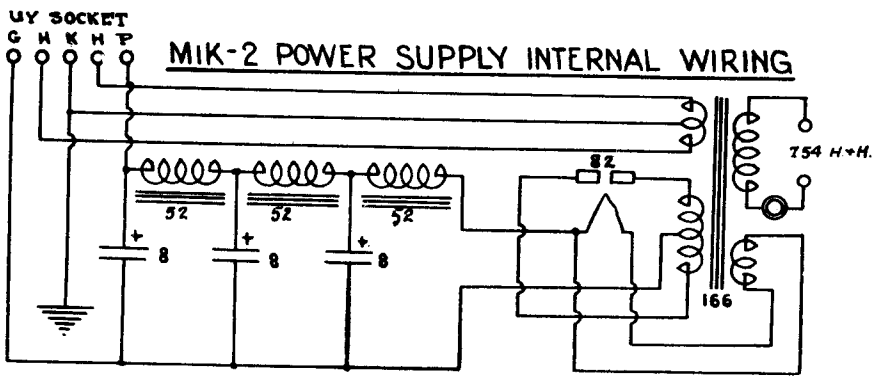
MODEL 435

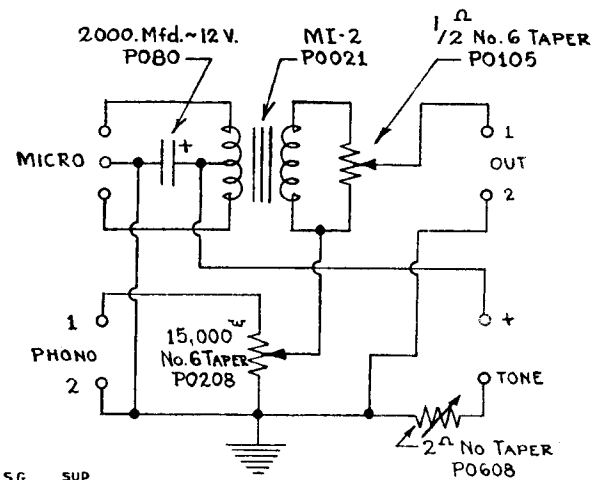


S. H. COUCH CO., Inc.

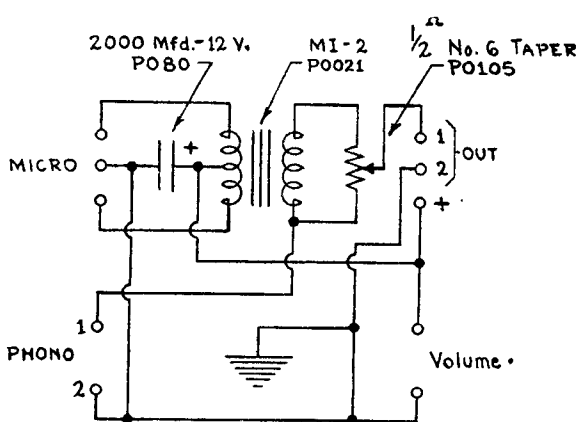
MIK-2 Microphone Mixer-Amplifier







MIX-2 DIAGRAM



MIK-3 DIAGRAM

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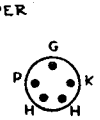

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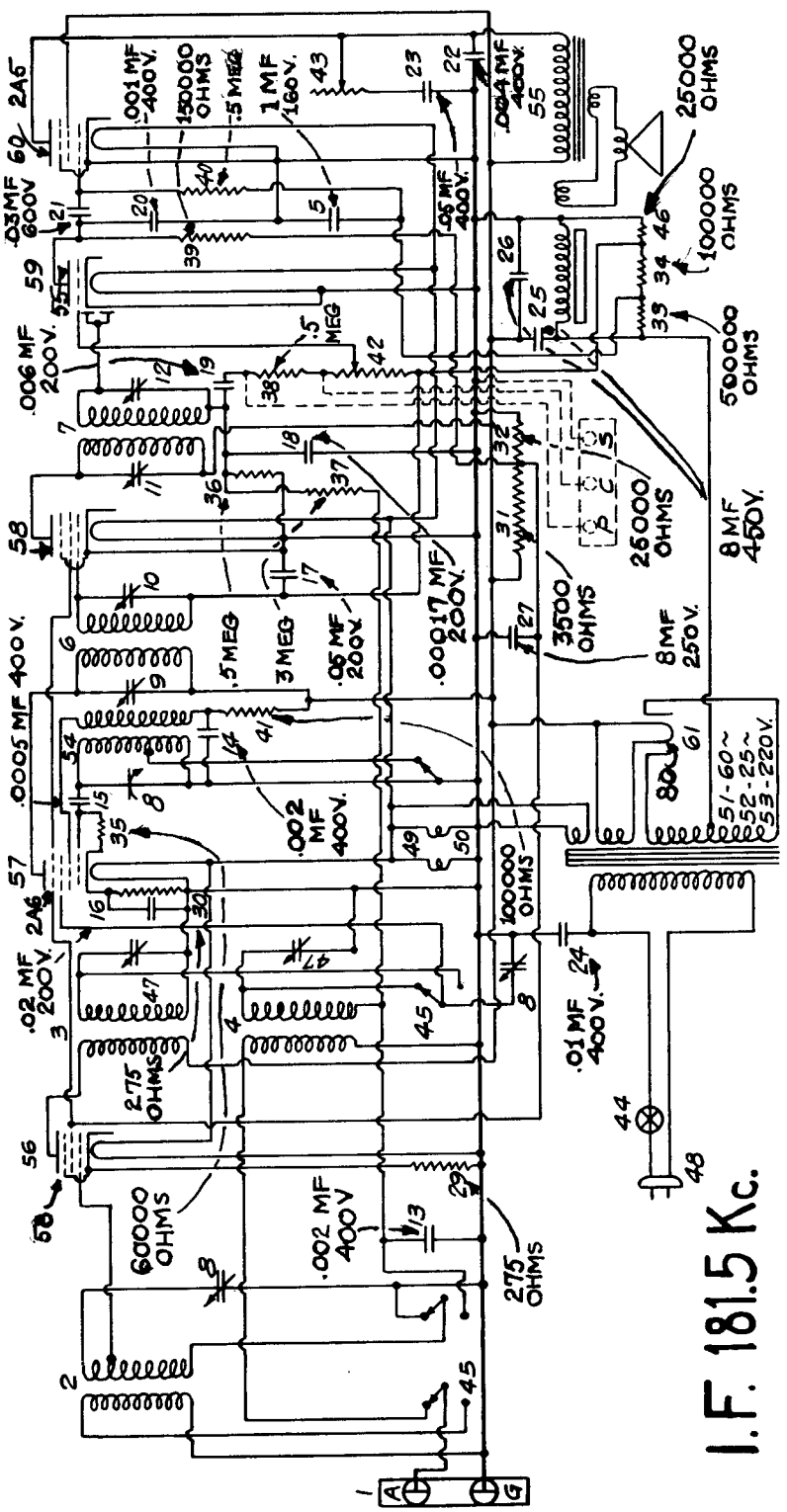
CROSLEY RADIO CORP.

MODEL 6V2



Trouble Shooting Hints

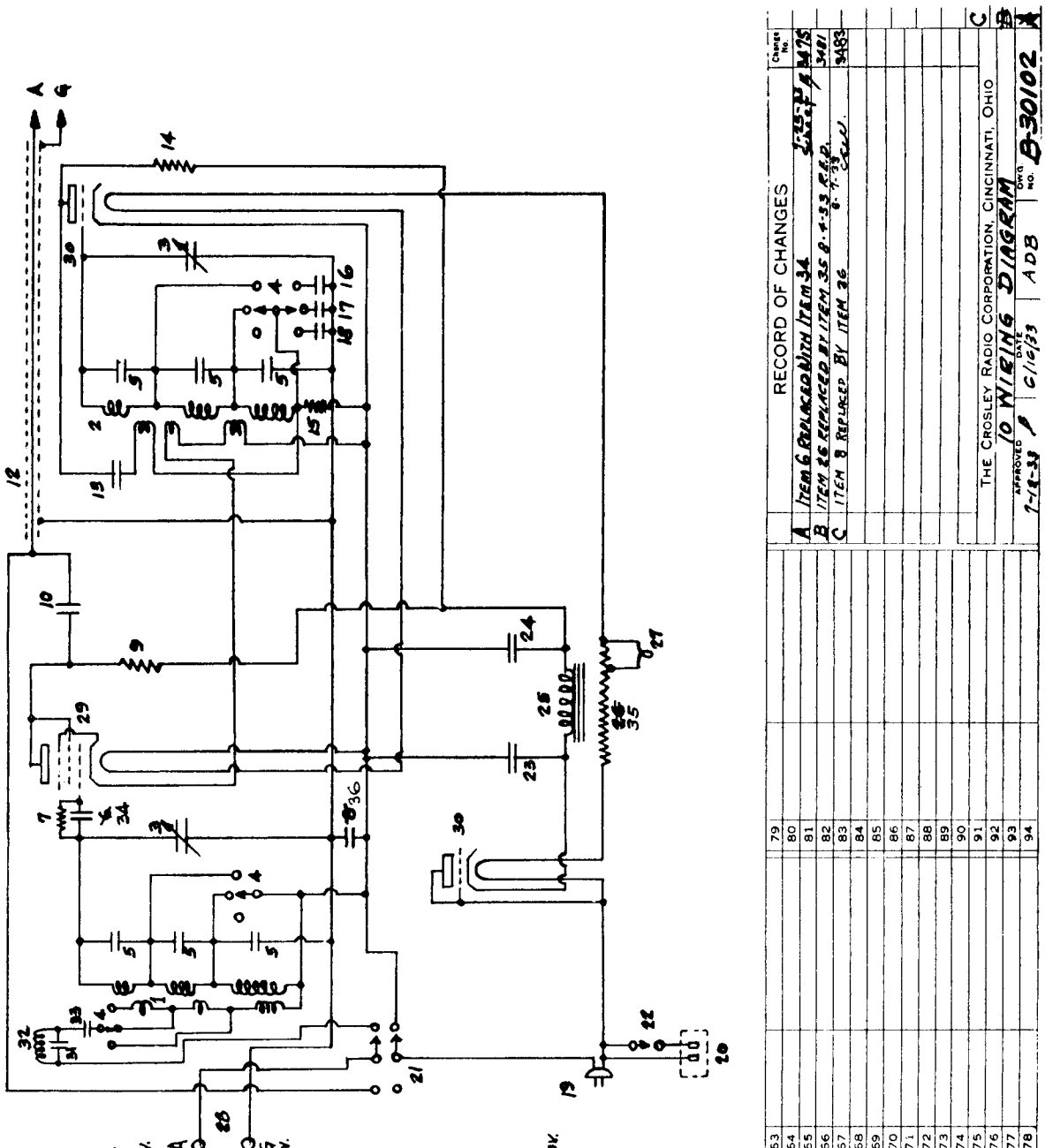
Lack of sensitivity or oscillation caused by drifting of the I.F. amplifier is the usual complaint for this model. Realign on both the wave bands by the use of a good service oscillator and output meter.

6V2 WIRING DIAGRAM

Type	Where Used	Ef	Ep	Eg	Ek	Esg	Ep-osc	Eg-osc
58	R. F.	2.5	225	0	3	120	—	—
2A7	Osc.-Mod.	2.5	225	0	3.5	120	175	-15
58	I. F.	2.5	225	-4	0	120	—	—
55	Diode-AF	2.5	40	-4	0	—	—	—
2A5	Output	2.5	210	-18	0	225	—	—
80	Rectifier	4.9	330AC	—	225	—	—	—

CROSLEY RADIO CORP.

MODEL 10



1	G2-30173	Antenna Coil
2	G1-30173	Osc. Coil
3	B-30079	Var. Condenser
4	B-30192	A-47 Switch
5	G2-29639	B-47 Trimmer Cond.
6	W-28617	.5 Meg. Resis.
7	24677	.5 Meg. Resis.
8	W-28614	Cond. .01 Mfd. 2000 V.
9	21875	100,000 Ω Resis.
10	W-28619	Cond. (.006 Mfd.) 2000 V.
11	G1-30113	Shielded Lead
12	W-30113	Shielded Lead
13	W-28619	Cond. (.006 Mfd.) 2000 V.
14	21876	10,000 Ω Resis.
15	21237-A	60,000 Ω Resis.
16	G1-28884	Padding Cond.
17	G1-28884	Padding Cond.
18	W-30180	Cond. (.0012 Mfd.) 2000 V.
19	W-27885 A	Cord & Plug
20	G1-30078	AC Receptacle
21	W-30084	Switch D.P.D.T.
22	W-30084	Switch S.P.S.T.
23	W-27676	Cond. .4 Mfd. 150 V.
24	G6-28868	Cond. .4 Mfd. 150 V.
25	G6-28868	Filter Choke
26	W-28864A	50,000 Ω Resis.
27	W-4099A	Dial Lamp 6 V.
28	W-30264	Ant. Cnd. Term.
29	G2-27975	Socket '77
30	G2-27975	Socket '37
31	G6-29799	Trimmer Cond.
32	G3-24434	R.F. Choke
33	W-28619	.006 Mfd. Cond. 2000 V.
34	W-7847A	Cond. (.0001 Mfd.) 2000 V.
35	W-28864B	Resistance Unit 1.5 Meg. 1 Watt
36	W-30488	Cond. .02 Mfd. 400 V.
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RECORD OF CHANGES

		Change No.
A	Item 6 Replaced with Item 34	1-25-34 3475
B	Item 26 Replaced by Item 35 & 1-33 Eff.	3481
C	Item 9 Replaced by Item 36 & 7-33 Eff.	3483

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

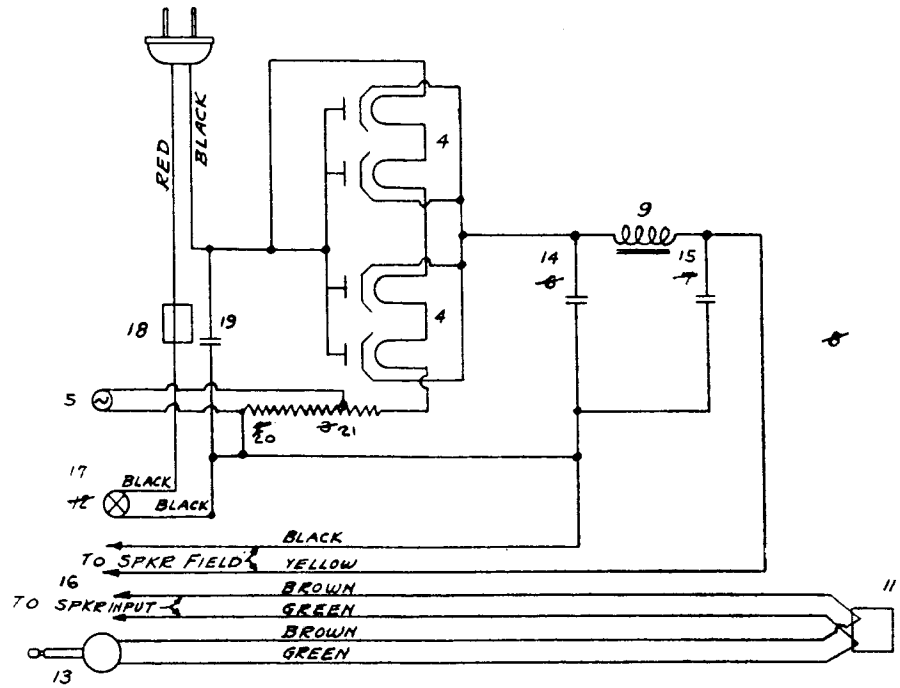
10 WIRING DIAGRAM

APPROVED 7-12-34 | DATE 6/6/33 | ADB | DWG. NO. B-30102 X

CROSLEY RADIO CORP.

CROSLEY 38

1	W29951	A 57 CORD
2	~~W29953~~	~~97 Ω RESIS.~~
3	~~W29953~~	~~68 Ω RESIS.~~
4	GS1-28807	25 Z 5 SOCKETS
5	W4099A	PILOT LIGHT
6	~~W29806~~	~~16 MFD. 125 V.~~
7		~~16 MFD. 100 V.~~
8		~~16 MFD. 100 V.~~
9	82-24628	F.V.T. CHOKE
10	~~G1-24393~~	~~TERM. BOARD~~
11	G4-24393	TERM. BOARD
12	~~W28808~~	~~SWITCH~~
13	W29755	CORD & SPKR. PLUG
14	W-29806A	16 MFD. 125 V.
15		16 MFD. 100 V.
16	W-30119	CABLE
17	W28607-A	SWITCH
18	G4-24393	TERM. BOARD
19	W-29592A	.003 MFD. 400 V.
20	W-29953-A	184.5 ~ RESIS.
21		26.9 ~ RESIS.



63			79		
64			80		
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71			87		
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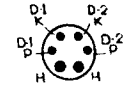
	RECORD OF CHANGES		Change No.
A	ITEMS 6-7-8 REPLACED BY ITEMS 14-15	6-14-33 B	S-317
B	CABLE ADDED ITEM 16	6-19-33 B	S331
C	ITEM 12 REPLACED BY ITEM 17	6-20-33 B	3430
D	ITEM 10 REPLACED BY ITEM 18	6-22-33 B	S-335
E	CIRCUIT CHANGED ITEM 19 ADDED	6-30-33 B	3457
F	ITEMS 2-3 REPLACED BY ITEMS 20-21	8-7-33	3483

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

MODEL 38 AC-DC SPEAKER FIELD SUPPLY

APPROVED 6-10-33 DATE 5-26-33 DWG NO. B-29957 F



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CROSLEY RADIO CORP.

MODEL 98

Specifications

Model 98 is a five tube superheterodyne designed for automobile operation. The intermediate frequency is 181.5 KC. The "A" supply is furnished by the automobile storage battery and the "B" supply by the automobile storage battery used in connection with a Crosley Syncronode. Service information on the Syncronode is furnished in a separate bulletin.

Tubes and Voltage Limits

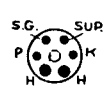
The following chart gives the tubes, their functions, and voltages, measured with the receiver in operating condition but with no signal to the antenna circuit. Use a high resistance D. C. voltmeter (1000 ohms per volt or more) for all measurements. The voltage limits are + or — 10% of the values given.

All voltages are measured from tube contact to chassis with 6.3 volts at the battery and 180 volts from the Syncronode.

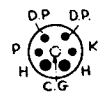
The "Q" control should be entirely off.

Tube	Position	Plate	Voltages Screen Grid	Cathode	Supp. Grid	Fil.
-78	R. F. Amplifier	180	85	0	0	6.0
-77	Oscillating detector	180	85	4.5	4.5	6.0
-78	I. F. Amplifier	180	85	2.0	0	6.0
-75	Diode—A. F. Amplifier	130		1.5		6.0
-89	Output (Class A Pentode)	180	180	17.0	17.0	6.0

"A" battery drain—4.6 amp. at 6.3 volts.



77 & 78



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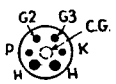
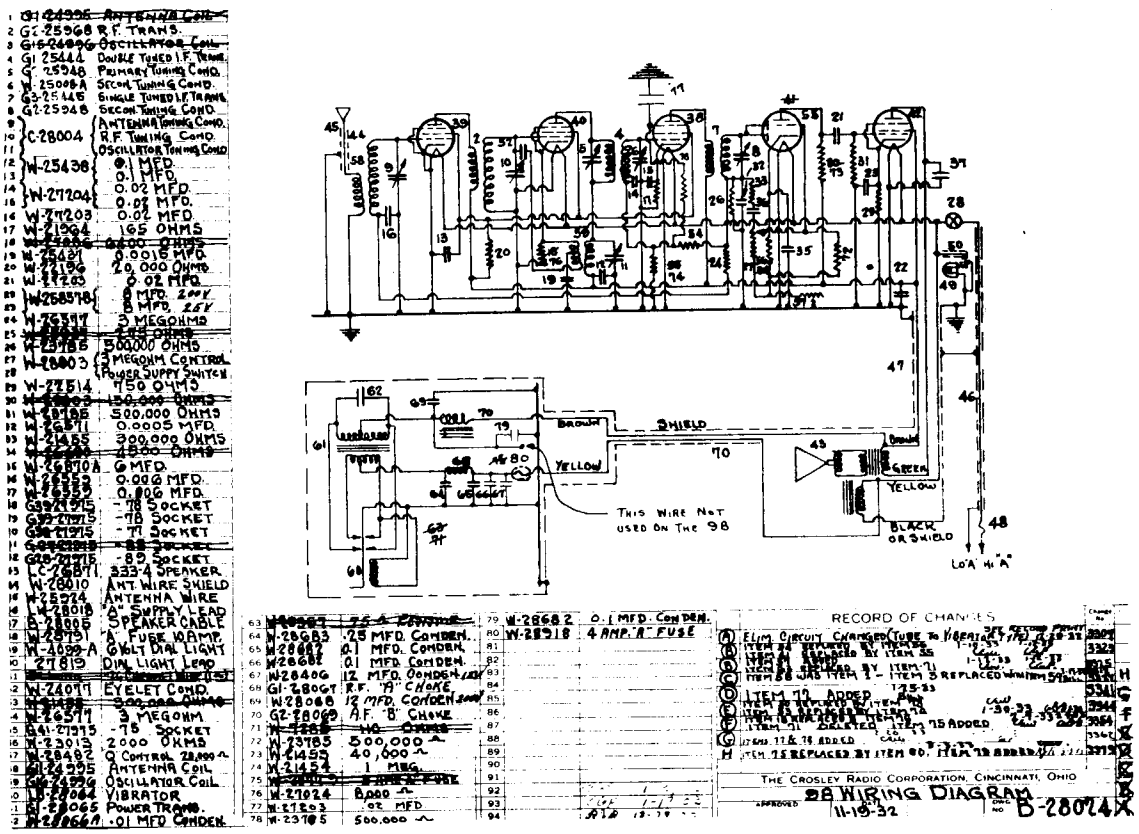


89

Trouble Shooting Hints

Low volume in this set is usually due to low emission in the 55 detector or "vibrator trouble."



CROSLEY RADIO CORP.

CROSLEY 99

Specifications

Model 99 is a six tube superheterodyne designed for automobile operation. The intermediate frequency is 181.5 KC. The "A" supply is furnished by the automobile storage battery and the "B" supply by the automobile storage battery used in connection with a Crosley Syncronode. Service information on the Syncronode is furnished in a separate bulletin.

Tubes and Voltage Limits

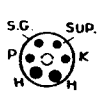
The following chart gives the tubes, their functions, and voltages measured with the receiver in operating condition but with no signal to the antenna circuit. Use a high resistance D. C. voltmeter (1000 ohms per volt or more) for all measurements. The voltage limits are + or — 10% of the values given.

All voltages are measured from tube contact to chassis with 6.3 volts at the battery and 170 volts from the Syncronode.

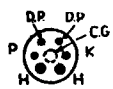
The "Q" control should be entirely off.

Tube	Position	Voltages Plate	Screen Grid	Cathode	Supp. Grid	Fil.
-78	R. F. Amplifier	170	80	0	0	6.0
-77	Oscillating detector	170	80	4.0	4.0	6.0
-78	I. F. Amplifier	170	80	1.5	1.5	6.0
-85	Diode—A. F. Amplifier	25		2.0		6.0
-89	A. F. Amplifier	170	170	17	17	6.0
-79	Output (Class B)	170		0		6.0

"A" battery drain—5.3 amp. at 6.3 volts.



77 & 78



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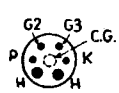

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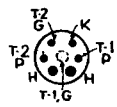
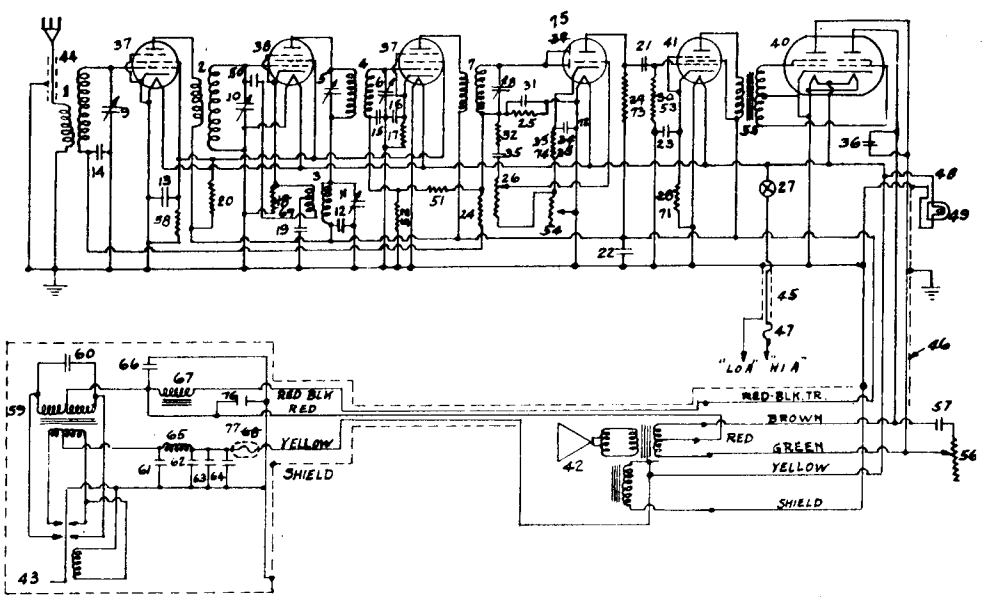


79

G11-24335	ANTENNA COIL	
G2-25968	R.F. TRANS.	
G16-24396	OSC. COIL	
G1-25444	I.F. TRANS.	
G2-26948	PRI. TUNING COND.	
W-25008A	SEC. TUNING COND.	
G3-25445	SINGLE TUNED I.F. TRANS.	
G2-25348	SEC. TUNING COND.	
C-28004A	ANT. TUNING COND. R.F. TUNING COND. OSC. TUNING COND.	
W-25438	0.1 MFD.	
W-24049	0.1 MFD.	
W-27204	0.02 MFD. 0.02 MFD.	
W-21964	165 Ω	
W-27086	6400 Ω	
W-25437	0.0015 MFD.	
W-22831	15 000 Ω	
W-27203	0.02 MFD.	
W-25857A	8 MFD. 200V 8 MFD. 25V	
W-26577	3 MEG.	
W-23785	500,000 Ω	
W-28003	3 MEG. LEVEL CONT. POWER SUPPLY SWITCH	
W-21462	1100 Ω	
W-21463	60,000 Ω	
W-21460	150 000 Ω	
W-26571	0.0005 MFD.	
W-21455	300,000 Ω	
W-23013	2000 Ω	
W-26704	6 MFD.	
W-26559	0.006 MFD.	
W-26559	0.006 MFD.	
G39-27975	-78 SOCKET	
G38-27975	-77 SOCKET	
G41-27975	-75 SOCKET	
G42-27975	-79 SOCKET	
G28-27975	-83 SOCKET	
28748	350-4J SPEAKER	
LB-28064	VIBRATOR	
W-28010	ANTENNA LEAD	
LW-28018	"A" SUPPLY LEAD	
D-28702	SPEAKER CABLE	
W-25791	"A" FUSE 10 AMP.	
W-4039A	6 VOLT DIAL LIGHT	
LW-28636	DIAL LIGHT LEAD	
G3-27976	EYELET COND.	
W-26577	3 MEG.	
W-21454	1 MEG.	
W-23785	500 000 Ω	
W-28682	"Q" CONT. 20,000 Ω	
G4-27062	AUDIO TRANS.	
W-28131A	TONE CONT. 80,000 Ω	
W-27216	0.05 MFD.	
W-21453	40,000 Ω	
61-28065	POWER TRANS.	
W-28066B	0.01 MFD.	
W-28683	0.25 MFD.	
W-28682	0.1 MFD.	



W-28682	0.1 MFD.	
W-28406A	12 MFD. 12V	
G1-28067	R.F. "A" CHOKE	
W-28068	12 MFD. 200V	
G2-28069	A.F. "B" CHOKE	
W-28779	3 AMP "A" FUSE	
W-27024	8,000 Ω	
W-22196	20,000 Ω	
W-22514	750 Ω	
W-26870-A	6 MFD.	
W-21455	300,000 Ω	
W-6705	3500 Ω	
G27-27975	85 SOCKET	
W-28682	0.1 MFD.	
W-28918	4 AMP. "A" FUSE	

CROSLEY

MODEL 99

CROSLEY RADIO CORP.

MODEL 102

Specifications

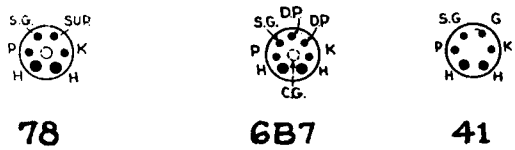
Model 102 is a single unit five tube superheterodyne designed for operation from a six volt automobile battery. "B" voltage is furnished by the Crosley Syncronode which is built into the receiver. Intermediate frequency is 181.5 Kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit, and a battery voltage of 6.3 volts. All voltages are measured with a 250 volt D.C. voltmeter (1000 ohms per volt) from tube to chassis.

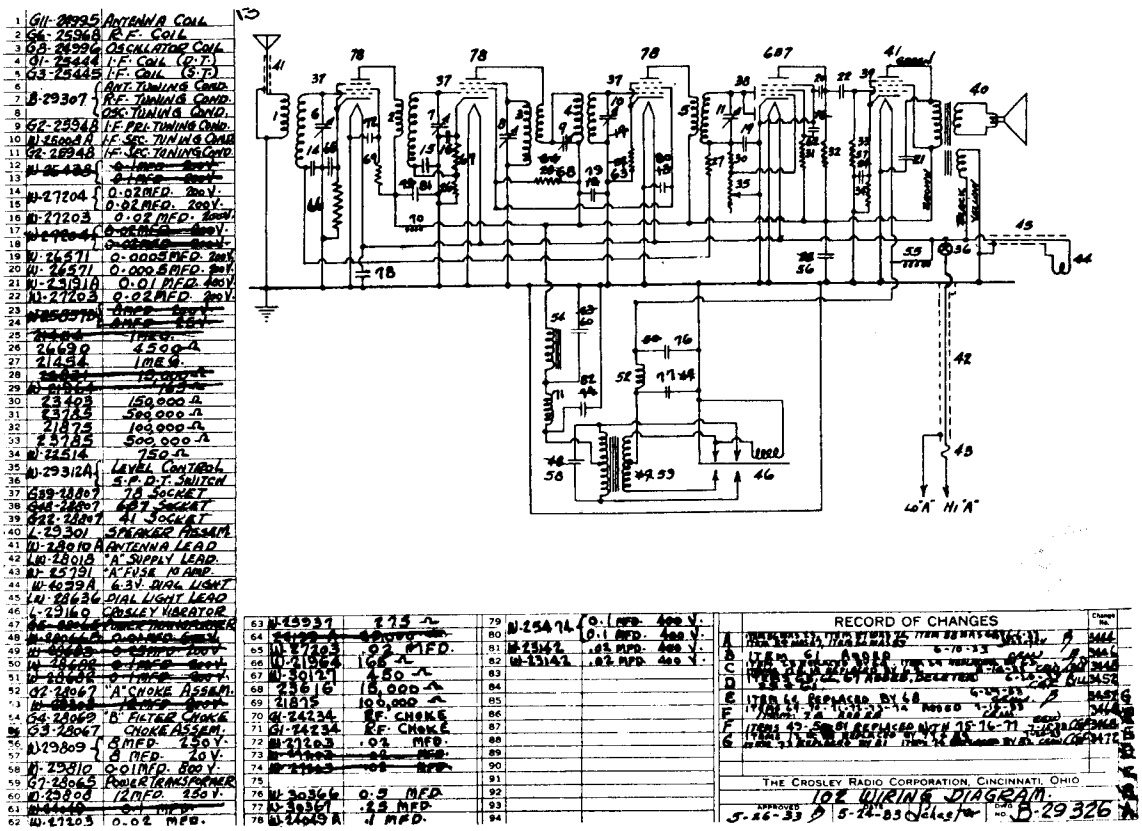
Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
78	R. F. Amplifier	206	108	2.0	2.0	6.3
78	Oscillator Modulator	206	108	28.0	0	6.3
78	I. F. Amplifier	206	108	3.0	3.0	6.3
6B7	Detector and A. F. Amplifier	37	26	0		6.3
41	Output	198	206	16.0		6.3

Voltage limits should be plus or minus 15% of values given.



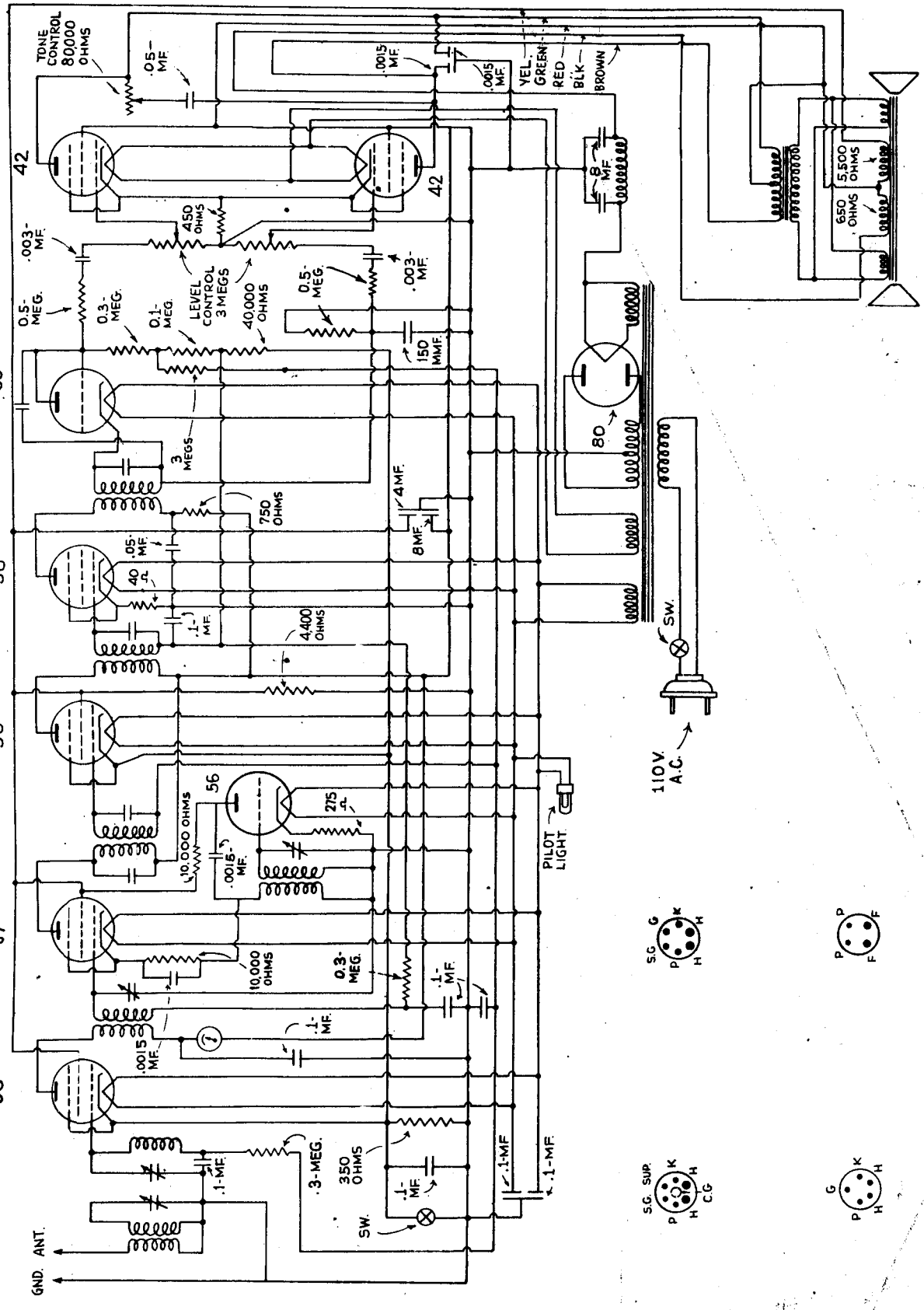
Trouble Shooting Hints

Oscillation can usually be traced to the 6B7 tube circuit. Check all resistance values and test by-pass condensers for open circuit.



CROSLEY RADIO CORP.

MODEL 130-1



CROSLEY RADIO CORP.

MODEL 143

Specifications

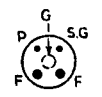
Model 143 is an eight tube superheterodyne designed for operation from a 2 volt "A" battery; 135 volts of "B" battery and 22½ volts of "C" battery. The intermediate frequency is 181.5 Kc.

Tubes and Voltage Limits

The tubes and voltages are given in the following table. All voltages, except bias, are measured with a 250 volt D.C. voltmeter (1000 ohms per volt, from "B-" to tube contact; with the receiver in operating condition, but no signal to the antenna circuit Bias voltages are measured from negative filament to grid.

Tube	Position	Plate	Screen Grid	Bias	Filament
34	R. F. Amplifier	135	50	4	2.0
30	Oscillator	15		0	2.0
34	Modulator	135	50	4	2.0
34	I. F. Amplifier	135	50	4	2.0
34	I. F. Amplifier	135	50	4	2.0
34	Detector	80	20	0.5	2.0
30	A. F. Amplifier	135		1.5	2.0
19	Output	135		0	2.0

Voltage limits are plus or minus 10% of values given.
Voltages between "B-" and chassis is 4 volts, used for R. F., I. F., and modulator bias.



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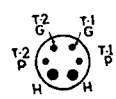
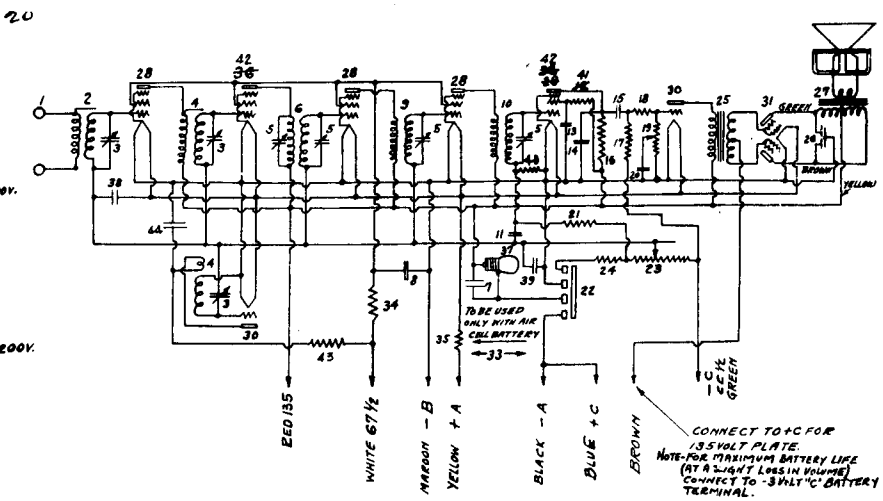


19

1	LM-20264	ANT. & GND. POST
2	GW-24985	ANTENNA COIL
3	C-2844RC	TUNING CONDENSER
4	GZ-27837	INT. & OSC. COIL
5	GZ-25944	I.F. TUNING COND.
6	GZ-24065	FIRST I.F. TRANS.
7	W-24779	.8 MFD. 150V.
8	W-28869	2 MFD. 200V.
9	GZ-24449	SECOND I.F. TRANS.
10	GZ-25449	THIRD I.F. TRANS.
11	W-27803	0.02 MFD. 200V.
12	W-28677	3-MEGOHM
13	W-24049A	0.1 MFD. 200V.
14	W25969A	0.0001 F. MFD. 400V.
15		0.03 MFD. 400V.
16	21455	300,000 Ω.
17	W-26577	3-MEGOHM
18	23085	500,000 Ω.
19	W-25666A	TONE CONT. 3-MEG.
20	W-6754	0.001 MFD.
21	W-21454	1-MEGOHM
22	W28766A	SWITCH
23		VOL. CONT. 10,000 Ω.
24	W-24535	2850 Ω.
25	GS-24765	A.F. TRANS.
26	W-28771	TWO 0.06 MFD. 200V.
27	28782	343-A SPEAKER
28	GV-27456	-34 SOCKET
29	W-20822	SPEAKER SOCKET
30	GV-27456	-30 SOCKET
31	GV-27456	-19 SOCKET
32	W-27824	SPEAKER CABLE
33	P-28770A	BATTERY CABLE
34	23862	6500 Ω.
35	GS-23300	.372 Ω.
36	GV-20021	BLACK SOCKET
37	W-24885	NEON LAMP
38	W25516	0.25 MFD. 200V.
39		0.25 MFD. 200V.
40	21454	1 MEGOHM
41	21454	1 MEGOHM
42	GI-29082	-34 FLEX. SOCKET
43	21516	20,000 ~
44	W-24049A	0.1 MFD. 200V.



	RECORD OF CHANGES	Change No.
A	3 MEG REPLACED WITH 1 MEG. 32 REPLACED WITH 24	3264
I	1 MEG ADDED	3364
D	TYPE OF -24 FLEX SOCKET CHANGED	3369
B	ITEMS 12823 WAS W-28766 4-1-33 E.C.	3376
C	SEE RECORD POINT	3443

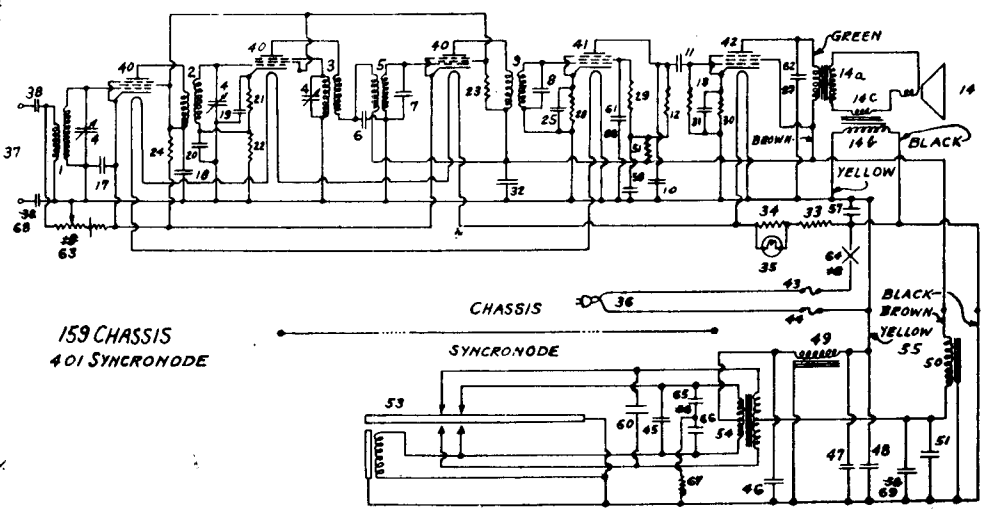
THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO
143 WIRING DIAGRAM
APPROVED 2-24-33 2-7-33 No. B28781

CROSLEY RADIO CORP.

MODEL 159

1	GU-24995	ANTENNA COIL
2	63-25968	R.F. TRANSFORMER
3	GU8-24996	OSCILLATOR COIL
4	B-28974	VAR. CONDENSER
5	G7-25444	1ST I.F. TRANS.
6	G2-25948	1ST I.F. TRANS. PRI. TUN. COND.
7	W-25008A	1ST I.F. TRANS. SEC. TUN. COND.
8	W-25008A	2ND I.F. TRANS. SEC. TUN. COND.
9	G9-25445	2ND I.F. TRANS.
10	W-26537A	0.0006 MFD. 400V
11		0.03 MFD. 400V
12	23403	150,000 Ω
13	23785	500,000 Ω
14	29090	338-3M SPEAKER
15	W-26878A	~~VOLUME CONTROL~~
16		~~S.P.S.T. SWITCH~~
17	W-25438	0.1 MFD. 200V.
18		0.1 MFD. 200V.
19	W-27204	0.02 MFD. 200V
20		0.02 MFD. 200V
21	W-25937	275 Ω
22	26690	4500 Ω
23	W-23907	750 Ω
24	23616	15,000 Ω
25	W-24784	0.25 MFD. 400V
26	W-26878	~~0.02 MFD.~~
27		~~0.02 MFD.~~
28	22199A	25,000 Ω
29	23785	500,000 Ω
30	W-23907	750 Ω
31	W-26870A	6 MFD. 25V.
32	W-28976	8 MFD. 200V.
33	W-28977	6 Ω
34		9 Ω
35	W-4099B	6.3V DIAL LIGHT
36	B-21491A	CORD & PLUG
37	LW-20264	ANT.-GND. TERM.
38	W-23635	0.006 MFD. 400V.
39	W-23442	~~0.02 MFD.~~
40	G39-27456	78 SOCKET
41	G38-27456	77 SOCKET
42	G30-27456	43 SOCKET
43	W-7983A	3 AMP. FUSE
44	W-7983A	3 AMP. FUSE
45	W-29012	2.5 MFD. 80V. AC.
46		12 MFD. 40V.
47	W-28682	0.1 MFD. 200V.
48	W-28682	0.1 MFD. 200V.
49	G5-28168	"A" FILTER CHOKE
50	G8-28069	"B" FILTER CHOKE
51	W-28978	18 MFD. 185V.
52	W-28682	~~0.1 MFD.~~
53	L-21949	VIBRATOR ASSEM.
54	G2-28065	POWER TRANSFORMER
55	W-28980A	A & B SUPPLY CABLE
56	W-28682	~~0.1 MFD.~~
57	W-24049A	0.1 MFD. 200V.
58	W-24049A	0.1 MFD. 200V.
59	21453	40,000 Ω
60	W-28065B	.01 MFD. 600V. A.C.
61	W29089	0.02 MFD. 400V.
62		0.016 MFD. 400V.

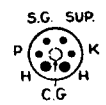
63	W26573B	VOLUME CONTROL
64		S.P.S.T. SWITCH
65	W-25438	0.1 MFD. 200V.
66		0.1 MFD. 200V.
67	W-23012A	40 Ω
68	W-22688	0.1 MFD. 400V.
69	W-30367	0.25 MFD. 160V.



RECORD OF CHANGES

A	ADDED 0.1 MFD. AND .01 MFD. COND'S. ALSO 40,000 Ω	
B	ITEMS 26 & 27 REPLACED WITH ITEMS 64 & 65	
C	ITEMS 15 & 16 REPLACED WITH ITEMS 63 & 64	
C	ITEM 14 WAS 28997 339-3 SPEAKER 4-3-33	
D	ITEM 36 DELETED, ITEMS 65, 66, 67 ADDED	
E	ITEMS 37 & 52 REPLACED WITH ITEMS 68 & 69	

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO
159 WIRING DIAGRAM
APPROVED B DATE 3-6-33 DWG. NO. B-28984



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43

Specifications

Model 159 is a five tube superheterodyne designed for operation from a 32 volt D.C. lighting system. It receives its "B" supply from a Crosley Syncronode. The intermediate frequency is 456 Kc.

Tubes and Voltage Limits

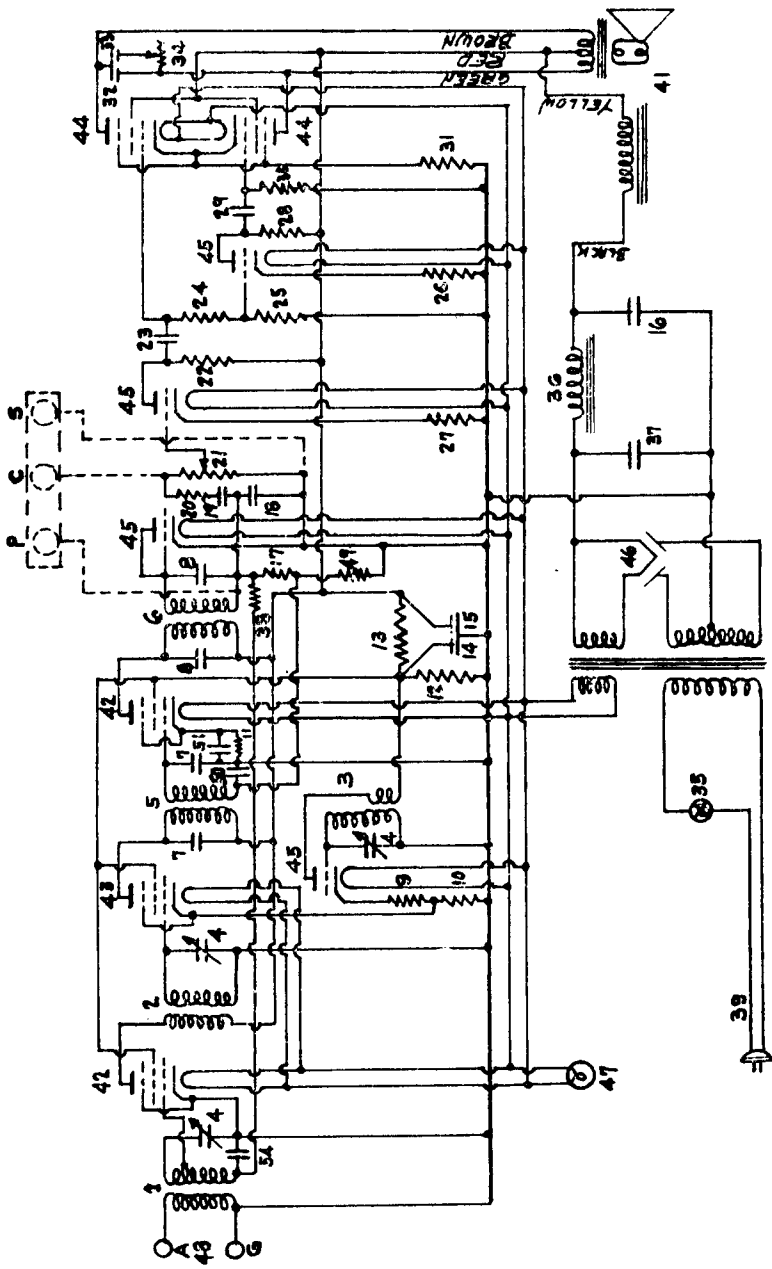
The tubes and voltages are given in the following table. All voltages are measured with a 300 volt D.C. voltmeter (1000 ohms per volt) with a line voltage of 32 volts, from tube contact to chassis. The receiver should be in operating condition, but with no signal to the antenna circuit.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
78	R. F. Amplifier	130	130	4.5	4.5	6.0
78	Oscillator Modulator	147	130	33.0	0	6.0
78	I. F. Amplifier	147	130	4.5	4.5	6.0
77	Detector	53	26.5	6.0	6.0	6.0
43	Output	146	147	6.0		24.0

Voltage limits are plus or minus 10% of values given.

CROSLEY RADIO CORP.

MODEL 164



1	G1-24005	ANTENNA COIL	
2	G2-25968	INTERSTAGE COIL	
3	G4-24226	OSCILLATOR COIL	
4	C-26442	C TUNING CONDENSER	
5	G5-24065	1ST I.F. TRANS.	
6	G10-24065	2ND I.F. TRANS.	
7	G9-25948	I.F. TUNING COND.	
8	G3-25948	I.F. TUNING COND.	
9	W-23013	350 Ω	
10	W-24097	165 Ω	
11	W-21964	25,000 Ω	
12	W-28471	8500 Ω	
13		8 MFD 25 V.	
14	W-29097A	8 MFD 350 V.	
15		8 MFD 450 V.	
16	21454	1 MEG.	
17			
18	W-25969	0.0001 MFD. 400 V.	
19		0.03 MFD. 400 V.	
20	21455	500,000 Ω	
21	W-25968	LEVEL CONT. (3 MEG)	
22	21457A	60,000 Ω	
23	W-23615	0.05 MFD. 400 V.	
24	21455	500,000 Ω	
25	21453	40,000 Ω	
26	W-23013	2000 Ω	
27	21457A	60,000 Ω	
28	W-23615	0.05 MFD. 400 V.	
29	21455	500,000 Ω	
30	W-22873	220 Ω	
31	W-25519A	0.008 MFD. 400 V.	
32		0.05 MFD. 400 V.	
33	W-25594B	TONE CONT. (1 MEG)	
34		S.P.S.T. SWITCH	
35	G1-24628	FILTER CHOKE	
36	W-23705-A	12 MFD. 440 V.	
37		3 MEG.	
38	26577	CABLE & PLUG	
39	Z-21491A	POWER TRANS. (ALL)	
40	G25-25669	317-4M SPKR.	
41	27622	58 SOCKET	
42	G14-27456	57 SOCKET	
43	G13-27456	2A5 SOCKET	
44	G12-27456	56 SOCKET	
45	G8-27456	80 SOCKET	
46	G6-27456	2.5V. DIAL LIGHT	
47	LW-22321	ANT.-GND. TERM.	
48	LW-20264	150,000 Ω	
49	23603	0.1 MFD. 200 V.	
50	W-25430	0.1 MFD. 200 V.	
51		POWER TRANS. (25 V.)	
52	G26-25669	POWER TRANS. (220 V.)	
53	G27-24669	0.02 MFD. 200 V.	
54	W-27203		
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RECORD OF CHANGES

		Chanot No.
A	ITEM 4 WAS C-29020 4-1-33 P.E.D.	522

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

164 WIRING DIAGRAM

APPROVED 4-6-33 DATE 4-5-33 DRG. NO. B-29130 A

I.F. = 181.5 KC.

CROSLEY RADIO CORP.

MODEL 166

Specifications

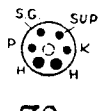
Models 166 and 172 are four tube superheterodyne receivers designed for operation on 110 volt D.C. or 25 to 60 cycle A.C. The intermediate frequency is 456 Kc. The only difference between these sets is that Model 172 is a dual band receiver and Model 166 is a broadcast band receiver only.

Tubes and Voltage Limits

The following are the voltages measured with the receiver in operating condition but with no signal to the antenna circuit. Line voltage is 117.5 volts, 60 cycle A.C. All voltages, except filament, are measured with 300 volt D.C. voltmeter (1000 ohms per volt) from tube contact to gang condenser frame. Filament voltages are measured with a low range A.C. voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
78	Oscillator Modulator	101	101	20	0	6.0
6F7	I. F. Amplifier and Detector	101	101	4.5		6.0
38	Output	Triode 7.5	101	2.0		6.0
12Z3	Rectifier	98		117.5		12.0

Voltages on D. C. are approximately 10% lower than the values given.
Voltage limits are plus or minus 10% of values given.



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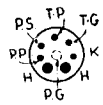

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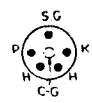

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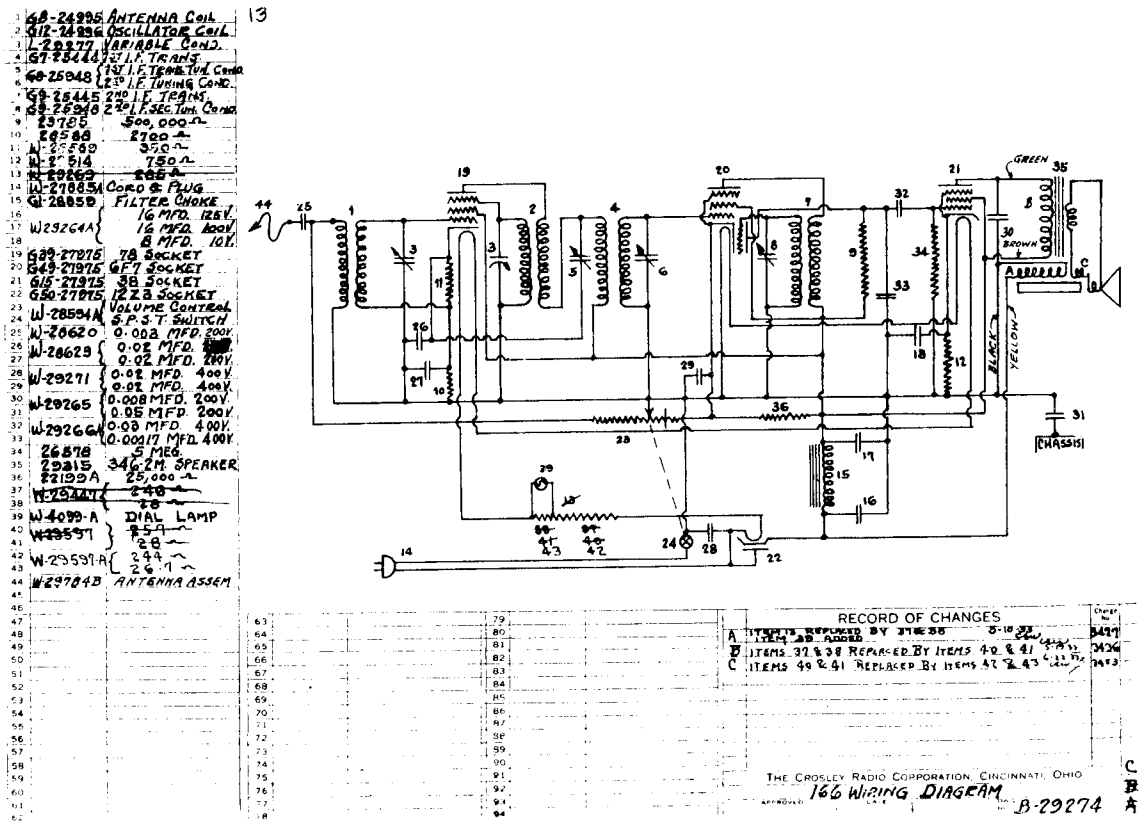
12Z3



CROSLEY RADIO CORP.

MODEL 167

1	G20-24995	ANTENNA COIL
2	G17-24996	OSCILLATOR COIL
3	L-27426	VARIABLE CONDENSER
4	G7-25444	1ST I.F. TRANS.
5	G2-25948	1ST I.F. TRANS. PRI. TUN. COND.
6	W-25008A	1ST I.F. SEC. TUN. COND.
7	W-27548	2ND I.F. TRANS. SEC. TUN. COND.
8	G7-25445	2ND I.F. TRANS.
9	W-25537A	0.0006 µf 400V.
10		0.03 µf 400V.
11	W-21455	300,000 Ω
12	W-23785	500,000 Ω
13	27610	335-3 SPEAKER
14	LW-20264	ANT-GND. TERM.
15	W-26573B	VOLUME CONTROL
16		LINE SWITCH
17	W-25438	0.1 µf 200V.
18		0.1 µf 200V.
19	W-25438	0.1 µf 200V.
20		0.1 µf 200V.
21	W-25937	275 Ω
22	~~W-26030~~	~~45000 Ω~~
23	~~W-27120~~	~~8500 Ω~~
24		~~25,000 Ω~~
25	W-24784	0.25 µf 200V.
26	~~W-25517A~~	~~0.05 µf~~
27		~~0.006 µf~~
28	W-21453	40,000 Ω
29	W-26577	3 MEG.
30	W-23907	750 Ω
31	W-27488	8 µf 25V.
32		6 µf 300V.
33	W-23701B	7 µf 440V.
34	B-21491A	CORD & PLUG
35	G11-23559	POWER TRANS (60~)
36	W-4099A	6V. DIAL LIGHT
37	G23-27456	-57 SOCKET
38	G24-27456	-58 SOCKET
39	G25-27456	-42 SOCKET
40	G6-27456	-80 SOCKET
41	~~W-27540~~	~~0.0005 µf~~
42	W-28913	WAVE CHANGE SWITCH
43	G12-23559	POWER TRANS. (25~)
44	G13-23559	POWER TRANS. (220V.)
45	W-29089	0.02 MFD. 400V.
46		0.016 MFD. 400V.
47	~~W-25970~~	~~10,000 Ω~~
48		~~15,000 Ω~~
49	W-29591A	.0005 MFD 400V.
50	W-27120	25,000 Ω
51		8,500 Ω
52	30137	3,500 Ω
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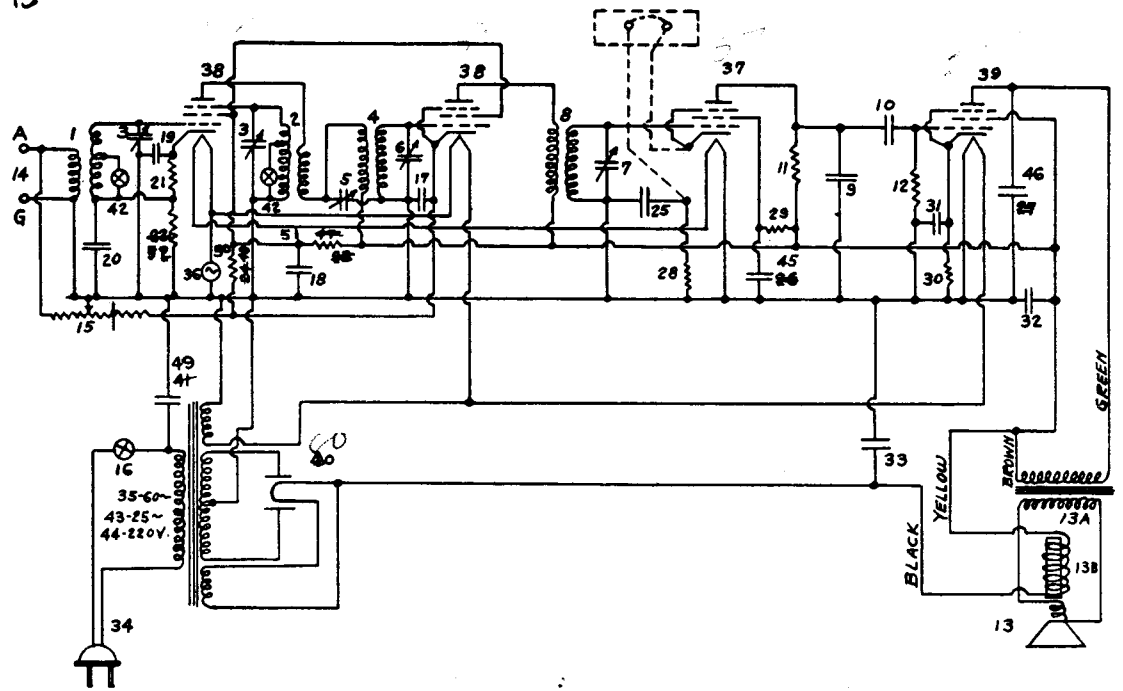

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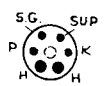
RECORD OF CHANGES

			Change No.
A	ITEMS 26 & 27 REPLACED WITH ITEMS 45 & 46	B	3395
B	ITEMS 15 & 16 WAS W-26573A 4-3-33 F.D.	B	3396
B	ITEMS 23 & 24 REPLACED WITH ITEMS 49 & 40 4-5-33 A.C.D.	B	3398
C	ITEM 41 REPLACED BY ITEM 49 5-15-33 C.W.J.	C	3436
D	ITEM [illegible] REPLACED BY [illegible] 6-8-33 C.W.J.	D	3454

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

167 WIRING DIAGRAM 3-2-33 A.D.

APPROVED	DATE	DRAWN	DWG NO.	
B 5-6-33	3-3-33	Schaefer	B-28932	A



57 & 58

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80

I.F. = 456 KC.

CROSLEY RADIO CORP.

MODEL 168

Specifications

Model 168 is a seven tube dual band superheterodyne designed for operation from A.C. electric circuits. The intermediate frequency is 181.5 Kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit. Line voltage should be 117.5 volts (235 volts for 220 volt receivers). All voltages, except filament, are measured from tube contact to chassis with a 500 volt D.C. voltmeter (1000 ohms per volt). Filament voltages are measured with a low range A.C. voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
56	Oscillator	66		6.5		2.5
58	Modulator	270	122	8.0	8.0	2.5
58	I. F. Amplifier	270	122	8.5	8.5	2.5
58	I. F. Amplifier	270	122	7.0	7.0	2.5
2A6	Detector and A. F. Amplifier	231		2.0		2.5
2A5	Output	257	270	18.0		2.5
80	Rectifier	380				4.9

Voltage limits are plus or minus 10% of values given.

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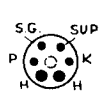

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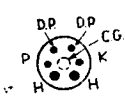

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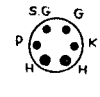

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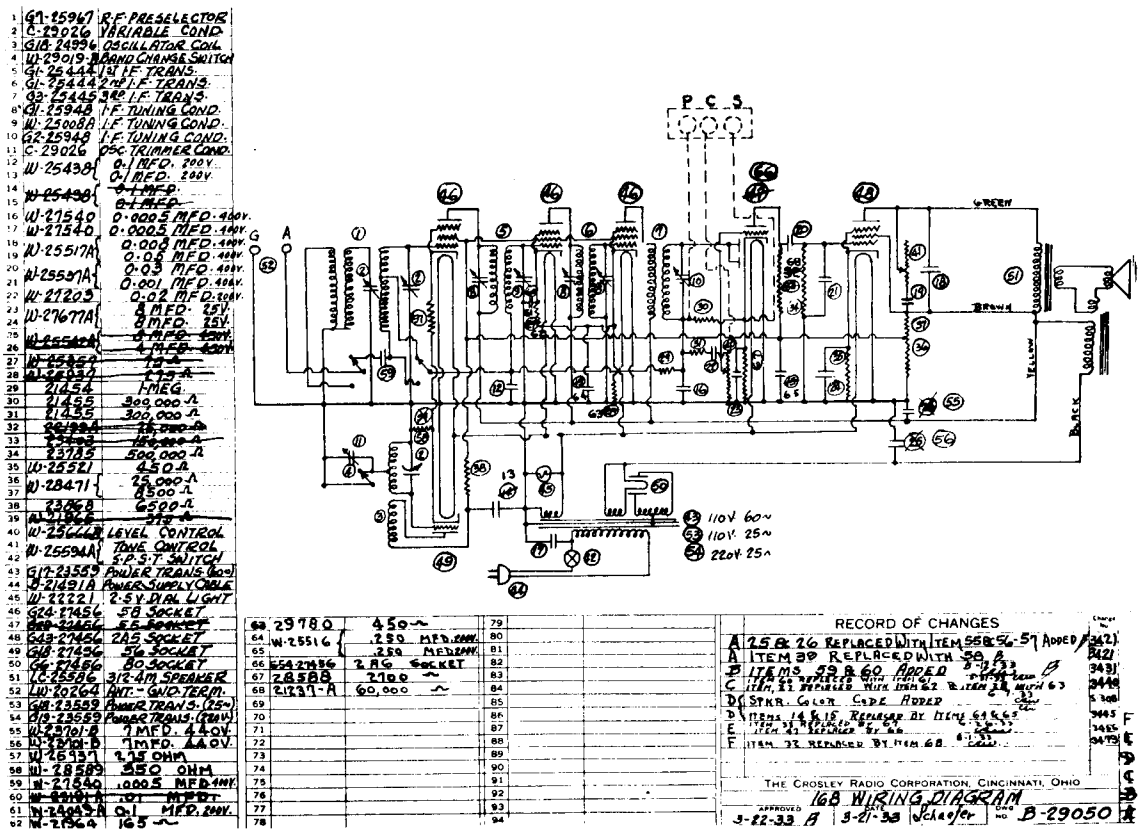

CROSLEY RADIO CORP.

CROSLEY 169

Specifications

Model 169 is a four tube dual band superheterodyne designed for operation from A.C. electric circuits. The intermediate frequency is 456 Kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit, with a line voltage of 117.5 volts (235 volts for 220 volt receivers). All voltages, except filament, are measured with a 500 volt D.C. voltmeter (1000 ohms per volt) from tube contact to chassis. Filament voltages are measured with a low range A.C. voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
58	Oscillator-Modulator	188	88	28	0	2.5
2B7	I. F. Amplifier and Detector	188	88	2		2.5
42	Output	178	188	14.5		2.5
80	Rectifier	322				4.9

Voltage limits are plus or minus 10% of values given.

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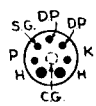

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1	G12-24995	ANTENNA COIL
2	G11-24996	OSCILLATOR COIL
3	C-28877	TUNING CONDENSER
4	G1-27444	I.F. TRANSFORMER
5	G1-25848	1ST I.F. TUNING COND.
6	G3-24984	2ND I.F. TUNING COND.
7	G4-24426	2ND I.F. TRANSFORMER
8	L4-20164	ANT.-GRID TERM.
9	W-28959A	D.P.S.T. SWITCH
10	W-27204	0.02 MFD. 200V.
11		0.02 MFD. 200V.
12	71454	1-MEG.
13	W-28963	6500 Ω
14	W-27204	0.02 MFD. 200V.
15		0.02 MFD. 200V.
16	W-22221	2.5 V. DIAL LIGHT
17	W-25970	10,000 Ω
18		15,000 Ω
19	G1-28500	POWER TRANS. (40-)
20	G2-28500	POWER TRANS. (25-)
21	G3-28500	POWER TRANS. (12-)
22	W-21454	1-MEG.
23	W-25969A	0.0001 MFD. 400V.
24		0.03 MFD. 400V.
25	71454	1-MEG
26	W-28907	760 Ω
27	W-25857B	8 MFD. 25V.
28		8 MFD. 200V.
29	W-23701B	7 MFD. 440V.
30	W-28488	0.002 MFD.
31	W-28781A	0.01 MFD. 400V.
32	28490	8-12 IN SPEAKER
33	B-21841M	CORD & PLUG
34	G24-27445	58 SOCKET
35	G4-27448	2B7 SOCKET
36	G5-27449	42 SOCKET
37	G6-27450	80 SOCKET
38	W-25964C	ON-OFF SWITCH
39		VOLUME CONTROL
40	4065	EXCELLO CONDENSER
41	W-27448	2ND I.F. TUNING COND.
42	W-27203	0.02 MFD. 200V.
43	28490	4800 Ω
44	W-29150A	6 MFD. 400V.
45		1 MFD. 400V.
46		8 MFD. 25V.
47	W-29552A	.002 MFD. 400V.
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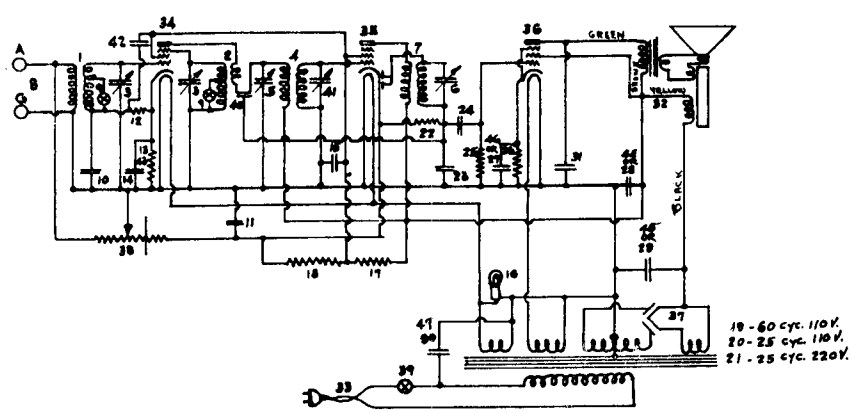

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RECORD OF CHANGES

		Change No.
D	ITEM 18 REPLACED BY ITEM 48 4-26-38	3415
E	ITEM 30 REPLACED BY ITEM 47 5-15-38	3436
F	ITEM 44 WAS W-29150 (300 WVTS) 6-1-38 E.C.O.	3574

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

169 WIRING DIAGRAM

DATE 4-14-38 DRAWN Schaefer DRG. NO. B-29074

CROSLEY RADIO CORP.

CROSLEY 170

Specifications

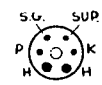
Model 170 is a ten tube dual band superheterodyne designed for operation from A.C. electric circuits. The intermediate frequency used is 181.5 Kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 volts for 220 volt receivers). All voltages, except filament, are measured with a 500 volt D.C. voltmeter (1000 ohms per volt) from tube contact to chassis. Filament voltages are measured with a low range A.C. voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
58	Modulator	276	120	6.0	6.0	2.5
56	Oscillator	50		6.0		2.5
58	I. F. Amplifier	276	120	8.0	8.0	2.5
58	I. F. Amplifier	276	120	8.0	8.0	2.5
56	Detector	0				
56	Phase Shifter	55		0		2.5
56	A. F. Amplifier	56		2.0		2.5
2-2A5	Output	269		3.0		2.5
80	Rectifier	355	276	18.0		2.5
						4.9

Voltage limits are plus or minus 10% of values given.



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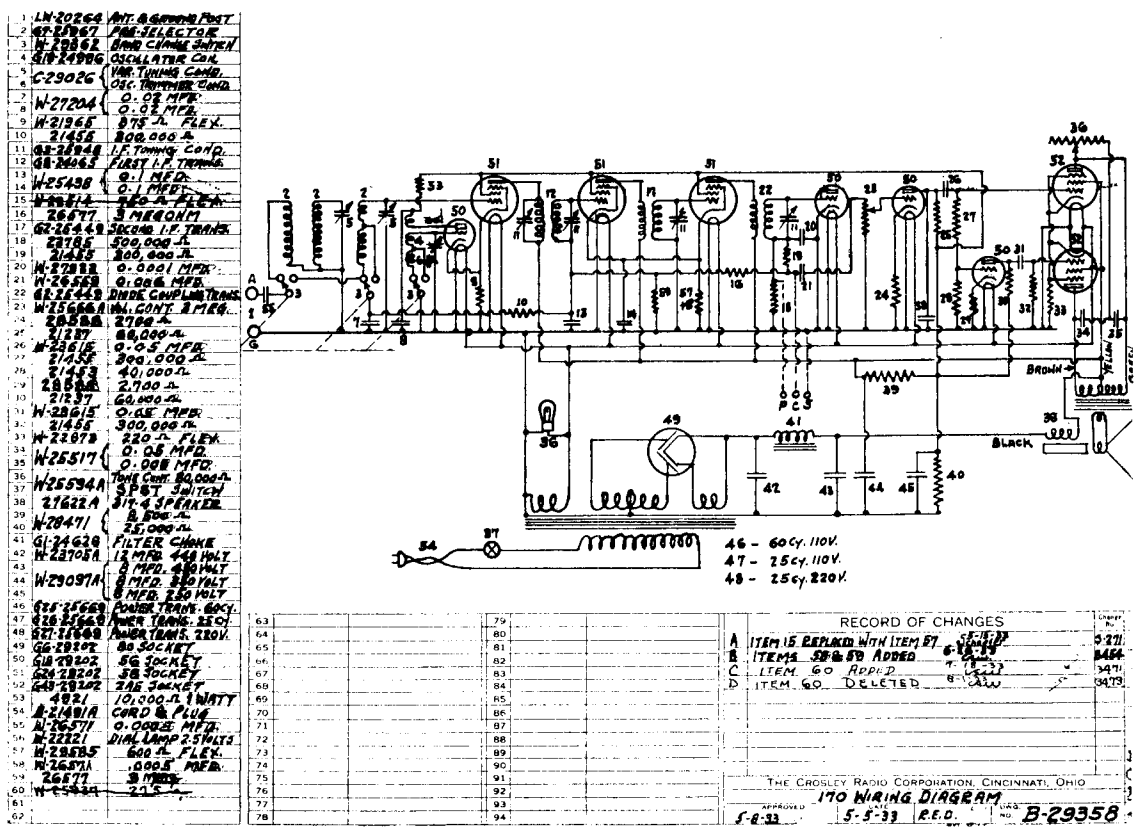


CROSLEY RADIO CORP.

CROSLEY 171

Specifications

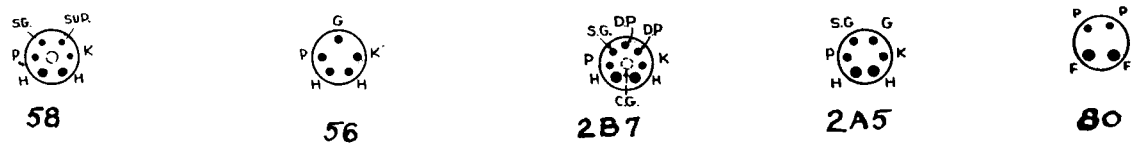
Model 171 is a twelve tube dual band superheterodyne designed for operation from A.C. electric circuits. The intermediate frequency is 181.5 Kc.

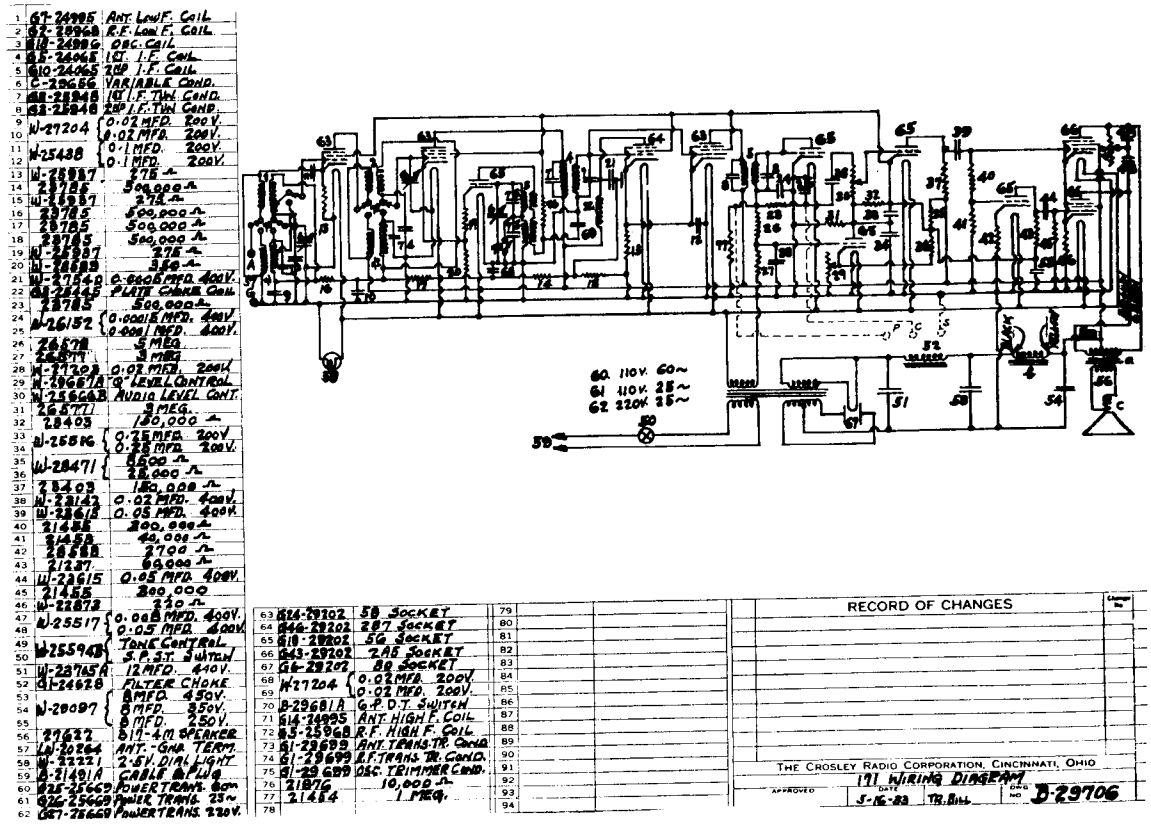
Voltages and Tube Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 volts for 220 volt receivers). All voltages, except filament are measured with a 500 volt D.C. voltmeter (1000 ohms per volt) from tube contact to chassis. Filament voltages are measured with a low range A.C. voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
58	R. F. Amplifier	267	115	3.0	3.0	2.5
56	Oscillator	60		7.0		2.5
58	Modulator	267	115	5.5	5.5	2.5
58	I. F. Amplifier	267	115	4.5	4.5	2.5
2B7	A. V. C. Tube	267	115	4.5	4.5	2.5
56	QAVC Tube	70		0-20.0*		2.5
56	Detector	0		0		2.5
56	Phase Shifter	58		2.5		2.5
56	A. F. Amplifier	170		115		2.5
2-2A5	Output	260	267	17.5		2.5
80	Rectifier	355				4.9

Voltage limits are plus or minus 10% of values given.
***Voltage depends on position of "Q" control.**





RECORD OF CHANGES

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

171 WIRING DIAGRAM

APPROVED | DATE 5-16-33 | DRAWN TR. BILL | DWG NO D-29706

CROSLEY RADIO CORP.

CROSLEY 172

Specifications

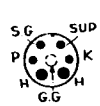
Models 166 and 172 are four tube superheterodyne receivers designed for operation on 110 volt D.C. or 25 to 60 cycle A.C. The intermediate frequency is 456 Kc. The only difference between these sets is that Model 172 is a dual band receiver and Model 166 is a broadcast band receiver only.

Tubes and Voltage Limits

The following are the voltages measured with the receiver in operating condition but with no signal to the antenna circuit. Line voltage is 117.5 volts, 60 cycle A.C. All voltages, except filament, are measured with 300 volt D.C. voltmeter (1000 ohms per volt) from tube contact to gang condenser frame. Filament voltages are measured with a low range A.C. voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
78	Oscillator Modulator	101	101	20	0	6.0
6F7	I. F. Amplifier and Detector	101	101	4.5		6.0
38	Output	Triode 7.5	101	2.0		6.0
12Z3	Rectifier	98		117.5		12.0

Voltages on D. C. are approximately 10% lower than the values given.
Voltage limits are plus or minus 10% of values given.



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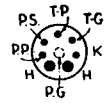

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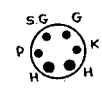

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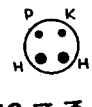

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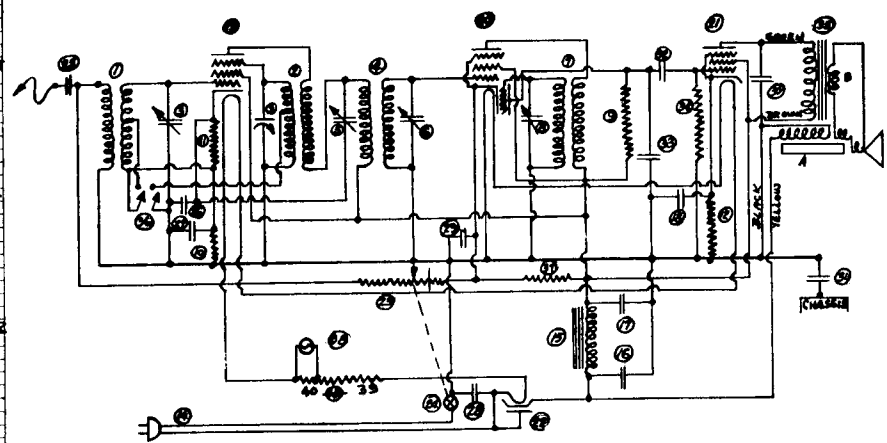


RECORD OF CHANGES

A Spkr. Color Code Added 6-5-33 Galli
B Item 13 Replaced By Items 39 & 40 6-20-33

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO
172 WIRING DIAGRAM
APPROVED 5-26-33 DATE 5-25-33 Wheeler DWG. NO. B-29689 A

CROSLEY RADIO CORP.

CROSLEY 173 & 173-5

Specifications

Models 173 and 173-5 are six tube dual band superheterodynes. Model 173 is designed for operation from 110 volts D.C. or 60 cycle A.C. Model 173-5 is designed for operation on 110 volts D.C. or 25 to 60 cycle A.C. The circuits of the two sets are similar except for the filter system. In Model 173-5, choke G6-28069 is substituted for choke G3-24628 used in the 173, and the condenser W-27216 is omitted. These models can be used with Model 38 power pack and remote speaker 390-6. The intermediate frequency is 456 Kc.

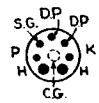
Tubes and Voltages

The following are the tubes and voltages measured with the receiver in operating condition, but with no signal to the antenna circuit, and with a line voltage of 117.5 volts 60 cycle A.C. All voltages, except filament, are measured with a 300 volt D.C. voltmeter (1000 ohms per volt) from tube contact to frame of condenser gang. Filament voltages are measured with a low range A.C. or D.C. meter (depending on supply).

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
78	R. F. Amplifier	112	112	4	0	6.3
78	Oscillator Modulator	112	112	20	0	6.3
6B7	I. F. Amplifier and Detector	112	112	4		6.3
78	A. F. Amplifier	7.5	12.5	4	4	6.3
43	Output	101	112	16.5		25
25Z5	Rectifier			125		25

Voltage limits are plus or minus 10% of values given.
D. C. voltages are 10% less than values given.

78



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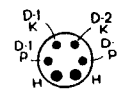
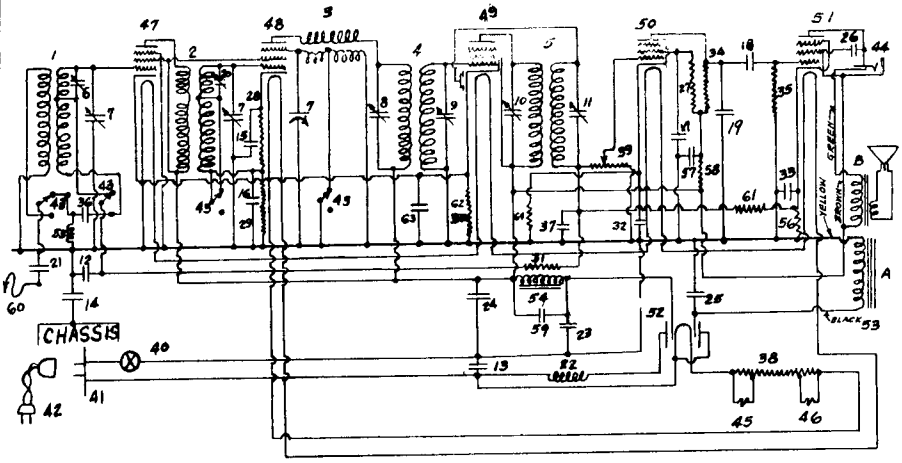


25 Z5

1	G1-24995	ANTENNA COIL
2	G-30082	R.F. INTER. COIL
3	G2-24996	OSCILLATOR COIL
4	G7-25444	1ST I.F. TRANS.
5	G7-25444	SECOND I.F. TRANS.
6	C4-29639	SHORT WAVE TRIMMER
7	C-30019 C	TUNING CONDENSER
8		FIRST I.F. PRI. TRIMMER
9	G11-25948	FIRST I.F. SEC. TRIMMER
10	G11-25948	2ND I.F. PRI. TRIMMER
11		2ND I.F. SEC. TRIMMER
12	W-30324	0.02 MFD. 400V.
13		0.02 MFD. 400V.
14	W-25438	0.1 MFD. 200 V.
15		0.1 MFD. 200V.
16	W-25438	0.1 MFD. 200V.
17		0.1 MFD. 200V.
18	W-30322	0.006 MFD. 200 V.
19		0.008 MFD. 200V.
20	C5-29699	SHORT WAVE TRIMMER
21	W-30325	0.002 MFD. 200V.
22	G2-24234	MODULATION CHOKE
23	W-30124	16 MFD. 125 VOLTS
24		16 MFD. 100 VOLTS
25		8 MFD. 165 VOLTS
26	W-30323	0.01 MFD. 200V.
27	23765	500000 Ω
28	W-28589	350 Ω FLEX.
29	28588	2700 Ω
30	W-24849A	1.65 Ω FLEX.
31	26577	3 MEGOHMS
32	W-27677A	8 MFD. 25 VOLTS
33		8 MFD. 25 VOLTS
34	23403	150000 Ω
35	23785	500,000 Ω
36	W-26971	0.0005 MFD. 200V.
37	W-26971	0.0008 MFD. 200V.
38	W-30033A	MAIN 5.5 Ω 26.5 Ω
39	W-30034C	LEVEL CONT. 500000 Ω
40		SWITCH S.P.S.T. 1A 110V.
41	W-30034	JUNCTION BOX
42	G1-30092	POWER SUPPLY CABLE
43	W-30038A	WAVE CHANGE SWITCH
44	G1-30085	SPEAKER JACK
45	W-4099A	DIAL LIGHT 6.3V.
46	W-4099A	DIAL LIGHT 6.3V.
47	G39-27995	78 SOCKET
48	G39-27995	78 SOCKET
49	G48-27925	6B7 SOCKET
50	G39-27995	78 SOCKET
51	G38-27975	43 SOCKET
52	G5-27925	25Z5 SOCKET
53	29923	347-3 SPEAKER
54	G3-24628	FILTER CHOKE
55	G11-24234	MAIN FILTER CHOKE
56	W-23907	150 Ω FLEX.
57	W-24764	025 MFD. 200 VOLT
58	21875	100000 Ω
59	W-27216	005 MFD. 200 VOLT
60	W-29764B	ANTENNAE ROLL
61	26577	3 MEGOHMS
62	W-25357	75 Ω FLEX.
63	W-24849A	0.1 MFD. 200V.
64	28588	2700 Ω



RECORD OF CHANGES		
A	ITEM 30 REPLACED BY G2. ITEMS 63 & 64 ADDED 2-7-33	

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO
173 WIRING DIAGRAM
APPROVED 1/24/33 DATE 1/12/33 DWG. NO. B-30074

CROSLEY RADIO CORP.

CROSLEY 174

Specifications

Model 174 is a four tube dual band superheterodyne designed for operation from 110 volt D.C. or 25 to 60 cycle A.C. electric circuits. The intermediate frequency used is 456 Kc.

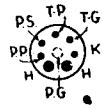
Tubes and Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts A.C., 60 cycles. All voltages, except filament, are measured with a 300 volt D.C. voltmeter (1000 ohms per volt) from tube contact to frame of condenser gang. Filament voltages are measured with a low range A.C. voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
78	Oscillator-Modulator	108	103	21	0	6.0
6F7	I. F. Amplifier and Detector	20	108	3.5		6.0
		108				
43	Output	104	110	0		25.
25Z5	Rectifier				110	25.

Voltage limits are plus or minus 10% of values given.
D. C. Voltages are 10% lower than values given.
Condenser frame to "B-" 20 volts, used to furnish bias to output system.

78



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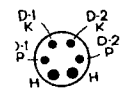
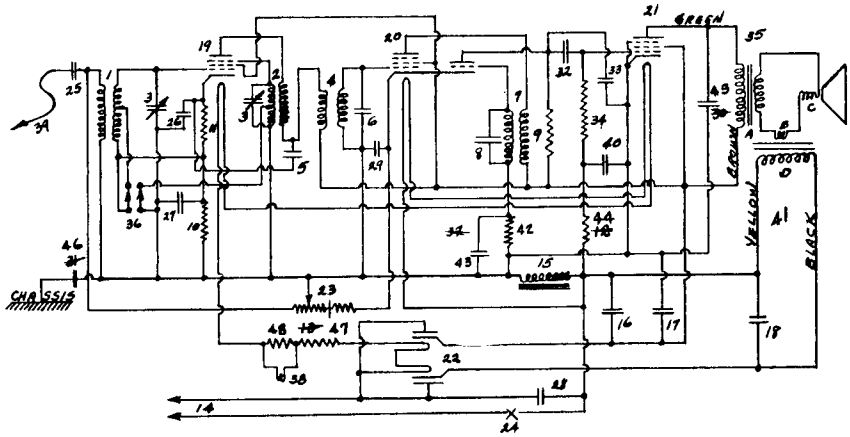


25Z5

1	615-24995	ANTENNA COIL
2	620-24996	OSCILLATOR COIL
3	B-28592 B	GANG CONDENSER
4	617-25444	1ST I.F. TRANS.
5	618-25948	1ST I.F. TUNING COND.
6		1ST I.F. TUNING COND.
7	619-25445	2ND I.F. TRANS.
8	619-25948	2ND I.F. TUNING COND.
9	23785	500,000 Ω
10	28588	2700 Ω
11	W-28889	350 Ω
12	[illegible]	[illegible]
13	[illegible]	[illegible]
14	W-27885	CORD & PLUG
15	GI-28859	POWER FILTER CHOKE
16		16 MFD. 185V.
17	W-29804A	25 MFD. 100V.
18		8 MFD. 125V.
19	635-28807	78 SOCKET
20	649-28807	6F7 SOCKET
21	650-28807	43 SOCKET
22	651-28807	25Z5 SOCKET
23	W-28594A	VOLUME CONTROL
24		S.P.S.T. SWITCH
25	W-28620	0.003 MFD. 2000V.
26	W-28623	0.02 MFD. 2000V.
27		0.02 MFD. 2000V.
28	W-29271	0.02 MFD. 400V.
29		0.02 MFD. 400V.
30	W-29284	0.05 MFD. 200V.
31		0.05 MFD. 200V.
32	W-29244A	0.03 MFD. 400V.
33		0.0001 MFD. 400V.
34	23785	500,000 Ω
35	29894	348-A SPEAKER
36	W-29959A	D.P.S.T. SWITCH
37	[illegible]	[illegible]
38	W-40994	6 V. DIAL LIGHT
39	W-29784	ANTENNA LEAD
40	W-29910	0.25 MFD. 200V.
41	W-29912	SPEAKER CABLE
42	21454	1 MEG.
43	W-28621	0.02 MFD. 200V.
44	21455	300,000 Ω
45	W-30038	0.016 MFD. 200 V.
46		0.05 MFD. 200 V.
47	W-29911-A	144 Ω
48		26.1 Ω



RECORD OF CHANGES

		Change No.
A	ITEM 36 & 37 REPLACED BY 48 & 46	24468
B	ITEM 13 REPLACED BY ITEMS 47 & 48	24552
C	ITEM 17 WAS W-29804 (16 MFD.) ITEM 37 DELETED	5379

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

CHASSIS 174

APPROVED 6-9-33 DATE 6-7-33 DWG. NO. B-29942

CROSLEY RADIO CORP.

CROSLEY 175

Specifications

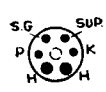
Model 175 is a fourteen tube dual band superheterodyne designed for operation from A.C. electric circuits. The intermediate frequency is 181.5 Kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 for 220 volt receivers). All voltages, except filament, are measured with 300 volt D.C. voltmeters (1000 ohms per volt) from tube contact to chassis. Filament voltages are measured with a low range A.C. voltmeter.

Tube	Position	Plate	Screen Grid	Cathode	Suppressor Grid	Filament
58	R. F. Amplifier	280	90	2.5	2.5	2.5
58	Oscillator Modulator	280	90	32.0	0	2.5
58	I. F. Amplifier	280	90	5.0	5.0	2.5
58	I. F. Amplifier	280	90	4.5	4.5	2.5
58	A. V. C.	280	90	4.5	4.5	2.5
55	Detector	80		15.5		2.5
56	"Q" Control Tube	70		0-22.0*		2.5
56	A. F. Amplifier	165		90.0		2.5
56	Phase Shifter	125		6.0		2.5
4-45	Output	280		0		2.5
5Z3	Rectifier	295				5.0

Voltage limits are plus or minus 10% of values given.
***Voltage depends on position of "Q" control.**
Chassis to "B-" 75 volts of which 55 volts is used for biasing output tubes.



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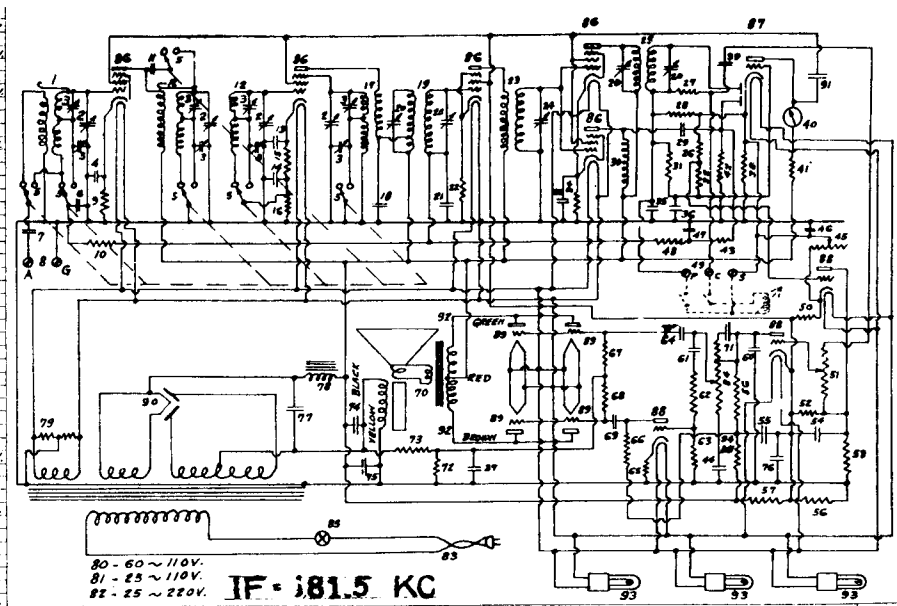
5Z3

1	GIE-24995	ANTENNA COIL
2	C-30054	TWINING CONDENSER
3		TRIMMING CONDENSERS
4	W-27203	0-.02 MFD. 200V.
5	S-29813	3 CIRCUIT S.P.S.T. SWITCH
6	W-24049	0-.1 MFD. 200V.
7	W-26571	0-.0005 MFD. 800V.
8	LW-20264	ANT. & GROUND TERM.
9	W-21964	165 Ω FLEX.
10	21455	300,000 Ω
11	W-27540	0-.0005 MFD. 400V.
12	GB-25367	PHASE TRIMMER TRANS.
13	W-25438	0-.1 MFD. 200V.
14		0-.1 MFD. 200V.
15	W-21965	375 Ω FLEX.
16	24814	7,000 Ω
17	GE-24996	OSCILLATOR COIL
18	W-30270	0-.001 MFD. 400V.
19	GB-25444	1ST I.F. TRANS.
20	GB-25948	I.F. TUNING COND.
21	W-27203	0-.02 MFD. 200V.
22	W-22514	750 Ω
23	GB-25445	I.F. TRANS.
24	W-25008A	I.F. TUNING COND.
25	GB-25444	DIODE TRANS.
26	26577	3 MEG.
27	21455	300,000 Ω
28	23785	500,000 Ω
29	W-27540	0.0005 MFD. 400V.
30	LW-25445	I.F. TRANS.
31	26578	5 MEG.
32	26577	3 MEG.
33	W-24049	0-.1 MFD. 200V.
34	W-30127	450 Ω
35	W-27932	0-.0001 MFD. 200V.
36	W-24049A	0-.1 MFD. 200V.
37	W-30321	1 MFD. 160V.
38	W-22180	1650 Ω
39	W-23191	0-.01 MFD. 400V.
40	W-26091B	TUNING METER
41	W-30147	25,000 Ω
42	23785	500,000 Ω
43	21454	1 MEG.
44	W-30251	0-.05 MFD. 400V.
45	W-30057	"Q" CONTROL
46	W-27204	0-.02 MFD. 200V.
47		0-.02 MFD. 400V.
48	23785	500,000 Ω
49	LW-20266	PHONO. TERMINAL
50	21453	40,000 Ω
51	W-30056	VOLUME CONTROL
52	23403	150,000 Ω
53	26578	5 MEG.
54	W-25516	0-.25 MFD. 200V.
55		0-.25 MFD. 200V.
56	W-27651	10,000 Ω 1.5 W.
57		10,000 Ω 3.25 W.
58	24106	25,000 Ω
59	21837A	60,000 Ω
60	W-21840	0.0005 MFD. 400V.
61	W-23142	0-.02 MFD. 400V.
62	21452	1 MEG.
63	23403	150,000 Ω
64	W-23615	0.05 MFD. 400V.
65	28588	2700 Ω
66	21237A	60,000 Ω
67	21455	300,000 Ω
68	21455	300,000 Ω
69	W-23615	0.05 MFD. 400V.
70	29919	391-G J SPEAKER
71	W-25435	0.003 MFD. 400V.
72	21454	1 MEG.
73	21455	300,000 Ω
74	W-30059	8 MFD. 450V.
75		8 MFD. 450V.
76		8 MFD. 250V.
77	W-23619A	12 MFD. 475V.
78	GE-24078	FILTER CHOKE
79	W-27417A	10 Ω & 10 Ω
80	GB-25668	POWER TRANS. 60~
81	GB-25669	POWER TRANS. 25~
82	GB-25669	POWER TRANS. 220V.
83	B-30375	CORD & PLUG
84	W-30058B	TONE CONTROL
85		S.P.S.T. SWITCH
86	GA-27456	58 SOCKET
87	GB-27456	55 SOCKET
88	GA-27456	56 SOCKET
89	GB-27456	45 SOCKET
90	GB3-27456	5Z3 SOCKET
91	W-24784	0.25 MFD. 200V.
92	W-30121	FIELD AND SPEAKER
93	W-22221	2.5V. DIAL LIGHT
94	27121	5,000 Ω



RECORD OF CHANGES

A ITEM 58 REPLACED WITH ITEM 94 7-25-33 SCHAEFER

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

175 WIRING DIAGRAM

DRAWING 1 7-19-33 L.N. B-30105 A

CROSLEY RADIO CORP.
MODEL 176

1	G15-24995	ANTENNA COIL
2	G20-24996	OSCILLATOR COIL
3	G7-24444	1ST I.F. TRANS.
4	G9-24445	2ND I.F. TRANS.
5	A-29502 E	TUNING CONDENSER
6	68-29948	1ST I.F. PRI. TRIMMER
7		1ST I.F. SEC. TRIMMER
8	69-29949	2ND I.F. SEC. TRIMMER
9	W-27809	0.02 MFD. 200V.
10		0.02 MFD. 200V.
11	W-29271	0.02 MFD. 400V.
12		0.02 MFD. 400V.
13	W-28620	0.005 MFD. 200V.
14	W-28622	0.1 MFD. 200V.
15		0.1 MFD. 200V.
16	W-29445	0.0001 MFD. 200
17		0.006 MFD. 200V.
18	W-26593	0.006 MFD.
19	W-25851B	8 MFD. 25V.
20		8 MFD. 200V.
21	W-26170 A	6 MFD. 25 V.
22	W-28668	12 MFD. 200V.
23	G1-28852	POWER SUPPLY FILTER CHOKE
24	W-4099 A	6.3V. DIAL LIGHT
25	W-27885 A	CORD & PLUG
26	W-28447	225 Ω
27	W-28588	350 Ω
28	28588	2700 Ω
29	21237A	60,000 Ω
30	21454	1 MEG.
31	26377	.3 MEG.
32	26578	.5 MEG.
33	W-22514	750 Ω
34	21455	300,000 Ω
35	492HG	10,000 Ω
36	W-28594-A	VOLUME CONTROL
37		S.P.S.T. SWITCH
38	W-28958 A	WAVE CHANGE SWITCH D.P.S.T.
39	W-29547	EXTENSION SPKR. JACK
40	28867	343-2M SPEAKER
41	629-28807	78 SOCKET
42	611-28807	36 SOCKET
43	615-28809	38 SOCKET
44	620-28807	12Z3 SOCKET
45	W-28623	.02 MFD. 200V.
46		.02 MFD. 200V.
47	W-28618	0.006 MFD. 200V.
48	W-29447-A	224 Ω
49		26.7 Ω
50	W-29784 A	ANTENNA ASSEM. 20FT.
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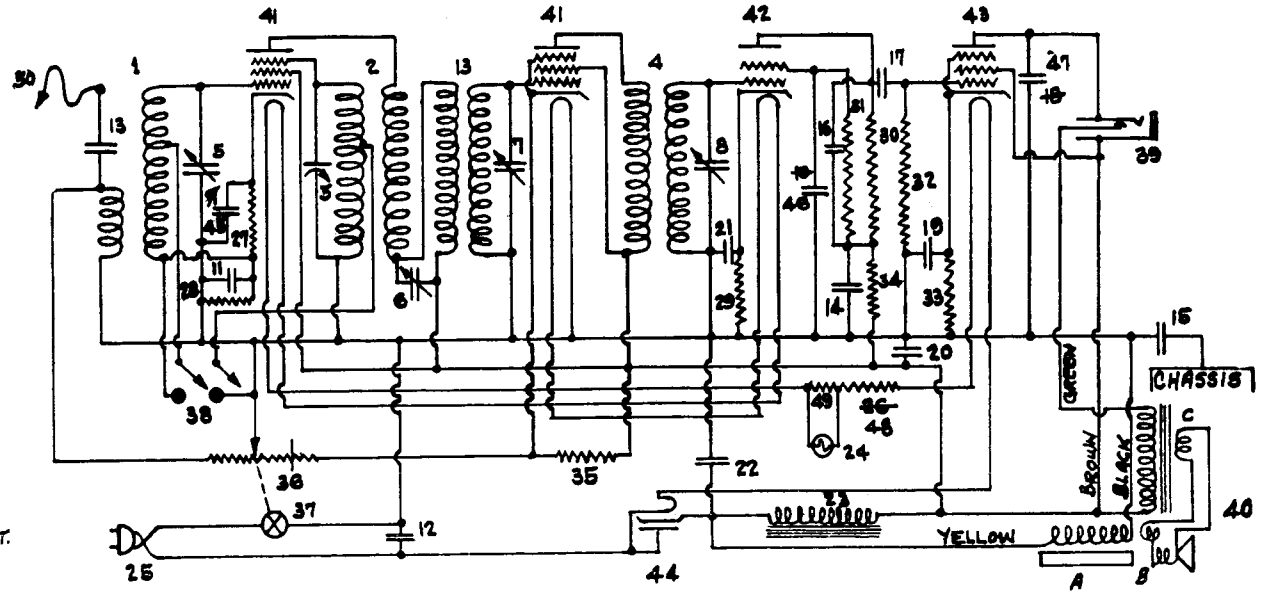

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77			93		
78			94		

RECORD OF CHANGES

		Change No.
A	ITEMS 9 & 10 REPLACED BY 45 & 46 5-11-38 CWH	3433
B	SPK'R. COLOR CODE ADDED 6-7-38 CWH	3488
C	ITEM 26 REPLACED BY ITEMS 48 & 49 6-11-38 CWH	3453

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

176 WIRING DIAGRAM

APPROVED S/ic/as DATE 5-18-38 DWG. NO. B-29514

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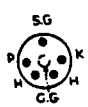

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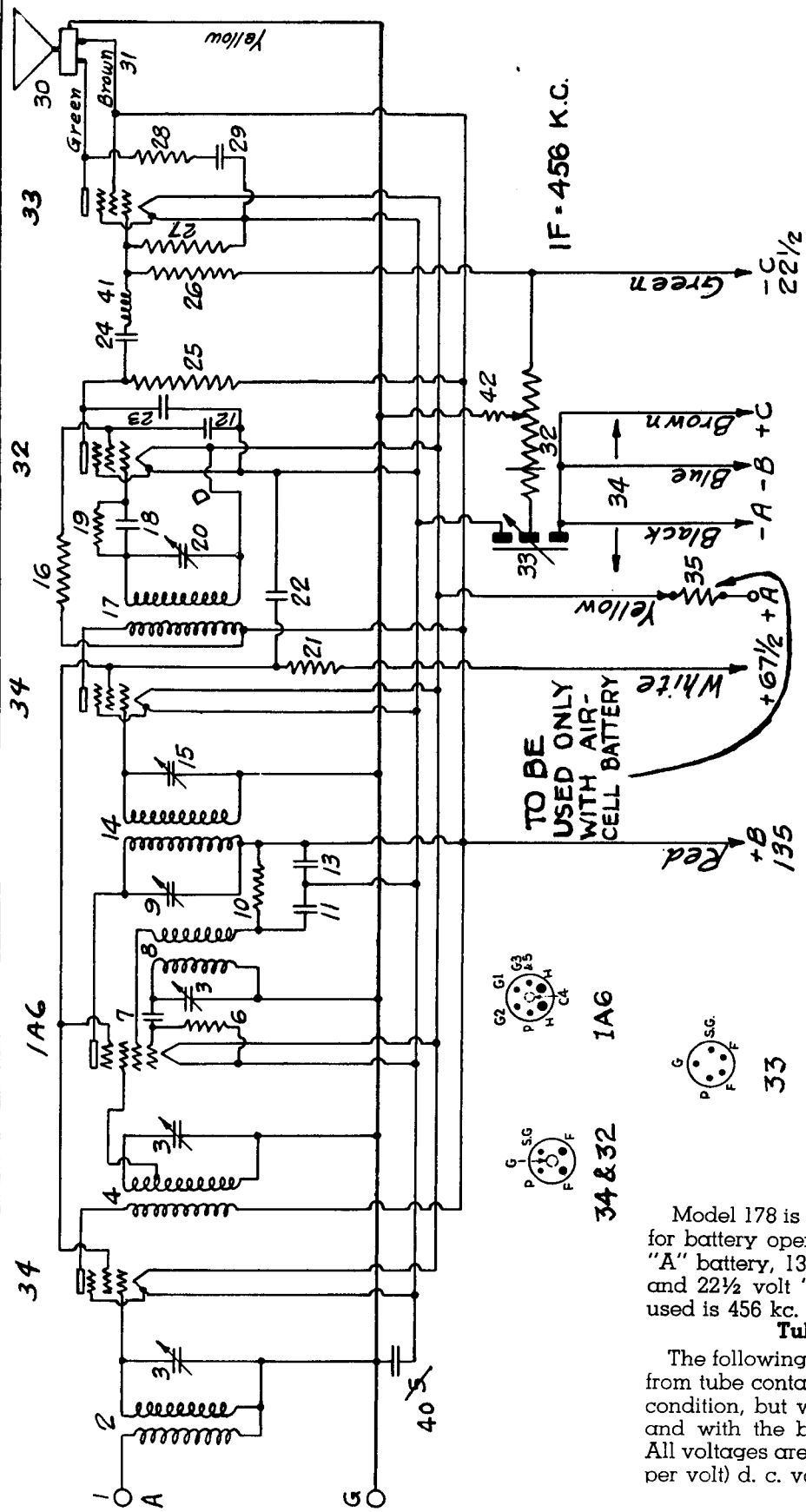
12Z3

I.F. 456 KC.

CROSLEY RADIO CORP.

CROSLEY 178



Tube	Position and Use	Plate	Voltages Screen Grid	Grid	Filament
34	RF Amplifier	135	67.5	4.0	2.0
1A6	Oscillator	95	5		
	Modulator	135	67.5	4.0	2.0
34	IF Amplifier	135	67.5	4.0	2.0
32	Detector	50	15	0	2.0
33	Output	135	135	8.0	2.0

Voltage limits are plus or minus 10% of values given.

Specifications

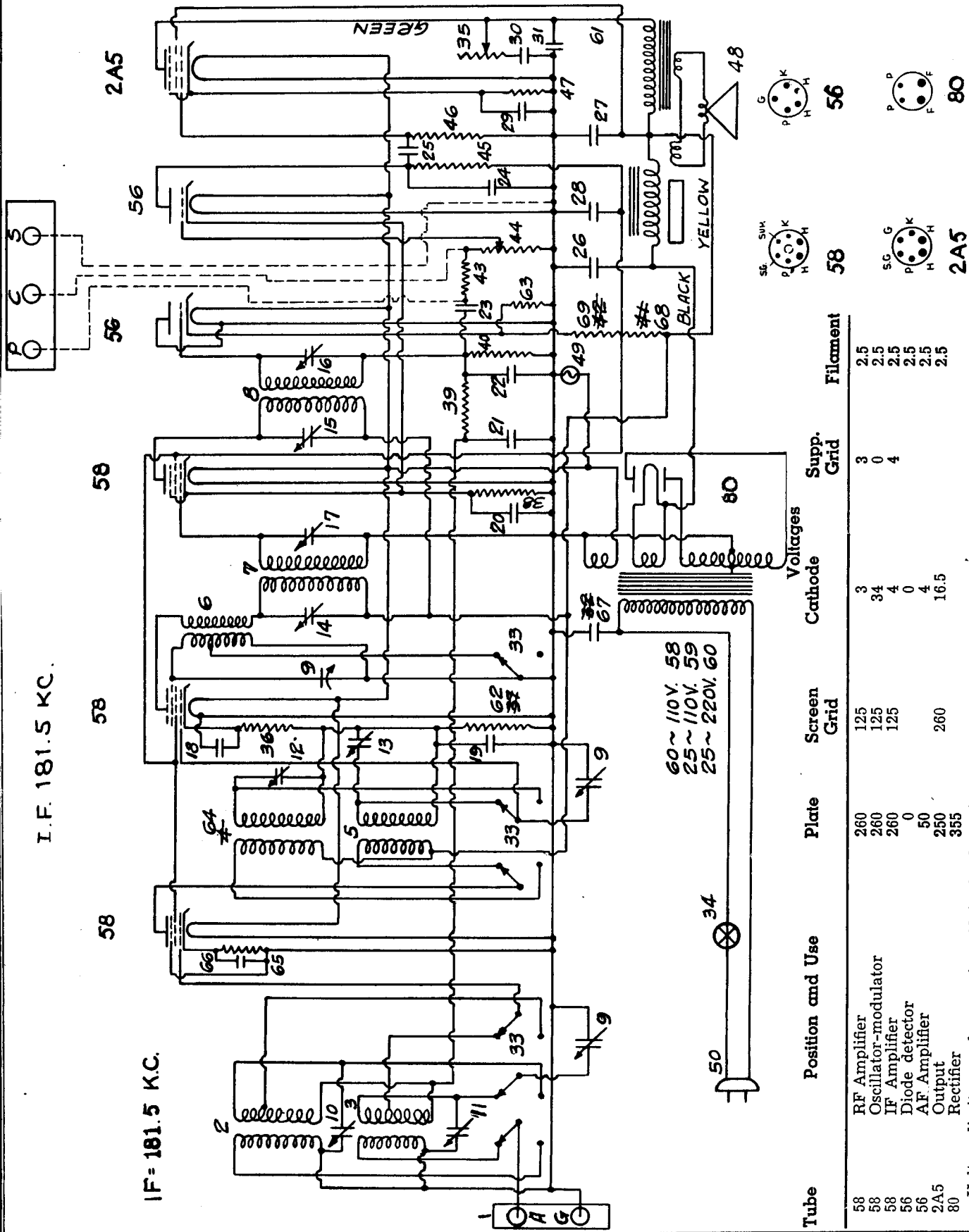
Model 178 is a five tube superheterodyne designed for battery operation. Batteries required are: 2 volt "A" battery, 135 volt "B" battery with 67½ volt tap, and 22½ volt "C" battery. Intermediate frequency used is 456 kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured from tube contact to B- with the receiver in operating condition, but with no signal to the antenna circuit, and with the battery voltages as specified above. All voltages are measured with a 250 volt (1000 ohms per volt) d. c. voltmeter.

CROSLEY RADIO CORP.

CROSLEY 179



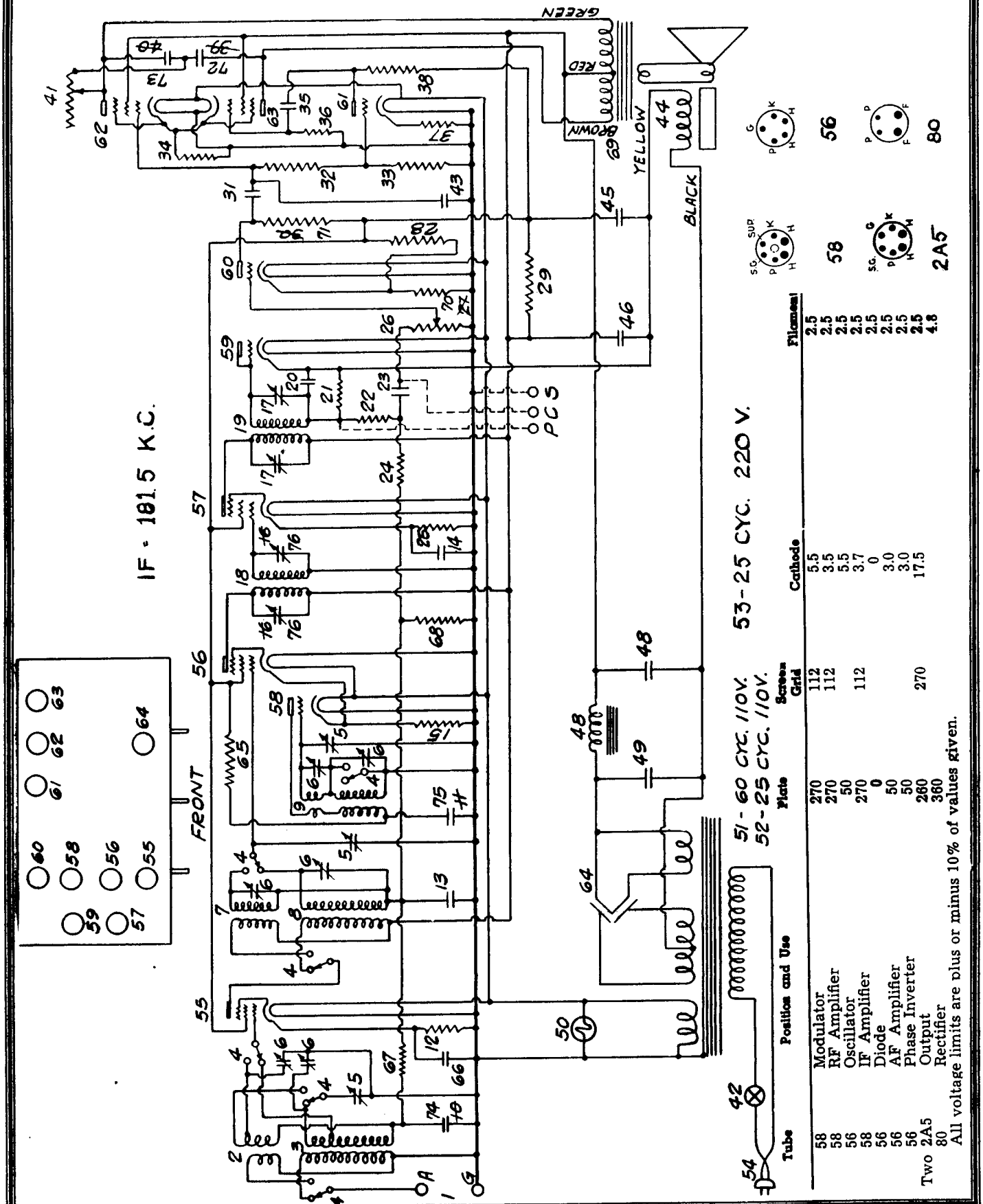
Tube	Position and Use	Plate	Screen Grid	Cathode	Supp. Grid	Filament
58	RF Amplifier	260	125	3	3	2.5
58	Oscillator-modulator	260	125	34	0	2.5
58	IF Amplifier	260	125	4	4	2.5
56	Diode detector	0		0		2.5
56	AF Amplifier	50		4		2.5
2A5	Output	250	260	16.5		2.5
80	Rectifier	355				

Voltages

Voltage limits are plus or minus 10% of values given.

CROSLEY RADIO CORP.

CROSLEY 180

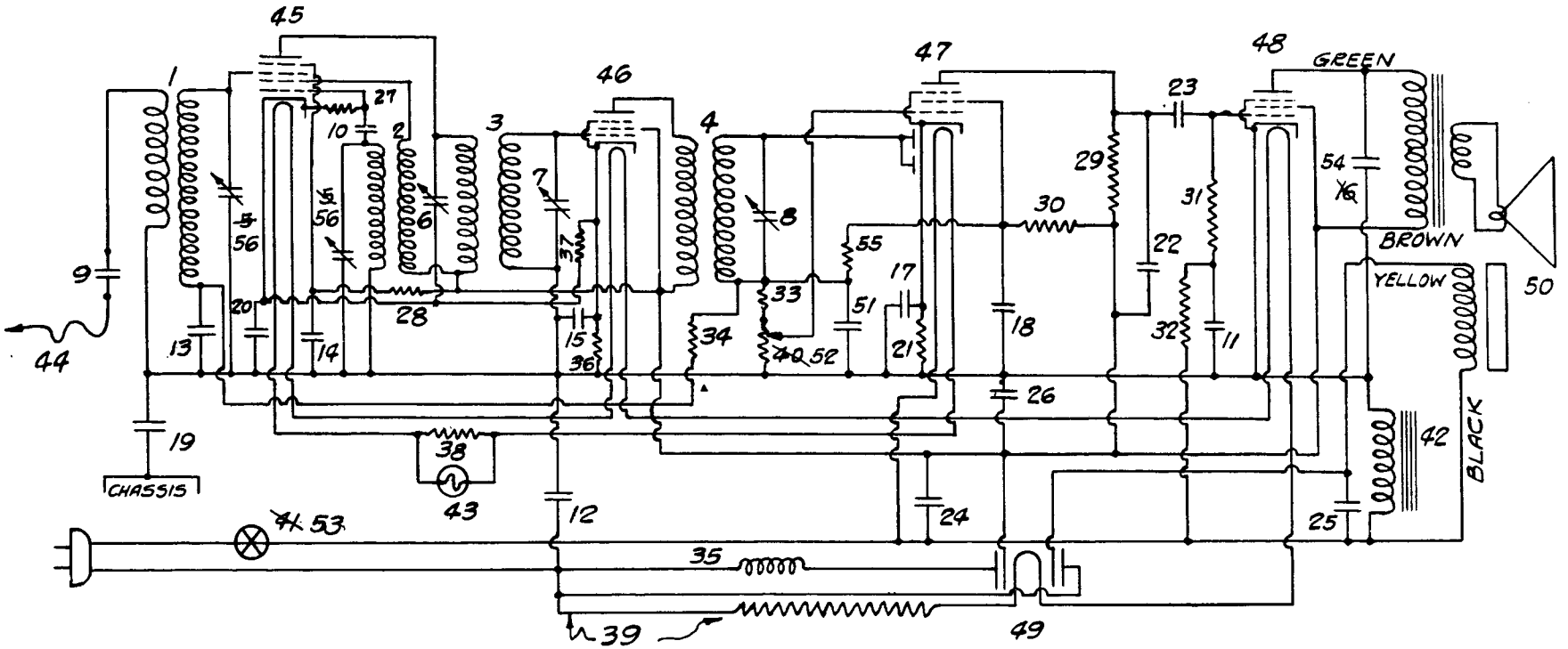


Tube	Position and Use	Plate	Screen Grid	Cathode	Filament
58	Modulator	270	112	5.5	2.5
58	RF Amplifier	270	112	3.5	2.5
56	Oscillator	50		5.5	2.5
58	IF Amplifier	270	112	3.7	2.5
56	Diode	0		0	2.5
56	AF Amplifier	50		3.0	2.5
56	Phase Inverter	50		3.0	2.5
Two 2A5	Output	260	270	17.5	2.5
80	Rectifier	360			4.8

All voltage limits are plus or minus 10% of values given.

CROSLEY RADIO CORP.

CROSLEY 182



Specifications

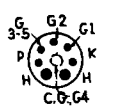
Model 182 is a five tube superheterodyne designed for operation from AC or DC electric circuits. The intermediate frequency used is 456 kc.

Tubes and Voltage Limits

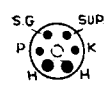
The following are the tubes and voltages measured from tube contact to negative line (B -) with the receiver in operating condition but with no signal to the antenna circuit (antenna coiled up), and with a line voltage of 117.5 volts, 60 cycle a. c. All voltages except filament, are measured with a 500 volt (1000 ohms per volt) d. c. voltmeter. Filament voltages are measured with a low range AC voltmeter.

Tube	Position and Use	Plate	Voltages Screen Grid	Control Grid	Cathode	Supp. Grid	Filament
6A7	Oscillator	120		—8			
	Modulator	120	50		3		6.5
78	IF Amplifier	120	120		2.5	2.5	6.5
6B7	Diode and AF Amplifier	20	30		3	3	6.5
43	Output	115	120	*—20	0		25.1
25Z5	Rectifier				120		25.1

Voltage limits are plus or minus 15% of values given.
On DC operation, voltages are approximately 90% of those given above.
* Output bias voltage is obtained by using drop across filter choke which is 20 volts.



6A7



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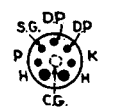
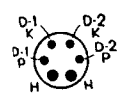


6B7

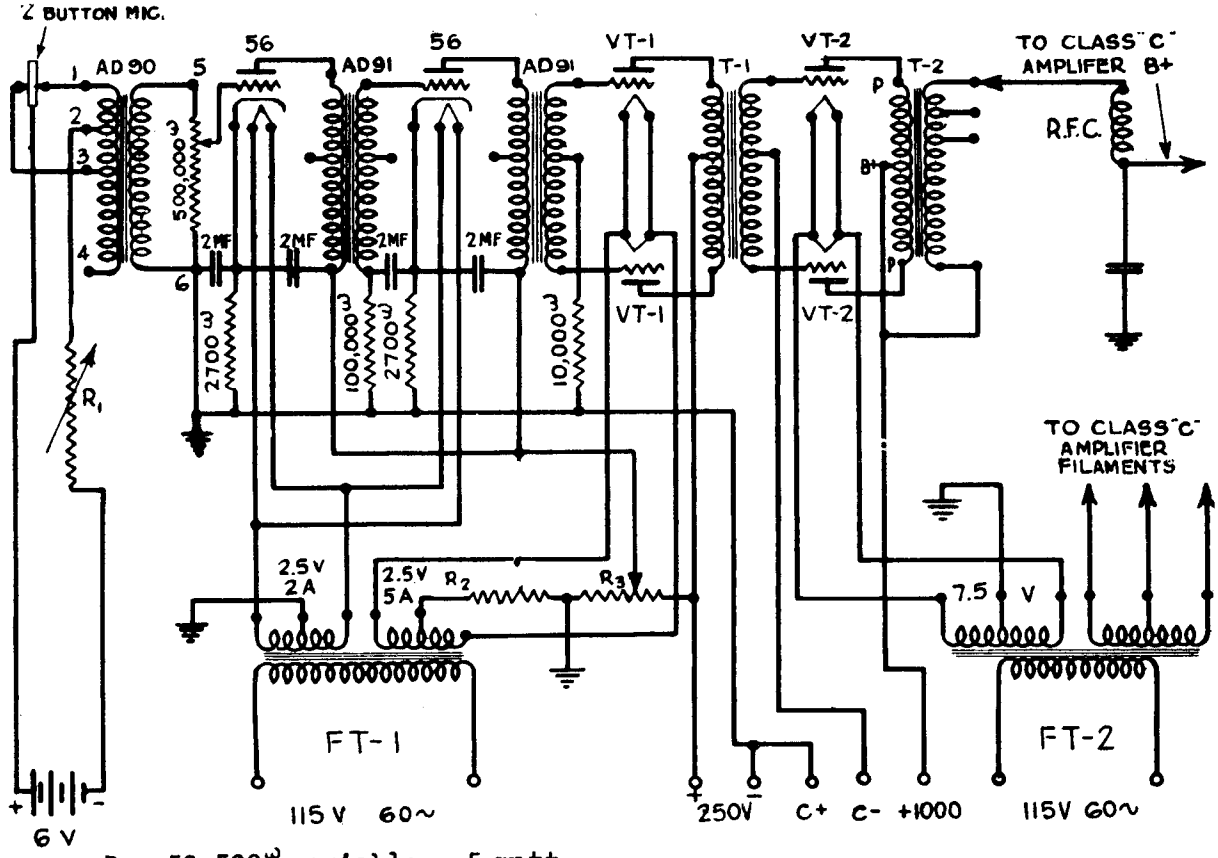
43



25 Z5

DELTA MFG. CO.

CLASS "B" AUDIO AMPLIFIER MODEL



R_1 50-500$^{\omega}$ variable. 5 watt
R_2 750$^{\omega}$ 10 watt for 1-2A3, 2-2A3's or 2-245's
R_3 20,000$^{\omega}$ 25 watt

GROUP	STAGE	TUBE NO.	TUBE TYPE	TRANS-FORMER A TAPS	PLATE VOLTS	PLATE M.A. TOTAL	GRID BIAS	FILAMENT VOLTS	FILAMENT AMPS	TRANS. NO.	REQUIRED MOD. WATTS	AVE. CARRIER WATTS	% HARM. DIST.
	Driver (VT-1 & T-1)	2	245	AD-75	250	60	-50	2.5	3.00	AD-18			
(1)	Modulator (VT-2 & T-2)	2	-RK-18	AD-76	1000	168 max.	@-48	7.6	5.00	AD-1012			
	Class "C" Amplifier (VT-3)	2	-RK-18	6250 Ω	1000	160	-150	7.5	5.00		80	96	4.0
		1 or 2	-03-A	5700 Ω	1000	175	-100	10.0	3.25	AD-12	87.5	105	3.9
		1 or 2	-03-A	5000 Ω	1000	200	-100	10.0	6.25	AD-12	100.0	120	4.0
	Driver (VT-1 & T-1)	2	-2A3	AD-75	250	100	-62	2.5	5.00	AD-15			
(2)	Modulator (VT-2 & T-2)	2	-RK-18	AD-76									
	Class "C" Amplifier, (VT-3)	2	-RK-18	6250 Ω	These conditions same as in (1) above.						80	96	4.2
		1 or 2	-03-A	5700 Ω							87.5	105	4.1
		1 or 2	-03-A	5000 Ω							100.0	120	4.0

NOTES: Φ Cannot be self bias. Must be heavy duty "B" batteries or special C bias power supply.
* Class "C" efficiency assumed to be 80%

56

VT1 & VT2

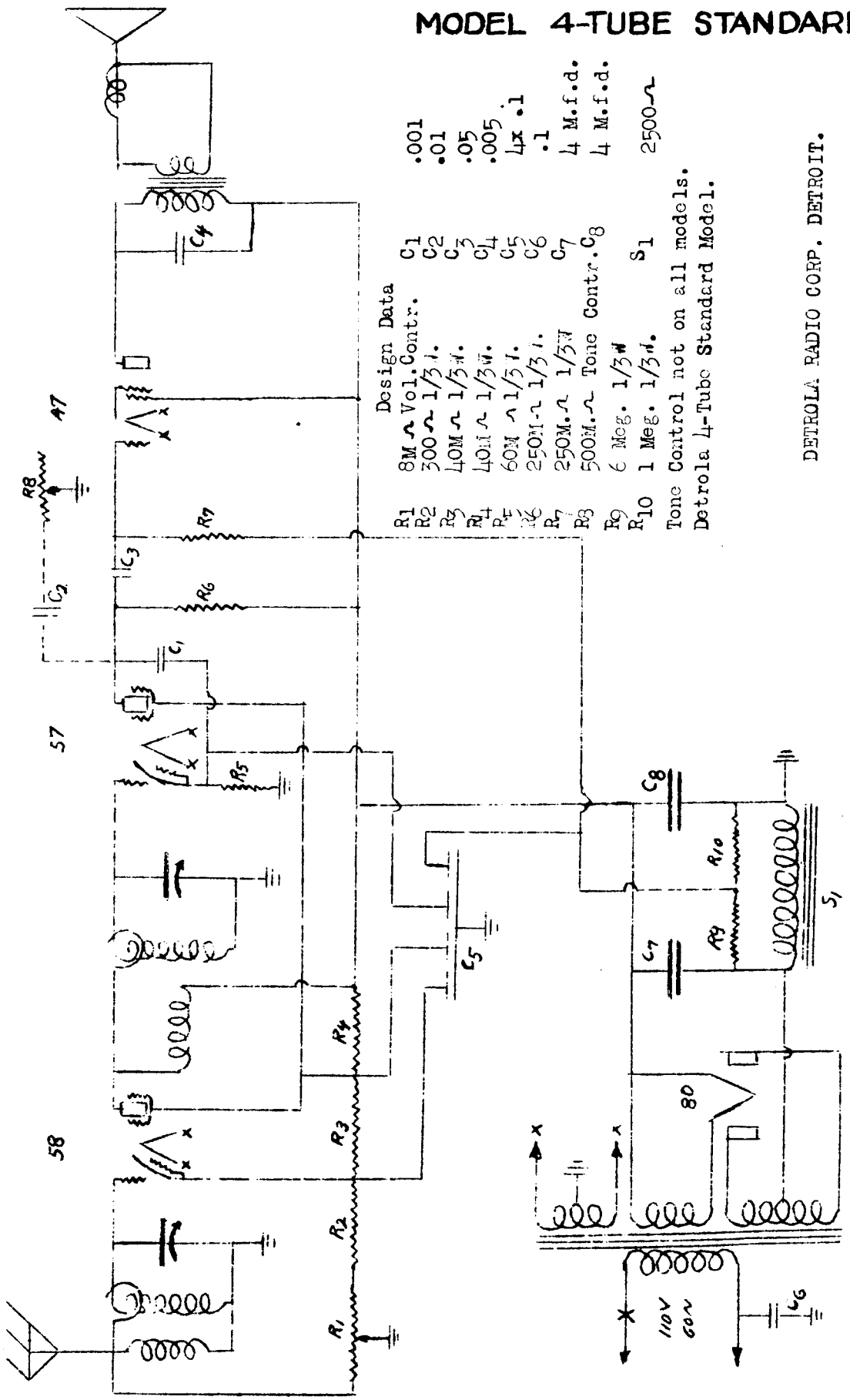
Trouble Shooting Hints

The most common cause of trouble in this set is defective tubes, which cause either complete failure or poor quality. Since the last two stages are balanced circuits, the tubes must be matched in order to obtain high quality amplification. If noisy operation is discovered, the resistors, especially R1 should be suspected first.

The first column of the table indicates the group number desired. Column three indicates the proper tube to use for each stage in this group. Column four shows the proper Delta transformer for use with the particular driver and modulator combination selected as well as the proper impedance adjusting tap for the Class "C" lead selected. The remaining columns give the correct voltage, current and other operating conditions for each tube. While the conditions shown in the table are by no means the only conditions under which these tubes may be operated, it is believed that the average experimenter will obtain much better results by operating the amplifier in exact accordance with the conditions set forth in the table and that when the apparatus is so operated, long and satisfactory operation may be obtained from such an amplifier.

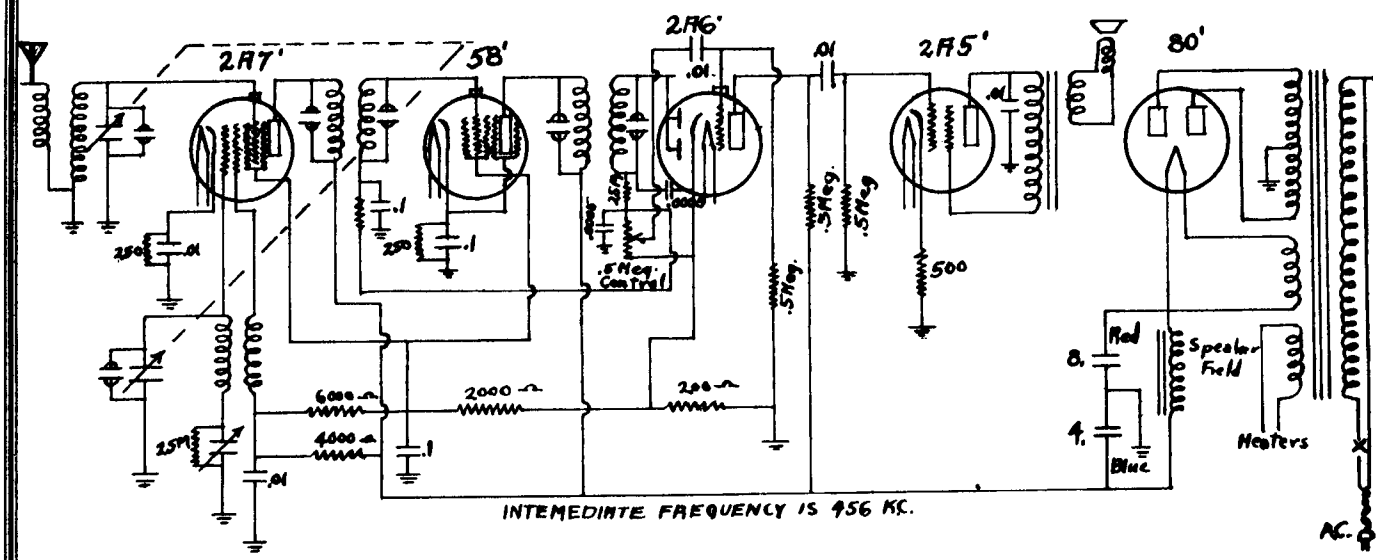
DETROLA RADIO CORP.

MODEL 4-TUBE STANDARD



ECHOPHONE RADIO MFG. CO., Ltd.

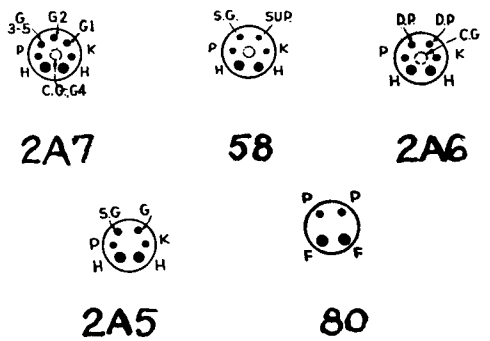
MODEL 1731



GENERAL INFORMATION

This set is a superheterodyne designed to give maximum output of good quality which can be obtained from 5 tubes - and can be operated on 105-120 volt AC at 50-60 cycles only.

To operate, plug in AC and connect colored flexible wire out rear of chassis to approximately 50' of antenna, preferably outside; next, turn on switch and turn volume control nearly up and tune to desired station.



2A7 58 2A6

2A5 80

listed below are a few suggestions:

1. Poor tone -
   a. Defective 2A5 or 2A6 tube
   b. Defective condenser
   c. Speaker off center or dust particles in voice coil.
2. Hum -
   a. Defective filter condenser
   b. Open resistor
   c. Short in circuit
   d. Defective 80 tube or others.
3. Weak -
   a. Defective tube
   b. Set out of balance
   c. Open resistor
   d. Open by-pass condenser

To balance set, first align the IF transformers at 456 kc with gang condenser closed, next turn condenser all way open and align at 1720 kc, then adjust padder condenser at 600 kc, then go back and check at 1720 kc.

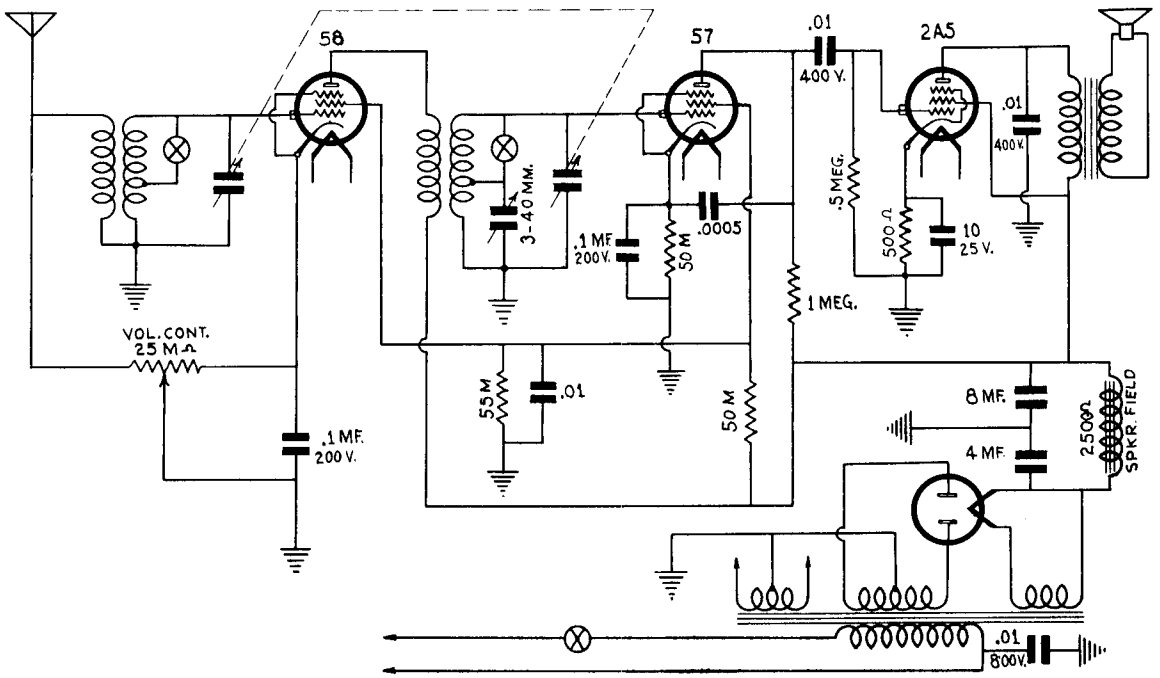
Trouble Shooting Hints

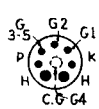
The main difficulties encountered with this set appear to be in the plate supply circuits. The power transformer in numerous sets has broken down and the electrolytic filter condensers are often the cause of trouble. In the latter case, a loud 60 cycle hum is encountered. It is advisable to replace both filter condensers if one causes trouble rather than insert a replacement condenser to take the place of the defective one.

If weak reception is encountered, the most likely cause of the trouble is an open circuited resistor either in the second detector or the voltage divider.

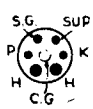
ECHOPHONE RADIO MFG. CO., Ltd.

MODEL 1800



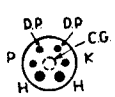


2A7



57 & 58

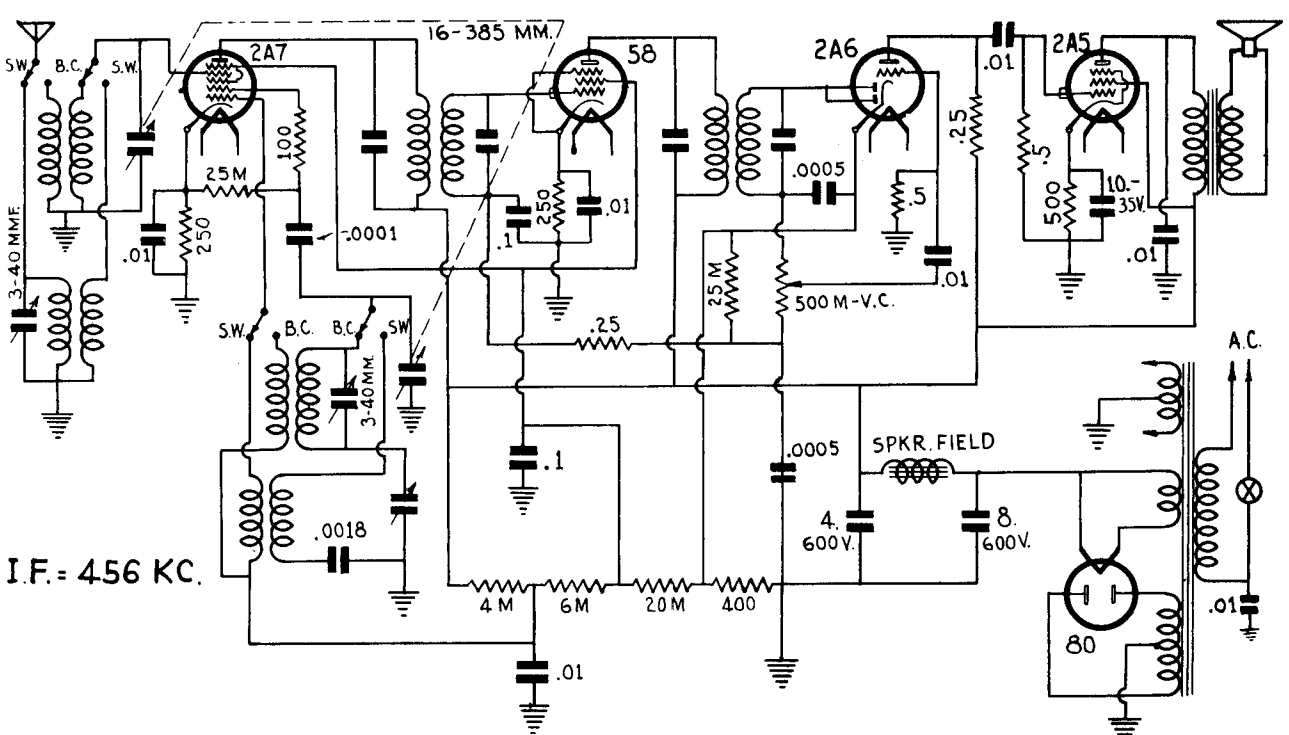
2A5



2A6

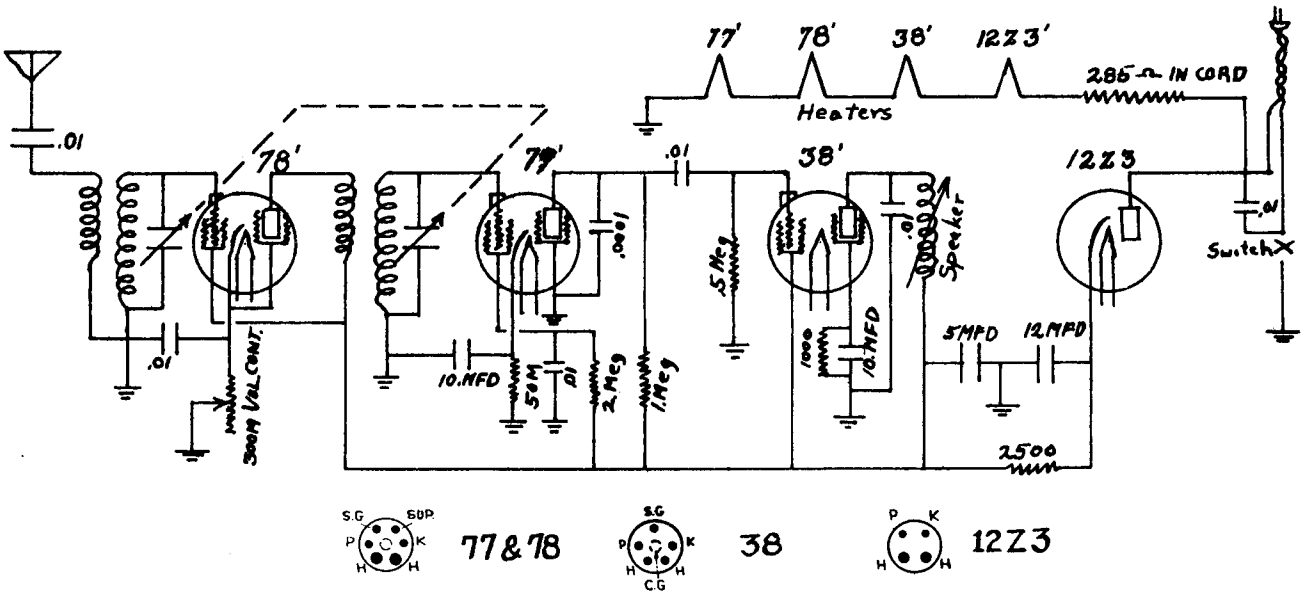
80

MODEL 1734 & 1734 A



ECHOPHONE RADIO MFG. CO., Ltd.

MODEL 7110



77 & 78

38

12Z3

GENERAL INFORMATION

This set is designed to operate on 105-120 volts AC or DC from 25 to 60 cycles. The cord of the set will become quite warm in operation. This is a normal condition, the voltage reducing resistor being an integral part of the line cord for rapid dissipation of heat.

The set is of the conventional tuned radio frequency type and is so developed as to give a minimum of trouble and a maximum of enjoyment.

It is recommended that the aerial be used that is supplied with the set. However, if a longer aerial is used, it is advisable to rebalance the antenna stage of the set to the aerial used. To accomplish this, remove the set from the cabinet and set the dial at about 20 on the scale. Turn the compensator screw on the rear section of the variable condenser back and forth until maximum signal strength is obtained.

Below are listed a few suggestions as to service:

1. Hum -
   a. Poor tubes
   b. Defective filter condenser
2. Poor tone -
   a. Speaker off center
   b. Bad tube
   c. Defective filter condenser
3. Weak signals -
   a. Poor tubes
   b. Set not properly balanced
   c. Defective coils
   d. Open resistor
   e. Shorted bypass condenser

This set is designed to oscillate across a major portion of the broadcast band. This regeneration is controllable by reducing the volume of the set. Oscillation in a set of this type increases the sensitivity from ten to twenty times.

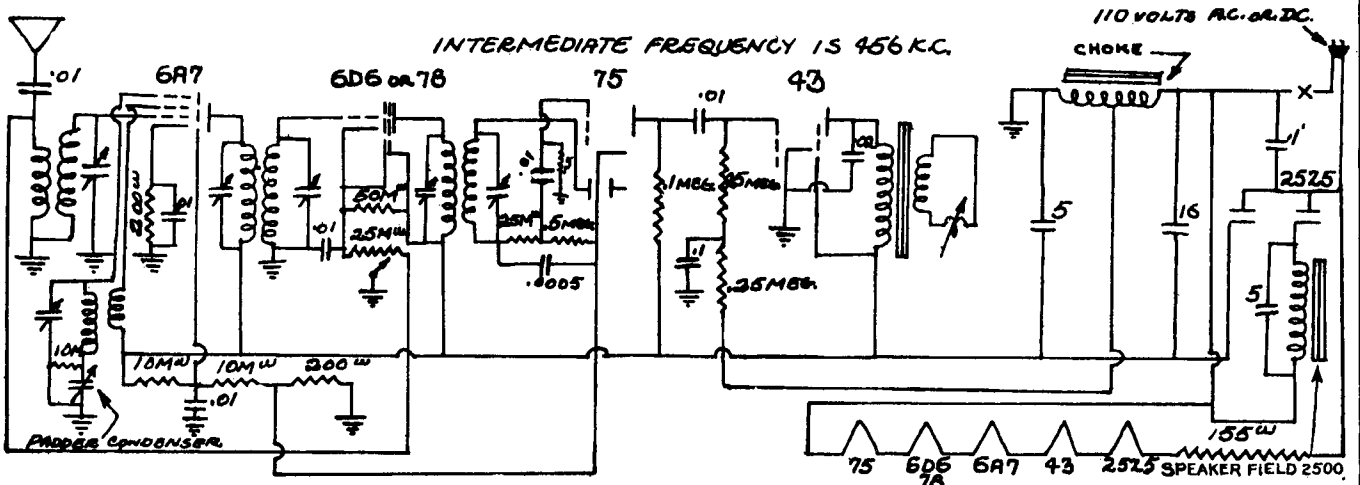
Trouble Shooting Hints

A good many complaints about this set concern the whistles which are heard when the volume control is turned up. As mentioned above regeneration is employed in this receiver to increase the over-all gain, and on certain parts of the band this permits the R.F. and detector tubes to oscillate. Correct alignment of the tuning condensers to suit the aerial will minimize this trouble.

The other prevailing cause of complaint is a rattling in the speaker and it is necessary to test the .01 mf. condenser before adjusting the speaker armature.

ECHOPHONE RADIO MFG. CO., Ltd.

MODEL 7114



GENERAL INFORMATION

This set is a superheterodyne designed to operate on alternating or direct current of any commercial frequency.

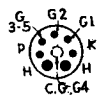
To operate, unreel the aerial to its full length and lay on the floor or drop out of a window. Turn the volume control all the way on. If after a few minutes the set does not function, reverse the plug in the wall socket.

The cord of this set becomes quite warm when the set is in operation. This is a natural condition as the voltage reducing resistor is woven in this cord.

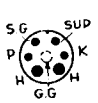
Listed below are a few hints at correcting troubles in the set.

1. Poor tone
   a. Defective 43 or 75 tube
   b. Defective filter condenser
   c. Dust particles in speaker.
2. Hum
   a. Defective tube
   b. Defective filter condenser
   c. Open resistor
   d. Shorted choke
3. Weak
   a. Defective tube
   b. Defective filter condenser
   c. Set out of balance
   d. Open resistor or condenser

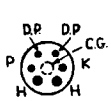
To rebalance the set, first align the I.F. transformers at 456 kc. Then with the variable condenser turned to zero, adjust the trimmers on the variable to 1712 kc. Now tune the set to some frequency around 1400 kc and readjust the detector section only to maximum output. The padder condenser (which is located beneath the chassis) is now readjusted at 600 kc. Tune the set to some signal around 600kc and with a No.4 Spintite adjust the padder condenser for maximum output, at the same time rocking the variable condenser back and forth to follow the signal.



6A7



6D6 OR 78



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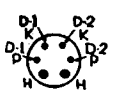
43



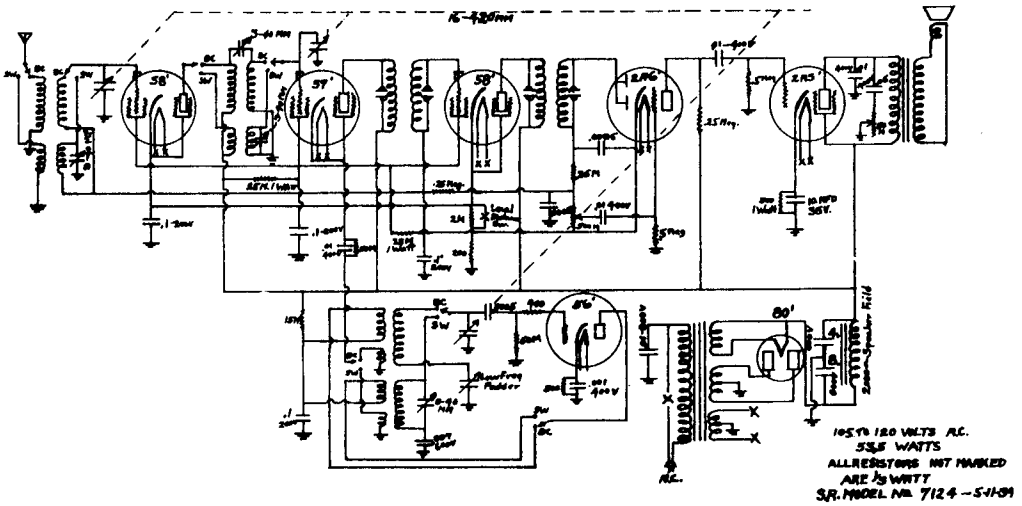
25Z5

Trouble Shooting Hints

If the tubes do not light in this model, suspect the resistor in the power cord as well as the tube filaments which are connected in series. The filter condensers sometimes cause difficulty, and if these electrolytics break down, it is usually necessary to replace the 25Z5 tube as well as the condenser.

ECHOPHONE RADIO MFG. CO., Ltd.

MODEL 7124



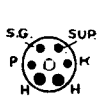
GENERAL INFORMATION

This set is designed to operate on 105-120 volts, A.C. The regular band covers from 1712 KC-550 KC and short wave from 15-55 meters.

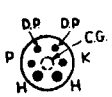
To align set on broadcast, remove 56 oscillator tube, trim Intermediate Frequency Transformers at 456 KC from an oscillator, feeding same into 57, first detector grid. Secondly, open gang condenser wide open and adjust trimmer condensers on top to maximum noise level, then adjust low frequency padder at approximately 600 KC; after doing this go back and recheck at 1700 KC.

To adjust short wave, turn switch left and tune gang condenser to 31 meters on dial and trim small padders underneath to maximum noise level or some station, checking oscillator coil padder with gang condenser tuned at different points.

This set is built to give maximum enjoyment and a minimum of trouble. Below are a few suggestions as to services



57 & 58



2A6

2A5

56

80

Hum - check
a. Defective tube or tubes
b. Defective filter block.
c. Defective by pass condenser.
d. Poor connection.

Poor tone - check
a. Speaker cone rattles or dirt in voice coil
b. Bad by pass condenser
c. Defective resistor
d. Defective tubes.
e. Defective volume control
f. Poor connection.

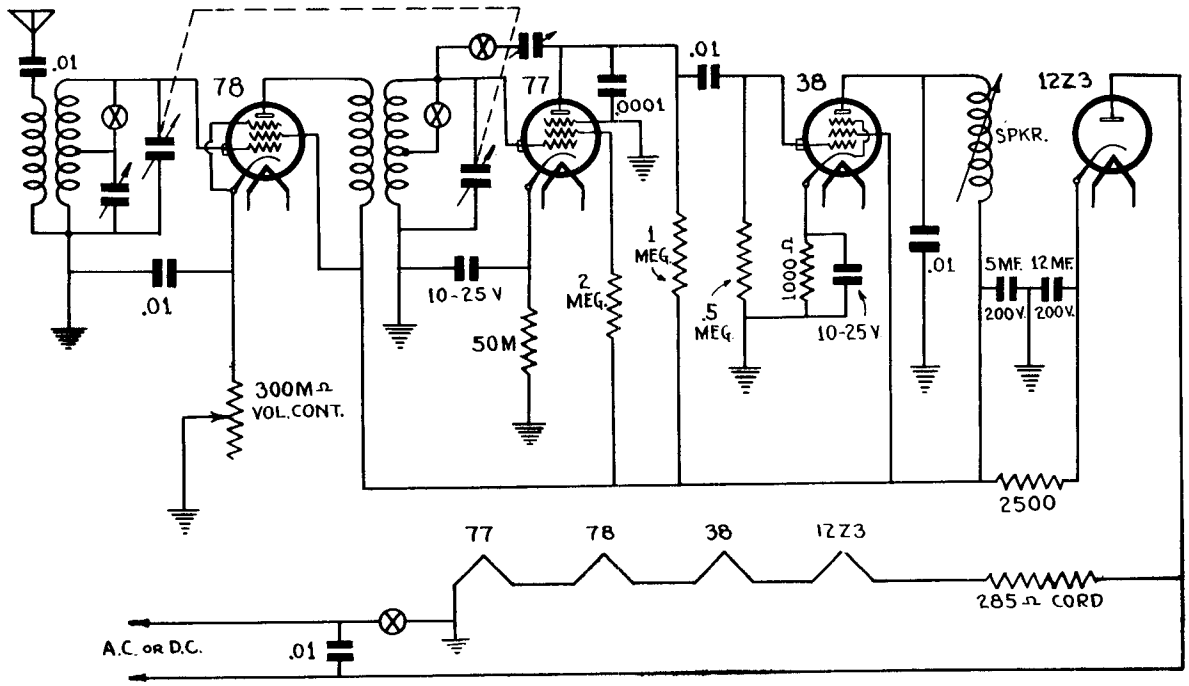
Weak - check
a. Set out of balance
b. Weak tubes
c. Defective resistor or by pass condenser
d. Defective coils.

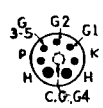
Trouble Shooting Hints

In this model lack of results on the short wave band is often caused by failure of the oscillator to work with the short wave coil connected. The value of the 50,000 ohm grid leak often changes sufficiently so that the tube will not oscillate properly on the high frequency end of the band. If the usual background noise is missing when the switch is in the low-wave position, first check the wave change switch and then try a new type 56 tube in the oscillator socket. Finally check the grid leak value.

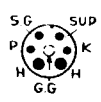
ECHOPHONE RADIO MFG. CO., Ltd.

MODEL 7126





2A7



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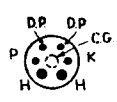
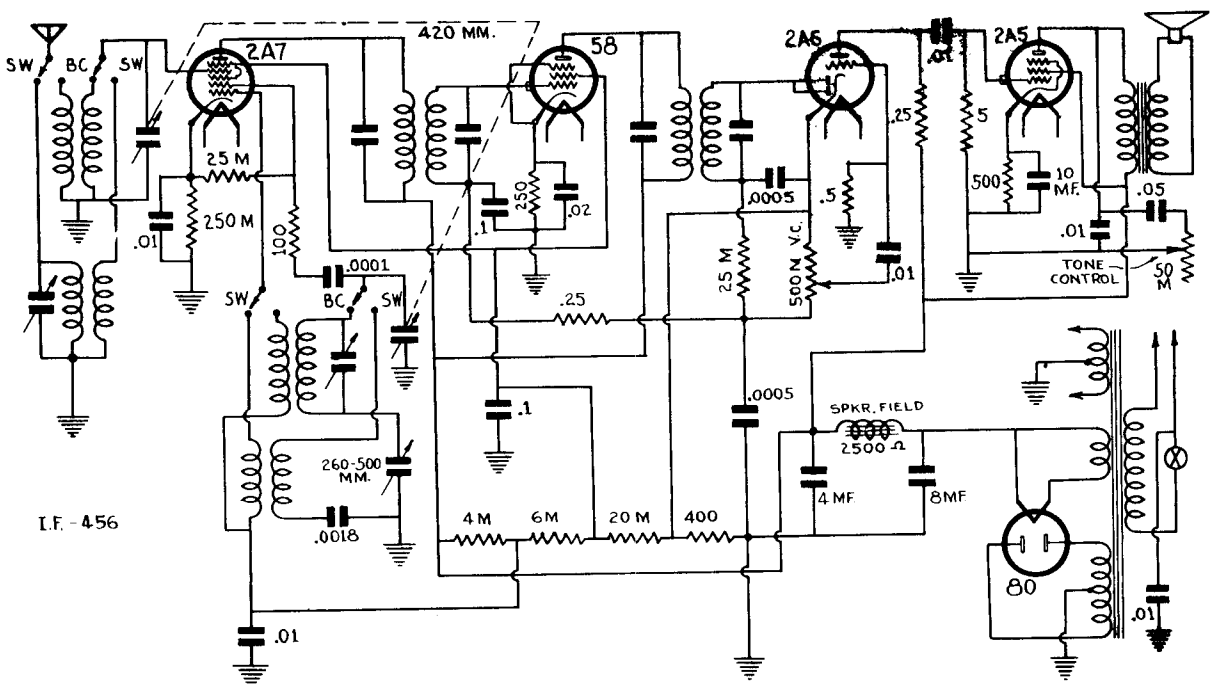


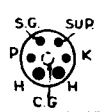
2A6

2A5

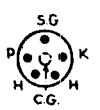
80

MODEL 7127





77 & 78



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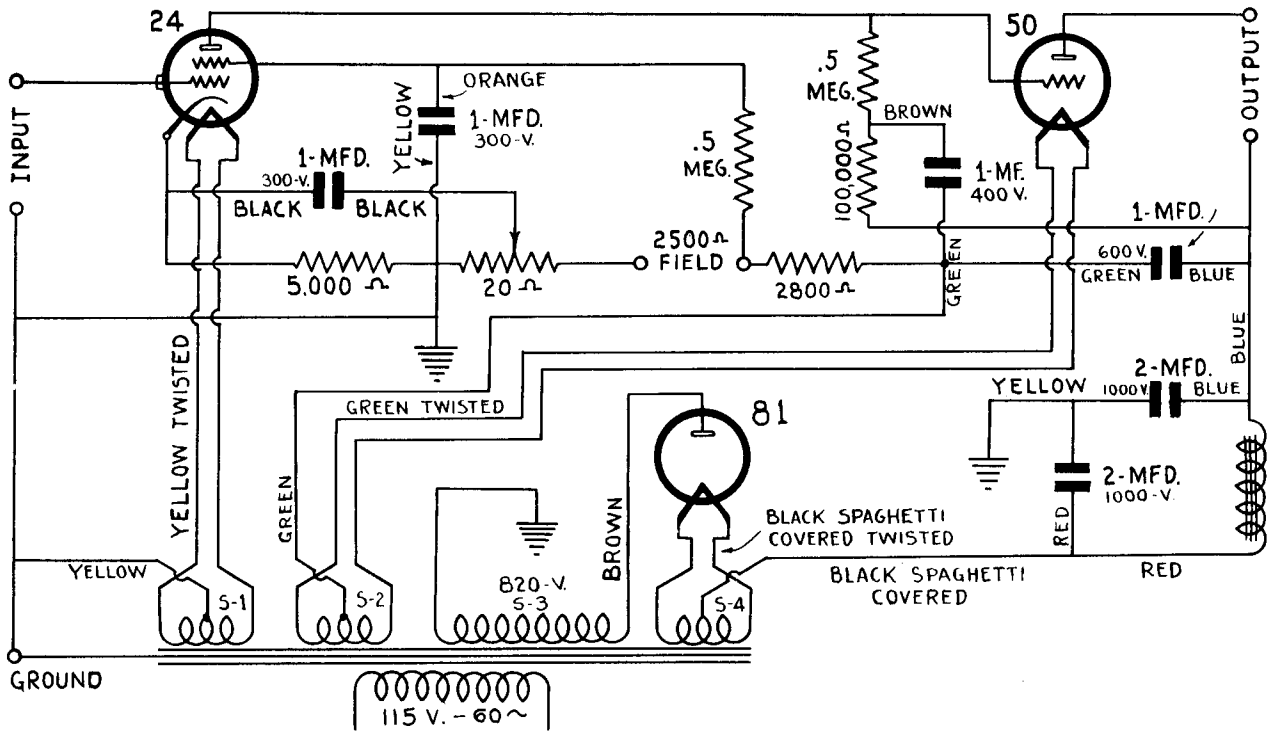
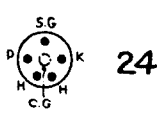
12 Z 3

ELECTRAD, Inc.

MODEL A-250





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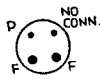

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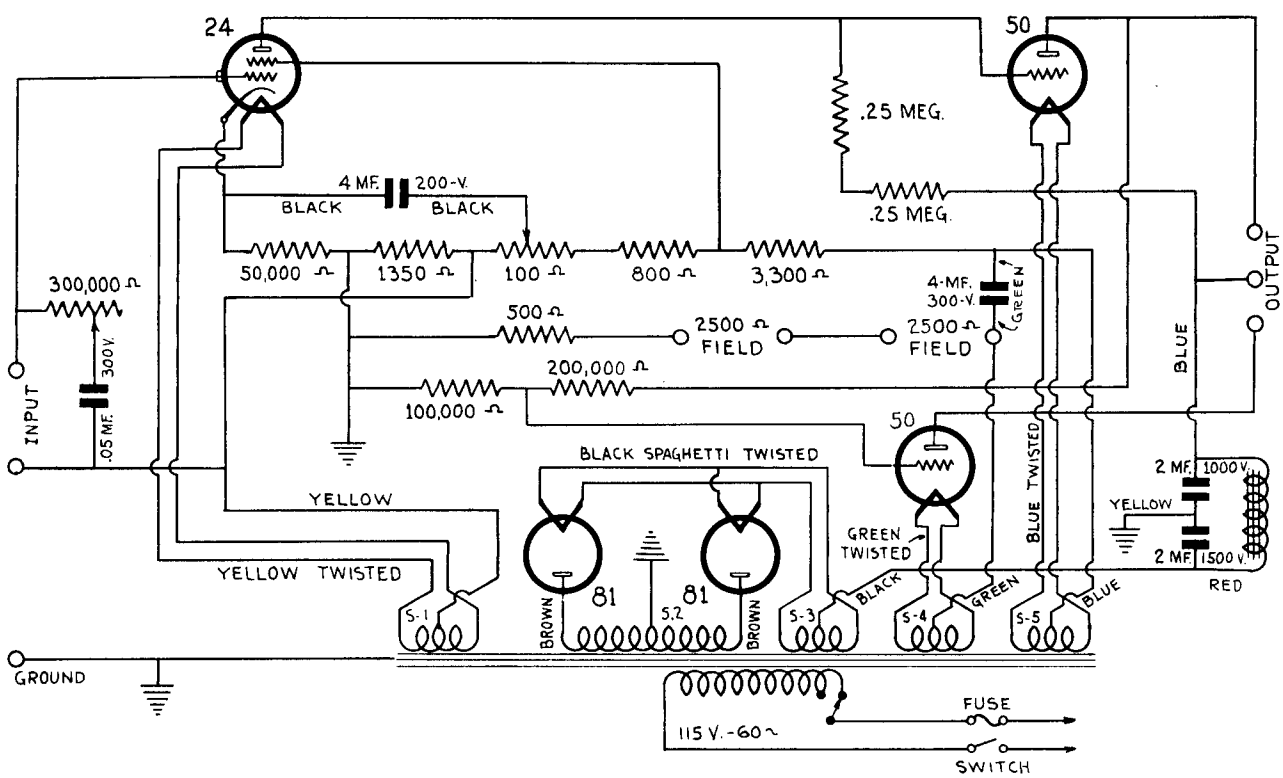
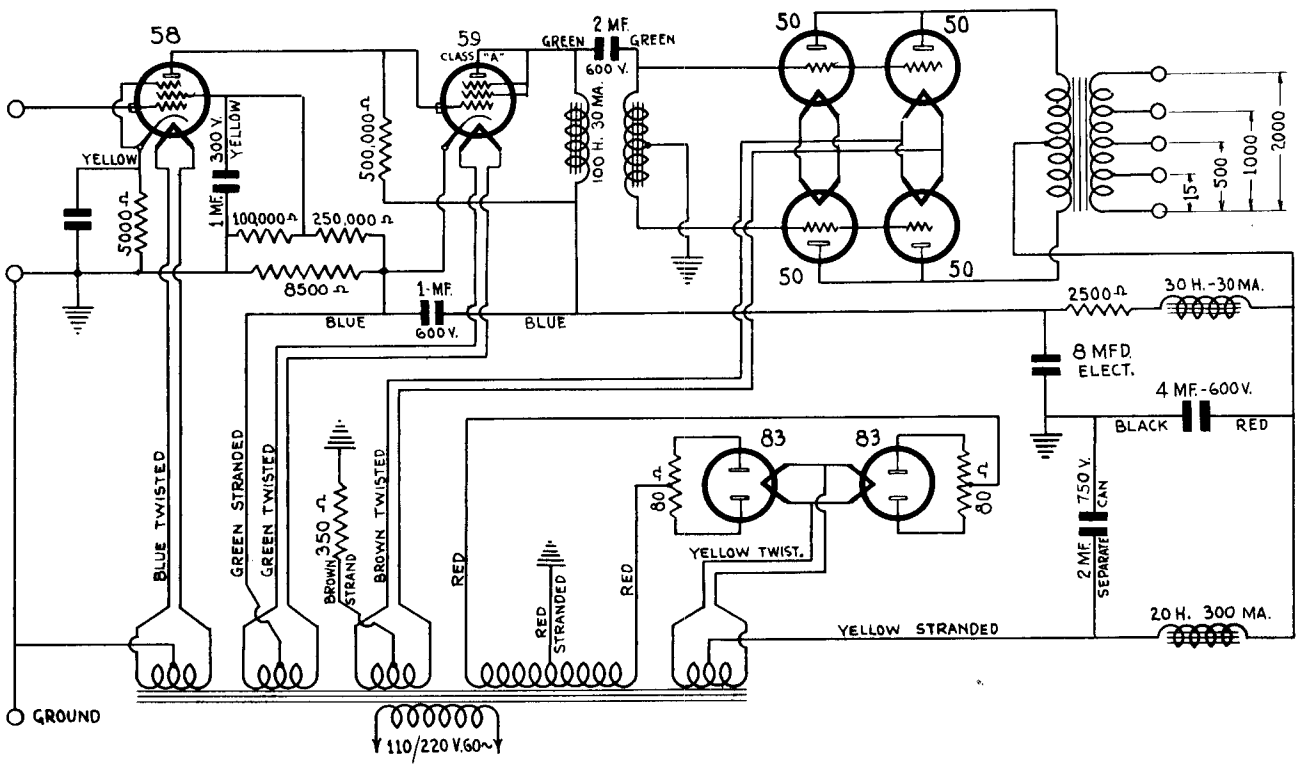
MODEL C-250



ELECTRAD, Inc.

MODEL E-450

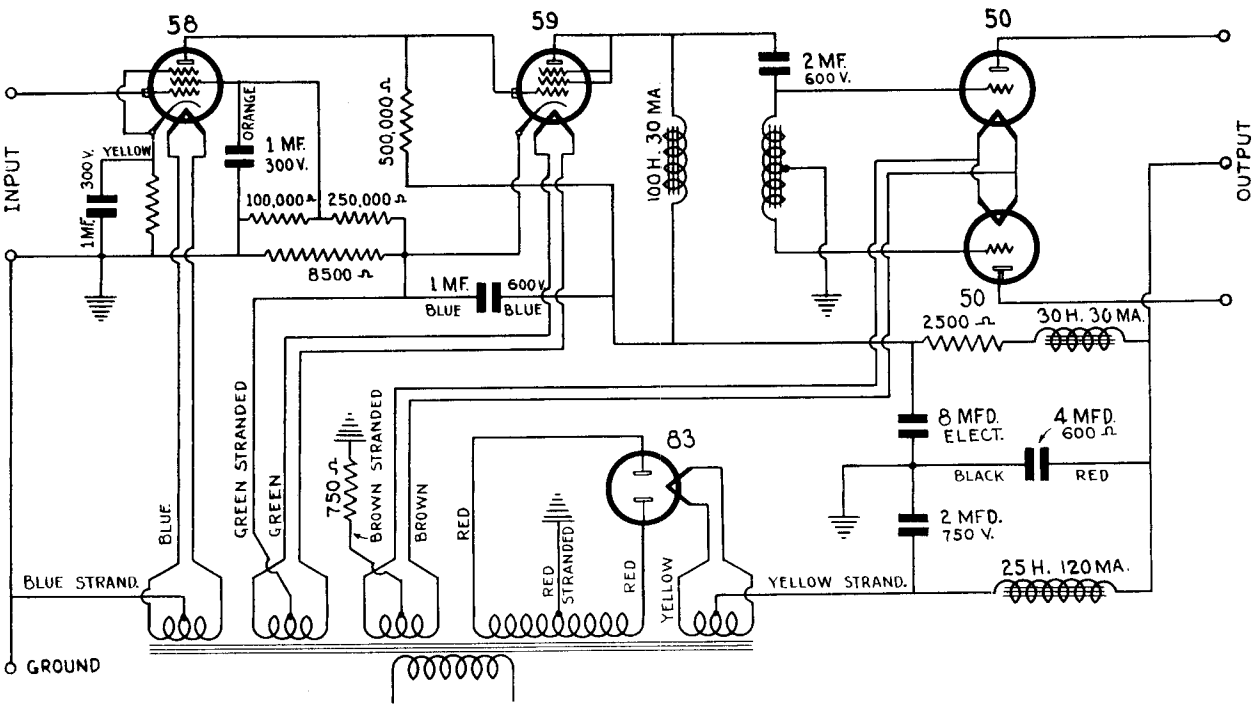


58 59

MODEL D-450

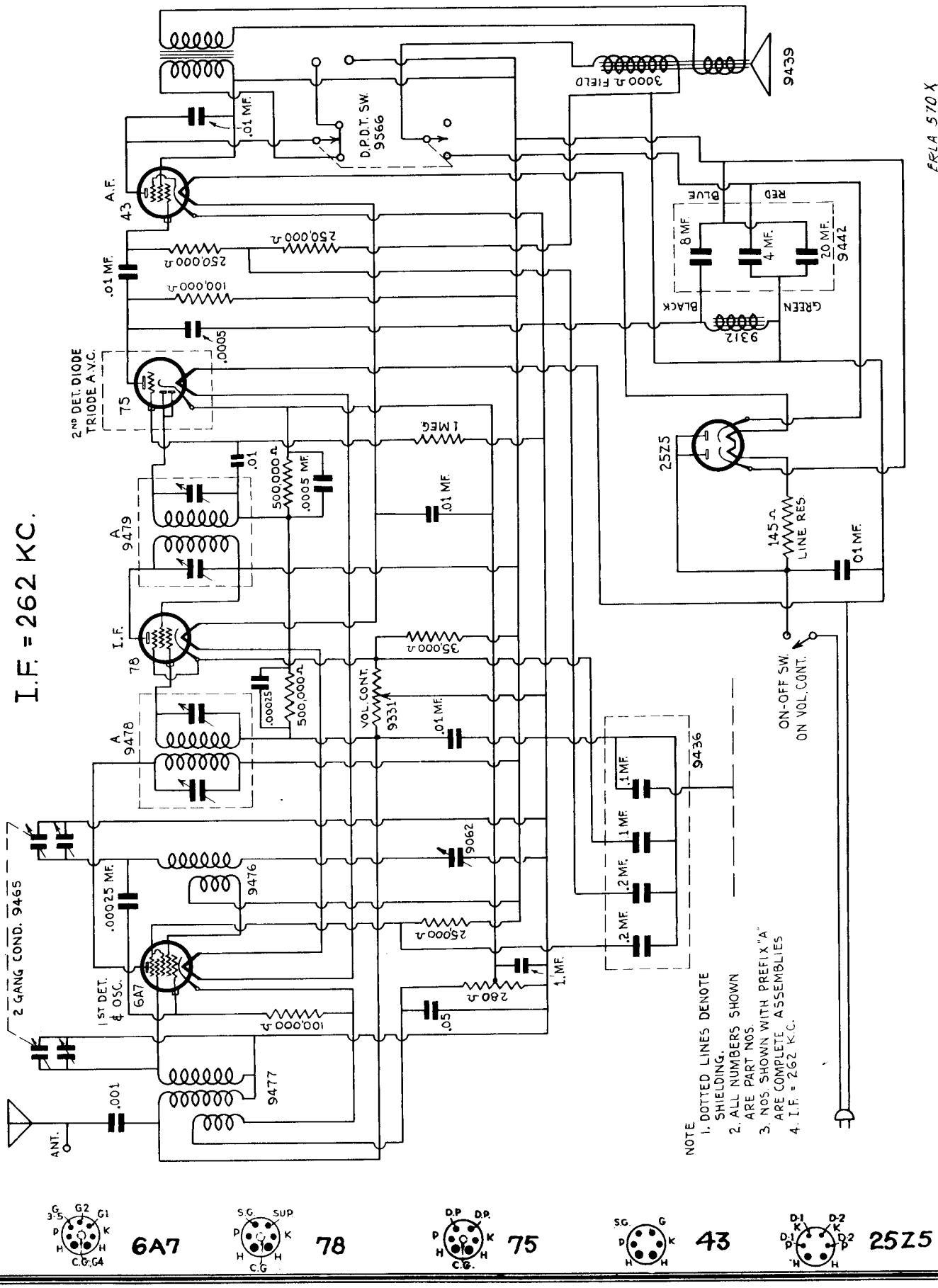
50

83



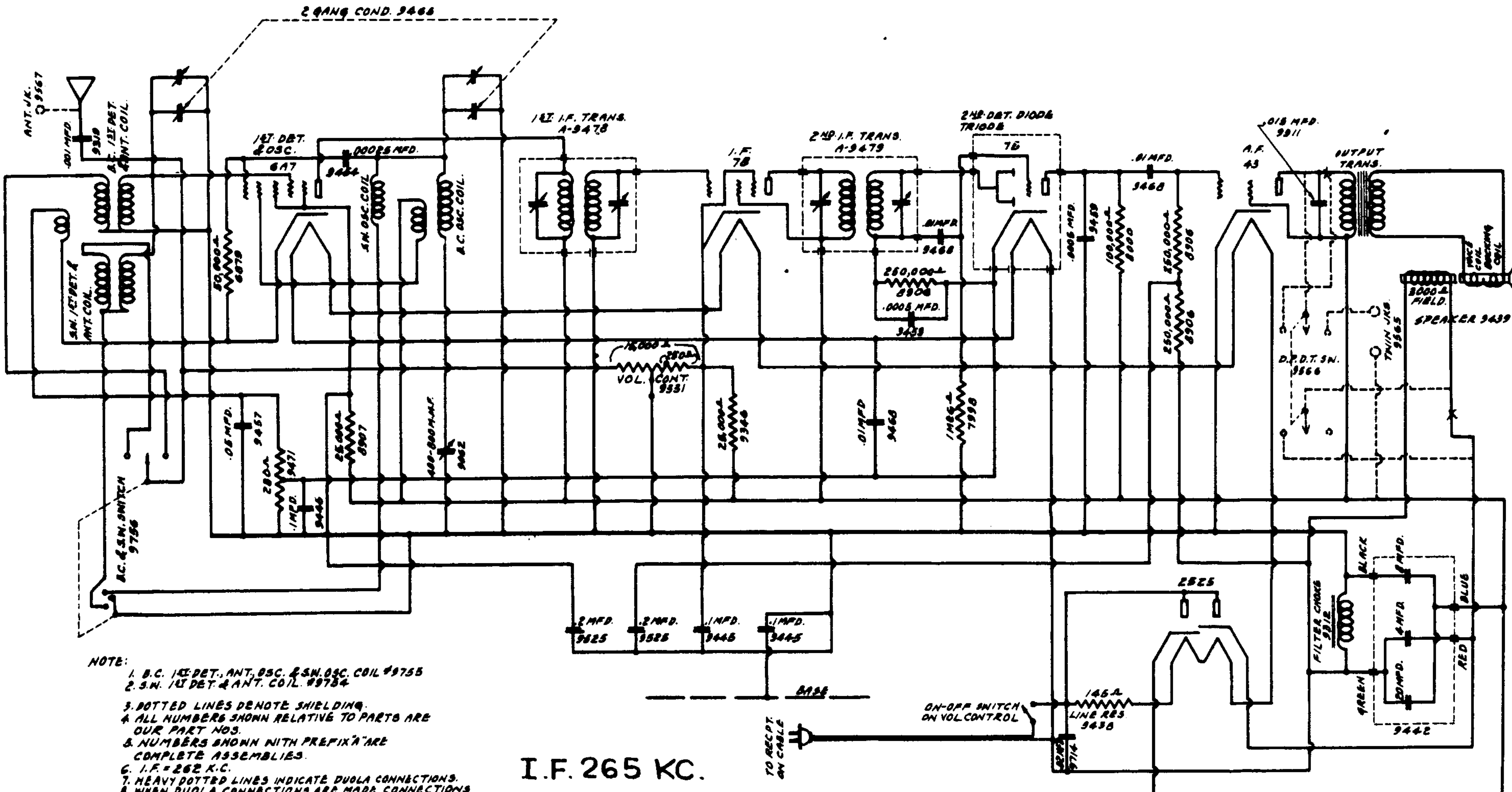
ELECTRICAL RES. LABS., Inc.

MODEL 570X



ELECTRICAL RES. LABS., Inc.

MODEL 599



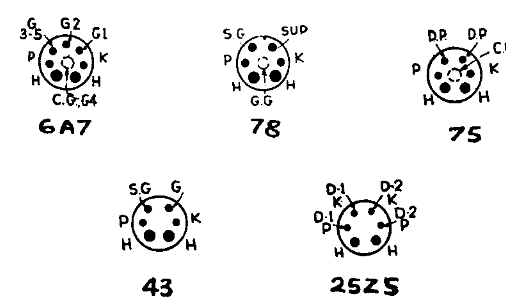
NOTE:
1. B.C. 1ST DET., ANT., OSC. & SW. OSC. COIL #9755
2. S.W. 1ST DET. & ANT. COIL #9754
3. DOTTED LINES DENOTE SHIELDING.
4. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
5. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
6. I.F. = 262 K.C.
7. HEAVY DOTTED LINES INDICATE DUOLA CONNECTIONS.
8. WHEN DUOLA CONNECTIONS ARE MADE CONNECTIONS X ARE OPEN.

I.F. 265 KC.

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	SCREEN VOLTS	CATHODE VOLTS	OSC. GRID NO.1	ANODE GRID NO.2	SCREEN GRID NO.3 & 5
6A7	Oscillator & Modulator	5.2	128		2.00	1.5	125	76
78	Intermediate Frequency	5.1	128	128	2.25			
75	2nd Detector Diode & AVC	5.0	82.5*		2.00			
43	Output	25	115	128	20**			
25Z5	Rectifier	25						

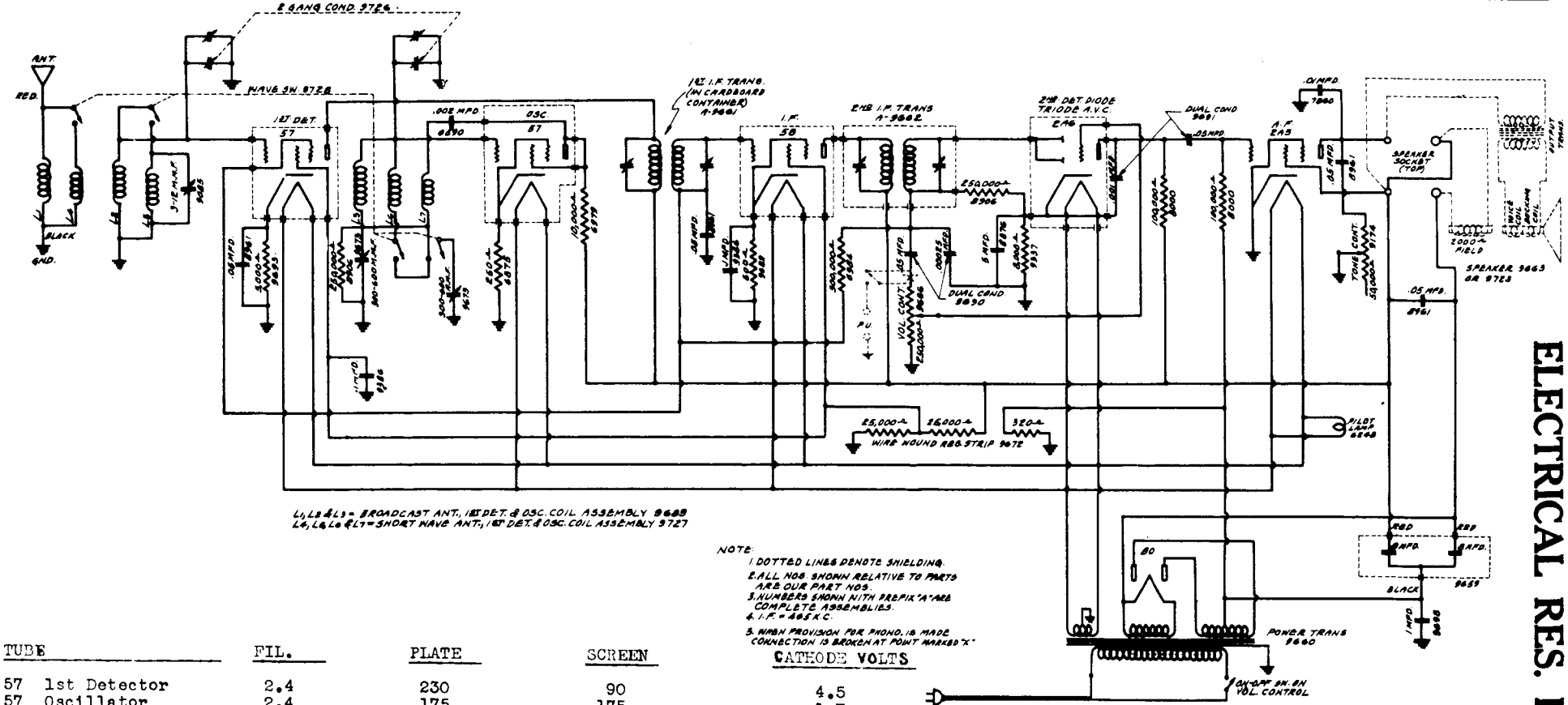
* Triode plate voltage. Comparative only is not the true voltage applied. The voltmeter, when readings are taken at this point, is in series with a very high resistance.

** Bias for the 43 output tube is obtained by the voltage drop across the filter choke. Read bias voltage from cathode to negative side of filter choke.



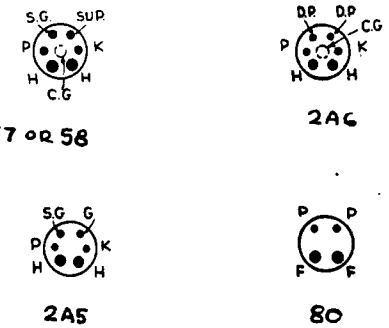
ELECTRICAL RES. LABS., Inc.

MODELS 622 & 623



NOTE:
1. DOTTED LINES DENOTE SHIELDING.
2. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. I.F. = 465 K.C.
5. WHEN PROVISION FOR PHONO. IS MADE CONNECTION IS BROKEN AT POINT MARKED "X"

TUBE	FIL.	PLATE	SCREEN	CATHODE VOLTS
57 1st Detector	2.4	230	90	4.5
57 Oscillator	2.4	175	175	1.7
58 I. F.	2.4	230	90	4
2A6 2nd Detector	2.45	160*		3
2A5 A. F.	2.4	218	230	7**
80 Rectifier	4.8	340 ea.plate		



* Comparative voltage only. The voltmeter, when readings are taken at this point, is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

** Read from grid to chassis.

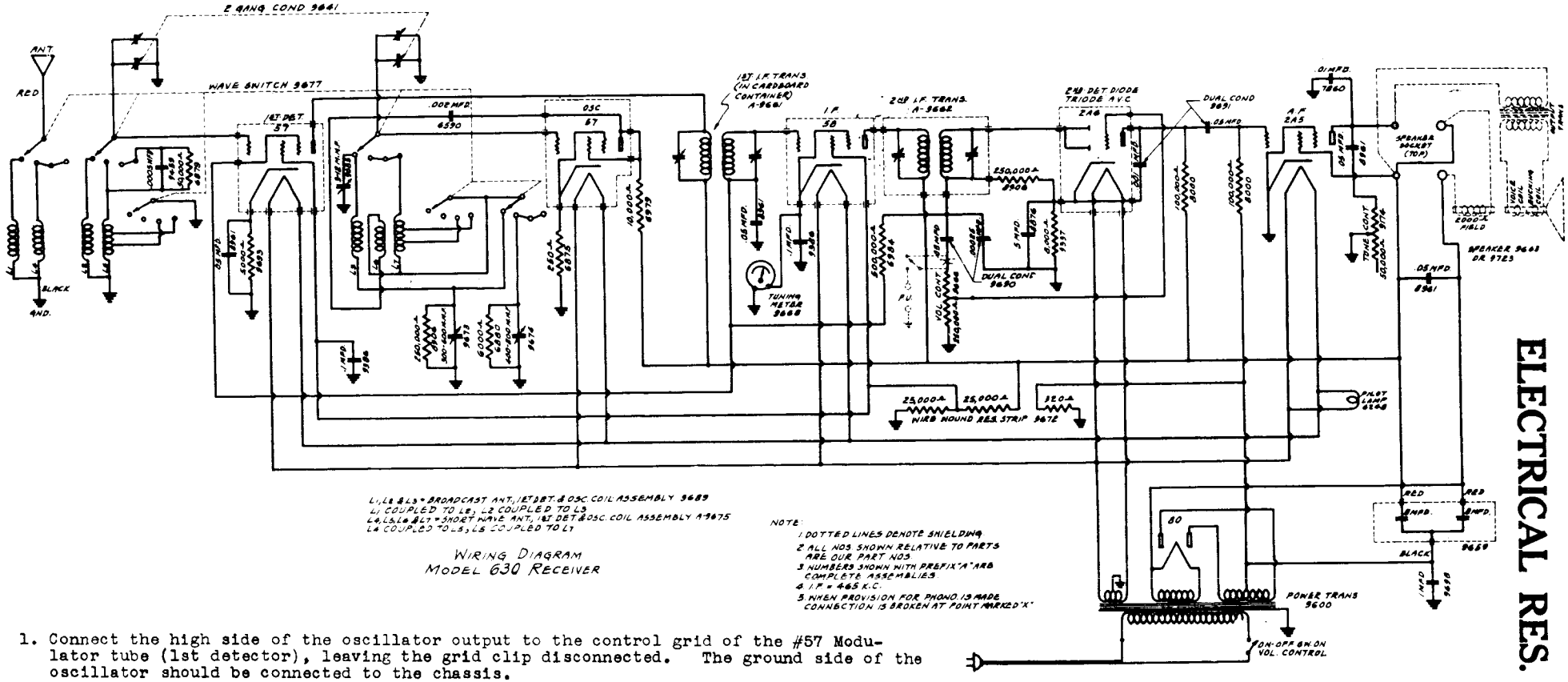
1. Connect the high side of the oscillator output to the control grid of the type 57 modulator tube (1st detector) leaving the grid cap disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

ELECTRICAL RES. LABS., Inc.

MODELS 634 & 635



L1, L2 & L3 = BROADCAST ANT., 1ST DET. & OSC. COIL ASSEMBLY 9689
L1 COUPLED TO L2, L2 COUPLED TO L3
L4, L5, L6 & L7 = SHORT WAVE ANT., 1ST DET. & OSC. COIL ASSEMBLY A-9675
L4 COUPLED TO L5, L6 COUPLED TO L7

WIRING DIAGRAM
MODEL 630 RECEIVER

NOTE:
1. DOTTED LINES DENOTE SHIELDING
2. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. I.F. = 465 K.C.
5. WHEN PROVISION FOR PHONO. IS MADE CONNECTION IS BROKEN AT POINT MARKED "X"

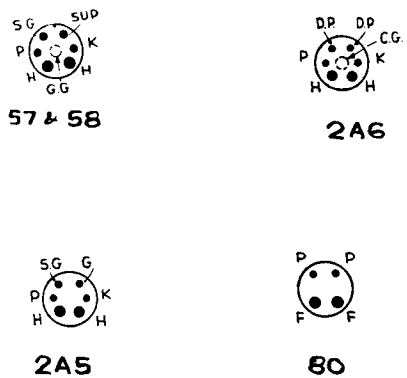
1. Connect the high side of the oscillator output to the control grid of the #57 Modulator tube (1st detector), leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the 1st intermediate transformer trimmer up and down until maximum reading is obtained on the output meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

4. The second I.F. transformer should next be adjusted in the same manner as the first I.F. transformer.

TUBE	FIL.	PLATE	SCREEN	CATHODE VOLTS
57 1st Detector	2.4	230	90	4.5
57 Oscillator	2.4	175	175	1.7
58 I.F.	2.4	230	90	4
2A6 Second Detector	2.45	160*		3
2A5 A.F.	2.4	218	230	7**
80 Rectifier	4.8	340 each plate		

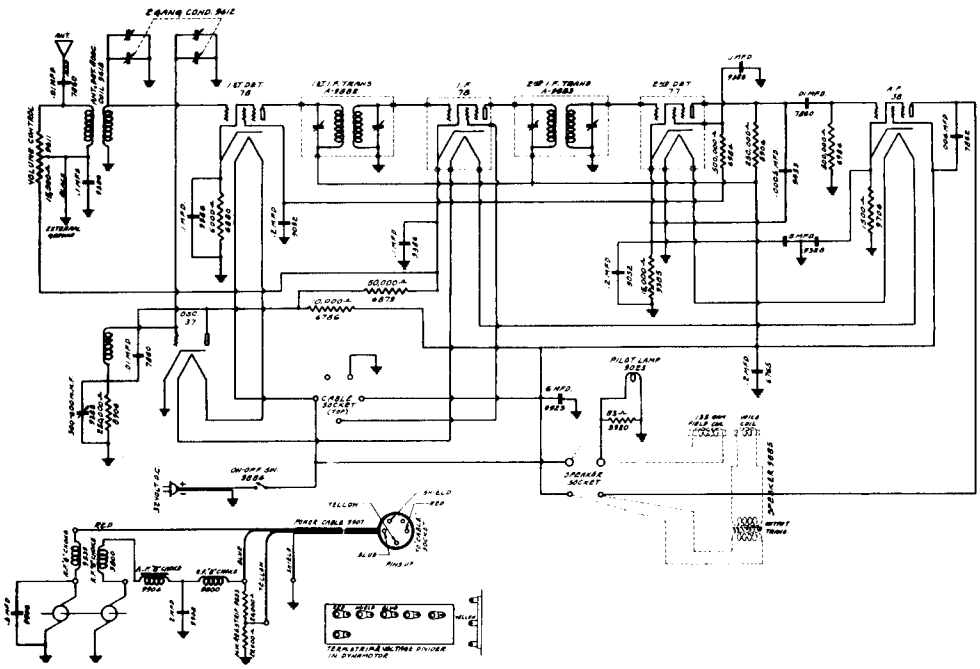


* Comparative voltage only. The voltmeter when readings are taken at this point is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

** Read from grid to chassis.

ELECTRICAL RES. LABS., Inc.

MODELS 5001 & 5002



78 & 77

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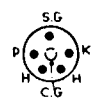

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Line Voltage : 32 Volts
Volume Control : Full on

TUBE	FIL.	PLATE	SCREEN	CATHODE
78 1st Detector	6.5	215	100	10
37 Oscillator	6.5	140		25
78 I.F.	6.5	215	100	26
77 2nd Detector	6.5	90*	32.5*	4
38 Output	6.5	208	215	20

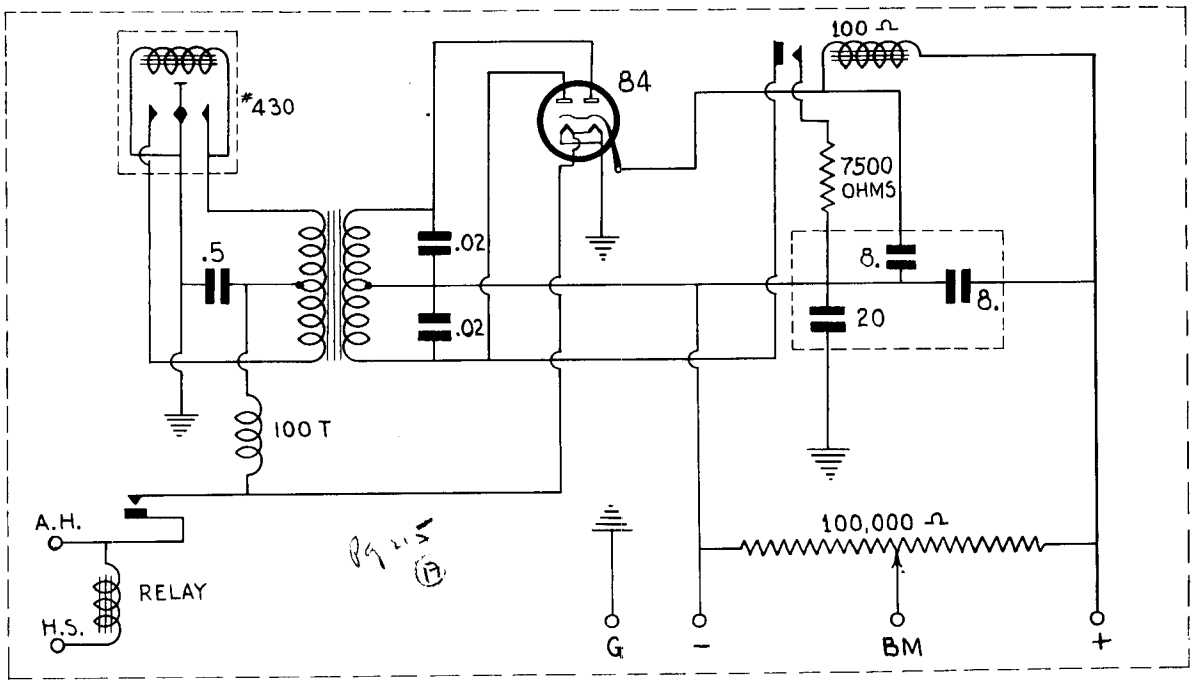
* Comparative Voltage only.
Read voltage from socket to chassis.

INTERMEDIATE ALIGNMENT: Only when an intermediate transformer has become defective due to an open or burned out winding should it be necessary to readjust the intermediate transformer. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device. To align the intermediate transformer:

1. Connect the high side of the oscillator output to the control grid of the #36 modulator tube. The ground side of the oscillator should be connected to the chassis.
2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.
3. Align the first intermediate transformer by turning one of the intermediate transformer trimmer screws up and down until maximum reading is obtained on the output meter. Then adjust the other trimmer screw in the same manner.
4. The second I.F. transformer should next be adjusted in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

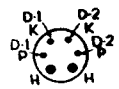
ELECTRONIC LABS., Inc.

MODEL 6 VOLT ELIMINATOR 331

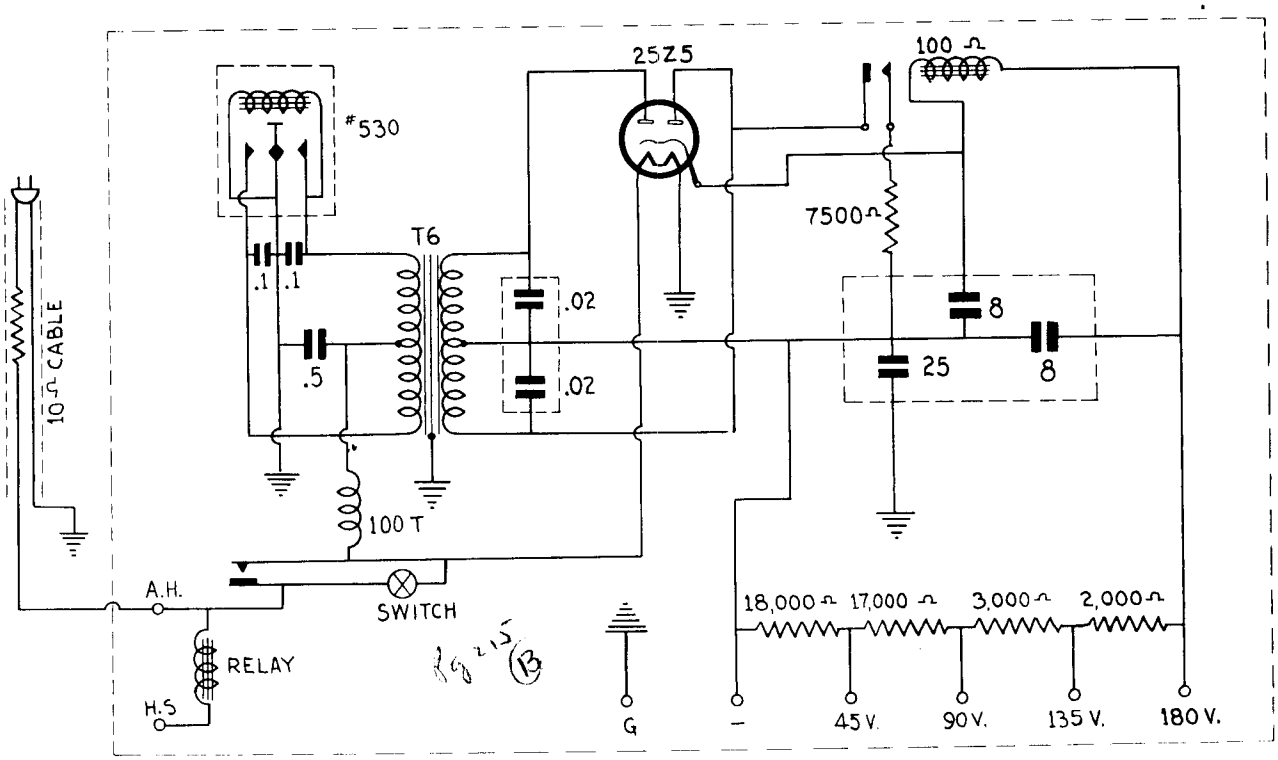


84

25Z5

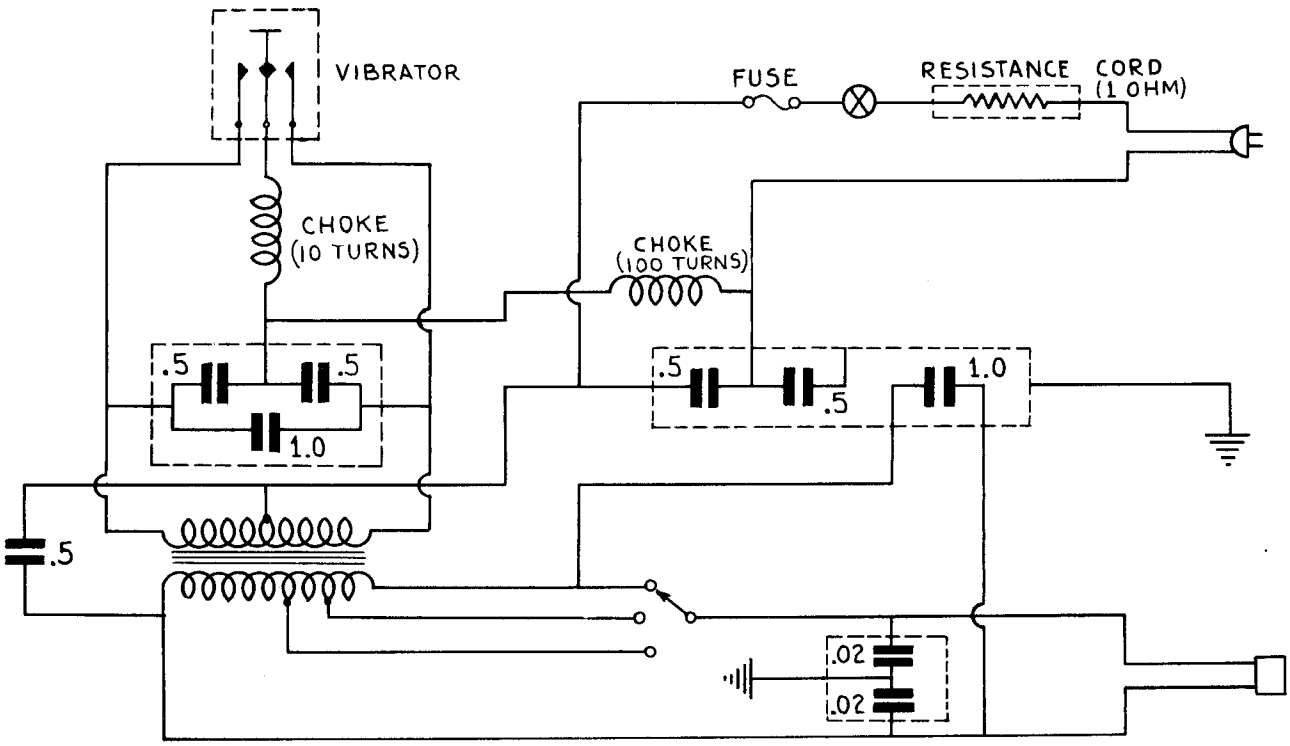


MODEL 32 VOLT ELIMINATOR 332

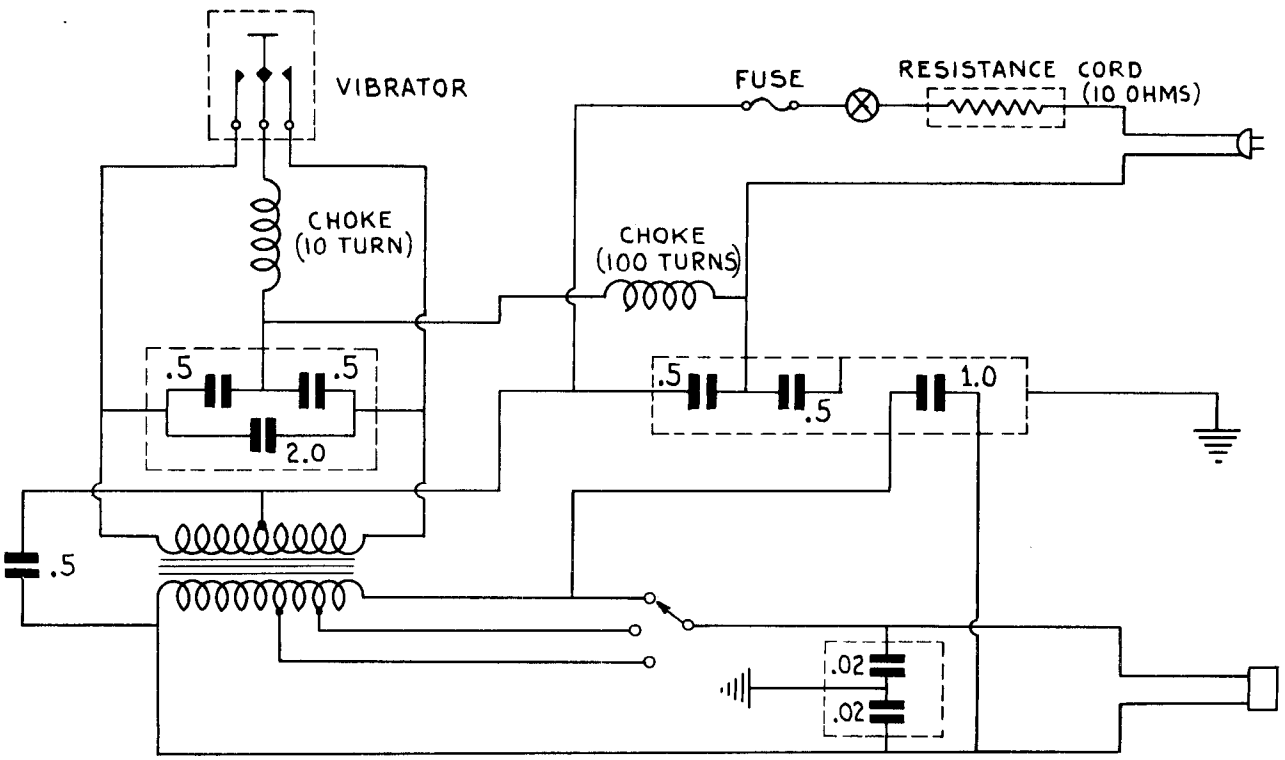


ELECTRONIC LABS., Inc.

MODEL 32 VOLT D.C. CONVERTER



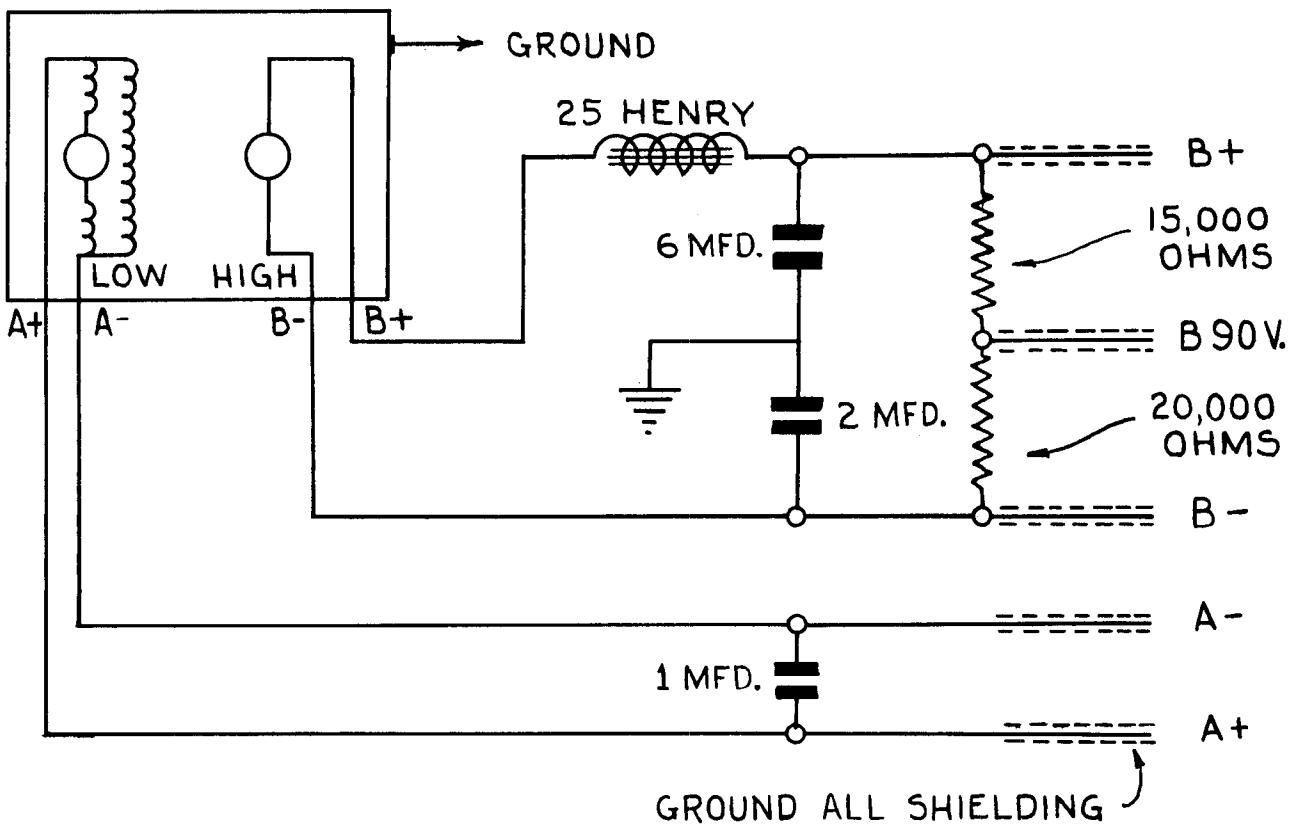
MODEL 110 VOLT D.C. CONVERTER



EMERSON ELECTRIC MFG. CO., Inc.

MODEL DM4AD-108 "B" POWER UNIT

DYNAMOTOR

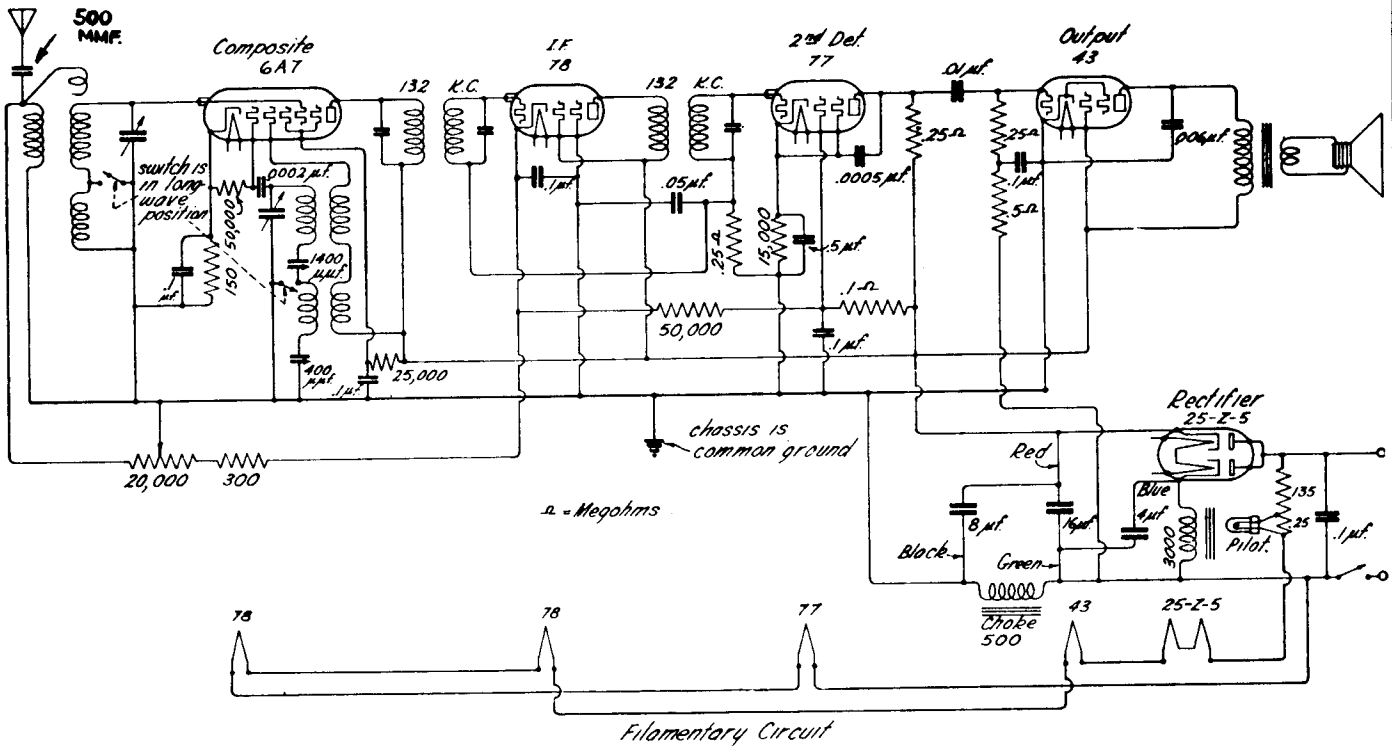


Some sets specify 135 and 67-1/2 volts, but in nearly all cases such sets will operate as well or better on 180-90 volts. If necessary, the 135 and 67-1/2 volts can be obtained by inserting a 2,000 to 3,000 ohm 3 watt resistor between the +B of the power unit and the +B of the radio. A 15,000 to 30,000 ohm 1 watt resistor can be connected between the +90 volt lead of the power unit and the 67-1/2 volt lead of the radio.

When making an installation, shielded, insulated copper covered wire should be used. #14 or #16 should be used for the A leads, while #16 or #18 or the regular B leads from the radio should be used for the B connections. A heavy copper braid should be used for the ground connection from the lug or terminal on end plate of the B power unit. It is important that this lead be short and securely bonded to the car chassis. Connect remaining A lead to the radio control switch. This shielded A lead should not run too close to the aerial lead-in. Shielding on this A lead should be grounded to the car chassis every 18 to 20" between the power unit and the control switch (of the radio set). Heavy copper braid should be soldered to shielding of all power unit leads and A and B leads running to the set. This braid should be bonded to the car chassis. In some cases it is necessary to use regular shielded automobile antenna lead in to eliminate the pick-up noise.

EMERSON RADIO & PHONO. CORP.

MODELS 3LW-33LW-350LW-H-5-L-250LW-321LW

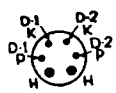


Ω = Megohms

Voltage Readings:

78 & 77

43



25Z5

Readings should be taken with Volume Control fully on. Tuning control set for 550 K.C., and antenna outside the set. Use a D.C. Voltmeter having a resistance of 1000 ohms per volt.

Using	300-volt scale Plate to Ground	300-volt scale Screen to Ground	30-volt scale Cathode to Ground
78—Detector Oscillator ...	98	98	1.6
78—I. F. Amplifier	98	98	2.8
77—2nd Detector	35	25	1.5
43—Power Amplifier	92	98	..
25Z5—Rectifier	..		98

Voltage across speaker field 100 volt.

Ground is the electrical ground of the circuit and is not the chassis proper.

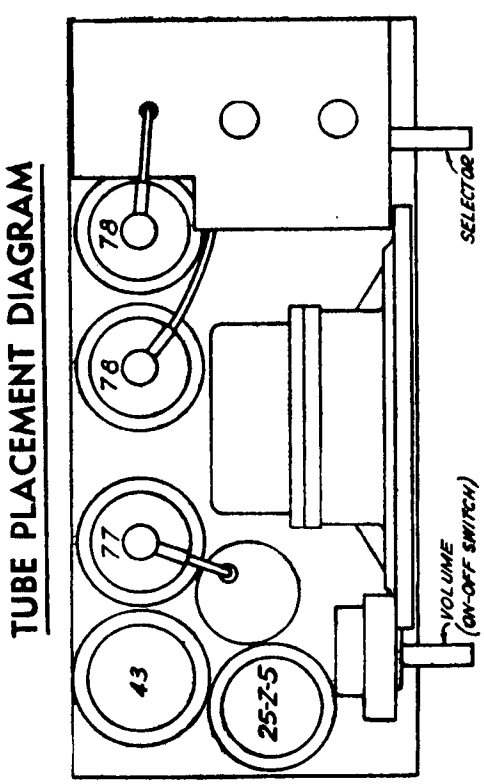
Bias for 43 tube is measured across filter choke and should be 15 to 18 volts.

The heat generated in normal operation is about the same as that produced by an ordinary 30 watt electric bulb. To allow normal ventilation so that this heat is not sealed in the cabinet do not cover the vents in the back of the cabinet by placing its back tightly against a wall or other obstruction.

Tubes may be replaced by removing the back of the cabinet.

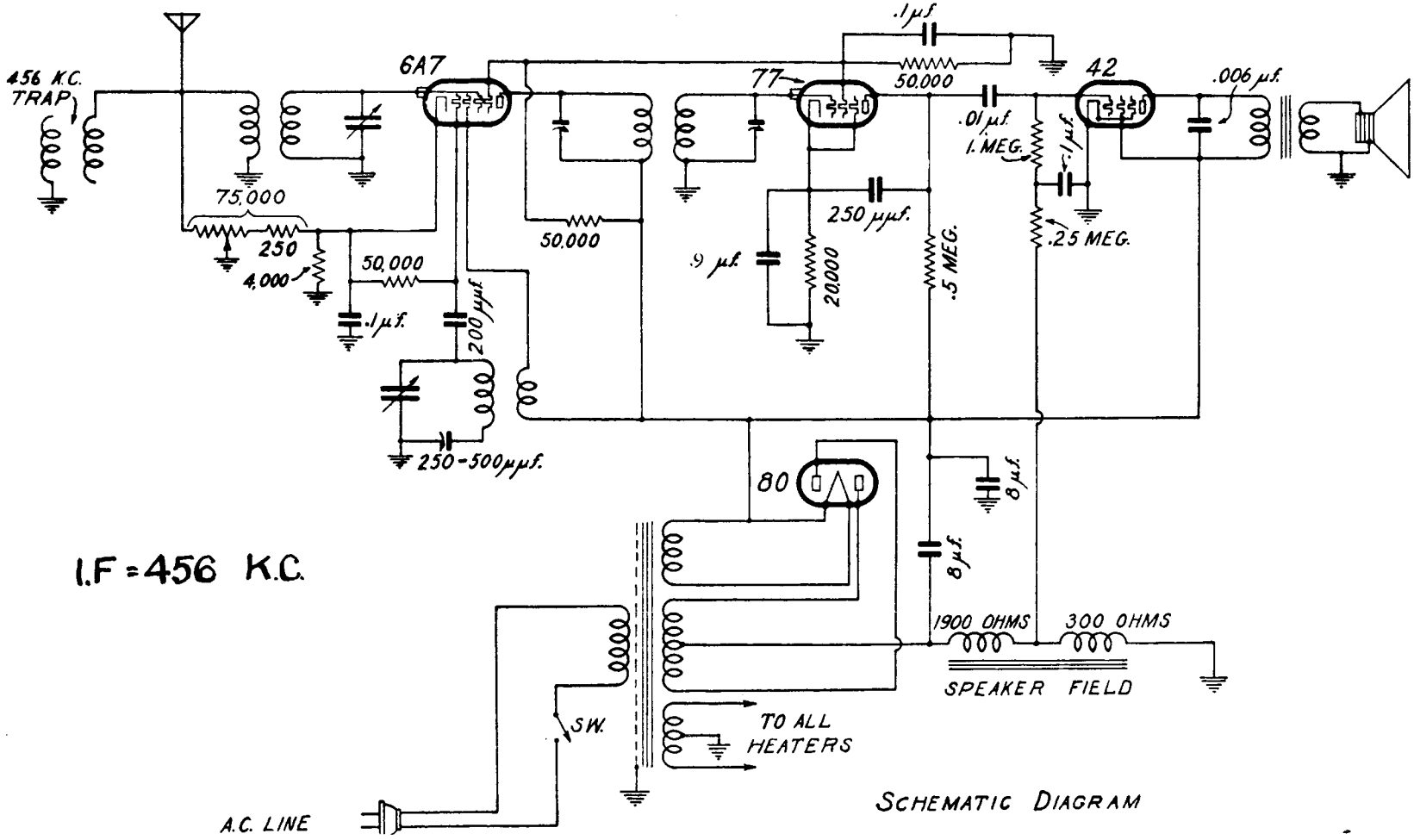
Minor Reasons for Failure to Operate:

1. Tubes not in sockets
2. Grid clips not on tubes
3. On D.C.—supply-plug reversed
4. Defective tubes
5. Not sufficient antenna

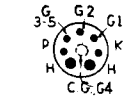


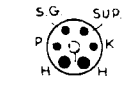
EMERSON RADIO & PHONO. CORP.

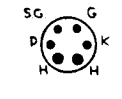
MODEL 23
CHASSIS MODEL 4B

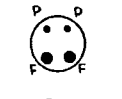


SCHEMATIC DIAGRAM









Voltage Readings:

For the convenience of servicemen, a table giving the voltage readings for this receiver is included in these instructions. Readings should be taken with the volume control turned on fully (all the way to the right) and a high resistance voltmeter (1000 ohms per volt) must be used for the d-c measurements. An a-c voltmeter must be used on the a-c circuits. D-c voltages measured from point indicated to ground.

Tube	*Plate*	*Anode Grid*	*Control Grid*	*Osc. Grid*	*Screen Grid.*	*Suppressors*	*Cathode*
6A7	214	214	—	—	62	—	2
77	70	—	—	—	62	4	4
42	194	—	*—13	—	215	—	—
80	—	—	—	—	—	—	—

*Measured from ground to tap on speaker field winding.

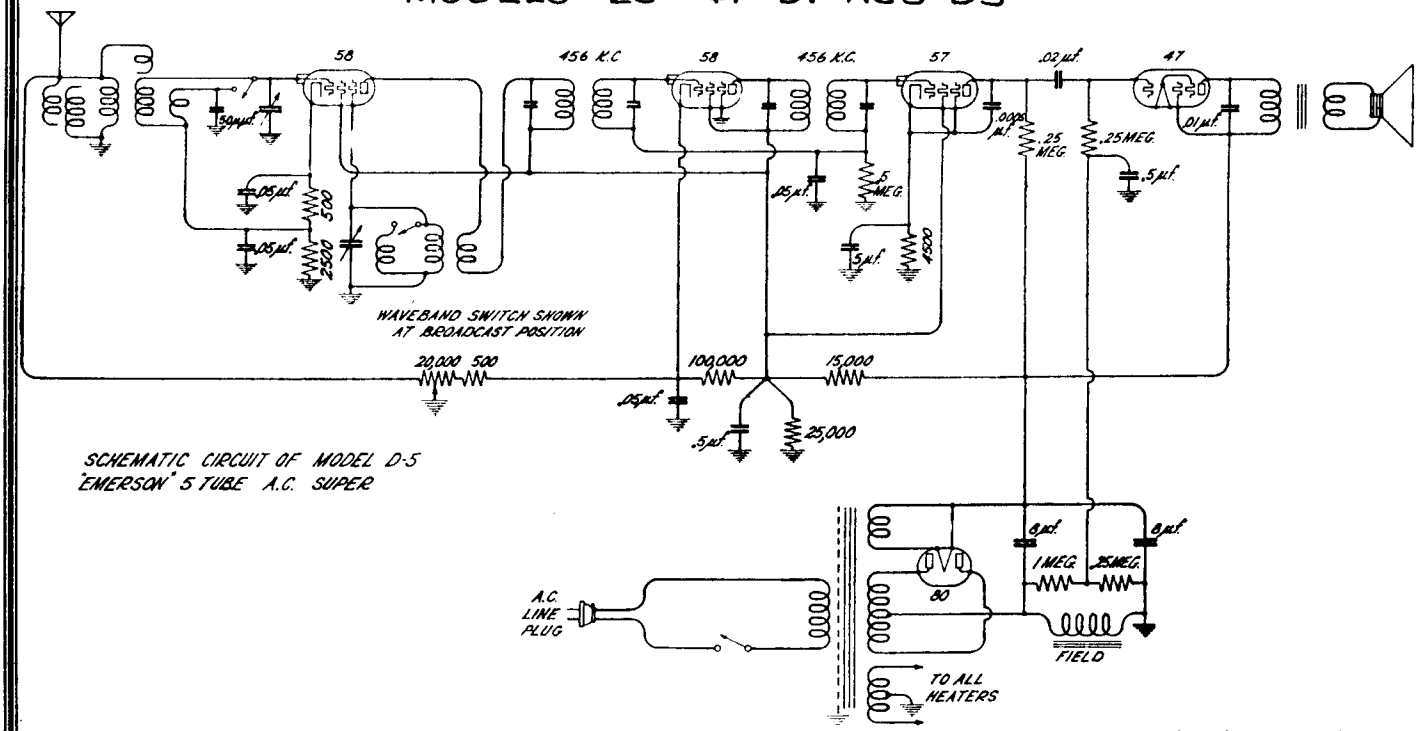
Voltage across field—100 volts d-c.

Voltage across 80 filament—5 volts a-c.

Voltage across all other filaments or heaters—6.2 volts a-c.

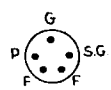
EMERSON RADIO & PHONO. CORP.

MODELS 26 - 41 - D. - AC-5 - D5



SCHEMATIC CIRCUIT OF MODEL D-5
"EMERSON" 5 TUBE A.C. SUPER

57 & 58



47

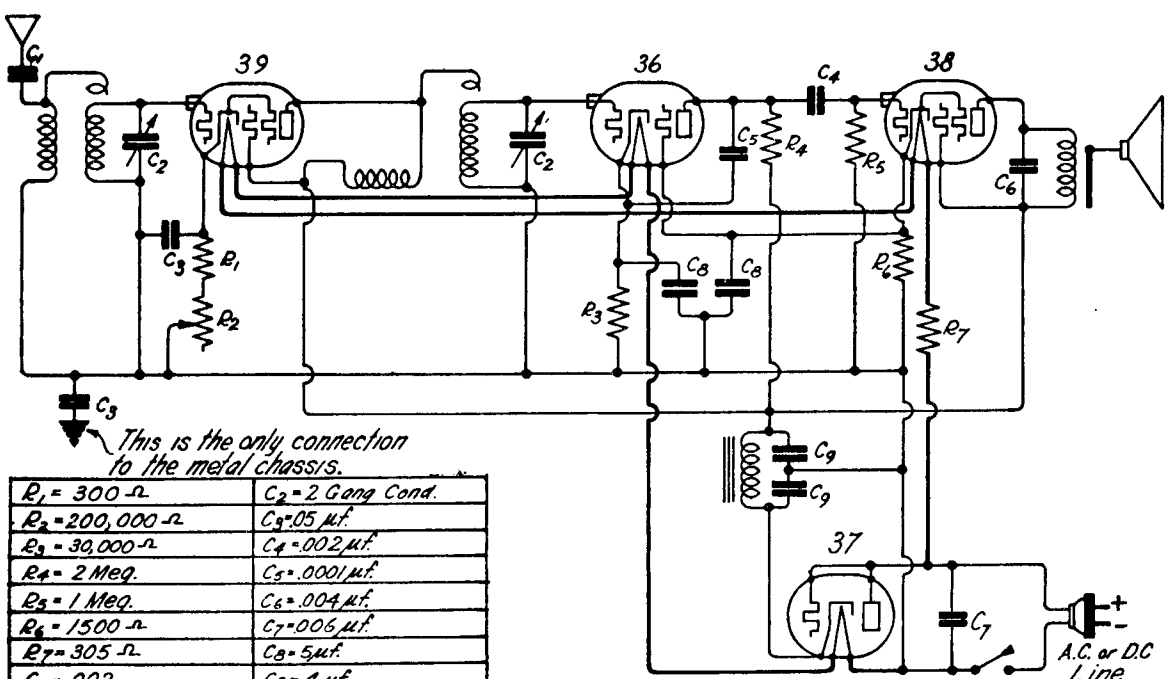
80

Readings are to be taken with all the tubes in their places, volume control turned on full and antenna wire grounded to chassis.

The D.C. Voltmeter used should be 1000 ohms per volt, or over. Line volts 117 A.C.

	Fil.	Ground to Plate	Ground to Screen	Ground to Cathode	Ground to Suppressor
58 Osc. 1st Det.	2.4 A.C.	80 D.C.	80 D.C.	2. D.C.	.....
58 Osc. I. F. Amplifier	2.4 A.C.	80 D.C.	80 D.C.	11. D.C.	.....
57 2nd Det.	2.4 A.C.	75 D.C.	80 D.C.	4.5 D.C.	4.5 D.C.
47 Output	2.4 A.C.	245 D.C.	255 D.C.	.....	.....
80 Rectifier	5.0				

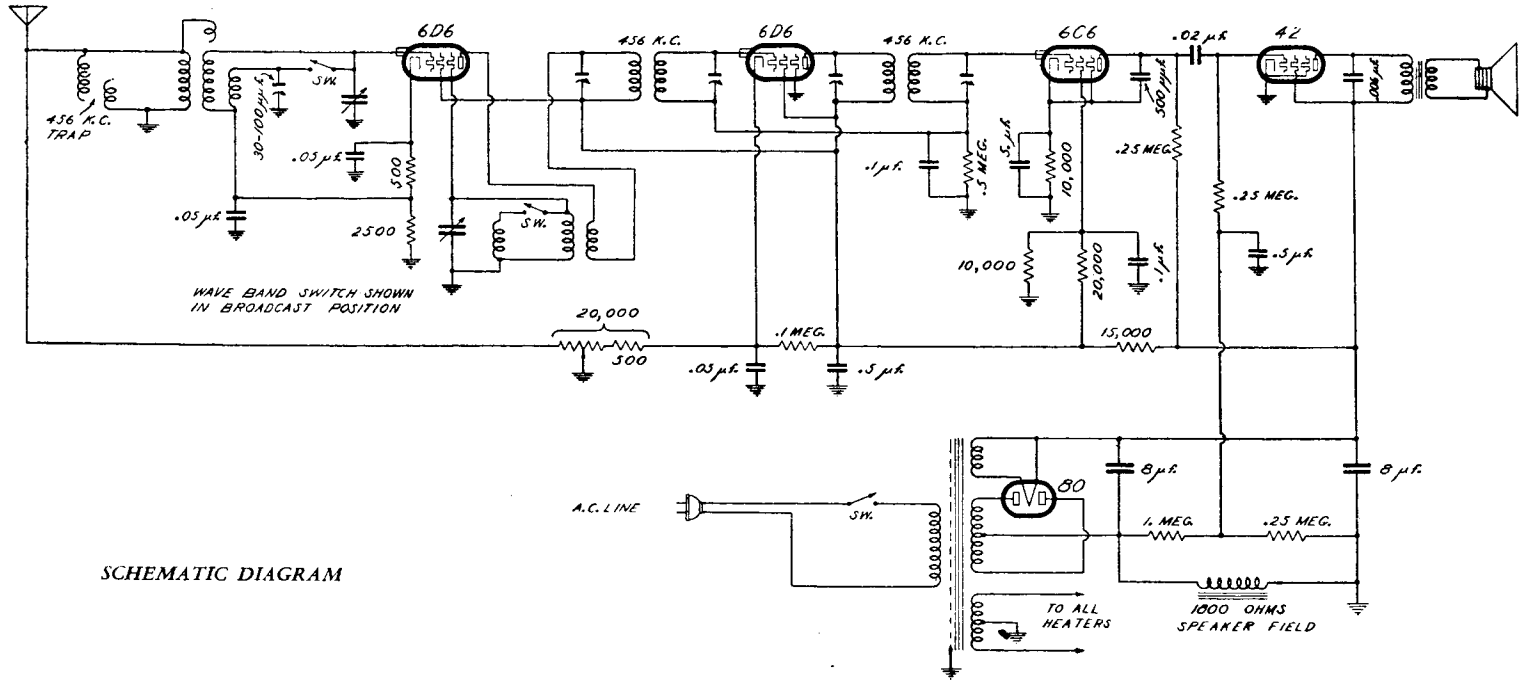
MODEL G4



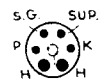
R_1 = 300 Ω	C_2 = 2 Gang Cond.
R_2 = 200,000 Ω	C_3 = .05 μf.
R_3 = 30,000 Ω	C_4 = .002 μf.
R_4 = 2 Meg.	C_5 = .0001 μf.
R_5 = 1 Meg.	C_6 = .004 μf.
R_6 = 1500 Ω	C_7 = 006 μf.
R_7 = 305 Ω	C_8 = 5 μf.
C_1 = .002	C_9 = 4 μf.

EMERSON RADIO & PHONO. CORP.

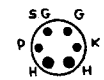
MODEL 28 CHASSIS 5J



SCHEMATIC DIAGRAM



6D6 & 6C6



42

80

115-120 Volts . . . A.C. . . . 60 Cycle

Broadcast	Short Wave
540—1500 Kilocycles	1500—3000 Kilocycles
550— 200 Meters	200— 100 Meters

Description:

The Model 28 is a five-tube superheterodyne radio receiver bringing in regular broadcast stations, and, in addition, stations on the short-wave band down to 100 meters.

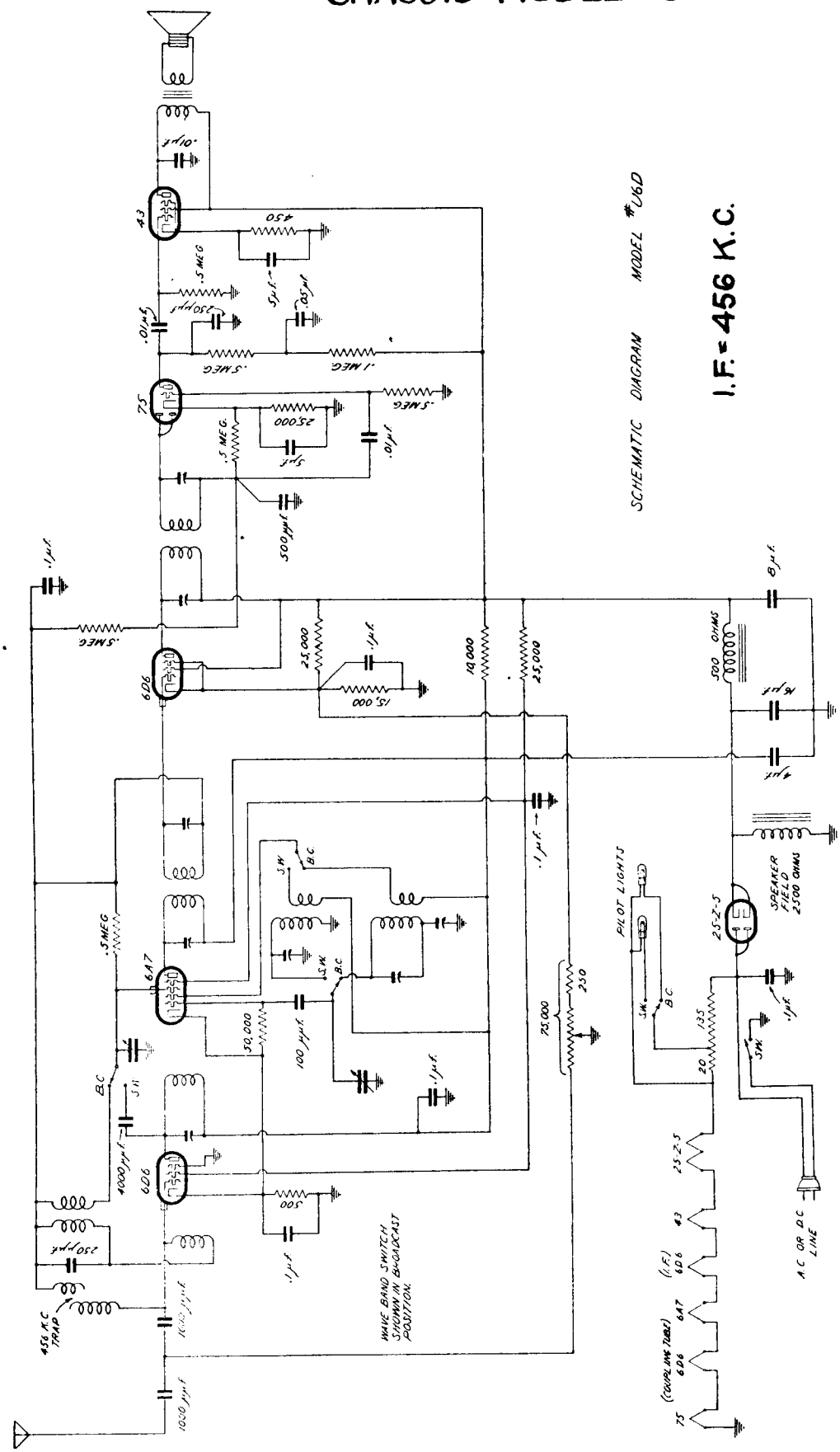
The following tubes are employed:

1 – 6D6 R.F. Pentode (1st Detector-Oscillator)
1 – 6D6 I.F. Amplifier
1 – 6C6 R.F. Pentode (2nd Detector)
1 – 42 Output-Pentode
1 – 80 Rectifier

Unless marked otherwise, this receiver is designed to operate on 105-125 volts, 50-60 cycles, alternating current only.

EMERSON RADIO & PHONO. CORP.

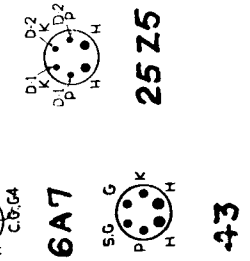
MODELS 38 & 42
CHASSIS MODEL U6D



Readings should be taken with a 1000 ohms per volt meter.

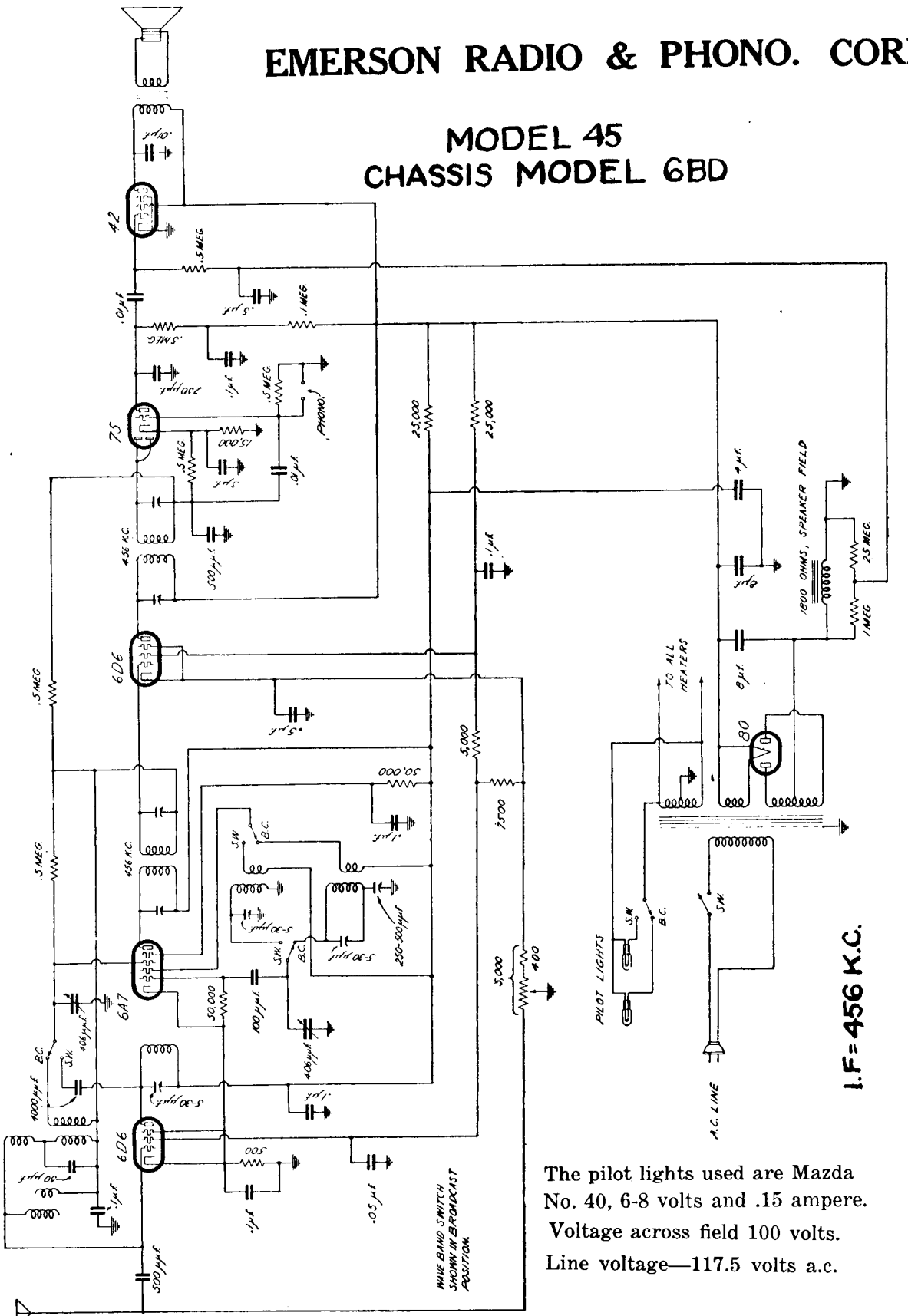
Voltages listed below are from the point indicated to ground.

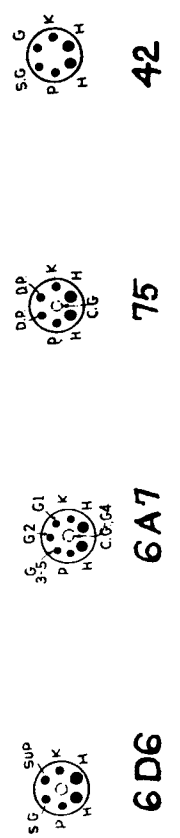
	Plate	*Screen*	*Suppressor*	*Cathode*		
6D6 R.f.	70	50	0	3	6D6	
6A7 Oscillator-Modulator	70	50	—	3	6A7	
6D6 I.f.	100	100	3.5	3.5	6D6	
75 A.f.	60	—	—	1	75	
43 Output	100	100	—	12.5	43	



EMERSON RADIO & PHONO. CORP.

MODEL 45
CHASSIS MODEL 6BD



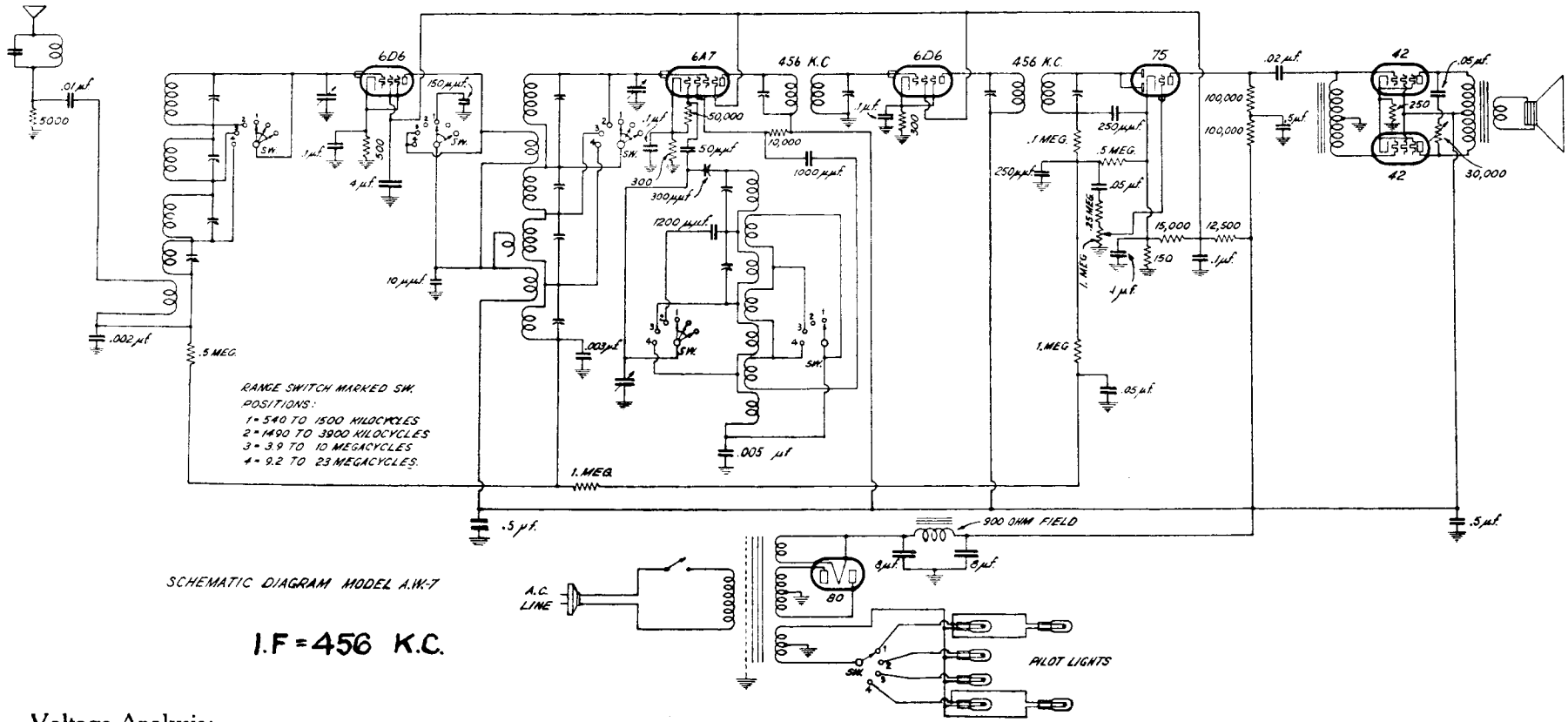


The pilot lights used are Mazda No. 40, 6-8 volts and .15 ampere.
Voltage across field 100 volts.
Line voltage—117.5 volts a.c.

	Plate	*Screen*	*Suppressor*	*Cathode*
6D6 R-f.	100	45	3.0	3.0
6A7 Oscillator-Modulator	100	50	—	3.0
6D6 I-f.	250	80	4.0	4.0
75 A-f.	85	—	—	1.5
42 Output	230	250	—	0

EMERSON RADIO & PHONO. CORP.

MODELS 71 & 770 - CHASSIS MODEL AW 7



SCHEMATIC DIAGRAM MODEL A.W-7

I.F = 456 K.C.

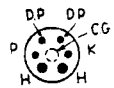
Voltage Analysis:

Readings should be made with a 1000 ohms per volt meter:

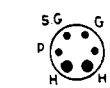
Line voltage 115 volts, A.C.—60 cycles.	*Plate to ground*	*Screen to ground*	*Cathode to ground*	*Oscillator Anode to ground*
6D6 R.F. amplifier	250	100	4.5	...
6A7 Oscillator-modulator	250	100	4.5	160
6D6 I.F. amplifier	250	100	3	...
75	150	...	1.25	...
42	240	250	16.5	...

6D6

6A7



75



42

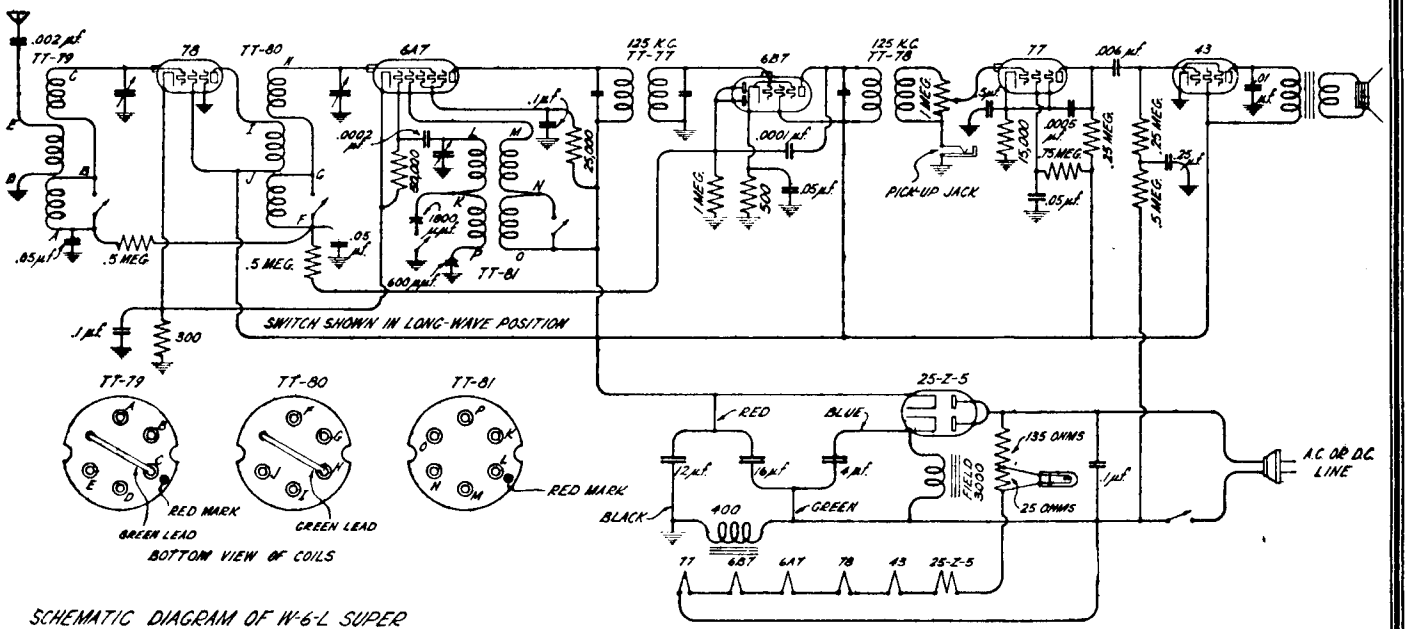
80

Minor Reasons for Failure to Operate:

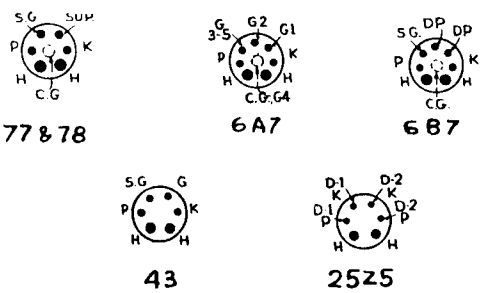
1. Tubes not pushed securely into sockets.
2. Line plug not inserted in wall socket.
3. Grid caps not on tubes properly.
4. Grid caps grounded to tube shield, (adjust between edges of openings).

EMERSON RADIO & PHONO. CORP.

MODEL 375 LW - W-6-L



SCHEMATIC DIAGRAM OF W-6-L SUPER



I.F. = 125 KC.

The heat generated in normal operation is about the same as that produced by an ordinary 30 watt electric bulb. To allow normal ventilation so that this heat is not sealed in the cabinet do not cover the vents in the back of the cabinet by placing its back tightly against a wall or other obstruction.

It is not advisable to place the set on a radiator or other heating device, as some owners insist on doing. This practice may mar the finish of the cabinet and will produce excess heat that may injure the set.

Tubes may be replaced by removing the back of the cabinet.

Minor Reasons for Failure to Operate:

1. Tubes not in sockets
2. Grid clips not on tubes
3. On D.C.—supply-plug reversed
4. Defective tubes
5. Not sufficient antenna

This *Universal Compact* is a complete, compact universal electric screen-grid superheterodyne receiver adapted for use on common commercial power available, i.e. 100 to 135 volts, A.C. or D.C., 25-70 cycles. On 220 volt operation, Special Ballast Resistor is required.

Although extremely compact, highest efficiency is attained through the utilization of a new Electro-Dynamic Speaker in conjunction with radically new tubes including a large Power Tube, a Dual Rectifier and new R.F. Pentodes.

The following tubes are employed:

1—6-A-7 (Amplifier) First Detector-Oscillator

1—78 R.F. Amplifier

1—77 Second Detector

1—6-B-7—I.F. Amplifier and A.V.C.

1—25-Z-5 Dual Rectifier

1—43 Pentode Power-Tube

Voltage Readings:

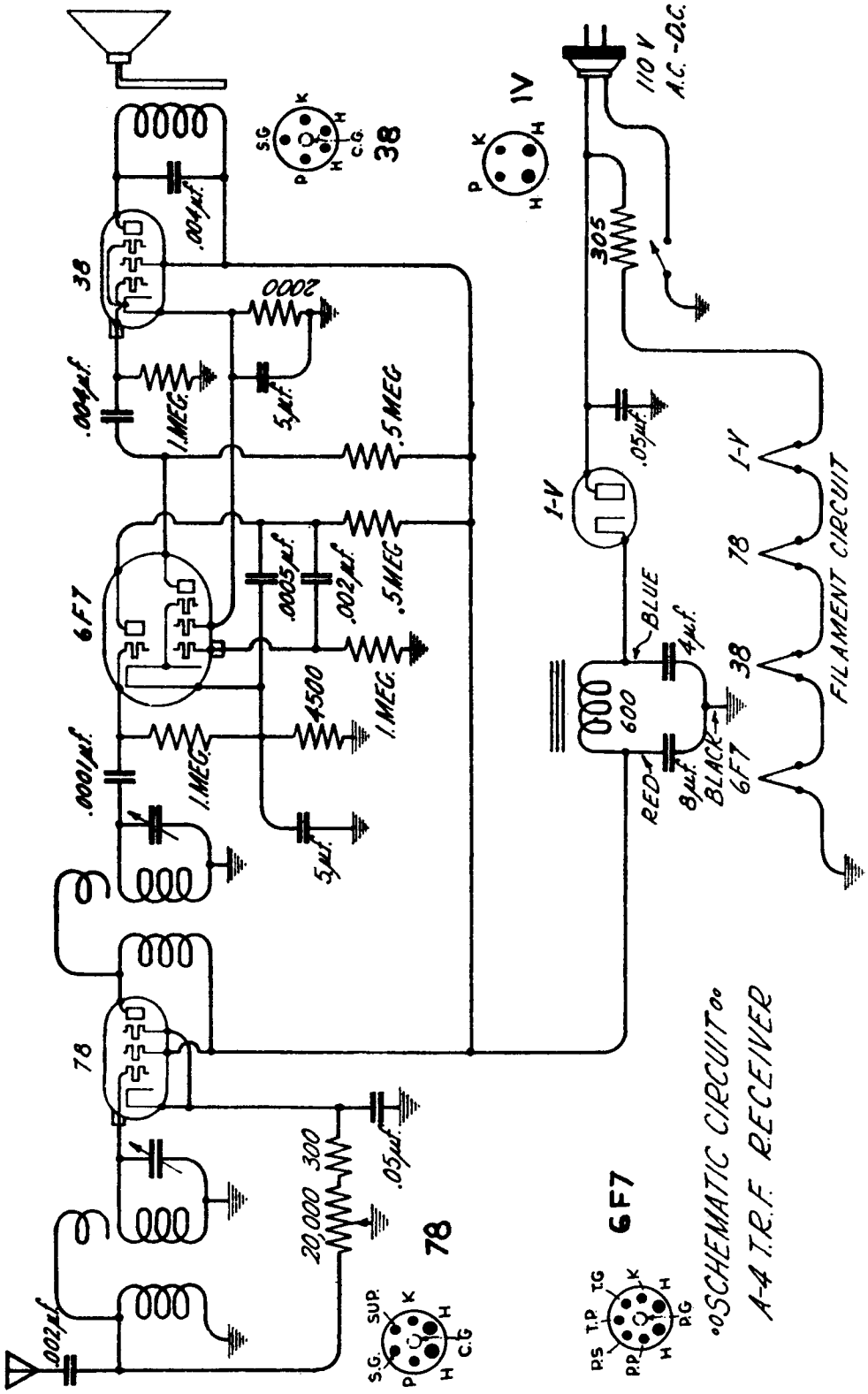
All readings are taken with the volume control fully on. A voltmeter having a resistance of 1000 ohms per volt was used.
Line Voltage—115-V.—A.C.

VOLTMETER SCALE	300-Volt Plate to B—	300-Volt Screen to B—	30-Volt Cathode to B—	30-Volt Suppressor to B—
78—Radio Frequency Amplifier	100	100	3	0
6A7—(Amplifier) First Detector and Oscillator	100	{G. 2—100 {G. 3 & 5—50	3	..
6B7—I.F. Amplifier and A.V.C.	100	100	3	..
77—Second Detector .	30	20	2	2
43—Power Amplifier .	98	100	..	..
25Z5—Rectifier	..	..	{100 {85	..

Bias for 43 tube is measured across filter choke and should be 15 to 18 volts.

EMERSON RADIO & PHONO. CORP.

MODELS 409-410-411
"MICKEY MOUSE"



*SCHEMATIC CIRCUIT OF A-4 T.R.F. RECEIVER

Service Notes:

The tubes are accessible upon removing the back of the cabinet. Be sure to turn off the set before removing or replacing tubes.

Failure of the set to operate may be traced to one or more of the following reasons:

1. Tubes not securely in their sockets
2. Grid clips not in place on the tubes
3. Power plug reversed—applies to D. C. operation

Line Voltage—115 V A.C.

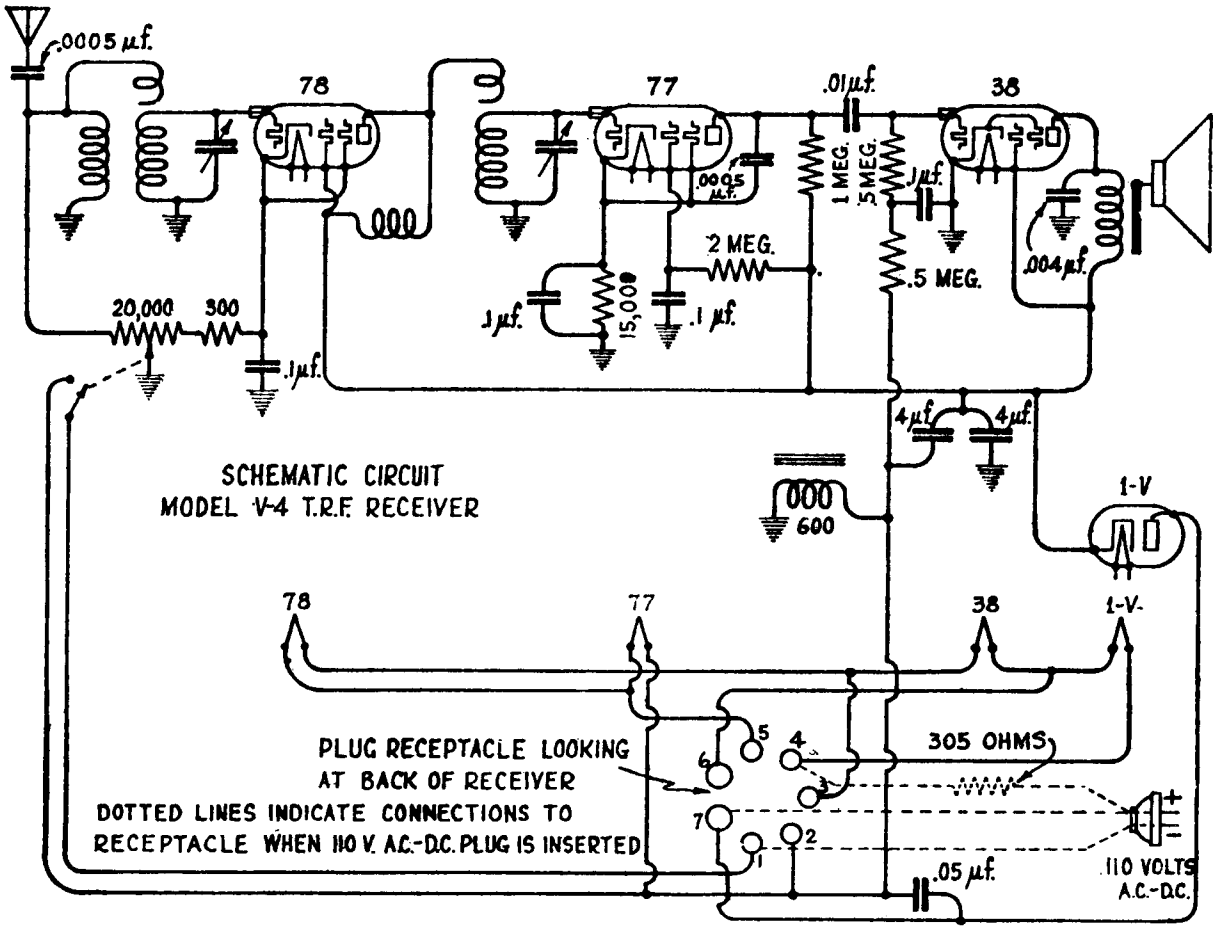
	Scale	300 Volts Plate	300 Volts Screen	30 Volts Cathode	30 Volts Suppresor
78		105	105	2.5	2.5
6F7	Triode	15	—	1.5	—
	Pentode	35	11	1.5	—
38		103	105	11.	—

All above voltages measured to chassis

Caution: Do not connect a ground wire to this set, except through a small condenser of about 0.1 Mfd. capacity and rated at least 200 Volts.

EMERSON RADIO & PHONO. CORP.

MODEL 420 & V4



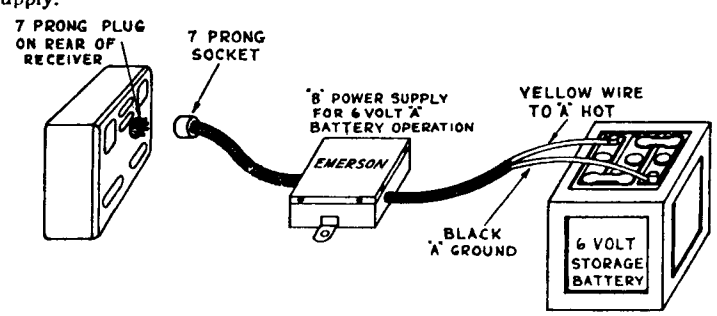
Voltage Readings:

Readings should be taken with Volume Control fully on, Tuning Control set for 550 KC., and antenna outside of set. Use a D. C. voltmeter having a resistance of 1000 ohms per volt.

Chassis	*To— Plate*	*Screen*	*Cathode*
77—Detector	10- 15	9- 12	1- 2
78—R.F. Amplifier	105-115	105-115	2- 3
38—Output Pentode	105-115	105-115	

Voltage across filter choke is "C" bias for 38 Tube=10v.

Readings will not change materially regardless of type of power supply.

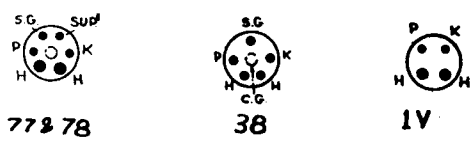


Directions for 6-Volt (Automobiles, Motorboats, etc.)

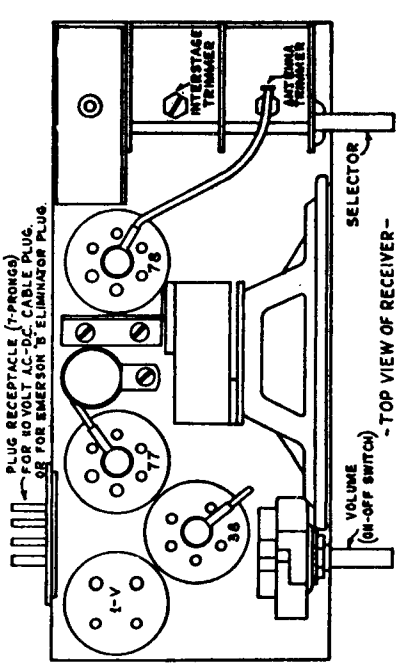
Remove the regular power cord and plug from the set.

Attach the 7-prong socket on the eliminator cable to the 7-prong plug in rear of the set. Attach the 2-conductor cable from the eliminator to the 6-volt battery.

Where 12-Volt "A" Battery is used in automobile, care should be exercised that cable is so connected that only 6 Volts is applied to the set.

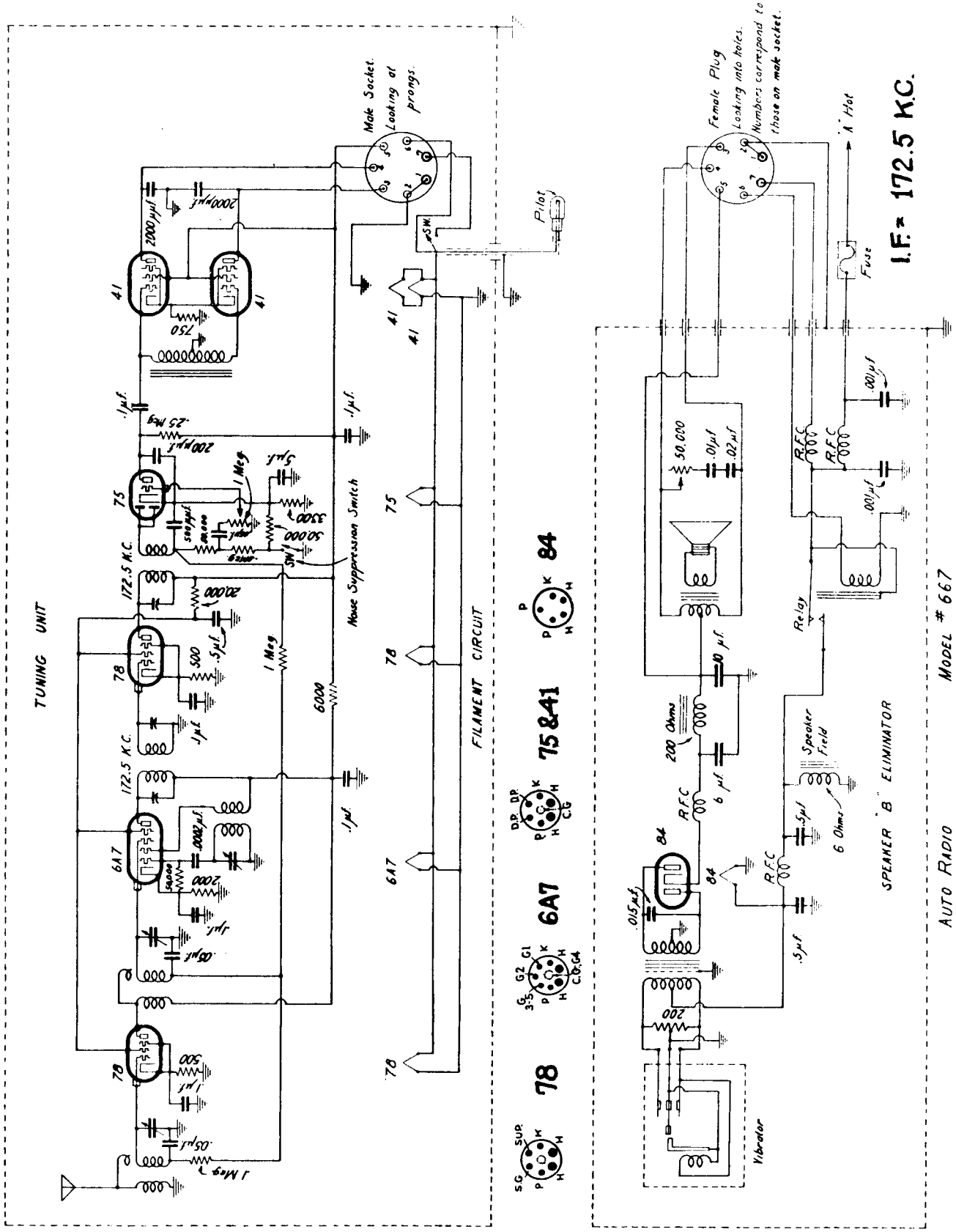


77 & 78 — 38 — 1V



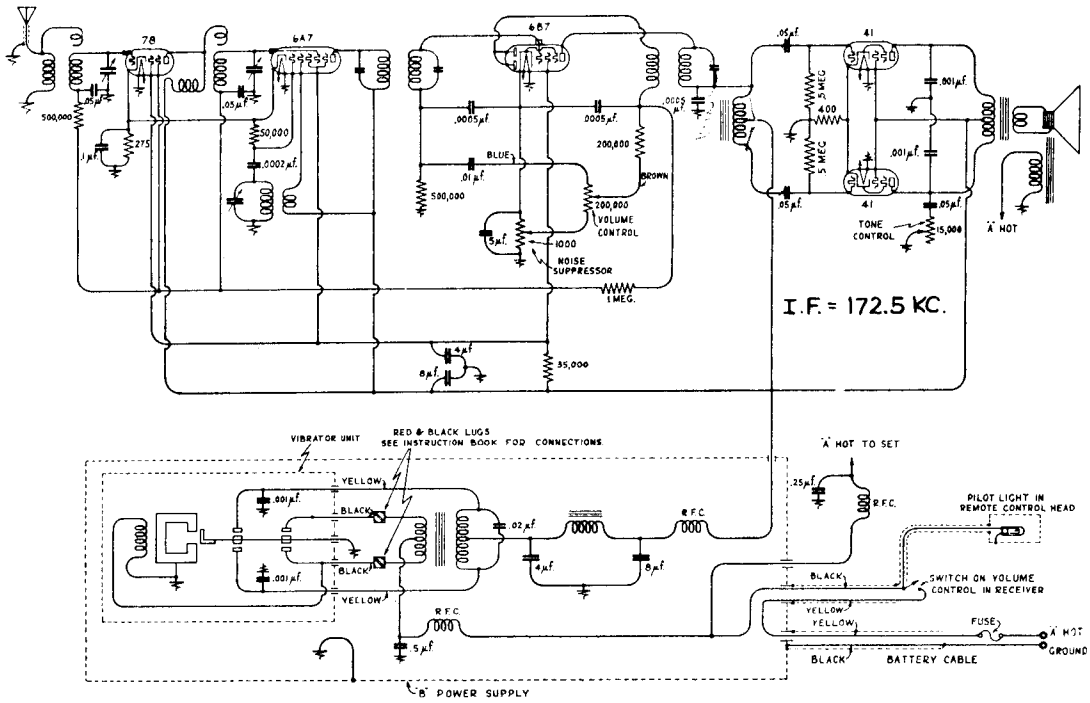
EMERSON RADIO & PHONO. CORP.

MODEL 667



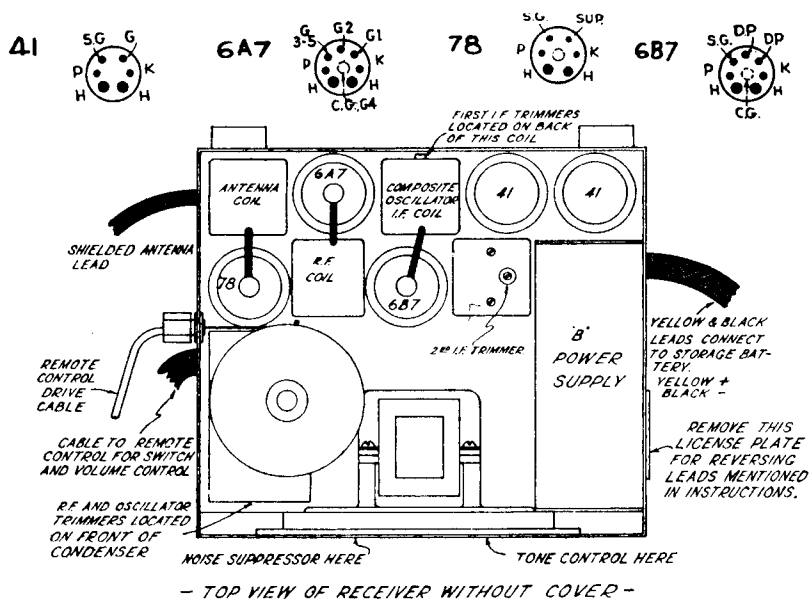
EMERSON RADIO & PHONO. CORP.

MODEL 678 AUTO-MOTORBOAT SET



Tube-Functions and circuit analysis:

78	1	Radio-frequency amplifier
	2	Automatic fidelity control
	3	Automatic selectivity control
6A7	4	High gain modulator
	5	Electron coupled oscillator
6B7	6	High gain I. F. Amplifier
	7	Neutralized space-charge diode detector
	8	Separate delayed automatic volume control
	9	Automatic noise suppression
	10	Reflexed audio-frequency amplifier
41	11	Push-pull output tube Class A"
41	12	Push-pull output tube Class A"
	13	Full wave synchronous vibrator rectifier



— TOP VIEW OF RECEIVER WITHOUT COVER —

VOLTAGE ANALYSIS

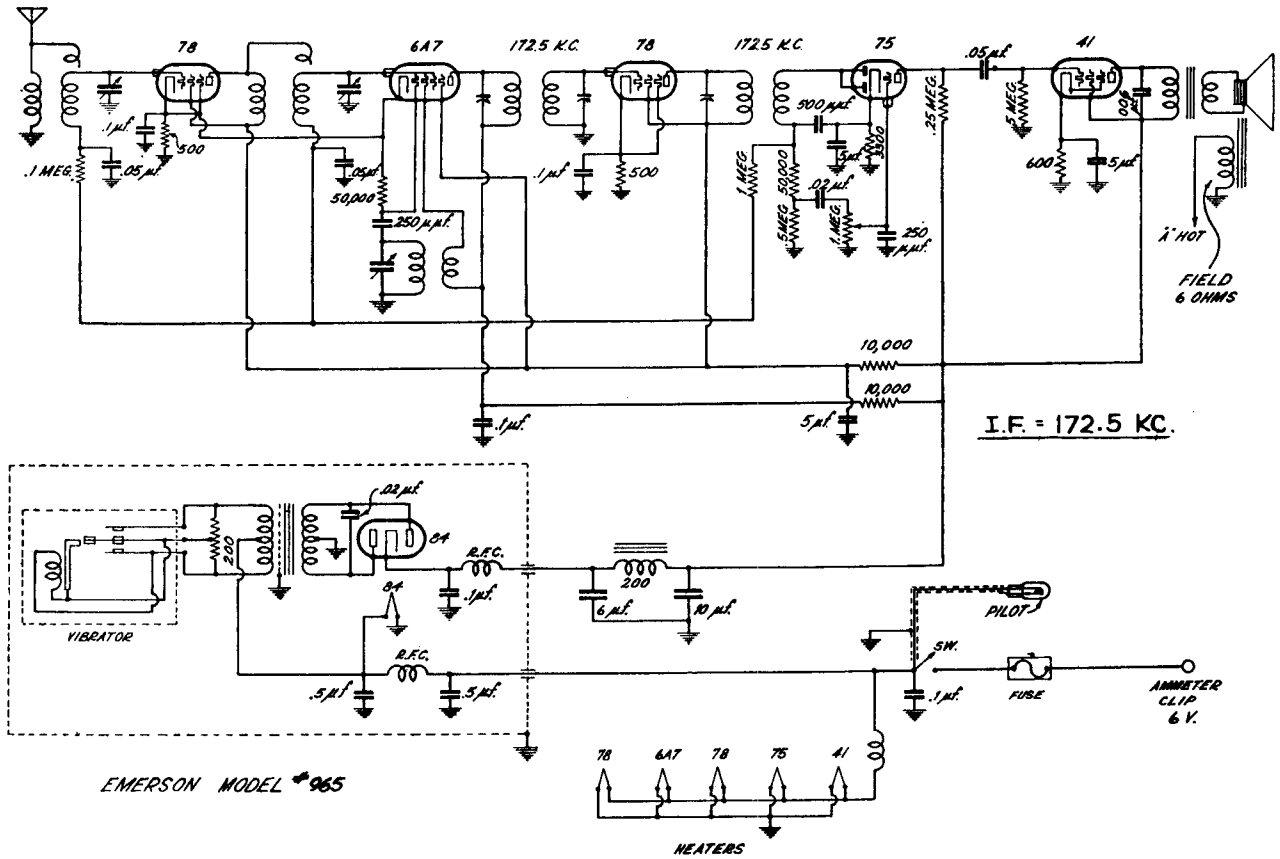
Use a high resistance voltmeter. Storage battery should be fully charged. Readings taken with no signals received.

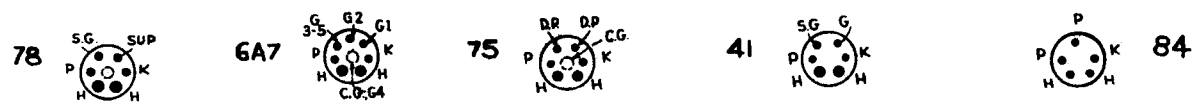
Tube	*Cathode to Ground*	*Screen Grid to Ground*	*Plate to Ground*	*Heater to Ground*
78	3- 3.5V.	75-85V.	200-210V.	6V.
6A7	3- 3.5	75-85	200-210	6
6B7	3.5-4.5	75-85	200-210	6
41	14-18	200-210	190-200	6
41	14-18	200-210	190-200	6

Voltage across speaker field—6 volts.

EMERSON RADIO & PHONO. CORP.

MODEL 965





Voltage Analysis:

Note: All "B" and "C" voltages should be measured on a high resistance voltmeter of 1000 ohms per volt or over.

The voltages are measured to ground from the points named. Ground the antenna to its shield when taking readings.

Battery volts—6. Volts across heaters—6 scant. Volts across speaker field—6 scant.

Tube	*Plate*	*Screen*	*Cathode*	*Suppressor*	*Osc. plate*
78	110	110	6	6	—
6A7	170	110	6	—	170
75	110	—	1.3	—	—
78	110	110	3.5	3.5	—
41	210	220	15	—	—

Intermediate Transformers

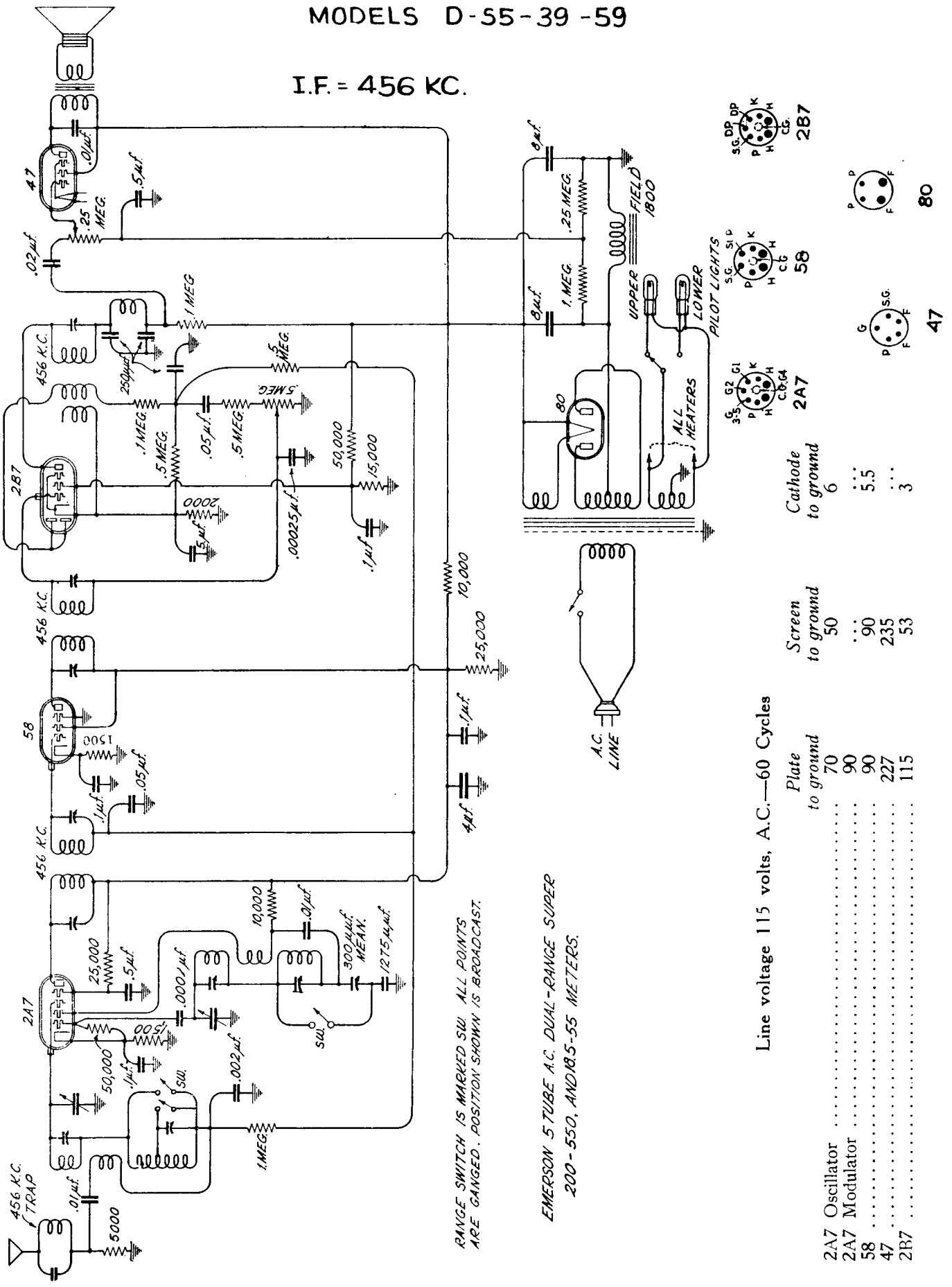
To align the intermediate frequency transformers, use a good modulated oscillator set for 172½ k.c. Set the volume control for maximum volume and turn the dial to a point where little or no signal is received; then ground the antenna.

Connect the oscillator output between the grid of the 6A7 tube and ground. Connect an output meter across the primary of the speaker transformer or across the voice coil. Using the smallest output from the test oscillator that will give a small reading on the meter, adjust the two I.F. transformers for the largest reading obtainable. Use a non-metallic screw driver if possible.

EMERSON RADIO & PHONO. CORP.

MODELS D-55-39-59

I.F. = 456 KC.



RANGE SWITCH IS MARKED SW. ALL POINTS ARE GANGED. POSITION SHOWN IS BROADCAST.

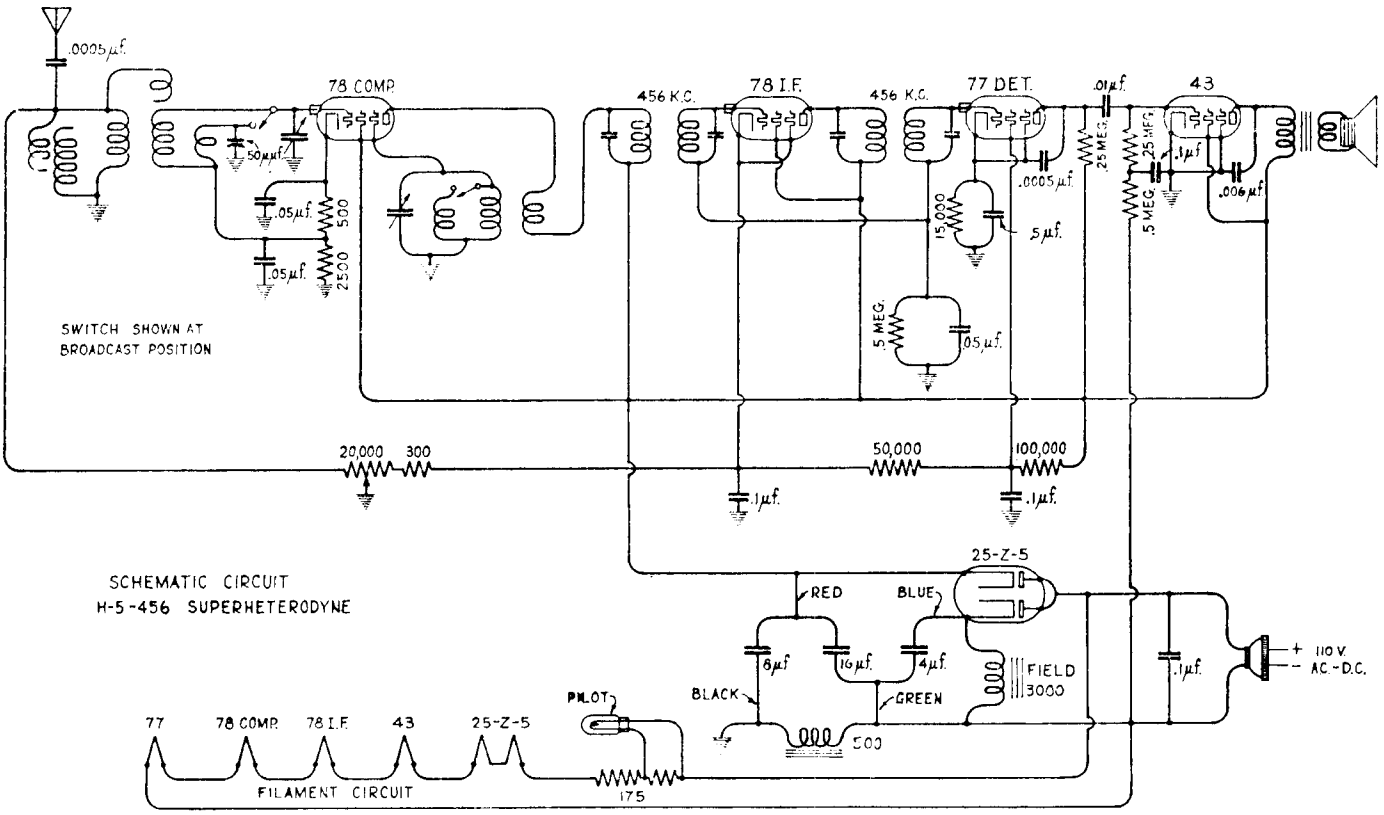
EMERSON 5 TUBE A.C. DUAL-RANGE SUPER
200-550, AND 185-555 METERS.

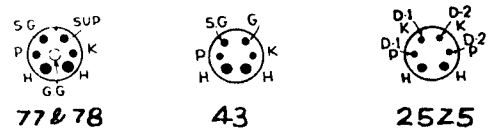
Line voltage 115 volts, A.C.—60 Cycles

	Plate to ground	Screen to ground	Cathode to ground
2A7 Oscillator	70	50	6
2A7 Modulator	90	...	5.5
58	90	90	...
47	227	235	...
2B7	115	53	3

EMERSON RADIO & PHONO. CORP.

MODELS H-5-456 - 30AW - 33AW - 250AW - 350AW - 321AW





77 & 78 43 25Z5

Voltage Readings:

Readings should be taken with Volume Control fully on. Tuning control set for 550 K.C., and antenna outside the set. Use a D.C. Voltmeter having a resistance of 1000 ohms per volt.

Using	300-volt scale Plate to Ground	300-volt scale Screen to Ground	30-volt scale Cathode to Ground
78—Detector Oscillator ..	98	98	1.6
78—I. F. Amplifier.....	98	98	2.8
77—2nd Detector	35	25	1.5
43—Power Amplifier	92	98	..
25Z5—Rectifier	..	..	98

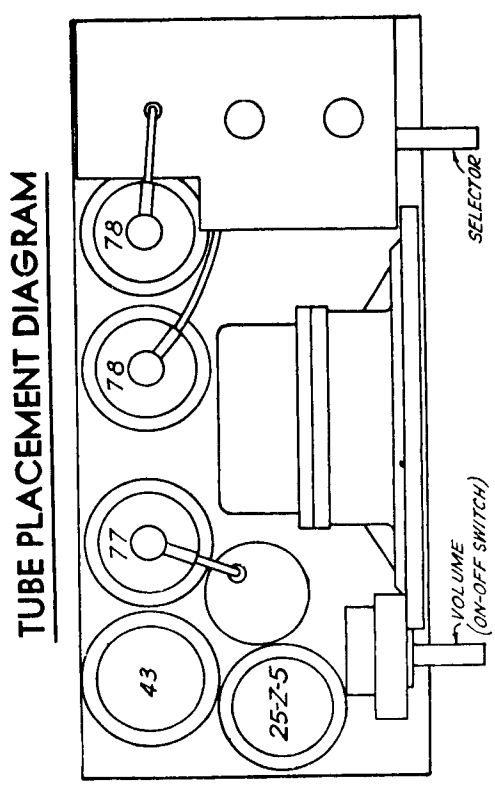
Voltage across speaker field 100 volt.

Bias for 43 tube is measured across filter choke and should be 15 to 18 volts.

Tubes may be replaced by removing the back of the cabinet.

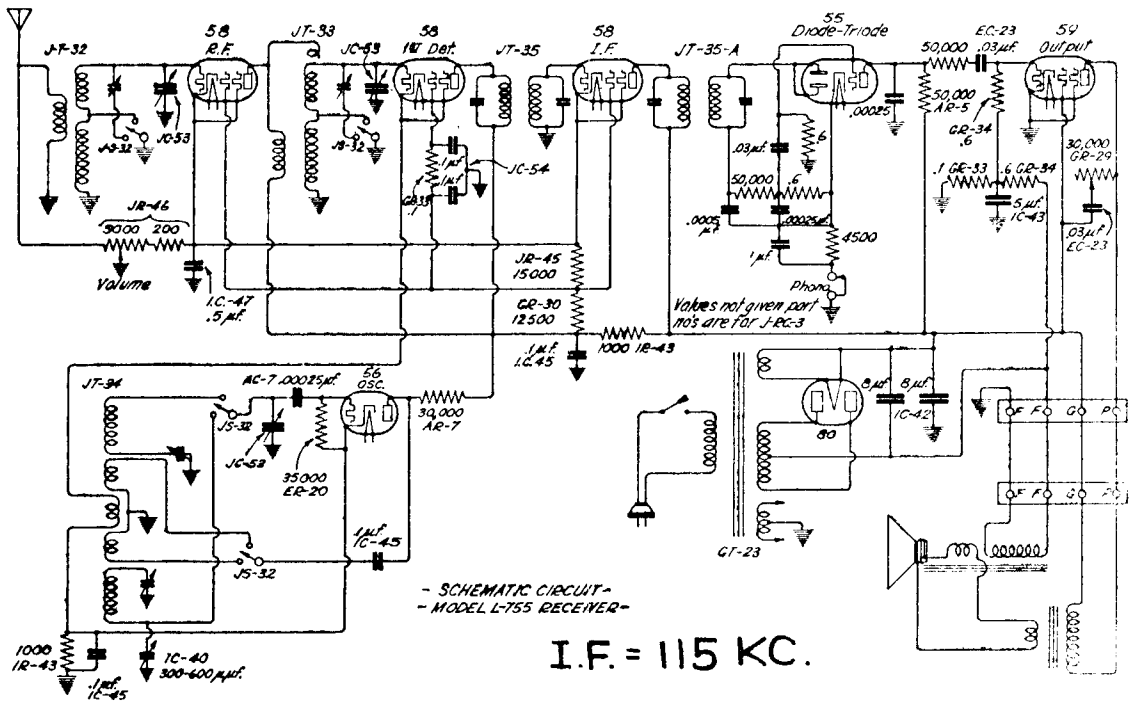
Minor Reasons for Failure to Operate:

1. Tubes not in sockets
2. Grid clips not on tubes
3. On D.C.—supply-plug reversed
4. Defective tubes
5. Not sufficient antenna

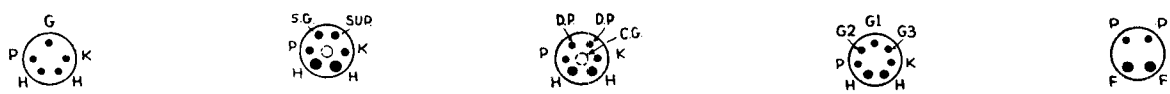


EMERSON RADIO & PHONO. CORP.

MODEL-L-755-50L



Corrections: Omit 50,000 ohm Resistor from Triode Plate to Coupling Condenser. GR-34, 59 Grid Resistor changed to JR-47, 3 meg. Resistor.



56 58 55 59 80

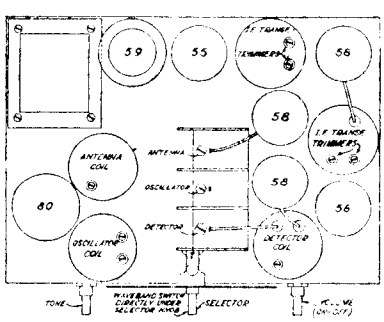
The L-755 is a de luxe superheterodyne receiver incorporating the latest features in medium and long wave receiver design to achieve unusual performances on both the 1500-535 kilocycle and 150-320 kilocycle bands.

Voltage Readings

Readings should be taken with the Volume Control turned clockwise as far as it will go and the Station Selector set for 550 K. C. Use a high resistance (1000 ohms per volt) voltmeter.

	Ground to—Plate	Screen	Cathode
56 Oscillator	65— 90	——	6—7
58 R. F. Amplifier	220—235	95-105	3—4
58 Detector	220—235	60-70	6—7
58 I. F. Amplifier	235—250	95-103	3—4
55 2nd Detector and A. F. Amplifier	105—115	——	8—10
59 Output Tube	230—240	240-255	——

TUBE LAYOUT



The following tubes are employed:

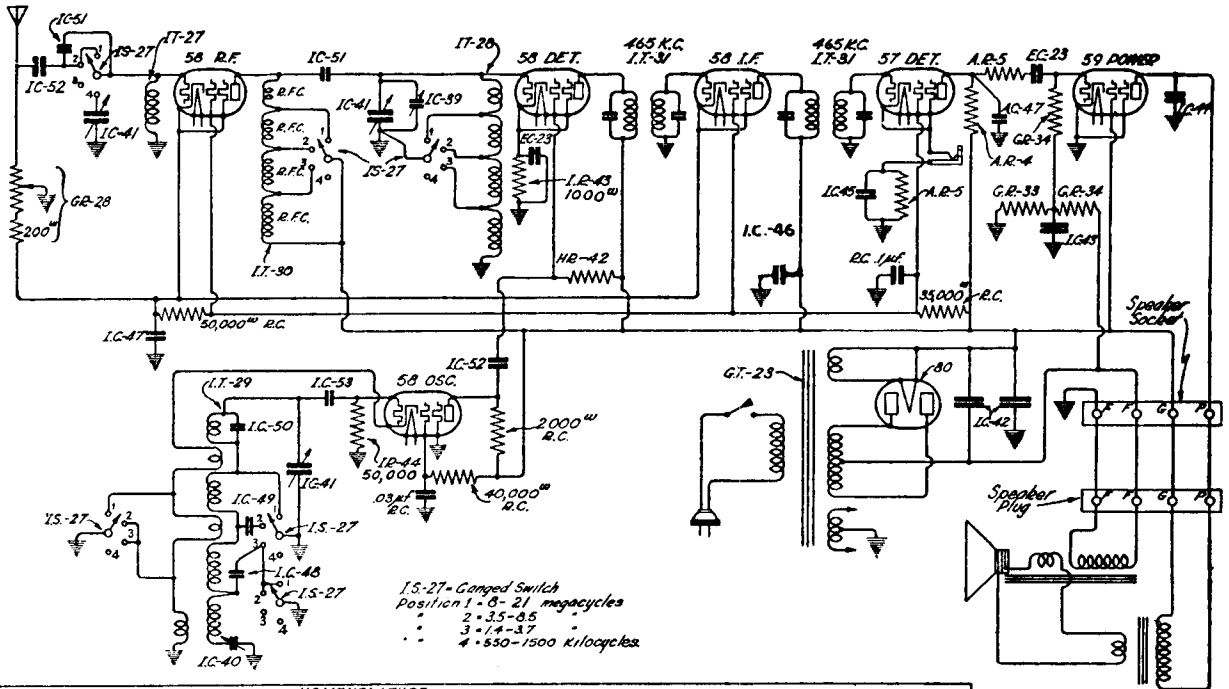
1— 56 Triode
1— 59 Triple Grid Output Tube
1— 55 Duo-Diode Triode
3— 58 Variable-Mu Pentodes
1—380 Rectifier

Minor Reasons for Failure of Set to Operate

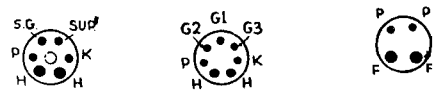
1. **Defective Tubes**
2. **Grid Clips off Tubes**
3. **Vol. Control not turned fully on**
4. **Tubes not in sockets securely**
5. **Aerial disconnected or grounded**
6. **Defective A.C. plug or poor plug connections**
7. **Band Switch in intermediate position**

EMERSON RADIO & PHONO. CORP.

MODELS S-755 , 50S, S7



NOMENCLATURE				
I.T.-27 = Antenna Coil	I.C.-40 = 300-600 M.M.F. Semi-Variable	I.C.-45 = .1 M.F. 300 V.	I.C.-51 = 10 M.M.F. Mica	H.R.-42 = 2 Meg.
I.T.-28 = Detector Coil	I.C.-41 = 365 M.M.F. 3 Gang	I.C.-46 = .5 M.F. 300 V.	I.C.-52 = .002 M.F. Mica	G.R.-33 = 100,000 Ω
I.T.-29 = Oscillator Coil	I.C.-42 = 8 8 M.F. Electrolytic	I.C.-47 = .5 M.F. 300 V.	I.C.-53 = .0001 M.F. Mica	G.R.-34 = 600,000 Ω
I.T.-30 = 4 Section Choke Coil	I.C.-43 = 5 M.F. Electrolytic	I.C.-48 = .001 M.F. Mica	I.C.-47 = .0005 M.F. Mica	G.R.-28 = 5000 Ω Tapped
I.T.-31 = Power Transformer	I.C.-44 = .004 M.F. 300 V.	I.C.-49 = .001 M.F. Mica	A.R.-4 = 250,000 Ω	Ω = Ohms
I.C.-39 = 35 M.M.F. Variable	I.C.-29 = .05 M.F. 300 V.	I.C.-50 = 34 M.M.F. Mica	A.R.-5 = 50,000 Ω	P.C. = Plug + Cord Assy. IP-2



57 & 58 59 80

The Model S-755 All-Wave Receiver is a deluxe superheterodyne receiver, incorporating the latest features in all-wave receiver design, capable of giving unusual performance on all wavelengths from 15 to 550 meters.

Many technical innovations have been incorporated in this receiver, designed to make it exceptionally sensitive and selective. The latest type tubes are used, including the new type 59 Triple Grid Power Output Tube and the types 57 and 58 Radio Frequency Pentodes.

Voltage Readings:

Readings should be made using a D.C. voltmeter having a resistance of 1,000 ohms per volt. Volume control should be on full.

58 Oscillator	Ground	to	plate	230-245	Screen	120-140	Cathode	
58 R.F. Amplifier	"	"	"	235-250	"	90-110	"	3-4
58 1st Detector	"	"	"	235-250	"		"	1-2
58 I.F. Amplifier	"	"	"	235-250	"	90-110	"	3-4
57 2nd Detector	"	"	"	100-125	"	90-110	"	4-6
59 Output tube	"	"	"	230-245	"	235-250	"	

Line voltage, 115v.

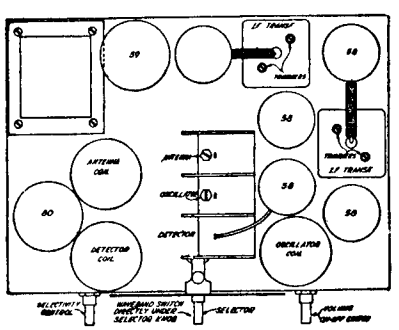
The bias on the 59 and the screen voltage of the 1st detector cannot be read with the usual voltmeter.

Instructions for Adjusting Transformer to Comply with Voltage Requirements:

Color scheme of primary winding of the Power Transformer:

Common—Red with a white tracer
110-Volt—Green with a white tracer
135-Volt—Blue with a white tracer
220-Volt—Brown with a white tracer

In changing the primary voltage, always be sure to tape up the lead that is disconnected before soldering in the lead for the voltage desired.



Tube Diagram

The Model S-755 Receiver uses the following tubes:

1—80 Rectifier

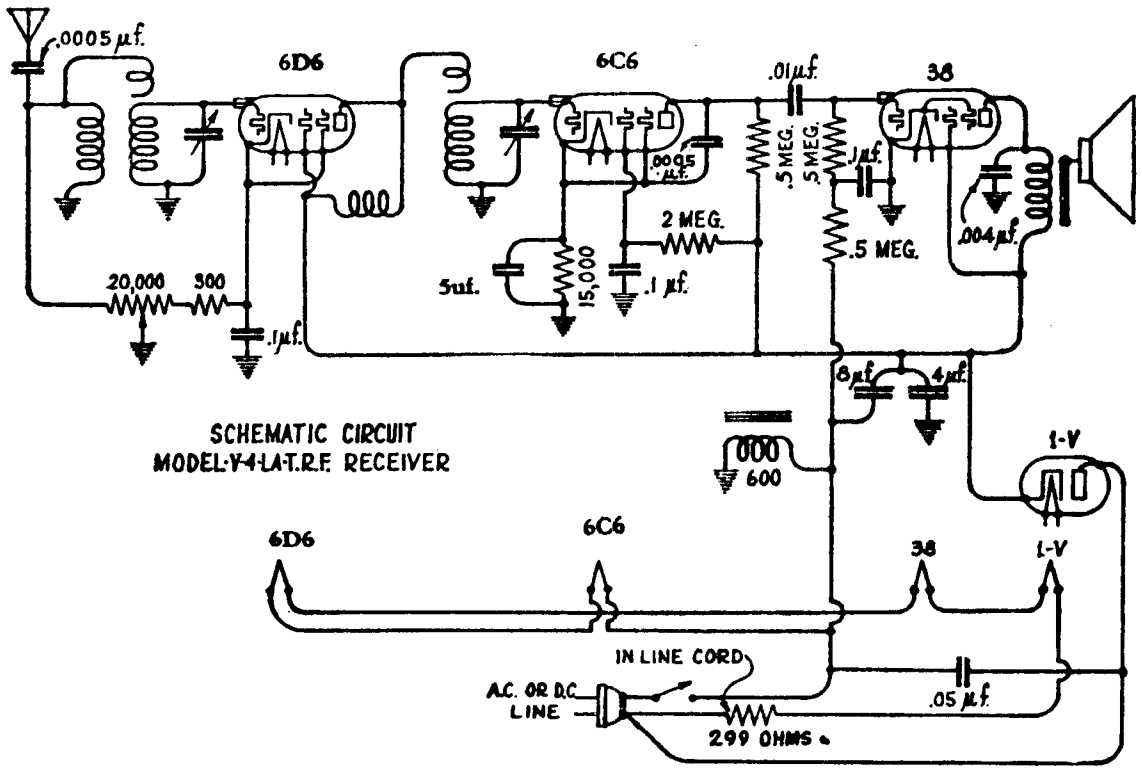
1—57 Pentode Detector

1—59 Triple Grid Output Tube

4—58 Variable-Mu Pentodes

EMERSON RADIO & PHONO. CORP.

MODELS V4-LA-415-416



SCHEMATIC CIRCUIT
MODEL V-4-LA-T.R.F. RECEIVER

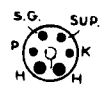
Voltage Readings:

Readings should be taken with Volume Control fully on, Tuning Control set for 550 KC, and antenna outside of set. Use a D. C. voltmeter having a resistance of 1000 ohms per volt.

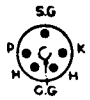
Chassis	*To— Plate*	*Screen*	*Cathode*
6C6—Detector	10- 15	9- 12	1- 2
6D6—R.F. Amplifier	105-115	105-115	2- 3
38—Output Pentode	105-115	105-115	——

Voltage across filter choke is "C" bias for 38 Tube=10v.

Readings will not change materially regardless of type of power supply.



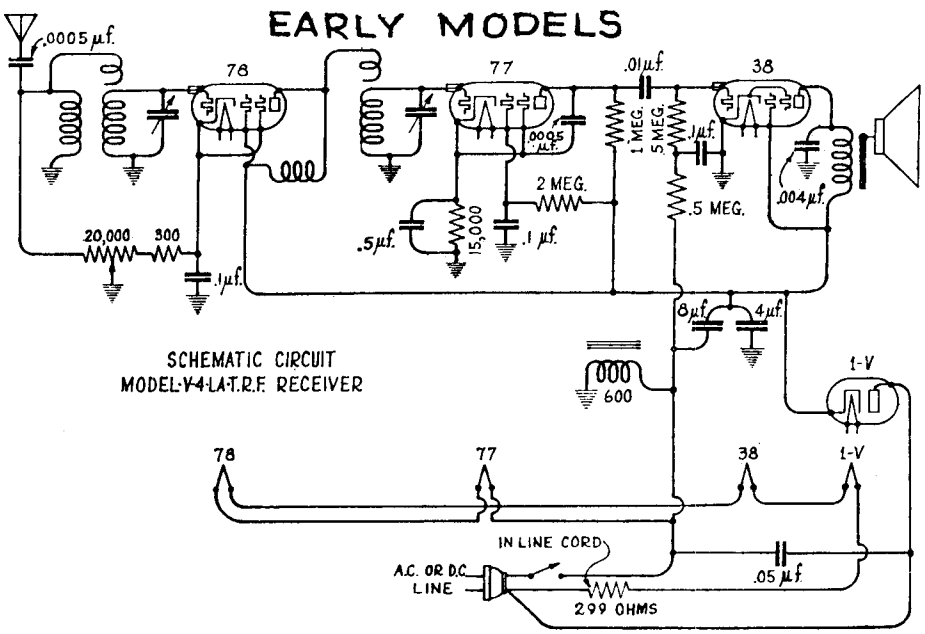
6D6 & 6C6
77 & 78



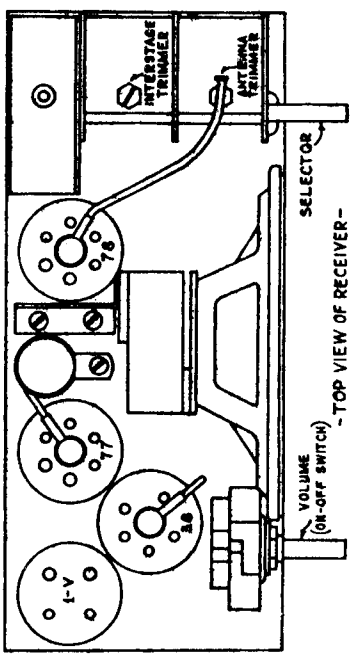
38

1V

EARLY MODELS



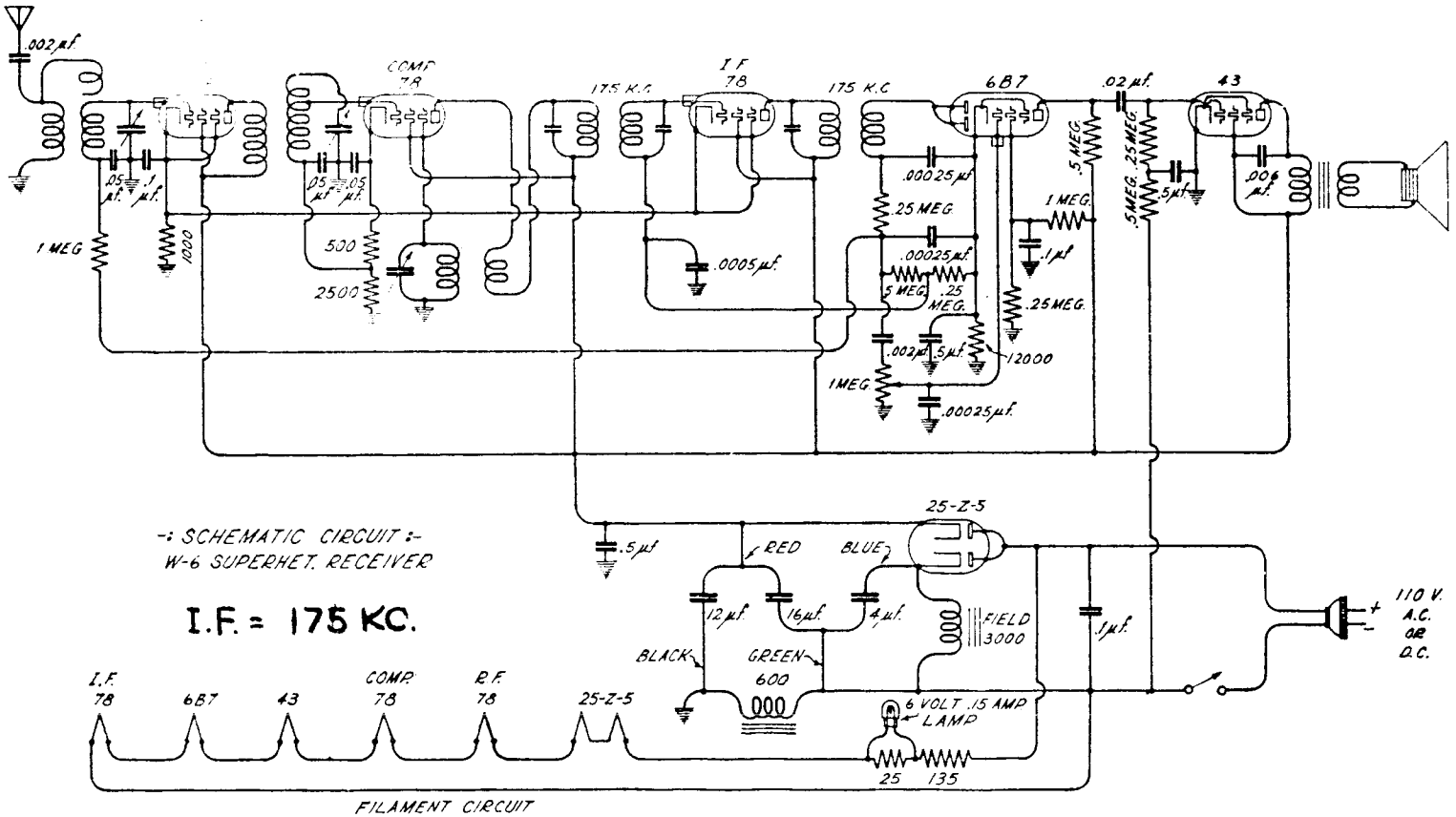
SCHEMATIC CIRCUIT
MODEL V-4-LA-T.R.F. RECEIVER



- TOP VIEW OF RECEIVER -

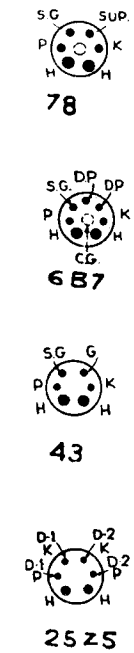
EMERSON RADIO & PHONO. CORP.

MODEL W6 - 40 - 375



-: SCHEMATIC CIRCUIT :-
W-6 SUPERHET. RECEIVER

I.F. = 175 KC.



Voltage Readings:

All readings were made with Volume Control fully on.

A Voltmeter having a resistance of 1000 ohms per volt was used.

LINE VOLTAGE—115-V - A.C.

Voltmeter Scale	300-volt Plate to B-	300-volt Screen to B-	30-volt Cathode to B-	30-volt Suppressor to B-
78 First Radio Frequency ...	105	105	7	7
78 First Detector Oscillator .	105	105	16	0.0
78 I. F. Amplifier.....	105	105	7	7
75 Second Detector A. V. C..	25	15	2	—
43 Power Amplifier	92	105	0.0	—

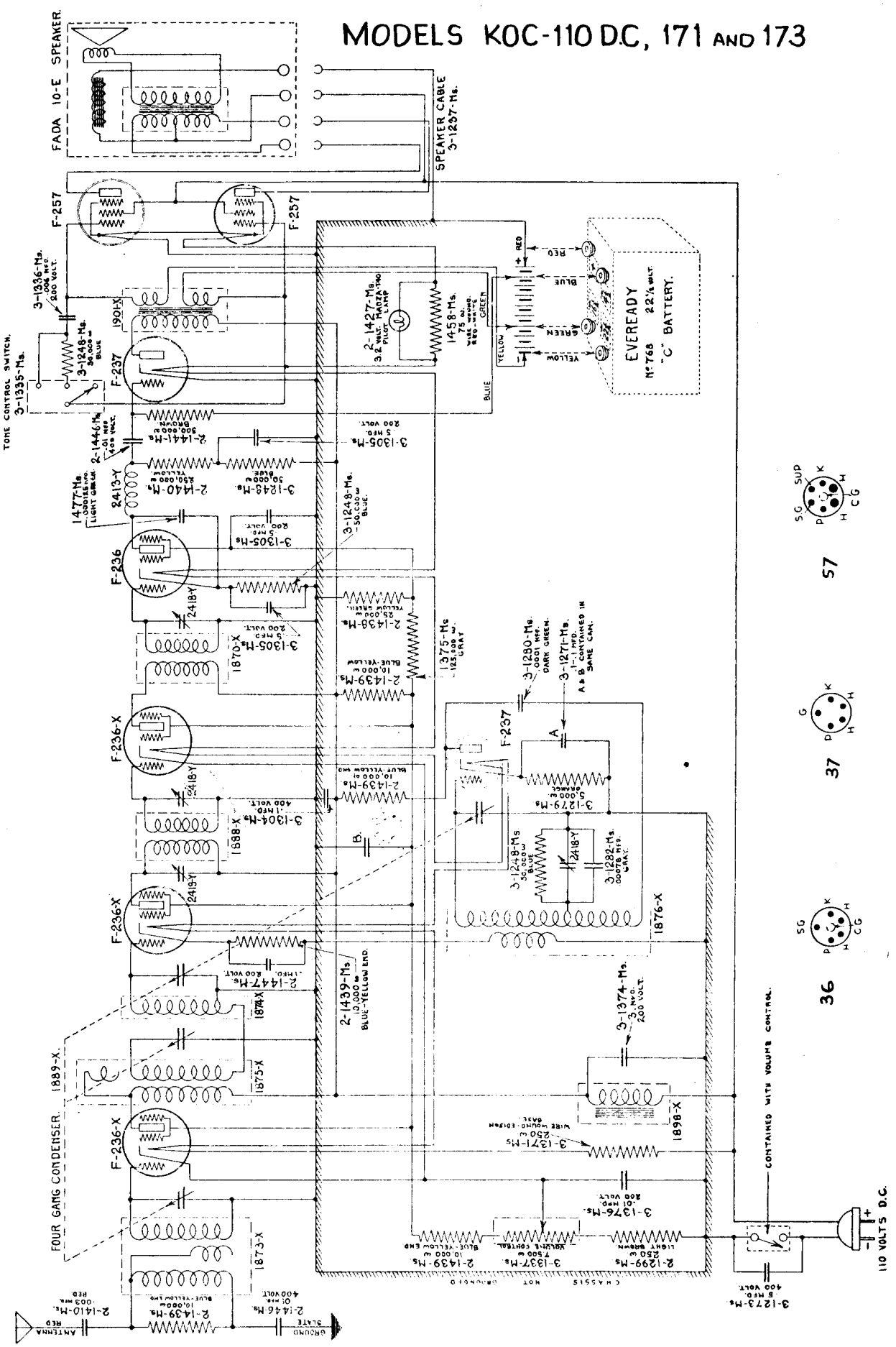
Description:

The Emerson Universal Six-Tube Superheterodyne is a universal compact—all-electric radio receiver, specially designed to operate on either direct current or alternating current of from 25 to 70 cycles and the usual voltages of 105 to 130. It may also be used on 220 volts by attaching the extra ballast resistor.

The remarkably fine performance of this receiver is due to its special design which includes an electro-dynamic speaker of high efficiency, new type tubes, and automatic volume control.

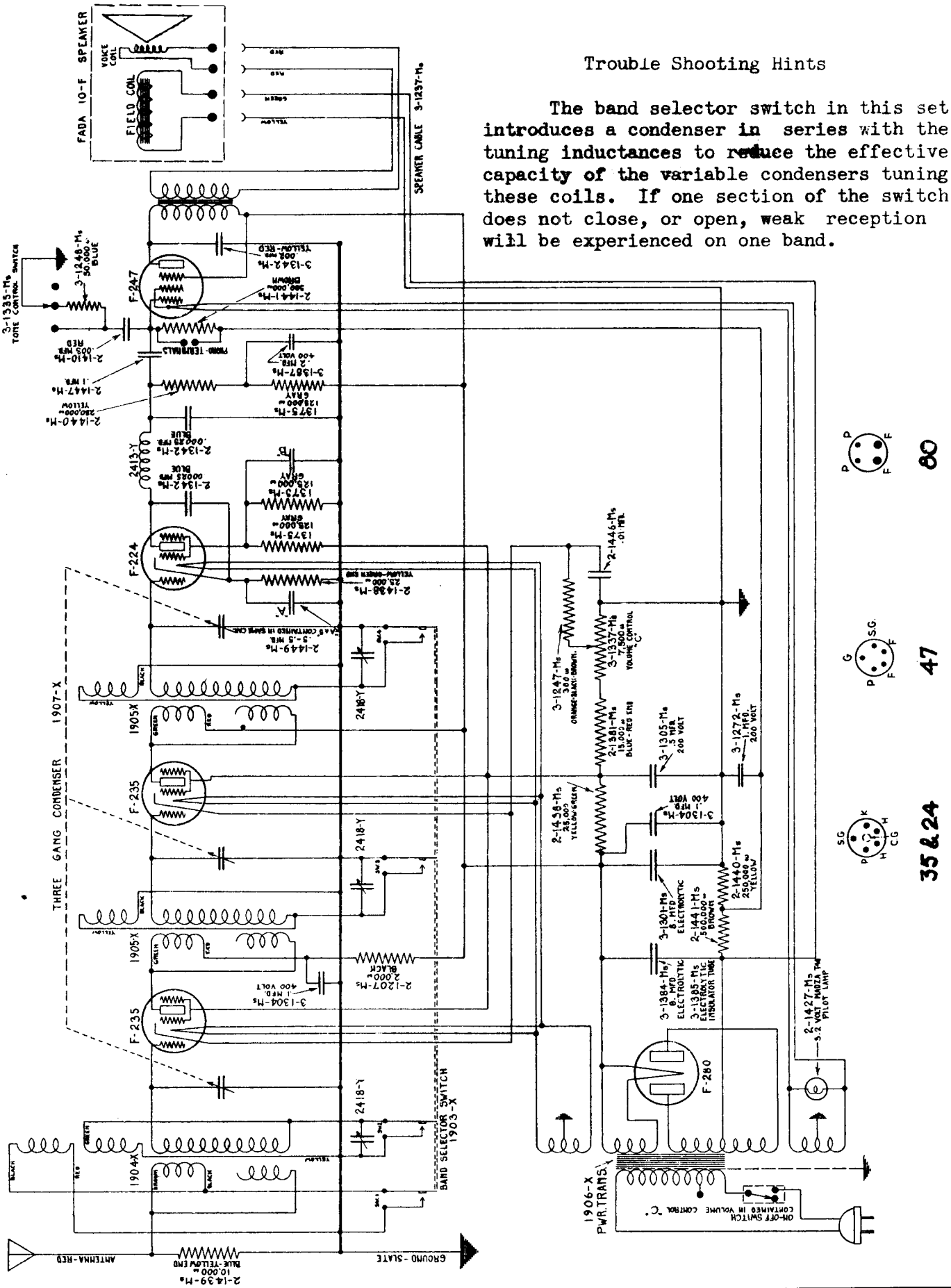
FADA RADIO & ELEC. CORP.

MODELS KOC-110 D.C, 171 AND 173



FADA RADIO & ELEC. CORP.

MODEL KX A.C.-60 CYCLE

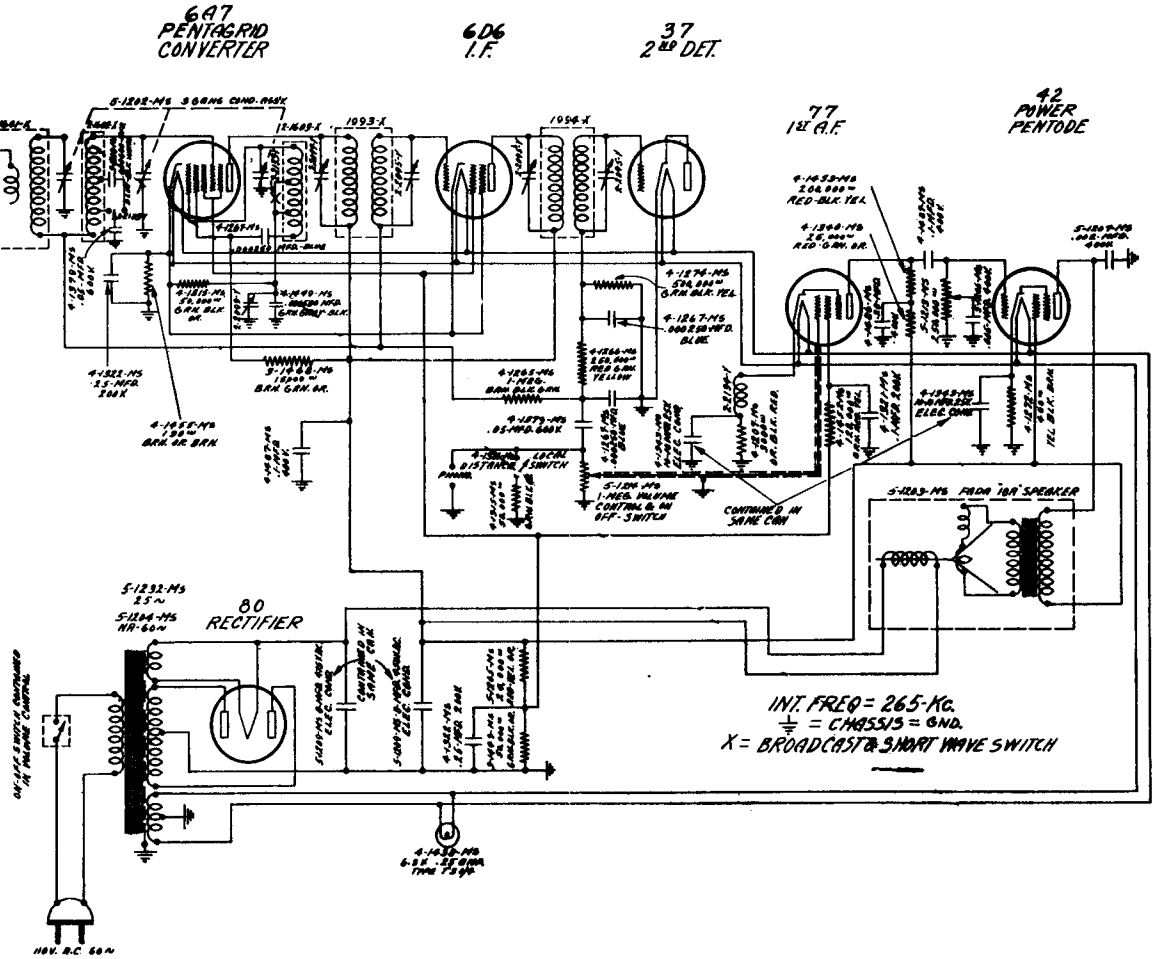


Trouble Shooting Hints

The band selector switch in this set introduces a condenser in series with the tuning inductances to reduce the effective capacity of the variable condensers tuning these coils. If one section of the switch does not close, or open, weak reception will be experienced on one band.

FADA RADIO & ELEC. CORP.

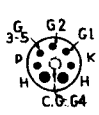
MODELS NA-141 AND 142



TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CONTROL GRID VOLTS	SCREEN GRID VOLTS
6-A-7	1st Det.-Osc.	236	2.5	2.2**	88
6-D-6	Int. freq.	236	7.5	2.2**	88
37	2nd Det.	---	---	---	--
77	1st A.F.	78*	0.23	2.1**	54*
42	Pwr.Pentode	204	30.0	14.0	224
80	Rectifier	---	58. TOTAL		

Connect a lead wire from the dummy antenna system of the signal generator to the control grid of the 6A7 first detector tube. Do not disconnect the control grid connector from the tube nor remove the tube shield. Connect the ground (slate) lead of the receiver to the ground post of the signal generator.

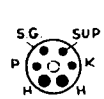
Place the signal generator in operation and adjust the carrier frequency output to 265 KC. Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers of the receiver.



6A7

6D6

37



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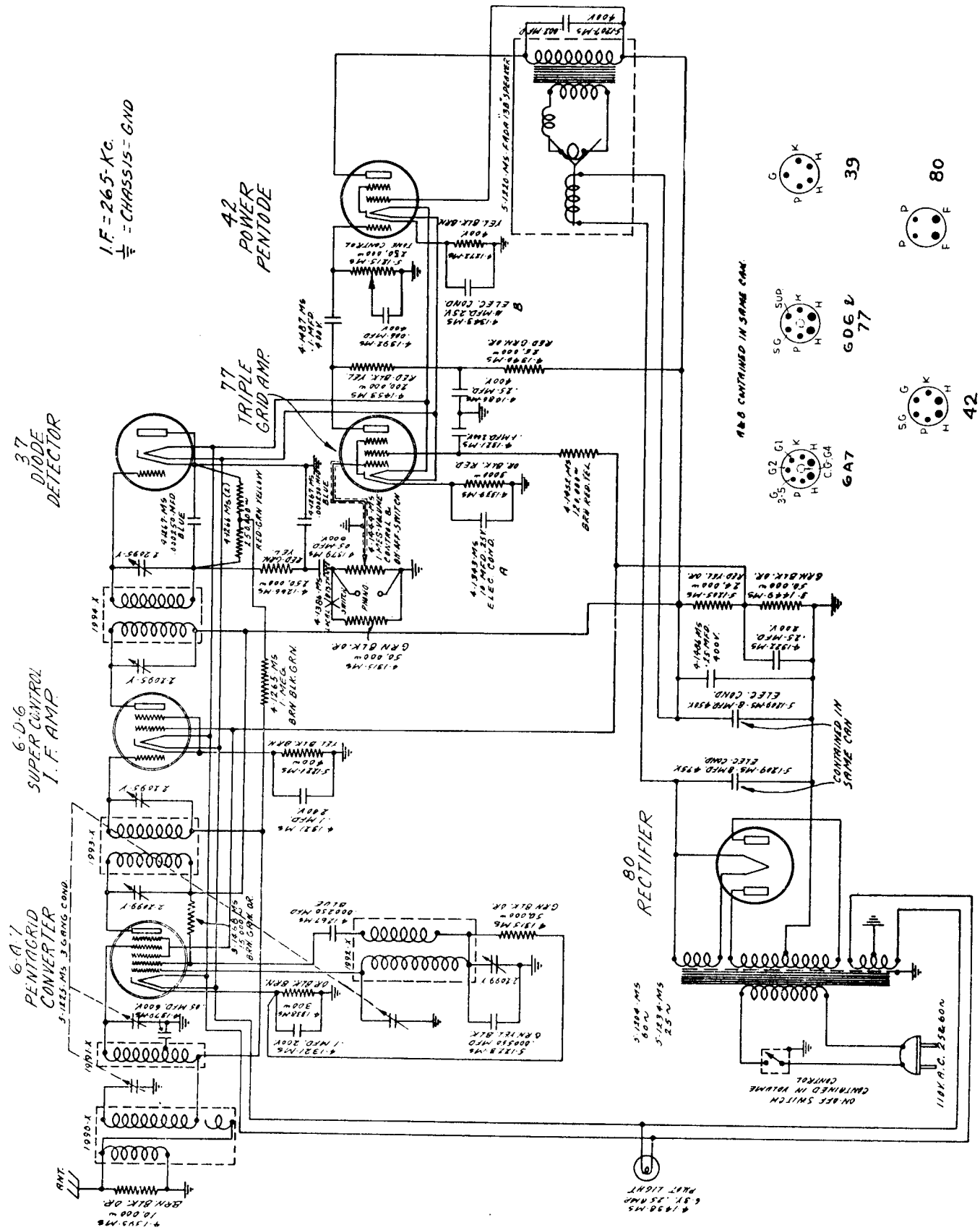
42

80

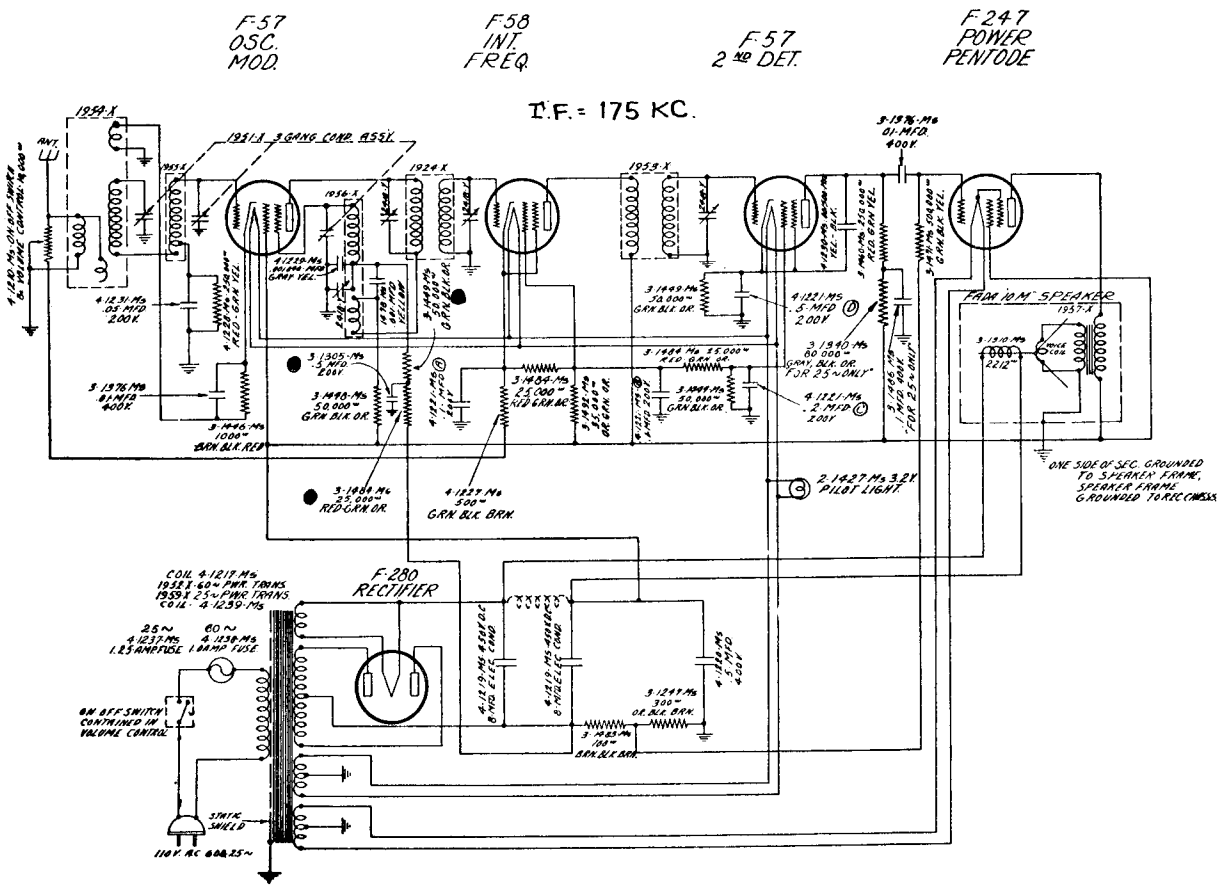
FADA RADIO & ELEC. CORP.

MODELS NE-151 AND 152



FADA RADIO & ELEC. CORP.

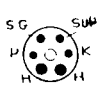
MODELS 55 AND RG



TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CONTROL GRID VOLTS	SCREEN GRID VOLTS
F-57	1st Det. Osc.	60*	3.3	6.0**	240
F-58	Int. Freq.	242	4.0	3.5	81
F-57	2nd Det.	131*	.1	---	47
F-47	Pwr. Pentode	224	30.0	16.0**	246
F-80	Rectifier	---	53.0 total	---	---

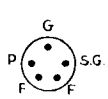
* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

** Bias readings are to be taken across each respective bias resistor. Correct readings cannot be obtained at control grids due to series resistors. Disconnect the outside antenna system from the Receiver.



57 & 58

Connect a lead from the output of the signal generator to the control grid of the detector-oscillator tube. Do not disconnect the control grid connector from the tube, nor remove the tube shield. Connect the ground (slate) lead of the Receiver to the ground post of the signal generator. Connect a 250 mmfd. condenser in series with the lead wire of the signal generator.



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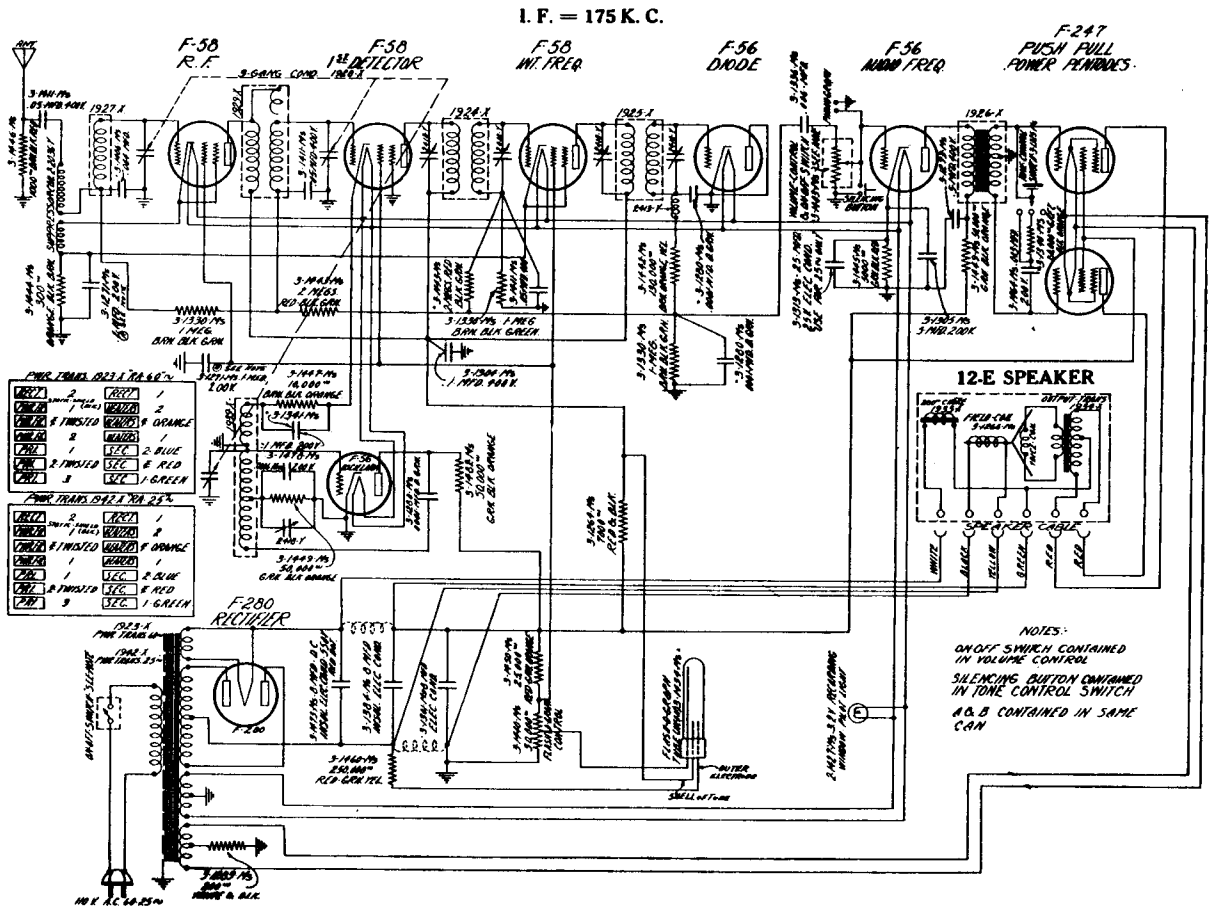
FADA RADIO & ELEC. CORP.

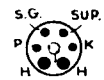
MODELS RH, 74, 76, 83, 87, 88, 89 AND 97



Remove the F-56 oscillator tube from the receiver socket.

Place an output meter across the secondary of the receiver output transformer (which is mounted on the speaker) so that the variations in signal output can be noted.

Place the signal generator in operation and adjust the frequency output to 175 KC. Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers of the receiver.



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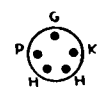

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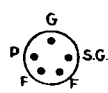

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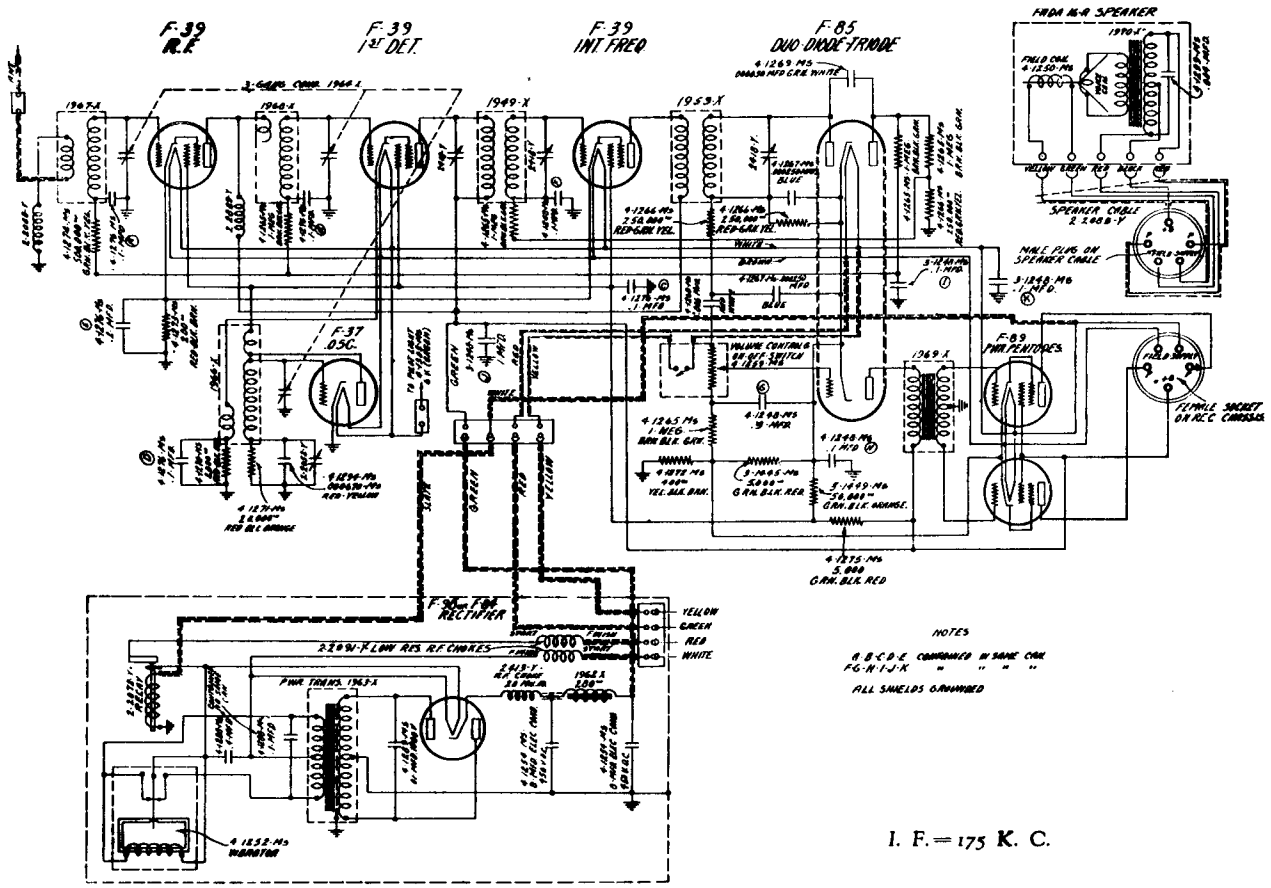
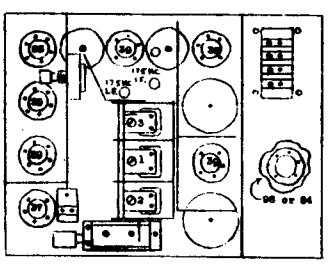
TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE (MA) CURRENT	CONTROL GRID VOLTS	SCREEN GRID VOLTS
F-58	R.F. & I.F.	180	7.0	4.2	110
F-58	1st Detector	173	1.1	11.0	103
F-56	Oscillator	70	4.0	--	--
F-56	2nd Detector	--	--	--	--
F-56	1st Audio	164	2.0	10.0	--
F-247	P.P. Audio	248	34.0	15.0	262
F-280	Rectifier		112 total		

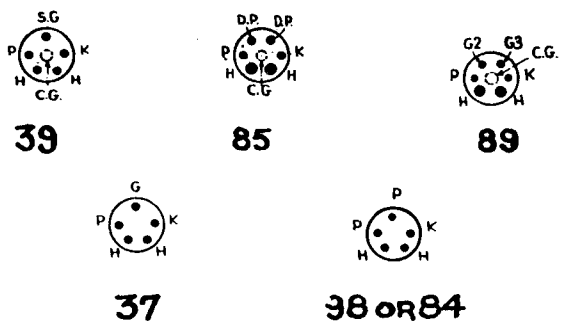
FADA RADIO & ELEC. CORP.

MODELS RK, 101 MOTOSET



I. F. = 175 K. C.





Insert the speaker plug into the receptacle of the MOTOSET chassis.

Connect a lead wire from the output of the signal generator to the control grid of the first detector tube. Do not disconnect the control grid connector from the tube.
Remove the F-37 oscillator tube from the receiver socket.

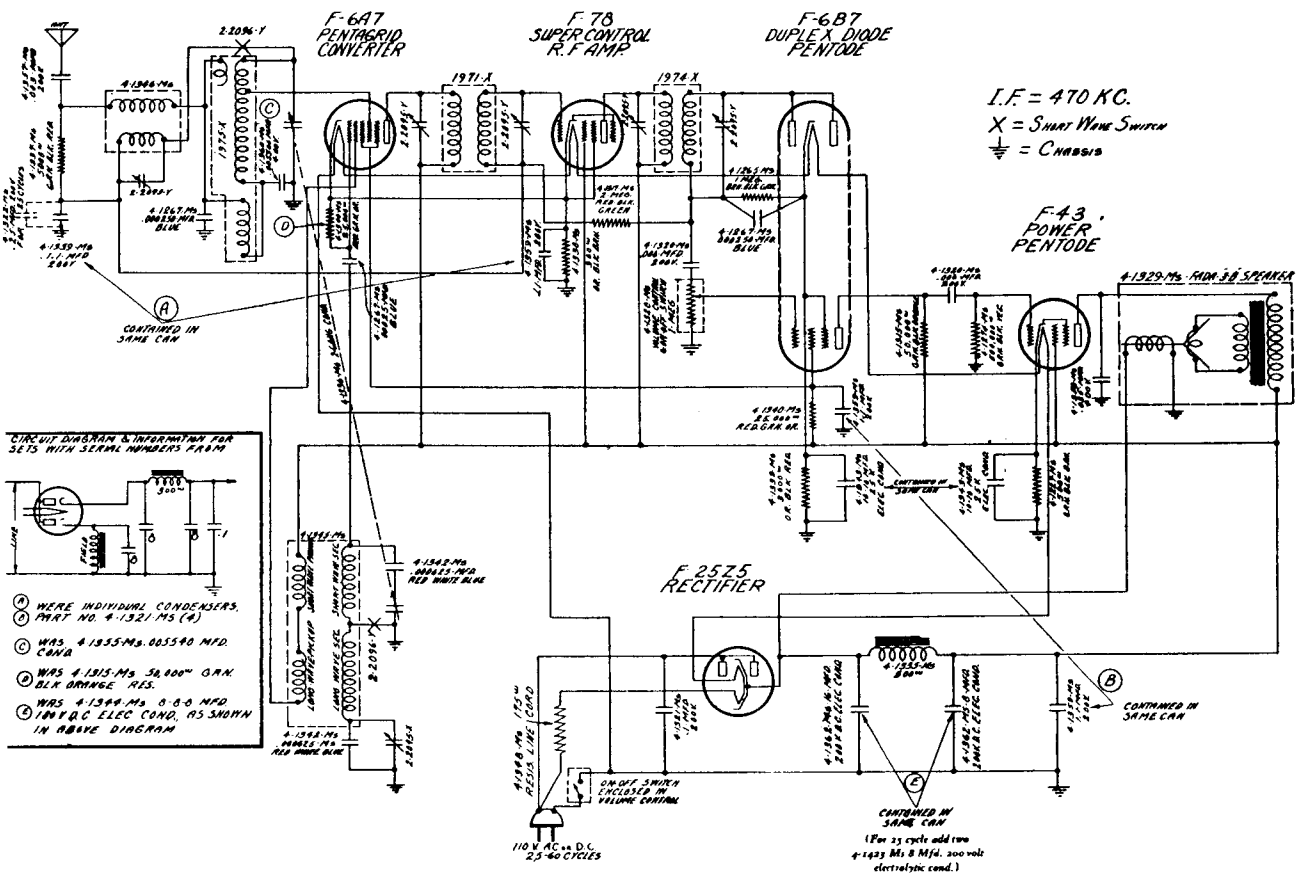
Place the signal generator in operation and adjust the carrier frequency output to 175 K.C. Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the I.F. compensators of the MOTOSET.

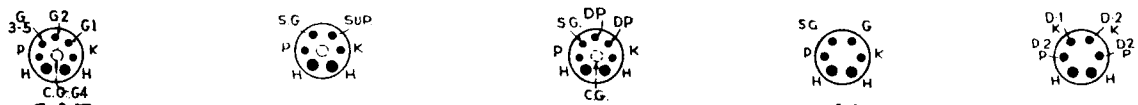
Trouble Shooting Hints

The leads from the power unit to the receiver in this set are all carried through metal sleeves which are grounded to the container of the power unit. If the bonding of these shields is not complete, considerable noise will result.

FADA RADIO & ELEC. CORP.

MODELS RN, 105, 106 AND 107





TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CONTROL GRID VOLTS	SCREEN GRID VOLT
F-6-A-7	1st Det. Osc.	98	1.2	4.2	49*
F-78	Int. Freq.	98	8.7	4.2	92
F-6-B-7	2nd Det.A.F. Amp.	34*	1.1	3.1	48*
F-43	Pwr. Pentode	82	20.	12.	90
F-25-Z-5	Rectifier		60. total		

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

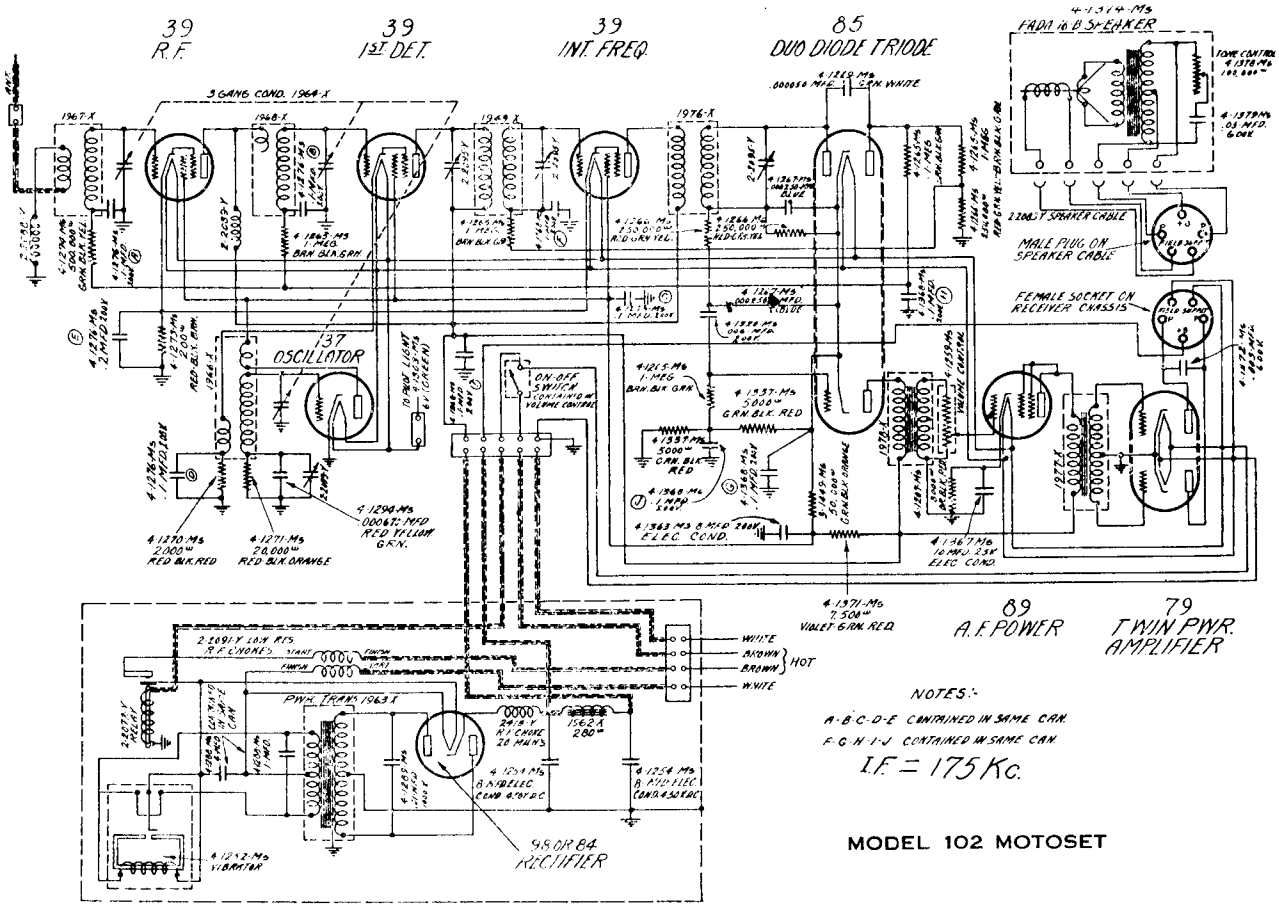
Bias readings are to be taken across each respective bias resistor.

Connect a wire from the dummy antenna system of the signal generator to the control grid of the 6-A-7 tube. Do not disconnect the control grid connector from the tube, nor remove the tube shield.

Place the signal generator in operation and adjust the carrier frequency output to 470 KC. Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers of the Receiver.

FADA RADIO & ELEC. CORP.

MODELS RP AND 102 MOTOSET



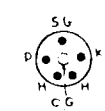
MODEL 102 MOTOSET

Insert the speaker plug into the receptacle of the MOTOSET chassis.

Connect a lead wire from the output of the signal generator to the control grid of the first detector tube. Do not disconnect the control grid connector from the tube.

Remove the F-37 oscillator tube from the receiver socket.

Place the signal generator in operation and adjust the carrier frequency output to 175 K.C. Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the I.F. compensators of the MOTOSET.



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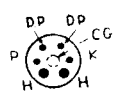

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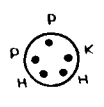

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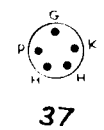

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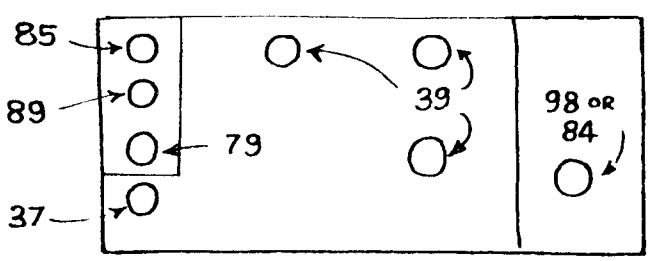
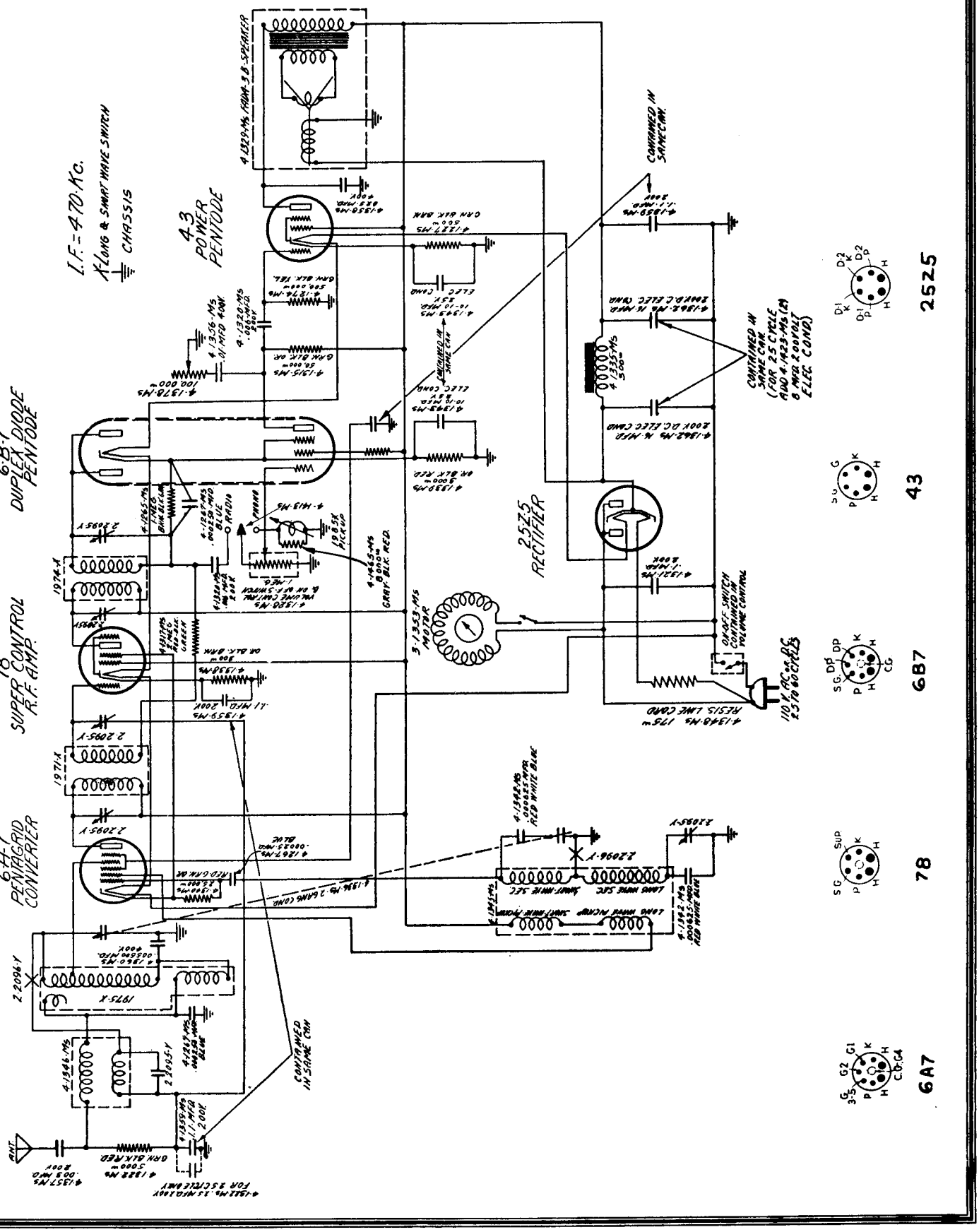


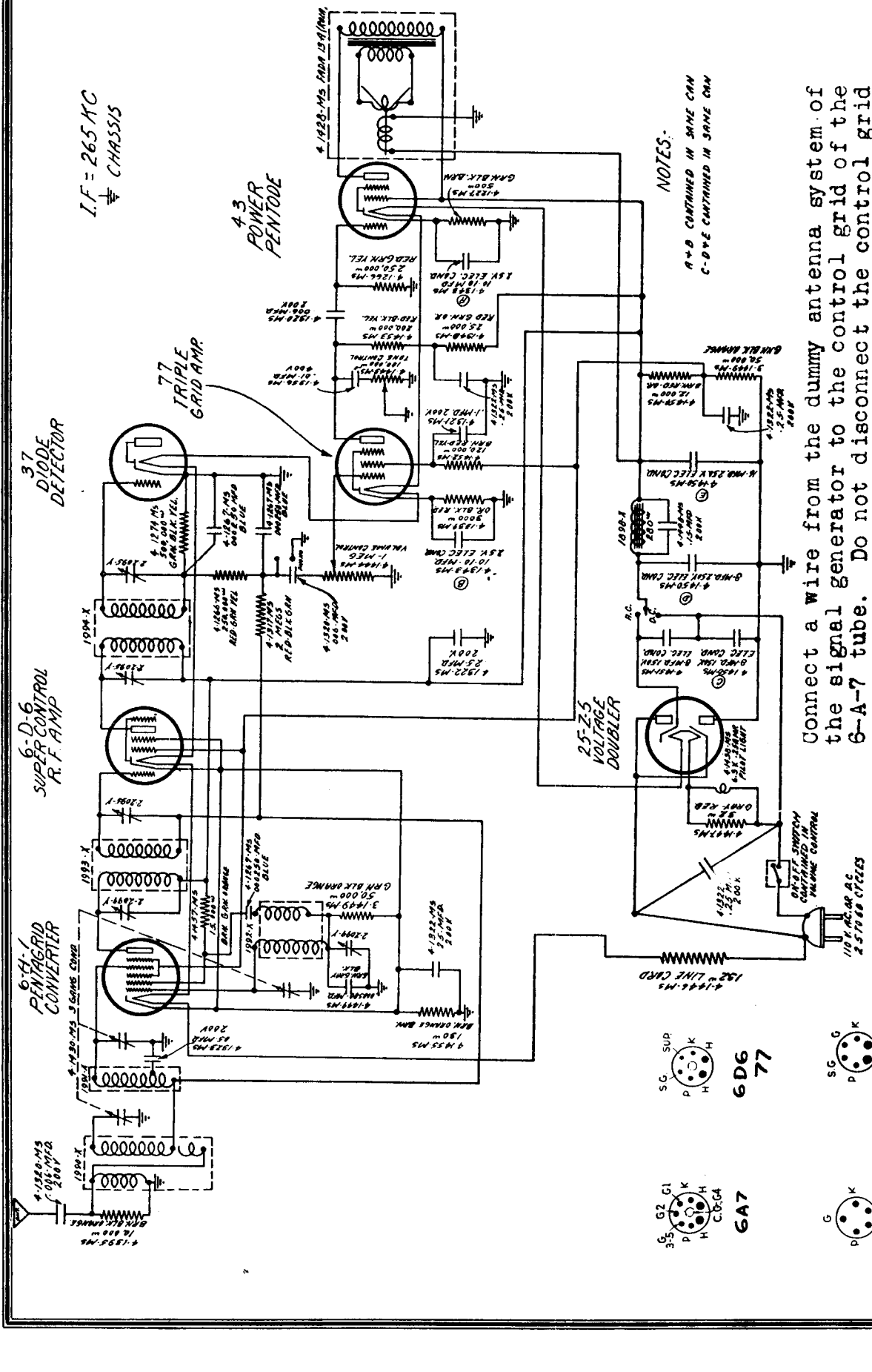
FADA RADIO & ELEC. CORP.

MODELS RS AND 112



FADA RADIO & ELEC. CORP.

MODEL RU, 131 AND 132 A.C.-D.C.

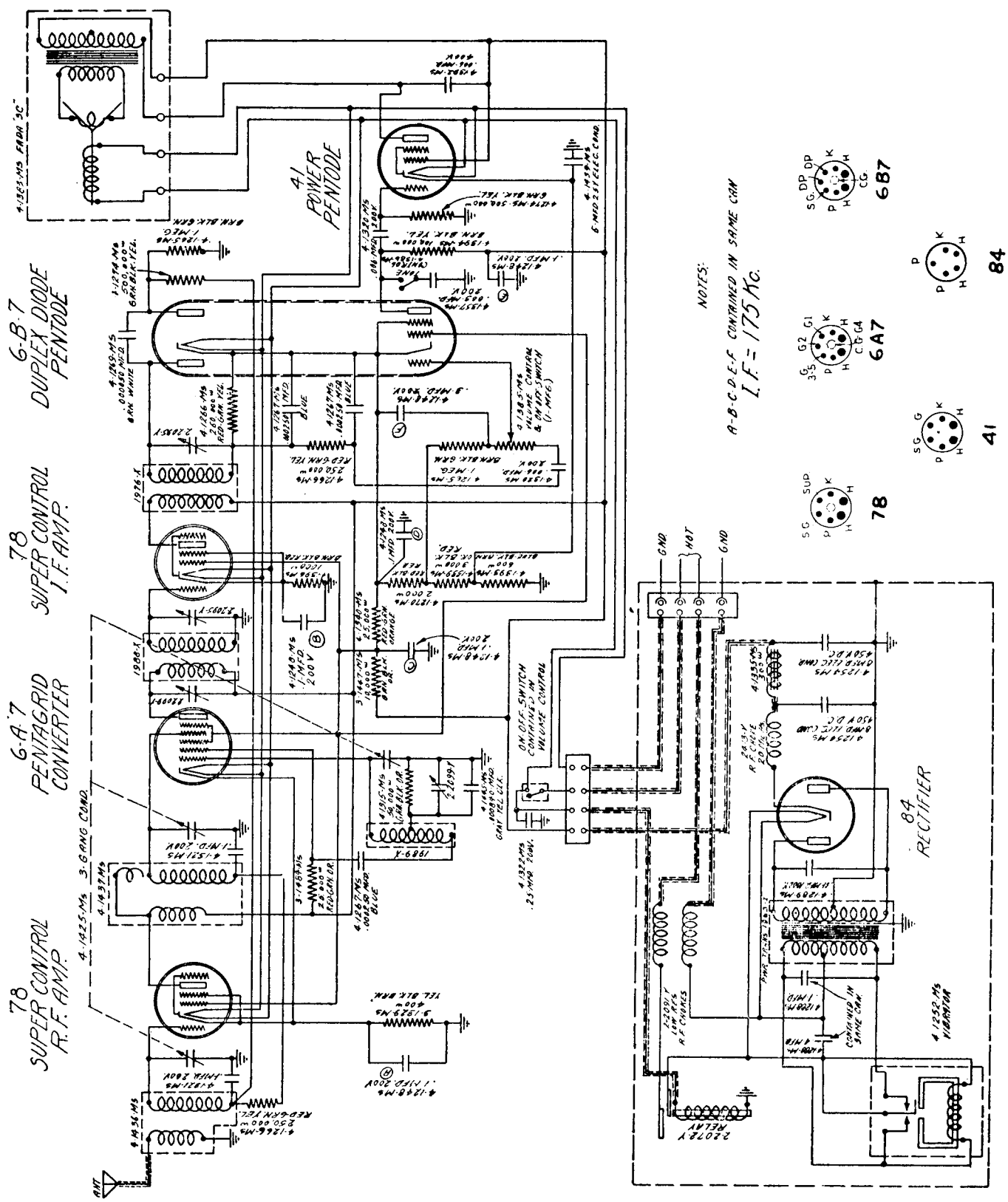


Connect a wire from the dummy antenna system of the signal generator to the control grid of the 6-A-7 tube. Do not disconnect the control grid connector from the tube, nor remove the tube shield.

Place the signal generator in operation and adjust the carrier frequency output to 265 KC. Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers of the Receiver.

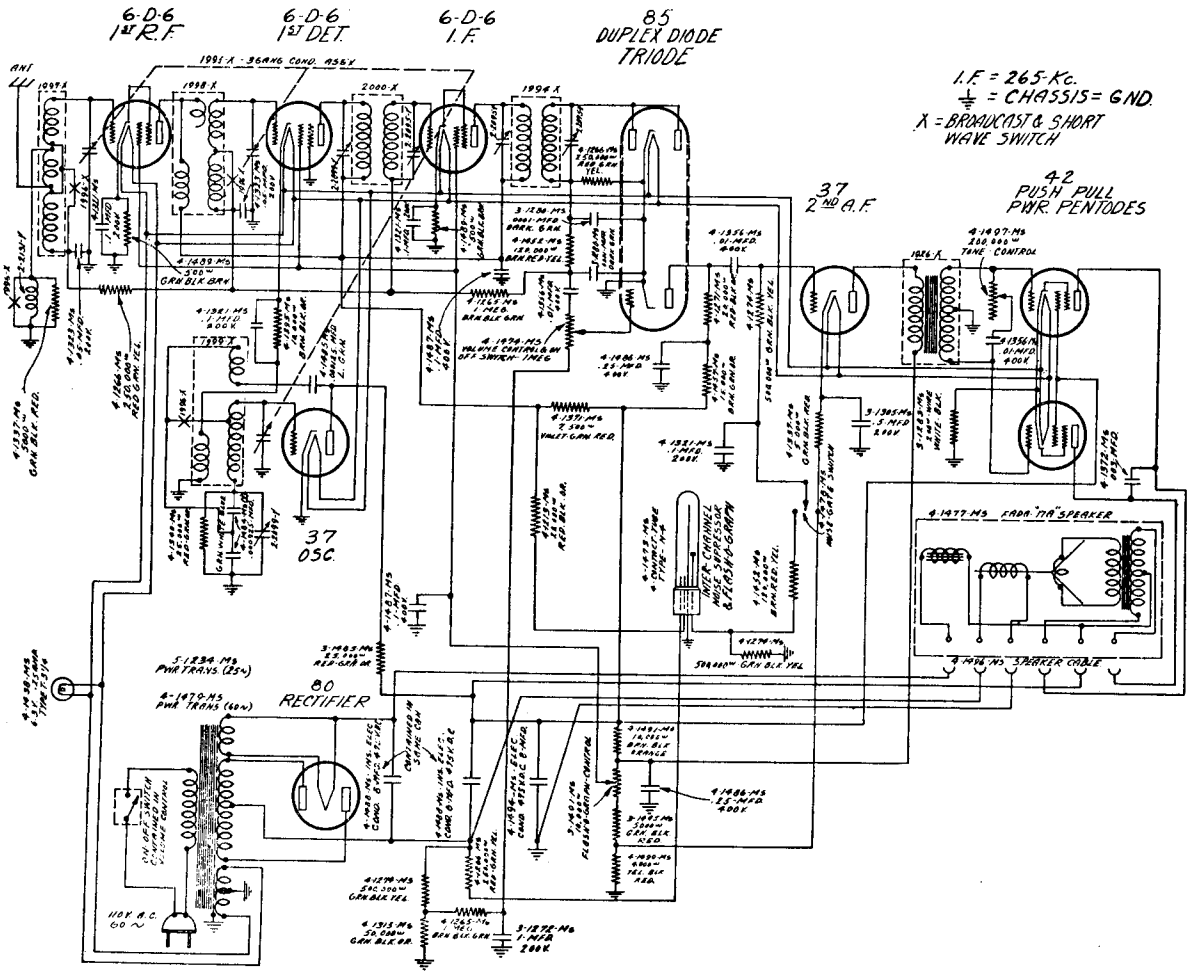
FADA RADIO & ELEC. CORP.

MODELS RV, AND 104 B, MOTOSET



FADA RADIO & ELEC. CORP.

MODELS RW, 133, 134, 135, 78-10, 79-10 & 97-10

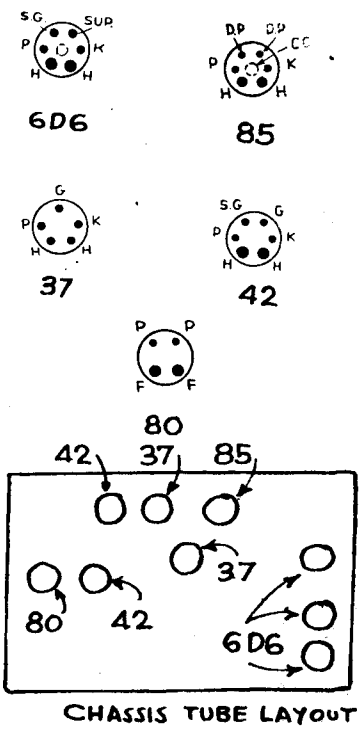


Disconnect the outside antenna system from the receiver.

Remove the shield cap from the first detector tube shield. Connect a lead wire from the dummy antenna system of the signal generator to the control grid of the first detector tube. Do not disconnect the control grid connector from the tube, nor remove the tube shield. Connect the ground (slate) lead of the receiver to the ground post of the signal generator. In the event that the signal generator being used does not have a dummy antenna system, connect a 25 mmfd. condenser in series with the lead wire.

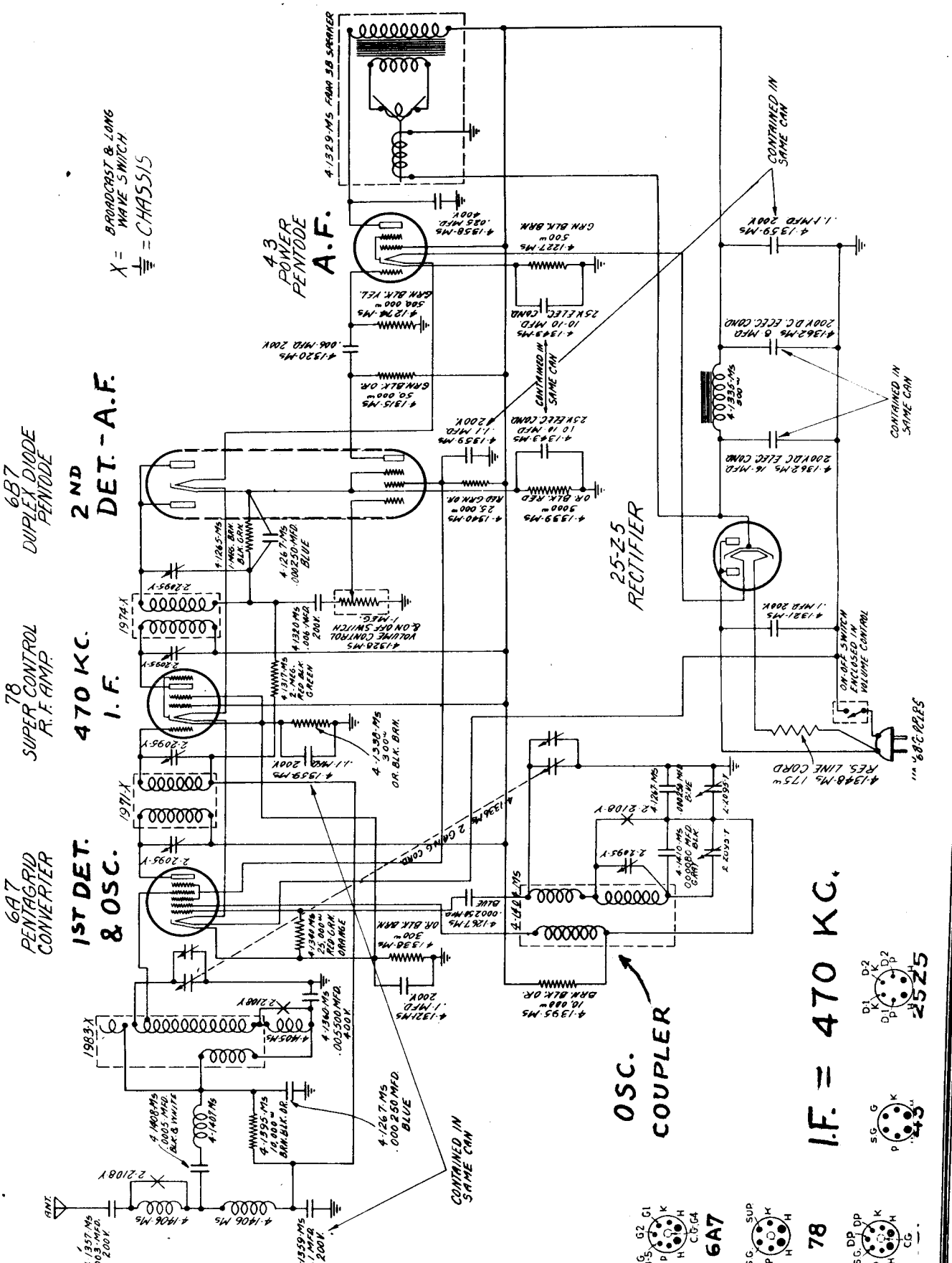
Remove the F-37 oscillator tube from the receiver socket.

Place the signal generator in operation and adjust the frequency output to 265 KC. Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers of the receiver.



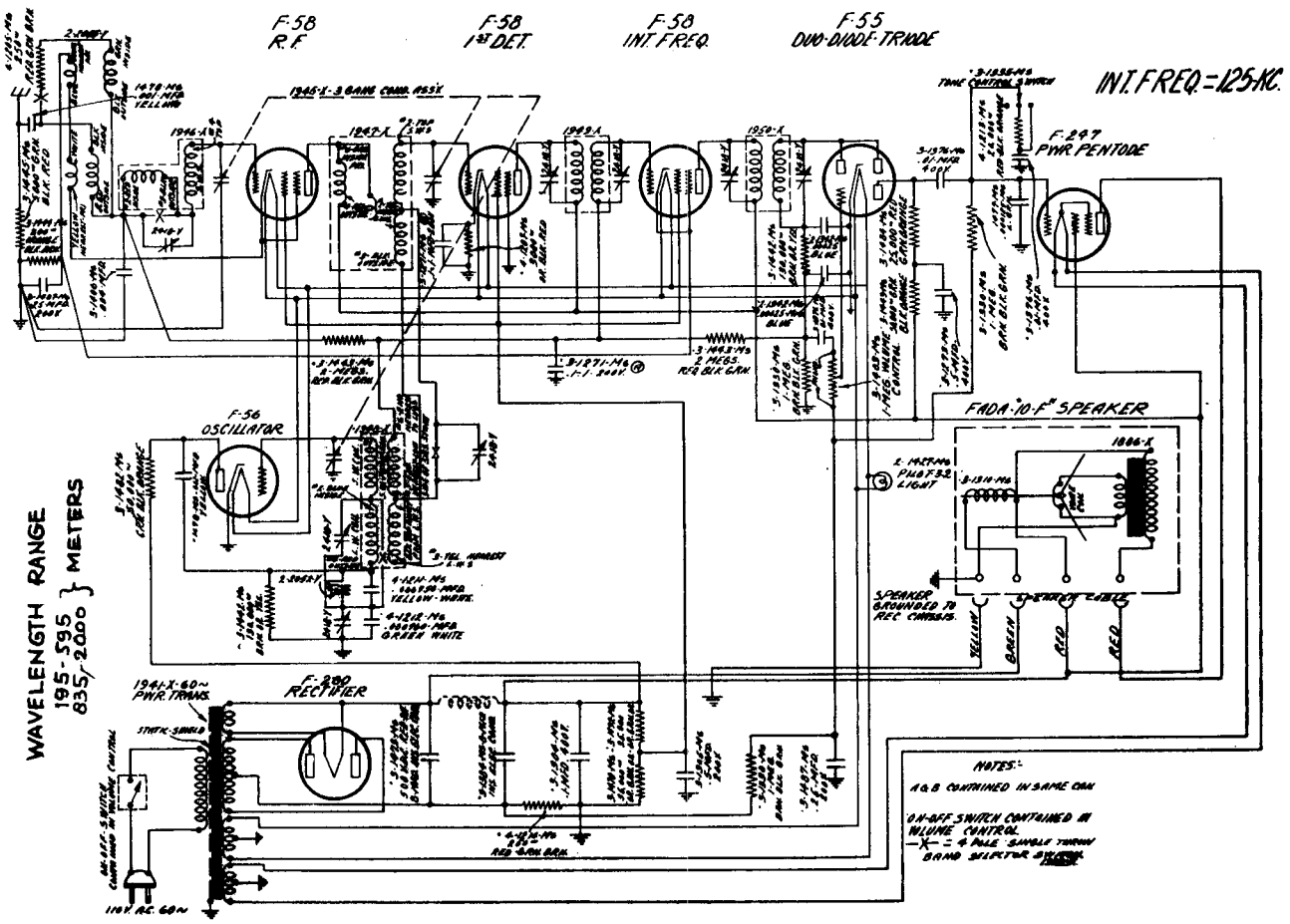
FADA RADIO & ELEC. CORP.

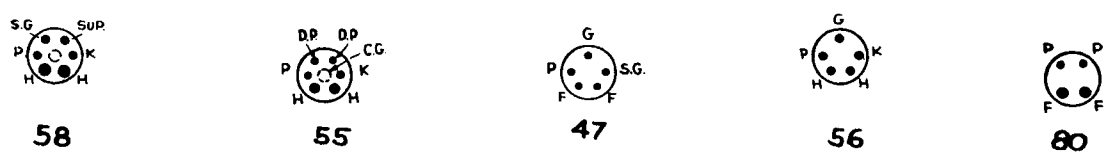
MODEL - RY



FADA RADIO & ELEC. CORP.

MODELS 93, 95 AND RX



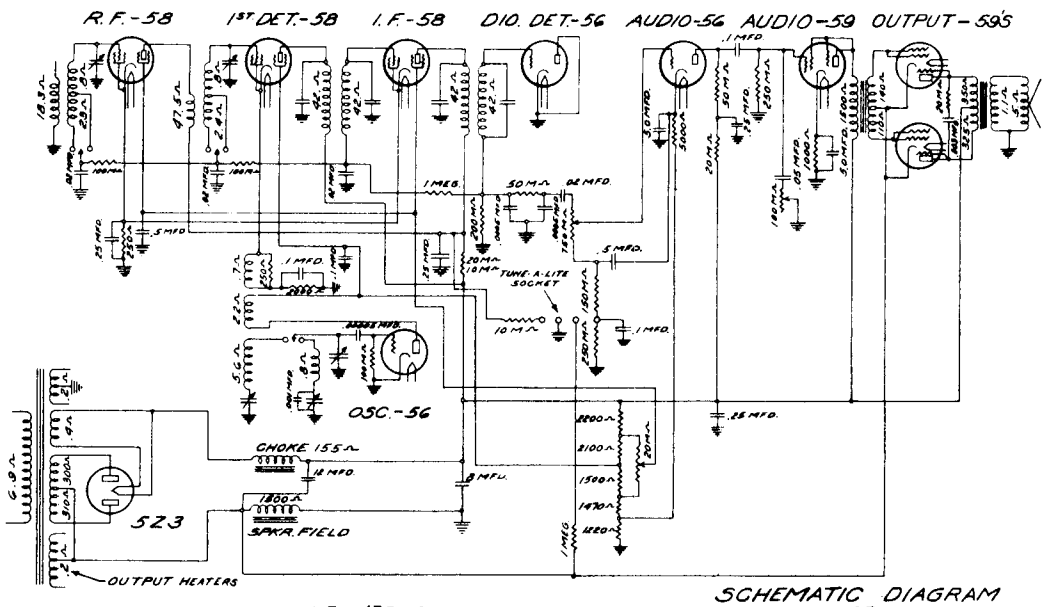


1st - Disconnect the outside antenna system from the Receiver.

2nd - Connect a lead wire from the output system of the signal generator to the control grid of the first detector tube. Do not disconnect the control grid connector from the tube nor remove the tube shield. Connect the ground (slate) lead of the Receiver to the ground post of the signal generator. Install a 250 mmfd. condenser in series with the signal generator lead wire.

5th - Place the signal generator in operation and adjust the frequency output to 2402 meters (125 kilocycles). Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers of the Receiver.

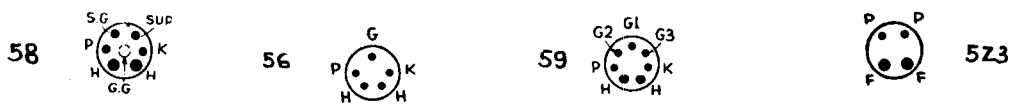
FEDERATED PURCHASER, Inc.



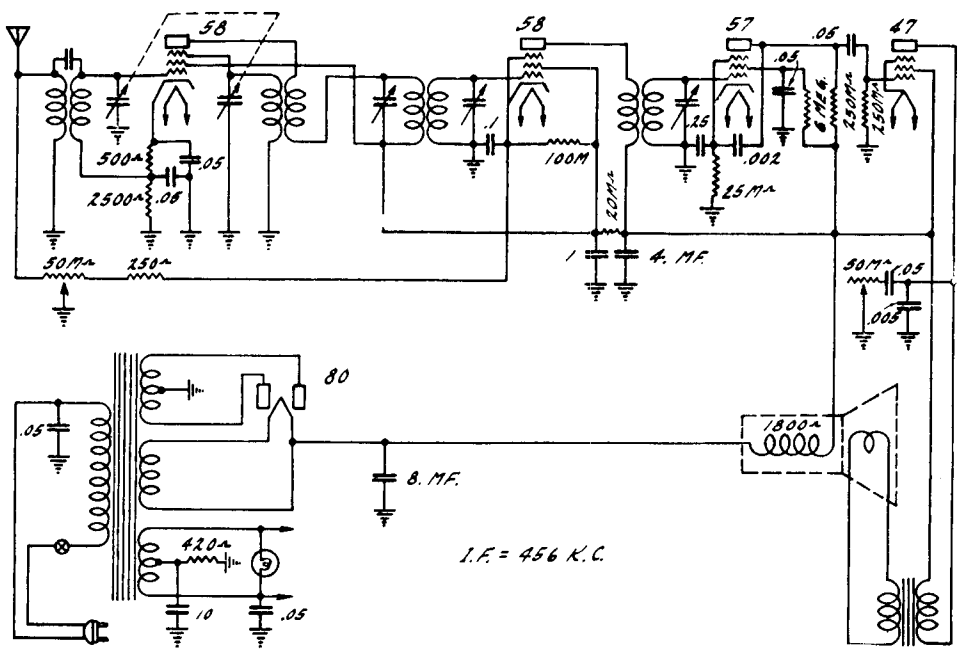
I.F. = 175 K.C.

SCHEMATIC DIAGRAM OF ACRATONE 6A, 12A

SUPPLEMENTARY CORRECTION TO ORIGINAL CIRCUIT DIAGRAM OF MODEL 480. 11/10/33

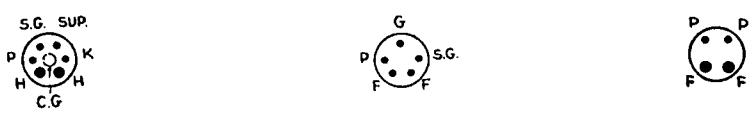


SCHEMATIC DIAGRAM OF MODEL 503 RADIO

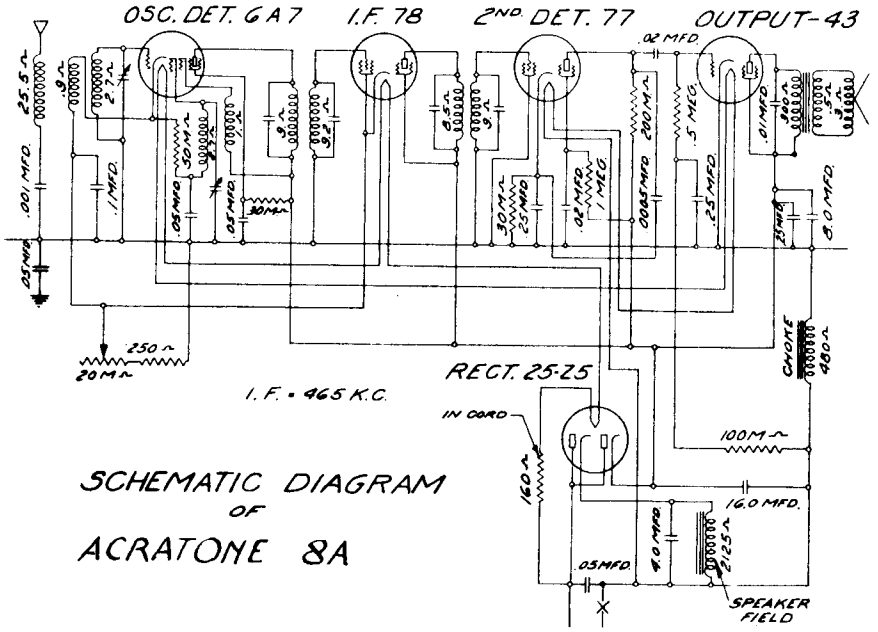


I.F. = 456 K.C.

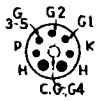
ACRATONE 38A



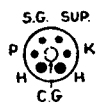
FEDERATED PURCHASER, Inc.



SCHEMATIC DIAGRAM
OF
ACRATONE 8A

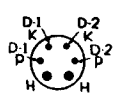


6A7

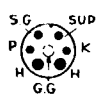


77 & 78

43



25Z5



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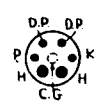
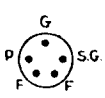


2A6



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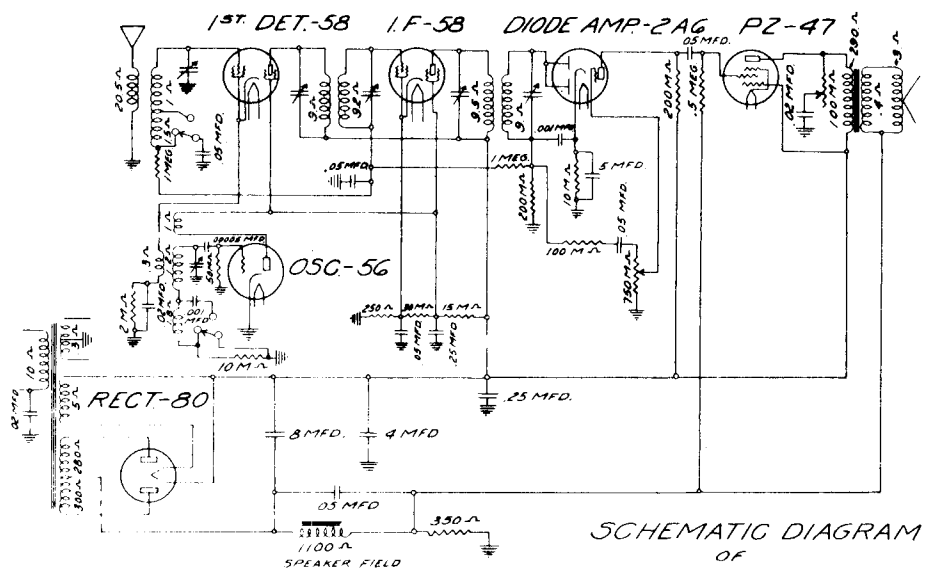
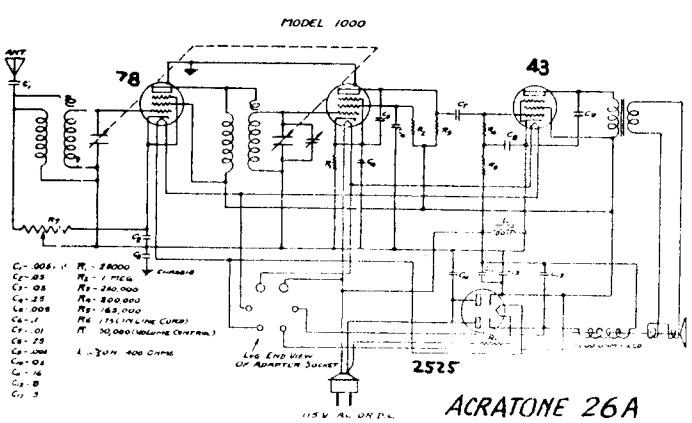
80



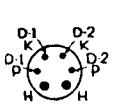
SCHEMATIC DIAGRAM
OF
ACRATONE 24A, 7A, 13A



ACRATONE 26A
AND 1000

77&78

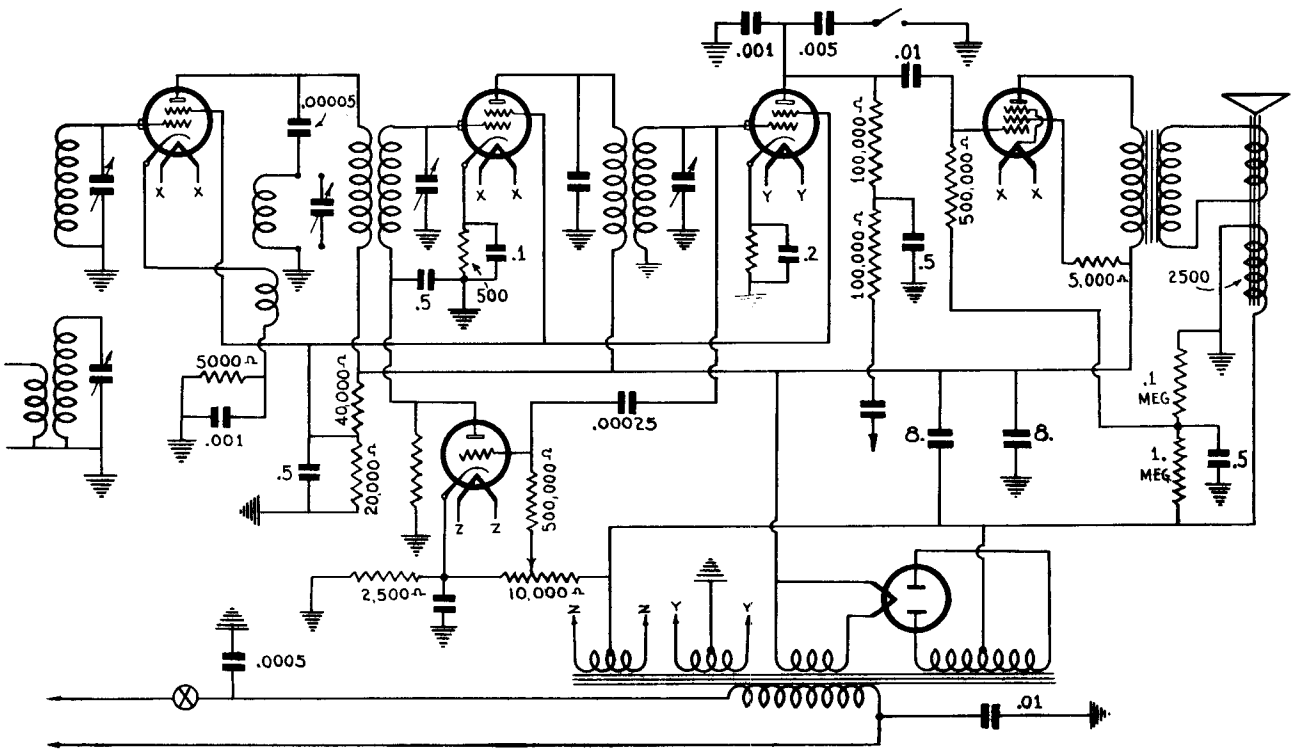
43



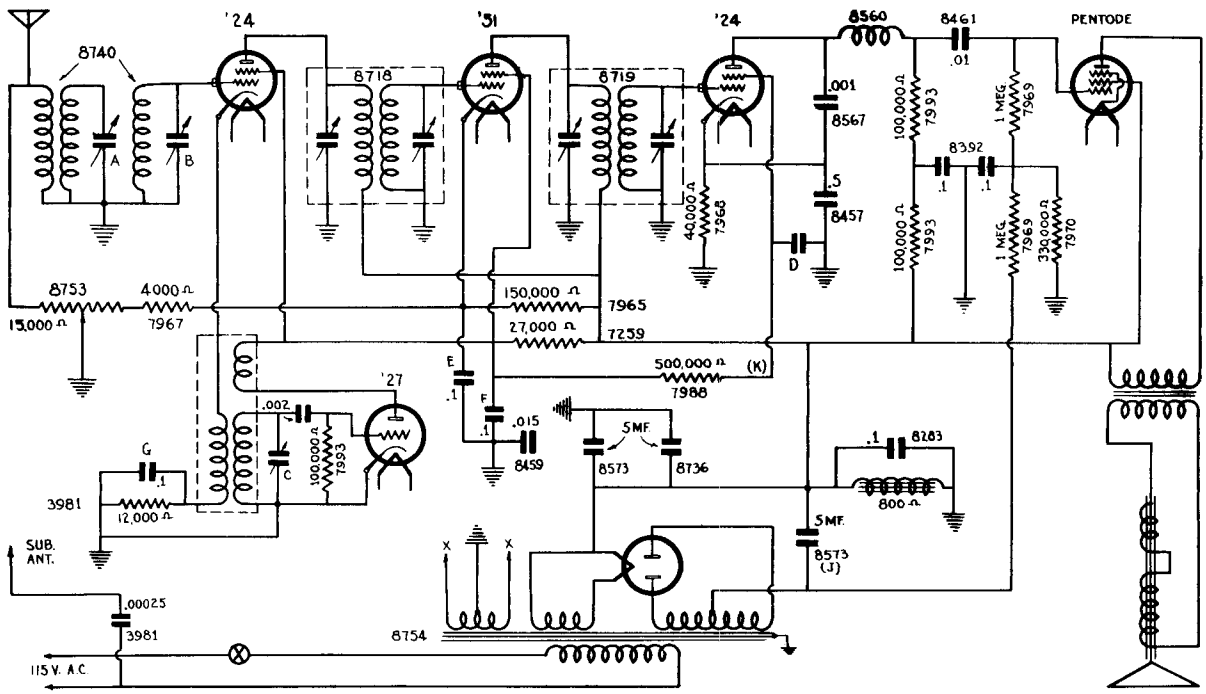
2525

FEDERATED PURCHASER, Inc.

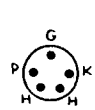
MODEL 10



MODEL 5



24 & 51



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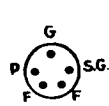
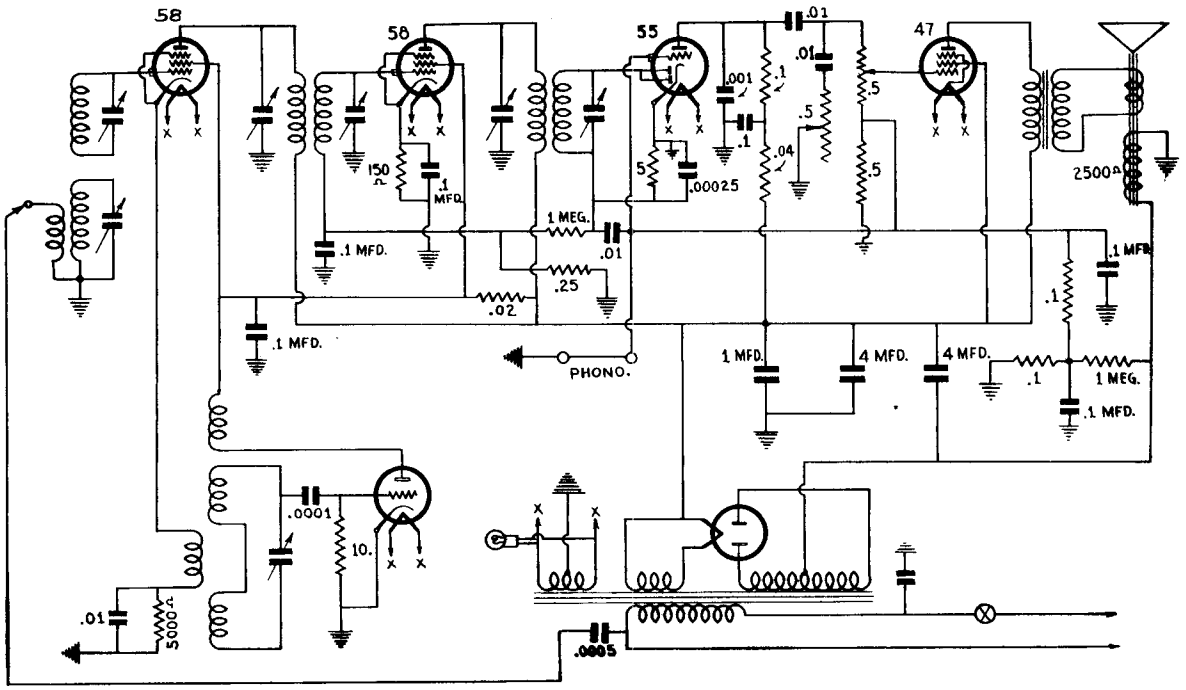
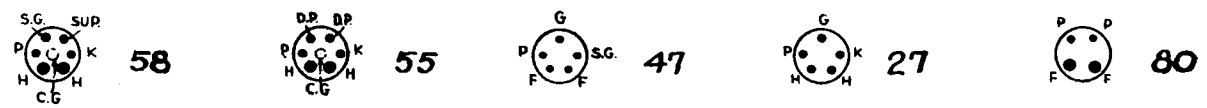


47

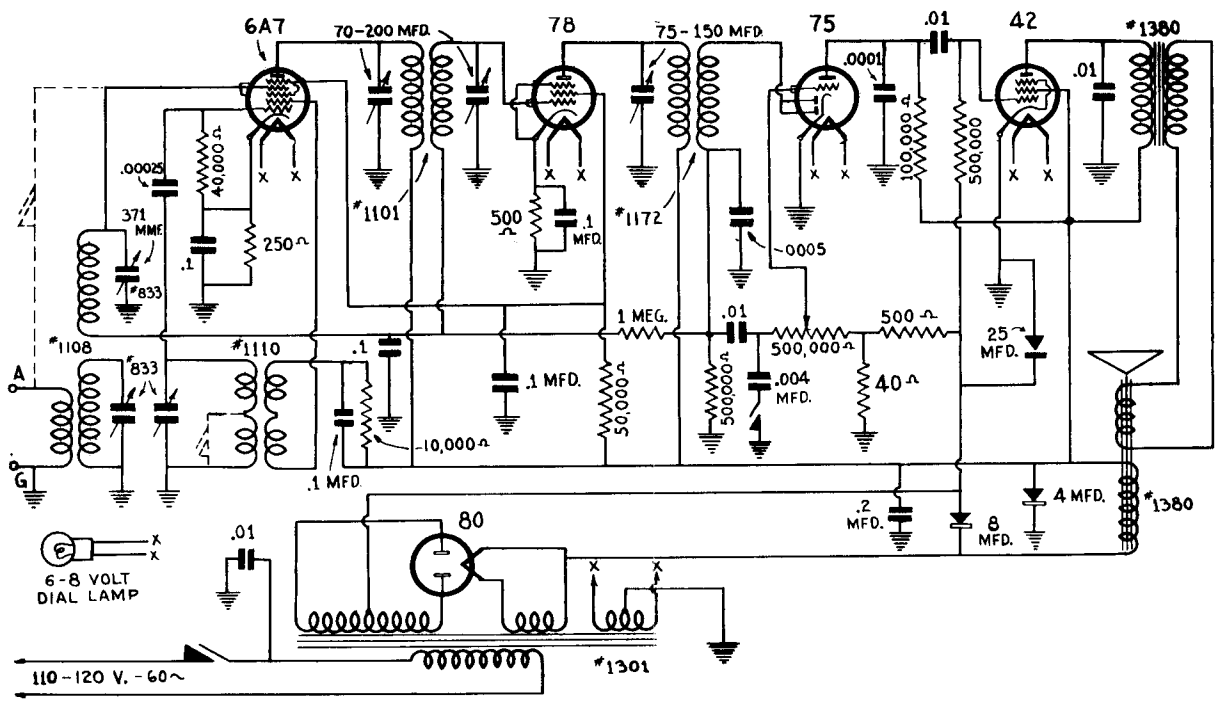
FEDERATED PURCHASER, Inc.

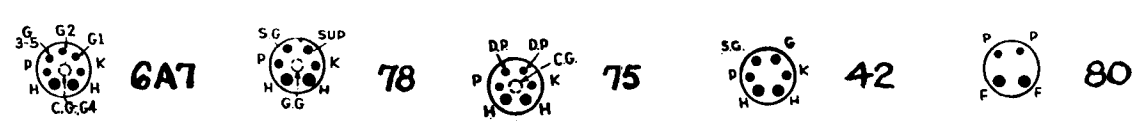
MODEL 17 ACRATONE





MODEL 67 ACRATONE





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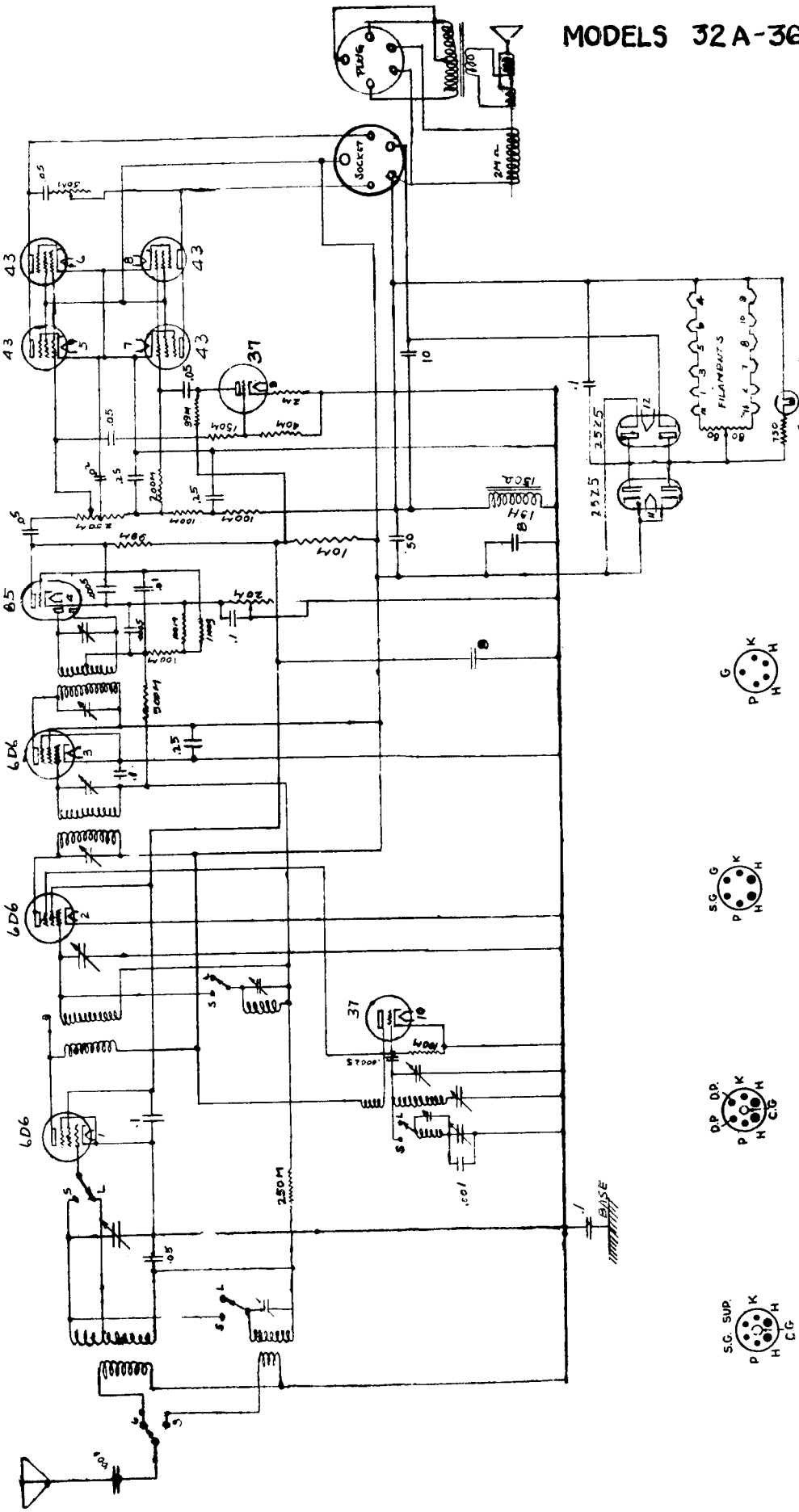
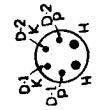
MODELS 32A-36A & 1200



37

43

85



2525

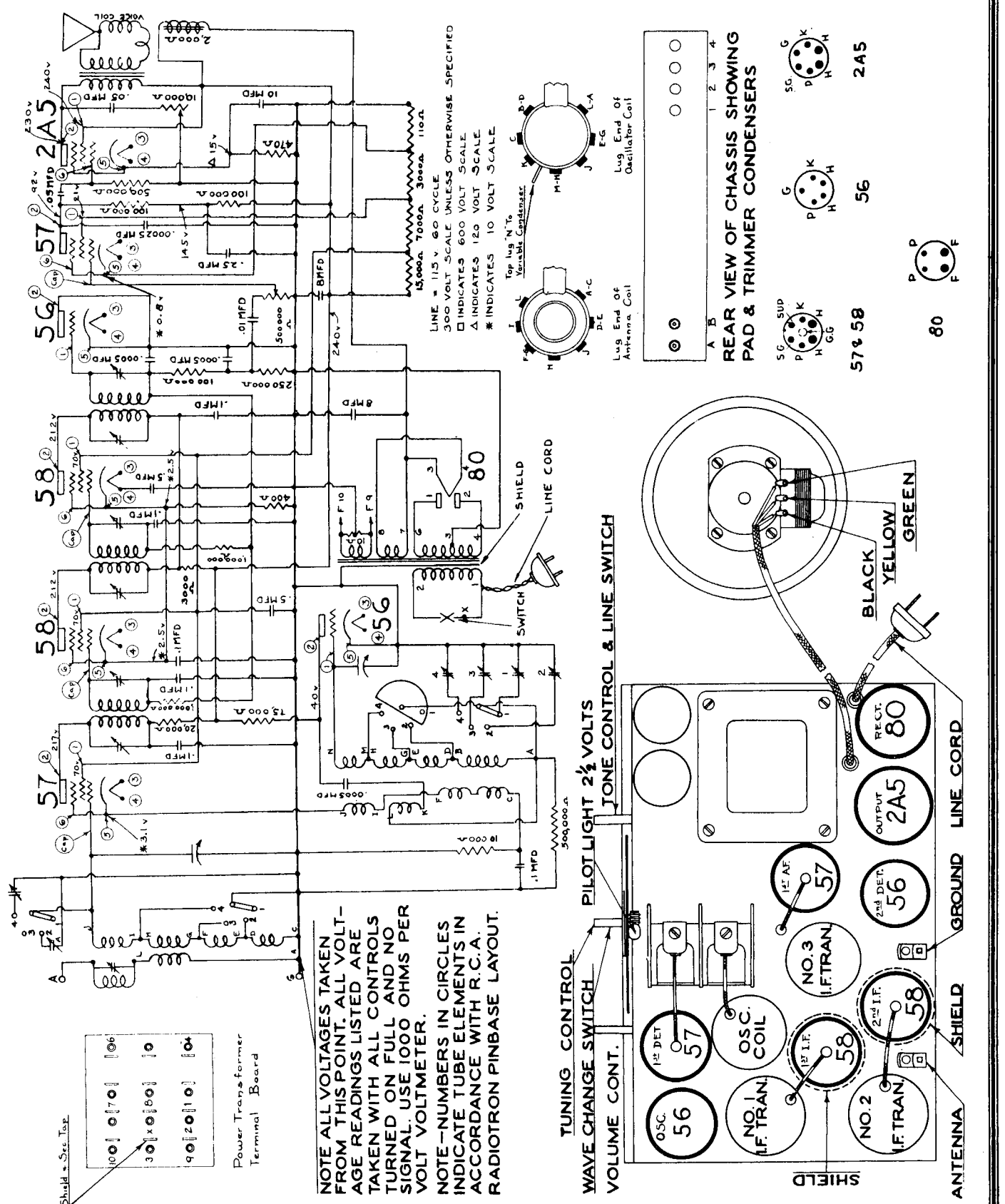
6D6

Trouble Shooting Hints

If the customer complains of poor quality and low volume the 25Z5's should be tested first, and if plate voltages are normal the 85 second detector should be replaced and all of the associated resistors in the grid and plate circuits should be checked.

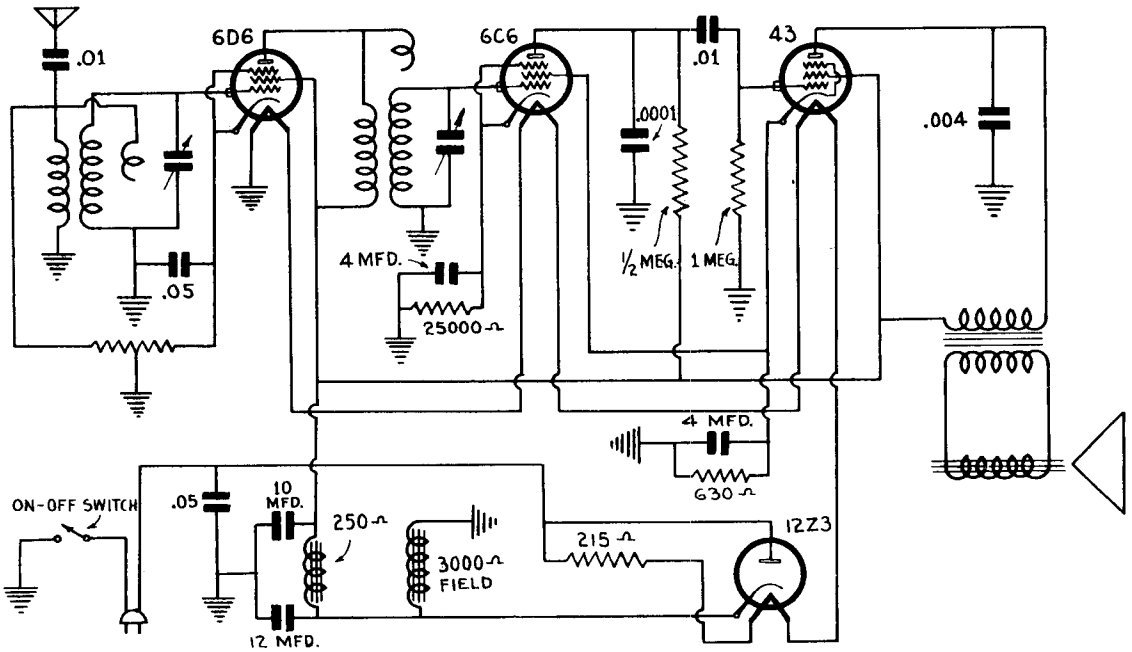
FEDERATED PURCHASER, Inc.

MODELS 43A, 44A, 39A, 86A, 87A & SW-88



FEDERATED PURCHASER, Inc.

MODELS 53-54-58 & 59

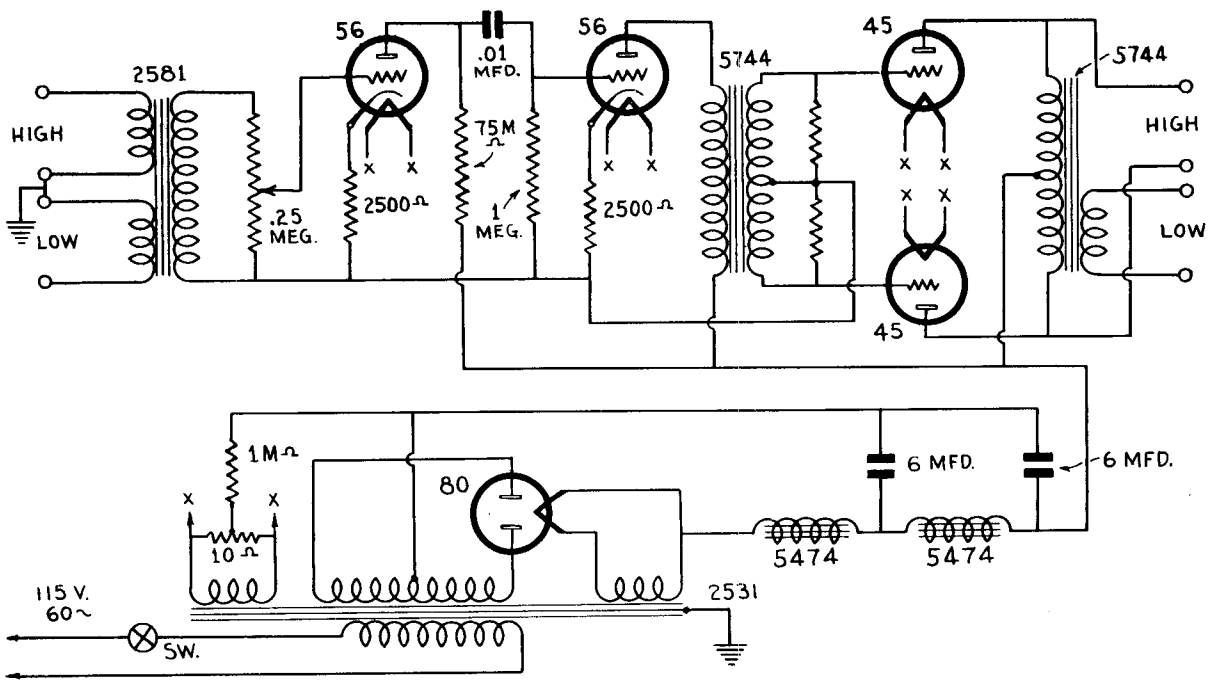


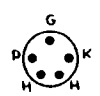
6C6 & 6D6

43

12Z3

MODEL 120 AMPLIFIER





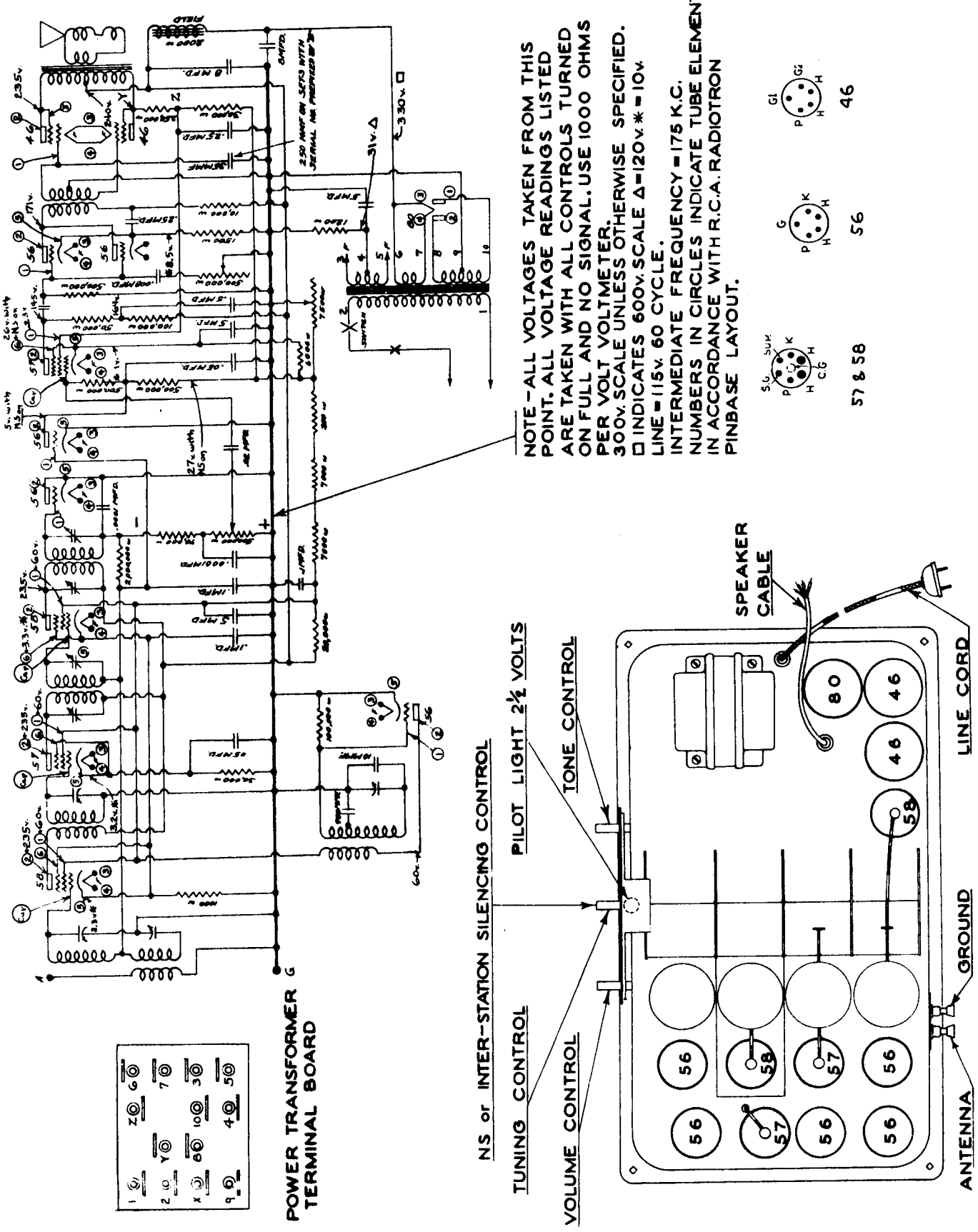
56

45

80

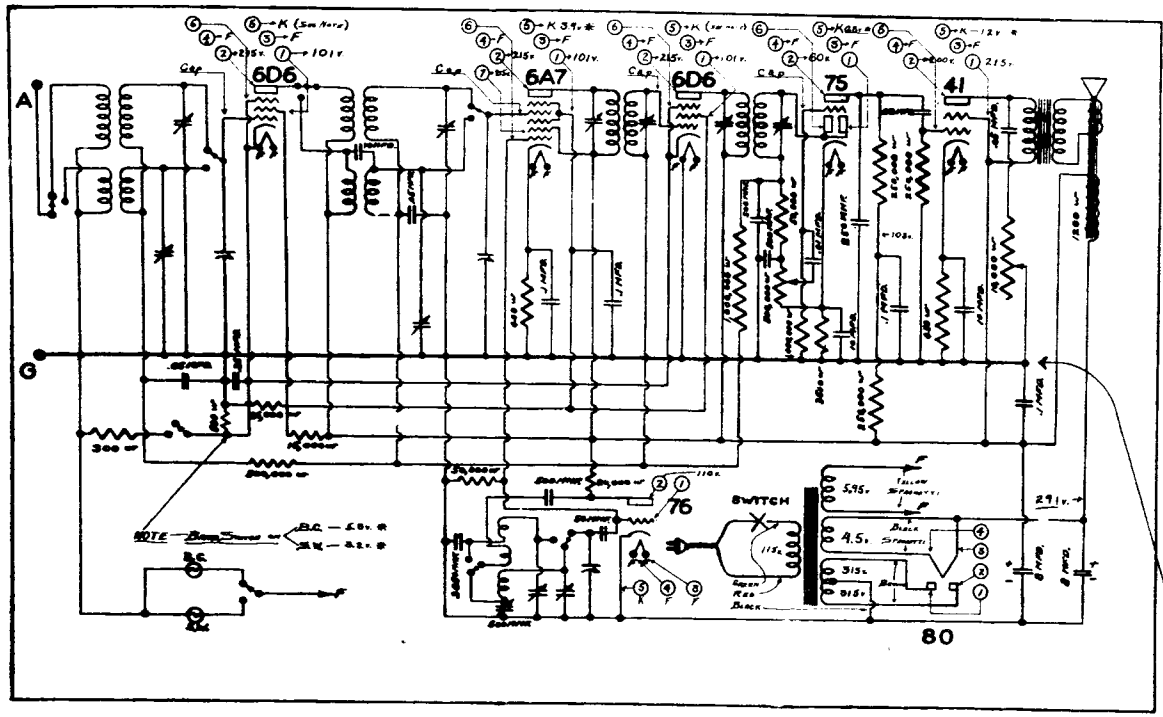
FEDERATED PURCHASER, Inc.

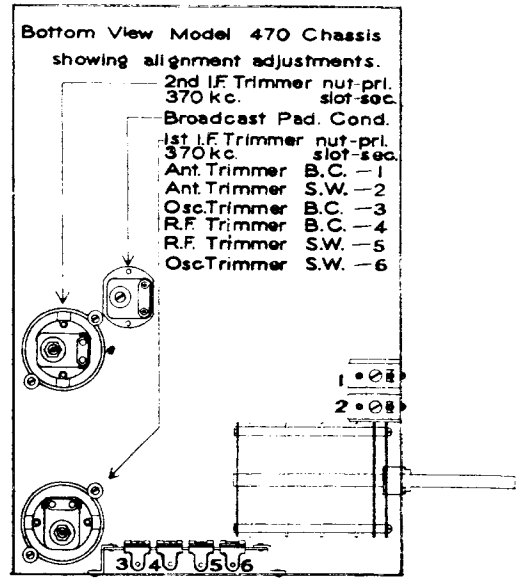
MODELS 79, 80, SA-120 TO 123 SERIAL 200,001 & UP



FEDERATED PURCHASER, Inc.

MODELS 93, 94, 96, 97, 470 to 474, 600, 001 & UP





NOTES

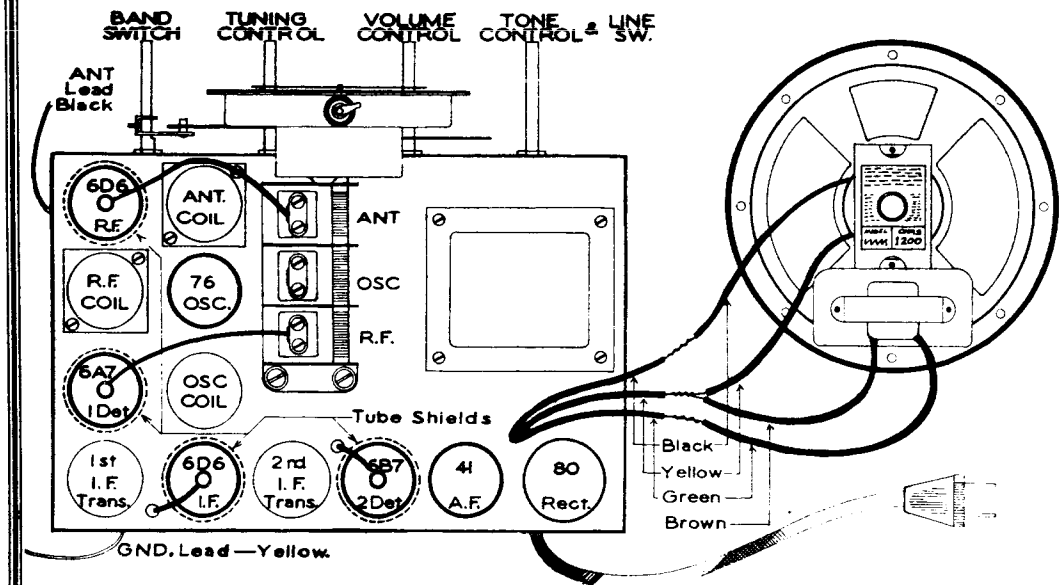
ALL VOLTAGES MEASURED

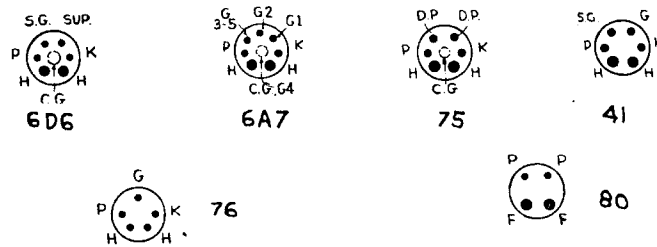
1. From this point (ground) with line at 115 v. 60 c.
2. With a 1000 ohm/volt voltmeter
3. With all controls turned full ON (on BC band)
4. With NO SIGNAL! Short ant. lead if necessary.
5. Use the 300v. scale unless otherwise indicated.
6. △ Indicates 100v. scale ✳ Indicates 10v. scale.

NUMBERS IN CIRCLES indicate tube elements in accordance with R.C.A-Cunn. Pinbase Layout.

FREQUENCY RANGE 550 to 1550kc. & 6 to 16mc.

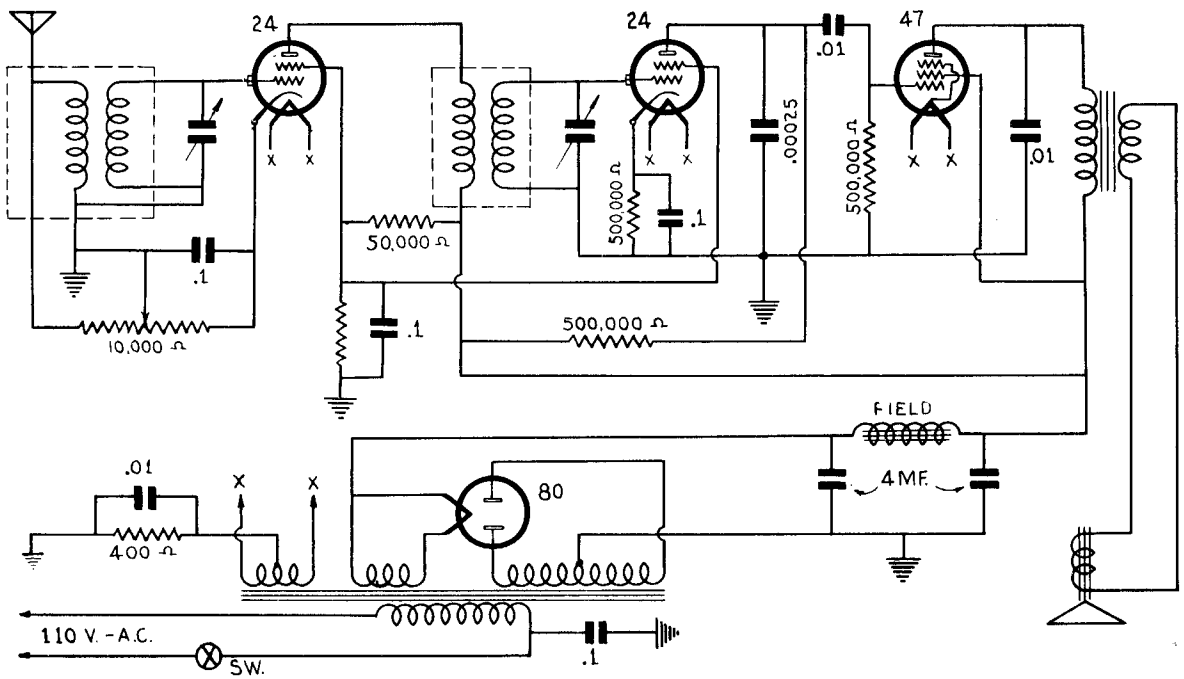
PILOT LIGHTS — 6.3v. 2 req'd. code ···· blue bead
NOTE — pilot lites wired to band switch to light only the calibration of the band in use.

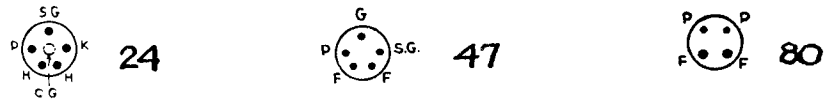




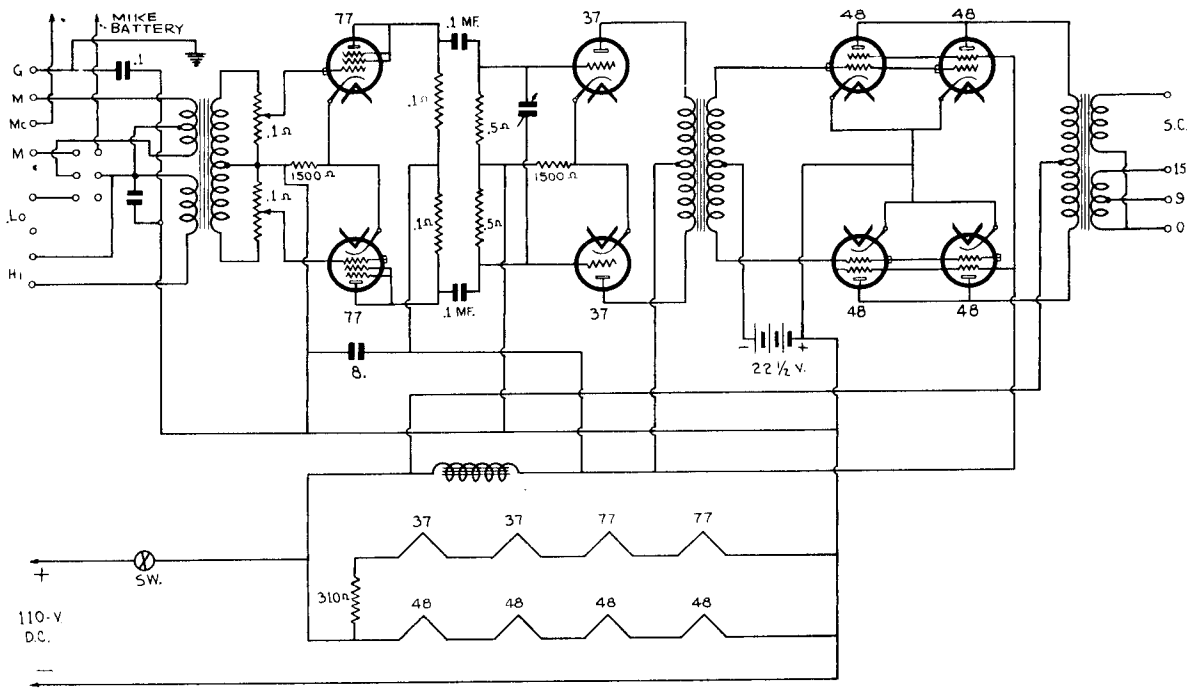
FEDERATED PURCHASER, Inc.

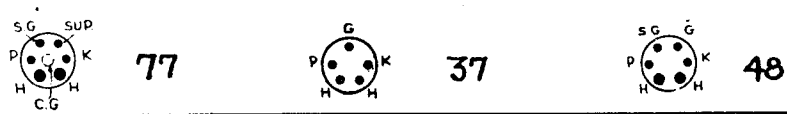
MODEL 100 ACRATONE & 424 CLIMAX





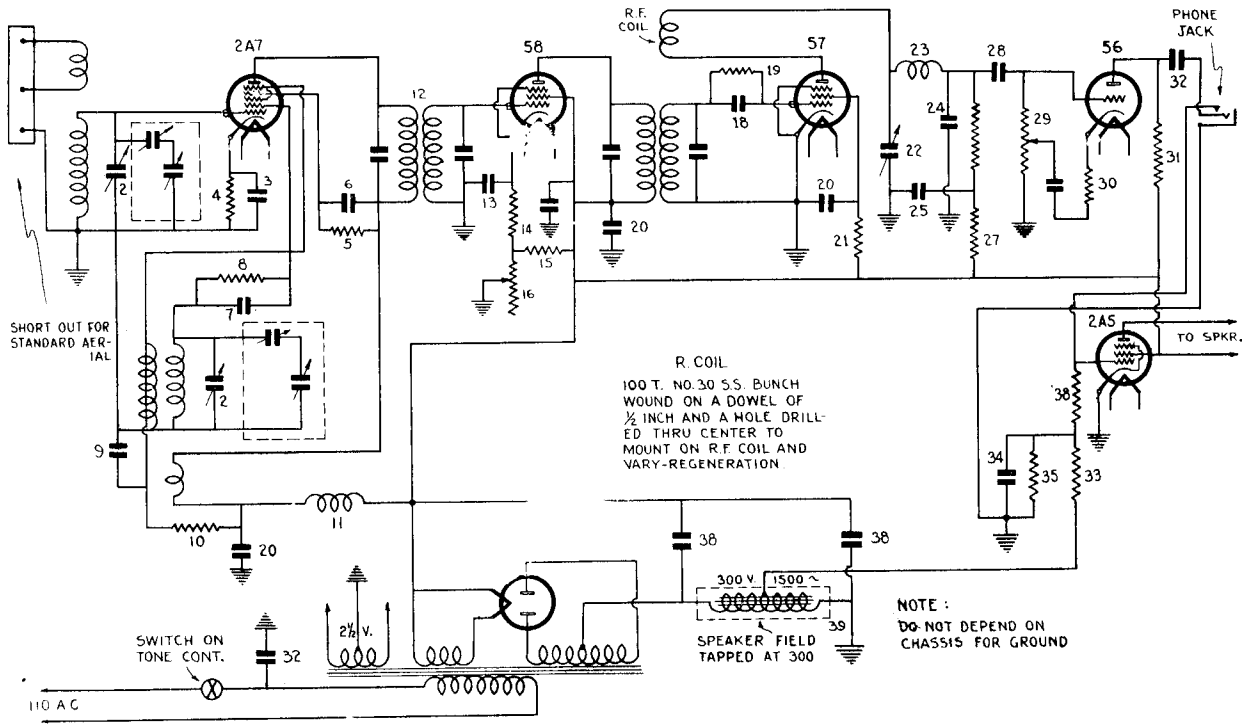
MODEL 734 AMPLIFIER

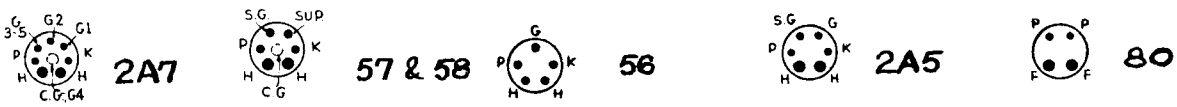




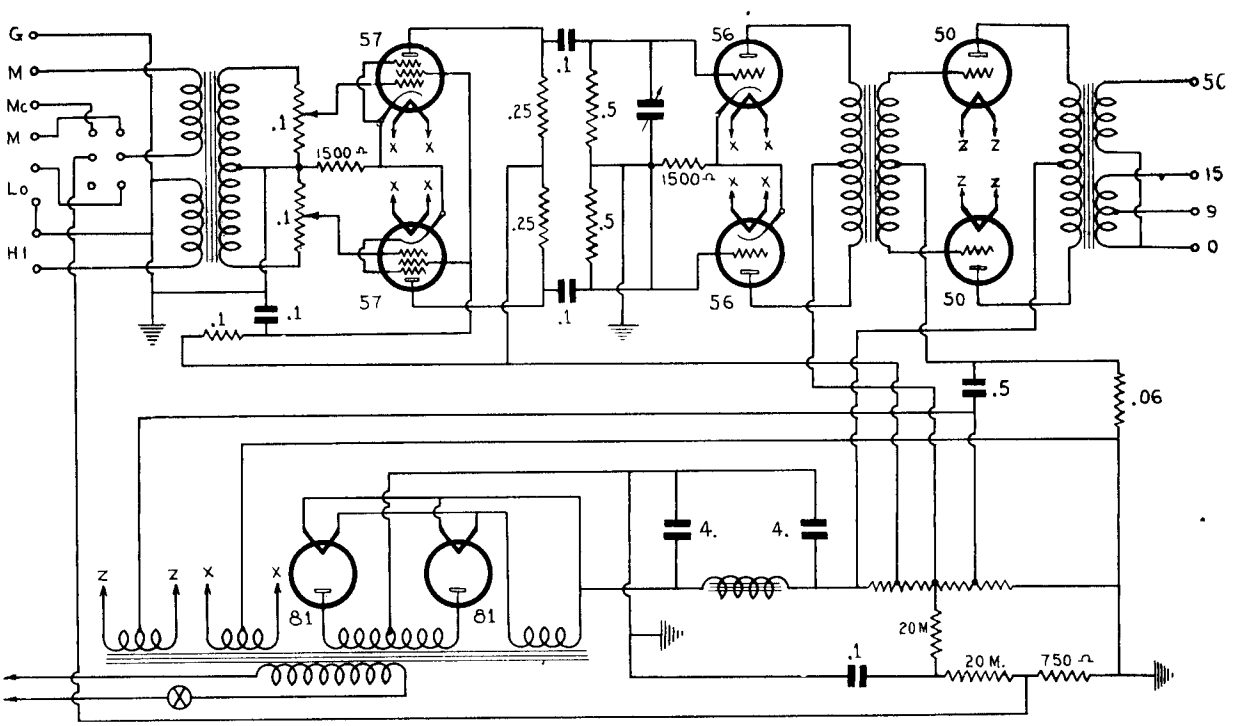
FEDERATED PURCHASER, Inc.

MODEL 104



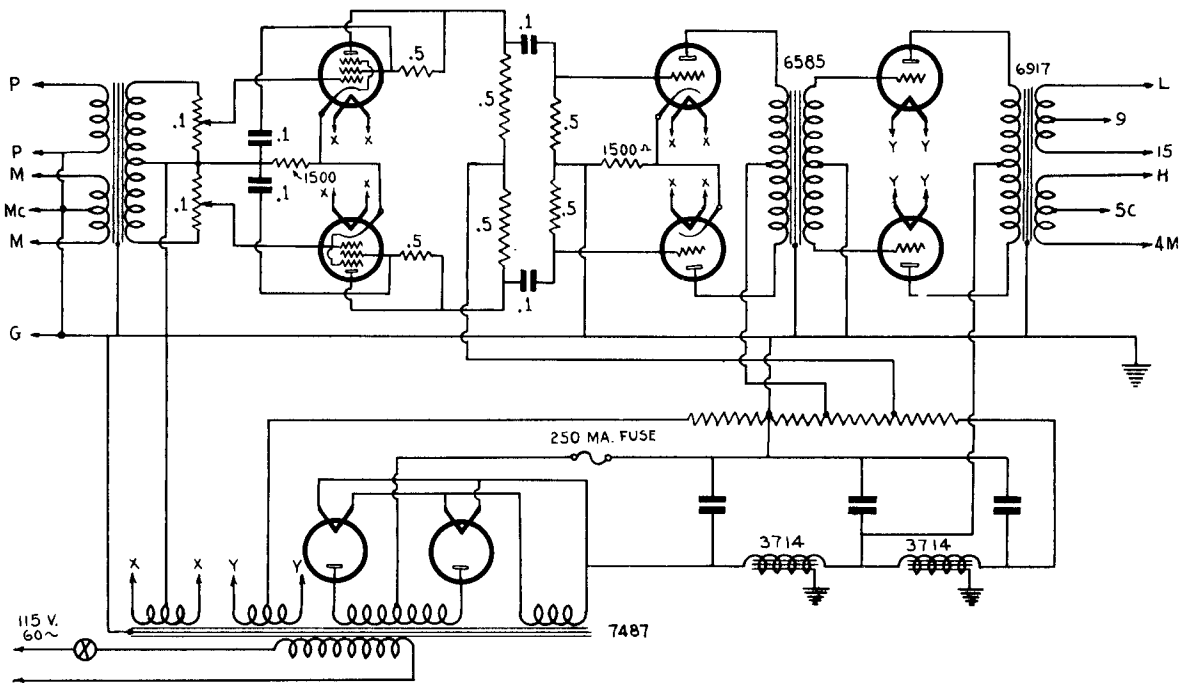


ACRATEST 126 AMPLIFIER MODEL



FEDERATED PURCHASER, Inc.

MODEL 125 AMPLIFIER



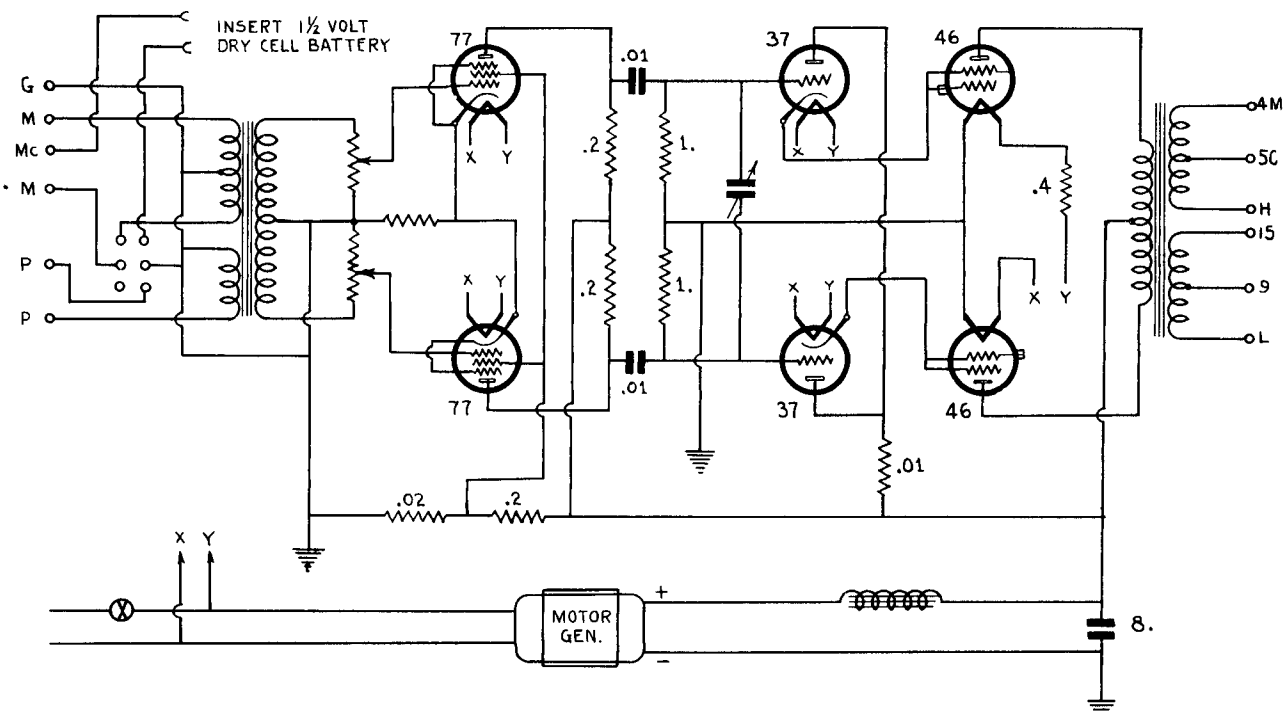
1ST STAGE

2ND STAGE

3RD STAGE

RECT.

MODEL 745 AMPLIFIER



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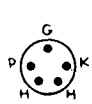

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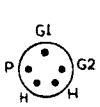
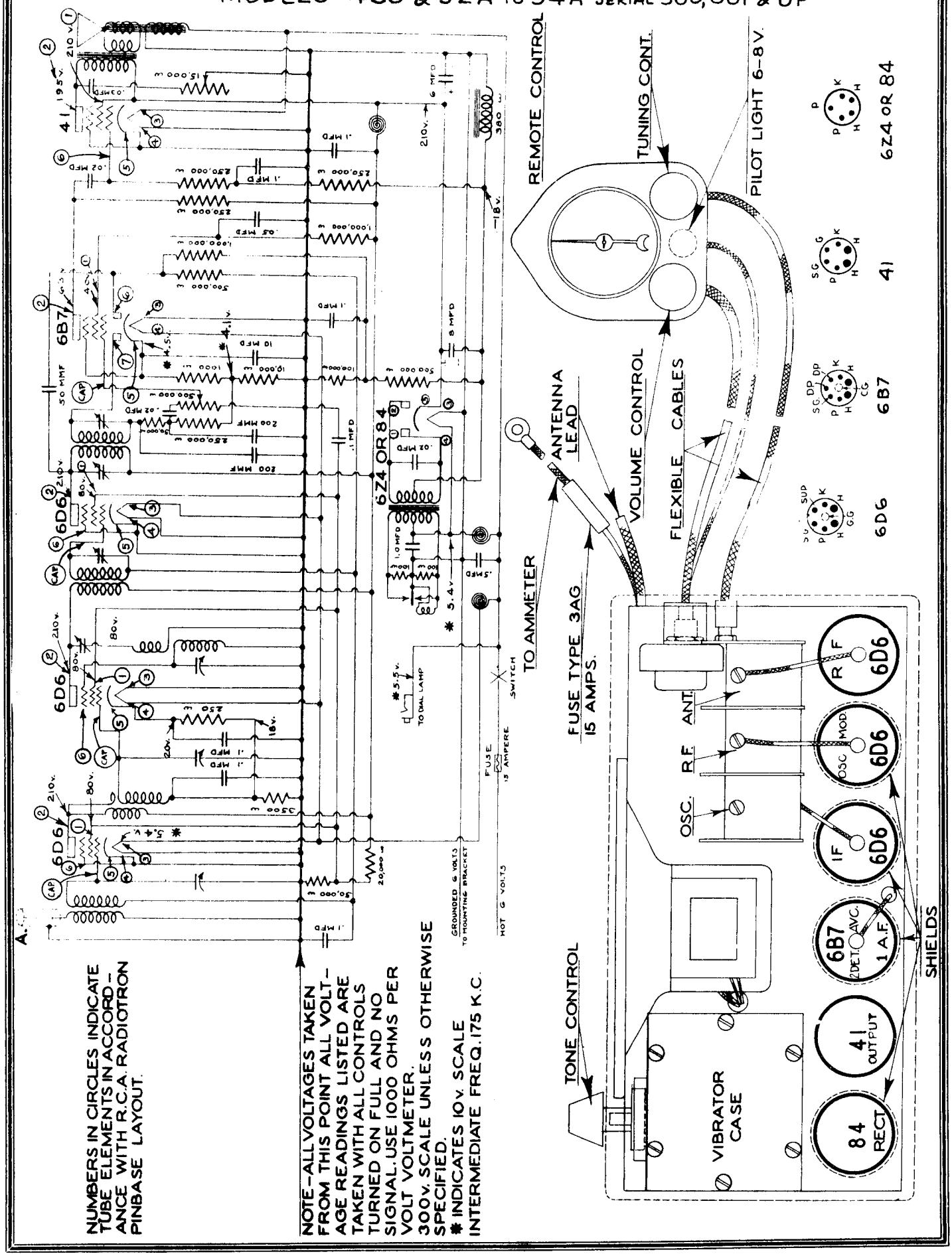


46

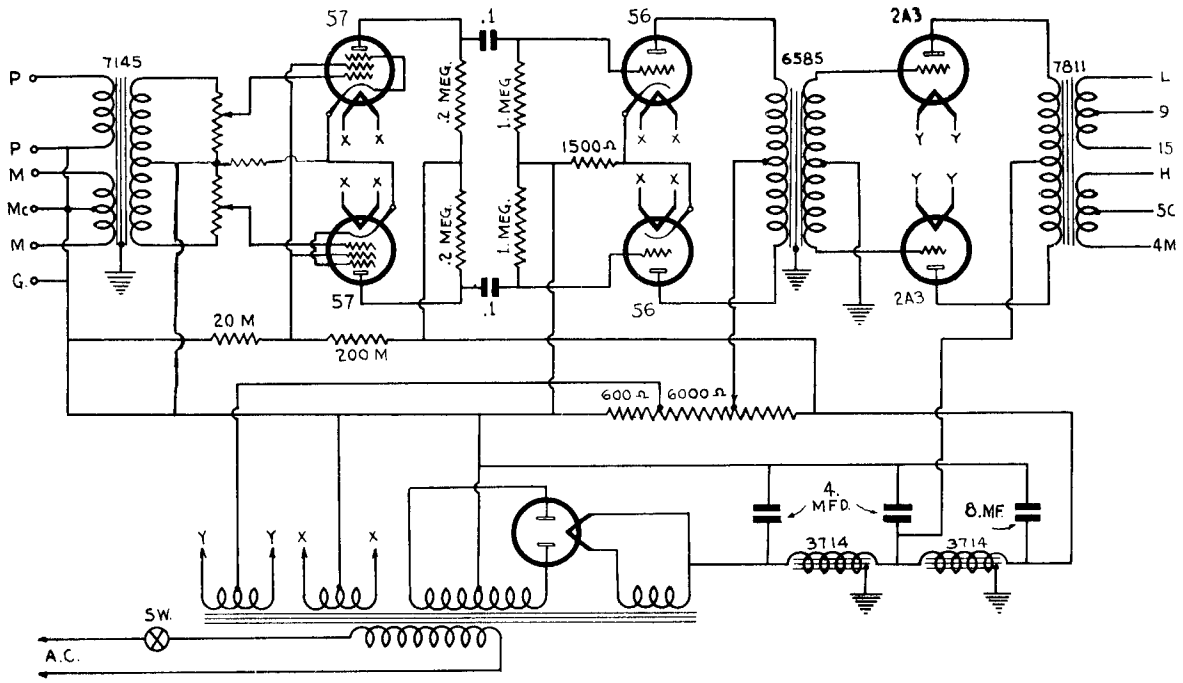
FEDERATED PURCHASER, Inc.

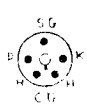
MODELS 460 & 92A TO 94A SERIAL 500,001 & UP



FEDERATED PURCHASER, Inc.

MODEL 708

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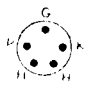
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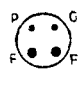
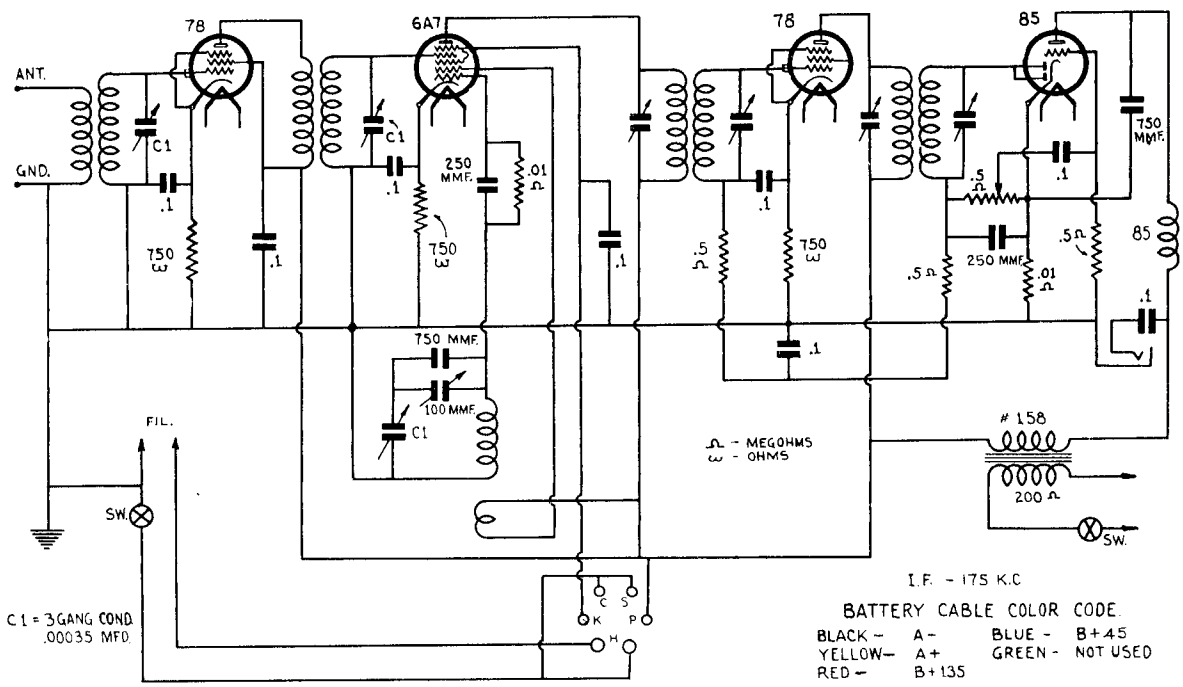

2A3

80

ACRATONE 749 TUNER MODEL



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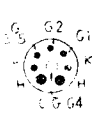
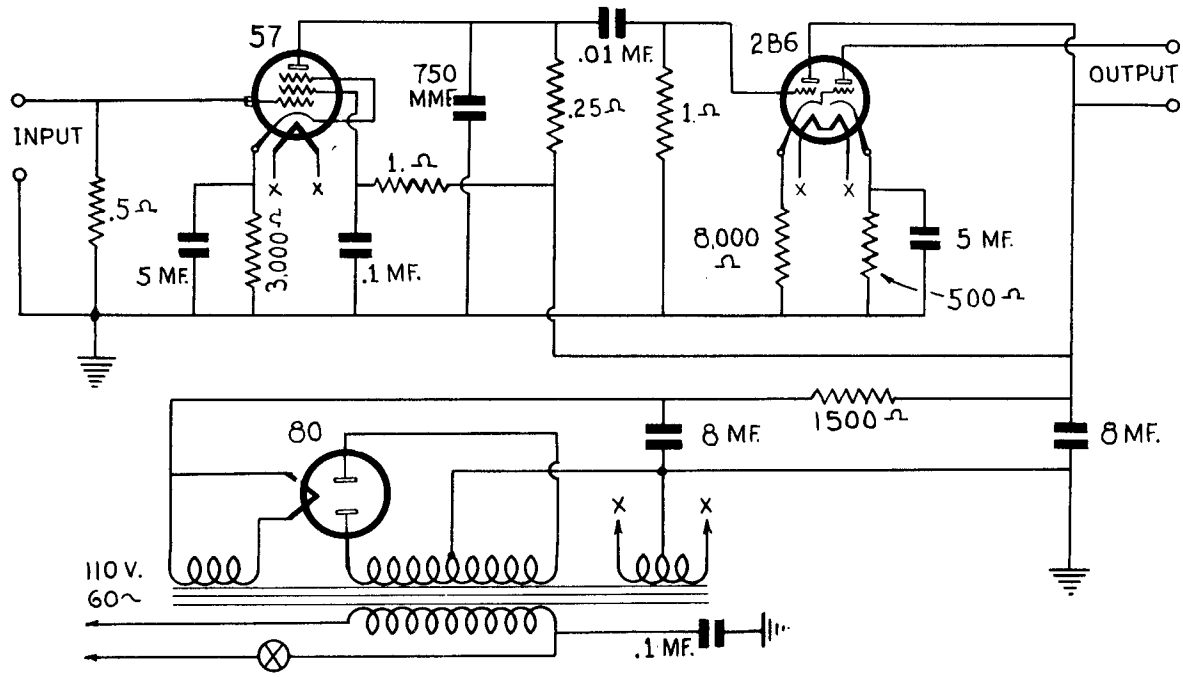

6A7

85

FEDERATED PURCHASER, Inc.

MODEL 728 AMPLIFIER



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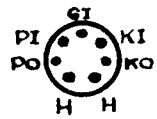

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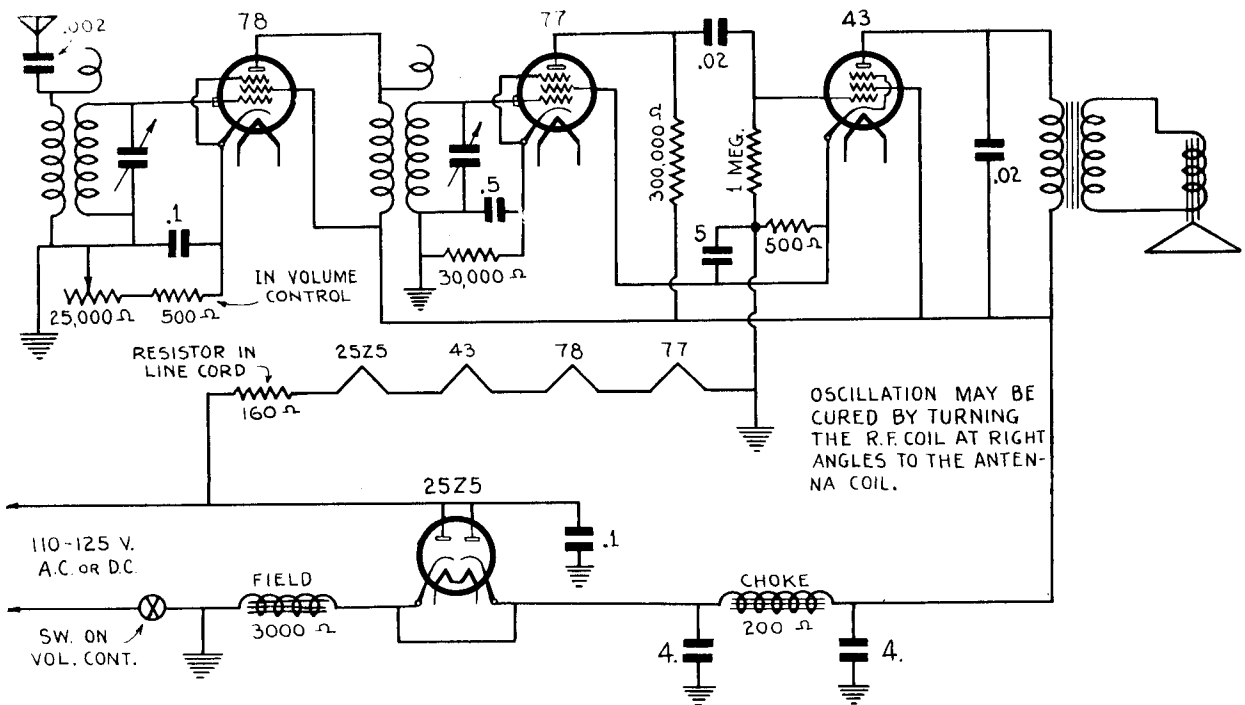
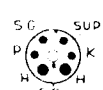
ACRATONE ROYAL 9A MODEL




77 & 78

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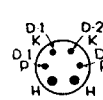
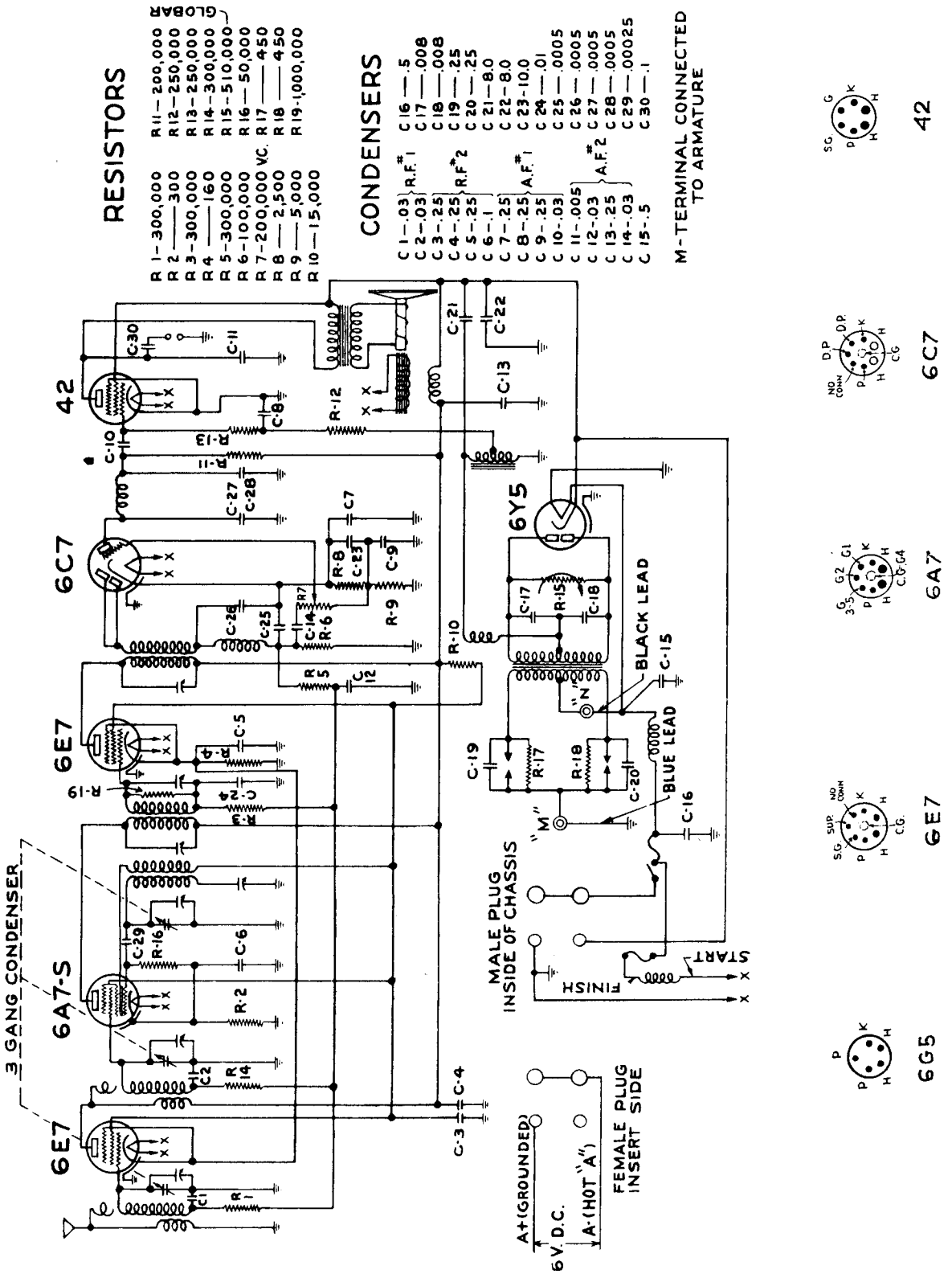


25Z5

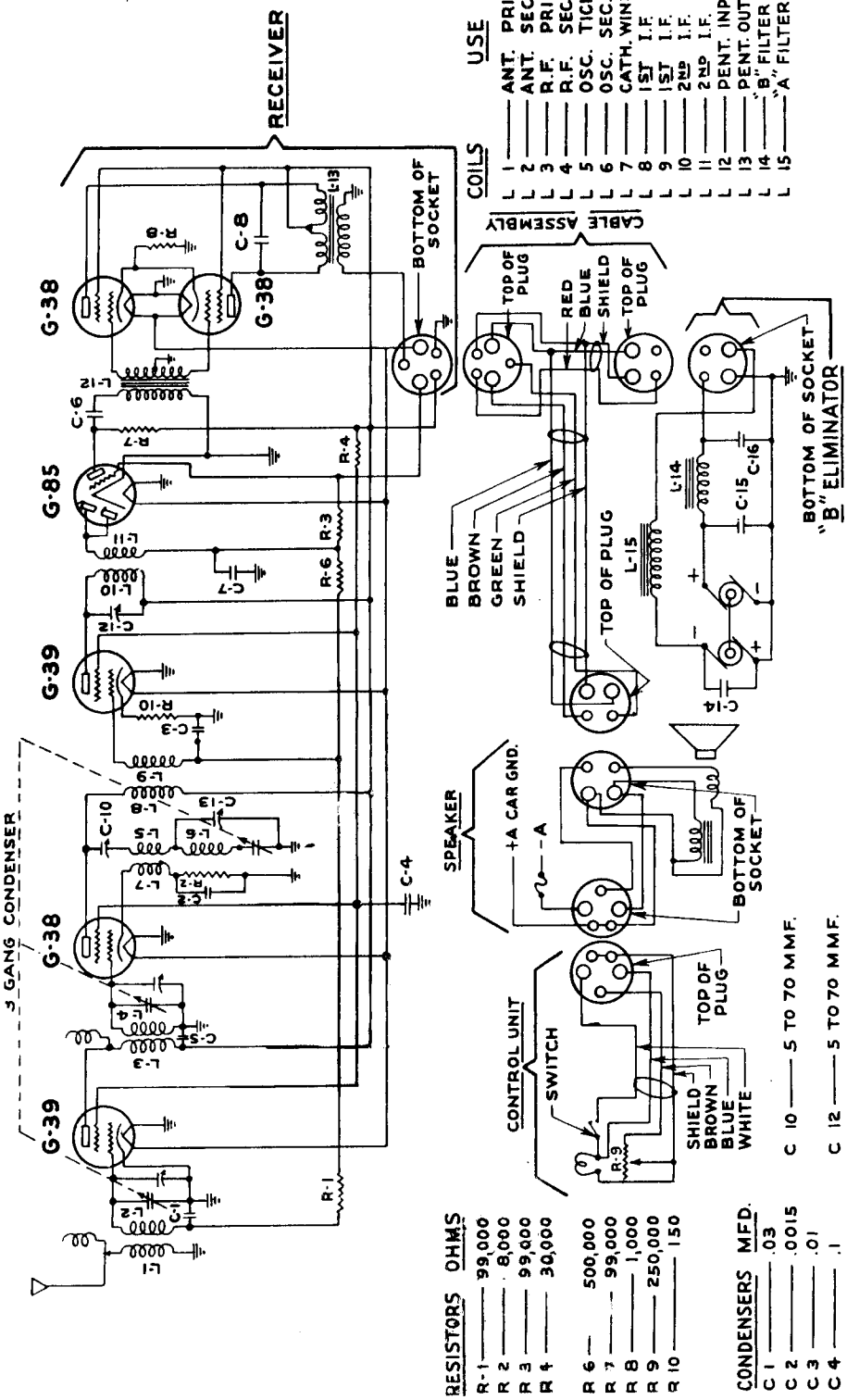
FORD MOTOR CO.

MODEL 40-18805 B
GLOVE BOX



FORD MOTOR CO.

MODEL B-18805

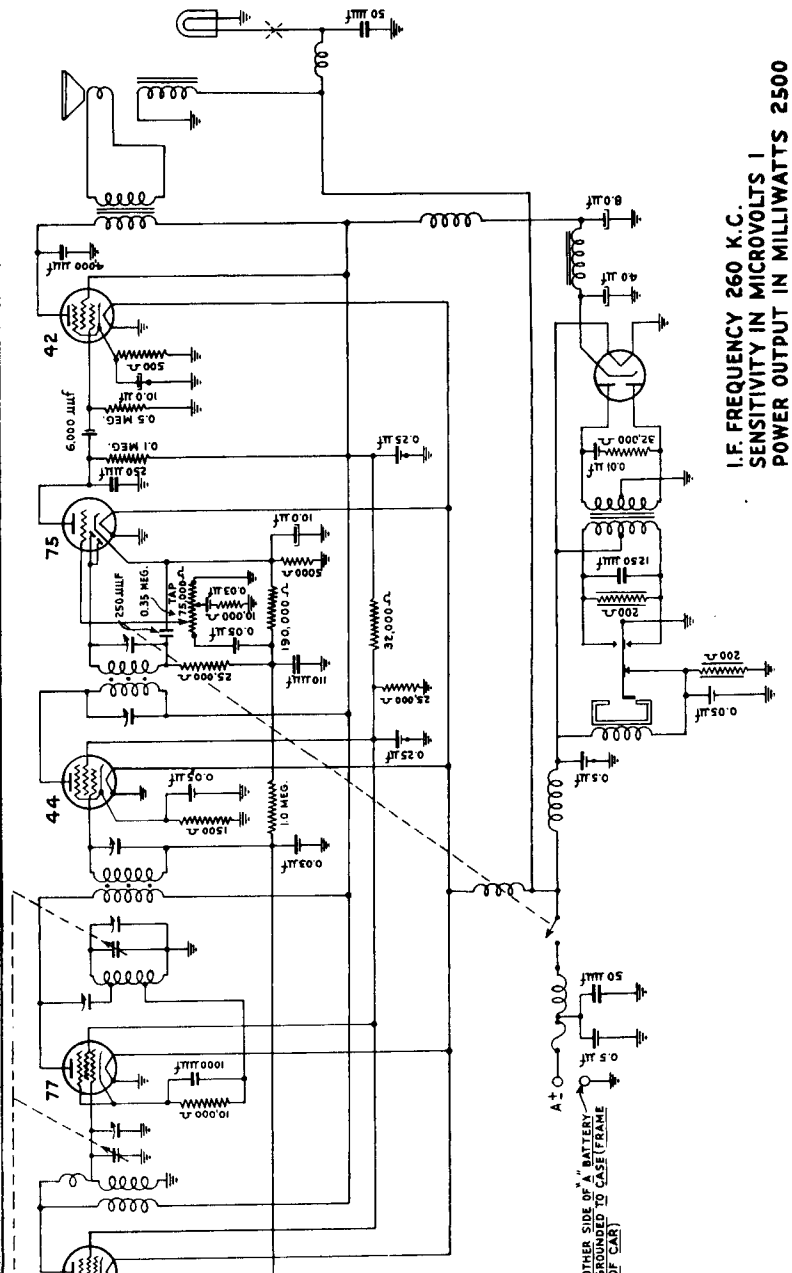


Trouble Shooting Hints

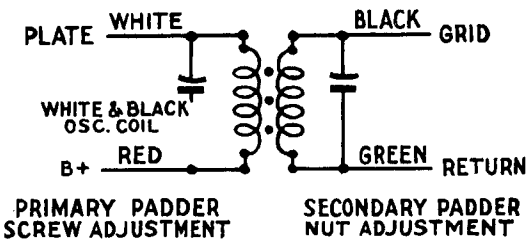
The usual complaint for this set is a reduction in volume after the set has been in use for some time. First determine if tube caps are in place and the tubes are tight in their sockets and then realign the I.F. and oscillator circuits.

FORD MOTOR CO.

MODEL CENTER CONTROL



I.F. FREQUENCY 260 K.C.
SENSITIVITY IN MICROVOLTS 1
POWER OUTPUT IN MILLIWATTS 2500
POWER CONSUMPTION 40 WATTS AT 6 VOLTS



1st I. F. Transformer

Fig. 277

The following instructions are intended for radio engineers only.

I. F. Transformers and Padders

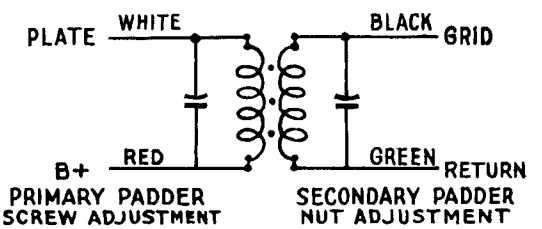
A new type I. F. transformer complete with padders is used in the Ford center control radio receiver.

The padders are placed in the top of the shield can, one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figure 280.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figures 277 and 278.

If replacements are ever necessary, replace the entire coil assembly for the first or second I. F. stage. Neither the coil nor the padders can be obtained separately.



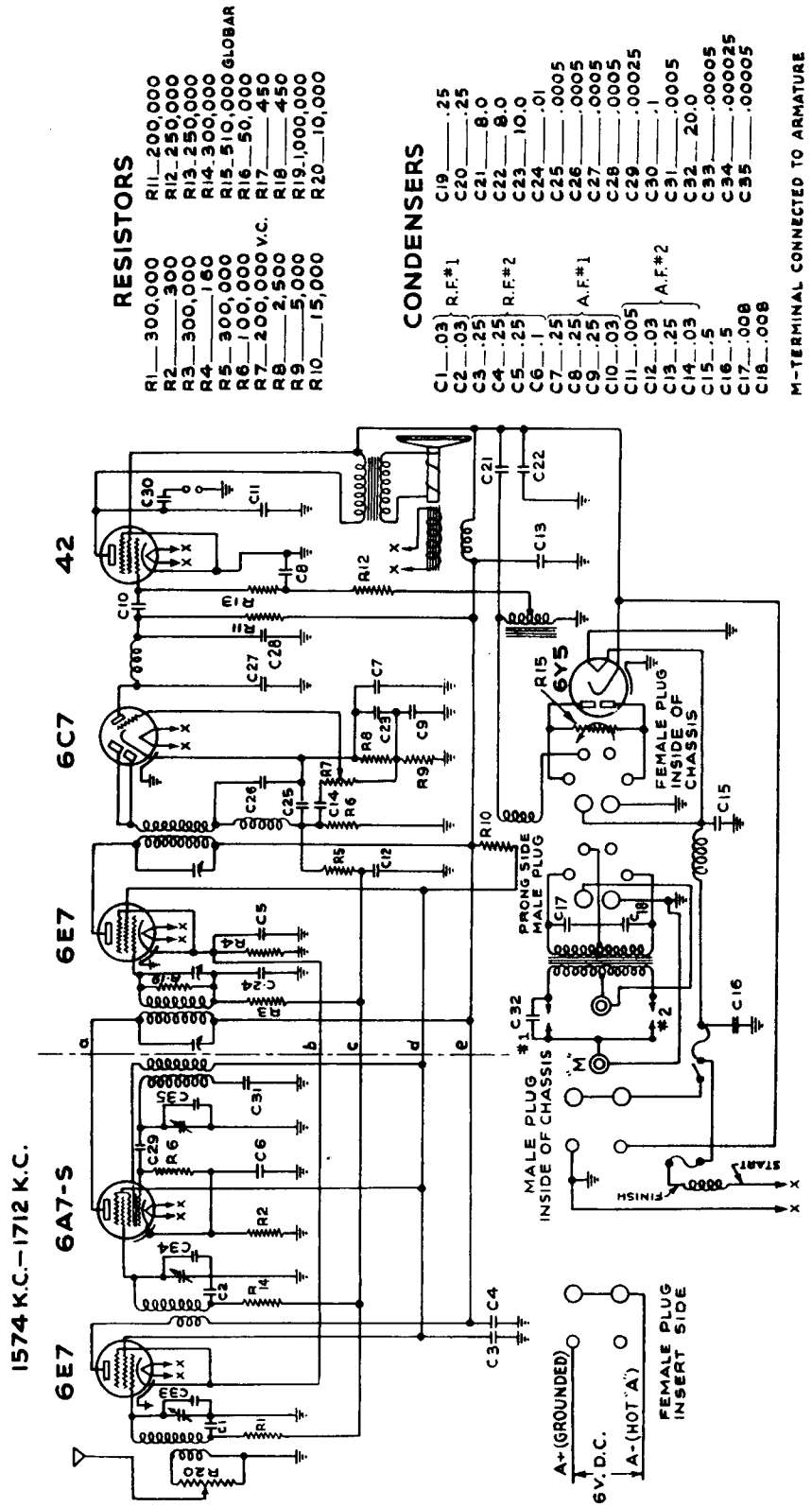
2nd I. F. Transformer

Trouble Shooting Hints

In the early models of this set the first I. F. transformer was susceptible to short circuit between the primary and secondary, where the leads crossed. It is advisable to replace the entire unit to prevent a reoccurence of the trouble.

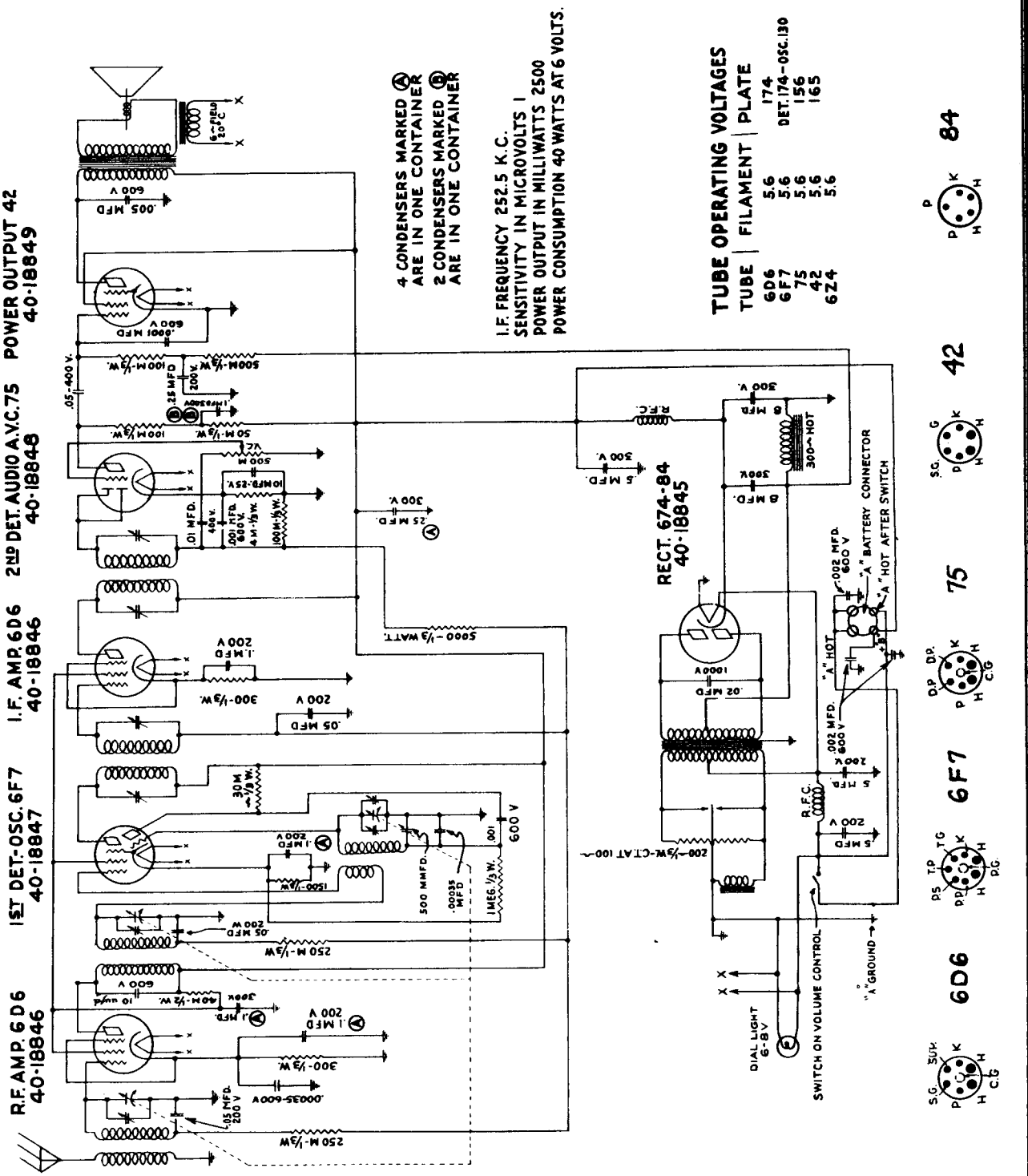
FORD MOTOR CO.

MODEL GLOVE BOX
(GRIGSBY GRUNOW)



FORD MOTOR CO.

MODEL GLOVE BOX (ZENITH)

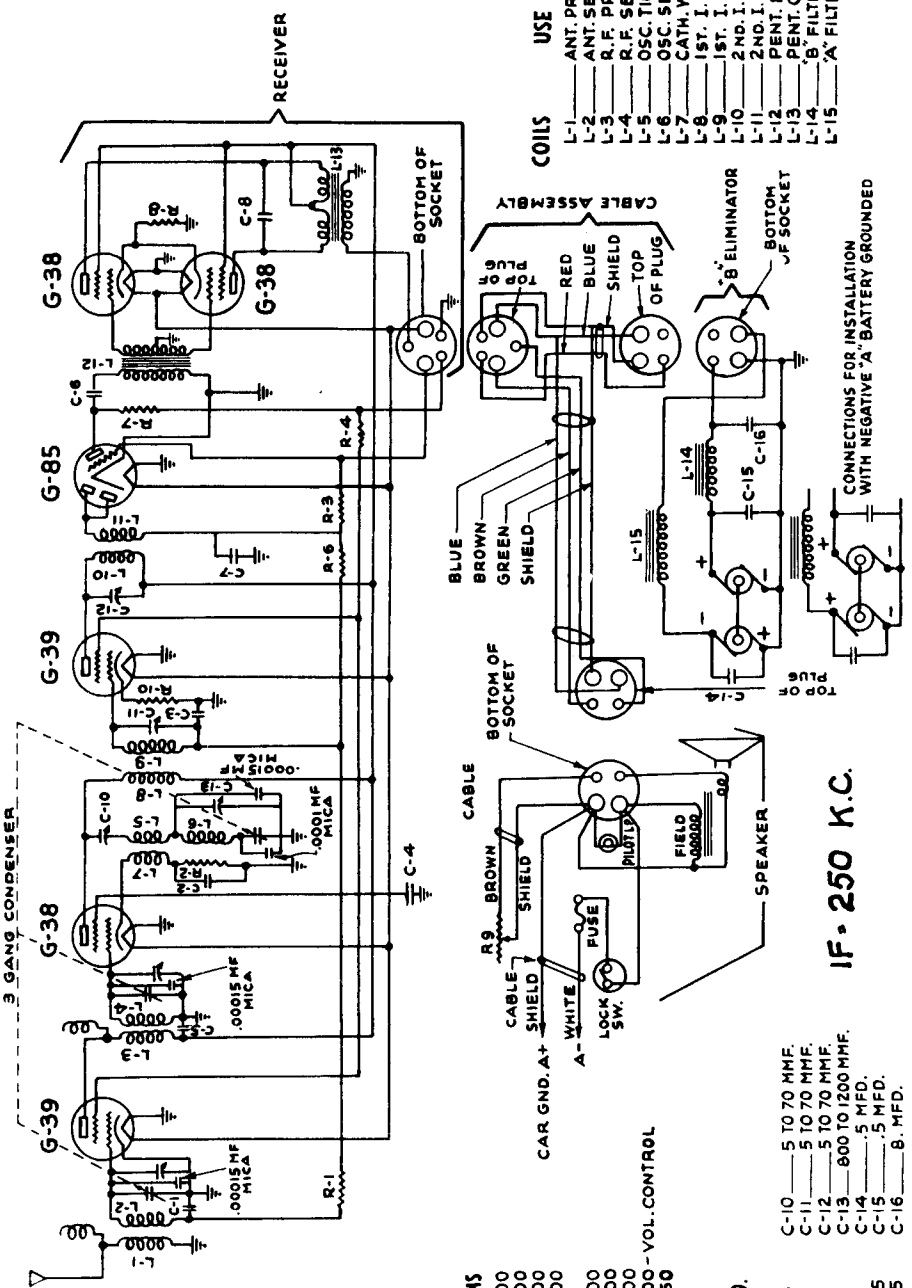


Trouble Shooting Hints

The by-pass condensers in container B have caused many service calls. A short circuit in either of these two condensers will cause the set to cease functioning. If the "B" supply does not deliver voltage to the tubes, check the 300 ohm filter choke for open circuit.

FORD MOTOR CO.

MODEL - POLICE AUTO RADIO

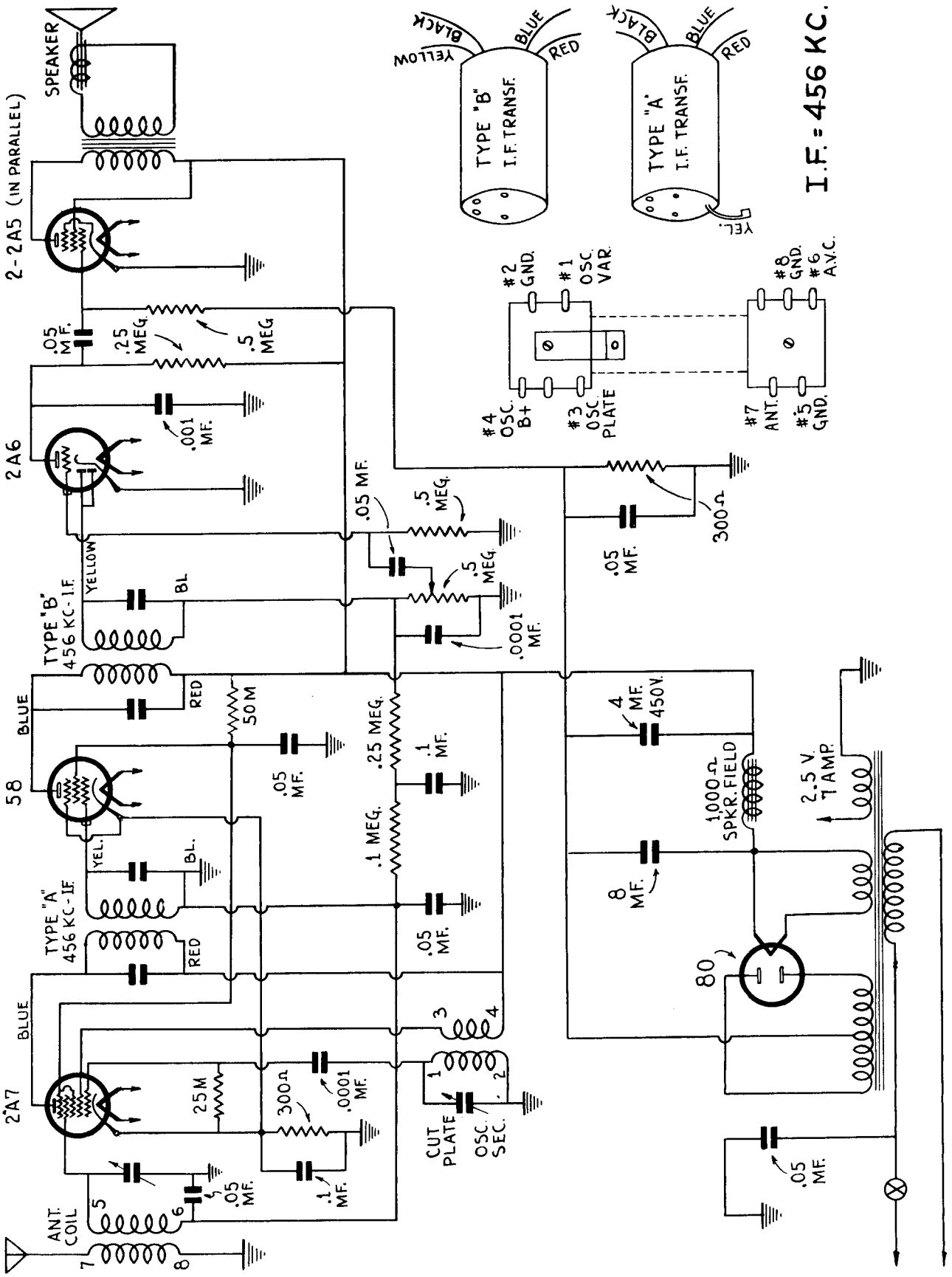


Trouble Shooting Hints

The lock switch in this set has caused a good many service calls due to an internal "jamming" which prevents the key from turning. It is advisable to replace the entire lock with the later type developed for this set.

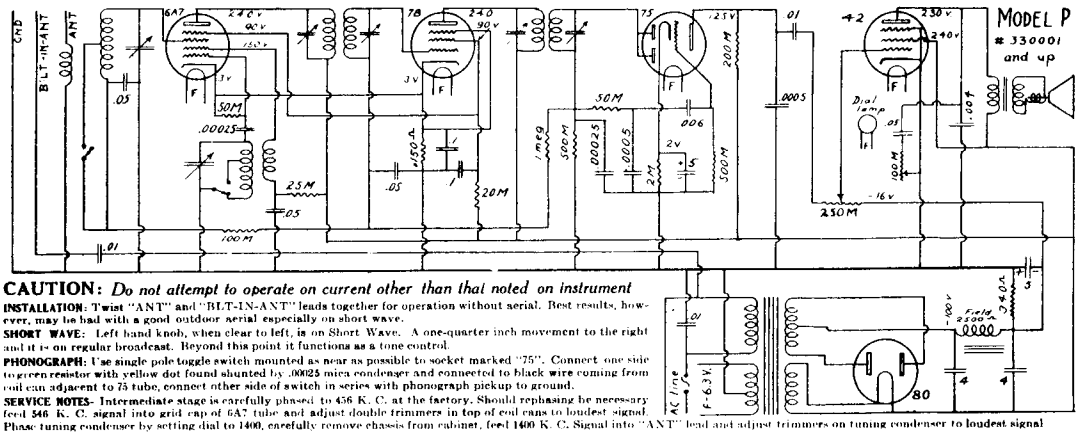
FORDSON RADIO, Inc.

MODEL 6TA



FORDSON RADIO, Inc.

MODEL-P (330001 & UP)



CAUTION: *Do not attempt to operate on current other than that noted on instrument*

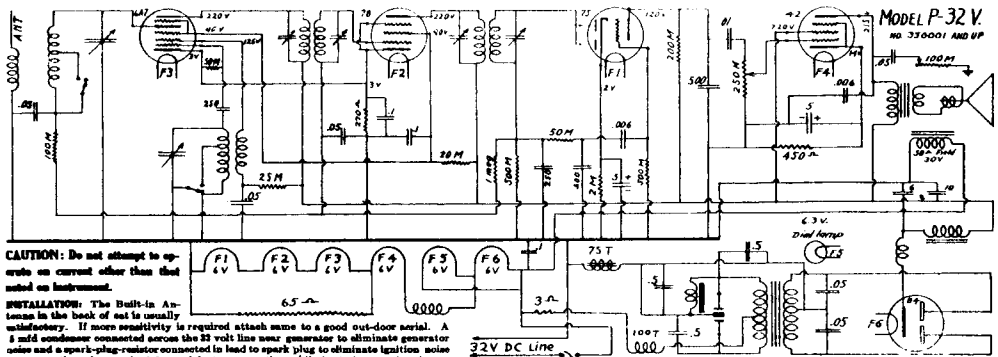
INSTALLATION: Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial especially on short wave.

SHORT WAVE: Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.

SERVICE NOTES- Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 546 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

MODEL P-32 V. (350001 & UP)

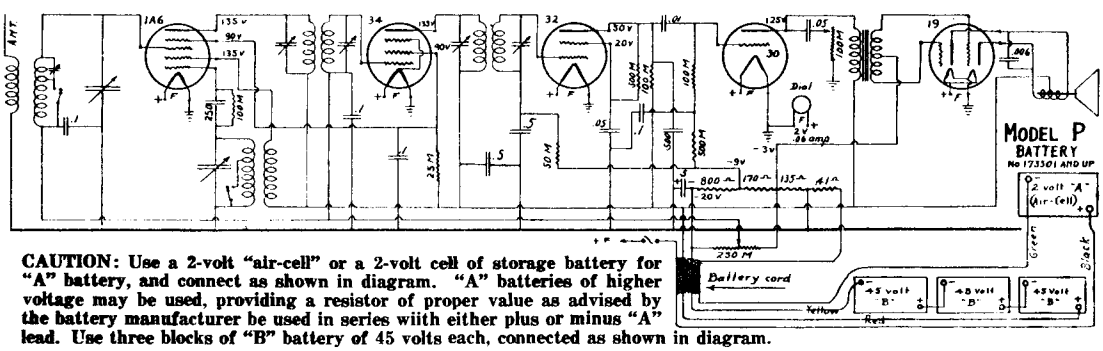


CAUTION: Do not attempt to operate on current other than that noted on instrument.

INSTALLATION: The Built-in Antenna in the back of set is usually satisfactory. If more sensitivity is required attach same to a good out-door aerial. A .5 mfd condenser connected across the 32 volt line near generator to eliminate generator noise and a spark-plug-resistor connected in lead to spark plug to eliminate ignition noise may sometimes be required for satisfactory reception while batteries are charging.

USE NO GROUND CONNECTION ON SET. SHORT WAVE: Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control. **PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground. **SERVICE NOTES-** Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 456 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

MODEL P- BATTERY (173501 & UP)

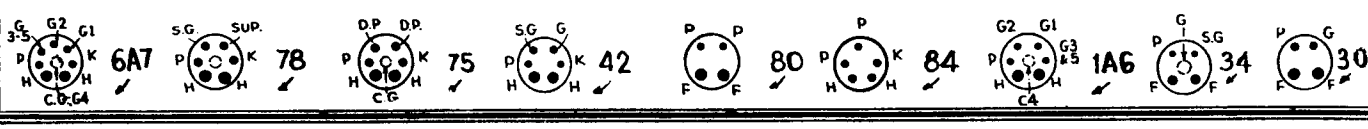


CAUTION: Use a 2-volt "air-cell" or a 2-volt cell of storage battery for "A" battery, and connect as shown in diagram. "A" batteries of higher voltage may be used, providing a resistor of proper value as advised by the battery manufacturer be used in series with either plus or minus "A" lead. Use three blocks of "B" battery of 45 volts each, connected as shown in diagram.

INSTALLATION: A good outdoor aerial will give best results, especially on short wave. No ground wire is usually required.

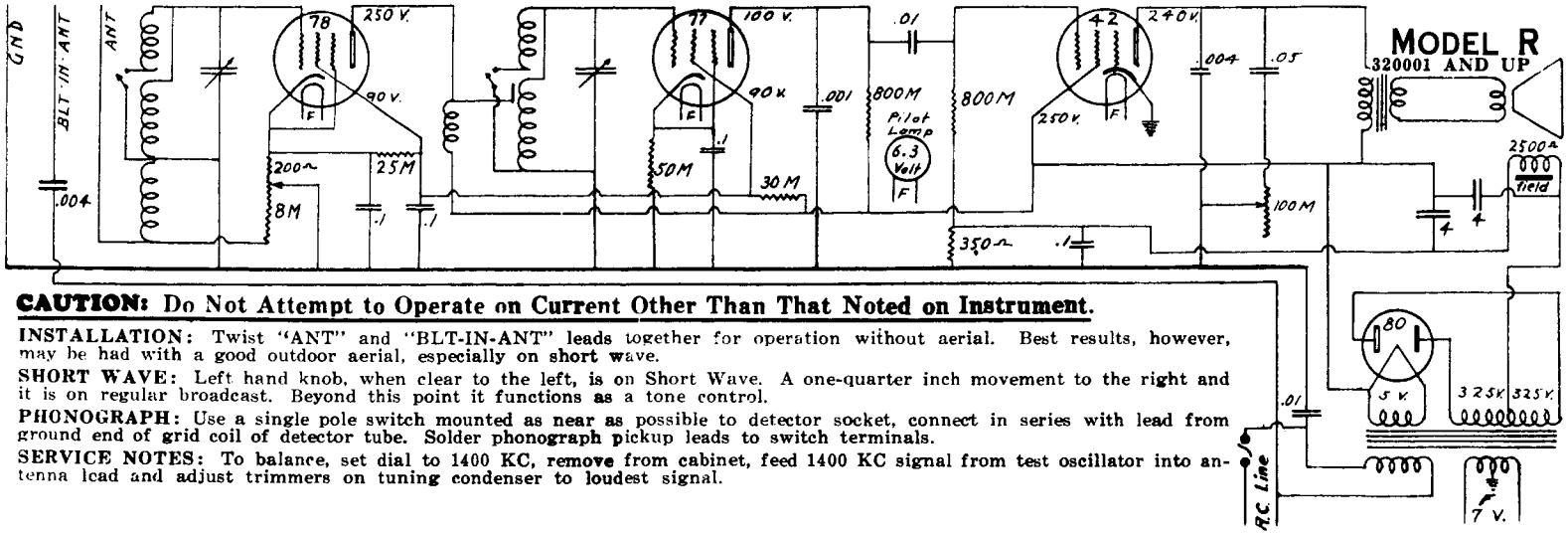
PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "32." Cut black wire coming from bottom of coil can adjacent to this tube and connect across switch. Connect phonograph pickup across switch.

SERVICE NOTES: Intermediate stage is carefully phased to 456 k.c. at the factory. Should rephasing be necessary, feed 456 k.c. signal into grid cap of "1A6" tube, and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400 k.c., carefully remove chassis from cabinet, feed 1400 k.c. signal into antenna lead and adjust trimmers on tuning condenser to loudest signal.



FORDSON RADIO, Inc.

MODEL R 2 TYPES



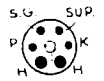
CAUTION: Do Not Attempt to Operate on Current Other Than That Noted on Instrument.

INSTALLATION: Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial, especially on short wave.

SHORT WAVE: Left hand knob, when clear to the left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

SERVICE NOTES: To balance, set dial to 1400 KC, remove from cabinet, feed 1400 KC signal from test oscillator into antenna lead and adjust trimmers on tuning condenser to loudest signal.



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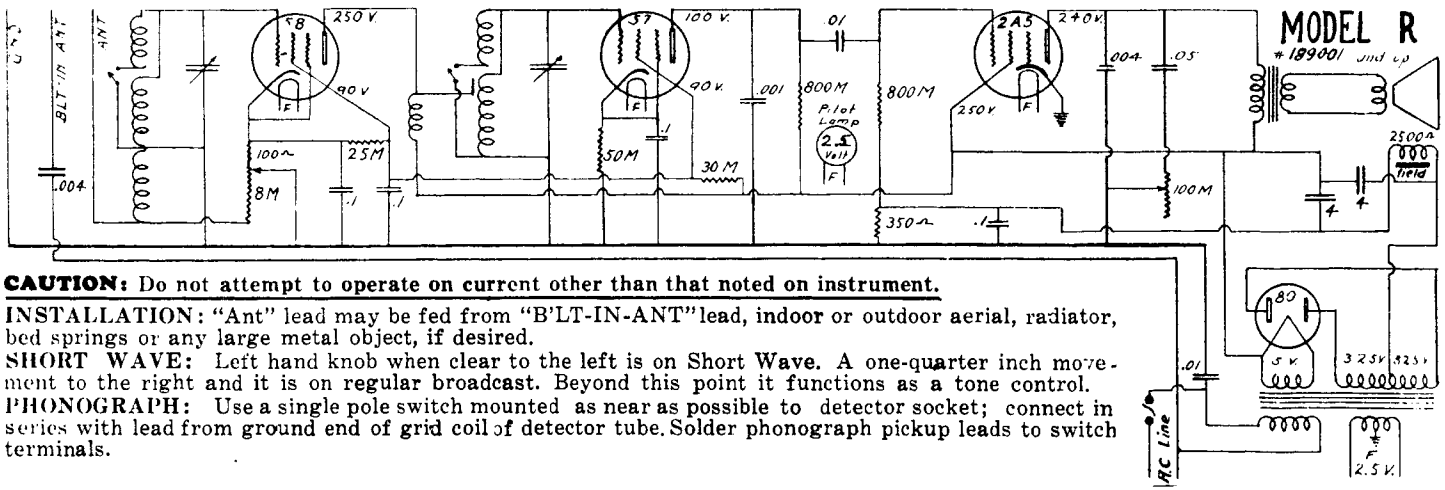
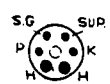


CAUTION: Do not attempt to operate on current other than that noted on instrument.

INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or outdoor aerial, radiator, bed springs or any large metal object, if desired.

SHORT WAVE: Left hand knob when clear to the left is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket; connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.



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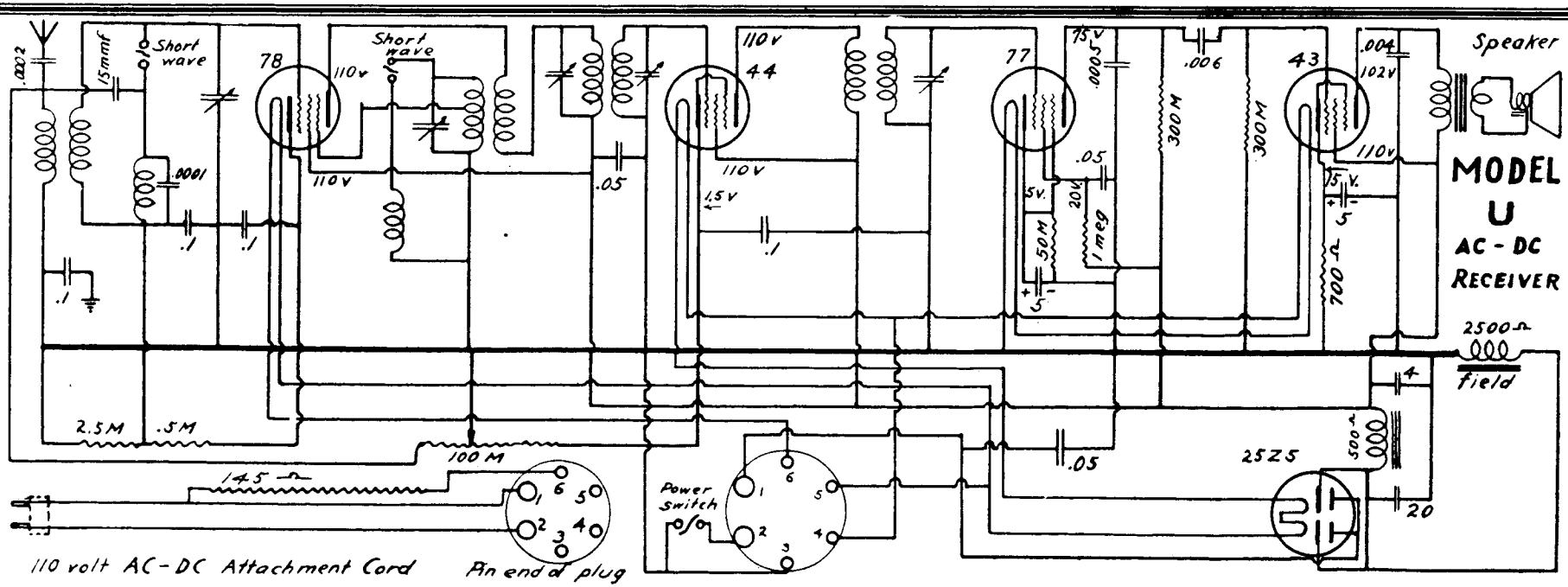


OPERATING INSTRUCTIONS

Model U Long and Short Wave

CAUTION:

This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost, for operating this receiver on automobiles, 32 volt farm light plants and 220 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out along the floor or hung outside a window and is ordinarily all the aerial required. No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to a radiator or other ground connection or to an outside aerial.

TO OPERATE:

Turn left hand knob to right as far as it will go. Wait a few moments for tubes to heat. Turn right hand knob slowly back and forth till a station is heard. Numbers on the dial correspond to kilocycle of station when one zero is added. Adjust this knob carefully to secure best tone and adjust left hand knob to volume desired. When left knob is turned entirely to left a click is heard and power is turned off. When operating on D. C. current and set fails to operate after waiting a reasonable time for tubes to heat up, reverse power supply plug.

TO RECEIVE SHORT WAVES:

Push handle of switch in rear toward end of cabinet for short wave position. Local police calls, etc., will then be heard at approximately 65 and 100 on the dial, and amateurs, etc., at various other positions. Often local conditions make short wave reception difficult unless the aerial wire is grounded or attached to outside aerial. Reception of short wave requires a good aerial and more careful adjustment of both knobs than is necessary on the broadcast band.

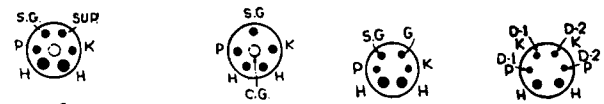
PHONOGRAPH:

Trace wire from cap of tube in left rear socket to where it solders to bracket in chassis. Note that a black wire connects between the adjacent bracket and chassis. Disconnect black wire at the bracket, inserting small single pole switch between wire and bracket. Solder phonograph pick-up leads to switch terminals.

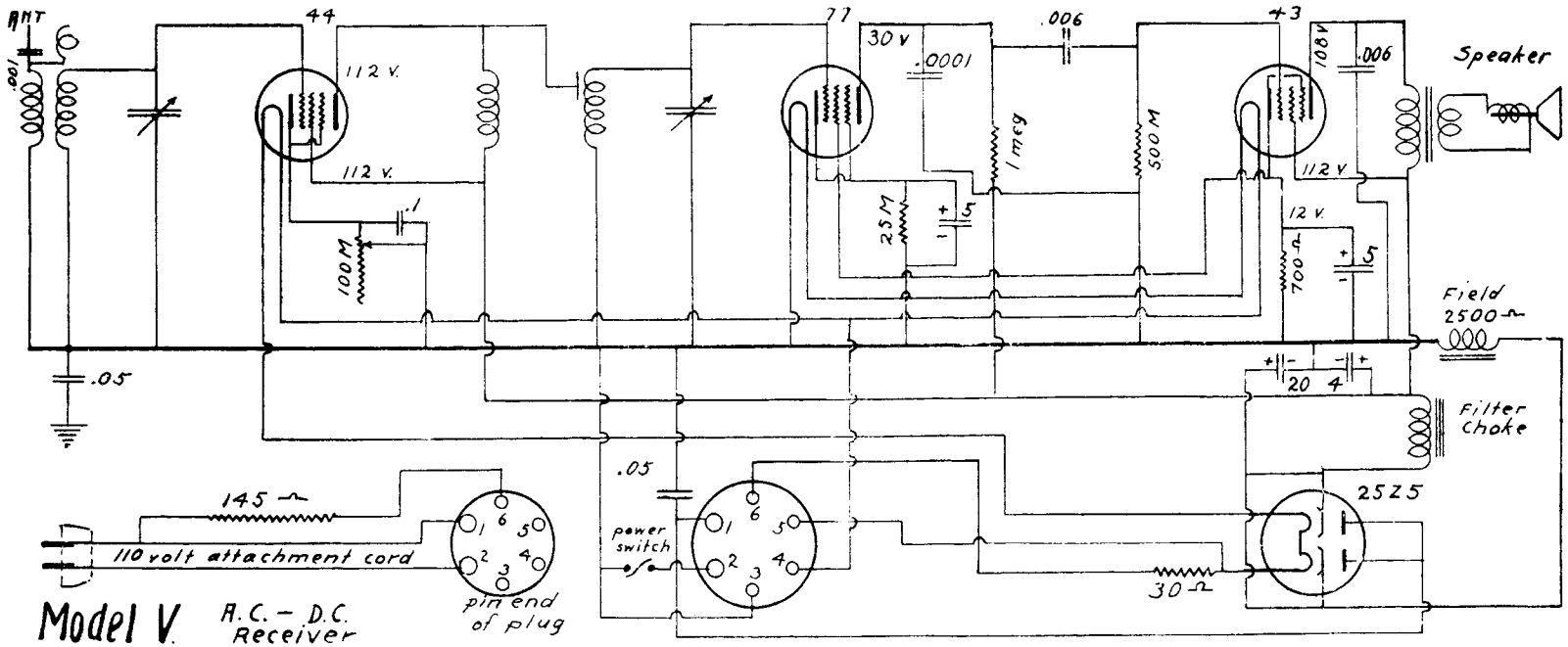
SERVICE NOTES:

To balance set remove from cabinet. Intermediates are first balanced. Feed a 456 K. C. signal into grid of 78 tube. Adjust double and single trimmers through rear flange of chassis. Next, trim radio frequency coil by first setting tuning condenser to 1400 K. C. on dial, carefully remove from cabinet and attach test oscillator to antenna lead and feed 1400 K. C. signal to antenna coil. Adjust trimmers on tuning condenser to loudest signal.

If used in automobile, antenna stage should be trimmed to car antenna at time of installation.



FORDSON RADIO, Inc.
MODEL U



OPERATING INSTRUCTIONS

Model V

CAUTION:

This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost, for operating this receiver on automobiles, 32 volt farm light plants and 200 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately, as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out along the floor or hung outside a window and is ordinarily all the aerial required. No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to a radiator or other ground connection or to an outside aerial.

TO OPERATE:

Turn left-hand knob to right as far as it will go. Wait a few moments for tubes to heat. Turn right-hand knob slowly back and forth till a station is heard. Adjust this knob carefully to secure best tone and adjust left-hand knob to volume desired. When left knob is turned entirely to left a click is heard and power is turned off. When operating on D. C. current and set fails to operate after waiting a reasonable time for tubes to heat up, reverse power supply plug.

PHONOGRAPH:

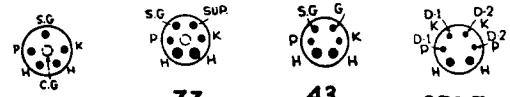
Connect pick-up leads to single pole toggle switch, which may be mounted in large hole in rear flange of set. Unsolder black wire and 5 mfd condenser from ground lug of coil on under side of chassis and resolder to one side of toggle switch. Solder other side of switch to ground lug of coil.

SERVICE NOTES:

To remove set from cabinet, disconnect from power supply, remove knobs, remove back if compact model, and unscrew the four felt headed screws on bottom of cabinet.

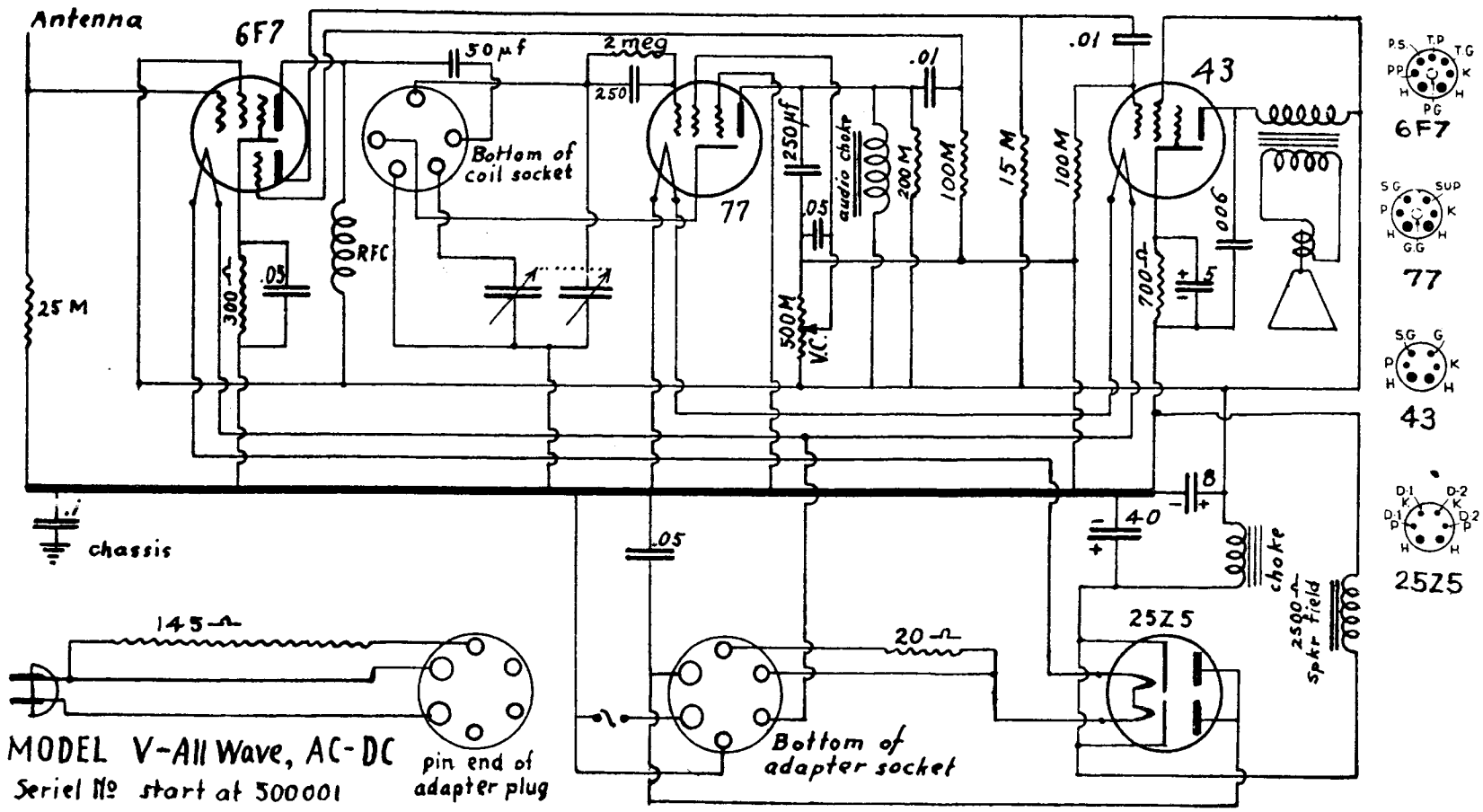
To balance set remove from cabinet, turn tuning condenser plates completely out, attach a test oscillator delivering 1712 K. C. to antenna of set and adjust trimmers on tuning condenser to loudest signal. Change test oscillator signal to 1400 K. C., turn tuning condenser until signal is tuned in and check trimmers again without moving tuning condenser.

If used in automobiles antenna stage should be trimmed to the car antenna at time of installation.



FORDSON RADIO, Inc.

MODEL V



FORDSON RADIO, Inc.

MODEL V ALL-WAVE

Operating Instructions

MODEL V - ALL WAVE

CAUTION:

This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost, for operating this receiver on automobiles, 32 volt farm light plants and 220 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately, as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out along the floor or hung outside a window, and is ordinarily all the aerial required. No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to an outside aerial.

COILS:

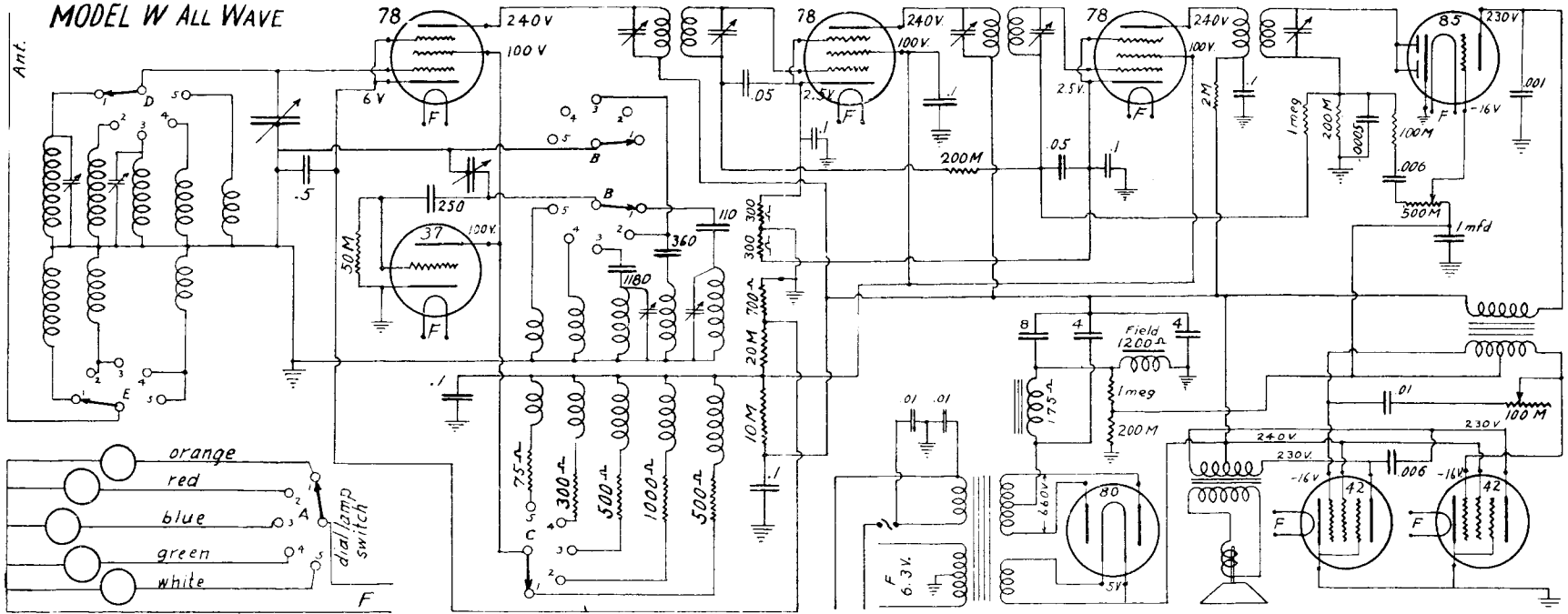
The short wave bands are covered by coil set No. 1 and range from 1,500 to 20,000 K. C. (15 to 200 meters). Set No. 2 covers from 110 to 1,500 K. C. (200 to 2,700 meters). Each coil is marked with the frequency range it covers.

TO OPERATE:

Turn left hand knob to the right and allow about one minute for the tubes to reach full operating temperature. Select the coil covering the desired frequency and plug it into the socket at the right-hand end of set. Turn left-hand knob to right slowly until a "click"

FORDSON RADIO, Inc.

MODEL W ALL-WAVE



OPERATING INSTRUCTIONS MODEL W—ALL WAVE 8-TUBE SUPERHETERODYNE

CAUTION: Do not attempt to operate on current other than that noted on the instrument.

INSTALLATION:

The built-in aerial at the back of the set usually gives satisfactory sensitivity when stretched around the edge of the floor or along the picture moulding of the room. A good outside aerial connected to the built-in aerial sometimes increases sensitivity. Power noise interferes especially with short-wave reception. If set is located where power noise is prevalent it may be necessary to install an aerial high above the street and use a "transposition" lead-in to the set. Any radio dealer can supply such an aerial kit with full instructions for installing.

CONTROL KNOBS:

The lower middle knob is for selecting the various frequency bands as indicated on the dial. The upper middle knob is tuning control. The right-hand knob is power switch and volume control and the left-hand knob is tone control.

PHONOGRAPH:

Mount a single pole toggle switch and two insulated pin jacks in the rear of the chassis near the tube socket marked "85," connect one side of the switch to one pin jack, the remaining pin jack to one outside terminal of the volume control and the remaining switch terminal to the other outside terminal of the volume control. Plug the phonograph pickup leads into the pin jacks.

SERVICE NOTES:

If radio fails to operate when unpacked, or stops working after a few days, proceed as follows: (1) Have tubes checked. (2) Remove chassis and check for loose connections. (3) Have competent "Radio Service Man" check over entirely.

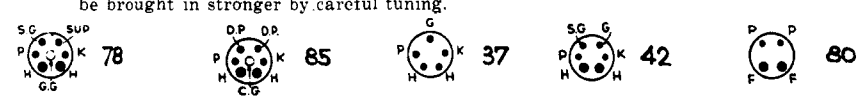
Do not return unless you have made the above tests. This set left the factory carefully inspected.

The intermediate stages are carefully phased to 456 kilocycles at the factory. Should rephasing be necessary, feed a 456 kilocycle signal from a test oscillator to the grid cap of the tube marked "78," located at the rear end of the tuning condenser, then adjust the double trimmers in the top of the coil cans nearest this tube, also the single trimmer in the top of the coil can near the "85" tube, to loudest volume, being sure to keep the oscillator signal at a low volume level. In trimming the frequency bands, first set the dial to the third group of figures from the right-hand end. Trim the "red" band first by adjusting the trimmers on the top of the tuning condenser until a signal of the proper frequency applied to the built-in aerial is heard at its loudest. Next, trim the "orange" band by adjusting the three-plate trimmers, located on the underside of the chassis, to loudest volume with proper signal frequency applied to the antenna. Next, trim the "blue" band by adjusting the two-plate trimmers located adjacent to the three-plate trimmers, to loudest volume with the proper signal frequency applied to the antenna. In trimming the various bands be sure that the band switch is set to the proper band as indicated by the color of the dial lamp. Also, keep the oscillator signal to as low volume level as possible for accuracy.

NOTE: Should it be necessary to write to the factory for parts or information, always give the serial number of the set as stamped on the back of the chassis.

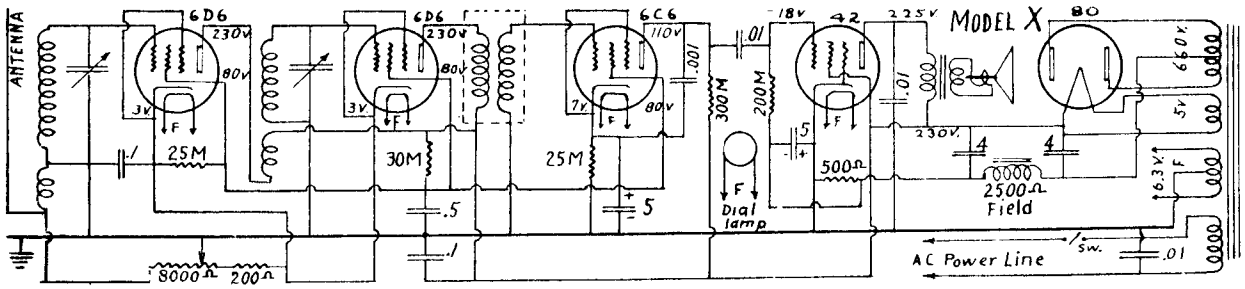
SHORT WAVE TIPS:

In listening for short-wave broadcast DON'T forget to consider the difference in time between the location of the broadcaster and the receiver. DON'T expect to hear a station because it is on the air, as many things govern short-wave reception. DON'T get discouraged if reception is poor one night; it may be fine the next. DON'T expect stations to tune broadly; most stations tune sharply. DON'T tune below 10,000 kilocycles (above 30 meters) for distant stations in daylight. DON'T tune above 12,000 kilocycles (below 25 meters) for distant stations after dark. DON'T expect to find stations on all parts of the dial. Short-wave stations are widely separated, except in a few instances. DON'T skim over the dial. It requires some knowledge of tuning to get good results. Tune very slowly. DON'T pass up any weak signal, as it may often be brought in stronger by careful tuning.



FORDSON RADIO, Inc.

MODEL X



OPERATING INSTRUCTIONS—MODEL X

CAUTION: Do not attempt to operate on current other than that noted on instrument.

INSTALLATION: An outdoor antenna approximately twenty-five feet long, located away from power lines and above nearby steel buildings, will give excellent results. A good ground connection will usually aid in reducing any interfering power noise.

TO OPERATE: Left hand knob is power switch and volume control. Right hand knob is tuning control. Turn left hand knob as far as it will go to the right and allow thirty seconds for tubes to reach operating temperature. Turn tuning knob slowly to number on dial corresponding to station frequency desired, and carefully readjust both volume and tuning knobs to satisfactory reception.

PHONOGRAPH: Mount single pole toggle switch at any convenient point on rear flange of chassis, disconnect 5 mfd. condenser from "cathode" of 6C6 socket and connect it to one side of switch, connect other side of switch to "cathode" of socket and connect phonograph across switch.

SERVICE NOTES: If radio fails to operate when unpacked, or stops after a few days, proceed as follows: (1) have tubes checked; (2) remove chassis and check for loose connections; (3) have competent "Radio Service Man" check over entirely. Do not return unless you have made the above tests. This set left the factory carefully inspected. To remove set from cabinet, disconnect from power supply, remove knobs, remove back and unscrew the four felt-headed screws on bottom of cabinet.

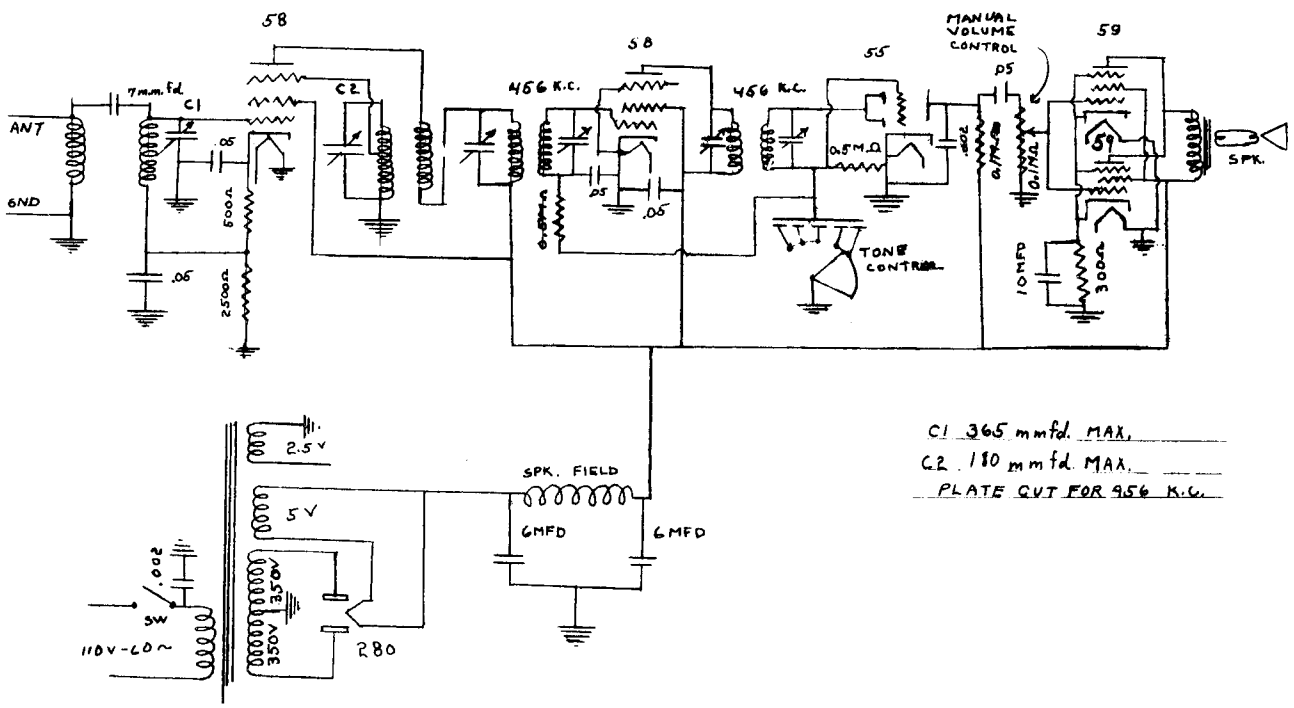
NOTE: Should it be necessary to write to the factory for parts or information, always give the serial number of the set as stamped on back of the chassis.

6D6 & 6C6

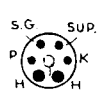
42

80

MODEL 6T GOLDENTONE

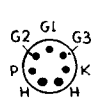


C1 .365 mmfd. MAX.
C2 .180 mmfd. MAX.
PLATE CUT FOR 956 K.C.



58

55



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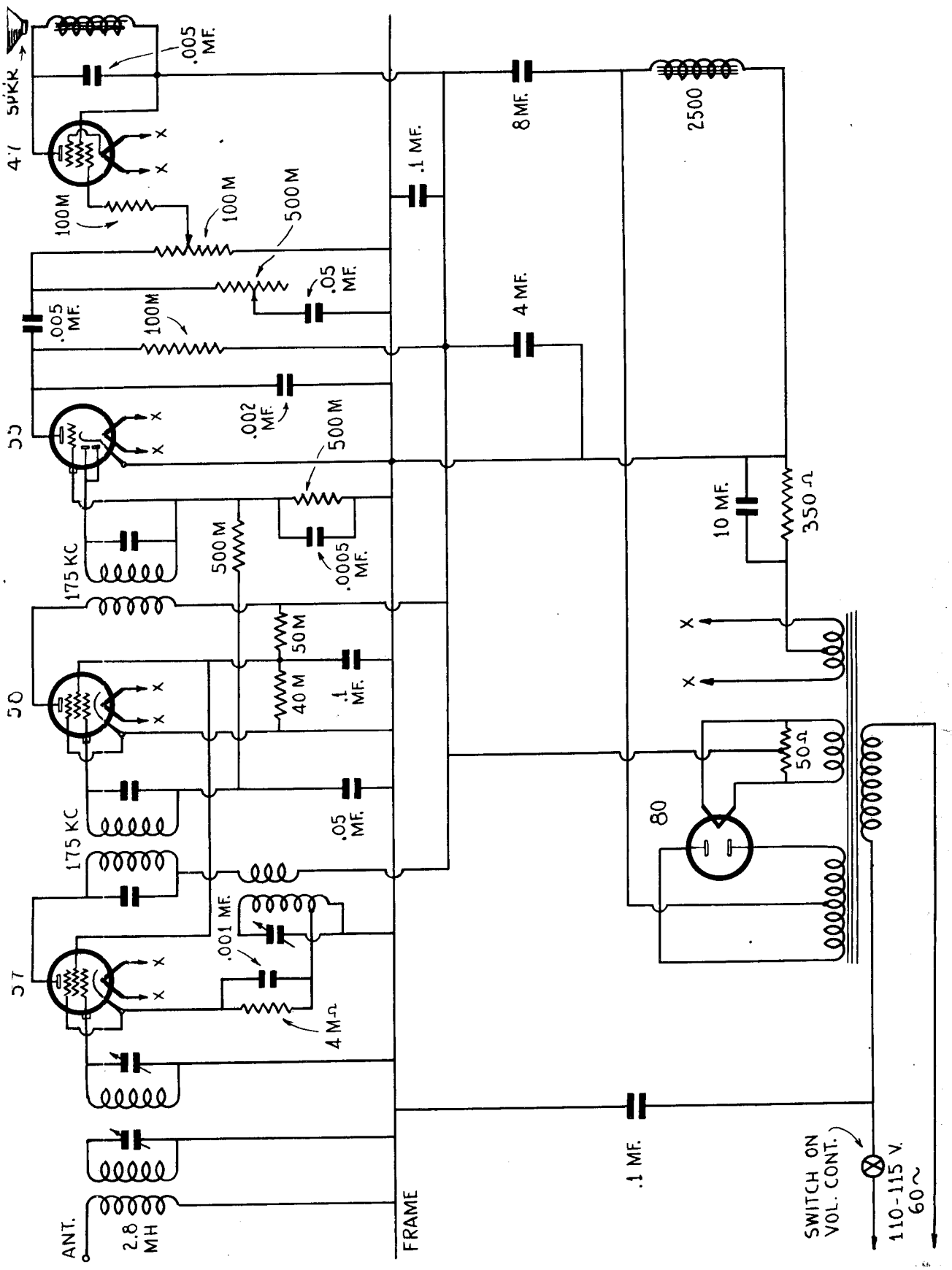
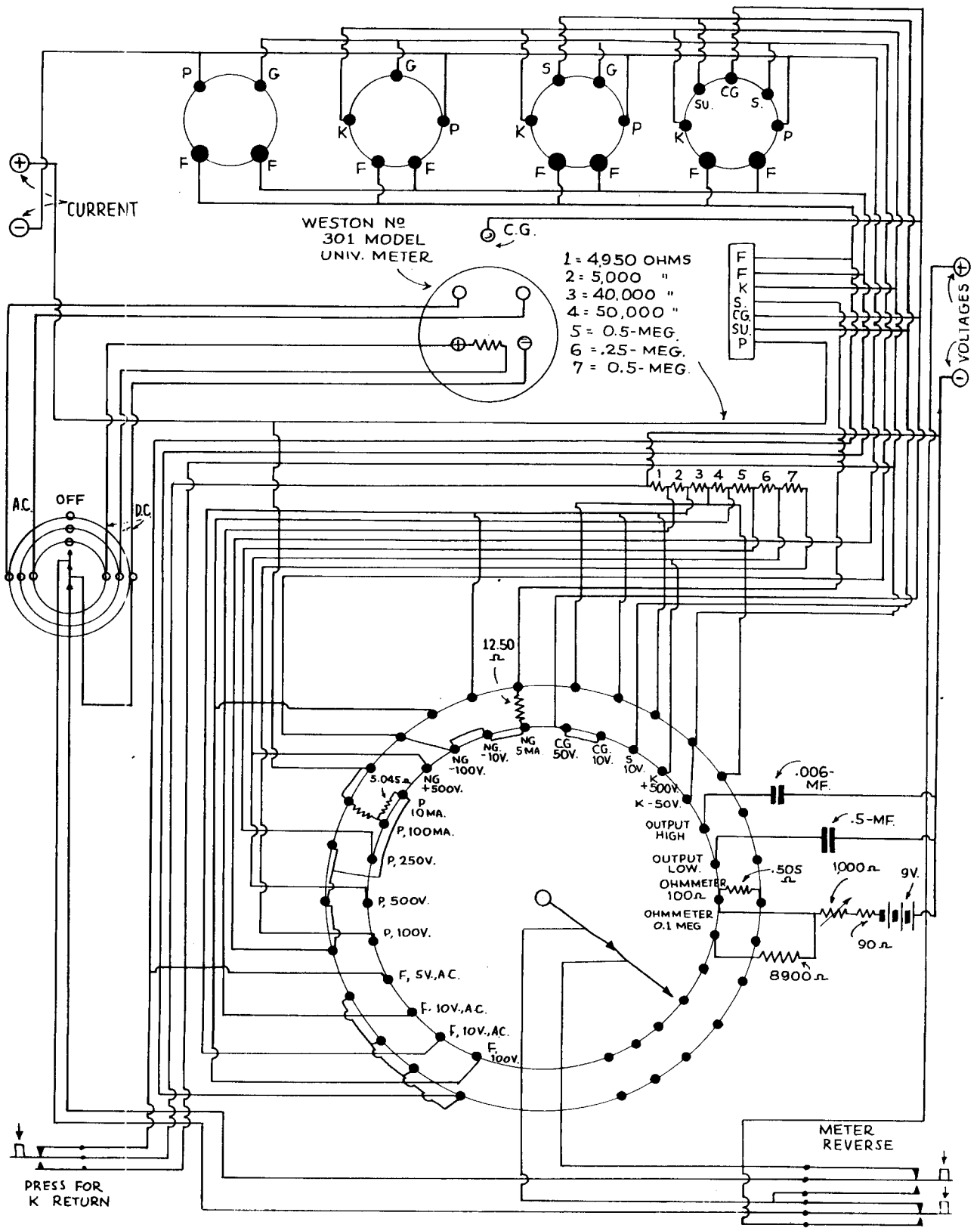
FORDSON RADIO, Inc.

"WARWICK"-5 TUBE SUPERHET MODEL



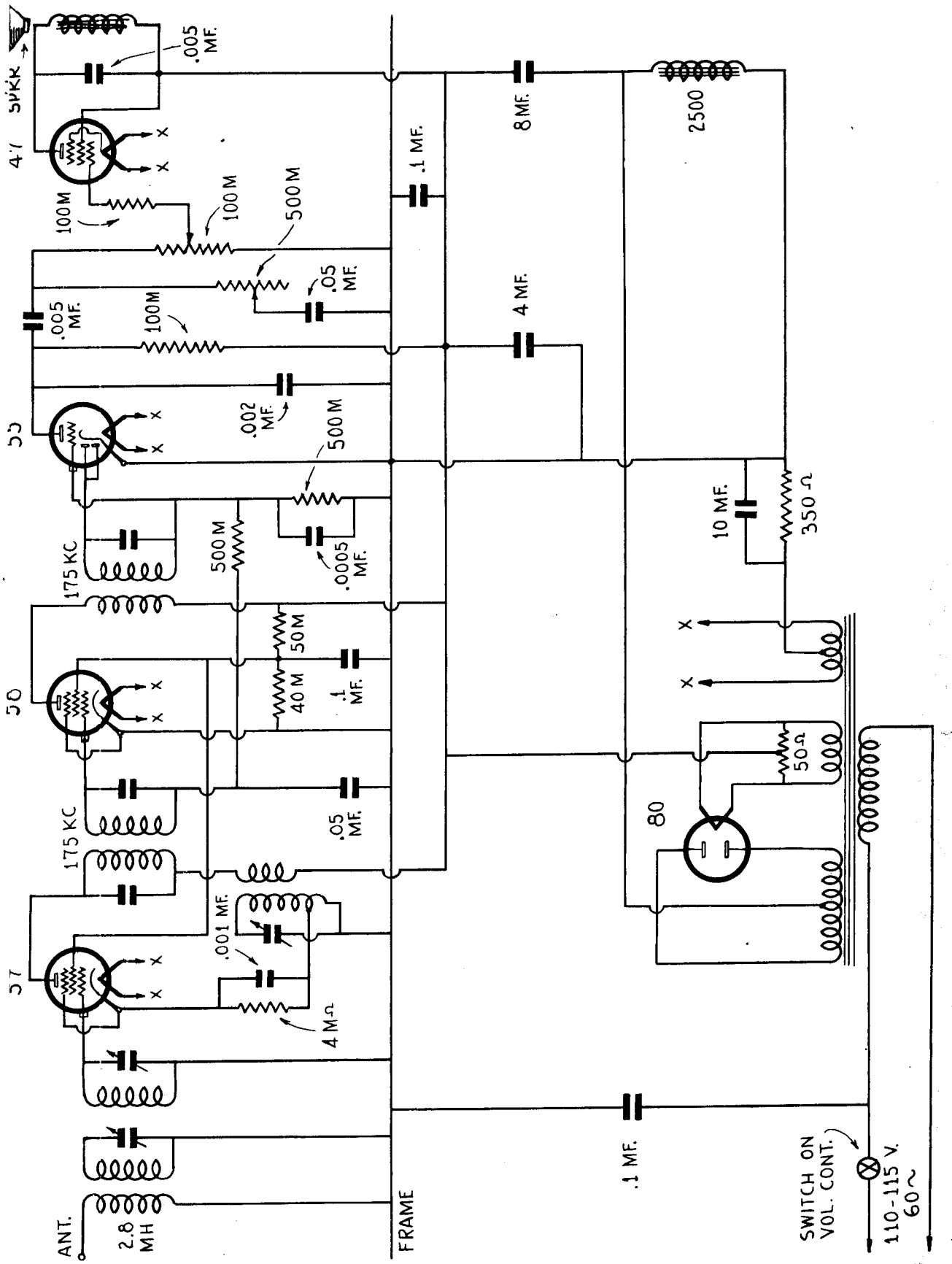
FRANKLIN RADIO CORP.

MODEL 33B
RADIO SET ANALYZER



FORDSON RADIO, Inc.

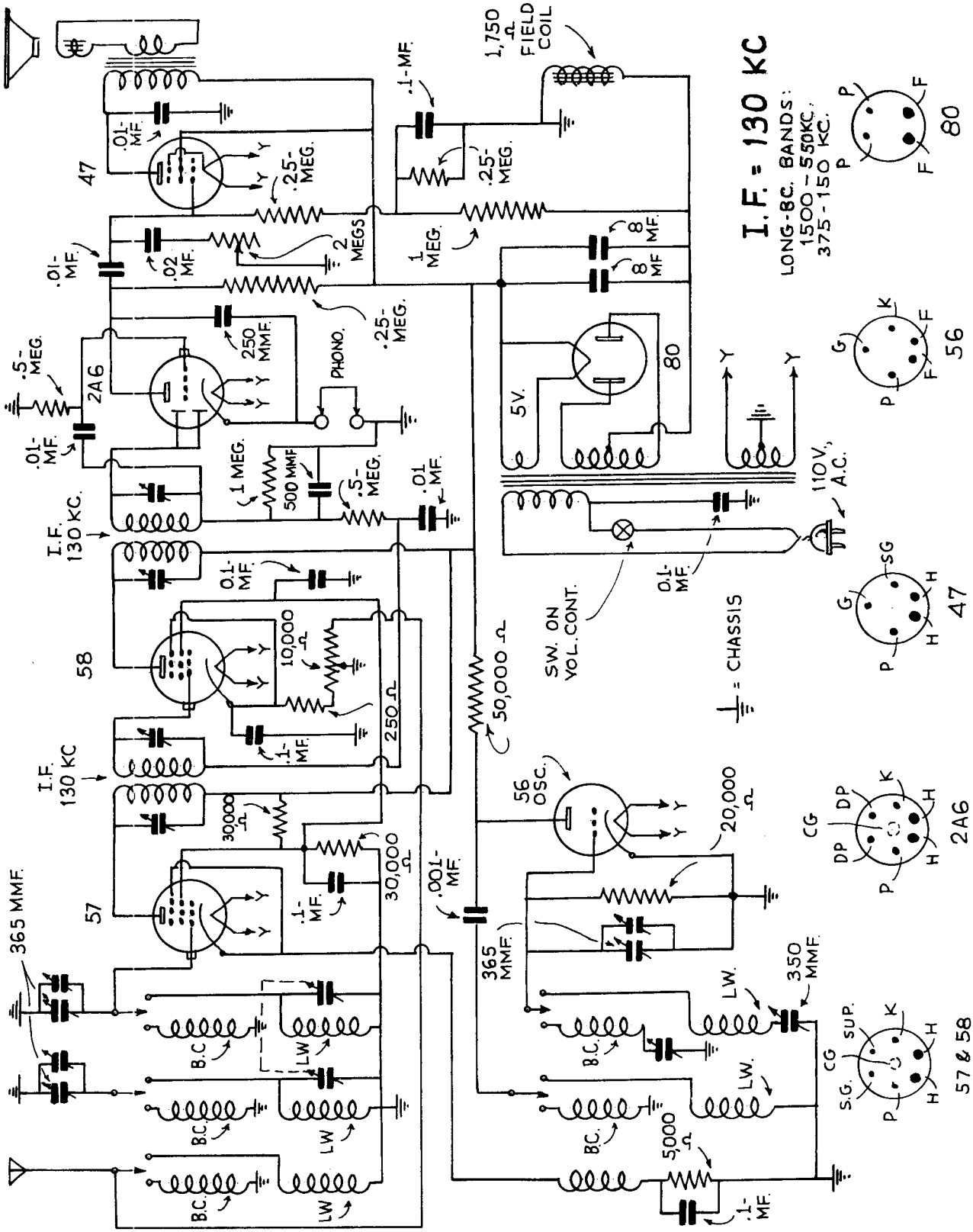
"WARWICK"-5 TUBE SUPERHET MODEL



FRANKLIN RADIO CORP.

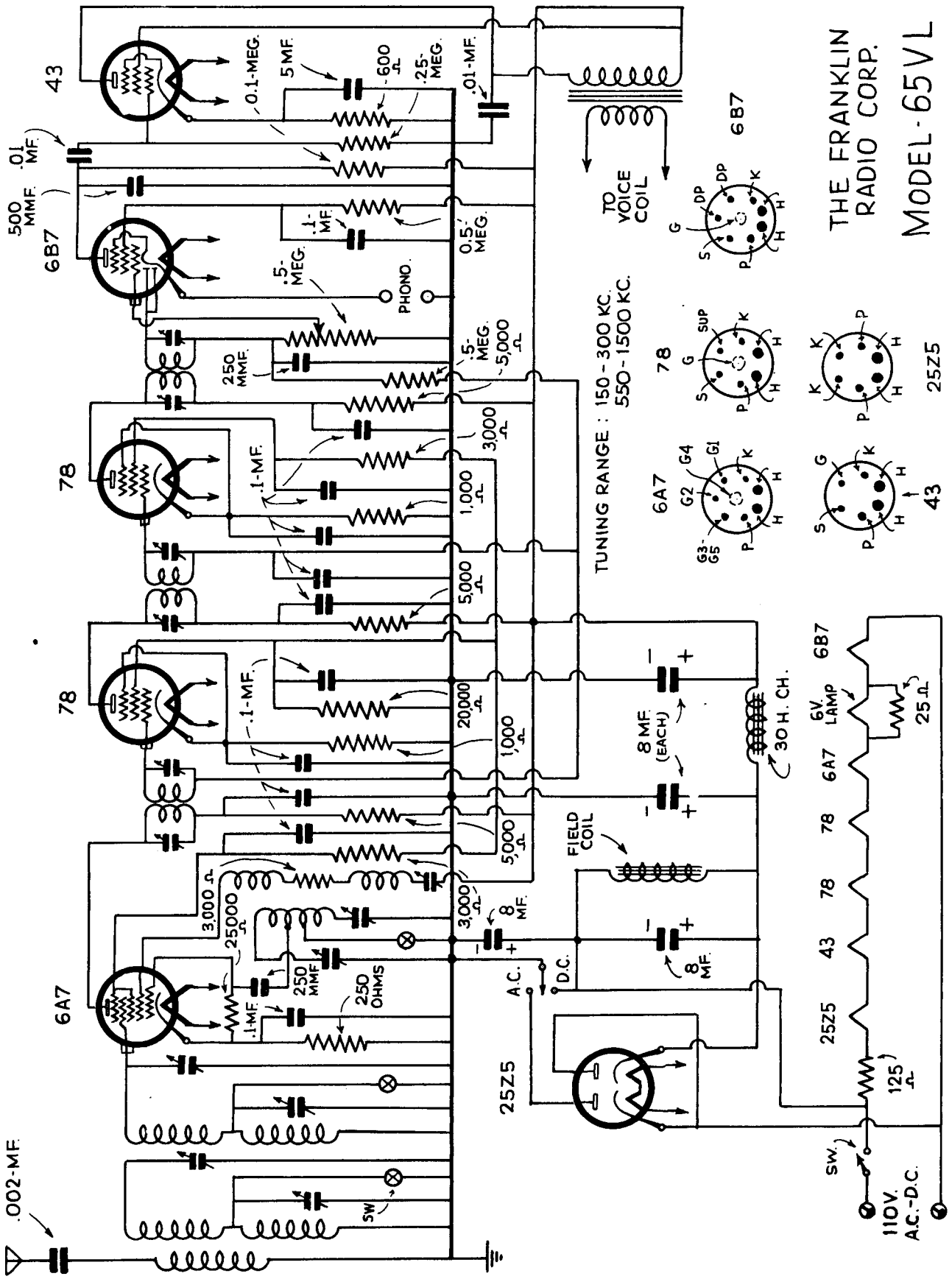
MODEL 63L

LONG WAVE & BROADCAST SET



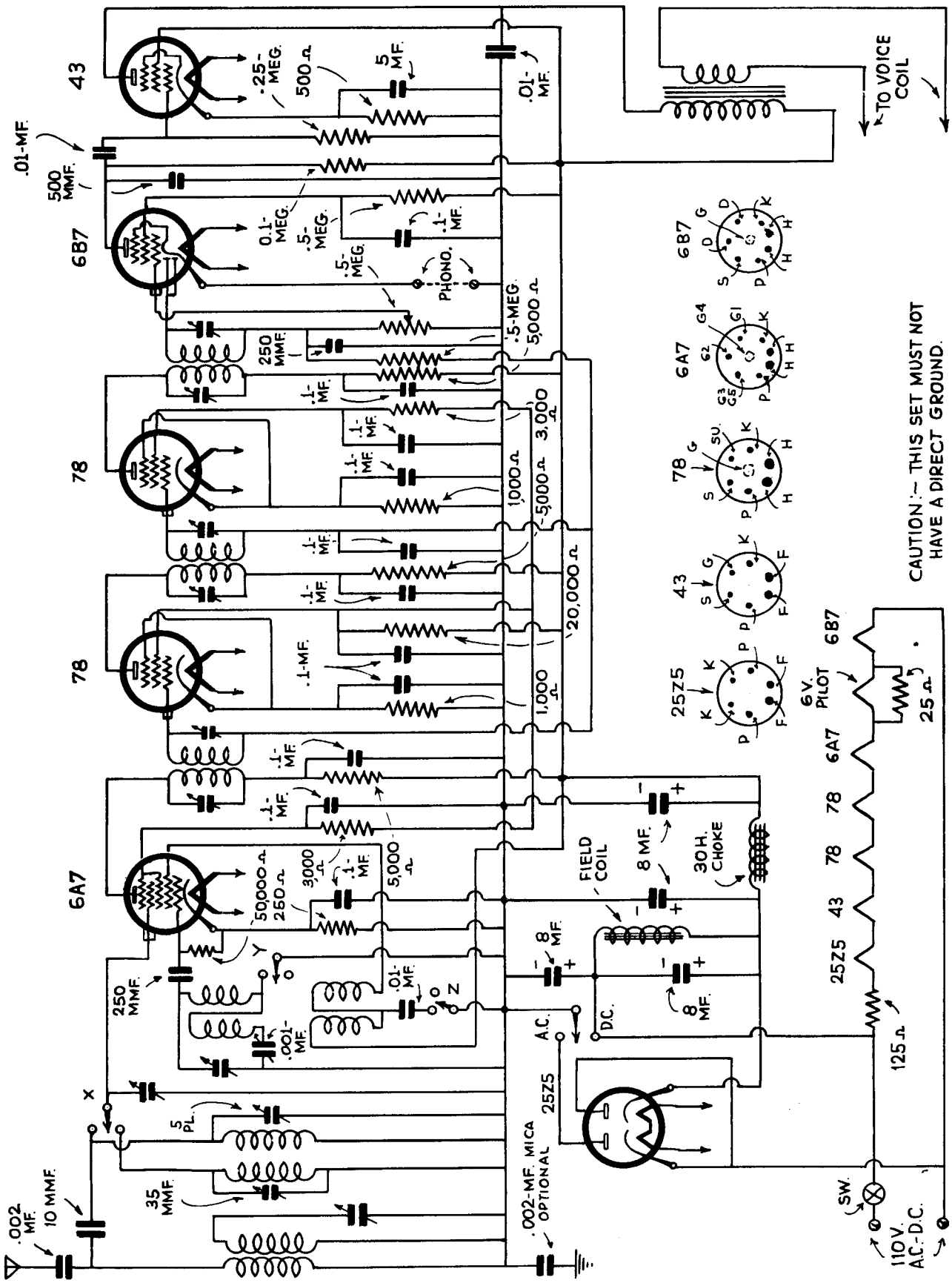
FRANKLIN RADIO CORP.

MODEL 65 VL

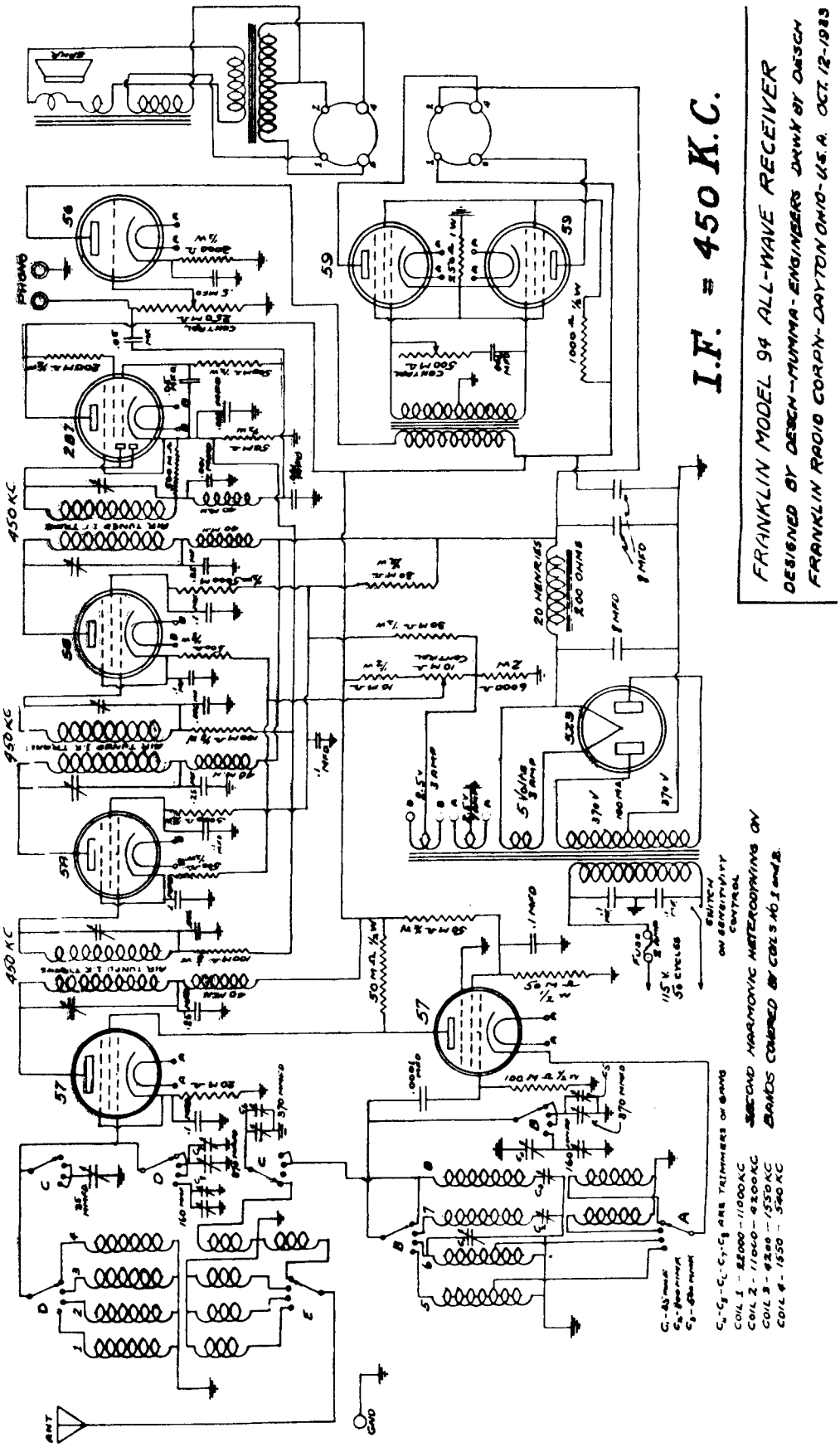


FRANKLIN RADIO CORP.

MODEL 65 VU

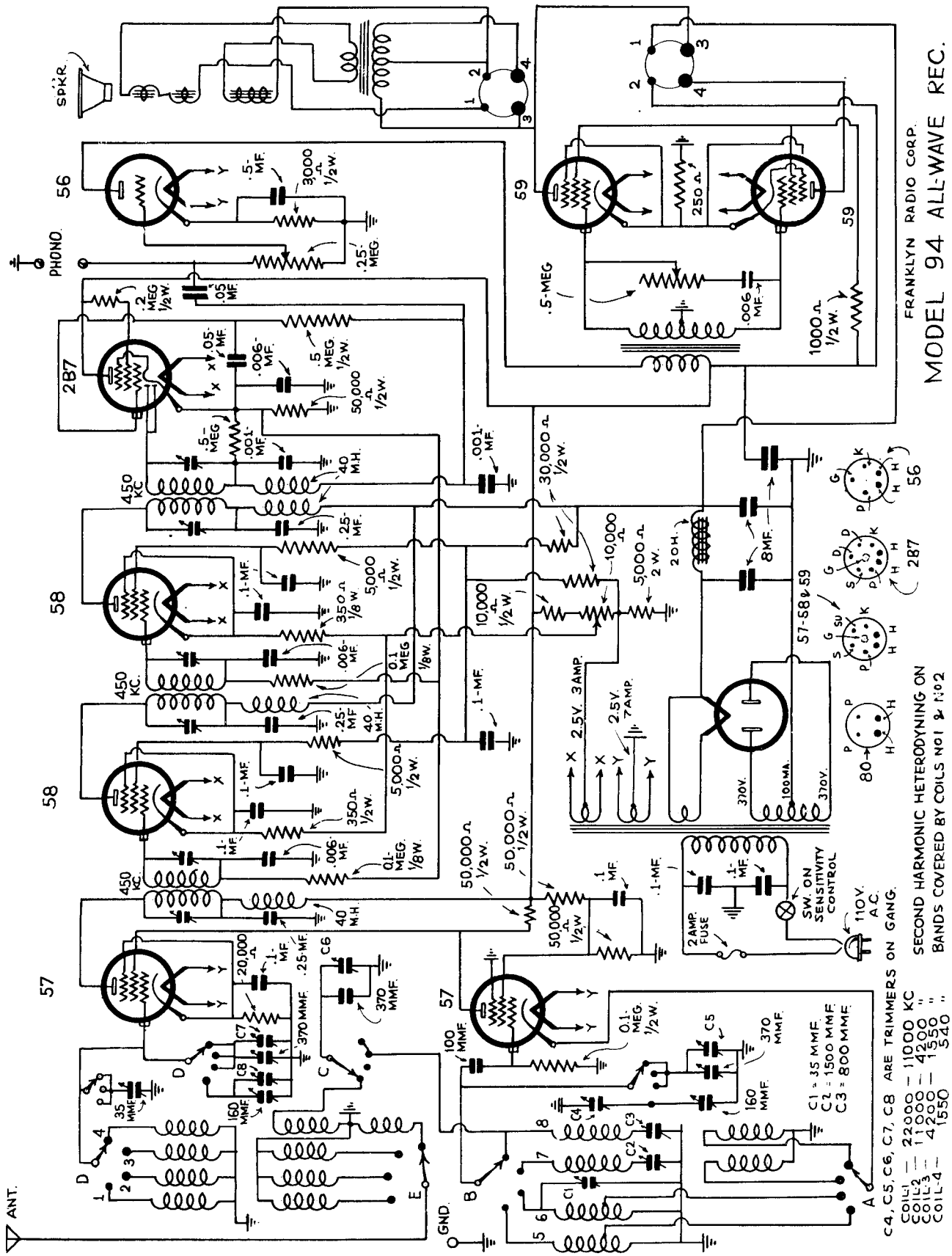


FRANKLIN RADIO CORP.
MODEL 94



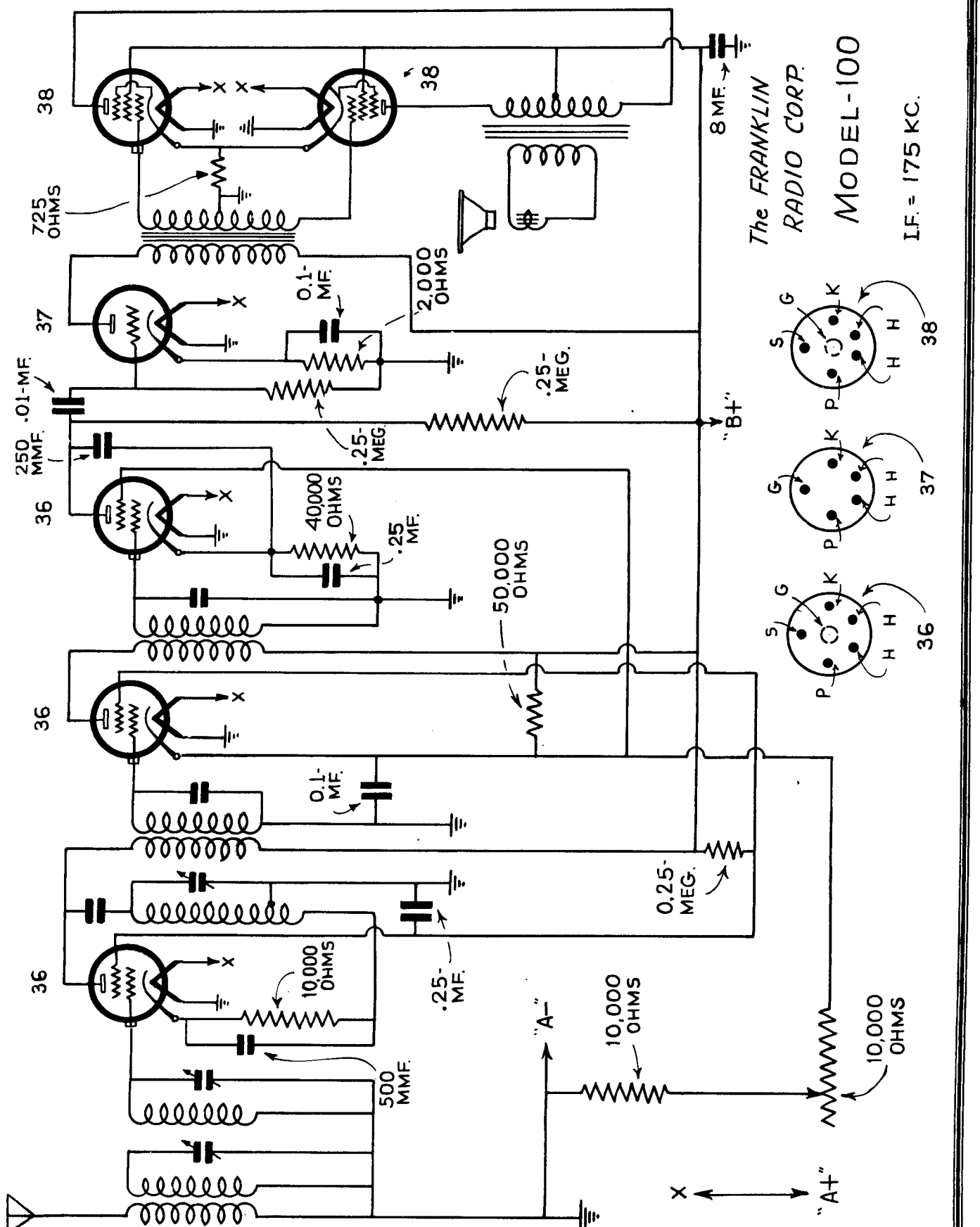
FRANKLIN RADIO CORP.

MODEL 94 ALL-WAVE



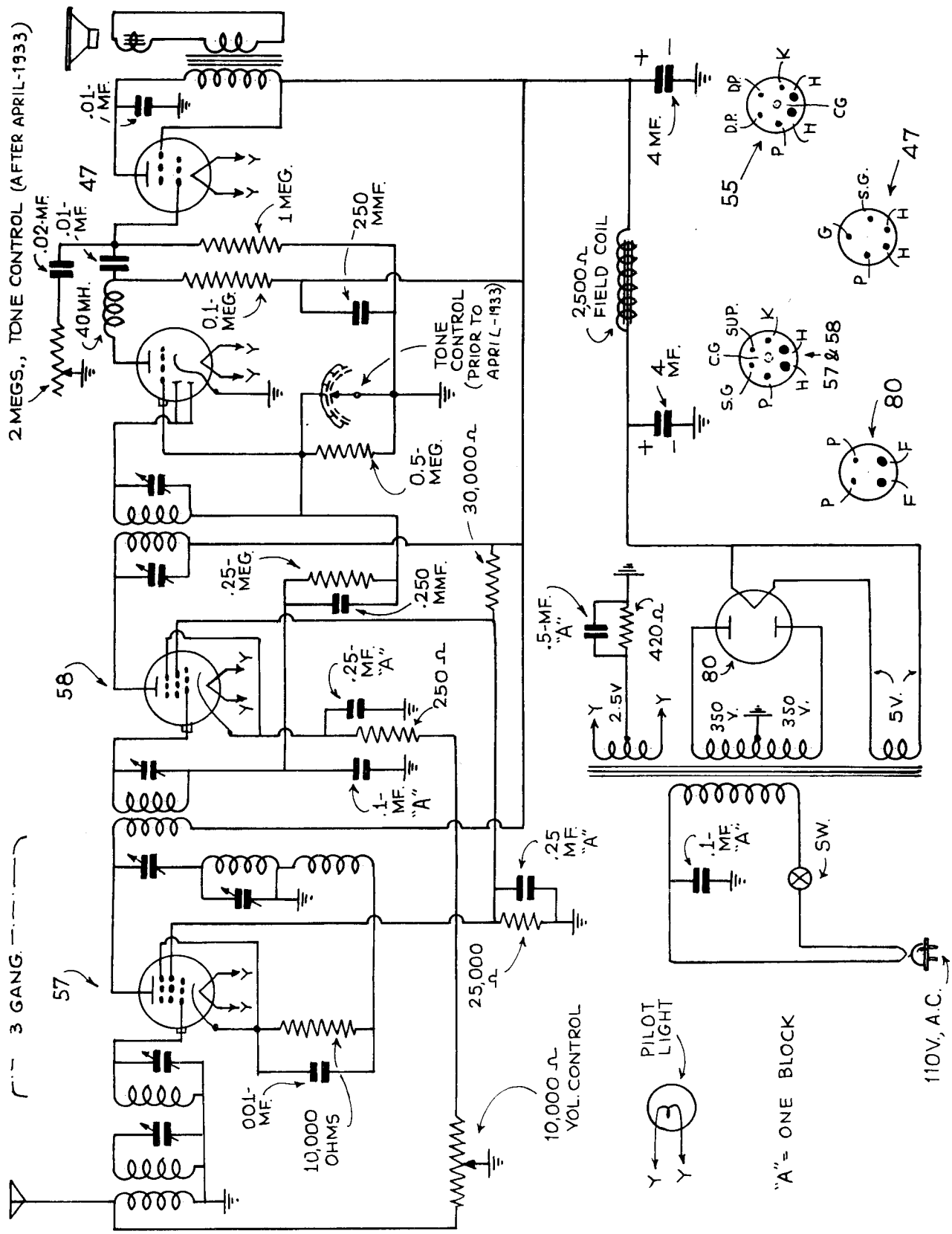
FRANKLIN RADIO CORP.

MODEL 100



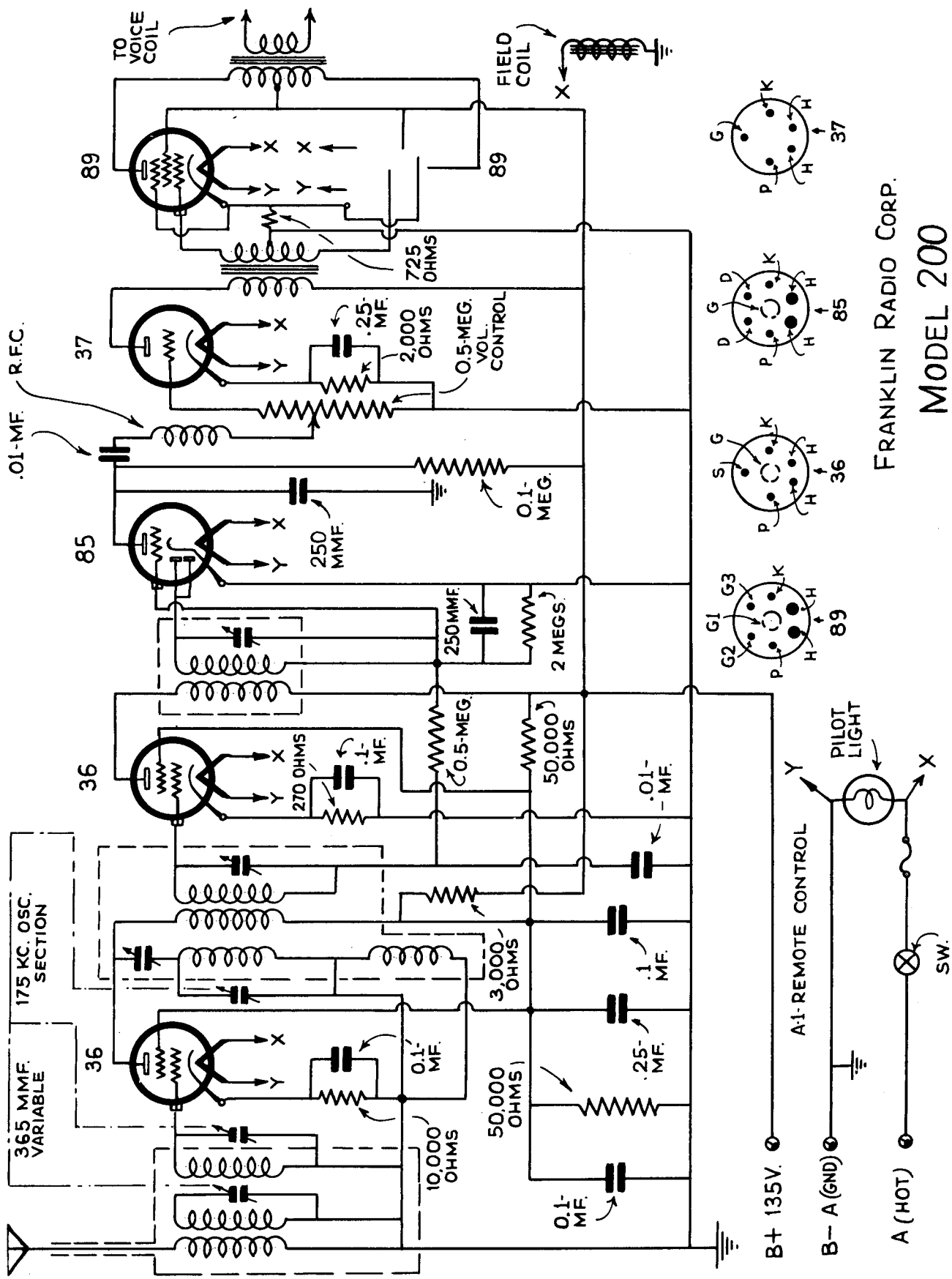
FRANKLIN RADIO CORP.

MODEL 106



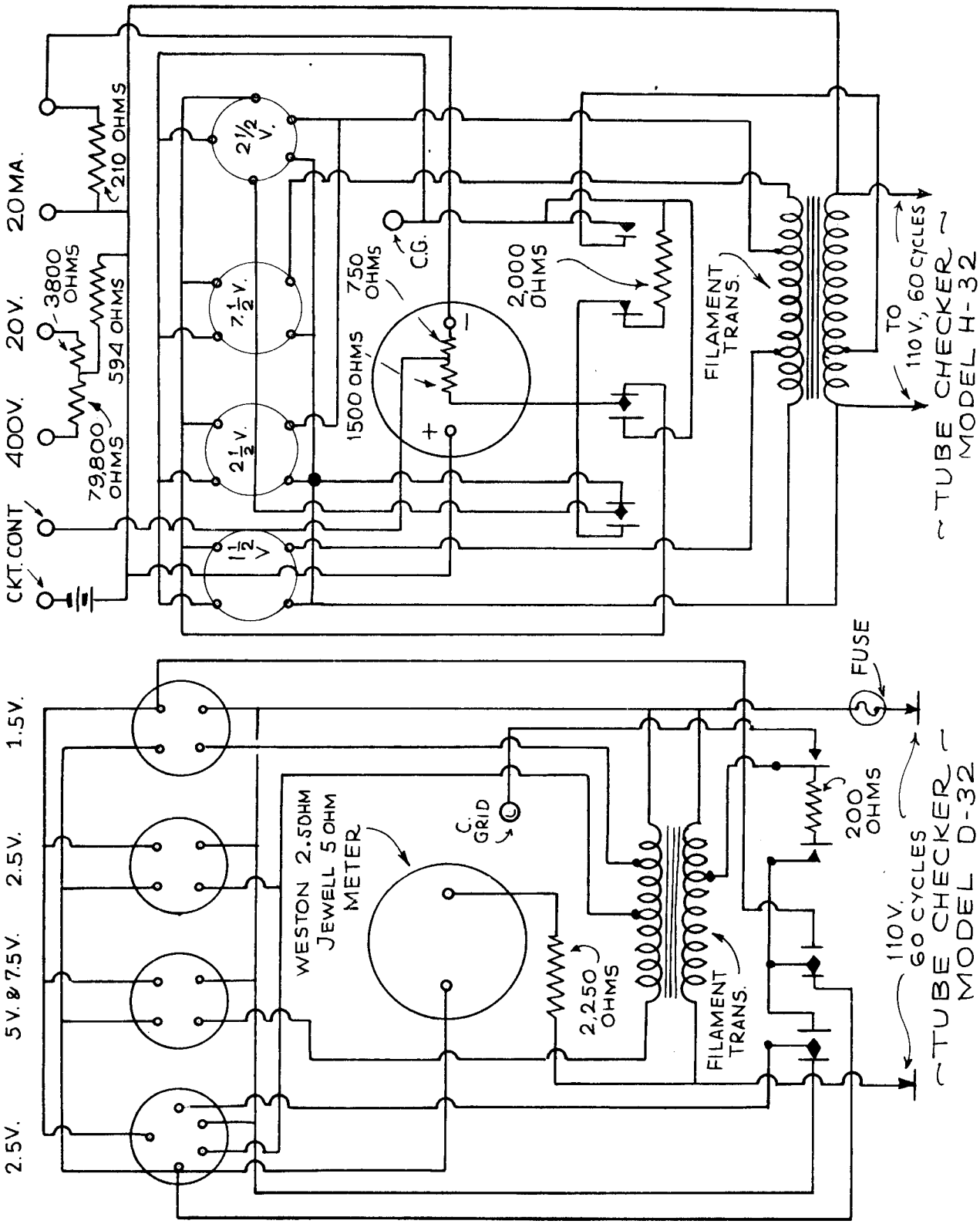
FRANKLIN RADIO CORP.

MODEL 200



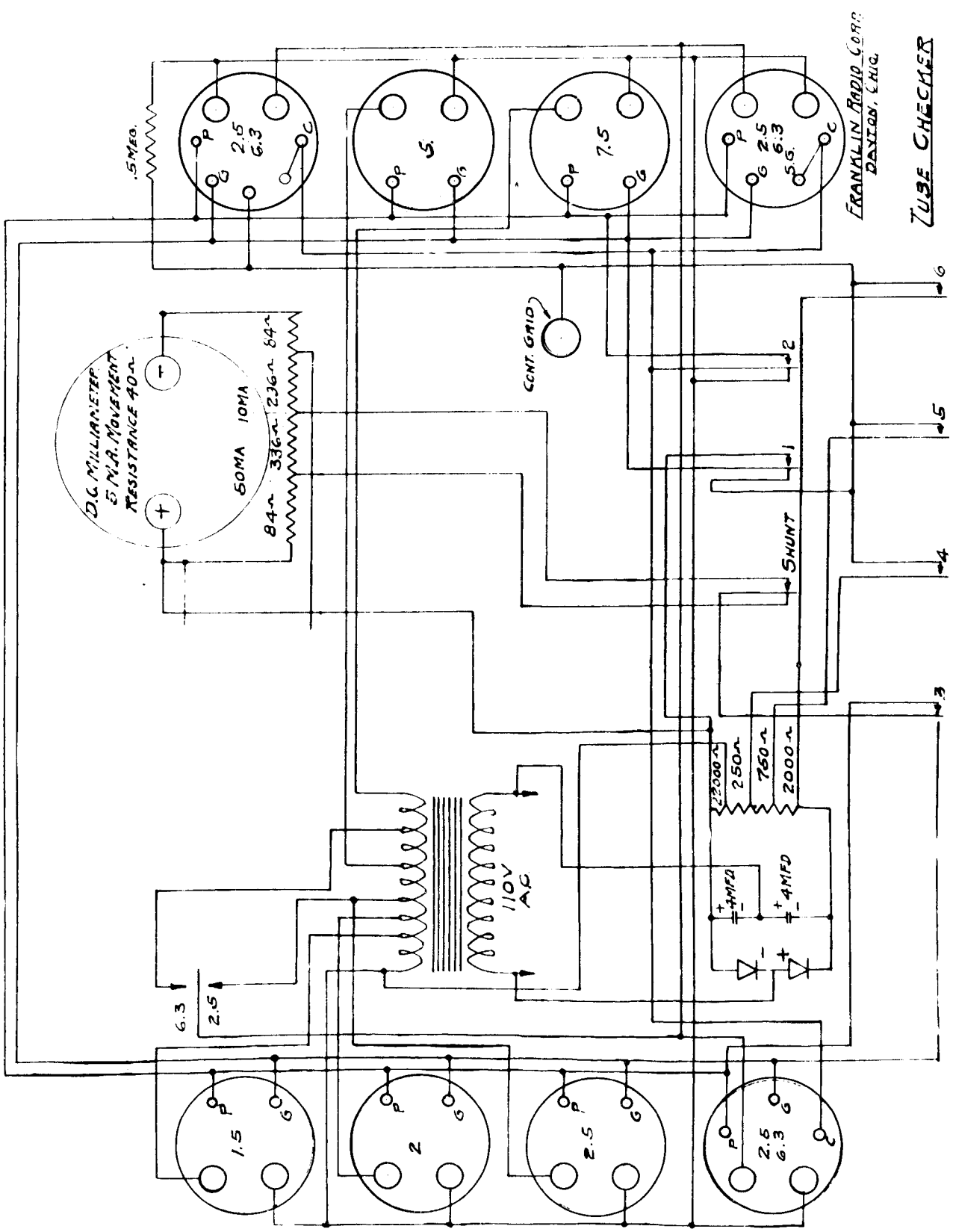
FRANKLIN RADIO CORP.

D32 & H32 TUBE CHECKERS



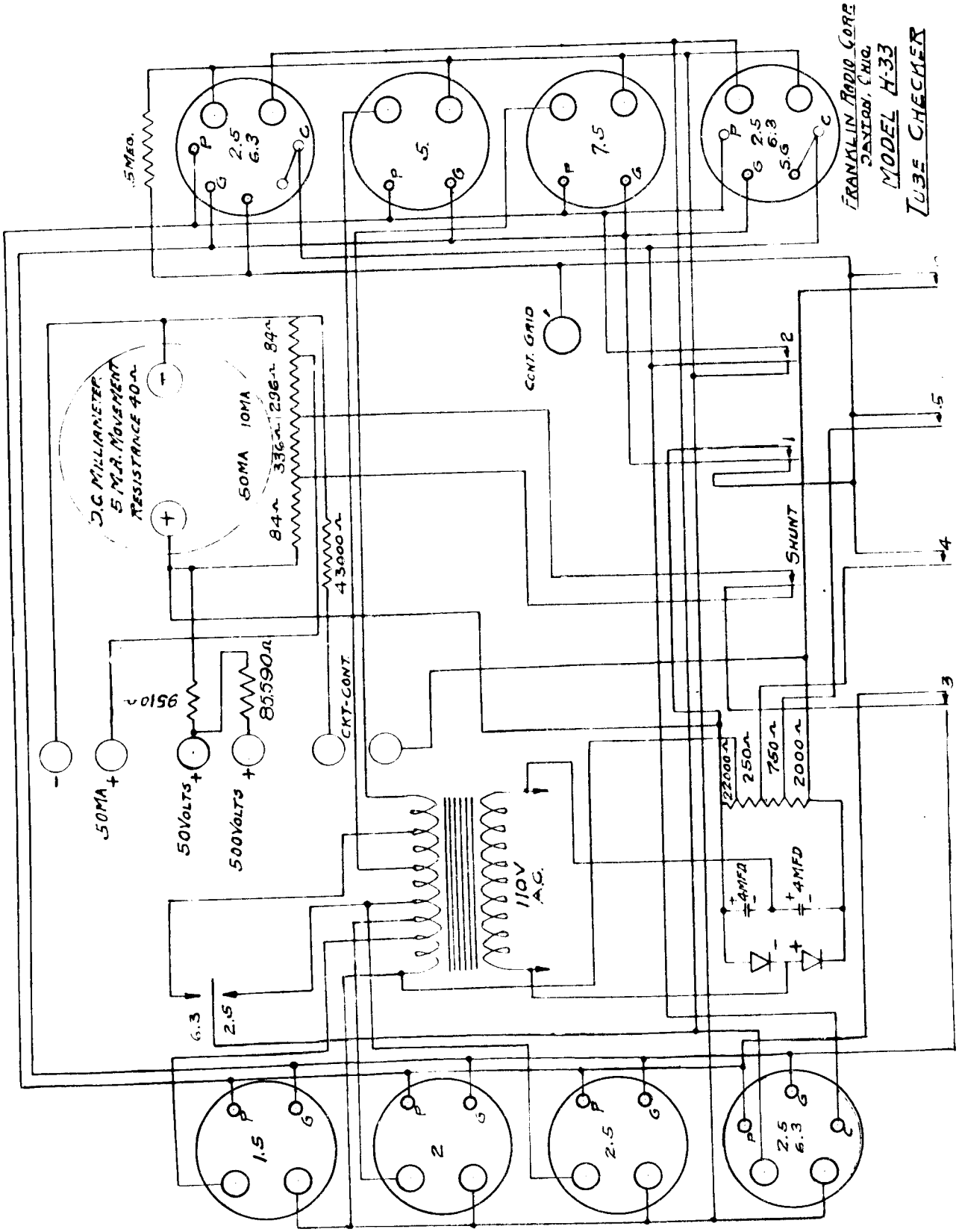
FRANKLIN RADIO CORP.

MODEL D-33



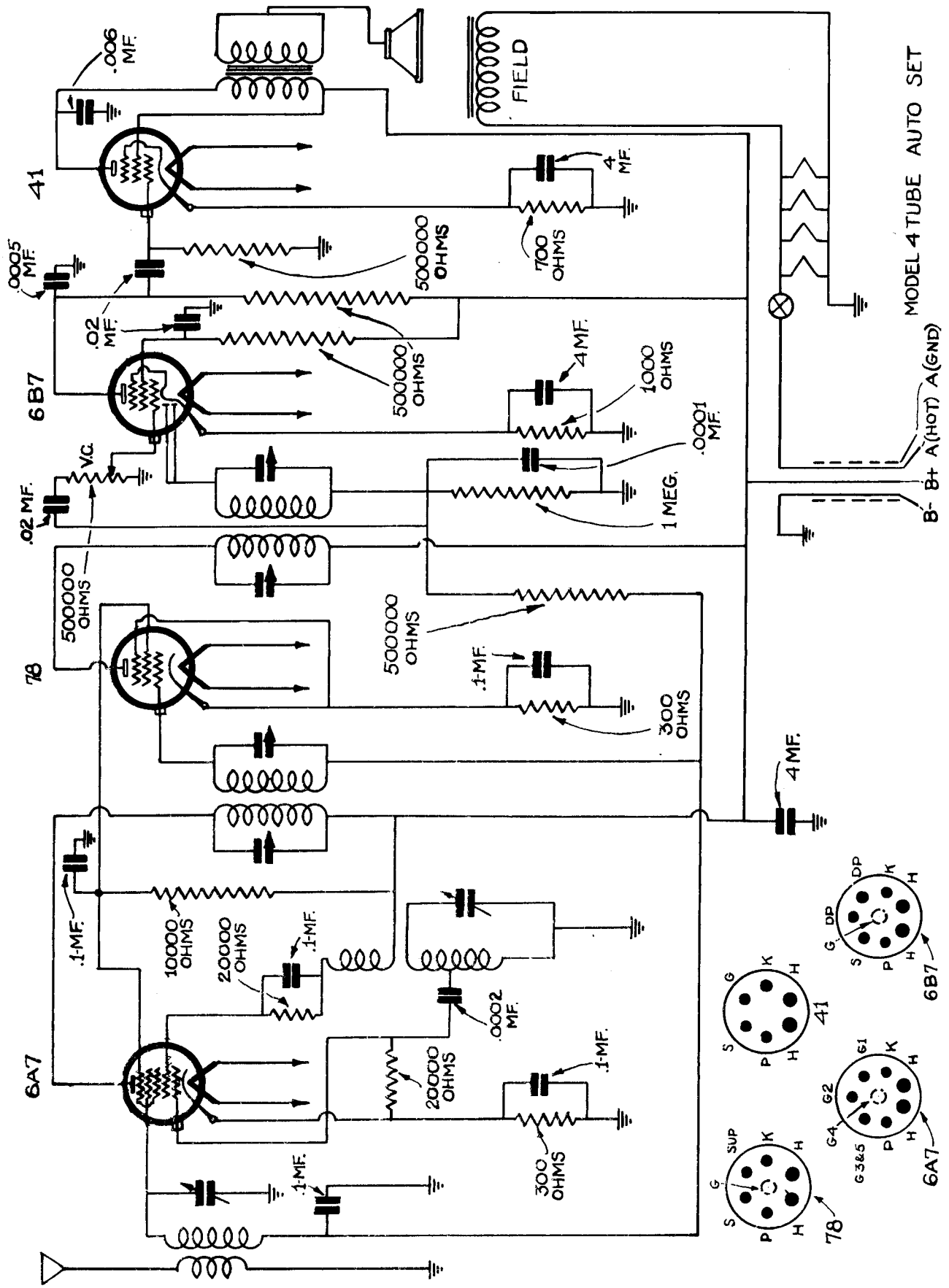
FRANKLIN RADIO CORP.

MODEL H30



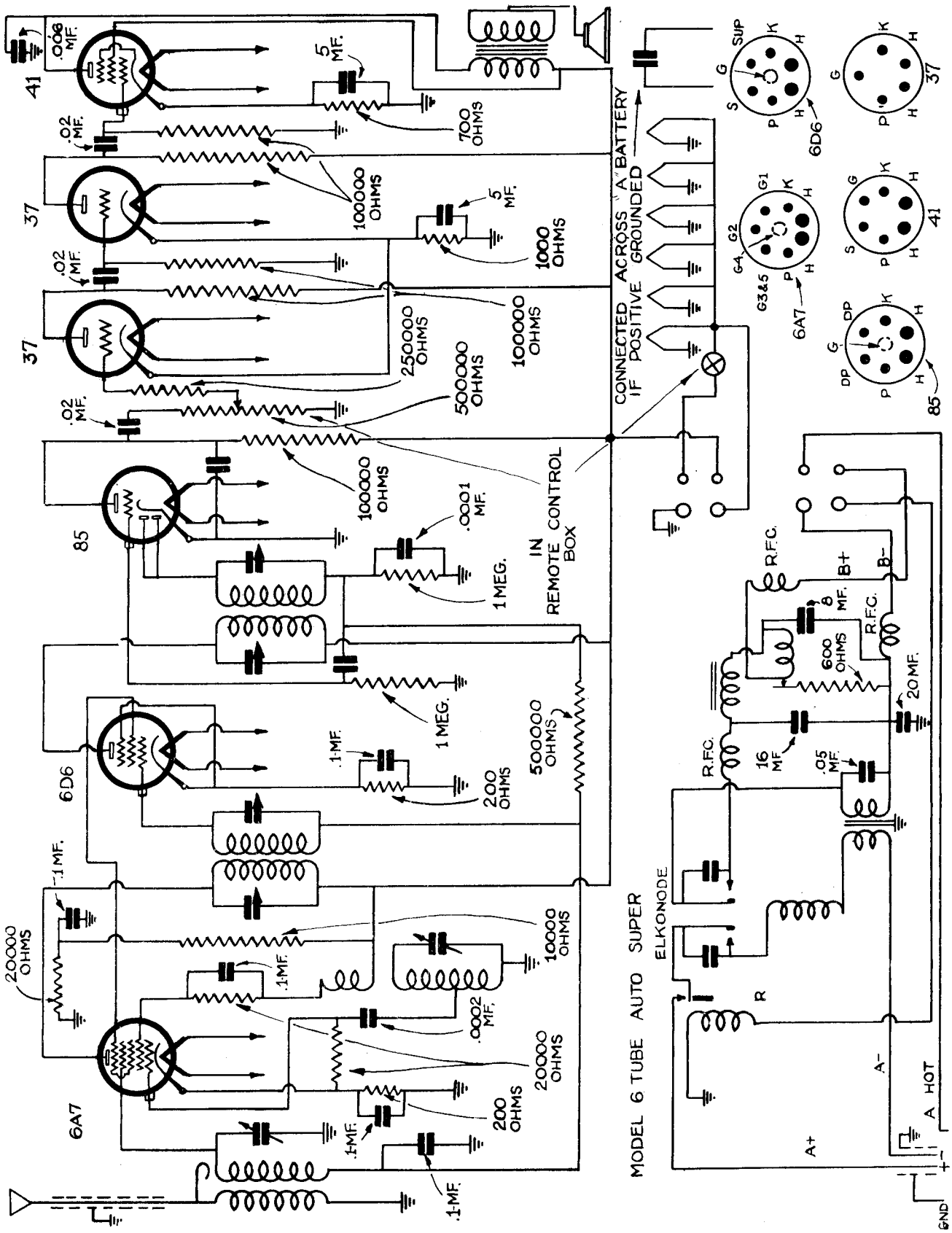
FREED TEL. & RADIO CORP.

4 TUBE AUTO SET MODEL A7



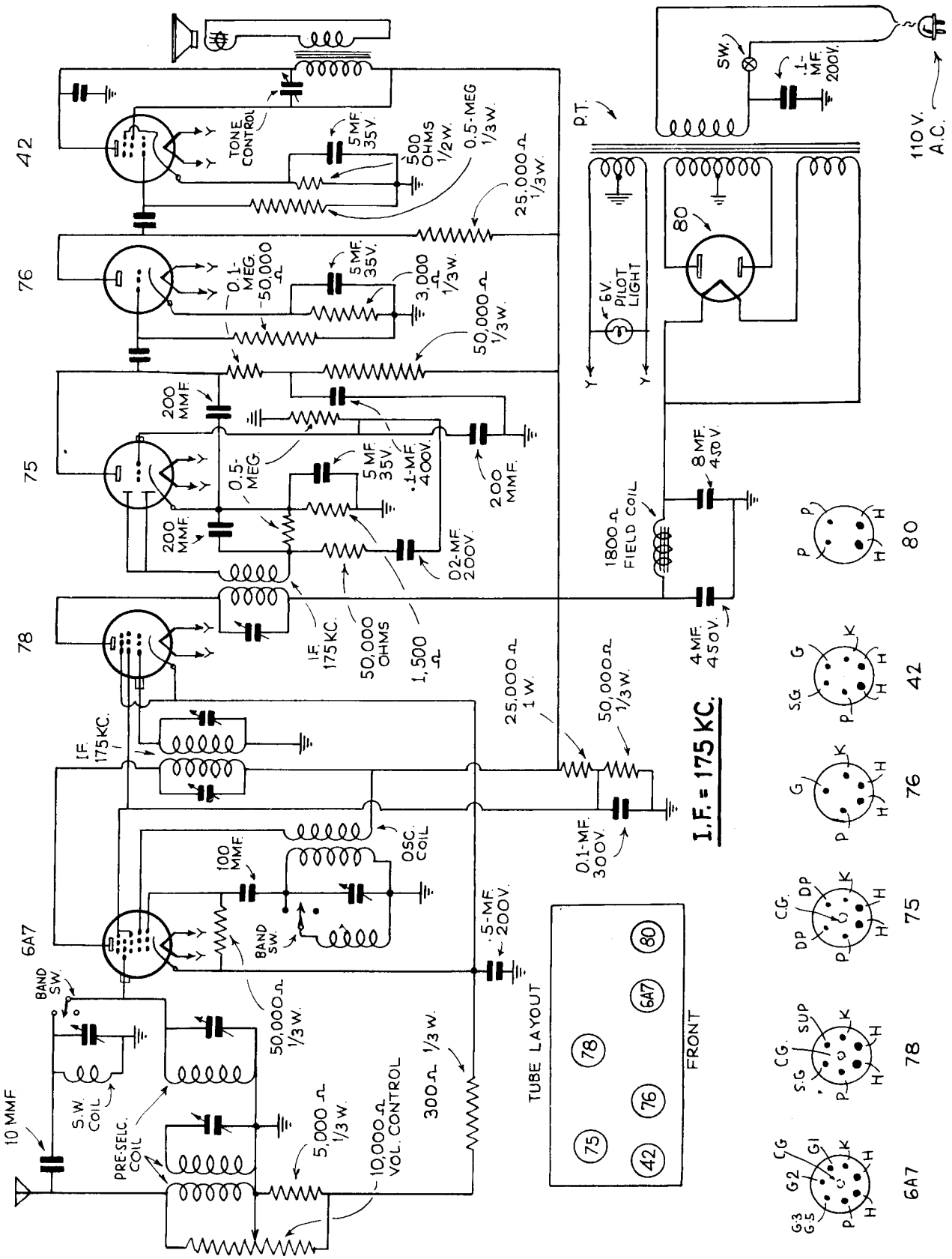
FREED TEL. & RADIO CORP.

6 TUBE AUTO SUPER MODEL A9



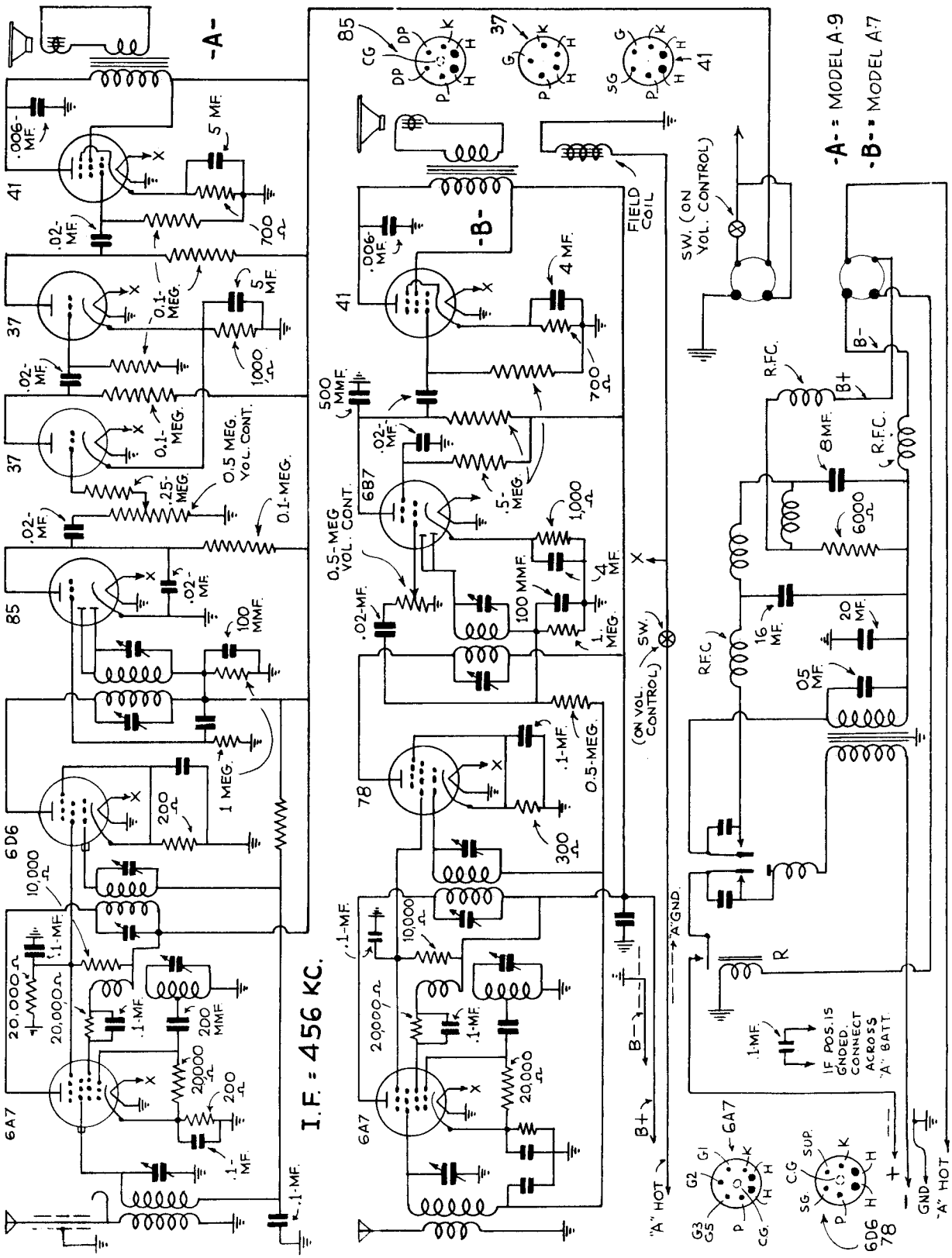
FREED TEL. & RADIO CORP.

MODELS 360 & 360X "A.C."



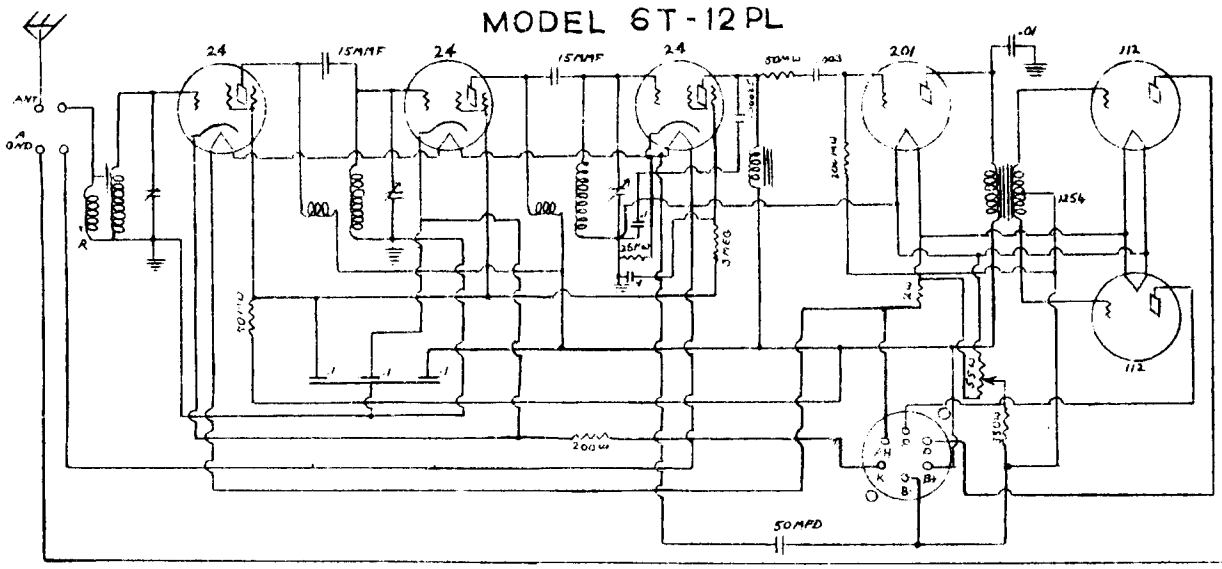
FREED TEL. & RADIO CORP.

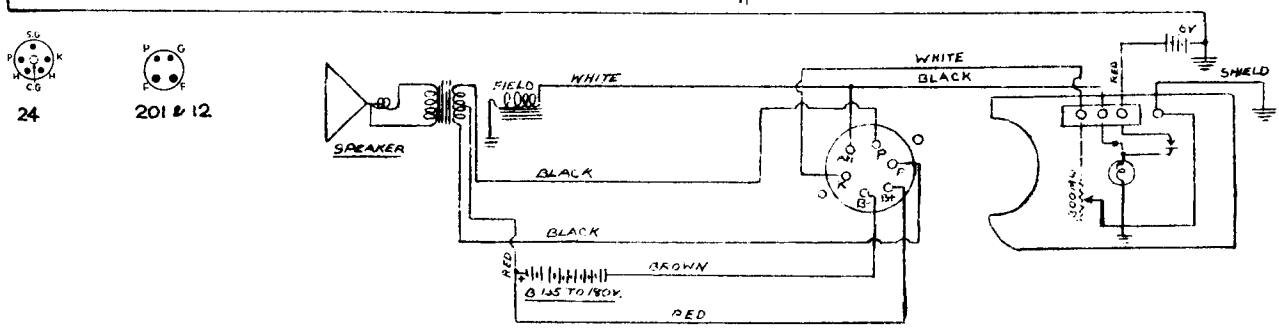
MODELS A7 & A9 AUTO SETS



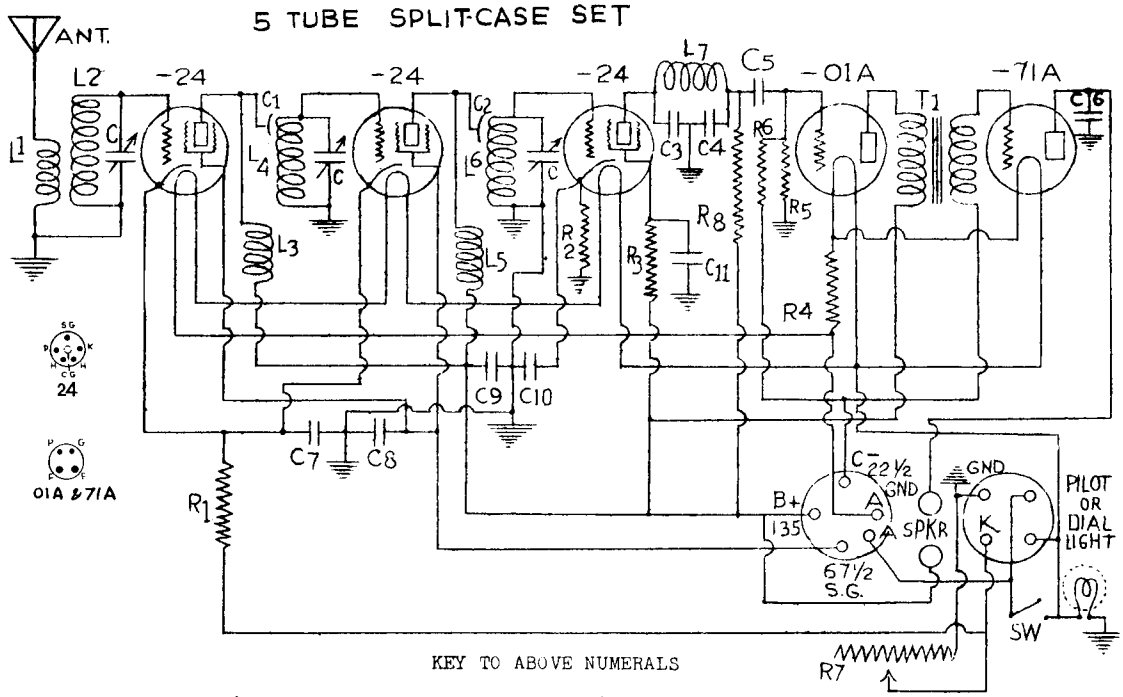
GALVIN MFG. CORP.

MODEL 6T-12PL





5 TUBE SPLIT-CASE SET

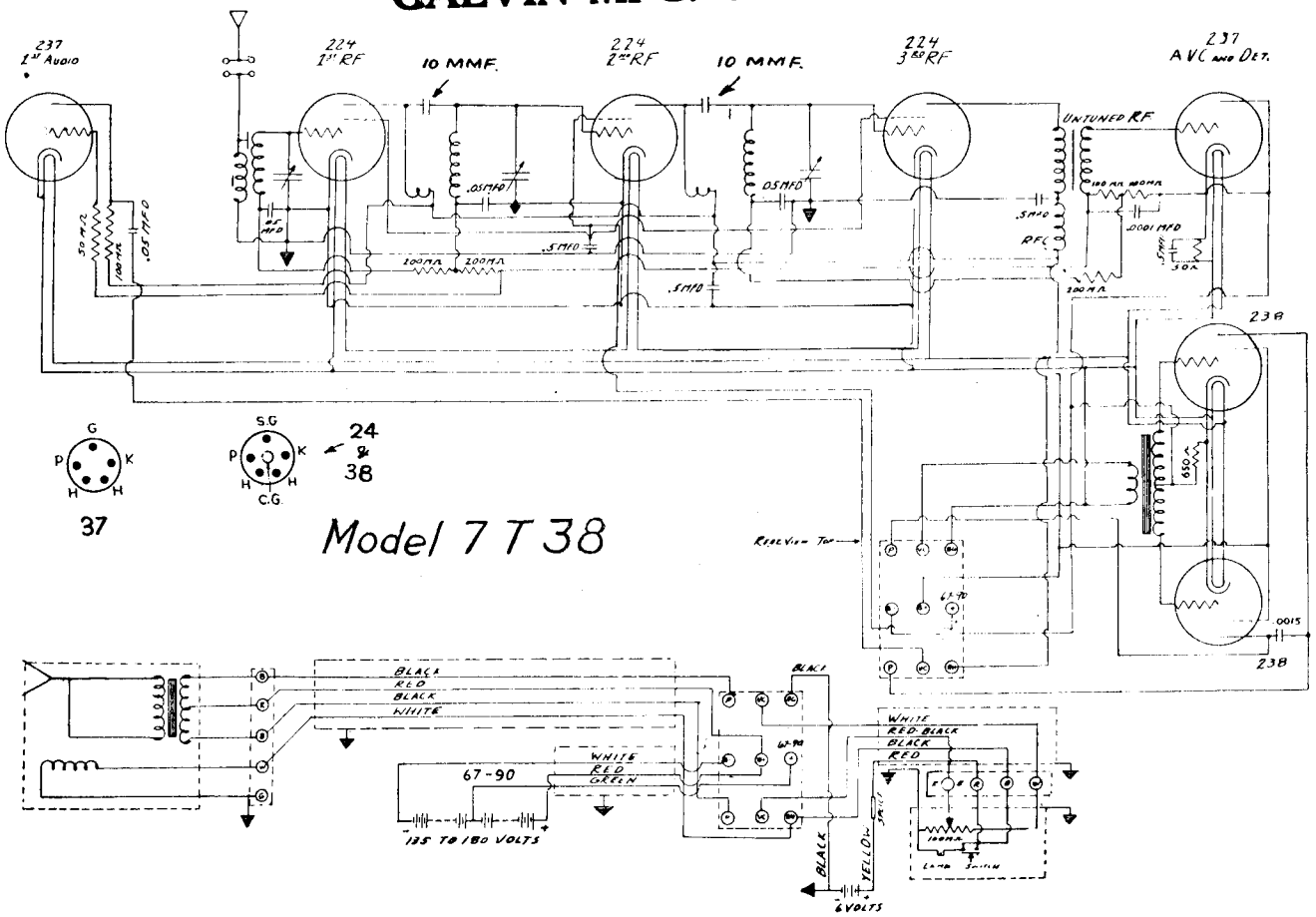


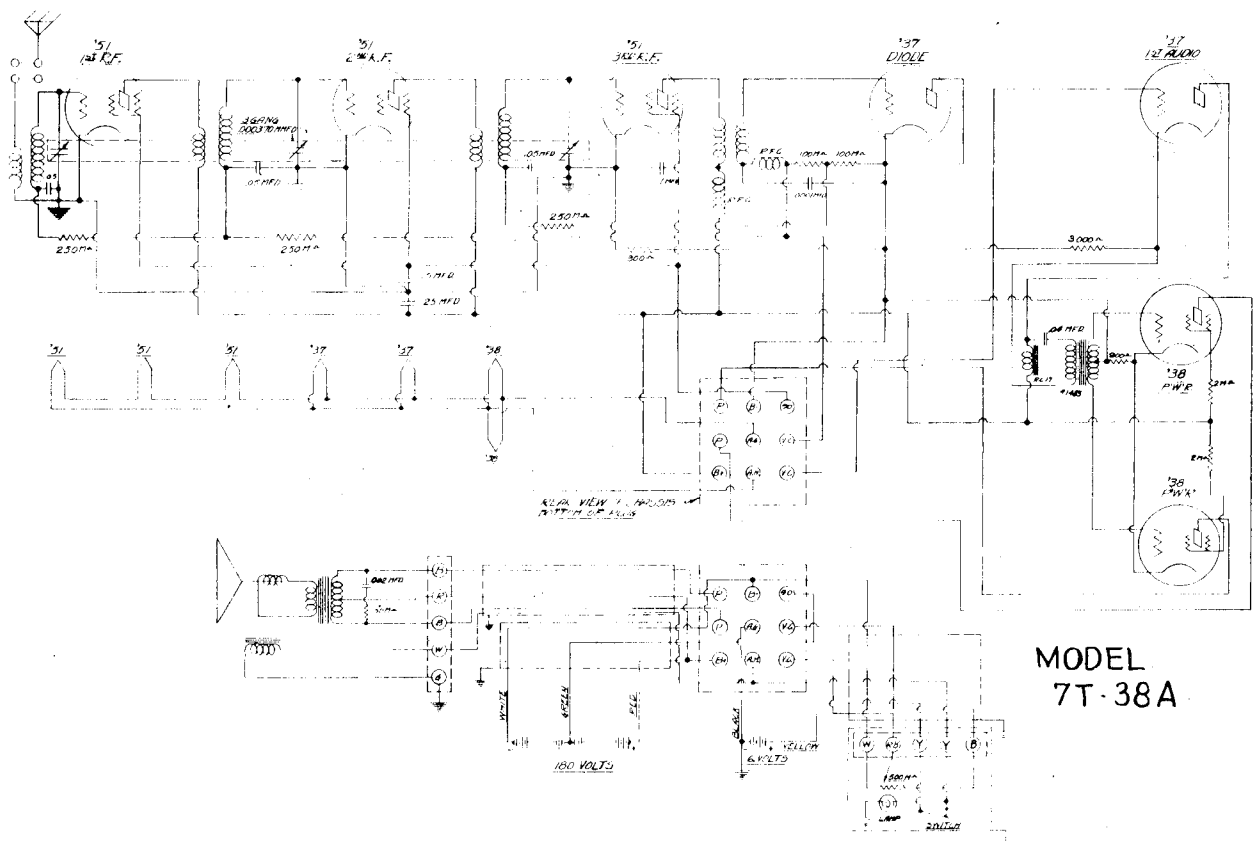
KEY TO ABOVE NUMERALS

L1 - Antenna primary
L2, L4, L6 - R.F. secondarys
L3, L5 - R.F. plate chokes
L7 - Detector plate choke
C, C1, C2 - Main tuning condensers
C1, C2 - R.F.coupling condenser. Cap. 0.6 microfarads
C3, C4 - 0001 mfd. condensers
C5, C6, C11 - .003 mfd.condensers
C7, C8, C9, C10 - .25 mfd.by pass condensers
R1 - 200 (Gray resistor
R2 - 25,000 (Black) resistor
R3, R6 - 3 meg (Blue or Pink) resistor
R4 - 2 wire wound resistor
R5, R8 - 1 meg (Lavender) resistor
R7 - 300,000 Volume control

Sets prior to 1930

GALVIN MFG. CORP.

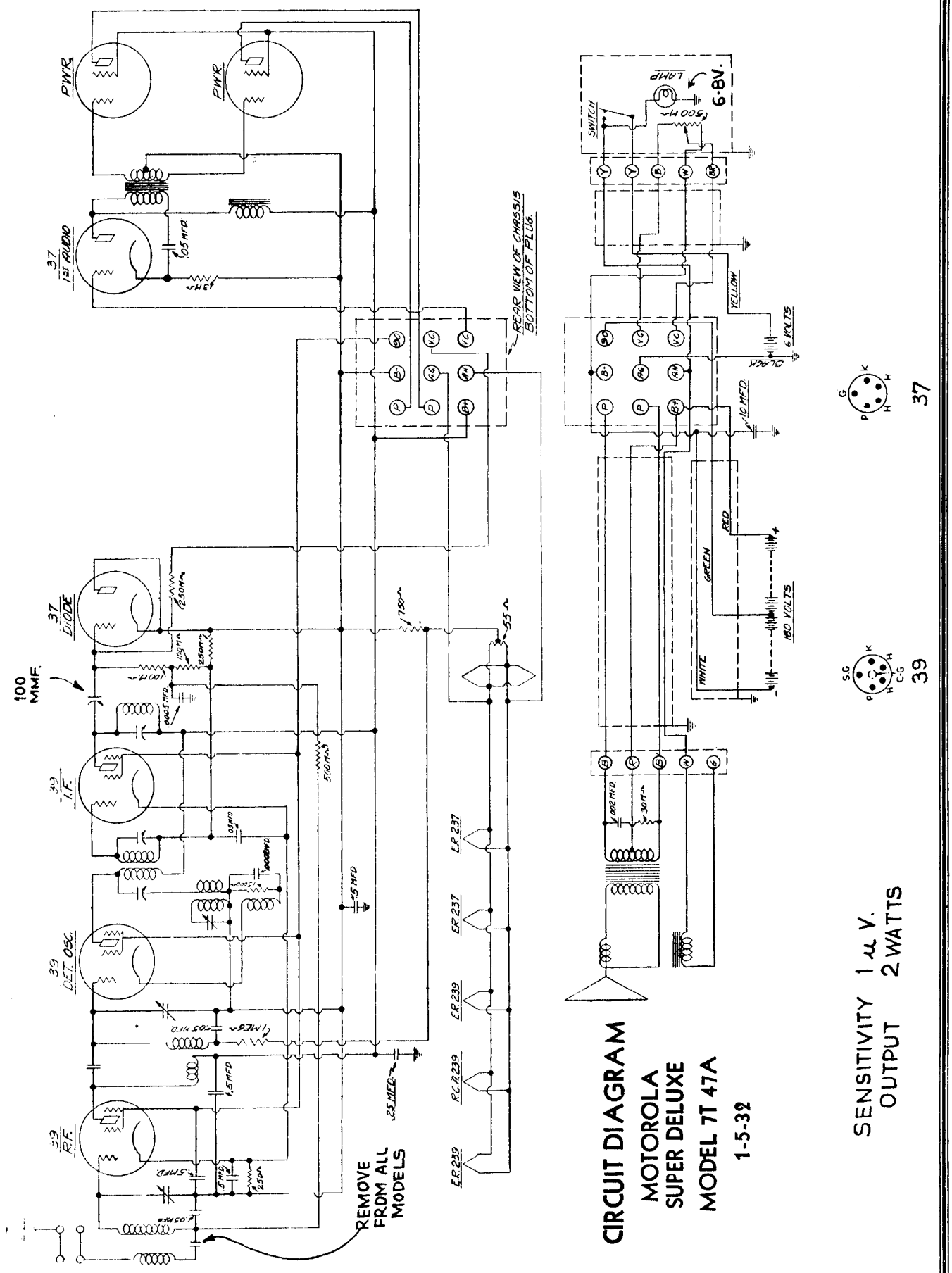




MODEL
7T-38A

GALVIN MFG. CORP.

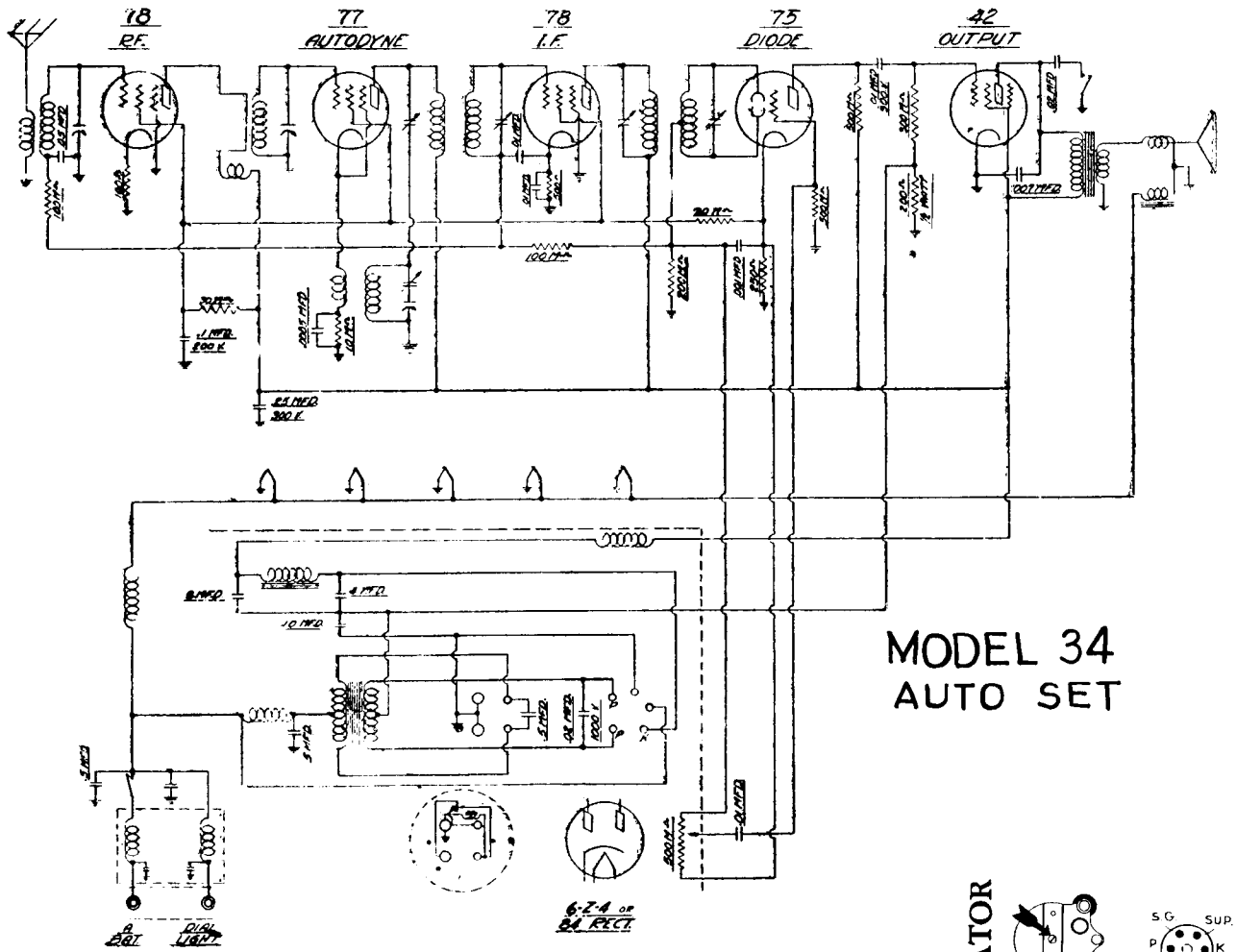
MODEL 7T, 47A



CIRCUIT DIAGRAM
MOTOROLA
SUPER DELUXE
MODEL 7T 47A
1-5-32

SENSITIVITY 1 μ V.
OUTPUT 2 WATTS

GALVIN MFG. CORP.



MODEL 34
AUTO SET

ELIMINATION OF IGNITION INTERFERENCE

1 Mount the spark plug suppressors on the plugs and connect the ignition wire to the suppressor.

2 Insert the screw type suppressor in the high tension lead about two inches from the distributor.

3 Mount the generator condenser under the cut-out mounting screw and connect the pig-tail lead to either side of the generator cut-out.

4 If the ignition coil is mounted on the instrument panel it may be necessary to shield the high tension wire from the coil to the bulkhead only. Ground shield to bulkhead. (Slip a piece of 3/8" loom over the high tension wire before applying shielding).

ADJUSTMENT OF TUNING CONDENSER GEAR

The tuning condenser gear may be adjusted against its drive pinion by simply turning the cam screw, reaching through a hole in the left side of front cover. This hole is covered by button, easily pried upward with screwdriver. Turn screw to the left until slight drag is felt on the station selector knob, then back off slightly until free movement is obtained. After adjustment has been made tighten small locking screw located on face of cam screw.

BALANCING THE SET TO THE ANTENNA

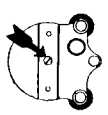
After the set is installed ready for operation, it may be necessary to balance the set to the antenna. This is done by adjustment of the antenna trimmer, located under a 3/8" hole in the TOP of the set. This hole is covered by a button which is removed by simply prying upward with a screw driver.

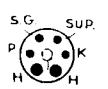
In making this adjustment tune in a very weak station around 120 to 140 on the dial. Adjust the trimmer with a screw driver until the point of maximum volume is reached.

ADJUSTING THE STATION SELECTOR INDICATOR

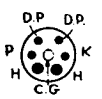
Tune in a station of known frequency preferably between 1000KC and 1300 KC.

Insert a screw driver in the center rear of the control head and adjust indicator to the frequency of the station being received.





77 & 78



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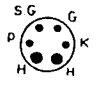

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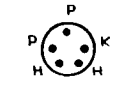
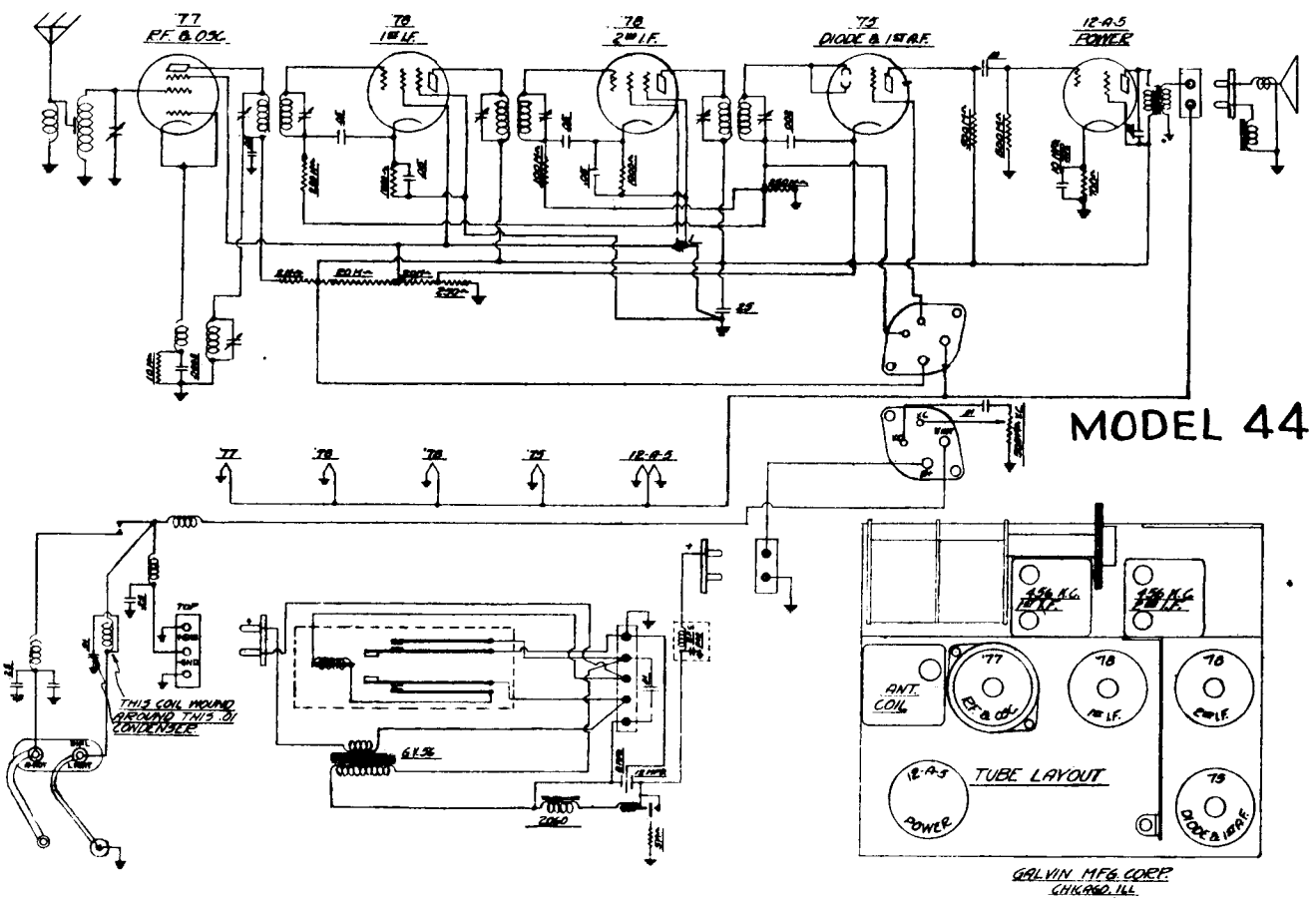
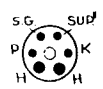


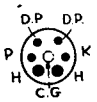
84

GALVIN MFG. CORP.





77 & 78



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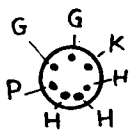


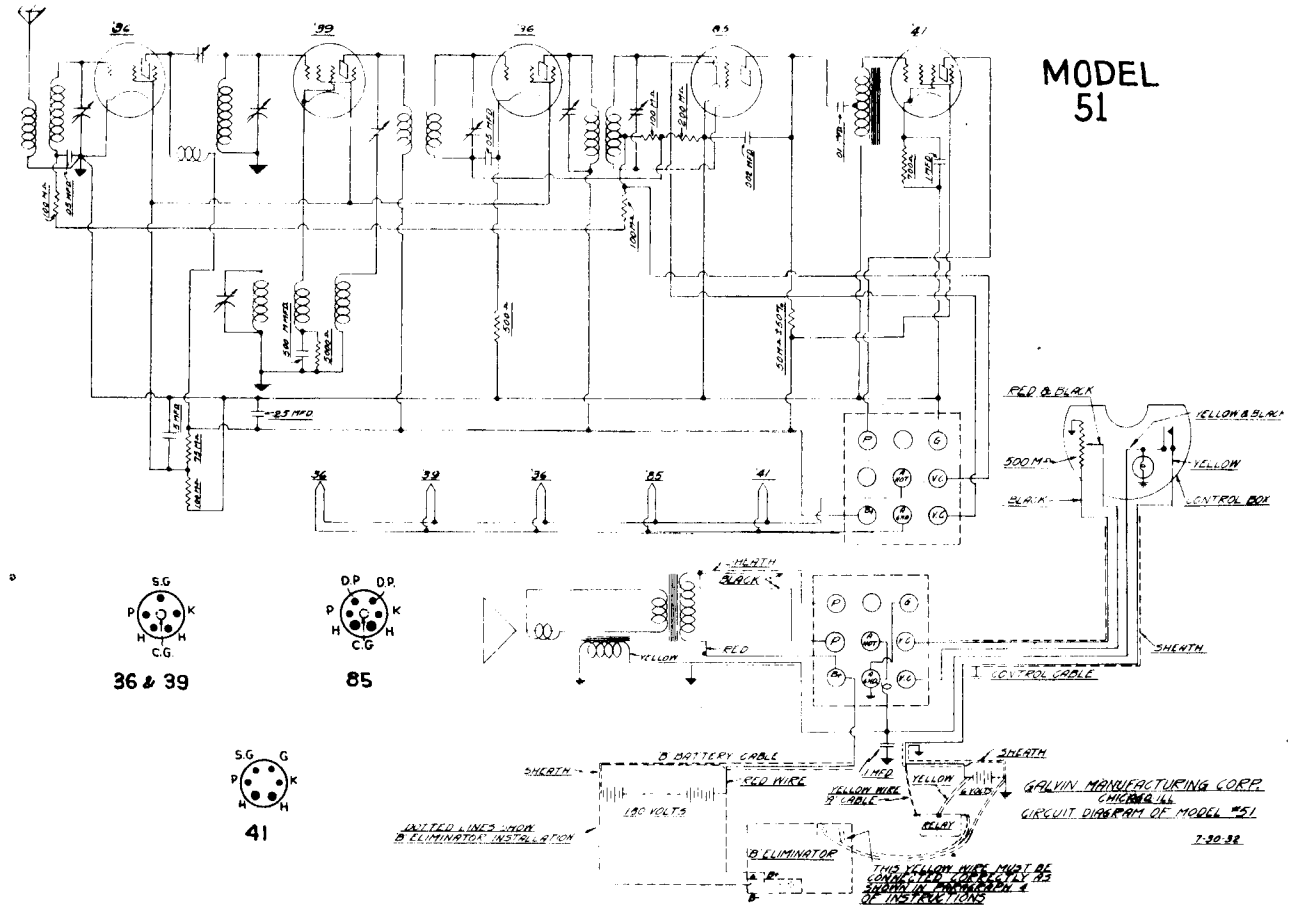
12A5

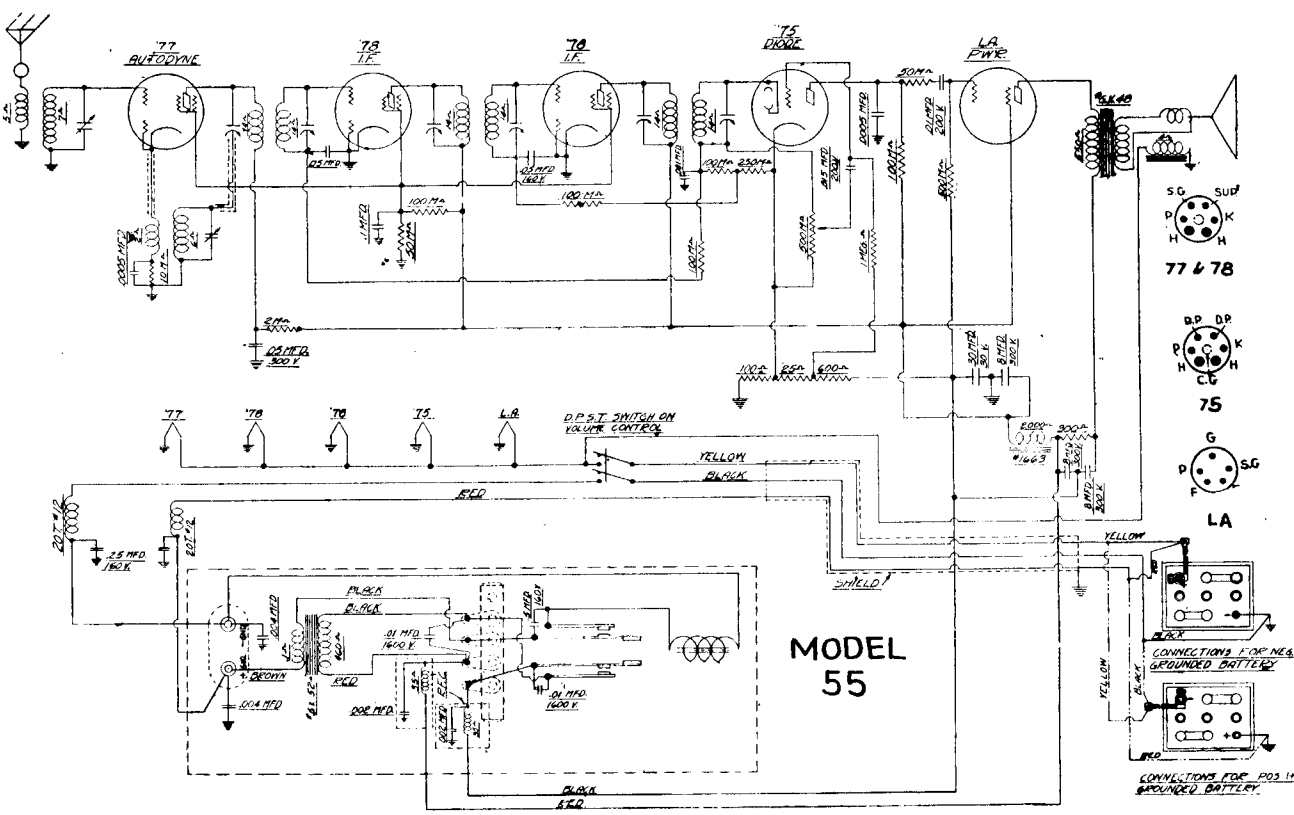
	AUTO-DYNE	1st I.F.	2nd I.F.	2nd DET.	12A5
E_p	195 V.	200 V.	200 V.	80 V.	190 V.
E_g	0	A.V.C.	A.V.C.	0	0
E_s	112 V.	112 V.	112 V.	0	200 V.
E_f	5.8 V.	5.8 V.	5.8 V.	5.8 V.	5.8 V.
E_c	10 V.	4 V.	4 V.	1.5 V.	2.8 V.

Total B current of set - 40 mils. at 200 volts. Battery voltage 6.5 volts at battery terminals. Approximate voltage Motorola Model 44 Voltage Chart.

The antenna coil feeds into the grid of the type 77 Autodyne tube, whose function is that of oscillator first detector amplifier. From the plate circuit of the 77 tube it is fed into the primary of the first I.F. transformer, which is adjusted to 456 kilocycles. The secondary feeds the grid of the 78 or first I.F. amplifier tube. The low end of the secondary is left open for the insertion of A.V.C. voltages. The plate of this first I.F. tube feeds into the primary of the second I.F. transformer. The secondary is fed into the grid of the 78 tube or second I.F. amplifier, with the ground end of this secondary left open for the insertion of A.V.C. voltages. From the plate of the second I.F. tube it is fed into the diode circuit, with the voltage of this transformer being rectified with the diode section of the 75 or second detector. From the plate of this 75 tube it is resistance coupled into the 12A5 power tube.

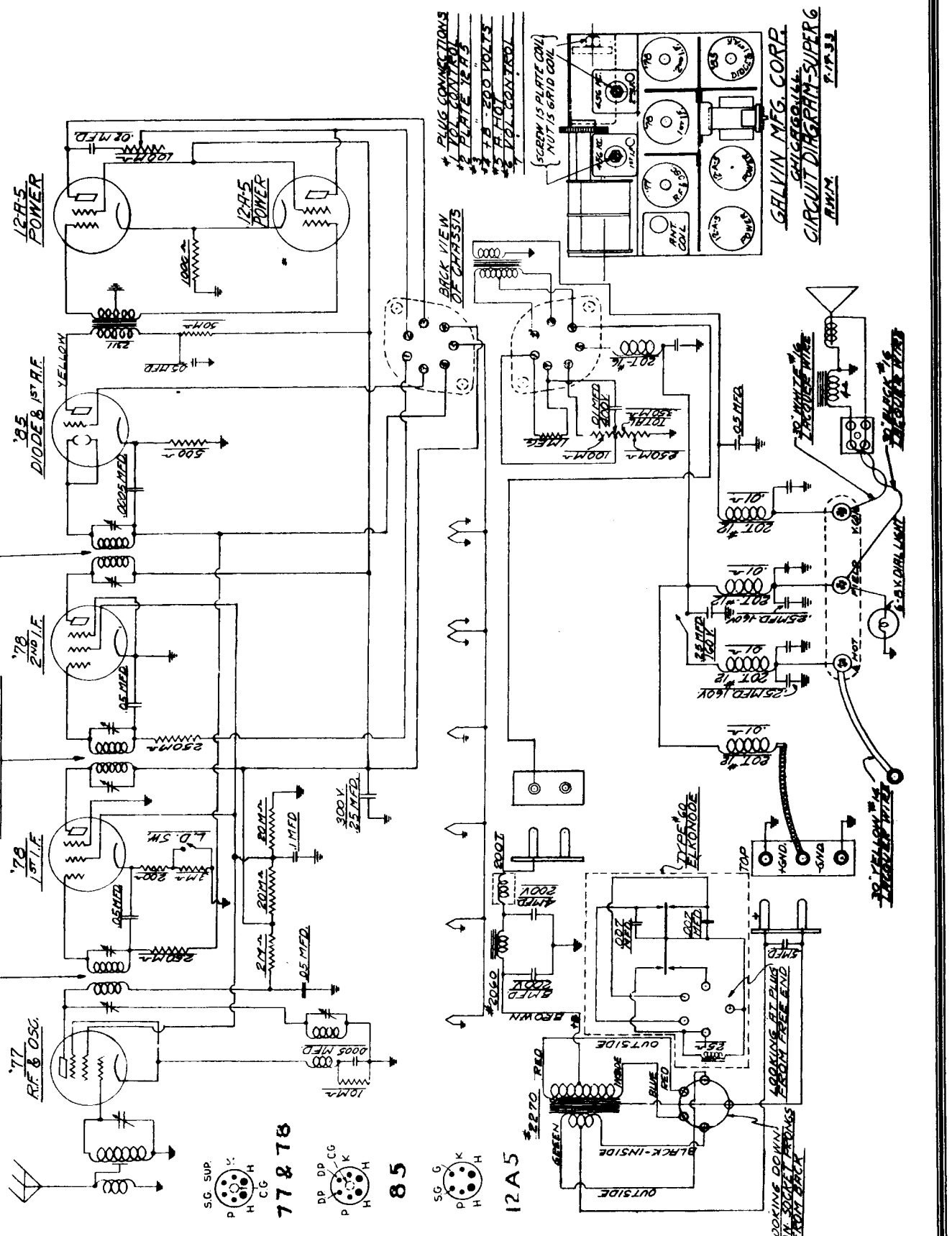
GALVIN MFG. CORP.





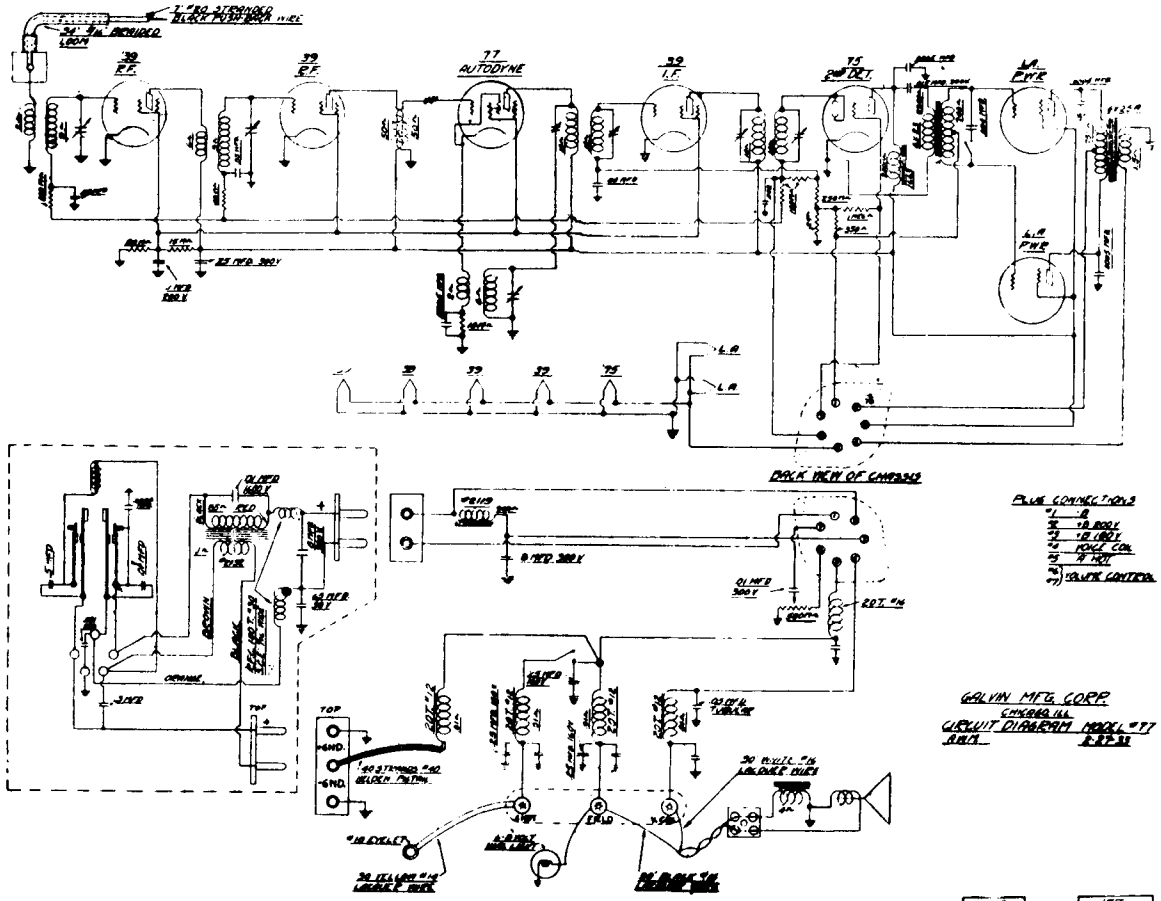
GALVIN MFG. CORP.

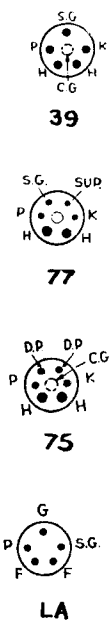
MODEL 66



GALVIN MFG. CORP.

MODEL 77 AUTO SET





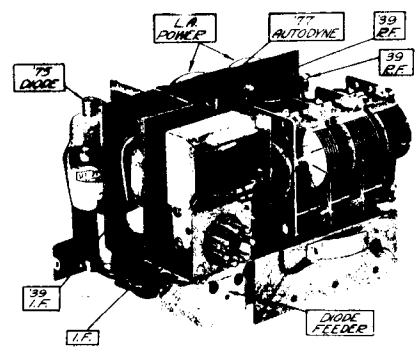
I.F. = 456 KC.

ALIGNMENT OF THE VARIABLE CONDENSERS

The alignment of cut plate variable condensers, the type used in Model "77" differs from the alignment of the variable condenser with a padder, in that the cut plate condenser has a fixed mechanical ratio between the capacities of its sections. In the past it has been possible with padders to align the condenser with an accuracy of ten degrees of rotation of the condenser plates - that is, it could be set at the high frequency end with all trimmers in alignment and then could be re-aligned at the low frequency end by rocking the condenser while adjusting the padder, thereby finding the point of proper alignment. This procedure cannot be used with a cut plate condenser.

The simplest and easiest way to align a cut plate condenser is as follows: Use a standard test service oscillator and output meter. Connect a 200 mfd. condenser in series with the antenna lead of the oscillator and connect to the antenna of the radio set. CAUTION: Before proceeding be sure that the I.F. transformers have been tuned to exactly 456 kilocycles.

Align all three trimmers to 1400 kilocycles. Then move the variable condenser to approximately the 600 kilocycle position and check the alignment of the second radio frequency trimmer. If it is found that the trimmer must be moved either in or out to return to resonance it is an indication that the variable condenser is not at correct starting position for the initial setting of the test oscillator. If, for example, it is found that the trimmer must be screwed down, it is an indication that the radio frequency tuning condenser requires more capacity at the low frequency end. Therefore, return to the initial high frequency setting of the condenser. Change your test oscillator to correspond with this setting of the condenser. It is not necessary to return to the exact setting you originally had. Re-adjust the second radio frequency trimmer which was moved when it was in the low frequency position. This will restore it to its initial setting of the oscillator trimmer.

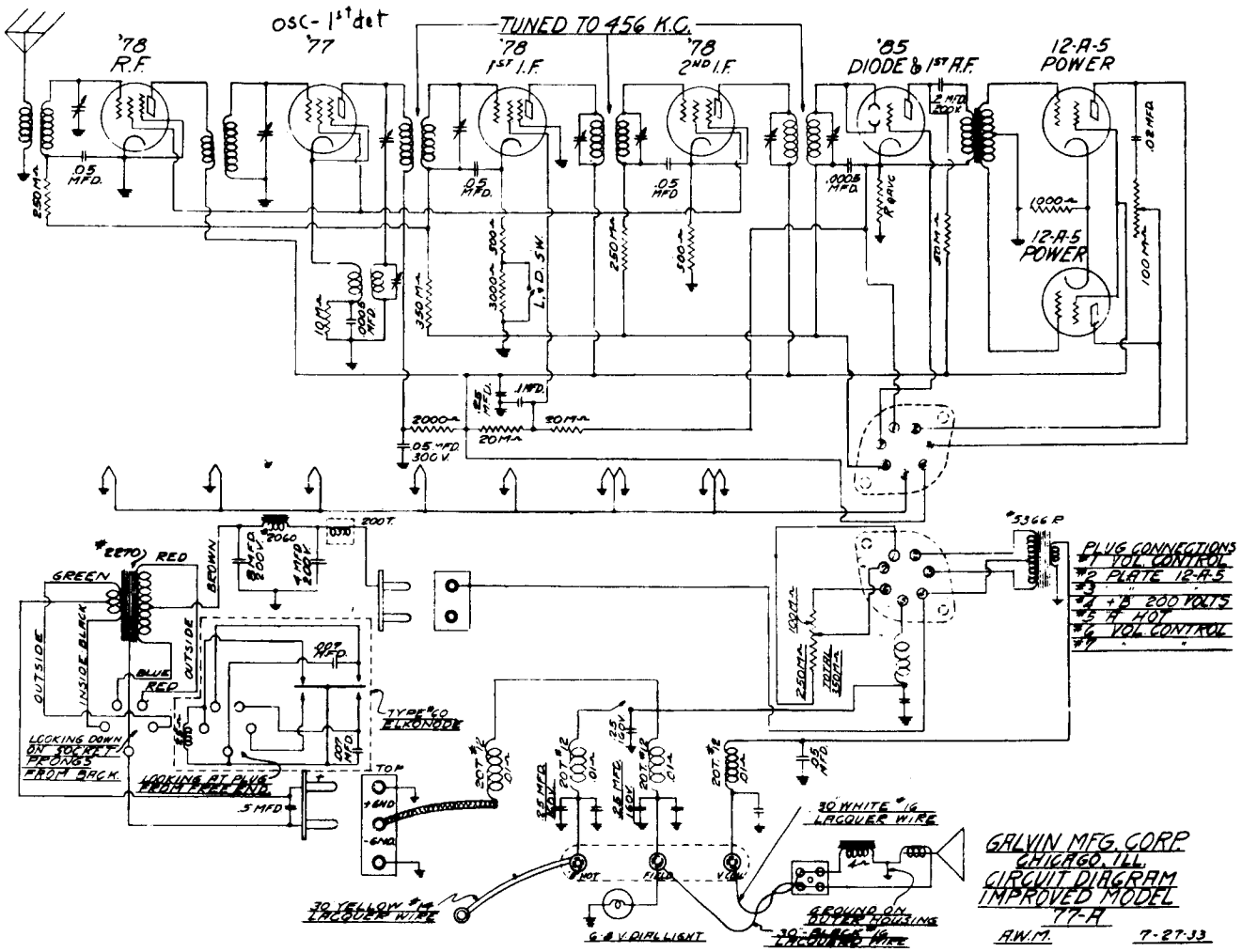


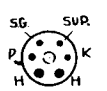
	1st R.F.	2nd R.F.	AUTO-DYNE	1st I.F.	2nd DET.	L.A.	L.A.
E_p	155 V.	160 V.	155 V.	155 V.	150 V.	175 V.	175 V.
E_g	A.V.C.	0	-	A.V.C.	1.5 V.	20 V.	20 V.
E_s	75 V.	75 V.	75 V.	75 V.	0	155 V.	155 V.
E_f	5.8 V.	5.8 V.	5.8 V.	5.8 V.	5.8 V.	5.8 V.	5.8 V.
E_c	0	0	10 V.	0	0	0	0

Total B Current of set 49 mils. at 195 V. measured from -B to +B. Battery voltage 6.5 volts at Battery Terminal. Approx. voltages Motorola Model '77 Voltage Chart.

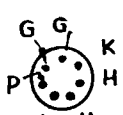
GALVIN MFG. CORP.

MODEL 77A

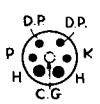




77 & 78



12A5



85

The Motorola Model 77-A is a single unit 7-tube superheterodyne and differs from the Model 77 in that one stage of radio frequency has been eliminated and one extra stage of intermediate frequency has been added, which the circuit diagram clearly illustrates.

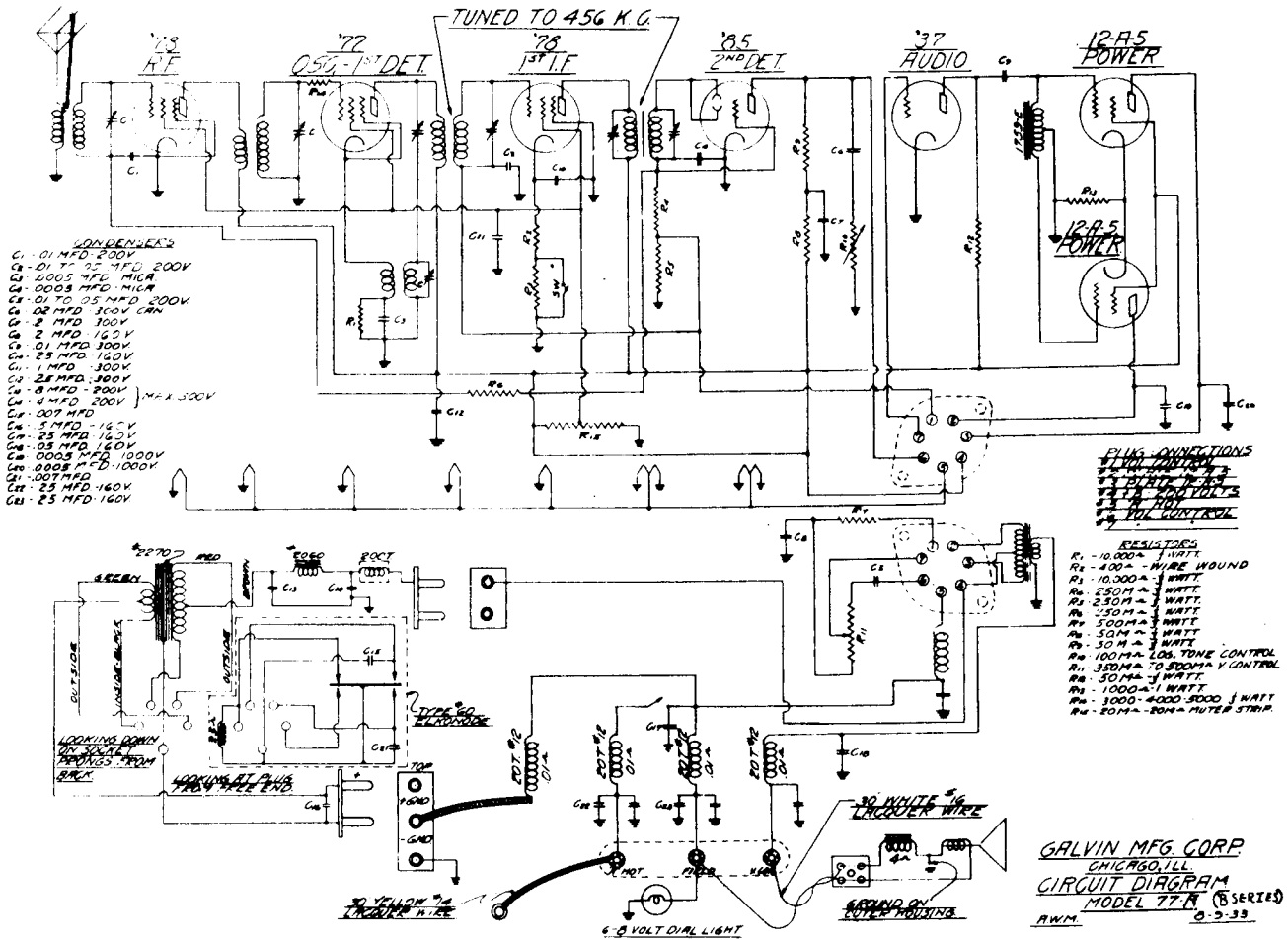
The type 78 tube functions as a first R.F. amplifier, followed by a 77 oscillator first detector amplifier, a 78 first I.F. amplifier, a 78 second I.F. amplifier, an 85 second detector A.V.C. and first audio amplifier and two (2) 12A5's power amplifier push-pull.

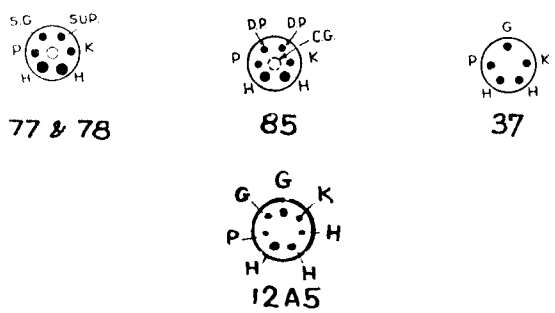
	1st R.F.	AUTO-DYNE	1st I.F.	2nd I.F.	2nd DET.	12A5	12A5
E_p	195 V.	195 V.	195 V.	195 V.	50 V.	195 V.	195 V.
E_g	A.V.C.	0	A.V.C.	A.V.C.	1.5 V.	0	0
E_s	75 V.	75 V.	75 V.	75 V.	0	795 V.	195 V.
E_f	5.8 V.	5.8 V.	5.8 V.	5.8 V.	5.8 V.	5.8 V.	5.8 V.
E_c	0	6 V.	L DX. 5V. 2V.	3 V.	1.5 V.	39 V.	39 V.

Total B current of set 56 mils. at 195 volts. Battery Voltage 6.5 volts at battery terminals. Approximate Voltage Motorola Model 77-A Voltage Chart.

GALVIN MFG. CORP.

MODEL 77A - SERIES B





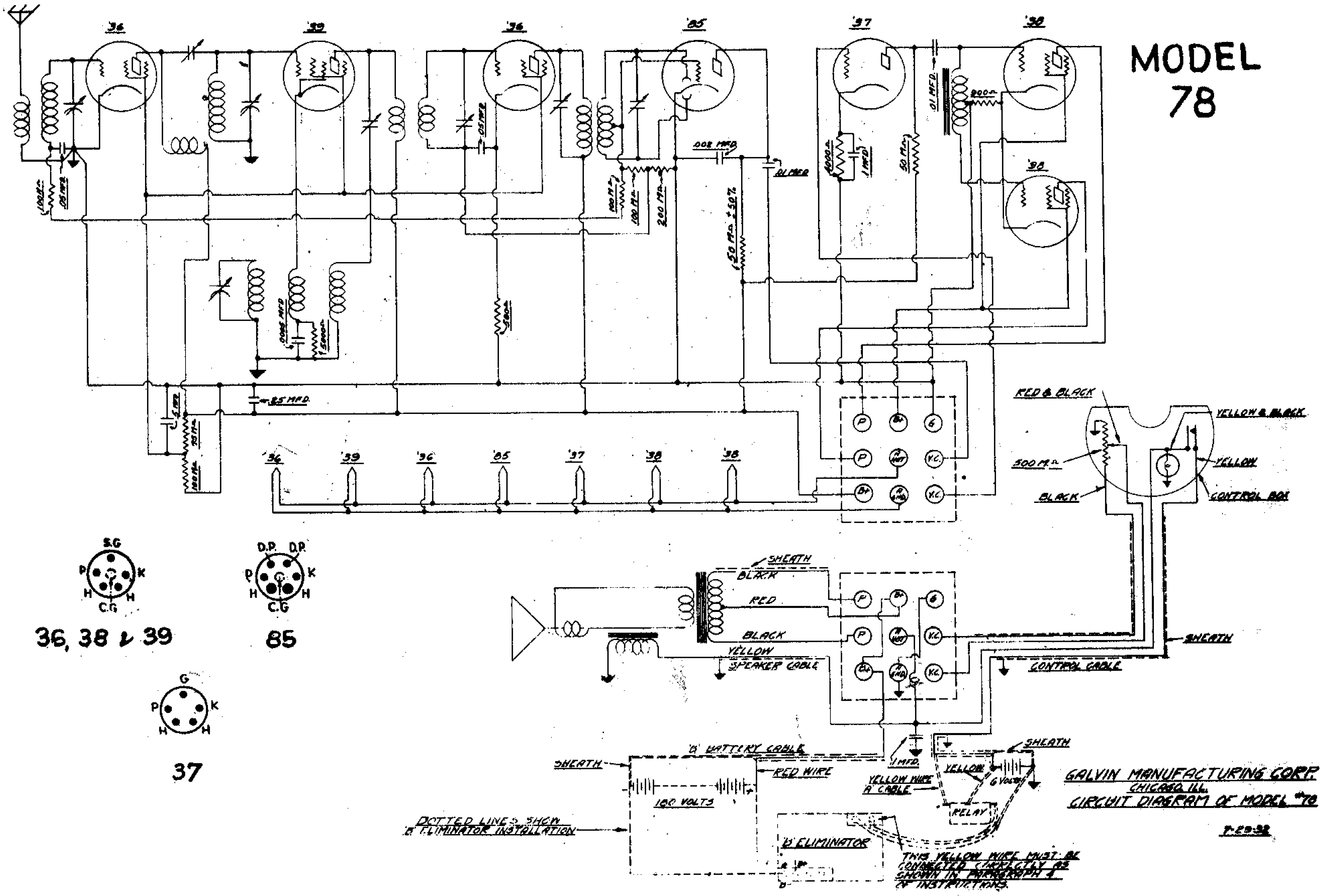
	1st R.F.	AUTO-DYNE	1st I.F.	2nd DET.	2nd AUDIO	12A5	12A5
E_p	195 V.	195 V.	195 V.	35 V.	45 V.	195 V.	195 V.
E_g	A.V.C.	0	A.V.C.	A.V.C.	.2 V.	0	0
E_s	75 V.	75 V.	75 V.	0	0	195 V.	195 V.
E_f	5.8 V.	5.8 V.	5.8 V.	5.8 V.	5.8 V.	5.8 V.	5.8 V.
E_c	0	8 V.	L. DX. 7V 2V.	0	A.V.C.	39 V.	39 V.

Total B current of set 58 mils. at 195 volts. Battery Voltage 6.5 volts at battery terminals. Approximate voltages Motorola Model 77-A Series B Voltage Chart.

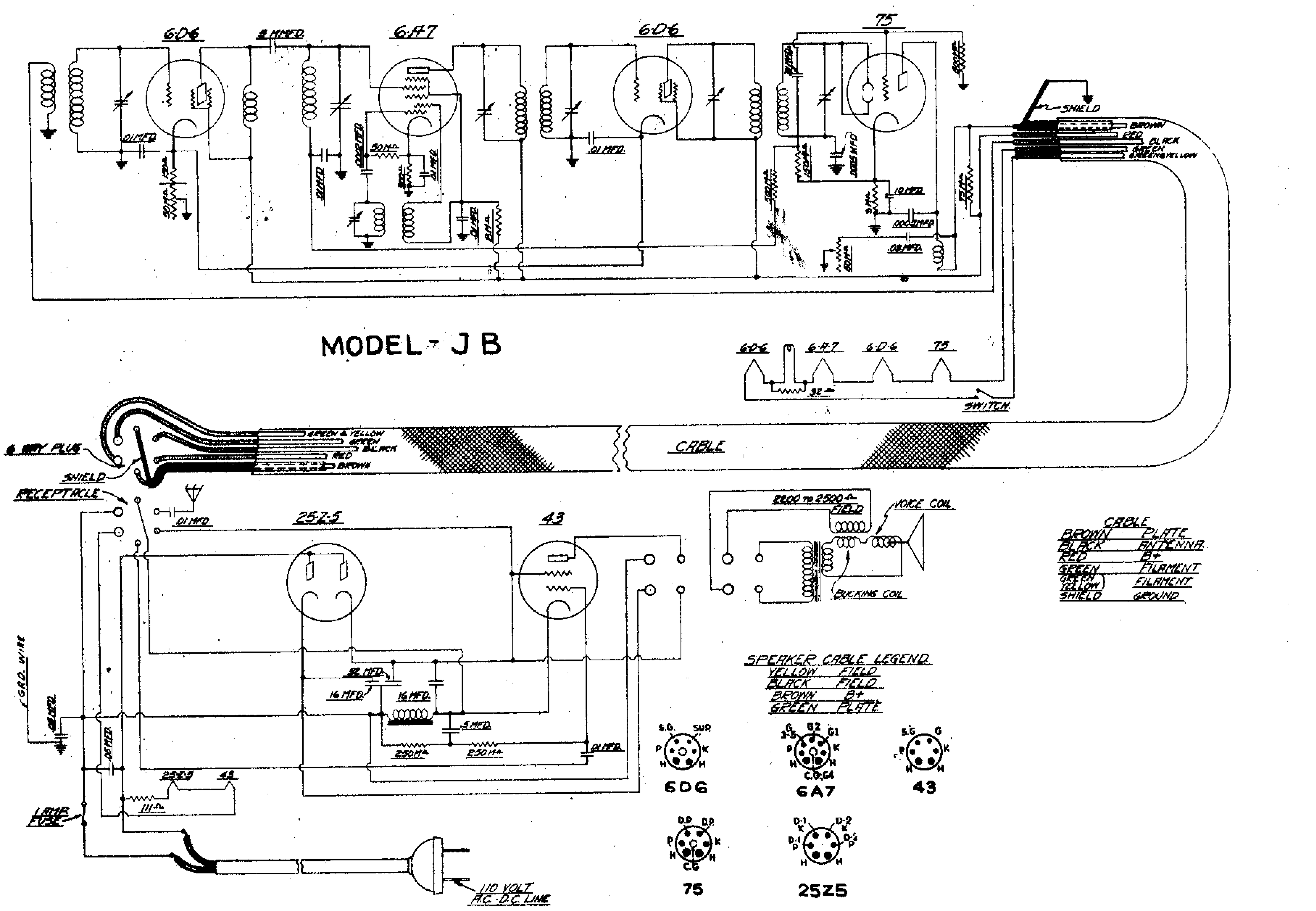
This model is a single unit 7-tube superheterodyne receiver, different from Model 77-A in that one stage of radio frequency has been eliminated and the audio stage has been added, which the circuit diagram clearly illustrates. The type 78 tube functions as a first R.F. amplifier, followed by a 77 oscillator first detector and amplifier, a 78 first I.F. amplifier, an 85 second detector A.V.C. and first audio amplifier, a 37 second audio amplifier and two (2) 12A5 power amplifier push-pull.

GALVIN MFG. CORP.

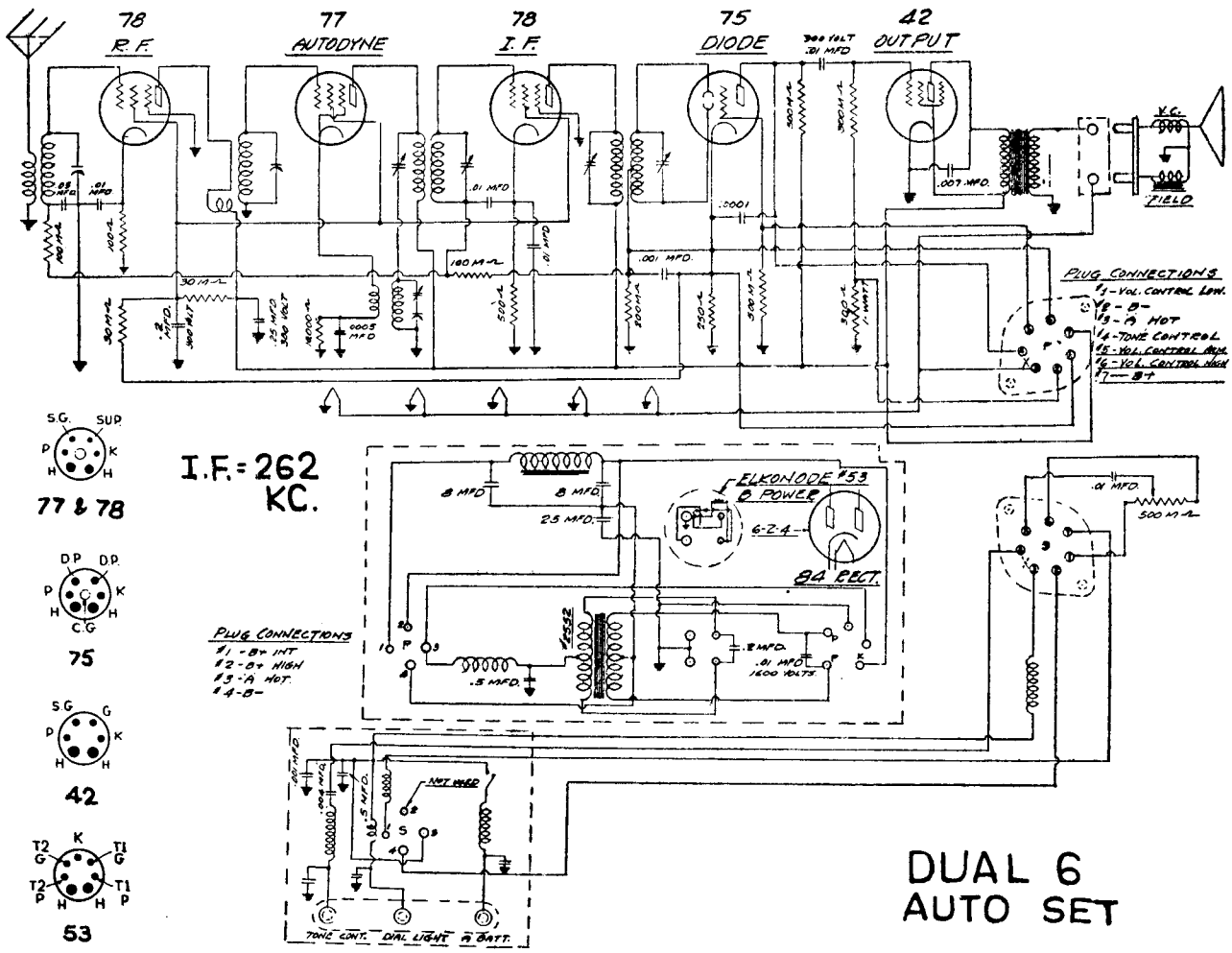
MODEL 78



MODEL - J B



GALVIN MFG. CORP.



ELIMINATION OF IGNITION INTERFERENCE

1 Mount the spark plug suppressors on the plugs and connect the ignition wire to the suppressor.

2 Insert the screw type suppressor in the high tension lead about two inches from the distributor.

3 Mount the generator condenser under the cut-out mounting screw and connect the pig-tail lead to either side of the generator cut-out.

4 Connect the dome lite filter in series with the dome light lead at the point where it enters the front corner post of the car. Connect the terminal marked (BAT.) to the ammeter and the terminal marked (LOAD) to the dome light. GROUND THE CASE.

5 If the ignition coil is mounted on the instrument panel it may be necessary to shield the high tension wire from the coil to the bulkhead only. Ground shield to bulkhead. (Slip a piece of 3/8" loom over the high tension wire before applying shielding).

In practically all cases the above procedure will completely eliminate ignition interference while in many cases it will be necessary to use the distributor suppressor only.

ADJUSTMENT OF TUNING CONDENSER GEAR

The tuning condenser gear may be adjusted against its drive pinion by simply turning the cam screw, reached through a hole in the left side of the set housing. This hole is covered by button, easily pried upward with screwdriver. Turn screw to the left until slight drag is felt on the station selector knob, then back off slightly until free movement is obtained. After adjustment has been made tighten small locking screw located on face of cam screw.

BALANCING THE SET TO THE ANTENNA

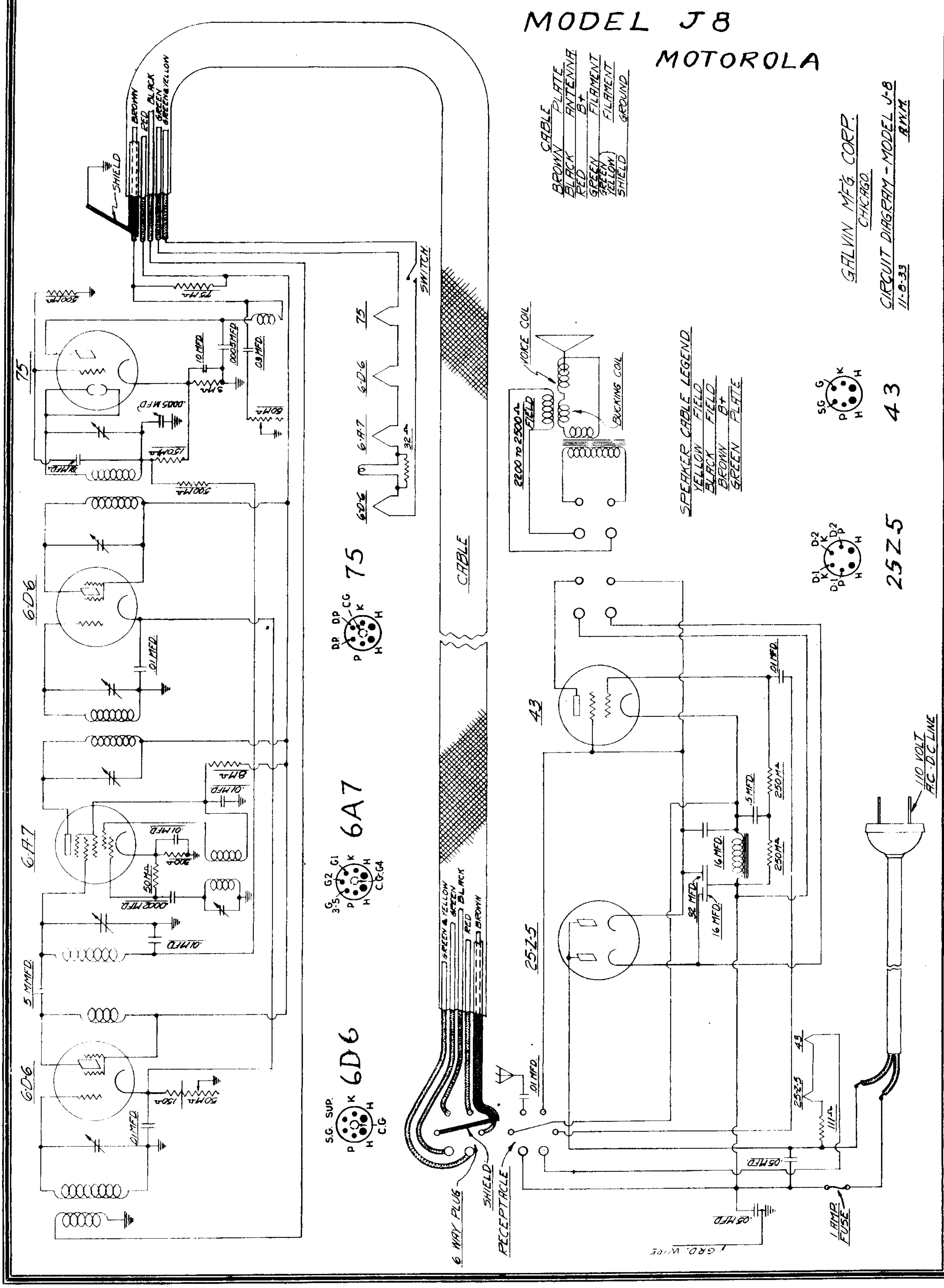
After the set is installed ready for operation, it may be necessary to balance the set to the antenna. This is done by adjustment of the antenna trimmer, located under a 3/8" hole in the TOP of the set. This hole is covered by a button which is removed by simply prying upward with a screw driver.

In making this adjustment tune in a very weak station around 120 to 140 on the dial. Adjust the trimmer with a screw driver until the point of maximum volume is reached.

* A.V.C. VOLTAGE APPLIED TO GRIDS.

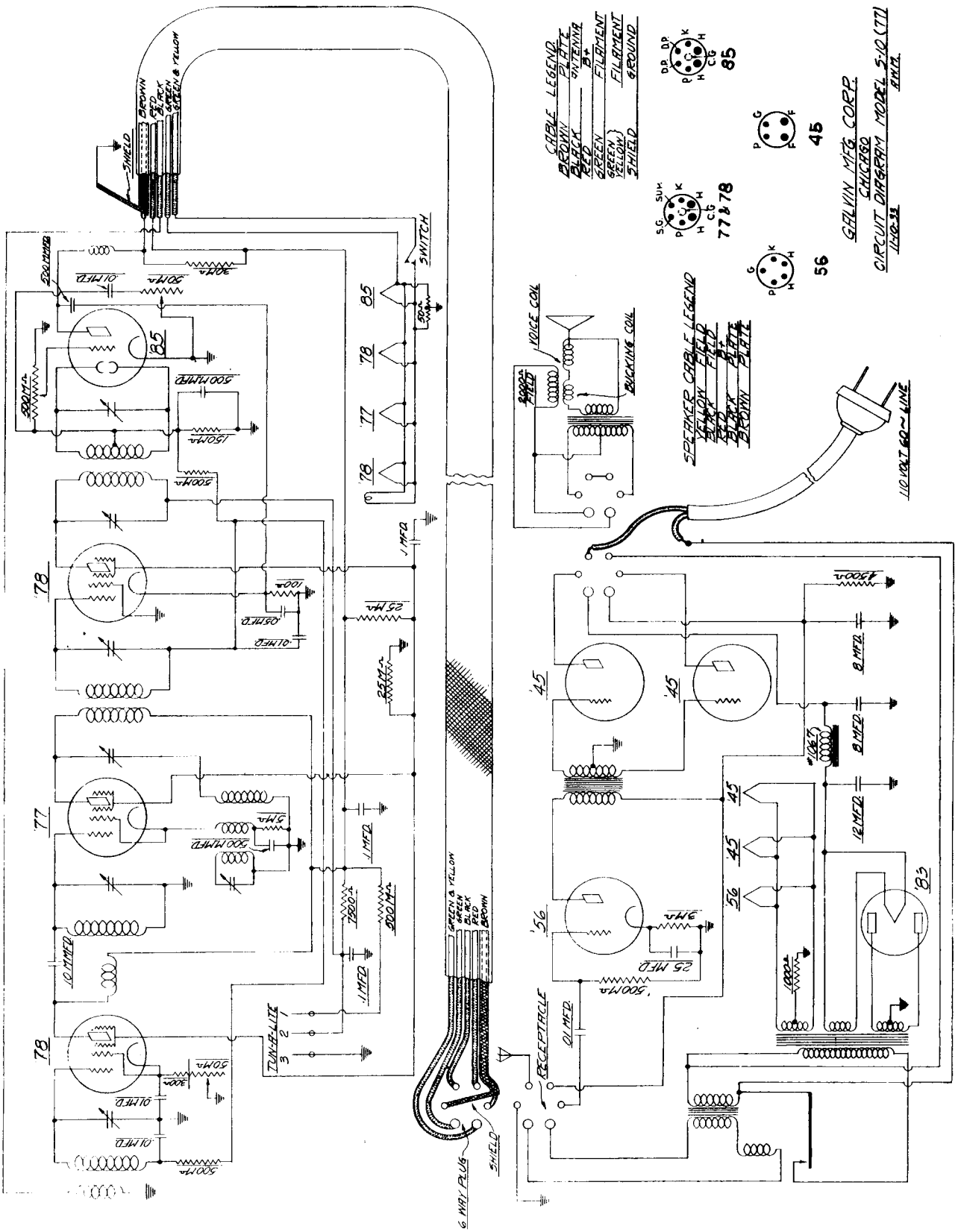
TUBE	PLATE	SCREEN	CATHODE	CONTROL GRID	FIL.
78 R.F.	210	70	.6	*	5.8
77 AUTODYNE	210	70	5.6	-	5.8
78 I.F.	210	70	2.5	*	5.8
75 DIODE	65		.6	-	5.8
42 POWER	200	205		-16	5.8

GALVIN MFG. CORP.



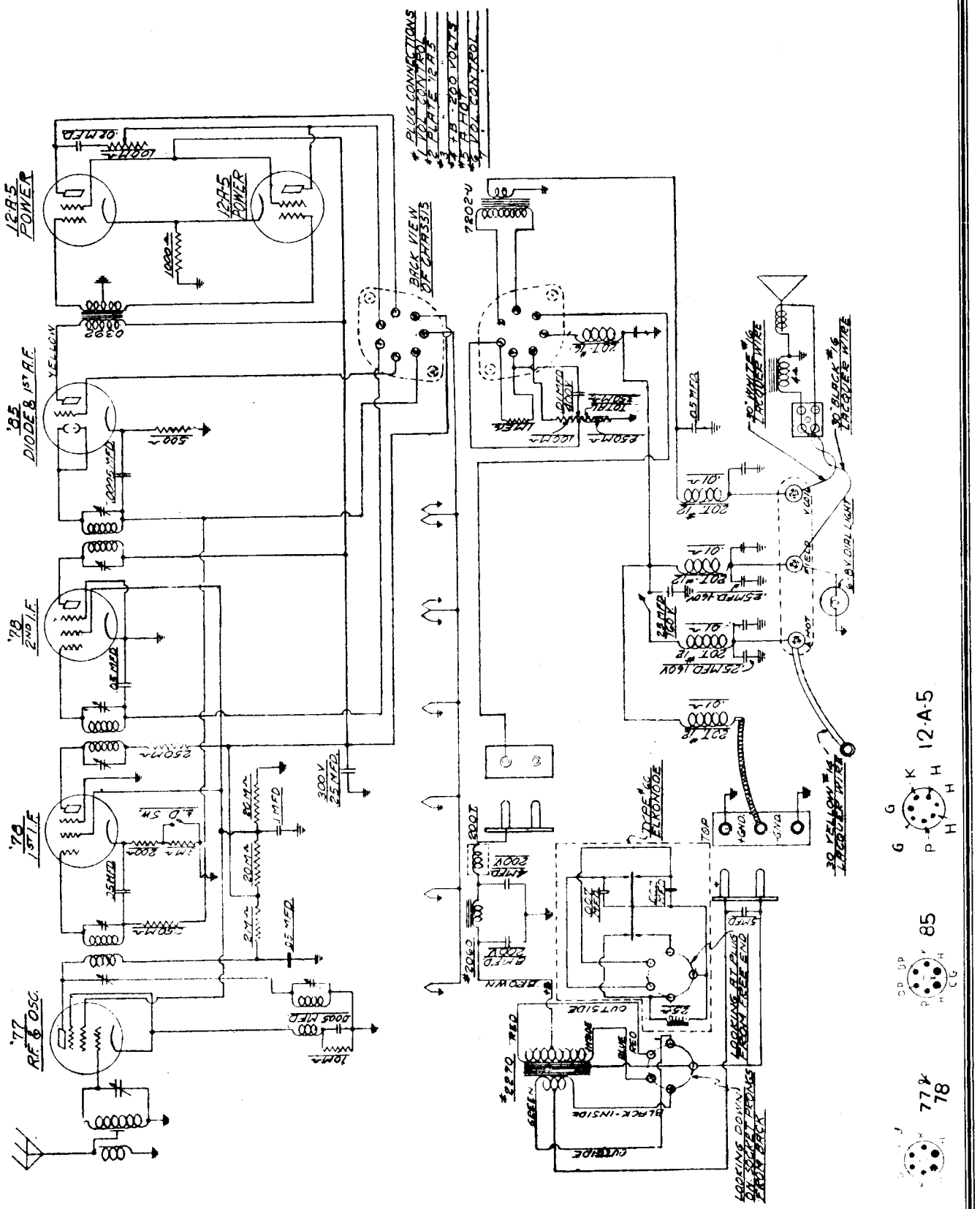
GALVIN MFG. CORP.

MODEL S10

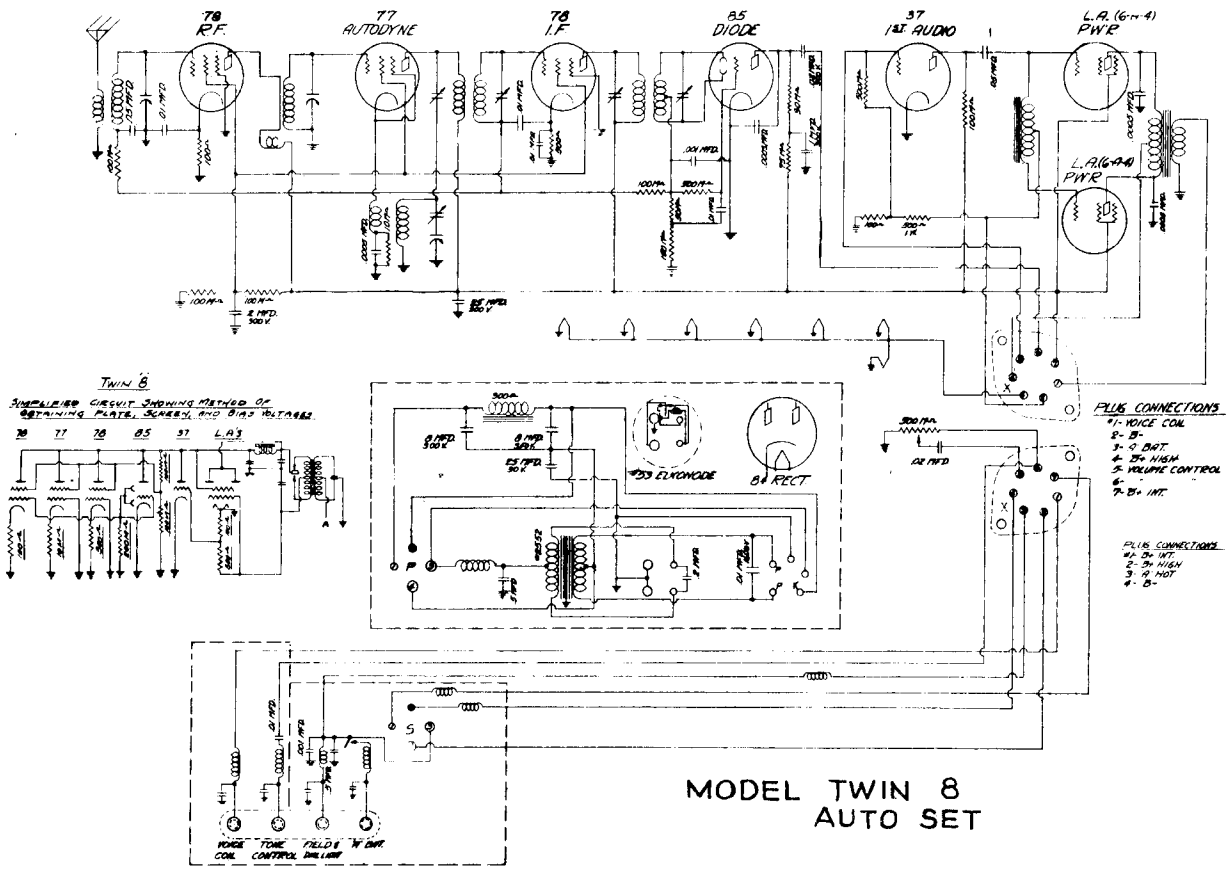


GALVIN MFG. CORP.

MODEL SUPER 6 AUTO SET



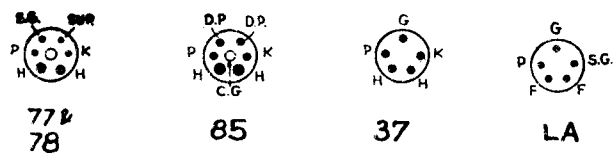
GALVIN MFG. CORP.



MODEL TWIN 8
AUTO SET

TWIN "8" VOLTAGE AT BATTERY 6.2					
TUBE	PLATE	SCREEN	CATHODE	CONTROL GRID	FIL.
78 R.F.	220	55	.5	*	5.8
77 AUTODYNE	220	55	4.5	-	5.8
78 I.F.	220	55	1.5	*	5.8
85 DIODE	40			-	5.8
37 1st AUDIO	60			3.8**	5.8
LA POWER	222	220		-20**	5.8

* A.V.C. VOLTAGE APPLIED TO GRIDS.
** VOLTAGE MEASURED FROM GRID. RETURN TO GROUND.



ALIGNMENT OF THE IF TRANSFORMERS

The IF transformers and diode feeder in the Twin "8" and Dual "6" should always be aligned with a good calibrated service oscillator or signal generator.

Connect the feeder from the oscillator to the grid of the 77 autodyne tube. Remove the grid connection and connect a 500M ohm resistor from grid of the tube to the ground.

Rotate the variable condensers to the full open position.

Set the oscillator to a frequency of 262 KC and adjust the IF and diode feeder trimmers to obtain maximum reading on the output meter.

SERVICING

In shooting trouble in an auto radio it is well to endeavor to isolate it to one particular section of the set.

The set may be divided into four parts for servicing. (1) Outer housing. (2) Power supply. (3) Speaker. (4) Set chassis.

The audio end of the chassis may be easily checked by removing the grid cap of the 85 or 75 tube and, if normal, a loud hum will occur.

Check the autodyne circuit by tuning the variable condensers to the minimum position and touching the oscillator stator plates. If a click is heard when touching them and also when removing the finger, it indicates that the autodyne is oscillating properly.

ALIGNMENT OF VARIABLE CONDENSERS

Because of the necessity of aligning the variable condensers with the chassis out of the housing it is important to use a definite point. Unless this is done the dial calibration will be incorrect when replacing the chassis in its housing. This point we may take as 1400 KC which is exactly 32° of angular rotation from minimum condenser setting.

Connect the oscillator feeder to the antenna pin of the chassis and set the oscillator to 1400 KC.

Carefully adjust the trimmers of the oscillator and RF variable condensers for maximum reading of output meter.

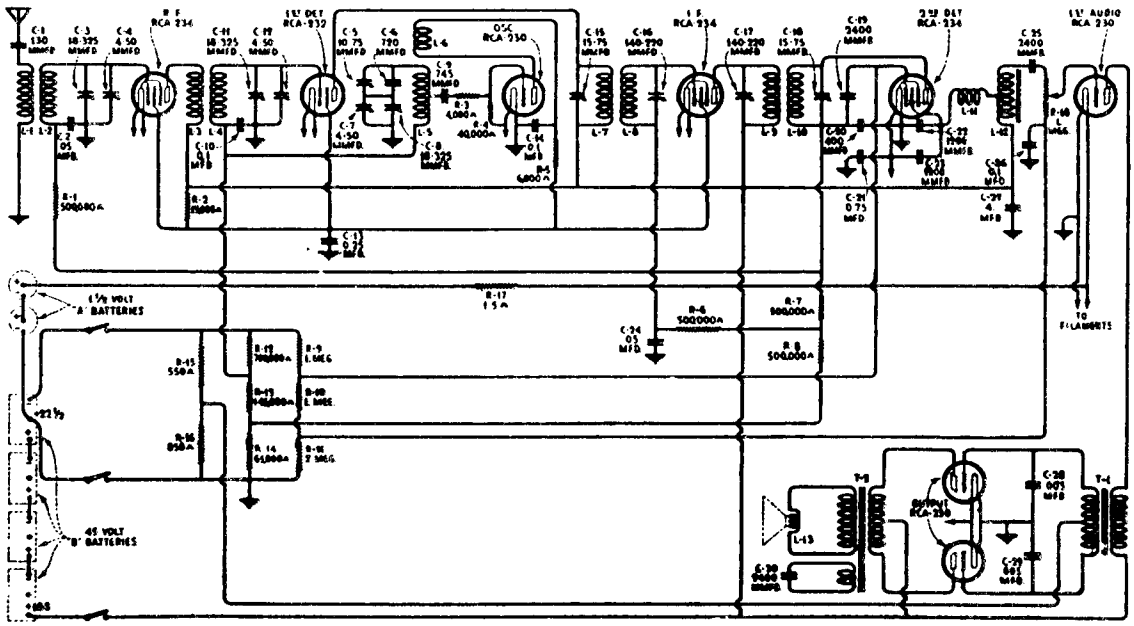
Next set the service oscillator to 600 KC rotating the variable condensers to a point 155 degrees 30 min. from minimum condenser setting.

Adjust the 600 KC padder condenser (accessible from the front of the chassis) for highest output reading.

The 600 KC setting may also be found by setting the service oscillator to 600 KC. Tune in the oscillator signal and rotate the variable condensers back and forth while adjusting the 600 KC trimmer condenser for highest reading of the output meter. The variable condensers should now track perfectly and coincide with the dial calibration.

GENERAL ELECTRIC CO.

MODEL A81



34 & 32

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Trouble Shooting Hints

Most of the complaints on this model arise from paralyzed tubes which are caused by excessive filament voltages when new batteries are installed.

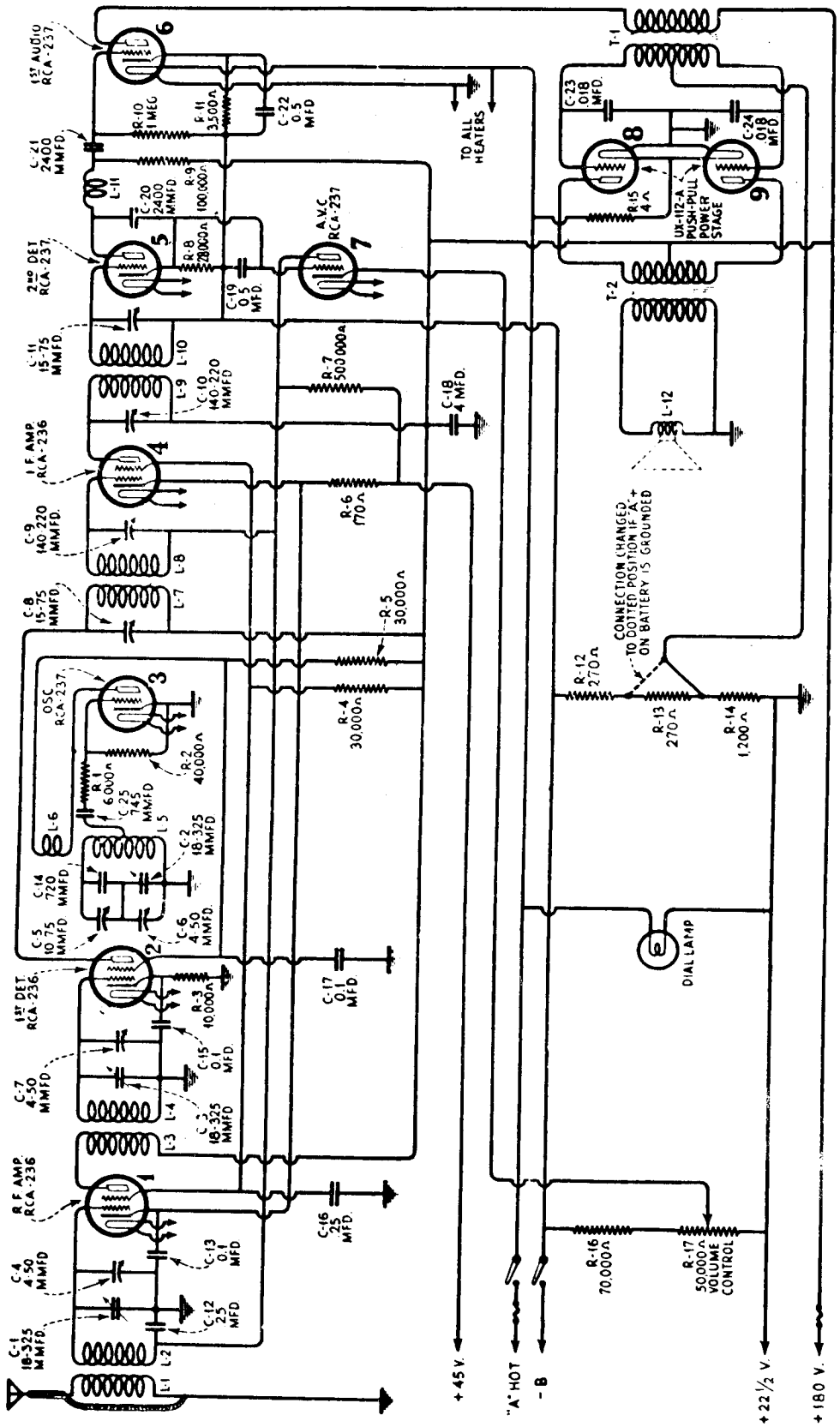
RADIOTRON SOCKET VOLTAGES

(No Signal Being Received)

Radiotron No.	Control Grid to Filament Volts	Screen Grid to Filament Volts	Plate to Filament Volts	Screen Current M. A.	Plate Current M. A.	Filament Volts
1. R. F.	0.2	65	150	1.0	3.0	2.0
2. 1st Det.	0.5	65	150	0.1	0.2	2.0
3. Osc.	1.0	—	45	—	3.0	2.0
4. I. F.	0.5	65	150	1.0	3.0	2.0
5. 2nd Det.	2.0	150	—1.5	4.0	0	2.0
6. 1st A. F.	1.0	—	145	—	2.5	2.0
7. Power	14.0	—	150	—	1.5	2.0
8. Power	14.0	—	150	—	1.5	2.0

GENERAL ELECTRIC CO.

MODEL A-90

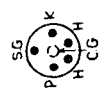


Trouble Shooting Hints

If this set stops functioning the AVC tube and the resistors associated with it should be tested carefully. In this set tubes seem to work loose in their sockets easily, which is another common for failure.

12A

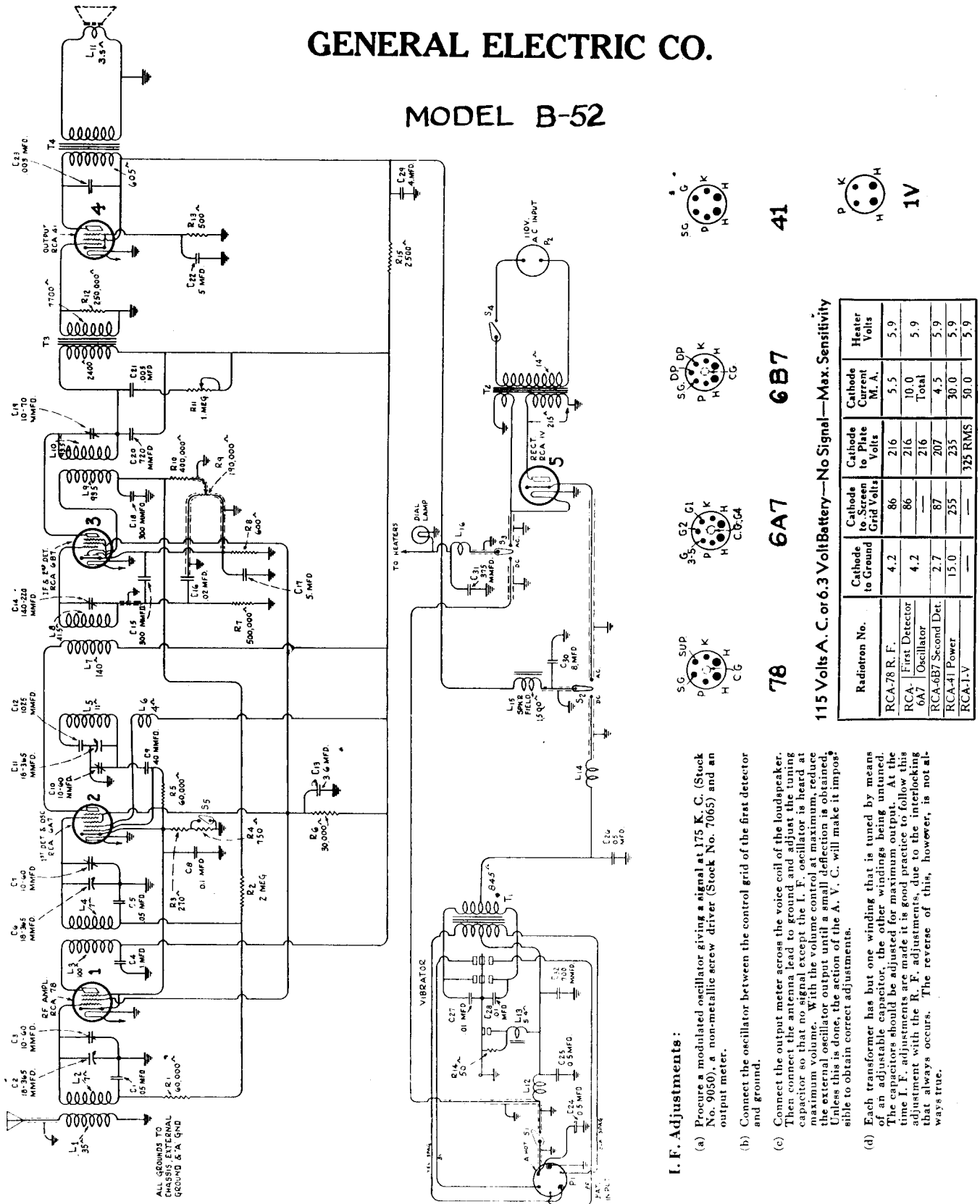
37



36

GENERAL ELECTRIC CO.

MODEL B-52



I. F. Adjustments:

(a) Procure a modulated oscillator giving a signal at 175 K. C. (Stock No. 9030), a non-metallic screw driver (Stock No. 7065) and an output meter.

(b) Connect the oscillator between the control grid of the first detector and ground.

(c) Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(d) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output. At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

115 Volts A. C. or 6.3 Volt Battery—No Signal—Max. Sensitivity

Radiotron No.	Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
RCA-78 R. F.	4.2	86	216	5.5	5.9
RCA-6A7 First Detector	4.2	86	216	10.0 Total	5.9
RCA-6A7 Oscillator		—	216		
RCA-6B7 Second Det.	2.7	87	207	4.5	5.9
RCA-41 Power	15.0	255	235	30.0	5.9
RCA-1-V	—	—	325 RMS	50.0	5.9

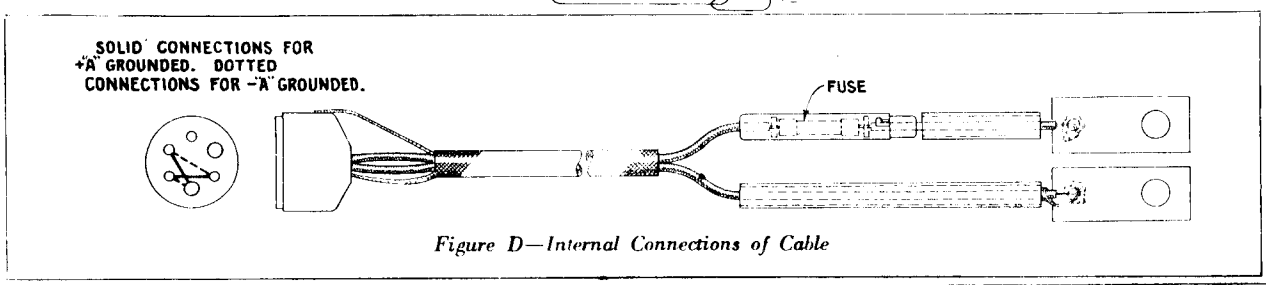
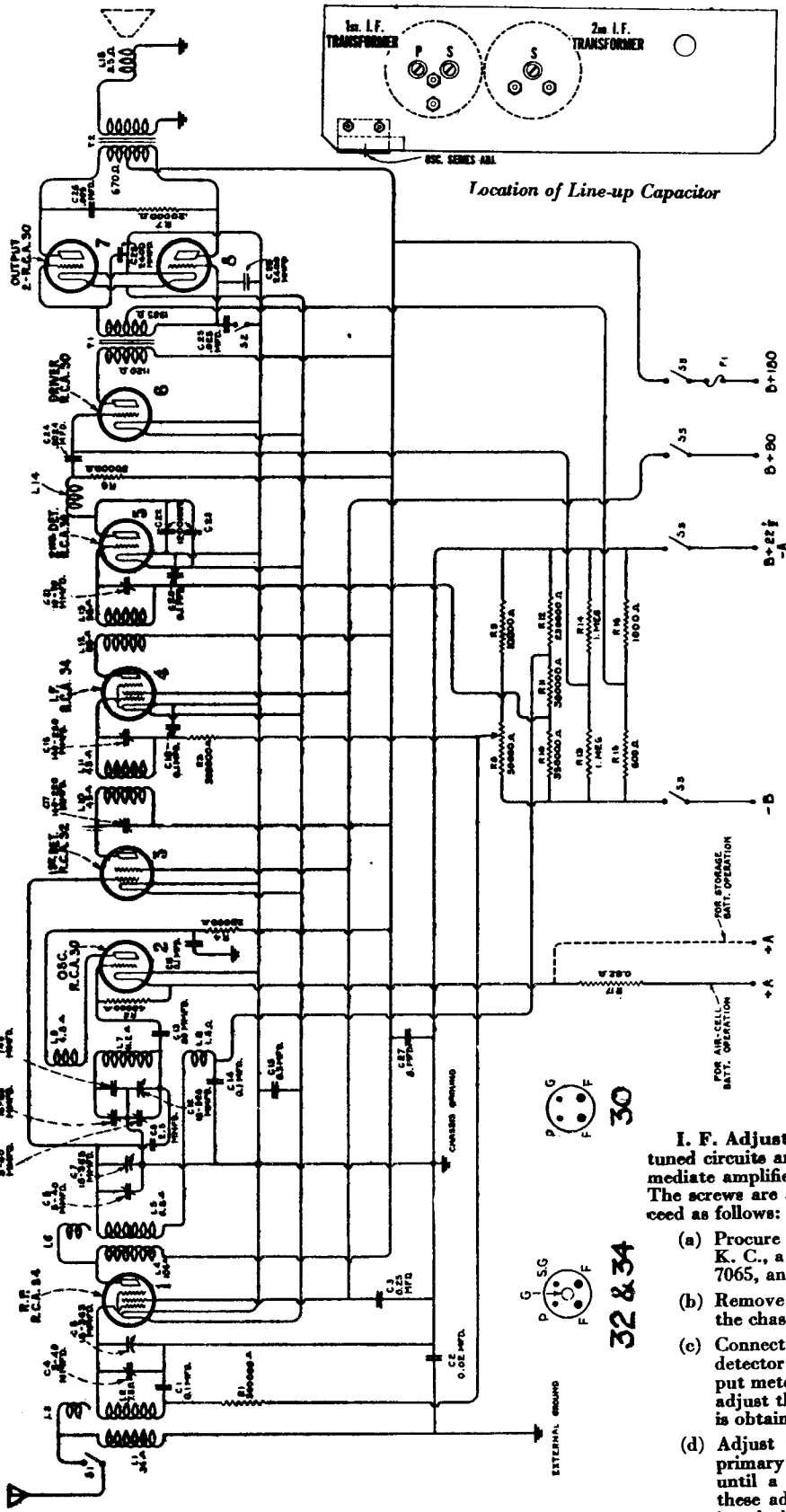


Figure D—Internal Connections of Cable

GENERAL ELECTRIC CO.

MODELS B81 & B86



New "A" and "B" Batteries—No Signal Received—Volume Control at Maximum

Radiotron No.	Control Grid to Filament Volts	Screen Grid to Filament Volts	Plate to Filament Volts	Plate Current M. A.	Filament Volts
1. R. F.—RCA-34	*3.0	65	155	2.5	2.0
2. Oscillator—RCA-30	—	—	55	4.0	2.0
3. 1st Detector—RCA-32	*4.0	65	155	0.5	2.0
4. I. F.—RCA-34	*3.0	65	155	2.5	2.0
5. 2nd Detector—RCA-30	*10.0	—	*130	0.25	2.0
6. A. F.—RCA-30	*7.0	—	150	2.5	2.0
7. Power—RCA-30	*14.0	—	155	2.0 Total	2.0
8. Power—RCA-30	*14.0	—	155		2.0

Line-up Adjustments

I. F. Adjustments: Two transformers comprising three tuned circuits and one untuned circuit are used in the intermediate amplifier. These circuits are all tuned to 175 K. C. The screws are accessible from the rear of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter.

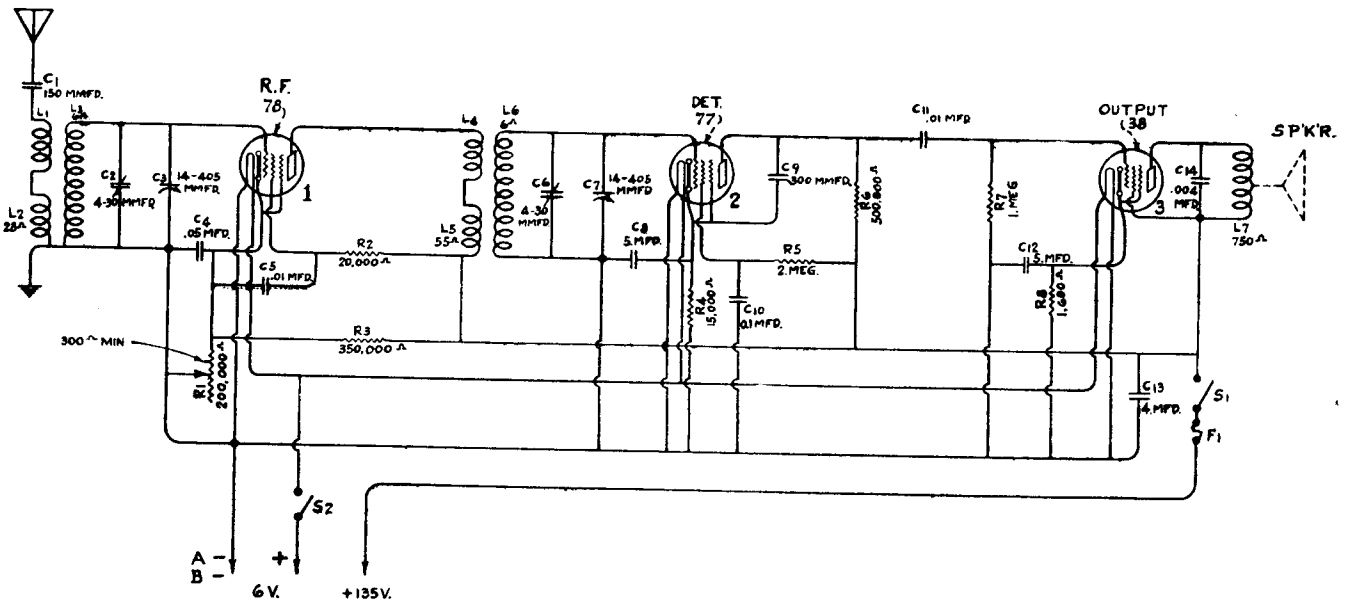
(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that a slight deflection is obtained in the output meter.

(d) Adjust the secondary of the second and then the primary and secondary of the first I. F. transformers until a maximum deflection is obtained. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

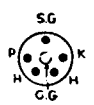
GENERAL ELECTRIC CO.

MODEL C-30



Fuse—The receiver is protected by a 0.5 ampere fuse connected in the "B+" (red) lead from the On-Off switch. Should the receiver at any time fail to operate, separate the coupling-type fuse holder and examine the fuse (being careful not to lose the tubular spacer, which is necessary to insulate the fuse from the metal holder). If the fuse is burned out, check all battery connections and have all tubes tested by your dealer before installing a new fuse. This is a special fuse. Obtain replacement fuses from your dealer—*do not use any substitute for this fuse.*

77 & 78



38

"A" Battery Required.....Six-Volt Storage Battery

"B" Battery Required.....Three 45-Volt Blocks

"A" Current.....0.9 Ampere

"B" Current.....(Maximum Volume) 18 M. A. (Minimum Volume) 9 M. A.

Type and Number of Radiotrons
1 RCA-78, 1 RCA-77, 1 RCA-38, Total 3

Undistorted Output.....0.2 Watts

Tuning Range.....540–1712 K. C.

Type of Loudspeaker.....Magnetic

This battery type tuned R. F. receiver incorporates excellent performance in conjunction with minimum cost and up-keep requirements. Service work consists principally of replacements and line-up adjustments. The proper method of aligning the receiver follows.

R. F. Line-up Capacitor Adjustments

Two adjustable capacitors are provided for adjusting the R. F. circuits to maximum electrical alignment. In order to properly adjust the capacitors, a Stock No. 9050 Test Oscillator and 7065 adjustment screwdriver are required. Also an output meter should be connected across or in place of the loudspeaker winding. Proceed as follows:

(A) Place the oscillator in operation at 1400 K. C. and connect its output to the antenna and ground of the receiver. Connect the output meter and place the receiver in operation.

(B) Tune in the signal from the oscillator and adjust the volume control and oscillator output until a deflection is obtained in the output meter. Adjust each trimmer until maximum output is obtained. The proper adjustment is when a minimum value of trimmer capacity is used. Readjusting the dial may be necessary to arrive at such a condition. Then slightly reduce the setting of the detector trimmer by turning it clockwise. This compensates for a slight increase in the capacity of this circuit that occurs when the chassis is returned to its case. A little experimenting will disclose the proper amount of this reduction.

RADIOTRON SOCKET VOLTAGES

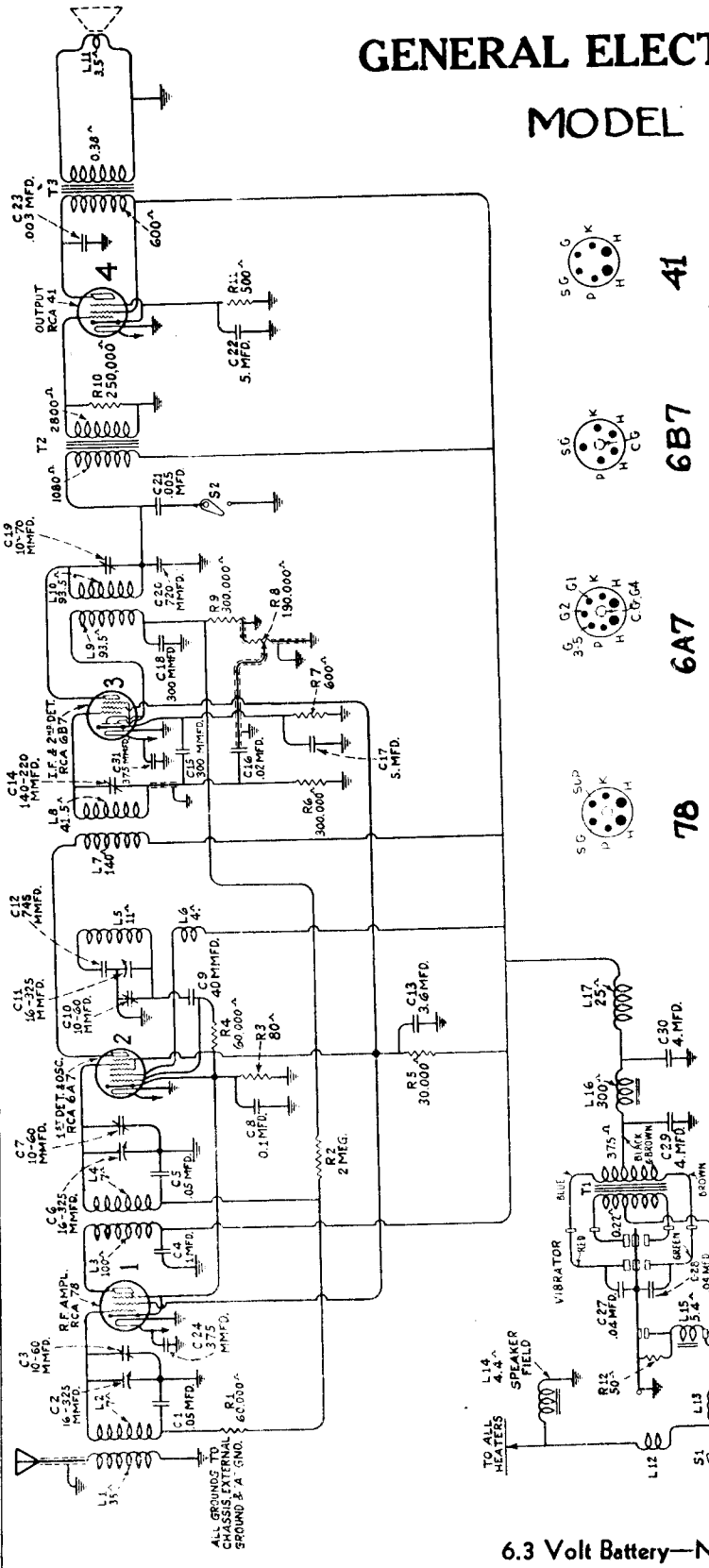
Maximum Volume Control Setting

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Filament or Heater, Volts
1. RCA-78 R. F.	2.5	95	132.5	7.0	6.0
2. RCA-77 Detector	2.5*	27*	50*	0.135	6.0
3. RCA-38 Output	12.0	123	115	7.5	6.0

* Cannot be measured with ordinary voltmeter.

GENERAL ELECTRIC CO.

MODEL C-41



R. F. Adjustment

A satisfactorily accurate and rapid adjustment of the three R. F. line-up capacitors can be made by ear, although, for optimum results, the use of an output meter connected across the loudspeaker voice coil is recommended. The latter method however, involves removal of the rear cover to connect the meter, thus in turn eliminating the shielding effect of the case. Temporary shielding for the bottom and Radiotron sides of the chassis and for the transformer therefore must be provided to prevent vibrator interference.

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and a non-metallic screw driver.

(b) Couple the output of the oscillator from antenna to ground, set the dial at 140, and the oscillator at 1400 K. C.

(c) Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is obtained in the loudspeaker when the volume control is at its maximum position.

(d) Then adjust the three line-up capacitors until maximum sound in the speaker or maximum deflection of the output meter is obtained. Readjust these capacitors a second time as there is a slight interlocking of adjustments.

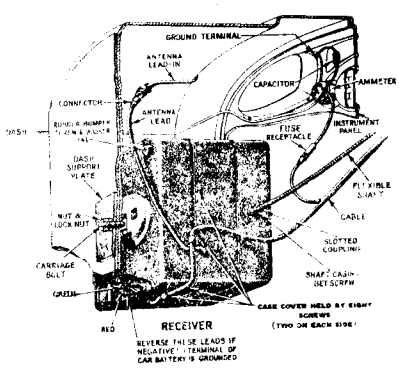
I. F. Adjustments

In order to make the I. F. adjustments, it is necessary to remove the rear cover, due to the fact that the external oscillator must be connected between the control grid of the first detector and ground. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver and an output meter.

(b) Remove the receiver from its case, shield the transformer and Radiotrons as described under R. F. adjustments, place the receiver in operation and connect the oscillator output between the first detector grid and ground. Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(c) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output.



6.3 Volt Battery—No Signal

Radiotron No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
RCA-78 R. F.		4.42	83	222	5.25	6.0
RCA-6A7	First Detector	4.42	83	222	11.0 Total	6.0
	Oscillator	4.42	—	223		
RCA-6B7 Second Detector		3.22	84	218	5.25	6.0
RCA-41 Power		13.0	214	200	26.0	6.0

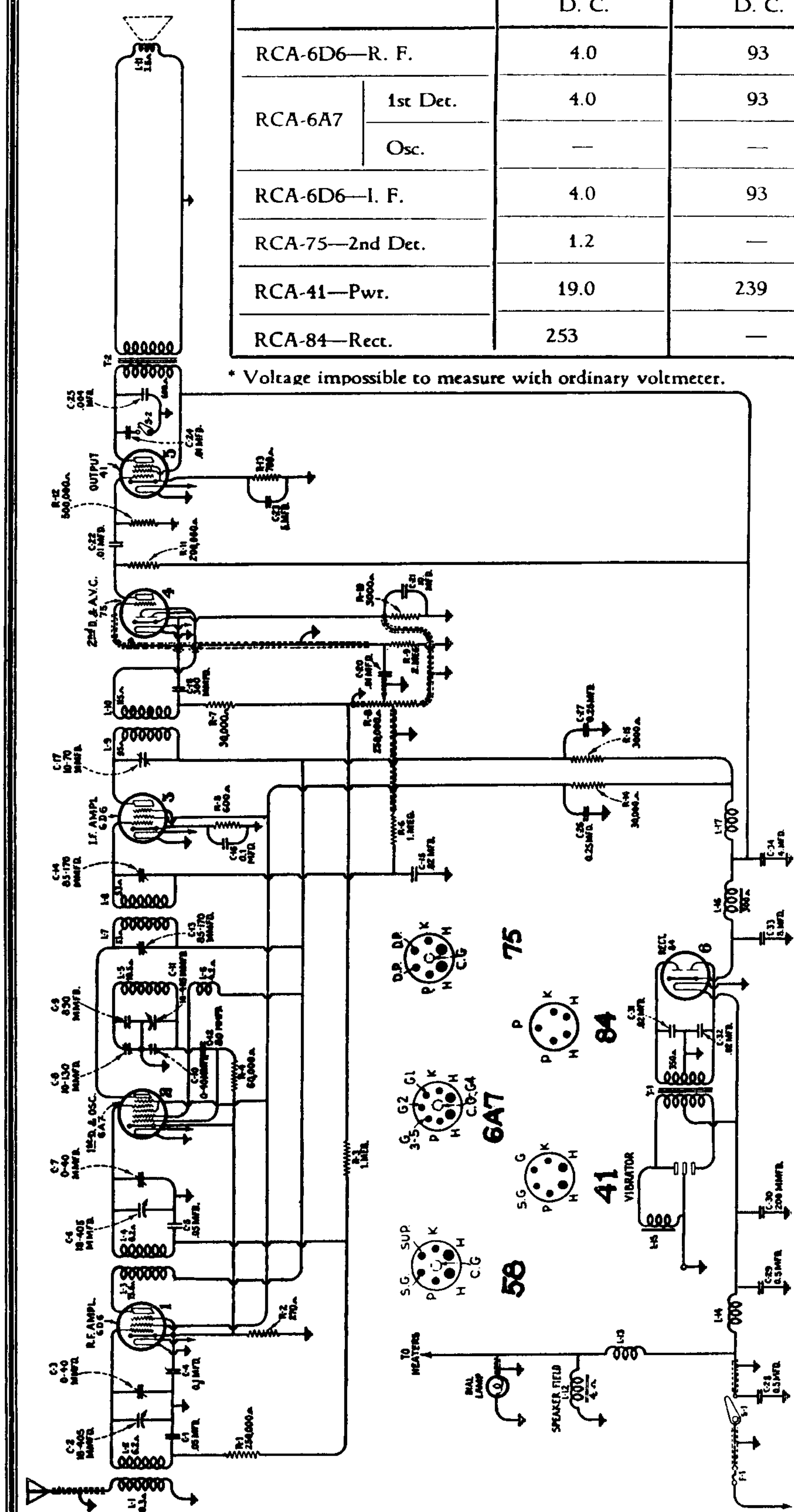
GENERAL ELECTRIC CO.

MODEL C60

6.3 Volt Battery—No Signal—Minimum Volume

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.
RCA-6D6—R. F.		4.0	93	204	6.3
RCA-6A7	1st Det.	4.0	93	204	8.2
	Osc.	—	—	204	
RCA-6D6—I. F.		4.0	93	204	7.3
RCA-75—2nd Det.		1.2	—	153*	0.4
RCA-41—Pwr.		19.0	239	230	27.0
RCA-84—Rect.		253	—	—	49.0

* Voltage impossible to measure with ordinary voltmeter.



Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure 3. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

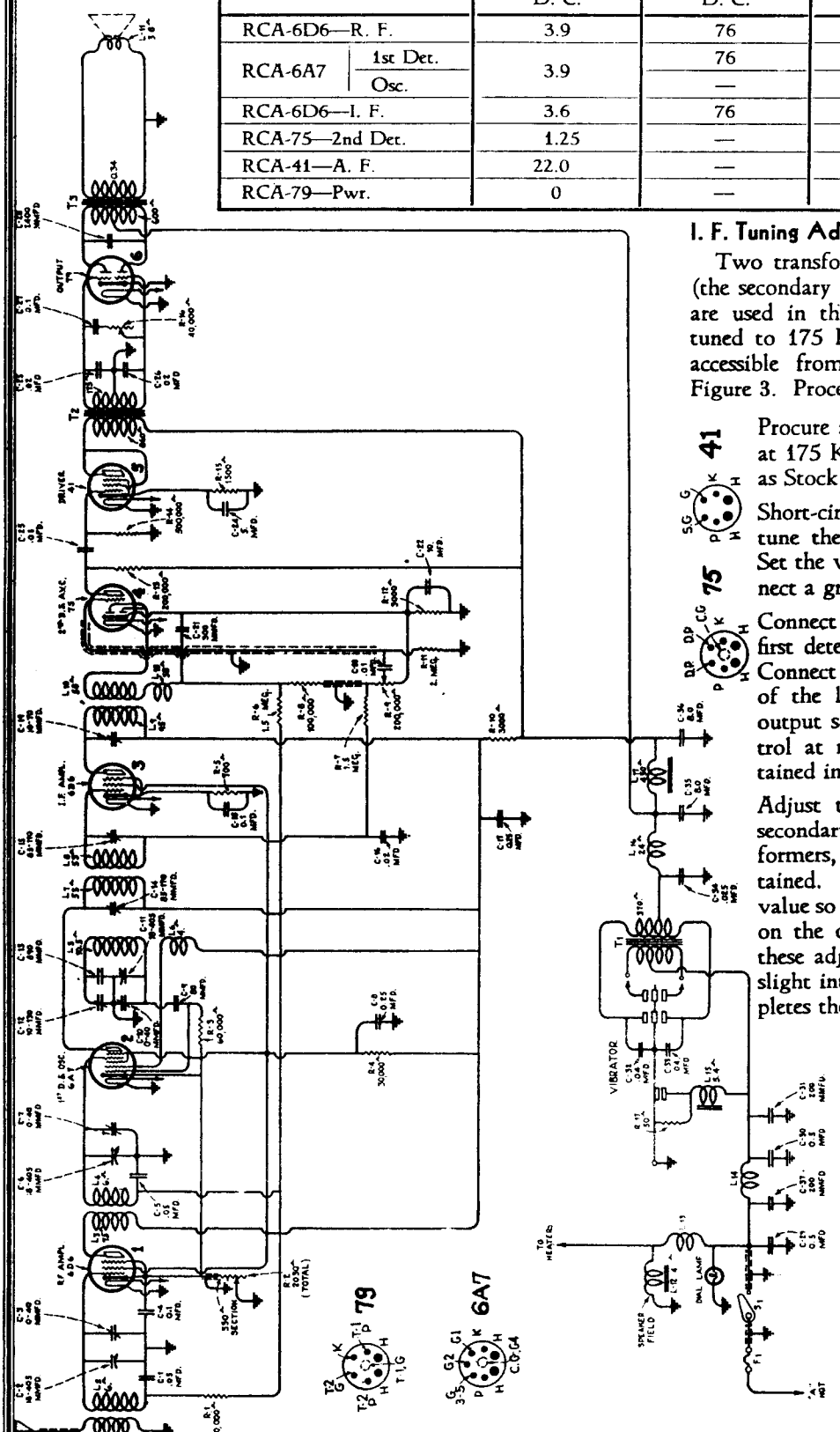
(d) Adjust the primary of the second, and the primary and secondary of the first I. F. transformers, until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

GENERAL ELECTRIC CO.

MODEL C-61

6.3 Volt Battery—No Signal—Maximum Sensitivity

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.
RCA-6D6—R. F.		3.9	76	192	4.5
RCA-6A7	1st Det.	3.9	76	192	7.5
	Osc.		—	192	
RCA-6D6—I. F.		3.6	76	192	5.3
RCA-75—2nd Det.		1.25	—	165	.46
RCA-41—A. F.		22.0	—	235	14.5
RCA-79—Pwr.		0	—	256	10.5



I. F. Tuning Adjustments:

Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure 3. Proceed as follows:

Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

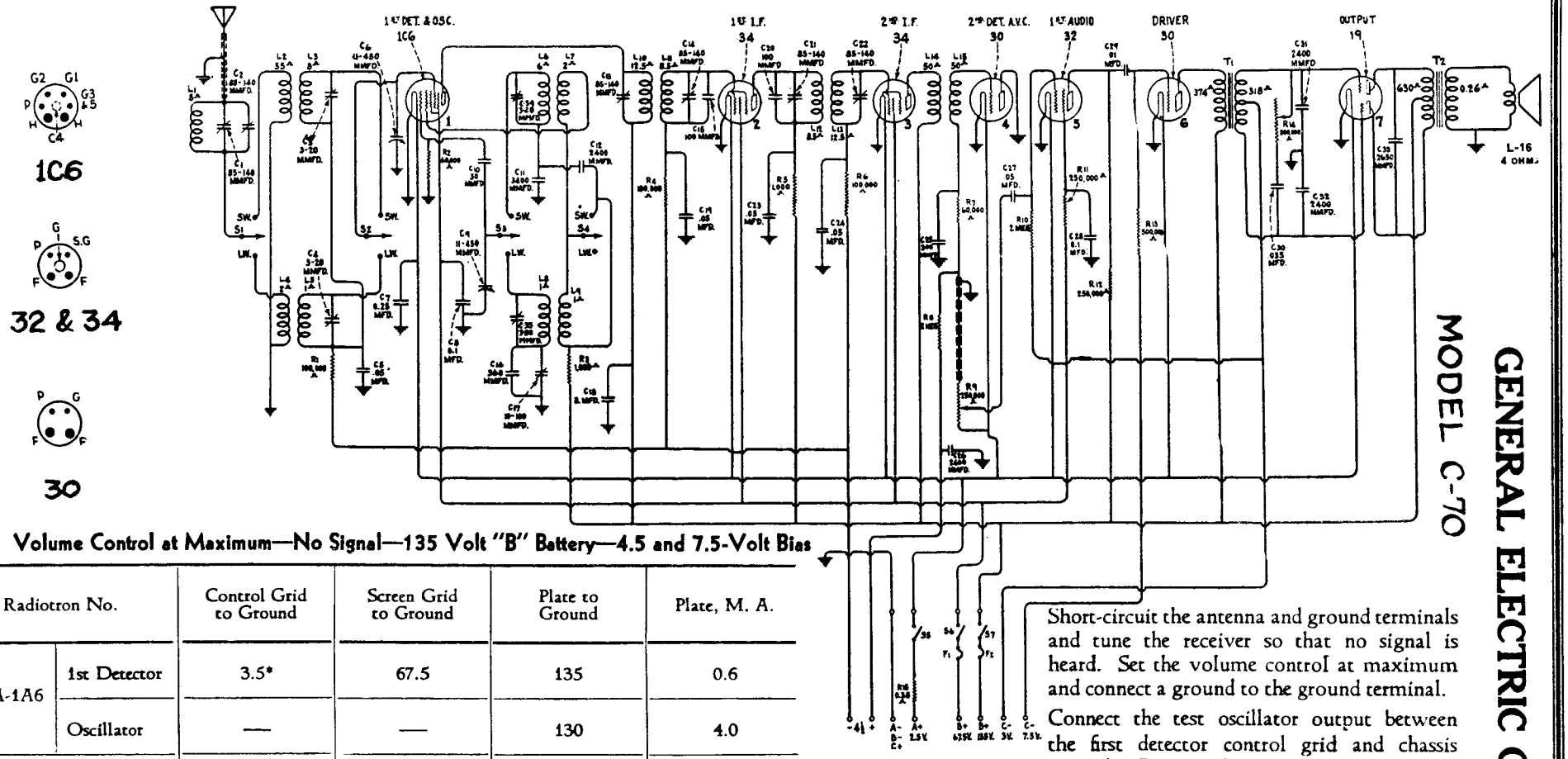
Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

Adjust the primary of the second, and the secondary and primary of the first I. F. transformers, until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

GENERAL ELECTRIC CO.

MODEL C-70



Volume Control at Maximum—No Signal—135 Volt "B" Battery—4.5 and 7.5-Volt Bias

Radiotron No.		Control Grid to Ground	Screen Grid to Ground	Plate to Ground	Plate, M. A.
RCA-1A6	1st Detector	3.5*	67.5	135	0.6
	Oscillator	—	—	130	4.0
RCA-34—I. F.		3.5*	67.5	135	2.3
RCA-34—I. F.		3.5*	67.5	135	2.3
RCA-30—Detector AVC		—	—	—	—
RCA-32—Audio		3.0*	30*	40*	0.3
RCA-30—Driver		7.5*	—	133	4.0
RCA-19—Power		3.0	—	135	3.0

*These voltages cannot be measured with ordinary voltmeter.

Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output indicator across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. The third transformer is untuned and does not require adjusting. Keep the oscillator output at a low value so that only a slight indication is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

GENERAL ELECTRIC CO.

MODEL J 72

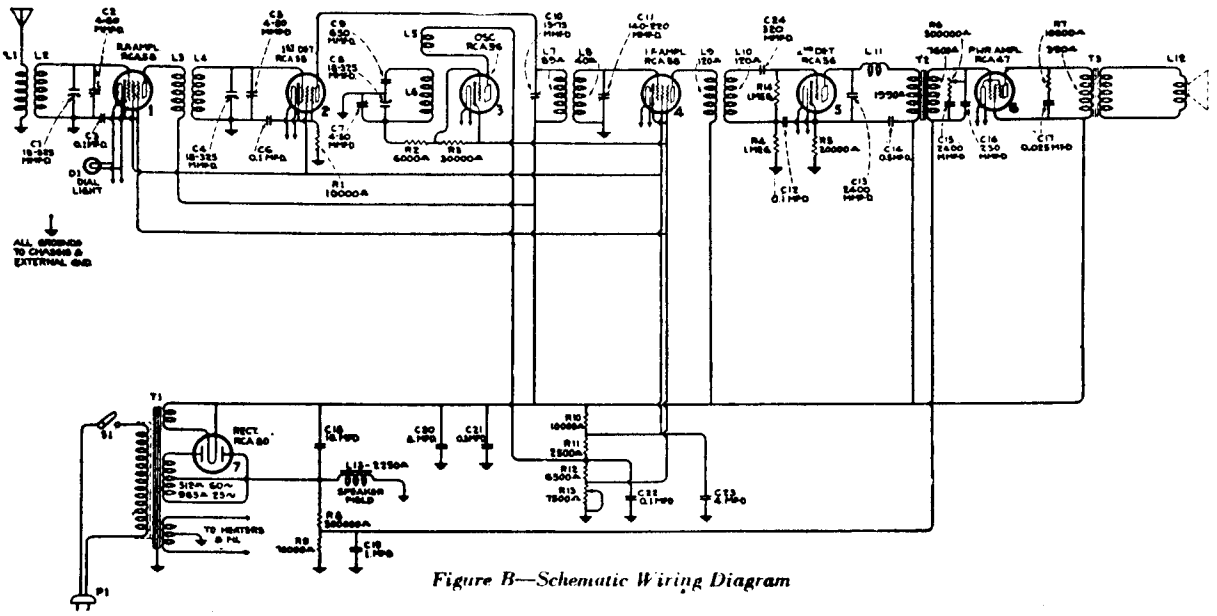


Figure B—Schematic Wiring Diagram

RADIOTRON SOCKET VOLTAGES

All Voltages Measured at Maximum Volume with No Signal Impressed on Input. 120 Volt 60 Cycle A. C. Source Used

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid Volts	Cathode or Filament to Plate Volts	Plate Current M. A.	Heater or Filament Volts
1. R. F. RCA-58	4.5	100	245	6.0	2.37
2. Oscillator RCA-56	—	—	60	4.5	2.37
3. First Detector RCA-58	13.0	90	235	1.3	2.37
4. I. F. RCA-58	4.5	100	245	6.0	2.37
5. Second Detector RCA-56	18.0	—	230	1.0	2.37
6. Power RCA-247	16.5	250	240	30.0	2.37
7. Rectifier UX-280	370 Volts R. M. S. each plate			70.0	5.0

58 56 47 80

Electrical Specifications

Voltage Rating.....105–125 Volts
Power Consumption.....85 Watts

Radiotrons Required
3 RCA-58, 2 RCA-56, 1 RCA-247, 1 UX-280—Total 7
Undistorted Output.....2.25 Watts
Intermediate Frequency.....175 K. C.
R. F. and Oscillator Line-up Frequency.....1400 K. C. Only

This receiver is a seven tube Super-Heterodyne receiver incorporating such features as new high efficiency Radiotrons, Pentode Output Stage, continuously variable tone control and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers. Line-up adjustments are made with a modulated oscillator and output meter. The I. F. amplifier consists of an untuned transformer and one tuned transformer. The I. F. frequency is 175 K. C. and the line-up capacitors should be adjusted for maximum output at this frequency. The three gang capacitor trimmers are adjusted for maximum output when the dial and oscillator are both set at 1400 K. C.

Figure A shows the loudspeaker wiring, Figure B the schematic wiring and Figure C, the chassis wiring. The voltage readings are given on the next page and the replacement parts below.

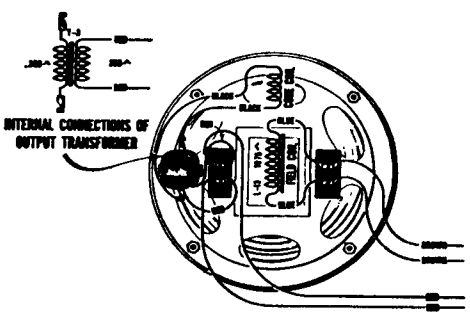
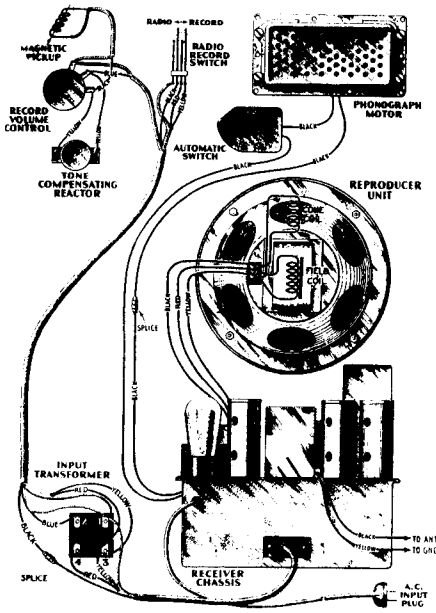
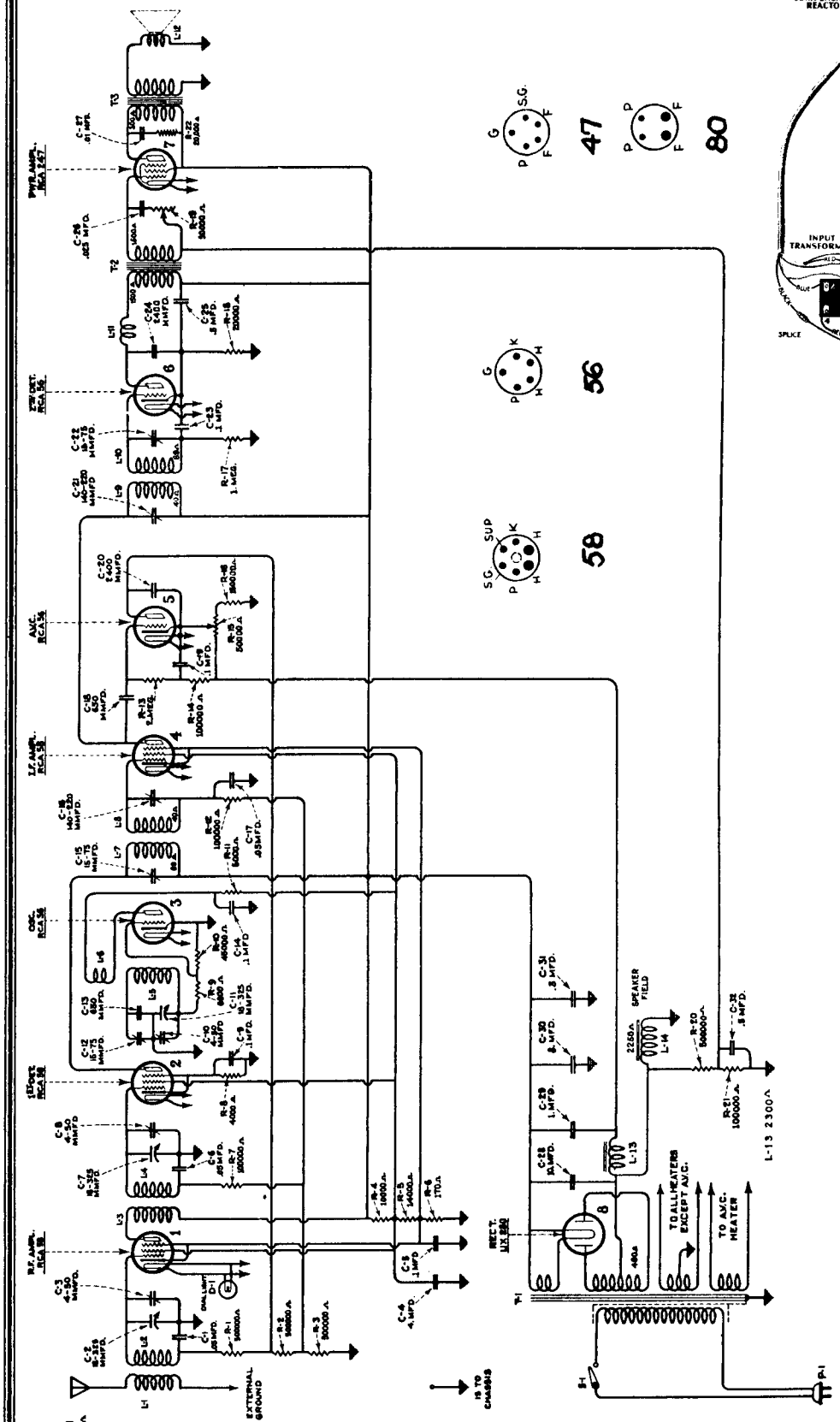


Figure A—Loudspeaker Wiring

GENERAL ELECTRIC CO.

MODELS J82-J86-J88



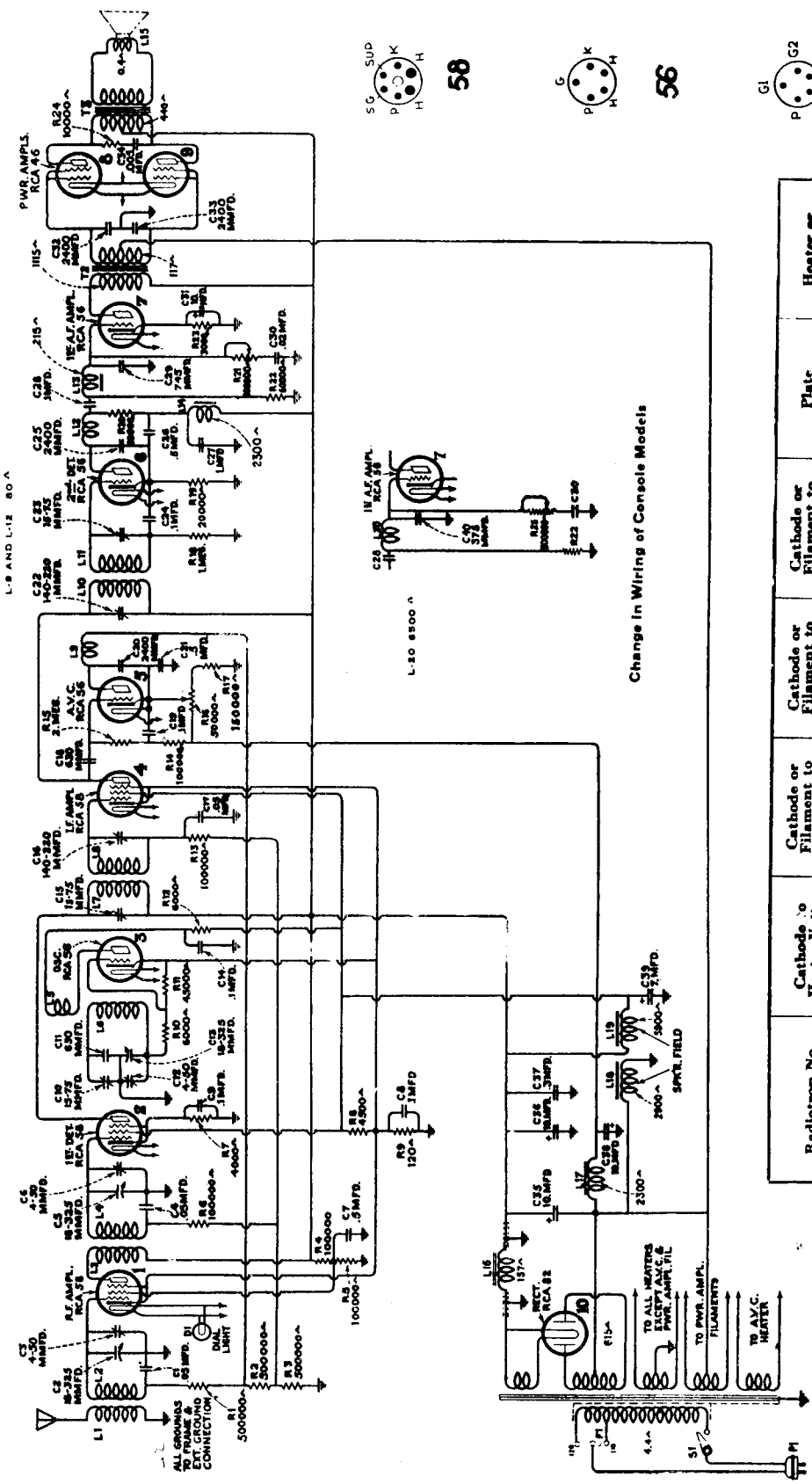


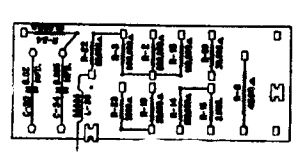
VOLUME CONTROL AT MAXIMUM

Radiotron No.	Cathode to Heater, Volts, D. C.	Cathode or Filament to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid, Volts, D. C.	Cathode or Filament to Plate, Volts, D. C.	Plate Current, M. A.	Heater or Filament, Volts, D. C.
1—R. F.	**4.0	*0.1	100	260	5.0	2.5
2—1st Det.	**10.0	*1.0	95	250	2.0	2.5
3—Osc.	——	——	——	75	4.5	2.5
4—I. F.	**4.0	*1.8	100	260	5.0	2.5
5—A. V. C.	——	2.0	——	20	0	2.5
6—2nd Det.	——	7.0	——	240	1.0	2.5
7—Pwr.	——	20.0	275	265	30.0	2.5

GENERAL ELECTRIC CO.

MODELS J 100-J 105 & J 107

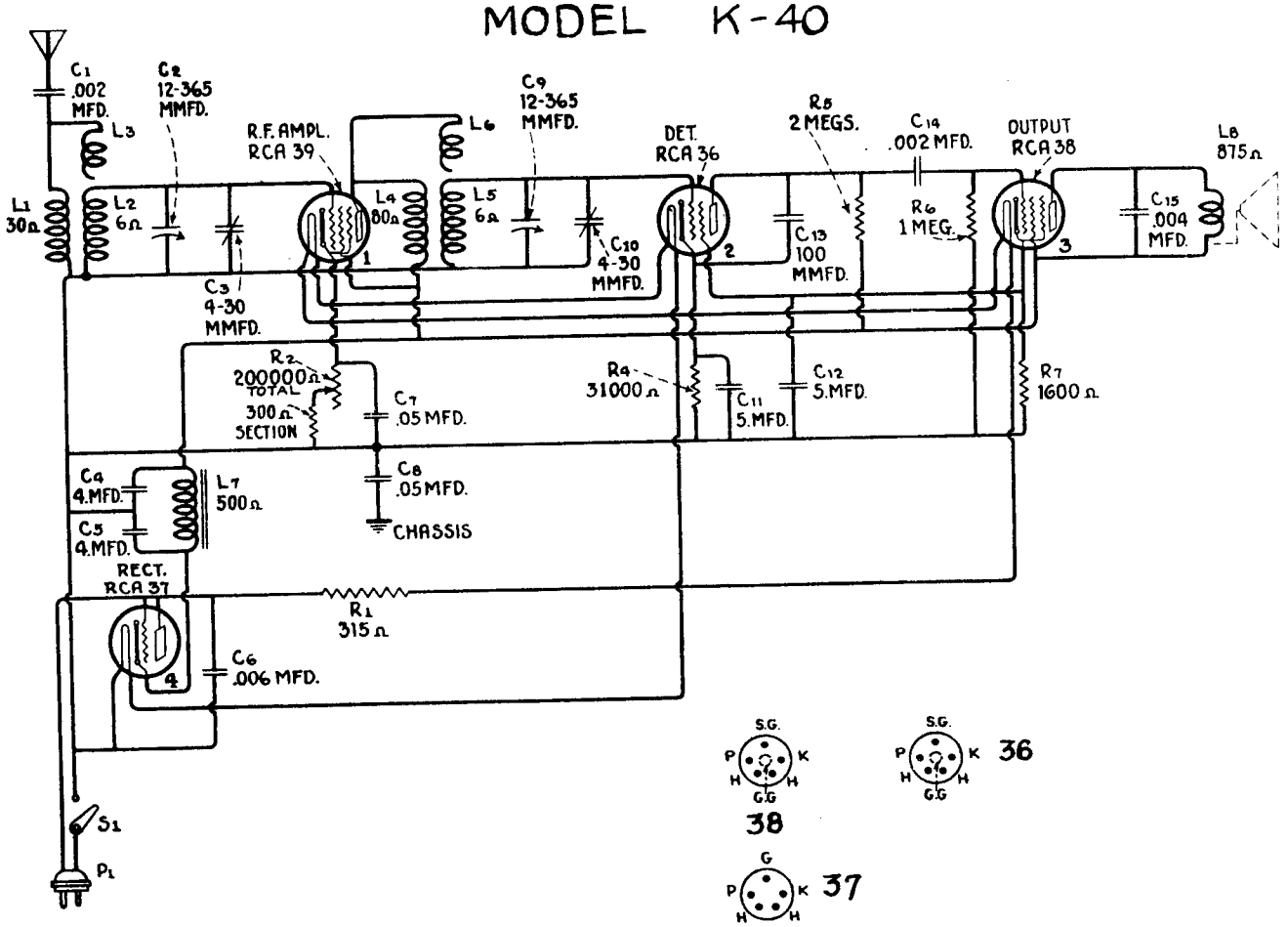




Radiotron No.	Cathode to Heater Volts, D. C.	Cathode or Filament to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current, M. A.	Heater or Filament Volts, D. C.
VOLUME CONTROL AT MAXIMUM						
1. R. F.	+4	0	70	250	4.5	2.4
2. 1st Det.	+6	0.6	75	235	2.0	2.4
3. Osc.	+4	0	—	50	5.0	2.4
4. I. F.	+4	1.5	84	250	4.5	2.4
5. A. V. C.	0	0	—	15	0	2.4
6. 2nd Det.	+15	3.0	—	210	1.0	2.4
7. 1st A. F.	+14	10.0	—	240	5.0	2.4
8. Power	—	0	—	400	6.0	2.4
9. Power	—	0	—	400	6.0	2.4

GENERAL ELECTRIC CO.

MODEL K-40



Electrical Specifications

Voltage Rating . . 105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption . . . . . 40 Watts
Frequency Range . . . . . 540 K. C.–1700 K. C.
Type and Number of Radiotrons—
1 RCA-36, 1 RCA-37, 1 RCA-38, 1 RCA-39—Total 4

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation of both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volt A. C. Line

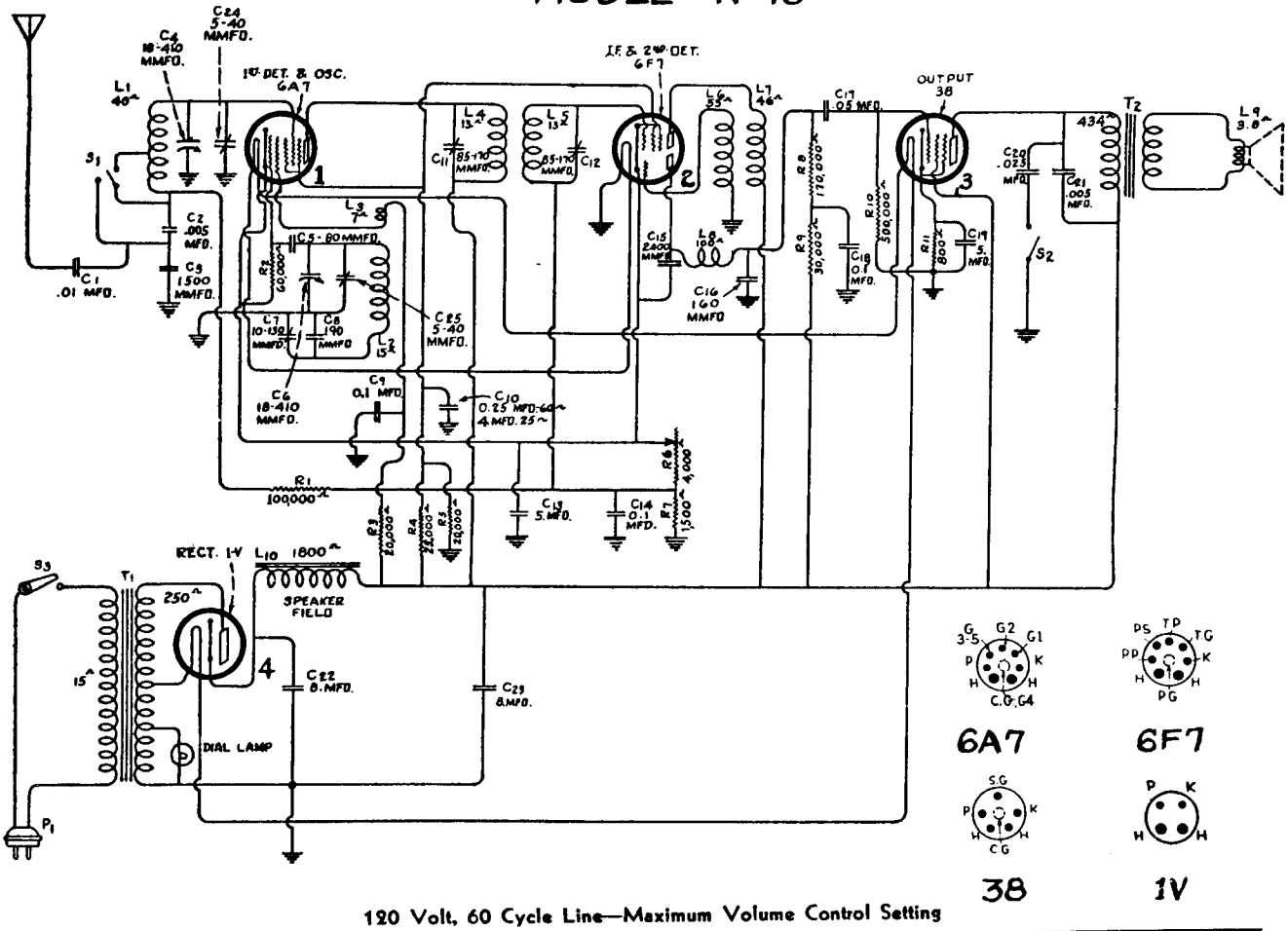
All Voltages on D. C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-39 R. F.	3.0	105	105	7.0	6.0
2. RCA-36 Det.	*0.75	11.0	*60	.025	6.0
3. RCA-38 Output	11.0	100	95	3	6.0
4. RCA-37 Rect.	—	—	115	15	6.0

*Impossible to measure on ordinary voltmeter

GENERAL ELECTRIC CO.

MODEL K-43



120 Volt, 60 Cycle Line—Maximum Volume Control Setting

Radiotron No.		Cathode to Control Grid, Volts D. C.	Cathode to Screen Grid, Volts D. C.	Cathode to Plate, Volts D. C.	Plate Current, M. A.	Heater or Filament, Volts
RCA-6A7	First Detector	3.0	95	235	5.0	6.3
	Oscillator	—	—	165	3.5	
RCA-6F7	I. F.	3.0	95	235	7.0	6.3
	Second Detector	20.0	—	150*	0.25	
RCA-38	Output	20.0	240	230	22	6.3
RCA-1-V	Rectifier	—	—	310 RMS	50	6.3

*Actual voltage cannot be measured with ordinary voltmeter. Voltage supplied is 260.

Voltage Rating.....115 Volts
Frequency Rating.....25–60 or 50–60 Cycles
Power Consumption.....40 Watts
Number and Types of Radiotrons—
1 RCA-6A7, 1 RCA-6F7, 1 RCA-38, 1 RCA-1-V
Undistorted Output.....1.6 Watts
Frequency Range.....540–1500 K. C. and 1600–3500 K. C.

This receiver is a four-tube superheterodyne incorporating features such as wide tuning range, electro-dynamic loudspeaker, two-point tone control, illuminated dial and the inherent sensitivity, selectivity and tone quality of the superheterodyne.

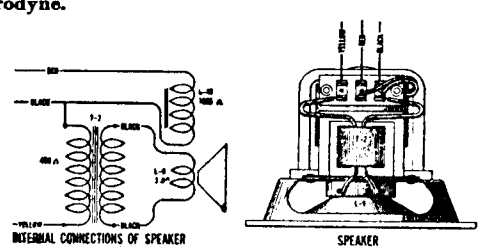


Figure C—Loudspeaker Wiring

The following description of the circuit describes several new design features which are incorporated in this receiver.

The first tube is a combined first detector and oscillator using Radiotron RCA-6A7. Separate tuned circuits are provided for each function. The detector coil is tapped so that the tuning range may be extended merely by shorting out a portion of the coil. The oscillator circuit is not tapped, the high frequency range being obtained by use of its second harmonic instead of the fundamental for obtaining the I. F frequency.

The next tube is a combined I. F. stage and second detector using Radiotron RCA-6F7. It has two sets of elements, one being used as a screen grid I. F. amplifier and one as a triode detector. The I. F. frequency in this receiver is 460 K. C. The output stage is a single Pentode RCA-38.

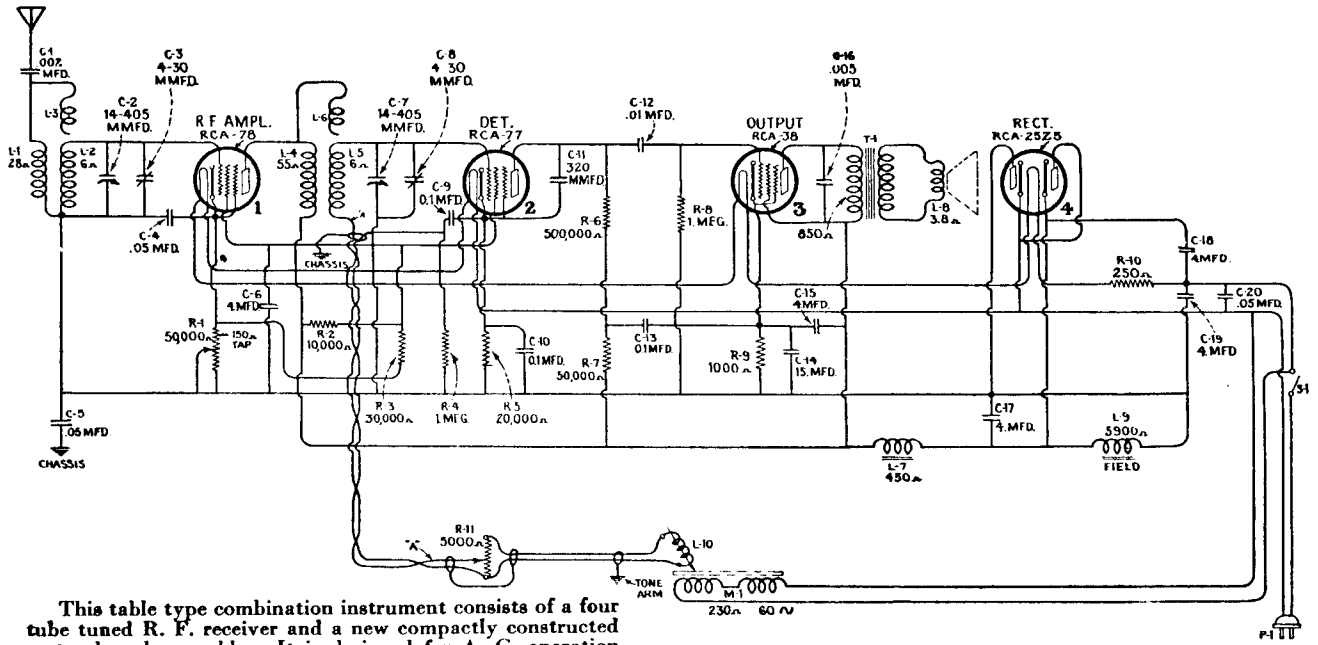
The rectifier is an RCA-1-V used in a half-wave rectifying circuit. A feature of this circuit is that only one transformer secondary is used. This is accomplished by having a cathode type rectifier, a series arrangement of filaments and a tapped secondary winding.

Line-Up Adjustments

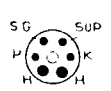
The detector and oscillator line-up trimmer capacitors are adjusted by setting both the dial and an external oscillator first at 1400 K. C. and adjusting the tuning capacitor trimmer capacitors for maximum output, then changing the oscillator frequency and dial setting to 600 K. C. and adjusting the submounted trimmer capacitor for maximum output. The I. F. adjustments are made by adjusting the two trimmer capacitors located on the first I. F. transformer for maximum output when a 460 K. C. signal is connected between the control grid of the first detector and ground. Be sure and set the station selector at a point where no signal is being received when making I. F. adjustments.

GENERAL ELECTRIC CO.

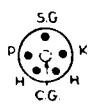
MODEL K48



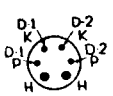
This table type combination instrument consists of a four tube tuned R. F. receiver and a new compactly constructed motor board assembly. It is designed for A. C. operation only. Features such as wide tuning range, electro-dynamic loudspeaker, ability to play both 10 and 12 inch records and excellent quality of reproduction characterize this instrument. Figures C and D show the schematic and wiring diagrams respectively while the voltage readings and replacement parts are given below:



77 & 78



38



25Z5

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volts, 60 Cycles

Radiotron No.	Cathode to Control Grid, Volts D.C.	Cathode to Screen Grid, Volts D.C	Cathode to Plate, Volts D.C.	Plate Current M. A	Filament or Heater Volts
RCA-78, R. F.	2.5	100	200	8.0	6.0
RCA-77, Detector	*5.0	95	*100	0.2	6.0
RCA-38, Output	18.0	180	170	14.0	6.0
RCA-25Z5, Rectifier	—	—	115	30.0	25.0

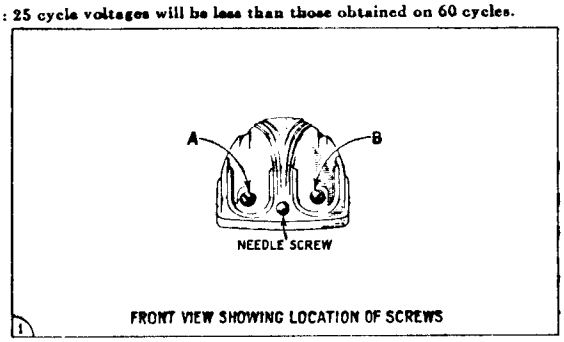
*Impossible to measure on ordinary voltmeter

NOTE: 25 cycle voltages will be less than those obtained on 60 cycles.

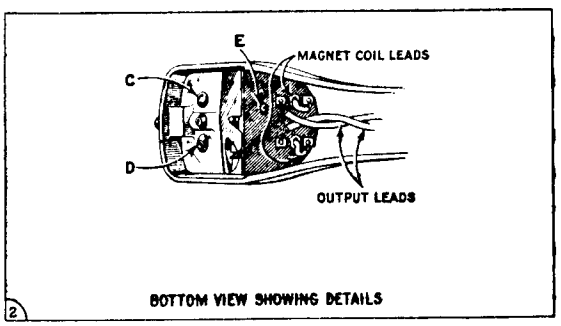
Pickup Service Data

The magnetic pick-up and tone-arm assembly of this instrument is of new design and unique construction. Service work will consist of centering the armature, replacing the rubber pivots and replacing the magnet coil.

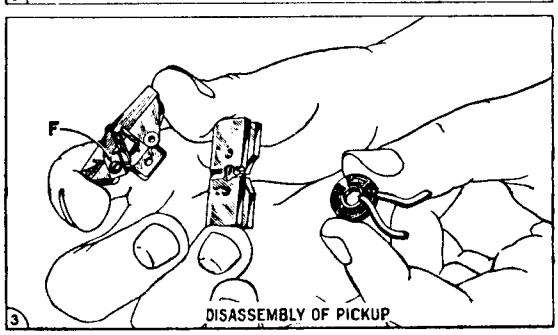
It is important to remember that in all operations after reassembling but before placing in the tone arm, the pickup should be magnetized and the armature centered after remagnetizing. Magnetizing should be done by placing the pickup magnet on the magnetizer and sliding it onto the pole pieces, after magnetizing being careful not to break the magnetic circuit.



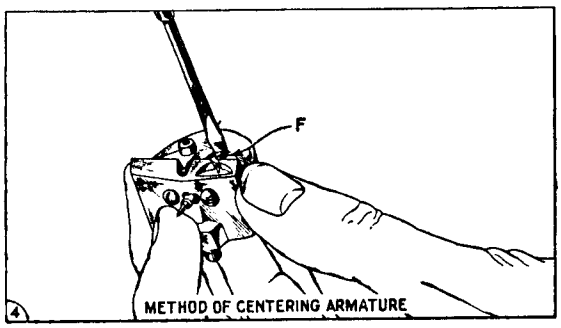
1 FRONT VIEW SHOWING LOCATION OF SCREWS



2 BOTTOM VIEW SHOWING DETAILS



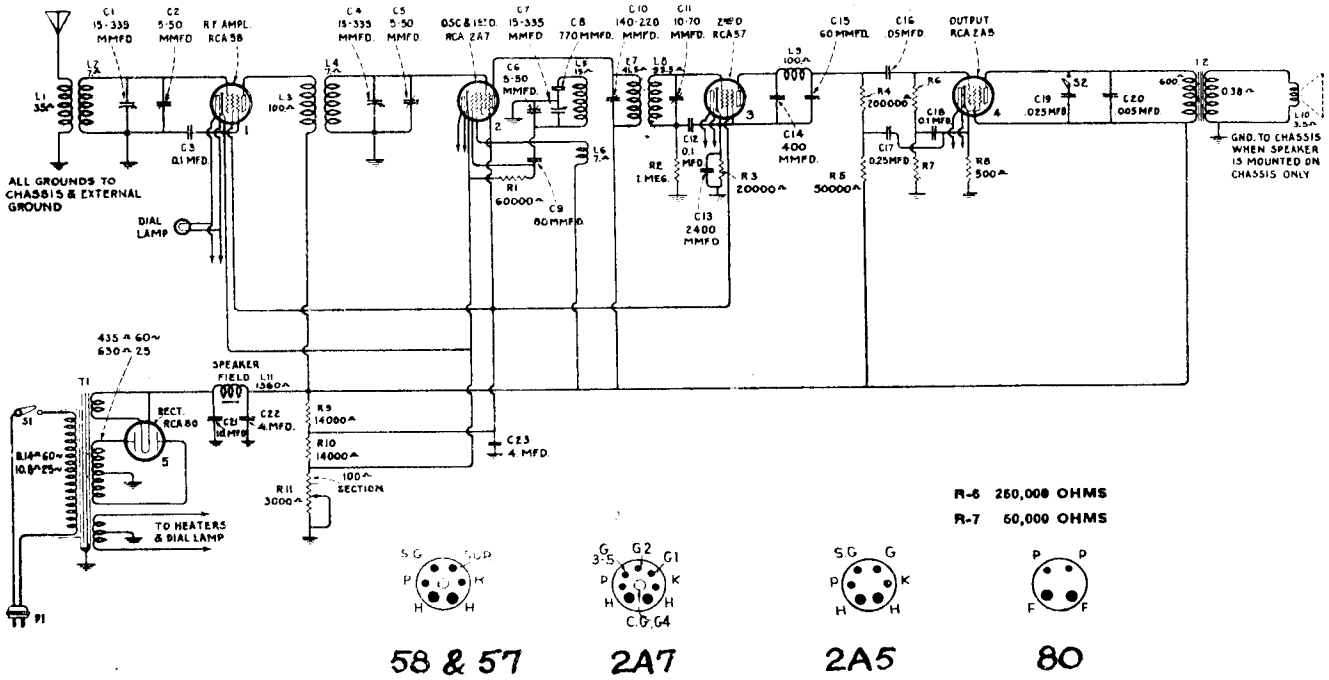
3 DISASSEMBLY OF PICKUP



4 METHOD OF CENTERING ARMATURE

GENERAL ELECTRIC CO.

MODELS K50 & K51



SERVICE DATA

Voltage Rating.....105-125 Volts
Frequency Rating.....25-40 Cycles and 50-60 Cycles
Power Consumption.....70 Watts
Number and Types of Radiotrons.....1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5
Undistorted Output.....1.75 Watts
Frequency Range.....540 K. C. to 1500 K. C.

This receiver is a five-tube Super-Heterodyne incorporating a Dynamic Loudspeaker as a part of the chassis; two-point tone control; single heater type Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer only using two tuned circuits, a second detector, an output tube and a rectifier.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers of the small compact type construction. The line-up adjustments are made in conjunction with an external oscillator and an output meter. The line-up capacitors on the gang capacitor are adjusted for maximum output when the oscillator is coupled to the antenna and the set and oscillator are both set at 1400 K. C. The I. F. frequency is 175 K. C. and the two circuits that comprise it are adjusted for maximum output at 175 K. C.

RADIOTRON SOCKET VOLTAGES

115 Volt A. C. Line

MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

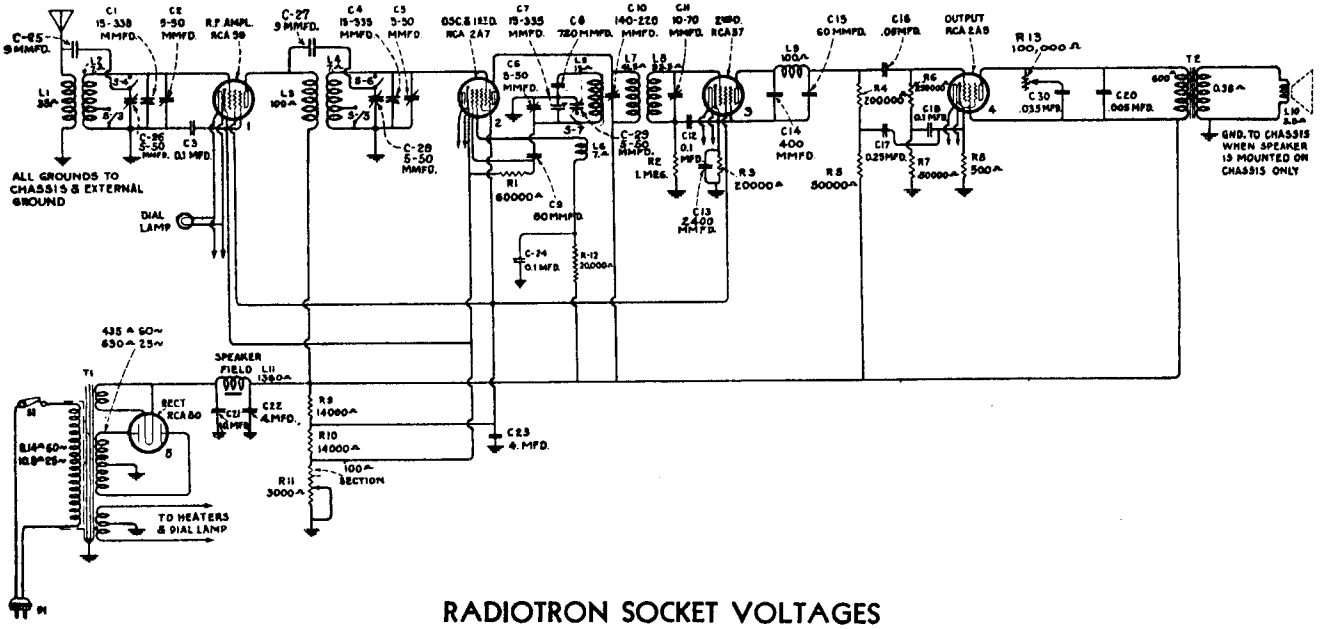
Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

Trouble Shooting Hints

Low volume in this set is usually caused by a defectibr alignment of the series padding condenser in the oscillator circuit. The I. F. and oscillator adjustment should be checked.

GENERAL ELECTRIC CO.

MODELS K52 & K53



RADIOTRON SOCKET VOLTAGES
115 Volt A. C. Line
MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater, Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

Line-up Capacitor Adjustment

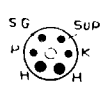
The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

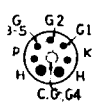
(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

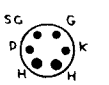
(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.



58 & 57



2A7



2A5

80

Voltage Rating.....115 Volts

Frequency Rating.....25–60 Cycles and 50–60 Cycles

Power Consumption.....60 Cycles—70 Watts

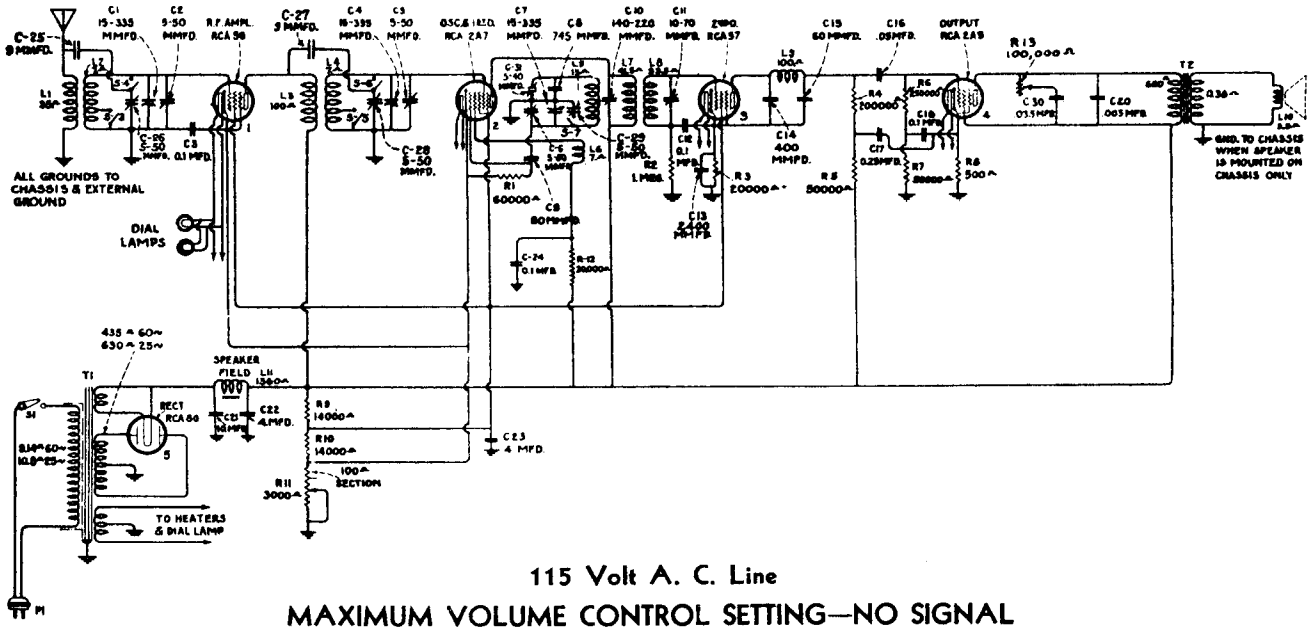
Number and Types of Radiotrons.....1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5

Undistorted Output.....1.75 Watts

Frequency Range.....540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

GENERAL ELECTRIC CO.

MODEL K-55



115 Volt A. C. Line

MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater, Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector—Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

Line-Up Capacitor Adjustments

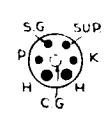
The line-up capacitor adjustments of the I. F. stage, gang capacitor and high frequency circuit are made in the following manner:

(a) Procure a modulated oscillator such as stock No. 9050, giving a signal at 175 K. C., 600 K. C., 1400 K. C. and 2440 K. C., a non-metallic screwdriver (Stock No. 7065), and an output meter.

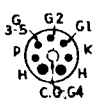
(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid of the first detector and ground, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. alignment, the broadcast band R. F. circuits are adjusted at 1400 and 600 K. C. For these adjustments the Range Switch must be set in the broadcast position and the oscillator output connected to the antenna and ground leads of the receiver. First set the oscillator at 1400 K. C. and the receiver dial at 140 and adjust the three trimmer capacitors located on top of the gang capacitor for maximum output. Shift the oscillator to 600 K. C., tune in the signal and adjust the oscillator series capacitor (accessible at the right-hand side of the chassis) for maximum output while rocking the variable condenser back and forth. Then repeat the 1400 K. C. adjustments, as there is a tendency toward interaction.

(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the broadcast band R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.



57 & 58



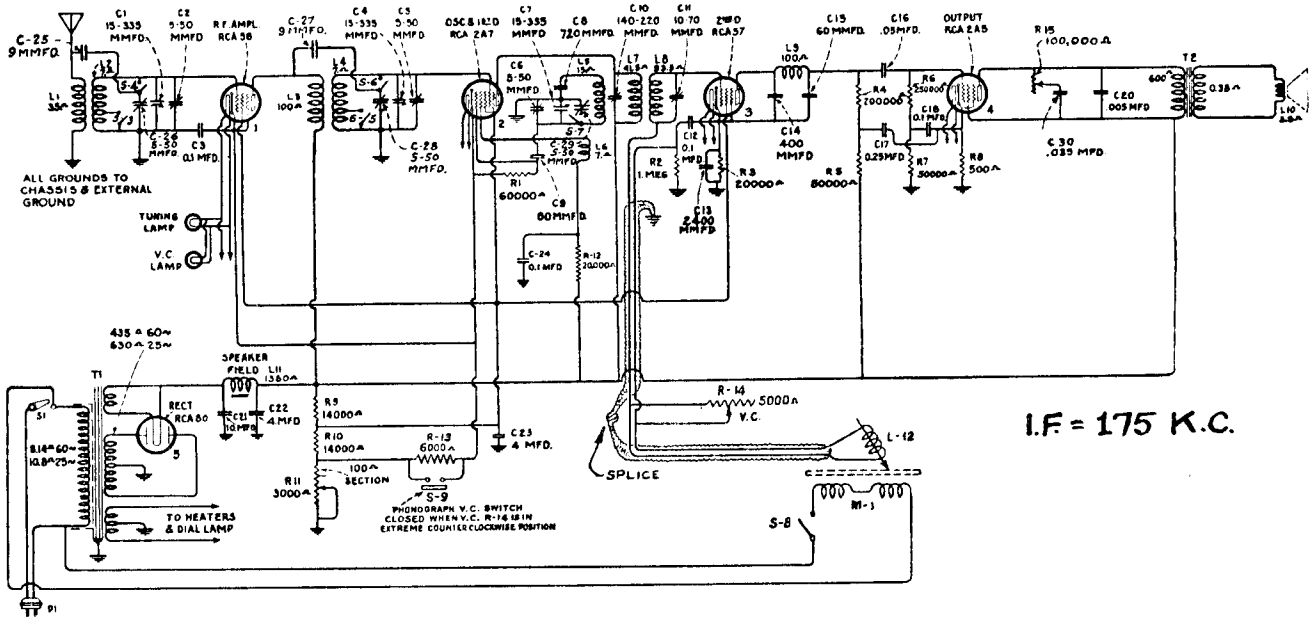
2A7

2A5

80

GENERAL ELECTRIC CO.

MODEL K 58



RADIOTRON SOCKET VOLTAGES
115 Volt A. C. Line
MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

Line-up Capacito. Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

If, when first installed, the receiver does not operate or performs imperfectly, one or more of the tubes, shields or dome terminal leads may have been jarred loose in shipment. Remove the back cover of the cabinet and refer to the tube location diagram on the rating label. *Make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the spring connectors at the ends of the short flexible leads are securely attached to the dome terminals of the proper Radiotrons as indicated on the diagram.

Police Calls—At dial settings near "80" for stations transmitting at 1712 kilocycles, and at "118-122" for stations operating in the 2450 kilocycle band.

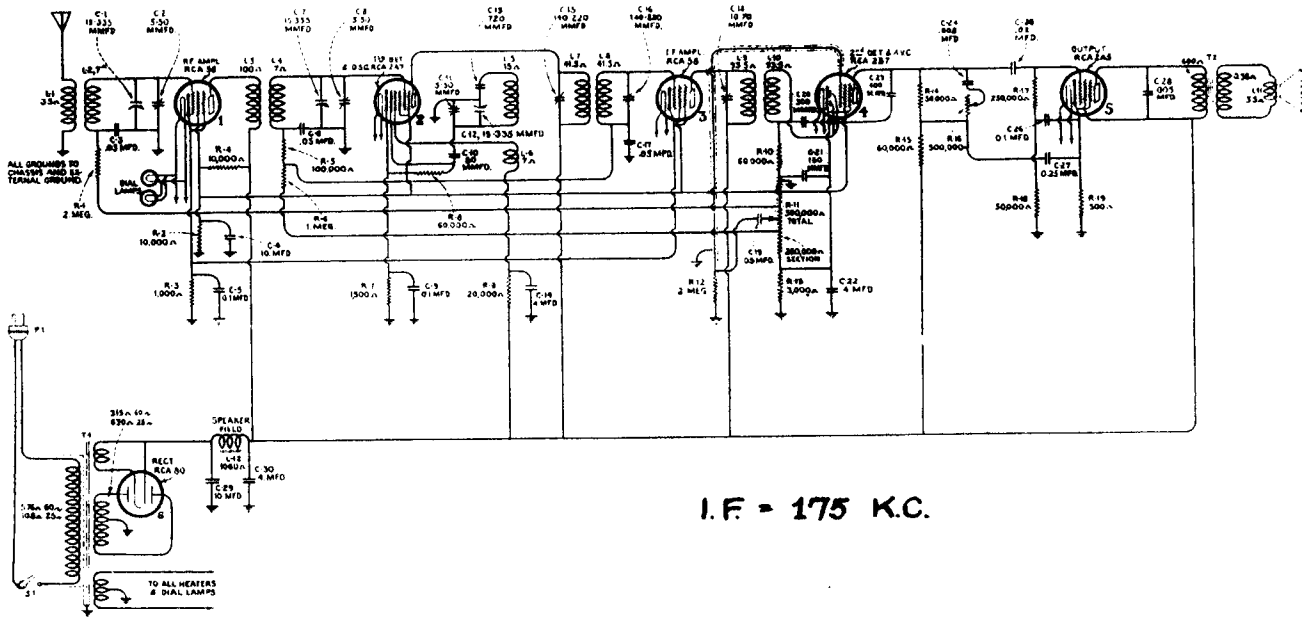
Amateur Radio "Phone"—At dial settings "90-95" (assigned band 1900-2000 kilocycles).

Aviation Reports, Airport Beacons, Etc.—At dial settings "95-118" (assigned band 2000-2400 kilocycles).

Amateur Radio "CW" (Code)—At dial settings "80-90" (assigned band 1715-1900 kilocycles). Signals of this class are normally unintelligible or inaudible with this type of receiver.

GENERAL ELECTRIC CO.

MODELS K60 & K65



I. F. = 175 K.C.

115 Volts. A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.0	95	255	5.0	2.31
2. RCA-2A7 1st Det. Osc.	3.0*	95*	255*	3.0*	2.31
3. RCA-58 I. F.	3.0	95	255	5.0	2.31
4. RCA-2B7 2nd Det. A. V. C.	7.5	92	60	2.0	2.31
5. RCA-2A5 Power	20.0	250	235	33.0	2.31
6. RCA-80 Rect.	700/350 Volts - 75 M.A. Total Current				4.82

*The Voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

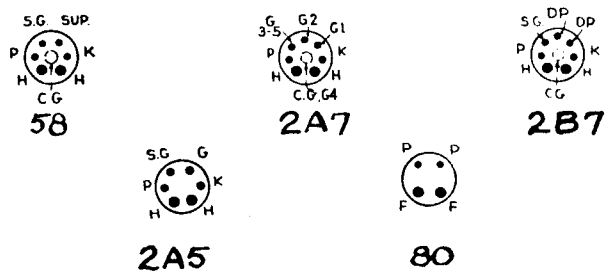
(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible at the top of the chassis. Proceed as follows:

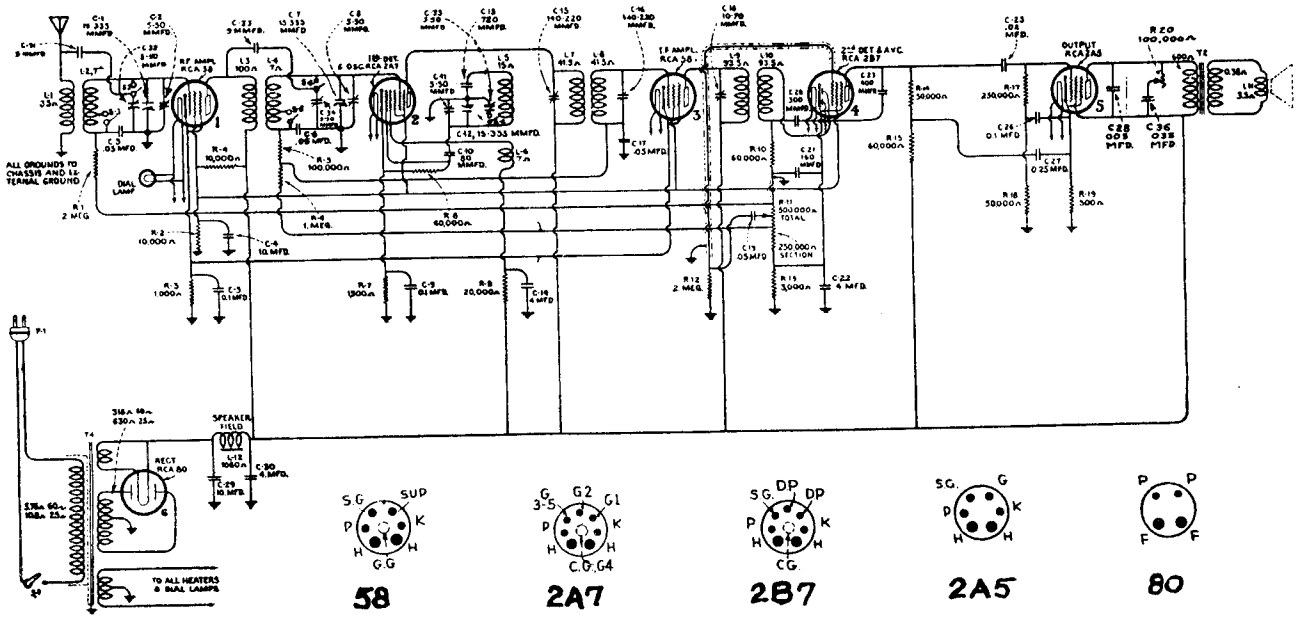
(a) Procure a modulated oscillator giving a signal at 1400 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter.



GENERAL ELECTRIC CO.
MODEL K63



115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	4.0	95	255	5.0	2.31
2. RCA-2A7 1st Det. Osc.	5.0*	95*	255*	3.0*	2.31
3. RCA-58 I. F.	4.0	95	255	5.0	2.31
4. RCA-2B7 2nd Det. A. V. C.	7.5	92	60	2.0	2.31
5. RCA-2A5 Power	20.0	250	235	33.0	2.31
6. RCA-80 Rectifier	700/350 Volts—75 M. A. Total Curent				4.82

*The voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.

LINE-UP ADJUSTMENTS

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

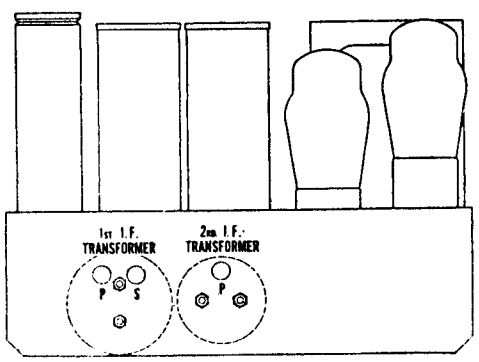


Figure D—Location of I. F. Line-up Adjustment Screws

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

Police Calls—At dial settings near "80" for stations transmitting at 1712 kilocycles, and at "118–122" for stations operating in the 2450 kilocycle band.

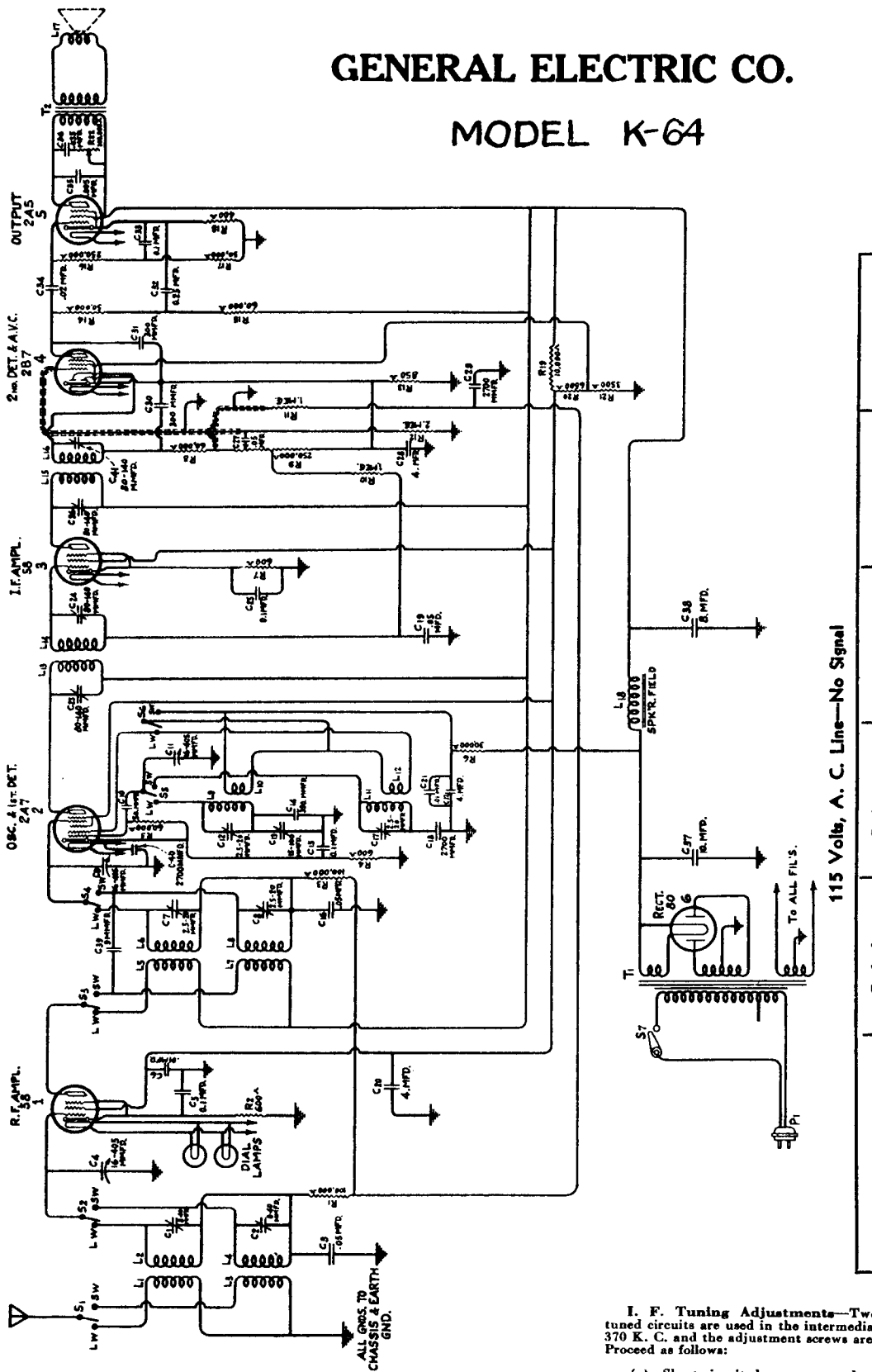
Amateur Radio "Phone"—At dial settings "90–95" (assigned band 1900–2000 kilocycles)

Aviation Reports, Airport Beacons, Etc.—At dial settings "95–118" (assigned band 2000–2400 kilocycles).

Amateur Radio "CW" (Code)—At dial settings "80–90" (assigned band 1715–1900 kilocycles). Signals of this class are normally unintelligible or inaudible with this type of receiver.

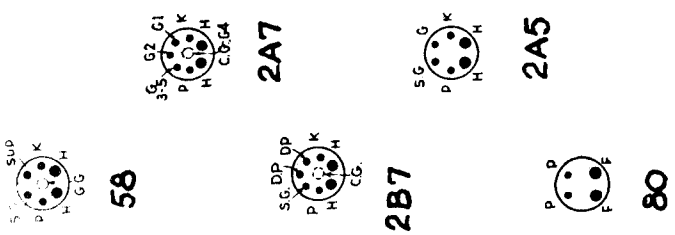
GENERAL ELECTRIC CO.

MODEL K-64



Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.0	100	265	6.0	2.32
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*	2.32
3. RCA-58 I. F.	3.0	100	265	6.0	2.32
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5	2.32
5. RCA-2A5 Power	16.0	255	240	35.0	2.32
6. RCA-80 Rectifier	725 Volts R. M. S.—75 M. A. Total Current				4.80

*The voltages and current refer to the detector part of the tube.



I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

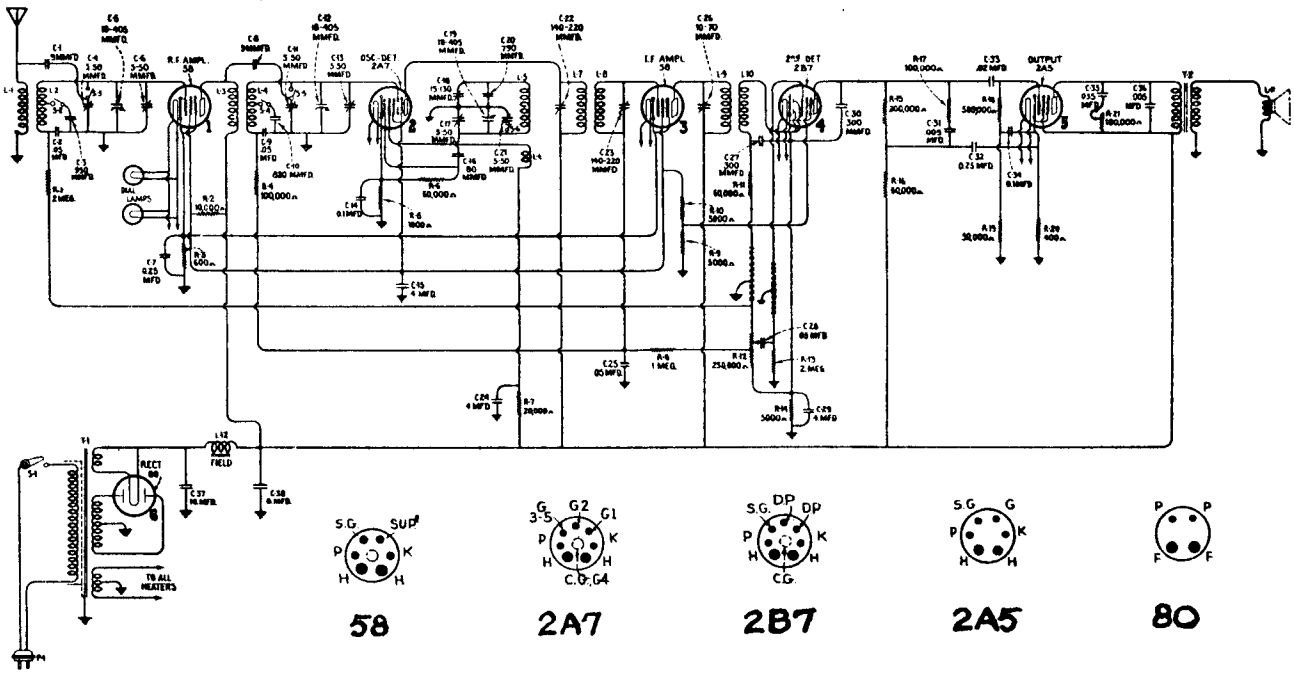
(a) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

GENERAL ELECTRIC CO.

MODEL K-66



115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.5	100	260	5.0	2.32
2. RCA-2A7 1st Det. Osc.	5.5*	100*	260*	2.0*	2.32
3. RCA-58 I. F.	3.5	100	260	5.0	2.32
4. RCA-2B7 2nd Det. A. V. C.	4.5	50	90	0.7	2.32
5. RCA-2A5 Power	16.5	255	245	34.0	2.32
6. RCA-80 Rectifier	725 RMS			73.0 Total	4.82

*The voltages and current refer to the detector part of the tube.

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

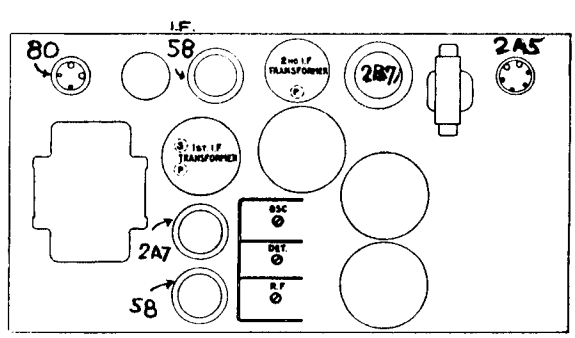
R. F. and Oscillator Adjustments—The three gang capacitor screws are located on the main tuning capacitor, accessible at the top of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator pointer should be set on the white inner radial line located at approximately 530 K. C. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

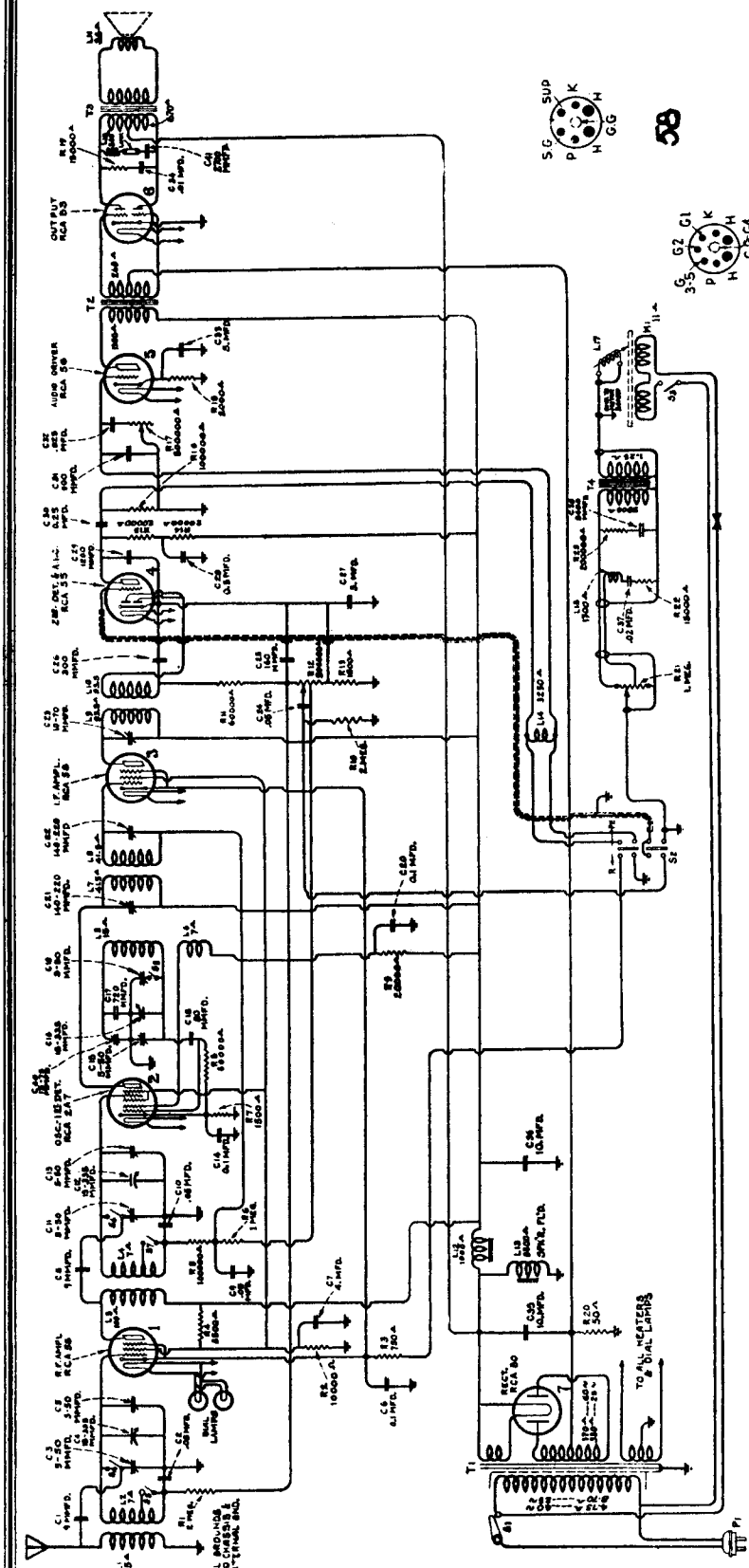
(c) After making the 1400 K. C. adjustment, shift the oscillator to 600 K. C. and tune in the signal. Adjust the 600 K. C. trimmer, accessible from the top of the chassis, for maximum output while rocking the gang-capacitor back and forth. Then again check the adjustment described in (b).

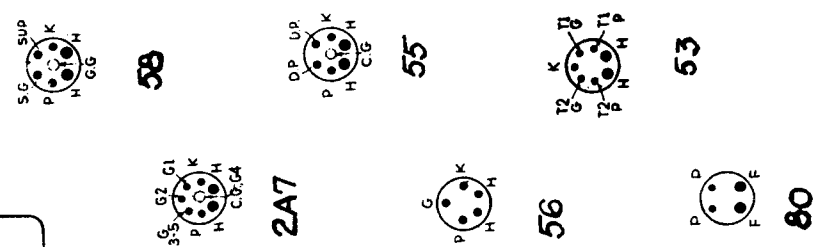
(d) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 244. The three line-up capacitors located on the Range Switch and accessible from the bottom of the chassis should then be adjusted for maximum output.



GENERAL ELECTRIC CO.

MODEL K-78





I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

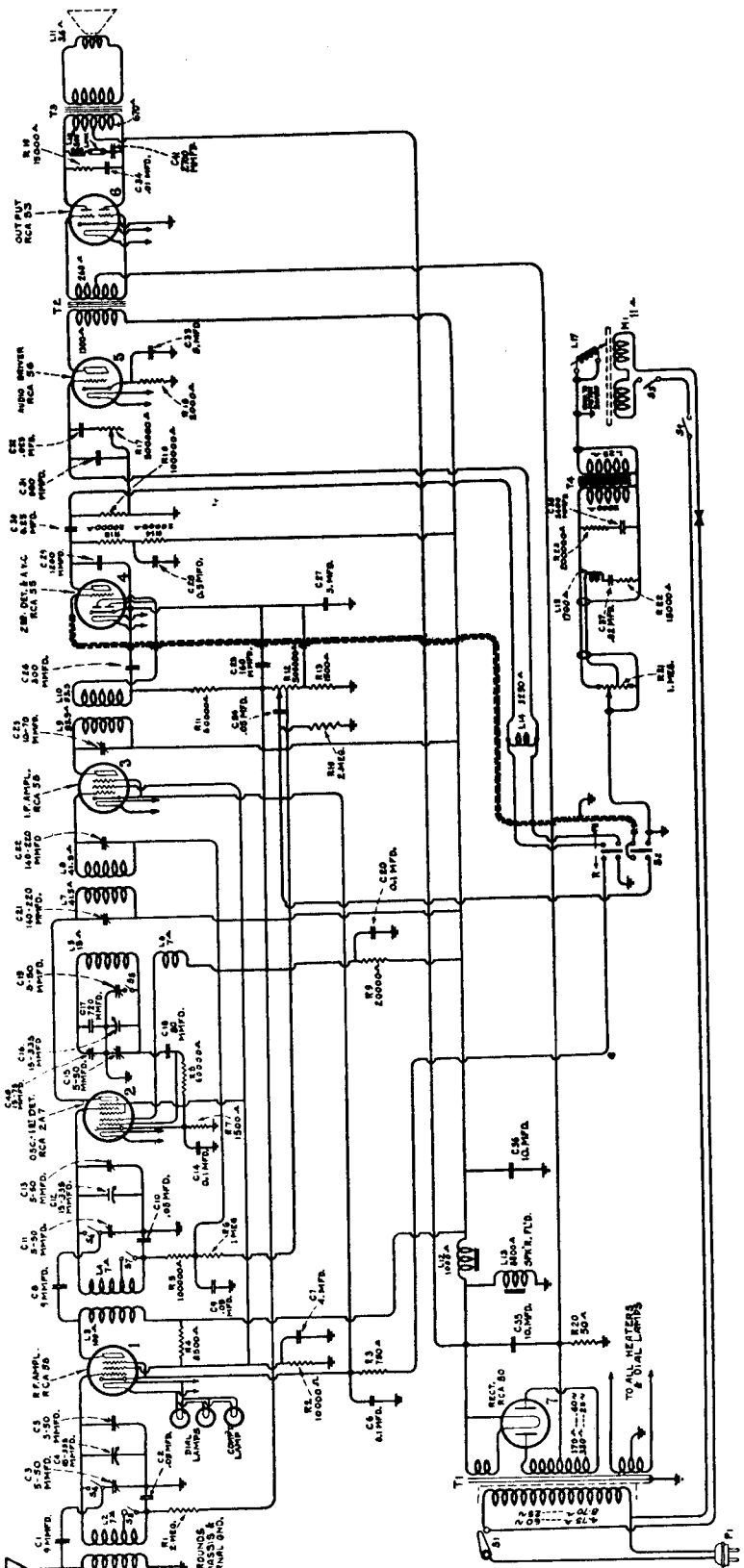
(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

120 Volt A. C. Line—Volume Control at Maximum

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	4.0	100	245	6.6	2.1
RCA-2A7 Osc. Det.	4.0	100	245	5.0	2.1
RCA-58 I. F.	4.0	100	245	6.0	2.1
RCA-55 2nd Det. A. V. C.	6.0	—	100	4.0	2.4
RCA-56 Driver A. F.	13.0	—	235	6.3	2.4
RCA-53 Output	4.5	—	290	12.0	2.4
RCA-80 Rectifier	600 R. M. S. Plate to Plate			88.0	5.0

GENERAL ELECTRIC CO.

MODEL K-79



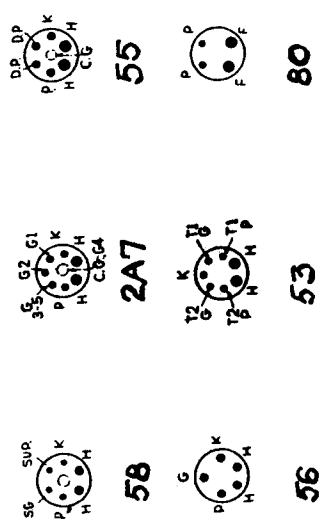
I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

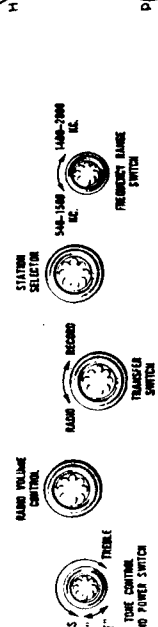
(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.



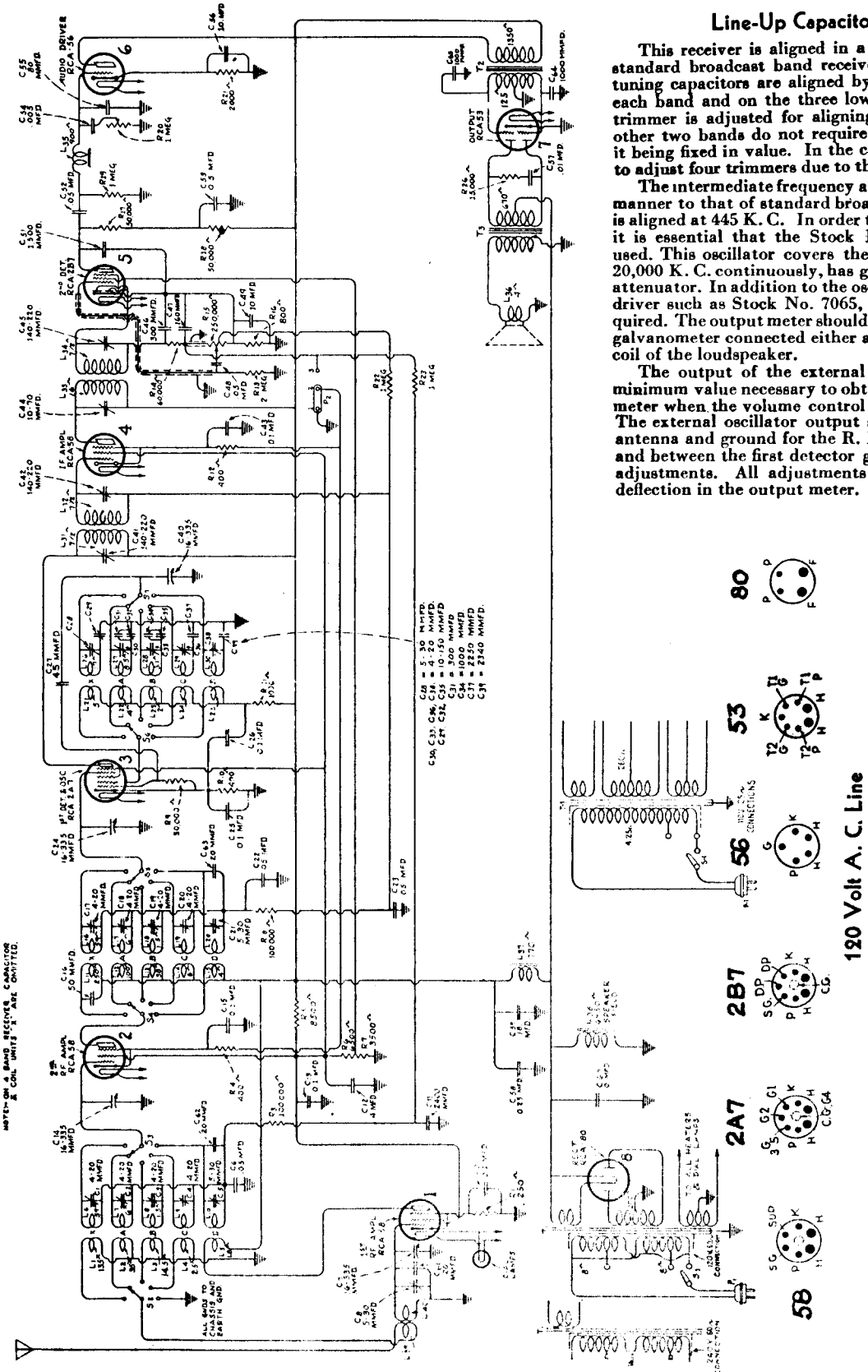


120 Volt A. C. Line—Volume Control at Maximum

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	4.0	100	245	6.0	2.4
*RCA-2A7 Osc. Det.	4.0	100	245	5.0	2.4
RCA-58 I. F.	4.0	100	245	6.0	2.4
RCA-55 2nd Det. A. V. C.	6.0	—	100	4.0	2.4
RCA-56 Driver A. F.	13.0	—	235	6.3	2.4
RCA-53 Output	4.5	—	290	12.0	2.4
RCA-80 Rectifier	600 R. M. S. Plate to Plate			88.0	5.0

GENERAL ELECTRIC CO.

MODELS K80-K80X & K85



Line-Up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and on the three lowest frequency bands a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers due to the additional R. F. stage used.

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 20,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screwdriver such as Stock No. 7065, and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

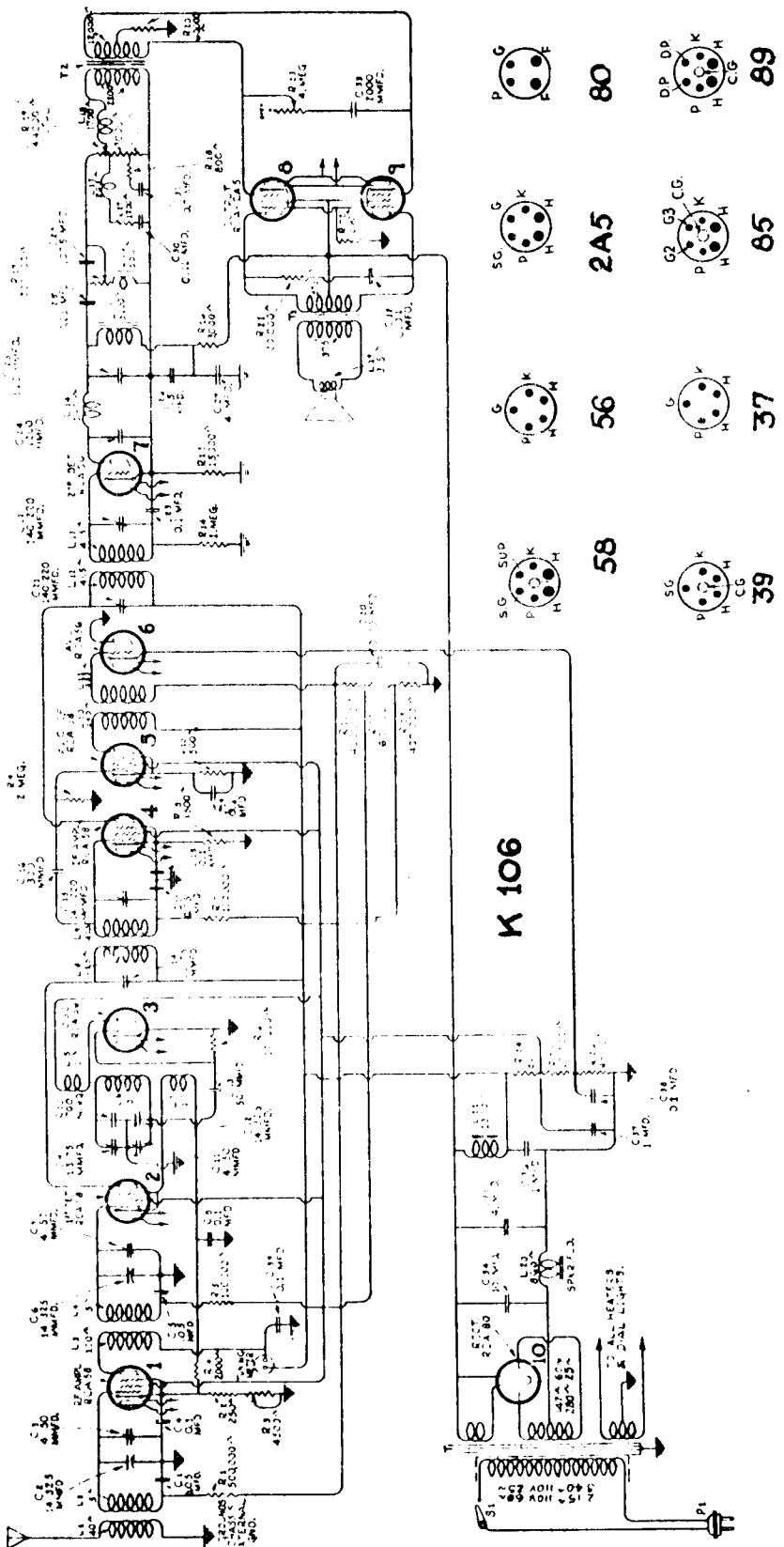
The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position. The external oscillator output should be connected between antenna and ground for the R. F. and oscillator adjustments and between the first detector grid and ground for the I. F. adjustments. All adjustments are made for a maximum deflection in the output meter.

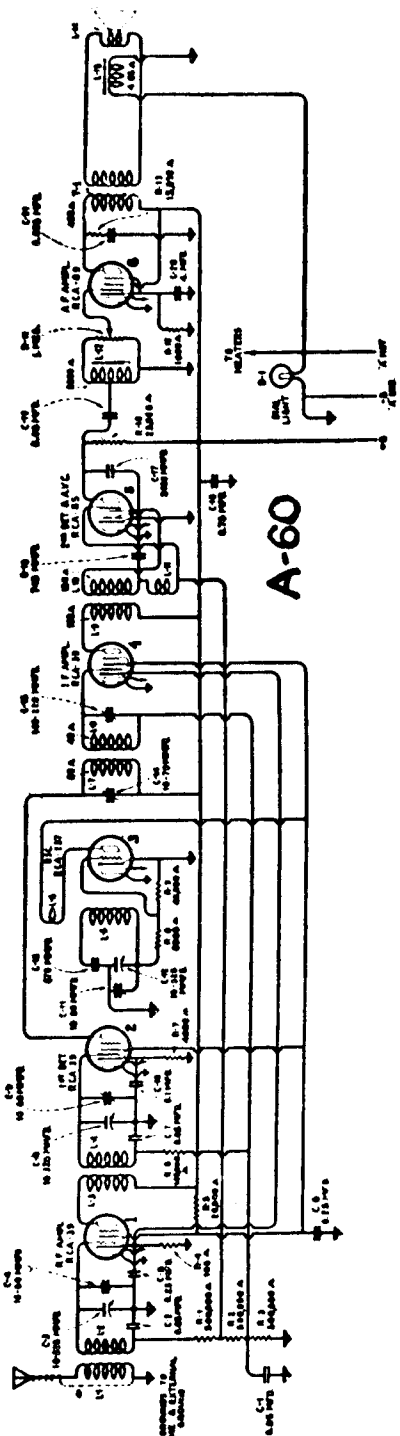
120 Volt A. C. Line

Radiotron No.	Control Grid to Cathode Volts	Screen Grid to Cathode Volts	Plate to Cathode Volts	Plate Current M. A.
RCA-58, R. F.	**2.0	100	255	6.0
RCA-58, S. W. R. F.	**2.0	100	255	6.0
RCA-2A7, Det.-Osc.	**2.5	100	250	*5.0
RCA-58, I. F.	**2.0	100	255	6.0
RCA-2B7, 2nd Det.-AVC	**1.5	35	105	1.5
RCA-56, A. F. Driver	**12.0	—	245	6.0
RCA-53, Output	0	—	300	36.0
RCA-80, Rectifier	640 R. M. S. Plate to Plate			130 per Plate

GENERAL ELECTRIC CO.

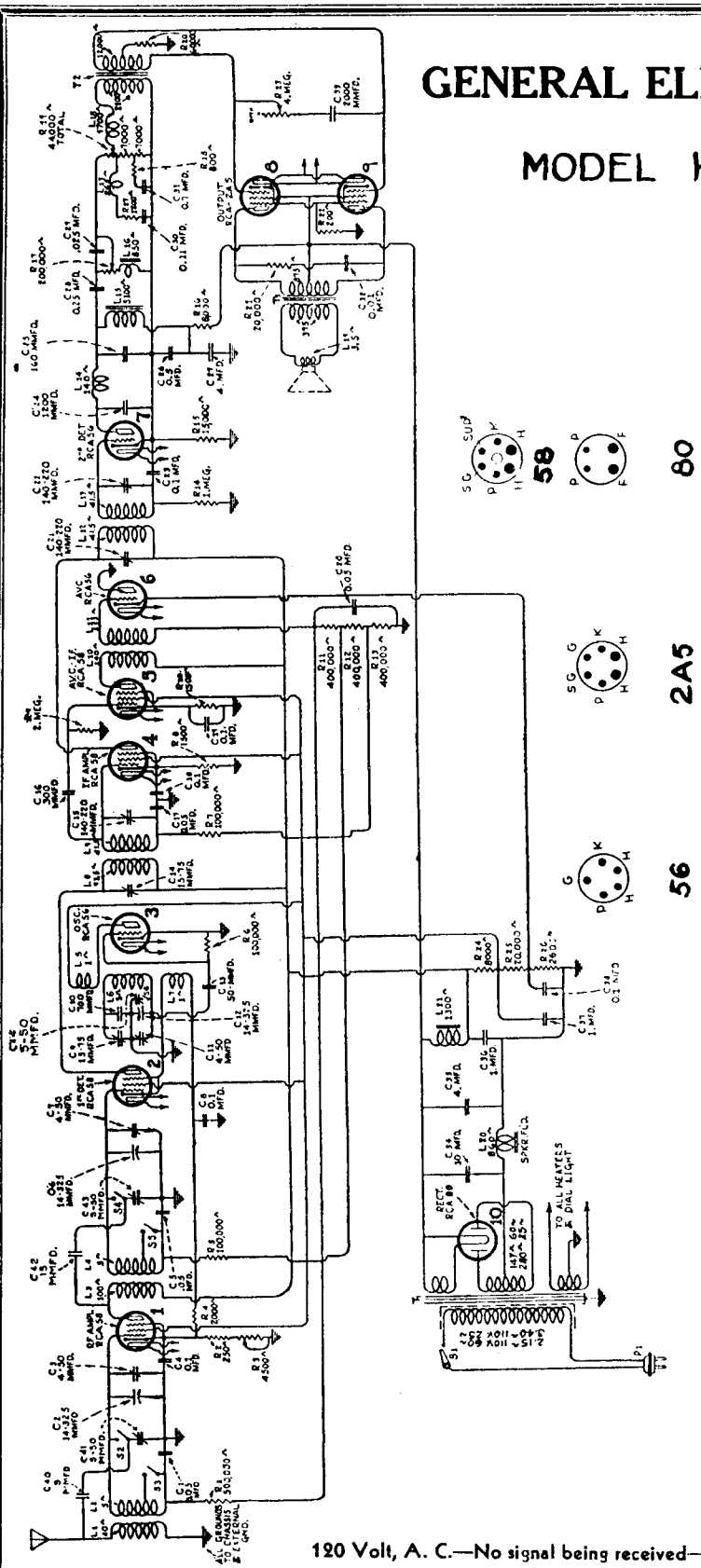
MODELS K106 & A60





GENERAL ELECTRIC CO.

MODEL K-105



To reduce the high-frequency (treble) response, or to decrease the background noise (static) interference *on station settings*, turn the right-hand tone control knob counter-clockwise.

To reduce the low-frequency (bass) response, or to decrease low-pitched hum present on the signals of some stations, turn the left-hand tone control knob clockwise.

R. F. And Oscillator Line-Up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C.—difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors:

(a) Procure an R. F. Oscillator such as Stock No. 9050 giving a modulated signal at 600 K. C., 1400 K. C. and 2440 K. C. Also procure a non-metallic screwdriver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects but having one heater prong removed. Insert this tube in the A. V. C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that an excessive reading on the output meter is not obtained.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a maximum deflection is obtained in the output meter.

(g) The high frequency band is adjusted at 2440 K. C.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a deflection is obtained in the output meter.

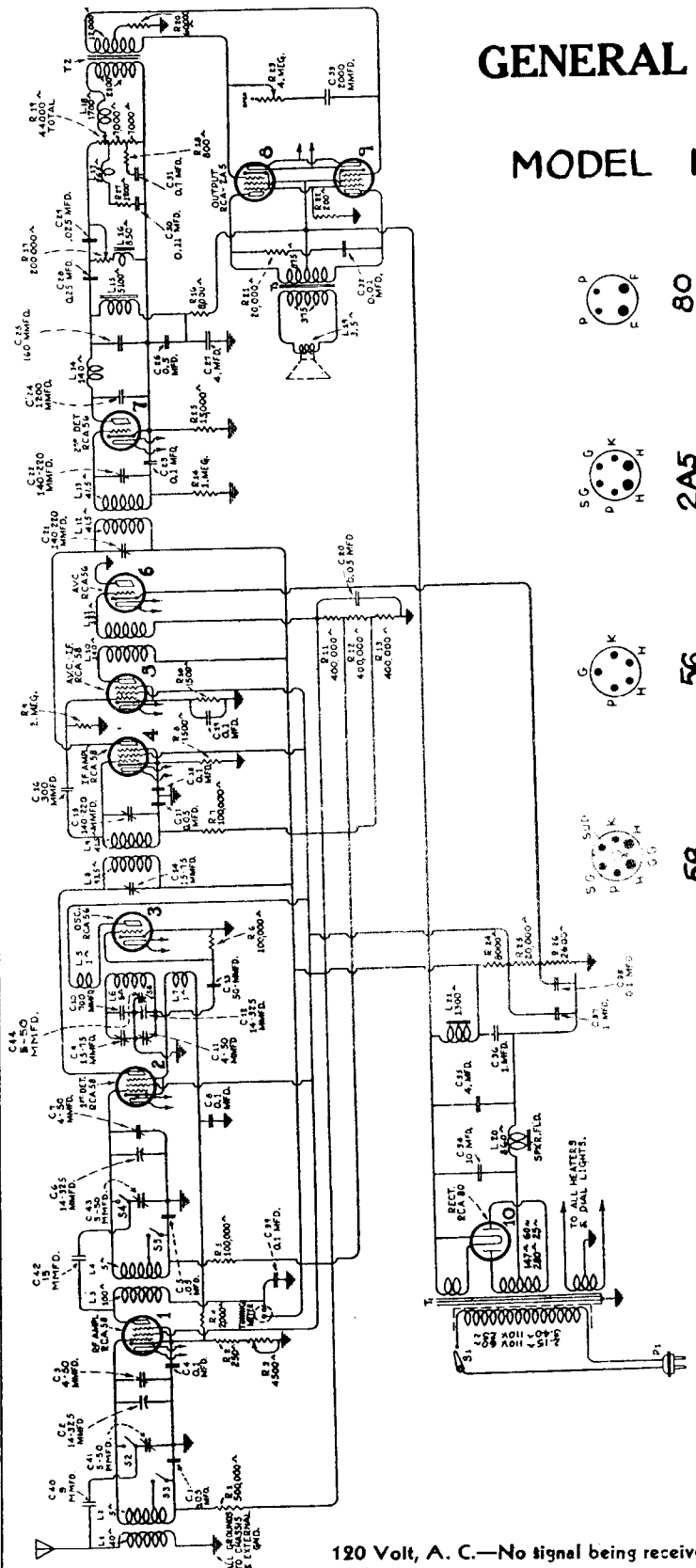
(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

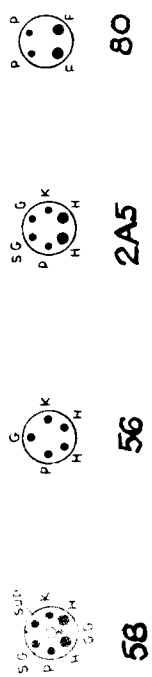
120 Volt, A. C.—No signal being received—Volume Control at minimum

Radiotron No.	Cathode to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current, M. A.	Heater or Filament Volts, A. C.
1. R. F.	3.0	100	230	7.0	2.4
2. 1st Detector	8.0	95	220	2.5	2.4
3. Oscillator	—	—	105	6.0	2.4
4. I. F.	7.5	100	225	2.5	2.4
5. A. V. C.—I. F.	7.5	100	225	2.5	2.4
6. A. V. C.	20.0	—	0	—	2.4
7. 2nd Detector	17.0	—	250	1.2	2.4
8. Power	18.0	255	245	33.0	2.4
9. Power	18.0	255	245	33.0	2.4

GENERAL ELECTRIC CO.

MODEL K-107





R. F. And Oscillator Line-Up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C.—difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors.

(a) Procure an R. F. Oscillator giving a modulated signal at 600 K. C., 1400 K. C. and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects but having one heater prong removed. Insert this tube in the A. V. C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that an excessive reading on the output meter is not obtained.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a maximum deflection is obtained in the output meter.

(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure C, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interact.

(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g) and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed precedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a deflection is obtained in the output meter.

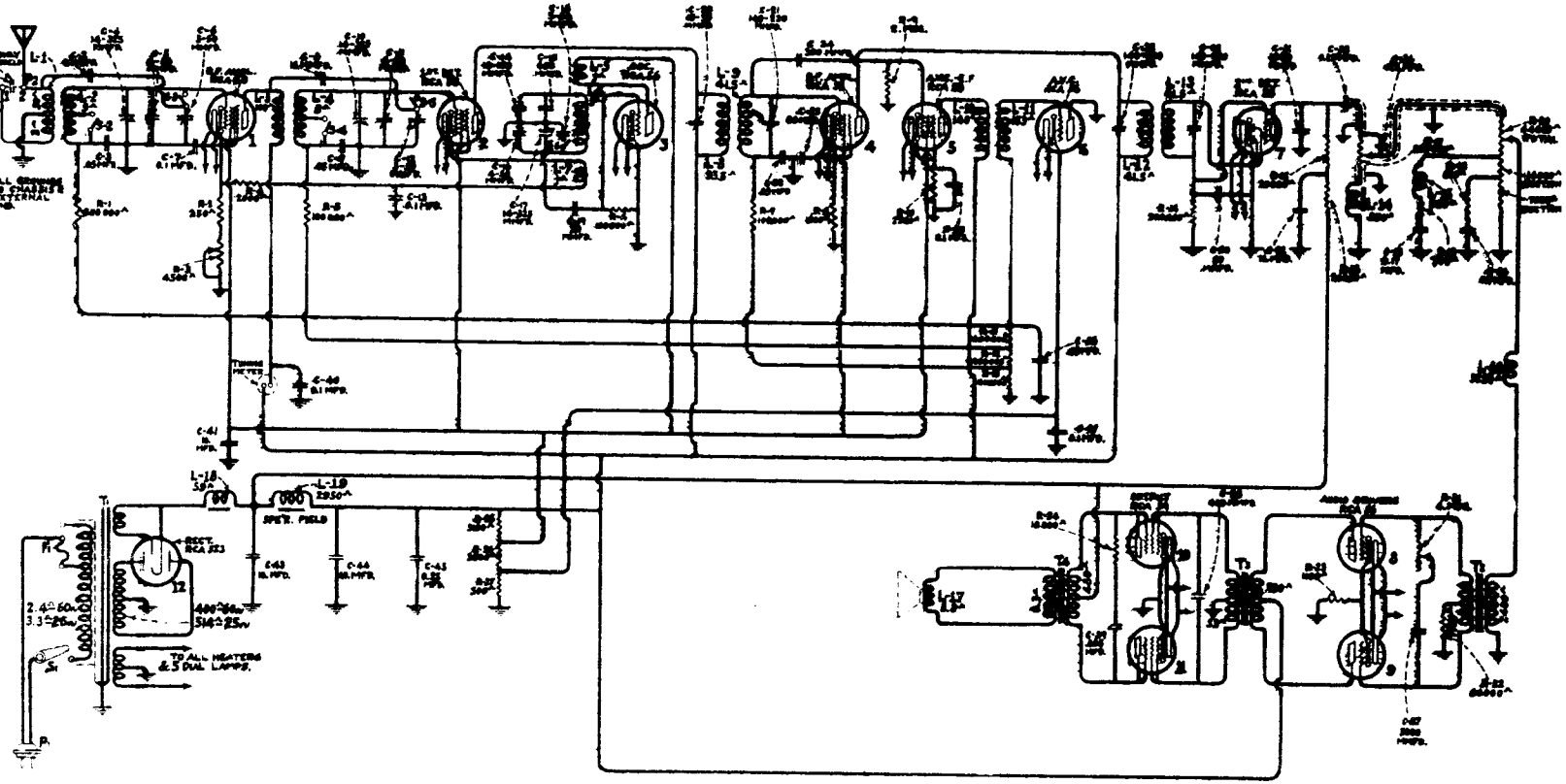
(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

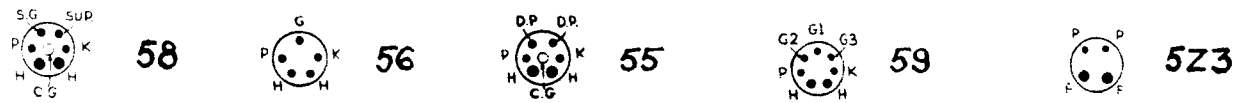
120 Volt, A. C.—No signal being received—Volume Control at minimum

Radiotron No.	Cathode to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current, M. A.	Heater or Filament Volts, A. C.
1. R. F.	3.0	100	230	7.0	2.4
2. 1st Detector	8.0	95	220	2.5	2.4
3. Oscillator			105	6.0	2.4
4. I. F.	7.5	100	225	2.5	2.4
5. A. V. C.—I. F.	7.5	100	225	2.5	2.4
6. A. V. C.	20.0		0		2.4
7. 2nd Detector	17.0		250	1.2	2.4
8. Power	18.0	[illegible]	245	33.0	2.4
9. Power	16.0	[illegible]	245	33.0	2.4

GENERAL ELECTRIC CO.

MODEL K-126





I. F. Tuning Capacitor Adjustments

120 Volt A. C. Line—Volume Control and Sensitivity Control at Maximum—No signal being received

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	3.1	97	212	7.5	2.5
RCA-56 Osc.	—	—	100	6.0	2.5
RCA-58 1st Det.	9.5	91	206	2.8	2.5
RCA-58 I. F.	7.5	93	208	4.0	2.5
RCA-58 A. V. C.–I. F.	8.5	92	207	3.0	2.5
RCA-56 A. V. C.	12.0	—	—	0	2.5
RCA-55 2nd Det.	0	—	74	8.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-5Z3 Rect.	990–495 R. M. S.			92 Total	5.0

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.

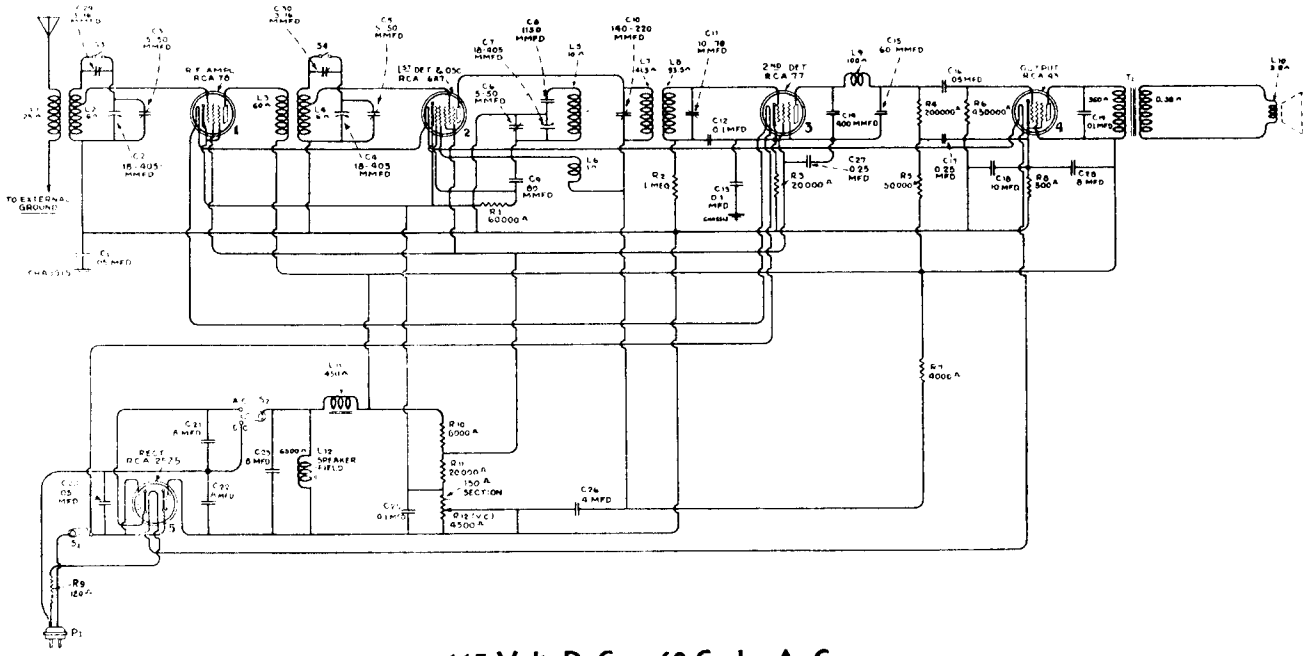
(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a slightly reduced deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a minimum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

GENERAL ELECTRIC CO.

MODEL L-53



115 Volts D. C. or 60 Cycles A. C.

Divide all A. C. Values (Except Heater) by 1.3 for 25 Cycles

Radiotron No.	Cathode to Control Grid, Volts D. C.		Cathode to Screen Grid, Volts D. C.		Cathode to Plate, Volts D. C.		Plate Current, M. A.		Heater Volts
	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	
RCA-78 R. F.	2.6	1.5	90	50	157	88.5	5.5	3.0	6.0
RCA-6A7 Oscillator	—	—	—	—	157	88.5	1.7	1.0	6.0
1st Detector	2.6	1.5	90	50	157	88.5	2.5	1.5	—
RCA-77 2nd Detector	Plate and Bias Supply 160 Volts						—	—	6.0
RCA-43 Power	21.0	12.0	135	80	125	72.0	35.0	20.0	25.0
RCA-25Z5 Rectifier	115 R. M. S.						89.0 Total	35.0 Total	25.0

Line-Up Capacitor Adjustments

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

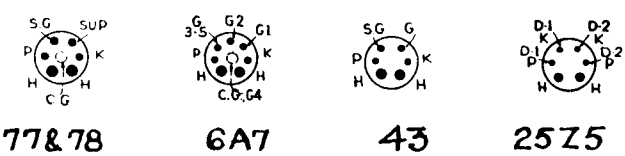
(a) Procure a modulated oscillator such as Stock No. 9050, giving a signal at 175 K. C., 1400 K. C., 1710 K. C. and 2440 K. C. An output meter and non-metallic screw driver (Stock No. 7065) are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F., line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1710 K. C. This is done with the Range Switch at the broadcast position (counter-clockwise). A similar manner is used as that of the I. F. except that the oscillator is set at 1710 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 8 (minimum dial position). The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

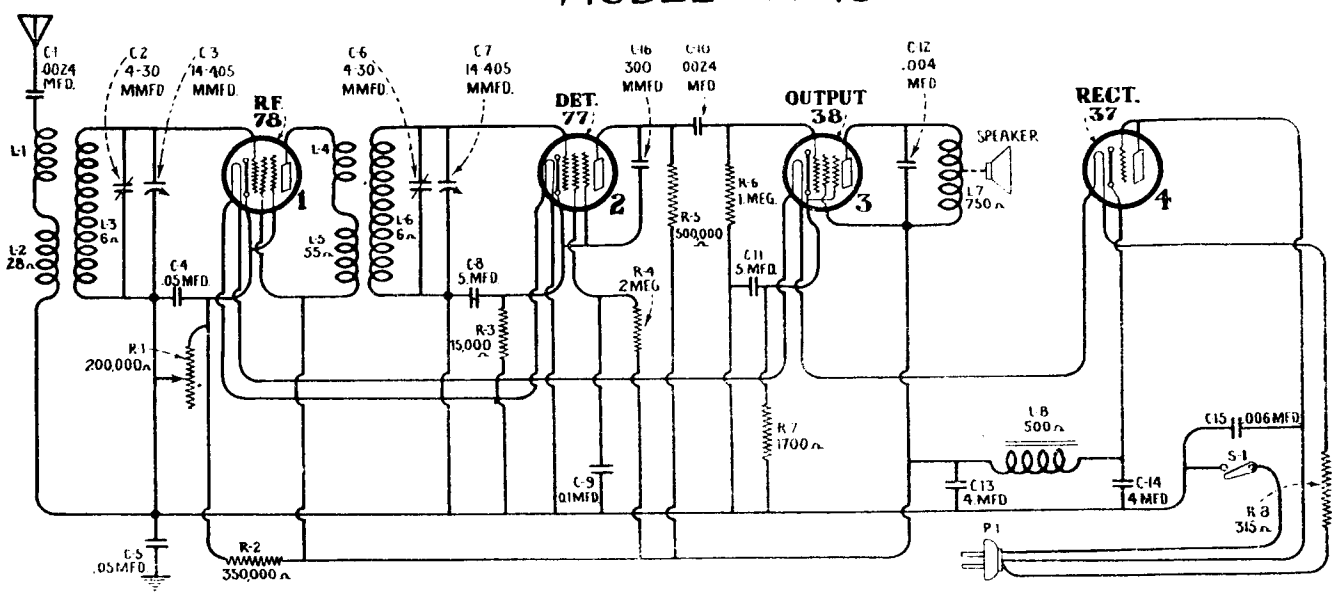
(d) After making the 1710 K. C. adjustment, set the dial at 18 and the oscillator at 1400. Then adjust the first detector and R. F. line-up capacitors only. This adjustment is made so that the R. F. and 1st detector will be aligned over the broadcast band, but the receiver will still tune to 1710 K. C. due to the oscillator line-up capacitor not being readjusted.

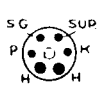
(e) Then set the Range Switch at its clockwise position. The oscillator should now be set at 2440 K. C. and the signal tuned in. Two points on the dial will be noted where the signal is heard, one of which may be louder than the other. Set the dial at either point. Note—the 2440 K. C. signal will still be heard at two points, since the R. F. stage acts as a fixed tuned circuit. Adjust the two high-frequency trimmers, located on the lower side of the gang capacitor, until maximum output is obtained.



GENERAL ELECTRIC CO.

MODEL M-40





77 & 78

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CAUTION: DISCONNECT INSTRUMENT FROM POWER SUPPLY BEFORE TOUCHING CHASSIS, TUBES OR METAL PARTS INSIDE CABINET.

Electrical Specifications

Voltage Rating..105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption.....40 Watts
Frequency Range.....540 K. C.–1712 K. C.
Type and Number of Radiotrons—
1 RCA-77, 1 RCA-37, 1 RCA-38, 1 RCA-78—Total 4
Undistorted Output.....0.18 Watts

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

The receiver is aligned at 1400 K. C. by means of the two trimmer capacitors located on the main tuning capacitor. The proper alignment is made by adjusting the trimmers for maximum output after tuning in a 1400 K. C. signal. This adjustment should be made when they are near their extreme minimum position. After alignment a check to make sure that a 1712 K. C. signal can be heard when the main tuning capacitor is near its extreme minimum position should be made. Stock No. 9050 Test Oscillator and Stock No. 7065 non-metallic screwdriver are desirable for making this adjustment.

RADIOTRON SOCKET VOLTAGES

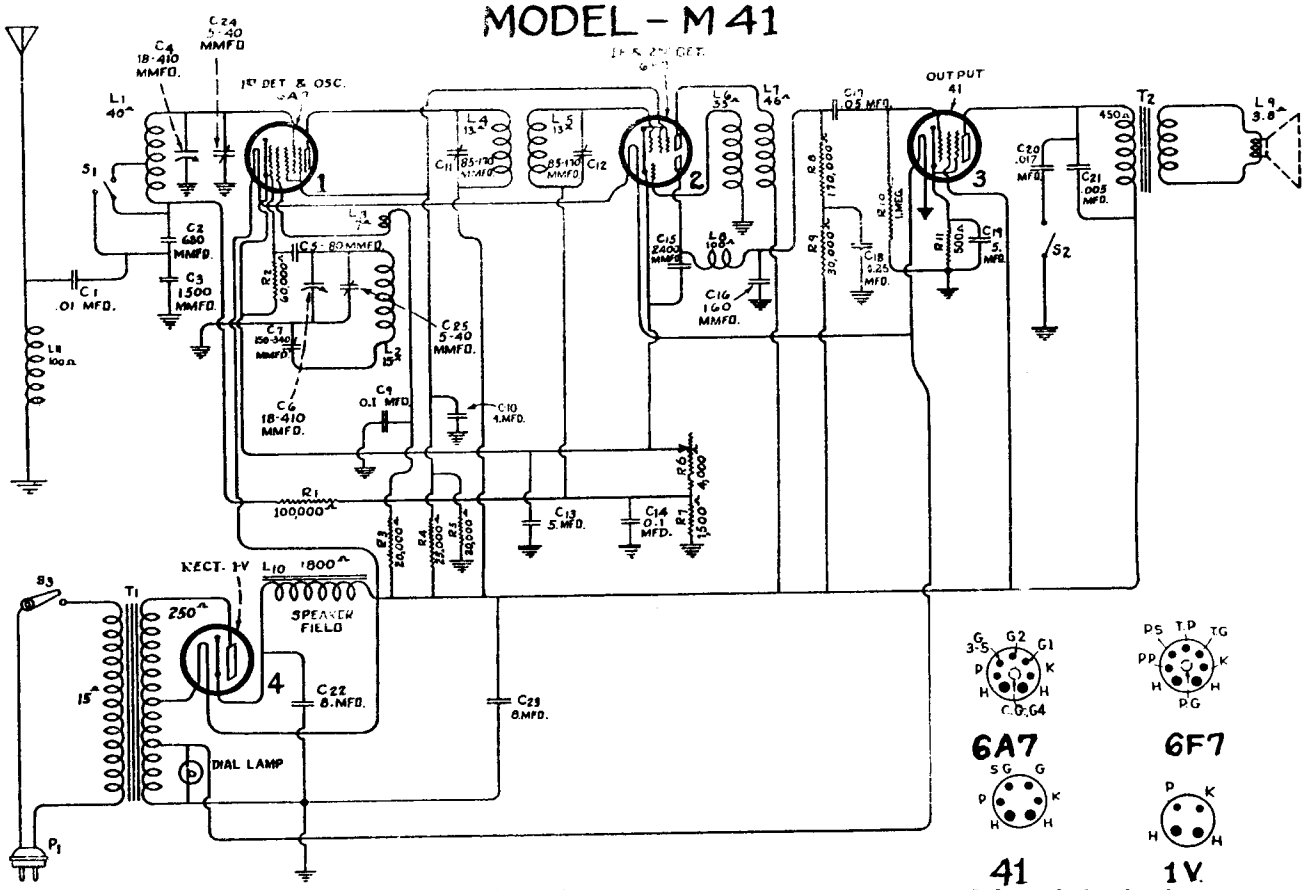
Measured at Maximum Volume—115 Volt A. C. Line
All Voltages on D. C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-78 R. F.	2.5	10.	105	7.0	6.0
2. RCA-77 Det.	*2.0	17.	*40	0.1	6.0
3. RCA-38 Output	10.0	100	95	5.5	6.0
4. RCA-37 Rect.	—	—	115 RMS	16.0	6.0

* Impossible to measure on ordinary voltmeter.
Note—Above voltages will be approximately 5% lower on 115 volts D. C. except for heater voltages which will be the same.

GENERAL ELECTRIC CO.

MODEL - M 41



Voltage Rating.....105-125 Volts
Frequency Rating.....25-60 or 50-60 Cycles
Power Consumption.....40 Watts
Number and Type of Radiotrons—
1 RCA-6A7, 1 RCA-6F7, 1 RCA-41, 1 RCA-1-V
Undistorted Output.....1.9 Watts
Frequency Range.....540-1500 K. C. and 1600-3500 K. C.

This receiver is a four-tube superheterodyne incorporating features such as wide tuning range, electro-dynamic loudspeaker, two-point tone control, illuminated dial and the inherent sensitivity, selectivity and tone quality of the superheterodyne.

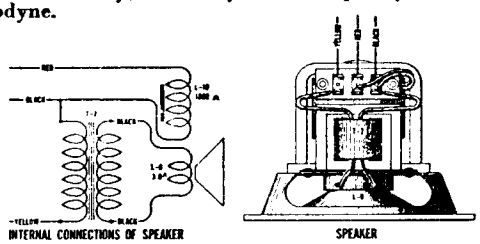


Figure C—Loudspeaker Wiring

The following description of the circuit describes several new design features which are incorporated in this receiver.

The first tube is a combined first detector and oscillator using Radiotron RCA-6A7. Separate tuned circuits are provided for each function. The detector coil is tapped so that the tuning range may be extended merely by shorting out a portion of the coil. The oscillator circuit is not tapped, the high frequency range being obtained by use of its second harmonic instead of the fundamental for obtaining the I. F. frequency.

The next tube is a combined I. F. stage and second detector using Radiotron RCA-6F7. It has two sets of elements, one being used as a screen grid I. F. amplifier and one as a triode detector. The I. F. frequency in this receiver is 460 K. C. The output stage is a single Pentode RCA-41.

The rectifier is an RCA-1-V used in a half-wave rectifying circuit. A feature of this circuit is that only one transformer secondary is used. This is accomplished by having a cathode type rectifier, a series arrangement of filaments and a tapped secondary winding.

Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring.

Line-Up Adjustments

The detector and oscillator line-up trimmer capacitors are adjusted by setting both the dial and an external oscillator first at 1400 K. C. and adjusting the tuning capacitor trimmer capacitors for maximum output, then changing the oscillator frequency and dial setting to 600 K. C. and adjusting the submounted trimmer capacitor for maximum output. The I. F. adjustments are made by adjusting the two trimmer capacitors located on the first I. F. transformer for maximum output when a 460 K. C. signal is connected between the control grid of the first detector and ground. Be sure and set the station selector at a point where no signal is being received when making I. F. adjustments.

RADIOTRON SOCKET VOLTAGES

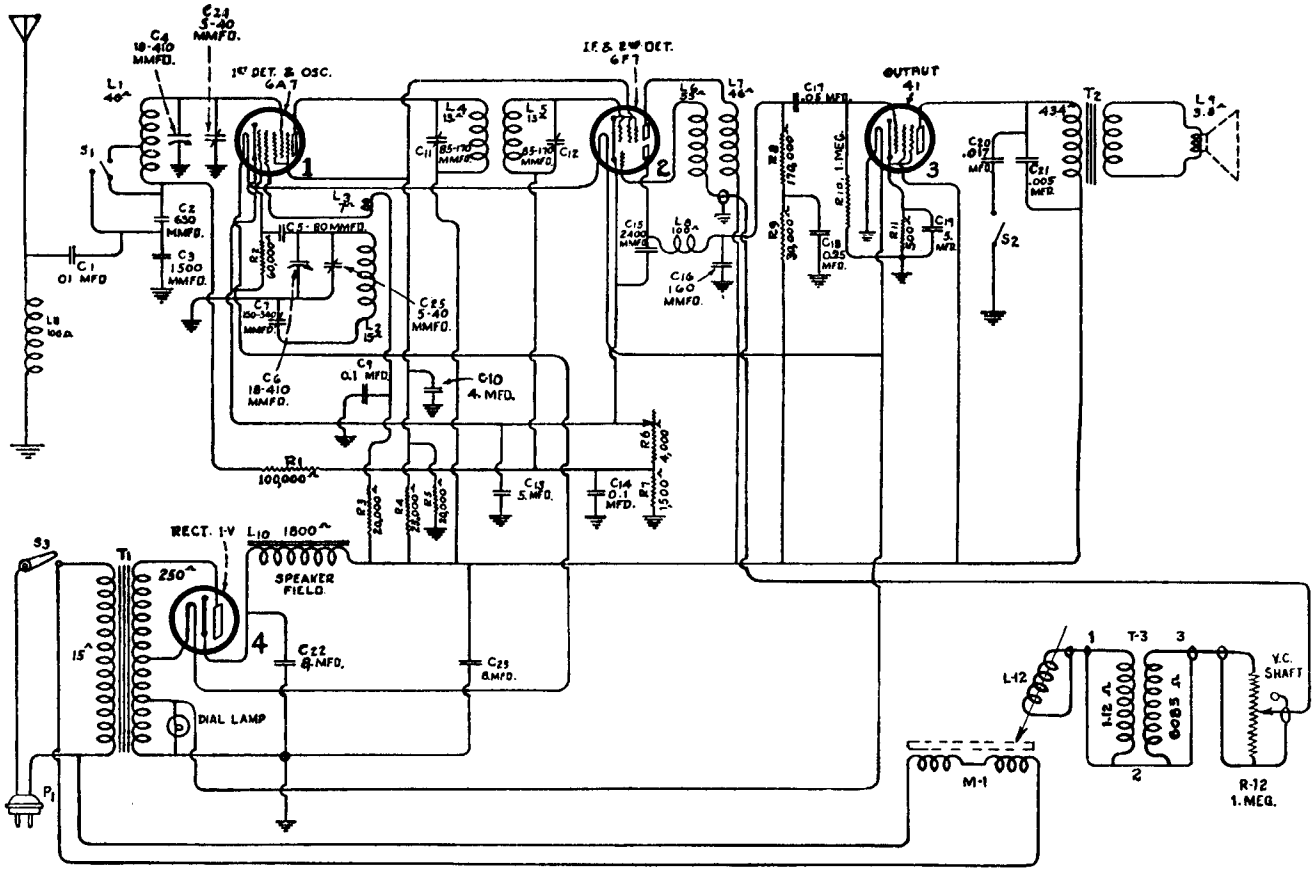
120 Volt, 60 Cycle Line—Maximum Volume Control Setting—No Signal

Radiotron No.		Cathode to Control Grid, Volts D. C.	Cathode to Screen Grid, Volts, D. C.	Cathode to Plate, Volts D. C.	Plate Current, M. A.	Heater or Filament, Volts
RCA-6A7	First Detector	1.25	70	235	2.5	6.3
	Oscillator	—	—	180	3.5	
RCA-6F7	I. F.	1.25	70	235	5.5	6.3
	Second Detector	19	—	145*	0.4	
RCA-41 Output		17	240	230	26.5	6.3
RCA-1-V Rectifier		—	—	335 RMS	50	6.3

* Actual voltage cannot be measured with ordinary voltmeter.

GENERAL ELECTRIC CO.

MODEL M-49

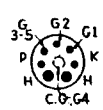


RADIOTRON SOCKET VOLTAGES

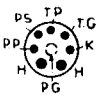
120 Volt, 60 Cycle Line—Maximum Volume Control Setting—No Signal

Radiotron No.		Cathode to Control Grid, Volts D. C.	Cathode to Screen Grid, Volts D. C.	Cathode to Plate, Volts D.C.	Plate Current, M.A.	Heater or Filament, Volts
RCA-6A7	First Detector	1.25	70	235	2.5	6.3
	Oscillator	—	—	180	3.5	
RCA-6F7	I. F.	1.25	70	235	5.5	6.3
	Second Det.	19	—	145*	0.4	
RCA-41	Output	17	240	230	26.5	6.3
RCA-1-V	Rectifier	—	—	335 RMS	50	6.3

* Actual voltage cannot be measured with ordinary voltmeter.



6A7



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Line-Up Adjustments

The detector and oscillator line-up trimmer capacitors are adjusted by setting both the dial and an external oscillator first at 1400 K. C. and adjusting the tuning capacitor trimmer capacitors for maximum output, then changing the oscillator frequency and dial setting to 600 K. C. and adjusting the submounted trimmer capacitor for maximum output. The I. F. adjustments are made by adjusting the two trimmer capacitors located on the first I. F. transformer for maximum output when a 460 K. C. signal is connected between the control grid of the first detector and ground. Be sure and set the station selector at a point where no signal is being received when making I. F. adjustments.

make certain:

(a) That all tubes are in the proper sockets and pressed down firmly.

(b) That all shields are rigidly in place over the tubes shown by double circles on the diagram.

(c) That the short flexible leads shown on the diagram are attached to the dome terminals of the proper tubes as indicated, and that the spring contact clips are pressed down firmly.

Frequency Range Switch (Right-hand Knob)—With this knob in its *counter-clockwise* position, stations transmitting in the 540–1500 kilocycle or broadcast range will be received (frequencies in this range are indicated by the large numerals adjacent to the scale graduations). When the knob is turned *clockwise*, the circuits are transferred to permit reception from stations operating in the 1600–3500 kilocycle range (frequencies in this range are indicated approximately by the small outer numerals).

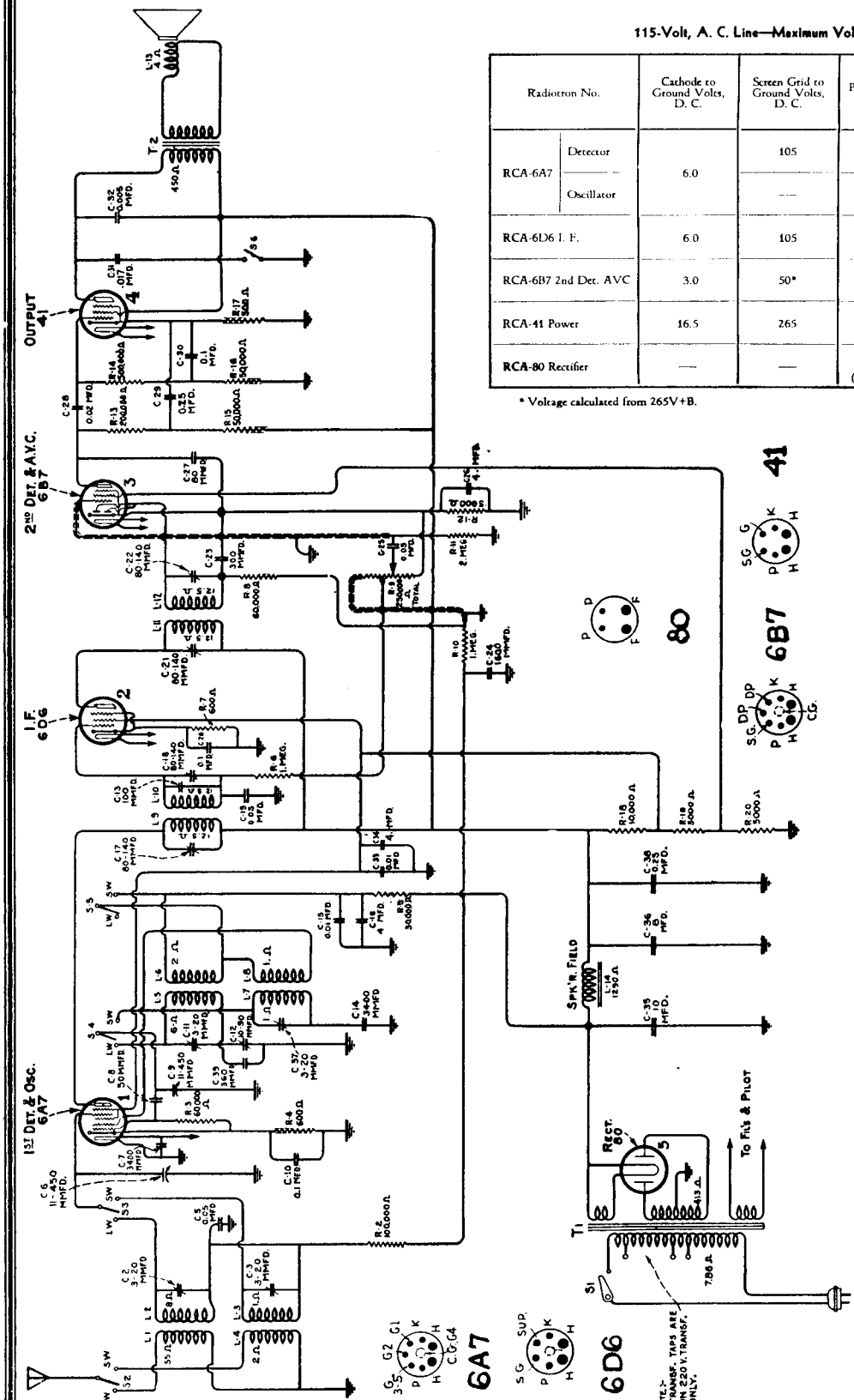
GENERAL ELECTRIC CO.

MODELS M-51 & M56

115-Volt, A. C. Line—Maximum Volume Control—No Signal

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-6A7	Detector	6.0	105	265	3.5	6.3
	Oscillator		—	220	4.5	
RCA-6D6 I. F.		6.0	105	265	9.0	6.3
RCA-6B7 2nd Det. AVC		3.0	50*	90*	0.7	6.3
RCA-41 Power		16.5	265	245	30.0	6.3
RCA-80 Rectifier		—	—	690 (Plate to Plate)	64.0	5.0

* Voltage calculated from 265V+B.



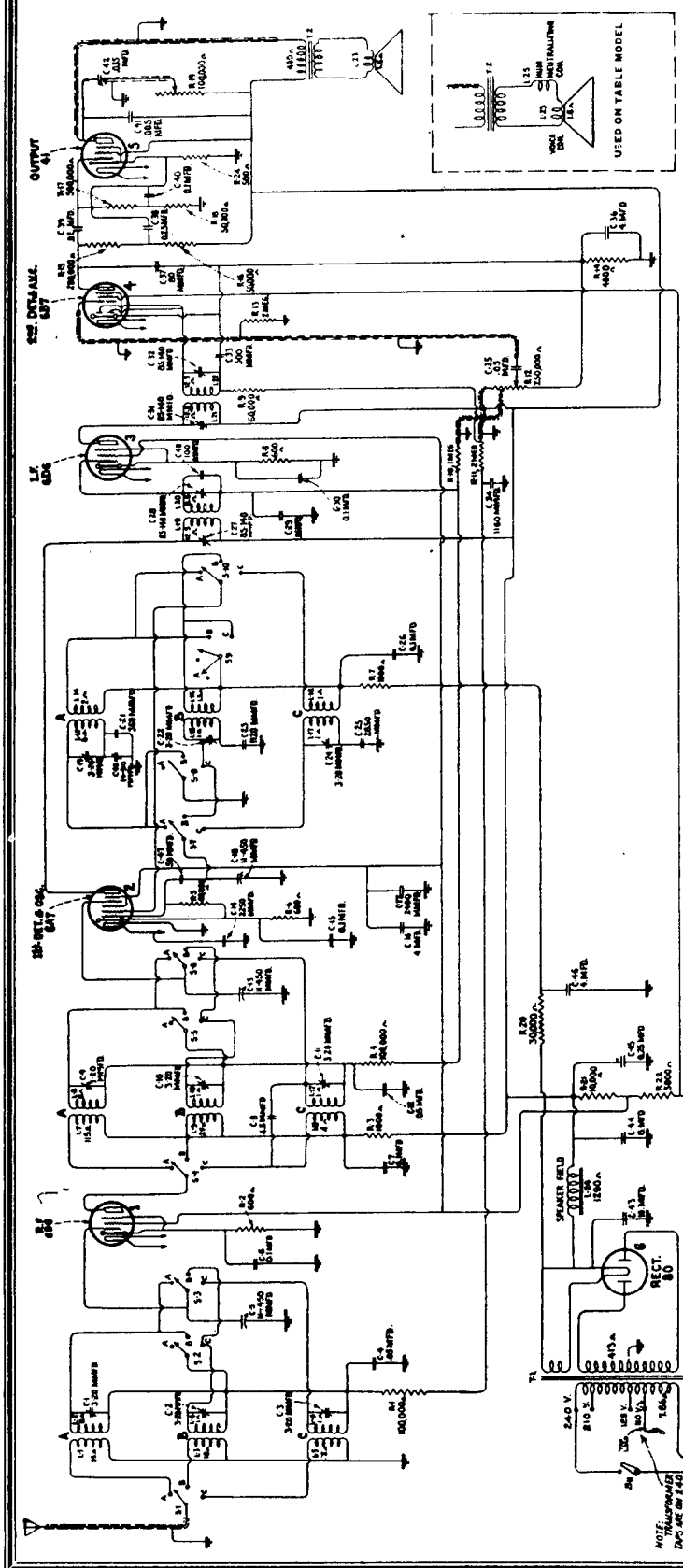
(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

GENERAL ELECTRIC CO.

MODELS M-61 & M67



I. F. TUNING CAPACITOR ADJUSTMENTS

Although this receiver has one I. F. stage, two transformers having four adjustable capacitors may require adjustment. The transformers are all peaked, being tuned to 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 6. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

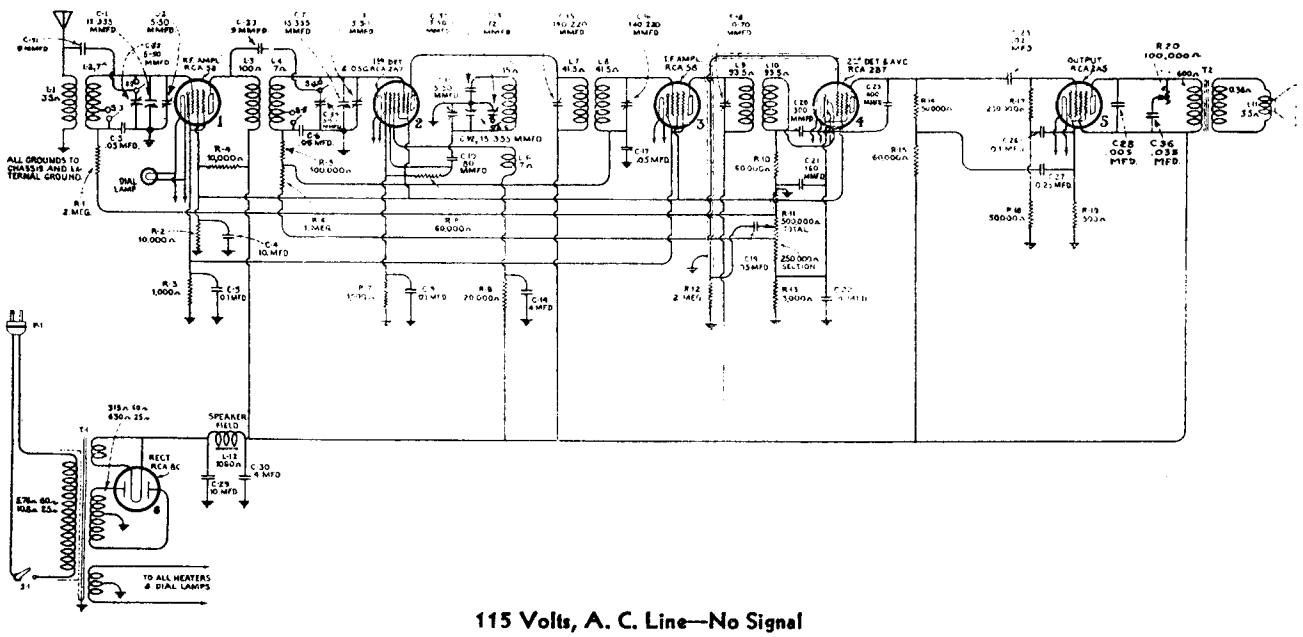
115-Volt A. C. Line—No Signal—Volume Control Maximum

Radiotron Number		Cathode to Ground, Volts, D. C.	Screen Grid to Ground, Volts, D. C.	Plate to Ground, Volts, D. C.	Plate Current, M. A.
RCA-6D6—R. F.		6.0	105	265	9.0
RCA-6A7	Dec.	6.0	105	265	3.5
	Osc.	—	—	220	4.5
RCA-6D6—1. F.		6.0	105	265	9.0
RCA-6B7—2nd Detector		3.0	50	90*	0.7
RCA-41—Pwr		16.5	265	245	30.0
RCA-80—Rectifier		—	—	690 (RMS)	70.0

*Voltage calculated from 265 V. + B.

GENERAL ELECTRIC CO.

MODEL M 63



115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	4.0	95	255	5.0	2.31
2. RCA-2A7 1st Det. Osc.	5.0*	95*	255*	3.0*	2.31
3. RCA-58 I. F.	4.0	95	255	5.0	2.31
4. RCA-2B7 2nd Det. A. V. C.	7.5	92	60	2.0	2.31
5. RCA-2A5 Power	20.0	250	235	33.0	2.81
6. RCA-80 Rectifier	700–350 Volts—75 M. A. Total Current				4.82

*The voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.

LINE-UP ADJUSTMENTS

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

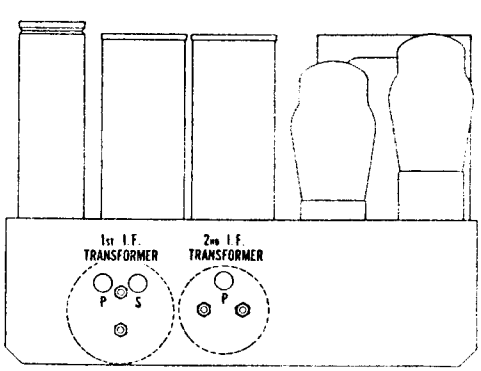


Figure D—Location of I. F. Line-up Adjustment Screws

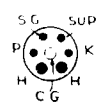
R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be opposite the last division of the low frequency end of scale with the indicator at its center position. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important points to remember are that the receiver volume control must be at its maximum position and that the input signal from the external oscillator must be no greater than necessary.



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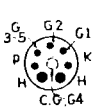

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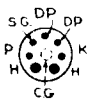

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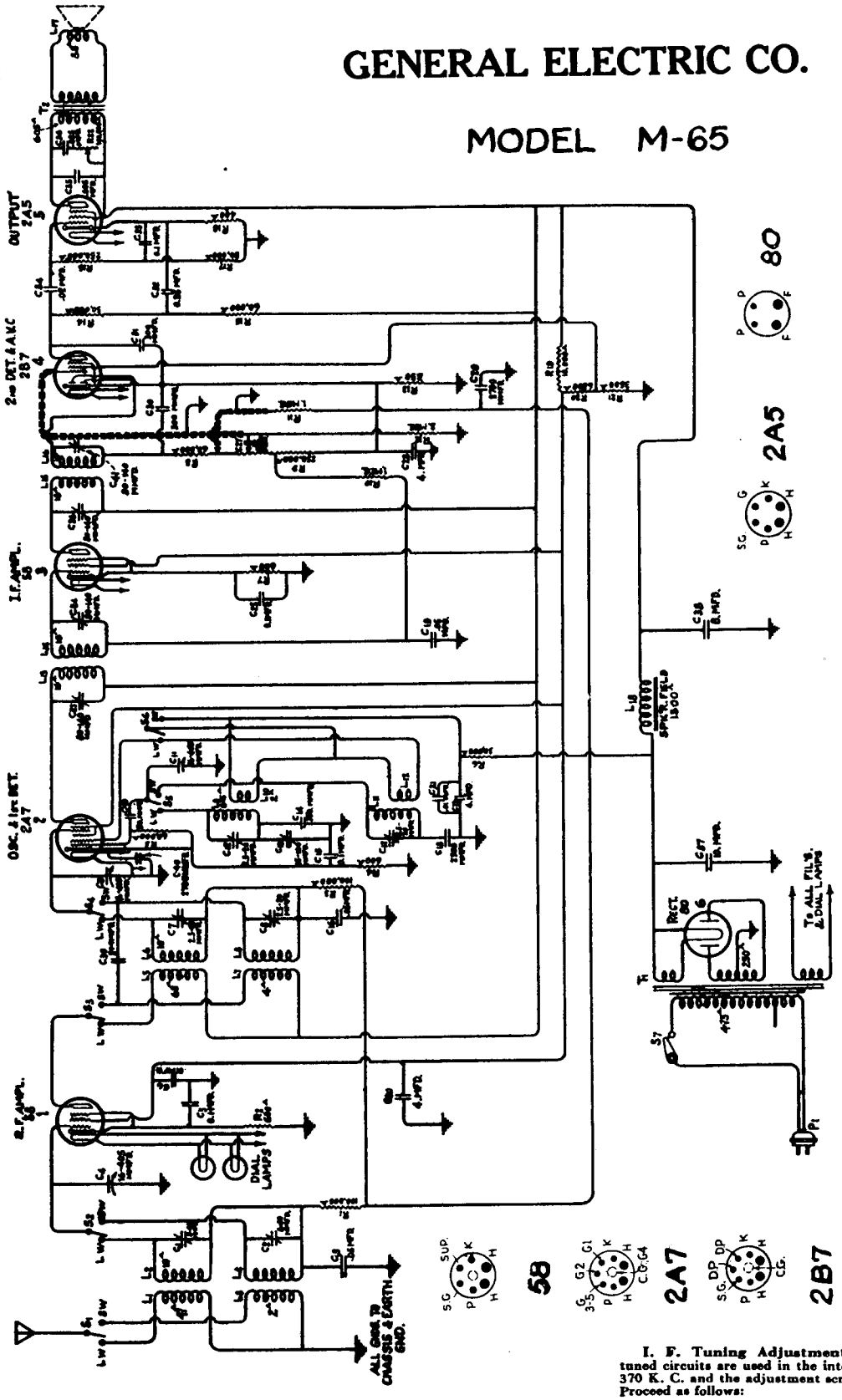
GENERAL ELECTRIC CO.

MODEL M-65



Type No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.0	100	265	6.0	2.42
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*	2.42
3. RCA-58 I. F.	3.0	100	265	6.0	2.42
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5	2.42
5. RCA-2A5 Power	16.0	255	240	35.0	2.42
6. RCA-80 Rectifier	725 Volts R. M. S.—75 M. A. Total Current				4.80

* The voltages and current refer to the detector part of the tube.

Range Switch—This switch is of push-pull construction and adapts the receiver for operation within either tuning range as follows:

(a) *Inward Position*—For standard broadcast band (540 to 1500 kilocycles).

(b) *Outward Position*—For short-wave range (5400 to 15,350 kilocycles).

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receive so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

GENERAL ELECTRIC CO.

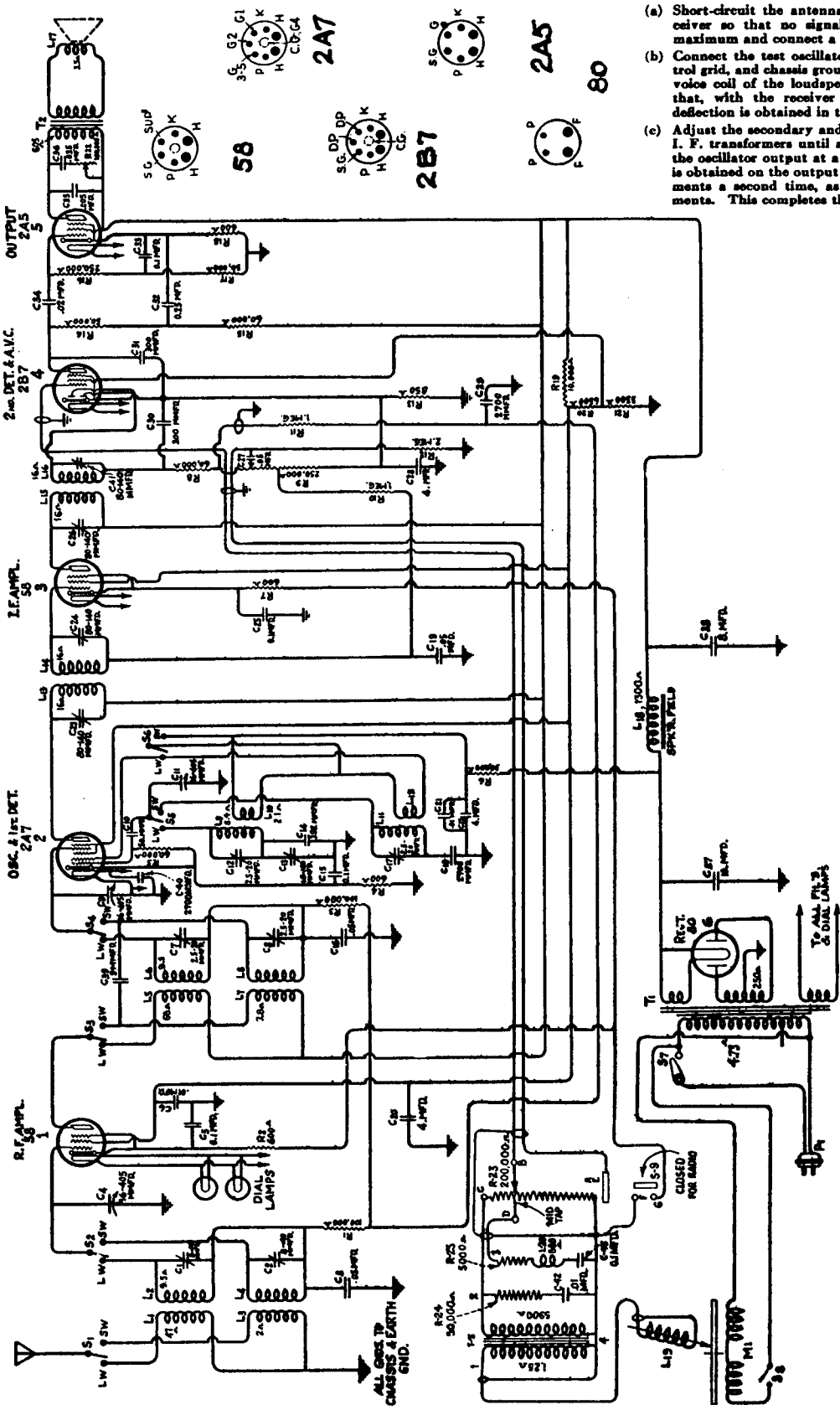
MODEL M-68

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid, and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

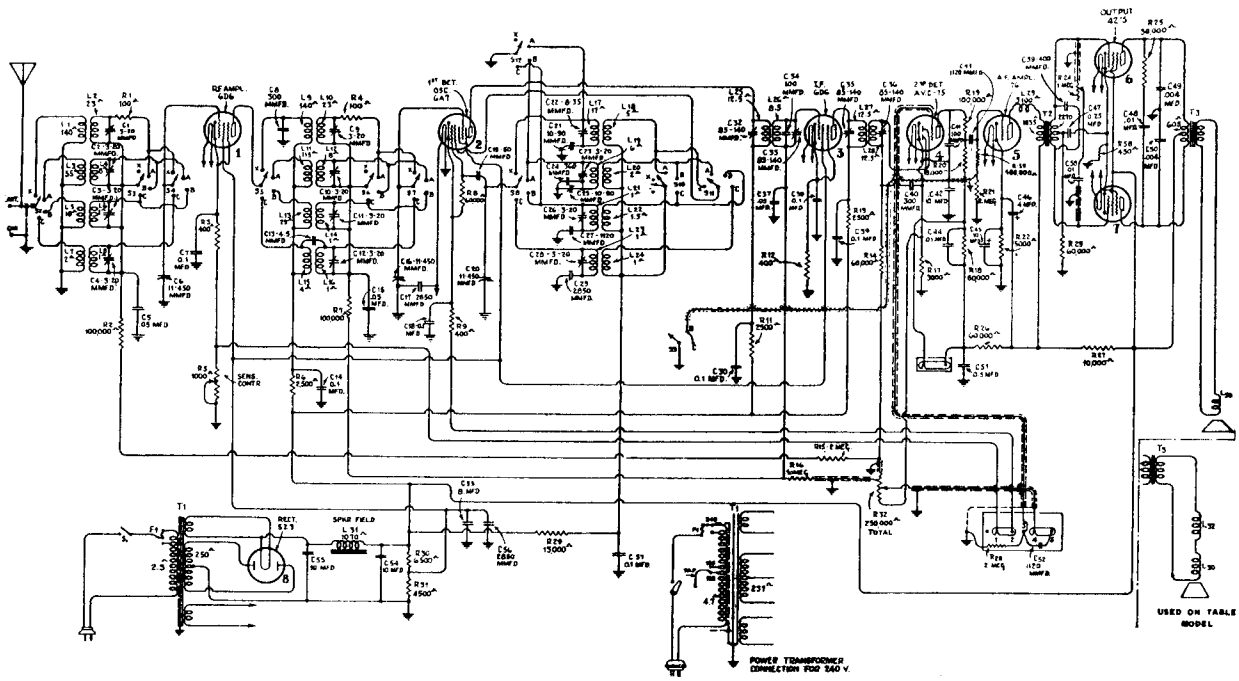


Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.0	100	265	6.0	2.32
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*	2.32
3. RCA-58 I. F.	3.0	100	265	6.0	2.32
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5	2.32
5. RCA-2A5 Power	16.0	255	240	35.0	2.32
6. RCA-80 Rectifier	725 Volts R. M. S.—75 M. A. Total Current				4.80

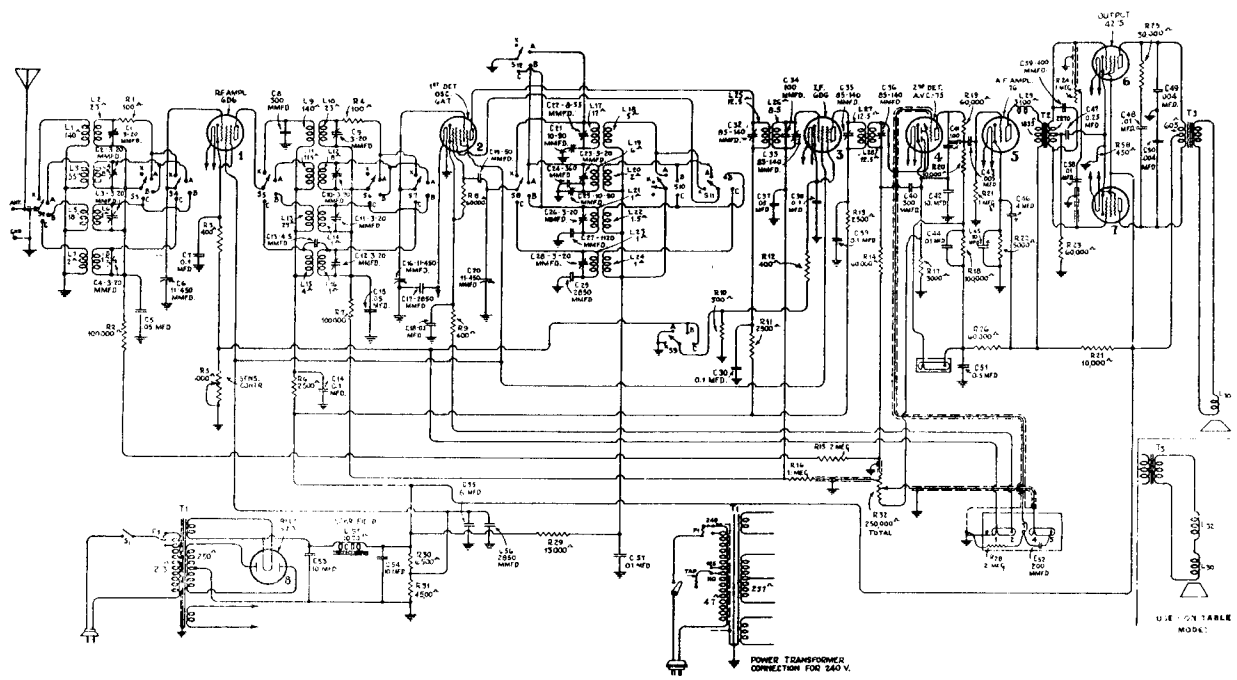
* The voltages and current refer to the detector part of the tube.

GENERAL ELECTRIC CO.

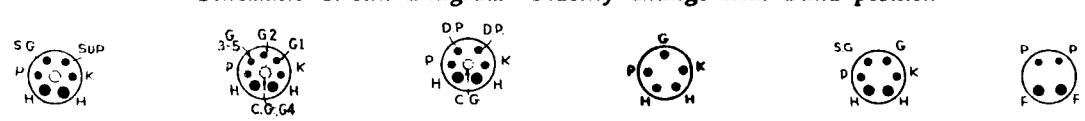
MODELS M81 & M86



Schematic Circuit Diagram—Sensitivity Control Change with Band position

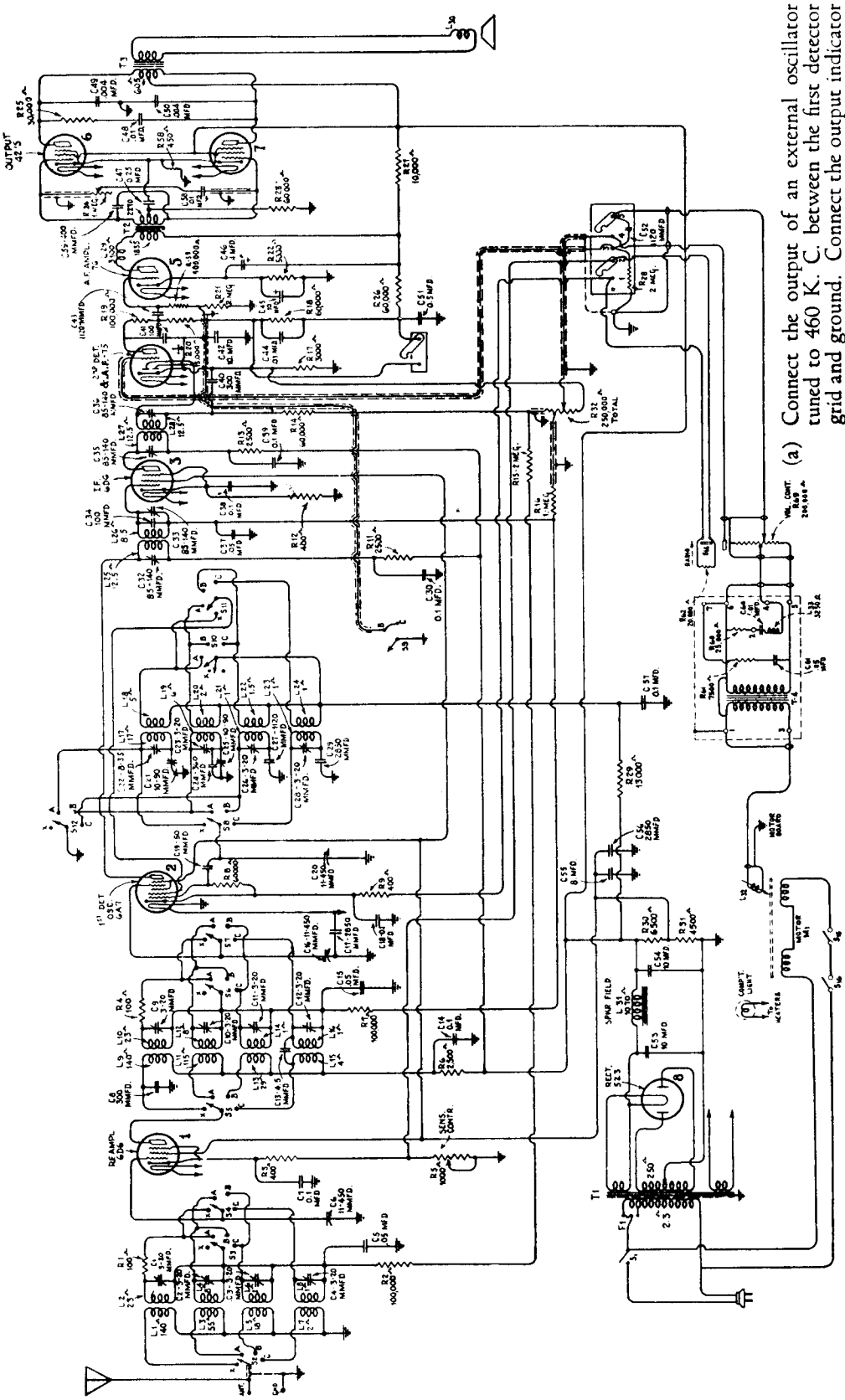


Schematic Circuit Diagram—Fidelity Change with Band position



GENERAL ELECTRIC CO.

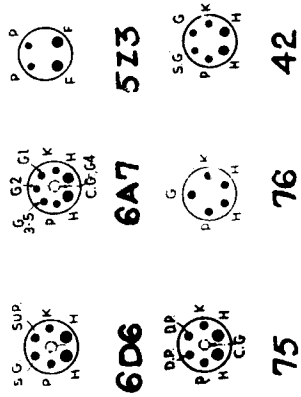
MODEL M-89



(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

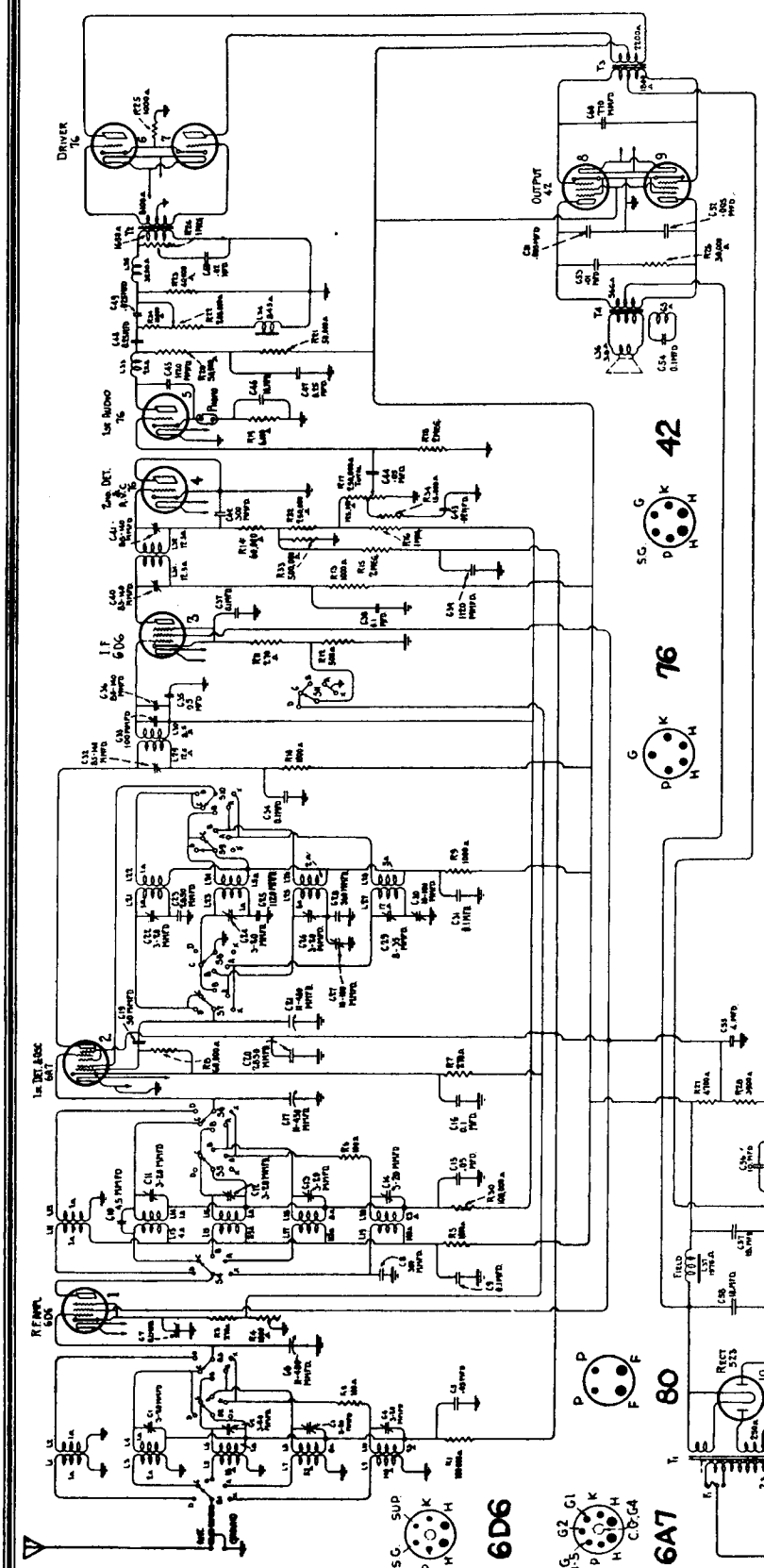
(b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 6. Adjust each trimmer of the I. F. transformers until maximum output is obtained. Go over the adjustments a second time.



GENERAL ELECTRIC CO.

MODEL M 106



Radiotron No.		Cathode to Ground Volts, D.C.	Screen Grid to Ground Volts, D.C.	Plate to Ground Volts, D.C.	Cathode Current, M.A.	Heater Volts, A.C.
RCA-6D6—R. F.		2.5	101	242	9.2	6.3
RCA-6A7	Detector	2.8	101	244	10.9	6.3
	Oscillator	—	—	244		
RCA-6D6—1. F.		2.5	101	242	9.2	6.3
RCA-76—2nd Det. AVC		0	—	—	0	6.3
RCA-76—A. F.		6.2	—	196*	1.2	6.3
RCA-76—Driver		11.4	—	247	5.6	6.3
RCA-76—Driver		11.4	—	247	5.6	6.3
RCA-42—Power		0	247	376	21.0	6.3
RCA-42—Power		0	247	376	21.0	6.3
RCA-523—Rectifier		—	—	768/384 R. M. S.	112	5.0

*Cannot be measured with ordinary voltmeter.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

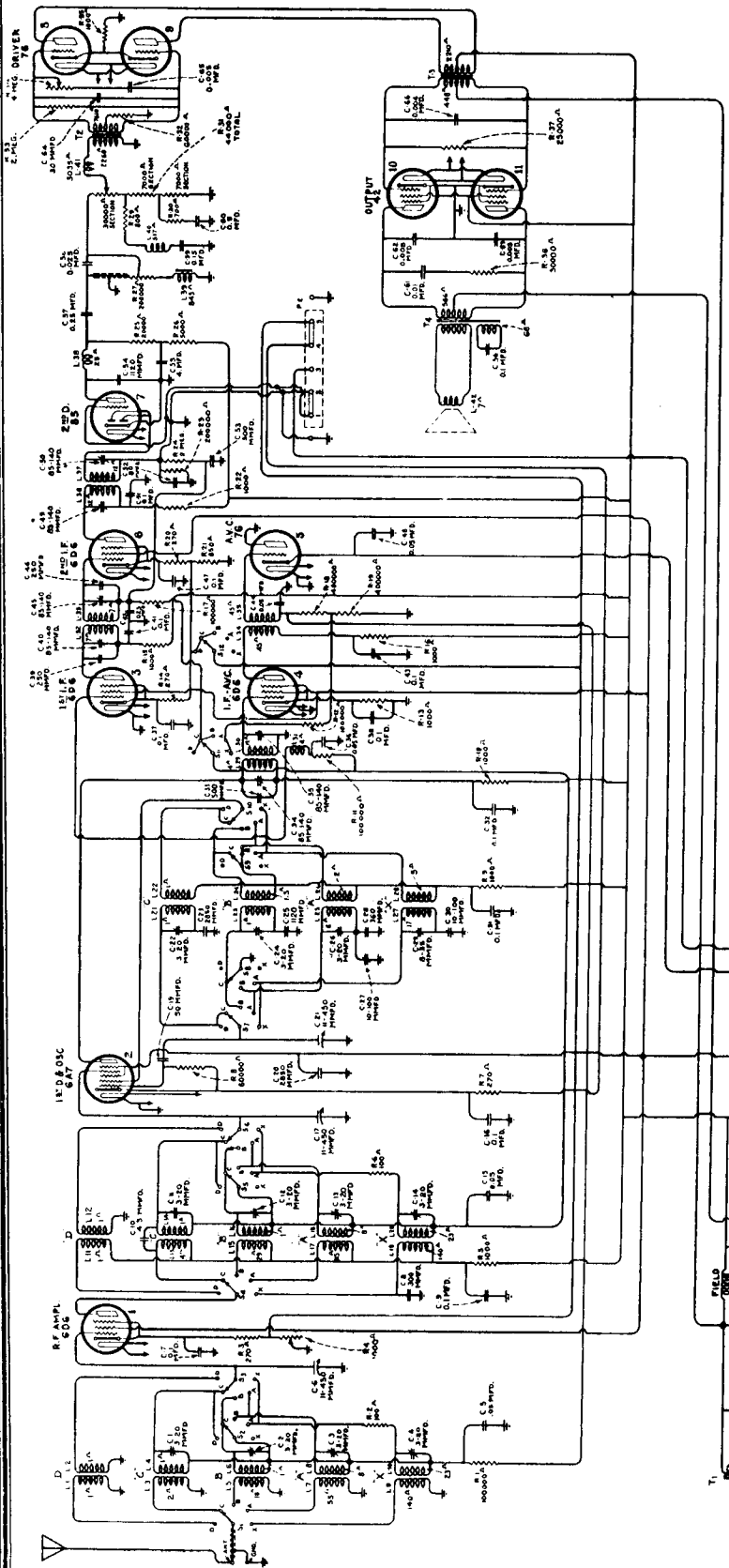
This receiver has one I. F. stage, and two transformers having four adjustable capacitors which may require adjustment. The transformers are all peaked at 460 KC.

(a) Connect the output of an external oscillator tuned to 460 KC between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 KC. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

GENERAL ELECTRIC CO.

MODEL M-125



I. F. TUNING CAPACITOR ADJUSTMENTS

Although this receiver has three I. F. stages, two for the signal and one for the A. V. C., only three transformers having six adjustable capacitors require adjustment. The fourth transformer is in the A. V. C. circuit and is broadly tuned, not requiring adjustments. The transformers are all peaked, being tuned to 460 K. C.

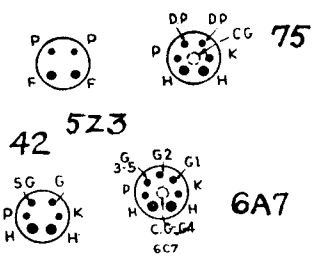
A detailed procedure for making this adjustment follows:

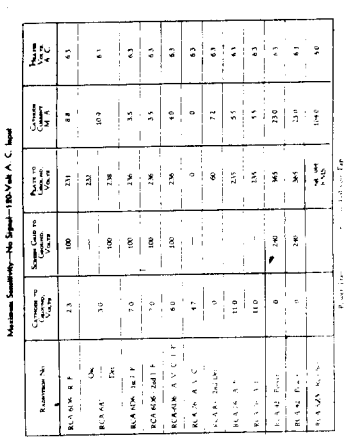
(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker. Replace the A. V. C. tube in the receiver with the "dummy" RCA-76.

(b) Place the oscillator in operation at 460 K. C.; place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn both the volume and sensitivity controls to their maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 9. Adjust each trimmer of the I. F. tuning capacitors until a maximum output is obtained. Go over the adjustments a second time.

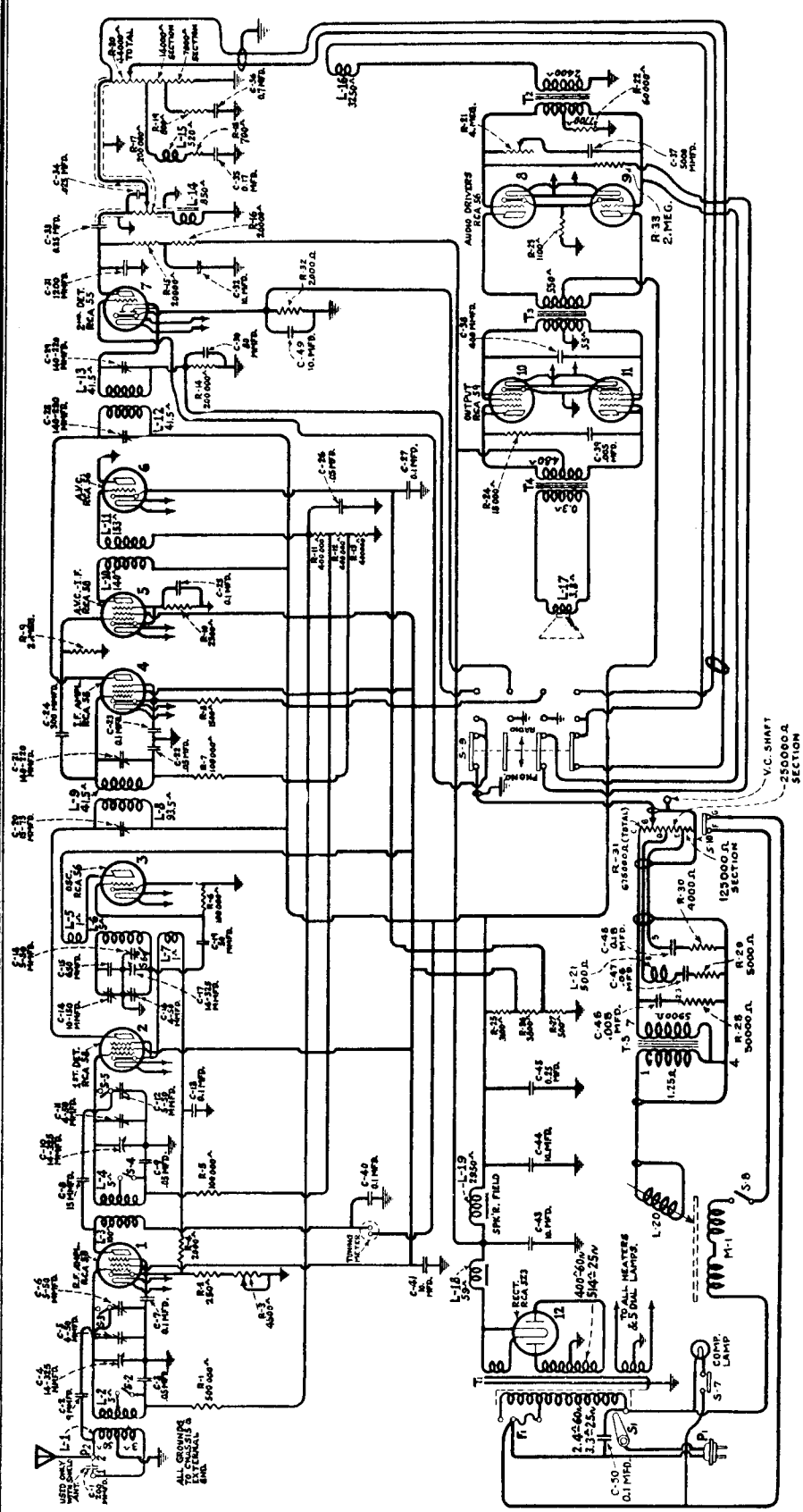
This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and Oscillator adjustments due to interlocking which always occurs.





GENERAL ELECTRIC CO.

MODEL M-128



120 Volt A. C. Line—Volume Control and Sensitivity Control at Maximum—No signal being received

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	3.1	97	212	7.5	2.5
RCA-56 Osc.	—	—	100	6.0	2.5
RCA-58 1st Det.	9.5	91	206	2.8	2.5
RCA-58 I. F.	7.5	93	208	4.0	2.5
RCA-58 A. V. C.-1. F.	8.5	92	207	3.0	2.5
RCA-56 A. V. C.	12.0	—	—	0	2.5
RCA-55 2nd Det.	0	—	74	8.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-5Z3 Rect.	990–495 R. M. S.			92 Total	5.0

I. F. Tuning Capacitor Adjustments

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator, such as Stock No. 9050, that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector. A dummy antenna (Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

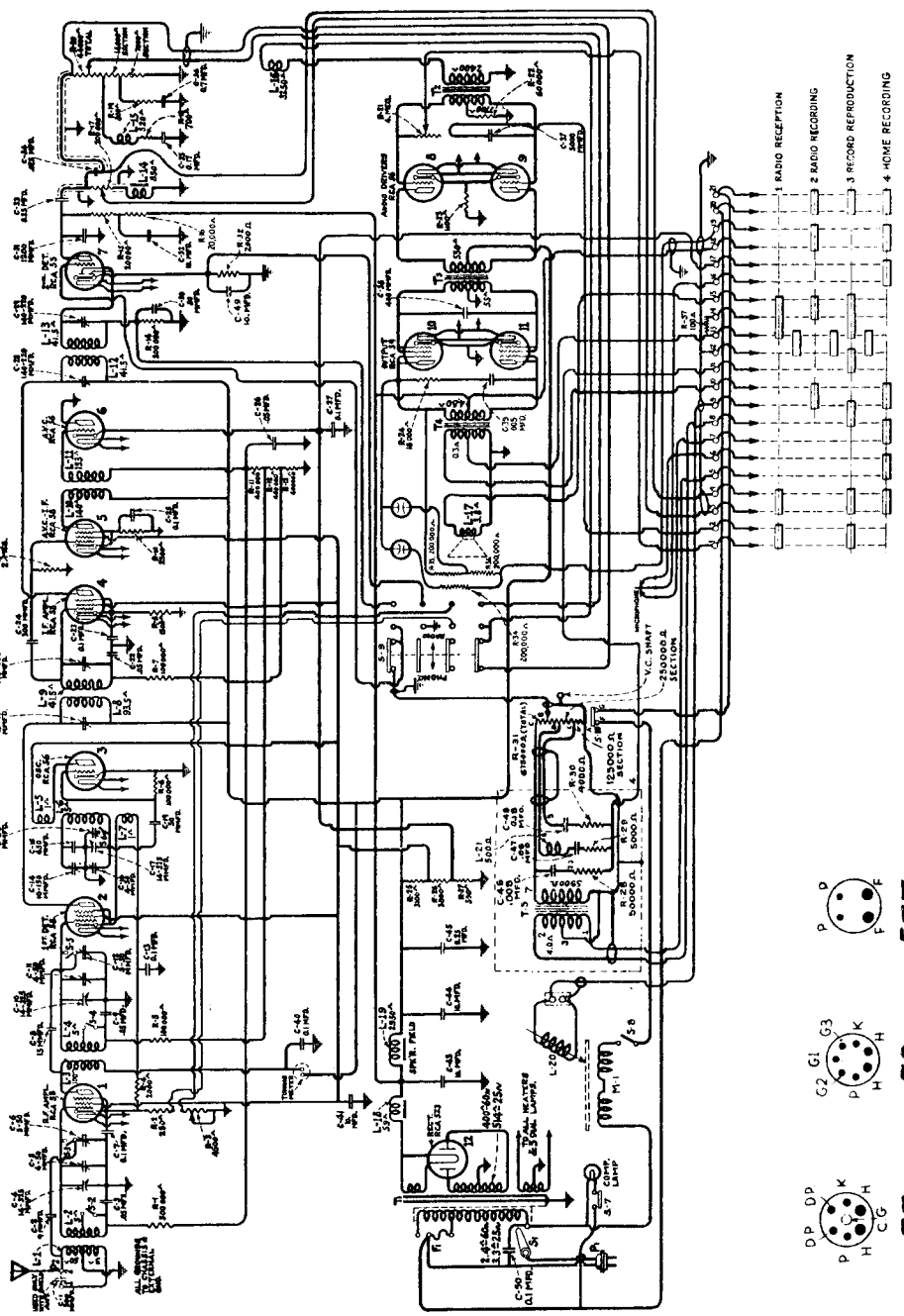
(c) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a slightly reduced deflection is obtained in the output meter.

(d) Refer to Figure B. Adjust the secondary and primary of the second and then the first I. F. transformer until a minimum deflection is obtained in the output meter. Go through these adjustments a second time, as a slight readjustment may be necessary.

(e)

GENERAL ELECTRIC CO.

MODEL M-128 R



120 Volt A. C. Line—Volume Control and Sensitivity Control at Maximum—No signal being received

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	3.1	97	212	7.5	2.5
RCA-56 Osc.	—	—	100	6.0	2.5
RCA-58 1st Det.	9.5	91	206	2.8	2.5
RCA-58 I. F.	7.5	93	208	4.0	2.5
RCA-58 A. V. C.–I. F.	8.5	92	207	3.0	2.5
RCA-56 A. V. C.	12.0	—	—	0	2.5
RCA-55 2nd Det.	0	—	74	8.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-523 Rect.	990–495 R. M. S.			92 Total	5.0

I. F. Tuning Capacitor Adjustments

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator, such as Stock No. 9050, that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7005.

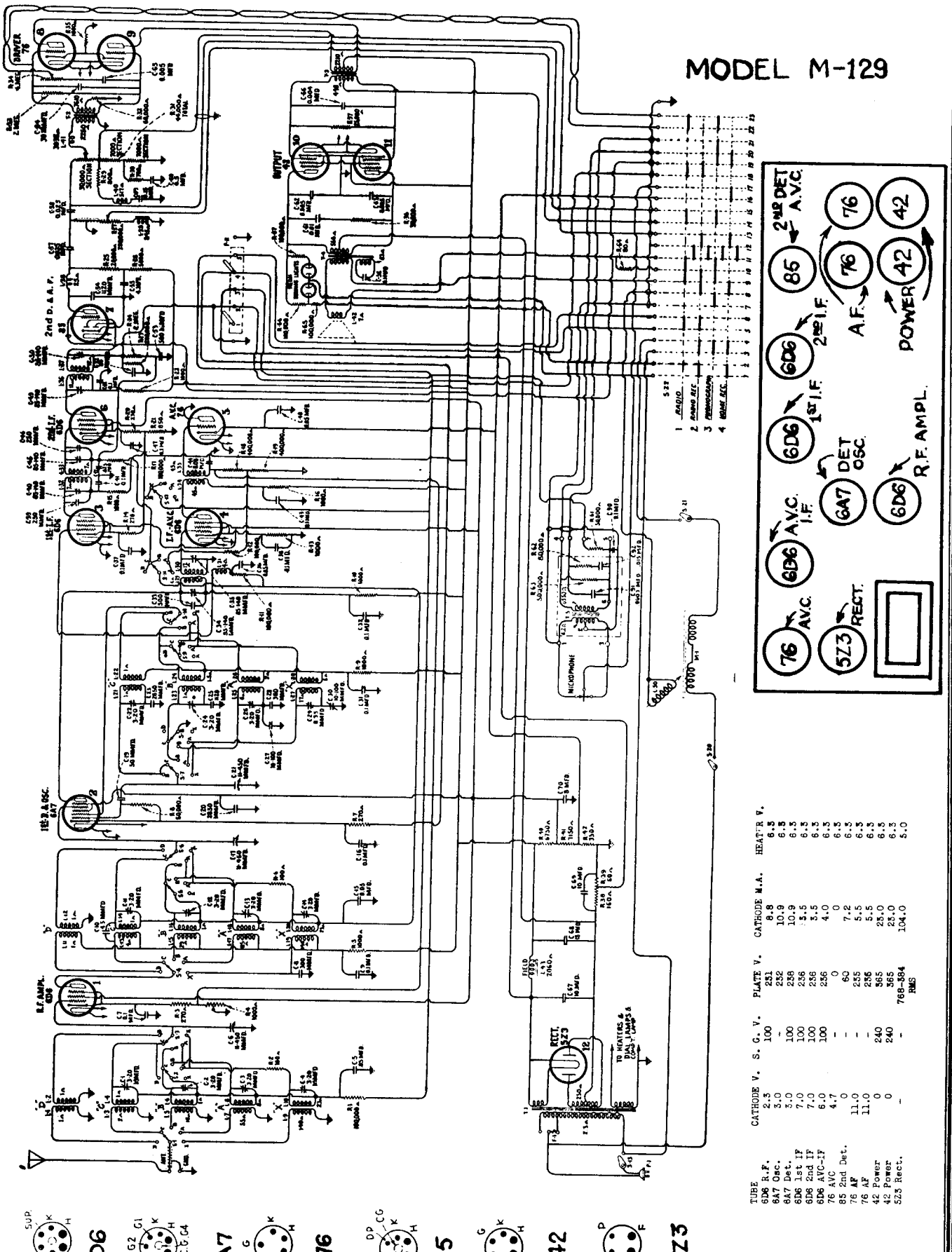
(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a slightly reduced deflection is obtained in the output meter. Refer to Figure D. Adjust the secondary and primary of the second and then the first I. F. transformer until a minimum deflection is obtained in the output meter. Go through these adjustments a second time, as a slight readjustment may be necessary.

GENERAL ELECTRIC CO.

MODEL M-129



TUBE	CATHODE V.	S. G. V.	PLATE V.	CATHODE M.A.	HEATR V.
6D6 R.F.	2.5	100	231	8.8	6.3
6A7 Osc.	3.0	-	252	10.9	6.3
6A7 Det.	3.0	100	238	10.9	6.3
6D6 1st IF	7.0	100	236	5.5	6.3
6D6 2nd IF	7.0	100	236	5.5	6.3
6D6 AVC-IF	6.0	100	236	4.0	6.3
76 AVC	4.7	-	0	0	6.3
85 2nd Det.	0	-	60	7.2	6.3
76 AF	11.0	-	255	5.5	6.3
76 AF	11.0	-	256	5.5	6.3
42 Power	0	240	365	25.0	6.3
42 Power	0	240	365	25.0	6.3
5Z3 Rect.	-	-	768-384 RMS	104.0	5.0

GENERAL ELECTRIC CO.

MODEL T12E

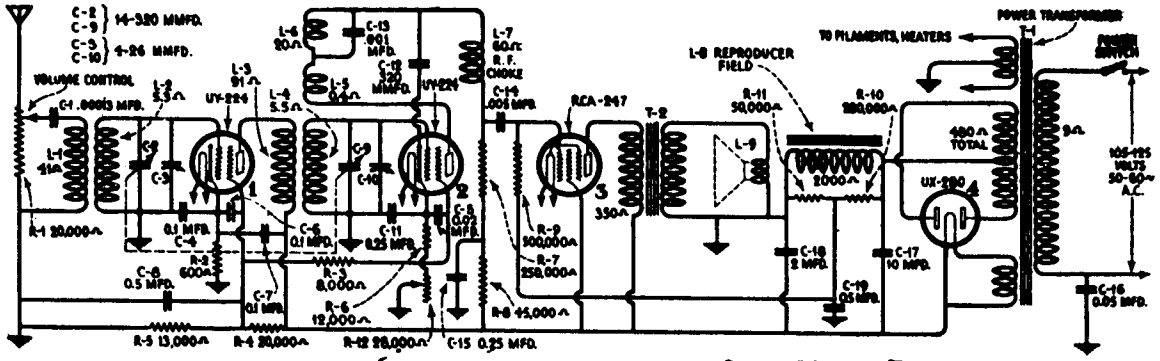


Figure 1—Schematic Circuit Diagram of G-E. T-12-E

SOCKET VOLTAGE READINGS

110-VOLT LINE

These are readings obtained with the usual Set Analyzers and are not true readings of the voltages at which the Radiotrons operate.

Radiotron No.	Heater to Cathode Volts	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid Volts	Cathode or Filament to Plate Volts	Plate Current M. A.	Heater Volts
1	3.0	3.0	85	225	4.0	2.2
2	7.0	7.0	65	100	0.25	2.2
3	——	2.0	225	215	30.0	2.2

LINE-UP CAPACITOR ADJUSTMENTS

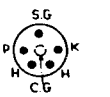
Two adjustable capacitors are provided for aligning the two tuned circuits at the high frequency end of the scale. The following procedure may be used for making any readjustments that may be necessary.

A. Procure an Oscillator giving a modulated signal at exactly 1400 K.C. Also procure a special socket wrench such as G.E. Stock No. 3007

B. An output indicator is necessary. This may be a current squared thermo-galvanometer connected to the secondary of the output transformer in place of the cone coil or other types of output indicators.

C. Turn the station selector until the knob reads exactly 0. Then remove the chassis from the cabinet being careful not to disturb the setting of the dial. The gang condenser rotor plates should be fully meshed with the stator plates. If not, then the dial drum must be adjusted until such a condition exists. Replace the chassis in the cabinet.

D. Place the oscillator in operation at exactly 1400 K.C. and couple its output to the antenna lead. Set the dial scale at 85 and place the Radiolette in operation. Place a soft pad on the bench and turn the instrument on its side. Now with the special wrench, adjust each line-up capacitor until maximum output is obtained in the output meter. Be careful to adjust the volume control or oscillator output so that an excessive reading is not obtained. Go over each adjustment a second time to compensate for any interlocking of adjustments.



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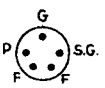

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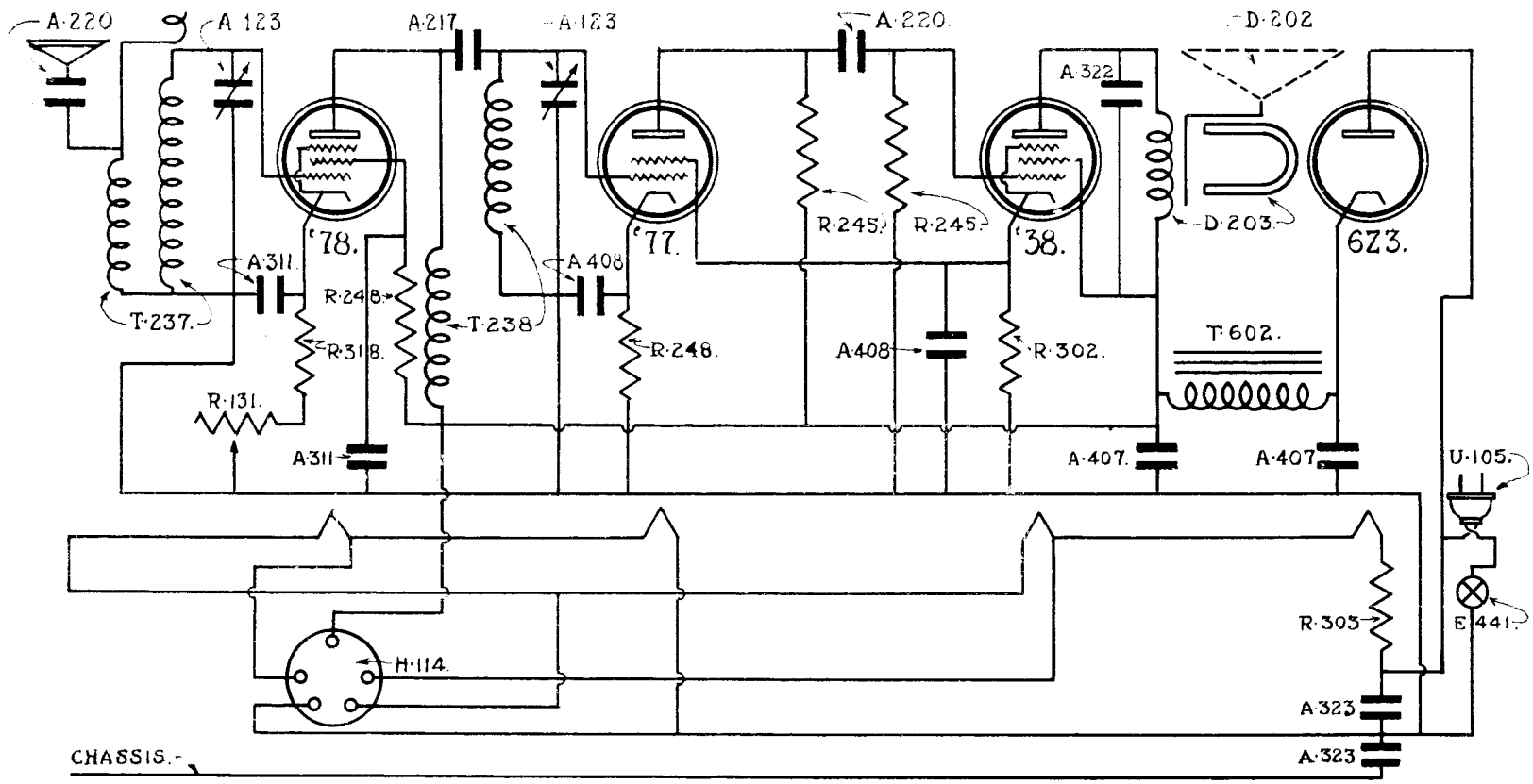
Trouble Shooting Hints

One of the most common complaints about this set is that the volume control does not reduce the level of local stations sufficiently. If the set is used very close to a broadcast transmitter, it may be necessary to replace the 24 R. F. tube with one of the variable mu type such as 58 or 35. It is normal for this set to whistle when tuning on certain parts of the wave band since regeneration is used to increase sensitivity. Care should be taken when adjusting the tuning condensers to prevent "interlocking."

GENERAL FIREPROOFING CO.

MODEL-P



MODEL "P" SYMBOLS FOR SETS BEARING SERIAL NUMBERS 100,001 AND OVER

A-123	2-GANG VARIABLE CONDENSER - $1.75	A-408	DUAL 5 MFD BYPASS CONDENSER .50	R-248	50M OHM CARBON RESISTOR - - .20
A-217	16 MMFD WIRE WOUND - - - - .10	D-202	SPEAKER CONE - - - - - - - - .45	R-302	1500 OHM WIRE WOUND RESISTOR .25
A-220	.002 MFD MICA CONDENSER - - .25	D-203	SPEAKER UNIT - - - - - - - - 1.50	R-303	310 OHM WIRE WOUND RESISTOR .75
A-311	.01 MFD BYPASS CONDENSER - .15	E-441	POWER SWITCH - - - - - - - - .30	R-318	150 OHM WIRE WOUND RESISTOR .25
A-322	.006 MFD CONDENSER - - - - - .15	H-114	AUTO PLUG - - - - - - - - - .50	T-237	ANTENNA COIL ASSEMBLY - - - .30
A-323	.05 MFD BYPASS CONDENSER - - .15	R-131	VOLUME CONTROL - - - - - - .60	T-238	R. F. COIL ASSEMBLY - - - - .35
A-407	FILTER CONDENSER - - - - - 1.00	R-245	2 MEG. CARBON RESISTOR - - - .20	T-602	FILTER CHOKE - - - - - - - .65

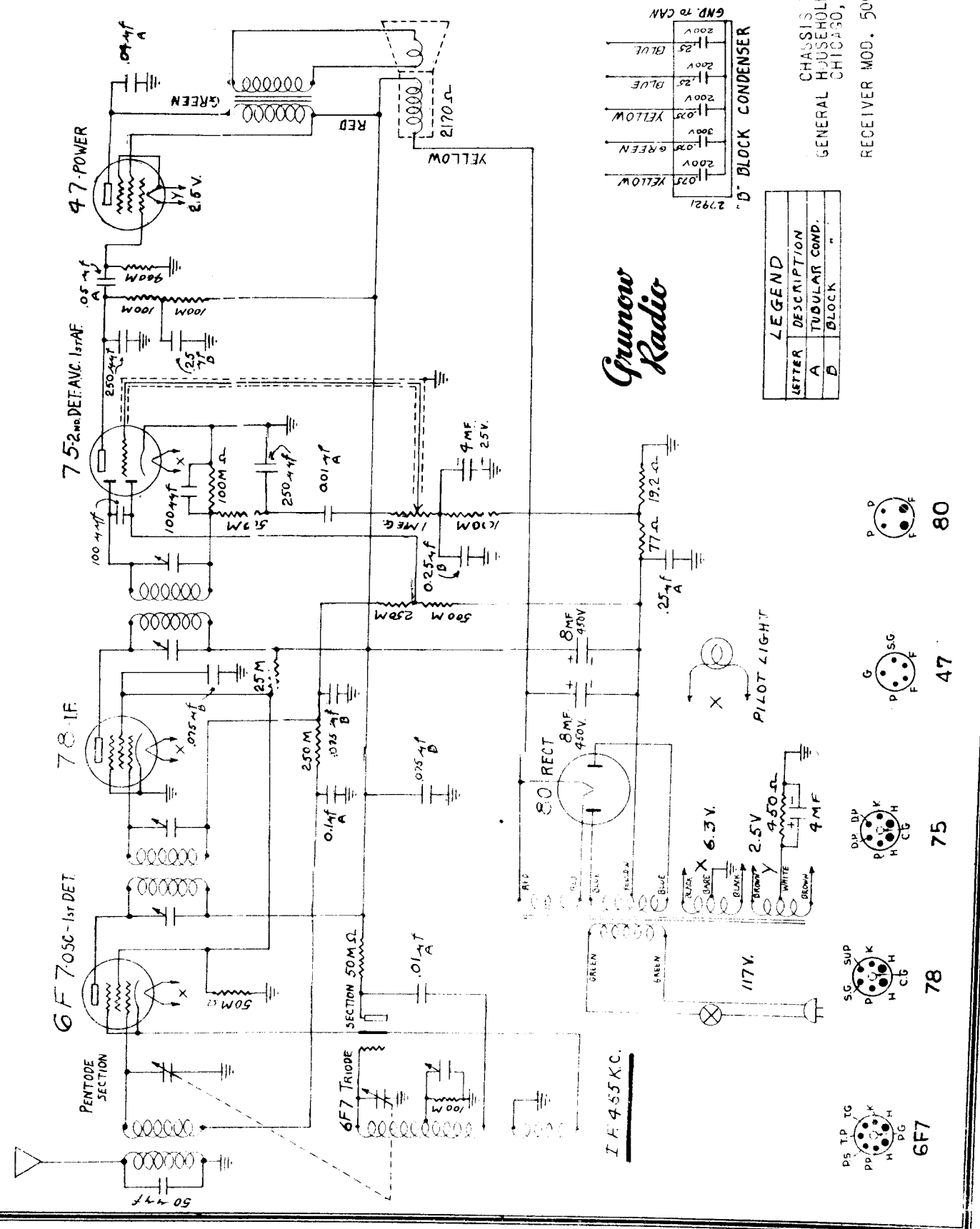
77 & 78

38

6Z3

GENERAL HOUSEHOLD UTILITIES CO.

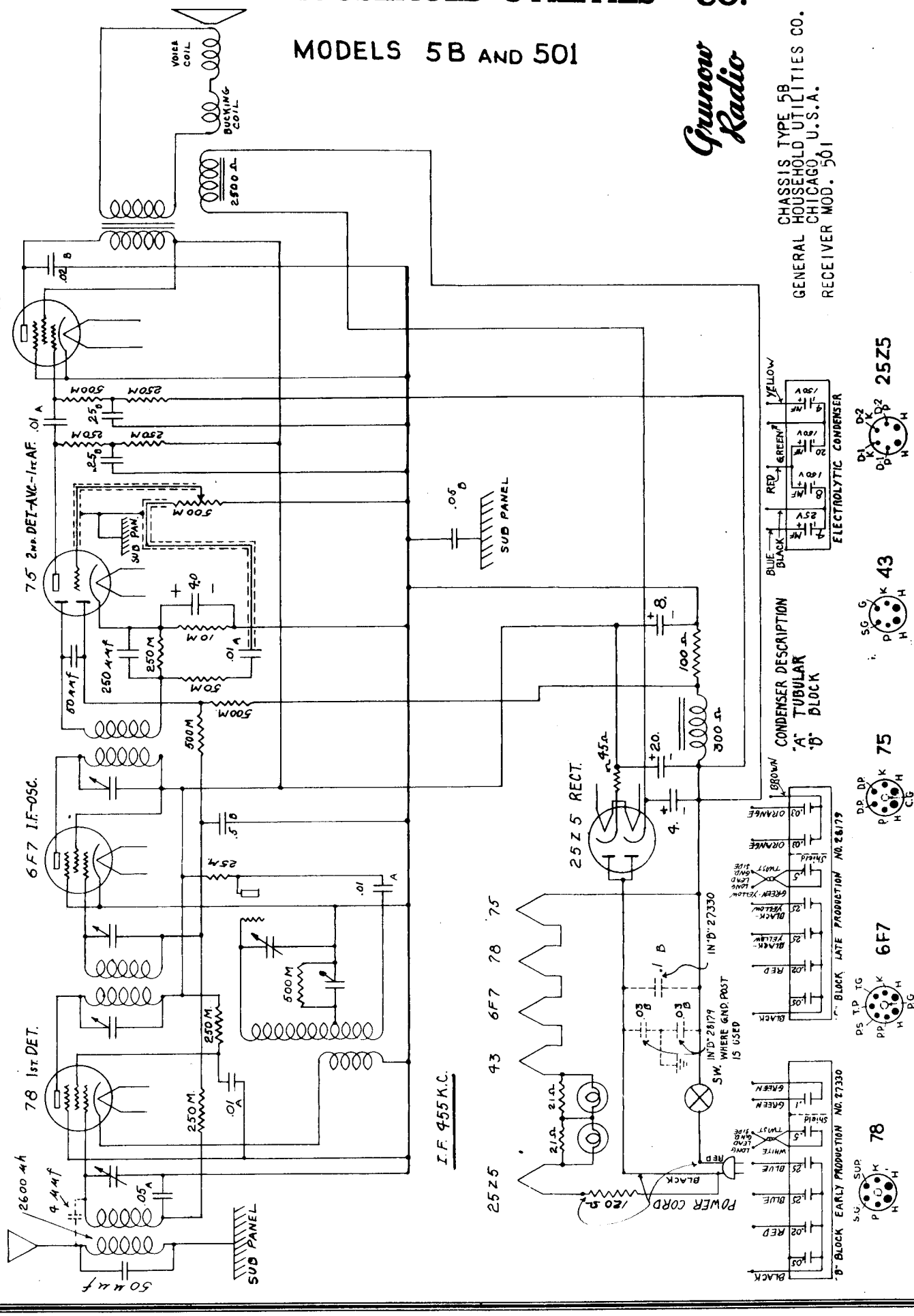
MODELS 5A AND 500



GENERAL HOUSEHOLD UTILITIES CO.

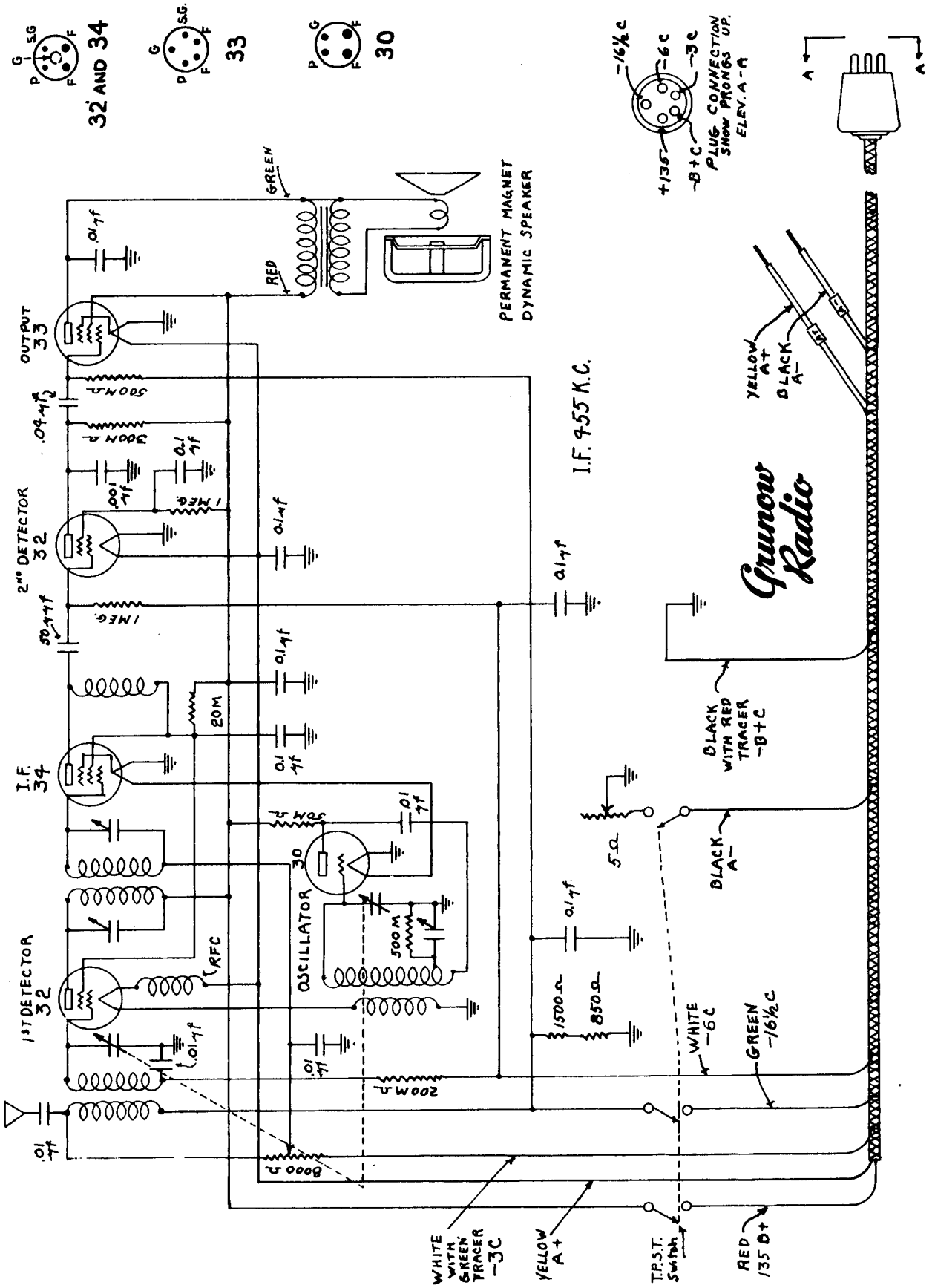
MODELS 5B AND 501

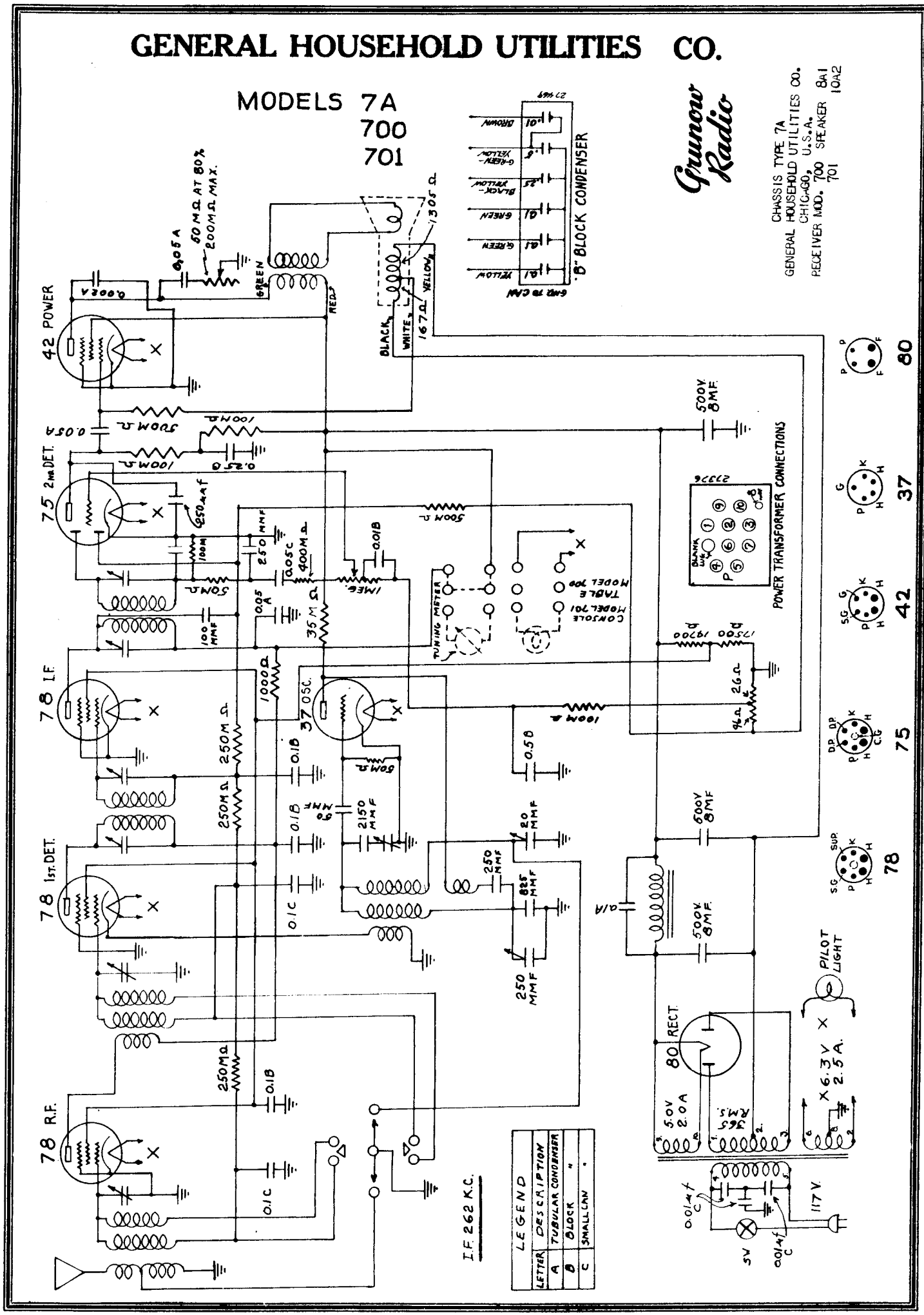
Grunow Radio



GENERAL HOUSEHOLD UTILITIES CO.

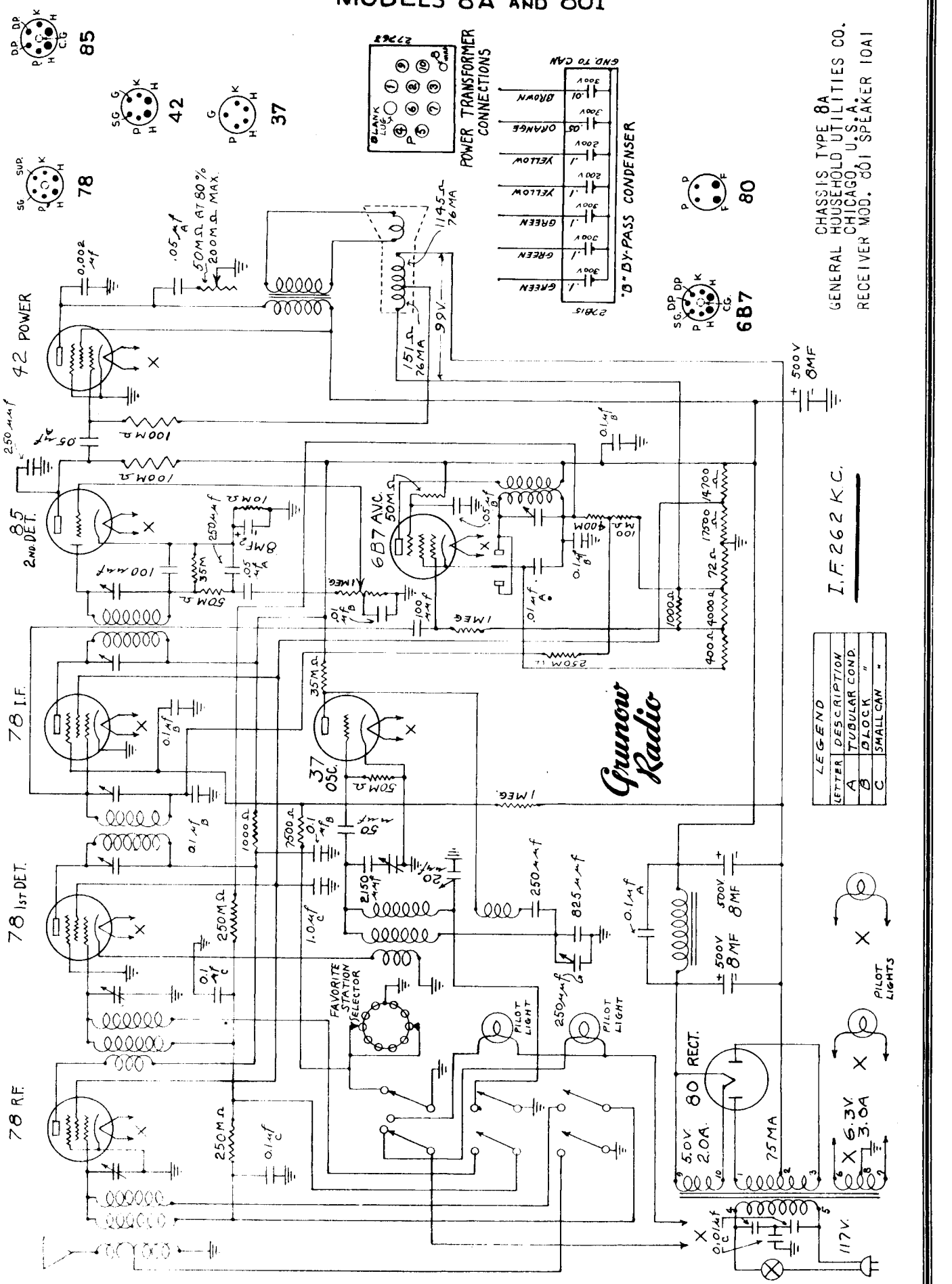
MODELS 5C - 502 AND 503




GENERAL HOUSEHOLD UTILITIES CO.
MODELS 7A
700
701
Grunow Radio
CHASSIS TYPE 7A
GENERAL HOUSEHOLD UTILITIES CO.
CHICAGO, U.S.A.
RECEIVER MOD. 700 SPEAKER 8A1
701 10A2
"B" BLOCK CONDENSER
42 POWER
75 2ND DET.
78 I.F.
78 1ST. DET.
78 R.F.
37 OSC.
80 RECT.
POWER TRANSFORMER CONNECTIONS
TUNING METER
CONSOLE MODEL 701
TABLE MODEL 700
PILOT LIGHT
6.3V 2.5A.
5.0V 2.0A
365 RMS
117 V.
I.F. 262 K.C.
LEGEND
LETTER DESCRIPTION
A TUBULAR CONDENSER
B BLOCK "
C SMALL CAN "

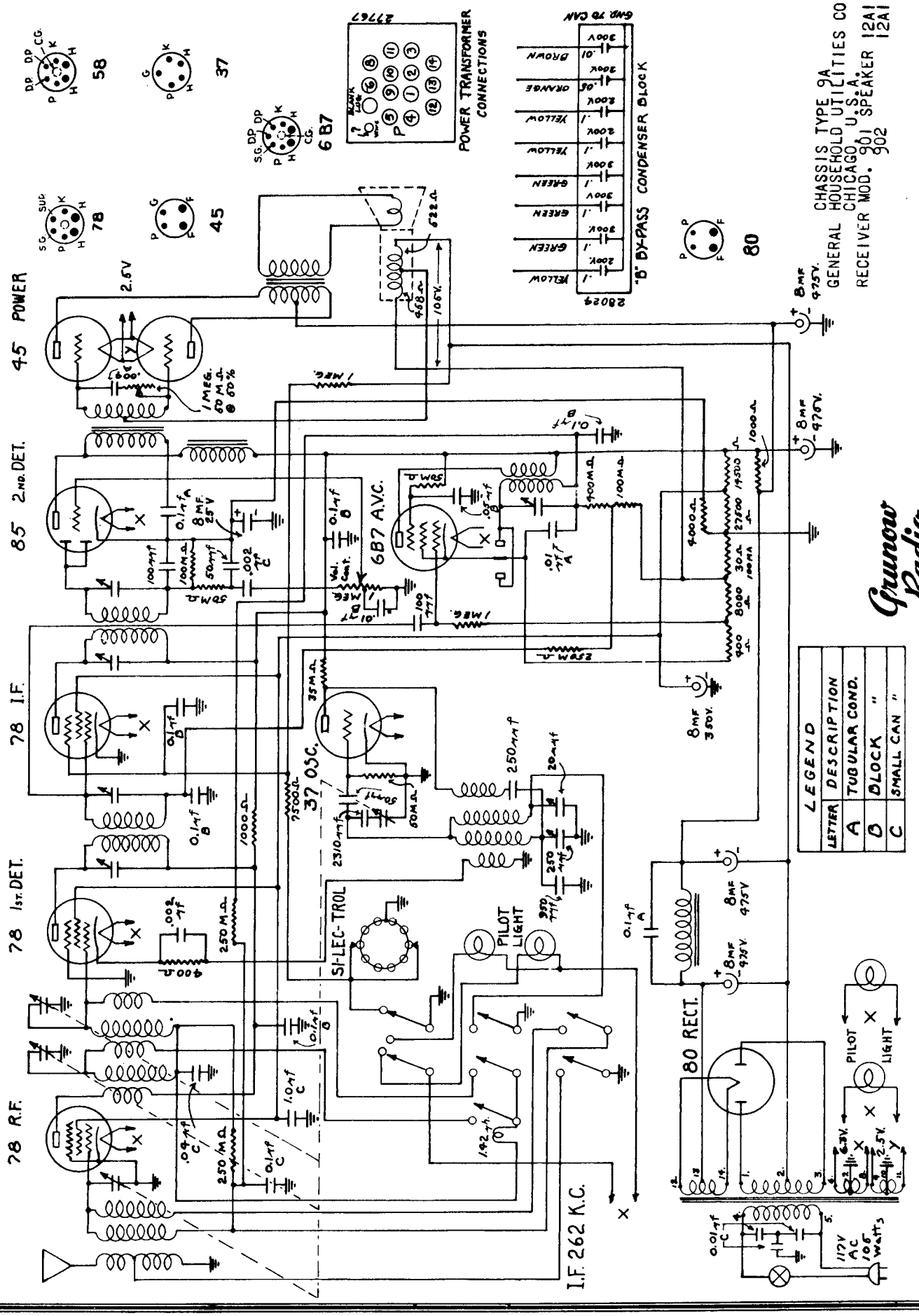
GENERAL HOUSEHOLD UTILITIES CO.

MODELS 8A AND 801



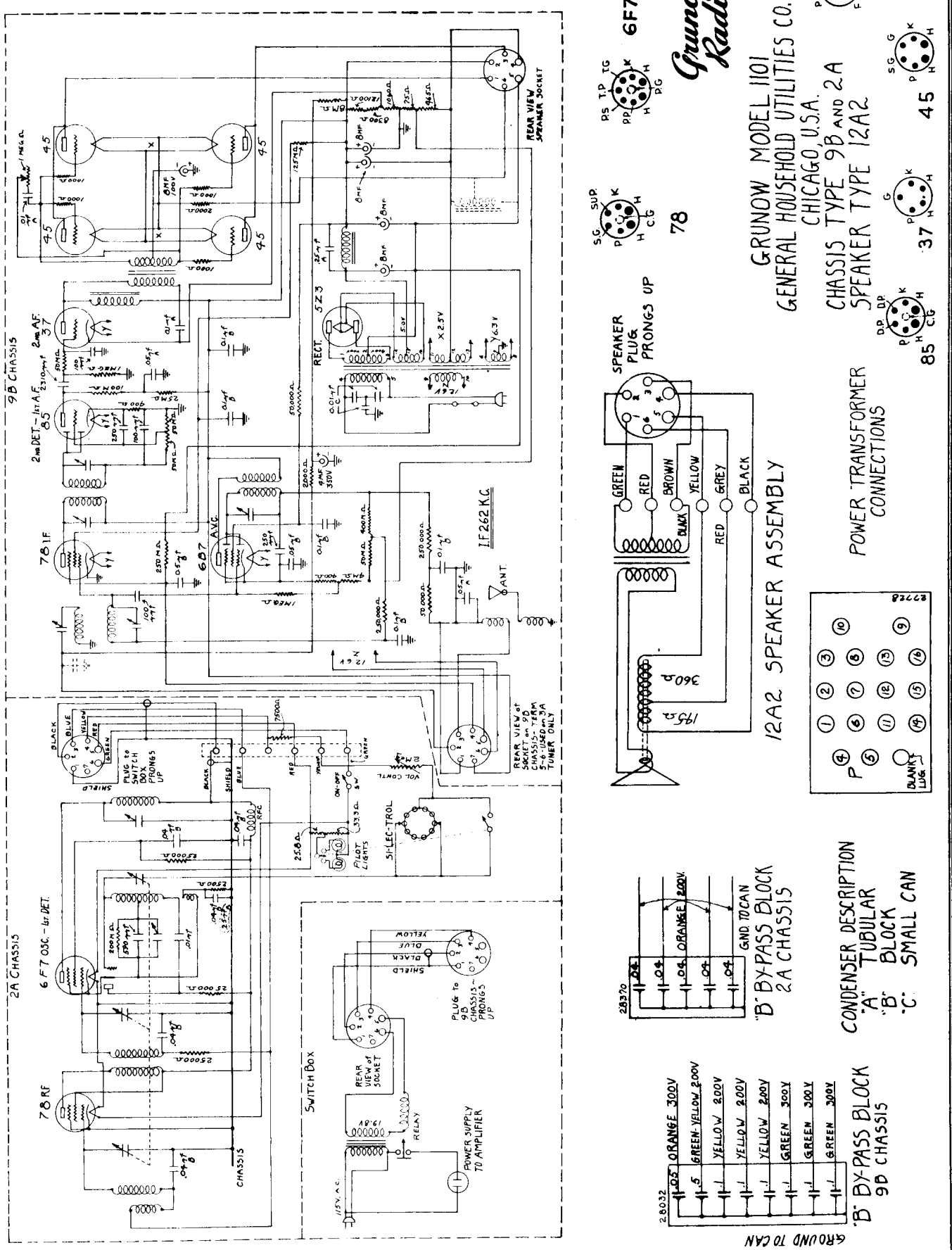
GENERAL HOUSEHOLD UTILITIES CO.

MODELS 9A - 901 - AND 902

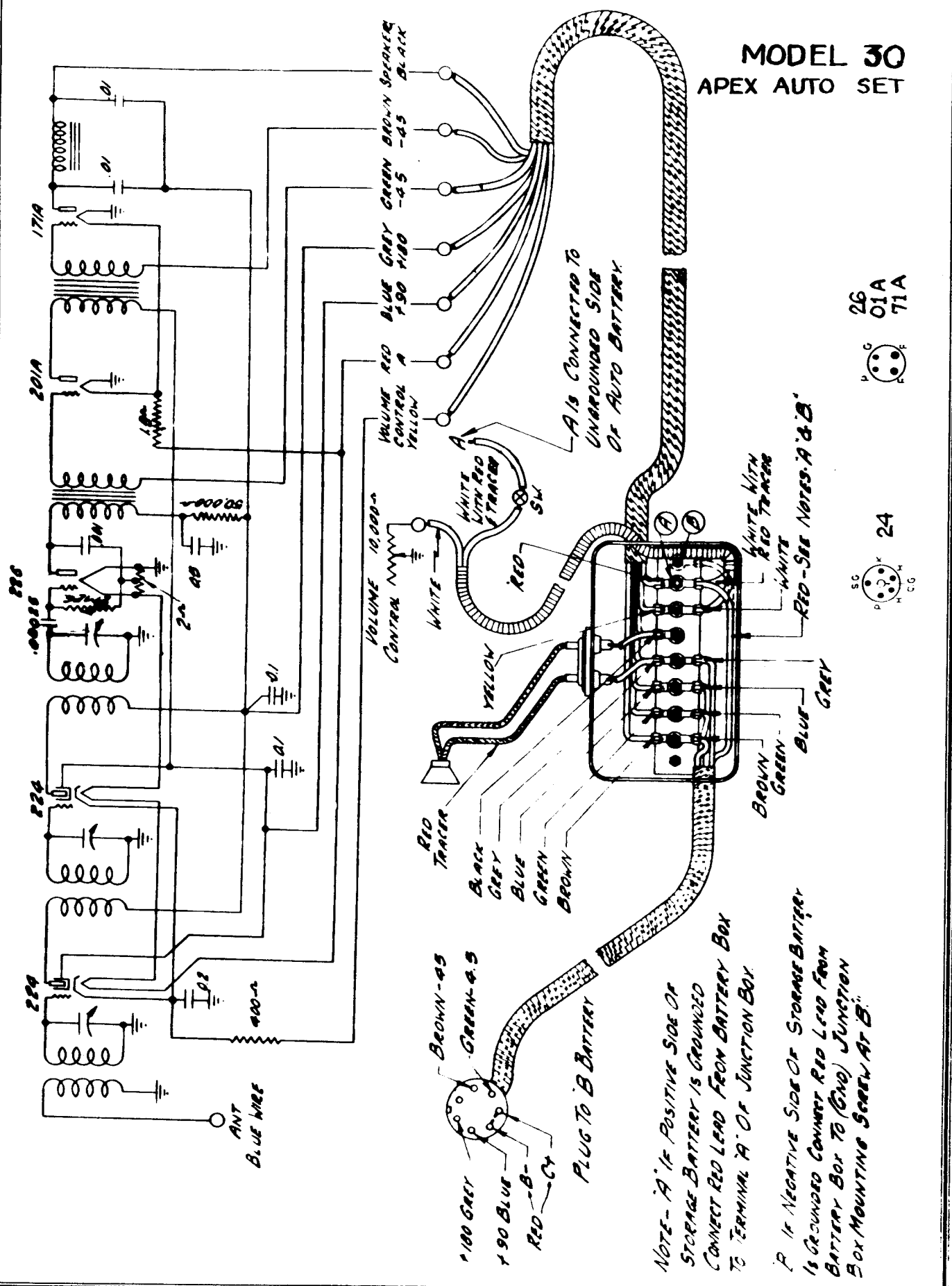


GENERAL HOUSEHOLD UTILITIES CO.

MODELS 9B-2A- AND 1101

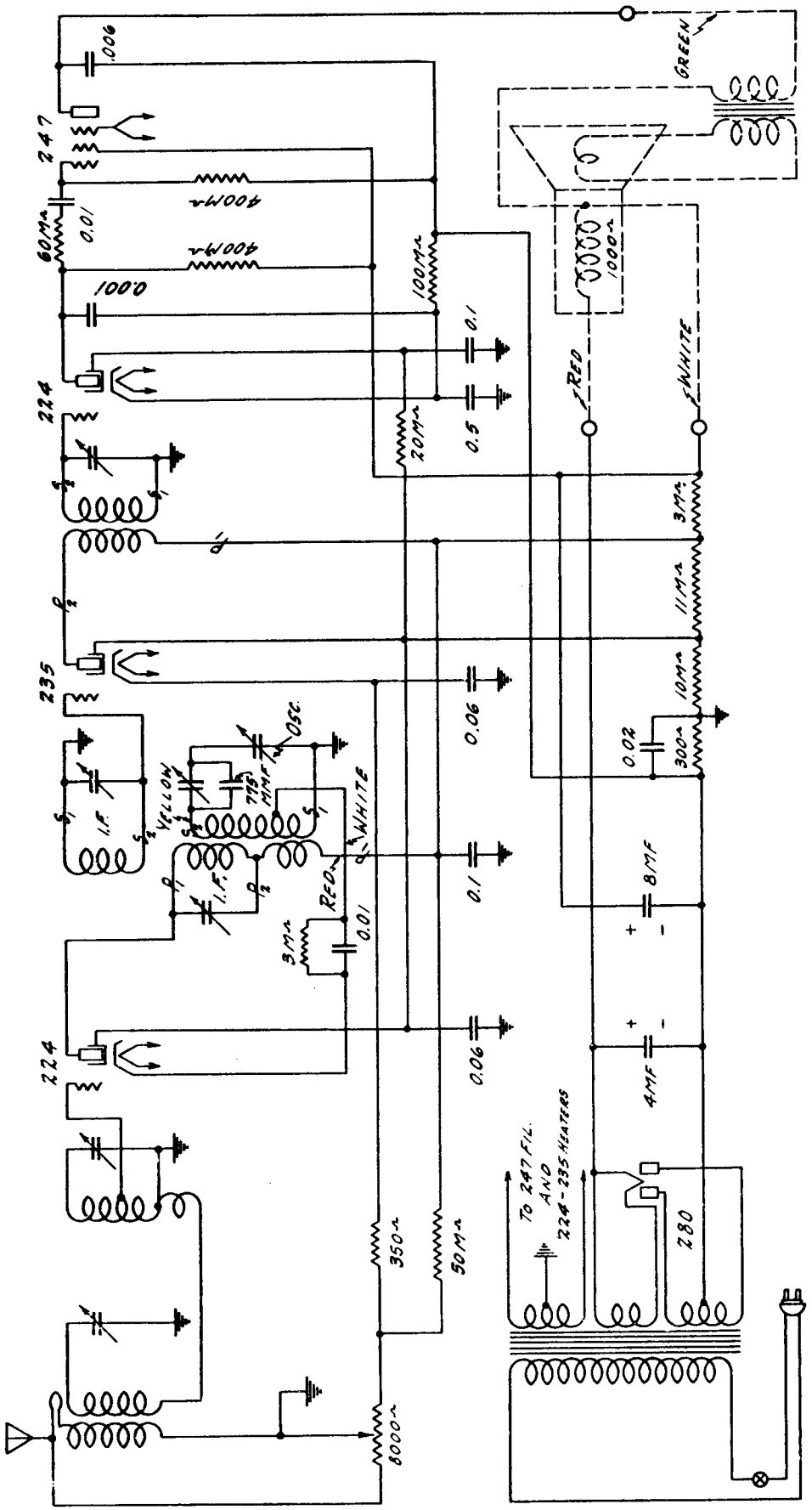


GENERAL HOUSEHOLD UTILITIES CO.



GENERAL HOUSEHOLD UTILITIES CO.

MODELS 99 & 99A

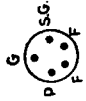


DOTTED LINES SHOWN ARE IN SPEAKER

Trouble Shooting Hints

Short circuits in the electrolytic filter condensers and open resistors in the voltage divider, both of which change the plate voltage on the tubes are the cause of a great many service calls.

80



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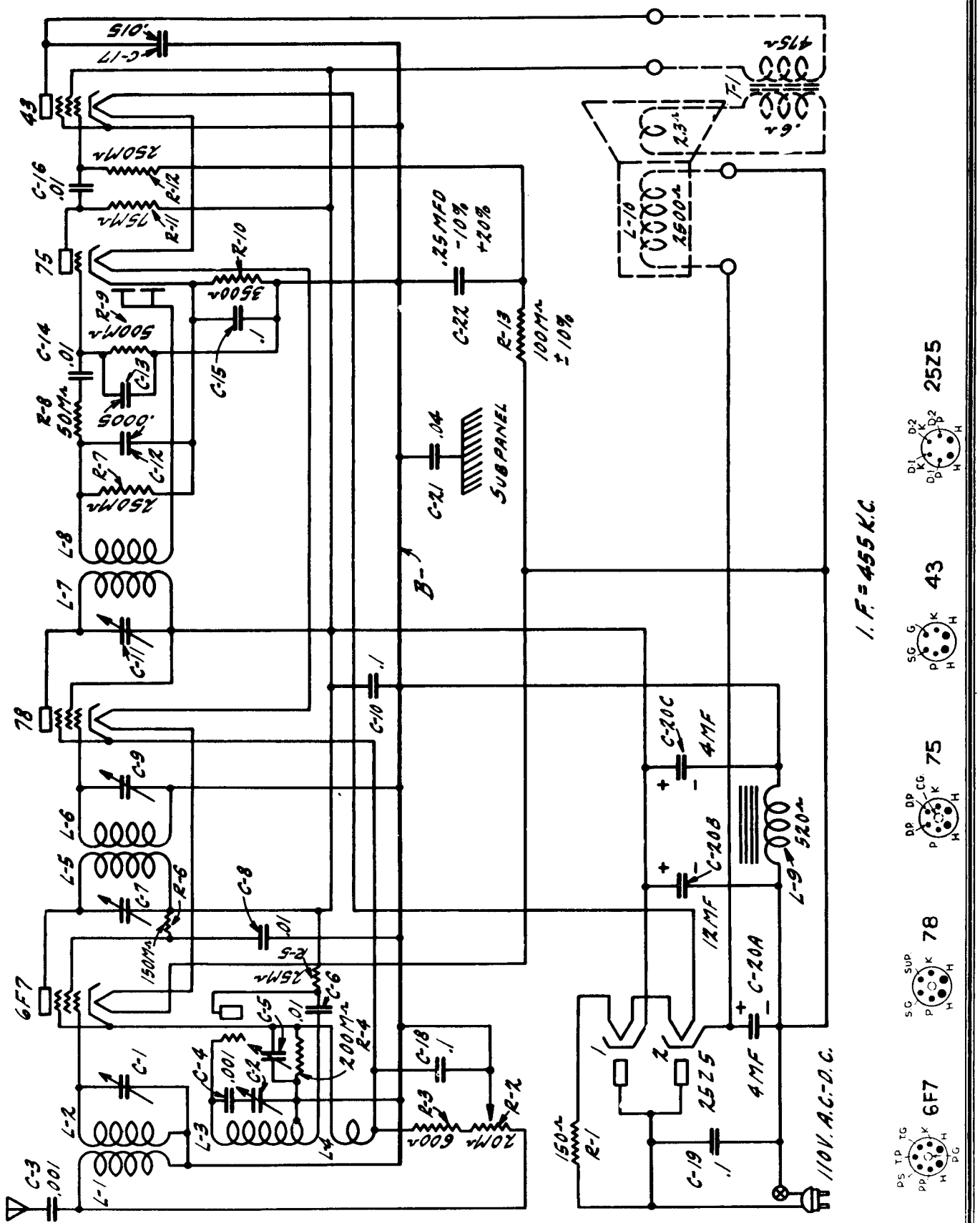
24 & 35

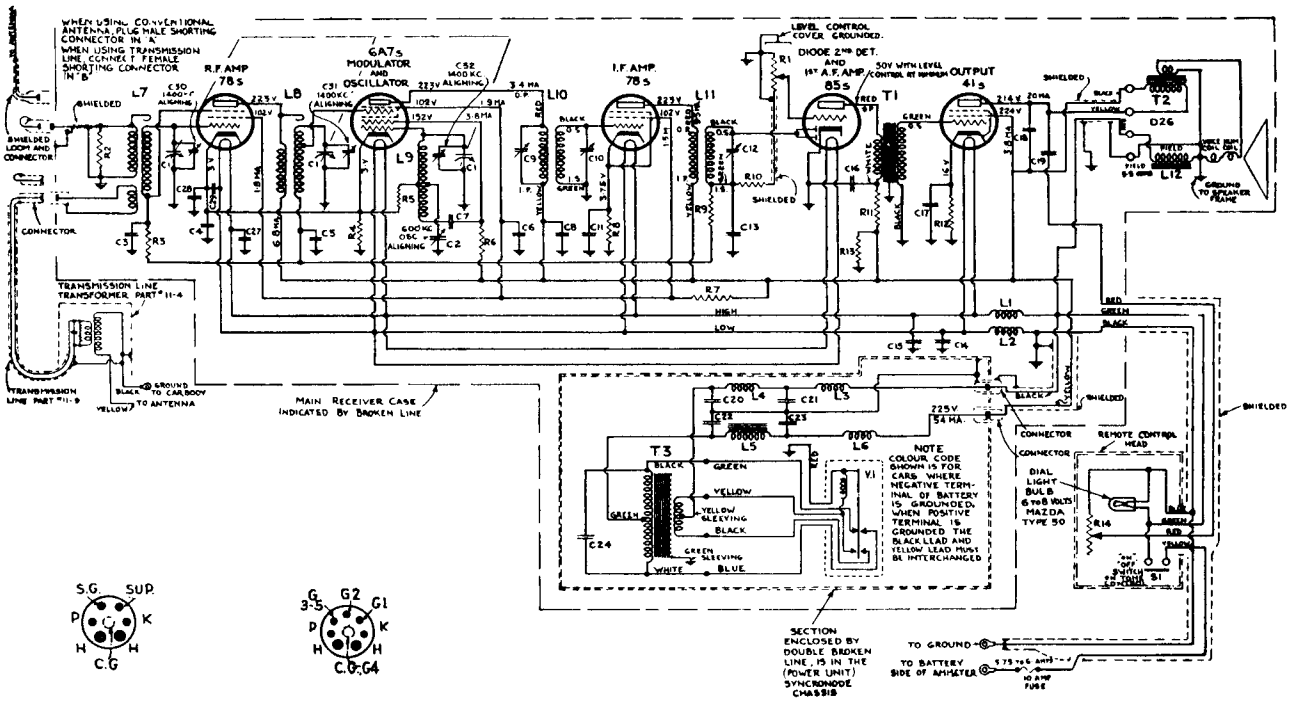
GENERAL HOUSEHOLD UTILITIES CO.

MODELS 513



GENERAL MOTORS PRODS. OF CANADA, Ltd.

MODEL 135



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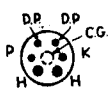
6A7



85

41

Trouble Shooting Hints

The most common cause of trouble in this set is pitted contacts on the synchronous vibrator. Since this vibrator is used for both voltage interruption and rectification, it is not advisable to try to clean the contacts or readjust the unit. If oscillation occurs the shielded lead to the 85 grid should be examined and grounded.

Variable Condenser and Intermediate Frequency Alignment

Re-alignment of the variable condensers may be necessary after the replacement of parts. This adjustment must however, be made only by a competent radio repair man, familiar with the adjustment and equipped with a Standard Service Oscillator and Output Meter. Unless such equipment is available the aligning adjustment should not be altered.

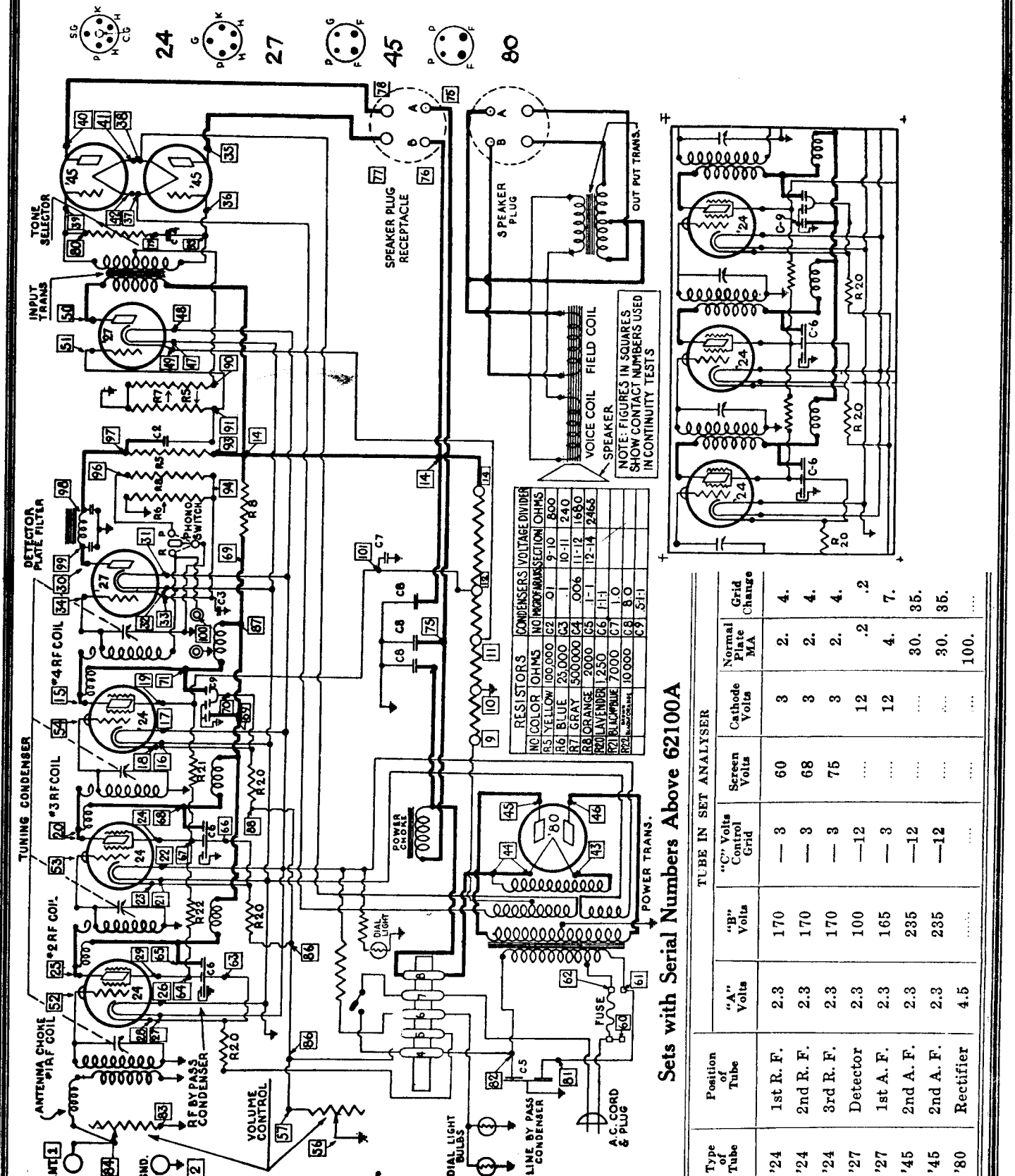
Complete re-alignment should be performed in the following order, reference being made to Figures 8 and 10:

1. Remove the radio unit case bottom cover. (See "Removing Case Covers").
2. Connect the output meter across the speaker voice-coil terminals or between the plate and screen grid of the type 41 output tube (yellow and black speaker leads). (Speaker must be connected).
3. Connect the service oscillator to the grid cap of the type 6A7 tube, allowing the tube grid connection to remain in position. Tune the receiver to 1,400 kilocycles. Disconnect the antenna, if necessary, to reduce the noise level. Adjust the volume control to nearly the "full on" position.
4. Adjust the service oscillator to exactly 175 kilocycles as this is the frequency to which the intermediate frequency transformers are tuned.
5. Adjust the intermediate frequency aligning condensers, C12, C10 and C9, in that order, for maximum reading of the output meter (see Note A).
6. Transfer the service oscillator output connections to the antenna (connector "B" of Figure 2) and the chassis of the radio unit. Adjust the radio unit and the service oscillator in tune at 1,400 kilocycles.
7. Adjust aligning condensers C32, C31 and C30 in that order, for maximum reading of the output meter (see Note A).
8. Adjust the receiver and service oscillator in tune at 600 kilocycles. Adjust condenser C2 for maximum reading of the output meter, rocking the tuning control in the usual manner during this adjustment.
9. Tune the receiver and service oscillator to 1,400 kilocycles and recheck the adjustment of aligning condensers C32, C31 and C30.

NOTE A:—If the output of the service oscillator is too high in value when starting aligning adjustments, the increase in gain or sensitivity, usually resulting from re-alignment, may overload one or more tubes and result in false aligning peaks being obtained. It is, therefore, very essential that the output of the service oscillator be kept low enough to give a readable indication only on the output meter.

GENERAL MOTORS RADIO CORP.

MODELS 120-130 & 140 ABOVE SERIAL #62100A



NO	COLOR	OHMS
R5	YELLOW	100,000
R6	BLUE	25,000
R7	GRAY	500000
R8	ORANGE	2000
R20	LAVENDER	1,250
R21	BLK-BLUE	7000
R22		10000

NO	MODE	MFD
C2		.01
C3		.1
C4		.006
C5		.1-.1
C6		1:1
C7		1.0
C8		8.0
C9		.5:1:1

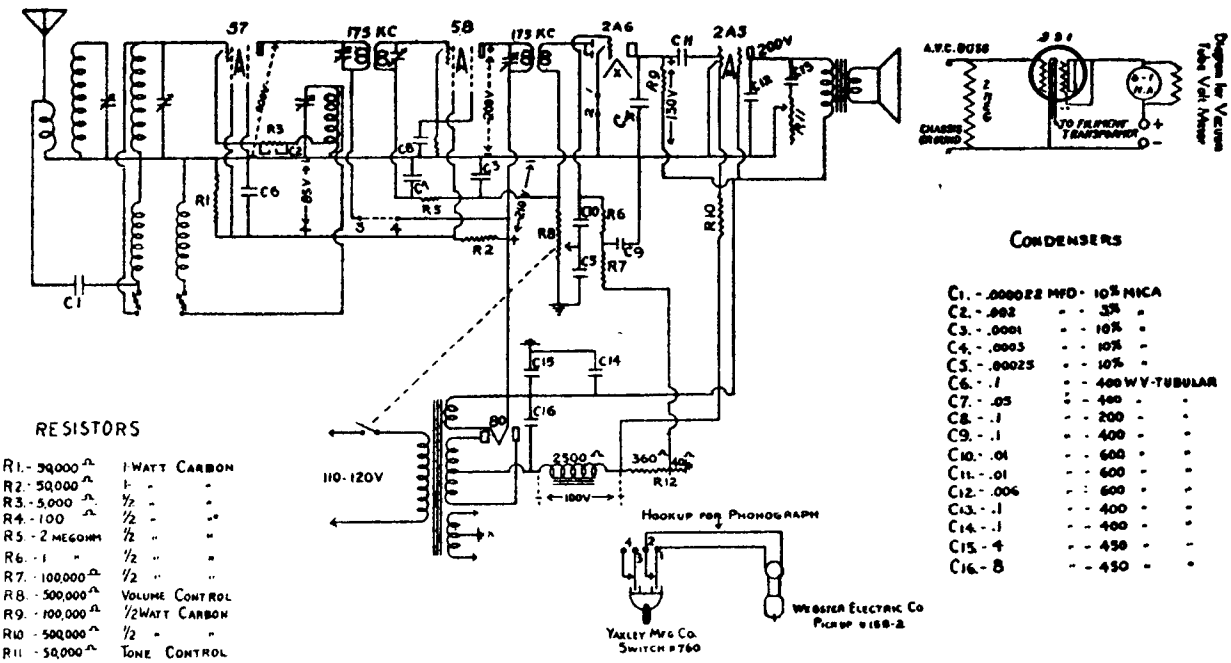
SECTION	OHMS
9-10	800
10-11	240
11-12	1680
12-14	2465

Sets with Serial Numbers Above 62100A

Type of Tube	Position of Tube	TUBE IN SET ANALYSER						
		"A" Volts	"B" Volts	"C" Volts Control Grid	Screen Volts	Cathode Volts	Normal Plate MA	Grid Change
'24	1st R. F.	2.3	170	— 3	60	3	2.	4.
'24	2nd R. F.	2.3	170	— 3	68	3	2.	4.
'24	3rd R. F.	2.3	170	— 3	75	3	2.	4.
'27	Detector	2.3	100	—12	....	12	.2	.2
'27	1st A. F.	2.3	165	— 3	....	12	4.	7.
'45	2nd A. F.	2.3	235	—12	....	....	30.	35.
'45	2nd A. F.	2.3	235	—12	....	....	30.	35.
'80	Rectifier	4.5	....	....	....	...	100.	....

GILFILLAN BROS., Inc.

MODEL 5 TUBE SUPERHET 1934-35



RESISTORS

R1. - 30,000 Ω	1	WATT CARBON
R2. - 50,000 Ω	1	" "
R3. - 5,000 Ω	½	" "
R4. - 100 Ω	½	" "
R5. - 2 MEGOHM	½	" "
R6. - 1 "	½	" "
R7. - 100,000 Ω	½	" "
R8. - 500,000 Ω	VOLUME CONTROL	
R9. - 100,000 Ω	½ WATT CARBON	
R10 - 500,000 Ω	½	" "
R11 - 50,000 Ω	TONE CONTROL	
R12. - 400 Ω	CANDOHM TAPPED AT 40 OHMS	

CONDENSERS

C1. - .000022	MFD.	10%	MICA
C2. - .002	"	5%	"
C3. - .0001	"	10%	"
C4. - .0003	"	10%	"
C5. - .00025	"	10%	"
C6. - .1	"	400	W.V. - TUBULAR
C7. - .05	"	400	" "
C8. - .1	"	200	" "
C9. - .1	"	400	" "
C10. - .01	"	600	" "
C11. - .01	"	600	" "
C12. - .006	"	600	" "
C13. - .1	"	400	" "
C14. - .1	"	400	" "
C15. - 4	"	450	" "
C16. - 8	"	450	" "

SERVICE DATA, FIVE TUBE SUPER-HETERODYNE, 1934-1935

All models have automatic volume control of the diode type, controlling the first detector as well as the high frequency amplifier tubes. This A.V.C. makes it impossible to service and rebalance without a meter of the type to be described. This meter will work on any make or type of A.V.C., provided care is used. It can not be damaged by improper connection of the leads.

PARTS REQUIRED FOR VACUUM TUBE VOLT METER

1—0 to 1 or 0 to 1.5 milliampmeter.
1—Bell ringing transformer with secondary of 6-10 volts.
1—5 prong socket.
1—551 tube.
1—2 megohn grid leak.
1—10 ohm rheostat.
1—45 volt B battery.
Clips, Box, Cord, Hookup Wire.

USING VACUUM TUBE VOLT METER

The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor.

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward 0. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 175 K.C. oscillator to the first detector grid (No. 57 tube) leaving grid cap in place. Set dial at 1400 K.C. Hook up vacuum tube volt meter as described and carefully adjust 3 screws on top of intermediates for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 1400 K.C. when gang is at minimum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

If the intermediates are balanced on 175 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R. F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 2 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear.

NOISY OPERATION (Not Static)

A defective tube will cause a sharp 60 cycle R.F. pickup. This is most prominent on low frequency. Replace with a good tube.

In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter into the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

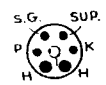
There is no freak or trick antenna that will eliminate natural static.

GENERAL

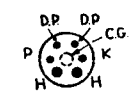
All resistors, bypass condensers and filter units are marked.

Voltages are shown at tube socket on diagram.

99 per cent of trouble in a chassis is caused by defective tubes, check them carefully.



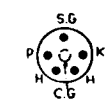
58 & 57



2A6

2A5

80



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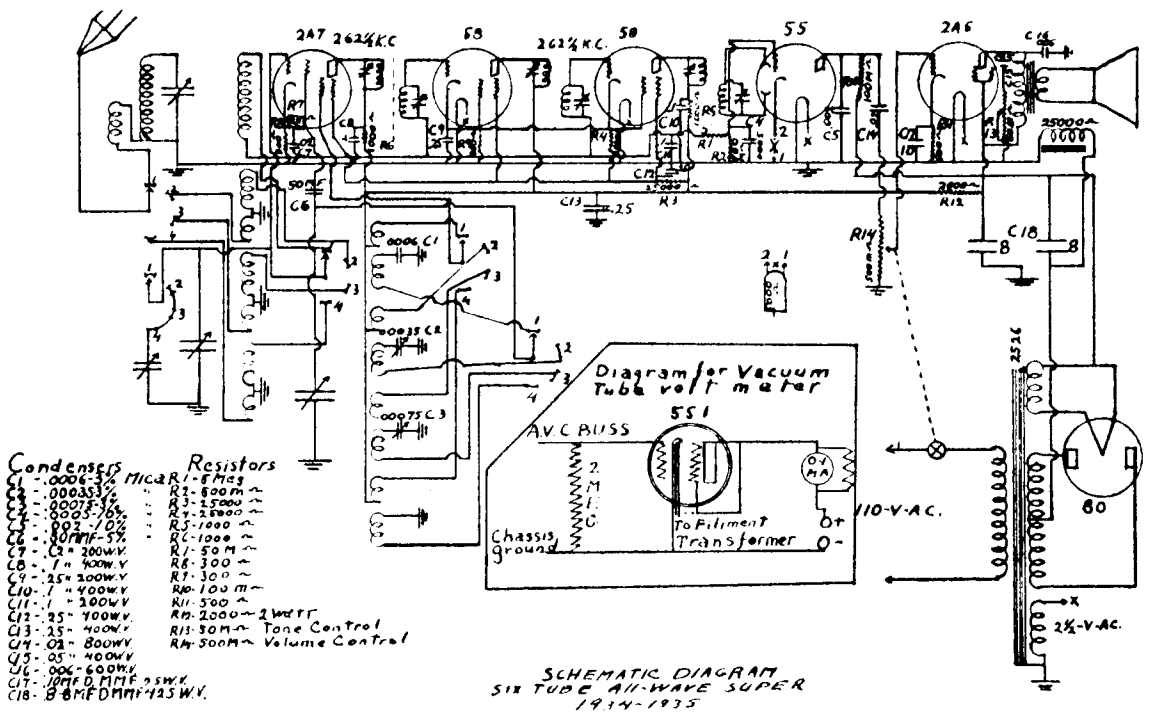
GILFILLAN BROS., Inc.

MODEL 6TUBE ALL-WAVE SUPERHET 1934-35



SCHEMATIC DIAGRAM
SIX TUBE ALL-WAVE SUPER
1934-1935

SERVICE DATA (SIX TUBE ALL-WAVE SUPER HETERODYNE 1934-1935)

All models have automatic volume control of the diode type, controlling the first detector as well as the high frequency amplifier tubes. This A.V.C. makes it impossible to service and rebalance without a meter of the type to be described. This meter will work on any make or type of A.V.C., provide care is used. It can not be damaged by improper connection of the leads.

PARTS REQUIRED FOR VACUUM TUBE VOLT METER

1—0 to 1 or 0 to 1.5 milliampmeter.
1—Bell ringing transformer with secondary of 6-10 volts.
1—5 prong socket.
1—551 tube.
1—2 megohn grid leak.
1—10 ohm rheostat.
1—45 volt B battery.
Clips, Box, Cord, Hookup Wire.

USING VACUUM TUBE VOLT METER

The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor.

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 262½ K. C. oscillator to the first detector grid (No. 2-A 7 tube) leaving grid cap in place. Set dial at 1400 K.C. Hook up vacuum tube meter as described and carefully adjust 3 screws on top of Intermediates for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 1400 K.C. when gang is at minimum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

If the intermediates are balanced on 262½ K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R. F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 2 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear.

NOISY OPERATION (Not Static)

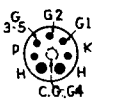
A defective tube will cause a sharp 60 cycle R.F. pickup. This is most prominent on low frequency. Replace with a good tube.

In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter into the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

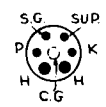
There is no freak or trick antenna that will eliminate natural static.

GENERAL

All resistors, bypass condensers and filter units are marked.
Voltages are shown at tube socket on diagram.
99 per cent of trouble in a chassis is caused by defective tubes, check them carefully.



2A7



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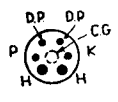

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2A5

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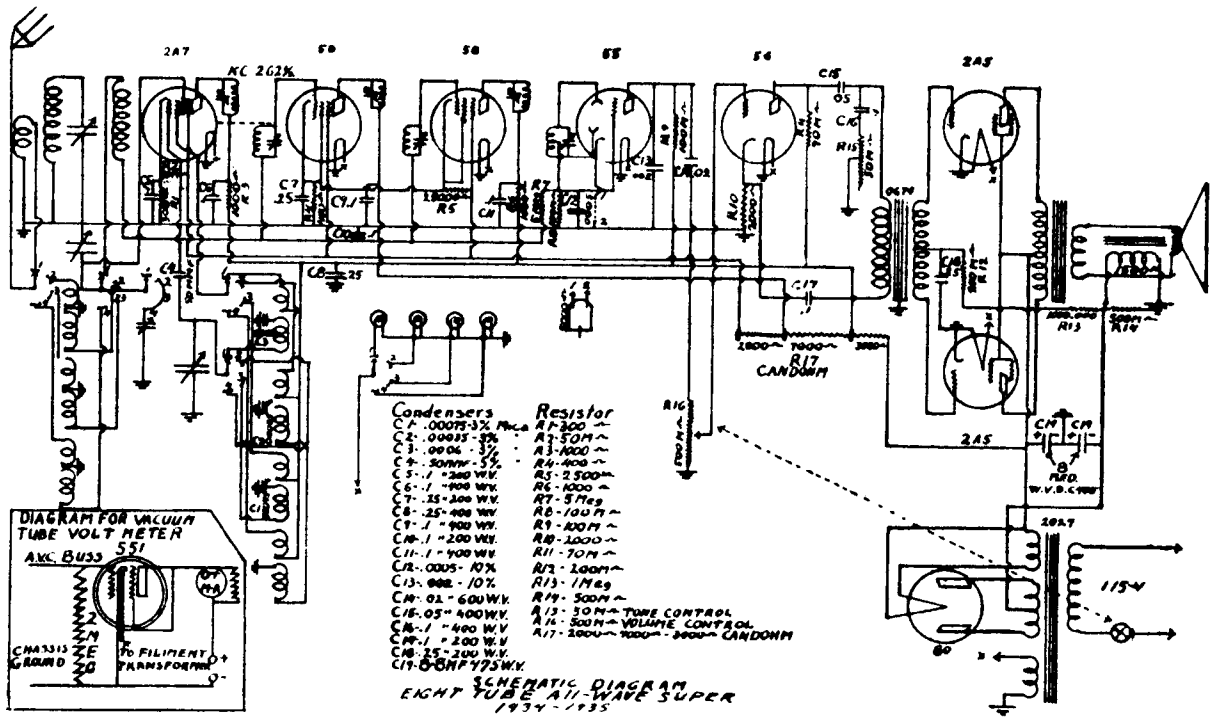
GILFILLAN BROS., Inc.

8 TUBE ALL-WAVE SUPERHET 1934-35



SERVICE DATA EIGHT TUBE ALL-WAVE SUPER HETERODYNE 1934-1935)

All models have automatic volume control of the diode type, controlling the first detector as well as the high frequency amplifier tubes. This A.V.C. makes it impossible to service and rebalance without a meter of the type to be described. This meter will work on any make or type of A.V.C., provided care is used. It can not be damaged by improper connection of the leads.

PARTS REQUIRED FOR VACUUM TUBE VOLT METER

1—O to 1 or O to 1.5 milliampmeter.
1—Bell ringing transformer with secondary of 6-10 volts.
1—5 prong socket.
1—551 tube.
1—2 megohn grid leak.
1—10 ohm rheostat.
1—45 volt B battery.
Clips, Box, Cord, Hookup Wire.

USING VACUUM TUBE VOLT METER

The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor.

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 262½ K. C. oscillator to the first detector grid (No. 2-A 7 tube) leaving grid cap in place. Set dial at 1400 K.C. Hook up vacuum tube meter as described and carefully adjust 3 screws on top of Intermediates for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 1400 K.C. when gang is at minimum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

If the intermediates are balanced on 262½ K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R. F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 2 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear.

NOISY OPERATION (Not Static)

A defective tube will cause a sharp 60 cycle R.F. pickup. This is most prominent on low frequency. Replace with a good tube.

In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter into the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

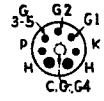
There is no freak or trick antenna that will eliminate natural static.

GENERAL

All resistors, bypass condensers and filter units are marked.

Voltages are shown at tube socket on diagram.

99 per cent of trouble in a chassis is caused by defective tubes, check them carefully.



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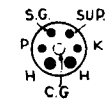

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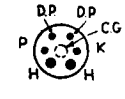

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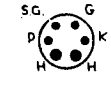

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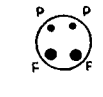
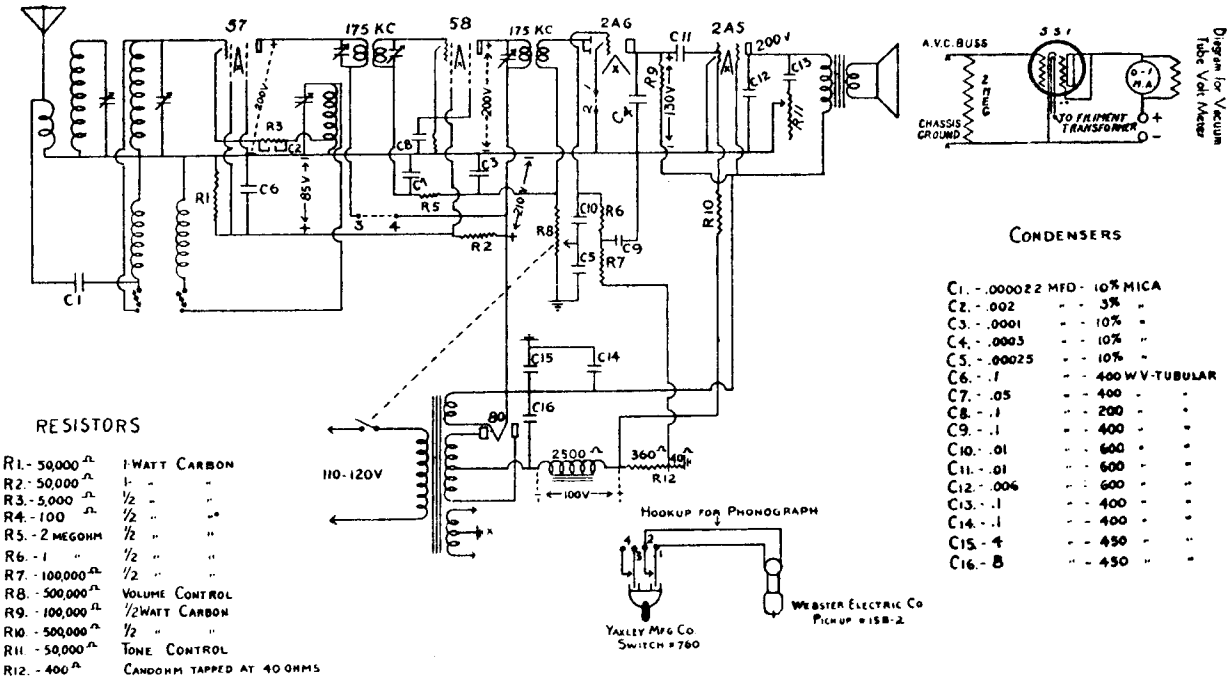


80

GILFILLAN BROS., Inc.

MODEL 32-35-41



RESISTORS

R1. - 50,000 Ω	1 WATT	CARBON
R2. - 50,000 Ω	1	" "
R3. - 5,000 Ω	½	" "
R4. - 100 Ω	½	" "
R5. - 2 MEGOHM	½	" "
R6. - 1 "	½	" "
R7. - 100,000 Ω	½	" "
R8. - 500,000 Ω	VOLUME	CONTROL
R9. - 100,000 Ω	½ WATT	CARBON
R10. - 500,000 Ω	½	" "
R11. - 50,000 Ω	TONE	CONTROL
R12. - 400 Ω	CANDOHM TAPPED AT 40 OHMS	

CONDENSERS

C1. - .000022	MFD -	10%	MICA
C2. - .002	" -	3%	"
C3. - .0001	" -	10%	"
C4. - .0003	" -	10%	"
C5. - .00025	" -	10%	"
C6. - .1	" -	400	W V-TUBULAR
C7. - .05	" -	400	" "
C8. - .1	" -	200	" "
C9. - .1	" -	400	" "
C10. - .01	" -	600	" "
C11. - .01	" -	600	" "
C12. - .006	" -	600	" "
C13. - .1	" -	400	" "
C14. - .1	" -	400	" "
C15. - 4	" -	450	" "
C16. - 8	" -	450	" "

SERVICE DATA (MODEL 32-35-41)

All models have automatic volume control of the diode type, controlling the first detector as well as the high frequency amplifier tubes. This A.V.C. makes it impossible to service and rebalance without a meter of the type to be described. This meter will work on any make or type of A.V.C., provided care is used. It can not be damaged by improper connection of the leads.

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1—0 to 1 or 0 to 1.5 milliampmeter.
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1—5 prong socket.
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The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor.

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All balancing is done with maximum peak indicated by the meter swing toward 0. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 175 K.C. oscillator to the first detector grid (No. 57 tube) leaving grid cap in place. Set dial at 1400 K.C. Hook up vacuum tube volt meter as described and carefully adjust 3 screws on top of Intermediates for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 1400 K.C. when gang is at minimum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

If the intermediates are balanced on 175 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

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The chief cause of this trouble is too long an antenna. A powerful local station will cause the R. F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

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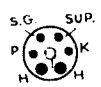
GENERAL

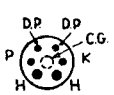
All resistors, bypass condensers and filter units are marked.

Voltages are shown at tube socket on diagram.

99 per cent of trouble in a chassis is caused by defective tubes, check them carefully.



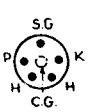
57 & 58



2A6

2A5

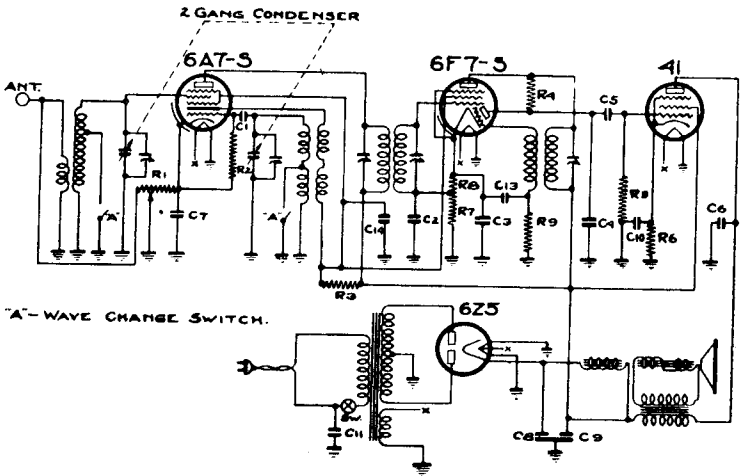
80



51

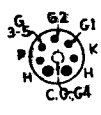
GRIGSBY-GRUNOW CO., Inc.

MODELS 44-49-194-440

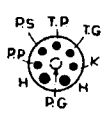


CONDENSER VALUES			
No.	Mfds.	No.	Mfds.
C1	.00025	C8	6.0
C2	.01	C9	4.0
C3	.5	C10	10.0
C4	.001	C11	.03
C5	.03	C12	
C6	.007	C13	.03
C7	.1	C14	.25

RESISTANCE VALUES			
No.	Ohms.	No.	Ohms
R1	7,500 V.C.	R6	500
R2	150,000	R7	1500
R3	20,000	R8	300
R4	700,000	R9	1,000,000
R5	500,000	R10	



6A7



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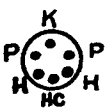
41



6Z5

Tube Type	Purpose	Fil. Volt A.C.	Plate Volts	Screen Volts D.C.	Cathode Volts D.C.
6A7-S	Modulator	6.3	255 D.C.	92	3.5 to 40
	Oscillator		92 D.C.	—	3.5 to 40
6F7-S	I. F. Amp.	6.3	255 D.C.	92	12
	2nd Det.		*100 D.C.	—	12
41	Output	6.3	240 D.C.	255	18
6Z5	Rectifier	6.3(Parallel)	285 A.C.	—	315

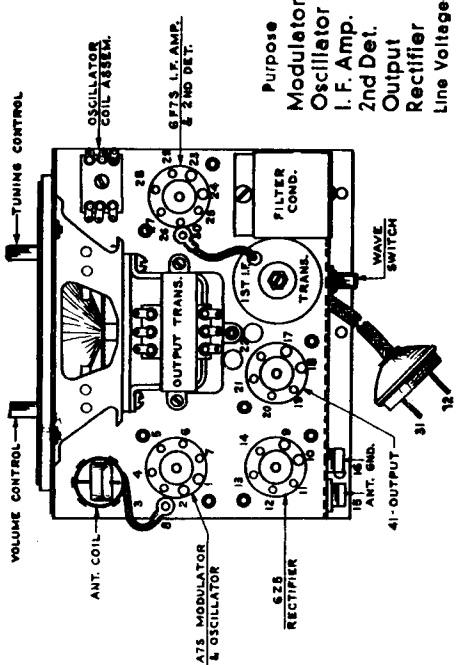
Line Voltage—115 Volts, 60 Cycle. *Measured with 600,000 ohm Meter.

RESISTANCE TABLE

All readings are taken from designated points to ground except those marked with an asterisk (*) which are taken to terminal No. 12, with all tubes removed from their sockets, volume control turned to maximum clockwise position, and the speaker connected in the circuit.

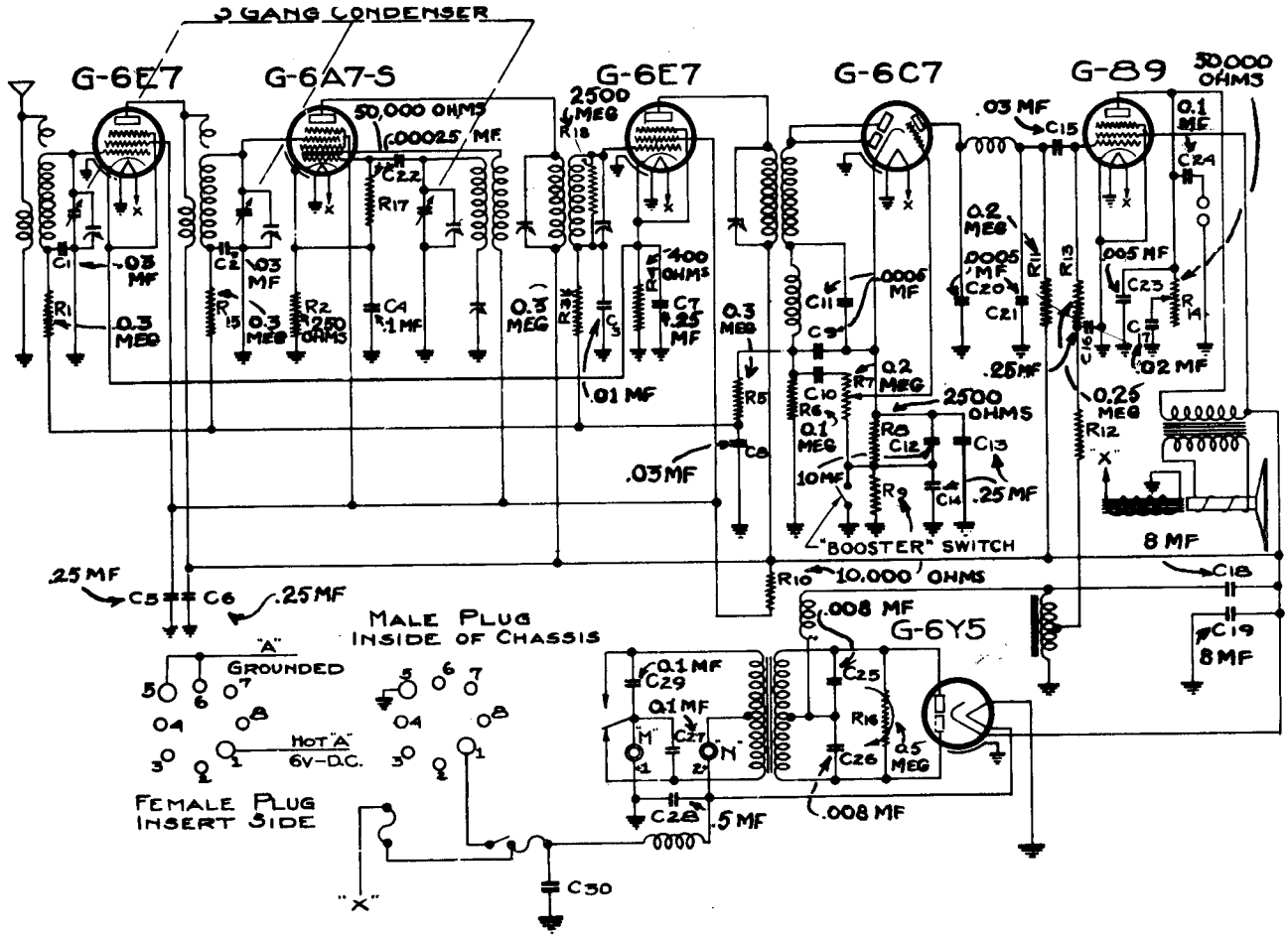
Terminal Number	Resistance In Ohms	If Resistance Differs Greatly From Value Shown, Check the Following
1	.34	Filament connection and ground connection
2	0	Ground connection
3	0	Volume control and C-7
4	150,000	C-1 & R-2. Also see terminal No. 2
*5	20,982	Pri. of oscillator coil, R-3 and filter choke
*6	20,980	R-3 and C-14
*7	1,006	Pri. of 1st I. F. trans.
8	5.22	Secondary of ant. coil
9	Same as No. 1	
10	0	Ground connection
11	405	One-half of hi-voltage secondary
12	Very high	C-8, C-9 and filter choke
13	Same as No. 11	
14	0	Ground connection
15	.79	Pri. of antenna coil
16	0	Ground connection
17	Same as No. 1	
18	Same as No. 2	
19	500	R-6 and C-10
20	500,000	R-5 and C-5
*21	980	Filter choke
*22	1,530	Pri. of output trans. and C-6. Also term. No. 21
23	Same as No. 2	
24	Same as No. 1	
25	1,800	R-7, R-8, C-2 and C-3
26	1,000,000	Secondary of 2nd I. F., R-9 and C-13
*27	701,035	C-4, R-4 and pri. of 2nd I. F. trans.
*28	20,980	R-3 and C-14
*29	1,035	Pri. of 2nd I. F. trans. and filter choke
30	1,527	Sec. of 1st I. F. trans., C-2 and R-7
31	0	C-11, A. C. switch and pri. of power trans.
32	Same as No. 31	

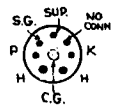
Due to manufacturing tolerances on carbon resistors, the values given above may be expected to differ plus or minus 15 per cent



GRIGSBY-GRUNOW CO., Inc.

MODEL 66





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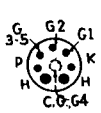

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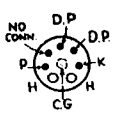

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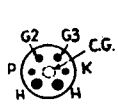


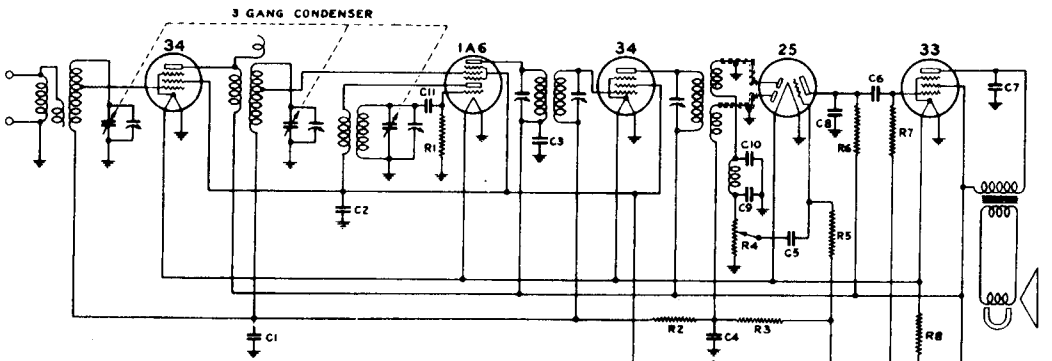
89

G-6Y5

	PLATE VOLTS			SCREEN VOLTS			CATHODE VOLTS			GRID VOLTS		
Battery Volts Terminal	5.5	6.3	7.5	5.5	6.3	7.5	5.5	6.3	7.5	5.5	6.3	7.5
R. F. (G-6E7)	182	217	256	88	99	109	8.0	9.3	12.5	8.0	9.3	12.5
G-6A7S Det.	182	217	256	88	99	109	2.7	3.4	4.2	2.7	3.4	4.2
G-6A7S Osc.	88	99	109	-	-	-	-	-	-	7.0*	8.0*	8.0*
I. F. (G-6E7)	182	217	256	88	99	109	8.0	9.3	12.5	8.0	9.3	12.5
Audio (G-6C7)	51	60	61	-	-	-	7.5	9.2	9.5	1.8	2.2	2.3
Output (G-89)	177	209	248	184	218	257	-	-	-	23.0	27.0	35.0

GRIGSBY-GRUNOW CO., Inc.

MODELS 105 & 95 & 520



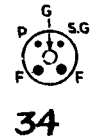
RESISTORS

R-1 – 100,000 OHMS
R-2 – 100,000 "
R-3 – 300,000 "
R-4 – 200,000 " V.C.
R-5 – 500,000 "
R-6 – 300,000 "
R-7 – 500,000 "
R-8 – 0.66 "

CONDENSERS

C-1 – .25 MFD.
C-2 – .1 "
C-3 – .1 "
C-4 – .01 "
C-5 – .03 "
C-6 – .03 "
C-7 – .005 "
C-8 – .0005 "
C-9 – .0005 "
C-10 – .0005 "
C-11 – .00025 "
} BY-PASS UNIT

IF = 175 KC.



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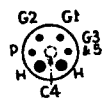
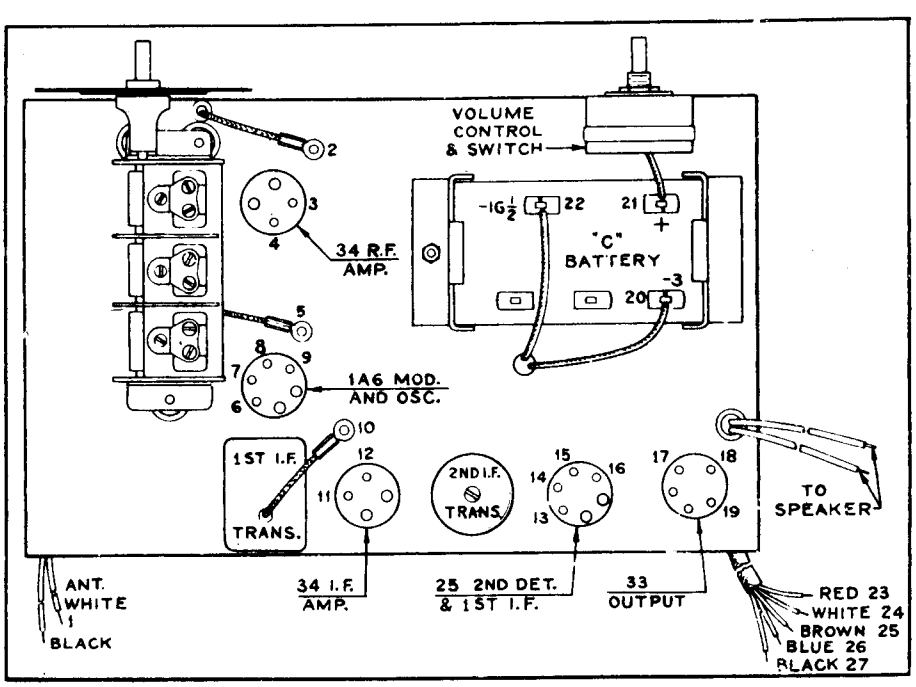


1A6

25

TYPE	PURPOSE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS
34	R.F. Amp.	135	67.5	-3
1A6	Modulator	135	67.5	-3
	Oscillator	67.5	----	0
34	I.F. Amp.	135	67.5	-3
25	2nd Det. & 1st Audio	Triode *70	----	-3
33	Output	130	135	-16.5



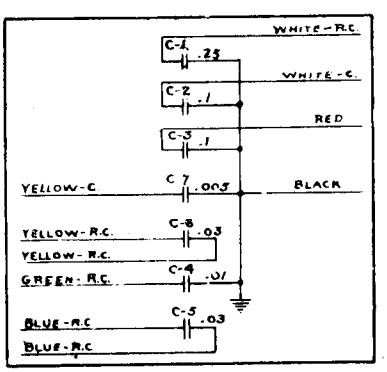
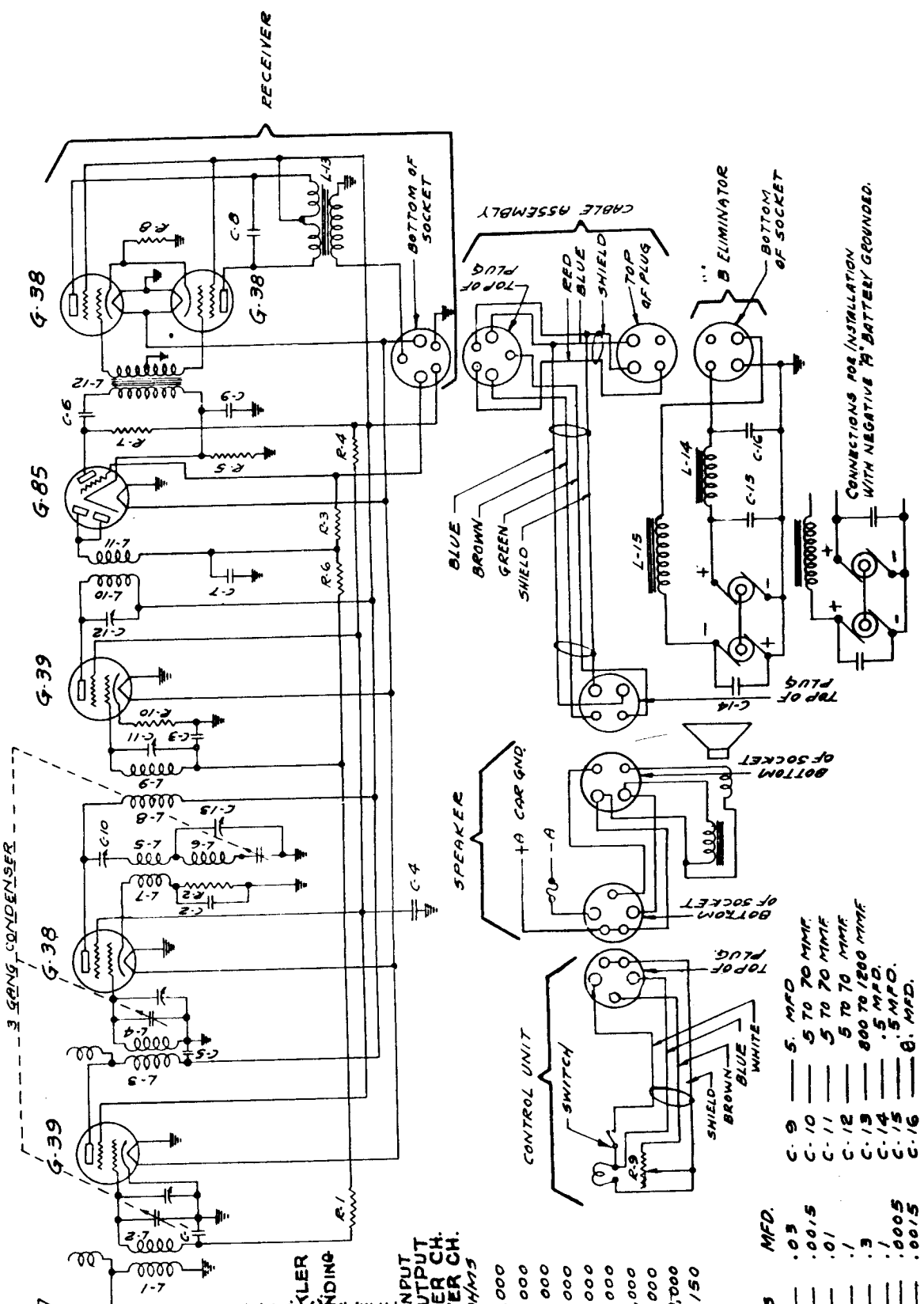


Diagram showing internal connections of #11245 Bypass Condenser Assembly. Reference numbers correspond to those used in the schematic diagram.

GRIGSBY-GRUNOW CO., Inc.

MODEL 114



COILS USE

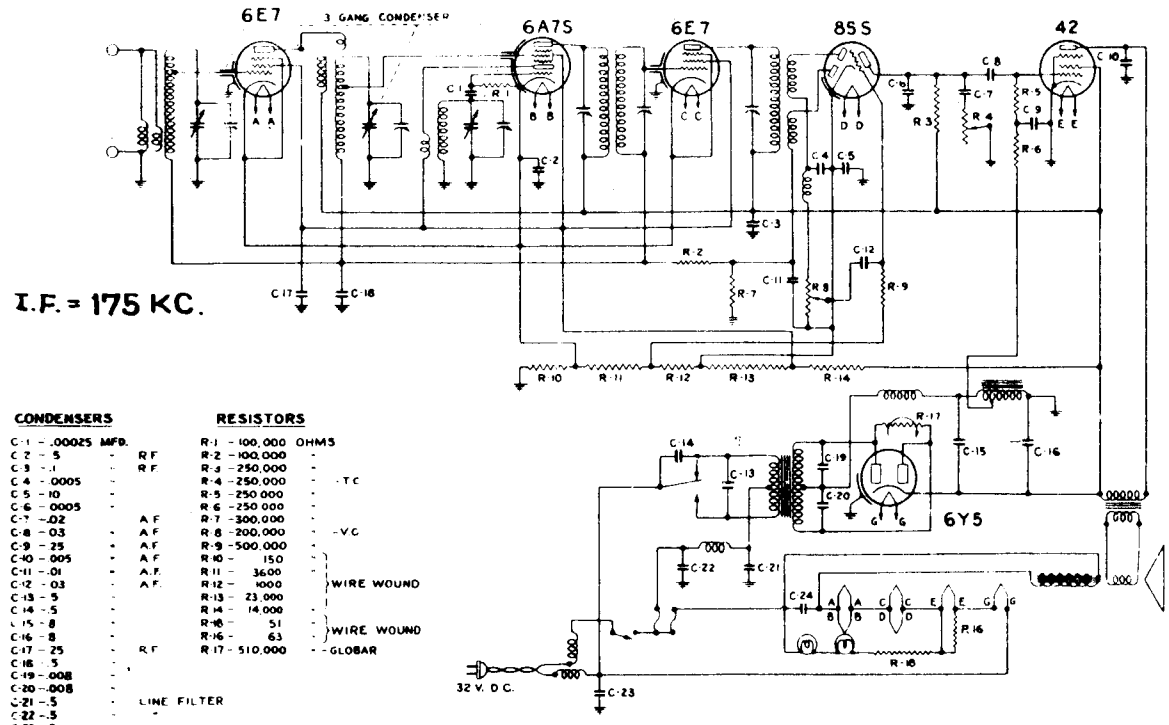
L1 - ANT. PRI.
L2 - ANT. SEC.
L3 - R.F. PRI.
L4 - R.F. SEC.
L5 - OSC. TICKLER
L6 - OSC. SEC.
L7 - CATH WINDING
L8 - 1ST. I.F.
L9 - 1ST. I.F.
L10 - 2ND I.F.
L11 - 2ND I.F.
L12 - PENT. INPUT
L13 - PENT. OUTPUT
L14 - "B" FILTER CH.
L15 - "A" FILTER CH.

RESISTORS	OHMS
R-1	99,000
R-2	8,000
R-3	99,000
R-4	30,000
R-5	2,000
R-6	500,000
R-7	99,000
R-8	1,000
R-9	250,000
R-10	150

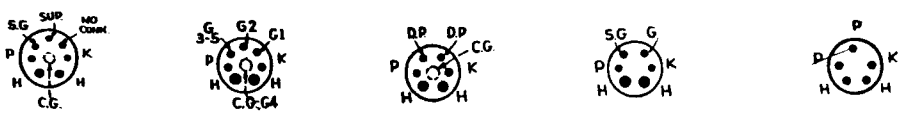
CONDENSERS	MFD.
C-1	.03
C-2	.0015
C-3	.01
C-4	.1
C-5	.3
C-6	.1
C-7	.0005
C-8	.0015
C-9	.5 MFD
C-10	5 TO 70 MMF.
C-11	5 TO 70 MMF.
C-12	5 TO 70 MMF.
C-13	800 TO 1200 MMF.
C-14	.5 MFD.
C-15	.5 MFD.
C-16	8. MFD.

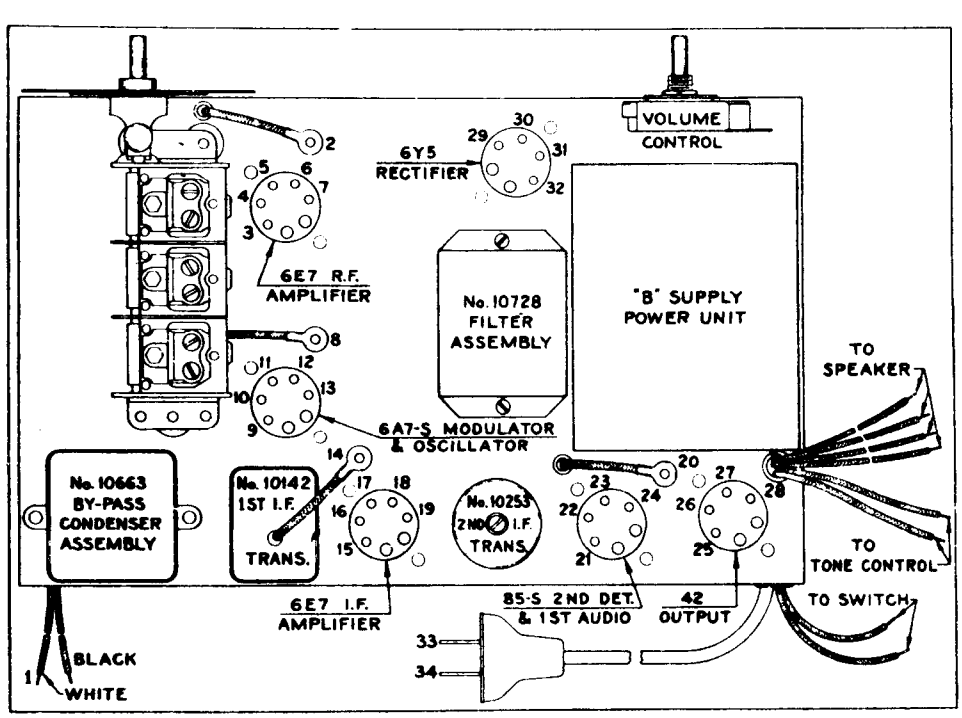
GRIGSBY-GRUNOW CO., Inc.

MODEL 490

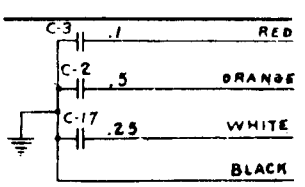


CONDENSERS			RESISTORS		
C-1 - .00025 MFD.			R-1 - 100,000 OHMS		
C-2 - 5	-	R.F.	R-2 - 100,000	-	
C-3 - .1	-	R.F.	R-3 - 250,000	-	
C-4 - .0005	-		R-4 - 250,000	-	T.C.
C-5 - 10	-		R-5 - 250,000	-	
C-6 - .0005	-		R-6 - 250,000	-	
C-7 - .02	-	A.F.	R-7 - 300,000	-	
C-8 - .03	-	A.F.	R-8 - 200,000	-	V.C.
C-9 - .25	-	A.F.	R-9 - 500,000	-	
C-10 - .005	-	A.F.	R-10 - 150	-	
C-11 - .01	-	A.F.	R-11 - 3600	-	
C-12 - .03	-	A.F.	R-12 - 1000	-	WIRE WOUND
C-13 - .5	-		R-13 - 23,000	-	
C-14 - .5	-		R-14 - 14,000	-	
C-15 - .8	-		R-15 - 51	-	
C-16 - .8	-		R-16 - 63	-	WIRE WOUND
C-17 - .25	-	R.F.	R-17 - 510,000	-	GLOBAR
C-18 - .5	-				
C-19 - .008	-				
C-20 - .008	-				
C-21 - .5	-	LINE FILTER			
C-22 - .5	-				
C-23 - .5	-				
C-24 - 10	-	N.P.			

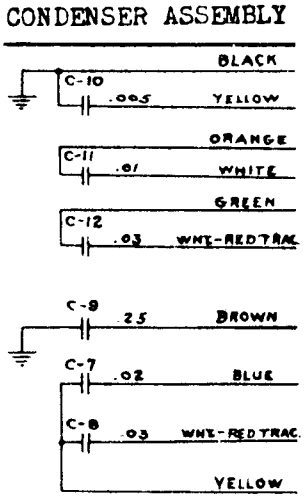




RESISTANCE CHART DIAGRAM.



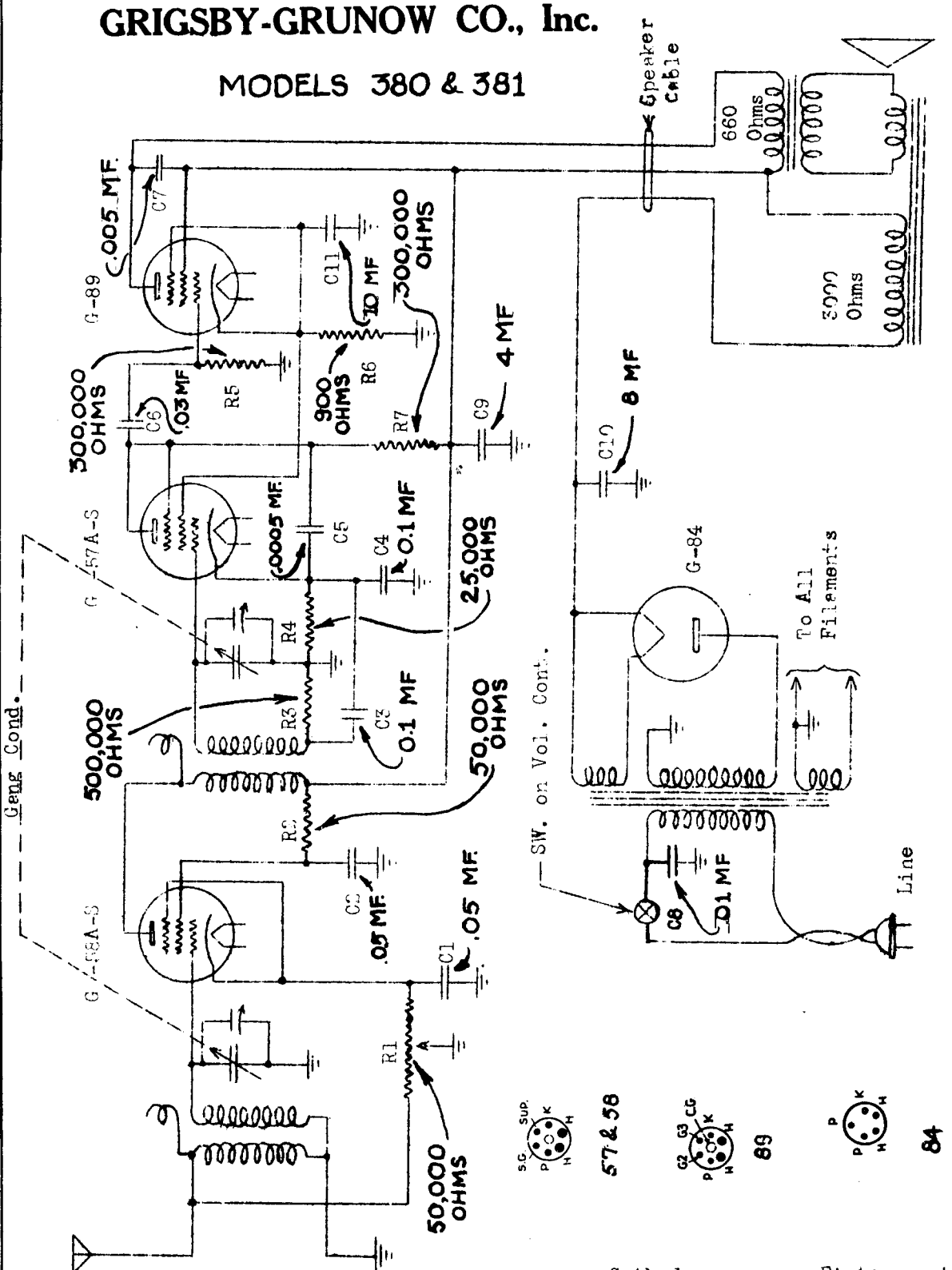
PART #10663 BYPASS CONDENSER ASSEMBLY



PART #10637 BYPASS CONDENSER ASSEMBLY

GRIGSBY-GRUNOW CO., Inc.

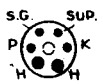
MODELS 380 & 381



Tube Purpose	Tube Type	Heater	Cathode to Ground	Plate to Ground	Screen to Ground
R.F. Amplifier	G-58A-S	5.9 A.C.	2.5 D.C.	178 D.C.	--
Detector	G-57A-S	5.9 A.C.	1.4 D.C.	80 D.C.	18.4 D.C.
Pentode Output	G-89	5.9 A.C.	18.4 D.C.	171 D.C.	183 D.C.
Rectifier	G-84	2.4 A.C.	--	350 A.C.	--

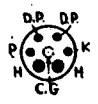
GRIGSBY-GRUNOW CO., Inc.

MODELS 461-463&460 67-68 &69



58

2A7



55

2A5

80

RESISTANCE VALUES

ANTENNA COIL
Primary ...22.16 ohm
Secondary (total) .. 5.38 ohm

R. F. COIL
Primary ..146 ohm
Secondary (total). 5.15 ohm

OSCILLATOR COIL
Primary ... 2.7 ohm
Secondary ..2.13 ohm

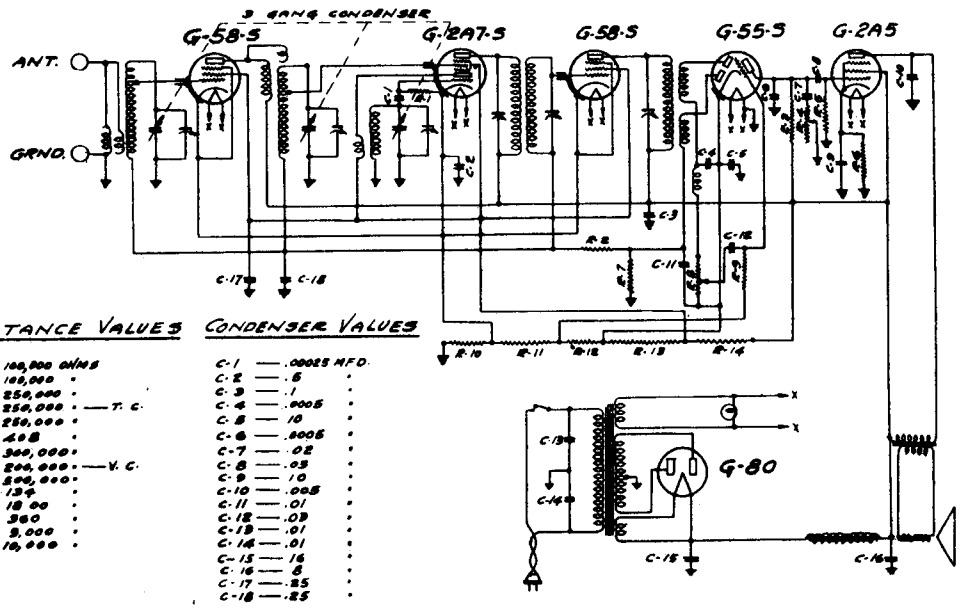
1st I. F. TRANSFORMER
Primary ....125 ohm
Secondary ..122 ohm

2nd I. F. TRANSFORMER
Primary....148 ohm
Secondary
Audio ... 69.3 ohm
A.V.C. .. 68.3 ohm

OUTPUT TRANSFORMER
Primary ... 500 ohm

FIELD COIL
.....1070 ohm

HIGH VOLTAGE SECONDARY
Each Side...360 ohm



RESISTANCE VALUES

R-1 — 100,000 ohms
R-2 — 100,000 "
R-3 — 250,000 "
R-4 — 250,000 " — T. C.
R-5 — 250,000 "
R-6 — 400 "
R-7 — 300,000 "
R-8 — 200,000 " — V. C.
R-9 — 500,000 "
R-10 — 1.3 "
R-11 — 18 00 "
R-12 — 360 "
R-13 — 3,000 "
R-14 — 10,000 "

CONDENSER VALUES

C-1 — .00025 MFD.
C-2 — .5 "
C-3 — .1 "
C-4 — .0005 "
C-5 — .10 "
C-6 — .0005 "
C-7 — .02 "
C-8 — .03 "
C-9 — .10 "
C-10 — .005 "
C-11 — .01 "
C-12 — .03 "
C-13 — .01 "
C-14 — .01 "
C-15 — 16 "
C-16 — 8 "
C-17 — .25 "
C-18 — .25 "

WIRING COLOR CODE

With the hope that we shall eventually have a uniform color code, we are setting up the following tentative specifications:

Blue—Yellow Tracer	— High V. from Rect. (filter input)
Red	— B+Plus
Orange	— Cathodes
White	— Screen
Blue	— Filament
Black	— Filament and Grounds
Green	— Grid Returns
Brown	— Cathode Returns
Black—Red Tracer	— Grid
White—Red Tracer	— Grid (Cond.)
Orange—Black Tracer	— Suppressor Grid
Black—Yellow Tracer	— Special Plate
Blue—Red Tracer	— Special Screens
Yellow	— All Plates
White R.C.	— A.V.C. Circuits
Yellow R.C.	— Special A.V.C. Circuits
Black and Red Twisted	— Pilot Lamp

For some time to come there will be cases where substitutions will be made for the purpose of using up inventory. There may also be cases which arise where it will be impossible to obtain the specific wire when needed, in which case a substitution will be made. In general, however, the above code will be strictly adhered to.

ALIGNMENT PROCEDURE

1—The receiver must be aligned with volume control in maximum position.

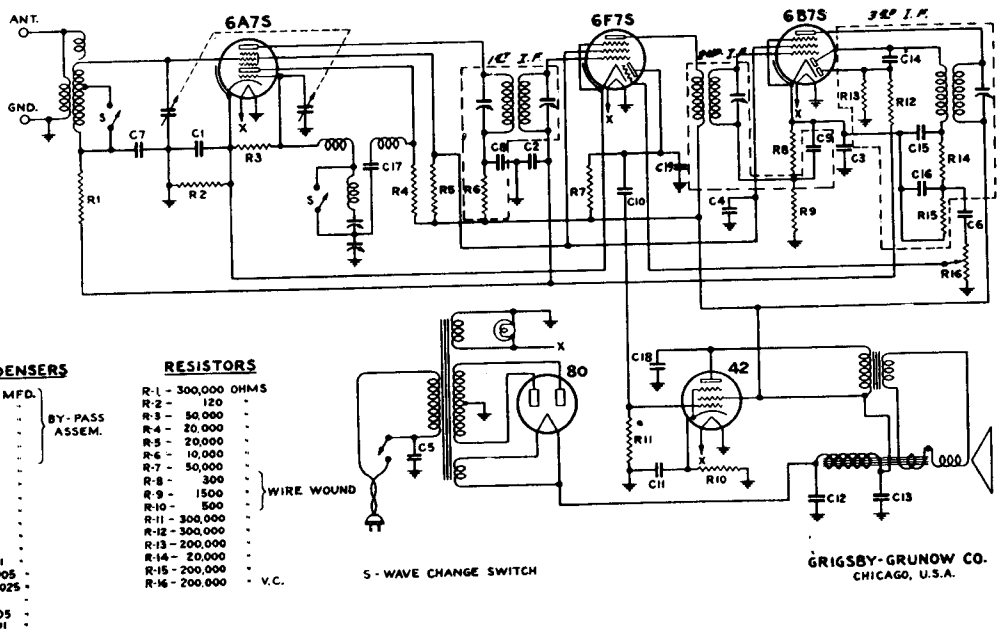
2—Supply a 175 K.C. signal to the grid of the G-2A7-S modulator tube, and adjust the three I.F. tuning condensers for maximum sensitivity.

3—Set the gang condenser in minimum capacity position (all the way out of mesh), supply a 1730 K.C. signal to the input of the receiver and align the three gang condenser trimmers for maximum sensitivity.

After the receiver is aligned the sensitivity for 100 milliwatts output at 30% modulation should be 10 microvolts or less.

GRIGSBY-GRUNOW CO., Inc.

MODELS 500-55-59-75-195-560 & 566



CONDENSERS

C-1 - .25 MFD.
C-2 - .25 "
C-3 - .25 "
C-4 - .25 "
C-5 - .03 "
C-6 - .03 "
C-7 - .03 "
C-8 - .01 "
C-9 - .03 "
C-10 - .05 "
C-11 - 10 "
C-12 - 8 "
C-13 - 8 "
C-14 - .001 "
C-15 - .0005 "
C-16 - .00025 "
C-17 - .01 "
C-18 - .005 "
C-19 - .001 "

BY-PASS ASSEM.

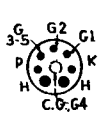
RESISTORS

R-1 - 300,000 OHMS
R-2 - 120 "
R-3 - 50,000 "
R-4 - 20,000 "
R-5 - 20,000 "
R-6 - 10,000 "
R-7 - 50,000 "
R-8 - 300 "
R-9 - 1500 "
R-10 - 500 "
R-11 - 300,000 "
R-12 - 300,000 "
R-13 - 200,000 "
R-14 - 20,000 "
R-15 - 200,000 "
R-16 - 200,000 " V.C.

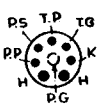
WIRE WOUND

TUBE TYPE	PURPOSE	PLATE	SCREEN—D.C.	CATHODE—D.C.
6A7-S	Modulator	210* D.C.	100	2.8
	Oscillator	90* D.C.	—	
6F7-S	1st I.F.	250 D.C.	100	2.8
	1st A.F.	60* D.C.	—	
6B7-S	2nd I.F.	250 D.C.	100	17.0
	2nd Det.	0	—	
42	Output	235 D.C.	250	17.0
80	Rectifier	340 A.C.	—	—

LINE VOLTAGE—115 VOLTS A. C.
*MEASURED WITH A 600,000 OHM METER.



6A7



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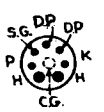

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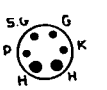


42

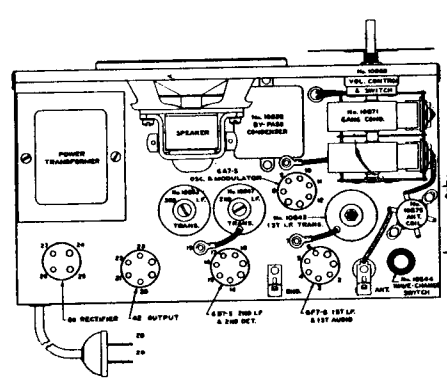
80

RESISTANCE CHART

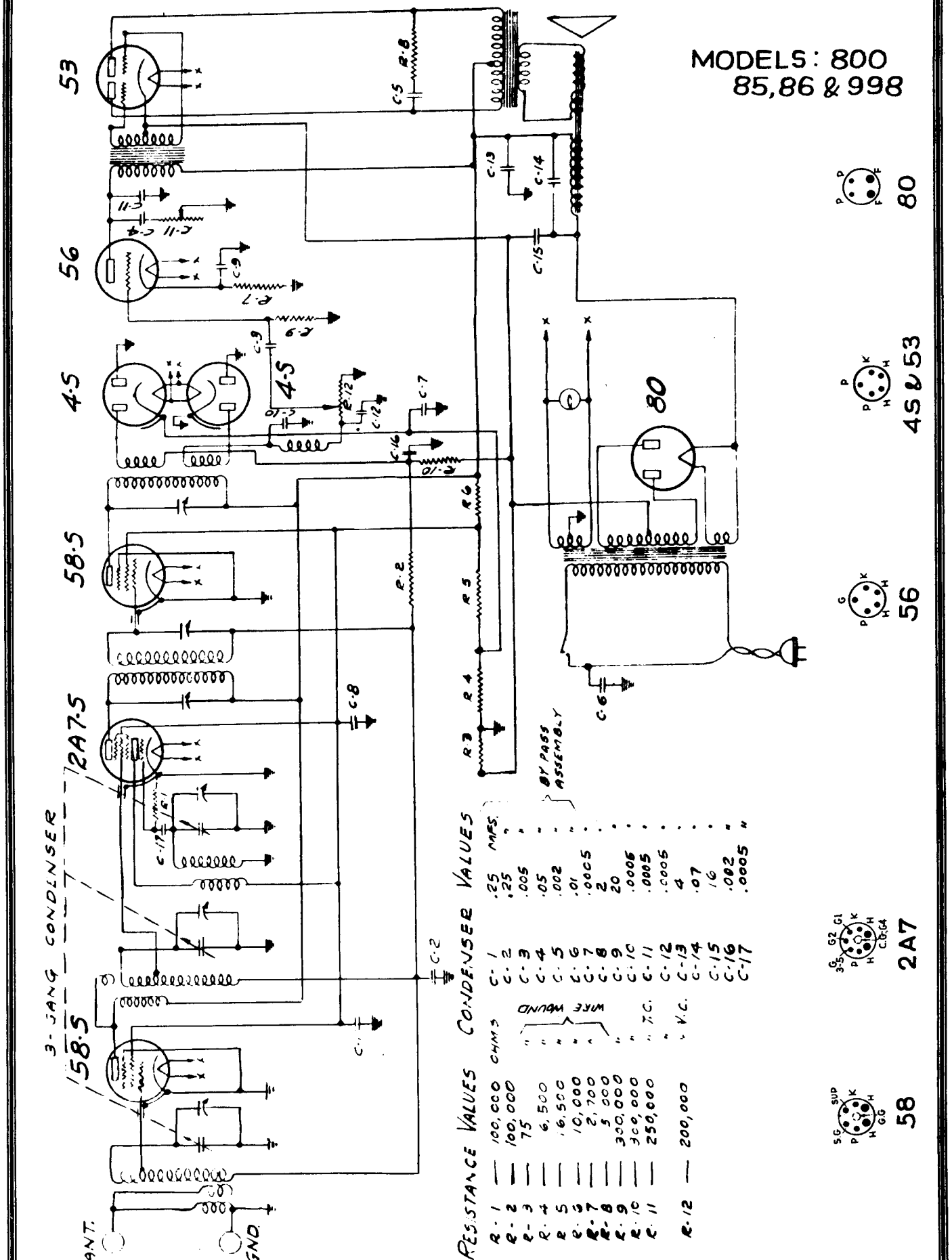
All readings are taken from designated points to ground except those marked with an asterisk (*) which are taken to terminal No. 25, with all tubes removed from their sockets, volume control in maximum position and the speaker connected in the circuit.

Terminal Number	Resistance In Ohms	If resistance differs greatly from value shown, check the following
1	27	Primary of antenna coil.
2	120	R-2 and C-1.
3	200,000	Volume Control.
4	Very high	C-4, C-10, C-13, C-12 and C-8.
*4	50,980	R-7 and field coil.
*5	20,980	R-5 and field coil.
*6	1,000	Primary of 2nd I. F. Transformer and field coil.
7	500,020	Secondary of 1st I. F. Trans. C-2, R-12 and R-13.
8	Same as No. 2	
9	50,120	R-2, R-3 and C-1.
*10	20,980	R-4 and field coil.
*11	Same as No. 5	
*12	11,000	Primary of 1st I. F. Transformer, R-6 and field coil.
13	800,003.9	Secondary of ant. coil, C-7 and R-1. Also see terminal No. 7.
14	1,800	R-8, C-9, C-3 and R-9.
†15	200,000	R-13.
†16	221,846	R-14, C-15, C-16, R-15, C-6, C-3, C-9, R-8 and R-9.
*17	Same as No. *5	
*18	1,026	Primary of 3rd I. F. Transformer and field coil.
19	1,520	Secondary of 2nd I. F. Transformer, R-9, C-9, R-8 and C-3.
20	500	R-10 and C-11.
21	300,000	R-11.
*22	980	Field coil.
*23	1,405	Primary of output transformer and field coil.
*24	.24	Rectifier filament winding.
25	Very high	C-12, C-13, C-8 and C-4.
26	490	Hi-voltage secondary of power transformer.
27	490	Hi-voltage secondary of power transformer.
28	Open	Primary of power transformer, C-5 and "On-off" Switch.
29	Open	See terminal No. 28.

†The connections to these two diode plates may be reversed with no effect.

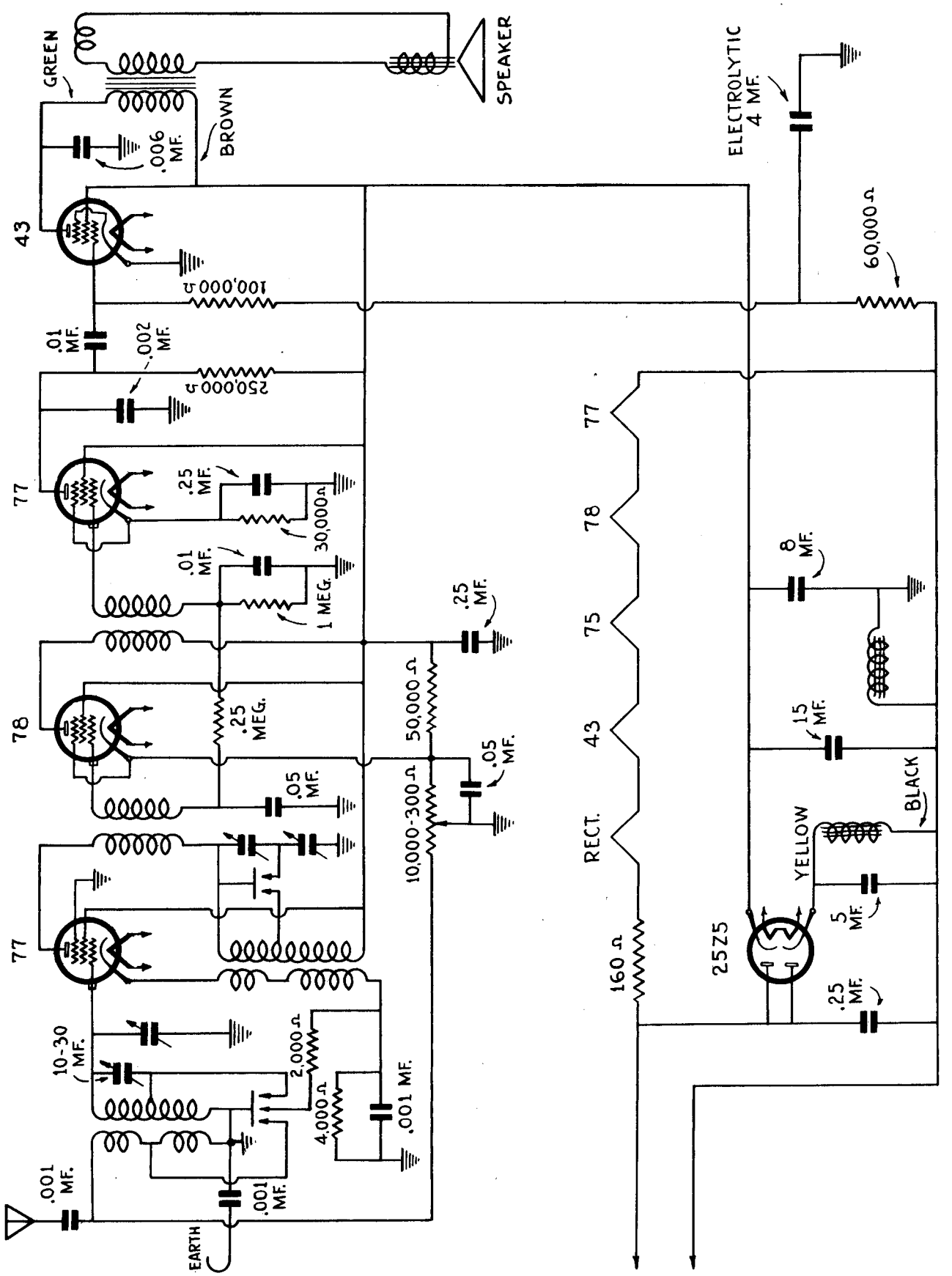


GRIGSBY-GRUNOW CO., Inc.



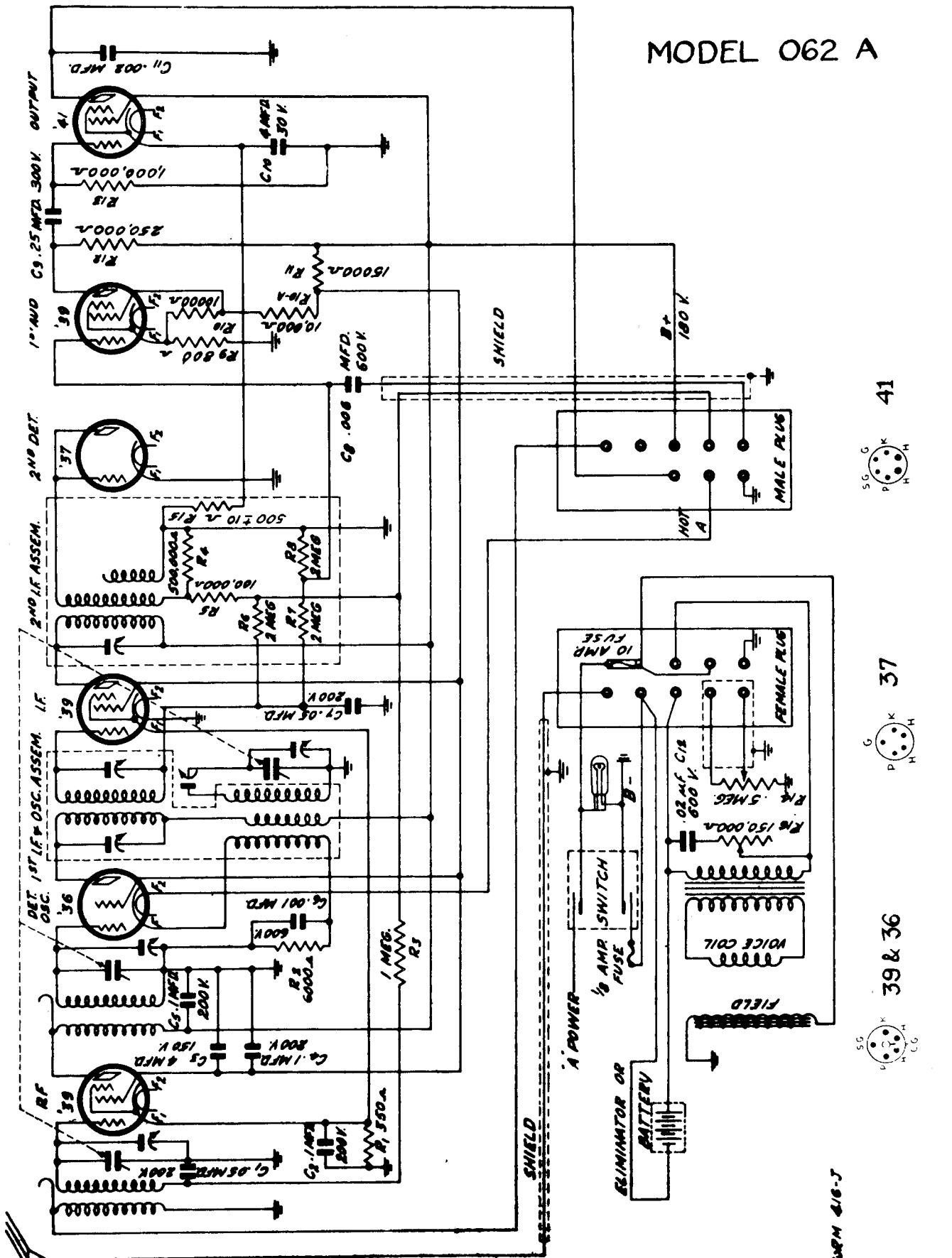
GULBRANSEN CO.

MODEL SERIES 05A



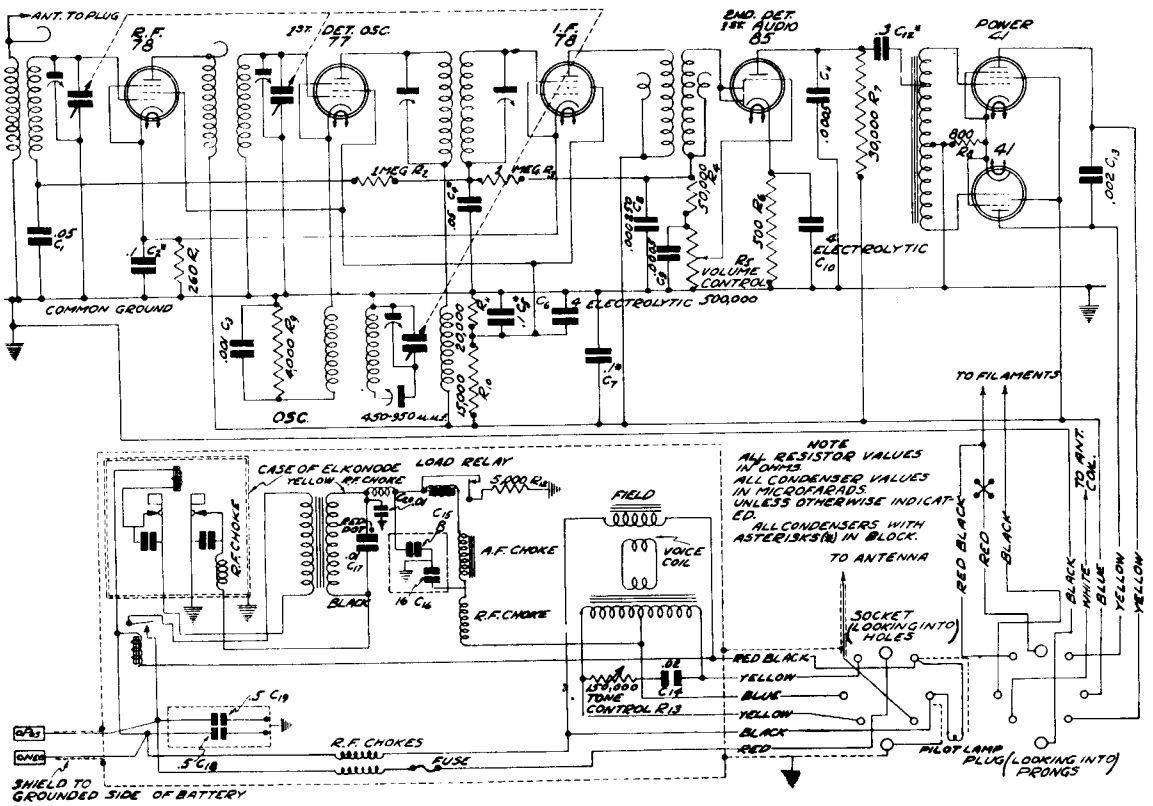
GULBRANSEN CO.

MODEL 062 A



GULBRANSEN CO.

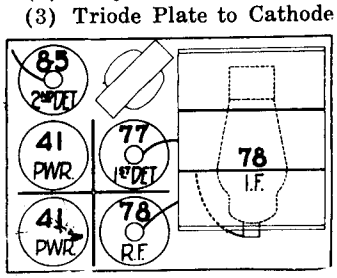
MODEL 06W

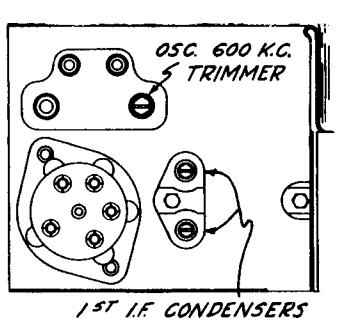


Type of Tube	Function	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78	R. F.	6.1	182	80	3.(1)	7.0
77	1st Det. and Osc.	6.1	178	77	5.(2)	1.3(2)
78	I. F.	6.1	182	80	3.(1)	7.0
85	2nd Det. 1st Audio	6.1	70(3)		1.8(1)	3.5
41	Output	6.1	162	168.5	17.	11.

NOTE:—Above voltages are at 185 volts input from "B" Eliminator

(1) Cathode to Ground
(2) Subject to Variation
(3) Triode Plate to Cathode





77 & 78

85

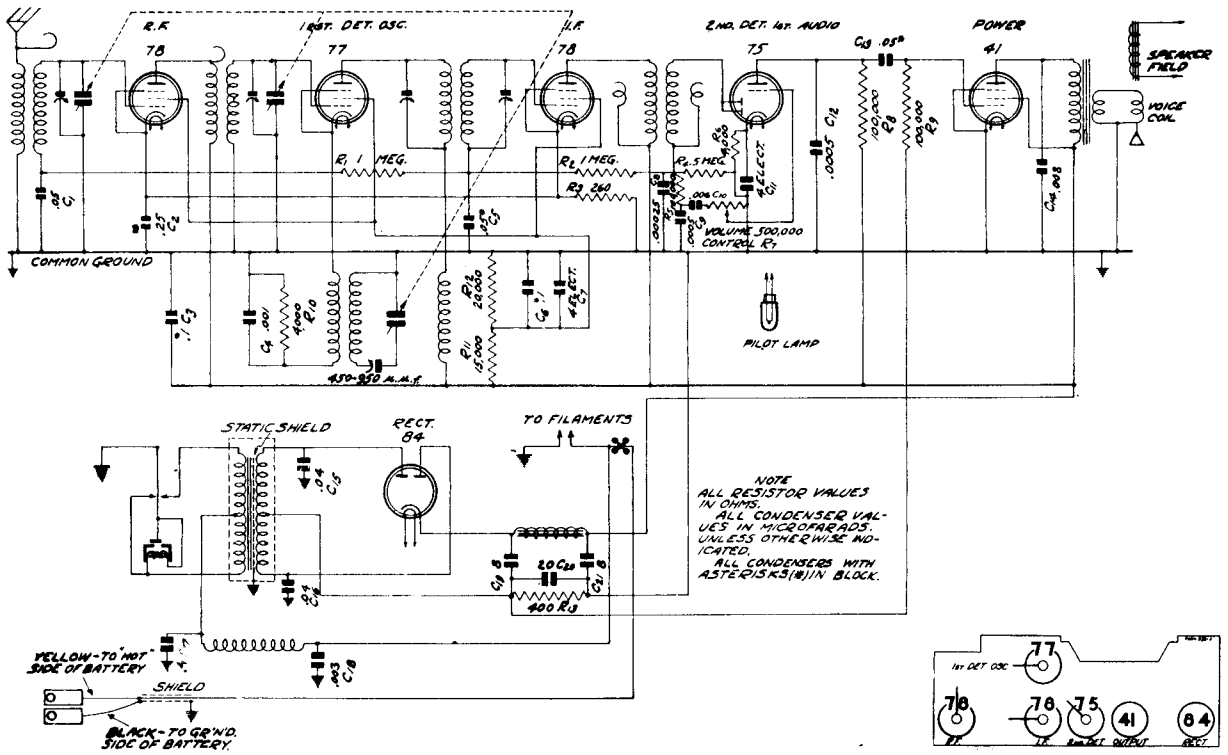
41

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output.

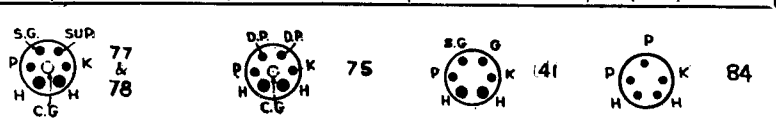
GULBRANSEN CO.

MODEL V6Z2 AUTO SET



Type of Tube	*Function*	*Across Heater*	*Plate to Cathode*	*Screen to Cathode*	*Grid to Cathode*	*Normal Plate MA*
78	R. F.	6.1	182	80	3.(1)	7.0
77	1st Det. and Osc.	6.1	178	77	5.(2)	1.3(2)
78	I. F.	6.1	182	80	3.(1)	7.0
75	2nd Det. 1st Audio	6.1	70(3)		1.4(1)	.35
41	Output	6.1	172.5	176.5	12.5(4)	16.0
84	Rect.	6.1	205			17.5 per plate

(1) Cathode to Ground
(2) Subject to Variation
(3) Triode Plate to Cathode
(4) Read Across 400-Ohm Resistor, R13

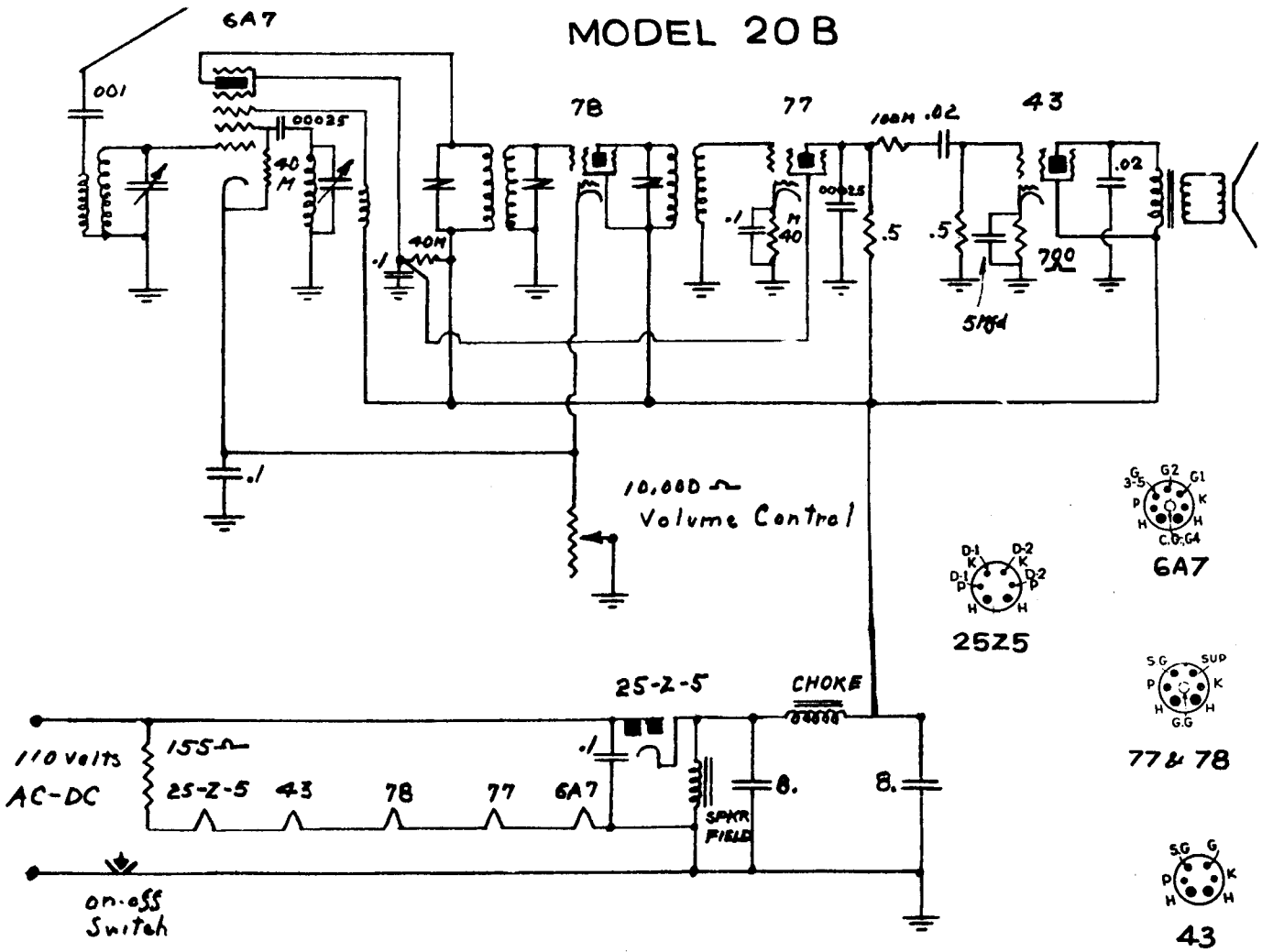


First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. One of the I.F. condenser screws is reached through the hole on the top of the 1st I.F. assembly can. The other I.F. condenser screw is reached from the bottom of the sub-panel through a hole at the bottom of this assembly.

HALSON RADIO MFG. CO.

MODEL 20 B



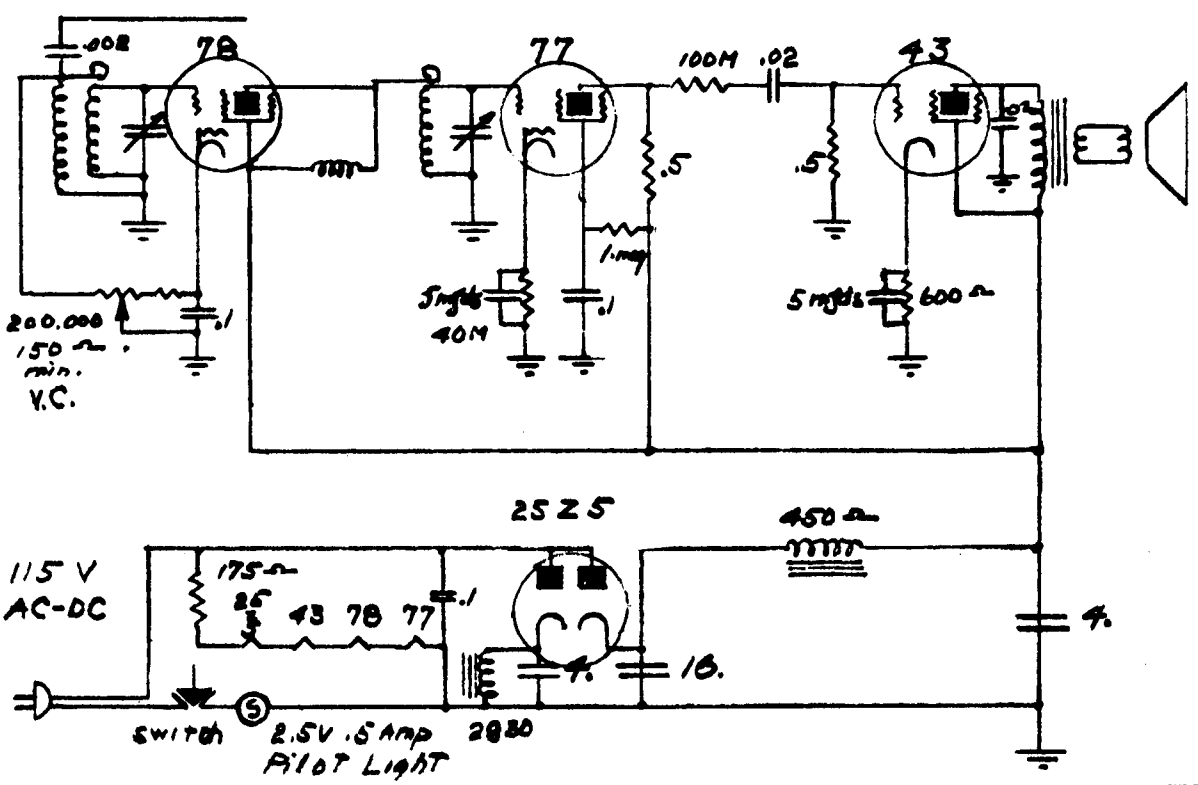
6A7

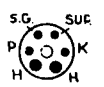
25Z5

77 & 78

43

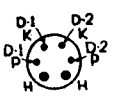
MODEL NS-40





77 & 78

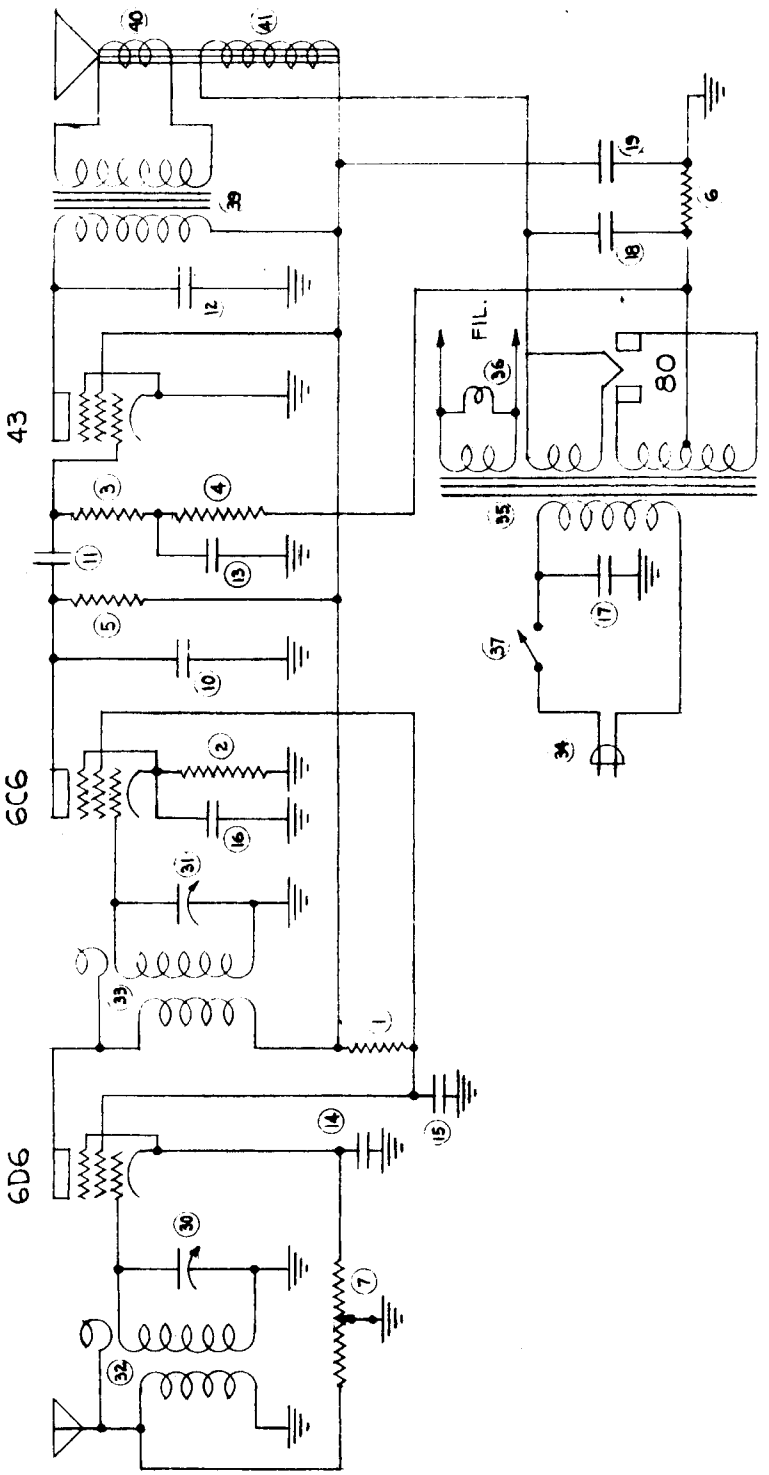
43



25Z5

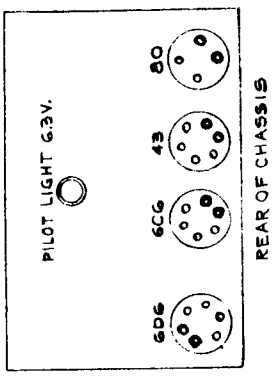
HALSON RADIO MFG. CO.

MODEL 410



1	1158	RESISTOR	110,000ᵂ	1 WATT	11	1101	CONDENSER	.01 M.F.	400 V.	30	1285	VARIABLE COND. 370 M.M.F.
2	1160	"	51,000ᵂ	½ "	12	"	"	"	"	31	"	" " " "
3	1165	"	260,000ᵂ	" "	13	1040	"	.05 "	200 V.	32	1286	ANTENNA COIL
4	"	"	"	" "	14	"	"	"	"	33	1288	R.F. COIL
5	1029	"	"	1 "	15	1036	"	.1 "	"	34	1115	LINE CORD & PLUG
6	1292	"	400ᵂ	1 "	16	1103	"	.25 "	"	35	1184	POWER TRANSFORMER
7	1289	VOLUME CONTROL 25,000ᵂ			17	1102	"	.02 "	400 V.	36	1086	PILOT LIGHT 6.3 V.
					18	1194	ELECTROLYTIC COND. 8 M.F. 450 V.			37	—	LINE SWITCH ON NO.7
10	1098	CONDENSER	510 M.M.F.	MICA	19	"	"	"	"	"	"	

39	1293	OUTPUT TRANS. 7000ᵂ			
40	5782	VOICE COIL			
41	ASSY.	FIELD COIL 2000ᵂ			



6C6 & 6D6

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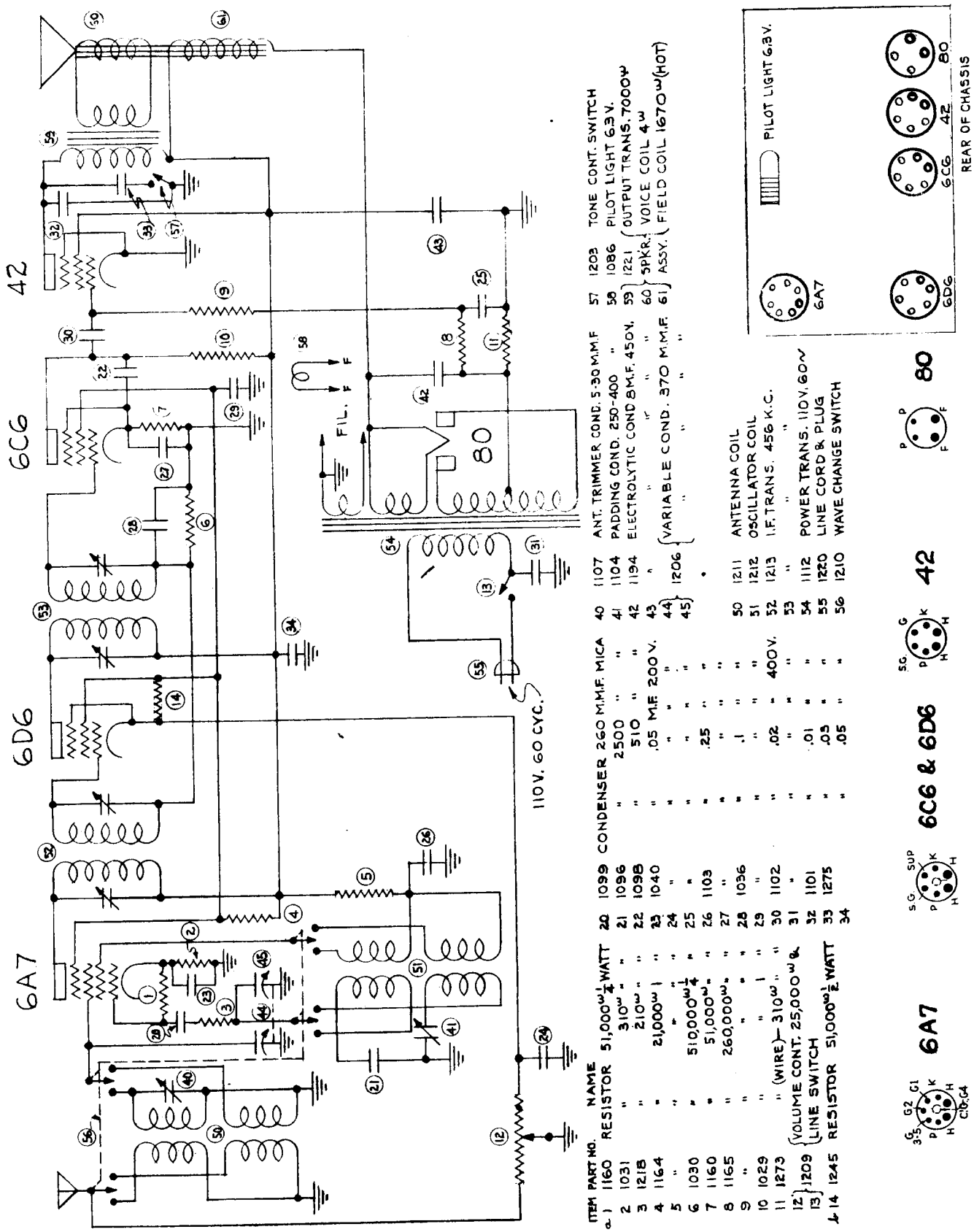
80

HALSON RADIO MFG. CO.

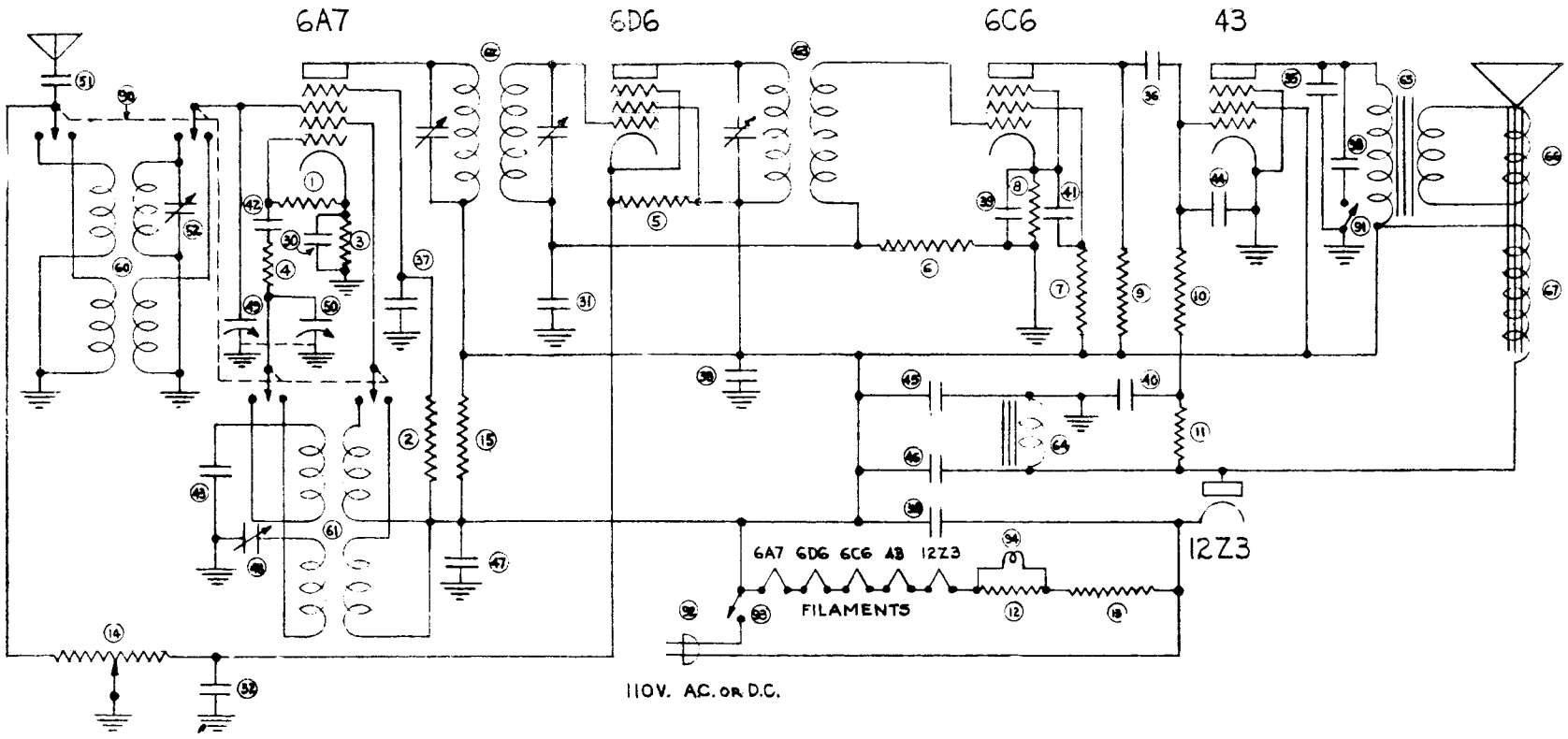
MODEL 520



ITEM	PART NO.	NAME									
a 1	1160	RESISTOR	51,000 ohm 1/4 WATT	20	1099	CONDENSER	260 M.M.F. MICA	40	1107	ANT. TRIMMER COND. 5-30 M.M.F.	
2	1031	"	310 ohm " "	21	1096	"	2500 " "	41	1104	PADDING COND. 250-400 "	
3	1218	"	210 ohm " "	22	1098	"	510 " "	42	1194	ELECTROLYTIC COND 8 M.F. 450 V.	
4	1164	"	21,000 ohm 1 "	23	1040	"	.05 M.F. 200 V.	43		" " " " "	
5	"	"	" " "	24	"	"	" " "	44	1206	VARIABLE COND. 370 M.M.F.	
6	1030	"	510,000 ohm 1/4 "	25	"	"	.25 " "	45		" " " "	
7	1160	"	51,000 ohm "	26	1103	"	" " "	50	1211	ANTENNA COIL	
8	1165	"	260,000 ohm "	27	"	"	" " "	51	1212	OSCILLATOR COIL	
9	"	"	" " "	28	1036	"	.1 " "	52	1213	I.F. TRANS. 456 K.C.	
10	1029	"	" " 1 "	29	"	"	" " "	53		" "	
11	1273	" (WIRE)	310 ohm "	30	1102	"	.02 " 400 V.	54	1112	POWER TRANS. 110 V. 60 ~	
12	1209	VOLUME CONT.	25,000 ohm	31	"	"	" " "	55	1220	LINE CORD & PLUG	
13		LINE SWITCH		32	1101	"	.01 " "	56	1210	WAVE CHANGE SWITCH	
14	1245	RESISTOR	51,000 ohm 1/2 WATT	33	1275	"	.03 " "	57	1203	TONE CONT. SWITCH	
				34		"	.05 " "	58	1086	PILOT LIGHT 6.3 V.	
								59	1221	OUTPUT TRANS. 7000 ohm	
								60		SPKR. VOICE COIL 4 ohm	
								61		ASSY. FIELD COIL 1670 ohm (HOT)	

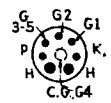
HALSON RADIO MFG. CO.

MODEL 530



1	1242	RESISTOR 21,000ω ½ WATT	13	——	RESISTANCE 190ω WITH 92	37	1040	CONDENSER .05 M.F. 200V.	49	1206	VARIABLE COND. 370 M.M.F.
2	"	" " "	14	1209	VOLUME CONT. 25,000ω	38	1036	" .1 "	50		" " " "
3	1243	" 260ω "			WITH 93	39	1103	" .25 " "	51	1101	CONDENSER .01 M.F. 400V.
4	1276	" 110ω "	15	1315	RESISTOR 5100ω ½ WATT	40	"	" " " "	52	1107	ANT. TRIMMER COND. 5-30 M.M.F.
5	1245	" 51,000ω ½ WATT				41	1036	" .1 " "	60	1211	ANTENNA COIL
6	1094	" 1.1 MEGω ¼ WATT	30	1040	CONDENSER .05 M.F. 200V.	42	1099	" 260 M.M.F. MICA	61	1212	OSCILLATOR COIL
7	"	" " "	31	"	" " " "	43	1096	" 2500 " "	62	1213	I.F. TRANSFORMER 456 K.C.
8	1027	" 31,000ω "	32	"	" " " "	44	1098	" 510 " "	63	1316	I.F. TRANSFORMER 456 K.C.
9	1029	" 260,000ω 1 WATT	33	"	" " " "	45	1320	" ELEC. 8 M.F. 150V.	64	1281	FILTER CHOKE
10	1030	" 510,000ω ¼ WATT	34	1102	" .02 " 400V.	46	"	" " " "	65	1279	OUTPUT TRANS. 4300ω
11	1165	" 260,000ω "	35	1101	" .01 " "	47	"	" " " "	66	SPKR.	VOICE COIL
12	1016	" 20ω 2 WATT	36	"	" " " "	48	1104	PADDING COND. 250-400 M.M.F.	67	ASSY.	FIELD COIL 4500ω

90	1210	WAVE CHANGE SWITCH
91	1203	TONE CONTROL SWITCH
92	1278	LINE CORD & PLUG WITH 13
93	——	LINE SWITCH WITH 14
94	1086	PILOT LIGHT BULB 6.3V.



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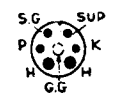
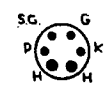


6C6 & 6D6



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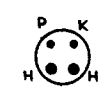
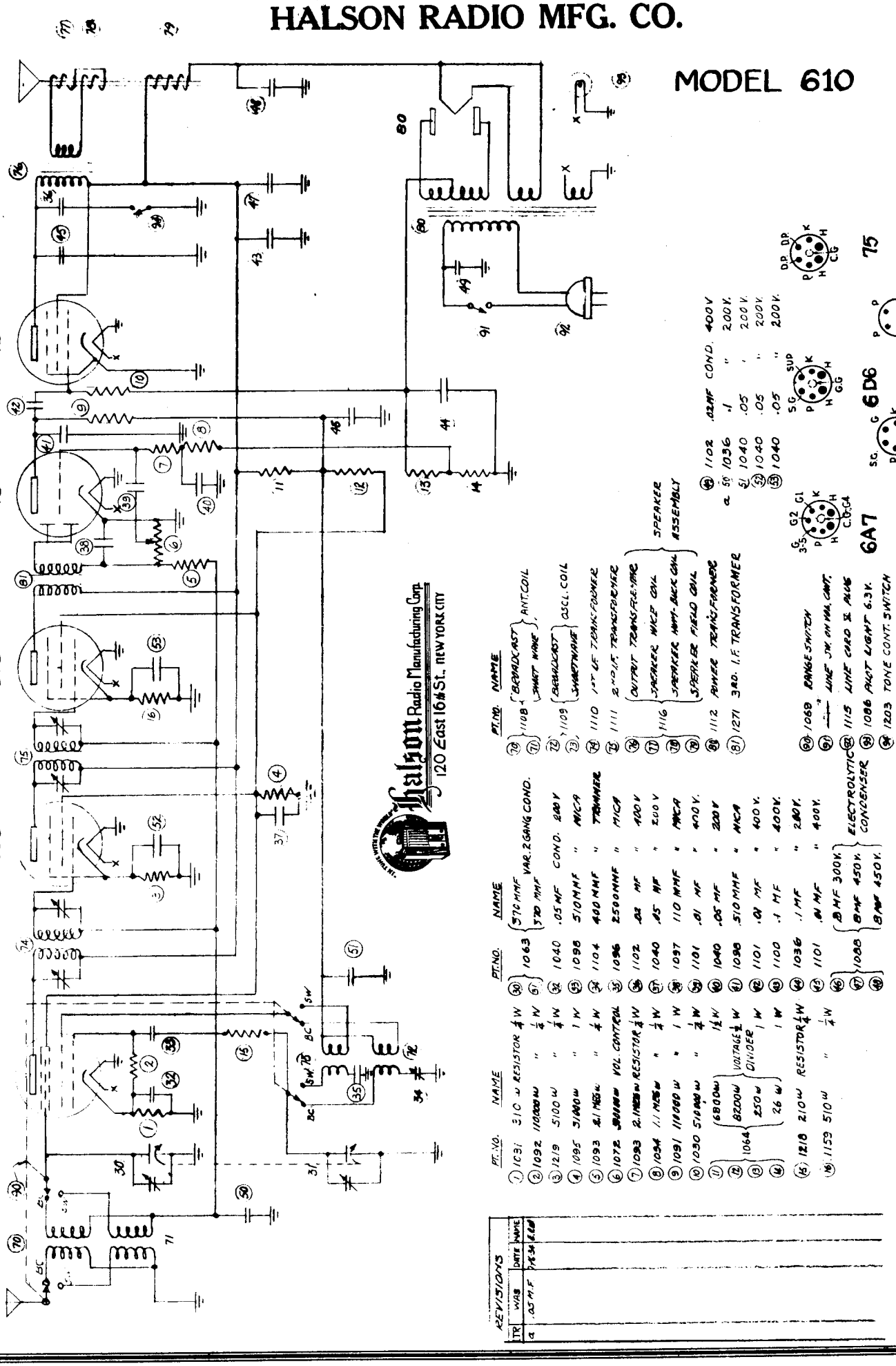


12Z3

HALSON RADIO MFG. CO.

MODEL 610



PT.NO.	NAME	PT.NO.	NAME
① 1031	310 Ω RESISTOR ¼ W	㉚ 1063	370 MMF VAR. 2 GANG COND.
② 1092	110000 Ω " ½ W	㉛	730 MMF
③ 1219	5100 Ω " ½ W	㉜ 1040	.05 MF COND. 200 V
④ 1095	31000 Ω " 1 W	㉝ 1098	510 MMF " MICA
⑤ 1093	21000 Ω " 1 W	㉞ 1104	400 MMF " TRIMMER
⑥ 1072	500000 Ω VOL. CONTROL	㉟ 1096	250 MMF " MICA
⑦ 1093	2.1 MEG Ω RESISTOR ¼ W	㊱ 1102	.02 MF " 400 V
⑧ 1034	1.1 MEG Ω " ¼ W	㊲ 1040	.05 MF " 200 V
⑨ 1091	110000 Ω " 1 W	㊳ 1097	110 MMF " MICA
⑩ 1030	51000 Ω " ½ W	㊴ 1101	.01 MF " 400 V.
⑪	6800 Ω VOLTAGE ½ W	㊵ 1040	.05 MF " 200 V
⑫ 1064	8200 Ω DIVIDER 1 W	㊶ 1098	510 MMF " MICA
⑬	250 Ω 26 W) 1 W	㊷ 1101	.02 MF " 400 V.
⑭		㊸ 1100	.1 MF " 400 V.
⑮ 1218	210 Ω RESISTOR ¼ W	㊹ 1036	.1 MF " 200 V.
⑯ 1159	510 Ω " ¼ W	㊺ 1101	.01 MF " 400 V.
		㊻ 1088	.8 MF 300 V. ELECTROLYTIC CONDENSER
		㊼	8 MF 450 V.
		㊽	8 MF 450 V.

PT.NO.	NAME
㊾ 1108	BROADCAST SHORT WAVE ANT. COIL
㊿ 1109	BROADCAST SHORTWAVE OSCL. COIL
(51) 1110	1ST I.F. TRANSFORMER
(52) 1111	2ND I.F. TRANSFORMER
(53)	OUTPUT TRANSFORMER
(54) 1116	SPEAKER FIELD COIL
(55)	SPEAKER HUM-BUCK COIL
(56) 1112	POWER TRANSFORMER
(57) 1271	3RD. I.F. TRANSFORMER
(58) 1069	RANGE SWITCH
(59) —	LINE SW. ON VOL. CONT.
(60) 1115	LINE CORD & PLUG
(61) 1086	PILOT LIGHT 6.3 V.
(62) 1203	TONE CONT. SWITCH

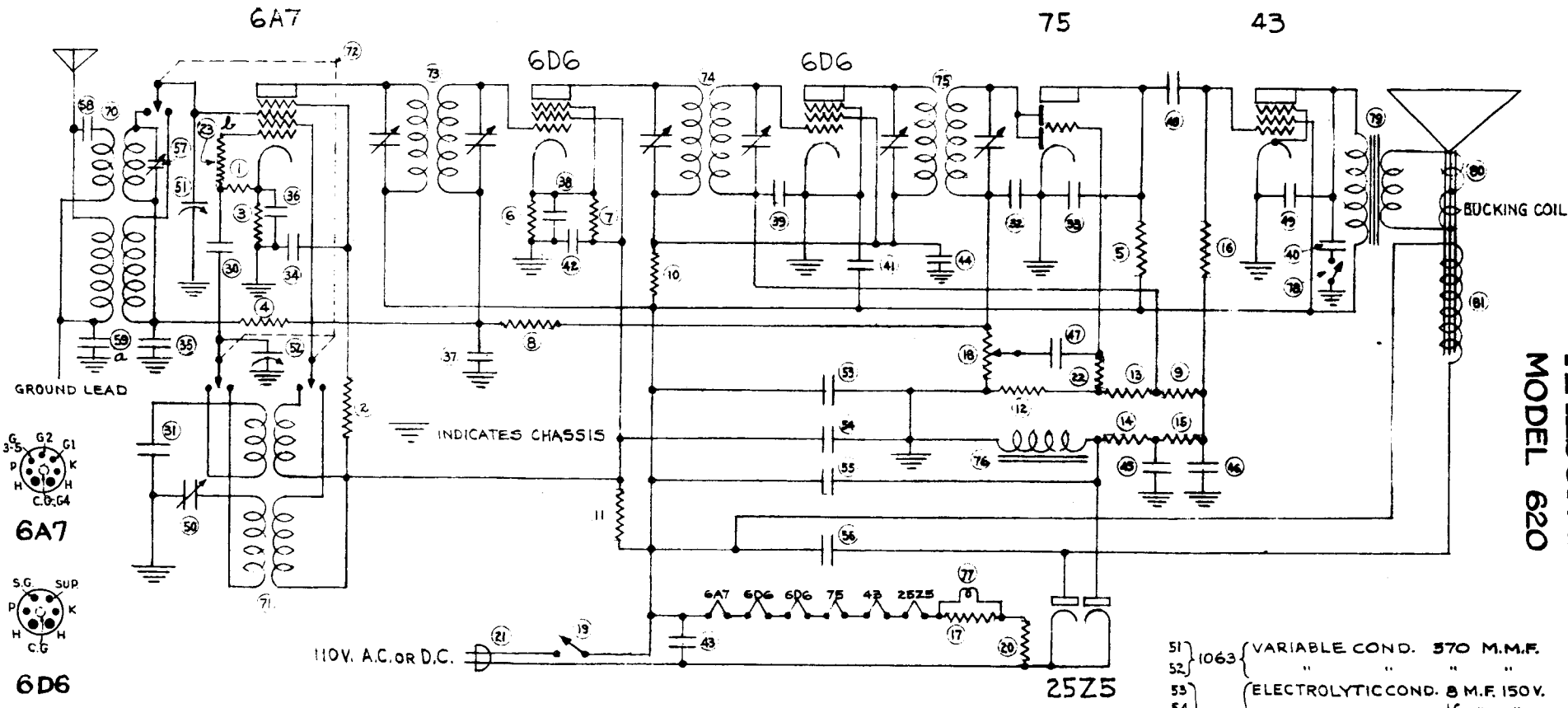
SPEAKER ASSEMBLY

(63)	1102	.02 MF COND.	400 V
a (64)	1036	.1 "	200 V.
(65)	1040	.05 "	200 V.
(66)	1040	.05 "	200 V.
(67)	1040	.05 "	200 V.

REVISIONS			
LTR	WAS	DATE	NAME
a	.05 M.F.	FEB 34	E.H.H.

HALSON RADIO MFG. CO.

MODEL 620



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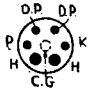

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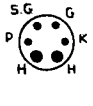

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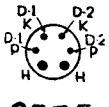
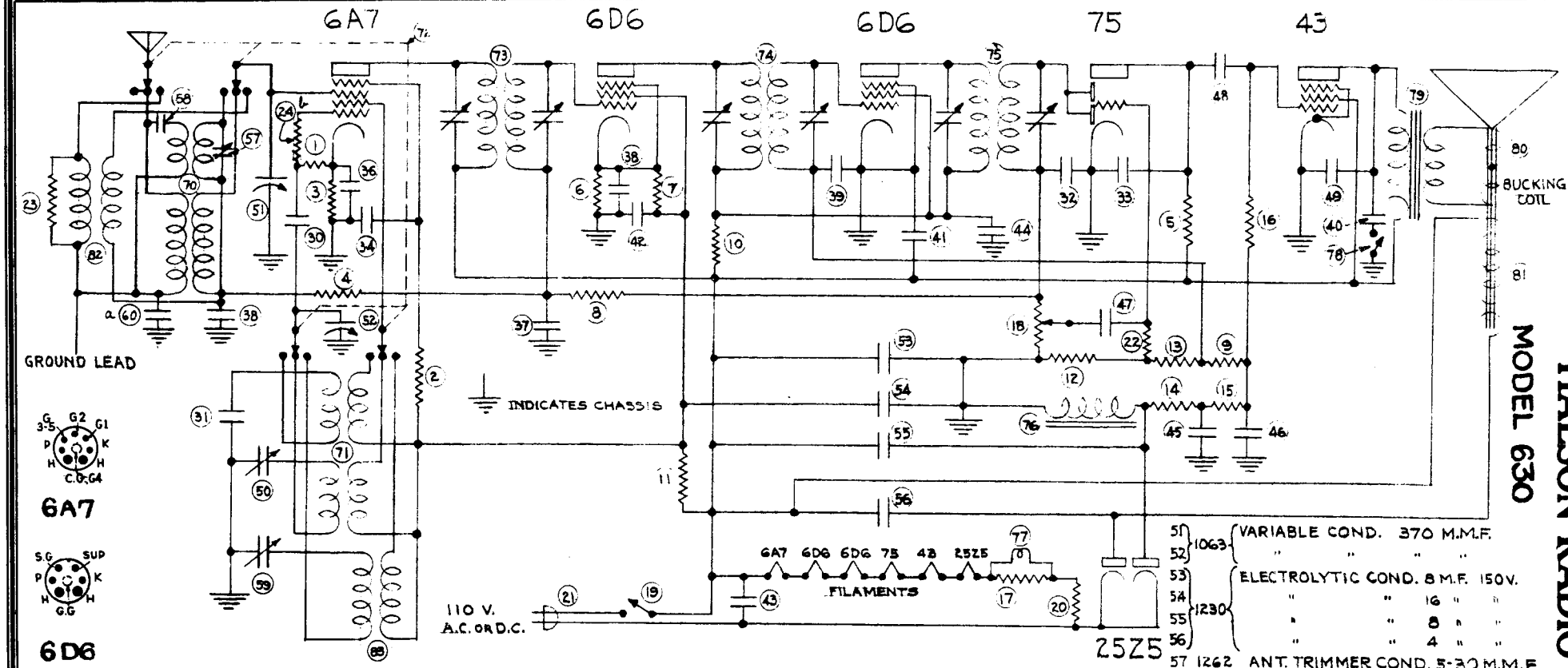


25Z5

ITEM	PART NO.	NAME
1	1242	RESISTOR 21,000Ω ½ WATT
2	"	" " " "
3	1243	" 260Ω "
4	1165	" 260,000Ω "
5	"	" " "
6	1159	" 510Ω "
7	1245	" 51,000Ω ½ WATT
8	1094	" 1.1 MEGΩ ½ WATT
9	"	" " "
10	1032	" 2,100Ω "
11	1244	" 5,100Ω "
12	1246	" 310,000Ω "
13	1248	" 3.1 MEGΩ "
14	1092	" 110,000Ω "
15	"	" " "
16	1246	RESISTOR 510,000Ω ½ WATT
17	1249	" 20Ω 2 WATT
18, 19	1240	VOL. CONT. 100,000Ω & LINE SWITCH
20, 21	1233	RESISTANCE 127Ω & LINE CORD & PLUG
22	1246	RESISTOR 510,000Ω ½ WATT
b-23	1276	" 110Ω "
30	1099	CONDENSER 260 M.M.F. MICA
31	1096	" 2500 " "
32	1097	" 110 " "
33	1098	" 510 " "
34	1241	" .5 M.F. 200V.
35	1040	" .05 " "
36	1040	CONDENSER .05 M.F. 200V.
37	"	" " " " "
38	"	" " " " "
39	"	" " " " "
40	"	" " " " "
41	1103	" .25 " "
42	"	" " " " "
43	"	" " " " "
44	1036	" .1 " "
45	"	" " " " "
46	"	" " " " "
47	1101	" .01 " 400V.
48	"	" " " " "
49	"	" " " " "
50	1104	PADDING COND. 250-400 M.M.F.
a-59	1102	CONDENSER .02 M.F. 400 .
51, 52	1063	VARIABLE COND. 370 M.M.F.
53, 54, 55, 56	1230	ELECTROLYTIC COND. 8 M.F. 150V.
"	"	" " 16 " "
"	"	" " 8 " "
"	"	" " 4 " "
57	1237	ANT. TRIMMER COND. 5-30 M.M.F.
58	1097	CONDENSER 110 M.M.F. MICA
70	1238	ANTENNA COIL
71	1109	OSCILLATOR COIL
72	1069	WAVE CHANGE SWITCH
73	1250	I.F. TRANSFORMER 1ST 456 K.C.
74	"	" " 2ND "
75	1251	" " 3RD "
76	1231	FILTER CHOKE 430Ω
77	1086	PILOT LIGHT 6.3 V.
78	1203	TONE CONTROL SWITCH
79	1252	OUTPUT TRANS. 4300Ω PRI. IMP.
80	SPKR.	VOICE COIL
81	ASSY.	FIELD COIL 2300Ω HOT

HALSON RADIO MFG. CO.

MODEL 630



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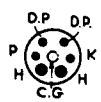

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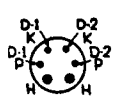
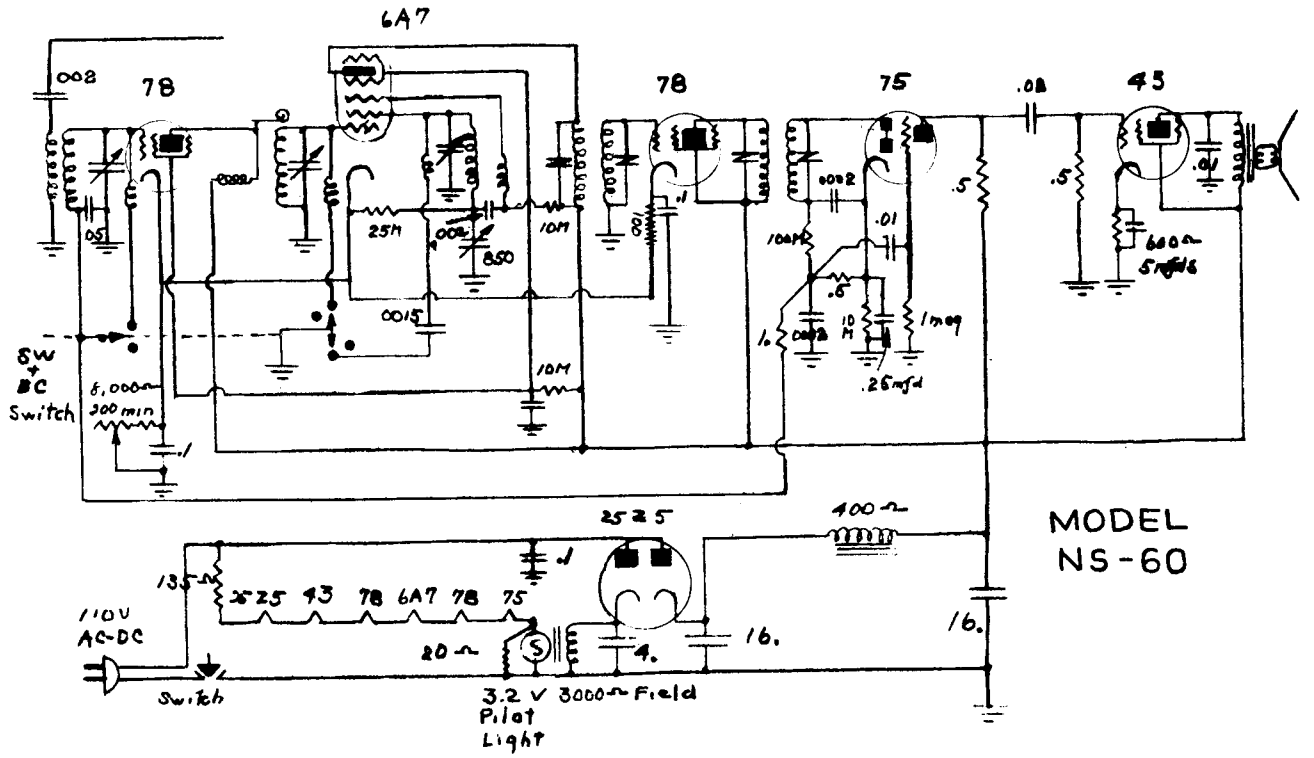
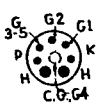


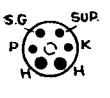
25Z5

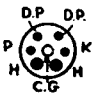
ITEM	PART NO.	NAME
1	1242	RESISTOR 21,000Ω ¼ WATT
2	"	" " "
3	1243	" 260Ω "
4	1165	" 260,000Ω "
5	"	" " "
6	1159	" 510Ω "
7	1245	" 51,000Ω ½ WATT
8	1094	" 1.1 MEGΩ ¼ WATT
9	"	" " "
10	1032	" 2,100Ω "
11	1244	" 5,100Ω "
12	1246	" 310,000Ω "
13	1248	" 3.1 MEGΩ "
14	1092	" 110,000Ω "
15	"	" " "
16	1246	RESISTOR 510,000Ω ¼ WATT
17	1249	" 20Ω 2 WATT
18, 19	1240	VOL. CONT. & LINE SWITCH 100,000Ω
20, 21	1233	RESISTANCE & LINE CORD & PLUG 127Ω
22	1246	RESISTOR 510,000Ω ¼ WATT
23	1267	" 11,000Ω "
b 24	1276	" 110Ω "
30	1099	CONDENSER 260 M.M.F. MICA
31	1096	" 2500 " "
32	1097	" 110 " "
33	1098	" 510 " "
34	1241	" .5 M.F. 200V.
35	1040	" .05 " "
36	1040	CONDENSER .05 M.F. 200V.
37	"	" " " "
38	"	" " " "
39	"	" " " "
40	"	" " " "
41	1103	" .25 " "
42	"	" " " "
43	"	" " " "
44	1036	" .1 " "
45	"	" " " "
46	"	" " " "
47	1101	" .01 " 400V
48	"	" " " "
49	"	" " " "
50	1104	PADDING COND. 250-400 M.M.F.
51, 52	1063	VARIABLE COND. 370 M.M.F.
53, 54, 55, 56	1230	ELECTROLYTIC COND. 8 M.F. 150V. / " " 16 " " / " " 8 " " / " " 4 " "
57	1262	ANT. TRIMMER COND. 5-30 M.M.F.
58	1097	CONDENSER. 110 M.M.F. MICA
59	1262	" 50 TO 120 M.M.F.
a 60	1102	" .02 M.F. 400 V.
70	1238	ANTENNA COIL
71	1109	OSCILLATOR COIL
72	1069	WAVE CHANGE SWITCH
73	1250	I.F. TRANSFORMER 1ST 456 K.C.
74	"	" " 2ND "
75	1251	" " 3RD "
76	1231	FILTER CHOKE 430Ω
77	1086	PILOT LIGHT 6.3V.
78	1203	TONE CONTROL SW.
79	1252	OUTPUT TRANS. 4300Ω PRI. IMP.
80	SPKR.	VOICE COIL
81	ASSY.	FIELD COIL 2300Ω HOT
82	1264	L.W. ANT. COIL
83	1265	L.W. OSCL. COIL

HALSON RADIO MFG. CO.



6A7 

78 

75 

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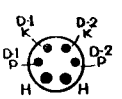
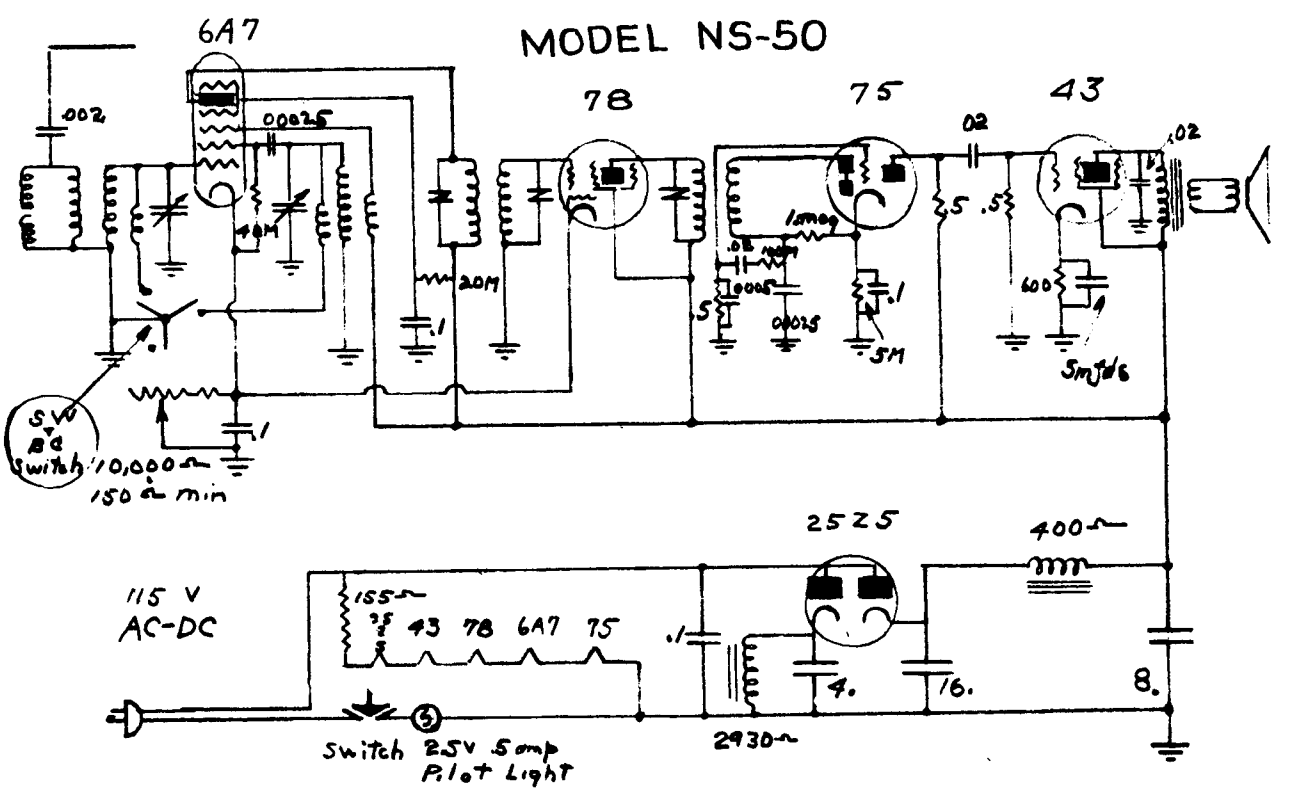
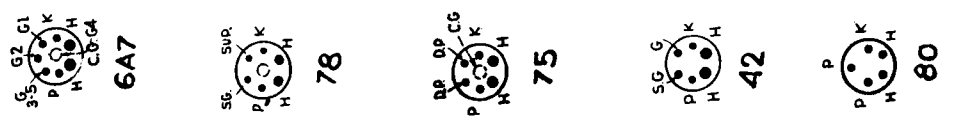
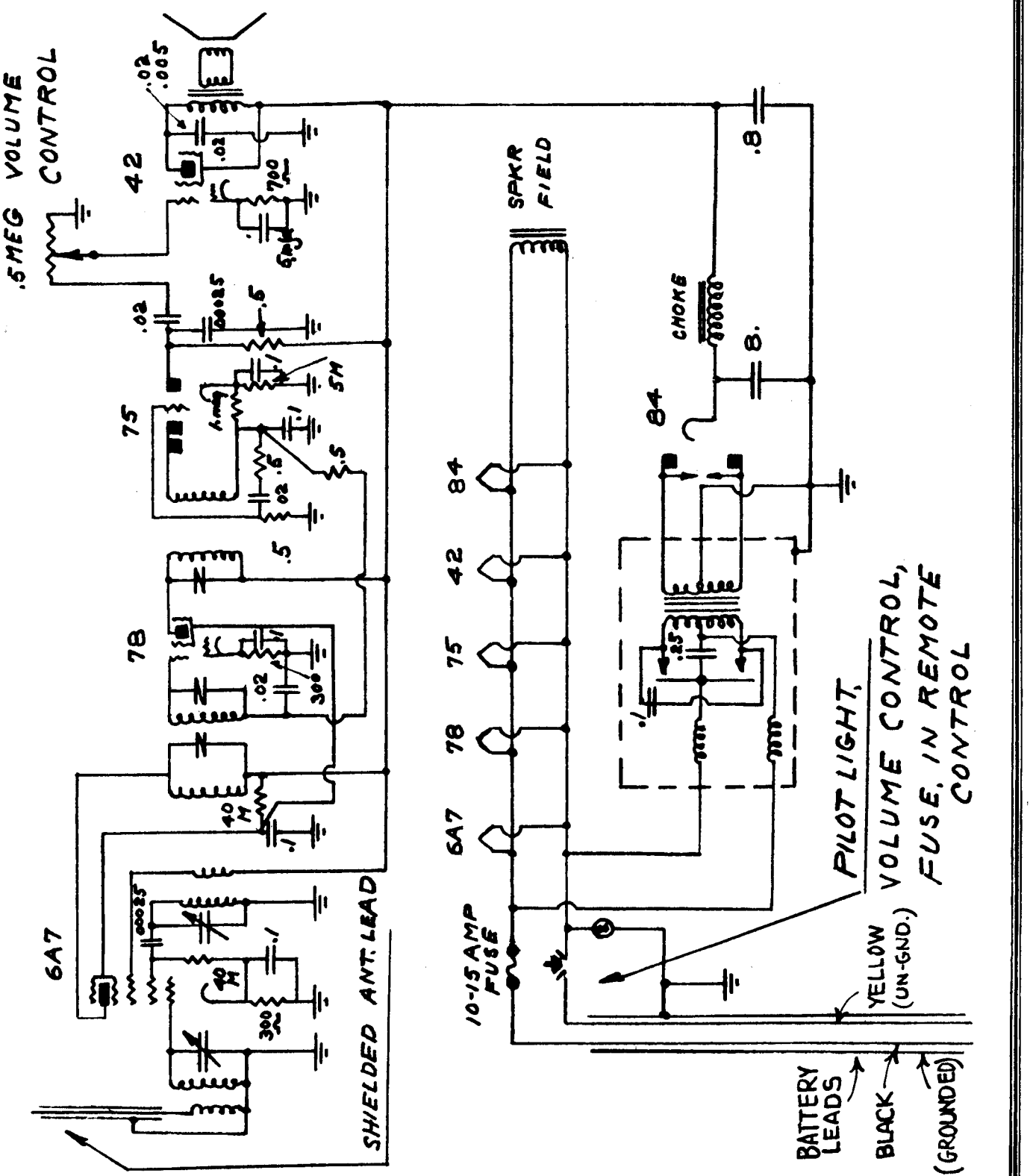
25Z5 



HALSON RADIO MFG. CO.

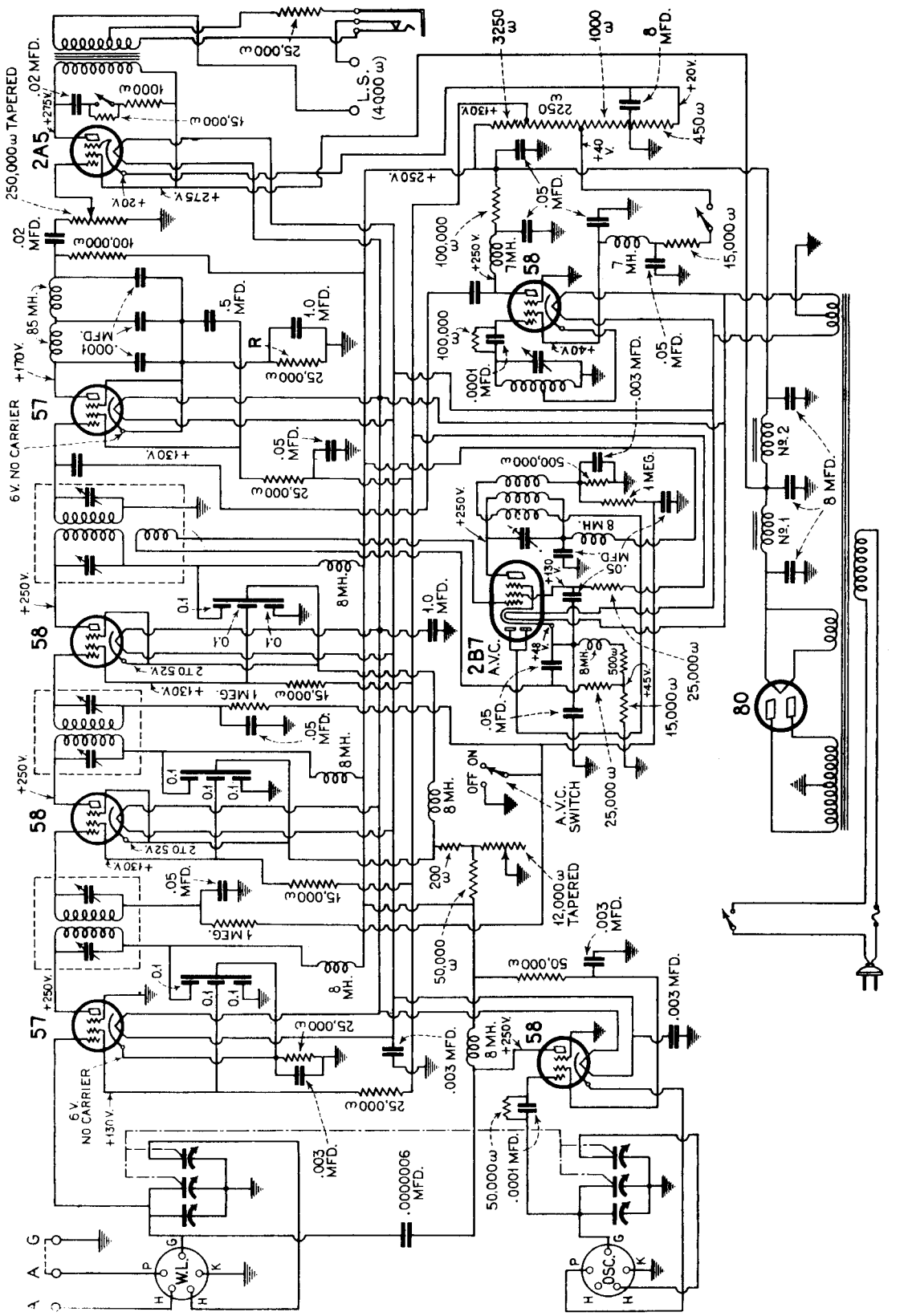
ROADMASTER





HAMMARLUND MFG. CO., Inc.

MODEL COMET PRO A.V.C.

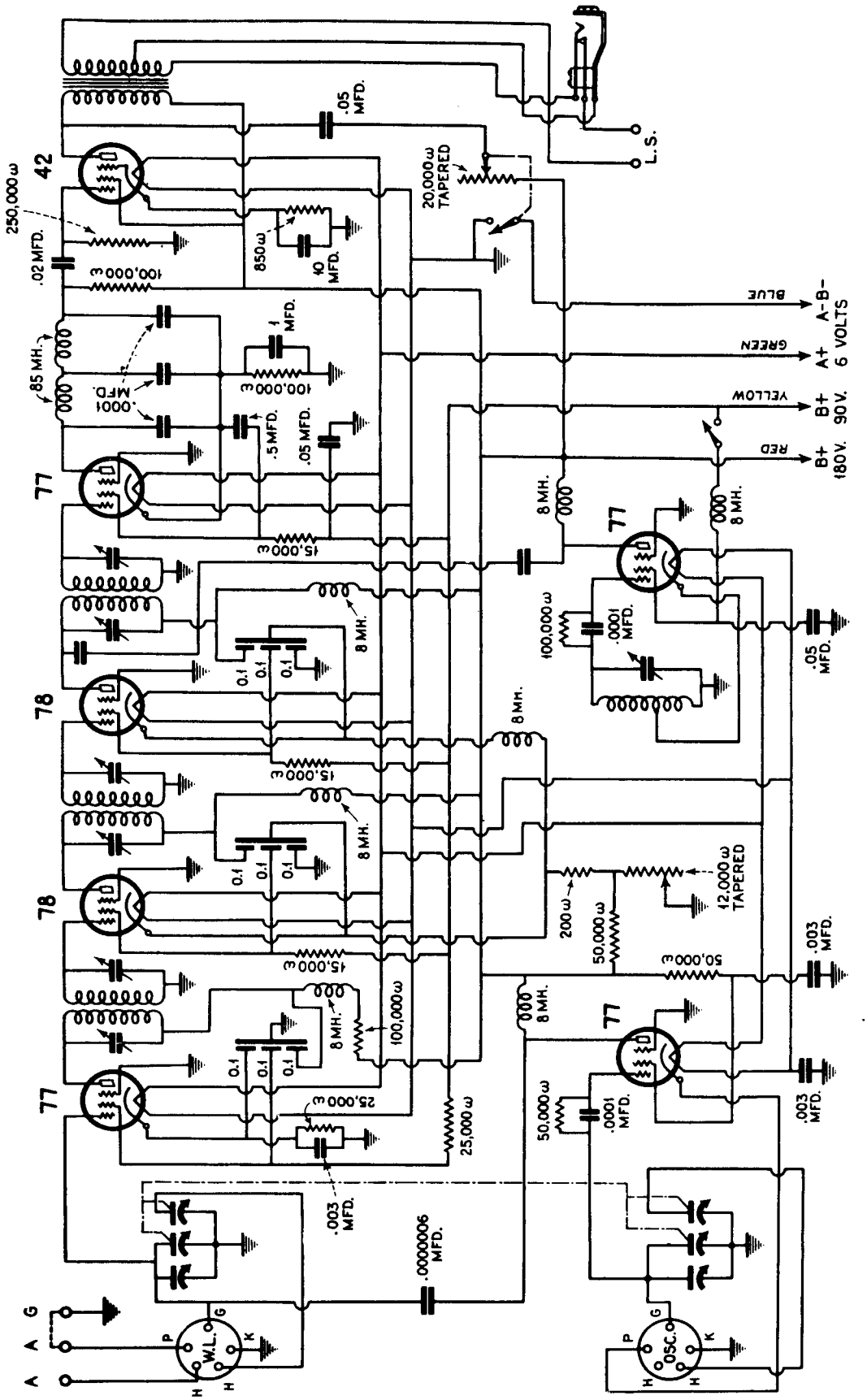


Trouble Shooting Hints

In a complex receiver of this type difficulties may be encountered from numerous resistors or condensers throughout the entire circuit.

HAMMARLUND MFG. CO., Inc.

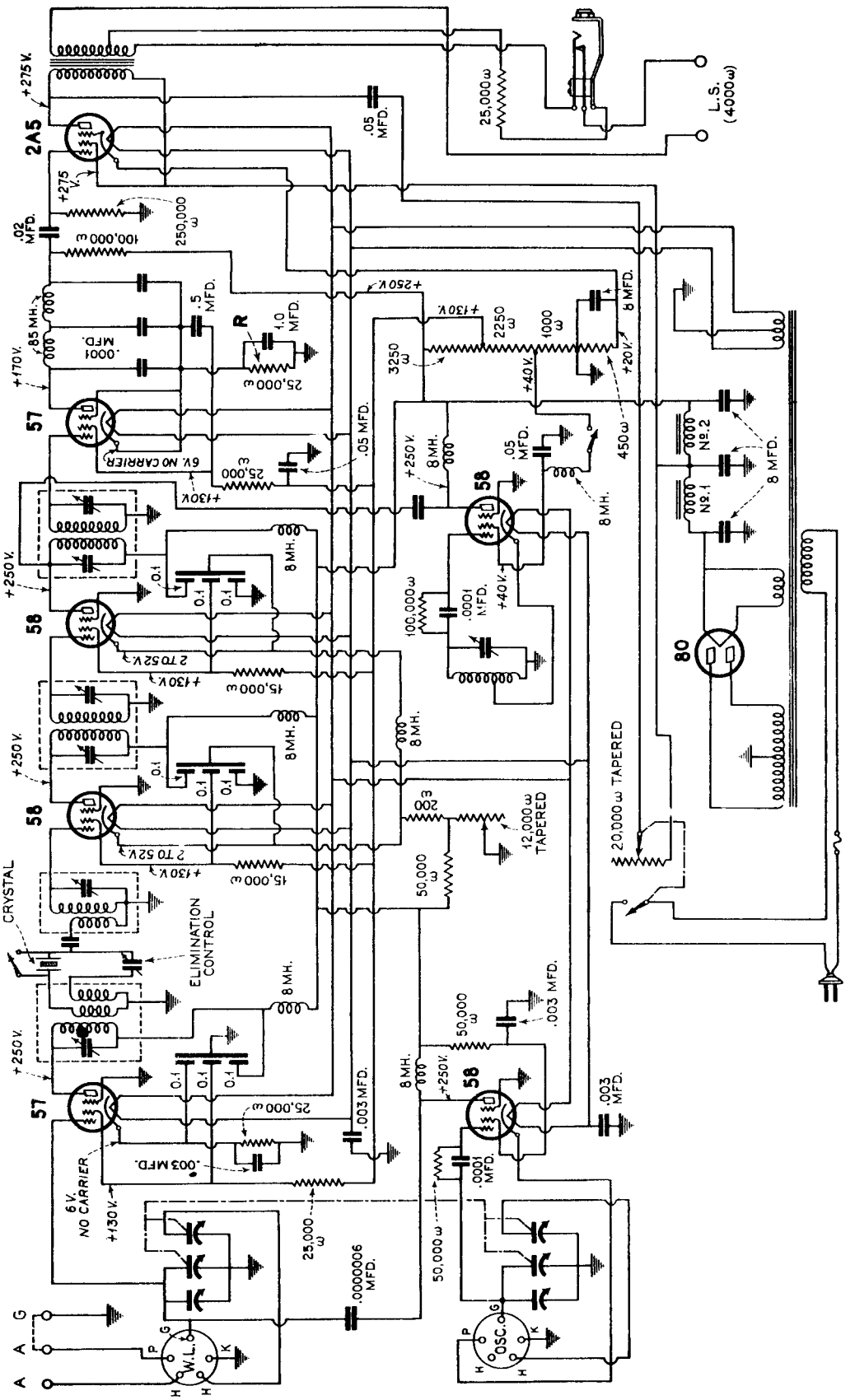
MODEL COMET PRO BATTERY



Correct alignment and batteries which supply the full rated current are the two essentials to correct operation. With the numerous condensers and resistors employed for by passing, stabilizing and voltage reduction, difficulties are often encountered with leaky condensers and open resistors.

HAMMARLUND MFG. CO., Inc.

MODEL COMET PRO CRYSTAL

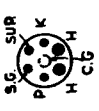


Trouble Shooting Hints

Unless the intermediate frequency is adjusted to the exact point required by the crystal filter this set will not operate normally. Do not attempt to tune the I.F. amplifier without an accurately calibrated oscillator.

80

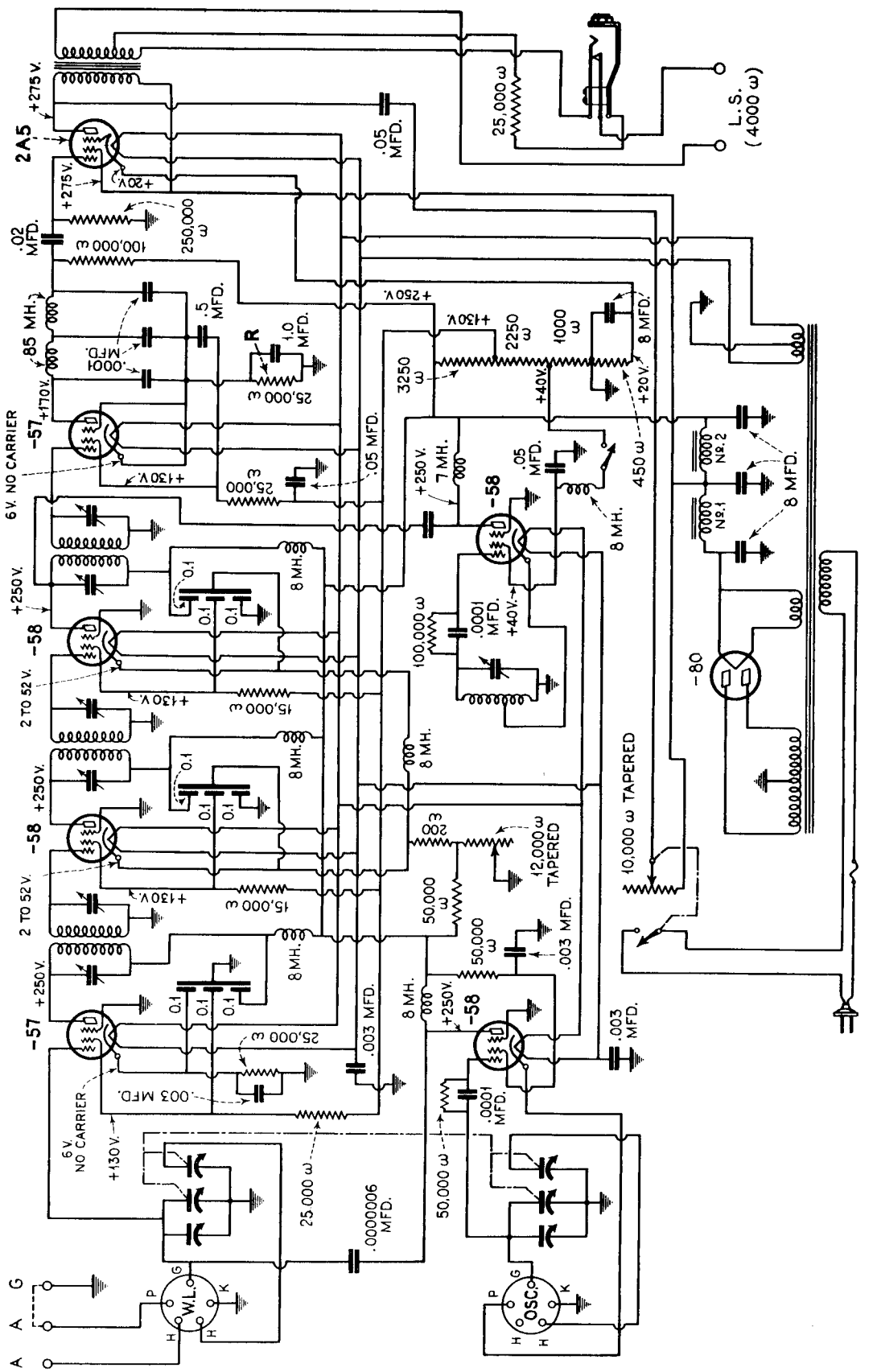
2A5



58 & 57

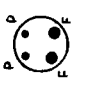
HAMMARLUND MFG. CO., Inc.

MODEL COMET PRO STANDARD



Trouble Shooting Hints

In a complex set of this type trouble is usually caused by defective resistors or condensers in the plate or power supply circuits. Localize the trouble by checking each circuit separately.



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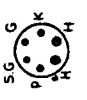
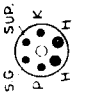


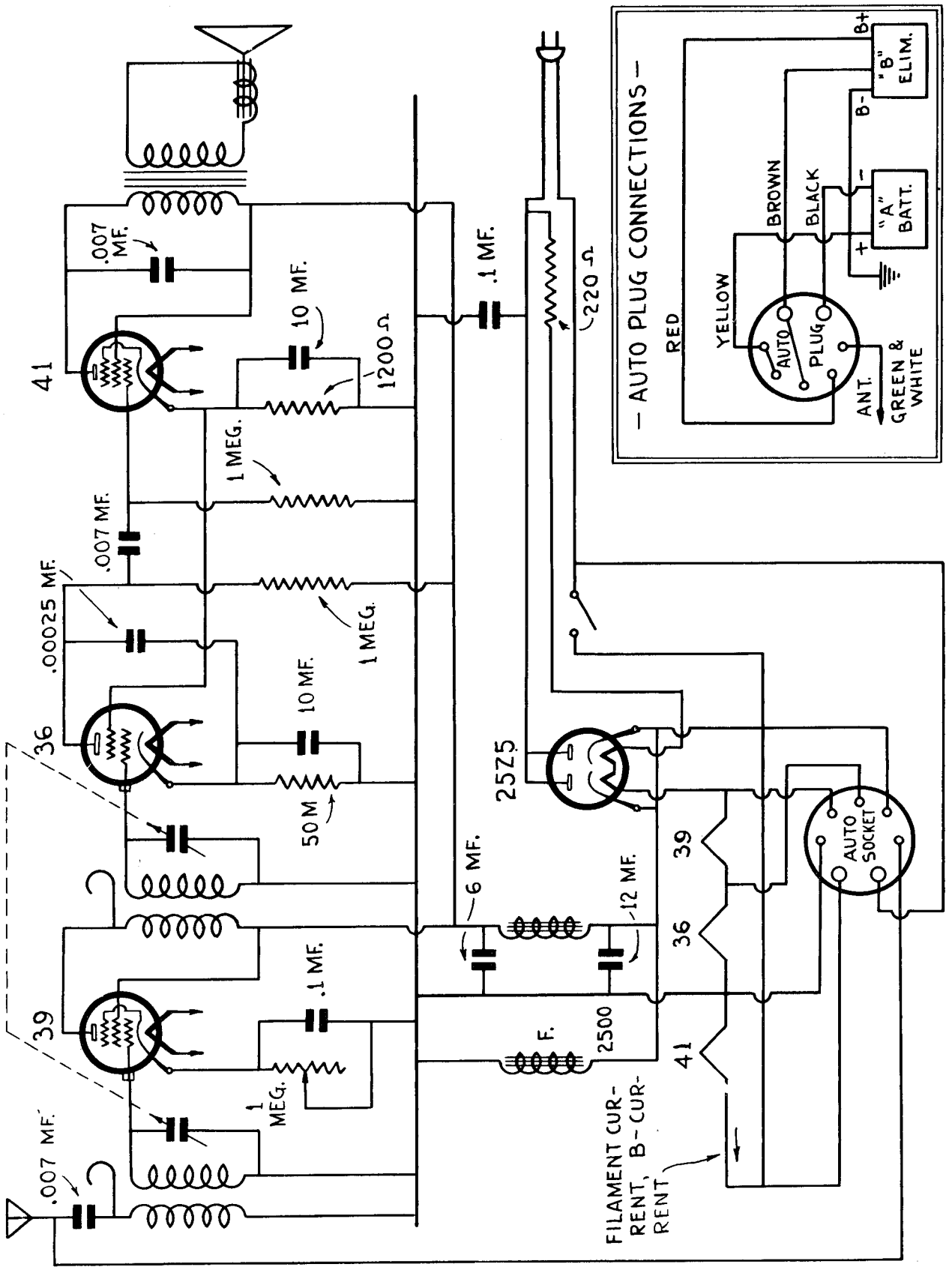
2A5



57&58

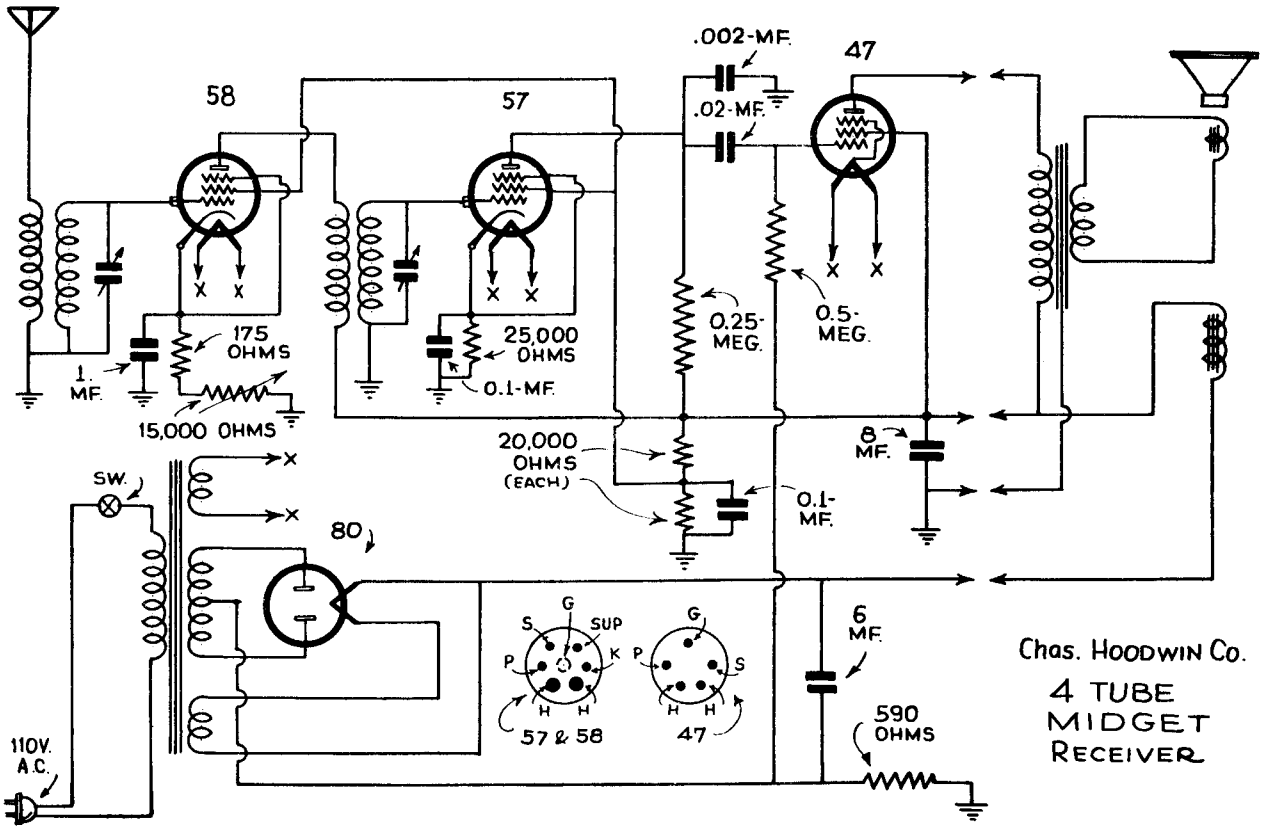
HI-LO

4 TUBE A.C.-D.C. MODEL 34TDDA

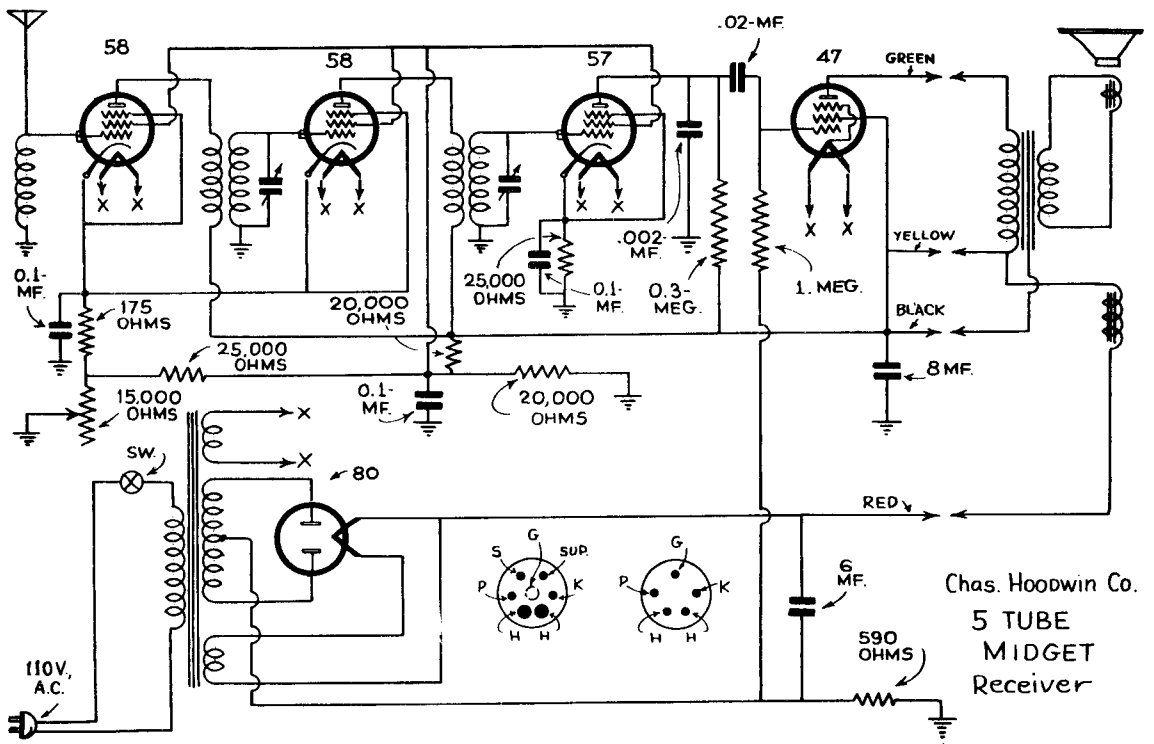


CHAS. HOODWIN CO.

4 TUBE MIDGET MODEL



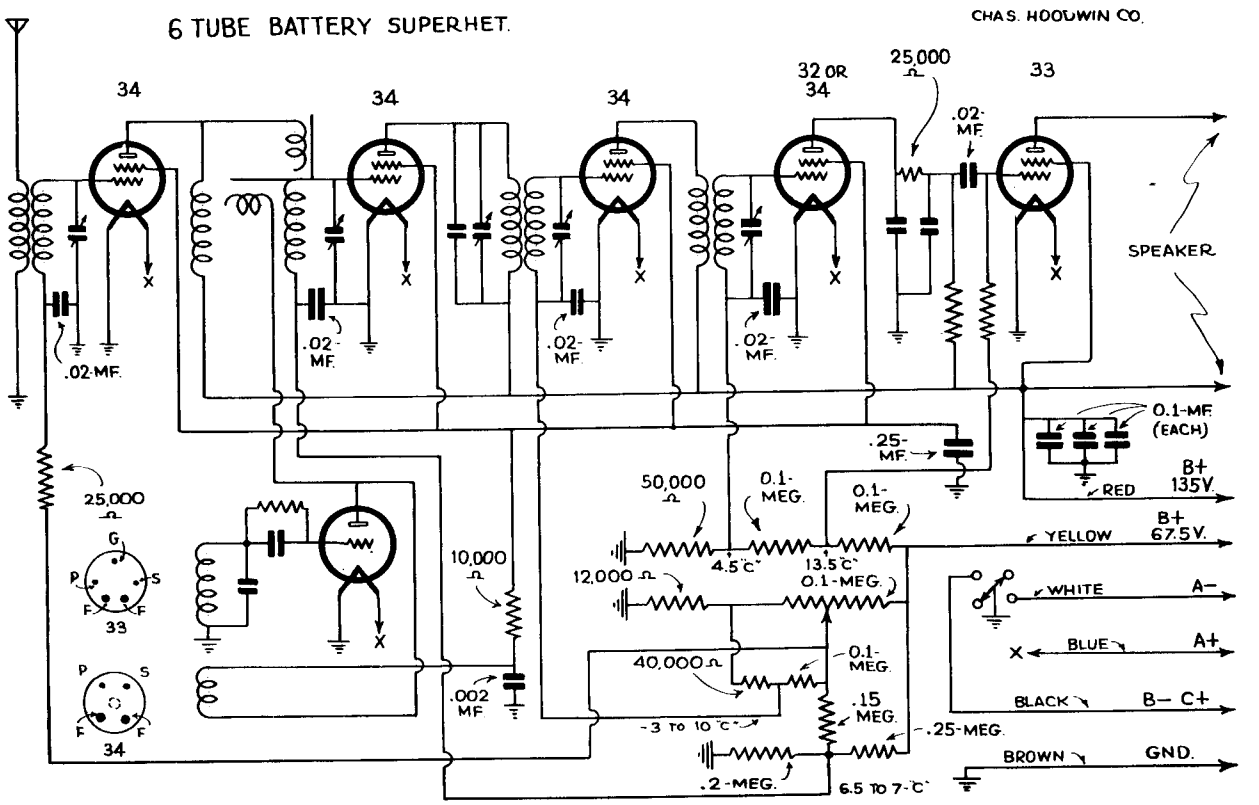
5 TUBE MIDGET MODEL



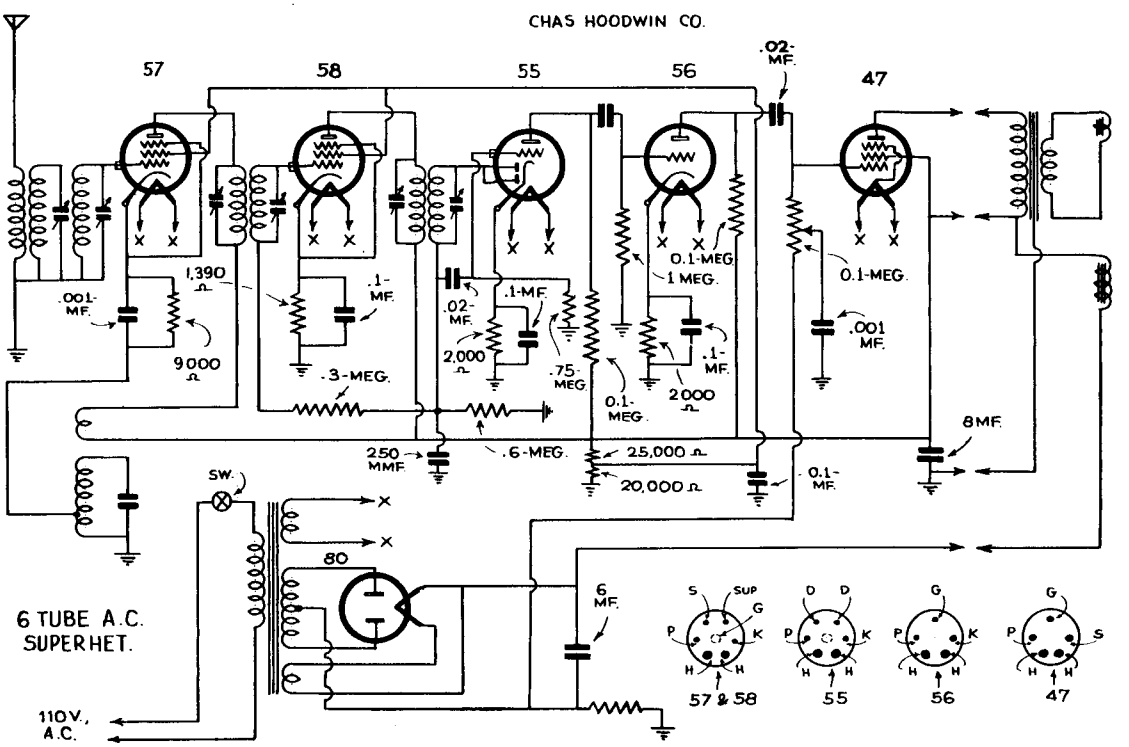
CHAS. HOODWIN CO.

6 TUBE BATTERY SUPERHET MODEL

AS OF APRIL 1 ST

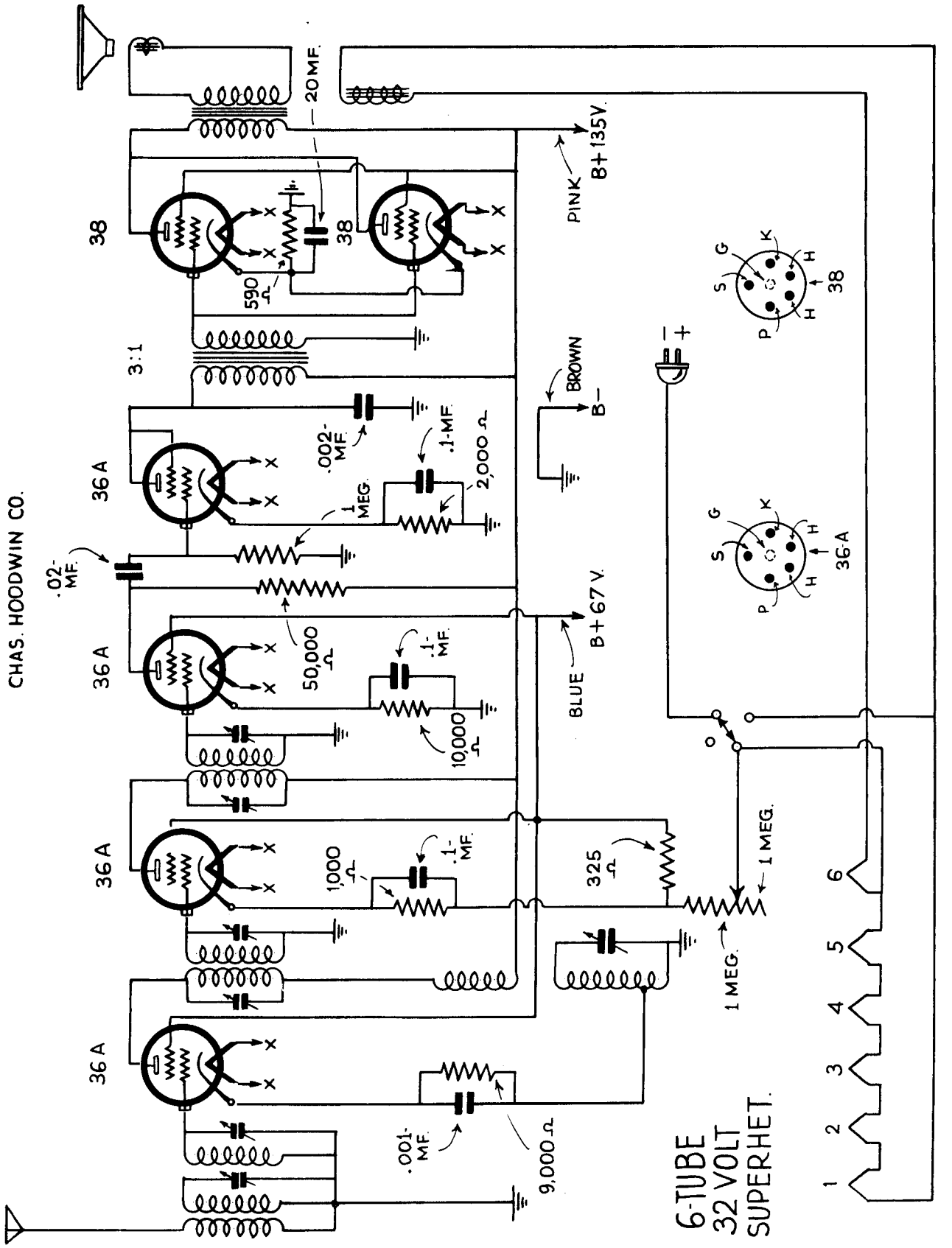


6 TUBE A.C. SUPERHET MODEL



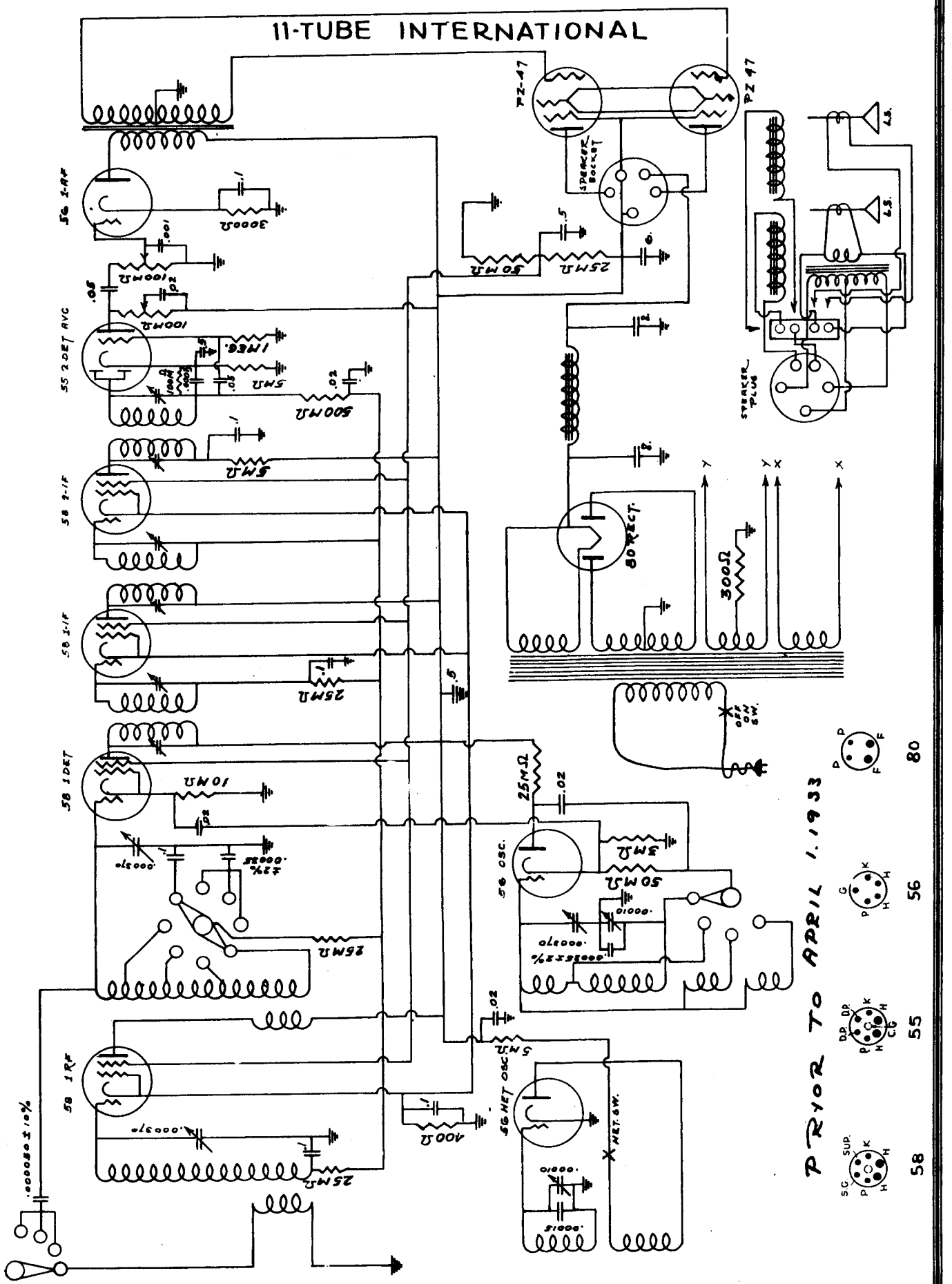
CHAS. HOODWIN CO.

6 TUBE 32 VOLT SUPERHET MODEL

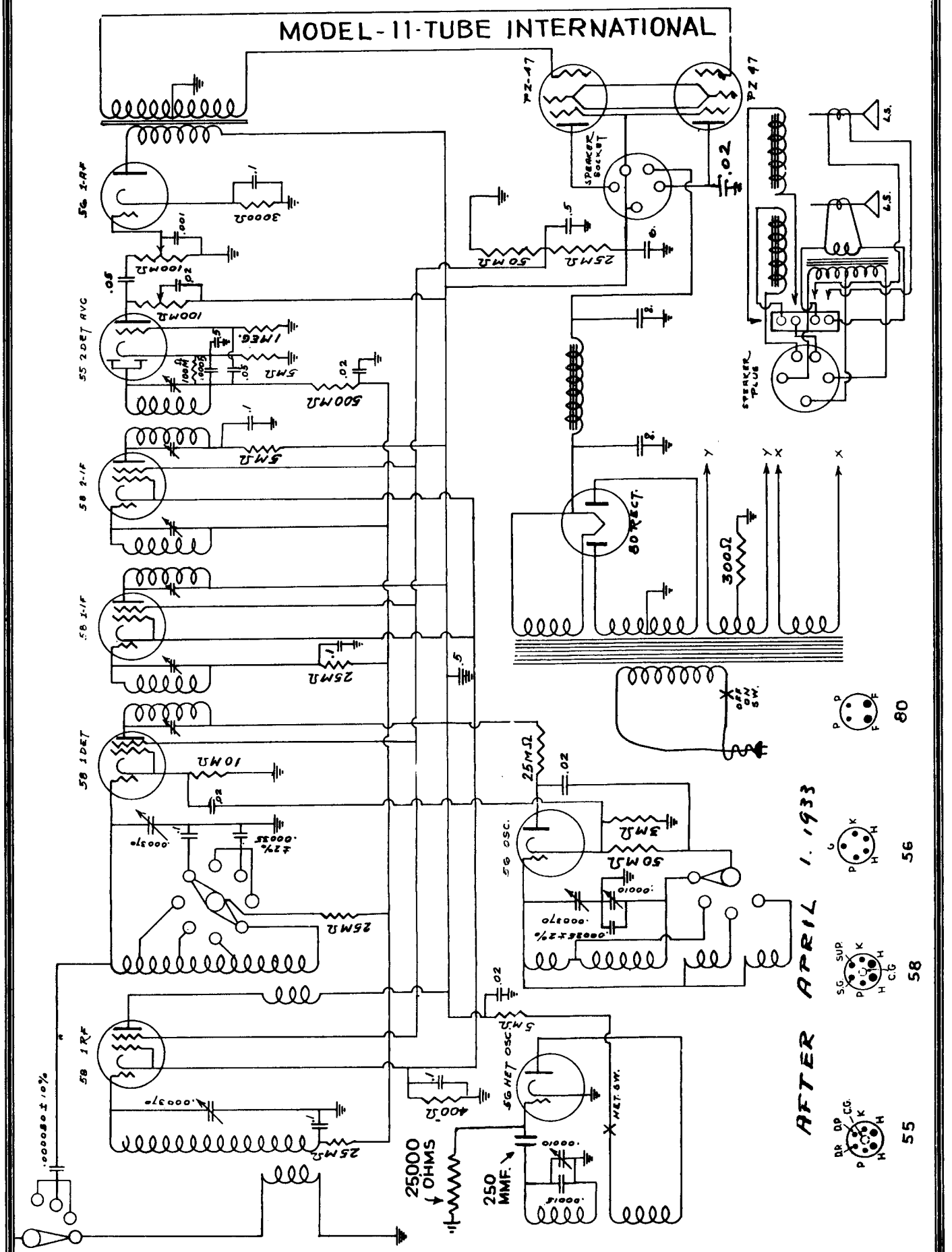


CHAS. HOODWIN CO.

11-TUBE INTERNATIONAL

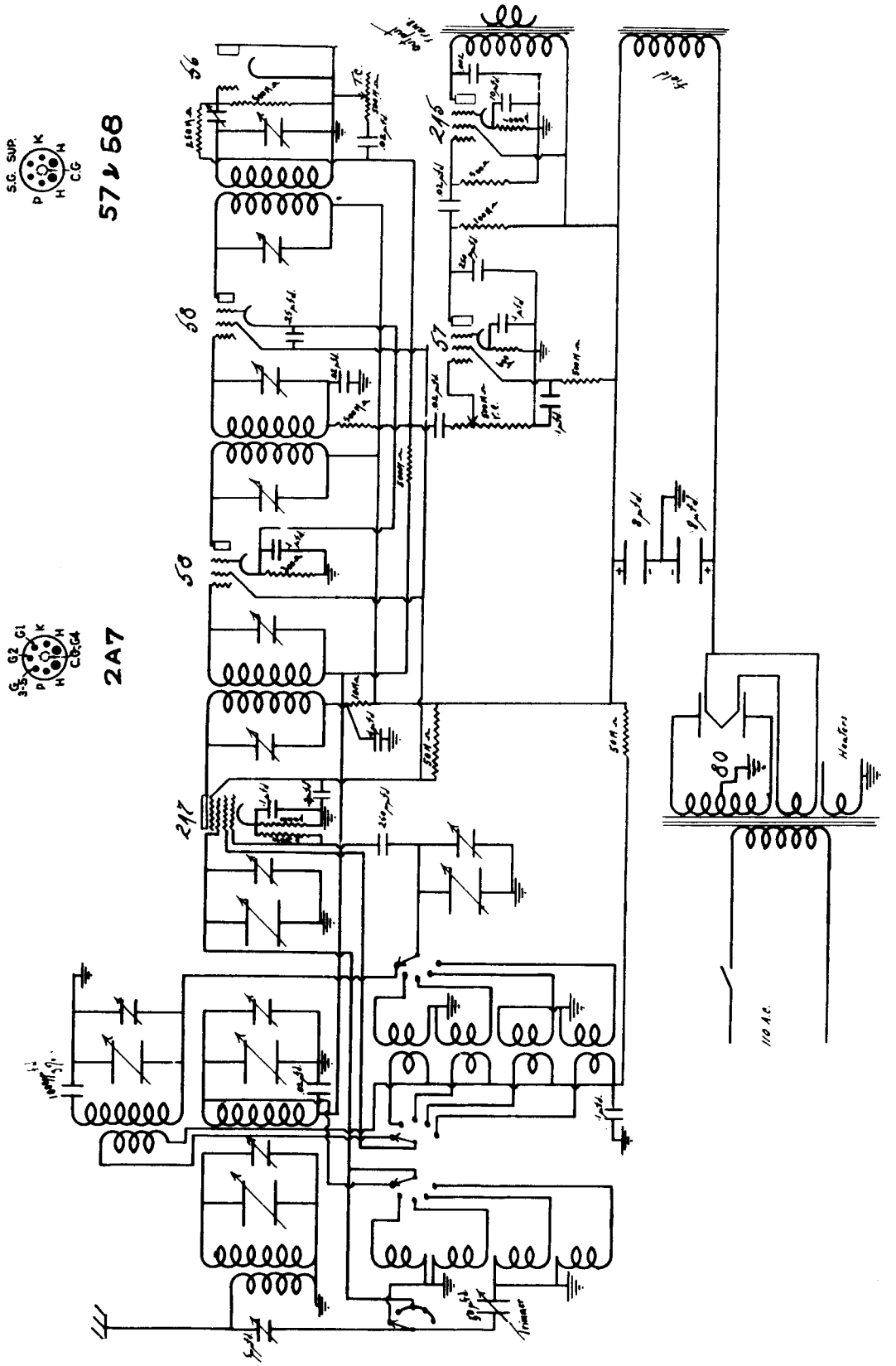


CHAS. HOODWIN CO.



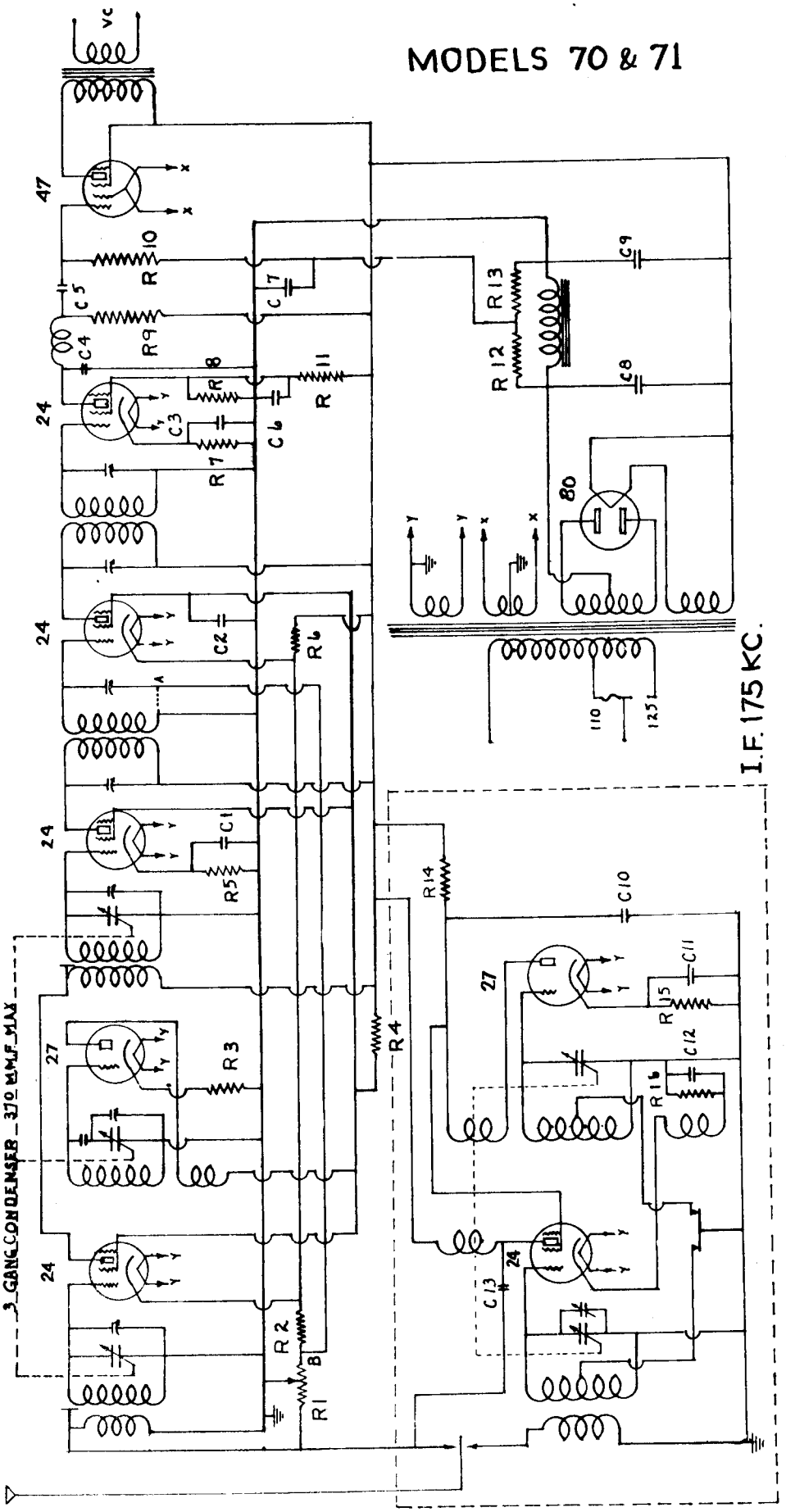
HERBERT H. HORN RADIO MFG. CO.

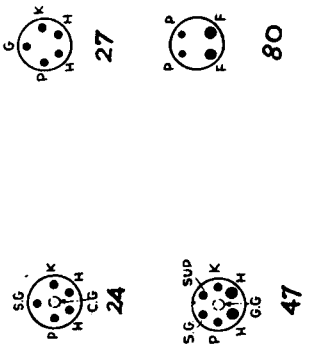
MODEL 58



HERBERT H. HORN RADIO MFG. CO.

MODELS 70 & 71

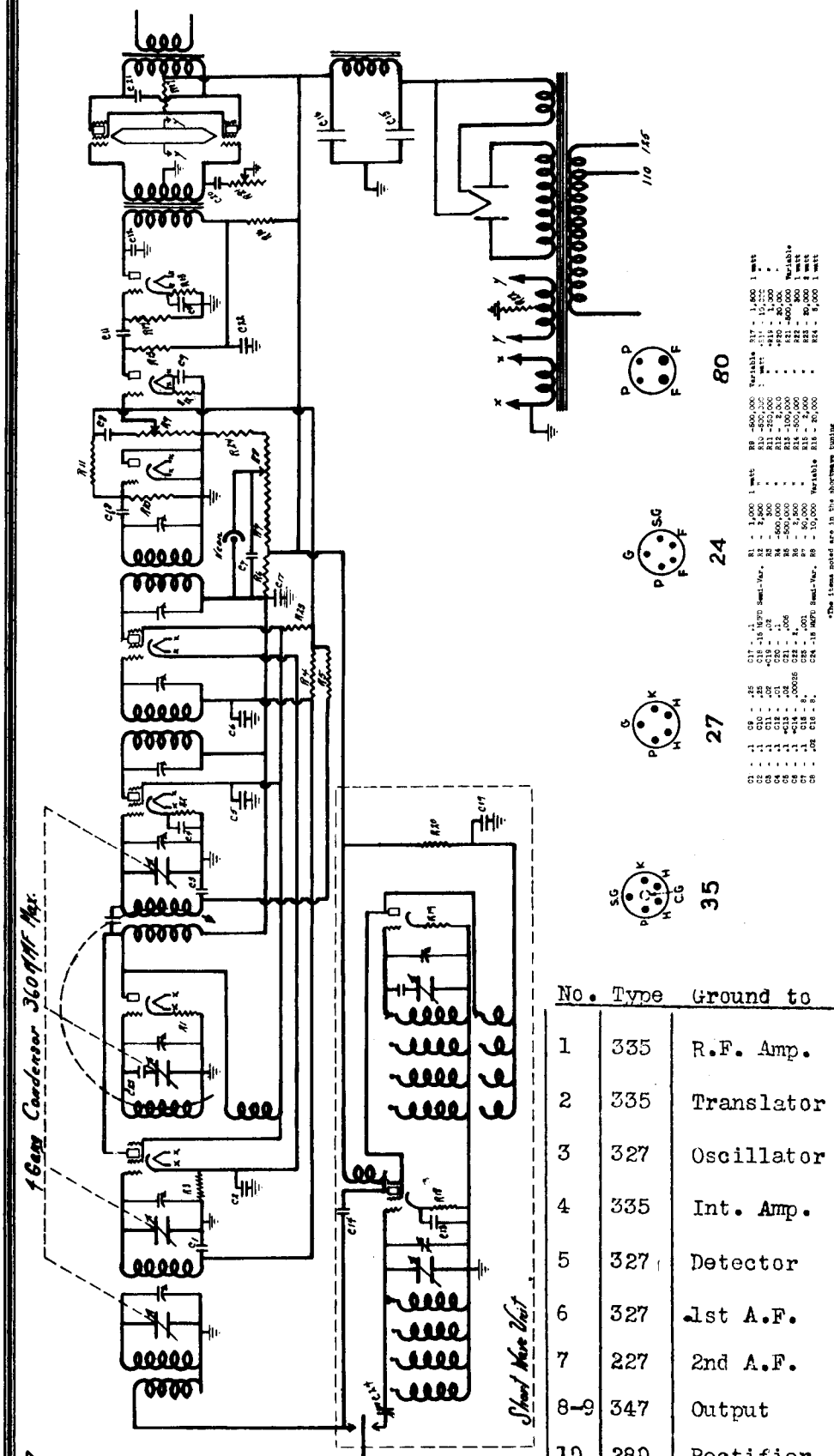




No.	Position	Plate to ground	Screen to ground	Cathode to ground	Heater or Fil. Voltage	Grid to ground
1	R.F. Amp	260	90	*5.5	2.45 AC	0
2	Translator (1st Det.)	260	90	*7	2.45 AC	0
3	Oscillator	90		*4	2.45 AC	0
4	Int. Amp	260	90	*3.5	2.45 AC	0
5	Detector	118	*30	*8	2.45 AC	0
6-7	Power tubes	260	260	0	2.51 AC	*3.3
8	Rectifier	0		375 AC	4.8 AC	0

HERBERT H. HORN RADIO MFG. CO.

MODELS 101 & 110



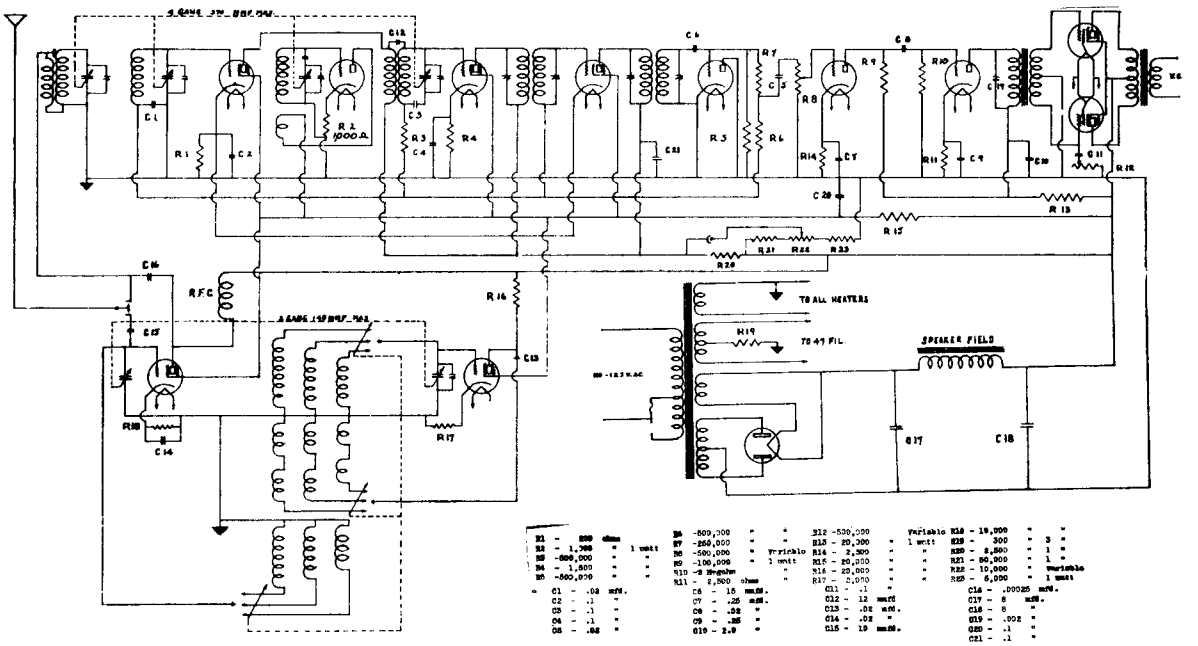
There are two intermediate frequency transformers. Both the grid and plate circuits of each must be tuned sharply to 175 kilocycles. The condensor adjustments are accessible from the under side of the chassis, there being two slotted screws protruding through the insulated base of each intermediate transformer.

A modulated oscillator, accurately calibrated to 175 kilocycles, and an 0-to-15 milliammeter is necessary. Connect the output of the oscillator to the control grid cap of the translator tube, removing the normal grid lead. The ground terminal of the oscillator must be connected to the ground terminal of the set. Connect the 0-to-15 milliammeter in series with the R.F. cathode resistor and ground. Turn the set on, adjust the volume control of the set and the output control of the oscillator until the oscillator signal is audible in the speaker.

No.	Type	Ground to	Plate	Screen	Cathode
1	335	R.F. Amp.	187	80	*2.8
2	335	Translator	187	80	*2.8
3	327	Oscillator	80	-	*4.2
4	335	Int. Amp.	187	80	*2.8
5	327	Detector	-	-	-
6	327	1st A.F.	*30	-	*1.9
7	227	2nd A.F.	115	-	*7.2
8-9	347	Output	210	205	*13.1
10	280	Rectifier			

HERBERT H. HORN RADIO MFG. CO.

MODELS 101 B & 102



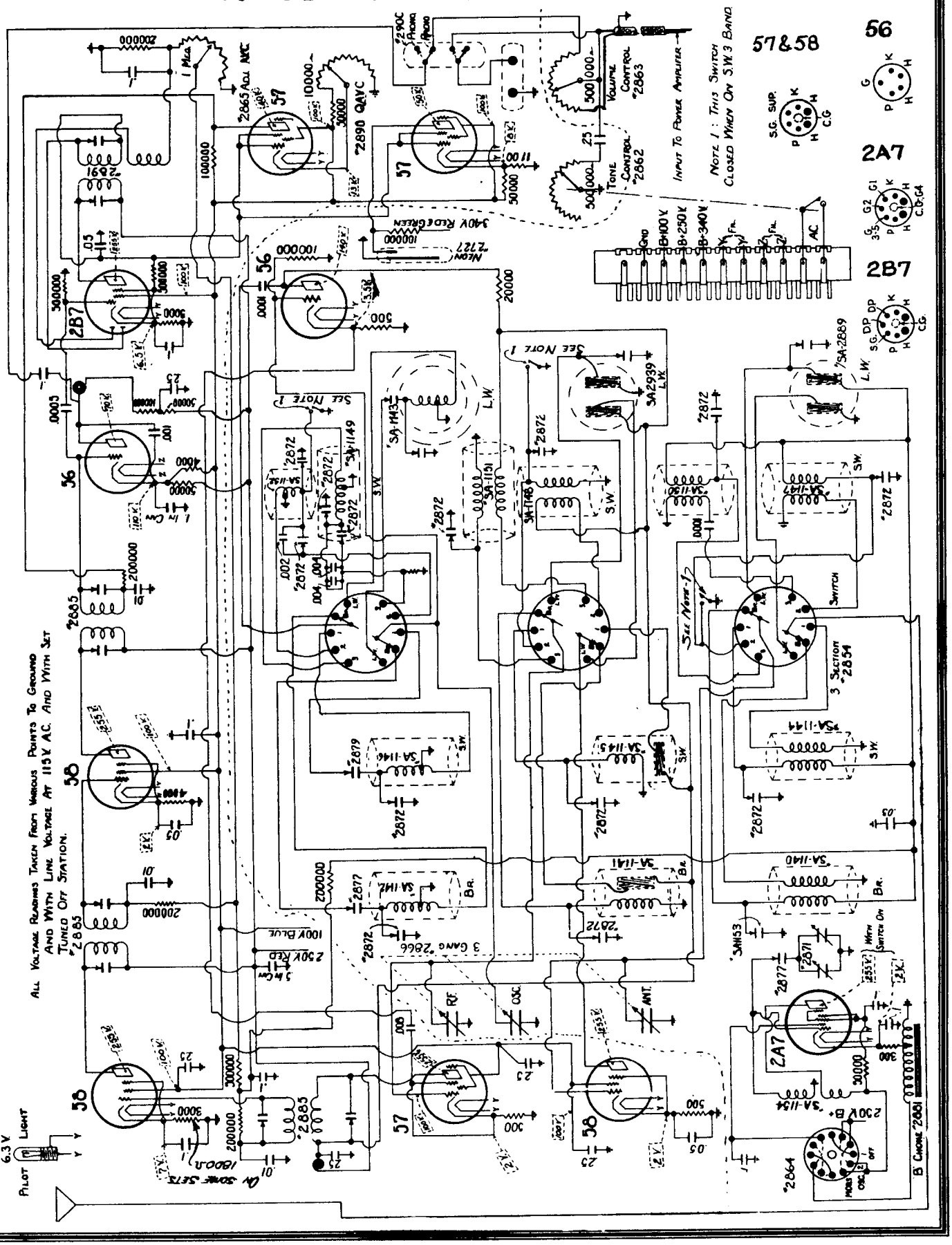
No.	Type	Ground to	Plate	Screen	Fil. or Cathode
1	335	R.F. Amp.	228	87	*2.8
2	335	Translator	228	87	*8.
3	327	Oscillator	87	-	*3.5
4	335	Int. Amp.	228	87	*2.8
5	327	Detector (2nd)	0	-	0
6	327	1st A.F.	*30	-	*1.75
7	227	2nd A.F.	240	0	*16.5
8-9	347	Output	2.50	-	*18.0
10	280	Rectifier	360 AC Each	-	0
11	324	S.W. Detector	260	87	*25
12	324	S.W. Oscillator	130	87	*.9

There are two intermediate frequency transformers. Both the grid and plate circuits of each must be tuned sharply to 175 kilocycles. The condenser adjustments are accessible from the under side of the chassis, there being two slotted screws protruding through the insulated base of each intermediate transformer.

A modulated oscillator, accurately calibrated to 175 kilocycles, and an 0-to-15 milliammeter is necessary. Connect the output of the oscillator to the control grid cap of the translator tube, removing the normal grid lead. The ground terminal of the oscillator must be connected to the ground terminal of the set. Connect the 0-to-15 milliammeter in series with the R.F. cathode resistor and ground. Turn the set on, adjust the volume control of the set and the output control of the oscillator until the oscillator signal is audible in the speaker.

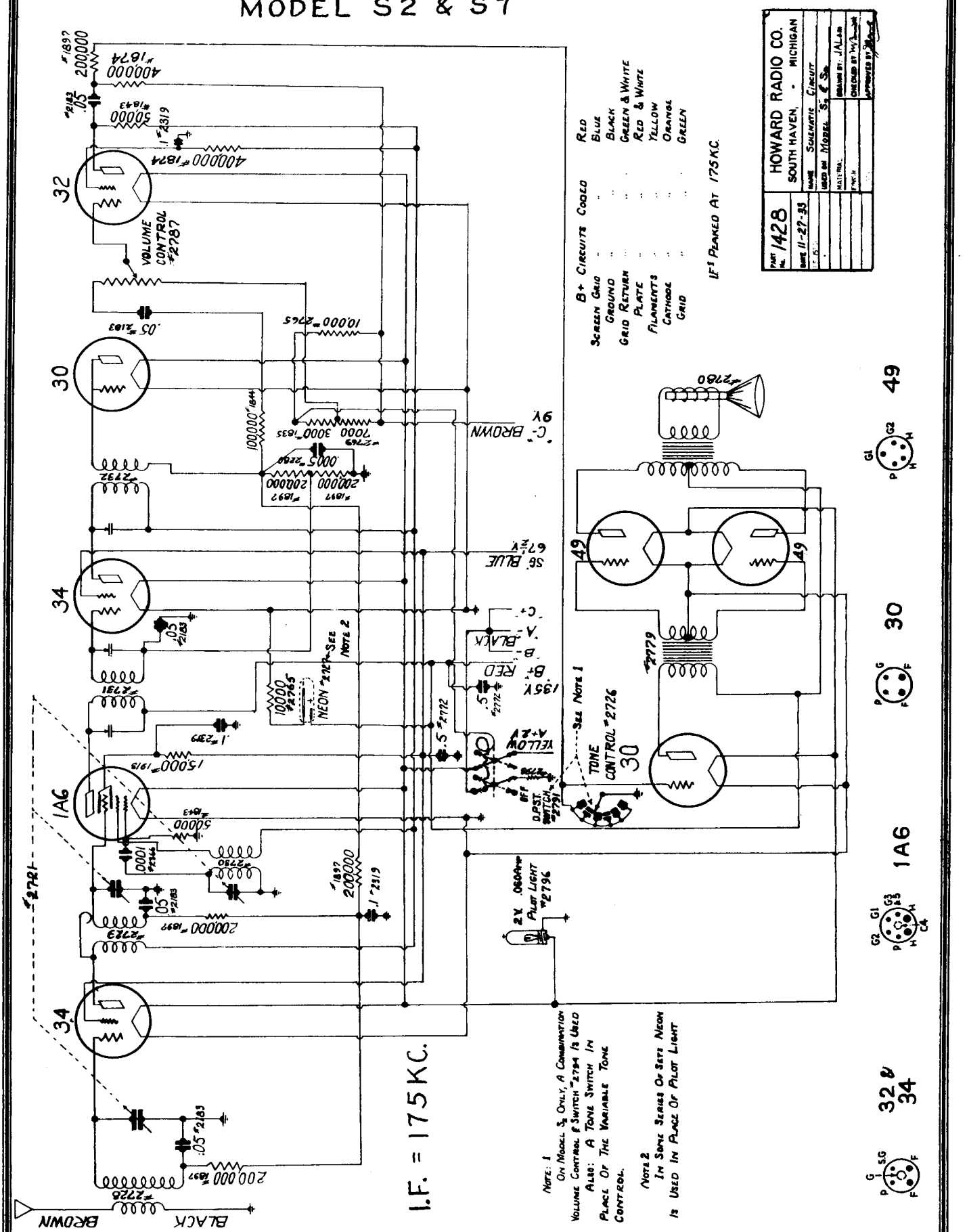
HOWARD RADIO CO.

19 TUBE ALL WAVE DE LUXE MODEL

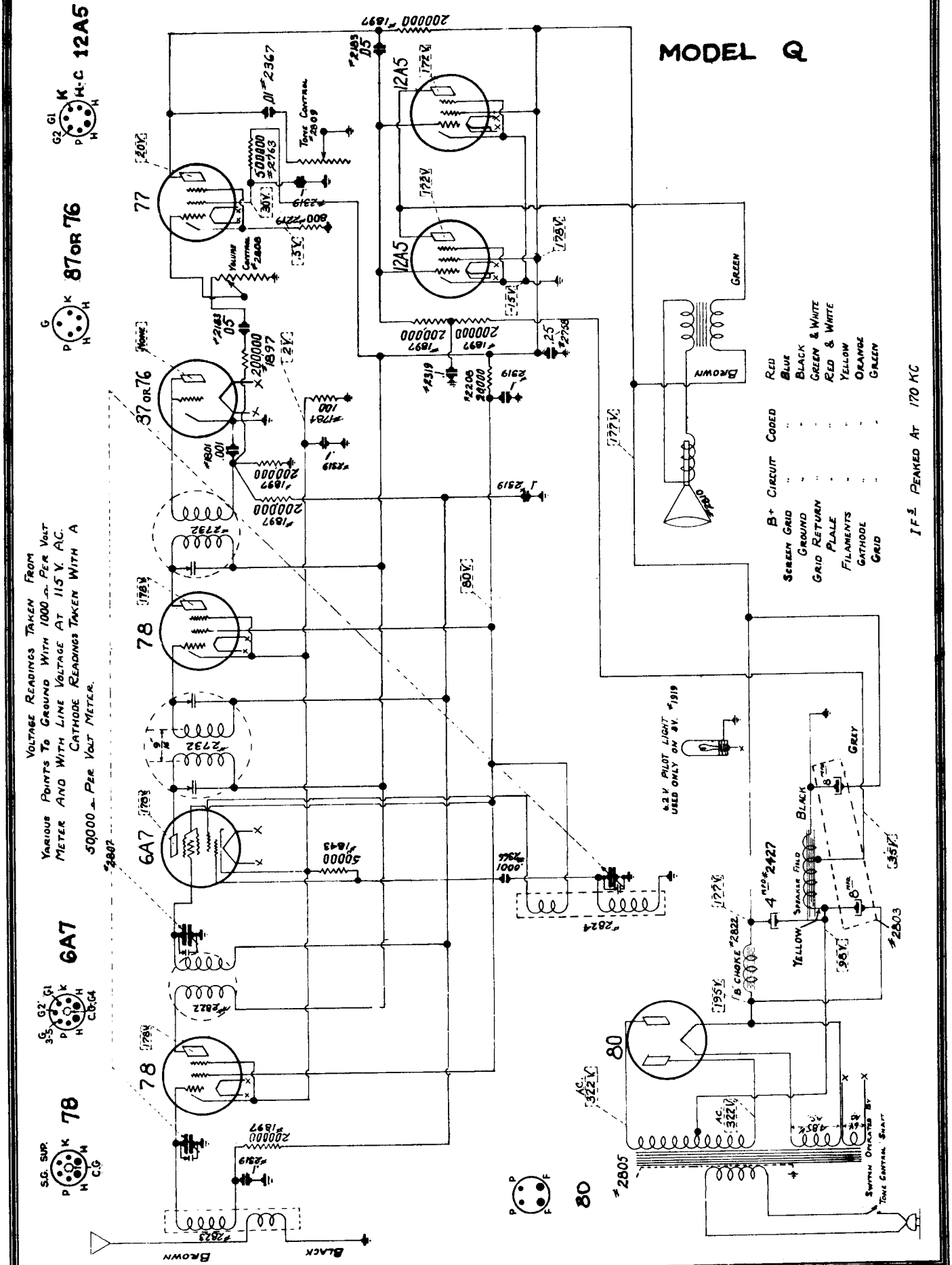


HOWARD RADIO CO.

MODEL S2 & S7

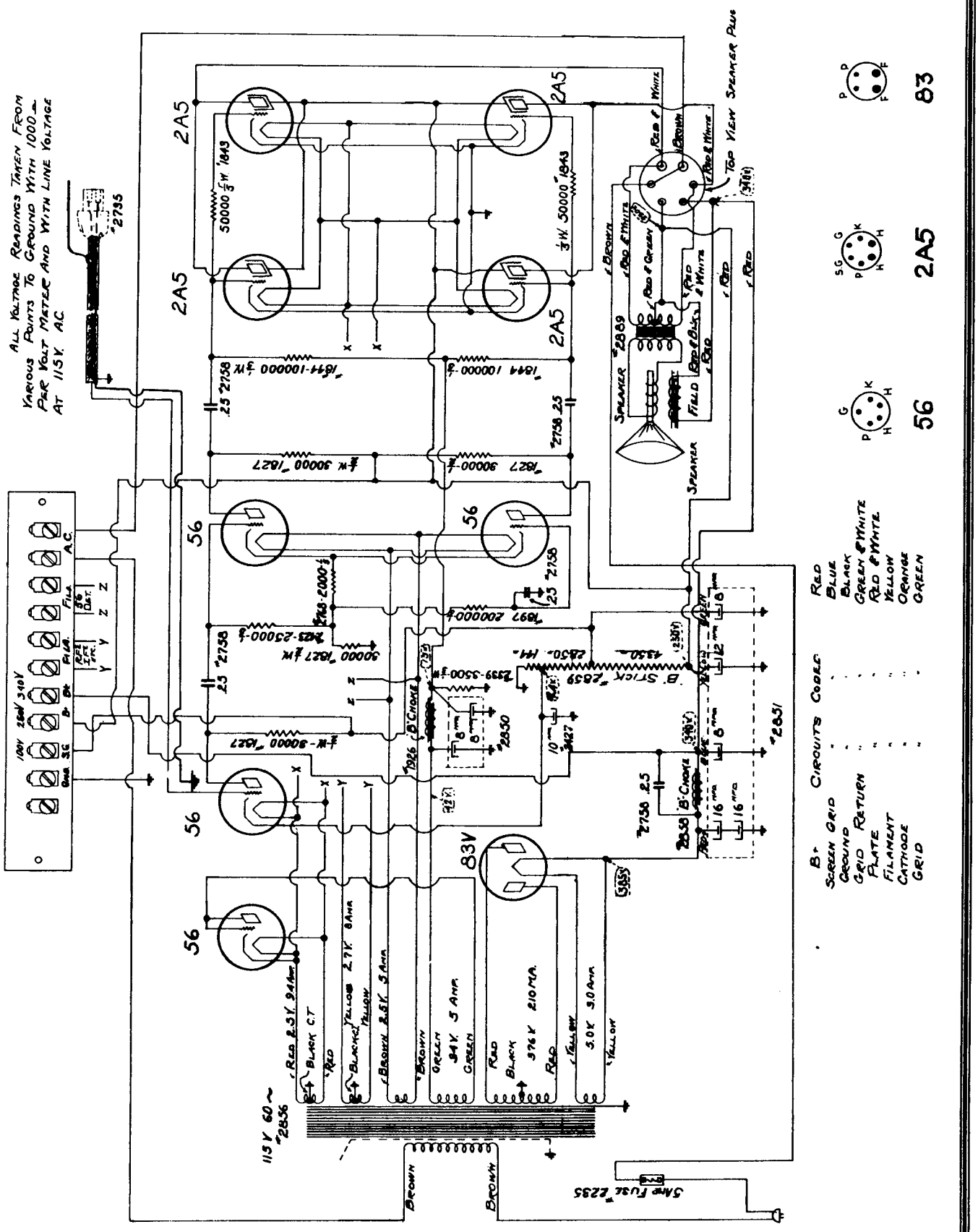


HOWARD RADIO CO.



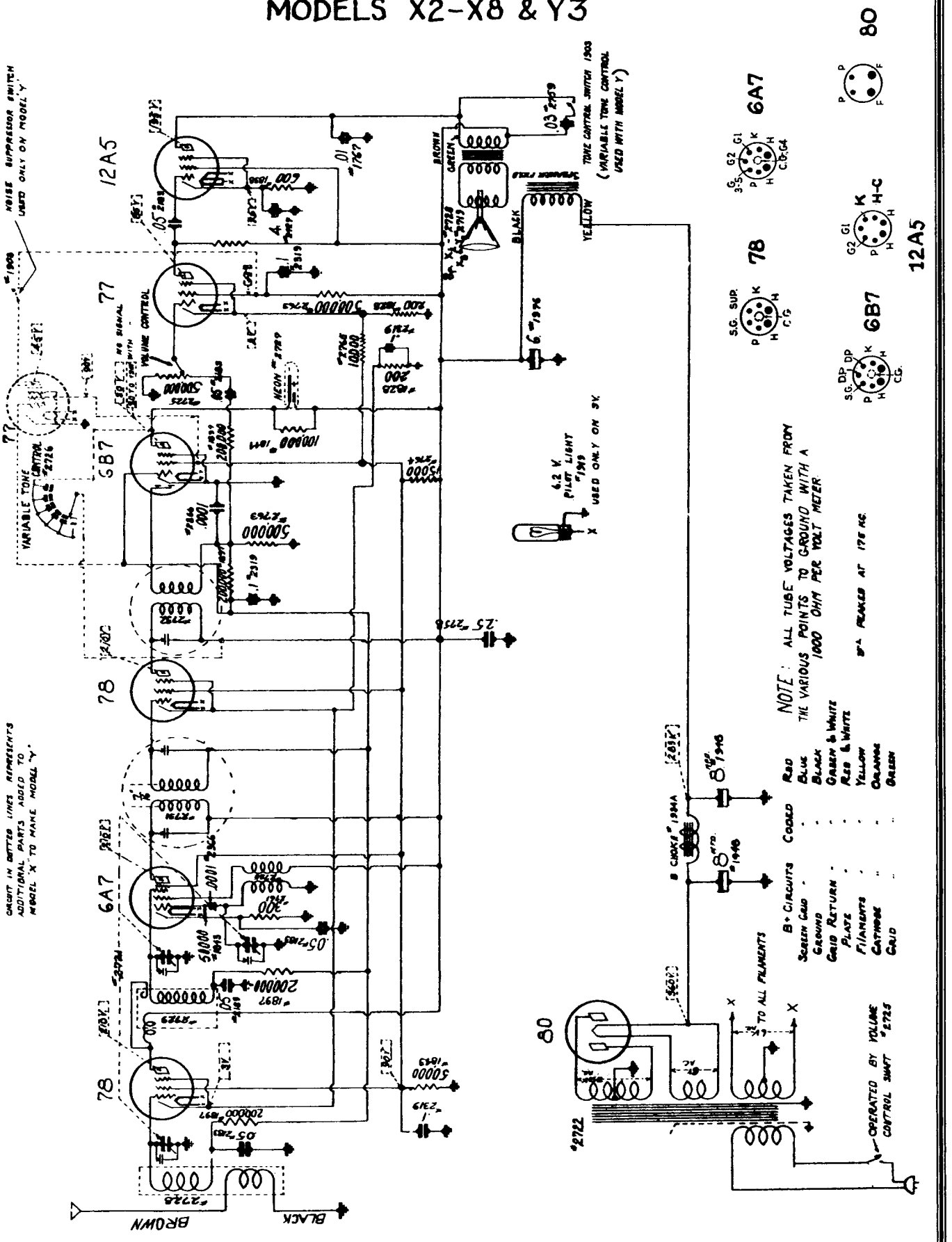
HOWARD RADIO CO.

MODEL W (EXPLORER)



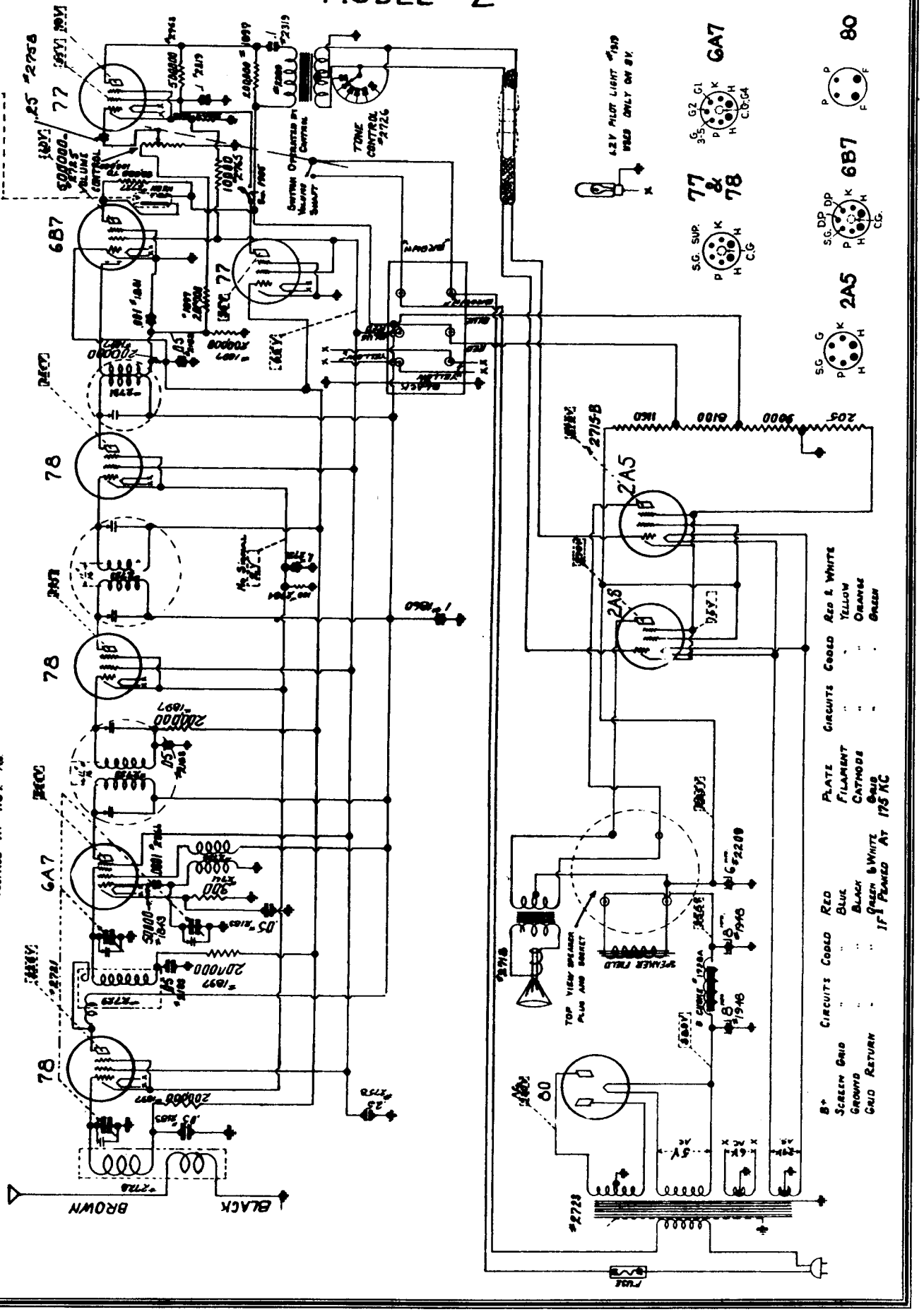
HOWARD RADIO CO.

MODELS X2-X8 & Y3



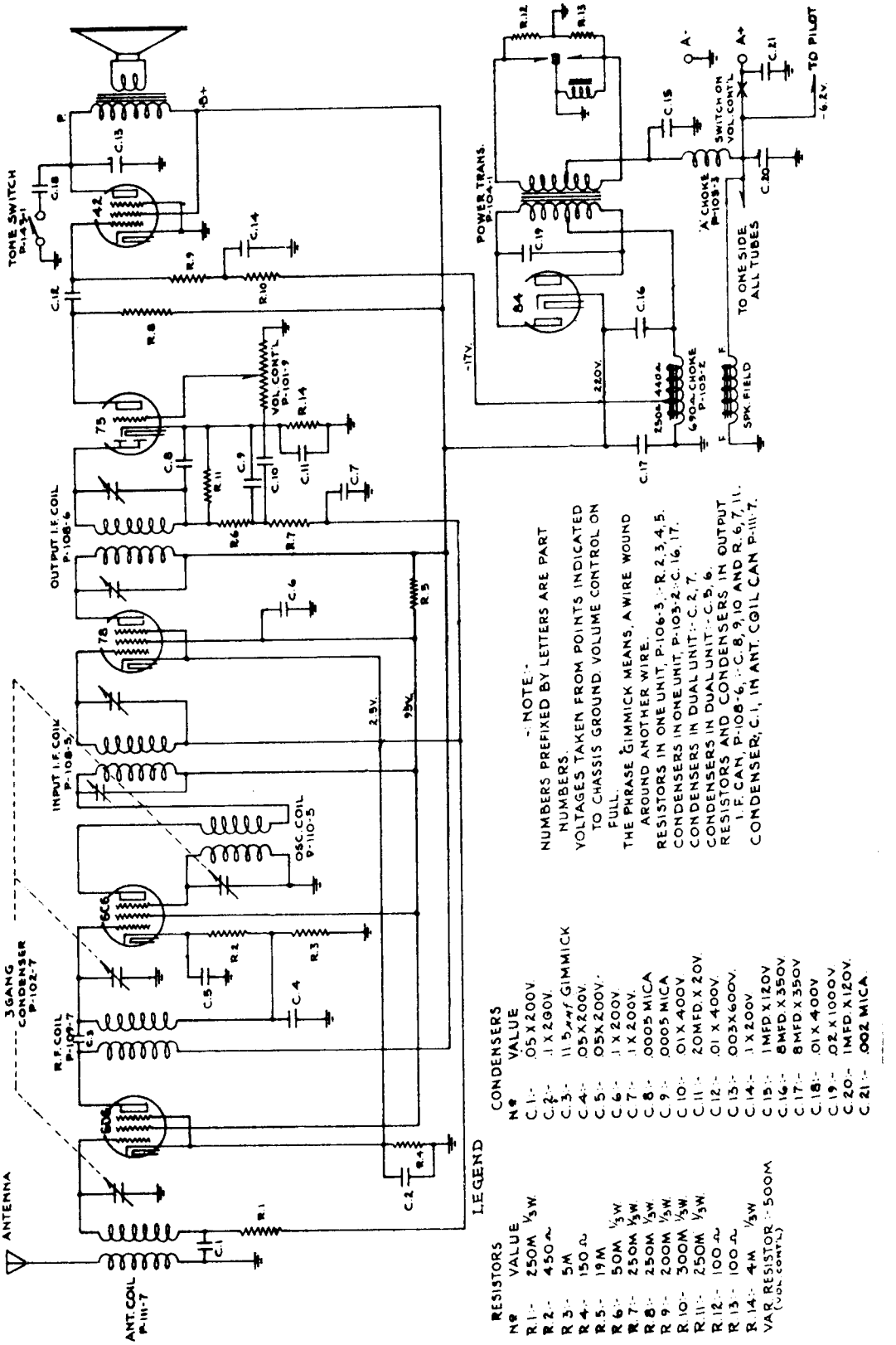
HOWARD RADIO CO.

MODEL Z



HOWARD RADIO CO.

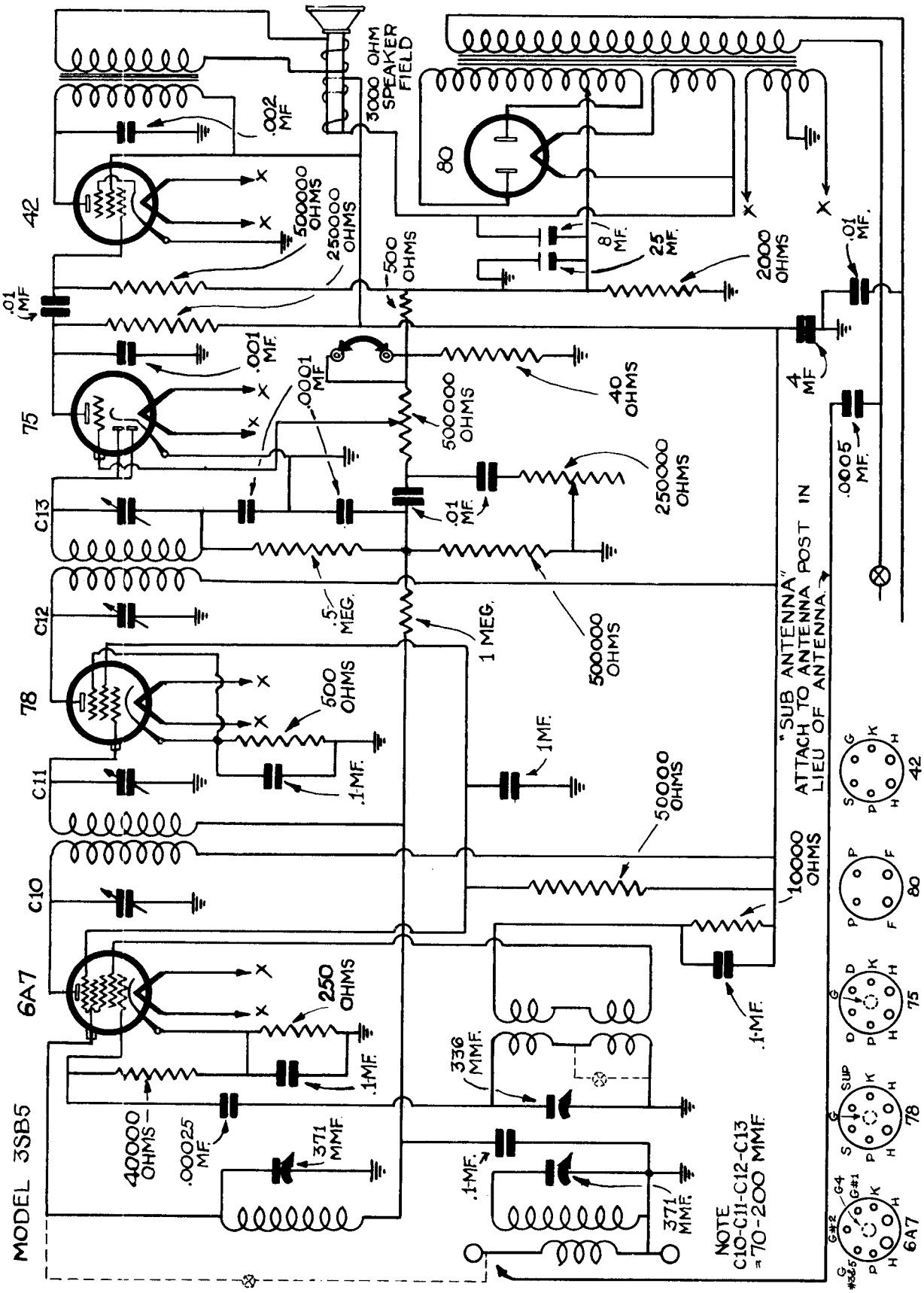
MODEL HIGHWAYMAN



RESISTORS		CONDENSERS	
Nº	VALUE	Nº	VALUE
R.1 :-	250M 1/3W	C.1 :-	.05 X 200V
R.2 :-	450Ω	C.2 :-	.1 X 200V.
R.3 :-	5M	C.3 :-	11.5 μμf GIMMICK
R.4 :-	150Ω	C.4 :-	.05 X 200V
R.5 :-	1.9M	C.5 :-	.05 X 200V.
R.6 :-	50M 1/3W	C.6 :-	.1 X 200V
R.7 :-	250M 1/3W	C.7 :-	.1 X 200V.
R.8 :-	250M 1/3W	C.8 :-	.0005 MICA
R.9 :-	200M 1/3W	C.9 :-	.0005 MICA
R.10 :-	300M 1/3W	C.10 :-	.01 X 400V
R.11 :-	250M 1/3W	C.11 :-	20MFD. X 20V
R.12 :-	100Ω	C.12 :-	.01 X 400V
R.13 :-	100Ω	C.13 :-	.003 X 600V.
R.14 :-	4M 1/3W	C.14 :-	.1 X 200V
VAR. RESISTOR :- 500M (VOL. CONT'L)		C.15 :-	1MFD X 120V
		C.16 :-	8MFD. X 350V
		C.17 :-	8MFD X 350V
		C.18 :-	.01 X 400V
		C.19 :-	.02 X 1000V
		C.20 :-	1MFD. X 120V.
		C.21 :-	.002 MICA

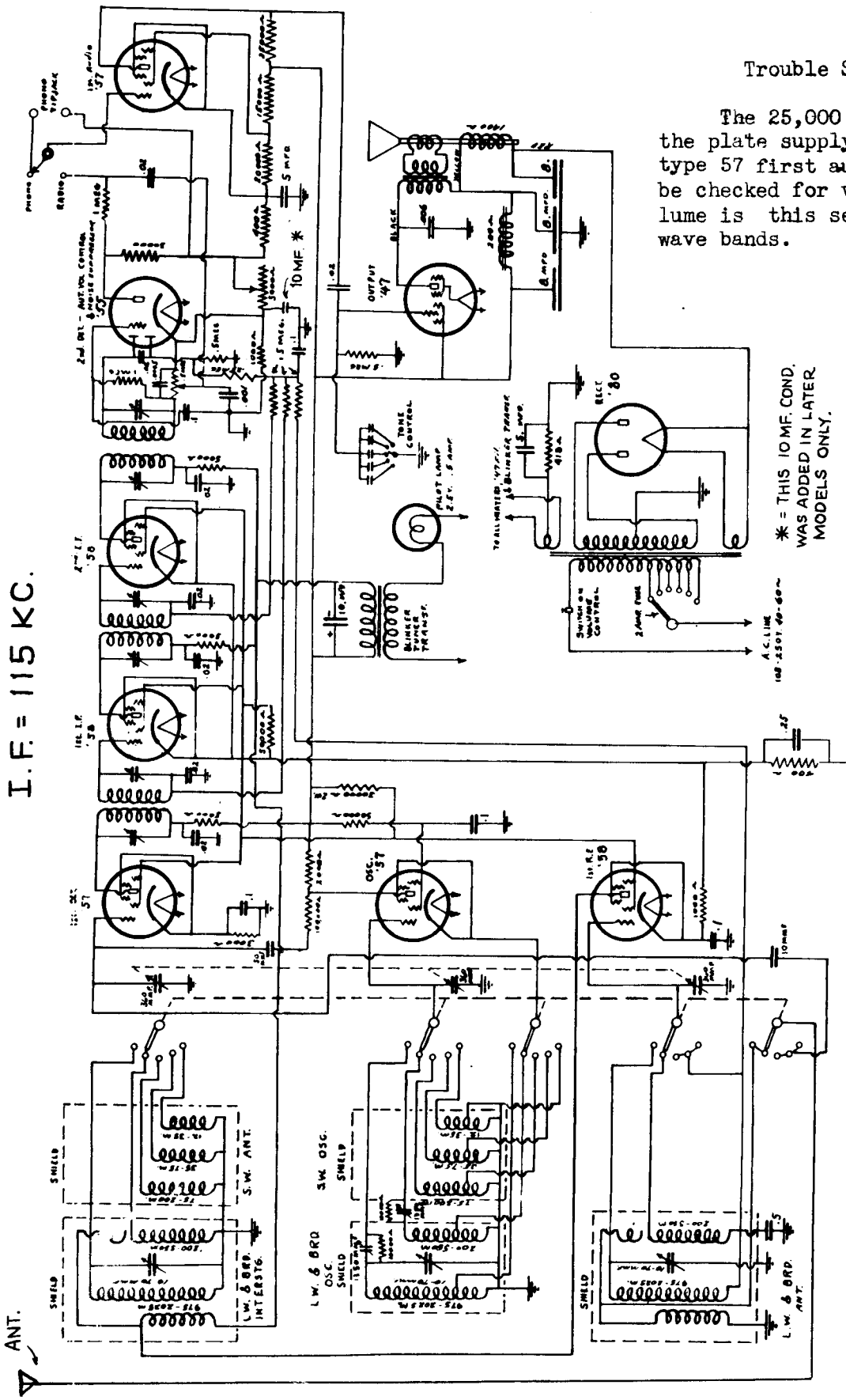
IMPERIAL FURNITURE CO.

MODEL 3SB5



INSULINE CORP. OF AMERICA

MODEL A.C.-108 – 250V.

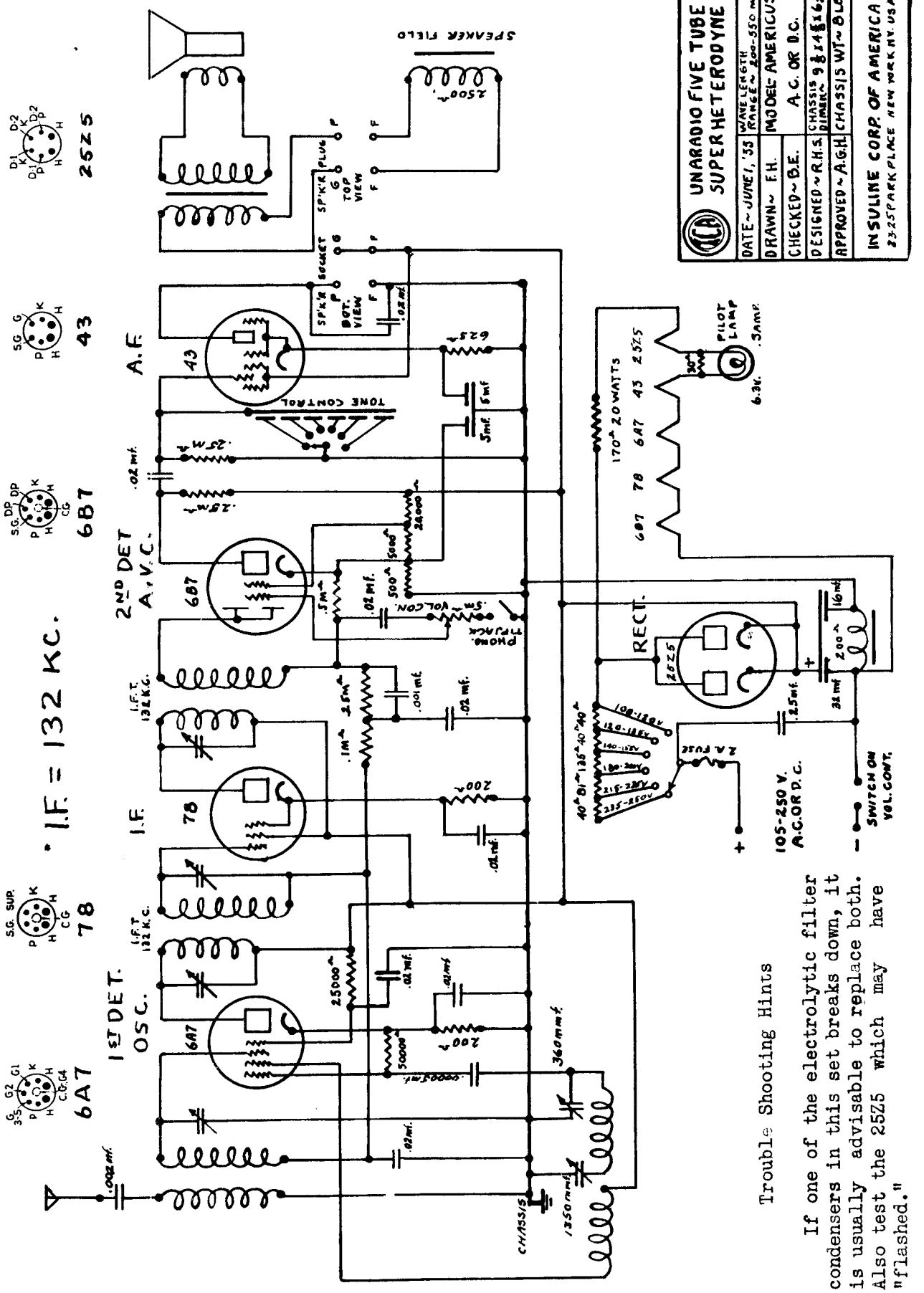


Trouble Shooting Hints

The 25,000 ohm resistor in the plate supply circuit to the type 57 first audio tube should be checked for value if the volume is this set is low on all wave bands.

INSULINE CORP. OF AMERICA

AMERICUS A.C.-D.C.



Trouble Shooting Hints

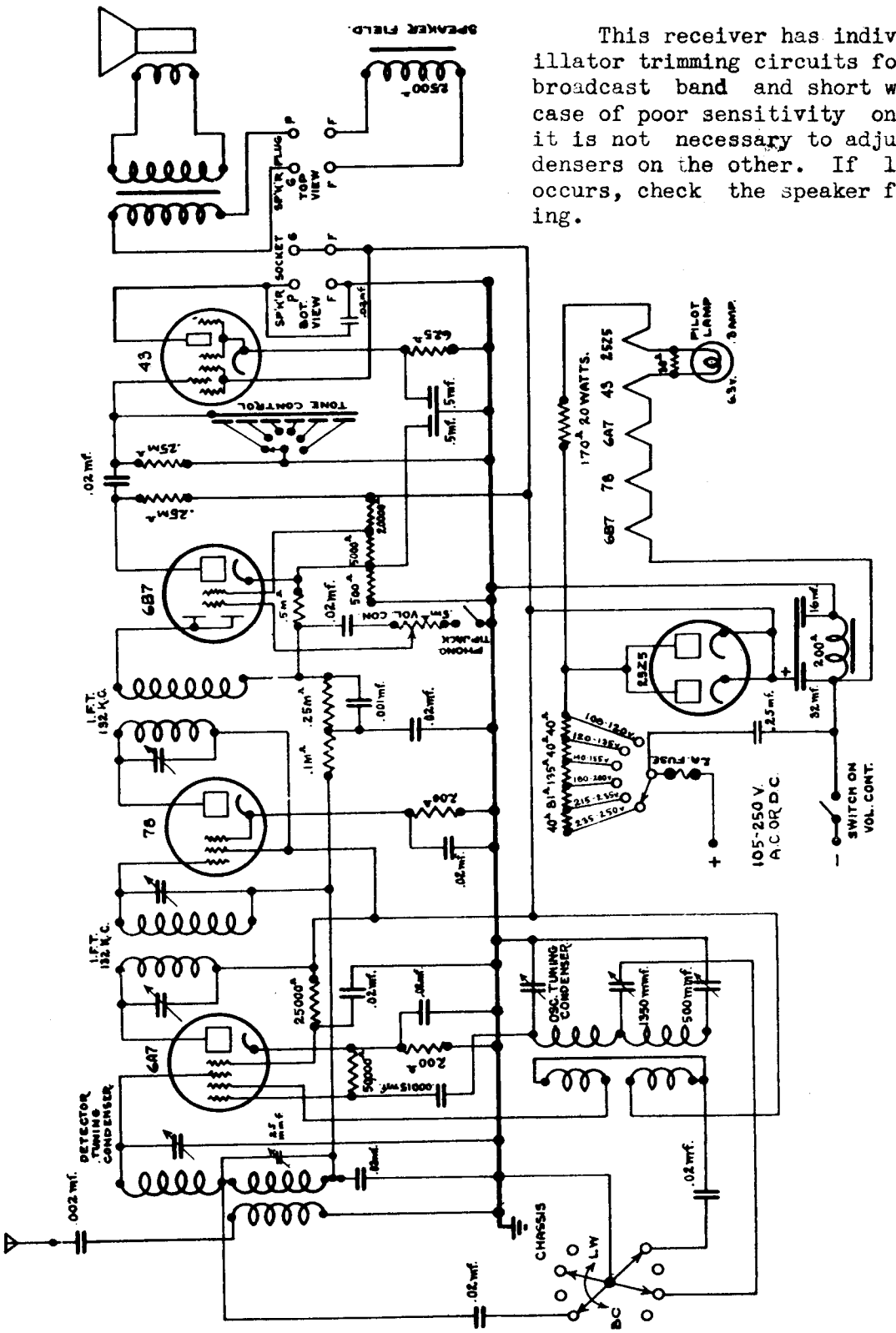
If one of the electrolytic filter condensers in this set breaks down, it is usually advisable to replace both. Also test the 25Z5 which may have "flashed."

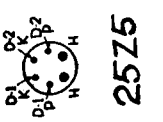
INSULINE CORP. OF AMERICA

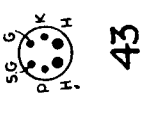
MODEL "ATLANTIC" A.C.-D.C.

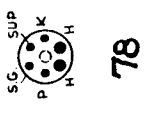
Trouble Shooting Hints

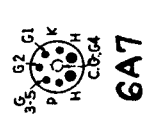
This receiver has individual oscillator trimming circuits for both the broadcast band and short waves, In case of poor sensitivity on one band, it is not necessary to adjust the condensers on the other. If low volume occurs, check the speaker field winding.





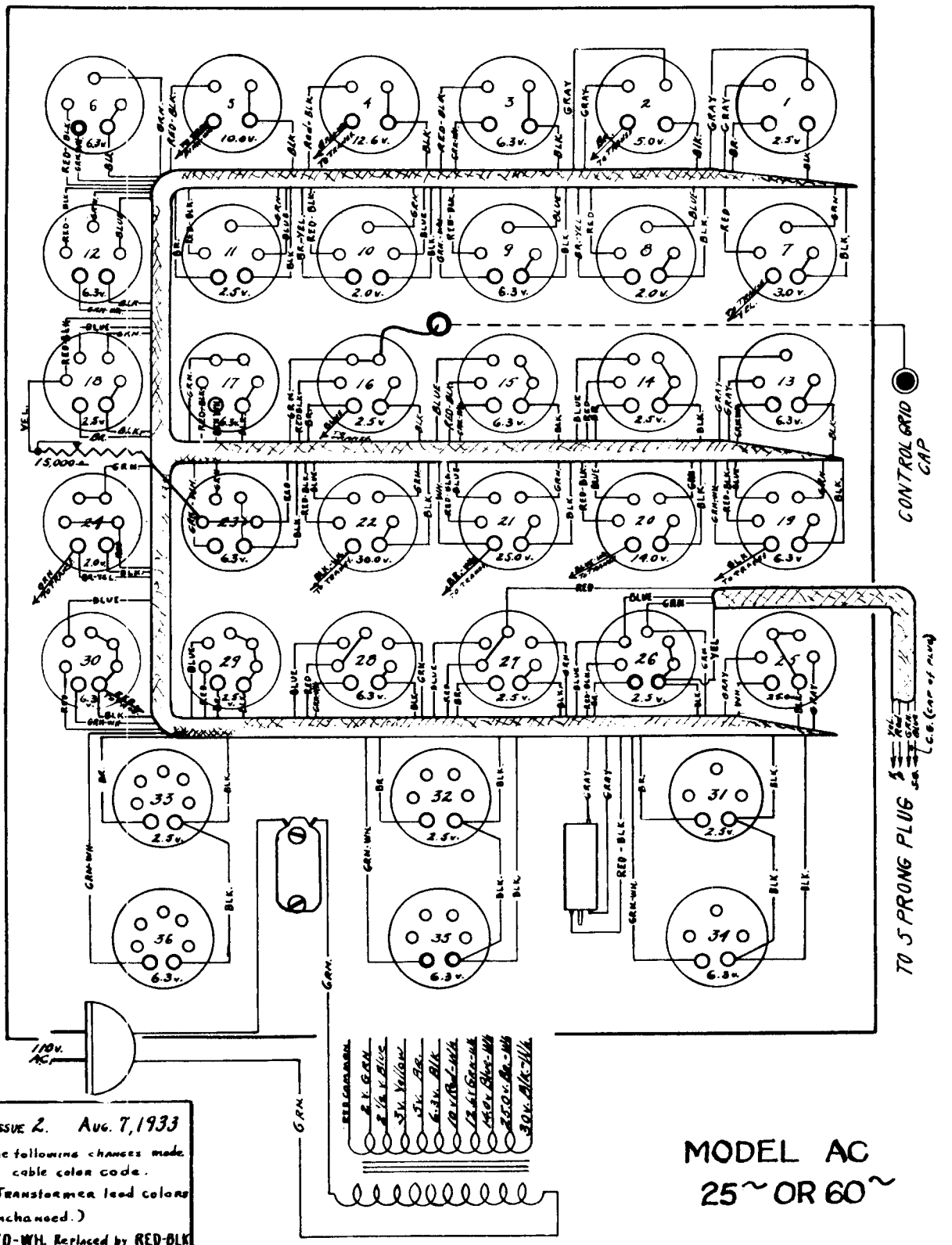






INSULINE CORP. OF AMERICA

AUXILIARY TUBE TESTER



ISSUE 2. AUG. 7, 1933

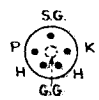
The following changes made in cable color code. (Transformer lead colors unchanged.)

RED-WH. Replaced by RED-BLK
TAN - - BR.-YEL.
BLUE-WH. - - GRN.-WH.

MODEL AC
25~ OR 60~

INSULINE CORP. OF AMERICA

SUPER SEVEN



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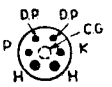
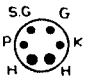


85

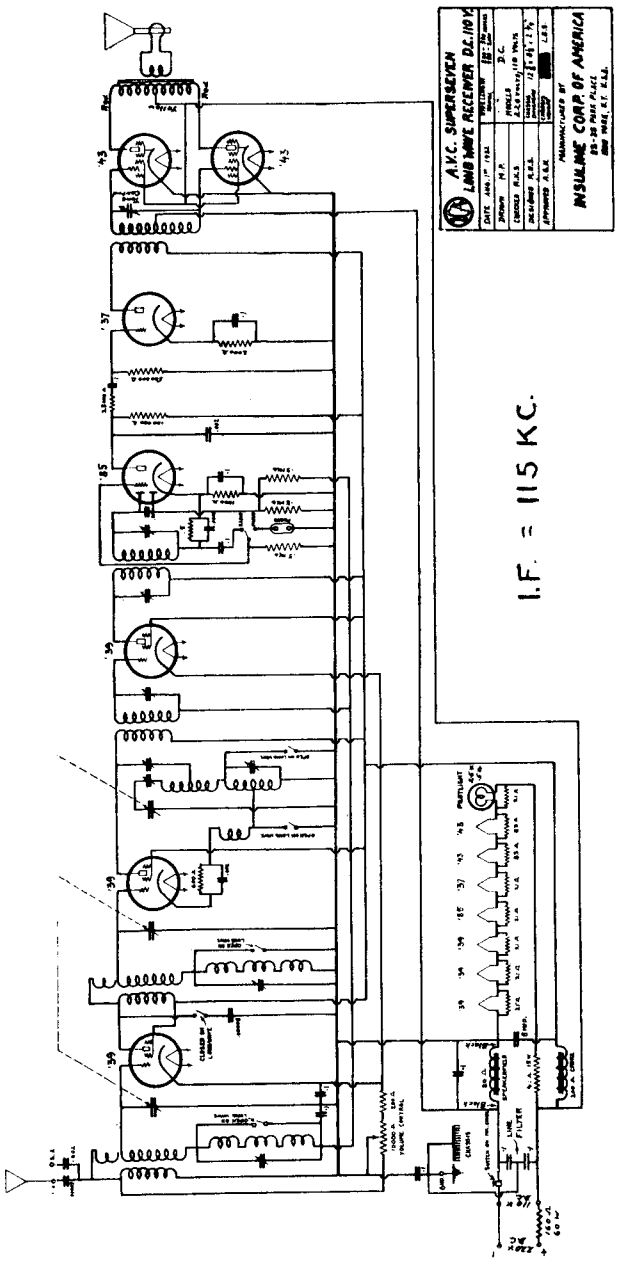
37

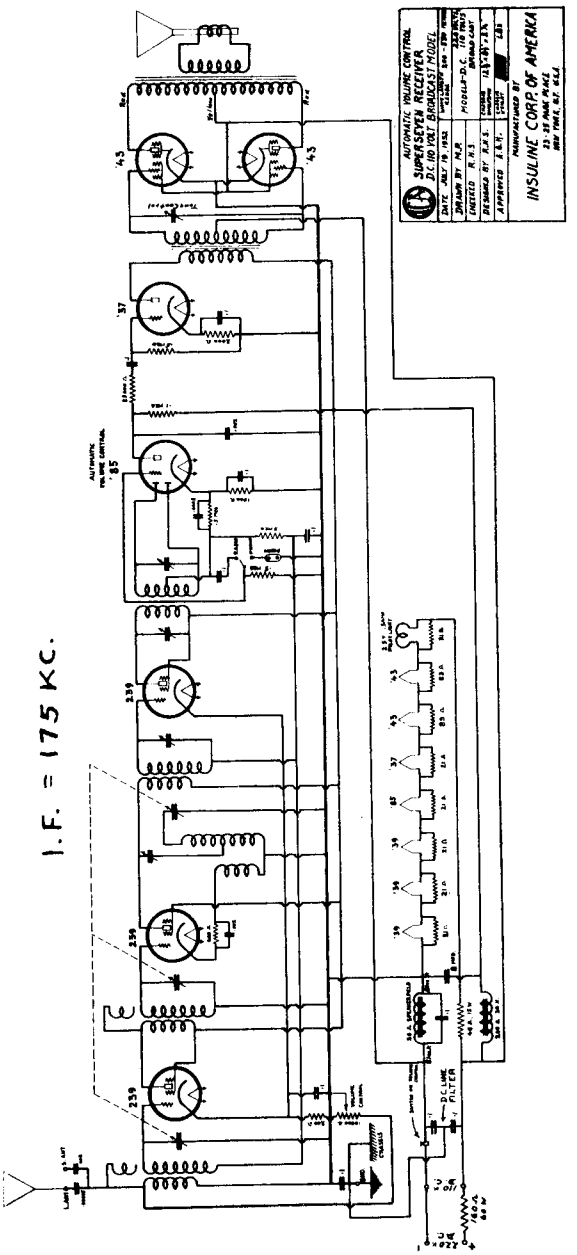


43

LONG-WAVE 220 V. D.C.
110 V. D.C.

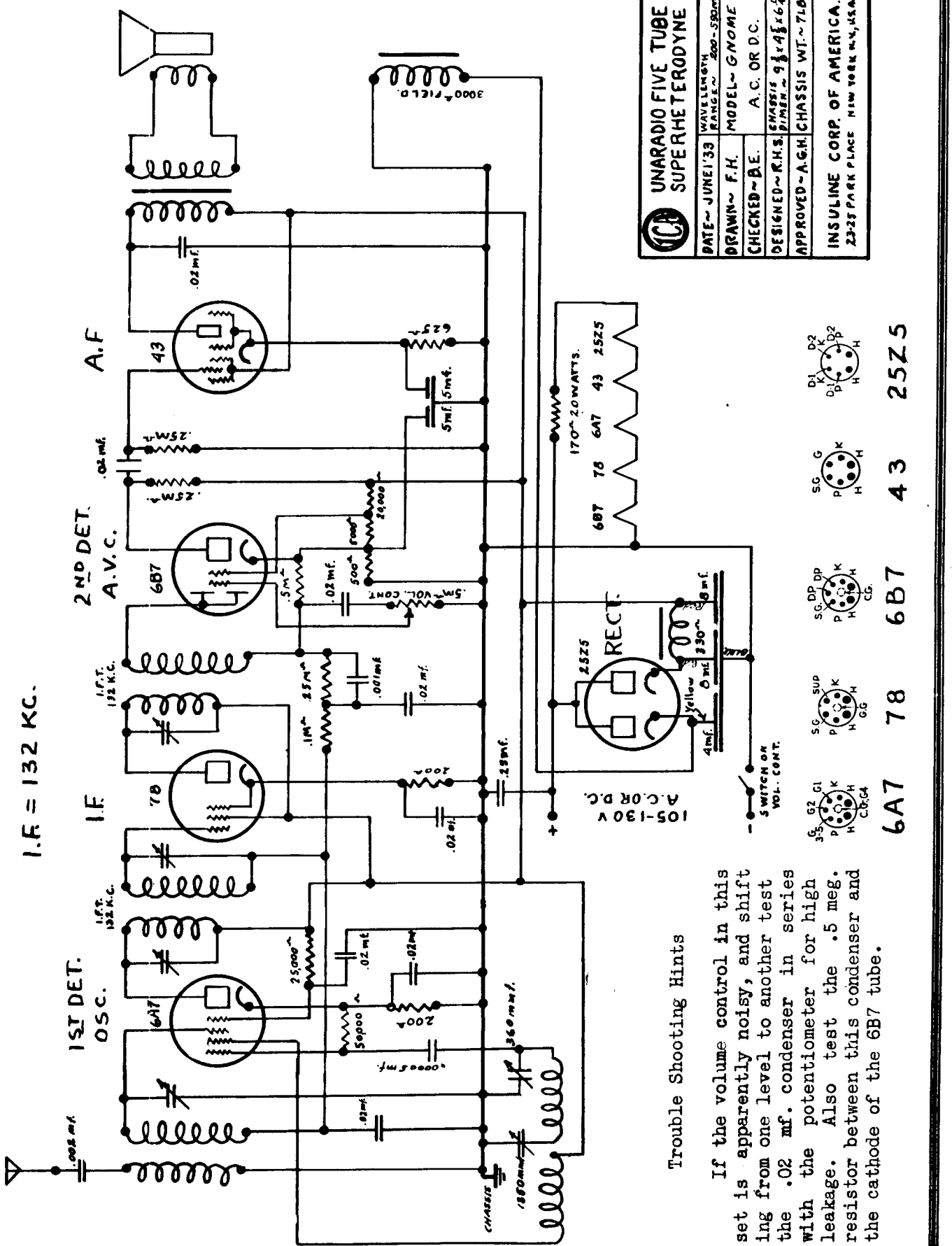
BROADCAST 220 V. D.C.
110 V. D.C.





INSULINE CORP. OF AMERICA

GNOME A.C.-D.C.

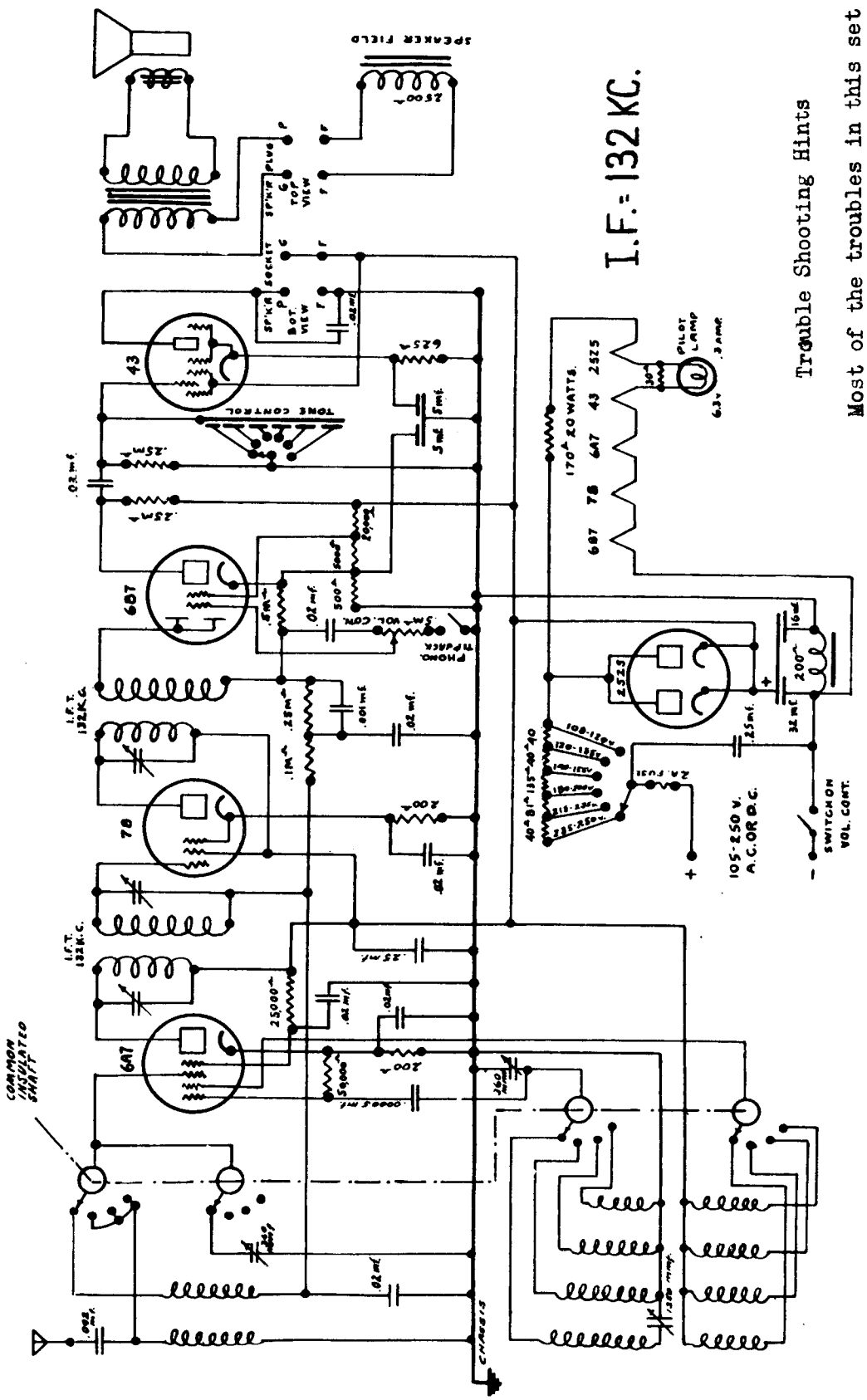


Trouble Shooting Hints

If the volume control in this set is apparently noisy, and shifting from one level to another test the .02 mf. condenser in series with the potentiometer for high leakage. Also test the .5 meg. resistor between this condenser and the cathode of the 6B7 tube.

INSULINE CORP. OF AMERICA

MODEL "LATINIC" A.C.-D.C.

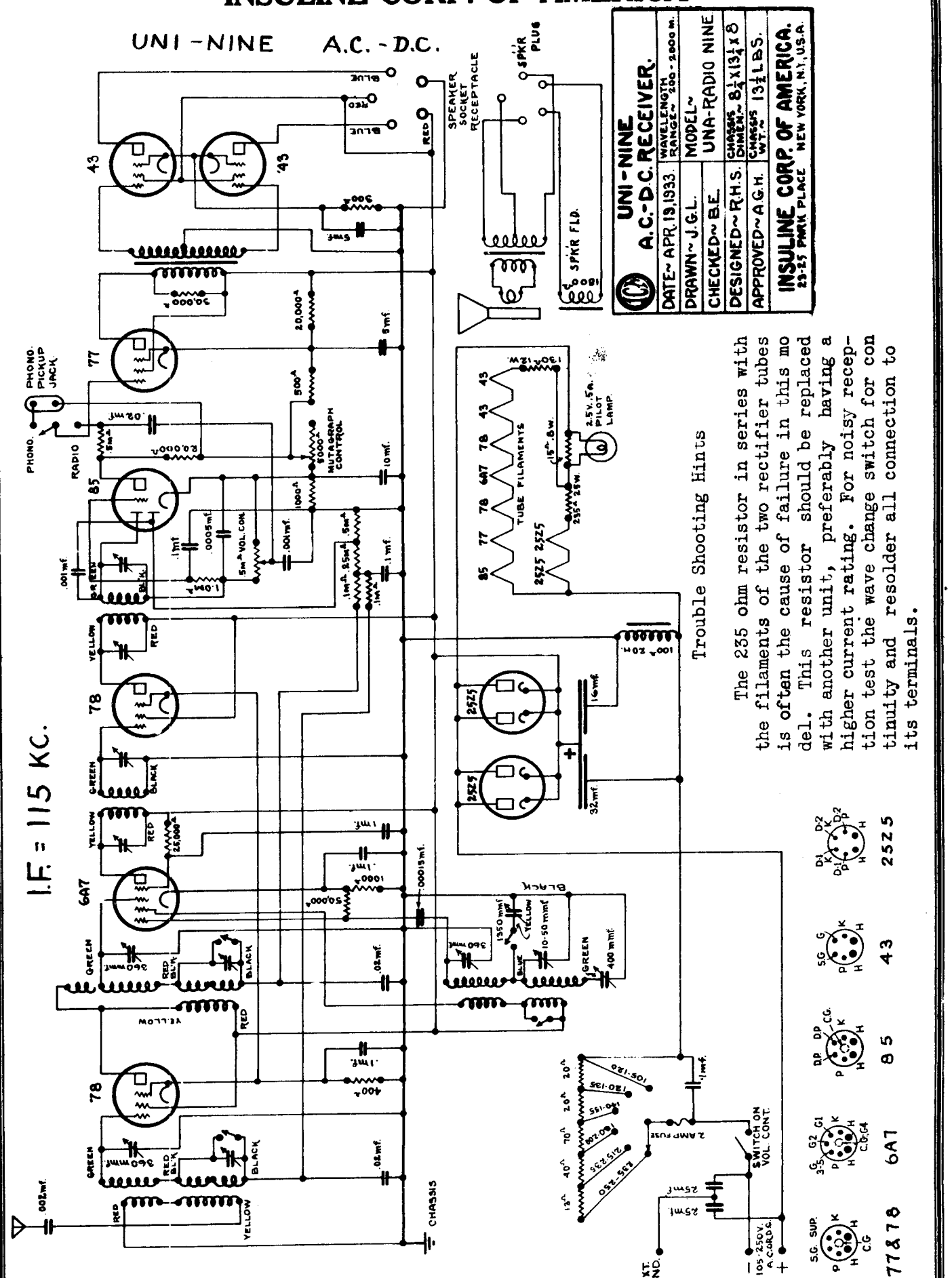


Trouble Shooting Hints

Most of the troubles in this set seem to center around the 6B7 second detector. The voltage divider circuit which supplies the screen potential should be checked first and the resistors connecting to the diode circuit, next. If motor-boating is encountered check the bias resistor for the 43 tube.

INSULINE CORP. OF AMERICA

UNI-NINE A.C.-D.C.

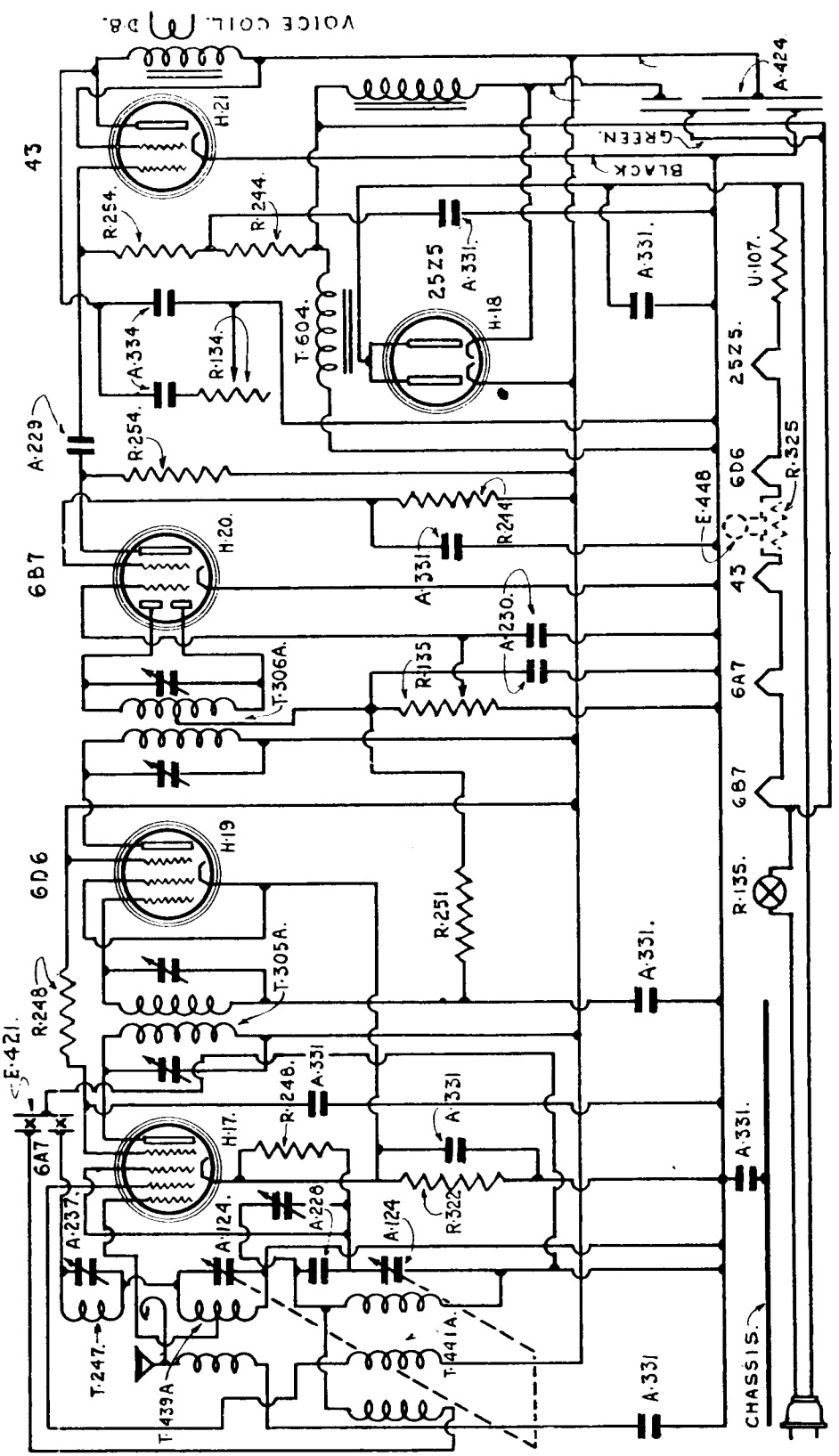


Trouble Shooting Hints

The 235 ohm resistor in series with the filaments of the two rectifier tubes is often the cause of failure in this model. This resistor should be replaced with another unit, preferably having a higher current rating. For noisy reception test the wave change switch for continuity and resolder all connection to its terminals.

INTERNATIONAL RADIO CORP.

MODELS A & B



D-8. DYNAMIC SPEAKER 5"
H-17. 7-PRONG 6A7 SOCKET.
H-18. 6-PRONG 2525 SOCKET.
H-19. 6-PRONG 6D6 SOCKET.
H-20. 7-PRONG 6B7 SOCKET.
H-21. 6-PRONG 43 SOCKET.
E-448. PILOT LIGHT BRKT.
E-421. S.W. SWITCH.

R-135. 250 M. OHM VOL. CONTROL.
R-134. 50 M. OHM. TONE CONTROL.
R-244. 1 MEGOHM.
R-248. 50 M. OHM.
R-251. 500 M. OHM.
R-254. 250 M. OHM.
R-325. 20 OHM.

R-322. 140 OHMS.
T-305A. 1ST. I.F. ASSEMBLY.
T-306A. 2ND. IF. ASSEMBLY.
T-439A. ANT. COIL.
T-441A. OSC. COIL. S.W.
T-604. 450 OHM FILTER CHOKE
U-107. 160 OHM POWER COR
T-247. S.W. RF. COIL.

A-124. 2 GANG VAR. COND.
A-228. 730 M.MFD.
A-229. .003 MFD.
A-230. .00035 MFD.
A-331. .15.05.05.006 MFD. BY PASS.
A-334. .01.08 MFD. 200V.
A-424. 24 MFD.
A-237. 16 M.MFD.

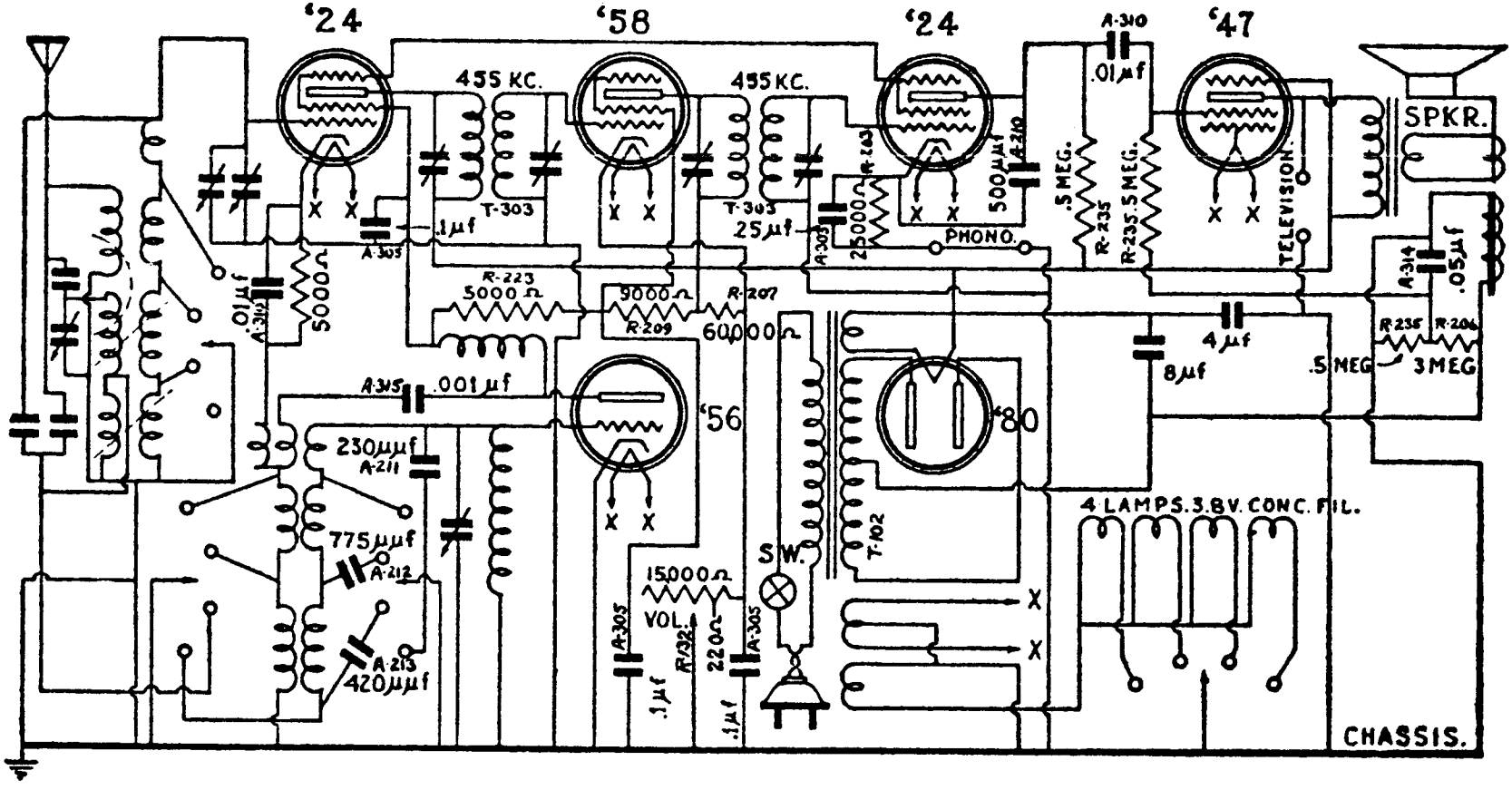
6A7 6D6 6B7 43 2525

A-331

R. BLK.
RED .006 MF
GREEN .05 MF
YELLOW .05 MF
BLUE .15 MF

INTERNATIONAL RADIO CORP.

MODEL AW-55



NOTE: Voltages should be measured with volume control all the way "ON" and the range selector in position 3 (broadcast). Use a 250-volt D. C. meter with a resistance of 1000 ohms per volt.

	Plate	Screen	Cathode
'47 Tube —ground to	235	245	.....
'24 Tube —ground to (Tube next to '47)	70	40	6
58 Tube —ground to	240	100	3
'24 Tube —ground to	240	40	8
56 Tube —ground to	40	.....	0

The grid of the '47 is biased through such high resistances that only an indication of negative bias can be read with an ordinary meter.

Should the set at any time fail to function properly:

1—Examine tubes to be sure they are all pushed securely into their sockets.

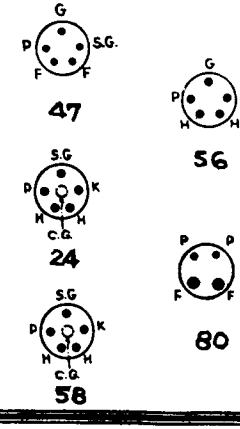
2—Be sure the grid caps are attached to the caps of the 58 and '24 tubes.

3—Inspect antenna and ground leads for shorts or opens.

4—Check A. C. plug and receptacle to be sure of current at the receptacle and good contact to the plug.

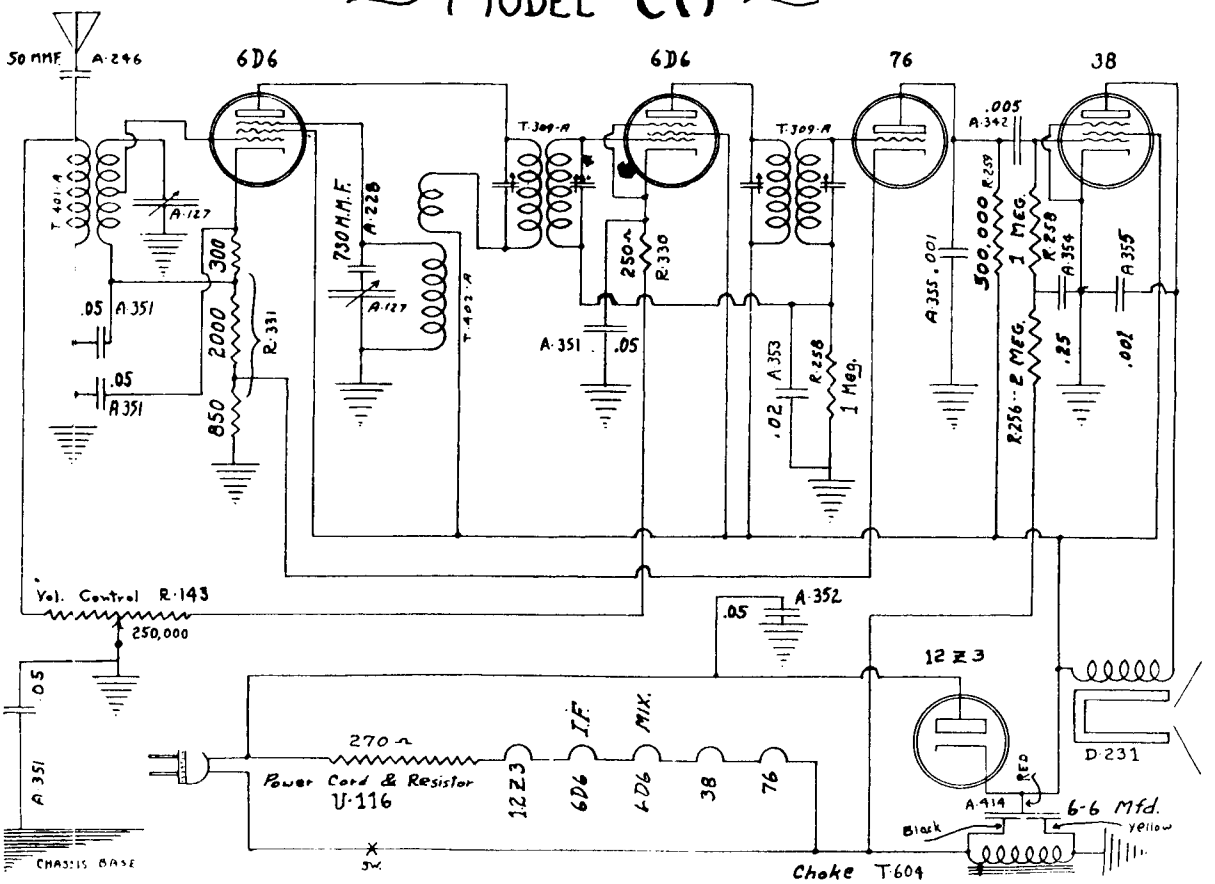
5—Have tubes checked. Most radio stores offer this service gratis.

6—Do not adjust any screw adjustment unless thoroughly familiar with superheterodyne construction.



INTERNATIONAL RADIO CORP.

~ MODEL CM ~



ST. REGIS

OPERATION NO. 1 Adjustment of IF transformers. When adjusting the IF units the oscillator section (nearest rear of chassis) of the 2 gang variable condenser must be shorted out. This is easily accomplished by inserting a thin strip of metal between the plates. Set the test oscillator to 262½ kilocycles and connect its output to the antenna wire of the set. Using a No. 4 fibre spintite socket wrench adjust the 4 nuts at the ends of the IF units until exact resonance is obtained.

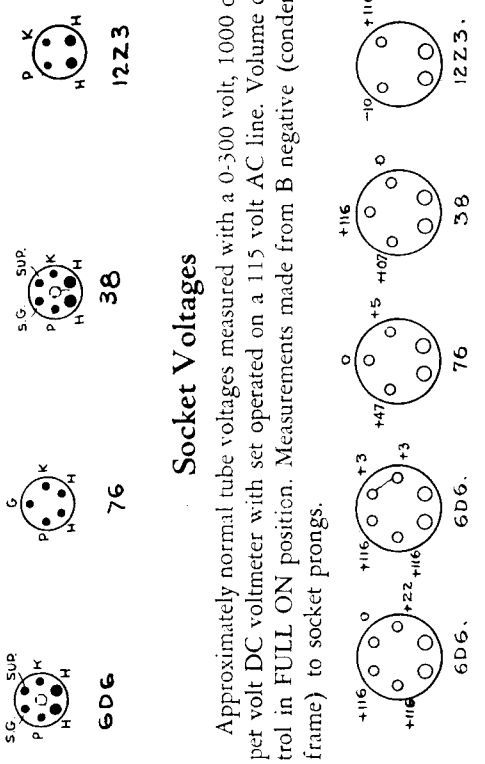
OPERATION NO. 2. Adjusting trimmers on 2 gang condenser at 1500 kilocycles. Set the test oscillator to 1500 kilocycles and connect its output to the antenna wire of the set. If the output of the oscillator is too strong connect through a very small fixed condenser or place the output wire of the oscillator near the antenna wire without making any direct connection. Open the variable condenser until maximum signal is indicated by the meter. Then adjust the trimmer on the antenna section of the condenser until maximum signal is indicated on the meter.

OPERATION NO. 3. Aligning 2 gang condenser on 1000 kilocycles. Test oscillator set at 1000 kilocycles and coupled to antenna wire of set. Insert a thin bakelite celluloid or mica feeler strip between the plates of the variable condensers to determine whether the circuits are properly matched. The action is this—the dielectric constant of the celluloid feeler strip being higher than that of the air it displaces, results in an increase of capacity. Open the variable condenser just enough to indicate two or three points below maximum signal. As the feeler is inserted the meter reading should indicate increasing signal and then decreasing as the feeler is inserted farther. This procedure should be followed on both sections. Should the meter fail to show an increase in signal as the strip is inserted in either section this indicates too great a capacity for that section. This may be corrected by bending the outside rotor plates out at the point where they begin to mesh with the stator.

OPERATION NO. 4 Aligning 2 gang condenser at 550 kilocycles. Instructions same as for operation 3 except test oscillator and set tuned at 550 kilocycles.

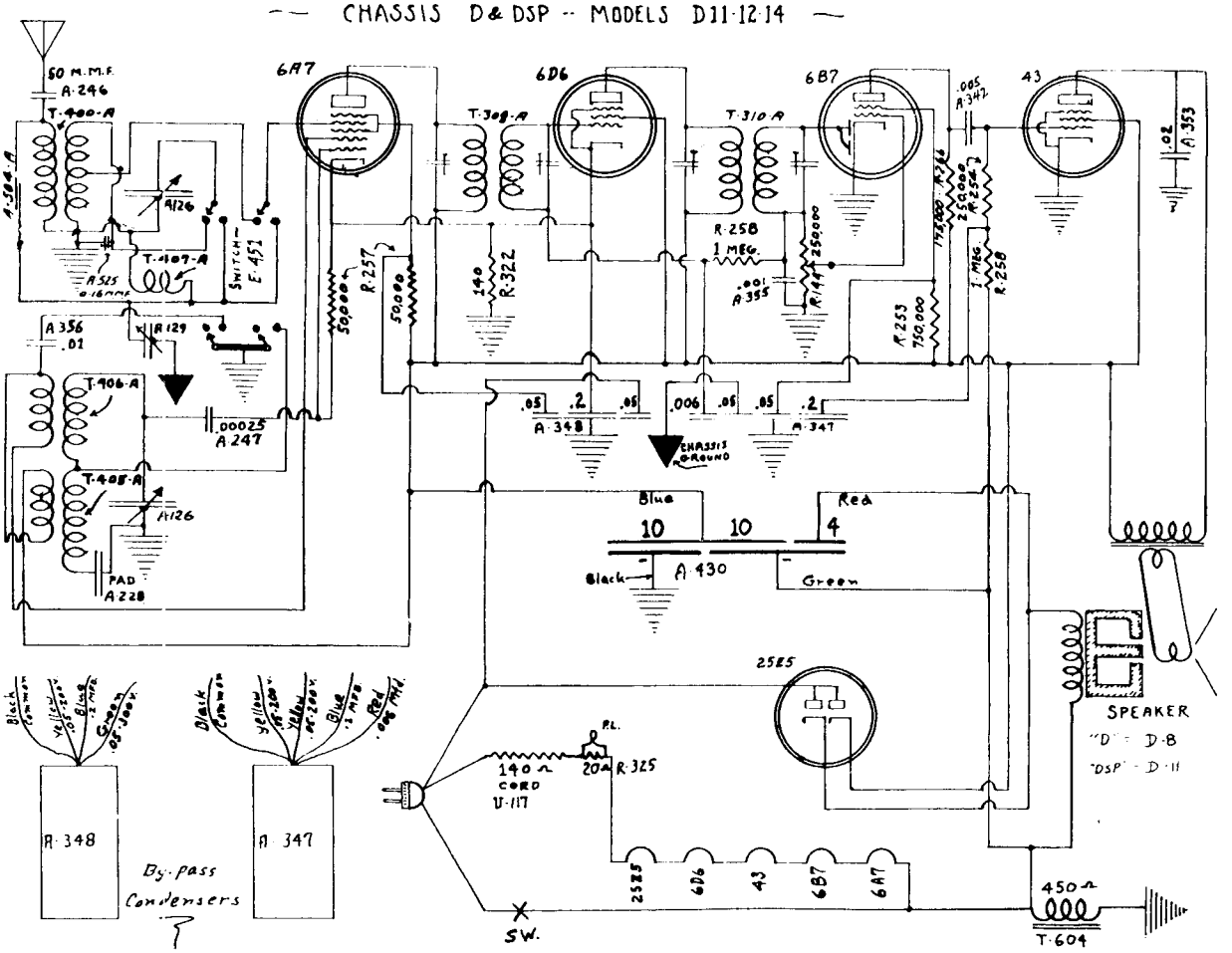
Socket Voltages

Approximately normal tube voltages measured with a 0-300 volt, 1000 ohm per volt DC voltmeter with set operated on a 115 volt AC line. Volume control in FULL ON position. Measurements made from B negative (condenser frame) to socket prongs.

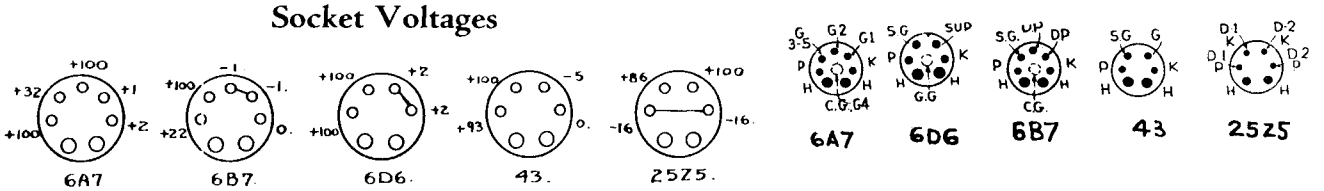


INTERNATIONAL RADIO CORP.

— CHASSIS D & DSP — MODELS D11-12-14 —



Socket Voltages



OPERATION NO. 1 Adjustment of IF transformers. When adjusting the IF units the oscillator section of the 2 gang variable condenser must be shorted out. This is easily accomplished by inserting a thin strip of metal between the plates. Set the test oscillator to 262½ kilocycles and connect its output to the antenna wire of the set. Using a No. 4 fibre spintite socket wrench adjust the 4 nuts at the ends of the IF units until exact resonsnace is obtained.

OPERATION NO 2. Adjusting trimmers on 2 gang condenser at 1500 kilocycles. Set the test oscillator to 1500 kilocycles and connect its output to the antenna wire of the set. If the output of the oscillator is too strong connect through a very small fixed condenser or place the output wire of the oscillator near the antenna wire without making any direct connection. Open the variable condenser until maximum signal is indicated by the meter.

OPERATION NO. 3. Aligning 2 gang condenser on 1000 kilocycles. Test oscillator set at 1000 kilocycles and coupled to antenna wire of set. Insert a thin bakelite, celluloid or mica feeler strip between the plates of the variable condensers to determine whether the circuits are properly matched. The action is this—the dielectric constant of the celluloid feeler strip being higher than that of the air it displaces, results in an increase of capacity. Open the variable condenser just enough to indicate two or three points below maximum signal. As the feeler is inserted the meter reading should indicate increasing signal and then decreasing as the feeler is inserted farther. This procedure should be followed on both sections.Should the meter fail to show an increase in signal as the strip is inserted in either section this indicates too great a capacity for that section. This may be corrected by bending the outside rotor plates out at the point where they begin to mesh with the stator.

OPERATION NO. 4 Aligning 2 gang condenser at 550 kilocycles. Instructions same as for operation 3 except test oscillator and set tuned at 550 kilocycles.

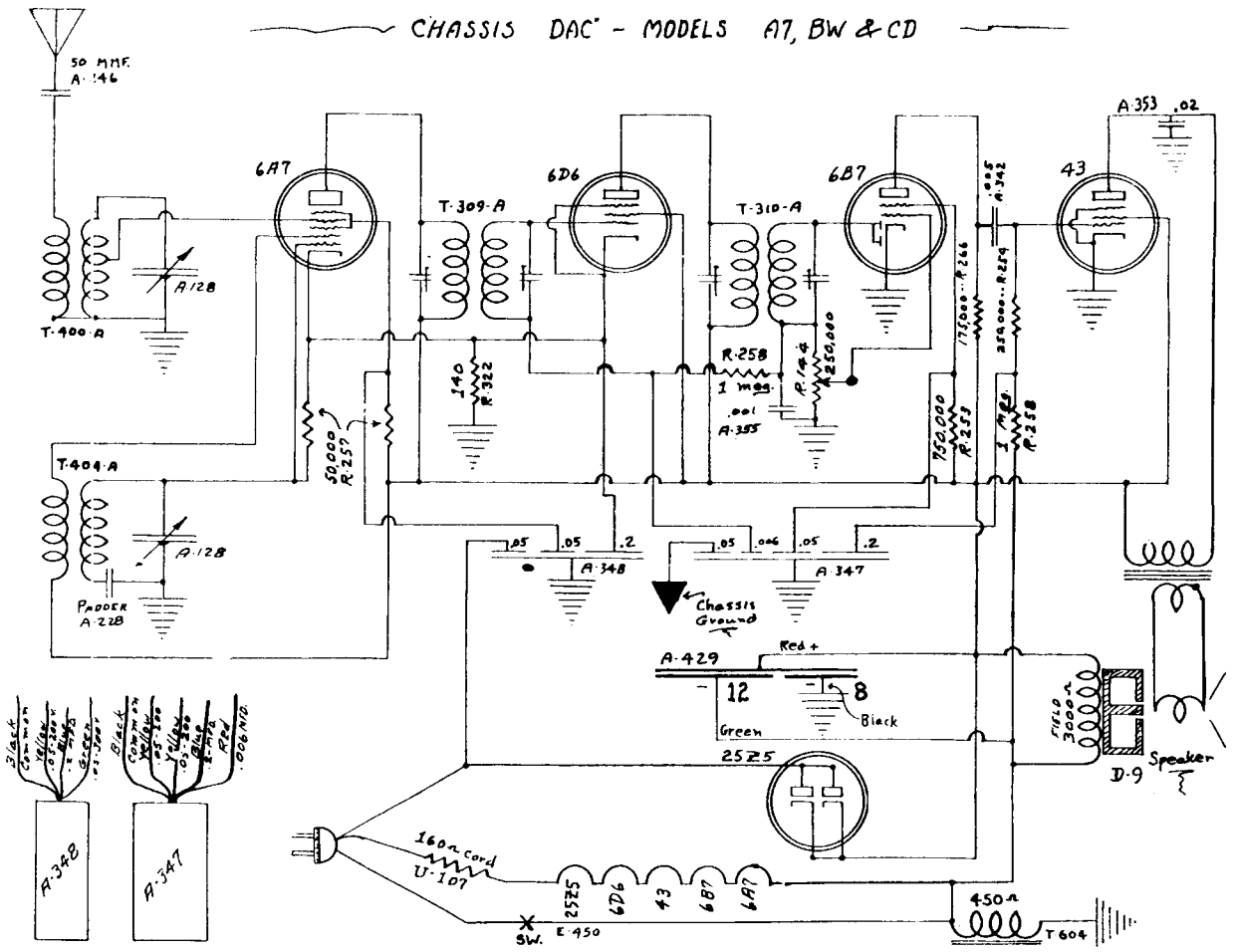
OPERATION NO. 5 Be sure the switch on the rear of the chassis is turned to the short wave position. Remove short from the oscillator section of the 2 gang condenser and proceed as follows. Turn the small two plate vernier condenser so that it is only about 1/5 meshed. If the test oscillator is to be coupled direct to the antenna wire it should be attached close to the chassis. The coiled up antenna wire acts as an RF choke and high frequency signals will not go through it. A pin pushed through the insulation of the antenna wire will allow connection close to the chassis. Set the test oscillator so that it is radiating a signal on approximately 22 meters and rotate the condenser gang very slowly until this signal is picked up. Alternately change the setting of the trimmer on the oscillator section of the 2 gang and retune the 2 gang until the maximum signal is indicated.

OPERATION NO. 6 Turn the switch on the rear of the chassis to the broadcast position. Tune in the 1500 kilocycle signal from the broadcast test oscillator. It will have been noted that there is no trimmer in the customary location on the antenna section of the 2-gang condenser. The trimmer is mounted externally near the 2 plate vernier condenser. This trimmer is used only on the broadcast band, the 2-plate vernier being in the circuit on the short wave position. Adjust the broadcast antenna trimmer for maximum signal.

OPERATION NO. 7. Turn the switch on the rear of the chassis to the short wave position. Set the two plate vernier condenser so that it is about 4/5 meshed. Pick up the 45 meter signal from the short wave test oscillator. Test for resonance with the feeler strip as described in operation 3 but do not bend any plates. If the antenna section of the condenser gang has insufficient capacity it will be necessary to crowd together two or three turns of wire on the short wave antenna coil. If too much capacity, they must be spread somewhat. The short wave antenna coil is the space wound coil on the bottom of the chassis.

INTERNATIONAL RADIO CORP.

CHASSIS DAC - MODELS A7, BW & CD

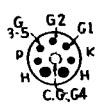


OPERATION No. 1 Adjustment of IF transformers. When adjusting the IF units the oscillator section of the 2 gang variable condenser must be shorted out. This is easily accomplished by inserting a thin strip of metal between the plates. Set the test oscillator to 262½ kilocycles and connect its output to the antenna wire of the set. Using a No. 4 fibre spintite socket wrench adjust the 4 nuts at the ends of the IF units until exact resonsnace is obtained.

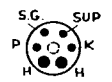
OPERATION No. 2. Adjusting trimmers on 2 gang condenser at 1500 kilocycles. Set the test oscillator to 1500 kilocycles and connect its output to the antenna wire of the set. If the output of the oscillator is too strong connect through a very small fixed condenser or place the output wire of the oscillator near the antenna wire without making any direct connection. Open the variable condenser until maximum signal is indicated by the meter.

OPERATION No. 3. Aligning 2 gang condenser on 1000 kilocycles. Test oscillator set at 1000 kilocycles and coupled to antenna wire of set. Insert a thin bakelite, celluloid or mica feeler strip between the plates of the variable condensers to determine whether the circuits are properly matched. The action is this—the dielectric constant of the celluloid feeler strip being higher than that of the air it displaces, results in an increase of capacity. Open the variable condenser just enough to indicate two or three points below maximum signal. As the feeler is inserted the meter reading should indicate increasing signal and then decreasing as the feeler is inserted farther. This procedure should be followed on both sections. Should the meter fail to show an increase in signal as the strip is inserted in either section this indicates too great a capacity for that section. This may be corrected by bending the outside rotor plates out at the point where they begin to mesh with the stator.

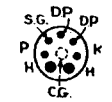
OPERATION No. 4 Aligning 2 gang condenser at 550 kilocycles. Instructions same as for operation 3 except test oscillator and set tuned at 550 kilocycles.



6A7

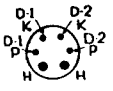


6D6



6B7

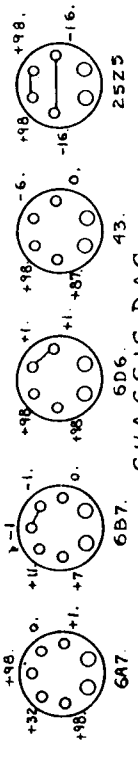
43



2525

Socket Voltages

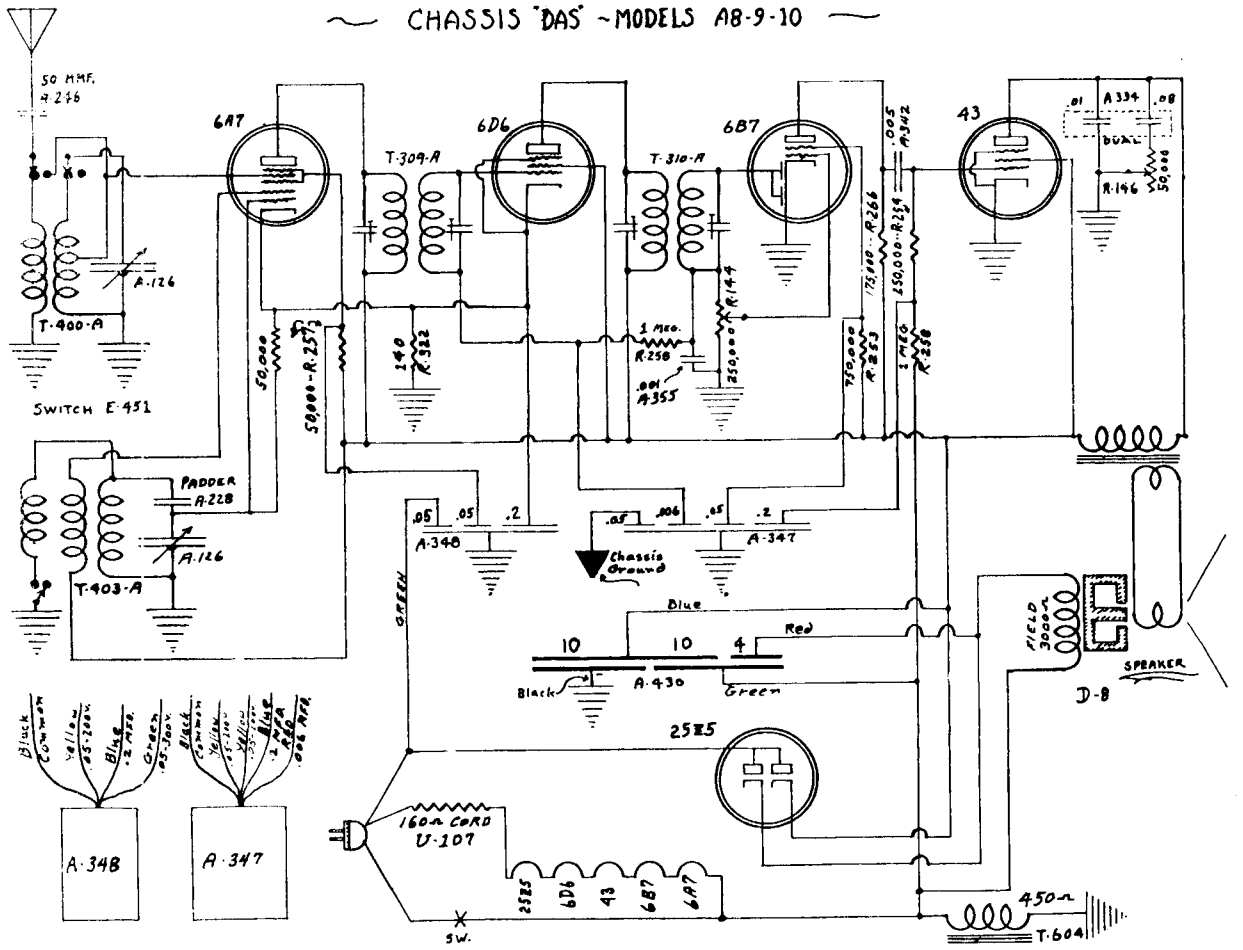
Approximate normal tube voltages measured with a 0-300 volt, 1000 ohm per volt DC voltmeter with set operated on a 115 volt AC line. Volume control in FULL ON position. Measurements made from B negative (condenser frame) to socket prongs.



CHASSIS DAC.
BOTTOM VIEW.

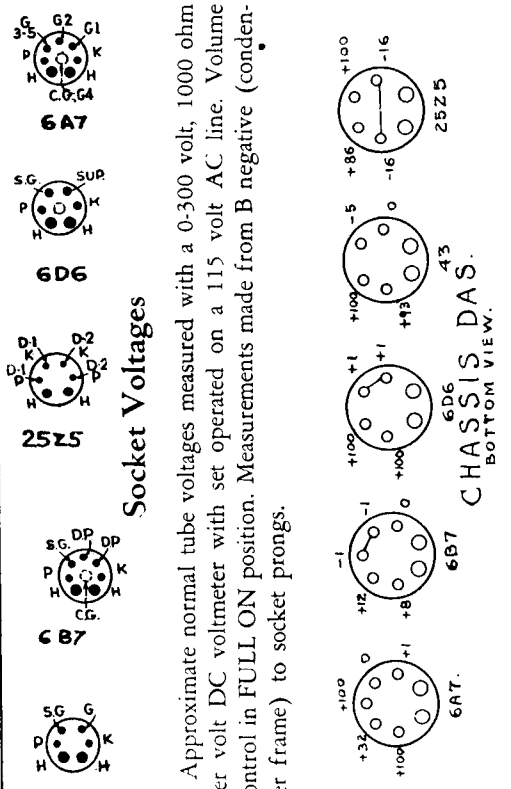
INTERNATIONAL RADIO CORP.

CHASSIS "DAS" - MODELS A8-9-10



Socket Voltages

Approximate normal tube voltages measured with a 0-300 volt, 1000 ohm per volt DC voltmeter with set operated on a 115 volt AC line. Volume control in FULL ON position. Measurements made from B negative (condenser frame) to socket prongs.



OPERATION NO. 1 Adjustment of IF transformers. When adjusting the IF units the oscillator section of the 2 gang variable condenser must be shorted out. This is easily accomplished by inserting a thin strip of metal between the plates. Set the test oscillator to 262½ kilocycles and connect its output to the antenna wire of the set.

OPERATION NO. 2. Adjusting trimmers on 2 gang condenser at 1500 kilocycles. Set the test oscillator to 1500 kilocycles and connect its output to the antenna wire of the set. If the output of the oscillator is too strong connect through a very small fixed condenser or place the output wire of the oscillator near the antenna wire without making any direct connection. Open the variable condenser until maximum signal is indicated by the meter. Then adjust the trimmer on the antenna section of the condenser until maximum signal is indicated on the meter.

OPERATION NO. 3. Aligning 2 gang condenser on 1000 kilocycles. Test oscillator set at 1000 kilocycles and coupled to antenna wire of set. Insert a thin bakelite, celluloid or mica feeler strip between the plates of the variable condensers to determine whether the circuits are properly matched. The action is this—the dielectric constant of the celluloid feeler strip being higher than that of the air it displaces, results in an increase of capacity. Open the variable condenser just enough to indicate two or three points below maximum signal. As the feeler is inserted the meter reading should indicate increasing signal and then decreasing as the feeler is inserted farther. This procedure should be followed on both sections. Should the meter fail to show an increase in signal as the strip is inserted in either section this indicates too great a capacity for that section. This may be corrected by bending the outside rotor plates out at the point where they begin to mesh with the stator.

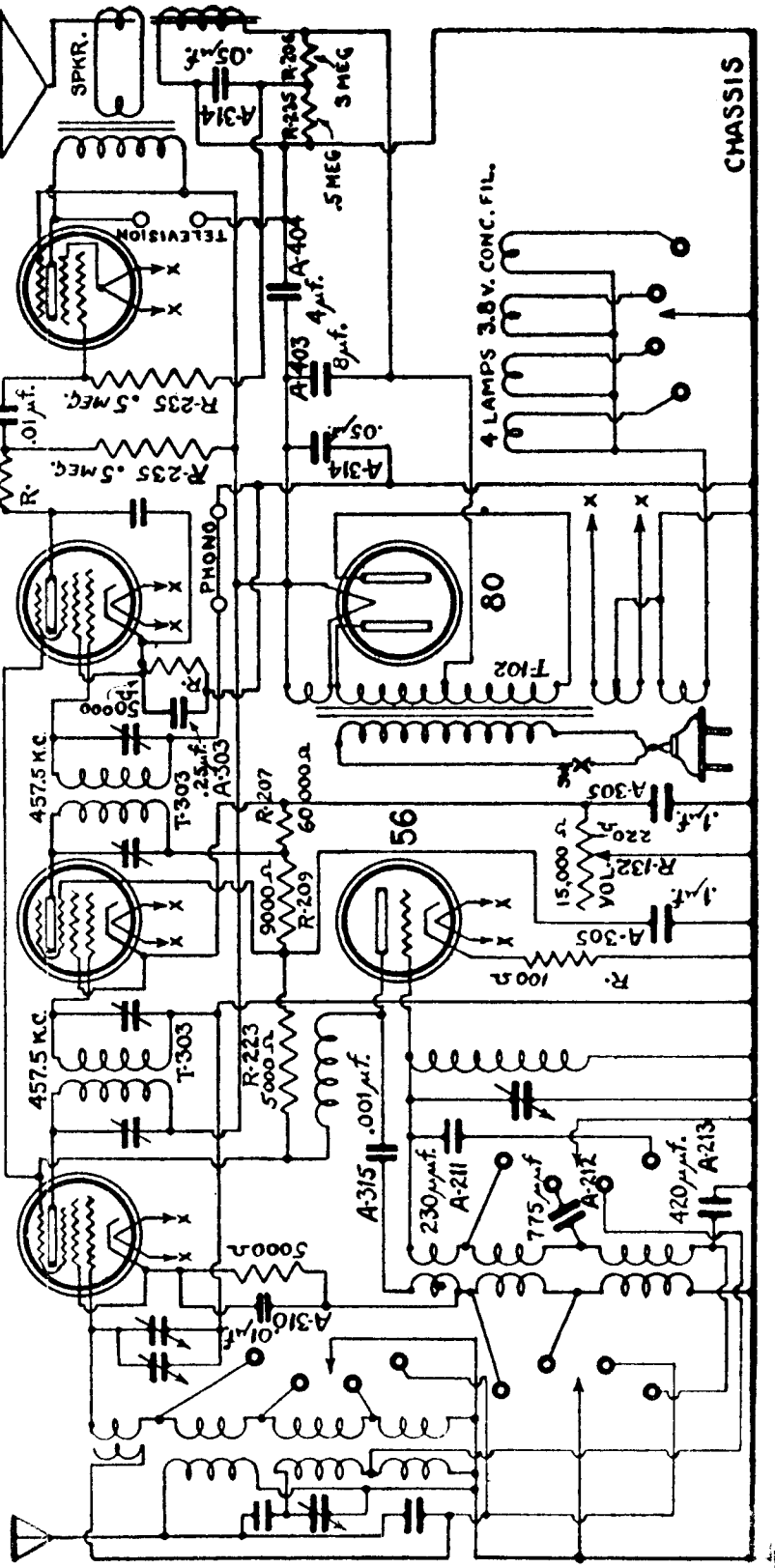
OPERATION NO. 4 Aligning 2 gang condenser at 550 kilocycles.

When properly adjusted for the broadcast band No Additional Adjustments Are Necessary on the Short Wave Band.

INTERNATIONAL RADIO CORP.

MODEL "EX" WAL-TONE

MFRD FOR WALTON RADIO CORP.



The grid of the 47 is biased through such high resistances that only an indication of negative bias can be read with an ordinary meter.

The model "EX" Wal-Tone is made for A. C. current, 50-60 cycle, 110 volts. Also made for 25 cycle or 220 volts at slight additional cost.

57 & 58 — 47

VOLTAGE READINGS:

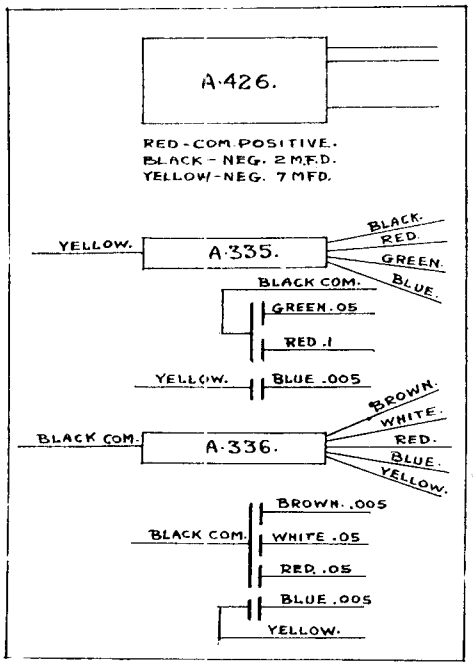
NOTE: Voltages should be measured with volume control all the way "ON" and the range selector in position 3 (broadcast). Use a 250 volt D. C. meter with a resistance of 1000 ohms per volt.

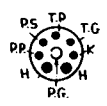
The following are average voltages measured on 118 volt, 60 cycle line. A slight variation is allowable for variation in meters, tubes, and line voltage.

	Plate	Screen	Cathode
47 Tube—ground to	235	245	
57 Tube—ground to	70	40	6
58 Tube—ground to	240	100	3
58 Tube—ground to	240	40	8
56 Tube—ground to	40		0

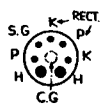
INTERNATIONAL RADIO CORP.

MODEL F-F1-KADETTE JR.





6F7



12A7

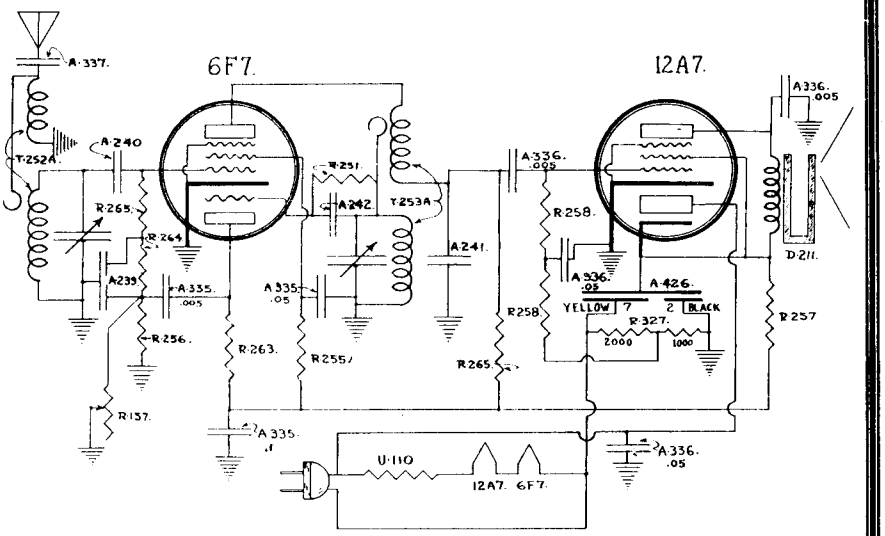
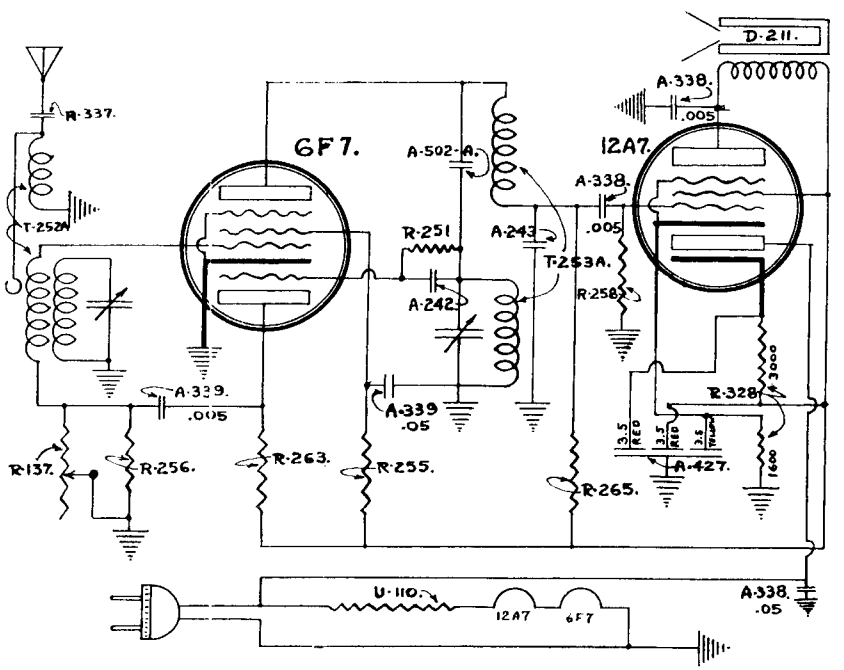


DIAGRAM NO. 1

A-239	dual .00025 mfd.	R-251	½ meg.
A-240	.00025 mfd.	R-255	1¼ meg.
A-241	.0001 mfd.	R-256	2 meg.
A-242	.00025 mfd.	R-257	50 M ohms.
A-335	values on diagram.	R-258	1 meg.
A-336	values on diagram.	R-263	3 meg.
A-337	.001 mfd.	R-265	¼ meg.
A-426	values on diagram.	R-327	2000-1000 ohm.
R-137	2½ meg. vol. cont.		



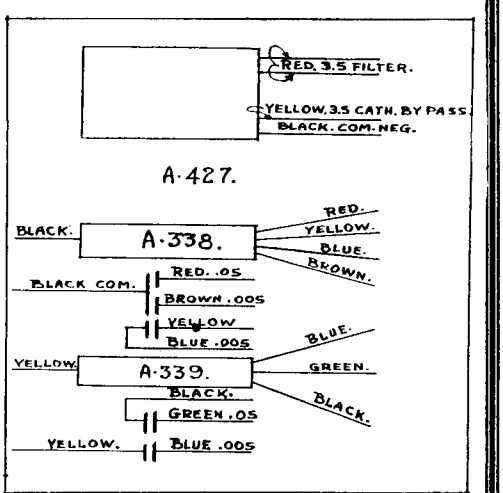
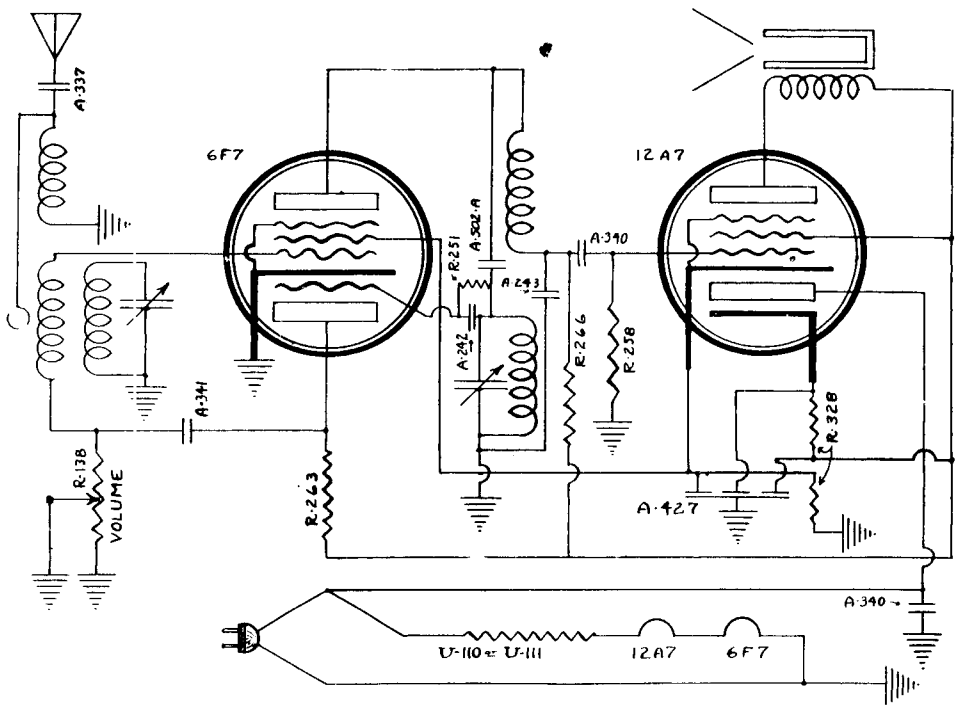


DIAGRAM NO. 2

A-242	.00025 mfd.	R-251	½ meg.
A-243	.0005 mfd.	R-255	1¼ meg.
A-337	.001 mfd.	R-256	2 meg.
A-338	values on diagram.	R-258	1 meg.
A-339	values on diagram.	R-263	3 meg.
A-427	values on diagram.	R-265	¼ meg.
A-502A	18 mmfd. coupling.	R-328	3000-1600 ohm.
R-137	2½ meg. vol. cont.		

INTERNATIONAL RADIO CORP.

MODEL F2 - KADETTE JR.



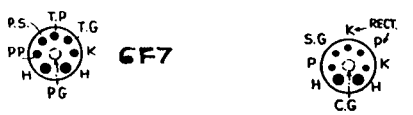


DIAGRAM NO. 3

A-243	.0005 mfd	
*A-340	.005 mfd grid coupling	
	.05 mfd line by pass	
*A-341	.005 mfd	
A-346	.007 mfd	
R-138	1¼ meg.	
R-226	175 M ohms	

All other values same as on diagram 1 and 2

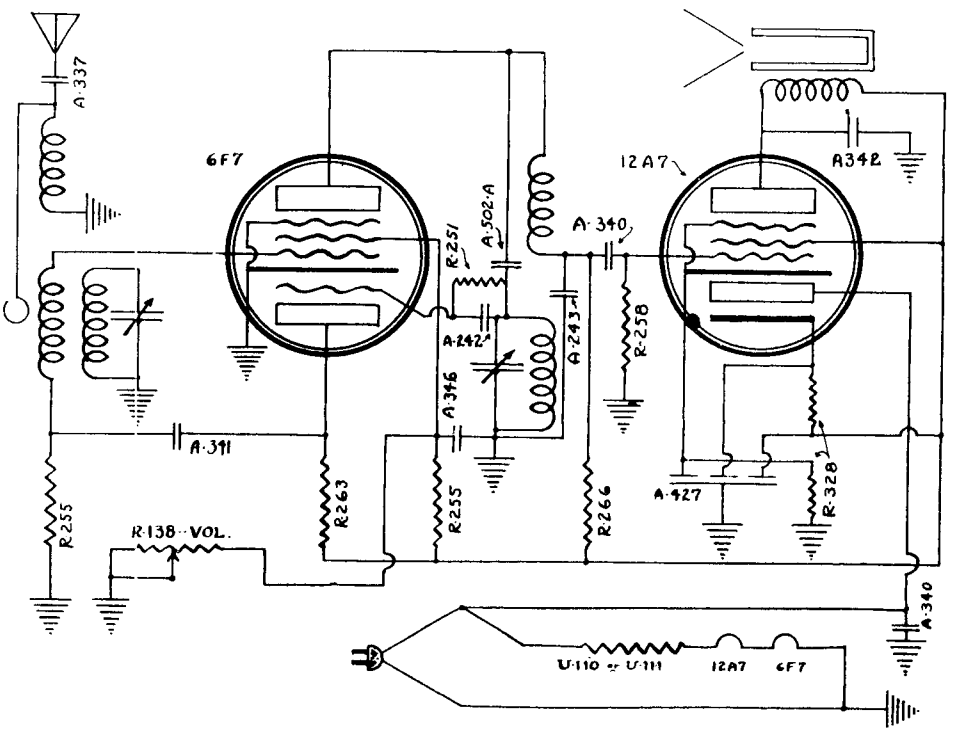


DIAGRAM NO. 4

A-243	.0005 mfd	
*A-340	.005 mfd grid coupling	
	.05 mfd line bypass	
*A-341	.005 mfd	
A-342	.005 mfd	
A-346	.007 mfd	
R-138	1¼ meg.	
R-266	175 M ohms	

All other values same as on diagrams 1 and 2.

Voltage Readings

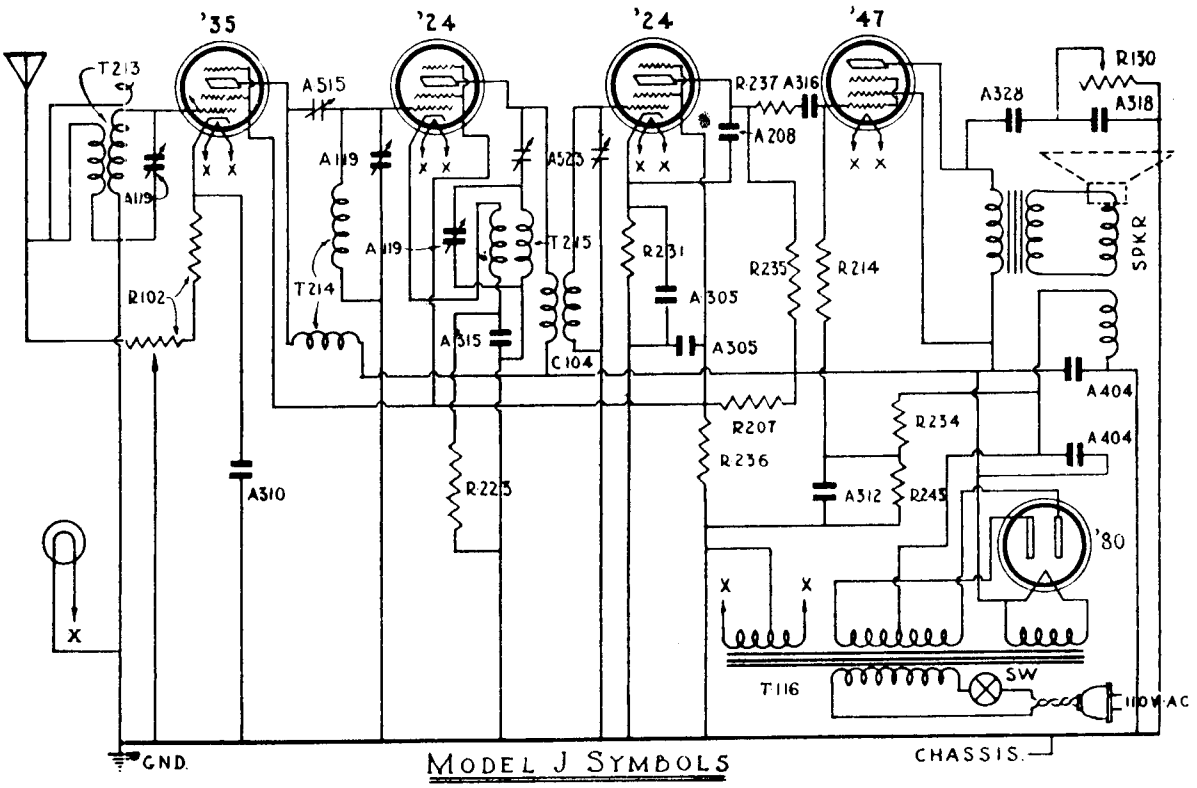
The following voltage readings are approximate when set is operated on a 115 volt AC line with volume control in full on position.

CIRCUITS 3 AND 4

	6F7	12A7
Pentode plate	33	107
Pentode screen	10	115
Triode plate	5	135
Triode grid	0	0
Cathode	0	10
Pentode plate		
Pentode screen		
Rectifier cathode		
Rectifier plate		
Pentode cathode		

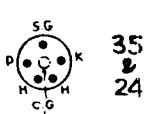
INTERNATIONAL RADIO CORP.

MODEL -J



MODEL J SYMBOLS

A119	3-GANG COND.	A318	.005 MF	R130	TONE CONTROL.	R236	60 M. OHM.
A208	.00015 MF.	A328	.06 MF.	R207	60 M.OHM 1-WATT.	R237	100 M. OHM.
A305	.1 MF	A 404	.4 MF	R214	750 M OHM.	R243	1 MEGOHM
A310	.01 MF	A515	ADJ. COND.	R223	5 M. OHM.	T213	ANT. COIL
A312	.03 MF	A523	I.F. TUNING UNIT.	R231	50 M.OHM.	T214	R.F. COIL.
A315	.001 MF	C104	I.F. COIL	R234	6 MEGOHM.	T215	OSC. COIL.
A316	.003 MF	R102	VOL CONTROL	R235	500 M.OHM.	T116	PWR TRANS.



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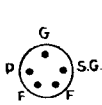
24



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80

I.F. = 175 KC.

The recommended procedure is—first to track the R. F. and detector tuned stages, with the oscillator cut out, allowing the set to operate as a 2-gang TRF job and then, without moving the tuning condenser, replace the oscillator in the circuit and set the oscillator condenser to loudest possible position.

The following instructions call for the use of any ordinary test oscillator which greatly facilitates adjusting the receiver. If no oscillator is available, the set can be adjusted by using signals from broadcast stations having frequencies near those specified in the instructions. However, in using broadcast stations the volume control must be turned back to prevent any tendency of overloading, as too strong a signal from either an oscillator or a station prevents close and accurate setting of the circuits.

It is further assumed that the intermediate frequency transformer is set at 175 KC. This is properly adjusted at the factory and there is no reason for changing this adjustment. CAUTION. Do not adjust the I.F. unless you are sure this adjustment has been changed. If the I. F. trimmers have been disturbed they can easily be adjusted by the following method.

1. Ground the cathode of the detector oscillator tube (center tube in the tube shield).
2. Remove the grid clip and substitute for it one of the leads of the 175 KC oscillator. Connect the other lead from the oscillator to the chassis base.
3. Adjust trimmers to maximum reading on your output meter.

NOTE: If no output meter is had, a 0 to 50 high resistance voltmeter connected from cathode of second detector to ground will work very satisfactorily. Adjustments are then made for maximum deflection.

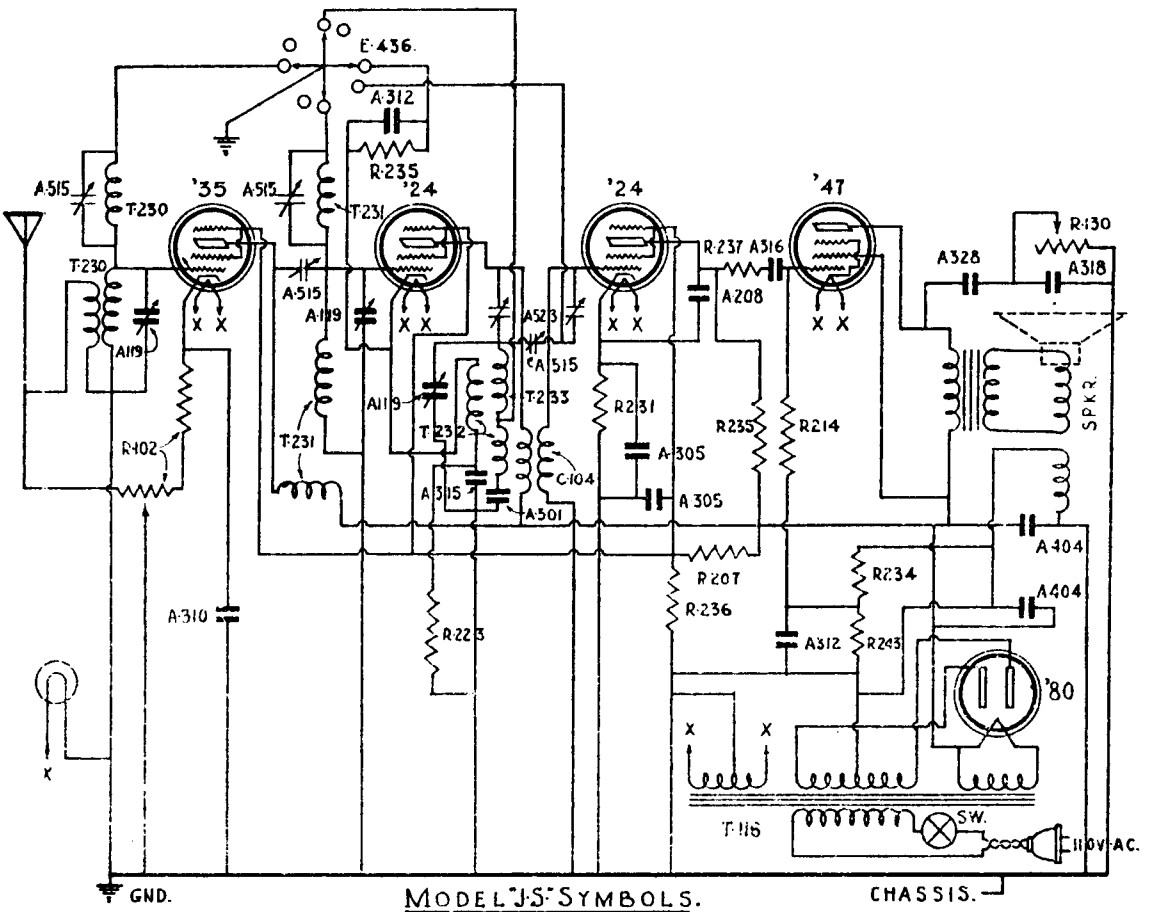
NOTE: Voltages should be measured with volume control all the way "ON" using zero to 250 volt D. C. voltmeter with resistance of 1,000 ohms per volt.

	Plate	Screen	Cathode
Pentode tube —ground to	240	245	None
235 R. F. tube —ground to	245	70	2.5
224 1st. Detector tube —ground to (center tube)	245	70	7
224 2nd. Detector —ground to	75	70	10

The grid of the Pentode is biased through such high resistance that only an indication of negative bias can be read with an ordinary high resistance meter.

INTERNATIONAL RADIO CORP.

MODEL J-S



MODEL J-S SYMBOLS.

A-119	3-GANG COND.	A-318	.005 MF.	R-130	TONE CONTROL.	R-236	60 M. OHM.
A-208	.00015 MF.	A-328	.06 MF.	R-207	60 M.OHM 1-WATT	R-237	100 M. OHM.
A-305	.1 MF.	A-404	.4 MF.	R-214	750 M.OHM.	R-243	1 MEGOHM.
A-310	.01 MF.	A-515	ADJ. COND.	R-223	5 M. OHM.	T-230	ANT. COIL.
A-312	.03 MF.	A523	I.F. TUNING UNIT	R-231	50 M.OHM.	T-231	R.F. COIL.
A-315	.001 MF.	C-104	I.F. COIL.	R-234	6 MEGOHM.	T-232	O SC. COIL.
A-316	.003 MF.	R-102	VOL. CONTROL	R-235	500 M.OHM.	TZ33	S.W. COIL.
						A-302	.03 MF.
						A-501	ADJ. COND.
						R-235	500 OHM.
						E-436	S.W. SWITCH.
						T-116	PWR. TRANS.

Should the set fail to function properly:

1. Examine tubes to be sure they are pushed securely into their sockets.

2. Be sure the three grid clips are attached to the caps of the 235 and 224 tubes.

3. Inspect antenna for grounds at lead in or at chassis.

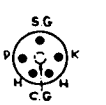
4. Check A. C. plug to be sure there is a good contact in receptacle.

5. Have tubes checked. Most Radio Stores offer this service gratis.

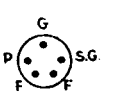
6. DO NOT ADJUST ANY SCREW ADJUSTMENT unless thoroughly familiar with superheterodyne construction.

NOTE: Voltages should be measured with volume control all the way "ON" and the band selector switch at the "long" wave position using zero to 250 volt D. C. voltmeter with resistance of 1,000 ohms per volt.

The grid of the Pentode is biased through such high resistance that only an indication of negative bias can be read with an ordinary high resistance meter.



35 & 24



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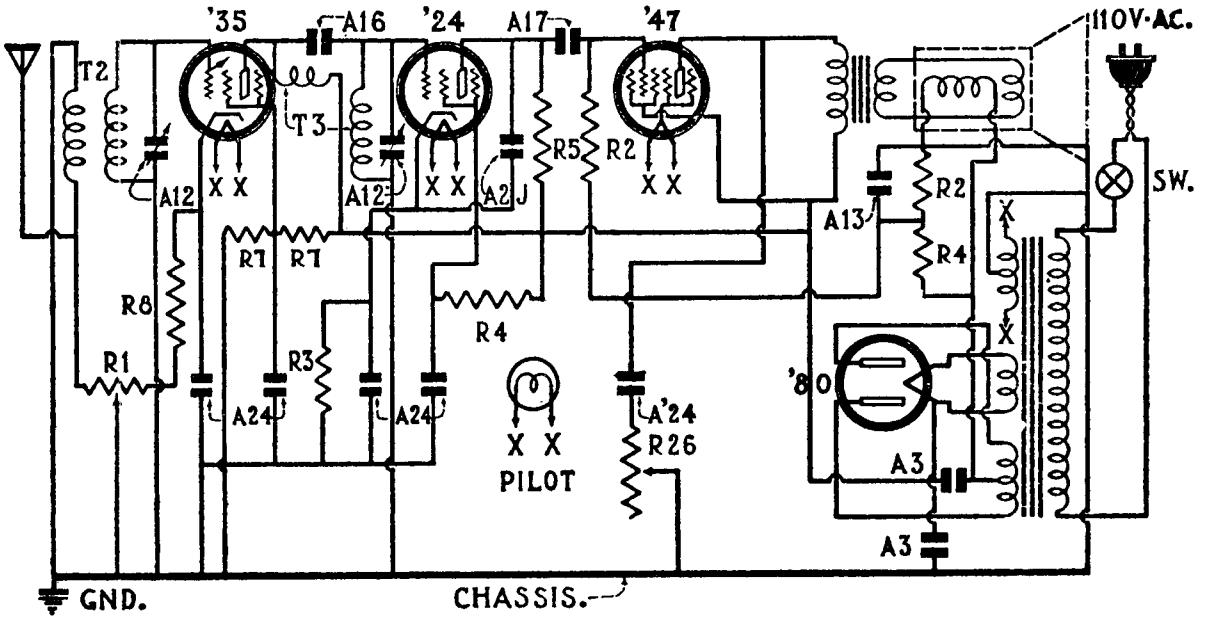
80

Voltage Readings:

	Plate	Screen	Cathode
Pentode tube —ground to	240	245	None
235 R. F. tube —ground to	245	70	2.5
224 1st. Detector tube —ground to (center tube)	245	70	7
224 2nd. Detector —ground to	75	70	10

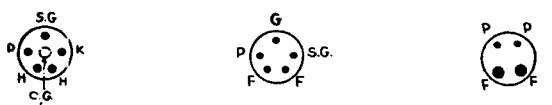
INTERNATIONAL RADIO CORP.

MODELS - K40, M, REGAL



KEY·TO·SYMBOLS.

A12 = 2 GANG VAR.COND.	A17=.006 MF.	R5 =.5 MEGOHM.
A2J =.0001 MF.	A24-A'24=.1MF.-.05 MF.	R7 =60 M.OHM.
A3 = 8 MF.	R1=8020 OHM.	R8 =200 OHM.
A4 = 4 MF.	R2=1 MEGOHM.	R26=10 M.OHM.
A13=.02 MF.	R3=25 M.OHM.	T2 =ANTENNA COIL.
A16=16 M.MF.	R4=6 MEGOHM	T3 =R.F. COIL.



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SELECTIVITY—Trimming Tuning Condenser

If a set lacks selectivity, the trouble is usually too much antenna input for the location. This can often be corrected by removal of the ground wire or connecting ground wire to antenna post, leaving aerial disconnected. If a strong local still interferes—a short inside aerial should be used.

For proper selectivity, be sure the trimmers on the tuning condenser are set so both stages are in perfect resonance. This is very easily done by tuning a weak station and without moving the dial, turn the two adjusting screws on the variable condenser to point of loudest reception—Do not change bending of condenser plates.

VOLTAGES

NOTE—Voltages should be measured with volume control all the way "ON" using a zero to 250 volt D. C. voltmeter with resistance of 1,000 ohms per volt.

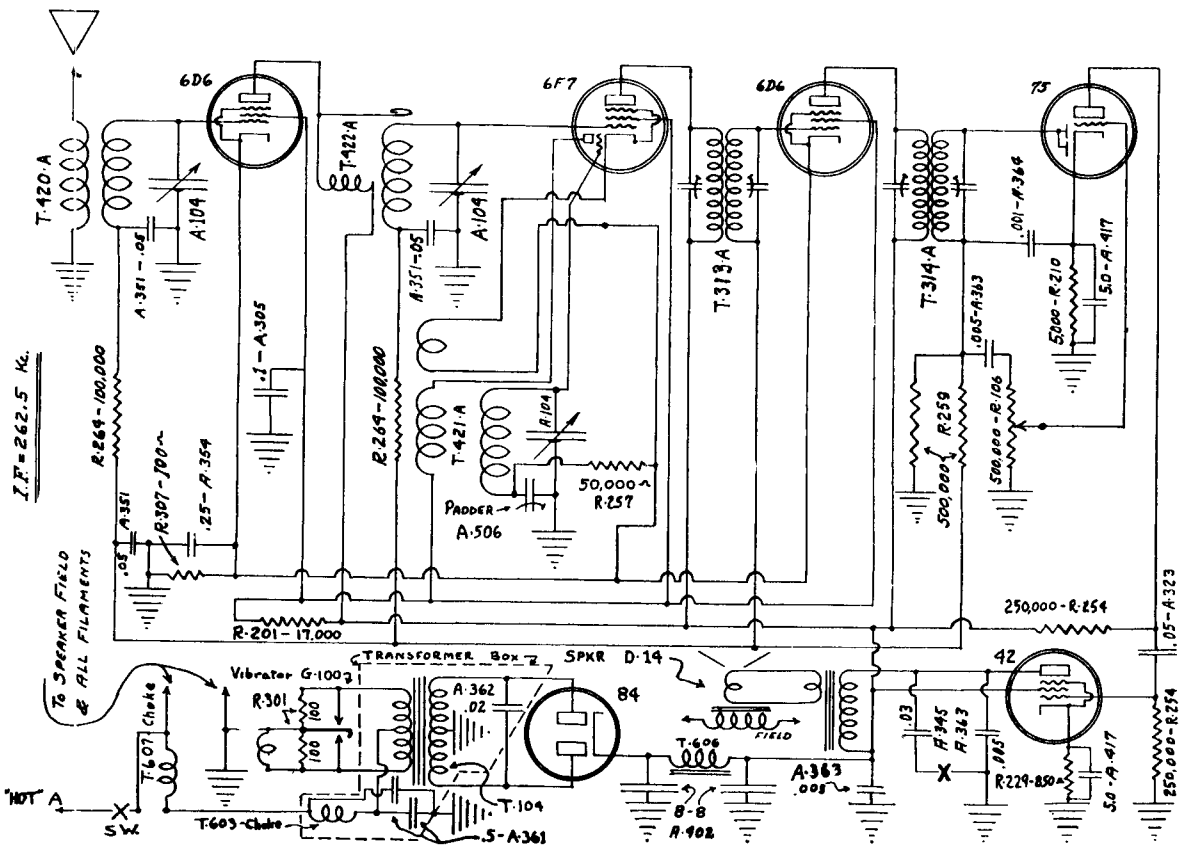
Following are the average voltages taken on 118 volts 60 cycle A. C. line. A slight variation is allowable for variation in meters and line voltage:

	Plate	Screen	Cathode
Detector Tube —ground to	60 V	7 V	3.5 V
1st R. F. Tube —ground to	240 V	82 V	2.0 V
Pentode Tube —ground to	235 V	240 V	None

The grid of the Pentode is bias through such high resistance that only an indication of negative bias can be read with an ordinary high resistance meter.

INTERNATIONAL RADIO CORP.

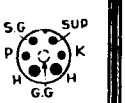
MODEL K60 AUTO SET



Balancing and Aligning

Each automobile radio is carefully balanced on accurate oscillators before leaving the factory. If it is necessary to rebalance because of part changes or other causes a good test oscillator capable of delivering modulated signals at 262½, 1500 and 600 Kc. will be needed. The customary audio out-put meter may be used IF the out-put of the test oscillator is weak enough to get below the A.V.C. action. Otherwise a microammeter will be needed to measure the A.V.C. voltage developed. It should be connected from ground to the junction of two 100M resistors and one condenser in the center bottom of the chassis.

To balance the I.F. circuits, attach the antenna wire to the test oscillator. Short out the oscillator section of the tuning condenser in the radio by inserting a thin piece of metal between the plates. Set the test oscillator to 262½ Kc. and adjust the trimmers on the I.F. transformers for maximum output. Go over all four adjustments at least twice for accuracy.



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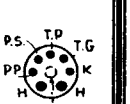

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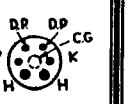

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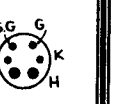

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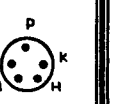

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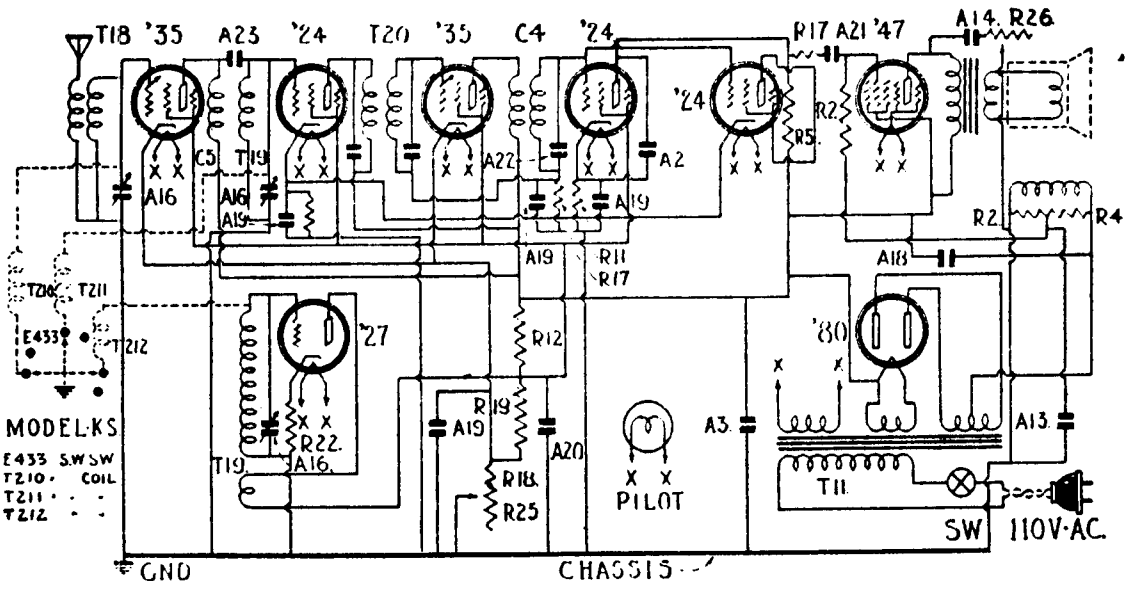
POSITION	TUBE	Ef	Ek	E_{g_1}	E_{g_2}	E_{g_3}	Ep
R. F. Amplifier	6D6	5.6	2	*	2	75	185
1st Det.-Osc.	6F7	5.6	3	Det. * Osc. —1	3	75	Det. 185 Osc. 75
I.F. Amplifier	6D6	5.6	2	*	2	75	185
2nd Det.-A.V.C.	75	5.6	2	0	0	—	75
Power Amp.	42	5.6	15	0	—	185	175
Rectifier	84	5.6	185	—	—	—	—

f—Filament; k—Cathode; g_1—Control Grid; g_2—Suppressor Grid; g_3—Screen Grid; p—Plate; *—Depends on applied signal strength.

INTERNATIONAL RADIO CORP.

MODEL K-S



MODEL "K" KEY TO SYMBOLS

A2 - .0001 MF
A3 - .8MF
A13 - .02MF
A14 - .05MF
A16 - 3 GANG SUPER COND.
A18 - 6MF
A19 - 3-.1MF 1-2MF
A20 - 4MF
A21 - .003MF
A22 - 40-80 MMF
A23 - .00005MF
C4 - TWIN CHOKE
C5 - R.F. CHOKE
R2 - 1MEGOHM
R4 - .6MEGOHM
R5 - 500M.OHM.
R11 - 50M.OHM
R12 - 1.2M.OHM
R17 - 100M.OHM
R18 - 150 OHM
R19 - 10M.OHM
R22 - 1250 OHM
R25 - .8M.OHM.
R26 - 10M.OHM.
T11 - POWER TRANSF'R
T18 - ANTENNA COIL
T19 - TRANSLATOR COIL
T20 - I.F. TRANSFORMER.

The Model "K-S" Receiver is designed for reception of broadcast stations from 1500 to 550 kilocycles and short wave stations from 4000 to 1500 kilocycles.

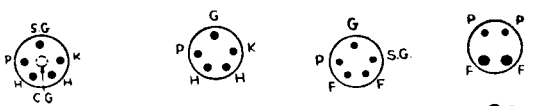
The small knob directly below the tuning knob controls the band selection switch. For broadcast reception this switch should be turned to the right; for the reception of short wave stations to the left.

The set is turned on by turning the lower right-hand knob to the right.

To increase volume continue rotation of lower right-hand knob to right. The automatic volume control incorporated in the circuit limits the output to a certain degree and prevents blasting on local stations. This may cause a condition where a powerful local station may have only fair volume with the control full on, but sound considerably better with equal volume with the volume control turned back to suitable position.

The knob at the lower left is the tone control. For greatest bass response, turn to left. For clearest reception of high notes, turn to right. Adjust to suit.

To turn set off, turn lower right-hand knob to extreme left.

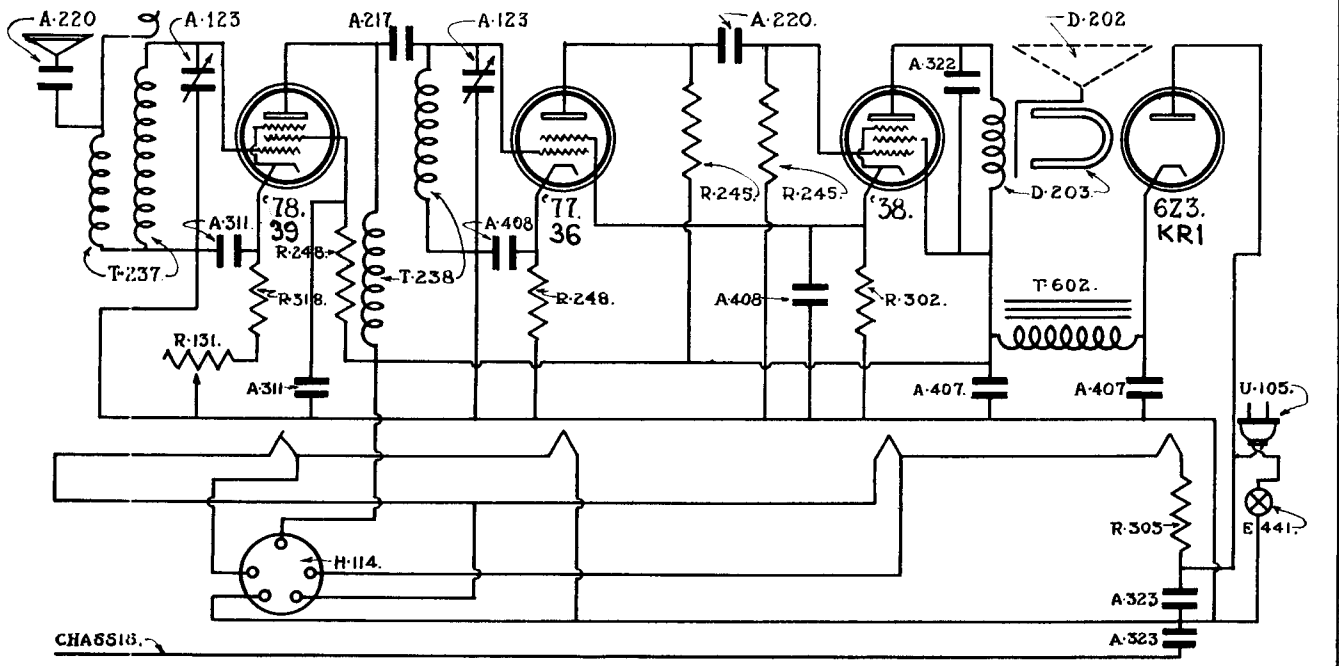


Test Voltages: Measured with volume control on full position measured with D. C. voltmeter having at least 1000 ohms per volt. Line voltage 115.

	Ground to	Plate	Screen	Cathode
'35 R. F. Tube		250	75	3
'27 Oscillator Tube		75	—	12
'24 1st. Detector Tube		250	75	9
'35 I. F. Tube		250	75	3
'24 Automatic Volume Control Tube		—	—	9
'24 2nd. Detector Tube		85	75	7
'47 Audio Amplifier Tube		230	250	—

INTERNATIONAL RADIO CORP.

MODEL P



MODEL "P" SYMBOLS FOR SETS BEARING SERIAL NUMBERS 100,001 AND OVER

A-123 2-GANG VARIABLE CONDENSER
A-217 16 MMFD WIRE WOUND - - -
A-220 .002 MFD MICA CONDENSER -
A-311 .01 MFD BYPASS CONDENSER -
A-322 .006 MFD CONDENSER - - - -
A-323 .05 MFD BYPASS CONDENSER -
A-407 FILTER CONDENSER - - - -

A-408 DUAL 5 MFD BYPASS CONDENSER
D-202 SPEAKER CONE - - - - - - -
D-203 SPEAKER UNIT - - - - - - -
E-441 POWER SWITCH - - - - - - -
H-114 AUTO PLUG - - - - - - - -
R-131 VOLUME CONTROL - - - - - -
R-245 2 MEG. CARBON RESISTOR - - -

R-248 50M OHM CARBON RESISTOR - -
R-302 1500 OHM WIRE WOUND RESISTOR
R-303 310 OHM WIRE WOUND RESISTOR
R-318 150 OHM WIRE WOUND RESISTOR
T-237 ANTENNA COIL ASSEMBLY - - -
T-238 R. F. COIL ASSEMBLY - - - -
T-602 FILTER CHOKE - - - - - - -

77 & 78

36, 39 & 38 →

← 6Z3 & KR1

Oscillation Control

The circuit arrangement is such that oscillation will occur over a portion of the tuning range to provide the greatest possible selectivity and sensitivity. The amount of regeneration or oscillation can be controlled by proper placing of the short wire attached to the trimmer adjacent to the Antenna Coil on the variable condenser.

By moving this wire closer to the coil more oscillation will occur. If greater stability is desired the wire should be moved away from the coil. This can be best done by removing the set from the cabinet, although it is possible to reach this wire with a small tool through the antenna compartment at the rear of the cabinet.

Selectivity

If the set lacks selectivity, the trouble is usually due to the use of too long an antenna and by shortening the length of the pick-up wire the selectivity will be materially improved. Near powerful local stations it is often necessary to use less than ten feet of antenna to maintain good selectivity.

For proper selectivity, the trimmers on the tuning condenser must be set so that both stages are in perfect resonance. This is very easily done by tuning a weak station and adjusting the two trimmers on the top of the variable condenser to the point of loudest reception.

Sensitivity

The characteristics of the tubes used are of great importance. A variation in tube characteristics will result in a variation in the sensitivity of the set. The most critical tube in this respect is the No. 36 tube. A weak set can usually be corrected by replacing the No. 36 tube with one selected for high mutual conductance.

Voltages read between ground (frame of variable condenser) and:

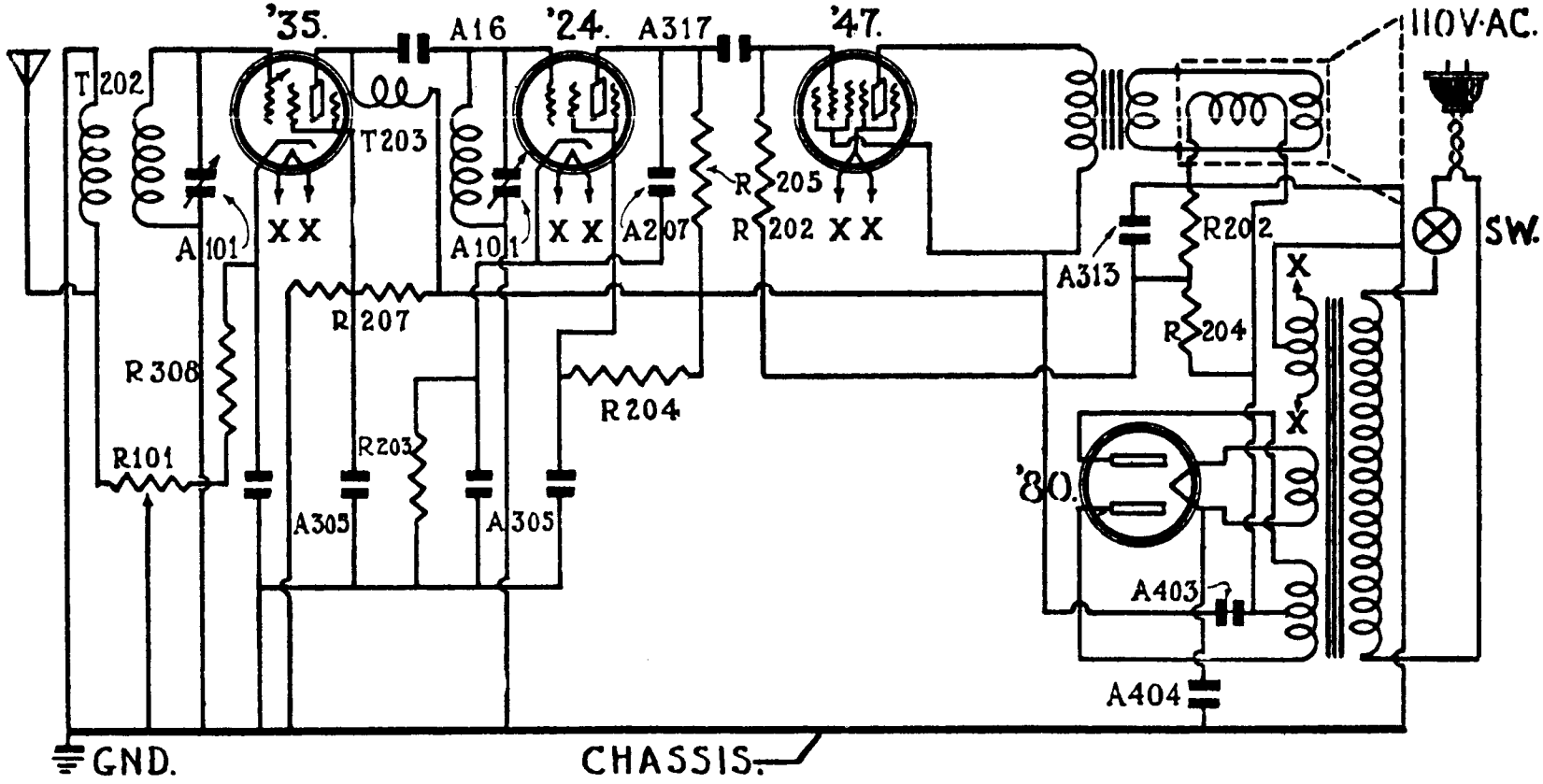
	Plate	Screen	Cathode
39 Tube	114 V.	114 V.	2 V.
36 Tube	6 V.	11 V.	3 V.
38 Tube	107 V.	114 V.	11 V.
KR-1 Tube	—	—	125 V.

Variations in line voltage, tubes, etc., will affect the above readings.

Any extreme variations in the above voltage readings will indicate a defective part or tube in the particular circuit in which the reading was taken.

INTERNATIONAL RADIO CORP.

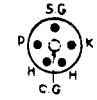
MODEL-T



Voltages should be measured with volume control all the way "ON" using a 250 volt D. C. voltmeter with resistance of 1,000 ohms per volt.

		Plate	Screen	Cathode
Detector tube	—ground to	80 V	80 V	7 V
1st R. F. tube	—ground to	240 V	80 V	2.0 V
Pentode tube	—ground to	235 V	240 V	None

The grid of the Pentode is biased through such high resistance that only an indication of negative bias can be read with an ordinary high resistance meter.



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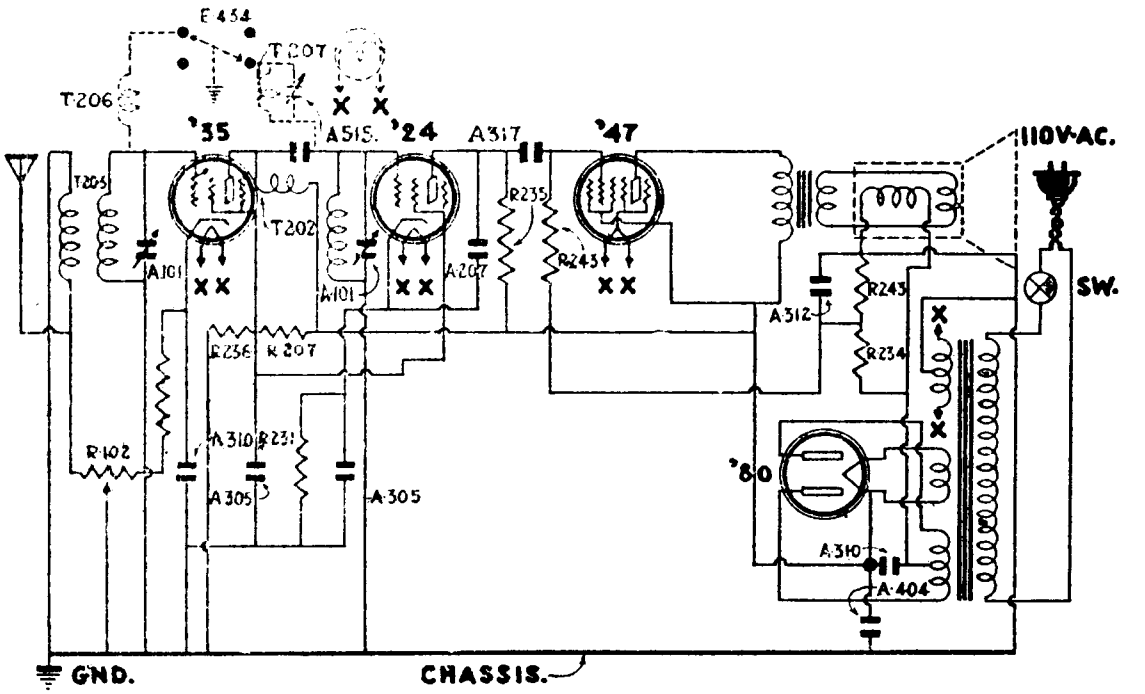
80

OSCILLATION CONTROL:

The degree of regeneration or tendency to oscillate can be readily controlled by the position of the red wire found on top of the chassis between the speaker and the tuning condenser. Should the set oscillate too readily it may be made more stable by moving this wire closer to the speaker. Should the set be too stable, moving the wire closer to the tuning condenser will produce a tendency to oscillate increasing the gain.

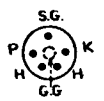
INTERNATIONAL RADIO CORP.

MODEL T-S

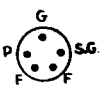


MODEL T-S.

A101. 2-GANG VAR. COND.	R243. 1 MEGOHM.	A515. ADJ. COND.
A207. .0001 MF.	R231. 50 M.OHM.	E434. SHORT WAVE SWITCH.
A310. .01 MF.	R234. 6 MEGOHM.	T206. S.W. ANT. COIL.
A404. .1 MF.	R235. .5 MEGOHM.	T207. S.W. RF. COIL.
A312. .03 MF.	R236. 60 M.OHM.	
A317. .006 MF.	R207. 60 M.OHM.	
A305. .1 MF.	T202. RF COIL.	
R102. 8020 OHM.	T203. ANTENNA COIL.	



35 & 24



47

80

OSCILLATION CONTROL:

The degree of regeneration or tendency to oscillate can be readily controlled by the position of the red wire found on top of the chassis between the speaker and the tuning condenser. Should the set osciallate too readily it may be made more stable by moving this wire closer to the speaker. Should the set be too stable, moving this wire closer to the tuning condenser will produce a tendency to oscillate increasing the gain.

SELECTIVITY:

If a set lacks selectivity, the trouble is usually too much antenna. This can often be corrected by removal of the ground wire or connecting ground wire to antenna post, leaving antenna disconnected. If a strong local still interferes, a short aerial should be used.

VOLTAGE READINGS:

Voltages should be measured with volume control all the way "ON" using a 250 volt D. C. voltmeter with resistance of 1,000 ohms per volt.

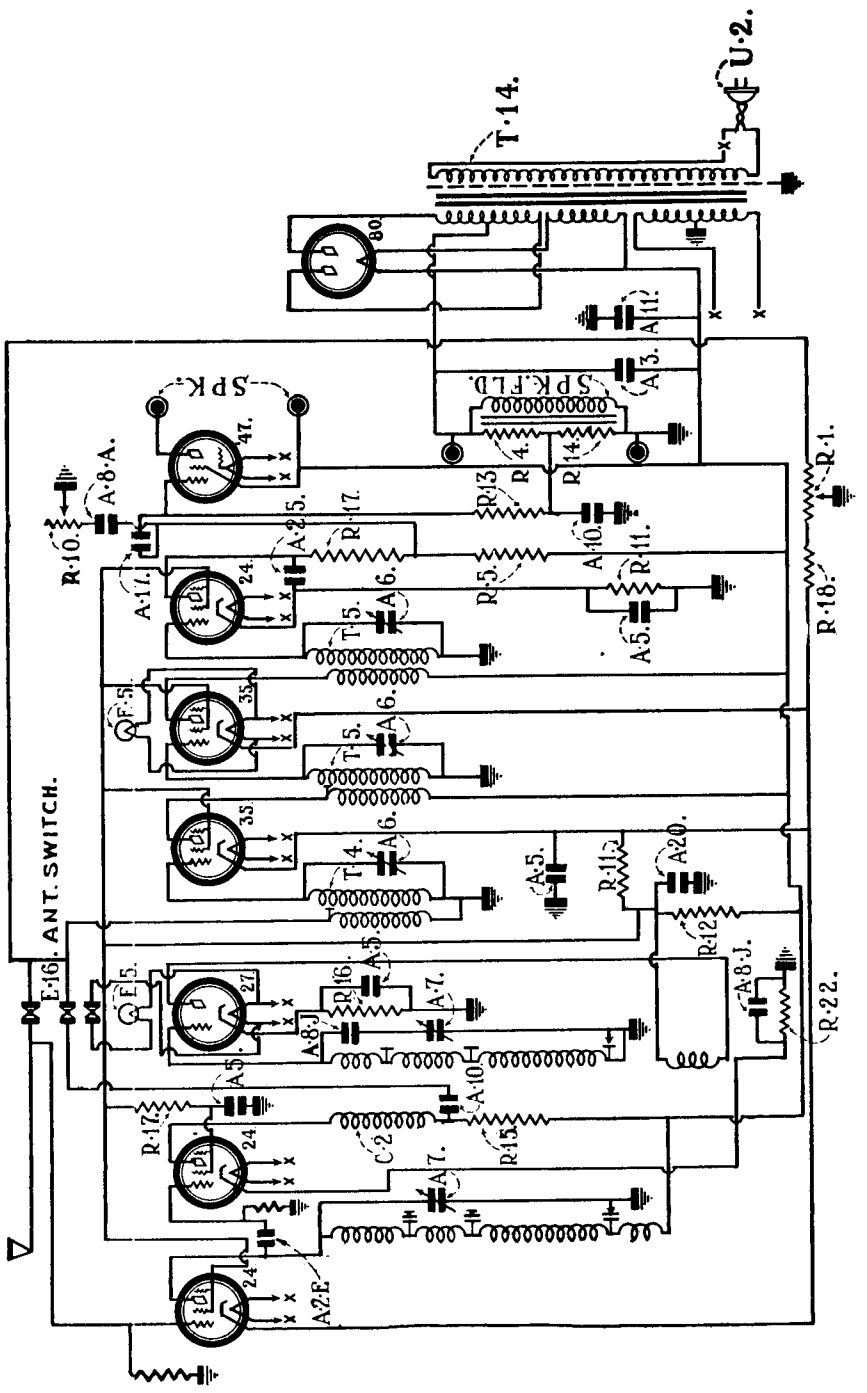
The following are the average voltages taken on 110 volt 60 cycle A. C. line. A slight variation is allowable for variation in meters and line voltages:

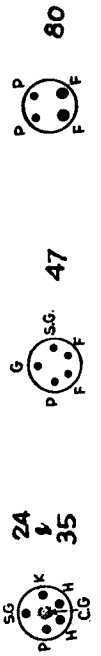
	Plate	Screen	Cathode
Detector tube —ground to	80 V	80 V	7 V
1st R. F. tube —ground to	240 V	80 V	2.0 V
Pentode tube —ground to	235 V	240 V	None

The grid of the Pentode is biased through such high resistance that only an indication of negative bias can be read with an ordinary high resistance meter.

INTERNATIONAL RADIO CORP.

MODEL ALL-WAVE DUO





KEY-TO-SYMBOLS.

A2E-.0001MF. A8J-.002MF. R11-50M.OHM. R17-100M.OHM.
A5 - .8MF. C2 - R.F.CHOKE. R12-12M.OHM. R18-150 OHM.
A10-.01MF. C6 - R.F.CHOKE. R13-15 MEGOHM. R22-1250 OHM.
A6 - 3 GANG CC. COND. A17-.006MF. R14-750M.OHM. T14-ANTENNACOIL
A7 - 2 " " A20-.4MF. R4 - 5MEGOHM. T5 - R.F.COIL.
A8A-.002MF. A25-.0001MF. R10-250M.OHM. R16-2000 OHM. T14-POWER TRANS.

Trimmer Adjustments

In checking an All Wave Duo—first check the setting of the resonance of the broadcast stages by adjusting the trimmers on the three-gang condenser. The trimmers on the two-gang short wave tuning condenser are handled in exactly the same manner. Tune in a weak short wave signal on the lowest Band No. 1 and bring the tuned stages into resonance by turning the trimmer on the rear condenser—following the signal along by moving the dial as you turn the screw. Set at loudest and clearest point.

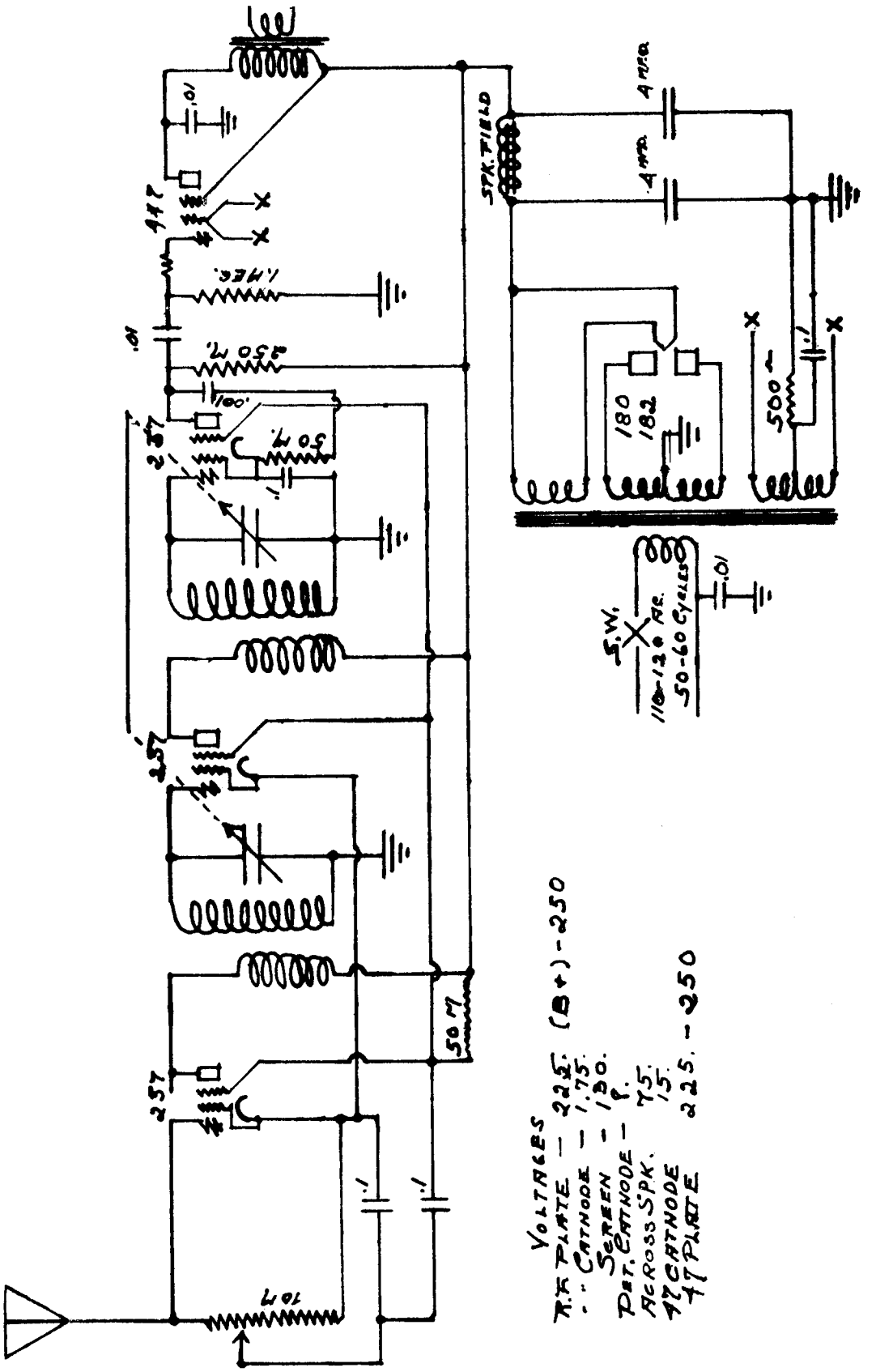
SERVICING THE ALL WAVE DUO

Although a combination long and short wave set is more complicated than a broadcast receiver, it is no more difficult to adjust and repair.

The following circuit gives all values used in the circuit and may be helpful in making any replacements of resistors or condensers.

JACKSON RADIO & TEL. CO.

MODELS LK 447, SF 547, 401A, 504B, J 104, J 105



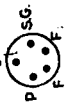
VOLTAGES

R.F. PLATE	225. (B+) - 250
" CATHODE	1.75.
SCREEN	150.
DET. CATHODE	1.
ACROSS SPK.	75.
1ST CATHODE	15.
1ST PLATE	225. - 250

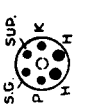
Trouble Shooting Hints

The usual trouble with this set is a loud high pitched whistle caused by oscillation of the 47 tube. If a new tube does not remove the noise, reduce the screen voltage.

180-182



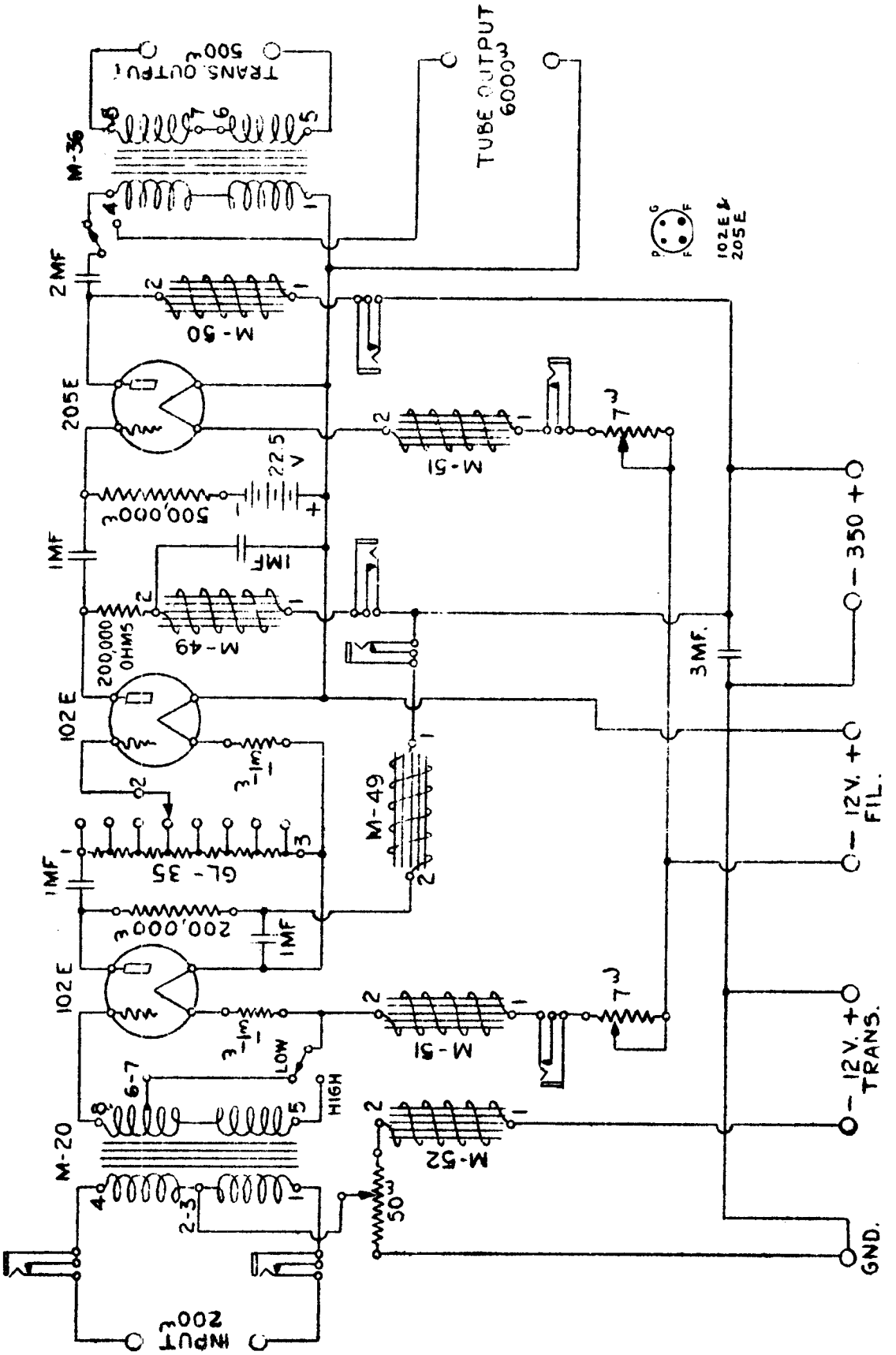
47



57

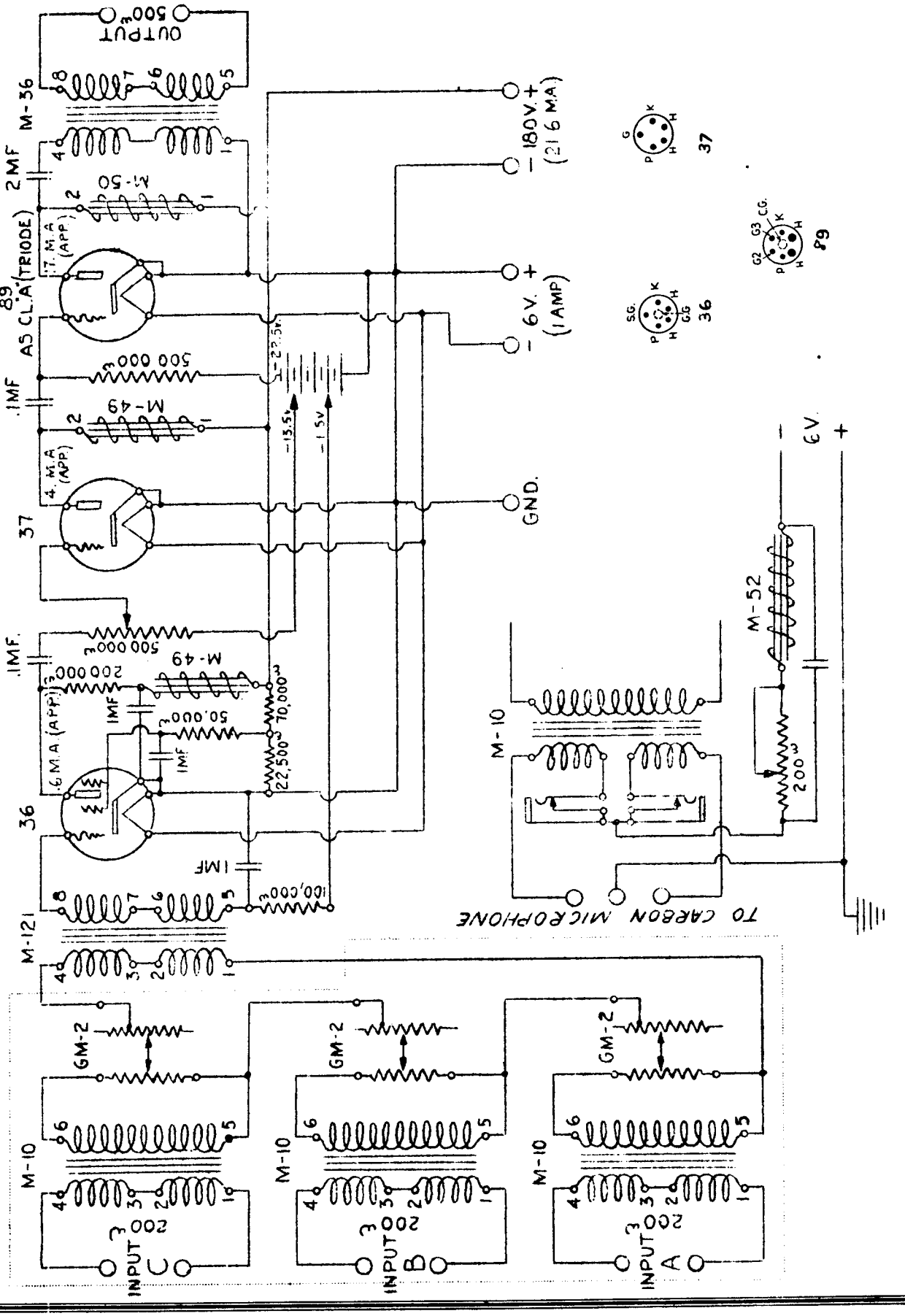
JENKINS & ADAIR, Inc.

TYPE "AM" AMPLIFYING PANEL



JENKINS & ADAIR, Inc.

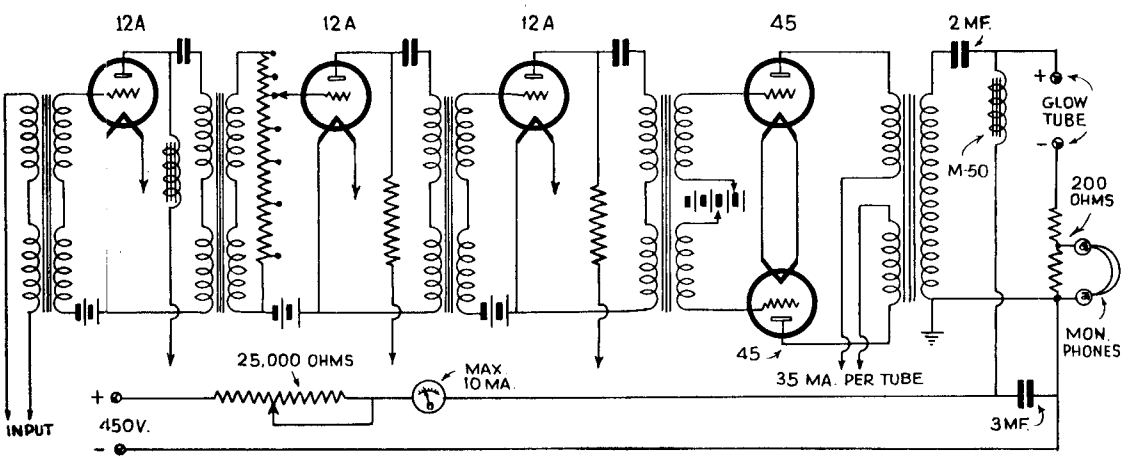
TYPE S-259



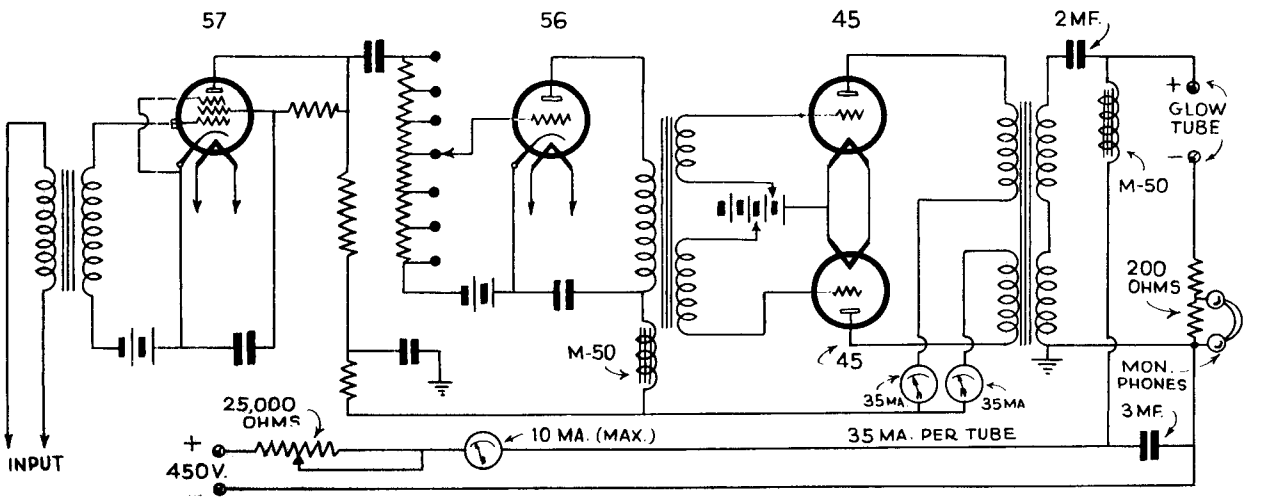
JENKINS & ADAIR, Inc.

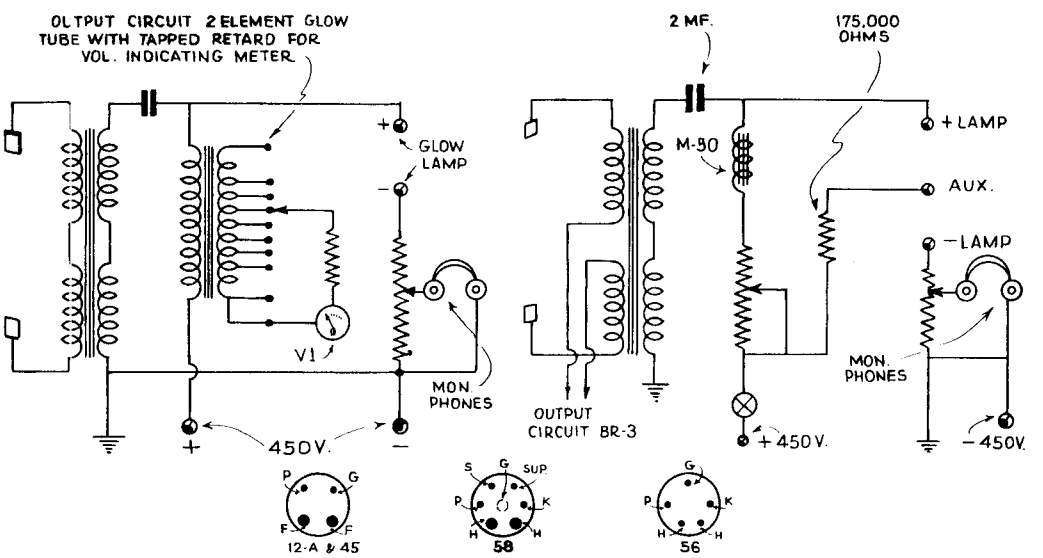
TYPE 3 ELP PORTABLE FILM RECORD AMPLIFIER

~ TYPE 3 ELP PORTABLE FILM RECORDING AMPLIFIER ~



TYPE 2 P PORTABLE FILM RECORDING AMPLIFIER

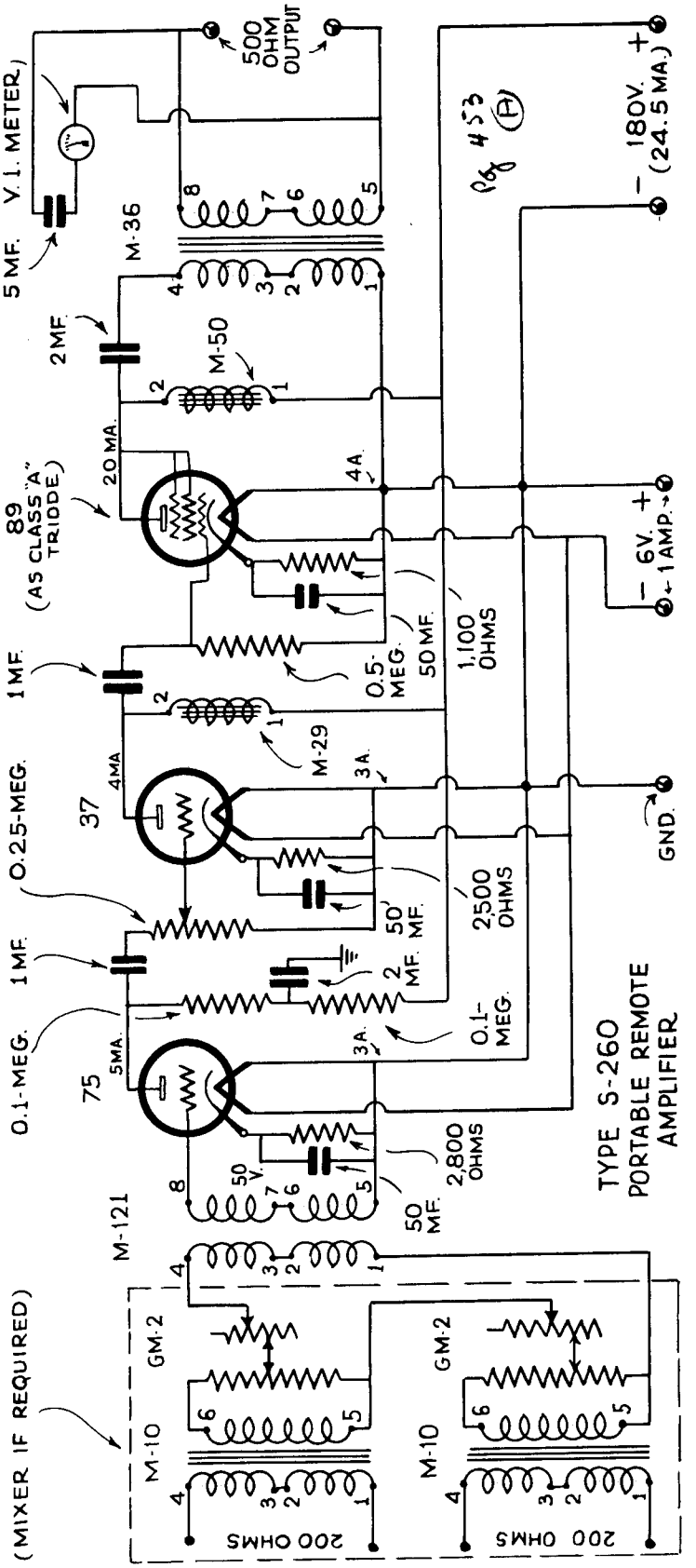


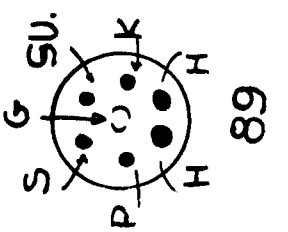


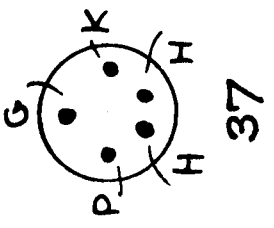
JENKINS & ADAIR, Inc.

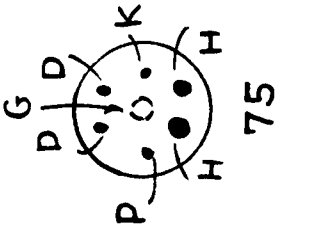
PORTABLE TYPE REMOTE AMPLIFIER

PORTABLE TYPE REMOTE AMPLIFIER



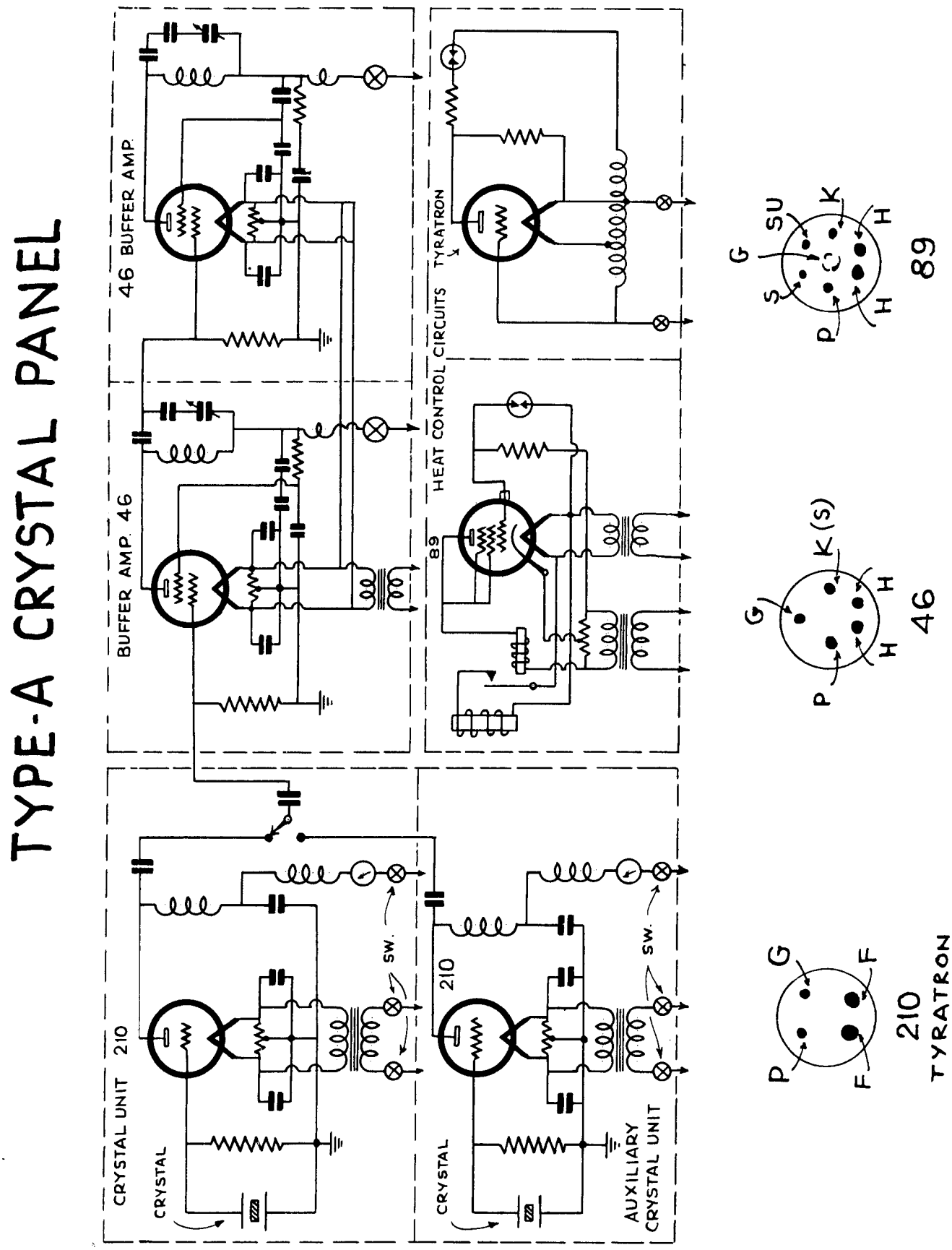






JENKINS & ADAIR, Inc.

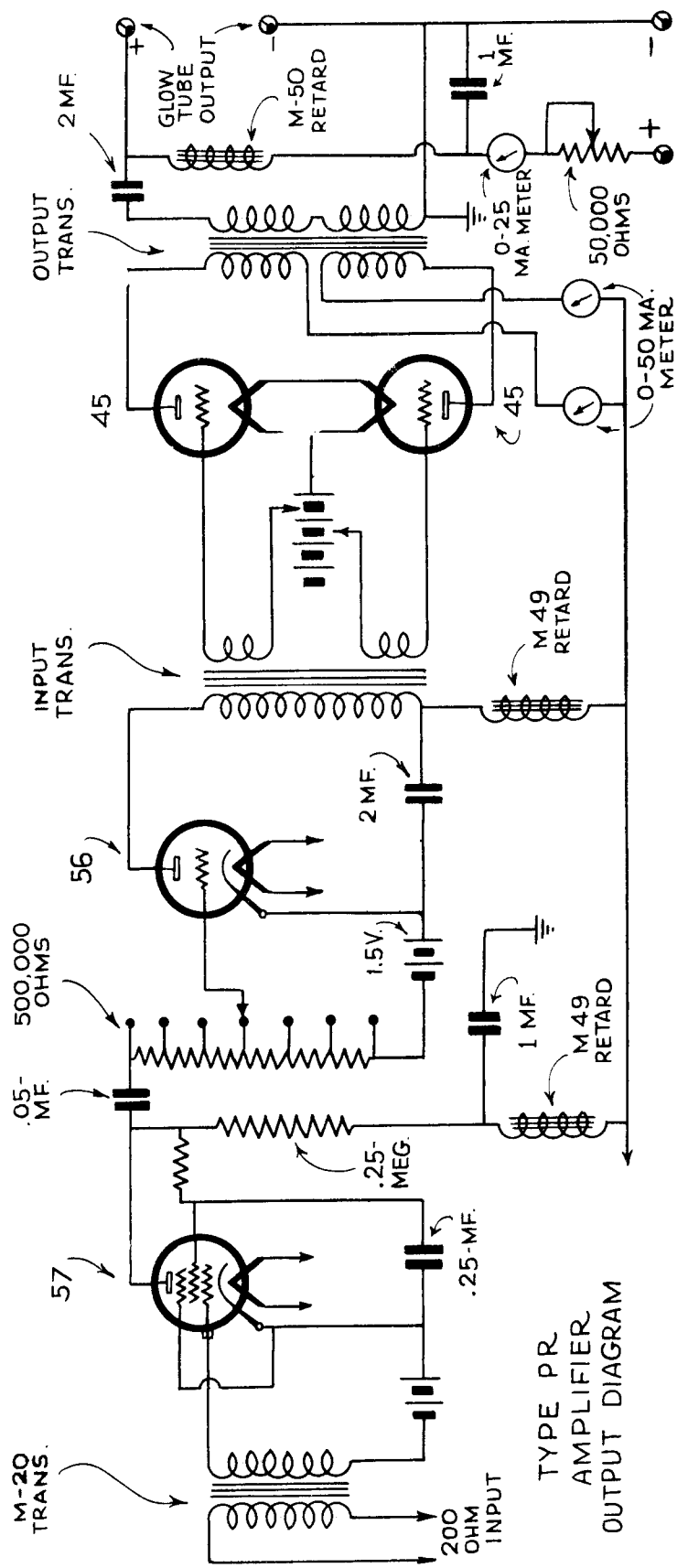
TYPE A CRYSTAL PANEL



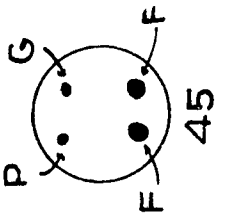
TYPE P. P. AMPLIFIER

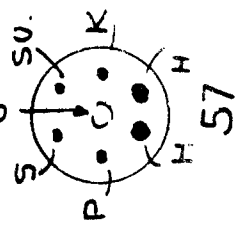
JENKINS & ADAIR, Inc.

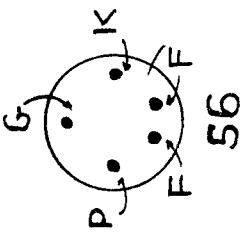
TYPE P. R. AMPLIFIER



TYPE PR AMPLIFIER OUTPUT DIAGRAM

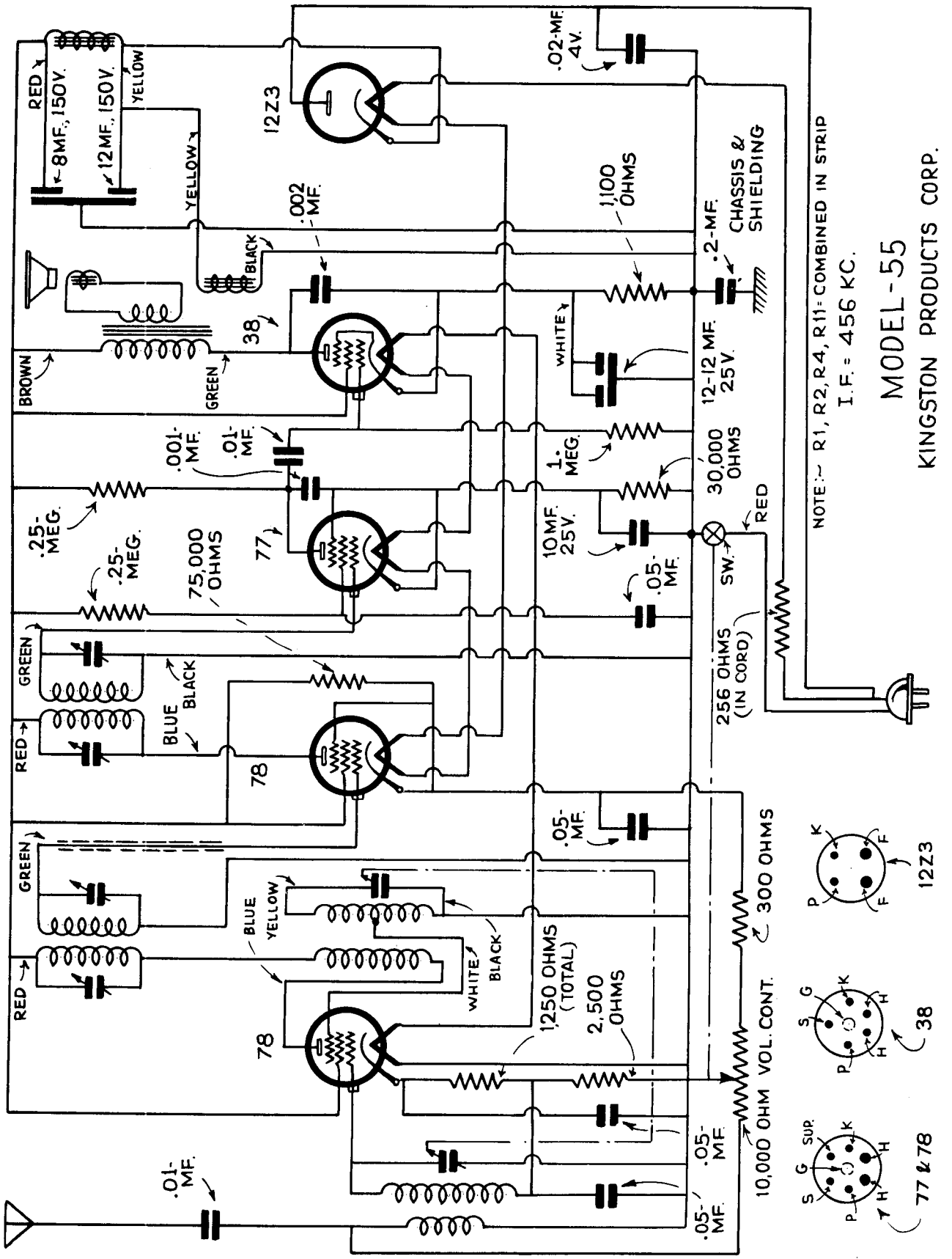






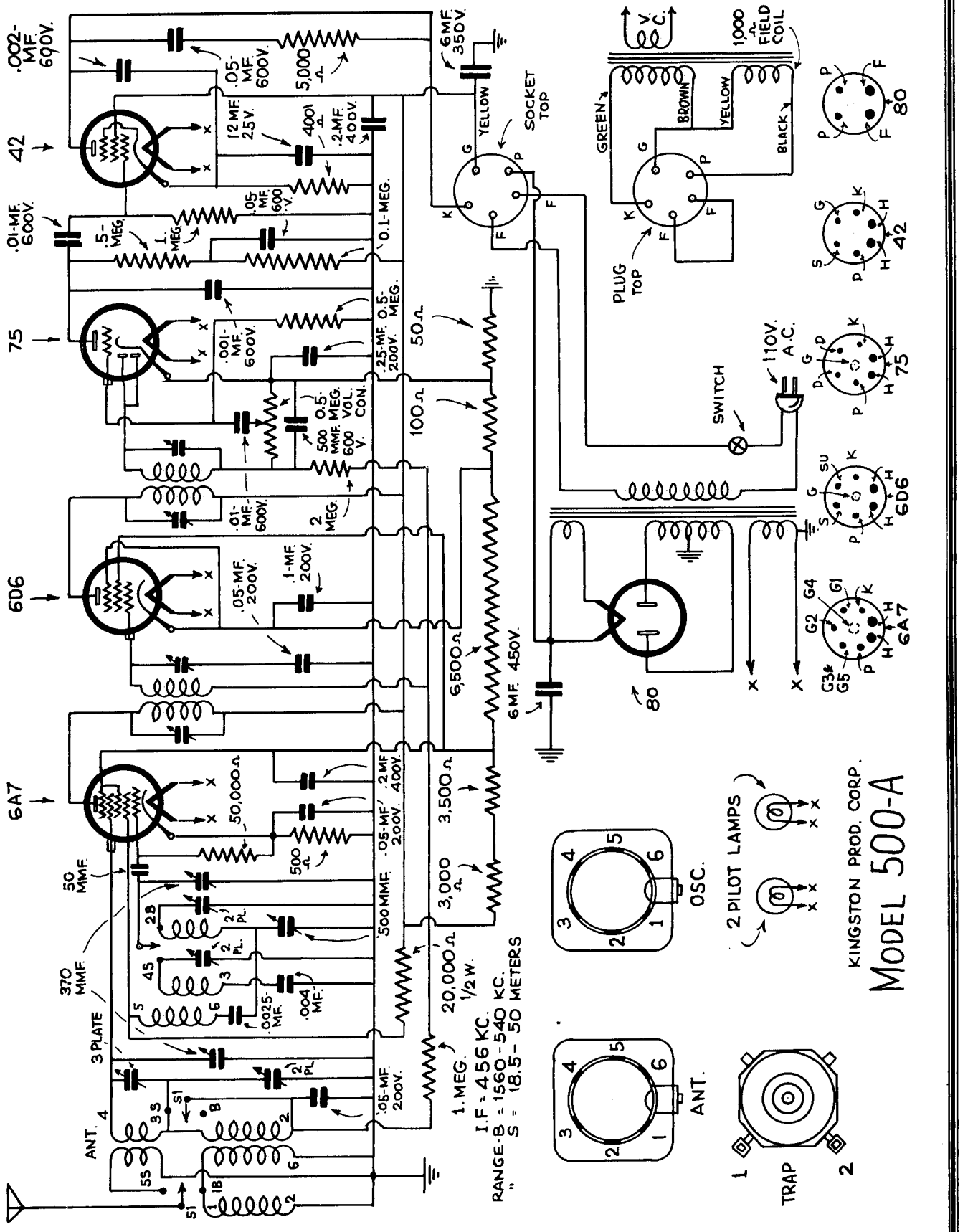
KINGSTON RADIO CO., INC.

MODEL 55



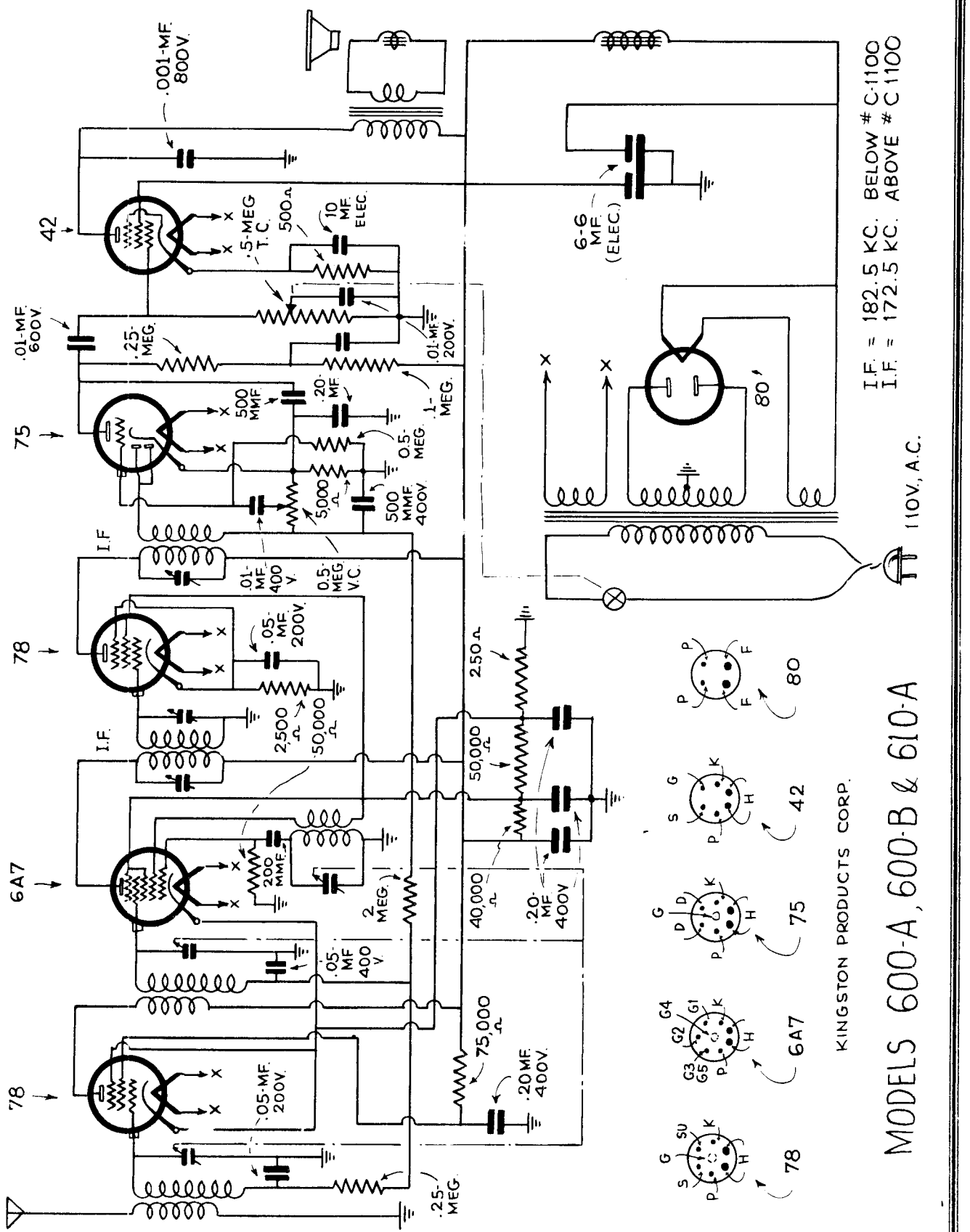
KINGSTON RADIO CO., INC.

MODEL 500



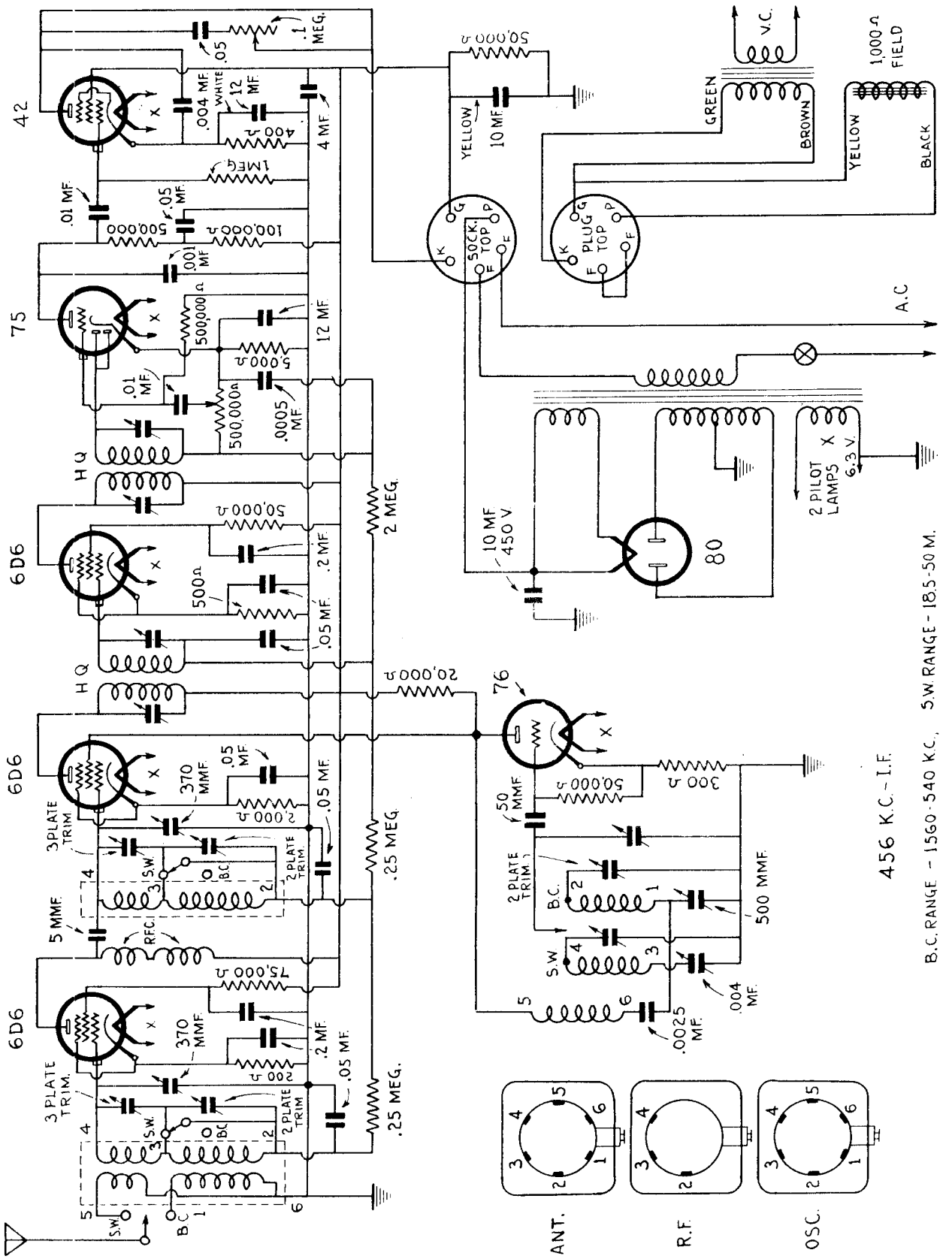
KINGSTON RADIO CO., INC.

MODELS 600A-600B & 610A



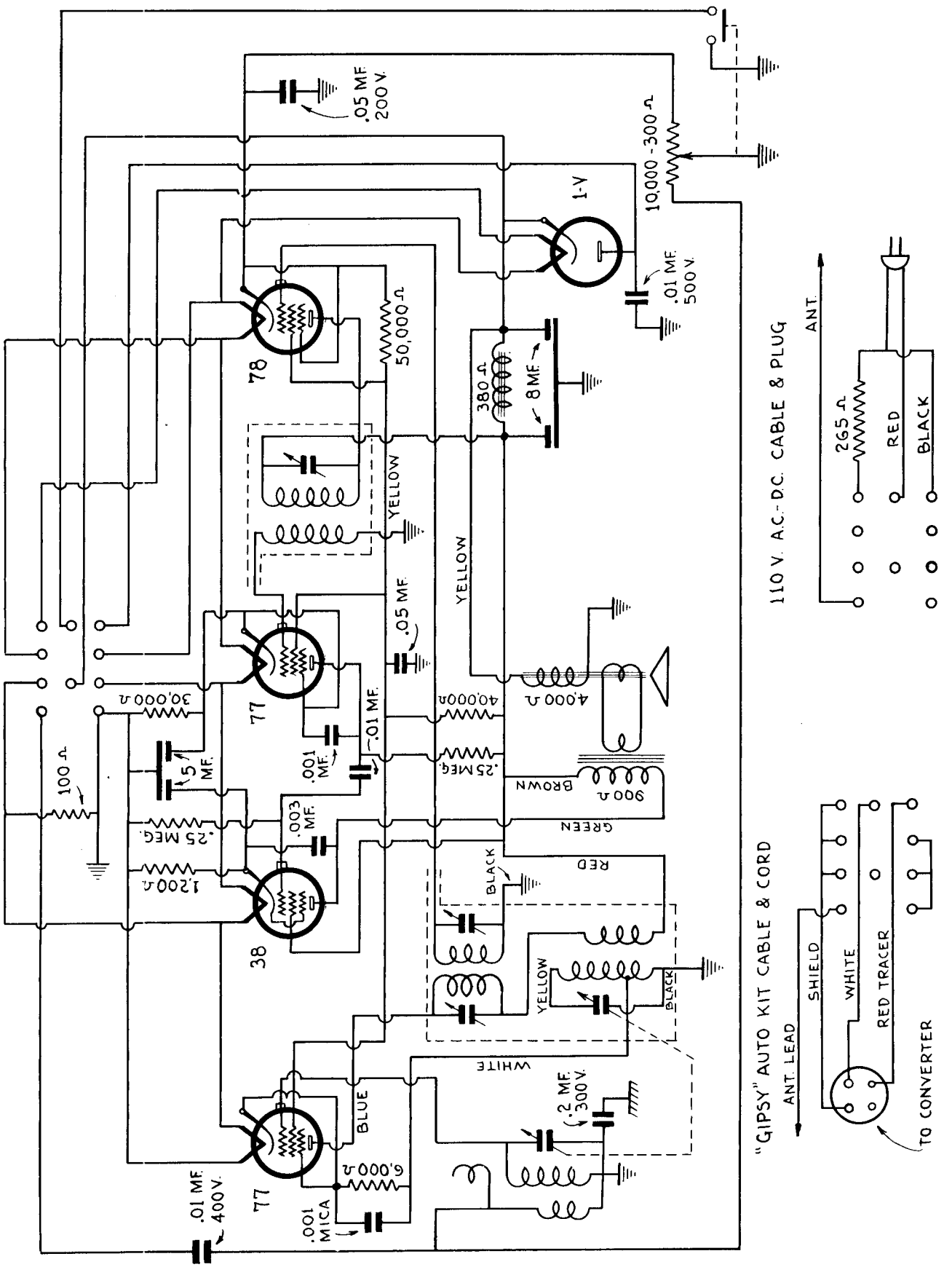
KINGSTON RADIO CO., INC.

MODEL 700A-700B



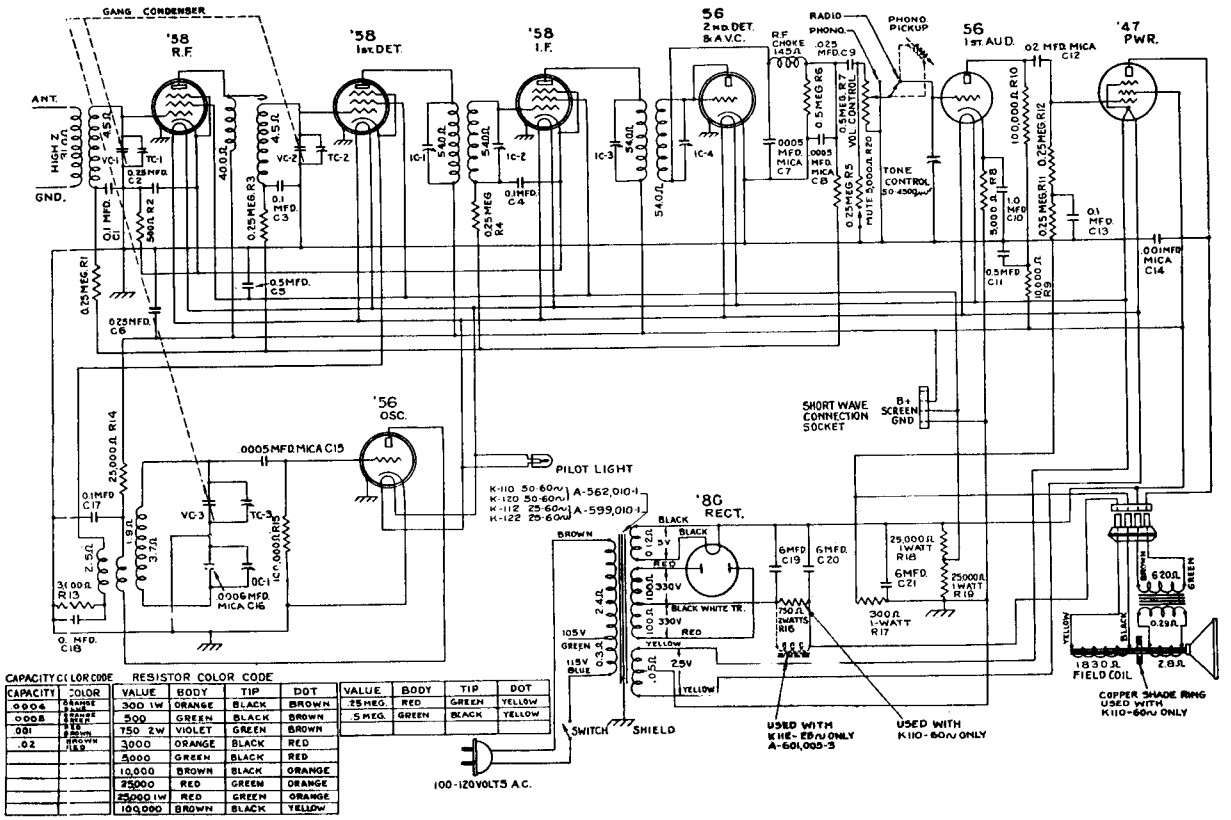
KINGSTON RADIO CO., INC.

GIPSY MODEL



KOLSTER RADIO, Inc.

MODELS K 110-112 K 120-122



CAPACITY COLOR CODE

CAPACITY	COLOR
.0004	1 ORANGE 1 ORANGE 1 BLACK
.0008	1 GREEN 1 BLACK 1 BROWN
.001	1 BROWN 1 BLACK 1 RED
.002	1 RED 1 RED 1 RED
	1 ORANGE 1 ORANGE 1 ORANGE
	1 YELLOW 1 VIOLET 1 YELLOW
	1 GREEN 1 BLUE 1 GREEN
	1 BLUE 1 GREY 1 BLUE
	1 VIOLET 1 GREEN 1 VIOLET
	1 GREY 1 WHITE 1 GREY
	1 WHITE 1 BROWN 1 WHITE
	1 BLACK 1 BLACK 1 BLACK

RESISTOR COLOR CODE

VALUE	BODY	TIP	DOT
300 1W	ORANGE	BLACK	BROWN
500	GREEN	BLACK	BROWN
750 2W	VIOLET	GREEN	BROWN
3000	ORANGE	BLACK	RED
5000	GREEN	BLACK	RED
10,000	BROWN	BLACK	ORANGE
25000	RED	GREEN	ORANGE
25000 1W	RED	GREEN	ORANGE
100,000	BROWN	BLACK	YELLOW
.25 MEG.	RED	GREEN	YELLOW
.5 MEG.	GREEN	BLACK	YELLOW

Tube	Cathode to Heater Volts D.C.	Cathode or Filament to Control Grid Volts, D.C.	Cathode or Filament to Screen Grid Volts, D.C.	Cathode or Filament to Plate Volts D.C.	Plate Current M.A.	Screen Grid Current M.A.	Filament Volts A.C.
'58 R.F.	3.	– .2	72.	205	2.5	.6	2.2
'58 1st Det.	6.	– .8	70.	205	1.7	.4	2.2
'56 Osc.	0	–2.	–	90	5.	–	2.2
'58 I.F.*	3.	–3.	70.	205	2.5	.8	2.2
'56 2nd Det.	0	–1.	–	0	0	–	2.2
'56 1st A.F.	5.	–1.** –5.***	–	95	1.2	–	2.2
'47 2nd A.F.	–	–2.	210	190	22	6.5	2.2
'80 Rect.	(Plate to Plate A.C. Volts 625)				27 each plate	–	4.7

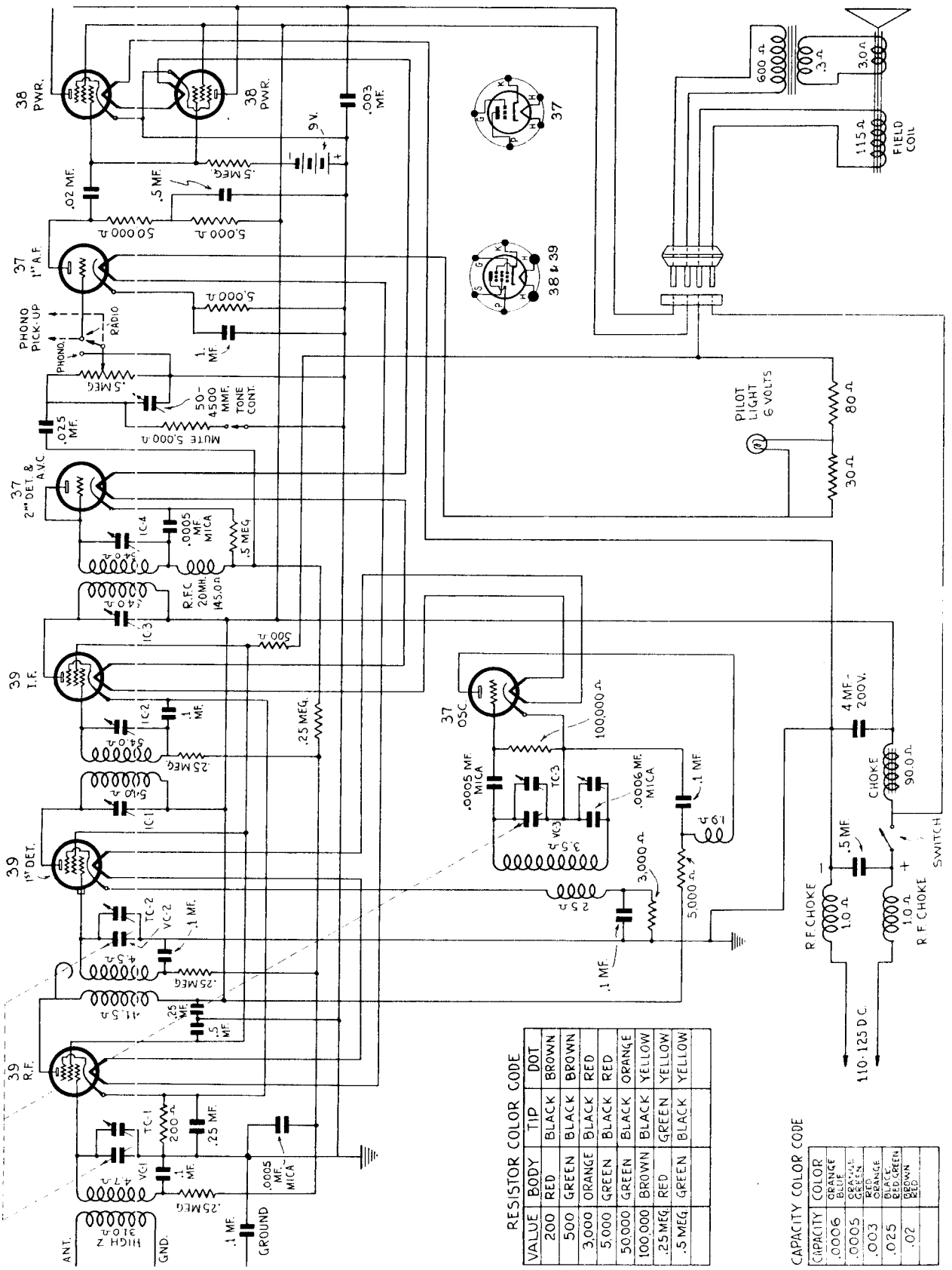
Remove the '56 oscillator tube and the tube shield and grid clip from the '58 I.F. tube.

Couple the output of a modulated oscillator to the control grid of this tube and clip the other oscillator lead to the chassis frame. Do not connect this lead to either of the antenna coil leads. Set the modulated oscillator to 175 K.C.

Adjust IC-3 and IC-4 to maximum output.

KOLSTER RADIO, Inc.

MODELS K113 & 123



RESISTOR COLOR CODE

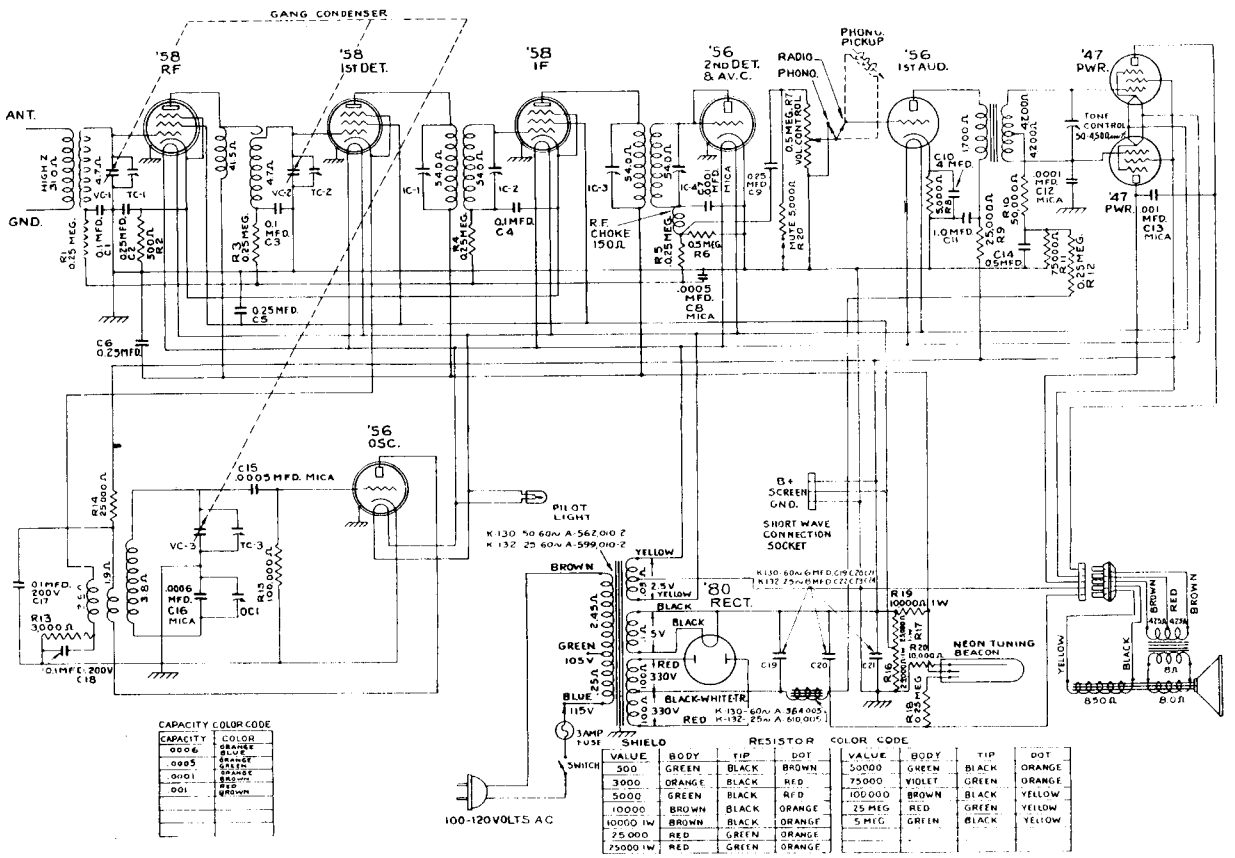
VALUE	BODY	TIP	DOT
200	RED	BLACK	BROWN
500	GREEN	BLACK	BROWN
3,000	ORANGE	BLACK	RED
5,000	GREEN	BLACK	RED
50,000	GREEN	BLACK	ORANGE
100,000	BROWN	BLACK	YELLOW
.25 MEG	RED	GREEN	YELLOW
.5 MEG	GREEN	BLACK	YELLOW

CAPACITY COLOR CODE

CAPACITY	COLOR
.0006	ORANGE BLUE
.0005	ORANGE GREEN
.003	RED ORANGE
.025	GREEN RED-GREEN
.02	BROWN RED

KOLSTER RADIO, Inc.

MODELS K 130 & 132

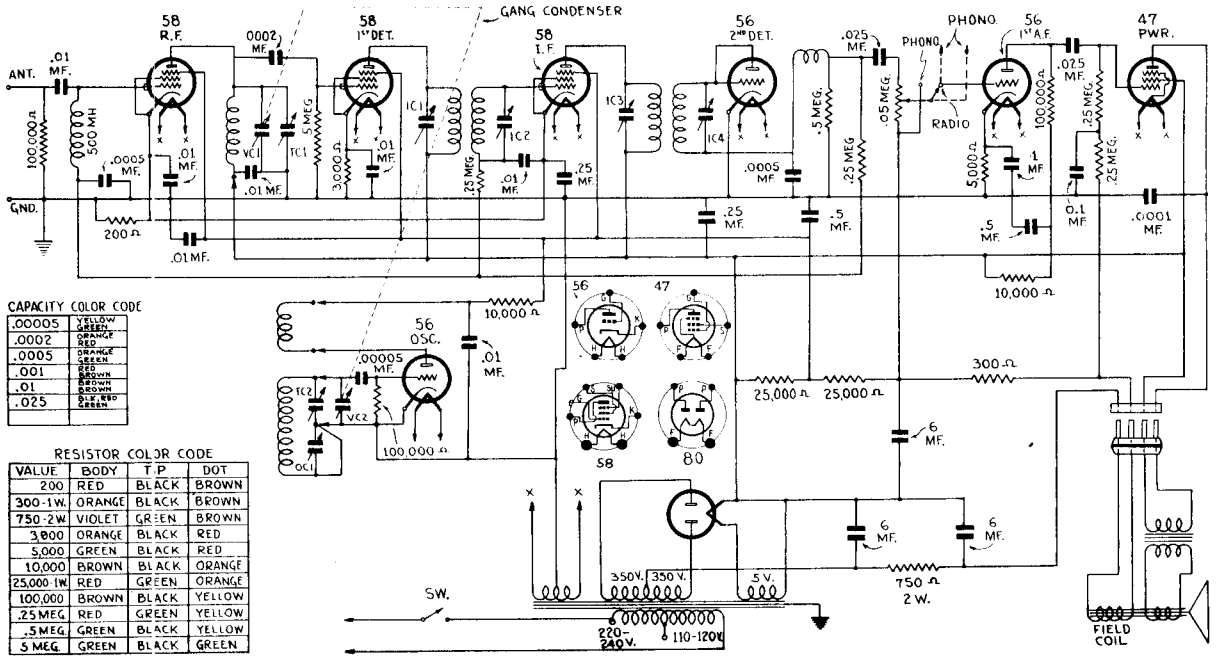


Tube	Cathode to Heater Volts D.C.	Cathode or Filament to Control Grid Volts, D.C.	Cathode or Filament to Screen Grid Volts, D.C.	Cathode or Filament to Plate Volts D.C.	Plate Current M.A.	Screen Grid Current M.A.	Filament Volts A.C.
'58 R.F.	4.	– .2	80.	145	3.	.7	2.2
'56 Osc.	0	–2.	–	90	5.5	–	2.2
'58 1st Det.	7.	– .8	77.	145	1 8	.6	2.2
'58 I.F.	1.5	–5.	95.	180	1.7	1.	2.2
'56 2nd Det.	0	– .2	–	0	0	–	2.2
'56 1st Audio	9.5	–1.* –9.**	–	165	2.	–	2.2
'47 Power	–	–4.	235	215	24	5.	2.2
'47 Power	–	–4.	235	215	24	5.	2.2
'80 Rect.	(Plate to Plate A.C. Volts 580)				45 each plate	–	4.7

A triple grid super-control type '58 tube in a single stage I.F. amplifier is used. Two I.F. transformers accurately tuned to 175 K.C. are used in a band-pass arrangement having four tuned circuits which give a flat top selectivity characteristic and make for ease in tuning. Transmission side bands are not destroyed in such an arrangement. The high frequency tones are reproduced clearly, resulting in exceptional full range tone quality.

KOLSTER RADIO, Inc.

MODEL K165 INTERNATIONAL



CAPACITY COLOR CODE

.00005	YELLOW GREEN
.0002	ORANGE RED
.0005	ORANGE GREEN
.001	RED BROWN
.01	BROWN BROWN
.025	D.F. RED GREEN

RESISTOR COLOR CODE

VALUE	BODY	TIP	DOT
200	RED	BLACK	BROWN
300-1W.	ORANGE	BLACK	BROWN
750-2W	VIOLET	GREEN	BROWN
3,000	ORANGE	BLACK	RED
5,000	GREEN	BLACK	RED
10,000	BROWN	BLACK	ORANGE
25,000-1W	RED	GREEN	ORANGE
100,000	BROWN	BLACK	YELLOW
.25 MEG.	RED	GREEN	YELLOW
.5 MEG.	GREEN	BLACK	YELLOW
5 MEG.	GREEN	BLACK	GREEN

1 - Remove tube shield and grid clip from '58 first detector tube.

2 - Couple the output of a signal generator to the control grid of this tube and clip the return lead to the chassis frame.

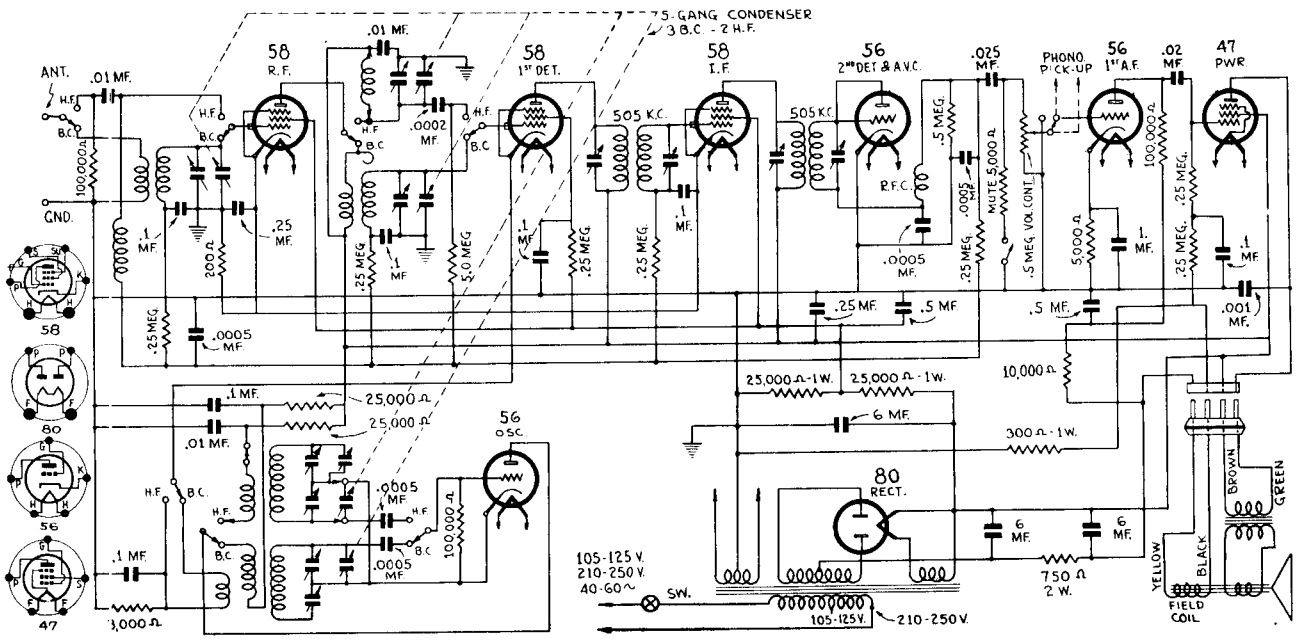
3 - Adjust signal generator to 535 kilocycles.

4 - Adjust the four I.F. trimmer condensers for maximum deflection of the output meter connected across the voice coil.

Tube	Cathode to Heater Volts D.C.	Cathode or Filament to Control Grid Volts D.C.	Cathode or Filament to Screen Grid Volts D.C.	Cathode or Filament to Plate Volts D.C.	Plate Current M.A.	Screen Grid Current M.A.	Filament Volts A.C.
'56 R.F.	2.5	- .4	72.	205	5.	1.2	2.3
'58 1st Det.	3.	- .5	18.	205	.7	.2	2.3
'56 Osc.	0.	- .2	-	60	5.5	-	2.3
'58 I.F.*	2.5	-2.4	68.	205	5.	1.4	2.3
'56 2nd Det.	0.	-1.	-	0	0.	-	2.3
'56 1st A.F.	5.	-1.** -5.***	-	90	1.	-	2.3
'47 2nd A.F.	-	-	210	190	23.	5.	2.3
'80 Rect.	(Plate to Plate A.C. Volts 625)				26. ea. plate	-	5.

KOLSTER RADIO, Inc.

MODEL K-175 INTERNATIONAL



1 - Remove tube shield and grid clip from '58 first detector tube.

2 - Couple the output of a signal generator to the control grid of this tube and clip the return lead to the chassis frame.

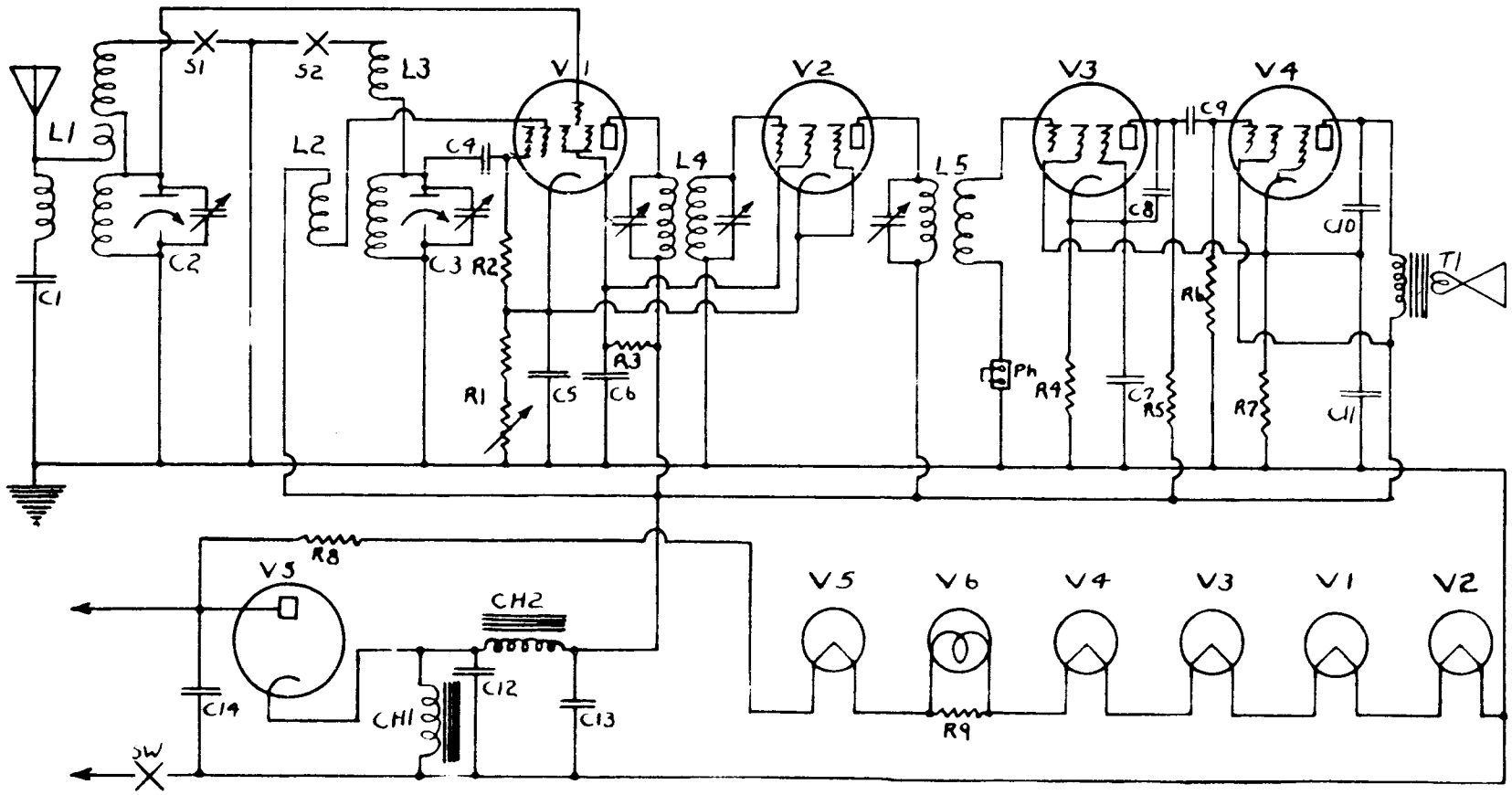
3 - Adjust signal generator to 505 kilocycles.

4 - Adjust the four I.F. trimmer condensers for maximum deflection of the output meter connected across the voice coil.

Tube	Cathode to Heater Volts Volts D.C.	Cathode or Filament to Control Grid Volts D.C.	Cathode or Filament to Screen Grid Volts D.C.	Cathode or Filament to Plate Volts D.C.	Plate Current M.A.	Screen Grid Current M.A.	Filament Volts A.C.
'56 R. F.	2.5	- .4	72.	205	5.	1.2	2.3
'58 1st Det.	3.	- .5	18.	205	.7	.2	2.3
'56 Osc.	0	- .2	-	60	5.5	-	2.3
'58 I.F.*	2.5	-2.4	68.	205	5.	1.4	2.3
'56 2nd Det.	0	-1.	-	0	0	-	2.3
'56 1st A.F.	5.	-1. ** -5. ***	-	90	1.	-	2.3
'47 2nd A.F.	-	-	210	190	23.	5.	2.3
'80 Rect.	(Plate to Plate A.C. Volts 625)				26. ea. plate	-	5.

LANG RADIO CO.

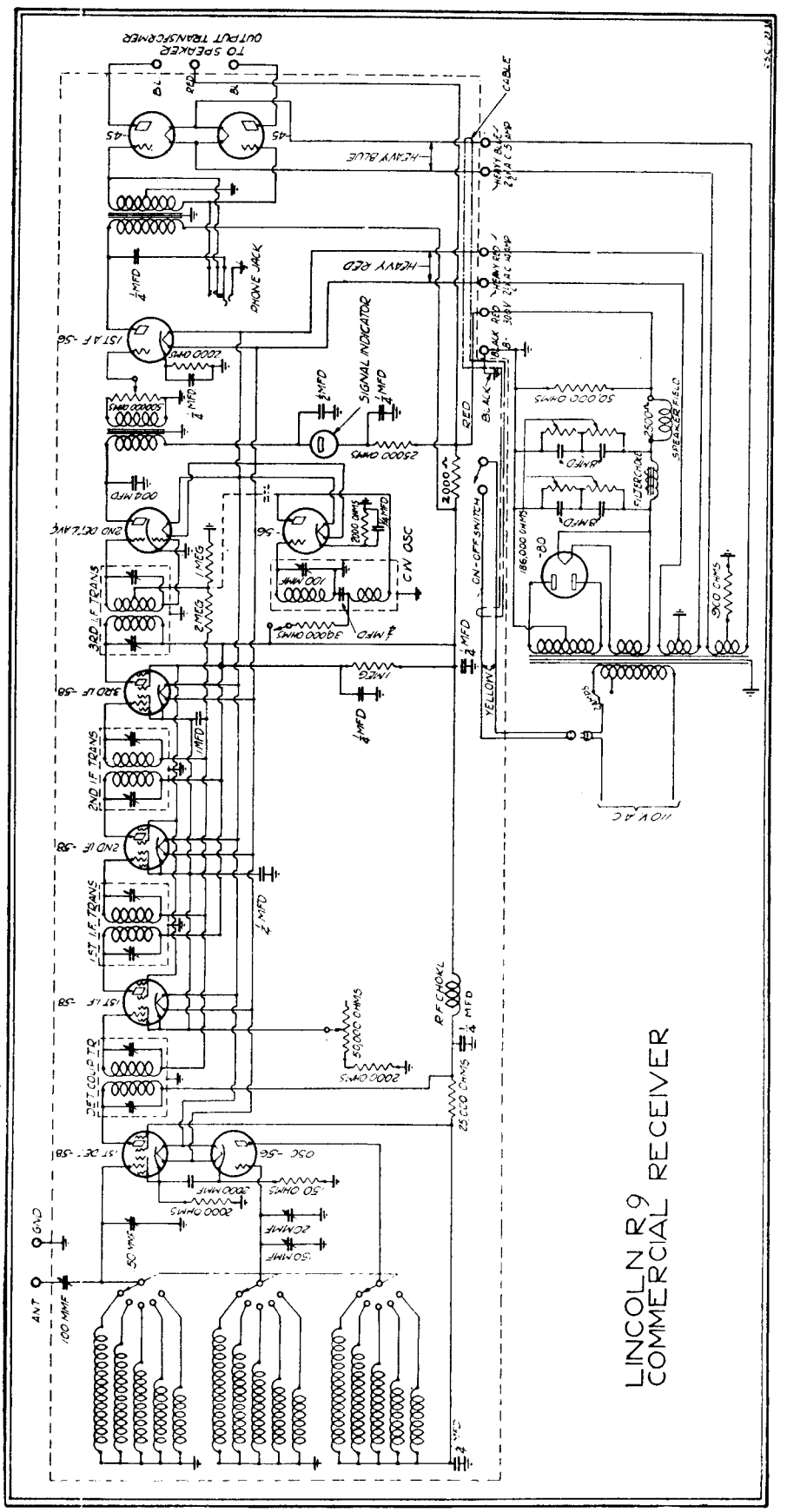
MODELS 502 UA AND UG5H

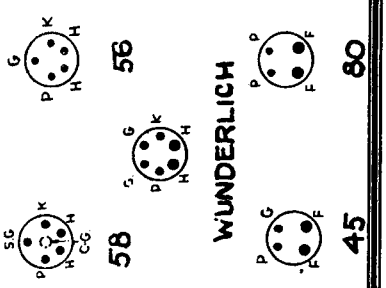


V1	6A7 Tube	C7	10 μfd.	L1	Antennae Coil
V2	6D6 "	C9-10	01 "	L2	Oscillator Coil
V3	6C6 "	C11	10 "	L3	Short Wave Oscillator Coil
V4	43 "	C12	12 "	L4	DT IF 456 Coil
V5	12Z3 "	C13	8 "	L5	ST IF 456 Coil
V6	6 3 Pilot Light	R1	4M Ohm Vol. control 200 Ohm mm	T1	Speaker Trans
C1	.002 μfd	R2-3-4	2M Ohm resistor	CH1	" Field
C2	365 μfd Var. cond.	R5-6	500M	CH2	Choke
C3	Osc. section for 456	R7	700M	S1-2	Short Wave Switch
C4-8	00025 μfd	R8	205 Ohms in Line cord	SW	Line switch on Vol control
C5-6-14	.05 "	R9	25 "	Ph	Phono

To align the receiver. - Short C3 - band switch on broadcast - turn condenser plates out - apply 456 to grid of V2 and adjust L5 apply 456 to grid of V1 and adjust L4 remove short on C3 - apply 1500 Kc. signal to antennae wire through .00005 condenser and adjust trimmers on C2 and C3 so that signal comes to 10 on dial

LINCOLN RADIO CORP.
MODEL R9





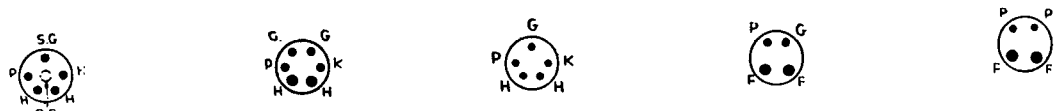
Silent Tuning-Signal Indicator

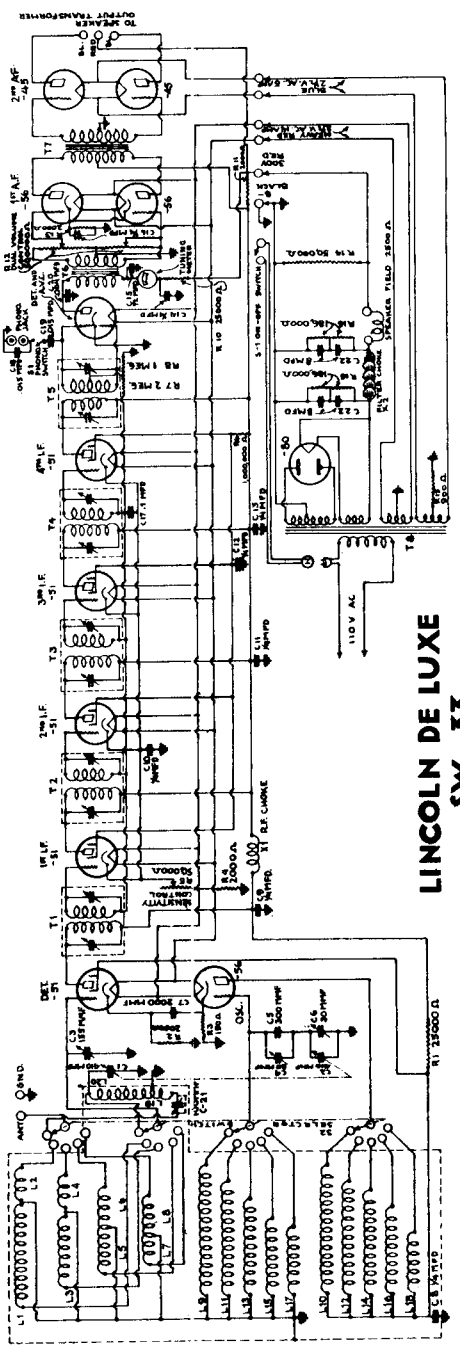
After one has operated a receiver with the silent tuning feature, they will never go back to the old noisy method of locating the desired station. This radical development pioneered by Lincoln Engineers is accomplished by a **Dual System of Controls.** One regulates the bias of the I.F. amplifier manually, and the other controls the volume from the audio end. By this system one may have the receiver at full sensitivity and have volume at a whisper,—a desirable feature for tuning late at night. Not only does this system eliminate inter-station noise, but allows the receiver to be tuned with absolute accuracy to the center of the carrier; the volume control being completely off, and signal brought to exact resonance by indicating meter, (far more accurate than possible by ear). The value of this revolutionary feature cannot be over-estimated. The needle swing to the right gives a fair estimate of signal strength and could be calibrated from R1 to R9.

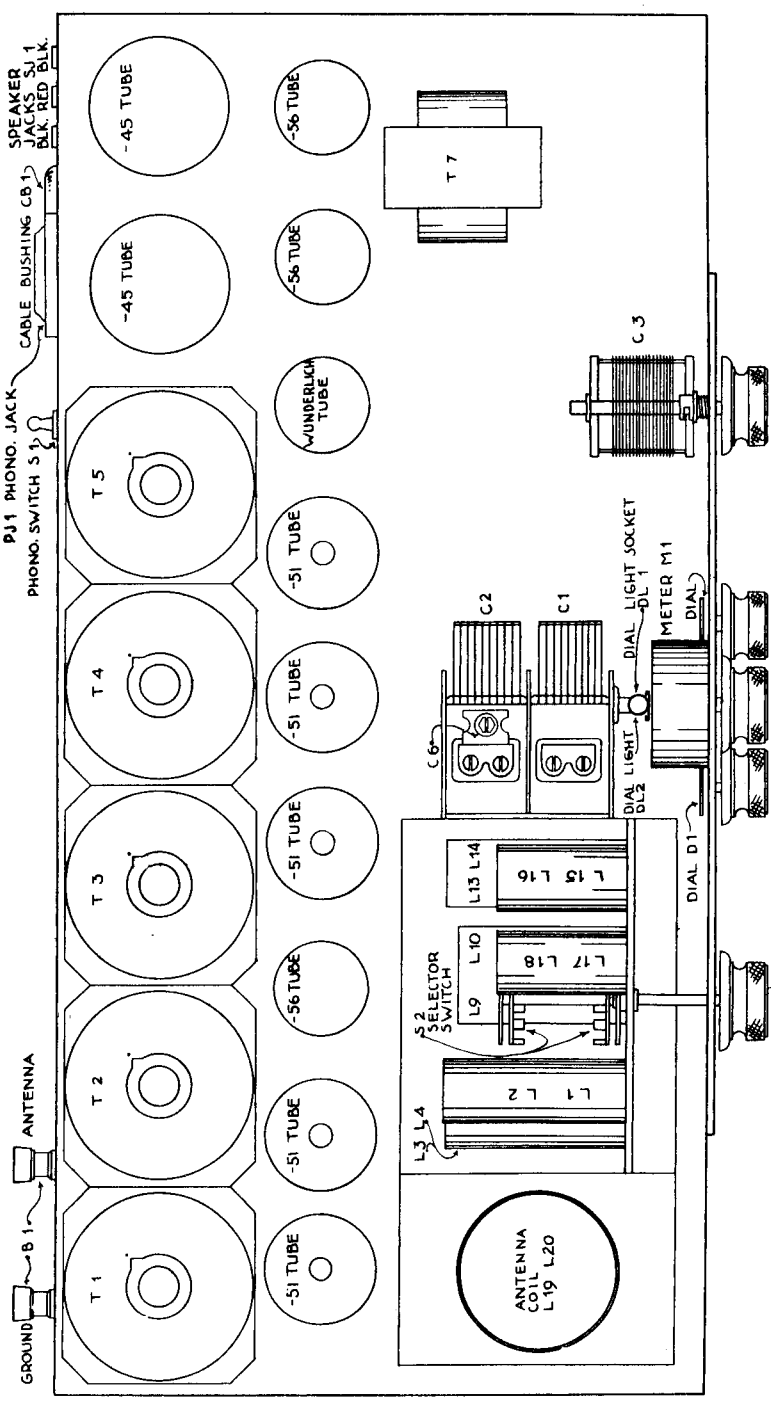
THREE HIGH GAIN I.F. STAGES Really, what you get out of a receiver depends on the amplification of the radio frequency amplifier. Poor design, poor system of impregnating coils, improper coupling and many other features make for poor reception or none at all. The R 9 I.F. amplifier has been completed after months of research. The primary and secondary windings of the transformers are of Litz wire carefully adjusted to produce the high gain and selectivity required. These coils are especially impregnated: after months of experimenting to arrive at a successful method of making the coils impervious to moisture and still maintain their desired characteristics.
Both plate and grid circuits are tuned,—the adjustment done with precision using the meter on front panel. The measured gain per stage is 128 and is adjusted to a fixed frequency of 480 KC.

LINCOLN RADIO CORP.

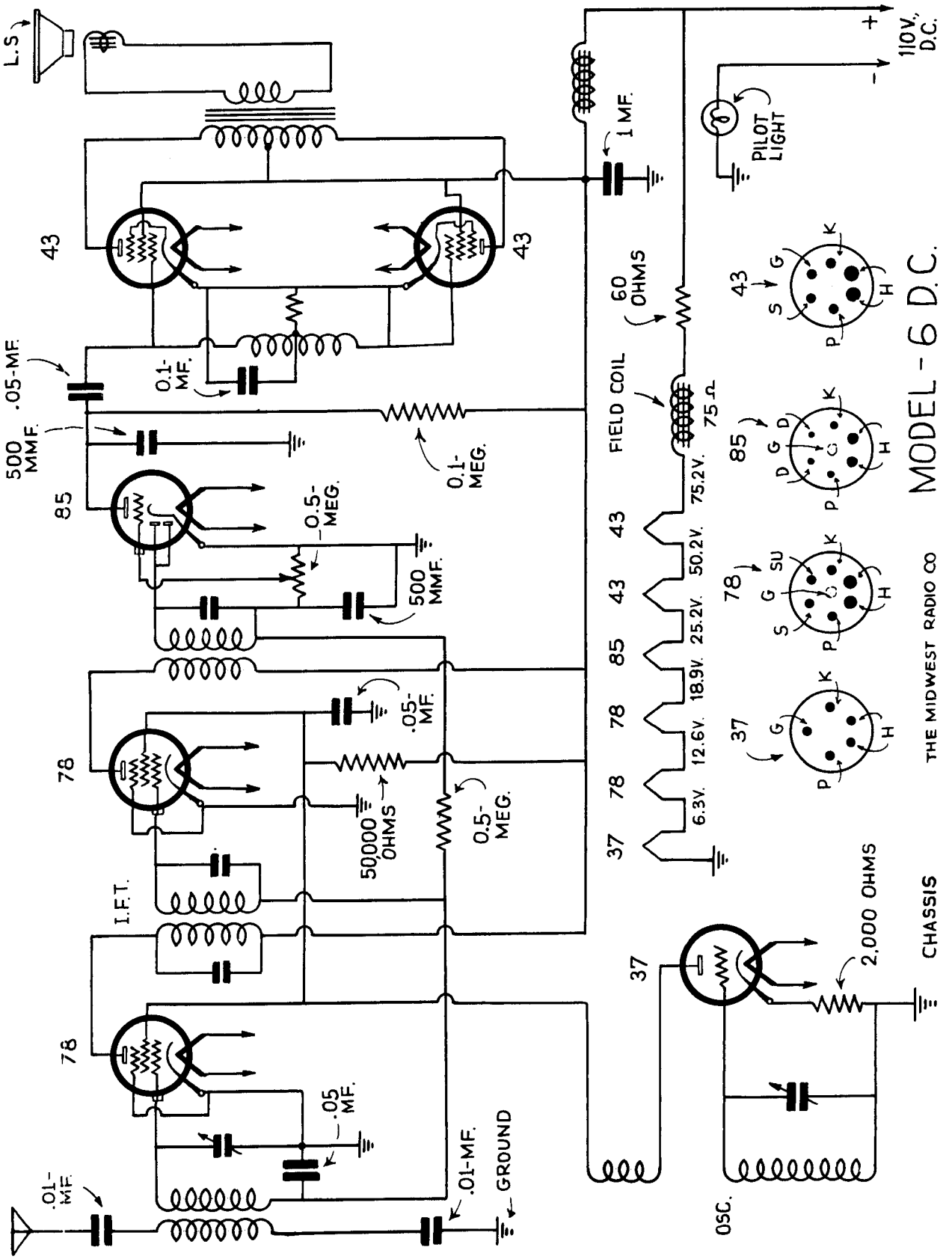
MODEL SW-33



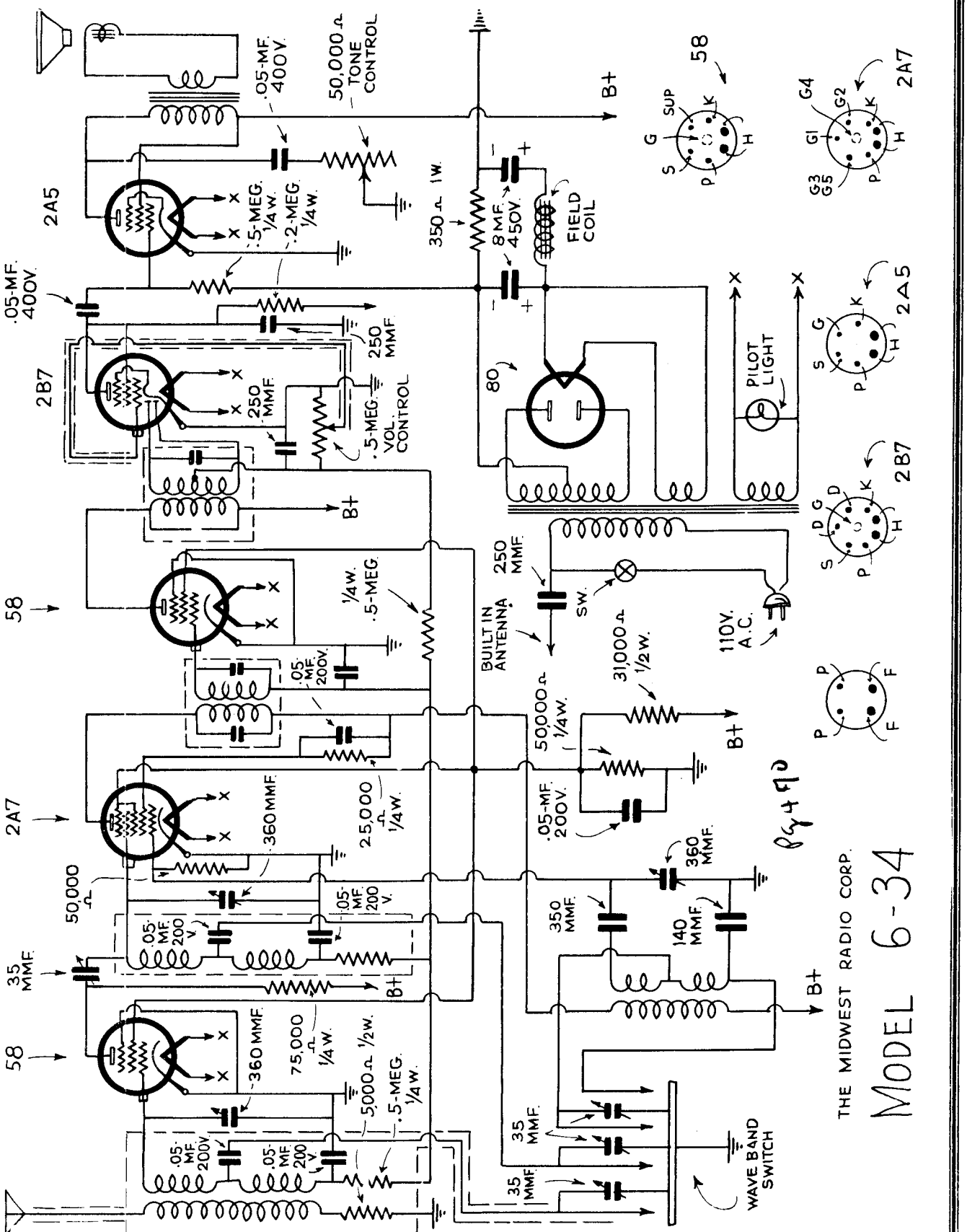




MIDWEST RADIO CORP.
MODEL 6DC

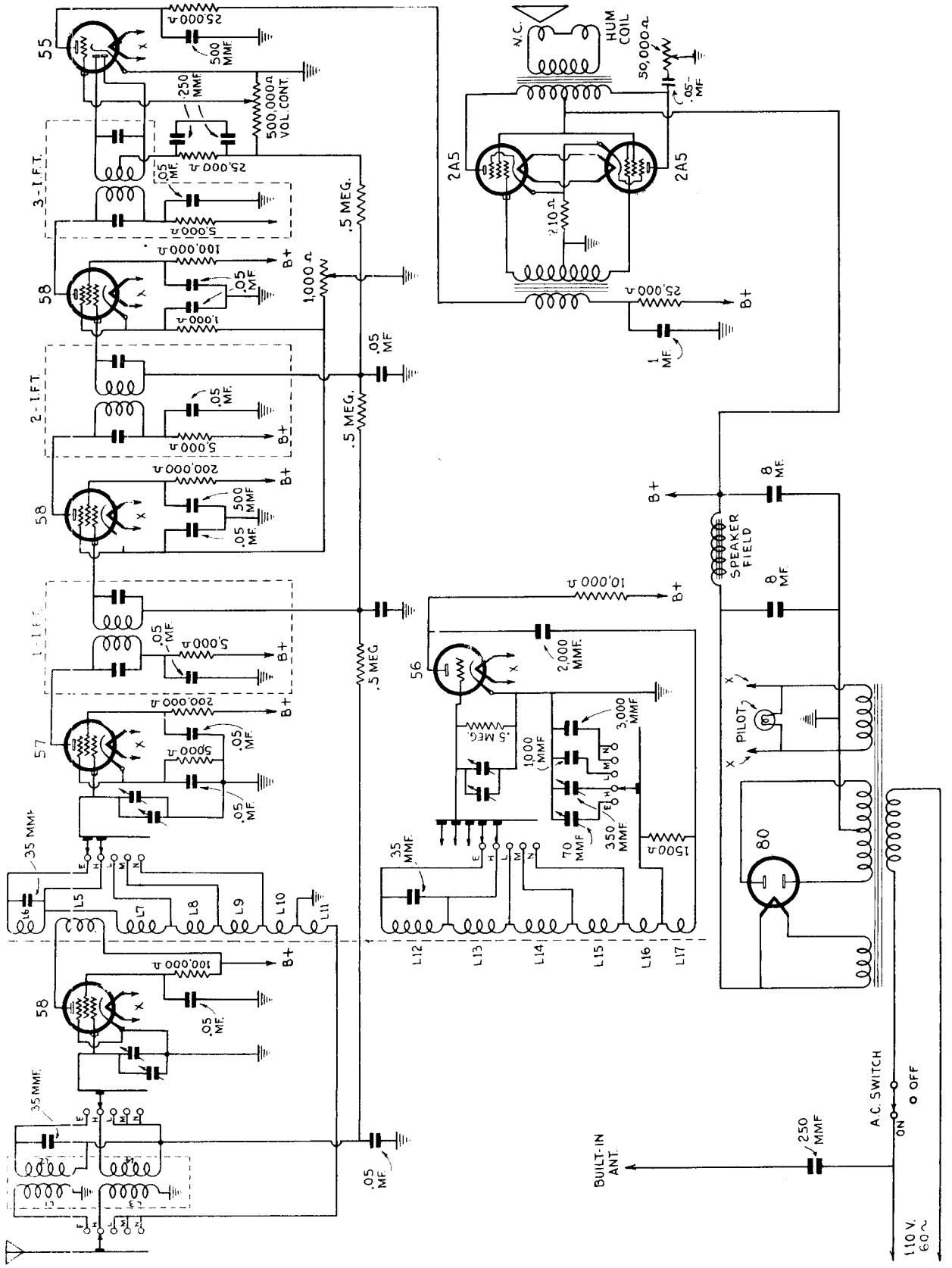


MIDWEST RADIO CORP.
MODEL 6-34



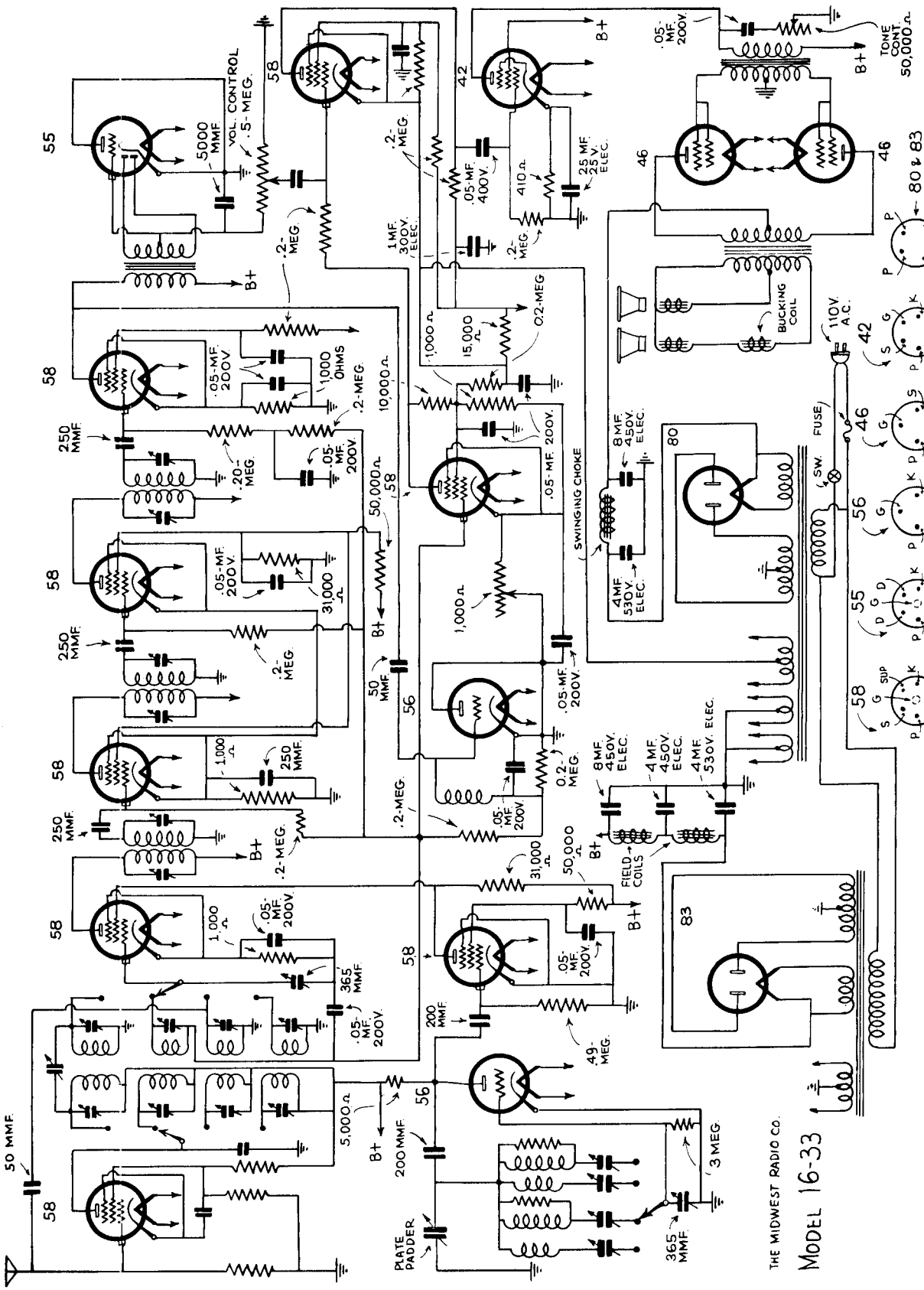
MIDWEST RADIO CORP.

MODEL 9-34 SET



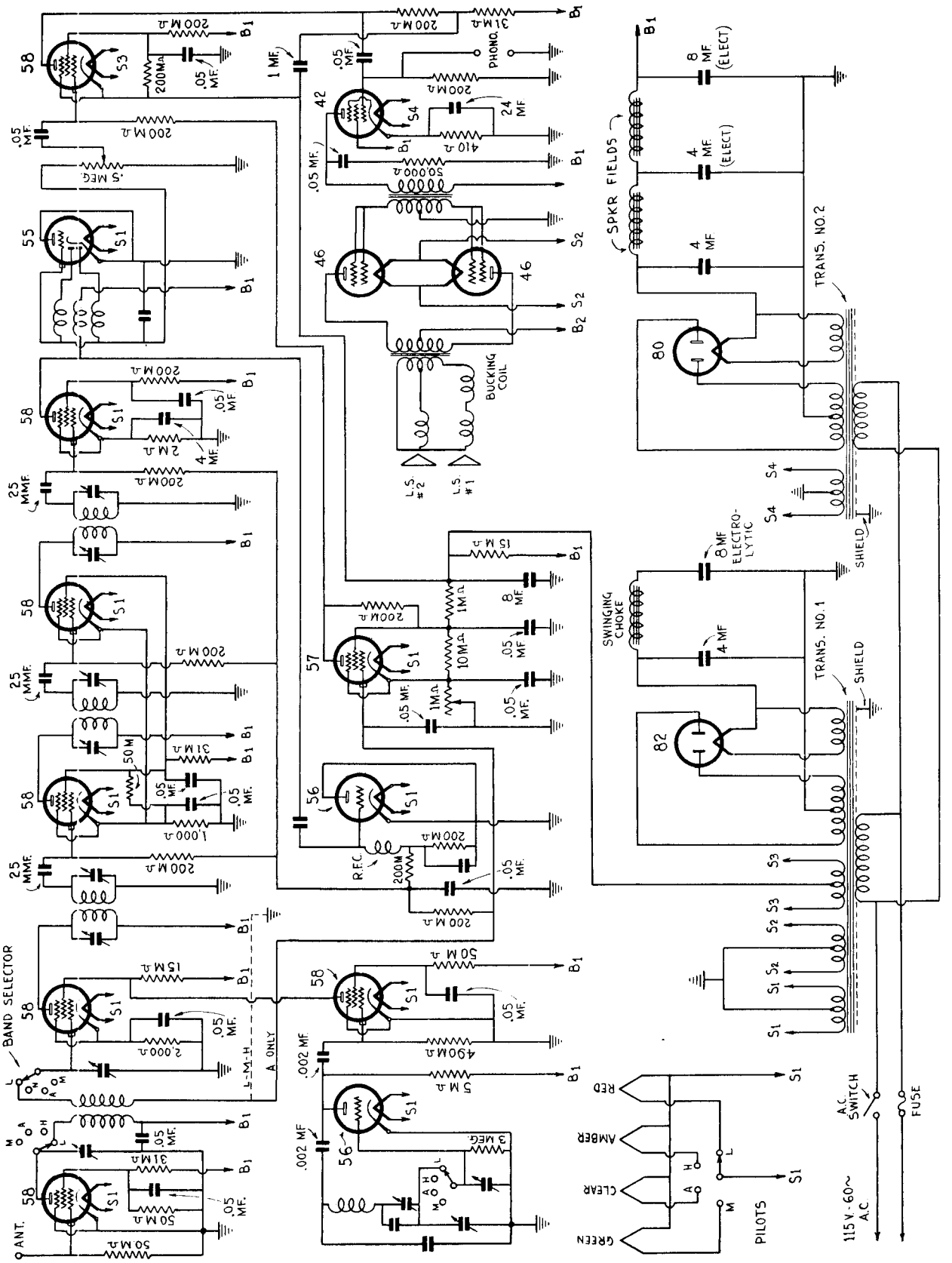
MIDWEST RADIO CORP.

MODEL 16



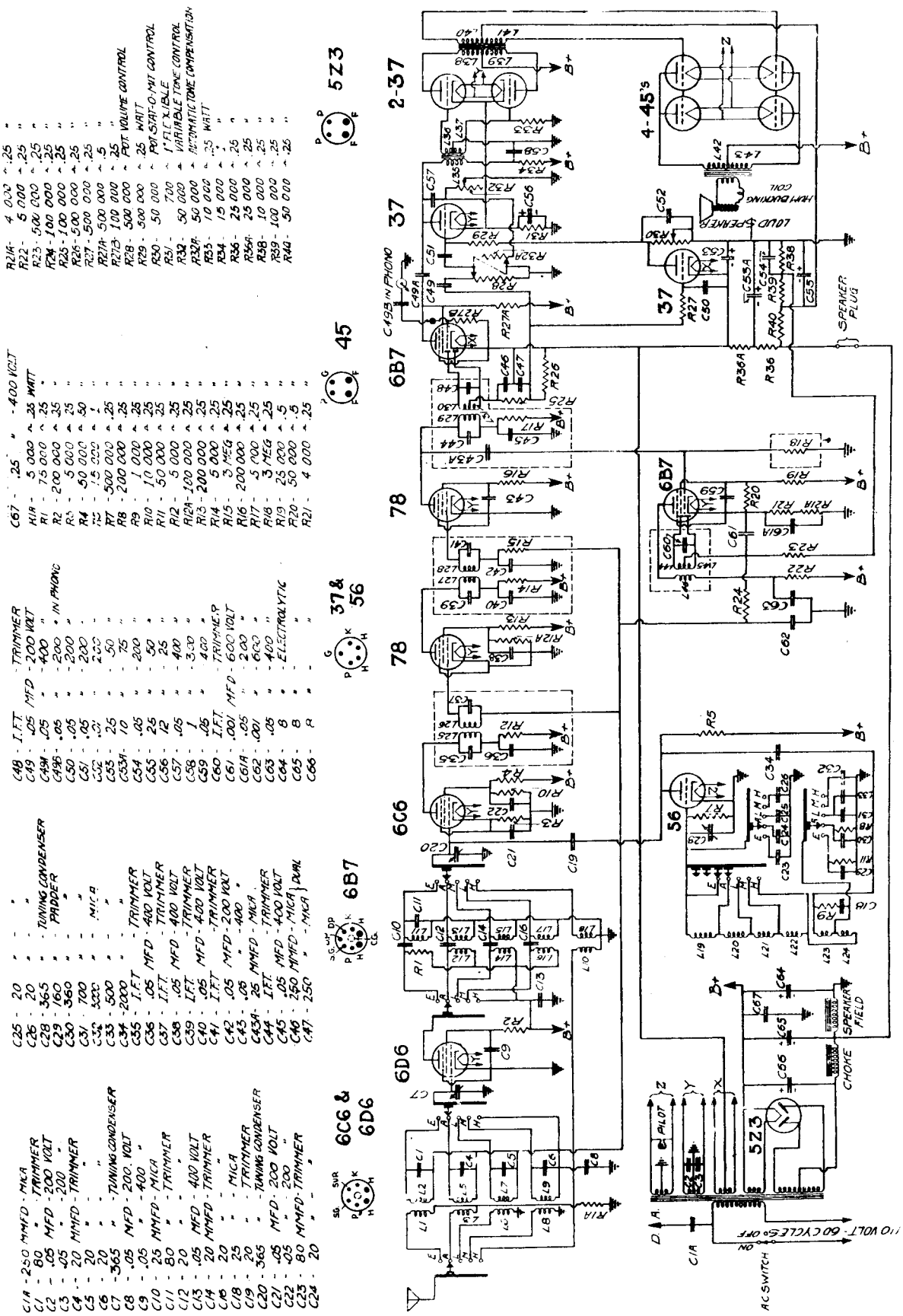
MIDWEST RADIO CORP.

MODEL 16-1932 & 1933



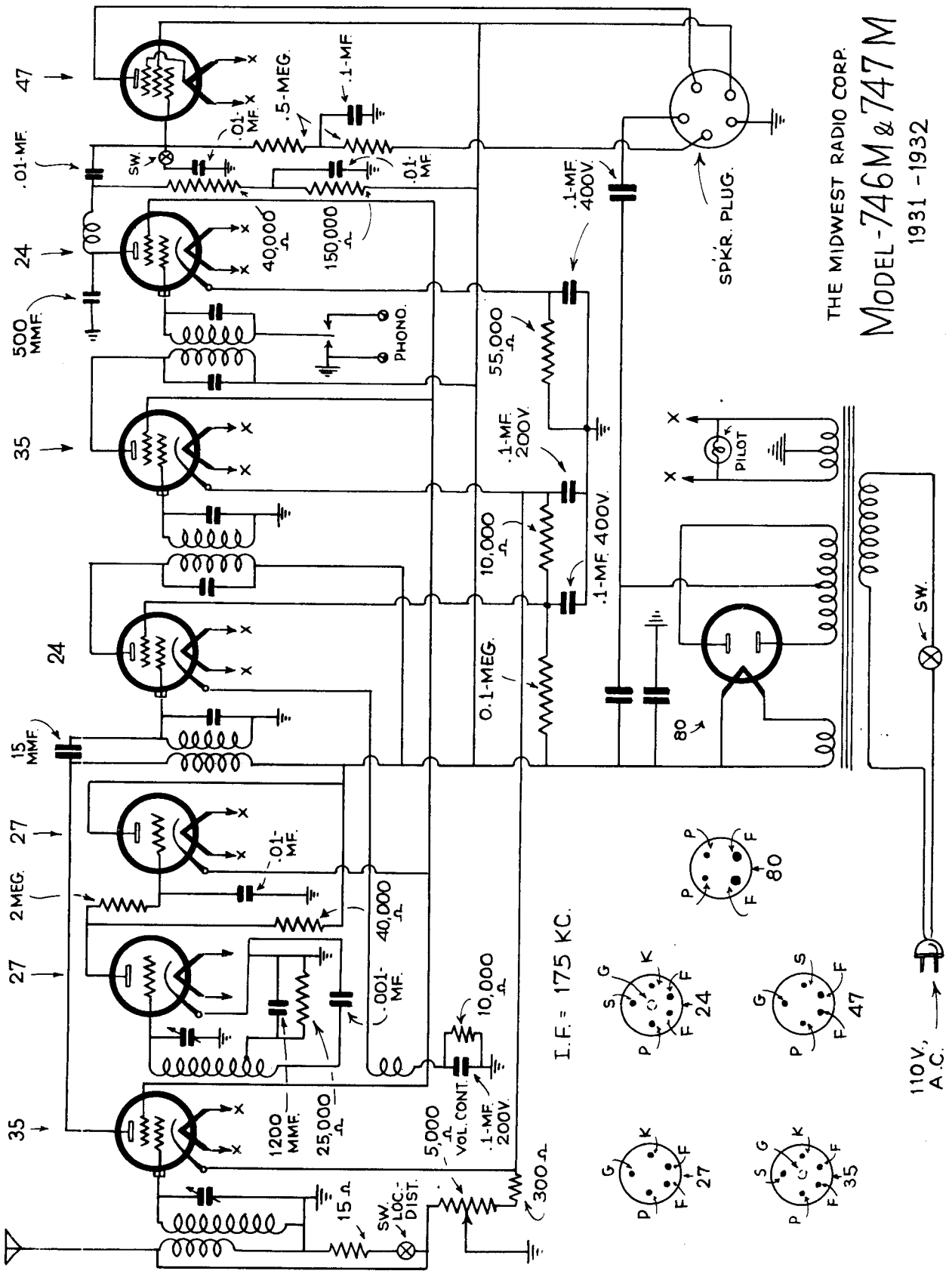
MIDWEST RADIO CORP.

MODEL 16-34



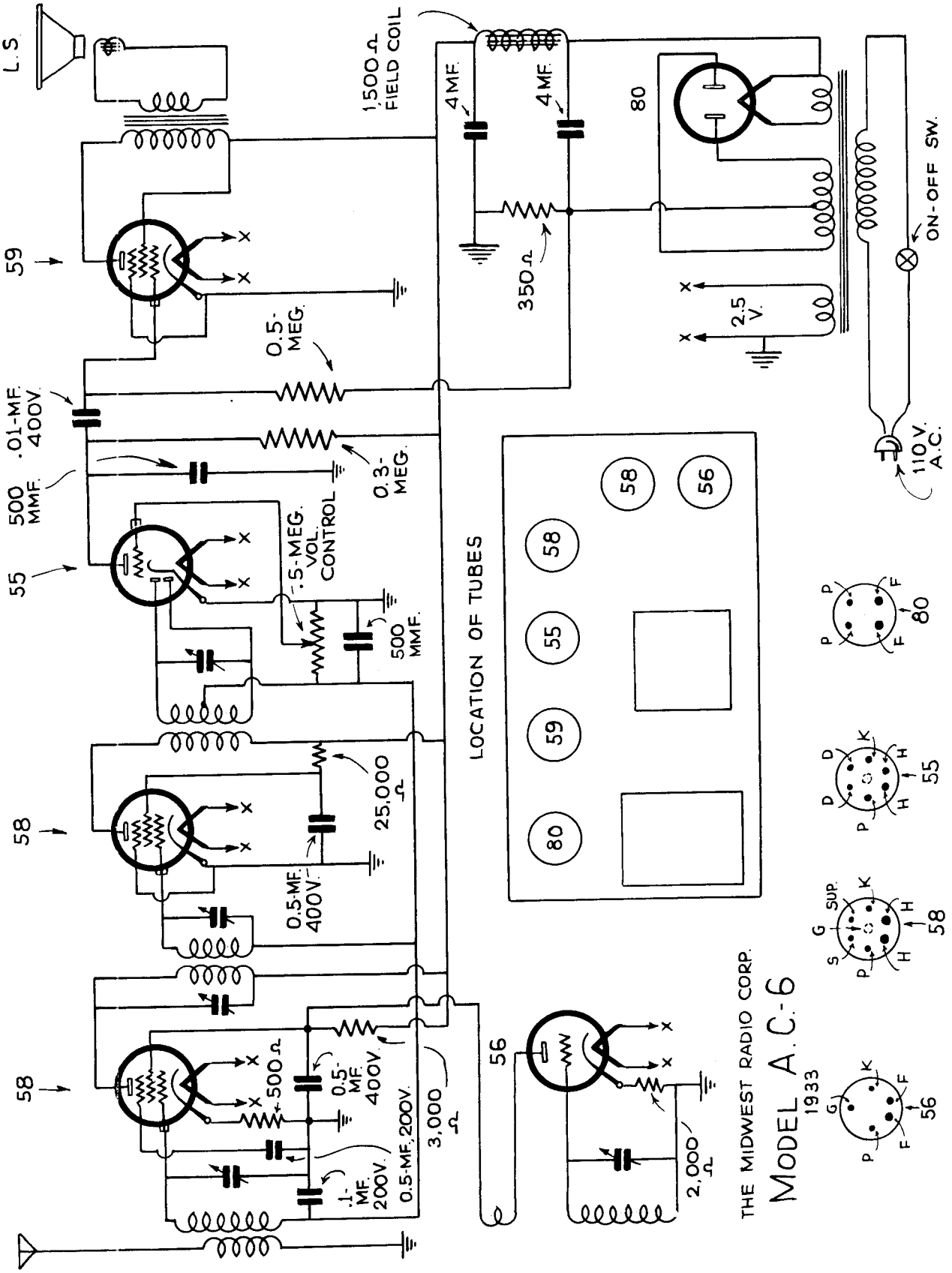
MIDWEST RADIO CORP.

MODEL 746 M & 747 M (1931-32)



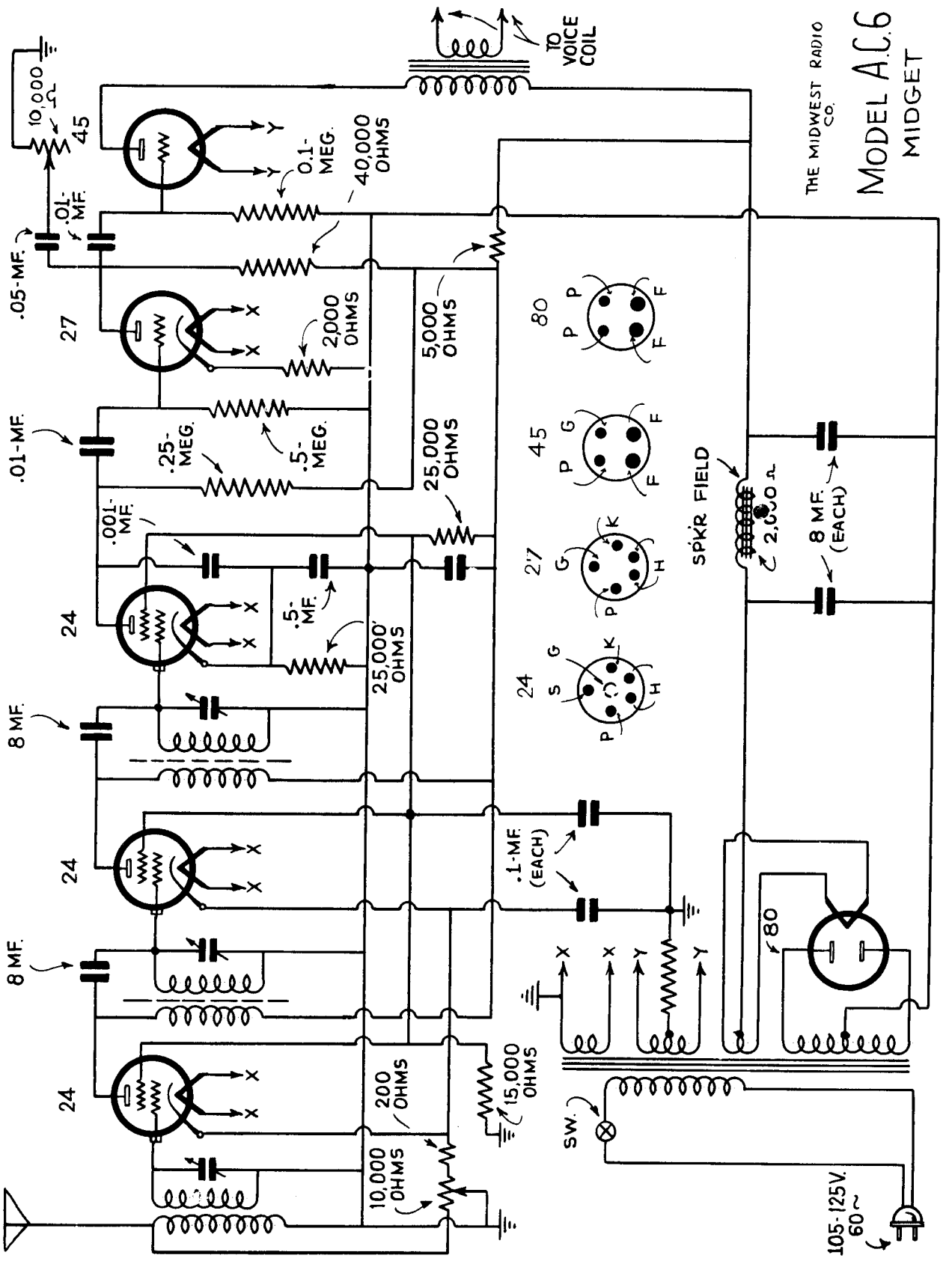
MIDWEST RADIO CORP.

1933 MODEL AC-6



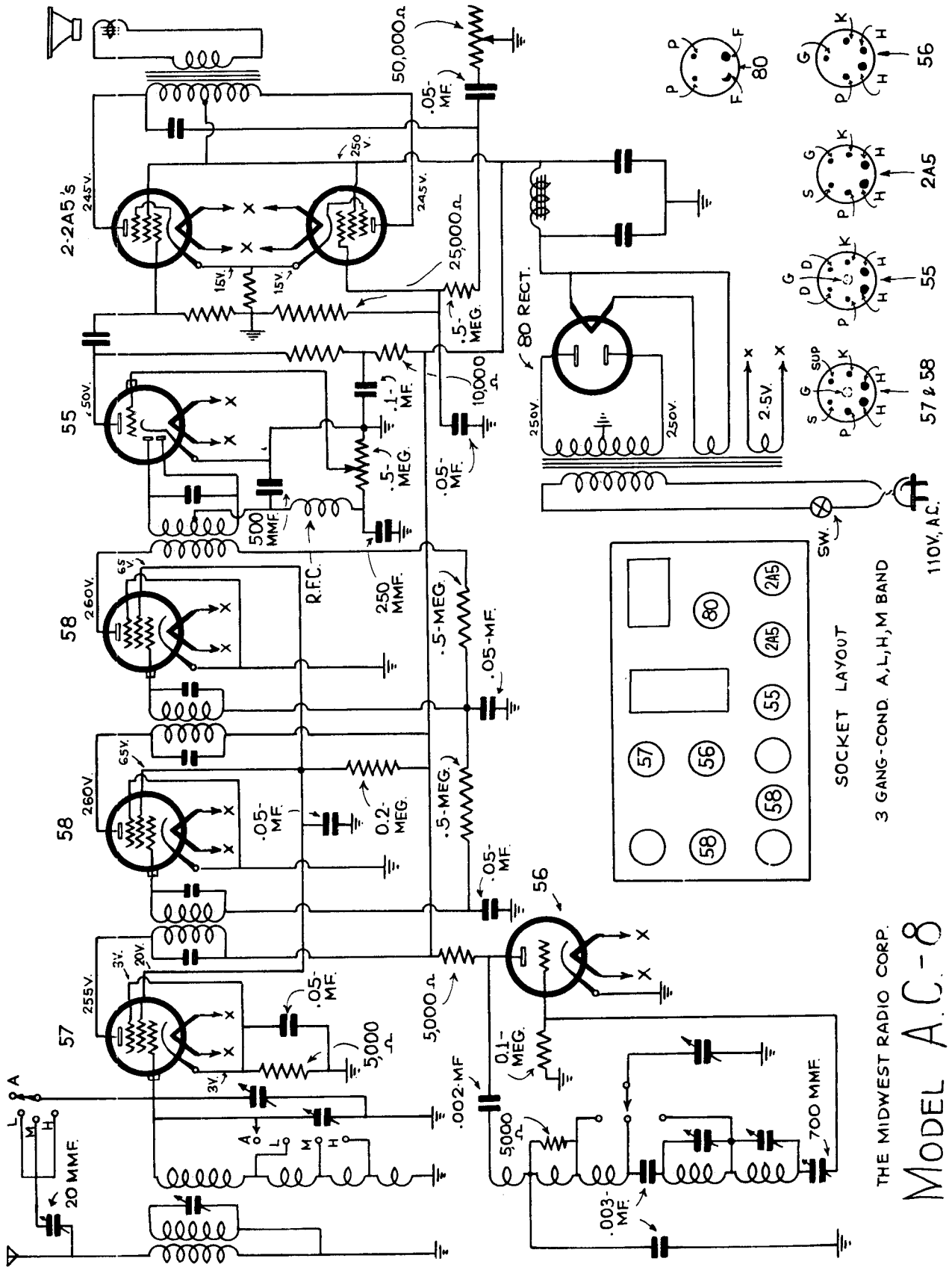
MIDWEST RADIO CORP.

MODEL AC-6 MIDGET



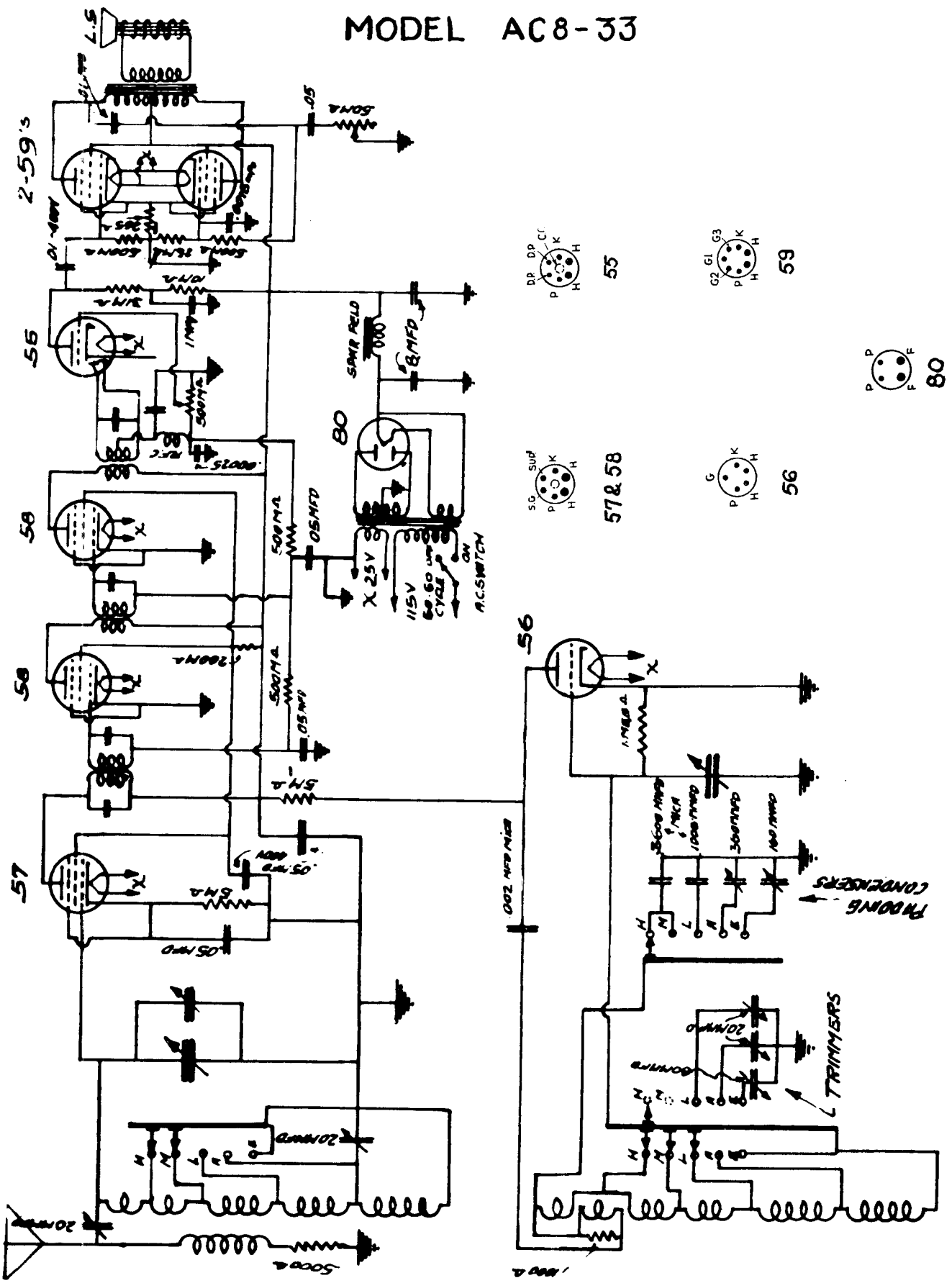
MIDWEST RADIO CORP.

MODEL AC-8



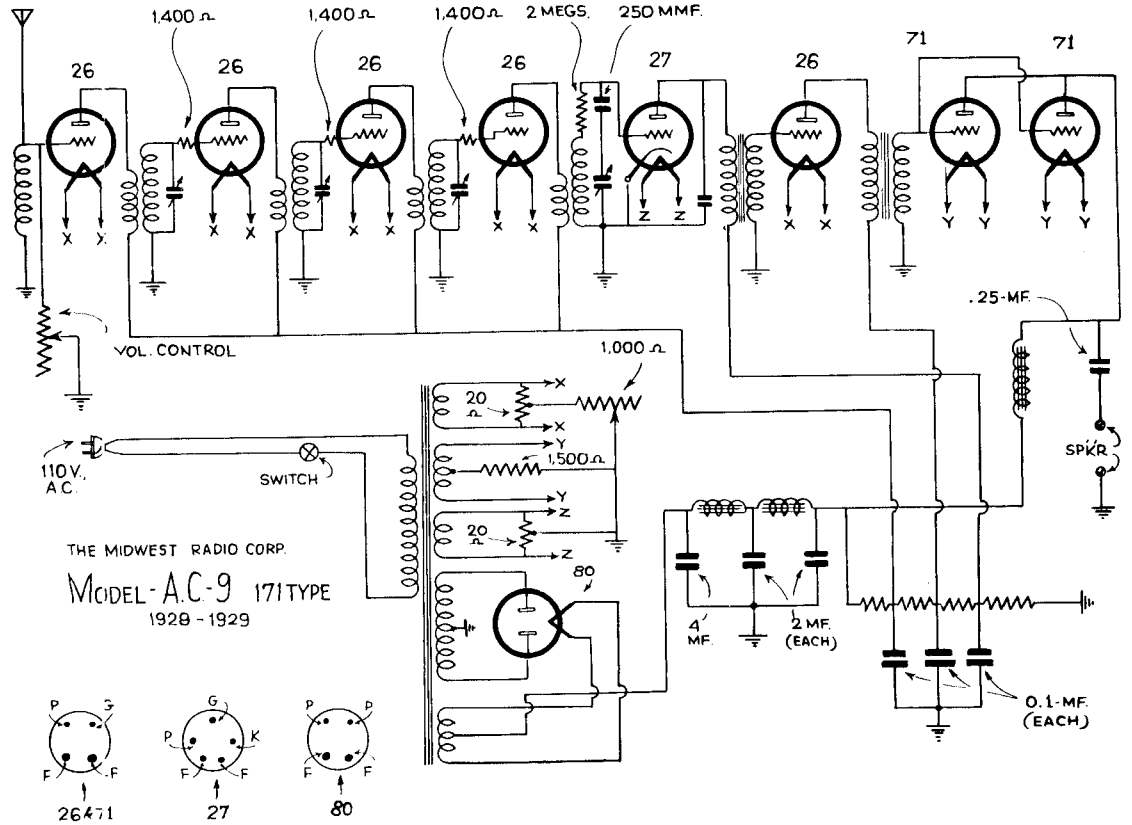
MIDWEST RADIO CORP.

MODEL AC8-33

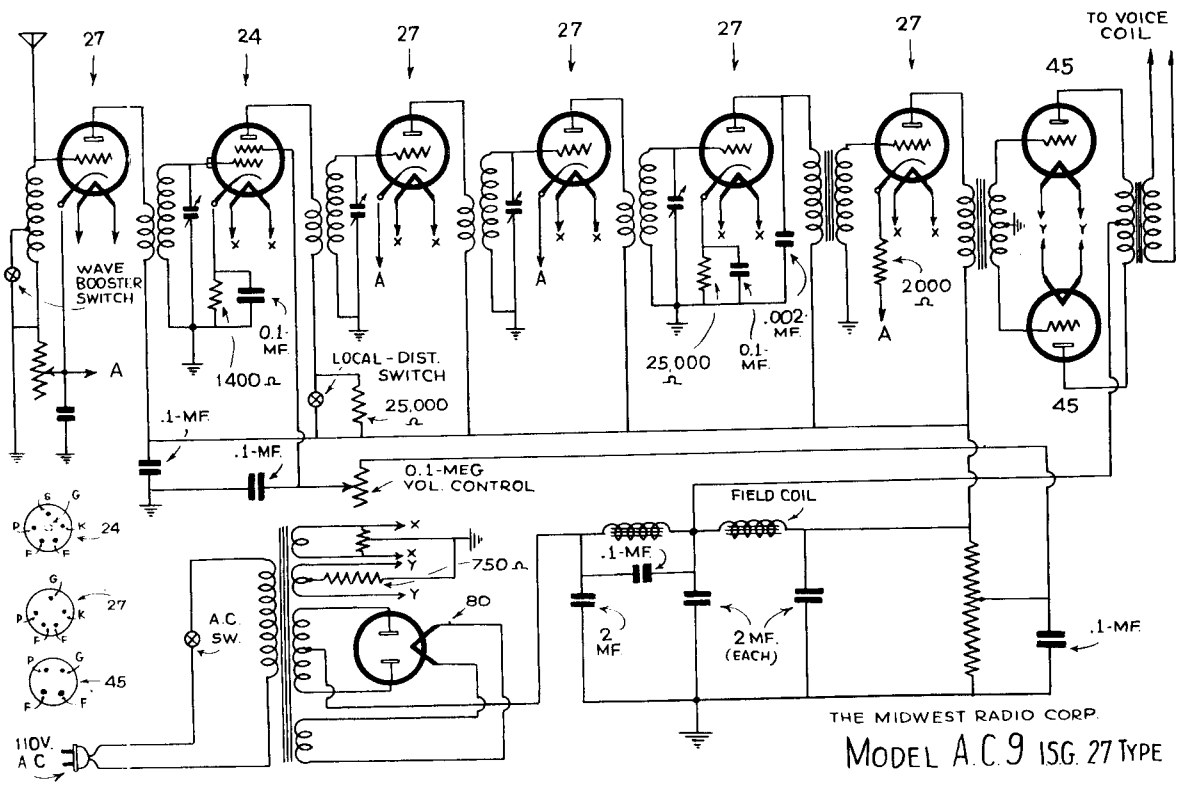


MIDWEST RADIO CORP.

MODEL AC-9-171 TYPE-1928-29

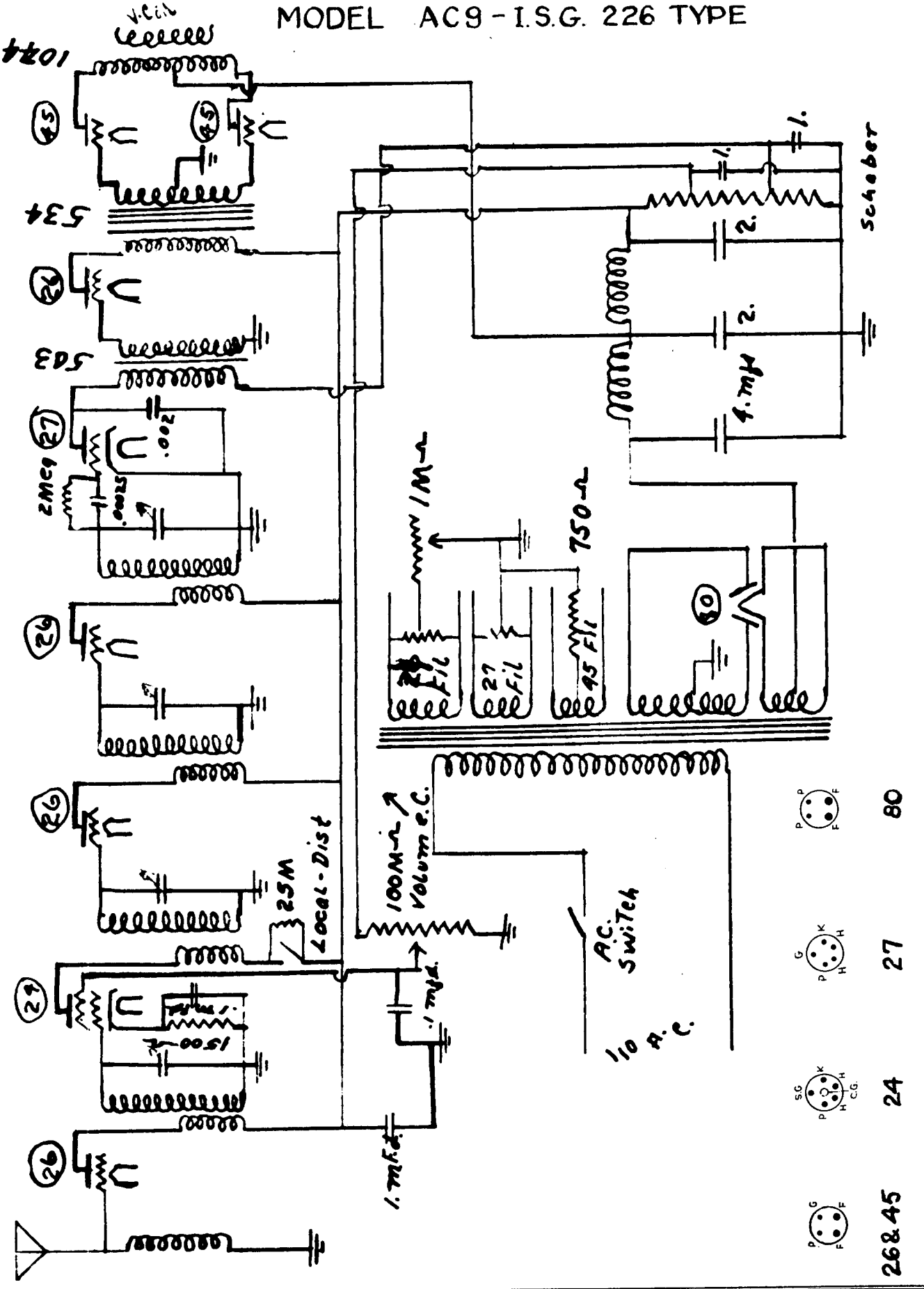


MODEL AC-9 ISG 227 TYPE



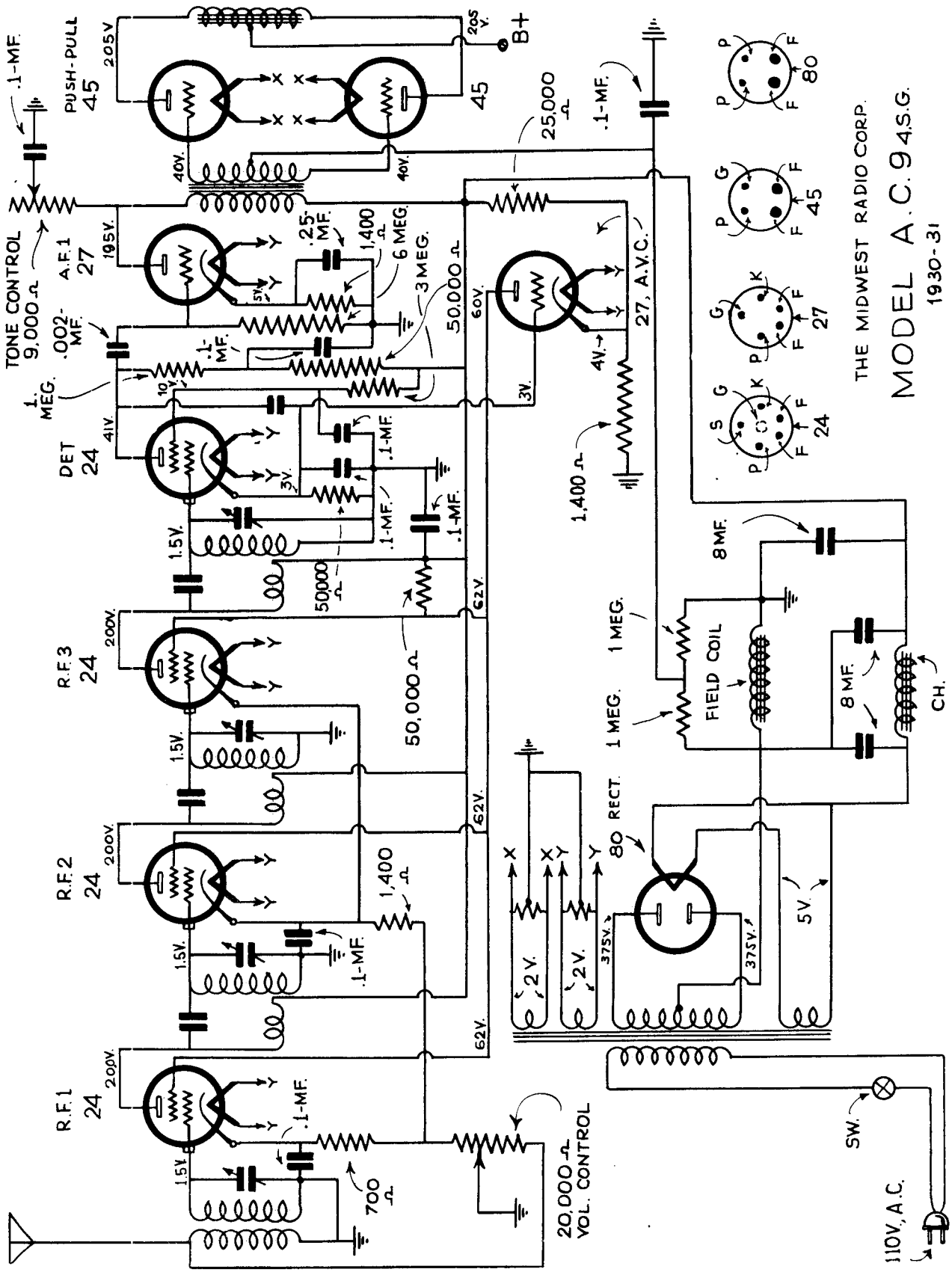
MIDWEST RADIO CORP.

MODEL AC9 - I.S.G. 226 TYPE



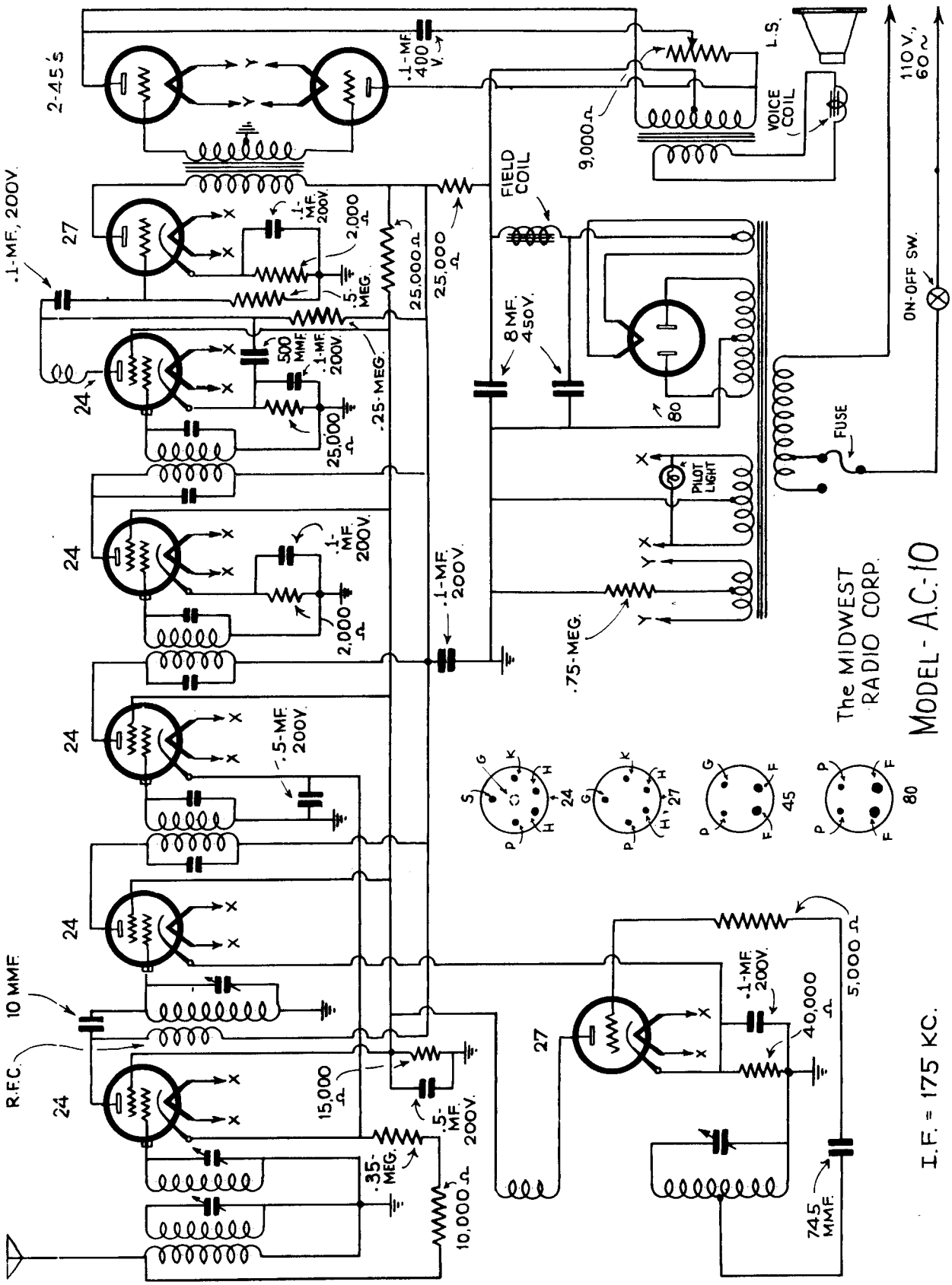
MIDWEST RADIO CORP.

MODEL AC-9 4SG -1930-31



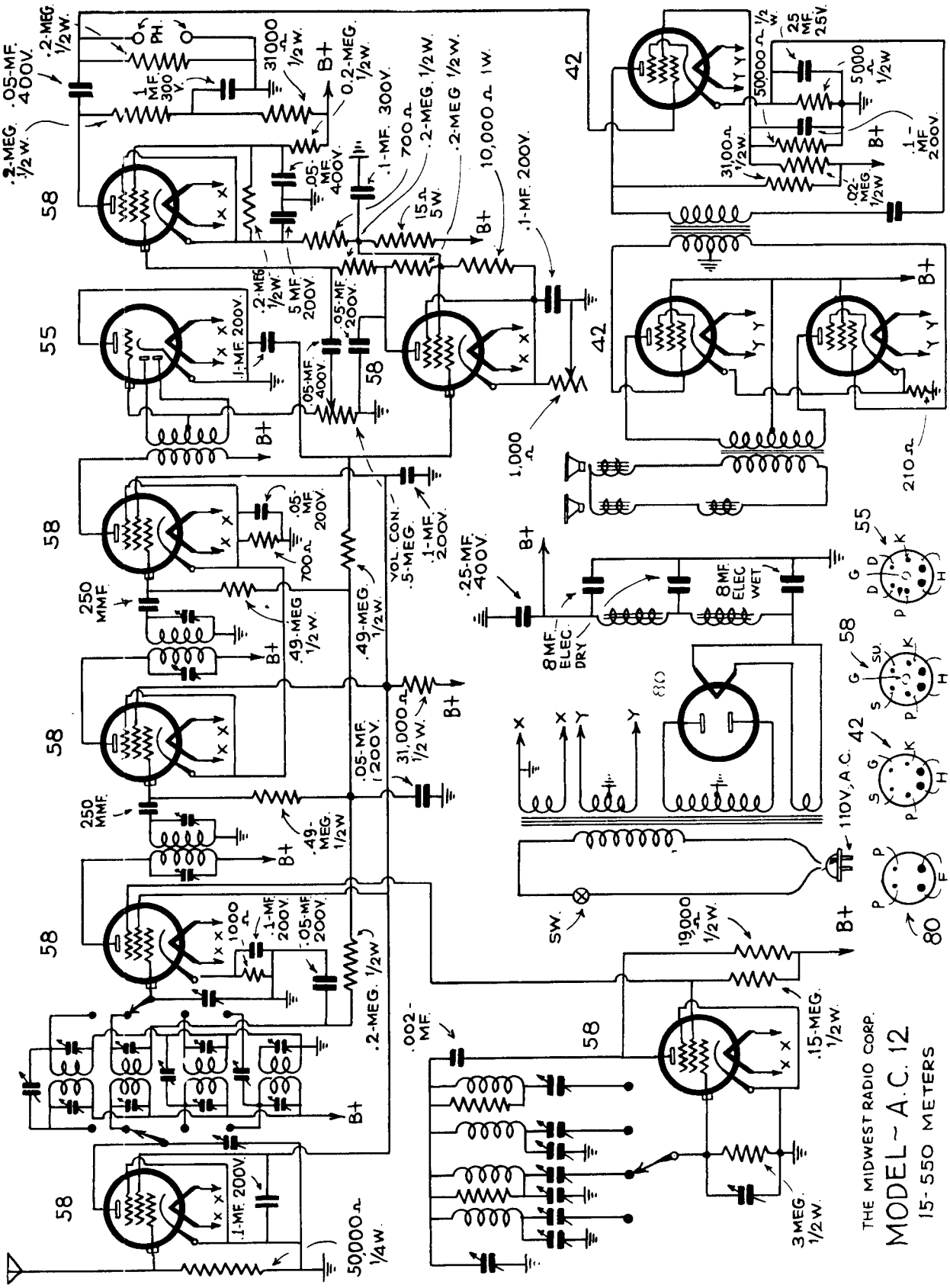
MIDWEST RADIO CORP.

MODEL AC-10



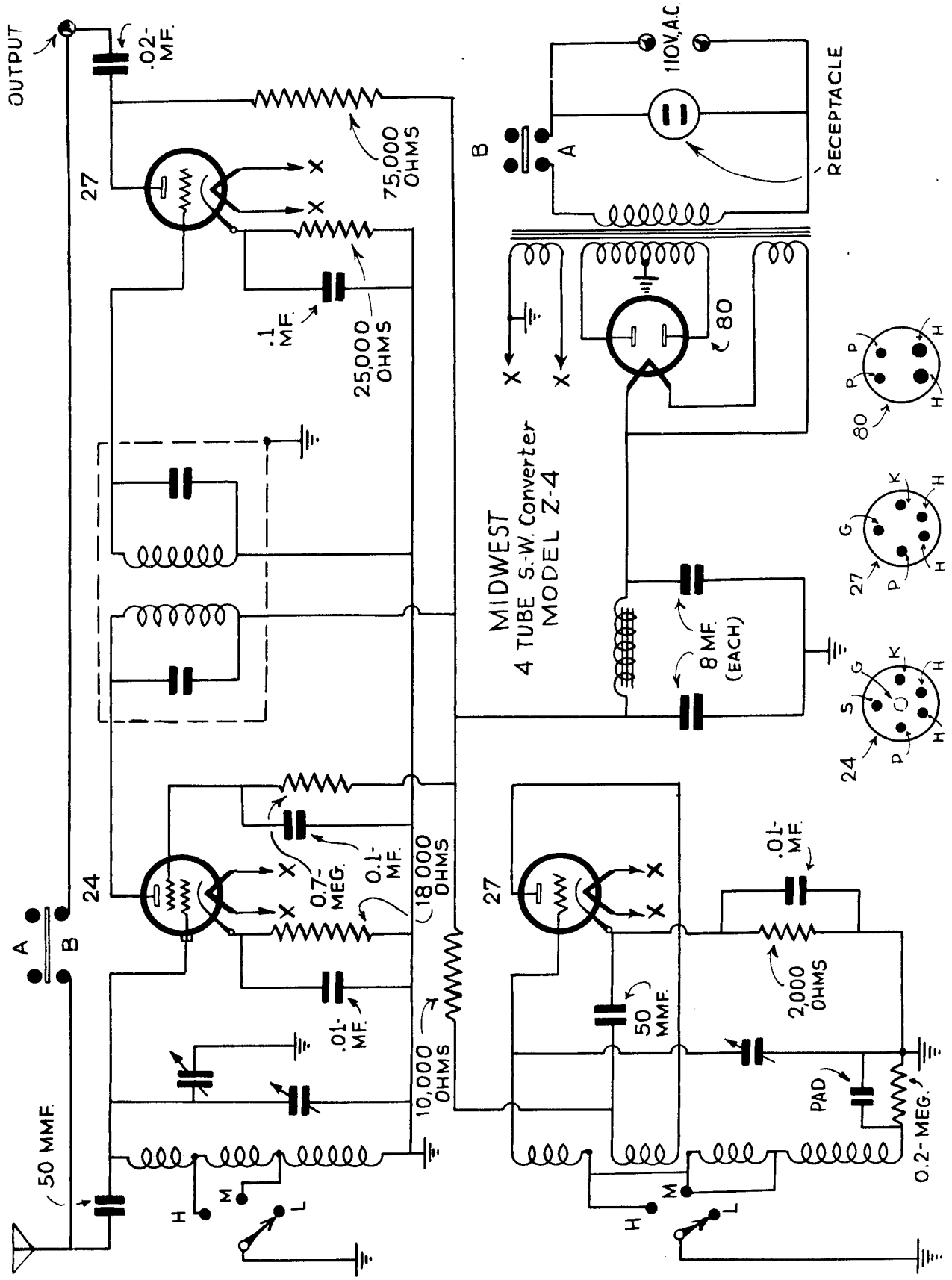
MIDWEST RADIO CORP.

MODEL AC-12 15 TO 550 METERS



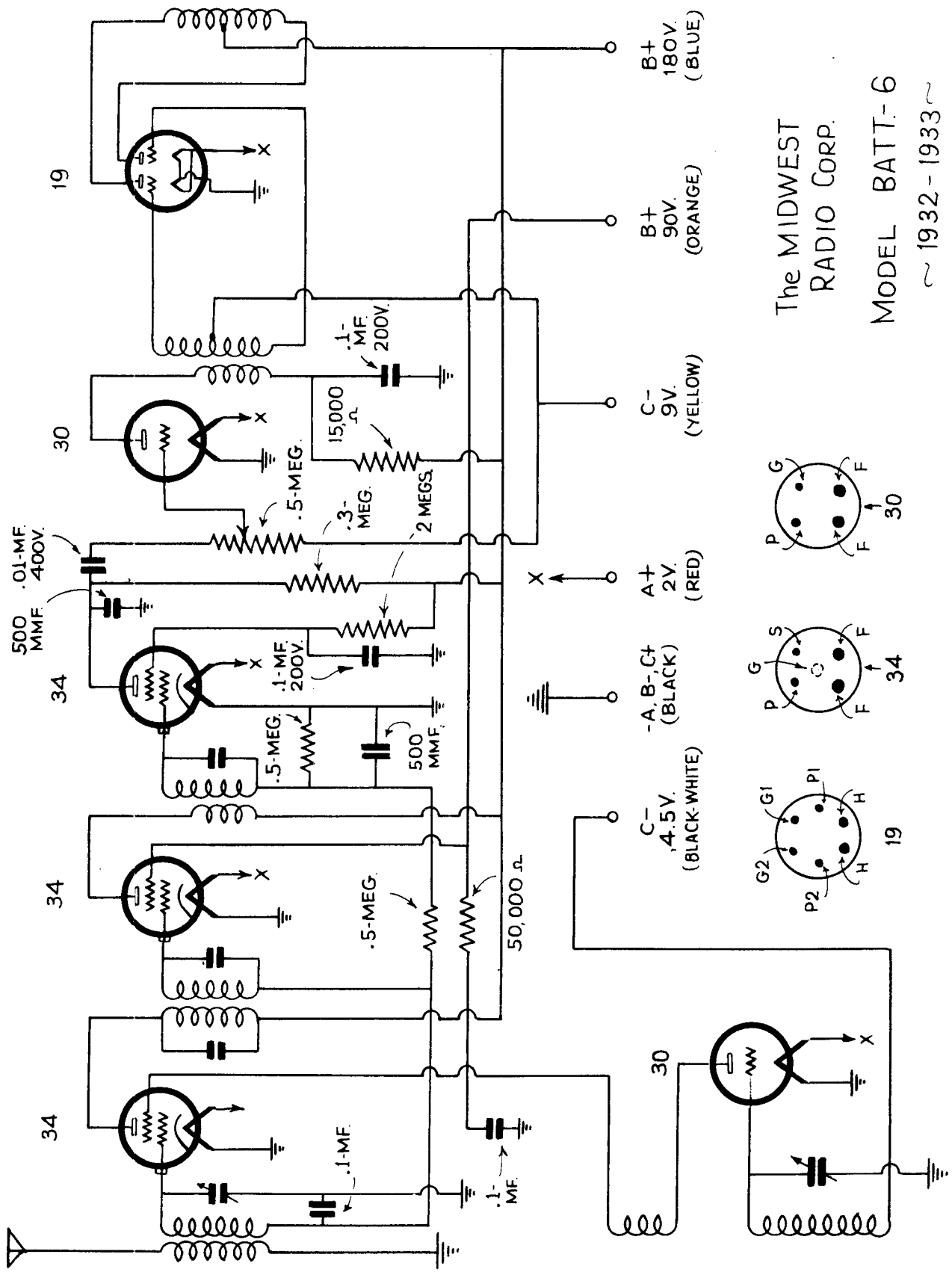
MIDWEST RADIO CORP.

Z4 - MODEL 4 TUBE SHORT WAVE CONVERTER



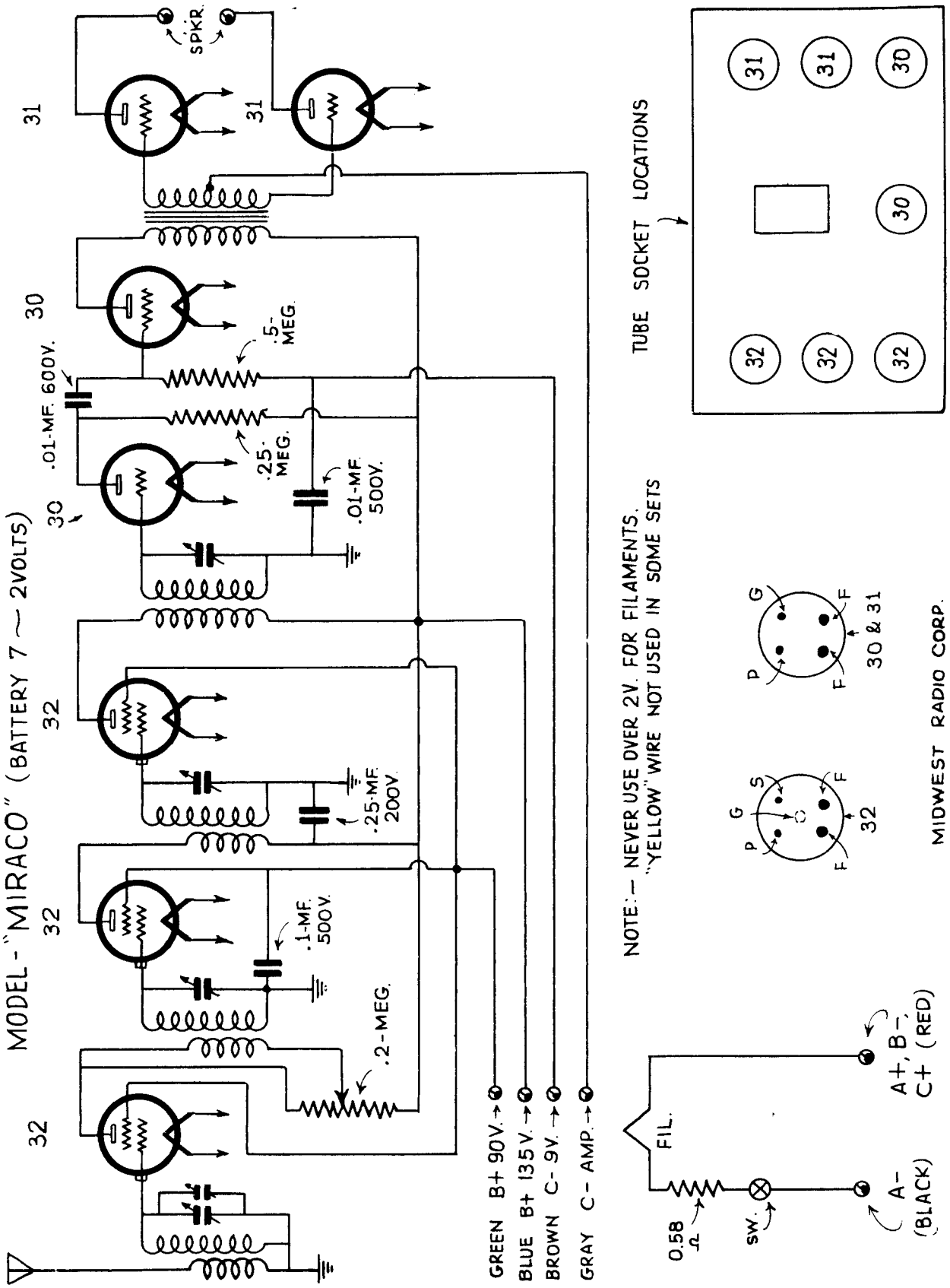
MIDWEST RADIO CORP.

BATTERY 6 MODEL



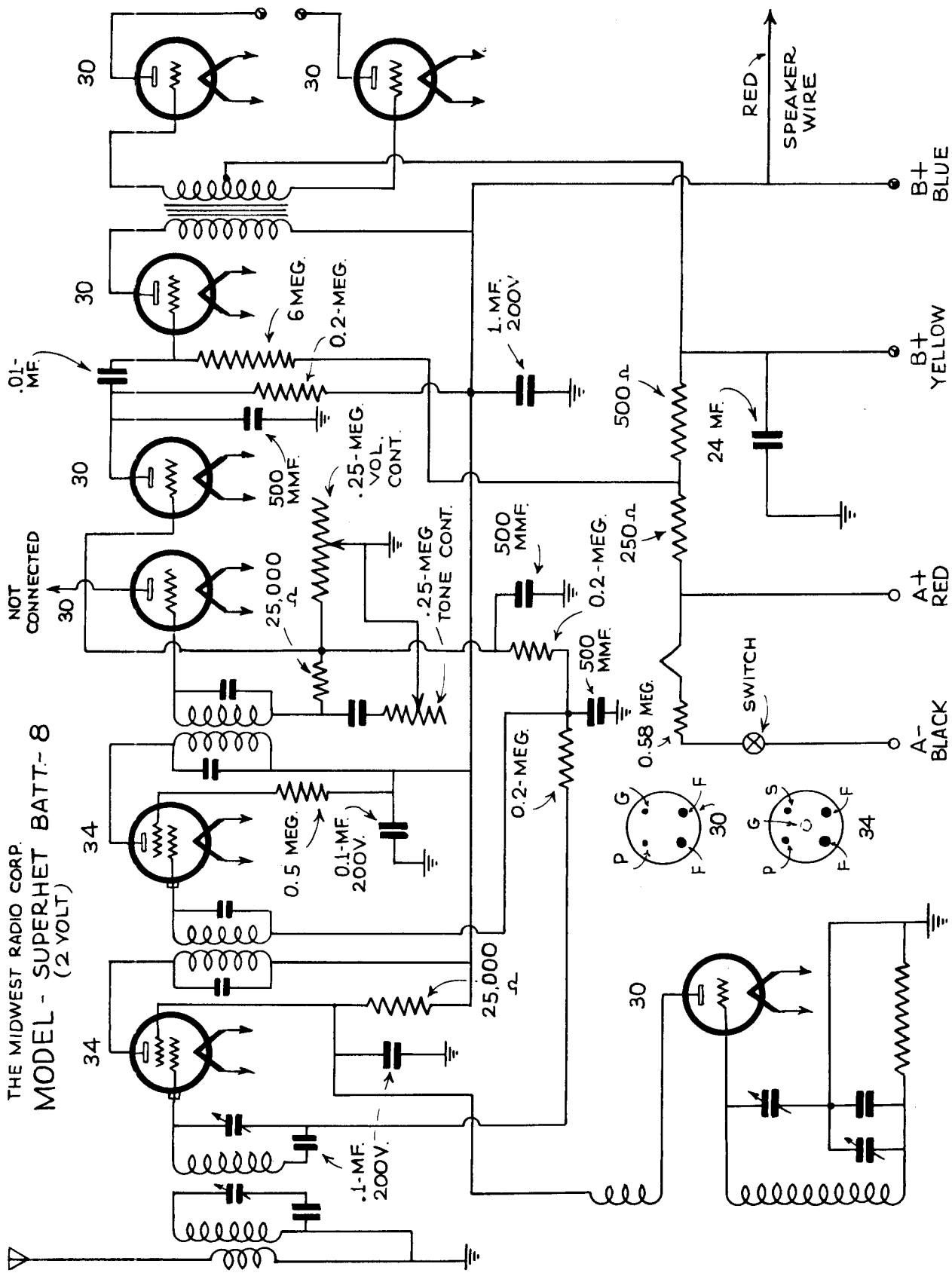
MIDWEST RADIO CORP.

BATTERY 7-2 VOLT MODEL



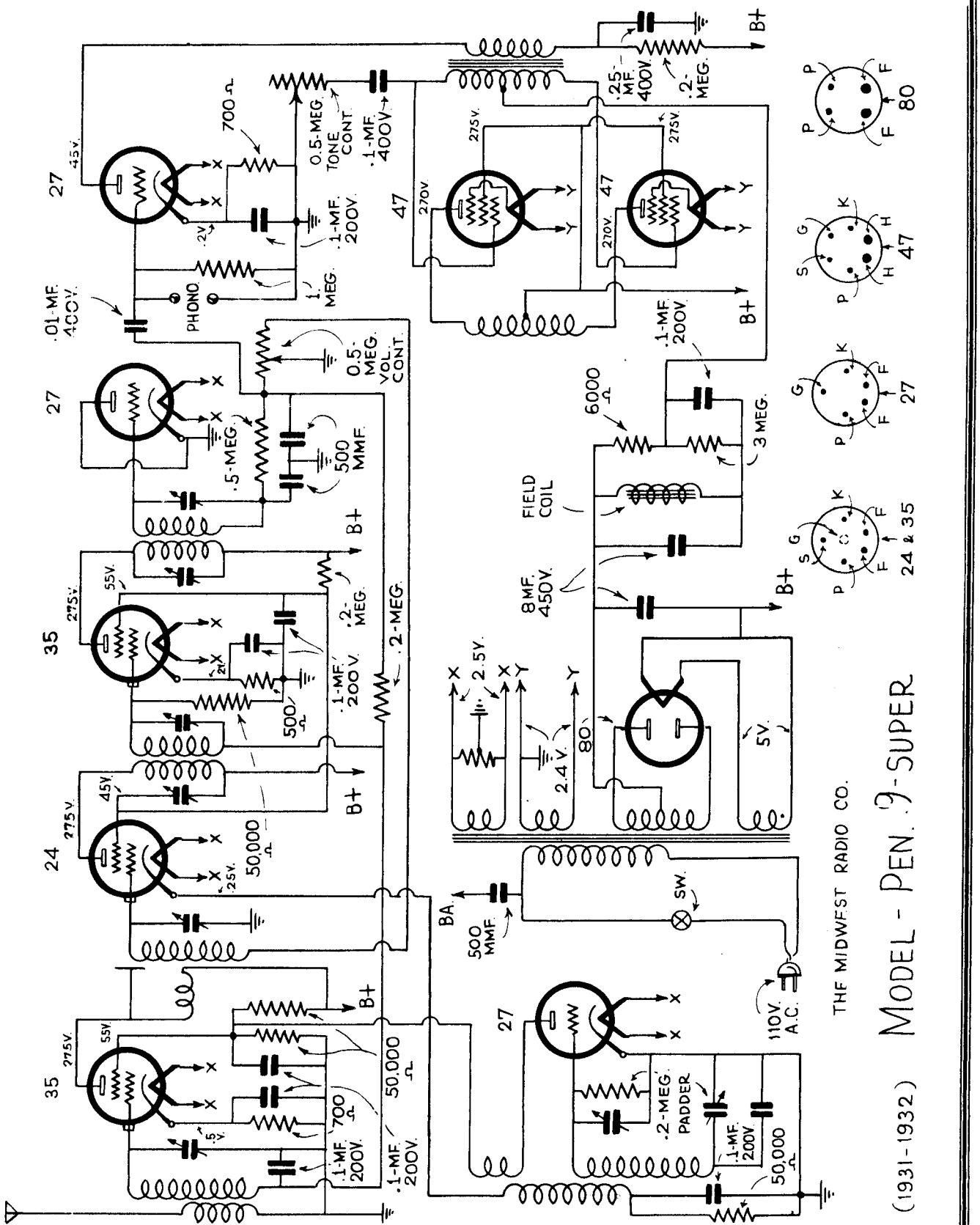
MIDWEST RADIO CORP.

SUPERHET BATTERY 8 - 2 VOLT MODEL



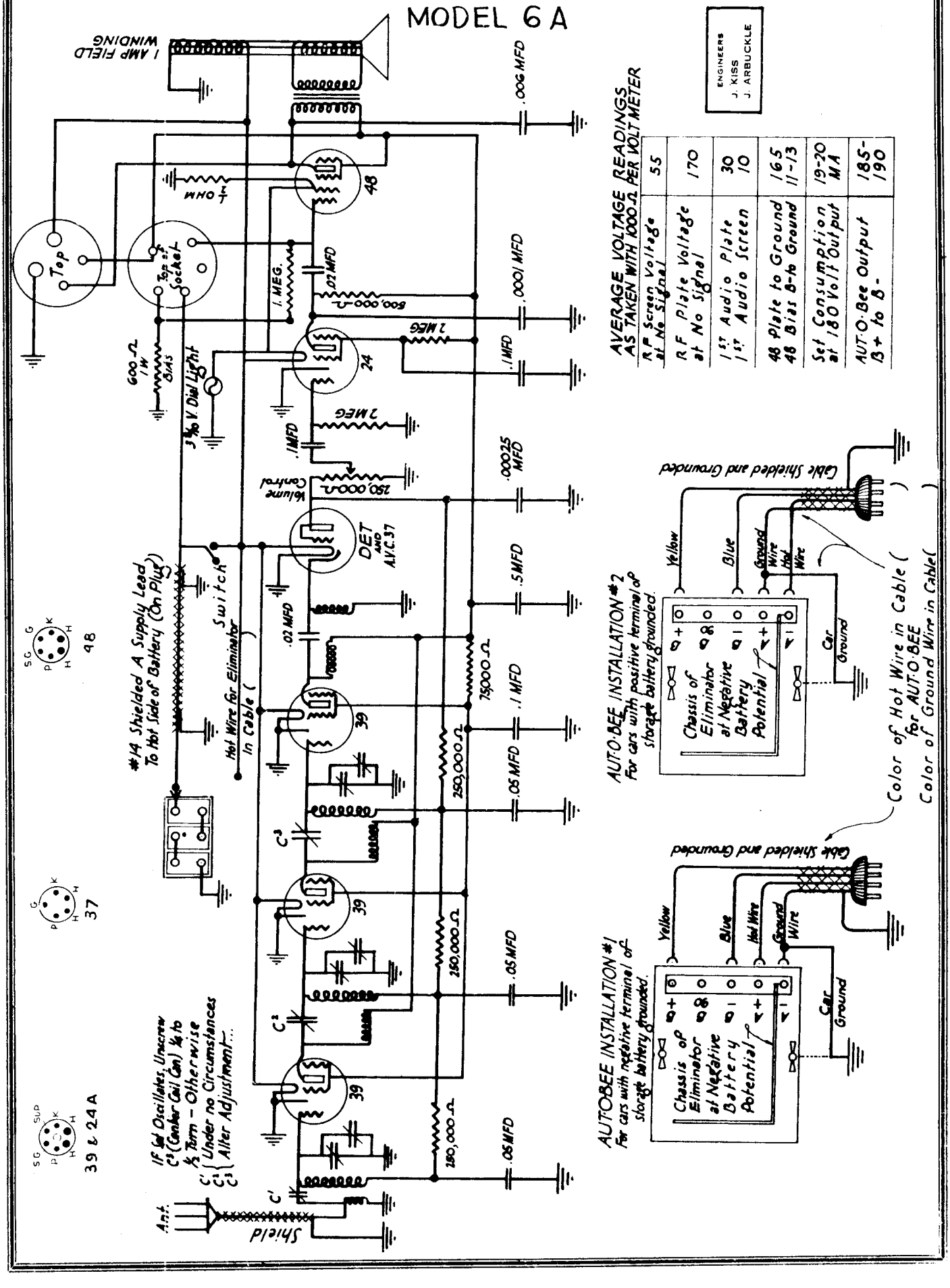
MIDWEST RADIO CORP.

PENTODE 9 SUPER MODEL 1931-32



MISSION BELL RADIO MFG. CO., Inc.

MODEL 6 A



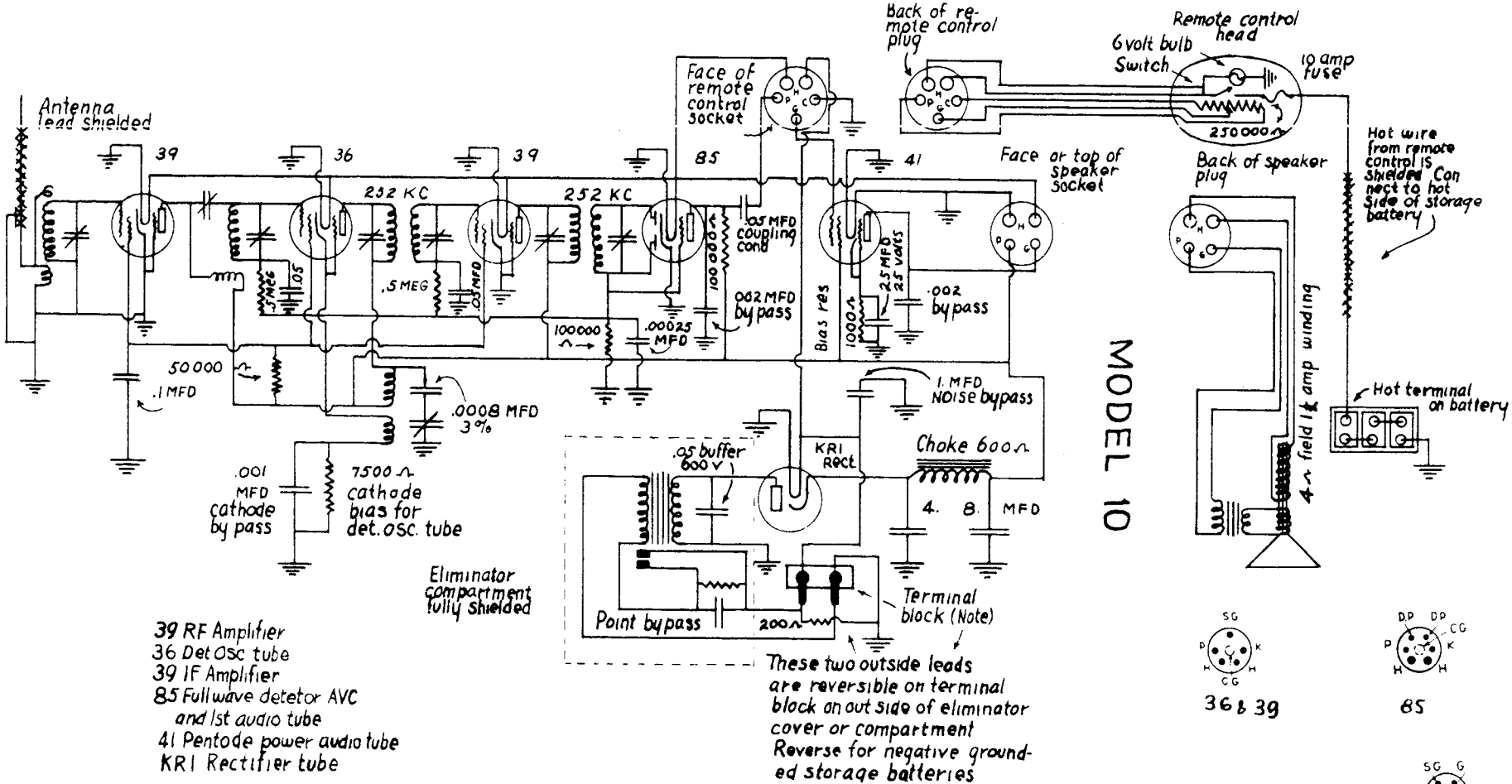
AVERAGE VOLTAGE READINGS AS TAKEN WITH 1000Ω PER VOLT METER

R.F. Screen Voltage at No Signal	55
R.F. Plate Voltage at No Signal	170
1st Audio Plate	30
1st Audio Screen	10
48 Plate to Ground	165
48 Bias B-to Ground	11-13
Set Consumption at 180 Volts Output	19-20 MA
AUTO-BEE Output B+ to B-	185-190

ENGINEERS
J. KISS
J. ARBUCKLE

MISSION BELL RADIO MFG. CO., Inc.

MODEL 10

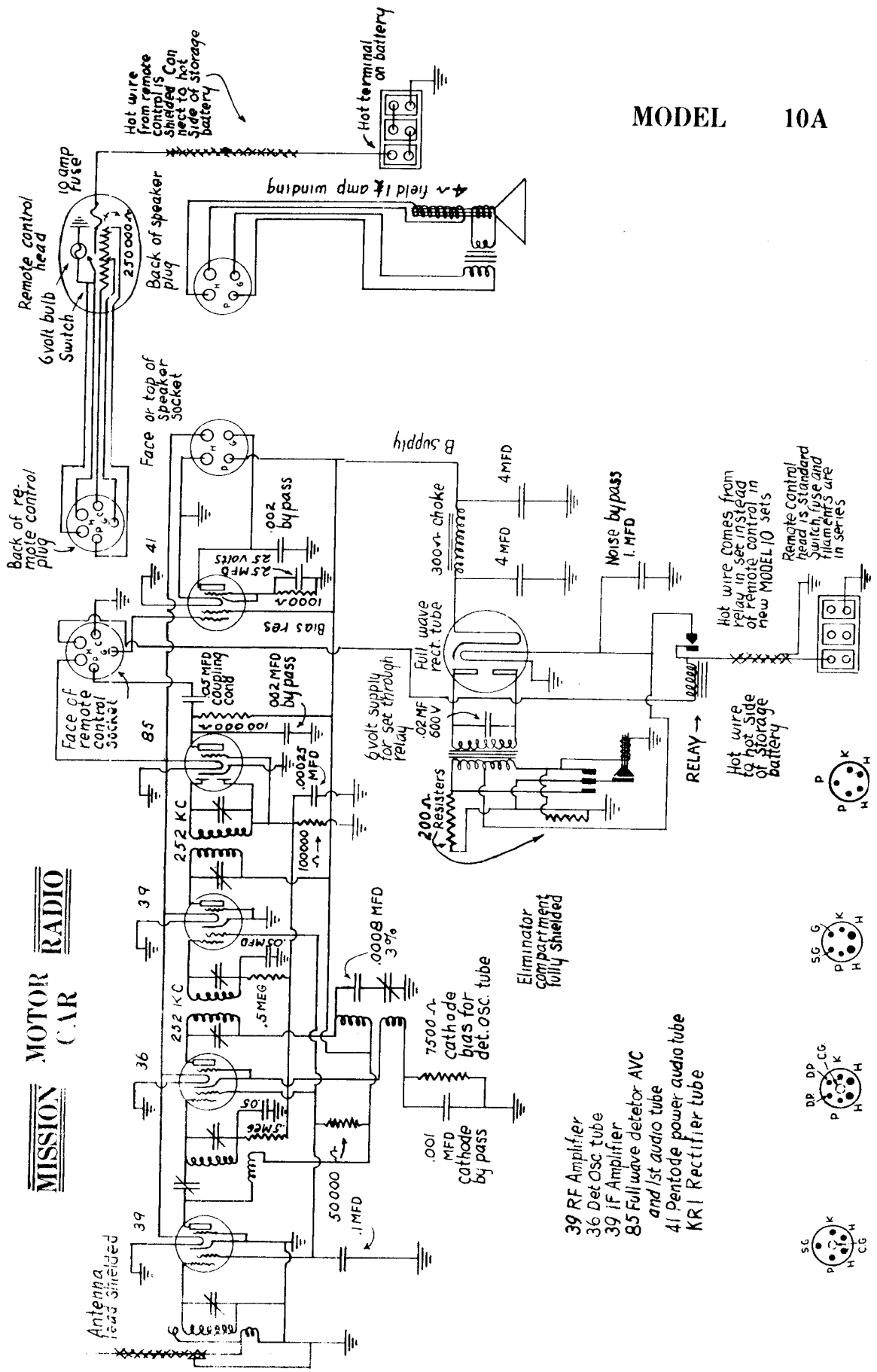


Seven tuned circuits are used, and the tube equipment is as follows:

1 - 6C6 Radio Frequency Pentode Tube - used as both 1st detector and oscillator.
2 - 6D6 Vari-Mu Tubes - used in radio frequency and intermediate stages.
1 - #85 Diode-Triode - used as both 1st audio frequency and 2nd detector.
1 - #42 Power Pentode Tube - used in the 2nd audio frequency stage.
1 - #84 Full-Wave Vacuum Rectifier Tube.
(Note: Above tube equipment applies to all sets beginning with serial #3700. Prior to that number, the #36 and #39 tubes were used in place of 6D6 and 6C6)

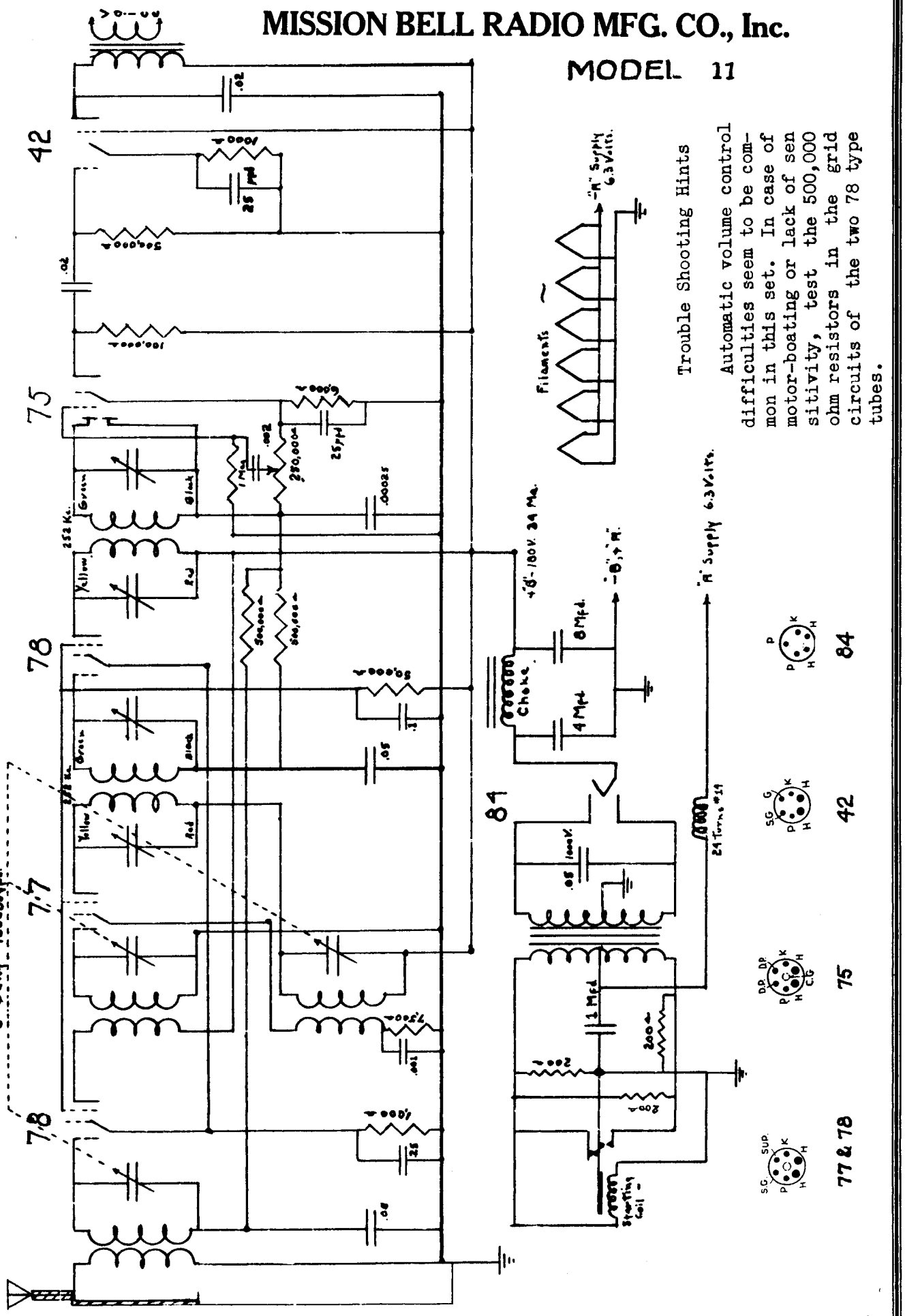
MISSION BELL RADIO MFG. CO., Inc.

MODEL 10A



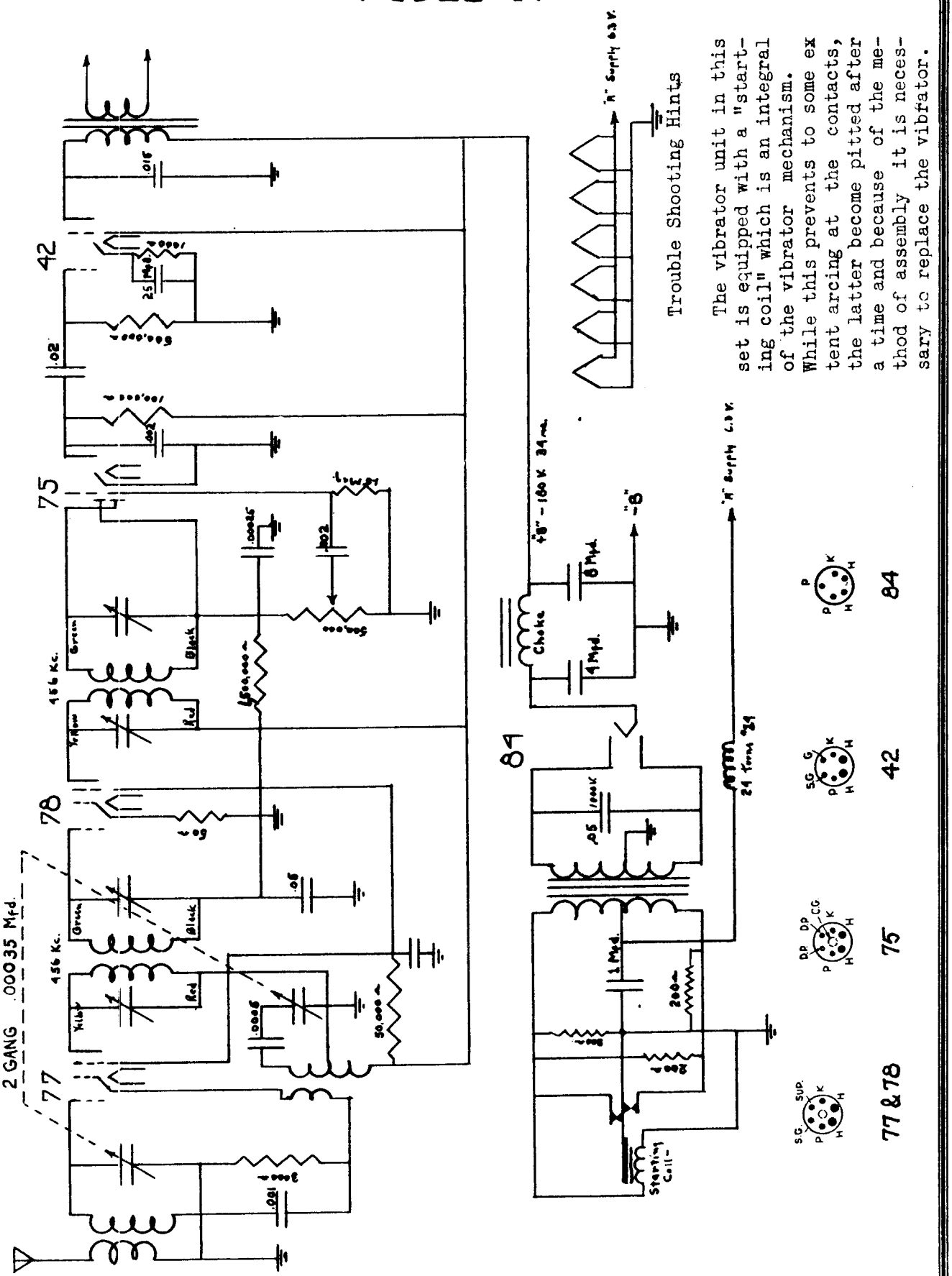
MISSION BELL RADIO MFG. CO., Inc.

MODEL 11



MISSION BELL RADIO MFG. CO., Inc.

MODEL 14

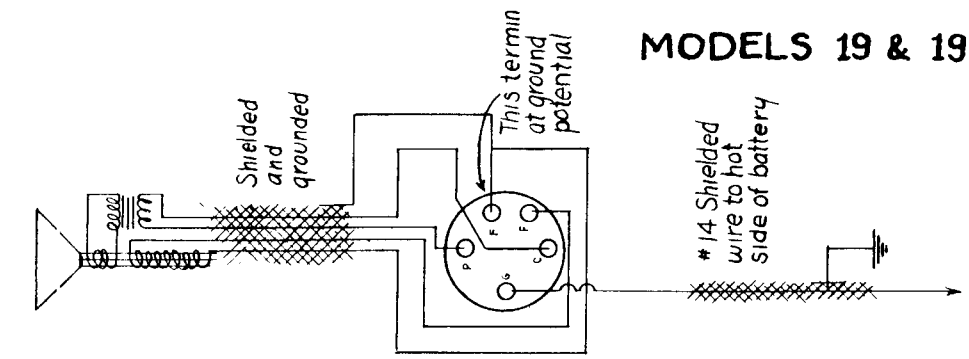


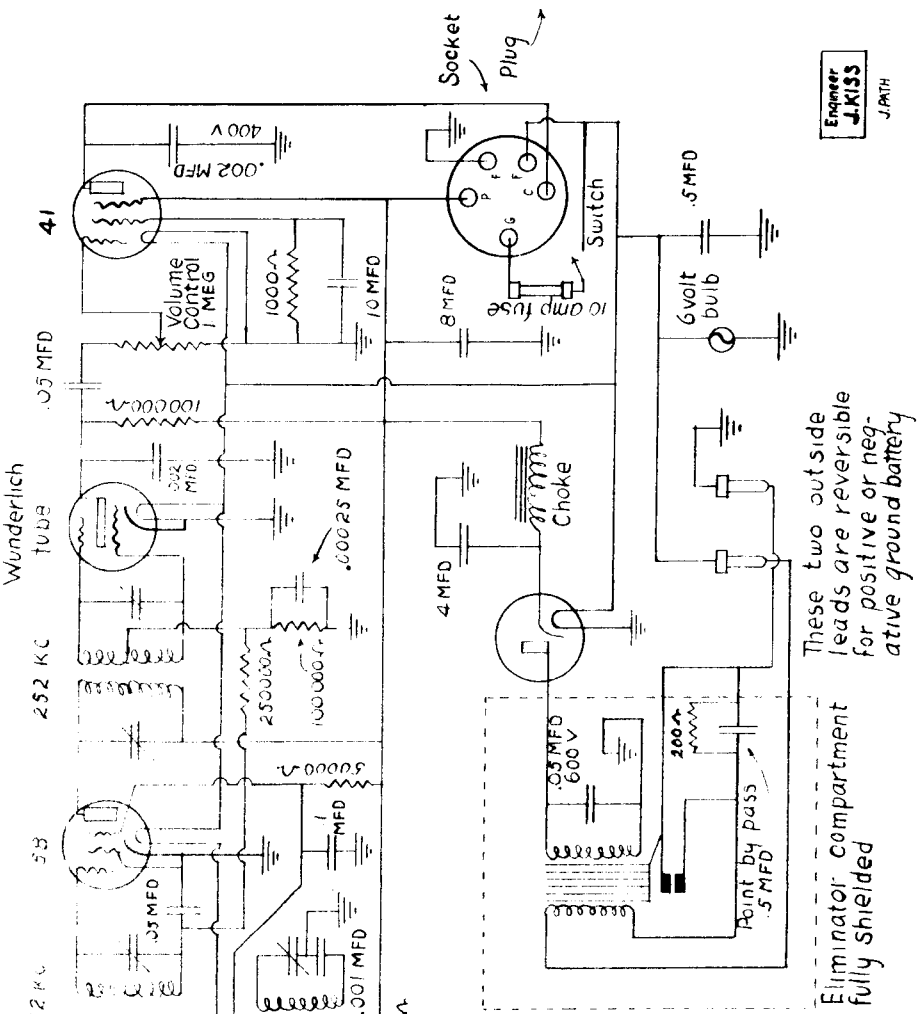
Trouble Shooting Hints

The vibrator unit in this set is equipped with a "starting coil" which is an integral of the vibrator mechanism. While this prevents to some extent arcing at the contacts, the latter become pitted after a time and because of the method of assembly it is necessary to replace the vibrator.

MISSION BELL RADIO MFG. CO., Inc.

MODELS 19 & 19A





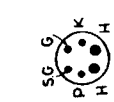
MODEL 19 AND 19A

NOTE
57 and 58 tube filaments are in series with ½ ohm resister to drop voltage

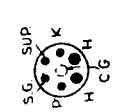
Mission Bell Radio Mfg. Inc.
1455 Venice Blvd., Los Angeles

Trouble Shooting Hints

The 77 tube used as first detector must be in good condition or the set will not operate. If the set becomes insensitive this tube should be checked on a tube tester and if necessary a new one should be inserted.



41

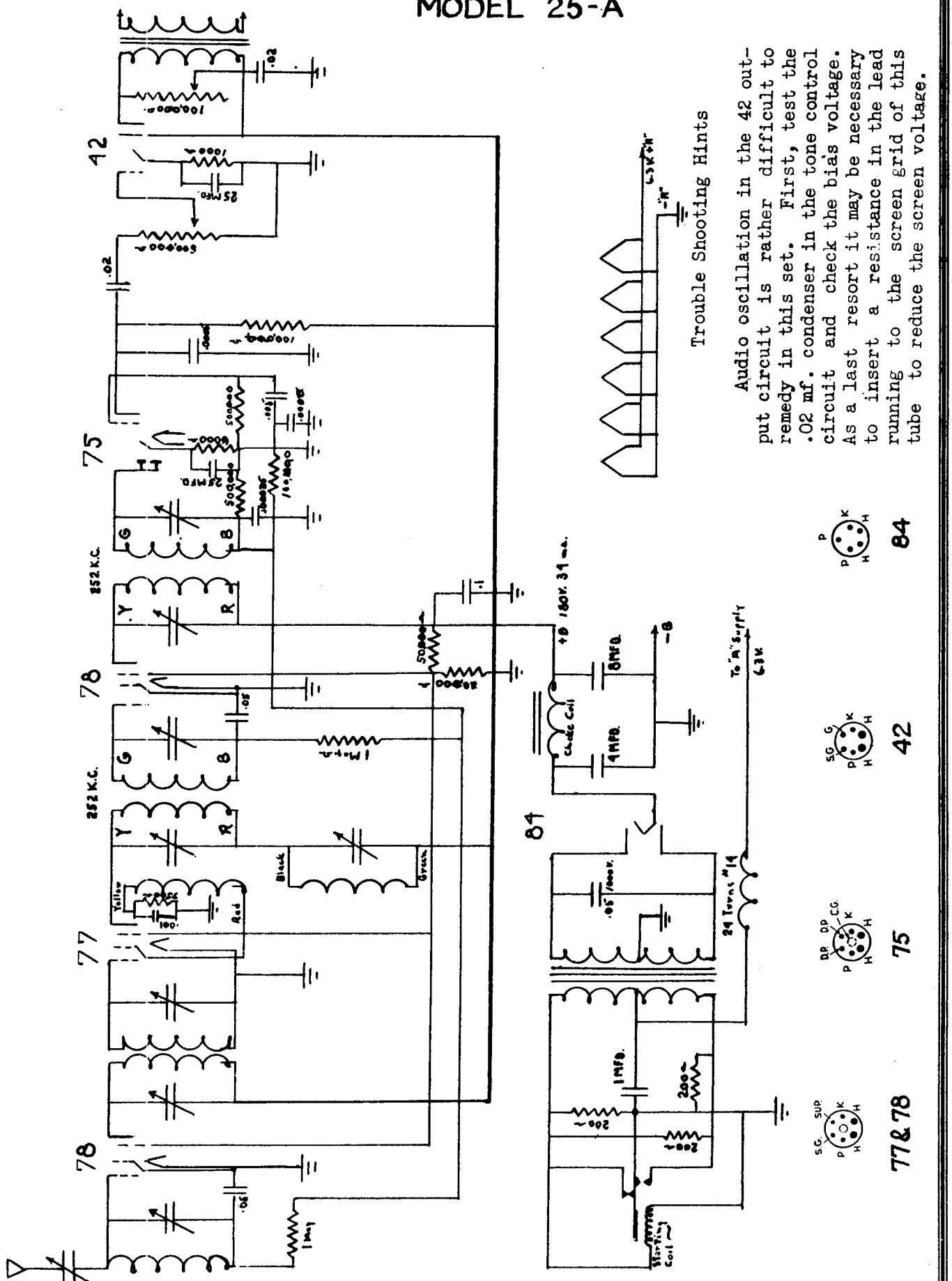


57&58

WUNDERLICH

MISSION BELL RADIO MFG. CO., Inc.

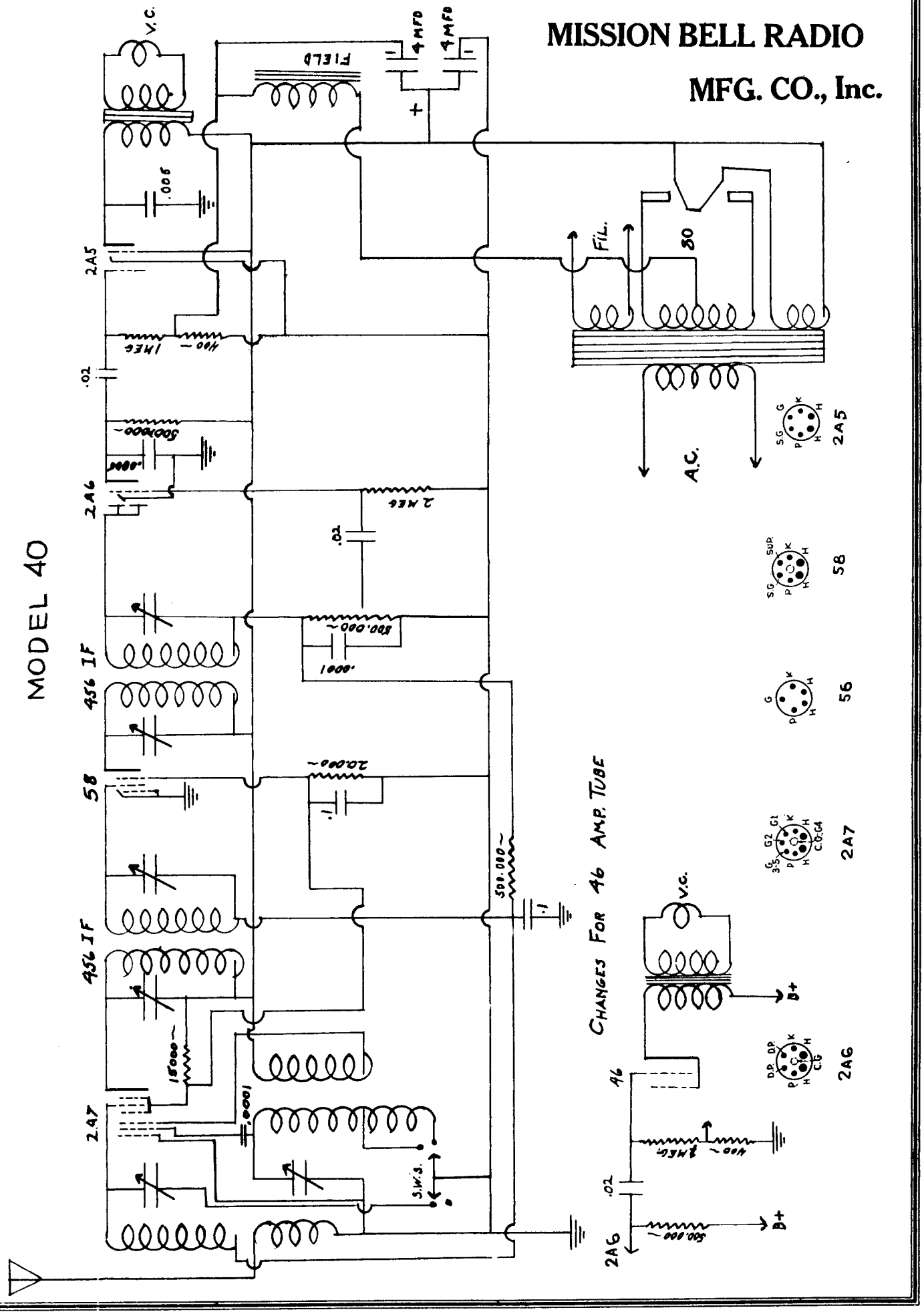
MODEL 25-A



MISSION BELL RADIO

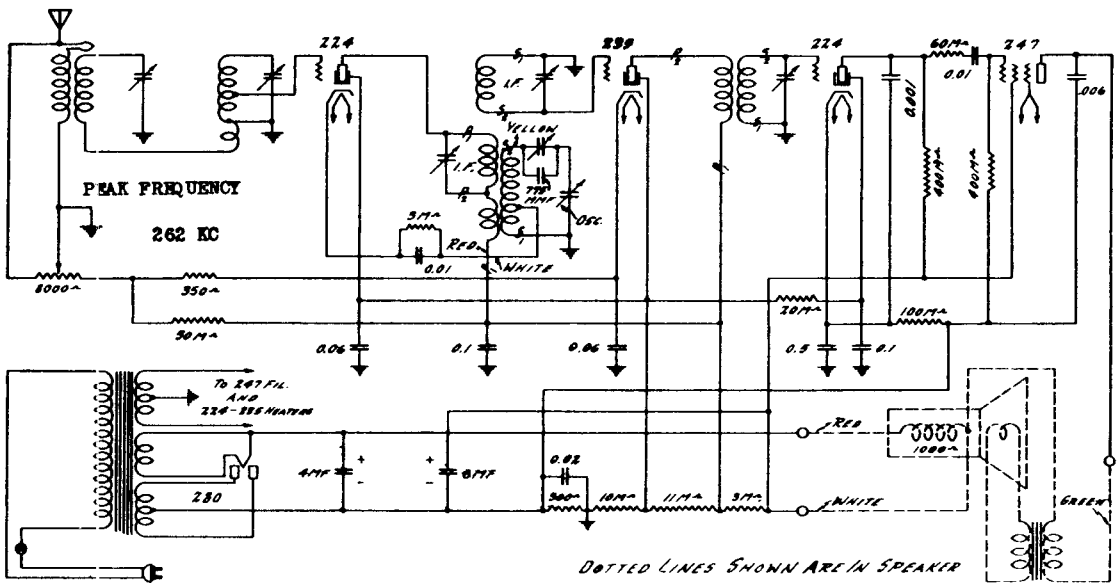
MFG. CO., Inc.

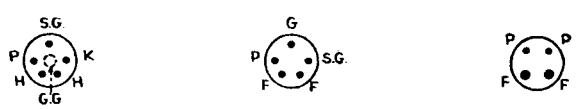
MODEL 40



MONTGOMERY WARD & CO.

MODELS 13, 15, 16, 16X, 18 & 18X

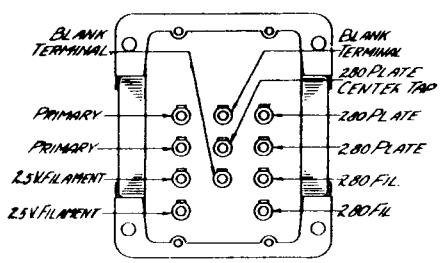




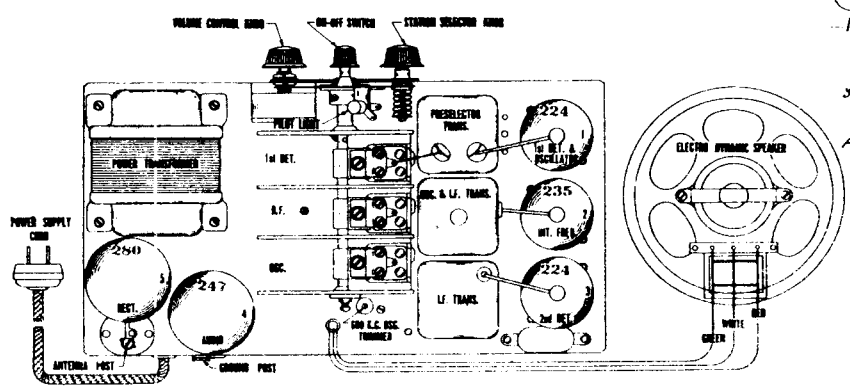
24 ℣
35

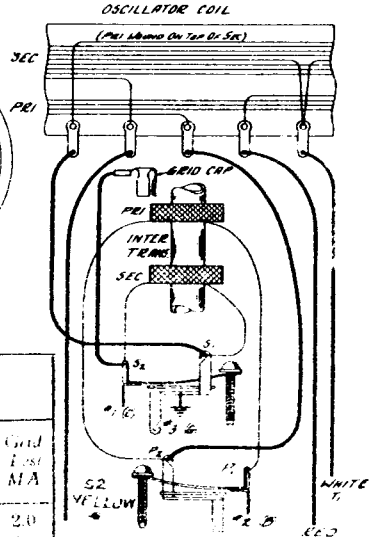
47

80



Power Transformer Terminals





Oscillator Coil Assembly

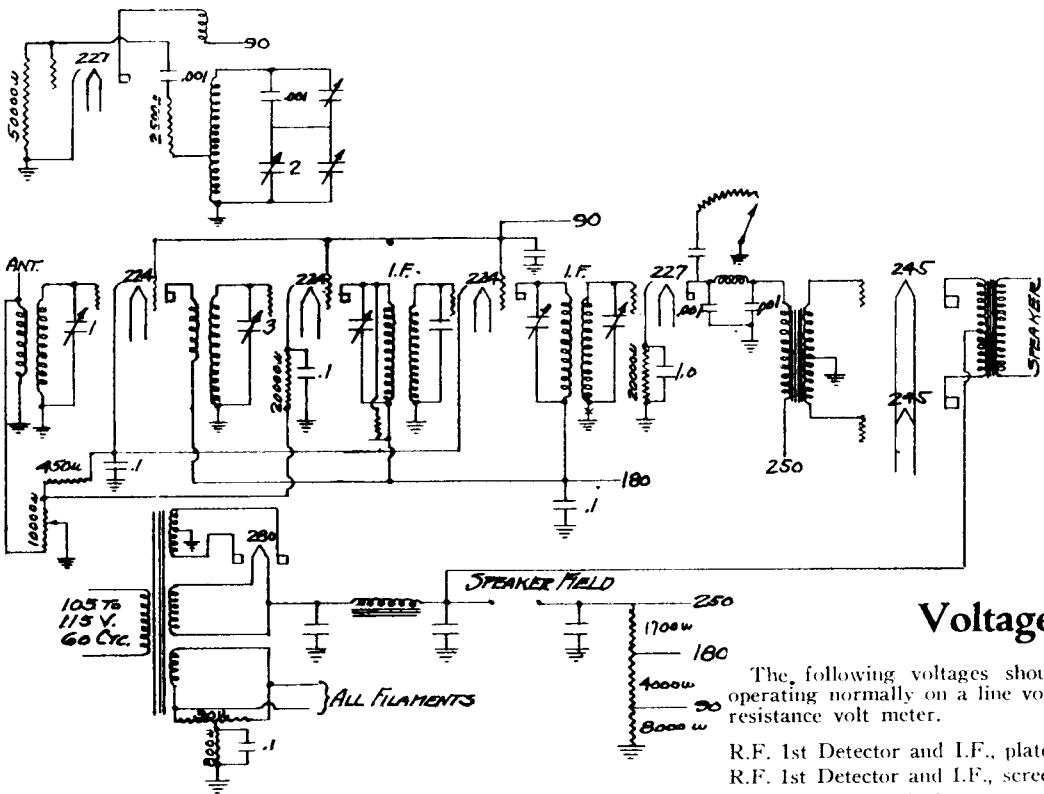
VOLTAGES AT SOCKETS
LINE VOLTAGE 115—VOLUME CONTROL AT MAXIMUM

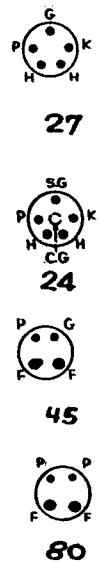
Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Volts	Screen Current MA	Cathode Volts	Plate MA	Grid Leak MA
224	1	1st Det. & Osc.	2.25	165	4.5-5.25(1)	65	.4	4.5-5.25(1)	1.3	2.0
235	2	I.F.	2.25	165	2.5	65	1.5	2.5	6.4	7.1
224	3	2nd Det.	2.25	128	6.5	60(2)	.05	6.5	.32	.23
247	4	Audio	2.25	205	16. (3)	225	8.0		29	.53
280	5	Rect.	4.9						27 per plate	

(1) Varies with frequency setting of dial approximately as shown
(2) Voltage as measured with 600,000 ohm meter.
(3) Measured across 500 ohm section of voltage divider resistor

MONTGOMERY WARD & CO.

MODELS 22;62-080, 62-090, 62-100





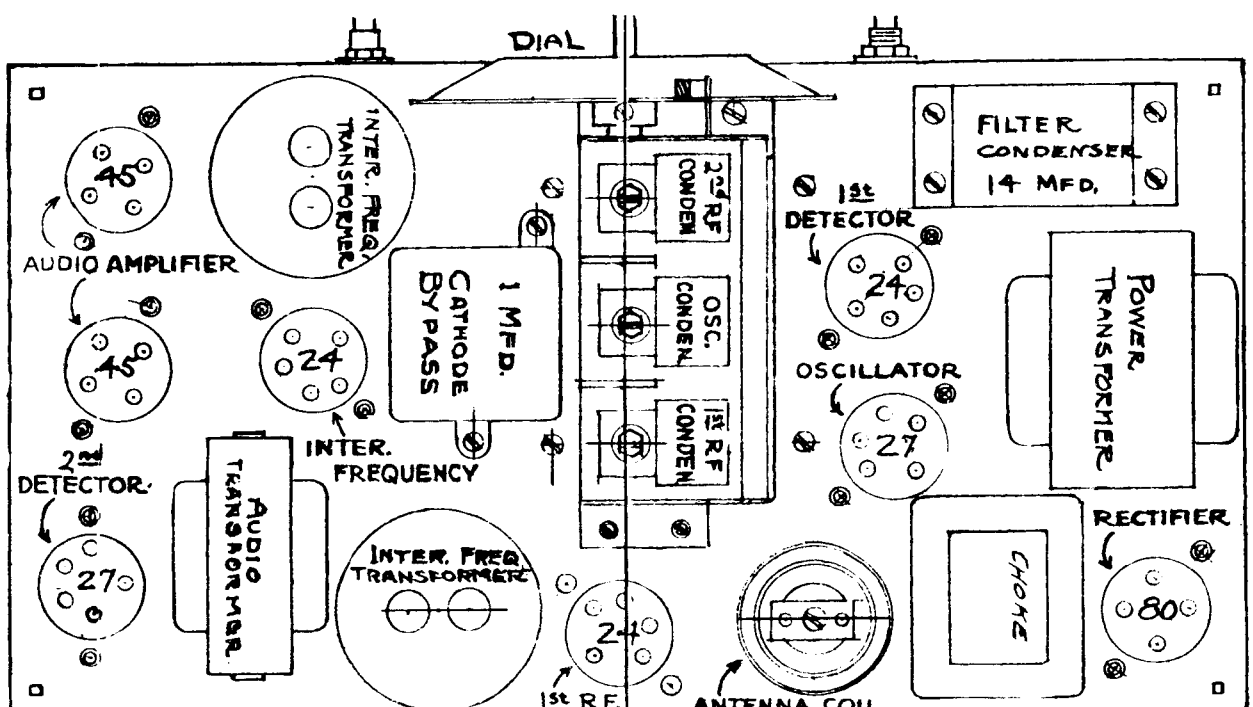
Trouble Shooting Hints

If the oscillator fails to work, try changing tubes and test for open-circuited coils. For voltage failure test the wet electrolytic condenser.

Voltage Chart

The following voltages should be obtained on a receiver operating normally on a line voltage of 110 volts, using a high resistance volt meter.

R.F. 1st Detector and I.F., plate to ground	180 volts
R.F. 1st Detector and I.F., screen to ground	90 "
R.F. and I.F., cathode to ground	4 "
1st Detector, cathode to ground	12 "
Oscillator, plate to ground	90 "
2nd Detector, plate to ground	200 "
2nd Detector, cathode to ground	22 "
'45 plate to filament	250 "
All filaments to ground	50 "
'45, '27 and '24 filaments	2.2 "
'80 filament	4.5 "



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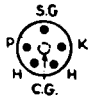
MODELS 62-010 -62-020 & 51



24

27

45

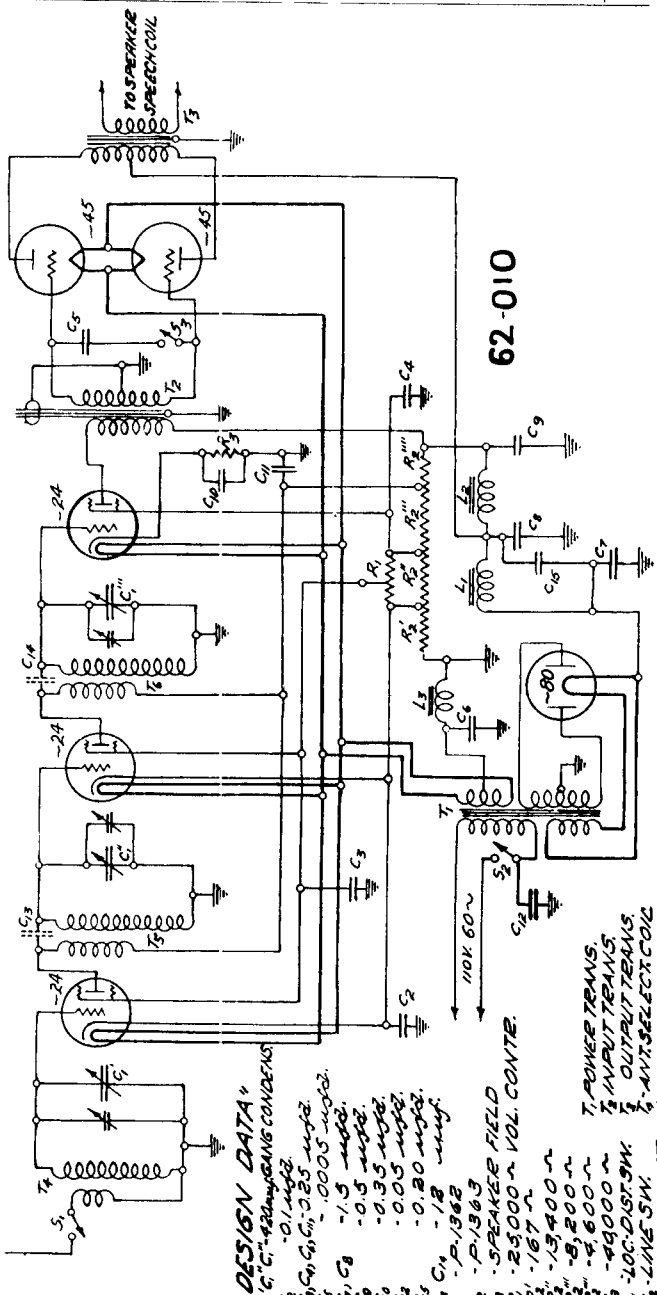
80

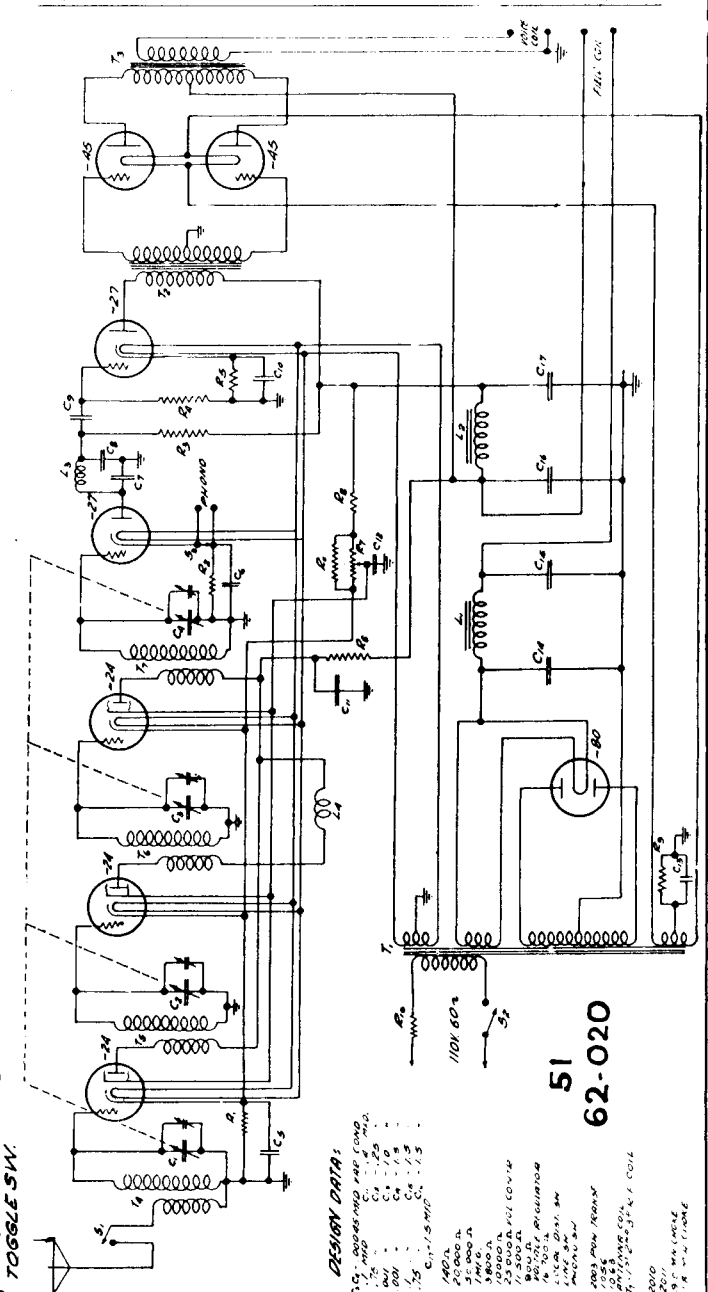
VOLTAGE CHART FOR 6 TUBE MIDGET
No. (62-010)

No.	Stage	Type Tube	A Volts	B Volts	Cont. Grid Volts	Cath. Volts	Ip' Norm.	Ip'' G. D.	Ip''-Ip' (Diff.)	SG Volts
1	1st r. f.	'24	2.05	165	2.6	44	2.1	3.6	1.5	76
2	2nd r. f.	'24	2.05	165	2.6	44	2.3	3.8	1.5	76
3	Det.	'24	2.06	196	*7.0	*26	*0.2	*1.3	*1.1	*70
4	AF	'45	2.15	230	45.0		28.	32.	4.0	
5	AF	'45	2.15	230	45.0		25.	29.	4.0	
6	Rect.	'80	4.6							

VOLTAGE CHART FOR 8 TUBE CONSOLE
No. (62-020) CHASSIS MODEL No. 51

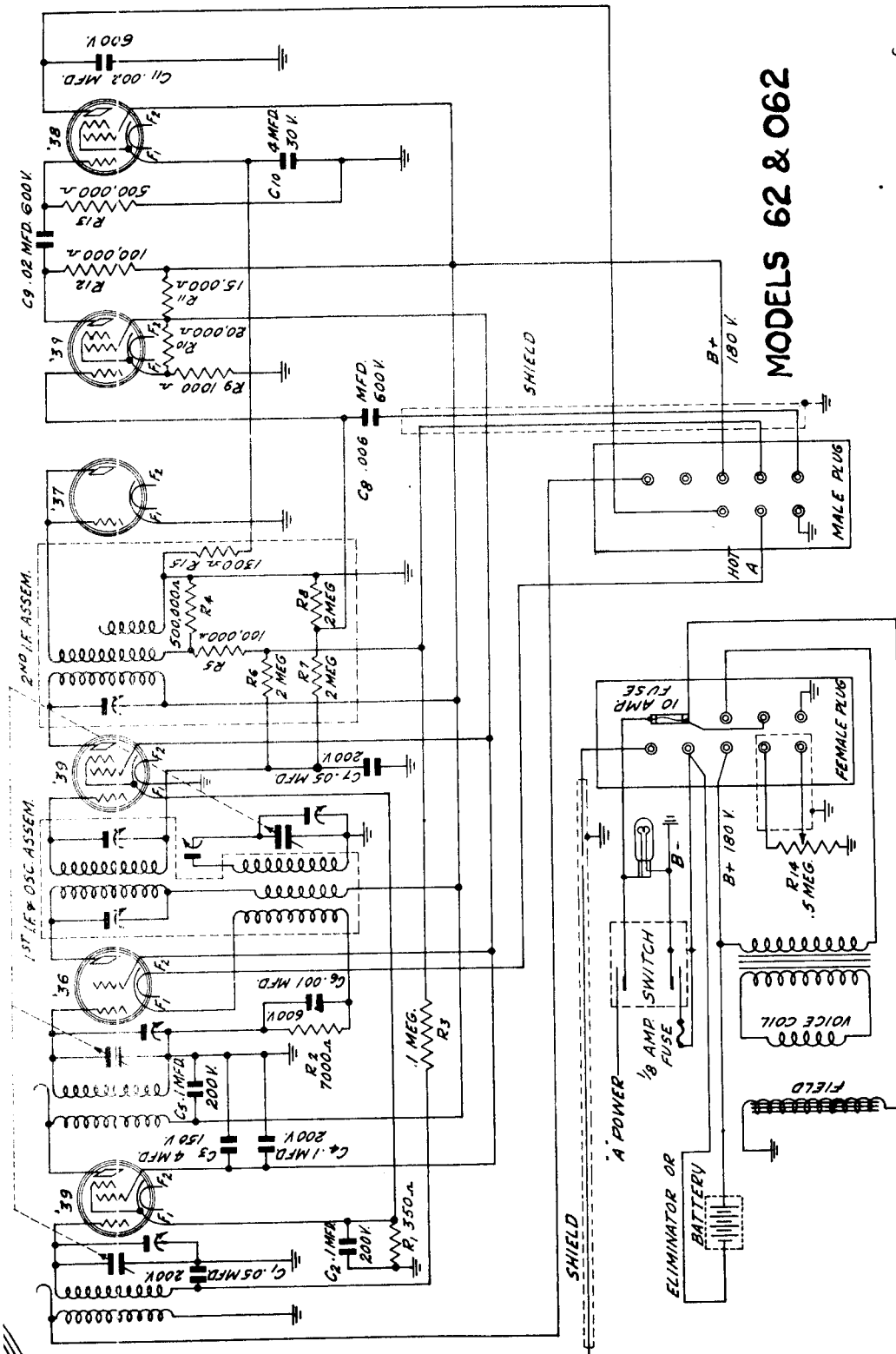
Tube Order	Tube Type	Stage in Set	Reading, Plug in Socket of Set, Tube in Tester							
			A Volts	B Volts	C Volts Cont. Grid	Cathode Heater Volts	Normal Plate M.A.	Plate M.A. Grid Test	Plate Charge M.A.	Screen Grid Volts
1	2	3	6	7	8	9	10	11	12	13
1	224	1 R. F.	2.09	146	2.43	2.43	2.72	5.55	2.82	87.5
2	224	2 R. F.	2.09	151	2.43	2.43	2.55	5.65	3.11	85.5
3	224	3 R. F.	2.09	151	2.43	2.43	2.72	5.8	2.92	87.5
4	227	Det.	2.09	134	12.2	13.15	.58	.78	.194	
5	227	1 A. F.	2.14	170	1.22	13.6	3.31	4.08	.78	
6	245	2 A. F.	2.14	195	37.5		20.4	24.3	3.9	
7	245	2 A. F.	2.14	195	37.5		23.4	27.2	3.9	
8	280	Rect.	4.51				35. *			

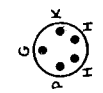


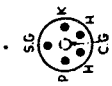


MONTGOMERY WARD & CO.

MODELS 62 & 062







The circuit consists of an antenna stage, a '39 R. F. stage, a '36 Detector-oscillator stage, a '39 I. F. stage, a '37 diode detector stage, a '39 first audio stage, and a '38 output stage.

The intermediate frequency is 262 K. C. The diode current establishes a drop across a resistor network, which is used as an additional bias voltage on the R. F. '39, I. F. '39, and audio '39 tubes, giving automatic volume control action.

The full control voltage is supplied to the R. F. tube, two-thirds to the I. F. tube, and one-third to the audio tube. As the signal increases in intensity, the applied control voltage is increased, thus giving uniform output as set by the manual volume control. The manual volume control varies the diode audio voltage applied to the first audio tube.

An electrodynamic speaker with the field energized by the six-volt car battery is used. Power for the receiver is obtained from the car storage battery and from a "B" eliminator or from "B" batteries. The tone control is mounted on the speaker. The tubes used are the new six-volt tubes especially designed for automobile radio receivers.

Type of Tube	*Function*	*Across Heater*	*Plate to Cathode*	*Screen to Cathode*	*Grid to Cathode*	*Normal Plate MA*
'39	R. F.	6.	177	80	3	3.6
'36	1st Det.	6.	173	76	7(1)	.9(1)
'39	I. F.	6.	177	80	3	3.6
'37	2nd Det.	6.	0		0	0
39	1st Audio	6.	54	77	6	1.2
'38	Output	6.	159	165	15.5	10

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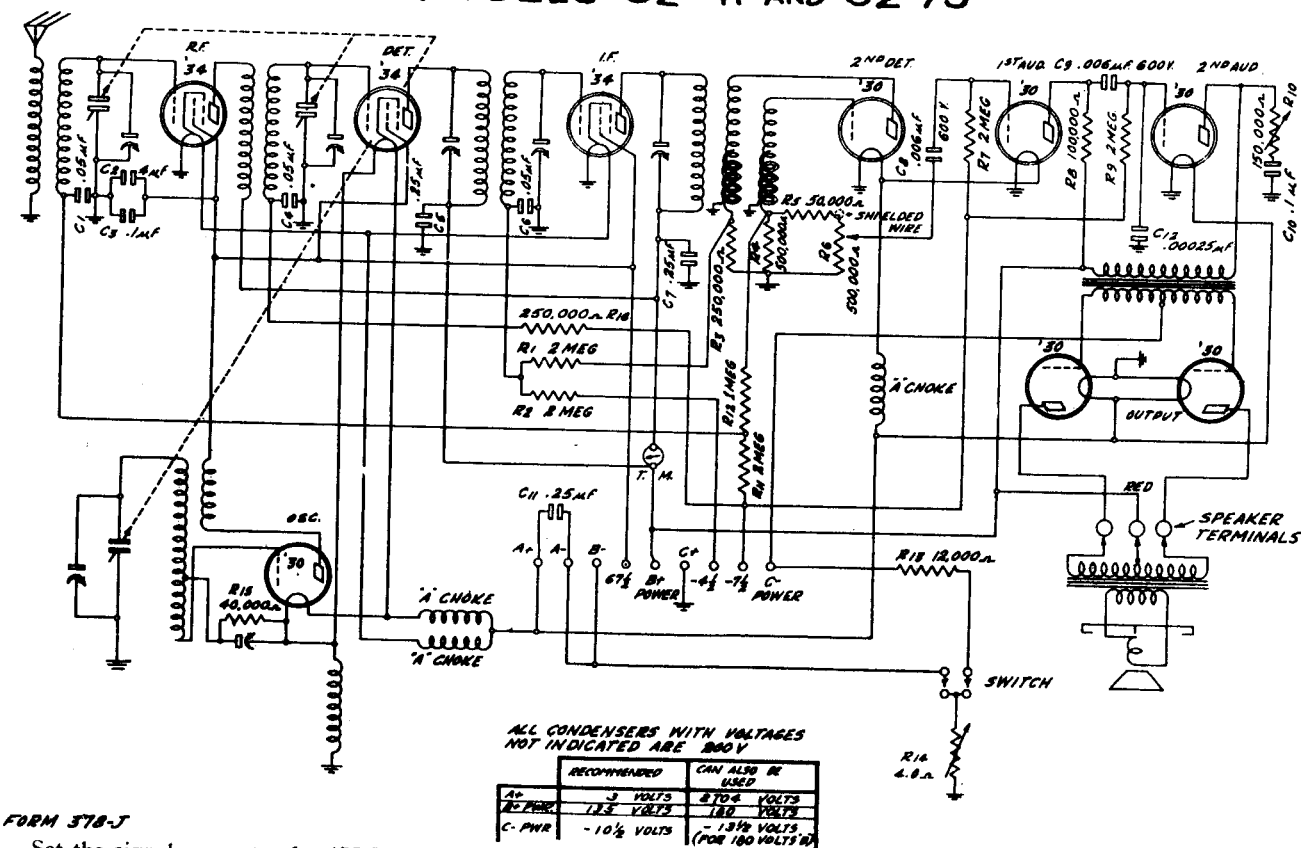
MODELS 62-41 AND 62-75



ALL CONDENSERS WITH VOLTAGES NOT INDICATED ARE 200 V

	RECOMMENDED	CAN ALSO BE USED
A+	3 VOLTS	2 TO 4 VOLTS
A+ PWR.	135 VOLTS	180 VOLTS
C- PWR	-10½ VOLTS	-13½ VOLTS (FOR 180 VOLTS 'B')

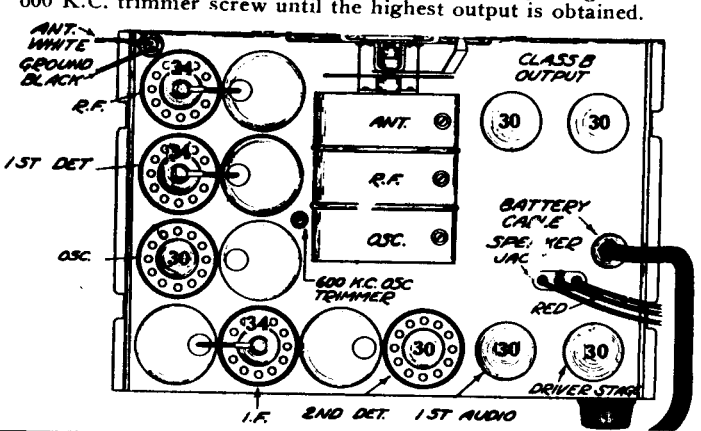
FORM 378-J

Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the three intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached from the top of the chassis and is between the tuning condenser and the coil cans.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.



Trouble Shooting Hints

Oscillation in these sets may be due to mis-alignment or to shorted "A" chokes. Low volume may be due to defective tubes or mis-alignment.

Voltages at Sockets

"B" AND "C" BATTERIES UP TO RATED VOLTAGE—FILAMENT CONTROL KNOB SET SO THAT FILAMENT VOLTAGE IS 2—ANTENNA LEAD SHORTENED TO GROUND—VOLTAGES READ FROM NEGATIVE FILAMENT LEG

Type of Tube	Function	Across Filament	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
'34	R.F.	2.0	125	65	2.88(1)	2.3
'34	1st Det.	2.0	130	65	7.5(1)	1.4
'30	Osc.	2.0	67		4-15(2)	1.6-4(2)
'34	I.F.	2.0	120	65	2.38(1)	2.4
'30	2nd Det.	2.0	0		0	0
'30	1st Audio	2.0	85		7.5(1)	.5
'30	Driver	2.0	125		7.5(1)	4.0
'30	Output	2.0	130		10.	1.1

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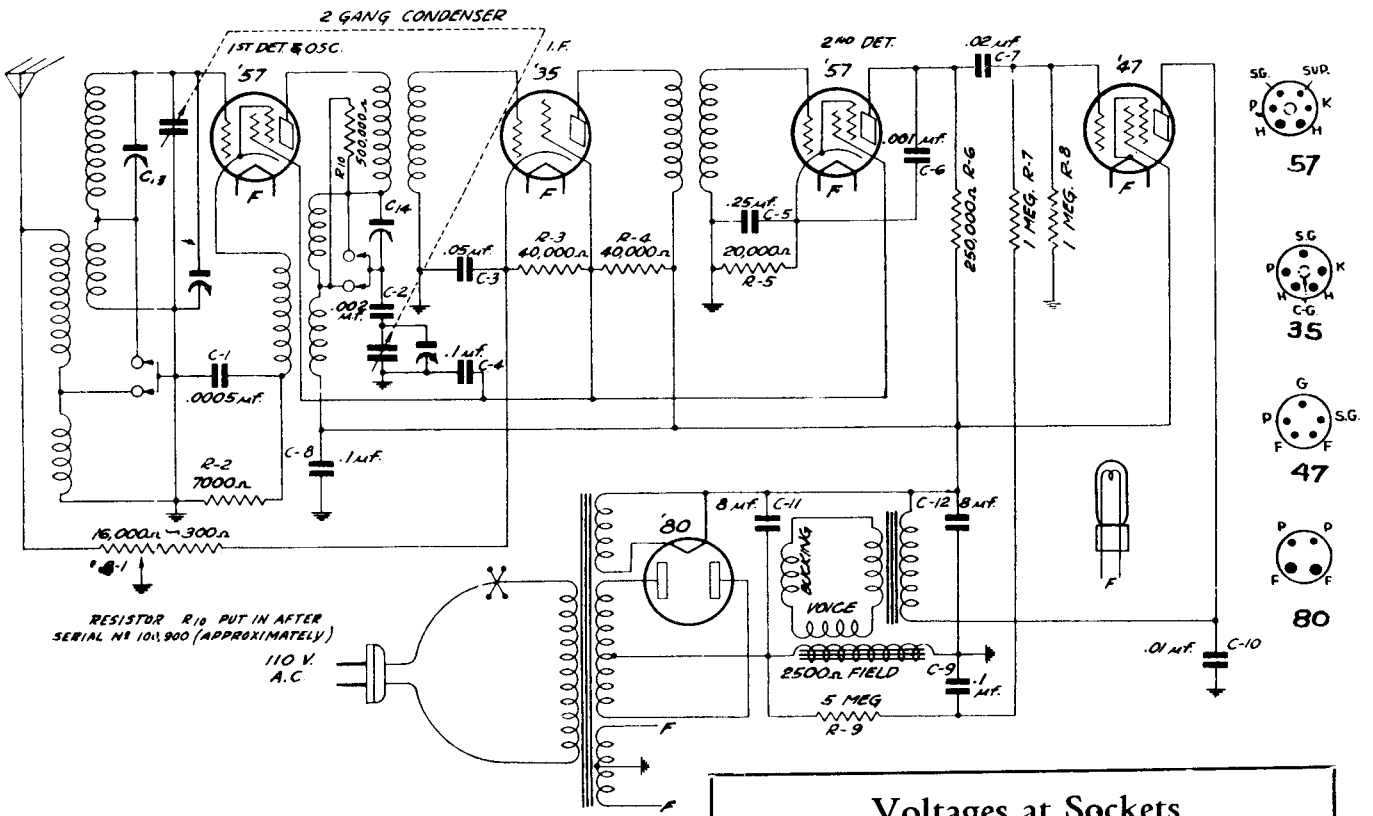
MODELS 62-43, 62-43X, 62-57, 62-92, 62-078



As the I.F. stages are self-tuned, no I.F. aligning at the intermediate frequency of 262 K.C. is required.

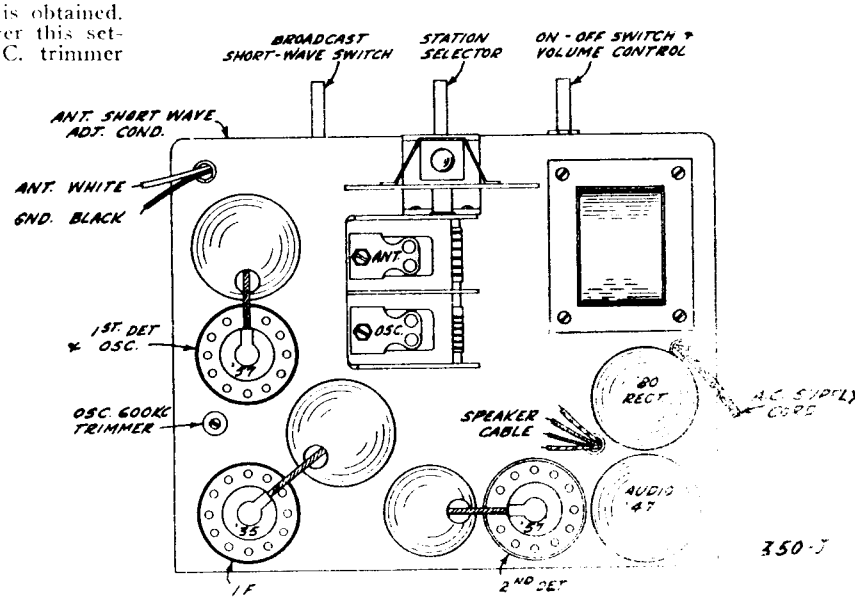
First set the signal generator for a signal of exactly 1400 K.C. Connect the antenna lead from the signal generator to the antenna lead of the receiver and the ground lead of the signal generator to the ground of the receiver. Then turn the tuning condenser rotor until the marker is at 1400 K.C. on the dial scale. In order to do this, it will be necessary to put the chassis back in the cabinet. Adjust the two trimmers on the tuning condenser for maximum output adjusting the oscillator trimmer first (section nearest back of receiver).

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. This adjusting screw is between the 1st detector '57 and I.F. '35 sockets and is reached from the top of the chassis. A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Voltages at Sockets

LINE VOLTAGE 115 — VOLUME CONTROL AT MAXIMUM — ANT. SHORTED TO GND.

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
'57	1st Det.	2.15	225	90	4	.5
'35	I.F.	2.15	230	90	3.2(1)	6.2
'57	2nd Det.	2.15	170	90	4.3	.2
'47	Audio	2.15	225	240	14(2)	23.
'80	Rect.	4.75	620 volts plate to plate			20. per plate



Trouble Shooting Hints

Many service calls for this set are due to failure of the wave-change switch. This may be either a poorly soldered contact which opens and causes complete failure, or a poor contact in one position of the switch which permits operation on only one wave band. The remedy is to resolder all connections and clean contacts.

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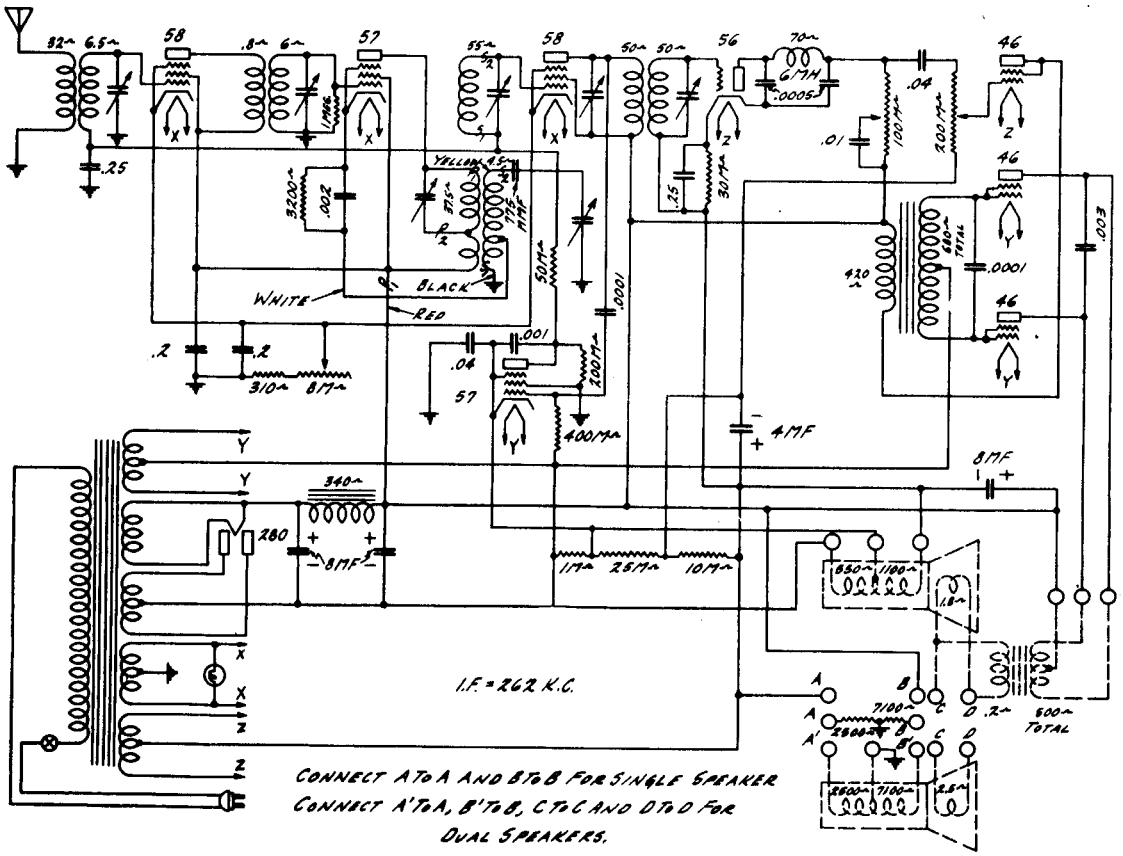
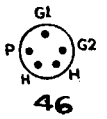
MODELS 62-49, 62-68, 62-68X AND 62-88





VOLTAGES AT SOCKETS — LINE VOLTAGE 115 — VOLUME CONTROL AT MAXIMUM NOISE SUPPRESSOR CONTROL AT MAXIMUM

Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Volts	Screen Current MA	Cathode Volts	Plate MA	Grid Test MA
58	1	R. F.	2.25	125	5.0	125	1.7	5.0	6.0	10.0
57	2	1st Det.	2.25	125	5.0 (2)	125	.3 (2)	5.0 (2)	1.2 (2)	2.0
58	3	I. F.	2.25	125	5.0 (1)	125	1.7	5.0	6.0	10.0
57	4	A.V.C.	2.25	100 (3)	24.0 (4)	145	0	24.0	0	0
56	5	2nd Det.	2.25	150	12.0	.....	.....	12.0	.4	.5
46	6	Driver	2.25	215	19.0 (5)	.....	.....	.....	25.0	30.0
46	7	Power	2.25	320	0	.....	.....	.....	5.0 (6)	13.0
46	8	Power	2.25	320	0	.....	.....	.....	5.0 (6)	13.0
280	9	Rect.	4.8	.....	.....	.....	.....	.....	41. Per Plate	.....

In order to adjust the four I.F. trimmer condensers it is necessary to remove the chassis from the cabinet. The I.F. trimmer adjusting screws are located on the underside of the chassis subpanel and protrude through the porcelain bases of the I.F. transformer. The intermediate frequency in this chassis is 262 kilocycles. In aligning this receiver a "dummy" 57 tube (one which has one filament prong removed) should be inserted in the AVC socket. This will remove any possibility of AVC action. Alignment in this chassis should not be attempted without any tube in the AVC socket as the lack of the tube capacity in the circuit will cause an incorrect alignment to be made. The tube shield should be in position when making any alignment adjustments.

Trouble Shooting Hints

A loud hum in this set may be caused by the type 46 tube in the driver stage. Try switching the three type 46 tubes for least hum or replace the driver with a new one. Low volume may be due to misalignment, a defective noise suppressor control or to poor grid connections to the tube caps.

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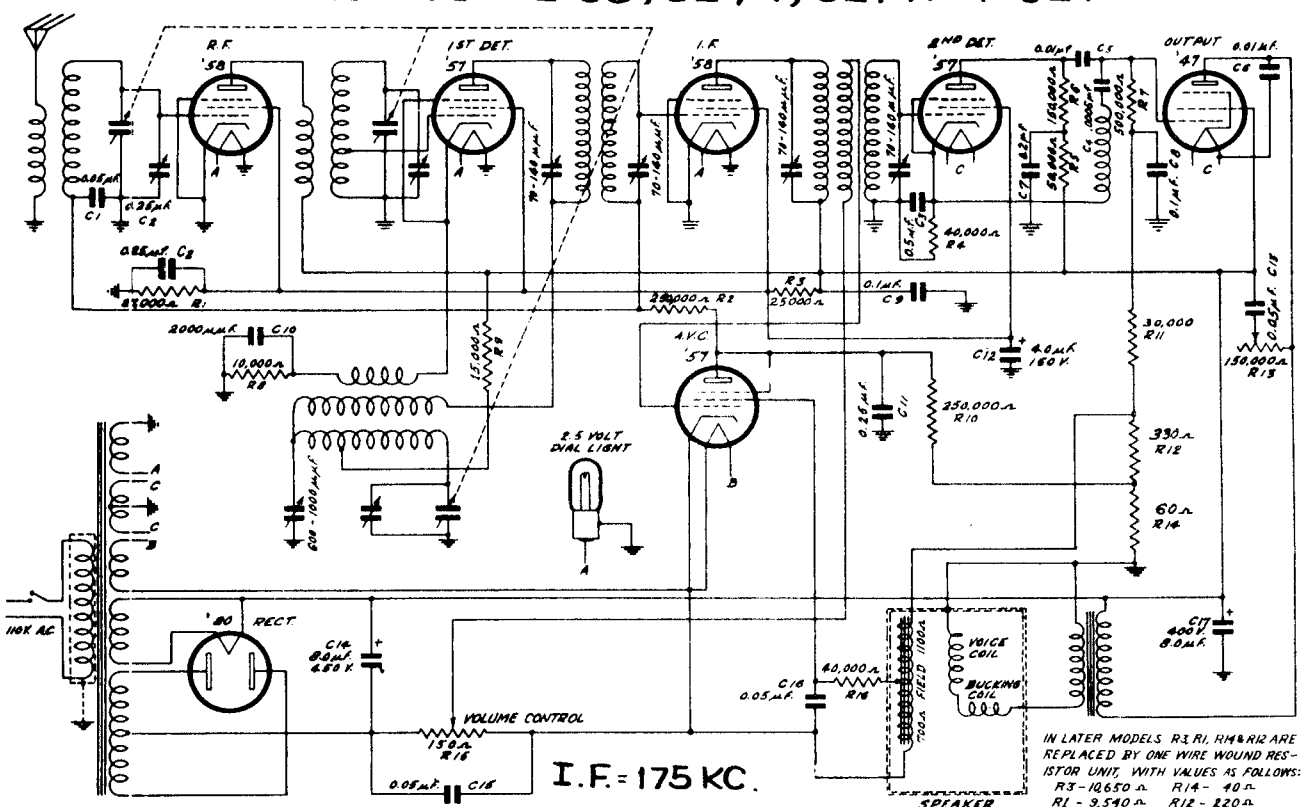
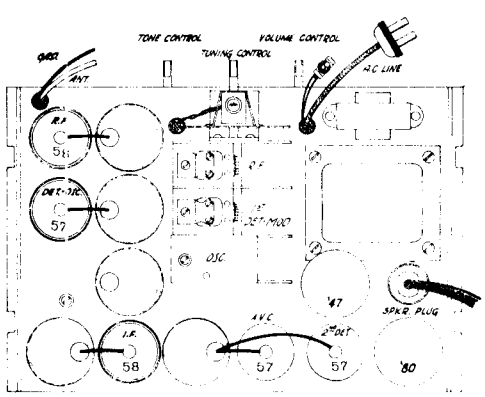
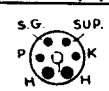
MODELS 62-53, 62-74, 62-74X AND 62-71



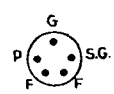
LINE VOLTAGE 115—ANTENNA LEAD SHORTED TO GROUND—VOLUME CONTROL AT MAXIMUM

Type of Tube	Function	Across Filament or Heater	For early Models with 2-section vitreous enamel resistor. Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	For later Models with 4-section armoured wire-wound resistor. Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
'58	R.F.	2.4	282	107	4(1)	8.	258	106	2.8(1)	8.0
'57	1st Det.	2.4	270	100	5	.4	250	103	5	.4
'58	I.F.(2)	2.4	282	107	4(1)	8.	258	106	2.8(1)	8.0
'57	A.V.C.	2.4	90	40	9.5	0	103	45	10	0
'57	2nd Det.	2.4	207	98	6	.15	190	101	6	.15
'47	Audio	2.4	262	280	24(3)	31	242	260	17(3)	30
'80	Rect.	4.8				30 per plate				34 per plate





57 & 58.



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Trouble Shooting Hints

, Microphonic howl due to vibration of the tube elements and condenser plates is commonly reported for this set. The solution is found in damping the vibration of the tubes or switching them around. In severe cases the variable condenser should be mounted on sponge rubber.

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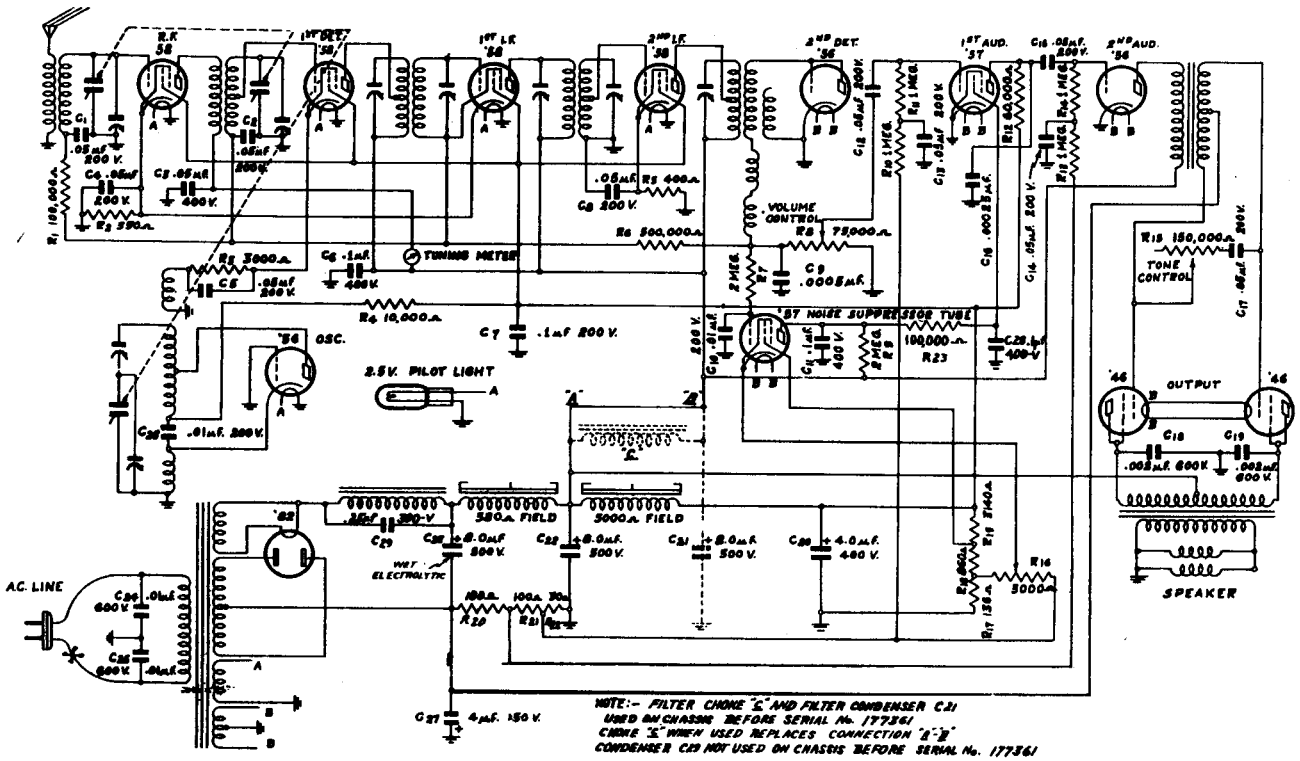
MODELS 62-64X, 62-64 AND 62-51



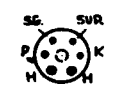
Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the five intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached from the top of the chassis and is between the tuning condenser and the coil cans. A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Trouble Shooting Hints

Excessive hum in this set is commonly caused by a short circuit in the field coil of one of the two speakers. Replace the defective coil or speaker. Low plate voltage is usually due to short-circuited electrolytic condensers.



57 & 58

56

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Voltages at Sockets

LINE VOLTAGE 115—ANTENNA SHORTED TO GROUND—NOISE SUPPRESSOR AT MAXIMUM CLOCKWISE POSITION

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
58	R.F.	2.4	242	90	4(1)	4
58	1st Det.	2.4	250	86	7(1)	2
56	Osc.	2.4	24		0	8
58	1st I.F.(2)	2.4	252	90	4(1)	4
58	2nd I.F.(3)	2.4	254	91	3	5.7
56	2nd Det.	2.4	0		0	0
57	1st Audio	2.4	65	55	4(3)	.4
57	NoiseSup.	2.4	55	20	3(1)	0
56	2nd Audio	2.4	255		14(4)	3.3
46	Power	2.4	260	260	34	23
82	Rectifier	2.4	880 volts plate to plate			53 per plate

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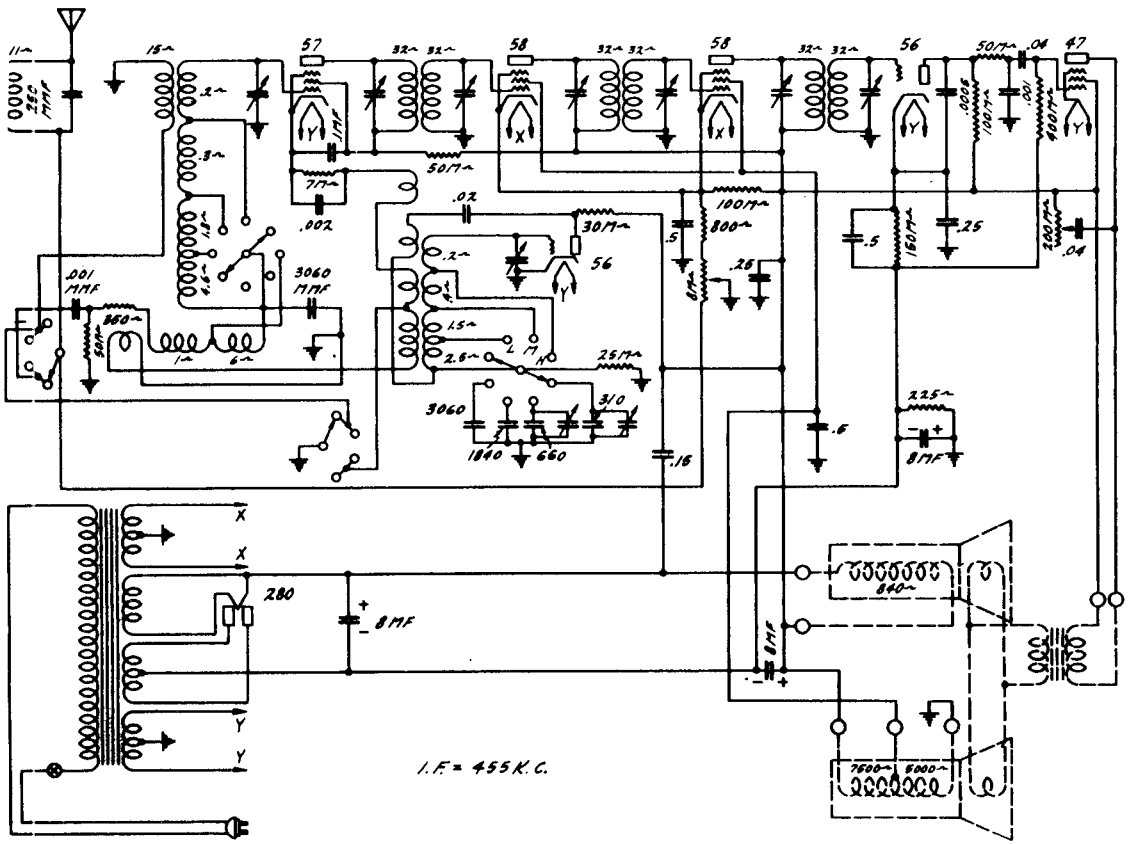
MODELS 62-70, 62-70X, 62-72, 62-72X, 62-47, 62-90, 62-45



Voltages

With line voltage of 115 Volts; wave change switch on broadcast band; volume control at maximum; no signal being received; the following voltages (with slight variations) should be obtained on a 1000 Ohm per volt voltmeter:

PLATE VOLTAGES

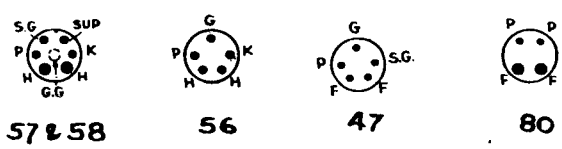
Ground to plate of 57 1st Det. 153
Ground to plate of 58 1st I.F. 260
Ground to plate of 58 2nd I.F. 260
Ground to plate of 56 2nd Det. 172
Ground to plate of 47 Audio 238
Ground to plate of 56 Oscillator 60

SCREEN VOLTAGES

Ground to screen of 57 1st. Det. 153

Trouble Shooting Hints

Low volume in these sets may be due to open resistors in the plate circuits, open or shorted by-pass condensers, open circuits in one or both of the speaker voice coils or improper phasing of the speakers. One method of phasing is to check the polarity of speaker field by holding a compass close to them when the set is turned on. The compass deflection should be the same.



57 & 58 56 47 80

Condenser Alignment

This receiver is aligned on the broadcast band in the same manner as any of our other superheterodynes previously described. Turn the wave band changing switch to the black or broadcast band and align the R.F., oscillator, and I.F., stages, either on a broadcast signal or an oscillator as explained in the Blue Service manual insert on aligning. The 600 kilocycle tracking condenser is located adjacent to the 56 oscillator tube. It the broadcast circuits are properly aligned the short wave band circuits automatically are in alignment unless there is a defect in the short wave section of the R.F. coil or oscillator coil, or unless one of the oscillator fixed tracking condensers are defective. Only one aligning adjustment is provided for the short wave band, this is the oscillator tracking condenser and is located on the side of the chassis directly beneath the 600 kilocycle tracking condenser adjustment. In order to properly adjust the short wave band oscillator tracking condenser, turn the band selector switch to the red band and tune in a short wave station such as a police broadcast or a broadcasting station of approximately 1500 to 1350 kilocycles and adjust the oscillator tracking condenser for maximum speaker volume, at the same time rocking the tuning dial slowly back and forth across the signal. In order to make this adjustment it is necessary to remove the chassis from the cabinet. It is advisable to use a bakelite or non metallic screw driver when adjusting these screws.

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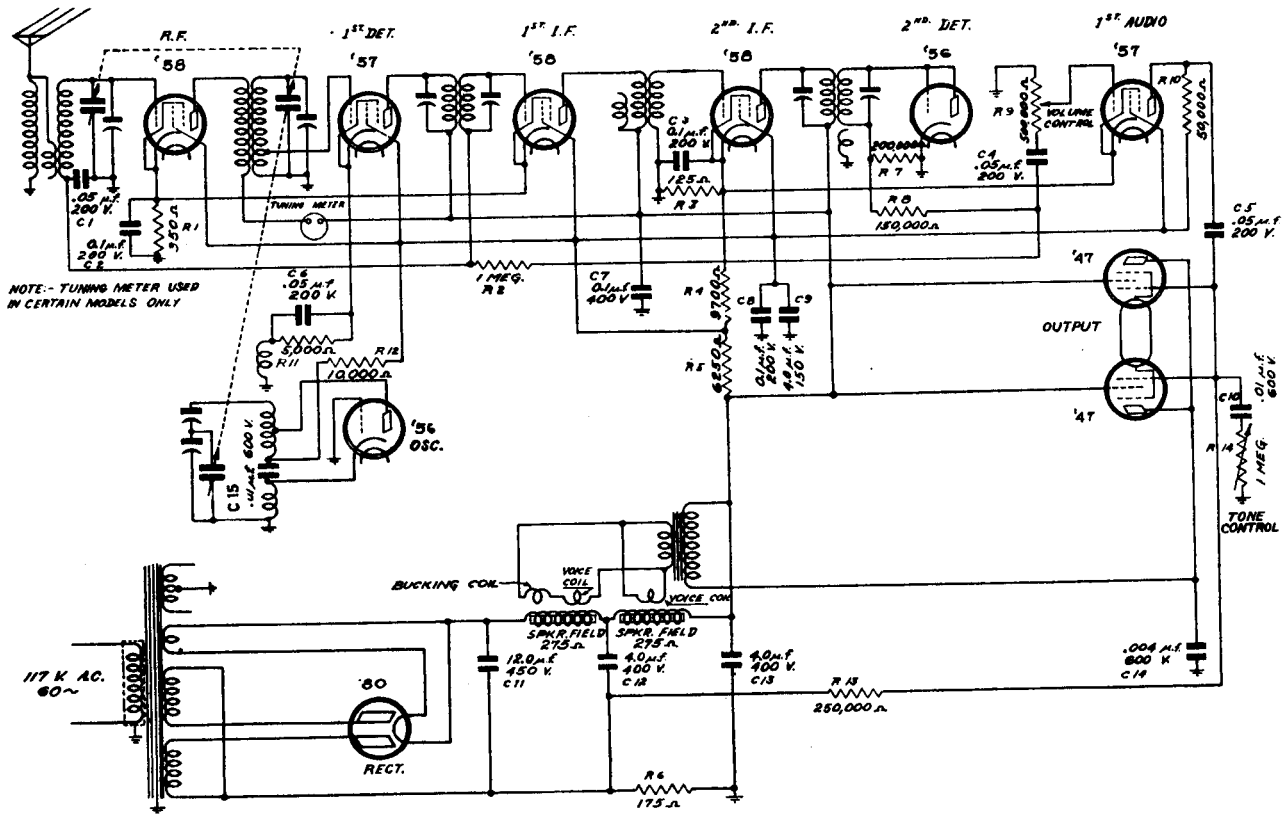
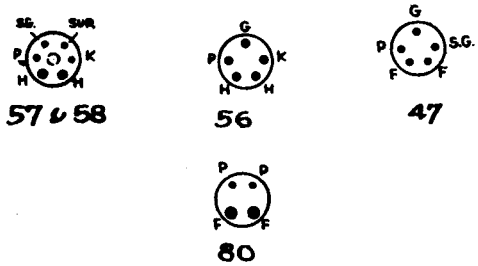
MODEL 62-76





Trouble Shooting Hints

Open by-pass condensers in the R. F. and I. F. sections of this set often cause severe oscillation/ Misalignment of I. F. tuning circuits is also common.

Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached from the top of the chassis and is between the I.F. and oscillator coil cans.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condensor rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

LINE VOLTAGE, 115 — ANTENNA LEAD SHORTED TO GROUND

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
58	R.F.	2.4	275	100	4.2(1)	5.2
57	1st Det.	2.4	265	99	5.4	.9
56	Osc.	2.4	28		0	8.6
58	1st I.F.	2.4	275	100	4 2(1)	5.2
58	2nd I.F.	2.4	275	102	3.0	8.5
56	2nd Det.	2.4	0		0	0
57	1st Audio	2.4	12	102	3.0(1)	1.8
47	Output	2.4	265	280	18.5(2)	30.0
80	Rect.	4.9				55.0 per plate

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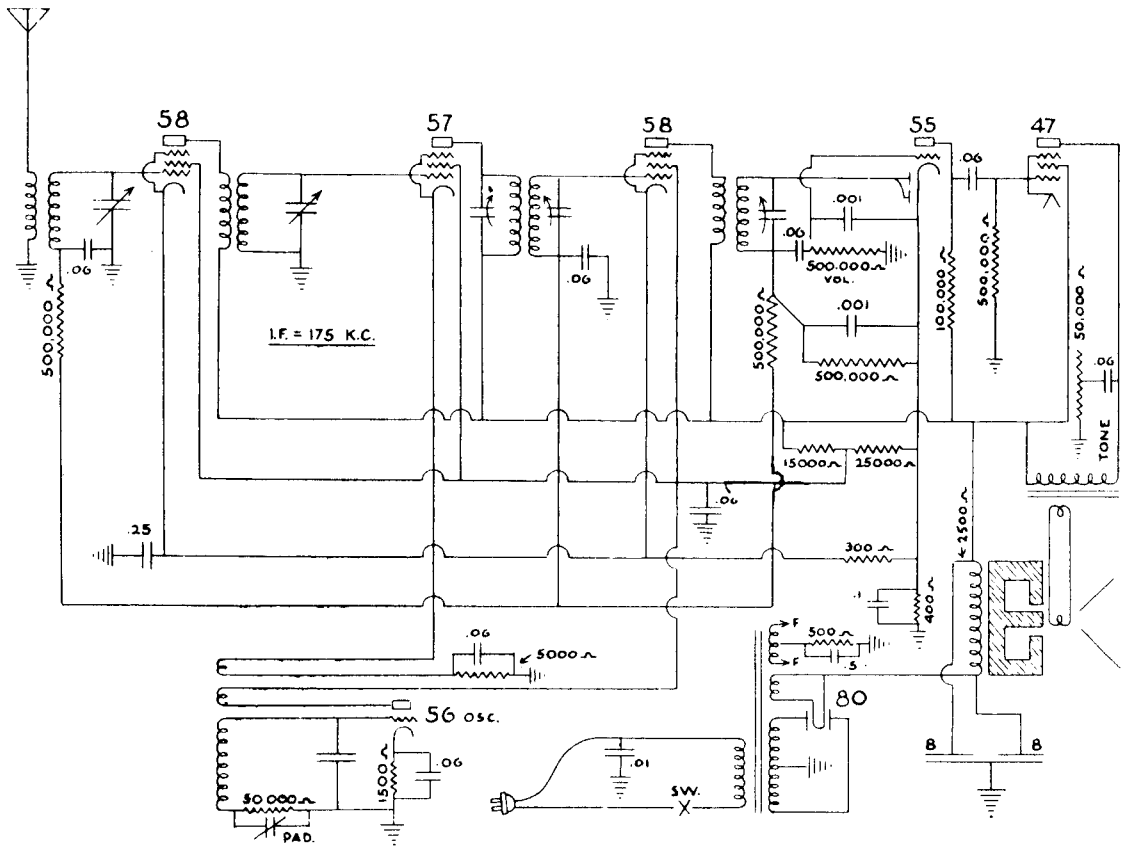
MODEL 62-80 AND 62-67



57 & 58 55 47

Circuit Description And Aligning Procedure

The tubes employed are as follows, and are operated at rated voltages and biases:

R.F.	58	Osc.	56
1st Det.	57	2nd Det.	55
I.F.	58	Audio	47
Rectifier	80		

The second detector is the new dual diode triode, the diode portion operating as a detector and providing automatic volume control—acting on the grids of the R.F. and I.F. stages. The triode portion of this tube is operated as an individually biased A.F. amplifier.

In aligning, it is first desirable to see that the I.F. transformers are properly set. Both are on top of the base, the first having two adjustments, the second but one adjustment. The intermediate frequency is 175 K.C. Couple test oscillator into grid of first detector. Use an output meter.

The tuning condenser may be adjusted for alignment or "tracking" of the tuned circuits by means of an oscillator and output meter, also. The oscillator should cover the band from 550 to 1500 K.C. The energy from the oscillator should be coupled weakly into the antenna circuit. The receiver and oscillator are first tuned to approximately 1500 K.C., and, by watching the output meter the three condenser trimmers are adjusted for maximum output. These three trimmers must then be left untouched for all further aligning.

The next step is to tune both receiver and oscillator to some point near 550 K.C. Here the alignment is made by adjusting the oscillator "pad" condenser for maximum response. It may be reached through hole in base between 1st detector and oscillator tubes. If necessary to adjust the two R.F. condenser sections it may be done by bending the slotted condenser rotor end plates. If necessary to align at points other than the ends of the "band" it may be done by bending portions of these slotted plates. Alignment of the two ends of the scale is usually quite sufficient.

IMPORTANT: It is desirable to move the dial back and forth across the signal while making the above alignments. This is particularly necessary when altering any capacities connected with the oscillator circuit. Use an insulated or bakelite screw driver.

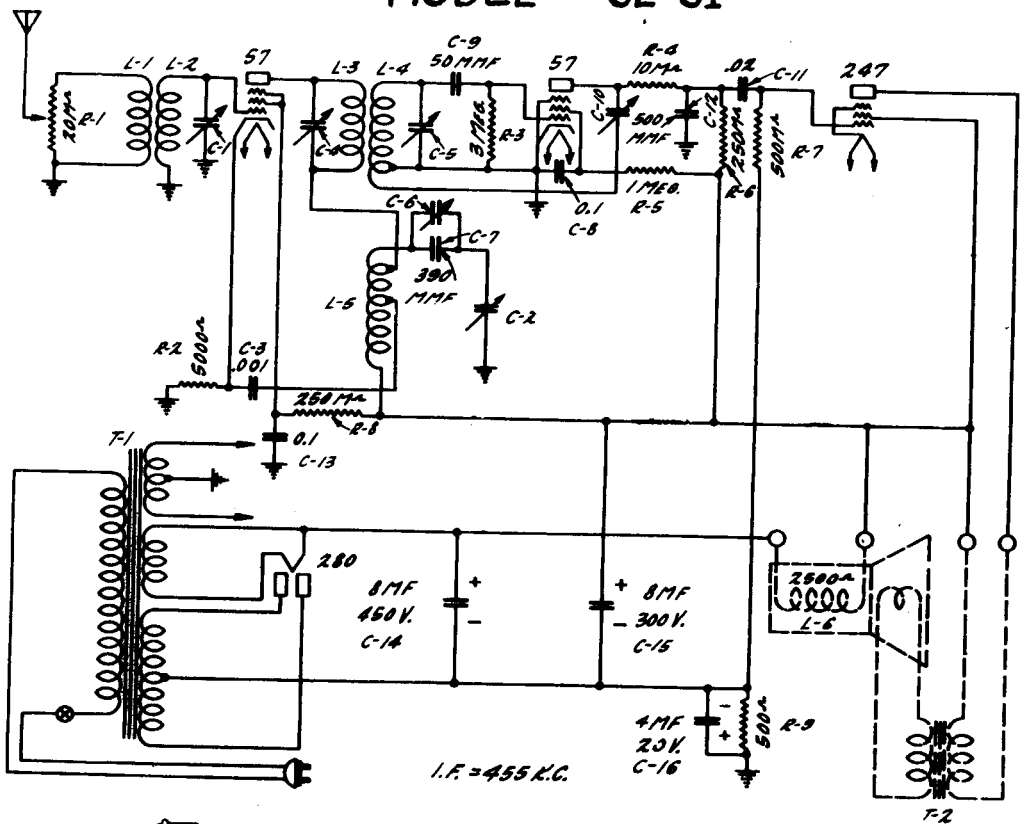
Be certain that good tubes are used in all sockets.

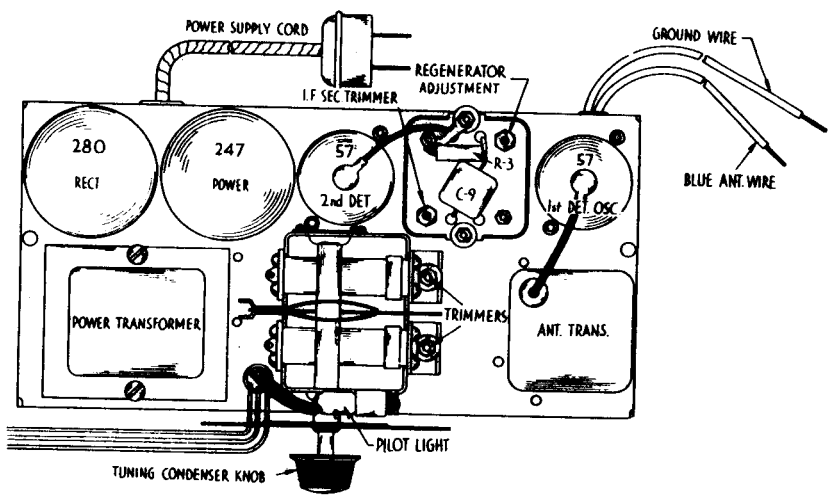
Trouble Shooting Hints

If the power tube has no plate voltage, test the .06 mf. condenser in the tone control. Test the double 8 mf. filter condenser if excessive hum is encountered. Realign oscillator in case of low volume.

MONTGOMERY WARD & CO.

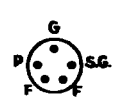
MODEL 62-81





Aligning I.F. Condensers. During I.F. alignment, the oscillator should be rendered inoperative by shorting a portion of the oscillator coil. Connecting a wire jumper between the two vertical insulated terminals located near the base of the oscillator—I.F. assembly beneath the chassis will accomplish this.

57



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Trouble Shooting Hints

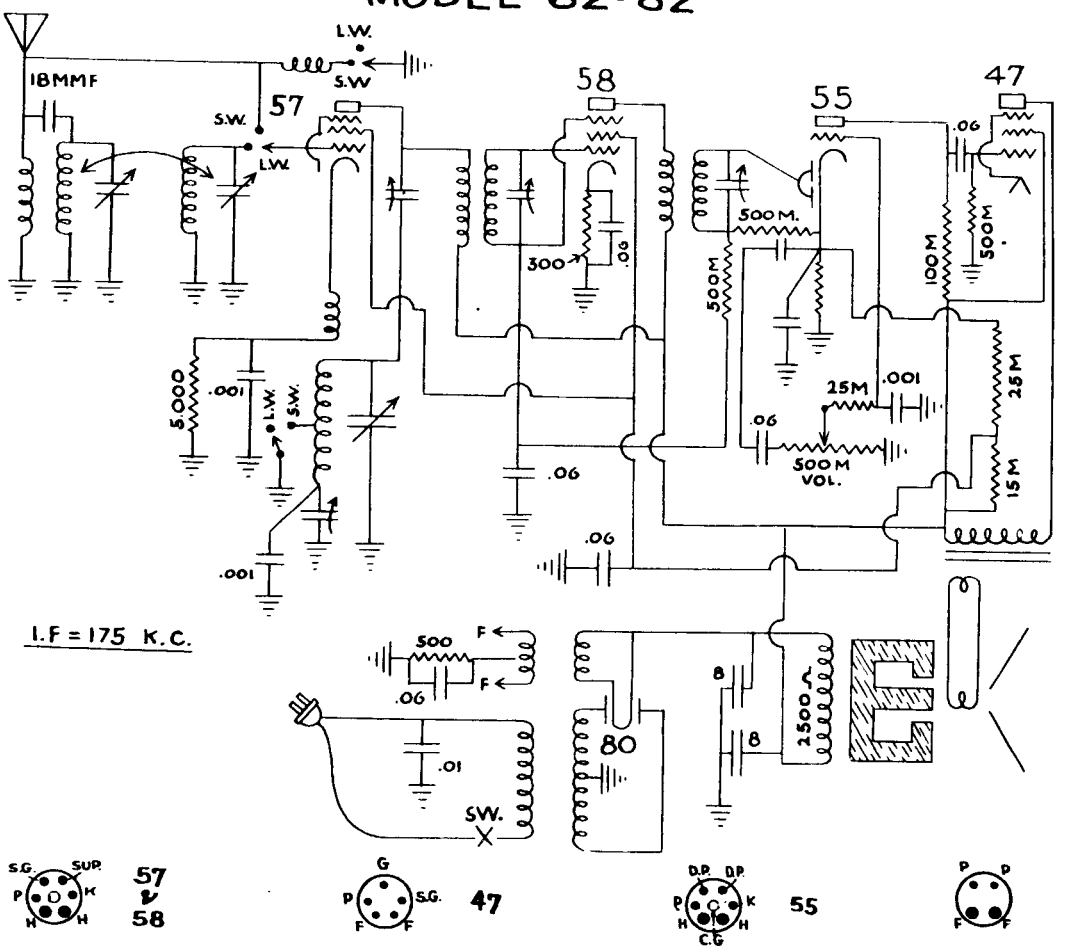
Oscillation can be caused by the tube shield over the second detector tube being loose. The antenna lead must also be kept away from the second detector socket and oscillator I. F. assembly. Test by-pass condensers for open circuit in case of severe oscillation.

No. 62-81 Chassis — Voltages at Sockets
Line Voltage 115 — Volume Control at Maximum

Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Grid Volts	Screen Grid Current	Cathode Volts	Plate Current MA
	1	1st Det. S. Osc.	2.4	230	7	130	...(1)	7	...(1)
	2	2nd Det.	2.3	40(2)	0	20(3)	.2	0	.7
	3	Audio	2.3	220	1.0(4)	240	5.2	...	26.0
	4	Rect.	2.3		...	...	...	...	16 Per Plate

MONTGOMERY WARD & CO.

MODEL 62-82



General Description and Aligning Procedure

The tubes employed are as follows, and are operated at rated voltages and biases:

Oscillator and Mixer	57
Intermediate Frequency	58
Second Detector	55
Output	247
Rectifier	280

This receiver employs a combination oscillator and first detector, or mixer. The second detector is the new dual diode-triode, the diode portion acting as detector and providing automatic volume control—acting on the grid of the type 58 I.F. tube. The triode portion of the second detector is operated as an individually biased A.F. amplifier.

The first two variable tuned circuits are not electrically coupled. They are mutually coupled by being placed close together and left unshielded. In all other respects the circuits are entirely conventional.

In aligning, it is first desirable to see that the I.F. transformers are properly set. The First I.F. transformer is on top of the base and has two adjustments. The second is inside the base but its single adjustment may be reached through a hole in the rear-center of the base. The intermediate frequency is 175 K.C.

The tuning condenser may be adjusted for alignment or "tracking" of the tuned circuits by means of an oscillator and output meter. The oscillator should cover the band from 550 to 1500 K.C. The energy from the oscillator is coupled weakly into the antenna circuit—a simple means being to place the oscillator near the antenna wire. The receiver and oscillator are first tuned to approximately 1500 K.C., and by watching the output indicator, the three condenser trimmers are adjusted for maximum output. These three trimmers must then be left untouched for all further aligning.

The next step is to tune both receiver and oscillator to some point near 550 K.C. Here the alignment is made by adjusting the oscillator "pad" condenser for maximum response. It may be reached through hole in base near the first I.F. transformer. If necessary to adjust the two R.F. condenser sections, it may be done by bending the condenser end plates. If necessary to align at points other than the ends of the "band" it may be done by bending portions of the slotted end plates of the condenser rotor sections. Alignment of the two ends of the scale is usually quite sufficient.

IMPORTANT: It is desirable to move the dial back and forth across the signal while making the above alignments. This is particularly necessary when altering any capacities connected with the oscillator circuit. Use an insulated or bakelite screw driver. No aligning, other than the I.F. transformers, is necessary for the short wave band (75 to 200 meters) as no attempt has been made to tune more than the oscillator.

Be certain that a good 57 tube is used in the first socket.

Trouble Shooting Hints

If poor volume is encountered test the continuity of the volume control. Also test the wave change switch contacts.

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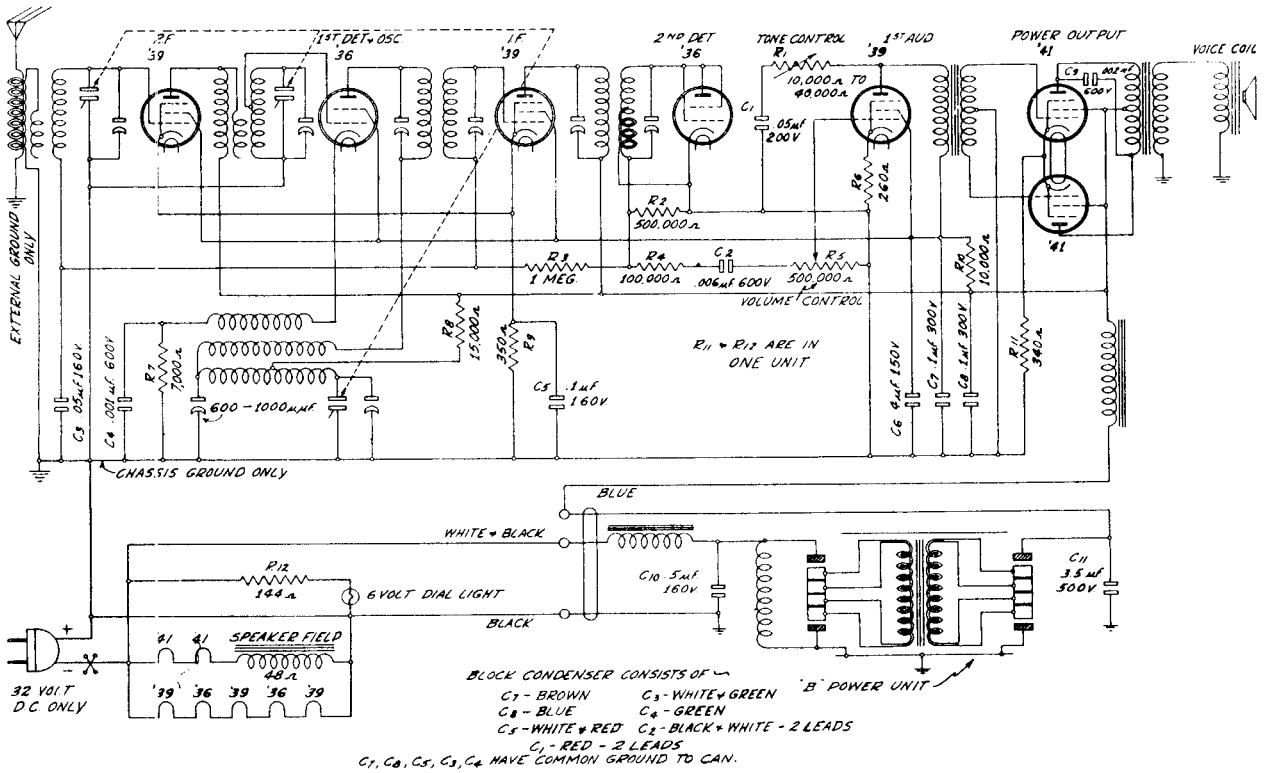
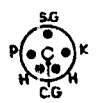
MODEL - 62-83





36 & 39

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Trouble Shooting Hints

Breakdown of I. F. transformers due to crossed leads in the coil assembly can be corrected by replacing the defective units or removing the short if the windings are not burned.

Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Keep the signal weak enough to prevent action of the A.V.C. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached from the top of the chassis and is between the I.F. and oscillator coil cans.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condensor rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Voltages at Sockets

INPUT 32 VOLTS—GROUND R.F. GRID

Type of Tube	Function	Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
'39	R.F.	6.4	190	90	3.0(1)	5.0
'36	1st Det. & Osc.	6.4	170	86	6.5(2)	.6
'39	I.F.	6.4	190	90	3.0(1)	5.0
'36	2nd Det.	6.4	0	0	0	0
'39	1st A.F.	6.4	70	90	1.75(1)	6.0
'41	Output	6.4	180	185	14.0	18.0

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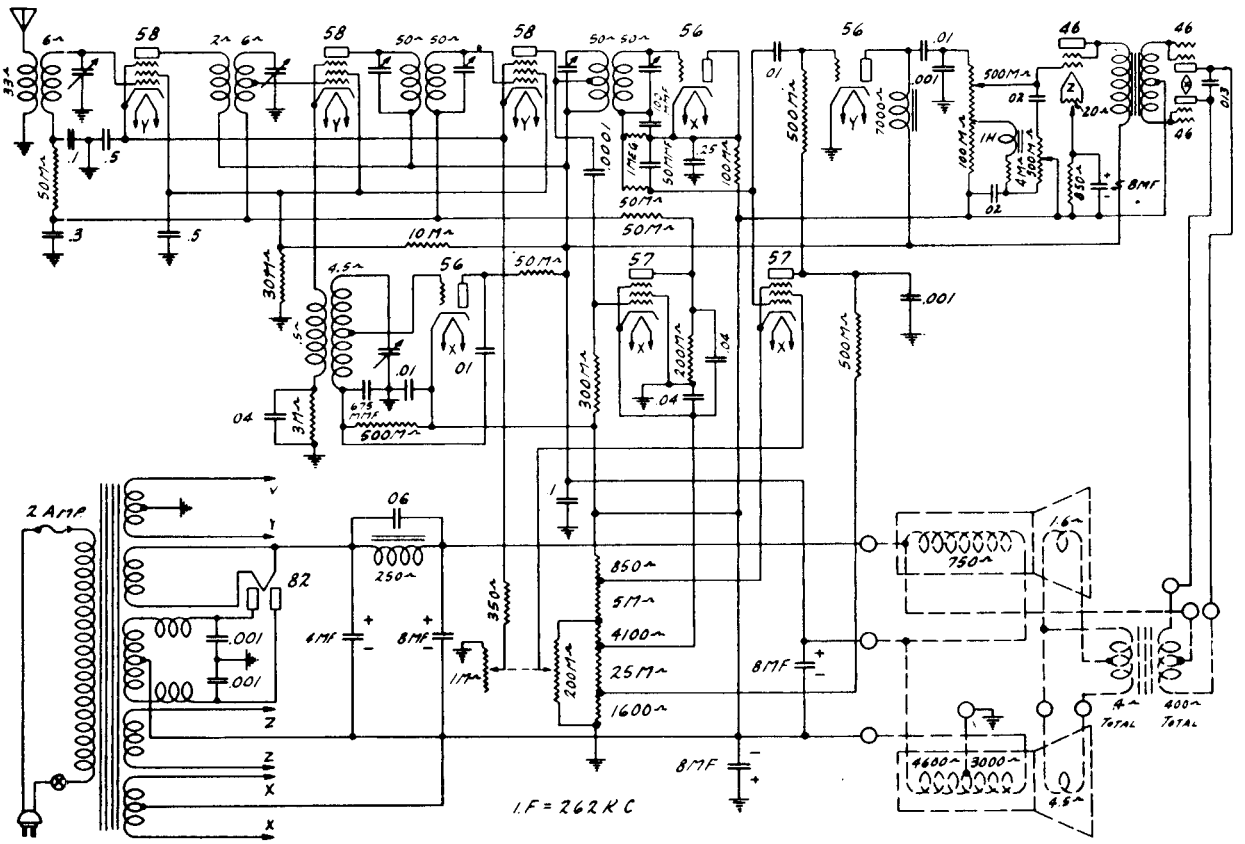
MODELS 62-86 AND 62-86 X



Condenser Alignment

The chassis may be aligned either on the oscillator or a broadcasting station according to the procedure given in the Blue Service Manual insert. The R.F., and oscillator tuning condensers are located on the variable tuning condenser assembly, one in each section. The I.F. tuning condensers are located on the underside of the chassis subpanel and protrude through the porcelain bases of the I.F. transformer. In order to reach these adjusting screws, it will be necessary to remove the chassis from the cabinet. The I.F. trimmers are used to adjust the I.F. transformer circuit to 262 K.C. During all of the alignment procedure a dummy 57 tube (one which has one filament prong removed) should be inserted in the AVC socket. This will remove any possibility of AVC action which would make the determination of the output very difficult. Alignment should **never** be attempted without any tube in the AVC socket as the lack of the tube capacity in the circuit will cause an incorrect alignment to be made. In aligning the intermediate frequency condensers with an oscillator, the signal generator lead should be connected to the grid of the 58 first detector, and the tube shield should be in position, and the chassis grounded. The tube shield cover may be removed to facilitate making the control grid connection. A small battery clip on the signal generator lead makes it more convenient in making this connection. The ground lead of the signal generator is connected to the ground post at the back of the chassis.

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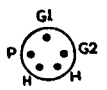

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Trouble Shooting Hints

For excessive hum, the hum control should be adjusted. Check the grounding of tube shields.

No. 62-86 CHASSIS — VOLTAGES AT SOCKETS — LINE VOLTAGE 115
VOLUME CONTROL AT MAXIMUM — "Q" CONTROL AT MAXIMUM

Tube No.	Type of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Grid Volts	Screen Grid MA	Cathode Volts	Plate Current MA	Grid Test MA
1	58	R.F.	2.25	140	3.2(1)	80	.9	3.2	3.6	7.6
2	58	1st Det.	2.25	130	7.5	74	.5	7.5	2.0	2.3
3	58	I. F.	2.25	140	3.2(1)	80	.9	3.2	3.6	7.6
4	56	2nd Det.	2.25							
5	56	1st Audio	2.25	110	5.5(2)			0	4.2	8.6
6	56	Osc.	2.25	110	10-23(3)			0	3.4	
7	57	AVC	2.25	65(4)	35(5)	85	0	35(5)	0	0
8	57	"Q"	2.25	120(6)	3.5(7)	20	0	3.5(7)	0	0
9	46	Driver	2.25	235	28(8)				26.0	28
10	46	Power	2.25	335	0				5.5(9)	13
11	46	Power	2.25	335	0				5.5(9)	13
12	82	Rect.	2.2						51 Per Plate	

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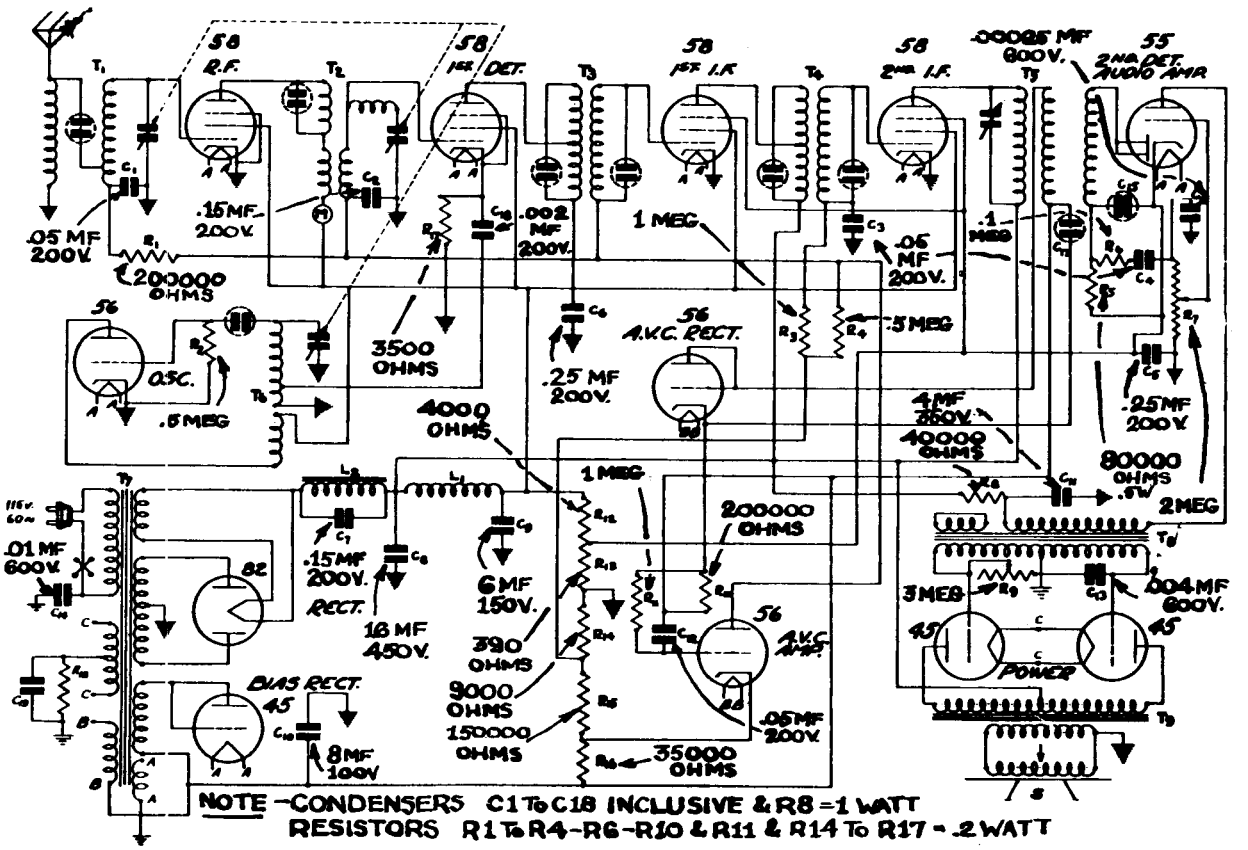
MODEL 62-89



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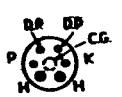

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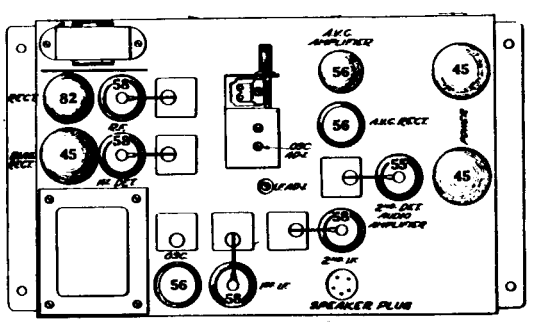
Voltages at Sockets

LINE VOLTAGE, 115
ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater.	Plate to Cath.	Screen to Cath.	Control Grid to Cath.	Suppressor Grid to Cath.	Normal Plate M.A.
58	R. F.	2.5	116	122	4.5 (1)		7.5
58	1st Det.	2.5	112	112	13.0 (2)		2.2
56	Osc.	2.5	122		0		5.0
58	1st I. F.	2.5	400	120	4.5 (1)	13	8.0
58	2nd I. F.	2.5	400	120	4.5 (1)	13	8.0
56	A.V.C.Rect.	2.5	0				0
56	A.V.C.Ampl.	2.5	60 (3)		17.0 (4)		0
55	2nd Det.	2.5	160 (5)		13.0 (6)		5
45	Power	2.5	330		75.		30
45	Bias. Rect.	2.5	105				.5
82	Rectifier	2.5	1040 Volts A.C. Pl. to Pl.				60 per plate



Replacing Power Transformer

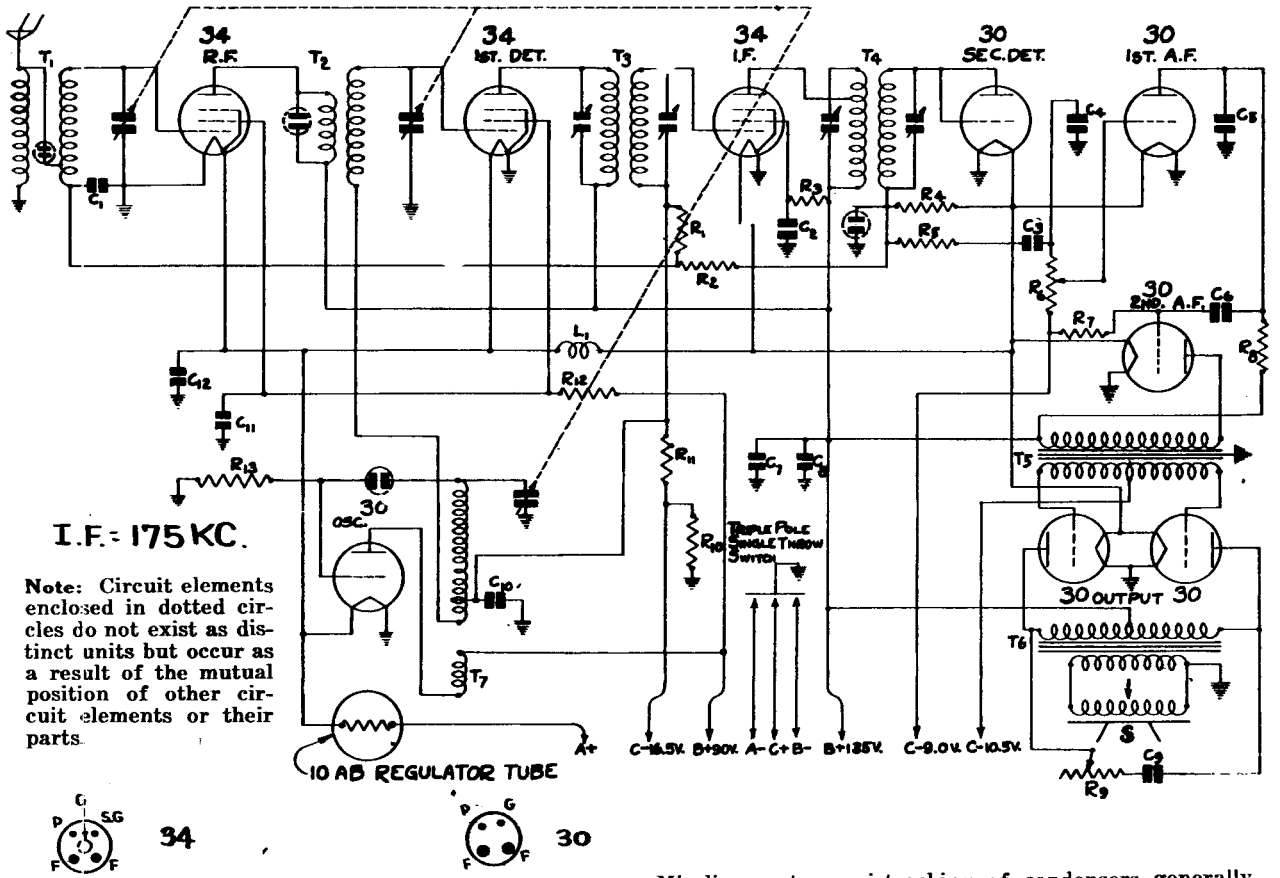
When installing the 16 lead transformer in the original models of receivers the two windings A and C must be connected in parallel - see Fig. 1 in this supplement and Fig. 1 in the original service manual. *These two secondaries must be so connected that the windings will be in the same direction.*

Winding A has heavy leads about 4" long, one white and one black. Winding C has three leads, a white center tap lead about 11" long *which should be grounded* and two end leads about 7" long. The latter two leads may either be blue or brown as transformers with both colors have been supplied.

Paralleling the two windings can be done correctly by connecting together one end of each winding and lightly touching together the other ends while the primary is connected to the AC source. If the polarity is correct, there will be no sparking and the leads may be soldered together.

MONTGOMERY WARD & CO.

MODEL 62-91



Antenna Shorted to Ground
Batteries Up to Rated Voltages. See Fig. 1
Voltages Read From Negative Filament Terminal

Type of Tube	Function	Across Filament	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
34	R.F.	2.0	135	65	3.0(1)	2.6
34	1st Det.	2.0	135	65	4.5(1)	2.5
30	Osc.	2.0	90		2–4(2)	3.3
34	I.F.	2.0	135	90	4.5(1)	3.0
30	2nd Det.	2.0				
30	1st Audio	2.0	90		9.0(3)	.45
30	2nd Audio	2.0	130		9.0(4)	3.4
30	Output	2.0	135		10.5	2.5

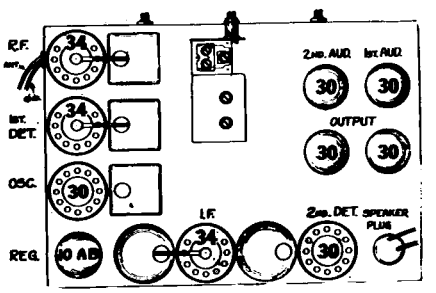
Trouble Shooting Hints

Oscillation in these sets is often caused by poor ground contact on the tuning condenser. Also check the "A" line chokes in case of oscillation, for short circuit. Distorted signals are usually caused by defective tubes. Replace the regulator tube.

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K. C. and accurately calibrated signals over the broadcast band, and an output indicating meter are desirable. The procedure is as follows:

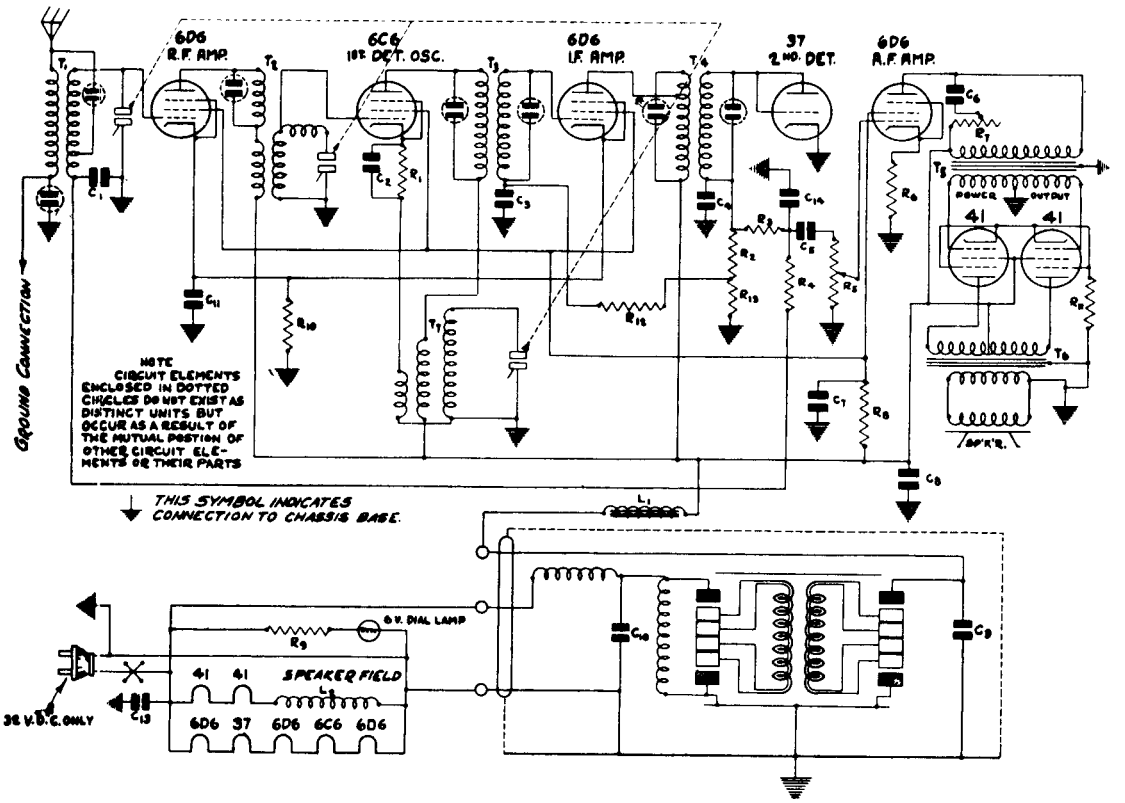
Set the signal generator for 175 K. C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

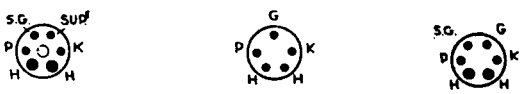
Next set the signal generator for a signal of exactly 1400 K. C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K. C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.



MONTGOMERY WARD & CO.

MODEL 62-93





6D6 & 6C6 — 37 — 41

Trouble Shooting Hints

Noisy operation in this set may be due to the 32 volt generating plant which should be cleaned up and tightened. It may also be due to the "B" voltage unit. In this case check the brush contacts and connecions to the field coil.

Voltages at Sockets

Input 32 Volts
Antenna Shorted to Ground

Type of Tube	Function	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
6D6	R.F.	6.4	190	96	3.0(1)	7.5
6C6	1st Det. & Osc.	6.4	185	91	7.0(2)	1.6(2)
6D6	I.F.	6.4	190	96	3.0(1)	7.5
37	2nd Det.	6.4	0		0	0
6D6	1st A.F.	6.4	170	94	4.8(1)	5.0
41	Output	6.4	175	177	14.0	18.0

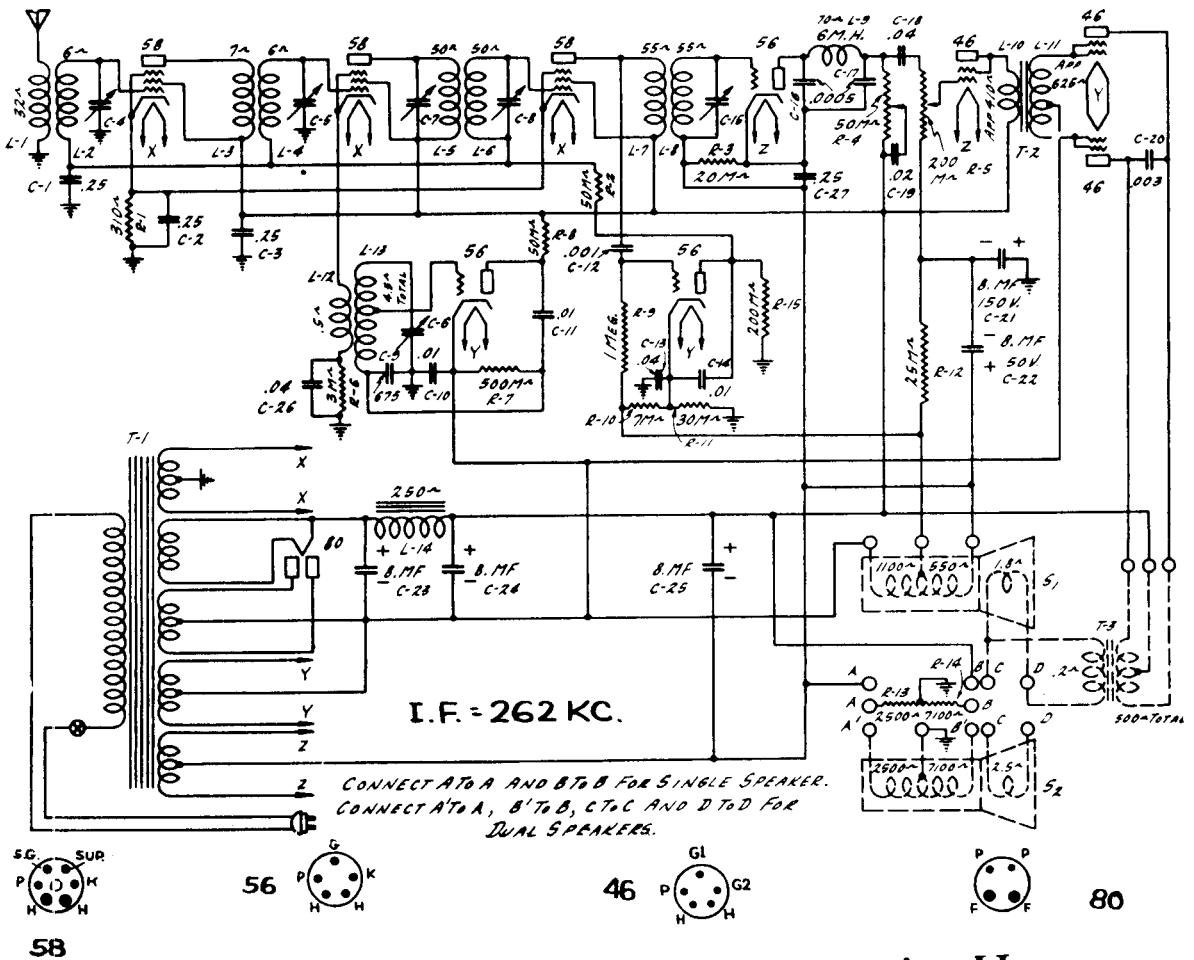
As the I. F. stages are fixed tuned, no I. F. alignment at the intermediate frequency of 175 K. C. is required.

First set the signal generator for a signal of exactly 1400 K. C. Connect the antenna lead from the signal generator to the antenna lead of the receiver, and the ground lead from the signal generator to the ground lead of the receiver. Set the dial pointer on the 1400 K. C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

The tuning condensers are all adjusted at the factory for the correct relative capacity between the oscillator section and the other two sections. As a rule no adjustment other than at 1400 K. C., as mentioned above, is required. If, after the receiver has been aligned at 1400 K. C., the sensitivity is still low at some portion of the band, adjust the signal generator to that setting and tune for maximum output with the station selector knob of the receiver. Then, without readjusting the trimmers, bend the slotted rotor plates on the **front two sections** of the gang to obtain maximum output. Care should be taken not to bend these plates too far in an inward direction as the condenser may short as a result.

MONTGOMERY WARD & CO.

MODELS 62-94 62-94X, 62-69, 62-79, 62-84 AND 62-84 X



Oscillation

One of the most common causes of oscillation in this chassis as well as in any of our other receivers, is open by-pass condensers. The open condenser can readily be located by allowing the receiver to oscillate and at the same time clipping a condenser of 1 microfarad or larger across each of the by-pass condensers in turn in the receiver. When the defective condenser is located, oscillation will immediately cease. Coupling between the R. F. or I. F. grid and plate leads may cause trouble and these leads should be separated and pushed close to the chassis.

Distortion

Distorted reproduction may be brought about by defective tubes and these should be checked first. An inoperative 46 output tube will especially cause distortion. Leaky or open by-pass condensers are also a cause. The connections to the voice coil of one speaker being reversed will cause a very noticeable distortion, and these should be checked at the terminal strip. Open field windings in either speaker will allow the receiver to continue operation but at reduced volume and with some distortion. At low volume, distortion may be caused by the tone control rheostat having a resistance higher than the normal value of 50,000 ohms. Other resistors which will bring about distortion if they are high in value are the 20,000 ohm second detector bias resistor and the 7,000 ohm resistor in the voltage dividing circuit which provides grid bias for the AVC tube. In case of distortion at low volume, these resistors should be checked with an ohmmeter and replaced if not within normal 10% plus or minus.

Excessive Hum

Excessive hum may be brought about by an open filter condenser or by an open circuit in one-half of the 280 plate winding of the power transformer. A heater to cathode short in the 56 or 58 tubes will cause hum to be higher than normal and new tubes should be tried in any case of excessive hum. Certain 46 tubes, when used in the driver stage, will produce a hum much greater than normal and the tube in this socket should be interchanged with the other two 46 tubes in the receiver. Short circuits in the filter choke or 1,650 ohm speaker field will cause the receiver to hum as will various shorts, open or grounds in different points of the chassis.

Trouble Shooting Hints

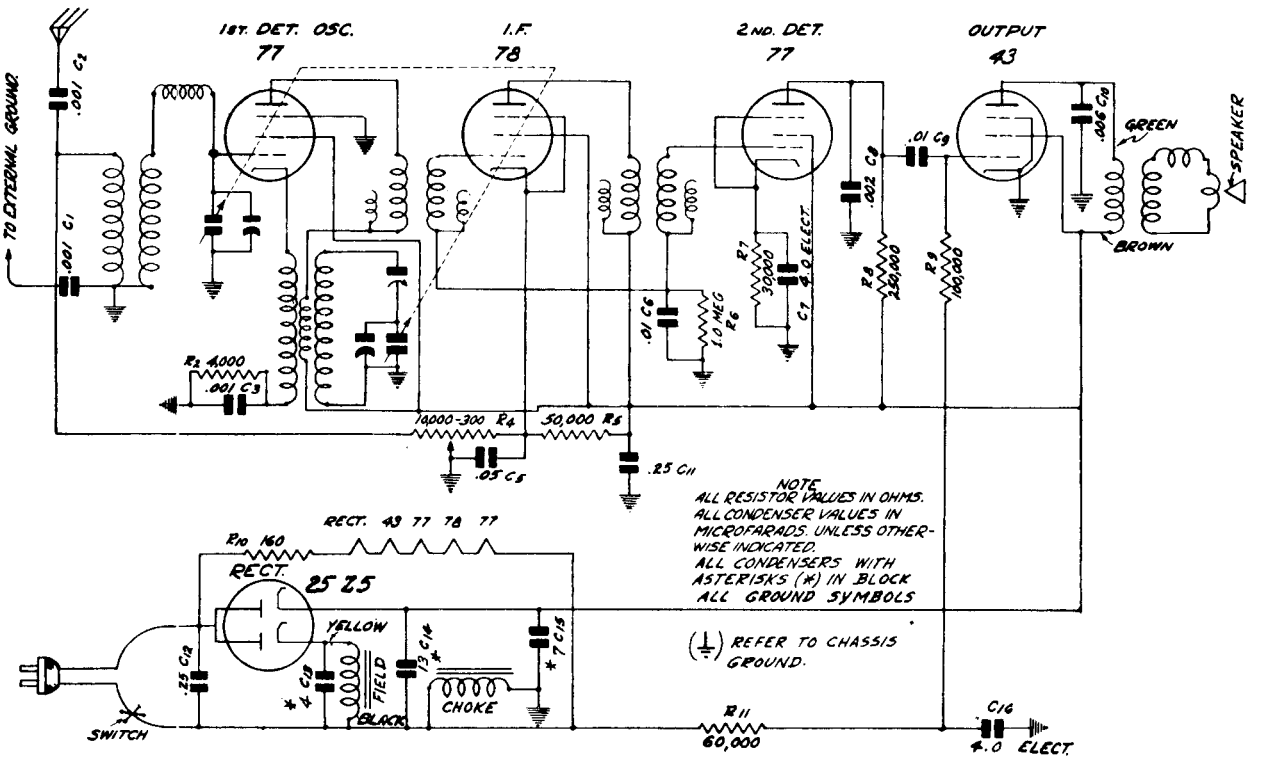
Electrolytic condensers seem to cause most of the service calls for this set. The 8 mf. condenser C 22 and the .04 coupling condenser C18 are the worst offenders. In dual speaker models the resistors R13 and R14 sometimes become open-circuited and must be replaced.

VOLTAGES AT SOCKETS—LINE VOLTAGE 115—VOLUME CONTROL AT MAXIMUM

Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Volts	Screen Current MA	Cathode Volts	Plate Current MA	Grid Test MA
58	1	R.F.	2.35	125	.3(1)	125	1.3	5.0	5.6	9.6
58	2	1st Det.	2.35	115	5.0(2)	115	.6	10.0	2.9	3.5
58	3	I.F.	2.35	125	.3(1)	125	1.3	5.0	5.6	9.6
56	4	2nd Det.	2.30	170	12.0			12.0	.6	.6
46	5	Driver	2.25	215	18.0(3)				18.0	21.0
56	6	Osc.	2.30	130	7-15(4)			0(4)	3.7	3.8
56	7	AVC	2.25	60(5)	2.0(6)			85.0	0	.0
46	8	Class B	2.25	310	0				6.0(7)	13.0
46	9	Class B	2.25	310	0				6.0(7)	13.0
280	10	Rect.	4.2						41 Per Plate	

MONTGOMERY WARD & CO.

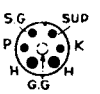
MODEL 62-96



As the I.F. stages are self-tuned, no I.F. aligning at the intermediate frequency of 262 K.C. is required.

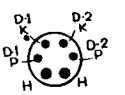
First set the signal generator for a signal of exactly 1400 K.C. Connect the antenna lead from the signal generator to the antenna lead of the receiver and the ground lead of the signal generator to the ground of the receiver. Then turn the tuning condenser rotor until the marker is at 1400 K.C. on the dial scale. In order to do this, it will be necessary to put the chassis back in the cabinet. Adjust the two trimmers on the tuning condenser for maximum output adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. This adjusting screw will be seen on the back panel of the chassis. A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.



77 & 78

43



25Z5

Trouble Shooting Hints

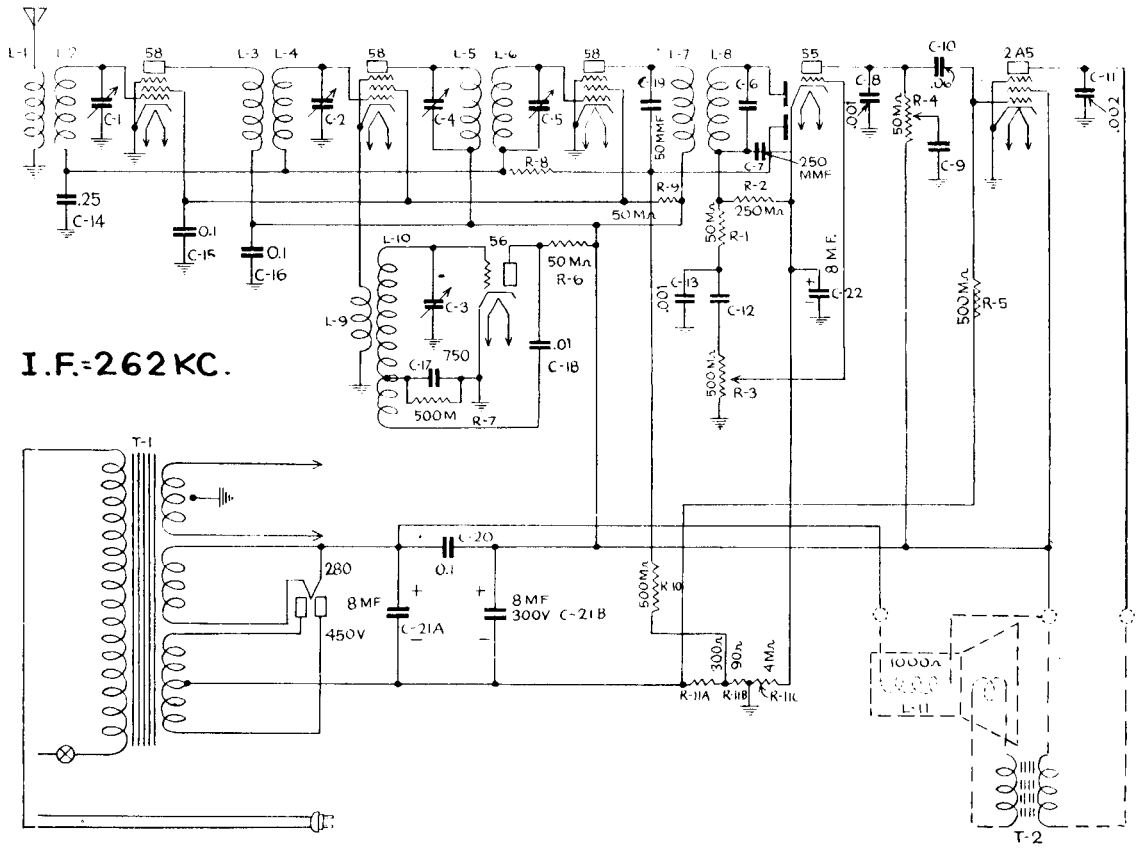
Hum may be caused by defective 43 or 25Z5 or open filter condensers. Oscillation may be due to defective tubes, tube shields or caps being off or open by-pass condensers. Oscillation may also be caused by poor connections to the chassis.

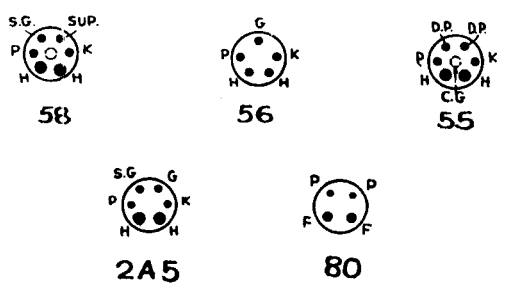
Antenna lead connected to ground lead (not external ground).—Volume Control at Maximum.
CAUTION—Do not put chassis on any grounded surface or let chassis touch any ground.

Type of Tube	Function	A.C. Line Voltage—115 Use High Resistance A.C. Meter, Rectifier Type, for Heater Voltage Measurements					D.C. Line Voltage—110 Use High Resistance D.C. Meter for Heater Voltage Measurements				
		Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
77	1st Det. Osc.	5.8	106	106	5.2	.8	5.6	87	87	4.3	.6
78	I.F.	5.8	108	108	3.0(1)	7.4	5.6	88	88	2.4(1)	6.0
77	2nd Det.	5.8	65(2)	104	6.0(3)	.14	5.6	58(2)	82	5.0(3)	.11
43	Output	24.	95	110	18.0(4)	22.0	23.0	80	90	15.0(4)	17.0
25Z5	Rect.	24.	110 / 155 (5)			84.0 Total	23.0	5.0 / 6.0 (5)			74.0 Total

MONTGOMERY WARD & CO.

MODELS 62-97, 62-99, 62-97X, AND 62-99X





Alignment

An accurately calibrated signal generator is necessary for the proper alignment of the R. F. and I. F. circuits. This generator must produce an I. F. signal at 262 K. C. as well as R. F. signals throughout the broadcast band of 540 to 1500 K. C. An output meter for determining the maximum output of the receiver is also essential.

The necessity for realignment of the R. F. or I. F. circuits will be indicated by poor sensitivity and selectivity but realignment should not be attempted until all other possible causes for the same condition such as defective tubes, poor antenna installation, shielded location or low line voltage have been checked and eliminated.

Aligning Intermediate Condensers—It is essential that the I. F. stages be correctly tuned for maximum deflection upon the output meter before the R. F. and Oscillator Circuits can be aligned. Connect the signal lead from the signal generator to the control grid contact of the first detector tube. The ground lead from the signal generator is connected to the ground post on the rear of the chassis. Place the signal generator in operation at 262 K. C. and attenuate its output until as low a signal as will give satisfactory deflection on the output meter is obtained. It is important that the signal be maintained at a low value in order to prevent any action of the Automatic Volume Control. *The manual Volume Control should be set at maximum during alignment.*

Line Voltage 115—Volume Control at Maximum

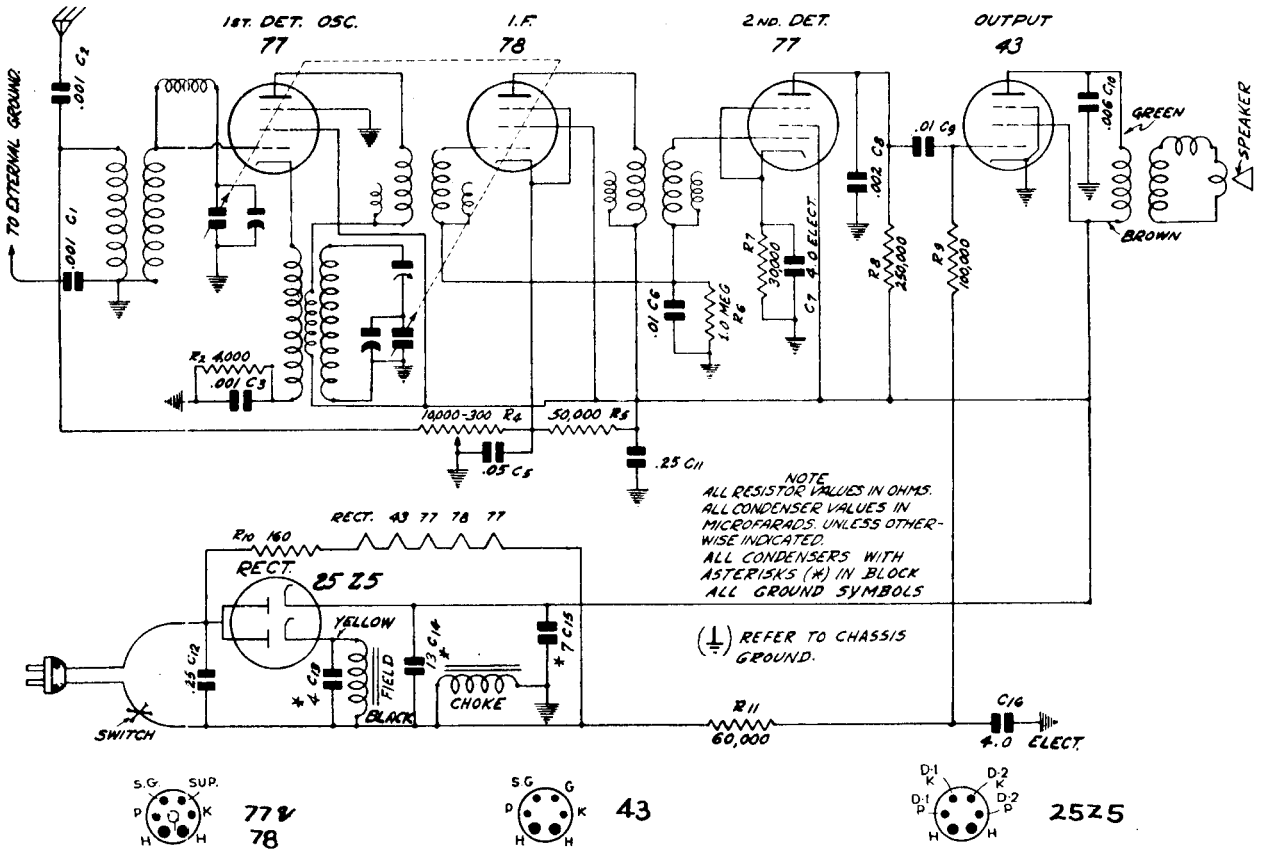
Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Grid Volts	Screen Current MA	Plate Current MA	Cathode Volts
56	1	Osc.	2.3	110	15-30(1)	.....	...	3-3.4(1)	0
58	2	R. F.	2.3	260	2.0(2)	90(3)	1.2	4.8	0
58	3	1st Det.	2.3	260	2.0(2)	90(3)	1.3	5.4	0
58	4	I. F.	2.3	260	2.0(2)	90(3)	1.2	4.6	0
55	5	2nd Det. AVC-1st Audio	2.3	Diode 1-0 Diode 2-3 Triode 135	2.0(5)	.....	...	4.6	12
2A5	6	Power	2.3	255	3.0(6)	260	...	.....	0
80	7	Rectifier	4.8	.....	.....	.....	..	26 Per Plate	....

Trouble Shooting Hints

Condenser break-down in the filter circuit and defective AVC action seem to be the most common service calls on these sets. Condenser C21A and condenser C20 should be tested when the plates of the type 80 rectifier become red-hot. Resistors R1 and R2 should be tested in case of motor-boating or eratic volume.

MONTGOMERY WARD & CO.

MODEL 62-98



Antenna lead connected to ground lead (not external ground).—Volume Control at Maximum.

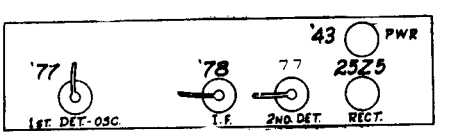
CAUTION—Do not put chassis on any grounded surface or let chassis touch any ground.

Type of Tube	Function	A.C. Line Voltage—115 Use High Resistance A.C. Meter, Rectifier Type, for Heater Voltage Measurements: Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	D.C. Line Voltage—110 Use High Resistance D.C. Meter for Heater Voltage Measurements: Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
77	1st Det. Osc.	5.8	106	106	5.2	.8	5.6	87	87	4.3	.6
78	I.F.	5.8	108	108	3.0(1)	7.4	5.6	88	88	2.4(1)	6.0
77	2nd Det.	5.8	65(2)	104	6.0(3)	.14	5.6	58(2)	82	5.0(3)	.11
43	Output	24.	95	110	18.0(4)	22.0	23.0	80	90	15.0(4)	17.0
25Z5	Rect.	24.	110 (5) 155			84.0 Total	23.0	5.0 (5) 6.0			74.0 Total

As the I.F. stages are self-tuned, no I.F. aligning at the intermediate frequency of 262 K.C. is required.

First set the signal generator for a signal of exactly 1400 K.C. Connect the antenna lead from the signal generator to the antenna lead of the receiver and the ground lead of the signal generator to the ground of the receiver. Then turn the tuning condenser rotor until the marker is at 1400 K.C. on the dial scale. In order to do this, it will be necessary to put the chassis back in the cabinet. Adjust the two trimmers on the tuning condenser for maximum output adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. This adjusting screw will be seen on the back panel of the chassis. A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

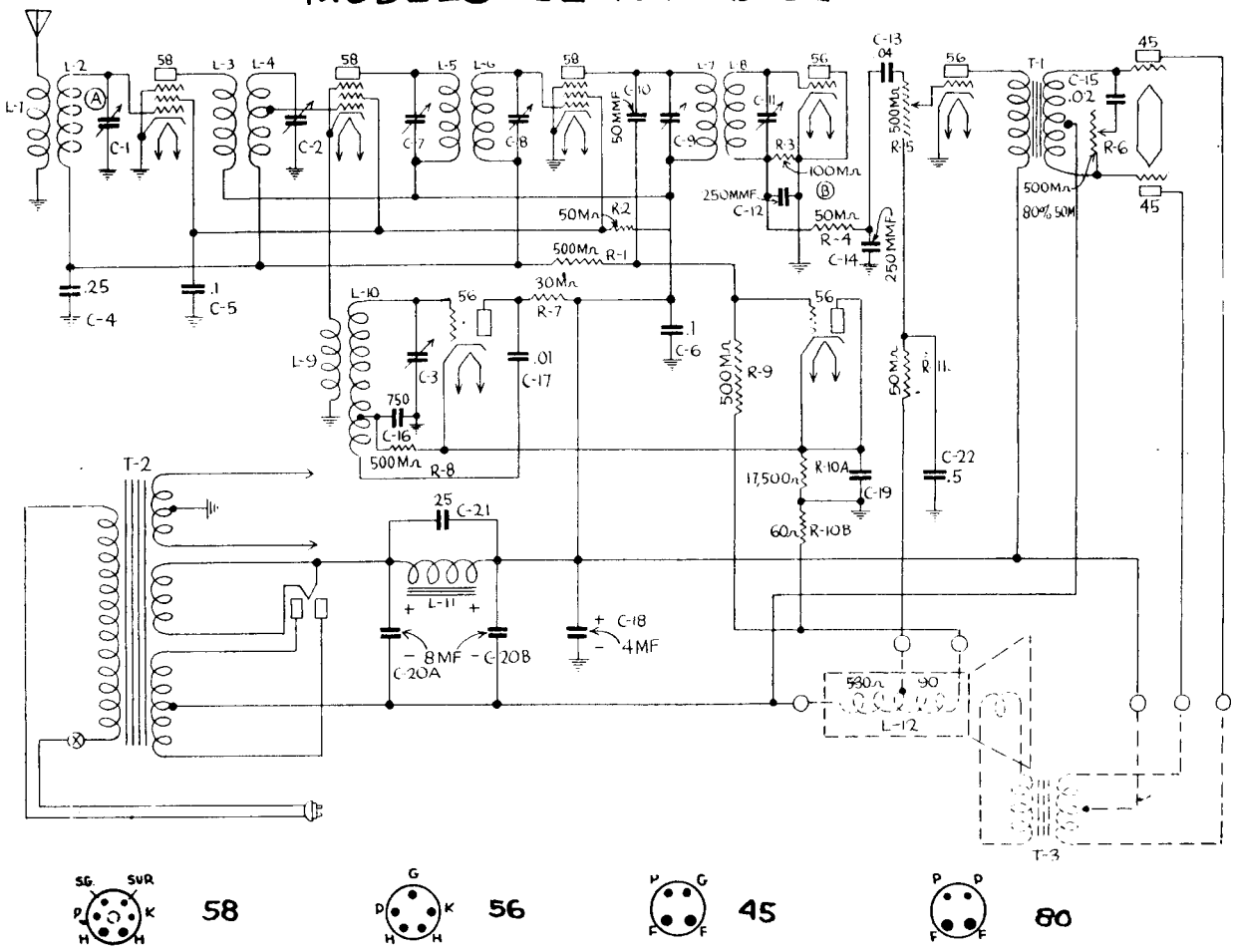


Trouble Shooting Hints

Accidental shorting of the chassis to ground in these sets results in a burned out volume control and in some cases renders the 25Z5 inoperative. If line fuses blow, check the condenser C12 across the power circuit.

MONTGOMERY WARD & CO.

MODELS 62-101 AND 62-101X



Alignment

An accurately calibrated signal generator is necessary for the proper alignment of the R. F. and I. F. circuits. This generator must produce an I. F. signal at 262 K. C. as well as R. F. signals throughout the broadcast band of 540 to 1500 K. C. An output meter for determining the maximum output of the receiver is also essential.

The necessity for realignment of the R. F. or I. F. circuits will usually be indicated by poor sensitivity and selectivity, but realignment should not be attempted until all other possible causes for the same condition, such as defective tubes, poor antenna installation, shielded location or low line voltage have been checked and eliminated as contributing causes.

During the following alignment procedure the 56 AVC Tube should be replaced with a dummy tube (one from which one filament prong has been cut). This will prevent any possibility of AVC action which would make it difficult to determine the exact point of the output peak when adjusting the trimmer condensers. The signal applied to the receiver during alignment should be maintained at as low a value as will give an indication on the output meter sufficient to insure accurate adjustment of the trimmer condensers.

Aligning Intermediate Condensers—It is essential that the I. F. stages be correctly tuned for maximum deflection upon the output meter before the R. F. and oscillator circuits can be aligned.

Remove the 56 oscillator tube and connect the signal lead from the signal generator to the control grid contact of the first detector tube. The ground lead from the signal generator is connected to the ground post on the rear of the chassis. Place the signal generator in operation at 262 K. C. and attenuate its output until as low a signal as will give satisfactory deflection on the output meter is obtained. The manual volume control should be set at maximum during alignment.

Then adjust the four intermediate condenser screws until maximum output is indicated on the output meter. After all four screws have been adjusted the first time go over them again and check the setting for maximum output. The intermediate condenser screws are accessible from beneath the chassis and protrude through the porcelain bases of the I. F. Transformers.

Trouble Shooting Hints

Condenser C18 in the power supply circuit often becomes shorted thus overloading the rectifier and producing low plate voltage. Also check the R. F. by-pass condensers for the latter complaint.

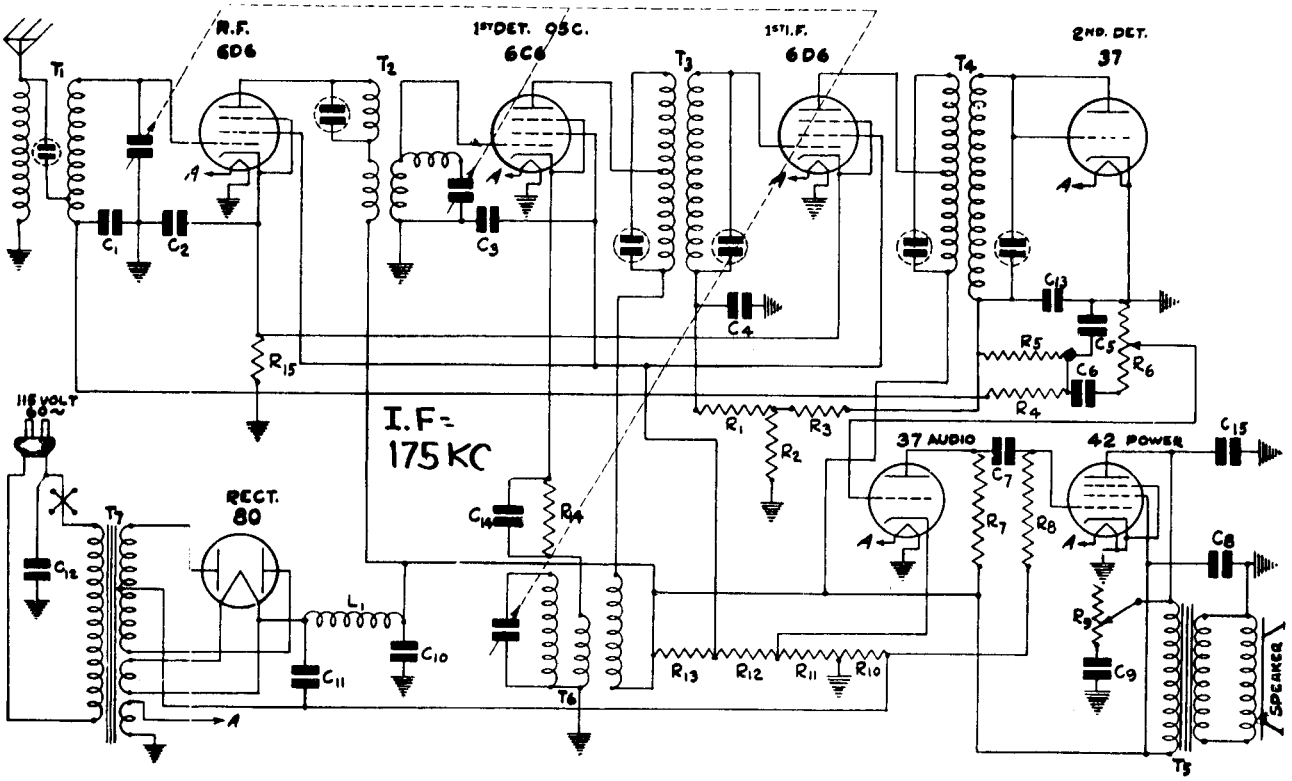
Voltages at Sockets

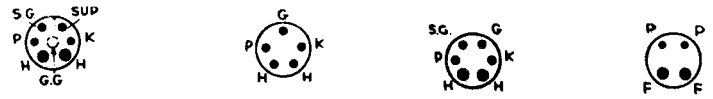
Line Voltage—115—Volume Control at Maximum

Position of Tube	Type of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Grid Volts	Screen Current MA	Plate Current MA	Cathode Volts
1	58	R. F.	2.35	270	1.2(1)	70(2)	1.3	5.0	0
2	58	1st Det.	2.35	270	1.2(1)	70(2)	1.3	6.0	0
3	58	I. F.	2.35	270	1.2(1)	70(2)	1.3	5.6	0
4	56	2nd Det.	2.35	0	0	....	....	0	0
5	56	1st Audio	2.35	250	2.0(3)	....	....	7.2	0
6	56	Osc.	2.35	100	8.0-12.0(4)	....	....	32-34(4)	53
7	56	AVC	2.35	0	15.0(5)	....	....	0	53
8	45	Power	2.35	265	57.0	....	....	25.0	....
9	45	Power	2.35	265	57.0	....	....	25.0	....
10	80	Rectifier	4.9	....	....	....	....	43 Per Plate	....

MONTGOMERY WARD & CO.

MODELS 62-103 AND 62-105





6D6
6C6 37 42 80

As the I. F. stages are fixed tuned, no I. F. alignment at the intermediate frequency of 175 K. C. is required.

First set the signal generator for a signal of exactly 1400 K. C. Connect the antenna lead from the signal generator to the antenna lead of the receiver, and the ground lead from the signal generator to the ground lead of the receiver. Set the dial pointer on the 1400 K. C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

The tuning condensers are all adjusted at the factory for the correct relative capacity between the oscillator section and the other two sections. As a rule no adjustment other than at 1400 K. C., as mentioned above, is required. If, after the receiver has been aligned at 1400 K. C.. the sensitivity is still low at some portion of the band, adjust the signal generator to that setting and tune for maximum output with the station selector knob of the receiver. Then, without readjusting the trimmers, bend the slotted rotor plates on the **front two sections** of the gang to obtain maximum output. Care should be taken not to bend these plates too far in an inward direction as the condenser may short as a result.

After any adjustment of this nature, set the signal generator again for a signal of 1400 K. C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Trouble Shooting Hints

Speaker rattle in this set is commonly reported. Align the voice coil and if it still persists try changing the 42 power tube.

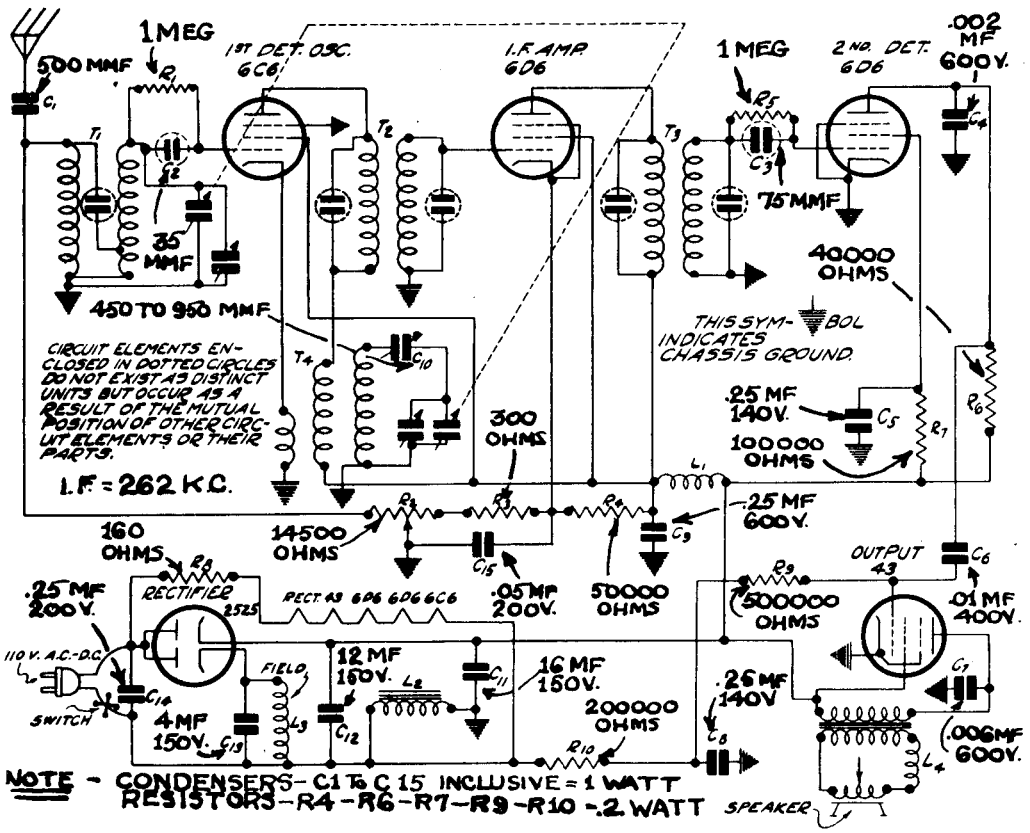
Voltages at Sockets

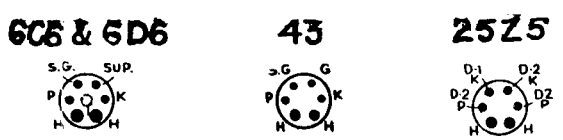
Line Voltage — 115
Antenna Shorted to Ground

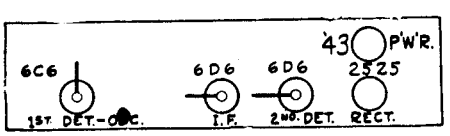
Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
6D6	R.F.	6.2	260	100	3.0(1)	8.0
6C6	1st Det.	6.2	255	96	12.0(2)	1.0
6D6	I.F.	6.2	260	100	3.0(1)	8.0
37	2nd Det.	6.2	0		0	0
37	Audio	6.2	60		4.6(1)	0.9
42	Output	6.2	246	263	16.0(3)	33
80	Rect.	5.0	725 V. AC plate to plate			35 per plate

MONTGOMERY WARD & CO.

MODEL 62-104







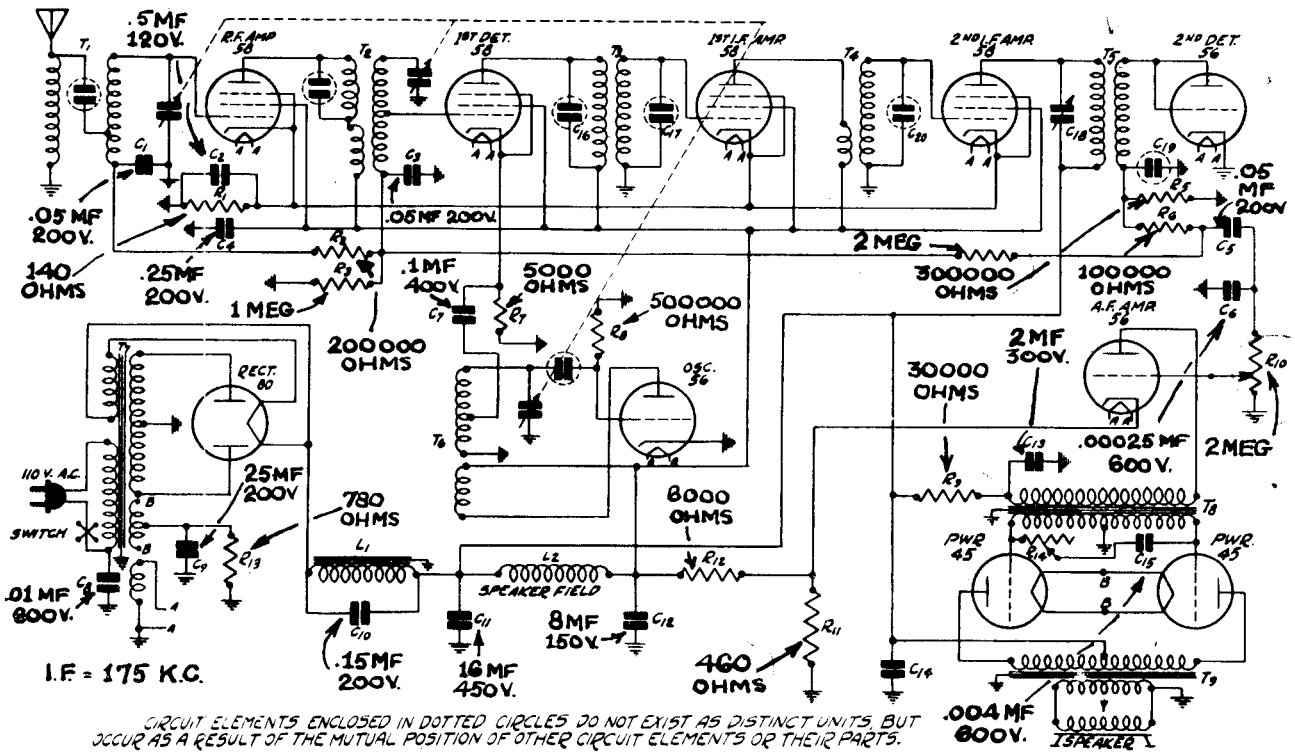
Antenna lead connected to subpanel.—Volume Control at Maximum.

CAUTION—Do not put chassis on any grounded surface or let chassis touch any ground.

Type of Tube	Function	A.C. Line Voltage—115 Use High Resistance A.C. Meter, Rectifier Type, for Heater Voltage Measurements					D.C. Line Voltage—110 Use High Resistance D.C. Meter for Heater Voltage Measurements				
		Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
6C6	1st Det.	5.8	108	108	12.0(1)	6.0(1)	5.6	90	90	10.0(1)	4.0(1)
6D6	I.F.	5.8	105	105	3.0	7.5	5.6	86	86	2.4	6.0
6D6	2nd Det.	5.8	20(2)	40(2)	.3	2.3	5.6	17(2)	34(2)	.2	2.0
43	Output	24.0	95	108	17.0(3)	20.0	23.0	80	90	14.0(3)	17.0
25Z5	Rect.	24.0	105 (4) 125			84.0 Total	23.0	6 (4) 7			74.0 Total

MONTGOMERY WARD & CO.

MODELS 62-106-62-107 & 62-121



CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS, BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

NOTE - CONDENSERS C1 TO C18 & R8 = 1 WATT
RESISTORS R1 TO R18 = .2 WATT

58 56 45 80

Voltages at Sockets

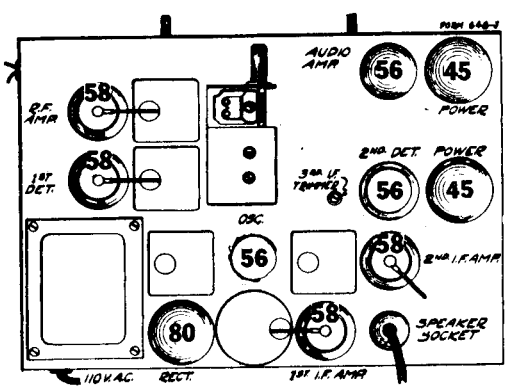
Line Voltage, 115

Antenna Shorted to Ground

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Control Grid to Cathode	Normal Plate M.A.
58	R.F.	2.3	93	93	3 (1)	6.4
58	1st Det.	2.3	85	85	11 (2)	1.7
56	Osc.	2.3	96		2 (3)	2.8
58	1st I.F.	2.3	93	93	3 (1)	6.4
58	2nd I.F.	2.3	315	93	3	6.6
56	2nd Det.	2.3	0		0	0
56	A.F. Amp.	2.3	170		8 (4)	4.4
45	Power Amp.	2.4	255		50	32.
80	Rectifier	4.7	850 Volts A. C. plate to plate			55 per plate.

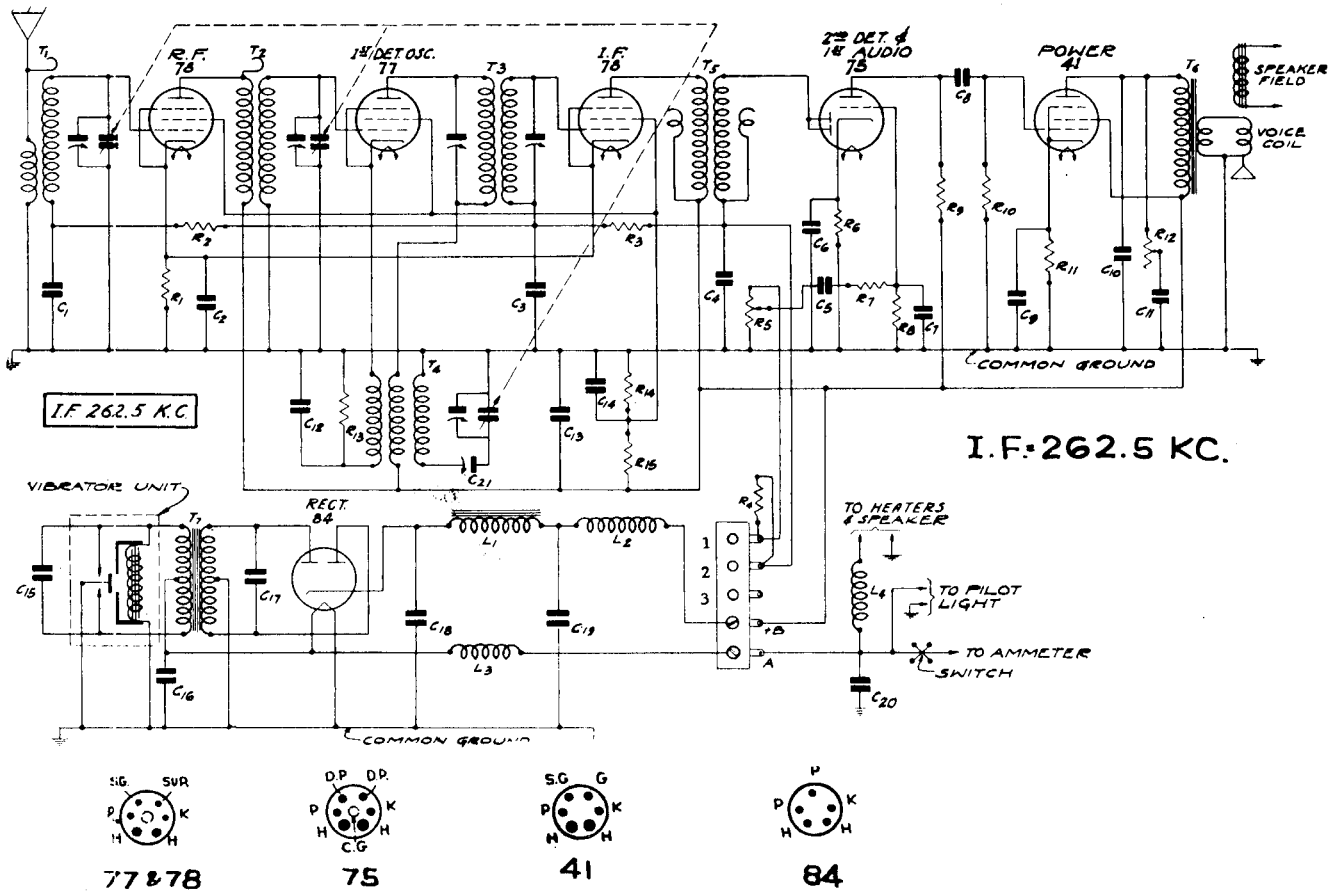
A type 56 tube is used in a separate oscillator circuit. The oscillating circuit is tuned by one of the sections of the three gang condenser and is always resonant at 175 K. C. above the frequency to which the R. F. amplifier is tuned.

The oscillator potential is fed into the cathode circuit of the 58 1st detector tube. This results in the intermediate or beat frequency of 175 K. C. being present in the plate circuit of this tube.



MONTGOMERY WARD & CO.

MODEL 62-118



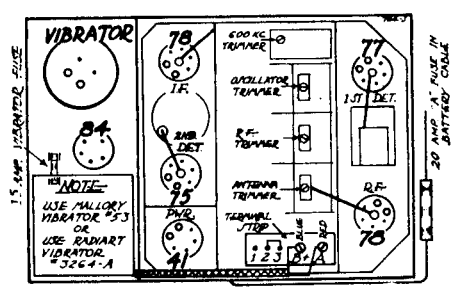


Fig. 2—Location of Tubes.

Voltages At Sockets

On the following chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected.

The voltages can be read with the chassis in the box, by means of an analyzer plug.

If the chassis unit is taken out of the box all of the socket terminals can easily be reached under the chassis with test prods.

If the chassis is taken out, the power unit must also be taken out. Connect a jumper from chassis base to the metal wall of unit to complete the ground circuit.

Connect the Hot side of battery to the battery cable on the chassis and the ground side of the battery to the metal chassis base.

The reading at the battery should be 6 volts with the set operating.

VOLTAGES AT SOCKETS

Antenna Disconnected—Battery 6 Volts Under Load

Type of Tube	Function	Across Heater	Plate to Cath.	Screen to Cath.	Cath. to Ground	Normal Plate M.A.
78	R. F.	5.7	220	100	3.5	5.0
77	1st Det. and Osc.	5.7	220	100	8.0 (1)	1.1 (1)
78	I. F.	5.7	220	100	3.5	5.0
75	2nd Det.	5.7	140 (2)		1.0	0.3
41	Output	5.7	200	210	15.5	18.0
84	Rect.	5.7				20. per plate

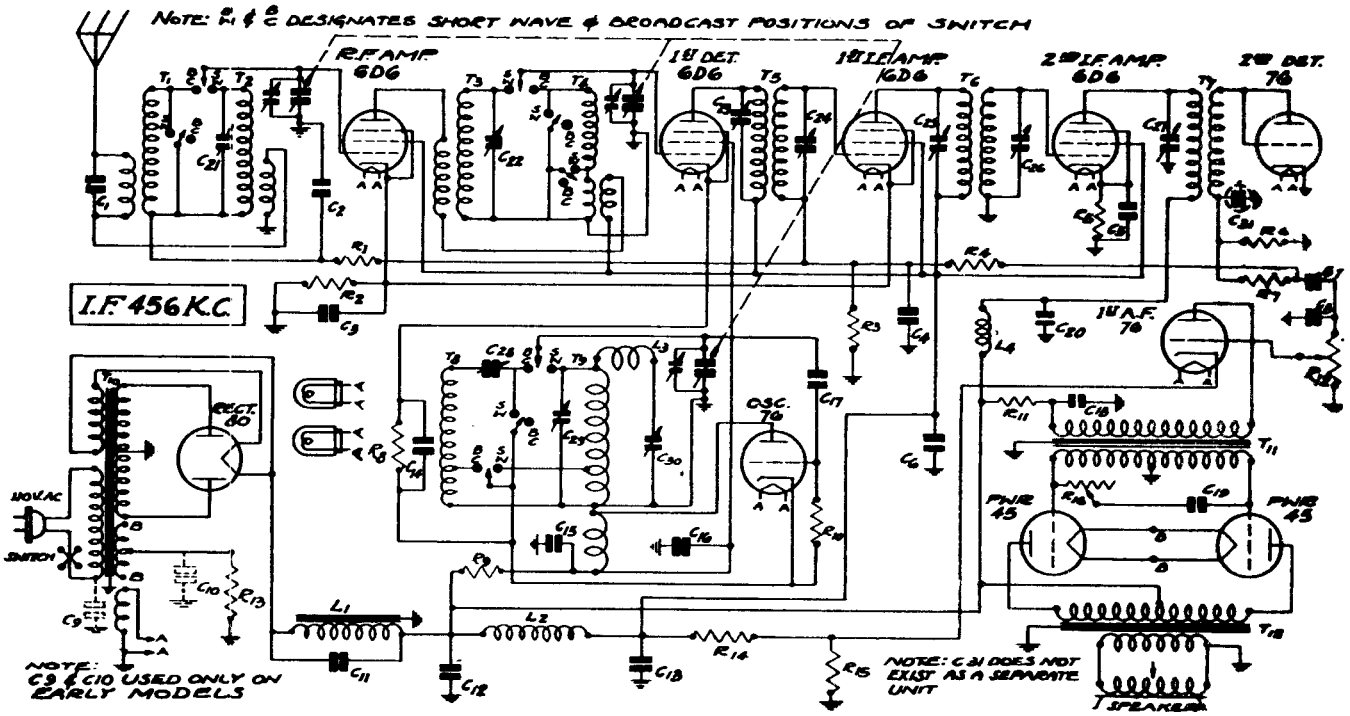
(1) Subject to variation.
(2) Triode Plate to Cathode—as read with 1,000,000 ohm meter.

Trouble Shooting Hints

After this set has been in use for some time the vibrator unit may cause trouble. A new unit should be plugged in if this occurs. Open circuits in the resistors connected to the second detect or are also common. They should be checked with a continuity meter or preferably with an ohmmeter and replaced if defective.

MONTGOMERY WARD & CO.

MODELS 62-132 AND 62-137



6D6 76 45 80

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans - The openings to these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION - Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the back panel of the chassis and the adjustment screw is reached through a hole in the back panel.

Short Wave Band Adjustment

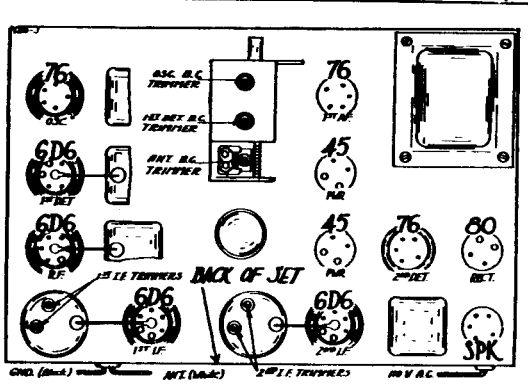
In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K.C. higher in frequency than the signal.

Voltages at Sockets

LINE VOLTAGE — 115

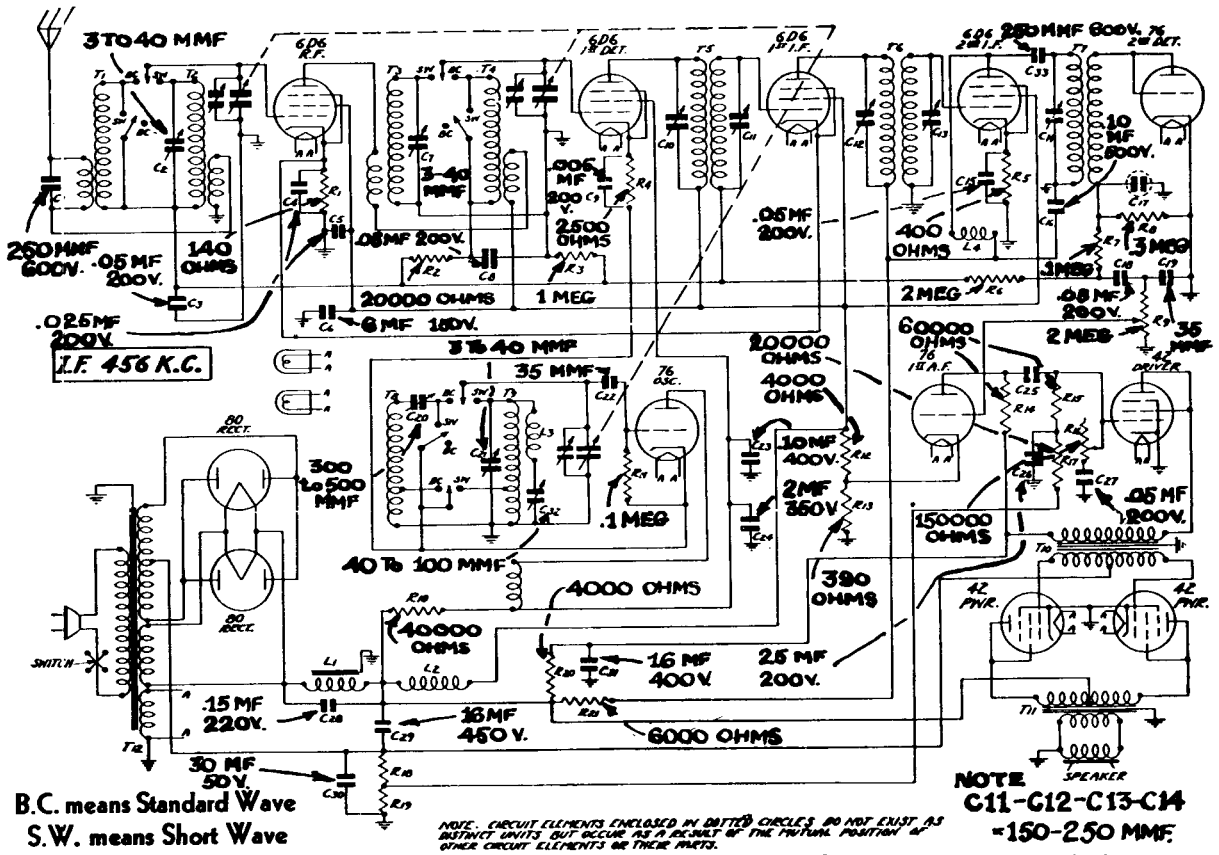
ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cath.	Cath. to Ground	Normal Plate M. A.
6D6	R. F.	6.3	95	95	2.8	7.0
6D6	1st Det.	6.3	88	95	9.2	2.9
76	Osc.	6.3	110	—	—	5.0
6D6	1st I. F.	6.3	95	95	2.8	7.0
6D6	2nd I. F.	6.3	300	95	3.3	6.0
76	2nd Det.	6.3	—	—	—	—
76	1st Audio	6.3	160	—	9.0	4.0
45	Output	2.5	245	—	48.0	30.0
80	Rectifier	5.0	890 V. A. C. pl. to pl.			58.0 per plate



MONTGOMERY WARD & CO.

MODELS 62-134, 62-139, 62-134X & 62-139X



Voltages at Sockets

LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

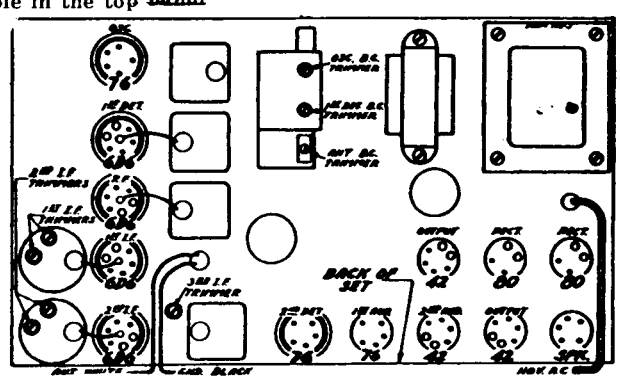
Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cathode	Grid to Cath.	Normal Plate M. A.
6D6	R. F.	6.3	105	105	2.8	8.8
6D6	1st Detector	6.3	95	105	10.0	3.3
76	Oscillator	6.3	115		0.0	5.8(1) 7.7(2)
6D6	1st I. F.	6.3	260	105	2.8	8.8
6D6	2nd I. F.	6.3	260	105	3.2	7.2
76	2nd Detector	6.3				
76	1st Audio	6.3	170		11.0	1.2
42	Driver Stage	6.3	235	235	18 (3)	26.5
42	Output	6.3	350	350	38.0	21.0
80	Rectifier	4.6	435			35.5 per plate

(1) Switch in Standard Wave position.
(2) Switch in Short Wave position (No Signal).
(3) Measured across resistor R19.

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans—See Fig. 2. The openings to these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION - Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the top panel of the chassis as shown in Fig. 2 and the adjustment screw is reached through a hole in the top panel.



MONTGOMERY WARD & CO.

MODELS 62-140, 62-148, 62-140X, 62-148X

Aligning I. F. Transformer

1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme right of its rotation) make the following adjustments:

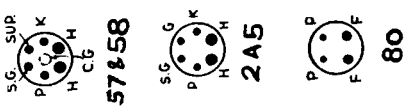
(a) Connect an external oscillator adjusted to 175 kilocycles, in series with a .1 mfd. condenser, to the control grid cap of the type 57 tube located between the R. F. coil (part numbers 109-10) and the I. F. transformer (part number 108-11) and chassis.

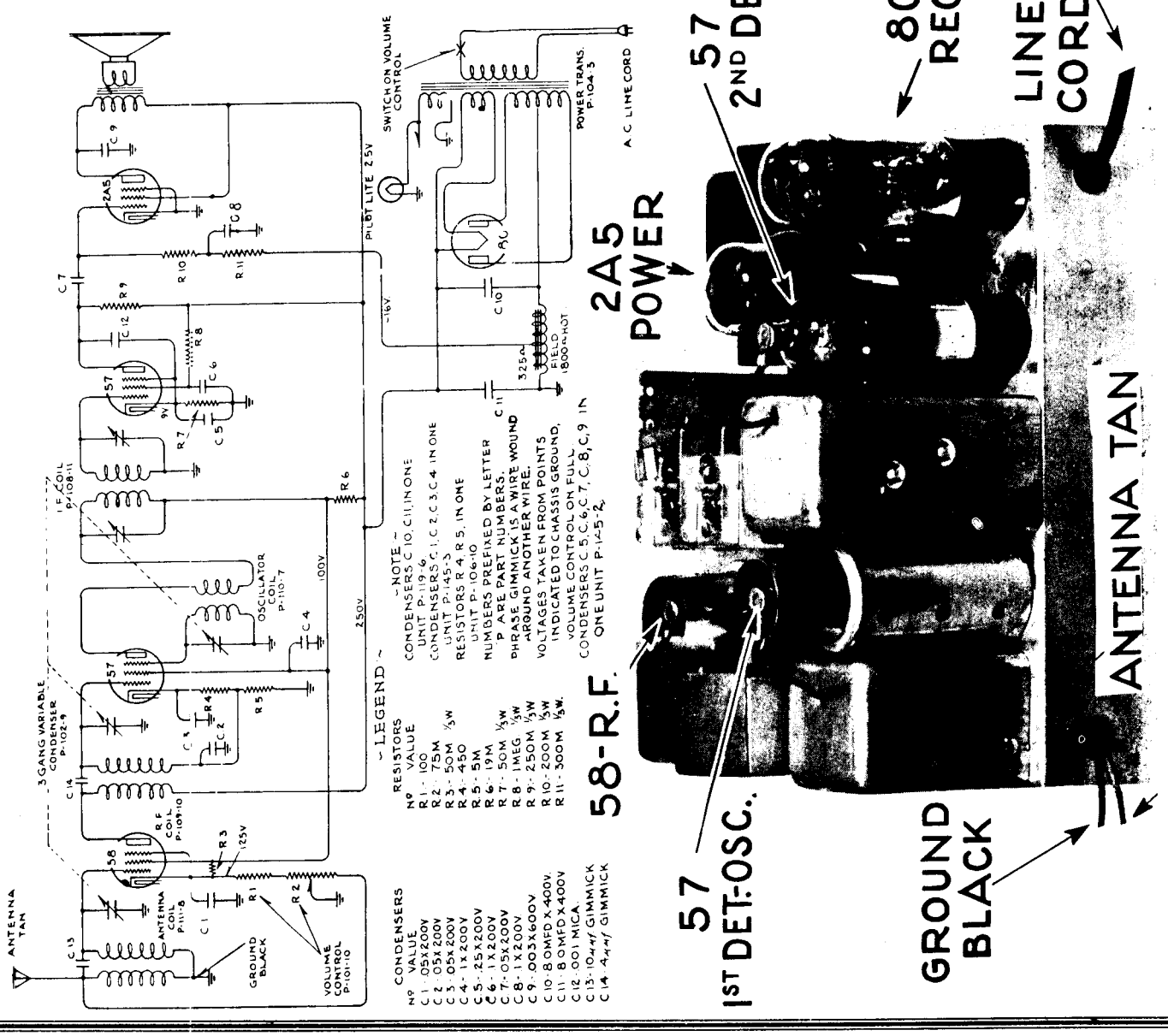
(b) Adjust trimming condensers of I. F. transformer (part number 108-11) to resonance. See top view of chassis. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or between the plate and screen terminals of the type 2A5 tube, by means of an adapter. Maximum deflection of the meter indicates resonance. Care must be taken to use only enough signal to give a readily readable output, as excessive input will result in overload and a false resonance point.

NOTE: The two trimmer condensers which tune the primary and secondary of the I. F. transformer are adjusted by set screws accessible from the back of the chassis.

Trouble Shooting Hints

Break-down of the high voltage winding and of the power transformer seems a common cause for trouble in this set. After replacing with a new unit, check plate current on all tubes to find the cause of breakdown. Drifting of the I. F. alignment is also common.





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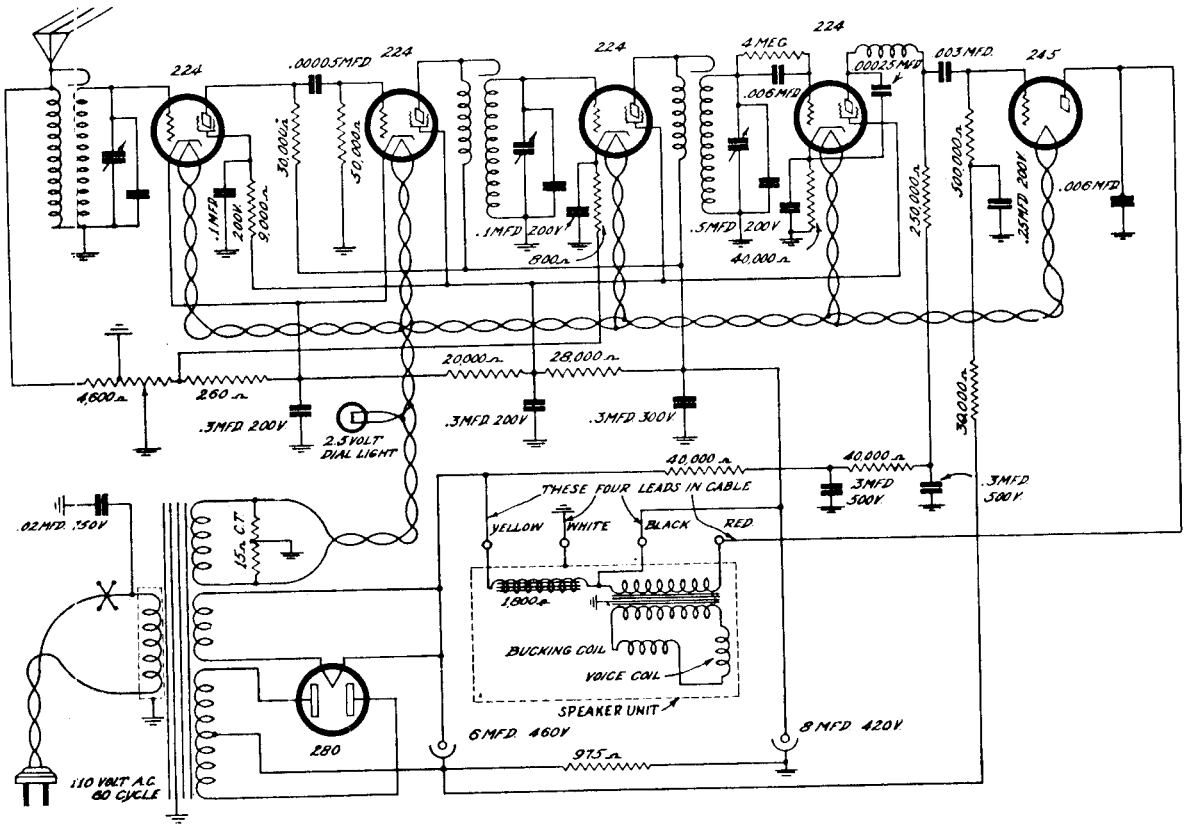
MODELS 62-360, 62-367



Oscillation

Uncontrolled oscillation at certain parts of the dial is many times caused by one or more high resistance connections between the spring contacts and rotor shaft of the variable gang condenser. A small amount of dirt or oil in these connections will cause the chassis to oscillate. This usually happens after the receiver has been used for three or four months. In a case of this kind, clean each contact spring and each contact point on the rotor shaft of the gang condenser, thoroughly with a piece of very fine sandpaper.

Hum

Excessive hum in this chassis usually indicates a bad 224 detector tube, 280 rectified tube, or a poorly grounded chassis. There are three major types of hum, sixty cycle A.C. hum, modulation hum and mechanical hum. Sixty cycle hum is noticeable in the speaker with no station being received and the aerial disconnected. An excessive hum of this type is caused by a defective tube, a defective center tap resistor, a poorly grounded chassis, or to a defective resistor, filter choke, or filter condenser, in some part of the chassis. Modulation hum is more noticeable when receiving broadcast stations, and it is due to the sixty cycle current modulating the R.F. signal; therefore, look for this type of hum in a defective resistor in the R.F. amplifier, shunt resistor, power pack or by-pass condensers. Mechanical hum is a hum that is due to loose laminations in the filter choke or power transformer. It may also be due to a poorly connected transformer shield.

Tube Voltages

All D.C. voltages taken with a 1000 ohm per volt meter on the scale indicated in column headed "Meter Scale." Turn on the volume control all the way and connect the antenna and ground leads together. The grid, plate, and screen grid voltages are measured to cathode of the heater tubes and to filament of the 245 tube.

Tube	Circuit	Meter Scale	90 V.	100 V.	110 V.	120 V.	130 V.
1st R. F. 224	Grid	0—10	2	2.3	2.6	3	3.3
	Screen-Grid	0—100	52	58	63	68	73
	Plate	0—250	133	142	155	167	178
2nd R. F. 224	Grid	0—10	.4	.5	.6	.7	.8
	Screen-Grid	0—100	60	67	72	78	83
	Plate	0—1000	190	210	230	250	278
3rd R. F. 224	Grid	0—10	2	2.3	2.6	3	3.3
	Screen-Grid	0—100	60	67	72	78	83
	Plate	0—1000	190	210	230	250	278
Detec 224	Grid	0—10	.08	.09	.1	.11	.12
	Screen-Grid	0—100	48	54	59	63	67
	Plate	0—100	58	66	72	78	87
Audio 245	Grid	0—100	23	27	31	35	40
	Plate	0—1000	202	222	242	262	282
280 Rect.	Plate Current	0—100	40 mils.	45 mils.	50 mils.	56 mils.	64 mils.
280 Rect.	Filament to Ground	0—1000	265	298	330	358	392

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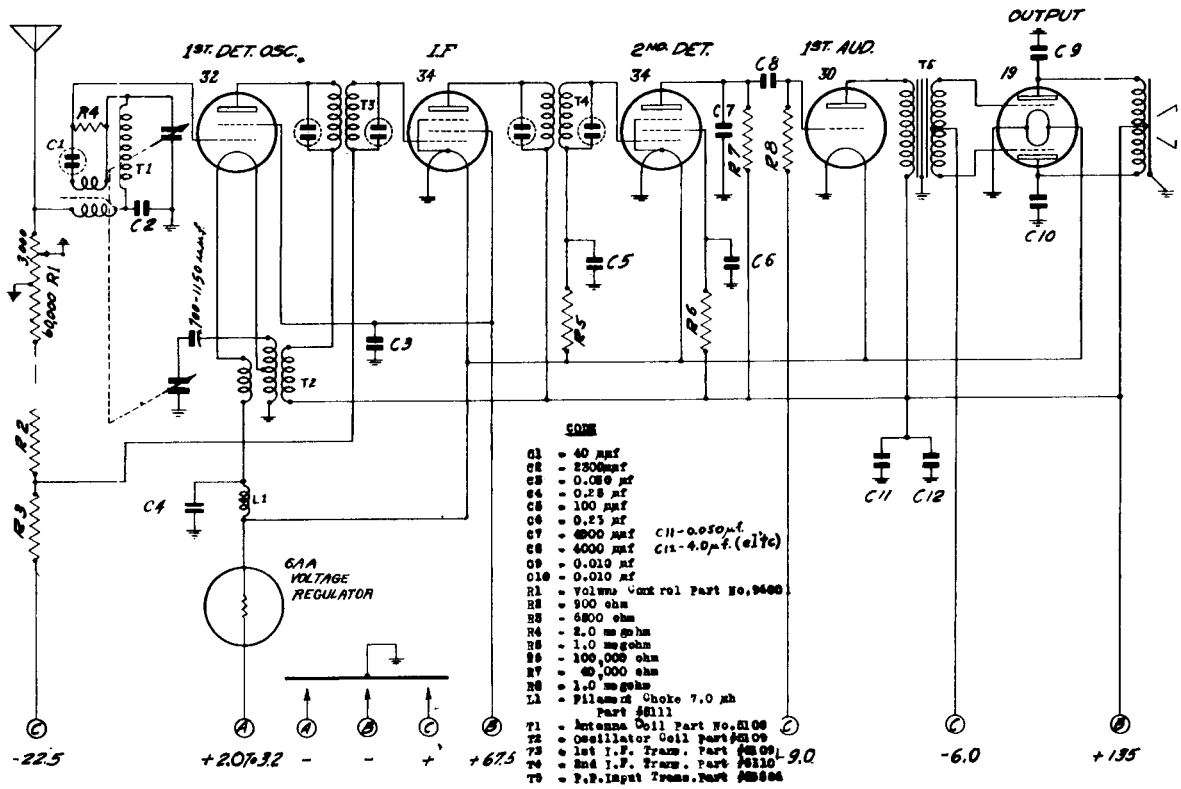
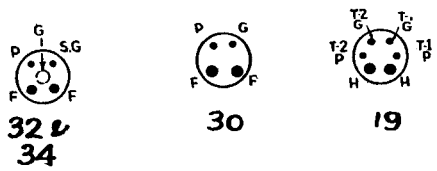
MODELS 77 AND 95





Trouble Shooting Hints

Paralyzed tubes caused by filament overloads may be due to ineffective control of the voltage regulator tube. Replace this tube frequently to insure correct operation of the set. In case of set failure test your tubes, especially the type 19 power tube.

As the I.F. stages are self-tuned, no I.F. aligning at the intermediate frequency of 175 K.C. is required.

First set the signal generator for a signal of exactly 1400 K.C. Connect the antenna lead from the signal generator to the antenna lead of the receiver and the ground lead of the signal generator to the ground of the receiver. Then turn the tuning condenser rotor until the marker is at 1400 K.C. on the dial scale. Adjust the two trimmers on the tuning condenser for maximum output adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C and adjust the oscillator 600 K.C. trimmer. The adjusting screw will be seen at the side of the tuning condenser and is reached from the top of the chassis. A non-metallic screw-driver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Voltages at Sockets

Volume Control at Maximum—Antenna Shorted to Ground

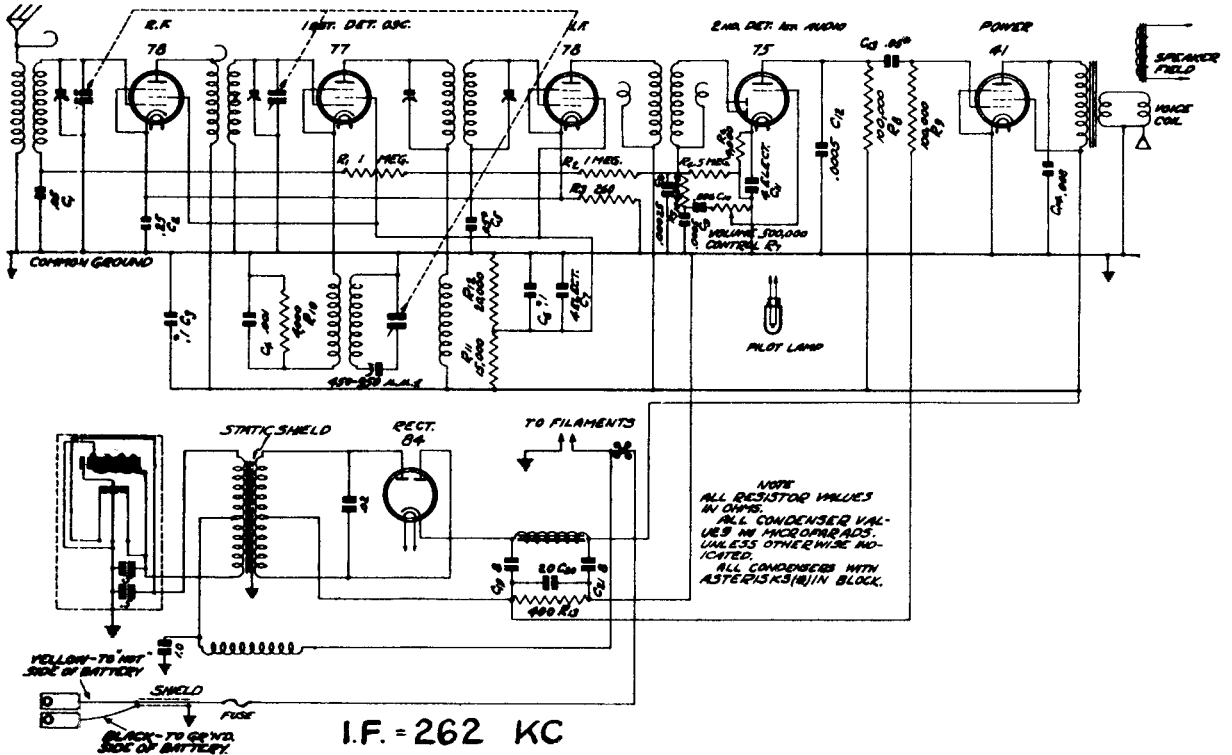
A—3 Volts, B—140 Volts

Voltages to Most Negative Point of Filament

Type of Tube	Function	Across Filament	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
32	1st Det. & Osc.	-2.0	139	70	5(2)	5
34	I.F.	2.2	139	70	2.5	6
34	2nd Det.	2.2	34(1)	40(1)	0	2.5
30	1st Audio	2.2	135		9(3)	3.0
19	Output	2.2	136		6	2.1 Total

MONTGOMERY WARD & CO.

MODEL 87



I.F. = 262 KC

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262 K.C., the intermediate frequency and an output indicating meter are desirable.

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. One of the I.F. condenser screws is reached through the hole on the top of the 1st I.F. assembly can. The other I.F. condenser screw is reached from the bottom of the sub-panel through a hole at the bottom of this assembly.

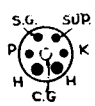
Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first.

Next, set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached through a hole in the back wall of the sub-panel.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.



77 & 78

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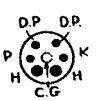

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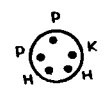

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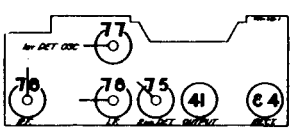


Location of Tubes

TYPE OF TUBE	FUNCTION	ACROSS HEATER	PLATE TO CATHODE	SCREEN TO CATHODE	GRID TO CATHODE	NORMAL PLATE MA
78	R. F.	6.1	182	80	3.(1)	7.0
77	1st Det. and Osc.	6.1	178	77	5.(2)	1.3(2)
78	I. F.	6.1	182	80	3.(1)	7.0
75	2nd Det. 1st Audio	6.1	70(3)		1.4(1)	.35
41	Output	6.1	172.5	176.5	12.5(4)	16.0
84	Rect.	6.1	205			17.5 per plate

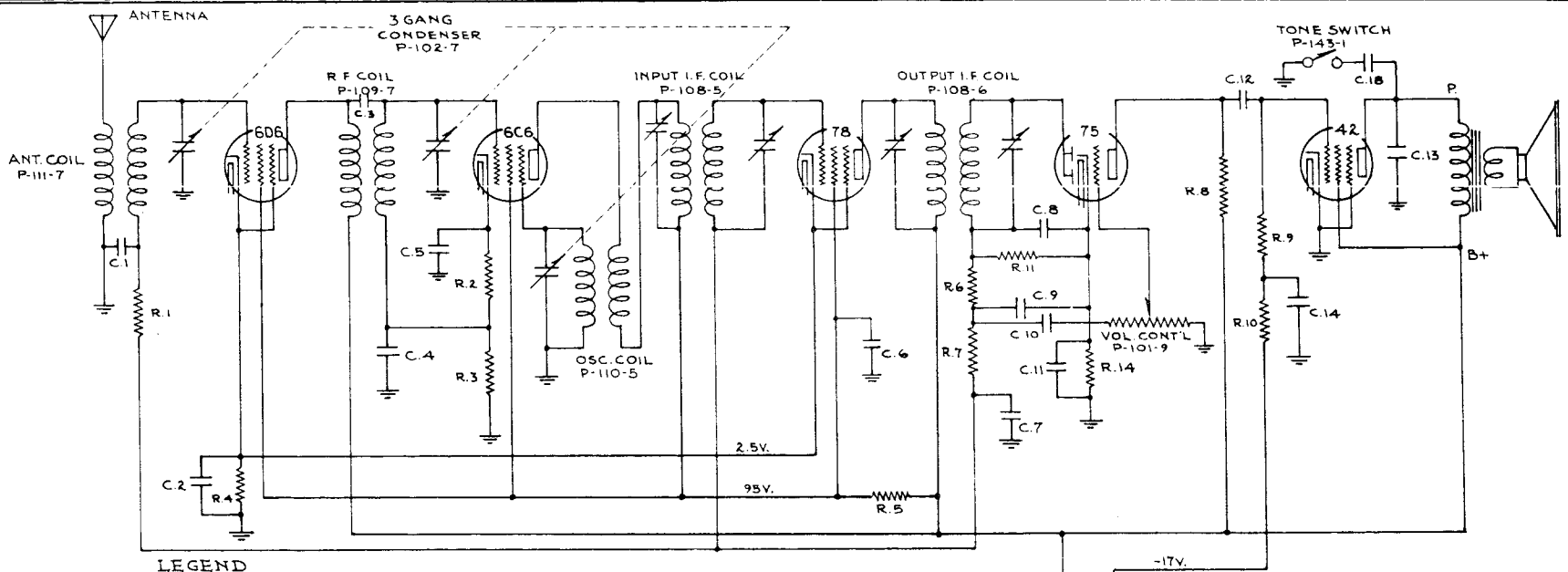
Trouble Shooting Hints

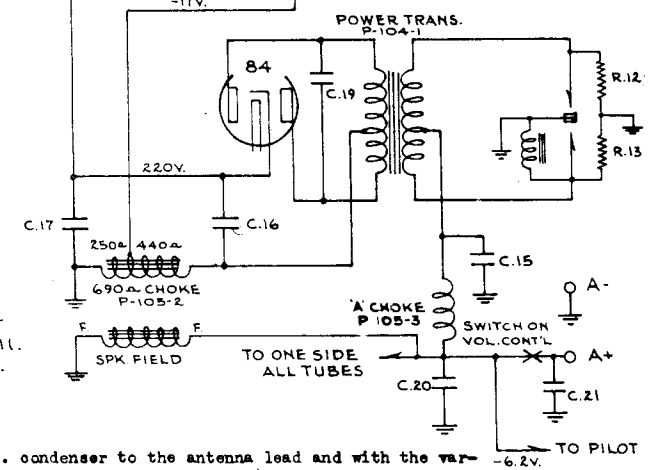
Oscillation may be caused by grid caps being loose or off; defective tubes or cover being loose on receiver case.

Weak reception may be cured by antenna trimming.

MONTGOMERY WARD & CO.

MODEL 102





LEGEND

RESISTORS		CONDENSERS	
Nº	VALUE	Nº	VALUE
R.1 :-	250M 1/3W.	C.1 :-	.05 X 200V.
R.2 :-	450Ω	C.2 :-	.1 X 200V.
R.3 :-	5M	C.3 :-	11.5 μμf GIMMICK
R.4 :-	150Ω	C.4 :-	.05X200V.
R.5 :-	19M	C.5 :-	.05X200V.
R.6 :-	50M 1/3W.	C.6 :-	.1 X 200V.
R.7 :-	250M 1/3W.	C.7 :-	.1 X 200V.
R.8 :-	250M 1/3W.	C.8 :-	.0005 MICA
R.9 :-	200M 1/3W.	C.9 :-	.0005 MICA
R.10 :-	300M 1/3W.	C.10 :-	.01X 400V.
R.11 :-	250M 1/3W.	C.11 :-	20MFD. X 20V.
R.12 :-	100Ω	C.12 :-	.01 X 400V.
R.13 :-	100Ω	C.13 :-	.003X600V.
R.14 :-	4M 1/3W	C.14 :-	.1 X 200V.
VAR RESISTOR :- 500M. (VOL. CONT'L)		C.15 :-	1MFD. X 120V.
		C.16 :-	8MFD. X 350V.
		C.17 :-	8MFD. X 350V.
		C.18 :-	.01 X 400V.
		C.19 :-	.02 X 1000V.
		C.20 :-	1MFD. X 120V.
		C.21 :-	.002 MICA.

-: NOTE :-

NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.

THE PHRASE GIMMICK MEANS, A WIRE WOUND AROUND ANOTHER WIRE.

RESISTORS IN ONE UNIT, P-106-3 :- R. 2, 3, 4, 5.

CONDENSERS IN ONE UNIT, P-103-2 :- C. 16. 17.

CONDENSERS IN DUAL UNIT :- C. 2, 7.

CONDENSERS IN DUAL UNIT :- C. 5, 6.

RESISTORS AND CONDENSERS IN OUTPUT I.F. CAN, P-108-6, :- C. 8, 9, 10 AND R 6, 7, 11.

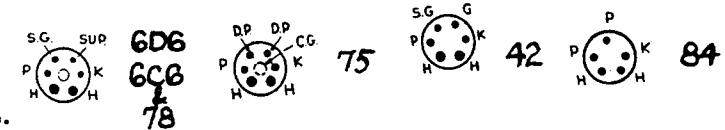
CONDENSER, C.1, IN ANT. COIL CAN P-111-7.

FREQUENCY ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (shaft end) to resonance.
2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna and R.F. trimmers to resonance.
3. Check alignment at 1200-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.
4. Bend slotted plates of antenna and R.F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

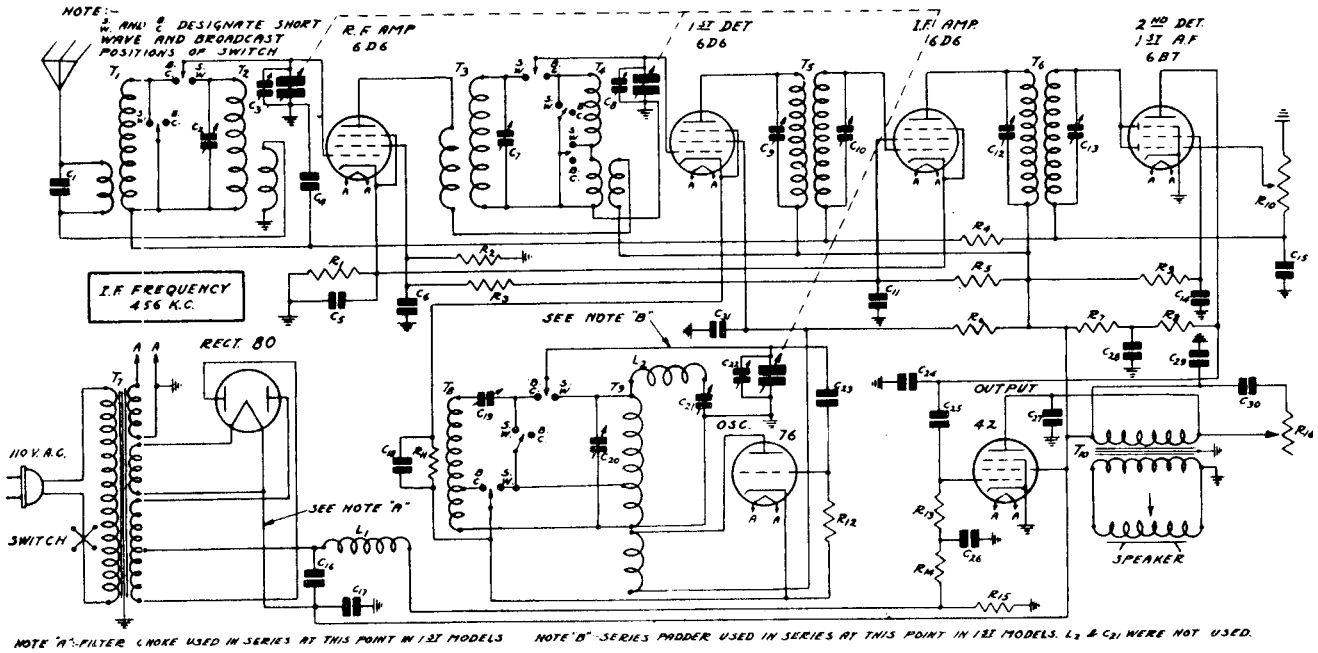
I.F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.
2. Adjust trimming condensers of both input and output I.F. transformers, parts number 108-5 and 108-6 (see top view of chassis) to resonance with oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer. Maximum deflection on the meter indicates resonance.



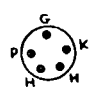
MONTGOMERY WARD & CO.

MODELS 123-131-133-142 AND 144



6D6

6B7



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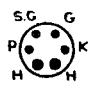

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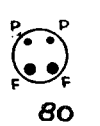


80

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Attenuate the signal so that A. V. C. action is not obtained.

Then adjust the four I. F. trimmer condensers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and are in the round I. F. cans The openings to the trimmer condensers are covered over by a small cover plate which is held in position by a screw. Loosen these screws until the cover plates can be swung around.

Voltages at Sockets

LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cath.	Control Grid to Cath.	Normal Plate M. A.
6D6	R. F.	6.3	246	100	3.6(1)	5.3
6D6	1st Det.	6.3	237	97	8.0(2)	3.4
76	Osc.	6.3	115		0	4.8
6D6	I. F.	6.3	246	130	3.6(1)	8.3
6B7	2nd Det.	6.3	50(3)	40(3)	0	2.7
42	Power	6.3	230	245	17.0(4)	33.0
80	Rectifier	5.0				37.0 per plate

Short Wave Band Adjustment

Turn the broadcast short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be attenuated to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis

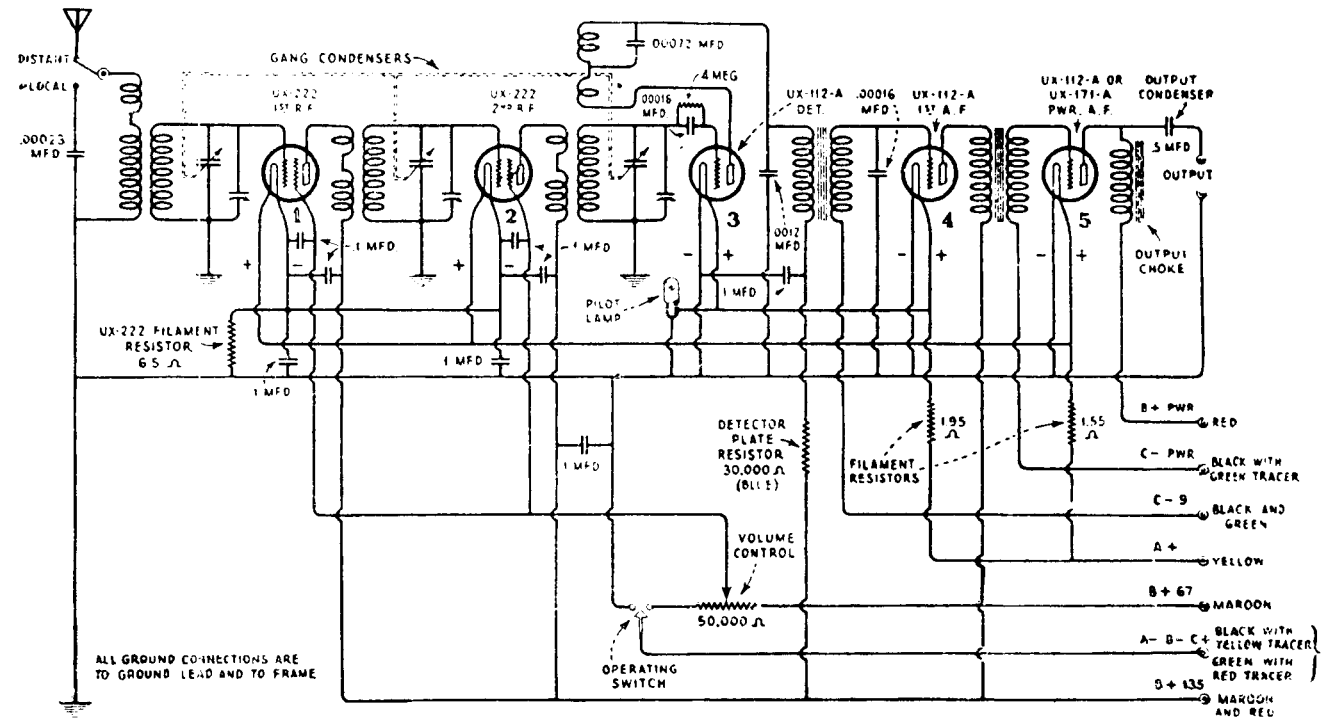
Next set the signal generator for 15,000 K. C. Turn the rotor until the dial pointer is at the 15,000 K. C. mark on the short wave portion of the dial scale. Then adjust the antenna and 1st detector short wave trimmers until maximum output is obtained.

Trouble Shooting Hints

Trouble in these sets is usually caused by the wave change switch which remains open on one section, thus preventing signals from passing through. In case of failure first check this switch. In case of no plate voltage on tubes, check coil L1 which is the speaker field coil. In early models also check filter choke.

MONTGOMERY WARD & CO.

MODELS 839-921-923-924 RADIOLA 21-22-62-63



Converting Radiola

22

112A or 71A

First examine Figure No. 2. There are three resistors at the back of the chassis mounted directly underneath the sub-panel. The wires attached to these three resistors must not be removed but the three resistors should be shorted out by soldering short pieces of wire across as shown on the dotted lines in Figure No. 2. On the console models it is not necessary to remove the chassis to do this. Remove the chassis when changing the table model.

Insert new low drain pilot light and adjust the position by sliding the pilot light clamp up and down until the figures on the dial can be seen prominently.

Connect one end of the green (2.2 Ohms) resistor to the end of the yellow positive A battery lead. This is important.

The red resistor is given to the customer in an envelope. It contains a small red label tied at one end and instructing the customer how to use it, which is as follows:

Over a period of time the A battery voltage will drop. Its initial voltage is slightly over 3 Volts. The green resistor drops this 3 Volts down to 2 Volts for the tubes. After the set has been used for a few months the battery voltage will drop to about 2½ Volts, so it is necessary to use a smaller resistor on the battery to give the tubes 2 Volts. When the set begins to lose volume and the tubes go dim, the green resistor should be replaced with the red resistor. After the receiver has been in use a few months more, the battery voltage will drop to about 2 Volts, then the resistor should be removed entirely and the battery used alone until dead.

Alignment:

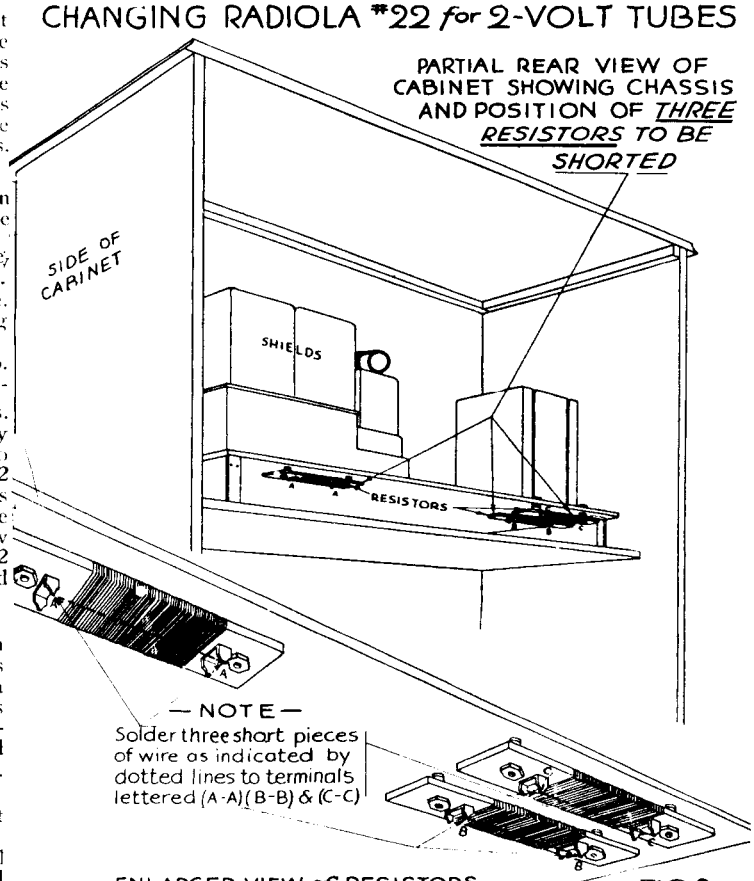
In order to align the condensers, it is necessary both in the console and table model, to first remove the chassis from the cabinet. Connect up all batteries and tune in a station at about 1400 Kilocycles. The trimmer condensers will be found mounted on the frame of the variable condenser nearest the front panel. These should be adjusted in turn for maximum volume on a station that does not fade.

Long Distance Switch:

In many localities the local distance switch will not operate satisfactorily on the local side.

In the country it is seldom necessary to use the local switch on the local side, for it is only put on as a safeguard to enable proper control of volume when under the shadow of powerful broadcast stations.

CHANGING RADIOLA #22 for 2-VOLT TUBES

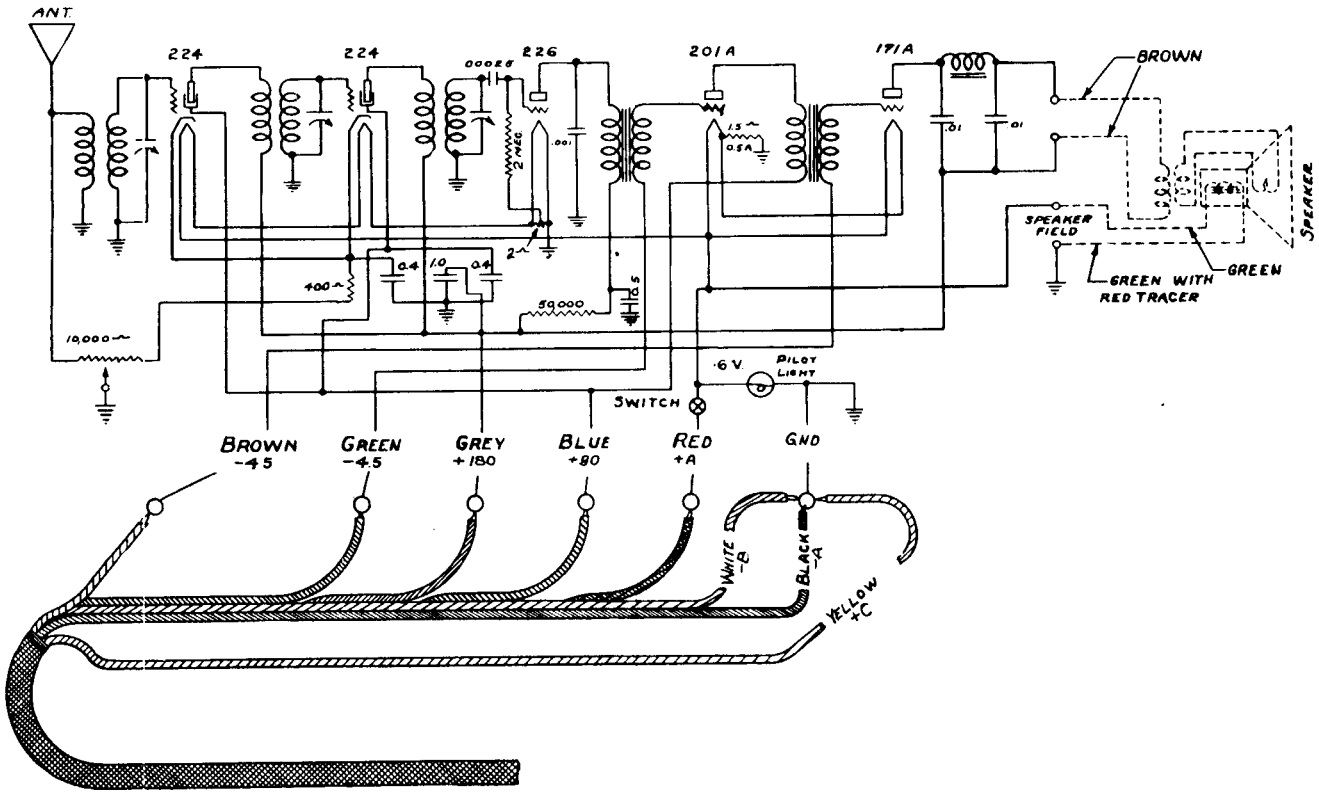


ENLARGED VIEW of RESISTORS SHOWING WHERE TO SOLDER SHORTING WIRES

FIG. 2

MONTGOMERY WARD & CO.

MODELS 1922, 62-055, 49



24

26, 201A & 171A

General Description

Not many of these chassis were put out. Because of the high "A" battery consumption, certain changes were suggested that could be made to reduce "A" battery consumption.

Diagram No. 1 gives the original circuit and it will be seen that the tube circuit consists of—

2—224's; 1—226; 1—201A; and 1—171A.

Diagram No. 2 shows the changes to be made so the set will consume less "A" battery current. The tubes are now:

2—NY 64's, or 236's; 2—201A; and 1—112A.

The NY 64 tubes are screen-grid battery operated tubes which were designed for use in automobile radio sets. Their current consumption is small; their amplification factor quite high and they are rugged and very long lived.

The "A" and "B" batteries are not changed to convert the receiver for lower "A" battery consumption.

Make the changes shown on the diagram. Connect the storage battery to black (neg.) and red (pos.) leads. Insert two NY 64 tubes in sockets marked 224. Place a 201A in socket marked 226, and one 201A in socket marked 201A. Use a 112A in socket marked 171A. Turn on filament switch and see if tubes light—if so connect "B" batteries as tagged, except "B + 180" lead—connect this to "B + 135" terminal.

Connect two 4½ Volt "C" batteries in series. The "C — 4½" Volt lead goes to the connection between the 4½ Volt "C" batteries. The "C — 45" goes to the 4½ Volt part of the second battery.

It is recommended that these changes not be made on sets where the customer is entirely satisfied with the operation and the life of the "A" battery. The operation with the 224 tubes is very highly satisfactory. The sensitivity is extremely high, and the tone quality very good.

Trouble Shooting Hints

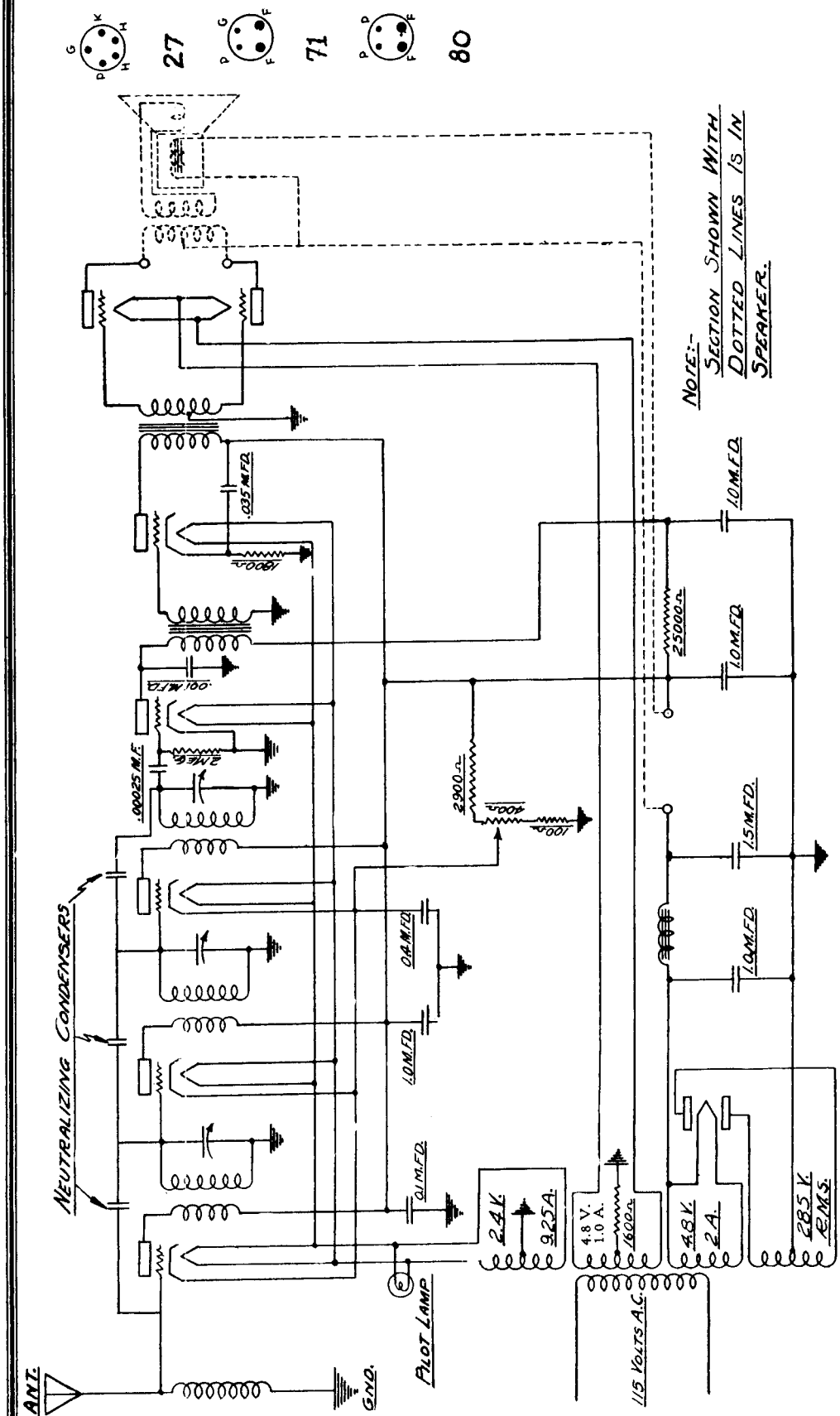
Noisy operation in these sets is usually caused by a defective volume control resistor.

If the type 24 tubes are replaced by NY 64 tubes, oscillation in the R. F. amplifier may result. This necessitates realignment of the R. F. amplifier.

In case of speaker rattle, first check the filter choke for vibration of its core and then check the voice coil position.

MONTGOMERY WARD & CO.

MODELS AE 11-51-52-53 & 54



The three-gang condenser is properly aligned at the factory and will not normally lose its alignment unless mishandled or tampered with. When the condenser is out of alignment, one or more of the stages are out of resonance and the set may tune broadly, lack volume at certain points of the broadcast band, or tune in a station at two or more points on the dial.

The most satisfactory method of re-alignment is with a small oscillator although this can be done with fair success on a broadcast signal. In either case, the method is the same. Tune the receiver to a low wavelength station; then reduce the volume until the signal can just be heard. Now push the two shields between the three condenser banks back or forth with an edged or pointed piece of bakelite or fibre until the point of maximum volume is reached.

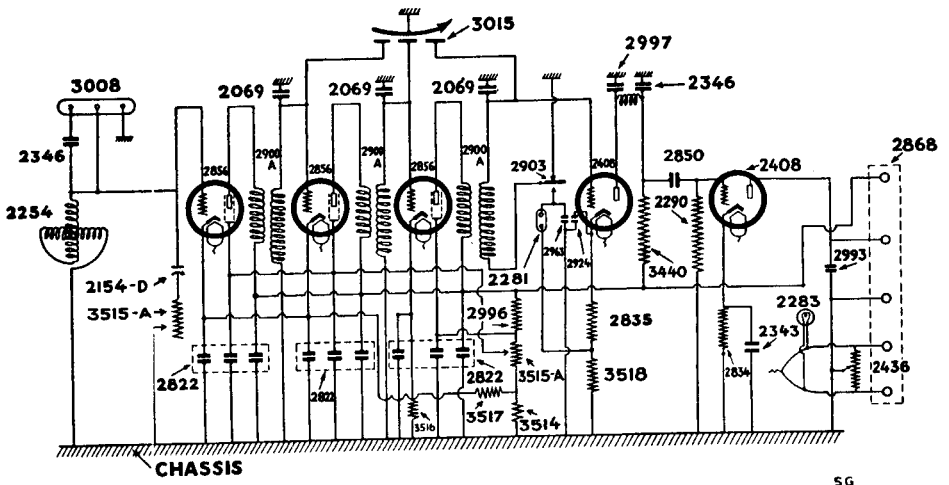
... a high wavelength signal and reduce the volume until the signal can just be heard. Then beginning with the condenser next to the dial and using the same piece of bakelite or fibre, push the end stator plate in or out a slight amount until the point of maximum volume is reached. Follow the same procedure on the next two condensers. Care should be taken that the stator plates do not touch the rotor plates at any point.

VOLUME CONTROL AT MAXIMUM

Type of Tube	Tube No.	"A" Volts	"B" Volts	Control Grid Negative Volts	Cathode Volts	Plate Current Milliamps
227	1	2.28	90	4.05	4.05	1.6
227	2	2.35	90	4.05	4.05	4.6
227	3	2.35	90	4.05	4.05	4.6
227	4	2.35	84.6	4	4	2.1
227	5	2.36	87	4.75	4.75	2.7
171	6	4.8	175	39.5		11.0
171	7	4.8	175	39.5		11.0
280	8	4.9				27.0 Rectifier

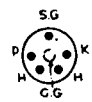
NATIONAL CARBON CO., Inc.

50 SERIES



UP TO C-58,000

27



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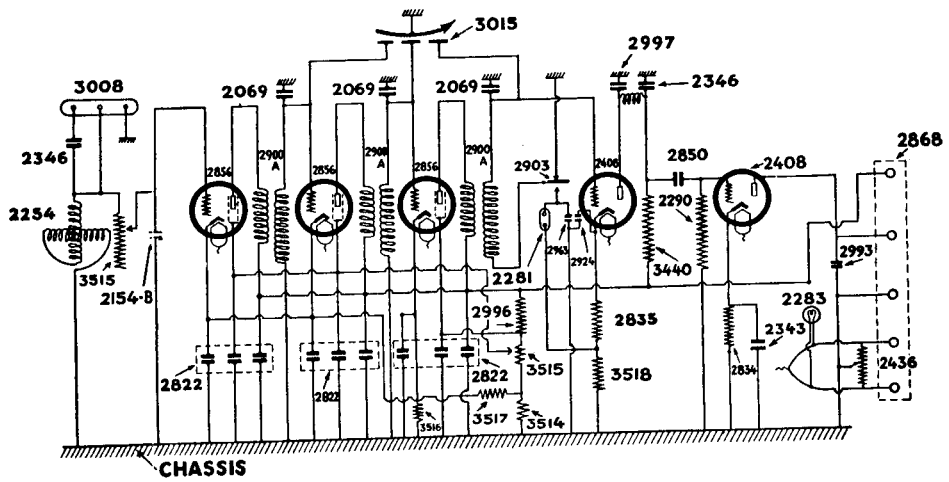


ABOVE C-58,000

45

80

Tube No.	Tube Type	Tube Out A Volts	Tube Out B Volts	A Volts	B Volts	C Volts	Tube in Tester K Normal Plate M.A.	Screen Grid Volts
1	224	2.4	180	2.3	160	-2.2	+3 2.5	70
2	224	2.4	180	2.3	160	-2.2	+3 2.5	70
3	224	2.4	180	2.3	160	-2.2	+3 2.5	70
4	227	2.45	100	2.3	65	-5.8	+3.5 .7	-
5	227	2.45	180	2.3	150	-11.7	+12.5 4.2	-
6	245	2.5	300	2.4	240	-46	- 25	-
7	245	2.5	300	2.4	240	-46	- 25	-
8	280	5.0	-	4.9	-	-	- 53	-

Serial Numbers up to C-58000

Fixed Condensers

2346	-	.0001 mfd.
2822	-	3 sec. ea. .5 mfd.
2963	-	.002 mfd.
2924	-	1 mfd.
2997	-	.0005 mfd.
2850	-	.01 mfd.
2993	-	.004 mfd.
2343	-	2 mfd.
2707-C	-	2 - 1 mfd.
		1 - 2 mfd.
		1 - 4 mfd.
		2 - .3 mfd.

Resistors

2917 - 1-500,000 ohms) variable
1- 10,000 ohms)
in bakelite case
3004 - 200 ohms
2338 - 2500 ohms
2996 - 2250 ohms
2835 - 4000 ohms
3440 - 125,000 ohms
2290 - 2 megohms
2834 - 3000 ohms
2346 - 10 ohm variable center tap wire wound
3423 - 100,000 ohms
2705 - 900 ohms
2528 - 50 ohms center tap wire wound

NATIONAL CO., Inc.

MODEL ACSW-3

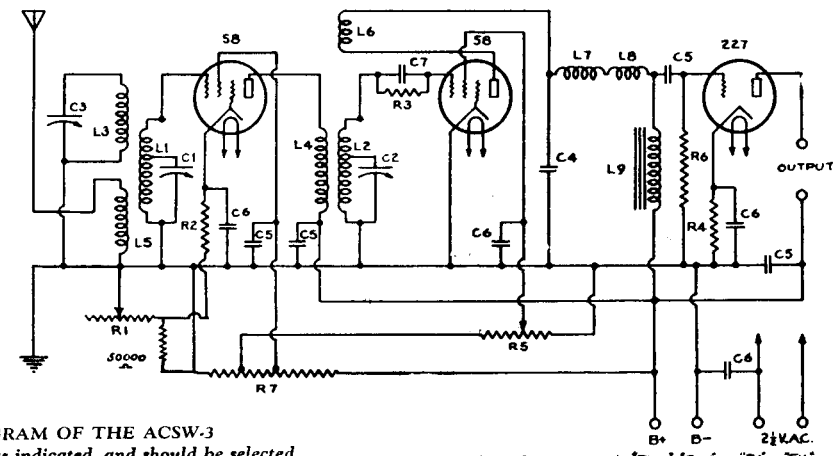


FIGURE 1 — CIRCUIT DIAGRAM OF THE ACSW-3

This receiver employs only a-c tubes, as indicated, and should be selected for complete a-c operation, or for partial a-c operation (using plate batteries) where a 2.5 a-c heater potential will always be available. The circuit constants are as follows —

L_1, L_2, L_3, L_4, L_5 and L_6 — *R.F. Transformers.*
L_7 — *No. 100 Ultra High Frequency R.F. Choke.*
L_8 — *No. 92 Low Radio Frequency Choke.*
L_9 — *700 Henry Choke — Part of S-101 Audio Coupler.*
C_1 *and* C_2 — *Ganged S.F.L. 270° Tuning Condensers with isolated rotors. 90-μμf per section.*
C_3 — *Midget Type Trimmer Condenser — 50-μμf.*
C_4 — *250-μμf mica by-pass condenser.*
C_5 — *.01-μf non-inductive mica fixed condensers.*
C_6 — *.5-μf non-inductive paper by-pass condenser.*
C_7 — *100-μμf small mica grid condenser. Incorporated in Detector R.F. transformer.*
R_1 — *3000 ohm potentiometer — special taper — used as gain control.*
R_2 — *300 ohm cathode resistor, 2 watt type.*
R_3 — *5 megohm detector grid leak.*
R_4 — *2000 ohm cathode resistor, 2 watt type.*
R_5 — *50,000 ohm potentiometer for regeneration control.*
R_6 — *250,000 ohm audio grid resistor — part of S-101 Coupler.*
R_7 — *Voltage Divider-total resistance 12,000 ohms.*

MODEL DCSW-3

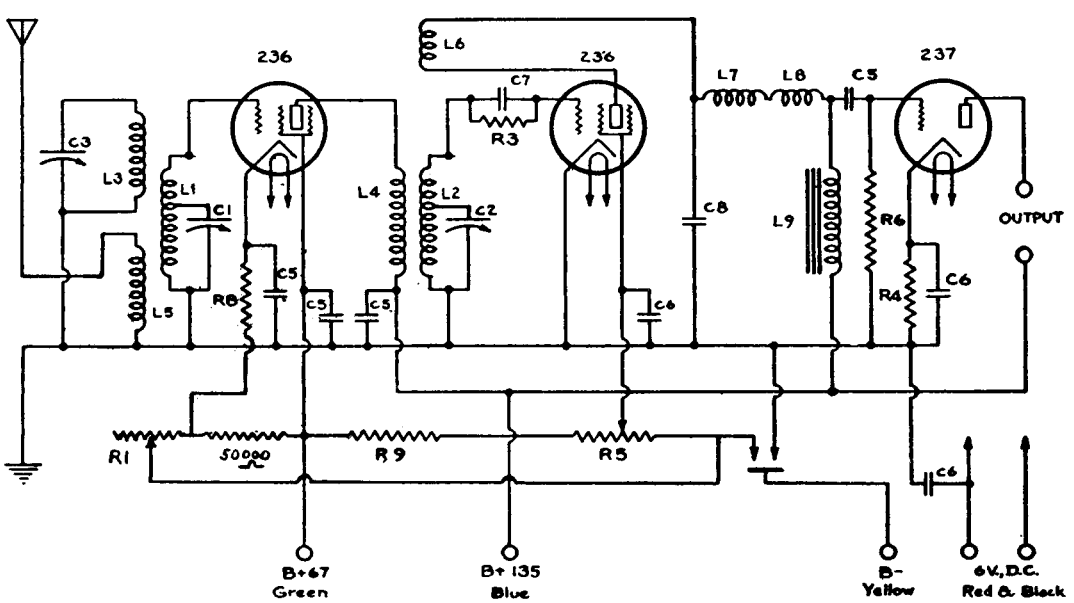


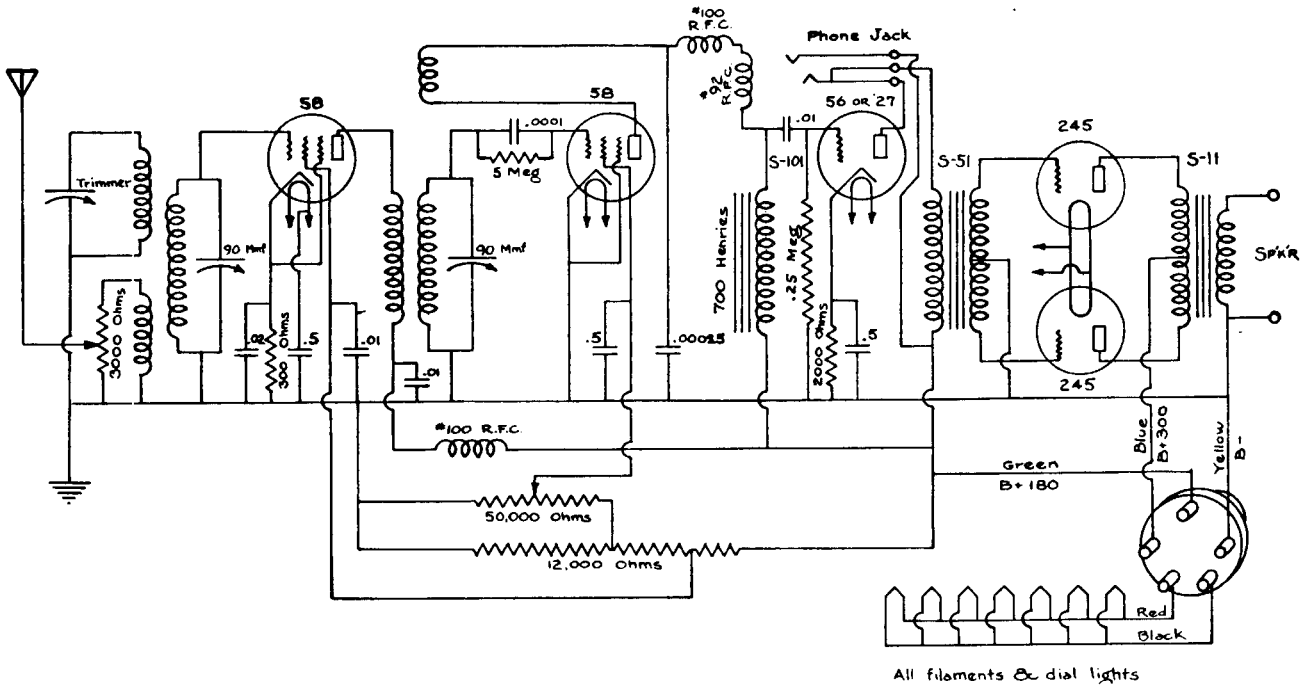
FIGURE 2 — CIRCUIT DIAGRAM OF THE DCSW-3

This is the combination circuit which should always be selected when battery operation may be required. It can, however, readily be converted to a-c operation using the standard 235 and 227 tubes. The circuit constants are identical with those indicated in Figure 1, with the following exceptions —

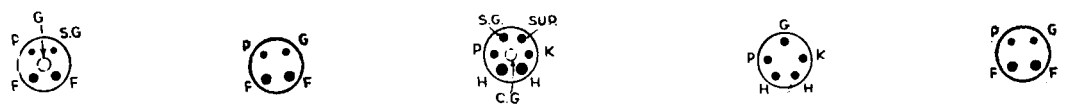
R_8 — *350 ohm resistor.*
R_9 — *20,000 ohm 2-watt type resistor.*
SW — *Regeneration control and cathode circuit switch.*

NATIONAL CO., Inc.

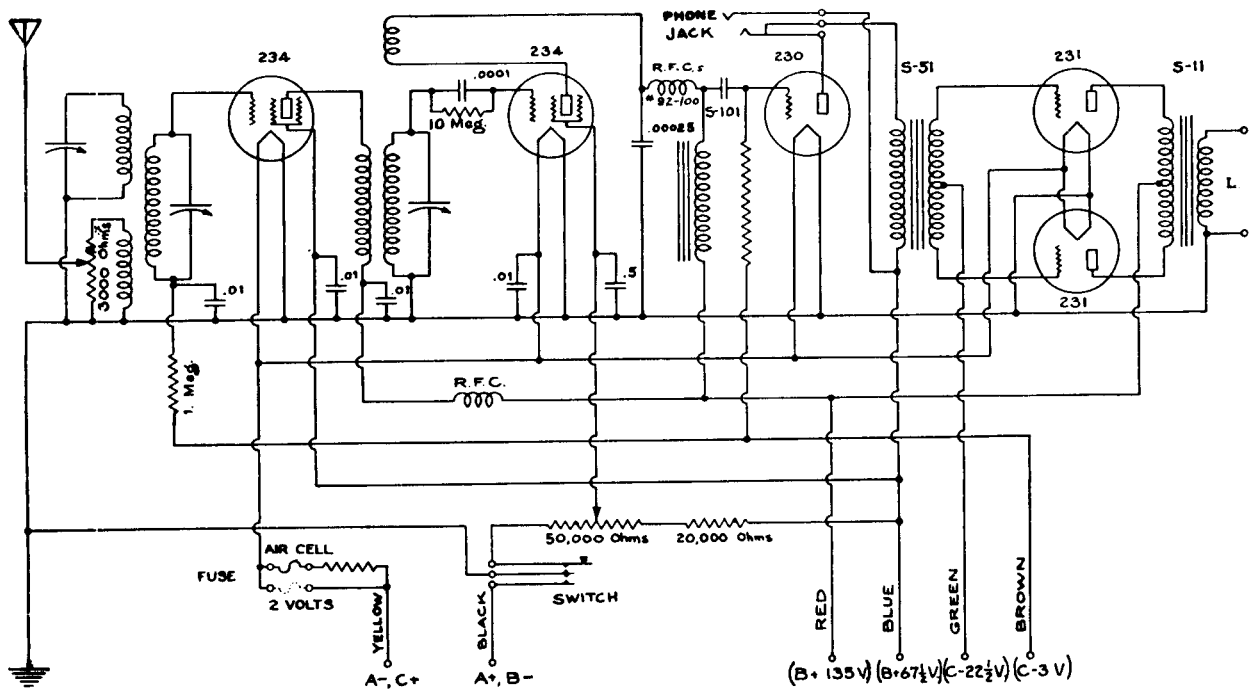
MODELS ACSW-58 & DCSW-34



All filaments & dial lights

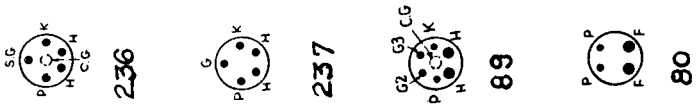


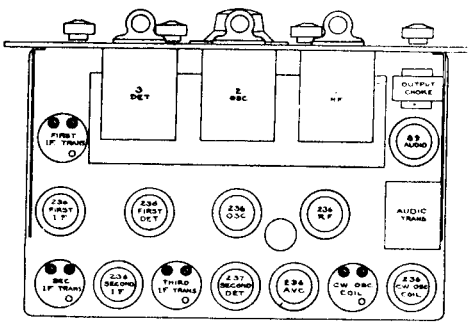
234 230 & 231 58 56 & 27 245



NATIONAL CO., Inc.

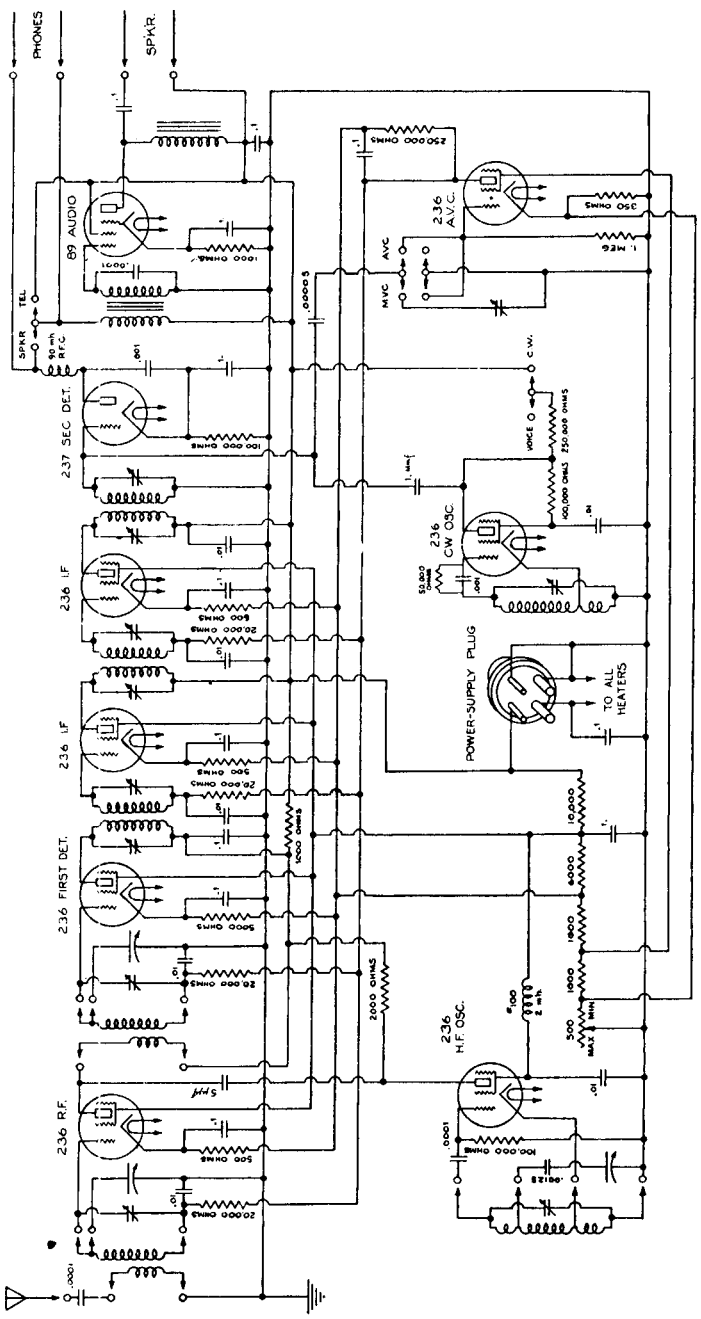
MODEL AGS
COMMUNICATIONS TYPE





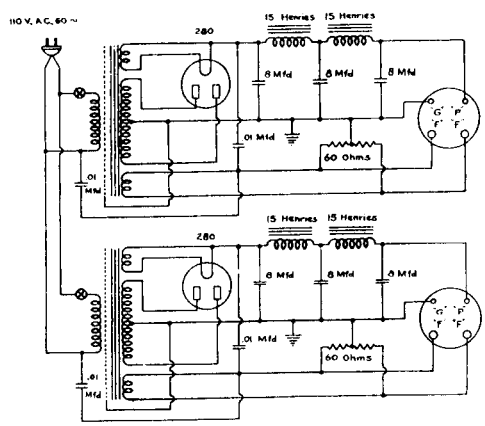
— Tube, transformer and coil layout in the AGS short wave super.

SCHEMATIC DIAGRAM TYPE A.G.S. RECEIVER



Intermediate Frequency Amplifier

The intermediate frequency amplifier is tuned to 500 kc. by means of the condenser adjusting screws located at the top of the i.f. transformer cans. A signal generator should be coupled



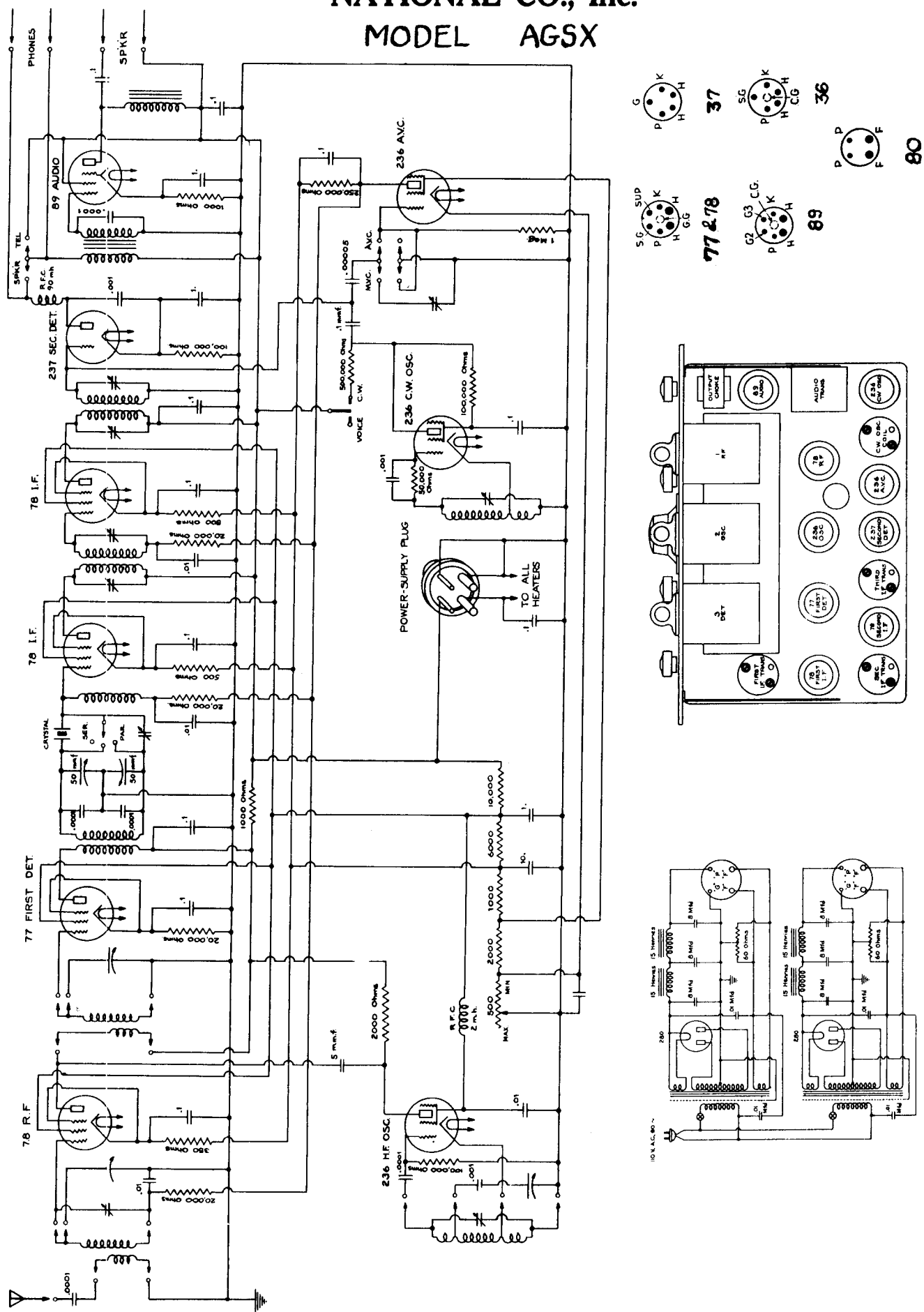
Circuit diagram of the GRDPU double power supply unit specially designed for noise and hum reduction.

to the first detector grid circuit, and an approximate alignment effected with the volume control switch at "MVC" and the beat-frequency switch at "voice." Final alignment is made with the selector switch in the "AVC" position with a very low input.

The selector switch is then returned to the MVC position and the compensating condenser adjusted through the hole near the middle of the chassis bottom. At low signal levels, there should be no difference in sensitivity with the selector switch in either the "AVC" or "MVC" positions.

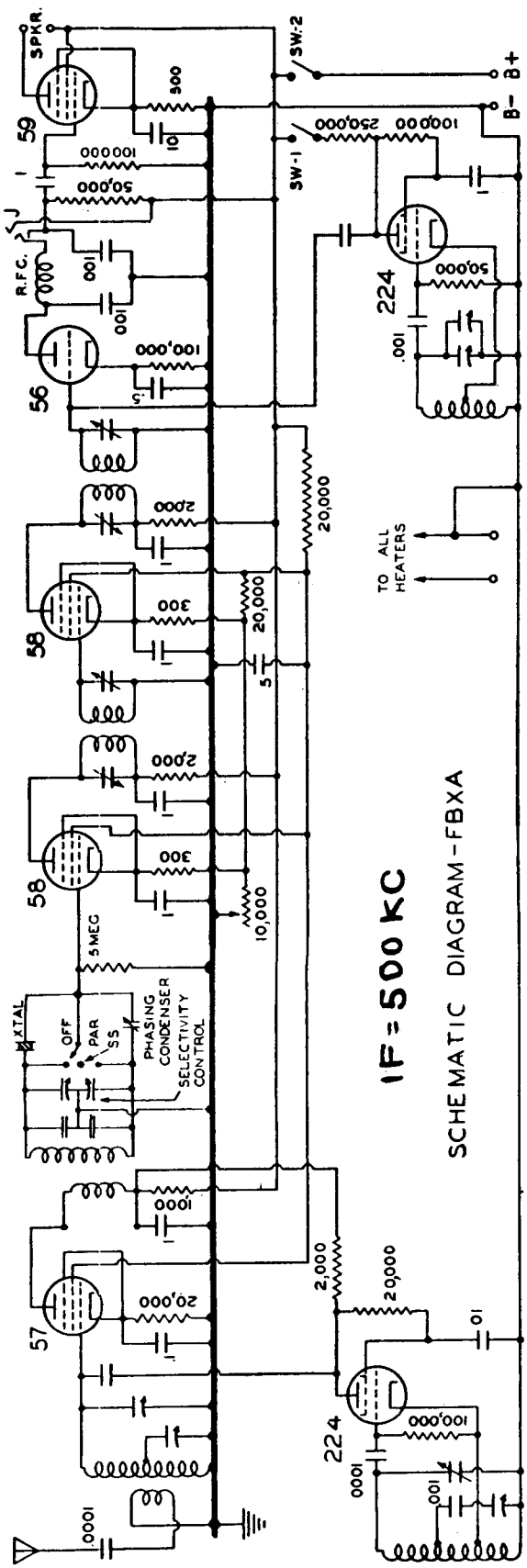
NATIONAL CO., Inc.

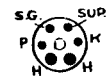
MODEL AGSX



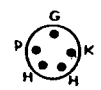
NATIONAL CO., Inc.

MODELS FBX & FBXA





57 & 58



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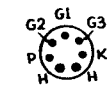

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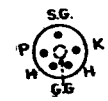

224

The main point to remember when considering single signal receivers is that they are simply ultra selective superheterodynes, which must be tuned exactly to the signal and that the beat oscillator must be detuned from the crystal frequency in order to obtain an audible beat note.

Preliminary Adjustments—The I.F.

From the above explanation, the reader will see that it is absolutely essential that the I.F. transformers be aligned to the crystal, since the two must work together. This alignment may be accomplished in a number of ways. If the I.F. transformers are far out of adjustment, it is necessary to connect an external crystal oscillator which uses the crystal from the receiver. This oscillator is put in operation and is coupled to the first detector of the receiver. In most cases no actual connection will be required since the field from the oscillator will be sufficiently strong to be picked up, even with the I.F. far out of adjustment. If coupling is required, a lead twisted around the grid cap of the detector tube and run near the oscillator tank coil, will be suitable. The beat oscillator is turned on and adjusted until the crystal signal is picked up. The pitch of the beat note is not important as long as it is well inside the audible range.

All the I.F. transformers are now adjusted for maximum signal. This adjustment need not be made with any great degree of precision, since the crystal will not oscillate at exactly the same frequency to which it will be resonant in the receiver. The crystal selector switch should be in the "off" position.

The crystal may now be removed from the oscillator and installed in the receiver. Throw the crystal selector switch to connect the crystal in the series position for single signal reception. Set the selectivity control for maximum selectivity; that is, with the edge of the knurled disk moved as far as it will go toward the back of the receiver. Now, tune in a steady signal from a local oscillator or monitor. Tuning very slowly across the carrier, there should be one point at which the signal will peak very sharply. The audio pitch of this peak will be nearly the same as the pitch of the beat used when the crystal oscillator was being picked up.

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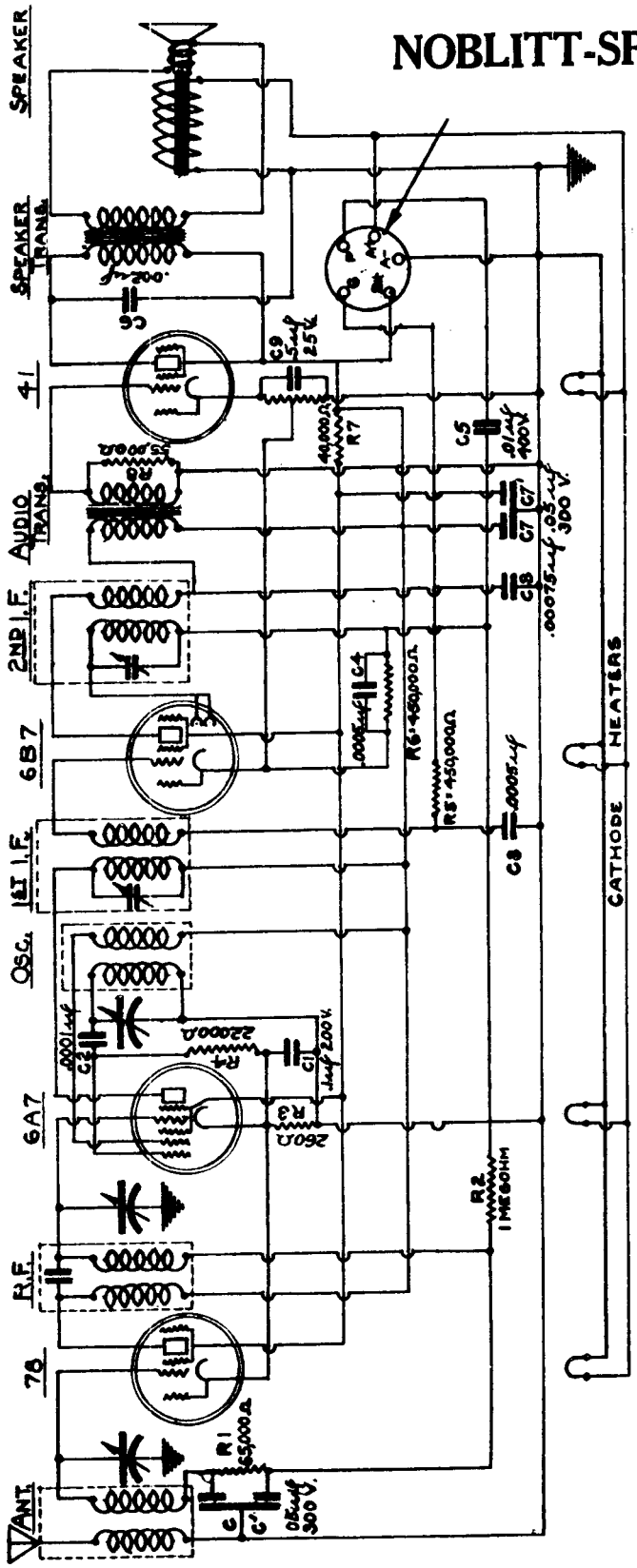
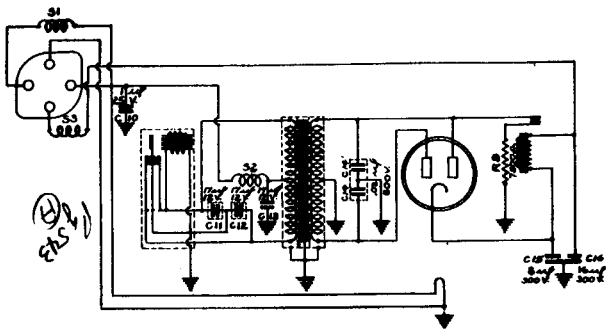
MODEL 10 A



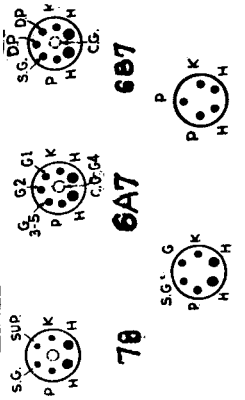


WIRING COLOR CODE		CAPACITY VALUES			RESISTANCE VALUES		
		SIGN	mf	P.V.D.C.	SIGN	Ω	WATTS
CATHODES	YELLOW	C	.5	300	R1	65,000	
NEG. "A" HEATER & GROUND	BLACK	C'	.5	300	R2	1,000,000	
POS. "A" & POS. HEATER	YELLOW	C1	.1	200	R3	260	
CONTROL GRIDS	GREEN	C2	.0001		R4	22,000	
PLATES	BLUE	C3	.0005		R5	450,000	
"B" POS. & SCREEN GRIDS	RED	C4	.0005		R6	450,000	
"A" POS. TO SPEAKER	YELLOW	C5	.01	400	R7	40,000	
"A" NEG. TO SPEAKER	BLACK	C6	.002	600	R8	55,000	
SPEAKER TRANS. LEAD	RED	C7	.5	300			
SPEAKER TRANS. RETURN LEAD	BROWN	C7'	.5	300			
"A" POS. BATTERY TO SWITCH	BLACK	C8	.0005				
SWITCH TO POWER PACK	YELLOW	C9	.5	.25			
"B" TO ROTATING CONTACT	GREEN						
"B" TO VOLUME CONTROL	BLUE						
SWITCH TO LAMP BULB	RED						

R.F. CHASSIS — SPEAKER — REMOTE CONTROL

CAPACITY VALUES			RESISTANCE VALUES		
SIGN	mf	P.V.D.C.	SIGN	Ω	WATTS
C10	1	10	R9	7500	1
C11	17	12			
C12	17	12	CHOKE SPEC.		
C13	17	12	SIGN	TURNS	GAUGE
C14	.02	200	S1	100	#36
C14'	.02	200	S2	100	#36
C15	8	300	S3	750	#29
C16	16	300			

CHASSIS WIRING COLOR CODE	
CATHODE & GROUND	YELLOW
PLATES	BLUE
"B" POSITIVE	RED
HEATERS	BLACK
POWER TRANS. PRIM. RED TAP	BLACK
POWER TRANS. PRIM. END TAP	BLUE WITH RED TRACER

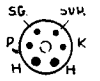


Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	6.3	220	85	2.0	2.0	*1.8	—	—
6A7	6.3	220	85	2.0	—	*1.8	220	*6
6B7	6.3	220	85	1.75	—	*1.75	—	—
41	6.3	205	220	16.5	—	*16.5	—	—
84	6.3	255 (AC)	—	225	—	—	—	—

Measured with vacuum tube voltmeter only.

NOBLITT-SPARKS INDUSTRIES, Inc.

MODEL 15



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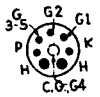
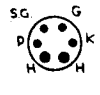


6A7

6B7



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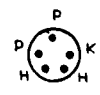

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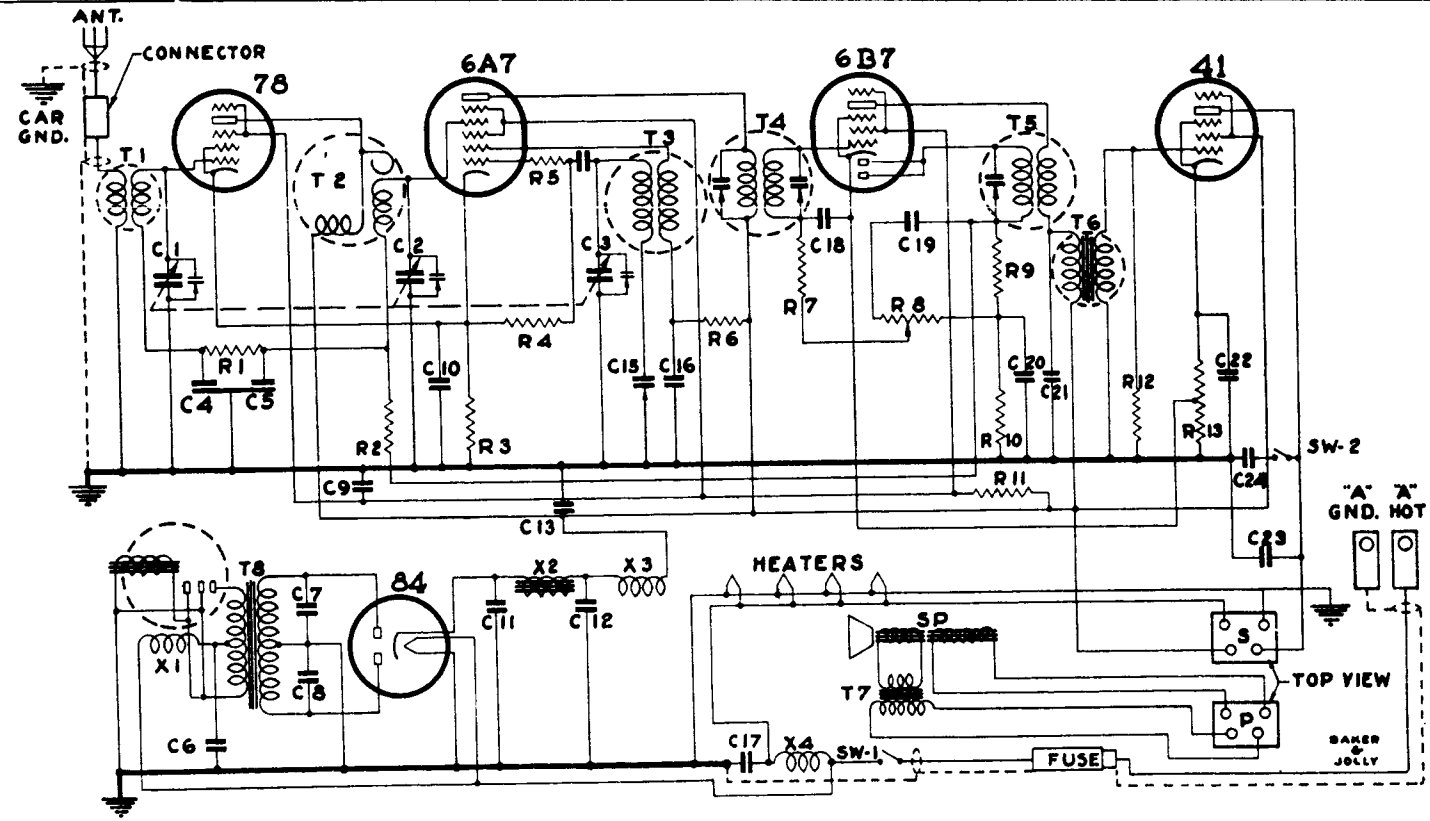

CAPACITORS

	Description		Part No.
C 1, C 2, C 3	3 Gang Variable		00-4452
C 4, C 5	.015 *uf*	50 V. Twin	17-3004
C 6	.5	15 V.	29-4284
C 7, C 8	.02 *uf*	1000 V. Twin	29-4193
C 9	.1 *uf*	200 V.	17-2097
C10	.1 *uf*	200 V.	17-2097
C11	12 *uf*	450 WVDC } Dual Elec.	
C12	4 *uf*	500 PVDC }	17-4184
C13	.5 *uf*	300 V.	17-3037
C14	100 *uuf*	600 V. Mica	17-2064
C15	Padder		17-4181-1
C16	.001 *uf*	600 V. Mica	17-4292

CAPACITORS

	Description		Part No.
C17	.5	15 V.	17-4284
C18	500 *uuf*	600 V. Mica	17-2211
C19	.01 *uf*	160 V. Tiny	17-4291
C20	.5 *uf*	10 V.	29-2224
C21	500 *uuf*	600 V. Mica	17-2211
C22	12 *uf*	20 V. Elec.	17-2082
C23	.005 *uf*	600 V.	17-2252
C24	.02 *uf*	400 V.	17-2214

MISCELLANEOUS

SW-1 Switch (Integral with R8)	17-4152
SW-2 Switch	17-4445
SP—Speaker	17-4226
S—Socket, Connector	17-4447
P—Plug, Connector	17-4448
V—Vibrator Unit	29-4186

RESISTORS

	Description		Part No.
R 1	100,000 Ω	¼ W.	17-2068
R 2	1,000,000 Ω	¼ W.	17-2080
R 3	200 Ω	¼ W.	17-4287
R 4	100,000 Ω	¼ W.	17-2068
R 5	1,000 Ω	¼ W.	17-2065
R 6	20,000 Ω	¼ W.	17-2072
R 7	500,000 Ω	¼ W.	17-2070
R 8	250,000 Ω Volume Control		17-4152
R 9	500,000 Ω	¼ W.	17-2070
R10	150,000 Ω	¼ W.	17-4283
R11	40,000 Ω	¼ W.	17-4282
R12	50,000 Ω	¼ W.	17-2060
R13	Tapped Candohm		17-3031

TRANSFORMERS

	Description	Part No.
T1	Antenna	00-3020-1
T2	Radio Frequency	00-3017-1
T3	Oscillator	00-3018-1
T4	1st Intermediate	00-2258-A
T5	2nd Intermediate	00-2259-2
T6	Audio	00-2261
T7	Output	00-4111
T8	Power	00-4102

CHOKES

X1	Center Tap Primary R. F.	00-4131-1
X2	Filter	00-4141
X3	"B" Radio Frequency	00-2181-1
X4	"A" Radio Frequency	00-4130-1

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	6.3	250	50	2.2	2.2	2.0*	—	—
6A7	6.3	250	50	2.2	2.2	2.0*	150	5-10
6B7	6.3	245	50	2.0	—	1.8*	—	—
41	6.3	245	250	18	—	14.0*	—	—
84	6.3	275 (AC)	—	260	—	—	—	—

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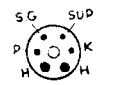
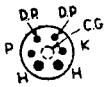
MODEL 20 A



77 & 78



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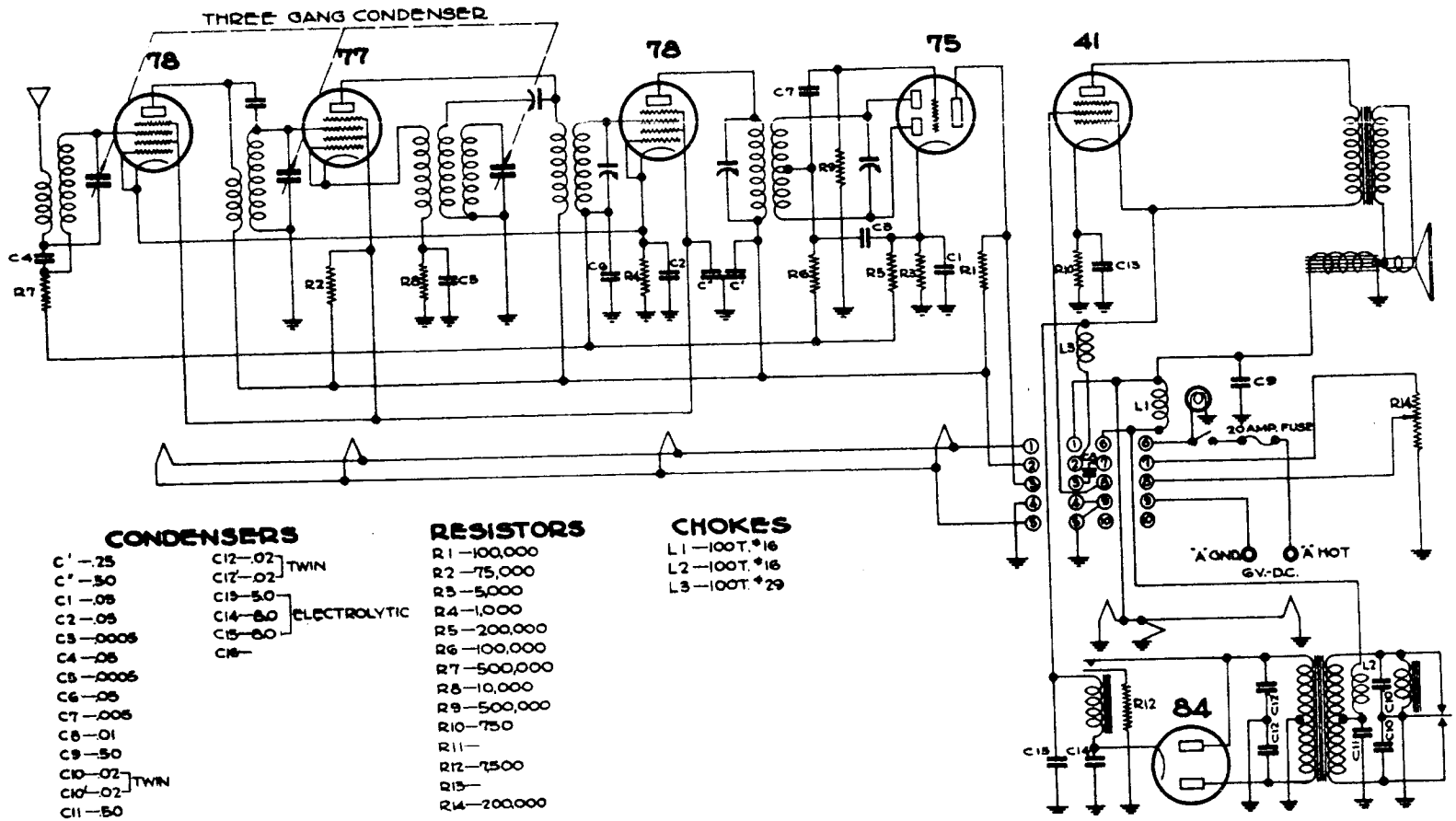

CONDENSERS

C' —.25
C" —.50
C1 —.05
C2 —.05
C3 —.0005
C4 —.05
C5 —.0005
C6 —.05
C7 —.005
C8 —.01
C9 —.50
C10 —.02 TWIN
C10' —.02
C11 —.50
C12 —.02 TWIN
C12' —.02
C13 —5.0
C14 —8.0 ELECTROLYTIC
C15 —8.0
C16 —

RESISTORS

R1 —100,000
R2 —75,000
R3 —5,000
R4 —1,000
R5 —200,000
R6 —100,000
R7 —500,000
R8 —10,000
R9 —500,000
R10 —750
R11 —
R12 —7,500
R13 —
R14 —200,000

CHOKES

L1 —100T. #16
L2 —100T. #16
L3 —100T. #29

MODEL 20-A SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control
78	6.3	180	60	0	0	*1.0
77	6.3	180	60	6	6	*5.8
78	6.3	180	60	2.4	2.4	*2.2
75	6.3	120	—	1.3	—	*1.3
41	6.3	175	180	16.0	—	*16.0
84	6.3	200 (AC)	—	190	—	—

* Measured with vacuum tube voltmeter only.

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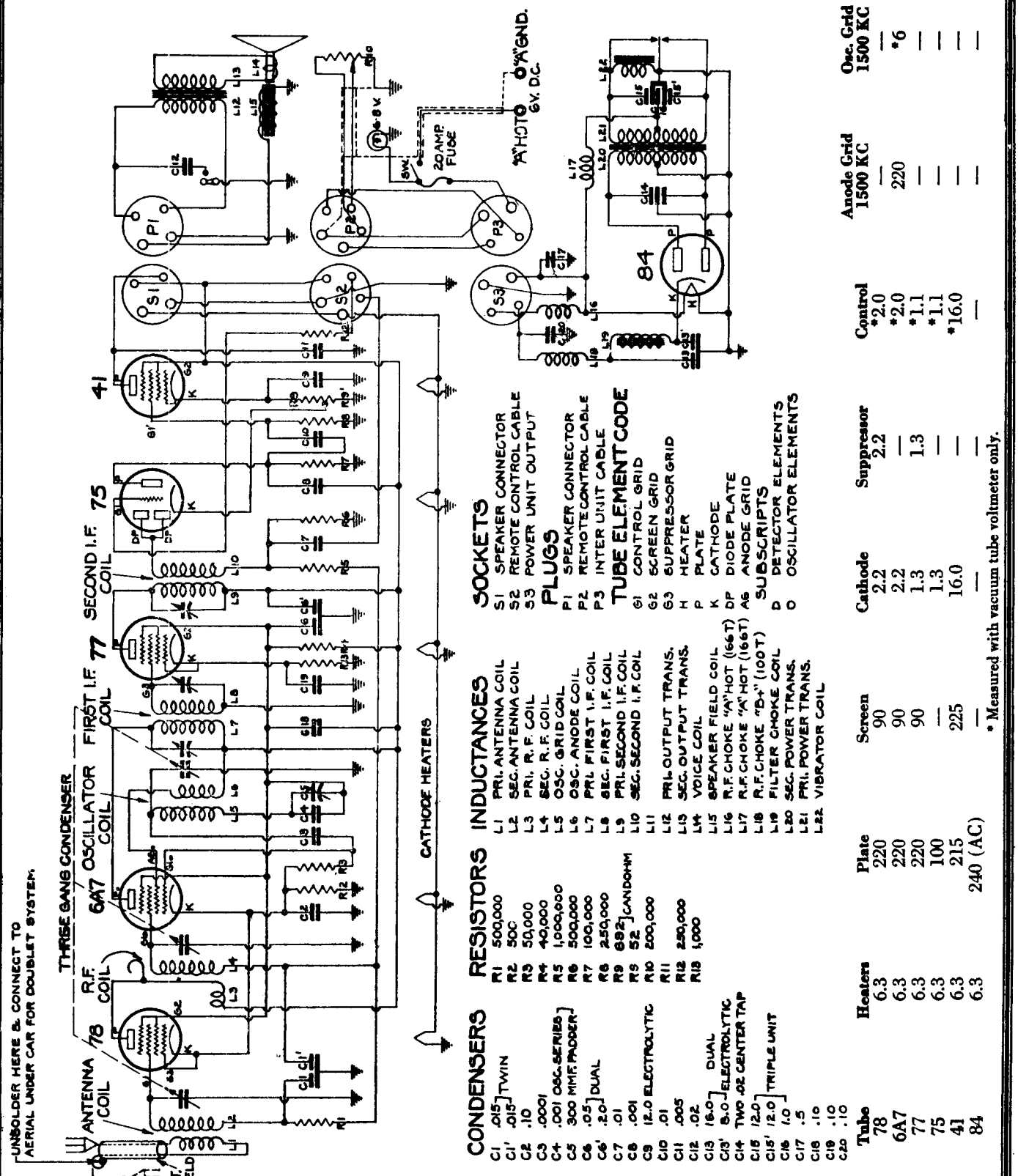
MODEL 20 B



CONDENSERS

C1	.015	TWIN
C1'	.015	
C2	.10	
C3	.0001	
C4	.001	OSC. SERIES
C5	300 MMF.	PADDER
C6	.05	DUAL
C6'	.20	
C7	.01	
C8	.001	
C9	12.0	ELECTROLYTIC
C10	.01	
C11	.005	
C12	.02	DUAL
C13	16.0	
C13'	8.0	ELECTROLYTIC
C14	TWO .02	CENTER TAP
C15	12.0	
C15'	12.0	TRIPLE UNIT
C16	1.0	
C17	.5	
C18	.10	
C19	.10	
C20	.10	

RESISTORS

R1	500,000
R2	500
R3	50,000
R4	40,000
R5	1,000,000
R6	500,000
R7	100,000
R8	250,000
R9	892 CANOHM
R9	52
R10	200,000
R11	
R12	250,000
R13	1,000

INDUCTANCES

L1	PRI. ANTENNA COIL
L2	SEC. ANTENNA COIL
L3	PRI. R. F. COIL
L4	SEC. R. F. COIL
L5	OSC. GRID COIL
L6	OSC. ANODE COIL
L7	PRI. FIRST I.F. COIL
L8	SEC. FIRST I.F. COIL
L9	PRI. SECOND I.F. COIL
L10	SEC. SECOND I.F. COIL
L11	
L12	PRI. OUTPUT TRANS.
L13	SEC. OUTPUT TRANS.
L14	VOICE COIL
L15	SPEAKER FIELD COIL
L16	R.F. CHOKE "A" HOT (166T)
L17	R.F. CHOKE "A" HOT (166T)
L18	R.F. CHOKE "B+" (100T)
L19	FILTER CHOKE COIL
L20	SEC. POWER TRANS.
L21	PRI. POWER TRANS.
L22	VIBRATOR COIL

SOCKETS

S1	SPEAKER CONNECTOR
S2	REMOTE CONTROL CABLE
S3	POWER UNIT OUTPUT

PLUGS

P1	SPEAKER CONNECTOR
P2	REMOTE CONTROL CABLE
P3	INTER UNIT CABLE

TUBE ELEMENT CODE

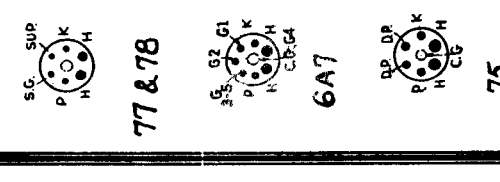
G1	CONTROL GRID
G2	SCREEN GRID
G3	SUPPRESSOR GRID
H	HEATER
P	PLATE
K	CATHODE
DP	DIODE PLATE
AG	ANODE GRID

SUBSCRIPTS

D	DETECTOR ELEMENTS
O	OSCILLATOR ELEMENTS

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	6.3	220	90	2.2	2.2	*2.0	—	—
6A7	6.3	220	90	2.2	—	*2.0	220	*6
77	6.3	220	90	1.3	1.3	*1.1	—	—
75	6.3	100	—	1.3	—	*1.1	—	—
41	6.3	215	225	16.0	—	*16.0	—	—
84	6.3	240 (AC)	—	—	—	—	—	—

* Measured with vacuum tube voltmeter only.



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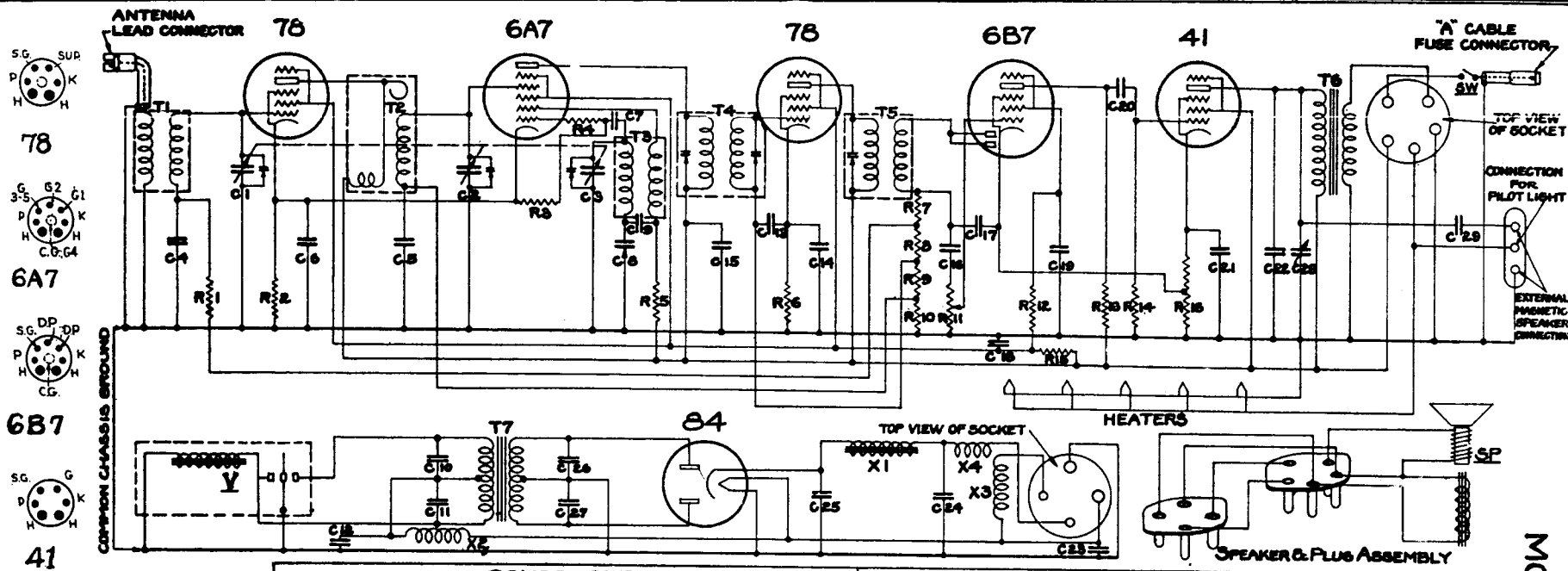
MODEL 25



CONDENSERS

	DESCRIPTION	PART NO.
C1, C2, C3	THREE GANG VARIABLE	19-3019
C4, C5	.015 μf 50 V. TWIN	17-3004
C6	.10 μf 200 V.	17-2097
C7	100 μμf	17-2064
C8	SERIES PADDER (1400 μμf MAX.)	17-4181
C9	.001 μf 600 V.	17-3005
C10	12 μf 15 V. ELECTROLYTIC, TRIPLE UNIT	17-2253
C11	12 μf 15 V. ELECTROLYTIC, TRIPLE UNIT	
C12	1. μf 15 V.	
C13	.02 μf 400 V.	17-2214
C14	.10 μf 200 V.	17-2097
C15	.25 μf 300 V.	29-4155
C16	.05 μf 300 V.	17-3006
C17	50 μμf	17-2211
C18	.10 μf 200 V.	17-2097
C19	.10 μf 200 V.	17-2097
C20	.05 μf 300 V.	17-3006
C21	12 μf 20 V. ELECTROLYTIC	17-2082
C22	.005 μf 600 V. SPECIAL	17-2252
C23	.50 μf 10 V.	29-2224
C24, C25	4 μf, 450 V. DUAL ELECTROLYTIC	17-4201
C26, C27	.02 μf 1000 V. TWIN	29-4133
C28	.02 VARIABLE TONE CONTROL	17-4151
C29	.02 μf 400 V.	17-2214

NOTE:
ON ORDERS FOR REPLACEMENT PARTS, STATE PART NUMBER AND QUANTITY DESIRED.

RESISTORS

	DESCRIPTION	PART NO.
R1	500000 Ω, ½ WATT	17-2070
R2	250 Ω, ½ WATT	17-2066
R3	100000 Ω, ½ WATT	17-2068
R4	1000 Ω, ½ WATT	17-2065
R5	20000 Ω, ½ WATT	17-2072
R6*	2000 Ω, ½ WATT	17-4202
R7	250000 Ω, ½ WATT	17-3011
R8	100000 Ω, ½ WATT	17-2068
R9	100000 Ω, ½ WATT	17-2068
R10	30000 Ω, ½ WATT	17-4276
R11	250000 Ω, †	17-4152
R12	100000 Ω, ½ WATT	17-2068
R13	30000 Ω, ½ WATT	17-4276
R14	250000 Ω, ½ WATT	17-3011
R15	75000 Ω, ½ WATT	17-2067
R16	CANDOHM, 800 Ω TOTAL, TAPPED AT 100 & 120 Ω	17-4281

* THIS RESISTOR MAY VARY FROM 1000 Ω TO 3000 Ω, CONTROLLING SENSITIVITY.
† VOLUME CONTROL

TRANSFORMERS

	DESCRIPTION	PART NO.
T1	ANTENNA	00-3020-1
T2	RADIO FREQUENCY	00-3017-1
T3	OSCILLATOR	00-3018-1
T4	FIRST INTERMEDIATE FREQUENCY	00-2258-A
T5	SECOND INTERMEDIATE FREQUENCY	00-2259
T6	OUTPUT	00-4111
T7	POWER	00-4102

CHOKES

	DESCRIPTION	PART NO.
X1	FILTER CHOKE	00-4141
X2	CENTER TAP PRIMARY R.F.	00-2178-E
X3	FILAMENT R.F.	00-2178-F
X4	PLATE R.F.	00-2181-1

MISCELLANEOUS

	DESCRIPTION	PART NO.
V	VIBRATOR UNIT	29-2168-B
SW	SWITCH INTEGRAL WITH R-11	17-4152
SP	DYNAMIC SPEAKER	17-4226

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	6.3	250	70	2	2	1.8*	—	—
6A7	6.3	250	70	2	—	1.8*	150	5-10
78	6.3	250	70	2.5	2.5	2.3*	—	—
6B7	6.3	220	45	1.8	—	1.6*	—	—
41	6.3	245	255	20	—	20.0*	—	—
84	6.3	275 (AC)	—	255	—	—	—	—

* Measured with vacuum tube voltmeter only.

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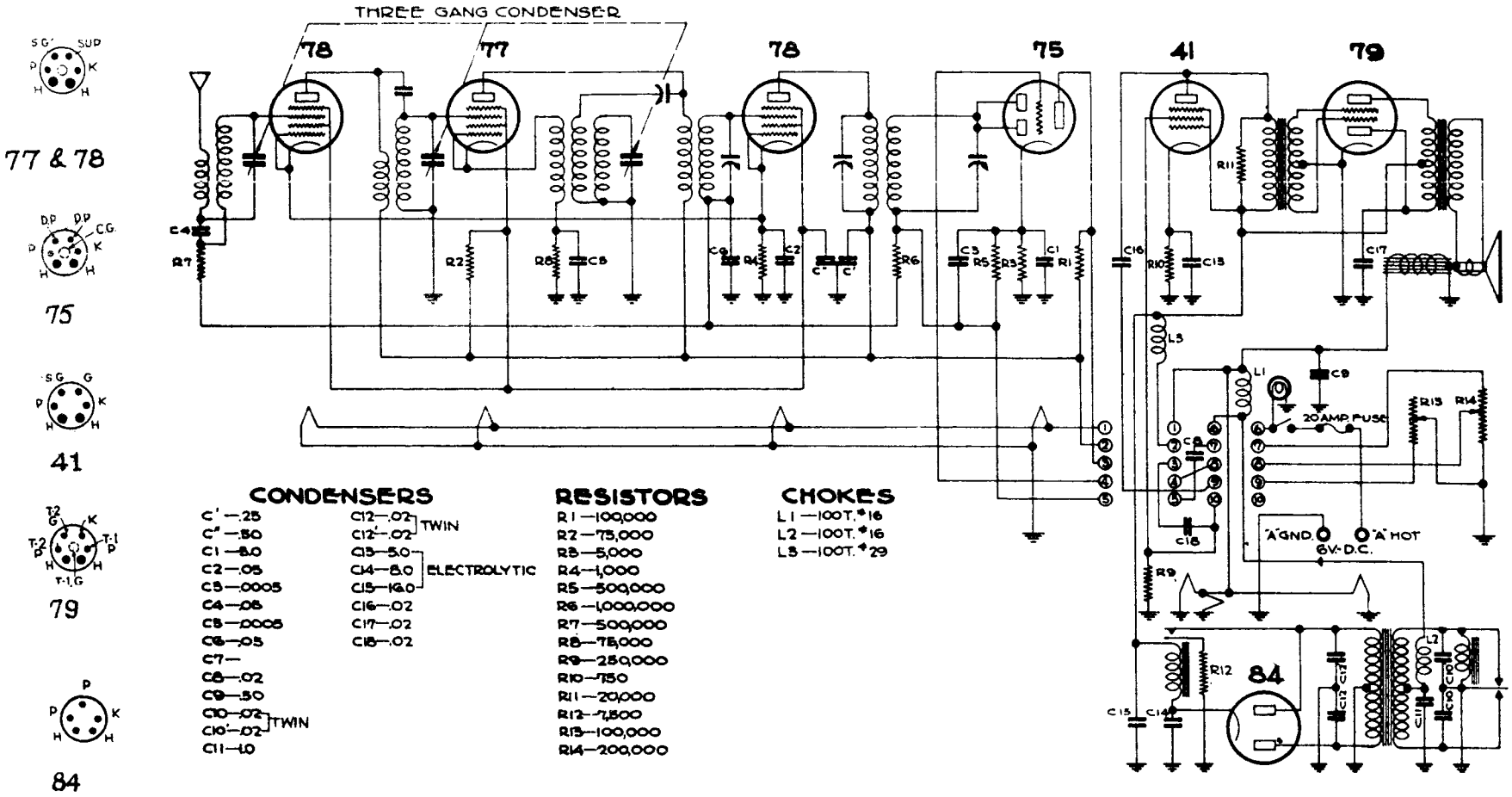
MODEL 30 A



CONDENSERS

C' —.25
C'' —.50
C1 —.50
C2 —.05
C3 —.0005
C4 —.05
C5 —.0005
C6 —.05
C7 —
C8 —.02
C9 —.50
C10 —.02 TWIN
C10' —.02
C11 —1.0
C12 —.02 TWIN
C12' —.02
C13 —5.0
C14 —8.0 ELECTROLYTIC
C15 —16.0
C16 —.02
C17 —.02
C18 —.02

RESISTORS

R1 —100,000
R2 —75,000
R3 —5,000
R4 —1,000
R5 —500,000
R6 —1,000,000
R7 —500,000
R8 —75,000
R9 —250,000
R10 —750
R11 —20,000
R12 —7,500
R13 —100,000
R14 —200,000

CHOKES

L1 —100T. *16
L2 —100T. *16
L3 —100T. *29

MODEL 30-A SOCKET VOLTAGES—

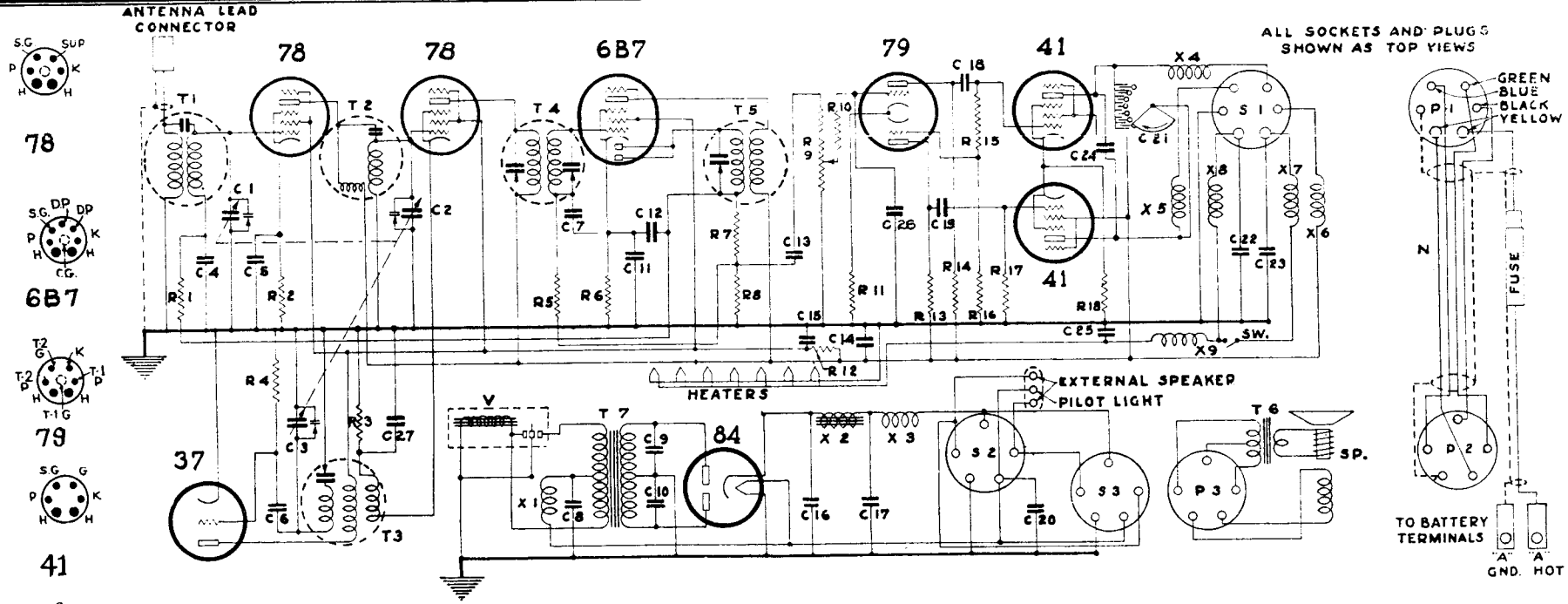
Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control
78	6.3	180	60	2.4	2.4	*2.2
77	6.3	180	60	6	9	*5.8
78	6.3	180	60	2.4	2.4	*2.2
75	6.3	120	—	1.3	—	*1.3
41	6.3	175	180	16.0	—	*16.0
79	6.3	180	—	0	—	0
84	6.3	700 (AC)	—	190	—	—

* Measured with vacuum tube voltmeter only.

NOBLITT-SPARKS INDUSTRIES, Inc.

MODEL 35 ABOVE SERIAL E 31577 H



CAPACITORS

	Description		Part No.
C 1, C 2, C 3	3 Gang Variable		00-4182-1
C 4	.05 *uf*	160 V.	17-4329
C 5	.1 *uf*	200 V.	17-2097
C 6	100 *uuf*	600 V. Mica	17-2064
C 7	.01 *uf*	160 V.	17-4291
C 8	.5 *uf*	10 V.	29-2224
C 9, C10	.02 *uf*	1000 V. Twin	29-4193
C11	.1 *uf*	200 V.	17-2097
C12	500 *uuf*	600 V. Mica	17-2211
C13	.01 *uf*	160 V.	17-4291
C14	.5 *uf*	300 V.	17-3037
C15	.1 *uf*	200 V.	17-2097
C16	12 *uf*	450 WVDC	Dual Elec.
C17	4 *uf*	500 PVDC	17-4184
C18	.01 *uf*	400 V.	17-2189
C19	.01 *uf*	400 V.	17-2189

CAPACITORS

	Description		Part No.
C25	.002 *uf*	600 V. Mica	17-2063
C20	.5 *uf*	10 V.	29-2224
C21	Tone Control		17-4151
C22	.5 *uf*	10 V.	29-2224
C23	.5 *uf*	10 V.	29-2224
C24	.001 *uf*	600 V. Mica	17-4292
C25	.002 *uf*	600 V. Mica	17-2063
C26	100 *uuf*	600 V. Mica	17-2064
C27	.1 *uf*	200 V.	17-2097

MISCELLANEOUS

N—Interconnecting Cable, Complete	00-4180
SP—Speaker	00-4227
SW—Switch (Integral with R9)	17-4152
V—Vibrator	29-4186
Socket S1 Receives Plug P1	
Socket S2 Receives Plug P2	
Socket S3 Receives Plug P3	

RESISTORS

	Description		Part No.
R 1	1,000,000 Ω	¼ W.	17-2080
R 2	500 Ω	¼ W.	17-2088
R 3	3,000 Ω	¼ W.	17-2090
R 4	50,000 Ω	¼ W.	17-2075
R 5	1,000,000 Ω	¼ W.	17-2080
R 6	500 Ω	¼ W.	17-2088
R 7	30,000 Ω	¼ W.	17-4276
R 8	500,000 Ω	¼ W.	17-2070
R 9	250,000 Ω Volume Control		17-4152
R10	250,000 Ω	¼ W.	17-3011
R11	1,000 Ω	¼ W.	17-2065
R12	25,000 Ω	1 W.	17-3010
R13	100,000 Ω	¼ W.	17-2068
R14	100,000 Ω	¼ W.	17-2068
R15	500,000 Ω	¼ W.	17-2070
R16	15,000 Ω	¼ W.	17-4191
R17	500,000 Ω	¼ W.	17-2070
R18	400 Ω	½ W.	17-4189

TRANSFORMERS

	Description	Part No.
T1	Antenna	00-4134-1S
T2	Radio Frequency	00-4132-1S
T3	Oscillator	00-4133S
T4	1st Intermediate Freq.	00-4489
T5	2nd Intermediate Freq	00-4488
T6	Output	00-4112
T7	Power	00-4101

CHOKES

X1	Center Tap Primary R. F.	00-4131
X2	Filter	00-4141
X3	"B" Radio Frequency	00-2181-1
X4	Plate Radio Frequency	00-2181-1
X5	Plate Radio Frequency	00-2181-1
X6	"B" Radio Frequency	00-2181-1
X7	"A" Radio Frequency	00-4130-1
X8	"A" Radio Frequency	00-4130-1
X9	"A" Radio Frequency	00-4131

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control
78	6.3	250	60	2.2	2.2	*2.0
77	6.3	250	60	2.2	2.2	*2.2
6B7	6.3	250	60	1.6	—	*1.4
79	6.3	135	—	1.6	—	*1.6
41	6.3	245	250	18	—	*18
41	6.3	245	250	18	—	*18
37	6.3	60	—	0	—	*6—1500 KC
84	6.3	275 (AC)	—	255	—	

NOBLITT-SPARKS INDUSTRIES, Inc.

MODEL 45 ABOVE SERIAL # E 40356 L

CAPACITORS

	Description	Part No.
C 1		
C 2	3 Gang Variable	00-4182-1
C 3		
C 4	.05 *uf* 160 V.	17-4329
C 5	.1 *uf* 200 V.	17-2097
C 6	100 *uuf* 600 V. Mica	17-2064
C 7	.01 *uf* 160 V.	17-4291
C 8	.5 *uf* 10 V.	17-2224
C 9	.02 *uf* 1000 V. Twin	17-4193
C10		
C11	.1 *uf* 200 V.	17-2097
C12	.1 *uf* 200 V.	17-2097
C13	.01 *uf* 160 V.	17-4291
C14	500 *uuf* 600 V. Mica	17-2211
C15	500 *uuf* 600 V. Mica	17-2211
C16	12 *uf* 450 WVDC	Dual Elec.
C17	4 *uf* 500 PVDC	17-4184
C18	.01 *uf* 400 V.	17-2189
C19	.5 *uf* 300 V.	17-3037
C20	.01 *uf* 400 V.	17-2189

CAPACITORS

	Description	Part No.
C21	.001 *uf* 600 V. Mica	17-4292
C22	Tone Control	17-4151
C23	.5 *uf* 10 V.	17-2224
C24	.5 *uf* 10 V.	17-2224
C25	.5 *uf* 10 V.	17-2224
C26	.002 *uf* 600 V. Mica	17-2063
C27	.1 *uf* 200 V.	17-2097
C28	100 *uuf* 600 V. Mica	17-2064

MISCELLANEOUS

N	Interconnecting Cable, Complete	00-4180
SP	Speaker	19-4228
SW	Switch (Integral with R7)	17-4152
V	Vibrator	29-4186
	Socket S1 Receives Plug P1	
	Socket S2 Receives Plug P2	
	Socket S3 Receives Plug P3	

RESISTORS

	Description	Part No.
R 1	1,000,000 Ω ¼ W.	17-2080
R 2	500 Ω ¼ W.	17-2088
R 3	3,000 Ω ¼ W.	17-2090
R 4	50,000 Ω ¼ W.	17-2075
R 5	1,000,000 Ω ¼ W.	17-2080
R 6	500 Ω ¼ W.	17-2088
R 7	250,000 Ω Volume Control	17-4152
R 8	250,000 Ω ¼ W.	17-3011
R 9	500,000 Ω ¼ W.	17-2070
R10	2,500 Ω ¼ W.	17-2087
R11	250,000 Ω ¼ W.	17-3011
R12	500,000 Ω ¼ W.	17-2070
R13	8,000 Ω ¼ W.	17-4290
R14	500,000 Ω ¼ W.	17-2070
R15	25,000 Ω 1 W.	17-3010
R16	250,000 Ω ¼ W.	17-3011
R17	500,000 Ω ¼ W.	17-2070
R18	400 Ω ½ W.	17-4189
R19	30,000 Ω ¼ W.	17-4276

TRANSFORMERS

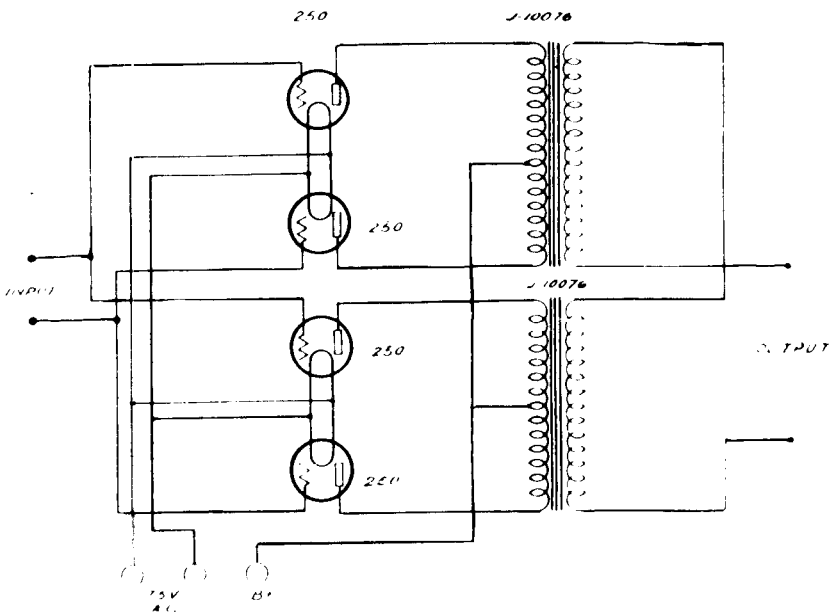
	Description	Part No.
T1	Antenna	00-4134-1S
T2	Radio Frequency	00-4132-1S
T3	Oscillator	00-4133S
T4	1st Intermediate Freq.	00-4489
T5	2nd Intermediate Freq.	00-4488
T6	Output	00-4112
T7	Power	00-4101

CHOKES

X1	Center Tap Primary R. F.	00-4131
X2	Filter	00-4141
X3	"B" Radio Frequency	00-2181-1
X4	Plate Radio Frequency	00-2181-1
X5	Plate Radio Frequency	00-2181-1
X6	"A" Radio Frequency	00-4130-1
X7	"A" Radio Frequency	00-4130-1
X8	"B" Radio Frequency	00-2181-1
X9	"A" Radio Frequency	00-4131

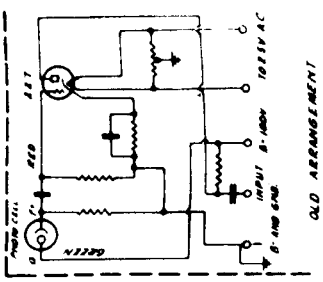
Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control
78	6.3	250	60	2.2	2.2	*2.0
77	6.3	250	60	2.2	2.2	*2.2
78	6.3	250	60	1.6	1.6	*1.4
37	6.3	60	—	0	—	*6—1500 KC
75	6.3	135	—	1.3	—	*1.3
75	6.3	135	—	1.3	—	*1.3
41	6.3	245	250	18	—	*18
41	6.3	245	250	18	—	*18
84	6.3	275 (AC)	—	25.5	—	—

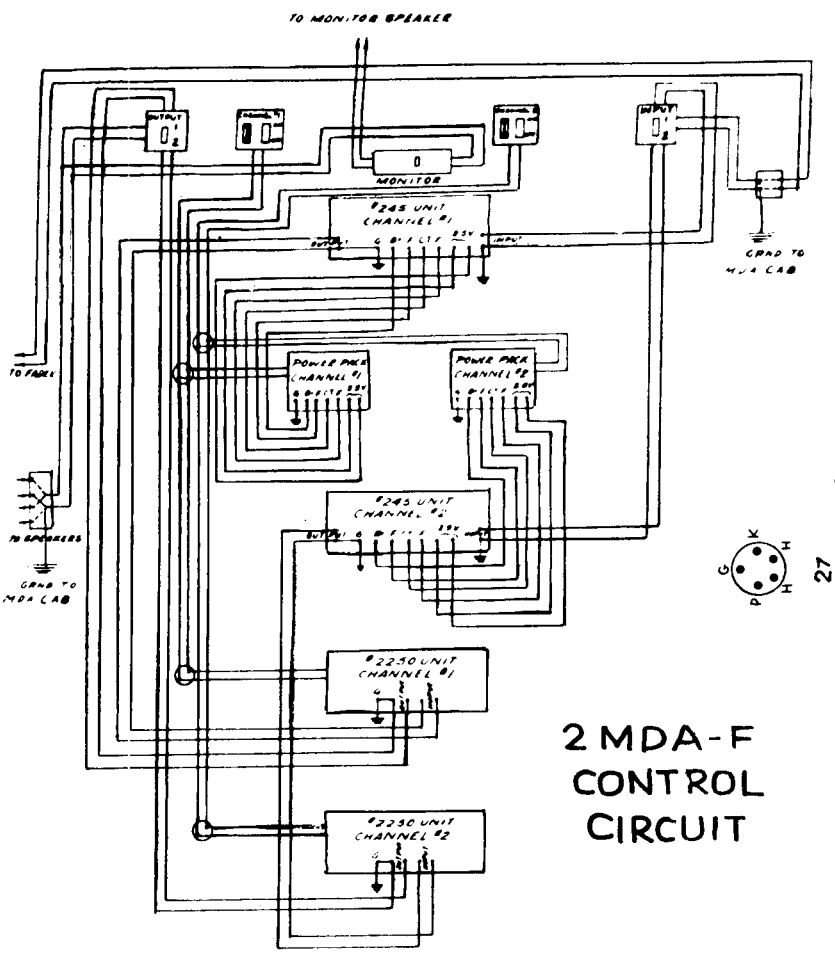
PACENT ENGINEERING CORP.



1015 AMPLIFIER

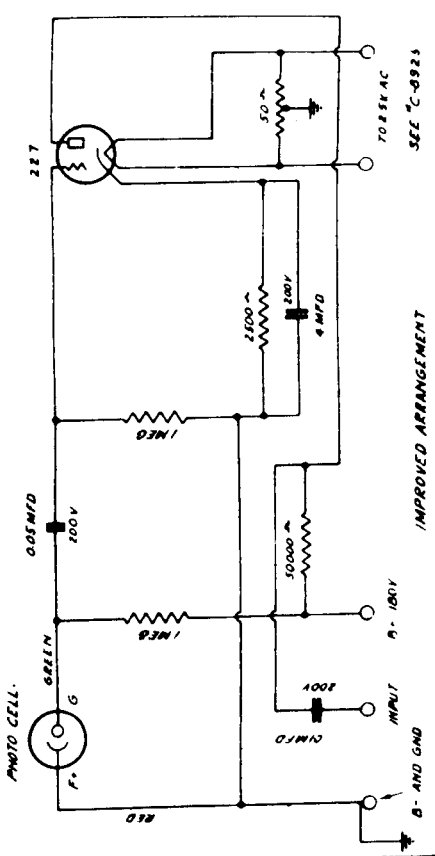
250





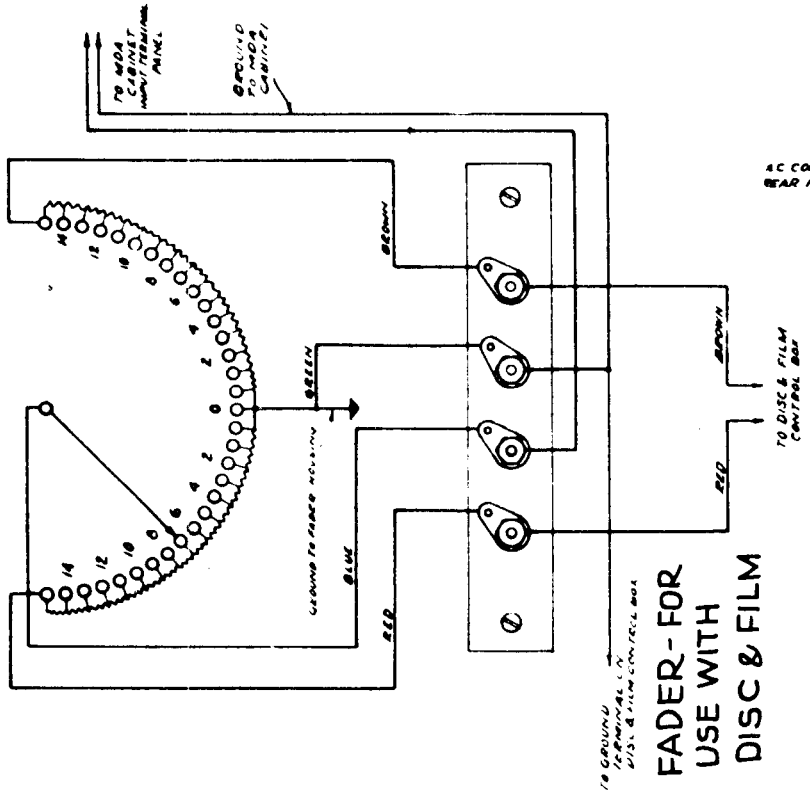
2 MDA-F CONTROL CIRCUIT

27

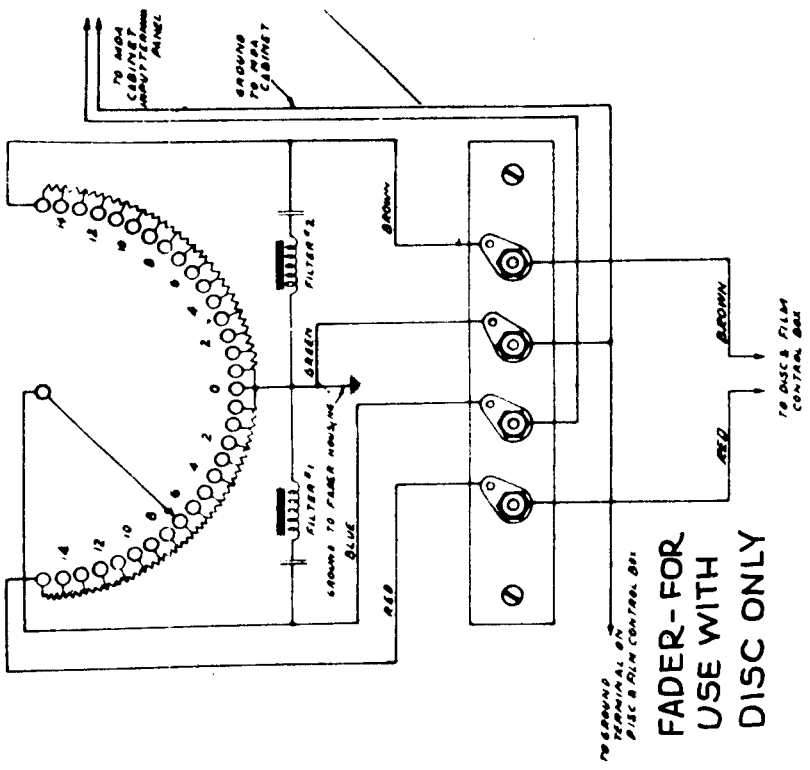


PEC BOOSTER

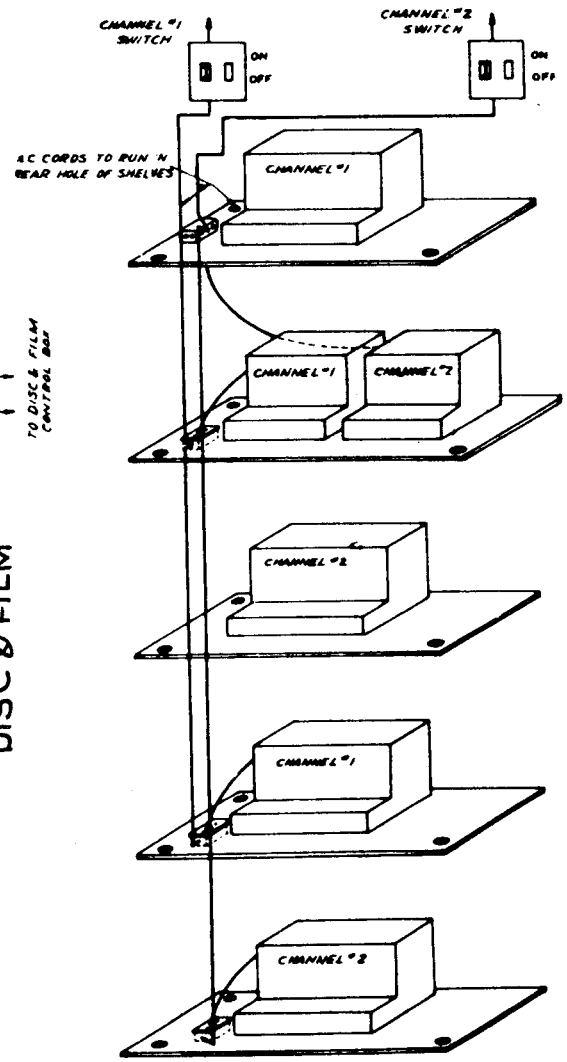
PACENT ENGINEERING CORP.



FADER-FOR USE WITH DISC & FILM

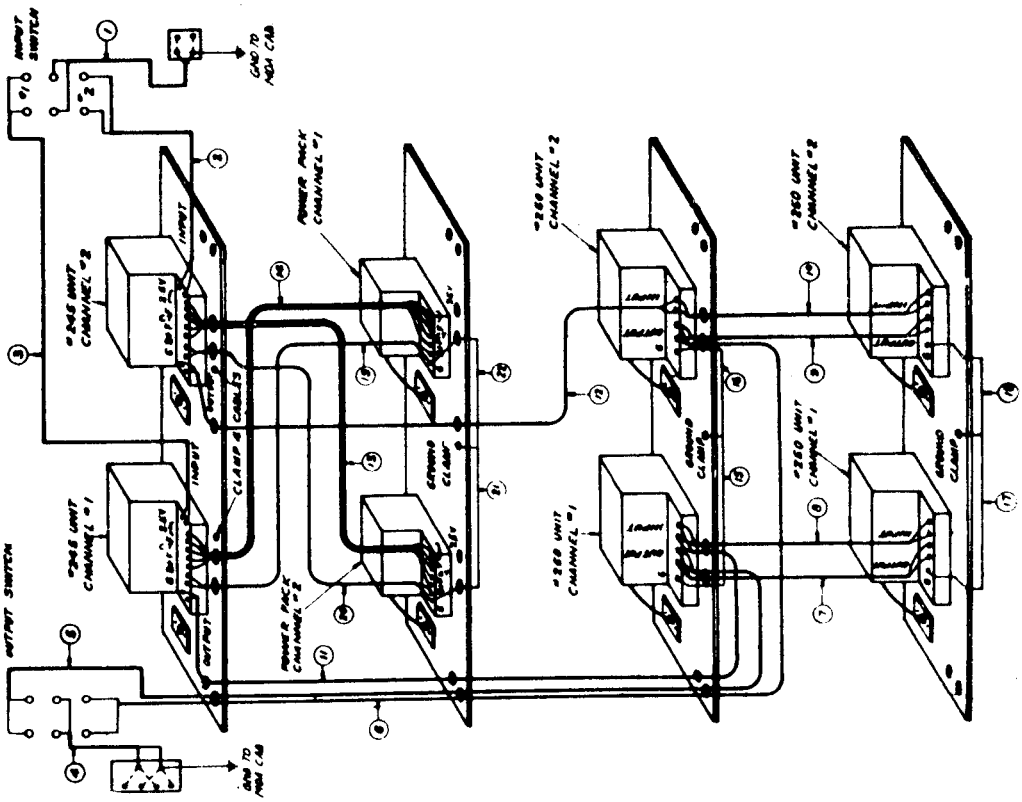


FADER-FOR USE WITH DISC ONLY

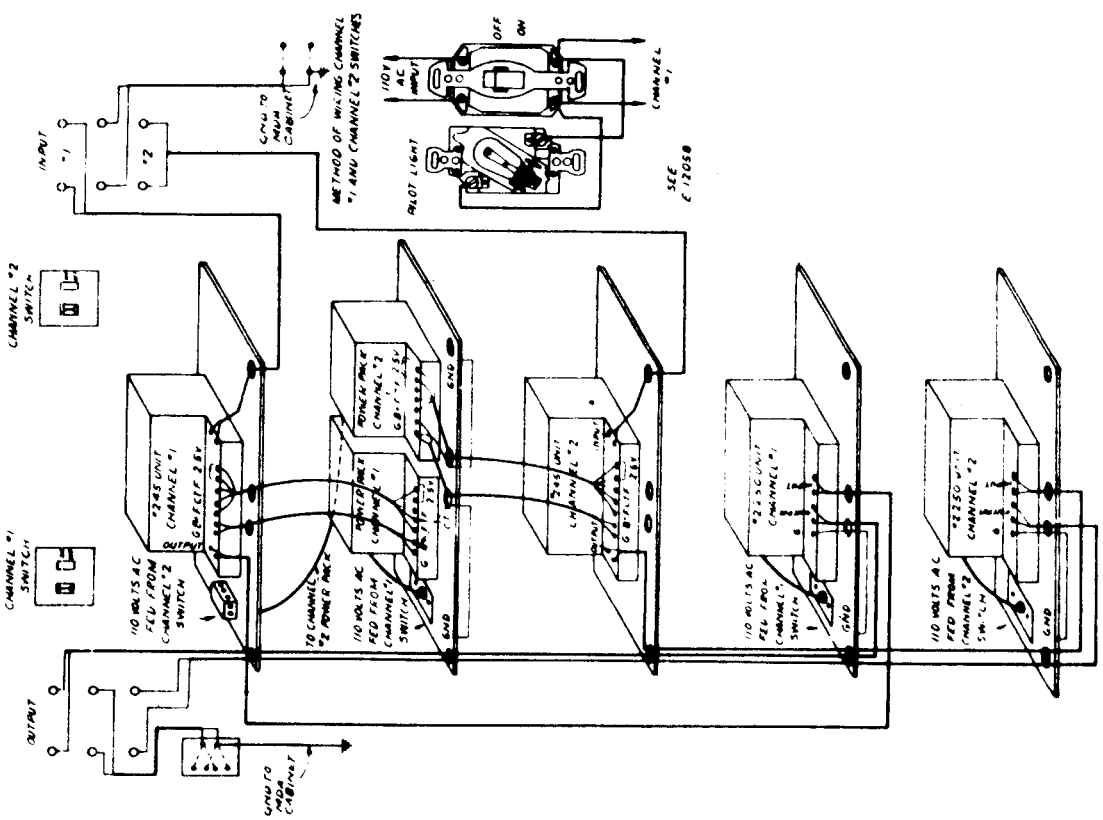


2MD4-F A.C. SERVICE HARNESS

PACENT ENGINEERING CORP.

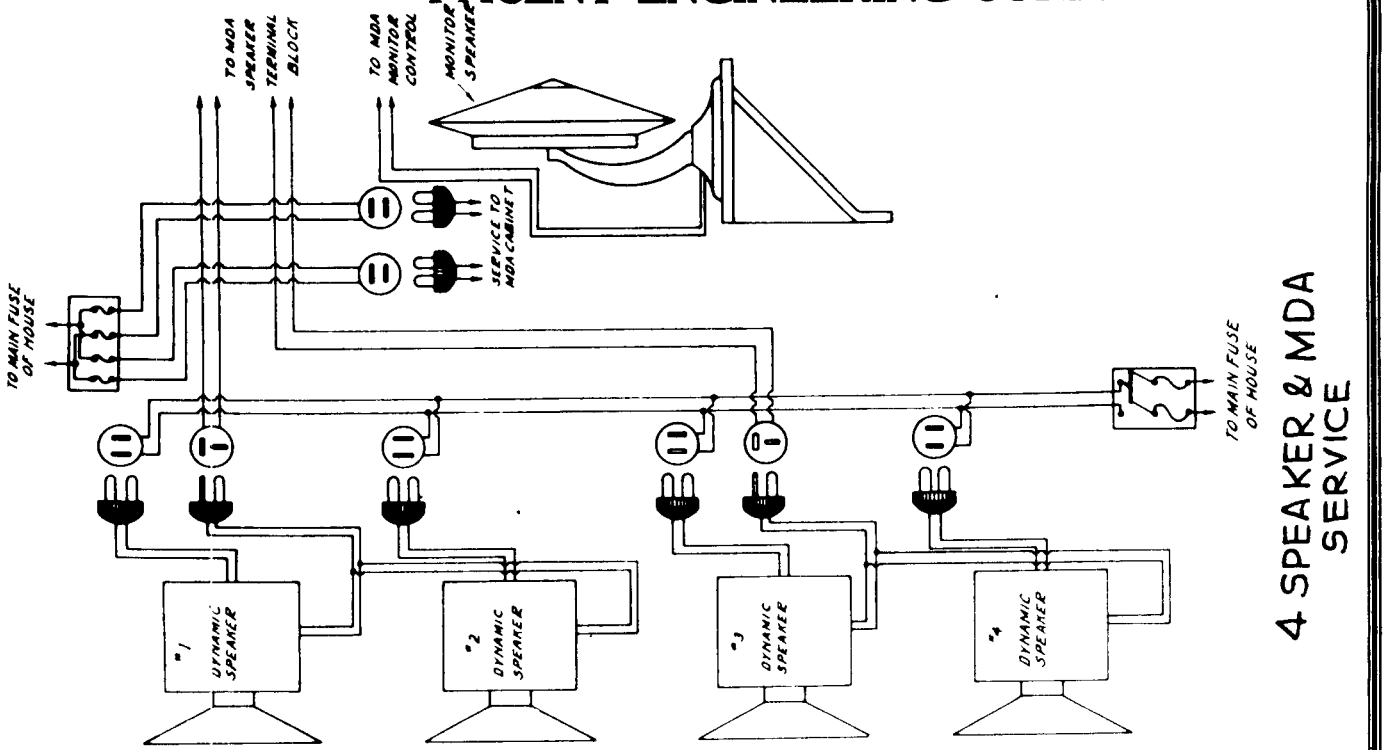


4MDA-F HARNESS

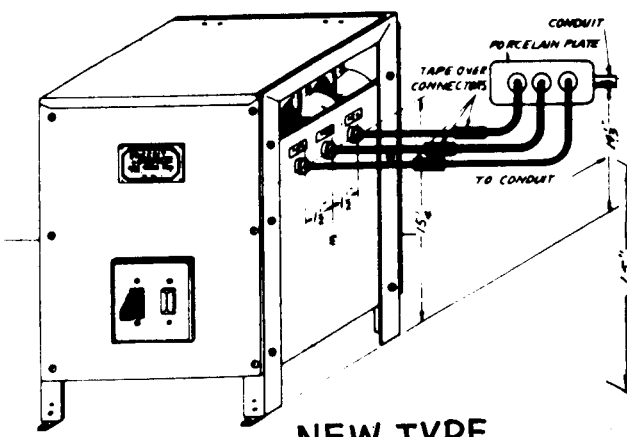


2MDA-F HARNESS

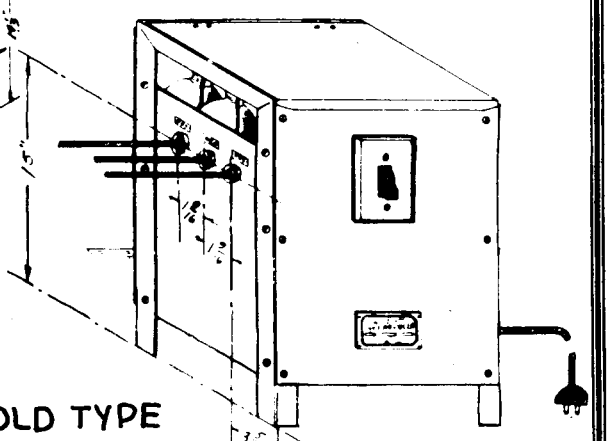
PACENT ENGINEERING CORP.



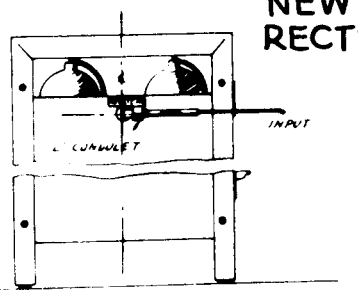
4 SPEAKER & MDA SERVICE

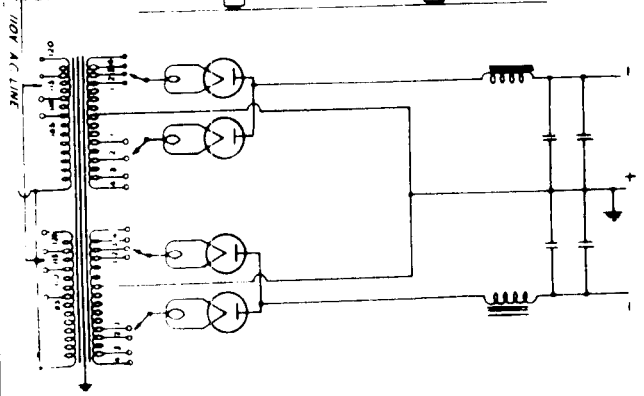


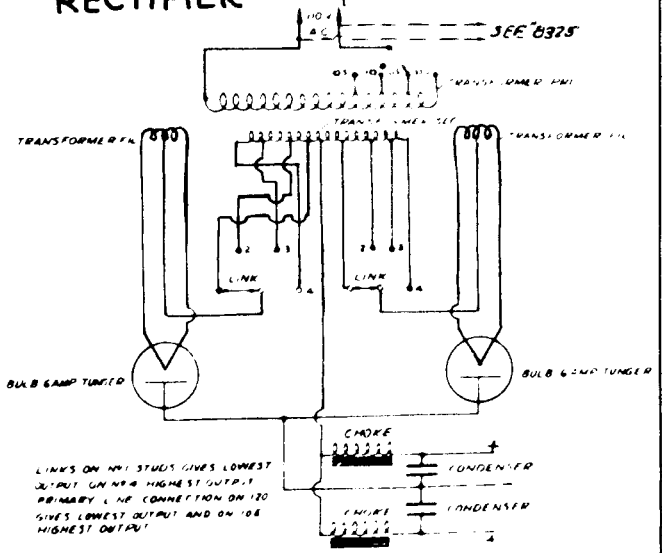
NEW TYPE RECTIFIER



OLD TYPE RECTIFIER







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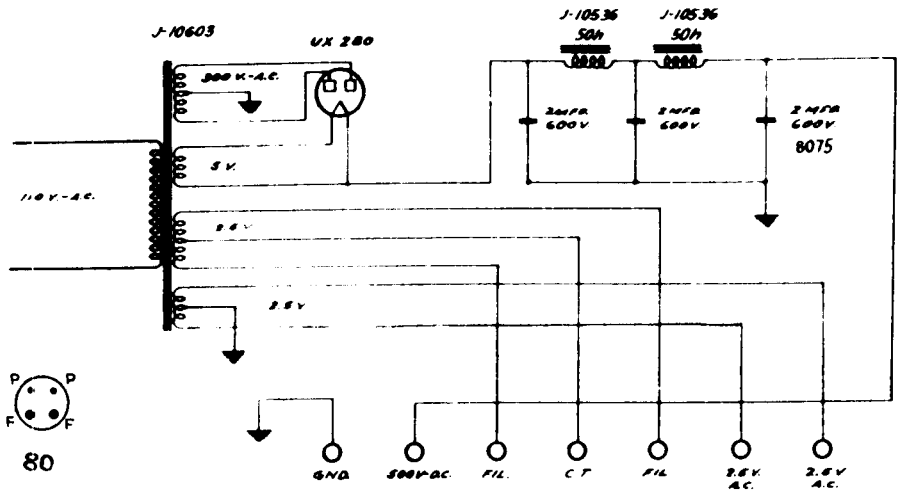
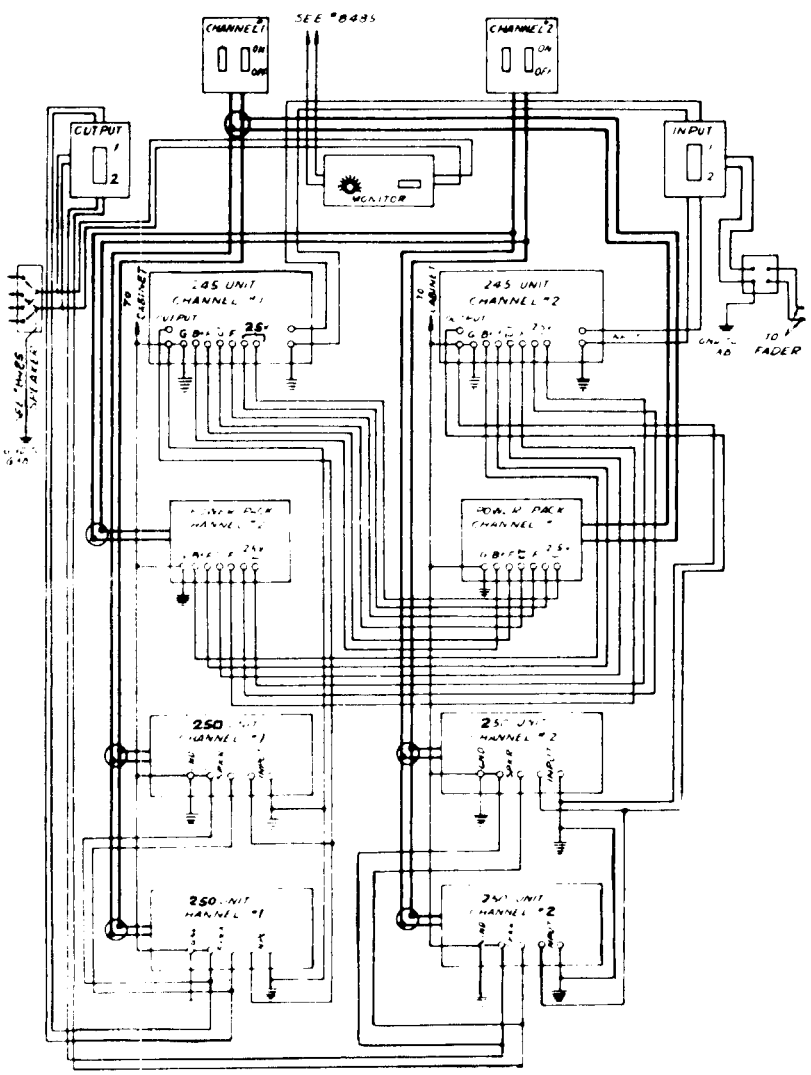
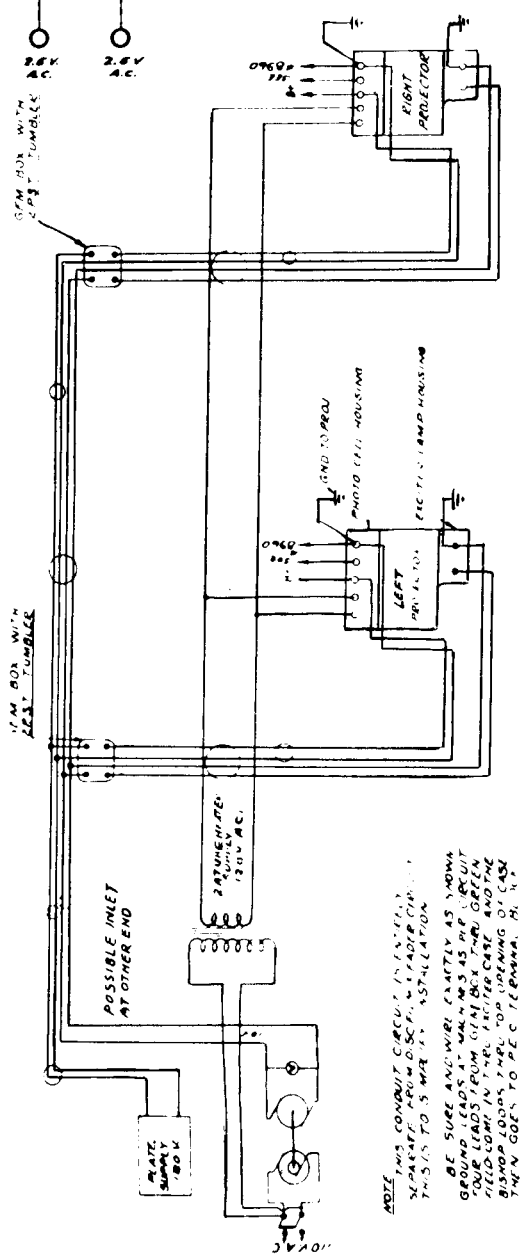


MODELS
C-62
10-2
C-66
20
POWER
SUPPLY

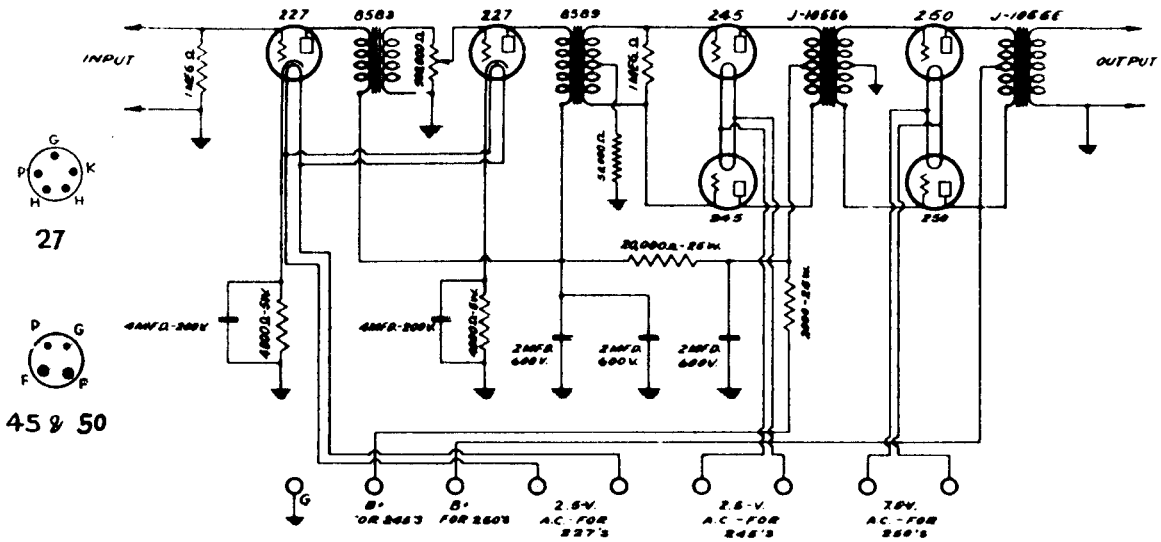


4MDA-F AMP.

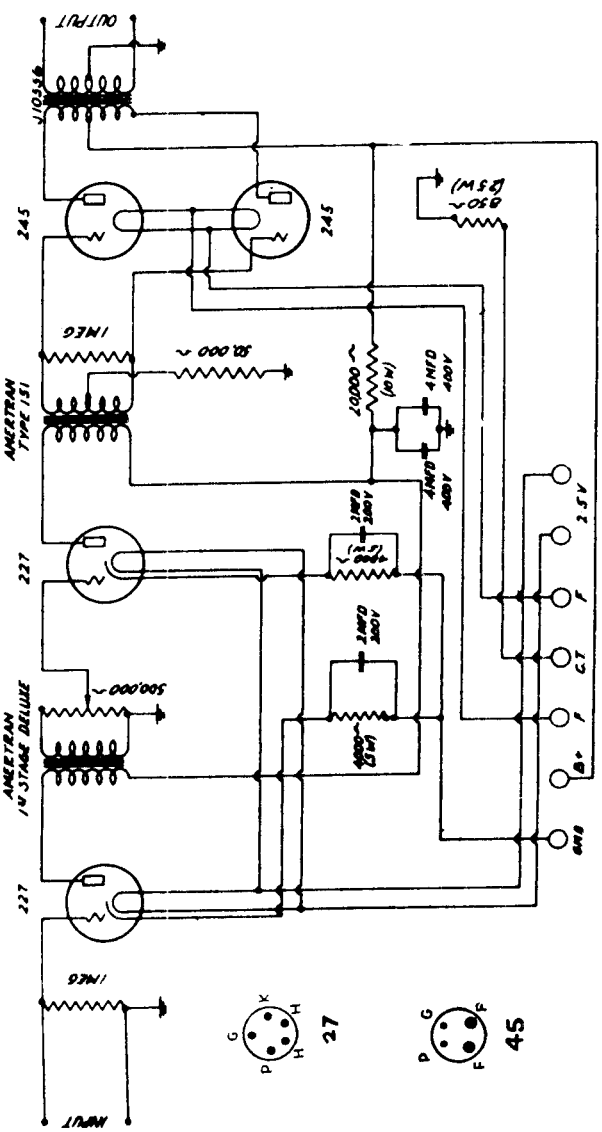


PEC & EXCITER LAMP CIRCUIT

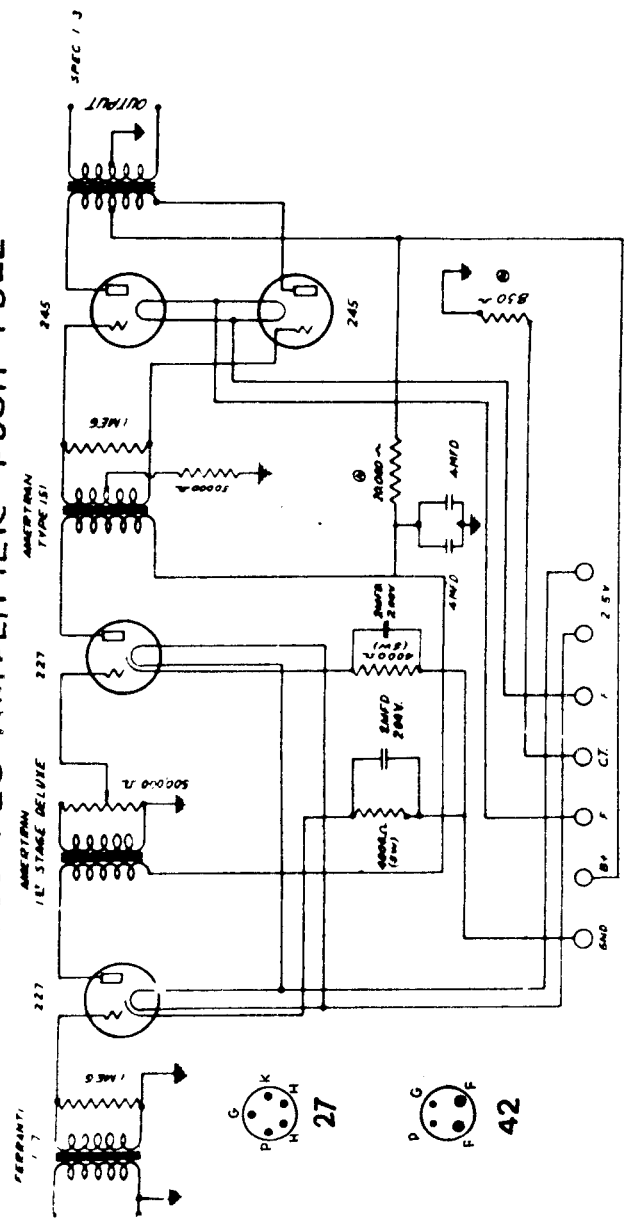
PACENT ENGINEERING CORP.



C 1005 AMPLIFIER

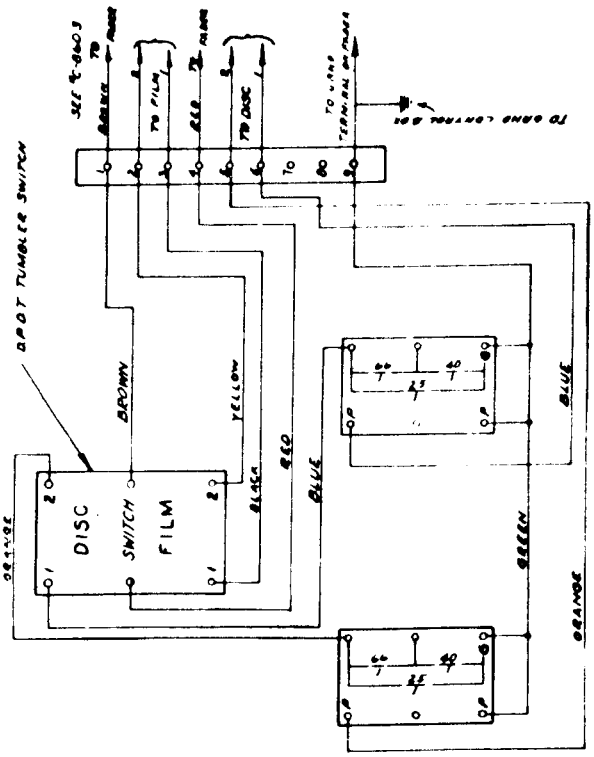


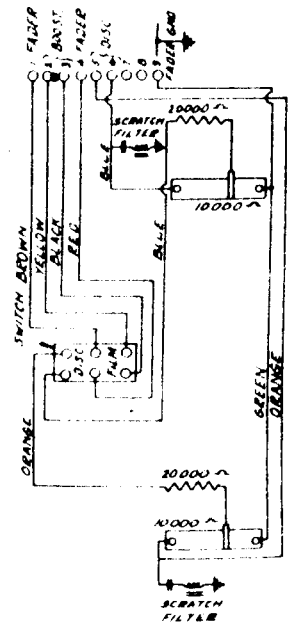
1063 PEC AMPLIFIER - PUSH - PULL



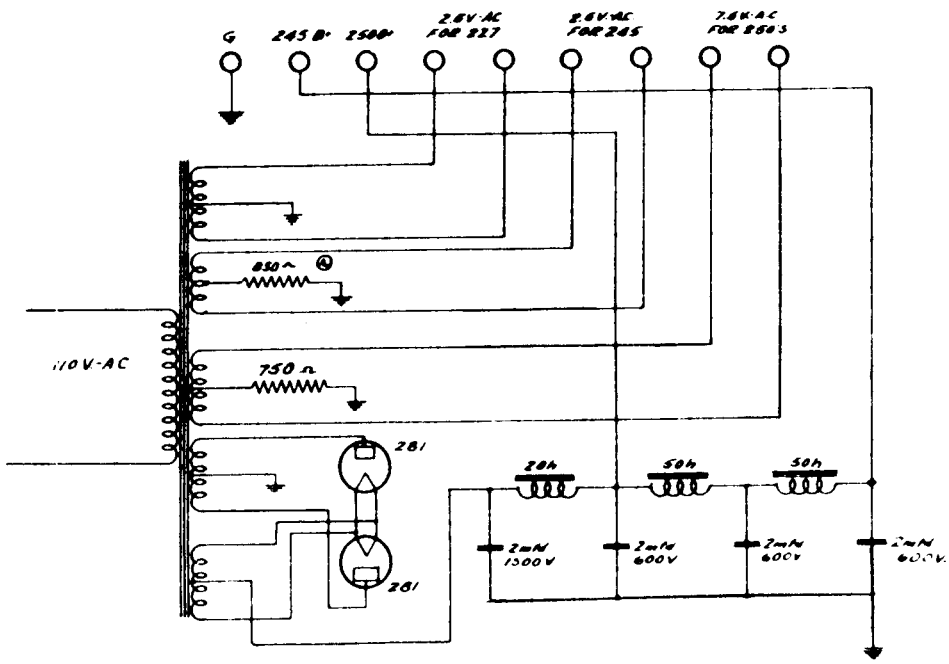
63 PEC AMPLIFIER PUSH-PULL

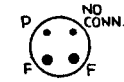
PACENT ENGINEERING CORP.





DISC AND FILM CONTROL
BOX – 2 MDA-F

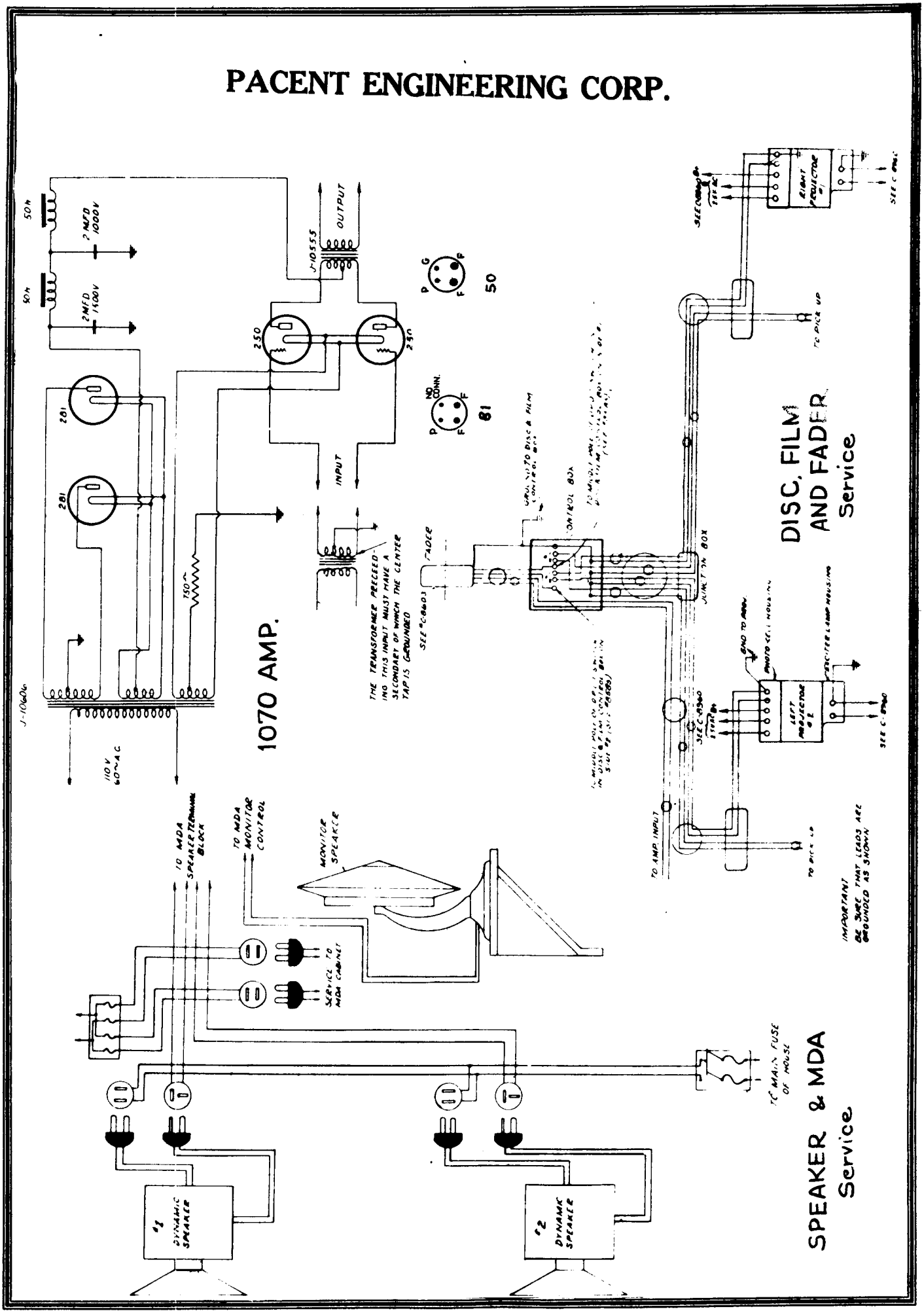




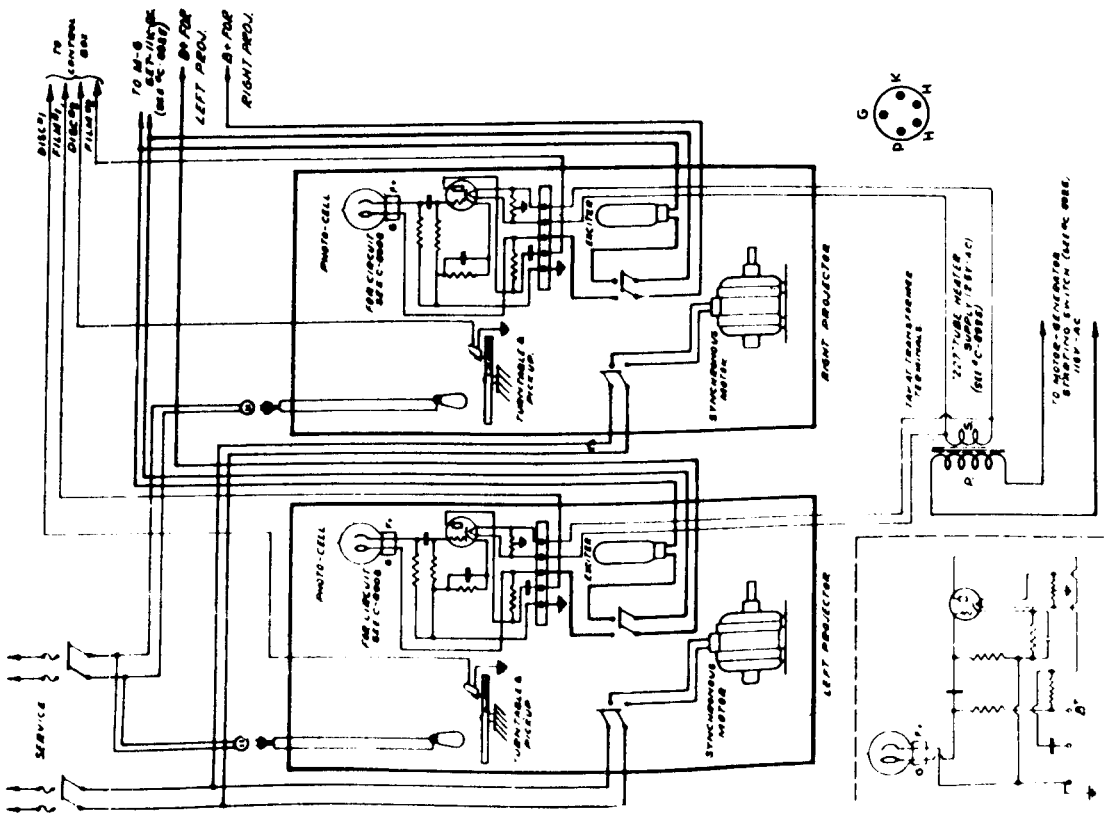
81

1010
POWER SUPPLY

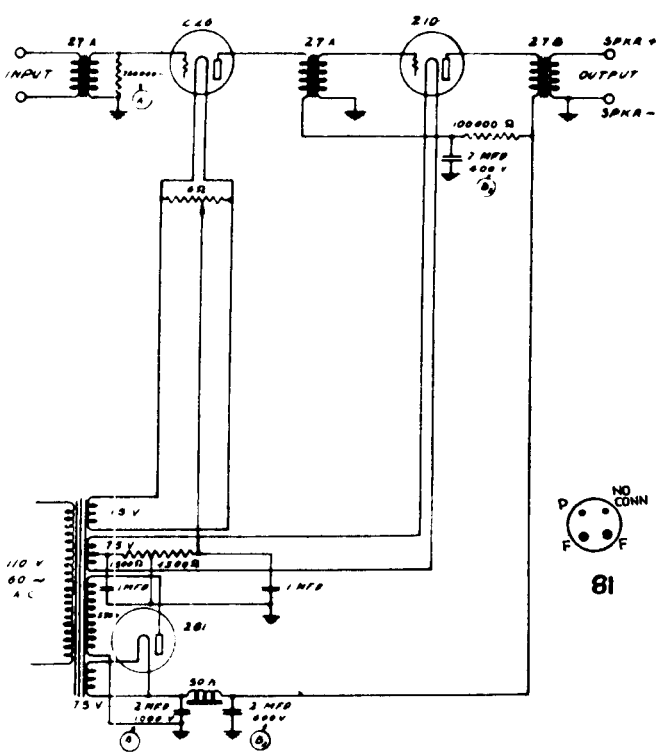
PACENT ENGINEERING CORP.



PACENT ENGINEERING CORP.

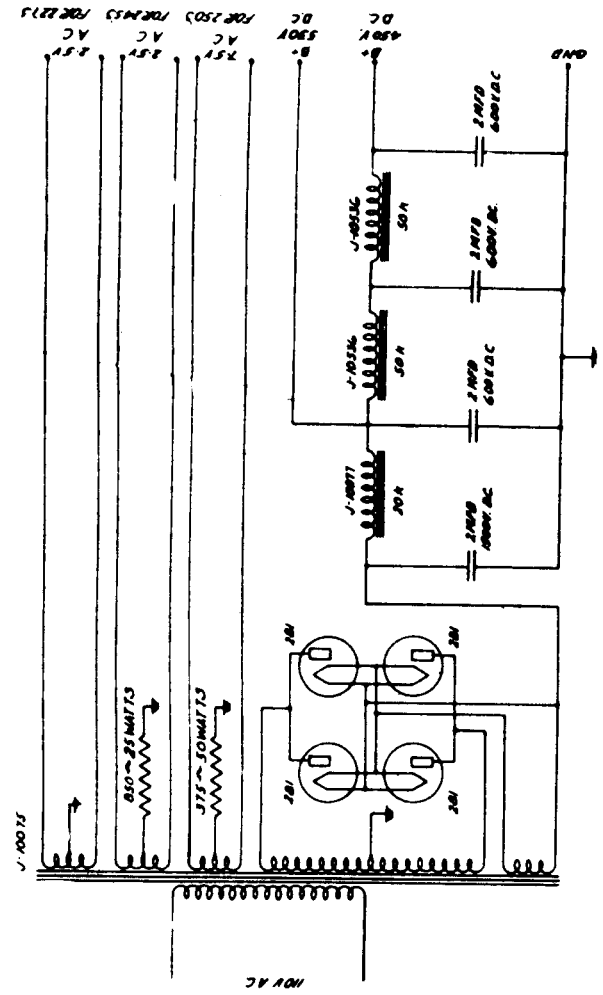


DISC & PHOTOCELL EXCITER LAMP & PROJECTOR WITH BOOSTER



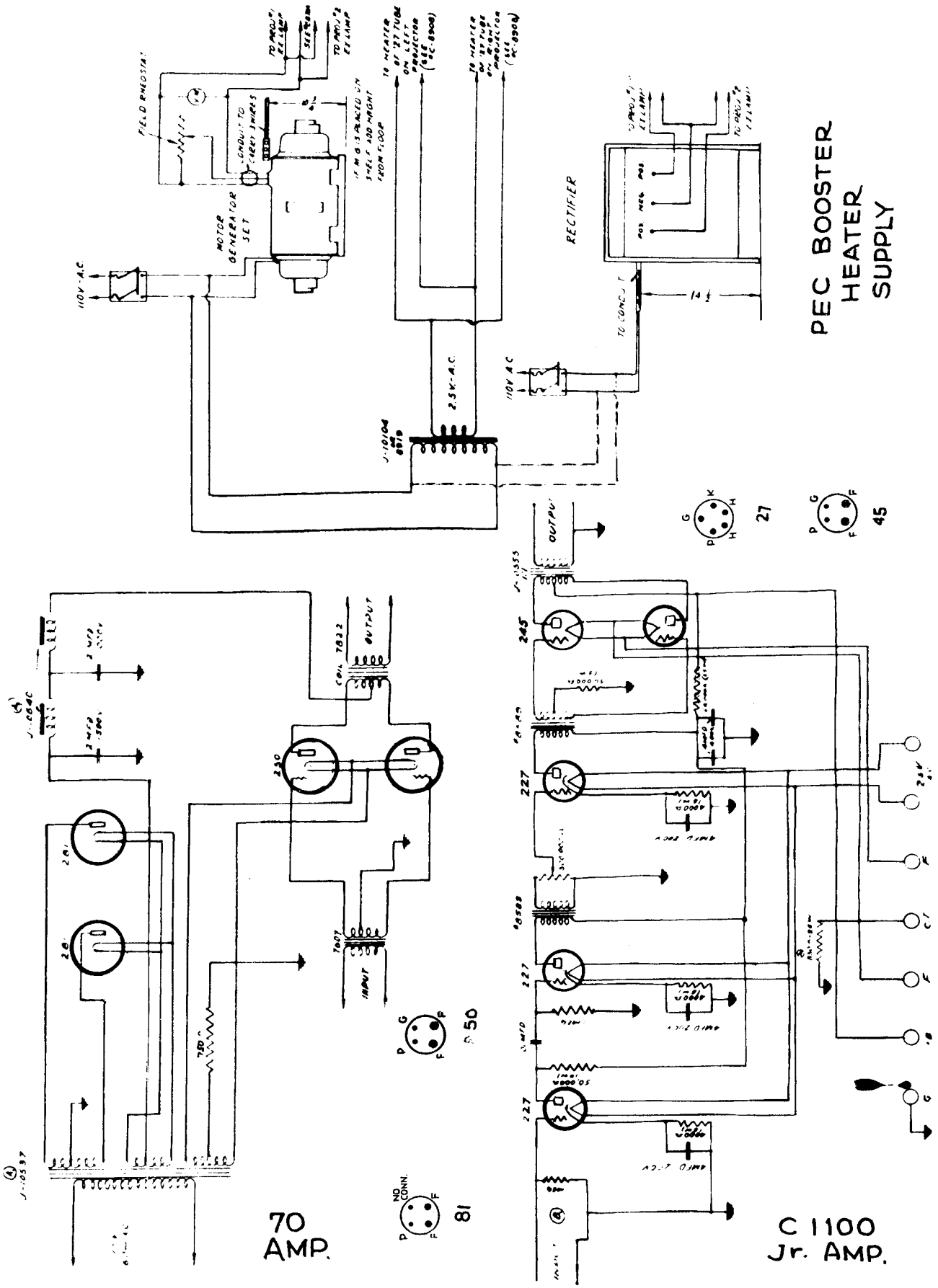
65 AMP

NOTE: CORES OF ALL TRANSFORMERS CONNECTED TO BASE "GROUND" BINDING POST TO BASE



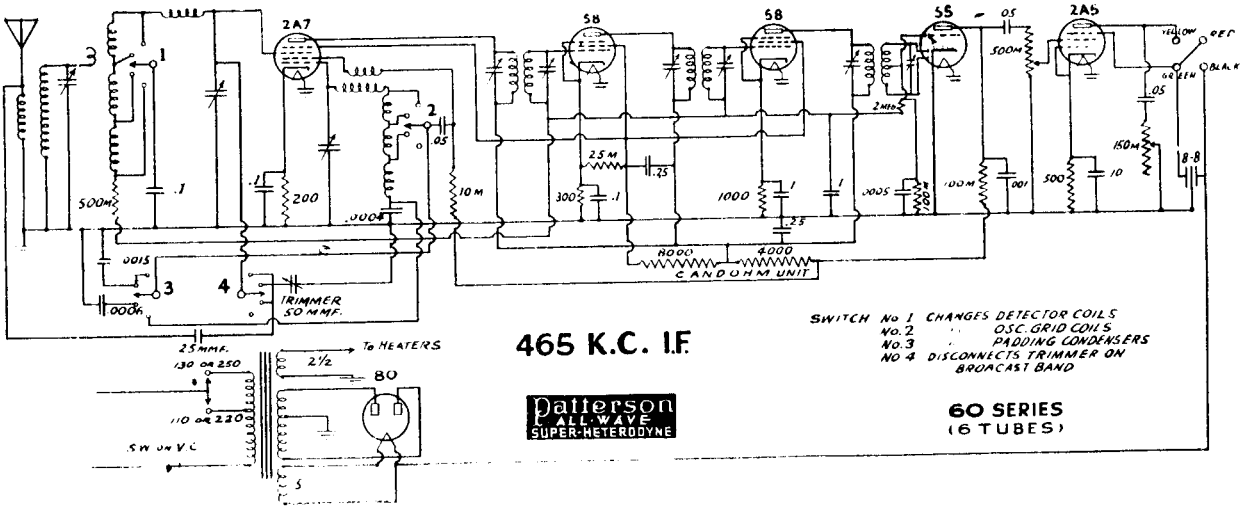
1020 SPU

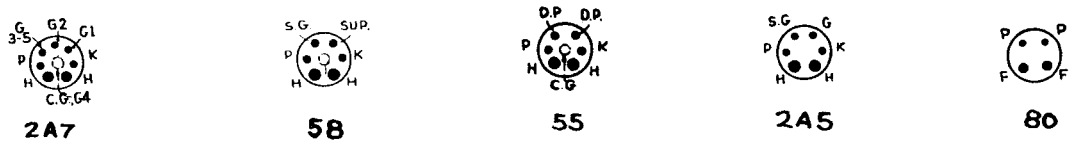
PACENT ENGINEERING CORP.

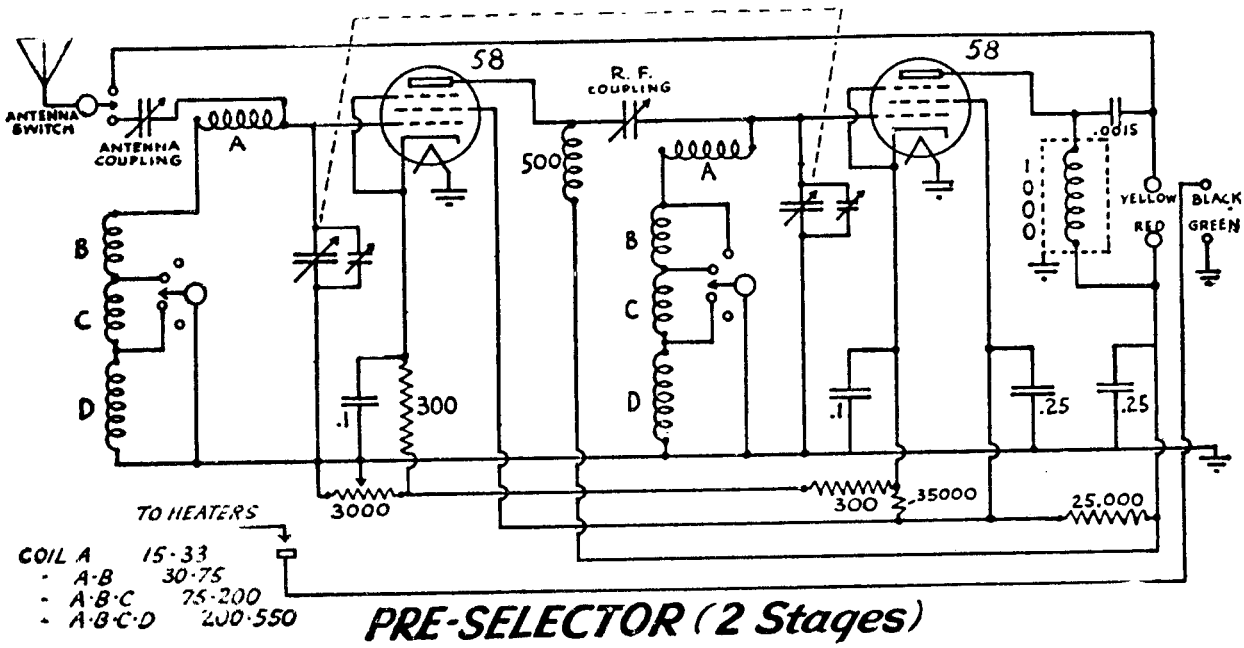


PATTERSON RADIO CO.

60 SERIES 60 AW & 64 AW







PRE-SELECTOR (2 Stages)

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The Chief cause of this trouble is too long an antenna. A powerful local station will cause the R.F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

CHECK THE FOLLOWING:

Disconnect the grid returns where they connect to the load resistor of the diodes of the 55 tube; this is generally a 100M ohm ½ watt resistor and is either located in the last intermediate or directly below it.

Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 50 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear. Check tubes for leakage from grid to ground.

TUBE TROUBLE

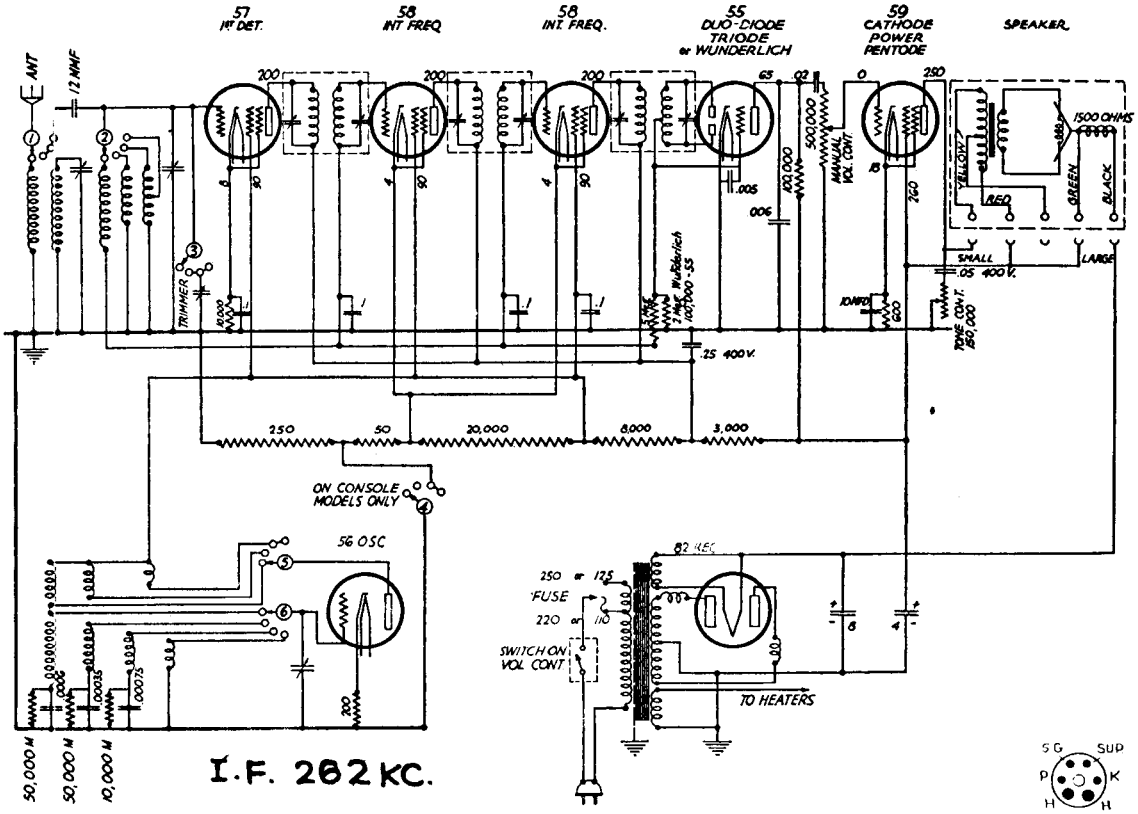
The tubes in this set have been carefully checked and re-heated four times before shipment. Occasionally a tube has a small air leak that will allow gas to enter and cause it to become inoperative within the first thirty days. After this time they should give from 1500 to 2000 hours of satisfactory service. Ninety-nine per cent of trouble in a chassis is caused by defective tubes, check them carefully.

PATTERSON RADIO CO.

7 TUBE MODELS (Compact and Consoles)

Without Rear Fuse and Cover

70 AW, 107 AW, 207 AW, 210 AW

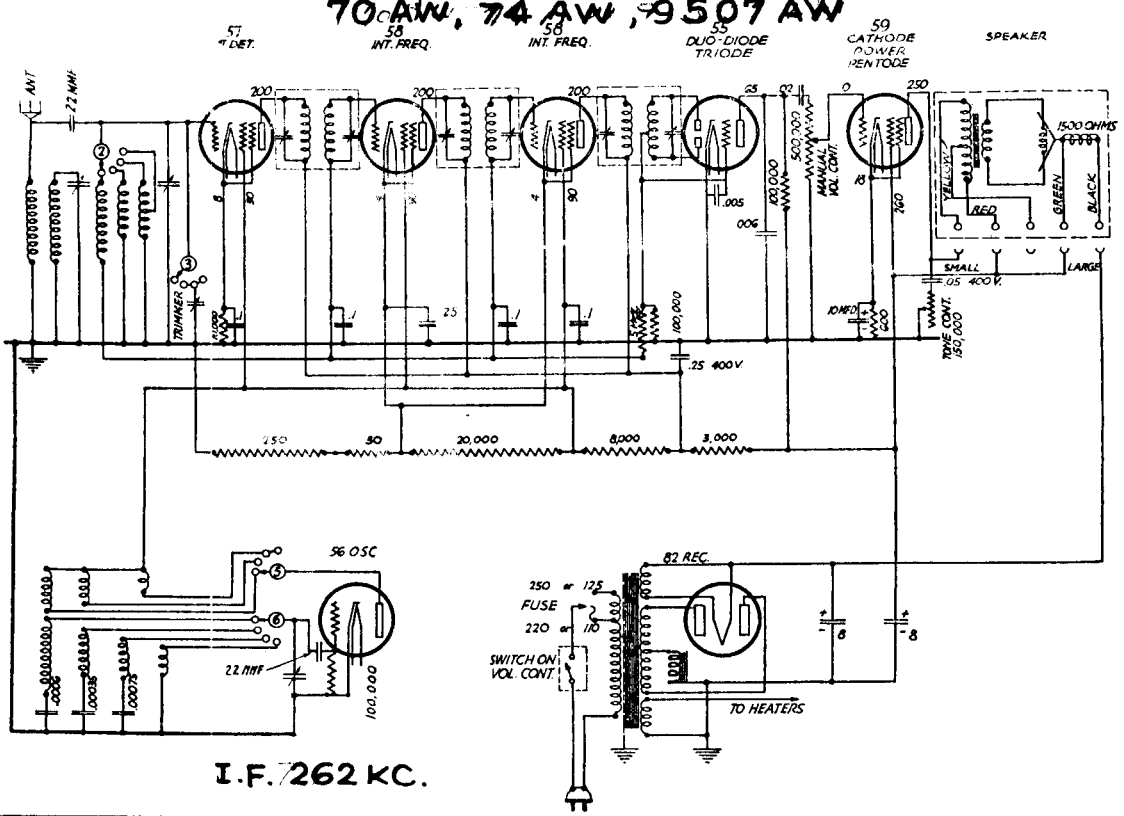


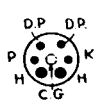
57 & 58

7 TUBE MODELS (Compact and Consoles)

With Rear Fuse and Cover

70 AW, 74 AW, 9507 AW





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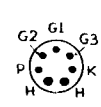

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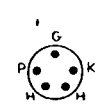


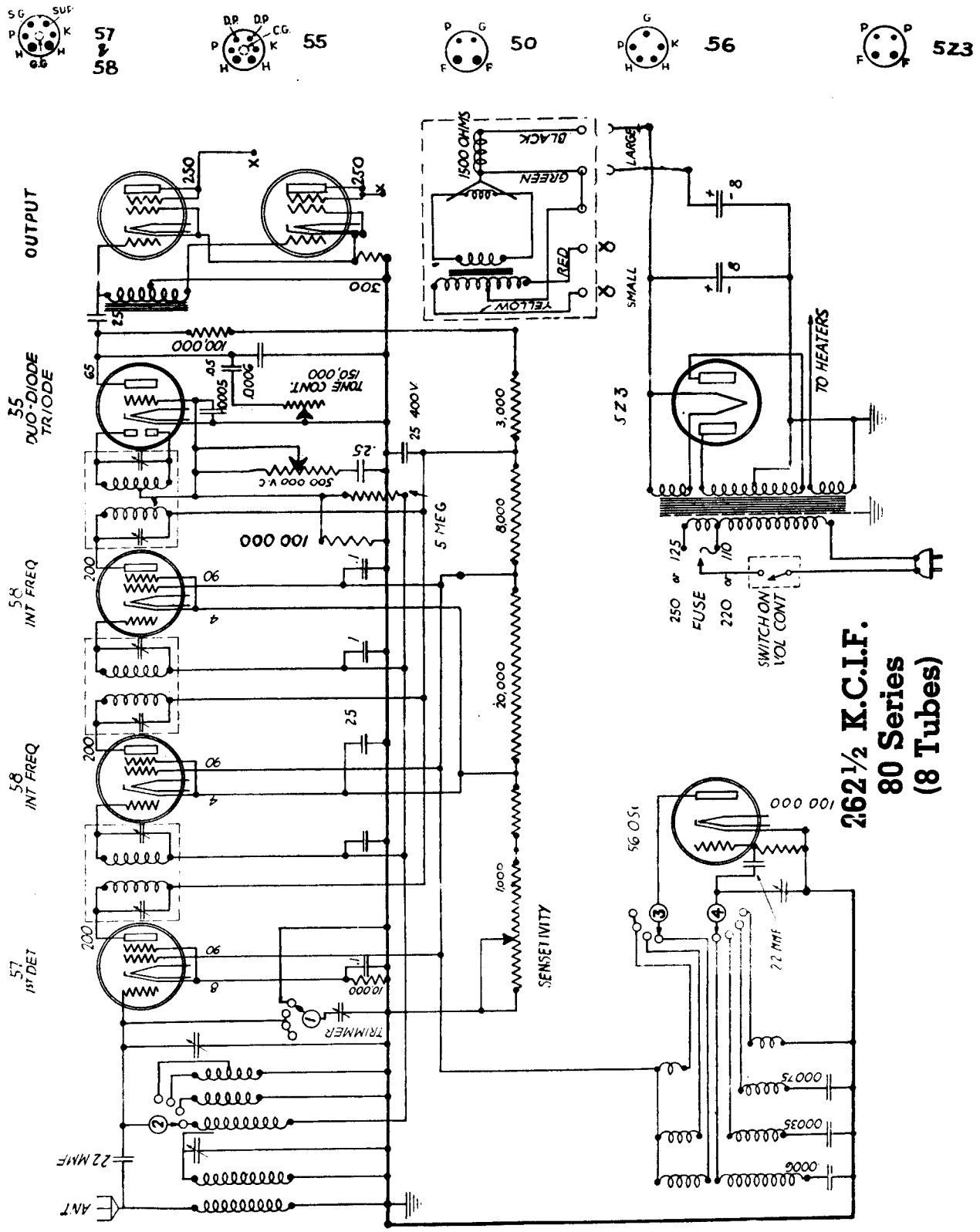
56

82

PATTERSON RADIO CO.

80 SERIES

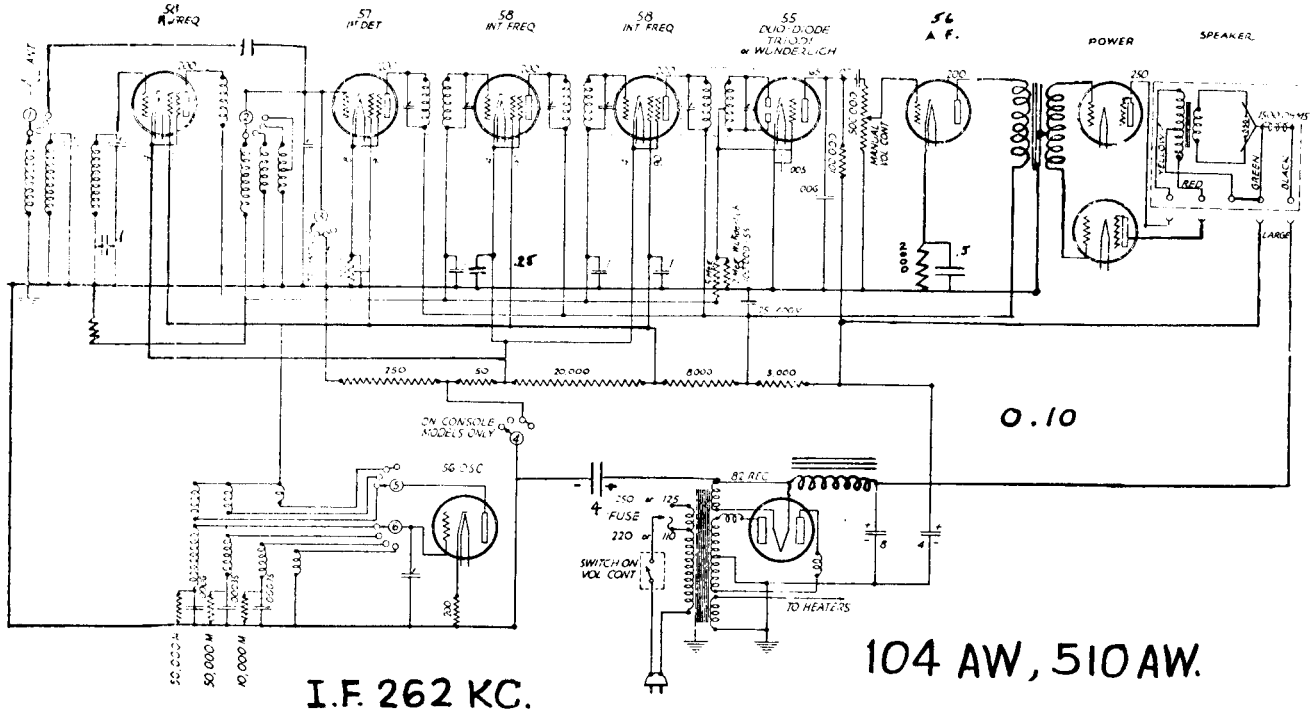
80 AW, 84 AW & 50 AW

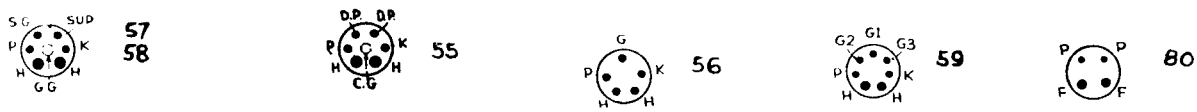


10 TUBE MODELS (Consoles)

Without Rear Fuse and Cover
No. 46 Power Tubes

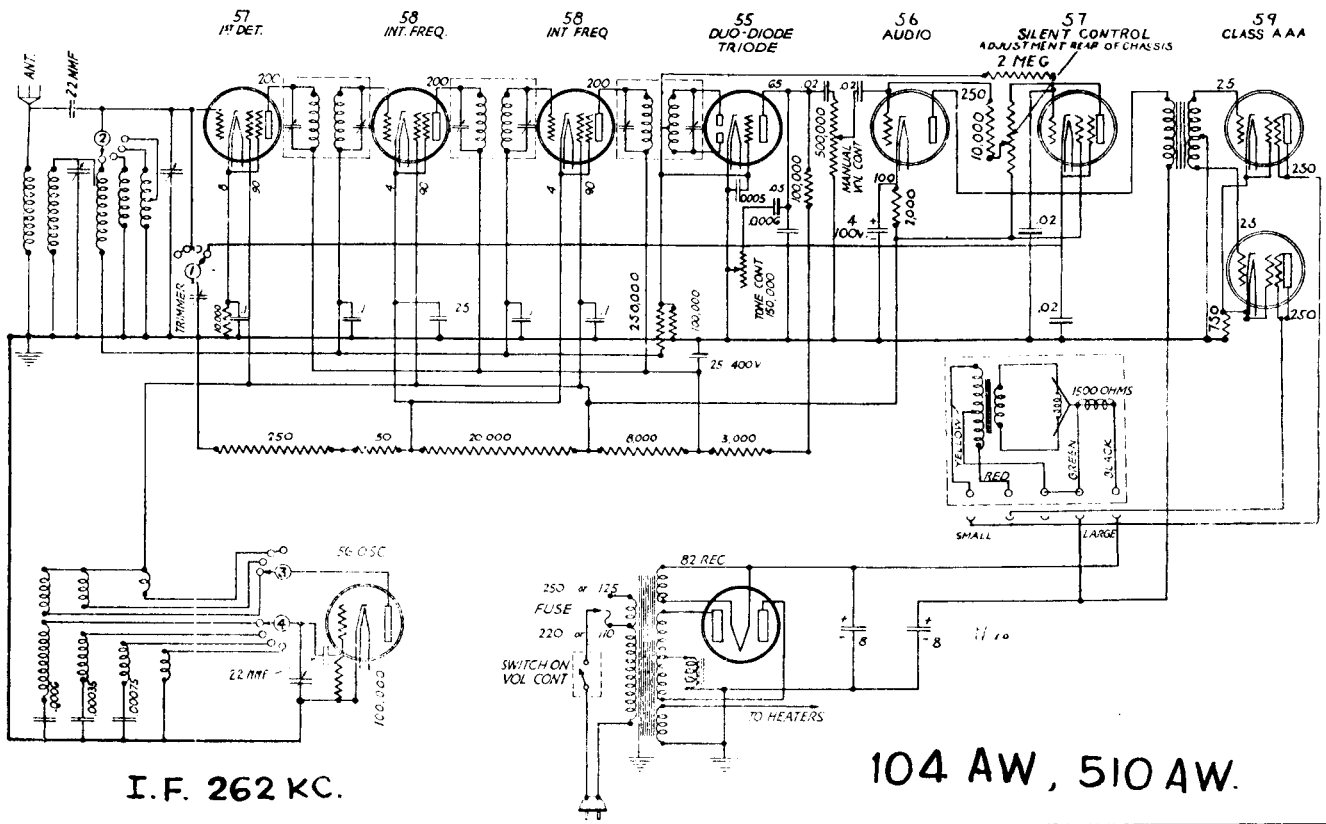
PATTERSON RADIO CO.





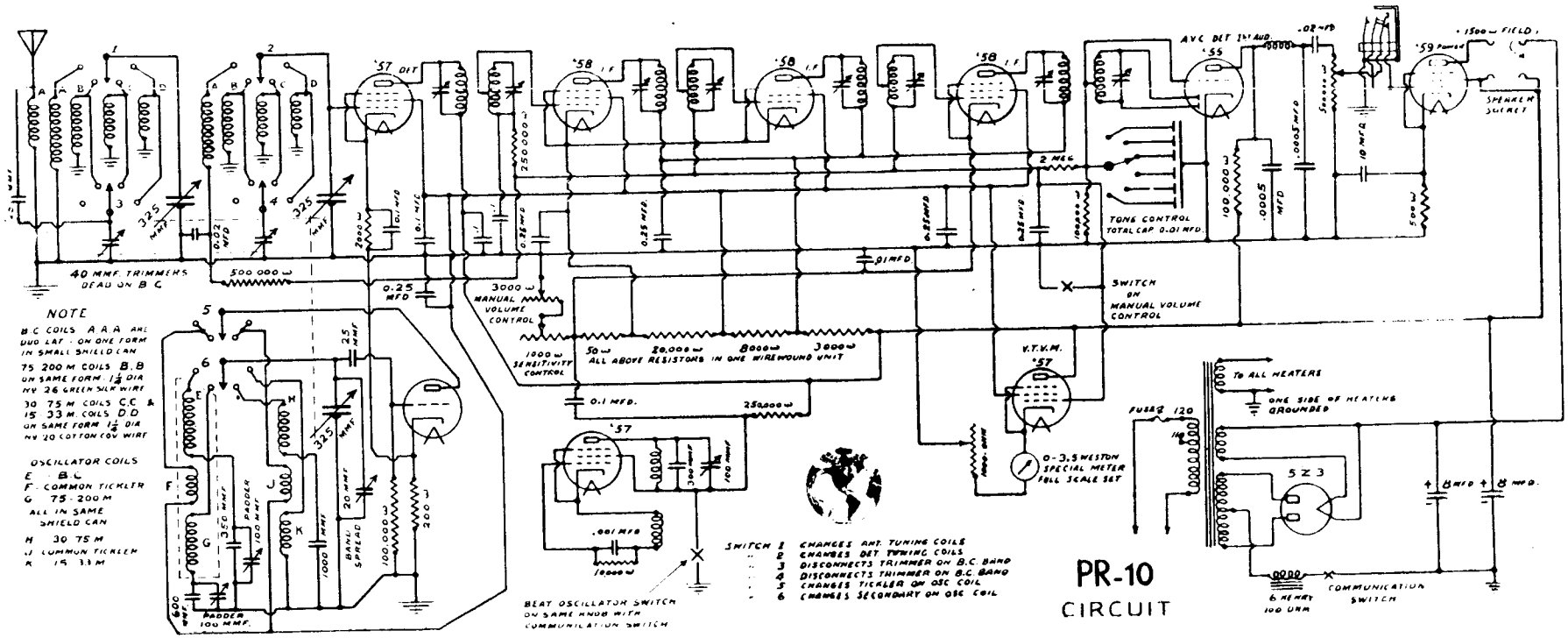
10 TUBE MODELS (Consoles)

With Rear Fuse and Cover
No. 59 Power Tubes



PATTERSON RADIO CO.

MODEL PR-10



To rebalance the receiver does not require any equipment. The meter will indicate the exact resonance point of the I.F. trimmers and also the condenser gang. Proceed as follows: Set band spread dial at "O" then tune in a station on the high frequency end of the Broadcast band (any station around 1400 K.C. is okay). Next, adjust the trimmer on the condenser section nearest the dial until the station reads exactly on its known K.C. Now tune in a station in around 600 K.C. and be careful to be on the exact center of the carrier. All of the above operations must be made with the manual control in off position. Next, turn the sensitivity control toward minimum so that the meter reads about R-9. Now, adjust each of the eight I.F. trimmers very carefully until the meter swings the farthest to the right. You probably will not be able to increase the gain more than 1.5-R. It should not be necessary to turn any trimmer more than 1/8 of a turn.

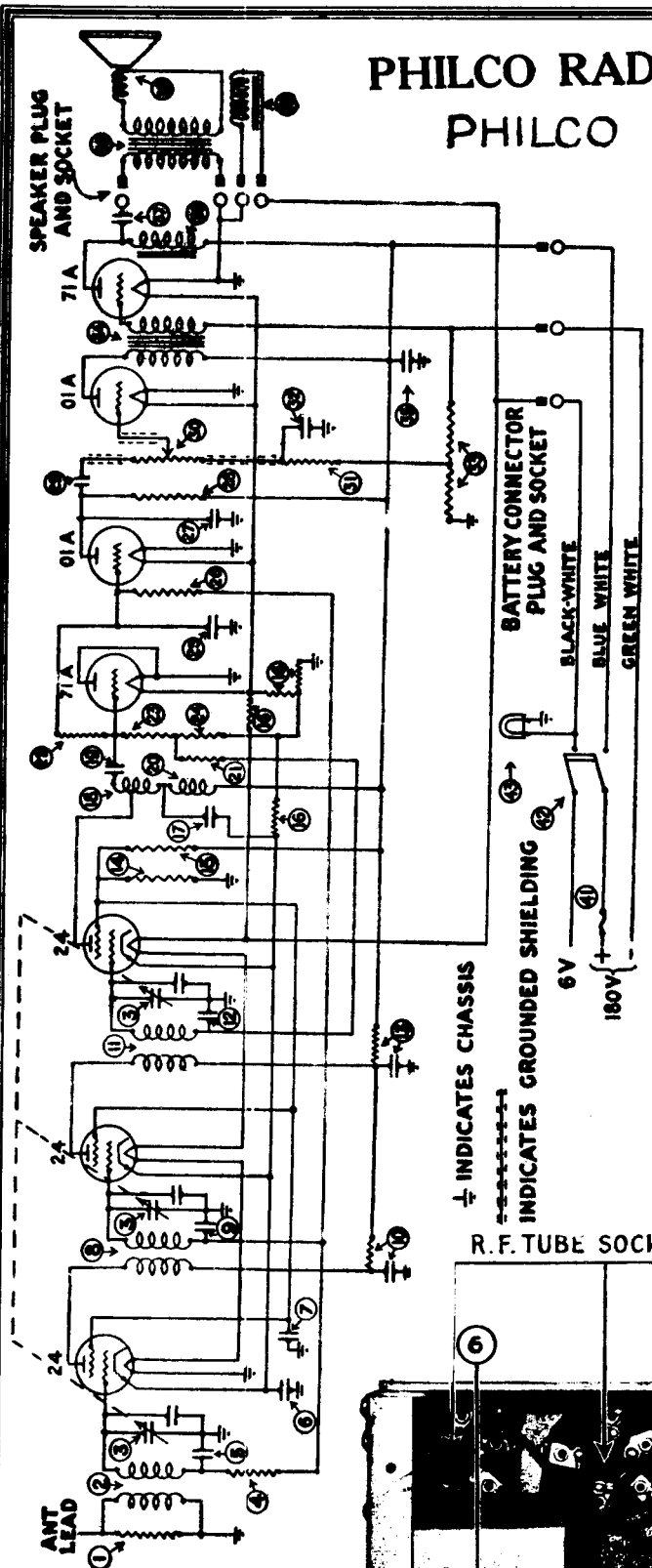
The manual control should be only used on code reception or when you wish to stand by on a station when the carrier has been turned off. The meter should be set only on automatic volume control and the meter reading taken on code signals only by comparison as to the setting of the manual control to a certain predetermined audio output.

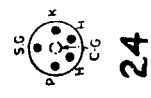
Do not attempt to check noise level by disconnecting the antenna or try to check a set with automatic volume control with another with manual control. The reason for this is, with automatic volume control the set is at maximum sensitivity whenever the carrier input is zero. A receiver with manual control only hears the high points of input, whereas the automatic volume control keeps the output equal at all times. Check the noise level by tuning in a signal with equal audio level when using the manual control.

The band spread condenser is connected across the oscillator section of the large gang and covers approximately four divisions of the main tuning dial. The amateur bands are shown on the card supplied with the receiver and if the main dial is tuned to the figure shown on the card, the band spread dial will cover the complete band. When tuning in short wave broadcast stations, the band spread can be used either as a vernier adjustment or to spread out the short wave station the same way as on the amateur band.

PHILCO RADIO & TEL. CORP.

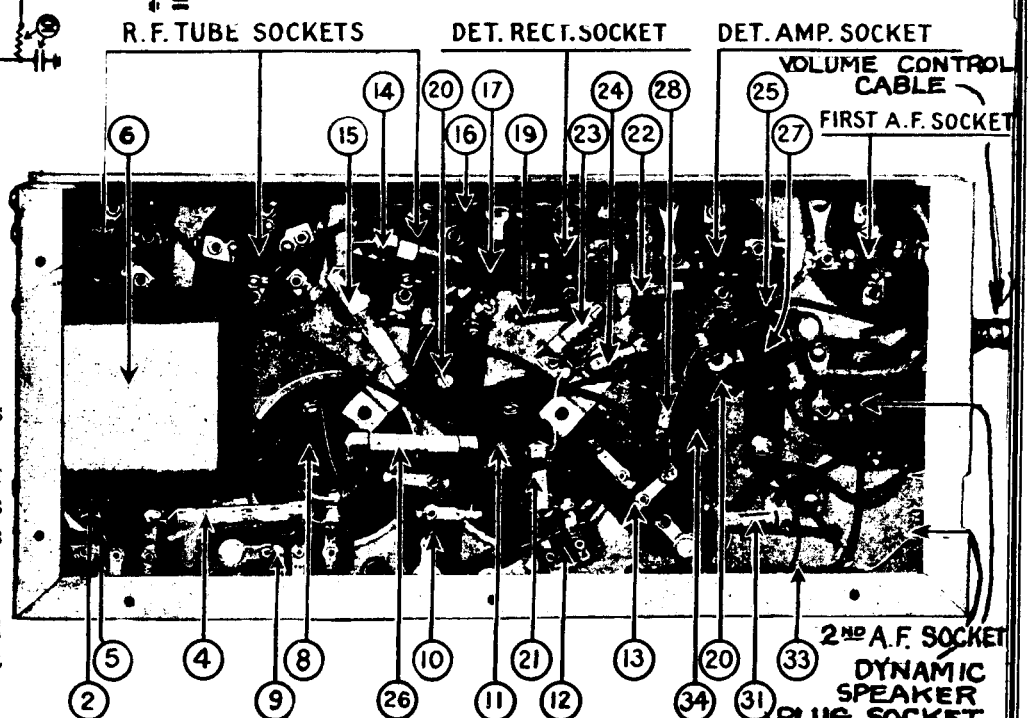
PHILCO 3





REPLACEMENT PARTS—

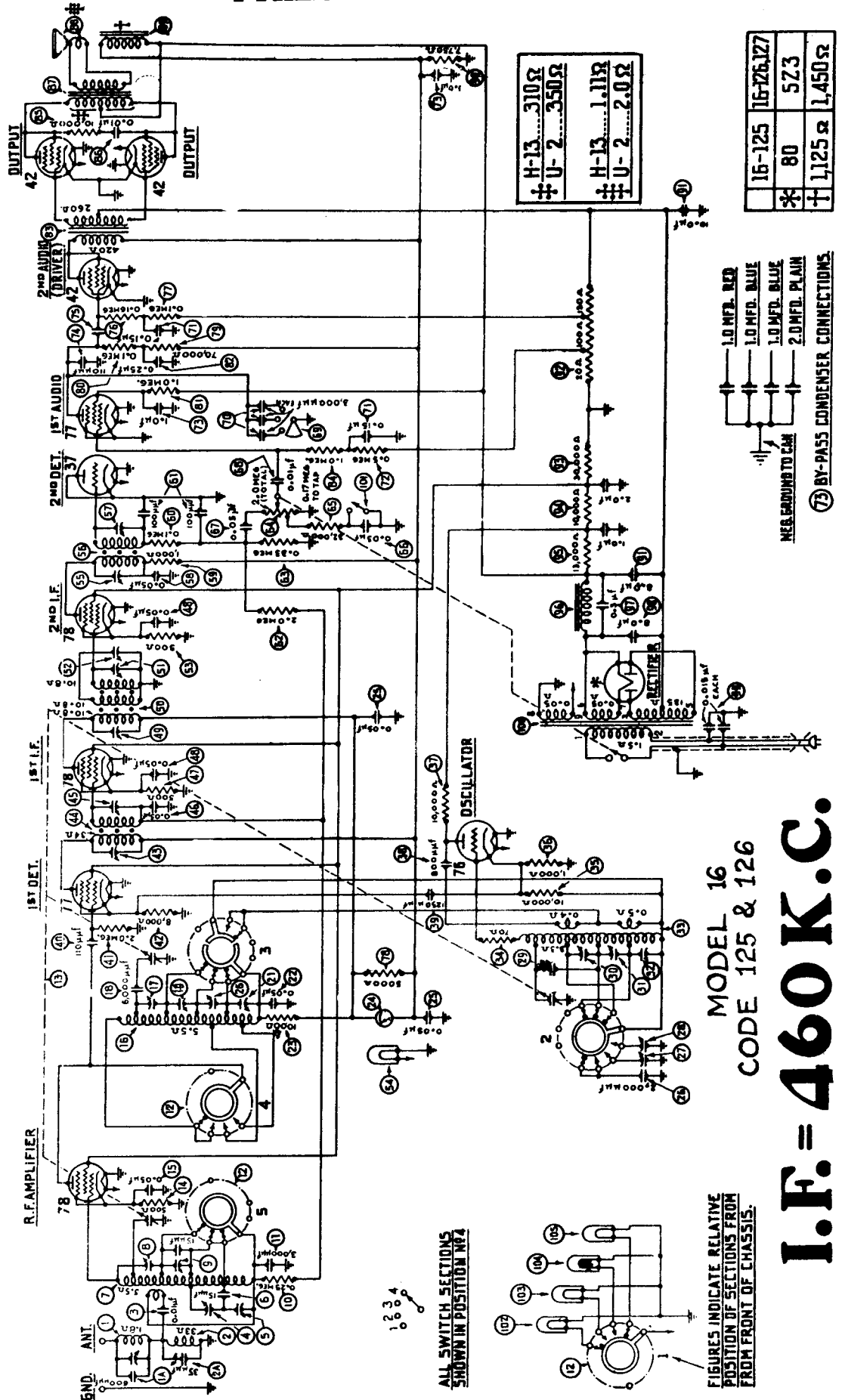
No. on Figs. 1 and 2	Description	Part No.
①	Resistor (10,000 ohms—½ watt)	4412
②	First R. F. Transformer	4401-A
③	Tuning Condenser	4372-A
④	Resistor (100,000 ohms—1 watt)	3767
⑤	Condenser (.05 mfd)	3615-N
⑥	Condenser (1.0 mfd)	4419
⑦	Condenser (.25 mfd)	4487
⑧	Second R. F. Transformer	4401-B
⑨	Condenser (.05 mfd)	3615-N
⑩	Condenser and Resistor (.05 mfd with 250 ohms)	3615-P
⑪	Third R. F. Transformer	4401-B
⑫	Condenser (.05 mfd)	3615-N
⑬	Condenser and Resistor (.05 mfd with 250 ohms)	3615-C
⑭	Resistor (50,000 ohms—1 watt)	4237
⑮	Resistor (25,000 ohms—1 watt)	3656
⑯	Resistor (4-section)	4407
⑰	Condenser (.00025 mfd)	3082
⑱	Fourth R. F. Transformer	3775-B
⑲	Condenser (.00005 mfd)	3774
⑳	R. F. Choke	3256-A
㉑	Resistor (1,000,000 ohms—½ watt)	4409
㉒	Resistor (250,000 ohms — ½ watt)	4410
㉓	Resistor (100,000 ohms — ½ watt)	4411
㉔	Resistor (100,000 ohms — ½ watt)	4411
㉕	Condenser (.00025 mfd)	3082
㉖	Resistor (1,000,000 ohms — 1 watt)	4414
㉗	Condenser (.00025 mfd)	3082
㉘	Resistor (100,000 ohms — ½ watt)	4411
㉙	Condenser (.015 mfd)	3793-D
㉚	Volume Control	4463
㉛	Resistor (250,000 ohms — ½ watt)	4410
㉜	Condenser (.25 mfd)	4487
㉝	Resistor (2-section)	4408
㉞	Audio Transformer	3241
㉟	Condenser (2.0 mfd)	4418
㊱	Audio Choke	4485
㊲	Output Condenser (1.0 mfd)	4420



Trouble Shooting Hints

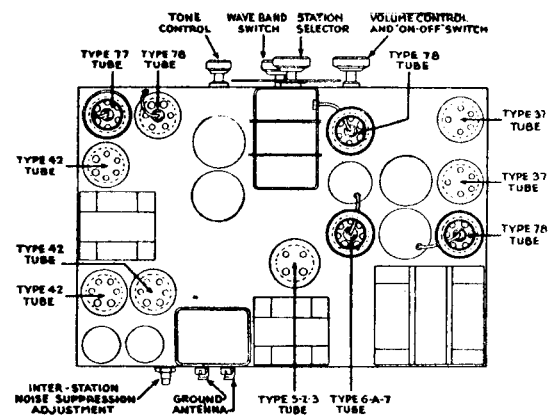
Shorted condensers in the R.F. plate leads are the common causes for trouble in this set. Connections in the battery plug should be checked when the set fails.

PHILCO RADIO & TEL. CORP.



PHILCO RADIO & TEL. CORP.

PHILCO 17



The OSC.; H. F. ⑲ compensating condenser is adjusted with the signal generator delivering a frequency of 1500 kilocycles. Next in order, the OSC.; L. F.; (Broadcast) ⑭ at 600 kilocycles, "rocking" the Tuning Condenser ⑦ as this adjustment is made; then the OSC.; L. F.; (Police and Aircraft) ⑯ at 1700 kilocycles. The OSC.; H. F. ⑱ is readjusted at 1500 kilocycles. Finally, the 1st, Detector ⑫ and Ant.; H. F. ⑧ compensating condensers are adjusted at 1400 kilocycles with the signal generator.

Compensating condensers ⑱, ⑫, and ⑧ are mounted upon Tuning Condenser ⑦; **all** of the compensating condensers can be adjusted from above the chassis. Each individual adjustment should be made with extreme care.

ADJUSTMENT FOR INTERSTATION NOISE SUPPRESSION

The adjustment of the Interstation Noise-Suppression circuit is made with the knurled brass adjustment knob at the rear of the chassis (see Fig. 1). No tools are necessary. This adjustment occurs to Potentiometer ⑯. Tune the receiver to a moderately strong broadcasting station, adjusting the Station Selector to the exact point of best reception shown by the narrowing of the shadow thrown on the screen of the Shadow Tuning Meter. Place the Toggle Switch ⑮ in the "S" position.

The receiver then should be de-tuned, by turning the Station Selector slightly in either direction to a point **between** adjacent channels; that is, where no broadcasting station is received. The noise-level at this point should be reduced by turning the knurled brass knob to the left until the noise just disappears.

NEVER OPERATE RECEIVER WITH THE SHIELD REMOVED FROM OVER THE FIRST AUDIO FREQUENCY TUBE (TYPE 77), AS THE RESULTING AUDIO OSCILLATION MAY DAMAGE RESISTOR ㊽.

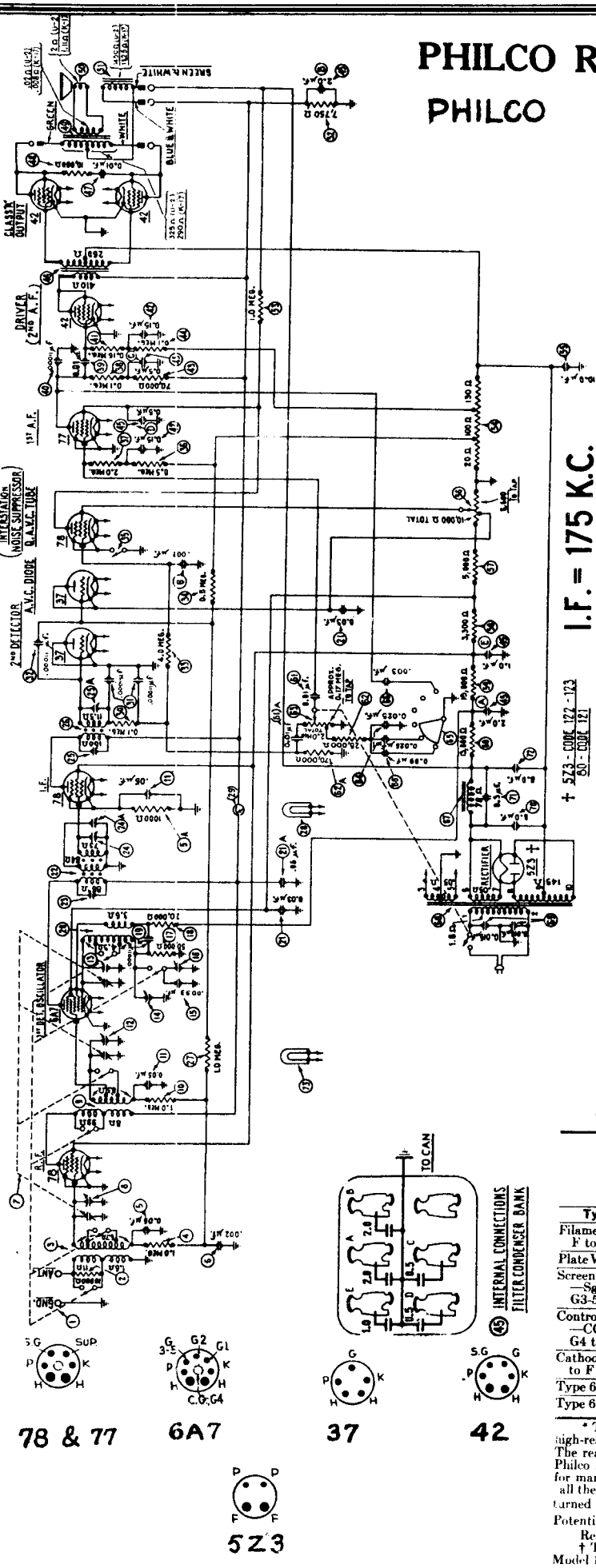
Table 1—Tube Socket Data*—A. C. Line Voltage, 115

Circuit	R.F.	1st Det. Osc.	I.F.	2nd Det.	A. V. C.	Inter-Station Noise Supr. Crt.	1st A.F.	Driver (2nd A.F.)	Output (Class A)		Rectifier †
Type Tube	78	6A7	78	37	37	78	77	42	42	42	5Z3
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	4.7
Plate Volts—P to K	220	220	225	0	0	45	45	230	340	340	400
Screen Grid Volts—Sg to K (6A7-G3-5 to K)	75	58	75	—	—	50	50	230	340	340	...
Control Grid Volts—CG to K (6A7-G4 to K)	Negligible	Negligible	3.7	.25	.25	.24	.24	.24	34.	34.	...
Cathode Volts—K to F	0	0	3.7	0	11.	0	0	0	0	0	...
Type 6A7-G1 to K.	22	...	...	...	...	...	...	...	...	...	...
Type 6A7-G2 to K.	140	...	...	...	...	...	...	...	...	...	...

* The filament voltage values in Table 1 were gotten with an A. C. voltmeter; a high-resistance multi-range D. C. voltmeter was used for all the other values in Table 1. The readings were taken from the under side of the chassis, with test prods and leads. Philco Model 048 All-Purpose Set Tester is highly recommended for these readings and for many other tests of Model 17. The Volume Control of Model 17 was at maximum all the way to the right); the Station Selector was at 520 K. C., with Wave-Band Switch turned to the left; Toggle Switch ⑮ in "S" position, and Interstation Noise Suppressor Potentiometer ⑯ turned all the way to the right, when these values were obtained.

Readings taken with a plug-in adaptor will NOT be reliable.

† These values cover the use of Rectifier Tube Type 5Z3, in a Model 17-122 chassis. Model 17-121 uses a Type 80 Rectifier.



PHILCO RADIO & TEL. CORP.

PHILCO 18

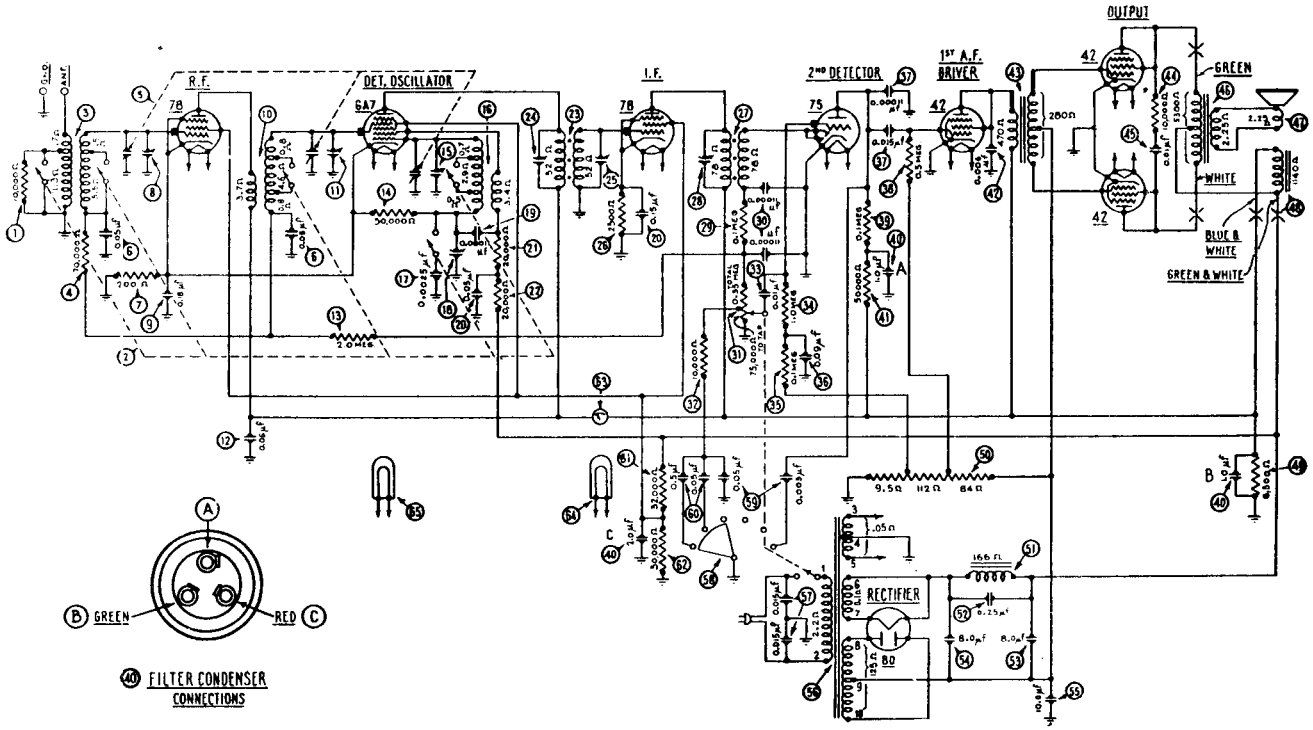
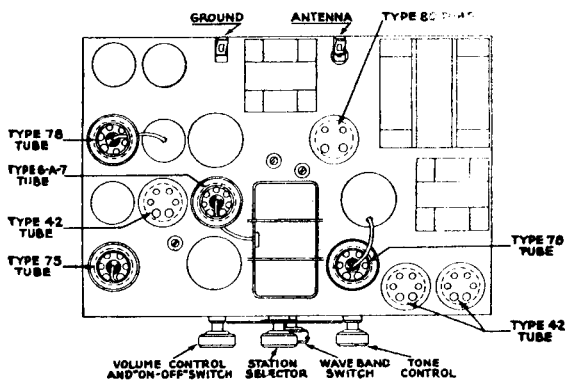


Table 1—Tube Socket Data*—A. C. Line Voltage 115 Volts

Circuit	R. F.	Det. Osc.	I. F.	2nd Det. & 1st A. F.	Driver (2nd A. F.)	Output (Class "A")		Rectifier
Type Tube	78	6A7	78	75	42	42	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K	210	210	210	120	205	280	280	350
Screen Grid Volts—SG to K (Type 6A7—G3-5 to K)	80	80	80	...	200	300	300	...
Control Grid Volts—CG to K (Type 6A7—G4 to K)	.3	.15	5.3	.3	.35	28	28	...
Cathode Volts—K to F	2.8	2.8	5.3	0	0	0	0	...
Type 6A7—G1 to K		35	...	...	...	...	...	...
Type 6A7—G2 to K	...	130	...	...	...	...	...	...

*All the above values were obtained from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high-resistance multi-range D. C. voltmeter for all other values. The **Philco Model 048 All-Purpose Set Tester** is highly recommended for this use. Volume control at maximum and station selector at 520 K. C. Readings obtained with a plug-in adaptor will NOT be satisfactory.



The intermediate frequency compensating condensers should be adjusted first. The intermediate frequency is 260 kilocycles. These compensating condensers are situated:

(a) 1st I. F. PRIMARY—㉔, underneath chassis. Access from above through hole in sub-base, back of the Tuning Condenser Assembly ⑤. Shield covers the hole and may be removed by prying with a screw driver.

(b) 1st I. F. SECONDARY—㉕, at rear of chassis, beneath the two vertically mounted electrolytic condensers ㊸ and ㊹. Accessible from rear of chassis.

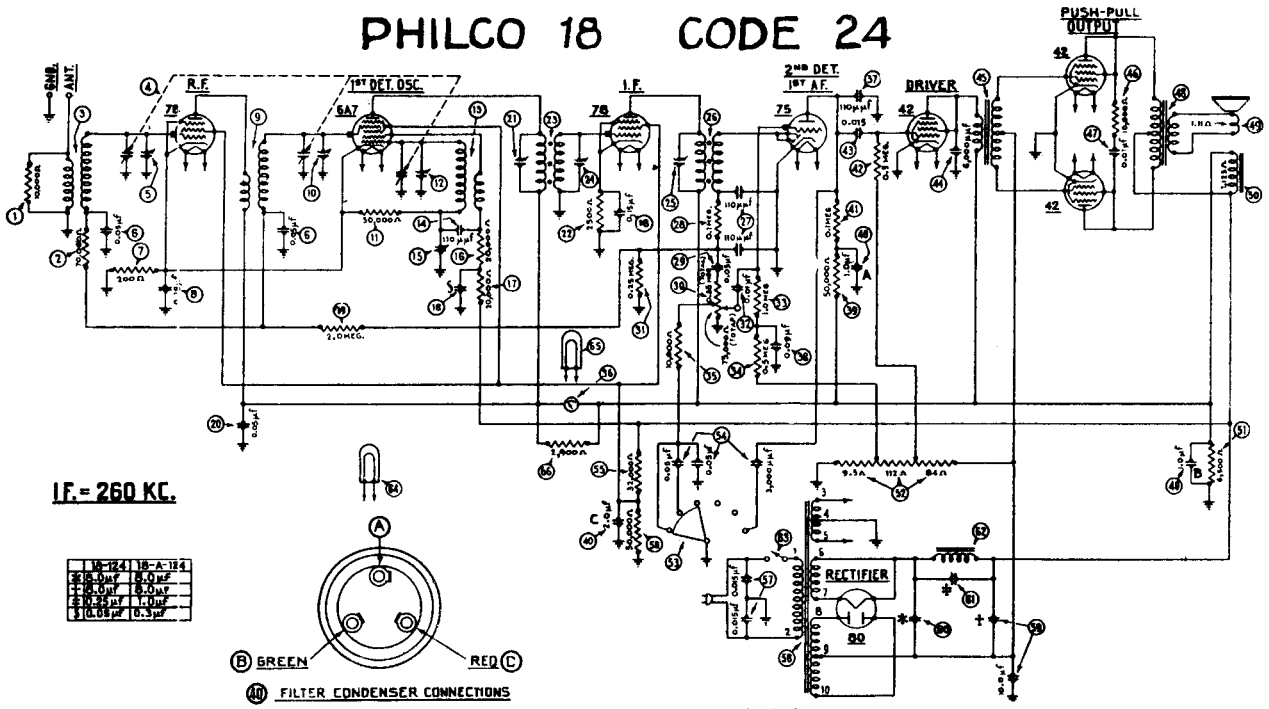
(c) 2nd I. F. PRIMARY—㉘, underneath chassis. Accessible from above through hole in chassis sub-base, in *front* of Type 42 (Driver; 2nd A. F.), and to right of Type 75 tube. The shield can be removed as under (a). The "OSC.; H. F." ⑮, the "DETECTOR" ⑪, and the "ANT.; H. F." ⑧ compensating condensers are then adjusted, in this sequence. The signal generator is set at 1500 K. C. for ⑮; at 1400 K. C. for ⑪ and ⑧. These are mounted upon the Tuning Condenser Assembly ⑤. ⑧ is mounted upon the condenser section nearest front.

The "OSC.; L. F." ⑱ compensating condenser, located at rear of chassis is adjusted next; with the signal generator set at 600 K. C. It is accessible from rear of chassis. The Tuning Condenser ⑤ should be "rocked" while the OSC.; L. F." adjustment is made.

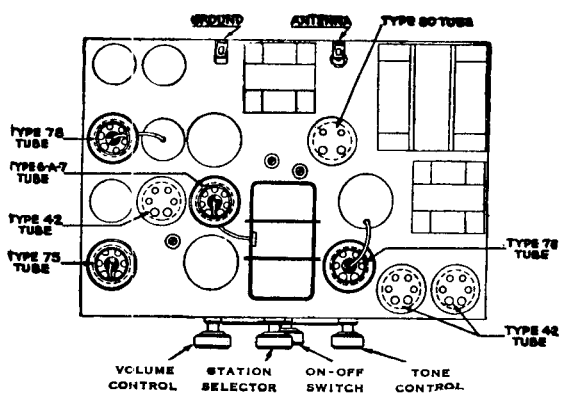
The "Push-on Button" shields should be replaced over ㉔ and ㉘ after the adjustments are finished.

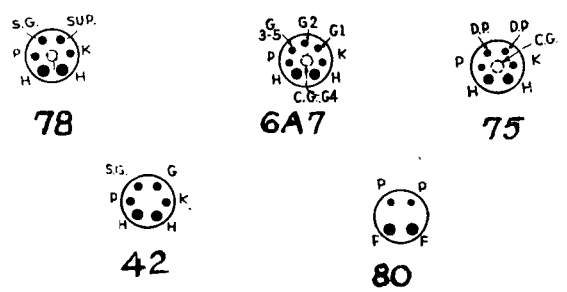
PHILCO RADIO & TEL. CORP.

PHILCO 18 CODE 24



NOTE: A resistor No. 5309 (2900 ohms) (red-white-red) is used, shunted across the shadowmeter.





Tube Socket Voltages

Circuit	R. F.	Det. Osc.	I. F.	1st A. F.	Driver	Output (Class "A")		Rectifier
Type Tube	78	6A7	78	75	42	42	42	80
Filament (F-F)	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P-K)	210	210	210	120	205	280	280	350
Screen Grid (SG-K) (6A7)	80	..	80	..	200	300	300	..
G1-K	..	35	..	..	..	..	..	..
G2-K	..	130	..	..	..	..	..	..
Cathode (K-F)	2.8	2.8	5.3	0	0	0	0	..

Trouble Shooting Hints

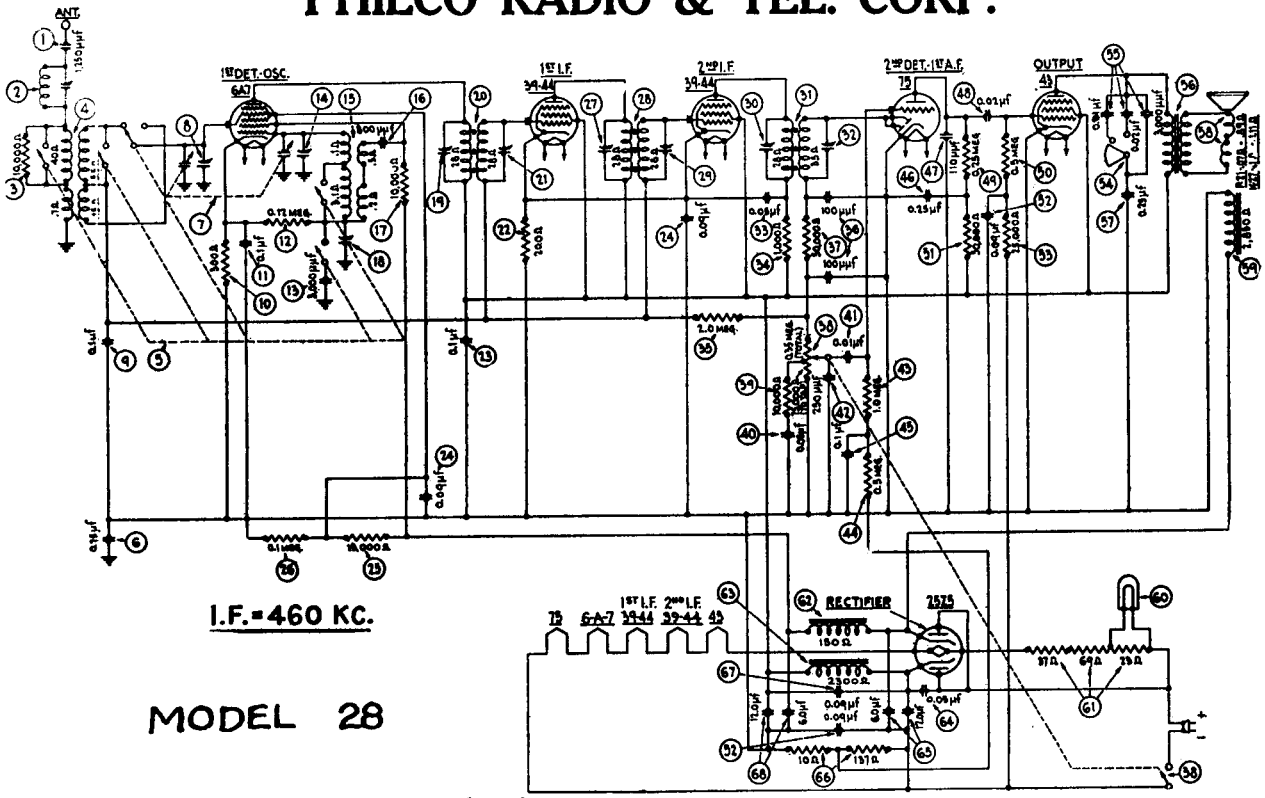
Lack of indication on the tuning meter shows low plate current on the R. F. and I. F. tubes which may be caused by a defective voltage divider or bias resistor.

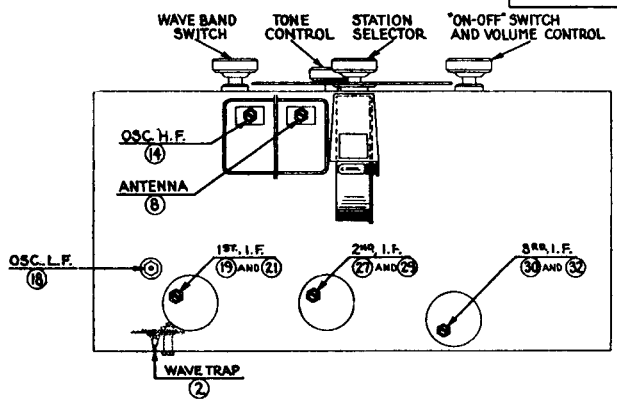
1. I. F. (Intermediate Frequency). Remove the grid clip from the cap on the 6A7 tube and attach the shielded antenna lead from the signal generator to the grid cap of the 6A7. Set the switch of the signal generator at 260 K. C. (the I. F. of Model 18) and the dial of the set at 550. Turn on the set and signal generator. Adjust each of the three I. F. compensating condensers in turn to give maximum reading in the output meter (connected to primary of output transformer). If the needle on the meter goes off scale, turn down the attenuator adjustment on the signal generator. See Fig. 4 for locations of the I. F. compensating condensers. The first and 2d I. F. primary condensers (21) and (26) are accessible through the two holes in the chassis sub-base directly over them. The 1st I. F. secondary (24) is accessible from the rear.

2. ANT. H. F., DET., and OSC. H. F. CONDENSERS ((5), (10), and (12).) These are located on top of the tuning condenser assembly and adjusted from above. (5) is mounted on the section nearest front of set. Replace the grid cap clip on the 6A7 and connect the antenna lead of signal generator direct to antenna post of set for these adjustments. Set signal generator at 1500 and dial of set at 1500.

3. OSC., L. F.—This adjustment (18) is made from rear of chassis (see Fig. 4). Set Signal Generator and dial of set at 600. The tuning condenser assembly should be "rocked" while this adjustment is being made.

PHILCO RADIO & TEL. CORP.





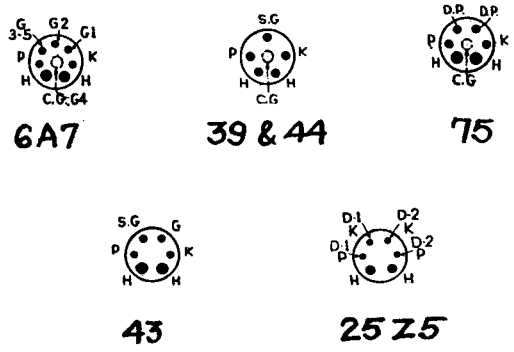


Fig. 1—Top View Showing Location of Compensating Condensers.

Adjusting Compensating Condensers

For adjustment of compensating (padding) condensers in Model 28, an accurately calibrated signal generator, an output meter, and a special insulated padding wrench and screwdriver are needed. We suggest the Philco Model 024 Signal Generator, which is accurately calibrated and easy to handle. Philco No. 3164 fibre wrench and No. 27-1159 fibre-handled screwdriver are also recommended. For the output meter either Philco Model 025 complete tester or Philco Model 012 shadow output meter is suggested.

The chassis must be removed from cabinet in order to make all adjustments.

Adjustments are made in the following order—

ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6-A-7 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter adapter leads to the plate and cathode prongs of the type 43 tube. Set the signal generator at 460 K.C. (the intermediate frequency of Model 28) and with the receiver and signal generator turned on, the wave band switch at left and dial at 600 K.C., adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The three pairs of I. F. compensating condensers are located one pair at the top of each of the three I. F. transformer shields. These are the three metal "cans" near the rear of the chassis. Each of the transformers has a dual compensating condenser mounted at its top, and accessible through a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6-A-7). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (left-hand position) and the Station Selector at the low frequency (540 K.C.) end. Adjust the Wave Trap condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap ② is located at rear and underneath the chassis, and is shown in Figure 1. It is reached from the rear of the chassis by inserting the fibre wrench through the hole near left-hand rear corner of chassis.

ANTENNA AND OSCILLATOR "HIGH" AND "LOW" FREQUENCY ADJUSTMENTS—The "antenna" and "oscillator H. F." compensators are located on top of the tuning condenser assembly, reached from above.

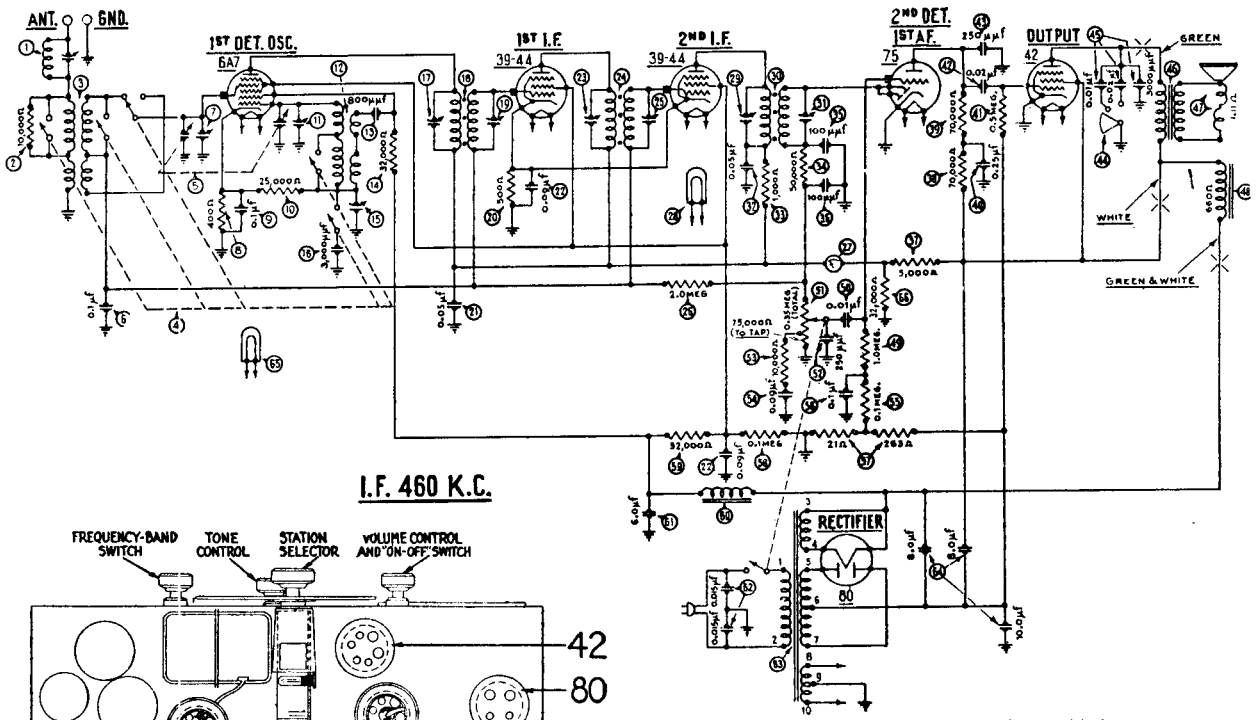
Set the signal generator at 1500 K.C., tune in this signal on the set and adjust the antenna compensator ⑧ (nearest tuning control) to give maximum reading in the output meter.

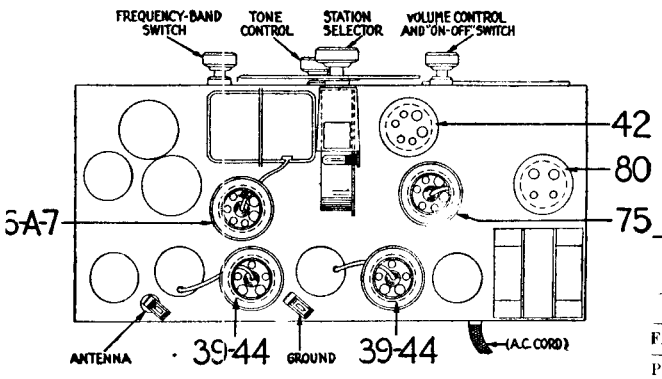
Next adjust the oscillator H. F. condenser ⑭ (located on the other section of tuning condenser) to maximum reading.

Finally, set the signal generator at 600, tune in this signal and adjust the "oscillator L. F." condenser, located underneath chassis (⑱ in Fig. 1) to maximum reading. This adjustment is reached through the hole in top of chassis, between the two electrolytic condensers (left-hand end of chassis when facing rear).

PHILCO RADIO & TEL. CORP.

PHILCO 29





ADJUSTMENT OF INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6-A-7 tube and connect the "ANT" output terminal on the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter to the primary terminals of the putput transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 29) turn wave-band switch of receiver to left and dial to 600 K.C. Turn receiver and Signal Generator "ON". Adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The three pairs of I. F. compensating condensers are located, one pair at the top of each of the three I. F. transformer shields. These are the metal "Cans" near the rear of chassis. Each of these transformers has a dual compensating concenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the secondary circuit is adjusted by turning the hex-head nut.

ADJUSTMENT OF WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6-A-7). Connect the output leads from the Signal Generator directly to the antenna and ground terminals of the receiver. Set the wave-band switch of the receiver to the standard broadcast band (left hand position) and the Station Selector at the low frequency (540 K.C.) end. Adjust the Wave Trap condenser to give MINIMUM response to a 460 K.C. Signal from signal generator. The Wave Trap ① is located at rear and underneath the chassis, and is shown in Circuit. It is reached from the rear of the chassis, thru hole at right hand end of set base.

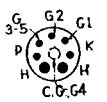
DETECTOR; AND OSCILLATOR — "HIGH" AND "LOW FREQUENCY" ADJUSTMENTS—The "Antenna" and "Oscillator H. F." compensators are located on top of the tuning condenser assembly, reached from above.

Set the signal generator at 1500 K.C., tune in this signal on the set, and adjust the antenna compensator ⑦ (nearest tuning control), to give maximum reading in the output meter.

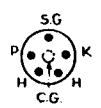
Next adjust the oscillator H. F. condenser ⑪, located on the other section of tuning condenser, to maximum reading. Finally set the signal generator at 600, tune in this signal and adjust the oscillator L. F. condenser, located underneath chassis (⑮ in Fig. 4) to maximum reading. This adjustment is reached thru the hole in top of chassis, between the two electrolytic condensers (left-hand end of chassis when facing rear).

Tube Socket Voltages—(Line Voltage 115)

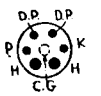
Function	Det. Osc.	1st I. F.	2nd I. F.	2nd Det.	Output	Rectifier
Type	6A7	39/44	39/44	75	42	80
Filament (F to F)	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P to K)	210	200	200	200	300	310
Screen (SG to K)	80	80	80	...	315	...
Cathode (K to GND)	4.8	4.8	4.8	0	0	...
6-A-7 Grid G1 to K	35	...	...	...	...	...
6-A-7 Grid G2 to K	170	...	...	...	...	...



6A7



39-44



75

42

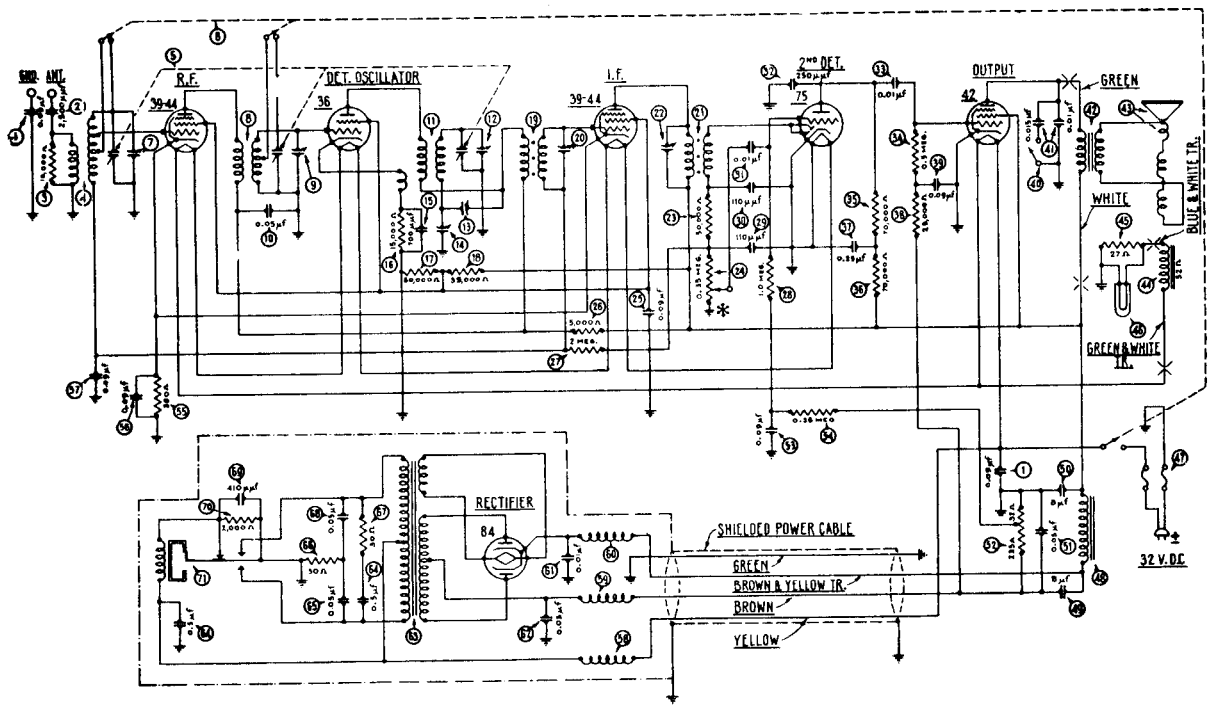
80

Trouble Shooting Hints

Shifting of the tuning circuit of the wave trap used in this set seems to be a common cause for "second channel" whistles at various points over the tuning band. When the trouble is "whistles" first adjust the wave trap circuit to give minimum response to a 460 K.C. signal from an oscillator.

PHILCO RADIO & TEL. CORP.

PHILCO 32



* MUST BE GROUNDED AT 75 CATHODE

These receivers are adjusted accurately before they are shipped from the Factory. If re-adjustment is required, it is usually necessary to re-align only the intermediate frequency compensating condensers. Fig. 3 shows the location of these compensating condensers. The intermediate frequency is 260 kilocycles.

An accurately calibrated signal generator is required for these adjustments. The PHILCO MODEL 024 is a precision signal generator supplying frequencies from 105 kilocycles to 2000 kilocycles and is recommended for this work.

To adjust the I. F. condensers, remove the grid cap clip from the type 36 tube and connect the shielded antenna lead from the signal generator to the grid cap. Connect the ground lead from signal generator to ground post of set.

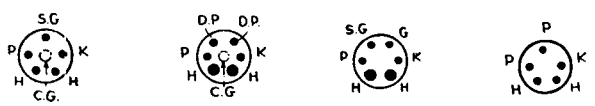
Connect the primary terminals of the output transformer to an output meter. Set the signal generator frequency switch at 260 K. C., turn it and the receiver "on" and adjust the attenuator of the signal generator so as to get a half scale deflection on the meter. Now with the fibre hex wrench, adjust each of the I. F. condensers in turn so as to obtain maximum reading in the meter.

If re-adjustment of the intermediate frequency circuits is not sufficient to restore sensitivity, the high frequency and low frequency compensating condensers are re-aligned as described in the following paragraphs. Figure 4 shows the location of these compensating condensers.

When making these adjustments replace the grid clip on the 36 tube, and connect the antenna and ground leads from the signal generator direct to the antenna and ground posts of set.

The High Frequency compensating condenser is first adjusted. This adjustment is made with the signal generator set at 1400 kilocycles. Next the Detector and Antenna Condensers, located on the tuning condenser assembly, should be adjusted, with the signal generator still operating at 1400. It may be necessary to readjust the attenuator on the signal generator for these adjustments.

The last adjustment is that of the low frequency (LF) compensating condenser which is accessible from above through the hole in chassis alongside the tuning condenser assembly. This adjustment is made with the signal generator set to give a 700 K. C. signal.

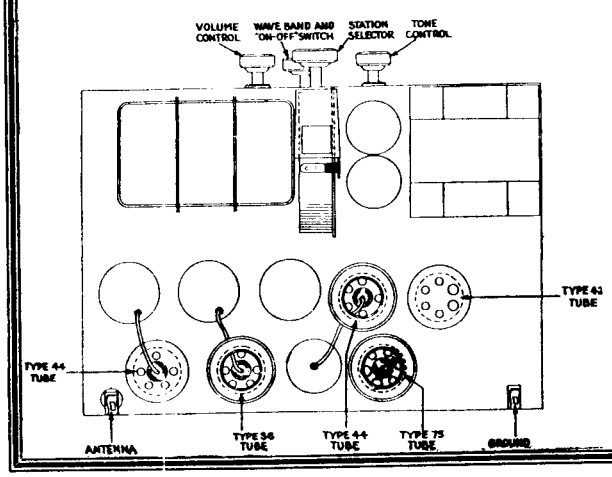


39-44 &36 75 42 84

Tube Socket Data Line Voltage 34 Volts

Circuit	RF	Det.-Osc.	IF	AF	Output	Rect.
Type Tube	39-44	36	39-44	75	42	84
Filament Volts	6.8	6.8	6.8	6.8	6.8	6.8
Plate Volts	205	200	235	155	220	300
Screen Grid Volts (SG to K)	85	83	85	.....	240	.....
Cathode Volts (K to Gnd)	4	8.5	4	0	0	.....

The above voltage values were obtained with a high-resistance, multi-range D. C. voltmeter. The readings were taken from the underside of the chassis, with test prods and leads. The PHILCO MODEL 048 ALL-PURPOSE SET TESTER is an ideal instrument for taking these readings, and is highly recommended for this purpose. When the above values were obtained, the Station Selector was set at the low frequency (550 K. C.) end of the scale; the Volume Control was at maximum

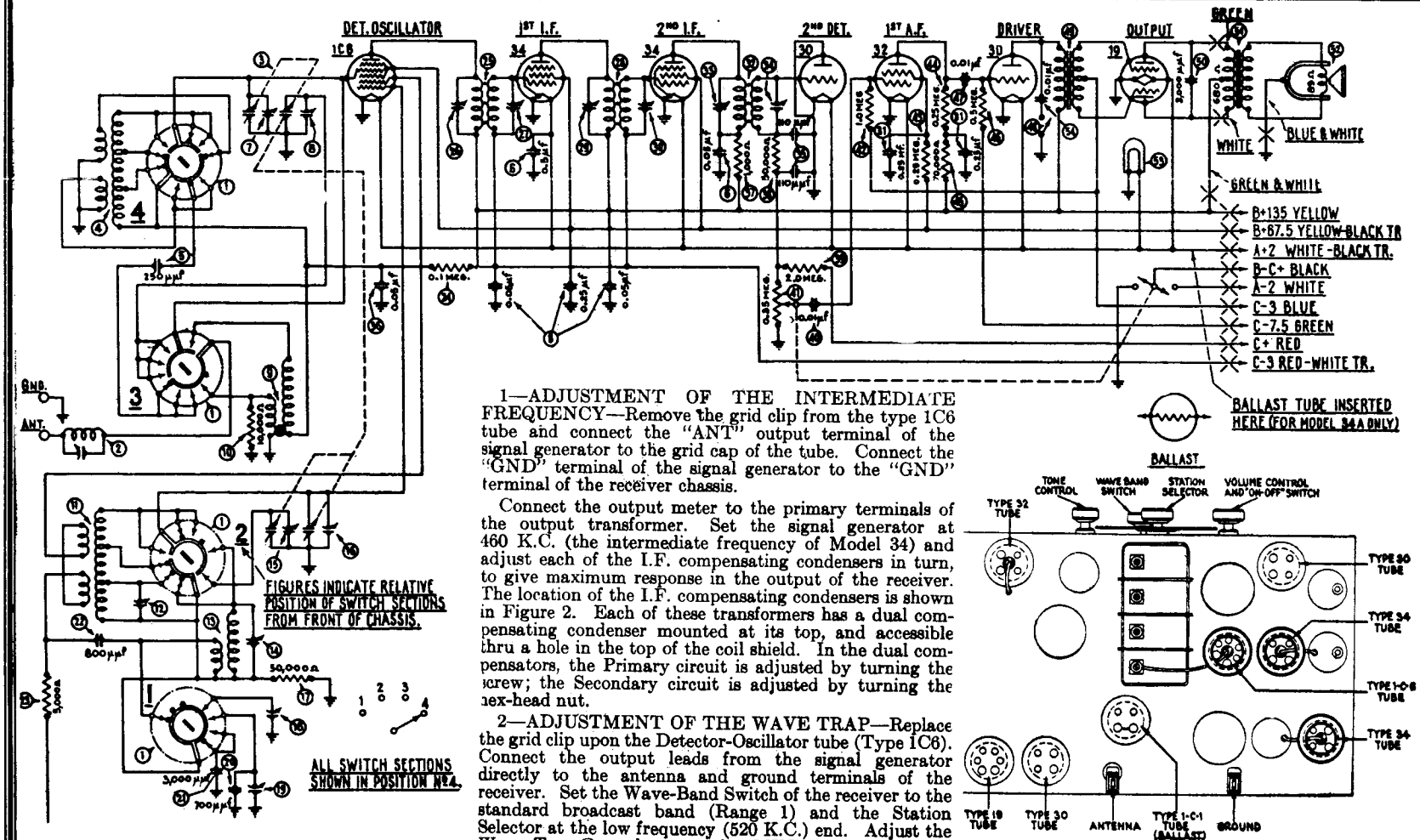


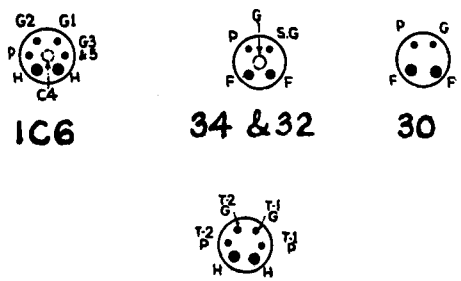
Trouble Shooting Hints

Failure of this type of set has been recorded due to the shielding of the power cable penetrating insullation of the wires contained, thus shorting the output and in some cases ruining the vibrator unit. The suppressor resistor on the 32 volt power supply should be replaced from time to time to prevent trouble.

PHILCO RADIO & TEL. CORP.

PHILCO 34 & 34 A





1—ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 1C6 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 34) and adjust each of the I.F. compensating condensers in turn, to give maximum response in the output of the receiver. The location of the I.F. compensating condensers is shown in Figure 2. Each of these transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

2—ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 1C6). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (Range 1) and the Station Selector at the low frequency (520 K.C.) end. Adjust the Wave Trap ② condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap ② is located at rear and underneath the chassis, and is shown in Figures 2 and 5. It is reached from the rear of the chassis.

3—ADJUSTMENT OF THE DIAL FREQUENCIES—Model 34 has four separate frequency bands or ranges, each obtained by one of the four positions of the wave-band switch. There is a compensating condenser for each range, which must now be adjusted. In the following procedure, the frequency ranges referred to, and obtained by the different positions of the switch are:

Range 1.....520 K.C.—1500 K.C.
Range 2.....1.5 M.C.—4.0 M.C.
Range 3.....4.0 M.C.—11.0 M.C.
Range 4.....11.0 M.C.—23.0 M.C.

Table 1—Tube Socket Data*

CIRCUIT	Det.-Osc.	1st I. F.	2nd I. F.	2nd Det.	1st A. F.	Driver	Output
TYPE TUBES	1C6	34	34	30	32	30	19
Filament Volts.....	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Plate Volts.....	P-135 G2-120	135	135	..	40	135	135
Screen Grid Volts.....	67½	67½	67½	..	35	..	..

*The above values were obtained from the underside of the chassis, using test prods and leads, with a high-resistance multi-range D. C. voltmeter. The Philco Model 048 All Purpose Set Tester is highly recommended for all tests of this character. Receiver volume control at maximum; station selector at 520 kilocycles. Readings taken with a plug-in adapter will not be satisfactory.

PHILCO RADIO & TEL. CORP.

PHILCO 38 & 38A

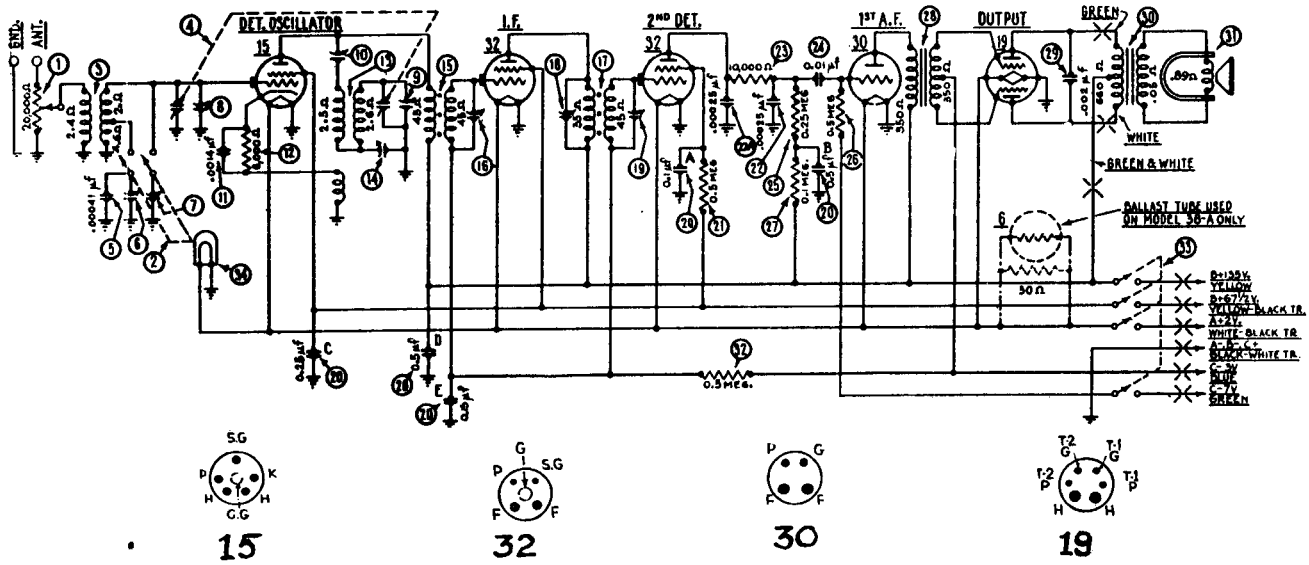


Table 1—Tube Socket Data*

CIRCUIT	Det.-Osc.	I. F.	2nd. Det.	1st. A. F.	Output
TYPE TUBES	15	32	32	30	19
Filament Volts—F to F.....	1.9	1.9	1.9	1.9	1.9
Plate Volts—P to F.....	135 (P to K)	135	40	135	135
Screen Grid Volts—SG to F..	67 (SG to K)	67	25	..	..
Control Grid Volts—CG to F	4. (CG to K)	.15	.15	.15	3 (To Gnd.)
Cathode Volts—K to F.....	5	..	..	..	..

*The above values were obtained from the underside of the chassis, using test prods and leads, with a high-resistance multi-range D. C. voltmeter. The Philco Model 048 All Purpose Set Tester is highly recommended for all tests of this character. Receiver volume control at maximum; station selector at 520 kilocycles. Readings taken with a plug-in adapter will not be satisfactory.

The Model 38 is designed to be used with the Philco Type 172-R two-volt storage battery and Philco Type "P-962" "B"/"C" battery; the Model 38-A with the Philco Type "P-166" dry "A" battery and Philco Type "P-962" "B"/"C" battery.

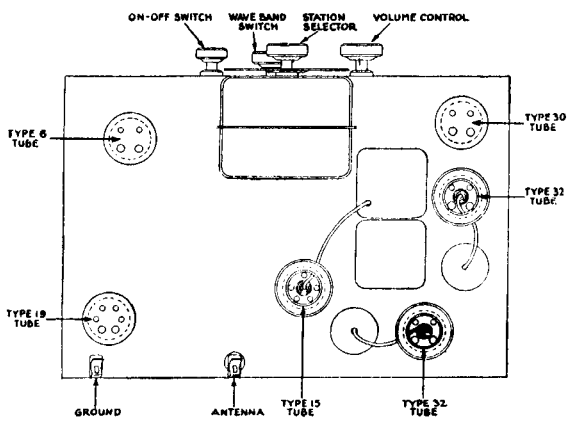
The filament ("A") supply should **never** exceed two volts at the tube socket terminals of either Model. The Type 6 tube acts as a voltage-regulator, and maintains a constant "A" potential to the filaments of the Model 38-A. The filament current drain upon the "A" battery is 720 milliamperes. The "B" battery current drain varies between 8 and 12 milliamperes,—at 135 volts. The intermediate frequency of the superheterodyne circuit is 460 kilocycles.

The intermediate frequency compensating condensers first should be adjusted. These condensers are identified as ⑲, ⑱, ⑰, and ⑯; they are situated at the rear of the chassis, and are shown in Fig. 2. They are accessible from the rear of the chassis. The intermediate frequency is 460 K.C.

The H.F.; Ant. (Broadcast) ⑧ and H.F.; Osc. ⑨ compensating condensers are situated upon the tuning condenser assembly, and these should next be adjusted. ⑧ is mounted upon the section nearest the front. Both are accessible from top of chassis, as is the H.F.; Ant.; (Police) ⑦, which also should be adjusted at this time. ⑦ is reached through an opening in the chassis sub-base, to the rear and left of the tuning condenser, facing front of chassis.

Next, the L.F.; Ant.; (Police) ⑥ and L.F.; Osc. ⑭ are adjusted. ⑥ is accessible through an opening in the chassis sub-base, to the right of ⑦ and behind the tuning condenser. ⑭ is situated along the rear underside of the chassis, and is accessible from chassis' rear.

Following the adjustments outlined above, the I.F. compensating condensers should finally be re-trimmed.

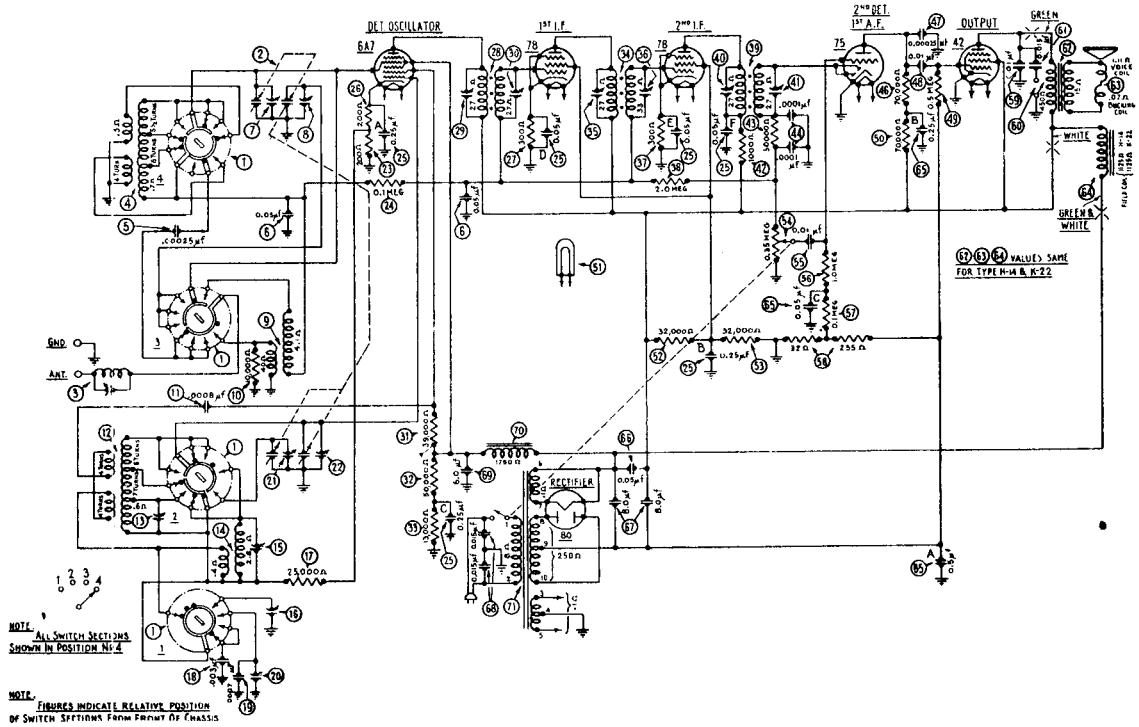


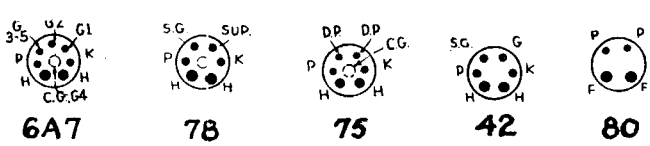
Trouble Shooting Hints

The application of excessive filament voltage on tubes in this set will permanently damage them. Failure of the type 6 ballast tube or the removal of thes tube while the set is in operation will result in excessive filament voltage. Rattling noises in this set are ordinarily caused by damage to the speaker, causing the cone drive to rattle against the pole pieces. Failure of the set to operate on either the broadcast or police bands indicates poor contact in the wave-change switch. The contacts should be carefully cleaned and if bent, straightened. In making tests on the set, the service man should remember that the on-off switch breaks the positive "B" leads as well as the filament. Realignment of this set shouldn't be attempted until it is sure that this is the cause of poor operation.

PHILCO RADIO & TEL. CORP.

PHILCO 44





PHILCO MODEL 44 is adjusted:

ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—

The "ANT" output terminal of the signal generator (Model 048 Set Tester) is connected to the grid cap of the Detector-Oscillator tube (Type 6A7),—after removing the grid clip. The "GND" output terminal (of the Model 048) is connected to the "GND" terminal of the receiver chassis.

The output meter is connected to the primary terminals of the Output Transformer. Set the signal generator of the Model 048 at 460 K.C.,—the intermediate frequency of Model 44,—and adjust each of the I.F. compensating condensers in turn, to give maximum response in the output of the receiver. The location of the I.F. compensating condensers is shown in Figure 2 and Figure 4. Figure 2 shows the position of the compensating condensers of the 2nd, I.F. Transformer (34) and of the 3rd, I.F. Transformer (39). Each of these transformers has its dual compensating condenser mounted at its top, and accessible through a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by the SCREW; the Secondary circuit is adjusted by the hex-head nut. The adjustment of the primary and secondary circuits of the 1st, I.F. Transformer (28) is made by means of two single compensating condensers (29) and (30) mounted underneath, and at the rear of the chassis and accessible from the rear. They are shown in Figures 2 and 4.

ADJUSTMENT OF THE WAVE TRAP—

Replace the grid clip upon the Detector-Oscillator tube (Type 6A7). Connect the output of the signal generator (Model 048) to the antenna and ground terminals of the receiver. Set the Wave-Band Switch (1) of the Model 44 to the standard broadcast band (520-1500 K.C.) (Range 1), and the Station Selector at the low frequency (520 K.C.) end. Adjust the Wave Trap (3) condenser to give minimum response to a 460 K.C. signal from the Model 048's signal generator. The Wave Trap (3) is located at rear and underneath the chassis, and is shown in Figures 2 and 4. It is reached from the rear of the chassis.

ADJUSTMENT OF THE DIAL FREQUENCIES—

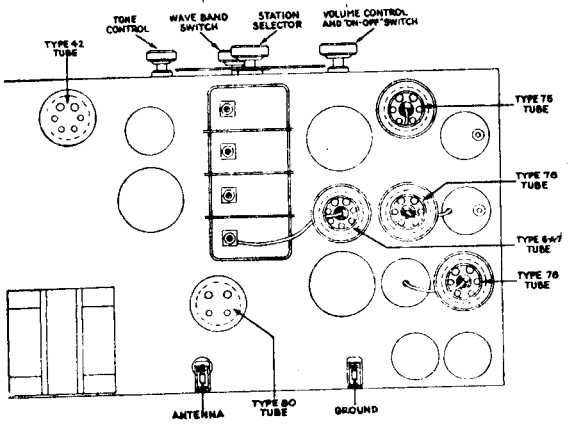
In the following procedure, the frequency ranges are:

Range 1	520 K.C.—1500 K.C.
Range 2	1.5 M.C.—4.0 M.C.
Range 3	4.0 M.C.—11.0 M.C.
Range 4	11.0 M.C.—23.0 M.C.

Table 1—Tube Socket Data*—A. C. Line Volts, 115.

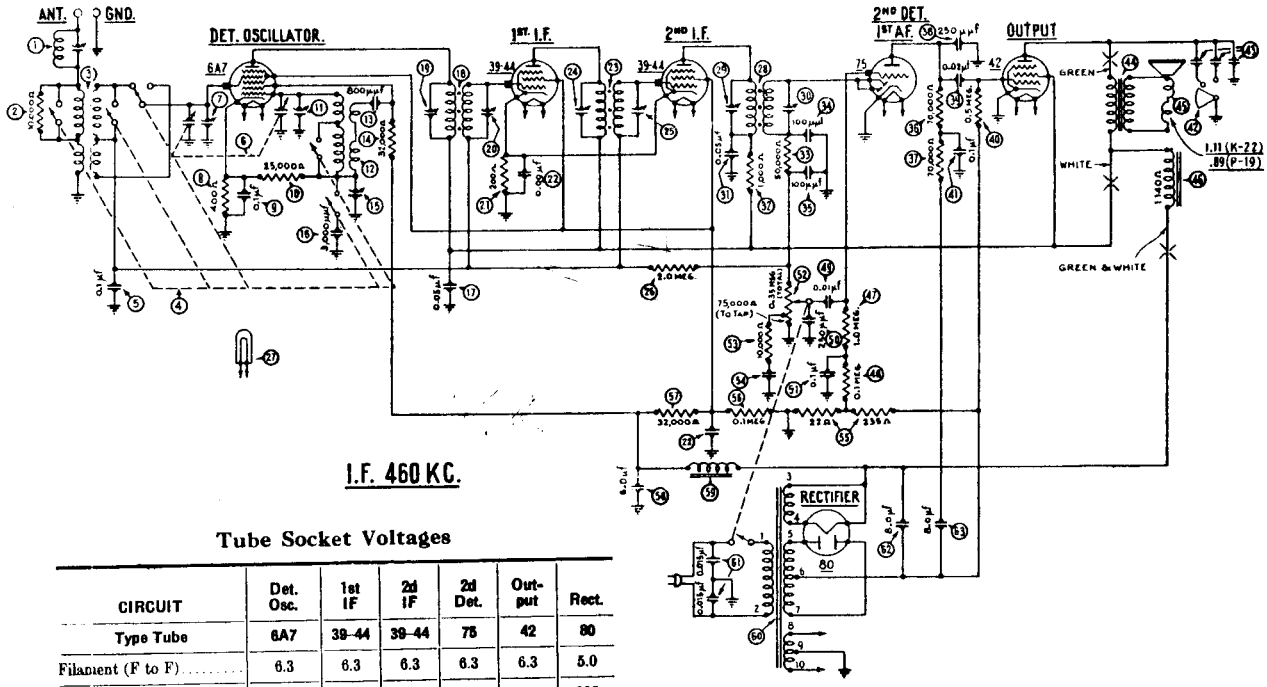
CIRCUIT	Det.-Osc.	1st I.F.	2nd I.F.	2nd Det. and 1st A.F.	Output	Rectifier
TUBE TYPE	6A7	78	78	75	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K	260	260	255	165	250	350
Screen Grid Volts—SG to K (Type 6A7—G-3-5 to K)	50	85	85	...	260	...
Control Grid Volts—CG to K (Type 6A7—G-4 to K)	.4	.4	.35	.2	.5	...
Cathode Volts—K to F	2.2	2.1	1.9	0	0	...
Type 6A7—G-1 to K	20	...	...	...	...	...
Type 6A7—G-2 to K	168	...	...	...	...	...

*The values in Table 1 were gotten with an A.C. voltmeter for filament voltages and a high-resistance D.C. voltmeter for all others. The values were gotten from the underside of the chassis with test prods and leads. The PHILCO MODEL 048 ALL-PURPOSE SET TESTER IS RECOMMENDED FOR THIS USE. The Volume Control was at maximum (all the way to right) and the Station Selector was adjusted to 520 K.C.,—(with Wave Band Switch all the way to left),—when these readings were taken. NOTE: Values obtained with a plug-in adaptor will NOT be reliable



PHILCO RADIO & TEL. CORP.

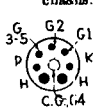
PHILCO 45



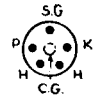
Tube Socket Voltages

CIRCUIT	Det. Osc.	1st IF	2d IF	2d Det.	Out-put	Rect.
Type Tube	6A7	39-44	39-44	75	42	80
Filament (F to F)	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P to K)	260	255	255	175	250	335
Screen Grid (SG to K)	G1-35 G2-135 G3&5-85	75	75	...	260	...
Cathode (K to F)	4.2	3.8	3.8	0	0	...

The above tests were made with an AC voltmeter for filament voltages and a high resistance DC voltmeter for all others. Dial at 550 KC, volume control at maximum. Test made with test prods applied to socket terminals underneath chassis. Line voltage 115.

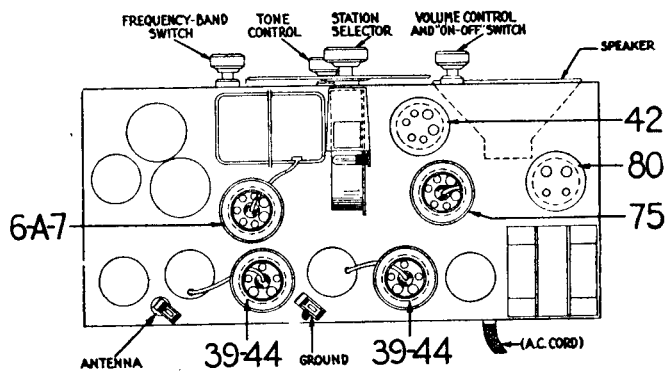


6A7



39-44

75



Adjustments are made in the following order—

ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6A7 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 45) and with the receiver and signal generator turned on, the wave band switch at left and dial at 600 K.C., adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The three pairs of I. F. compensating condensers are located one pair at the top of each of the three I. F. transformer shields. These are the three metal "cans" near the rear of the chassis. Each of the transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6A7). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (left hand position) and the Station Selector at the low frequency (540 K.C.) end. Adjust the Wave Trap condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap ① is located at rear and underneath the chassis, and is shown in Figure 4. It is reached from the rear of the chassis, by inserting the fibre wrench thru the hole near right-hand rear corner of chassis.

DETECTOR, AND OSCILLATOR "HIGH" AND "LOW" FREQUENCY ADJUSTMENTS—The "antenna" and "oscillator H. F." compensators are located on top of the tuning condenser assembly, reached from above.

Set the signal generator at 1500 K.C., tune in this signal on the set and adjust the antenna compensator ⑦ (nearest tuning control) to give maximum reading in the output meter.

Next adjust the oscillator H. F. condenser ⑪ (located on the other section of tuning condenser) to maximum reading.

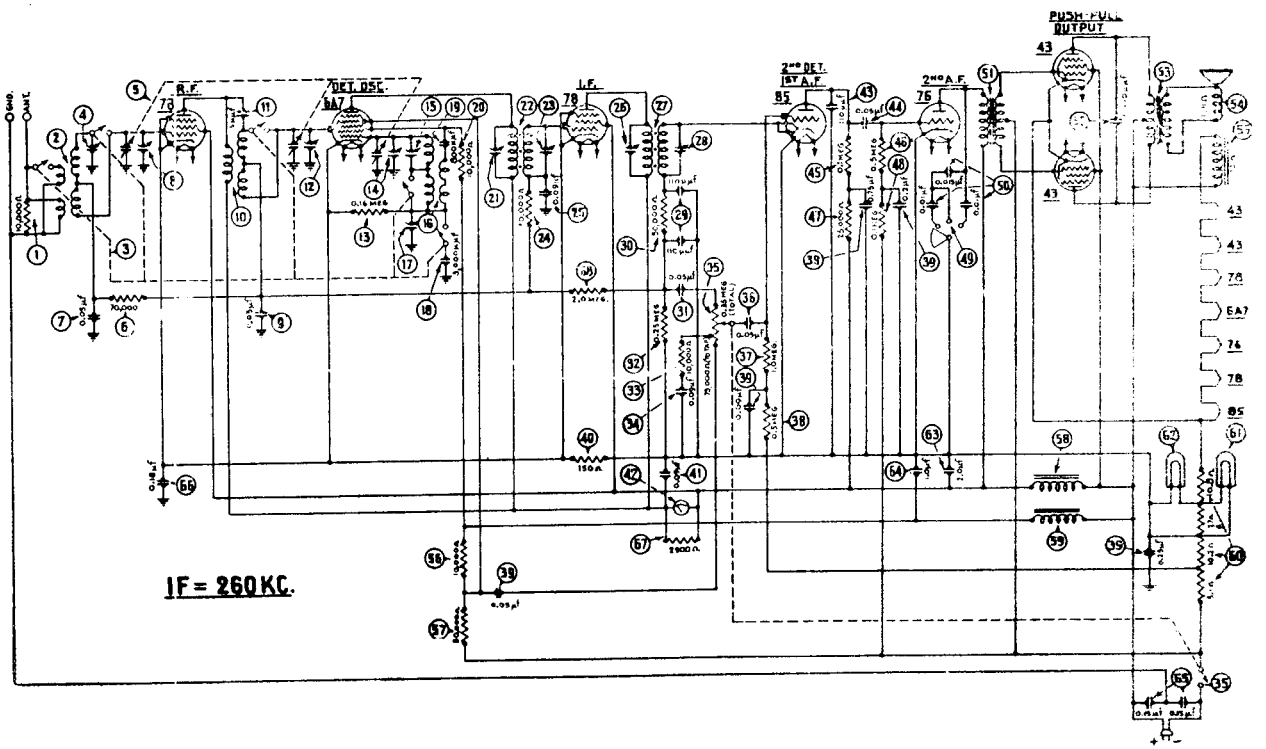
Finally set the signal generator at 600, tune in this signal and adjust the oscillator "L. F. condenser", located underneath chassis (⑱ in Fig. 4) to maximum reading. This adjustment is reached thru the hole in top of chassis, between the two electrolytic condensers (left hand end of chassis when facing rear).

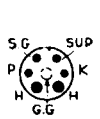
42

80

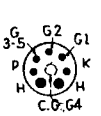
PHILCO RADIO & TEL. CORP.

MODEL 49

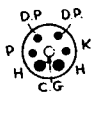




78



6A7



85

76

43

I. F. ADJUSTMENT—The I F. (intermediate frequency) of Model 49 is 260 K. C.

Remove the grid clip from the top of the 6A7 tube and connect the shielded antenna lead from the Signal Generator to the cap of this tube. Connect the ground lead of the Signal Generator to the ground post of receiver. Connect the output meter adapter leads to the plates of the output tubes (type 43) in the receiver. Set the wave-band switch at the left position (standard broadcast).

Set the wave switch of the Signal Generator at 260 K. C., and the dial of the receiver at 550. Turn on the set (volume full on), and the Signal Generator. Now adjust the 1st I. F. Primary and Secondary condensers (Nos. (21) and (23) in Fig. 2) and the 2d I. F. primary and secondary condensers ((26) and (28)) to give maximum reading on the output meter. The I. F. primary condenser is adjusted by turning the screw on top of the I. F. transformer and the secondary is adjusted by turning the nut. The I. F. transformers are in the smaller metal "cans". The screw and nut are reached through the hole in top. If the needle on the output meter goes off the scale, turn down the "attenuator" on the Signal Generator until a lower reading is obtained.

Tube Socket Voltages—Line Voltage 120 D.C.

TUBE		Filament F to F	Plate P to K	Screen Grid SG to K	Cathode K to F
Type	Circuit				
78	R. F.	5.8	85	100	30
6A7	Det.-Osc.	5.7	90	G3&5-K:65 G2 -K:80 G1 -K:12	22
78	I. F.	6.3	90	100	15
85	2d Det.—1st A. F.	6.3	40		15
76	Driver	6.3	100		20
43 43	Output	2.6 2.6	100 100	105 105	60 60

All readings above made with a high resistance multirange D. C. voltmeter using test prods applied to tube sockets underneath chassis (See Fig. 1). Volume control at maximum, wave-band switch at left (standard broadcast) and dial at 550 K.C.

Philco Model 025 Circuit Tester or 048 All-Purpose Tester are highly recommended for making the above tests.

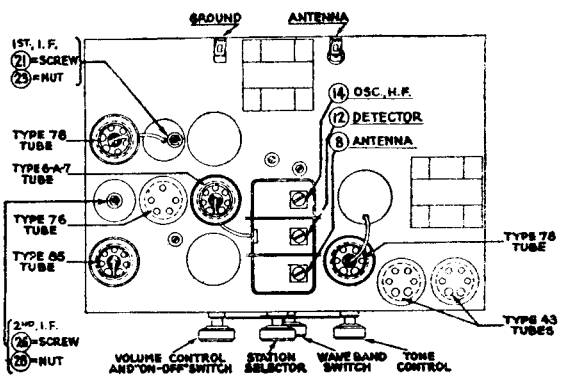
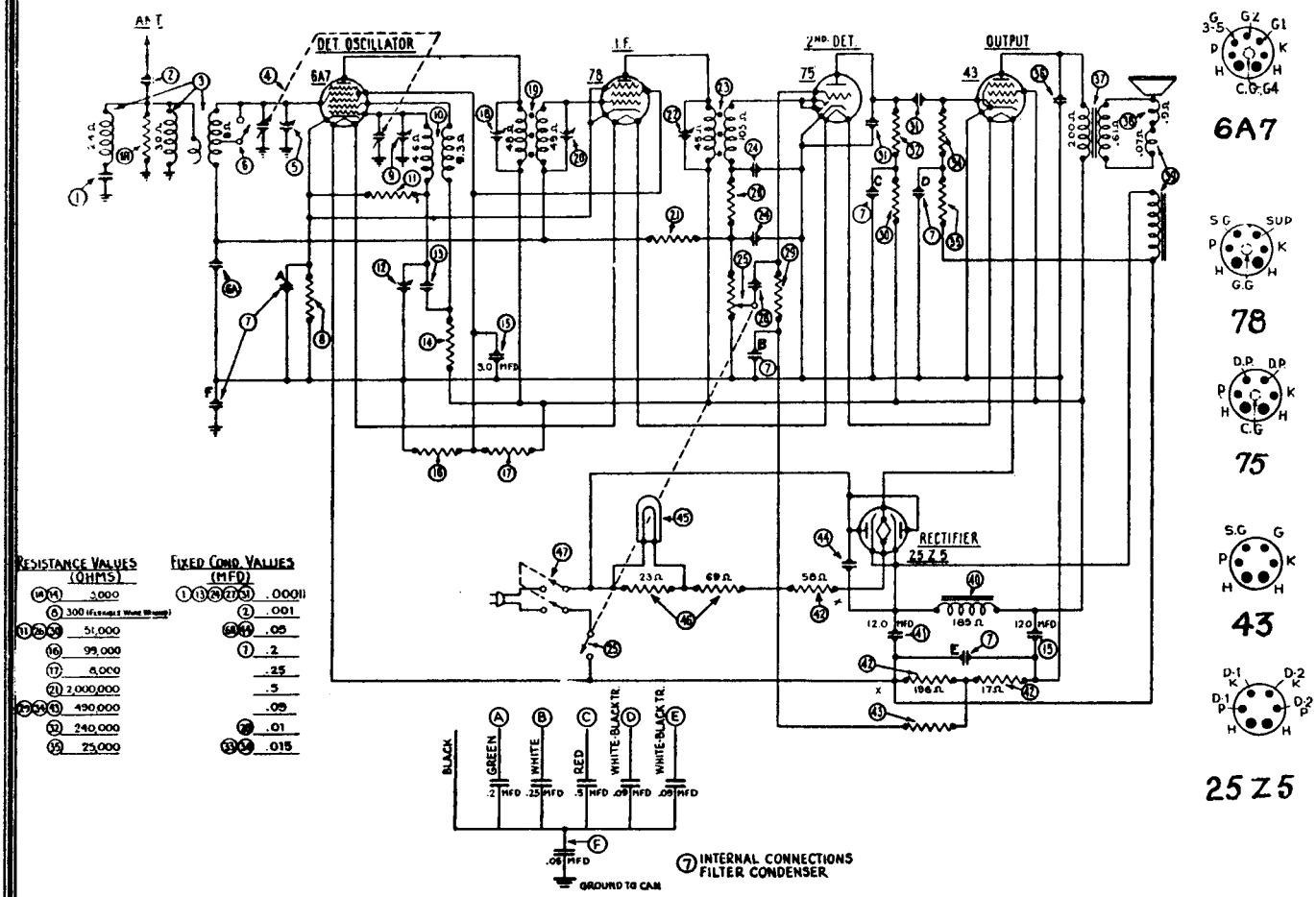


Fig. 2—Top View

PHILCO RADIO & TEL. CORP.

PHILCO 54



THE PHILCO RADIO MODEL 54 is a five-tube superheterodyne, designed for operation on 110 volts, alternating current, 60 cycles, and 110 volts direct current, employing the new Philco high efficiency tubes with pentode output and an Electro Dynamic Speaker. The set uses a Philco Type 6A7 tube as a first detector and oscillator; a Type 78 tube as intermediate frequency; a Type 75 tube as a second detector; a Type 43 tube as pentode output and a Type 25-Z-5 tube as a rectifier. The intermediate frequency for tuning the I. F. transformers is 460 kilocycles. The power consumption on both A. C. and D. C. is approximately 50 watts.

Table 1—Tube Socket Data*—A.C. Line Voltage 115 Volts

Circuit	Det. Osc.	I. F.	2nd Det.	Output	Rectifier
Type Tube	6A7	78	75	43	25-Z-5
Filament—Total 68—Refer to Note.					
Plate Volts—P to K	84	84	38	84	146
Screen Grid Volts—SG to K	K to G 3/5 65	52		90	....
Control Grid Volts—CG to K	.15	.15	.25	.5	....
Cathode Volts—K to F	12	12	10	10	....

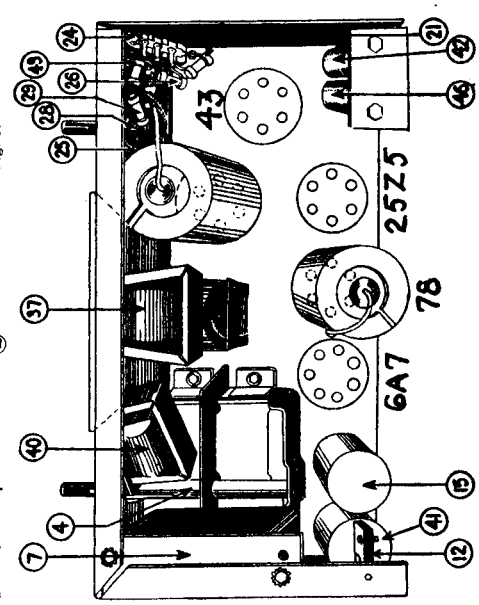
NOTE—Due to filaments in series, test with suitable A. C. voltmeter across the two points on Resistor (42) marked with an X in Fig. 3.

* All of the readings above in Table 1 were taken from the under side of chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltage and a high resistance, multi-range D. C. voltmeter for all other readings. Volume control at maximum and station selector set for 550 KC. Readings taken with a plug-in adapter will NOT be satisfactory.

Table 2—Tube Socket Data*—D.C. Line Voltage 120 Volts

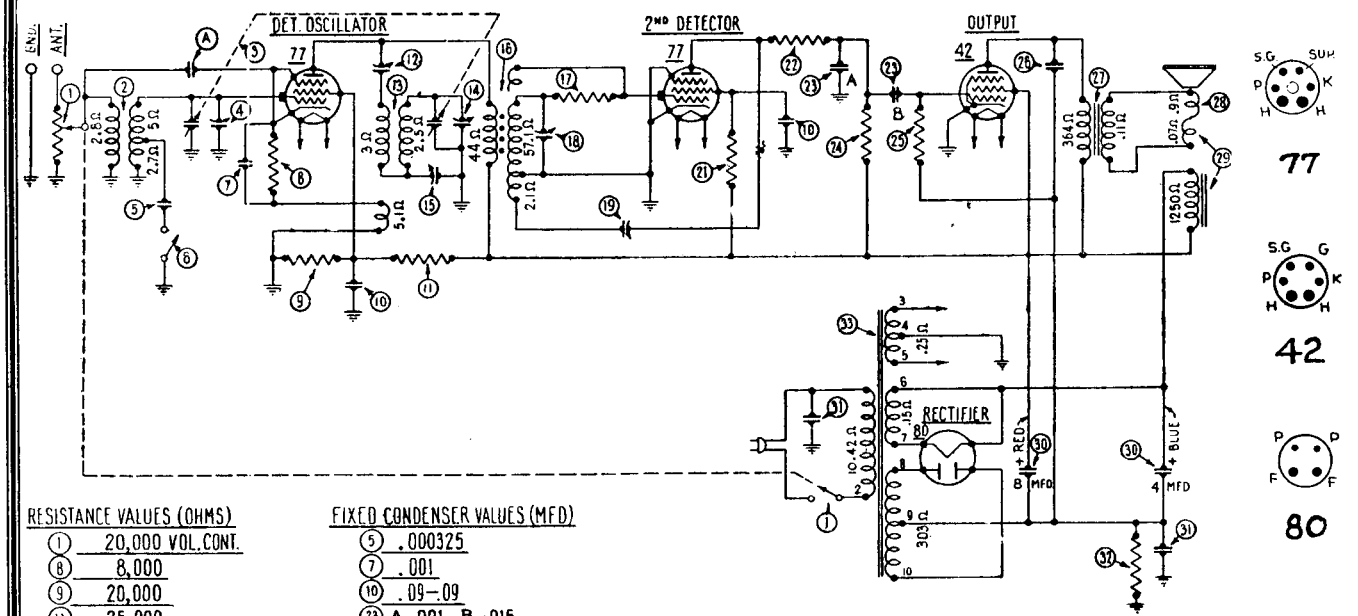
Circuit	Det. Osc.	I. F.	2nd Det.	Output	Rectifier
Type Tube	6A7	78	75	43	25-Z-5
Filament—Total 70—Refer to Note.					
Plate Volts—P to K	90	90	40	90	....
Screen Grid Volts—SG to K	K to G 3/5 70	70	..	92	....
Control Grid Volts—CG to K	.15	.15	.25	.5	....
Cathode Volts—K to F	7.5	7.5	10	10	....

NOTE—Due to filaments in series, test with suitable D. C. voltmeter across the two points on Resistor (42) marked with an X in Fig. 3.



PHILCO RADIO & TEL. CORP.

PHILCO 57



RESISTANCE VALUES (OHMS)

(1)	20,000 VOL. CONT.
(8)	8,000
(9)	20,000
(11)	25,000
(17)	4,000,000
(21)	1,000,000
(22)	10,000
(24)	240,000
(25)	490,000
(32)	325 (WIRE WOUND)

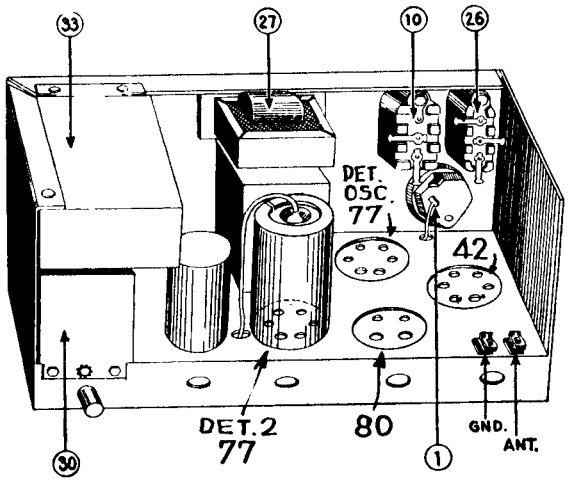
FIXED CONDENSER VALUES (MFD)

(5)	.000325
(7)	.001
(10)	.09–.09
(23)	A–.001–B–.015
(26)	.006
(31)	.015–.015

Table 1—Tube Socket Data*—Power Line Voltage 115 Volts

Circuit	Det. Osc.	2nd Det.	Output	Rectifier
Type Tube	77	77	42	80
Filament Volts—F to F	6.3	6.3	6.3	4.8
Plate Volts—P to K	235	45	235	300
Screen Grid Volts—SG to K	110	35	250	....
Control Grid Volts—CG to K	10.5	.25	.25	....
Cathode Volts—K to F	25	15	15	....

* All of the above readings were taken from the underside of the chassis.



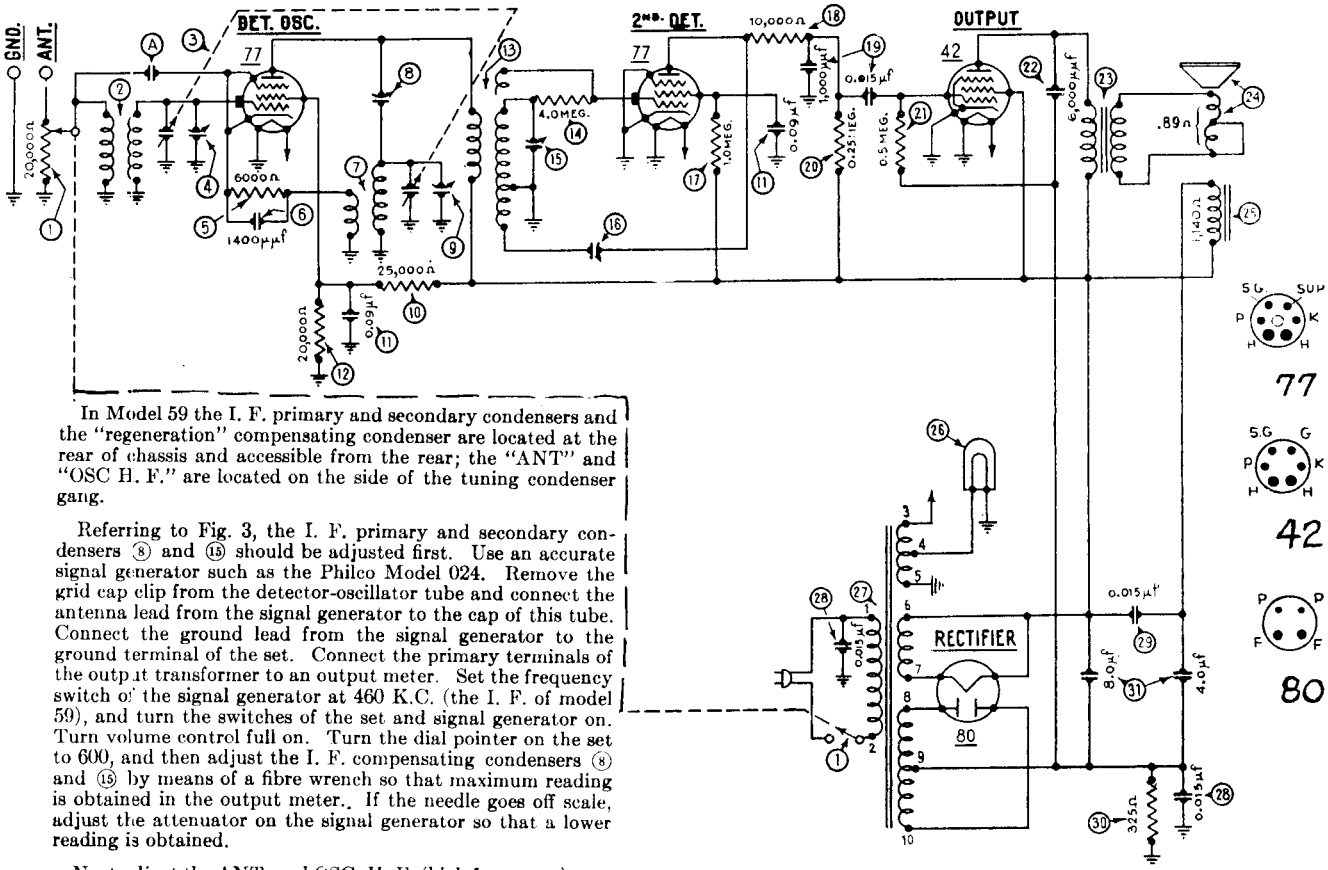
THE PHILCO RADIO MODEL 57 is a four-tube superheterodyne receiver, combining standard broadcast and police reception and employs the new Philco high efficiency tubes with pentode output and electro dynamic speaker. The same superheterodyne circuit is used for standard broadcast and police reception. The intermediate frequency for tuning the I. F. transformer is 460 kilocycles. The power consumption of the Model 57 is 46 watts.

Trouble Shooting Hints

Lack of sensitivity in this set usually indicates the need for readjustment of the sensitivity control, No. 19. Lack of reception on the police band sometimes is the result of a poor contact in the wave-change switch. Complete failure of the set is usually due to condenser faults.

PHILCO RADIO & TEL. CORP.

PHILCO 59

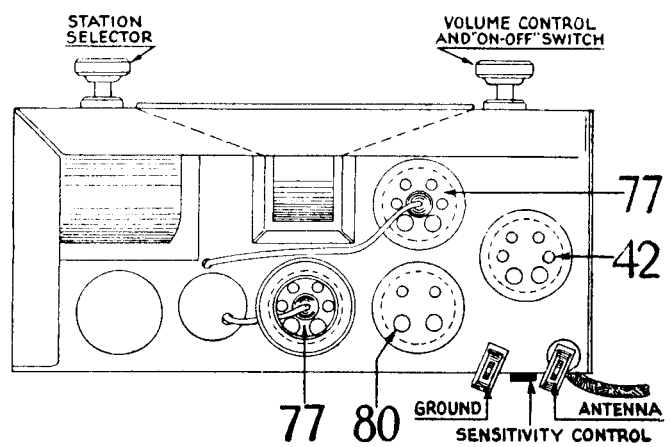


In Model 59 the I. F. primary and secondary condensers and the "regeneration" compensating condenser are located at the rear of chassis and accessible from the rear; the "ANT" and "OSC H. F." are located on the side of the tuning condenser gang.

Referring to Fig. 3, the I. F. primary and secondary condensers ⑧ and ⑮ should be adjusted first. Use an accurate signal generator such as the Philco Model 024. Remove the grid cap clip from the detector-oscillator tube and connect the antenna lead from the signal generator to the cap of this tube. Connect the ground lead from the signal generator to the ground terminal of the set. Connect the primary terminals of the output transformer to an output meter. Set the frequency switch of the signal generator at 460 K.C. (the I. F. of model 59), and turn the switches of the set and signal generator on. Turn volume control full on. Turn the dial pointer on the set to 600, and then adjust the I. F. compensating condensers ⑧ and ⑮ by means of a fibre wrench so that maximum reading is obtained in the output meter. If the needle goes off scale, adjust the attenuator on the signal generator so that a lower reading is obtained.

Next adjust the ANT. and OSC. H. F. (high frequency) condensers ④ and ⑨ located on the tuning condenser gang. To adjust these condensers it is necessary to remove the chassis from the cabinet, necessitating removing back plate, base screws, knobs and pointers. Replace the grid clip on the 77 tube and connect the antenna and ground leads of the signal generator direct to the antenna and ground terminals of the set. Set the signal generator switch at 1400, turn the tuning condenser shaft until the rotary plates barely start to mesh with the stationary ones. Tune in the 1400 K.C. signal here and adjust condensers ④ and ⑨ for maximum output meter reading. When replacing the dial pointer, be sure it is mounted exactly as it was removed.

Finally adjust the regeneration condenser ⑯. With the set connected to an antenna, turn the station selector to receive a station at about 130 on the dial. With a screw driver turn the small fibre hex-head screw (which operates the regeneration condenser) located at rear of chassis below antenna and ground terminals, clockwise until the set squeals or oscillates. Then turn the hex-screw ¼ of a turn back until the squealing stops. Tune in other stations on different points on the scale to make sure that the squealing is eliminated. It will be necessary to readjust this condenser if a different type 77 tube is used for second detector.



Tube Socket Data—Line 115 Volts

Circuit	Det. Osc.	2nd Det.	Output	Rectifier
Type Tube	77	77	42	80
Filament Volts—F to F	6.3	6.3	6.3	4.8
Plate Volts—P to K	235	45	235	300
Screen Grid Volts—SG to K	110	35	250	....
Control Grid Volts—CG to K	10.5	.25	.25	....
Cathode Volts—K to F	25	15	15	....

*All of the above readings were taken from the underside of the chassis.

Trouble Shooting Hints

Whistling in these sets often develops after the set has been in use for some time. Readjust the regeneration condenser, No. 16 for the greatest possible sensitivity without oscillation. Check for oscillation on all parts of the tuning scale. Complete failure of the set. is probably due to condenser breakdown or a defective volume control.

PHILCO RADIO & TEL. CORP.

PHILCO '60

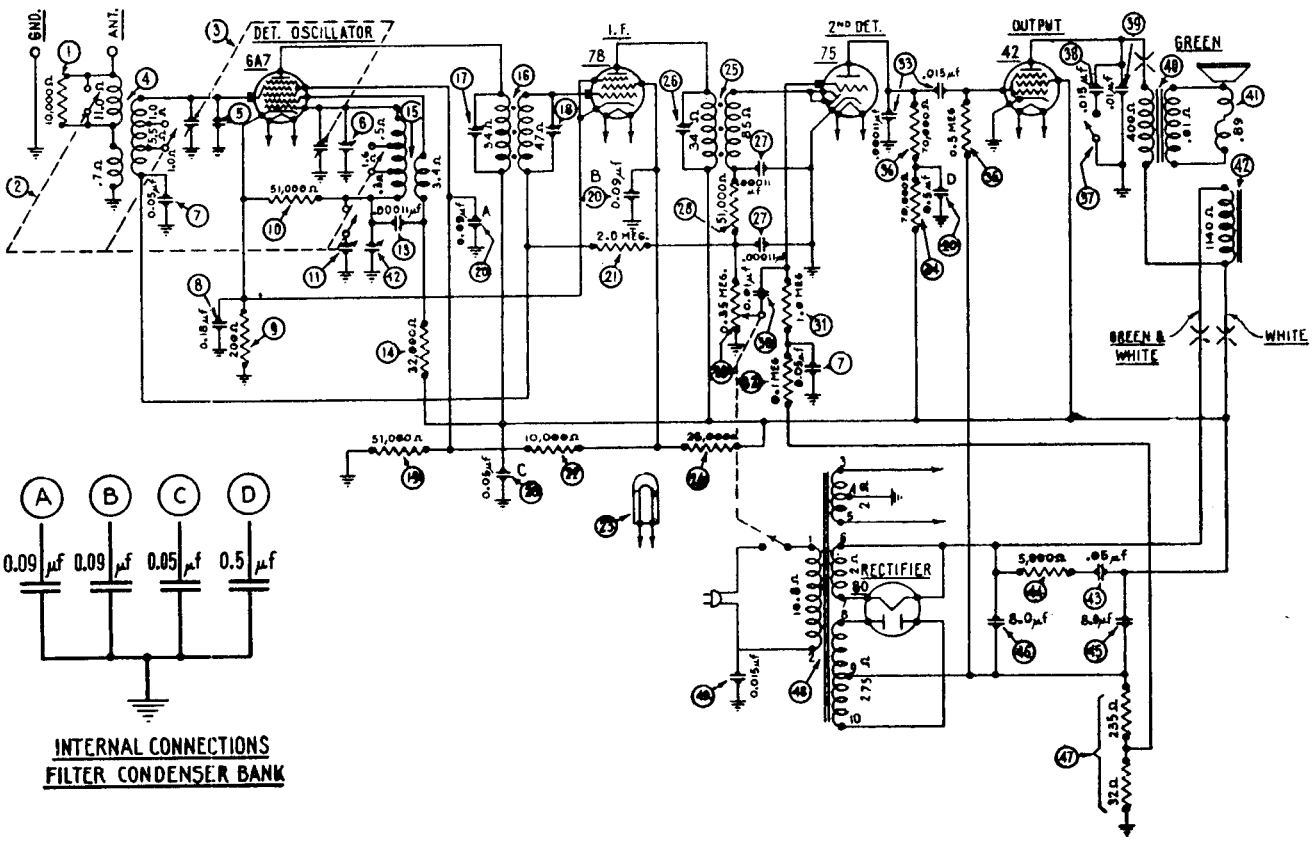


Table 1—Tube Socket Data*—A. C. Line Voltage 115 Volts

Circuit	Det. Osc.	I. F.	2nd Det. and 1st A. F.	2nd A.F. (Output)	Rectifier
Type Tube	6A7	78	75	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	4.8
Plate Volts—P to K	250	250	170	240	350
Screen Grid Volts—SG to K (6A7-G3-5 to K)	85	120	.....	245	.....
Control Grid Volts—CG to K (6A7-G4 to K)	.18	.18	.15	.18	.....
Cathode Volts—K to F	3.	3.	0	0	.....

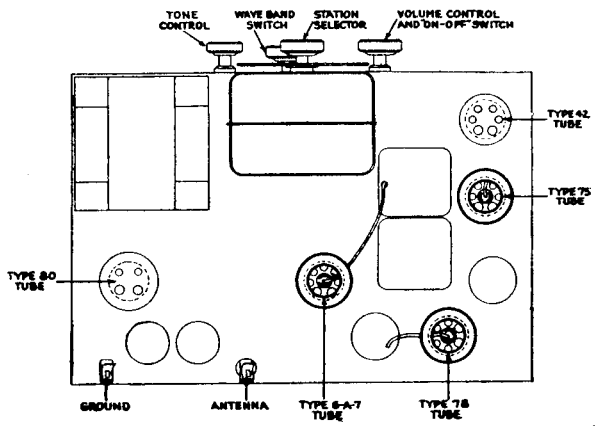
6A7-G1 to K = 1.4 volts.
6A7-G2 to K = 180 volts.
*All the above values were obtained from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high-resistance multi-range D. C. voltmeter for all other values. The Philco Model 048 All-Purpose Set Tester is highly recommended for this use. Volume control at maximum and station selector at 530 K. C. Readings obtained with a plug-in adaptor will NOT be satisfactory.

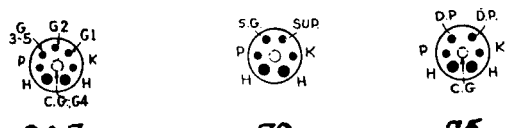
The intermediate frequency compensating condensers first should be adjusted. The intermediate frequency is 460 K. C. These condensers are (17), (18) and (26), accessible from rear of chassis.

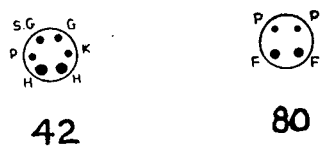
Next, the high frequency (6) and antenna (5) compensating condensers are adjusted. These are mounted upon the tuning condenser assembly (3); (5) is nearest front of chassis.

The low frequency compensating condensers are adjusted last. These are (11) for Police Band, (12) for Broadcast Band, and are at rear of chassis.

The I. F. compensating condensers should be given a final retrimming after these adjustments are completed.

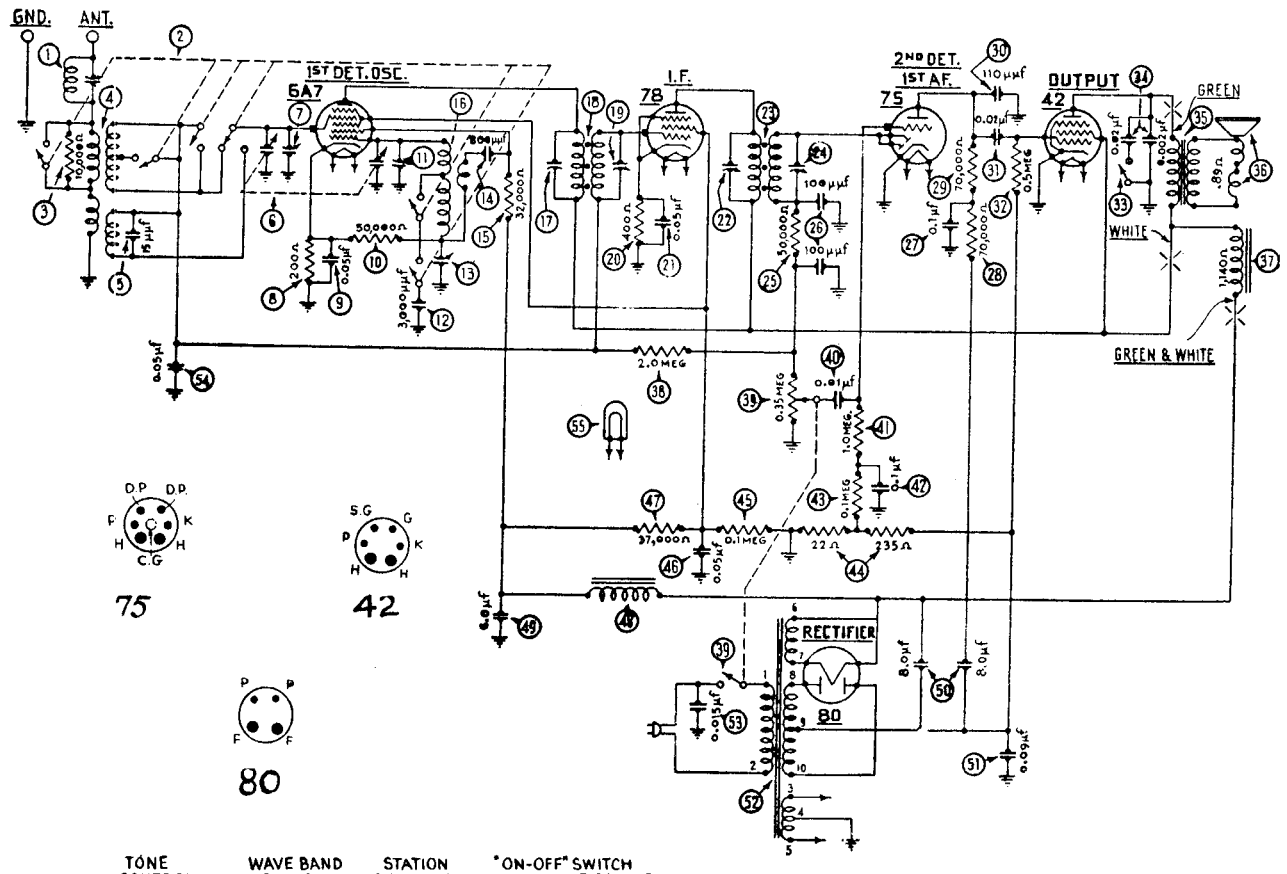


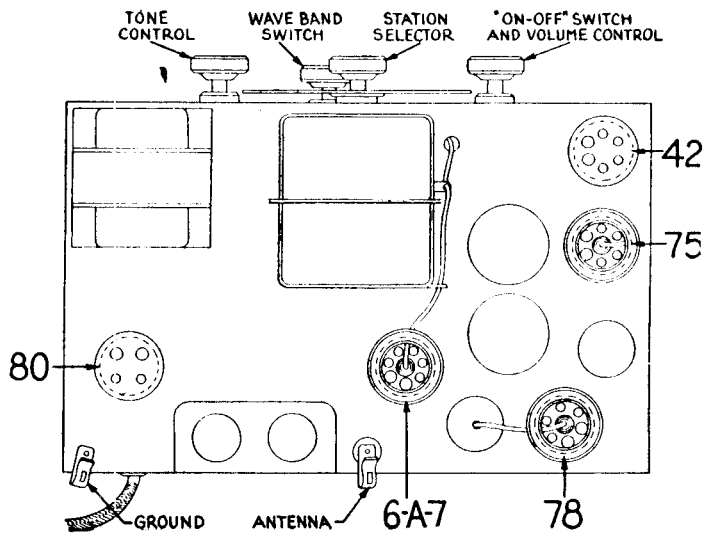




PHILCO RADIO & TEL. CORP.

PHILCO 66





Adjustments are made in the following order:

(1)—I. F. (Intermediate Frequency)—Remove grid clip from cap on 6A7 tube and connect antenna lead from signal generator to cap of tube. Connect ground lead to ground post on set. Turn on set and signal generator; set wave switch of latter to 460 K. C. (the I. F. of Model 66) and dial of set at 540, wave band switch to left. Adjust each of the four I. F. compensating condensers (17), (19), (22) and (24) in turn so that maximum reading is obtained in the output meter. If the meter reading goes off scale, adjust the attenuator on the signal generator so as to get a lower reading. These I. F. condensers (visible in Fig. 4) are adjusted by inserting the hex wrench thru the holes in rear of chassis sub-base (except one to extreme left when facing rear of set). Two of the holes are covered by small metal buttons which can be removed temporarily by hand.

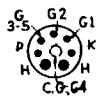
(2)—WAVE TRAP—Replace grid clip on cap of 6A7 tube and connect antenna lead from signal generator to antenna post on set. Set signal generator at 460 K. C. and adjust wave trap (1) so as to get MINIMUM reading in output meter.

(3)—ANT. and OSC. H. F.—These adjustments (7) and (11) are located on top of the tuning condenser assembly at right (facing front of set) and adjusted from above. The "ANT" (7) is nearest front of set. Set signal generator at 1700 and dial of set at 1700 and adjust these two condensers to get maximum output meter reading.

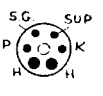
(4)—OSC. L. F.—This condenser (13) is located underneath chassis (see Fig. 4) and is reached from underneath. Set dial of set and signal generator switch at 600, and adjust for maximum reading.

Tube Socket Voltages—Line Voltage 115

Tube	6A7	78	75	42	80
Circuit	Det. Osc.	I. F.	2d Det.	Output	Rect.
Filament (F-F)	6.3	6.3	6.3	6.3	5.0
Plate (F-K)	260	260	160	250	340
Screen (SG-K)	85	85	...	260	...
Cathode (K-F)	2.1	2.2	0	0	...



6A7



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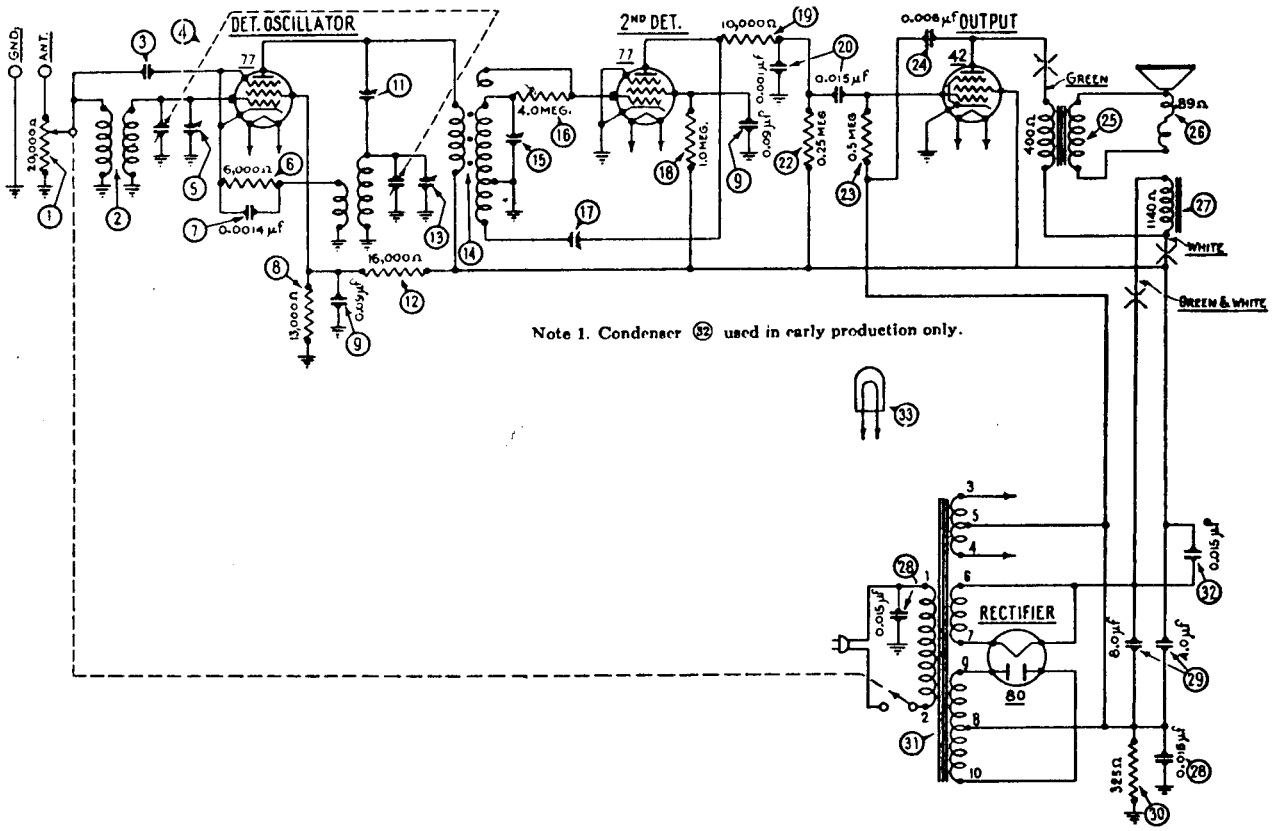
PHILCO RADIO & TEL. CORP.

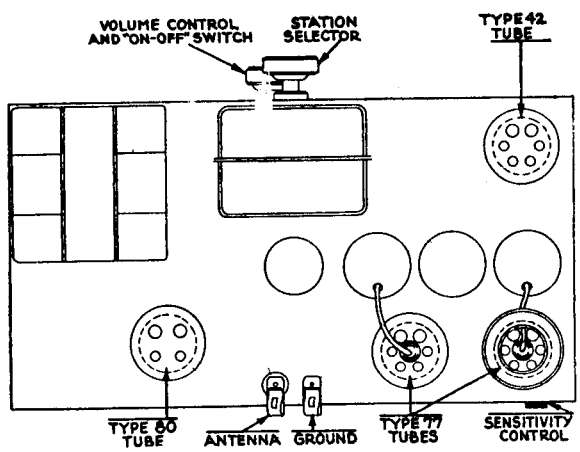
PHILCO 84



The I.F. primary and I.F. secondary condensers should be adjusted first. Set the signal generator at 460 KC (the I.F. of Model 84) and the dial pointer at 600. Adjust I.F. condensers (11) and (16) so that maximum signal is obtained. These condensers are at rear of chassis, accessible from rear.

Next, adjust the "regeneration" condenser. This is (17) located at the right hand rear of chassis (facing rear). Adjustment is made by turning the fibre hex nut with either a screw driver or the special fibre wrench. The procedure is: tune in a signal at the high frequency (1500) end of the dial and turn the fibre nut clockwise until oscillation or squealing is heard. Then turn the nut half a turn back (to left). Now tune in a low frequency station, and if squealing is still heard, turn the adjusting nut half a turn back from the squealing point.

The OSC HF (13) and ANT compensating condensers (5) are adjusted last in the order mentioned. These are located on the tuning condenser gang, the ANT (5) being nearest the front of set. In early production sets use the fibre handle screw driver for adjustment, later production, the fibre hex wrench. In making these adjustments, set the signal generator at 1400 and the station selector at 140.



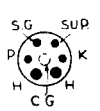


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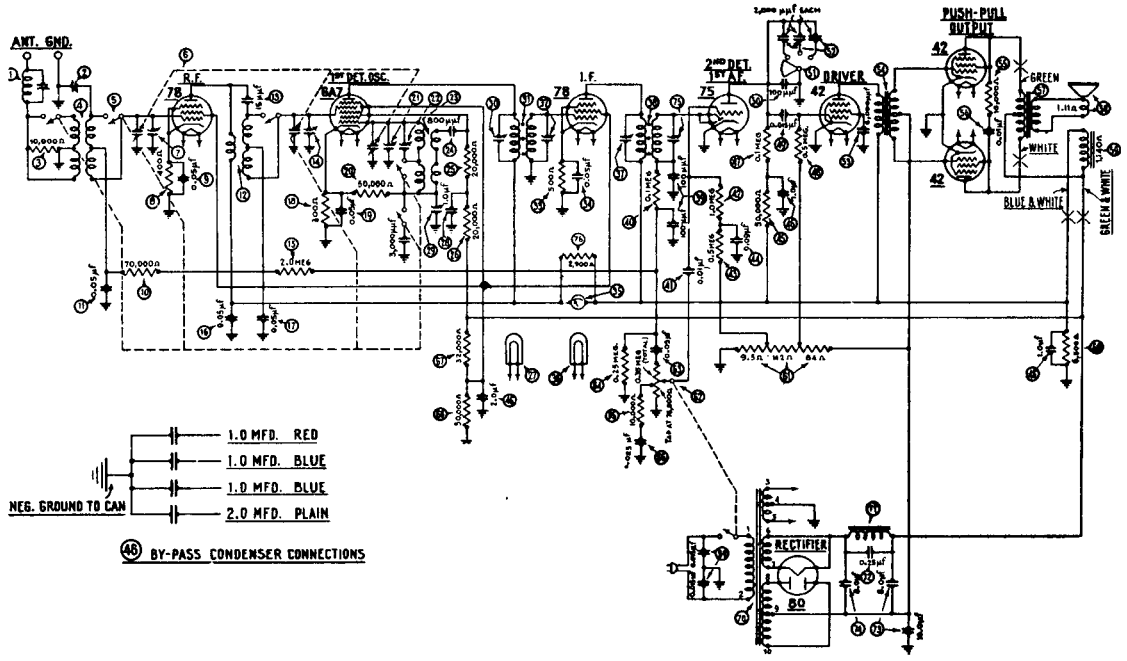
Table 1—Tube Socket Data*—A. C. Line Voltage 115 Volts

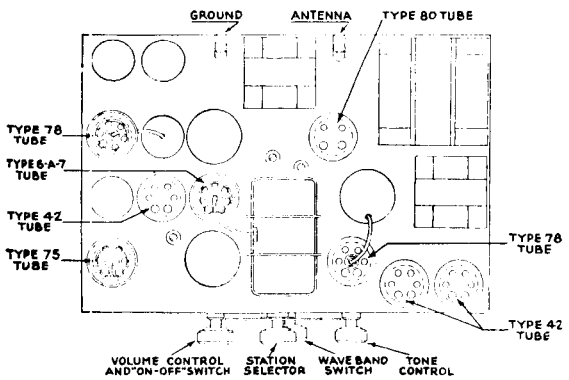
Circuit	Det. Osc.	2nd Det.	2nd A.F. (Output)	Rectifier
Type Tube	77	77	42	80
Filament Volts—F to F.....	6.3	6.3	6.3	5.0
Plate Volts—P to K.....	240	70	225	340
Screen Grid Volts—SG to K.....	95	23	225	...

*All the above values were obtained from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high-resistance multi-range D. C. voltmeter for all other values. The Philco Model 048 All-Purpose Set Tester is highly recommended for this use. Volume control at maximum and station selector at 540 K. C. Readings obtained with a plug-in adaptor will NOT be satisfactory.

PHILCO RADIO & TEL. CORP.

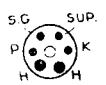
PHILCO 118





Tube Socket Voltages—Line Voltage 115

Function	R.F.	Det.-Osc.	I.F.	A.F.	Driver	Output		Rect.
Type	78	6A7	78	75	42	42	42	80
Filament (F-F).....	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
Plate (P-K).....	180	180	200	125	195	280	280	315
Screen (SG-K).....	80	175	80	...	195	290	290	...
Cathode (K to F)....	2.5	2.6	3.2	0	0	0	0	...
6A7 G^1 to K.....	26							
6A7 G^2 to K.....	150							



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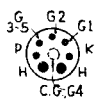

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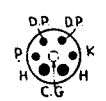

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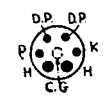

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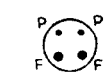

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Set the wave switch on the Signal Generator at 260 K. C., and the dial of the receiver at 550. Turn on the set (volume full on), and the Signal Generator. Now adjust the 1st I. F. Primary and Secondary condensers (Nos. ㉚ and ㉜ in Fig. 3) and the 2d I. F. primary and secondary condensers (㊲ and ㊺) to give maximum reading on the output meter. The I. F. primary condenser is adjusted by turning the screw on top of the I. F. transformer and the secondary is adjusted by turning the nut. The I. F. transformers are in the smaller metal "cans". The screw and nut are reached through the hole in top. If the needle on the output meter goes off the scale, turn down the "attenuator" on the Signal Generator until a lower reading is obtained.

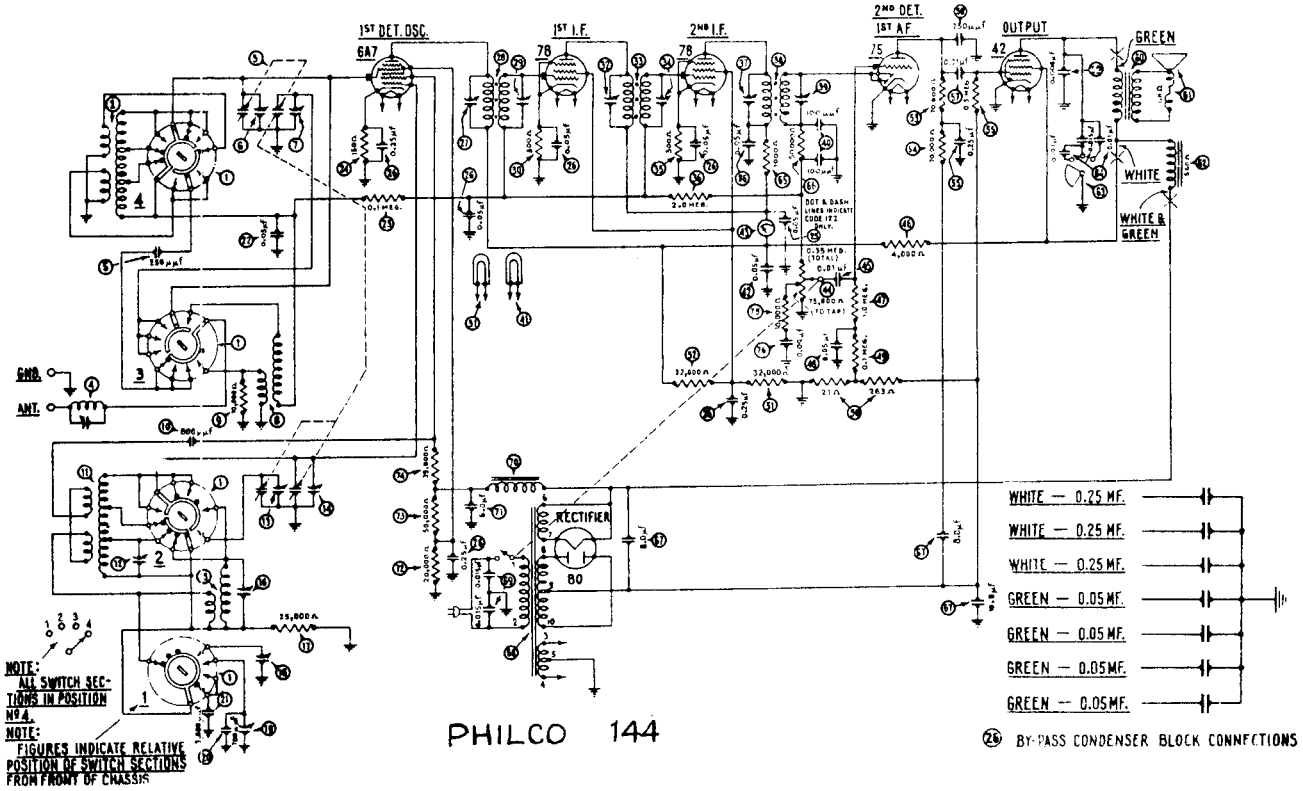
OSCILLATOR—LOW FREQUENCY—This is condenser ㉘ (see Figs. 3 and 4) located underneath chassis and accessible from underneath. Use the fibre wrench. Set signal generator switch at 600, tune in the signal at 600 on the dial and adjust condenser to maximum.

ANT. AND OSC. H. F.—SHORTWAVE—The crystal controlled signal generator is used for these adjustments. These are condensers ② (Ant. H. F.) and ㉒ (Osc. H. F.) located underneath chassis, and adjusted from underneath. The fundamental frequency of the Philco Model 091 crystal controlled signal generator is 3600 K. C. or 3.6 megacycles. The third harmonic of this is 10.8 M. C. Turn the waveband switch of the set to the right and the dial to just below 11 M. C. The 10.8 harmonic should be picked up here and the two condensers should be adjusted to give maximum reading on the output meter, on this signal.

Trouble Shooting Hints

Lack of sensitivity on the short wave bands of this set indicates that the tuning condensers are off adjustment. Tune the set to 11 mc. and use the third harmonic of a 3.6 mc. signal generator.

PHILCO RADIO & TEL. CORP.



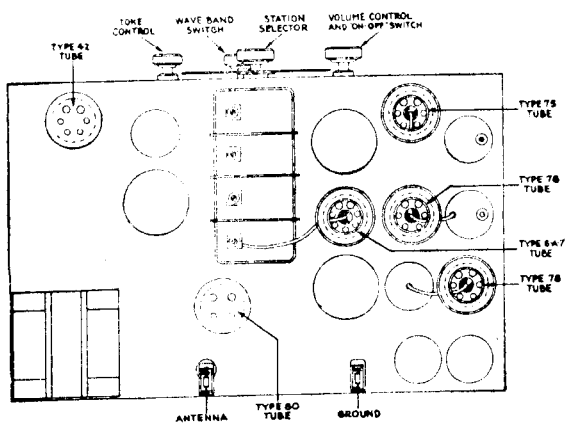
1—ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6A7 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect an output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 144) and adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The location of the I. F. compensating condensers is shown in Figure 5. Each of the I. F. transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

2—ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6A7). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (extreme left) and the Station Selector at the low frequency (520 K.C.) end. Adjust the Wave Trap ④ condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap ④ is located at rear and underneath the chassis, and is shown in Figures 4 and 5. It is reached from the rear of the chassis.

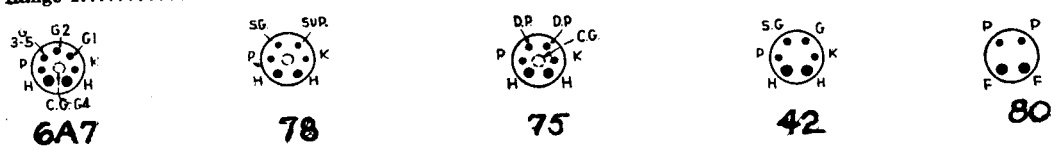
3—ADJUSTMENT OF THE DIAL FREQUENCIES—Model 144 has four separate frequency bands or ranges, each obtained by one of the four positions of the wave-band switch. There is a compensating condenser for each range, which must now be adjusted. In the following procedure, the frequency ranges referred to, and obtained by the different positions of the switch are:

Range 1.....520 K.C.—1500 K.C.
Range 2.....1.5 M.C.—4.0 M.C.
Range 3.....4.0 M.C.—11.0 M.C.
Range 4.....11.0 M.C.—23.0 M.C.



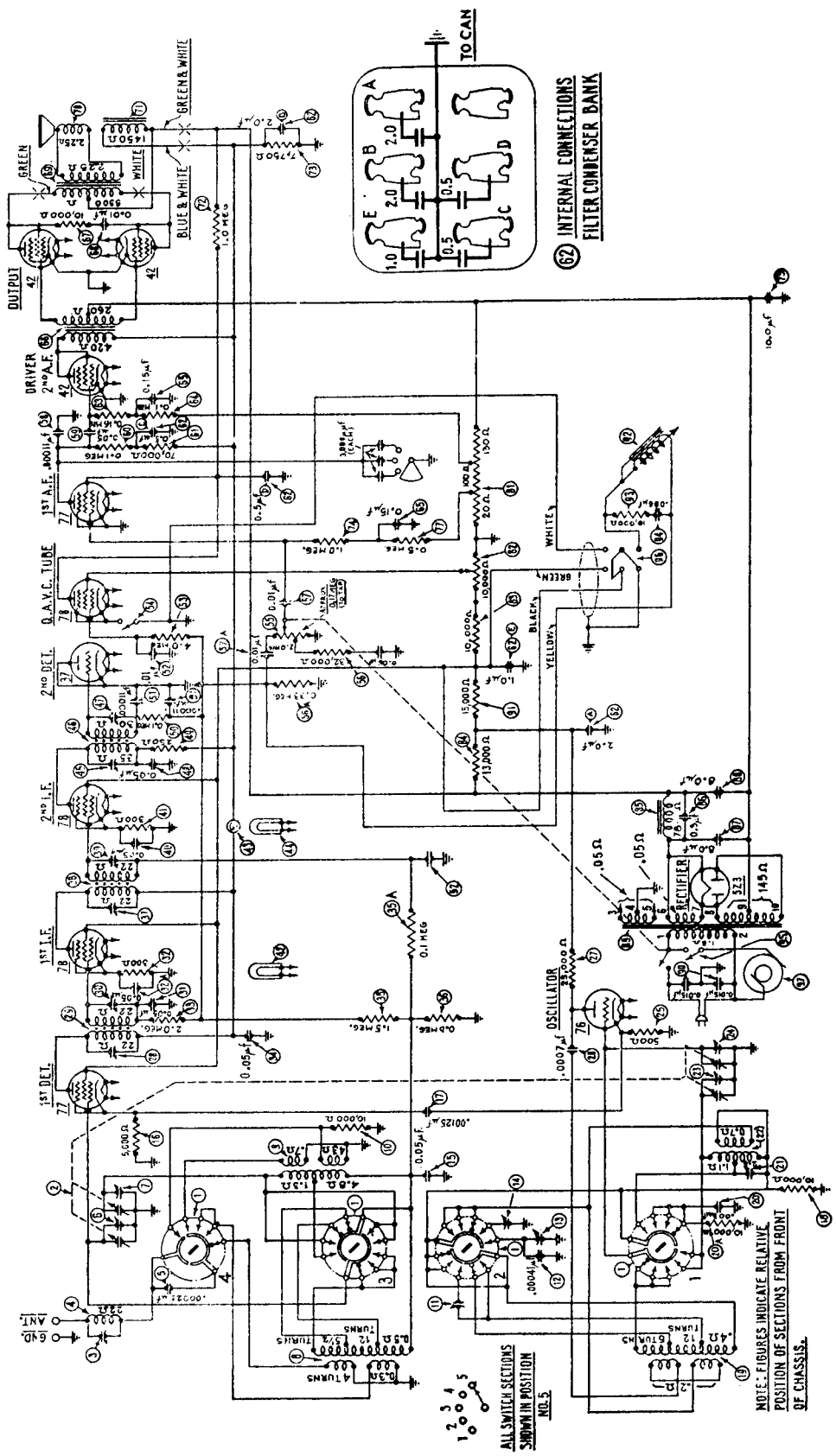
Tube Socket Voltages—Line Voltage 115

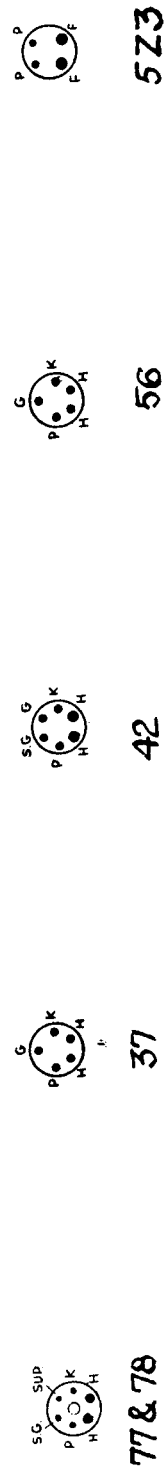
CIRCUIT	Det.-Osc.	1st I. F.	2nd I. F.	A. F.	Output	Rectifier
TUBE	6A7	78	78	75	42	80
Filament Volts (F-F).....	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts (P-K).....	250	230	230	185	300	350
Screen Grid Volts (SG-K)....	60	75	75	...	310	...
Cathode Volts (K-Gnd).....	1.4	2	2	0	0	...
6A7—G2 to K.....	160	...	...	...	...	...
6A7—G1 to K.....	20	...	...	...	...	...



PHILCO RADIO & TEL. CORP.

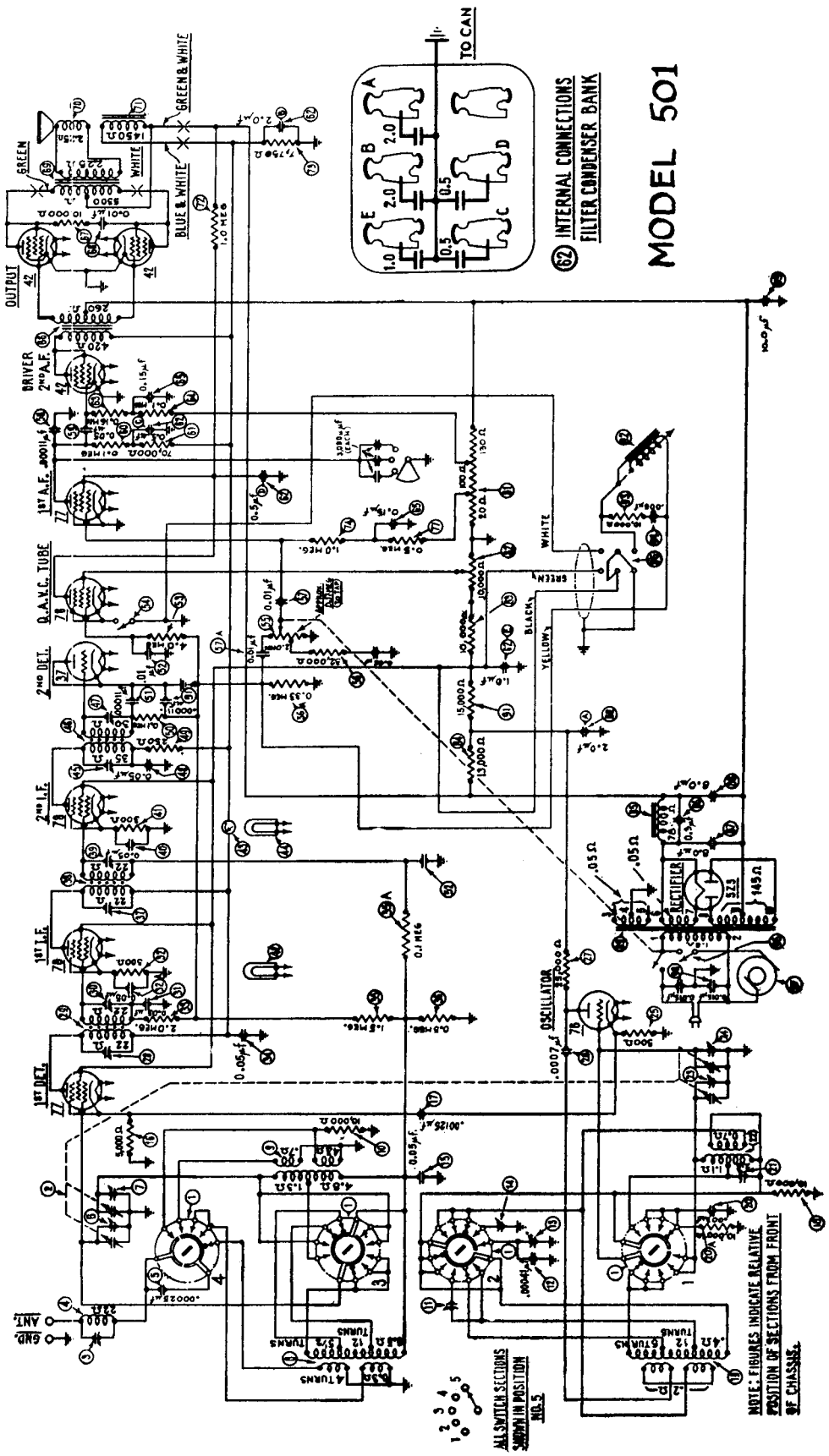
MODEL 500





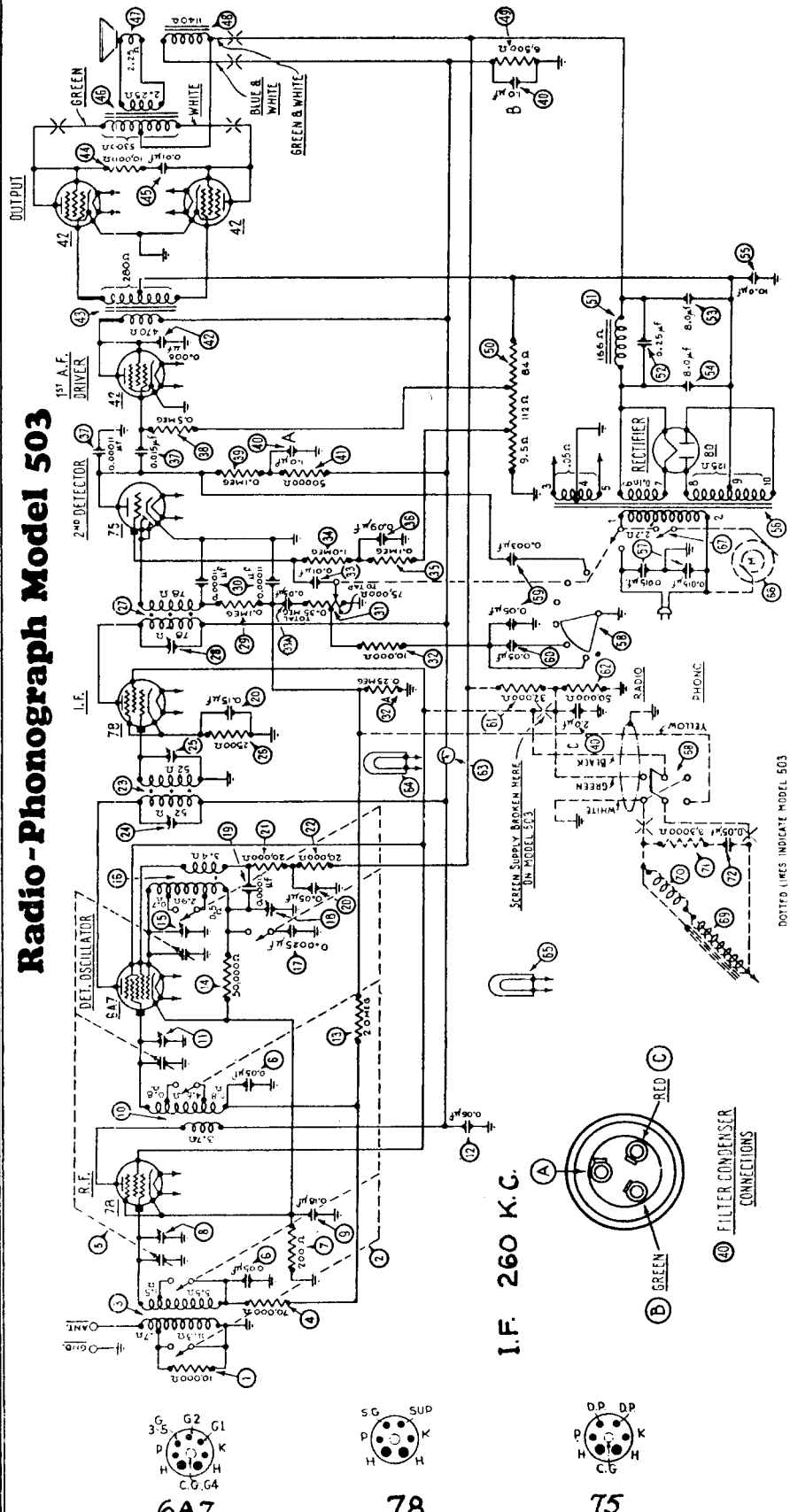
PHILCO RADIO & TEL. CORP.

MODEL 501



PHILCO RADIO & TEL. CORP.

PHILCO 503



NOTE: Primary and secondary winding values of ㊻ Output Transformer, and value of ㊼ Voice Coil are given in impedance at 200 cycles, 30 volts. The D. C. resistance of the primary winding is 350 ohms; of the secondary, .09 ohm. The D. C. resistance of ㊵ is 1.11 ohms.

NOTE: ㊶ and ㊷ form the Scratch Filter, Part No. 85-5001.

The electric motor of Model 503 is of the self-starting, synchronous type, depending on the power line frequency (cycles) for its correct speed. If the motor should develop trouble, do not attempt to repair it. Replace it, and communicate with your Distributor with regard to the faulty one. The motor should be lubricated at least once every six months. To do this, take off the turntable and put a few drops of a good grade of light machine oil in the oil-hole in the motor top-plate.

The pick-up is of the high impedance type. The impedance of the pick-up is approximately 2500 ohms, measured at 1000 cycles. The D.C. resistance is 600 ohms. Adjustment of the pick-up is described in Service Bulletin No. 89, "Adjusting the Electric Pick-up." The D.C. resistance of the pick-up bucking coil is 230 ohms. If the bucking coil is disconnected, be sure it is re-connected correctly. The direction of current flow is very important.

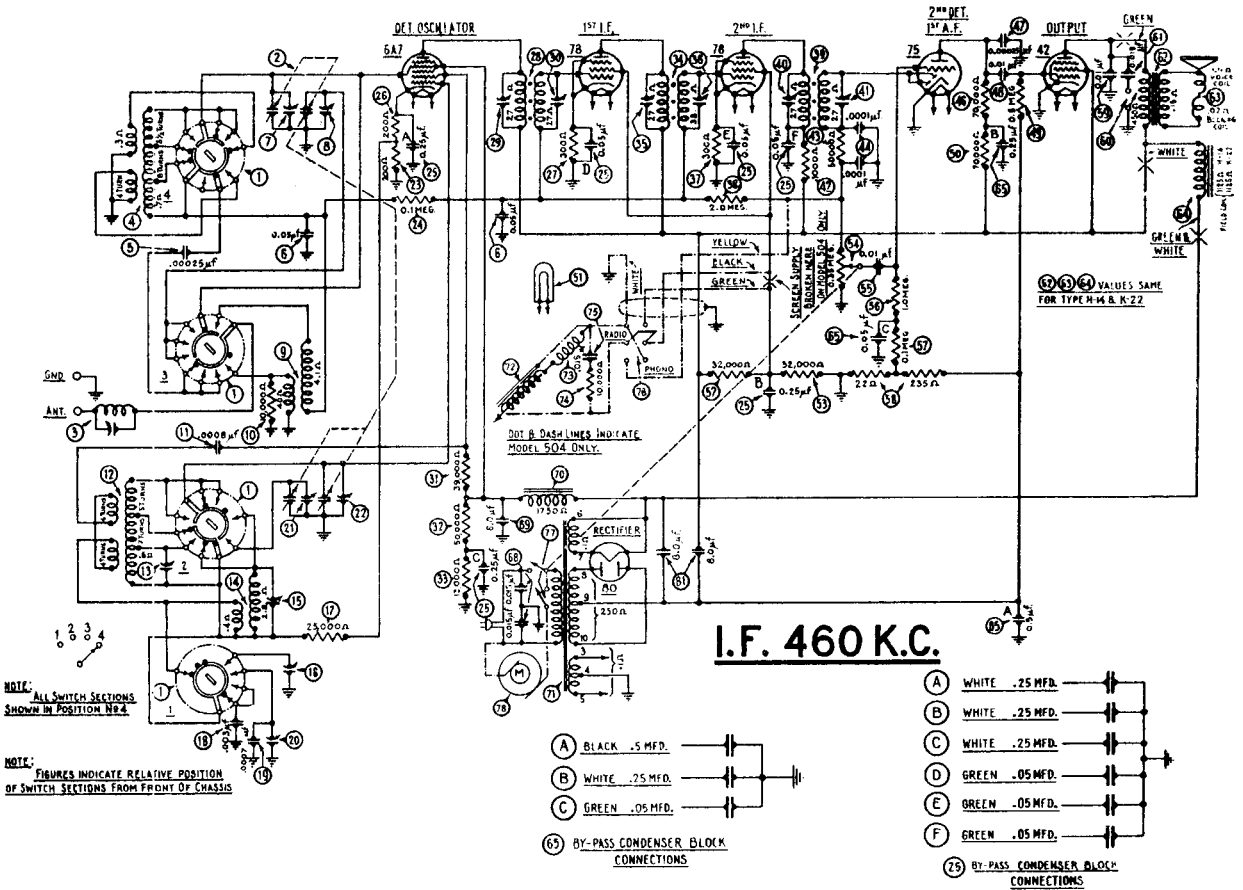
The tone arm must be free to rotate upon its axis at all times. Damage to the records will result if it is not.

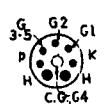
The speaker unit is Type H-13.

Except for the additional wiring of the phonograph, the circuits are the same as those of Model 18. The audio system of the radio chassis takes care of the amplification of the pick-up currents.

PHILCO RADIO & TEL. CORP.

PHILCO 504





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The electric pick-up is of the high-impedance type. Its impedance, at 1000 cycles, is 10,000 ohms. Its D. C. resistance is 700 ohms. A description of the adjustment of the pick-up is given in Service Bulletin No. 89, "Adjusting the Electric Pick-up". The D. C. resistance of the pick-up bucking coil is 230 ohms. The direction of current-flow in the bucking coil is very important for proper reproduction; if the bucking coil is temporarily disconnected, be sure it is re-connected correctly.

The electric motor depends upon the frequency (cycles) of the power supply for its correct speed. The power line frequency must be the same as that given in the name-label upon the radio chassis and upon the motor frame. Only a motor of the correct frequency will give the proper turntable speed.

The motor is of the self-starting, synchronous type. The motor should be lubricated at least once every six months. To do this, lift off the turntable and place a few drops of a good grade of light machine oil in the oil-hole in the top-plate of the motor.

If the electric motor should develop a fault, it should be replaced. Do not attempt to repair it; get in touch with your Distributor regarding the faulty motor.

The radio circuits are the same as those of Model 44,—with the additional phonograph reproducing circuits.

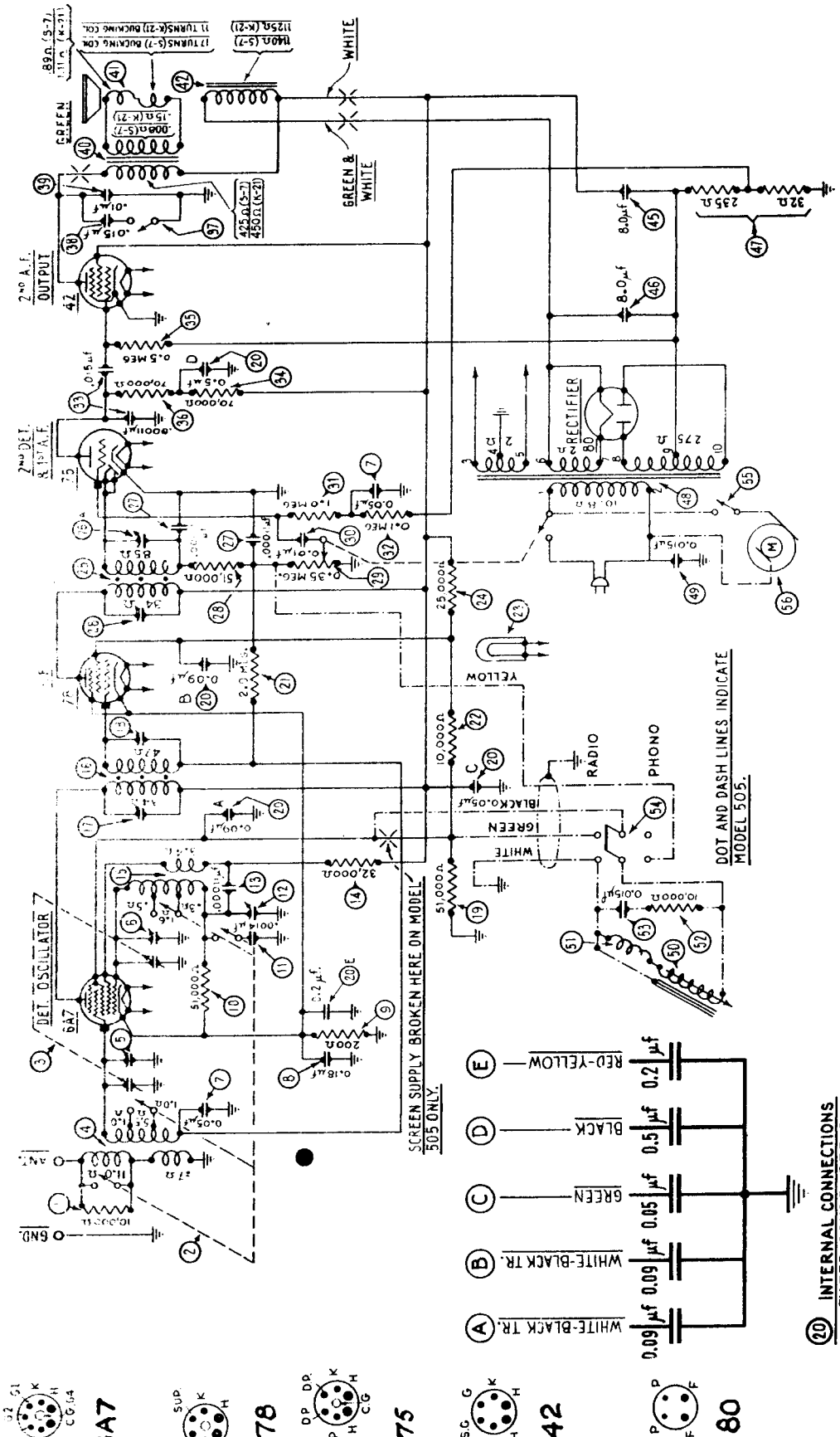
Trouble Shooting Hints

Electrolytic condensers sometimes give trouble in these sets after several months of use. Replace the defective units. In case of line fuses blowing, check the .015 mf. condensers across the power transformer primary. Also test the phonograph motor. In case of trouble with the latter return it to the factory.

PHILCO RADIO & TEL. CORP.

PHILCO 505

Radio-Phonograph Model 505



(20) INTERNAL CONNECTIONS FILTER CONDENSER BANK.

The radio circuits are the same as those of Model 60,—with the additional wiring of the phonograph. The audio system of the radio chassis amplifies the voltages generated by the pick-up.

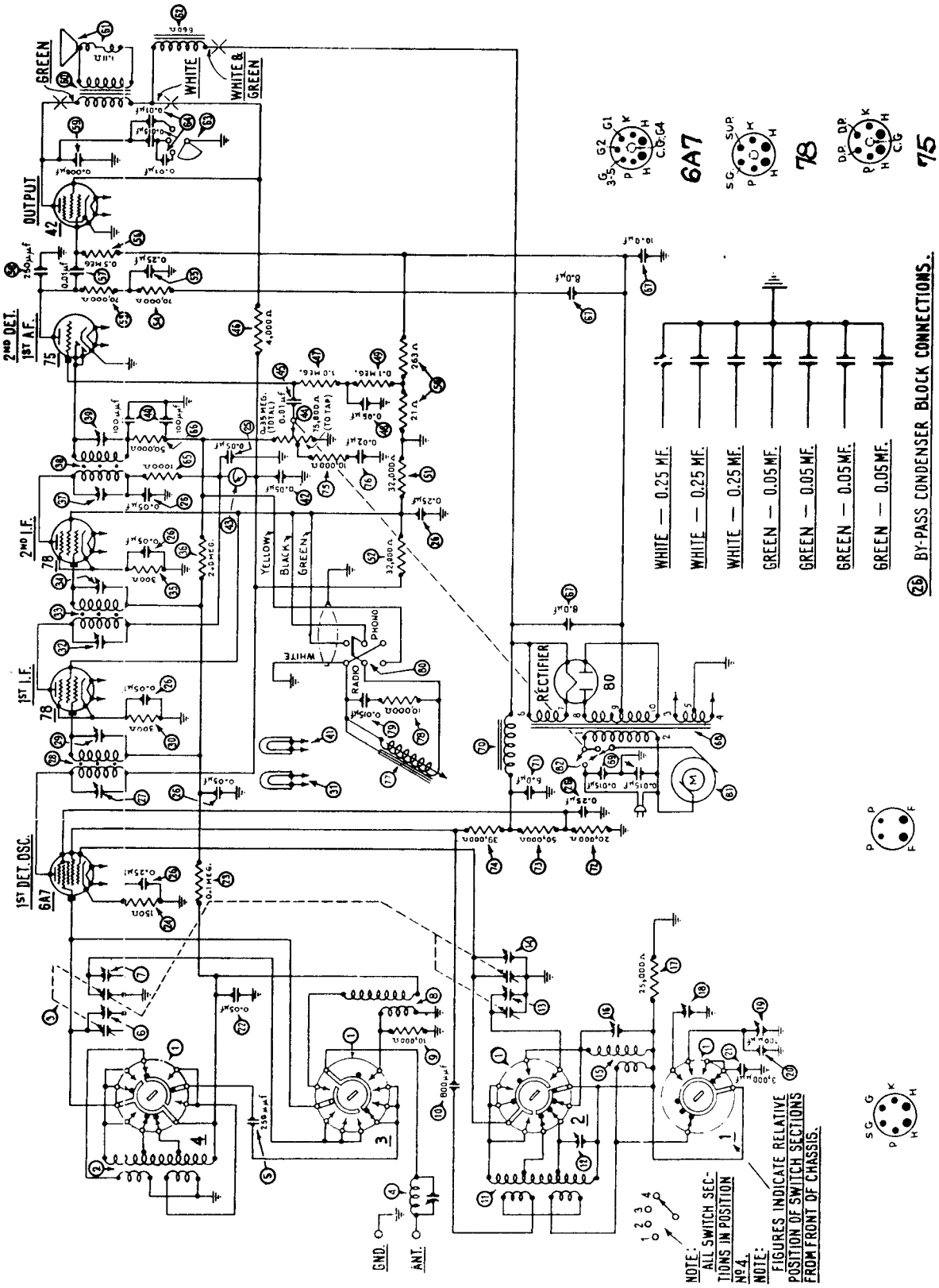
The electric motor of Model 505 is of the self-starting, synchronous type, depending upon the frequency (cycles) of the power line for its correct speed. The power line frequency must be the same as that given on name-label of Model 505. The motor should be lubricated at least once every six months. Lift off the turntable, and place a few drops of a good grade of light machine oil in the oil-hole in the top-plate of the motor. Only a motor of the correct frequency will give the proper turntable speed.

The electric pick-up is of the high-impedance type. Its impedance is 10,000 ohms, measured at 1000 cycles. The D. C. resistance is 700 ohms. Adjustment of the pick-up is described in Service Bulletin No. 89, "Adjusting the Electric Pick-up." The D. C. resistance of the pick-up bucking coil is 230 ohms. If the bucking coil is disconnected, be sure it is re-connected correctly, as the direction of current-flow is very important.

PHILCO RADIO & TEL. CORP.

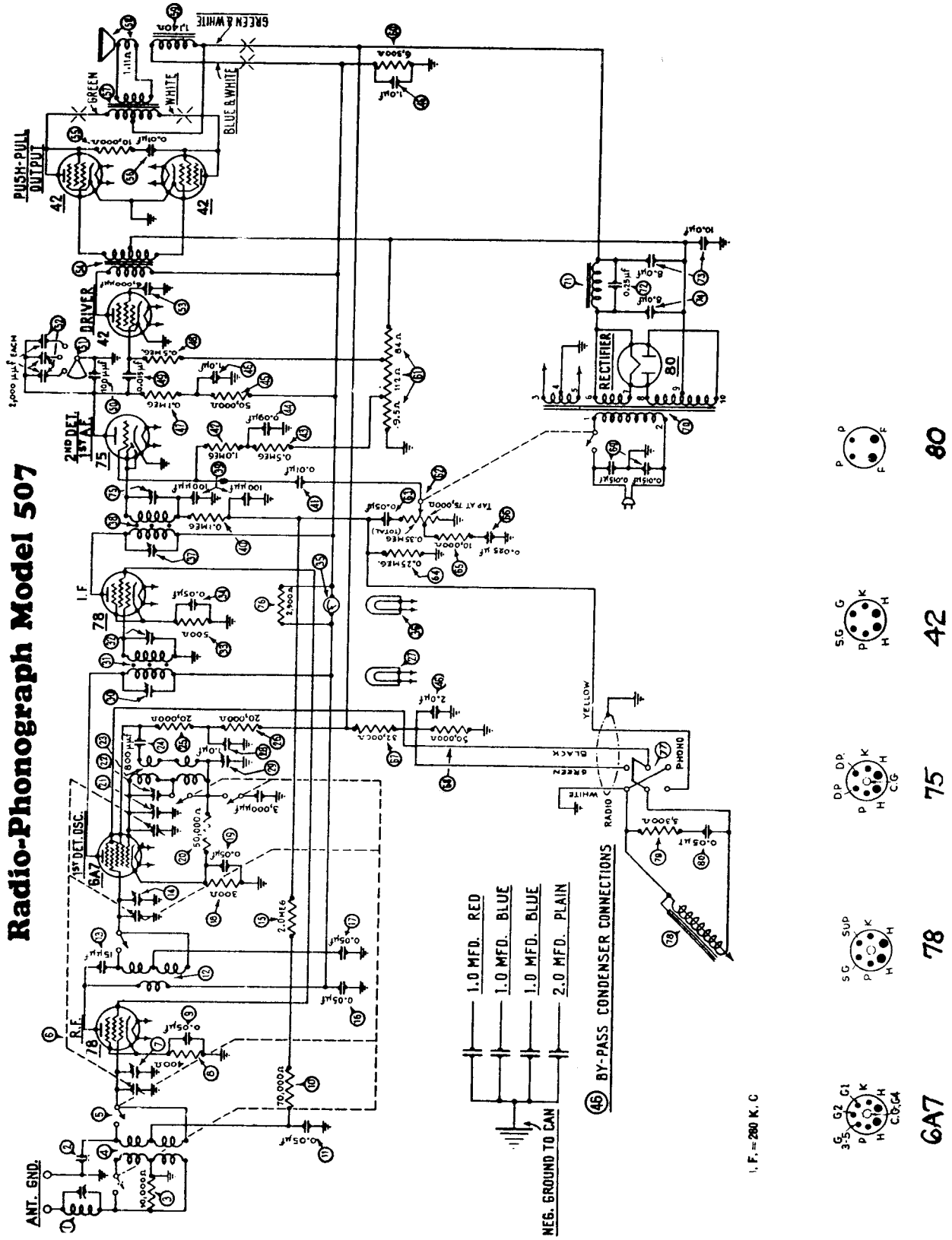
MODEL 506

Radio-Phonograph Model 506



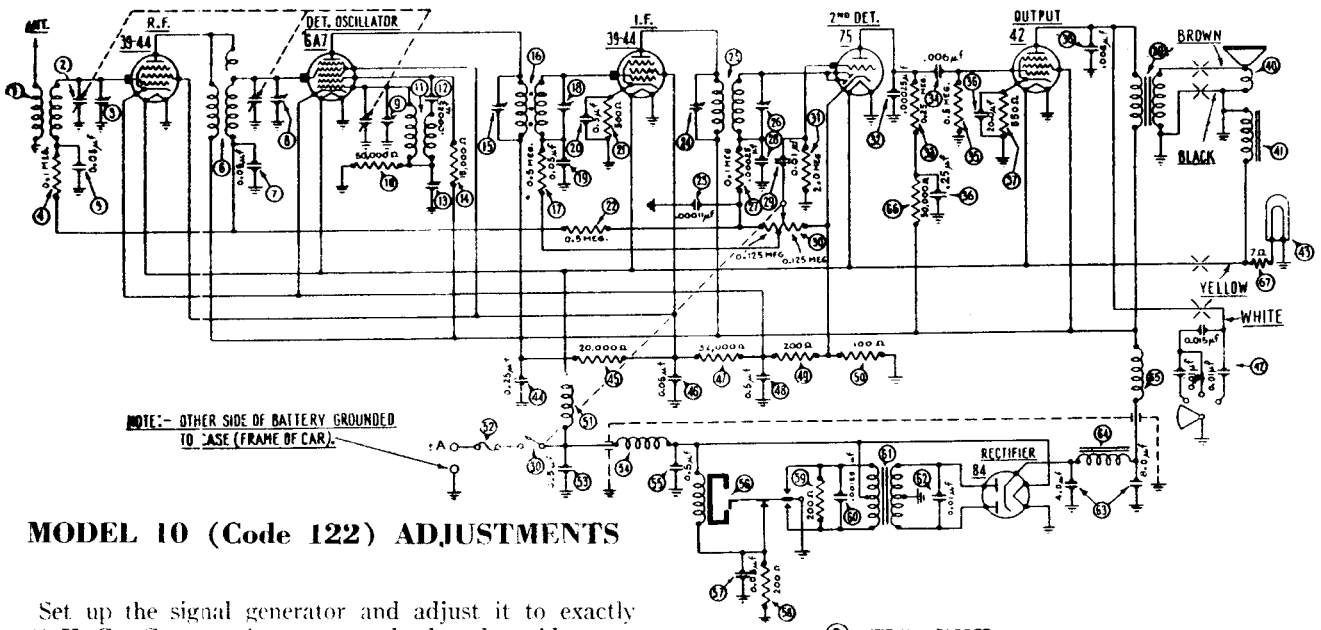
PHILCO RADIO & TEL. CORP.

MODEL 507



PHILCO RADIO & TEL. CORP.

PHILCO 10



MODEL 10 (Code 122) ADJUSTMENTS

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube. The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (3) and (8) must be adjusted first. These padders should be adjusted to peak.

First adjust the screw, then the nut.

The padders (17) and (21) must be adjusted next.

Turn the adjusting screw (17) all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (21) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (17) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

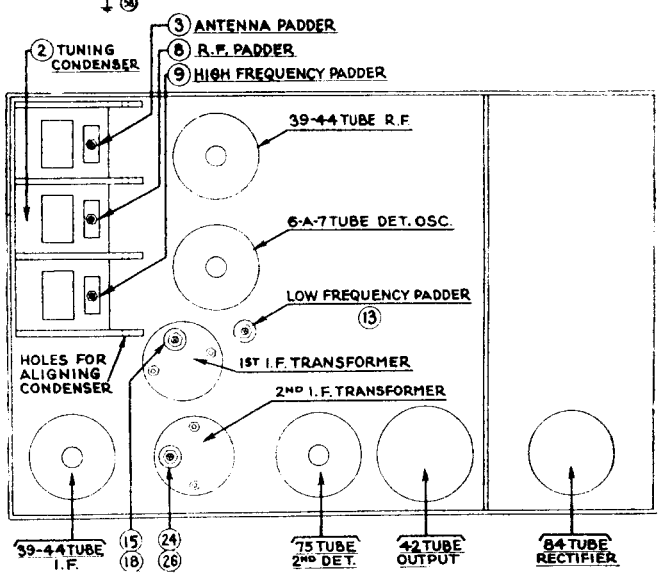
After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid cap to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

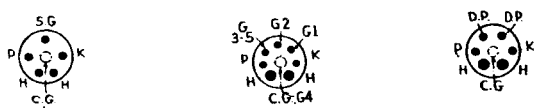
There are four holes in line, one in each of the sections of the tuning condenser housing. Place a high-frequency padder (9) until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder (8) and the antenna padder (3) are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 500 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder (13) for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.





PHILCO RADIO & TEL. CORP.

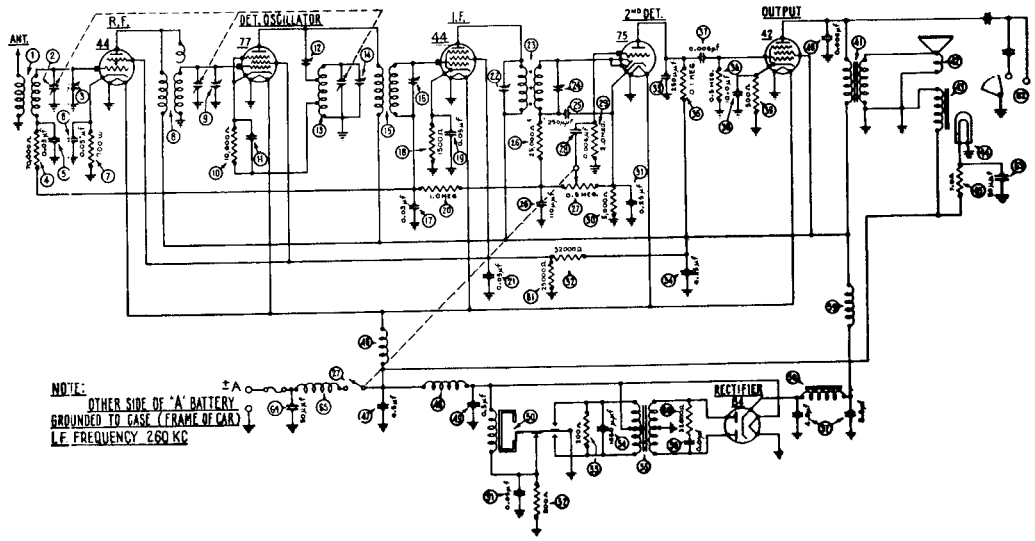
MODEL 11

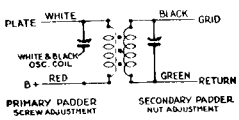
MODEL 11 PARTS LIST

(1)	Antenna Transformer	32-1331	(23)	2nd I. F. Transformer	32-1257	(45)	Resistor (7 ohms	33-3035
(2)	Tuning Condenser	31-1196	(24)	Padder (Sec. 2nd I. F. Tran.		(46)	"A" Choke	32-1258
(3)	1st Padder on tun. cond.		(25)	Cond. (.00011-.00025 mfd.	30-1020	(47)	Condenser (.5 mfd.	30-4047
(4)	Resistor (70,000 ohms	33-1111	(26)	Resistor (25,000 ohms	33-1013	(48)	Vibrator Choke	32-1235
(5)	Condenser (.03 mfd.	30-4027	(27)	Vol. Cont. & Switch Assm.	38-7004	(49)	Condenser (.5 mfd.	30-4147
(6)	Condenser (.05 mfd.	30-4028	(28)	Condenser (.006 mfd.	30-4125	(50)	Vibrator Unit	38-5036
(7)	Resistor (1400 ohms	33-3047	(29)	Resistor (2,000,000 ohms	33-1027	(51)	Condenser (.05 mfd.)	30-4030
(8)	R. F. Transformer	32-1332	(30)	Resistor (500 ohms	6006	(52)	Resistor (200 ohms	7217
(9)	2nd Padder on tun. cond.		(31)	Condenser (.25 mfd.	30-4130	(53)	Resistor (200 ohms	7217
(10)	Resistor (10,000 ohms	33-1004	(32)	Resistor (51,000 ohms	5858	(54)	Condenser (.00125 mfd.	5886
(11)	Condenser (.0005 mfd.	5858	(33)	Condenser (.00025 mfd.	3082	(55)	Power Transformer	32-7216
(12)	Padder (Pri. 1st I. F. Tran.)		(34)	Condenser (.25 mfd.	0430-0	(56)	Condenser (.01 mfd.	30-4051
(13)	Oscillator Transformer	32-1333	(35)	Resistor (100,000 ohms	6009	(57)	Condenser (4 — 8 mfd.	30-2072
(14)	3rd Padder on tun. cond.		(36)	Resistor (200,000 ohms	6007	(58)	"B" Choke	32-7217
(15)	1st I. F. Transformer	32-1326	(37)	Condenser (.006 mfd.	30-4125	(59)	R F Choke	32-1283
(16)	Padder (Sec. 1st I. F. Tran		(38)	Condenser (.10 mfd.	30-2072	(60)	Resistor (30,000 ohms	7830
(17)	Condenser (.05 mfd.	30-4025	(39)	Resistor (5600 ohms	33-3031	(61)	Resistor (32,000 ohms	3525
(18)	Resistor (700 ohms	6443	(40)	Condenser (.006 mfd.	30-4024		Spark Plug Resistor	33-1015
(19)	Condenser (.05 mfd.)	30-4029	(41)	Output Transformer	32-7214		Distributor Resistor	33-1113E
(20)	Resistor (1,000,000 ohms	33-1016	(42)	Cone & Voice Coil	0250-1		Nuts (mounting	W55A
(21)	Condenser (.05 mfd.)	30-4020	(43)	Field Coil Assembly	38-3007		Battery Cable	38-7206
(22)	Padders (Prim. 2nd I. F.)		(44)	Pilot Light	6408		Acorn Nut	W821
							Key	6001
							Fuse Insulator	27-7131
							Screw Type Resistor	4851
							Interference Condenser	30-4007
							Studs	28-4036
							Bracket	6035
							Strap	04341
							Knob	27-4058
							Glass	27-7325
							Glass Gasket	27-7309
							Pointer	28-1957
							Control Assembly	42-5107
							Face Assembly	42-5175
							Shaft	28-8206

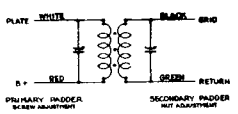
PHILCO RADIO & TEL. CORP.

PHILCO 700

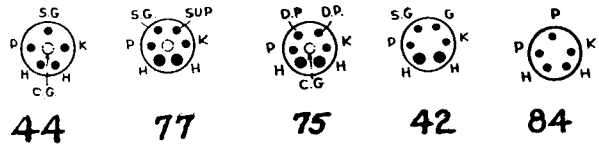




1st I. F. Transformer



2nd I. F. Transformer



I. F. TRANSFORMER AND PADDERS

The new style I. F. transformer complete with padders is used in the Model 700.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

Remove the speaker lid from the Receiver. Remove the grid cap terminal from the 77 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 77 tube. (See Fig. 2.) The output meter must be connected.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders ㉒ and ㉔ are adjusted first (Figs. 2 and 3). Turn the adjusting screw ㉒ all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut ㉔ with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw ㉒ for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

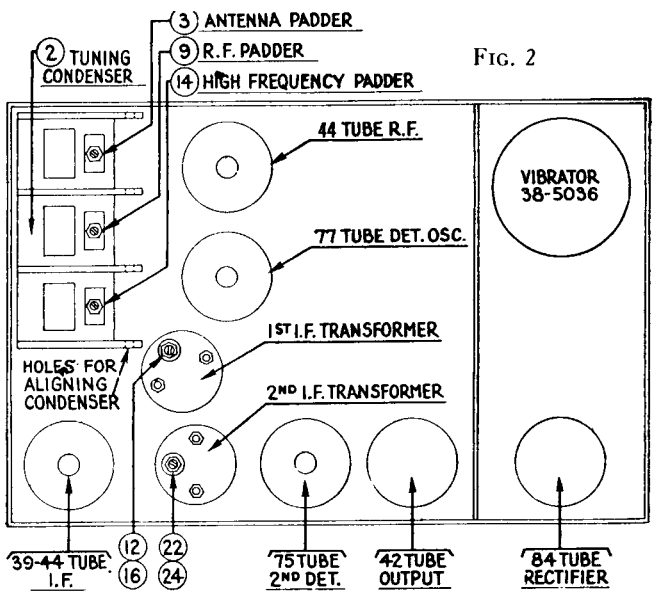


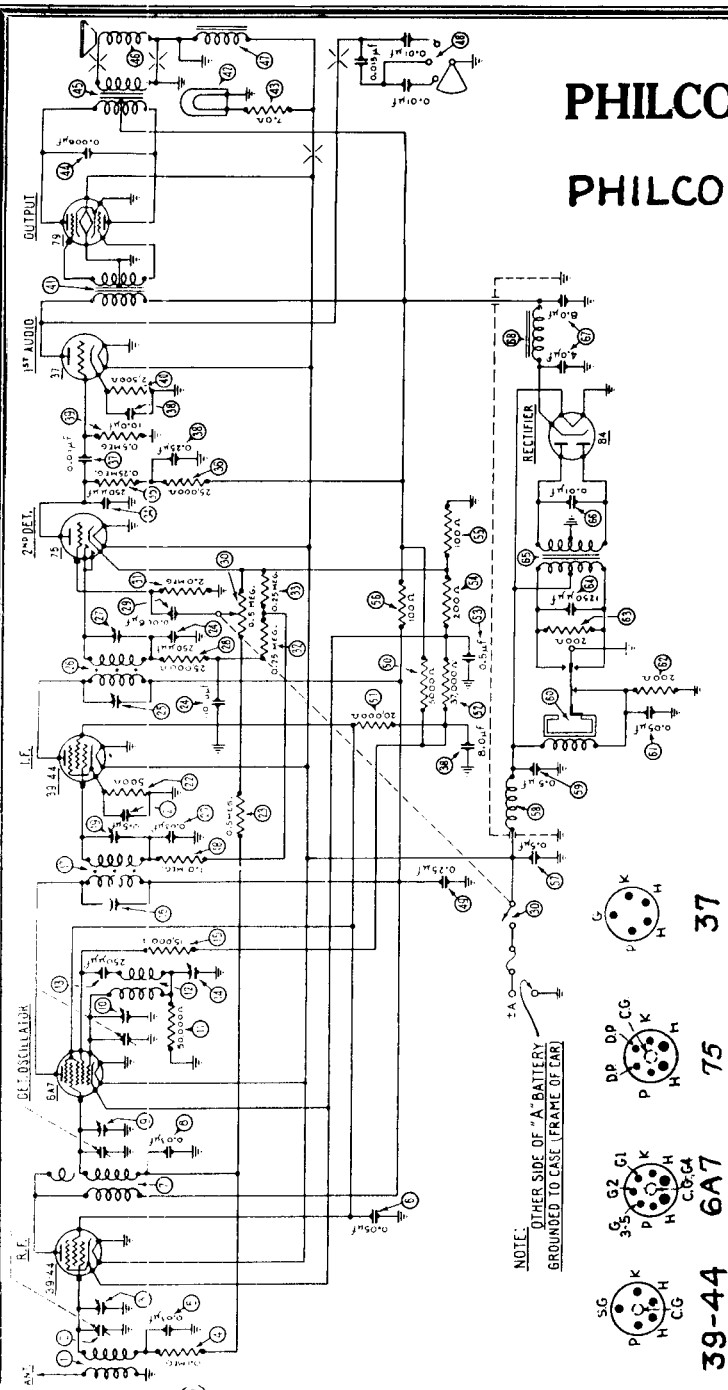
FIG. 2

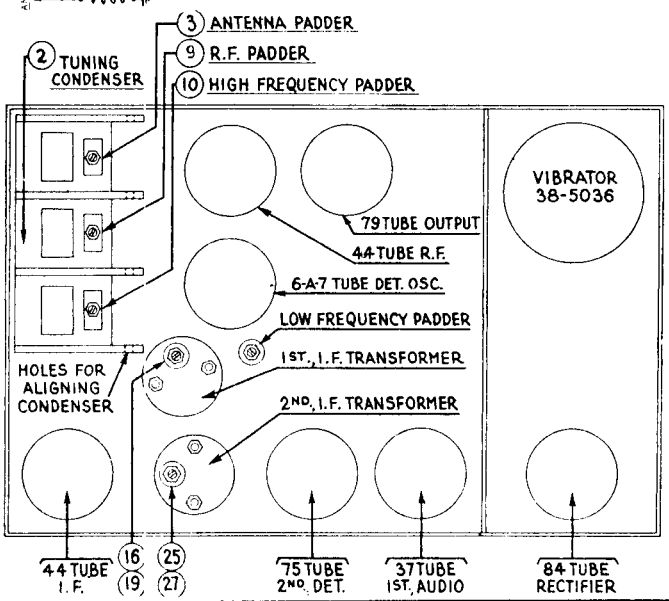
Trouble Shooting Hints

A sticking vibrator and mis-alignment of the oscillator circuit are commonly encountered. Replace the vibrator or file the contacts if the pitting is not too deep. Realing the I. F. amplifier first, then adjust the high and low frequencies padders at 1400 and 500 K. C.

PHILCO RADIO & TEL. CORP.

PHILCO 800





Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube. (See Fig. 2.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (25) and (27) are adjusted first

Turn the adjusting screw (25) all the way in. A metal screw driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (27) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (25) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the condensers (18) and (19).

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

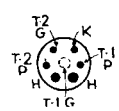
There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder (10) until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder (9) and the antenna padder (3) are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder (14) for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used. the Receiver is adjusted properlv



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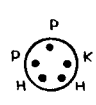

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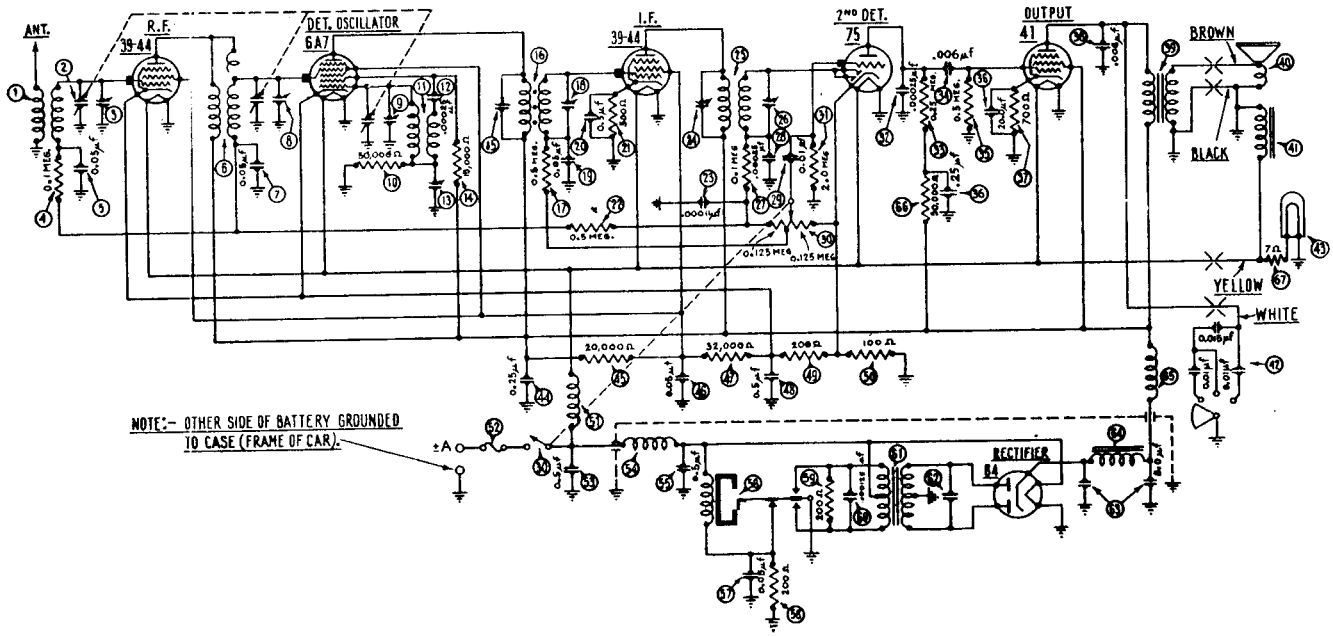
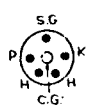
Trouble Shooting Hints

Shorted I. F. transformers due to crossed leads are sometimes encountered. Replace the coil. After some use vibrator contacts stick:-- file them or replace vibrator if necessary.

PHILCO RADIO & TEL. CORP.

STUDEBAKER DE LUXE MODEL A.C.-206
PIERCE-ARROW — AUTO RADIO
NASH MODEL A.C. 989





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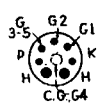

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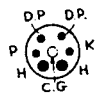

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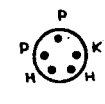

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(1) Antenna Transformer	32-1220	(22) Resistor (500,000 ohms)	6097	(43) Pilot Lamp	6608	(64) B Chokes	32-7038
(2) Tuning Condenser	31-1083	(23) Condenser (.00011 mfd.)	4519	(44) Condenser (.25 mfd.)	04360	(65) R. F. Chokes	32-1078
(3) 1st Padder (in tuning cond.)		(24) Padder (prim. 2nd I.F.)	31-6008	(45) Resistor (20,000 ohms)	6649	(66) Resistor (50,000 ohms)	4237
(4) Resistor (100,000 ohms)	6099	(25) I.F. Transformer (2nd)	32-1237	(46) Condenser (.05 mfd.)	30-4020	(67) Resistor (7 ohms)	5110
(5) Condenser (.05 mfd.)	30-4020	(26) Padder (secondary 2nd I.F.)	31-6008	(47) Resistor (32,000 ohms)	3525	Spark Plug Resistors	4551
(6) R.F. Transformer	32-1221	(27) Resistor (100,000 ohms)	6099	(48) Condenser (.5 mfd.)	30-4048	Distributor Resistor	4540
(7) Condenser (.05 mfd.)	30-4020	(28) Condenser (.00025 mfd.)	3082	(49) Resistor (200 ohms)	7217	Screw Type Resistor	4851
(8) 2nd Padder (in tuning cond.)		(29) Condenser (.01 mfd.)	30-4051	(50) Resistor (100 ohms)	7838	Interference Condenser	30-4007
(9) 3rd Padder (in tuning cond.)		(30) Vol. Control Assembly	38-5280	(51) A Choke	32-1268	Dial	27-5022
(10) Resistor (50,000 ohms)	6098	(31) Resistor (2,000,000 ohms)	33-1025	(52) 15 Amp. Fuse	7227	Studs—4½" Special	28-6102
(11) Oscillator Transformer	32-1222	(32) Condenser (.00025 mfd.)	5858	(53) Condenser (.5 mfd.)	30-4061	Nuts (mounting)	W55
(12) Condenser (.00025 mfd.)	3082	(33) Resistor (250,000 ohms)	3768	(54) Vibrator Choke	32-1259	Knob	03064
(13) Padder	040008	(34) Condenser (.006 mfd.)	30-4024	(55) Condenser (.5 mfd.)	30-4061	Battery Cable	38-5296
(14) Resistor (15,000 ohms)	6208	(35) Resistor (500,000 ohms)	6097	(56) Vibrator	38-5036	Antenna Lead	38-5131
(15) Padder (prim. 1st I.F.)	31-6007	(36) Condenser (20 mfd.; 25 mfd.)	30-4065	(57) Condenser (.05 mfd.)	30-4039	Instrument Panel Control	42-5088
(16) I.F. Transformer (1st)	32-1236	(37) Resistor (700 ohms)	33-3019	(58) Resistor (200 ohms)	7217	Acorn Nut	W821
(17) Resistor (500,000 ohms)	6097	(38) Condenser (.006 mfd.)	30-4024	(59) Resistor (200 ohms)	7217	De Luxe Control Assembly	42-5097
(18) Padder (secondary 1st I.F.)	31-6007	(39) Output Transformer	32-7102	(60) Condenser (.00125 mfd.)	5886	Standard Control Assembly	42-5101
(19) Condenser (.05 mfd.)	30-4020	(40) Cone and Coil	36-3020	(61) Power Transformer	32-7131	Steering Col. Control Assem.	42-5096
(20) Condenser (.5 mfd.)	30-4058	(41) Field Coil Assembly	36-3130	(62) Condenser (.006 mfd.)	30-4024	Gasket	27-7290
(21) Resistor (500 ohms)	6977	(42) Tone Control	30-4056	(63) Filter Condenser	30-2015	Nash Control Plate	28-7025

Ignition and Generator Interference Suppression

Install spark plug resistors on all spark plugs. On the right side of the motor the spark plug porcelains are covered with a rubber sleeve. When the sleeves are replaced, make sure that they are pushed down far enough to completely cover the porcelain on the plugs. Dipping the rubber sleeves in gasoline will make this operation very easy.

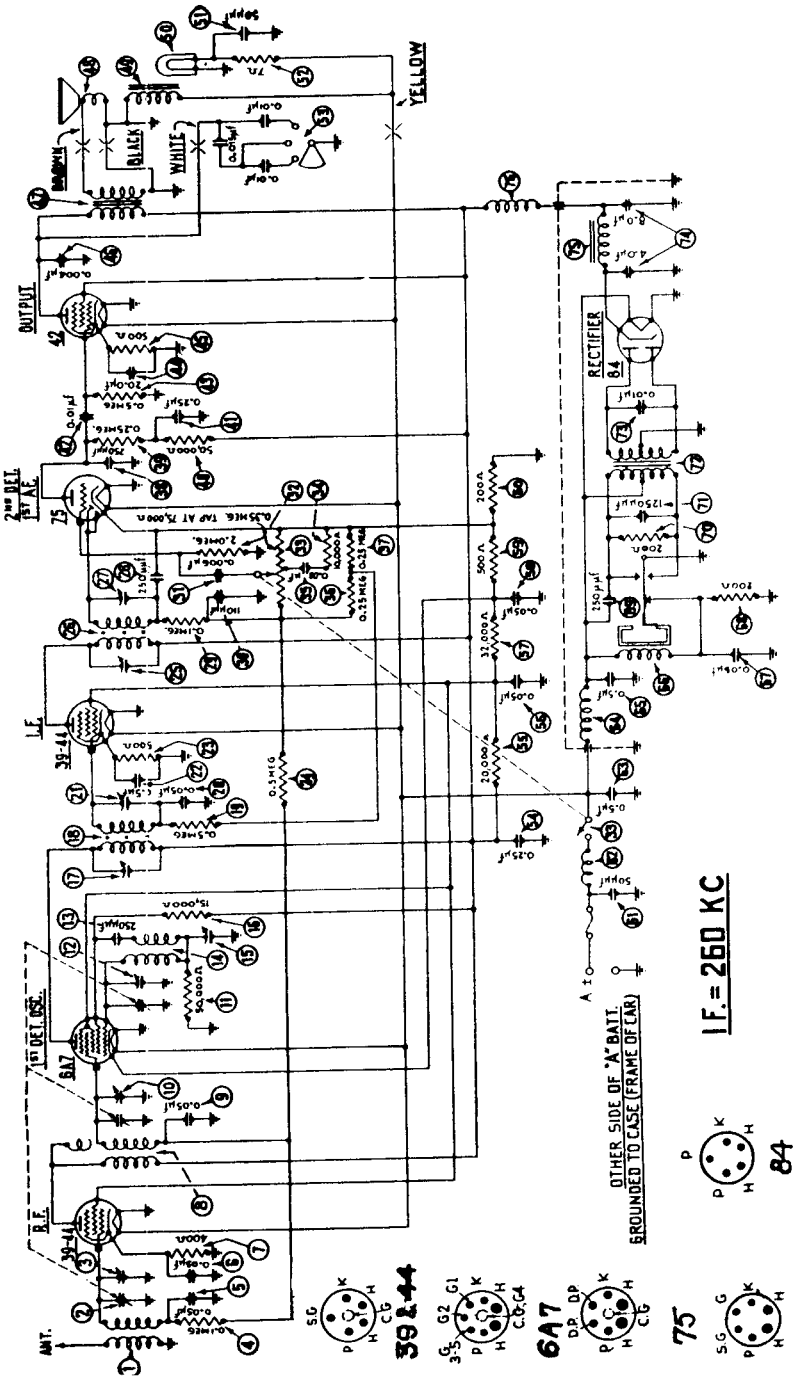
Cut the coil to distributor high tension lead about one inch from the distributor head and install the screw type suppressor.

Install a by-pass condenser on the generator and connect the condenser lead to the generator side of the cutout relay. The condenser must be fastened in place under the relay mounting screw.

The other by-pass condenser must be mounted behind the instrument board and the lead connected to the ammeter. Fasten the condenser mounting bracket under one of the instrument mounting screws. On some cars, this condenser may be more effective when connected to the dome light wire. In such cases, the condenser lead must be spliced to the dome light wire at the right pillar post and the condenser mounted on the instrument board flange.

PHILCO RADIO & TEL. CORP.

STUDEBAKER DE LUXE MODEL AC-206 CODE 122



42 STUDEBAKER DE LUXE MODEL AC-206 (Code 122) PARTS LIST

(1)	Antenna Transformer	32-1220	(21)	Resistor (500,000 ohms)	6097	(41) Output Transformer	32-7102
(2)	Tuning Condenser	31-1083	(25)	Padder (Pri. 2nd I. F. Trans.)		(46) Cone and Voice Coil	36-3159
(3)	First Padder (in tun. cond.)		(28)	Second I. F. Transformer	32-1237	(49) Field Coil Assembly	36-3130
(4)	Resistor (100,000 ohms)	6099	(37)	Padder (Sec. 2nd I. F. Trans.)		(50) Pilot Lamp	34-2039
(5)	Condenser (.05 mfd.)	30-4020	(38)	Condenser (.00025 mfd.)	30-1032	(51) Condenser (.00045 mfd.)	30-1029
(6)	Condenser (.05 mfd.)	30-4020	(39)	Resistor (100,000 ohms)	6099	(52) Resistor (7 ohms)	33-3035
(7)	Resistor (400 ohms)	33-3016	(50)	Condenser (.00011 mfd.)	30-1031	(53) Tone Control	30-4056
(8)	R. F. Transformer	32-1221	(51)	Condenser (.006 mfd.	30-4125	(54) Condenser (.25 mfd.)	04360
(9)	Condenser (.05 mfd.)	30-4020	(52)	Resistor (2,000,000 ohms)	33-1025	(55) Resistor (20,000 ohms)	6049
(10)	Second Padder (in tun. cond.)		(53)	Vol. Control & Sw. Assembly	38-5935	(56) Condenser (.05 mfd.)	30-4020
(11)	Resistor (50,000 ohms)	6098	(54)	Resistor (10,000 ohms)	33-1000	(57) Resistor (32,000 ohms)	3525
(12)	Third Padder (in tun. cond.)		(55)	Condenser (.03 mfd.)	30-4025	(58) Condenser (.05 mfd.)	30-4020
(13)	Condenser (.00025 mfd.)	30-1032	(56)	Resistor (250,000 ohms)	33-1047	(59) Resistor (400 ohms)	6977
(14)	Oscillator Transformer	32-1222	(57)	Resistor (250,000 ohms)	33-1047	(60) Resistor (200 ohms)	7217
(15)	Padder	040008	(58)	Condenser (.00025 mfd.)	30-1032	(61) Condenser (.00045 mfd.)	30-1029
(16)	Resistor (15,000 ohms)	6208	(59)	Resistor (250,000 ohms)	3768	(62) Choke	32-1374
(17)	Padder (Pri. 1st I. F. Trans.		(60)	Resistor (50,000 ohms)	4237	(63) Condenser (.5 mfd.)	30-4061
(18)	First I. F. Transformer	32-1236	(61)	Condenser (.25 mfd.)	30-4065	(64) Vibrator Choke	32-1259
(19)	Resistor (500,000 ohms)	6097	(62)	Condenser (.01 mfd.)	30-4169	(65) Condenser (.5 mfd.)	30-4061
(20)	Condenser (.05 mfd.)	30-4020	(63)	Resistor (500,000 ohms)	6097	(66) Vibrator	38-5036
(21)	Padder (Sec. 1st I. F. Trans.)		(64)	Condenser (20 mfd.)	30-4065	(67) Condenser (.05 mfd.)	30-4039
(22)	Condenser (.5 mfd.)	30-4058	(65)	Resistor (500 ohms)	6977	(68) Resistor (200 ohms)	7217
(23)	Resistor (500 ohms)	6977	(66)	Condenser .004 mfd.	30-1185	(69) Condenser .00025 mfd.	5858
						(70) Resistor (200 ohms)	7217
						(71) Condenser (.00125 mfd.	5856
						(72) Power Transformer	32-7008
						(73) Condenser (.01 mfd.)	30-4051
						(74) Filter Condenser (4-8 mfd.)	30-2015
						(75) Filter Choke	32-7104
						(76) R. F. Choke	32-1281
						Spark Plug Resistors	45311E
						Distributor Resistor	45511E
						Interference Condenser	30-4007
						Studs	28-6036
						Nuts (mounting)	W55A
						Battery Cable	38-5296
						Antenna Lead	38-5776
						Acorn Nut	W821
						Dial	27-5027
						Knob (volume)	27-4042
						Knob (tuning)	03064
						Flexible Shaft (volume)	28-8170
						Flexible Shaft (tuning)	28-8169

Ignition and Generator Interference Suppression

On all cars a standard suppression method is followed. Place the spark plug resistors on each spark plug in a vertical position and the screw type suppressor in the high tension lead between the coil and distributor as near the distributor as possible.

One of the small condensers is fastened under the screw that holds the generator cutout and the lead connected to the battery terminal of the cutout. The other condenser is connected to the dome light wire where it enters the windshield post on the right side of the instrument board and is grounded under the lower instrument board fastening screw. In some cases it may be necessary to bond all the metal controls that come through the large grommet in the center of the dash.

In extreme cases on the eight cylinder cars, it may be necessary to place an additional condenser on the ammeter. In this case it is grounded and held in place by the lower mounting screw of the ammeter. If, after this is completed, there is still a noticeable amount of ignition interference, the distributor rotor arm should be peened.

PHILCO RADIO & TEL. CORP.

NASH-PHILCO MODEL A.C.-989 CODE 122

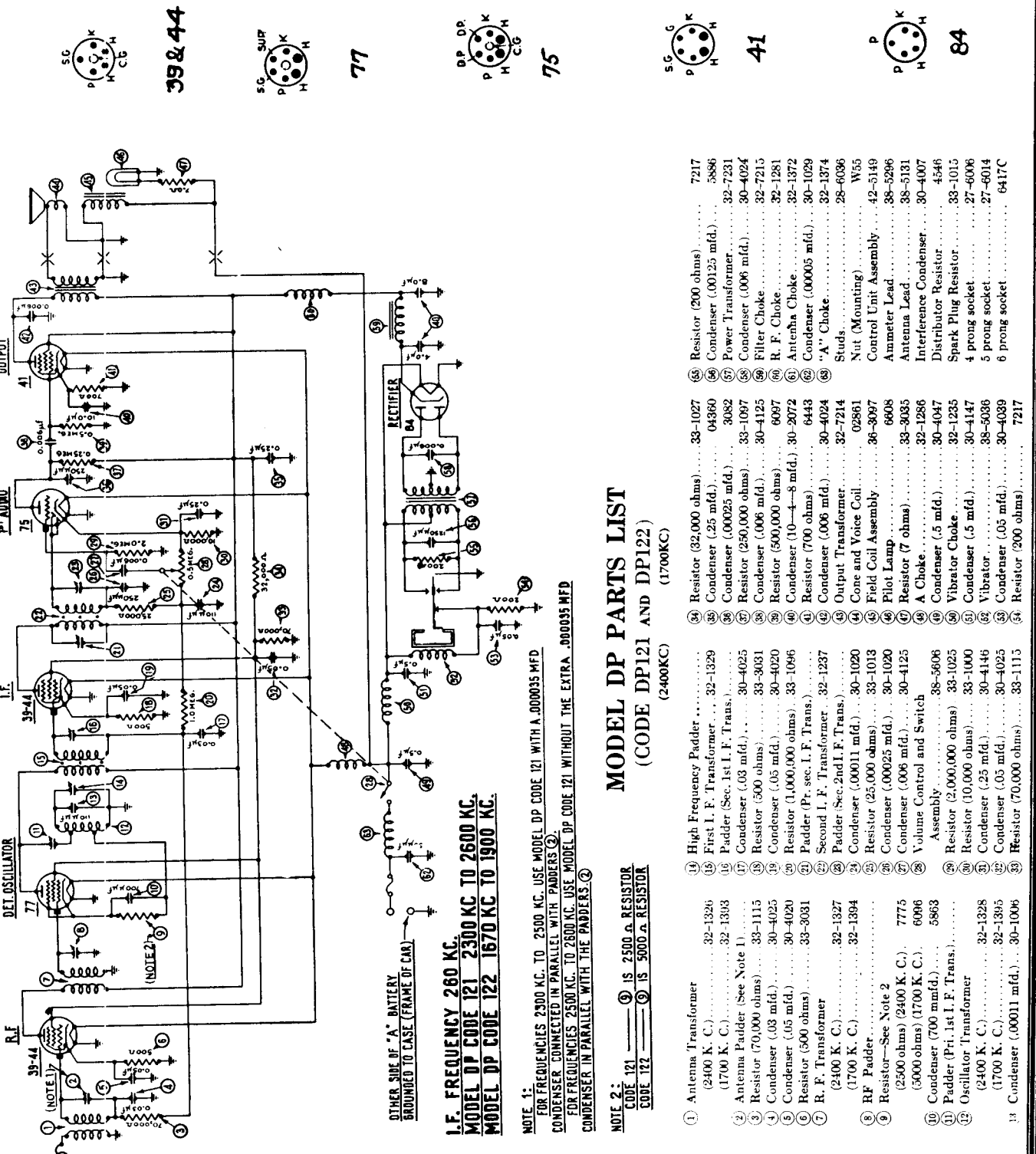
NASH - PHILCO MODEL AC 989 (Code 122) PARTS LIST

(1)	Antenna Transformer	32-1220	(24)	Resistor (500,000 ohms)	6057	(47)	Output Transformer
(2)	Tuning Condenser	31-1083	(25)	Padder (Pri. 2nd I. F. Trans.)		(48)	Cone and Voice Coil
(3)	First Padder (in tun. cond.)		(26)	Second I. F. Transformer	32-1237	(49)	Field Coil Assembly
(4)	Resistor (100,000 ohms)	6099	(27)	Padder (Sec. 2nd I. F. Trans.)		(50)	Pilot Lamp
(5)	Condenser (.05 mfd.)	30-4020	(28)	Condenser (.00025 mfd.)	30-1032	(51)	Condenser (.00005 mfd.)
(6)	Condenser (.05 mfd.)	30-4020	(29)	Resistor (100,000 ohms)	6099	(52)	Resistor (7 ohms)
(7)	Resistor (400 ohms)	33-3016	(30)	Condenser (.00011 mfd.)	30-1031	(53)	Tone Control
(8)	R. F. Transformer	32-1221	(31)	Condenser (.006 mfd.)	30-4125	(54)	Condenser (.25 mfd.)
(9)	Condenser (.05 mfd.)	30-4020	(32)	Resistor (2,000,000 ohms)	33-1025	(55)	Resistor (20,000 ohms)
(10)	Second Padder (in tun. cond.)		(33)	Vol. Control & Sw. Assembly	38-5035	(56)	Condenser (.05 mfd.)
(11)	Resistor (50,000 ohms)	6098	(34)	Resistor (10,000 ohms)	33-1060	(57)	Resistor (32,000 ohms)
(12)	Third Padder (in tun. cond.)		(35)	Condenser (.03 mfd.)	30-4025	(58)	Condenser (.05 mfd.)
(13)	Condenser (.00025 mfd.)	30-1032	(36)	Resistor (250,000 ohms)	33-1097	(59)	Resistor (500 ohms)
(14)	Oscillator Transformer	32-1222	(37)	Resistor (250,000 ohms)	33-1097	(60)	Resistor (200 ohms)
(15)	Padder	040008	(38)	Condenser (.00025 mfd.)	30-1032	(61)	Condenser (.00005 mfd.)
(16)	Resistor (15,000 ohms)	6208	(39)	Resistor (250,000 ohms)	3768	(62)	Choke
(17)	Padder (Pri. 1st I. F. Trans.)		(40)	Resistor (50,000 ohms)	4237	(63)	Condenser (.5 mfd.)
(18)	First I. F. Transformer	32-1236	(41)	Condenser (.25 mfd.)	30-4065	(64)	Vibrator Choke
(19)	Resistor (500,000 ohms)	6097	(42)	Condenser (.01 mfd.)	30-4169	(65)	Condenser (.5 mfd.)
(20)	Condenser (.05 mfd.)	30-4020	(43)	Resistor (500,000 ohms)	6097	(66)	Vibrator
(21)	Padder (Sec. 1st I. F. Trans.)		(44)	Condenser (20 mfd.)	30-4065	(67)	Condenser (.05 mfd.)
(22)	Condenser (.5 mfd.)	30-4058	(45)	Resistor (700 ohms)	33-3019	(68)	Resistor (200 ohms)
(23)	Resistor (500 ohms)	6977	(46)	Condenser (.004 mfd.)	30-4185	(69)	Condenser (.00025 mfd.)

(70)	Resistor (200 ohms)	7217
(71)	Condenser (.00125 mfd.)	5886
(72)	Power Transformer	32-7131
(73)	Condenser (.006 mfd.)	30-4024
(74)	Filter Condenser (4-8 mfd.)	30-2015
(75)	Filter Choke	32-7104
(76)	R. F. Choke	32-1281
	Spark Plug Resistors	33-1101
	Spark Plug Resistors	33-1102
	Distributor Resistor	33-1103
	Interference Condenser	30-4007
	Studs	28-6102
	Nuts (mounting)	W55A
	Battery Cable	38-5296
	Antenna Lead	38-5131
	Acorn Nut	W821
	Dial	27-5034
	Knob (volume)	27-4045
	Knob (tuning)	03064
	Flexible Shaft (volume)	28-8182
	Flexible Shaft (tuning)	28-8181

PHILCO RADIO & TEL. CORP.

POLICE RECEIVER-MODEL DP CODE 121 & 122



MODEL DP PARTS LIST

(CODE DP121 AND DP122)

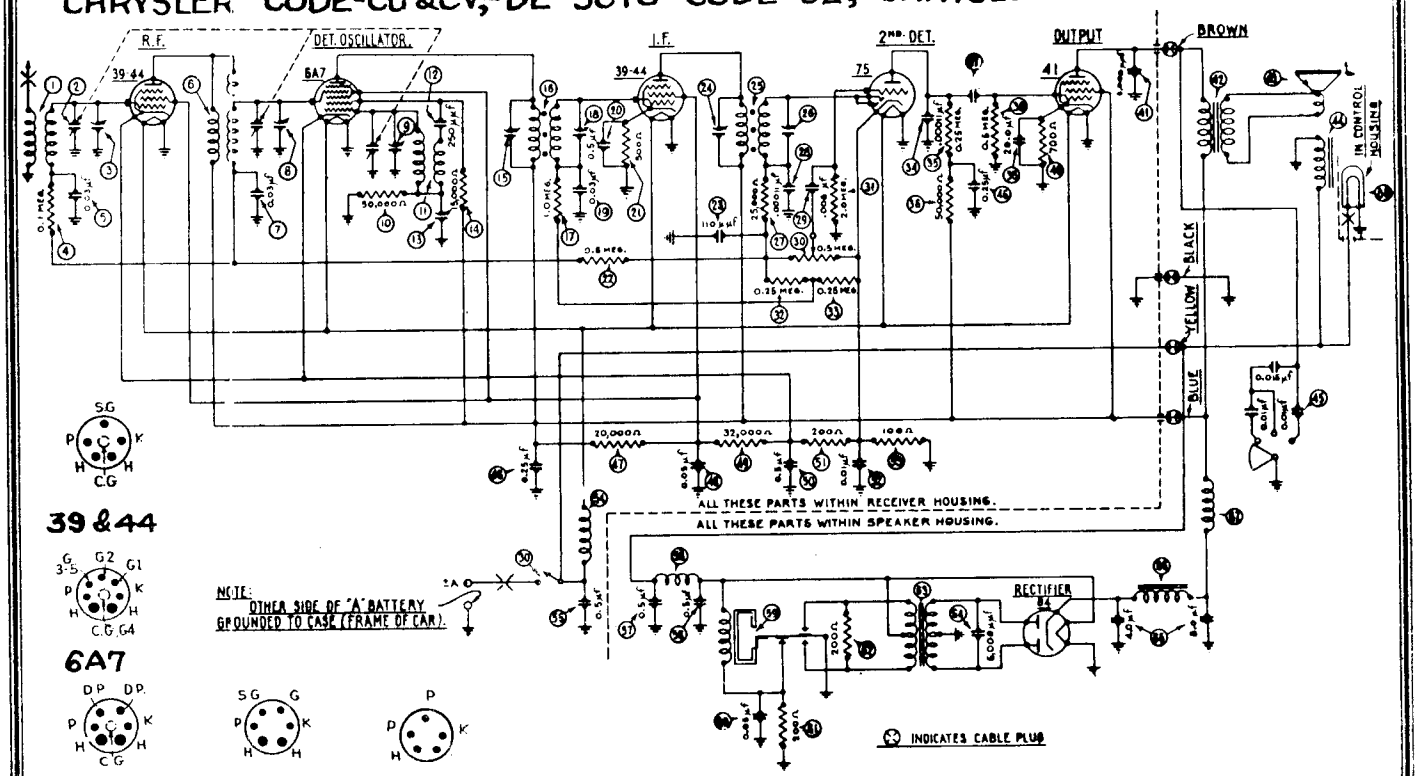
(2400KC) (1700KC)

①	Antenna Transformer (2400 K. C.)	32-1326	⑭	High Frequency Padder		⑭	Resistor (32,000 ohms)	33-1027	⑤⑤	Resistor (200 ohms)	7217
	(1700 K. C.)	32-1393	⑮	First I. F. Transformer	32-1329	⑮	Condenser (.25 mfd.)	04360	⑤⑥	Condenser (.00125 mfd.)	3886
②	Antenna Padder (See Note 1)		⑯	Padder (Sec. 1st I. F. Trans.)		⑯	Condenser (.00025 mfd.)	3082	⑤⑦	Power Transformer	32-7231
③	Resistor (70,000 ohms)	33-1115	⑰	Condenser (.03 mfd.)	30-4025	⑰	Resistor (250,000 ohms)	33-1097	⑤⑧	Condenser (.006 mfd.)	30-4024
④	Condenser (.03 mfd.)	30-4025	⑱	Resistor (500 ohms)	33-3031	⑱	Condenser (.006 mfd.)	30-4125	⑤⑨	Filter Choke	32-7215
⑤	Condenser (.05 mfd.)	30-4020	⑲	Condenser (.05 mfd.)	30-4020	⑲	Resistor (500,000 ohms)	6097	⑥⑩	R. F. Choke	32-1281
⑥	Resistor (500 ohms)	33-3031	⑳	Resistor (1,000,000 ohms)	33-1096	⑳	Condenser (10—4—8 mfd.)	30-2072	⑥①	Antenna Choke	32-1372
⑦	R. F. Transformer (2400 K. C.)	32-1327	㉑	Padder (Pr. sec. I. F. Trans.)		㉑	Resistor (700 ohms)	6443	⑥②	Condenser (.00005 mfd.)	30-1029
	(1700 K. C.)	32-1394	㉒	Second I. F. Transformer	32-1237	㉒	Condenser (.006 mfd.)	30-4024	⑥③	"A" Choke	32-1374
⑧	RF Padder		㉓	Padder (Sec. 2nd I. F. Trans.)		㉓	Output Transformer	32-7214		Studs	28-6036
⑨	Resistor—See Note 2 (2500 ohms) (2400 K. C.)	7775	㉔	Condenser (.00011 mfd.)	30-1020	㉔	Cone and Voice Coil	02861		Nut (Mounting)	W55
	(3000 ohms) (1700 K. C.)	6096	㉕	Resistor (25,000 ohms)	33-1013	㉕	Field Coil Assembly	36-3097		Control Unit Assembly	42-5149
⑩	Condenser (700 mmfd.)	5863	㉖	Condenser (.00025 mfd.)	30-1020	㉖	Pilot Lamp	6608		Ammeter Lead	38-5296
⑪	Padder (Pri. 1st I. F. Trans.)		㉗	Condenser (.006 mfd.)	30-4125	㉗	Resistor (7 ohms)	33-3035		Antenna Lead	38-5131
⑫	Oscillator Transformer (2400 K. C.)	32-1328	㉘	Volume Control and Switch Assembly	38-5606	㉘	A Choke	32-1286		Interference Condenser	30-4007
	(1700 K. C.)	32-1395	㉙	Resistor (2,000,000 ohms)	33-1025	㉙	Condenser (.5 mfd.)	30-4047		Distributor Resistor	4546
⑬	Condenser (.00011 mfd.)	30-1006	㉚	Resistor (10,000 ohms)	33-1000	㉚	Vibrator Choke	32-1235		Spark Plug Resistor	33-1015
			㉛	Condenser (.25 mfd.)	30-4146	㉛	Condenser (.5 mfd.)	30-4147		4 prong socket	27-6006
			㉜	Condenser (.05 mfd.)	30-4025	㉜	Vibrator	38-5036		5 prong socket	27-6014
			㉝	Resistor (70,000 ohms)	33-1115	㉝	Condenser (.05 mfd.)	30-4039		6 prong socket	6417C
						㉞	Resistor (200 ohms)	7217			

PHILCO RADIO & TEL. CORP.

MODEL G

DODGE-CODE DR & DS PLYMOUTH CODE PE & PF
CHRYSLER CODE-CU & CV,-DE-SOTO CODE SE,-CHRYSLER-SIX CODE CA & CB



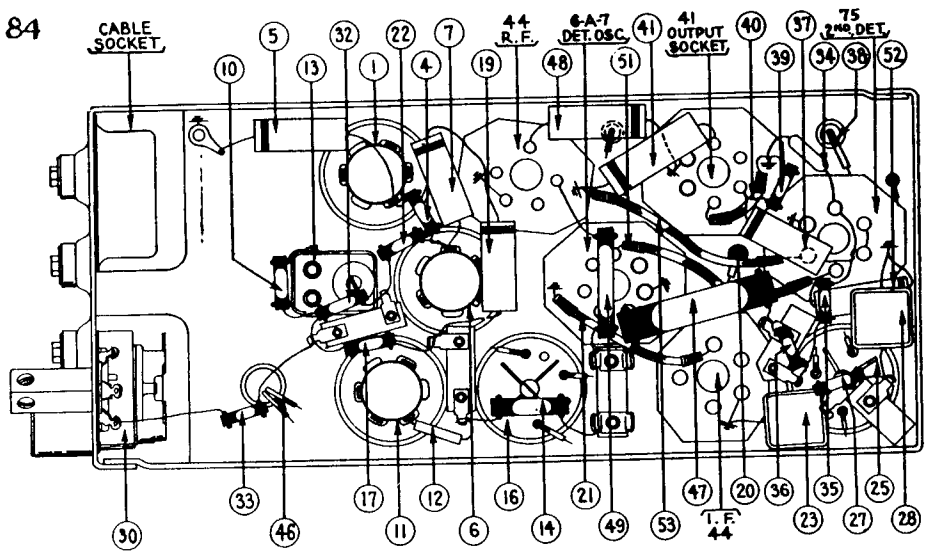
39 & 44

6A7

75 41 84

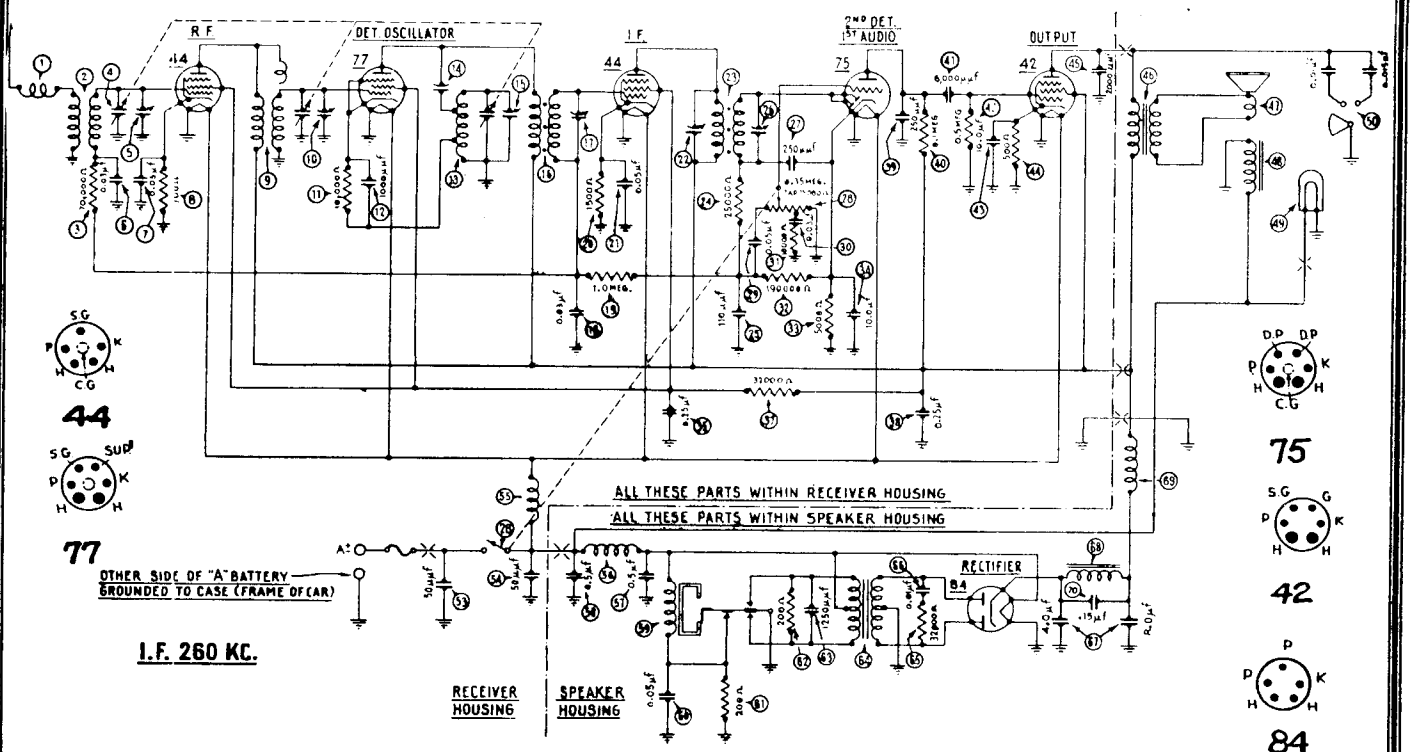
Model G

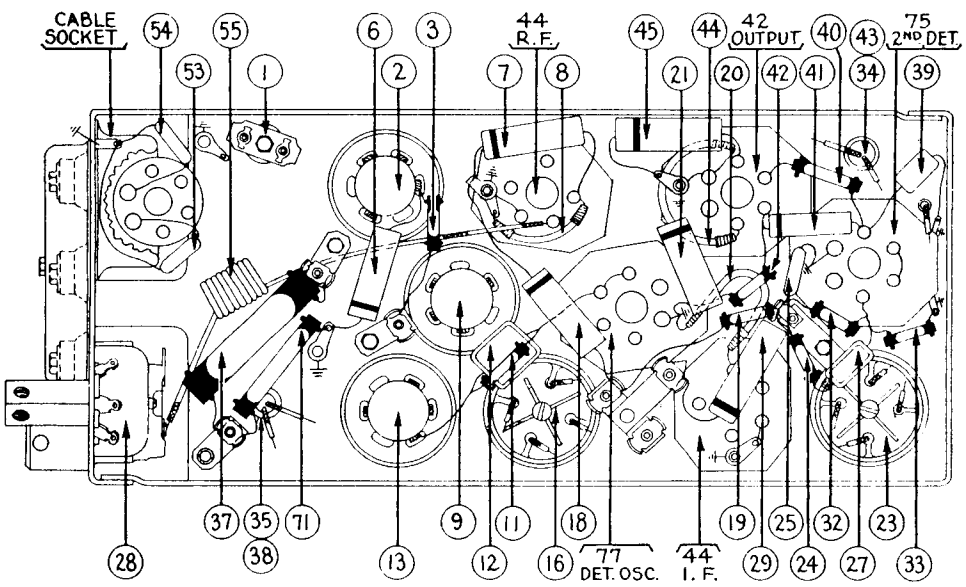
(1)	Antenna Transformer	32-1220
(2)	Tuning Condenser	31-1182
(3)	1st Padder (on tuning cond.)	
(4)	Resistor (99,000 ohms)	6099
(5)	Condenser (.03 mfd.)	30-4025
(6)	R. F. Transformer	32-1221
(7)	Condenser (.03 mfd.)	30-4025
(8)	2nd Padder (on tuning cond.)	
(9)	3rd Padder (on tuning cond.)	
(10)	Resistor (51,000 ohm)	6098
(11)	Oscillator Transformer	32-1222
(12)	Condenser (.00025 mfd.)	3082
(13)	Padder	31-6012
(14)	Resistor (15,000 ohms)	6208
(15)	Padder (Prim. 1st I. F.) part of 32-1236 assembly	
(16)	I. F. Transformer (1st)	32-1236
(17)	Resistor (1,000,000 ohms)	33-1096
(18)	Padder (Secondary 1st I. F.) part of 32-1236 assembly	
(19)	Condenser (.03 mfd.)	30-4025
(20)	Condenser (.5 mfd.)	40-4018
(21)	Resistor (500 ohms)	6977
(22)	Resistor (500,000 ohms)	6097
(23)	Condenser (.00011 mfd.)	30-1031
(24)	Padder (Prim. 2nd I. F.) part of 32-1237 assembly	
(25)	I. F. Transformer (2nd)	32-1237
(26)	Padder (Secondary 2nd I. F.) part of 32-1237 assembly	
(27)	Resistor (25,000 ohms)	33-1013
(28)	Condenser (.00011 mfd.)	30-1031
(29)	Condenser (.006 mfd.)	30-4125
(30)	Volume Control Assembly	33-5056
(31)	Resistor (2,000,000 ohms)	33-1025
(32)	Resistor (250,000 ohms)	33-1097
(33)	Resistor (250,000 ohms)	33-1097
(34)	Condenser (.00011 mfd.)	30-1006
(35)	Resistor (250,000 ohms)	33-1097
(36)	Resistor (51,000 ohms)	6098
(37)	Condenser (.05 mfd.)	30-4123
(38)	Condenser (20 mfd.)	30-2063
(39)	Resistor (500,000 ohms)	6097
(40)	Resistor (700 ohms)	6443
(41)	Condenser (.006 mfd.)	30-4024
(42)	Output Transformer	2598
(43)	Cone and Voice Coil	36-3159
(44)	Field Coil Assembly	36-3140
(45)	Tone Control	30-4127
(46)	Condenser (.25, .25 mfd.)	30-4126
(47)	Resistor (20,000 ohms)	5649
(48)	Condenser (.05 mfd.)	30-4020
(49)	Resistor (32,000 ohms)	3525
(50)	Condenser (.5 mfd.)	30-4018
(51)	Resistor (200 ohms)	7217
(52)	Condenser (.01 mfd.)	30-4124
(53)	Resistor (100 ohms)	33-3023
(54)	"A" Choke	32-1312
(55)	Condenser (.5 mfd.)	30-4015
(56)	Vibrator Choke	32-1260
(57)	Condenser (.5 mfd.)	30-4015
(58)	Condenser (.5 mfd.)	30-4015
(59)	Vibrator Unit	38-5036
(60)	Condenser (.05 mfd.)	30-4030
(61)	Resistor (200 ohms)	7217
(62)	Resistor (200 ohms)	7217
(63)	Power Transformer	32-7110
(64)	Condenser (.006 mfd.)	30-4024
(65)	Filter Condenser (4 mfd., 8 mfd.)	30-2030
(66)	"B" Chokes	32-7118
(67)	R. F. Choke	32-1260
(68)	Pilot Lamp	34-2031
	Spark Plug Resistor	33-1015
	Distributor Resistor	33-1113
	1 Mfd. Condenser	4522-S
	⅓ Mfd. Condenser	30-4007
	Strip Copper Braid	9446
	Glass for Control	27-7325
	Dial (Plymouth)	42-5123
	Pointer (Plymouth)	28-1763
	Control Assembly (Plymouth)	42-5113
	Knobs (Volume) Plymouth	27-4084
	Knobs (Tuning) Plymouth	27-4083
	Bezel Assembly (Plymouth)	42-5115
	Knob Springs	28-1738
	Interconnecting Cable	41-3065
	"A" Cable	38-5704
	"A" Terminal	L-1626
	Flexible Shaft (Tuning)	28-8188
	Flexible Shaft (Volume)	28-8198
	Speaker Mounting Plate	28-1790
	Speaker Mounting Bracket	28-1791
	Receiver Mounting Plate	28-1792
	Receiver Mounting Bracket	28-1848
	Fuse	7227
	Fuse Insulator	27-7131



PHILCO RADIO & TEL. CORP.

HUPMOBILE MODEL G, DE-SOTO CODE SE, CHRYSLER-SIX CODE CA & CB





Model G - Code 122

(1)	Antenna Choke	32-1372
(2)	Antenna Transformer	32-1331
(3)	Resistor (20,000 ohms)	33-1115
(4)	Tuning Condenser	31-1214
(5)	First Padder (on Tun. Cond.)	
(6)	Condenser (.03 mfd.)	30-4025
(7)	Condenser (.05 mfd.)	30-4020
(8)	Resistor (200 ohms)	6443
(9)	R. F. Transformer	32-1332
(10)	Second Padder (on Tun. Cond.)	
(11)	Resistor (10,000 ohms)	33-1000
(12)	Condenser (1000 mmfd.)	33-1007
(13)	Oscillator Transformer	32-1333
(14)	Padder (Pri. 1st I. F. Trans.)	
(15)	Third Padder (on Tun. Cond.)	
(16)	First I. F. Transformer	32-1329
(17)	Padder (Sec. 2nd I. F. Trans.)	
(18)	Condenser (.05 mfd.)	30-4025
(19)	Resistor (1,000,000 ohms)	33-1006
(20)	Resistor (1500 ohms)	33-3047
(21)	Condenser (.05 mfd.)	30-4020
(22)	Padder (Pri. 2nd I. F. Trans.)	
(23)	Second I. F. Transformer	32-1237
(24)	Resistor (25,000 ohms)	33-1013
(25)	Condenser (.00011 mfd.)	30-1031
(26)	Padder (Sec. 2nd I. F. Trans.)	
(27)	Condenser (.00025 mfd.)	30-1032
(28)	Volume Control and Switch Assembly	33-5067
(29)	Condenser (.05 mfd.)	30-4020
(30)	Condenser (.03 mfd.)	30-4025
(31)	Resistor (10,000 ohms)	33-1000
(32)	Resistor (190,000 ohms)	33-1116
(33)	Resistor (5000 ohms)	6096
(34)	Condenser (10 mfd.)	30-2076
(35)	Condenser (.25 mfd.)	30-4126
(37)	Resistor (32,000 ohms)	3525
(38)	Condenser (.25 mfd.)	30-4126
(39)	Condenser (.00025 mfd.)	30-1032
(40)	Resistor (100,000 ohms)	6099
(41)	Condenser (.005 mfd.)	30-4125
(42)	Resistor (500,000 ohms)	6097
(43)	Condenser (10 mfd.)	30-2076
(44)	Resistor (500 ohms)	33-3031
(45)	Condenser (.004 mfd.)	30-4185
(46)	Output Transformer	32-7042
(47)	Cone and Voice Coil	36-3157
(48)	Field Coil Assembly	36-3097
(49)	Pilot Lamp	31-2031
(50)	Tone Control	30-4189
(53)	Condenser (.00005 mfd.)	30-1029
(54)	Condenser (.00005 mfd.)	30-1029
(55)	"A" Choke	32-1432
(56)	Vibrator Choke	32-1260
(57)	Condenser (.5 mfd.)	30-4047
(58)	Condenser (.5 mfd.)	30-4015
(59)	Vibrator	38-5036
(60)	Condenser (.05 mfd.)	30-4039
(61)	Resistor (200 ohms)	7217
(62)	Resistor (200 ohms)	7217
(63)	Condenser (.00125 mfd.)	5886
(64)	Power Transformer	32-7253
(65)	Resistor (32,000 ohms)	3525
(66)	Condenser (.01 mfd.)	30-4051
(67)	Filter Condenser (4-8mfd.)	30-2030
(68)	Filter Choke	32-7254
(69)	R. F. Choke	32-1260
(70)	Condenser (.15 mfd.)	30-4191
(71)	Resistor (25,000 ohms)	3656
	Spark Plug Resistor	33-1015
	Distributor Resistor	33-1113E
	1 mfd. Condenser	45228
	½ mfd. Condenser	30-4007
	Glass for Control	27-7325
	Dial Assembly	42-5204
	Pointer	28-1825
	Control Assembly	42-5194
	Knobs—Volume	27-4072
	Knobs—Tuning	27-4071
	Knob Springs	28-1738
	Bezel Assembly	42-5115
	Interconnecting Cable	41-3065
	Ammeter Cable	38-5704
	Terminal	L-1626
	Flexible Shaft—Tuning	28-8188
	Flexible Shaft—Volume	28-8198
	Speaker Mounting Bracket	29-1791
	Speaker Mounting Plate	29-1790
	Receiver Mounting Plate	29-1792
	Receiver Mounting Bracket	29-1848
	Carriage Bolt	W-1316A
	Fuse	7227
	Fuse Insulator	27-7131

Note 1. Adjust the High Frequency padders (15) at 1600 K. C.

Note 2. A 25,000 ohm resistor, part number 3656, (71) on the parts list and base view has been added to the Receiver. One end is connected to the screen grid lead for the R. F. Osc. and I. F. tubes and the other end is grounded.

PHILCO RADIO & TEL. CORP.

HUPMOBILE MODEL H

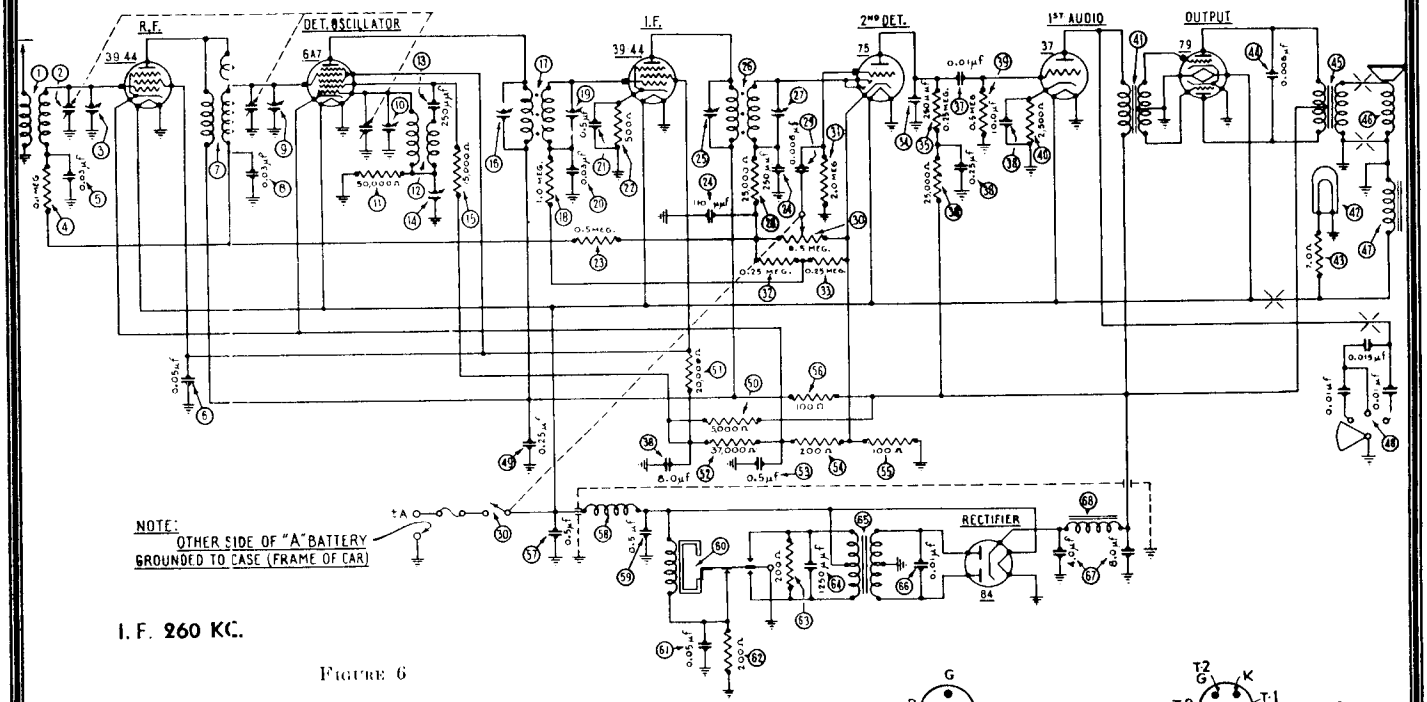
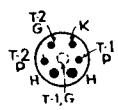
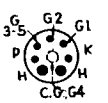
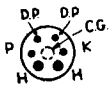
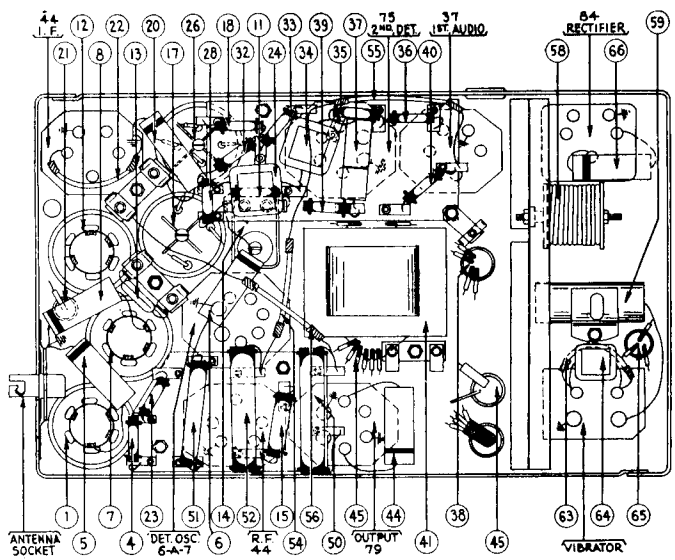


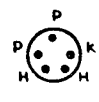
FIGURE 6









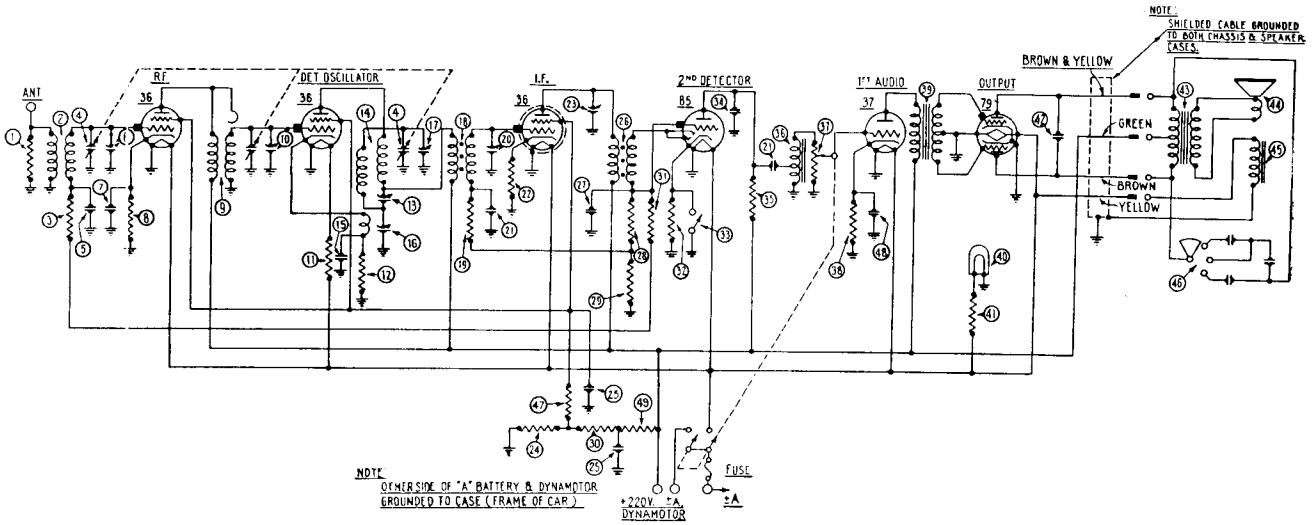


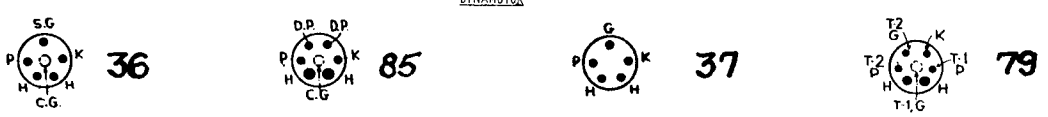
Hupmobile-Philco Model H Parts List

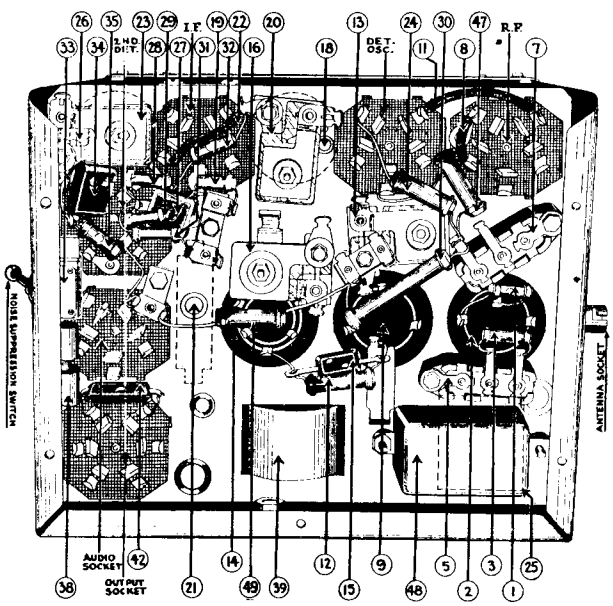
(1)	Antenna Transformer	32-1220
(2)	Tuning Condenser	31-1202
(3)	1st Padder (in tun. cond.)	
(4)	Resistor (100,000 ohms)	6099
(5)	Condenser (.03 mfd.)	30-4025
(6)	Condenser (.05 mfd.)	30-4020
(7)	R. F. Transformer	32-1221
(8)	Condenser (.03 mfd.)	30-4025
(9)	2nd Padder (in tun. cond.)	
(10)	3rd Padder (in tun. cond.)	
(11)	Resistor (50,000 ohms)	6098
(12)	Oscillator Transformer	32-1222
(13)	Condenser (.00025 mfd.)	3082
(14)	Padder	31-6012
(15)	Resistor (15,000 ohms)	6208
(16)	Padder (Primary 1st I. F.)	
(17)	First I. F. Transformer	32-1236
(18)	Resistor (1,000,000 ohms)	33-1096
(19)	Padder (Secondary 1st I. F.)	
(20)	Condenser (.03 mfd.)	30-4025
(21)	Condenser (.5 mfd.)	30-4058
(22)	Resistor (500 ohms)	6977
(23)	Resistor (500,000 ohms)	6097
(24)	Condenser (.0001 -.00025)	30-1020
(25)	Padder (Primary 2nd I. F.)	
(26)	Second I. F. Transformer	32-1237
(27)	Padder (Secondary 2nd I. F.)	
(28)	Resistor (25,000 ohms)	33-1013
(29)	Condenser (.006 mfd.)	30-4125
(30)	Volume Control Assembly	38-5534
(31)	Resistor (2,000,000 ohms)	33-1025
(32)	Resistor (250,000 ohms)	33-1097
(33)	Resistor (250,000 ohms)	33-1097
(34)	Condenser (.00025 mfd.)	5858
(35)	Resistor (250,000 ohms)	33-1097
(36)	Resistor (25,000 ohms)	33-1013
(37)	Condenser (.01 mfd.)	30-4145
(38)	Condenser (.25-8-10 mfd.)	30-4135
(39)	Resistor (500,000 ohms)	6097
(40)	Resistor (2500 ohms)	33-1100
(41)	Input Transformer	32-7206
(42)	Pilot Lamp	6608
(43)	Resistor (7 ohms)	33-3130
(44)	Condenser (.006 mfd.)	30-4024
(45)	Output Transformer	32-7205
(46)	Cone and Voice Coil	36-3159
(47)	Field Coil Assembly	36-3130
(48)	Tone Control	30-4142
(49)	Condenser (.25 mfd.)	30-4134
(50)	Resistor (5,000 ohms)	33-1070
(51)	Resistor (20,000 ohms)	6649
(52)	Resistor (37,000 ohms)	33-1098
(53)	Condenser (.5 mfd.)	30-4018
(54)	Resistor (200 ohms)	7217
(55)	Resistor (100 ohms)	33-3023
(56)	Resistor (100 ohms)	33-3023
(57)	Condenser (.5 mfd.)	30-4015
(58)	Vibrator Choke	32-1335
(59)	Condenser (.5 mfd.)	30-4115
(60)	Vibrator Unit	38-5036
(61)	Condenser (.05 mfd.)	30-4039
(62)	Resistor (200 ohms)	7217
(63)	Resistor (200 ohms)	7217
(64)	Condenser (.00125 mfd.)	5886
(65)	Power Transformer	32-7098
(66)	Condenser (.01 mfd.)	30-4051
(67)	Filter Condenser (4-8 mfd.)	30-2015
(68)	"B" Choke	32-7104
	Interference Condenser	4522S
	Studs	28-6036
	Nuts (mounting)	W55
	Battery Cable	38-5296
	Antenna Lead	38-5674
	Acorn Nut	W821
	Fuse	7227
	Fuse Insulator	27-7131
	Knob	27-4091
	Glass	27-7325
	Glass Gasket	27-7509
	Pointer	28-1793
	Shaft	28-8214
	Face Assembly	42-5125

PHILCO RADIO & TEL. CORP.

PACKARD DE LUXE MODEL PA







MODEL PA PARTS LIST

No. in Figs. 1 and 2	Description	Part No.
(1)	Resistor (5,000 ohm)	6096
(2)	Antenna Transformer	32-1197
(3)	Resistor (100,000 ohm)	6099
(4)	Tuning Condenser	04308
(5)	By-pass Condenser (.05 mfd.)	3615-AN
(6)	Compensator section on tuning condenser	
(7)	By-pass Condenser	3615-AY
(8)	Resistor (500 ohm)	6977
(9)	R. F. Transformer	32-1198
(10)	Compensator section on tuning condenser	
(11)	Resistor (2.7 ohm)	6511
(12)	Resistor (13,000 ohm)	8267
(13)	Compensator	04000-J
(14)	Oscillator Coil	06916
(15)	Condenser (.0007 mfd.)	4520
(16)	Compensating Condenser	04000-S
(17)	Compensator section on tuning condenser	
(18)	First I. F. Transformer	06932
(19)	Resistor (500,000 ohm)	6097
(20)	Compensating Cond.	04000-X
(21)	Condenser (.05 mfd., .15 mfd.)	06091
(22)	Resistor (500 ohm)	6977
(23)	Compensating Cond.	04000-X
(24)	Resistor (20,000 ohm)	6650
(25)	Cond. (.5 mfd., .25 mfd.)	06088
(26)	Second I. F. Transformer	05970
(27)	Condenser (.00025 mfd.)	3082
(28)	Resistor (100,000 ohm)	6099

No. in Figs. 1 and 2	Description	Part No.
(29)	Resistor (100,000 ohm)	6099
(30)	Resistor (20,000 ohm)	6649
(31)	Resistor (500,000 ohm)	6097
(32)	Resistor (5,000 ohm)	6096
(33)	Switch	5462
(34)	Condenser (.00125 mfd.)	5886
(35)	Resistor (50,000 ohm)	4518
(36)	Audio Transformer	7552
(37)	Volume Control	7525
(38)	Resistor (2,500 ohm)	7775
(39)	Input Transformer	7652
(40)	Pilot Lamp	6608
(41)	Resistor (7 ohm)	5110
(42)	Condenser (.06 mfd.)	6359
(43)	Output Transformer	2515
(44)	Speaker Coil and Cone	02823
(45)	Speaker Field Pot	02795
(46)	Tone Control	05366
(47)	Resistor (25,000 ohm)	4516
(48)	Condenser	7774
(49)	Resistor (8,000 ohm)	7835
	Dial	8255
	Battery Cable	41-3035
	Antenna Lead	38-5161
	Packard Dynamotor	41-1005
	Key	6091
	Studs	28-6088
	Nuts (Studs)	W-55
	Spark Plug Resistor	33-1016
	Distributor Resistor	33-1017
	Spark Plug Terminals	28-6053
	Intereference Condenser	4522

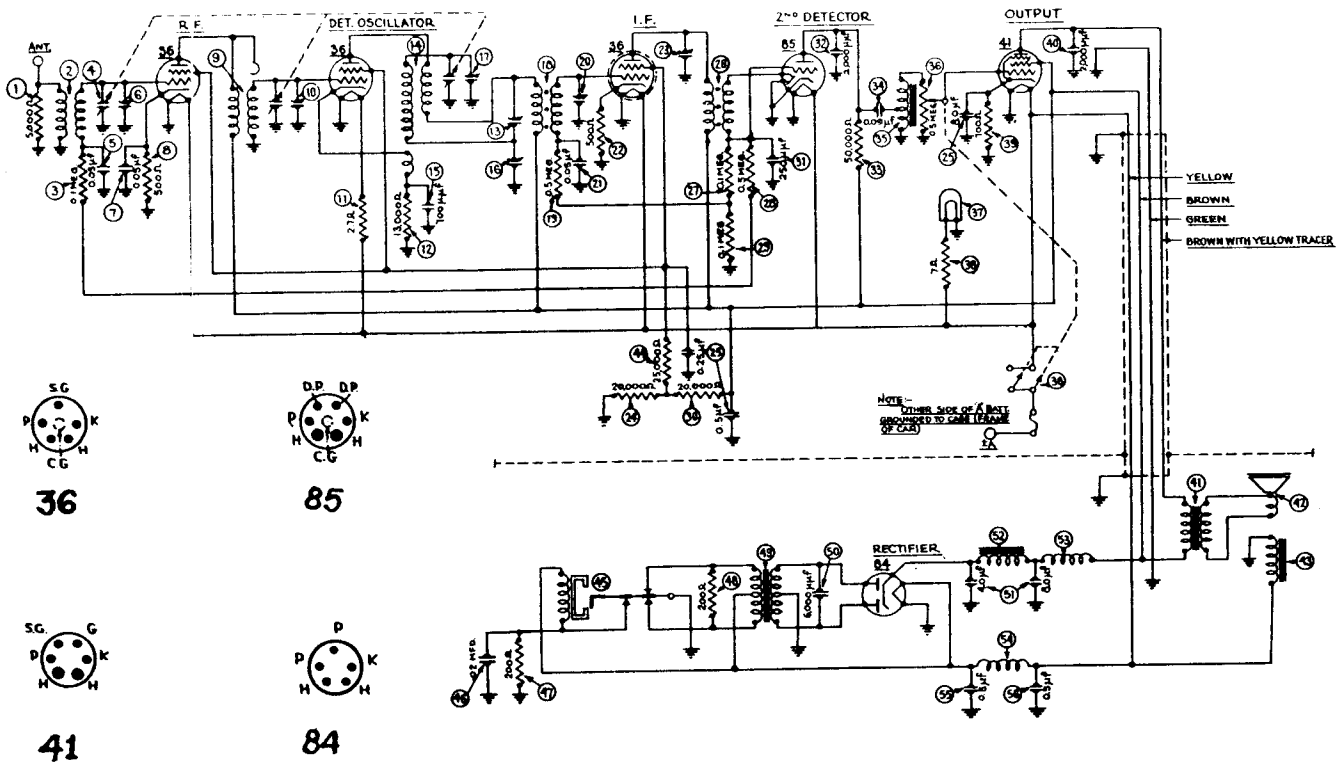
Control Shaft Installation

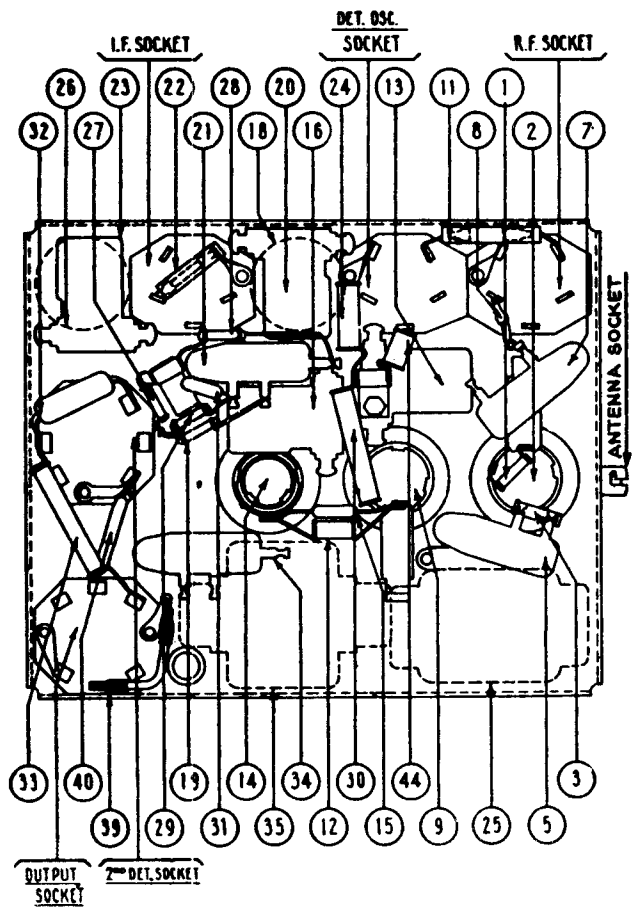
Remove the front cover plate from the receiver. Turn the left-hand knob (volume control) to a point where the key will lock it firmly in position. Insert this shaft and conduit into the left-hand receptacle on the front of receiver and tighten set screw. Next turn the dial to line up with the extra division below 150 and turn the condenser unit so the plates are completely out of mesh, at which point the screw in the brass coupler should be accessible. Next insert the tuning shaft and conduit in the right-hand receptacle on front of receiver, locking them in position with their respective set screws.

When the control unit is mounted on the steering column, fasten the two flexible shafts to the bottom edge of the instrument panel with a small clamp, this being so located as to make the best appearance and provide the smoothest operation. Cover these flexible shafts and the dial light wire with the small piece of loom (supplied with set) to prevent the shafts coming in contact with the ammeter terminals in the instrument board.

PHILCO RADIO & TEL. CORP.

PACKARD STANDARD CAR RADIO MODEL P B





MODEL PB PARTS LIST

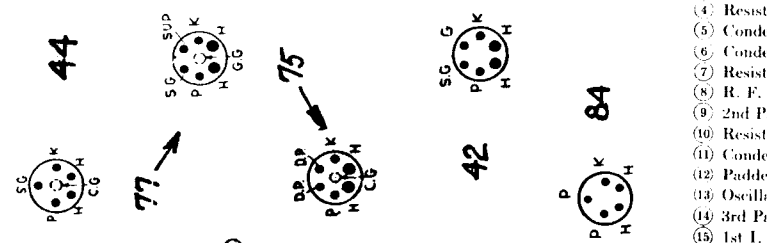
No. in Diagrams C & D	Description	Part No.
(1)	Resistor (5,000 ohm)	6096
(2)	Antenna Transformer	32-1197
(3)	Resistor (100,000 ohm)	6099
(4)	Tuning Condenser	04308
(5)	By-pass Condenser (.05 mfd.)	3615-AN
(6)	R. F. Transformer	32-1198
(7)	By-pass Condenser (.05 mfd.)	3615-AT
(8)	Resistor (500 ohm)	6977
(9)	Detector Coil	03915
(10)	Compensator section on tuning condenser	
(11)	Resistor (2.7 ohm)	6511
(12)	Resistor (13,000 ohm)	8267
(13)	Compensating Cond.	04000-J
(14)	Oscillator Coil	06916
(15)	Condenser (.0007 mfd.)	4520
(16)	Compensating Cond.	04000-S
(17)	Compensator section on tuning condenser	
(18)	First I. F. Transformer	06932
(19)	Resistor (500,000 ohm)	6097
(20)	Compensating Cond.	04000-X
(21)	Condenser (.05 mfd.)	3615-AK
(22)	Resistor (500 ohm)	6977
(23)	Compensating Cond.	04000-X
(24)	Resistor (20,000 ohm)	6650
(25)	Condenser (.25 mfd., .5 mfd., 8 mfd.)	04354
(26)	Second I. F. Transformer	05970
(27)	Resistor (100,000 ohm)	6099
(28)	Resistor (500,000 ohm)	6097
(29)	Resistor (100,000 ohm)	6099
(30)	Resistor (20,000 ohm)	6649
(31)	Condenser (.00025 mfd.)	3082
(32)	Condenser (.0002 mfd.)	4059
(33)	Resistor (50,000 ohm)	4237

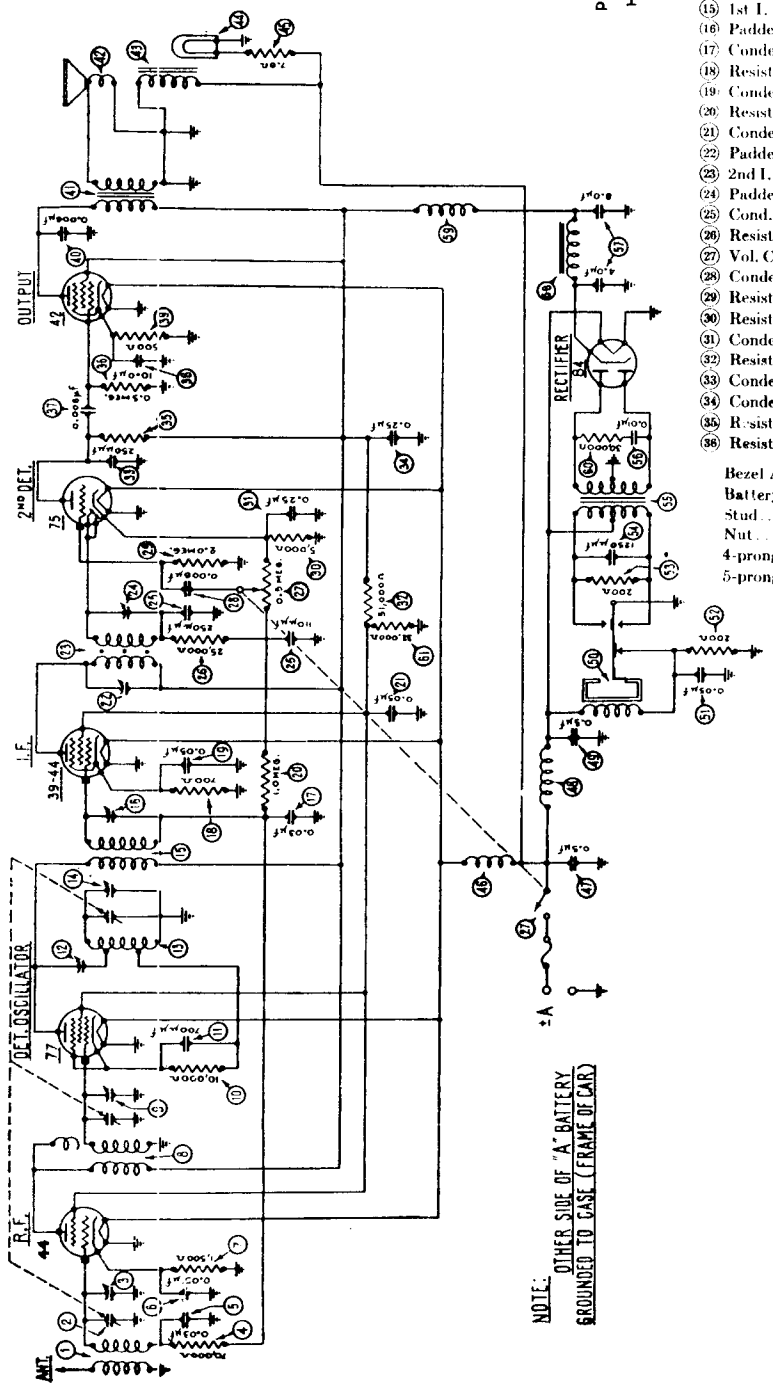
No. in Diagrams C & D	Description	Part No.
(34)	Condenser (.09 mfd.)	4989-Y
(35)	Audio Transformer	7535
(36)	Volume Control (500,000 ohm) and switch	7525
(37)	Pilot Lamp	6608
(38)	Resistor (7 ohm)	5110
(39)	Resistor (700 ohm)	6443
(40)	Condenser (.002 mfd.)	6853
(41)	Output Transformer	2598
(42)	Cone and Coil	36-3020
(43)	Field Coil	33-3140
(44)	Resistor (25,000 ohm)	4516
(45)	Vibrator	38-5036
(46)	Condenser (.05 mfd.)	30-4039
(47)	Resistor (200 ohm)	7217
(48)	Resistor (200 ohm)	7217
(49)	Power Transformer	32-7110
(50)	Condenser (.006 mfd.)	6359
(51)	Filter Condenser (4 mfd., 8 mfd.)	30-2030
(52)	Filter Choke	32-7118
(53)	R. F. Choke	32-1068
(54)	"A" Choke	32-1259
(55)	Condenser (.5 mfd.)	30-4015
(56)	Condenser (.5 mfd.)	30-4015
	Fuse (15A.)	7227
	Dial	8255
	"A" Battery Lead	41-3042
	Speaker Power Cable	41-3044
	Antenna Lead	38-5161
	Key	6091
	Studs	28-6088
	Nuts (Studs)	W-55
	Spark Plug Resistor	33-1016
	Distributor Resistor	33-1017
	Spark Plug Terminal	28-6053
	Interference Condenser	4522

PHILCO RADIO & TEL. CORP.

HUPMOBILE MODEL R
STUDEBAKER JR, A.C.-236

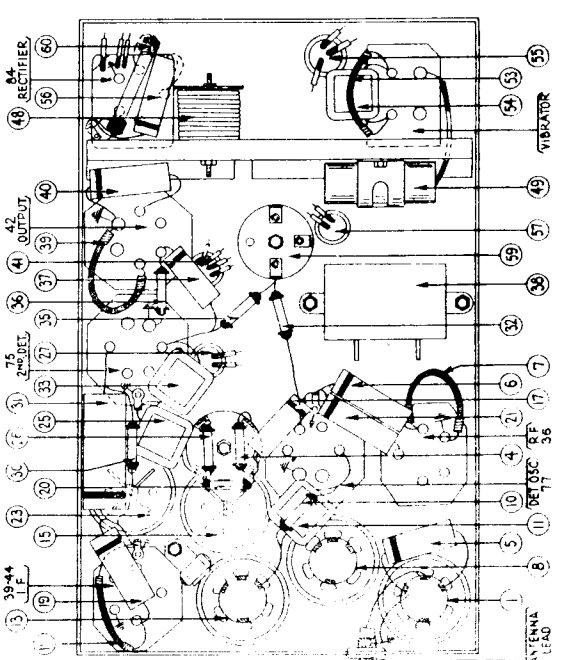
NASH 1200 SERIES
" 1289 A.C.
" 110 SERIES
" 1189 A.C.





MODEL R PARTS LIST

(1)	Antenna Transformer	32-1331	
(2)	Tuning Condenser	31-1164	
(3)	1st Padder (on tun. cond.)		
(4)	Resistor (70,000 ohms)	33-1115	
(5)	Condenser (.03 mfd.)	30-4025	
(6)	Condenser (.05 mfd.)	30-4020	
(7)	Resistor (1500 ohms)	32-3047	
(8)	R. F. Transformer	32-1332	
(9)	2nd Padder (on tun. cond.)		
(10)	Resistor (10,000 ohms)	33-1006	
(11)	Condenser (.0007 mfd.)	5863	
(12)	Padder (Pri. 1st I. F. Tran.)		
(13)	Oscillator Transformer	32-1333	
(14)	3rd Padder (on tun. cond.)		
(15)	1st I. F. Transformer	32-1329	
(16)	Padder (Sec. 1st I. F. Tran.		
(17)	Condenser (.03 mfd.)	30-4025	
(18)	Resistor (700 ohms)	6443	
(19)	Condenser (.05 mfd.)	30-4020	
(20)	Resistor (1,000,000 ohms)	33-1096	
(21)	Condenser (.05 mfd.)	30-4020	
(22)	Padders (Prim. 2nd I. F.)		
(23)	2nd I. F. Transformer	32-1237	
(24)	Padder (Sec. I. F. Tran.)		
(25)	Cond. (.00011 .00025 mfd.)	30-1020	
(26)	Resistor (25,000 ohms)	33-1013	
(27)	Vol. Con. & Switch Assm.	33-5058	
(28)	Condenser (.006 mfd.)	30-4125	
(29)	Resistor (2,000,000 ohms)	33-1025	
(30)	Resistor (5000 ohms)	6096	
(31)	Condenser (.25 mfd.)	30-4146	
(32)	Resistor (51,000 ohms)	5868	
(33)	Condenser (.00025 mfd.)	3082	
(34)	Condenser (.25 mfd.)	04360	
(35)	Resistor (100,000 ohms)	6099	
(36)	Resistor (500,000 ohms)	6097	
	Bezel Assembly	42-5115	
	Battery Cable	38-5704	
	Stud	28-6036	
	Nut	W55	
	4-prong Socket	27-6006	
	5-prong Socket	27-6014	
(37)	Condenser (.006 mfd.)	30-4125	
(38)	Condenser (10 mfd.)	7440	
(39)	Resistor (500 ohms)	33-3031	
(40)	Condenser (.006 mfd.)	30-4024	
(41)	Output Transformer	32-7214	
(42)	Cone & Voice Coil	02861	
(43)	Field Coil Assembly	36-3097	
(44)	Pilot Light	6908	
(45)	Resistor (7 ohms)	33-3035	
(46)	"A" Choke	32-1268	
(47)	Condenser (.5 mfd.)	30-4047	
(48)	Vibrator Choke	32-1235	
(49)	Condenser (.5 mfd.)	30-4147	
(50)	Vibrator Unit	38-5036	
(51)	Condenser (.05 mfd.)	30-4039	
(52)	Resistor (200 ohms)	7217	
(53)	Resistor (200 ohms)	7217	
(54)	Condenser (.00125 mfd.)	5886	
(55)	Power Transformer	32-7216	
(56)	Condenser (.01 mfd.)	30-4051	
(57)	Condenser (4.—8. mfd.)	30-2072	
(58)	"B" Choke	32-7215	
(59)	R F Choke	32-1281	
(60)	Resistor (30,000 ohms)	7836	
(61)	Resistor (32,000 ohms)	3525	
	Spark Plug Resistor	33-1015	
	Distributor Resistor	33-1113E	
	Screw Type Resistor	4851	
	Interference Cond. (½ mfd.)	30-4007	
	Interference Cond. (1 mfd.)	4522	
	Face Assembly	42-5176	
	Glass for Control	27-7325	
	Pointer	28-1991	
	Control Assembly	42-5174	
	Knobs	27-4058	
	Knob Spring	28-1738	
	6-prong Socket	6417	
	Antenna Lead	38-5705	
	Fuse	7227	
	Fuse Insulator	27-7131	
	Shafts	28-8234	



DATA ON ALL PHILCO SPEAKERS

All speakers are equipped with output transformer, except as mentioned in notes

Speaker Model No.	Speaker Part No.	Used in Receiver Model:	For Receiver Output, Using:	Field Coil and Pot Assembly (Part No.)	Replacement Voice Coil and Cone Assembly (Part No.)	Field Coil Resistance D.C. (Ohms)	Voice Coil Resistance (Ohms)	Bucking Coil (Part No.)	Output Transformer (Part No.)	Rated Field Current	Output Transformer Primary Resistance; D.C. (Ohms)	Replacement Speaker
A‡		3 (Transitone)	1-71A	Not furnished	02996	4.05	.62	.....	2706	1.50 A.	375	A-17
A-2‡	02971	3 (Transitone)	1-71A	Not furnished	02996	4.05	.62	.....	2706	1.50 A.	375	A-17
A-3‡	02832	7 (Transitone)	1-38 as Pentode	Not furnished	02996	4.05	.62	.....	2589	1.50 A.	700	A-18
A-4	02822	6 (Transitone); 7 (Transitone)	1-41 as Pentode	02795	36-3238	4.2	1.11	.....	2598	1.25 A.	680	.....
A-5	02756	8 (Transitone)	Push-Pull 41's as Pentodes	02795	36-3238	4.2	1.11	.....	2565	1.25 A.	680	.....
A-6	02712	12 (Transitone) (Code 121)	Push-Pull 41's as Pentodes	02688	36-3238	16.0	1.11	.....	2565	.75 A.	680	.....
A-7	02674	9 (Transitone) (6 Volt)	1-79 as Class "B"	02795	36-3238	4.2	1.11	.....	32-7039	1.25 A.	725	.....
A-8	02665	B-6 (Transitone)	1-41	02795	36-3238	4.2	1.11	.....	2598	1.25 A.	680	.....
A-9	36-1001	12 (Transitone) (Code 122)	1-79 as Class "B"	02688	36-3238	16.0	1.11	.....	32-7039	.75 A.	725	.....
A-10	36-1003	B-9-F (Transitone)	1-79 as Class "B"	02795	36-3238	4.2	1.11	.....	32-7039	1.25 A.	725	.....
A-11	36-1032	PB (Transitone)	1-41	02795	36-3238	4.2	1.11	.....	2598	1.25 A.	680	.....
A-12	36-1040	PA (Transitone)	1-79 as Class "B"	02795	36-3238	4.2	1.11	.....	32-7039	1.25 A.	725	.....
A-13	36-1045	9 (Transitone)	1-79 as Class "B"	02795	36-3238	4.2	1.11	.....	32-7039	1.25 A.	725	.....
A-17	36-1062	Replacement for A and A-2	1-71A	02795	36-3238	4.2	1.11	.....	32-7014	1.25 A.	170	.....
A-18	36-1063	Replacement for A-3	1-38 Pentode	02795	36-3238	4.2	1.11	.....	32-7005	1.25 A.	680	.....
A-19	36-1032	*G (Transitone)	1-42 Pentode	36-3140	36-3238	4.2	1.11	.....	2598	1.25 A.	680	.....
A-21	36-1094	HHA, HHD, HHS (Transitone)	1-79 Class B	02795	36-3238	4.2	1.11	.....	See Note 7	1.25A.	.....	.....
A-22	36-1104	CGD, CGDU (Transitone)	1-42 Pentode	02795	36-3238	4.2	1.11	.....	2598	1.25 A.	680	.....
A-23	36-1110	G-122 (Transitone)	1-42 Pentode	36-3097	36-3157	6	.89	.....	32-7042	1.0 A.	450	.....
A-24	36-1122	PHD (Transitone)	1-79 as Class B	02795	36-3238	4.2	1.11	.....	See Note 7	1.25 A.	.....	.....
A-25	36-1132	801-T (Transitone), 12 Volts	1-79 as Class B	02688	36-3238	16.0	1.11	.....	See Note 7	.75 A.	.....	.....
B	36-1007	54	1-43 as Pentode	36-3040	36-3029	2600	.89	36-3021	32-7020	40 M.A.	200	.....
B-2	36-1016	57; 58	1-42 as Pentode	36-3081	36-3029	1140	.89	36-3057	32-7041	50 M.A.	400	.....
E‡		86	Push-Pull 71A's	Not furnished	02996	3100	.62	.....	2766	40 M.A.	550	K-24
F-10‡		65, 76	Push-Pull 45's	Not furnished	.....	3200	.62	.....	2766	.....	550	K-24
G‡		65; 76; 87; 95	Push-Pull 45's	Not furnished	36-3170	3200	.62	.....	2766	40 M.A.	550	H-17
H‡		77; 96	Push-Pull 45's	Not furnished	36-3170	3200	.62	.....	2766	40 M.A.	550	H-17
H-2‡	02999	90-H; 90-L; 112-L; 111-L	Push-Pull 45's	Not furnished	36-3170	3200	.62	.....	2766	40 M.A.	550	H-17
H-3‡	02951	90-H, (Series "B"); 90-L, (Series "B")	1-47 as Pentode	Not furnished	36-3170	3200	.62	.....	2673	40 M.A.	450	H-18
H-4‡	02901	112, (Series "B")	Push-Pull 47's as Pentodes	Not furnished	36-3170	3200	.62	.....	2635	40 M.A.	800	H-12

NOTE 1: Output Transformer designed to carry two speaker voice coils in parallel;—with K-12.
NOTE 2: Output Transformer designed to carry two speaker voice coils in series;—with K-10.
NOTE 3: NO output transformer on speaker; this speaker paired with K-9.
NOTE 4: NO output transformer on speaker; this speaker paired with H-7.
NOTE 5: Output Transformer designed to carry two speaker voice coils in parallel;—with K-15.
NOTE 6: NO output transformer on speaker; this speaker paired with K-14.
NOTE 7: NO output transformer on speaker; Output Transformer is on chassis.
‡NOT available; use replacement.

Speaker Model No.	Speaker Part No.	Used in Receiver Model:	For Receiver Output, Using:	Field Coil and Pot Assembly (Part No.)	Voice Coil and Cone Assembly (Part No.)	Field Coil Resistance D.C. (Ohms)	Voice Coil Resistance (Ohms)	Bucking Coil (Part No.)	Output Transformer (Part No.)	Rated Field Current	Output Transformer Primary Resistance: D.C.	Replacement Speaker
H-5	02876	90-H, (Series "B"); 90-L, (Series "B")	1-47 as Pentode	Not furnished	36-3170	3200	.62	.....	2673	40 M.A.	450	H-18
H-6	02873	90-X, (Series "D"); 112-X, (Series "B")	Push-Pull 47's as Pentodes	Not furnished	36-3170	3200	.62	.....	2635	40 M.A.	800	H-12
H-7	02813	14-LZX; 15-X; 23-X; 91-X (See Note 1)	Push-Pull 42's as Pentodes	02803	02625	3275	1.11	.....	2565	40 M.A.	680	.....
H-9	02648	19-H; 19-LZX; 71-X; 25-L; 27-L; 43-L; 71-H; 44	1-42 as Pentode	02767	02625	1125	1.11	02775	2580	65 M.A.	450	.....
H-10	02641	47-H (Code 125); 47-X (Code 125)	Push-Pull 43's as Pentodes	02745	02625	70	1.11	.....	2550	300 M.A.	170	.....
H-11	36-1005	Central Control System	(4,000 Ohm Impedance on line)	02803	02625	3275	1.11	.....	32-7014	40 M.A.	170	.....
H-12	36-1036	91-D; 91-L; 91-X; 23-L	Push-Pull 42's as Pentodes	02803	02625	3275	1.11	.....	2585	40 M.A.	680	.....
H-13	36-1036	18-D; 18-H; 18-L; 18-X; 503-L	Push-Pull 42's as Triodes	36-3104	02625	1125	1.11	.....	32-7078	65 M.A.	310	.....
H-14	36-1037	44-H; 504-L; 260-L; 261-L	1-42 as Pentode	02767	02625	1125	1.11	02775	2580	65 M.A.	450	.....
H-15	36-1057	19-H (Code 126)	1-42 as Pentode	36-3201	02625	1125	1.11	02780	2580	65 M.A.	450	.....
H-16	36-1059	19-X (Code 128)	1-42 as Pentode	36-3218	02625	660	1.11	36-3204	32-7178	80 M.A.	260	.....
H-17	36-1064	Replacement for H, H-2, G	Push-Pull 45's	02803	02625	3275	1.11	.....	32-7078	40 M.A.	310	.....
H-18	36-1065	Replacement for H-3 and H-5	1-47 as Pentode	02803	02625	3275	1.11	.....	2580	40 M.A.	450	.....
H-19	36-1066	Replacement for J	Push-Pull 71A's	02795	02625	4.2	1.11	.....	32-7078	1.25 A.	310	.....
H-20	36-1080	Central Control System	(1000 Ohm Impedance on line)	02803	02625	3275	1.11	.....	32-7198	40 M.A.	32	.....
HR	02652	Central Control System	(12000 Ohm Impedance on line)	.....	02625	Permanent Magnet	1.11	.....	2598	.....	680	HR-3
HR-2	36-1113	29TX, 118RX	Aux. Spkr.	.....	02625	Permanent Magnet	1.11	.....	See Note 7	.....	.....	HR-4
HR-3	36-1125	Replaces HR	(12000 Ohm Impedance on line)	.....	02625	Permanent Magnet	1.11	.....	2598	.....	680	.....
HR-4	36-1126	Replaces HR-2	Aux. Spkr.	.....	02625	Permanent Magnet	1.11	.....	See Note 7	.....	.....	.....
J‡		40; 41	Push-Pull 71A's	Not furnished	36-3170	3	.62	.....	2766	1.75 A.	550	H-19
K‡		20; 21	Push-Pull 71A's	Not furnished	02996	3100	.62	.....	2766	40 M.A.	500	K-24
K-2‡	02998	90-B	Push-Pull 45's	Not furnished	02996	3100	.62	.....	2766	40 M.A.	500	K-24
K-3‡	02981	70-B; 70-H; 90-H, (Series "B")	1-47 as Pentode	Not furnished	02996	3100	.62	.....	2673	40 M.A.	450	K-25
K-4‡	02865	470; 490	1-47 as Pentode	Not furnished	02996	3100	.62	.....	2673	40 M.A.	450	K-25
K-5‡	02831	90, (Series "D")	Push-Pull 47's as Pentodes	Not furnished	02996	3100	.62	.....	2590	40 M.A.	700	K-6
K-6	02821	91-B (Also replacement for K-5)	Push-Pull 42's as Pentodes	02803	36-3159	3275	1.11	.....	2585	40 M.A.	680	.....
K-7	02819	19-B; 19-LZ; 89-B; 89-H; 71-B; 71-L; 43-B	1-42 as Pentode	02741	36-3159	1125	1.11	02780	2580	65 M.A.	450	.....
K-8	02806	470, 490	Push-Pull 47's as Pentodes	Not furnished	02996	3100	.62	.....	2590	40 M.A.	700	.....
K-9	02784	22-L; 43-H; 71-D; 71-H (See Note 2)	1-42 as Pentode	02761	36-3159	3275	1.11	02775	2564	40 M.A.	530	.....
K-10	02782	22-L; 43-H; 71-D; 71-H	.....	02767	36-3159	1125	1.11	02780	See Note 3	65 M.A.	.....	.....
K-12	02765	14-LZX; 15-X; 23-X; 91-X	.....	02803	36-3238	3275	1.11	.....	See Note 4	40 M.A.	.....	.....
K-13	02763	47-B and Replacement for N and N-2	Push-Pull 43's as Pentodes	02745	36-3238	70	1.11	.....	2550	300 M.A.	170	.....
K-14	02758	47-H (See Note 5)	Push-Pull 43's as Pentodes	02745	36-3238	70	1.11	.....	2544	300 M.A.	170	.....

PHILCO RADIO & TEL. CORP.

Speaker Model No.	Speaker Part No.	Used in Receiver Model:	For Receiver Output, Using:	Field Coil and Pot Assembly (Part No.)	Replacement Voice Coil and Cone Assembly (Part No.)	Field Coil Resistance D.C. (Ohms)	Voice Coil Resistance (Ohms)	Bucking Coil (Part No.)	Output Transformer (Part No.)	Rated Field Current	Output Transformer Primary Resistance; D.C. (Ohms)	Replacement Speaker
K-15	02757	47-H	.....	02744	36-3238	2200	1.11	.....	See Note b	50 M.A.	.....	.....
K-16	02706	247-E	Push-Pull 43's as Pentodes	02745	36-3238	70	1.11	.....	2585	300 M.A.	680	.....
K-17	36-1025	16-B; 17-B; 14-B (Code 122); 18-B	Push-Pull 42's as Triodes	36-3104	36-3238	1125	1.11	.....	32-7078	65 M.A.	310	.....
K-18	36-1031	10 (Transitone) (6 Volt)	.....	02795	36-3238	4.2	1.11	.....	See Note 7	1.25 A.	.....	.....
K-19	36-1035	261-B	1-42 as Pentode	02741	36-3159	1125	1.11	02780	2580	65 M.A.	450	.....
K-20	36-1043	10 (Transitone) (12 Volt)	.....	36-3172	36-3238	16	1.11	.....	See Note 7	.75 A.	.....	.....
K-21	36-1055	505-L; 19-B; 89-L; 89-B; 19-LZ	1-42 as Pentode	36-3245	36-3159	1125	1.11	36-3177	2580	65 M.A.	450	.....
K-22	36-1058	44-B	1-42 as Pentode	02767	36-3159	1125	1.11	02775	2580	65 M.A.	450	.....
K-23	36-1060	19 (Code 128)	1-42 as Pentode	36-3239	36-3159	660	1.11	36-3177	32-7178	80 M.A.	260	.....
K-24	36-1067	Replacement for E, F-10, M, K, K-2	Push-Pull 71A's or 45's	02803	35-3159	3275	1.11	.....	32-7078	40 M.A.	310	.....
K-25	36-1068	Replacement for K-3 and K-4	1-47 as Pentode	02803	36-3159	3275	1.11	.....	2580	40 M.A.	450	.....
K-26	36-1099	32B, 32-L	1-42 Pentode	36-3306	36-3159	52	1.11	36-3279	32-7042	350 M.A.	450	.....
K-27	36-1120	28-L	1-43 Pentode	36-3353	36-3159	2850	1.11	02775	32-7275	40 M.A.	170	.....
K-28	36-1133	800 (Code 122)	.....	02795	36-3238	4.2	1.11	.....	See Note 7	1.25 A.	.....	.....
KR	36-1002	Central Control System	(10000 Ohm Impedance on line)	.....	36-3157	Permanent Magnet	.89	.....	32-7005	.....	680	.....
KR-2	36-1004	38-B; 38-L	1-19 as Class "B"	.....	36-3157	Permanent Magnet	.89	.....	2565	.....	680	KR-10
KR-3	36-1022	Model 12, (Coast Guard)	Push-Pull 41's as Pentodes	.....	36-3157	Permanent Magnet	.89	.....	2585	.....	680	.....
KR-4	36-1085	Central Control System	(4000 Ohm Impedance on line)	.....	36-3157	Permanent Magnet	.89	.....	32-7014	.....	170	.....
KR-5	36-1097	Replaces R, R2, R4, R5	1-33 as Pentode	.....	36-3157	Permanent Magnet	.89	.....	2580	.....	450	KR-9
KR-6	36-1100	34B, 34L	1-19 Class B	.....	36-3157	Permanent Magnet	.89	.....	See Note 7	.....	.....	KR-7
KR-7	36-1121	Replaces KR-6	1-19 Class B	.....	36-3159	Permanent Magnet	1.11	.....	See Note 7	.....	.....	.....
KR-8	36-1124	233	1-2101 as Pentode	.....	36-3159	Permanent Magnet	1.11	.....	See Note 7	.....	.....	.....
KR-9	36-1128	Replaces KR-5	1-33 as Pentode	.....	36-3159	.....	1.11	.....	2580	.....	450	.....
KR10	36-1135	Replacement for KR-2	1-19 as Class "B"	.....	36-3159	Permanent Magnet	1.11	.....	2585	.....	450	.....
L		30	Push-Pull 31's	.....	36-3223	Magnetic	.....	.....	.....	.....	.....	.....
M‡		Separate Speaker	Push-Pull 71A's	.....	02996	3100	.62	.....	2766	40 M.A.	500	K-24
N‡		46-B; 46-H	Push-Pull 71A's	Not furnished	02996	80	.62	.....	2766	330 M.A.	500	K-13
N-2‡	02977	46-B; 46-H	Push-Pull 71A's	Not furnished	02996	80	.62	.....	2766	330 M.A.	500	K-13
P‡	02947	50; 51	1-47 as Pentode	Not furnished	02861	1140	.89	.....	2660	65 M.A.	360	P-16
P-2‡	02860	52-B; 52-C; 52-L	1-47 as Pentode	Not furnished	02861	1140	.89	.....	2660	65 M.A.	360	P-16
P-3‡	02705	48-E	1-18 as Pentode	Not furnished	02861	50	.89	.....	3651	330 M.A.	360	P-13
P-4‡	02680	48-B; 48-C	1-43 as Pentode	Not furnished	02861	50	.89	.....	2520	330 M.A.	175	P-17
P-5‡	02679	80-C; 80-P	1-42 as Pentode	Not furnished	02861	1140	.89	02678	2660	65 M.A.	360	P-8
P-6‡	02666	80-C; 80-P	1-42 as Pentode	Not furnished	02861	1140	.89	02664	2660	65 M.A.	360	P-8
P-8	36-1012	81 (Also Replacement for P-5 and P-6)	1-42 as Pentode	36-3058	02861	1140	.89	36-3101	32-7019	65 M.A.	400	.....
P-10	36-1014	5 (Transitone) (6 Volt)	1-41 as Pentode	36-3046	02861	6	.89	.....	32-7042	1.0 A.	450	.....
P-11	36-1018	5 (Transitone) (6 Volt)	1-41 as Pentode	36-3097	02861	6	.89	.....	32-7065	1.0 A.	450	.....
P-12	36-1023	5 (Transitone) (12 Volt)	1-41 as Pentode	36-3098	02861	24	.89	.....	32-7065	.5 A.	450	.....
P-13	36-1024	48-E (Also Replacement for P-3)	1-18 as Pentode	36-3130	02861	50	.89	.....	32-7076	330 M.A.	400	.....
P-16	36-1069	Replacement for P and P-2	1-47 as Pentode	36-3242	02861	1140	.89	.....	32-7076	65 M.A.	400	.....

Speaker Model No.	Speaker Part No.	Used in Receiver Model:	For Receiver Output, Using:	Field Coil and Pot Assembly (Part No.)	Replacement Voice Coil and Cone Assembly (Part No.)	Field Coil Resistance D.C. (Ohms)	Voice Coil Resistance (Ohms)	Bucking Coil (Part No.)	Output Transformer (Part No.)	Rated Field Current	Output Transformer Primary Resistance; D.C. (Ohms)	Replacement Speaker
P-17	36-1070	Replacement for P-4	1-43 as Pentode	36-3130	02861	50	.89	.....	32-7191	330 M.A.	175	.....
P-18	36-1098	11, DP, J, R (Transitone)	1-42 Pentode	36-3097	02861	6	.89	.....	See Note 7	1 A.	.....	.....
P-19	36-1101	45-C	1-42 Pentode	36-3298	02861	1140	.89	36-3296	See Note 7	65 M.A.	.....	.....
P-20	36-1105	N (Transitone)	1-42 Pentode	36-3097	02861	6	.89	.....	32-7019	1 A.	400	.....
P-21	36-1114	28-C	1-43 Pentode	36-3357	02861	2850	.89	36-3296	See Note 7	40 M.A.	.....	.....
P-22	36-1112	29-TX	1-42 Pentode	36-3325	02861	700	.89	36-3296	See Note 7	80 M.A.	.....	.....
P-23	36-1115	11T (12 Volts) (Transitone)	1-42 Pentode	36-3337	02861	24	.89	.....	See Note 7	.5 A.	.....	.....
PR	36-1000	53	1-43 as Pentode	.....	36-3000	Permanent Magnet	1.22	.....	32-7000	.....	200	.....
R‡	02941	35-B; 35-H	1-33 as Pentode	.....	02887	Permanent Magnet	.89	.....	2646	.....	450	KR-9
R-2‡	02888	35-B; 35-H	1-33 as Pentode	.....	02887	Permanent Magnet	.89	.....	2646	.....	450	KR-9
R-3‡	02753	Separate Speaker	(15000 Ohm Impedance on line)	.....	02887	Permanent Magnet	.89	.....	2551	.....	680	KR-2
R-4‡	02748	36-B; 36-H; 36-L	1-33 as Pentode	.....	02887	Permanent Magnet	.89	.....	2646	.....	450	KR-9
R-5‡	02709	36-B; 36-H; 36-L	1-33 as Pentode	.....	02887	Permanent Magnet	.89	.....	2646	.....	450	KR-9
R-6‡	02708	37-C; 37-L	1-19 as Class "B"	.....	02887	Permanent Magnet	.89	.....	2528	.....	680	KR-2
R-7‡	02619	Central Control System	(10000 Ohm Impedance on line)	.....	02887	Permanent Magnet	.89	.....	2585	.....	680	KR
S‡	02912	52-L; 50; 51	1-47 as Pentode	Not furnished	02887	1140	.89	.....	2660	65 M.A.	360	S-9
S-2‡	02858	24-L; 52-L; 50; 51	1-47 as Pentode	Not furnished	02887	1140	.89	.....	2660	65 M.A.	360	S-9
S-4‡	02672	48-L	1-43 as Pentode	Not furnished	02887	50	.89	.....	2520	330 M.A.	175	S-10
S-7	36-1009	60-B; 60-L; 260-B	1-42 as Pentode	36-3039	36-3157	1140	.89	36-3129	32-7019	65 M.A.	400	.....
S-9	36-1071	Replacement for S and S-2	1-47 as Pentode	36-3264	36-3157	1140	.89	.....	32-7076	65 M.A.	400	.....
S-10	36-1072	Replacement for S-4	1-43 as Pentode	36-3130	36-3157	50	.89	.....	32-7191	330 M.A.	175	.....
S-11	36-1107	700	1-42 Pentode	36-3046	36-3157	6	.89	.....	See Note 7	1 A.	.....	S-13
S-12	36-1116	66-B	1-42 Pentode	36-3341	36-3157	1140	.89	36-3336	32-7019	65 M.A.	400	.....
S-13	36-1130	Q, 700	1-42 Pentode	36-3046	36-3157	6	.89	.....	See Note 7	1 A.	.....	.....
SB	36-1073	84	1-42 as Pentode	36-3243	36-3157	1140	.89	36-3240	32-7019	50 M.A.	400	.....
U	36-1017	14 (Code 121)	Push-Pull 42's as Pentodes	36-3074	36-3061	6500	2.0	.....	32-7051	40 M.A.	680	.....
U-2	36-1019	16-L; 16-X; 16-RX; 16-PX; 17-L; 17-D; 17-X; 17-RX	Push-Pull 42's as Triodes	36-3088	36-3061	1450	2.0	.....	32-7052	80 M.A.	350	.....
U-3	36-1039	14-L (Code 122); 14-X (Code 122); 14-R (Code 123)	Push-Pull 42's as Triodes	36-3162	36-3061	1140	2.0	.....	32-7052	70 M.A.	350	.....
U-4	36-1088	Central Control	(4000 Ohms Impedance)	36-3074	36-3087	6500	2.0	.....	32-7200	40 M.A.	168	.....
U-5	36-1089	Central Control	(1000 Ohms Impedance)	36-3074	36-3087	6500	2.0	.....	32-7203	40 M.A.	32	.....
U-6	36-1090	Central Control	(500 Ohms Impedance)	36-3074	36-3087	6500	2.0	.....	32-7204	40 M.A.	32	.....
U-7	36-1108	200X	Push-Pull 42's as Triodes	36-3088	36-3321	1450	3.52	.....	32-7247	80 M.A.	350	.....

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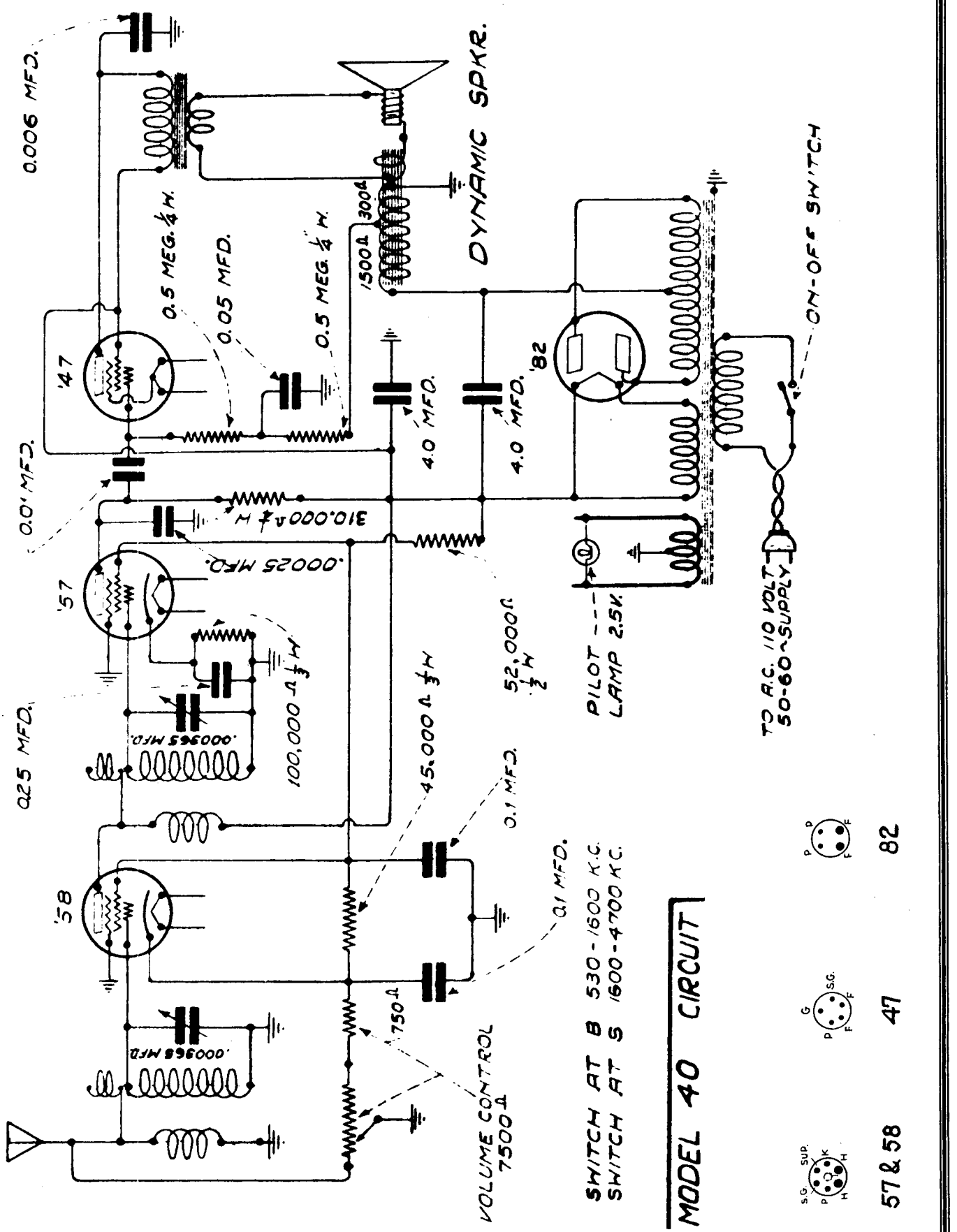

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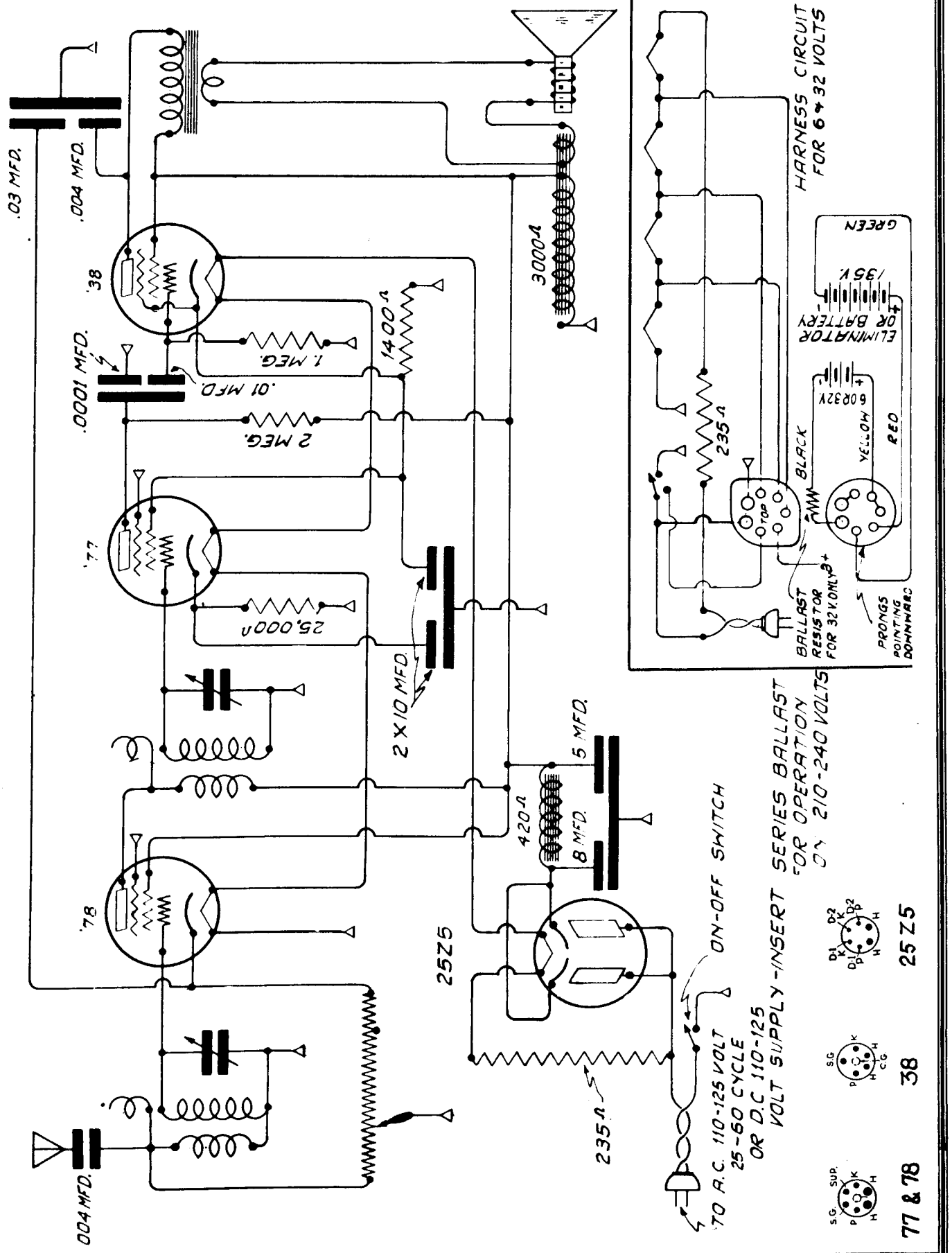
MODEL 41



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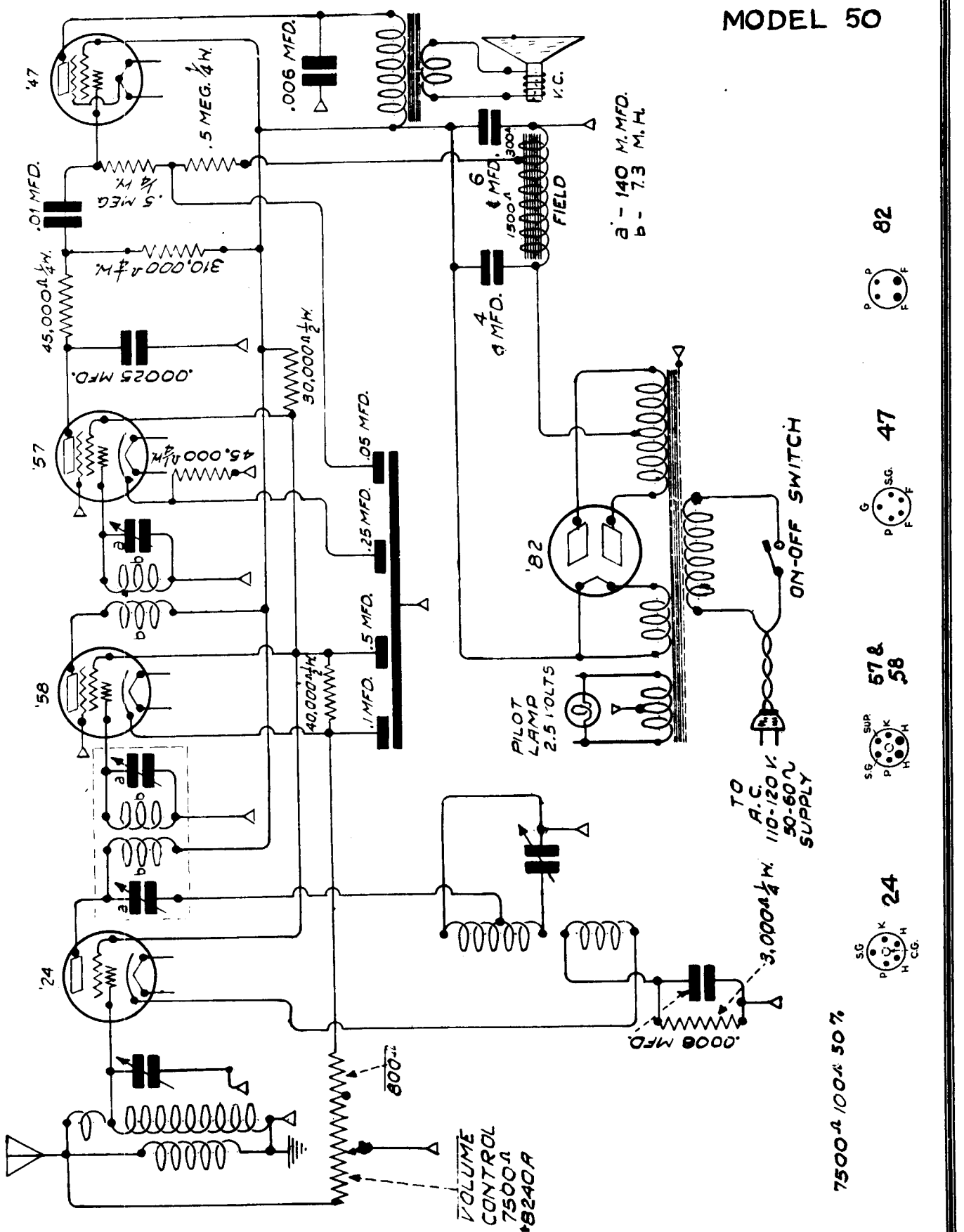

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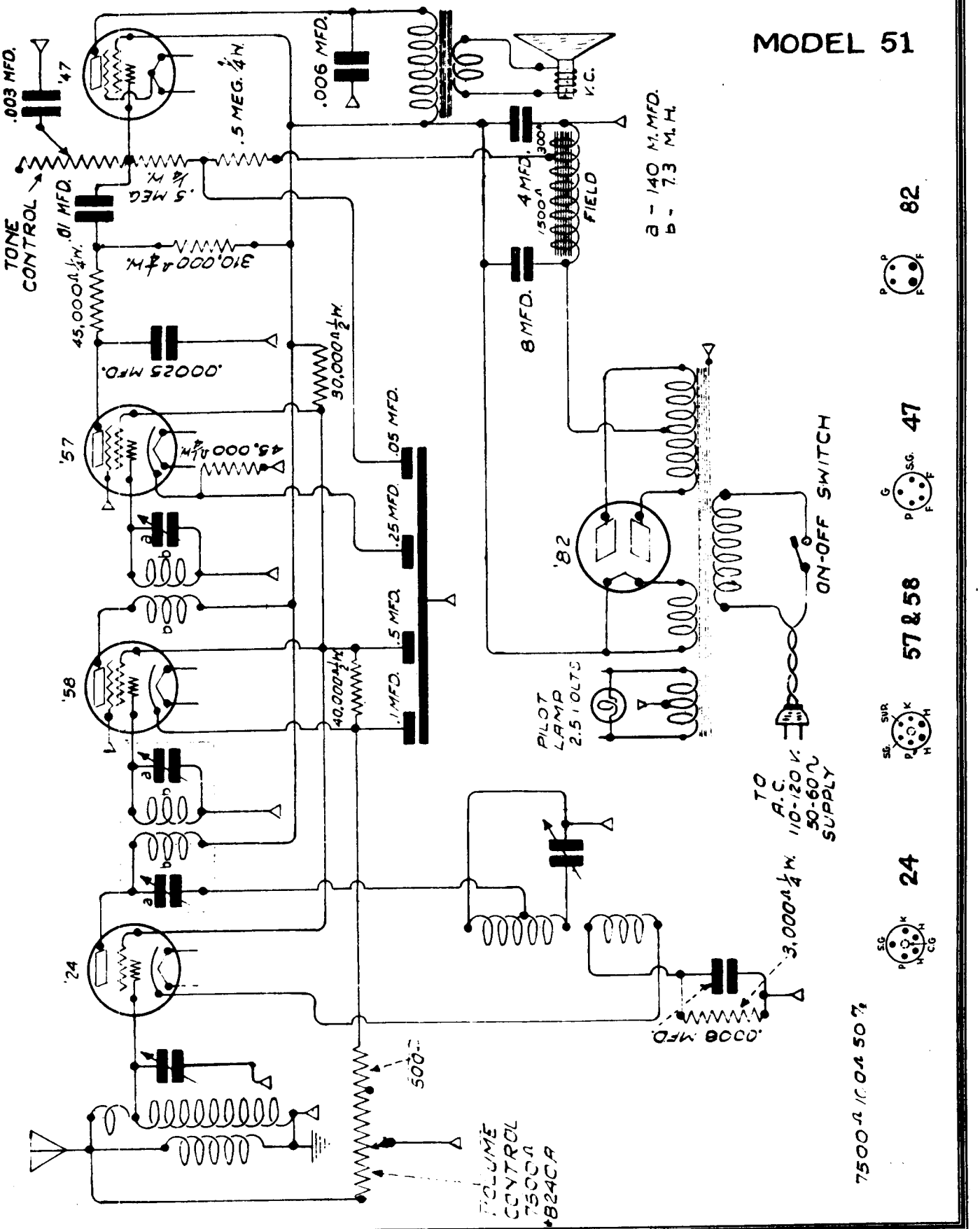

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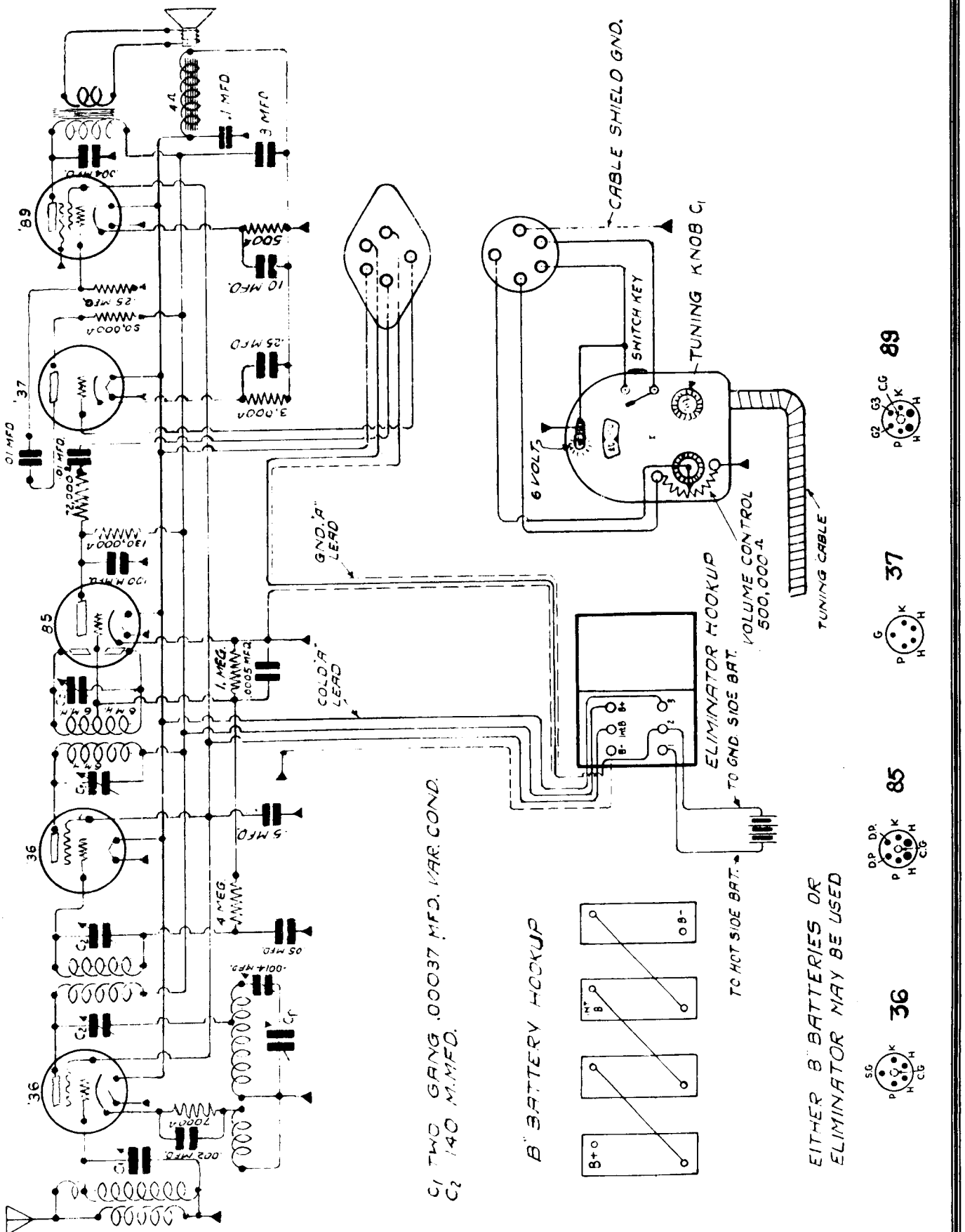
MODEL 52



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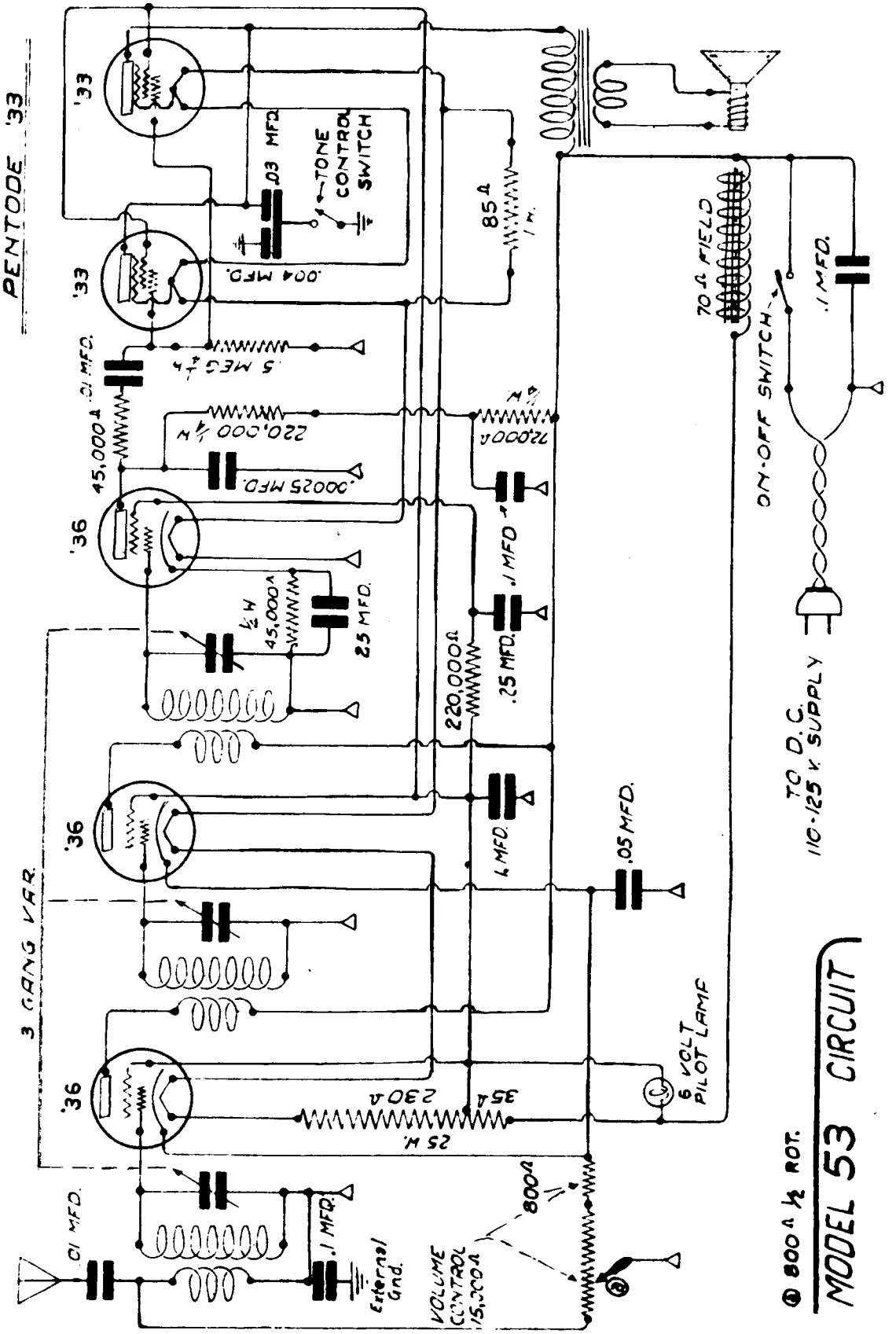
MODEL 53



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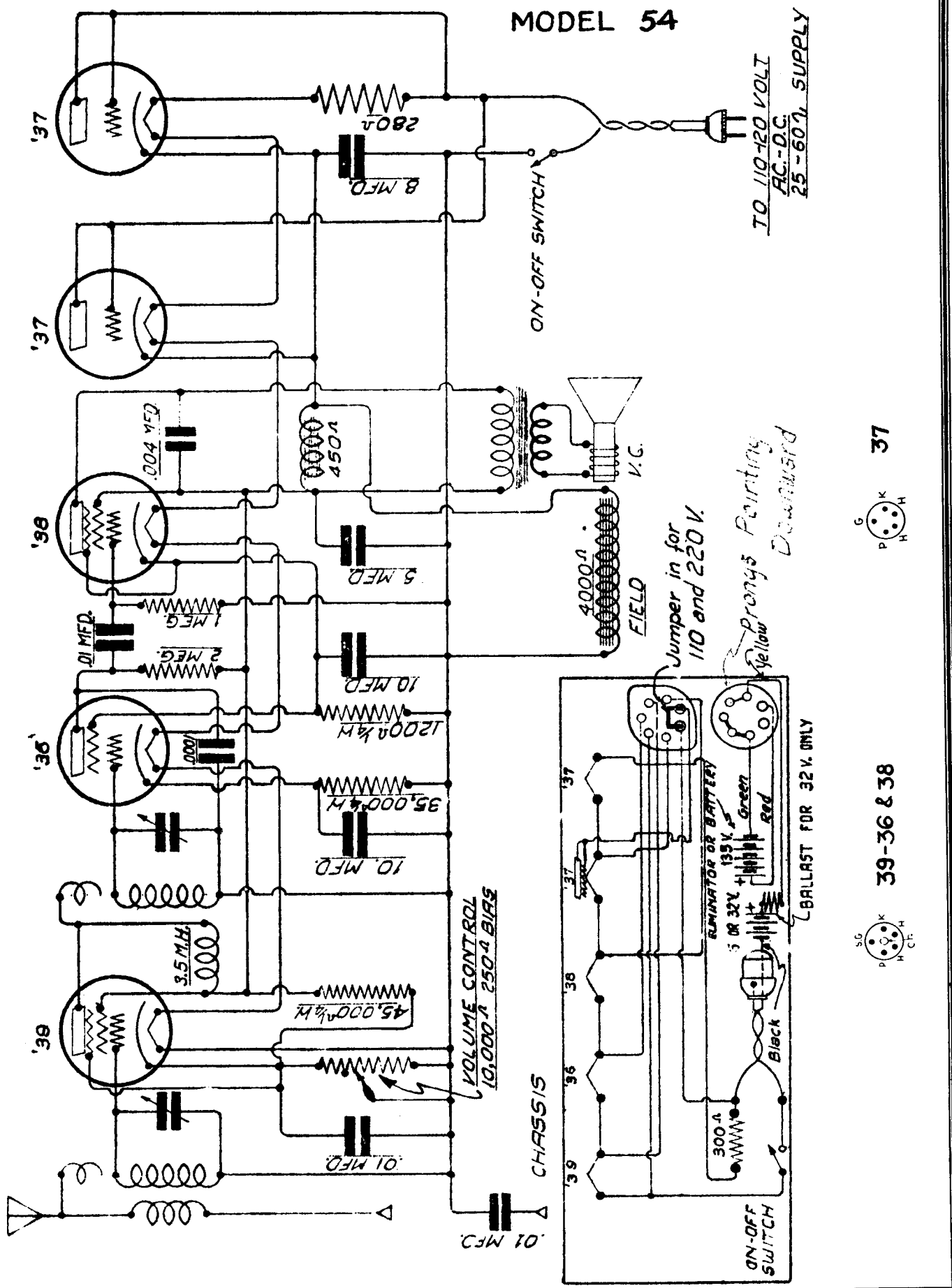
MODEL 54



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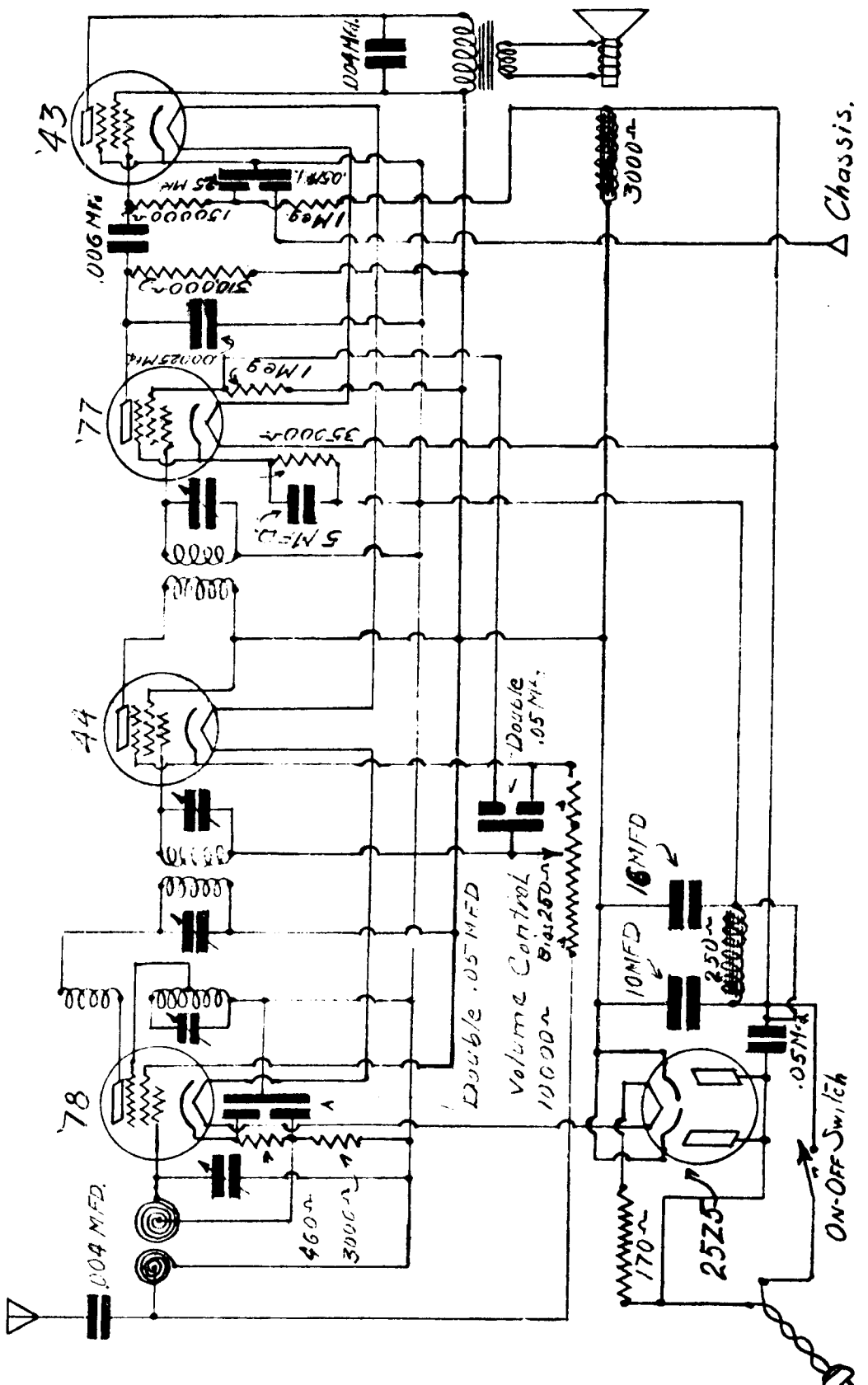
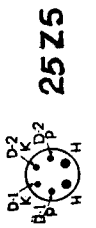
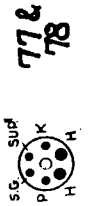
MODEL 55







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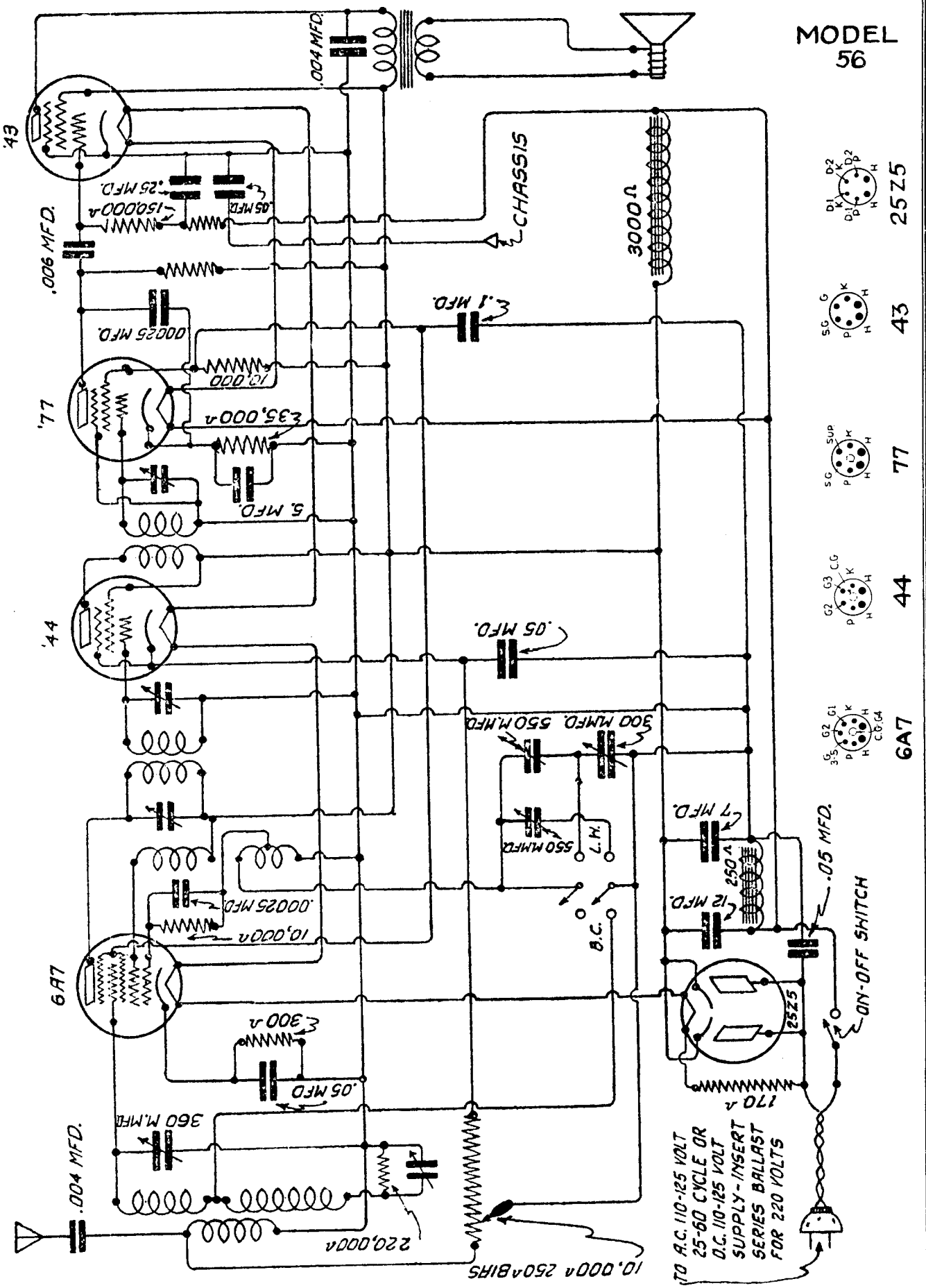
MODEL 56



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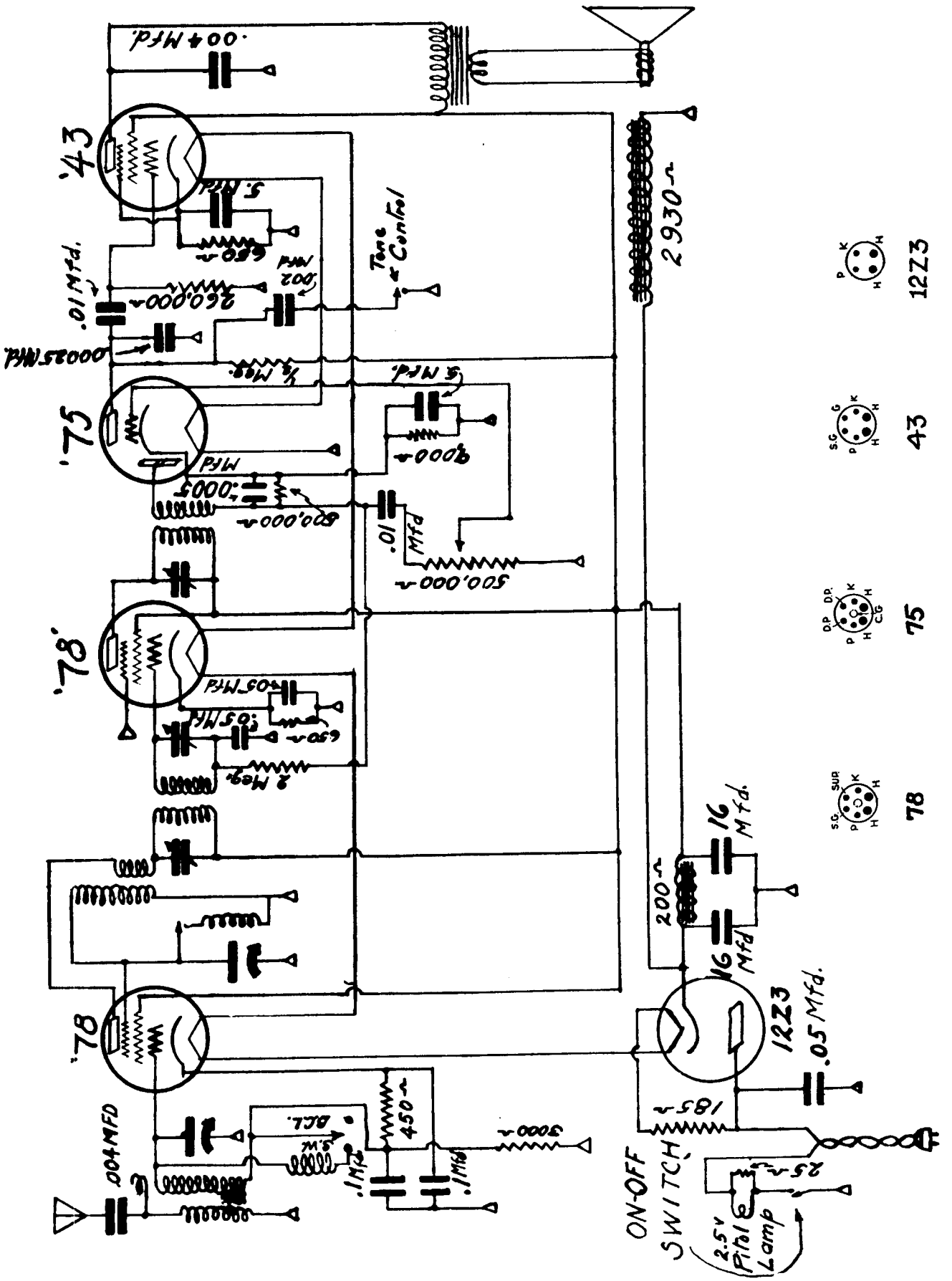
MODEL 58



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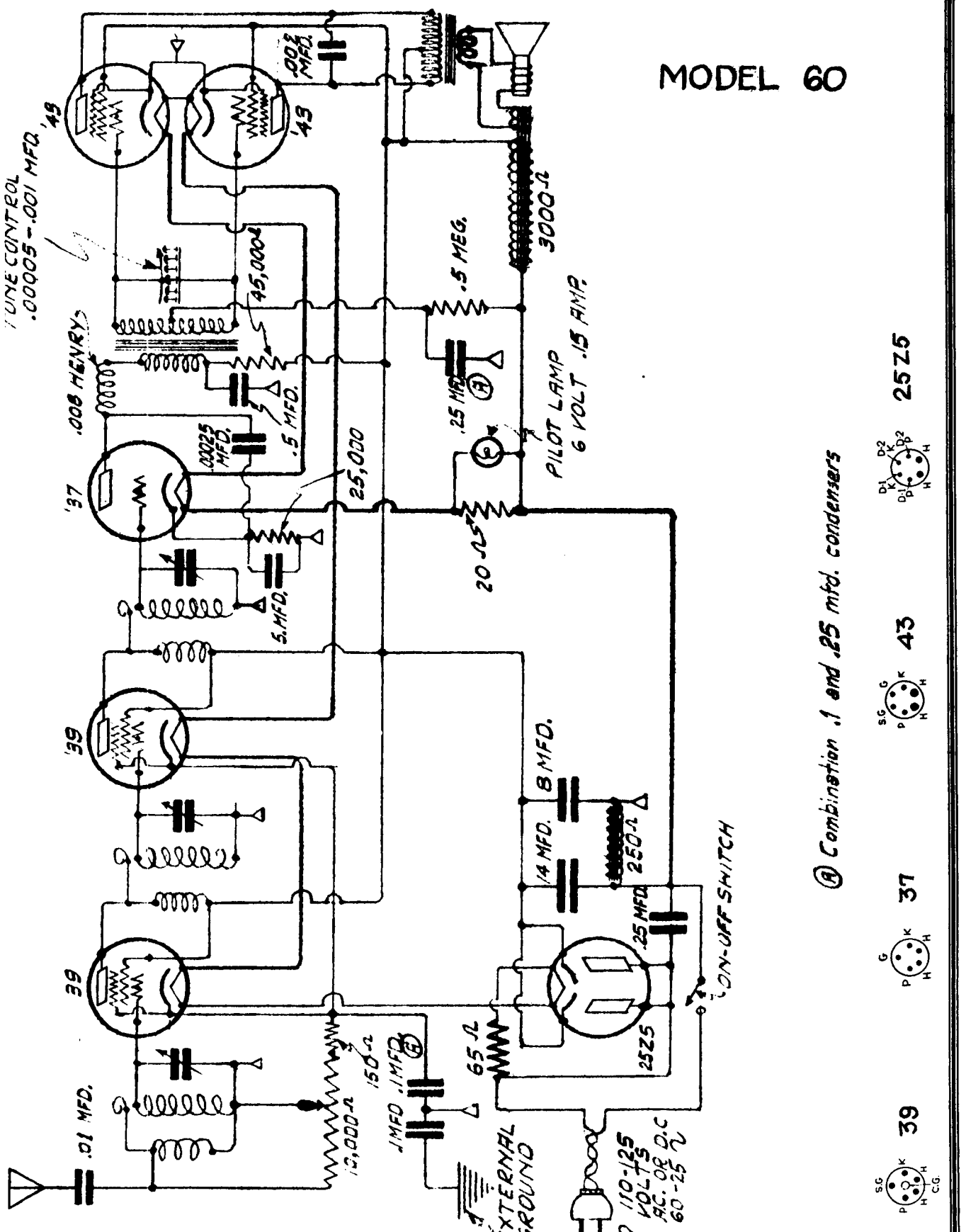
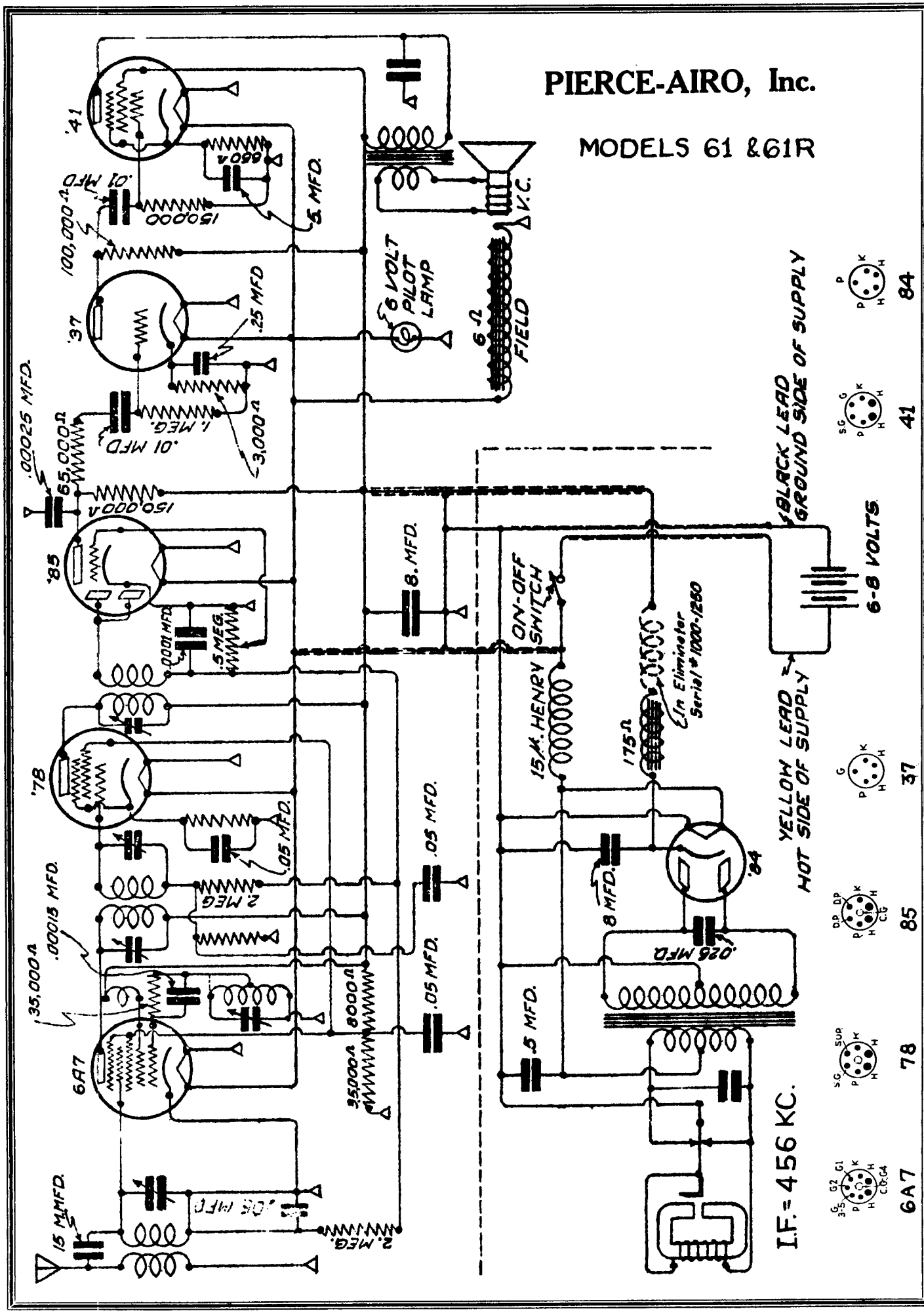
MODEL 60

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MODELS 61 &61R
'41
'37
'85
'78
6A7
'24
660Ω
.01 MFD.
150000
100,000Ω
.5 MFD.
.25 MFD
6 VOLT PILOT LAMP
6 Ω FIELD
V.C.
.00025 MFD.
65,000Ω
150,000Ω
.01 MFD.
1 MEG.
3,000Ω
.0001 MFD.
.5 MEG.
8. MFD.
ON-OFF SWITCH
15 M. HENRY
175Ω
E.In Eliminator Serial # 1000-1250
BLACK LEAD GROUND SIDE OF SUPPLY
6-8 VOLTS
YELLOW LEAD HOT SIDE OF SUPPLY
.05 MFD.
2 MEG.
.0001 MFD.
35,000Ω
80000Ω
35000Ω
.05 MFD.
.05 MFD.
2. MEG.
15 MMFD.
.05 MFD.
8 MFD.
.026 MFD.
.5 MFD.
I.F. = 456 KC.
84
41
37
85
78
6A7

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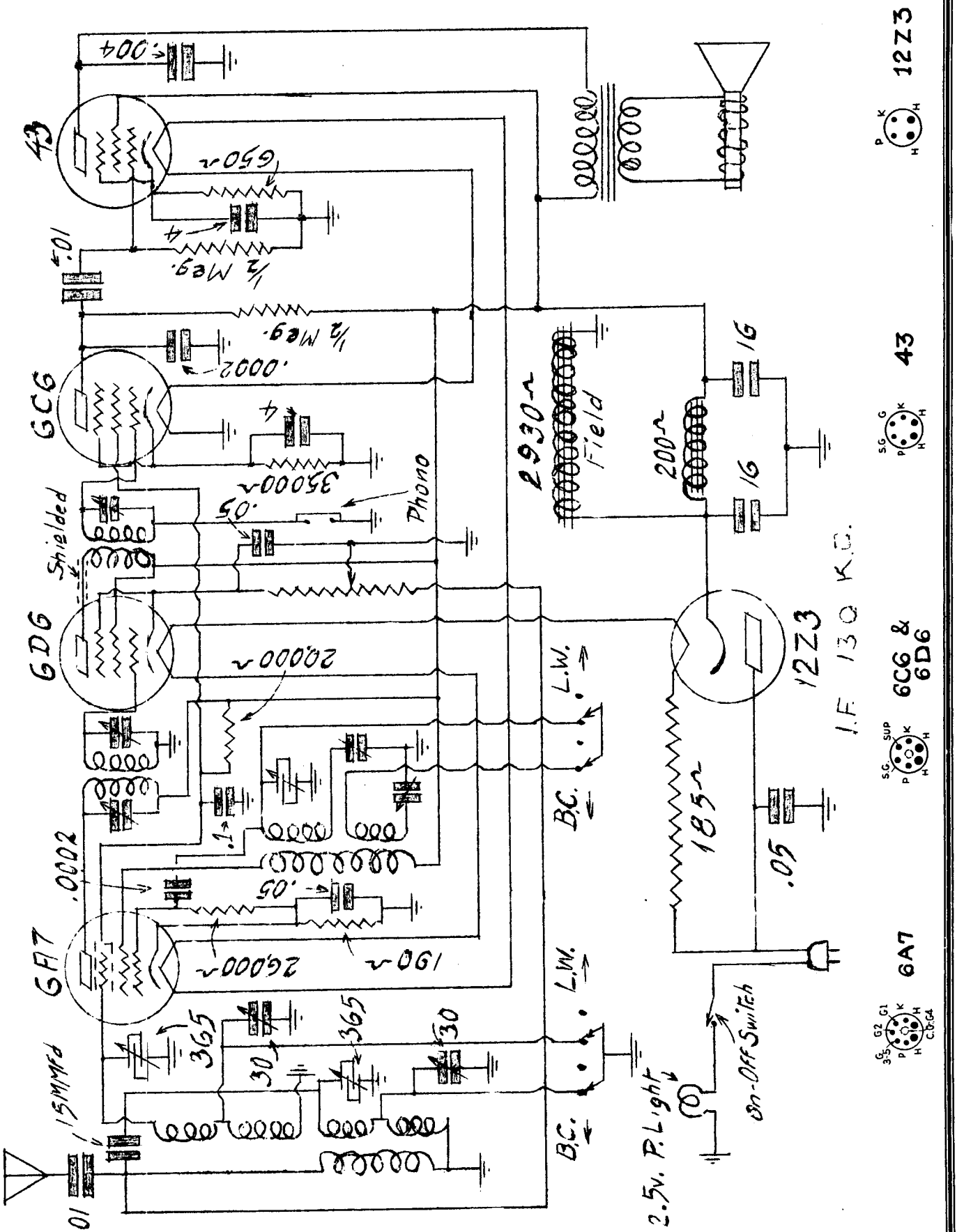
MODEL 500A



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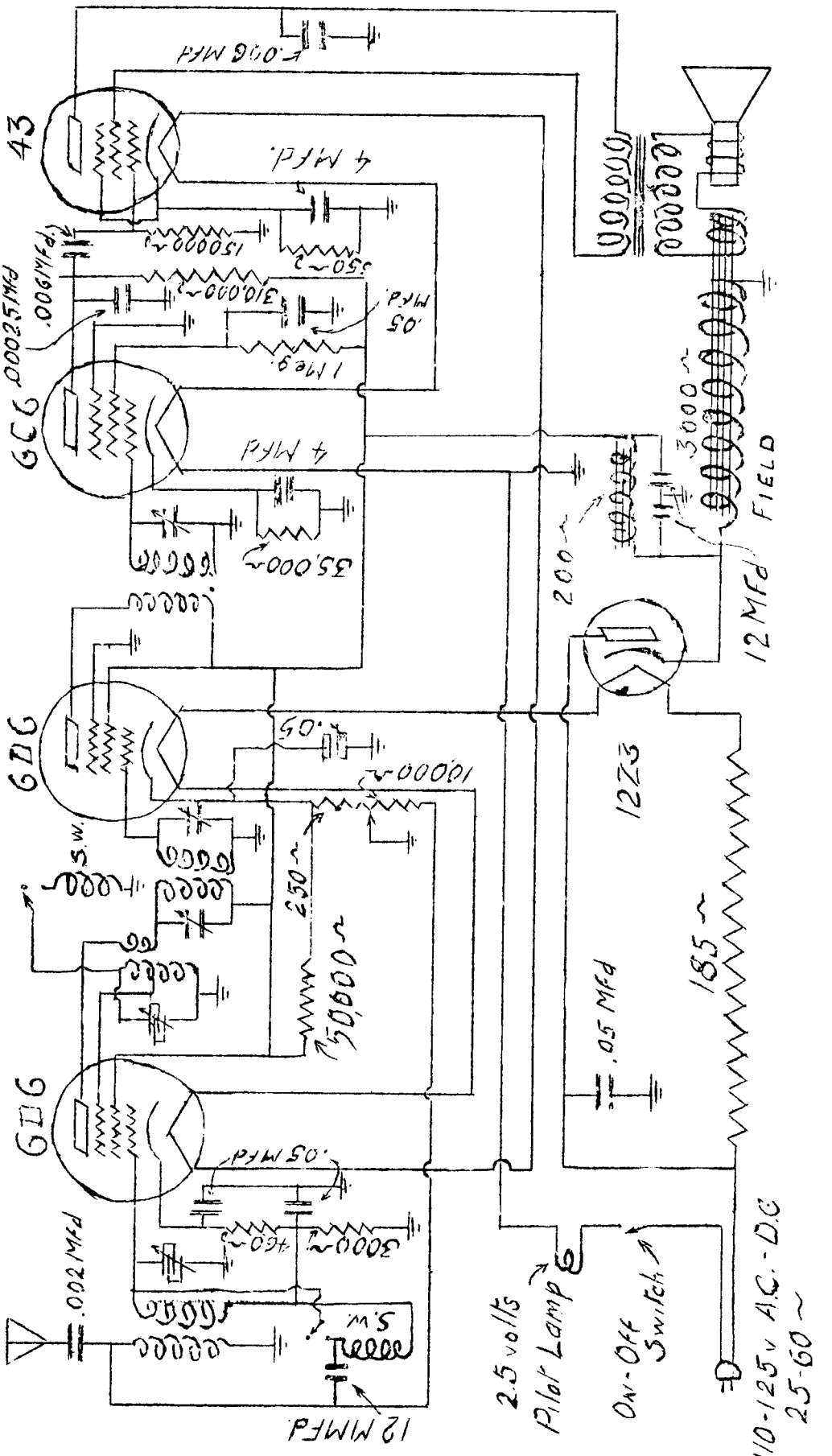
MODEL 553-4



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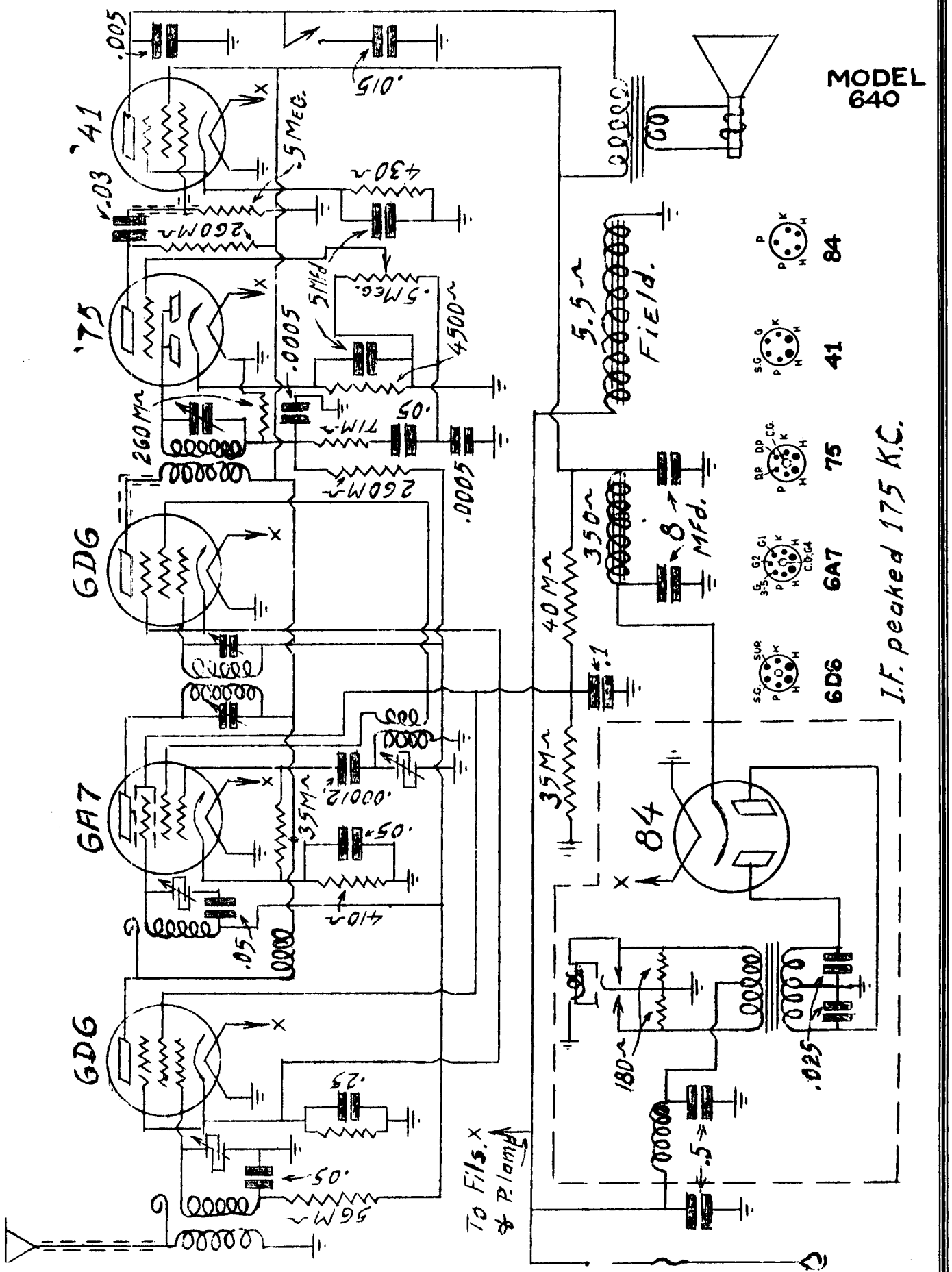

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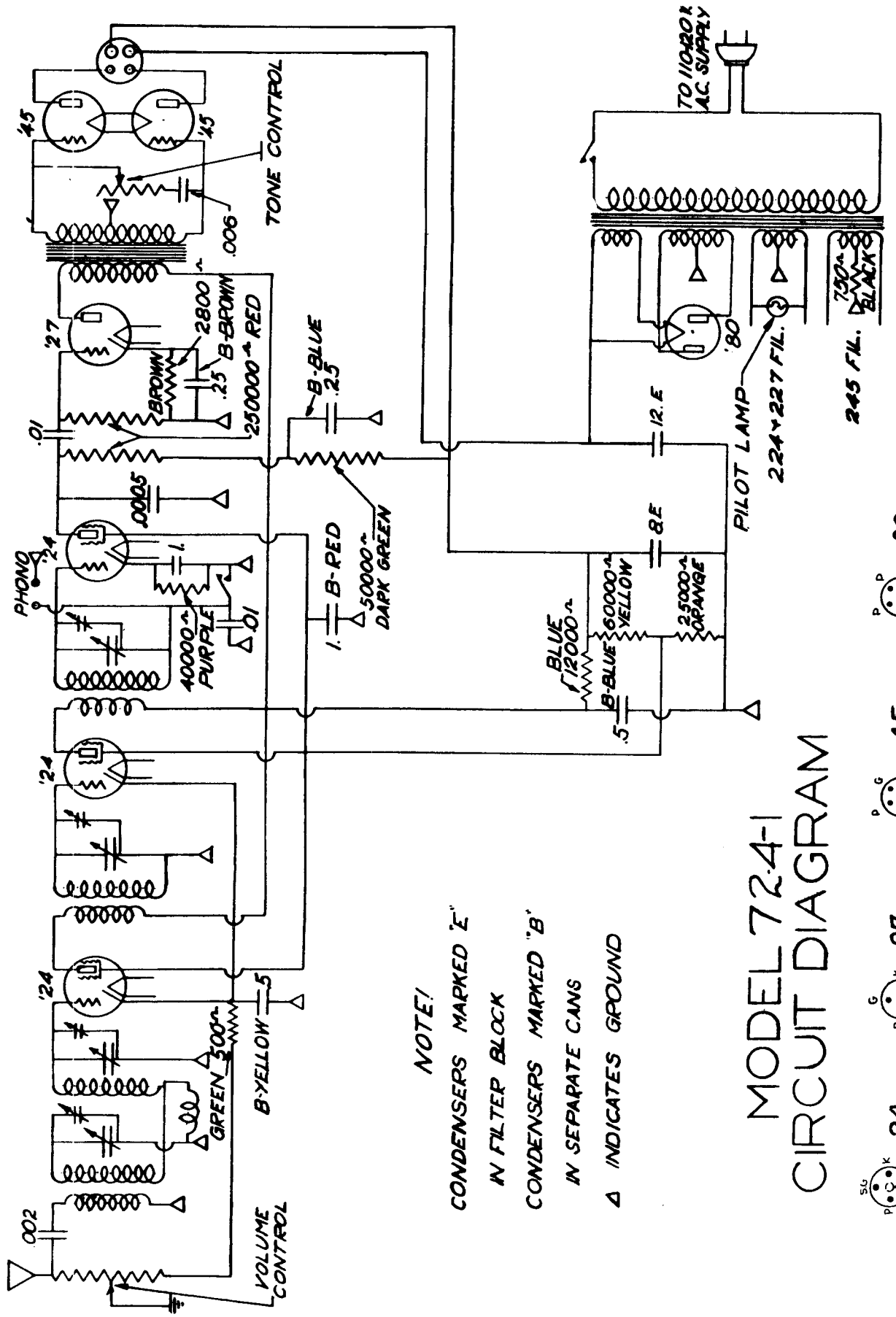
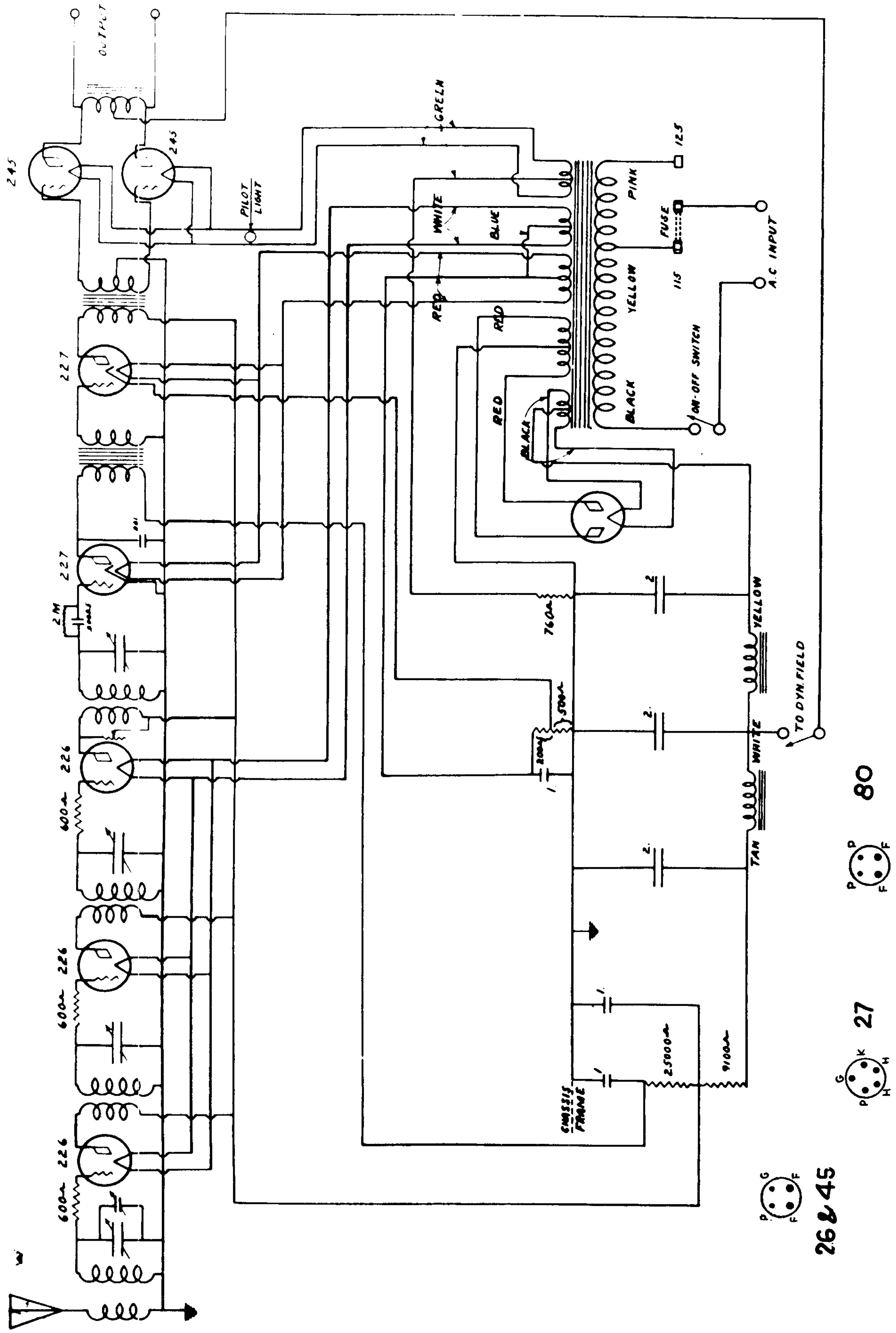


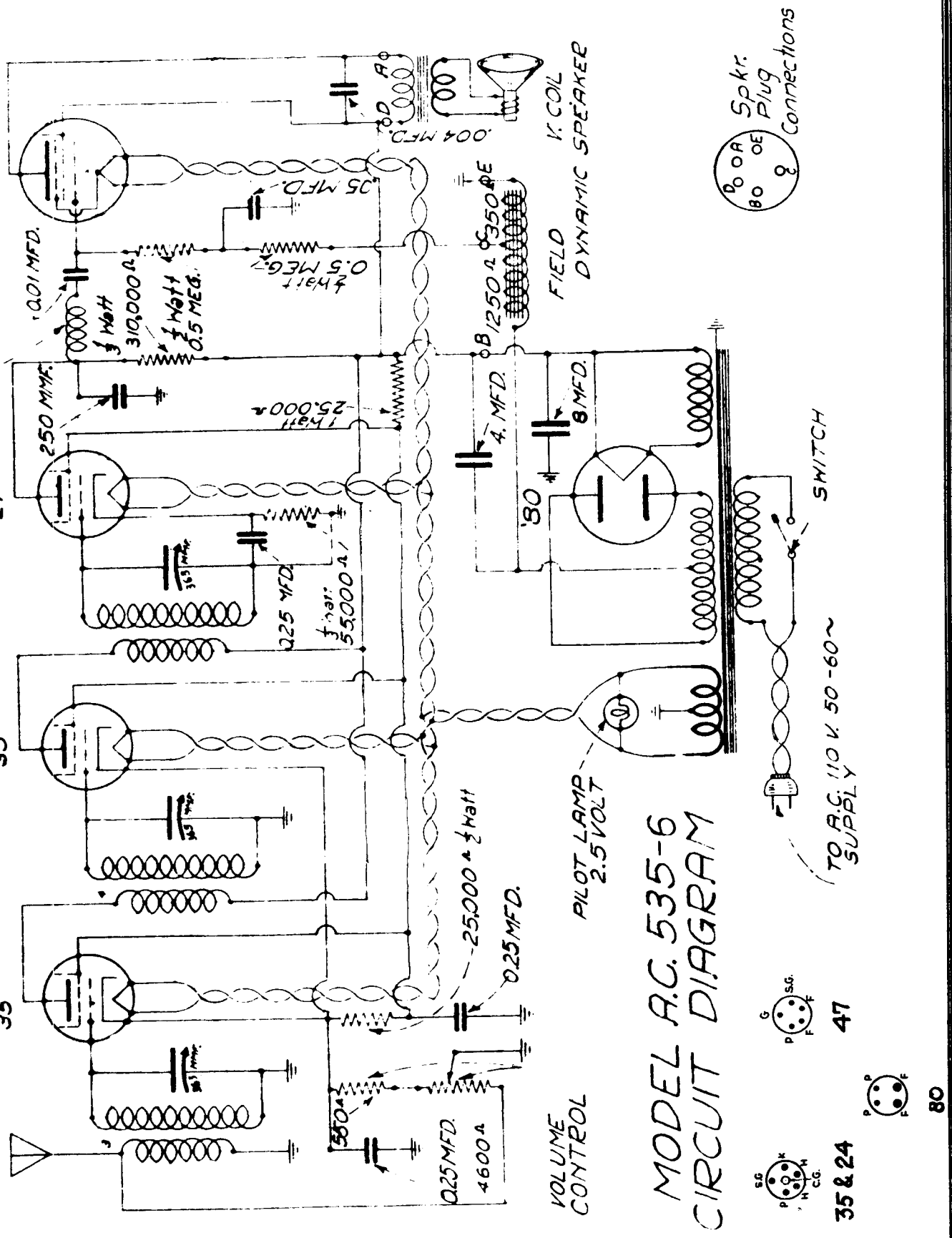
PIERCE-AIRO, Inc.

MODEL 245 A.C.

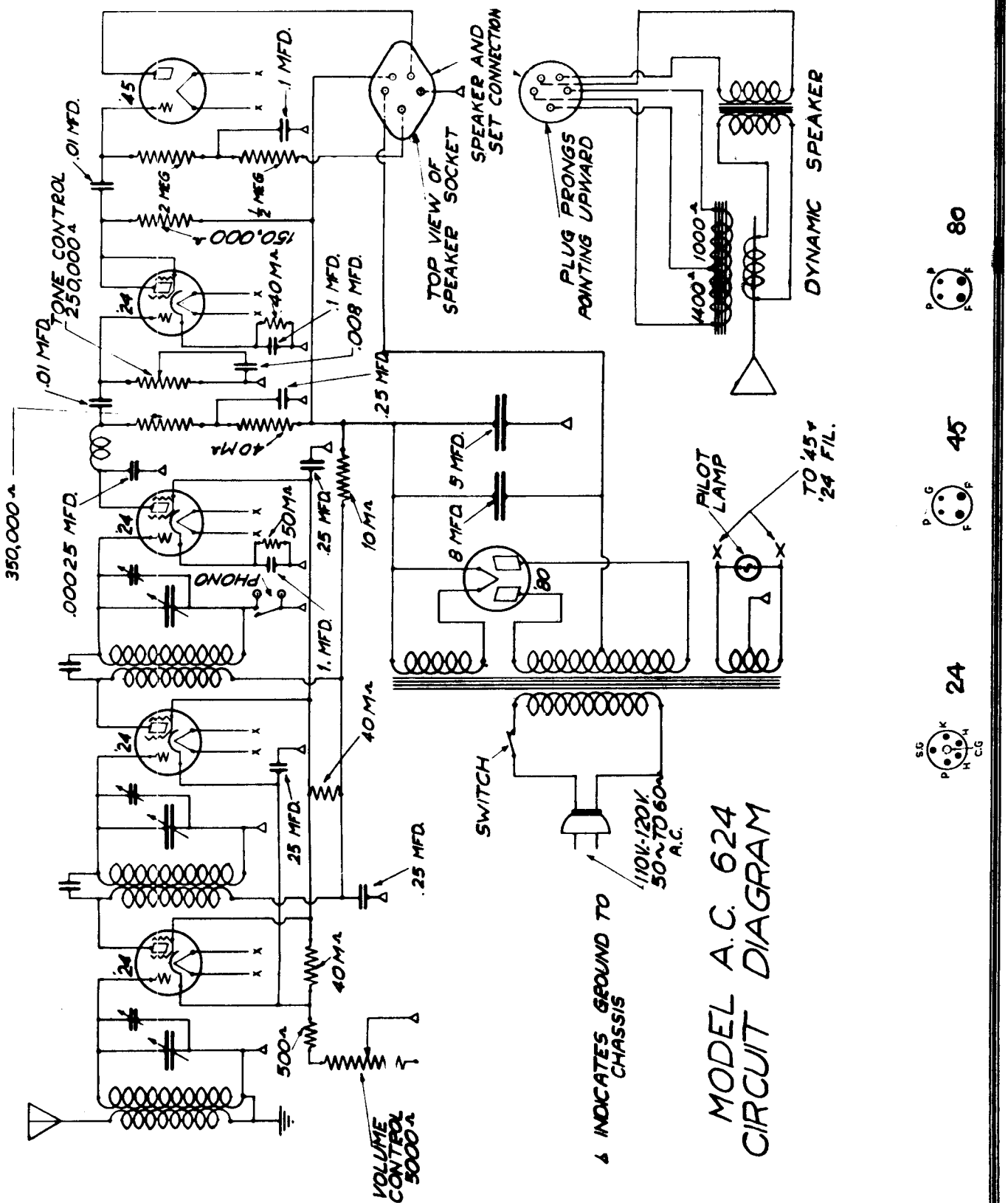


MODEL A.C. 245 WIRING DIAGRAM

PIERCE-AIRO, Inc.



PIERCE-AIRO, Inc.



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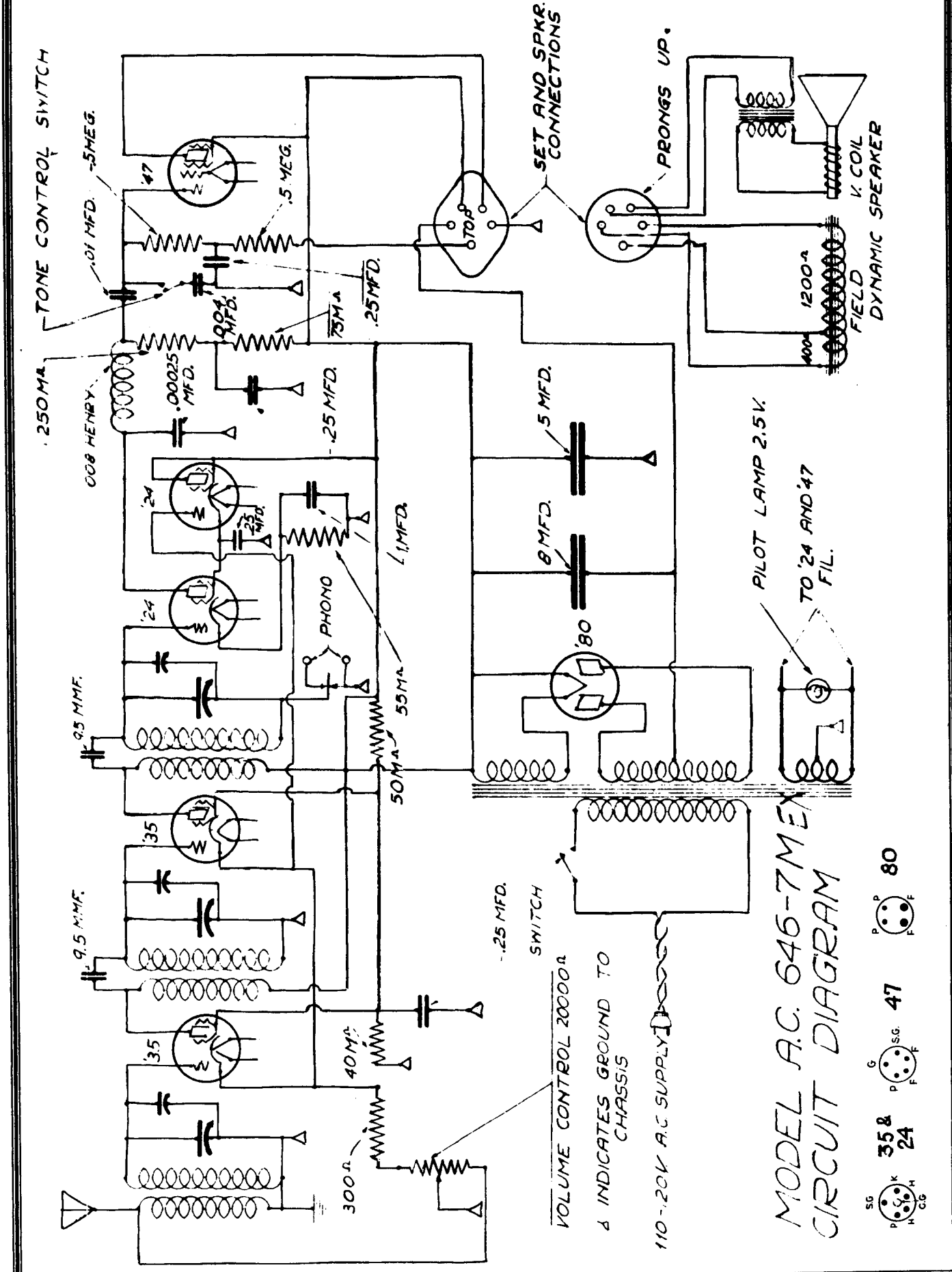
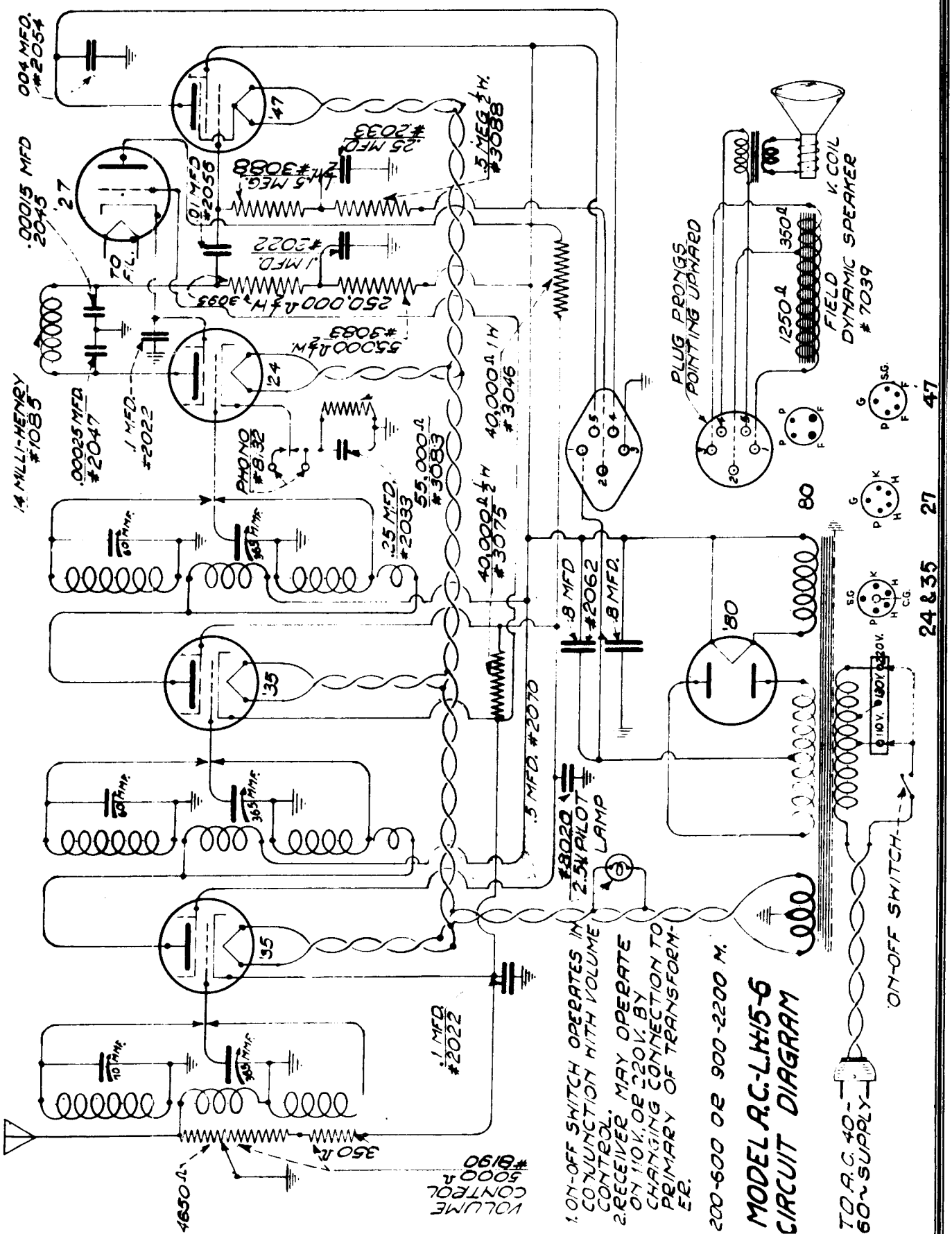
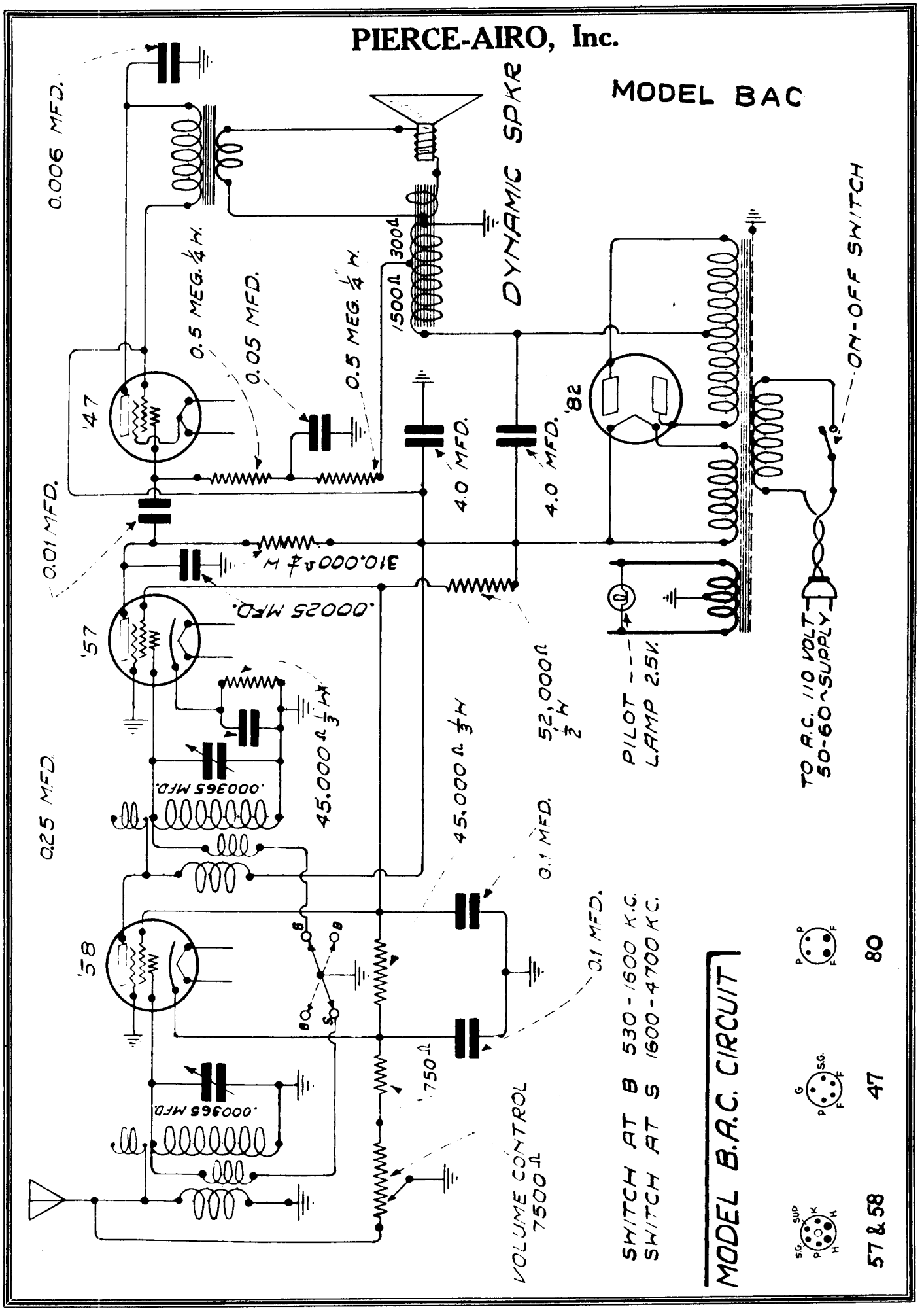


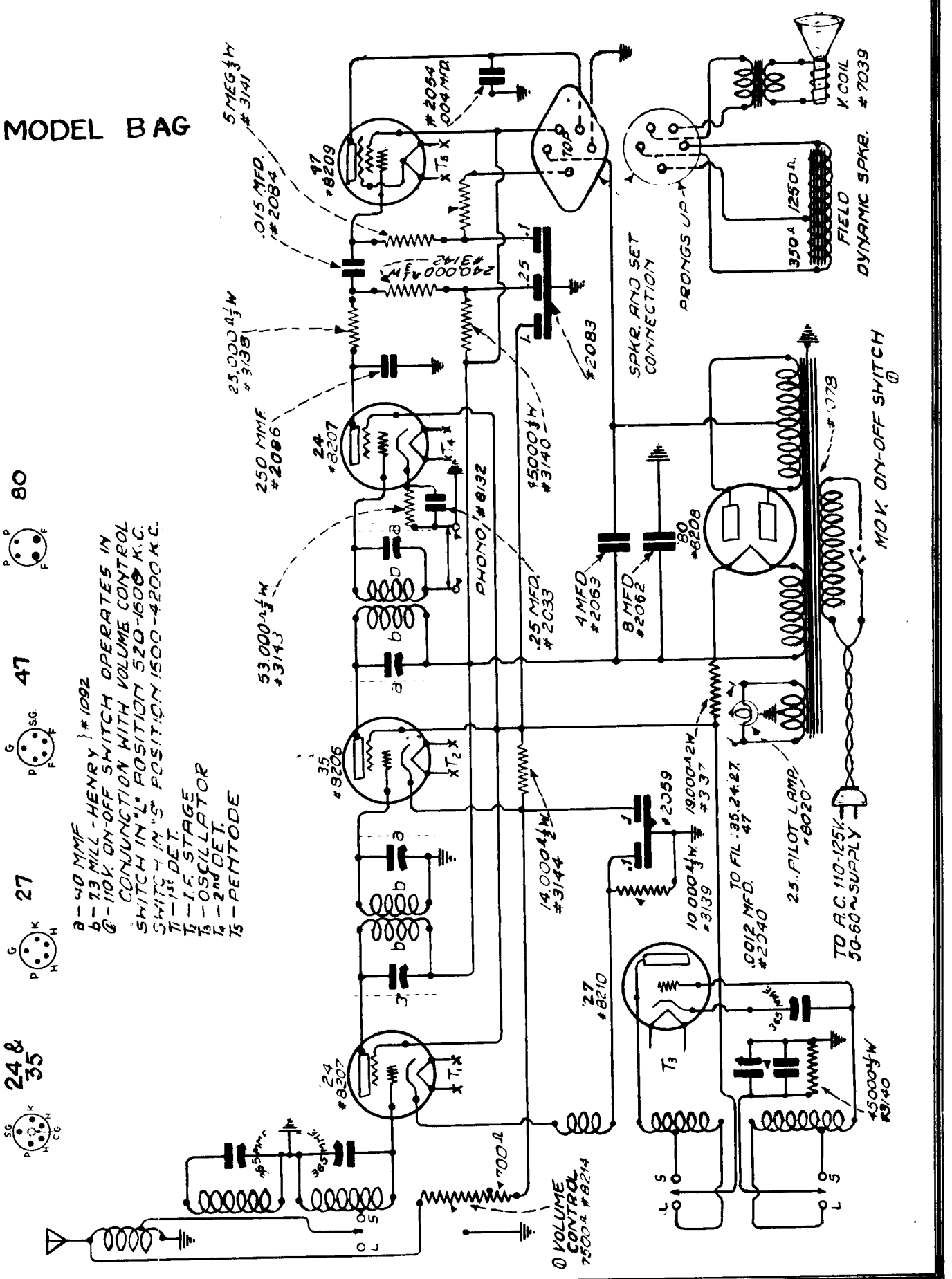
PIERCE-AIRO, Inc.




PIERCE-AIRO, Inc.
MODEL BAC
DYNAMIC SPKR
0.006 MFD.
0.5 MEG. ½ W.
0.05 MFD.
0.5 MEG. ½ W.
1500Ω 300Ω
'47
4.0 MFD.
4.0 MFD.
'82
ON-OFF SWITCH
0.01 MFD.
310,000Ω ½ W
.00025 MFD.
'57
45,000Ω ½ W
.00035 MFD.
0.25 MFD.
45,000Ω ½ W
52,000Ω ½ W
PILOT LAMP 2.5V.
TO A.C. 110 VOLT 50-60~ SUPPLY
0.1 MFD.
0.1 MFD.
'58
B
S
.00035 MFD.
750Ω
VOLUME CONTROL 7500Ω
SWITCH AT B 530-1600 K.C.
SWITCH AT S 1600-4700 K.C.
MODEL B.A.C. CIRCUIT
57 & 58
47
80

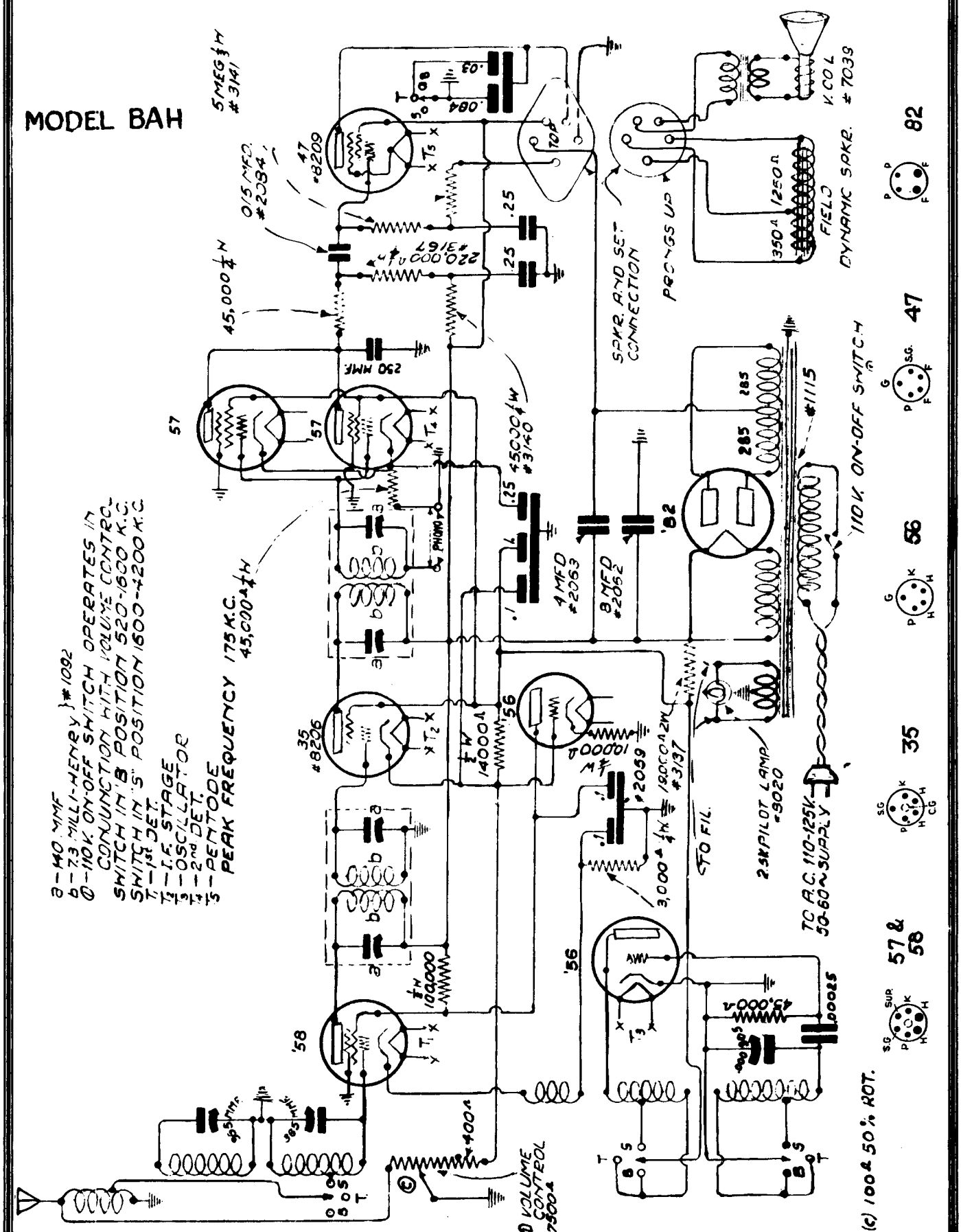
PIERCE-AIRO, Inc.

MODEL BAG



PIERCE-AIRO, Inc.

MODEL BAH

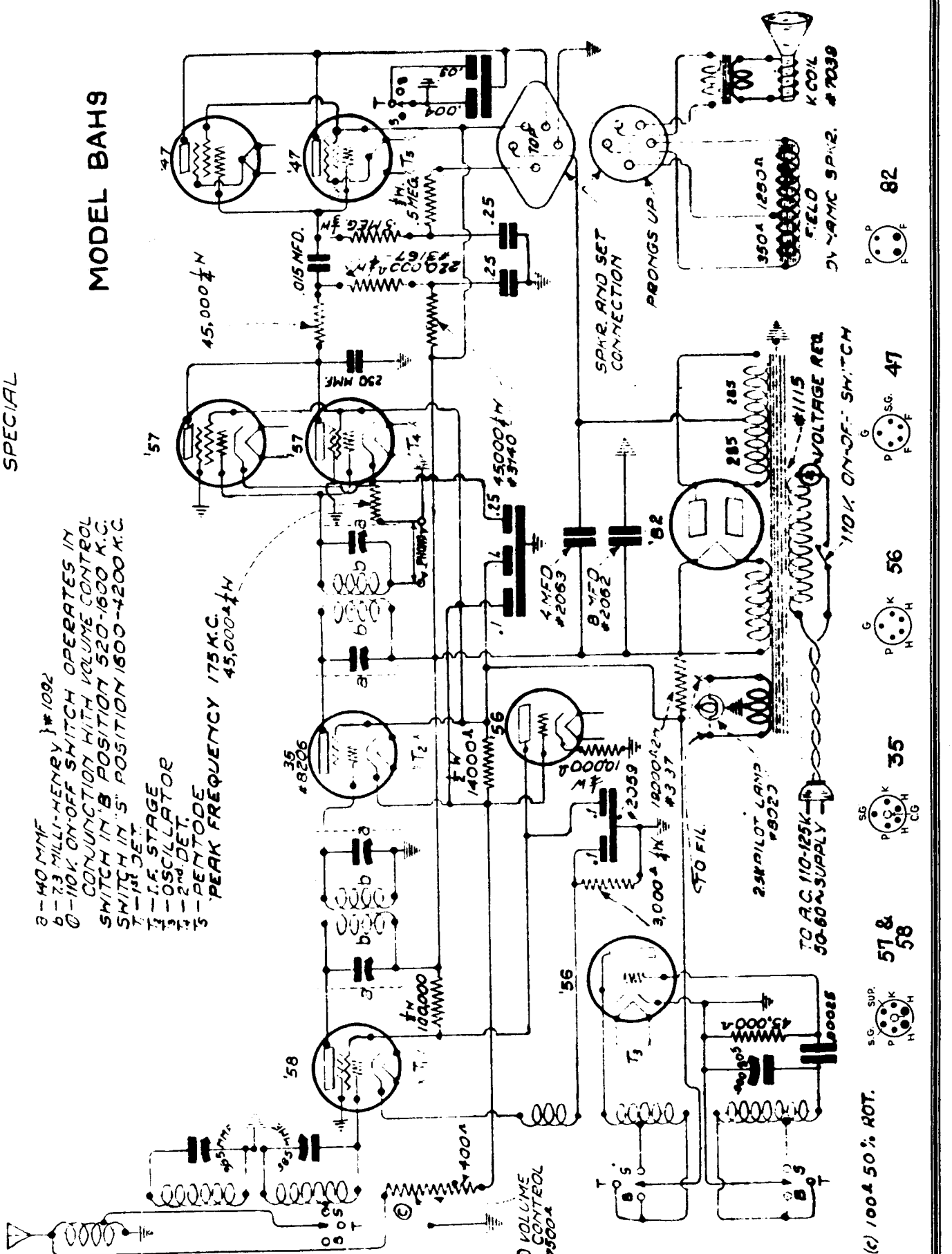


PIERCE-AIRO, Inc.

MODEL BAH9

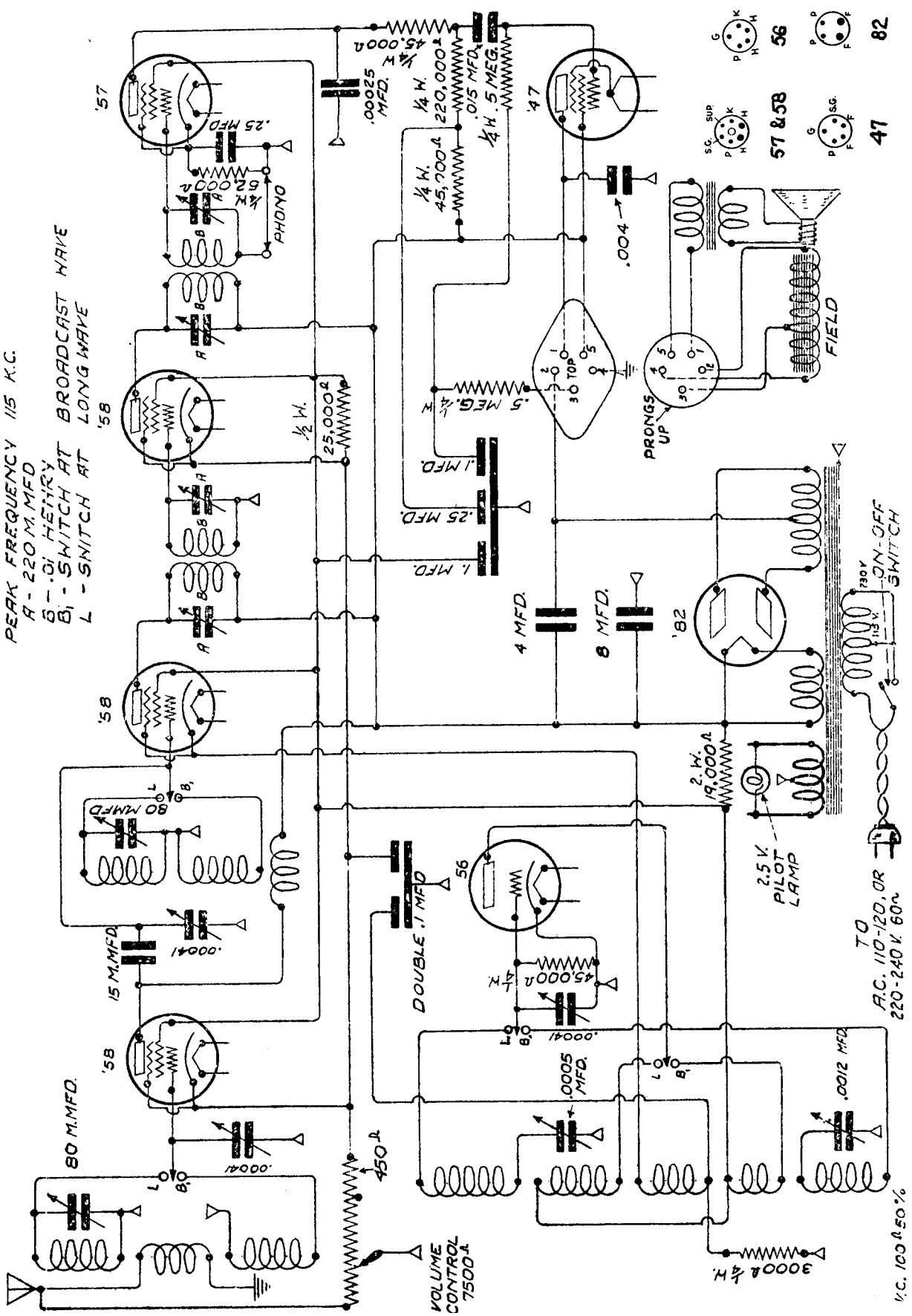
SPECIAL

a – 140 MMF
b – 7.3 MILLI-HENRY #1092
© – 110 V. ON-OFF SWITCH OPERATES IN CONJUNCTION WITH VOLUME CONTROL
SWITCH IN 'B' POSITION 520-1600 K.C.
SWITCH IN 'S' POSITION 1600-4200 K.C.
T – 1st DET.
T1 – I.F. STAGE
T2 – OSCILLATOR
T3 – 2nd DET.
T4 – PENTODE
'PEAK FREQUENCY 175 K.C.

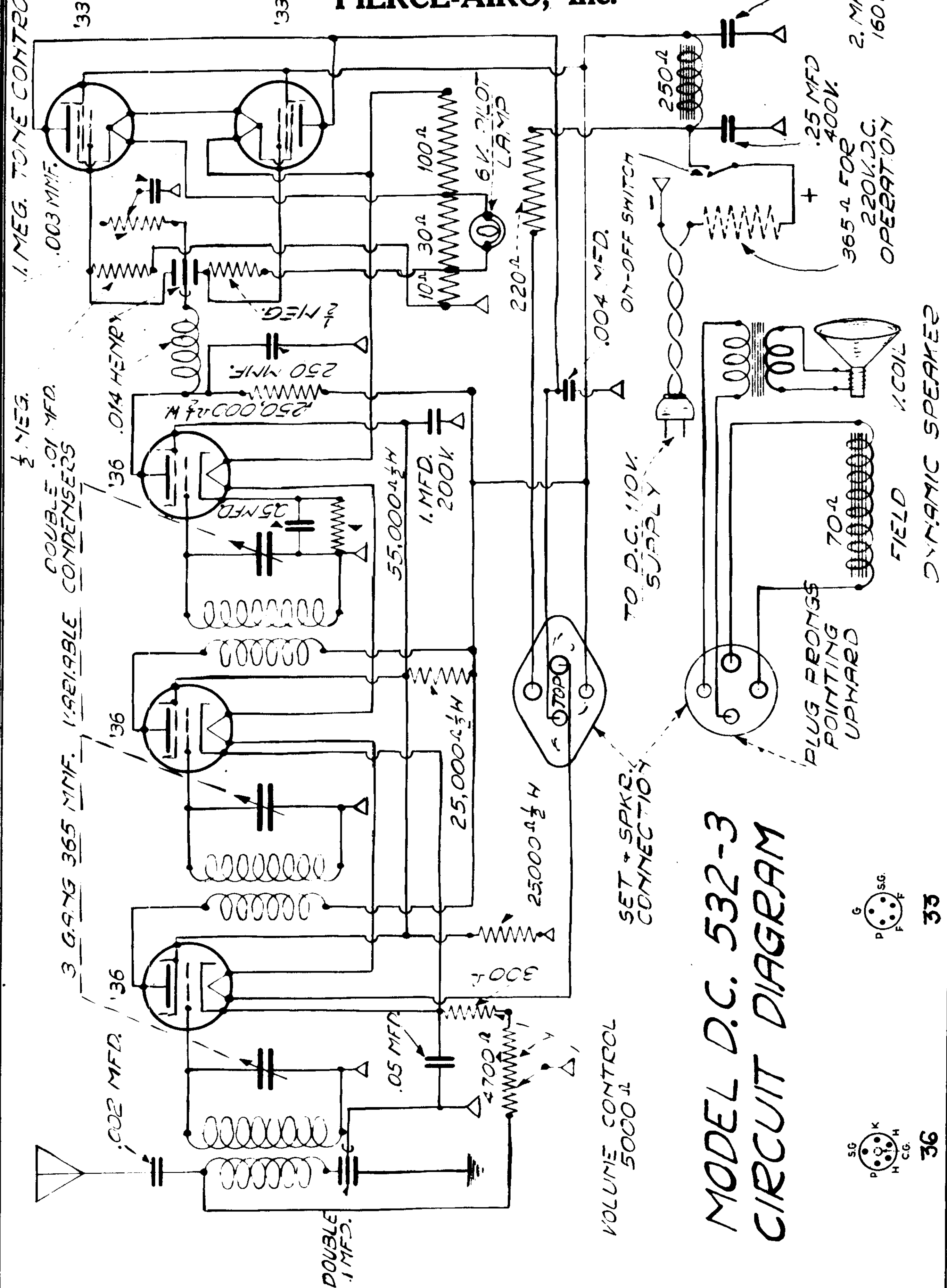


PIERCE-AIRO, Inc.

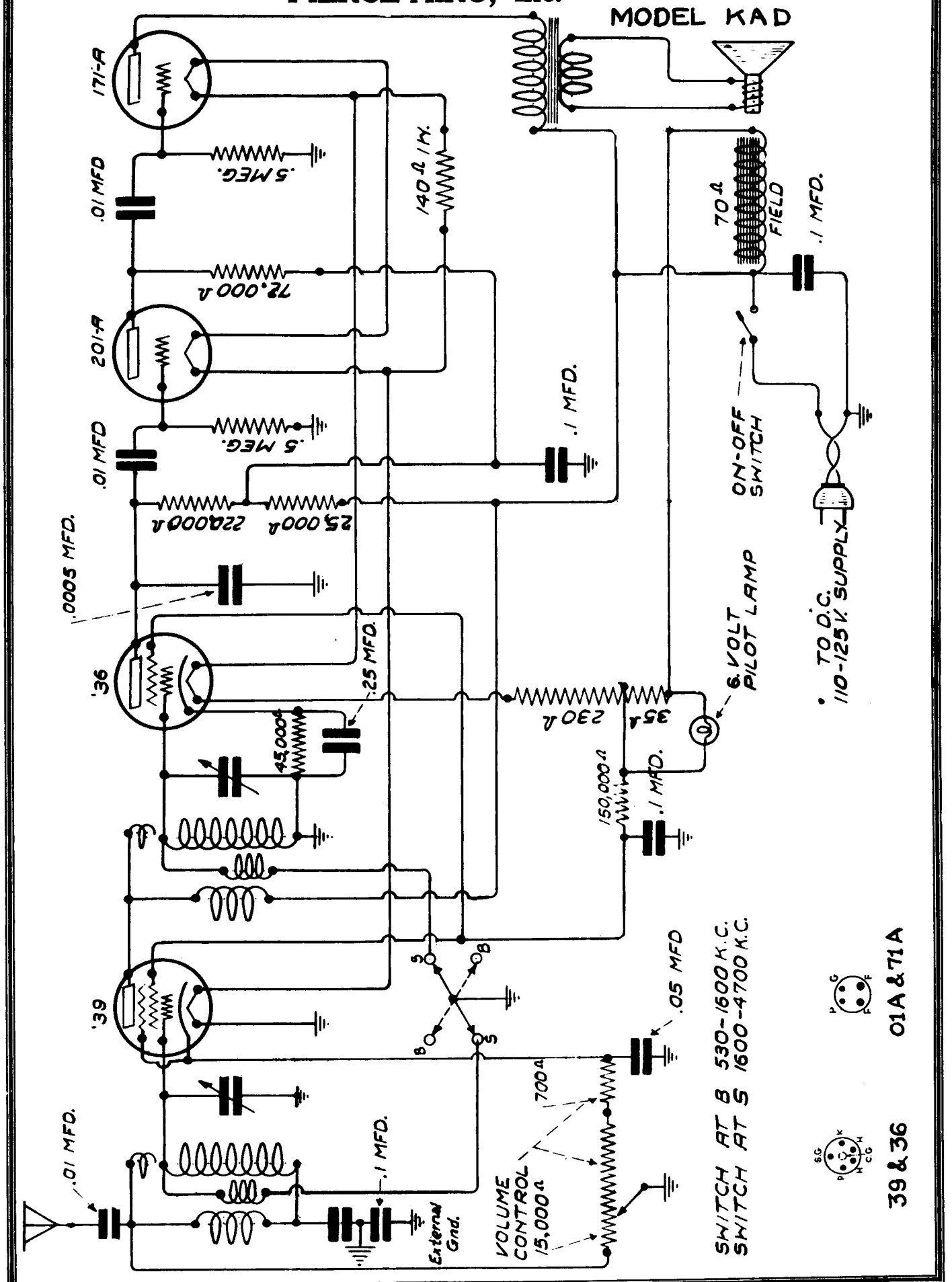
MODEL B.L.G.

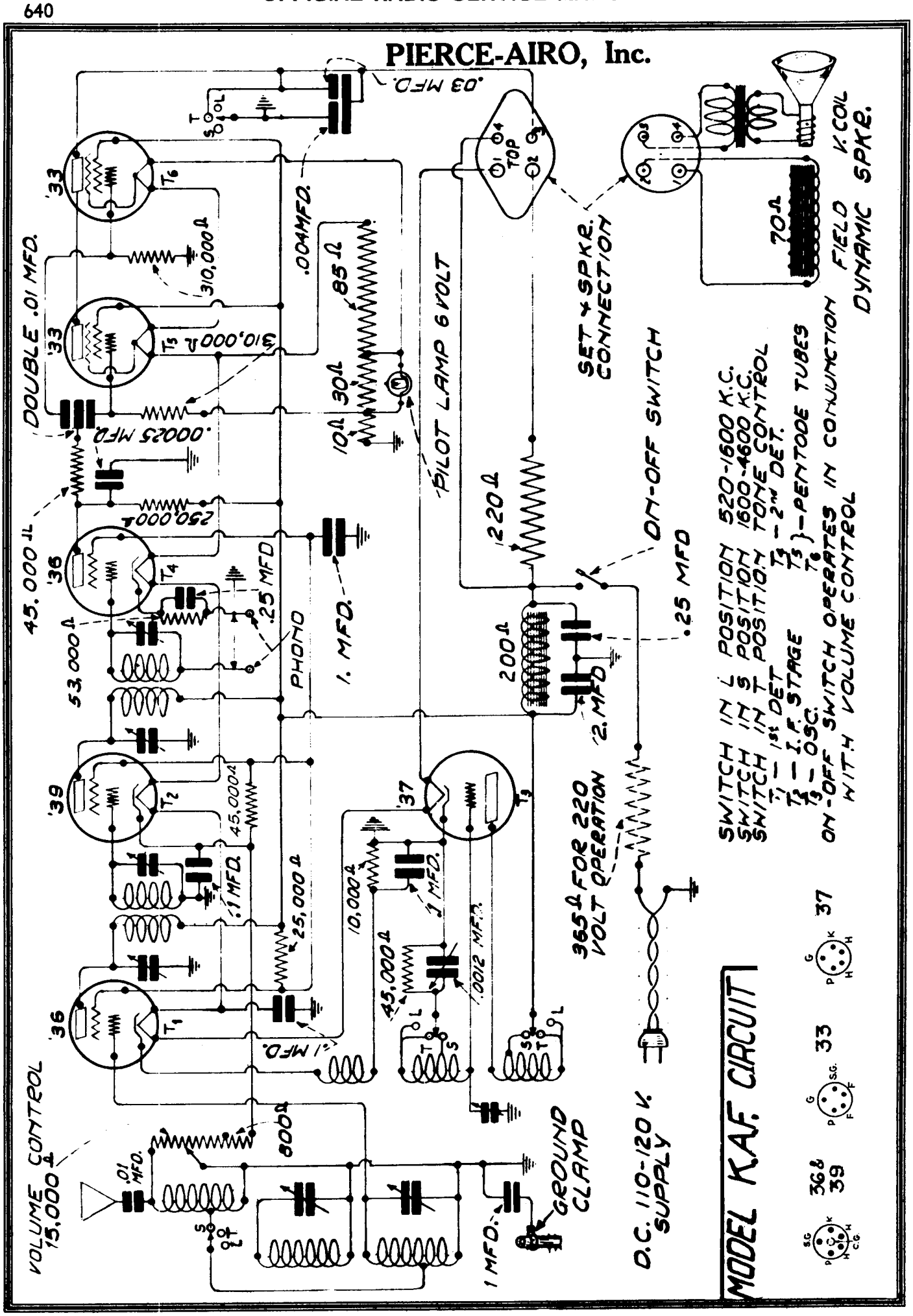


PIERCE-AIRO, Inc.



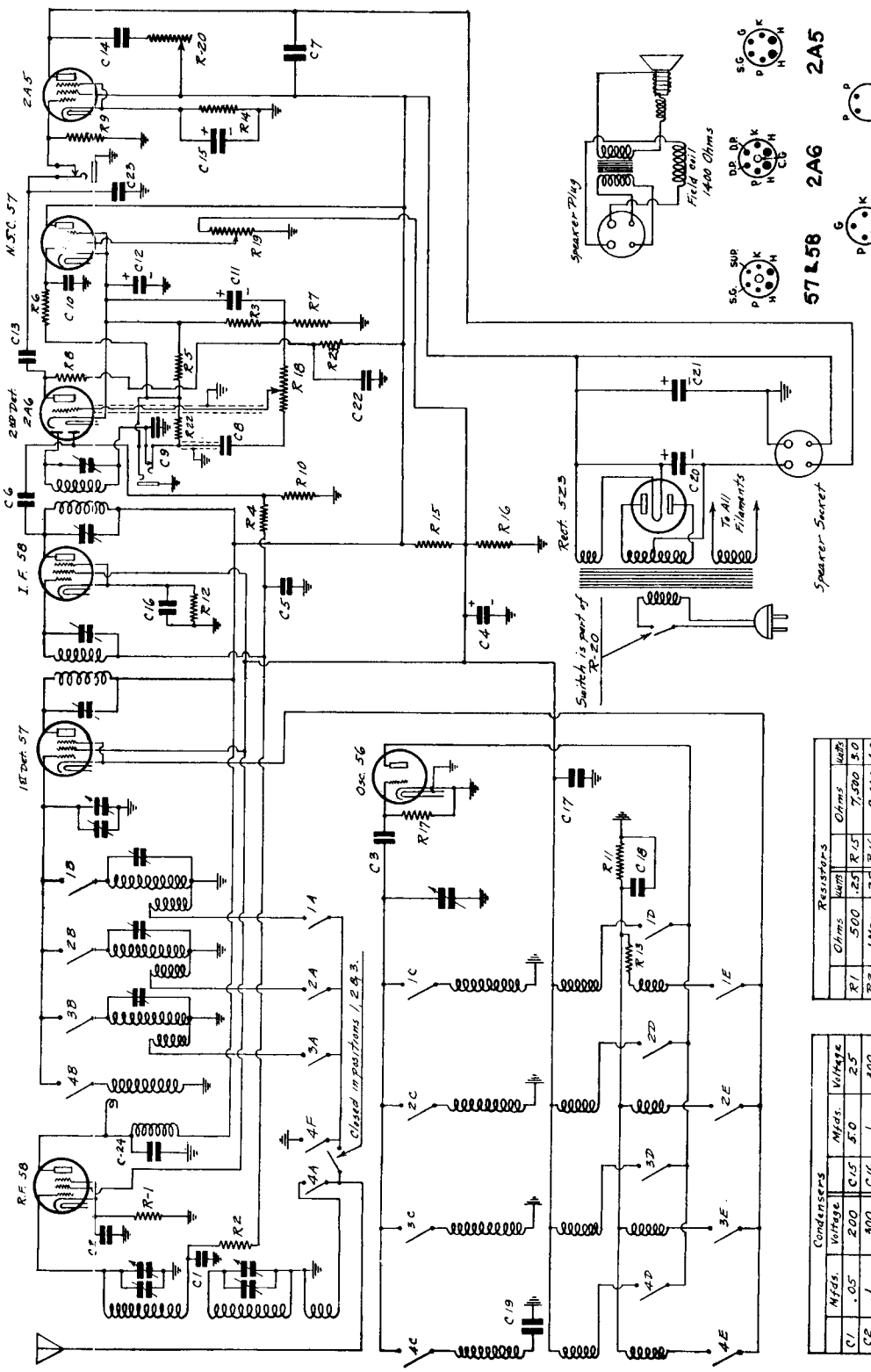
PIERCE-AIRO, Inc.




PIERCE-AIRO, Inc.
MODEL K.A.F. CIRCUIT
SWITCH IN 1 POSITION 520-1600 K.C.
SWITCH IN 2 POSITION 1600-4600 K.C.
SWITCH IN 3 POSITION TONE CONTROL
T1 - 1st DET. T4 - 2nd DET.
T2 - I.F. STAGE T5 } - PENTODE TUBES
T3 - OSC. T6
ON-OFF SWITCH OPERATES IN CONJUNCTION WITH VOLUME CONTROL
D.C. 110-120 V. SUPPLY
365Ω FOR 220 VOLT OPERATION
ON-OFF SWITCH
SET-SPKR. CONNECTION
PILOT LAMP 6 VOLT
DOUBLE .01 MFD.
.03 MFD.
.004MFD.
.00025 MFD.
.25 MFD
.1 MFD.
1. MFD.
2. MFD
.0012 MFD.
PHONO
VOLUME CONTROL 15,000Ω
GROUND CLAMP
V. COIL DYNAMIC SPKR.
FIELD
'33
'36
'39
'37
'38
'24
'27
TOP
368
39
33
37

PILOT RADIO CORP.

MODELS 8 & 84 & 7 & 81



SCHEMATIC DIAGRAM

Pilot "Dragon" All-Wave Superheterodyne

Models No. 8 and 84

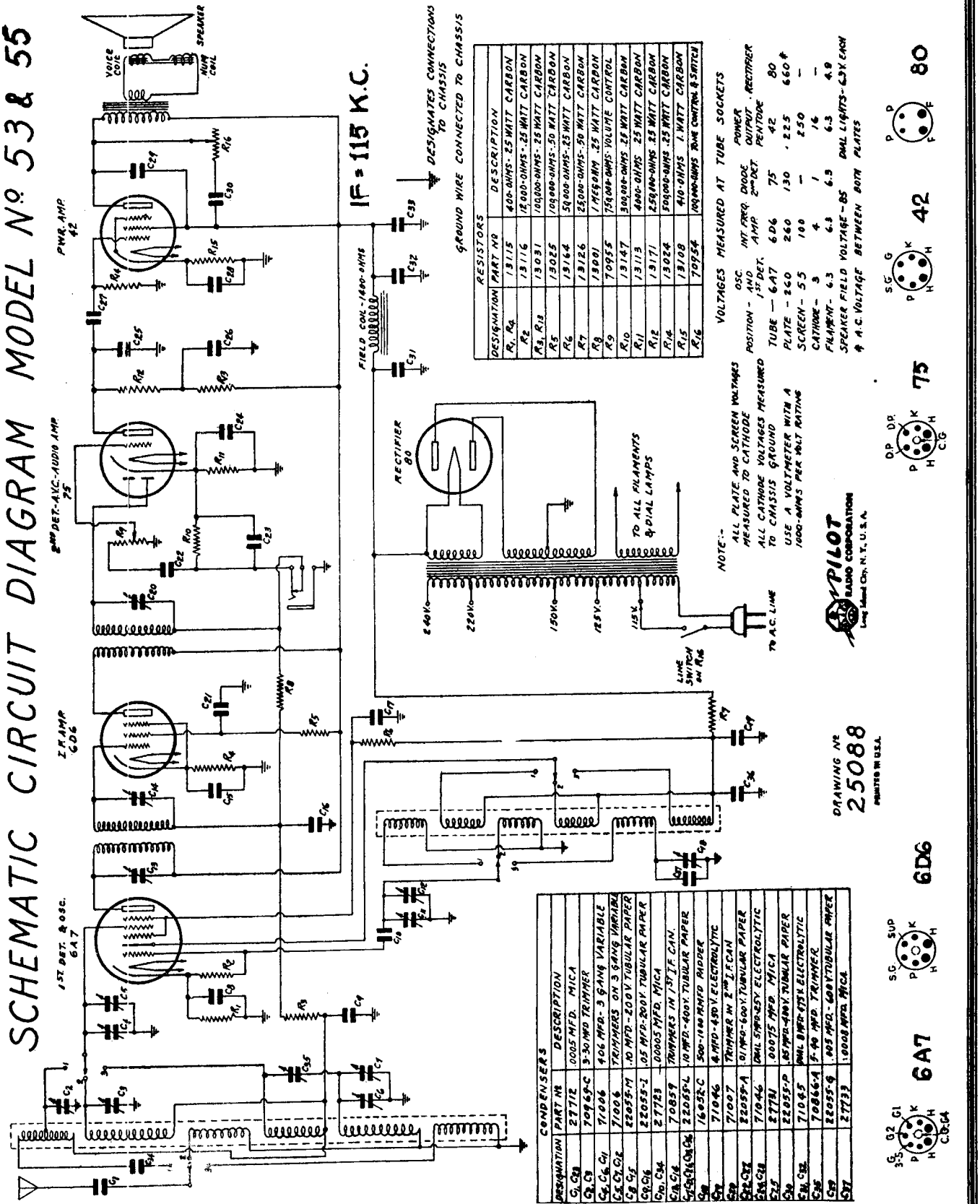
NOTE: In Models No. 7 and No. 81 the schematic diagram is identical except for the short-wave coil circuit.

Condensers	Mfds.	Voltage
C1	.05	200
C2	.1	300
C3	.00005	Mica
C4	2.0	350
C5	.05	200
C6	.0002	Mica
C7	.002	Mica
C8	.01	600
C9	.0005	Mica
C10	.01	600
C11	5.0	25
C12	2.0	350
C13	.01	600
C14	.05	600
C15	5.0	25
C16	.1	300
C17	.1	300
C18	.1	300
C19	.0021	Mica
C20	8.0	475
C21	8.0	475
C22	.1	300
C 23	.0005	Mica
K-24	.00005	Mica

Resistors	Watts	Ohms	Watts
R1	.5	500	.25
R2	1 Meg.	.25	R14
R3	6,000	.25	R17
R4	500,000	.25	R18
R5	250,000	.25	R19
R6	500,000	.25	R20
R7	6,000	.25	R21
R8	250,000	.25	R22
R9	500,000	.25	R23
R10	1 Meg.	.25	
R11	10,000	.5	
R12	500	.5	
R13	500	.5	
R14	410	1.0	
R15	7,500	5.0	
R16	9,000	1.0	
R17	18,000	.5	
R18	750,000		
R19	20,000		
R20	100,000		
R21			
R22	250,000	.25	
R23	250,000	.25	

PILOT RADIO CORP.

MODELS 53 & 55



RESISTORS		
DESIGNATION	PART NO	DESCRIPTION
R1, R4	13115	400-OHMS- .25 WATT CARBON
R2	13116	12,000-OHMS-.25 WATT CARBON
R3, R13	13031	100,000-OHMS-.25 WATT CARBON
R5	13025	100,000-OHMS-.50 WATT CARBON
R6	13164	50,000-OHMS-.25 WATT CARBON
R7	13126	25,000-OHMS-.50 WATT CARBON
R8	13001	1 MEGOHM .25 WATT CARBON
R9	70955	750,000-OHMS-VOLUTE CONTROL
R10	13147	300,000-OHMS .25 WATT CARBON
R11	13113	4000-OHMS .25 WATT CARBON
R12	13171	2,500-OHMS .25 WATT CARBON
R14	13024	50,000-OHMS .25 WATT CARBON
R15	13108	410-OHMS 1 WATT CARBON
R16	70954	100,000-OHMS TONE CONTROL & SWITCH

VOLTAGES MEASURED AT TUBE SOCKETS

POSITION -	OSC. AND 1ST DET.	INT. FREQ. AMP.	DIODE 2ND DET.	POWER OUTPUT PENTODE	RECTIFIER
TUBE —	6A7	6D6	75	42	80
PLATE -	240	260	130	225	660 *
SCREEN-	55	100	—	250	—
CATHODE-	3	4	1	16	—
FILAMENT-	6.3	6.3	6.3	6.3	4.9

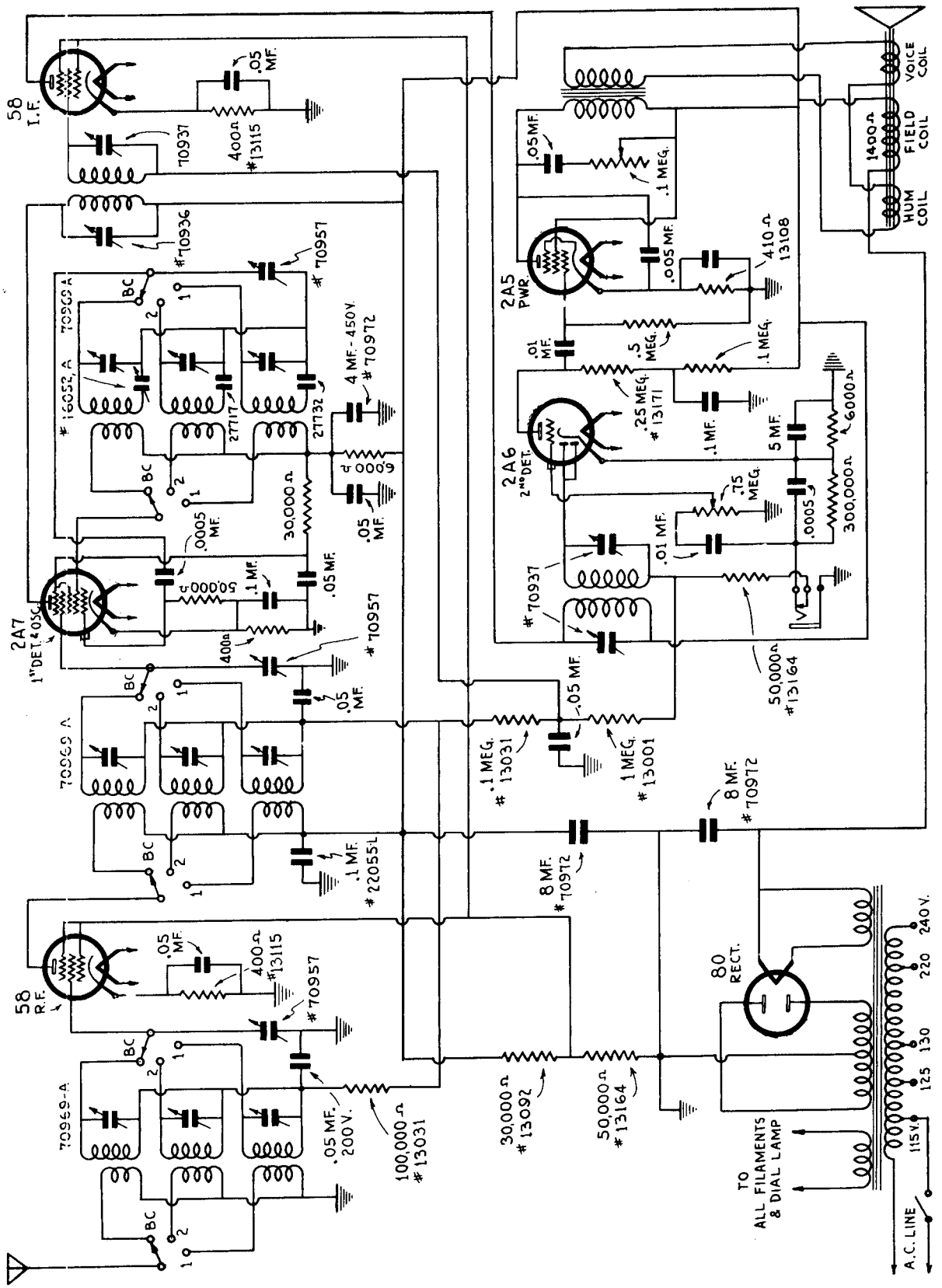
SPEAKER FIELD VOLTAGE - 85 DIAL LIGHTS - 6.3 V EACH
* A.C. VOLTAGE BETWEEN BOTH PLATES

CONDENSERS		
DESIGNATION	PART NO	DESCRIPTION
C1, C28	27712	.0005 MFD. MICA
C2, C3	70965-C	3-30 MFD TRIMMER
C4, C6, C11	71006	406 MFD- 3 GANG VARIABLE
C5, C7, C12	71006	TRIMMERS ON 3 GANG VARIABLE
C8, C15	22055-M	.10 MFD-200 V. TUBULAR PAPER
C9, C16	22055-J	.05 MFD-200 V. TUBULAR PAPER
C10, C34	27723	.0006 MFD. MICA
C13, C14	70859	TRIMMERS IN 1ST I.F. CAN.
C17, C18, C35, C36	22055-L	.10 MFD-400 V. TUBULAR PAPER
C19	16052-C	300-1100 RMFD RADDER
C20	71046	8 MFD-450 V. ELECTROLYTIC
C21	71007	TRIMMER IN 2ND I.F. CAN
C22, C31	22055-A	.01 MFD-600 V. TUBULAR PAPER
C23, C24	71046	DUAL SIMPLEX ELECTROLYTIC
C25	27731	.00075 MFD. MICA
C26	22055-P	.25 MFD-400 V. TUBULAR PAPER
C27, C32	71045	DUAL 8 MFD-450 V. ELECTROLYTIC
C28	70866-A	F-40 MFD. TRIMMER
C29	22055-G	.005 MFD.-600 V. TUBULAR PAPER
C30	27733	.0008 MFD. MICA

PILOT RADIO CORP.

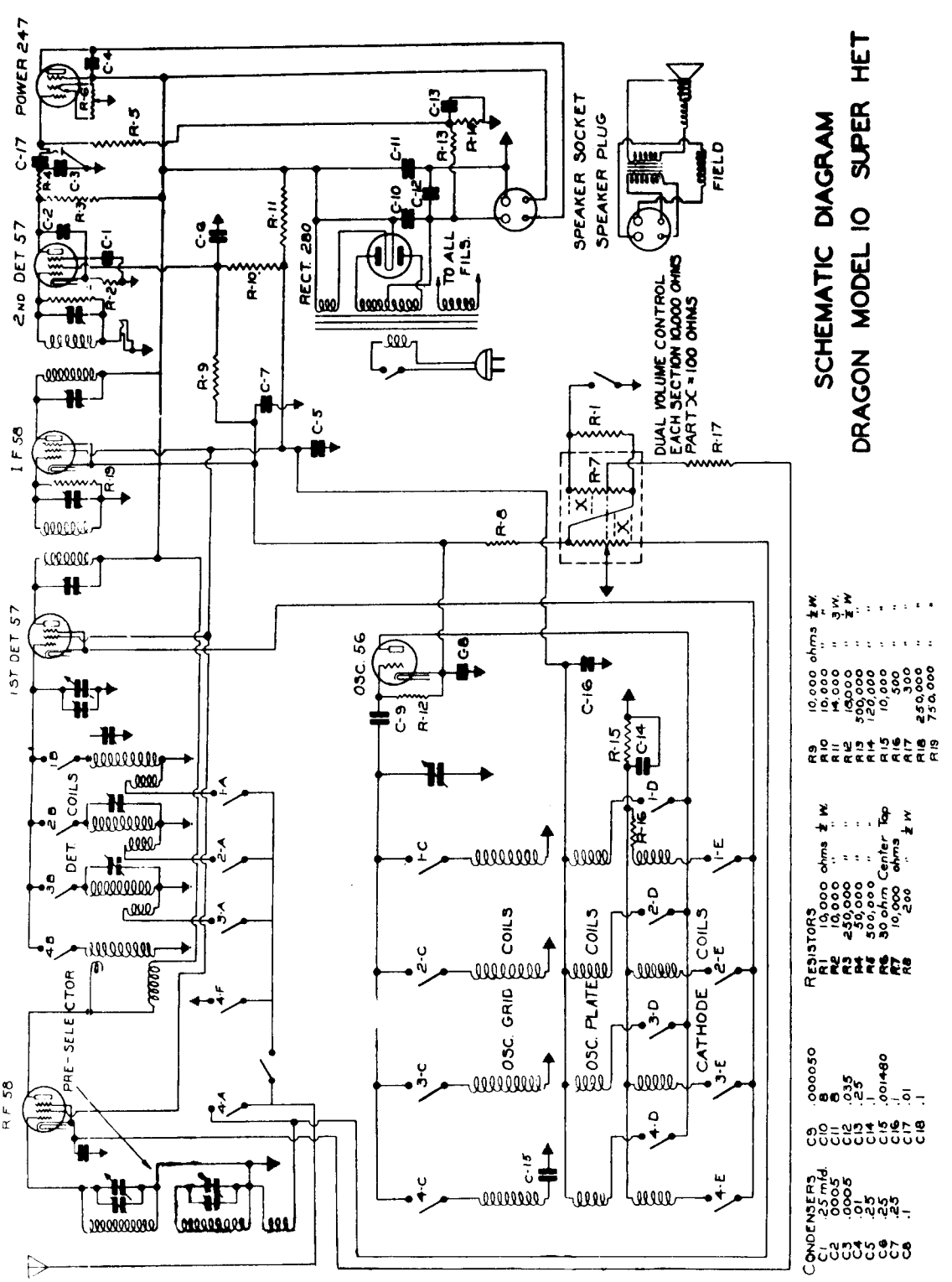
MODEL 63

58 2A7 2A6 2A5 80



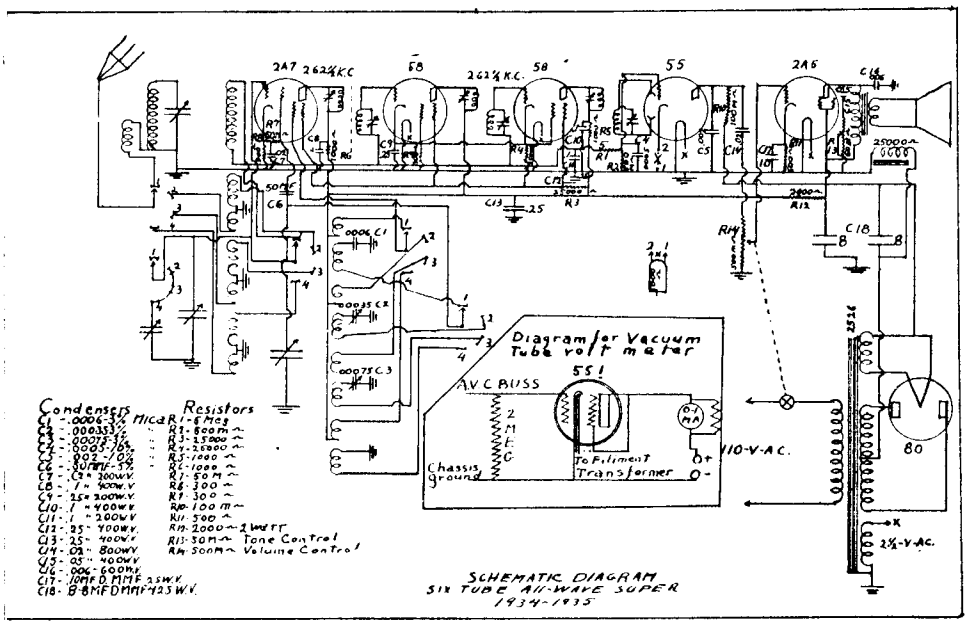
PILOT RADIO & TUBE CO.

MODEL 10 A.C



RADIOBAR CO. OF AMERICA

MODELS 106-506 & 526



SERVICE DATA (SIX TUBE ALL-WAVE SUPER HETERODYNE 1934-1935)

All models have automatic volume control of the diode type, controlling the first detector as well as the high frequency amplifier tubes. This A.V.C. makes it impossible to service and rebalance without a meter of the type to be described. This meter will work on any make or type of A.V.C., provided care is used. It can not be damaged by improper connection of the leads.

PARTS REQUIRED FOR VACUUM TUBE VOLT METER

1—0 to 1 or 0 to 1.5 milliampmeter.
1—Bell ringing transformer with secondary of 6-10 volts.
1—5 prong socket.
1—551 tube.
1—2 megohn grid leak.
1—10 ohm rheostat.
1—45 volt B battery.
Clips, Box, Cord, Hookup Wire.

USING VACUUM TUBE VOLT METER

The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor.

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 262½ K. C. oscillator to the first detector grid (No. 2-A 7 tube) leaving grid cap in place. Set dial at 1400 K.C. Hook up vacuum tube meter as described and carefully adjust 3 screws on top of Intermediates for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 1400 K.C. when gang is at minimum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

If the intermediates are balanced on 262½ K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R. F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 2 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear.

NOISY OPERATION (Not Static)

A defective tube will cause a sharp 60 cycle R.F. pickup. This is most prominent on low frequency. Replace with a good tube.

In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter into the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

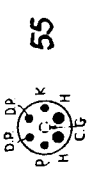
There is no freak or trick antenna that will eliminate natural static.

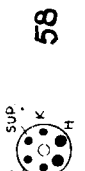
GENERAL

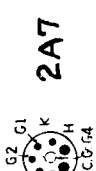
All resistors, bypass condensers and filter units are marked.

Voltages are shown at tube socket on diagram.

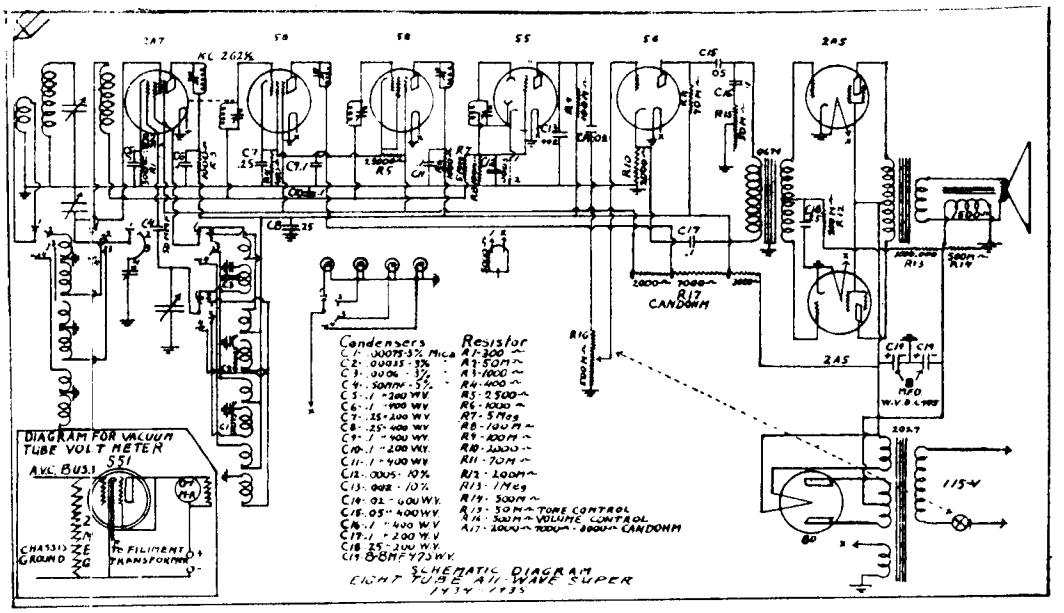
99 per cent of trouble in a chassis is caused by defective tubes, check them carefully.







RADIOBAR CO. OF AMERICA
MODELS 508 & 528 (1935)



SERVICE DATA EIGHT TUBE ALL-WAVE SUPER HETERODYNE 1934-1935)

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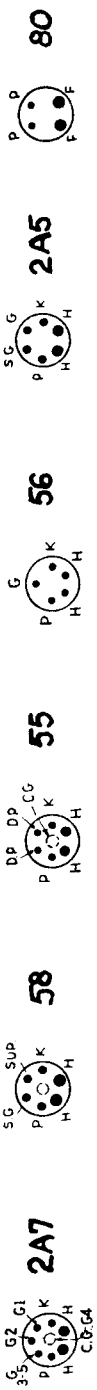
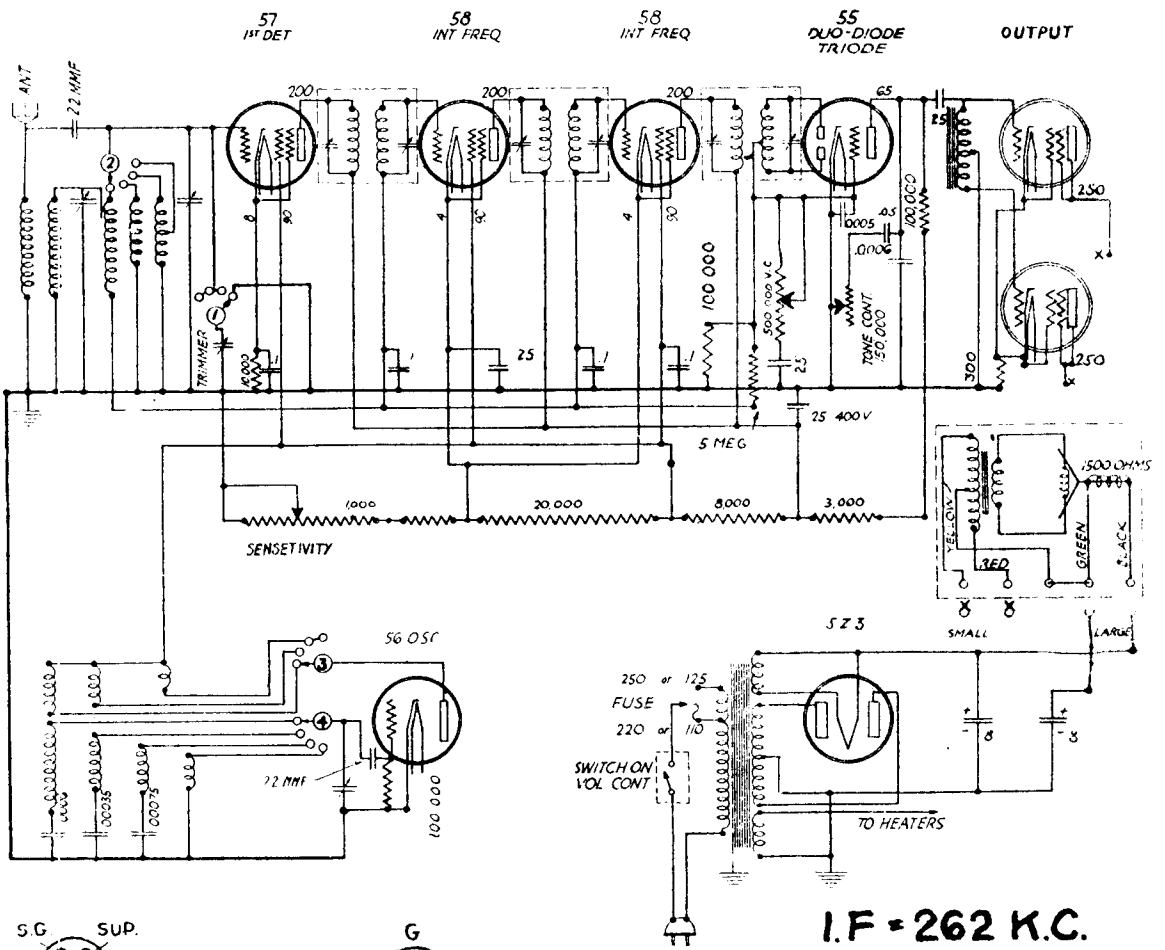


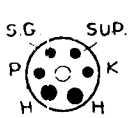
RADIOBAR CO. OF AMERICA

MODELS 508 & 528 (1934)

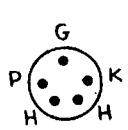
EIGHT TUBE MODELS (Compact and Consoles)

With Rear Fuse and Cover





57 & 58



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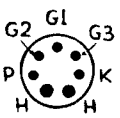
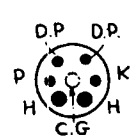


OUTPUT

Diagram for Vacuum Tube Volt Meter



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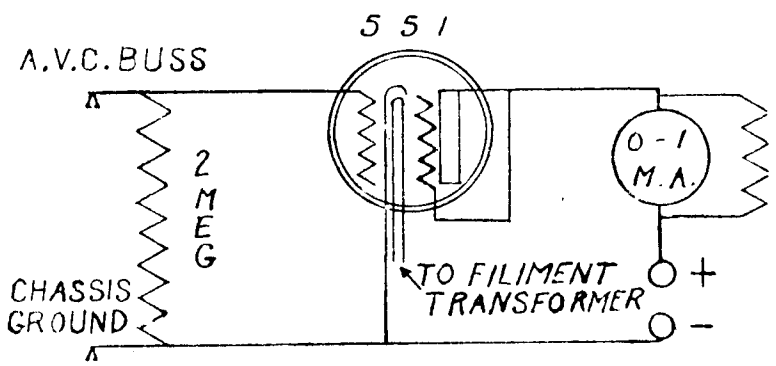
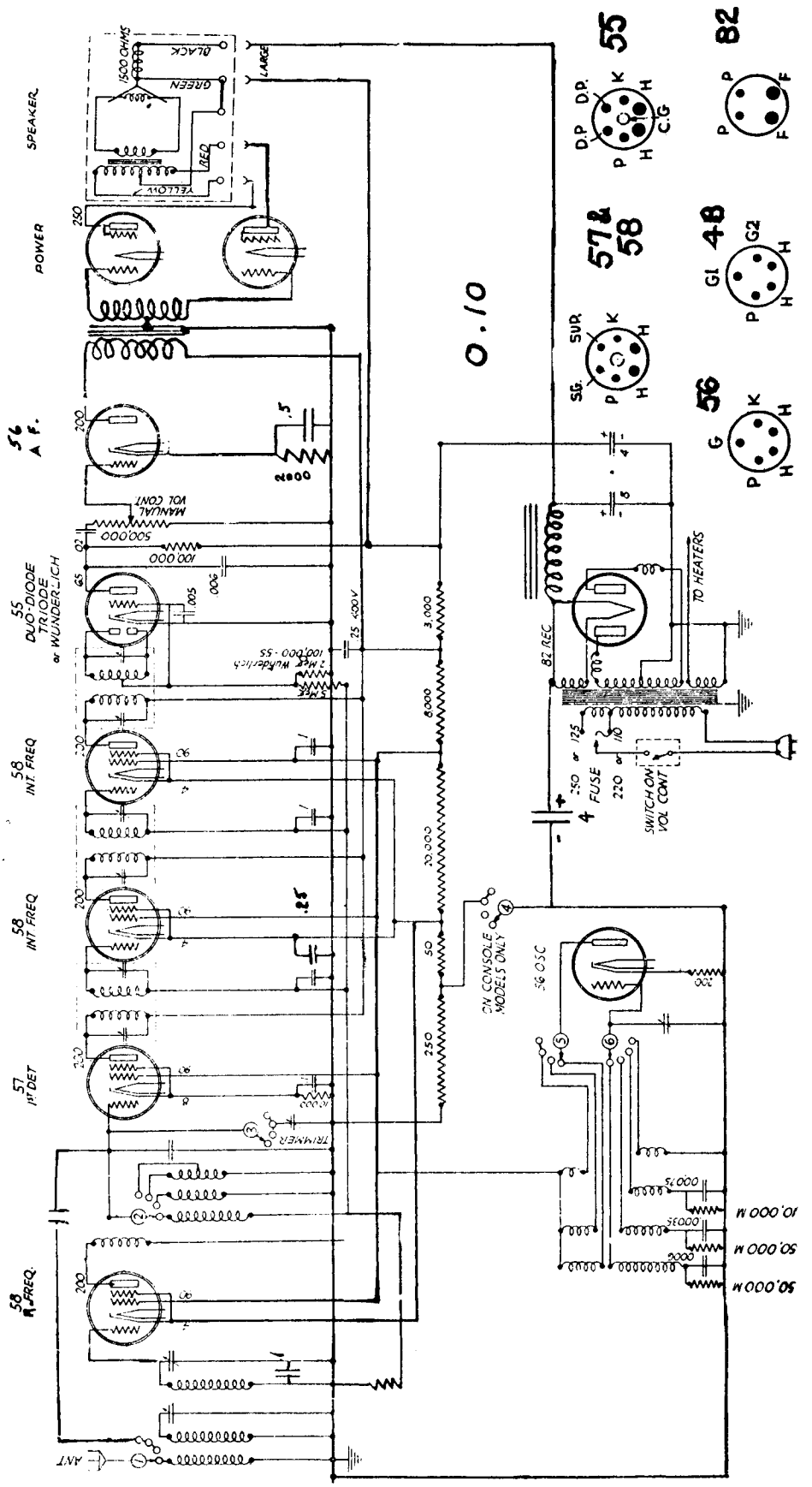


5Z3

RADIOBAR CO. OF AMERICA
MODELS 210 - 510(1934) & 510(1935)

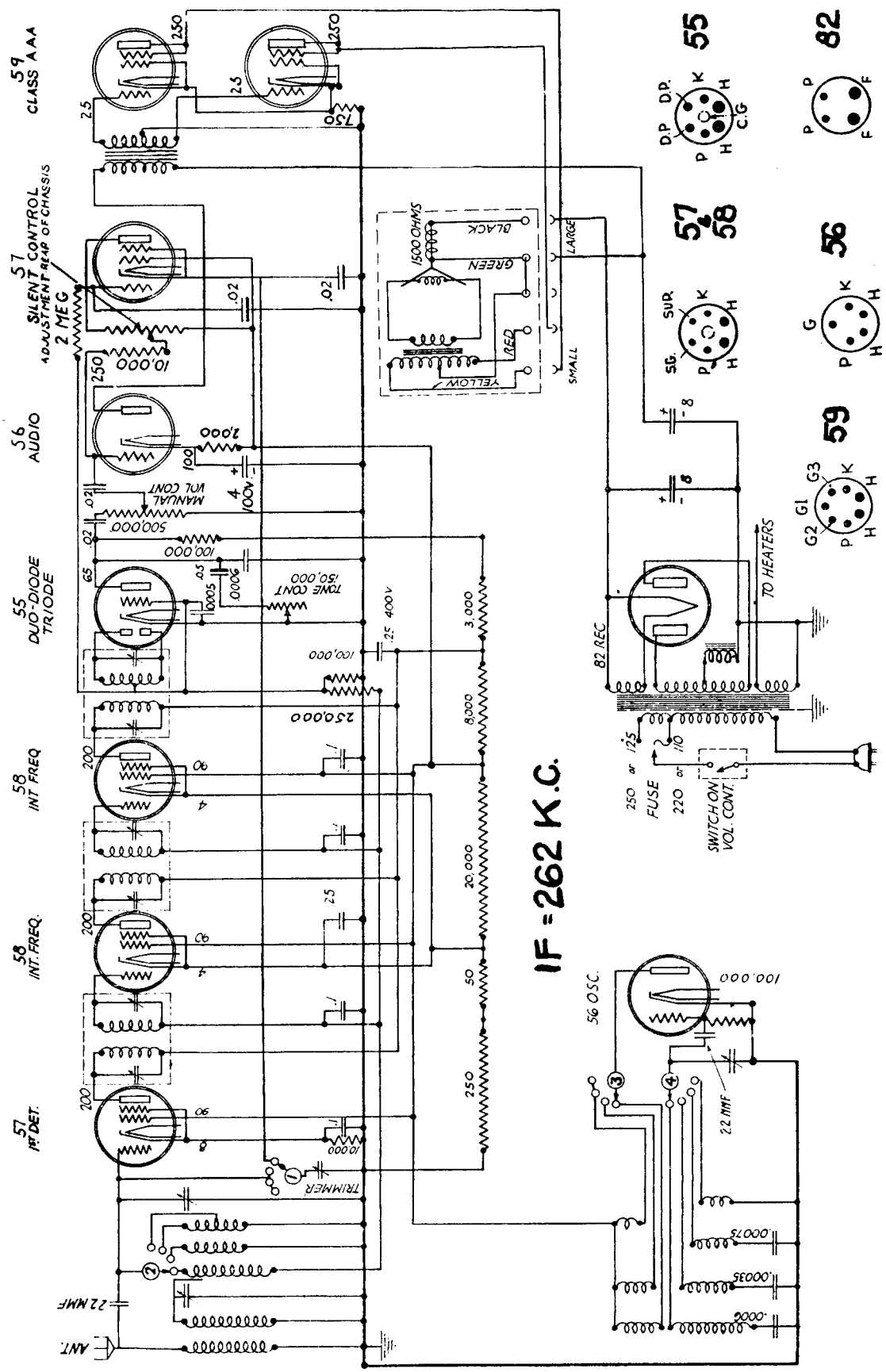
10 TUBE MODELS (Consoles)
Without Rear Fuse and Cover
No. 46 Power Tubes



RADIOBAR CO. OF AMERICA

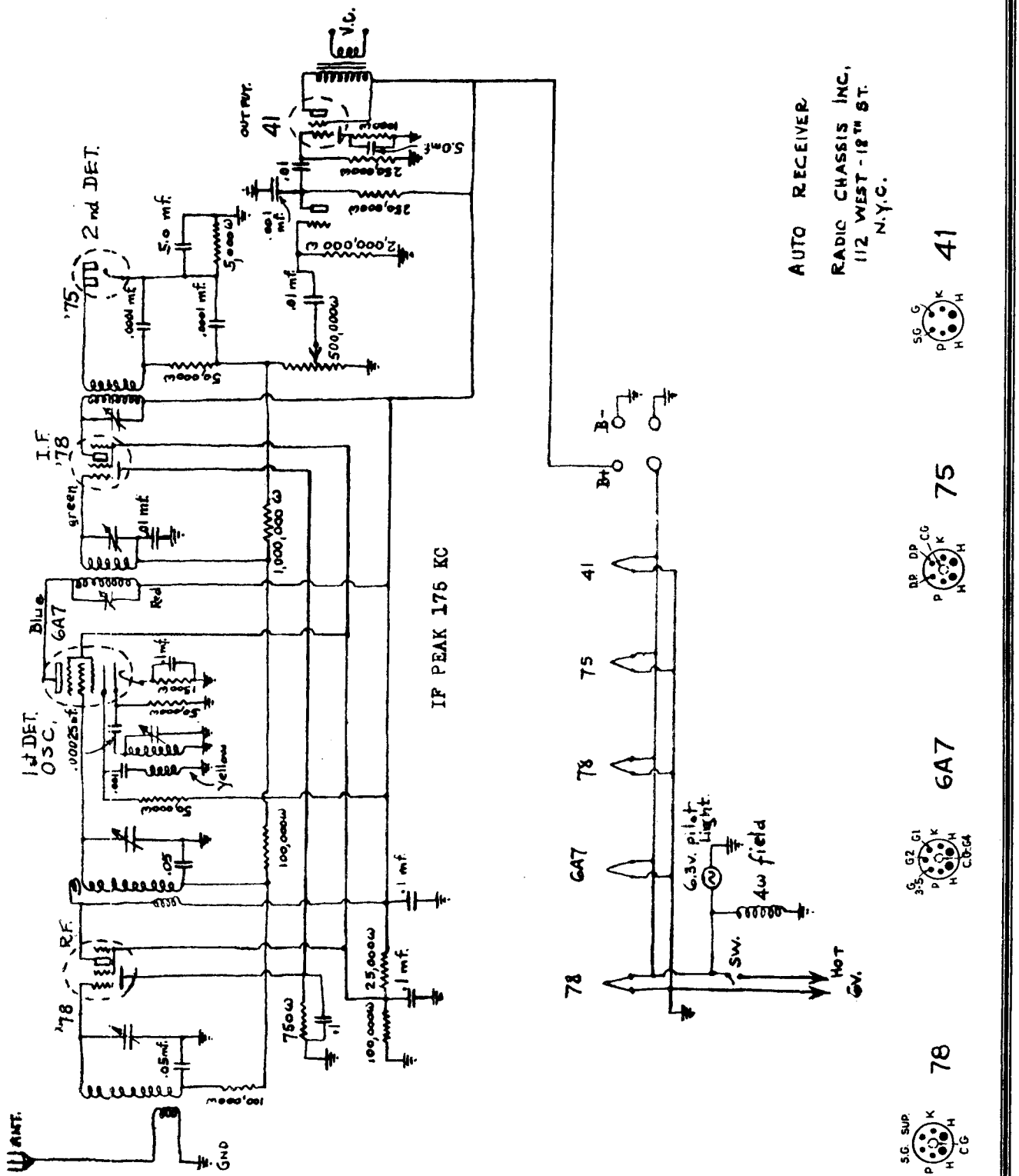
MODELS 210B-210C-510(1934) & 510(1935)

10 TUBE MODELS (Consoles)
With Rear Fuse and Cover
No. 59 Power Tubes



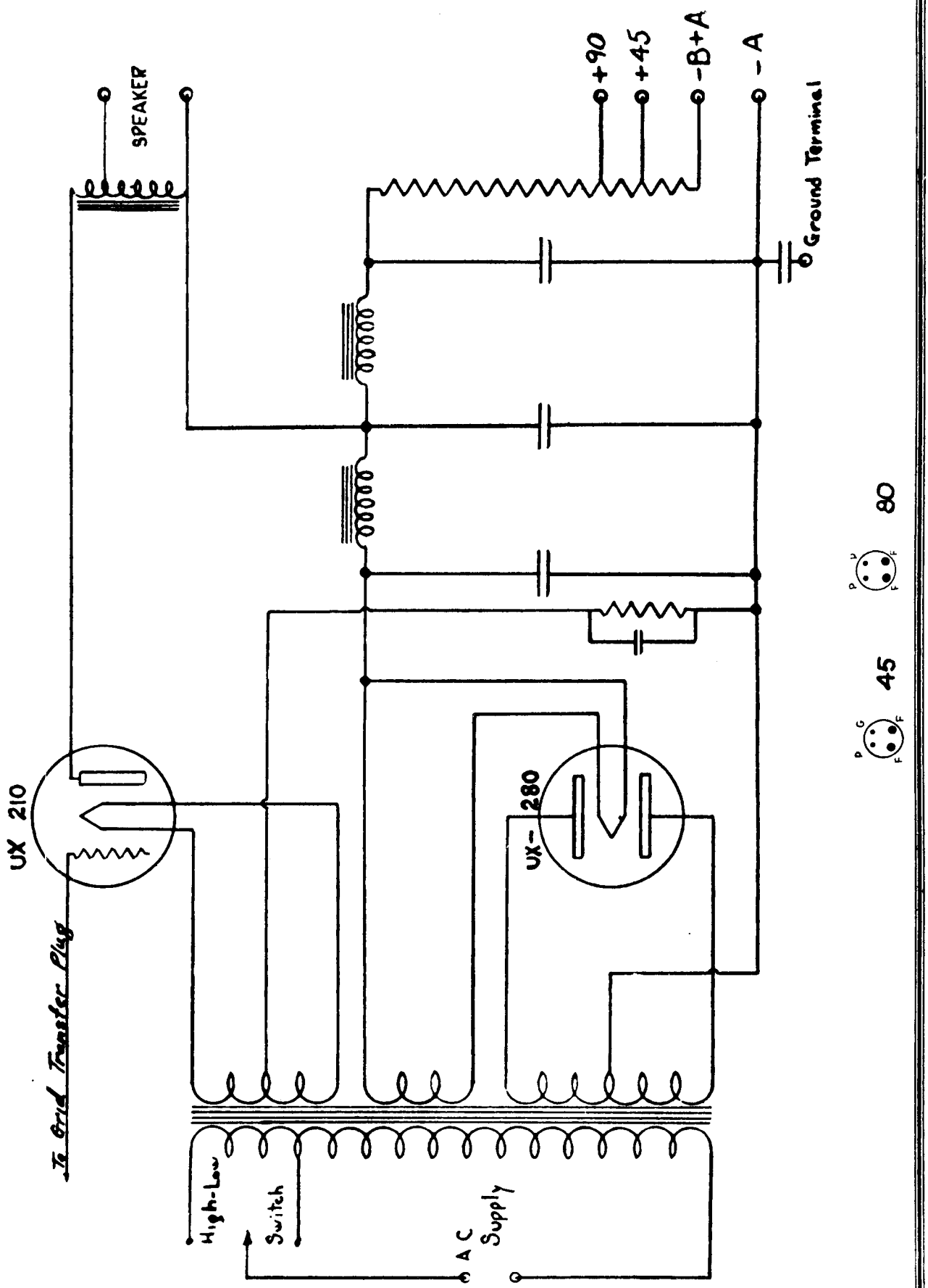
RADIO. CHASSIS, Inc.

MODEL AUTO - SET



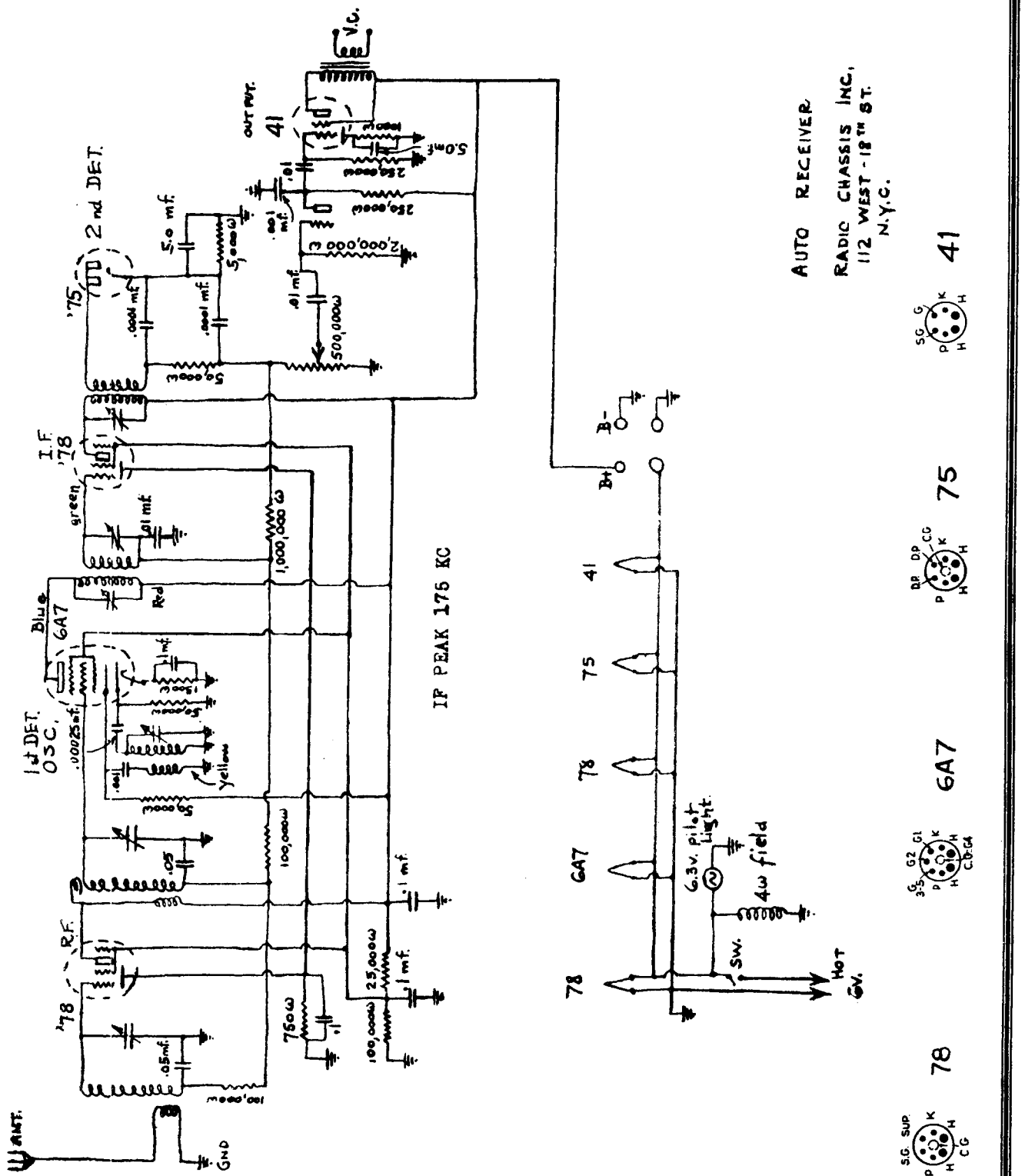
RADIO RECEPTOR CO., INC.

POWER PACK MODEL R-25-28

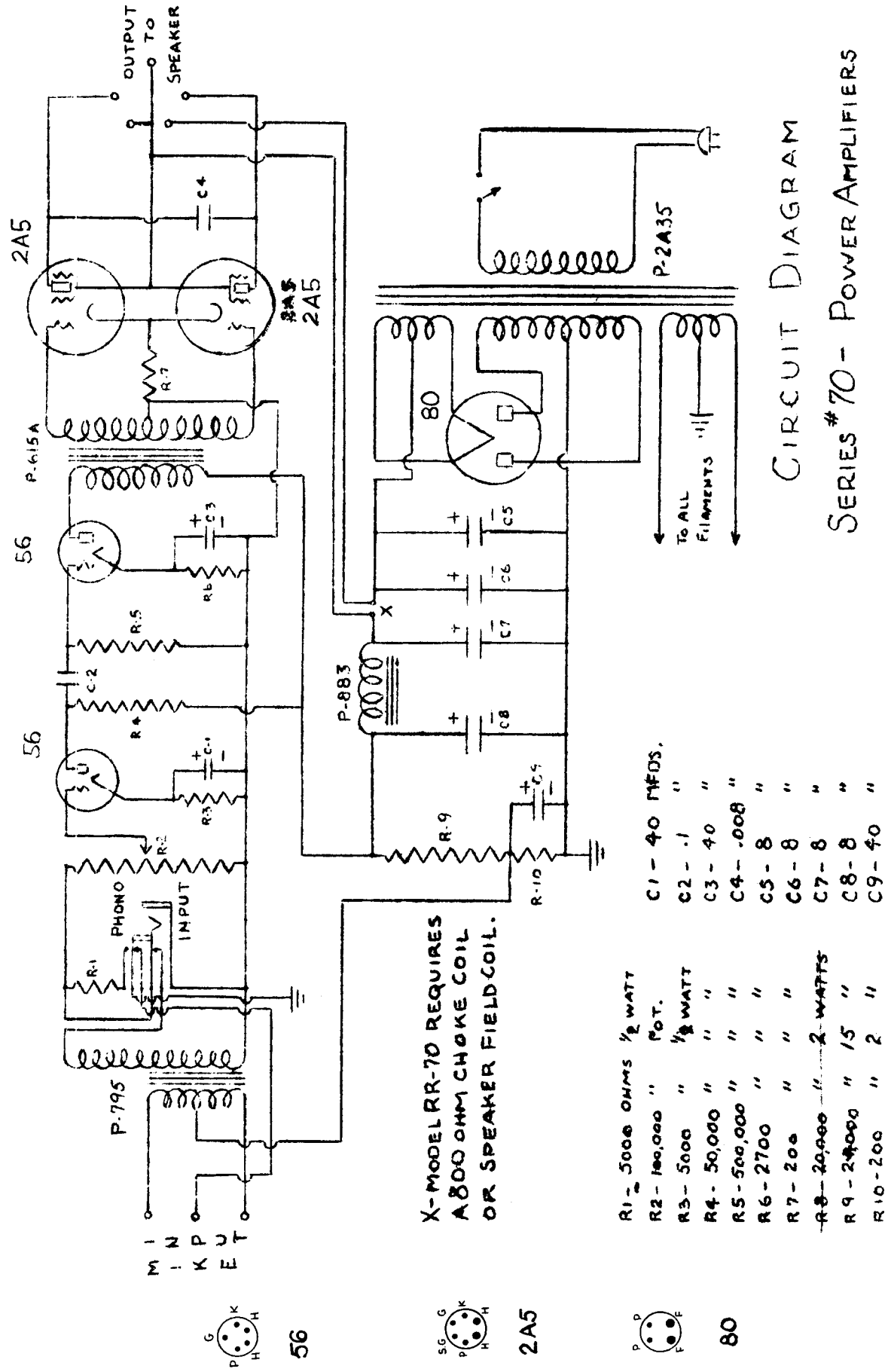


RADIO. CHASSIS, Inc.

MODEL AUTO - SET



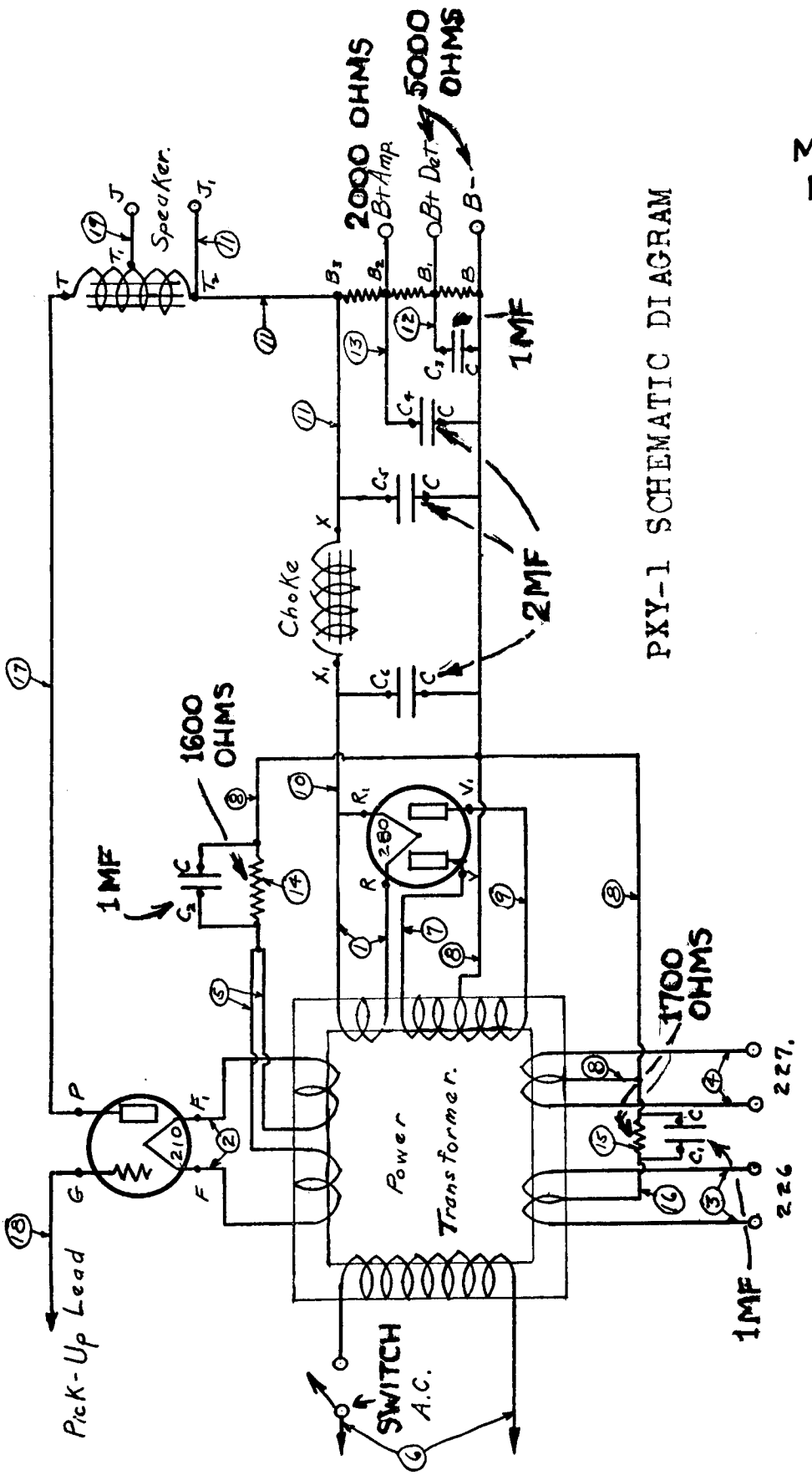
RADIO RECEPTOR CO., INC.



CIRCUIT DIAGRAM
SERIES #70 - POWER AMPLIFIERS

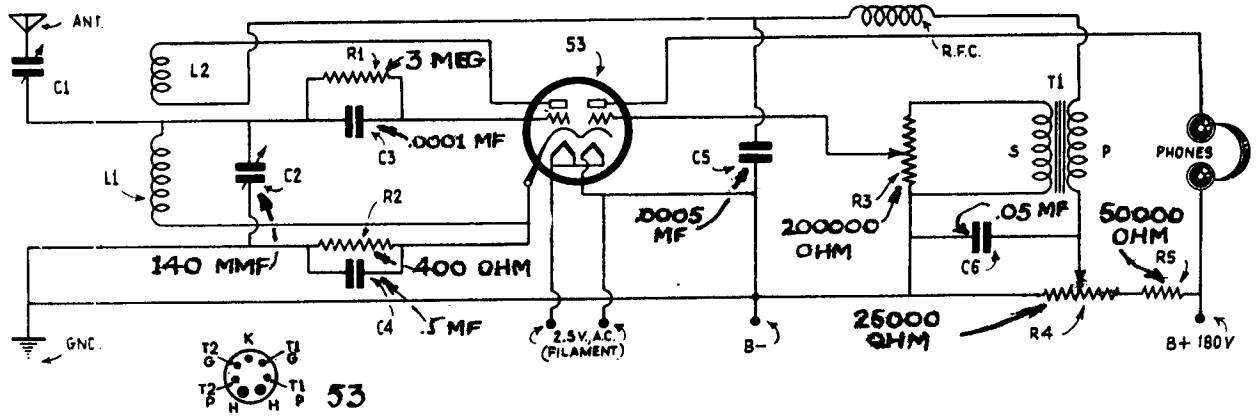
RADIO RECEPTOR CO., INC.

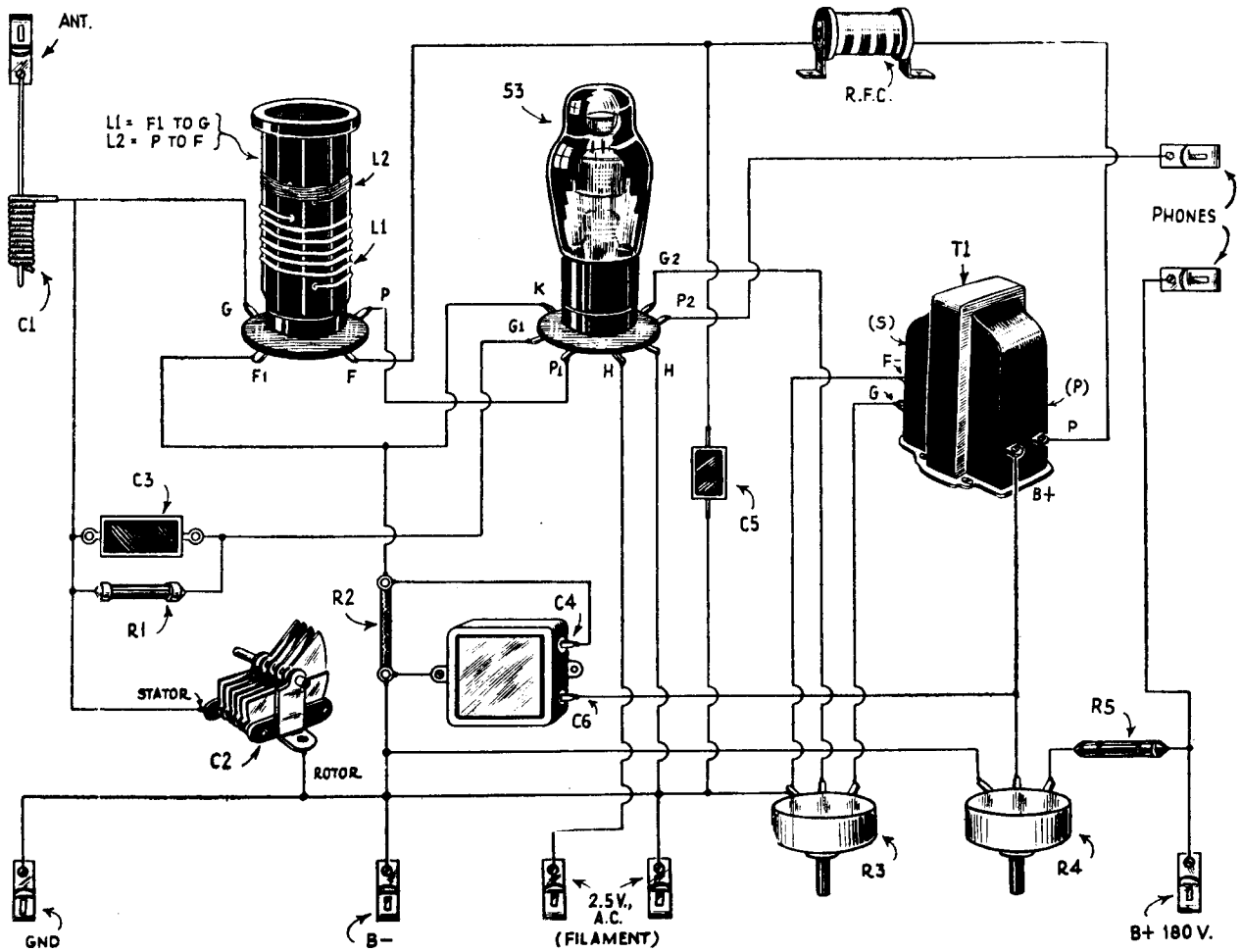
MODEL PXY-1 POWERIZER

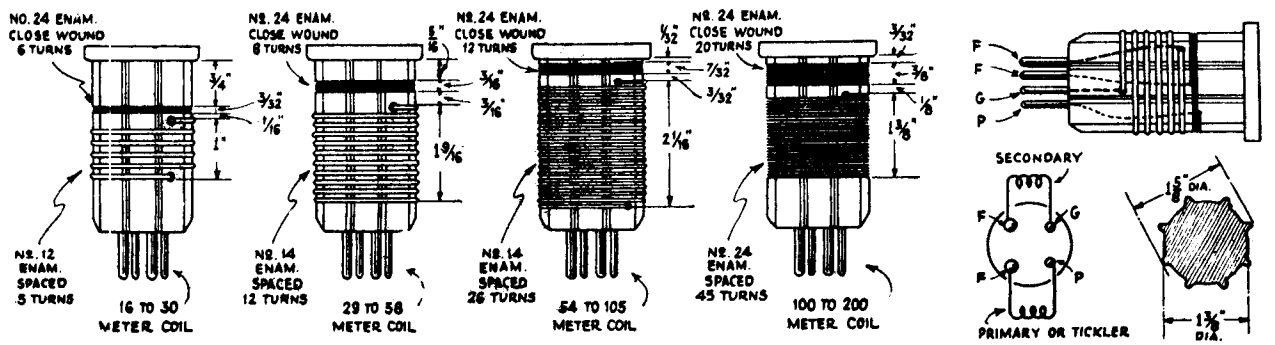


RADIO TRADING CO.

MODEL 53 TWINPLEX - NO 2115

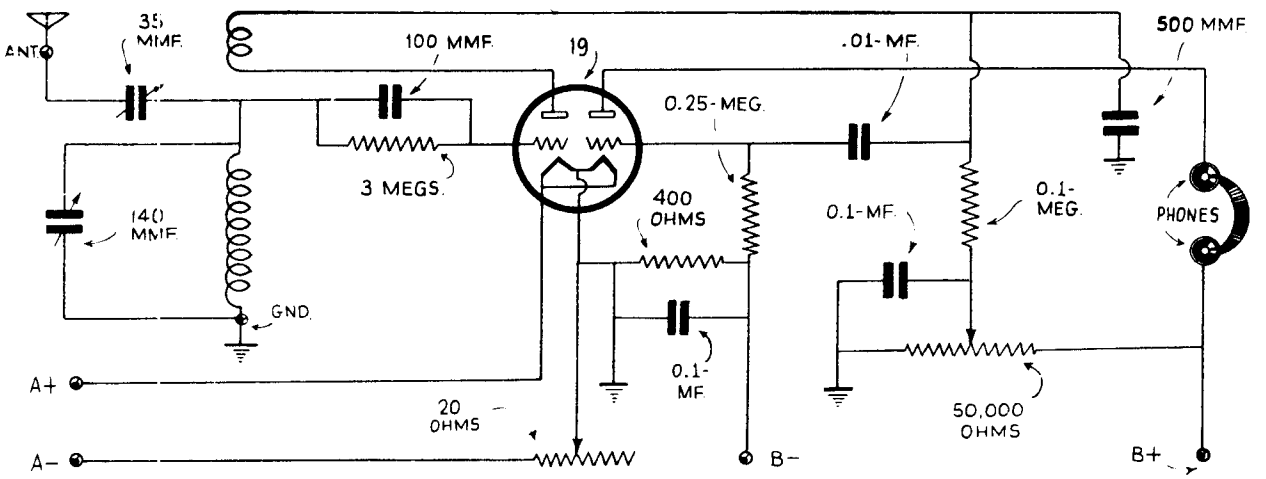


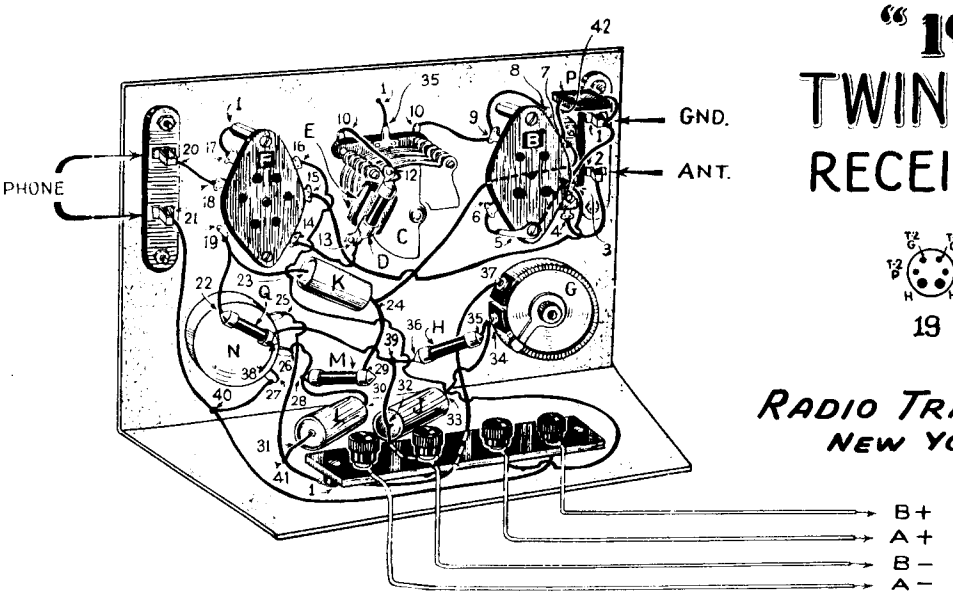




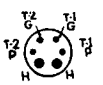
RADIO TRADING CO.

MODEL 308

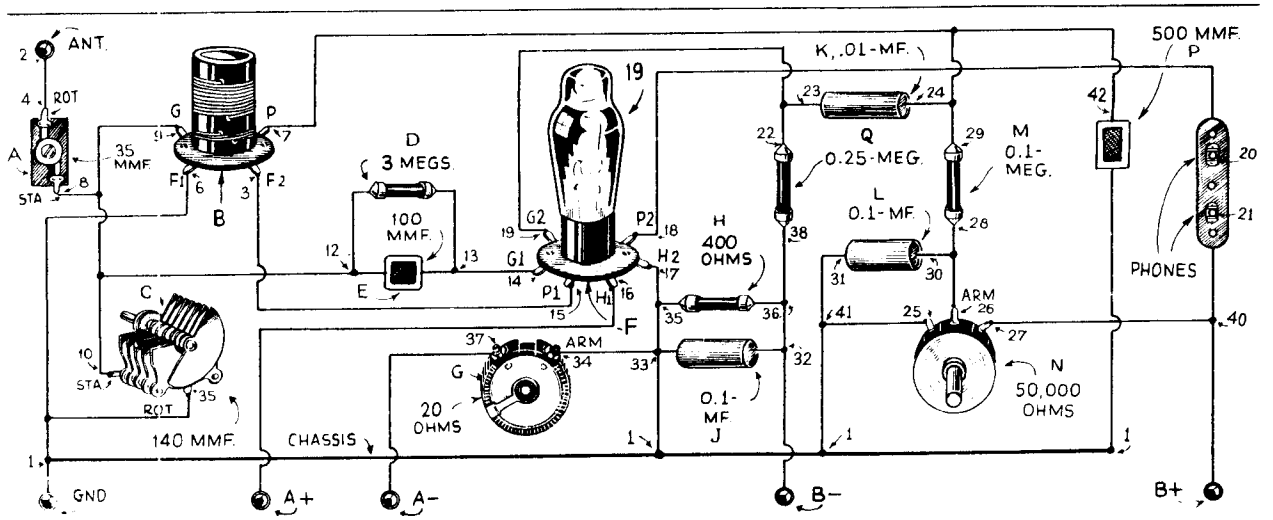




"19" TWINPLEX RECEIVER

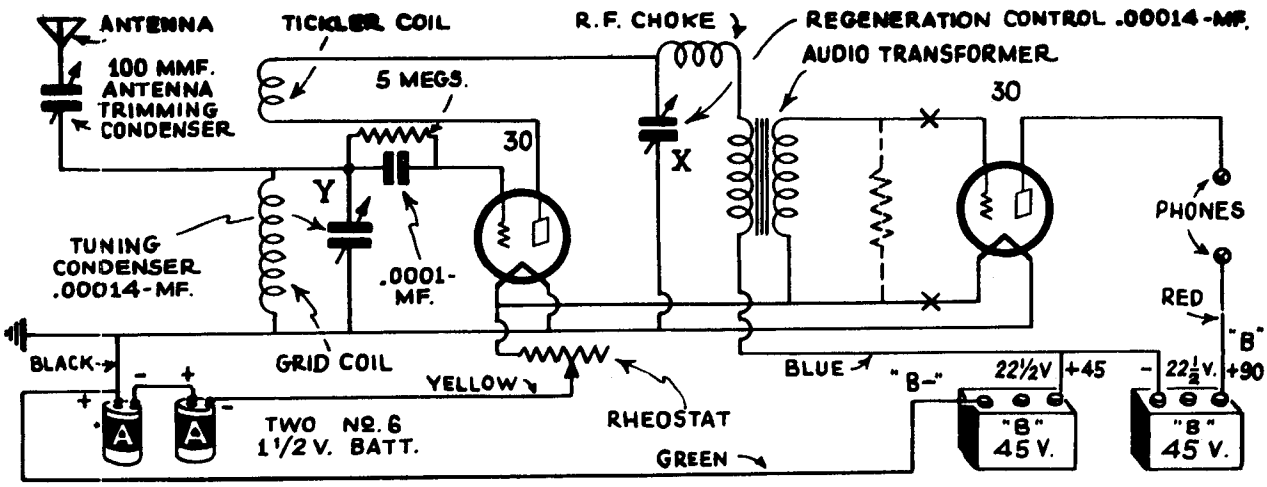


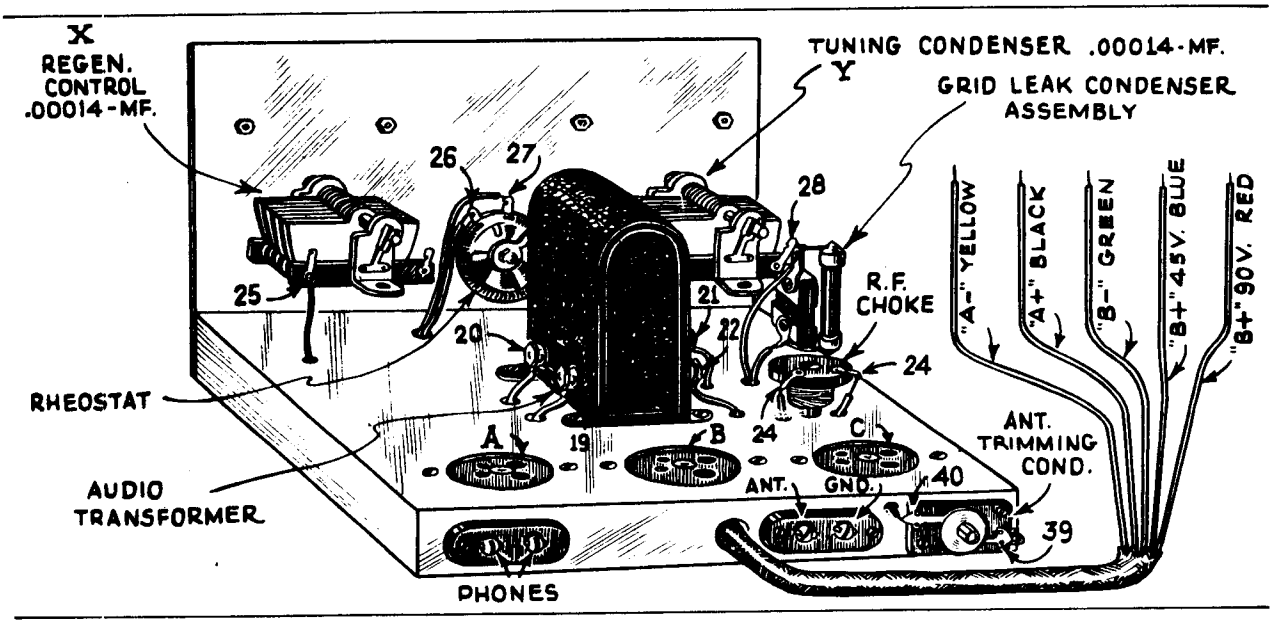
RADIO TRADING CO.
NEW YORK, N.Y.

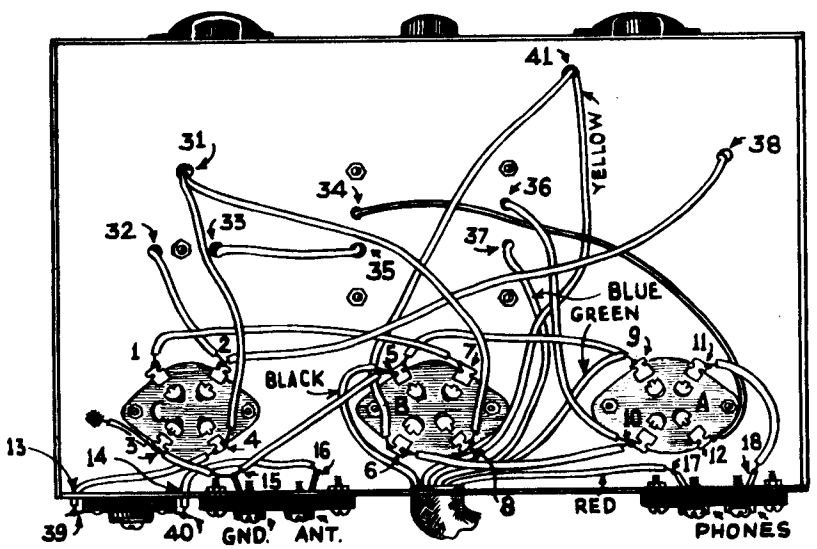


RADIO TRADING CO.

MODEL 2140





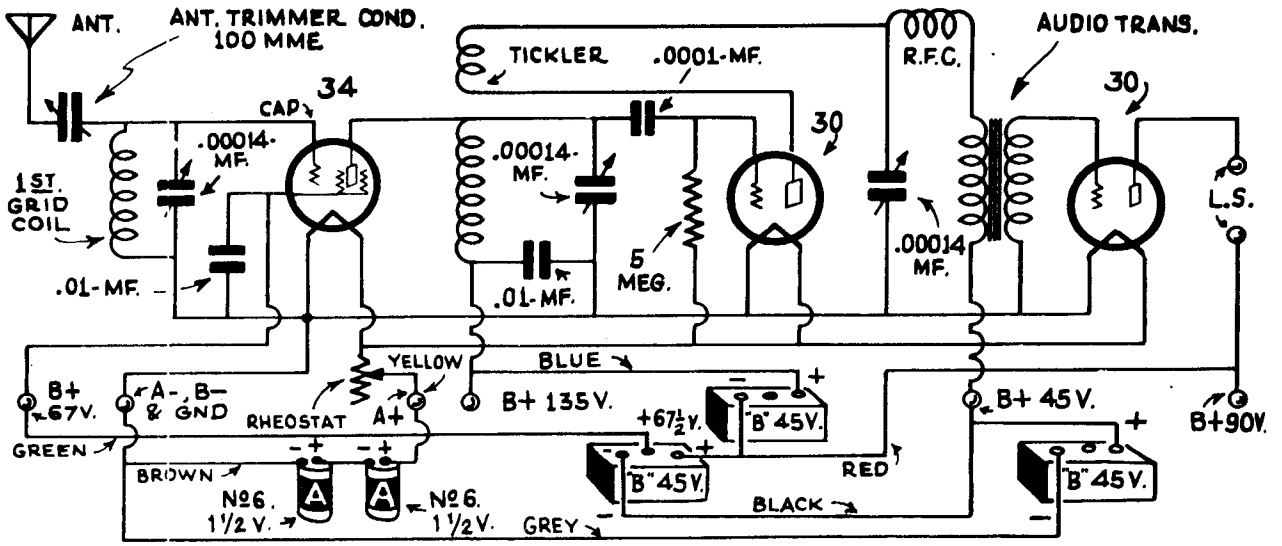


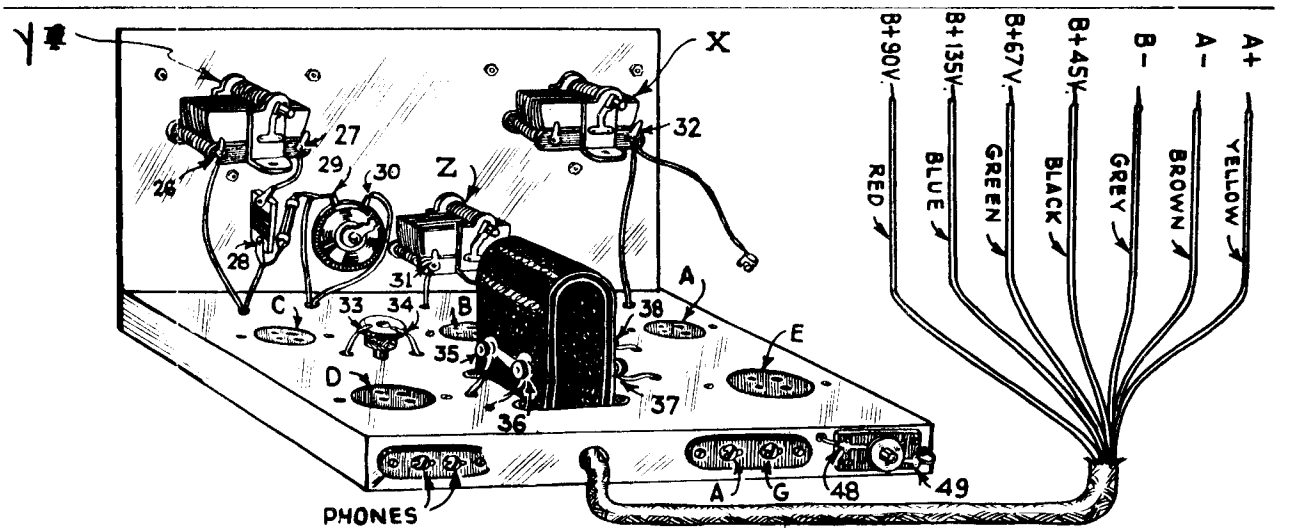
IMPROVED DOERLE 2 TUBE RECEIVER

30

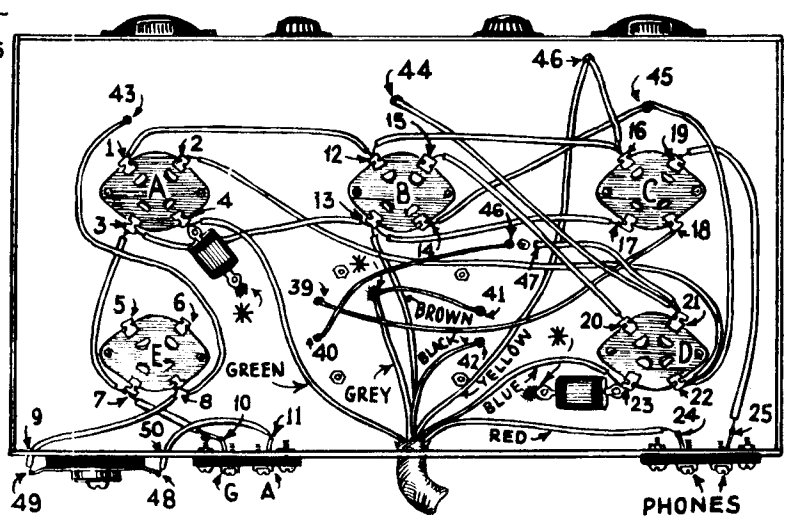
RADIO TRADING CO.

MODEL 2143





NOTE:-
✱ MEANS SOLDER TO CHASSIS



DOERLE "IMPROVED" 3 TUBE SIGNAL GRIPPER

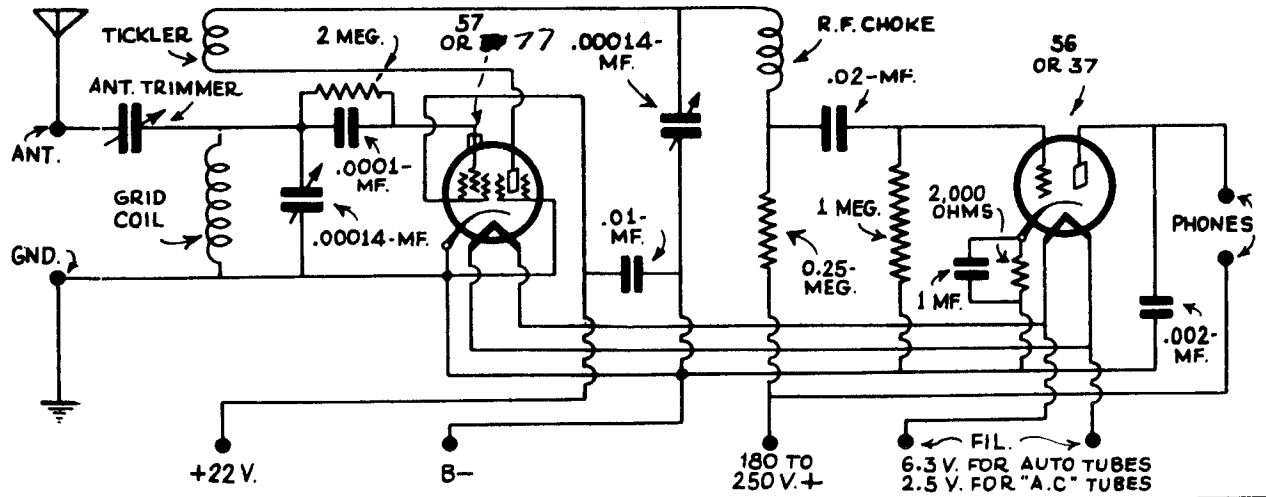
34

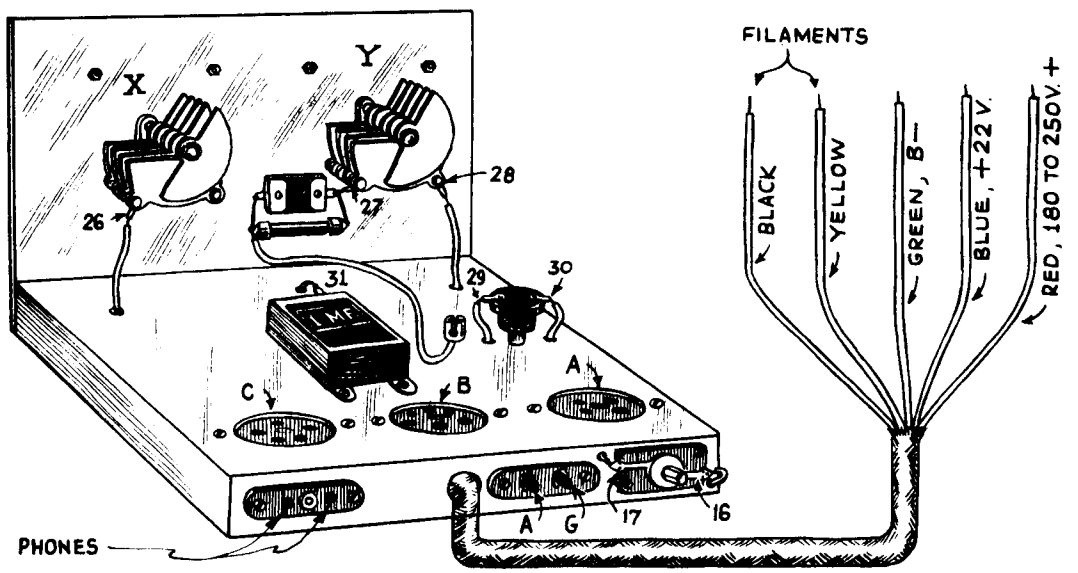
30

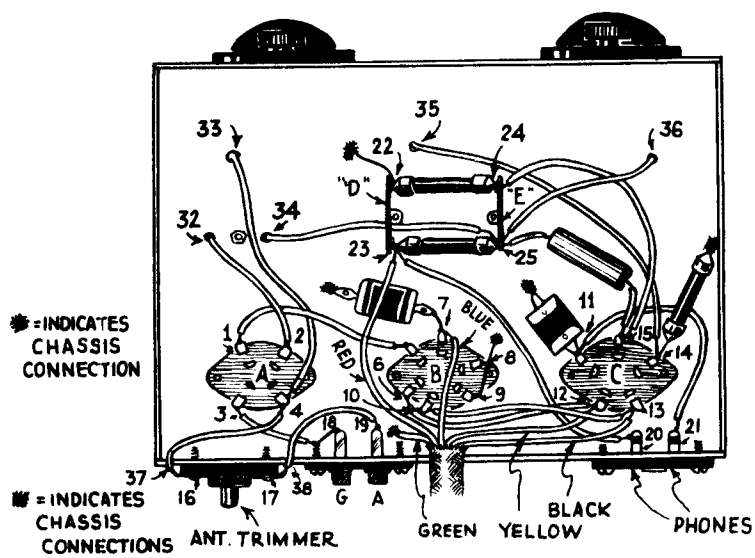
RADIO TRADING CO.
New York, N.Y.

RADIO TRADING CO.

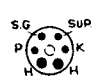
MODEL 2174







ELECTRIFIED DOERLE 2 TUBE - A.C. RECEIVER

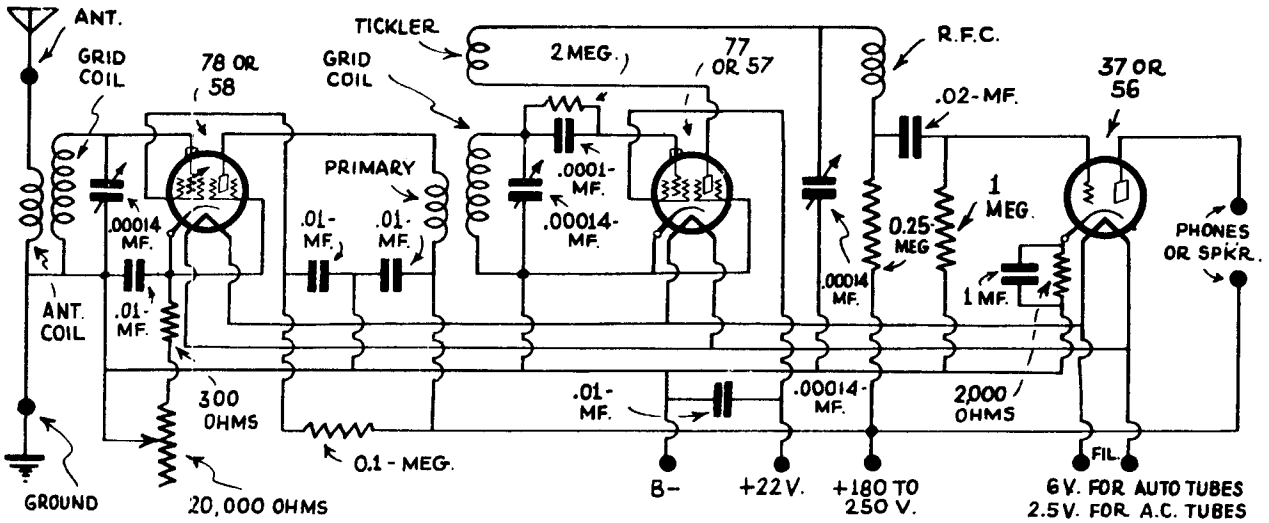


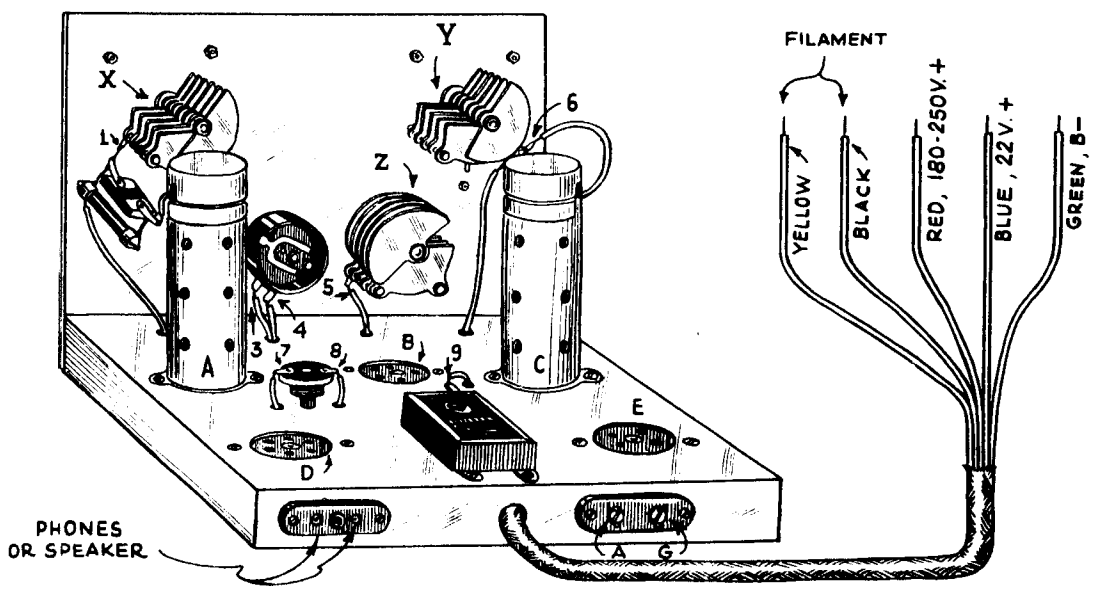
57 OR 77

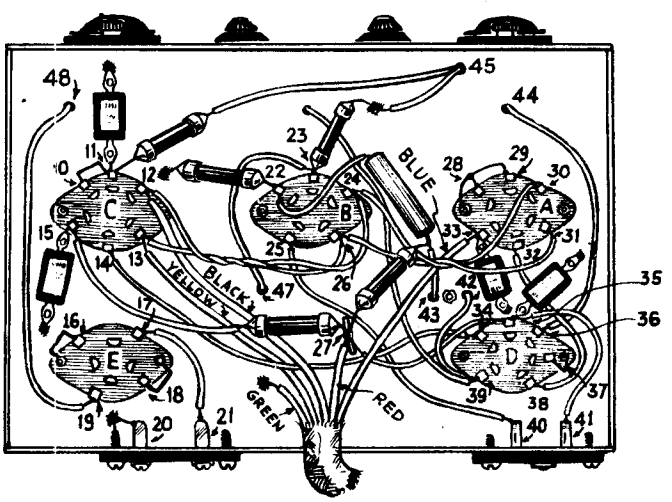
58 OR 37

RADIO TRADING CO.

MODEL 2177







ELECTRIFIED DOERLE 3-TUBE - A.C. RECEIVER

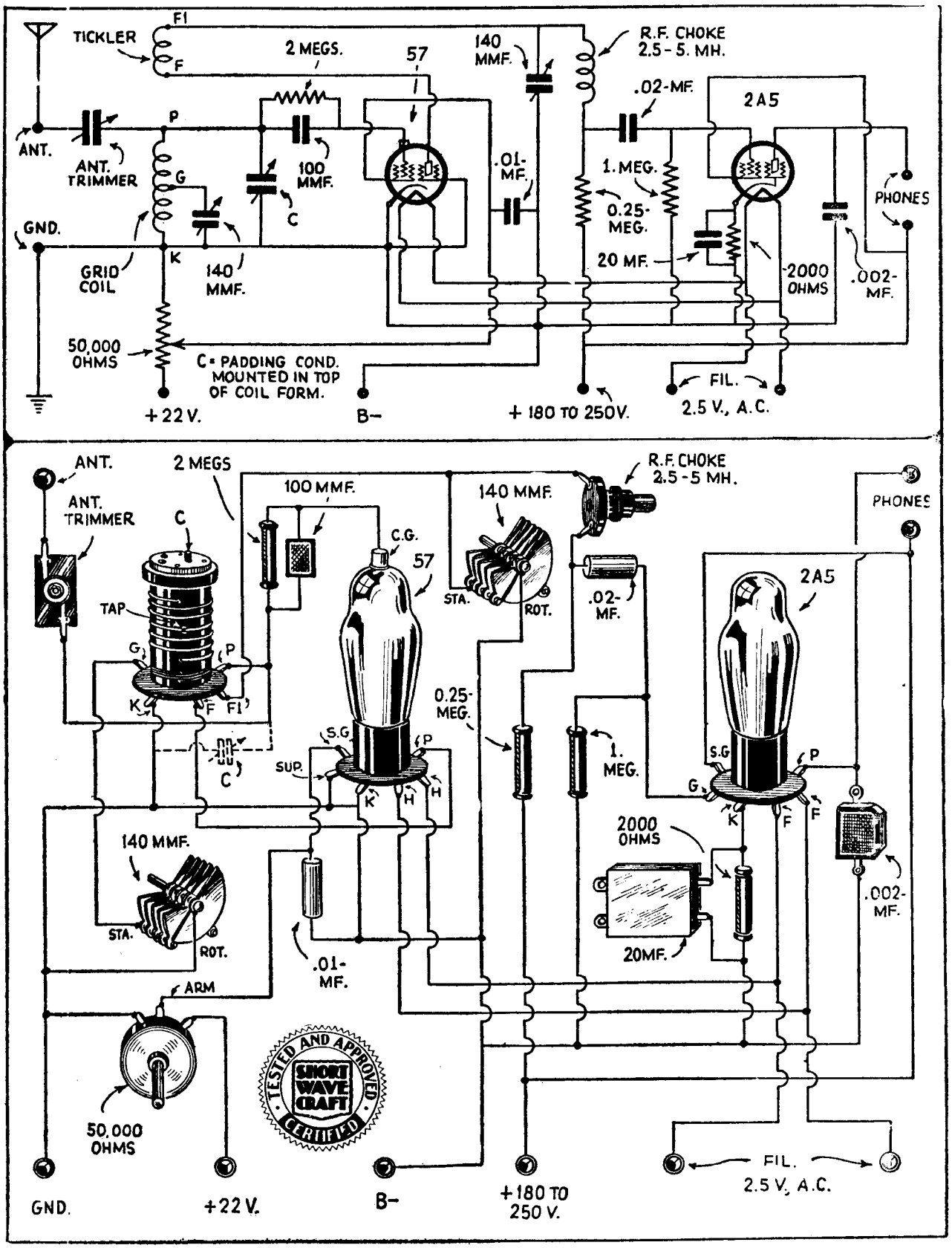
77 OR 57
78 OR 58

37 OR 56

RADIO TRADING CO.
New York, N.Y.

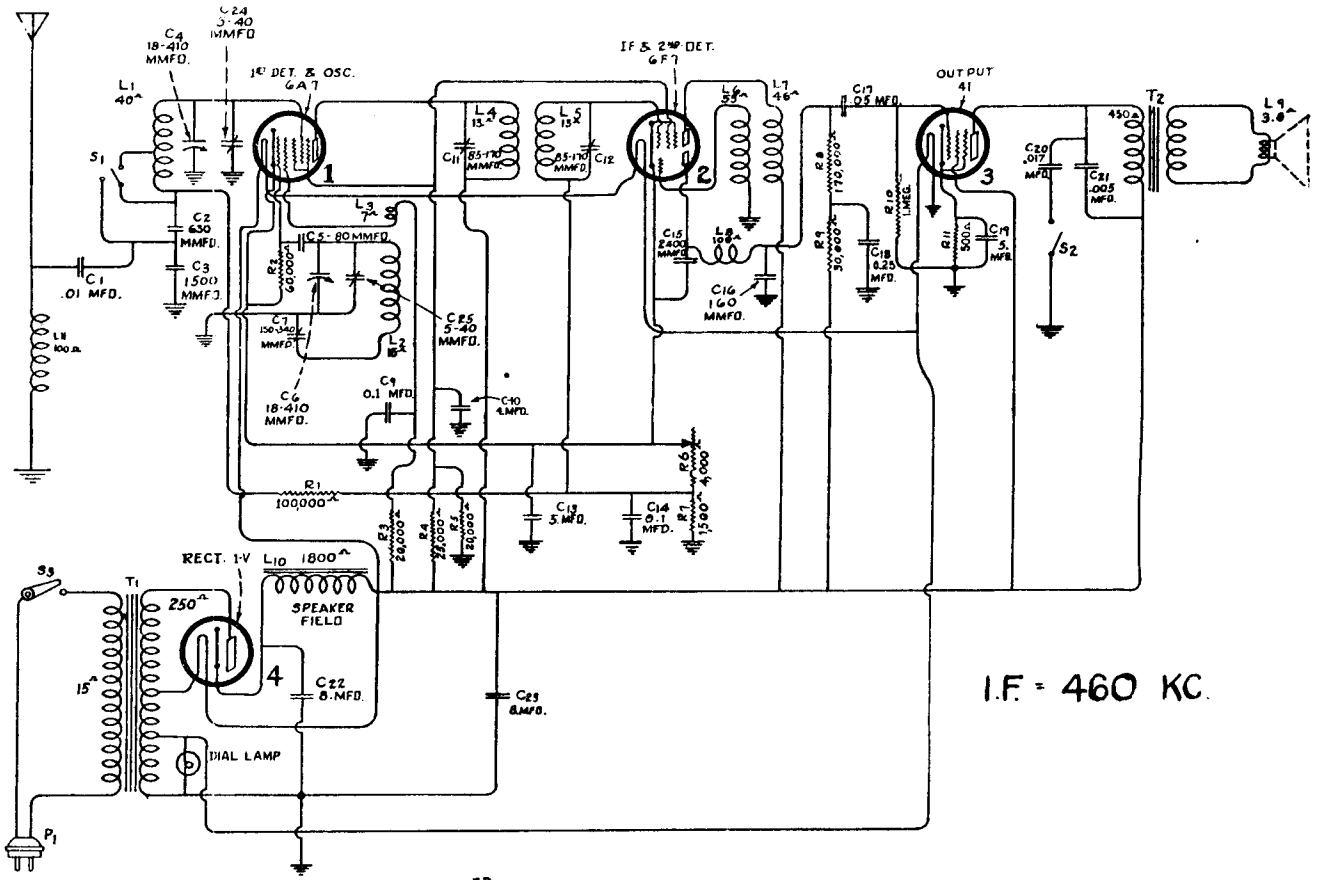
RADIO TRADING CO.

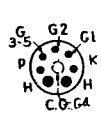
MODEL S-307 DOERLE BAND-SPREAD



RCA VICTOR, Inc.

MODEL 100 & 101





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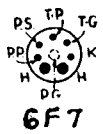

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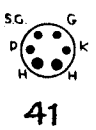


41

1-V

120 Volt, 60 Cycle Line—Maximum Volume Control Setting—No Signal

Radiotron No.		Cathode to Control Grid, Volts D. C.	Cathode to Screen Grid, Volts, D. C.	Cathode to Plate, Volts D. C.	Plate Current, M. A.	Heater or Filament, Volts
RCA-6A7	First Detector	1.25	70	235	2.5	6.3
	Oscillator	—	—	180	3.5	
RCA-6F7	I. F.	1.25	70	235	5.5	6.3
	Second Detector	19	—	145*	0.4	
RCA-41 Output		17	240	230	26.5	6.3
RCA-1-V Rectifier		—	—	335 RMS	50	6.3

* Actual voltage cannot be measured with ordinary voltmeter.

Line-Up Adjustments

The detector and oscillator line-up trimmer capacitors are adjusted by setting both the dial and an external oscillator first at 1400 K. C. and adjusting the tuning capacitor trimmer capacitors for maximum output, then changing the oscillator frequency and dial setting to 600 K. C. and adjusting the submounted trimmer capacitor for maximum output. The I. F. adjustments are made by adjusting the two trimmer capacitors located on the first I. F. transformer for maximum output when a 460 K. C. signal is connected between the control grid of the first detector and ground. Be sure and set the station selector at a point where no signal is being received when making I. F. adjustments.

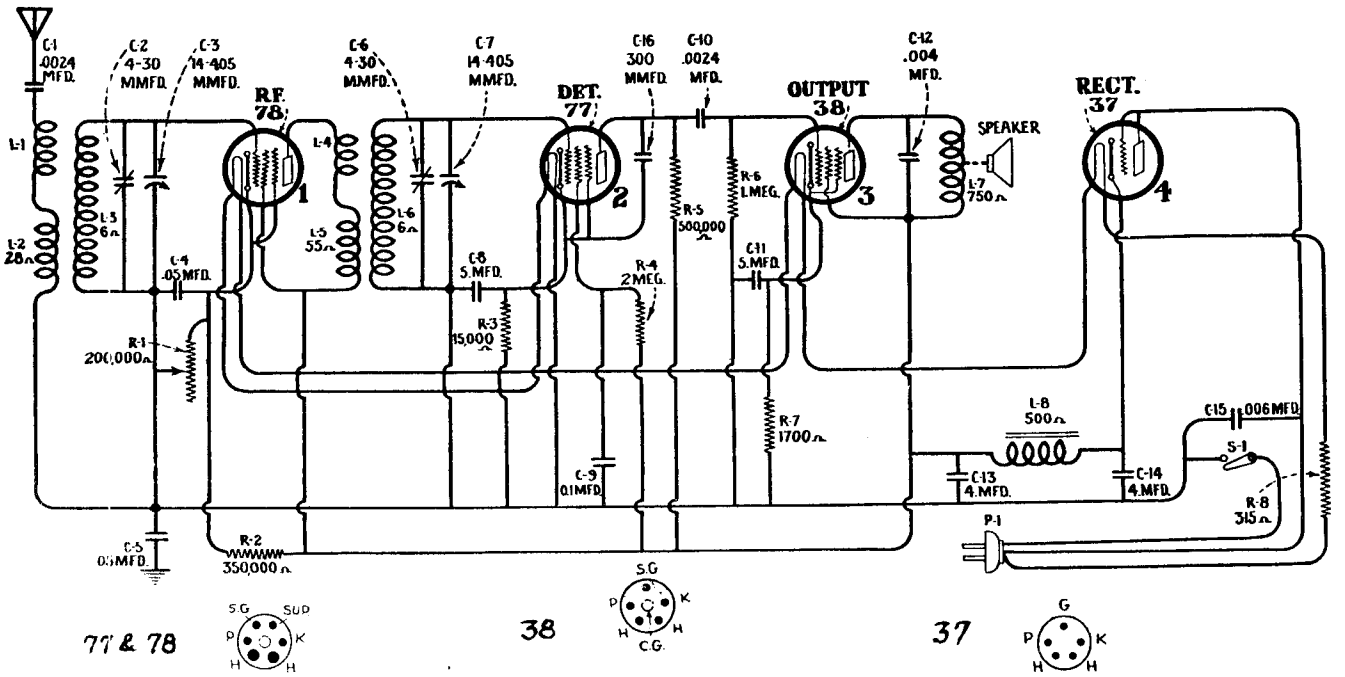
Trouble Shooting Hints

Oscillation in these receivers is usually caused by tube shields which are not properly secured, or to the grounding of the tuning condenser. Regarding the latter complaint, a flexible wire should be soldered to the condenser frame and the chassis to prevent reoccurence of the trouble.

Excessive hum or a loud background noise is commonly caused by a defect in condenser C22 which should be replaced.

RCA VICTOR, Inc.

MODEL 102



Measured at Maximum Volume—115 Volt A. C. Line
All Voltages on D. C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-78 R. F.	2.5	105	105	7.0	6.0
2. RCA-77 Det.	*2.0	17.0*	*40	0.1	6.0
3. RCA-38 Output	10.0	100	95	5.5	6.0
4. RCA-37 Rect.	—	—	115 RMS	16.0	6.0

* Impossible to measure on ordinary voltmeter.
Note—Above voltages will be approximately 5% lower on 115 volts D. C. except for heater voltages which will be the same.

The receiver is aligned at 1400 K. C. by means of the two trimmer capacitors located on the main tuning capacitor. The proper alignment is made by adjusting the trimmers for maximum output after tuning in a 1400 K. C. signal. This adjustment should be made when they are near their extreme minimum position. After alignment a check to make sure that a 1712 K. C. signal can be heard when the main tuning capacitor is near its extreme minimum position should be made. Stock No. 9050 Test Oscillator and Stock No. 7065 non-metallic screwdriver are desirable for making this adjustment.

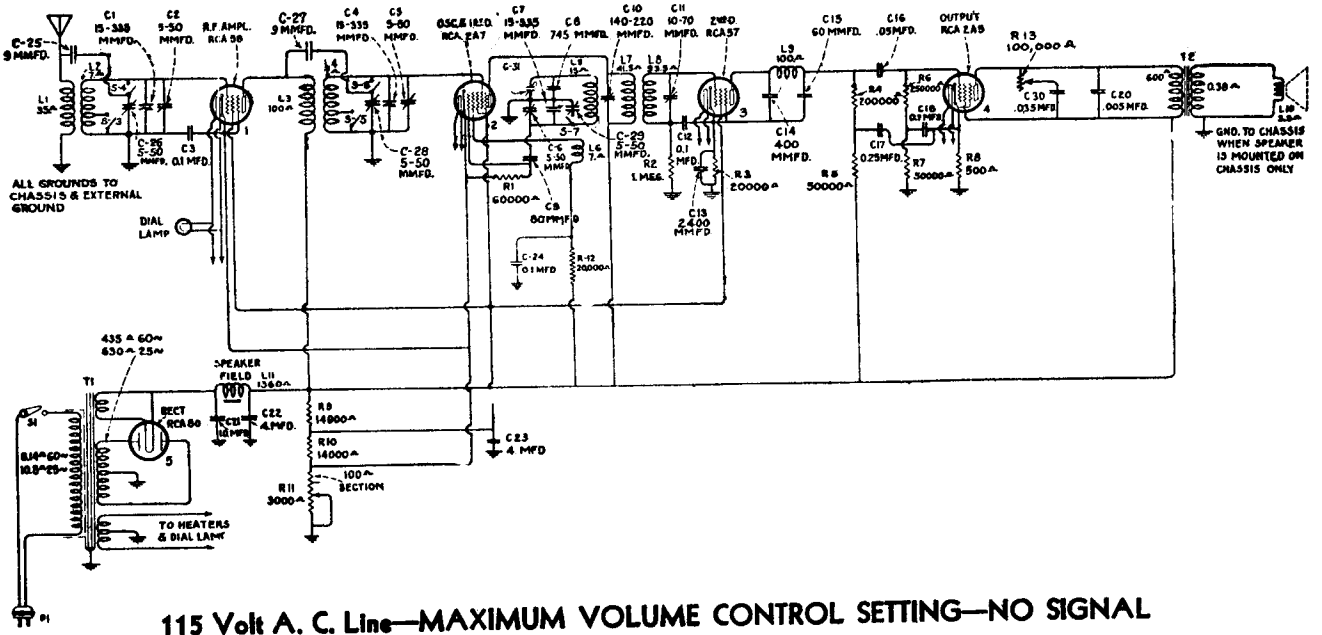
Trouble Shooting Hints

The rectifier tube in this receiver seems to be the worst offender. When replacing the tube, it is advisable to change it to a type 1V, making the necessary socket and wiring changes.

When the volume control becomes noisy, it should be replaced and not repaired as repairs are quite temporary.

RCA VICTOR, Inc.

MODELS 110 - 111 & 115



115 Volt A. C. Line—MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater, Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	230	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 600 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

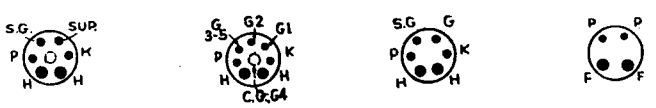
(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, located at the bottom of the chassis, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

(e) Change the frequency of the oscillator to 1400 K. C. and set the dial at 140. Again make the adjustments given under (c)

(f) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.



57 & 58 2A7 2A5 80

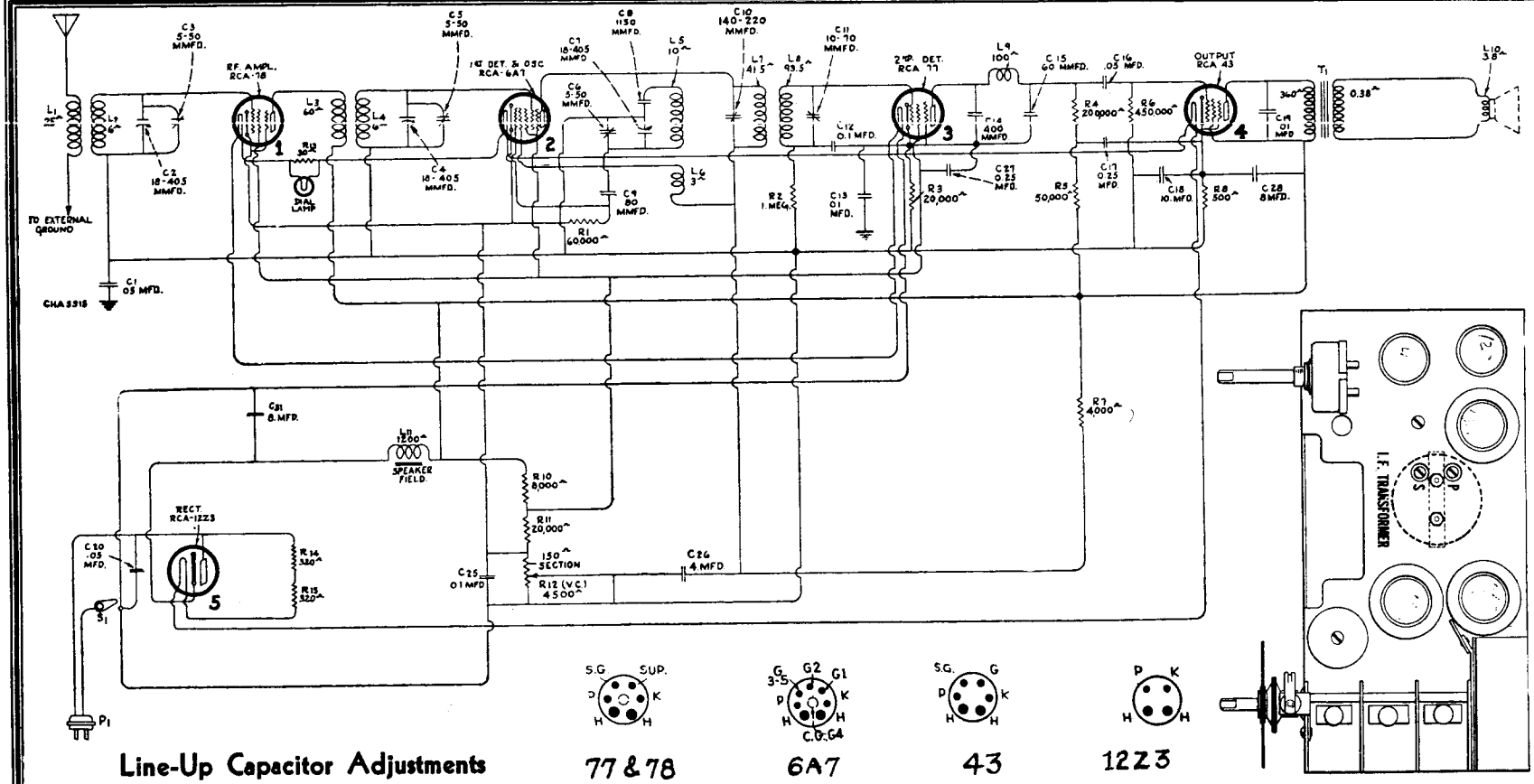
Trouble Shooting Hints

If lack of sensitivity is encountered or excessibe noise is the complaint, the first thing to check is the wave-change switch which may not be making good contact at all points. Clean the contacts and resolder all connecting wires which sometimes work loose. Do not realign the set until all tubes have been checked, especially the second detector which will cause poor sensitivity if its characteristics are not normal.

If the plate voltage is high, change the 2A5 tube and check the 500 ohm bias resistor as well as the resistors of the voltage divider which may have become open-circuited.

RCA VICTOR, Inc.

MODEL 112



Line-Up Capacitor Adjustments

The line-up capacitor adjustments for the I. F. stage and for the R. F. circuits should be made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 KC and 1400 KC. An output meter and non-metallic screw driver are also necessary. The Stock No. 9050 test oscillator and Stock No. 7065 screw driver are suitable for this purpose. Figure C shows the location of the I. F. capacitors.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 KC, coupling its output between the control grid of the first detector and ground, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the R. F. and oscillator circuits are adjusted at 1400 K. C. Prior to making the adjustment however, the dial should be checked. This is done by making sure the dial indicator reads 530 when the tuning capacitor rotor plates are fully meshed with the stator plates. The adjustments are then made in similar manner as that of the I. F. except that the oscillator is set at 1400 KC., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

***Measured at 220 Volts A. C., 60 cycles (Maximum Volume Control)**

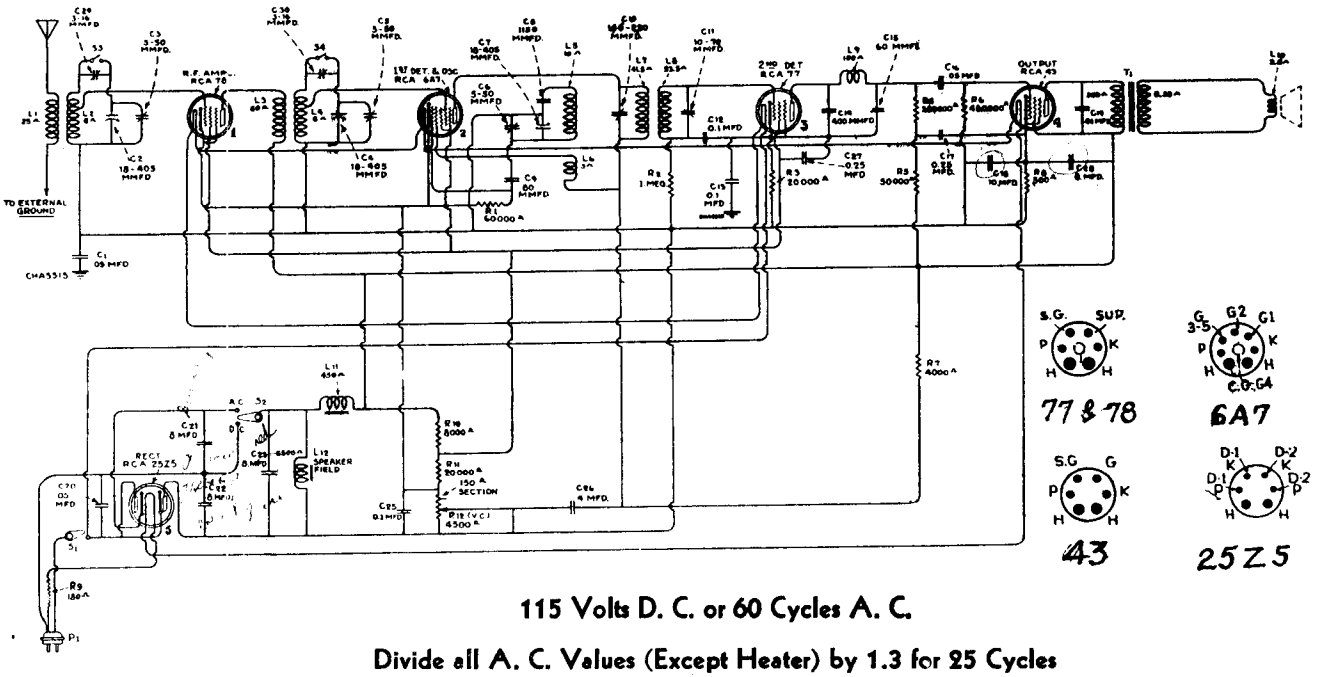
Radiotron No.	Cathode to Control Grid, Volts DC	Cathode to Screen Grid, Volts DC	Cathode to Plate, Volts DC	Plate Current M. A.
RCA-78 R. F	3.0	100	165	5.5
RCA-6A7 Oscillator 1st Detector	—	—	145	1.7
	3.0	100	145	2.5
RCA-77 2nd Detector	Plate and Bias Supply 165 Volts			—
RCA-43 Power	21.0	140	130	35.0
RCA-12Z3 Rectifier	220 RMS			—

Trouble Shooting Hints

Open circuits in the resistors comprising the voltage divider cause complete failure of the set and lack of voltage on tube plates. If all tubes lack plate voltage check the continuity of the speaker field first, then the filter condensers.

RCA VICTOR, Inc.

MODEL 114



115 Volts D. C. or 60 Cycles A. C.

Divide all A. C. Values (Except Heater) by 1.3 for 25 Cycles

Radiotron No.	Cathode to Control Grid, Volts D. C.		Cathode to Screen Grid, Volts D. C.		Cathode to Plate, Volts D. C.		Plate Current, M. A.		Heater Volts
	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	
RCA-78 R. F.	2.6	1.5	90	50	157	88.5	5.5	3.0	6.0
RCA-6A7 Oscillator 1st Detector	—	—	—	—	157	88.5	1.7	1.0	6.0
	2.6	1.5	90	50	157	88.5	2.5	1.5	—
RCA-77 2nd Detector	Plate and Bias Supply 160 Volts						—	—	6.0
RCA-43 Power	21.0	12.0	135	80	125	72.0	35.0	20.0	25.0
RCA-25Z5 Rectifier	115 R. M. S.						89.0 Total	35.0 Total	25.0

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator such as Stock No. 9050, giving a signal at 175 K. C., 1400 K. C., 1710 K. C. and 2440 K. C. An output meter and non-metallic screw driver (Stock No. 7065) are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1710 K. C. This is done with the Range Switch at the broadcast position (counter-clockwise). A similar manner is used as that of the I. F. except that the oscillator is set at 1710 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 8 (minimum dial position). The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) After making the 1710 K. C. adjustment, set the dial at 18 and the oscillator at 1400. Then adjust the first detector and R. F. line-up capacitors only. This adjustment is made so that the R. F. and 1st detector will be aligned over the broadcast band, but the receiver will still tune to 1710 K. C. due to the oscillator line-up capacitor not being readjusted.

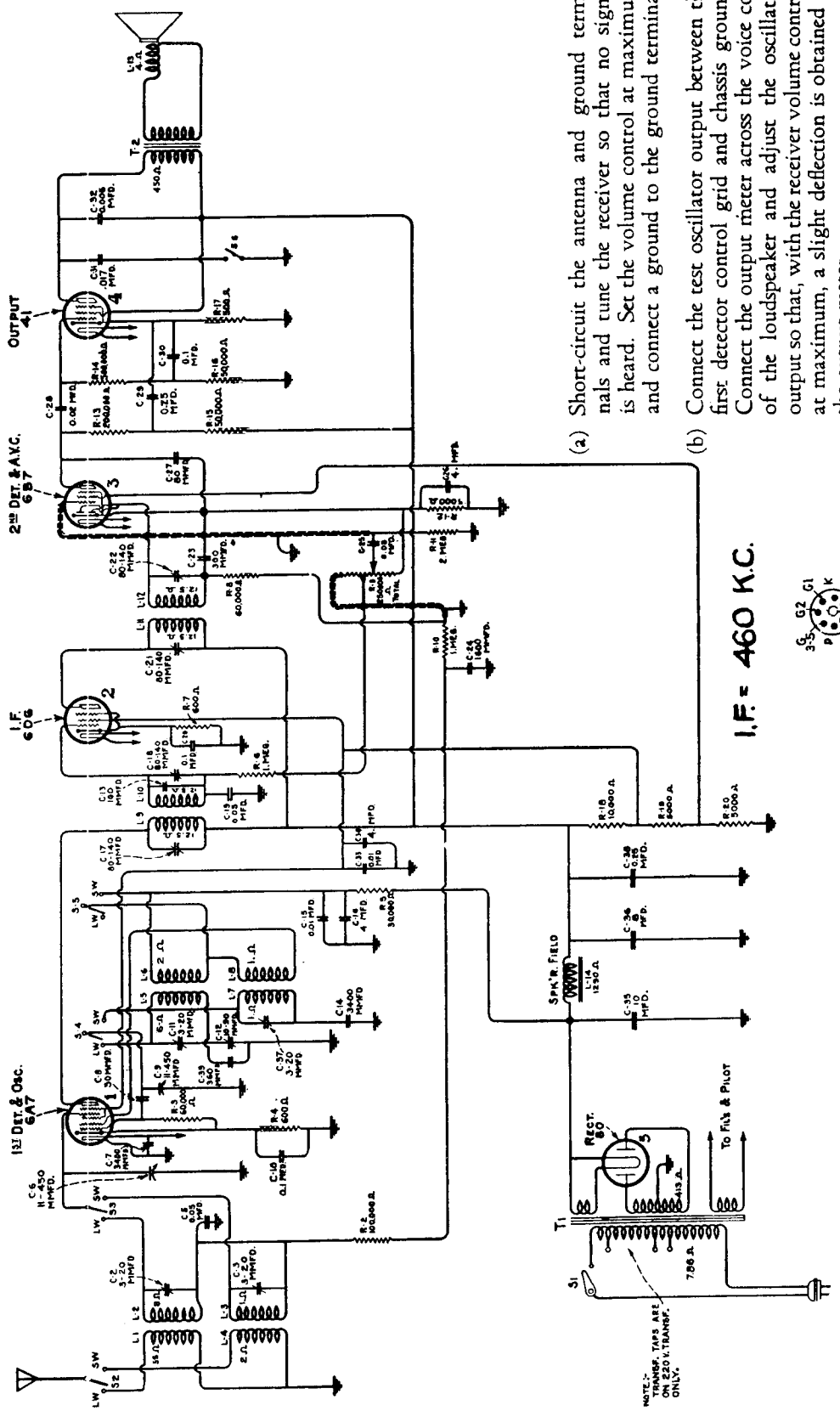
(e) Then set the Range Switch at its clockwise position. The oscillator should now be set at 2440 K. C. and the signal tuned in. Two points on the dial will be noted where the signal is heard, one of which may be louder than the other. Set the dial at either point. Note—the 2440 K. C. signal will still be heard at two points, since the R. F. stage acts as a fixed tuned circuit. Adjust the two high-frequency trimmers, located on the lower side of the gang capacitor, until maximum output is obtained.

Trouble Shooting Hints

The most common service calls for this set are for the replacement of tubes which have burned out or replacing of the power cord. The voltage drop resistor in this cord becomes open-circuited due to sharp bends or misuse.

RCA VICTOR, Inc.

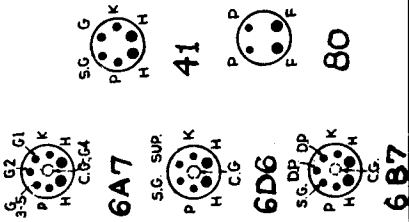
MODELS 118 & 211



(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

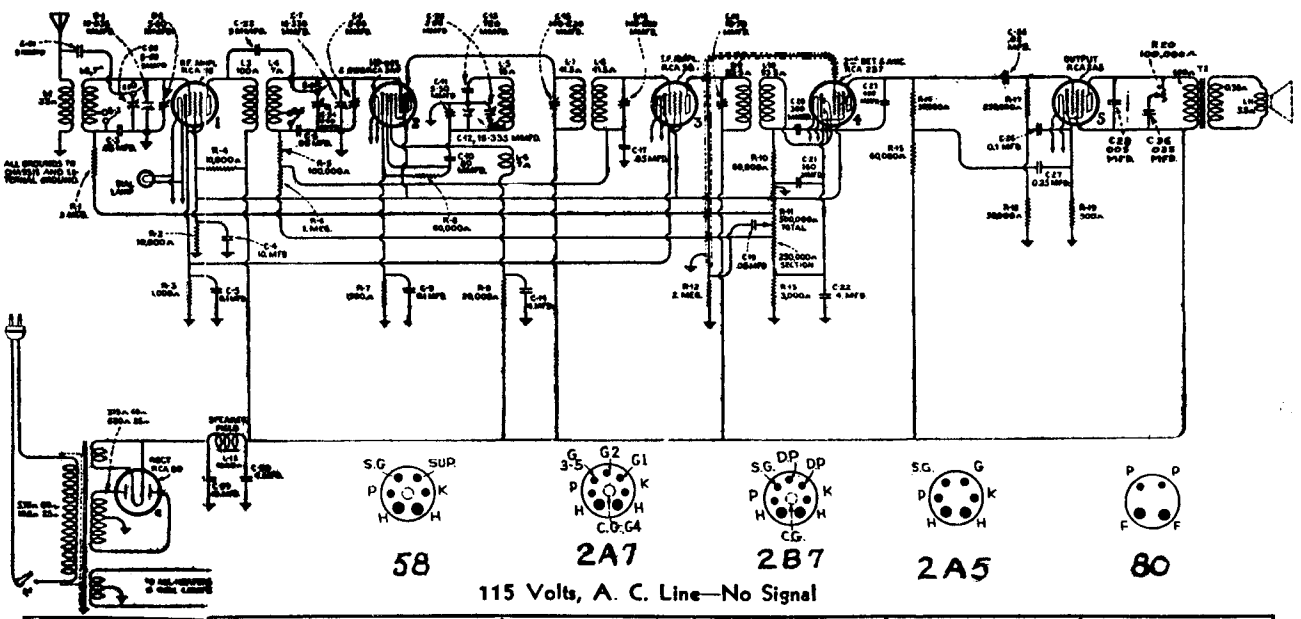


Publication No		Cathode to Ground Volts D.C.	Screen Grid to Ground Volts D.C.	Plate to Ground Volts D.C.	Plate Current M.A.	Heater Volts A.C.
[illegible]	Detector	8.0	105	265	3.5	6.3
[illegible]	Oscillator		—	220	4.5	—
RCA-6D6 I.F.		6.0	105	265	9.0	6.3
RCA-6B7 2nd Det. A.V.C.		3.0	50*	80*	0.7	6.3
[illegible]		16.5	265	245	30.0	6.3
RCA-6K7 Resistance		—	—	600 (Plate to Plate)	6.8	5.0

* Voltage calculated from 250V-0

RCA VICTOR, Inc.

MODEL 120



115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	4.0	95	255	5.0	2.31
2. RCA-2A7 1st Det. Osc.	5.0*	95*	255*	3.0*	2.31
3. RCA-58 I. F.	4.0	95	255	5.0	2.31
4. RCA-2B7 2nd Det. A. V. C.	7.5	92	60	2.0	2.31
5. RCA-2A5 Power	20.0	250	235	33.0	2.31
6. RCA-80 Rectifier	700/350 Volts—75 M. A. Total Current				4.82

*The voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.

Trouble Shooting Hints

If the tubes do not have plate voltage check the filter condenser connected to the rectifier output. Also check the .1 mf. condensers shunted across the bias resistors. In case of oscillation try moving the grid caps before realigning the I. F. and oscillator circuits.

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

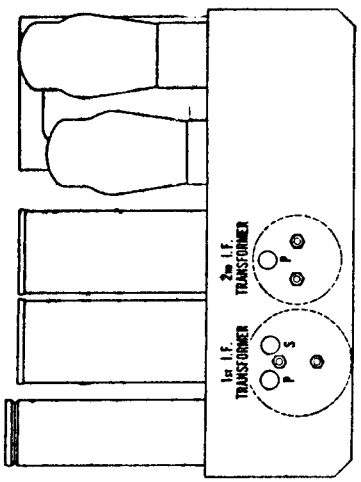


Figure D—Location of I. F. Line-up Adjustment Screws

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

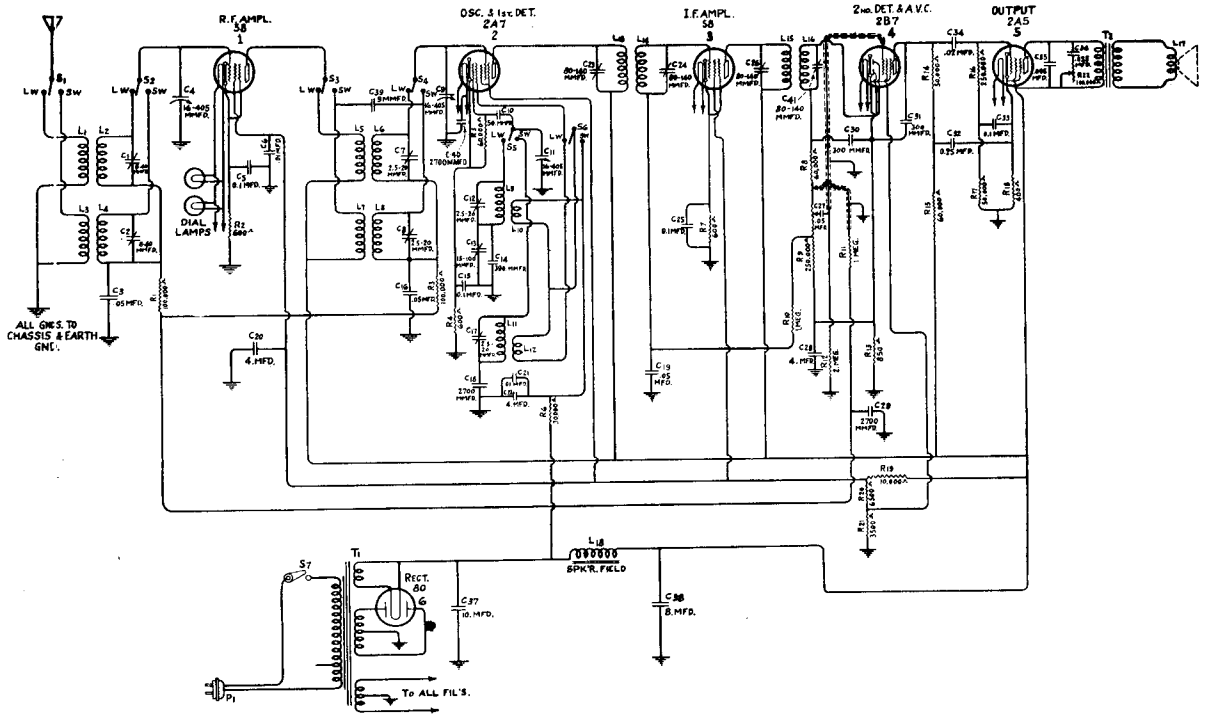
(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RCA VICTOR, Inc.
MODELS 121 & 122



I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

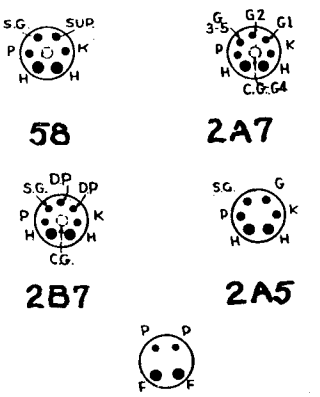
R. F. and Oscillator Adjustments—The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground leads of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 54. Then set the Test Oscillator at 1400 K. C., the dial indicator at 140 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils, designated as L. W. in Figure D, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the rear of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 150. Adjust the three trimmer capacitors designated as S.W in Figure D for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator while the position that uses a higher capacitance is correct for the detector. ***Both of these adjustments must be made as indicated irrespective of output.*** The R. F. is merely peaked. In conjunction with the detector adjustment, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.



Trouble Shooting Hints

If noisy reception is encountered in this set check the soldered connections to the wave-change switch which have a habit of working loose. Lack of sensitivity on the short wave section usually indicates a shifting of the capacity of condenser C17. In this case realign the entire oscillator padding system according to instructions.

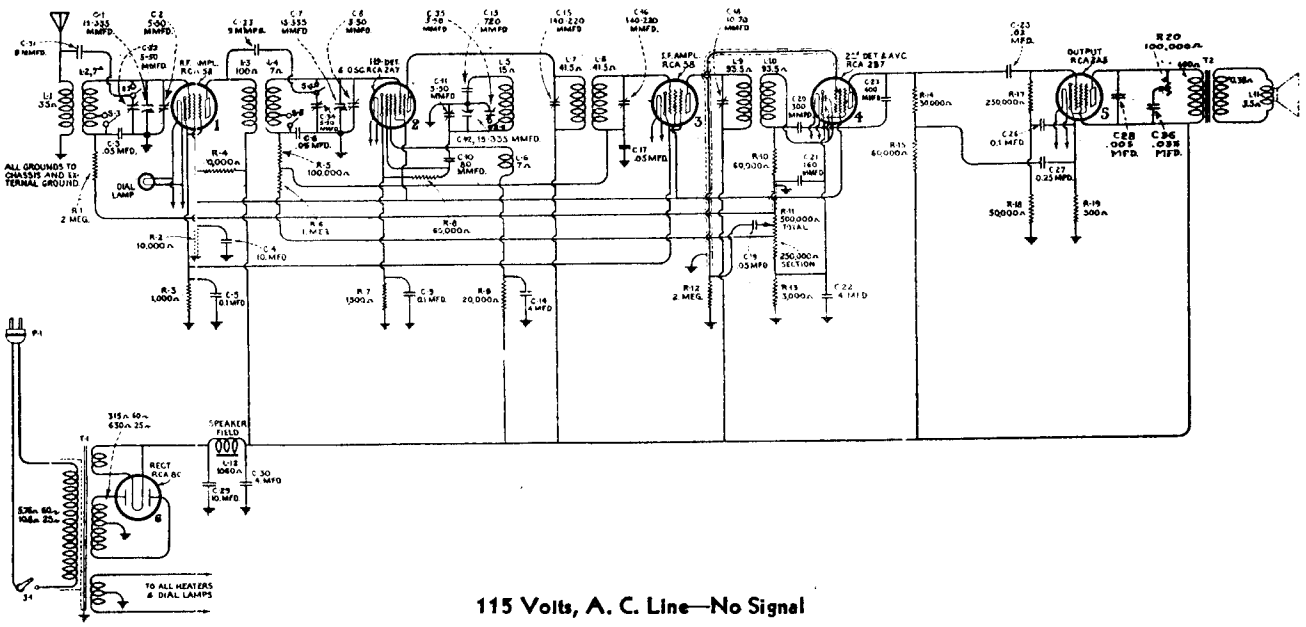
115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.
1. RCA-58 R. F.	3.0	100	265	6.0
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*
3. RCA-58 I. F.	3.0	100	265	6.0
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5
5. RCA-2A5 Power	16.0	255	240	35.0
6. RCA-80 Rectifier	725 Volts R. M. S.—75 M. A. Total Current			

*The voltages and current refer to the detector part of the tube.

RCA VICTOR, Inc.

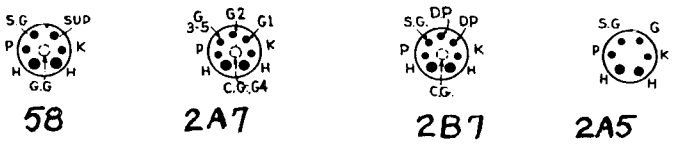
MODEL 124



115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	4.0	95	255	5.0	2.31
2. RCA-2A7 1st Det. Osc.	5.0*	95*	255*	3.0*	2.31
3. RCA-58 I. F.	4.0	95	255	5.0	2.31
4. RCA-2B7 2nd Det. A. V. C.	7.5	92	60	2.0	2.31
5. RCA-2A5 Power	20.0	250	235	33.0	2.81
6. RCA-80 Rectifier	700–350 Volts—75 M. A. Total Current				4.82

*The voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.



Trouble Shooting Hints

If the shielded lead running to the control grid of the 2B7 tube is not carefully enclosed at the tube shield oscillation may be encountered.

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

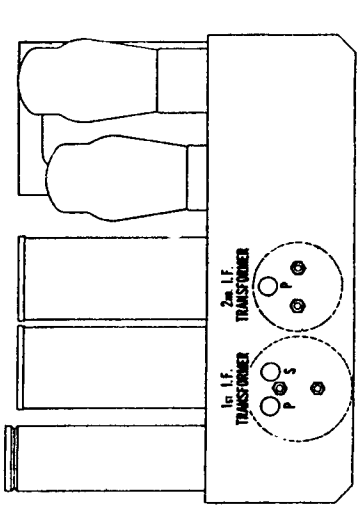


Figure D—Location of I. F. Line-up Adjustment Screws

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

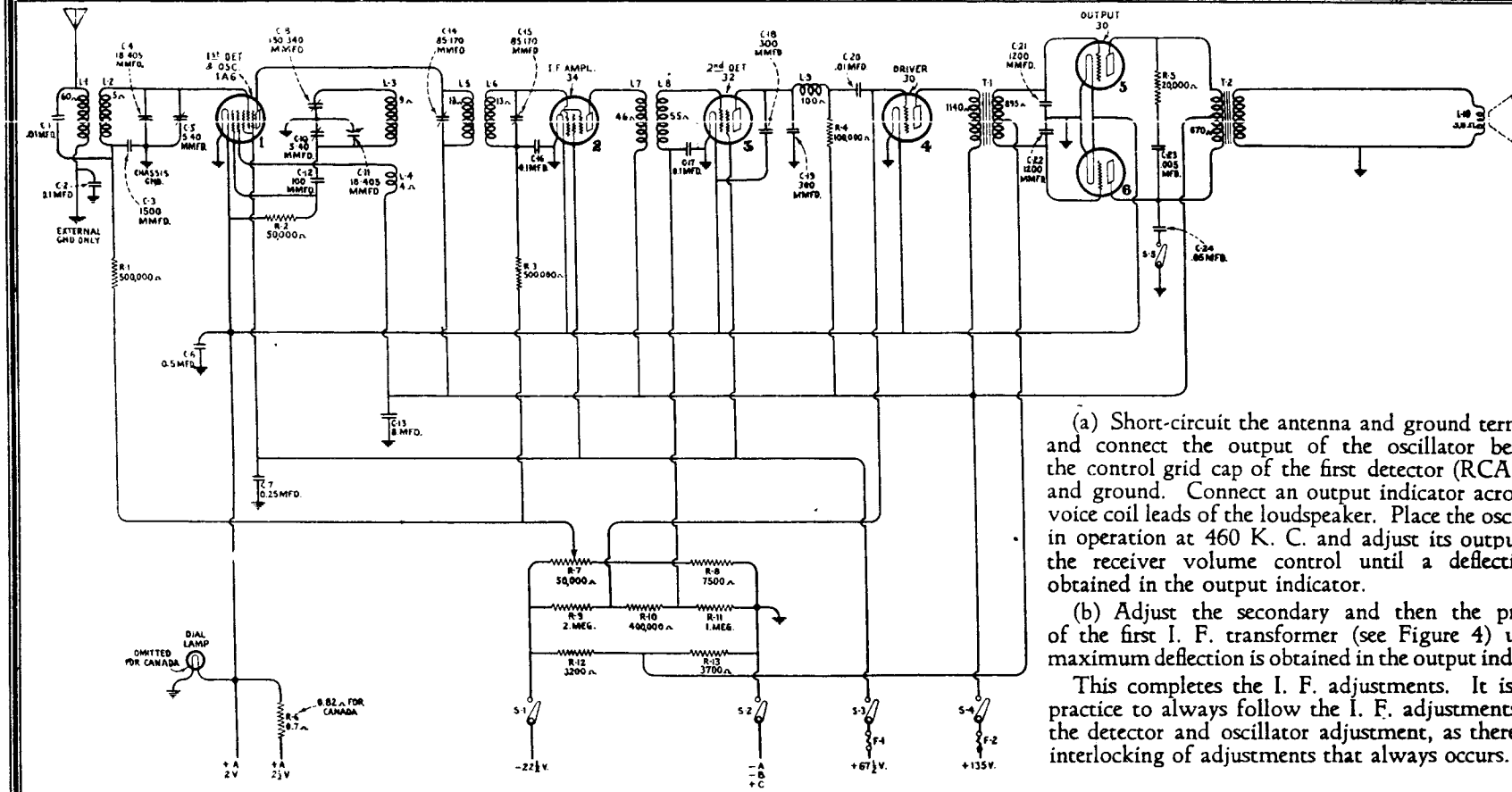
(b) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be opposite the last division of the low frequency end of scale with the indicator at its center position. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the R. F. and R. F. adjustments, the important points to remember are that the receiver volume control must be at its maximum position and that the input signal from the external oscillator must be no greater than necessary.

RCA VICTOR, Inc.

MODEL 126 B

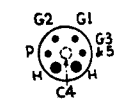


(a) Short-circuit the antenna and ground terminals and connect the output of the oscillator between the control grid cap of the first detector (RCA-1A6) and ground. Connect an output indicator across the voice coil leads of the loudspeaker. Place the oscillator in operation at 460 K. C. and adjust its output and the receiver volume control until a deflection is obtained in the output indicator.

(b) Adjust the secondary and then the primary of the first I. F. transformer (see Figure 4) until a maximum deflection is obtained in the output indicator.

This completes the I. F. adjustments. It is good practice to always follow the I. F. adjustments with the detector and oscillator adjustment, as there is an interlocking of adjustments that always occurs.

Radiotron No.		Control Grid to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Plate, M. A.	Filament Volts, D. C.
RCA-1A6	1st Det.	*3.0	67.5	135	1.7	2.0
	Osc.	—	—	135	1.8	
RCA-34—I. F.		*3.0	67.5	135	3.0	2.0
RCA-32—2nd Det.		*6.5	67.5	*95	0.4	2.0
RCA-30—Driver		*9.0	—	130	3.5	2.0
RCA-30—Output		12.0	—	135	1.0	2.0
RCA-30—Output		12.0	—	135	1.0	2.0



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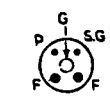

32 & 34

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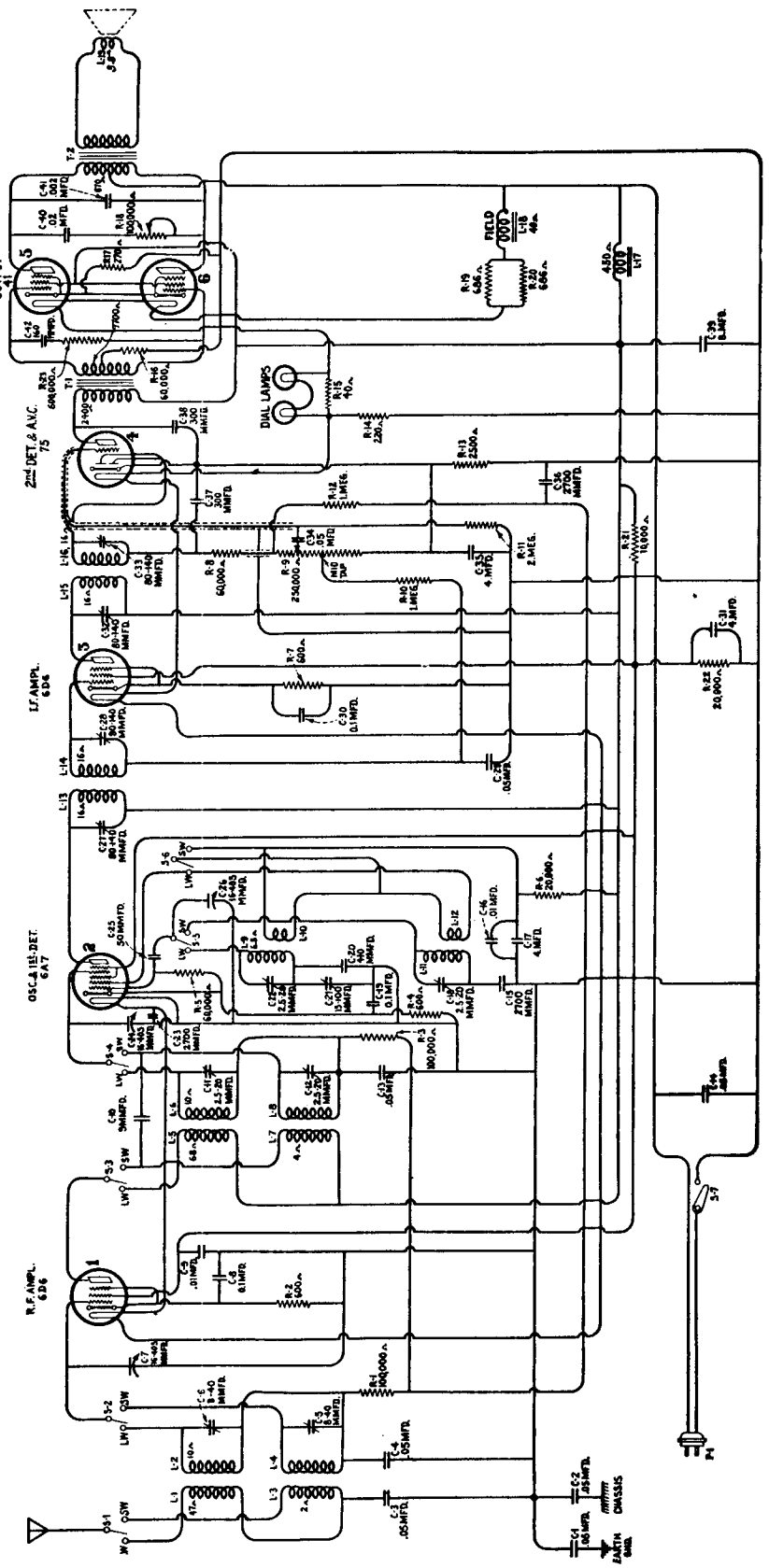
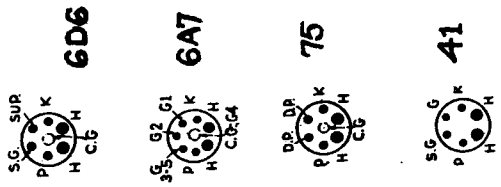
RCA VICTOR, Inc.

MODEL 127





(a) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

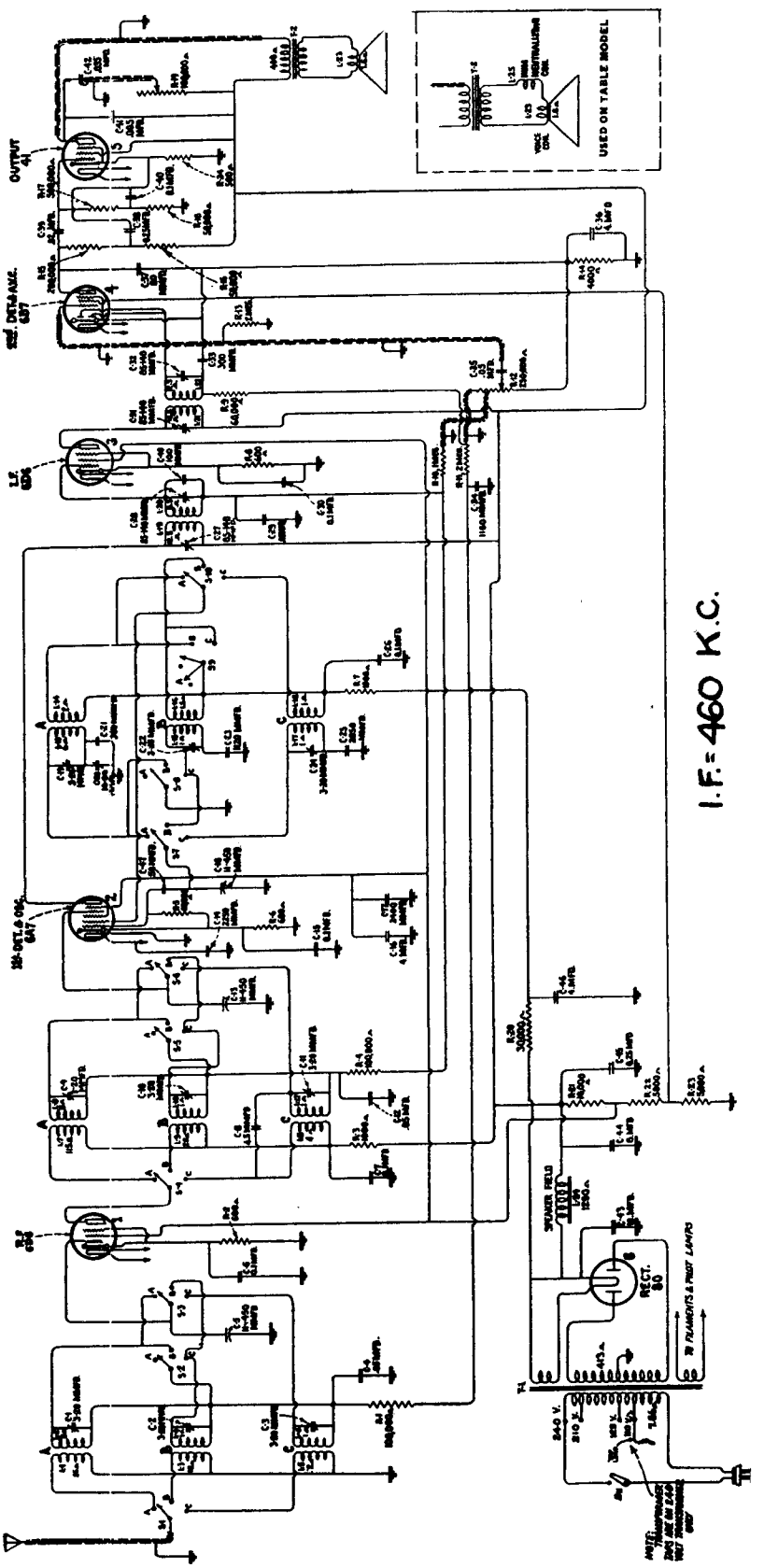
(b) Connect the test oscillator output between the first detector control grid and chassis ground, preferably through a series condenser. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

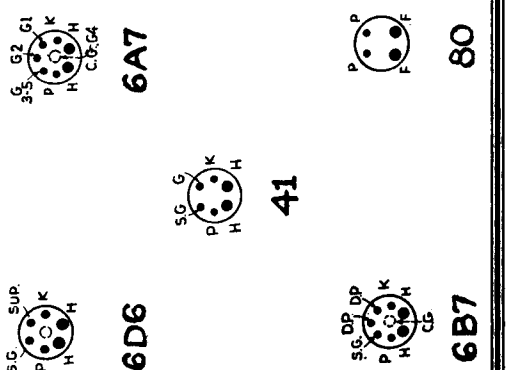
(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained.

Radiotron No.		Cathode to B— Volts, D. C.	Screen Grid to B— Volts, D. C.	Plate to B— Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-6D6 R. F.		3.0	90	200	6.0	6.4
RCA-6A7	1st Detector	4.0	90	200	2.6	6.4
	Oscillator	—	—	125	3.3	
RCA-6D6 I. F.		3.0	90	200	6.0	6.4
RCA-75 2nd Detector		1.5	—	200	0.7	6.4
RCA-41 Power		13.0	190	205	25.0	6.4
RCA-41 Power		13.0	190	205	25.0	6.4

RCA VICTOR, Inc.

MODELS 128 & 224



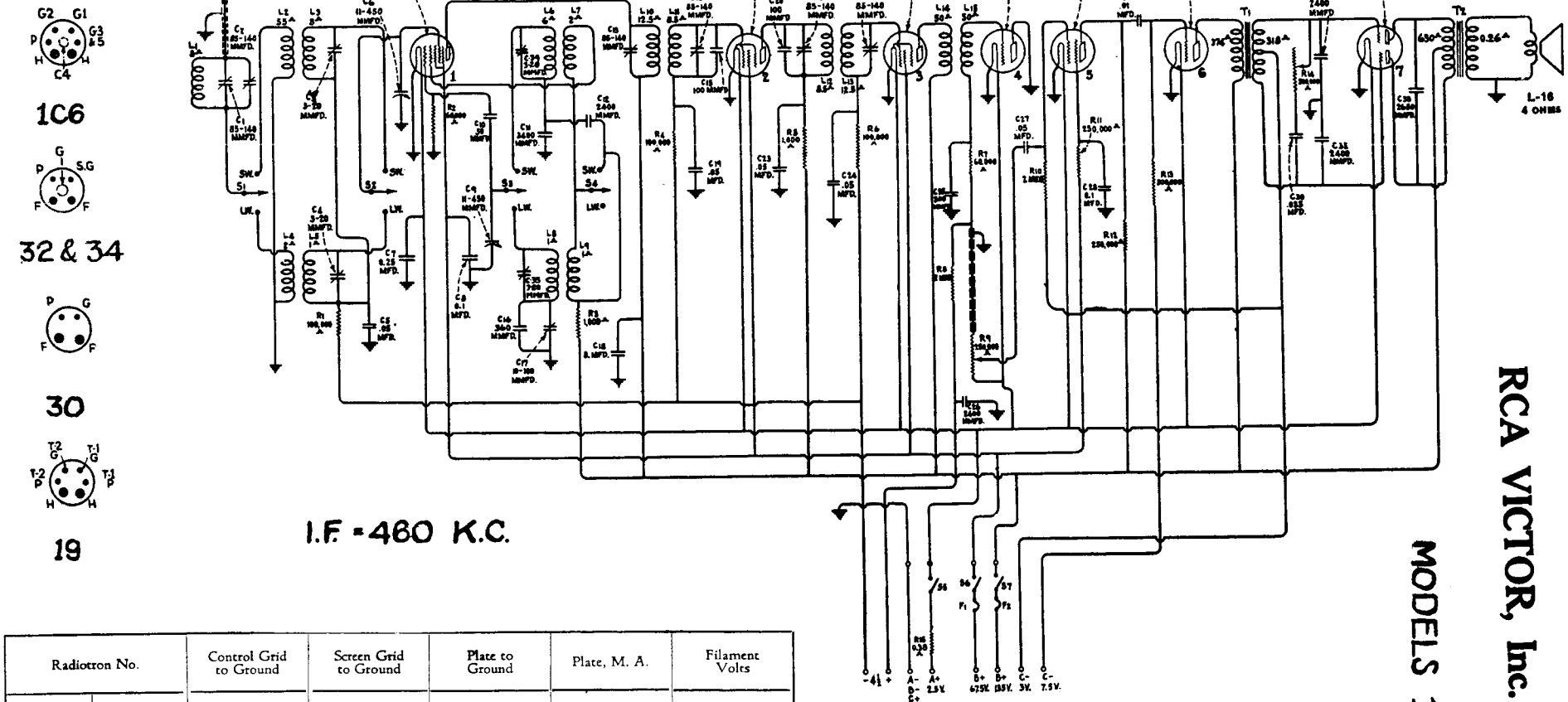


Radiotron Number		Cathode to Ground, Volts, D. C.	Screen Grid to Ground, Volts, D. C.	Plate to Ground, Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.		6.0	105	265	9.0	6.3
RCA-6A7	Det.	6.0	105	265	3.5	6.3
	Osc.	—	—	220	4.5	
RCA-6D6—I. F.		6.0	105	265	9.0	6.3
RCA-6B7—2nd Detector		3.0	50	90*	0.7	6.3
RCA-41—Pwr		16.5	265	245	30.0	6.3
RCA-80—Rectifier		—	—	690 (RMS)	70.0	5.0

*Voltage calculated from 265 V. + B.

RCA VICTOR, Inc.

MODELS 135B & 235B



Radiotron No.		Control Grid to Ground	Screen Grid to Ground	Plate to Ground	Plate, M. A.	Filament Volts
RCA-1A6	1st Detector	3.5*	67.5	135	0.6	2.0
	Oscillator	—	—	130	4.0	
RCA-34—I. F.		3.5*	67.5	135	2.3	2.0
RCA-34—I. F.		3.5*	67.5	135	2.3	2.0
RCA-30—Detector AVC		—	—	—	—	2.0
RCA-32—Audio		3.0*	30*	40*	0.3	2.0
RCA-30—Driver		7.5*	—	133	4.0	2.0
RCA-19—Power		3.0	—	135	3.0	2.0

*These voltages cannot be measured with ordinary voltmeter.

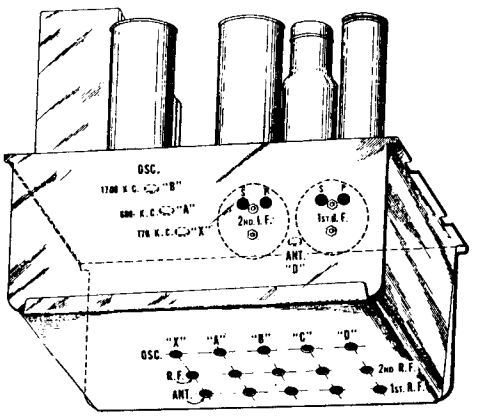
(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

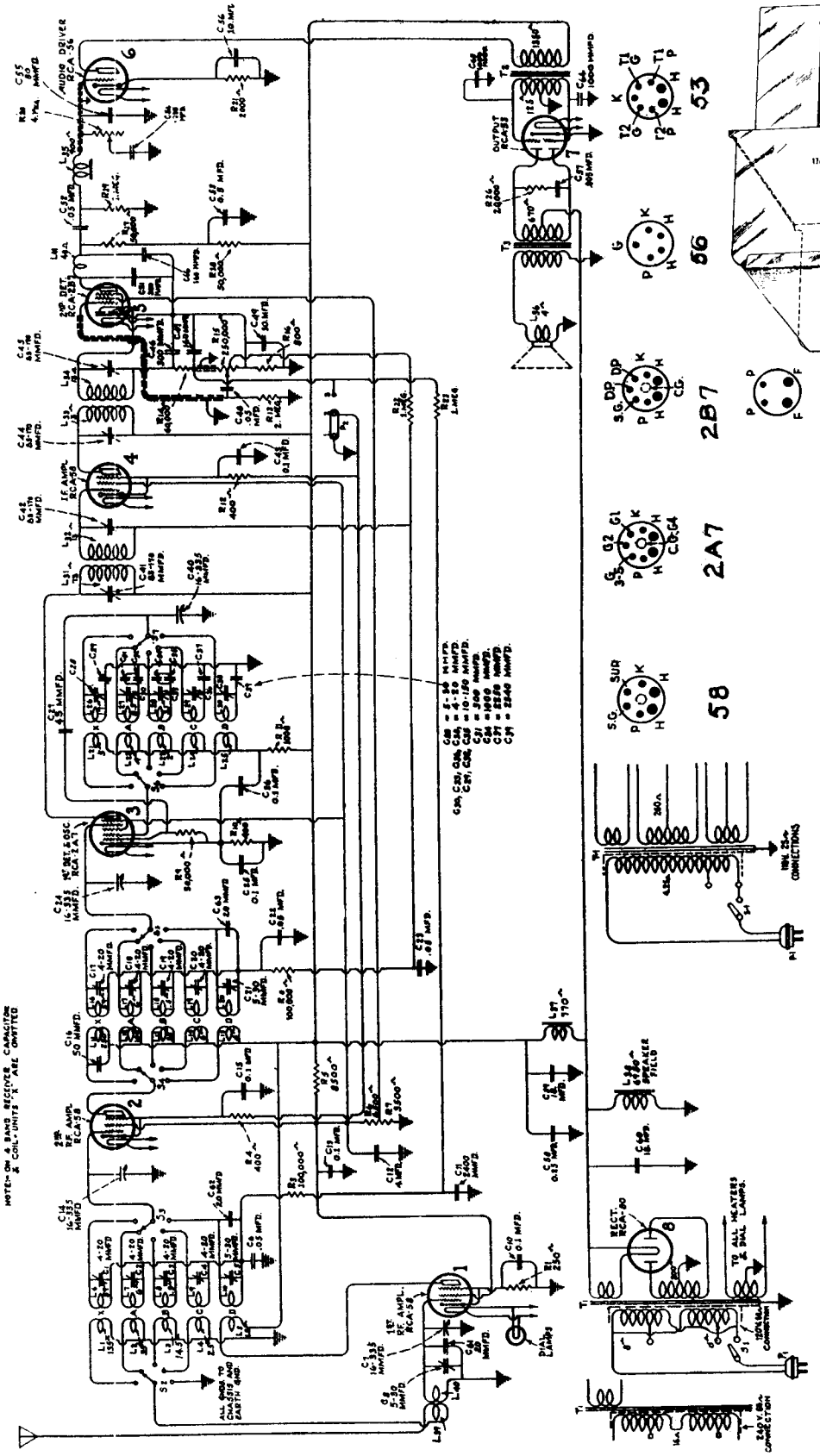
(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output indicator across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. The third transformer is untuned.

RCA VICTOR, Inc.

MODELS 140-141-141-E 240 & AUR 1





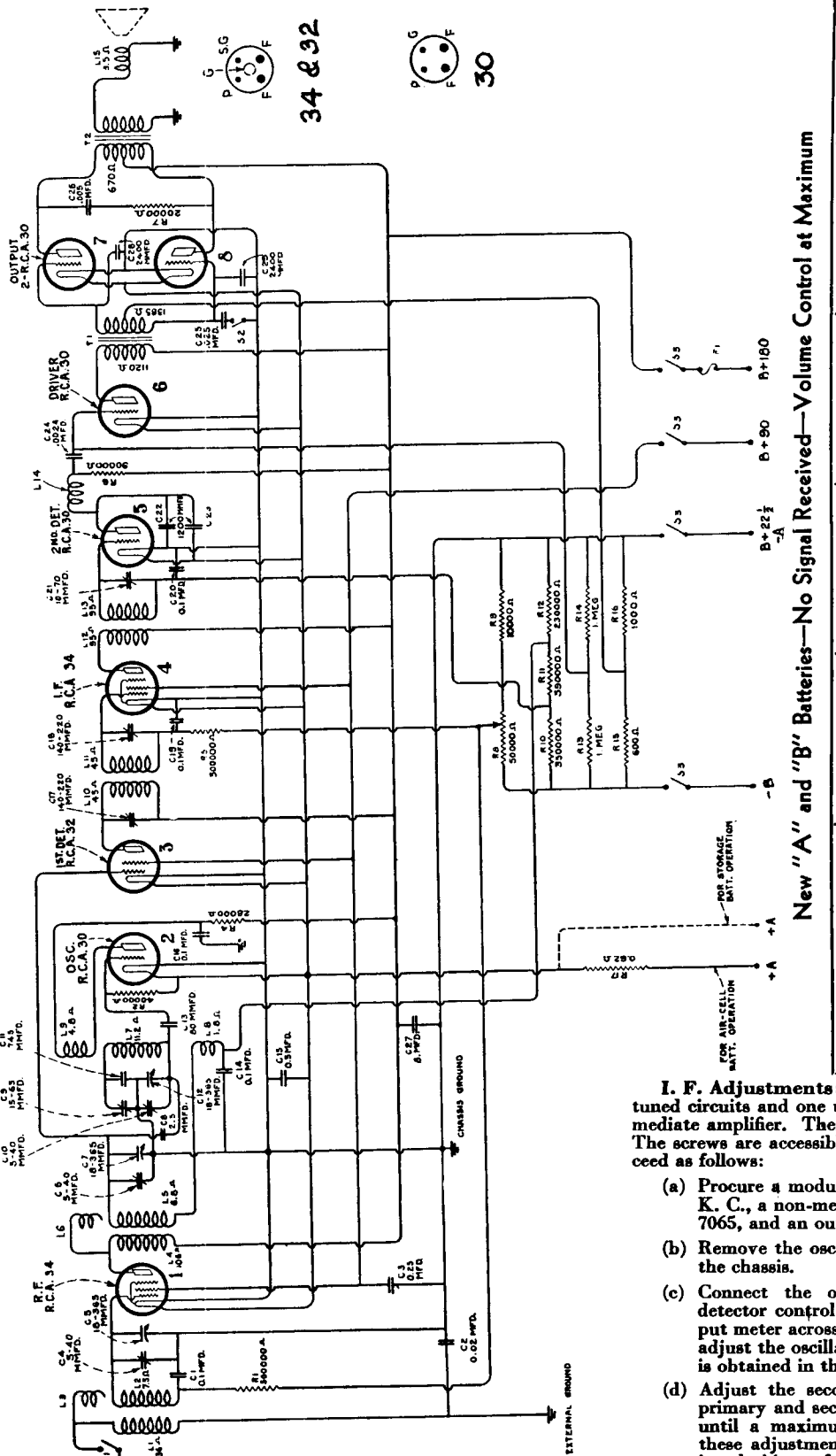
Radiotron No.	Control Grid to Cathode Volts	Screen Grid to Cathode Volts	Plate to Cathode Volts	Plate Current M. A.	Filament or Heater Volts
RCA-58, R. F.	**2.0	100	255	6.0	2.6
RCA-58, S. W. R. F.	**2.0	100	255	6.0	2.6
RCA-2A7, Det.-Osc.	**2.5	100	250	*5.0	2.6
RCA-58, I. F.	**2.0	100	255	6.0	2.6
RCA-2B7, 2nd Det.-AVC	**1.5	35	105	1.5	2.6
RCA-56, A. F. Driver	**12.0	—	245	6.0	2.6
RCA-53, Output	0	—	300	36.0	2.6
RCA-80, Rectifier	640 R. M. S. Plate to Plate			130 per Plate	5.0

* Voltages and current apply to detector portion of tube.

** These voltages cannot be measured because of the high resistance of the circuits.

RCA VICTOR, Inc.

MODELS 142 B & 241 B



New "A" and "B" Batteries—No Signal Received—Volume Control at Maximum

Radiotron No.	Control Grid to Filament Volts	Screen Grid to Filament Volts	Plate to Filament Volts	Plate Current M. A.	Filament Volts
1. R. F.—RCA-34	*3.0	65	155	2.5	2.0
2. Oscillator—RCA-30	—	—	55	4.0	2.0
3. 1st Detector—RCA-32	*4.0	65	155	0.5	2.0
4. I. F.—RCA-34	*3.0	65	155	2.5	2.0
5. 2nd Detector—RCA-30	*10.0	—	*130	0.25	2.0
6. A. F.—RCA-30	*7.0	—	150	2.5	2.0
7. Power—RCA-30	*14.0	—	155	2.0 Total	2.0
8. Power—RCA-30	*14.0	—	155		2.0

*Voltages are obtained by means of high resistance dividers and it is not possible to accurately measure them with ordinary equipment.

I. F. Adjustments: Two transformers comprising three tuned circuits and one untuned circuit are used in the intermediate amplifier. These circuits are all tuned to 175 K. C. The screws are accessible from the rear of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter.

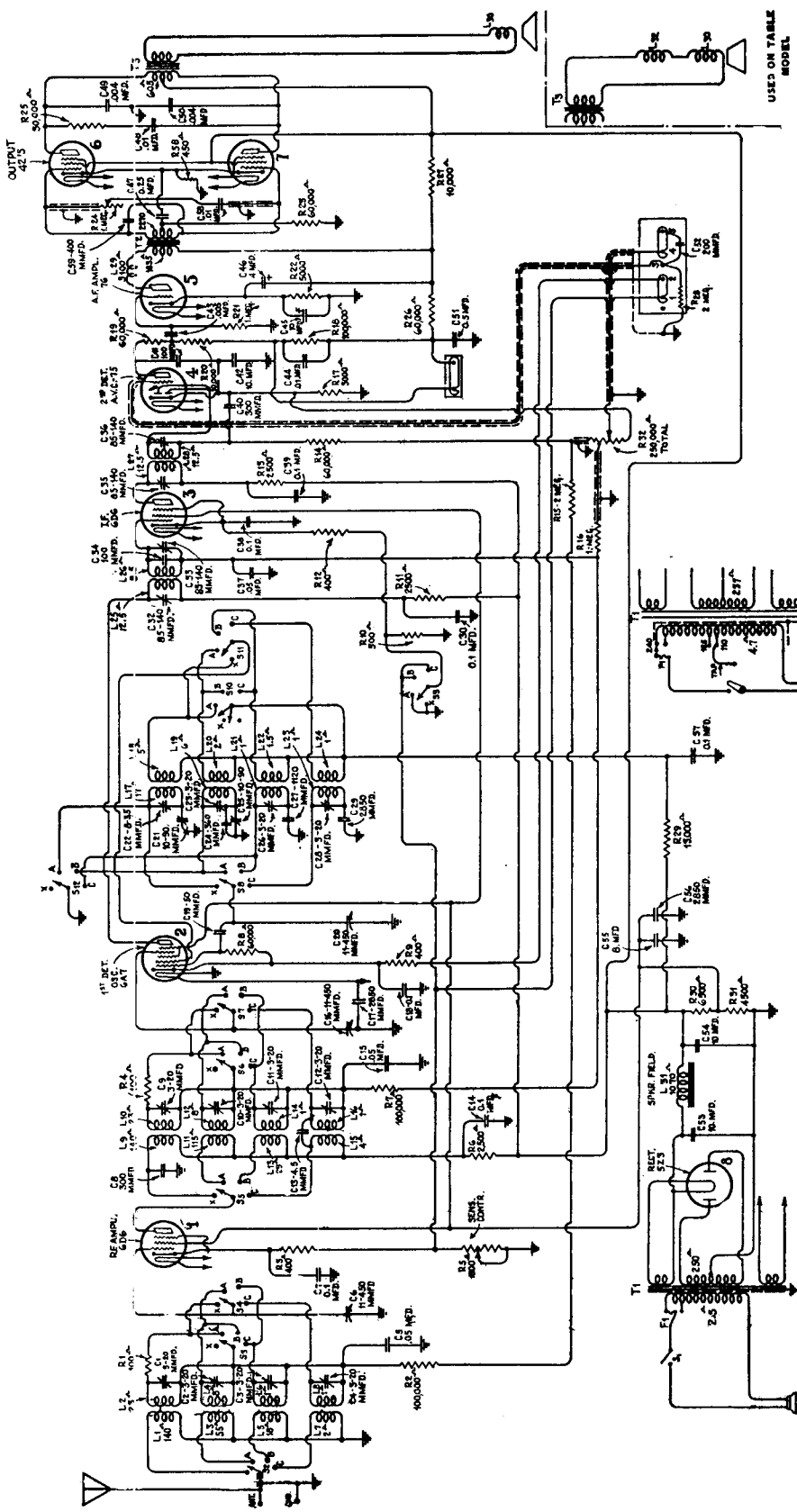
(b) Remove the oscillator tube and connect a ground to the chassis.

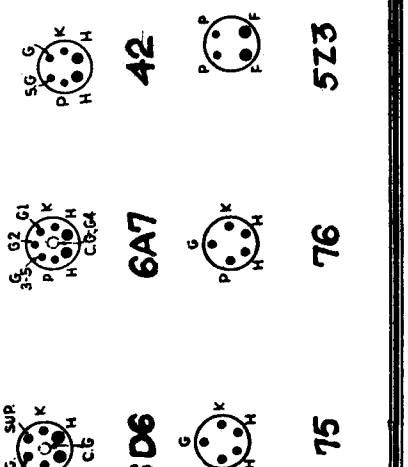
(c) Connect the oscillator output between the first detector control grid and ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that a slight deflection is obtained in the output meter

(d) Adjust the secondary of the second and then the primary and secondary of the first I. F. transformers until a maximum deflection is obtained. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

RCA VICTOR, Inc.

MODELS 143 & 242





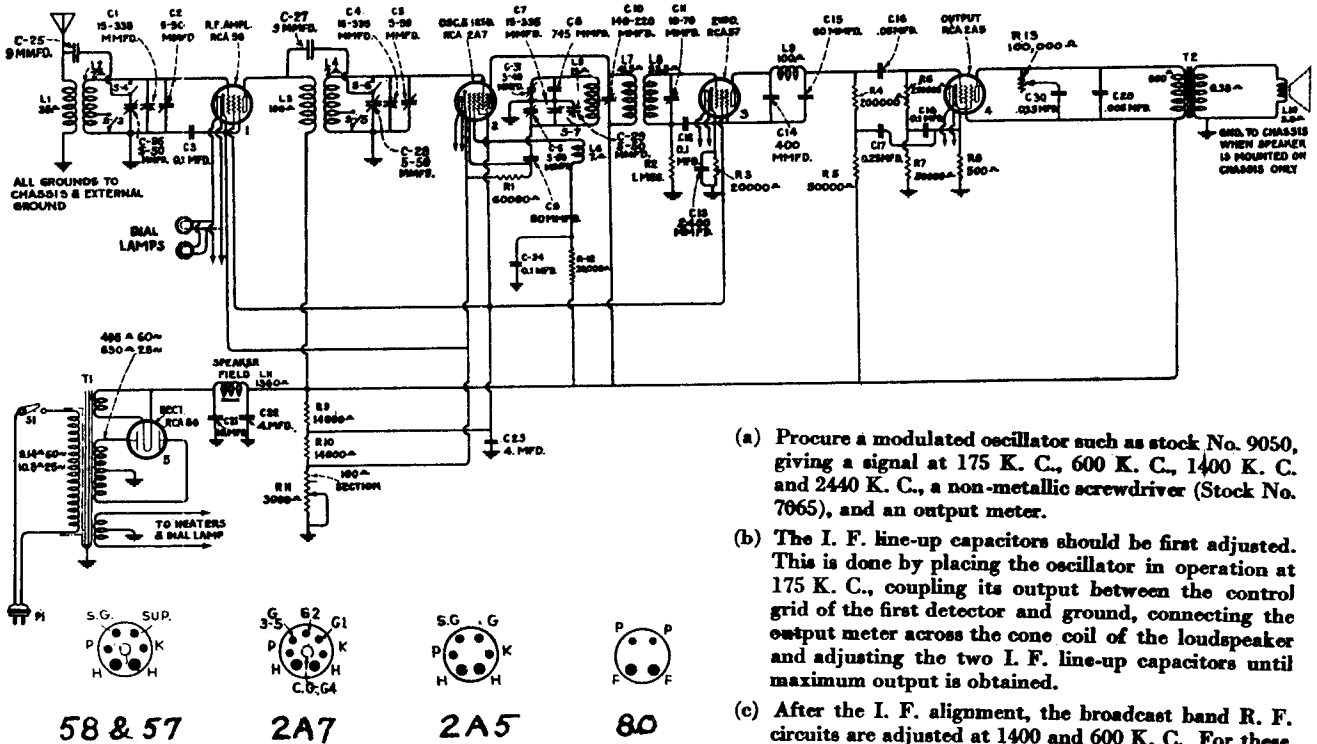
TUBE	CATHODE V.	S. G. V.	PLATE V.	CATHODE M.A.	HEATER V.
6D6 R. F.	4.2	110	272	10.5	6.3
6A7 Osc.			225	11.4	6.3
6A7 1st Det.	4.6	110	282	11.4	6.3
6D6 I. F.	4.2	110	272	10.5	6.3
75 2nd Det.	1.2		170	0.4	6.3
76 A. F.	14.0		252	2.8	6.3
42 Power	22.0	295	290	24.5	6.3
42 Power	22.0	295	290	24.5	6.3
5Z3 Rect.			768/384 R.M.S.	110.0	5.0

TUBE CATHODE V. S. G. V.

6D6 6A7 75 76 42 5Z3

RCA VICTOR, Inc.

MODEL 210



Trouble Shooting Hints

If oscillation is encountered in this set check condensers C25 and C27. If a loud hum is encountered try a replacement condenser at C21 and test the continuity of resistor R11. Poor quality is usually due to a defective 2A5. If noisy reception is experienced, check the contacts of the wave-change switch and test all by pass condensers.

(a) Procure a modulated oscillator such as stock No. 9050, giving a signal at 175 K. C., 600 K. C., 1400 K. C. and 2440 K. C., a non-metallic screwdriver (Stock No. 7065), and an output meter.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid of the first detector and ground, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. alignment, the broadcast band R. F. circuits are adjusted at 1400 and 600 K. C. For these adjustments the Range Switch must be set in the broadcast position and the oscillator output connected to the antenna and ground leads of the receiver. First set the oscillator at 1400 K. C. and the receiver dial at 140 and adjust the three trimmer capacitors located on top of the gang capacitor for maximum output. Shift the oscillator to 600 K. C., tune in the signal and adjust the oscillator series capacitor (accessible at the right-hand side of the chassis) for maximum output while rocking the variable condenser back and forth. Then repeat the 1400 K. C. adjustments, as there is a tendency toward interaction.

(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the broadcast band R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

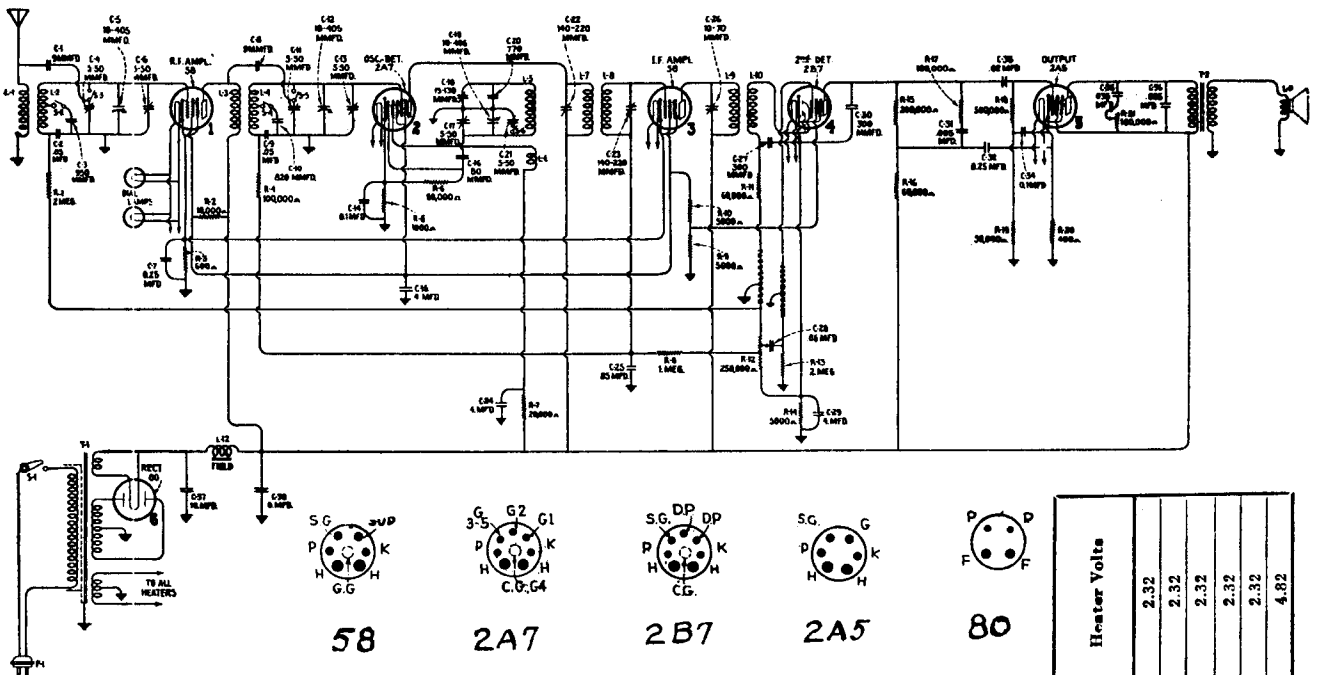
115 Volt A. C. Line

MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater, Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector—Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

RCA VICTOR, Inc.

MODELS 220 & 222



I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are located on the main tuning capacitor, accessible at the top of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

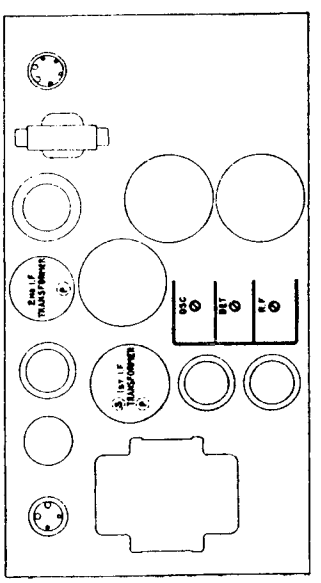
(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator pointer should be set on the white inner radial line located at approximately 530 K. C. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) After making the 1400 K. C. adjustment, shift the oscillator to 600 K. C. and tune in the signal. Adjust the 600 K. C. trimmer, accessible from the top of the chassis, for maximum output while rocking the gang-capacitor back and forth. Then again check the adjustment described in (b).

(d) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 244. The three line-up capacitors located on the Range Switch and accessible from the bottom of the chassis should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.



115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.5	100	260	5.0	2.32
2. RCA-2A7 1st Det. Osc.	5.5*	100*	260*	2.0*	2.32
3. RCA-58 I. F.	3.5	100	260	5.0	2.32
4. RCA-2B7 2nd Det. A. V. C.	4.5	50	90	0.7	2.32
5. RCA-2A5 Power	16.5	255	245	34.0	2.32
6. RCA-80 Rectifier		725 R.M.S.		73.0 Total	4.82

*The voltages and current refer to the detector part of the tube.

Trouble Shooting Hints

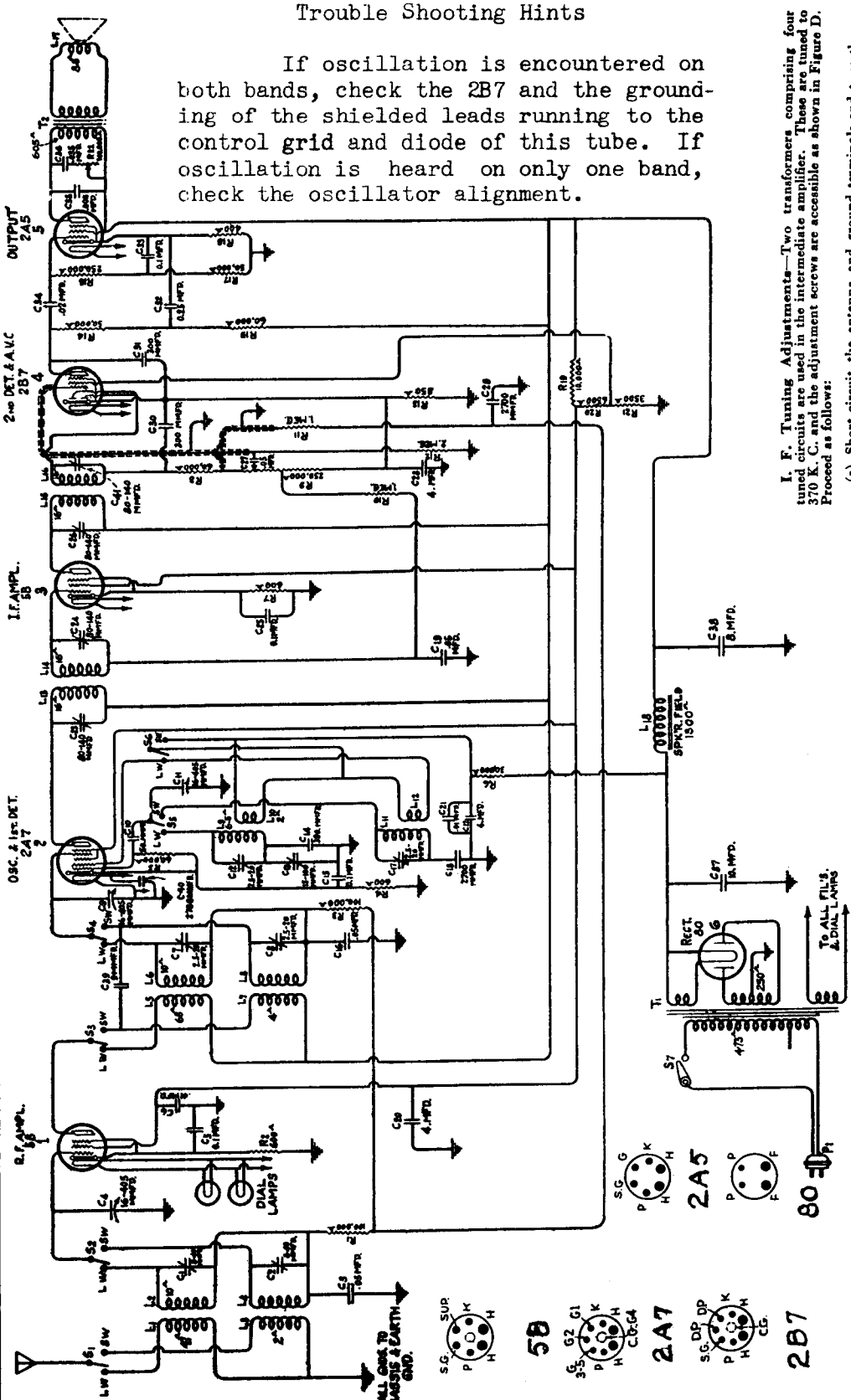
Poor quality in this set is often due to a defective tube, particularly the 2A5. If the volume control does not work, first check the coupling condenser C28 and then the resistors R8, R11, R12 and R14.

RCA VICTOR, Inc.

MODEL 221

Trouble Shooting Hints

If oscillation is encountered on both bands, check the 2B7 and the grounding of the shielded leads running to the control grid and diode of this tube. If oscillation is heard on only one band, check the oscillator alignment.



I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receive so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual

115 Volts, A. C. Line—No Signal

Type No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.
1. RCA-58 R. F.	3.0	100	265	6.0
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*
3. RCA-58 I. F.	3.0	100	265	6.0
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5
5. RCA-2A5 Power	16.0	255	240	35.0
6. RCA-80 Rectifier			725 Volts R. M. S.—75 M. A. Total Current	

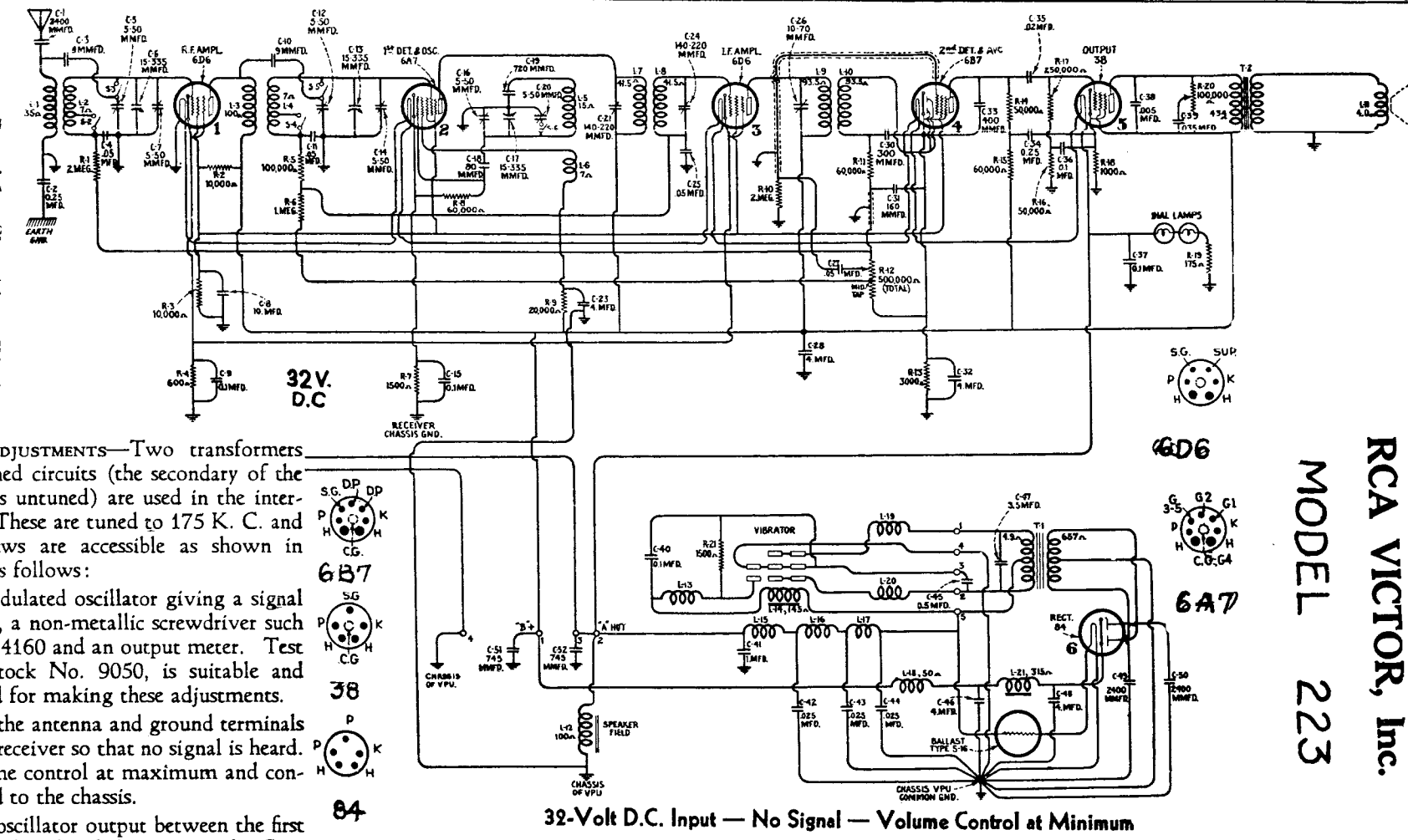
* The voltages and current refer to the detector part of the tube.

RCA VICTOR, Inc.

MODEL 223

Trouble Shooting Hints

If the voltage on all tubes is low replace the ballast tube, test the 84 and the vibrator. Do not try to repair the vibrator.



I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure 4. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter. Test Oscillator, Stock No. 9050, is suitable and recommended for making these adjustments.

(b) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

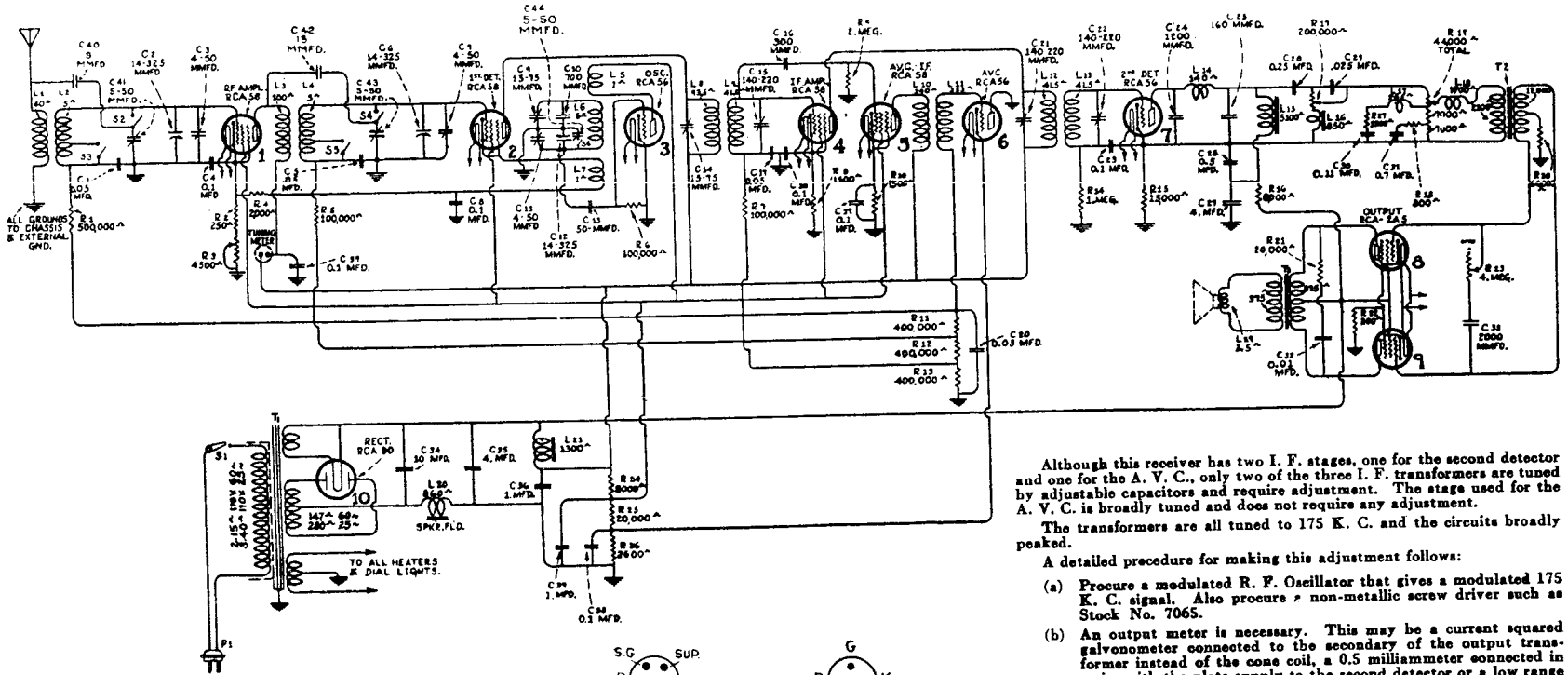
(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times.

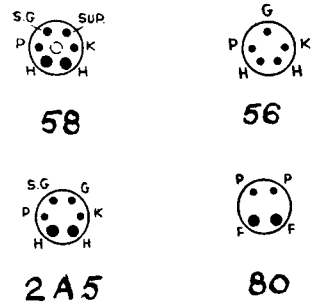
Radiotron No.	Cathode to Ground, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A
RCA-6D6 R. F.	8.4	77	216	4.2
RCA-6A7—Osc. Det.	9.7	76	215	6.5
RCA-6D6 I. F.	8.4	77	216	4.2
RCA-6B7—2nd Det.	5.7	80	52	1.9
RCA-38 Pwr.	19.5	205	197	21.5
RCA-84 Rect.	244			50

*Varies with ballast tubes and with time.

RCA VICTOR, Inc.

MODEL 260





Trouble Shooting Hints

The 600 K.C. series padder in the oscillator circuit must be readjusted when the sensitivity drops off towards the low frequency end of the band. This condenser is located under the second section of the tuning condenser.

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed precedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvonometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

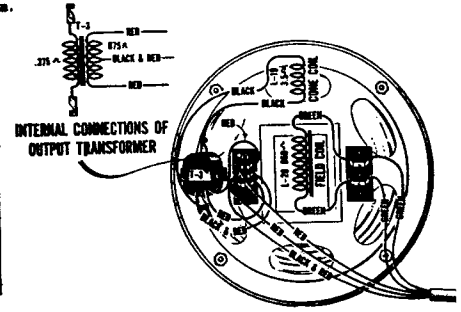
(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

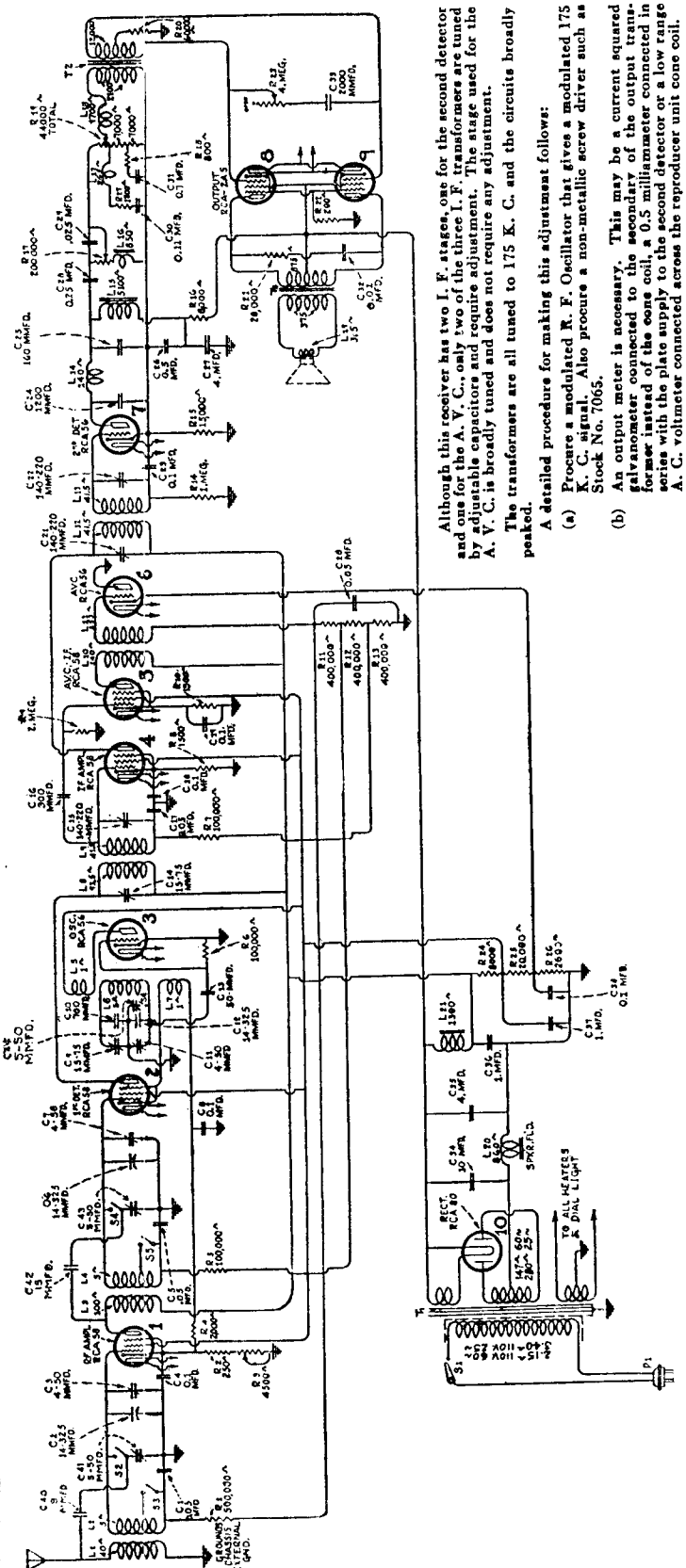
120 Volt, A. C.—No signal being received—Volume Control at minimum

Radiotron No.	Cathode to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current, M. A.	Heater or Filament Volts, A. C.
1. R. F.	3.0	100	230	7.0	2.4
2. 1st Detector	8.0	95	220	2.5	2.4
3. Oscillator	—	—	105	6.0	2.4
4. I. F.	7.5	100	225	2.5	2.4
5. A. V. C.—I. F.	7.5	100	225	2.5	2.4
6. A. V. C.	20.0	—	0	—	2.4
7. 2nd Detector	17.0	—	250	1.2	2.4
8. Power	18.0	255	245	33.0	2.4
9. Power	18.0	255	245	33.0	2.4



RCA VICTOR, Inc.

MODEL 261



Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

58 56 2A5 80

120 Volt, A. C.—No signal being received—Volume Control at minimum

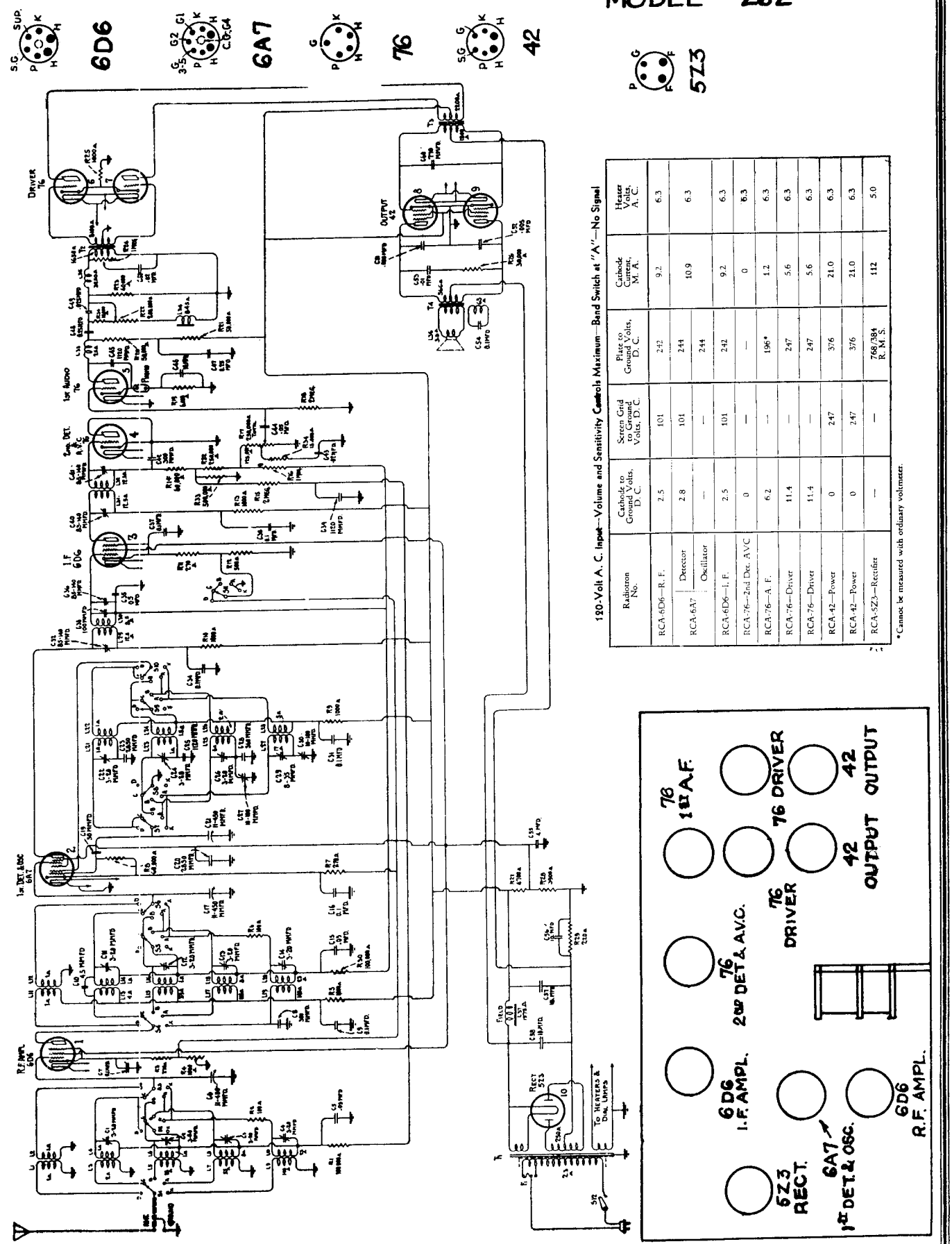
Radiotron No.	Cathode to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current, M. A.	Heater or Filament Volts, A. C.
1. R. F.	3.0	100	230	7.0	2.4
2. 1st Detector	8.0	95	220	2.5	2.4
3. Oscillator	—	—	105	6.0	2.4
4. I. F.	7.5	100	225	2.5	2.4
5. A. V. C.—I. F.	7.5	100	225	2.5	2.4
6. A. V. C.	20.0	—	0	—	2.4
7. 2nd Detector	17.0	—	250	1.2	2.4
8. Power	18.0	255	245	33.0	2.4
9. Power	18.0	255	245	33.0	2.4

Trouble Shooting Hints

A continuous audio howl may be due to break down of C 28, C 29, or C 33. It may also be due to oscillation in the 2A5. Replace the latter if defective.

RCA VICTOR, Inc.

MODEL 262



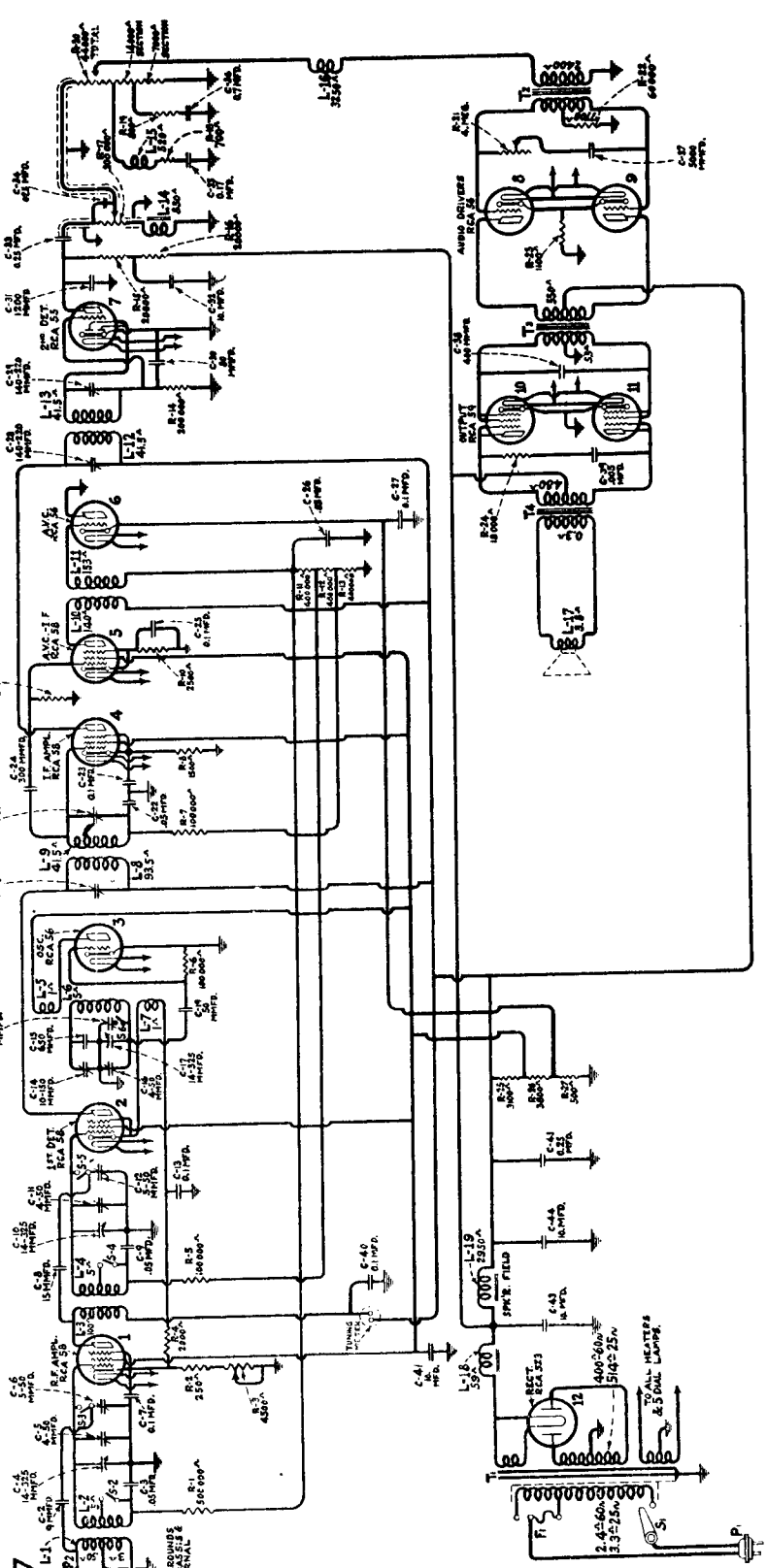
120-Volt A. C. Input—Volume and Sensitivity Controls Maximum—Band Switch at "A"—No Signal

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.		2.5	101	242	9.2	6.3
RCA-6A7	Detector	2.8	101	244	10.9	6.3
	Oscillator	—	—	244		
RCA-6D6—I. F.		2.5	101	242	9.2	6.3
RCA-76—2nd Det. AVC		0	—	—	0	6.3
RCA-76—A. F.		6.2	—	196*	1.2	6.3
RCA-76—Driver		11.4	—	247	5.6	6.3
RCA-76—Driver		11.4	—	247	5.6	6.3
RCA-42—Power		0	247	376	21.0	6.3
RCA-42—Power		0	247	376	21.0	6.3
RCA-5Z3—Rectifier		—	—	768/384 R. M. S.	112	5.0

*Cannot be measured with ordinary voltmeter.

RCA VICTOR, Inc.

MODEL 280



Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

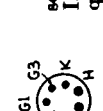
(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

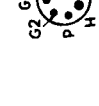
(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.

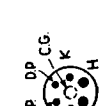
(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

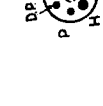
(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a slightly reduced deflection is obtained in the output meter.

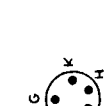
(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a minimum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

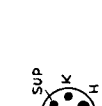


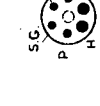


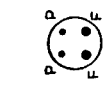












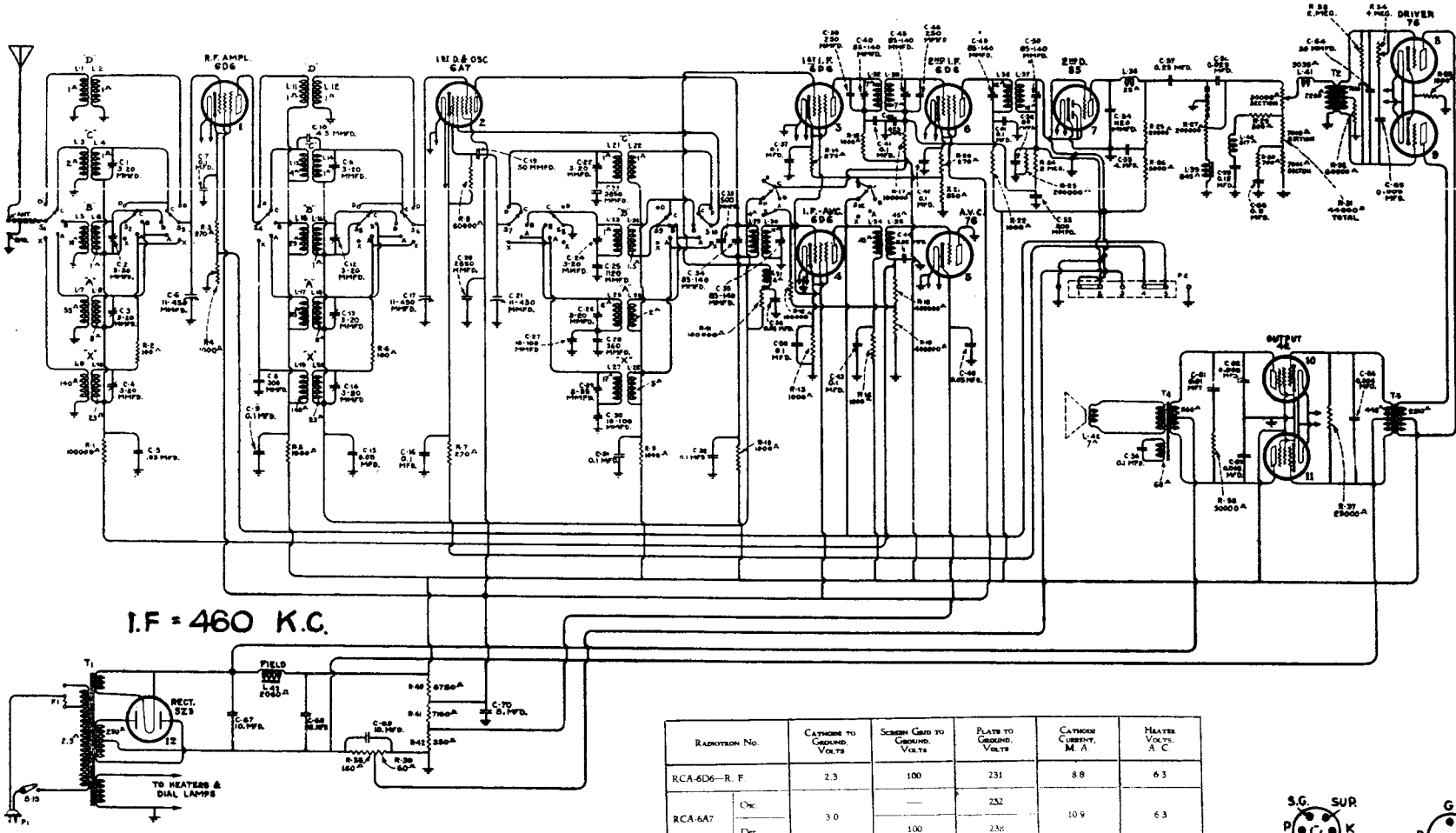
523	58	56	55	59

120 Volt A. C. Line—Volume Control and Sensitivity Control at Maximum—

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.
RCA-58 R. F.	3.1	97	212	7.5
RCA-56 Osc.	—	—	100	6.0
RCA-58 1st Det.	9.5	91	206	2.8
RCA-58 I. F.	7.5	93	208	4.0
RCA-58 A. V. C.–I. F.	8.5	92	207	3.0
RCA-56 A. V. C.	12.0	—	—	0
RCA-55 2nd Det.	0	—	74	8.0
RCA-56 A. F. Driver	11.0	—	205	5.0
RCA-56 A. F. Driver	11.0	—	205	5.0
RCA-59 Power	0	—	394	13.0
RCA-59 Power	0	—	394	13.0
RCA-523 Rect.	990-495 R. M. S.			92 Total

RCA VICTOR, Inc.

MODEL 281

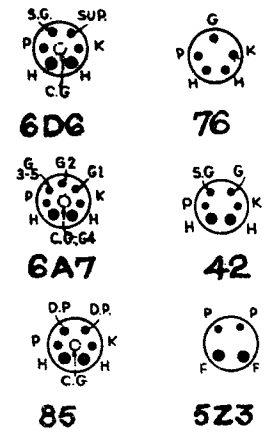


(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker. Replace the A. V. C. tube in the receiver with the "dummy" RCA-76.

(b) Place the oscillator in operation at 460 K. C.; place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn both the volume and sensitivity controls to their maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

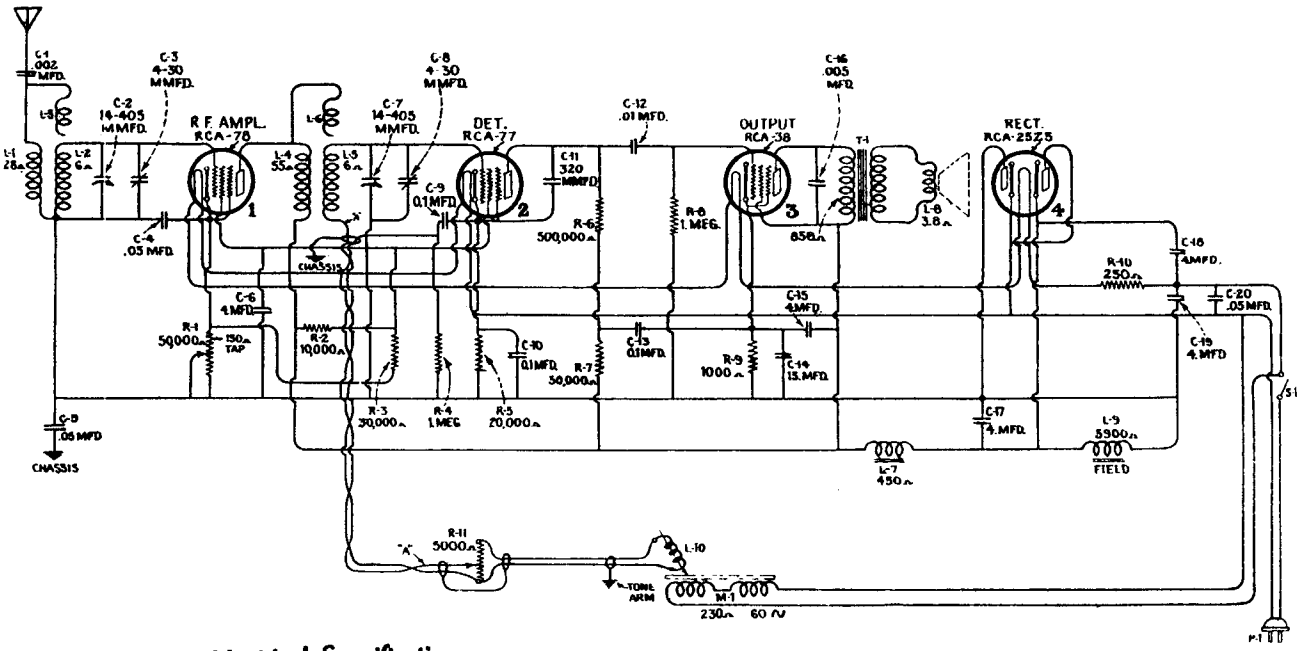
Radiotron No.		Cathode to Ground, Volts	Screen Grid to Ground, Volts	Plate to Ground, Volts	Cathode Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.		2.3	100	231	8.8	6.3
RCA-6A7	Osc.	3.0	—	252	10.9	6.3
	Det.		100	238		
RCA-6D6—1st I. F.		7.0	100	236	3.5	6.3
RCA-6D6—2nd I. F.		7.0	100	236	3.5	6.3
RCA-6D6—A. V. C.-I. F.		6.0	100	235	4.0	6.3
RCA-76—A. V. C.		4.7	—	0	0	6.3
RCA-85—2nd Det.		0	—	60	7.2	6.3
RCA-76—A. F.		11.0	—	235	5.5	6.3
RCA-76—A. F.		11.0	-	235	5.5	6.3
RCA-42—Power		0	240	365	23.0	6.3
RCA-42—Power		0	240	365	23.0	6.3
RCA-5Z3—Rectifier		-		768-384 RMS	104.0	5.0

Power Transformer connected to 120 volt Tap



RCA VICTOR, Inc.

MODEL 300



Electrical Specifications

Voltage Rating.....105–115 Volts
Frequency Rating.....25, 50, and 60 Cycles
Power Consumption.....55 Watts
Tuning Range.....546–1710 K. C.
Type and number of Radiotrons
1 RCA-78, 1 RCA-77, 1 RCA-38, 1 RCA-25Z5—Total, 4
Undistorted Output.....0.3 Watts at 60 Cycles

This table type combination instrument consists of a four tube tuned R. F. receiver and a new compactly constructed motor board assembly. It is designed for A. C. operation only. Features such as wide tuning range, electro-dynamic loudspeaker, ability to play both 10 and 12 inch records and excellent quality of reproduction characterize this instrument. Figures C and D show the schematic and wiring diagrams respectively while the voltage readings and replacement parts are given below:

RADIOTRON SOCKET VOLTAGES

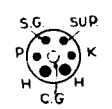
Measured at Maximum Volume—115 Volts, 60 Cycles

Radiotron No.	Cathode to Control Grid, Volts D.C.	Cathode to Screen Grid, Volts D.C	Cathode to Plate, Volts D.C.	Plate Current M. A	Filament or Heater Volts
RCA-78, R. F.	2.5	100	200	8.0	6.0
RCA-77, Detector	*5.0	95	*100	0.2	6.0
RCA-38, Output	18.0	180	170	14.0	6.0
RCA-25Z5, Rectifier	—	—	115	30.0	25.0

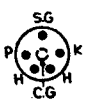
* Impossible to measure on ordinary voltmeter
NOTE: 25 cycle voltages will be less than those obtained on 60 cycles.

Trouble Shooting Hints

Oscillation in this set may be caused either by mis-alignment of the tuned circuits or the aerial wire being coiled up close to the receiver. Realign the set for the first trouble and remove the coiled up wire for the second.



77 & 78



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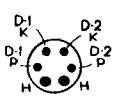


25 Z 5

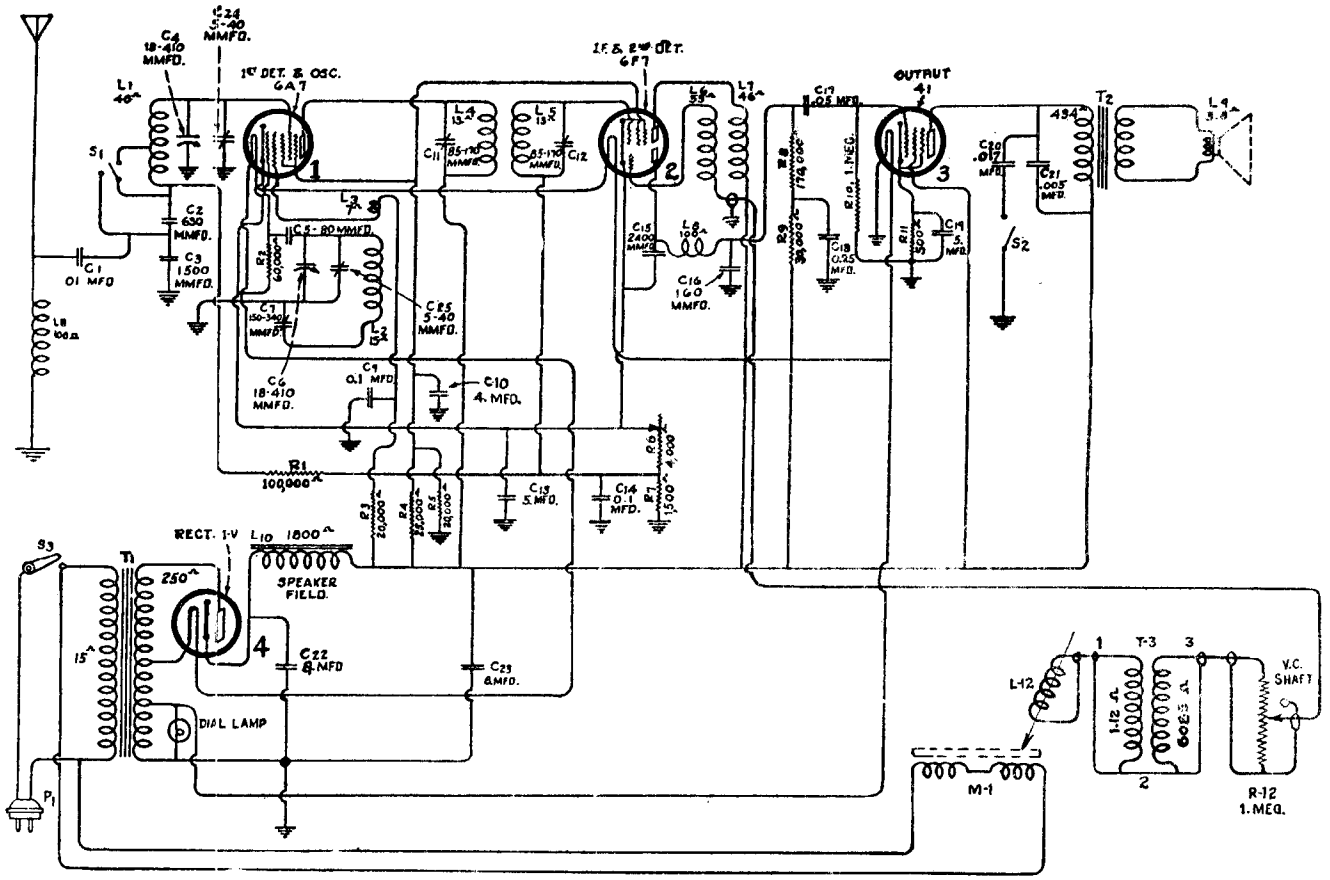
(1) *Station Selector (Left-hand knob on front panel)*—The pointer of this knob passes over an escutcheon marked in equally-spaced divisions (0–100) covering the complete tuning range (540–1712 kilocycles). Stations in the standardized broadcast band (540–1500 kilocycles) will be received between the dial settings "100" and "10," approximately. *Police calls* transmitted at 1554, 1575, 1596, 1662 and 1712 kilocycles will be received at settings near the "0" end of the scale.

(2) *Radio Volume Control and Power Switch (Right-hand knob on front panel)*—In the extreme counter-clockwise position, the power switch is *off*. A slight clockwise twist of the knob turns on the power and further rotation serves to increase the volume on radio reception.

(3) *Record Volume Control (Knob in phonograph playing compartment)*—The volume produced by a phonograph record will be increased upon rotation of this knob in a clockwise direction. When not operating the phonograph, this control should be turned fully counter-clockwise in order to insure proper radio performance.

RCA VICTOR, Inc.

MODEL 301



Voltage Rating.....105–125 Volts
Frequency Rating.....25, 50 and 60 Cycles
Power Consumption.....45 Watt
Number and Types of Radiotrons—
1 RCA-6A7, 1 RCA-6F7, 1 RCA-41, 1 RCA-1-V
Undistorted Output.....1.9 Watts
Frequency Range.....540–1500 K. C. and 1600–3500 K. C.

This table type combination instrument consists of a four tube superheterodyne chassis and a new compactly constructed motor board assembly. The receiver incorporates features such as wide tuning range, electrodynamic loudspeaker, two-point tone control, illuminated dial and the inherent sensitivity, selectivity and tone quality of the super-heterodyne.

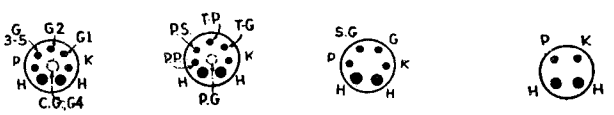
The following description of the circuit describes several new design features which are incorporated in this receiver.

The first tube is a combined first detector and oscillator using Radiotron RCA-6A7. Separate tuned circuits are provided for each function. The detector coil is tapped so that the tuning range may be extended merely by shorting out a portion of the coil. The oscillator circuit is not tapped, the high frequency range being obtained by use of its second harmonic instead of the fundamental for obtaining the I. F. frequency.

The next tube is a combined I. F. stage and second detector using Radiotron RCA-6F7. It has two sets of elements, one being used as a screen grid I. F. amplifier and one as a triode detector. The I. F. frequency in this receiver is 460 K. C. The output stage is a single Pentode RCA-41.

The rectifier is an RCA-1-V used in a half-wave rectifying circuit. A feature of this circuit is that only one transformer secondary is used. This is accomplished by having a cathode type rectifier, a series arrangement of filaments and a tapped secondary winding.

Figure A shows the pickup details, Figure B the assembly wiring, Figure C the schematic circuit and Figure D the wiring diagram and Figure E the loudspeaker wiring.



RADIOTRON SOCKET VOLTAGES

120 Volt, 60 Cycle Line—Maximum Volume Control Setting—No Signal

Radiotron No.		Cathode to Control Grid, Volts D. C.	Cathode to Screen Grid, Volts D. C.	Cathode to Plate, Volts D.C.	Plate Current, M.A.	Heater or Filament, Volts
RCA-6A7	First Detector	1.25	70	235	2.5	6.3
	Oscillator	—	—	180	3.5	
RCA-6F7	I. F.	1.25	70	235	5.5	6.3
	Second Det.	19	—	145*	0.4	
RCA-41	Output	17	240	230	26.5	6.3
RCA-1-V	Rectifier	—	—	335 RMS	50	6.3

* Actual voltage cannot be measured with ordinary voltmete-

Line-Up Adjustments

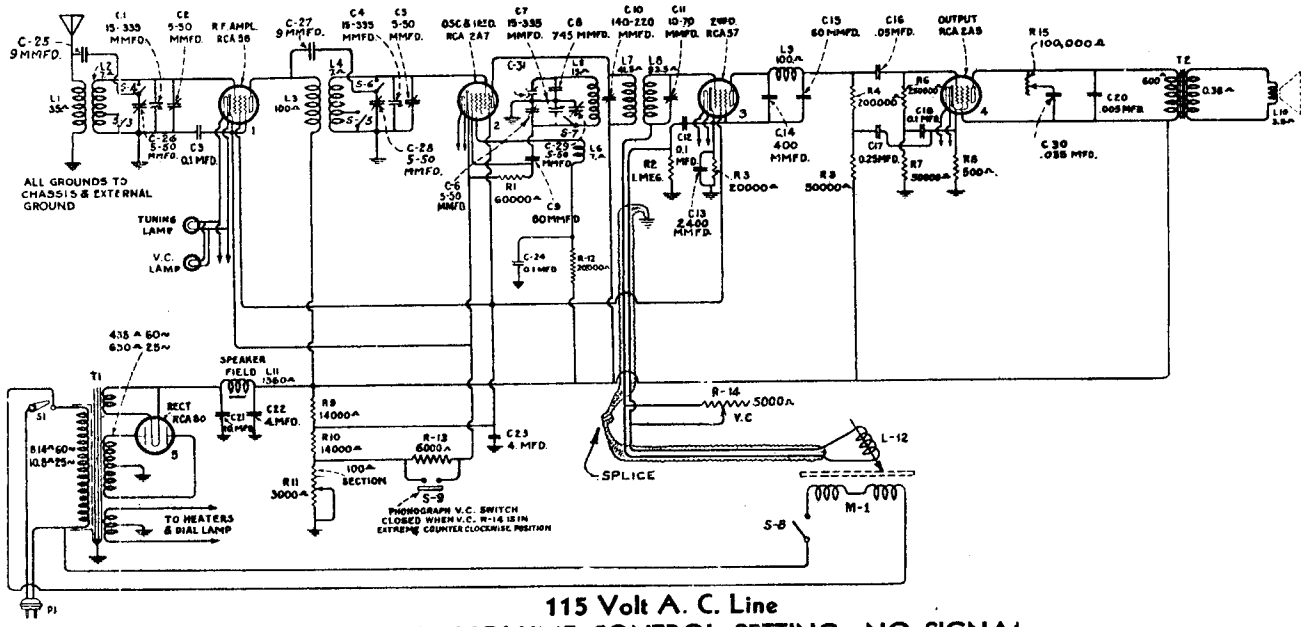
The detector and oscillator line-up trimmer capacitors are adjusted by setting both the dial and an external oscillator first at 1400 K. C. and adjusting the tuning capacitor trimmer capacitors for maximum output, then changing the oscillator frequency and dial setting to 600 K. C. and adjusting the submounted trimmer capacitor for maximum output. The I. F. adjustments are made by adjusting the two trimmer capacitors located on the first I. F. transformer for maximum output when a 460 K. C. signal is connected between the control grid of the first detector and ground. Be sure and set the station selector at a point where no signal is being received when making I. F. adjustments.

Trouble Shooting Hints

The two switches controlling the change from one wave band to the other and connecting the phonograph pick up, seem to cause the most service calls. The trouble is usually found in the soldered connections to the switch points. It is a good plan to resolder all of these connections when trouble develops to prevent a reoccurence. Another common cause of trouble is an open field winding in the speaker.

RCA VICTOR, Inc.

MODELS 310 & RE 40



115 Volt A. C. Line

MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 600 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

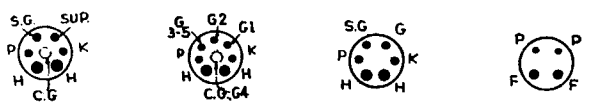
(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, located at the bottom of the chassis, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

(e) Change the frequency of the oscillator to 1400 K. C. and set the dial at 140. Again make the adjustments given under (c).

(f) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.



57 & 58 2A7 2A5 80

Voltage Rating.....105–125 Volts
Frequency Rating.....25, 50 and 60 Cycles
Power Consumption.....60 Cycles, 95 Watts
Number and Types of Radiotrons.....1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total, 5
Undistorted Output.....1.75 Watts
Frequency Range.....540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

This combination radio-phonograph instrument uses a five-tube Super-Heterodyne receiver incorporating a dynamic loudspeaker, continuously variable tone control, single heater type Pentode output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

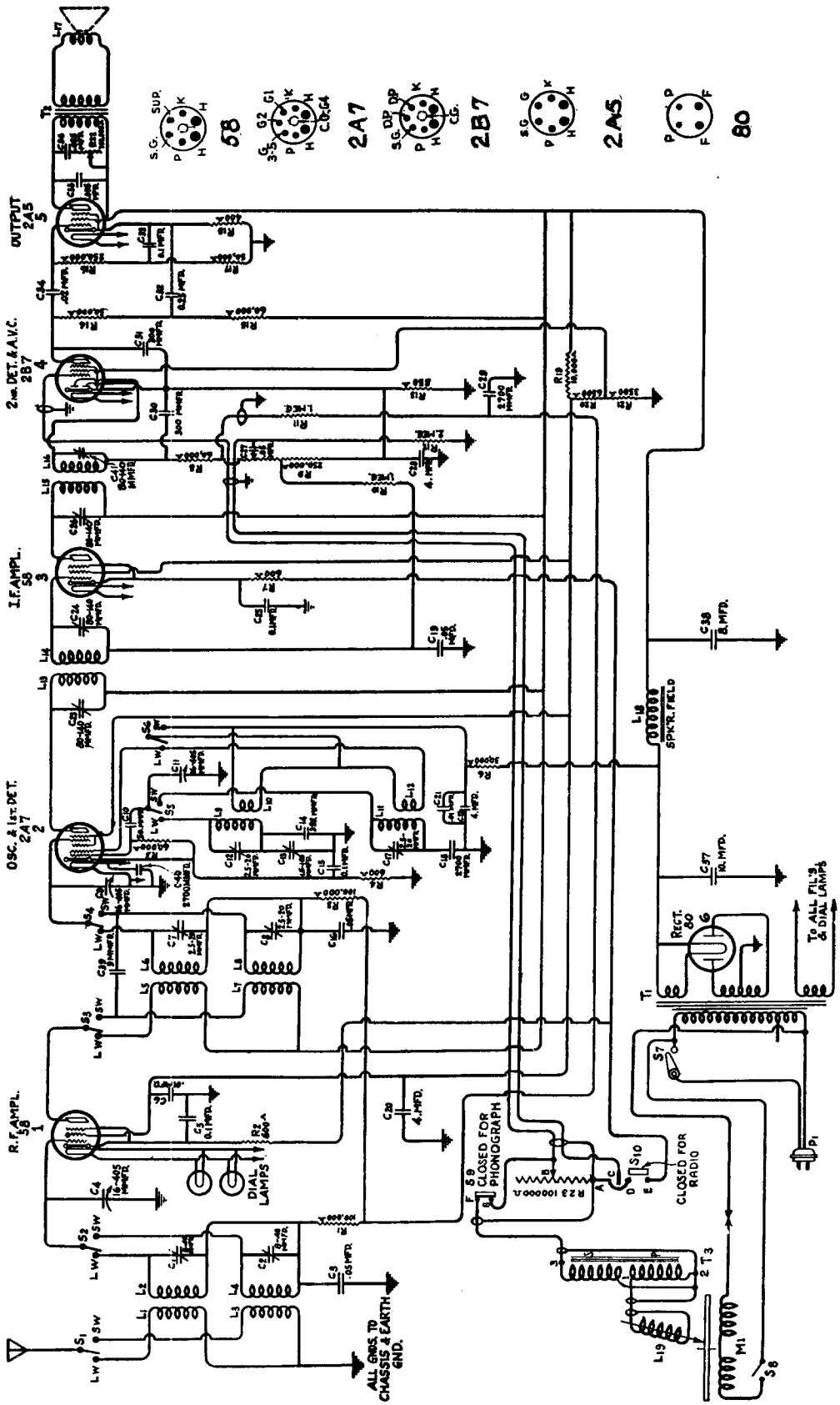
The standard two speed motor board equipment is used and the entire assembly enclosed in a table type cabinet.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure B shows the assembly wiring, Figure C the schematic diagram and Figure D the chassis wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer using two tuned circuits, a second detector, an output tube and a rectifier.

RCA VICTOR, Inc.

MODEL 320



Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.
1. RCA-58 R. F.	3.0	100	265	6.0
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*
3. RCA-58 I. F.	3.0	100	265	6.0
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5
5. RCA-2A5 Power	16.0	255	240	35.0
6. RCA-80 Rectifier	725 Volts R. M. S.—75 M. A. Total Current			

* The voltages and current refer to the detector part of the tube.

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

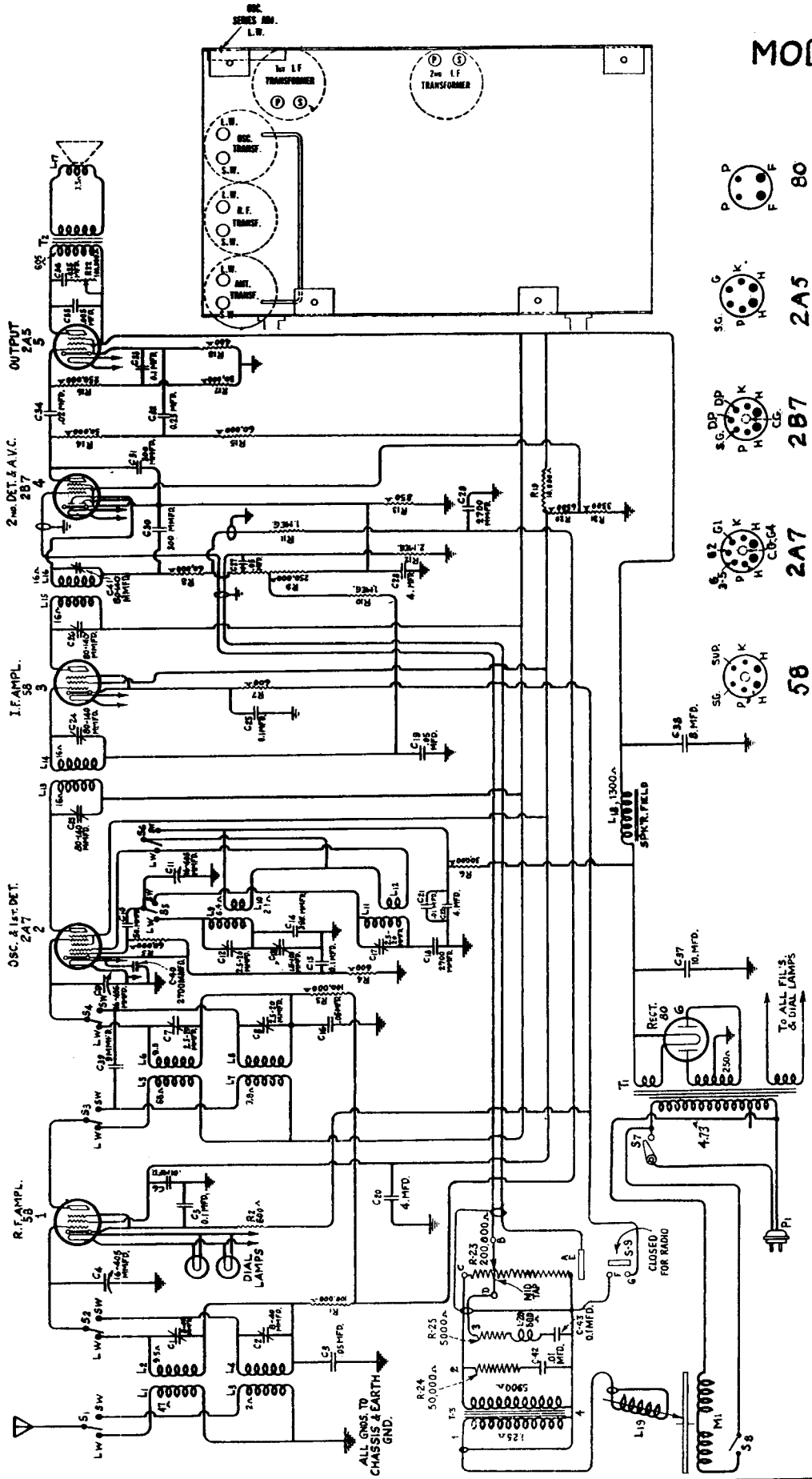
(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid, and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

RCA VICTOR, Inc.

MODEL 321



I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid, and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

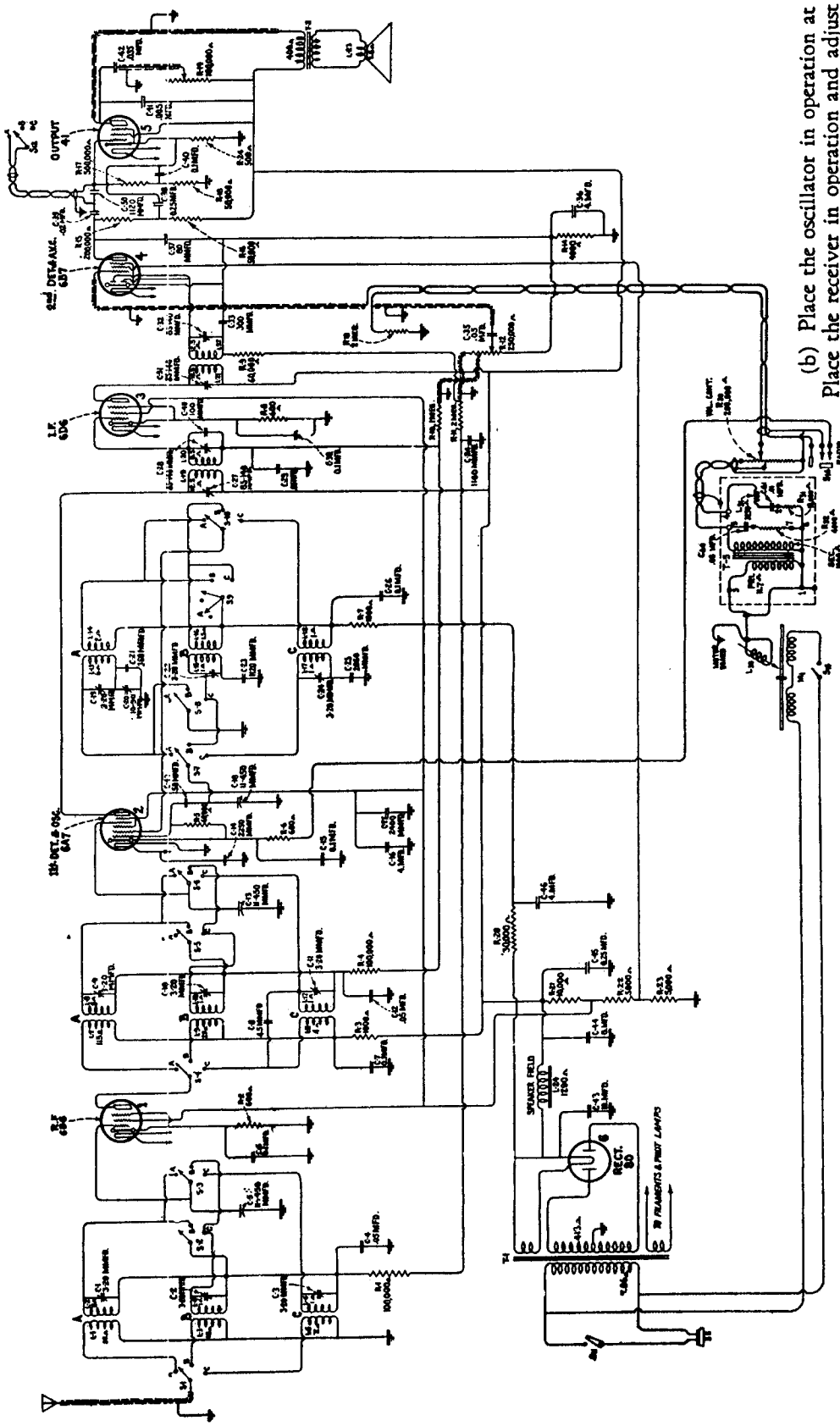
(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.
1. RCA-58 R. F.	3.0	100	265	6.0
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*
3. RCA-58 I. F.	3.0	100	265	6.0
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5
5. RCA-2A5 Power	16.0	255	240	35.0
6. RCA-80 Rectifier	725 Volts R. M. S.—75 M. A. Total Current			

* The voltages and current refer to the detector part of the tube.

RCA VICTOR, Inc.

MODEL 322 "DUO"



I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage, which uses two transformers. The transformers are all peaked at 460 K. C.

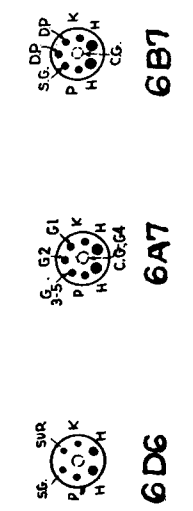
A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

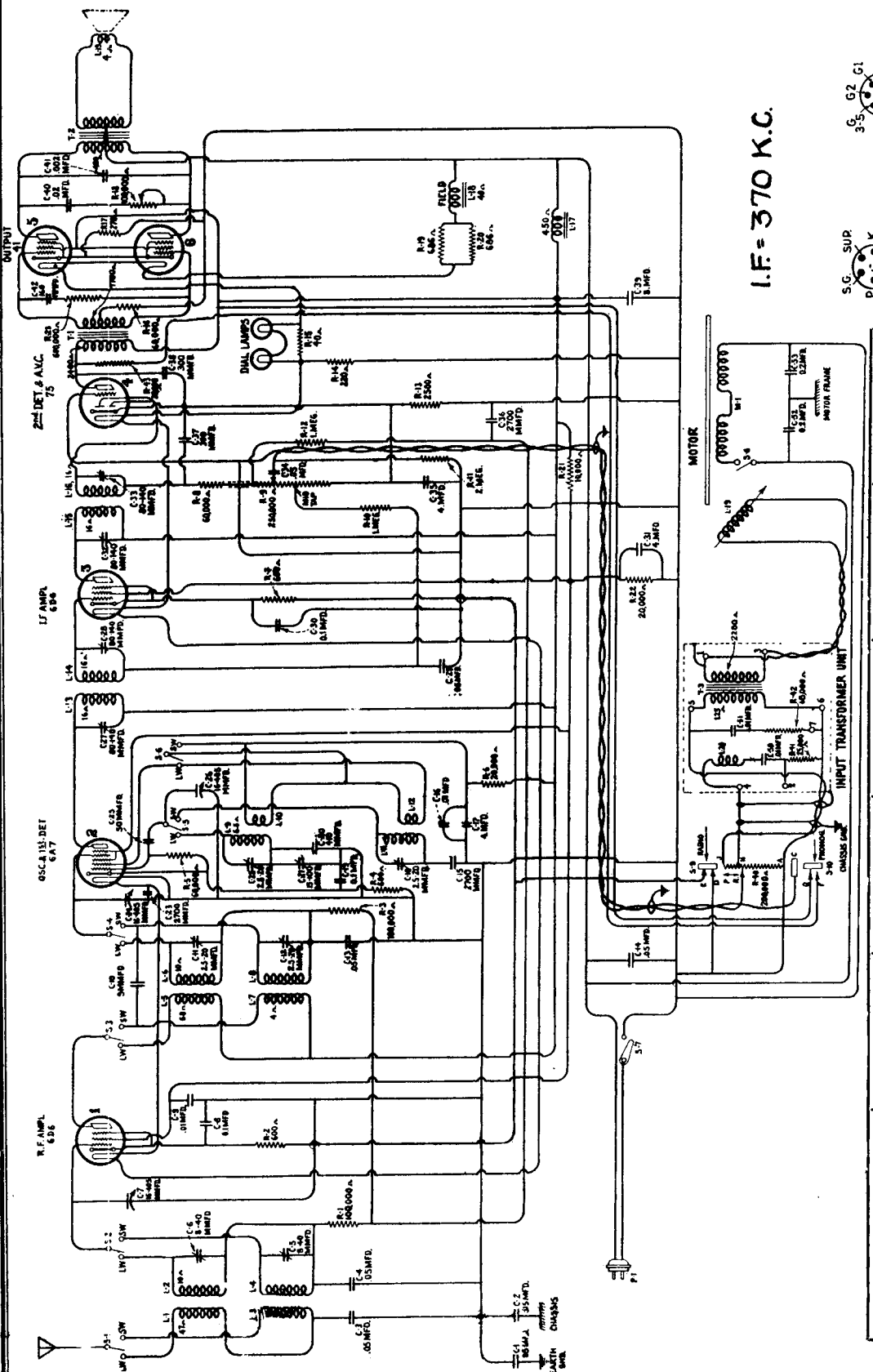
(c) Refer to Figure 6. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

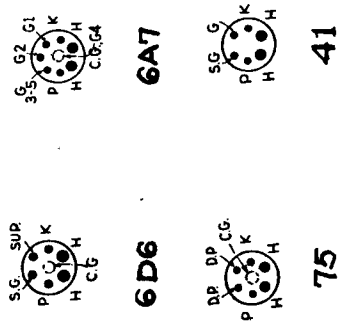
This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.



RCA VICTOR, Inc.

MODEL 327 220 V. D.C.

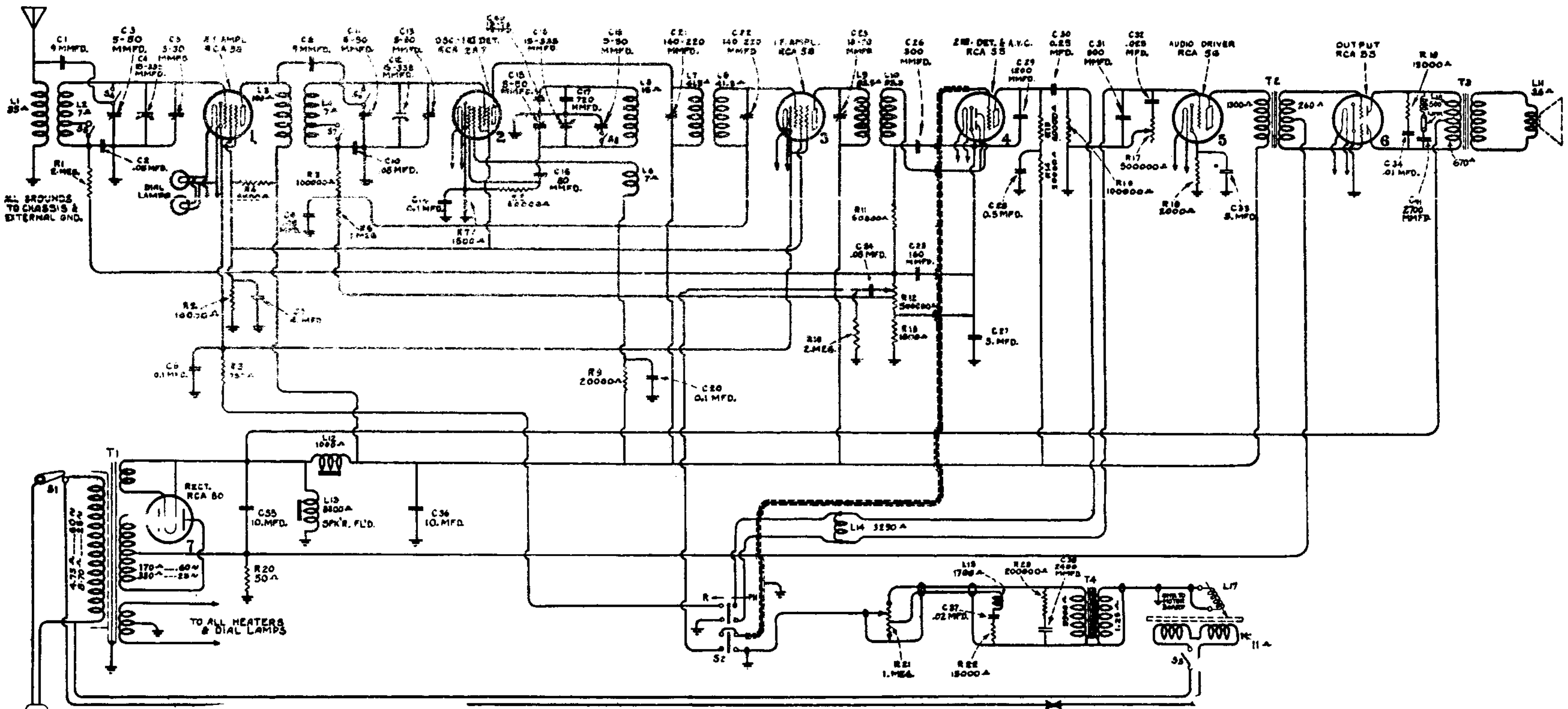


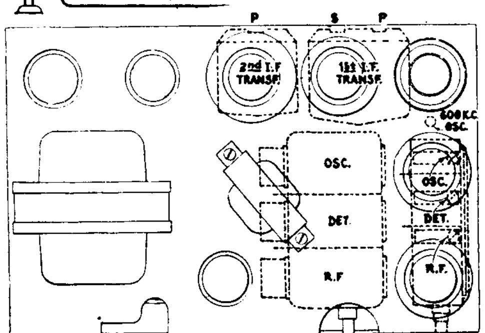


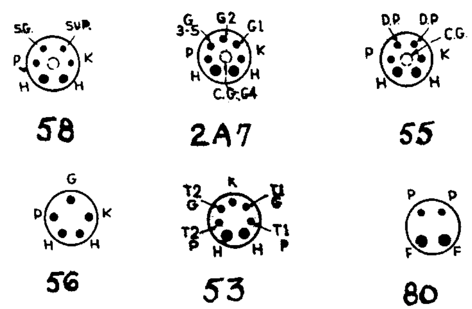
Radiotron No.		Cathode to B— Volts, D. C.	Screen Grid to B— Volts, D. C.	Plate to B— Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-6D6 R. F.		3.0	90	200	6.0	6.4
RCA-6A7	1st Detector	4.0	90	200	2.6	6.4
	Oscillator	—	—	125	3.3	
RCA-6D6 I. F.		3.0	90	200	6.0	6.4
RCA-75 2nd Detector		1.5	—	200	0.7	6.4
RCA-41 Power		13.0	190	205	25.0	6.4
RCA-41 Power		13.0	190	205	25.0	6.4

RCA VICTOR, Inc.

MODEL 330







120 Volt A. C. Line—Volume Control at Maximum

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.
RCA-58 R. F.	4.0	100	245	6.0
*RCA-2A7 Osc. Det.	4.0	100	245	5.0
RCA-58 I. F.	4.0	100	245	6.0
RCA-55 2nd Det. A V. C.	6.0	—	100	4.0
RCA-56 Driver A. F.	13.0	—	235	6.3
RCA-53 Output	4.5	—	290	12.0
RCA-80 Rectifier	600 R. M. S. Plate to Plate			88.0

* Voltages and current apply to detector portion of tube.

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

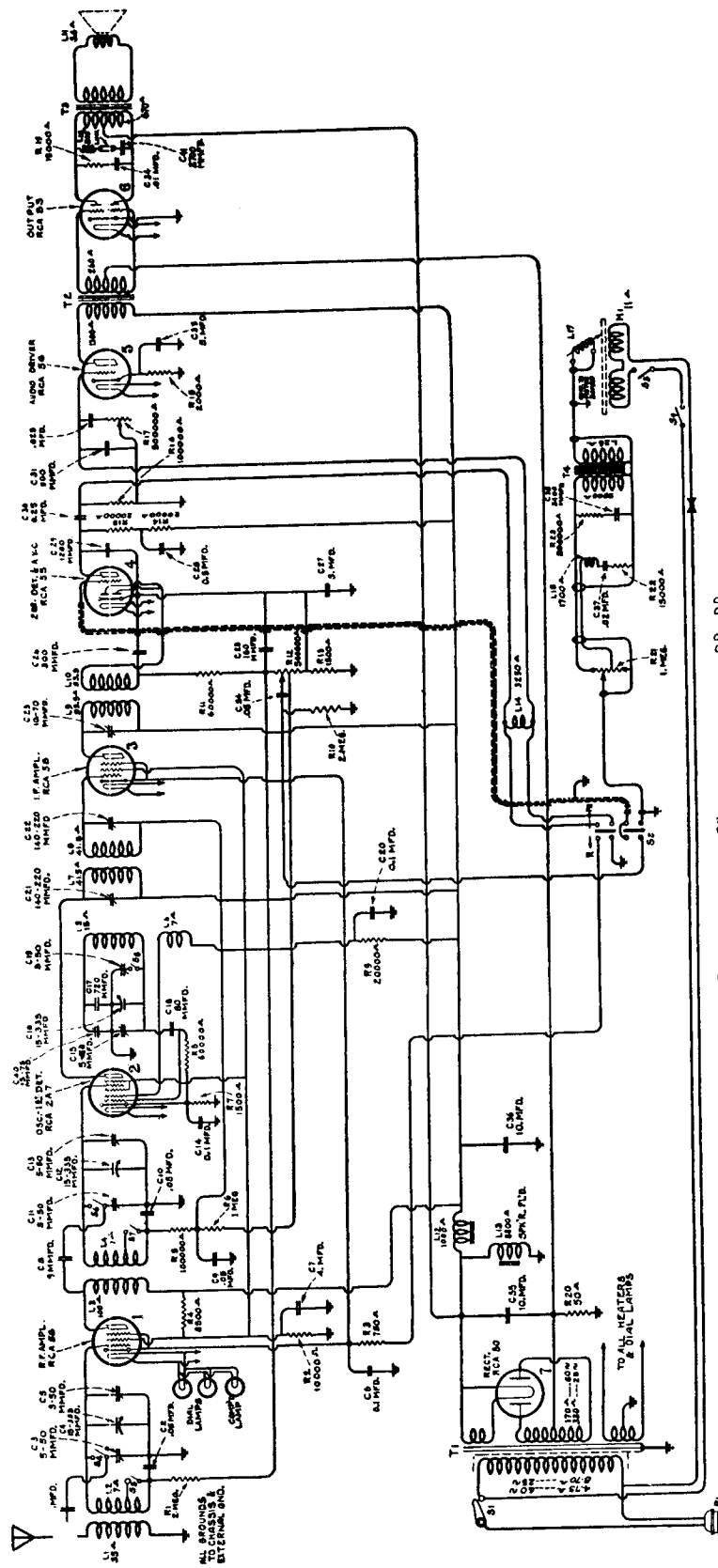
(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

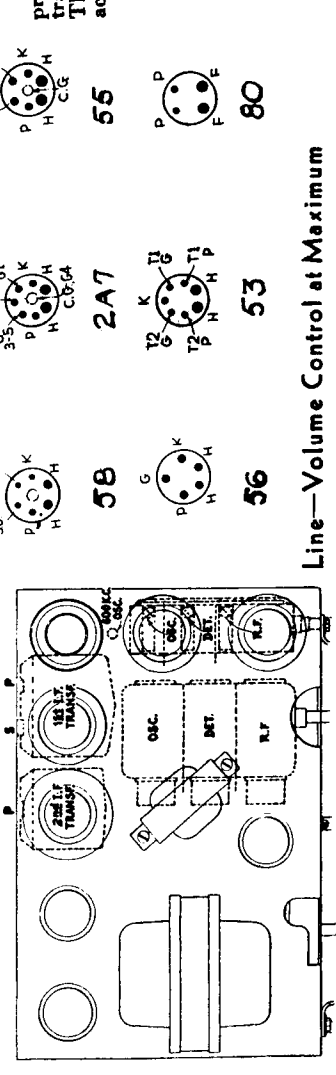
(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

RCA VICTOR, Inc.

MODEL 331





I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

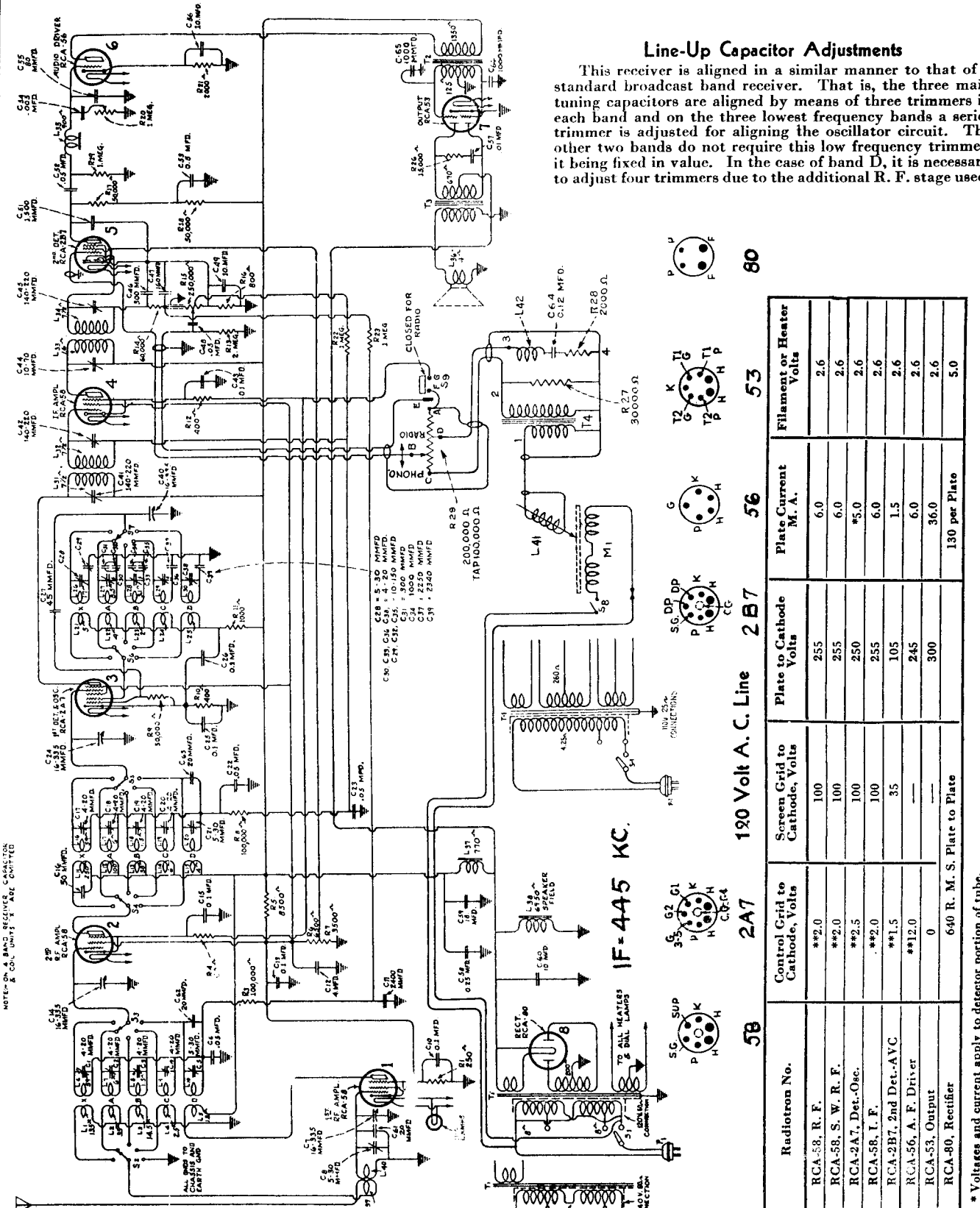
Line—Volume Control at Maximum

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.
RCA-58 R. F.	4.0	100	245	6.0
*RCA-2A7 Osc. Det.	4.0	100	245	5.0
RCA-58 I. F.	4.0	100	245	6.0
RCA-55 2nd Det. A. V. C.	6.0	—	100	4.0
RCA-56 Driver A. F.	13.0	—	235	6.3
RCA-53 Output	4.5	—	290	12.0
RCA-80 Rectifier	600 R. M. S. Plate to Plate			88.0

* Voltages and current apply to detector portion of tube.

RCA VICTOR, Inc.

MODELS 340 & 340 E



Line-Up Capacitor Adjustments

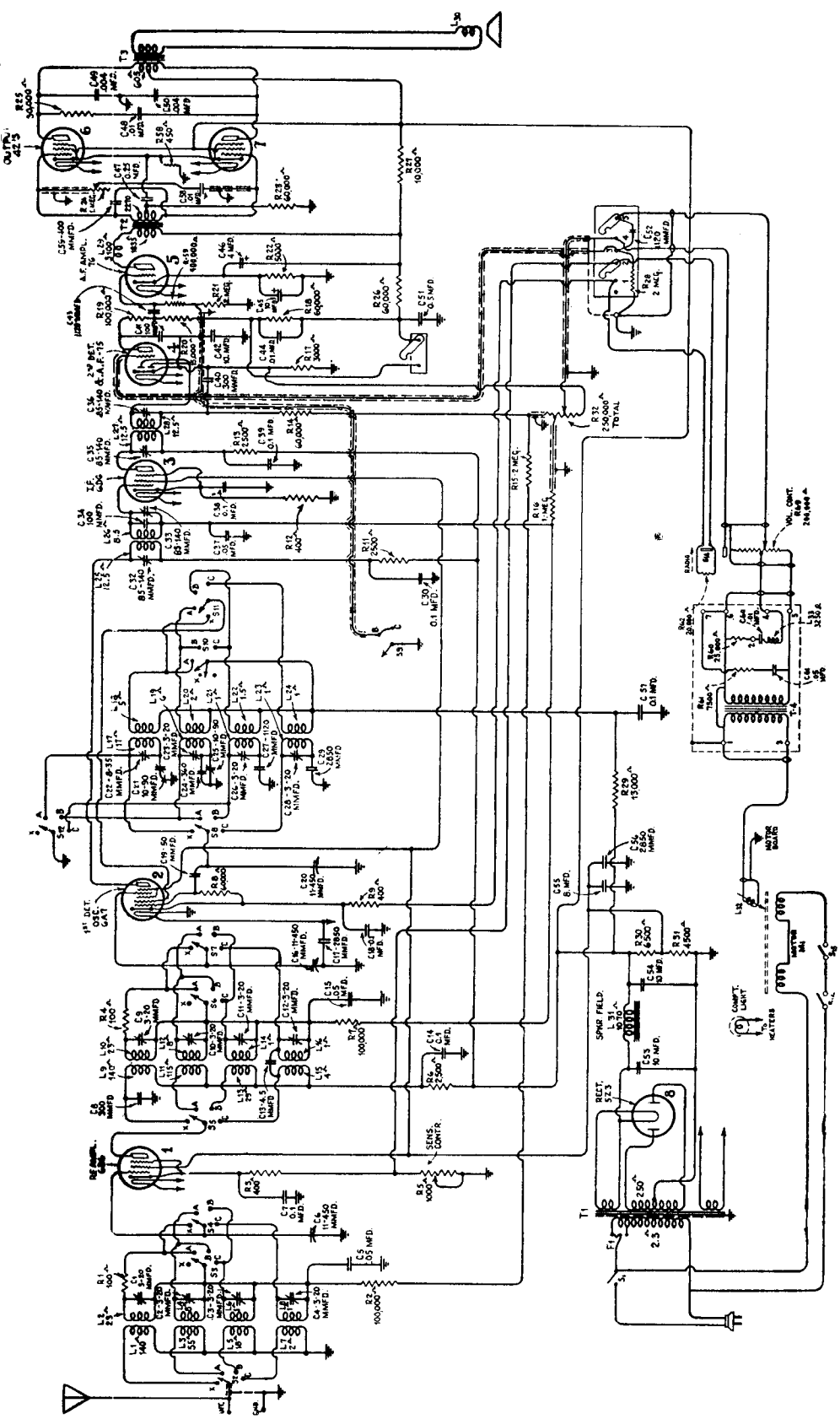
This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and on the three lowest frequency bands a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers due to the additional R. F. stage used.

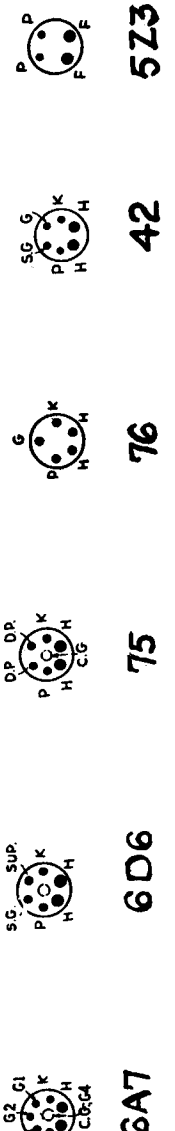
Radiotron No.	Control Grid to Cathode, Volts	Screen Grid to Cathode, Volts	Plate to Cathode Volts	Plate Current M. A.	Filament or Heater Volts
RCA-58, R. F.	**2.0	100	255	6.0	2.6
RCA-58, S. W. R. F.	**2.0	100	255	6.0	2.6
RCA-2A7, Det.-Osc.	**2.5	100	250	*5.0	2.6
RCA-58, I. F.	**2.0	100	255	6.0	2.6
RCA-2B7, 2nd Det.-AVC	**1.5	35	105	1.5	2.6
RCA-56, A. F. Driver	**12.0	—	245	6.0	2.6
RCA-53, Output	0	—	300	36.0	2.6
RCA-80, Rectifier	640 R. M. S. Plate to Plate			130 per Plate	5.0

* Voltages and current apply to detector portion of tube.
** These voltages cannot be measured because of the high resistance of the circuits.

RCA VICTOR, Inc.

MODEL 341 "DUO"





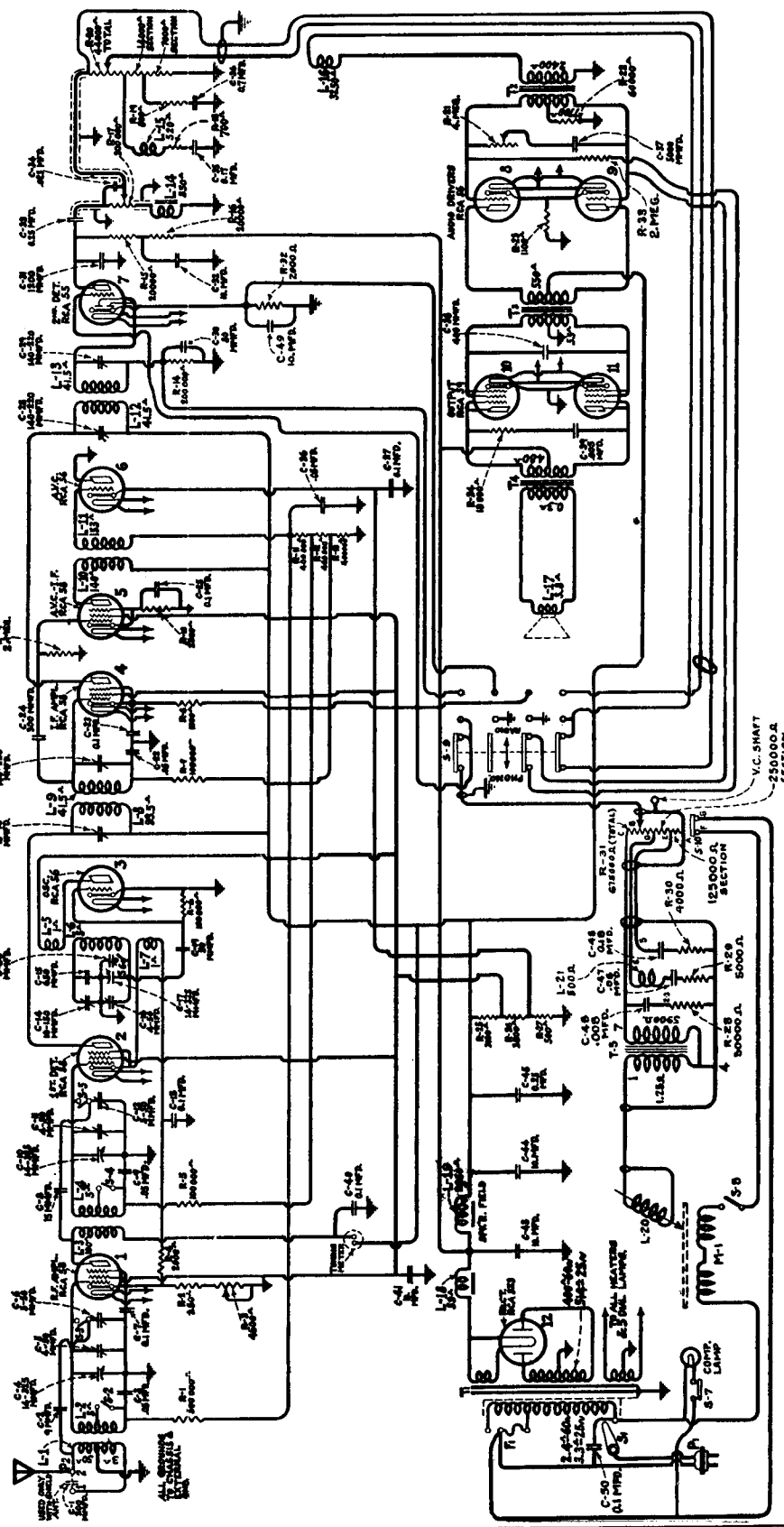
180-Volt A. C. Line—Maximum Volume and Sensitivity—No Signal

Radiotron No.	Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current M. A.	Heater Volts, A. C.
RCA-6D6 R. F.	4.2	110	272	10.5	6.3
RCA-6A7 Oscillator	—	—	225	11.4	6.3
RCA-6A7 1st Detector	4.6	110	282		
RCA-6C7 1 F.	4.2	110	272	10.5	6.3
RCA-75 2nd Detector	1.2	—	170*	0.4	6.3
RCA-76 A. F.	14.0	—	232	2.8	6.3
RCA-42 Power	22.0	295	290	24.5	6.3
RCA-42 Power	22.0	295	290	24.5	6.3
RCA-5Z3 Rectifier	—	—	768-384 R. M. S.	110.0	5.0

*Cannot be measured with ordinary voltmeter

RCA VICTOR, Inc.

MODEL DUO 380



58 56 55 59 523

120 Volt A. C. Line—Volume Control and Sensitivity Control at Maximum

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.
RCA-58 R. F.	3.1	97	212	7.5
RCA-56 Osc.	—	—	100	6.0
RCA-58 1st Det.	9.5	91	206	2.8
RCA-58 I. F.	7.5	93	208	4.0
RCA-58 A. V. C.-I. F.	8.5	92	207	3.0
RCA-56 A. V. C.	12.0	—	—	0
RCA-55 2nd Det.	0	—	74	8.0
RCA-56 A. F. Driver	11.0	—	205	5.0
RCA-56 A. F. Driver	11.0	—	205	5.0
RCA-59 Power	0	—	394	13.0
RCA-59 Power	0	—	394	13.0
RCA-523 Rect.	990–495 R. M. S.			92 Total

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator, such as Stock No. 9050, that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.

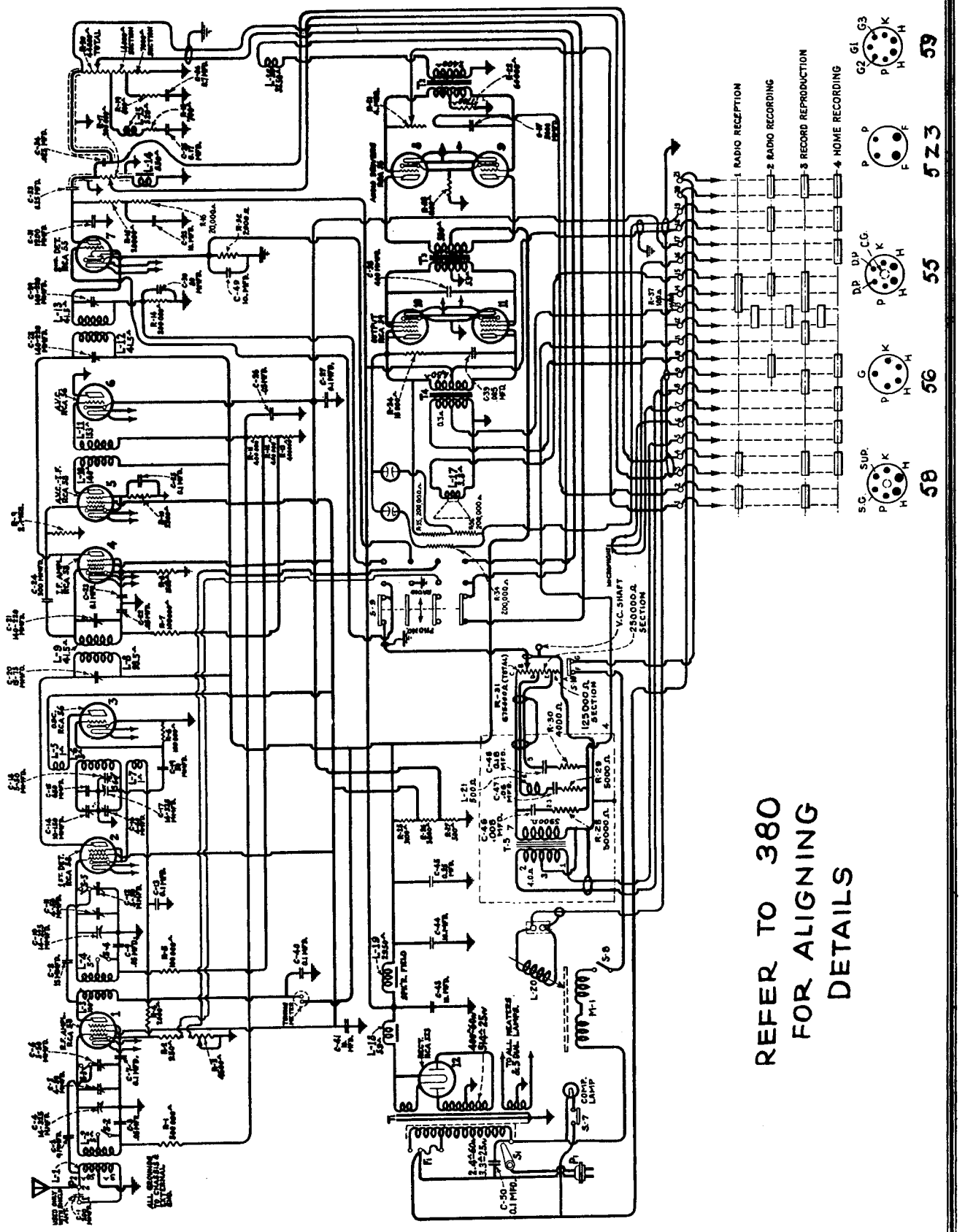
(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a slightly reduced deflection is obtained in the output meter.

(e) Refer to Figure B. Adjust the secondary and primary of the second and then the first I. F. transformer until a minimum deflection is obtained in the output meter. Go through these adjustments a second time, as a slight readjustment may be necessary.

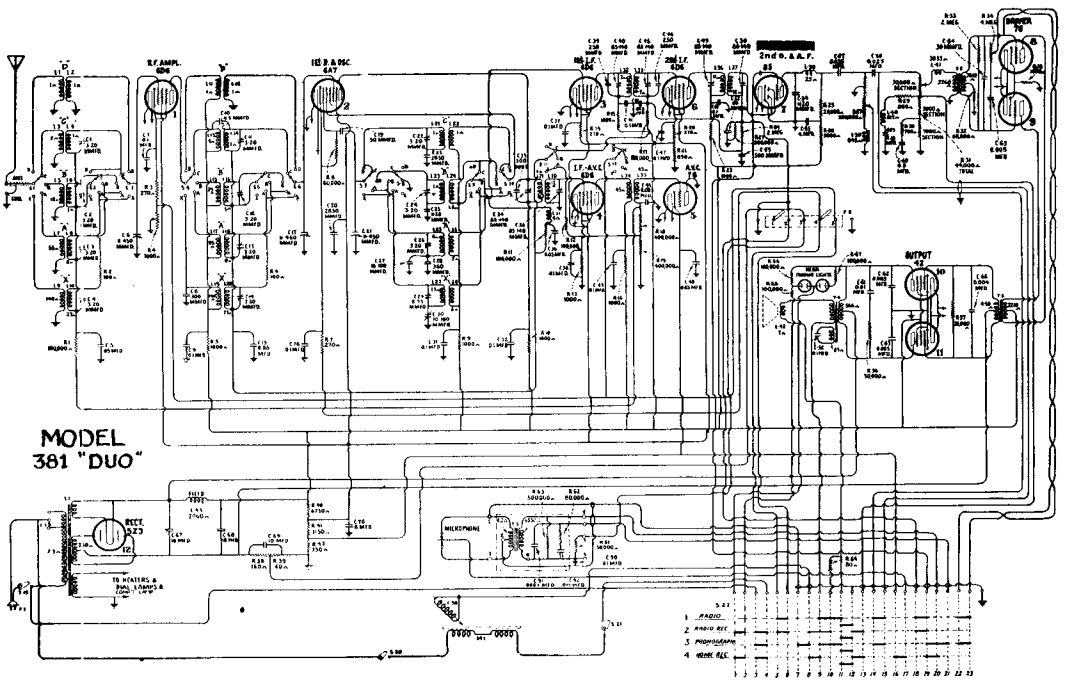
RCA VICTOR, Inc.

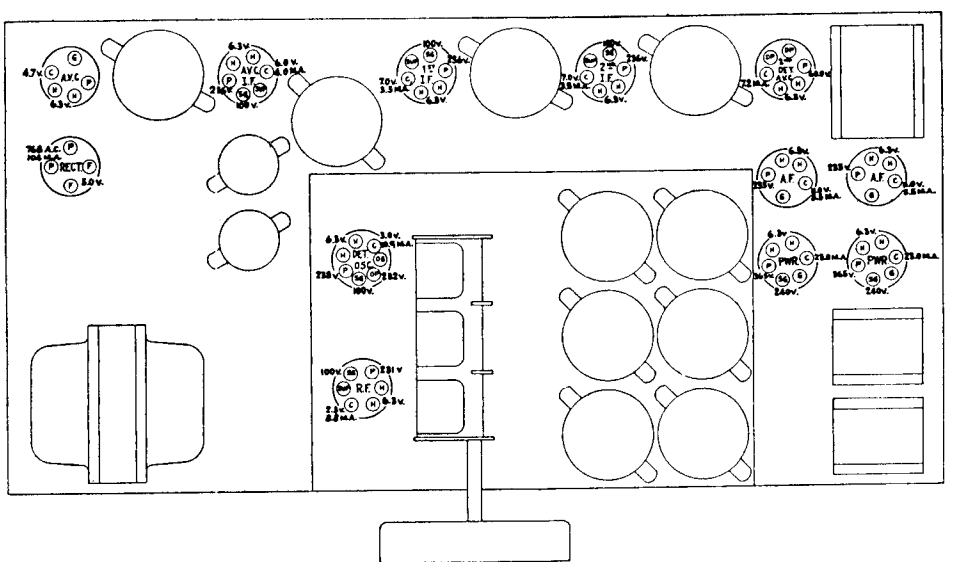
DUO MODEL 380 HR



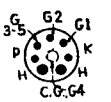
RCA VICTOR, Inc.

MODEL 381 "DUO"





6D6



6A7

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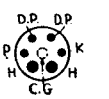

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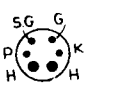


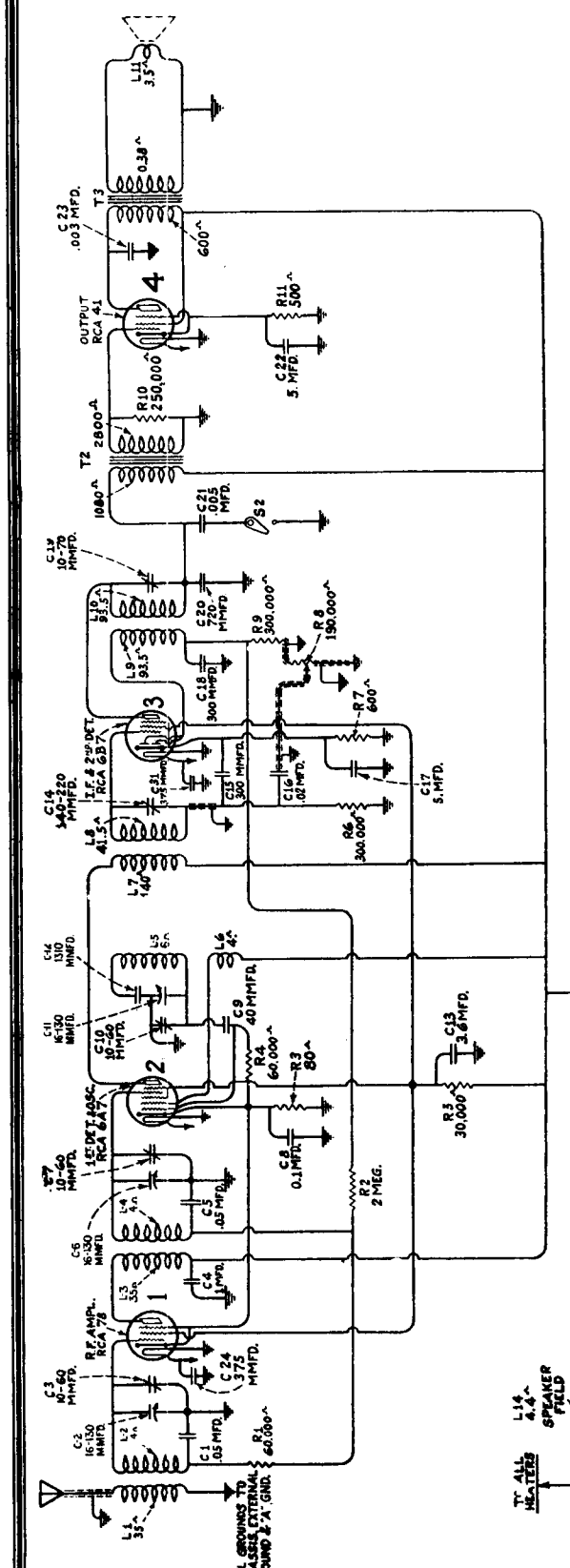
42

5Z3

TUBE	CATHODE V.	S. G. V.	PLATE V.	CATHODE M. A.	HEATER V.
6D6 R.F.	2.3	100	231	8.8	6.3
6A7 Osc.	3.0		232	10.9	6.3
6A7 Det.	3.0	100	238	10.9	6.3
6D6 1st IF	7.0	100	236	3.5	6.3
6D6 2nd IF	7.0	100	236	3.5	6.3
6D6 AVC-IF	6.0	100	236	4.0	6.3
76 AVC	4.7		0	0	6.3
85 2nd Det.	0		60	7.2	6.3
76 A.F.	11.0		235	5.5	6.3
76 A.F.	11.0		235	5.5	6.3
42 Power	0	240	365	23.0	6.3
42 Power	0	240	365	23.0	6.3
5Z3 Rect.	--		768-384 RMS	104.0	5.0

RCA VICTOR, Inc.

MODEL A4-4229



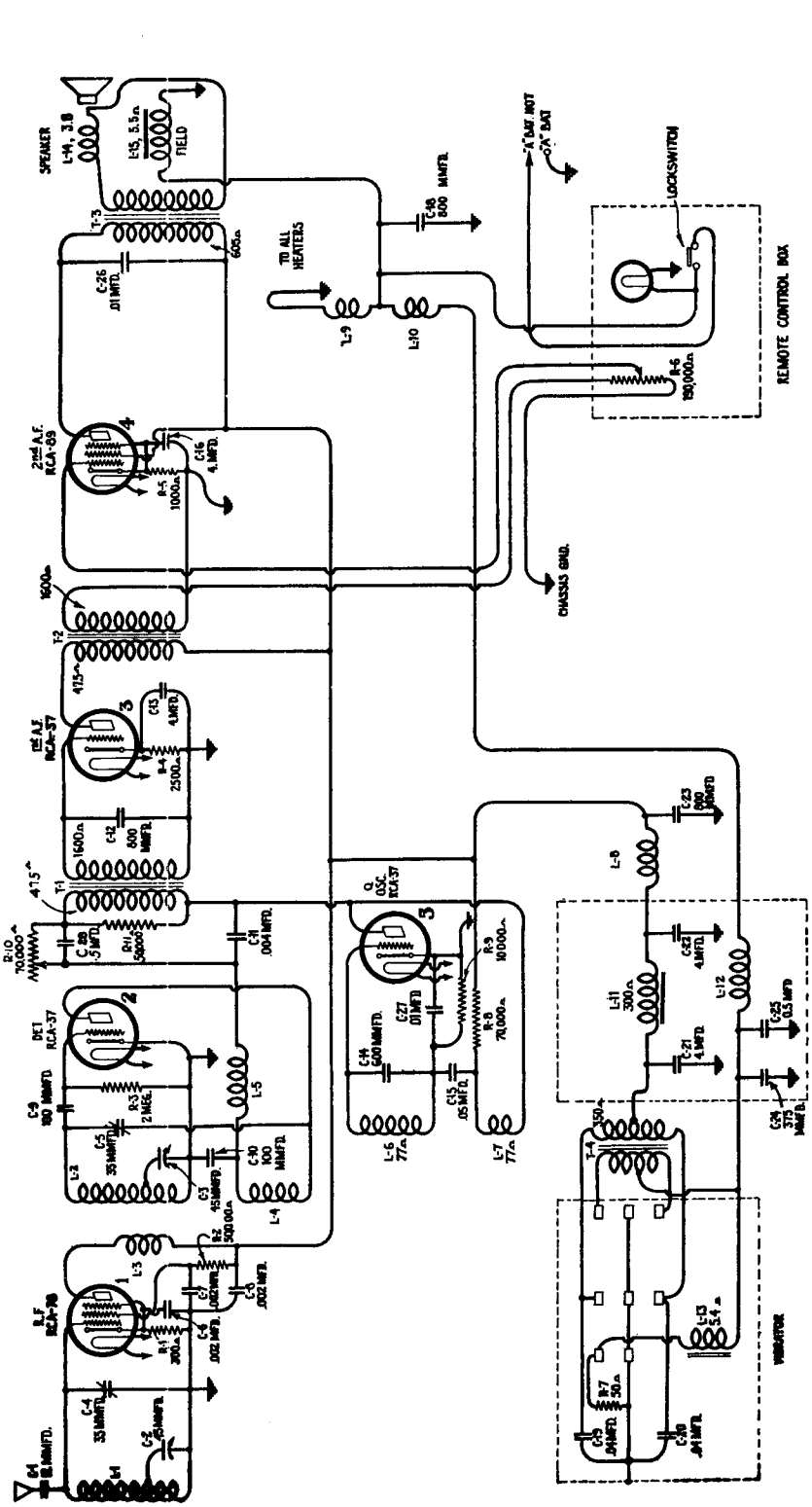
Tube No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
RCA-78 R. F.		4.42	83	222	5.25	6.0
RCA-6A7	First Detector	4.42	83	222	11.0	6.0
	Oscillator	4.42	—	223	Total	
RCA-6B7 Second Detector		3.22	84	218	5.25	6.0
RCA-41 Power		13.0	214	200	26.0	6.0

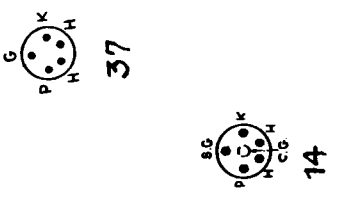
Trouble Shooting Hints

Lack of sensitivity due to shifting of the R. F. trimmers necessitates readjustment at 2508 K.C. and dial at 97.

RCA VICTOR, Inc.

MODEL AR-5006
POLICE AUTO RECEIVERS 29-36 MEGACYCLES





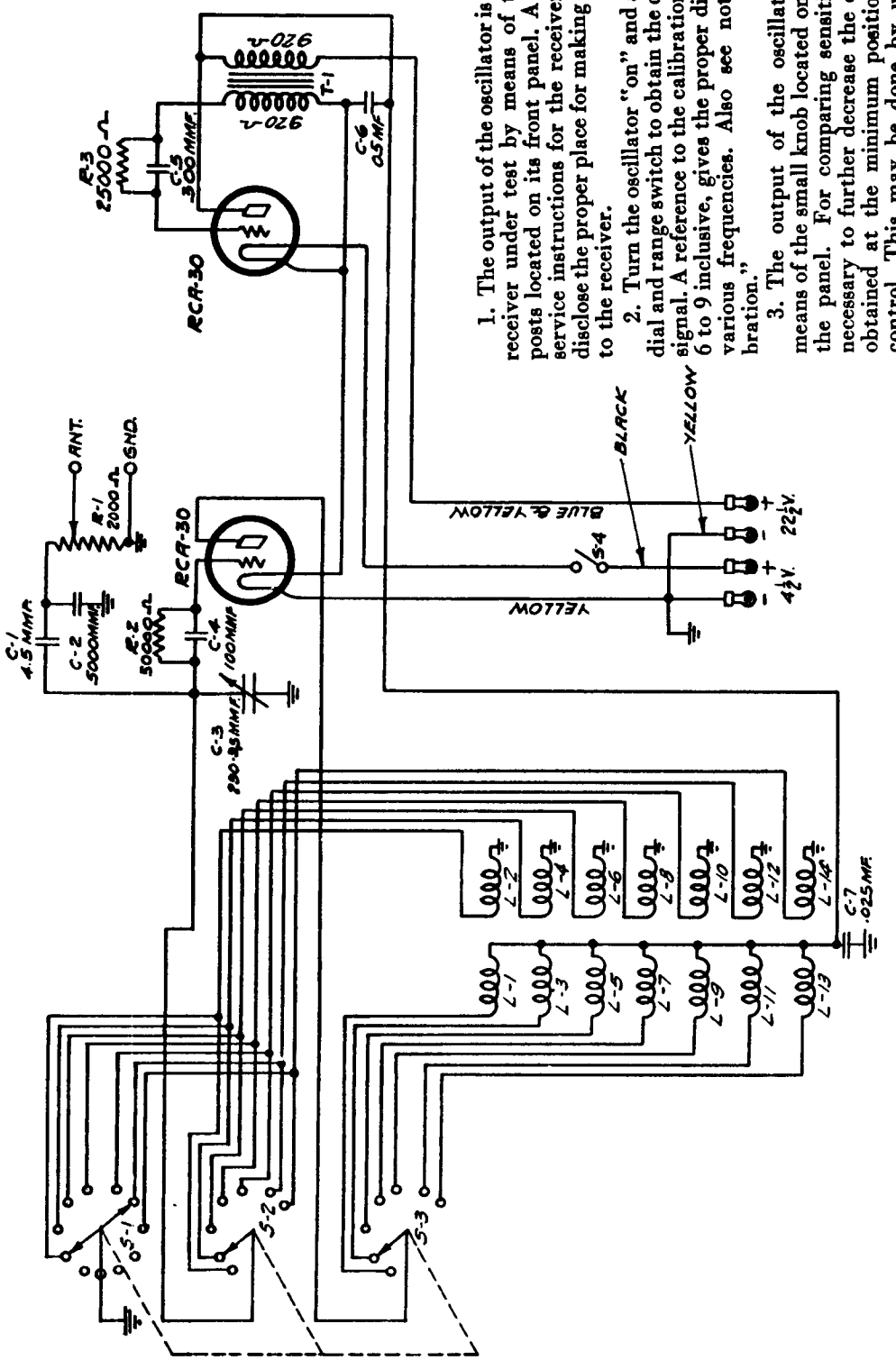
RADIOTRON SOCKET VOLTAGES

6.3 Volt Battery

Radiotron No.		Cathode to Ground, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
RCA-78 R. F.		3.3	125	253	9.0	6.06
RCA-37	Detector	0	...	10-35	0.5	6.06
	Quenching Osc.	2.5	...	80	2.5	6.06
	1st A. F.	16.0	...	235	6.4	6.06
RCA-89	2nd A. F.	26.0	230	217	25.0	6.06

RCA VICTOR, Inc.

MODEL JMV 97 A



1. The output of the oscillator is connected to the receiver under test by means of the two binding posts located on its front panel. A reference to the service instructions for the receiver under test will disclose the proper place for making such connections to the receiver.

2. Turn the oscillator "on" and adjust the tuning dial and range switch to obtain the desired frequency signal. A reference to the calibration charts on pages 6 to 9 inclusive, gives the proper dial setting for the various frequencies. Also see notes under "Calibration."

3. The output of the oscillator is varied by means of the small knob located on the right side of the panel. For comparing sensitivity, it may be necessary to further decrease the output from that obtained at the minimum position of the output control. This may be done by using two carbon resistors, one of 100 ohms and the other of 100,000 ohms resistance, connected in series and placed across the antenna and ground binding posts of the oscillator. (The 100 ohm resistor must be connected to the ground binding post.) Connect the receiver antenna lead to the junction of the two resistors and the ground lead to the ground terminal. Then by recording the position of the output dial setting throughout the receiver range (for same signal output) a good indication of the relative receiver sensitivity may be obtained.

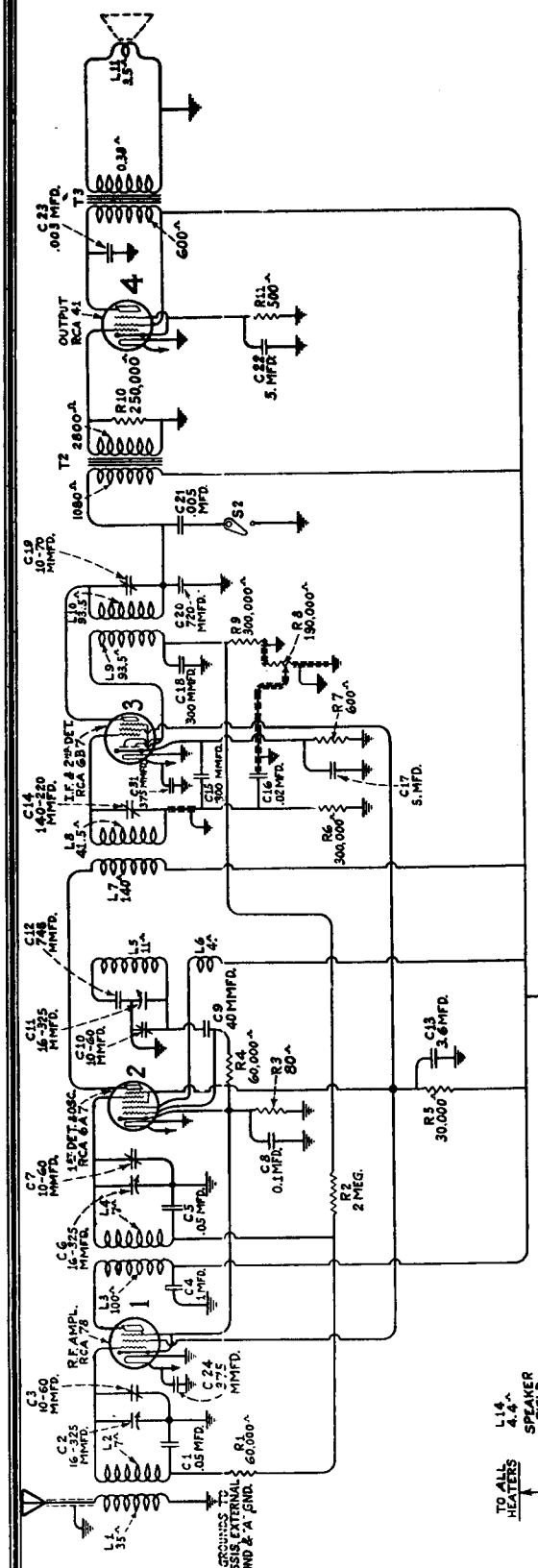
Position	*Frequency Range (K. C.)*
1	150–330
2	330–720
3	720–1460
4	1460–3050
5	3050–7400
6	7400–14300
7	14300–25000

RCA VICTOR, Inc.

MODEL M 105

Trouble Shooting Hints

When the fuse in the battery lead burns out frequently and the customary buzz is not heard from the receiver at all times when the set is turned on, the vibrator should be replaced. Do not try to adjust this vibrator which is the self rectifying type requiring special instruments.



I. F. Adjustments

In order to make the I. F. adjustments, it is necessary to remove the rear cover, due to the fact that the external oscillator must be connected between the control grid of the first detector and ground. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver and an output meter.

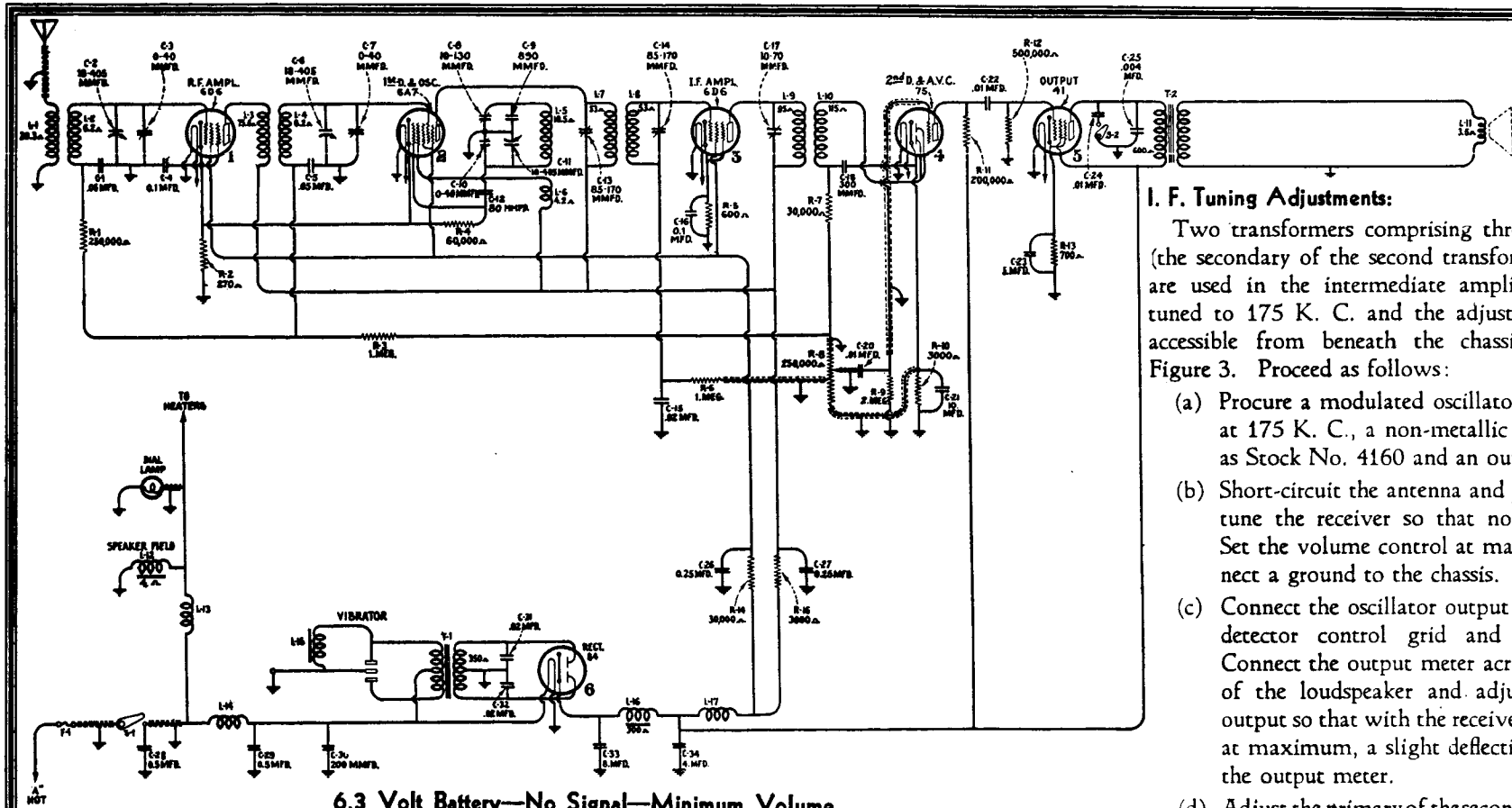
(b) Remove the receiver from its case, shield the transformer and Radiotrons as described under R. F. adjustments, place the receiver in operation and connect the oscillator output between the first detector grid and ground. Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(c) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output.

At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

6.3 Volt Battery—No Signal

Radiotron No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
RCA-78 R. F.		4.42	83	222	5.25	6.0
RCA-6A7	First Detector	4.42	83	222	11.0	6.0
	Oscillator	4.42	—	223	Total	
RCA-6B7 Second Detector		3.22	84	218	5.25	6.0
RCA-41 Power		13.0	214	200	26.0	6.0



6.3 Volt Battery—No Signal—Minimum Volume

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.	Heater Volts, D. C.
RCA-6D6—R. F.		4.0	93	204	6.3	6.0
• RCA-6A7	1st Det.	4.0	93	204	8.2	6.0
	Osc.	—	—	204		
RCA-6D6—I. F.		4.0	93	204	7.3	6.0
RCA-75—2nd Det.		1.2	—	153*	0.4	6.0
RCA-41—Pwr.		19.0	239	230	27.0	6.0
RCA-84—Rect.		253	—	—	49.0	6.0

I. F. Tuning Adjustments:

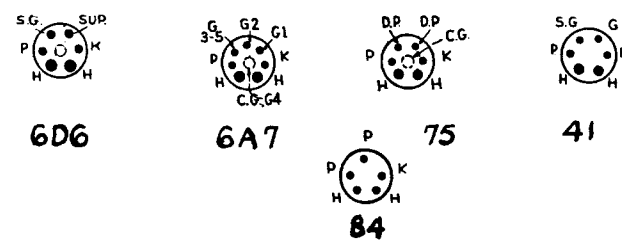
Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure 3. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

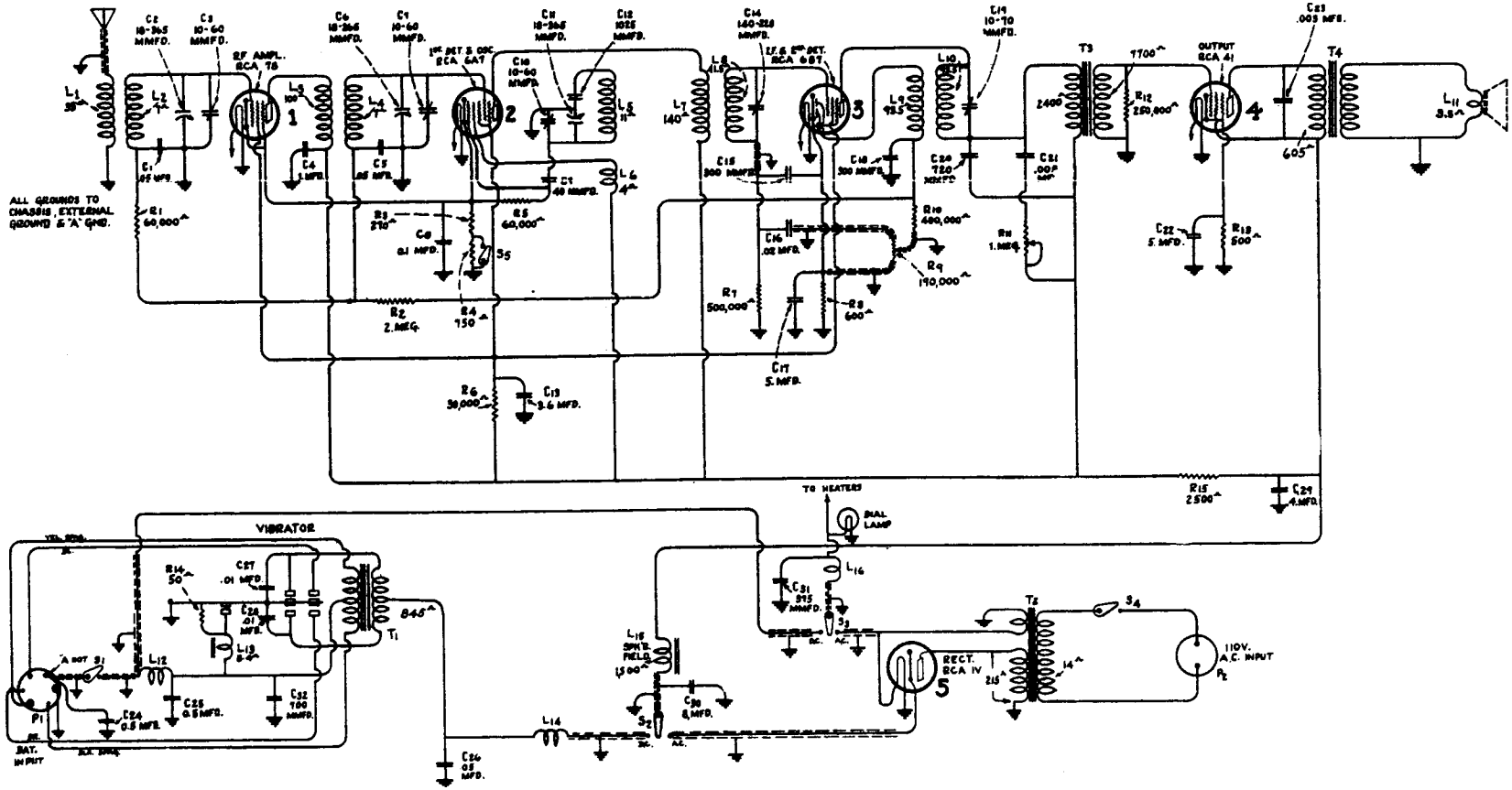
(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the primary and secondary of the first I. F. transformers, until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.



RCA VICTOR, Inc.

MODEL M-116



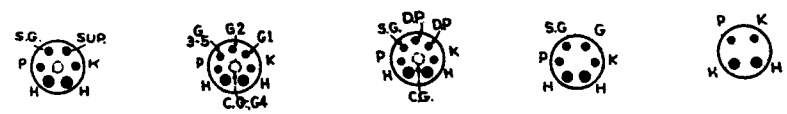
I. F. Adjustments:

(a) Procure a modulated oscillator giving a signal at 175 K. C. (Stock No. 9050), a non-metallic screw driver (Stock No. 7065) and an output meter.

(b) Connect the oscillator between the control grid of the first detector and ground.

(c) Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(d) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output. At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.



78 6A7 6B7 41 1V

115 Volts A. C. or 6.3 Volt Battery—No Signal—Max. Sensitivity

Radiotron No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
RCA-78 R. F.		4.2	86	216	5.5	5.9
RCA-6A7	First Detector	4.2	86	216	10.0 Total	5.9
	Oscillator		—	216		
RCA-6B7 Second Det.		2.7	87	207	4.5	5.9
RCA-41 Power		15.0	255	235	30.0	5.9
RCA-1-V		—	—	325 RMS	50.0	5.9

Trouble Shooting Hints

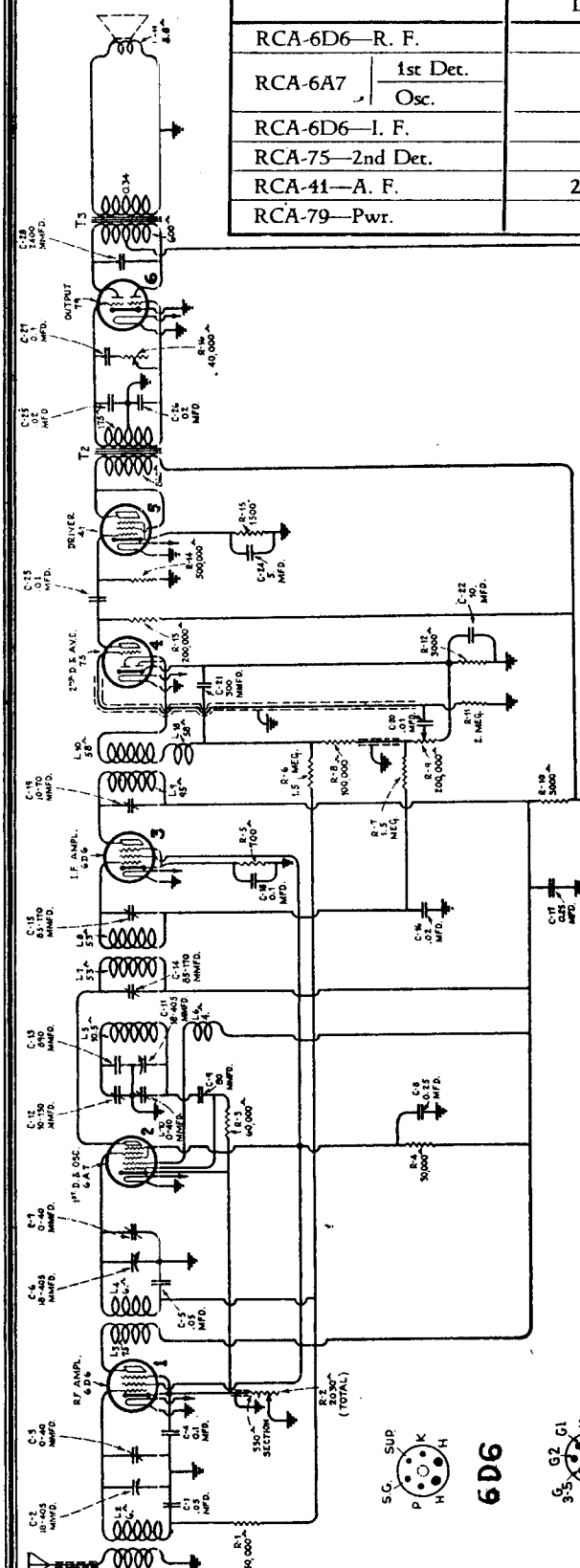
When this set fails to work remove the chassis and make sure that the tubes are properly seated in their sockets.

RCA VICTOR, Inc.

MODEL M 123

6.3 Volt Battery—No Signal—Maximum Sensitivity

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.
RCA-6D6—R. F.		3.9	76	192	4.5
RCA-6A7	1st Det.	3.9	76	192	7.5
	Osc.		—	192	
RCA-6D6—I. F.		3.6	76	192	5.3
RCA-75—2nd Det.		1.25	—	165	.46
RCA-41—A. F.		22.0	—	235	14.5
RCA-79—Pwr.		0	—	256	10.5



I. F. Tuning Adjustments:

Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure 3. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

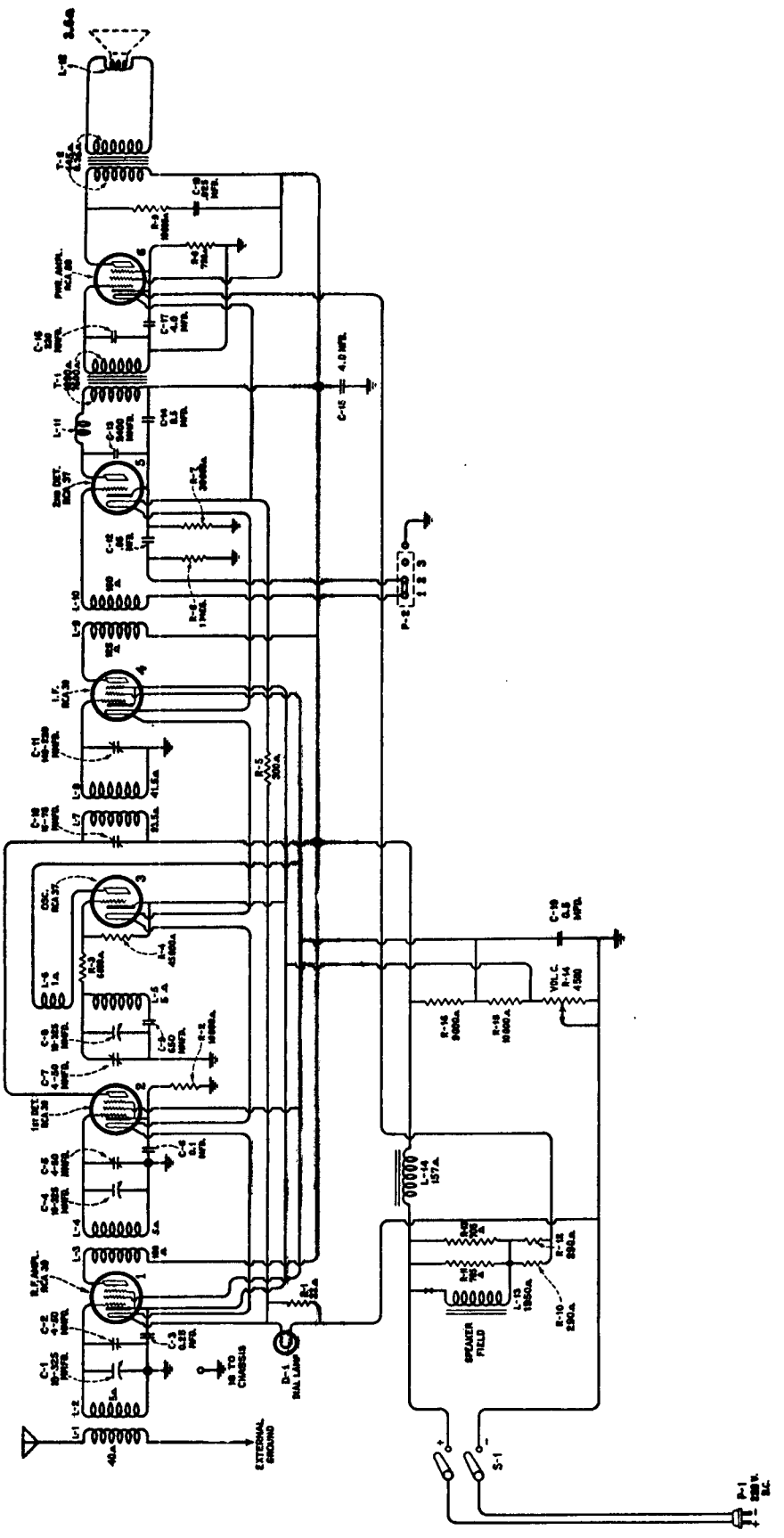
Adjust the primary of the second, and the secondary and primary of the first I. F. transformers, until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

Trouble Shooting Hints

Binding of the station selector is a common cause of complaint for this set. This is usually due to excessive pressure between the worm and drive gear. Proper tension exists when the gear is pushed 1/32 beyond the point of contact of the worm.

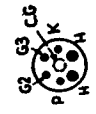
RCA VICTOR, Inc.

MODEL R-3-C.



Trouble Shooting Hints

This receiver is manufactured for use where 220 volts D. C. is available. Set will not operate on any other line. If volume is low test the continuity of the speaker field winding and the associated resistors R10, R11, R12 and R13. Also test the volume control and resistors R15 and R16.



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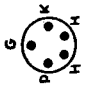

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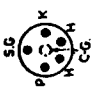

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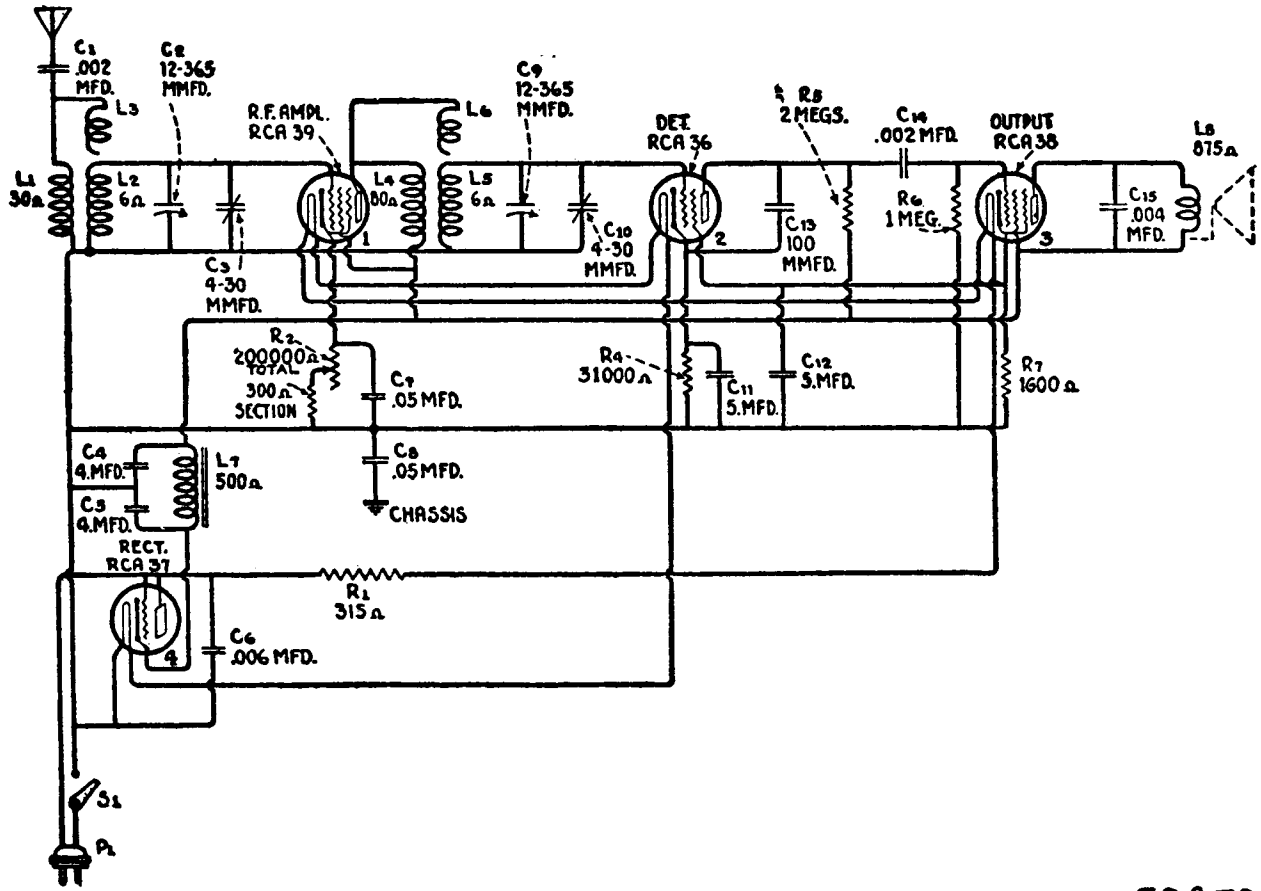
Radiotron No.	Cathode or Filament to Control Grid, Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Heater or Filament, Volts	Radiotron Socket Voltages
1. R. F. RCA-39	3.5	90	205	5.0	6.0	
2. 1st Detector RCA-39	10	83	200	1.0	6.0	
3. Oscillator RCA-37	—	—	90	4.5	6.0	
4. I. F. RCA-39	3.5	90	205	5.0	6.0	
5. 2nd Detector RCA-37	20	—	185	.75	6.0	
6. Power RCA-89	18.5	190	180	15.0	6.0	

All above voltages measured at maximum volume control setting with no signal impressed on input. 220 Volt, D. C. source used.

RCA VICTOR, Inc.

MODEL R-17-M



Measured at Maximum Volume—115 Volt A. C. Line
All Voltages on D. C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid Volts	Cathode or Filament to Plate Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-39 R. F.	3.0	105.0	105	7.0	6.0
2. RCA-36 Detector	*0.75	11.0	*60	0.025	6.0
3. RCA-38 Output	11.0	100.0	95	5.0	6.0
4. RCA-37 RECTIFIER	—	—	115	15.0	6.0

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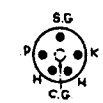

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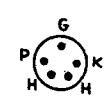
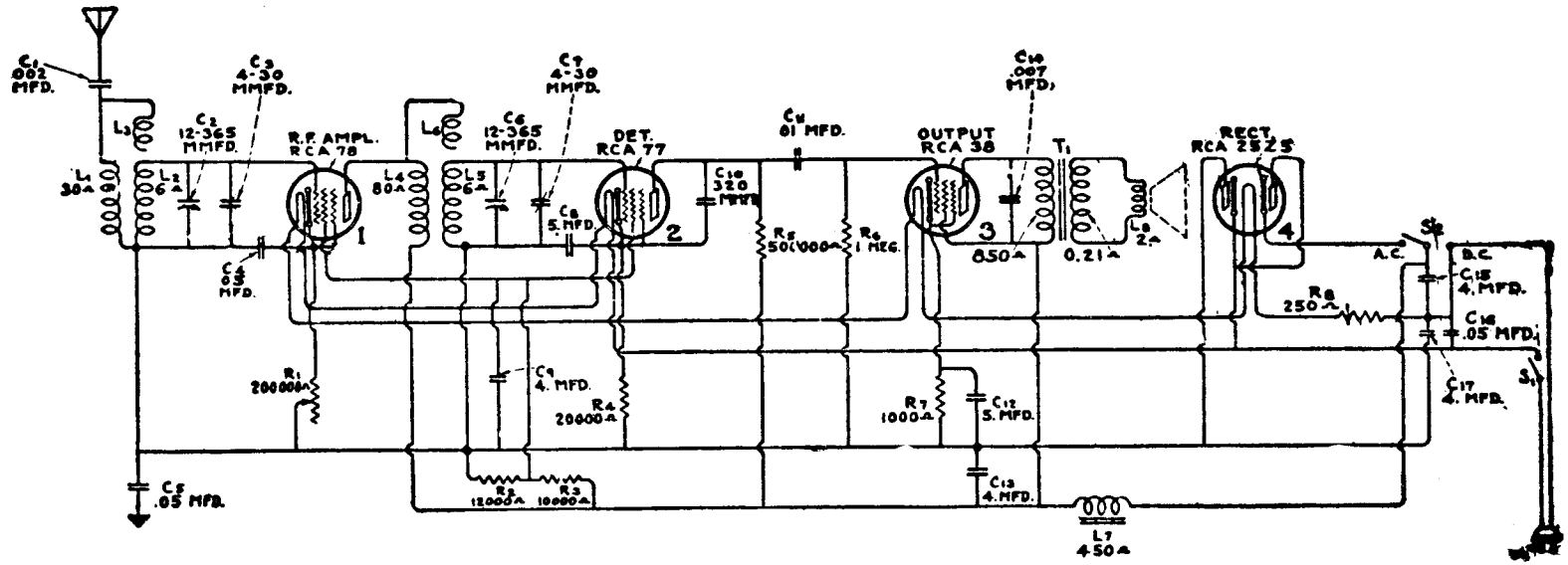


Trouble Shooting Hints

Low voltage on the tubes of this set is frequently due to low emission of the tupe 37 rectifier.

RCA VICTOR, Inc.

MODEL R-18-W

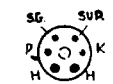


Measured at Maximum Volume—115 Volts, 60 Cycles and 115 Volts D. C.

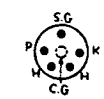
Radiotron No.	Cathode to Control Grid, Volts D. C.		Cathode to Screen Grid, Volts D. C.		Cathode to Plate Volts D. C.		Plate Current, M. A.		Filament or Heater Volts
	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	
RCA-78, R. F.	2.5	1.5	100	50	200	100	8.0	5.0	6.0
RCA-77, Detector	*5.0	*3.0	95	45	*100	*50	0.2	0.1	6.0
RCA-38, Output	18.0	9.0	180	95	170	90	14.0	7.0	6.0
RCA-25Z5, Rectifier	—	—	—	—	115	—	30.0	20.0	25.0

* Impossible to measure on ordinary voltmeter.

NOTE: 25 cycle voltages will be less than those obtained on 60 cycles.



77 & 78



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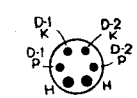


25 Z 5

SERVICE DATA

Electrical Specifications

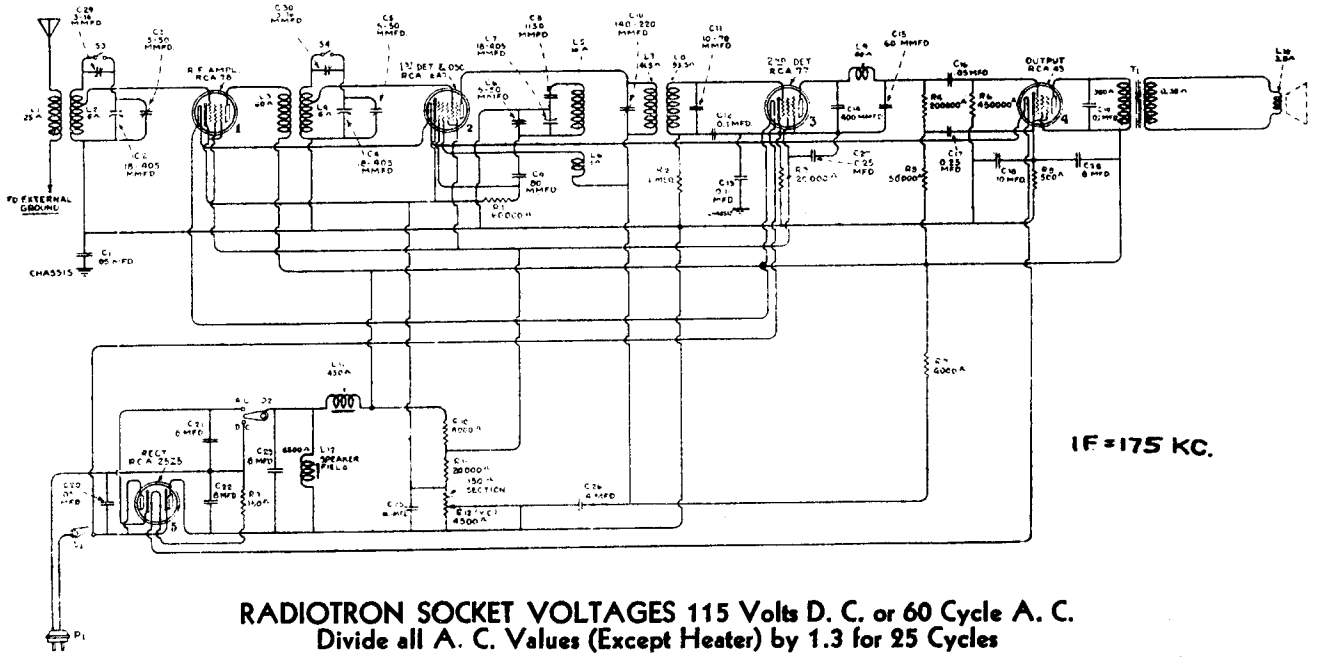
Voltage Rating..105–125 Volts, 25–133 Cycles, A. C. or D. C.
Power Consumption.....50 Watts at 115 Volts, 60 Cycles
Frequency Range.....540–1710 K. C.
Type and Number of Radiotrons—
1 RCA-78, 1 RCA-77, 1 RCA-38, 1 RCA-25Z5—Total 4
Undistorted Output.....A. C. 0.55 Watts
D. C. 0.15 Watts

This receiver is a four tube A. C.–D. C. table model R. F. type broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, dynamic loudspeaker, excellent performance and compact construction characterize this instrument. Due to the use of a voltage doubling circuit in the rectifier, the receiver has considerably greater output when operated on alternating current than when operated on direct current.

Figures A and B show the schematic and wiring diagrams respectively while the voltage readings and replacement parts are given below.

RCA VICTOR, Inc.

MODEL R 22



RADIOTRON SOCKET VOLTAGES 115 Volts D. C. or 60 Cycle A. C.
Divide all A. C. Values (Except Heater) by 1.3 for 25 Cycles

Radiotron No.	Cathode to Control Grid, Volts D. C.		Cathode to Screen Grid, Volts D. C.		Cathode to Plate, Volts D. C.		Plate Current, M. A.		Heater Volts
	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	
RCA-78 R. F.	2.6	1.5	90	50	157	88.5	5.5	3.0	6.0
RCA-6A7 Oscillator 1st Detector	—	—	—	—	157	88.5	1.7	1.0	6.0
	2.6	1.5	90	50	157	88.5	2.5	1.5	—
RCA-77 2nd Detector	Plate and Bias Supply 160 Volts						—	—	6.0
RCA-43 Power	21.0	12.0	135	80	125	72.0	35.0	20.0	25.0
RCA-25Z5 Rectifier	115 R. M. S.						89.0 Total	35.0 Total	25.0

Voltage Across Loudspeaker Field (115 Volts, 60 Cycles—185; 115 Volts, 25 Cycles—140; 115 Volts, D. C.—105)

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

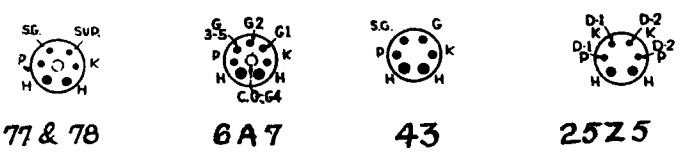
(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., 1710 K. C. and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C. coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1710 K. C. This is done with the Range Switch at the broadcast position (counter-clockwise). A similar manner is used as that of the I. F. except that the oscillator is set at 1710 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 8 (minimum dial position). The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) After making the 1710 K. C. adjustment, set the dial at 18 and the oscillator at 1400. Then adjust the first detector and R. F. line-up capacitors only. This adjustment is made so that the R. F. and 1st detector will be aligned over the broadcast band but the receiver will still tune to 1710 K. C. due to the oscillator line-up capacitor not being readjusted.

(e) Then set the Range Switch at its clockwise position. The oscillator should now be set at 2440 K. C. and the signal tuned in. Two points on the dial will be noted where the signal is heard, one of which may be louder than the other. Set the dial at either point. Note—the 2440 K. C. signal will still be heard at two points since these R. F. stages act as fixed tuned circuits. Adjust the two high frequency trimmers, located on the lower side of the gang capacitor until maximum output is obtained.

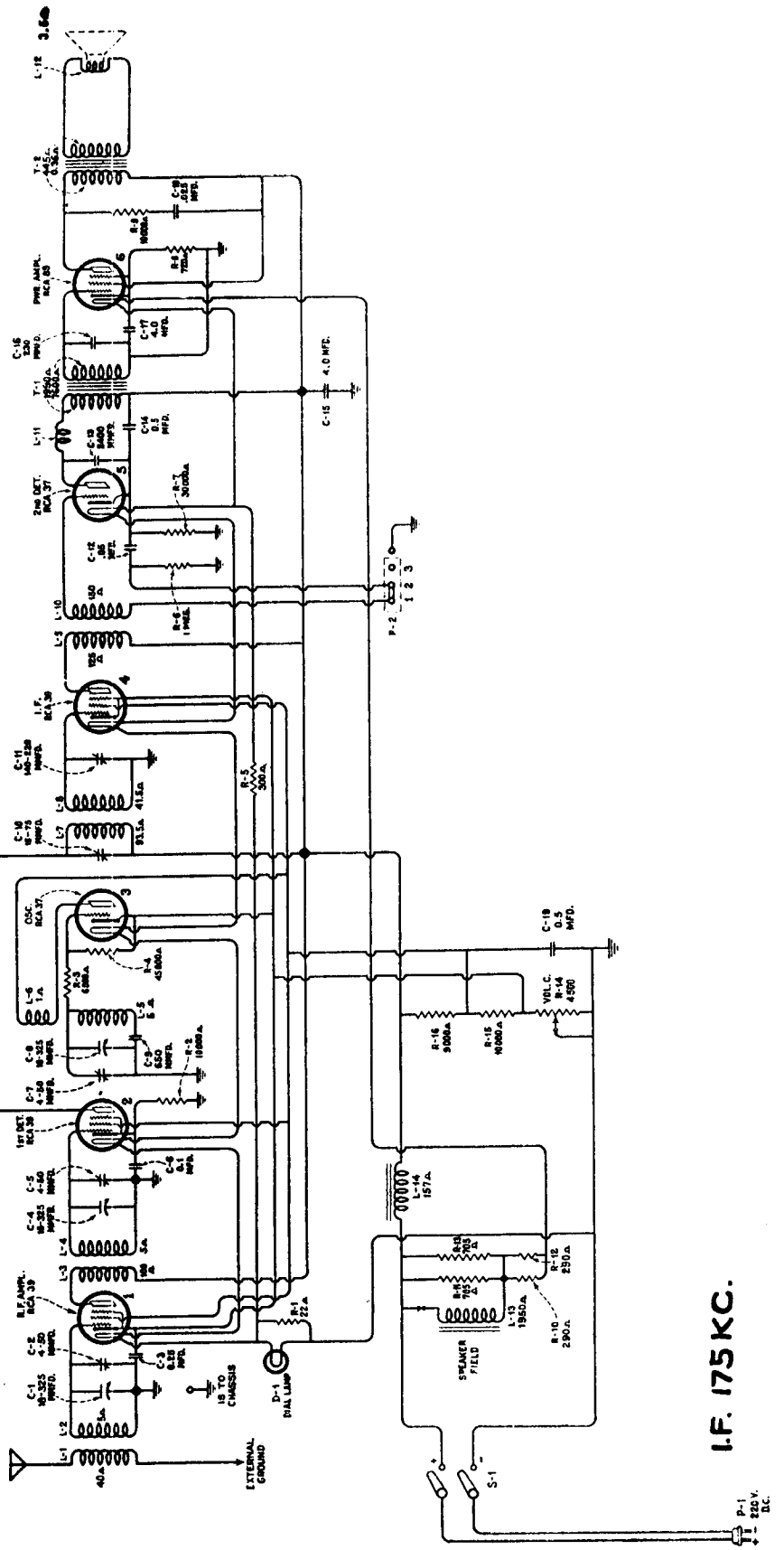


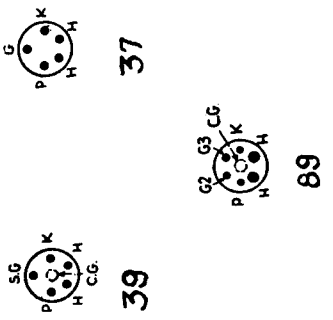
Trouble Shooting Hints

The output type 43 tube in the model R22 appears to be subject to audible whistles caused by oscillation. This oscillation can be removed by reducing the screen potential or changing the value of the grid coupling resistor. In some cases the insertion of a new type 43 tube will eliminate the difficulty. Do not try to realign this set unless you are sure that the oscillator or I. F. amplifier have drifted or been tampered with.

RCA VICTOR, Inc.

MODEL 25 (D.C.)



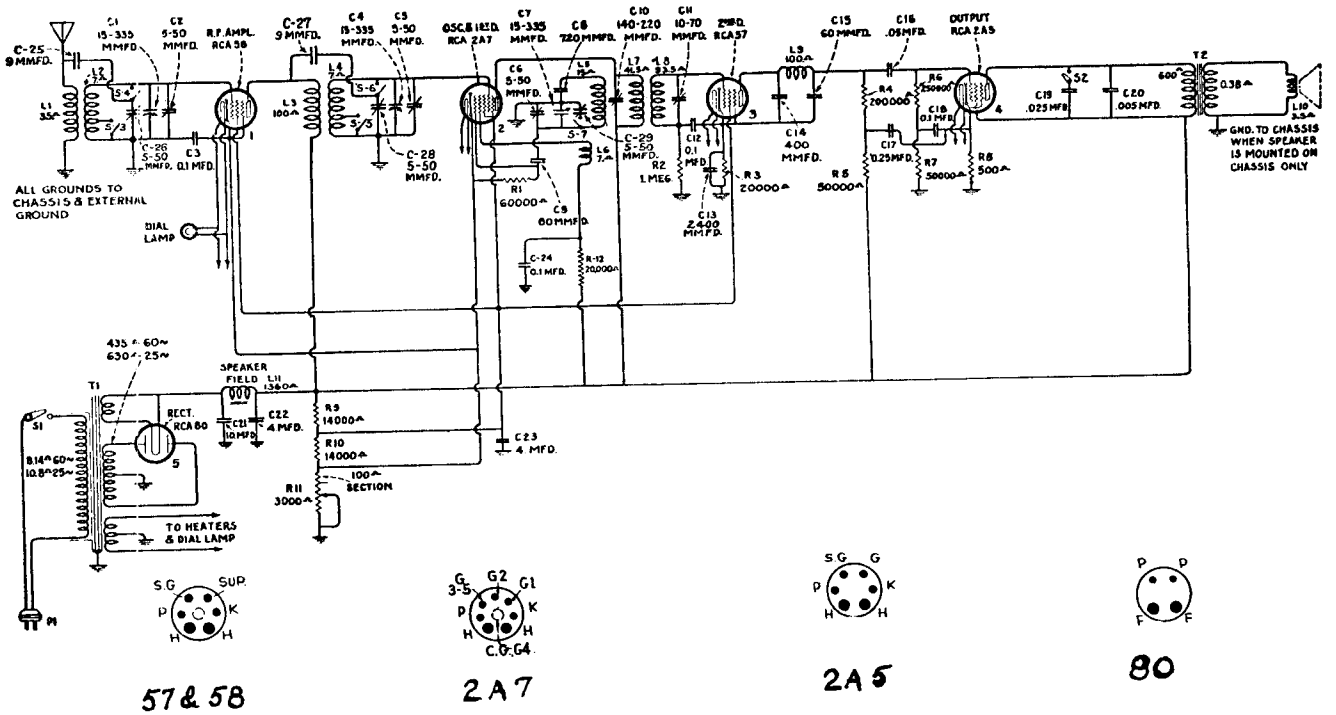


Radiotron No.	Cathode or Filament to Control Grid, Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament, to Plate, Volts	Plate Current M. A.	Heater or Filament, Volts	Radiotron Socket Voltages
1. R. F. RCA-39	3.5	90	205	5.0	6.0	
2. 1st Detector RCA-39	10	83	200	1.0	6.0	
3. Oscillator RCA-37	—	—	90	4.5	6.0	
4. I. F. RCA-39	3.5	90	205	5.0	6.0	
5. 2nd Detector RCA-37	20	—	185	.75	6.0	
6. Power RCA-89	18.5	190	180	15.0	6.0	

All above voltages measured at maximum volume control setting with no signal impressed on input. 220 Volt, D. C. source used.

RCA VICTOR, Inc.

MODEL R-28 P



115 Volt A. C. Line
MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater, Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

Line-up Capacitor Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) The high frequency band is adjusted at 2440 K. C This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

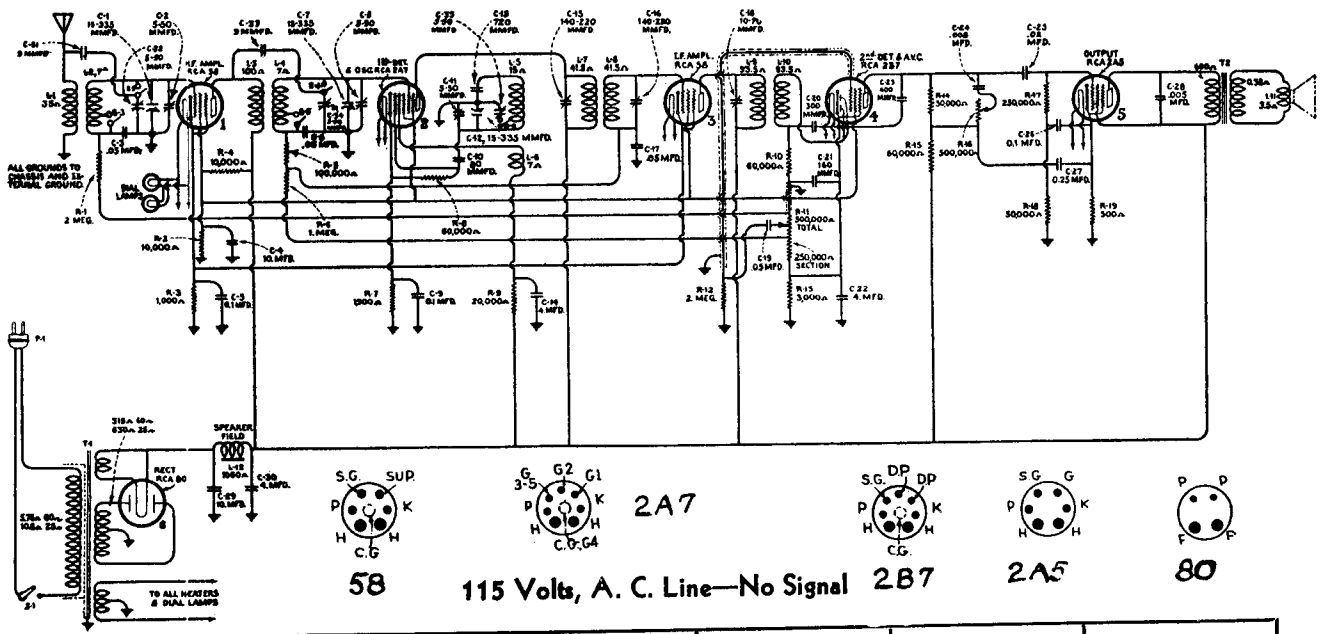
Trouble Shooting Hints

If this set lacks sensitivity, first change the 2A7 tube which seems to break down frequently in this particular model. Then, check all connections and contacts to the wave-change switch and third, test all by-pass condensers to ascertain if they have become open-circuited.

If a continuous audio howl is heard check the output transformer for short circuit to the chassis or speaker and then try changing the 2A5 tube. It may be necessary to insert a high resistance in the lead to the suppressor grid of this tube to dampen the audio oscillation.

RCA VICTOR, Inc.

MODELS R37 P & R38 P



Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F.	3.0	95	255	5.0	2.31
2. RCA-2A7 1st Det. Osc.	3.0*	95*	255*	3.0*	2.31
3. RCA-58 I. F.	3.0	95	255	5.0	2.31
4. RCA-2B7 2nd Det. A. V. C.	7.5	92	60	2.0	2.31
5. RCA-2A5 Power	20.0	250	235	33.0	2.31
6. RCA-80 Rectifier	700/350 Volts—75 M. A. Total Current				4.82

*The Voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible at the top of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Then set the dial at 140. the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

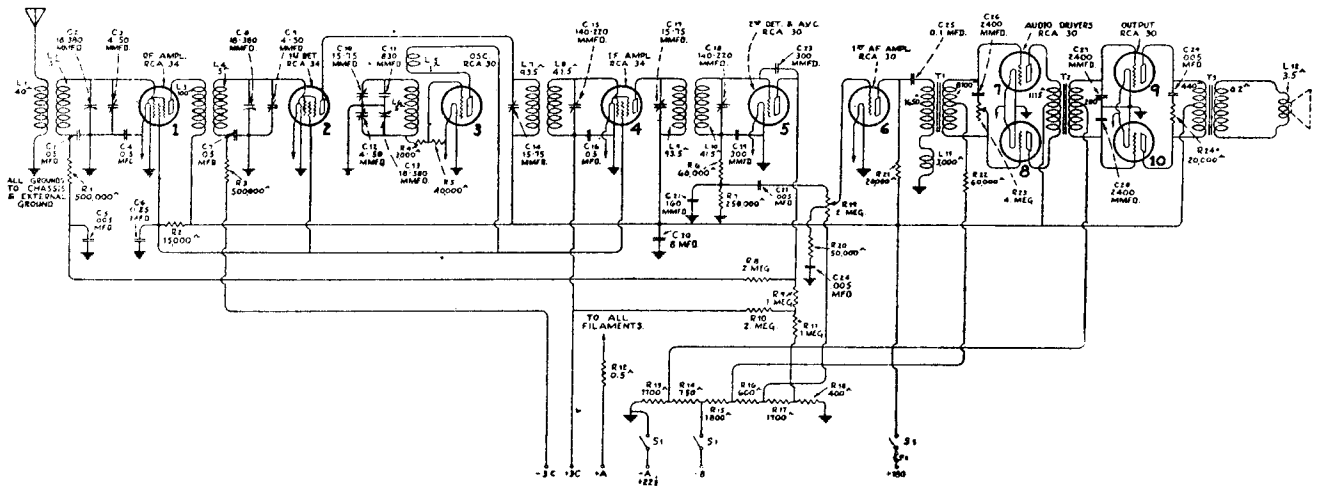
When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

Trouble Shooting Hints

Oscillation which may be controlled by the volume control is caused either by the tube shield for the 2B7 tube being loose or the shielded lead running to the cap not fitting tightly into the slot in the tube shield. Both the tube shield and the shielded lead must be very carefully grounded to prevent exteraneous pick-up. Lack of plate voltage may be caused by a shorted filter condenser - C 29.

RCA VICTOR, Inc.

MODELS R-51 B & R 53 B



New "A" and "B" Batteries—No Signal Received

Radiotron No.	Control Grid to Filament Volts	Screen Grid to Filament Volts	Plate to Filament Volts	Plate Current M. A.	Filament Volts
R. F.—RCA-234	2.0	65.0	157.5	3.0	2.15
Oscillator—RCA-230	—	—	65.0	4.0	2.15
First Detector—RCA-234	5.0	65.0	157.5	1.0	2.15
I. F.—RCA-234	2.0	65.0	157.5	3.0	2.15
Second Detector—RCA-230	0	—	—2.0	0	2.15
First A. F.—RCA-230	10.5	—	130.0	1.25	2.15
Driver A. F.—RCA-230	13.5	—	150.0	1.5	2.15
Driver A. F.—RCA-230	13.5	—	150.0	1.5	2.15
Power—RCA-230	13.5	—	150.0	1.5	2.15
Power—RCA-230	13.5	—	150.0	1.5	2.15

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis. A tube base with a 16000 ohms resistor connected between one filament prong and the plate prong must be substituted for the oscillator tube.

(c) Connect the oscillator output between the first detector control grid and the negative terminal on the 4.5 volt bias battery. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter. Also a socket wrench is necessary for the main tuning capacitor trimmers.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the first line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

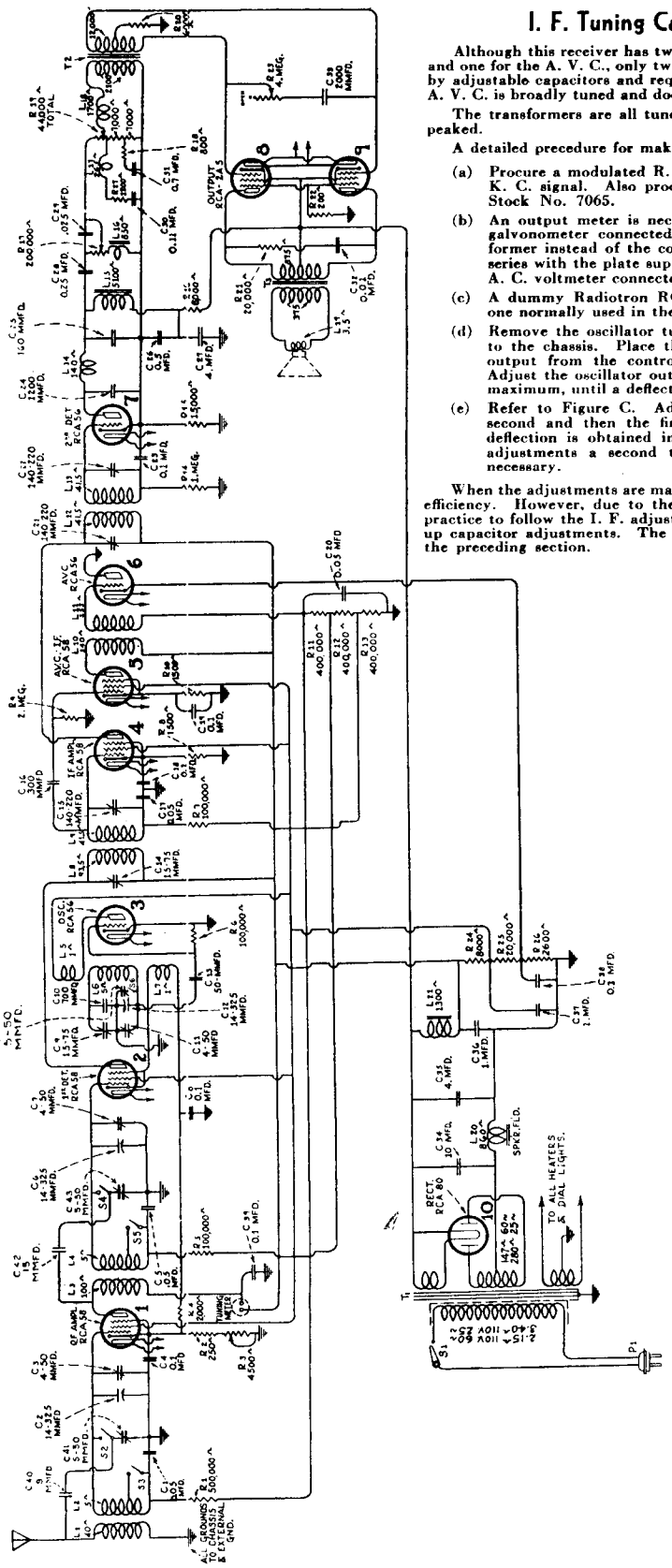
Trouble Shooting Hints

The most common trouble with this receiver seems to be second channel whistles caused by misalignment of the oscillator padding and intermediate frequency circuits. If whistles are encountered at certain parts of the tuning band, the set should be realigned using the correct instruments for the purpose as explained under "Line Up Adjustments.

Poor quality usually indicates run-down B batteries which must be replaced.

RCA VICTOR, Inc.

MODEL R 90 P



I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed precedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvonometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

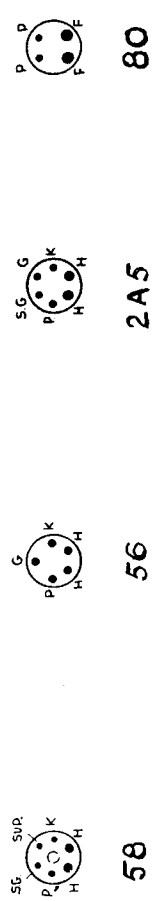
(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

Trouble Shooting Hints

If the tuning meter fails to read correctly check the R. F. tuning resonance. Also check the AVC tube.

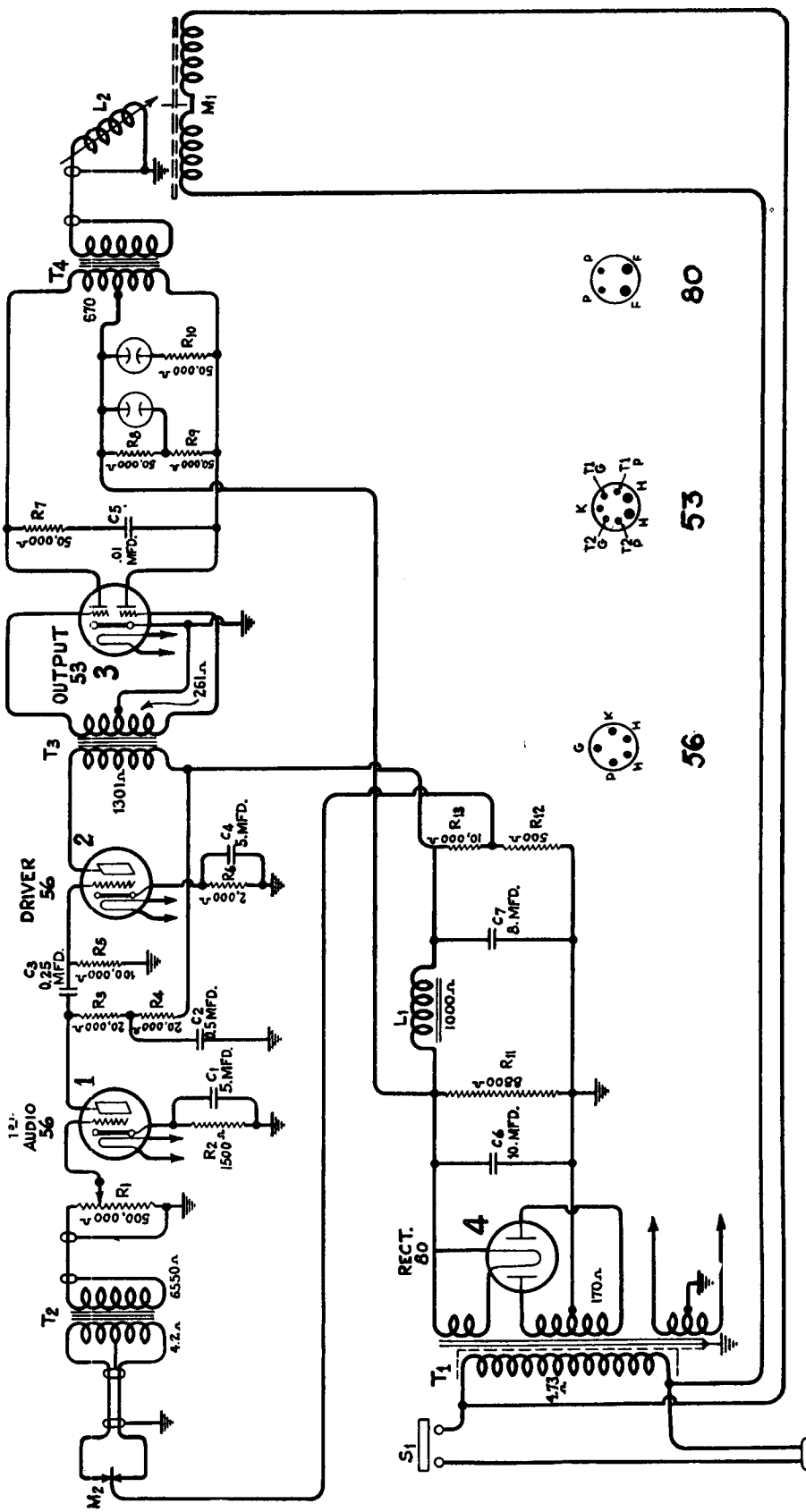


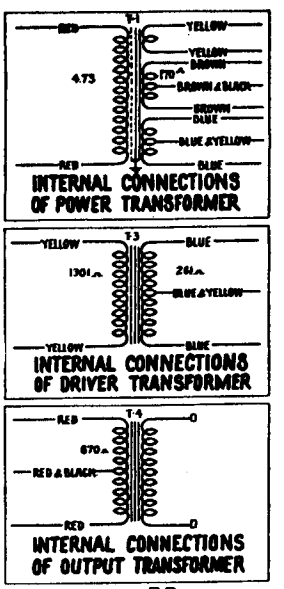
120 Volt, A. C.—No signal being received—Volume Control at minimum

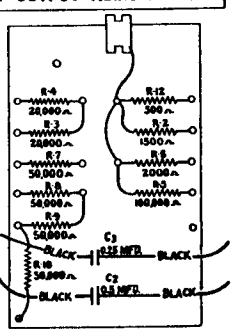
Radiotron No.	Cathode to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current, M. A.	Heater or Filament Volts, A. C.
1. R. F.	3.0	100	230	7.0	2.4
2. 1st Detector	8.0	95	220	2.5	2.4
3. Oscillator	—	—	105	6.0	2.4
4. I. F.	7.5	100	225	2.5	2.4
5. A. V. C.—I. F.	7.5	100	225	2.5	2.4
6. A. V. C.	20.0	—	0	—	2.4
7. 2nd Detector	17.0	—	250	1.2	2.4
8. Power	18.0	255	245	33.0	2.4
9. Power	18.0	255	245	33.0	2.4

RCA VICTOR, Inc.

MODEL R-92







Radiotron No.	Cathode to Ground, Volts	Plate to Ground, Volts	Plate Current, M. A.	Heater Volts
RCA-56—1st A. F.	5.0	100*	3.8	2.5
RCA-56—2nd A.F.	11.5	245	5.0	2.5
RCA-53—Power	—	285	30.0	2.5
RCA-80—Rectifier	Total Rectified Voltage—290 Volts			5.0

*Calculated—High Resistance Circuit.

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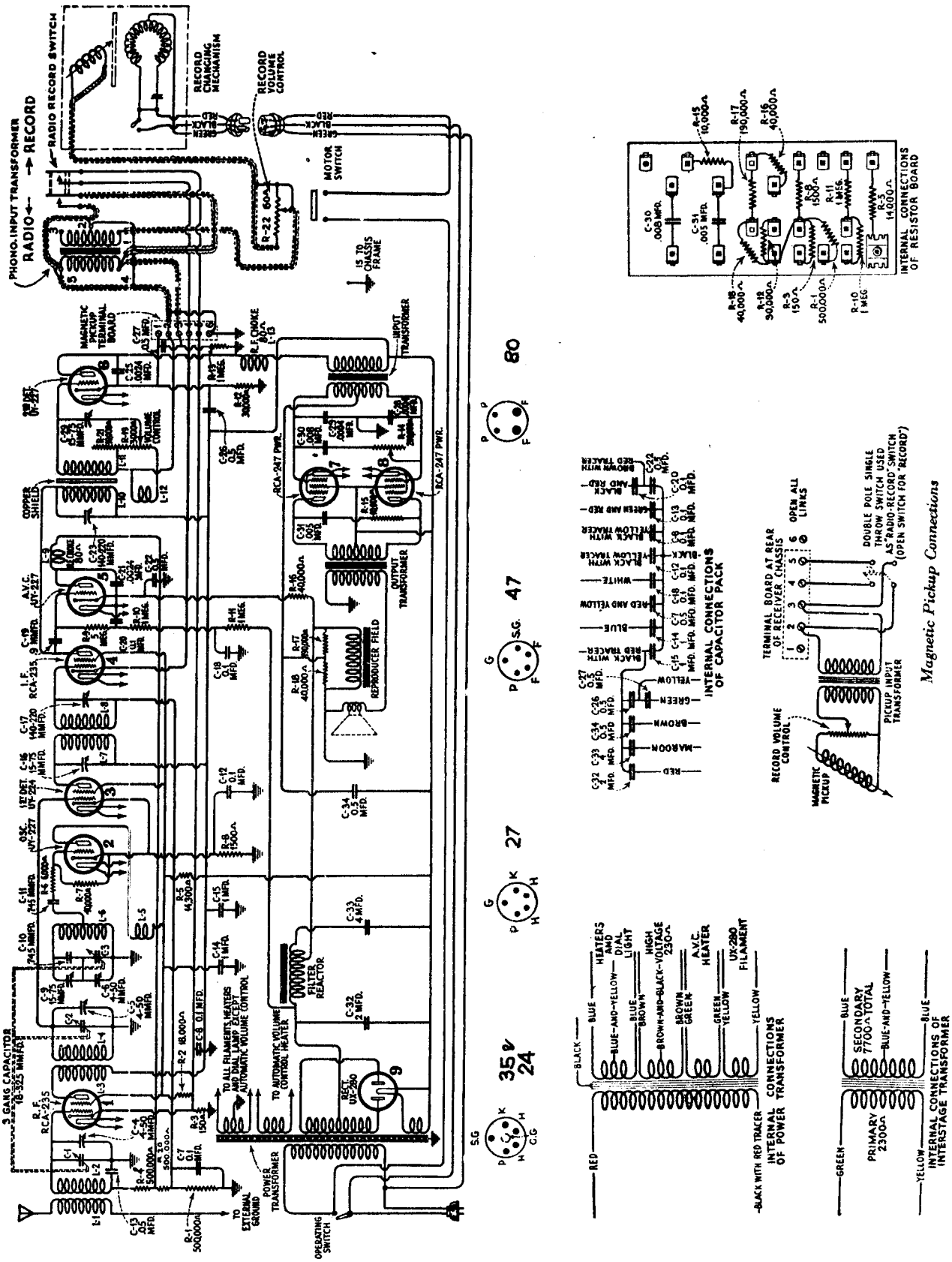
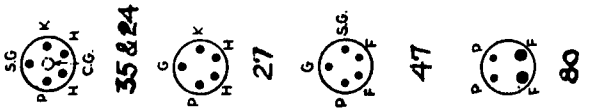
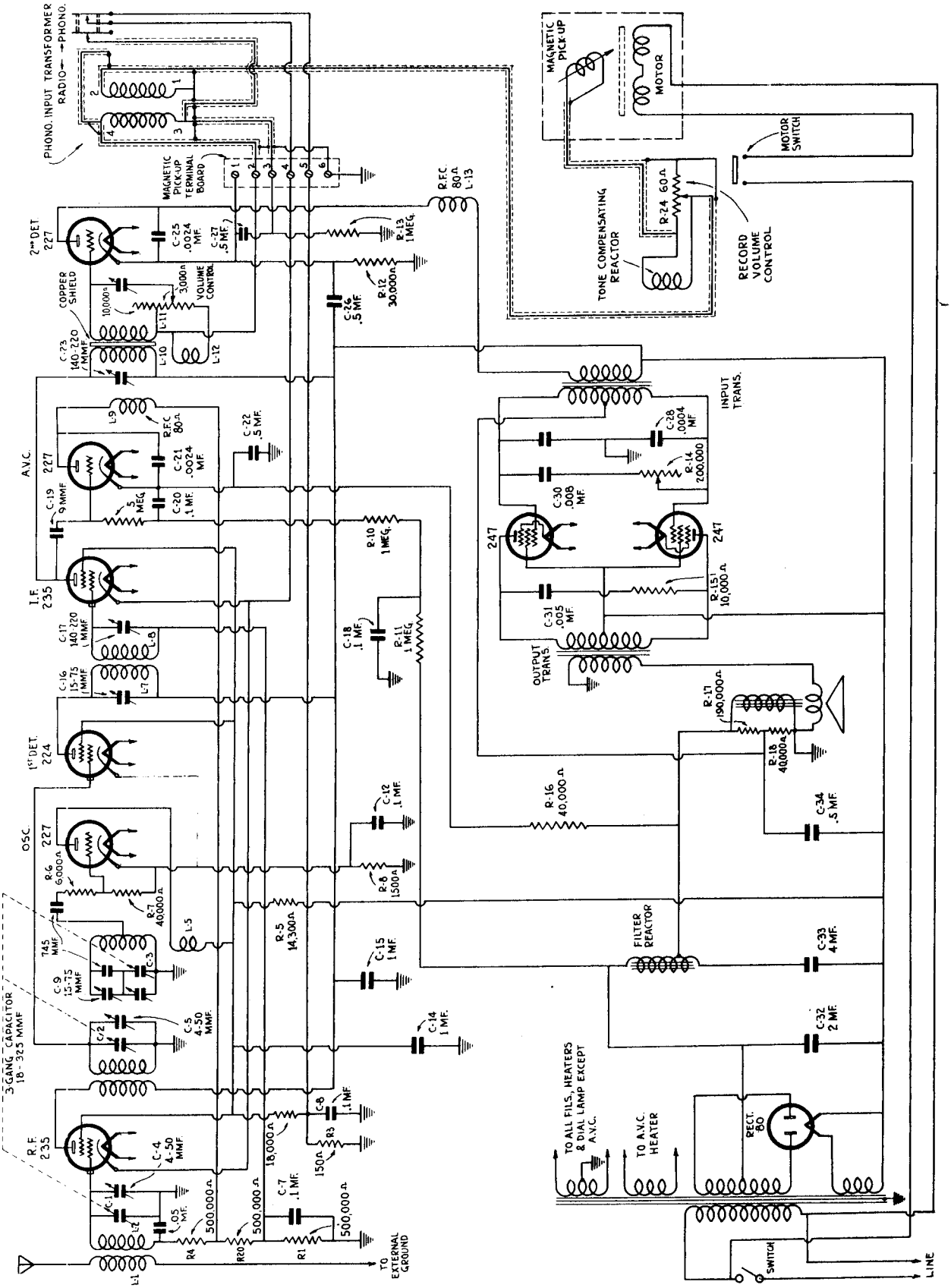
MODEL RAE 26



RCA VICTOR, Inc.

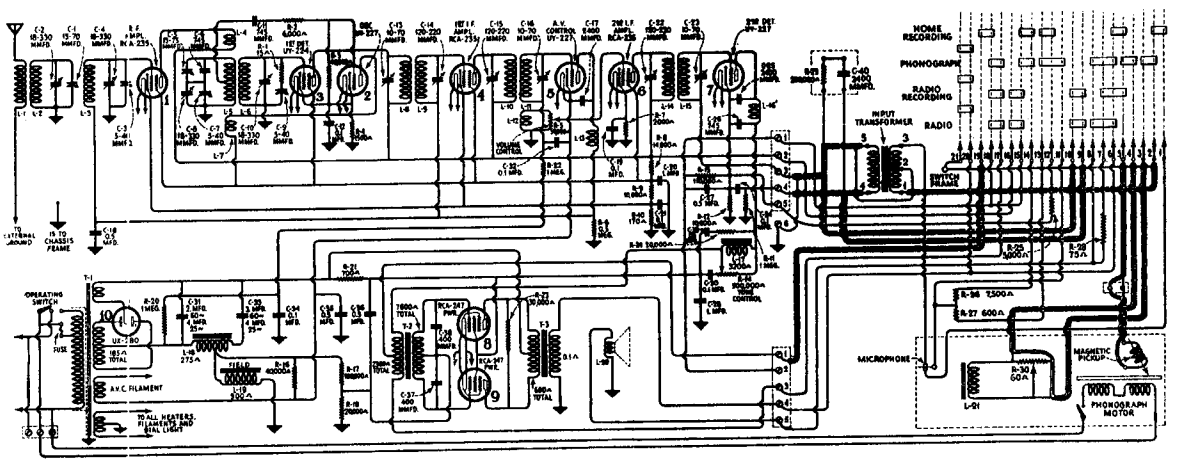
MODEL RE 18





RCA VICTOR, Inc.

MODEL RE 20



35 & 24

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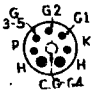
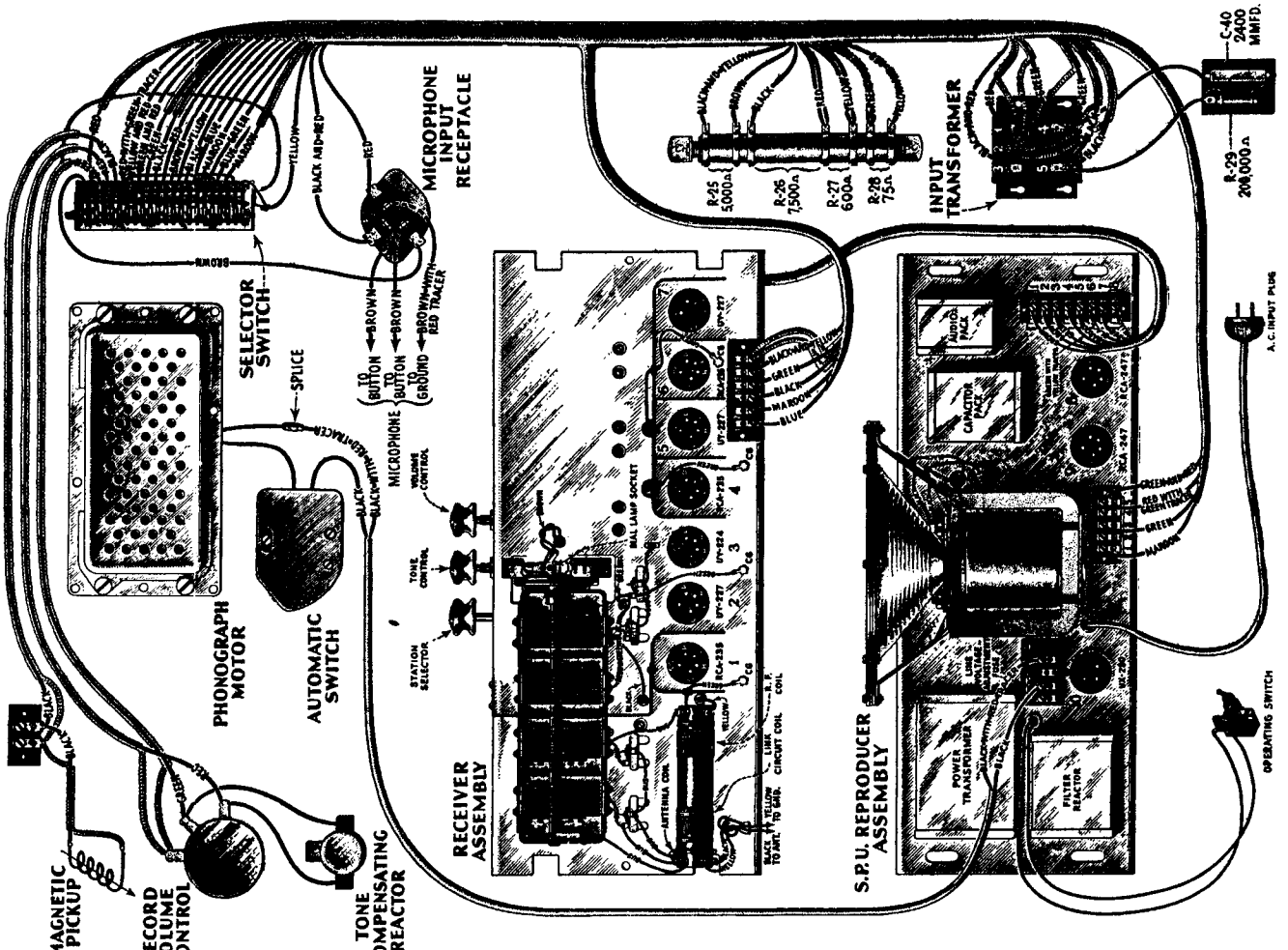


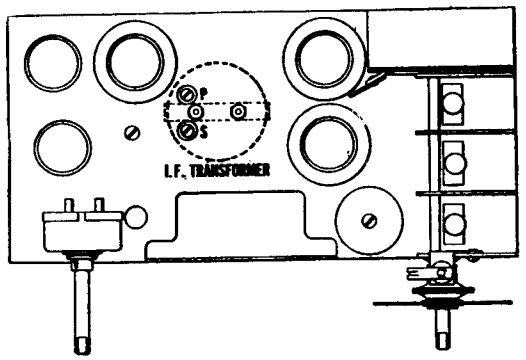
2A7

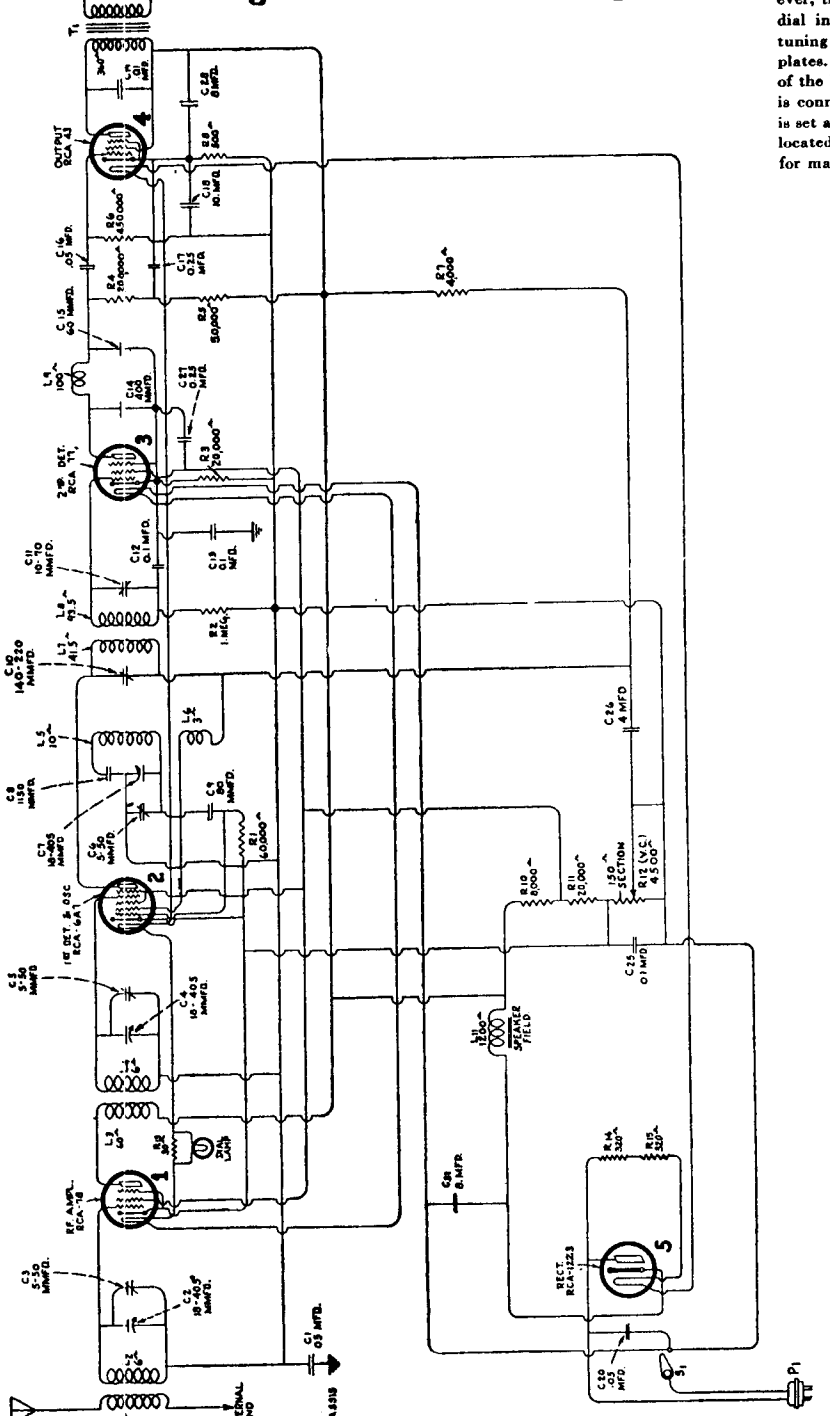
80



RCA VICTOR, Inc.

5 TUBE 220 VOLT A.C.-D.C. SUPERHET MODEL





Line-Up Capacitor Adjustments

The line-up capacitor adjustments for the I. F. stage and for the R. F. circuits should be made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 KC and 1400 KC. An output meter and non-metallic screw driver are also necessary. The Stock No. 9050 test oscillator and Stock No. 7065 screw driver are suitable for this purpose. Figure C shows the location of the I. F. capacitors.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 KC, coupling its output between the control grid of the first detector and ground, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the R. F. and oscillator circuits are adjusted at 1400 KC. Prior to making the adjustment, however, the dial should be checked. This is done by making sure the dial indicator reads 530 (indicator in center position) when the tuning capacitor rotor plates are fully meshed with the stator plates. The adjustments are then made in similar manner as that of the I. F. except that the oscillator is set at 1400 KC, its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

12Z3

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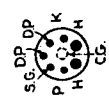
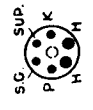


6A7



78 & 77

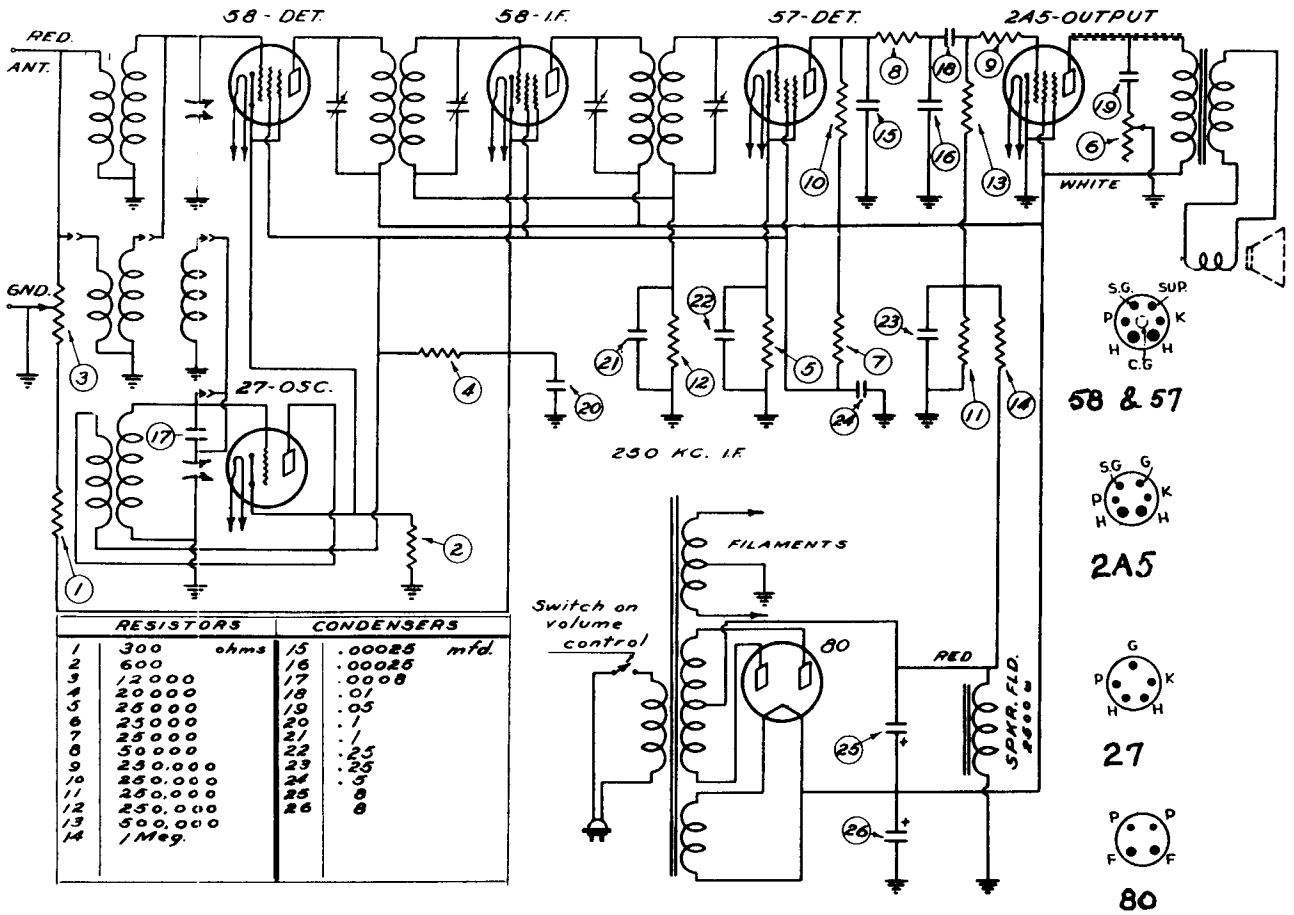
*Measured at 220 Volts A. C., 60 cycles (Maximum Volume Control)

Radiotron No.	Cathode to Control Grid, Volts DC	Cathode to Screen Grid, Volts DC	Cathode to Plate, Volts DC	Plate Current M. A.	Heater Volts
RCA-78 R. F.	3.0	100	165	5.5	6.0
RCA-6A7 Oscillator 1st Detector	—	—	145	1.7	6.0
	3.0	100	145	2.5	—
RCA-77 2nd Detector	Plate and Bias Supply 165 Volts			—	6.0
RCA-43 Power	21.0	140	130	35.0	25.0
RCA-1273 Rectifier	220 RMS			—	12.0

*Voltages with 220 Volts D. C. supply will be approximately 10 per cent less than tabulated values

REMLER CO., Ltd.

MODEL 10-3 CAMEO



RESISTORS		CONDENSERS	
1	300 ohms	15	.00025 mfd.
2	600	16	.00025
3	12000	17	.0008
4	20000	18	.01
5	25000	19	.05
6	25000	20	.1
7	25000	21	.1
8	50000	22	.25
9	250.000	23	.25
10	250.000	24	.5
11	250.000	25	8
12	250.000	26	8
13	500.000		
14	1 Meg.		

REMLER SUPERHETERODYNE

MODEL #10-3

This Radio Receiver is of the Conventional Super-heterodyne type, employing the following tubes:

#80 as rectifier; #58 as mixer; #58 as intermediate frequency amplifier; #57 as detector; #2A5 as audio power amplifier, and #27 as oscillator. These tubes are noted in the order of their placement on the chassis, beginning with the #80 tube nearest the power transformer.

INSTALLATION:

This set is designed to operate from a standard power supply of 110 to 125 volts, 50 or 60 cycles, alternating current. Best results will be obtained when operated from a fifty foot antenna and a good ground - connected respectively to the Red and Black wires at the back of the chassis.

CONTROLS:

The knob at the left controls the volume increasing in a clockwise rotation. This knob also controls the line power switch. The center knob controls the station selector dial. The knob at the right operates the variable tone control. In the center and below the station selector knob is the wave changing switch, the two positions of which are designated as "Short Wave" and "Long Wave".

The dual wave operation allows signal reception covering 6500 kilocycles to 2000 when the wave changing switch is in the Short Wave position and from 2000 K.C. to 550 K.C. when the wave changing switch is in the Long Wave (standard broadcast) position.

SERVICE DATA:

The circuits and associated apparatus in their sequence are as follows:

On the under side of the chassis and directly behind the two gang variable condenser will be found the "resonated" antenna coil and the secondary or grid coil of the mixer tube. Inductively coupled to the secondary coil and wound upon the same coil form are the grid and plate coils of the Oscillator. The front section of the gang condenser, with its series padding condenser, tune the Oscillator grid coil while the second gang condenser simultaneously tunes the grid coil of the mixer tube.

The blue plate lead of the mixer tube goes to the primary of the 250 K.C. intermediate transformer located directly beneath the mixer tube. The secondary of this transformer connects by a flexible lead to the grid of the shielded intermediate amplifier tube. The blue plate lead of the intermediate tube goes to the primary of the 250 K.C. detector transformer (located on the top of the chassis near the detector tube), while the secondary or grid coil connects to the grid cap or the #57 detector. The plate of the detector tube is "capacity coupled" to the grid of the power tube. Inspection of the circuit diagram will show the method of wave changing - the three short wave coils being placed in shunt with the broadcast coils for short wave operation.

The grid bias for the power tube is obtained by a voltage divider system across the choke (dynamic speaker field) on the negative side of the high voltage circuit.

Voltage readings for servicing purposes follow:

A. C. Voltages:

Line	-	120 volts
Heater filaments	-	2.3 "
Power tube filament	-	2.3 "
Rectifier filament	-	5.0 "

D. C. Voltages:

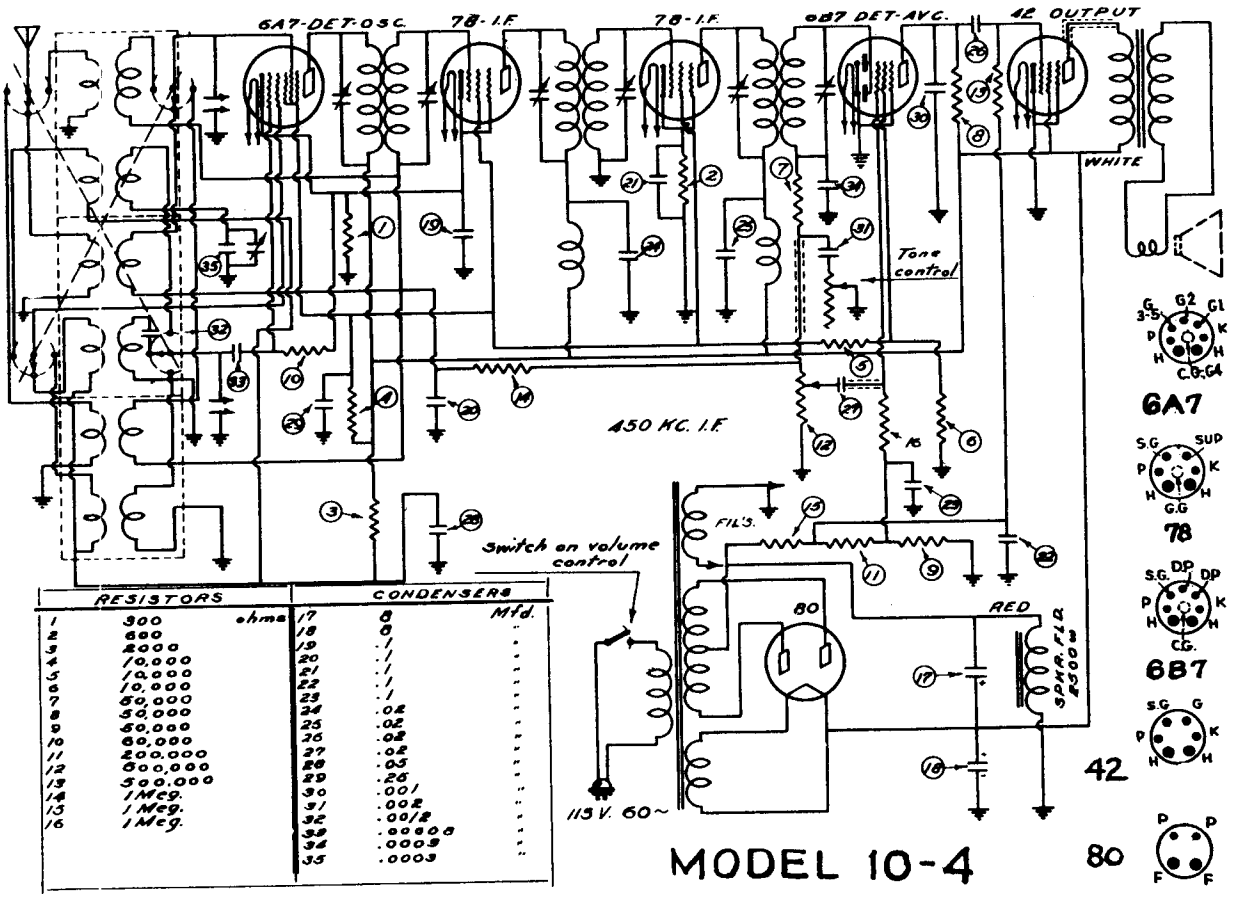
From Ground to:

#80	Rectifier tube filament	-	235	volts
#2A5	Power "	screen grid	-	235 "
#2A5	" "	plate	-	230 "
#2A5	" "	grid	-	17 "
#58	Mixer "	plate	-	235 "
#58	" "	screen grid	-	60 "
#58	" "	kathode	-	4 "
#58	Intermediate tube	plate	-	235 "
#58	" "	screen grid	-	60 "
#58	" "	kathode	-	2 to 20 volts
#57	Detector tube	plate	-	120 volts
#57	" "	screen grid	-	60 "
#57	" "	kathode	-	3½ "
#27	Oscillator tube	plate	-	60 "
#27	" "	kathode	-	4 "

Due to small current, meter readings will be inaccurate on detector plate and power tube grid.

Speaker field (red lead) - 105 volts negative.

REMLER CO., Ltd.



RESISTORS			CONDENSERS		
1	300	ohms	17	8	Mfd.
2	600		18	8	"
3	2000		19	.1	"
4	10,000		20	.1	"
5	10,000		21	.1	"
6	10,000		22	.1	"
7	50,000		23	.1	"
8	50,000		24	.02	"
9	50,000		25	.02	"
10	60,000		26	.02	"
11	200,000		27	.02	"
12	500,000		28	.05	"
13	500,000		29	.25	"
14	1 Meg.		30	.001	"
15	1 Meg.		31	.002	"
16	1 Meg.		32	.0012	"
			33	.00008	"
			34	.0003	"
			35	.0003	"

REMLER MODEL 10-4

INSTALLATION:

This set is designed to operate from a 110 to 125 volt, 50 or 60 cycle alternating current supply.

An outdoor antenna should be used, having a length of from 60 to 100 feet. The antenna should be kept clear of all metal objects, such as pipes and electric circuits. This also applies to the lead-in wire. Shielded wire should not be used for the lead-in. Connect the lead-in to the red wire extending from the back of the set. The ground connection should be made to the black wire. This lead should be as short as possible and preferably connected to a cold water pipe, scraped clean, and a ground clamp used.

Loosen the chassis hold-down screws one turn when installing the set.

The knob on the left controls the volume and also operates the ON and OFF switch.

The center knob controls the station selector, or tuning. This knob operates through a DUAL-RATIO reducing mechanism. When pressed in, the ratio is three and a half to one. This position may be used on the broadcast band, or when it is desired to turn quickly from one band to another. When the knob is pulled out, a ratio of seventeen to one is obtained. This position should be used for tuning on the short wave bands.

The dial is divided into three ranges. The outer range is from 540 to 1900 kilocycles, and is calibrated in tens of kilocycles, or broadcast channels. The bands included in this range are: the regular broadcast band from 540 to 1500 K.C., the police band from 1534 to 1712 K.C., and amateurs from 1715 to 1900 K.C. The middle range covers from 1900 to 6400 K.C. This range includes: amateurs 1900 to 2000 K.C., police stations 2308 to 2490 K.C., aviation 2608 to 3485 and 4110 to 5700 K.C., amateurs 3500 to 4000 K.C., and short wave broadcast 6010 to 6150 K.C. This range is calibrated in hundreds of kilocycles.

The inner range covers the higher frequency bands, extending from 6 to 18 megacycles (6000 to 18,000 kilocycles).

The principal short wave broadcast ranges included are: 6 to 6.15 megacycles, 9.5 to 9.6 megacycles, 11.7 to 11.9 megacycles, 15.1 to 15.35 megacycles, and 17.7 to 17.8 megacycles. Amateur phone transmissions may be tuned in from 14 to 14.4 megacycles. This range on the dial is marked in megacycles, which are thousands of kilocycles. The knob on the right controls the range switch and the pointer, which automatically indicates the range position on the dial.

A continuous type tone control is adjustable from the back of the receiver. This may be adjusted to modify the tone or to reduce noise or static disturbances.

SERVICE DATA:

This is a six tube superheterodyne receiver with automatic volume control. The following tubes are used:

6A7 Converter (mixer-oscillator)
78 Super-control amplifier, 1st I.F. stage
78 Super-control amplifier, 2nd I.F. stage
6B7 Diode detector - AF amplifier, Av.C.
42 Power amplifier
80 Full wave rectifier
Dial light 6-8 volt Mazda 50

The oscillator, antenna, and mixer coils are wound on the same form for each band. The short wave coils are mounted directly on the switch together with the trimmer capacities. A variable series trimmer is provided for the broadcast band oscillator circuit. This is accessible from the bottom of the chassis, and is mounted near the broadcast oscillator coil. The I.F. transformers are in the aluminum shields mounted on top of the chassis. The trimmers for these coils may be adjusted from the tops of the shields. The intermediate frequency is 450 kilocycles. Use a weak signal or oscillator input when adjusting the trimmers.

In removing the chassis from the cabinet, take the set screw, spring and brass pin from the tuning knob so that it may be removed from the shaft. The switch and volume knobs may be removed by prying with a wooden screw driver with a piece of cardboard against the cabinet.

Voltage readings for servicing purposes follow:

A. C. VOLTAGES:

Line	120 volts
Filaments - 6A7, 78s, 6B7 and 42	6.3 "
Filaments - 80	5.2 "

D. C. VOLTAGES: (No signal)

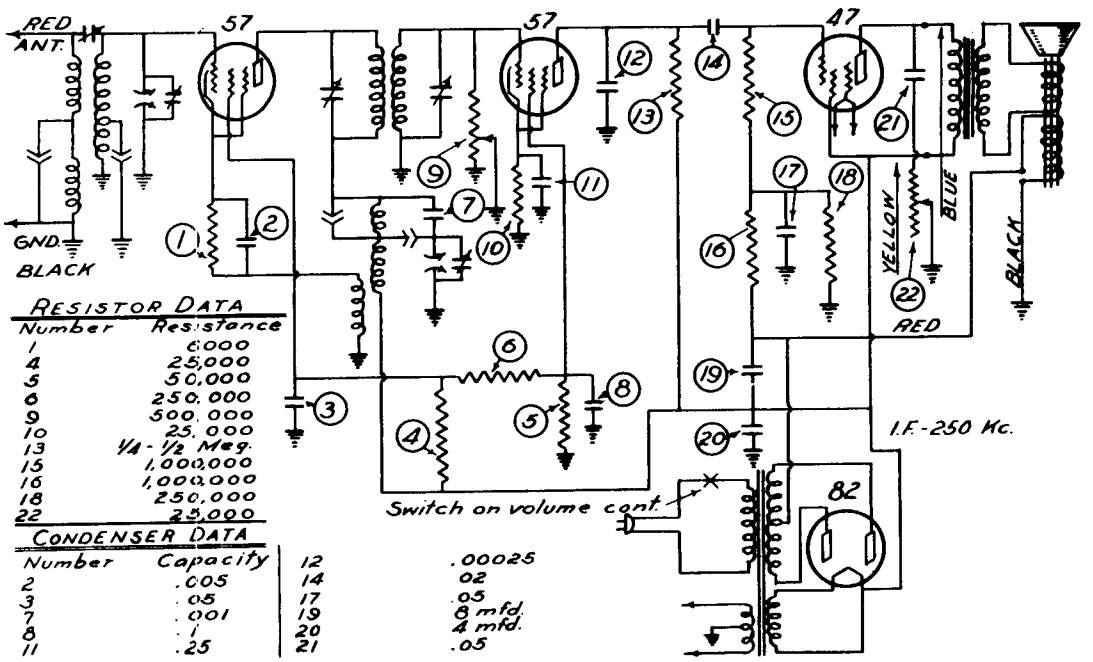
From ground to:

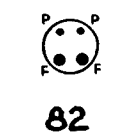
80 Rectifier filament	240 volts
42 Plate	250 "
42 Screen grid	240 "
42 Grid	17 "
6B7 Plate	165 "
6B7 Screen grid	70 "
6B7 Grid	4 "
78 2nd I.F. plate	240 "
78 2nd I.F. screen grid	125 "
78 2nd I.F. cathode	4.5 "
78 1st I.F. plate	240 "
78 1st I.F. screen grid	125 "
78 1st I.F. cathode	6 "
6A7 Plate (mixer)	240 "
6A7 Screen grid	125 "
6A7 Cathode	6 "
6A7 Plate (oscillator)	220 "
Speaker field (red lead)	115 "

Due to current taken by voltmeter used, readings of 6B7 and 42 grid voltages will be less than those above.

REMLER CO., Ltd.

MODEL 21-3 (MINUETTE)





RESISTOR DATA

Number	Resistance
1	6000
4	25,000
5	50,000
6	250,000
9	500,000
10	25,000
13	1/4 - 1/2 Meg.
15	1,000,000
16	1,000,000
18	250,000
22	25,000

CONDENSER DATA

Number	Capacity
2	.005
3	.05
7	.001
8	.1
11	.25
12	.00025
14	.02
17	.05
19	8 mfd.
20	4 mfd.
21	.05

This Radio Receiver is of the Superheterodyne type employing the following tubes:

#380 as rectifier; #57 as mixer-oscillator; #57 as detector and #547 as audio power amplifier. The Mixer-Oscillator tube is located between the #380 tube and the Antenna-R.F. coil. The Detector tube is located between the #547 and the Oscillator coil.

INSTALLATION:

This set is designed to operate from a standard power supply of 110 to 125 volts, 50 or 60 cycles, alternating current. Best results will be obtained when operated from a fifty foot antenna and a good ground - connected respectively to the red and black wires at the back of the chassis.

CONTROLS:

The knob at the left controls the volume increasing in a clockwise rotation. This knob also controls the line power switch. The center knob controls the station selector dial. The knob at the right operates the variable tone control. In the center and below the station selector knob is the wave changing switch, the two positions of which are designated as SHORT WAVE and LONG WAVE.

The dual wave operation allows signal reception covering 4000 kilocycles to 1500 when the wave changing switch is in the SHORT WAVE position and from 1500 K.C. to 550 K.C. when the wave changing switch is in the LONG WAVE (standard broadcast) position.

SERVICE DATA:

In the center-front of the chassis is located the variable tuning condenser. The front section (nearest the dial) tunes the oscillator plate coil. The back section (nearest the power transformer) tunes the Secondary of the R.F. coil.

The Antenna-R.F. coil form located at the left of the tuning condenser contains the following windings: At the top is the secondary or grid coil, trimmed by the trimmer condenser nearest the #57 mixer-oscillator tube. Below the secondary is the Short Wave Antenna coil and at the bottom of the coil form is the "resonated" antenna coil, capacity coupled to the grid coil by the coupling trimmer at the top-front of the coil form.

The oscillator coil form at the right of the tuning condenser contains the tuned oscillator plate coil which is trimmed by the front trimmer. The kathode coupling coil is below the tuned section.

Mounted inside of the oscillator coil form is the 250 K.C. intermediate transformer. The plate or primary section is tuned by the trimmer mounted beneath the chassis and accessible for tuning thru the hole in the chassis between the coil form and the variable condenser. The secondary is tuned by the trimmer at the top of the coil form nearest the detector tube.

Inspection of the circuit diagram will show the method of wave changing.

The grid bias for the power tube is obtained by a voltage divider system across the choke (dynamic speaker field) on the negative side of the high voltage circuit.

Voltage readings for servicing purposes follow:

A.C. VOLTAGES:

Line	—	118 volts
Heater filaments	—	2.3 "
Power tube filament	—	2.3 "
Rectifier filament	—	5.0 "

D.C. VOLTAGES:

From Ground to:

#380 Rectifier tube	filament	—	270	volts
#547 Power "	screen grid	-	270	"
#547 " "	plate	—	265	"
#547 " "	grid	—	17	"
#57 Mixer-Osc. "	plate	—	270	"
#57 " "	screen grid	-	215	"
#57 " "	kathode	—	12	"
#57 Detector "	plate	—	130	"
#57 " "	screen grid	-	30	"
#57 " "	kathode	—	3½	"

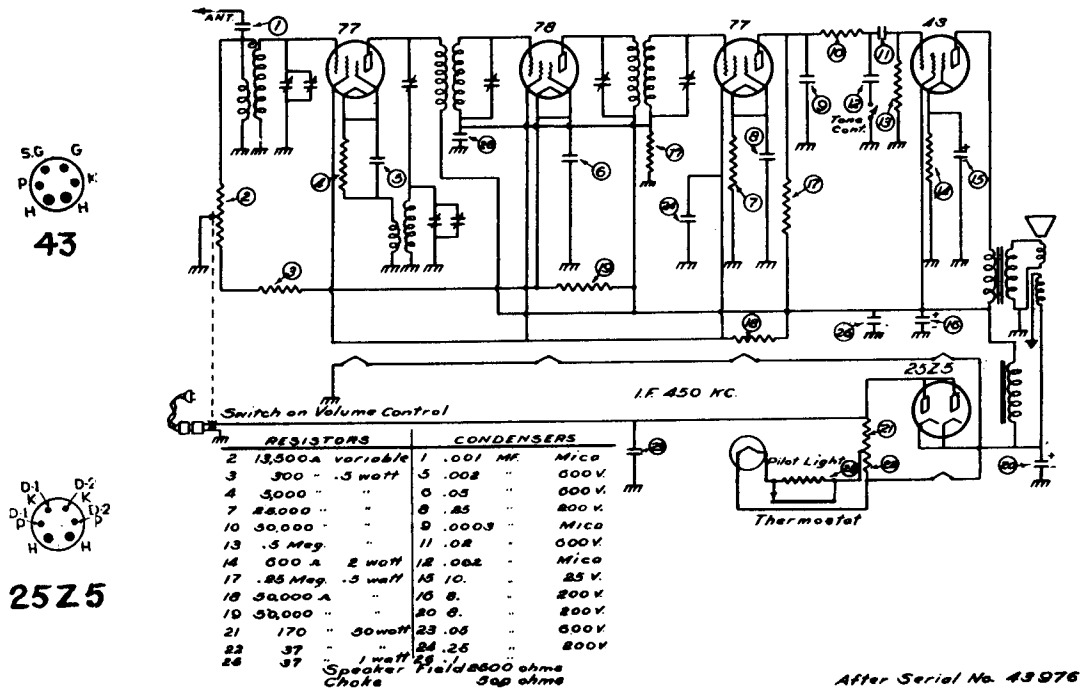
Due to small current, meter readings will be inaccurate on detector plate and power tube grid.

Speaker field (red lead) — 80 volts negative.

Trouble Shooting Hints

The bias for the 47 power tube is obtained from the voltage drop through the speaker field winding. If the 82 rectifier tube is "weak" or the 47 is not drawing normal plate current the bias on the latter tube will be wrong.

REMLER CO., Ltd.
MODEL 26 A.C.-D.C. (SCOTTY)



43

25Z5

77 & 78

After Serial No. 43976

MODEL #26

This Radio Receiver is of the Superheterodyne Type employing the following tubes:

#25Z5 as rectifier; #77 as mixer oscillator; #78 as I.F. amplifier; #77 as detector and #43 as power audio amplifier. A 6.3 volt dial light is used.

INSTALLATION:

This set is designed to operate from a power supply of 110 to 125 volts AC or DC. Best results will be obtained when connected to a twenty foot antenna attached to the black wire extending from the back of the cabinet. No ground connection is provided.

SERVICE DATA:

The plate supply is rectified directly from the power source and the filaments of the tubes are connected in series and thru a series resistor to this source. The chassis is directly connected to the power line, and contact between chassis and ground should be avoided.

To take the chassis out of the cabinet, first, remove the knobs, then the back, and finally the hold down screw in the base of the cabinet. To replace tubes it is only necessary to remove the back.

The back may be plugged on the chassis after removal from the cabinet for testing and aligning.

The mixer coil is in the aluminum shield can in back of the variable condenser and is trimmed by the back section trimmer on the variable condenser.

The oscillator coil is inside the chassis and is trimmed with the front section trimmer on the variable condenser.

Mounted inside the oscillator coil is the first I.F. coil which is trimmed by the condensers accessable from the back of the chassis.

The second I.F. transformer is also located within the chassis and may be trimmed by the condensers located under the holes in the chassis bottom.

VOLTAGE READINGS: (When operated on AC)

Line	120 volts
Filaments:	
43 and 25Z5	24 "
77, 78, 77 each	6 "
Across series resistor	54 "

(Filament voltages may vary with tubes)

DC Voltages - On full volume - No signal

From Chassis to:-

25Z5 Rectifier tube	cathode	140	volts
43 Power "	plate	123	"
43 "	screen grid	124	"
43 "	cathode	16	"
77 Mixer Osc. "	plate	123	"
77 " " "	screen grid	73	"
77 " " "	cathode	5	"
78 I.F. "	plate	123	"
78 " "	screen grid	73	"
78 " "	cathode	4	"
* 77 Detector "	plate	50	"
77 " "	screen grid	73	"
77 " "	cathode	5	"

*Due to small current, meter readings will be inaccurate on detector tube plate.

DC voltage readings when connected to a DC source of 120 volts will be slightly less than those above.

Trouble Shooting Hints

This receiver uses a thermostat switch to insert additional resistance in series with the tube filaments until the 25Z5 reaches normal operating temperature. If this thermostat switch does not close, the tubes do not get sufficient filament voltage to supply the full output and weak signals with distortion will result. This is the first test to be made in servicing a set.

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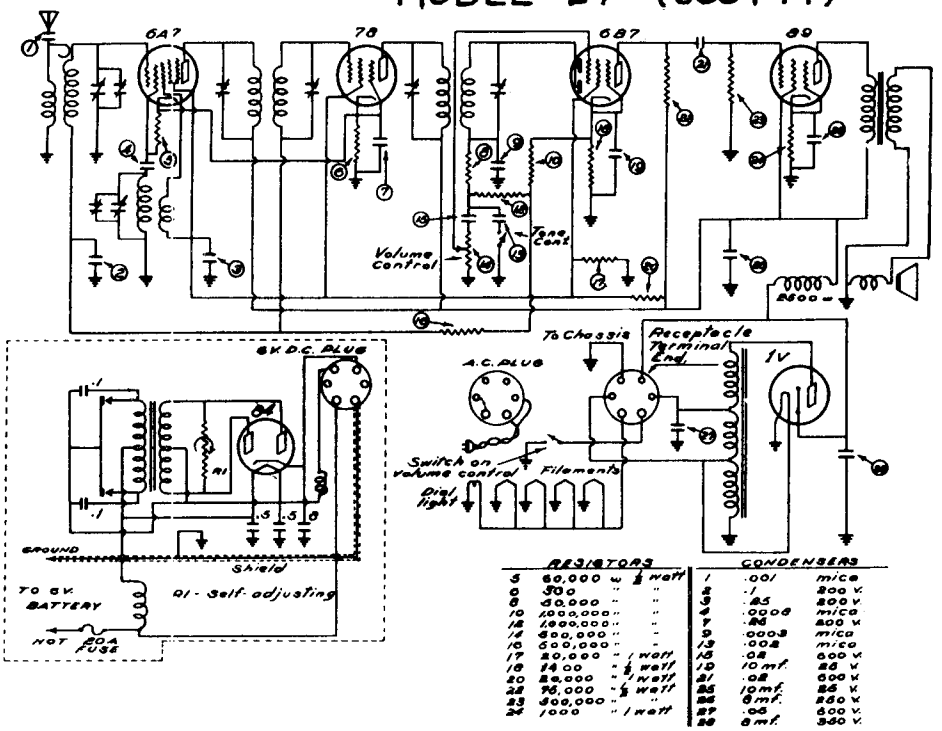
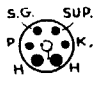
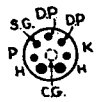
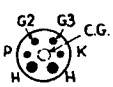
MODEL 27 (SCOTTY)









MODEL #27

This radio receiver is of the superheterodyne type with automatic volume control; and is intended for use on 110 to 125 volt, 50 - 60 cycles A.C. or from a 6 volt battery, using the power box.

INSTALLATION IN AUTOMOBILE:

Supplied with the radio receiver are the power box, eight spark plug type suppressors, one distributor suppressor and one generator condenser.

The power box may be mounted under the dash, high enough up to leave room for the feet on the toe board; or it may be placed under the front seat by those who do not care to permanently attach the box to the car. The metal shielded cable terminating in two connecting lugs is the battery cable. The lug connected to the metal shield should be connected to the car chassis, or the grounded side of the battery. The lug terminating the insulated wire may be connected to a terminal of the ammeter, or to the "hot," or ungrounded side of the battery.

After making the above connections, run the black thick cotton covered cable under the floor mat, or under the seat, and plug into radio receiver.

Later model automobiles have antennas built in the tops with a lead in wire usually brought down the right front door post. An extension may be made to this wire and connected to the antenna wire extending from the radio receiver. Older model cars may be equipped with either a top antenna or a running board type at slight cost.

In order to reduce the noise from the ignition system in the car, a spark plug suppressor should be connected in series with each spark plug wire at the plug, and the distributor suppressor should be plugged into the central distributor connection in series with the lead running to this point. The generator condenser should be mounted on the generator and the flexible lead connected to the terminal at the cutout where the wire from the generator is attached.

Some cars require special work to further reduce noises due to peculiarities of the wiring systems.

The on-and-off switch operated by the volume knob controls both the six volt battery supply and the 110 - 125 volt AC supply when used in the home with AC line cord supplied.

SERVICE DATA:

When operated from 110 - 125 volt A.C. source, an auto-transformer in the receiver is used to provide the high voltage for the plate and field supply, and the filament supply for the tubes. The chassis is directly connected to the power source, and contact between chassis and ground should be avoided.

On battery operation, the cable plug connects the six volt supply to the filaments of the tubes, and the plate and field supply from the power box to the filter in the set. Neither the auto transformer nor the 1v rectifier is in use when the set is battery operated.

To take the chassis out of the cabinet, first, remove the knobs then the back, and finally the hold down screw in the base of the cabinet. To replace tubes it is only necessary to remove the back.

The back may be plugged on the chassis after removal from the cabinet for testing and aligning.

The mixer coil is in the aluminum shield can in back of the variable condenser.

The oscillator coil is inside the chassis and is trimmed with the front section trimmer on the variable condenser.

Mounted with the oscillator coil is the first I.F. coil which is trimmed by the condensers accessible from the back of the chassis.

The second I.F. transformer is also located within the chassis and may be trimmed by the condensers located under the holes in the chassis bottom.

The power box contains a vibrator type interrupter and transformer, and a rectifier tube with necessary filter system. A 20 ampere auto type fuse is provided for protection to battery and wiring system. The cover of the power unit may be removed for servicing by taking out the four screws around the edge of the base. After several hundred hours' use, the vibrator contacts may require a slight adjustment due to wear. The necessity of this adjustment will be indicated by a marked reduction in the plate supply voltage

On account of the action of the A.V.C., when aligning the set, use a weak signal or oscillator input; and an output meter to indicate resonance.

The following tubes are used:

6A7 as oscillator-mixer,
78 as I.F. amplifier,
6B7 as detector and amplifier,
89 as power amplifier,
1v as rectifier,
6.3 volt dial lamp.

An 84 rectifier is used in the power box.

A.C. VOLTAGE READINGS:

Line	120 volts
Filaments	6 "
Plate 1v rectifier to chassis	230 "

D. C. VOLTAGE READINGS:

From chassis to:

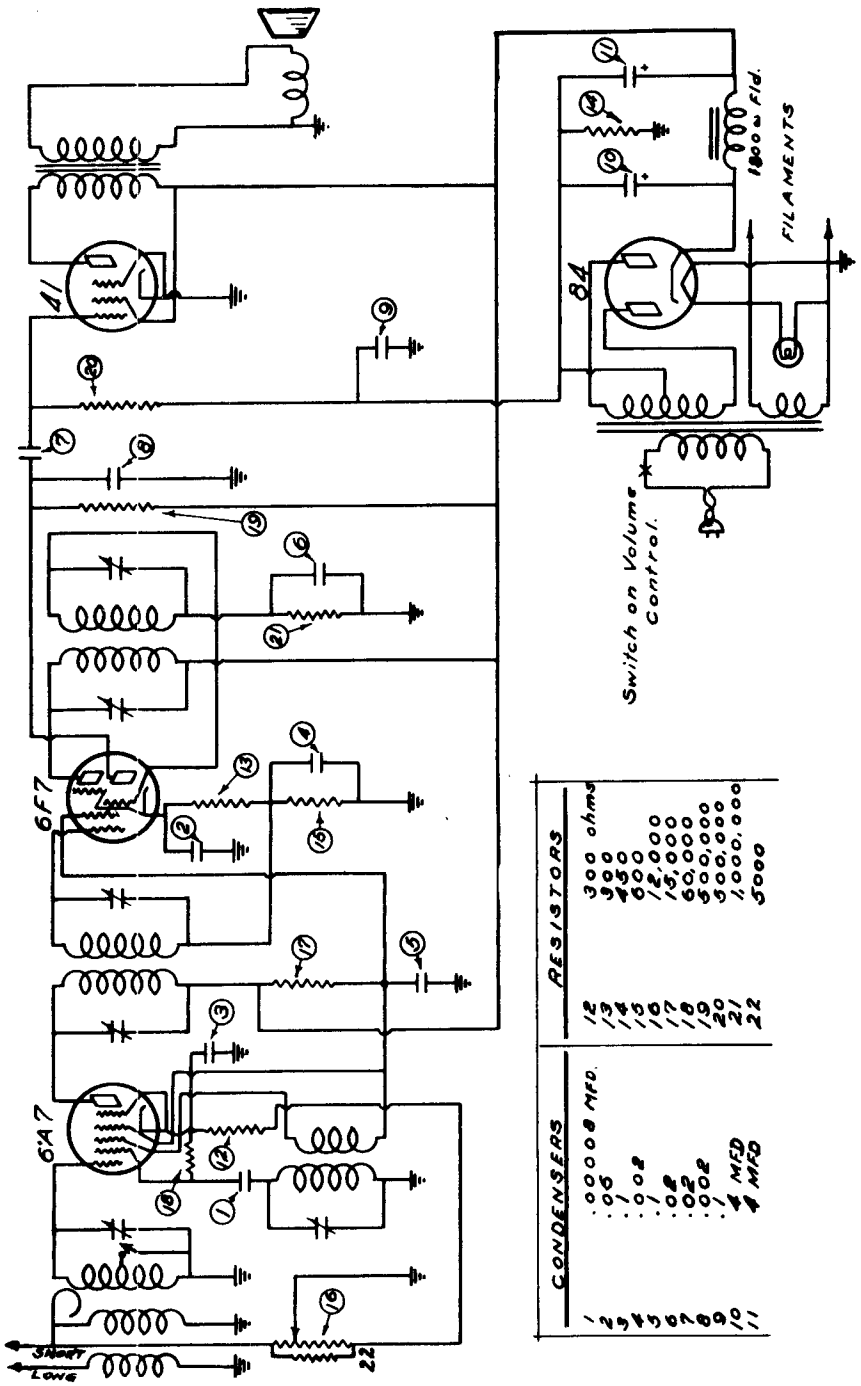
1v Rectifier	tube	cathode	250 volts
89 Power	"	plate	170 "
89 "	"	screen grid	175 "
89 "	"	cathode	18 "
6B7 Detector Amp.	"	plate	60 "
6B7 "	"	screen grid	70 "
6B7 "	"	cathode	2.5 "
78 I.F.	"	plate	175 "
78 I.F.	"	screen grid	70 "
78 I.F.	"	cathode	4.5 "
6A7 Mixer Osc.	"	plate	175 "
6A7 "	"	screen grid	70 "
6A7 "	"	cathode	4.5 "
84 Rectifier	"	cathode	350 "

Voltage across field 75 volts.

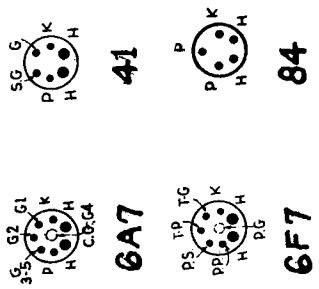
Total current from battery 4.5 amperes.

REMLER CO., Ltd.

MODELS 30 & 40 (SCOTTY)



CONDENSERS		RESISTORS	
1	.00008 Mfd.	12	3000 ohms
2	.05	13	35000
3	.002	14	50000
4	.002	15	2,0000
5	.002	16	60,0000
6	.002	17	600,0000
7	.1 MFD	18	1,000,000
8	4 MFD	19	5000
9		20	
10		21	
11		22	



CONTROLS:

The knob at the left controls the volume and also operates the ON and OFF switch. The knob at the right is the station selector. The dial is calibrated in hundreds of kilocycles. The short wave switch allows the reception of the higher frequency police band when the switch is to the right, and the selector is turned to from 15 to 16 on the dial. The lower frequency police band is received at 17 on the dial with the switch to the left, or broadcast position.

SERVICE DATA:

The antenna and mixer coils are in the aluminum shield at the back of the variable condenser. The mixer coil is trimmed by the back section trimmer. The oscillator coil is within the chassis and is trimmed by the front section trimmer on the variable condenser. The first I.F. transformer is mounted with the oscillator coil and is trimmed by the condensers accessible from the back of the chassis. The second I.F. transformer is also located within the chassis and may be trimmed by the condensers mounted thereon. The intermediate frequency used is 450 kilocycles.

TUBES:

This is a four tube superheterodyne receiver employing the following tubes:

#84 as full wave rectifier; #6A7 as oscillator and mixer;
#6F7 as I.F. amplifier and fixed bias detector; and #41
as pentode power amplifier.

INSTALLATION:

This set is designed to operate from a 110 to 125 volts, 50 or 60 cycle A.C. power supply. Two antenna leads are provided. The red wire should be connected when the antenna is less than 100 feet in length, and the green wire should be used when the antenna is longer. A good ground connection to the black lead is necessary for best results.

A. C. VOLTAGES:

Line	- 120 volts
Filaments	6.3 "

D. C. VOLTAGES:

From ground to:

#84	Rectifier cathode	- 330 volts
#41	Plate	240 "
#41	Screen grid	250 "
#41	Grid	20 "
#6F7	Triode plate	100 "
#6F7	Pentode plate	250 "
#6F7	Screen grid	100 "
#6r7	Cathode	8 "
#6F7	Pentode grid	5 "
#6A7	Plate	250 "
#6A7	Screen grid	100 "
#6A7	Oscillator plate	100 "
#6A7	Cathode	3½ - 23 volts

Due to current taken by voltmeter used, readings of detector plate and grid voltages may be slightly less than values shown above.

REMLER CO., Ltd.

MODEL 35

INSTALLATION:

The receiver unit is intended to be mounted on the bulkhead of the car by the single mounting stud which requires the drilling of one 1/2 inch hole through the bulkhead. When locating the position of this hole consideration should be given to possible interference of the set with the position of control cables and other apparatus between the dash and the bulkhead and also of the mounting stud with apparatus on the motor side of the bulkhead. Preferably the receiver should be mounted so as to allow long easy curves of the flexible control cables and a short lead connection to the antenna.

The location of antenna leads from factory installed antennas depends on the make and model of the car. Usually this lead is brought down one of the front body pillar posts and will be found coiled up at the end of the dash. Connect this lead to the shielded lead from the receiver and tape the joint. Where the car is not factory equipped with antenna, a roof type or plate type may be installed with lead brought to a convenient place for connection to the set. The lead and antenna should be kept as far as possible from wiring circuits and the metal body.

The flexible control cables for the tuning and volume control are fitted with special ends to look in the control head. Insert the cable with the slotted end into the left or volume control bushing, and the cable with keyed end into the right, or tuning control bushing. Be sure the cable housing extends into the head at least three-eighths of an inch, then tighten the set screws on the bushings. Next insert the cables into the brackets and couplings on the set. The volume control cable in the lower coupling and the tuning cable in the upper coupling, but do not tighten the set screws on the shafts. Next clamp the control head to the steering column, tape the control cables to the column bracket or some solid object under the dash and tighten the clamps on the cable housings at the set. Now turn the volume knob to the position where it is removable from the key slot, and turn the tuning knob to the left till the pointer is on the white line at the low frequency end of the dial. Rotate the couplings projecting from the set to the left till the condenser is against the stop and the switch on the volume control is in the off position. Now the set screws on the shaft couplings may be tightened.

Plug the dial light into the opening at the rear of the control head. Connect the battery wire, the shielded wire with fuse holder and terminal, to the battery side of the ammeter. This terminal on the ammeter usually has only one wire attached.

IGNITION NOISE SUPPRESSION:

The spark plug suppressors should be connected in series with the plugs at each plug and the distributor suppressor should be plugged into the central distributor connection in series with the lead running to this point. The generator condenser should be mounted on the generator and the flexible lead connected to the terminal at the cutout where the wire from the generator is attached. Some cars require special work to further reduce noises due to peculiarities of the wiring systems.

OPERATION:

The left hand knob on the control head operates both the power switch and the volume control. Turn the knob clockwise to increase volume. The dial should become illuminated when the power is on.

Rotate the station selector, or tuning knob until the desired program is heard, reduce the volume, and readjust the selector to the position where quality is the best. The volume control may now be advanced to the desired volume level. The knob on the right side of the set is the tone control. This may be adjusted to modify the tone or to reduce noise and static disturbances.

SHORT WAVE:

The short wave switch is on the left of the speaker. When this knob is turned to the left the regular broadcast band is covered by the station selector dial as well as the lower frequency police band as noted on the dial. When the switch is turned to the right the selector dial covers from 2200 to 6500 K. C. The positions of the higher frequency police band, the 49 meter short wave broadcast band and the major airport and amateur bands are noted on the inner portion of the dial. Many automobile antenna installations are not suitable for receiving these short wave stations from any great distance. When better results or increased range is desired with the car parked, a fifty or sixty foot portable antenna wire, with the far end raised at least fifteen feet from the ground, may be used.

SERVICE DATA:

Tubes:

6A7 Converter (mixer-oscillator)
78 Super-control amplifier, 1st I.F. stage
78 Super-control amplifier, 2nd I.F. stage
75 Diode-detector-A F amplifier, A.V.C.
41 Power amplifier
84 Full wave rectifier
T-40 Dial light 6.3 v.

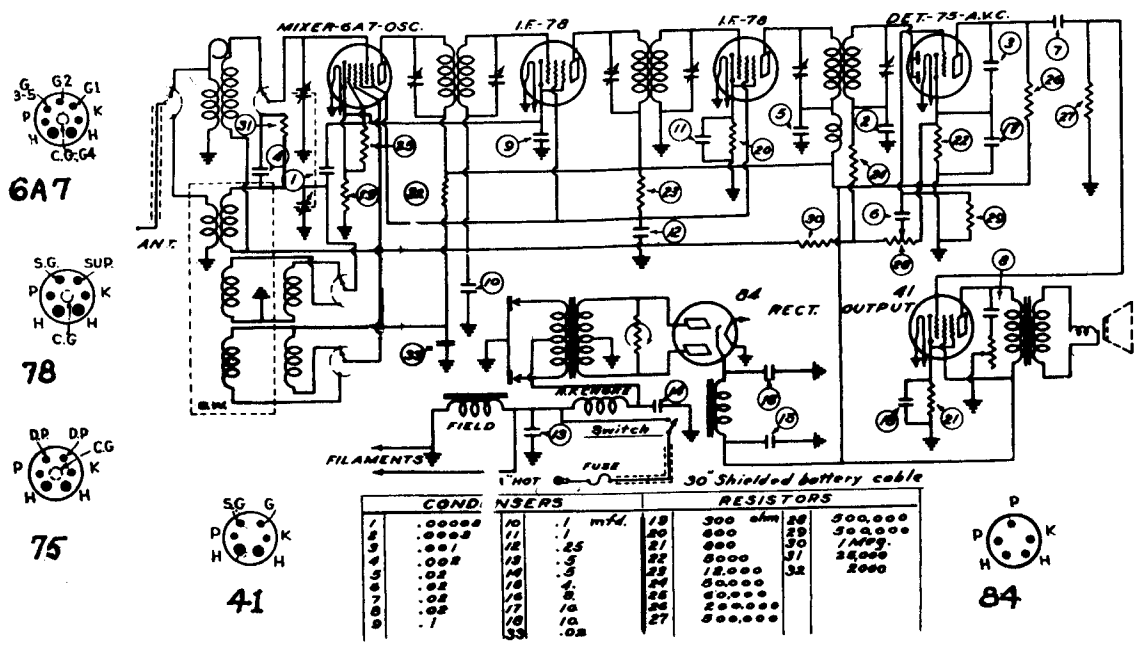
The antenna and mixer coils for the broadcast band are in the shield at the left side of the set. The short wave coils are mounted directly on the short wave switch with the oscillator coil for the broadcast band at the end of the switch. The I.F. transformers are in the aluminum shields adjacent to the antenna-mixer shield. These transformers are peaked at 450 K.C. by the trimmers located at the tops of the shields. Use a weak signal, or oscillator input, and an output meter when aligning the set.

The vibrator type interrupter and transformer are enclosed in the metal box at the right of the receiver. After several hundred hours use the vibrator contacts may require a slight adjustment due to wear. The necessity of this adjustment will be indicated by a marked reduction in plate supply voltage. Vibrator servicing should be done only by a service man with instructions and experience in this work.

Voltages: To chassis - No signal.

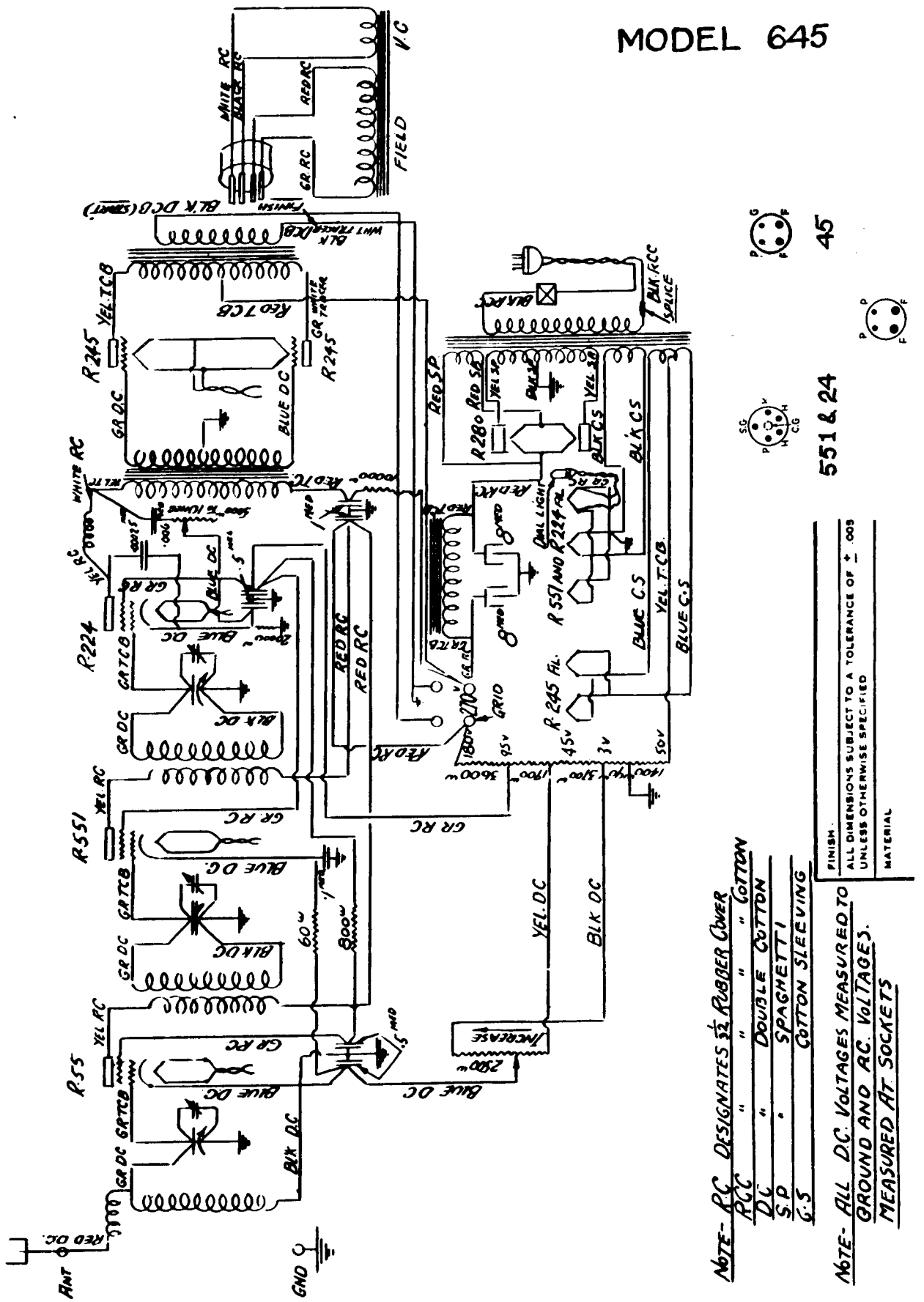
Battery, hot side			6 volts
84 Rectifier	cathode		250 "
41 Power	screen grid		230 "
41 "	plate		220 "
41 "	cathode		18 "
75 Detector amplifier	plate		125 "
75 "	cathode		1.5 "
78 2nd I.F.	"	plate	230 "
78 2nd I.F.	"	screen grid	100 "
78 2nd I.F.	"	cathode	3.5 "
78 1st I.F.	"	plate	230 "
78 1st I.F.	"	screen grid	100 "
78 1st I.F.	"	cathode	5 "
6A7 Mixer plate			230 "
6A7 Mixer screen grid			100 "
6A7 Oscillator plate			200 "
6A7 Mixer-oscillator cathode			5 "

Battery current - 6 amperes



ROGERS-MAJESTIC CORP., Ltd.

MODEL 645



45

80

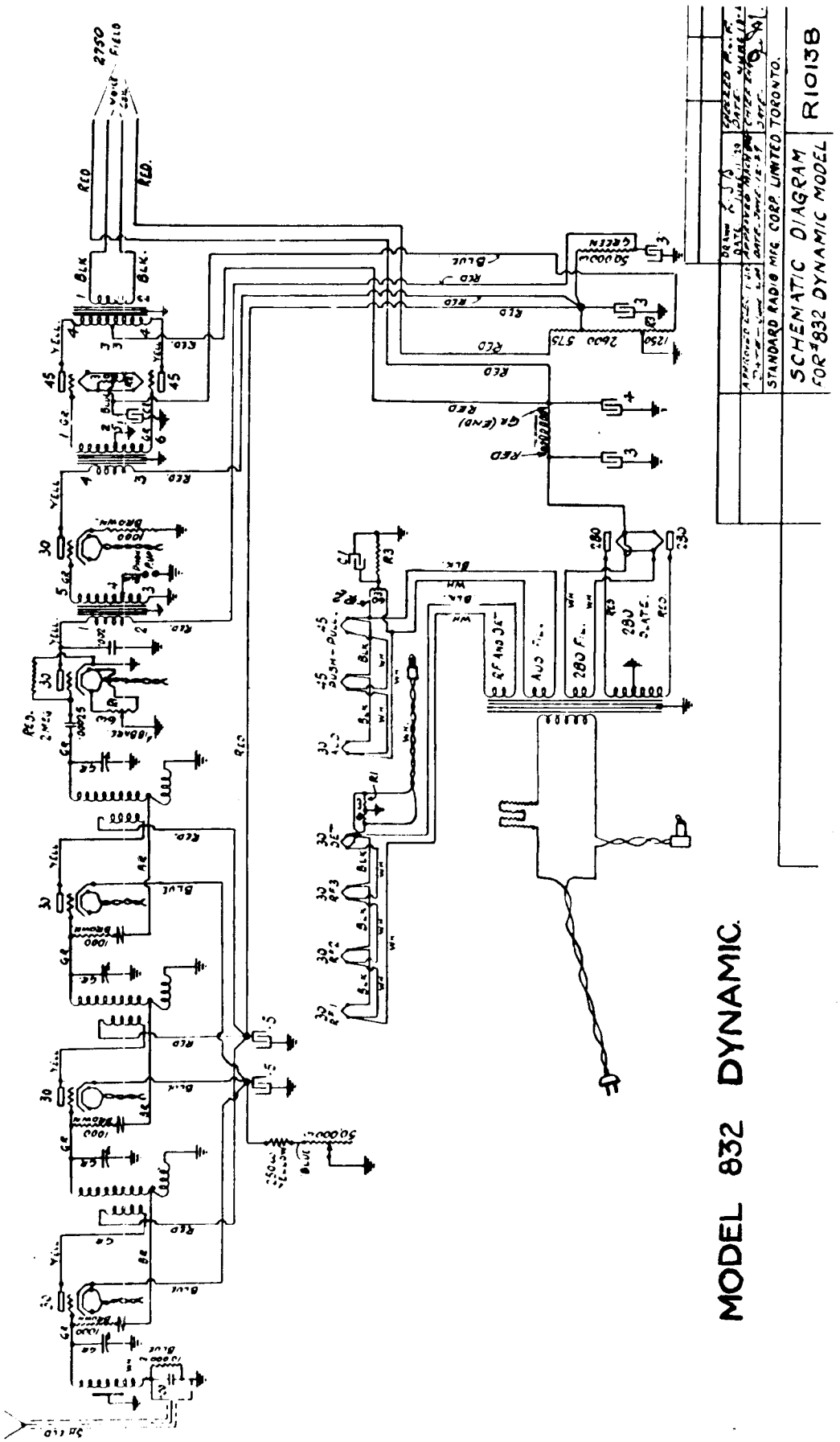
551 & 24

NOTE- RC DESIGNATES ½ RUBBER COVER
RCC " " " " COTTON
DC " " DOUBLE COTTON
SP " " SPAGHETTI
CS " " COTTON SLEEVING

NOTE- ALL DC. VOLTAGES MEASURED TO GROUND AND AC. VOLTAGES. MEASURED AT SOCKETS

FINISH
ALL DIMENSIONS SUBJECT TO A TOLERANCE OF ± .005 UNLESS OTHERWISE SPECIFIED
MATERIAL

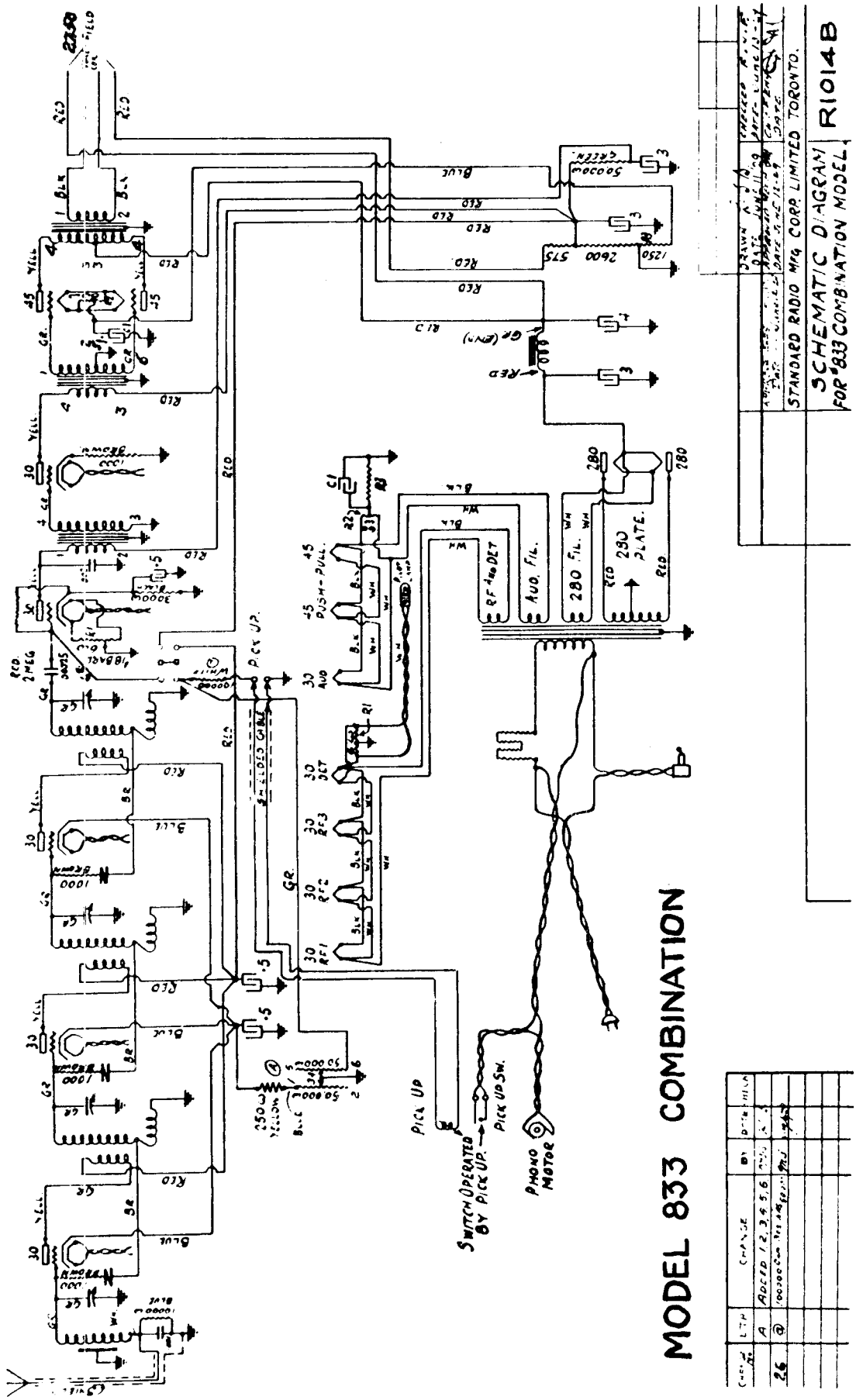
ROGERS-MAJESTIC CORP., Ltd.



Trouble Shooting Hints

Under certain conditions this set will block and it may be necessary to bypass the cathode bias resistors of the first A. F. tube. A condenser of at least 2 mf. should be used for this purpose.

ROGERS-MAJESTIC CORP., Ltd.

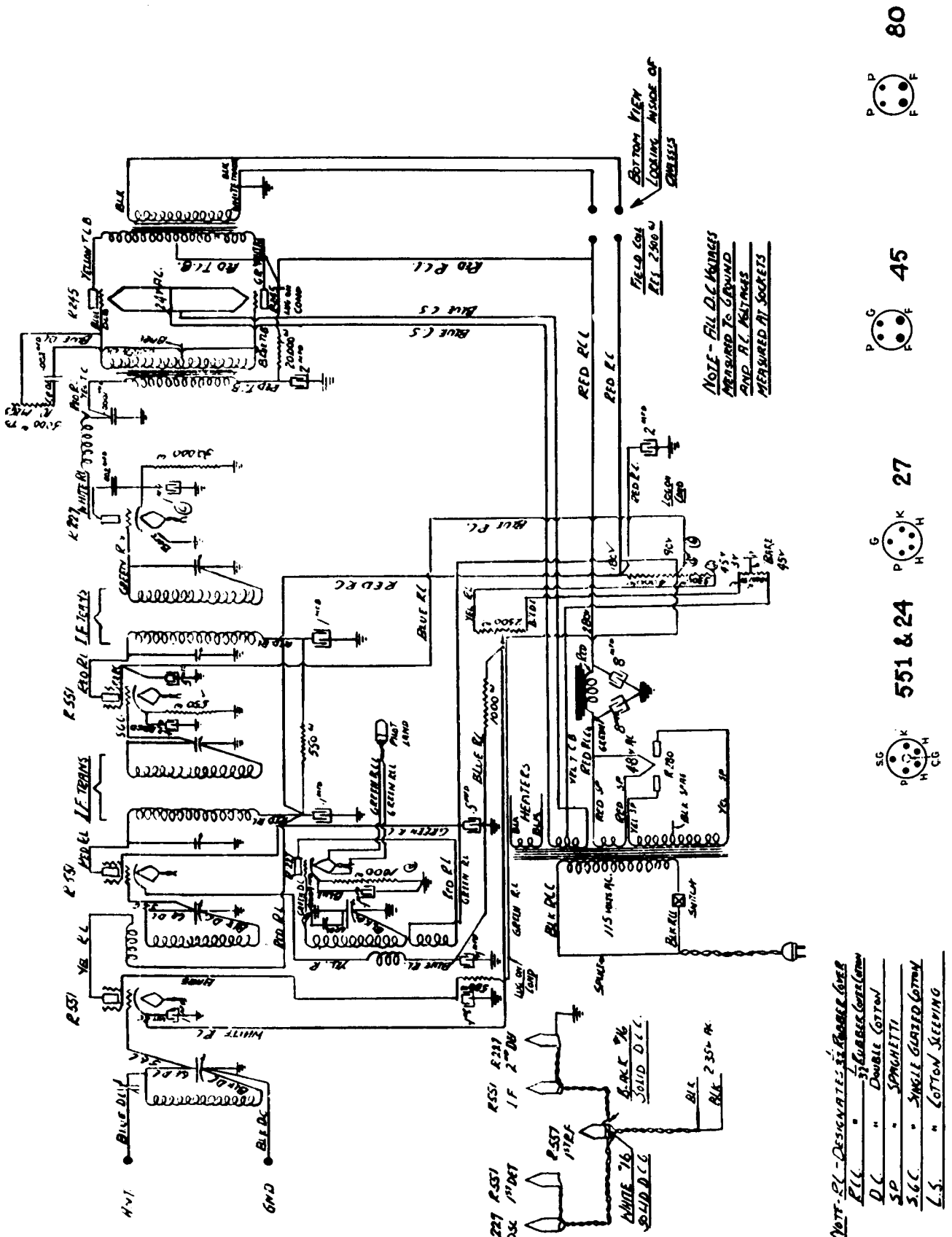


Trouble Shooting Hints

The aerial to this set runs through a shielded sleeve which must be kept away from the other wires in the set to prevent interstage coupling.

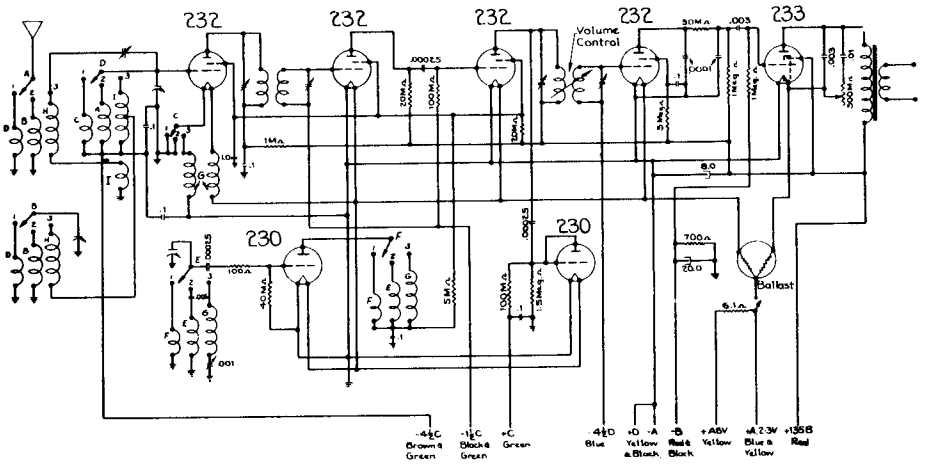
ROGERS-MAJESTIC CORP., Ltd.

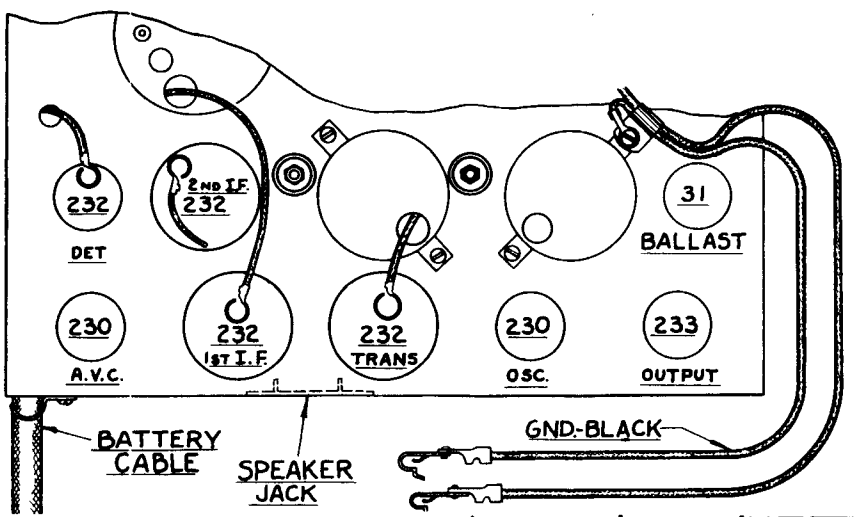
MODEL 840

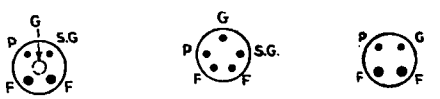


SEARS, ROEBUCK & CO.

MODELS 65-69-1570-1572-1574







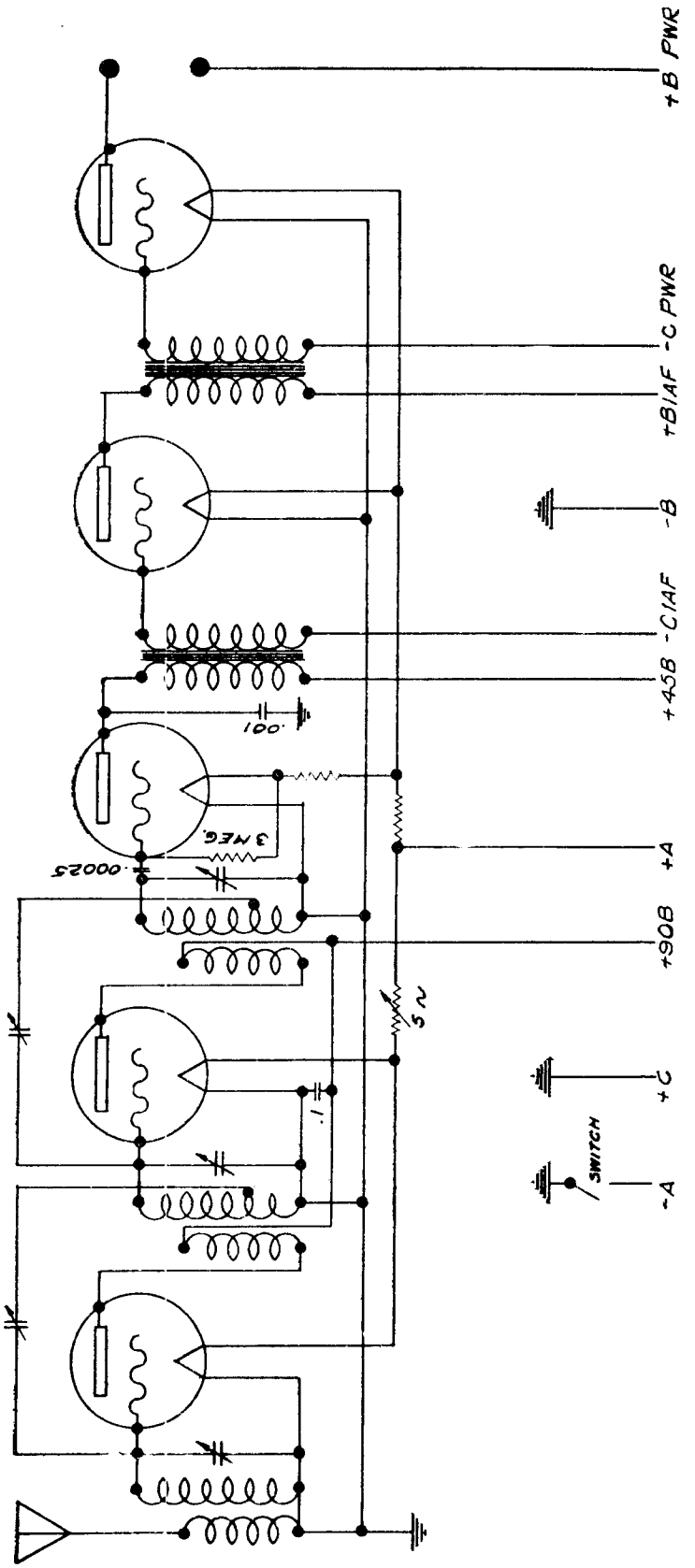
Trouble Shooting Hints

Defective tubes caused by filament over-loads and worn out ballast tubes cause most of the trouble in these sets. Replace the ballast tube if defective.

TUBE	Fil. Volt.	Plate Volt.	Screen Volt.	Control Grid Voltage	Plate Current	Screen Current
232 - Translator	2	118	50	1	.6	.05
232 - First IF	2	78	50	*	2	.4
232 - Second IF	2	118	50	*	1.5	.1
232 - Detector	2	15*	4*	-4.5	Too low to read	
233 - Output	2	112	120	*	11	5
230 - Oscillator	2	44-50**	**	--	2.5-2**	--
230 - A.V.C.	2	Used as receifier, with plate and grid tied together.				

SEARS, ROEBUCK & CO.

MODEL 105



MODEL 105

201 A & 112A

Readings with plug in set socket and tube in tester socket

Tube No. in order	Position of Tube	Type of Tube	A Volts	B Volts	C Volts	Cathode	Plate M.A.	Plate M.A. Grid Test	Plate Change M.A.	Screen Grid Volts
1	1st. R.F.	201A	5	90			6	8.5	2.5	
2	2nd R.F.	201A	5	90			6	8.5	2.5	
3	DET.	201A	5	42			3			
4	1st A.F.	201A	5	80	3		5	7.5	2.5	
5	2nd A.F.	112A	5	120	6		9	13.5	4.5	

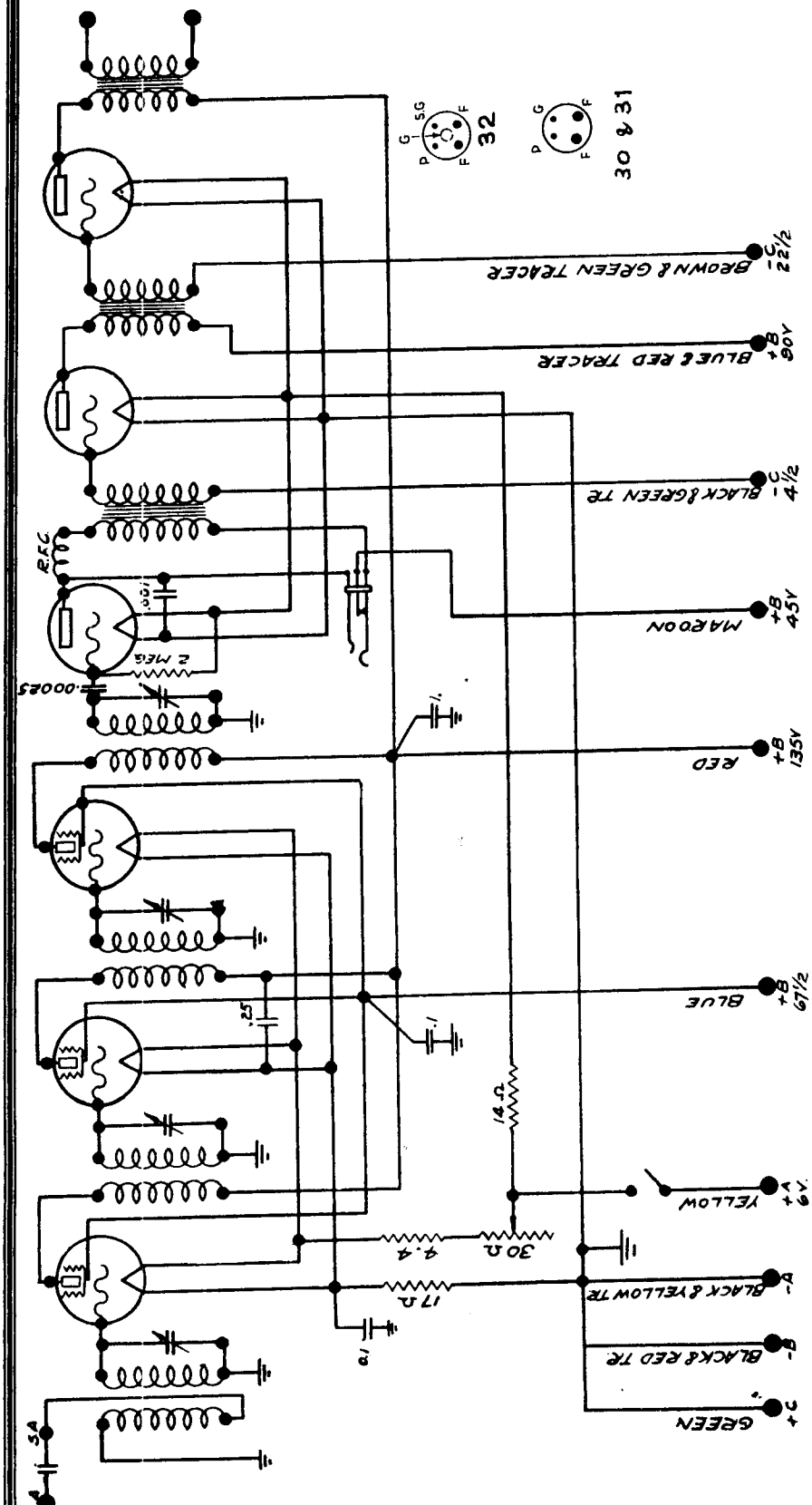
Line Voltage 120 Set on 120 Volt Tap Volume Control FULL ON

Model 105 is a table model, five tube battery operated set using the regular five volt 201A type tubes. It has two stages of neutralized tuned radio frequency, a detector, and two stages of audio amplification, a 112A type power tube being used in the last stage.

SEARS, ROEBUCK & CO.

MODEL 106

Model 106 is a table or console model battery operated set using the new two volt type tubes. It has three stages of screen grid radio frequency amplification, a detector, and two straight stages of audio, with the new two volt power tube in the last stage.



Model 106

1 No. 231 2nd a. f.
2 No. 230 1st a. f. and det.
3 No. 232 screen grid, r. f.

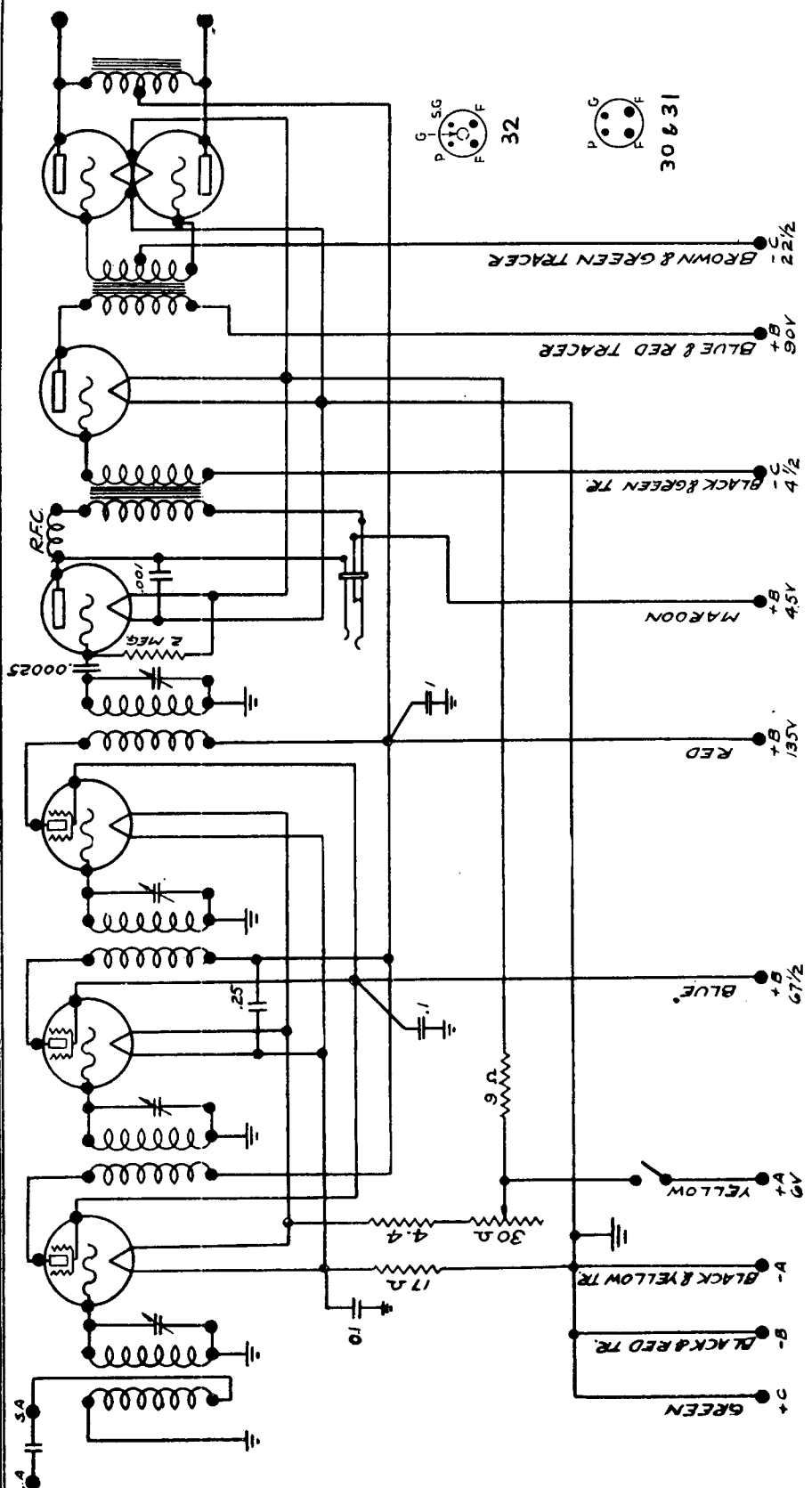
Readings with plug in set socket and tube in tester socket

Tube No. in order	Position of Tube	Type of Tube	A Volts	B Volts	C Volts	Cathode	Plate M.A.	Plate M.A. Grid Test	Plate Change M.A.	Screen Grid Volts
1	1st R.F.	232	2.	135	5		1.1	3.1	2.	64
2	2nd R.F.	232	2.	135	5		1.1	3.1	2.	64
3	3rd R.F.	232	2.	135	5		1.1	3.1	2.	64
4	DET.	230	2.	40	1	-	3.2	3.3	.1	
5	1st A.F.	230	2.	86	5.5		3.6	6.8	3.2	
6	2nd A.F.	231	2.	135	20.5		9.	13.	4.	

SEARS, ROEBUCK & CO.

MODEL 107

Model 107 receiver is similar to Model 106 except that an additional two volt power tube is used in the last audio stage to provide push-pull amplification.



Model 107

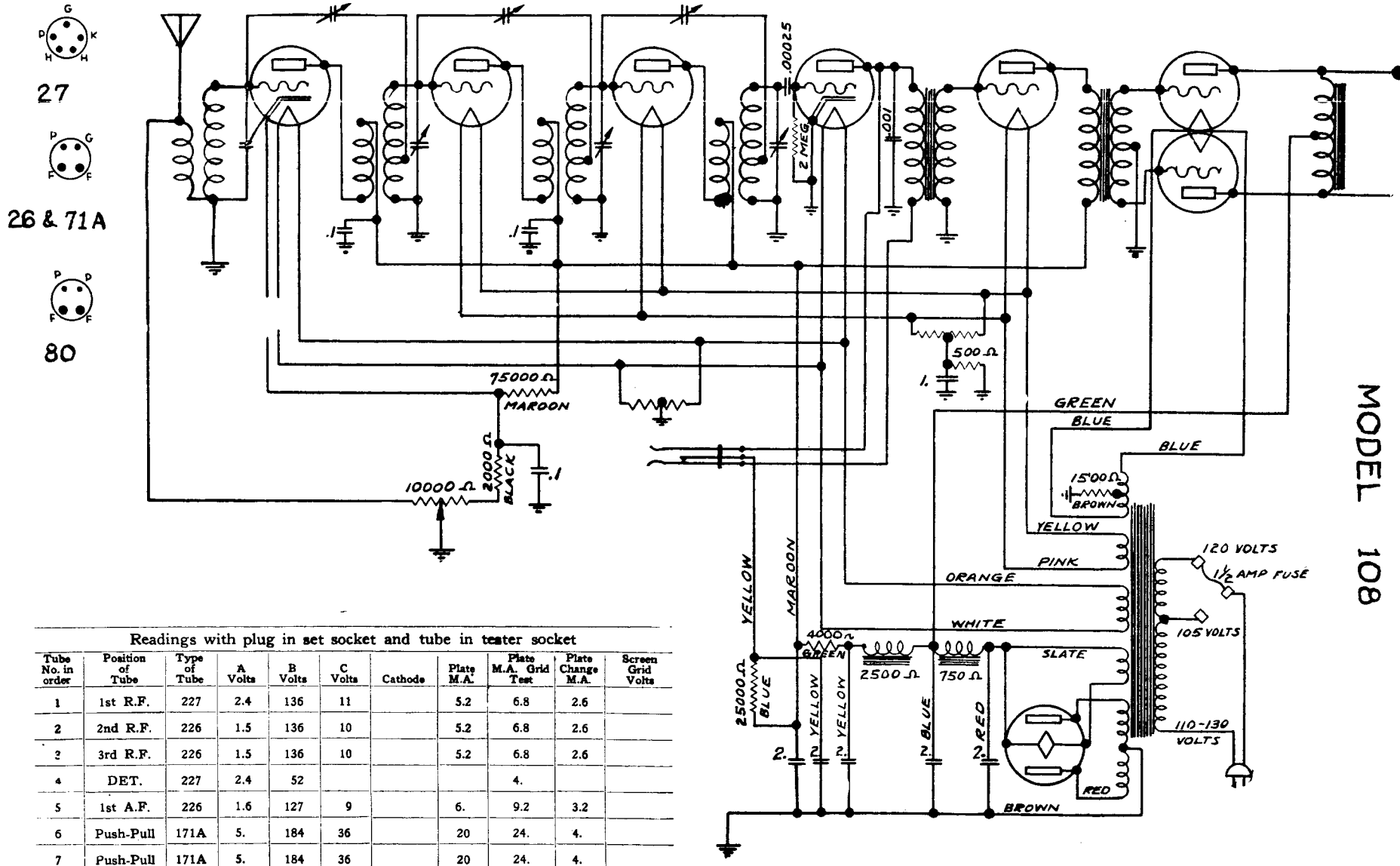
2 No. 231 push-pull, 2nd a. f.
2 No. 230 1st a. f. and det.
3 No. 232 screen grid, r. f.

Readings with plug in set socket and tube in tester socket

Tube No. in order	Position of Tube	Type of Tube	A Volts	B Volts	C Volts	Cathode	Plate M.A.	Plate M.A. Grid Test	Plate Change M.A.	Screen Grid Volts
1	1st R.F.	232	1.9	135	5		1.	3.1	2.1	64
2	2nd R.F.	232	1.9	135	5		1.	3.1	2.1	64
3	3rd R.F.	232	1.9	135	5		1.	3.1	2.1	64
4	DET.	230	2.	41	.5		2.1	2.2	.1	
5	1st A.F.	230	2.	84	5.5		2.6	4.7	2.1	
6	Push-Pull	231	2.	135	21.5		9.	13	4.	

SEARS, ROEBUCK & CO.

MODEL 108



Readings with plug in set socket and tube in tester socket

Tube No. in order	Position of Tube	Type of Tube	A Volts	B Volts	C Volts	Cathode	Plate M.A.	Plate M.A. Grid Test	Plate Change M.A.	Screen Grid Volts
1	1st R.F.	227	2.4	136	11		5.2	6.8	2.6	
2	2nd R.F.	226	1.5	136	10		5.2	6.8	2.6	
3	3rd R.F.	226	1.5	136	10		5.2	6.8	2.6	
4	DET.	227	2.4	52				4.		
5	1st A.F.	226	1.6	127	9		6.	9.2	3.2	
6	Push-Pull	171A	5.	184	36		20	24.	4.	
7	Push-Pull	171A	5.	184	36		20	24.	4.	
8	RECT.	280	5.							

Line Voltage 120 Set on 120 Volt Tap Volume Control FULL ON

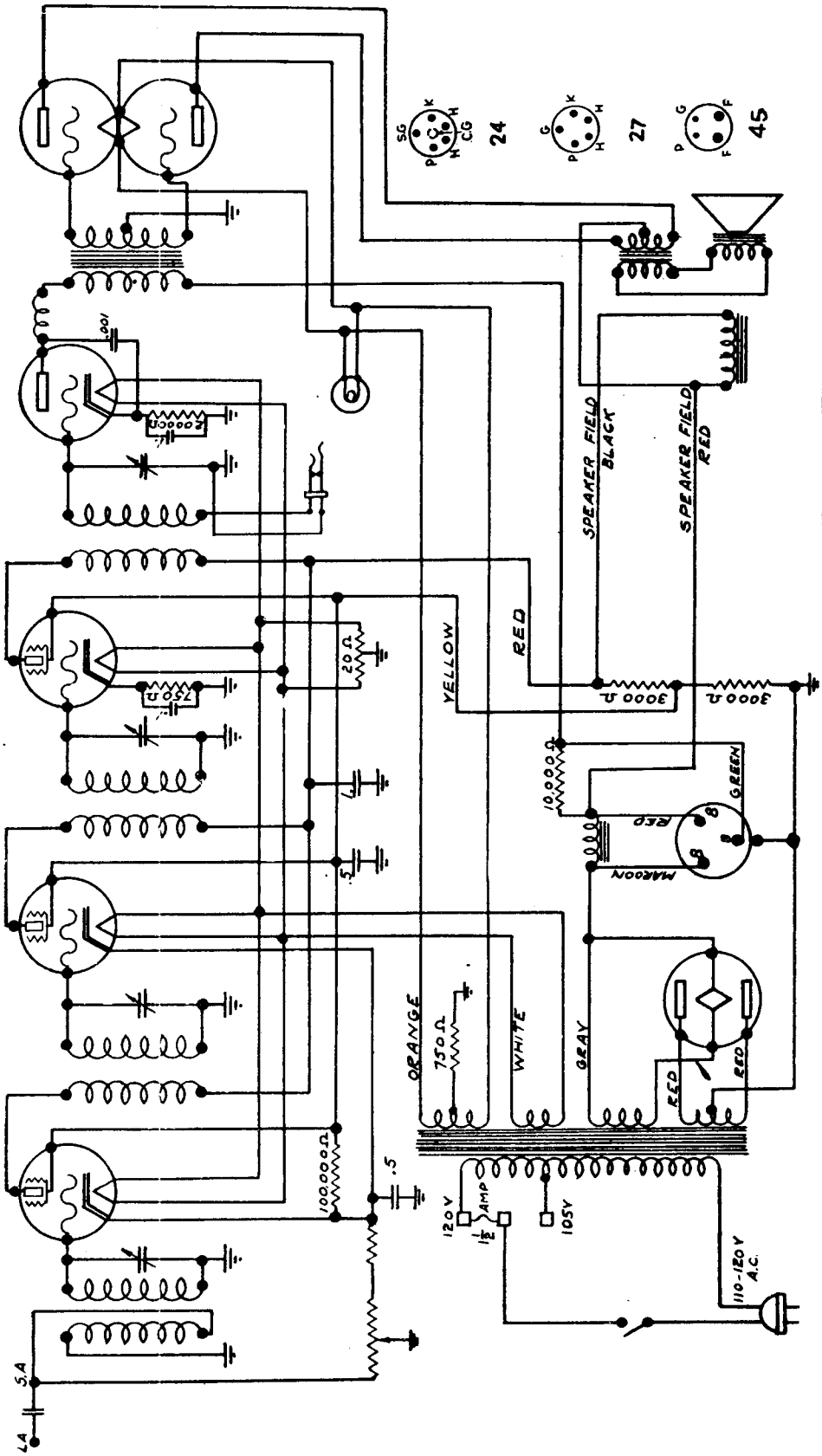
Trouble Shooting Hints

A breakdown in the .1 mf. condensers in the R.F. plate leads and oscillation caused by changes in the neutralizing condensers are the common causes for trouble.

SEARS, ROEBUCK & CO.

MODEL 109

Model 109 is a very sensitive seven tube screen grid console model set using three screen grid tubes in the r. f., a power detector, and a single stage of push-pull.



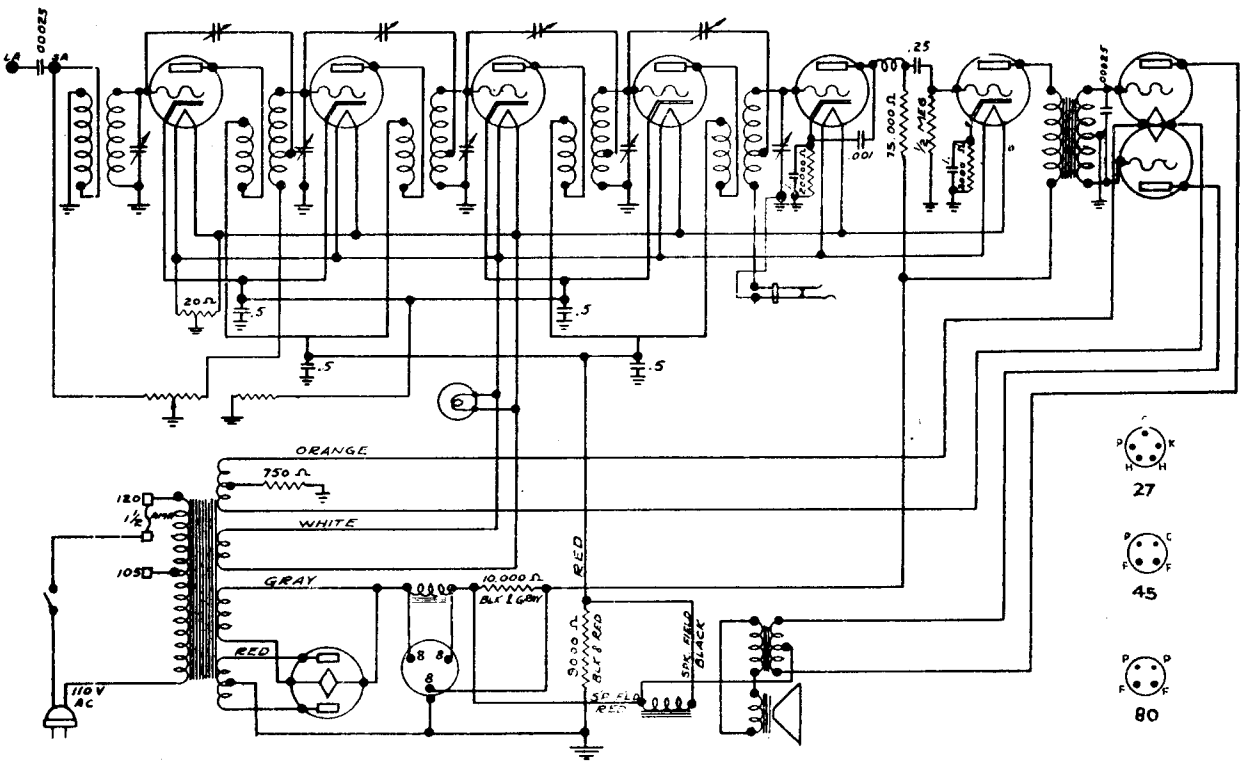
Model 109

1 No. 280 rectifier
2 No. 245 push-pull, a. f.
1 No. 227 detector
3 No. 224 screen grid, r. f.

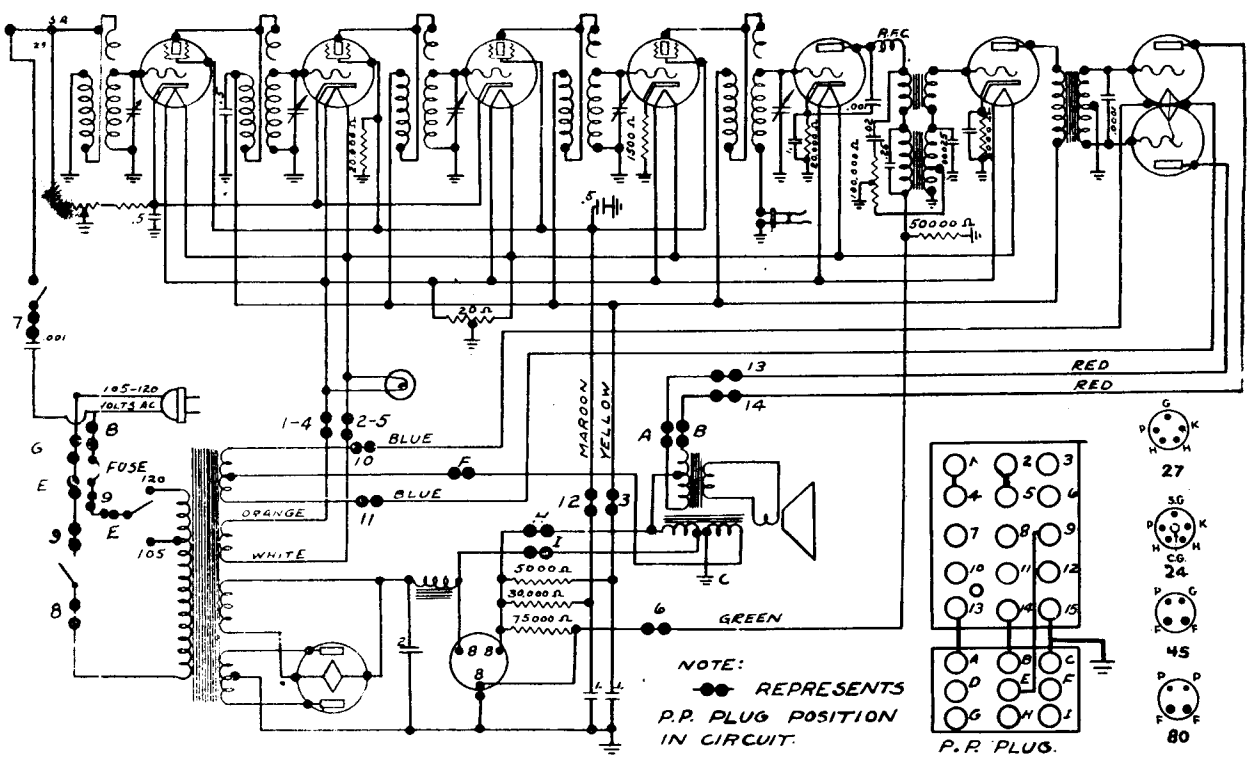
Tube No. in order	Position of Tube	Type of Tube	A Volts	B Volts	C Volts	Cathode	Plate M.A.	Plate M.A. Grid Test	Plate Change M.A.	Screen Grid Volts
1	1st R.F.	224	2.4	178	3.4	3.4	3.5	7.1	3.6	85
2	2nd R.F.	224	2.4	178	3.4	3.4	3.5	7.1	3.6	85
3	3rd R.F.	224	2.4	178	3.4	3.4	3.5	7.1	3.6	85
4	DET.	227	2.4	240	23	2.5	1.1	1.2	.1	
5	Push-Pull	245	2.4	235	45		27	32	5.	
7	RECT.	280	5.	310						

SEARS, ROEBUCK & CO.

MODEL 110

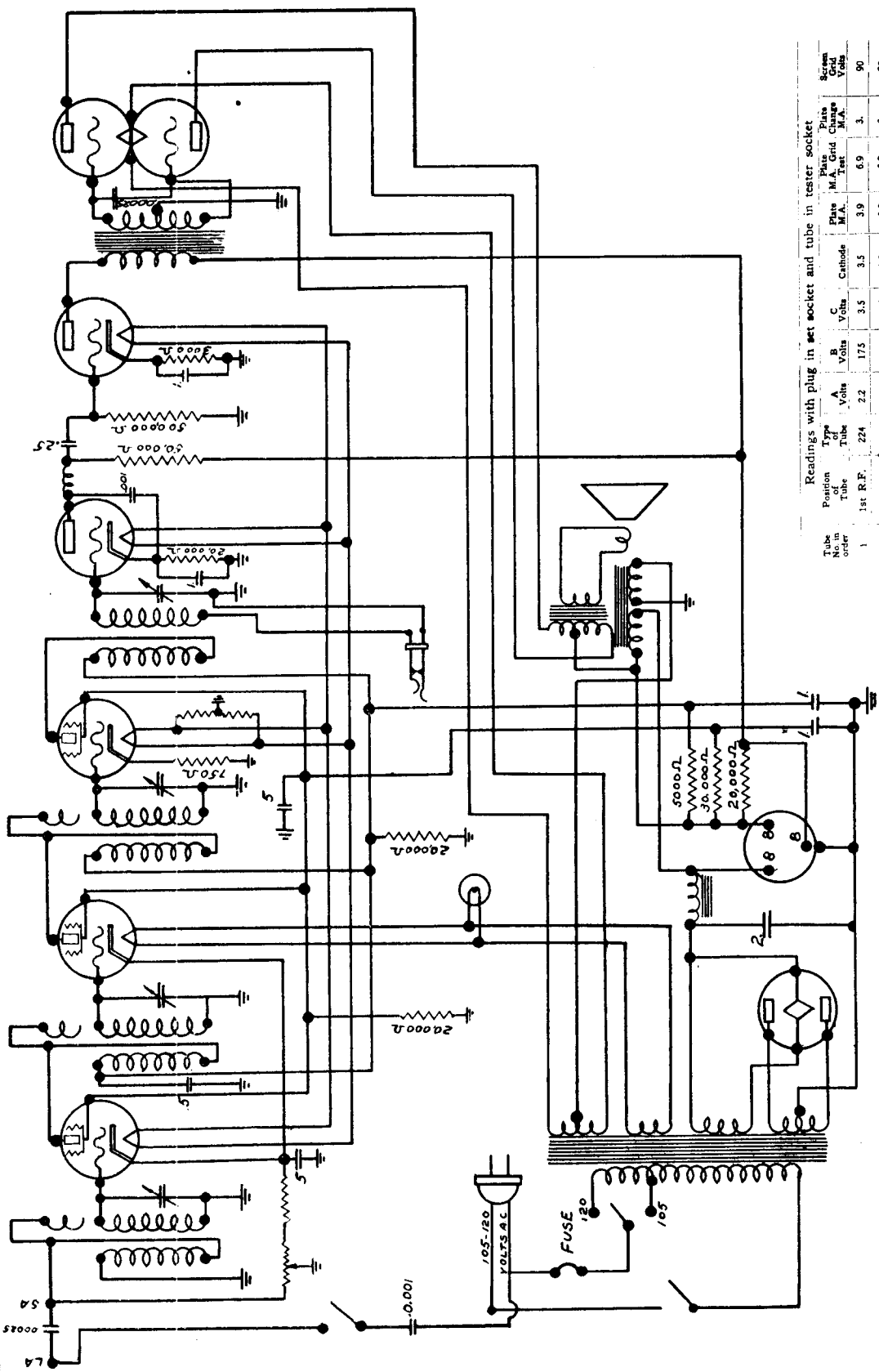


MODEL 111



SEARS, ROEBUCK & CO.

MODEL 112



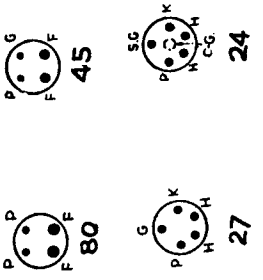
Readings with plug in set socket and tube in tester socket

Tube No. in order	Position of Tube	Type of Tube	A Volts	B Volts	C Volts	Cathode	Plate M.A.	Plate M.A. Grid Test	Plate Change M.A.	Screen Grid Volts
1	1st R.F.	224	2.2	175	3.5	3.5	3.9	6.9	3.	90
2	2nd R.F.	224	2.2	175	3.5	3.5	3.9	6.9	3.	90
3	3rd R.F.	224	2.2	175	3.5	3.5	3.9	6.9	3.	90
4	DET.	227	2.2	110	10	11	.5	.6	.1	
5	1st A.F.	227	2.2	145	1.	9.5	4.6	5.6	1.	
6	Push-Pull	245	2.45	215	43		21	24	3	
7	Push-Pull	245	2.45	215	43		21	24	3	
8	RECT.	280								

Line Voltage 120 Set on 120 Volt Tap Volume Control FULL ON

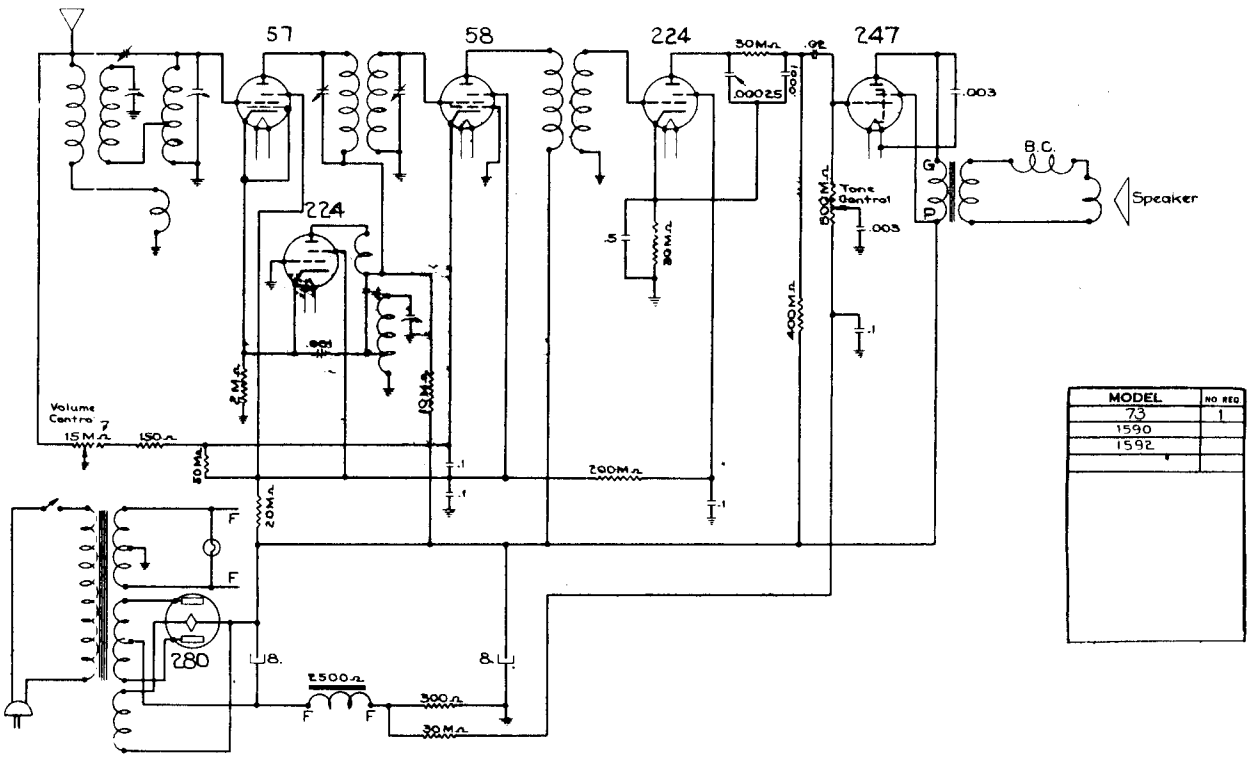
Model 112

1 No. 280 rectifier
2 No. 245 push-pull, 2nd a. f.
2 No. 227 1st a. f. and det
3 No. 224 screen grid, r. f.



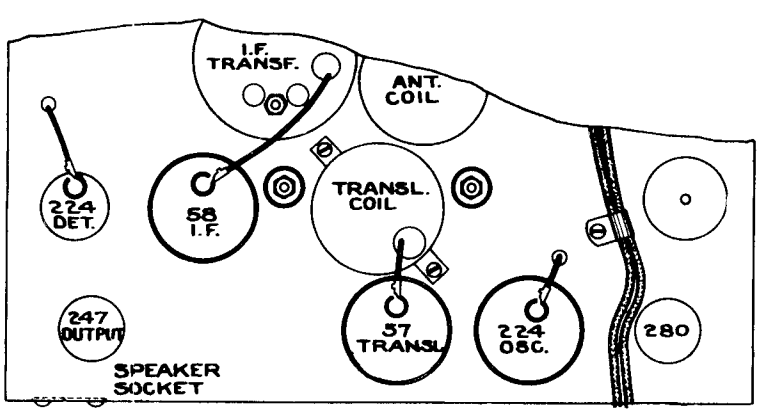
SEARS, ROEBUCK & CO.

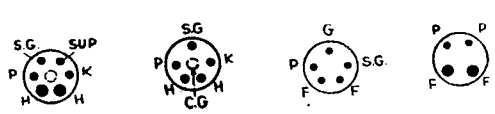
MODEL 1590-1592



TUBE	Plate Volt. Vol. Cont. at Max.	Min.	Screen Volt. Vol. Cont. at Max.	Min.	Cont. Grid V. Vol. Cont. at Max.	Min.	Plate m.a. Vol.Cont. at Max.	Min.	Screen m.a. Vol.Cont. at Max.	Min.
224 - Oscillator	200	200	110	150	-11	-11	3	3	.7	1.5
57 - Translator	180	200	105	145	-11	-11	1.2	1	.35	.3
58 - I. F.	230	210	105	115	-2	-36	10	0	2.5	0
224 - Detector	105	115	75	100	-8	-10	1	1.25	.25	.5
247 - Output	225	235	235	250	*	*	29	35	5.5	7
280 - Rectifier							27 each plate			

* 530,000 ohms in series.



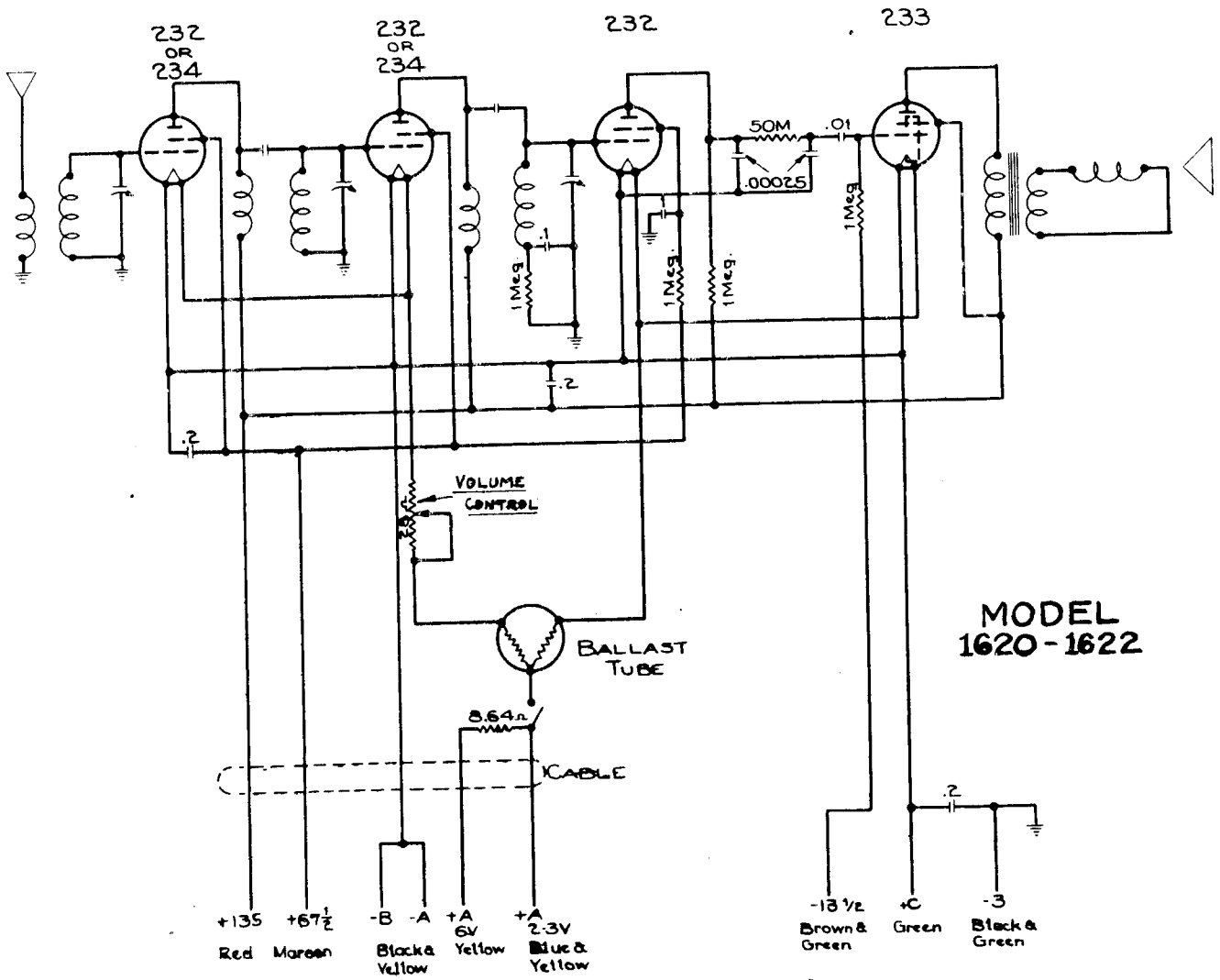


57&58 24 47 80

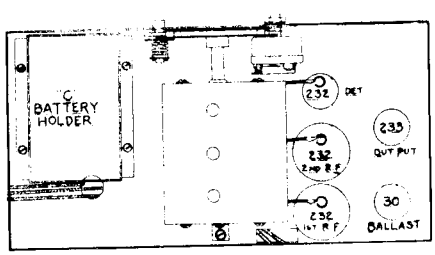
Trouble Shooting Hints

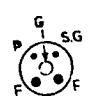
Burned out resistors in the power circuits are the most common causes of trouble. Do not realign the I.F. circuits unless coils are replaced.

SEARS, ROEBUCK & CO.

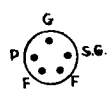


MODEL
1620-1622





32 OR 34



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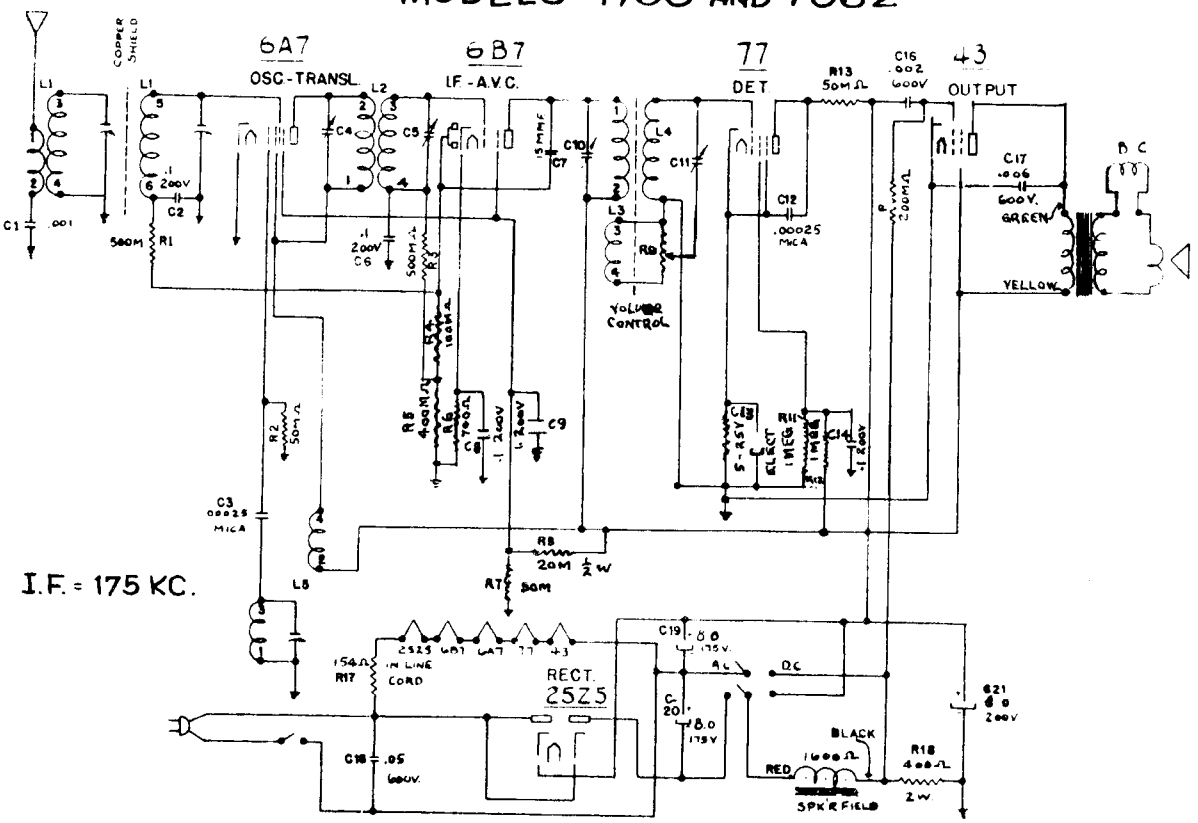
Trouble Shooting Hints

Trouble is usually caused by shorted coupling and filter condensers or defective tubes resulting from voltage overloads.

TUBE	Filament Voltage	Plate Voltage	Screen Voltage	Control Grid V.	Plate Current	Screen Current
232 - First R.F.	2.1	135	67	-3	1.7	.125
232 - Second R.F.	2.1	135	67	-3	1.7	.125
232 - Detector	2.05	27*	13.5*	*	.05	Too low to read
233 - Output	2.05	135	135	*	14	4

SEARS, ROEBUCK & CO.

MODELS 1700 AND 7062

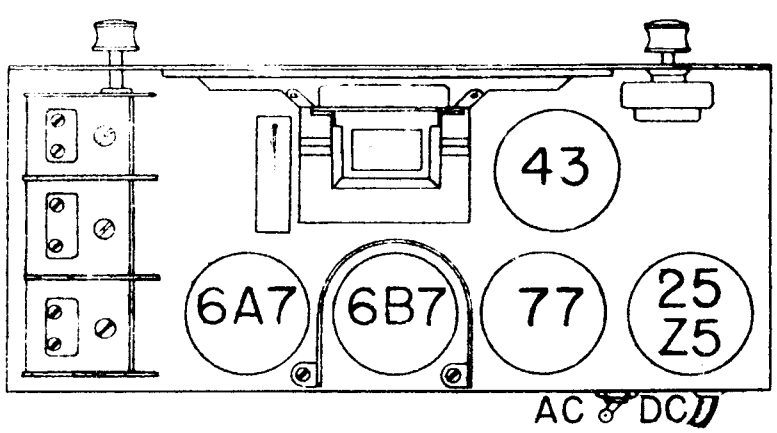


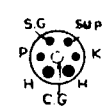
ALL RESISTORS ARE 1/3 WATT UNLESS OTHERWISE MARKED

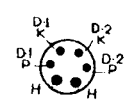
TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE MA	SCREEN MA
6B7 - IF-AVC	110	55	-7*	.4	.2
77 - Detector	50	22	-1.5	.1	.04
43 - Output	100	120	-10*	26	5
6A7 - Osc-Transl	Ep=105v; Ip=2ma	EG#1=-5v; IG#2=1.3ma;	EG#2=105v; EG#3&5=55v; EG#4=*; Ig-#3&5=1.2ma.		
25Z5- Rectifier	Plate Current - 40 M.A.per plate				

Speaker Field Voltage = 70 v.
*= Indicates high series resistor

Eg=Grid Voltage Ip=Plate Current
Ep=Plate Voltage Ig=Grid Current

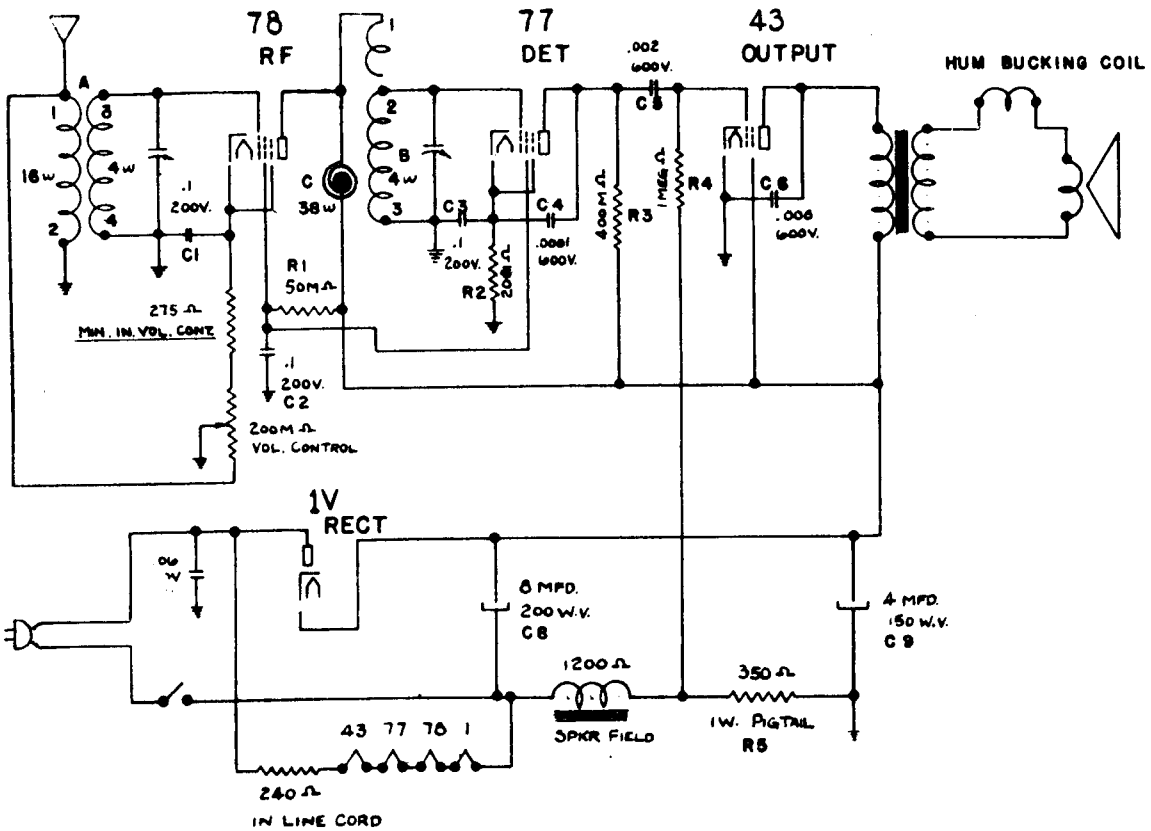




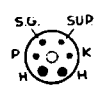


SEARS, ROEBUCK & CO.

MODELS 1703 - 7064

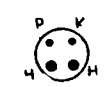


TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - IF	72	30	2.8	.6
77 - Det.	30*	40*	.08	.02
43 - Output	68	74	19	3.5
1V - Rectifier	DC voltage=110v. Plate current=25 m.a.			

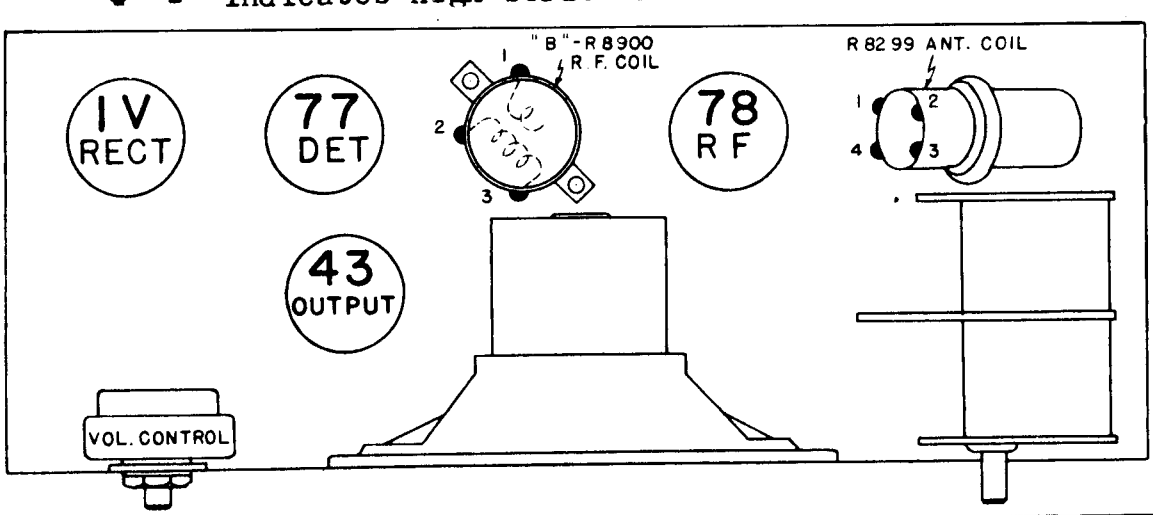


77 & 78

43

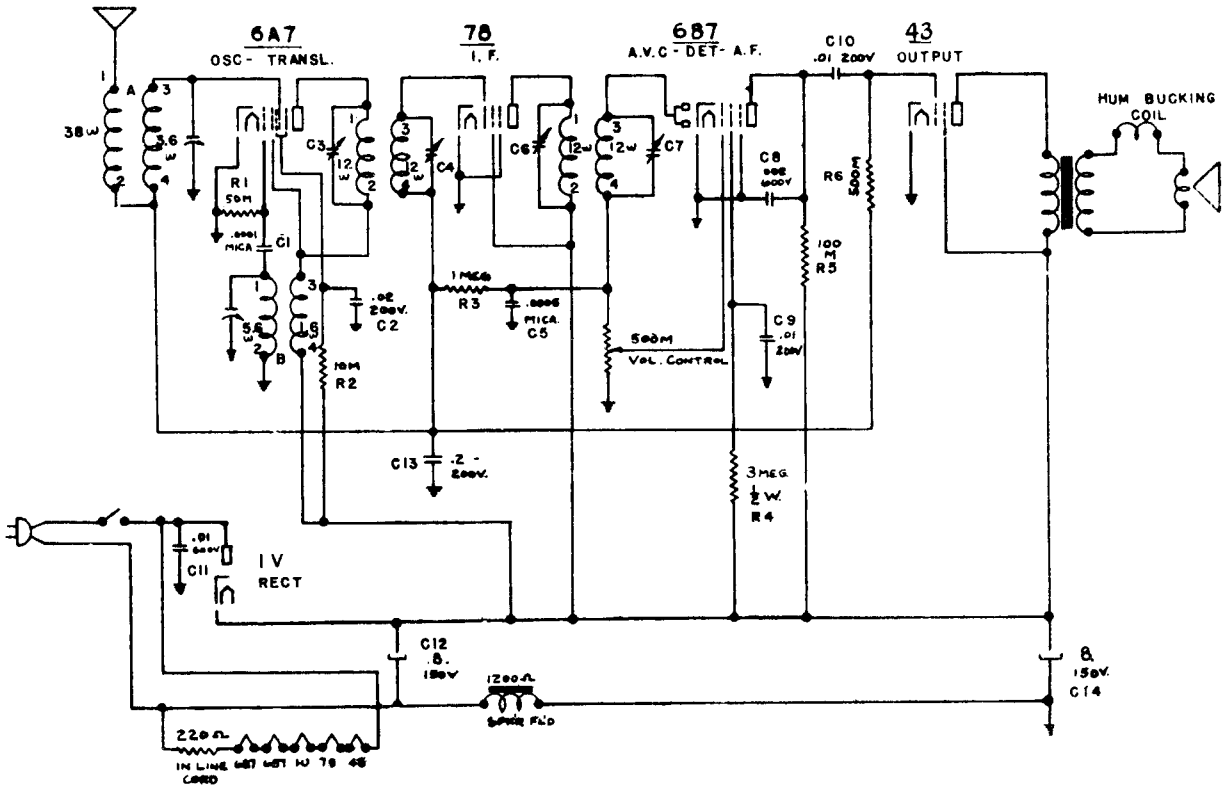


* - Indicates high series resistor

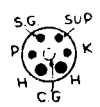


SEARS, ROEBUCK & CO.

MODELS 1704-7070-7071-7072-7073-7074



TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - IF	50	50	1	1
6B7 - AVC-Det-AF	25*		.07	
43 - Output	45	50	20	3.75
6A7 - Osc-Transl	Ep=50v; Eg#2=50v.; Eg#3&#5=35v; Ip=1m.a.; Ig#2=1.1m.a.; Ig#3&#5=1.5m.a.			
1-V - Rect.	Dc voltage=90v; Plate current = 32m.a.			



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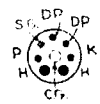

6B7

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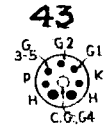
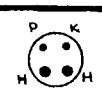


6A7



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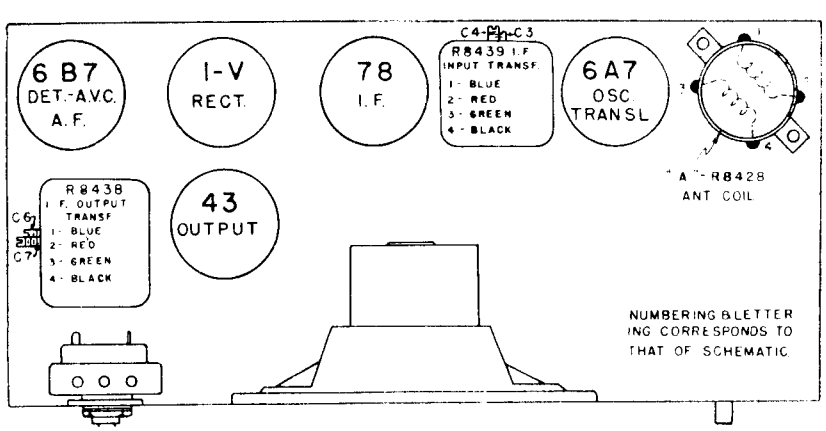
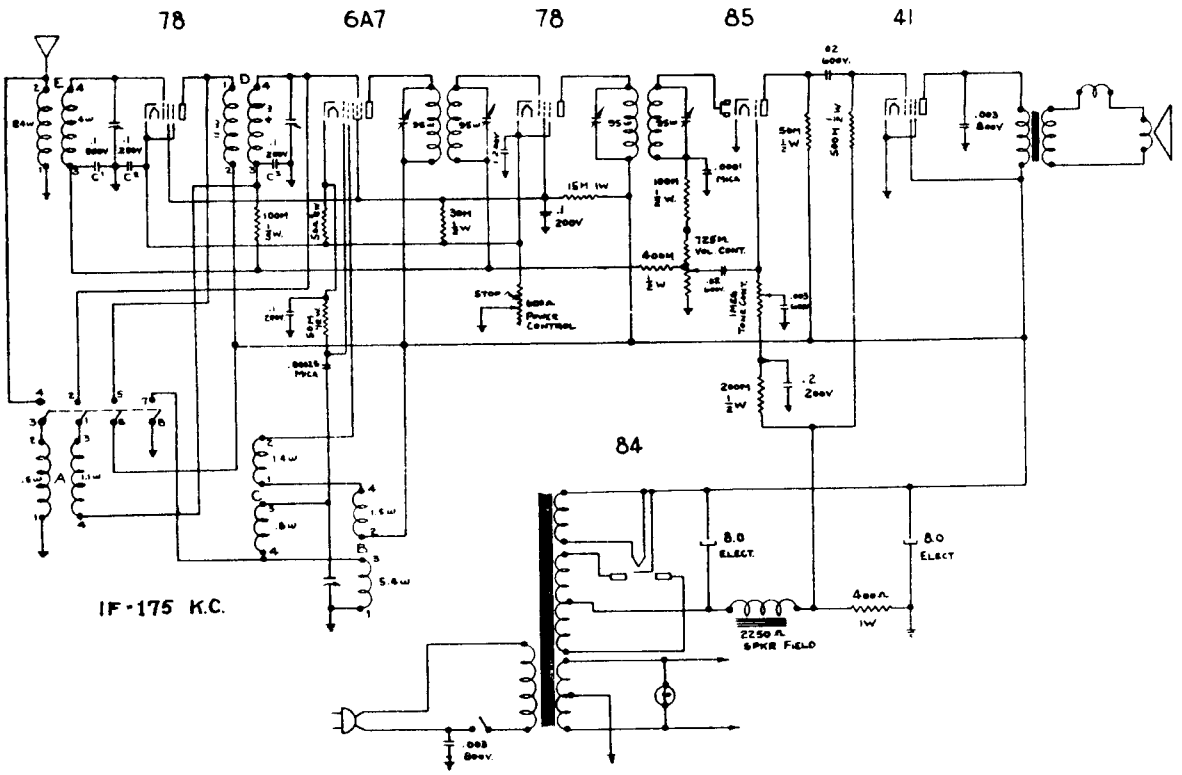


Trouble Shooting Hints

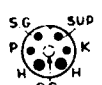
A continuous whistel is usually caused by oscillation of the output tube. Change tube and insert 1000 ohm resistor in screen lead to 43.

SEARS, ROEBUCK & CO.

MODEL 1705



TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M. A.	SCREEN M. A.
78 - RF	155	70	*	4.25	1
78 - IF	155	85	*	5	1.25
85 - AVC-Det-AF	120		*	.75	
41 - Output	155	160	*	12	1.75
6A7 - Osc-Transl	Ep=155v; Eg #2=155v; Eg#3&5=65v; Eg #4=*; Ip=2ma; Ig #2=3.5 ma; Ig #3&5=2.5 ma.				
84 - Rect	Plate current = 17m.a. per plate				



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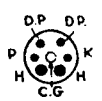

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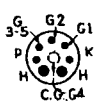
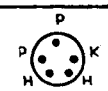


6A7



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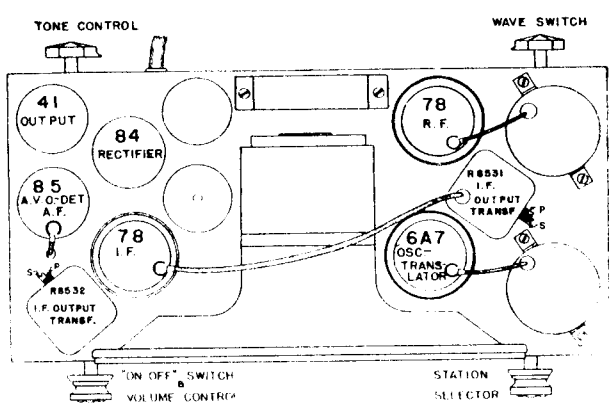
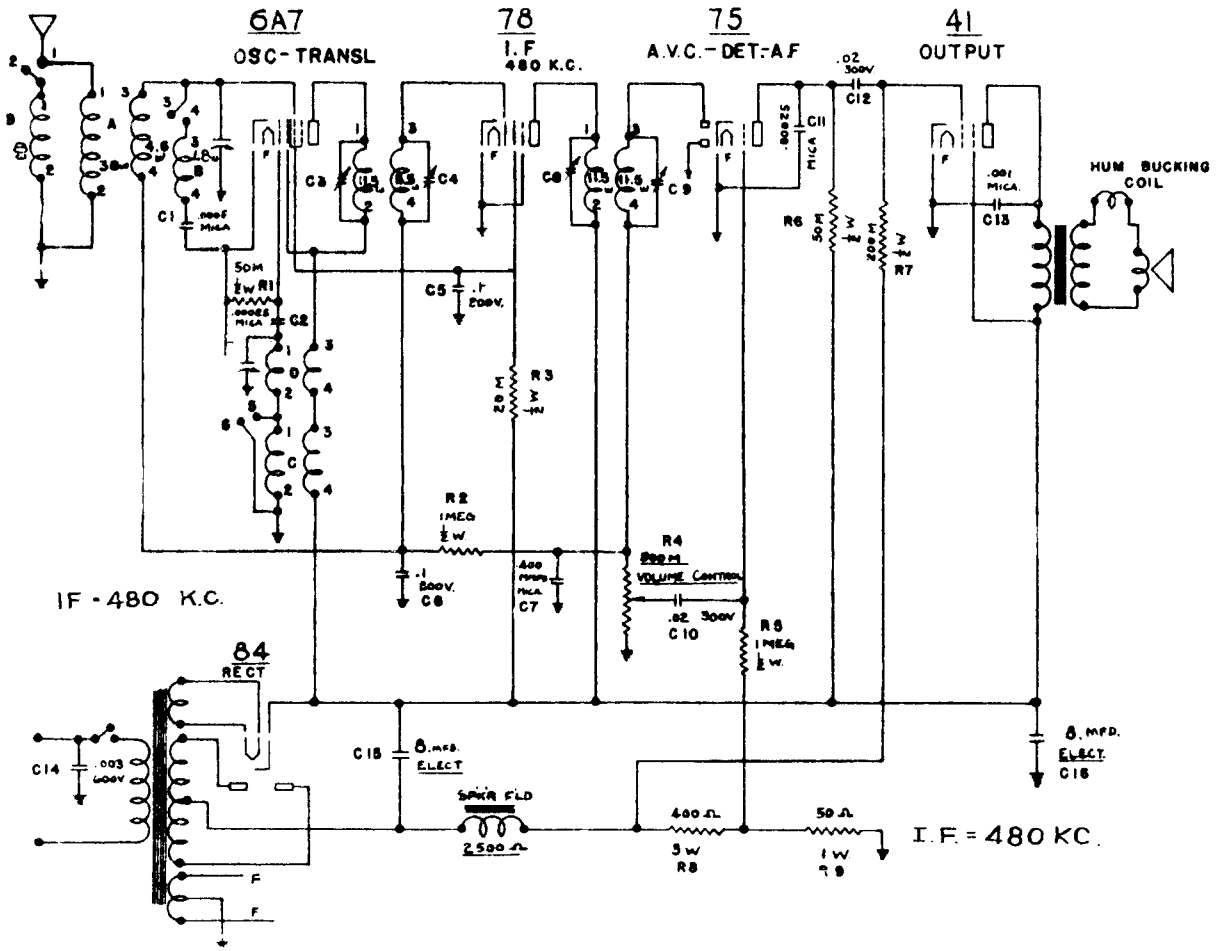


Trouble Shooting Hints

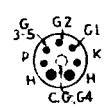
Check 84 rectifier and 8 mf. condensers in case tubes have no plate voltage. Change 85 tube is volume varies intermittently.

SEARS, ROEBUCK & CO.

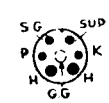
MODELS 1706 - 1707



TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M.A.
78 - IF	170	85	4	1
75 - AVC-DET-AF	140		.5	
41 - Output	165	170	11.5	2.25
6A7- Osc-Transl	Ep=170v; Eg#2=170v; Eg#3 & #5=85v; Ip=3.4m.a.; Ig#2=2.6m.a.; Ig#3 & #5=2.5m.a.			
84 - Rect.	Maximum d.c.=270 volts. Plate current=16m.a. per plate.			



6A7



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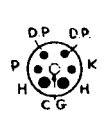

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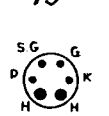

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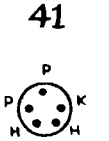

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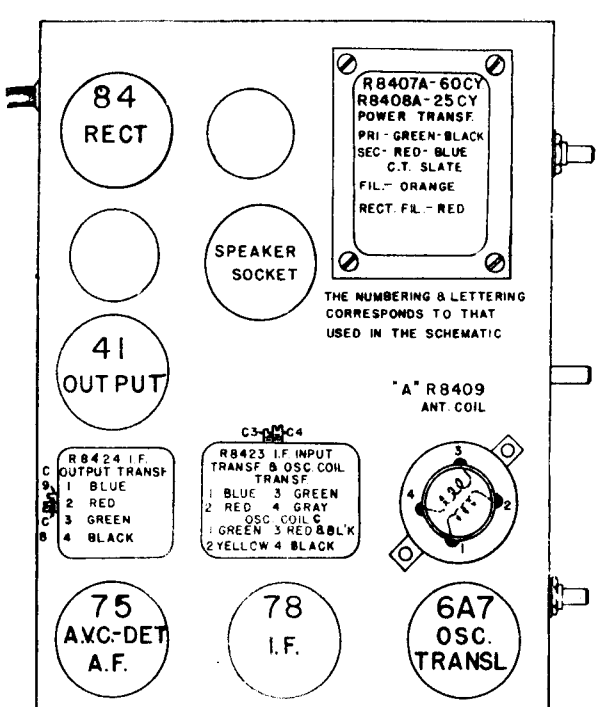

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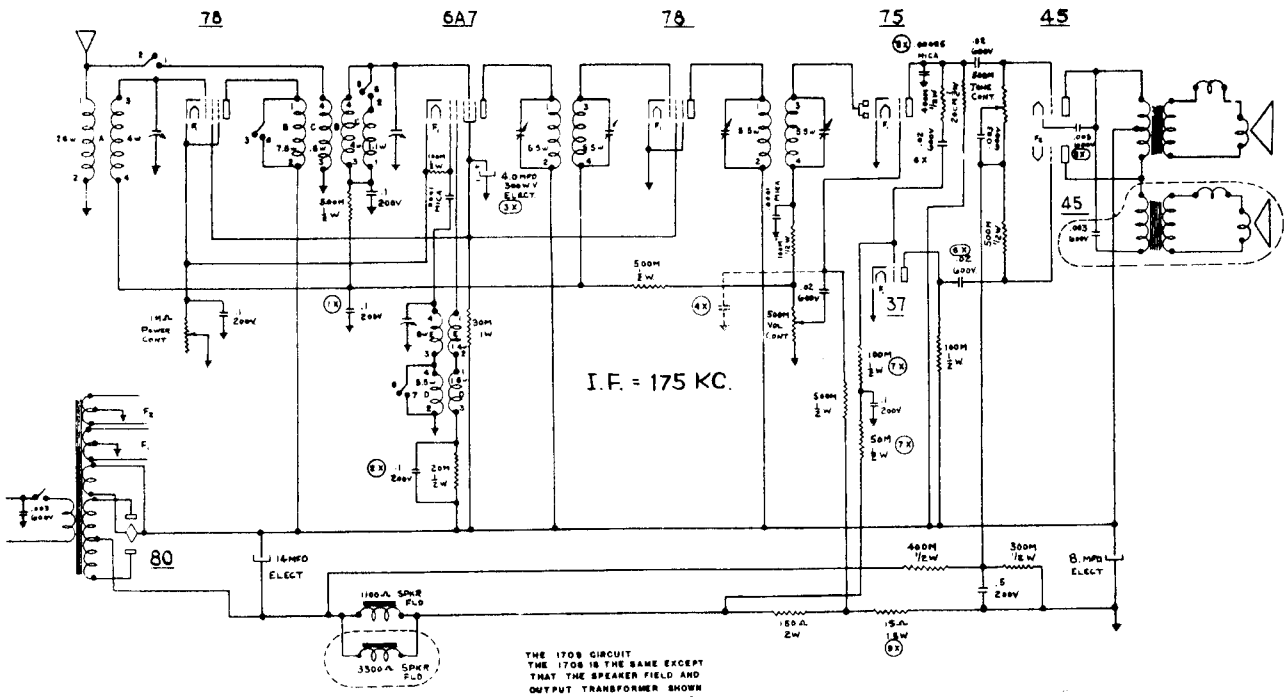
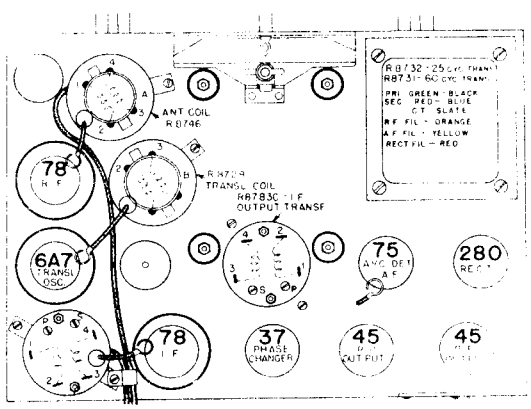
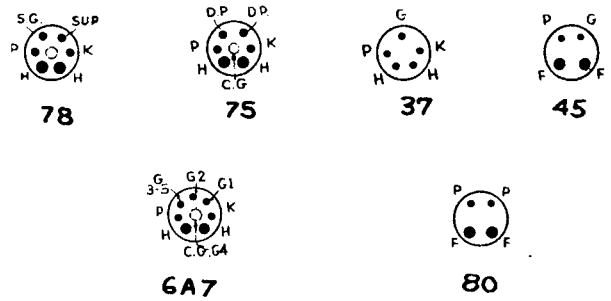
MODES 1708 - 1709



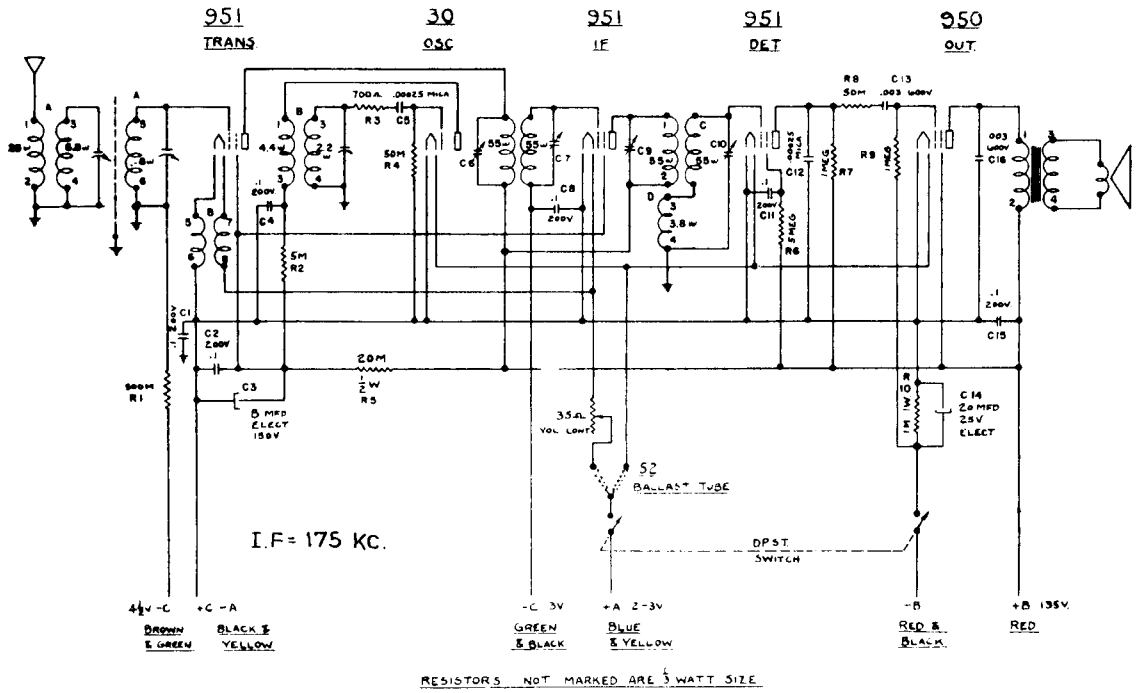




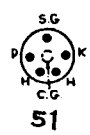
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - RF	235	80	*volume -10 con.off	1-vol.off 5-vol. on	.25-vol.off 1.5-vol. on
78 - IF	235	80	*	1.5	1
75 - AVC-Det-AF	110		*	.54	
'37 -Phase changer	135		*	5.5	
'45 - Output	235		*	30	
6A7 - Osc-transl	Ep=235v; Eg#2=180v; Eg#3&#5=80v; Ip=4.9m.a.; Ig#2=1.6m.a.; Ig#3&#5=1.7m.a.				
280 - Rectifier	Max. d.c. volts-355. Plate current-42m.a.perplate				

SEARS, ROEBUCK & CO.

MODEL 1710

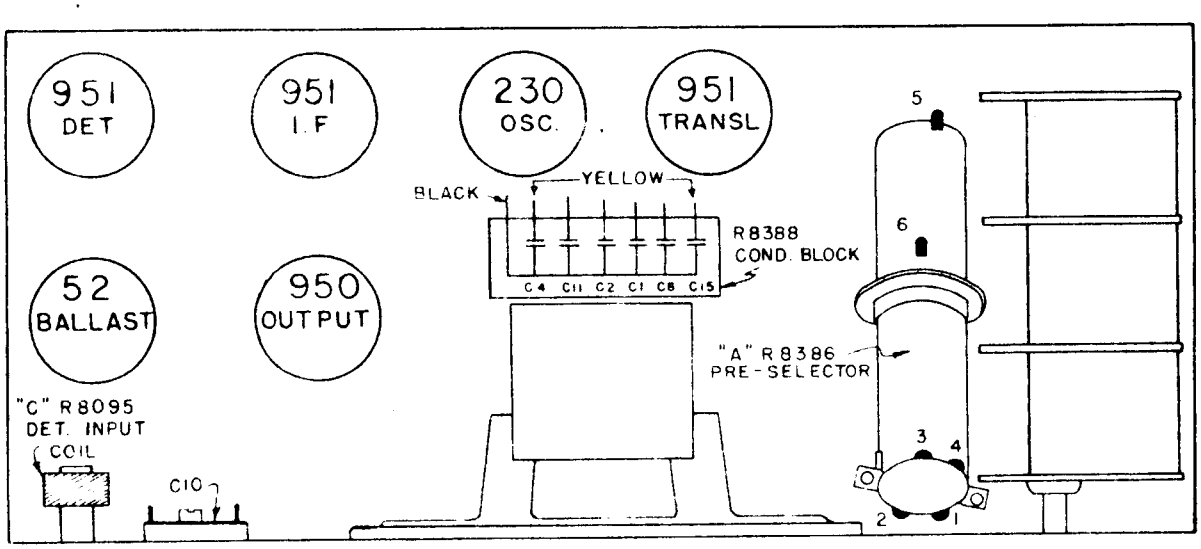


TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
951 - Translator	135	65	.85	.2
230 - Oscillator	50		2.6	
951 - IF	135	65	1.5	1.7
951 - Detector	25*	10*	.03	.02
950 - Output	135	135	6	1.5



51

30 & 50



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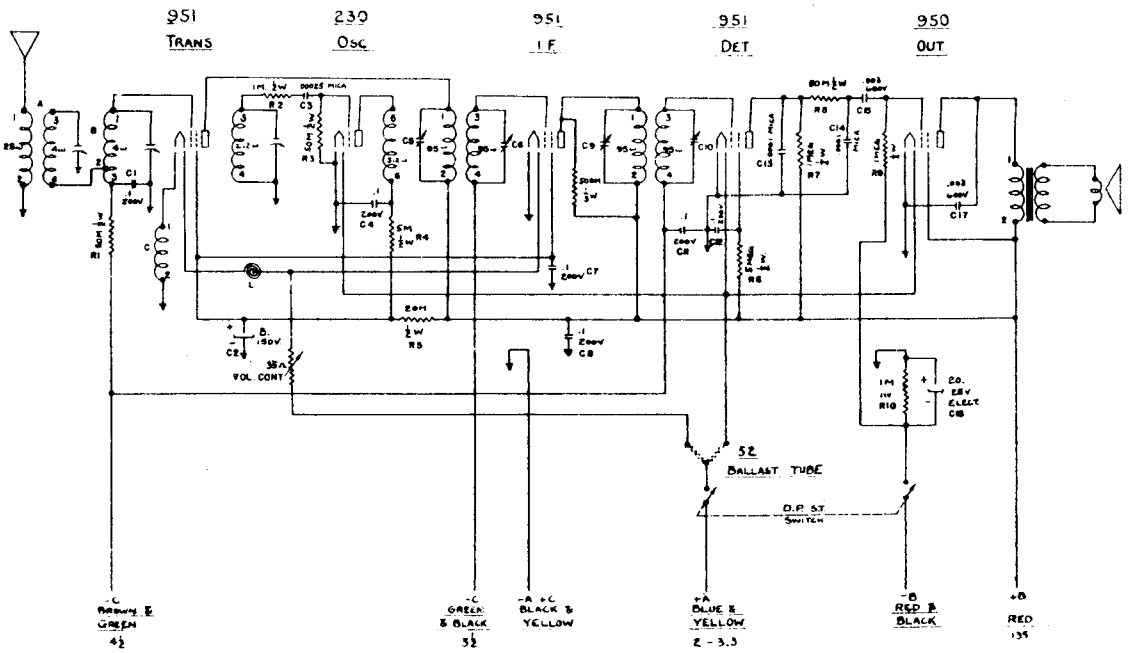
MODEL 1711 - 7090



TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
230 - Osc.	50		2.8	
951 - Transl.	135	65	1.25	1.5
951 - IF	135	65	1.5	2
951 - Det.	25*	5*	.03	.01
950 - Output	136	135	6	1

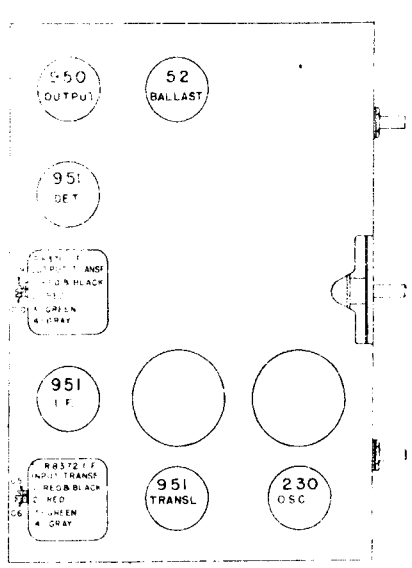
A type 951 translator tube creates a 175 kc signal in its plate circuit by mixing the incoming broadcast signal with the signal created by the type 230 oscillator. This 175 kc signal is amplified by the 951 IF stage and coupled to the 951 detector. The audio output of the detector is fed to the 950 output tube and then to the permanent magnet dynamic loudspeaker.

Volume is controlled by a 35 ohm rheostat in the IF and translator filament circuit. A type 52 ballast tube automatically adjusts the filament voltage to the proper value (2volts) even though the A supply has a value anywhere between two and three volts. Always turn the set off before removing or inserting tubes.

30&50 51

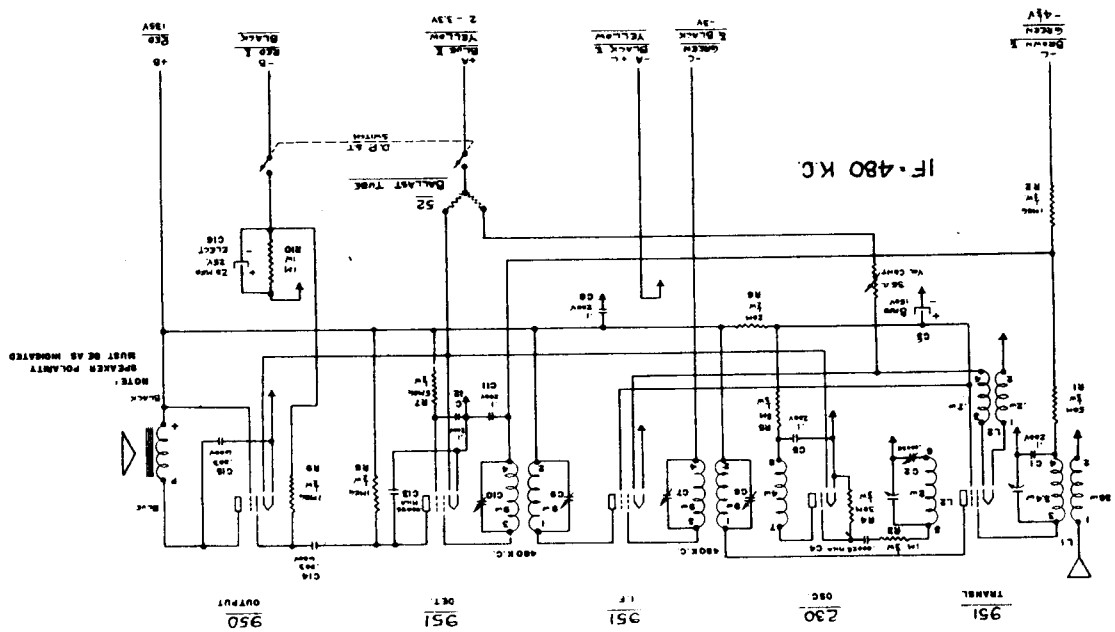
Trouble Shooting Hints

Defective ballast tubes seem to cause the most trouble in these sets. Replace ballast tube after 1000 hrs.

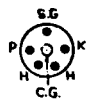


SEARS. ROEBUCK & CO.

MODEL 1711A - 7090A



30 & 50



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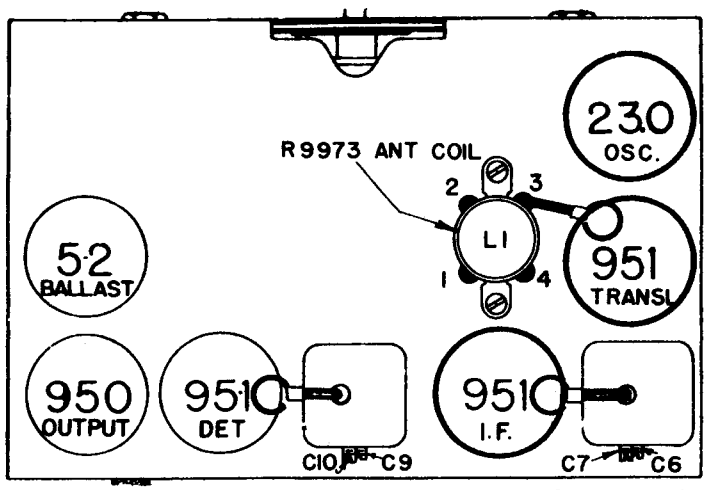


Trouble Shooting Hints

Ballast tubes, electrolytic condensers, and oscillator misalignment are the three common causes for trouble. The remedy in each case is obvious. Replace ballast tube after 1000 hours.

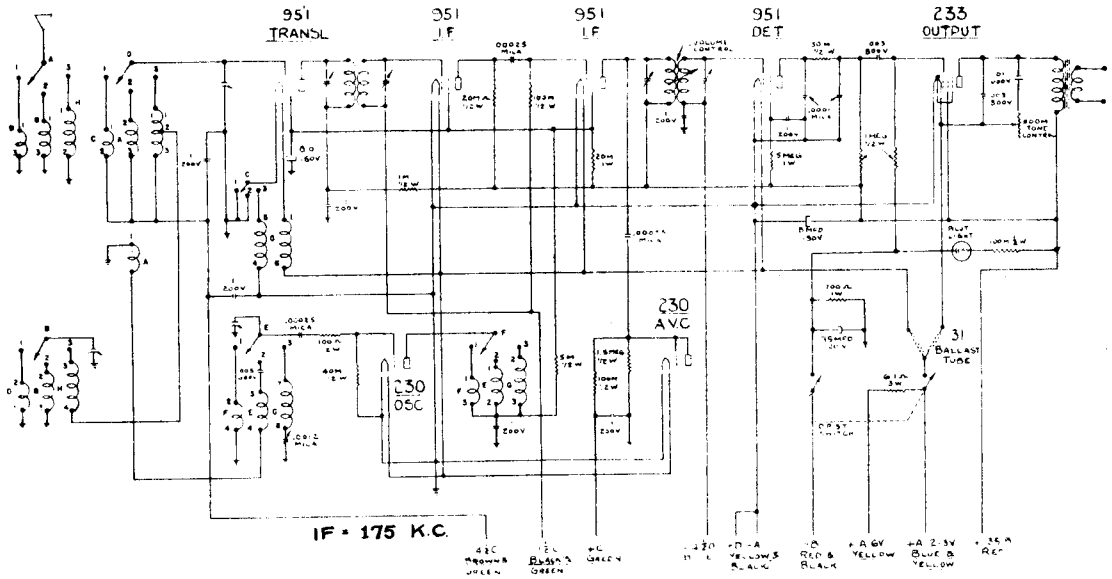
A type 951 translator tube creates a 480 kc signal in its plate circuit by mixing the incoming broadcast signal with the signal created by the type 230 oscillator. This 480 kc signal is amplified by the 951 IF stage and coupled to the 951 detector. The audio output of the detector is fed to the 950 output tube and then to the magnetic loudspeaker.

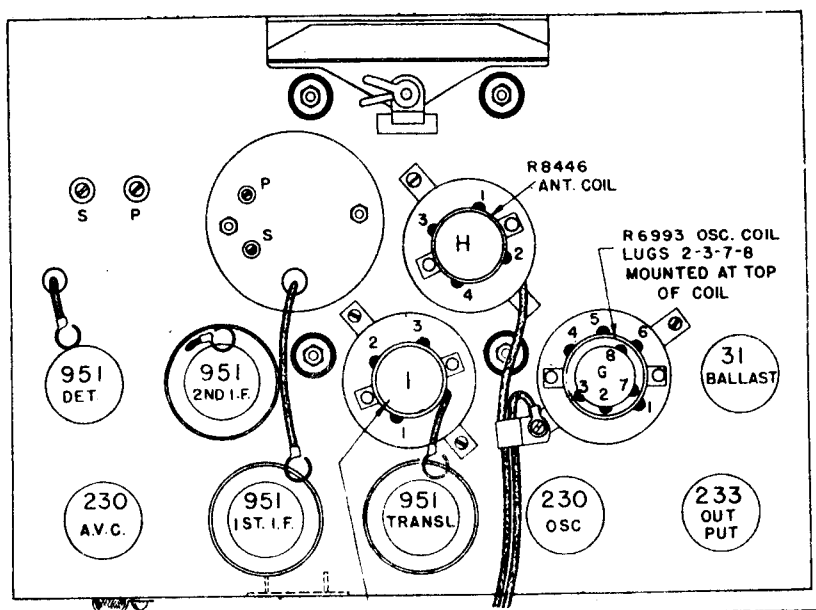
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
230 - Osc.	50		2.8	
951 - Transl.	135	65	1.25	1.5
951 - IF	135	65	1.5	2
951 - Det.	25*	5*	.03	.01
950 - Output	135	135	5	1

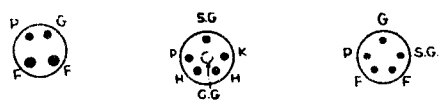
* Indicates high series resistor

SEARS, ROEBUCK & CO.

MODEL 1712-1713







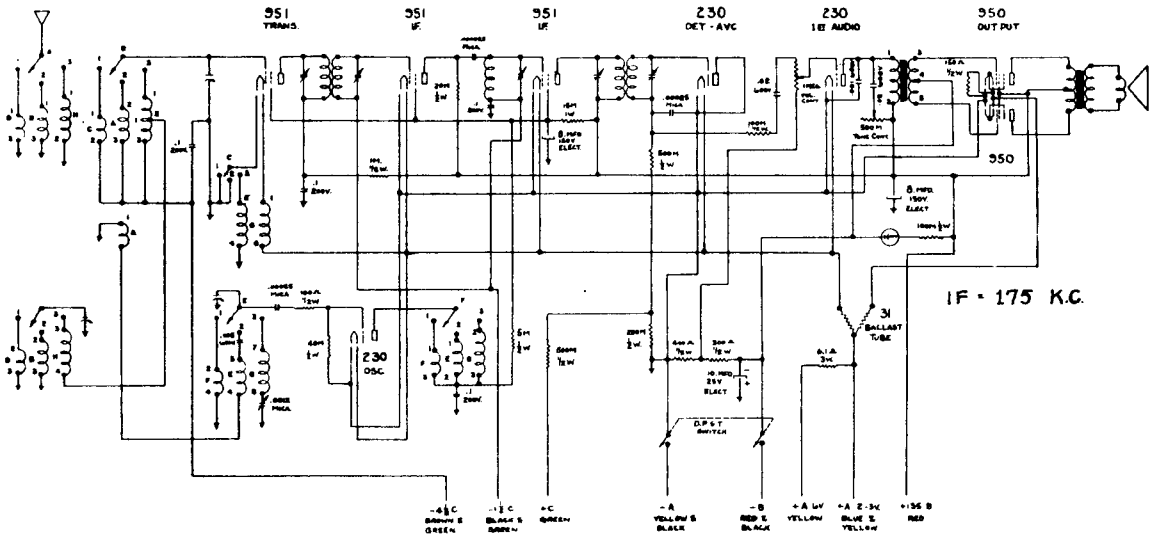
Trouble Shooting Hints

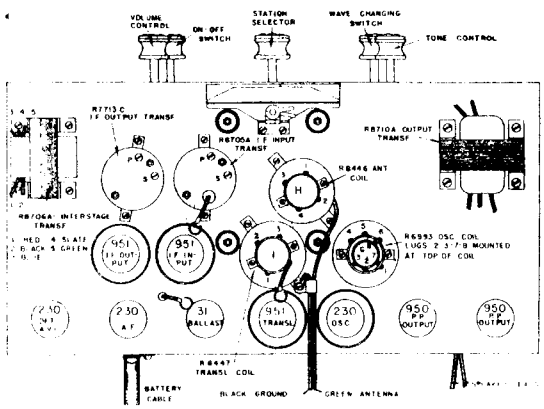
Motor-boating or ineffective AVC seems common in this set. Either is caused by the type 30 AVC tube being unsuited to its work. Replace with a new tube. The neon pilot light will not blow unless the B voltage is over 90. Do not remove tubes without turning off set.

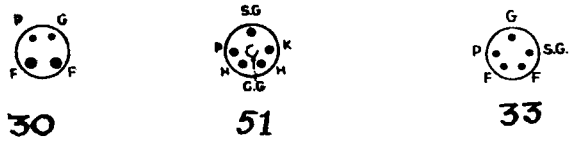
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
230 - Oscillator	45		2.25	
951 - Translator	135	55	.65	.08
951 - 1st IF	85	55	2	.5
951 - 2nd IF	135	55	2.5	.6
951 - Detector	25*	10*	.06	.02
233 - Output	130	135	10	2.5
230 - AVC	Used as rectifier with no applied DC potential			

* - Indicates high series resistor

SEARS, ROEBUCK & CO.
MODEL 1714







Trouble Shooting Hints

Oscillation on one or more wave bands is usually caused by drifting of the oscillator padding circuits. When realigning, short out the AVC by a connection from C- to chassis. When set fails on one band check wave band switch and clean contacts.

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
230 - Oscillator	45		2.25	
951 - Translator	135	55	.65	.08
951 - 1st IF	85	55	2	.5
951 - 2nd IF	135	55	2.5	.6
951 - Detector	25*	10*	.06	.02
233 - Output	130	135	10	2.5
230 - AVC	Used as rectifier with no applied DC potential			

* - Indicates high series resistor

SEARS, ROEBUCK & CO.

MODEL 1715

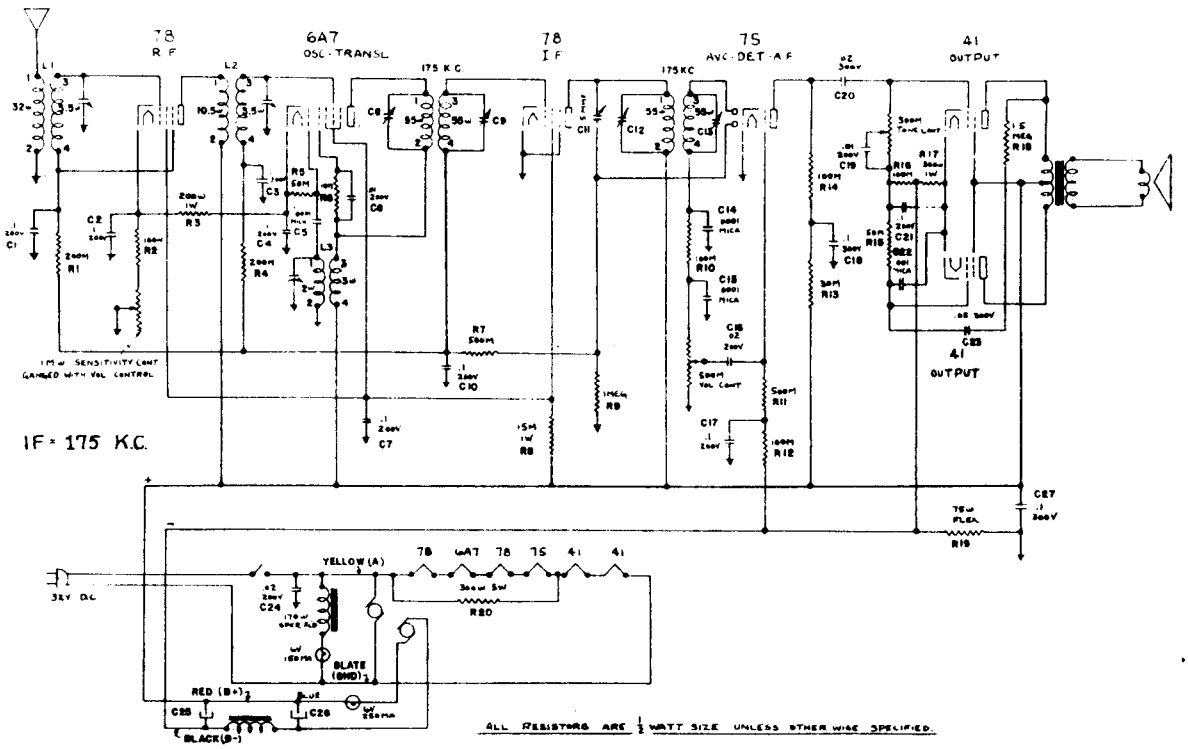
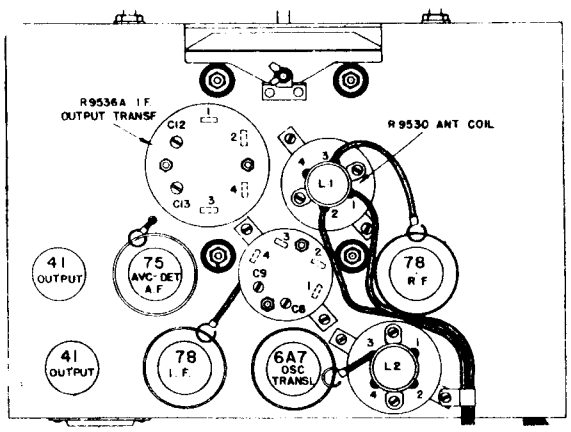
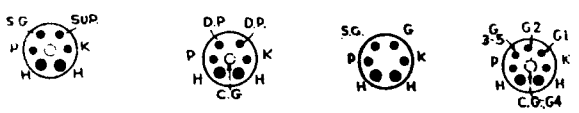


FIG. 2 THE SCHEMATIC MODEL 1715





78 75 41 6A7

Trouble Shooting Hints

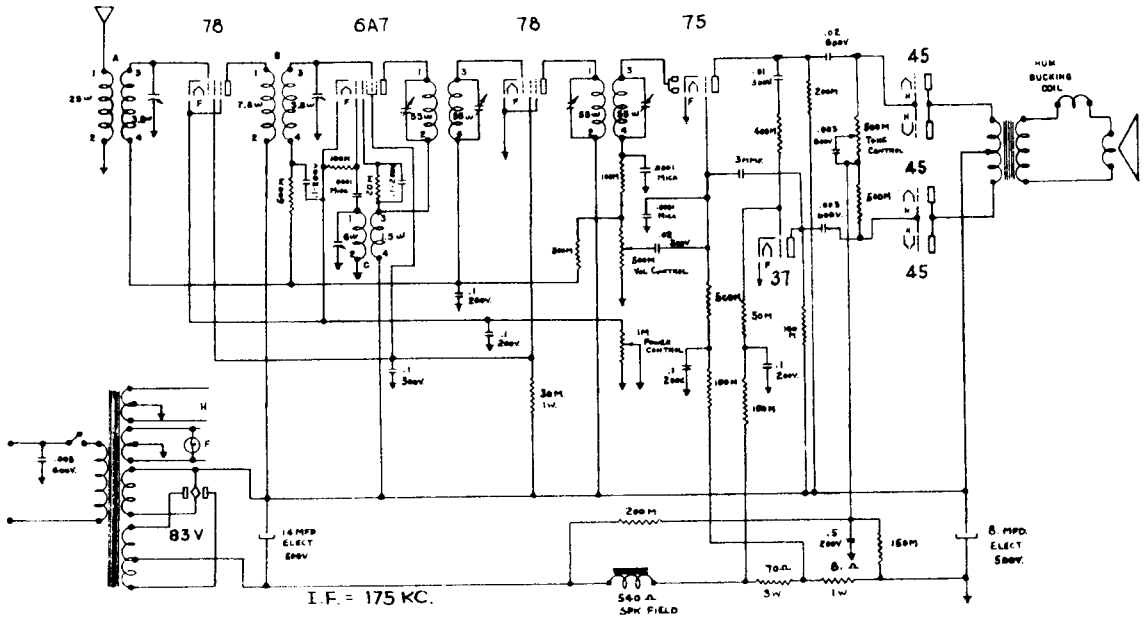
Failure of these sets to operate when the pilot light burns out is due to the circuit. The speaker field is in series with this bulb. Replace with a 150 ma. bulb only. Use a 250 ma. bulb for the polarity "tell-tale" light.

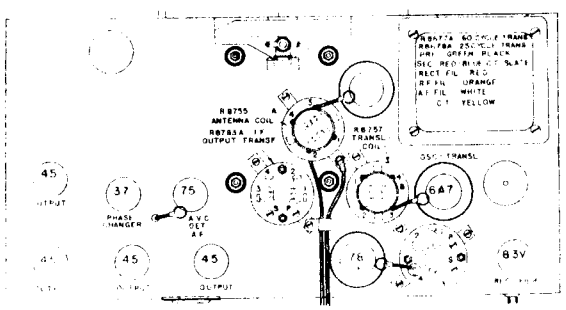
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - RF	225	90	7.5	1.75
78 - IF	230	95	10	3.7
75 - AVC-Det-AF	150		.25	
41 - Output	212	215	25	4
6A7 - Osc-Transl	Ep=225v; Eg#2=175v; Eg#3&#5=90v; Ip=4.5ma; Ig#2=3ma; Ig#3&#5=2.5ma.			

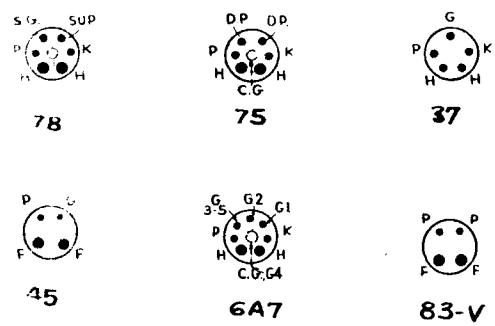
Total B drain=90ma. Input voltage=37v.

SEARS, ROEBUCK & CO.

MODELS 1720 - 7065 - 1725





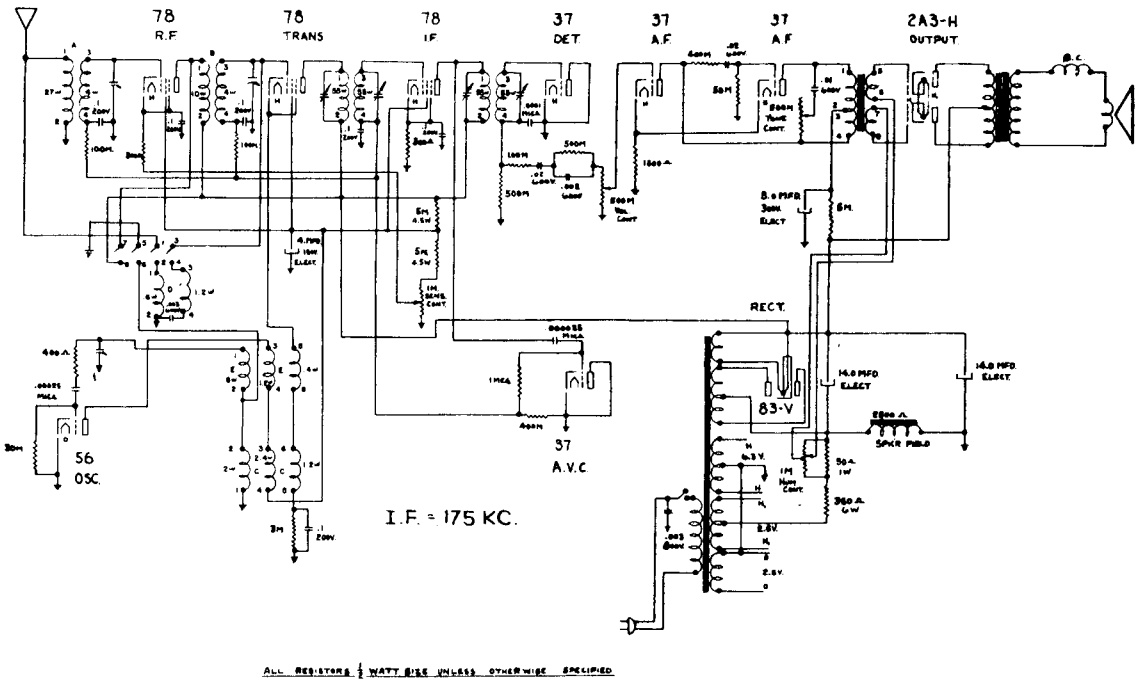


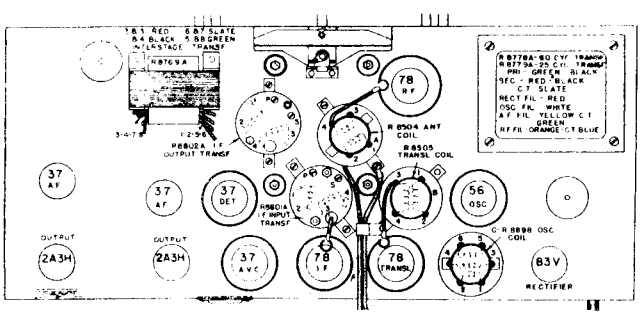
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - R F	255	100	*	8	2
78 - I F	255	100	*	8	2
75 - AVC-DET-AF	125		*	.5	
'37 - Phase Changer	190		*	1.5	
'45 - Output	245		*	32	
6A7 - Osc-Transl	Ep=255v; Eg #1=-10v; Eg #2=200v; Eg #3&#5=82v; Ip=3.75m.a.; Ig #2=3.5m.a.; Ig #3&#5=2.25m.a.				
83-V - Rect.	Maximum d.c. volts=390v. Plate current=84m.s.per plate				

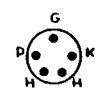
* - Indicates high series resistor

SEARS, ROEBUCK & CO.

MODEL 1721







56 & 37

78

2A3-H

83

TUBE	PLATE V.	SCREEN V.	GRID V.	PLATE ma	SCREEN ma
56 - Osc.	95		-7	7	
78 - RF	200	85	*	.3 vol off	
78 - Transl.	210	82	*	2	.4
78 - IF	220	92	*	5	1
37 - AF	165		-12	4.5	
2A3-H - Output	270		-44	60	
83 - Rect.	330 v. ac. Plate m.a. = 85 m.a. per plate				

* - Indicates high series resistance.
Speaker field voltage = 110 volts.

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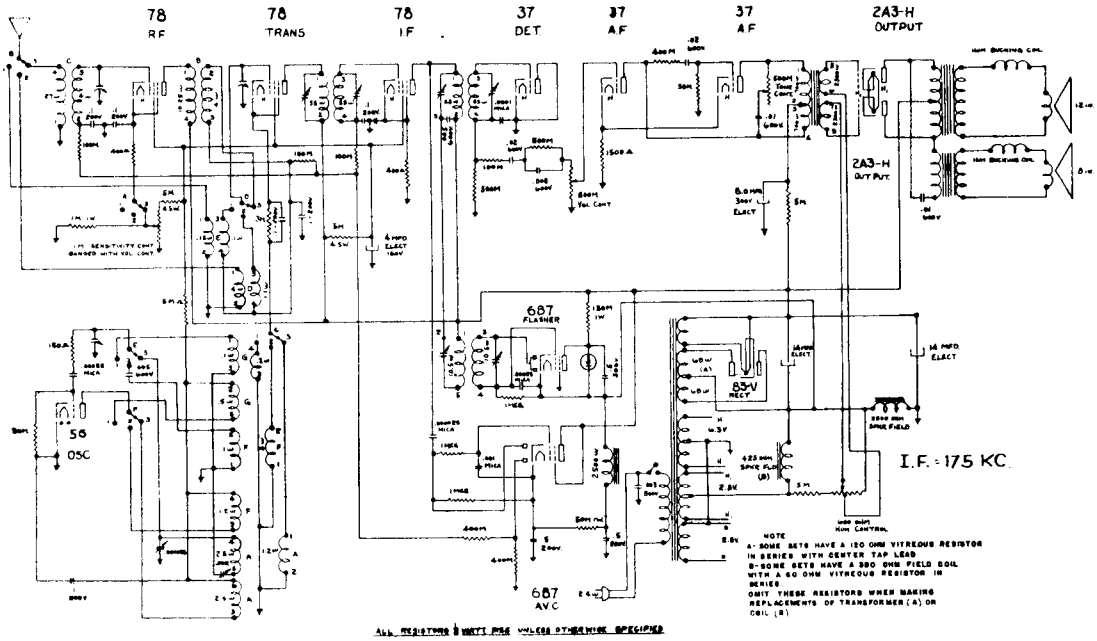
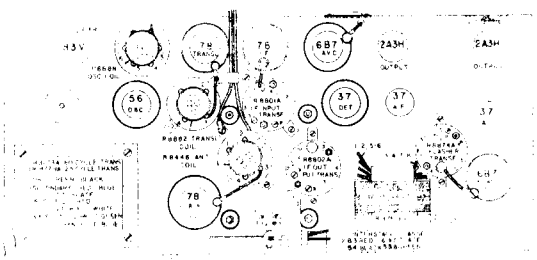
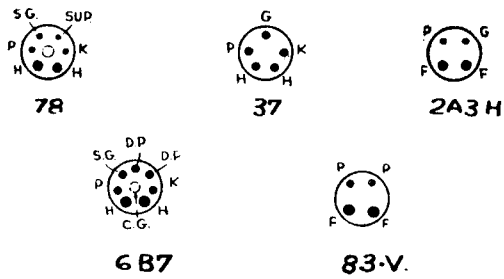
MODELS 1722 AND 1732



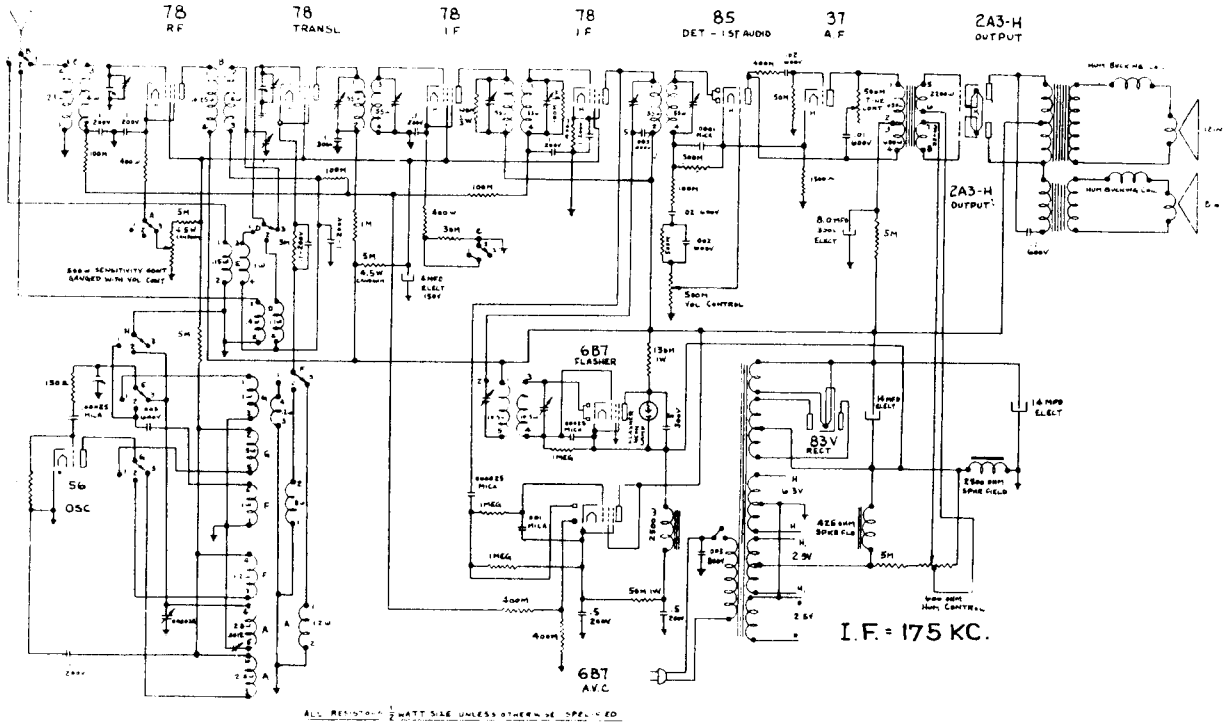




Tube	Plate Voltage	Screen Voltage	Grid Voltage	Plate m.a.	Screen m.a.
78 - R F	225	100	*	7	1.5
56 - Oscillator	70		-6	5	
78 - Translator	215	90	-6	2	.5
78 - I F	220	110	-3	8	1.5
37 - 1st A F	165		-12.5 (Volume control off)	4	
37 - 2nd A F	165		-9*	4	
2A3H - Output	265		-44	58	
6B7 - AVC	60	60		4	.1
6B7 - Flasher	7-No signal 90-With signal	Cathode is approximately 100 volts below ground.			
83V - Rectifier	DC volts = 350	Plate Current = 87 m.a. per plate			

SEARS, ROEBUCK & CO.

MODELS 1722X AND 1732X

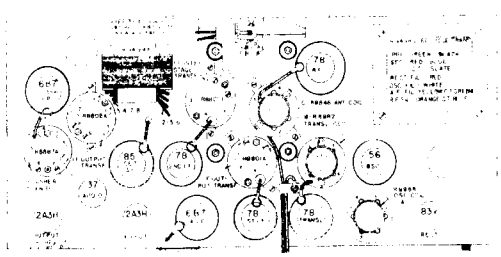


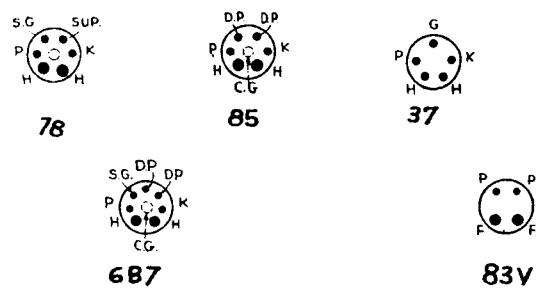
VOLTAGE AND CURRENT CHART - MODELS 1722 - 1732

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M.A.	SCREEN M.A.
78 - R F	225	100	*	7	1.5
56 - Oscillator	70		-6	5	
78 - Translator	215	90	-6	2	.5
78 - 1ST I F	220	110	-3	8	1.5
78 - 2ND I F	220 (a) 209(b)	110(a) 99 (b)	-3(a) -14(b)	8(a) .4(b)	1.5(a) .06(b)
37 - 1ST A F	165		-12.5 (Volume Control) Off)	4	
37 - 2ND A F	165		-9*	4	
2A3H - Output	265		-44	58	
6B7 - AVC	60	60		4	1
6B7 - Flasher	7 - No signal 90 -With signal	Cathode is approximately 100 volts below ground.			
83V - Rectifier	DC volts = 350	Plate Current = 87 m.a. per plate			

* - Indicates high series resistance.

(a) - Wave Selecting Switch in Broadcast position.
(b) - Wave Selecting Switch in Short Wave position.





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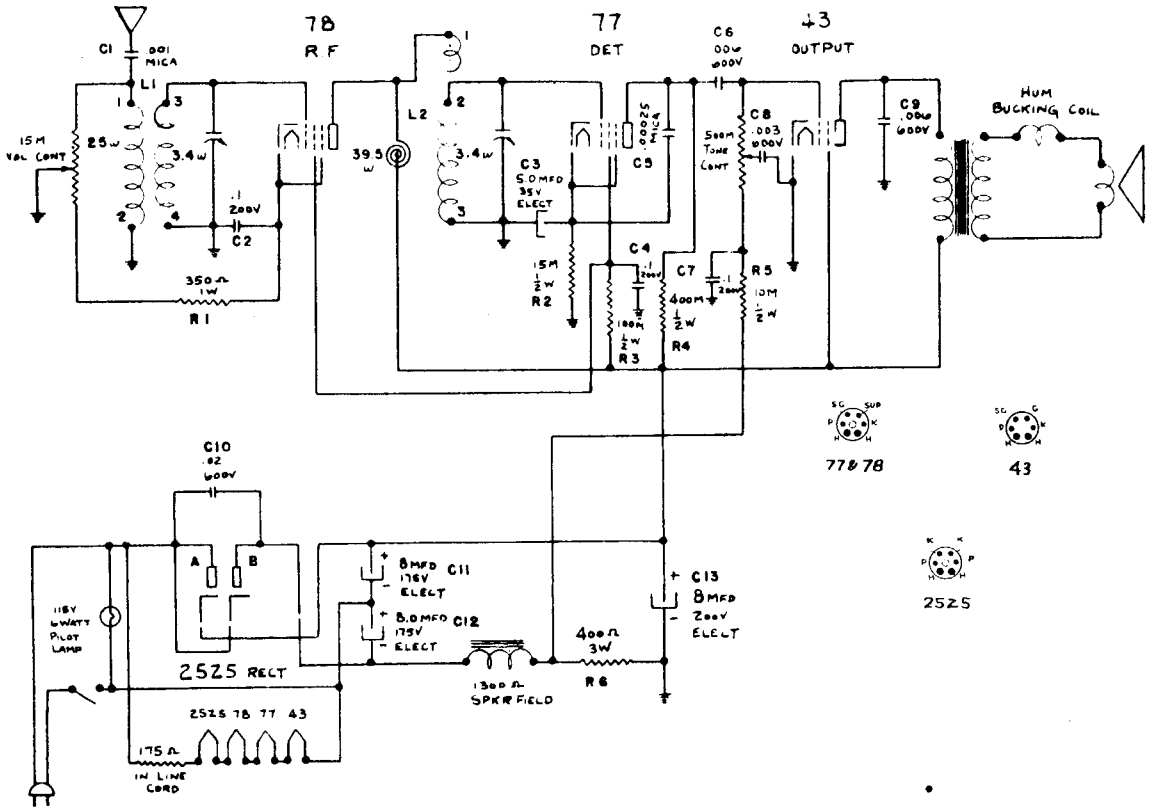
MODEL 1724



The SILVERTONE Model 1724 is a four tube TRF Receiver. It uses a series connection for the tube heaters, with a line cord resistor and a 25Z5 voltage doubler. Accordingly, it can be used on 105-125 volt alternating current power of any frequency, but not on direct current.

A 78 RF tube is impedance-capacity coupled to the tuned input of the 77 detector tube. The coupling capacity between the RF plate choke and the input coil of the detector, consists of a single open ended turn of wire at the top of the coil. The audio output of the 77 detector is fed to the 43 output pentode and then to the dynamic loudspeaker.

TUBE VOLTAGE AND CURRENT CHART

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - R F	110	70	-10	.7	.2
77 - Detector	30*	75	-3.5	.2	.1
43 - Output	105	120	*	30	6

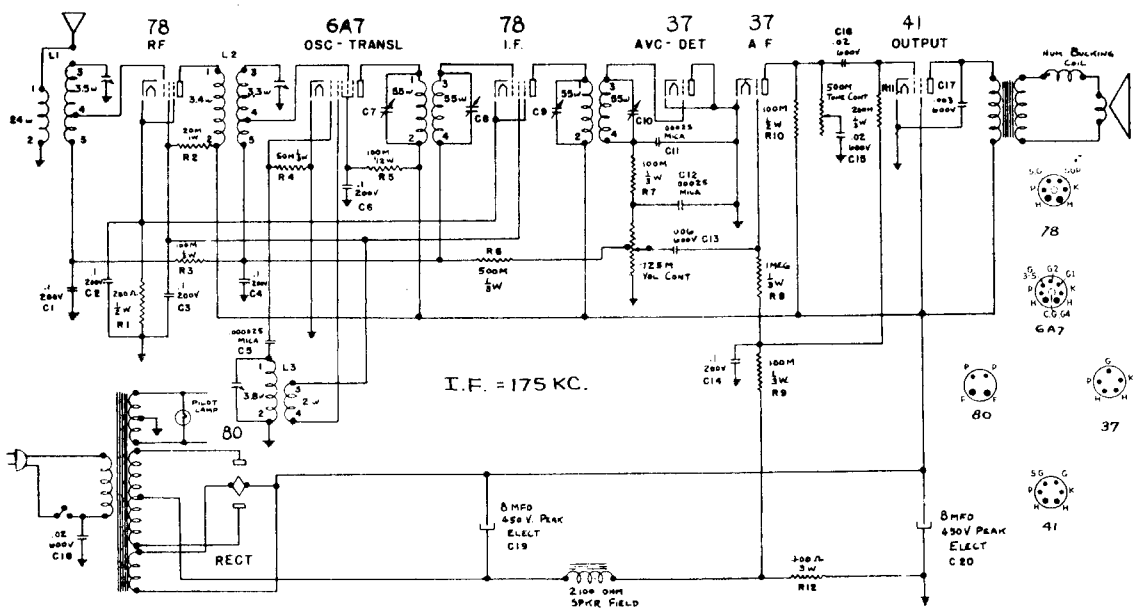
25Z5 - Rectifier Doubled Voltage = 200v. Plate Current = 36m.a.

Speaker field voltage = 70v.

* Indicates high series resistor.

SEARS, ROEBUCK & CO.

MODEL 1729



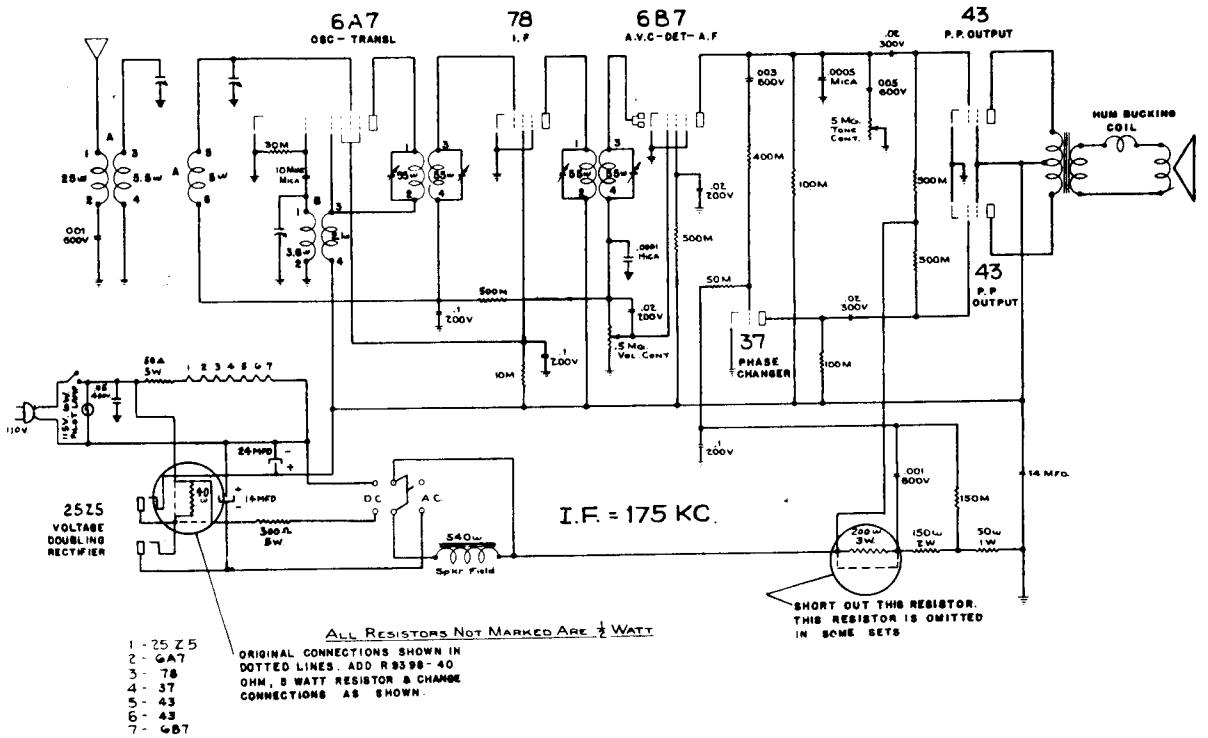
A 78 RF tube is used in the pre-selector stage which is coupled to the 6A7 oscillator-translator. The 175 kc IF signal created in the 6A7 plate circuit is amplified by the 78 IF tube and then fed to the 37 AVC-diode detector. The audio output of this tube is amplified by the 37 audio tube and then fed to the 41 output pentode. A type 80 rectifier is used. The speaker is a dynamic, with its field serving as the filter choke.

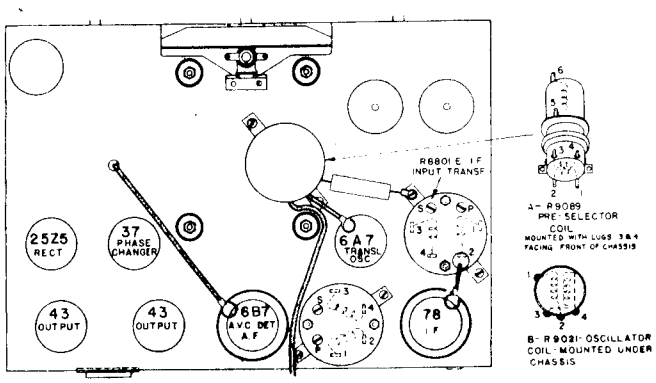
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - RF	225	105	7	1.6
78 - IF	225	105	7	1.6
37 - AF	165		3.5	
41 - Output	220	230	21	3.5
6A7 - Osc-Transl	Ep = 225v; Eg#2 = 105v; Eg#3&#5 = 70v; Ip = 2ma; Ig#2 = 2ma; Ig#3&#5=2ma.			
80 - Rect.	Max. d.c. voltage = 370v. Plate current - 28 m.a. per plate.			

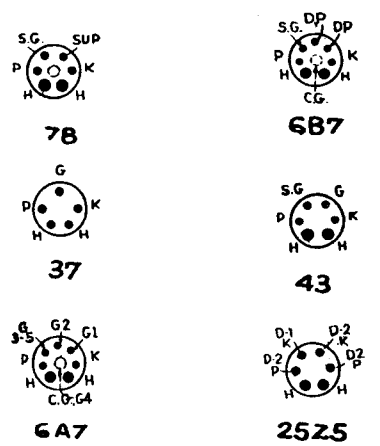
Readings taken with antenna disconnected and no signal received. Care should be used if measurements are made with an analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate will stop oscillation. If an analyzer is not used, voltage readings may be taken from the cathode to the respective element of each tube.

SEARS, ROEBUCK & CO.

MODEL 1750



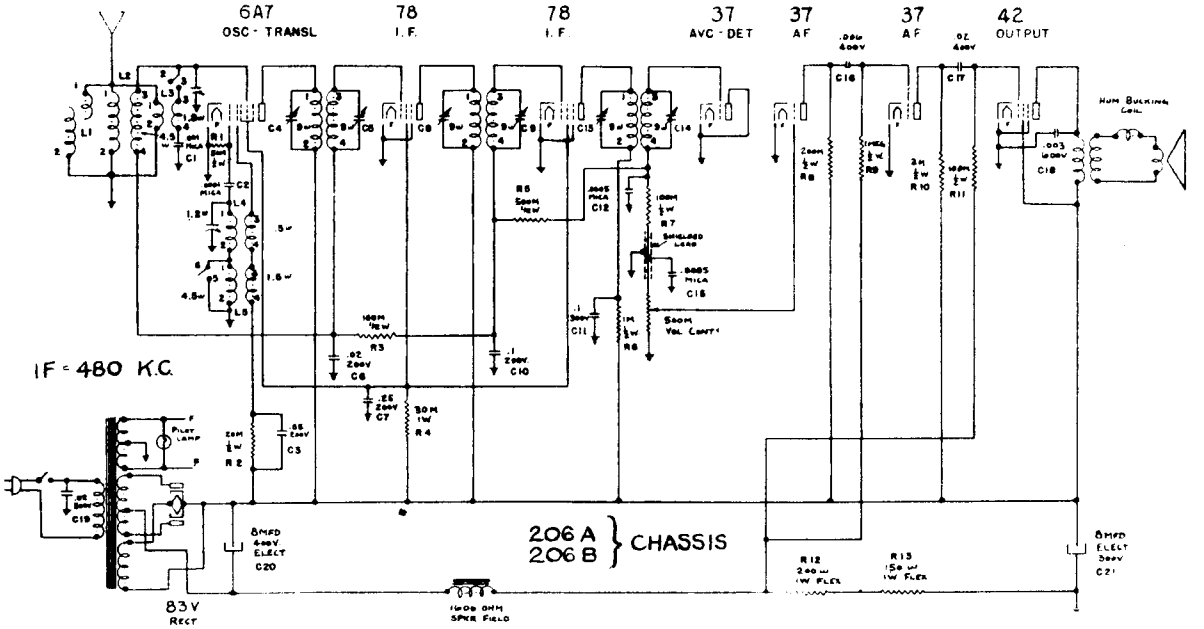


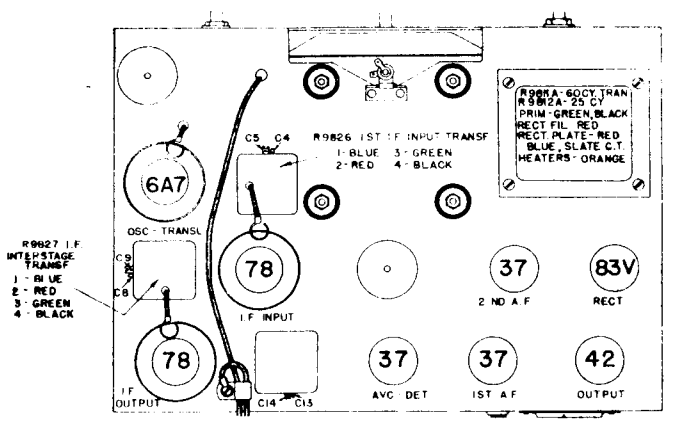


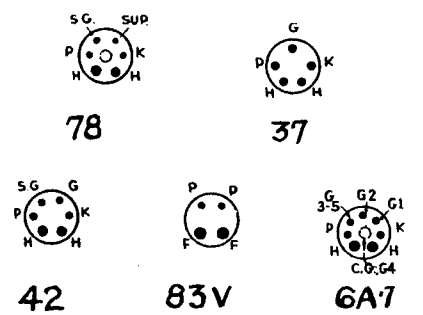
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - IF	150	85	*	2	1.25
6B7 - Det-AVC-AF	40*		*	1	
37 - Phase Changer	40*		*	1	
43 - Output	145	150	*	24	5
6A7 - Osc-Transl.	Ep=150v; Eg#2=150v; Eg#3&#5=85v; Ip=6m.a. Ig#2=5m.a.; Ig#3&#5=5m.a.				
25Z5 - Rectifier	Max. d.c. volts=225. Plate current =80m.a.				

* - Indicates high series resistance

SEARS, ROEBUCK & CO.
MODEL 1760







Trouble Shooting Hints

The use of a 5Z3 rectifier causes power tubes and condensers to breakdown.

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - 1st IF	245	100	6.5	2
78 - 2nd IF	240	100	6.5	2
37 - 1st AF	20		1.25	
37 - 2nd AF	235		3.5	
42 - Output	235	245	23	5
6A7 - Osc-Transl.	Ep=245v; Eg#2=175v; Eg#3&5=80v. Ip=4.25m.a.; Ig#2=2.5m.a; Ig#3&5=1.75m.a.			
83V - Rectifier	Max. d.c. voltage-360v. Plate current=29ma. per plate.			

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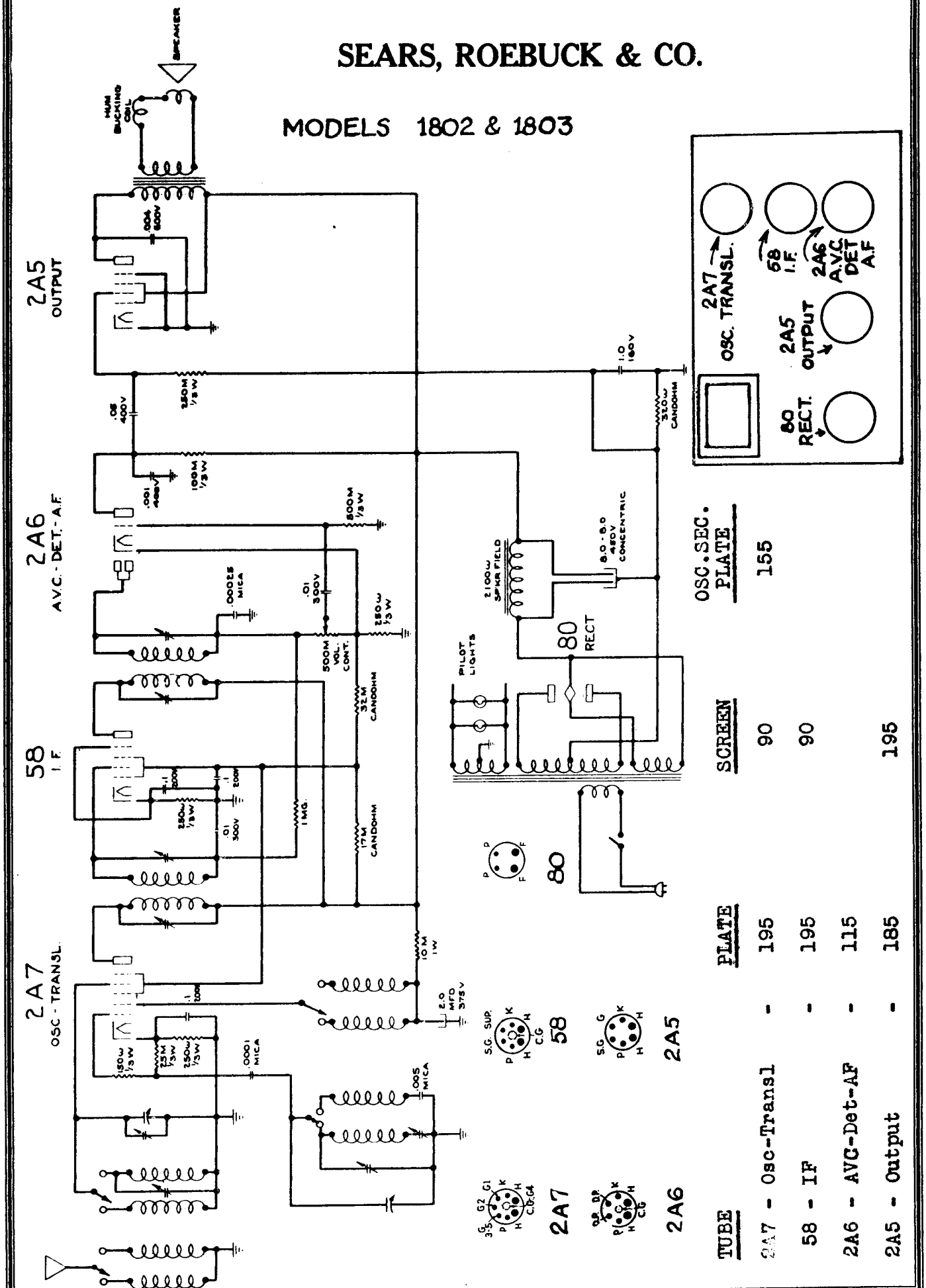
MODELS 1802 & 1803



SEARS, ROEBUCK & CO.

MODELS 1804-1805-1820 & 1826

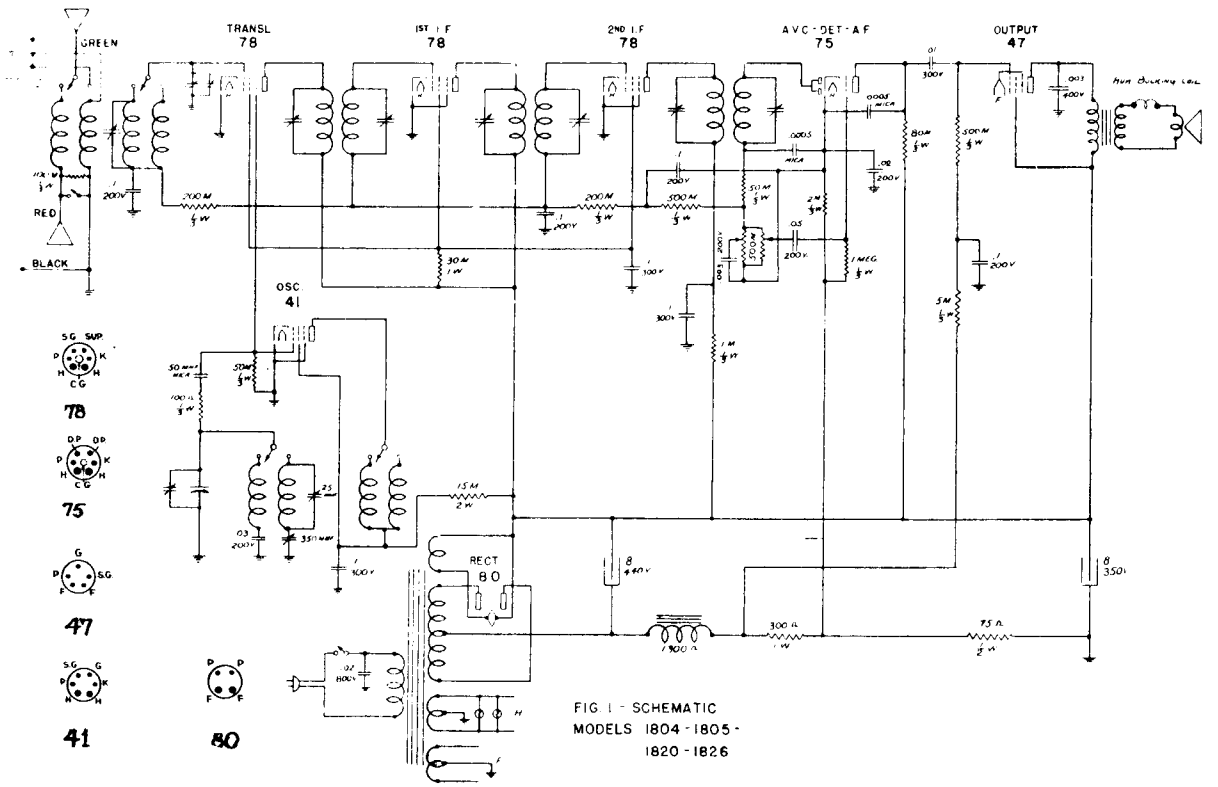


FIG. 1 - SCHEMATIC
MODELS 1804-1805-
1820-1826

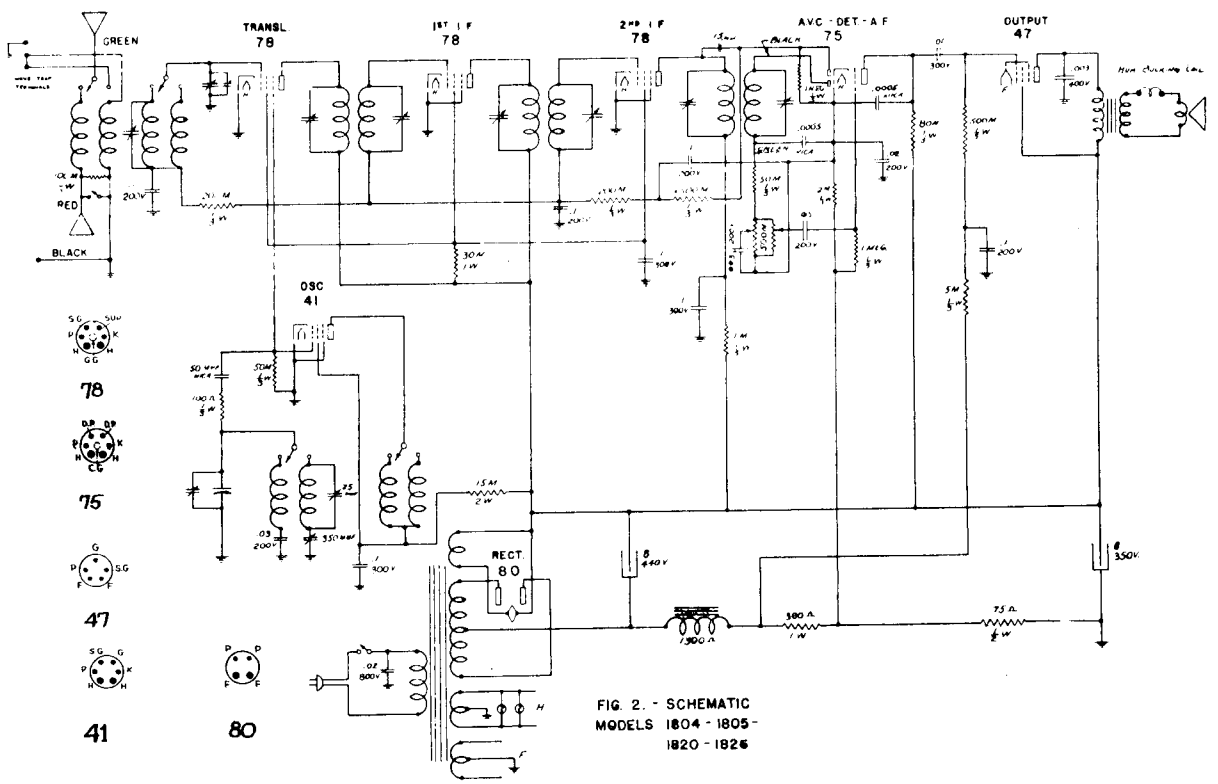
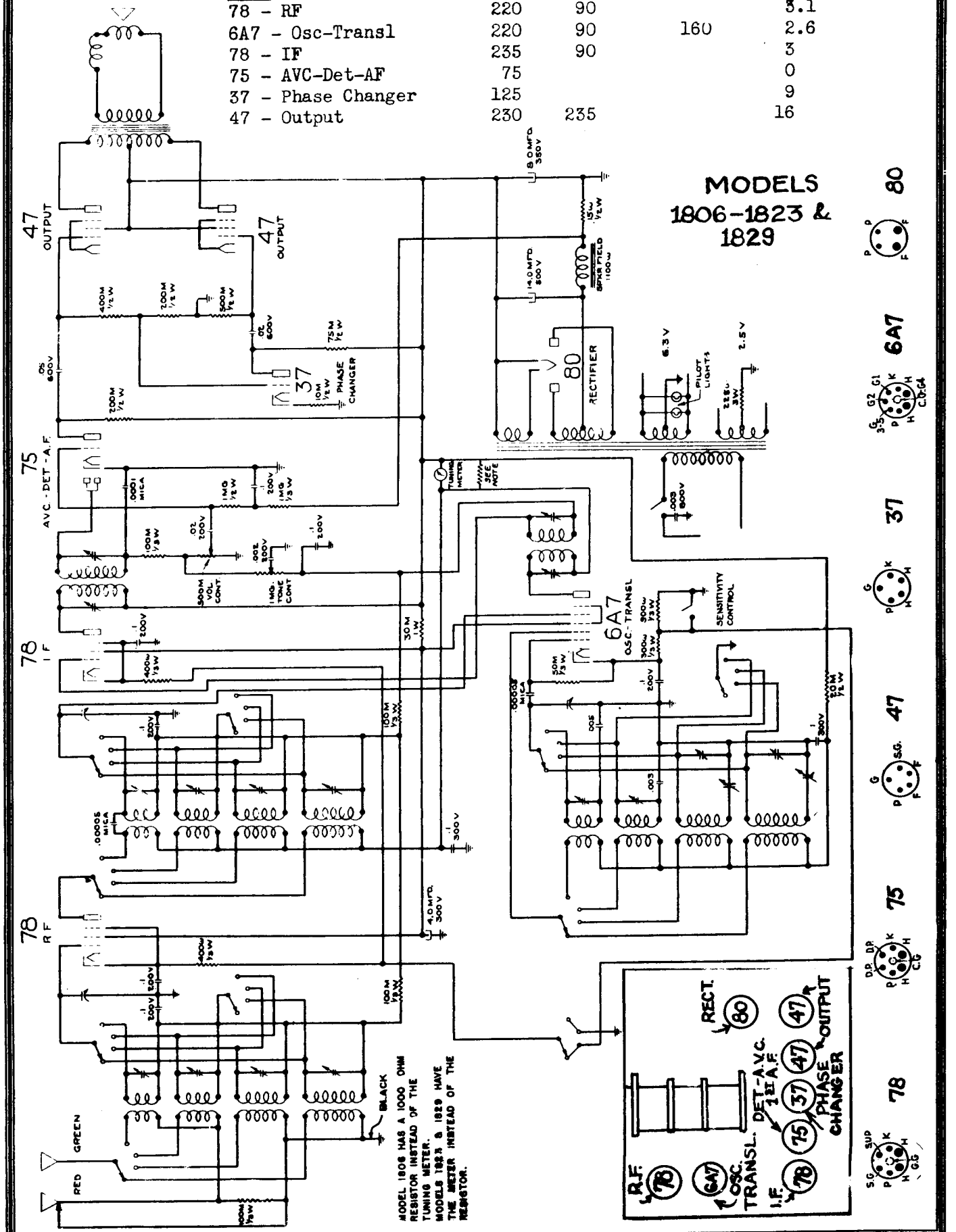


FIG. 2. - SCHEMATIC
MODELS 1804-1805-
1820-1826

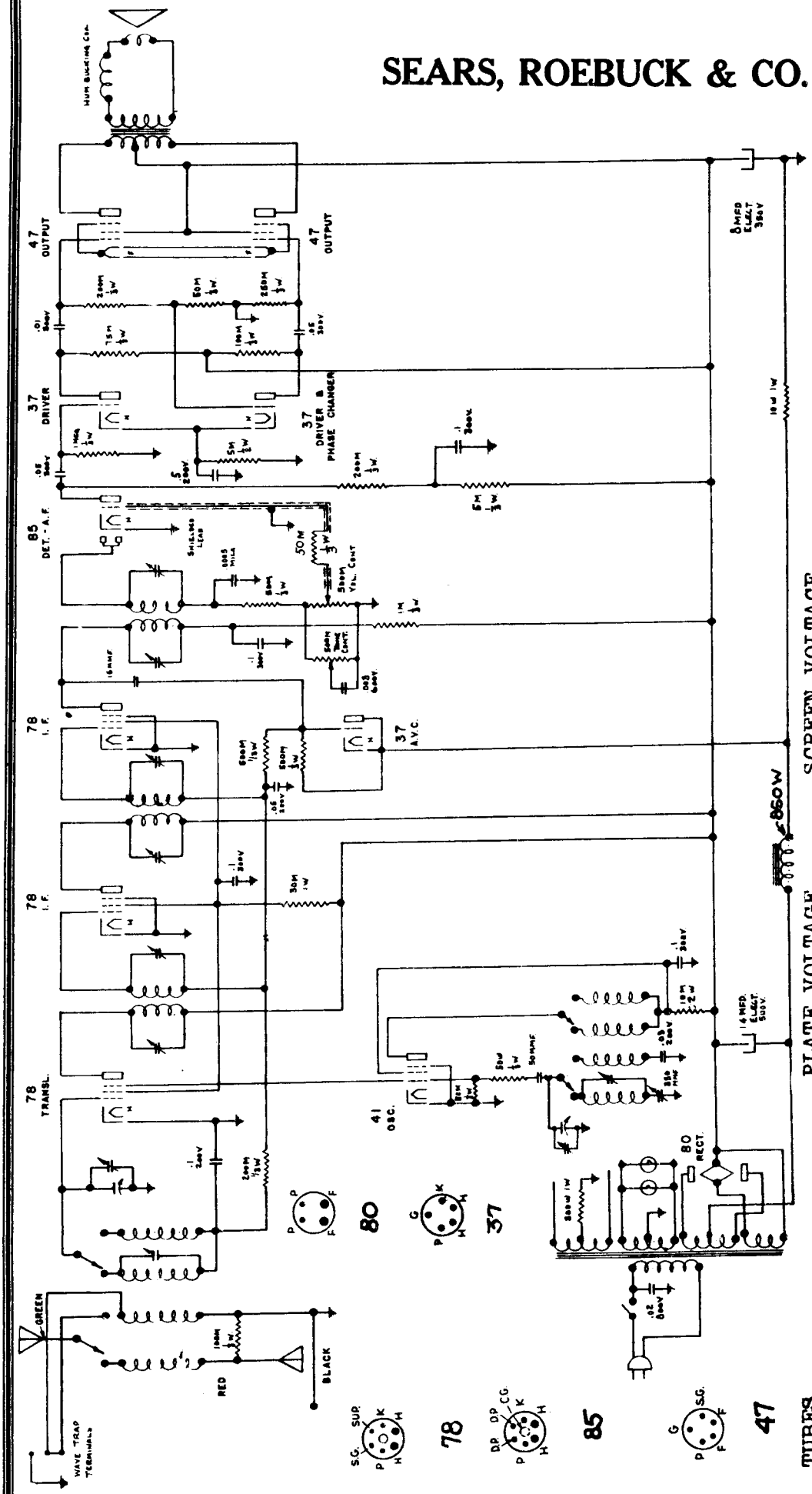
SEARS, ROEBUCK & CO.

TUBE	PLATE	SCREEN	OSC. PLATE	CATHODE
78 - RF	220	90		3.1
6A7 - Osc-Transl	220	90	160	2.6
78 - IF	235	90		3
75 - AVC-Det-AF	75			0
37 - Phase Changer	125			9
47 - Output	230	235		16



SEARS, ROEBUCK & CO.

MODELS 1821 & 1827

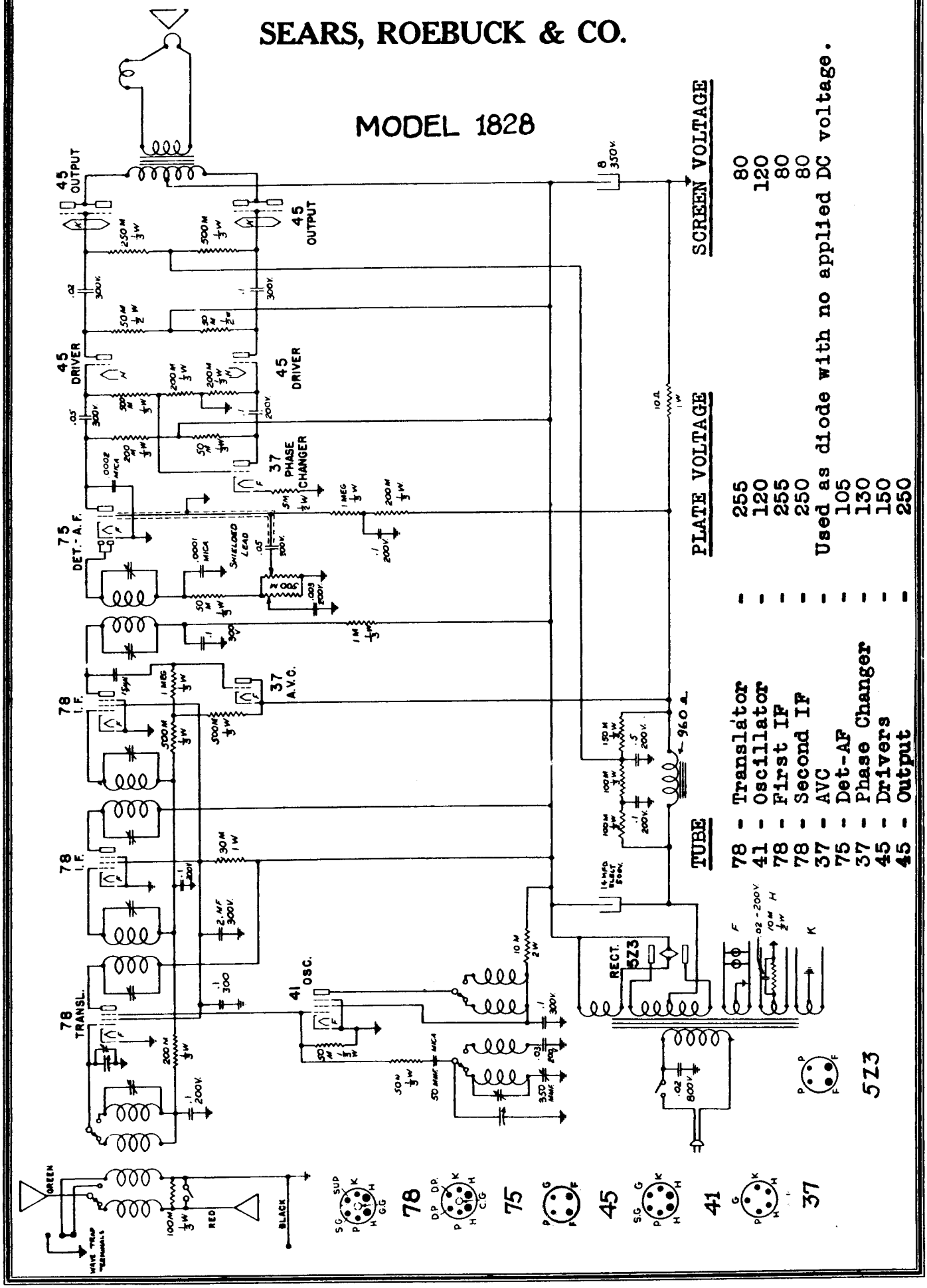


TUBES

		PLATE VOLTAGE	SCREEN VOLTAGE
78 - Translator	-	245	85
41 - Oscillator	-	115	115
78 - First IF	-	245	85
78 - Second IF	-	235	85
37 - AVC	-	Used as diode with no applied DC voltage.	
85 - Det-AF	-	20	
37 - Driver	-	140	
37 - Driver and Phase Changer	-	110	
47 - Output	-	240	245

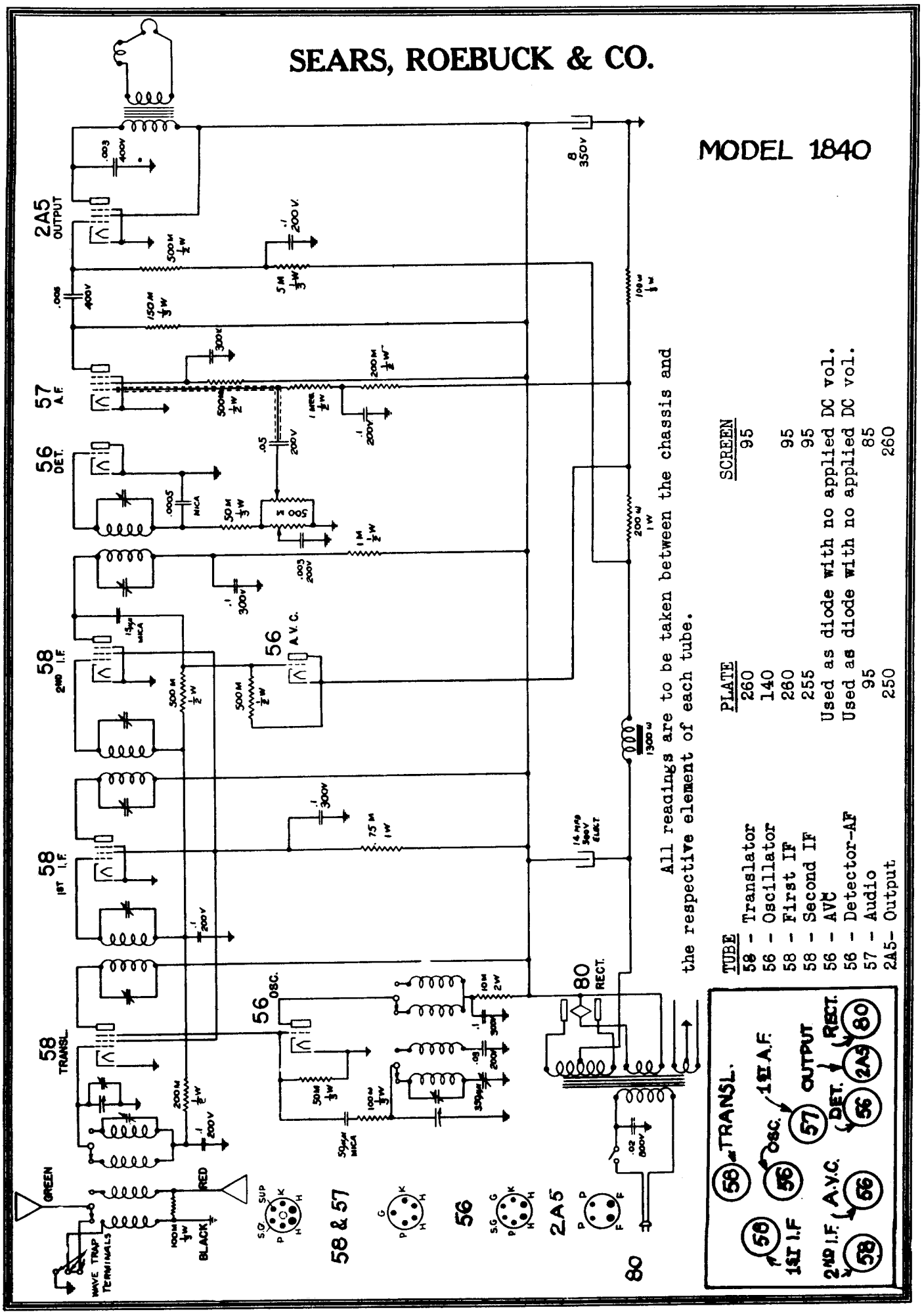
SEARS, ROEBUCK & CO.

MODEL 1828



SEARS, ROEBUCK & CO.

MODEL 1840

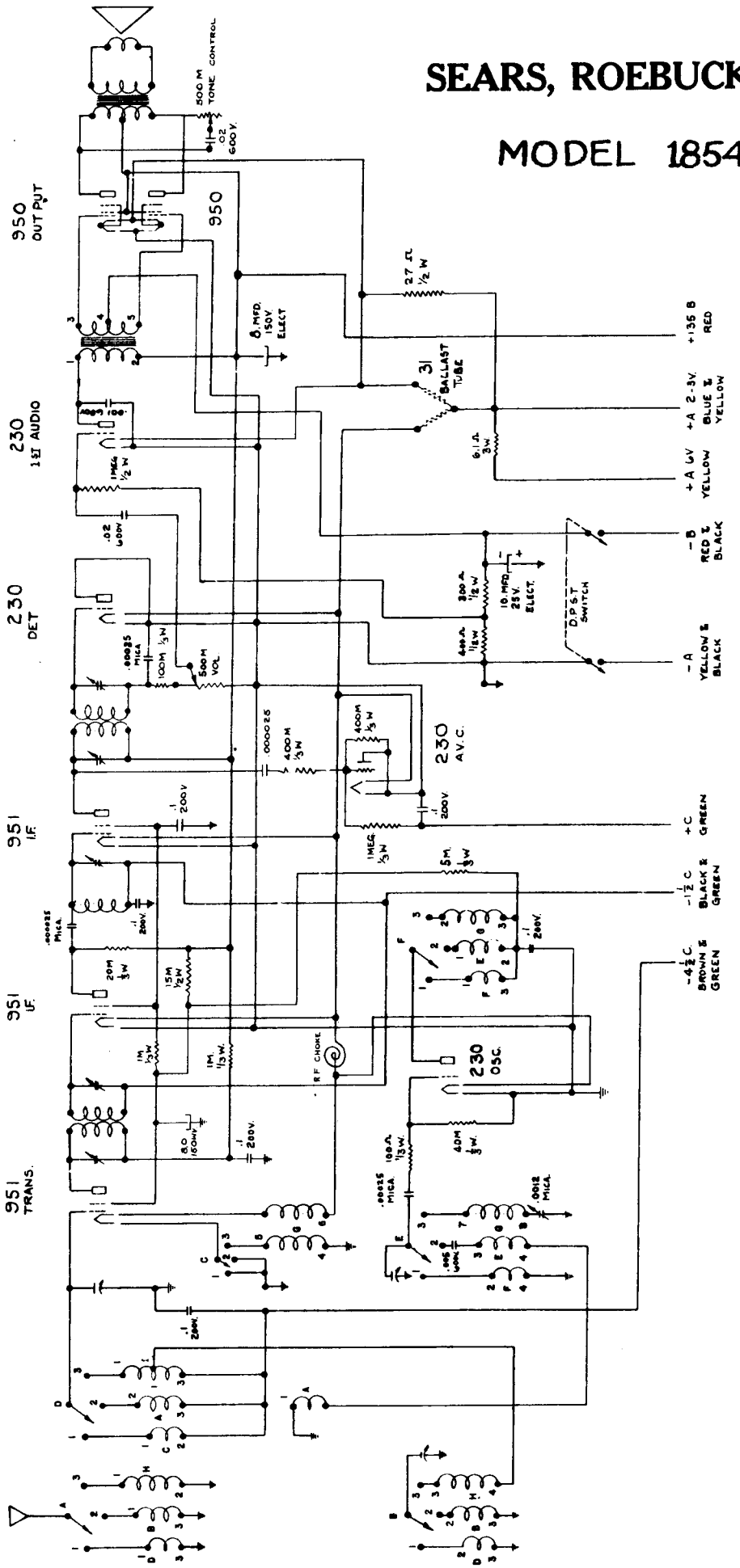


All readings are to be taken between the chassis and the respective element of each tube.

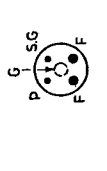
TUBE	PLATE	SCREEN
58 - Translator	260	95
56 - Oscillator	140	
58 - First IF	260	95
58 - Second IF	255	95
56 - AVC	Used as diode with no applied DC vol.	
56 - Detector-AF	Used as diode with no applied DC vol.	
57 - Audio	95	85
2A5- Output	250	260

SEARS, ROEBUCK & CO.

MODEL 1854

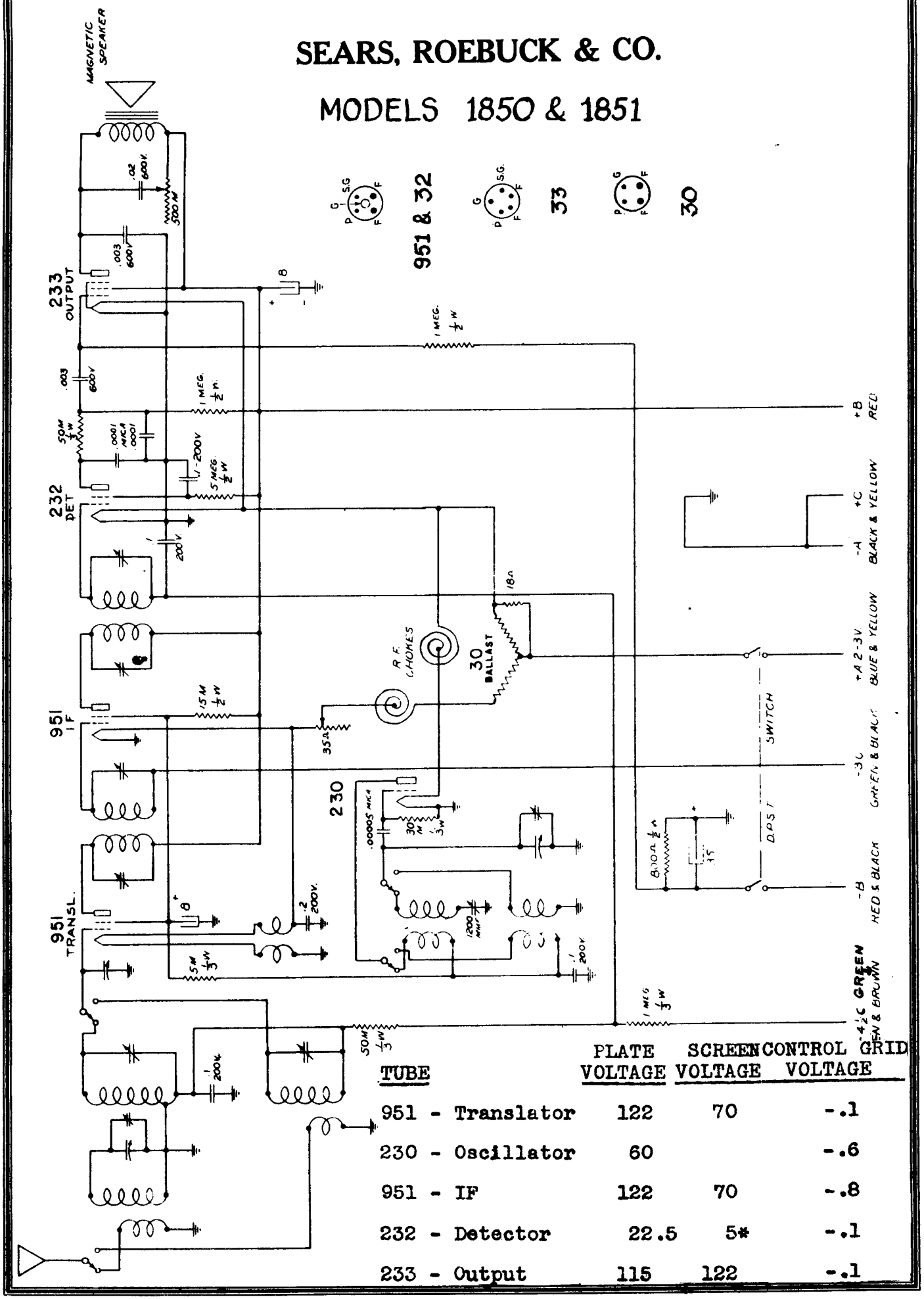


TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	CONTROL GRID VOLTAGE
951 Translator	120	58.5	-1.2
230 Oscillator	44		-2.35
951 1st IF	69	57	- .3
951 2nd IF	120	57	- .3
230 Detector	Used as diode with no applied DC voltage.		
230 AVC	Used as diode with no applied DC voltage.		
230 1st Audio	120		-15
950 Output	120	120	



SEARS, ROEBUCK & CO.

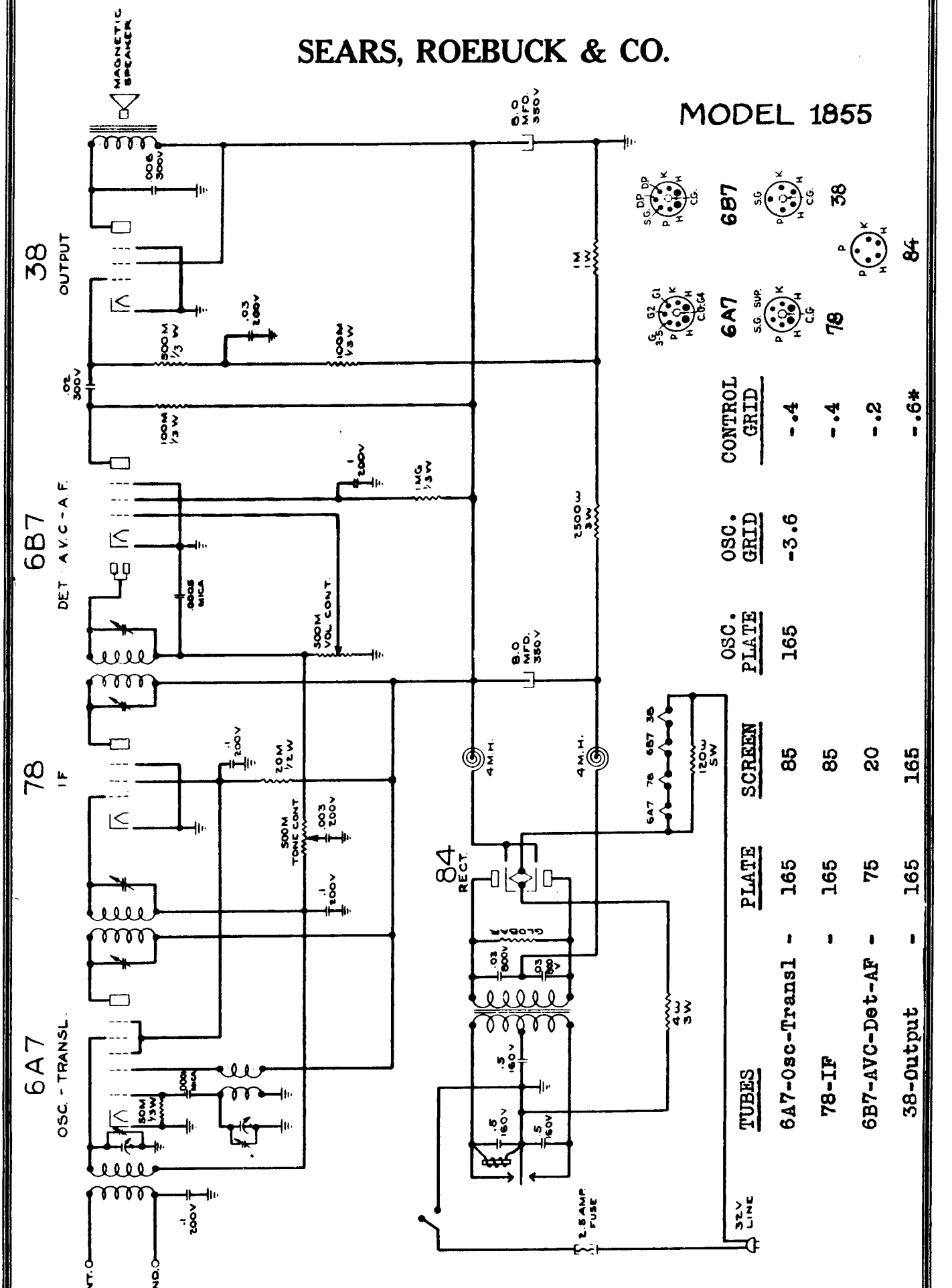
MODELS 1850 & 1851



TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	CONTROL GRID VOLTAGE
951 - Translator	122	70	-.1
230 - Oscillator	60		-.6
951 - IF	122	70	-.8
232 - Detector	22.5	5*	-.1
233 - Output	115	122	-.1

SEARS, ROEBUCK & CO.

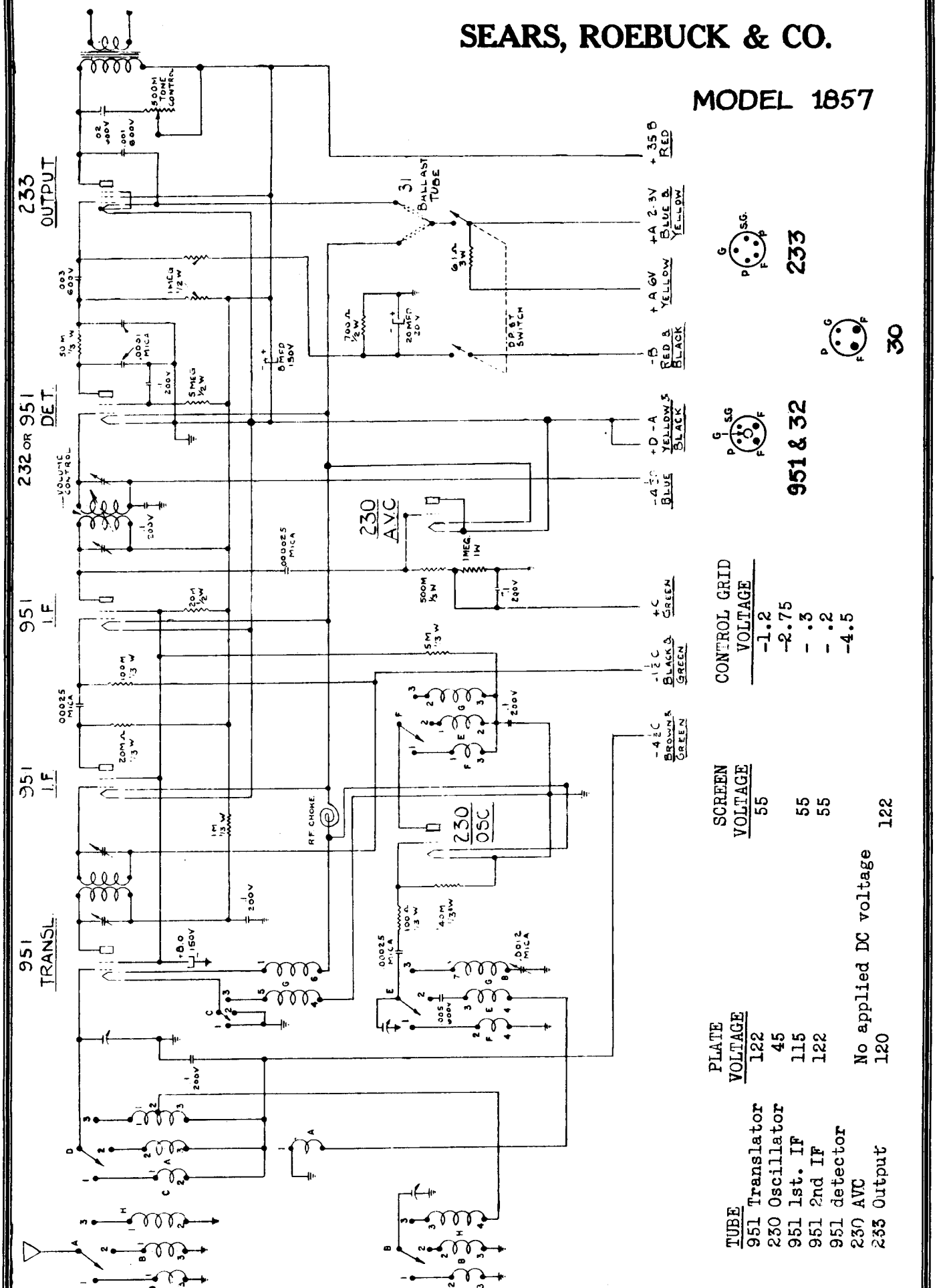
MODEL 1855



TUBES	PLATE	SCREEN	OSC. PLATE	OSC. GRID	CONTROL GRID
6A7-Osc-Transl -	165	85	165	-3.6	-.4
78-IF -	165	85			-.4
6B7-AVC-Det-AF -	75	20			-.2
38-Output -	165	165			-.6*

SEARS, ROEBUCK & CO.

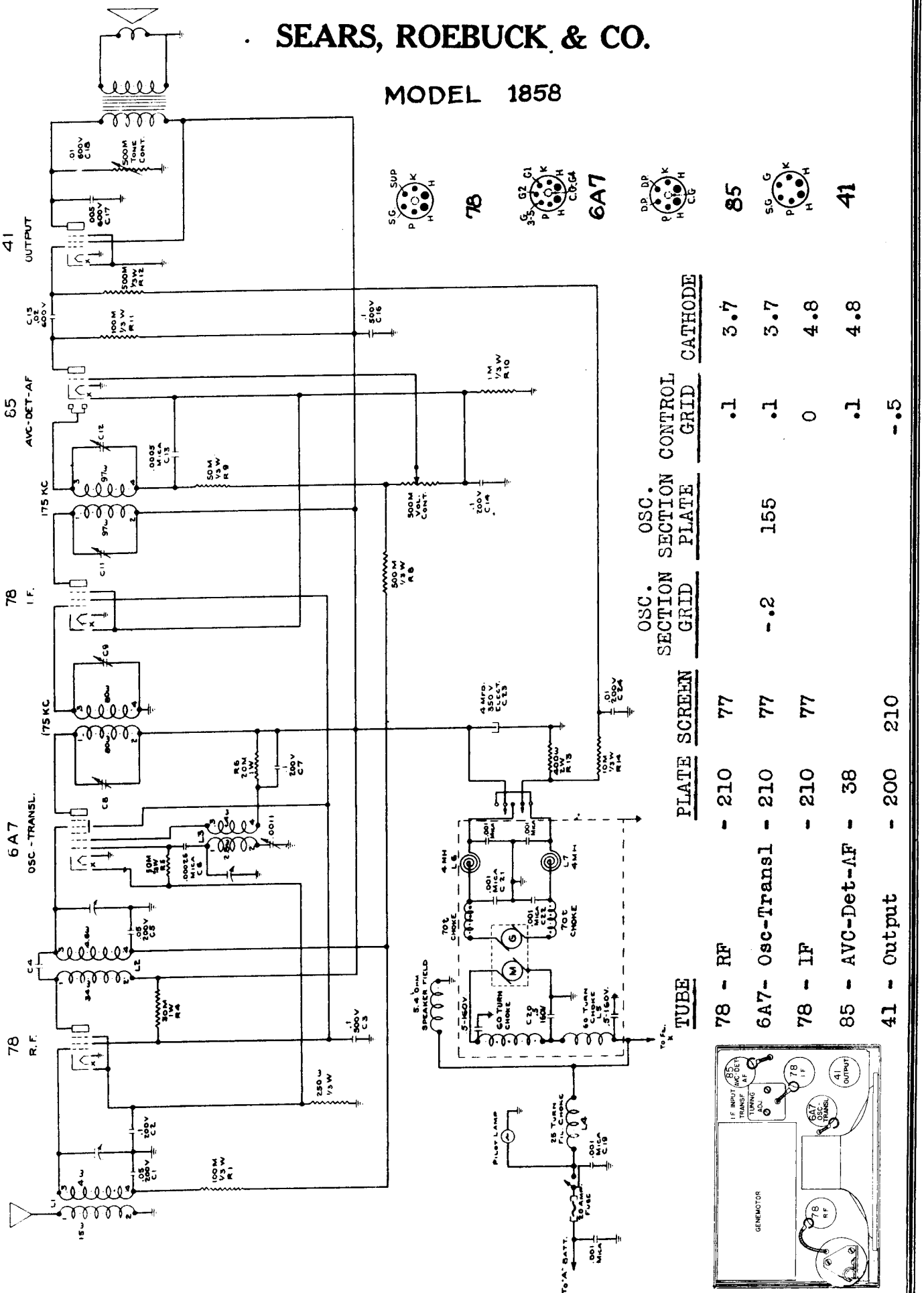
MODEL 1857



TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	CONTROL GRID VOLTAGE
951 Translator	122	55	-1.2
230 Oscillator	45		-2.75
951 1st. IF	115	55	- .3
951 2nd IF	122	55	- .2
951 detector			-4.5
230 AVC	No applied DC voltage		
233 Output	120	122	

SEARS, ROEBUCK & CO.

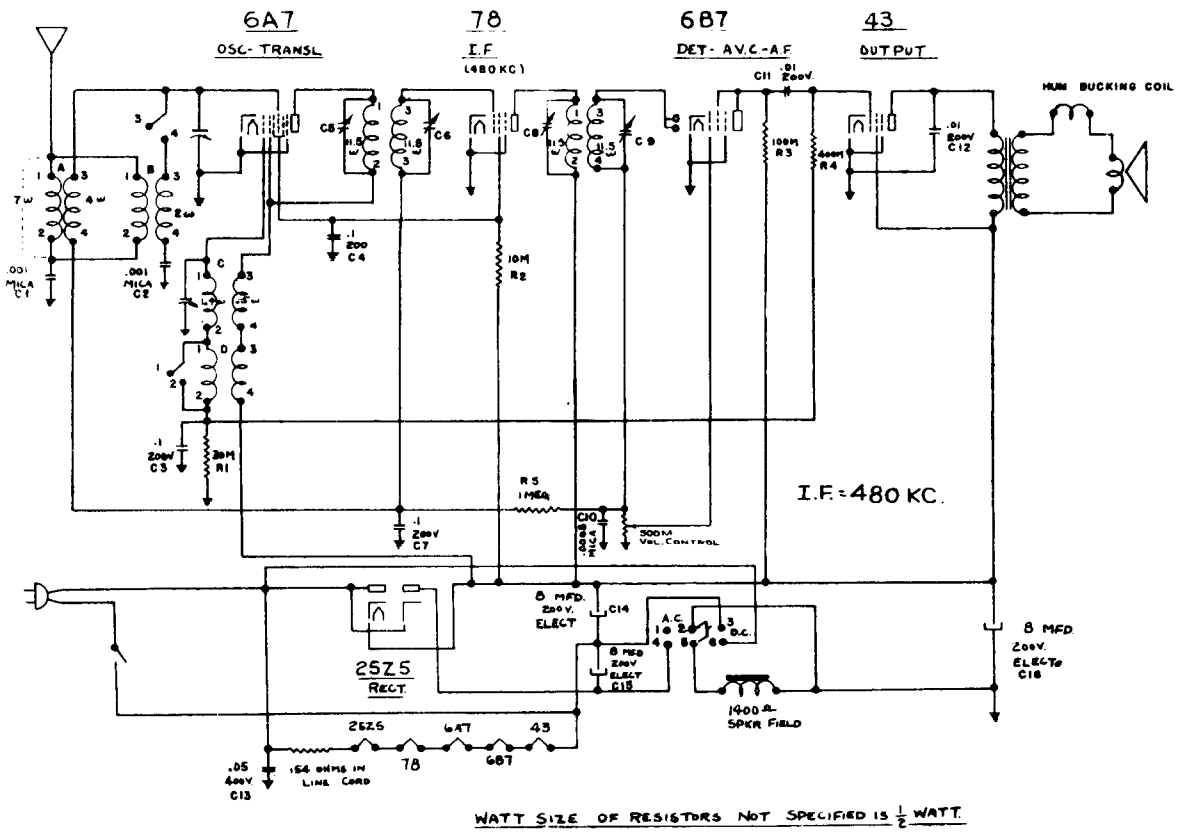
MODEL 1858

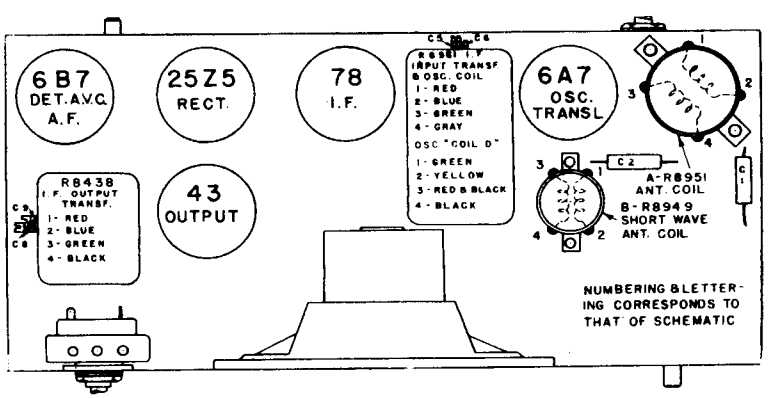


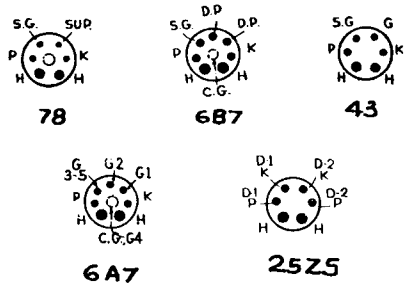
TUBE	PLATE	SCREEN	OSC. SECTION GRID	OSC. SECTION PLATE	CONTROL GRID	CATHODE
78 - RF	- 210	77			.1	3.7
6A7- Osc-Transl	- 210	77	-.2	155	.1	3.7
78 - IF	- 210	77			0	4.8
85 - AVC-Det-AF	- 38				.1	4.8
41 - Output	- 200	210			-.5	

SEARS, ROEBUCK & CO.

MODELS 7075-7076-7077-7078-7091-7092-7093-7094



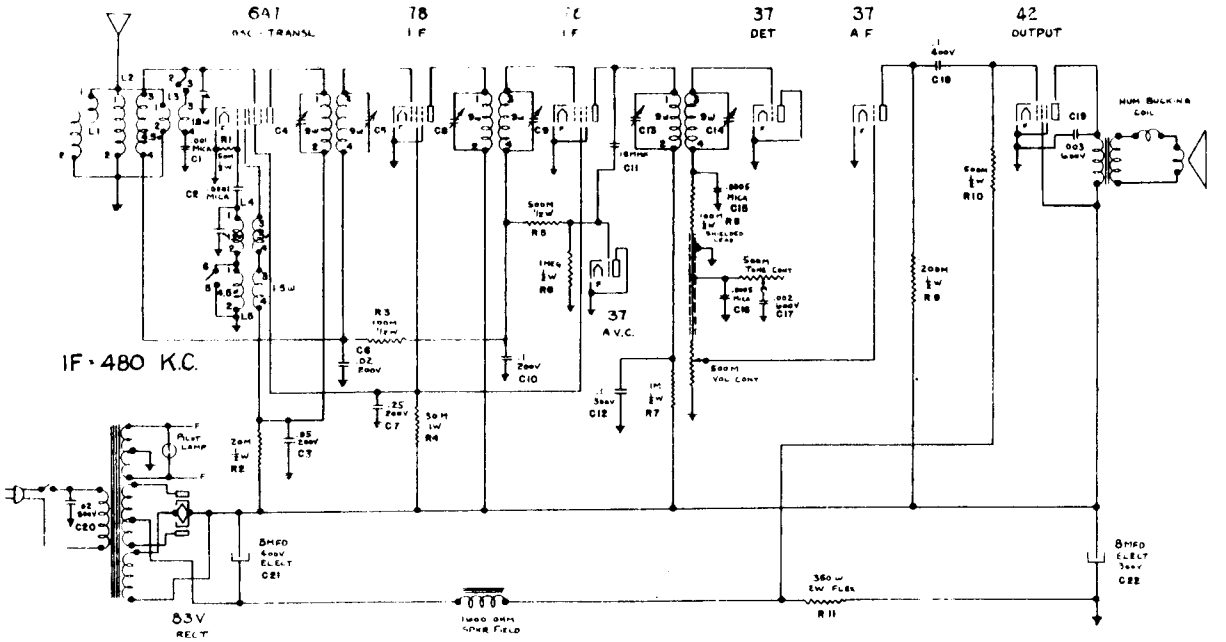


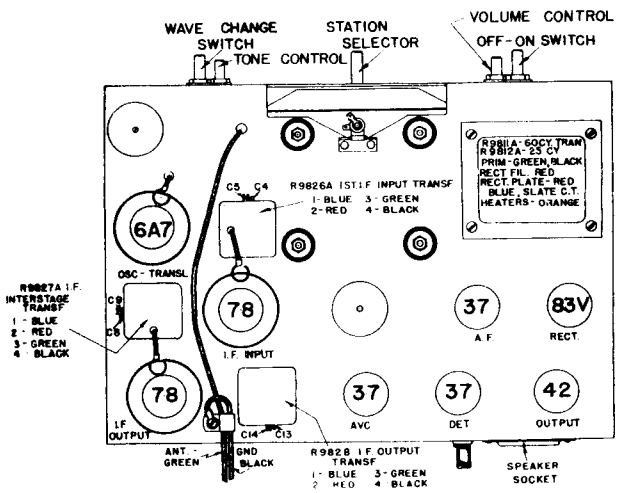


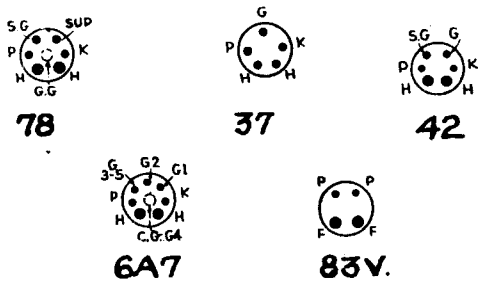
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - IF	115	80	3	1
6B7 - AVC-Det-AF	20	20	.6	.2
43 - Output	100	115	27	5.5
6A7 - Osc-Transl	Ep=84; EG#2 =84; EG #3 & #5=50; Ip=2; Ig#2 =2m.a. Ig#3 & #5=2m.a.			
25Z5 - Rect.	Max. d.c. volts=185. Plate current=46m.a.			

SEARS, ROEBUCK & CO.

MODELS 7118 & 1708A





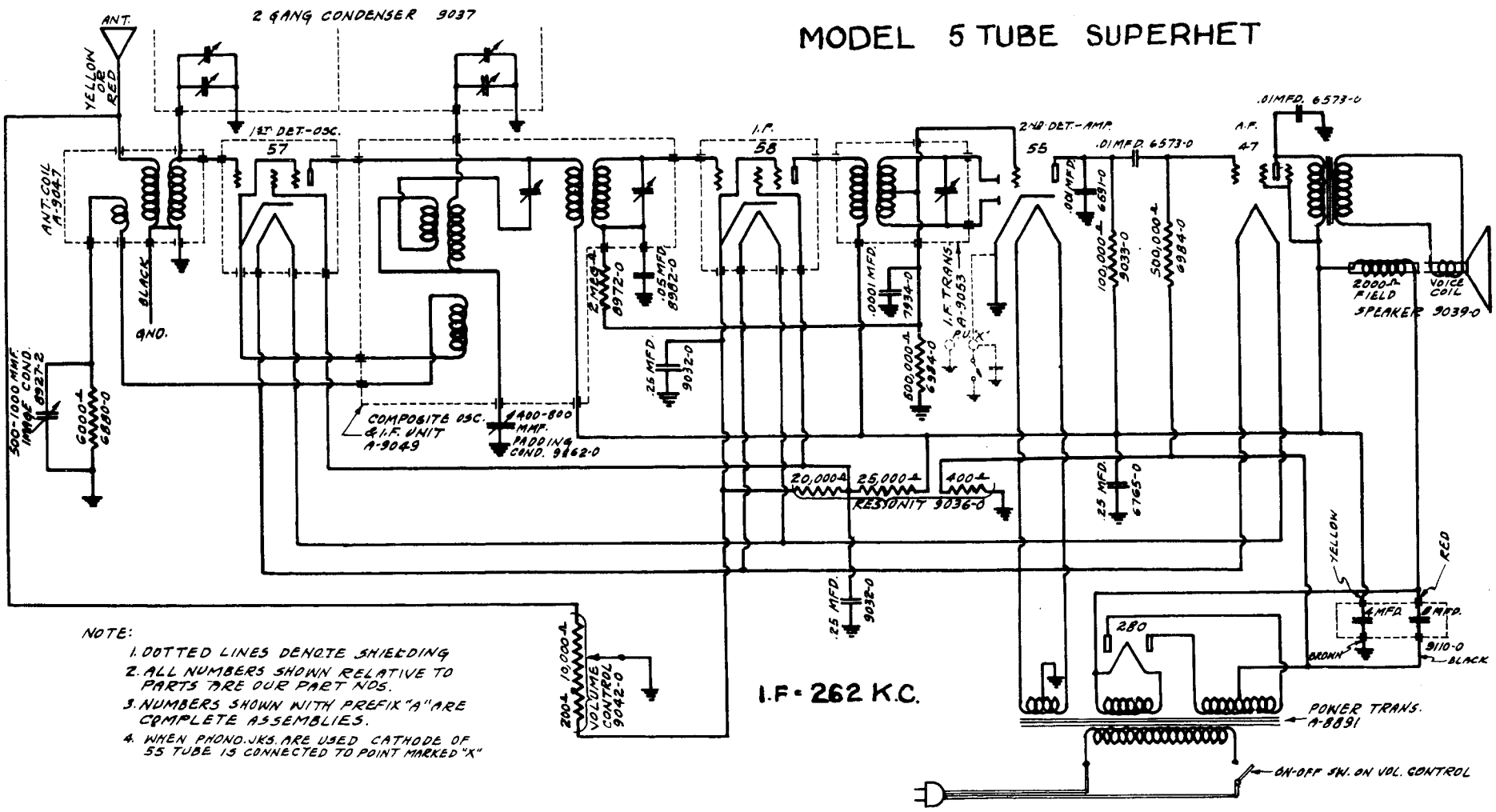


Trouble Shooting Hints

A continuous whistle in these sets is caused by oscillation of the 42 tube. Replace tube and connect 1,000 ohm resistor in suppressor lead.

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M. A.
78 - 1st IF	245	100	6.5	2
78 - 2nd IF	245	100	6.5	2
37 - AF	20		1.25	
42 - Output	235	245	23	5
6A7 - Osc-Transl	Ep=245v; Eg#2=175v; Eg#3&5=80v. Ip=4.25ma; Ig#2=2.5ma; Ig#3&5=1.75ma.			
83V - Rect.	Max d.c. voltage=360v. Plate current=29m.a. per plate.			

MODEL 5 TUBE SUPERHET



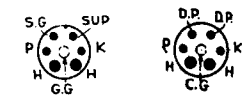
NOTE:

1. DOTTED LINES DENOTE SHIELDING
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. WHEN PHONO. JKS. ARE USED CATHODE OF 55 TUBE IS CONNECTED TO POINT MARKED "X"

I.F. - 262 K.C.

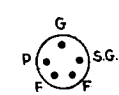
SENTINEL RADIO CORP.

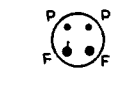
Type of Tube	Position of tube	Filament volts	Plate volts	C volts	Normal Plate-M.A.	Screen volts
257	Composite oscillator and modulator	2.4	240	6	3.5	85
258	Intermediate frequency	2.4	240	3	7	85
255	Detector and audio	2.4	30*			
247	Output	2.4	220	5**	32.5	240
280	Rectifier	4.9	30 M.A. each plate			



57 & 58 55

47



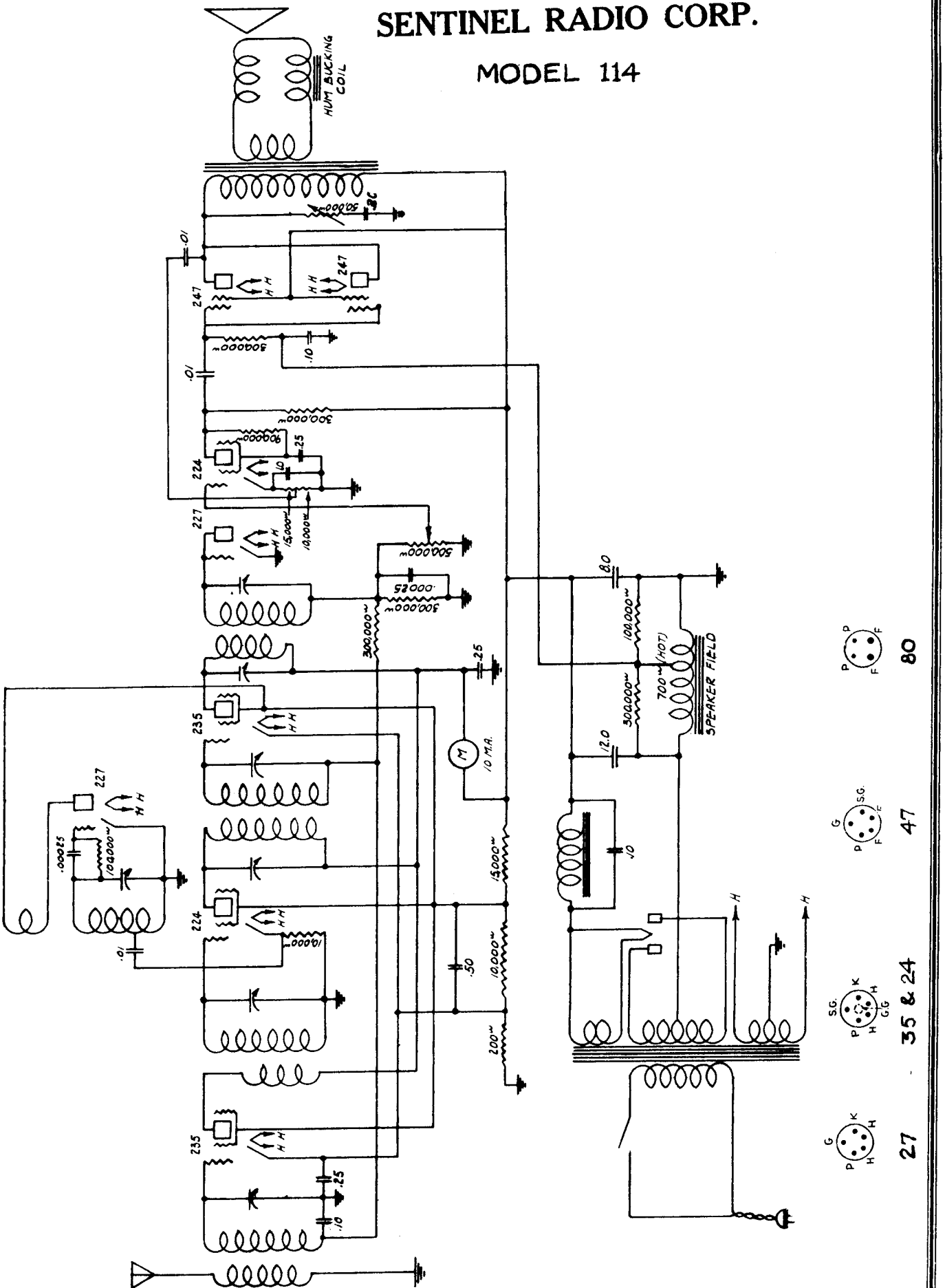


80

* These readings are only comparative and are not true voltages applied. The voltmeter, when readings are taken at these points, is in series with a very high resistance.
** To read 247 bias, read between 247 control grid and ground.

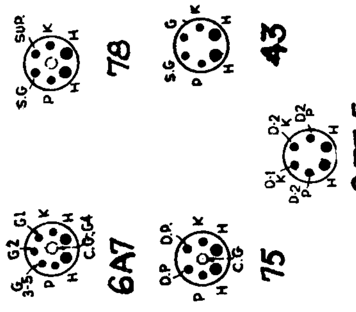
SENTINEL RADIO CORP.

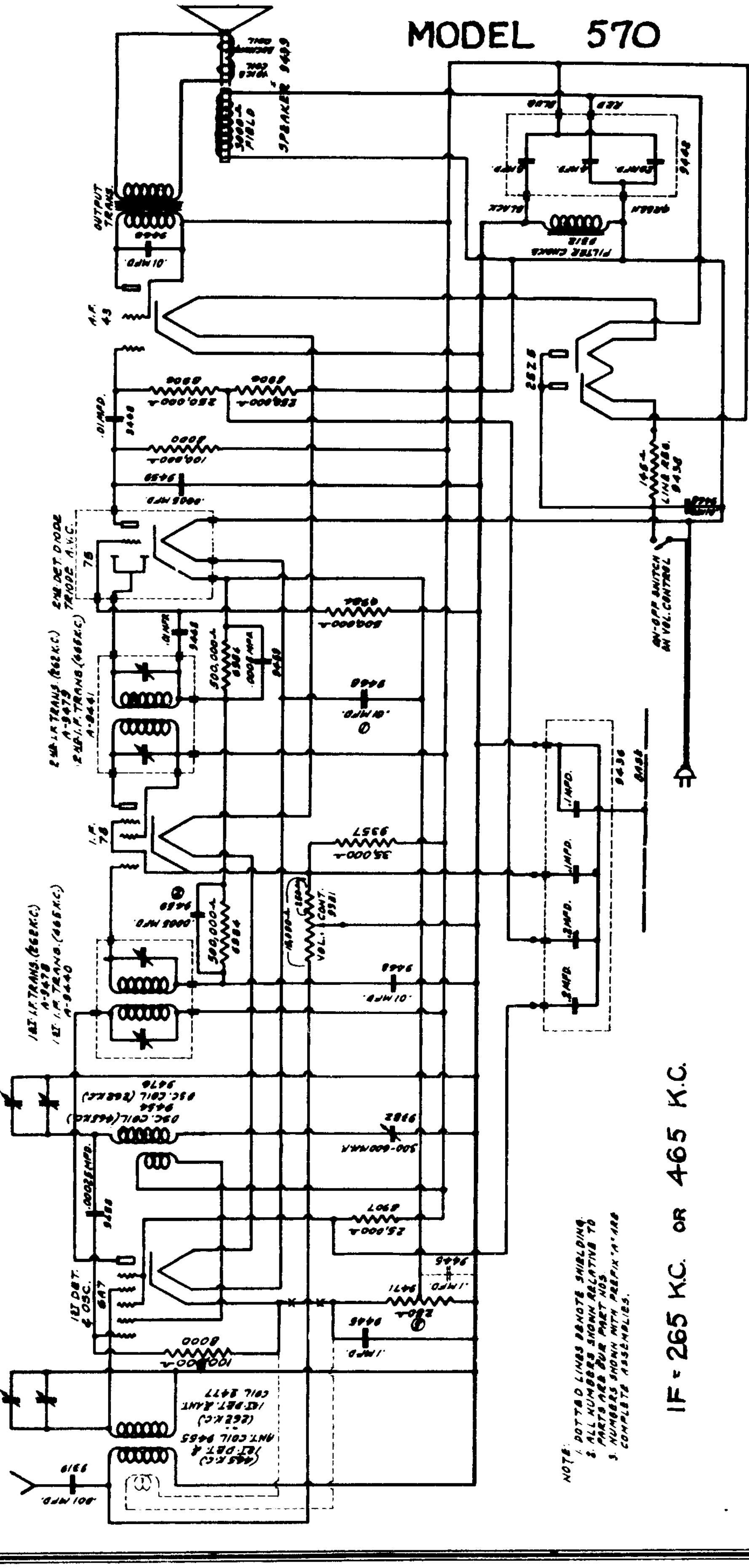
MODEL 114



SENTINEL RADIO CORP.

MODEL 570





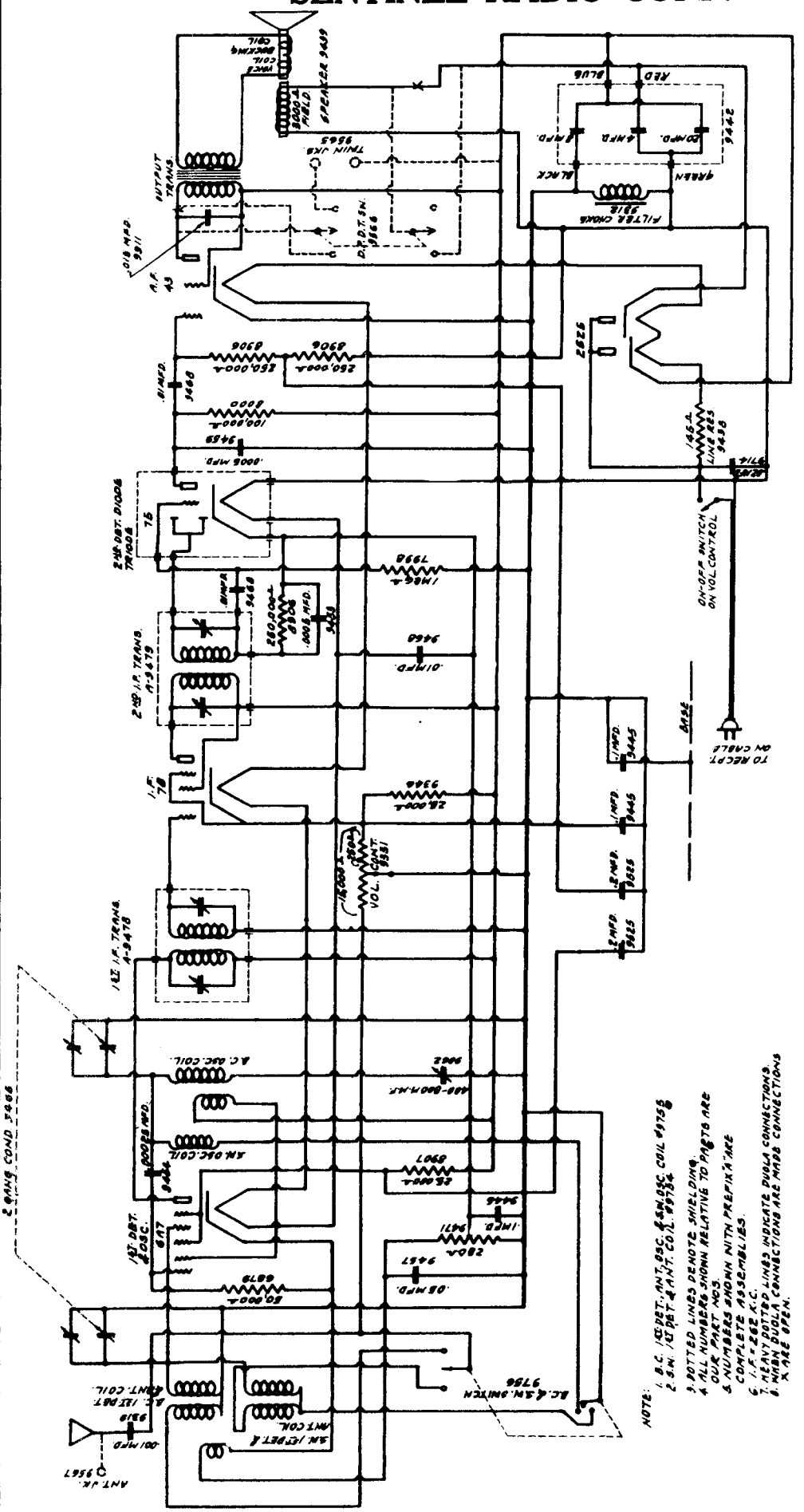
IF = 265 K.C. OR 465 K.C.

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	SCREEN VOLTS	CATHODE VOLTS	GRID NO.1	GRID NO.2	GRID NO.3	GRID NO.4	GRID NO.5
6A7	Oscillator & Modulator	5.2	128		2.00	1.5	125	76	2	76
78	Intermediate Frequency	5.1	128	128	2.25					
75	2nd Detector Diode&AVC	5.0	82.5*		2.00					
43	Output	25	115	128	20.**					
25Z5	Rectifier	25								

*These readings are only comparative and are not true voltages applied. The voltmeter, when readings are taken at these points is in series with a very high resistance.

SENTINEL RADIO CORP.

MODEL 590



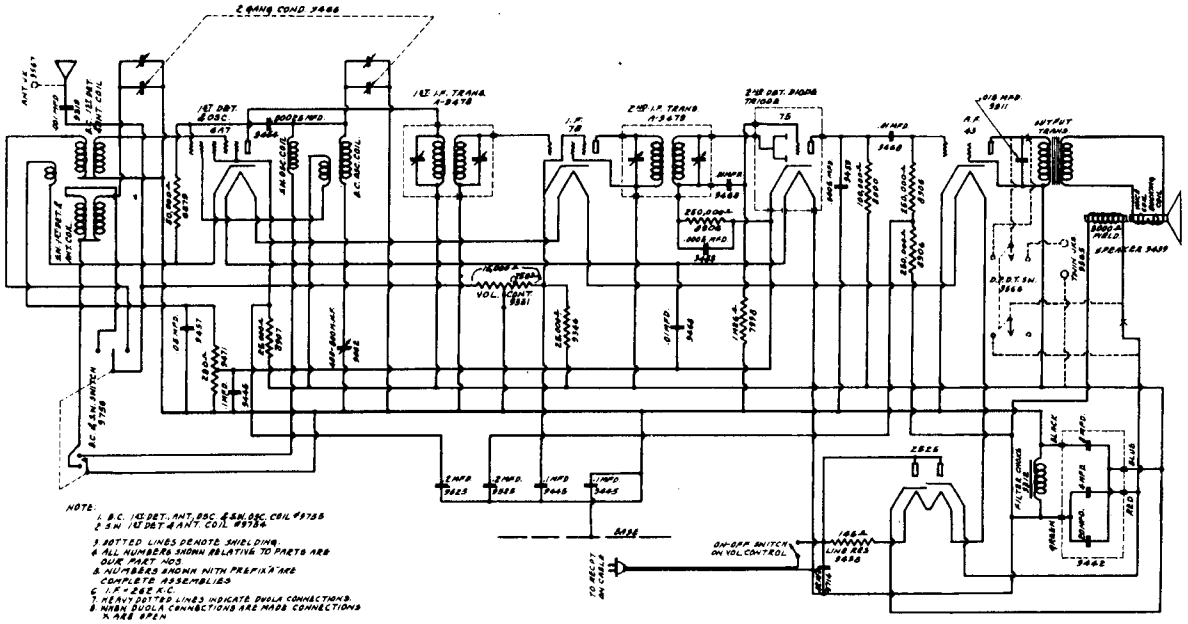
TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	SCREEN VOLTS	CATHODE VOLTS	OSC. GRID NO.1	ANODE GRID NO.2	SCREEN GRID NO.3 & 5
6A7	Oscillator & Modulator	5.2	128		2.00	1.5	125	76
78	Intermediate Frequency	5.1	128	128	2.25			
75	2nd Detector Diode & AVC	5.0	82.5*		2.00			
43	Output	25	115	128	20**			
2525	Rectifier	26						

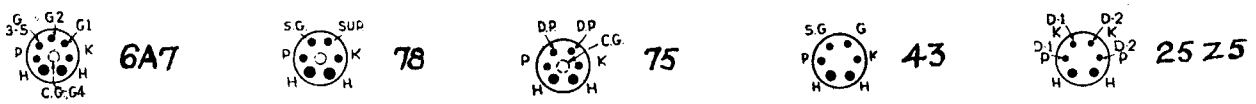
* Triode plate voltage. Comparative only is not the true voltage applied. The voltmeter, when readings are taken at this point, is in series with a very high resistance.

** Bias for the 43 output tube is obtained by the voltage drop across the filter choke. Read bias voltage from cathode to negative side of filter choke.

SENTINEL RADIO CORP.

MODEL 599





INTERMEDIATE TRANSFORMER ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the grid clip disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. The ground side of the test oscillator should be connected to the gang condenser frame and must not be otherwise grounded.

2. Set the oscillator at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer trimmer shields.

4. The second IF transformer should next be adjusted in the same manner as the first intermediate transformer.

TO ALIGN THE VARIABLE CONDENSER:

1. Place the band selector switch for operation on the 1500-540 kilocycle band (right hand position) and tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency. Next, adjust the trimmer screws of the oscillator and antenna section of the variable condenser to obtain maximum output reading. These trimmers are mounted on the top of the variable condenser.

2. Tune the receiver and set the oscillator frequency to approximately 600 kilocycles. Adjust the 600 kilocycle padding condenser which is located on the rear of and accessible through the small hole in the chassis for maximum output. Be sure to rock the variable condenser slightly to the right and left so as to obtain the position of greatest output.

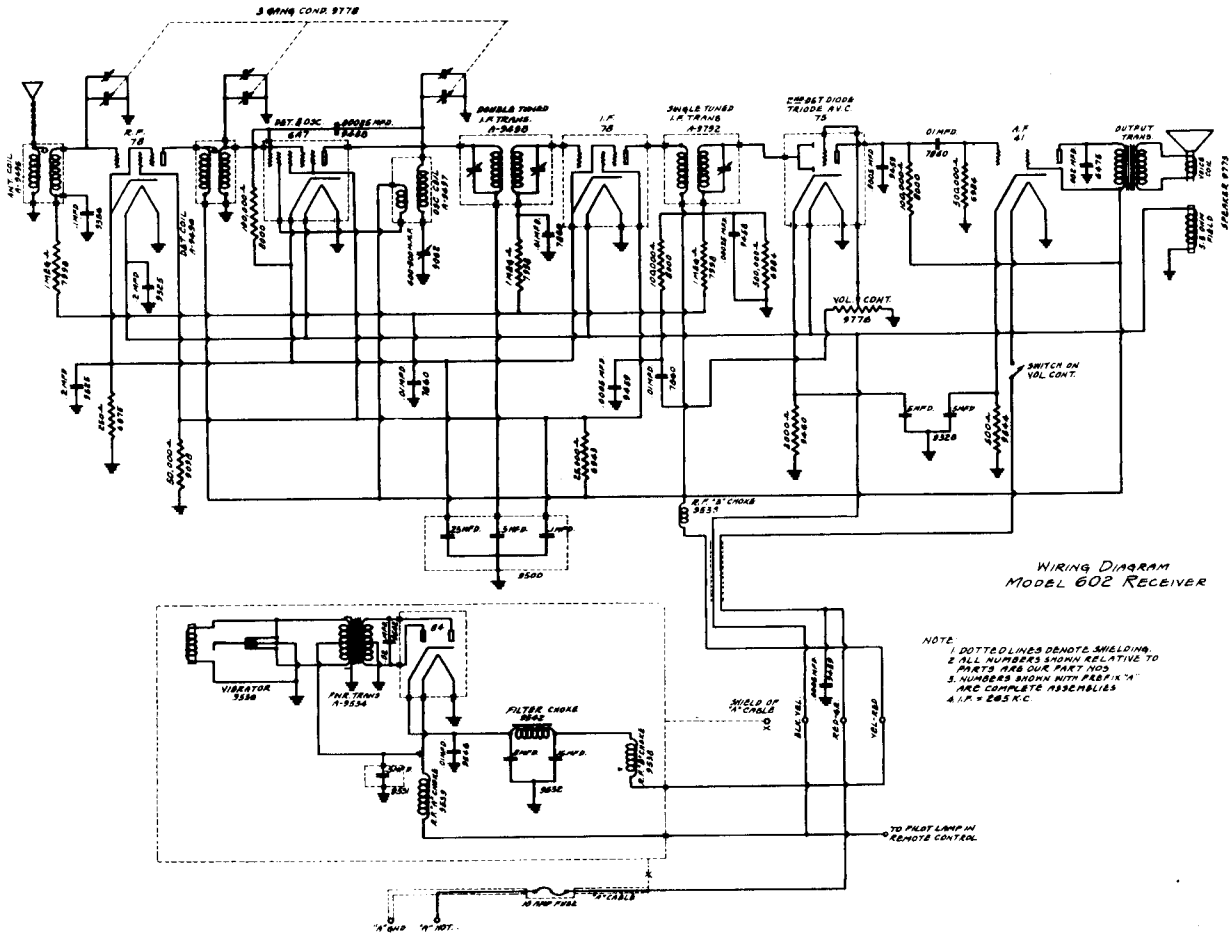
NOTE: There is no short wave adjustment. After alignment has been properly made in accordance with the instructions given, the dial calibration will be correct and the receiver will properly track on short wave band.

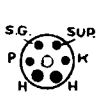
VOLTAGE TABLE

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	SCREEN VOLTS	CATHODE VOLTS	OSC. GRID NO.1	ANODE GRID NO.2	SCREEN GRID NO.3 & 5
6A7	Oscillator & Modulator	5.2	128		2.00	1.5	125	76
78	Intermediate Frequency	5.1	128	128	2.25			
75	2nd Detector Diode & AVC	5.0	82.5*		2.00			
43	Output	25	115	128	20**			
25Z5	Rectifier	25						

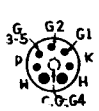
SENTINEL RADIO CORP.

MODEL 602

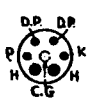




78

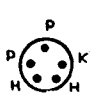


6A7



75

41



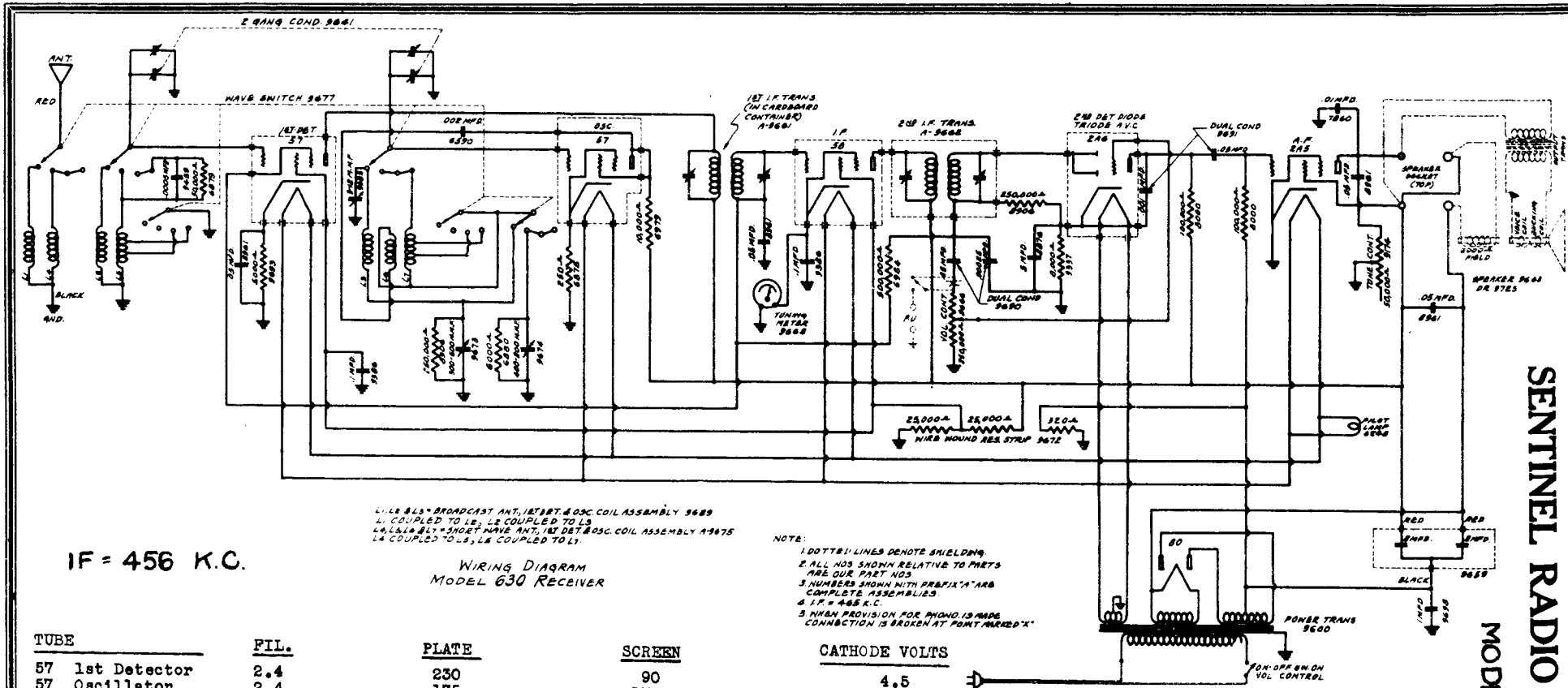
84

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO.1	GRID NO.2	GRID NO.3	GRID NO.5
78	Radio Frequency	6	225	4	92				
6A7	Oscillator & Modulator	6	225	4		6.2	225	92	92
78	Intermediate Frequency	6	225	4	92				
75	2nd Detector Diode & AVC	6	135	1.5					
41	Output	6	218	13	225				
84	Rectifier	6	260*	235					

INTERMEDIATE FREQUENCY: Unless an intermediate transformer has become defective due to an open or burned out winding it should never be necessary to readjust the intermediate stage. Should this occur it is essential that an oscillator be used with some type of output measuring device to correctly tune the I.F. Transformers. Connect the high side of the oscillator output to the control grid cap (grid No. 4) of the 6A7 oscillator modulator tube leaving the grid cap disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID CAP OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. If the output of the oscillator is too great the value of this resistor may be reduced. The ground side of the tes oscillator should be connected to the chassis. Set the oscillator to 265 K.C. (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Align the first intermediate transformer by turning the intermediate frequency transformer trimmer screw up and down until maximum reading is obtained on the output meter. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency trans-. former adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary trimmer. The first I.F. transformer is double-tuned, the trimmers of which are accessible through the top of the I. F. can, one section of which is adjusted by turning the brass hex nut and the other section by screwing in and out the set screw that is accessible through the hole provided in the brass hex nut. The second intermediate transformer has but one trimmer which is likewise accessible from the top of the intermediate transformer shield can. After both intermediate transformers are correctly adjusted the alignment of the intermediate stage is complete and the trimmers should not be further disturbed. The grid cap should be connected to the grid of the 6A7 tube and 50,000 ohm resistor removed.

SENTINEL RADIO CORP.

MODELS 630-634 & 635



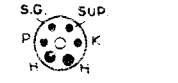
L1, L2 & L3 = BROADCAST ANT., 1ST DET. & OSC. COIL ASSEMBLY 9689
L1 COUPLED TO L2, L2 COUPLED TO L3
L4, L5, L6 & L7 = SHORT WAVE ANT., 1ST DET. & OSC. COIL ASSEMBLY A-9675
L4 COUPLED TO L5, L6 COUPLED TO L7.

NOTE:
1. DOTTED LINES DENOTE SHIELDING.
2. ALL NOS SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. I.F. = 465 K.C.
5. WHEN PROVISION FOR PHONO IS MADE, CONNECTION IS BROKEN AT POINT MARKED "X"

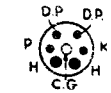
IF = 456 K.C.

WIRING DIAGRAM
MODEL 630 RECEIVER

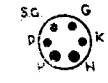
TUBE		FIL.	PLATE	SCREEN	CATHODE VOLTS
57	1st Detector	2.4	230	90	4.5
57	Oscillator	2.4	175	175	1.7
58	I.F.	2.4	230	90	4
2A6	Second Detector	2.45	160*		3
2A5	A.F.	2.4	218	230	7**
80	Rectifier	4.8	340 each plate		



57 & 58



2A6



2A5

80

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the #57 Modulator tube (1st detector), leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

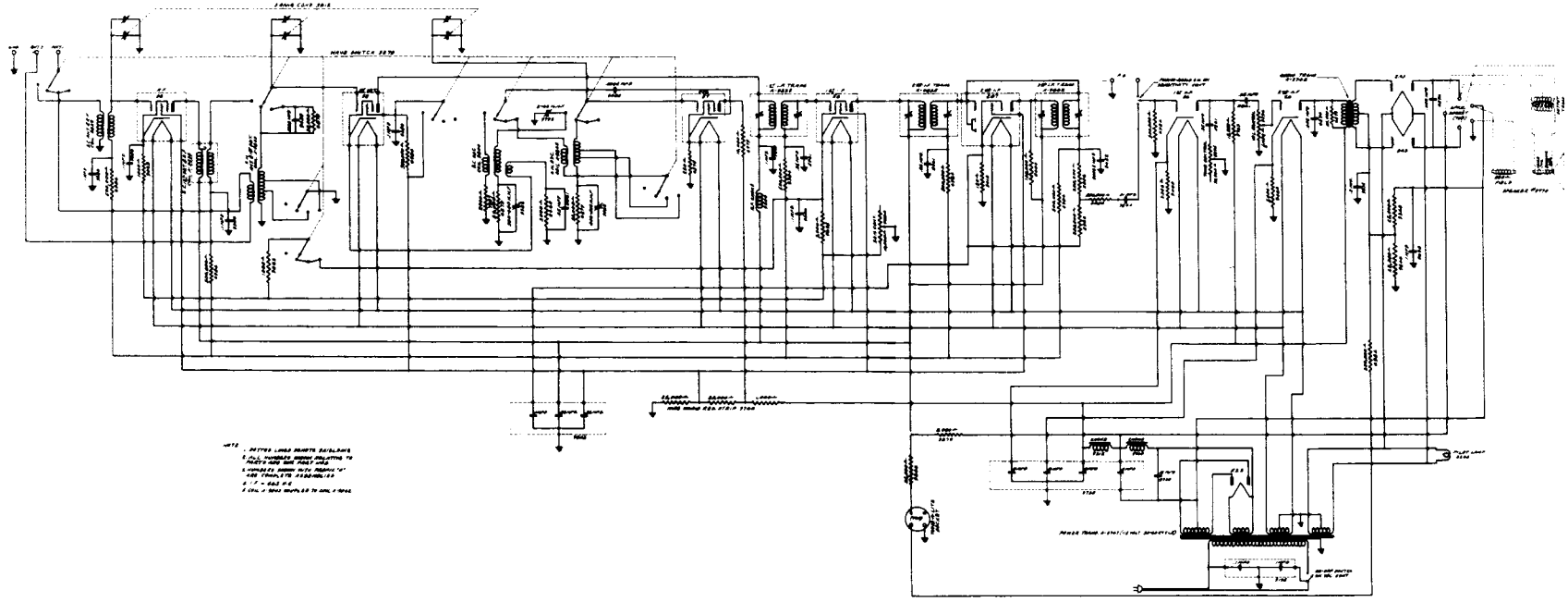
2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the 1st intermediate transformer trimmer up and down until maximum reading is obtained on the output meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

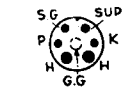
4. The second I.F. transformer should next be adjusted in the same manner as the first I.F. transformer.

SENTINEL RADIO CORP.

MODEL 1040

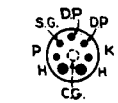


TUBE		FIL.	PLATE	SCREEN	CATHODE
58	RF	2.2	155*	80	4
58	1st Detector	2.2	155*	80	6
58	1st IF	2.2	155*	80	7
2B7	2nd IF	2.25	155*	80	1
57	Oscillator	2.3	150	150	
56	1st AF	2.3	185*		12
56	2nd AF	2.4	235		12
2A3	Push-Pull Output	2.4	245		45**
2A3	Push-Pull Output	2.4	245		45**
5Z3	Rectifier	5	5Z3		

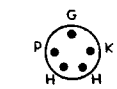


57 & 58

FIG. 21



2B7



56

5Z3

2A3

INTERMEDIATE ALIGNMENT:

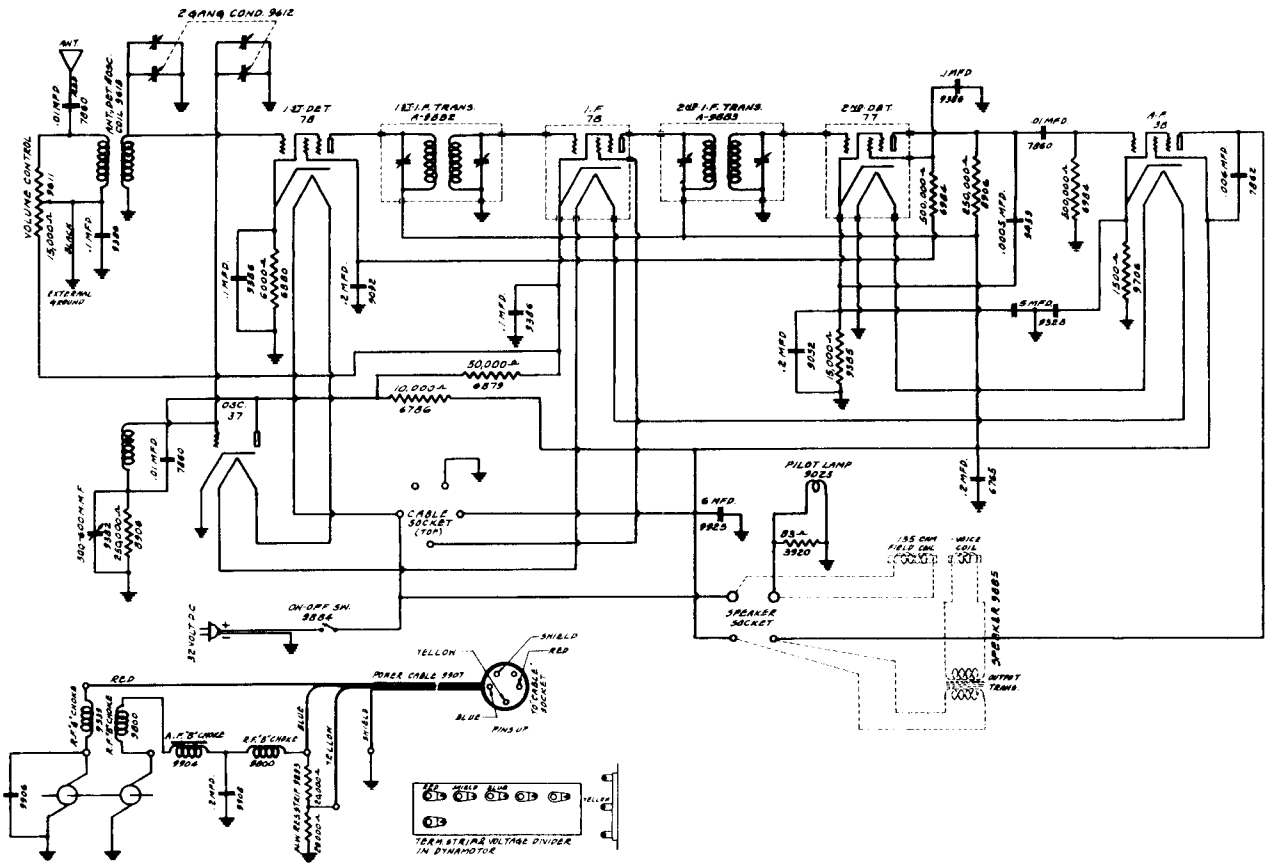
1. Connect the high side of the oscillator output to the control grid of the 58 first detector leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

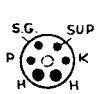
2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut (accessible through the hole in top of IF transformer shield) of the first intermediate transformer trimmer screw up and down until maximum reading is obtained on the output meter. The adjust the trimmer screw located inside of the brass hex nut in the same manner.

SENTINEL RADIO CORP.

MODELS 5000 & 5100





78 & 77

37

38

INTERMEDIATE ALIGNMENT: Only when an intermediate transformer has become defective due to an open or burned out winding should it be necessary to readjust the intermediate transformer. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device. To align the intermediate transformer:

1. Connect the high side of the oscillator output to the control grid of the #36 modulator tube. The ground side of the oscillator should be connected to the chassis.
2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.
3. Align the first intermediate transformer by turning one of the intermediate transformer trimmer screws up and down until maximum reading is obtained on the output meter. Then adjust the other trimmer screw in the same manner.
4. The second I.F. transformer should next be adjusted in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

VOLTAGE TABLE:

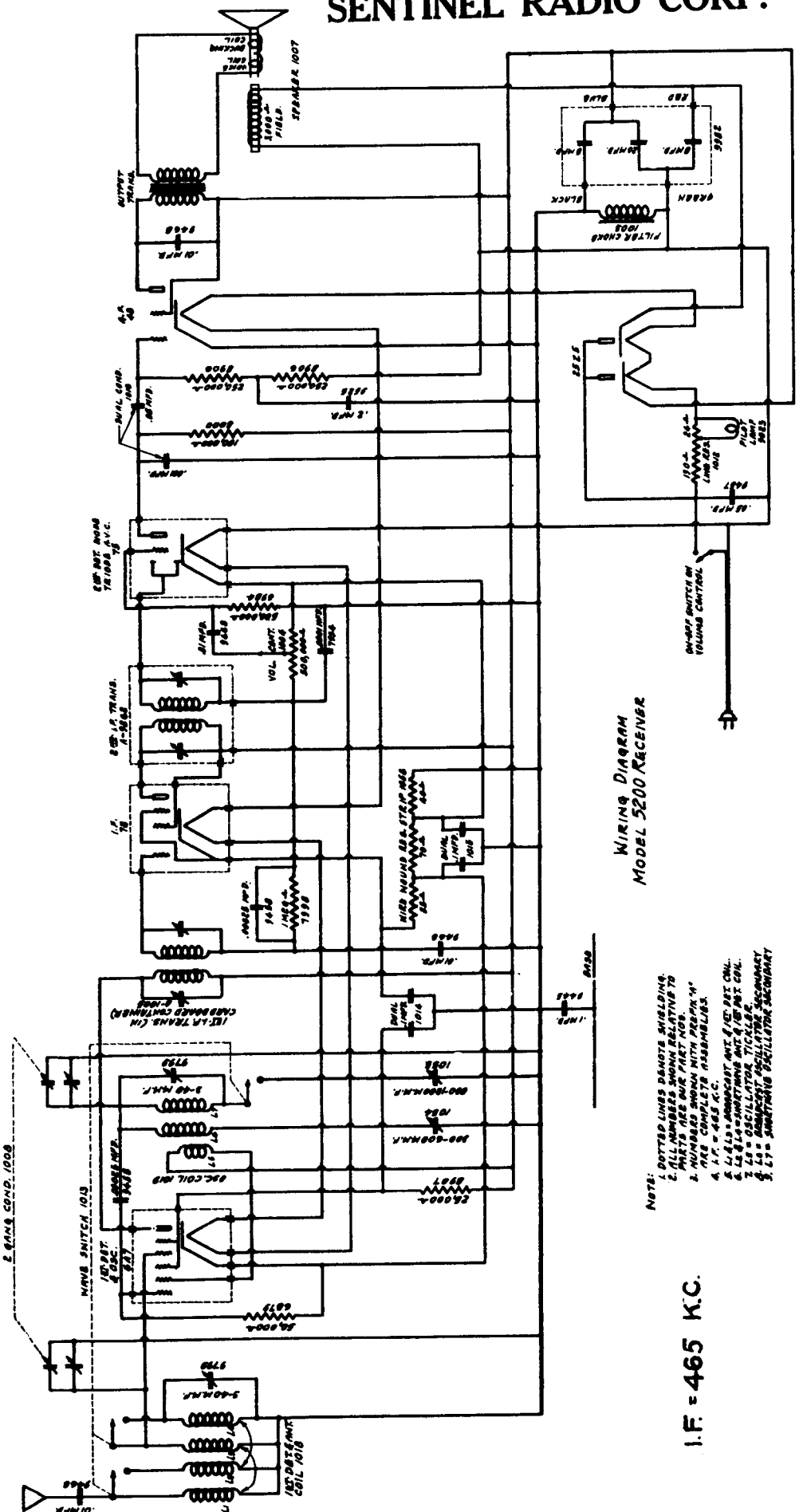
Line Voltage : 32 Volts
Volume Control : Full on

TUBE	FIL.	PLATE	SCREEN	CATHODE
78 1st Detector	6.5	215	100	10
37 Oscillator	6.5	140		25
78 I.F.	6.5	215	100	26
77 2nd Detector	6.5	90*	32.5*	4
38 Output	6.5	208	215	20

* Comparative Voltage only.
Read voltage from socket to chassis.

SENTINEL RADIO CORP.

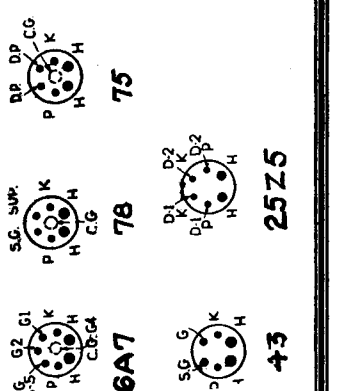
MODEL 5200



WIRING DIAGRAM
MODEL 5200 RECEIVER

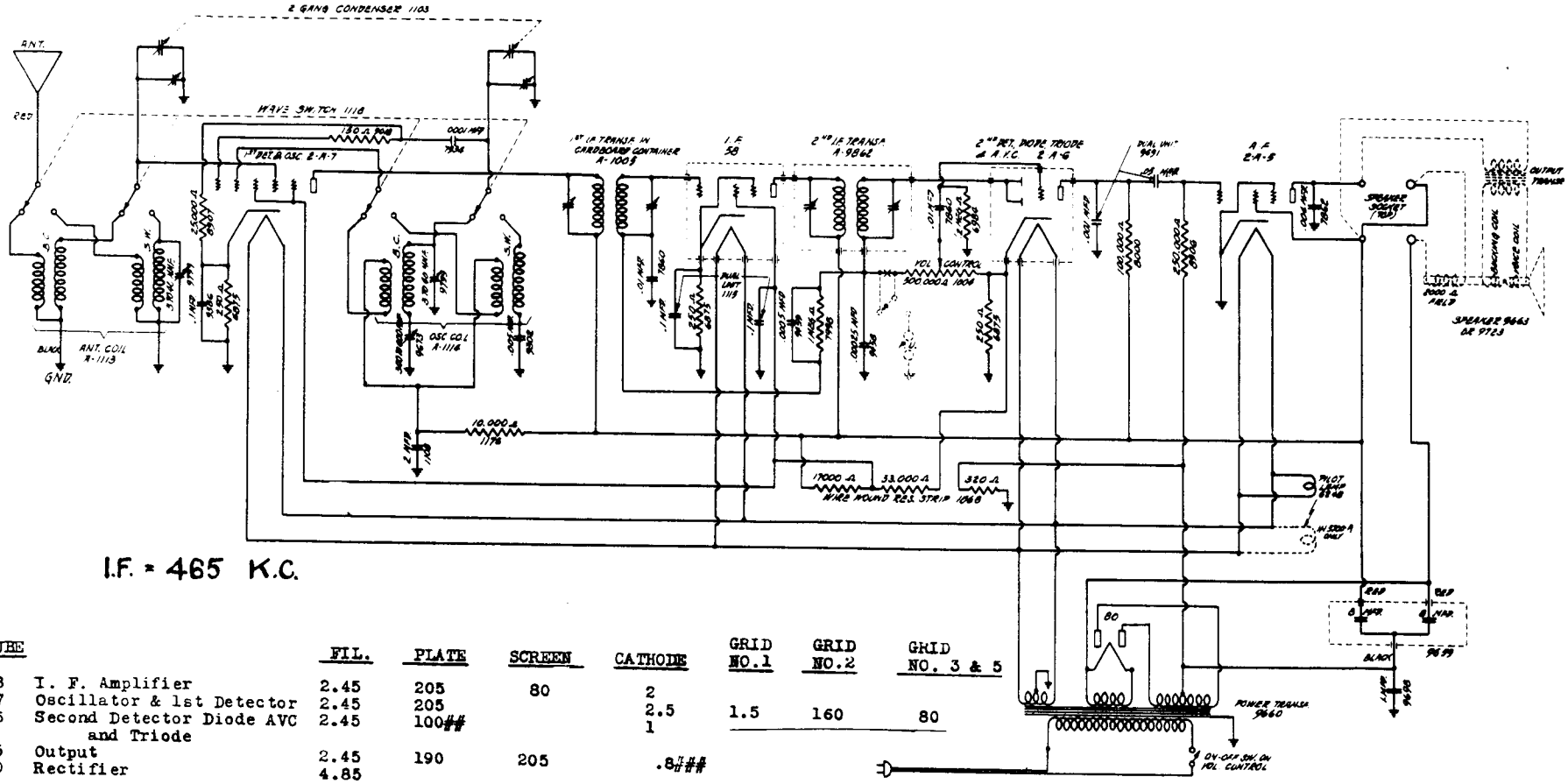
I.F. = 465 K.C.

TUBE	FIL.	PLATE	SCREEN	CATHODE	GRID NO.2	GRID NO. 3 & 5
6A7	5	100	50	1.8	100	50
78	5	100	100	2.5		
75	5	60*	118	.05		
43	25	95	100	18**		
2525	25					



SENTINEL RADIO CORP.

MODEL 5700



TUBE		FIL.	PLATE	SCREEN	CATHODE	GRID NO.1	GRID NO.2	GRID NO. 3 & 5
58	I. F. Amplifier	2.45	205	80	2			
2A7	Oscillator & 1st Detector	2.45	205		2.5	1.5	160	80
2A6	Second Detector Diode AVC and Triode	2.45	100##		1			
2A5	Output	2.45	190	205	.8###			
80	Rectifier	4.85						

Triode Plate. Comparative voltage only. The voltmeter is in series with a high resistance and is therefore not the true voltage applied.

Read all voltages from socket to chassis unless otherwise specified.

Read from grid to chassis.

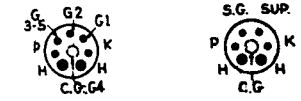
INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 2A7 tube leaving the grid cap disconnected. The ground side of the oscillator should be connected to the receiver chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

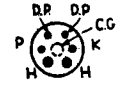
3. Align the first intermediate transformer by turning the intermediate transformer brass hext adjusting nut located on top of the intermediate transformer can up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside the brass hex nut for maximum output.

4. Adjust the second I. F. transformer in the same manner as the first I. F. transformer.



2A7

58



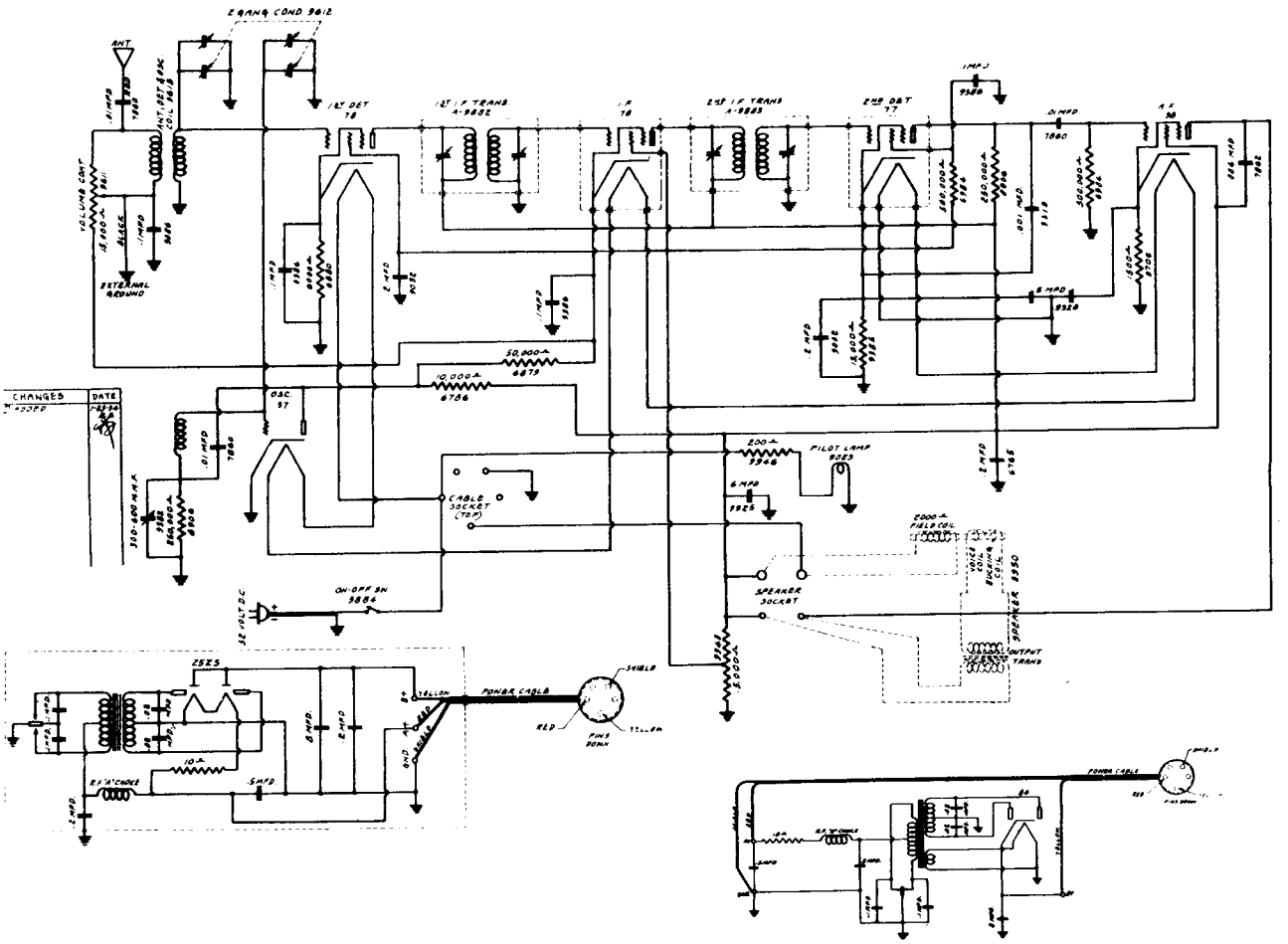
2A6

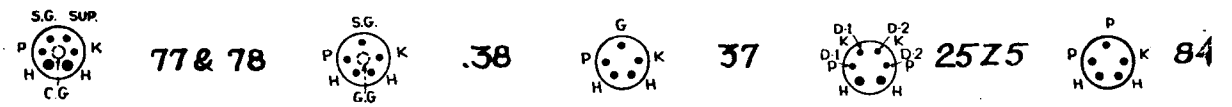
2A5

80

SENTINEL RADIO CORP.

MODEL 6100





INTERMEDIATE ALIGNMENT: Only when an intermediate transformer has become defective due to an open or burned out winding should it be necessary to readjust the intermediate transformer. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device. To align the intermediate transformer:

1. Connect the high side of the oscillator output to the control grid of the #36 modulator tube. The ground side of the oscillator should be connected to the ground lead.
2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.
3. Align the first intermediate transformer by turning one of the intermediate transformer trimmer screws up and down until maximum reading is obtained on the output meter. Then adjust the other trimmer screw in the same manner.
4. The second I. F. transformer should next be adjusted in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

Line Voltage : 32 Volts
Volume Control: Full On

TUBE		FIL.	PLATE	SCREEN	CATHODE
78	1st Detector	6.5	160	70	5
37	Oscillator	6.5	100		20
78	I.F.	6.5	160	70	25
77	2nd Detector	6.5	65*	25*	25
38	Output	6.5	150	160	15
25Z5	Rectifier or 84 Rectifier				

* Comparative voltage only.
Read voltage from socket to receiver chassis.

SENTINEL RADIO CORP.

MODEL 6300

Band No. 1 - from 10 Megacycles to 24 Megacycles
Band No. 2 - from 4 Megacycles to 10 Megacycles
Band No. 3 - from 1.5 Megacycles to 4 Megacycles
Band No. 4 - from 1500 Kilocycles to 540 Kilocycles

Line Voltage : 115
Volume Control: Full on
Wave Band : Broadcast

TUBE	Fil.	Plate	Screen	Cathode Volts	Grid No.1	Grid No.2	Grid No. 3 & 5
2A7 Oscillator 1st Detector	2.45	220		2.2	3.5	200	90
58 First I. F. Amplifier	2.45	220	90	6			
58 Second I. F. Amplifier	2.45	220	90	3.5			
2A6 Second Detector	2.45	120##		1			
2A5 Output	2.45	210	220				
80 Rectifier	4.89						

Triode Plate. Comparative voltage only. The voltmeter is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 2A7 First Detector tube, leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

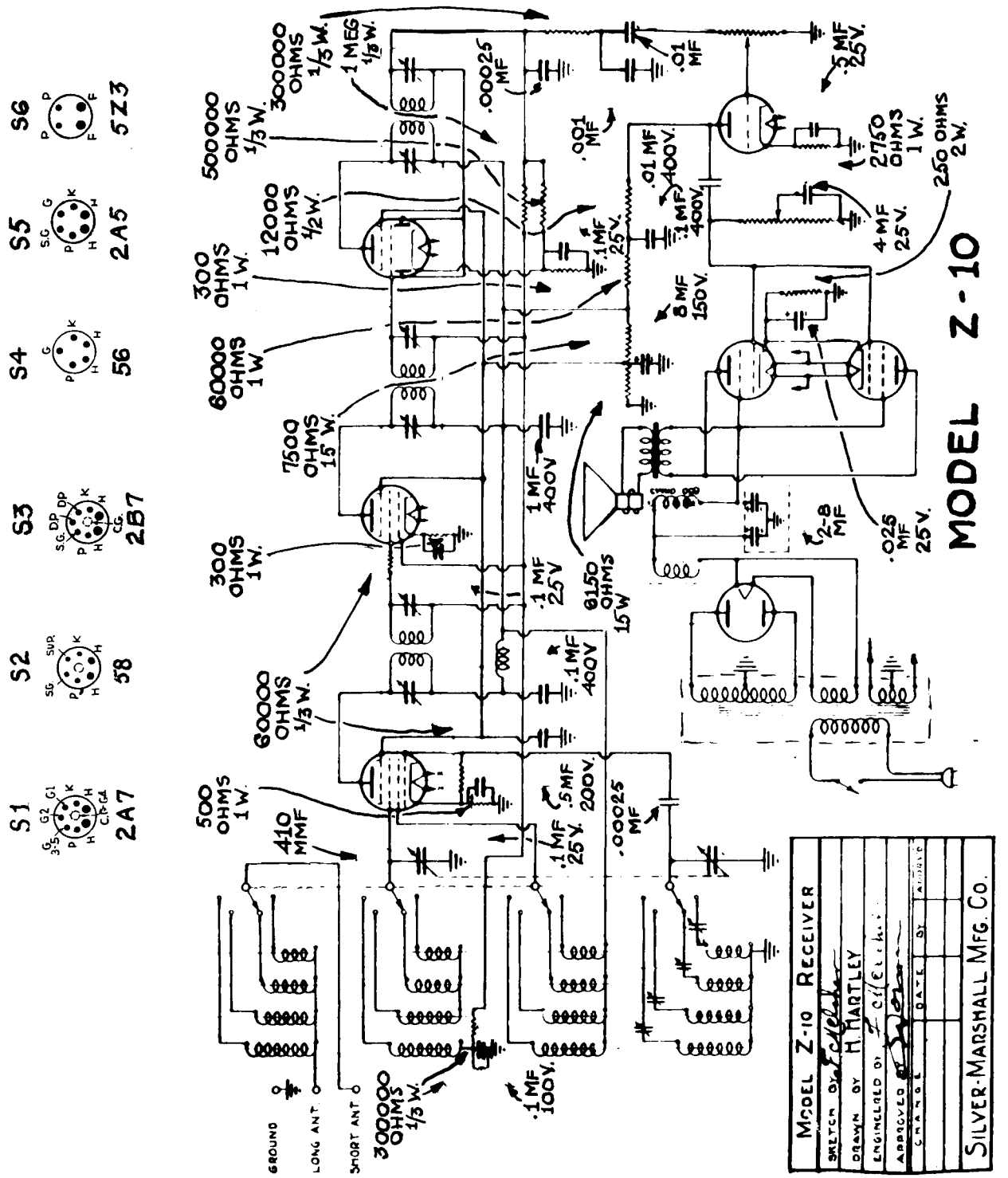
2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

4. The second and third I. F. transformers should next be adjusted in the same manner as the first I.F. transformer.

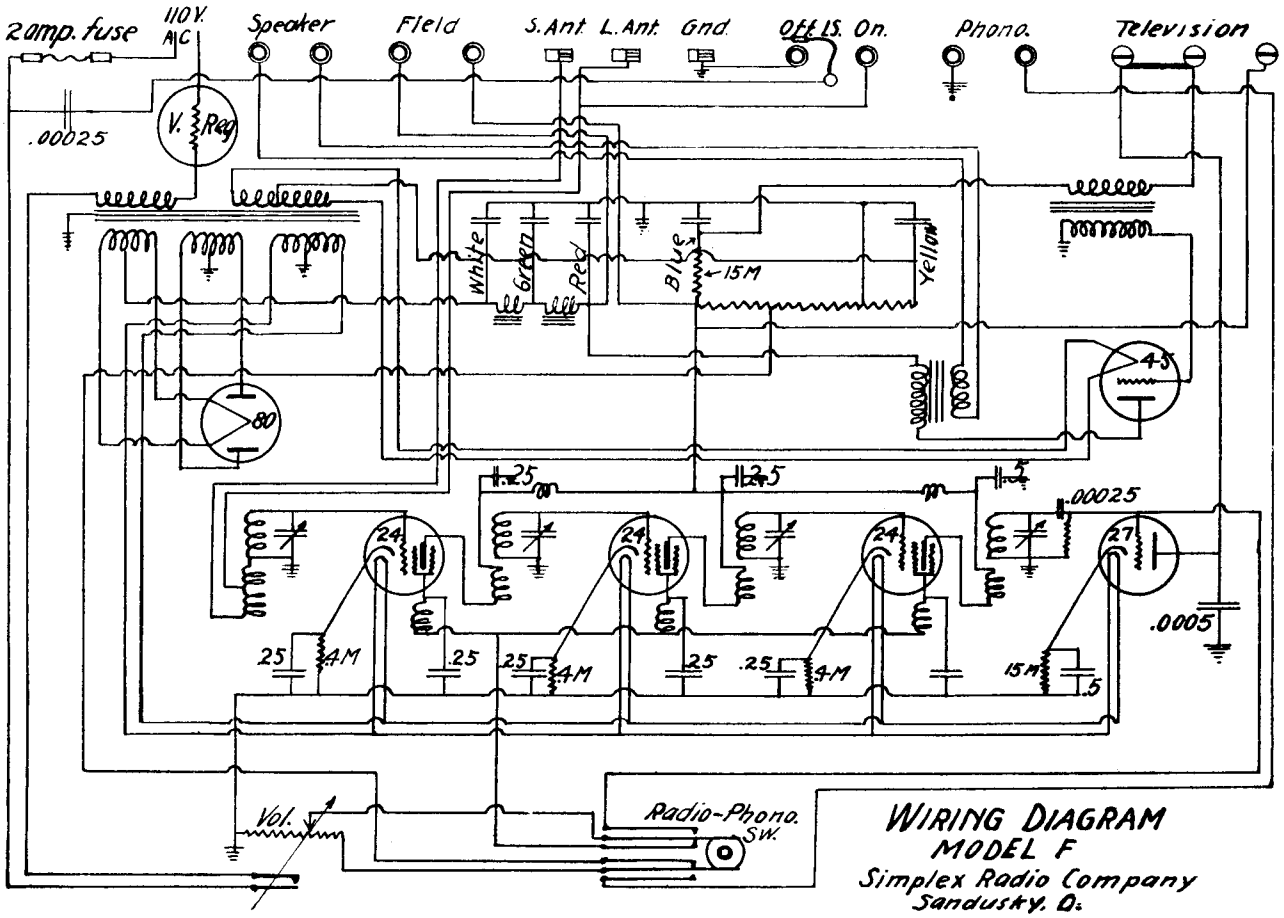
SILVER MARSHALL, Inc.

MODEL Z10

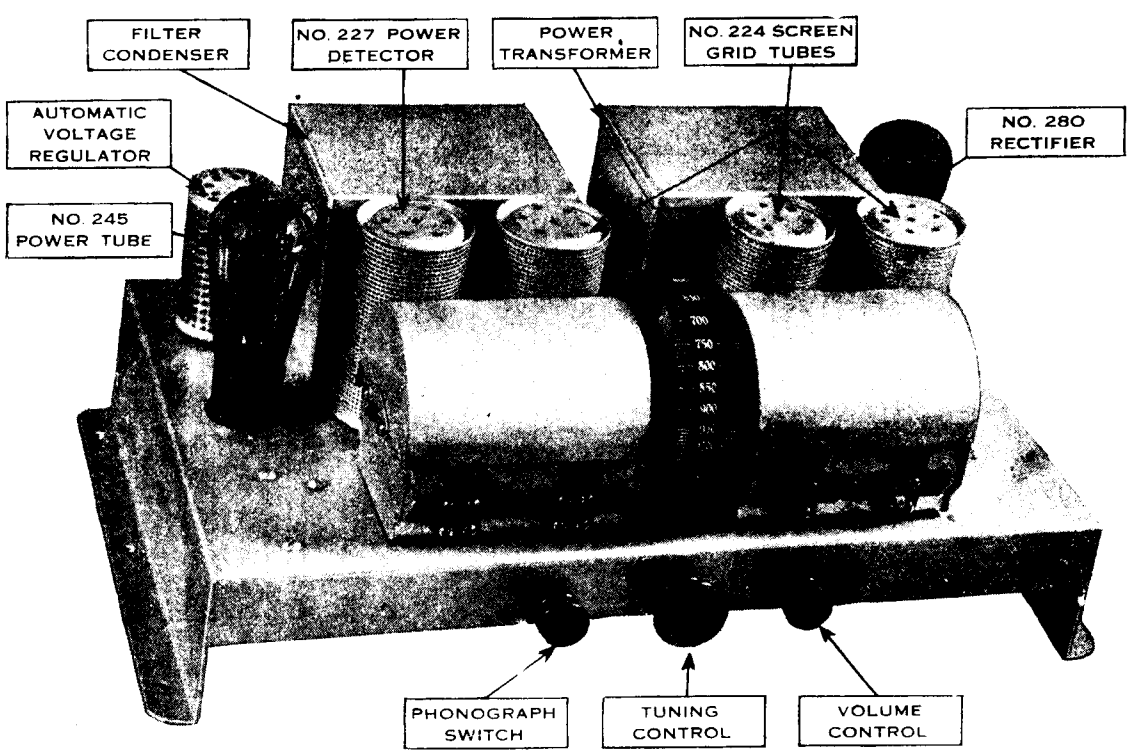


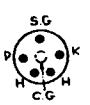
SIMPLEX RADIO CO.

MODEL F



WIRING DIAGRAM
MODEL F
Simplex Radio Company
Sandusky, O.





24

27

45

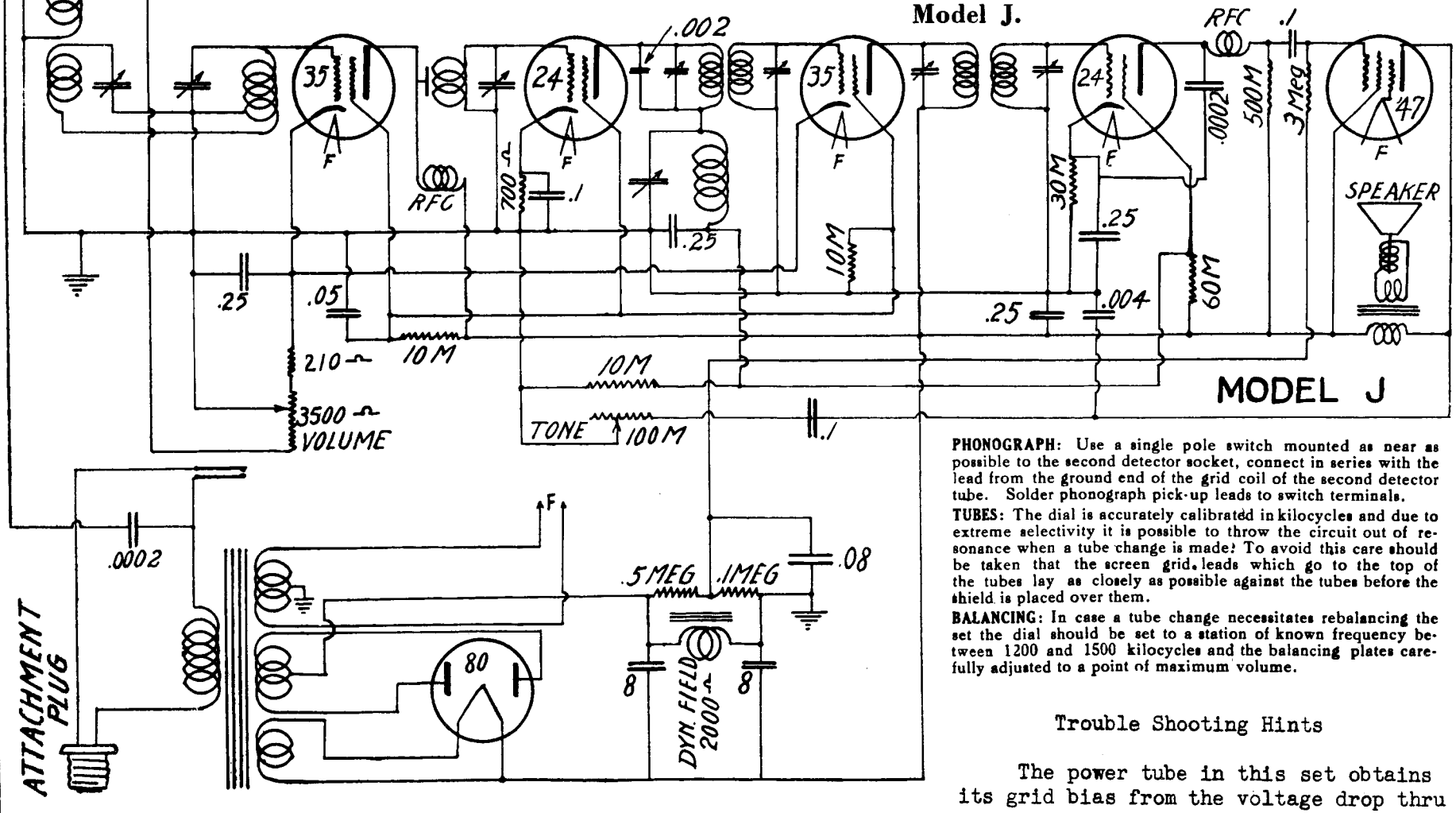
80

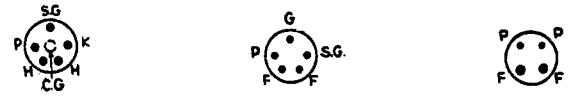
CAUTION: *DO NOT ATTEMPT TO OPERATE ON CURRENT OTHER THAN THAT NOTED ON INSTRUMENT.*

INSTALLATION: Thirty feet of aerial is enough for efficient operation. More may be used if desired. If no aerial available connect "ANT" to "B'LT-IN-ANT" and operate with or without ground.

OPERATION: The right hand knob is a combination switch and tone control. The left hand knob is the volume control. The center knob is the tuning control.

Model J.





35 & 24 47 80

PHONOGRAPH: Use a single pole switch mounted as near as possible to the second detector socket, connect in series with the lead from the ground end of the grid coil of the second detector tube. Solder phonograph pick-up leads to switch terminals.

TUBES: The dial is accurately calibrated in kilocycles and due to extreme selectivity it is possible to throw the circuit out of resonance when a tube change is made? To avoid this care should be taken that the screen grid leads which go to the top of the tubes lay as closely as possible against the tubes before the shield is placed over them.

BALANCING: In case a tube change necessitates rebalancing the set the dial should be set to a station of known frequency between 1200 and 1500 kilocycles and the balancing plates carefully adjusted to a point of maximum volume.

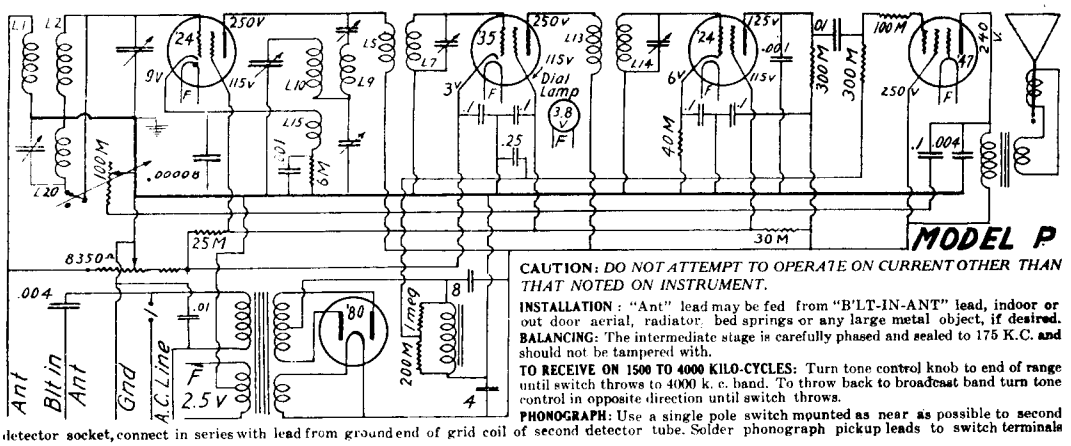
Trouble Shooting Hints

The power tube in this set obtains its grid bias from the voltage drop thru two resistors connected across the dynamic speaker field. A change in the value of one of these resistors throws the grid bias off resulting in audio oscillation, or low volume.

SIMPLEX RADIO CO.

SIMPLEX RADIO CO.

MODEL P



CAUTION: *DO NOT ATTEMPT TO OPERATE ON CURRENT OTHER THAN THAT NOTED ON INSTRUMENT.*

INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or out door aerial, radiator, bed springs or any large metal object, if desired.

BALANCING: The intermediate stage is carefully phased and sealed to 175 K.C. and should not be tampered with.

TO RECEIVE ON 1500 TO 4000 KILO-CYCLES: Turn tone control knob to end of range until switch throws to 4000 k. c. band. To throw back to broadcast band turn tone control in opposite direction until switch throws.

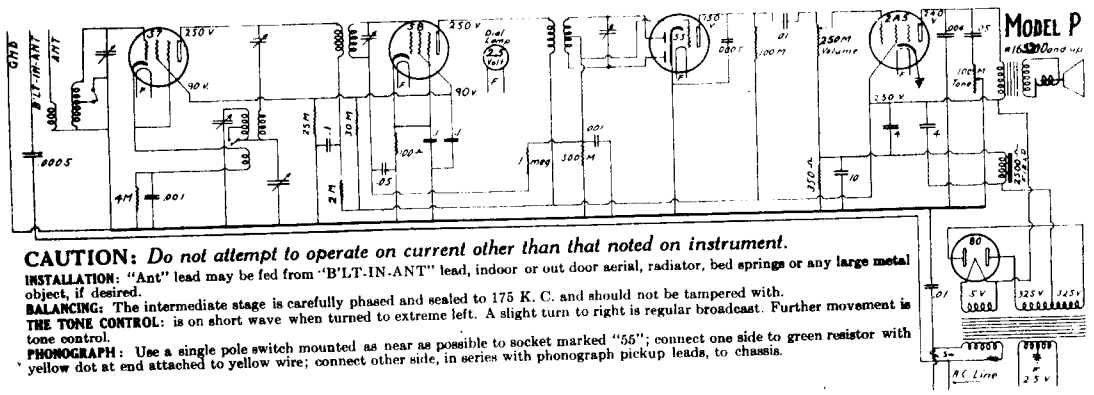
PHONOGRAPH: Use a single pole switch mounted as near as possible to second detector socket, connect in series with lead from ground end of grid coil of second detector tube. Solder phonograph pickup leads to switch terminals

MODEL P 16520 & UP

24 & 35 — S.G, P, K, H, H, C.G.

47 — G, P, S.G., F, F

80 — P, P, F, F



CAUTION: *Do not attempt to operate on current other than that noted on instrument.*

INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or out door aerial, radiator, bed springs or any large metal object, if desired.

BALANCING: The intermediate stage is carefully phased and sealed to 175 K. C. and should not be tampered with.

THE TONE CONTROL: is on short wave when turned to extreme left. A slight turn to right is regular broadcast. Further movement is tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to socket marked "55"; connect one side to green resistor with yellow dot at end attached to yellow wire; connect other side, in series with phonograph pickup leads, to chassis.

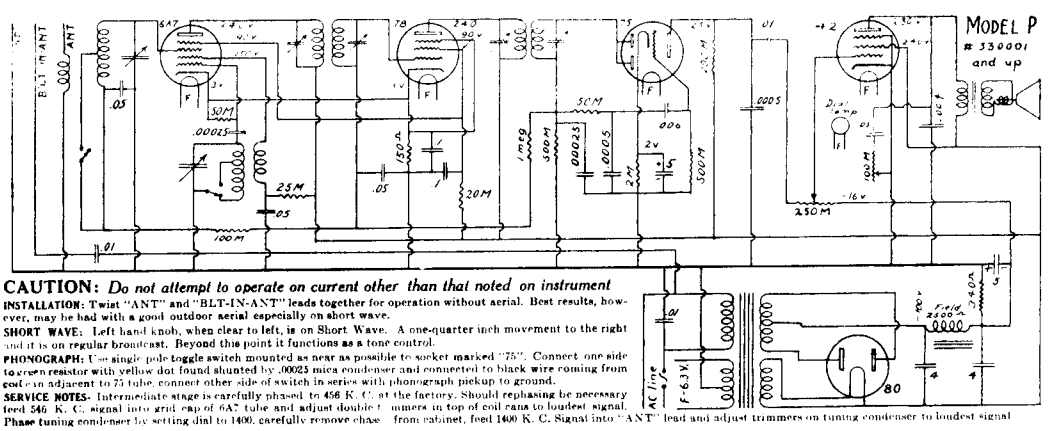
MODEL P 330,000 & UP

80 — P, P, F, F

2A5 — S.G, G, P, K, H, H

53 — D.P, D.P, C.G, P, K, H, H

57 & 58 — S.G, SUP, P, K, H, H, C.G



CAUTION: *Do not attempt to operate on current other than that noted on instrument*

INSTALLATION: Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial especially on short wave.

SHORT WAVE: Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil in adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.

SERVICE NOTES: Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 546 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

80 — P, P, F, F

42 — S.G., G, H, K

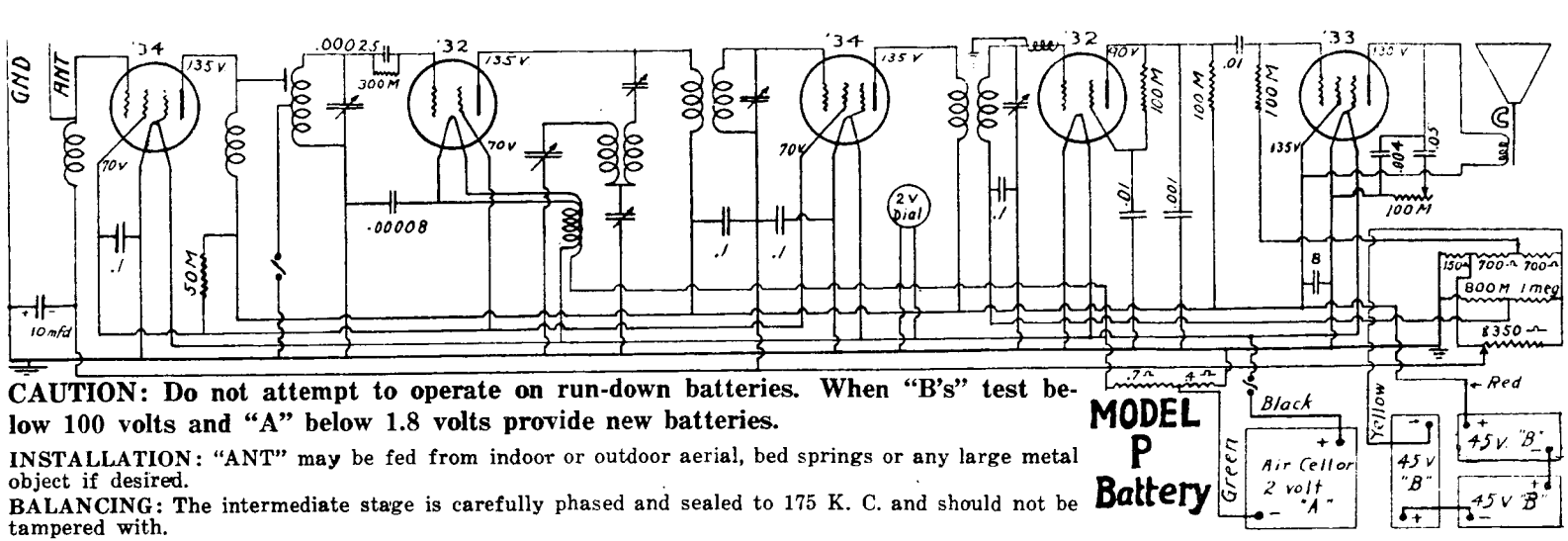
75 — D.P, D.P, H, K, C.G

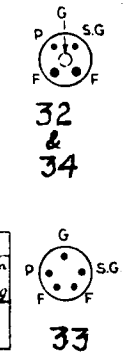
78 — S.G, SUP, H, K, G.G

6A7 — G, G2, G1, 3-5, H, K, C.G.G4

SIMPLEX RADIO CO.

MODEL P



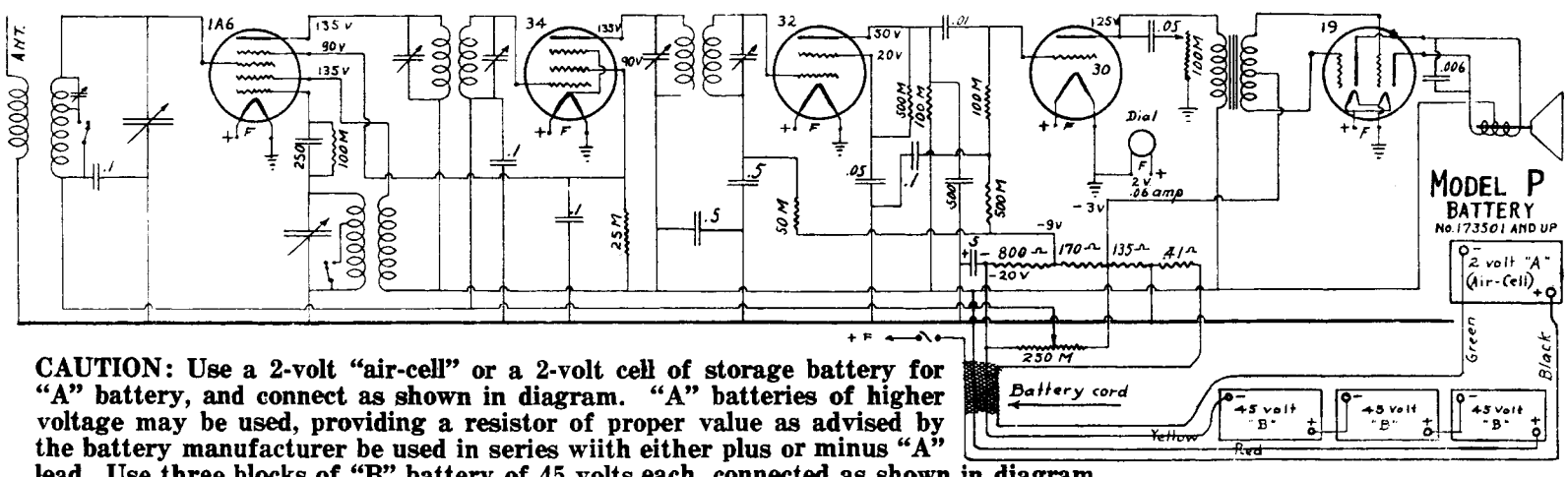


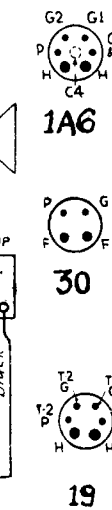
CAUTION: Do not attempt to operate on run-down batteries. When "B's" test below 100 volts and "A" below 1.8 volts provide new batteries.

INSTALLATION: "ANT" may be fed from indoor or outdoor aerial, bed springs or any large metal object if desired.

BALANCING: The intermediate stage is carefully phased and sealed to 175 K. C. and should not be tampered with.

PHONOGRAPH: Use a single pole switch mounted in rear of chassis. Connect in parallel with phonograph pick-up leads and connect both in series with grid return of second detector ahead of .1 mfd. by-pass condenser.





CAUTION: Use a 2-volt "air-cell" or a 2-volt cell of storage battery for "A" battery, and connect as shown in diagram. "A" batteries of higher voltage may be used, providing a resistor of proper value as advised by the battery manufacturer be used in series wiith either plus or minus "A" lead. Use three blocks of "B" battery of 45 volts each, connected as shown in diagram.

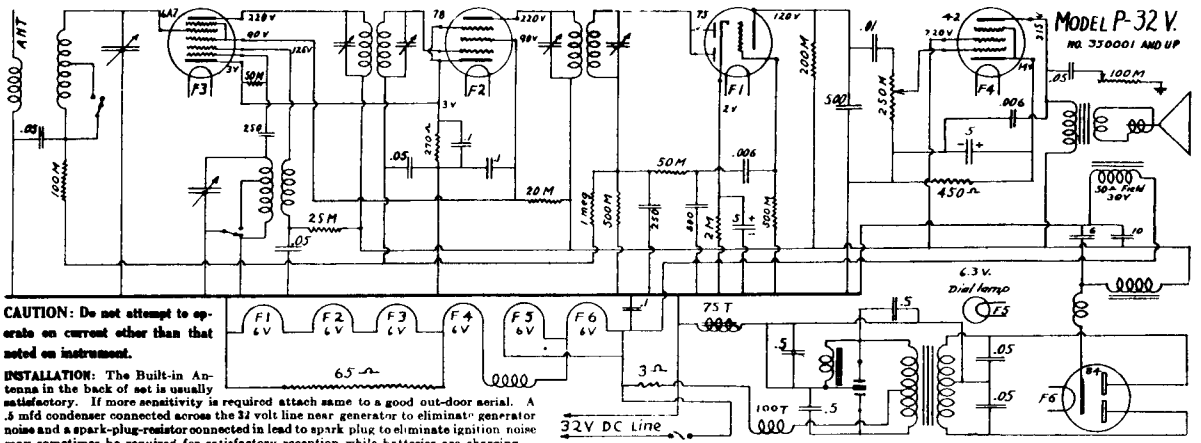
INSTALLATION: A good outdoor aerial will give best results, especially on short wave. No ground wire is usually required.

PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "32." Cut black wire coming from bottom of coil can adjacent to this tube and connect across switch. Connect phonograph pickup across switch.

SERVICE NOTES: Intermediate stage is carefully phased to 456 k.c. at the factory. Should rephasing be necessary, feed 456 k.c. signal into grid cap of "1A6" tube, and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400 k.c., carefully remove chassis from cabinet, feed 1400 k.c. signal into antenna lead and adjust trimmers on tuning condenser to loudest signal.

SIMPLEX RADIO CO.

MODEL P-32 V

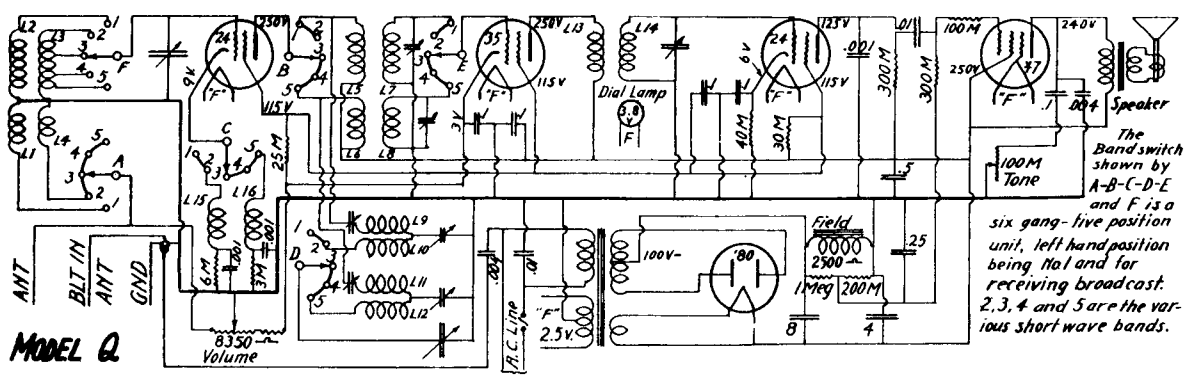


CAUTION: Do not attempt to operate on current other than that noted on instrument.

INSTALLATION: The Built-in Antenna in the back of set is usually satisfactory. If more sensitivity is required attach same to a good out-door aerial. A .5 mfd condenser connected across the 32 volt line near generator to eliminate generator noise and a spark-plug-resistor connected in lead to spark plug to eliminate ignition noise may sometimes be required for satisfactory reception while batteries are charging.

USE NO GROUND CONNECTION ON SET. **SHORT WAVE:** Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control **PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .0025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground. **SERVICE NOTES-** Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 456 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

MODEL Q



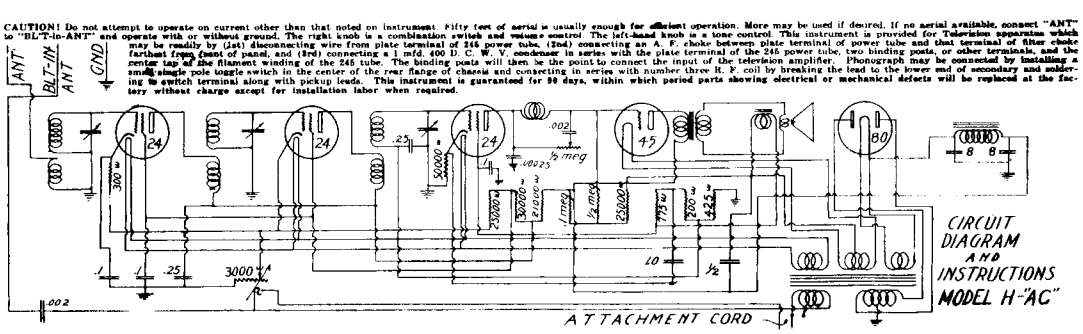
CAUTION: *Do not attempt to operate on current other than that noted on instrument.*

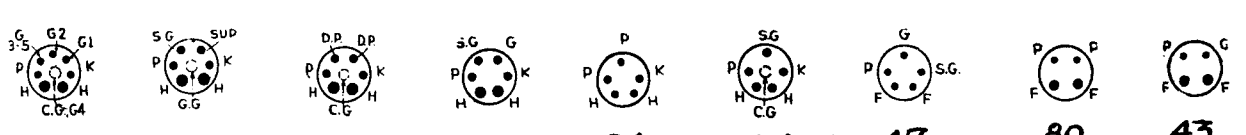
INSTALLATION: "ANT" may be fed from "B'LT-IN-ANT" lead, indoor or outdoor aerial, radiator, bed springs, or any large metal object, if desired

BALANCING: The intermediate stage is carefully phased and sealed to 175 K. C. and should not be tampered with.

PHONOGRAPH: Use a single pole switch mounted as near as possible to the second detector socket, connect in series with lead from ground end of the grid coil of second detector tube. Solder phonograph pick-up leads to switch terminals.

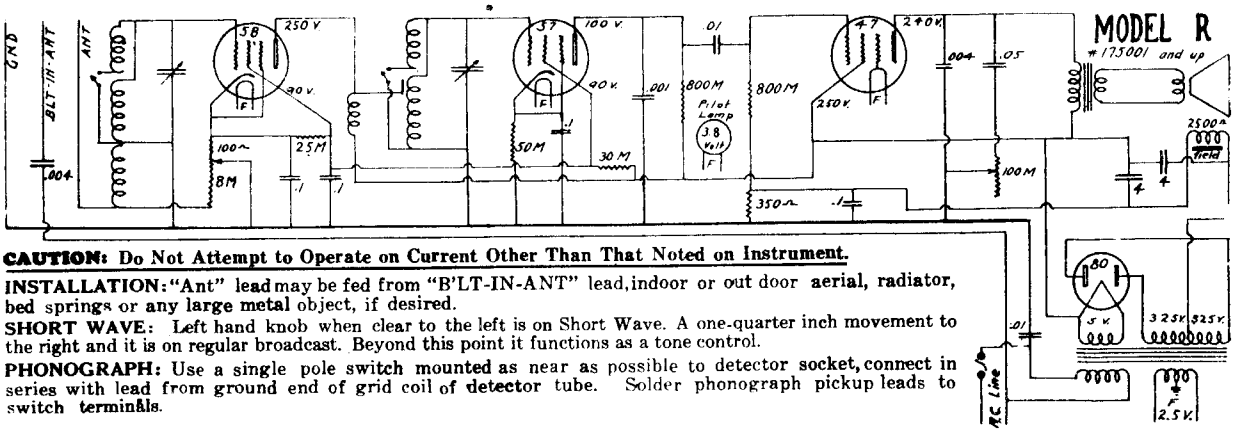
MODEL H-A.C.





SIMPLEX RADIO CO.

MODEL R-A.C.-175001 & UP



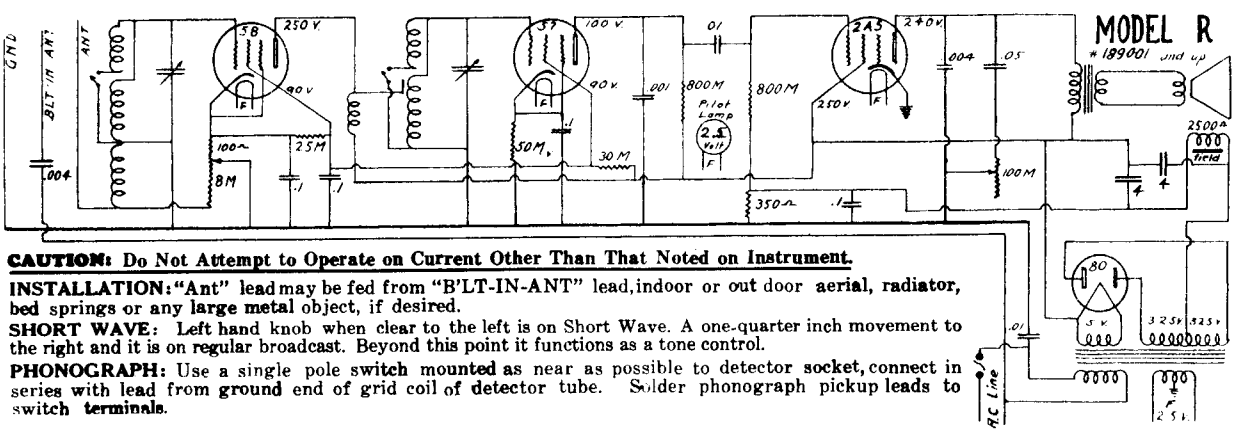
CAUTION: Do Not Attempt to Operate on Current Other Than That Noted on Instrument.

INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or out door aerial, radiator, bed springs or any large metal object, if desired.

SHORT WAVE: Left hand knob when clear to the left is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

MODEL R-A.C.-189001 & UP



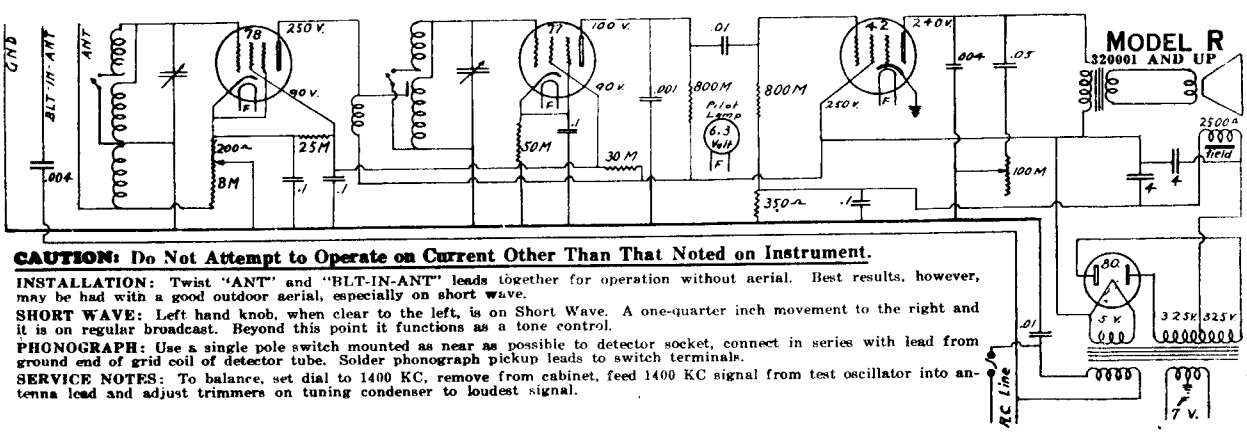
CAUTION: Do Not Attempt to Operate on Current Other Than That Noted on Instrument.

INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or out door aerial, radiator, bed springs or any large metal object, if desired.

SHORT WAVE: Left hand knob when clear to the left is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

MODEL R-A.C.- 320001 & UP



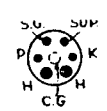
CAUTION: Do Not Attempt to Operate on Current Other Than That Noted on Instrument.

INSTALLATION: Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial, especially on short wave.

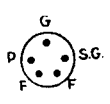
SHORT WAVE: Left hand knob, when clear to the left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

SERVICE NOTES: To balance, set dial to 1400 KC, remove from cabinet, feed 1400 KC signal from test oscillator into antenna lead and adjust trimmers on tuning condenser to loudest signal.



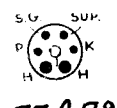
57 & 58



47

80

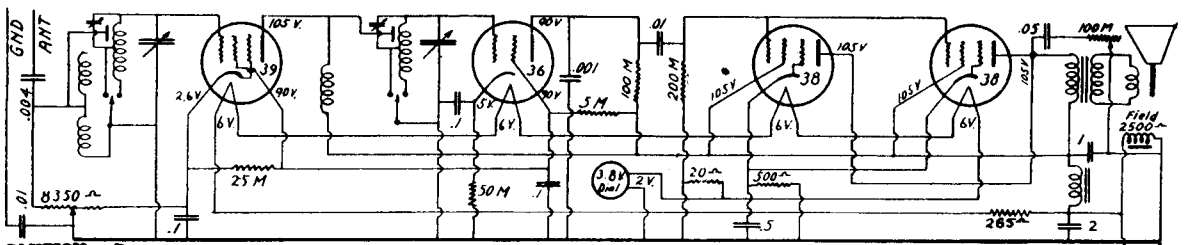
2A5 & 42



77 & 78

SIMPLEX RADIO CO.

MODEL R. D.C.



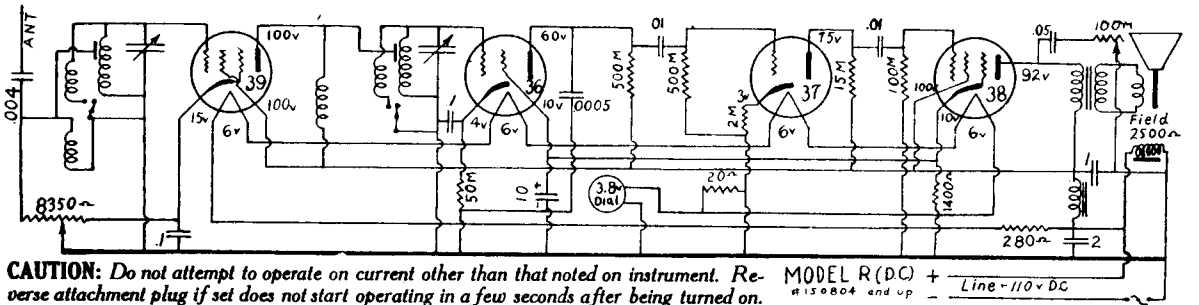
CAUTION:— Do not attempt to operate on current other than that noted on instrument. Reverse attachment plug if set does not start operating in a few seconds after being turned on.

INSTALLATION: "Ant" lead may be fed from indoor or outdoor aerial, radiator, bed springs or any large metal object, if desired.

SHORT WAVE: Left hand knob when clear to the left is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of dector tube. Solder phonograph pickup leads to switch terminals.

MODEL R - D.C. 150804 & UP



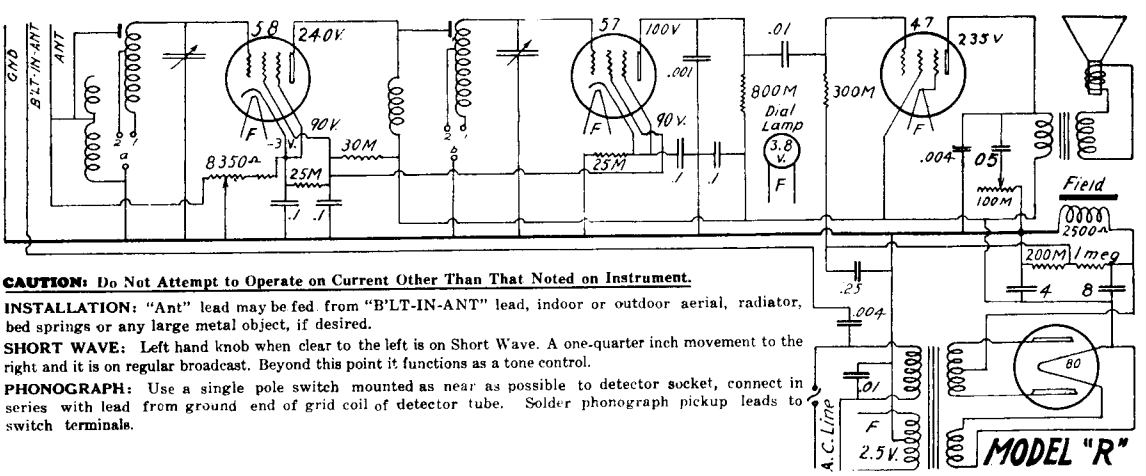
CAUTION: *Do not attempt to operate on current other than that noted on instrument. Reverse attachment plug if set does not start operating in a few seconds after being turned on.*

INSTALLATION: "ANT" lead ma, be fed from indoor or outdoor aerial, radiator, bed springs, or any large metal object, if desired.

SHORT WAVE: Left hand knob when clear to the left is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this it functions as a tone control. Use out door antenna for best results.

PHONOGRAPH: Use a single pole switch mounted as near as possible to the detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pick-up leads to switch terminals.

MODEL R - A.C.

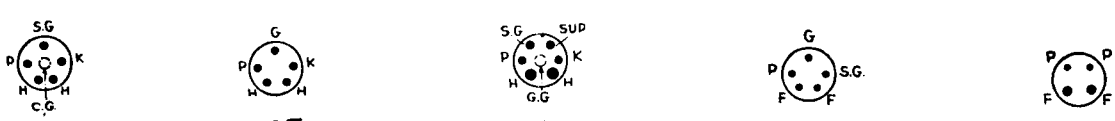


CAUTION: Do Not Attempt to Operate on Current Other Than That Noted on Instrument.

INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or outdoor aerial, radiator, bed springs or any large metal object, if desired.

SHORT WAVE: Left hand knob when clear to the left is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

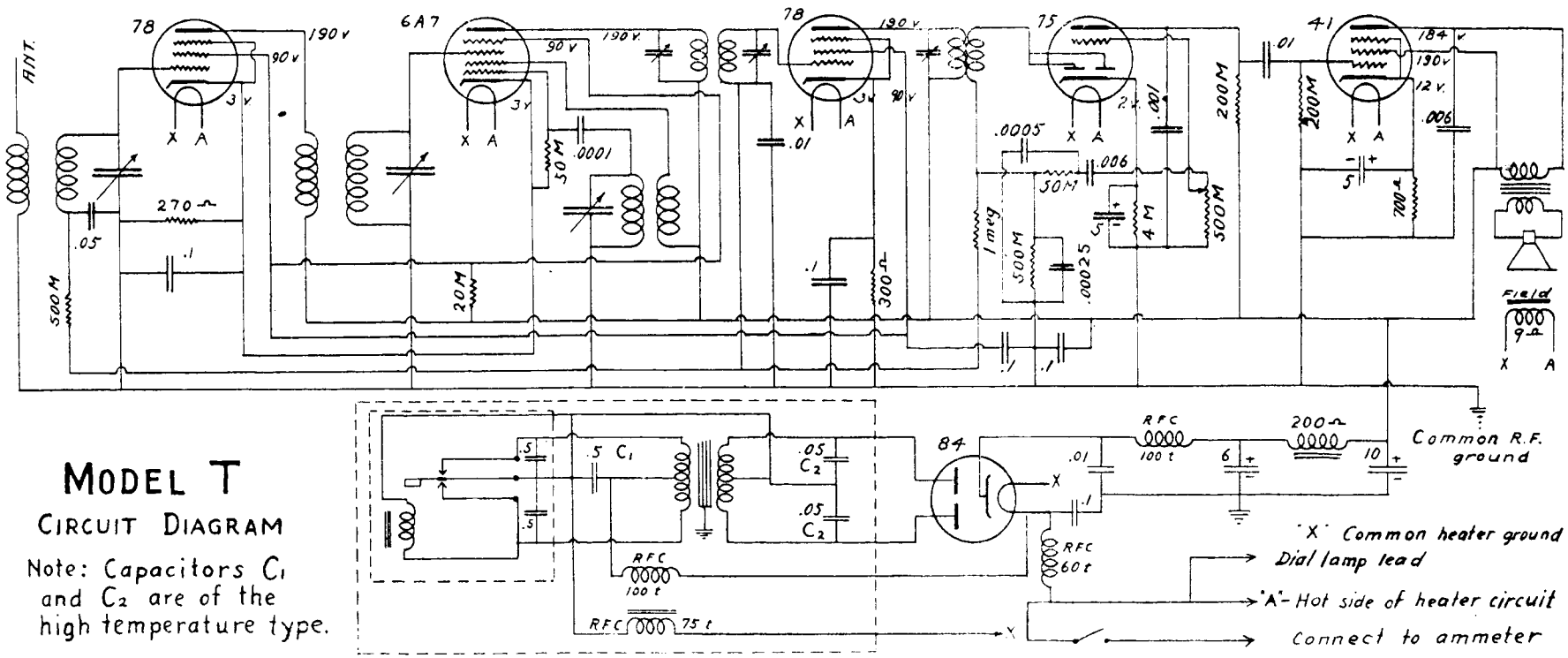
PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.



39 & 36 & 38 — 37 — 58 & 57 — 47 — 80

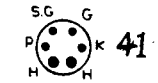
SIMPLEX RADIO CO.

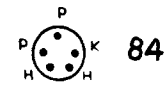
MODEL T



CIRCUIT DIAGRAM

Note: Capacitors C_1 and C_2 are of the high temperature type.





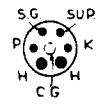
Balancing Intermediate Frequency Coils. These are peaked to 175 K. C. and are trimmed through the top of the tall cans by means of a small screwdriver and a 5-16" socket wrench. Chassis must first be removed from cabinet and signal from test oscillator fed into grid cap of the 6A7 tube.

Balancing R. F. Coils. The tuning control must first be attached to tuning condenser shaft with pointer set to 530 when tuning condenser is turned to maximum. Tune in a weak signal at its proper dial marking near 1400 and adjust first and second trimmers on variable from front of chassis for loudest signal. If signal does not come at proper dial setting carefully adjust rear trimmer on variable to shift signal to its proper location and then readjust first and second trimmers. After reinstalling set in car slightly readjust first trimmer through hole in top of cabinet.

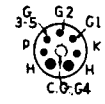
Ignition Noise. Fouled plugs or plugs with improperly adjusted gaps will affect the operation of the set. Burned or improperly adjusted breaker points will also impair the performance. In some cases a .5 mfd. or 1 mfd. condenser connected from ammeter to car frame will be required. Also, in some installations using a roof antenna, a .5 mfd. condenser connected from car frame to dome lamp lead at point where it leaves bulkhead will be required. It is usually necessary to connect a .5 mfd. condenser from primary of ignition coil to ground and from relay switch on generator to ground. Ground all of the control rods going to the instrument board of the car by soldering to each rod a length of copper braid and connecting same to the motor head. Isolate the battery lead to the ignition coil by running same through a grounded shield. In some cases it may be necessary to solder a short piece of copper braid from the shaft of the tuning condenser of set to the common ground point on the chassis just below the shaft.

Tubes should be tested at regular periods and replaced if necessary in order to maintain best performance. Each tube may be checked by comparison with a new one of the same type in its place.

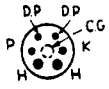
"B" Power Supply should require little or no attention. A full wave vibrator in connection with the primary of a transformer and the 6-volt storage battery furnishes the means of obtaining the proper "B" voltage. With the power turned on a slight buzz should be heard which indicates proper operation of vibrator. Failure to observe this buzz will denote a faulty condition, in which case the complete set should be taken to the dealer for inspection.



78



6A7



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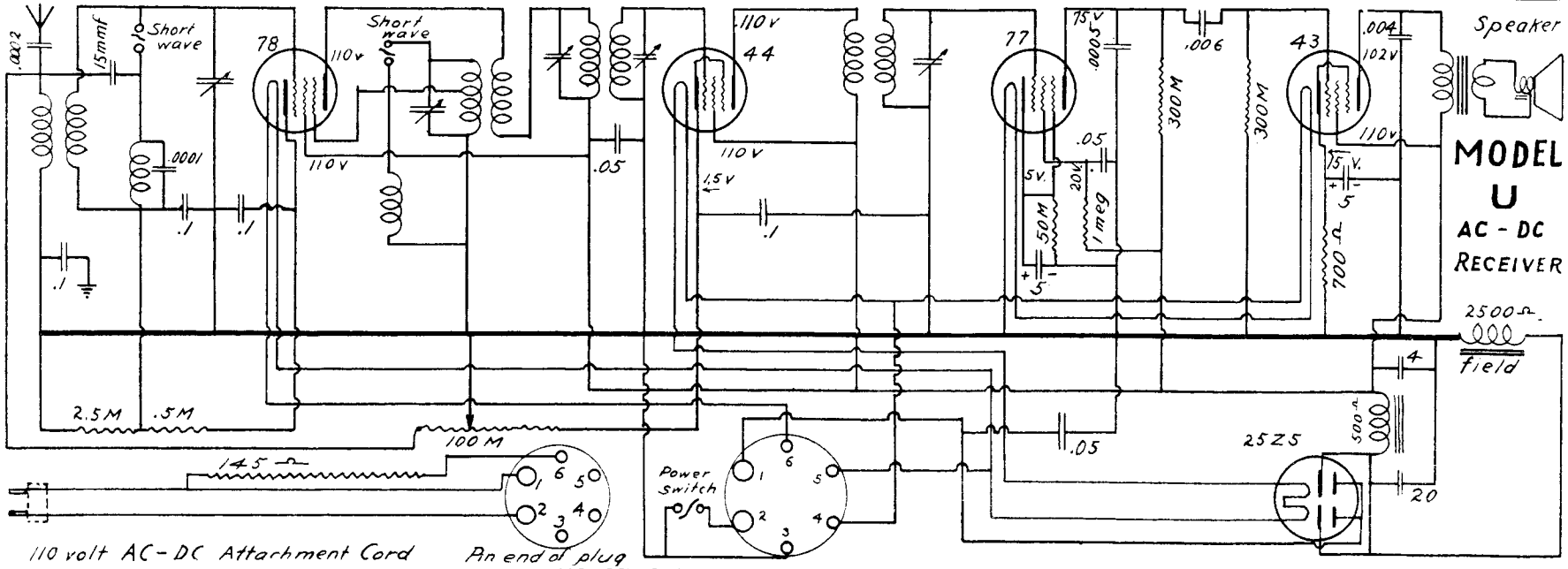


OPERATING INSTRUCTIONS

Model U Long and Short Wave

CAUTION:

This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost. for operating this receiver on automobiles, 32 volt farm light plants and 220 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out along the floor or hung outside a window and is ordinarily all the aerial required. No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to a radiator or other ground connection or to an outside aerial.

TO OPERATE:

Turn left hand knob to right as far as it will go. Wait a few moments for tubes to heat. Turn right hand knob slowly back and forth till a station is heard. Numbers on the dial correspond to kilocycle of station when one zero is added. Adjust this knob carefully to secure best tone and adjust left hand knob to volume desired. When left knob is turned entirely to left a click is heard and power is turned off. When operating on D. C. current and set fails to operate after waiting a reasonable time for tubes to heat up, reverse power supply plug.

TO RECEIVE SHORT WAVES:

Push handle of switch in rear toward end of cabinet for short wave position. Local police calls, etc., will then be heard at approximately 65 and 100 on the dial, and amateurs, etc., at various other positions. Often local conditions make short wave reception difficult unless the aerial wire is grounded or attached to outside aerial. Reception of short wave requires a good aerial and more careful adjustment of both knobs than is necessary on the broadcast band.

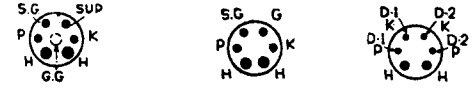
PHONOGRAPH:

Trace wire from cap of tube in left rear socket to where it solders to bracket in chassis. Note that a black wire connects between the adjacent bracket and chassis. Disconnect black wire at the bracket, inserting small single pole switch between wire and bracket. Solder phonograph pick-up leads to switch terminals.

SERVICE NOTES:

To balance set remove from cabinet. Intermediates are first balanced. Feed a 456 K. C. signal into grid of 78 tube. Adjust double and single trimmers through rear flange of chassis. Next, trim radio frequency coil by first setting tuning condenser to 1400 K. C. on dial, carefully remove from cabinet and attach test oscillator to antenna lead and feed 1400 K. C. signal to antenna coil. Adjust trimmers on tuning condenser to loudest signal.

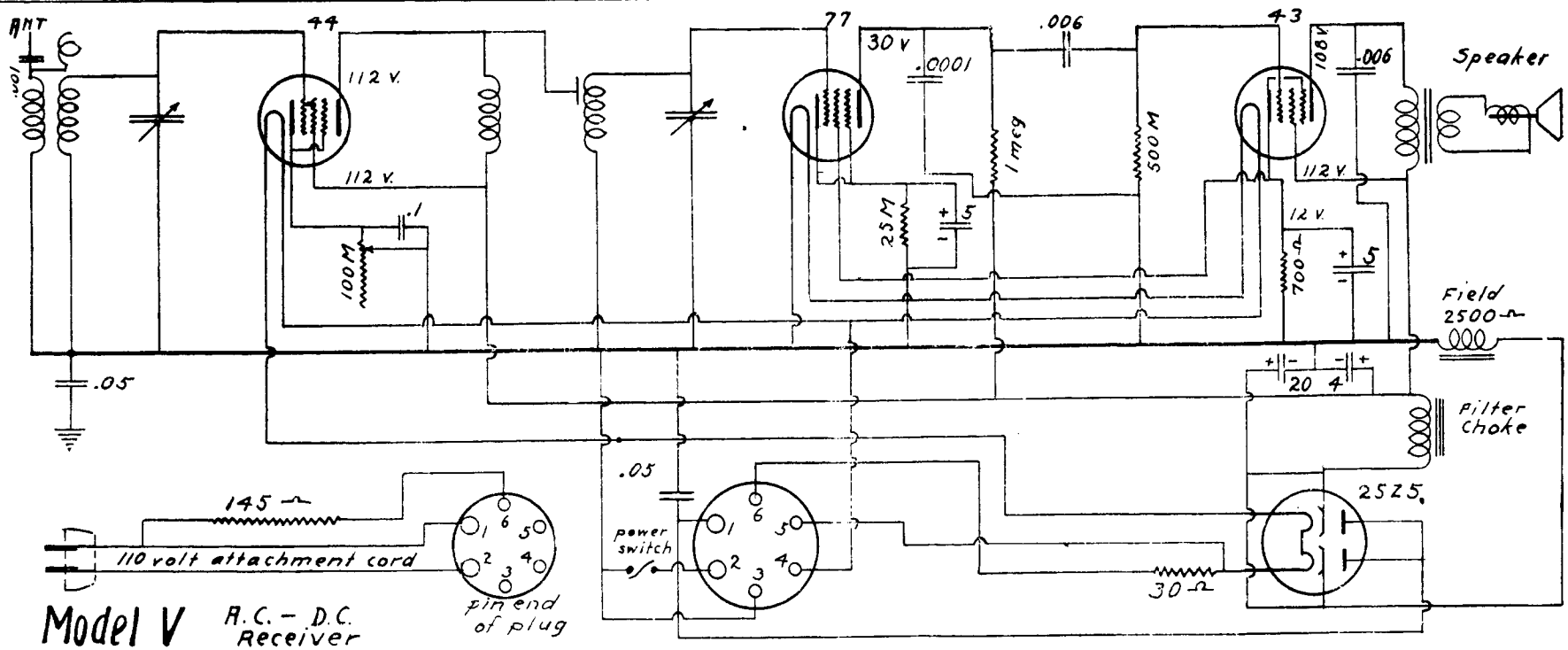
If used in automobile, antenna stage should be trimmed to car antenna at time of installation.



77 & 78 43 25Z5

SIMPLEX RADIO CO.

MODEL U A.C.-D.C.



OPERATING INSTRUCTIONS

Model V

CAUTION:

This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost, for operating this receiver on automobiles, 32 volt farm light plants and 200 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately, as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out along the floor or hung outside a window and is ordinarily all the aerial required. No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to a radiator or other ground connection or to an outside aerial.

PHONOGRAPH:

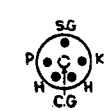
Connect pick-up leads to single pole toggle switch, which may be mounted in large hole in rear flange of set. Unsolder black wire and 5 mfd condenser from ground lug of coil on under side of chassis and resolder to one side of toggle switch. Solder other side of switch to ground lug of coil.

SERVICE NOTES:

To remove set from cabinet, disconnect from power supply, remove knobs, remove back if compact model, and unscrew the four felt headed screws on bottom of cabinet.

To balance set remove from cabinet, turn tuning condenser plates completely out, attach a test oscillator delivering 1712 K. C. to antenna of set and adjust trimmers on tuning condenser to loudest signal. Change test oscillator signal to 1400 K. C., turn tuning condenser until signal is tuned in and check trimmers again without moving tuning condenser.

If used in automobiles antenna stage should be trimmed to the car antenna at time of installation.



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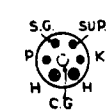

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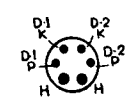


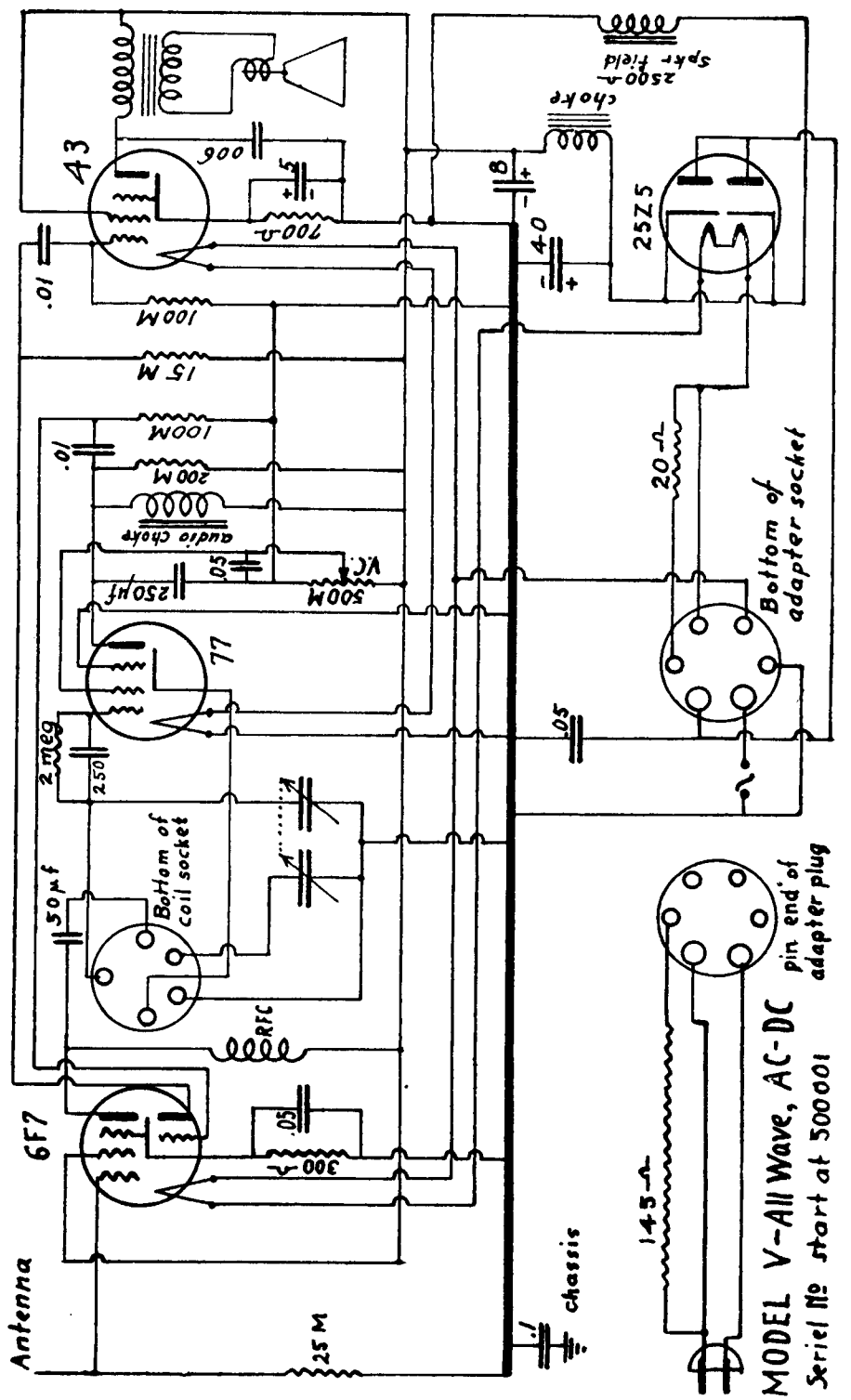
2525

SIMPLEX RADIO CO.

MODEL V

SIMPLEX RADIO CO.

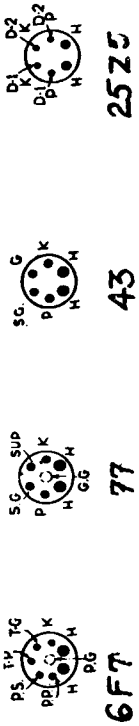
MODEL V ALL WAVE A.C.-D.C.



along the floor or hung outside a window, and is ordinarily all the aerial required. No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to an outside aerial.

COILS:

The short wave bands are covered by coil set No. 1 and range from 1,500 to 20,000 K. C. (15 to 200 meters). Set No. 2 covers from 110 to 1,500 K. C. (200 to 2,700 meters). Each coil is marked with the frequency range it covers.



Operating Instructions

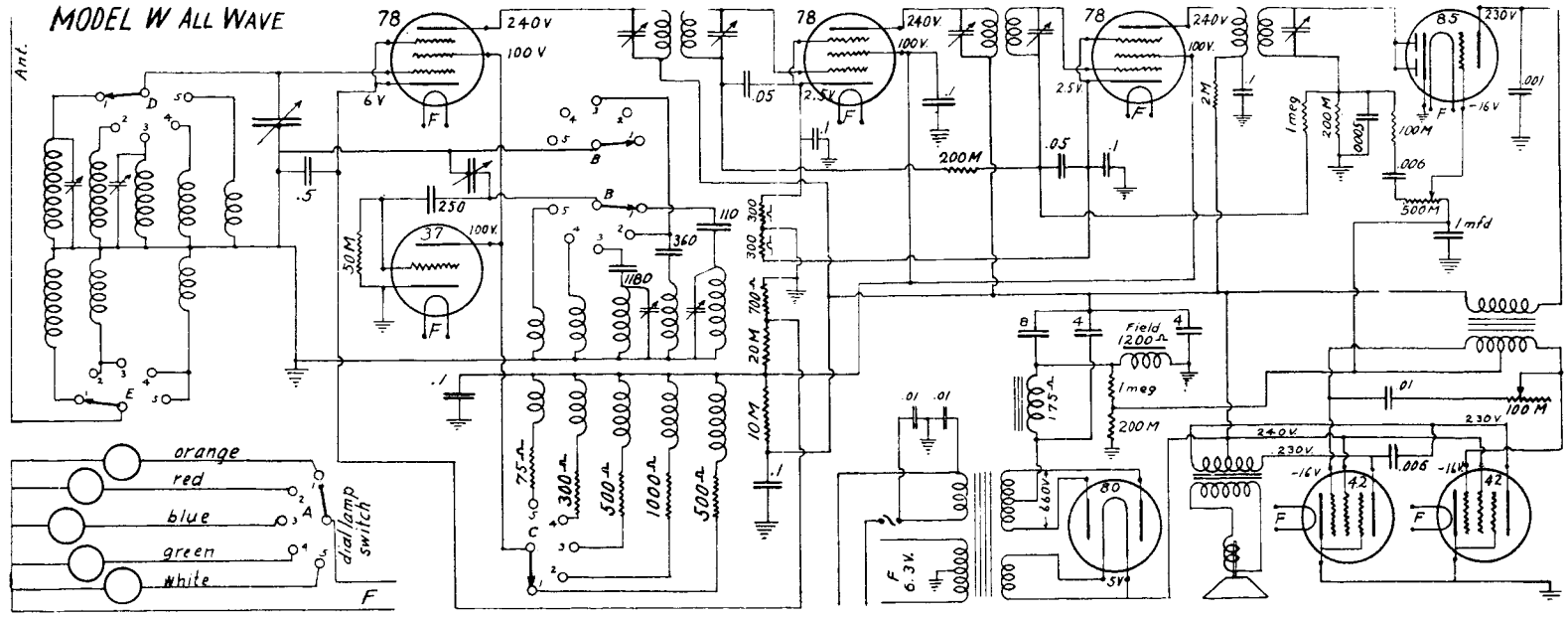
MODEL V - ALL WAVE

CAUTION:

This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost, for operating this receiver on automobiles, 32 volt farm light plants and 220 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately, as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out

SIMPLEX RADIO CO.

MODEL W ALL WAVE



INSTALLATION:

The built-in aerial at the back of the set usually gives satisfactory sensitivity when stretched around the edge of the floor or along the picture moulding of the room. A good outside aerial connected to the built-in aerial sometimes increases sensitivity. Power noise interferes especially with short-wave reception. If set is located where power noise is prevalent it may be necessary to install an aerial high above the street and use a "transposition" lead-in to the set. Any radio dealer can supply such an aerial cit with full instructions for installing.

PHONOGRAPH:

Mount a single pole toggle switch and two insulated pin jacks in the rear of the chassis near the tube socket marked "85," connect one side of the switch to one pin jack, the remaining pin jack to one outside terminal of the volume control and the remaining switch terminal to the other outside terminal of the volume control. Plug the phonograph pickup leads into the pin jacks.

SERVICE NOTES:

If radio fails to operate when unpacked, or stops working after a few days, proceed as follows: (1) Have tubes checked. (2) Remove chassis and check for loose connections. (3) Have competent "Radio Service Man" check over entirely.

Do not return unless you have made the above tests. This set left the factory carefully inspected.

The intermediate stages are carefully phased to 456 kilocycles at the factory. Should rephasing be necessary, feed a 456 kilocycle signal from a test oscillator to the grid cap of the tube marked "78," located at the rear end of the tuning condenser, then adjust the double trimmers in the top of the coil cans nearest this tube, also the single trimmer in the top of the coil can near the "85" tube, to loudest volume, being sure to keep the oscillator signal at a low volume level. In trimming the frequency bands, first

set the dial to the third group of figures from the right-hand end. Trim the "red" band first by adjusting the trimmers on the top of the tuning condenser until a signal of the proper frequency applied to the built-in aerial is heard at its loudest. Next, trim the "orange" band by adjusting the three-plate trimmers, located on the underside of the chassis, to loudest volume with proper signal frequency applied to the antenna. Next, trim the "blue" band by adjusting the two-plate trimmers located adjacent to the three-plate trimmers, to loudest volume with the proper signal frequency applied to the antenna. In trimming the various bands be sure that the band switch is set to the proper band as indicated by the color of the dial lamp. Also, keep the oscillator signal to as low volume level as possible for accuracy.

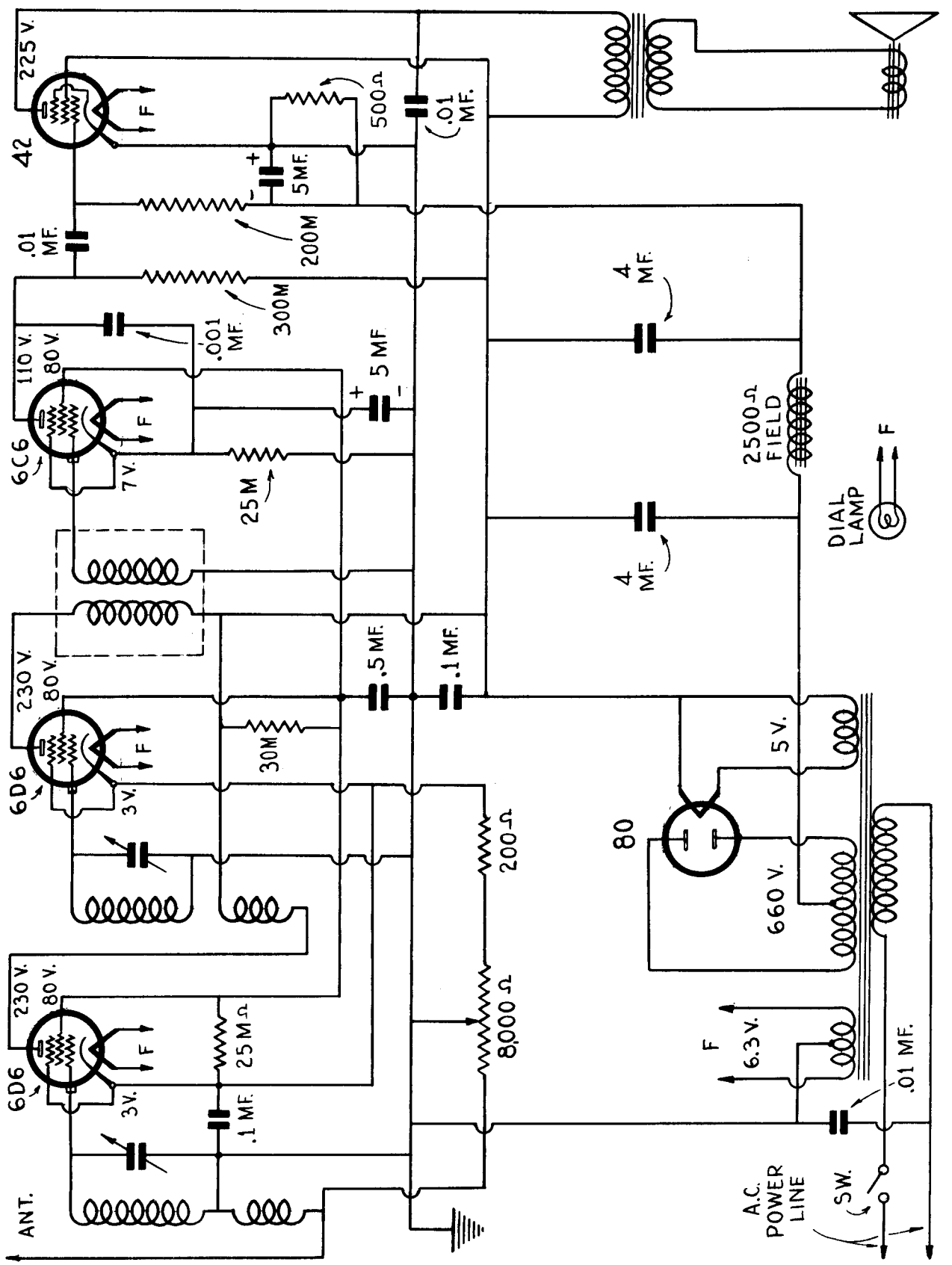
NOTE: Should it be necessary to write to the factory for parts or information, always give the serial number of the set as stamped on the back of the chassis.

SHORT WAVE TIPS:

In listening for short-wave broadcast DON'T forget to consider the difference in time between the location of the broadcaster and the receiver. DON'T expect to hear a station because it is on the air, as many things govern short-wave reception. DON'T get discouraged if reception is poor one night; it may be fine the next. DON'T expect stations to tune broadly; most stations tune sharply. DON'T tune below 10,000 kilocycles (above 30 meters) for distant stations in daylight. DON'T tune above 12,000 kilocycles (below 25 meters) for distant stations after dark. DON'T expect to find stations on all parts of the dial.

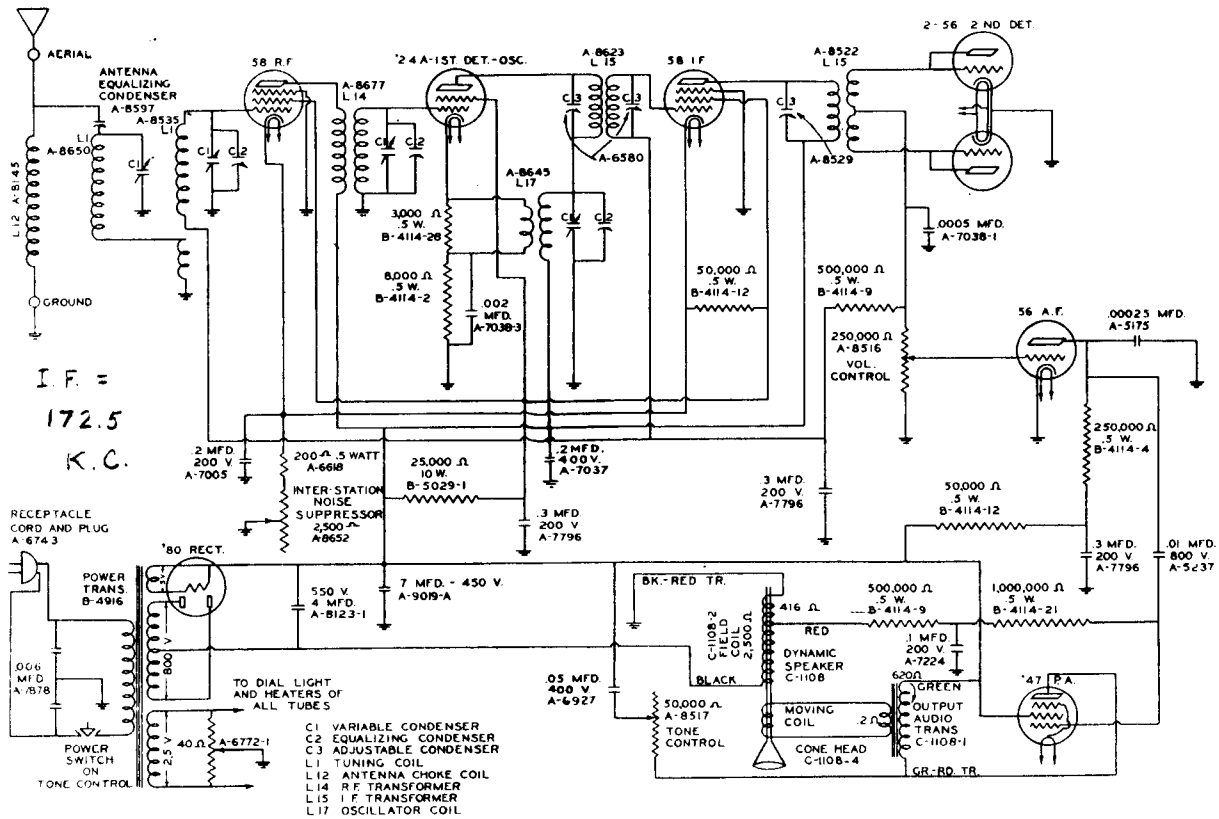
SIMPLEX RADIO CO.

MODEL X

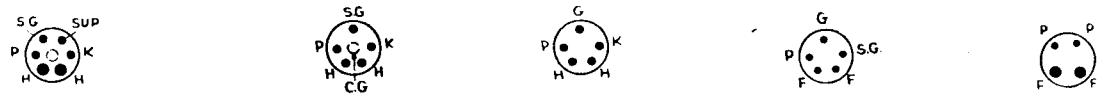


SPARKS-WITHINGTON CO.

MODELS 9X, 13, 14, 14A, 15X & 620X



†In Model 13 the 3,000 ohm .5 W resistor part B-4114-28 shunted across the primary of the oscillator coil part A-8645, and the Inter-Station Noise Suppressor part A-8650 are omitted. The end of the 200 ohm .5 W resistor part A-6618 shown connected to one end of the Inter-Station Noise Suppressor is grounded. The complete speaker is part No. C-1442, and the Antenna Equalizing Condenser is part No. A-9181.



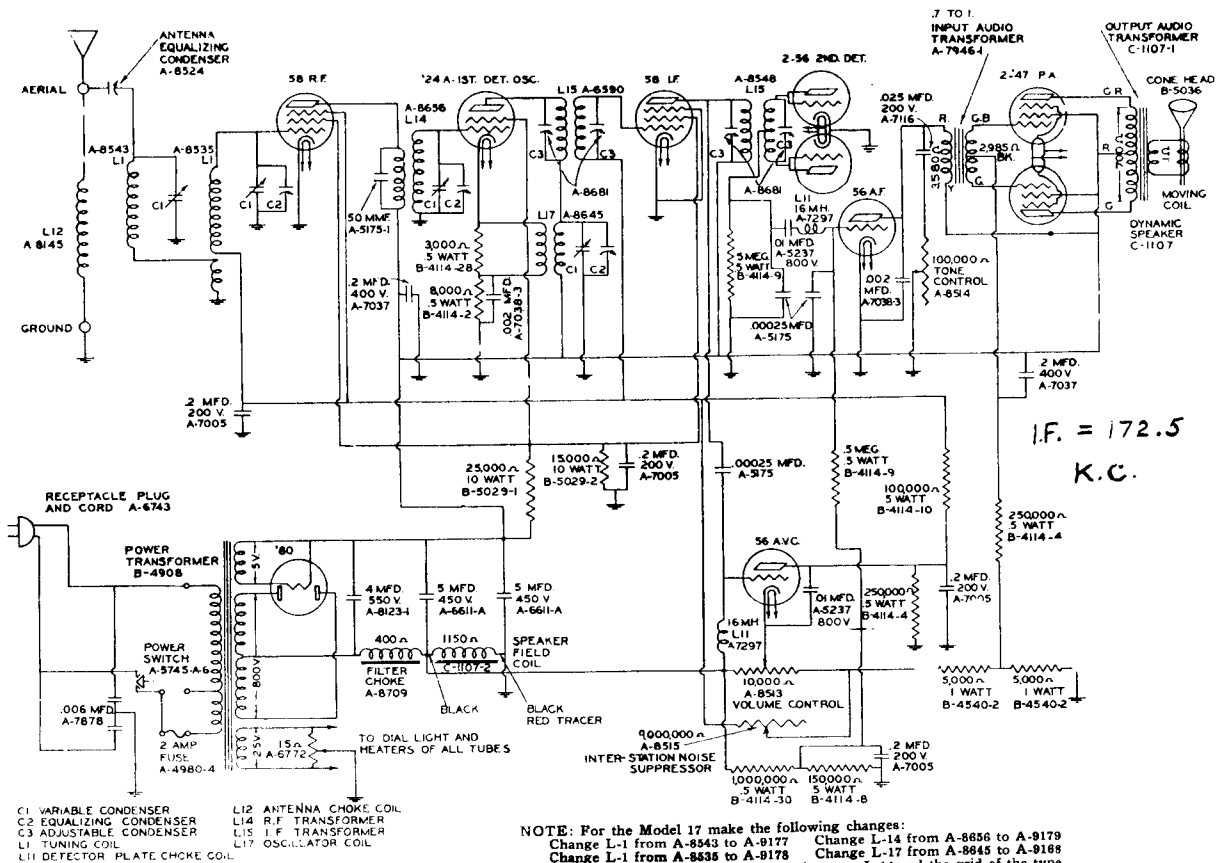
VOLTAGE ANALYSIS

Line Voltage 115—Position of Volume Control Full

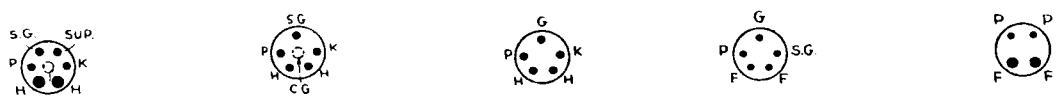
Tube	Location	Heater or Filament	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
58	R. F. Stage	2.2—2.5	218—242	2—4	95—105	5.5—7.0
'24	1st Det.-Osc.	2.2—2.5	218—242	——	95—105	0.7—8.0
58	I. F. Stage	2.2—2.5	218—242	2—4	95—105	5.5—7.0
56	2nd Det.-AVC	2.2—2.5	*	*	——	*
56	2nd Det.-AVC	2.2—2.5	*	*	——	*
56	A. F. Stage	2.2—2.5	20—40	Zero	——	0.5—0.7
'47	Power Stage	2.2—2.5	205—225	†18—20	218—242	20—24
'80	Rectifier	4.5—5.0	315—345	——	——	19–23 per Plate

SPARKS-WITHINGTON CO.

MODELS 17, 18, 111X, 750A OR X 870A OR X



NOTE: For the Model 17 make the following changes:
Change L-1 from A-8543 to A-9177 Change L-14 from A-8656 to A-9179
Change L-1 from A-8535 to A-9178 Change L-17 from A-8645 to A-9188
Add 200 ohm resistor, Part B-5243-1 between L-14 and the grid of the type '24-A 1st detector osc. tube.



58 24 56 47 80

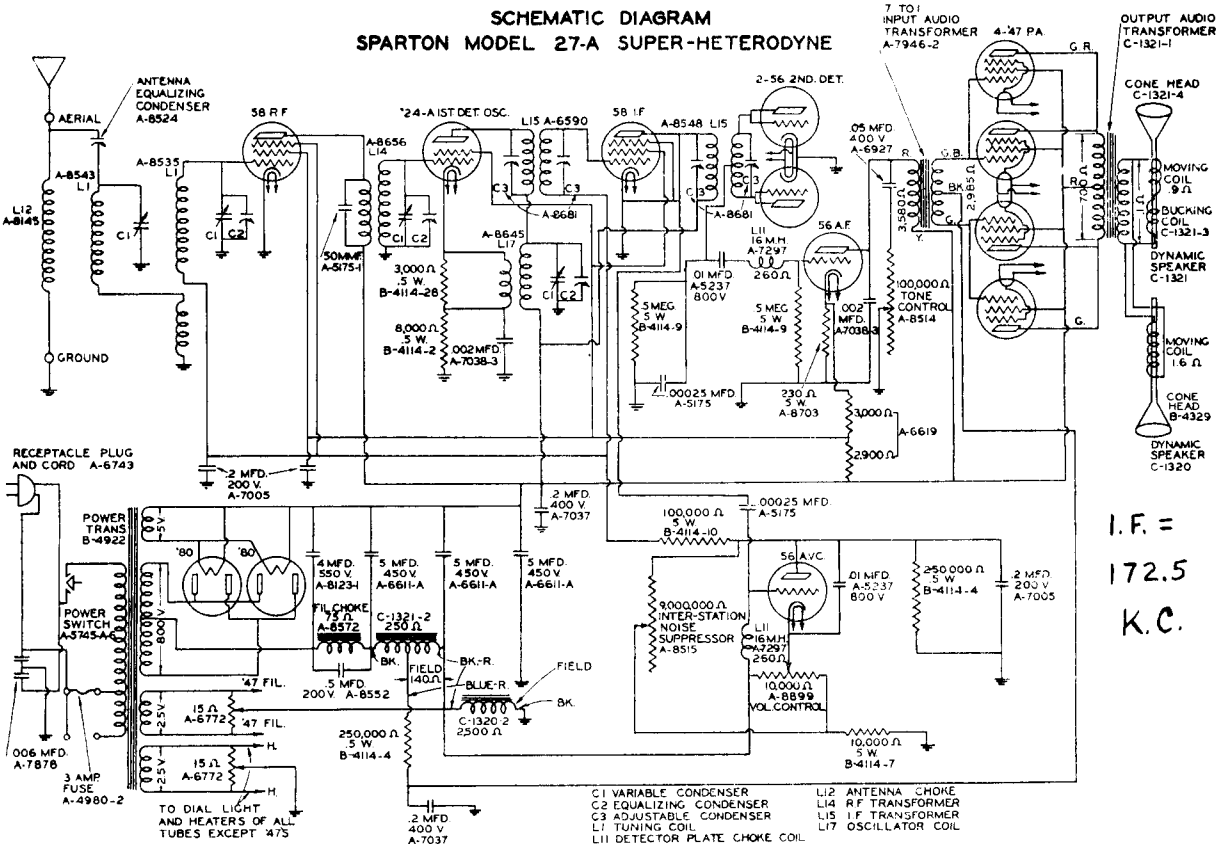
Line Voltage 115—Position of Voltage Compensator 100-115—Position of Volume Control Full

Tube	Location	Heater or Filament	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
58	R. F. Stage	2.2—2.5	260—305	1.9—2.5	70—88	4.5—8.0
'24	1st Det.-Osc.	2.2—2.5	260—305	5—9	70—88	0.8—1.4
58	I. F. Stage	2.2—2.5	260—305	1.9—2.5	70—88	4.5—8.0
56	2nd Det.	2.2—2.5	*	*	——	*
56	2nd Det.	2.2—2.5	*	*	——	*
56	A. F. Stage	2.2—2.5	245—285	10—14	——	4.5—8.0
56	AVC	2.2—2.5	35—50	40—50	——	Zero
'47	Power Stage	2.2—2.5	250—295	19—25	260—305	18—25
'47	Power Stage	2.2—2.5	250—295	19—25	260—305	18—25
'80	Rectifier	4.2—5.0	360—440	——	——	33-45 per Plate

SPARKS-WITHINGTON CO.

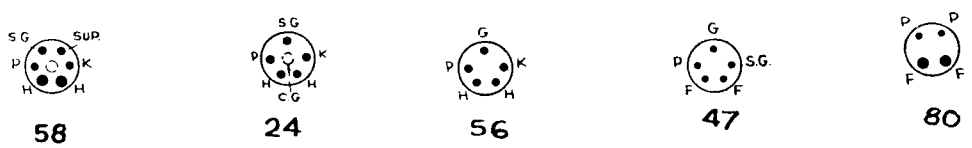
MODELS 27 A & 27

SCHEMATIC DIAGRAM
SPARTON MODEL 27-A SUPER-HETERODYNE



I. F. = 172.5 K.C.

NOTE: : In 25 cycle Model 27-A the 4 Mfd. 550 V. filter condenser part A-8123-1 is paralleled with another identical condenser. The 5 Mfd. 450 V. filter condenser part A-6611-A, connected from rectifier tube filaments to end of filter choke coil part A-8572, is removed. The 5 Mfd. 200 V. condenser part A-8552 shunted across filter choke coil part A-8572 is replaced with a 2 Mfd. 200 V. condenser part A-8895. Power Transformer part B-4922 is replaced with both Power Transformer parts B-4922-25 and Filament Transformer part A-8702.



Tube	Location	Heater or Filament	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
58	R. F. Stage	2.2—2.5	165—200	2.3—2.7	90—112	4.5—8.0
'24	1st Det.-Osc.	2.2—2.5	165—200	5.0—9.0	90—112	0.8—1.4
58	I. F. Stage	2.2—2.5	165—200	2.3—2.7	90—112	4.5—8.0
56	2nd Det.	2.2—2.5	*	*	——	*
56	2nd Det.	2.2—2.5	*	*	——	*
56	A. F. Stage	2.2—2.5	145—180	7—11	——	4—7
56	AVC	2.2—2.5	30— 50	50—80	——	0
'47	Power Stage	2.2—2.5	260—310	22—28	270—320	22—32
'47	Power Stage	2.2—2.5	260—310	22—28	270—320	22—32
'47	Power Stage	2.2—2.5	260—310	22—28	270—320	22—32
'47	Power Stage	2.2—2.5	260—310	22—28	270—320	22—32
'80	Rectifier	4.2—5.0	320—375	——	——	33—45 per Plate
'80	Rectifier	4.2—5.0	320—375	——	——	33—45 per Plate

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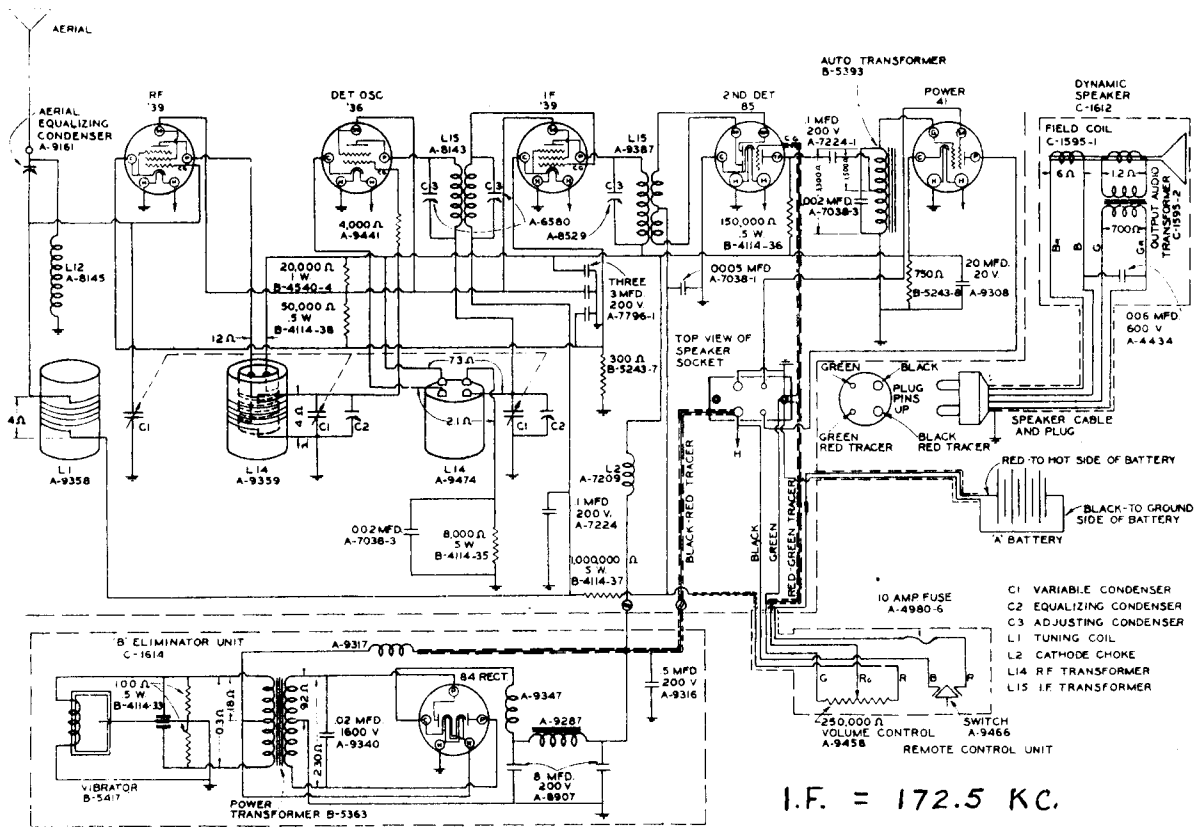
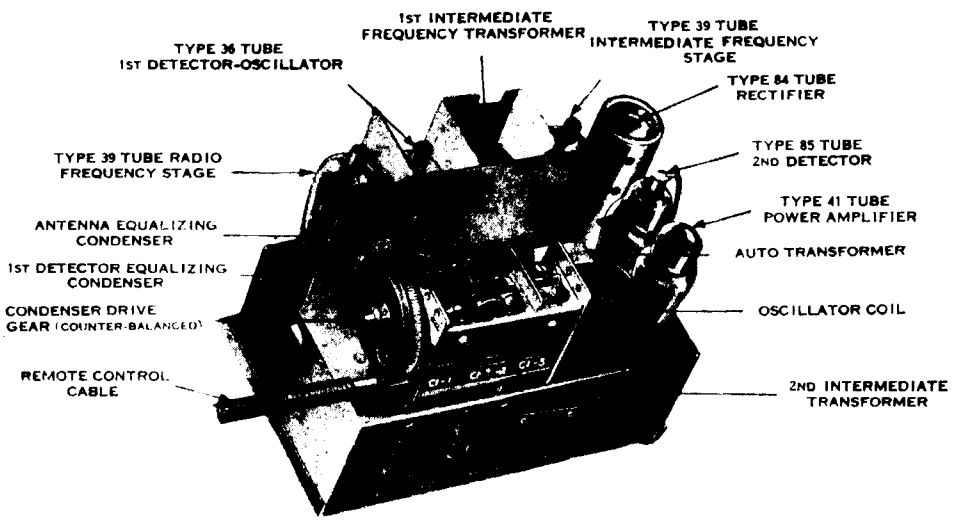
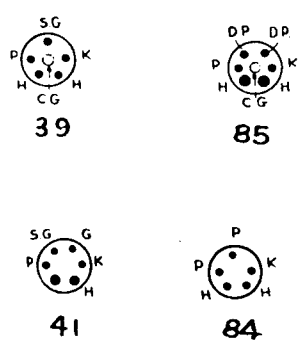
MODEL 33



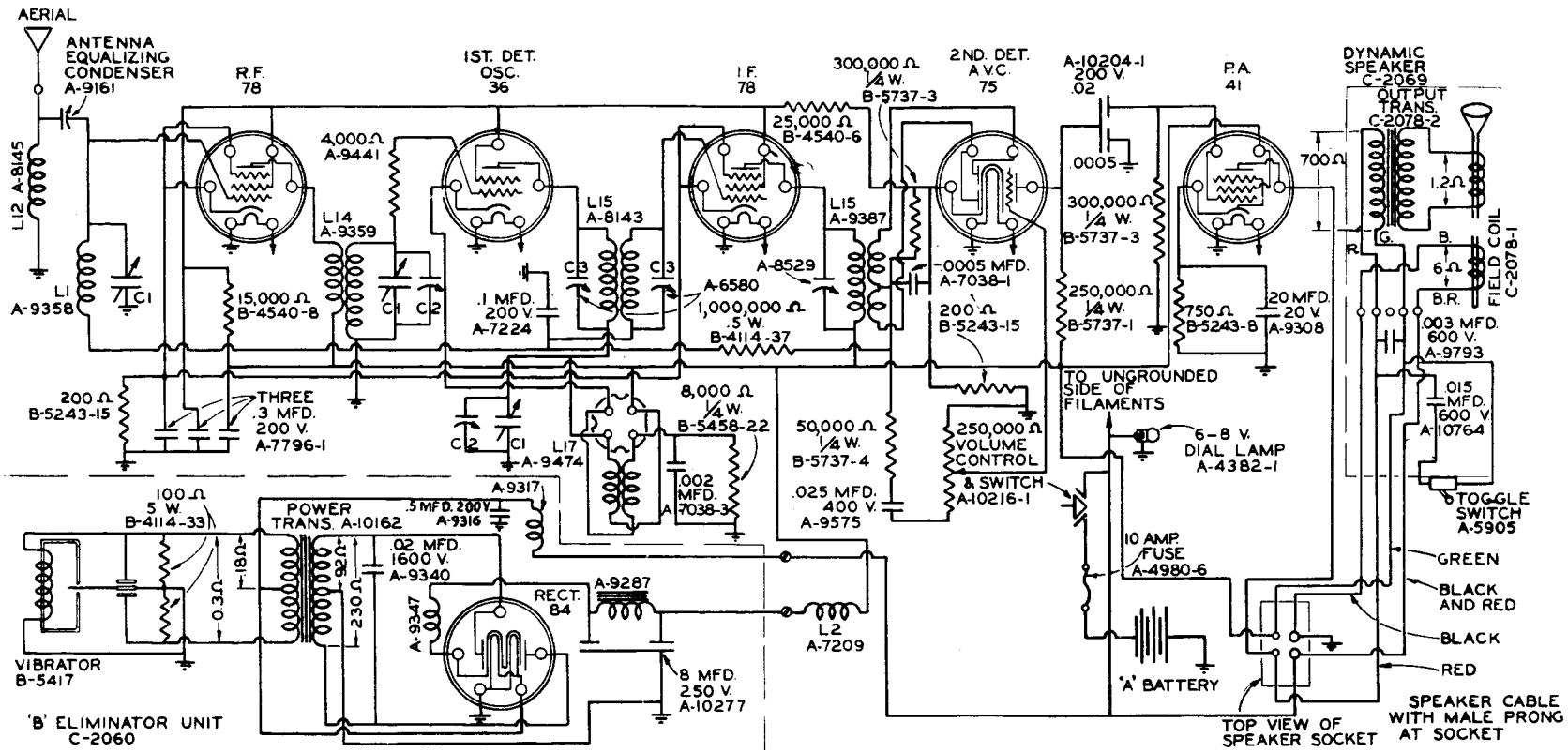
I.F. = 172.5 KC.





Tube	Location	Filament Heater or	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
'39	R. F. Stage	6.3	195	— 3.5	100	4.2
'36	1st Det.-Osc.	6.3	195	—12.	100	1.5
'39	I. F. Stage	6.3	195	— 3.5	100	4.2
85	2nd Det.-AVC	6.3	30	——	——	1.5
41	Power Stage	6.3	195	—15.	195	16.
84	Power Rec'fi'r	6.3	220	——	——	20 per plate

SPARKS-WITHINGTON CO.



C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTING CONDENSER

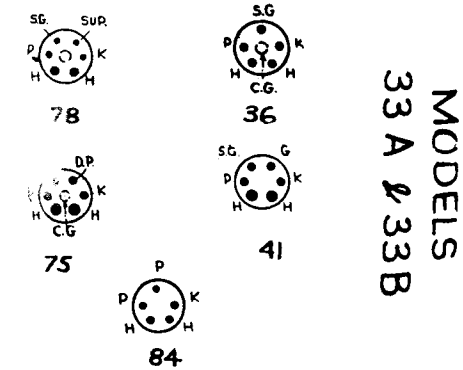
L1 TUNING COIL
L2 CATHODE CHOKE COIL
L12 ANTENNA CHOKE COIL

L14 R.F. TRANSFORMER
L15 I.F. TRANSFORMER
L17 OSCILLATOR COIL

I. F. = 172.5 KC.

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
78	R-F Stage	200	6.	100	—2.5	—	40,000	25,000	1,300,000	200
36	1st Det.-Osc.	200	1.5	100	—12.	44,000	40,000	25,000	4,000	8,000
78	I-F Stage	200	6.	100	—2.	1,340,000	40,000	25,000	1,300,000	200
75	Diode Det.-AVC	0	0	—	—	—	300,000	—	—	200
	A-F Triode	200	1.	—	—1.2	290,000	290,000	—	250,000	
41	Power Stage	185	18.	200	—16.0	590,000	40,000	40,000	300,000	750
84	Rectifier	250	25.	—	—	—	92	—	—	40,000

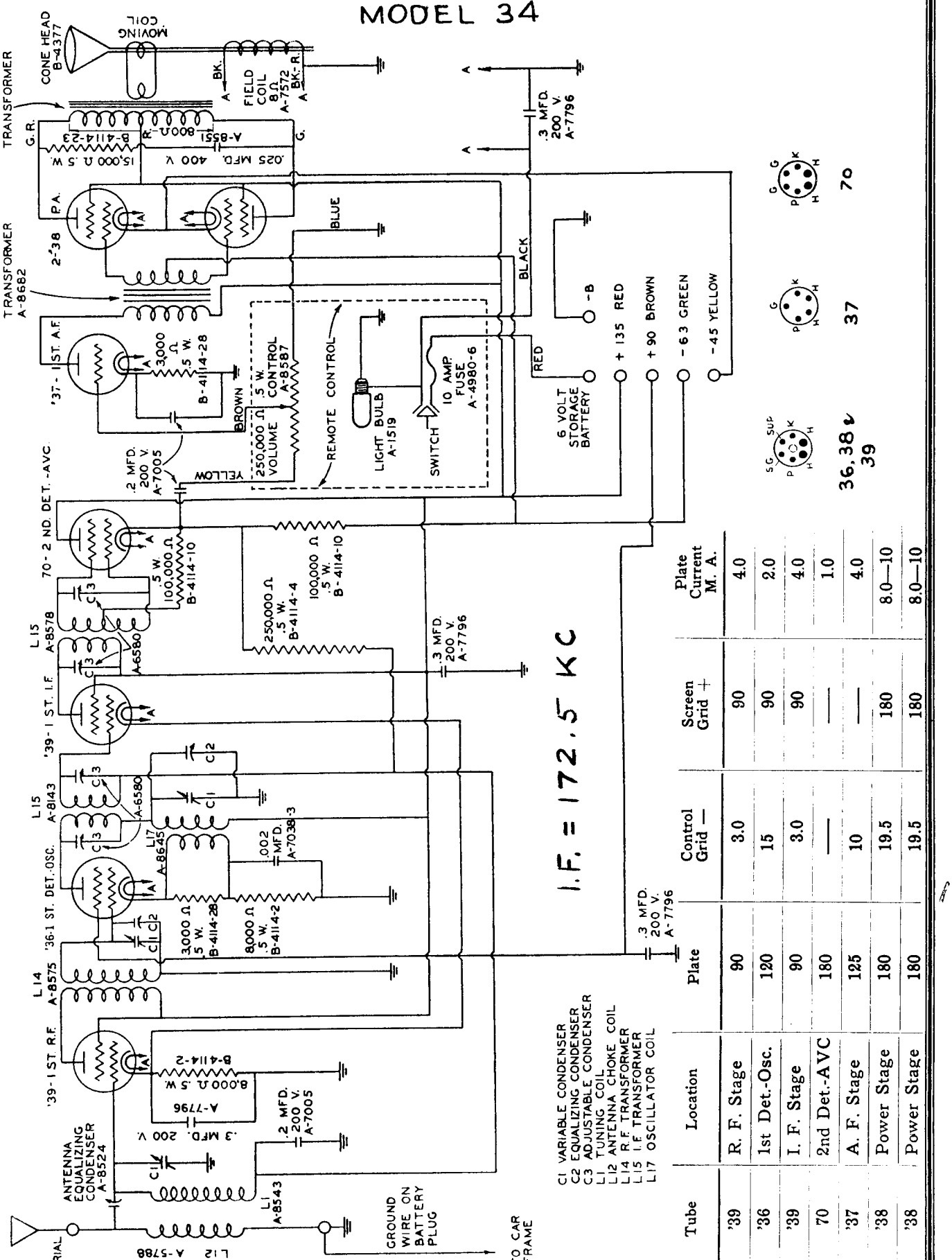
NOTES: Allow 15% + or — on all measurements. All heater voltages: 6.3. "A" battery drain: 6.0 amperes.



MODELS 33A & 33B

SPARKS-WITHINGTON CO.

MODEL 34

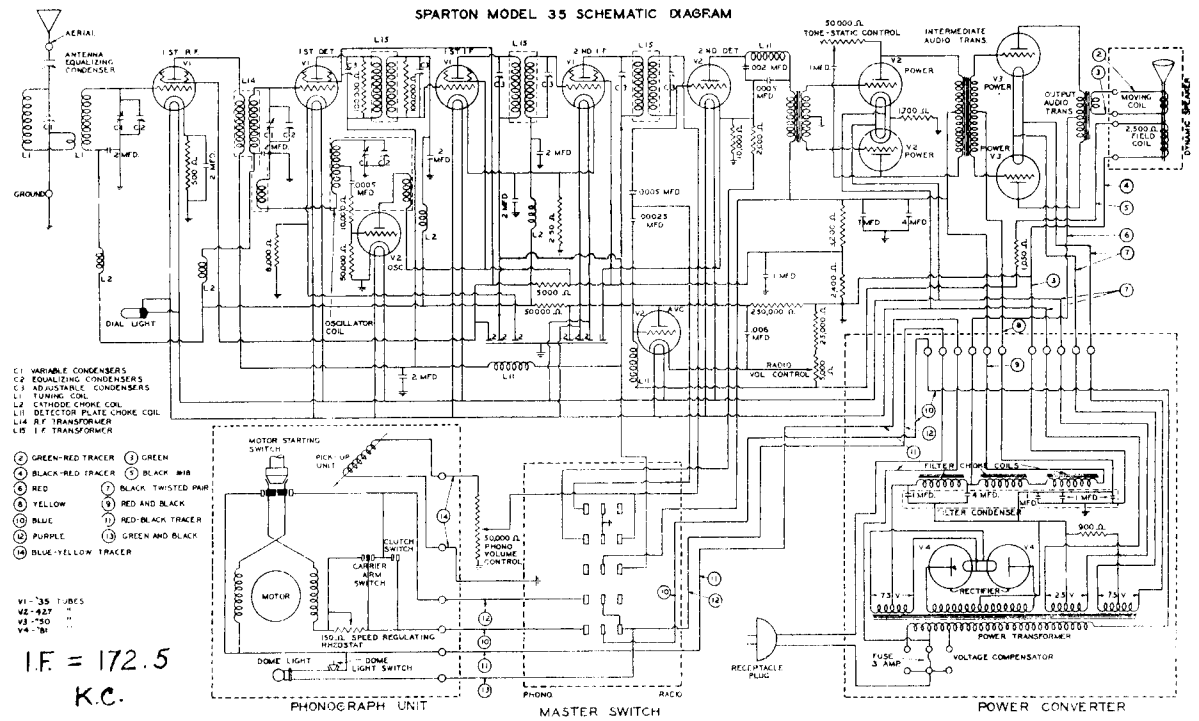


C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTABLE CONDENSER
L1 TUNING COIL
L12 ANTENNA CHOKE COIL
L14 R.F. TRANSFORMER
L15 I.F. TRANSFORMER
L17 OSCILLATOR COIL

Tube	Location	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
'39	R. F. Stage	90	3.0	90	4.0
'36	1st Det.-Osc.	120	15	90	2.0
'39	I. F. Stage	90	3.0	90	4.0
70	2nd Det.-AVC	180	—	—	1.0
'37	A. F. Stage	125	10	—	4.0
'38	Power Stage	180	19.5	180	8.0—10
'38	Power Stage	180	19.5	180	8.0—10

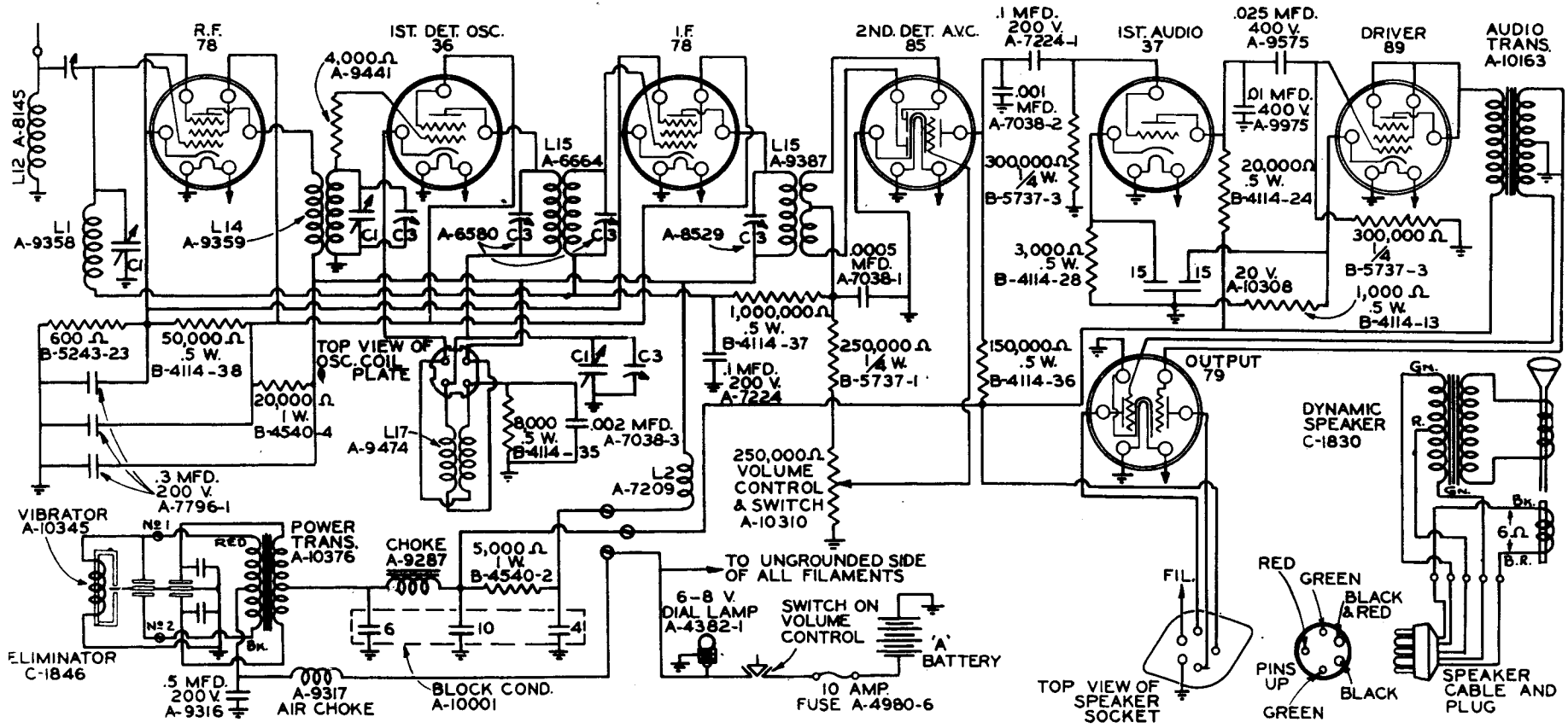
SPARKS-WITHINGTON CO.

MODEL 35



		OPERATING VOLTAGES				
Tube	Location	Heater or Filament	Plate	Control Grid—	Screen Grid+	Plate Current Mills.
'35	1st. R. F.	2.2 - 2.5	190 - 230	2 - 4	70 - 95	4 - 7
'35	1st. Det.	2.2 - 2.5	190 - 230	*6 - 14	70 - 95	*.8 - 1.8
'35	1st. I. F.	2.2 - 2.5	190 - 230	2 - 4	70 - 95	4 - 8
'35	2nd. I. F.	2.2 - 2.5	190 - 230	2 - 4	70 - 95	4 - 8
427	2nd. Det.	2.2 - 2.5	185 - 225	14 - 22	.....	.7 - 1.1
427	Oscillator	2.2 - 2.5	70 - 95	†	.....	‡
427	A. V. C.	2.2 - 2.5	§	30 - 50	.....	Zero
427	1st. Power	2.2 - 2.5	190 - 230	14 - 22	.....	5 - 8
427	1st. Power	2.2 - 2.5	190 - 230	14 - 22	.....	5 - 8
'50	2nd. Power	7.0 - 7.5	350 - 420	60 - 90	.....	36 - 48
'50	2nd. Power	7.0 - 7.5	350 - 420	60 - 90	.....	36 - 48
'81	Rectifier	7.0 - 7.5	440 - 560	.....	.....	65 - 85
'81	Rectifier	7.0 - 7.5	440 - 560	.....	.....	65 - 85

SPARKS-WITHINGTON CO.



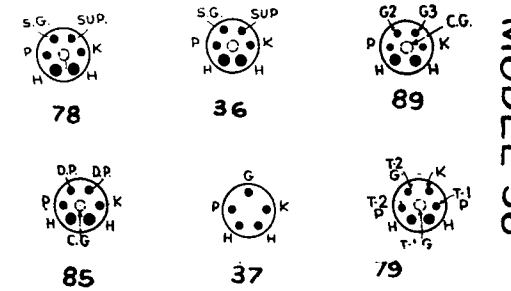
NOTE: WHEN POSITIVE (+) 'A' BATTERY IS GROUNDED, CONNECTIONS TO ELIMINATOR TERMINALS ONE (1) AND TWO (2) ARE AS SHOWN. (MODEL 36 SHIPPED FROM FACTORY WITH THESE CONNECTIONS.)
WHEN NEGATIVE (−) 'A' BATTERY IS GROUNDED, REMOVE ELIMINATOR COVER AND REVERSE CONNECTIONS TO TERMINALS ONE (1) AND TWO (2)

C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTING CONDENSER
L1 TUNING COIL
L2 CATHODE CHOKE.

L12 ANTENNA CHOKE COIL
L14 R.F. TRANSFORMER
L15 I.F. TRANSFORMER 172.5 K.C.
L17 OSCILLATOR COIL

I.F. = 172.5 K.C.

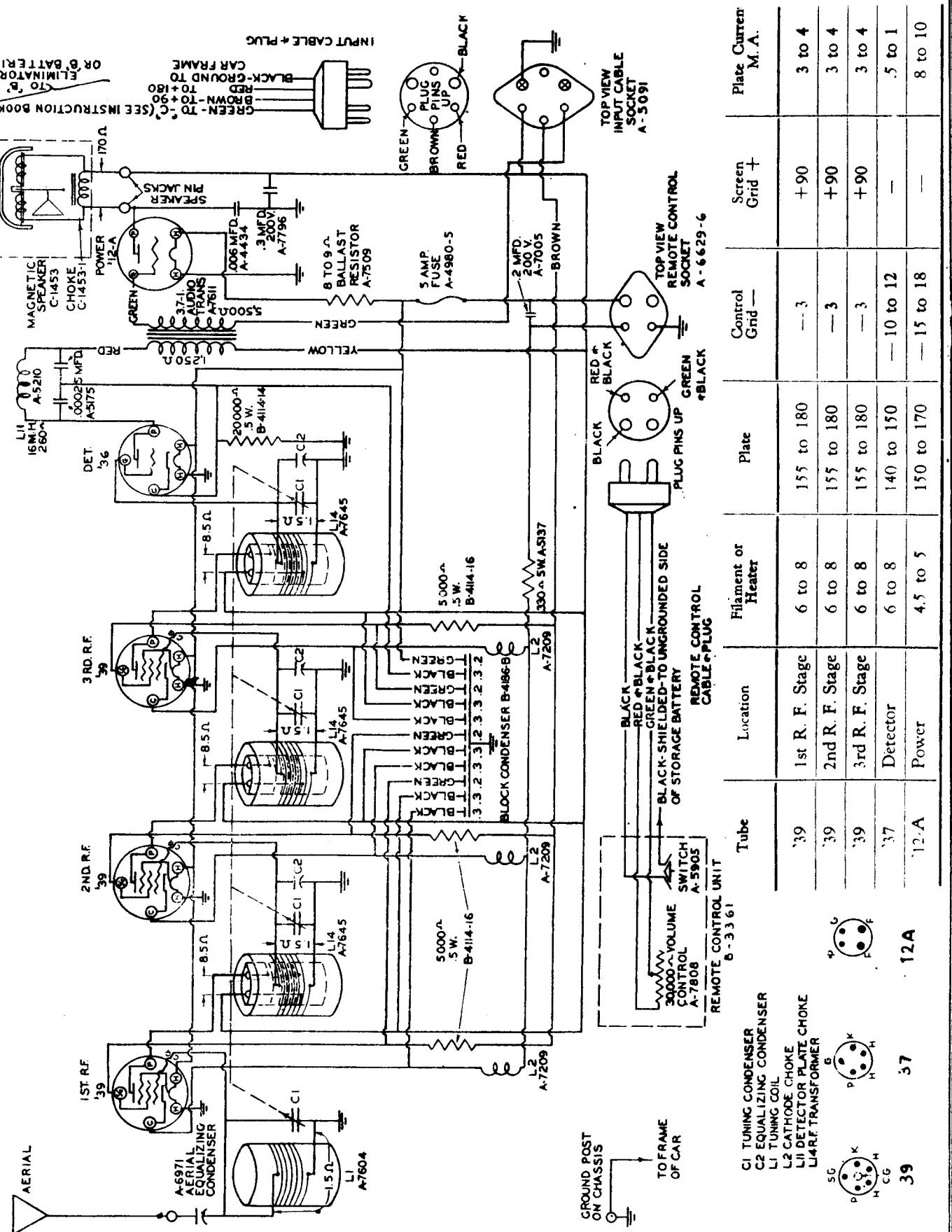
Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
78	R-F Stage	200	4.2	100	—3.	—	70,000	50,000	1,250,000	600
36	1st Det.-Osc.	200	1.5	100	—12.	80,000	70,000	50,000	4,000	8,000
78	I-F Stage	200	4.2	100	—3.	1,500,000	70,000	50,000	1,250,000	600
85	2nd Det.-AVC	50	1.5	—	0	325,000	225,000	—	250,000	0
37	1st Audio	170	3.5	—	—10.	575,000	95,000	—	300,000	3,000
89	Driver Stage	240	20.0	240	—20.	495,000	75,000	75,000	300,000	1,000
79	Power Stage	240	*4.0	—	0	75,000	75,000	—	300	0



MODEL 36

SPARKS-WITHINGTON CO.

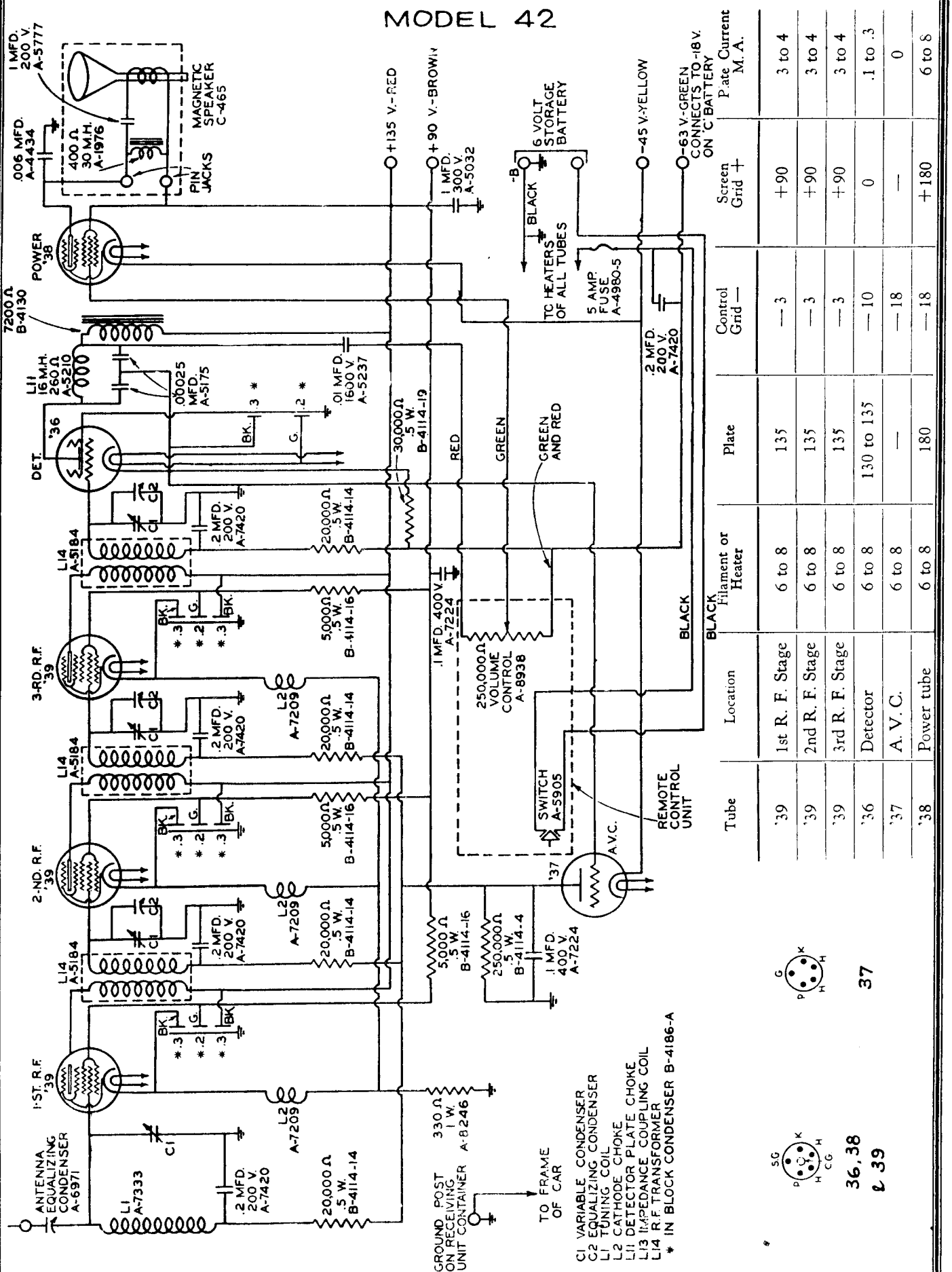
MODEL 41A



Tube	Location	Filament or Heater	Plate	Control Grid —	Screen Grid +	Plate Current M.A.
'39	1st R. F. Stage	6 to 8	155 to 180	—3	+90	3 to 4
'39	2nd R. F. Stage	6 to 8	155 to 180	—3	+90	3 to 4
'39	3rd R. F. Stage	6 to 8	155 to 180	—3	+90	3 to 4
'37	Detector	6 to 8	140 to 150	—10 to 12	—	.5 to 1
'12-A	Power	4.5 to 5	150 to 170	—15 to 18	—	8 to 10

SPARKS-WITHINGTON CO.

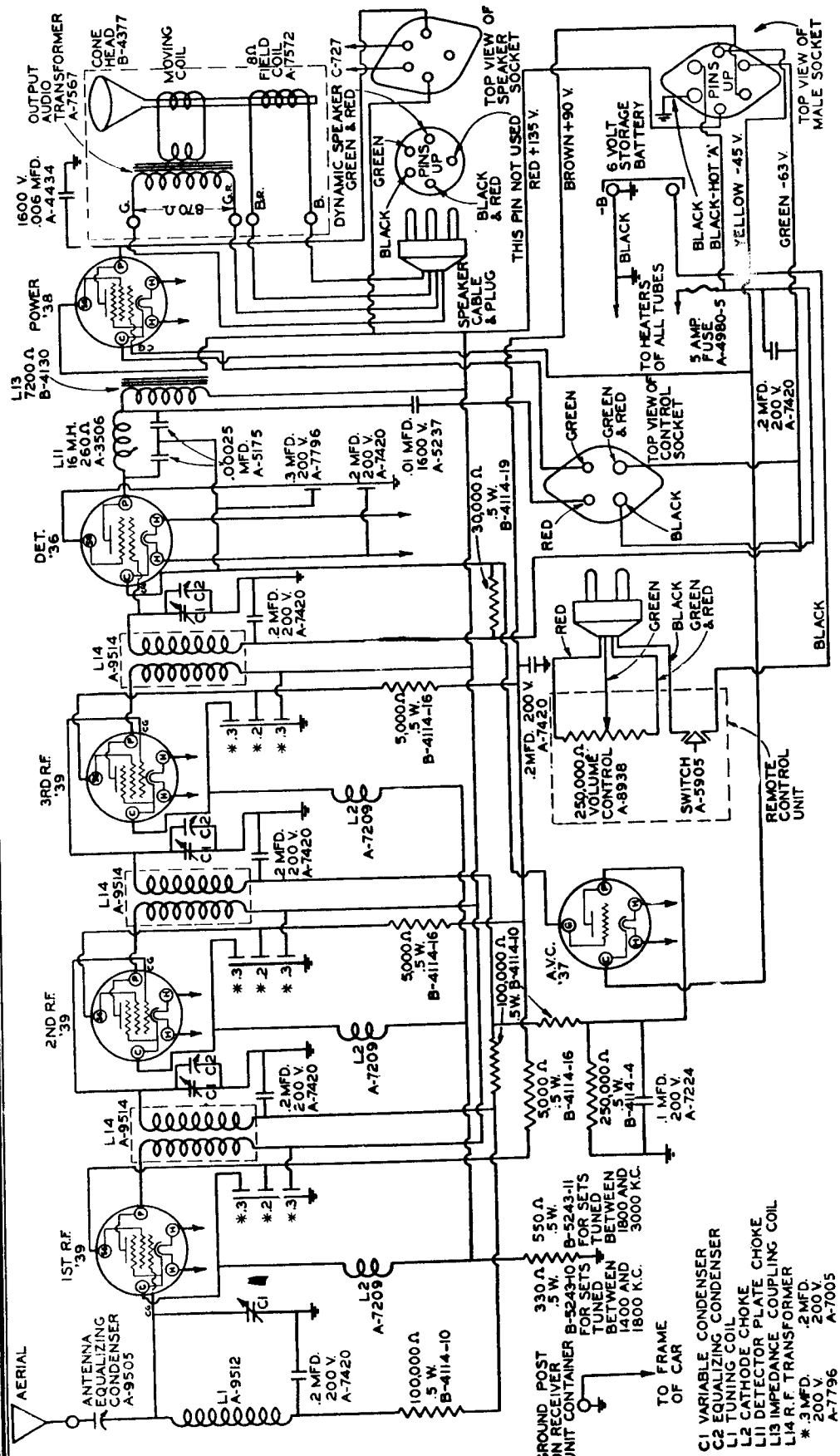
MODEL 42



Tube	Location	Filament or Heater	Plate	Control Grid —	Screen Grid +	Plate Current M.A.
'39	1st R. F. Stage	6 to 8	135	— 3	+90	3 to 4
'39	2nd R. F. Stage	6 to 8	135	— 3	+90	3 to 4
'39	3rd R. F. Stage	6 to 8	135	— 3	+90	3 to 4
'36	Detector	6 to 8	130 to 135	— 10	0	.1 to .3
'37	A. V. C.	6 to 8	—	— 18	—	0
'38	Power tube	6 to 8	180	— 18	+180	6 to 8

SPARKS-WITHINGTON CO.

MODEL 43



Condition of "A" Battery Good
Condition of "B" Battery Good
Condition of "C" Battery Good
Position of Volume Control Full with Antenna Disconnected

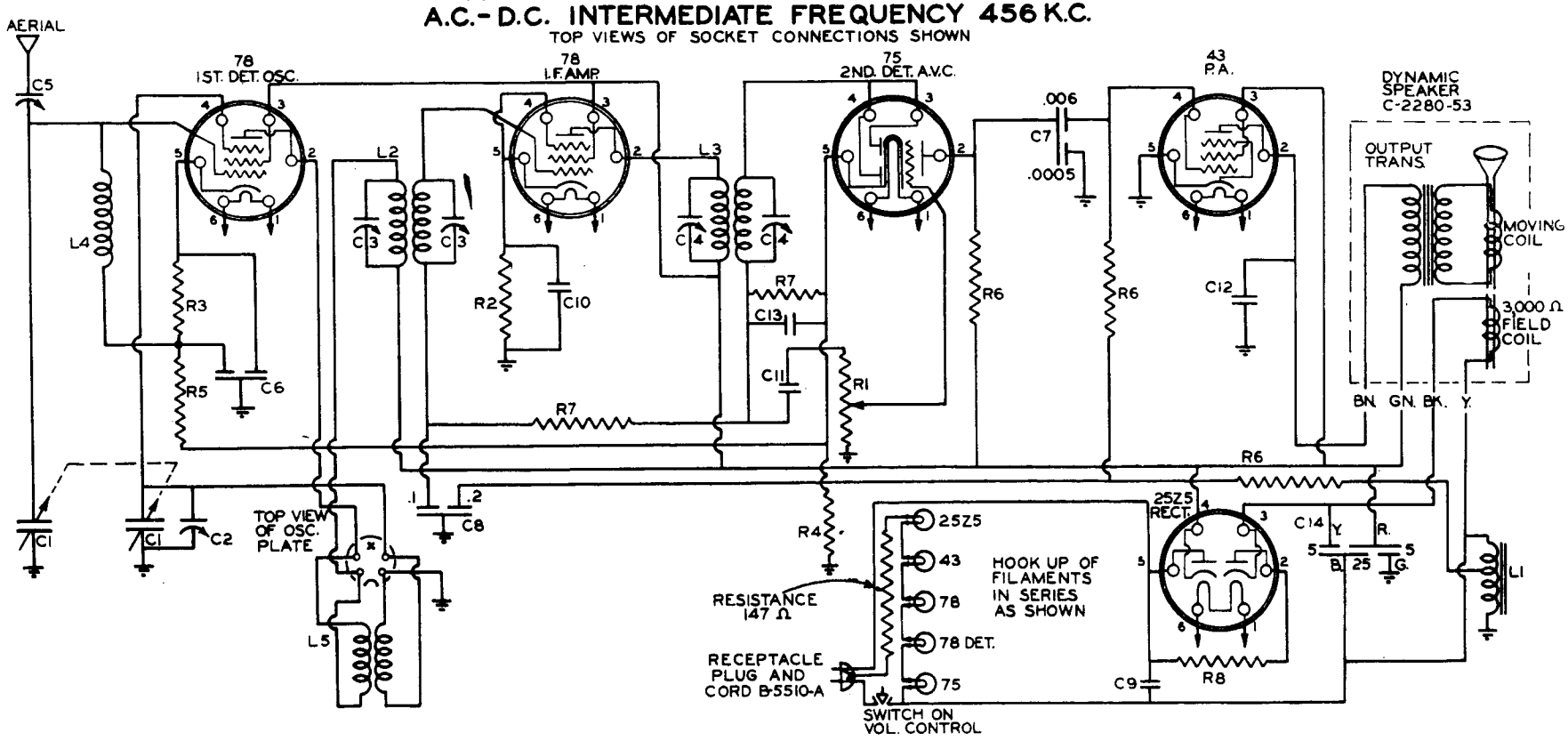
37

36, 38 & 39

Tube	Location	Filament or Heater	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
'39	1st R. F. Stage	6	135	— 3	+85	4.5
'39	2nd R. F. Stage	6	135	— 3	+85	4.5
'39	3rd R. F. Stage	6	135	— 3	+85	4.5
'36	Detector	6	132	—10	+63	.1
'37	A. V. C.	6	---	—18	---	0
'38	Power Stage	6	180	—18	+180	9

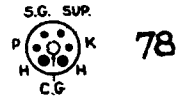
SCHEMATIC DIAGRAM
SPARTON MODEL 53 SUPERHETERODYNE
A.C.-D.C. INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF SOCKET CONNECTIONS SHOWN

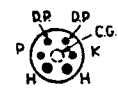


C1	VARIABLE CONDENSER	B-5509	C8	.1-.2 MFD. 100 V.	A-11092-6	R1	500,000 Ω VOL. CONTROL	A-11480	L1 TAPPED CHOKE A-9566
C2	ADJUSTABLE CONDENSER		C9	.025 MFD. 400 V.	A-11086-4	R2	400 Ω WIREWOUND	B-5243-30	L2 NO.1 I.F. TRANSFORMER A-11476
C3	NO.1 I.F. TRIMMER	A-11474	C10	.1 MFD. 100 V.	A-11130-1	R3	290 Ω WIREWOUND	B-5243-36	L3 NO.2 I.F. TRANSFORMER A-11477
C4	NO.2 I.F. TRIMMER	A-9553	C11	.006 MFD. 400 V.	A-11130-4	R4	100 Ω WIREWOUND	B-5243-37	L4 PRE-SELECTOR COIL A-11486
C5	ANTENNA TRIMMER	A-11484	C12	.01 MFD. 200 V.	A-11130-7	R5	2,200 Ω WIREWOUND	B-5243-13	L5 OSCILLATOR COIL A-11475
C6	.05-.05 MFD. 100 V.	A-11092-1	C13	.0005 MFD. MOLDED	A-9578-14	R6	300,000 Ω .25 W.	B-5737-3	
C7	.006-.0005 MFD. 400 V.	A-11092-2	C14	5-25-5 MFD. ELECTROLYTIC	A-11093-1	R7	500,000 Ω .25 W.	B-5737-5	
						R8	50 Ω WIREWOUND	B-6061-1	

NOTE: Part No. of Condenser C13 in late Model 53 Chassis is changed from A-9578-14 to A-9578.



78



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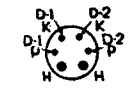
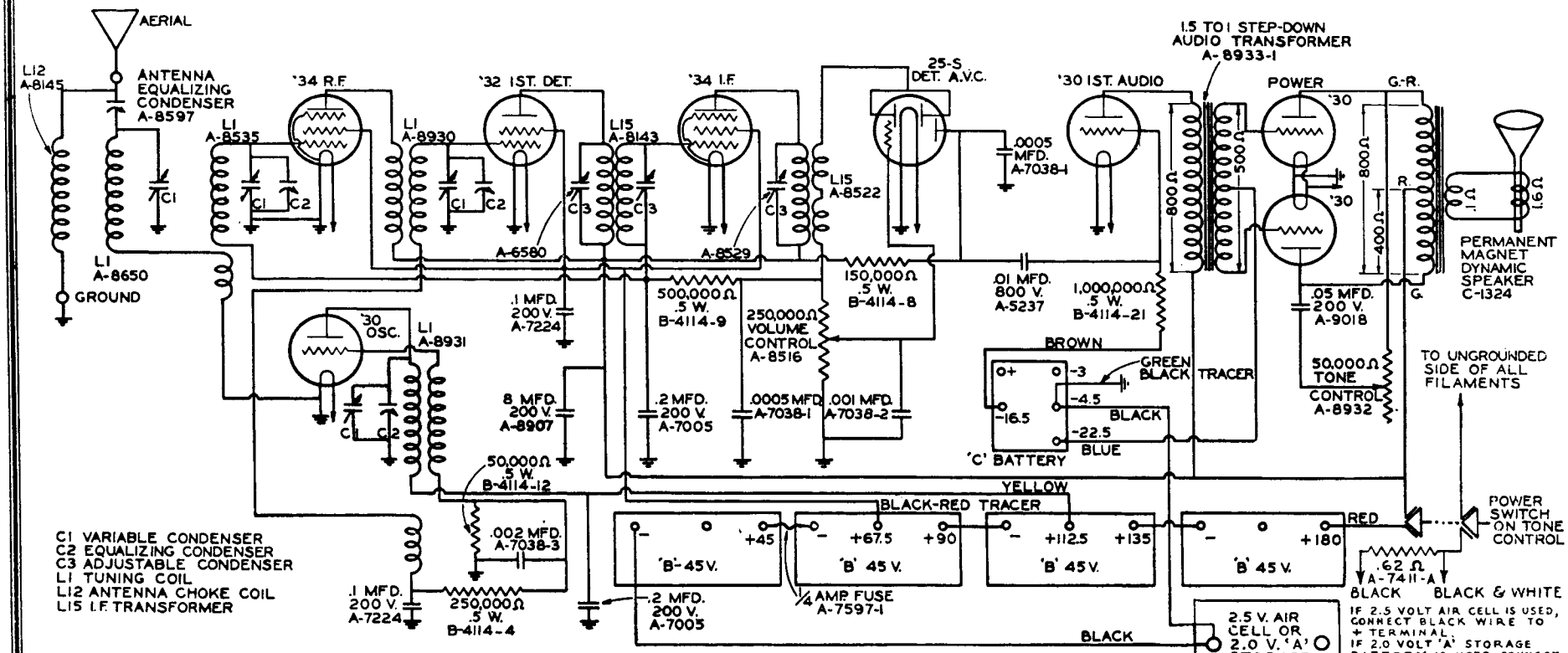
43



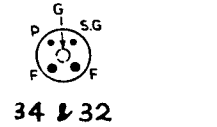
25 Z 5

SPARKS-WITHINGTON CO.

MODEL 53

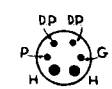


Tube	Location	Heater or Filament	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
'34	R. F. Stage	2.0	180	†—	67½	3.0
'32	1st Det.	2.0	180	†—	67½	0.5
'30	Oscillator	2.0	112½	†—	—	‡1.0—2.0
'34	I. F. Stage	2.0	180	†—	67½	3.0
25-S	2nd Det.-AVC	2.0	*—	†—	—	0.5
'30	A. F. Stage	2.0	180	12	—	0.2
'30	Power Stage	2.0	180	18	—	1.0
'30	Power Stage	2.0	180	18	—	1.0



34 & 32

30



25-S

SPARKS-WITHINGTON CO.

MODEL 54

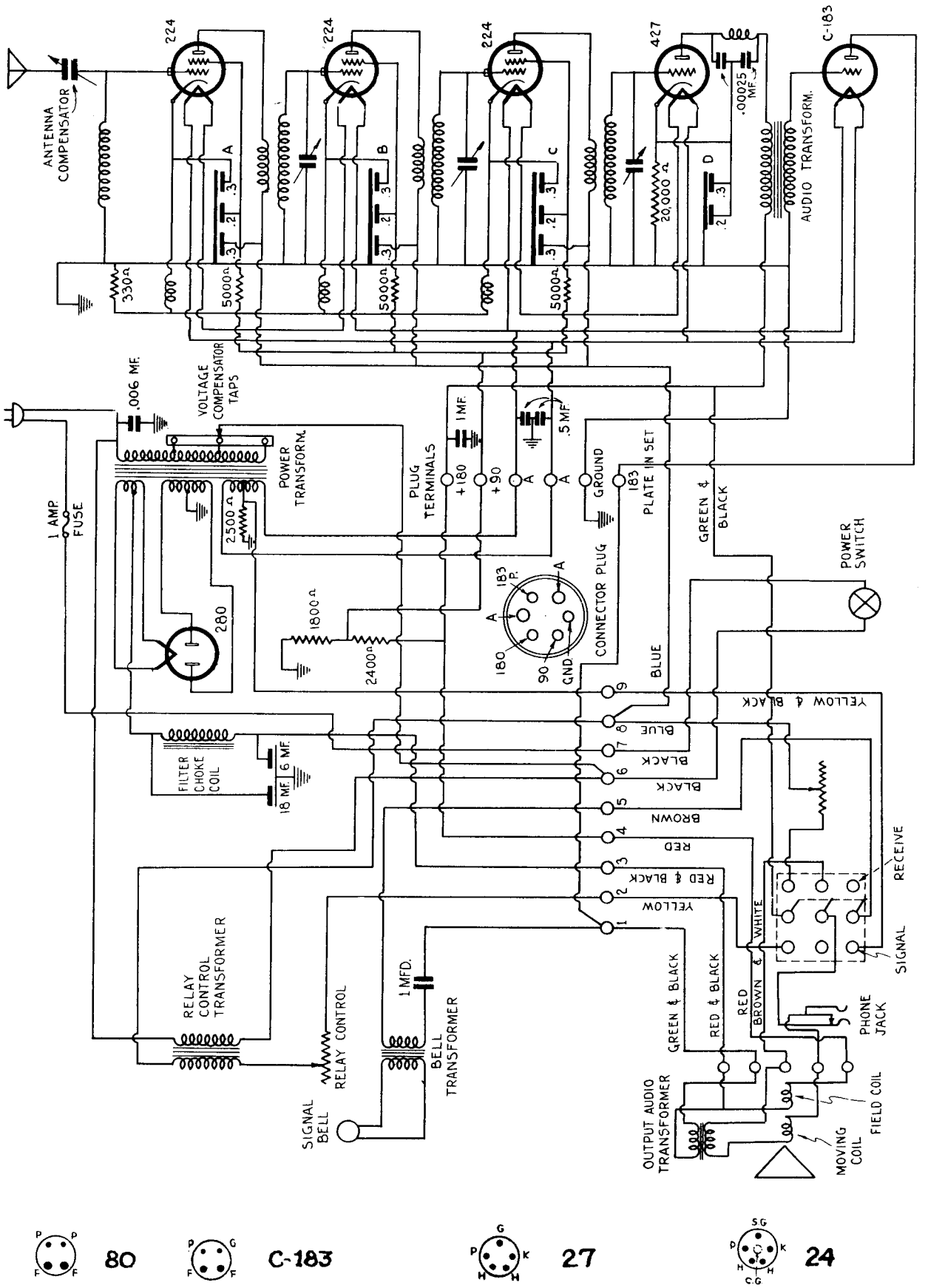
* 180 Volts through 150,000 ohm plate resistor.

† These biases supplied either by oscillator or by AVC tube—through very high resistances. Cannot be measured with a test kit.

‡ This current varies with frequency of oscillation. Cannot be measured in a test kit.

SPARKS-WITHINGTON CO.

MODEL 55 A.C.



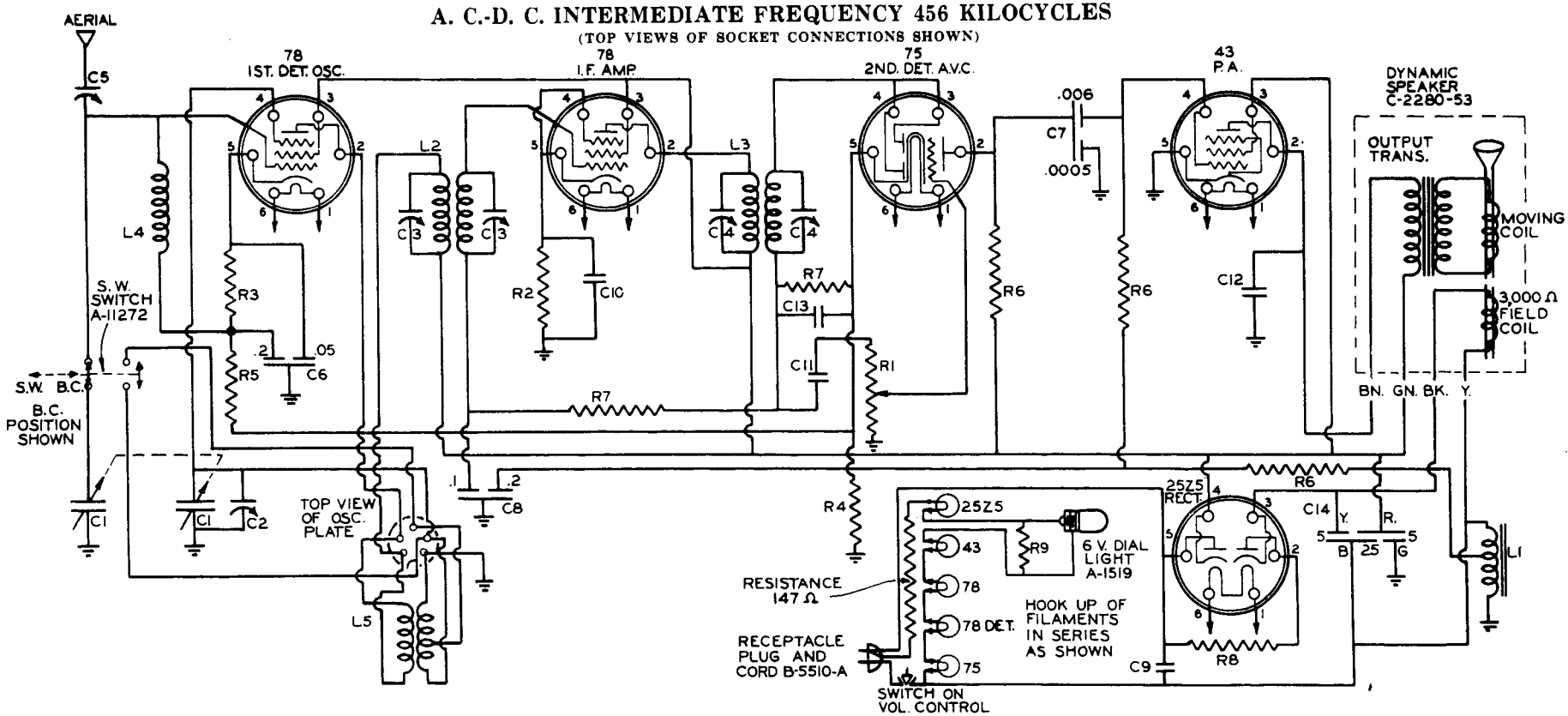
80

C-183

27

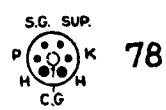
24

SPARTON MODEL 57 SUPERHETERODYNE
SCHEMATIC DIAGRAM
A. C.-D. C. INTERMEDIATE FREQUENCY 456 KILOCYCLES
(TOP VIEWS OF SOCKET CONNECTIONS SHOWN)



C1 VARIABLE CONDENSER	B-5509	C8 .1-.2 MFD. 100 V.	A-11092-6	R1 500,000 Ω VOL. CONTROL	A-11480	L1 TAPPED CHOKE	A-9566
C2 ADJUSTABLE CONDENSER		C9 .025 MFD. 400 V.	A-11086-4	R2 400 Ω WIREWOUND	B-5243-30	L2 NO. 1 I.F. TRANSFORMER	A-11476
C3 NO. 1 I.F. TRIMMER	A-11474	C10 .1 MFD. 100 V.	A-11130-1	R3 290 Ω WIREWOUND	B-5243-36	L3 NO. 2 I.F. TRANSFORMER	A-11477
C4 NO. 2 I.F. TRIMMER	A-9553	C11 .006 MFD. 400 V.	A-11130-4	R4 100 Ω WIREWOUND	B-5243-37	L4 PRE SELECTOR COIL	A-9601
C5 ANTENNA TRIMMER	A-11499	C12 .01 MFD. 200 V.	A-11130-7	R5 2,200 Ω WIREWOUND	B-5243-13	L5 OSCILLATOR COIL	A-11504
C6 .05-.2 MFD. 100 V.	A-11092-7	C13 .0005 MFD. MOLDED	A-9578-14	R6 300,000 Ω .25 W.	B-5737-3		
C7 .006-.0005 MFD. 400 V.	A-11092-2	C14 5-25-5 MFD. ELECTROLYTIC	A-11093-1	R7 500,000 Ω .25 W.	B-5737-5		
				R8 50 Ω WIREWOUND	B-6061-1		
				R9 25 Ω WIREWOUND	A-9647		

NOTE: Part No. of Condenser C-13 in late Models 57 chassis is changed from A-9578-14 to A-9578.



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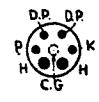

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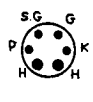

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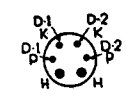

25Z5

SPARKS-WITHINGTON CO.

MODEL 57

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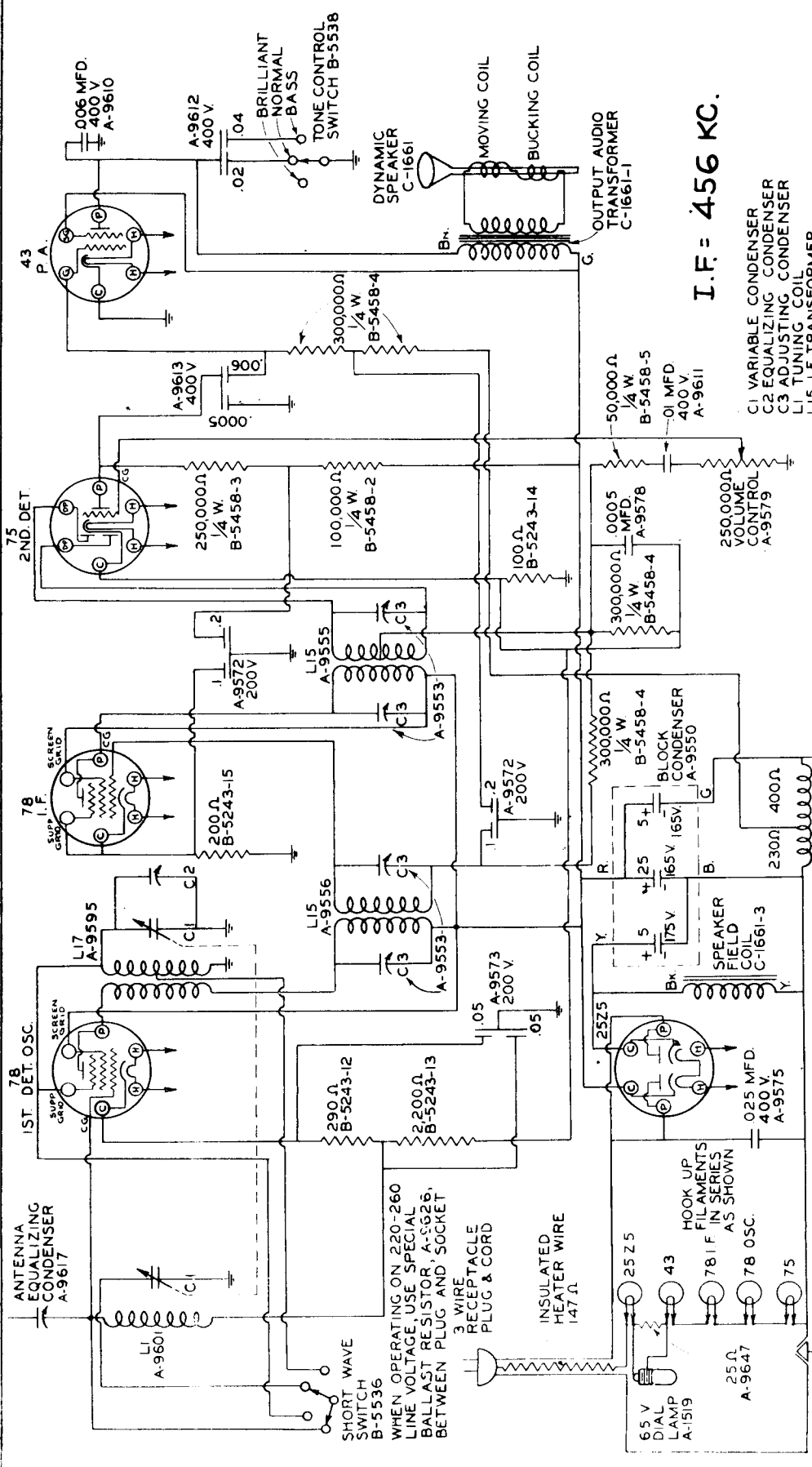
MODELS 61 & 62



Tube	Location	Heater or Filament	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
2525	Rectifier	22 - 28*	-------	-------	-------	-------
43	Power	22 - 28*	92 - 98	14 - 18	98 - 108	18 - 25
75	Detector-A.V.C.	5.9 - 7*	35 - 45	.4 - .65	-------	.19 - .22
78	I. F. Amplifier	5.9 - 7*	98 - 108	1.8 - 2.5	98 - 108	7 - 10
78	Det.-Oscillator	5.9 - 7*	98 - 108	14 - 18	98 - 108	4 - 6

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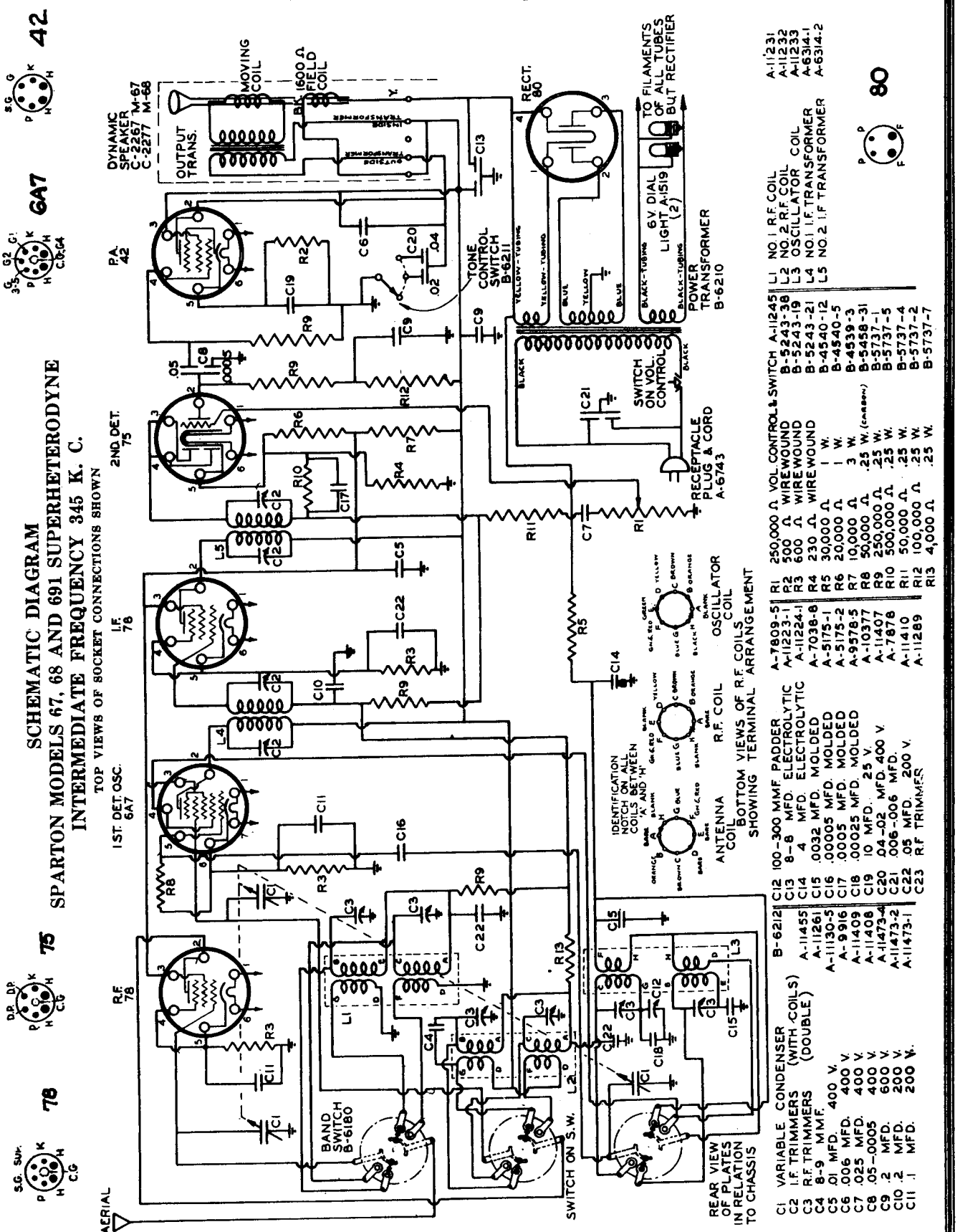
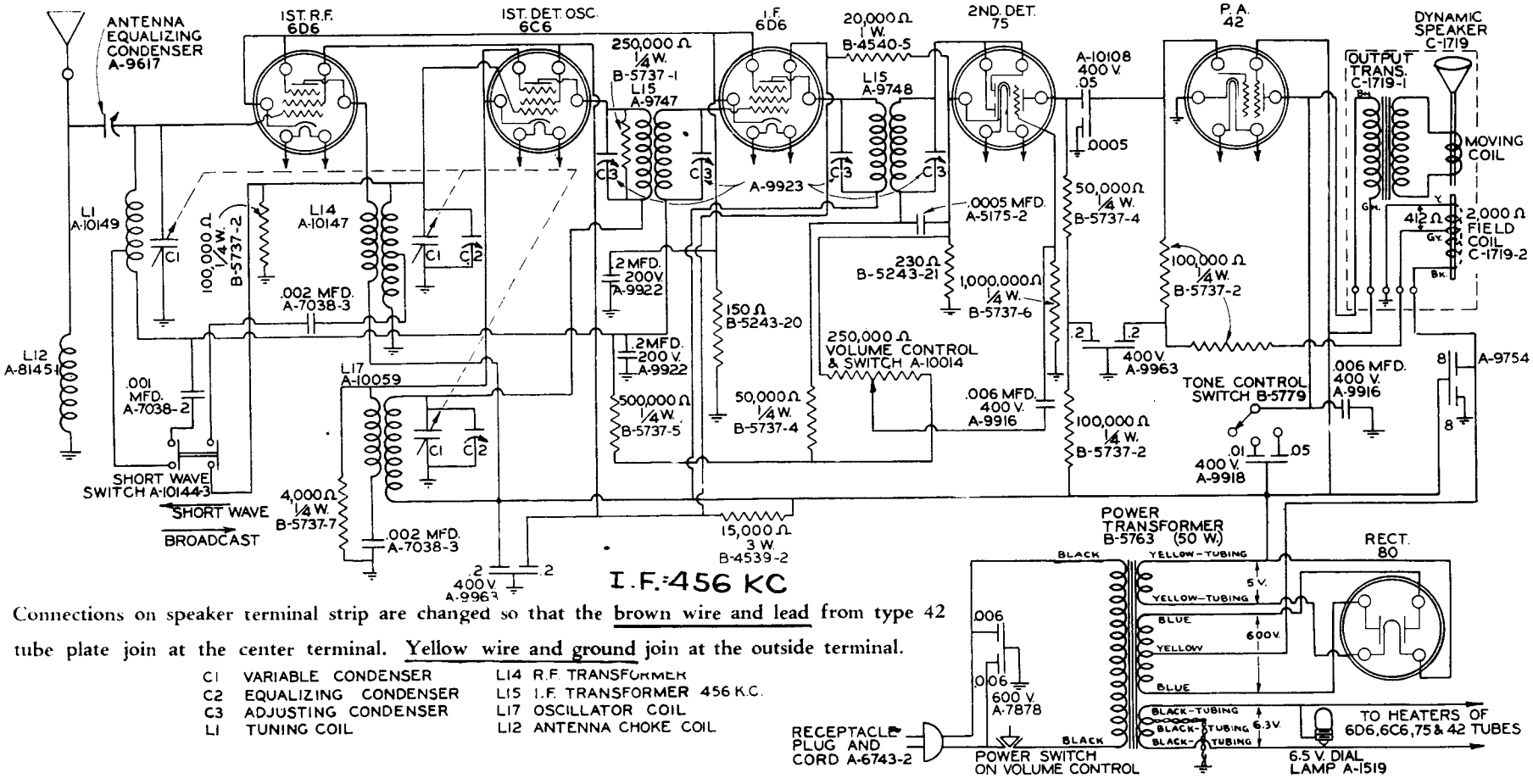
MODELS 67 68 AND 691



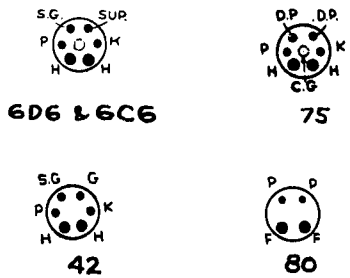
SPARKS-WITHINGTON CO.
MODELS 71 & 71B



Connections on speaker terminal strip are changed so that the brown wire and lead from type 42 tube plate join at the center terminal. Yellow wire and ground join at the outside terminal.

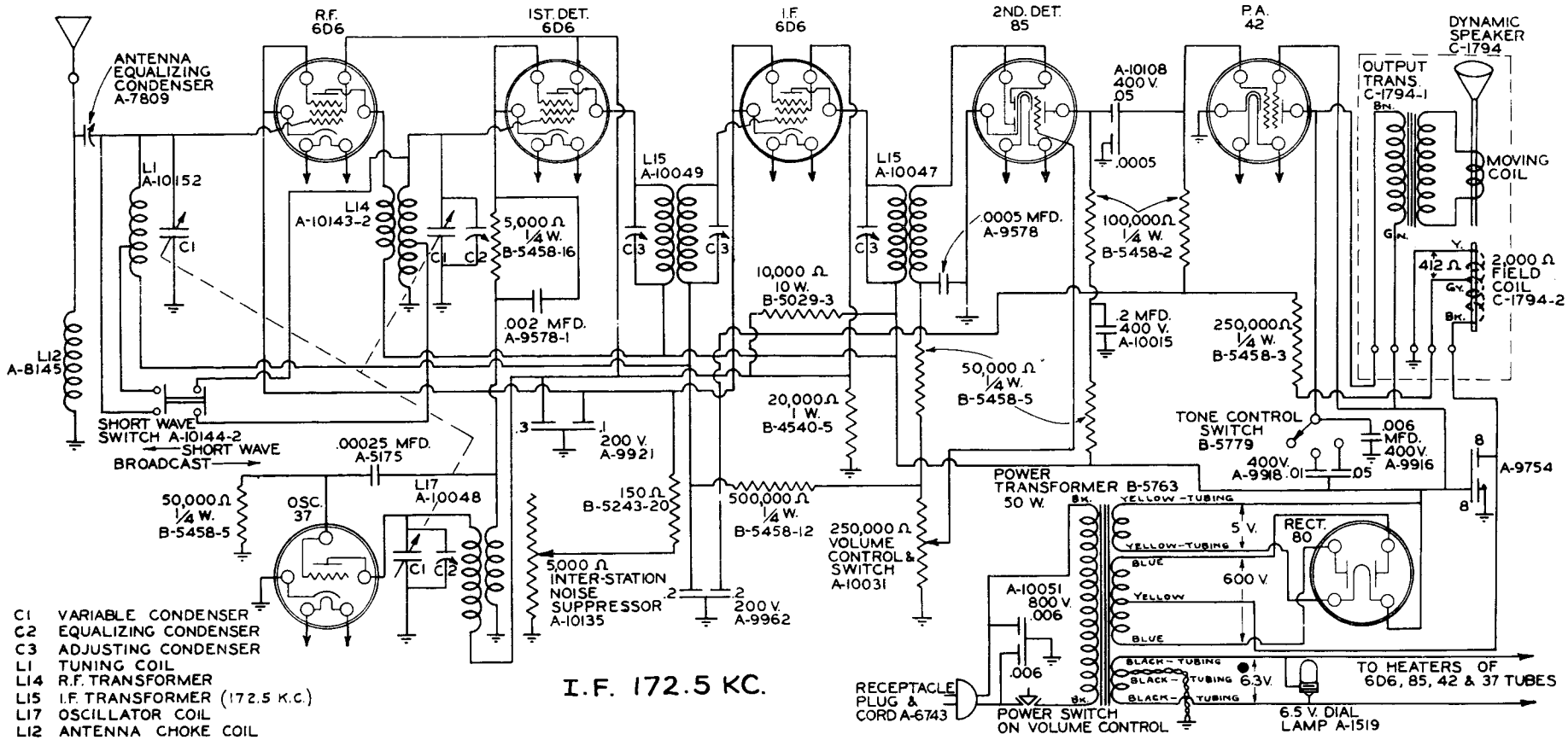
C1	VARIABLE CONDENSER	L14	R.F. TRANSFORMER
C2	EQUALIZING CONDENSER	L15	I.F. TRANSFORMER 456 K.C.
C3	ADJUSTING CONDENSER	L17	OSCILLATOR COIL
L1	TUNING COIL	L12	ANTENNA CHOKE COIL

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
6D6	R-F Stage	250	8.	100	—3.	—	35,000	20,000	750,000	150
6C6	1st Det.—Osc.	250*	*	100*	*	35,000	35,000	20,000	0	4,000
6D6	I-F Stage	250	8.	100	—3.	785,000	35,000	20,000	750,000	150
75	Diode Det.	0	0	—	—	785,000‡	750,000	—	—	230
	Triode A-F	135	0.5	—	—1.5	1,000,000	185,000	—	1,000,000	
42	Power Stage	240	20.	250	—12.**	385,000	35,000	35,000	200,000	0
80	Rectifier	450†	28.5***	—	—	600[1]	2,300	—	—	30,000[2]



SPARKS-WITHINGTON CO.

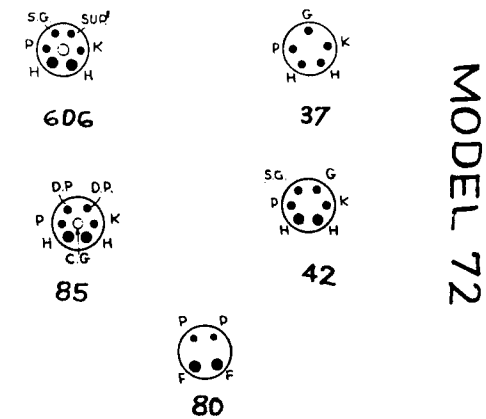
MODEL 72



I.F. 172.5 KC.

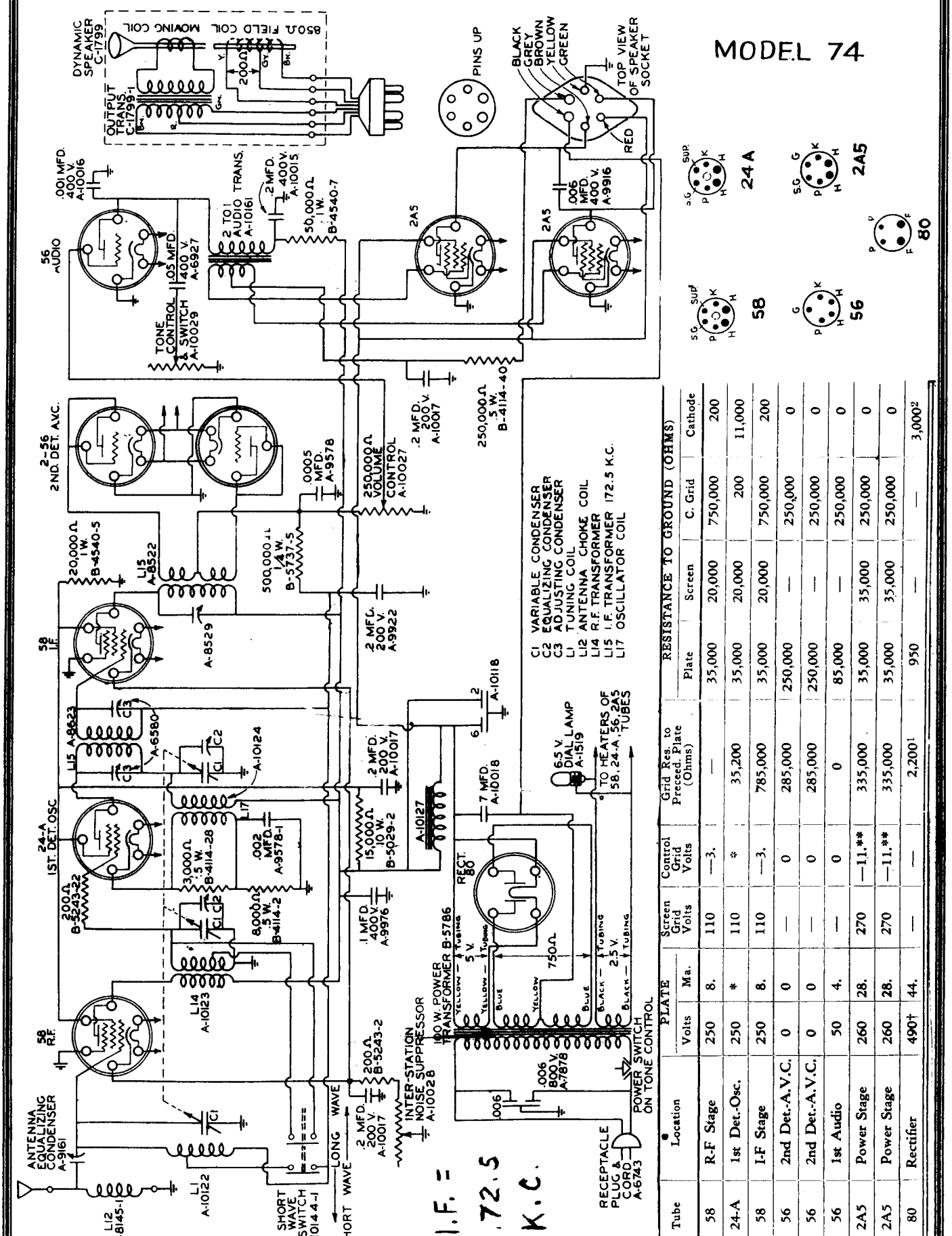
C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTING CONDENSER
L1 TUNING COIL
L14 R.F. TRANSFORMER
L15 I.F. TRANSFORMER (172.5 K.C.)
L17 OSCILLATOR COIL
L12 ANTENNA CHOKE COIL

Tube	Location	PLATE Volts	PLATE Ma.	Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS) Plate	Screen	C. Grid	Cathode
6D6	R-F Stage	250	8.	100	—3.	—	30,000	20,000	750,000	150
6D6	1st Det.	250	*	100	*	30,000	30,000	20,000	0	5,400
37	Osc.	100*	*	—	*	80,000	20,000	0	50 000	0
6D6	I-F Stage	250	8.	100	—3.	780,000	30,000	20,000	750,000	150
85	Diode Det.	0	0	—	—	330,000‡	300,000	—	—	0
	Triode A-F	22	1.6	—	0	280,000	180,000	—	250.000	
42	Power Stage	240	20.	250	—11.**	530,000	30,000	30,000	350,000	0
80	Rectifier	450†	26.***	—	—	600[1]	2,300	—	—	30,000[2]



SPARKS-WITHINGTON CO.

MODEL 74



Tube	Location	PLATE Volts	PLATE Ma.	Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS) Plate	Screen	C. Grid	Cathode
58	R-F Stage	250	8.	110	—3.	—	35,000	20,000	750,000	200
24-A	1st Det.-Osc.	250	*	110	*	35,200	35,000	20,000	200	11,000
58	I-F Stage	250	8.	110	—3.	785,000	35,000	20,000	750,000	200
56	2nd Det.-A.V.C.	0	0	—	0	285,000	250,000	—	250,000	0
56	2nd Det.-A.V.C.	0	0	—	0	285,000	250,000	—	250,000	0
56	1st Audio	50	4.	—	0	0	85,000	—	250,000	0
2A5	Power Stage	260	28.	270	—11.**	335,000	35,000	35,000	250,000	0
2A5	Power Stage	260	28.	270	—11.**	335,000	35,000	35,000	250,000	0
80	Rectifier	490†	44.	—	—	2,200[1]	950	—	—	3,000[2]

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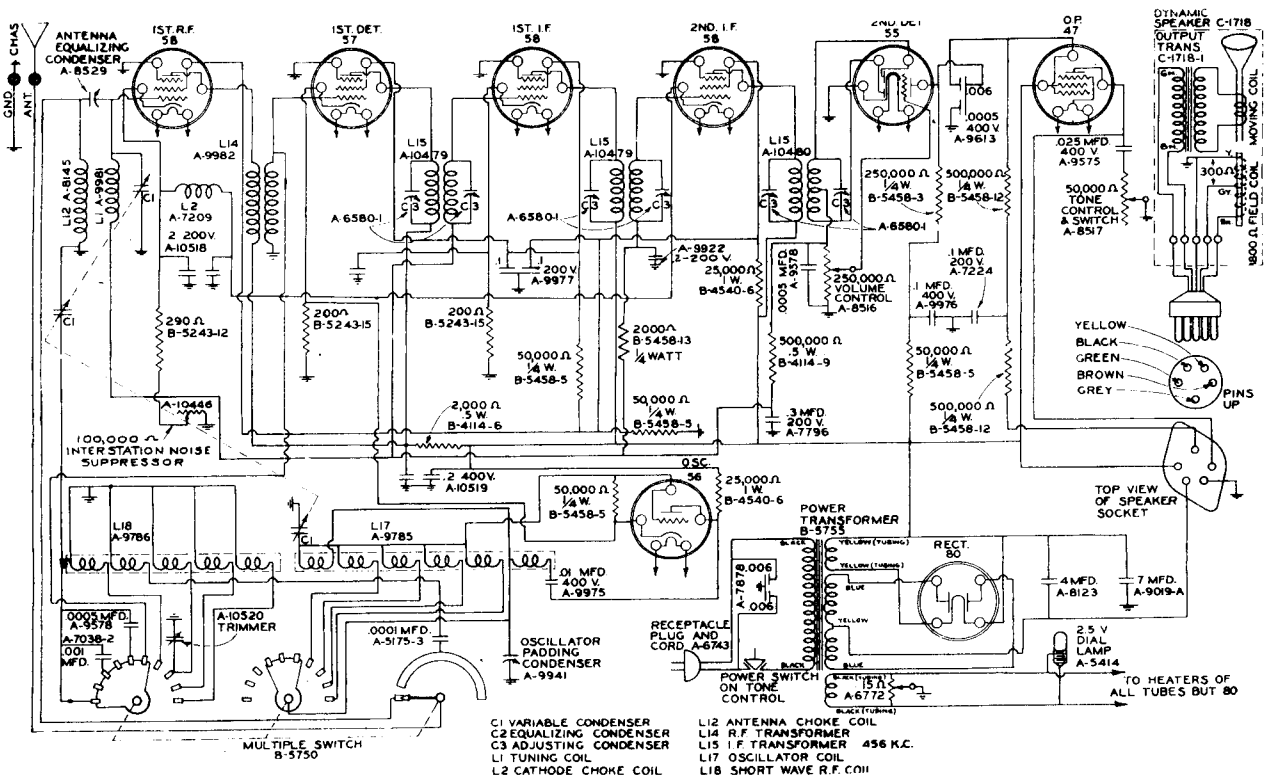
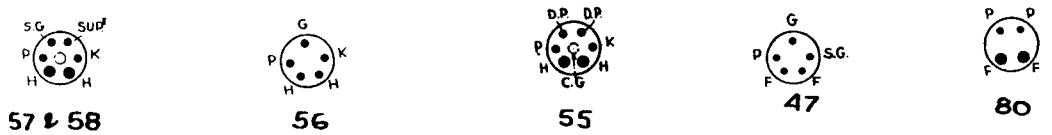
MODELS 75A, 475A & 478A





CHANGES IN MODELS 75-A, 475-A and 478-A SCHEMATIC DIAGRAM

Effective March 27, 1934

Resistor 8,000 ohms, B-5458-23 and condenser .006 mfd., A-9916, added to cathode circuit of Type 57 1st Detector tube. See diagram under Voltage Analysis and Continuity Chart.

I.F. = 456 K.C.

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.			Plate	Screen	C. Grid	Cathode
58	R-F Stage	245.	6.5	120.	—4.9	77,000	50,000	750,000	290
57	1st Detector	245.	—	52.	—1.9	77,000	100,000	12	200
56	Oscillator	105.	—	—	—1.9	100,000	—	50,000	200
58	1st I-F Stage	255.	5.0	52.	—1.0	75,000	100,000	750,000	200
58	2nd I-F Stage	255.	6.0	120.	—4.5	75,000	50,000	750,000	290
55	Diode Det.-A.V. C.	—	—	—	—	250,000	—	—	0
	Triode Audio	15.	0.75	—	—	375,000	—	250,000	
47	Power Stage	245.	21.0	255.	—20.0	75,000	75,000	1,000,000	7.5
80	Rectifier	355†	—	—	—	—	—	—	—

NOTES: Allow 15% + or — on all measurements.
All heater voltages: 2.5, except 80 Rectifier filament: 5.0 volts.

†As read on 800 volt scale of A-C meter in Jewell 444 Set Analyzer.

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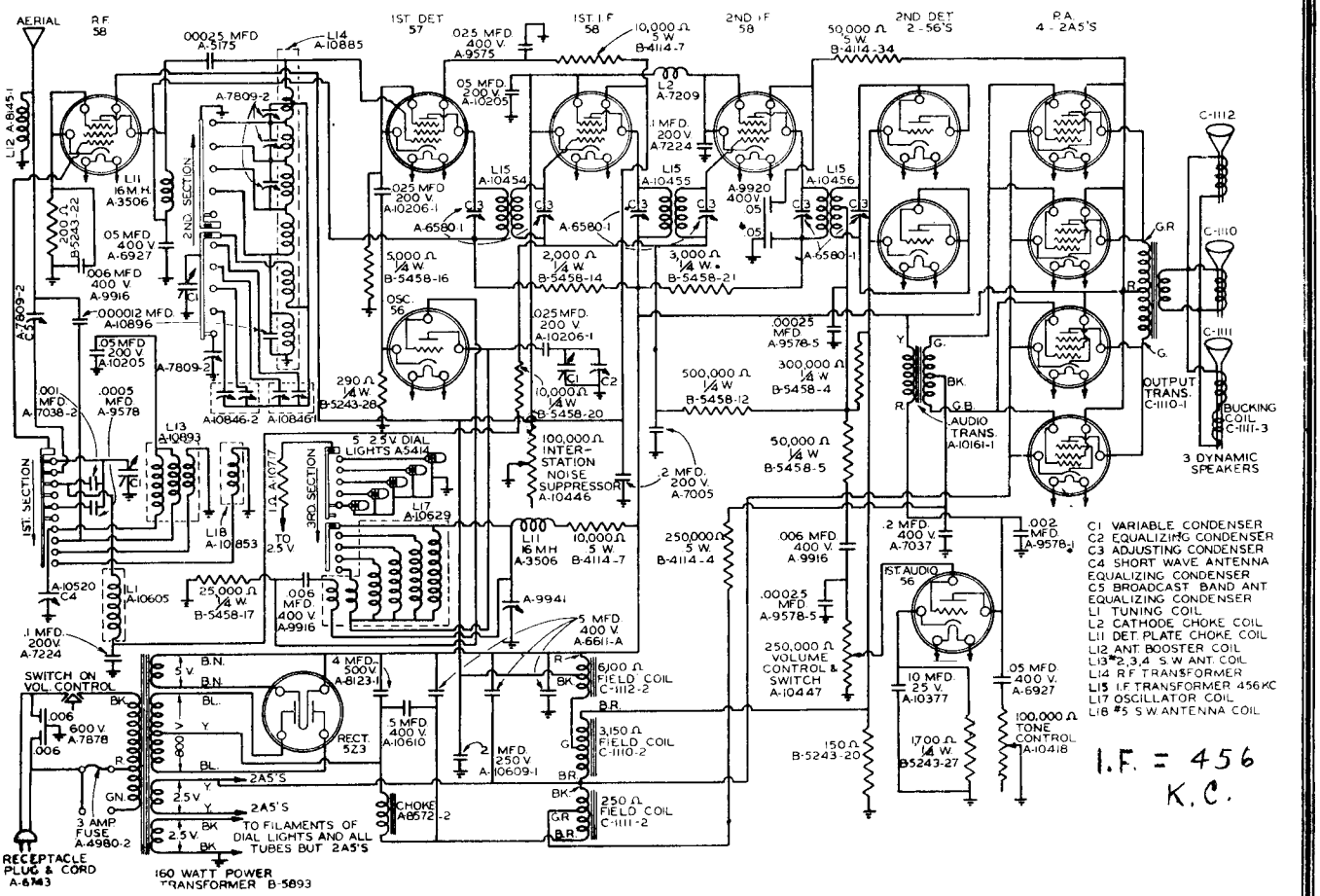
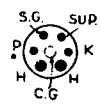
MODEL 76





57 & 58

56

2A5

5Z3

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.			Plate	Screen	C. Grid	Cathode
58	R-F Stage	150	2.9	76.	—	10,000	5,600	1,000,000	200
57	1st Detector	145	.8	64.	—5.0	10,000	15,000	2	5,000
56	Oscilator	90	6.5	—	—17.5	17,500	—	25,000	300
58	1st I-F Stage	165	2.6	95.	—	8,000	5,500	1,000,000	14
58	2nd I-F Stage	155	2.6	100.	—	11,000	57,500	1,000,000	20
56	2nd Det.-A.V. C.	—	—	—	—	250,000	—	250,000	150
56	2nd Det.-A.V. C.	—	—	—	—	250,000	—	250,000	150
56	1st A-F Stage	150	4.7	—	—	9,500	—	350,000	1,700
2A5	Power Stage	270	25.0	285.	—20.	8,000	7,500	275,000	3,200
2A5	Power Stage	270	25.0	285.	—20.	8,000	7,500	275,000	3,200
2A5	Power Stage	270	25.0	285.	—20.	8,000	7,500	275,000	3,200
2A5	Power Stage	270	25.0	285.	—20.	8,000	7,500	275,000	3,200
5Z3	Rectifier	430*	83.0	—	—	3,600	—	—	7,500

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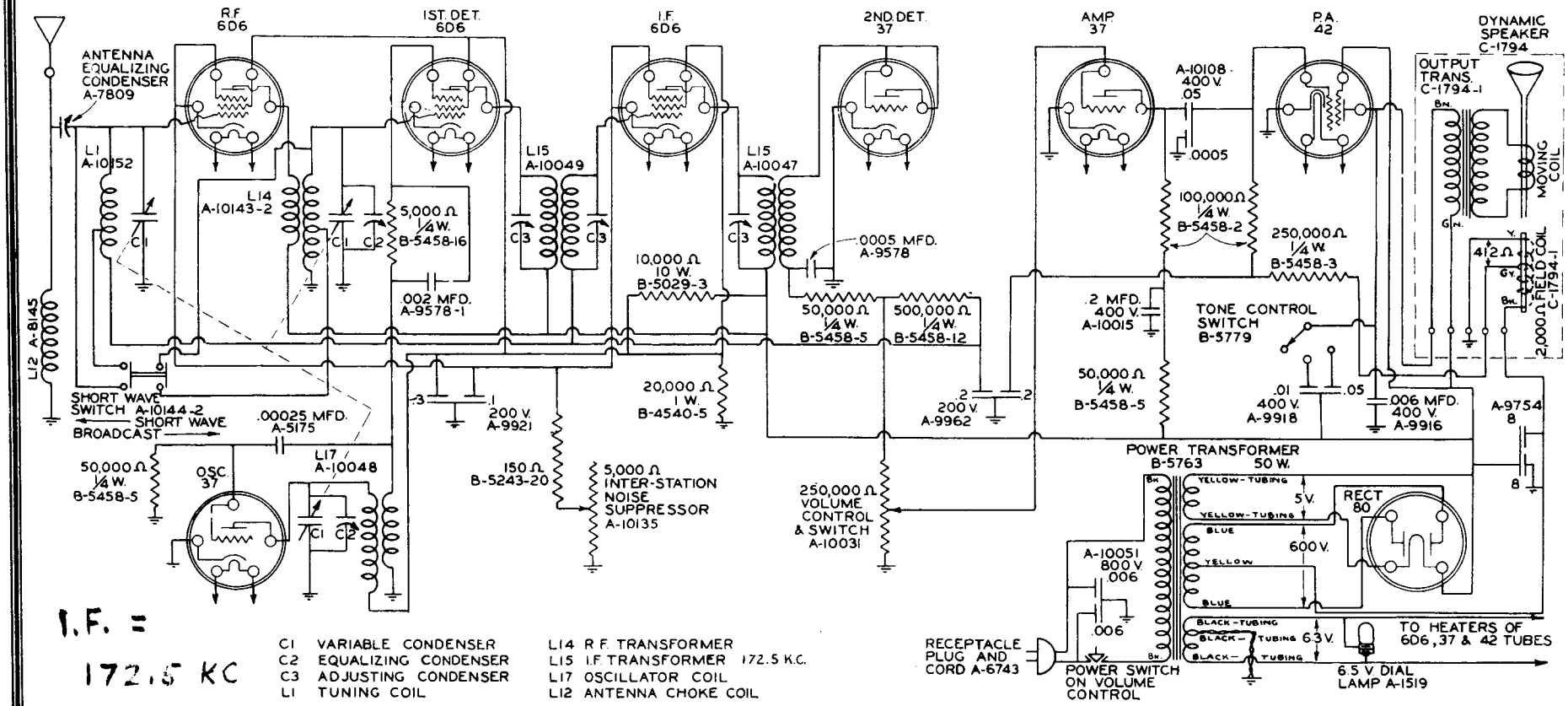
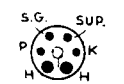
MODELS 78 & 478



I.F. = 172.5 KC

C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTING CONDENSER
L1 TUNING COIL
L14 R.F. TRANSFORMER
L15 I.F. TRANSFORMER 172.5 K.C.
L17 OSCILLATOR COIL
L12 ANTENNA CHOKE COIL

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
6D6	R-F Stage	250	8.	100	—3.	—	30,000	20,000	750,000	150
6D6	1st Det.	250	*	100	*	30,000	30,000	20,000	0	5,400
37	Osc. Stage	100*	*	—	*	80,000	20,000	0	50,000	0
6D6	I-F Stage	250	8.	100	—3.	780,000	30,000	20,000	750,000	150
37	2nd Det.-A.V.C.	0	*	—	*	330,000	300,000	—	300,000	0
37	1st Audio	22	1.6	—	0	280,000	180,000	—	250,000	0
42	Power Stage	240	20.	250	—11.**	530,000	30,000	30,000	350 000	0
80	Rectifier	450†	26.‡	—	—	600[1]	2,300	—	—	30,000[2]



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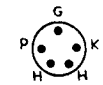

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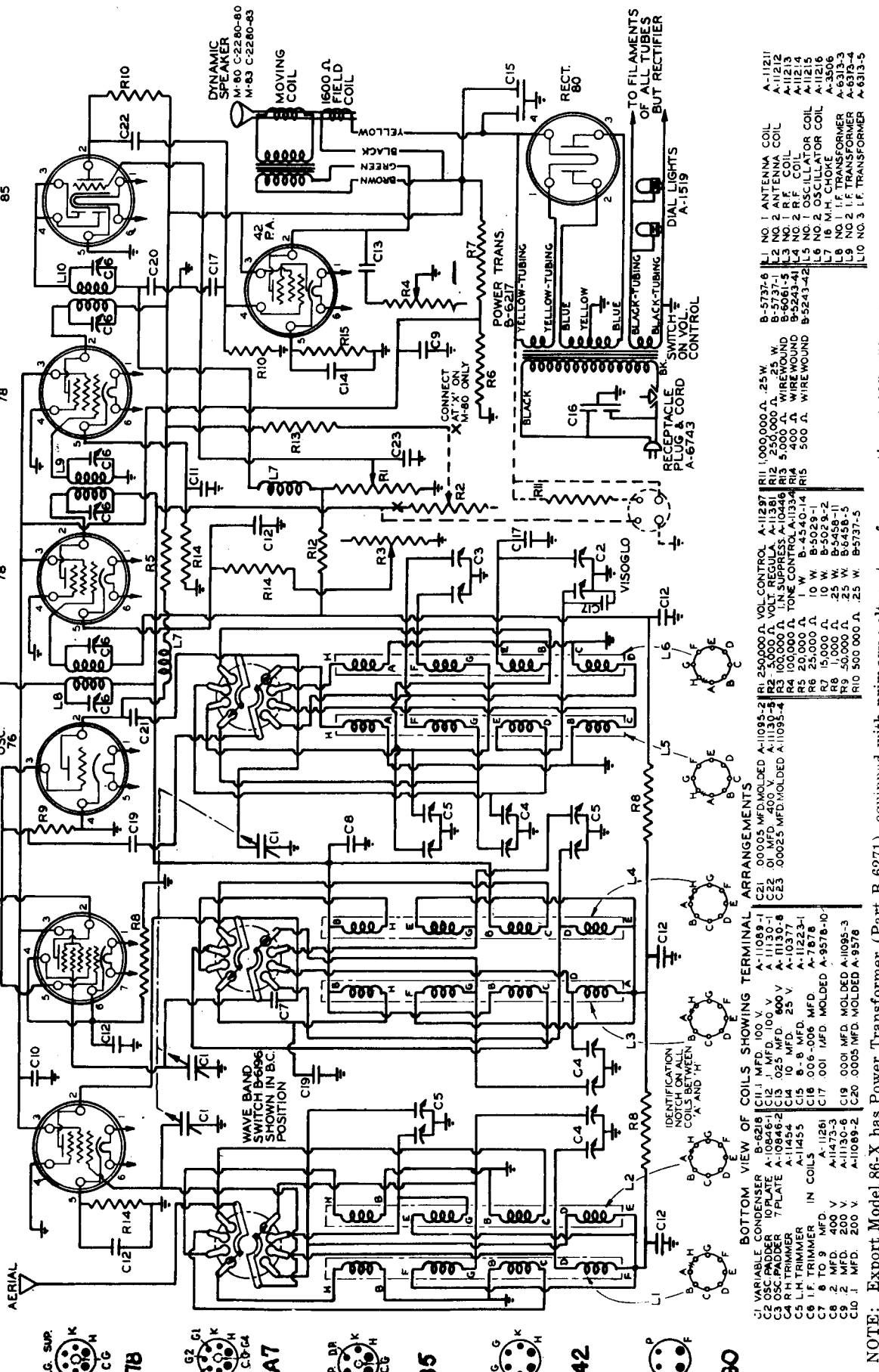
80

SPARKS-WITHINGTON CO.

SCHEMATIC DIAGRAM
SPARTON MODELS 80, 83, 84, 85-X AND 86-X SUPERHETERODYNE
INTERMEDIATE FREQUENCY 456 K. C.

TOP VIEWS OF SOCKET CONNECTIONS SHOWN



BOTTOM VIEW OF COILS SHOWING TERMINAL ARRANGEMENTS

C1 VARIABLE CONDENSER	B-6218	C11 .1 MFD. 100 V.	A-11089-1	C21 .00005 MFD. MOLDED	A-11095-2
C2 OSC. PADDER 10 PLATE	A-10846-1	C12 .1 MFD. 100 V.	A-11130-1	C22 .01 MFD. 400 V.	A-11130-5
C3 OSC. PADDER 7 PLATE	A-10846-2	C13 .025 MFD. 600 V.	A-11130-8	C23 .00025 MFD. MOLDED	A-11095-4
C4 R.H. TRIMMER	A-11454	C14 .10 MFD. 25 V.	A-10377		
C5 L.H. TRIMMER	A-11455	C15 8-8 MFD.	A-11223-1		
C6 I.F. TRIMMER IN COILS		C16 .006-.006 MFD.	A-7878		
C7 8 TO 9 MFD.	A-11261	C17 .001 MFD. MOLDED	A-9578-10		
C8 .2 MFD. 400 V.	A-11473-3				
C9 .2 MFD. 200 V.	A-11130-6	C19 .0001 MFD. MOLDED	A-11095-3		
C10 .1 MFD. 200 V.	A-11089-2	C20 .0005 MFD. MOLDED	A-9578		

R1 1,000,000 Ω. .25 W.	B-5737-6	L1 NO. 1 ANTENNA COIL	A-11211		
R2 250,000 Ω. VOL. CONTROL	A-11297	L2 NO. 2 ANTENNA COIL	A-11212		
R3 100,000 Ω. VOLT REGULA.	A-11381	L3 NO. 1 R.F. COIL	A-11213		
R4 100,000 Ω. I.N. SUPPRESS	A-10446	L4 NO. 2 R.F. COIL	A-11214		
R5 20,000 Ω. TONE CONTROL	A-11334	L5 NO. 1 OSCILLATOR COIL	A-11215		
R6 25,000 Ω. 1 W.	B-4540-14	L6 NO. 2 OSCILLATOR COIL	A-11216		
R7 15,000 Ω. 10 W.	B-5029-1	L7 18 M.H. CHOKE	A-3506		
R8 1,000 Ω. .25 W.	B-5029-2	L8 NO. 1 I.F. TRANSFORMER	A-6313-3		
R9 50,000 Ω. .25 W.	B-5456-11	L9 NO. 2 I.F. TRANSFORMER	A-6313-4		
R10 500,000 Ω. .25 W.	B-6458-5	L10 NO. 3 I.F. TRANSFORMER	A-6313-5		
	B-5737-5				

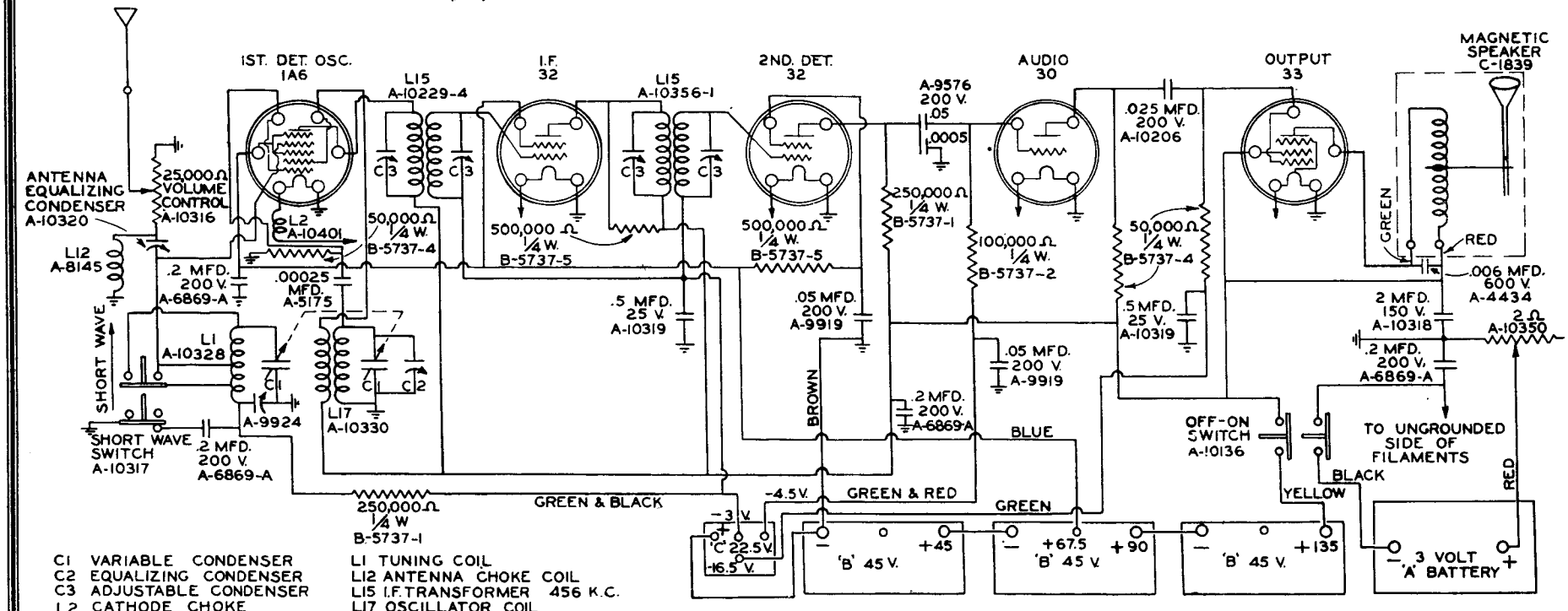
R11 1,000,000 Ω. .25 W.	B-5737-6	L1 NO. 1 ANTENNA COIL	A-11211
R12 250,000 Ω. VOL. CONTROL	A-11297	L2 NO. 2 ANTENNA COIL	A-11212
R13 5,000 Ω. WIREWOUND	B-5737-1	L3 NO. 1 R.F. COIL	A-11213
R14 400 Ω. WIREWOUND	B-6061-5	L4 NO. 2 R.F. COIL	A-11214
R15 500 Ω. WIREWOUND	B-5243-41	L5 NO. 1 OSCILLATOR COIL	A-11215
	B-5243-42	L6 NO. 2 OSCILLATOR COIL	A-11216
		L7 18 M.H. CHOKE	A-3506
		L8 NO. 1 I.F. TRANSFORMER	A-6313-3
		L9 NO. 2 I.F. TRANSFORMER	A-6313-4
		L10 NO. 3 I.F. TRANSFORMER	A-6313-5

NOTE: Export Model 86-X has Power Transformer (Part B-6271), equipped with primary voltage taps for operation at 125, 150 and 250 volts A. C. line. See schematic diagram and notes (Fig. 1) for Model 85-X.

SPARKS-WITHINGTON CO.

MODEL 81

I.F. = 456 KC.

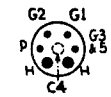


C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTABLE CONDENSER
L2 CATHODE CHOKE

L1 TUNING COIL
L12 ANTENNA CHOKE COIL
L15 I.F. TRANSFORMER 456 K.C.
L17 OSCILLATOR COIL

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
1A6	1st Det.-Osc.	135	1.3	67.5	—3.	—	12.5	0	250,000	0
32	I-F Stage	135	1.7	67.5	—3.	25	10.0	0	12.5	0
32	2nd Det.	135	.6	50.	—3.	20	250,000	500,000	10.0	0
30	1st Audio	135	3.0	—	—4.5	300,000	100,000	—	50,000	0
33	Power Stage	135	14.5	135	—16.5	150,000	630	0	50,000	0

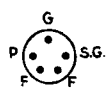
NOTES: Allow 15% + or — on all resistance measurements (all battery leads connected together).
All filament voltages: 2.4 volts.
"A" battery drain 0.5 ampere.
"B" battery drain 30. milliamperes.



1A6

32

30



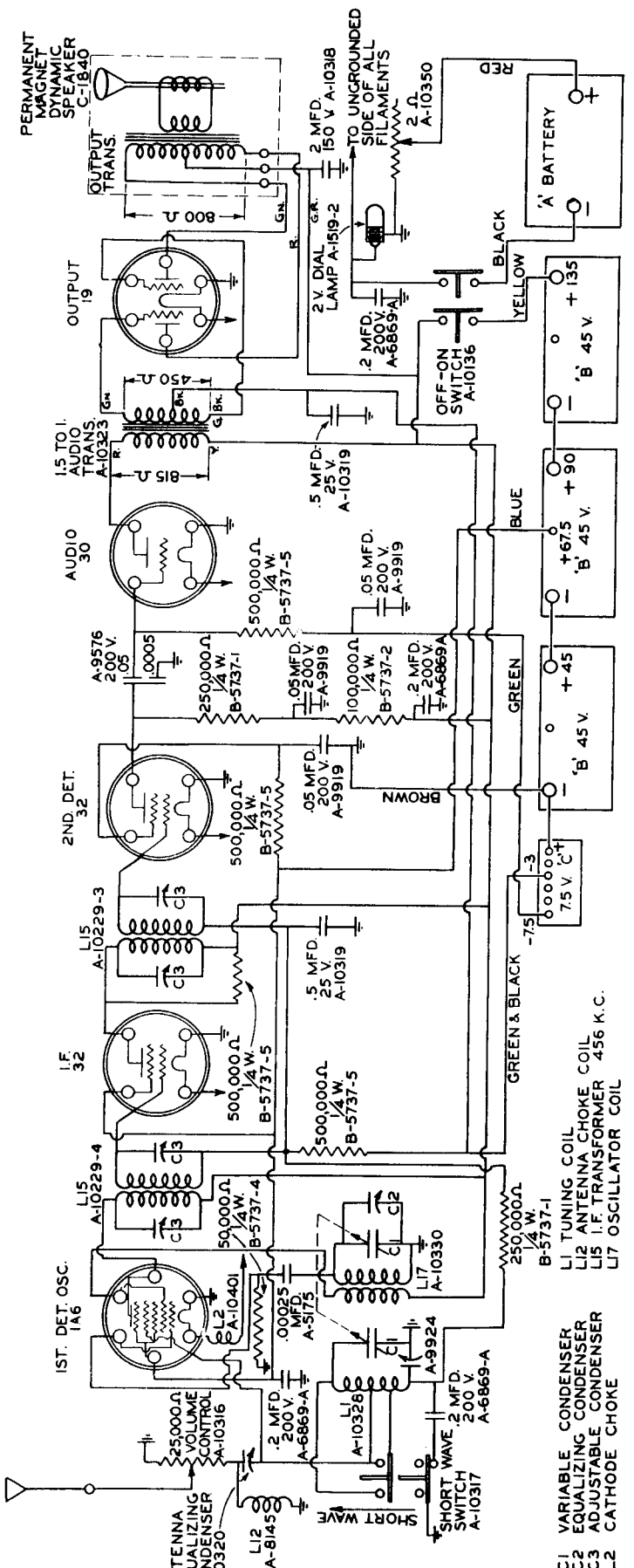
33

SPARKS-WITHINGTON CO.

MODEL 82

Trouble Shooting Hints

This set employs the two volt series tubes which are easily paralyzed if the filament voltage is permitted to exceed a critical value. If weak reception is experienced, test the tubes for emission, then test all by pass condensers and resistors for defects. The volume control is across the aerial circuit and may cause considerable noise if its contact is not good.



Tube	Location	PLATE Volts	PLATE Ma.	Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS) Plate	Screen	C. Grid	Cathode
1A6	1st Det.-Osc.	135	1.3	67.5	—3.	—	12.5	0	750,000	0
32	I-F Stage	135	1.7	67.5	—3.	500,000	12.5	0	500,000	0
32	2nd Det.	135	.6	50.	—3.	500,000	350,000	500,000	500,000	0
30	1st Audio	135	3.0	—	—7.5	85,000	80	—	500,000	0
19	Power Stage	135	4.0	—	—3.	300	75	—	220	0

NOTES: Allow 15% + or — on all resistance measurements (all battery leads connected together).
All filament voltages: 2.0 volts.
"A" battery drain .6 ampere.
"B" battery drain 25 to 35 milliamperes.

1A6

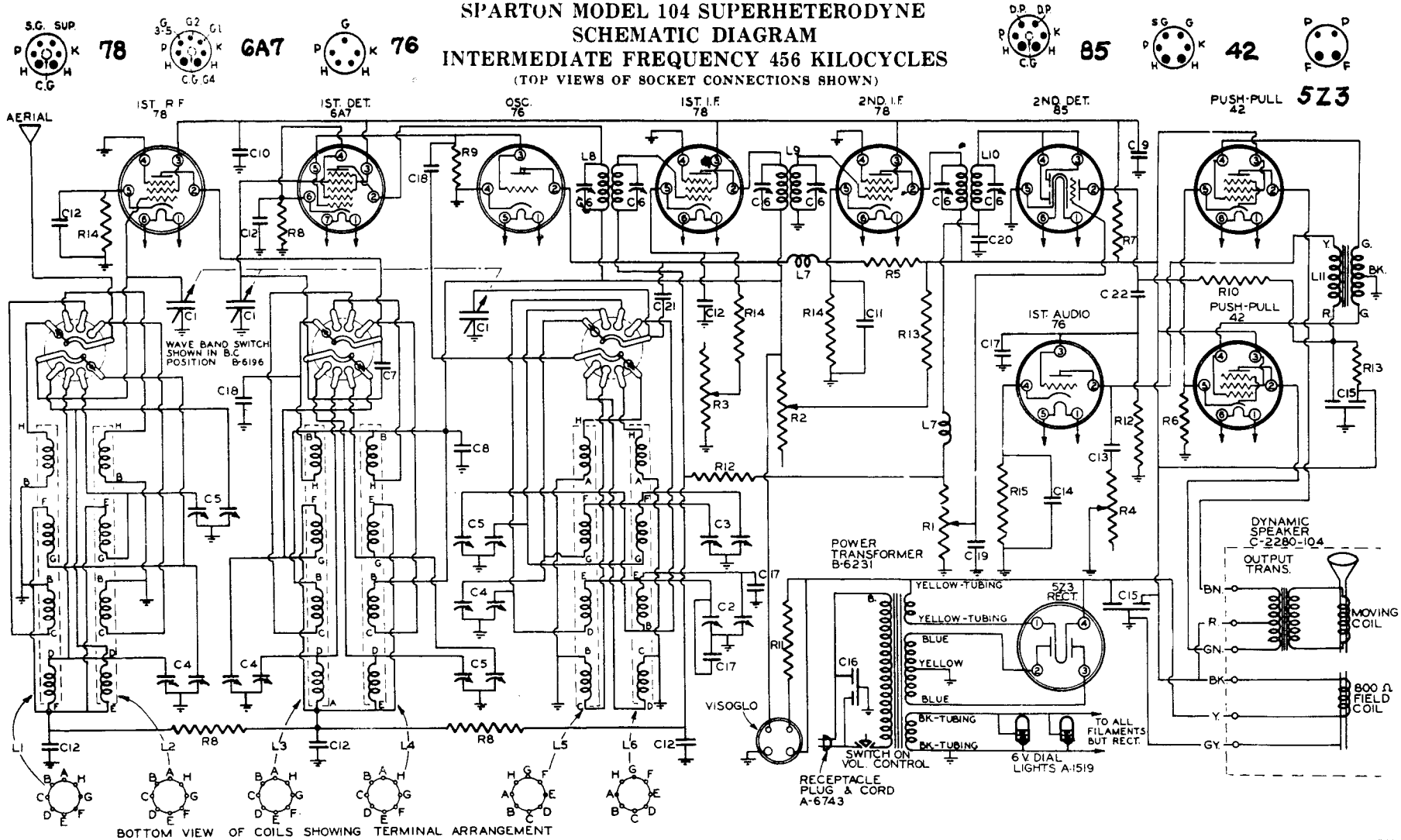
32

30

19

I.F. = 456 KC

SPARTON MODEL 104 SUPERHETERODYNE
SCHEMATIC DIAGRAM
INTERMEDIATE FREQUENCY 456 KILOCYCLES
(TOP VIEWS OF SOCKET CONNECTIONS SHOWN)



BOTTOM VIEW OF COILS SHOWING TERMINAL ARRANGEMENT

C1	VARIABLE CONDENSER	B-6218	C11	.1 MFD. 100 V.	A-11089-1	C21	.00005 MFD. MOLDED	A-11095-2	R1	250,000 Ω VOL. CONTROL	A-11297
C2	OSC. PADDER 10 PLATE	A-10846-1	C12	.1 MFD. 100 V.	A-11130-1	C22	.01 MFD. 400 V.	A-11130-5	R2	5,000 Ω VOLT. REGULA.	A-11381
C3	OSC. PADDER 7 PLATE	A-10846-2	C13	.025 MFD. 600 V.	A-11130-8				R3	100,000 Ω NOISE SUPP.	A-10446
C4	R.H. TRIMMER	A-11454	C14	10 MFD. 25 V.	A-10377				R4	100,000 Ω TONE CONT.	A-11334
C5	L.H. TRIMMER	A-11455	C15	8-8 MFD.	A-11223-1				R5	10,000 Ω 1 W.	B-4540-9
C6	I.F. TRIMMER IN COILS		C16	.006-.006 MFD.	A-7878				R6	250 Ω WIREWOUND	B-6061-4
C7	8 TO 9 MFD.	A-11261	C17	.001 MFD. MOLDED	A-9578-10				R7	15,000 Ω 10 W.	B-5029-2
C8	.2 MFD. 400 V.	A-11473-3	C18	.0001 MFD. MOLDED	A-11095-3				R8	1,000 Ω .25 W.	B-5458-11
C9	.2 MFD. 200 V.	A-11130-6	C19	.00025 MFD. MOLDED	A-11095-4				R9	50,000 Ω .25 W.	B-5458-5
C10	.1 MFD. 200 V.	A-11089-2	C20	.0005 MFD. MOLDED	A-9578				R10	500,000 Ω .25 W.	B-5737-5

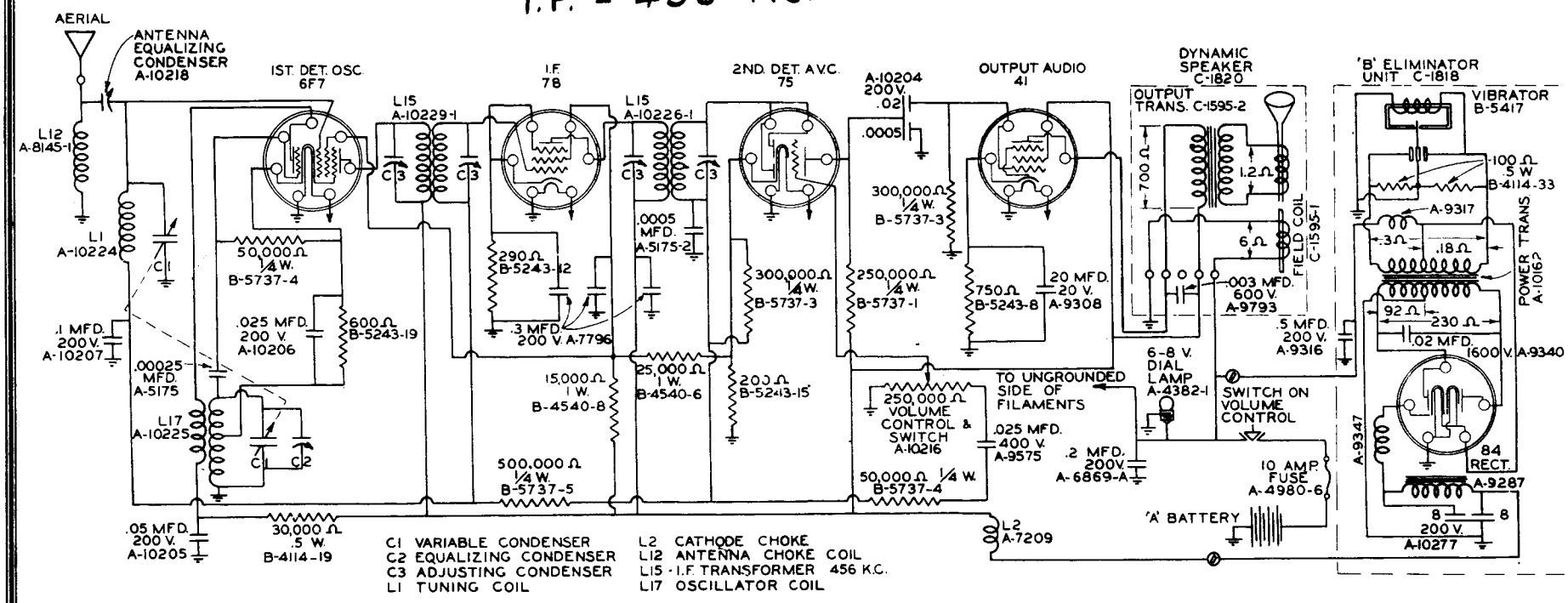
R11	1,000,000 Ω .25 W.	B-5737-6	L1	NO.1 ANTENNA COIL	A-11211	L7	16 M.H. CHOKE	A-3506
R12	250,000 Ω .25 W.	B-5737-1	L2	NO.2 ANTENNA COIL	A-11212	L8	NO. 1 I.F. TRANSFORMER	A-6313-3
R13	3,000 Ω WIREWOUND	B-6061-3	L3	NO.1 R.F. COIL	A-11213	L9	NO. 2 I.F. TRANSFORMER	A-6313-4
R14	400 Ω WIREWOUND	B-5243-41	L4	NO.2 R.F. COIL	A-11214	L10	NO. 3 I.F. TRANSFORMER	A-6313-5
R15	2,000 Ω .25 W.	B-5458-32	L5	NO.1 OSC. COIL	A-11215	L11	AUDIO TRANSFORMER	A-11434-1
			L6	NO.2 OSC. COIL	A-11216			

SPARKS-WITHINGTON CO.

SPARKS-WITHINGTON CO.

MODEL 333

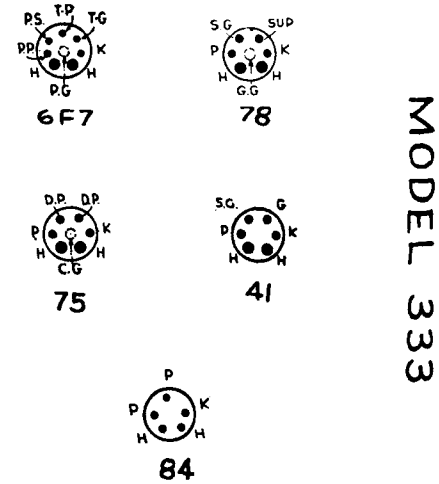
I.F. = 456 KC.



Condition of "A" Battery—Good

Position of Volume Control—Full with Antenna Disconnected

Tube	Location	PLATE Volts	PLATE Ma.	Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND Plate	Screen	C. Grid	Cathode
6F7	Triode Osc.	100	3.5	—	—3.0	—	70,000	—	50,000	600
	Pent. Mixer	200	6.	100	—2.5	850,000	40,000	25,000	800,000	
78	I-F Stage	200	6.	100	—2.5	840,000	40,000	25,000	800,000	290
75	Diode Det.-AVC	0	0	—	—	—	300,000	—	—	200
	A-F Triode	200	1.	—	—1.2	550,000	290,000	—	250,000	
41	Power Stage	185	18.	200	—16.0	590,000	40,000	40,000	300,000	750
84	Rectifier	250	25.	—	—	—	92	—	—	40,000



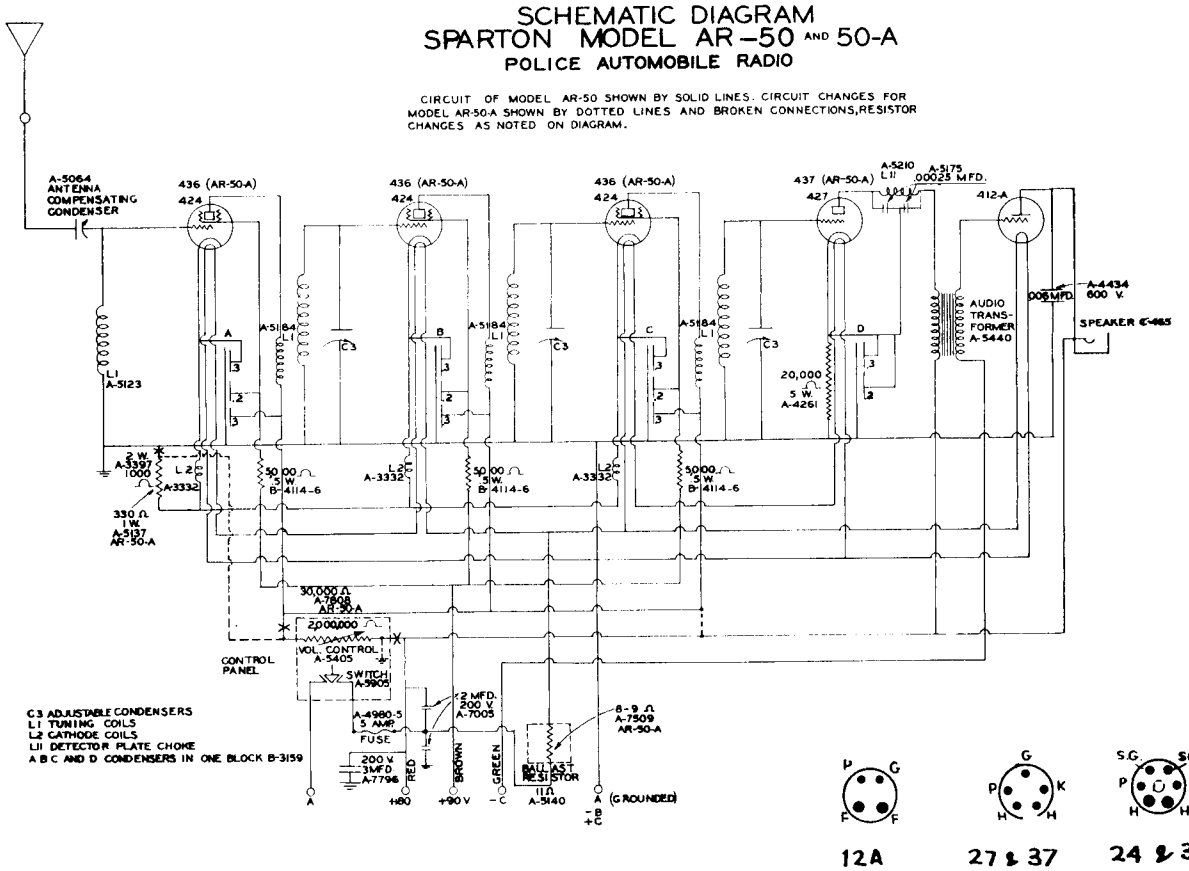
NOTES: Allow 15% + or — on all measurements.
All heater voltages: 6.3.
"A" battery drain: 5.7 amperes.

SPARKS-WITHINGTON CO.

MODELS AR-50 AND AR-50A

SCHEMATIC DIAGRAM
SPARTON MODEL AR-50 AND 50-A
POLICE AUTOMOBILE RADIO

CIRCUIT OF MODEL AR-50 SHOWN BY SOLID LINES. CIRCUIT CHANGES FOR MODEL AR-50-A SHOWN BY DOTTED LINES AND BROKEN CONNECTIONS, RESISTOR CHANGES AS NOTED ON DIAGRAM.



VOLTAGE ANALYSIS MODEL AR-50

Condition of "A" Battery Good
Condition of "B" Battery Good
Condition of "C" Battery Good
Position of Volume Control Full
With Antenna disconnected

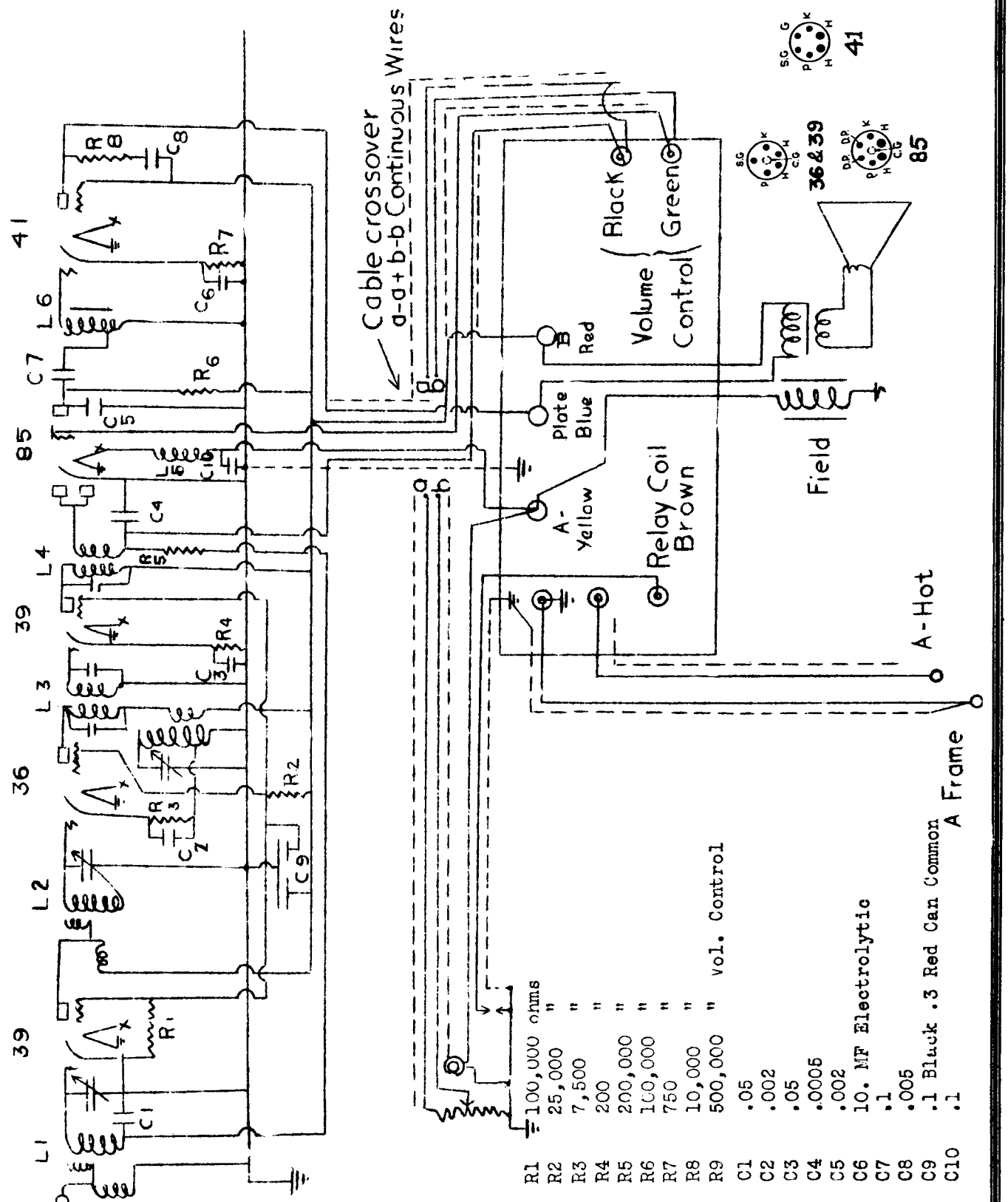
TUBE	LOCATION	HEATER OR FILAMENT	PLATE	CONTROL GRID —	SCREEN GRID —	PLATE CURRENT (ma.)
424-A	1st. R.F.	2.5	176	3.0	82	4.0
424-A	2nd. R.F.	2.5	176	3.0	82	4.0
424-A	3rd. R.F.	2.5	176	3.0	82	4.0
427	Detector	2.5	175	5.5	----	0.2
412-A	Power	5.0	178	12 - 22.5	----	8 - 10

VOLTAGE ANALYSIS MODEL AR-50-A

TUBE	LOCATION	HEATER OR FILAMENT	PLATE	CONTROL GRID —	SCREEN GRID —	PLATE CURRENT (ma.)
436	1st. R.F.	6.0	180	3.0	84	3.1
436	2nd. R.F.	6.0	180	3.0	84	3.1
436	3rd. R.F.	6.0	180	3.0	84	3.1
437	Detector	6.0	175	5.5	----	0.2
412-A	Power	5.0	178	12 - 22.5	----	8 - 10

STEWART WARNER CORP.

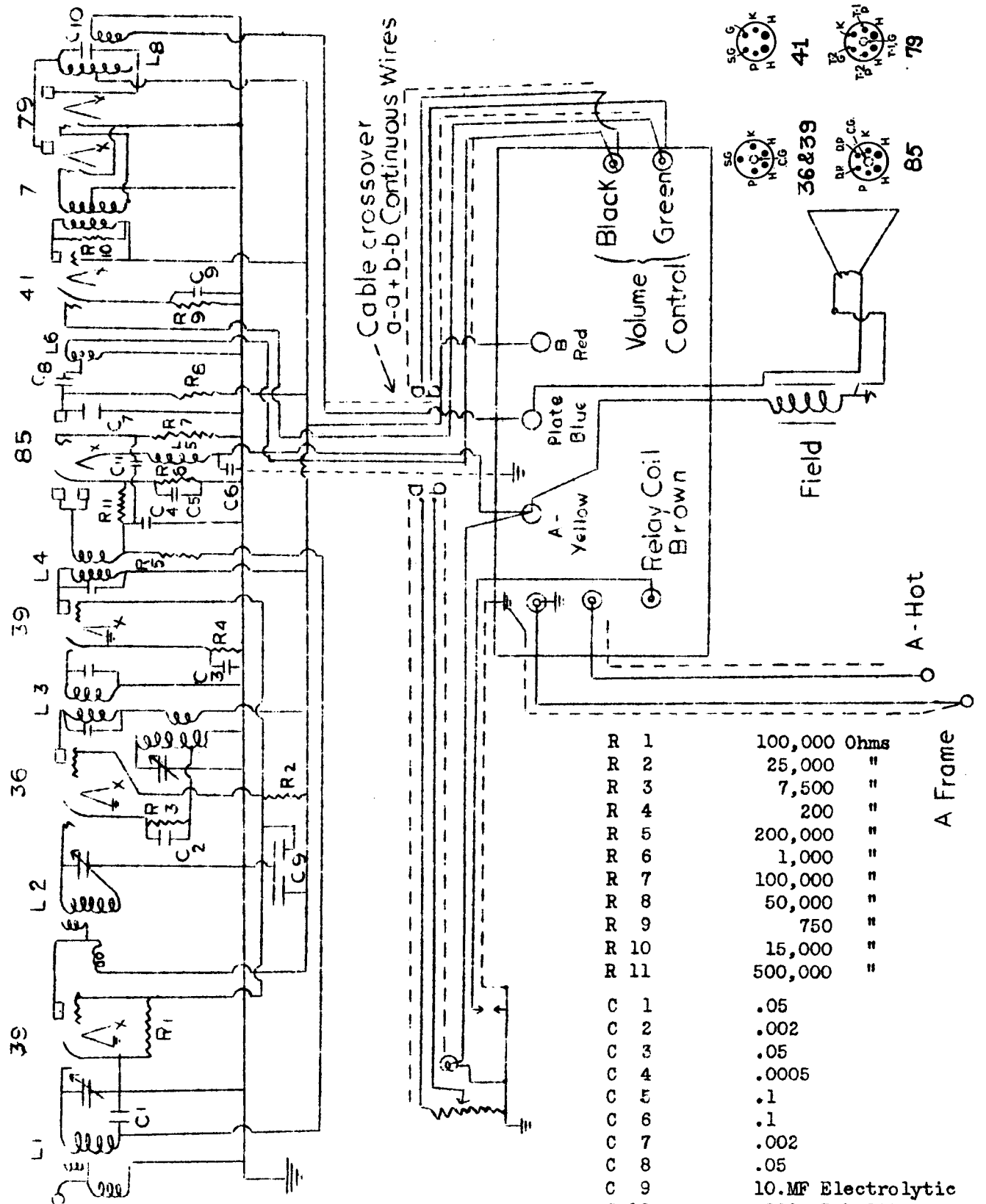
MODEL 0200
COMPANION AUTO SET



R1	100,000 ohms
R2	25,000 "
R3	7,500 "
R4	200 "
R5	200,000 "
R6	100,000 "
R7	750 "
R8	10,000 "
R9	500,000 " vol. Control
C1	.05
C2	.002
C3	.05
C4	.0005
C5	.002
C6	10. MF Electrolytic
C7	.1
C8	.005
C9	.1 Black .3 Red Can Common
C10	.1

STEWART WARNER CORP.

MODEL 0201
ARISTOCRAT AUTO SET

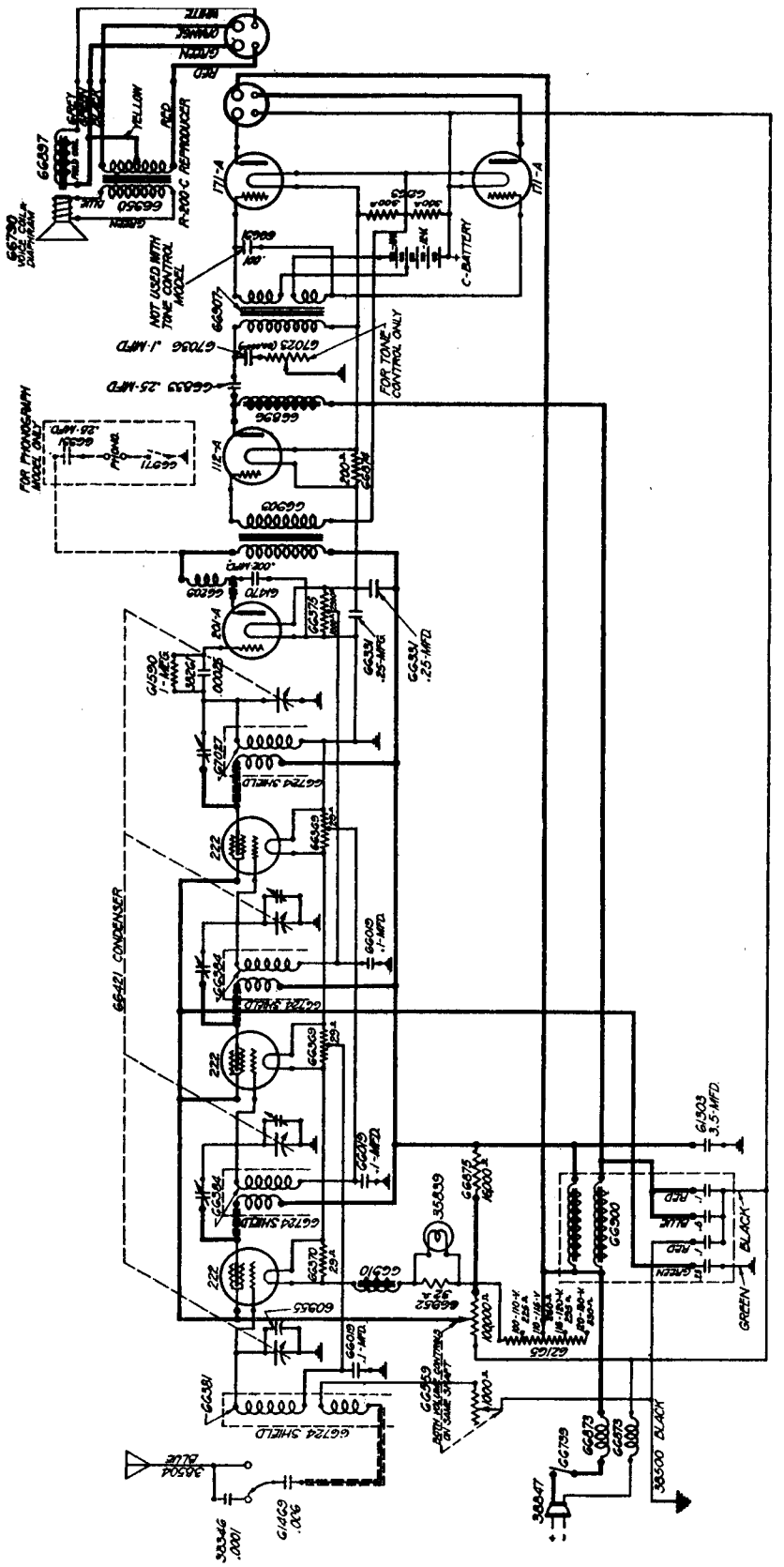


R	1	100,000 Ohms
R	2	25,000 "
R	3	7,500 "
R	4	200 "
R	5	200,000 "
R	6	1,000 "
R	7	100,000 "
R	8	50,000 "
R	9	750 "
R	10	15,000 "
R	11	500,000 "
C	1	.05
C	2	.002
C	3	.05
C	4	.0005
C	5	.1
C	6	.1
C	7	.002
C	8	.05
C	9	10.MF Electrolytic
C	10	.002 Bakelite
C	11	.05

STEWART WARNER CORP.

MODEL 100C, 100CF

D.C. MODELS



201A, 112A & 71A

22

Trouble Shooting Hints

Most of the trouble in this set is oscillation which can be removed by readjustment of the neutralizing condensers.

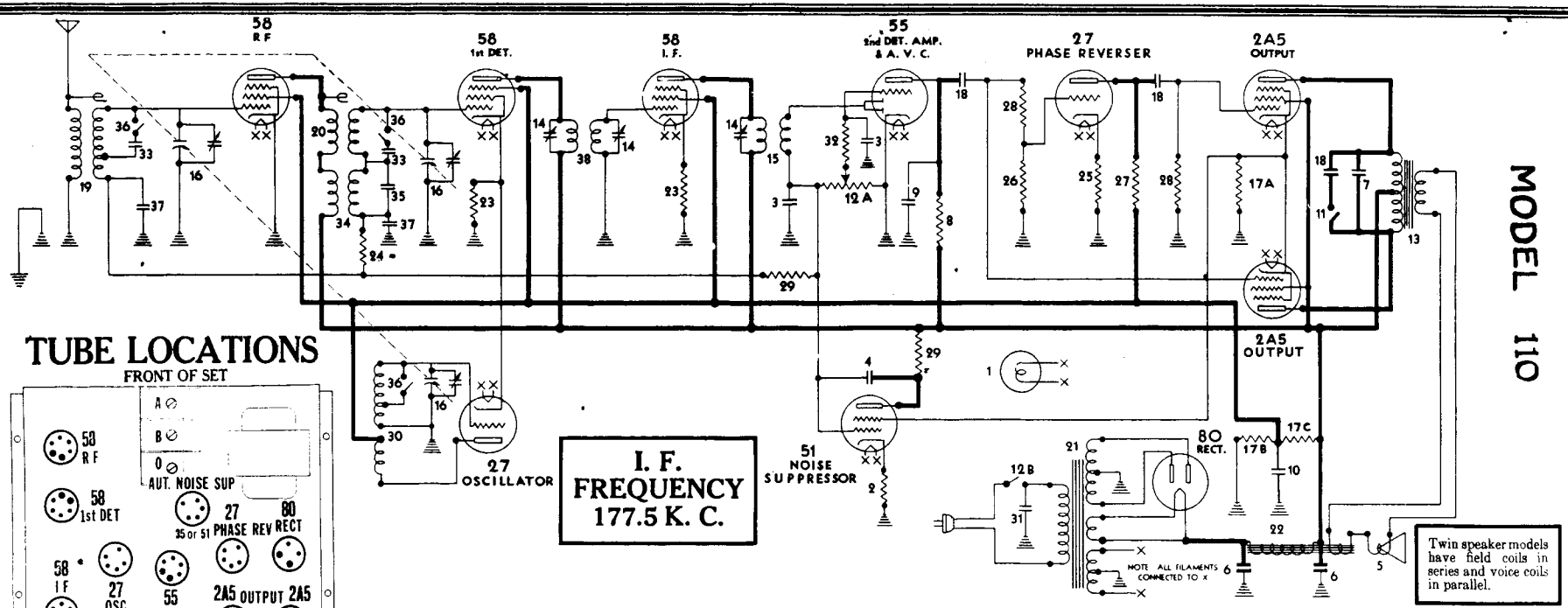
★This reading must be taken from negative filament to grid side of tuning coil because of the grid leak in this circuit.

VOLTAGE READINGS — LINE VOLTAGE 112

Tube Position	Filament	Screen Grid	Plate	Control Grid
1 R.F.	3	44	68	− 1.5
2 R.F.	3	47	71	− 1.5
3 R.F.	3	51	74	− 1.5
Det.	4.25		69	+ 4.2 ★
1 A.F.	4.25		92	− 3.7
2 A.F.	4.8		97	−14.8
2 A.F.	4.8		102	−15.2

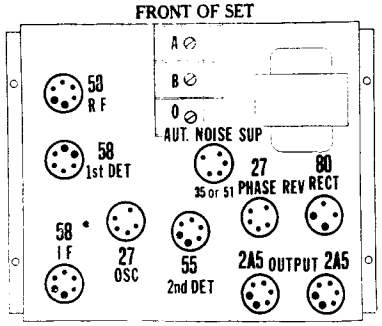
STEWART WARNER CORP.

MODEL 110



TUBE LOCATIONS

FRONT OF SET



VOLTAGE TABLE

LINE VOLTAGE 115 — VOLUME CONTROL FULL ON

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Control Grid Voltage	Cathode (Bias) Voltage
58	R. F.	2.26	280	101	—0.1	0
58	1st. Det.	2.27	281	101	—0.1	5.7
58	I. F.	2.29	280	101	0	3.9
27	Osc.	2.32	101		0	5.7
55	2nd Det.	2.34	26.0		—0.1	0
51 or 35	Noise Suppressor	2.37	17.0	17	—0.1	1.1
27	Phase Reverser	2.36	35.0		0	2.8
2A5	Output	2.34	271	281	0	17.0
2A5	Output	2.33	272	281	0	17.0
80	Rectifier	4.95	353 Volts D. C. from Fil. to Ground			

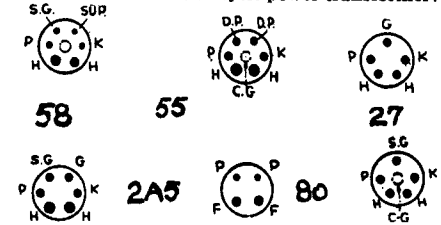
—0.1 Volt from Diodes of 55 to Ground

Speaker Field Voltage 72 Volts (Half of this across each field in twin speaker models.

All D. C. voltages measured with respect to ground, using high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltage.

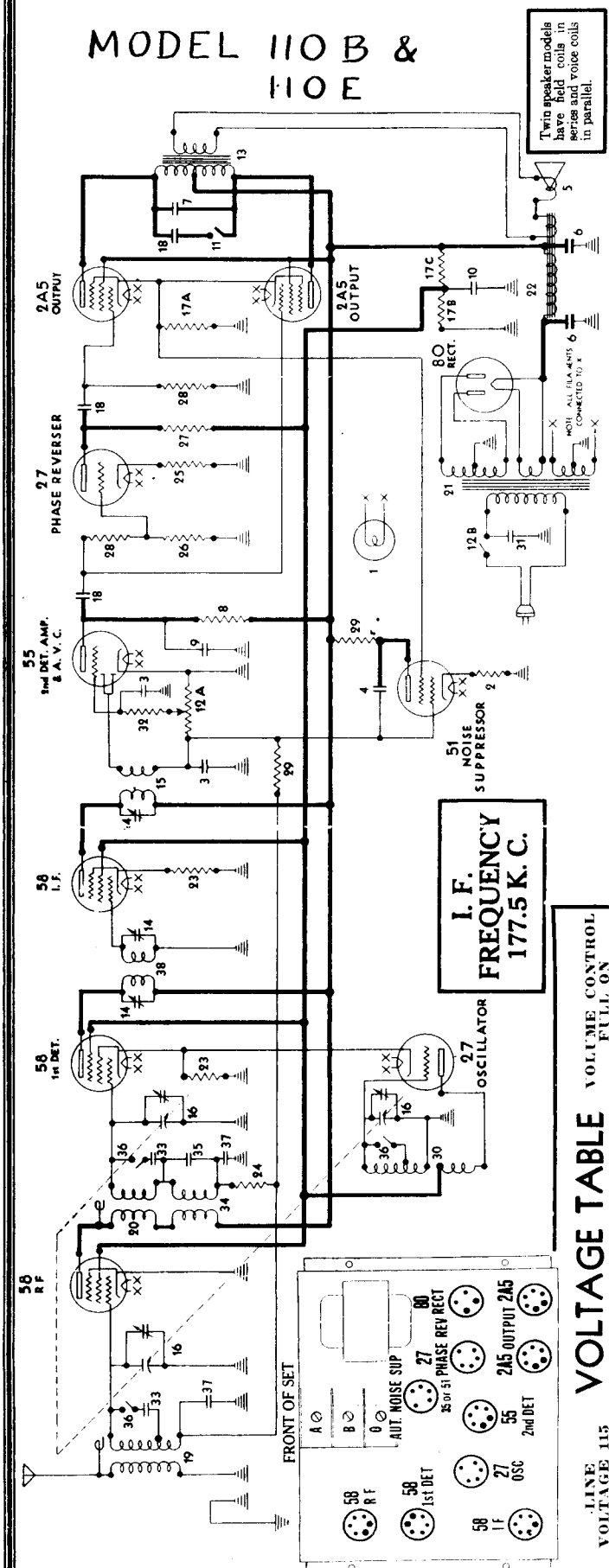
R-110 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	67551	Pilot Light, 2½ volt, .5 amp.	$0.15
2	81151	4000 ohm ¼ watt resistor	.20
3	81157	.00025 mfd. condenser	.30
4	81158	.0001 mfd. condenser	.25
5	81274	Single speaker diaphragm assembly (Note: See 83045 for twin speaker)	2.75
6	81347	8 mfd. 475 volt Electrolytic condenser	1.75
7	81415	.002 mfd. 1000 volt condenser. (Used in twin speaker models only) (Note: See 83011 for single speaker sets)	.35
8	81810	110,000 ohm 1 watt resistor	.20
9	81312	.00051 mfd. condenser	.25
10	81901	8 mfd. 180 volt dry electrolytic cond.	1.20
11	81903	Tone control switch	.45
12A, 12B	81904	500,000 ohm volume control; Line switch — In one unit	1.25
13	81907	Single speaker output transformer (Note: See 83096 for twin speaker)	2.25
14	81940	I. F. trimmer condenser	.50
15	81947	2nd I. F. transformer coil	1.25
16	81988	Variable condenser	3.65
17A, 17B, 17C	83001	200 ohm 1.5 watt resistor; 10,000 ohm 1 watt resistor; 7500 ohm 5 watt resistor — In one unit	.75
18	83007	.02 mfd. 600 volt condenser. (For single speaker models) (Note: For twin speaker models see 83352)	.35
..	83011	.004 mfd. 600 volt condenser. (Used in single speaker models only.)	.30
19	83024	Antenna coil	1.00
20	83025	Detector coil	1.00
21	[illegible]	115 volt 60 cycle power transformer (Note: See 83103 for 230 volt 50-60 cycle transformer.) (See 83416 for 115 volt 25 cycle transformer.)	6.00
..	83045	Twin speaker diaphragm and shell assem.	1.75
22	83071	Single speaker field coil	2.25
23	83077	500 ohm 1 watt resistor	.25
24	83078	2000 ohm ¼ watt resistor	.20
25	83079	4000 ohm 1 watt resistor	.25
26	83080	51,000 ohm ¼ watt resistor	.20
27	83081	76,000 ohm ½ watt resistor	.25
28	83082	260,000 ohm ¼ watt resistor	.20
29	83083	1.1 meg. ½ watt resistor	.25
..	83092	Twin speaker field coil	2.25
30	83094	Oscillator tuning coil	1.00
..	83096	Twin speaker output transformer	2.25
..	83103	230 volt special tapped power transformer	7.00
31	83216	.02 mfd. 1000 volt condenser	.35
32	83286	21,000 ohm ¼ watt resistor	.20
33	83329	.0015 mfd. fixed condenser	.25
34	83339	Short wave detector coil	.75
35	83341	16 mmfd. special capacity	.15
36	83344	Short wave range switch	1.00
..	83352	.015 mfd. 600 volt condenser. (For twin speaker models only)	.35
37	83353	.05 mfd. 100 volt condenser	.30
38	83392	1st I.F. transformer coil	1.00
..	83416	115 volt 25 cycle power transformer	8.50



STEWART WARNER CORP.

MODEL 110B & 110E



PARTS LIST

Diag. No.	Part No.	Description	List Price
1	67551	Pilot Light, 2½ volt, .5 amp.	$0.15
2	81151	4000 ohm ¼ watt resistor	.20
3	81157	.00025 mfd. condenser	.30
4	81158	.0001 mfd. condenser	.25
5	81274	Single speaker diaphragm assembly (Note: See 83045 for twin speaker)	2.75
6	81347	8 mfd. 475 volt Electrolytic condenser	1.75
7	81415	.002 mfd. 1000 volt condenser. (Used in twin speaker models only) (Note: See 83011 for single speaker sets)	.35
8	81810	10,000 ohm 1 watt resistor	.20
9	81812	.00051 mfd. condenser	.25
10	81901	8 mfd. 180 volt dry electrolytic cond.	1.20
11	81903	Tone control switch	.45
12A, 12B	81904	500,000 ohm volume control; Line switch (In one unit)	1.25
13	81907	Single speaker output transformer (Note: See 83096 for twin speaker)	2.25
14	81940	A. F. trimmer condenser	.50
15	81947	2nd I. F. transformer coil	1.25
16	81988	Variable condenser	3.65
17A, 17B, 17C	83001	200 ohm 1.5 watt resistor; 10,000 ohm 1 watt resistor; 7500 ohm 5 watt resistor (In one unit)	.75
18	83007	.02 mfd. 600 volt condenser. (For single speaker models) (Note: For twin speaker models see 83352)	.35
..	83011	.004 mfd. 600 volt condenser. (Used in single speaker models only.)	.30
19	83024	Antenna coil	1.00
20	83025	Detector coil	1.00
21		power transformer (Note: See 83103 for 230 volt 50-60 cycle transformer.) (See 83416 for 115 volt 25 cycle transformer.)	6.00
..	83045	Twin speaker diaphragm and shell assem.	1.75
22	83071	Single speaker field coil (Note: See 83092 for twin speaker field coil)	2.25
23	83077	500 ohm 1 watt resistor	.25
24	83078	2000 ohm ¼ watt resistor	.20
25	83079	4000 ohm 1 watt resistor	.25
26	83080	51,000 ohm ¼ watt resistor	.20
27	83081	76,000 ohm ½ watt resistor	.25
28	83082	260,000 ohm ¼ watt resistor	.20
29	83083	1.1 meg. ½ watt resistor	.25
..	83092	Twin speaker field coil	2.25
30	83094	Oscillator tuning coil	1.00
..	83096	Twin speaker output transformer	2.25
..	83103	230 volt special tapped power transformer	7.00
31	83216	.02 mfd. 1000 volt condenser	.35
32	83286	21,000 ohm ¼ watt resistor	.20
33	83329	.0015 mfd. fixed condenser	.25
34	83339	Short wave detector coil	.75
35	83341	16 mmfd. special capacity	.15
36	83344	Short wave range switch	1.00
..	83352	.015 mfd. 600 volt condenser. (For twin speaker models only)	.35
37	83353	.05 mfd. 100 volt condenser	.30
38	83392	1st I.F. transformer coil	1.00
..	83416	115 volt 25 cycle power transformer	8.50

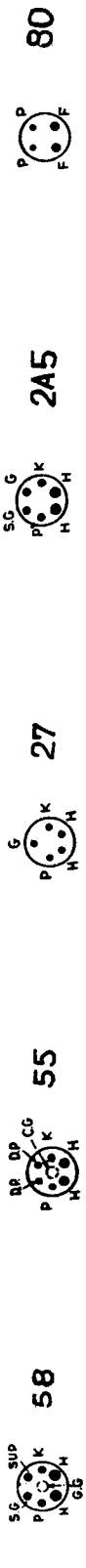
VOLTAGE TABLE

LINE VOLTAGE 115 — VOLUME CONTROL FULL ON

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Control Grid Voltage	Cathode (Bias) Voltage
58	R. F.	2.26	280	101	—0.1	0
58	1st. Det.	2.27	281	101	—0.1	5.7
58	I. F.	2.29	280	101	0	3.9
27	Osc.	2.32	101		0	5.7
55	2nd Det.	2.34	26.0		—0.1	0
51 or 35	Noise Suppressor	2.37	17.0	17	—0.1	1.1
27	Phase Reverser	2.36	35.0		0	2.8
2A5	Output	2.34	271	281	0	17.0
2A5	Output	2.33	272	281	0	17.0
80	Rectifier	4.95	353 Volts D. C. from Fil. to Ground			

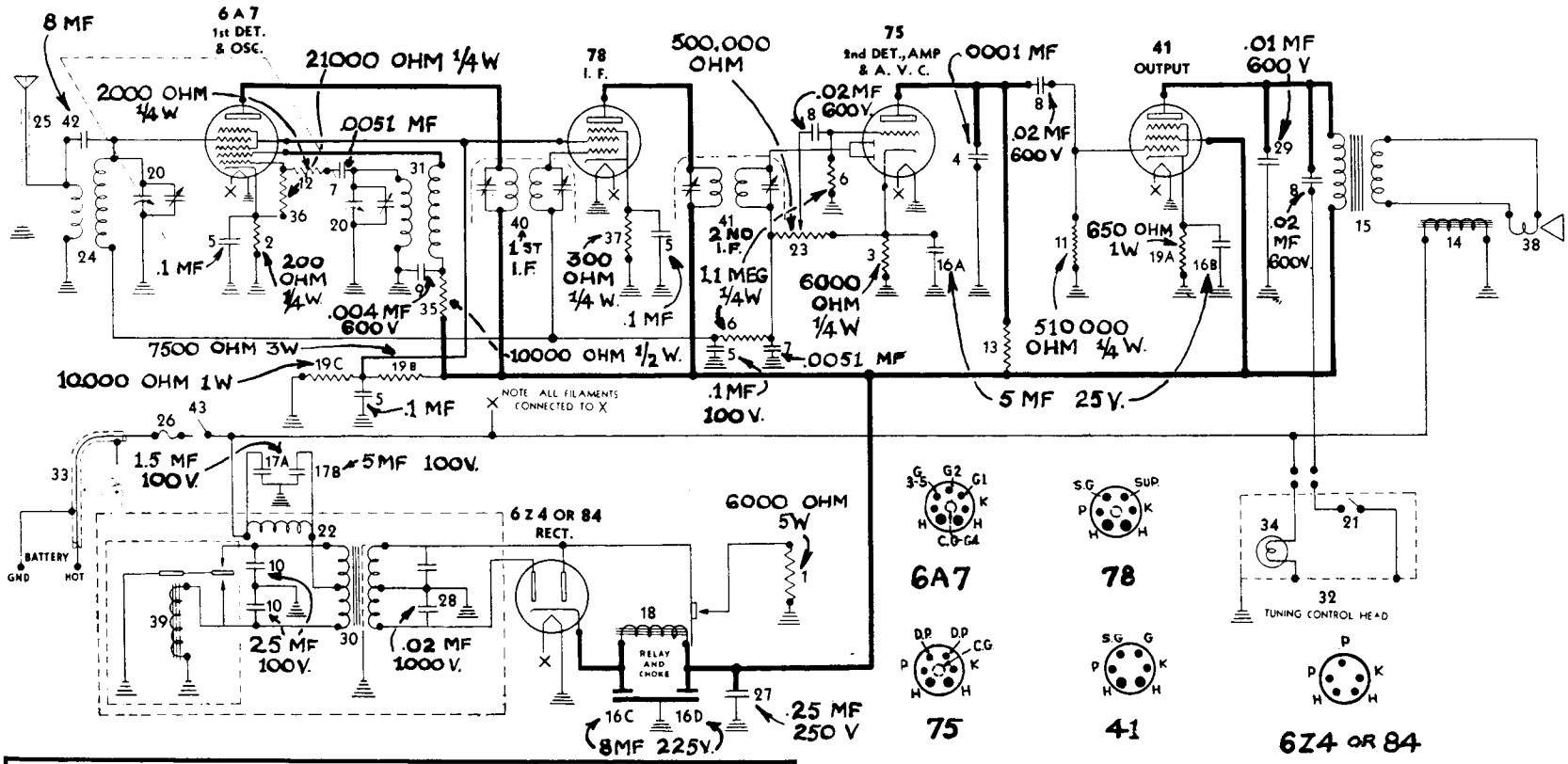
—0.1 Volt from Diodes of 55 to Ground.
Speaker Field Voltage 72 Volts (Half of this across each field in twin speaker models.)

All D. C. voltages measured with respect to ground, using high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltage.



STEWART WARNER CORP.

MODELS 1121 — R 112 AUTO SET



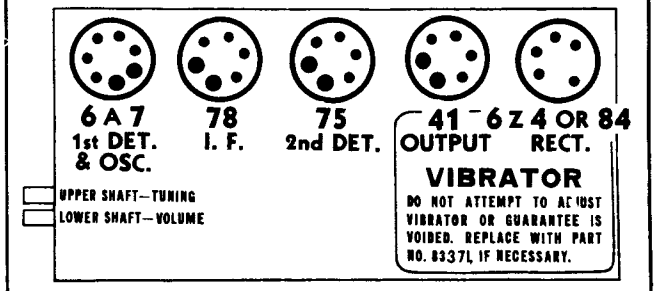
VOLTAGE TABLE

Battery Voltage 6.0 — Volume Control Full On

Tube Type	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Cathode (Bias) Voltage
6A7	1st Det. and Osc.	5.5	144	70	1.4
78	I. F.	5.5	144	70	2.0
75	2nd Det.	5.5	60	—	1.0
41	Output	5.5	142	144	9.0
84	Rect.	5.5	—	—	179

All D. C. voltages measured with respect to ground, using high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltages.

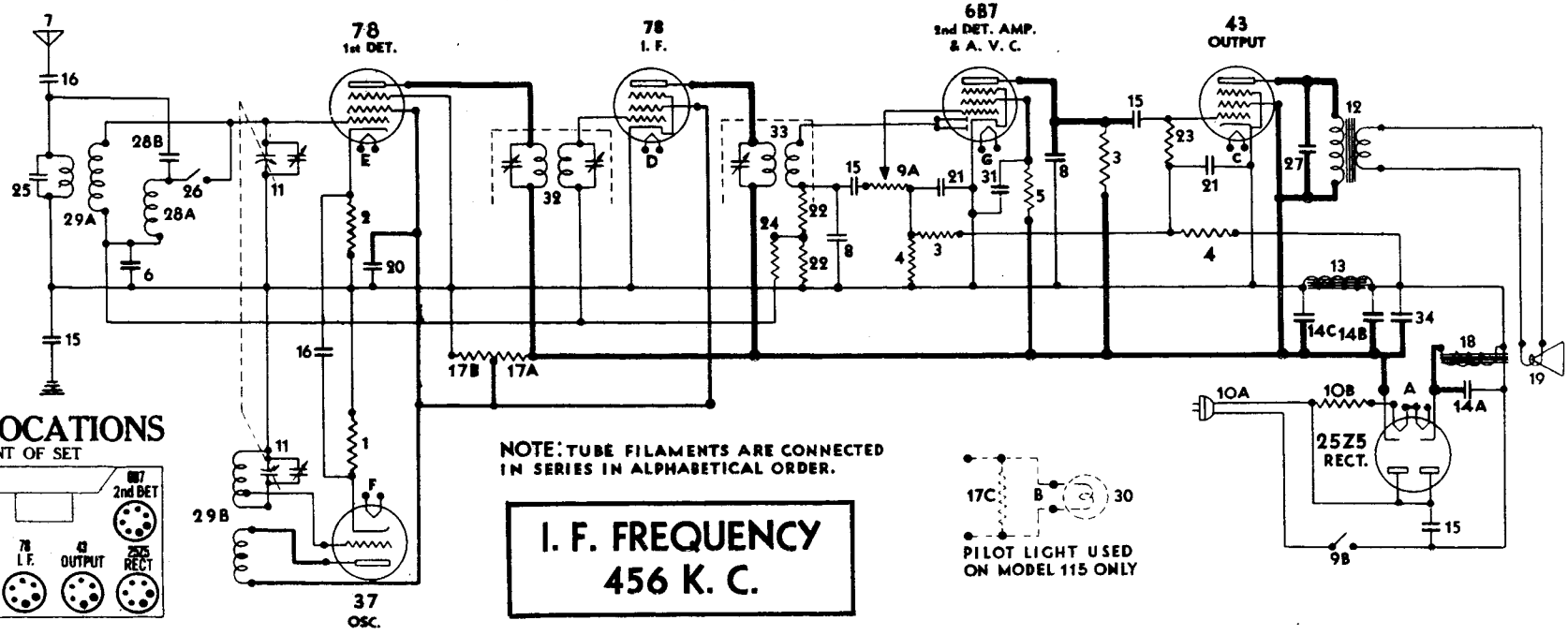
TUBE LOCATIONS



I. F. FREQUENCY 456 K. C.

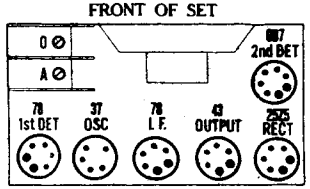
STEWART WARNER CORP.

MODELS R 111 & R 115



TUBE LOCATIONS

FRONT OF SET



VOLTAGE TABLE

LINE VOLTAGE 115 A. C. — VOLUME CONTROL FULL ON

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Control Grid Voltage	Cathode (Bias) Voltage
78	1st Det.	5.4	98	59	—0.4	5.8
37	Osc.	5.3	58		0	5.6
78	I. F.	5.7	98	59	—0.4	0
43	Output	20.	91	98	—2.9	0
25Z5	Rect.	22.	—21 —21			89 70 (Spkr.)
6B7	2nd Det.	5.4	21	37	—0.5	0

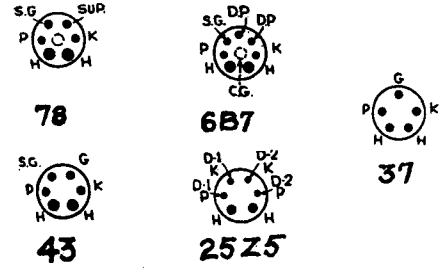
—0.4 Volt from Diode of 6B7 to Ground. Speaker field voltage 70.
For a 115 Volts D.C. line the above voltages will be about 10 to 15% lower with the exception of the speaker field voltage which will be about 85 and the filament voltages which will be the same. The A.C. filament voltages will depend upon the meter range and resistance.

IMPORTANT

All D. C. voltages measured with respect to condenser frame, using high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltages.

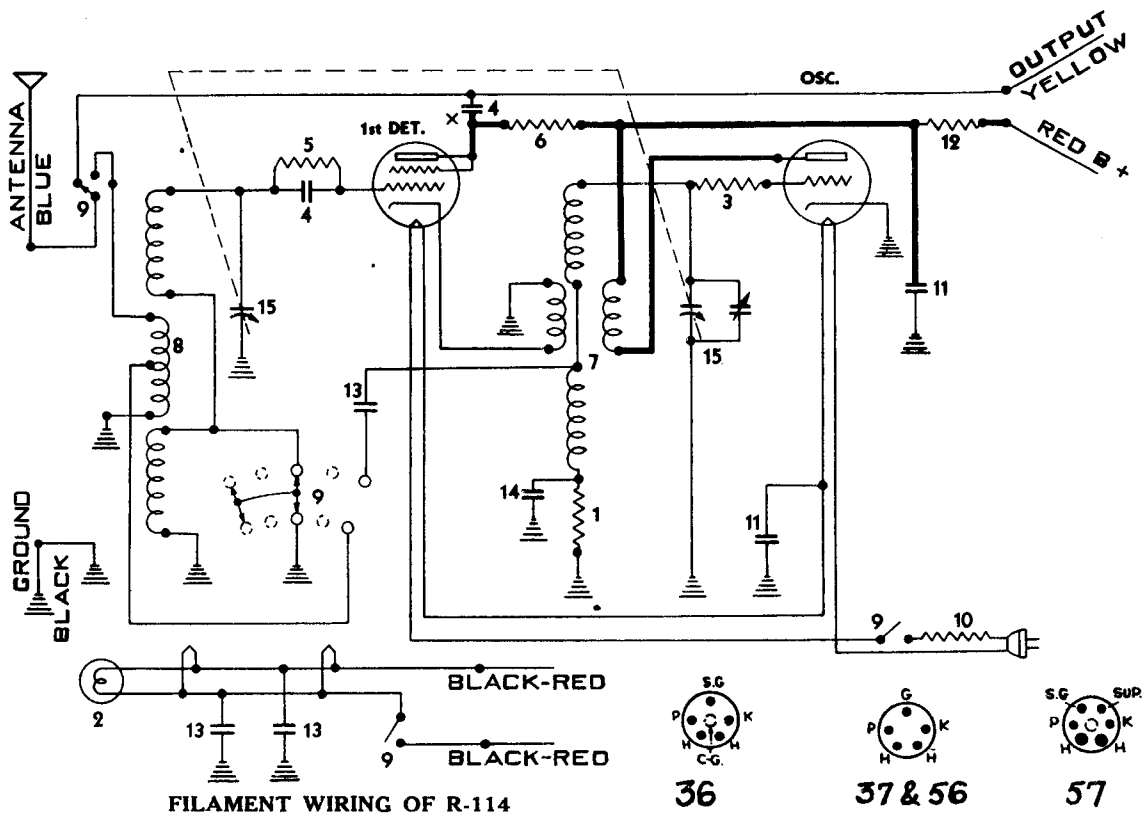
R-111 AND R-115 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	67257	500 ohm ¼ watt resistor	$0.25
2	81151	4000 ohm ½ watt resistor	.20
3	81161	250,000 ohm ½ watt resistor	.20
4	81381	150,000 ohm ½ watt resistor	.25
5	81509	500,000 ohm ¼ watt resistor	.35
6	81630	.1 mfd. 100 volt paper condenser	.30
7	81671	Antenna wire — per 100 ft.	.70
8	81812	.00051 mfd. mica fixed condenser	.25
9A, 9B	81908	500,000 ohm volume control with Line switch — In one unit	1.25
10A	81942	(Used in Model 111) Power cord and plug including filament series resistor	
10B	83295	(Used in Model 115) Power cord and plug including filament series resistor	.85
11	81948	Two gang variable tuning condenser	2.50
12	81956	Output transformer on 217-A speaker	2.00
13	81958	Filter choke assembly	1.75
14A, 14B, 14C	81959	4 mfd. / 13 mfd. / 7 mfd. — 3 section 150 volt dry electrolytic condenser	2.80
15	83007	.02 mfd. 600 volt paper fixed condenser	.35
16	83011	.004 mfd. 600 volt paper fixed condenser	.30
17A, 17B	83029	For Model 111: 2500 ohm 1 watt res. / 12500 ohm ½ watt res. — In one unit	.50
17A, 17B, 17C	83305	For Model 115 only: 2500 ohm 1 watt res. / 12500 ohm ½ watt res. / 20 ohm ballast res. — In one unit	.70
18	83042	Field coil and housing for 217-A speaker	2.75
19	83045	Diaphragm, voice coil, shell and spider assembly	1.75
20	83058	.25 mfd. 100 volt paper fixed condenser	.35
21	83063	.5 mfd. 100 volt paper fixed condenser	.45
22	83072	510,000 ohm ¼ watt resistor	.20
23	83082	260,000 ohm ½ watt resistor	.20
24	83083	1.1 meg. ½ watt resistor	.25
25	83109	.0001 mfd. mica fixed condenser	.20
26	83179	Short wave switch	.30
27	83219	.01 mfd. 600 volt paper fixed condenser	.30
28A, 28B	83254	Short wave coil / Short wave coupling condenser — In one unit	.60
29A, 29B	83255	Antenna coil / Oscillator coil — In one unit	1.25
30	83278	Pilot bulb (6.3 volt). Used on Model 115 only	.15
..	83295	(For Model 115 only). Power cord and plug including filament series resistor. See part No. 81942 for Model 111	.85
..	83305	For Model 115 only: 2500 ohm 1 watt res. / 12500 ohm ½ watt res. / 20 ohm ballast res. (See Part No. 83029 for Model 111)	.70
31	83353	.05 mfd. 100 volt paper fixed condenser	.30
32	83385	1st I.F. transformer with trimmers	2.00
33	83386	2d I.F. transformer with trimmers	2.00
34	83394	12 mfd. 100 volt dry electrolytic condenser	1.30



STEWART WARNER CORP.

MODELS R113 & R114



FILAMENT WIRING OF R-114

The Model R-113 Converter uses a 36 tube as first detector and a 37 oscillator. Model R-114 uses a 57 first detector and a 56 oscillator.

NOTE: The upper circuit diagram is that of the R-113. In the R-114, the filament circuit only is different, and is wired as shown in the lower diagram. In addition, a 6000 ohm carbon resistor, No. 67580 is inserted in series with the detector plate coupling condenser No. 4, at the point marked "X".

See Instruction Booklet for further information.

VOLTAGE TABLE

Plate Supply Voltage	1st Detector Plate Voltage	Oscillator Plate Voltage
170	14	59
210	16	70
250	19	83
270	20	89

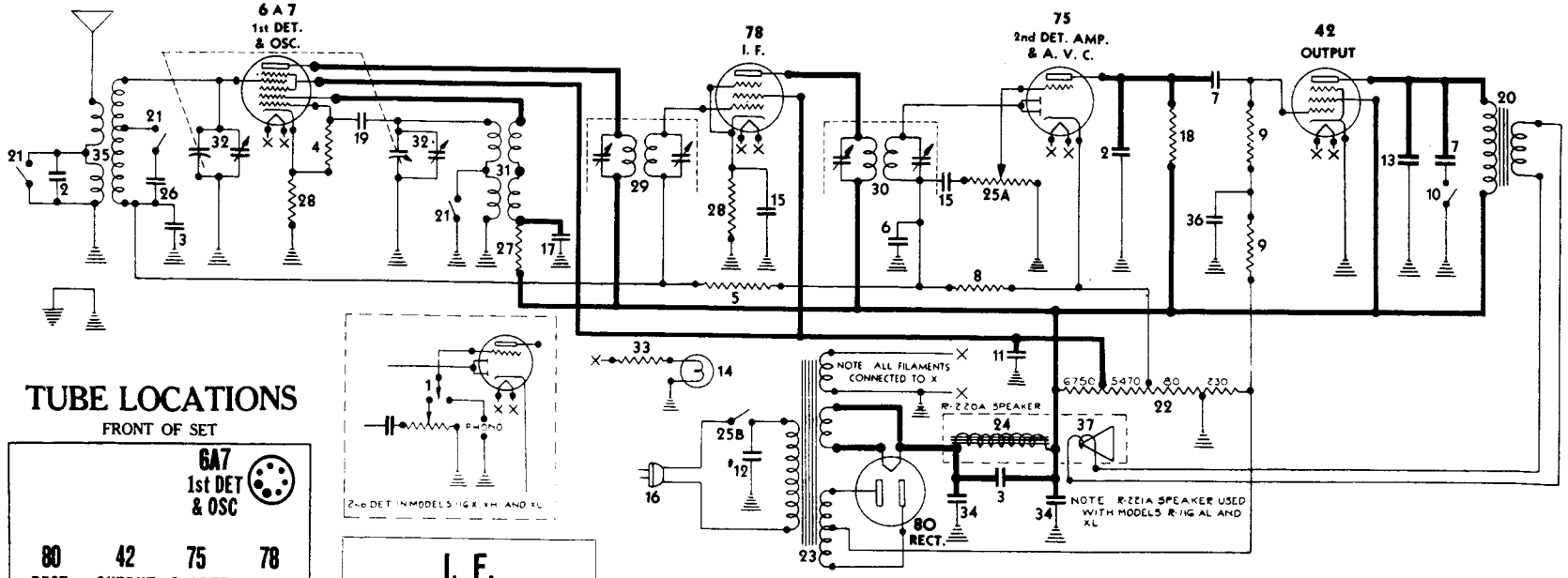
The voltages are measured between the tube socket terminals and chassis, using a high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for the detector voltage. The filament voltage readings of the 113 will also be dependent upon the type of meter used, but will be from 5.0 to 6.0 volts. The filament voltage of the Model 114 will be about 2.2 when used with a Model 110 Stewart-Warner broadcast set.

R-113-114 PARTS LISTS

Dia. No.	Part No.	Description	Price
1	67259	45,000 ohm, ¼ watt Carbon Resistor	$0.25
2	67551	2½ volt Pilot Bulb (Used in Model 114 only	.15
	67580	6000 ohm, ¼ watt Carbon Resistor (Used in Model 114 only)	.25
3	67981	400 ohm, ¼ watt Carbon Resistor	.25
4	81158	.0001 Mica Fixed Condenser	.25
5	81644	2.1 megohm, ¼ watt Carbon Resistor	.20
6	81810	110,000 ohm, 1 watt Carbon Resistor	.20
7	81985	Oscillator Coil	1.00
8	81991	Antenna Coil	1.00
9	81994	Three Section Range and Filament Switch	1.50
10	83003	Power Cord and Plug including 315 ohm Filament Series Resistor (Used in Model 113 only)	.65
11	83007	.02 mfd. 600 volt Fixed Condenser	.35
12	83014	26,000 ohm, 2 watt Carbon Resistor	.35
13	83015	.01 mfd. 200 volt Mica Fixed Condenser	.65
14	83016	.00055 mfd Mica Fixed Condenser	.15
15	83017	Two gang Variable Condenser	2.50
		MISCELLANEOUS PARTS NOT ON DIAGRAM	
	67282	Escutcheon	.25
	67532	Dial Drive Rubber Roller	.02
	81413	Tuning Knob	.25
	81834	6 prong Tube Socket (Model 114 only)	.10
	81951	5 prong Tube Socket	.10
	83019	Pilot Light Socket and Bracket	.20
	83104	Range Switch Knob	.25

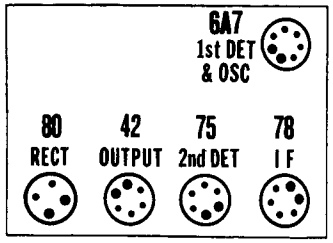
STEWART WARNER CORP.

MODEL R116-R116X-R116XH-R116AL-R116XL



TUBE LOCATIONS

FRONT OF SET



I. F. FREQUENCY 456 K. C.

VOLTAGE TABLE

Line Voltage 115 A. C. — Volume Control Full On

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Control Grid Voltage	Cathode (Bias) Voltage
6A7*	1 Det & Osc.	6.15	240	90	0	2.7
78	I. F.	6.15	240	90	0	2.4
75	2nd Det.	6.15	110		0	1.3
42	Output	6.15	227	240	-1.5†	0
80	Rect.	5.0	320 Volts D. C. From Filament to Ground			

* Oscillator plate voltage, 130; Oscillator grid voltage, —7.5.

† Actual bias voltage on type 42 tube is 17.0 volts measured across 230 ohm section of voltage divider.

Speaker field voltage, 85.

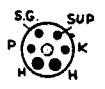
All D. C. voltages are to be measured with respect to ground, using a high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltage.

Readings taken with set analyzers will be different because such instruments generally measure voltages with respect to cathode instead of ground.

R-116 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	73689	Phonograph Switch (Used in R-116X, XL, and XH)	$1.00
2	81158	.0001 Mfd. Mica Fixed Condenser	.25
3	81630	.1 Mfd. 100 volt Fixed Condenser	.30
4	81681	29,000 ohm, ¼ watt Carbon Resistor	.20
5	81682	1.1 megohm, ¼ watt Carbon Resistor	.20
6	81812	.00051 mfd. Mica Fixed Condenser	.25
7	83007	.02 Mfd. 600 volt Fixed Condenser	.35
8	83072	510,000 ohm, ¼ watt Carbon Resistor	.20
9	83082	260,000 ohm, ¼ watt Carbon Resistor	.20
10	83179	Tone Control Switch	.30
11	83214	.25 mfd. 250 volt Fixed Condenser	.30
12	83216	.02 mfd. 1000 volt Fixed Condenser	.35
13	83219	.01 mfd. 600 volt Fixed Condenser (Used in models R-116-AL and XL only. See No. 83352 for R-116-A, AH, X and XH)	.30
14	83278	6.3 volt Pilot Light Bulb	.15
	83352	.015 mfd. 600 volt Fixed Condenser (Used in Models 116A, AH, X, and XH only)	.35
15	83353	.05 mfd. 100 volt Fixed Condenser	.30
16	83406	Power Cord and Plug	.50
17	83440	.1 mfd. 400 volt Fixed Condenser	.35
	83455	Diaphragm and Shell Assembly (for R221A Speaker used in Models R-116AL and XL)	2.75
18	83538	260,000 ohm, 1 watt Carbon Resistor	.25
19	83539	.00026 mfd. Mica Fixed Condenser	.25
20	83541	Output Transformer for R-220A Speaker (Used in Models R-116 A, AH, X and XH. See No. 83625 for R-116, AL and XL)	2.00
21	83542	Range Switch	1.00
22	83543	6750-5470-80-230 ohm Voltage Divider	1.00
23	83544	Power Transformer, 115 volts, 60 cycles. (Used in R-116A, AH, and AL only. See No. 83620 for 115-250 volt, 25-60 cycle)	4.25
24	83548	Field Coil and Housing for R-220A Speaker. (Used in R-116A, AH, X, and XH. See No. 83635 for R-221A Speaker Field Coil	2.50
25-A, 25-B	83551	500,000 ohm Volume Control, Line Switch — In one unit	1.25
26	83554	.0011 mfd. Mica Fixed Condenser	.25
27	83555	21,000 ohm, 1 watt Carbon Resistor	.25
28	83556	310 ohm, ¼ watt Carbon Resistor	.20
29	83557	1st I. F. Transformer Complete	1.75
30	83558	2nd I. F. Transformer Complete	1.75
31	83559	Oscillator Coil	1.25
32	83565	Variable Condenser	2.50
33	83566	10 ohm Wire Wound Resistor	.25
34	83613	8 mfd. 440 volt Dry Electrolytic Condenser	1.65
	83620	Power Transformer, 115-250 volts 60 cycles. (Used in Models R-116X, XH, XL)	6.00
	83625	Output Transformer for R-221A Speaker. (Used in Models R-116AL and XL only)	2.00
35	83631	Antenna Coil	1.50
36	83632	.5 mfd. 100 volt Fixed Condenser	.40
	83635	Field and Hum Bucking Coils (for R-221A Speaker used in R-116 AL and XL)	2.50
37	83662	Diaphragm and Shell Assembly for R-220A Speaker. (Used in R-119A, AH, X and XH only. See No. 83455 for R-221A Speaker)	2.50

6A7



78

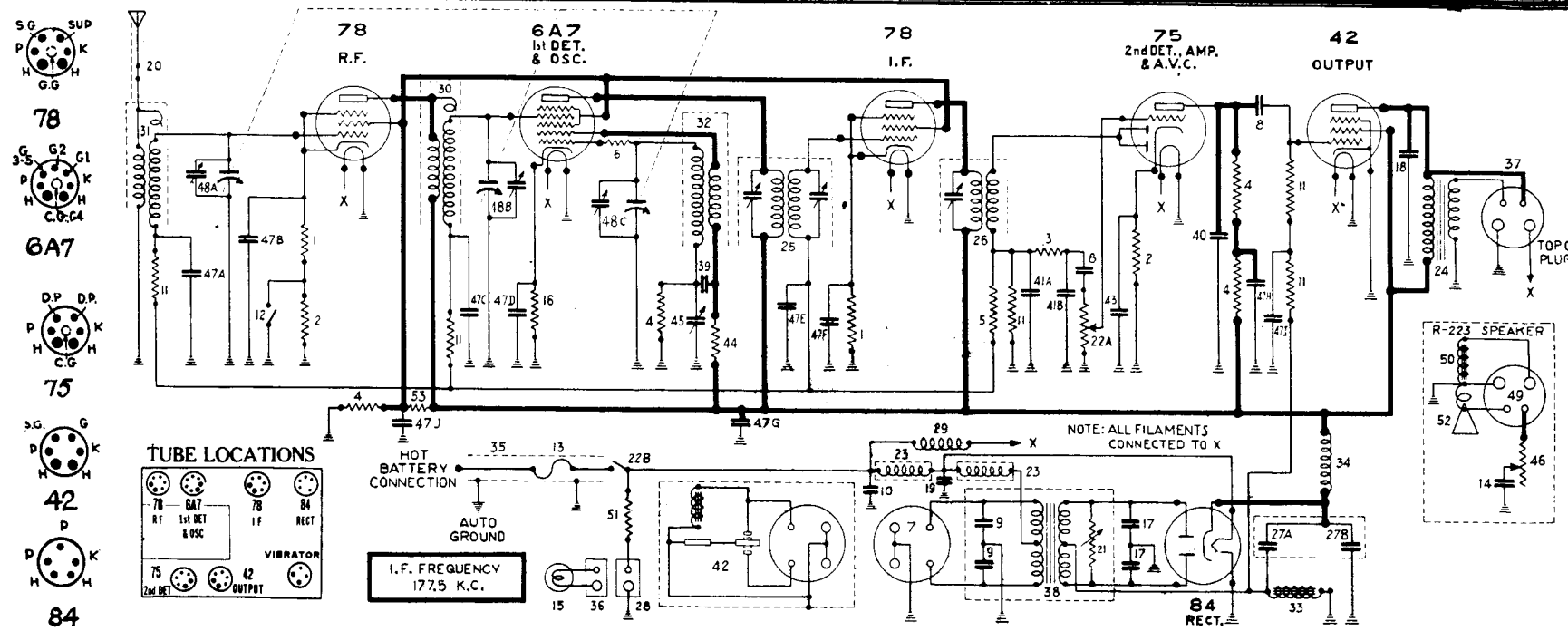
75

42

80

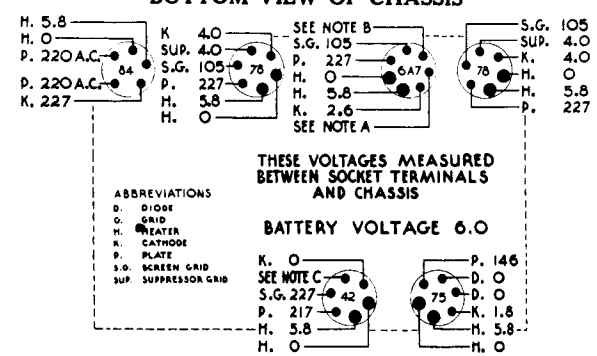
STEWART WARNER CORP.

MODEL R 117 CHASSIS
1171 & 1172



SOCKET VOLTAGES

LOCAL-DISTANCE SWITCH IN DISTANCE POSITION
BOTTOM VIEW OF CHASSIS



IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowances for battery voltage variations.

NOTE A: The oscillator grid voltage varies from 0 at 1500 K. C. to —5.0 at 530 K. C.

NOTE B: The oscillator anode voltage may vary from 118 at 1500 K. C. to 128 at 530 K. C.

NOTE C: The actual bias on the grid of the 42 tube is —15.5 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about —1 volt at the grid.

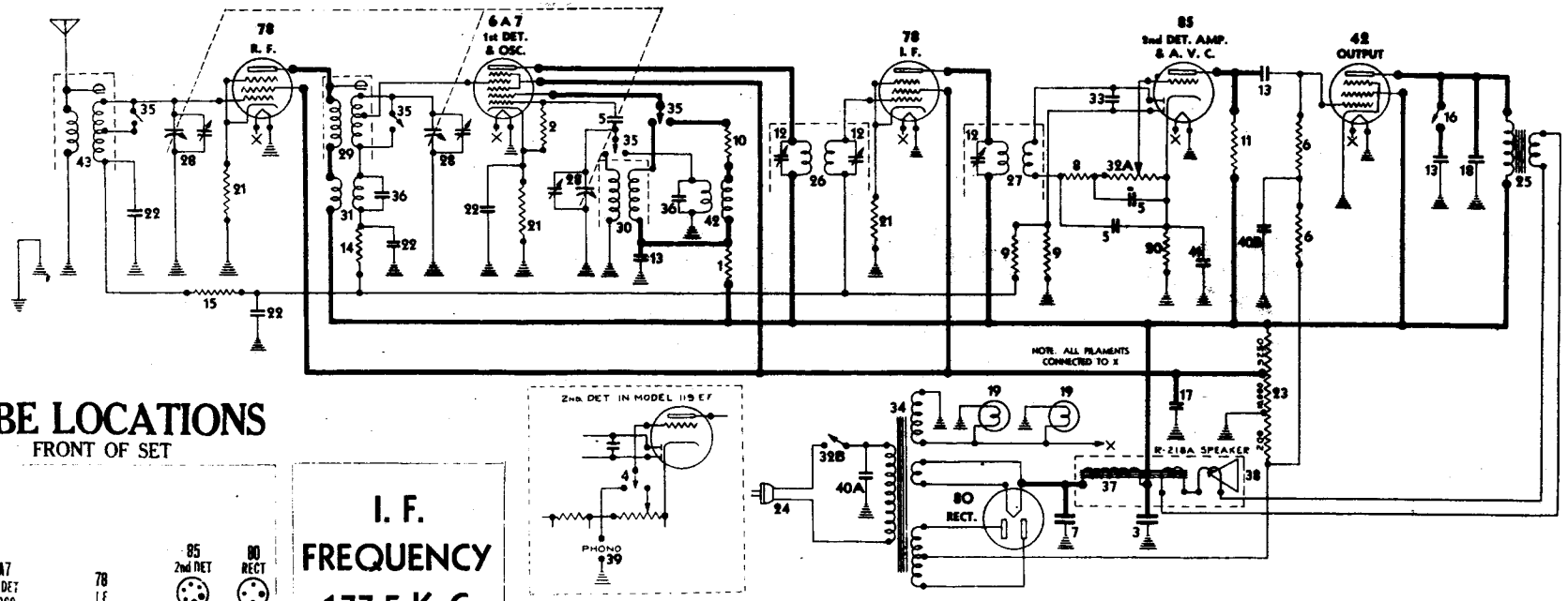
MODEL R-117 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	67257	500 ohm ¼ watt carbon resistor	$0.25
2	67580	6000 ohm ¼ watt carbon resistor	.25
3	81152	10,000 ohm ¼ watt carbon resistor	.25
4	81645	50,000 ohm ¼ watt carbon resistor	.20
5	81682	1.1 megohm ¼ watt carbon resistor	.20
6	81727	1000 ohm ¼ watt carbon resistor	.20
7	81837	Vibrator socket (Standard 4 prong)	.15
8	83007	.02 Mfd. 600 volt paper condenser	.35
9	83058	.25 Mfd. 100 volt paper condenser	.35
10	83063	.5 Mfd. 100 volt paper condenser	.45
11	83082	260,000 ohm ¼ watt carbon resistor	.20
12	83179	Local-distance switch (SPST)	.30
13	83207	15 ampere fuse	.05
14	83217	.04 Mfd. 600 volt paper condenser	.35
15	83278	6 volt pilot light bulb (1171 only) (See No. 84058 for Model 1172)	.15
16	83293	300 ohm ¼ watt carbon resistor	.25
17	83352	.015 Mfd. 600 volt paper condenser	.35
18	83706	.006 Mfd. 600 volt paper condenser	.35
19	83714	1.5 Mfd. 100 V. shielded paper condenser	.80
20	83723	Antenna lead and plug	.75
21	83725	0-500,000 ohm special Globar resistor	.45
22-A, 22-B	83728	500,000 ohm volume control; On-Off Switch — In one unit	1.20
23	83730	Vibrator R.F. Choke	.25
24	83731	Output Transformer	2.00
25	83732	First I.F. Transformer	2.00
26	83733	Second I.F. Transformer	2.00
27-A, 27-B	83734	Dual 8 Mfd. 350 Volt Dry Electrolytic Condenser	2.25
28	83739	2 prong Pilot Light Socket	.10
29	83742	Filament R.F. Choke	.16
30	83746	R.F. (B) Coil and shield	1.20
31	83747	Antenna (A) coil and shield	1.20
32	83748	Oscillator (O) coil and shield	1.15
33	83760	Filter Choke	1.00
34	83770	B supply R.F. Choke	$0.40
35	83777	Battery Lead and Fuse Housing	.50
36	83778	Pilot Light Cable and Plug	.50
37	83779	Speaker Cable and Plug	.50
38	83780	Power Transformer	3.50
39	83783	.00011 mfd. Molded Mica Cond nser	.16
40	83784	.0011 mfd. Molded Mica Condenser	.22
41A, 41B	83785	Dual .0005 mfd. Molded Mica Condenser	.32
42	83800	Plug-in Vibrator	5.00
43	83803	12 mfd. 25 V. Dry Electrolytic Condenser	.80
44	83804	40,000 ohm, ¼ watt Carbon Resistor	.20
45	83805	Oscillator Padding Trimmer	.65
46	83812	35,000 ohm Tone Control Variable Resistor	.90
47A, 47B, 47C, 47D, 47E, 47F, 47G, 47H, 47I, 47J	83831	.05 mfd. 100 volt Paper Condenser; .05 mfd. 100 volt Paper Condenser; .05 mfd. 100 volt Paper Condenser; .05 mfd. 100 volt Paper Condenser; .05 mfd. 100 volt Paper Condenser; .05 mfd. 100 volt Paper Condenser; .1 mfd. 400 volt Paper Condenser; .1 mfd. 400 volt Paper Condenser; .25 mfd. 100 volt Paper Condenser; .25 mfd. 300 volt Paper Condenser — In one Unit. Common terminal grounded to can.	2.50
48A, 48B, 48C	83834	Three gang Variable Condenser with mtg. Plate and Shaft Coupling	4.50
49	83845	Male Speaker Plug and Bracket	.25
50	83850	Speaker Field Coil and Housing (5.5 ohms)	2.50
51	84175	35 ohm Flexible Resistor. Note: Early Model 1171 sets used 15 ohm Resistor. No Resistor used in Model 1171	.15
52	84021	Diaphragm & Shell Assem. (R-223 Spkr.)	1.75
	84058	6 to 8 volt Dial Light Bulb (1172 only)	.15
53	84095	15,000 ohm, 2 watt Carbon Resistor	.20

(See other side for other parts)

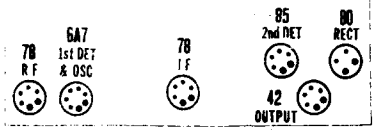
STEWART WARNER CORP.

MODEL R-119 CHASSIS
R 119A-R 119 EF



TUBE LOCATIONS

FRONT OF SET



I. F. FREQUENCY 177.5 K. C.

VOLTAGE TABLE

Line Voltage 115 A.C. — Volume Control Full On

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Control Grid Voltage	Cathode (Bias) Voltage
78	R. F.	6.1	260	104		3.2
6A7*	1 Det. & Osc.	6.1	260	104		3.0
78	I. F.	6.1	260	104		3.0
85	2nd Det	6.1	50	—		17.5
42	Output	6.1	247	260	-1.8†	0
80	Rectifier	5.1	320 Volts D. C. From Filament to Ground			

* Oscillator plate voltage 175; Oscillator grid voltage -5.

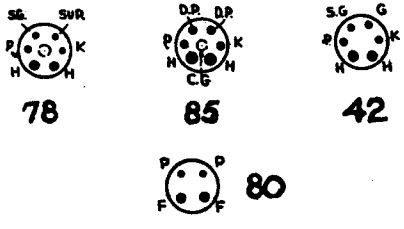
† Actual bias on 42 tube is 17.3 volts measured across 200 ohm section of voltage divider.

Speaker Field Voltage, 60.

All D. C. voltages are to be measured with respect to ground, using a high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for the second detector plate voltage. Readings taken with set analyzers will be different because such instruments generally measure voltages with respect to cathode.

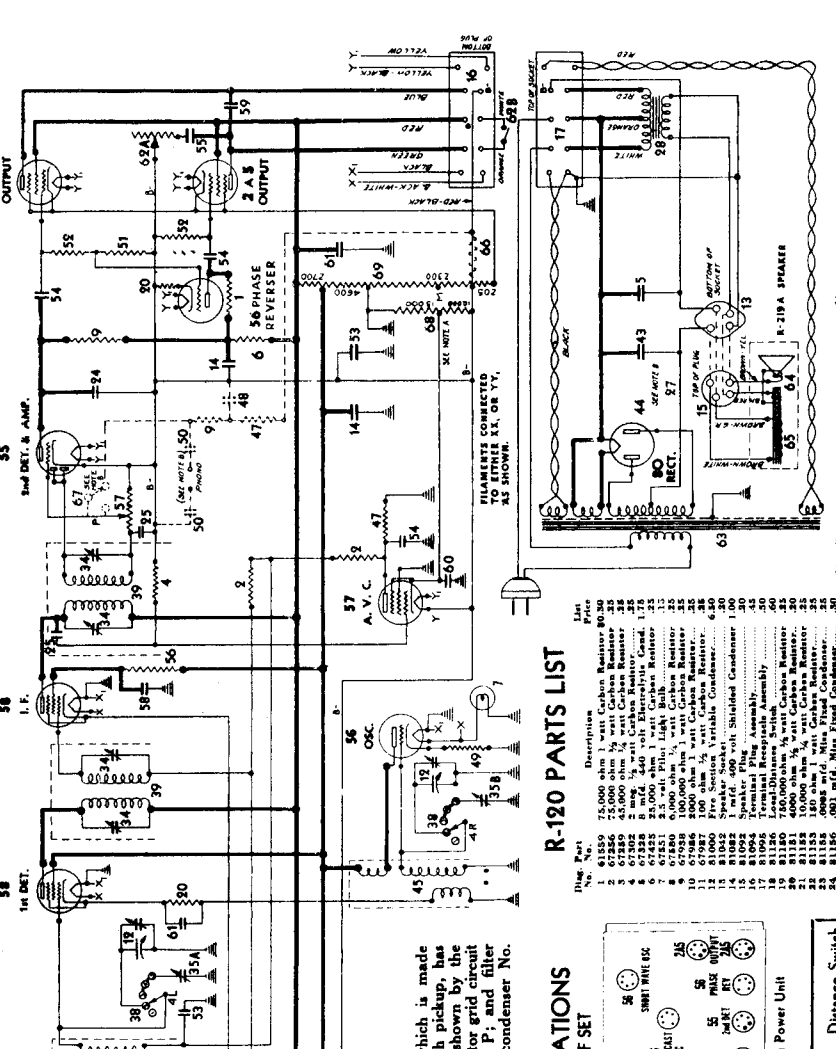
R-119 PARTS LIST

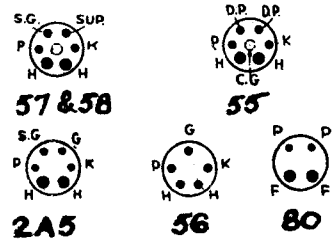
Diag. No.	Part No.	Description	List Price
1	67100	20,000 ohm, 1 watt Carbon Resistor	$0.25
2	67301	75,000 ohm, ½ watt Carbon Resistor	.25
3	67328	8 Mfd. 440 volt, Wet Electrolytic Condenser	1.75
4	73689	Phonograph Switch (Note: Used in Models R-119 EF only)	1.00
5	81157	.00025 Mfd. Mica Fixed Condenser	.30
6	81161	250,000 ohm, ½ watt Carbon Resistor	.20
7	81347	8 Mfd. 485 volt Wet Electrolytic Condenser	1.75
8	81681	29,000 ohm, ¼ watt Carbon Resistor	.20
9	81682	1.1 Megohm, ¼ watt Carbon Resistor	.20
10	81727	1000 ohm, ¼ watt Carbon Resistor	.20
11	81810	100,000 ohm, 1 watt Carbon Resistor	.20
12	81940	I. F. Trimmer Condenser	.50
13	83007	.02 Mfd. 600 volt Fixed Condenser	.35
14	83078	2000 ohm, ¼ watt Carbon Resistor	.20
15	83081	76,000 ohm, ½ watt Carbon Resistor	.25
16	83179	Tone Control Switch	.30
17	83214	.25 Mfd. 250 volt Fixed Condenser	.30
18	83219	.01 Mfd. 600 volt Fixed Condenser	.30
19	83278	6.3 volt Pilot Light Bulb	.15
20	83285	10,000 ohm, ½ watt Carbon Resistor	.25
21	83293	300 ohm, ¼ watt Carbon Resistor	.25
22	83353	.05 Mfd. 100 volt Fixed Condenser	.30
23	83398	9250-10,000-200 ohm Voltage Divider	1.00
24	83406	Power Cord and Plug	.50
25	83408	Output Transformer	2.75
26	83410	1st Intermediate Transformer Coil	1.25
27	83412	2nd Intermediate Transformer Coil	1.25
28	83413	3 gang Variable Condenser	3.75
29	83418	Broadcast 1st Detector Coil	1.25
30	83419	Broadcast Oscillator Coil	.75
31	83420	Short-Wave 1st Detector Coil	.75
32-A, 32-B	83424	500,000 ohm Volume Control, Line Switch — In one unit	1.30
33	83436	.002 Mfd. 1000 volt, Fixed Condenser	.25
34	83442	Power Transformer, 115 volt, 60 cycle (Note: See No. 83469 for 25-60 cycle 115-250 volt Transformer used in Model R-119EF)	5.75
35	83444	Range Switch (4 sections)	1.00
36	83448	25 Mmfd. Fixed Condenser	.10
37	83454	Speaker Field and Humbucking Coil Assembly	2.50
38	83455	Diaphragm, Voice Coil, Spider and Shell Assembly	2.75
39	83463	Terminal Strip (Used in Model R-119EF only)	.15
	83469	Power Transformer, 115-250 volts, 25-60 cycles (Note: Used on Model R-119-EF only)	9.00
40-A, 40-B	83476	.02 Mfd. 1000 volt Fixed Condenser, .5 Mfd. 100 volt Fixed Condenser — In one unit	.75
41	83537	10 Mfd. 25 volt Electrolytic Condenser	.75
42	83599	Short Wave Oscillator Coil	.75
43	83602	Antenna Coil	1.00



STEWART WARNER CORP.

MODEL R-120-1201 TO 1209





R-120 PARTS LIST

Diag. Part No.	No.	Description	List Price
1	61559	75,000 ohm 1 watt Carbon Resistor	$0.30
2	67256	75,000 ohm ½ watt Carbon Resistor	.35
3	67302	45,000 ohm ½ watt Carbon Resistor	.35
4	67303	25,000 ohm ½ watt Carbon Resistor	.35
5	67328	8 mfd. 440 volt Electrolytic Cond.	1.75
6	67425	25,000 ohm 1 watt Carbon Resistor	.35
7	67426	50,000 ohm 1 watt Carbon Resistor	.35
8	67880	6,000 ohm ½ watt Carbon Resistor	.35
9	67938	100,000 ohm 1 watt Carbon Resistor	.35
10	67986	100 ohm ½ watt Carbon Resistor	.35
11	67987	1500 ohm ½ watt Carbon Resistor	.35
12	81000	Fire Section Variable Condenser	6.50
13	81042	Speaker Socket	.30
14	81091	.0001 mfd. Mica Fixed Shielded Condenser	.30
15	81092	Speaker Plug	.30
16	81094	Terminal Plug Assembly	.45
17	81096	Terminal Receptacle Assembly	.60
18	81097	Volume Control with Switch	1.00
19	81180	750,000 ohm ½ watt Carbon Resistor	.35
20	81181	4000 ohm ½ watt Carbon Resistor	.30
21	81182	2000 ohm ½ watt Carbon Resistor	.35
22	81183	180 ohm ½ watt Carbon Resistor	.35
23	81186	.0085 mfd. Mica Fixed Condenser	.35
24	81187	.001 mfd. Mica Fixed Condenser	.30
25	81188	.0002 mfd. Mica Fixed Condenser	.35
26	81189	.0001 mfd. Mica Fixed Condenser	.35
27	81190	Filter Choke (Used in R-120EF only)	3.70
28	81191	Power Transformer	7.15
29	81192	40,000 ohm Volume Control Resistor	2.15
30	81178	Short Wave Oscillator Coil	1.50
31	81179	Short Wave Detector Coil	1.70
32	81188	Broadcast Oscillator Coil	1.00
33	81189	Broadcast Antenna Coil	1.00
34	81200	I.F. Trimmer Cond. (Double) (One unit used in each I. F. Transformer)	.60
35A	81201	Trimmer Condenser (Double)	.60
35B			
36	81202	Single Trimmer Condenser	.50
37	81232	Broadcast Oscillator Trimmer Cond.	.50
38	81233	Range Switch	1.00
39	81234	I.F. Transformer, Coil	1.00
40	81235	Trap Circuit Fixed Condenser	.35
41	81305	Trap Circuit Coil	.50
42	81306	Trap Circuit Trimmer	.35
43	81347	8 mfd. 475 volt Wet Electrolytic Condenser (Used in R-120 Chassis Model R-120EF (see No. 67328))	1.75
44	81367	10 mfd. 475 volt Wet Electrolytic Condenser (Used in R-120EF only)	1.00
45	81406	Broadcast Oscillator Coil only)	1.00
46	81427	1200 ohm ¼ watt Carbon Resistor	.25
47	81429	3000 ohm ½ watt Carb. Resistor	.35
48	81430	1000 ohm ½ watt Carbon Resistor (Used in Model R-120EF only)	.30
49	81829	1200 ohm ½ watt Carbon Resistor	.30
50	83088	2500 ohm ½ watt Carbon Resistor (Used in Model R-120EF only)	.35
51	83080	51,000 ohm ½ watt Carbon Resistor	.30
52	83082	250,000 ohm ½ w. Carbon Resistor	.20
53	83216	.25 mfd. 340 volt Fixed Condenser	.30
54	83210	.1 mfd. 600 volt Fixed Condenser	.35
55	83217	.04 mfd. 600 volt Fixed Condenser	.30
56	83285	10,000 ohm ½ watt Carbon Resistor	.25
57	83435	500,000 ohm Volume Control Resistor (Used in Model R-120EF)	.85
58	83439	.5 mfd. 200 volt Fixed Condenser	.35
59	83456	.05 mfd. 200 volt Fixed Condenser	.35
60	83457	.05 mfd. 200 volt Fixed Condenser	.30
61	83540	.1 mfd. 600 volt Fixed Condenser	.30
62	83466	125,000 ohm Tone Control (In one unit)	1.25
63	83489	Power Transformer, 118 volt, 60 cycle (Used in Model R-120A. See No. 67328 for Model R-120EF)	6.00
64	83525	Diaphragm and Shell Assembly	2.35
65	83528	Field & Hum Bucking Coils	2.50
	83098	Field Resistance, 860 ohms (Used in R-120 Chassis Model R-120EF) 25-60 cyc. (Used in R-120EF only)	13.00
66	83610	35 ohm ½ watt Resistor (Used in Model R-120EF only)	.25
67	83612	500,000 ohm Volume Control and Phonograph Switch (Used in model R-120EF only)	1.25
68	83627	15,000-10,000 ohm Wire Wound Resistor (See Note A)	.60
69	83628	Voltage Divider Resistor (See Note A)	1.75

TUBE LOCATIONS

FRONT OF SET

Use an 80 Tube in Power Unit

I. F. FREQUENCY 177.5 K. C.

CAUTION

Voltage readings must be taken with the set switched to one of the short wave ranges, and the local-distance switch pulled out.

All D. C. voltages are measured between the tube socket terminals and chassis, using a high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon voltage range of meter being higher for higher range instruments. This variation is most marked for all detector and oscillator D. C. voltages. Allowance must be made for line voltage variations.

Readings taken with set testers plugged into tube sockets may deviate considerably from the values given in this table, due to their internal circuit arrangements.

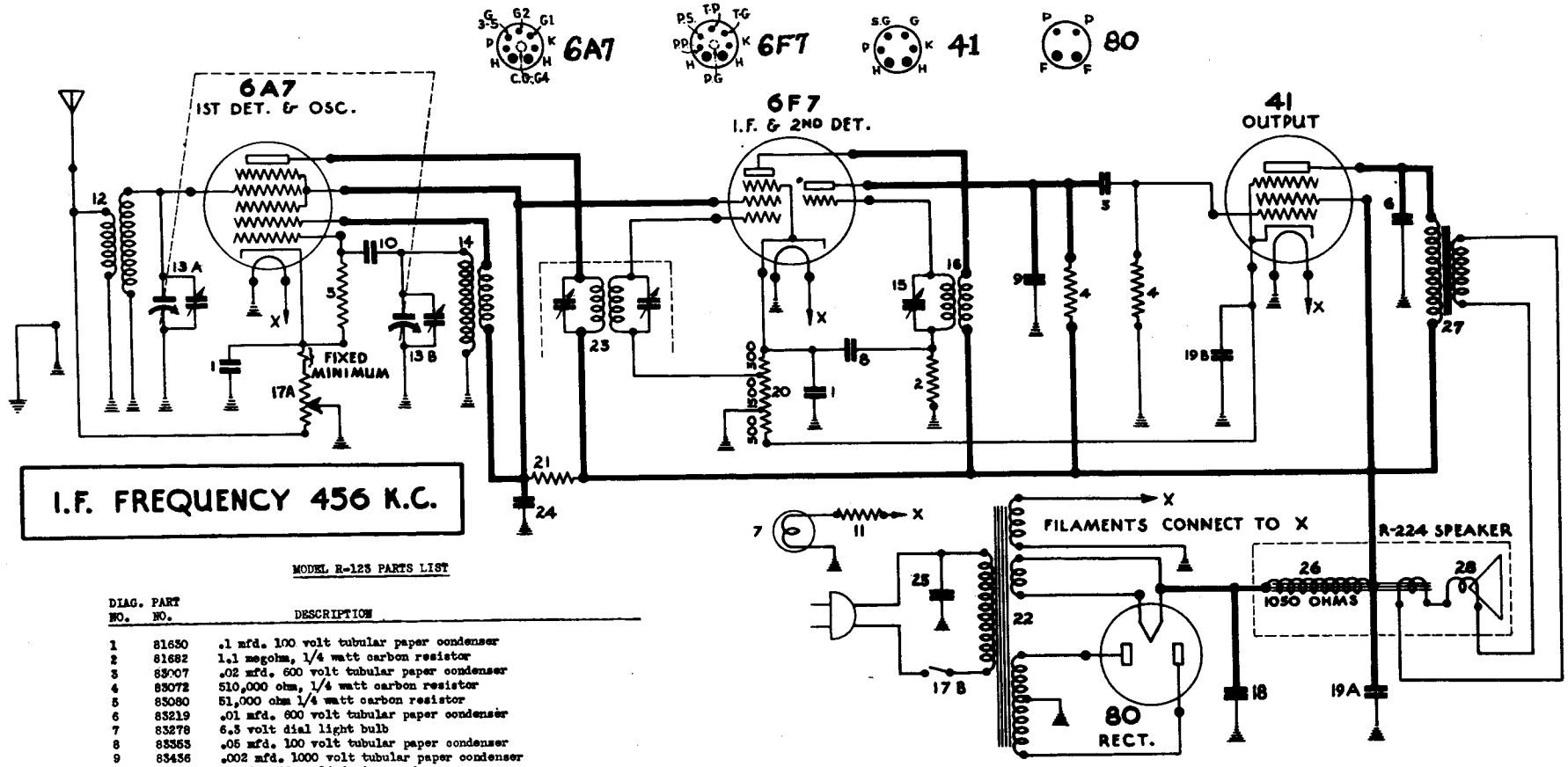
Line Voltage 115 A.C. VOLTAGE TABLE Distance Switch Pulled Out

Type of Tube	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Cathode Voltage	Control Grid Voltage
57	Short Wave Detector	2.33	8*	8*		0
56	Short Wave Oscillator	2.33	75		5.0	0
58	R. F.	2.33	166	90	2.1	0
58	First Detector	2.33	166	90	8.5	0
56	Broadcast Oscillator	2.33	90		9.4	0
58	I. F.	2.33	166	77	2.1	0
57	A. V. C.	2.32	0	0	—56	—30
55	Second Detector	2.32	—68*		—95	—95
56	Phase Reverser	2.32	—1*		—89	—83
2A5	Output	2.28	156	166	—79	—66
80	Rectifier	4.9	164 Volts D.C. from Filament to Chassis			

* Approximate Reading. Drop across Speaker Field, 68 volts.
B- to chassis -83 volts. B plus to B-, 250 volts.

STEWART WARNER CORP.

MODEL R-123 - 1231 TO 1239



MODEL R-123 PARTS LIST

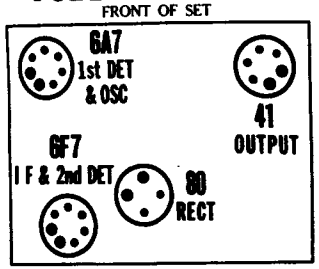
DIAG. NO.	PART NO.	DESCRIPTION
1	81650	.1 mfd. 100 volt tubular paper condenser
2	81682	1.1 megohm, 1/4 watt carbon resistor
3	83007	.02 mfd. 600 volt tubular paper condenser
4	83072	510,000 ohm, 1/4 watt carbon resistor
5	83080	51,000 ohm 1/4 watt carbon resistor
6	83219	.01 mfd. 600 volt tubular paper condenser
7	83278	6.3 volt dial light bulb
8	83353	.05 mfd. 100 volt tubular paper condenser
9	83436	.002 mfd. 1000 volt tubular paper condenser
10	83539	.00025 mfd. molded mica condenser
11	83566	10 ohm, flexible wire wound resistor
12	83948	Antenna (A) coil
13A, 13B	83949	Two section gang condenser
14	83950	Oscillator (O) Coil
15	83952	2nd I.F. trimmer condenser
16	83953	2nd I.F. transformer coil
17A, 17B	83959	(7500 ohm volume control with 350 ohm fixed minimum) (line switch) In one unit
18	83960	6 mfd. 400 volt wet electrolytic condenser
19A, 19B	83968	(5 mfd. 350 V. dry electro.cond.) (10 mfd. 25 V. dry electro.cond.) In one unit (Model R-123-A only. Also see No. 84399)
20	83965	300, 1500 and 500 ohm tapped bias resistor
21	83964	25,000 ohm, 2 watt carbon resistor
22	83966	Power transformer, 115 volts, 60 cycles (Model R-123-A) (See No. 84400 & 84402 for other voltages and frequencies)
23	83973	1st I.F. transformer
24	83974	.1 mfd. 200 volt tubular paper condenser
25	83976	.02 mfd. 1000 volt shielded paper condenser
26	83987	Field coil and housing (1050 ohms)
27	84009	Output transformer
28	84010	Diaphragm & Shell assembly
	84400	Power transformer, 115 volts, 25 to 133 cycles (Model R-123-B)
	84402	Power trans. 100 to 240 volts, 40 to 133 cycles (Model R-123-W)
	84399	(5 mfd. 350 V. Dry Electro.Cond.) (10 mfd. 25 V. Dry Electro.Cond.) In one shielded unit. For R-123-B & W only.

(Miscellaneous Parts not shown on Circuit Diagram)

PART NO.	DESCRIPTION
17615	Volume Control Mtg. Lock Washer (3/8")
51622	Tuning Dial set screw
67034	Volume Control Mtg. Nut (3/8"-32)
67263	#6 x 1/4" Self Tapping Screw
81834	Six prong tube socket
81837	Four prong tube socket
81949	Seven prong tube socket
83562	Chassis Mtg. Screw (#10 x 7/8" Self Tapping)
83674	Dial Light Socket and Bracket
83678	Escutcheon Mtg. Wood Screw (#1 x 1/4" R.H.)
83687	Front Plate Mtg. Screw (#6 x 1-1/4" Ornamental Head)
83824	#6 x 1/4 Self Tapping Screw
83941	Tuning Dial and Bushing
83945	Volume Control Dial & Bracket
83970	Escutcheon Plate
84015	Knob Washer (paper 5/8" O.D.)
84018	Rubber Washer (5/4" O.D.)
84017	Knob (Model 1231)
84130	Metal Front Grill (Model 1235 only)
84345	Knob (Model 1235 & 1236)
84541	Wave trap (to eliminate code interference)

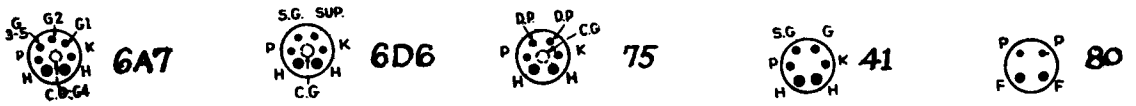
TUBE LOCATIONS

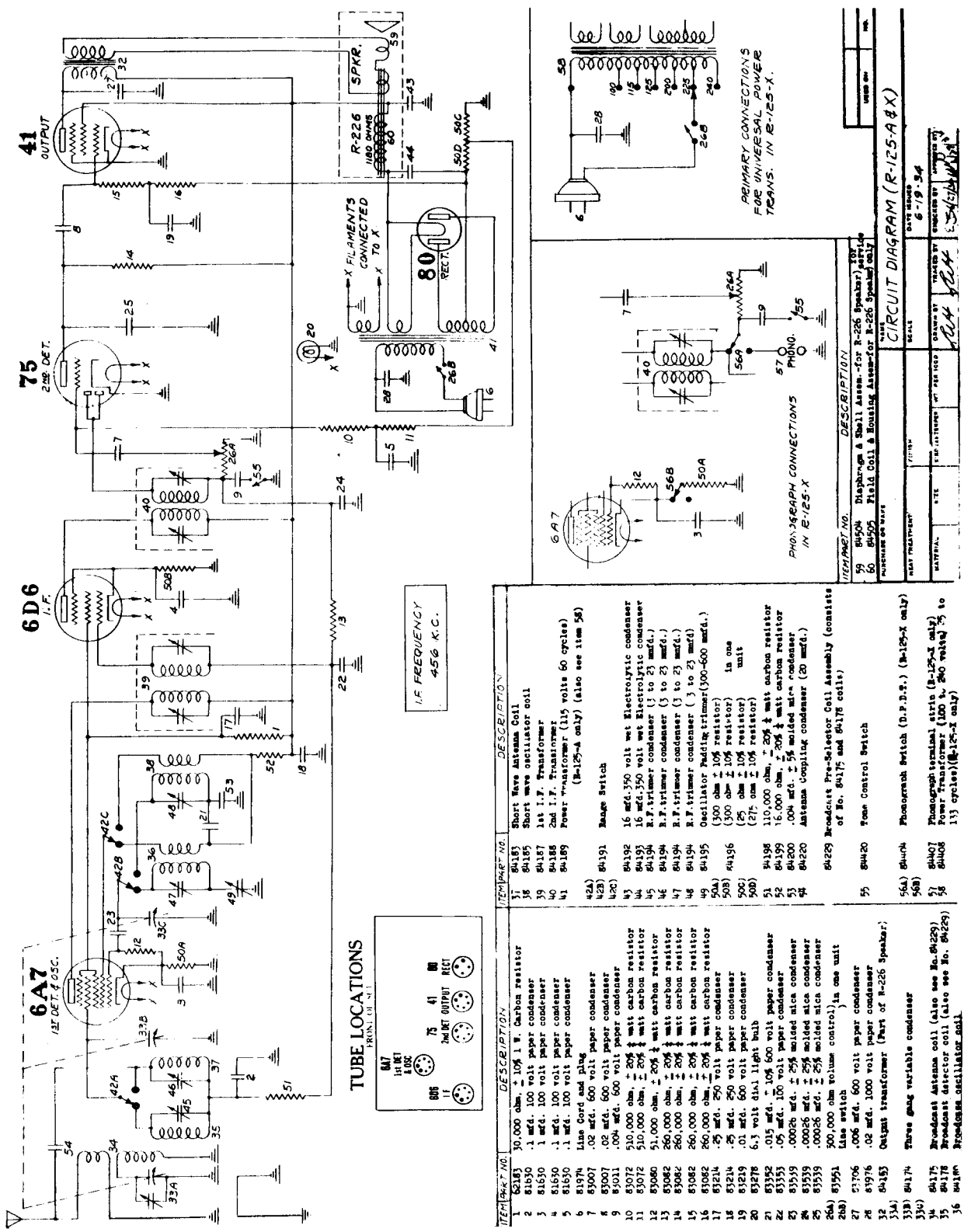
FRONT OF SET



STEWART WARNER CORP.

MODEL R-125 -1251 TO 1259





ITEM	PART NO.	DESCRIPTION
1	84183	30,000 ohm, ± 10% 1 W. Carbon resistor
2	84185	.1 mfd. 100 volt paper condenser
3	84187	.1 mfd. 100 volt paper condenser
4	84188	.1 mfd. 100 volt paper condenser
5	84189	.1 mfd. 100 volt paper condenser
6	84174	Line Cord and plug
7	83007	.02 mfd. 600 volt paper condenser
8	83011	.004 mfd. 600 volt paper condenser
9	83072	510,000 ohm, ± 20% ½ watt carbon resistor
10	83072	510,000 ohm, ± 20% ½ watt carbon resistor
11	83080	51,000 ohm, ± 20% ½ watt carbon resistor
12	83082	260,000 ohm, ± 20% ½ watt carbon resistor
13	83082	260,000 ohm, ± 20% ½ watt carbon resistor
14	83082	260,000 ohm, ± 20% ½ watt carbon resistor
15	83082	260,000 ohm, ± 20% ½ watt carbon resistor
16	83082	260,000 ohm, ± 20% ½ watt carbon resistor
17	83214	.25 mfd. 250 volt paper condenser
18	83214	.25 mfd. 250 volt paper condenser
19	83219	.01 mfd. 600 volt paper condenser
20	83278	6.3 volt dial light bulb
21	83352	.015 mfd. ± 10% 600 volt paper condenser
22	83353	.05 mfd. 100 volt paper condenser
23	83539	.00026 mfd. ± 2½% molded mica condenser
24	83539	.00026 mfd. ± 2½% molded mica condenser
25	83539	.00026 mfd. ± 2½% molded mica condenser
26a)	83551	300,000 ohm volume control) in one unit
26b)		Line switch)
27	83706	.006 mfd. 600 volt paper condenser
28	83976	.02 mfd. 1000 volt paper condenser
32	84183	Output transformer (Part of R-226 Speaker)
33a)	84174	Three gang variable condenser
33b)		
33c)		
34	84175	Broadcast Antenna coil (also see No.84229)
35	84178	Broadcast detector coil (also see No. 84229)
36	84180	Broadcast oscillator coil
37	84181	Broadcast Pre-Selector Coil Assembly (consists of No. 84175 and 84178 coils)
38	84185	Short Wave Antenna Coil
39	84187	Short wave oscillator coil
40	84188	1st I.F. Transformer
41	84189	2nd I.F. Transformer
42a)		Power Transformer (115 volts 60 cycles) (R-125-A only) (also see item 58)
42b)	84191	
42c)		Range Switch
43	84192	16 mfd.350 volt wet Electrolytic condenser
44	84193	16 mfd.350 volt wet Electrolytic condenser
45	84194	R.F.trimmer condenser (3 to 23 mmfd.)
46	84194	R.F.trimmer condenser (3 to 23 mmfd.)
47	84194	R.F.trimmer condenser (3 to 23 mmfd.)
48	84194	R.F.trimmer condenser (3 to 23 mmfd)
49	84195	Oscillator Padding trimmer(300-600 mmfd.)
50a)		(300 ohm ± 10% resistor) In one
50b)	84196	(300 ohm ± 10% resistor) unit
50c)		(25 ohm ± 10% resistor)
50d)		(275 ohm ± 10% resistor)
51	84198	110,000 ohm, ± 20% ½ watt carbon resistor
52	84199	16,000 ohm, ± 20% ½ watt carbon resistor
53	84200	.004 mfd. ± 5% molded mica condenser
54	84220	Antenna Coupling condenser (20 mmfd.)
	84229	
55	84420	Tone Control Switch
56a)	84424	Phonograph Switch (D.P.D.T.) (R-125-X only)
56b)		
57	84427	Phonograph terminal strip (R-125-X only)
58	84428	Power Transformer (100 v. 240 volts) 25 to 133 cycles)(R-125-X only)

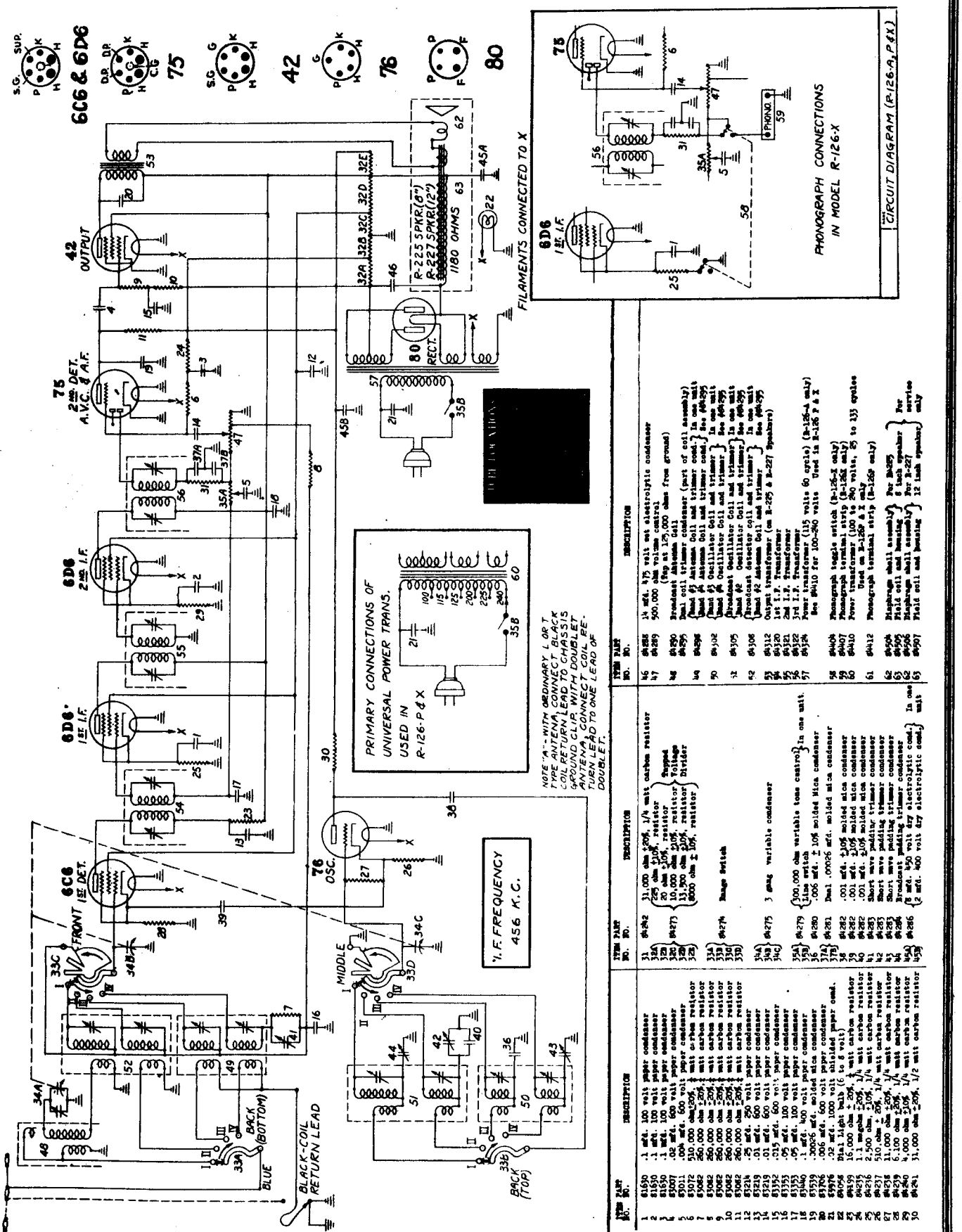
ITEM	PART NO.	DESCRIPTION
59	84504	Diaphragm & Shell Assem.-for R-226 Speaker) for
60	84505	Field Coil & Housing Assem-for R-226 Speaker) parts

PURCHASED ON WAVE

HEAT TREATMENT	FINISH	SCALE	DATE ISSUED 6-19-34				
MATERIAL	SIZE	STOCK SIZE	WT. PER 1000	DRAWN BY	TRACED BY	CHECKED BY	APPROVED BY

STEWART WARNER CORP.

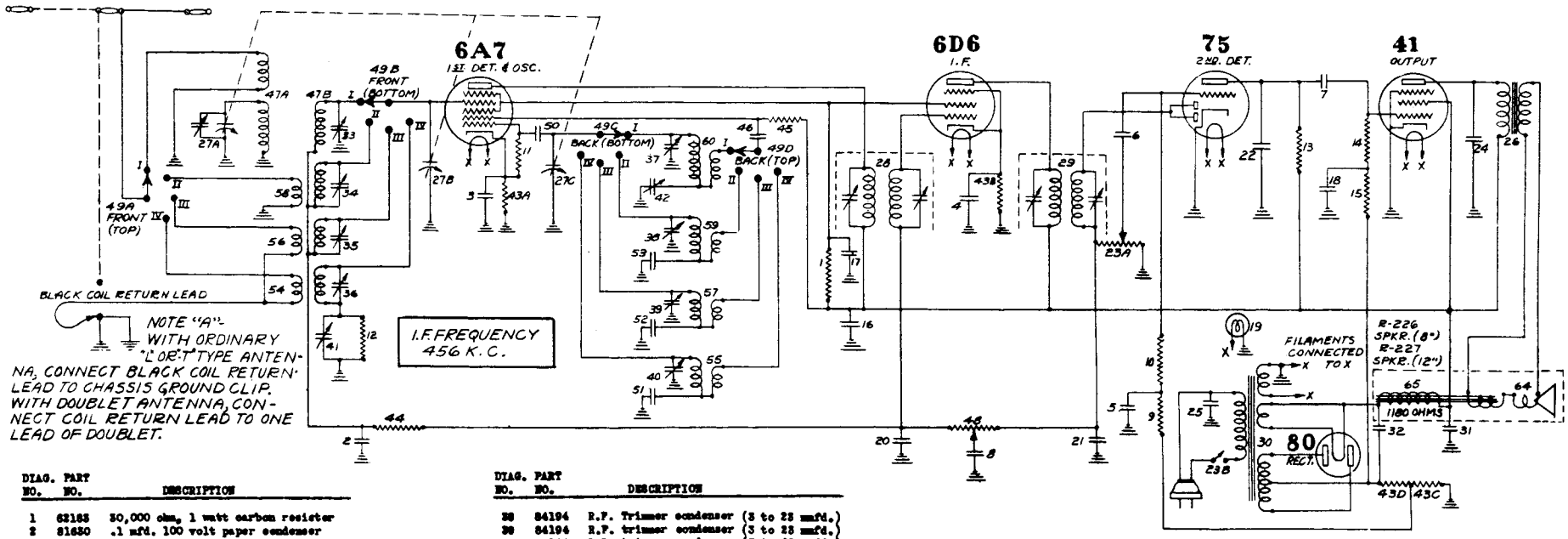
MODEL R-126 — 1261 TO 1269



ITEM NO.	PART NO.	DESCRIPTION
1	81690	.1 mfd. 100 volt paper condenser
2	81690	.1 mfd. 100 volt paper condenser
3	81690	.1 mfd. 100 volt paper condenser
4	83007	.02 mfd. 600 volt paper condenser
5	83011	.004 mfd. 600 volt paper condenser
6	85072	510,000 ohm ±20% ½ watt carbon resistor
7	85082	250,000 ohm ±20% ½ watt carbon resistor
8	85082	250,000 ohm ±20% ½ watt carbon resistor
9	85082	250,000 ohm ±20% ½ watt carbon resistor
10	85082	250,000 ohm ±20% ½ watt carbon resistor
11	85082	250,000 ohm ±20% ½ watt carbon resistor
12	83214	.25 mfd. 250 volt paper condenser
13	83219	.01 mfd. 600 volt paper condenser
14	83219	.01 mfd. 600 volt paper condenser
15	83152	.015 mfd. 600 volt paper condenser
16	83155	.05 mfd. 100 volt paper condenser
17	83155	.05 mfd. 100 volt paper condenser
18	81440	.1 mfd. 400 volt paper condenser
19	87539	.00025 mfd. molded mica condenser
20	83706	.006 mfd. 600 volt paper condenser
21	83706	.02 mfd. 1000 volt paper cond.
22	87976	Dial light 2.5 volt (6 to 8 volt)
23	84059	16,000 ohm ±20% 1 watt carbon resistor
24	84215	1.1 megohm ±20% 1 watt carbon resistor
25	84216	2,500 ohm ±10% 1/4 watt carbon resistor
26	84237	510 ohm ± 20% 1/4 watt carbon resistor
27	84238	11,000 ohm ±20% 1/4 watt carbon resistor
28	84239	6,100 ohm ±20% 1/4 watt carbon resistor
29	84240	4,000 ohm ±10% 1/4 watt carbon resistor
30	84241	31,000 ohm ±20% 1/2 watt carbon resistor
31	84242	11,000 ohm ±20% 1/4 watt carbon resistor
32A	84273	725 ohm ±10% resistor } Tapped
32B		20,000 ohm ±10% resistor } Voltage
32C		11,000 ohm ±10% resistor } Divider
32D		8000 ohm ± 10% resistor }
33A	84274	Range Switch
33B		
33C	84279	100,000 ohm variable tone control in one unit.
33D		Line switch
34	84280	.006 mfd. ± 10% molded Mica condenser
34A	84281	Dual .00026 mfd. molded mica condenser
34B		
34C	84275	3 gang variable condenser
35A	84279	100,000 ohm variable tone control in one unit.
35B		Line switch
36	84280	.006 mfd. ± 10% molded Mica condenser
37A	84281	Dual .00026 mfd. molded mica condenser
37B		
38	84282	.001 mfd. ±10% molded mica condenser
39	84282	.001 mfd. ±10% molded mica condenser
40	84282	.001 mfd. ±10% molded mica condenser
41	84283	Short wave padding trimmer condenser
42	84283	Short wave padding trimmer condenser
43	84283	Short wave padding trimmer condenser
44	84284	Broadcast padding trimmer condenser
45A	84286	2 mfd. 450 volt electrolytic cond. } In one unit
45B	84286	2 mfd. 450 volt dry electrolytic cond. } unit
46	84288	.1 mfd. 175 volt wet electrolytic condenser
47	84289	500,000 ohm volume control (Tap at 125,000 ohm from ground)
48	84290	Broadcast Antenna Coil
49	84295	Dual coil trimmer condenser (part of coil assembly)
		Dual #1 Antenna Coil and trimmer cond. } In one unit
		Dual #2 Antenna Coil and trimmer cond. } See #84295
50	84298	Dual #1 Oscillator Coil and trimmer } In one unit
		Dual #2 Oscillator Coil and trimmer } See #84295
51	84305	Broadcast Oscillator Coil and trimmer } In one unit
		Dual #2 Oscillator Coil and trimmer } See #84295
52	84306	Broadcast detector coil and trimmer } In one unit
		Dual #2 Antenna Coil and trimmer } See #84295
53	84312	Output transformer (on R-225 & R-227 Speakers)
54	84320	1st I.F. Transformer
55	84321	2nd I.F. Transformer
56	84322	3rd I.F. Transformer
57	84324	Power transformer (115 volts 60 cycle) (R-126-A only)
		See #8410 for 100-240 volts Used in R-126 P & X
58	84404	Phonograph toggle switch (R-126-X only)
59	84407	Phonograph terminal strip (R-126X only)
60	84410	Power transformer (100 to 240 volts, 25 to 133 cycles
		Used on R-126P & X only)
61	84412	Phonograph terminal strip (R-126P only)
62	84504	Diaphragm shell assembly } For R-225
63	84505	Field coil and housing } 8 inch speaker
64	84506	Diaphragm shell assembly } For R-227
65	84507	Field coil and housing } 12 inch speaker

STEWART WARNER CORP.

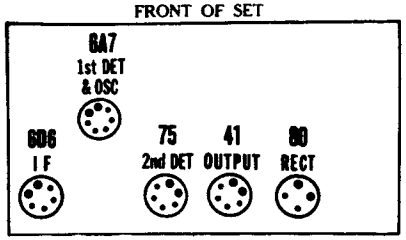
MODEL R 127 1271 & 1279

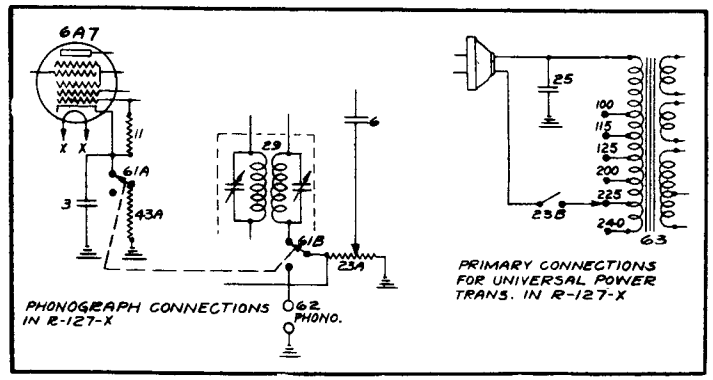


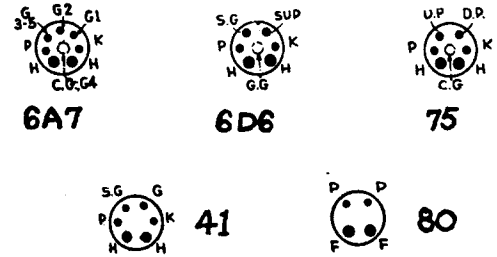
DIAG. NO.	PART NO.	DESCRIPTION
1	82165	50,000 ohm, 1 watt carbon resistor
2	81630	.1 mfd. 100 volt paper condenser
3	81630	.1 mfd. 100 volt paper condenser
4	81630	.1 mfd. 100 volt paper condenser
5	81630	.1 mfd. 100 volt paper condenser
6	83007	.02 mfd. 600 volt paper condenser
7	83007	.02 mfd. 600 volt paper condenser
8	83011	.004 mfd. 600 volt paper condenser
9	83072	510,000 ohm. 1/4 watt carbon resistor
10	83072	510,000 ohm. 1/4 watt carbon resistor
11	83080	51,000 ohm. 1/4 watt carbon resistor
12	83082	260,000 ohm 1/4 watt carbon resistor
13	83082	260,000 ohm 1/4 watt carbon resistor
14	83082	260,000 ohm 1/4 watt carbon resistor
15	83082	260,000 ohm 1/4 watt carbon resistor
16	83214	.25 mfd. 250 volt paper condenser
17	83214	.25 mfd. 250 volt paper condenser
18	83219	.01 mfd. 600 volt paper condenser
19	83278	6.3 volt dial light bulb
20	83555	.05 mfd. 100 volt paper condenser
21	83559	.00025 mfd. molded mica condenser
22	83559	.00025 mfd. molded mica condenser
23A, 23B	83661	500,000 ohm volume control, Line Switch — In one Unit
24	83706	.006 mfd. 600 volt paper condenser
25	83976	.02 mfd. 1000 volt shielded paper condenser
26	84185	Output transformer (for R-226, 8 inch speaker) (see No. 84512 for 12" speaker)
27A, 27B, 27C	84174	3-gang variable condenser
28	84187	1st I.F transformer
29	84186	2nd I.F transformer
30	84189	Power transformer (110 volts 60 cycle) (R-127-A only) (see No. 84408 for Universal transformer)
31	84192	16 mfd. 350 volt wet electrolytic condenser
32	84193	16 mfd. 350 volt wet electrolytic condenser
33	84194	R.F. trimmer condenser (3 to 23 mmfd.)
34	84194	R.F. trimmer condenser (3 to 23 mmfd.)
35	84194	R.F. trimmer condenser (3 to 23 mmfd.)
36	84194	R.F. trimmer condenser (3 to 23 mmfd.)
37	84194	R.F. trimmer condenser (3 to 23 mmfd.)

DIAG. NO.	PART NO.	DESCRIPTION
38	84194	R.F. Trimmer condenser (3 to 23 mmfd.)
39	84194	R.F. trimmer condenser (3 to 23 mmfd.)
40	84194	R.F. trimmer condenser (3 to 23 mmfd.)
41	84195	Trimmer Condenser (300-600 mmfd.)
42	84195	Trimmer Condenser (300-600 mmfd.)
43A, 43B, 43C, 43D	84196	300 ohm resistor, 300 ohm resistor, 25 ohm resistor, 275 ohm resistor — In One Unit
44	84198	110,000 ohm 1/2 watt carbon resistor
45	84199	16,000 ohm 1/2 watt carbon resistor
46	84200	.004 mfd. molded mica condenser
47A, 47B	84229	Broadcast Pre-Selector Coil Assembly
	84512	Output transformer (for R-227 12" speaker)
48	84568	500,000 ohm variable tone control
49A, 49B, 49C, 49D	84569	Range Switch
50	84570	.0001 mfd. molded mica condenser
51	84571	.0004 mfd. molded mica condenser
52	84572	.006 mfd. molded mica condenser
53	84575	.0015 mfd. molded mica condenser
54	84577	#4 band antenna coil
55	84580	#4 band oscillator coil
56	84581	#5 band antenna coil
57	84583	#5 band oscillator coil
58	84585	#2 band antenna coil
59	84587	#2 band oscillator coil
60	84589	Broadcast oscillator coil

FRONT OF SET

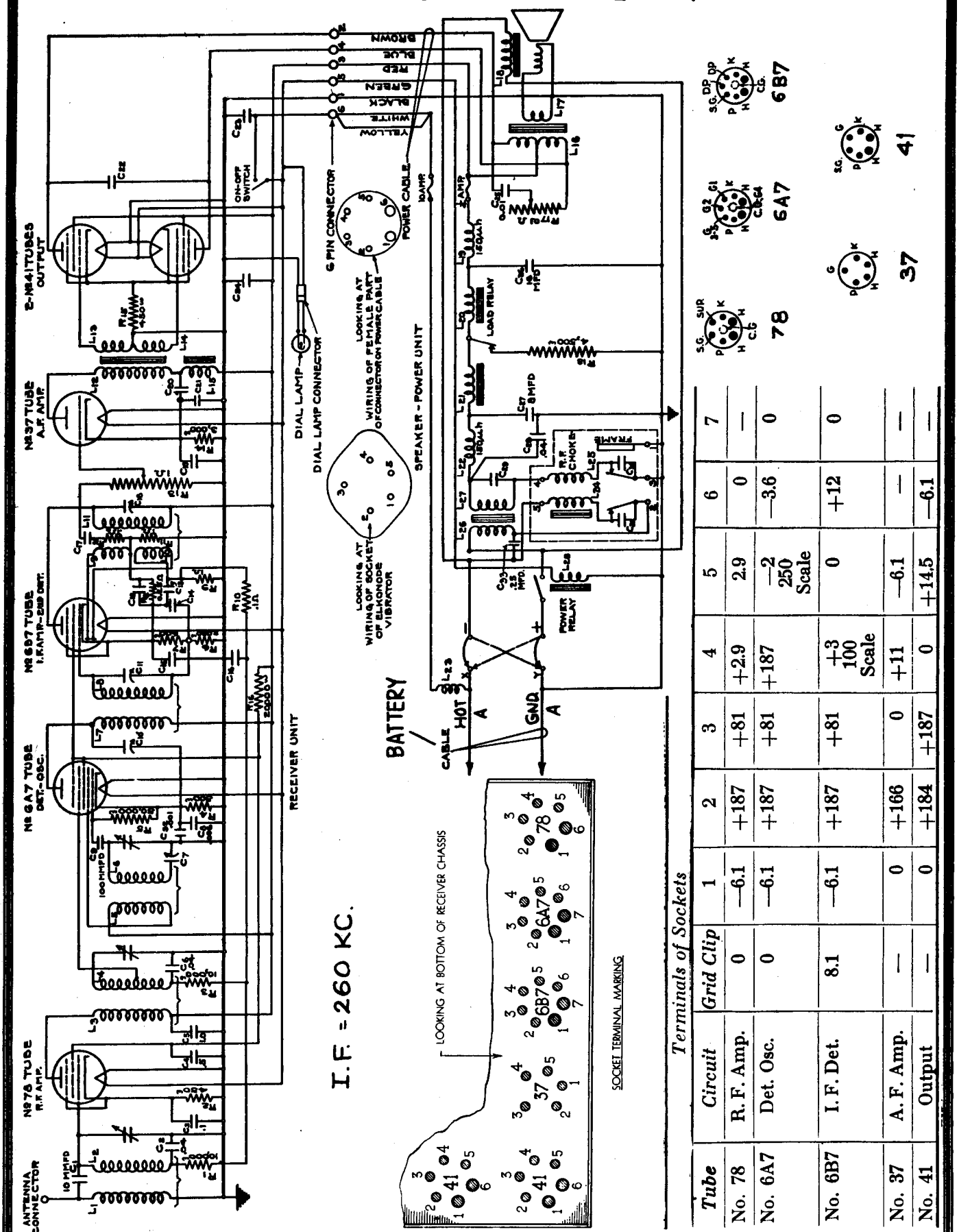






STROMBERG CARLSON TELEPHONE MFG. CO.

MODEL 33 AUTOMOBILE SET

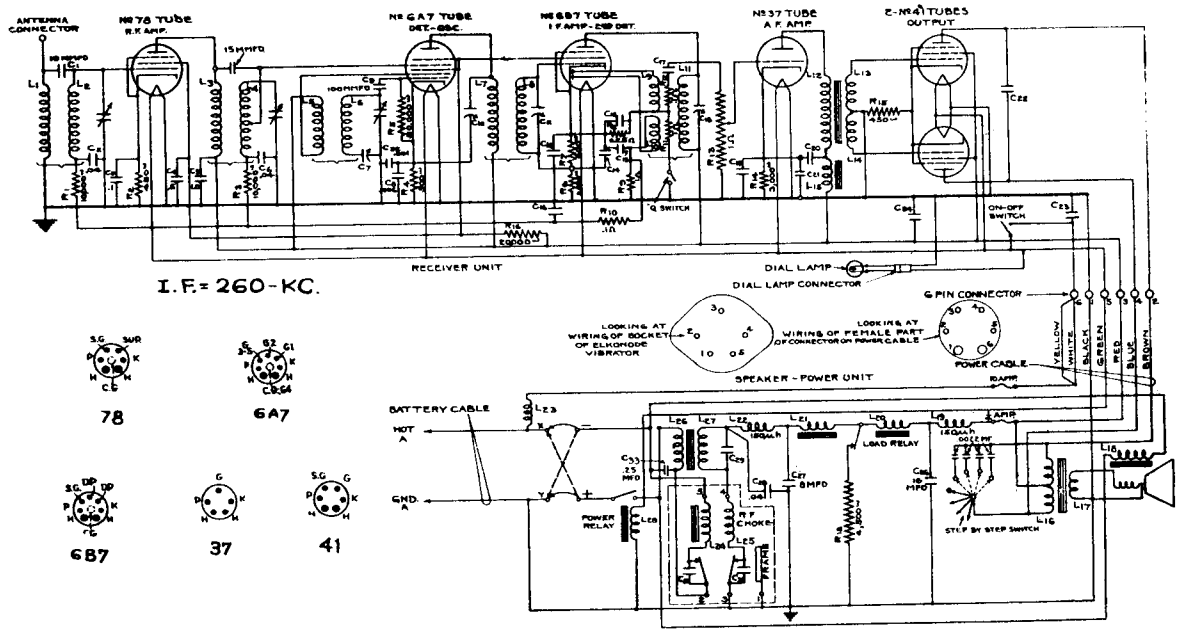


Terminals of Sockets

Tube	Circuit	Grid Clip	1	2	3	4	5	6	7
No. 78	R.F. Amp.	0	—6.1	+187	+81	+2.9	2.9	0	—
No. 6A7	Det. Osc.	0	—6.1	+187	+81	+187	—2 250 Scale	—3.6	0
No. 6B7	I.F. Det.	8.1	—6.1	+187	+81	+3 100 Scale	0	+12	0
No. 37	A.F. Amp.	—	0	+166	0	+11	—6.1	—	—
No. 41	Output	—	0	+184	+187	0	+14.5	—6.1	—

STROMBERG CARLSON TELEPHONE MFG. CO.

MODEL 33 A AUTOMOBILE SET



			Terminals of Sockets						
Tube	***Circuit***	*Grid Clip*	1	2	3	4	5	6	7
No. 78	R. F. Amp.	0	—6.1	+187	+81	+2.9	2.9	0	—
No. 6A7	Det. Osc.	0	—6.1	+187	+81	+187	—2 250 Scale	—3.6	0
No. 6B7	I. F. Det.	8.1	—6.1	+187	+81	+3 100 Scale	0	+12	0
No. 37	A. F. Amp.	—	0	+166	0	+11	—6.1	—	—
No. 41	Output	—	0	+184	+187	0	+14.5	—6.1	—

ALIGNMENT OF I. F.:

Use a test oscillator having an output with a frequency of 260 kilocycles. Connect the leads from this oscillator between the grid (top cap) of the No. 6A7 tube and chassis base. A .5 mfd. capacitor should be connected in series with the lead going to the grid to insulate the 260 k. c. oscillator source from the voltages of the No. 6A7 tube.

Connect the output meter across terminal "M" of the fuse block (See Fig. 11) and the speaker-power supply frame. This puts the meter across the moving coil of the speaker (4 ohms impedance). The signal applied should be very weak, just sufficient to show a deflection on the output meter.

Now adjust the aligners of the primary and the secondary of the first I. F. transformer (See Fig. 14) for the peak swing on the output meter. It will be necessary to check over these adjustments as they are somewhat interdependent. Now, adjust the aligner of the primary of the second I. F. transformer in the same manner. For this aligning operation an insulated screwdriver should be used, a Formica rod with a small piece of metal inserted in the end will serve.

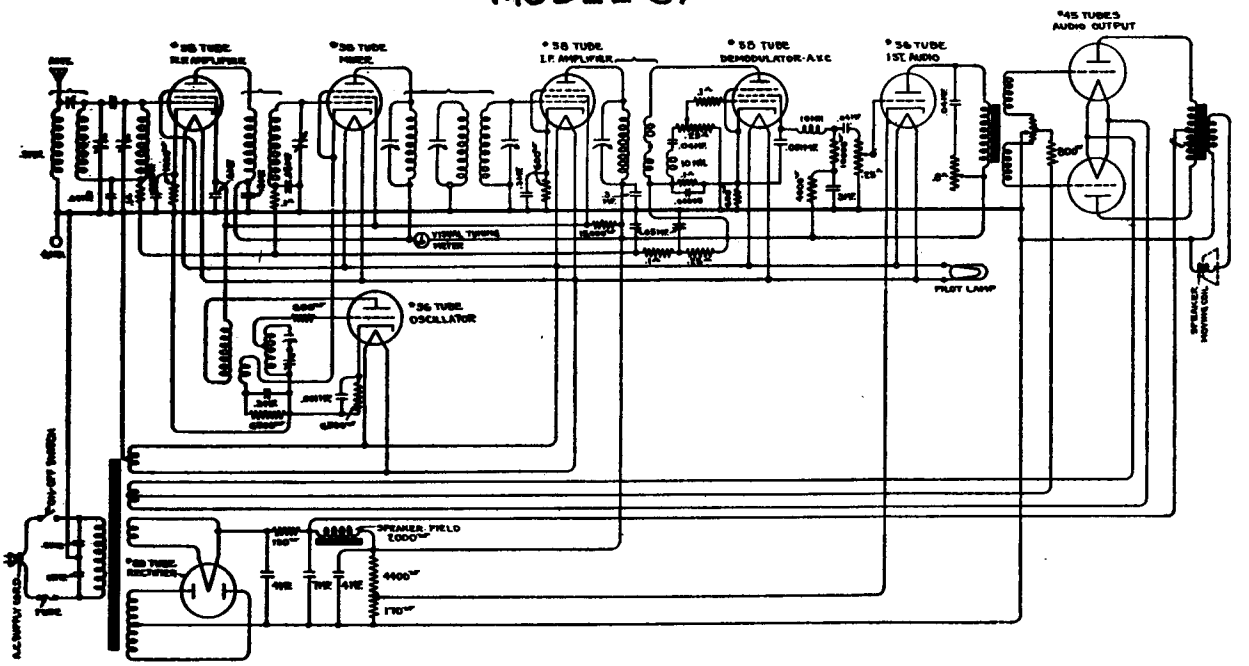
ALIGNMENT OF R. F. AND OSCILLATOR:

Now tune the test oscillator to 1400 k. c. and set the dial ot the remote control unit at 140. Make sure that the signal applied is only strong enough to give a deflection on the output meter. Now, adjust the oscillator shunt aligner (Fig. 15) for maximum meter deflection. Then, adjust the R. F. and Antenna Aligners (Fig. 15) in the same manner.

Now, set the test oscillator frequency to 600 k. c. and adjust the oscillator series aligner for maximum meter deflection. If this adjustment was very far out, it is advisable to re-set to 1400 k. c. and check the oscillator shunt aligner.

STROMBERG CARLSON TELEPHONE MFG. CO.

MODEL 37



58

56

45

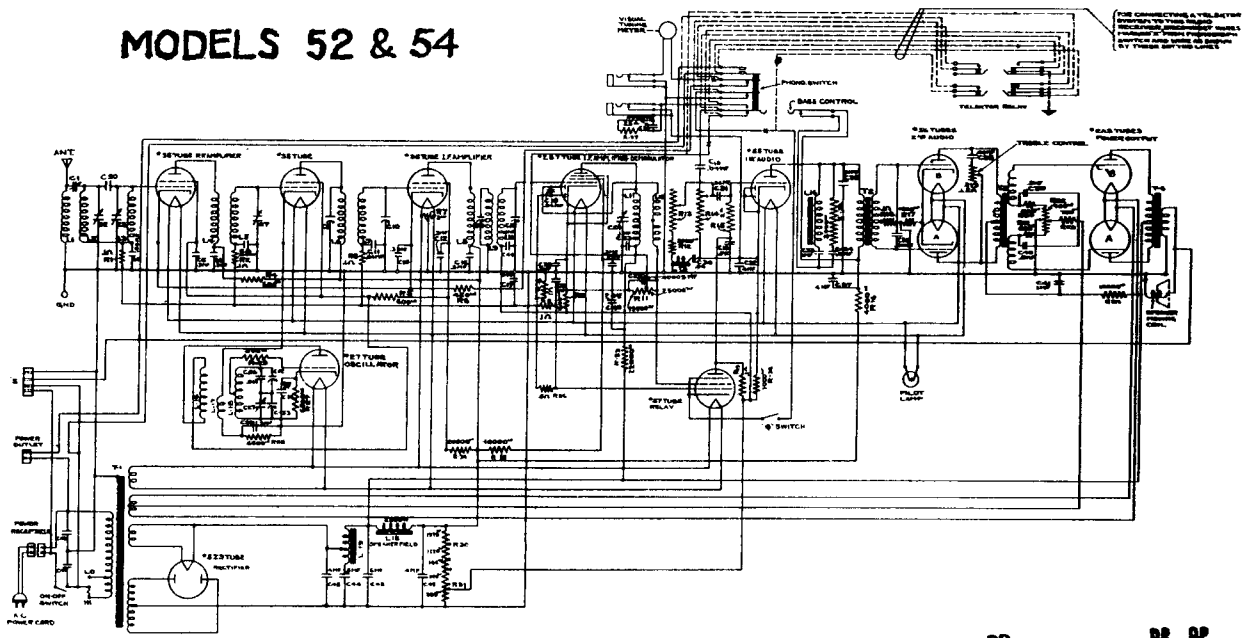
NORMAL VOLTAGE READINGS

These voltage readings correspond to a line voltage at 120 volts. When voltages are measured, proper allowances should be made for a difference in line voltage above or below 120 volts. Be sure to make these readings with the Meter and Scale indicated, otherwise the results will not agree with those tabulated. Alternating voltages are indicated in italics. The dial should be set at about 1,000 kc. D. C. voltages are measured with a 1,000 ohms per volt meter.

Voltage	Meter	Scale	Where Measured	Approx. Value in Volts
Heater Voltages No. 56 and No. 58 Tubes	A. C.	0-4	Across Heater Terminals of Sockets	*2.5*
Filament Voltages No. 245 Tubes	A. C.	0-4	Across Filament Terminals of Audio Output Sockets	*2.5*
Filament Voltage No. 80 Tube	A. C.	0-8	Across Filament Terminals of No. 80 Rectifier Socket	*5.06*
Plate Voltage Radio Amplifier Tube	D. C.	0-250	Between Plate Terminal of R. F. Amplifier Socket (+) and Chassis Base (—)	160
Plate Voltage Mixer Tube	D. C.	0-250	Between Plate Terminal of Mixer Socket (+) and Chassis Base (—)	160
Plate Voltage Oscillator Tube	D. C.	0-250	Between Plate Terminal of Oscillator Socket (+) and Chassis Base (—)	85
Plate Voltage I. F. Tube	D. C.	0-250	Between Plate Terminal of I. F. Socket (+) and Chassis Base (—)	165
Plate Voltage Demodulator Tube	D. C.	0-250	Between Plate Terminal of Demodulator Socket (+) and Chassis Base (—)	2.5
Plate Voltage First Audio Tube	D. C.	0-250	Between Plate Terminal of First Audio Socket (+) and Chassis Base (—)	150
Plate Voltages Audio Output Tubes	D. C.	0-750	Between Plate Terminals of Audio Output Sockets (+) and Chassis Base (—)	295
"C" Voltage R. F. Amplifier Tube	D. C.	0-10	Between Cathode Terminal of R. F. Amplifier Socket (+) and Chassis Base (—)	5
"C" Voltage Mixer Tube	D. C.	0-10	Between Cathode Terminal of Mixer Socket (+) and Chassis Base (—)	10
"C" Voltage Oscillator Tube	D. C.	0-250	Between Cathode Terminal of Oscillator Socket (+) and Chassis Base (—)	20
"C" Voltage I. F. Tube	D. C.	0-10	Between Cathode Terminal of I. F. Socket (+) and Chassis Base (—)	3
"C" Voltage Demodulator Tube	D. C.	0-10	Between Cathode Terminal of Demodulator Socket (+) and Chassis Base (—)	3
"C" Voltage First Audio Tube	D. C.	0-10	Between Cathode Terminal of First Audio Socket (+) and Chassis Base (—)	6.5
"C" Voltage Audio Output Tube	D. C.	0-250	Across 800 ohm Biasing Resistor	50
Screen Voltages R. F., Mixer, and I. F. Tubes	D. C.	0-250	Between Screen Terminals on Sockets (+) and Chassis Base (—)	80
"Screen" Voltage Demodulator Tubes	D. C.	0-250	Between Screen Terminal on Demodulator Socket (+) and Chassis Base (—)	90
"B" Voltage R. F. Mixer, I. F. First Audio, and Demodulator Tube	D. C.	0-250	Between High Side of Voltage Divider (+) and Chassis Base (—)	160
"B" Voltage Audio Output Tubes	D. C.	0-750	Between Mid-Tap of Output Transformer (+) and Chassis Base (—)	300
Speaker Field Volts	D. C.	0-250	Across Small Pins on Speaker Connector Socket	140
Plate Voltage A. C. per Anode No. 80 Rectifier Tube	A. C.		Between Plate Terminals of No. 80 Rectifier Socket and Chassis Base	*340*

STROMBERG CARLSON TELEPHONE MFG. CO.

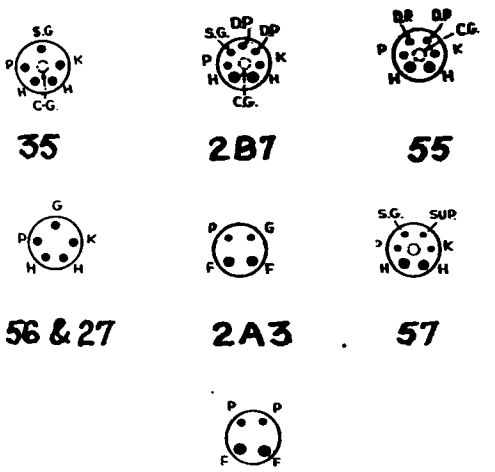
MODELS 52 & 54



NORMAL VOLTAGE READINGS

Voltage	Meter	Scale	Where Measured	Approx. Value in Volts
Heater Voltage Nos. 35, 37, 56, 58 and 57 Tubes	A. C.	0-5	Across Heater Terminals of Sockets	2.5
Filament Voltages Nos. 2A3 Tubes	A. C.	0-5	Across Filament Terminals of Sockets	2.5
Filament Voltage No. 5Z3 Tube	A. C.	0-5	Across Filament Terminals of Sockets	5.
Plate Voltage Radio Amplifier Tube	D. C.	0-250	Between Plate Terminal of R. F. Amplifier Socket (+) and Chassis Base ( )	164
Plate Voltage Mixer Tube	D. C.	0-250	Between Plate Terminal of Mixer Socket (+) and Chassis Base ( )	196
Plate Voltage Oscillator Tube	D. C.	0-250	Between Plate Terminal of Oscillator Socket (+) and Chassis Base ( )	95
Plate Voltage First I. F. Tube	D. C.	0-250	Between Plate Terminal of First I. F. Socket (+) and Chassis Base ( )	196
Plate Voltage I. F. Demodulator Tube	D. C.	0-750	Between Plate Terminal of I. F.—Demodulator Socket (+) and Chassis Base ( )	200
Plate Voltage First Audio Tube	D. C.	0-250	Between Plate Terminal of First Audio Socket (+) and Chassis Base ( )	182
Plate Voltage Second Audio Tubes	D. C.	0-250	Between Plate Terminals of Second Audio Sockets (+) and Chassis Base ( )	240
Plate Voltages Power Output Tubes	D. C.	0-750	Between Plate Terminals of Power Output Sockets (+) and Chassis Base ( )	358
Screen Voltages, R. F. and Mixer Tubes	D. C.	0-250	Between Screen Terminals of R. F., Mixer and First I. F. Sockets (+) and Chassis Base (-)	81
Screen Voltage First I. F. Tube	D. C.	0-250	Between Screen Terminal of First I. F. Socket (+) and Chassis Base ( )	84
Screen Voltage Second I. F. Tube	D. C.	0-250	Between Screen Terminal of Second I. F. Socket (+) and Chassis Base ( )	131
"C" Voltage R. F. Amplifier Tube	D. C.	0-10	Between Cathode Terminal of R. F. Amplifier Socket (+) and Chassis Base ( )	3.2
"C" Voltage Mixer Tube	D. C.	0-10	Between Cathode Terminal of Mixer Socket (+) and Chassis Base ( )	2.5
"C" Voltage First I. F. Tube	D. C.	0-10	Between Cathode Terminal of First I. F. Socket (+) and Chassis Base ( )	3.6
"C" Voltage I. F.—Demodulator Tube	D. C.	0-10	Between Cathode Terminal of I. F. Demodulator Socket (+) and Chassis Base ( )	3.6
"C" Voltage First Audio Tube	D. C.	0-250	Between Cathode Terminal of First Audio Socket (+) and Chassis Base ( )	55
Grid Voltage Oscillator Tube	D. C.	0-250	Between Cathode Terminal of Oscillator Tube Socket (+) and Chassis Base ( )	30
Grid Voltage Second Audio Tubes	D. C.	0-250	Between Cathode Terminal of Second Audio Sockets (+) and Chassis Base ( )	41
Grid Voltage Power Output Tubes	D. C.	0-250	Between Grid Terminals of Power Output Tubes ( ) and Terminal No. 1 on Voltage Divider (+)	97
"B" Voltage R. F. Amplifier Tube	D. C.	0-250	Between Tube Side of 600 ohm Resistor R4 (+) and Chassis Base ( )	196
"B" Voltage Mixer, First I. F. and First Audio Tubes	D. C.	0-250	Between Hi Side of Voltage Divider (+) and Chassis Base ( )	184
"B" Voltage Oscillator Tube	D. C.	0-250	Between Tube Side of 20,000 ohm Resistor (+) and Chassis Base ( )	85
"B" Voltage Second Audio Tubes	D. C.	0-250	Between Low Side of 10,000 ohm Resistor R34 (+) and Chassis Base ( )	248
"B" Voltage Power Output Tubes	D. C.	0-750	Between Hi Side of 10,000 ohm Resistor R34 (+) and Chassis Base (-)	265
"C" Voltage Power Output Tubes	D. C.	0-250	Across 250 ohm Biasing Resistor R32 on Voltage Divider	37
Speaker Field Voltage	D. C.	0-250	Across Small Pins on Speaker Connector Socket	182
Plate Voltage A. C. (per Anode No. 5Z3 Rectifier Tube	A. C.	See Remarks	Between Plate Terminals of No. 5Z3 Rectifier Socket and Chassis Base	360*

*Cannot be measured with Weston Model 538 Meter unless multiplier is used.



Trouble Shooting Hints

Excessive hum in this set can be remedied by adjusting the hum balancer on the rear of the chassis with the Q switch facing back.

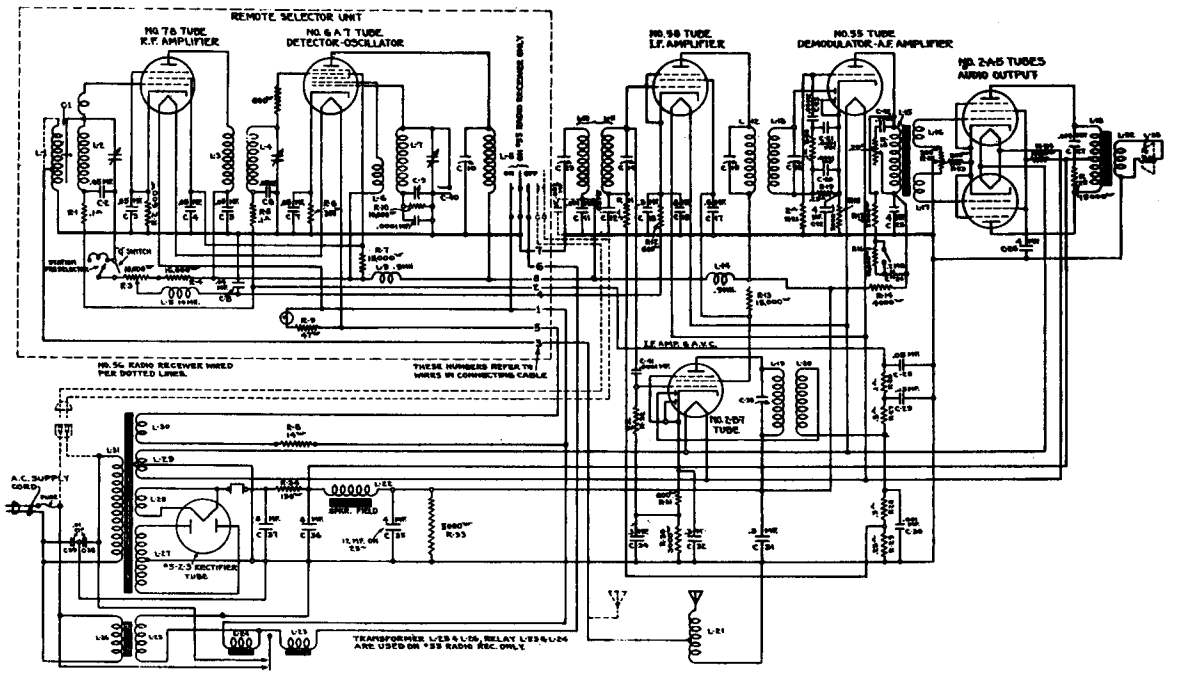
Realignment of the R. F. and Oscillator Tuning circuits **(when necessary)** may be accomplished in the following manner:

If a test oscillator and output meter are used, the signal strength applied to the receiver **should be low** enough so that the automatic volume control is not operated in order to avoid apparent **broad adjustment. If** broadcast signals are used, moderately strong signals which swing the meter pointer **about half the distance** back toward the "Off" position should be used.

With whichever method is used, the receiver should be tuned to a 1400 kc. **signal first, and the Antenna,** R. F. and Oscillator Shunt Aligners adjusted for best setting. Next the receiver **should be set at 600 kc. on the** dial, and the Oscillator Series Aligner ONLY adjusted for best position for maximum **background noise. After** this is done re-check the Oscillator Shunt Aligner at 1400 kc., using same dial setting as **previously. The receiver** should be left turned "On" for about fifteen minutes before aligning.

STROMBERG CARLSON TELEPHONE MFG. CO.

MODELS 55 AND 56 TEL-LEK-TOR-ETS



Tube	Circuit	Grid Clip	1	2	3	4	5	6	7	*Heater Voltages between Terminal Nos.
78		0	*	+145	+ 75	+ 2.8	+ 2.8	*		1–6—*6.3* volts
6A7		0	*	+145	+ 75	+142	— 2	+ 3.5	*	1–7—*6.3* volts
58		0	*	+145	+ 90	+ 6.8	+ 6.8	*		1–6—*2.5* volts
2B7		0	*	+145	+ 90	0	+ 6.4	+ 6.4	*	1–7—*2.5* volts
55		0	*	+110	+ 4	+ 6.5	+ 6.5	*		1–6—*2.5* volts
2A5's		—	*	+260	+260	0	+ 17	*		1–6—*2.5* volts
80		—	* +280	*300*	*300*	* +280				1–4— *5* volts
Speaker Socket		—	0	+260	+270	+270	+130	0		

A. C. voltages are indicated by italics. Additional voltages may be measured directly across the proper terminals.

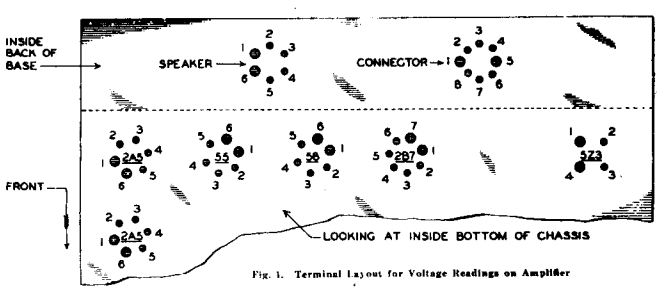


Fig. 1. Terminal Layout for Voltage Readings on Amplifier

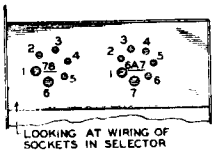
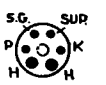
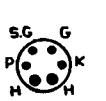


Fig. 2. Terminal Layout for Voltage Readings on Selector Unit





STROMBERG CARLSON TELEPHONE MFG. CO.

MODEL 60

Fig. 2. Terminal Layout for Voltage Measurement Chart.

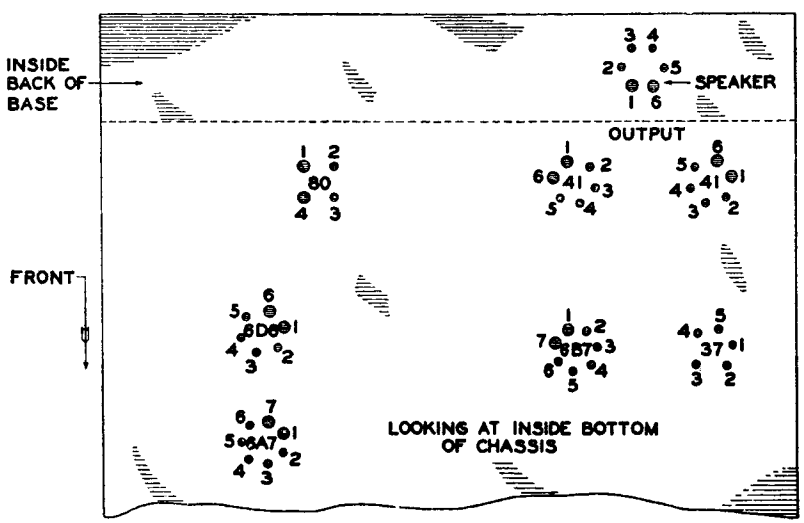
Tube	Circuit	Cap.	Terminals of Sockets 1	2	3	4	5	6	7	Heater Voltages Between Terminal Nos.
6D6	R. F. Amp	G 0	H 0	P 145	S 85	Sup. 5.5	K 5.5	H 0	—	1–6—*6.5* volts
6A7	Mixer-Osc.	Mix. G 0	H 0	Mix. P 145	S 85	Osc. P. 175	Osc. G —20	K 5.5	H 0	1–7—*6.5* volts
6B7	I. F., Dem.	G 0	H 0	P 145	S 85	D 0	D 0	K 3	H 0	1–7—*6.5* volts
37	1st Audio	—	H 0	P 140	G 0	K 8	H 0	—	—	1–5—*6.5* volts
41's	Output	—	H 0	P 250	S 250	G 0	K 16	H 0	—	1–6—*6.5* volts
80	Rectifier	—	F 270	P *298*	P *298*	F 270	—	—	—	1–4—*4.9* volts
Speaker Socket			245	145	270	270	250	245		

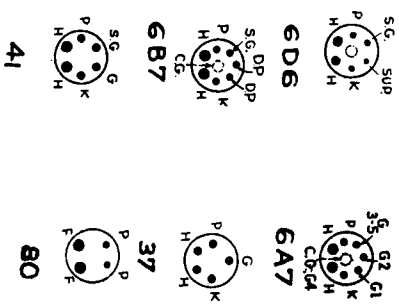
A. C. voltages are indicated by italics

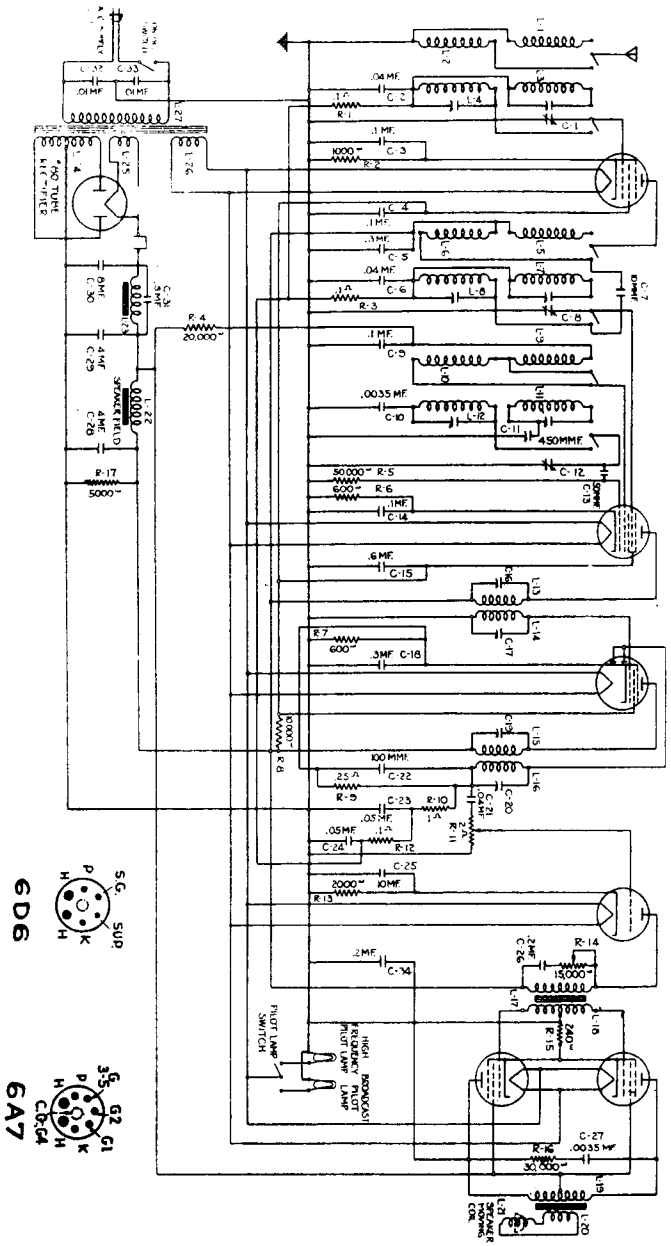
NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the bases with the tubes and speaker plug in place. The set is therefore in operation when the measurements are made. Fig. 2 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket. Tune Receiver to 1500 k. c.

Voltages are given for a line voltage of 120 volts and allowance should be made for differences when the line voltage is higher or lower. A meter with a resistance of 1,000 ohms per volt should be used for measuring the D. C. voltages. The Volume Control should be set all "On" (clockwise) before measuring voltages.







STROMBERG CARLSON TELEPHONE MFG. CO.

MODEL 64

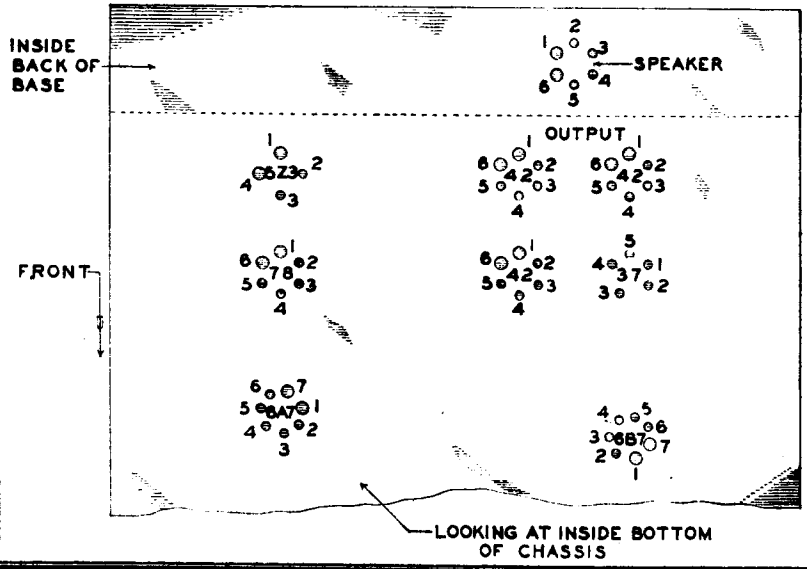
Terminals of Sockets

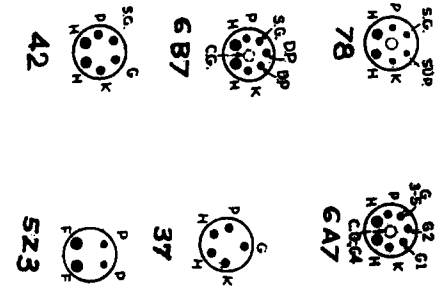
Tubes	*Circuit*	*Cap.*	1	2	3	4	5	6	7	*A. C. Meter for Heater Voltages Between Terminal Nos.*
78	R. F.			+210	+ 90	+2.5	+2.5			1–6—6.3 volts
6A7	Det. Osc.			+210	+ 90	+210	− 35	+2.5		1–7—6.3 volts
6B7	I. F. Dem. A. V. C.	+12		+210	+ 90		2.5	15		1–7—6.3 volts
37	1st Audio			+190		+ 10				1–5—6.3 volts
42	2nd Audio			+190		−3.5				1–6—6.3 volts
42	Output			+350		− 35				1–6—6.3 volts
5Z3	Rectifier	A. C. voltmeter between plate terminal and chassis base		480						1–4—5 volts
Speaker Socket				+210	+350	+350	+350			

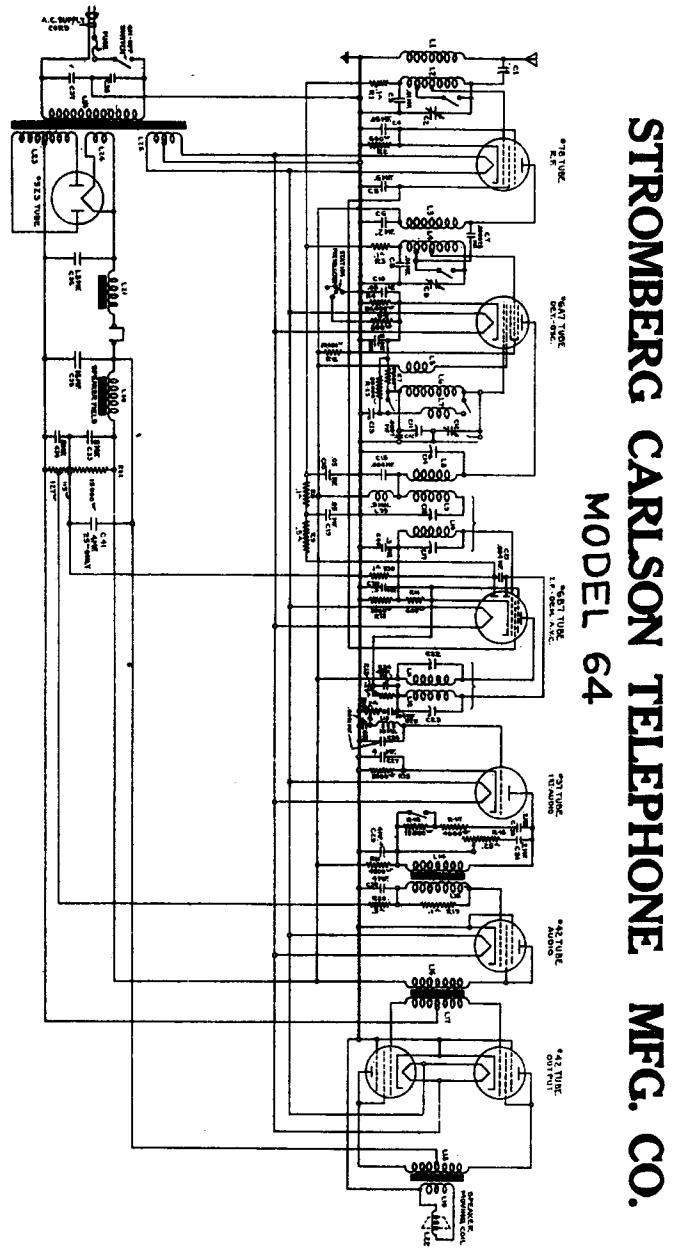
A. C. voltages are indicated by italics. Additional voltages may be measured directly across the proper terminals.

These voltage readings are obtained by measuring between the various tube socket contacts and the bases with the tubes, speaker, and cable plug in place. The set is therefore in operation when the measurements are made. Fig. 1 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket.

Voltages are given for a line voltage of 120 volts and allowance should be made for differences when the line voltage is higher or lower. A meter with a resistance of 1,000 ohms per volt should be used for measuring the D. C. voltages. The Volume Control should be set all "On" (clockwise) before measuring voltages.

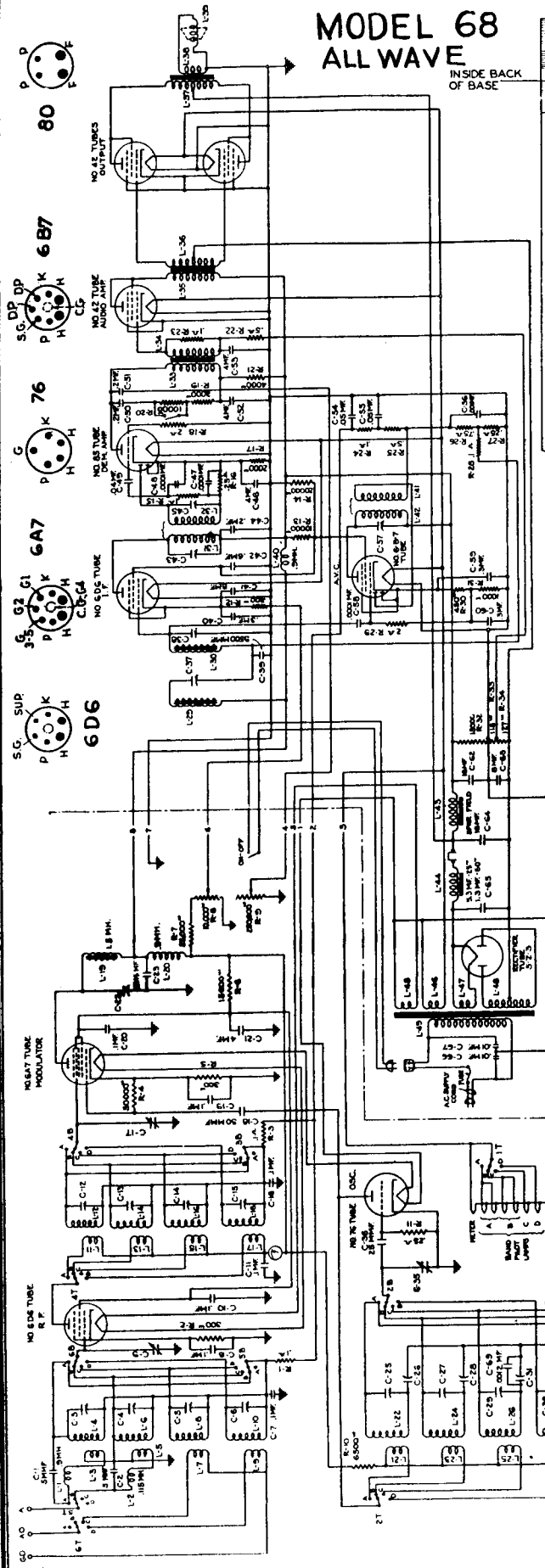


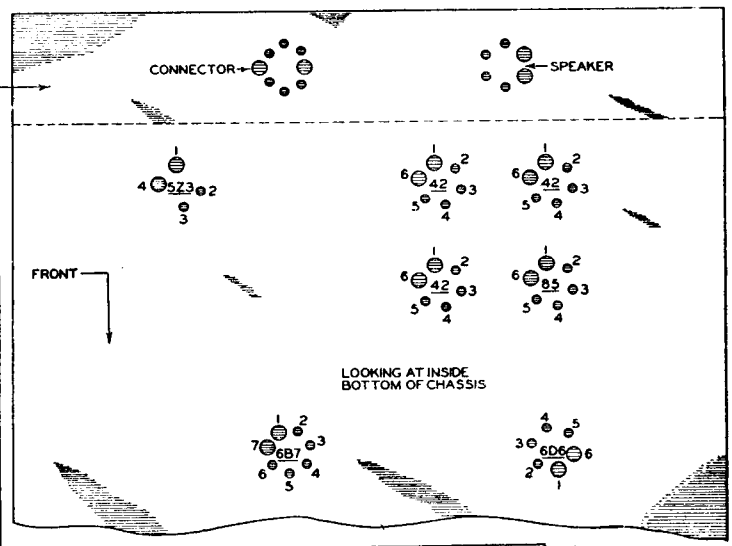


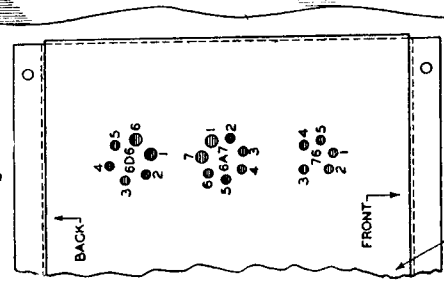


STROMBERG CARLSON TELEPHONE MFG. CO.

MODEL 68
ALL WAVE



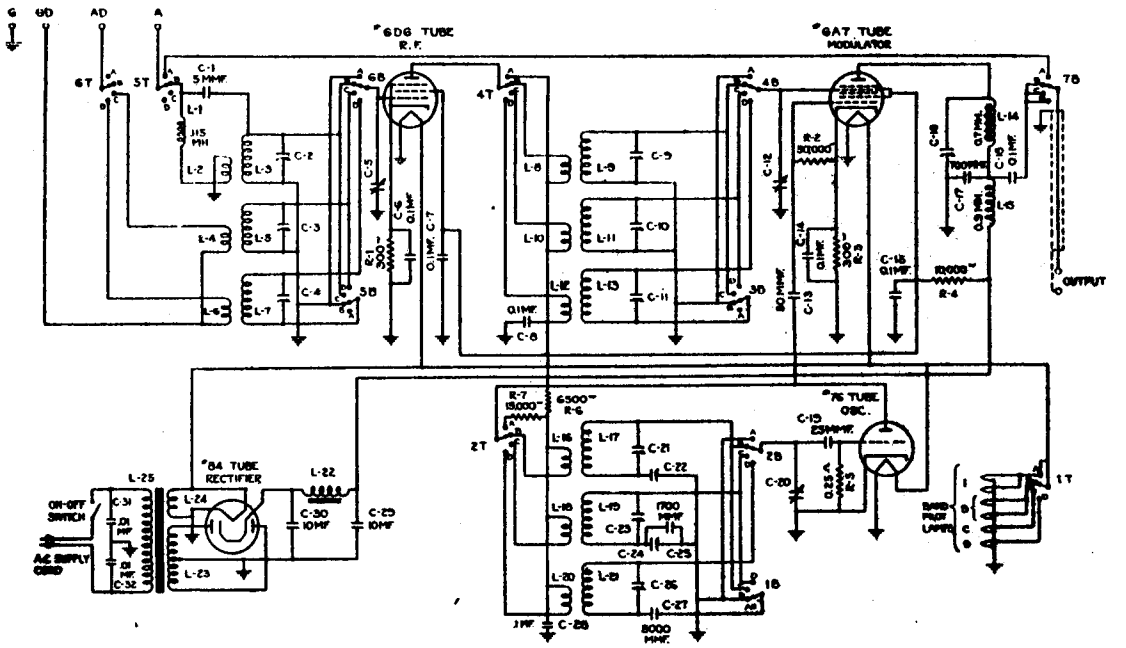




Tube	Circuit	Cap.	Terminals of Sockets 1	2	3	4	5	6	7	8	Heater Voltages Between Terminal Nos. at 119 Volts
6D6	R. F. Amp.			+175	+ 89	+2.38	+2.38		—	—	1–6—6.4 volts
6A7	Mod.			+180	+ 89	+ 89	—8.6	+2.0	—	—	1–7—6.4 volts
76	Osc.			+152	— 25	0		—	—	—	1–5—6.4 volts
6D6	I. F. Amp.			+181	+100	+ 2.6	+2.6		—	—	1–6—6.3 volts
6B7	A. V. C.			+181	+100	0	+8.65	+8.65		—	1–7—6.3 volts
85	1st Audio			+150	+ .1	+ 10	+ 10		—	—	1–6—6.35 volts
42	2nd Audio			+170	+170	— 22	0		—	—	1–6—6.3 volts
42	Output			+378	+378	— 37	0		—	—	1–6—6.3 volts
5Z3	Rectifier			484	484		—	—	—	—	1–4—4.8 volts
Speaker Socket					+181	+382	+ 382	—	—	—	
Connector Socket				0	6.3	0	19.2	0	0	+180	

Set tuned to 1000 kc., "A" Band, Volume Control full on
A. C. voltages are indicated by italics

STROMBERG CARLSON TELEPHONE MFG. CO.
MODEL 69 ALL-WAVE



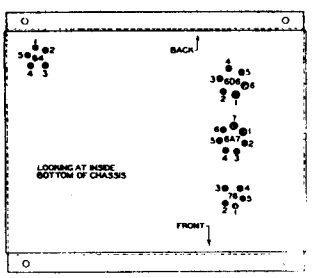
CIRCUIT DESCRIPTION

The No. 69 All-Wave Selector contains the frequency changer circuits of a superheterodyne system which connected to the input (Ant. and Gnd. connections) of a good standard broadcast receiver gives an extension of the tuning range from 1500 kilocycles to 25 megacycles. Thus all frequencies between 550 kilocycles and 25 megacycles can be readily tuned.

The No. 6D6 tube is used as the R. F. Amplifier. The No. 6A7 tube is used as the Modulator. The No. 76 tube is used as the Oscillator. The No. 84 tube is the Rectifier in the self-contained power supply.

Tube	*Circuit*	*Cap.*	*Terminals of Socket*						
			1	2	3	4	5	6	7
6D6	R. F. Amp.	G	H	P	S	Sup.	K	H	—
		0	0	191	103	2.9	2.9	A. C. 6.3	
6A7	Modulator	Mod. G	H	Mod. P	S	G2	G1	K	H
		0	A. C. 6.3	191	103	103	Approx. —1	3.1	0
76	Oscillator	—	H	P	G	K	H	—	—
			0	160	—14	0	A. C. 6.3		
84	Rectifier	—	H	P	P	K	H	—	—
			0	A. C. 178	A. C. 178	207	A. C. 6.3		

Measured on Range B at 2400 Kc.—Line voltage 120 volts A. C.

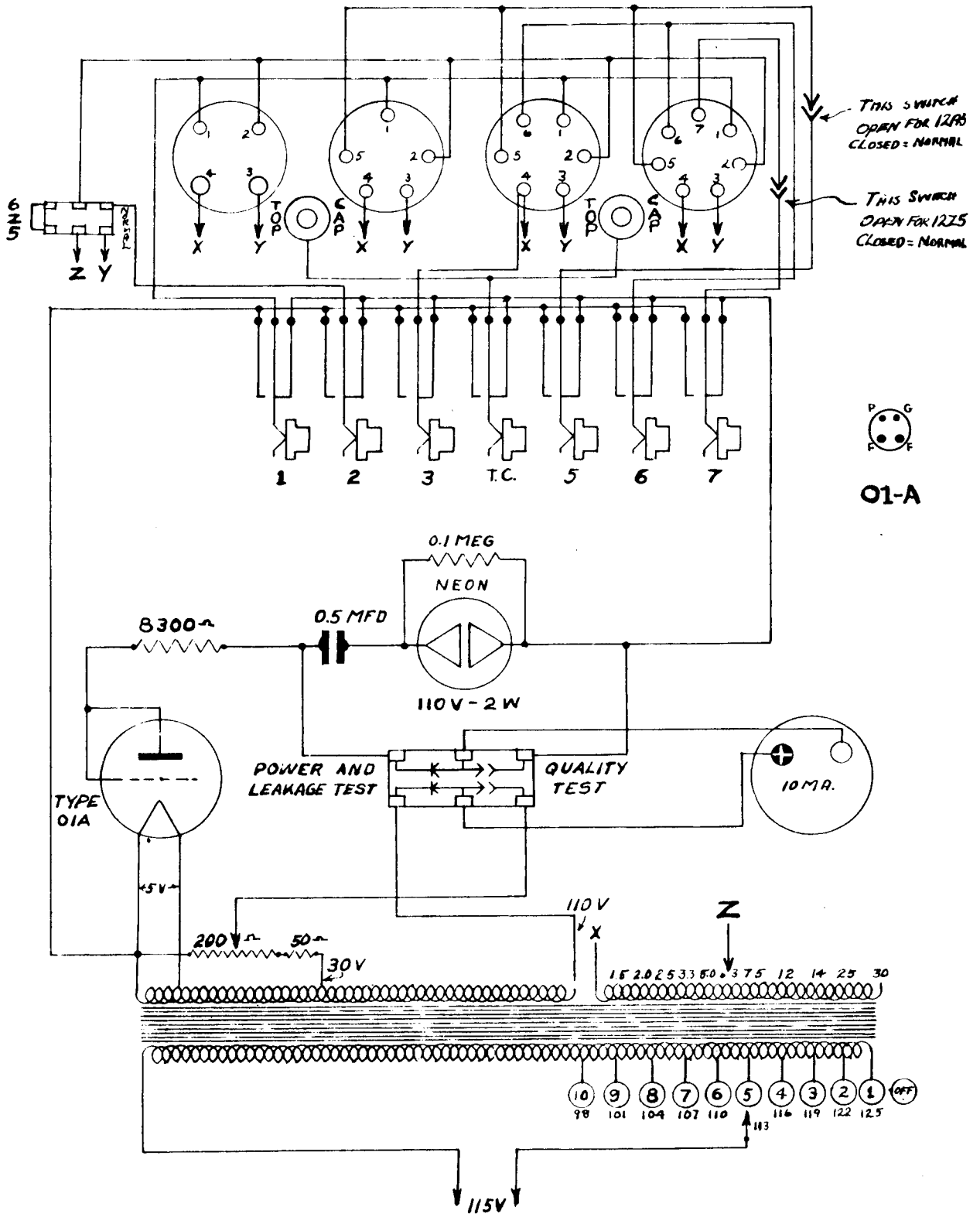


Trouble Shooting Hints

Trouble which usually develops in this converter can be traced to the power supply circuit, either the rectifier tube, the filter condensers or the primary buffer condensers, being at fault.

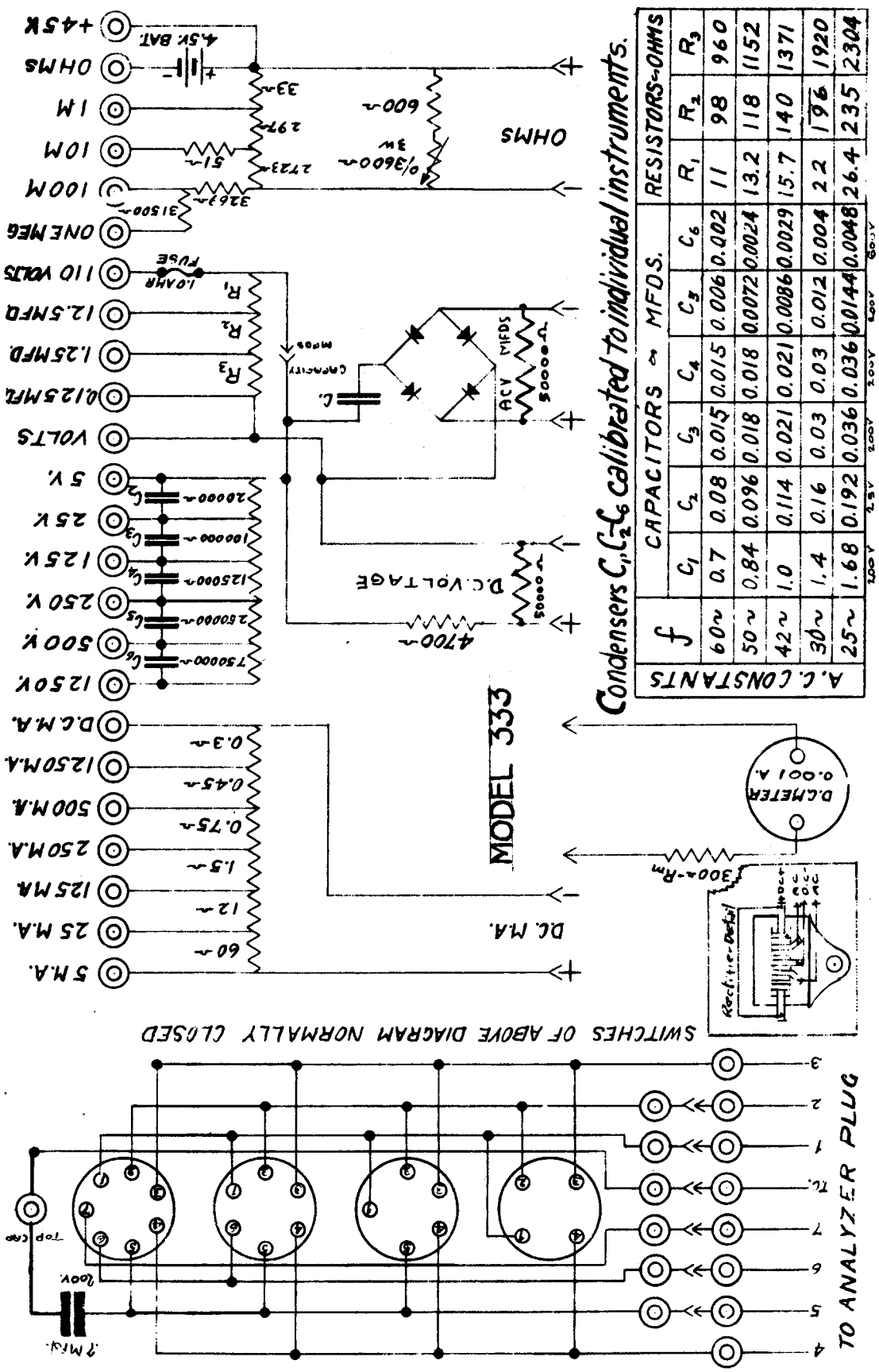
SUPREME INSTRUMENTS CORP.

MODEL 85



SUPREME INSTRUMENTS CORP.

MODEL 333

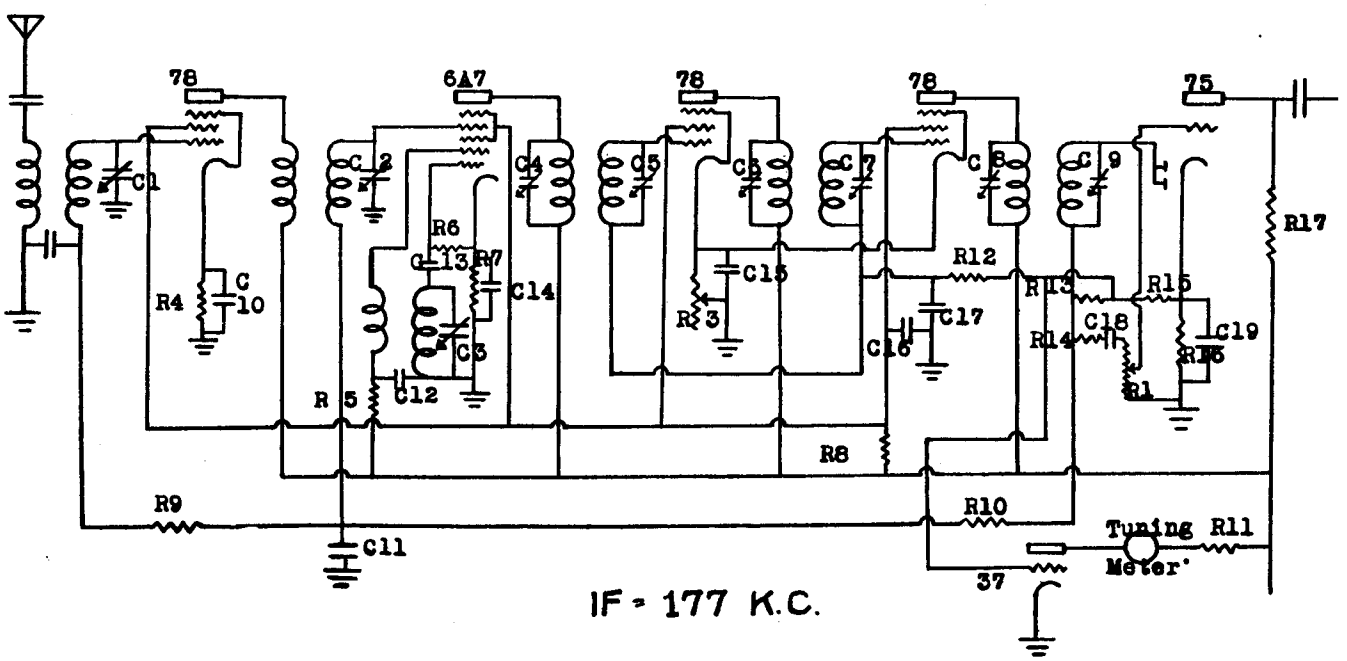


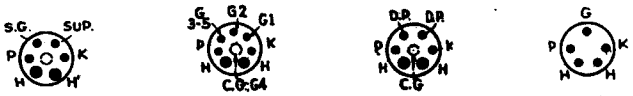
Condensers C_1, C_2-C_6 calibrated to individual instruments.

A.C. CONSTANTS	CAPACITORS ~ MFDS.						RESISTORS-OHMS		
f	C_1	C_2	C_3	C_4	C_5	C_6	R_1	R_2	R_3
60~	0.7	0.08	0.015	0.015	0.006	0.002	11	98	960
50~	0.84	0.096	0.018	0.018	0.0072	0.0024	13.2	118	1152
42~	1.0	0.114	0.021	0.021	0.0086	0.0029	15.7	140	1371
30~	1.4	0.16	0.03	0.03	0.012	0.004	22	196	1920
25~	1.68	0.192	0.036	0.036	0.0144	0.0048	26.4	235	2304
	100 V	75 V	200 V	300 V	500 V	1000 V			

L. TATRO PRODS. CORP.

MODEL 084





C1, C2 and C3 tuning condensers; C4, C5, C6, C7, C8, and C9 I. F. trimmers; C10, C12, C14, C15 and C16 .1 Mfd; C11 and C17 .05 Mfd; C13 100 Mmfd; C 18 .025 Mfd; C 19 10 Mfd. 6 volt electrolytic; Amt condenser .005 Mfd; condenser between primary and secondary of Ant coil .05 Mfd.

R1 ½ meg volume control; R3 20,000 ohm potentiometer with limiting resistor 800 ohms; R4 2500 ohms; R5 20,000 ohms; R6 30,000 ohms; R7 250 ohms; R8 30,000 ohms; R9 250,000 ohms; R10 1 meg; R11 30,000 ohms; R12, R13, and R15 250,000 ohms; R16 5000 ohms; R17 100,000 ohms; R14 100,000 ohms.

See MODEL L54 for schematic of the audio system and power unit of the Model 084. The 084 filament circuit is also identical to that of L54 with the exception that it has three additional tubes in series with a 50 ohm resistor.

The I.F.Units on this model are peaked at approximately 177 K.C.

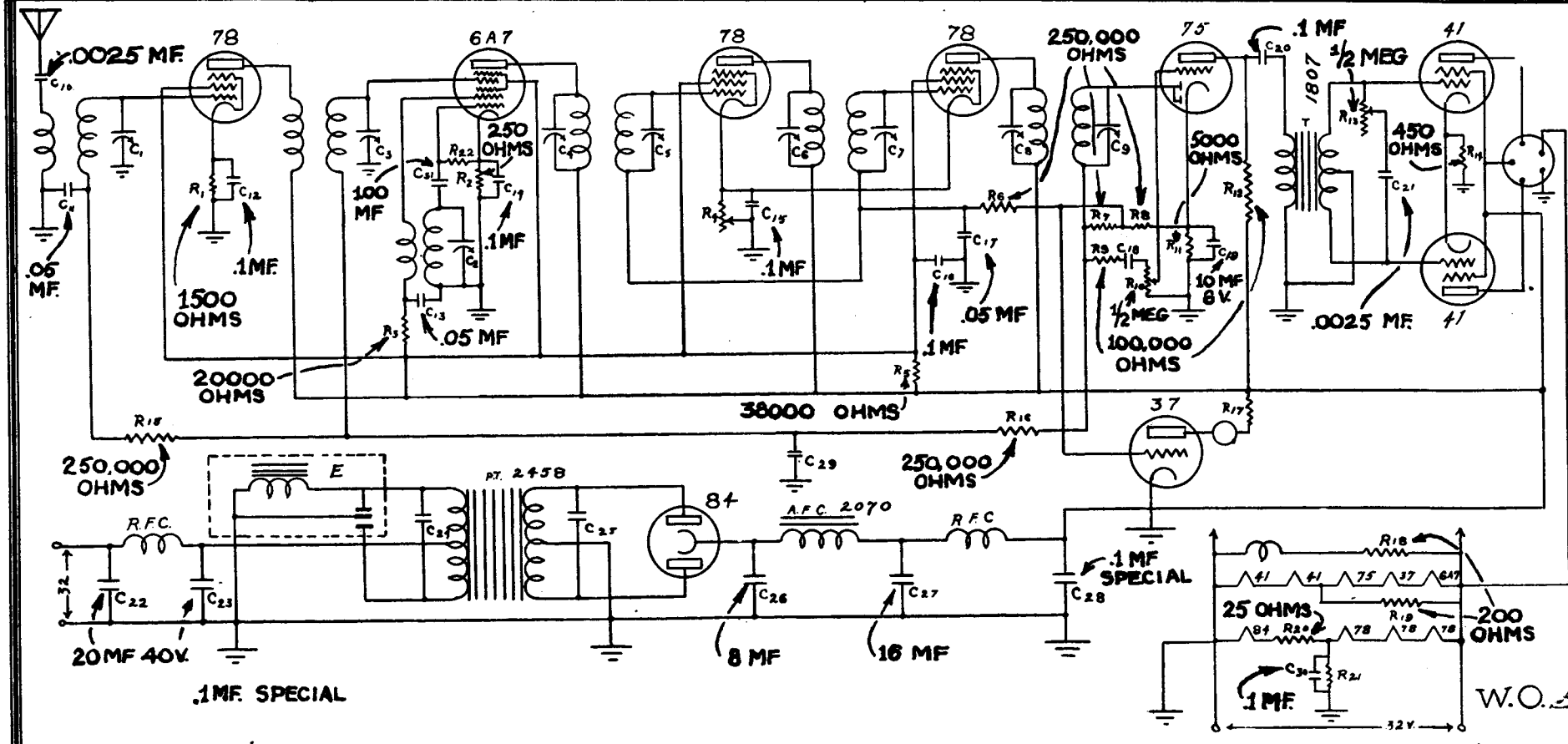
Approximate voltage readings to ground at no signal using a 1000 ohms-per-volt meter 300 volt scale on high readings; line voltage at receiver 31.5; plate 6A7 135 volts, screen 3 and 5 6A7 63 volts, anode grid 6A7 103 volts, cathode 6A7 1.75 volts. Plate 78s 135 volts, screen grid 78s 63 volts, cathode 78s I.F. 2 volts (with silent tuning control full on clockwise), cathode 78s r.f. 2.3 volts. Plate 75 125 volts, cathode 75 1.3 volts. Plates 41s 192 volts, screens 41s 197 volts, cathode 41s 18 volts. Plate 37 54 volts, cathode 37 tied to ground.

R3 of receiver controls the cathode voltage of the 2 type 78 tubes operating as intermediate amplifiers. When realigning receiver or taking signal readings this resistor should be adjusted for maximum output without oscillation.

It is always advisable to playtest all tubes of receiver to be positive that tubes are in proper condition.

L. TATRO PRODS. CORP.

MODEL 094 (PRESIDENT)

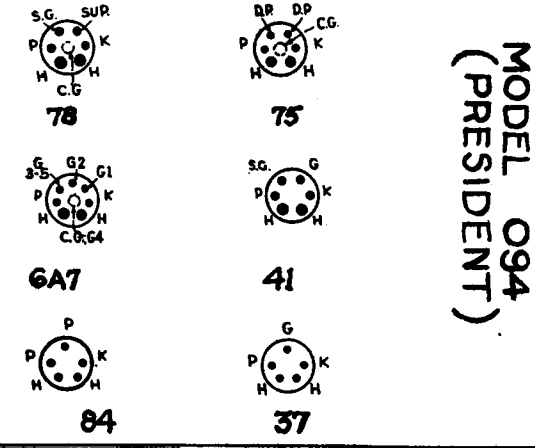


The intermediate amplifiers are tuned to 175 K. C. This receiver is aligned at the factory and should not be adjusted without the use of a satisfactory signal generator and output meter. Following are the average voltages measured with a 1000-ohm-per-volt meter from chassis to point designated:

TUBE	PLATE	SCREEN	CATHODE	ANODE GRID
6A7	155	60	1.6	115
*78 i. f.	155	60	3.1	...
**78 r. f.	155	60	3.	...
75	198	...	1.6	...
37	65	...	0	...
*41	198	204	20	...

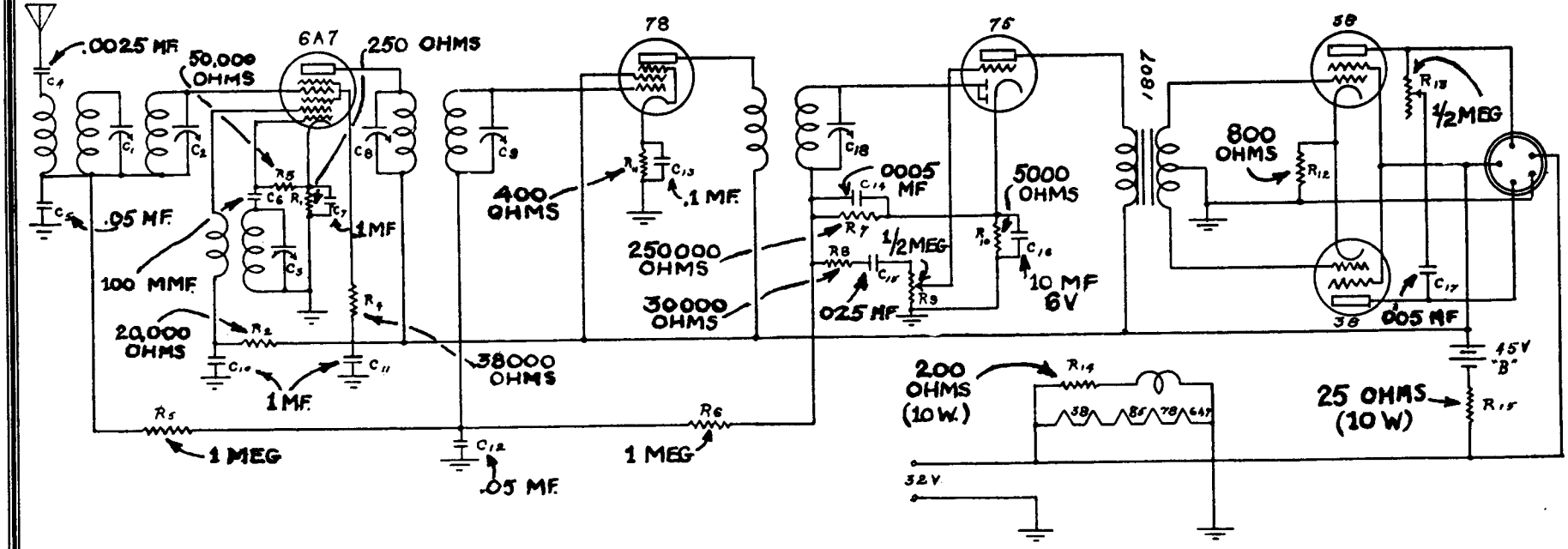
*Two tubes used, 78s in I. F.

**78 used as r. f. tube.



L. TATRO PRODS. CORP.

MODELS AK 54 & AM 54 (MAYOR & SENATOR)



The filaments of the tubes of this receiver as will be noted by circuit diagram are in series, hence if one tube has an open filament none of the tubes will light. In order to test for an open filament remove the tubes and touch one of the filament prongs to the central portion of the dial light socket and the other filament to ground (chassis) contact. If the filament is not open the dial light will become dimmed during the above process. Filament voltages range between 6.3 and 6.4 although slight variations are perfectly normal.

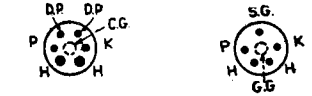
The intermediate amplifiers are tuned to 175 K. C. This receiver is aligned at the factory and should not be adjusted without the use of a satisfactory signal generator or oscillator and an output meter. R15 is a protective resistor only. The "B" battery may be operated on this receiver until it becomes noisy or depleted to such an extent that the desired volume is no longer available.

Some of these models use a type 85 tube in place of a 75 tube. In this conjunction R2 is 800 ohms instead of 400.

Replacement units of genuine "L'TATRO" parts for this receiver are obtainable at any "L'TATRO" dealer. We suggest that questionable tubes be play-tested in a radio receiver as an assurance that they are in satisfactory operating condition. Some tube testers on the market today are not entirely satisfactory for this purpose.

6A7

78

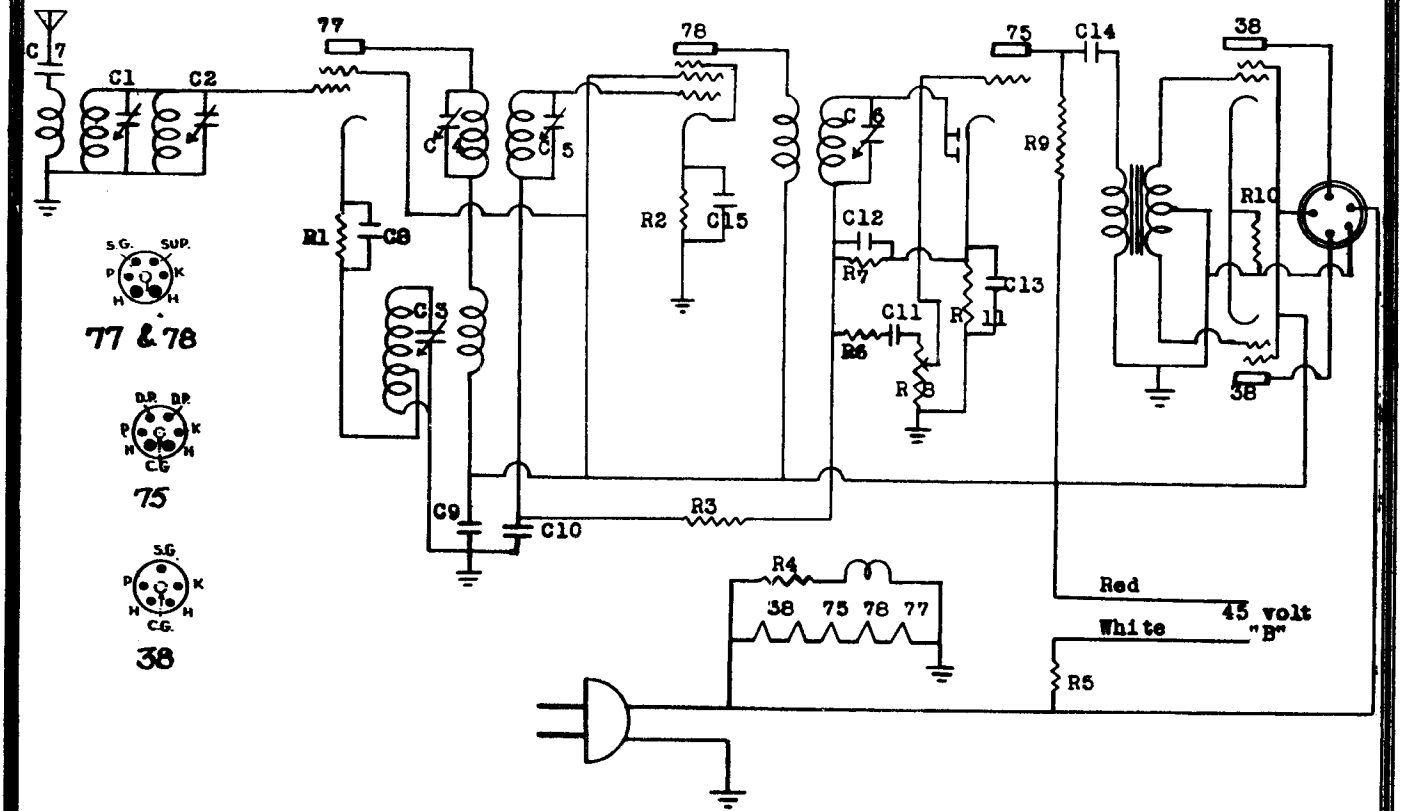


75

38

L. TATRO PRODS. CORP.

MODELS K54-M54 & NH44



C1, C2, C3 tuning condensers; C4, C5, C6 I.F.trimmers; C7 .0025 Mfd; C8 .005 Mfd; C9, C14, C15 .1 Mfd; C10 .05 Mfd; C11 .025 Mfd; C12 .0005 Mfd; C13 10 Mfd 6 volt electrolytic.

R1, R11 5000 ohms; R2 400 ohms; R3 1 meg; R4 200 ohms; R5 25 ohms; R6 30,000 ohms; R7 250,000 ohms; R8 $\frac{1}{2}$ meg volume control; R9 100,000 ohms; R10 800 ohms; R12 (not shown on circuit) $\frac{1}{2}$ meg. tone control connected in series to a .005 Mfd condenser between plates of output tubes.

R4 and R5 are 10 watt resistors. R5 is a protective resistor against a short circuit between negative "B" lead and chassis panel.

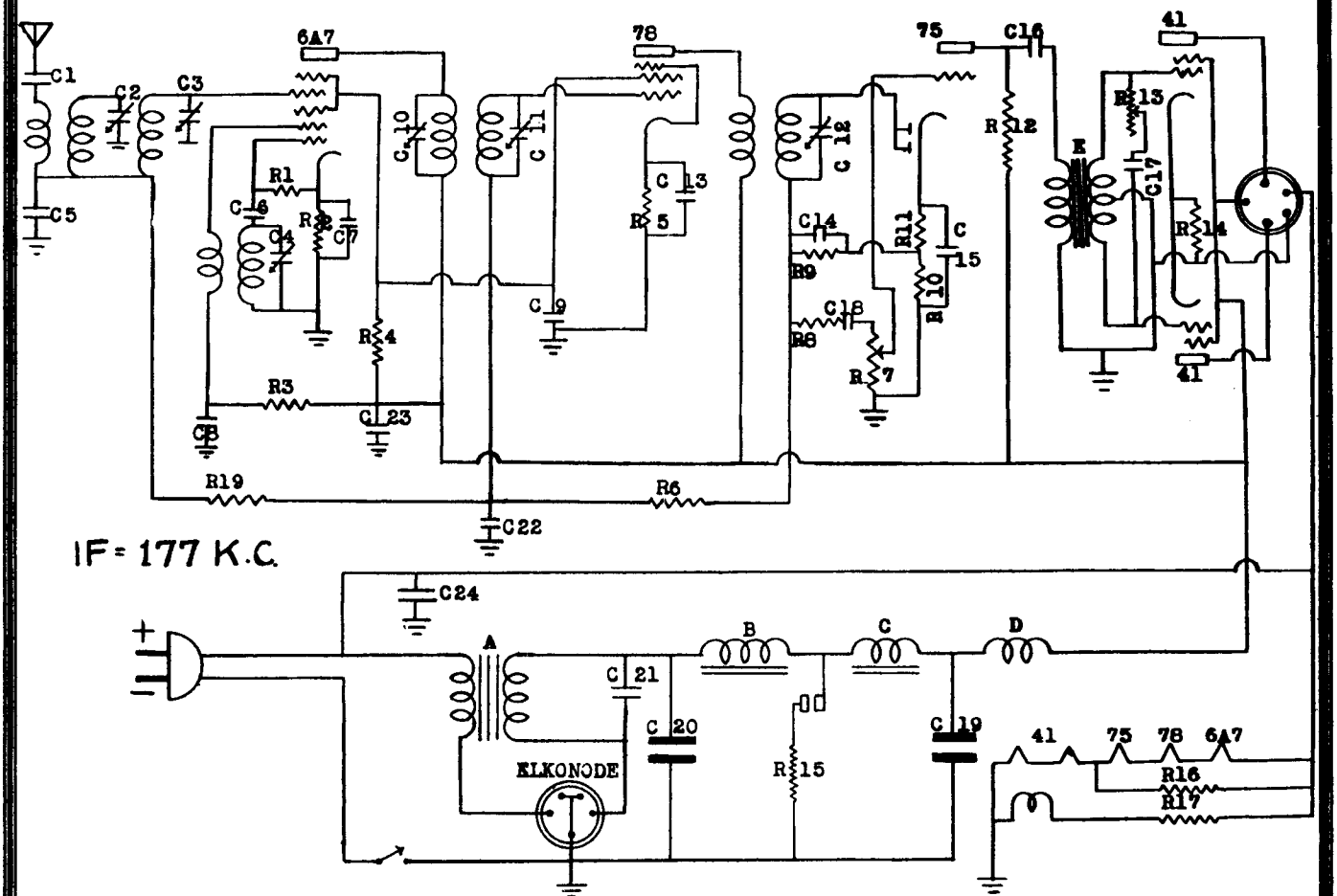
Voltage readings are not given on these models, since these readings will be dependent upon the type of "B" battery used.

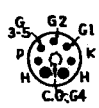
As will be noted from the circuit diagram the filament circuits of the tubes are in series, hence if one tube has an open filament the others will receive no filament current. In a field test a tube may be tested for open filament by touching one filament prong to the central portion of the dial light socket and the other to ground (chassis) contact. If filament is not open, the dial light will become dimmed in above process.

A "B" battery may be operated on this receiver until it becomes noisy or depleted to such an extent that the necessary volume is no longer available.

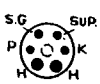
L. TATRO PRODS. CORP.

MODELS L 54 & N 54

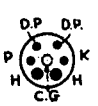




6A7



78



75

41

C2, C3, and C4 tuning condensers; C1 .0025 Mfd; C5, C7, C8, C9, C13, C16, C23 .1 Mfd; C6 100 mmfd; C10, C11, C12 I. F. trimmers; C14 .0005 Mfd; C15 10 Mfd 6 volt electrolytic; C17 .005 Mfd; C18 .025 Mfd; C19 16 Mfd 250 volt electrolytic; C20 8 Mfd 250 volt electrolytic; C21 .01 Mfd 1600 volts; C22 .05 Mfd; C24 20 Mfd 40 volt electrolytic.

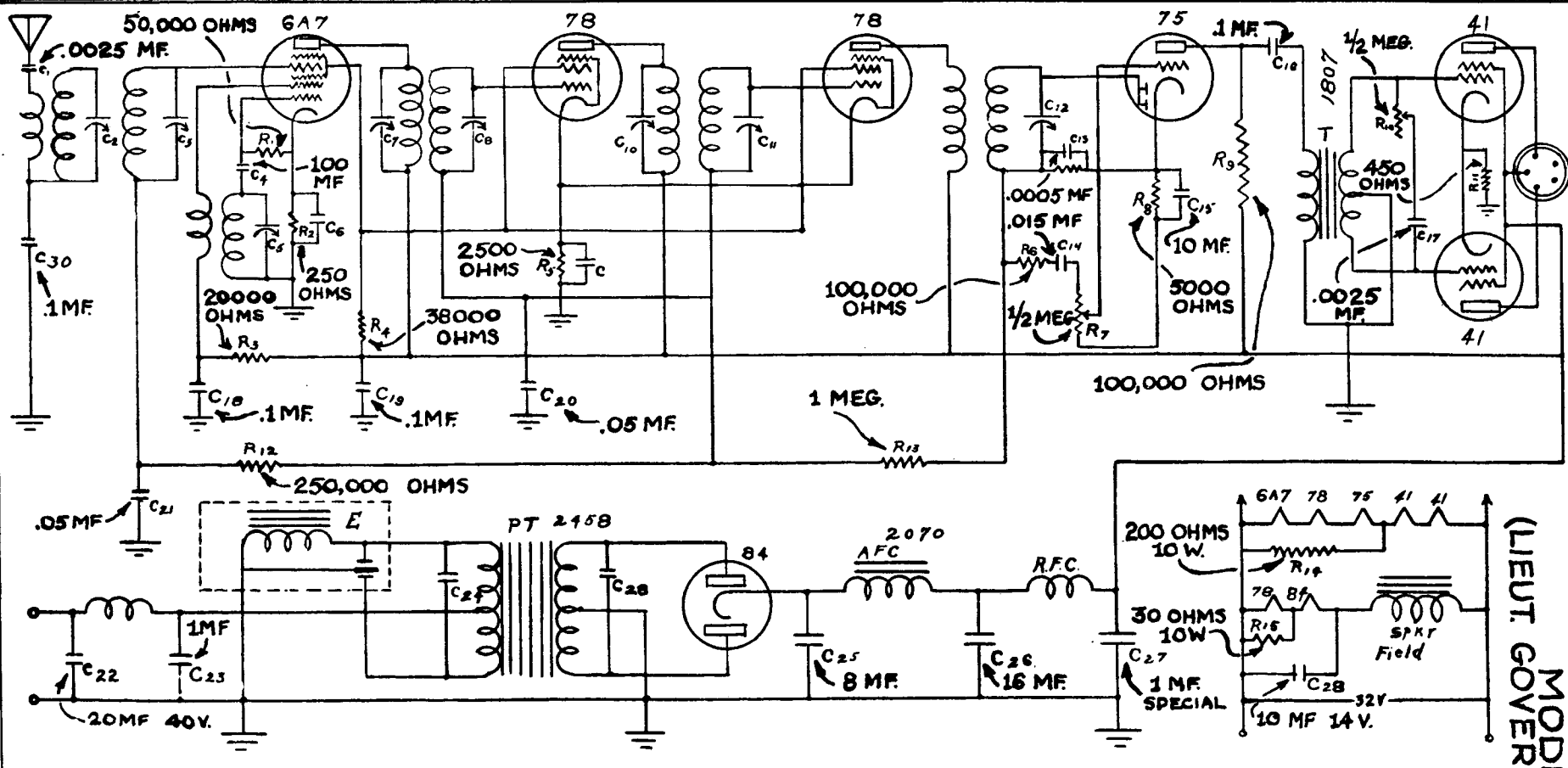
R1 30,000 ohms; R2 250 ohms; R3 20,000 ohms; R4 38,000 ohms; R5 400 ohms; R6 1 meg ohm; R7 ½ meg volume control; R8 30,000 ohms; R10 3500 ohms; R11 1500 ohms; R12 100,000 ohms; R13 ½ meg tone control; R14 800 ohms; R15 7000 ohms; R16 and R17 200 ohms; R9 and R19 250,000 ohms.

R6, R9, R12 and R14 are 2 watt resistors. R15, R16 and R17 are 10 watt resistors. All the rest of the resistors are of the 1 watt type. The I.F. units of this model are peaked at approximately 177 K.C. C6 is of a variable mica type condenser and may be adjusted to eliminate oscillation if there be any on the high frequency end of the dial.

Approximate voltage readings to ground at no signal using, a 1000 ohm-per-volt meter, 300 volt scale on high readings: Line voltage at receiver 31.5; plate 6A7, 193 volts, screen 3 and 5 6A7, 78 volts; anode grid 6A7, 152 volts; Cathode 6A7, 1.6 volts. Plate 78, 193; screen 78, 78 volts; cathode 78, 2.6 volts. Plate 75, 130 volts; cathode 75, 1.35 volts. Plates 41s, 193; screens 41s, 197; cathodes 41s, 18.5 volts.

L. TATRO PRODS. CORP.

MODELS L74-N74 (LIEUT. GOVERNOR & GOVERNOR)

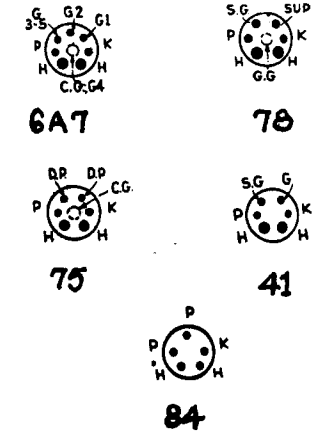


The filaments of the tubes of this receiver are operated in a series network and if any one tube of a series is removed the other tubes will not light. The speaker field is inserted in series with the type 84 and one of the type 78 tubes. In order to test for an open filament remove the tubes and touch one of the filament prongs to the central portion of the dial light socket and the other filament to the ground (chassis) contact. If the filament is not open the dial light will become dimmed during the above process.

The intermediate amplifiers are tuned to 175 K. C. This receiver is aligned at the factory and should not be adjusted without the use of a satisfactory signal generator and output meter. Following are the average voltages measured with a 1000-ohm-per-volt meter from chassis to point designated:

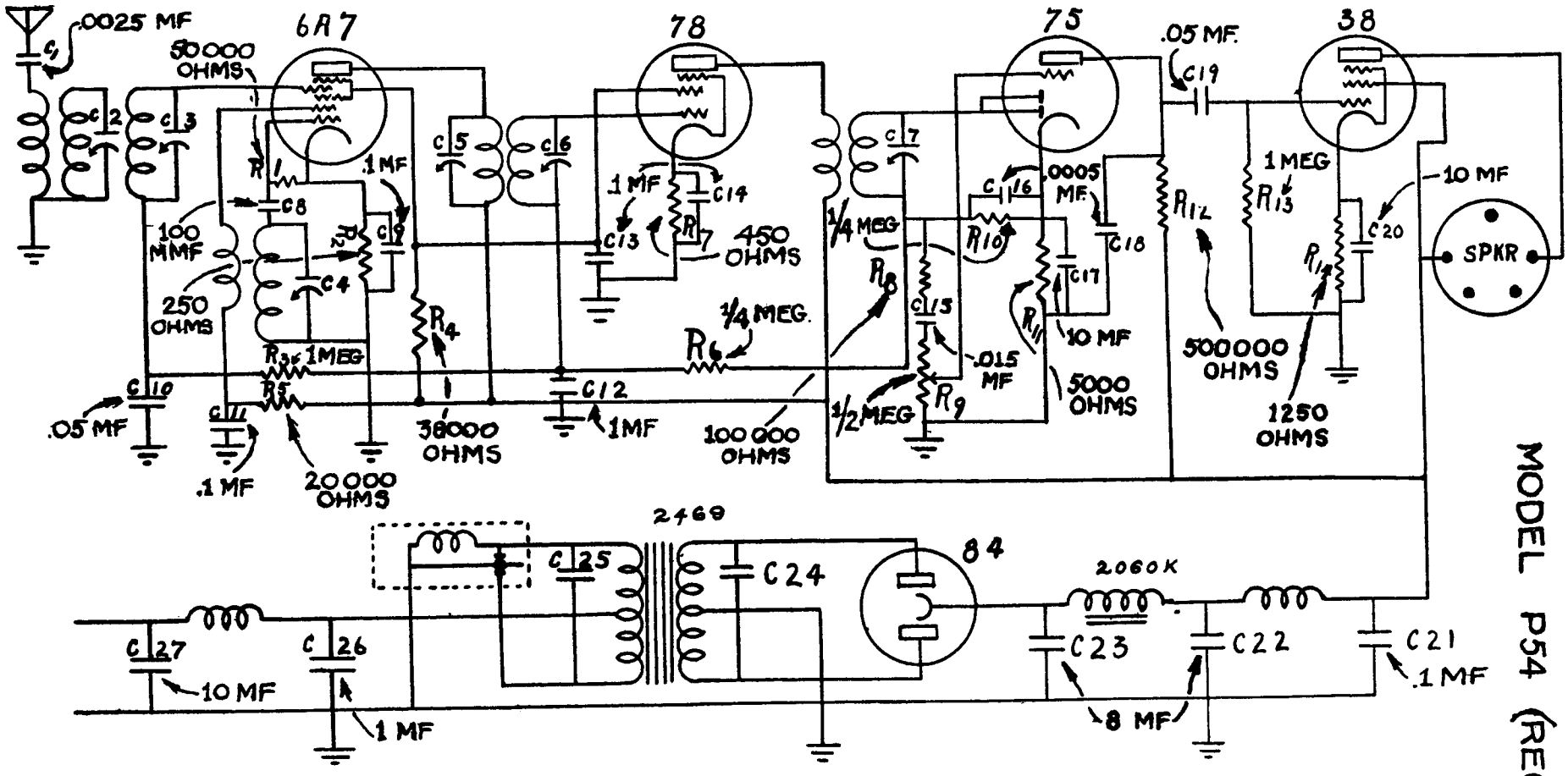
TUBE	PLATE	SCREEN	CATHODE	ANODE GRID
6A7	198	80	2.4	140
*78	198	80	7.	...
75	194	...	1.5	...
*41	193	198	16.5	...

*Two tubes used; same readings on both tubes.



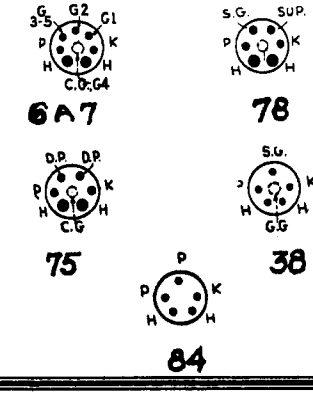
L. TATRO PRODS. CORP.

MODEL P54 (RECORDER)



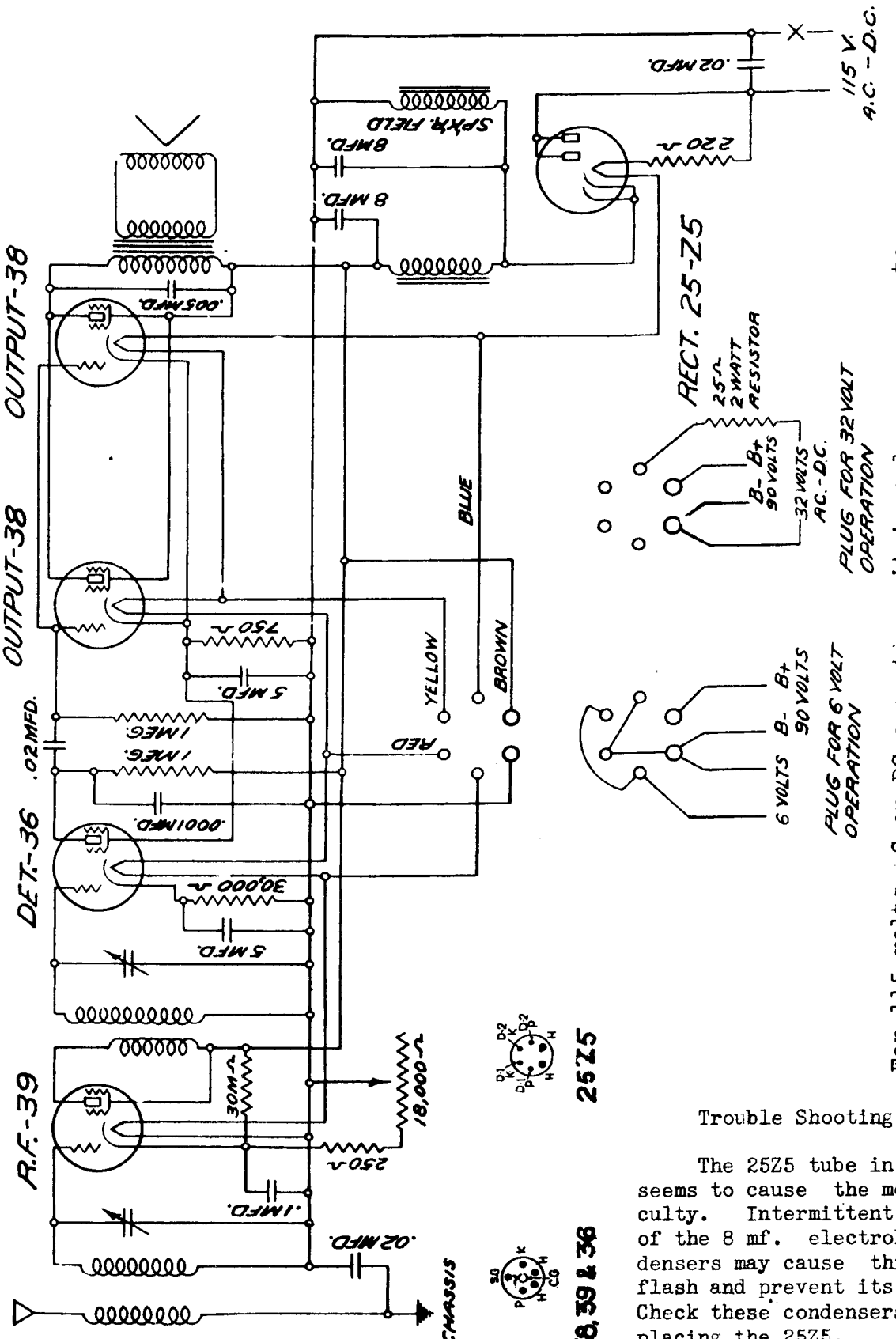
Intermediate amplifiers are tuned at 177½ K. C. This receiver is aligned at the factory and should not be adjusted without the use of a satisfactory signal generator or oscillator in connection with an output meter. Following are the average operating voltages measured with a 1000-ohm-per-volt meter from chassis to point designated:

TUBE	PLATE	SCREEN	CATHODE	ANODE GRID
75	108	...	1.05	...
38	158	165	15.5	...
78	163	100	3.	...
6A7	163	100	2.9	120



TRANSFORMER CORP. OF AMERICA

MODEL 400 A.C.-D.C.



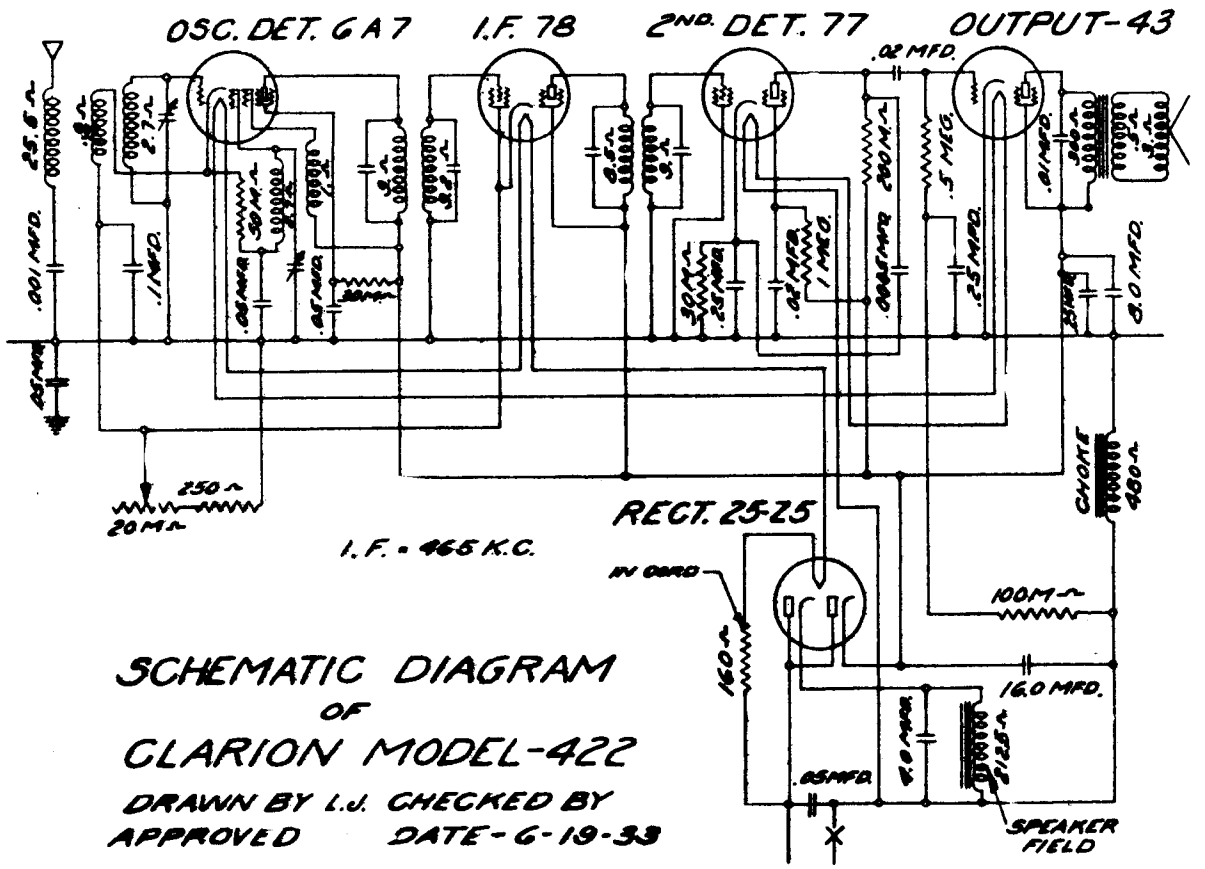
For 115 volts AC or DC operation, it is only necessary to insert the plug into a convenient outlet. For operation on 220 volt AC or DC, a Clarostat type 7820 C line voltage resistor should be obtained and inserted between the power cord of set and the outlet. The set draws approximately 42 watts power.

Trouble Shooting Hints

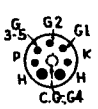
The 25Z5 tube in this set seems to cause the most difficulty. Intermittent breakdown of the 8 mf. electrolytic condensers may cause this tube to flash and prevent its operation Check these condensers when replacing the 25Z5.

TRANSFORMER CORP. OF AMERICA

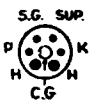
CLARION MODEL 422 & 423 A.C.-D.C.



SCHEMATIC DIAGRAM
OF
CLARION MODEL-422
DRAWN BY L.J. CHECKED BY
APPROVED DATE-6-19-33

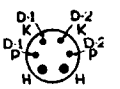


6A7



77 & 78

43



25Z5

SOCKET VOLTAGE ANALYSIS OF MODEL 422

USING A 1000 OHM PER VOLT METER

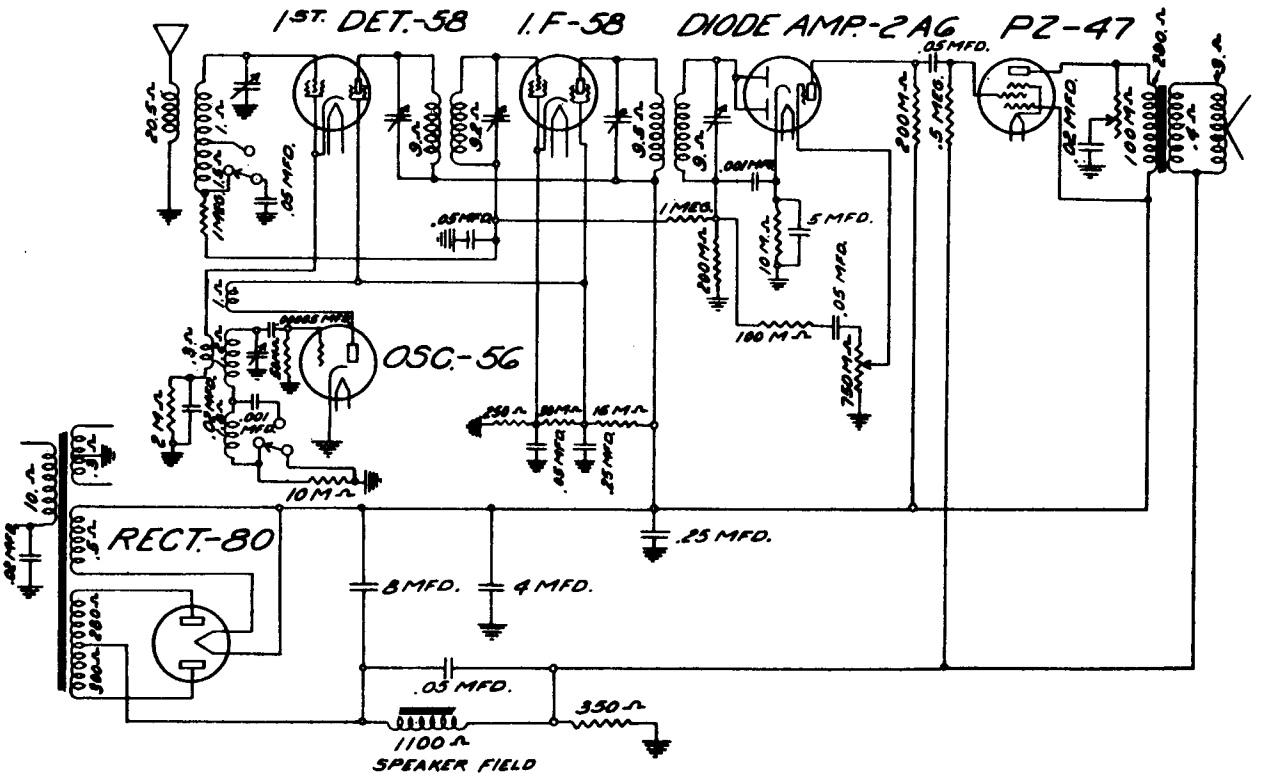
No.	STAGE	TUBE	Ef	Ep	Eg	Ek	Esg	Esug	Ip	Ep-0	Eg-0	Ip-0
1	Osc. Det. .	6A7	48	80	2.5	15	35		.6	77	.2	1.8
2	I. F. . . .	78	7	72	2.3	13	75	0	4.4			
3	2nd Det . .	77	6	28	.9	13	.3	.8	.1			
4	Output. . .	43	24	78	.3	13	82		13			
5	Rectifier .	25Z5	24	$_{p}90$		$_{c}90$			$_{p}32$			

0 - Oscillator
Volume Control - Full On
Line Voltage - 105

p - Per Plate
c - Per Cathode

TRANSFORMER CORP. OF AMERICA

MODEL 470



SOCKET VOLTAGE ANALYSIS OF MODEL 470

USING A 1000 OHM PER VOLT METER

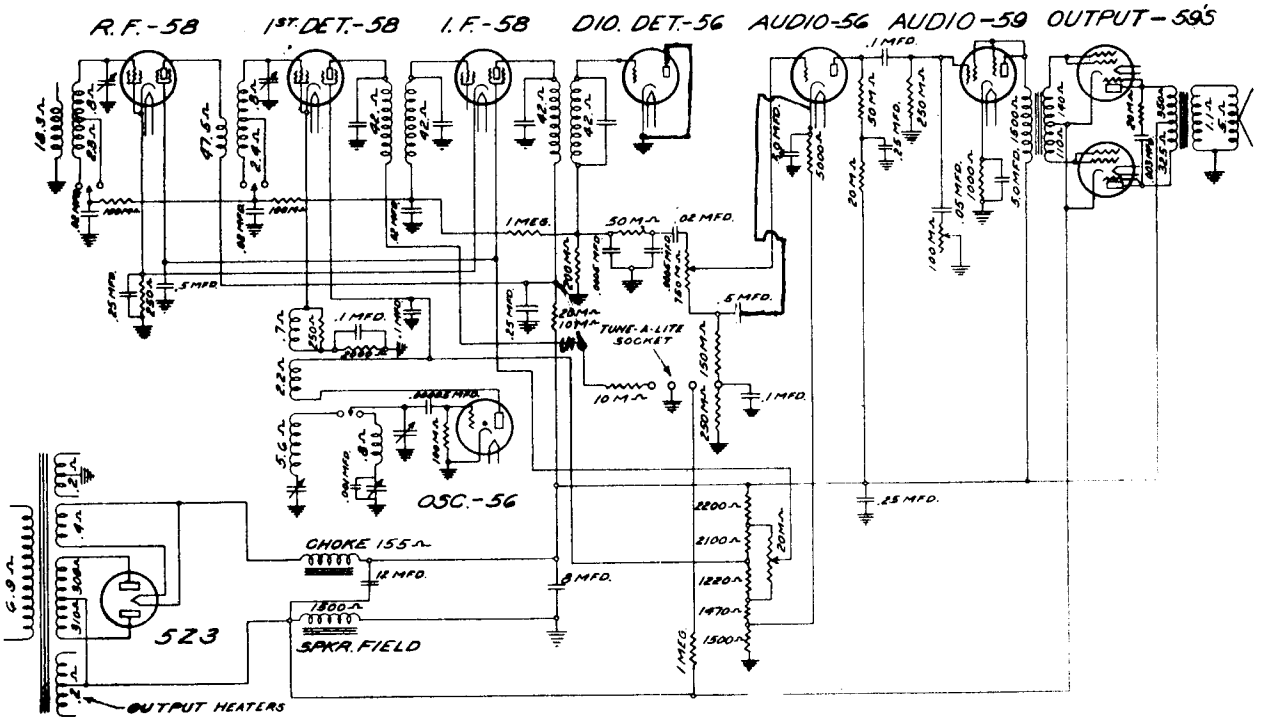
No.	STAGE	TUBE	Ef	Ep	Eg	Ek	Esg	Esug	Ip
1	1st Det. .	58	2.1	235	.4	7	80	0	2.7
2	Osc. . . .	56	2.1	95	.6	0			5
3	I. F . . .	58	2.1	243	.3	2.2	·85	0	6
4	Diode Amp.	2A6	2.1	140	4	1.1	d .1		.2
5	Output . .	PZ 47	2.1	235	.5	240			24
6	Rectifier.	80	4.7	p 328					p 24

Volume Control - Full On
Line Voltage - 109

p - Per Plate
d - Diode Plate

TRANSFORMER CORP. OF AMERICA

MODEL 480



58 56 59 5Z3

SOCKET VOLTAGE ANALYSIS OF MODEL 480

USING A 1000 OHM PER VOLT METER.

No.	Stage	Tube	Ef.	Ep.	Eg.	Ek.	Esg	Esug	Ip
1	R.F.	58	1.9	180	.2	2	72	0	3.7
2	1st. Det	58	1.9	230	1.2	6.5	100	0	2.6
3	Osc.	56	1.9	105	.1	0			5.5
4	I.F.	58	1.9	180	.2	2	72	0	3.5
5	Diode Det.	56	1.9	0	.3	0			0
6	Audio.	56	1.9	103	.1	42			1.3
7	2nd. Audio	59	2.1	190	3.5	19	190	190	16.5
8	Class B 1.	59	2.1	350	0	108	350	0	7
8	Class B 2.	59	2.1	350	0	108	350	0	7
9	Rectifier.	5Z3	4.5	$^{p}390$					$^{p}43$

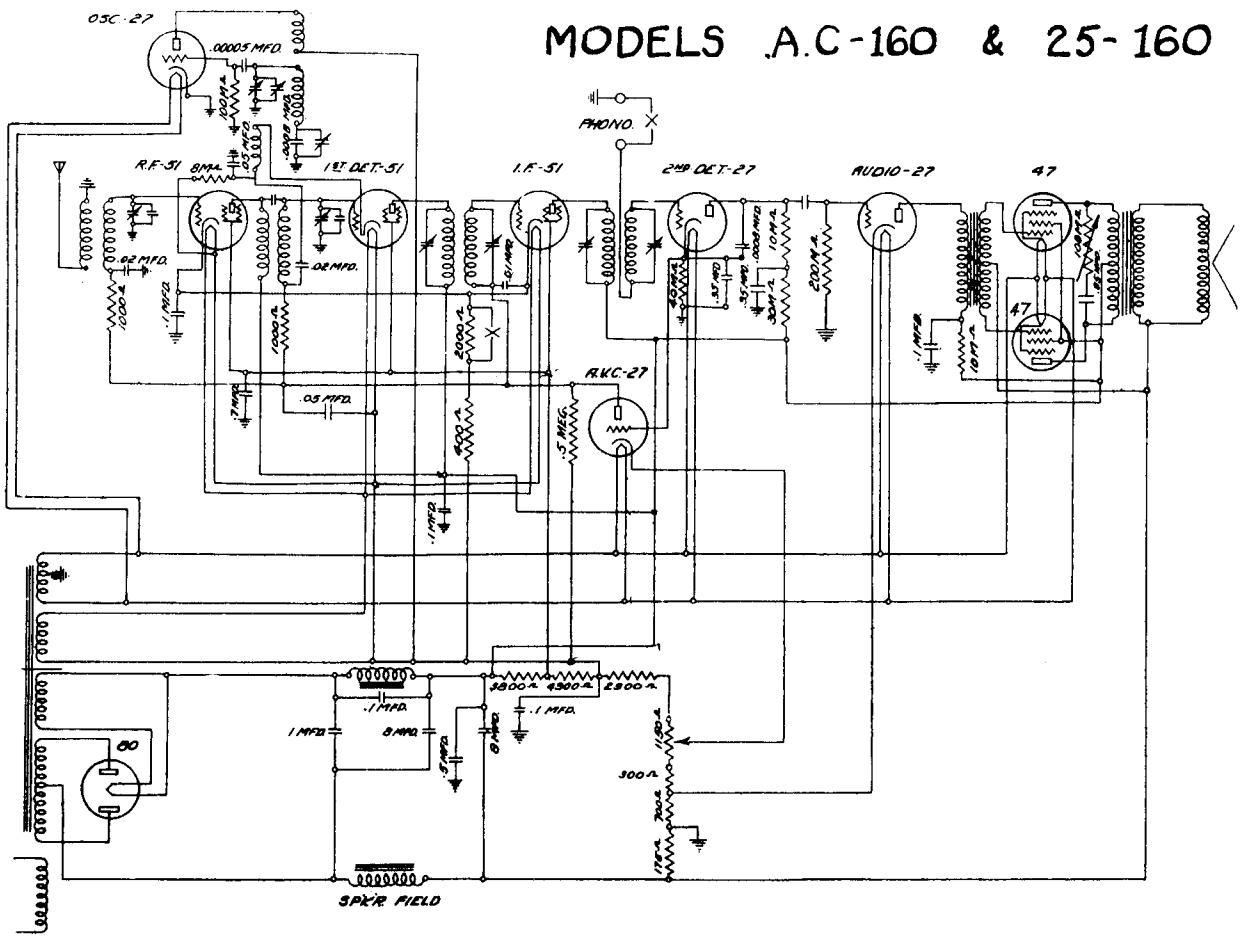
Volume Control Full On

Line Voltage--110

p--Per Plate

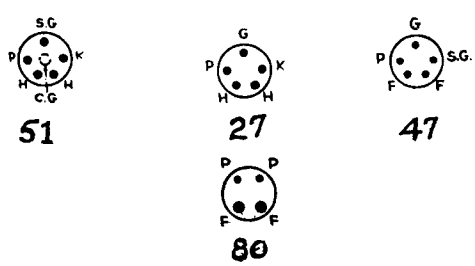
TRANSFORMER CORP. OF AMERICA

MODELS A.C-160 & 25-160



Vol. control position "full on" Super-sensitive switch "to right".

No.	Stage	Type Tube	"A" Volts	"B" Volts	Cont. Grid Volt	Cath. Volts	S.G. Volts	Ip. Norm.
1	R. F.	51	2.2	151	.2	3	75	3.
2	1st Det.	51	2.2	140	5.7	9	70	1.2
3	I. F.	51	2.2	151	.2	3	75	2.5
4	Osc.	27	2.1	115	0	0	0	9.5
5	2nd Det.	27	2.1	192	0	0	0	.5
6	1st Aud.	27	2.1	230	8	15	0	5.5
7 & 8	P.P. Pentodes	47	2.3	250	16.5	0	255	27
9	A. V. C.	27	2.2	15	20	45	0	0
10	Rect.	80	4.9	0	0	0	0	47



OSCILLATION. It should be remembered that with an intermediate frequency of 175 k.c., a heterodyne whistle, similar to oscillation, will be picked up at 700 k.c. This is due to the fourth harmonic of the receiver's oscillator frequency beating with the carrier frequency of the broadcasting station to produce an audio note in the loud speaker. However, this condition has been minimized in CLARION receivers and the intermediate frequency of 175 k.c. has been selected by many manufacturers as the one intermediate frequency having most advantages and least disadvantages.

In addition, oscillation may be brought about by a poor ground, or no ground at all being used. High line voltage may also cause oscillation. Omission of tube shields aggravates this condition. "Hot tubes" will seldom cause oscillation in a superheterodyne due to the wide tolerance shown by this circuit.

TRANSFORMER CORP. OF AMERICA

CLARION MODELS A.C.-240 - 25-240

VOLTAGE ANALYSIS

Model 240

No.	Stage	Tube	A	B	C	K	Sc.G	Ip.	Su.g
1	Autodyne. . . .	24	2.0	230	8.0	10	75	.6	....
2	Oscillator. . .	27	2.0	100	0	0	....	7.0	....
3	1st. I.F. . . .	51	2.0	250	.0	3.0	75	2.0	....
4	2nd. I.F. . . .	51	2.0	250	0	3.0	75	2.0	....
5	Audio	58	2.0	190	.4	0	25	1.0	.4
6	Dio Det	56	2.0	0	0	0	0	0	....
7	Output.	47	2.25	250	16.0	....	250	30.	....
8	Rectifier . . .	80	4.8	300	.....	.....	.....	.....	....

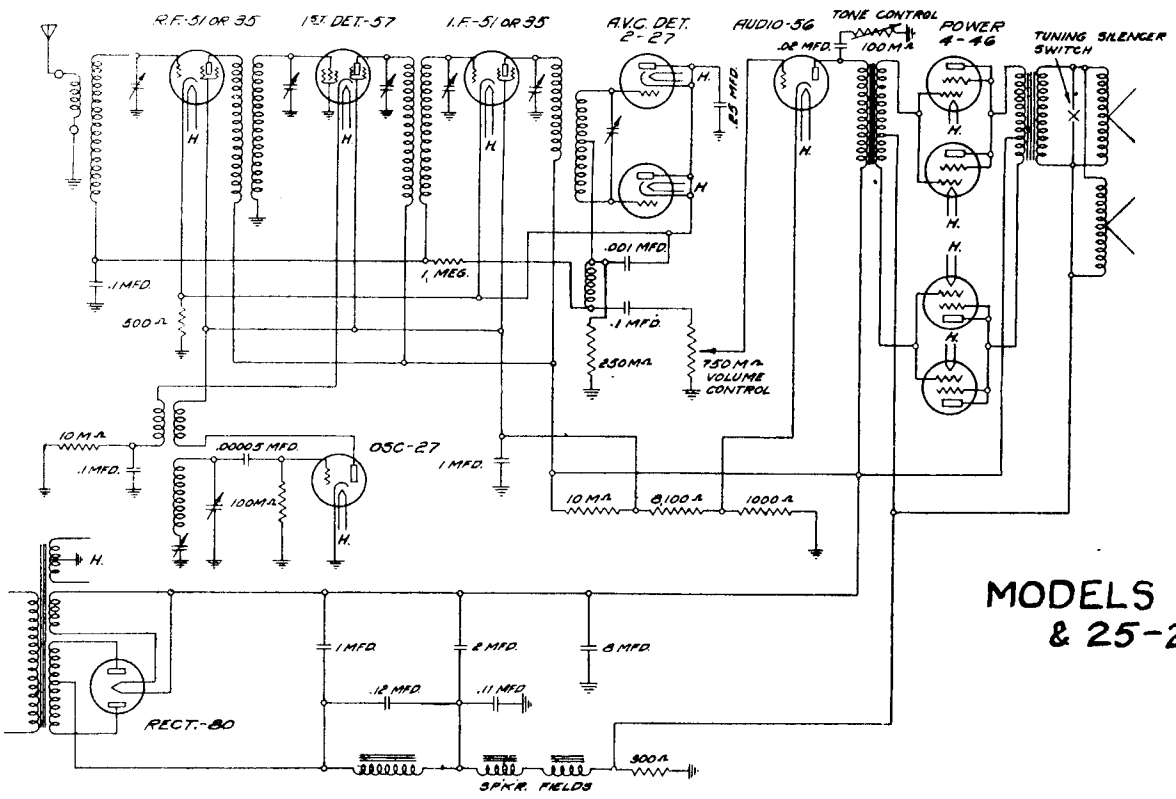
Vol. control "full on".
Band switch "broadcast".
Tested with Weston model 565 analyzer.
Line: 115 Volts.

ADJUSTING TRIMMERS: The model 240 receiver has ten trimmer condensers. The setting is critical, due to the high intermediate frequency that is employed, namely 490 K. C. Rough handling in shipment will occasionally jar these condensers and cause the set to lose sensitivity.

To adjust the trimmers connect your 490 K. C. oscillator to the first detector type 24 grid cap and in the following order. Readjust trimmers three, four, five, six, seven and eight for maximum output, preferably using an output meter as an indicator. The above operations take care of all intermediate adjustments. These trimmers will be found numbered on the drawings of the chassis, top view, in this manual.

Next disconnect the 490 K. C. oscillator and tune in a broadcast signal, either from an oscillator or a known frequency, crystal controlled, broadcasting station at 1400 K. C. Adjust trimmer #1 for maximum output, then adjust trimmer #2 for proper calibration so that the dial reads exactly 1400 K. C. when the signal is tuned in at maximum volume. Next retune the receiver to 600 K. C. and adjust #10 trimmer on the rear of the chassis, slowly increasing and decreasing the capacity of #10 trimmer at the same time, and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning.

TRANSFORMER CORP. OF AMERICA

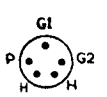


MODELS A.C.-280 & 25-280

51 OR 35

57

27 & 56



46

80

If your test oscillator is properly designed, it will supply exactly 175 k.c. and when trimmers No. 5, No. 6, No. 7 and No. 8 are set and turned for maximum output, they will be correctly adjusted.

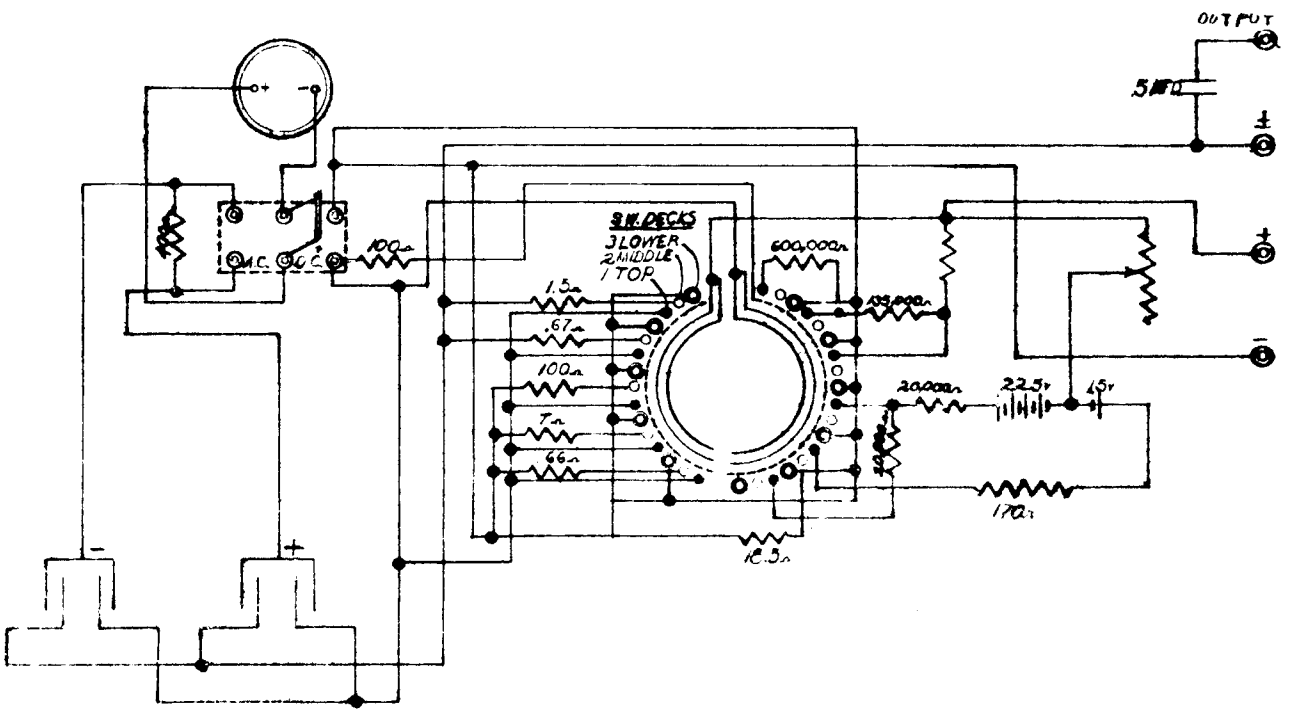
Next, disconnect the 175 k.c. test oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator or tune in a broadcast signal around 1400 k.c., then reset trimmer No. 2 and No. 1, respectively, for maximum output. This adjustment will track the first detector and r.f. stages.

No.	Stage	Type Tube	"A" Volts	"B" Volts	Cont. Grid Volts	Cath. Volts	Screen Volts	Ip, Norm.	Misc.
1	R. F.	51	2.2	250	.2	4.	77	4.	
2	1st. Det.	57	2.3	242	4.	5.	85	.25	Suppressor Grid 0
3	I. F.	51	2.2	249	.2	4.	77	2.	
4	Osc.	27	2.2	110	.05	0	0	8.	
5	Duo Det.	27	2.2	0	2.	5.	0	0	
6	Duo Det.	27	2.2	0	2.	5.	0	0	
7	1st. Aud.	56	2.3	237	3.	9.5	0	3.	
8	Output P.P.	46	2.4	245	32.			3.	Outer Grid Volts 245
9	Output P.P.	46	2.4	245	32.			3.	245
10	Output P.P.	46	2.4	245	32.			3.	245
11	Output P.P.	46	2.4	245	32.			3.	245
12	Rect.	80	4.9	340				108.	

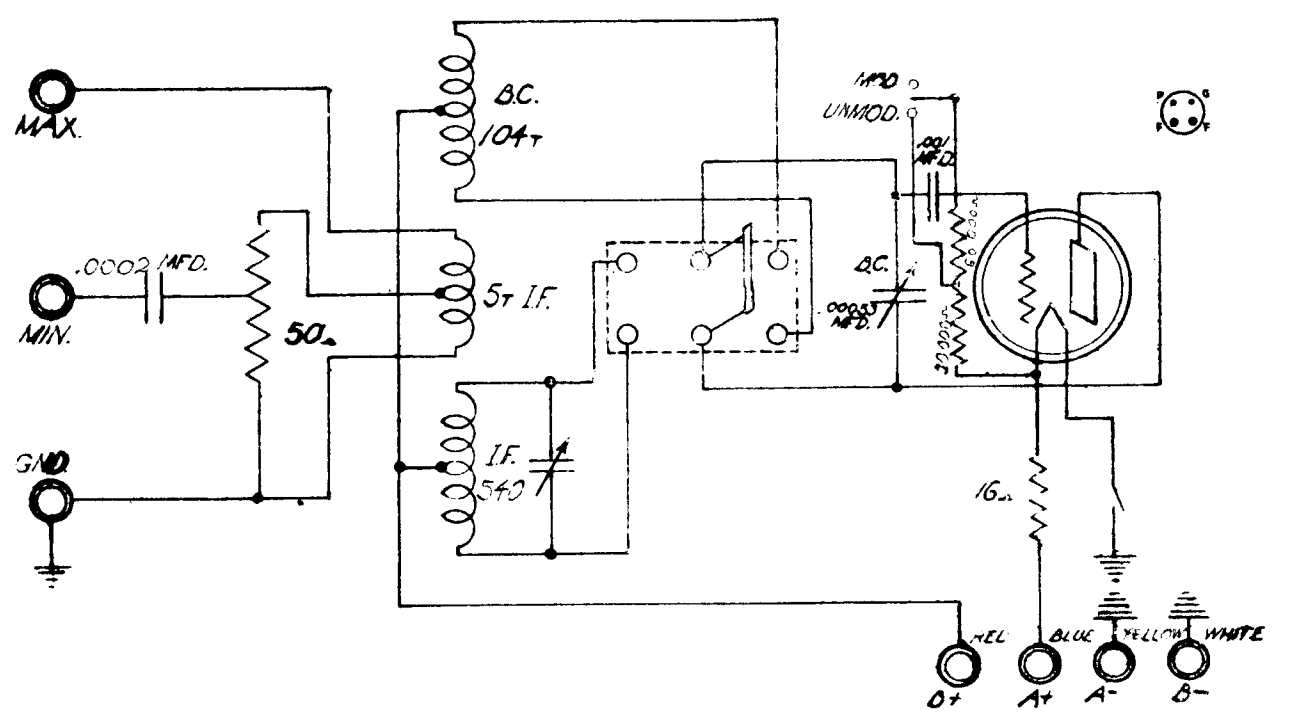
Line Voltage 115. Volume Control "Full On". Muting Switch "Out".

TRIPLETT ELECTRICAL INSTRUMENT CO.

MODEL 1125 TESTER

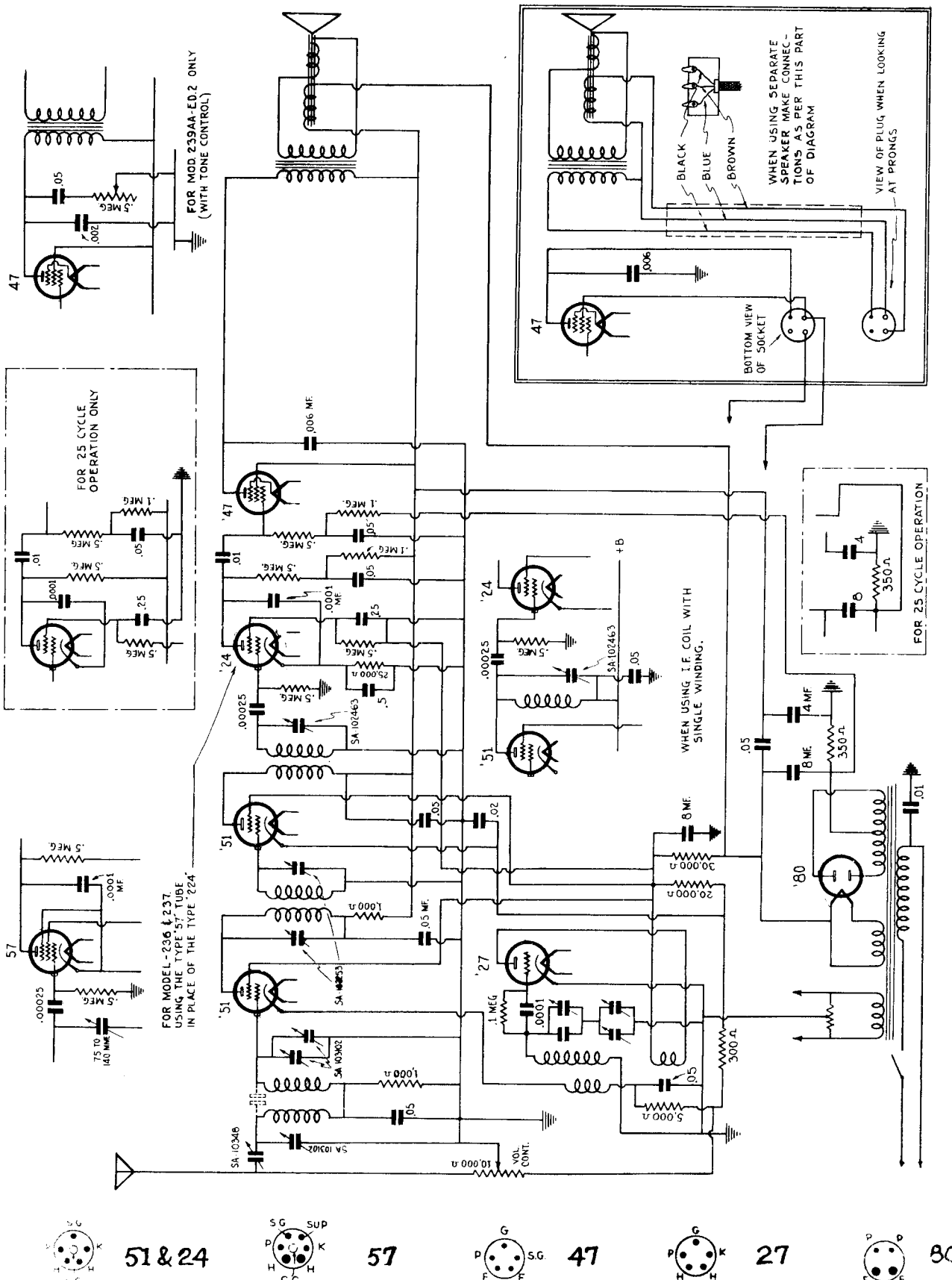


MODEL 1150 OSCILLATOR



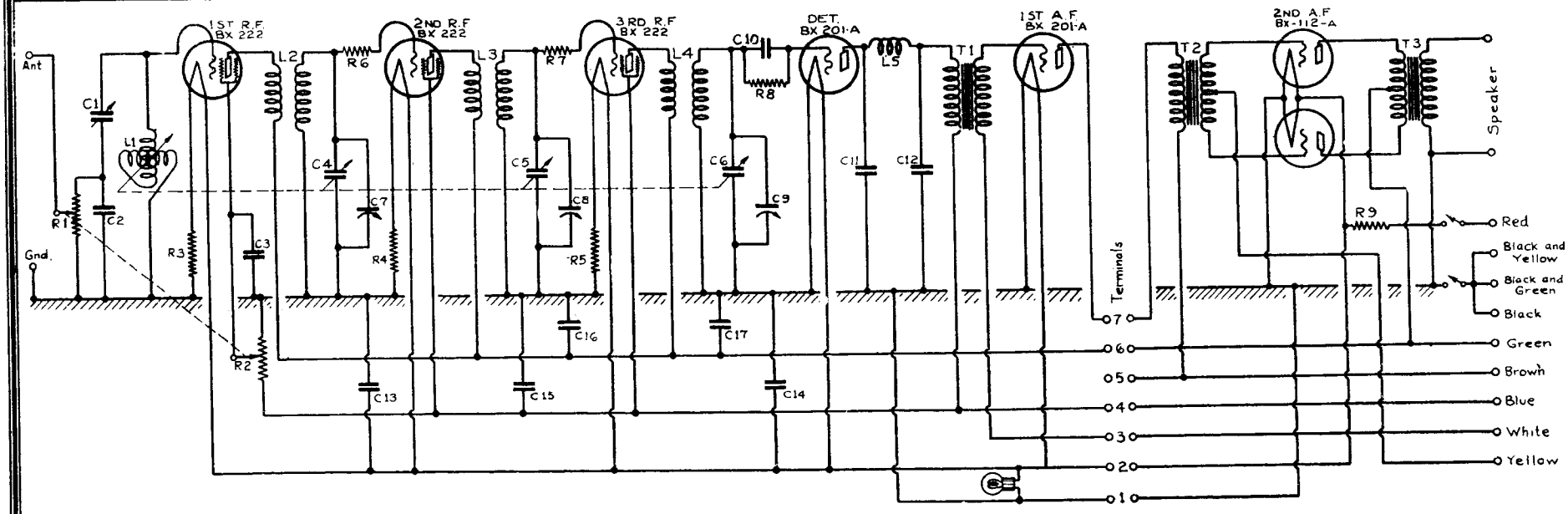
UNITED AMERICAN BOSCH CORP.

MODEL 36A & B



UNITED AMERICAN BOSCH CORP.

MODEL 56



C1. Trimming Condenser
C2. Antenna Condenser .00025 mf.
C3. Screen By-pass Condenser .5 mf.
C4. 2nd RF Tuning Condenser
C5. 3rd RF Tuning Condenser
C6. Detector Tuning Condenser
C7. 2nd RF Alignment Condenser
C8. 3rd RF Alignment Condenser
C9. Detector Alignment Condenser
C10. Grid Condenser .00025 mf.
C11. Detector By-pass Condenser .001 mf.
C12. Detector By-pass Condenser .001 mf.
C13. Filament By-pass Condenser .5 mf.
C14. Filament By-pass Condenser .5 mf.
C15. Screen By-pass Condenser .5 mf.
C16. Plate By-pass Condenser .5 mf.
C17. Plate By-pass Condenser .5 mf.

R1. Volume Control (Antenna) 10,000 ohms
R2. Volume Control (Screen) 50,000 ohms
R3. Filament Resistor 12.8 ohms
R4. Filament Resistor 12.8 ohms
R5. Filament Resistor 12.8 ohms
R6. 2nd RF Grid Resistor 250 ohms
R7. 3rd RF Grid Resistor 250 ohms
R8. Grid Leak 2 meg.
R9. Main Filament Resistor .55 ohms

T1. 1st Audio Transformer
T2. 2nd Audio Input Transformer
T3. 2nd Audio Output Transformer

L1. Variometer
L2. 2nd RF Coil
L3. 3rd RF Coil
L4. Detector Coil
L5. Detector Choke Coil

TABLE OF SOCKET VOLTAGES

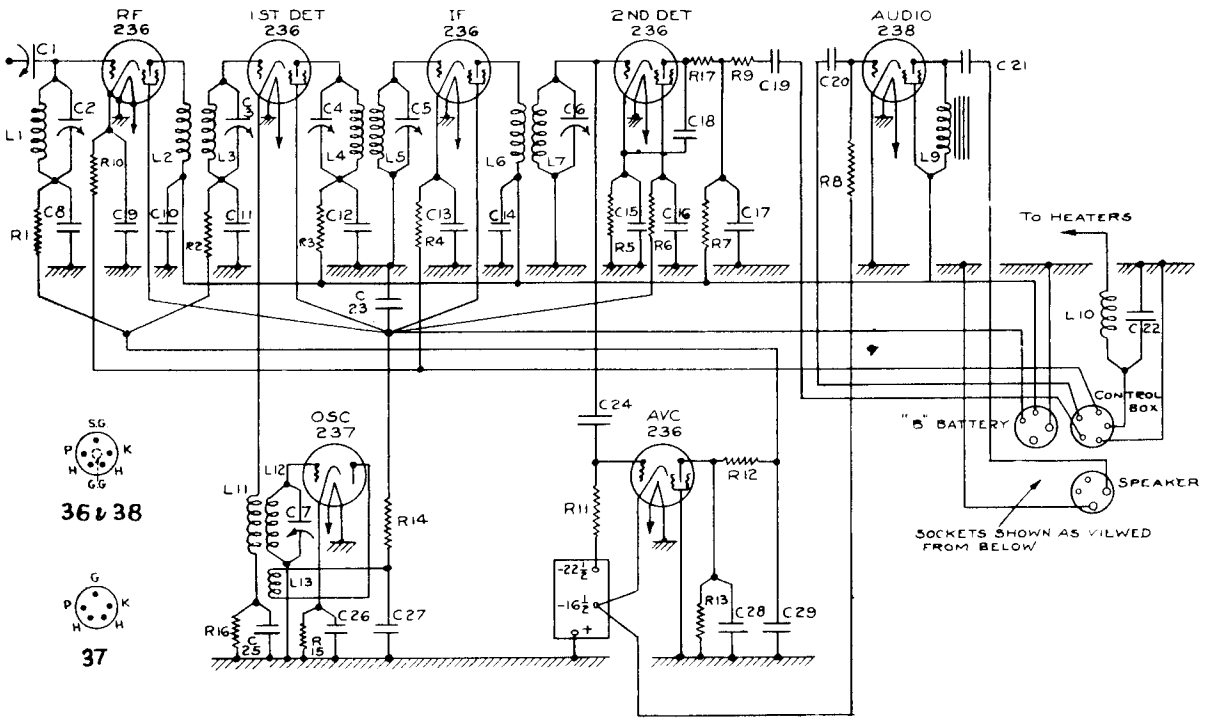
Stage	Tube	Fil. Volts	Plate Volts	Screen Volts	Grid Volts	Plate M. A.
1st RF	222	3.2	135	45	1.7	1.5
2nd RF	222	3.2	135	45	1.7	1.5
3rd RF	222	3.2	135	45	1.7	1.5
Det.	201-A	5.0	45	—	—	1.5
1st AF	201-A	5.0	90	—	4½	2.5
2nd AF	112-A	5.0	135	—	9	7.0
2nd AF	112-A	5.0	135	—	9	7.0

22

201A & 12A

UNITED AMERICAN BOSCH CORP.

MODEL 108 POLICE CAR RADIO



1. Switch the receiver "on" and turn the volume and sensitivity control to maximum position.

2. Adjust OSCILLATOR condenser until the signal is picked up, using a special screw driver with an insulated tip. (Such as American Bosch Service Tool No. 432).

3. Reduce the sensitivity control until the station can just be heard, and readjust the OSCILLATOR until the signal is loudest.

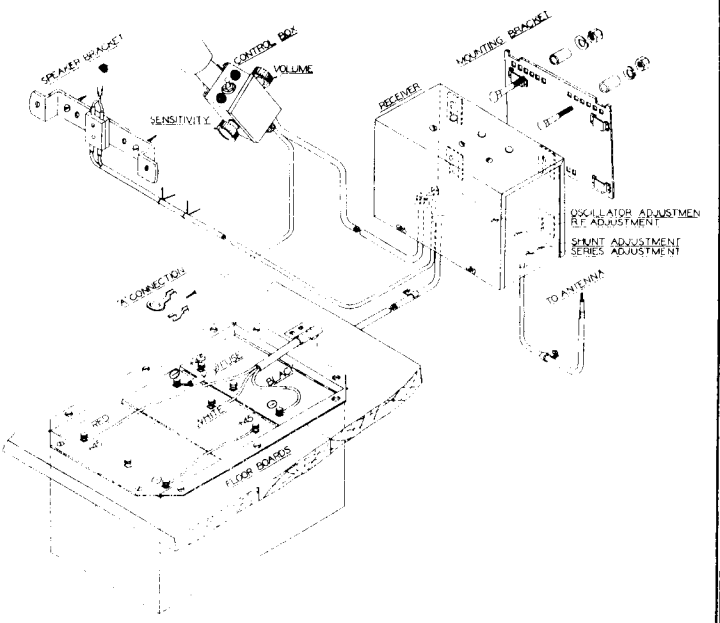
4. Reduce the sensitivity control until the station can just be heard and adjust the RF alignment for maximum volume. As the volume increases, reduce the sensitivity as far as possible. This permits a sharper adjustment to be made, as the ear is more sensitive to changes in volume when the signal is faint.

5. Screw the SERIES antenna condenser in as far as possible. Pay no attention to the signal while doing this.

6. Attempt to find a position of the SHUNT condenser which will give maximum volume. Always reduce the sensitivity control when increased response of the set results from the various adjustments which you are making.

7. If no position of the SHUNT condenser will give a point of maximum volume or "peak" unscrew it as far as possible and slowly unscrew the SERIES condenser until the adjustment is obtained. Endeavor to obtain this adjustment with the SERIES condenser screwed IN as far as possible.

R1	10,000 ohms	C1	75 to 140 mmf		
R2	10,000 ohms	C2	7 to 70 mmf	C17	.00025 mfd
R3	1,000 ohms	C3	75 to 140 mmf	C18	.00025 mfd
R4	1,000 ohms	C4	75 to 140 mmf	C19	.006 mfd
R5	1 megohm	C5	75 to 140 mmf	C20	.05 mfd
R6	500,000 ohms	C6	75 to 140 mmf	C21	.5 mfd
R7	500,000 ohms	C7	100 to 280 mmf	C22	.25 mfd
R8	1 megohm	C8	.05 mfd	C23	.25 mfd
R9	100,000 ohms	C9	.05 mfd	C24	.0001 mfd
R10	1,000 ohms	C10	.05 mfd	C25	.05 mfd
R11	2 megohm	C11	.05 mfd	C26	.05 mfd
R12	100,000 ohms	C12	.05 mfd	C27	.05 mfd
R13	500,000 ohms	C13	.05 mfd	C28	.25 mfd
R14	1,000 ohms	C14	.05 mfd	C29	.25 mfd
R15	2,000 ohms	C15	.25 mfd		
R16	20,000 ohms	C16	.25 mfd		
R17	10,000 ohms				



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MODELS 113 & 123 POLICE AUTO RECEIVERS

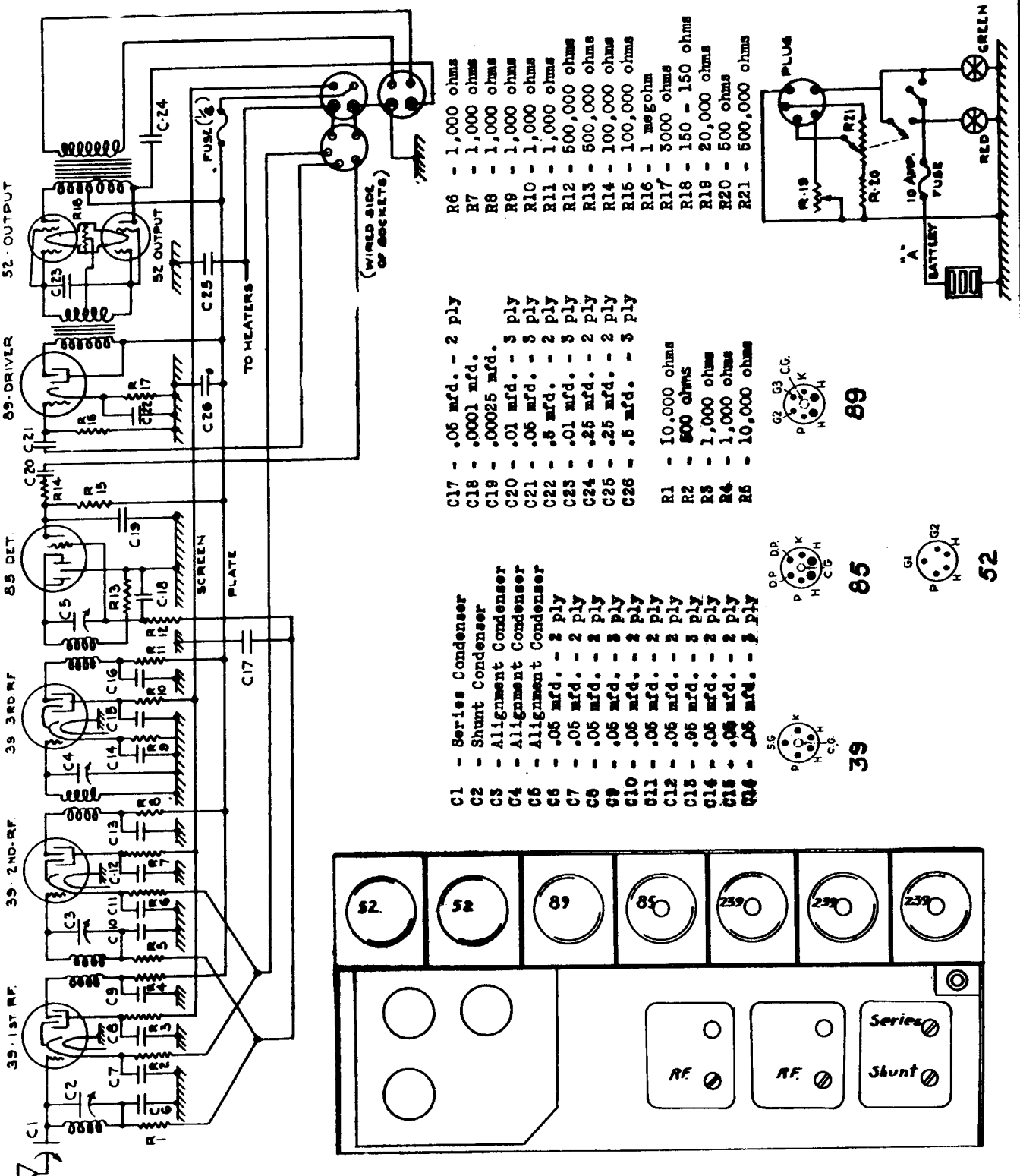


DIAGRAM OF CHASSIS SHOWING TUBES AND ADJUSTMENTS

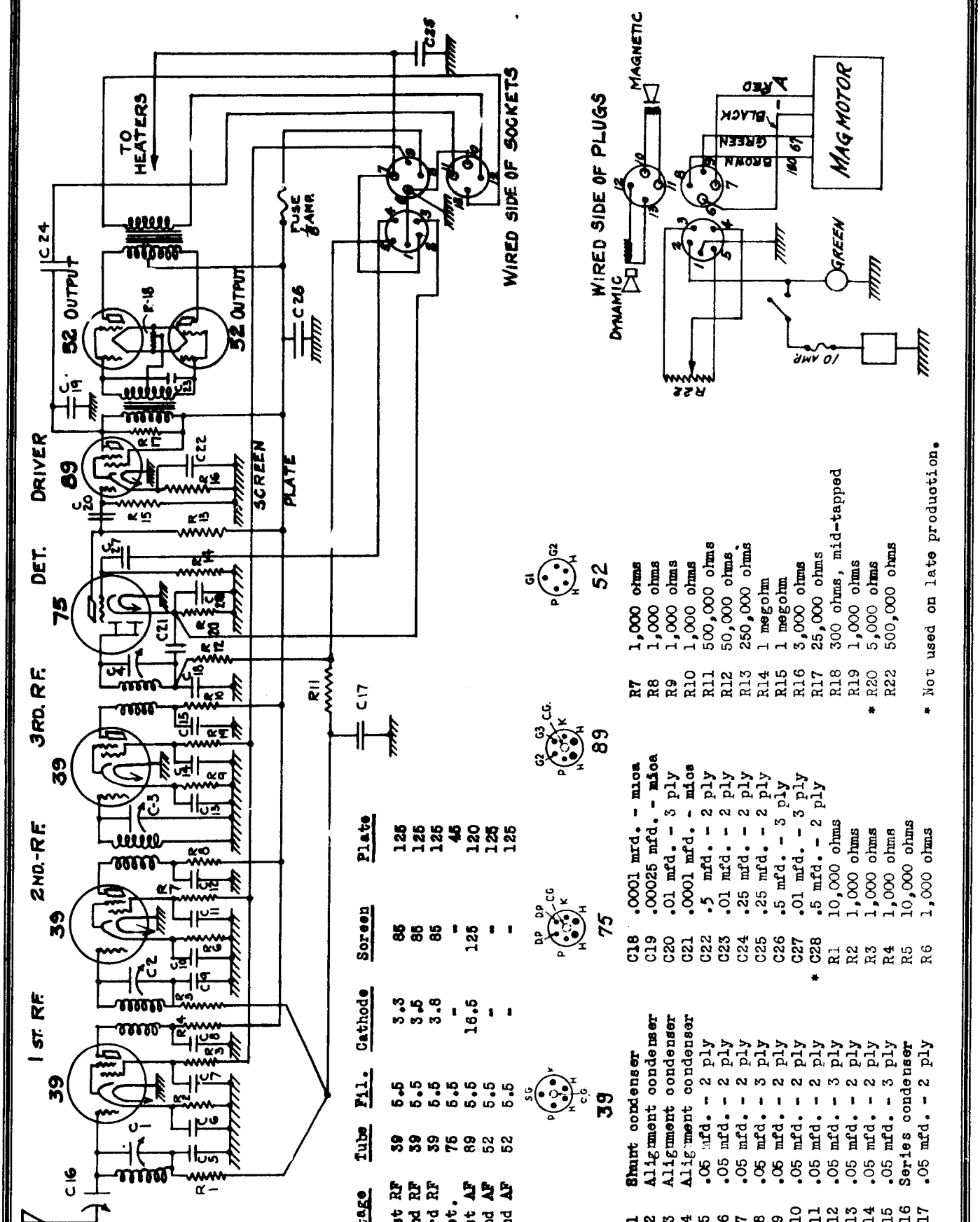
Socket Voltages

The following voltage readings are made between ground (metal chassis) and the element designated. The readings are only approximate, and will vary with the type of tester used, condition of the tubes, and other factors.

Stage	Tube	Fil.	Bias	Screen	Plate
1st RF	39	5.5	3.0	75	160
2nd RF	39	5.5	3.0	75	160
3rd RF	39	5.5	3.1	75	160
Det.	85	5.5	-	-	25
1st AF	89	5.5	21	160	150
2nd AF	52	5.5	-	-	160
2nd AF	52	5.5	-	-	160

UNITED AMERICAN BOSCH CORP.

MODEL 113X & 123X POLICE CAR RADIO



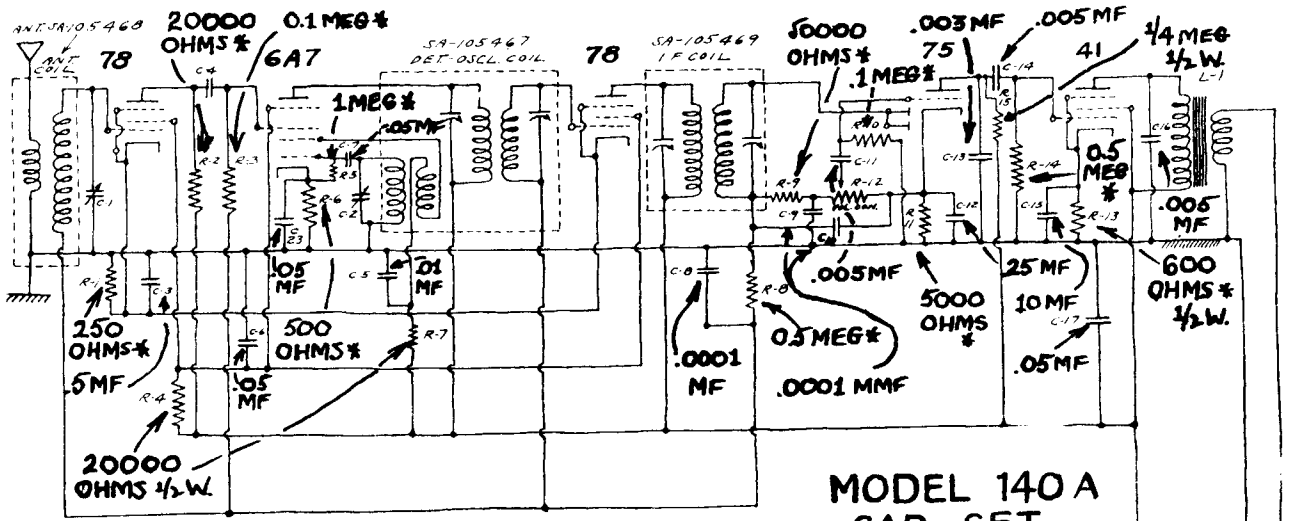
Stage	Tube	Fil.	Cathode	Screen	Plate
1st RF	39	6.5	3.3	85	125
2nd RF	39	6.5	3.5	85	125
3rd RF	39	6.5	3.8	85	125
Det.	75	6.5	-	-	45
1st AF	89	6.5	16.5	125	120
2nd AF	52	6.5	-	-	125
2nd AF	52	6.5	-	-	125

C1	Shunt condenser	C18	.0001 mfd. - mica	R7	1,000 ohms
C2	Alignment condenser	C19	.00025 mfd. - mica	R8	1,000 ohms
C3	Alignment condenser	C20	.01 mfd. - 3 ply	R9	1,000 ohms
C4	Alignment condenser	C21	.0001 mfd. - mica	R10	1,000 ohms
C5	.05 mfd. - 2 ply	C22	.5 mfd. - 2 ply	R11	500,000 ohms
C6	.05 mfd. - 2 ply	C23	.01 mfd. - 2 ply	R12	50,000 ohms
C7	.05 mfd. - 2 ply	C24	.25 mfd. - 2 ply	R13	250,000 ohms
C8	.05 mfd. - 3 ply	C25	.25 mfd. - 2 ply	R14	1 megohm
C9	.05 mfd. - 2 ply	C26	.5 mfd. - 3 ply	R15	1 megohm
C10	.05 mfd. - 2 ply	C27	.01 mfd. - 3 ply	R16	3,000 ohms
C11	.05 mfd. - 2 ply	* C28	.5 mfd. - 2 ply	R17	25,000 ohms
C12	.05 mfd. - 3 ply			R18	300 ohms, mid-tapped
C13	.05 mfd. - 2 ply			R19	1,000 ohms
C14	.05 mfd. - 2 ply			* R20	5,000 ohms
C15	.05 mfd. - 3 ply			R22	500,000 ohms
C16	Series condenser				
C17	.05 mfd. - 2 ply				

R1	10,000 ohms
R2	1,000 ohms
R3	1,000 ohms
R4	1,000 ohms
R5	10,000 ohms
R6	1,000 ohms

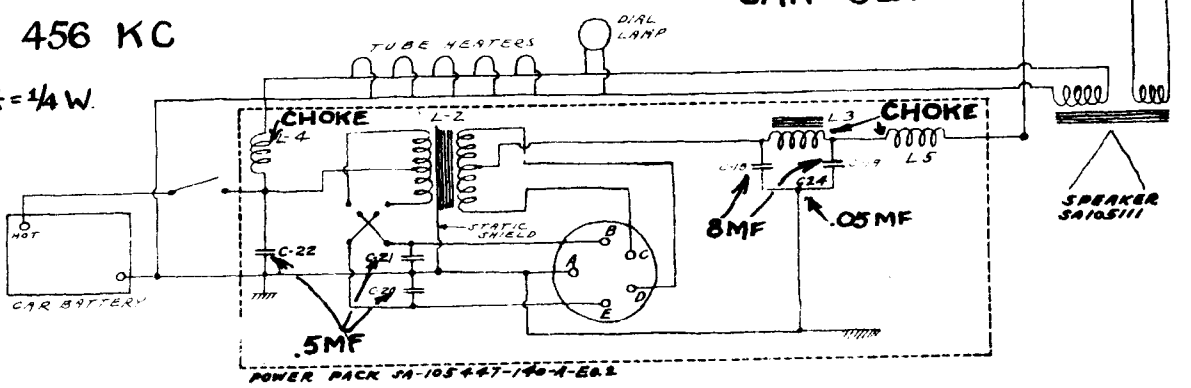
* Not used on late production.

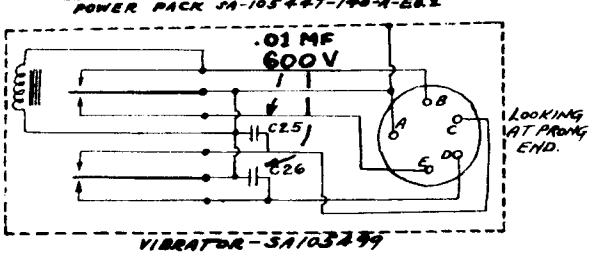
UNITED AMERICAN BOSCH CORP.

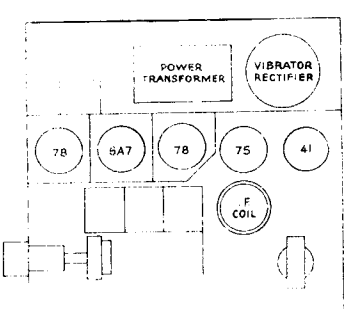


IF = 456 KC

NOTE * = 1/4 W.







78 6A7 75 41

Voltages read from ground to following points with Weston Model 564 Voltohmeter (six volt storage battery used).

3	5.9 V.	9	5.9 V.	16	5.9 V.	22	5.9 V.	28	5.9 V.
5	3.0 V.	11	3.5 V.	18	3.0 V.	24	1.5 V.	30	14.0 V.
7	80 V.	12	-8.5 V.	20	80 V.	27	60 V.	32	185 V.
8	90 V.	13	135 V.	21	185 V.			33	175 V.
		14	80 V.						
		15	185 V.						

78- R.F. Socket
3- Fil. (Hot)
4- Fil. (Grd.)
5- Cathode
6- Suppressor
7- Screen
8- Plate

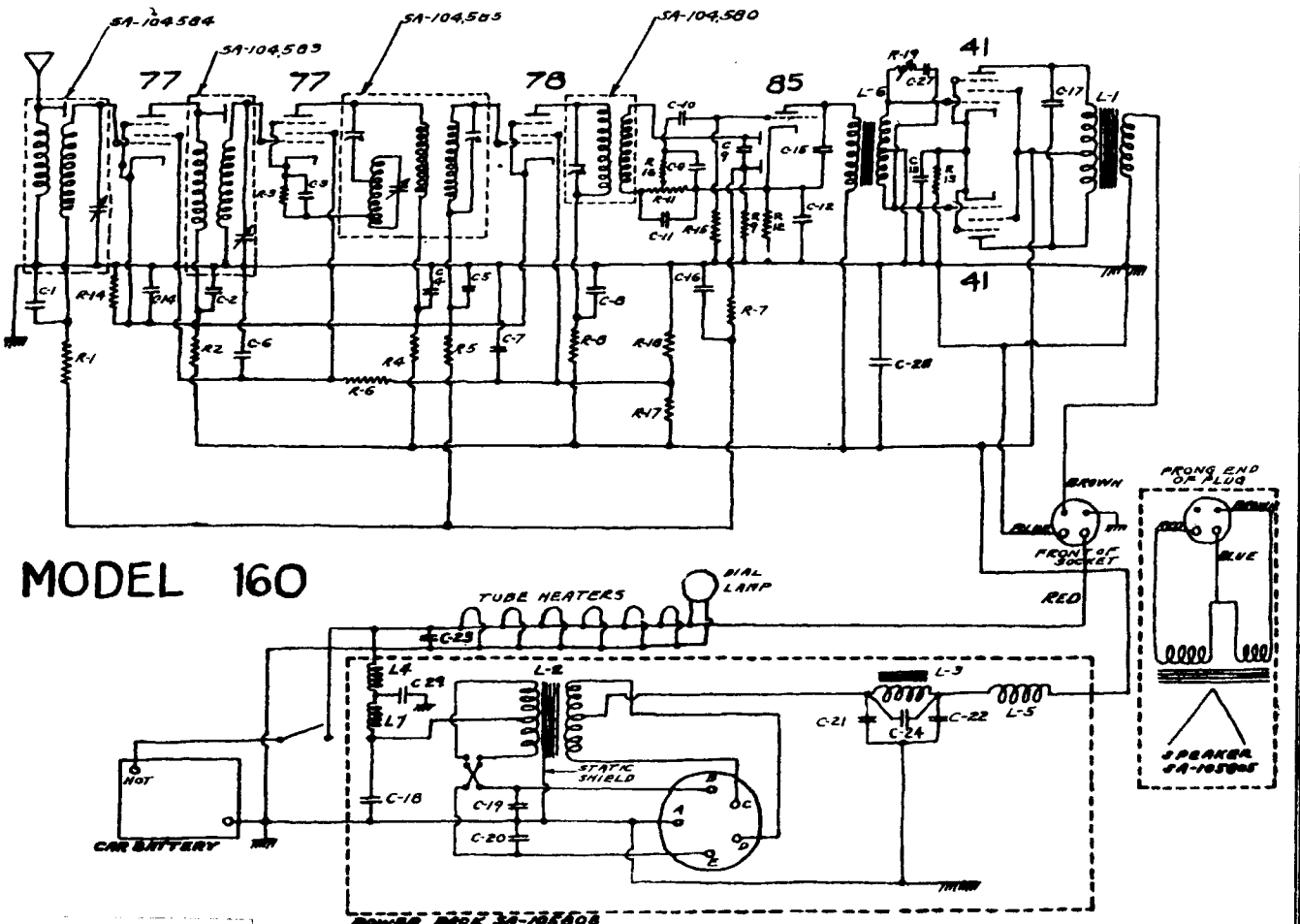
6A7- Det.- Osc.
9- Fil. (Hot)
10- Fil. (Grd.)
11- Cathode
12- Osc.Grid (G#1)
13- Osc.Plate(G#2)
14- Screen(G#3 &5)
15- Plate

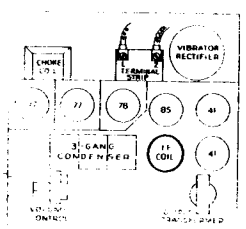
78 - I.F.
16- Fil. (Hot)
17- Fil. (Grd.)
18- Cathode
19- Suppressor
20- Screen
21- Plate

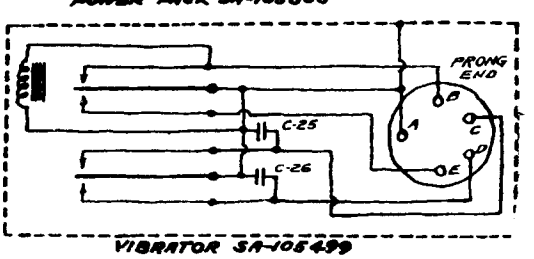
75- D2- AVC-AF1
22- Fil. (Hot)
23- Fil. (Grd.)
24- Cathode
25- Diode Plate
26- Diode Plate
27- Plate

41 - Power
28- Fil. (Hot)
29- Fil. (Grd.)
30- Cathode
31- Grid
32- Screen
33- Plate

UNITED AMERICAN BOSCH CORP.

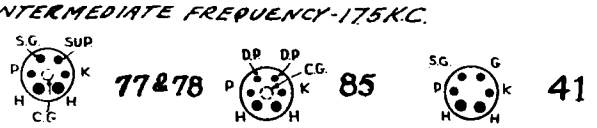






R1	100,000 ohms ½ watt	C14	.25 - 2 ply
R2	1,000 ohms ½ watt	C15	.002 - 4 ply
R3	7,500 ohms ½ watt	C16	.05 - 2 ply
R4	1,000 ohms ½ watt	C17	.002 - 4 ply
R5	100,000 ohms ½ watt	C18	.5 in metal housing
R6	5,000 ohms ½ watt	C19	.5 in " "
R7	1/2 meg. ½ watt	C20	.5 in can "
R8	1,000 ohms ½ watt	C21	8 mf.)
R9	1/2 meg. ½ watt	C22	8 mf.) electrolytic
R11	1/2 meg. Vol. Cont.	C23	.002 - 4 ply
R12	1,800 ohms ½ watt	C24	.1 - 2 ply
R13	600 ohms 1 watt	C25	.01 - 600 V.
R14	500 ohms ½ watt	C26	.01 - 600 V.
R15	1 meg. ½ watt	C27	.005 - 3 ply
R16	50,000 ohms ½ watt	C28	.25 - 3 ply
R17	40,000 ohms ½ watt	C29	.5 in metal housing
R18	75,000 ohms ½ watt	1	Chassis Assy.
R19	Tone control	2	Resistor Strip Assy.
C0	.0001 mica	3	Resistor Strip Assy.
C1	.05 - 2 ply	4	Resistor Strip Assy
C2	.05 - 3 ply	5	Power Pack Assy.
C3	.002 - 4 ply	6	Variable condenser & Shield Assy.
C4	.05 - 3 ply		
C5	.05 - 2 ply	7	Vibrator
C6	.1 - 2 ply	8	Chassis & Pack Assy.
C7	.05 - 2 ply	L-1	Outout Trans.
C8	.05 - 3 ply	L-2	Power Trans.
C9	.0001 mica	L-3	Choke
C10	.01 - 3 ply	L-4	Choke
C11	.0001 mica	L-5	Choke
C12	.5 - 2 ply	L-6	Input Trans.
C13	.5 - 2 ply	L-7	Choke 1

INTERMEDIATE FREQUENCY-175 K.C.



Total drain on the car battery: 6.1 amperes maximum

Output: 2.2 watts

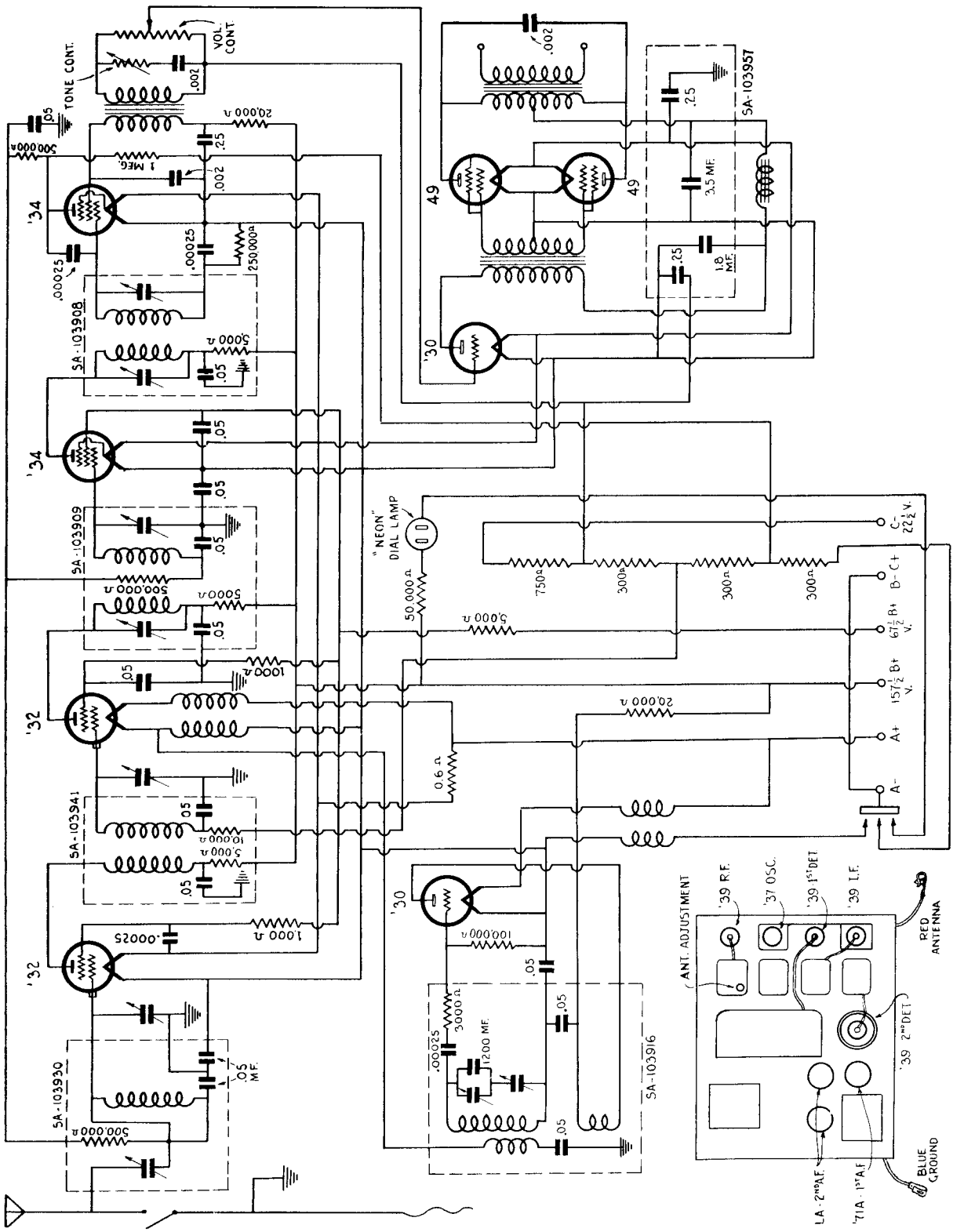
Intermediate frequency: 175 kilocycles

"B" voltage: 190 volts or more under set load (with 6 volt storage battery)

The connections to the car battery should be made at this period of the installation. The battery cable consists of two shielded wires one of which is provided with a fuse housing near the terminal. The RED battery wire with terminal marked "hot" should ALWAYS be connected to the "hot" terminal of the car battery and the BLACK terminal should ALWAYS be connected to the "grounded"

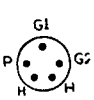
UNITED AMERICAN BOSCH CORP.

MODEL 226



32 & 34

30



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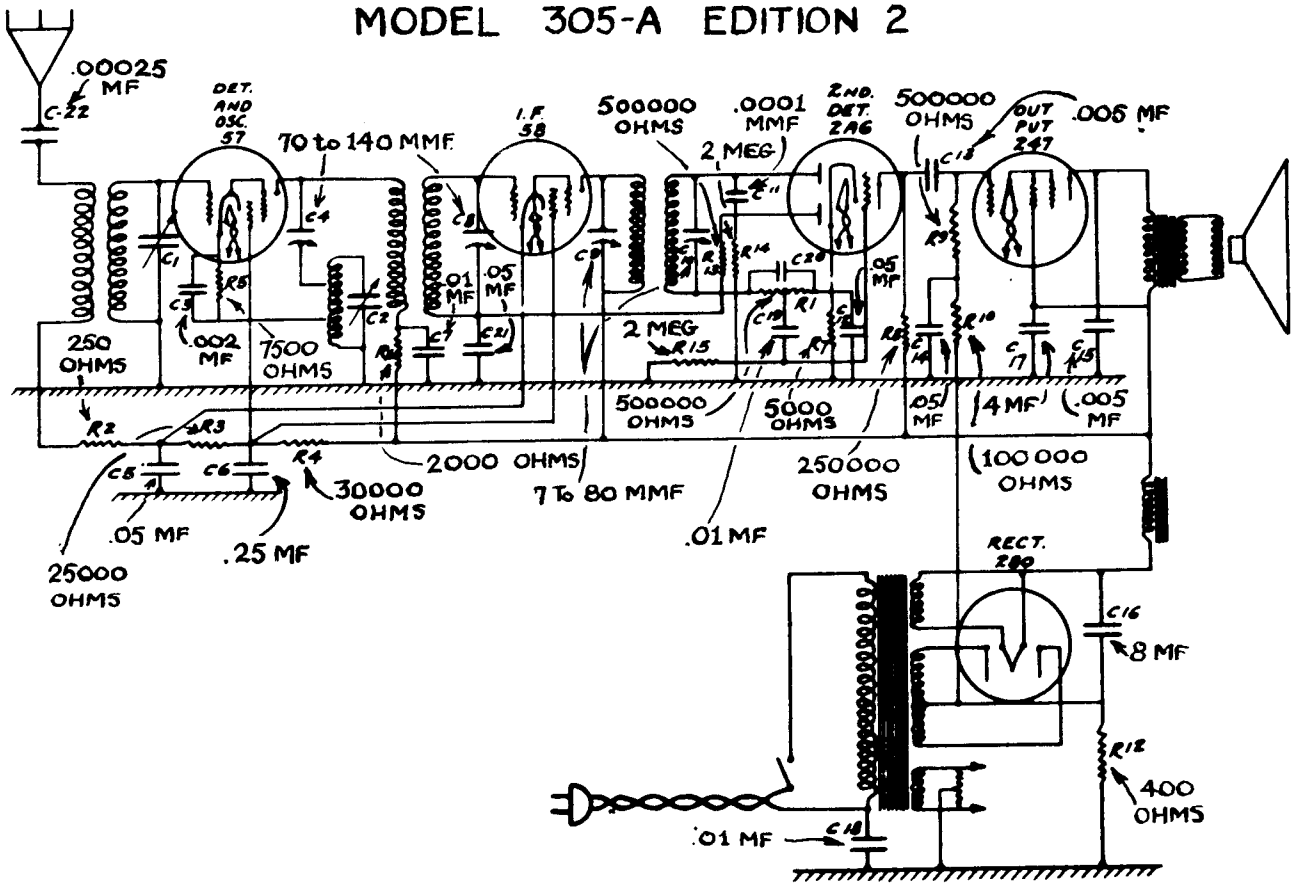
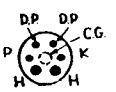
UNITED AMERICAN BOSCH CORP.

MODEL 305-A EDITION 2

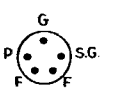


Stage	Tube	Fil.	Plate	Screen	Cathode	Grid
Detc. & Osc.	57	2.47	245	85	7	0
2nd Det.	2A6	2.48	75		.7	0
I. F.	58	2.47	248	85	3.	0
Output	47	2.5	235	248	0	18
Rect.	80	5	360	-	-	-

57 & 58



2A6



47

80

I. F. ADJUSTMENT: 456 K. C.

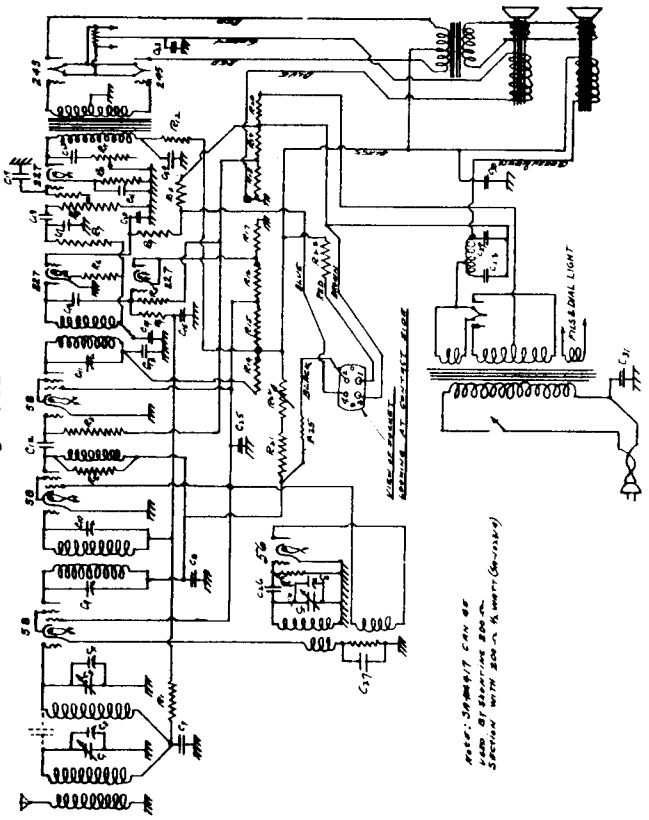
1. Connect output voltmeter to speaker.
2. Set volume control at maximum position.
3. Set signal generator at 456 K.C. and connect generator output lead to grid of I. F. tube.
4. Adjust both condensers on coil nearest back of set for maximum output as indicated on output voltmeter. Sensitivity at this point should be 300 microvolts.
5. Connect signal generator output lead to grid of first detector. Adjust both condensers on forward coil to maximum output as indicated on output voltmeter.

OSCILLATOR ALIGNMENT

1. Switch generator to R.F. and set at 1400 K.C.
2. Connect generator lead to antenna.
3. Set scale to 100 with gang closed tightly.
4. Adjust condenser gang to a scale reading of 21 and peak oscillator trim condenser. (This condenser is the back alignment screw on gang condenser)
5. To check I.F. alignment, connect I.F. signal generator to antenna; second harmonic should be at 912 K.C., third at 1368 K.C.

UNITED AMERICAN BOSCH CORP.

MODEL 310 A



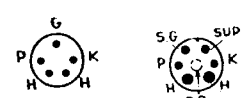
C14 - 100 mmf
C15 - .05 - 2 ply
C16 - 100 mmf
C17 - 100 mmf
C18 - .05 - 2 ply
C19 - 100 mmf
C20 - .25 2 ply
C21 - 8 mf - 200 v
C22 - .05 - 3 ply
C23 - .05 - 3 ply
C24 - 1 mf - 450 v
C25 - .5 - 3 ply
C26 - 100 mmf
C27 - .05 - 2 ply
C28 - 8 mfd)
C29 - 8 mfd)
C30 - 4 mfd)
C31 - .01 - 4 ply

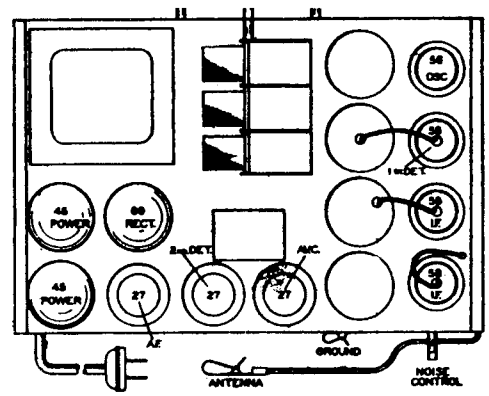
R20 - 300 ohms
R21 - 10,000 ohms
R22 - 10,000 ohms (vari.)
R23 - 2 megohms
R24 - 100,000 ohms
R25 - 20,000 ohms
C1) Variable
C2) gang
C3) with
C4) trimmers
C5)
C6)
C7 - .04 - 3 ply
C8 - .05 - 3 ply
C9 - 7 - 70 mmf
C10- 7 - 70 mmf
C11- 7 - 70 mmf
C12- 500 mmf
C13- .05 - 3ply

R1 - 100,000 ohms
R2 - 20,000 ohms
R3 - 100,000 ohms
R4 - 1/2 megohm
R5 - 1 megohm
R6 - 1/2 megohm
R7 - 20,000 ohms
R8 - 1/2 meg. Volume control
R9 - 1/4 megohm
R10 - 3,000 ohms
R11 - 1/2 meg. Tone control
R12 - 10,000 ohms
R13 - 1/4 megohm
R14 - 1,000 ohms
R15 - 12,000 ohms
R16 - 8,000 ohms
R17 - 8,000 ohms
R18 - 50 ohms
R19 - 70 ohms

RESISTOR COLOR CODE

1,000 ohms	Brown	Black	Red
20,000 ohms	Red	Black	Orange
100,000 ohms	Brown	Black	Yellow
3,000 ohms	Orange	Black	Red
300 ohms	Orange	Black	Brown
8,000 ohms	Gray	Black	Brown
10,000 ohms	Brown	Black	Orange
12,000 ohms	Brown	Red	Orange
6,000 ohms	Blue	Black	Red





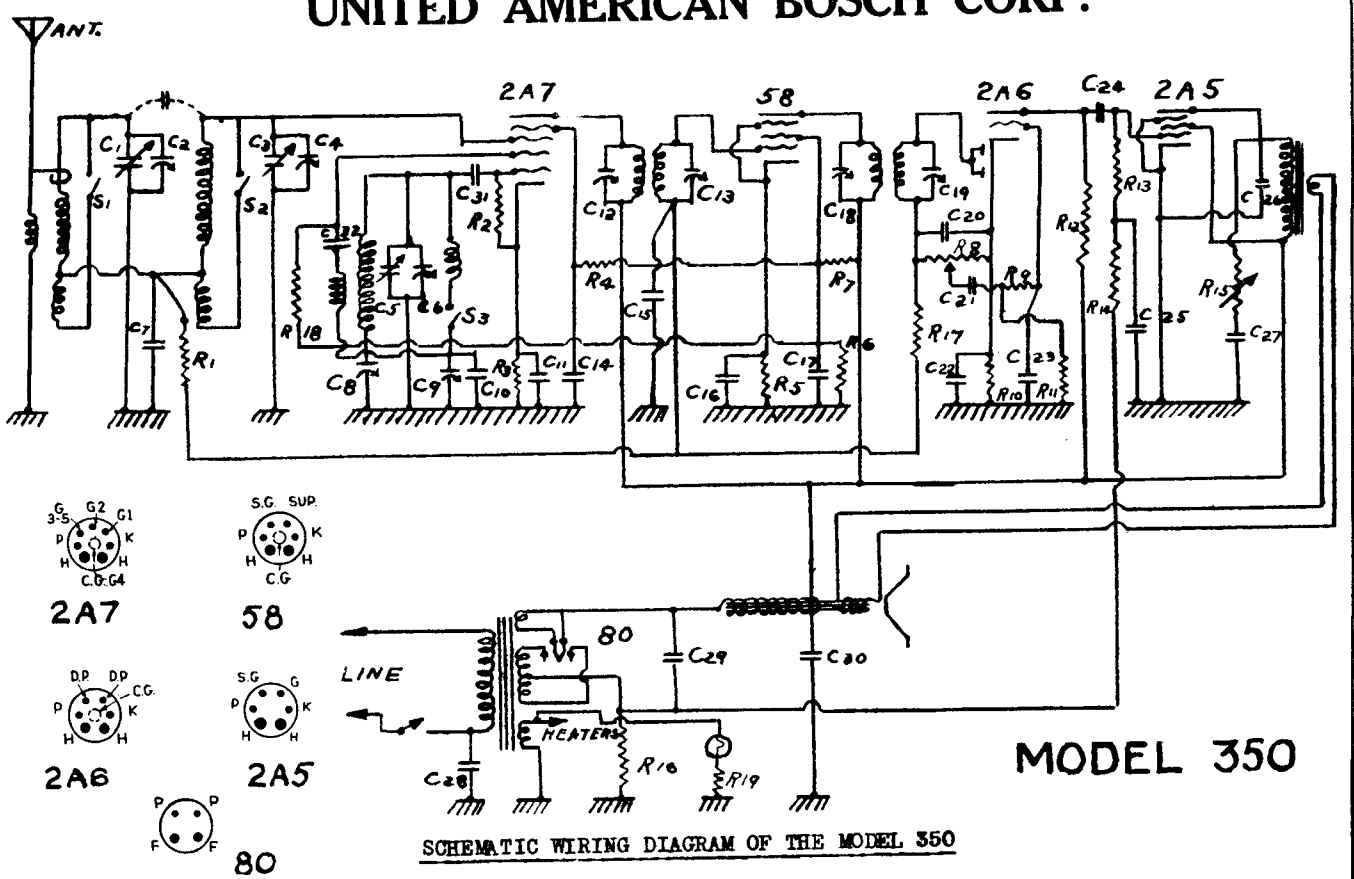
SOCKET VOLTAGES

	Osc 56	1st Det. 58	1st IF 58	2nd IF 58	AVC 27	2nd Det. 27	AF 27	AF 2-45	Rect. 80
Filament	2.48	2.49	2.50	2.50	2.50	2.50	2.52	2.52	5.1
Plate	100	#110-180	#110-180	280	44	-	210	290	-
Screen	-	100	100	100	-	-	-	-	-
Cathode	-	4.2	-	-	-	-	18	49	-
# Bias	-	3	3	3	-	* 0-12	-	-	-

* Depending upon setting of noise control.

Due to high resistance in grid circuit, this voltage cannot be measured at the socket

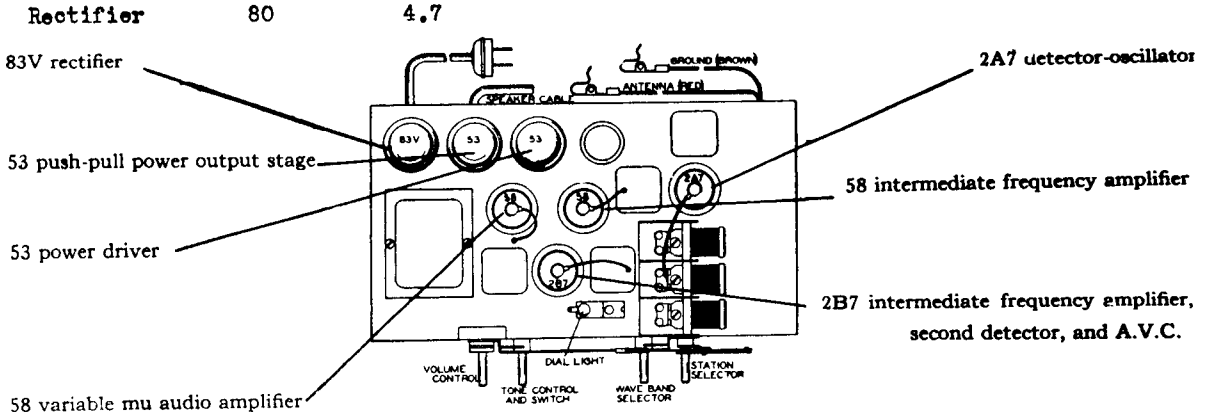
UNITED AMERICAN BOSCH CORP.



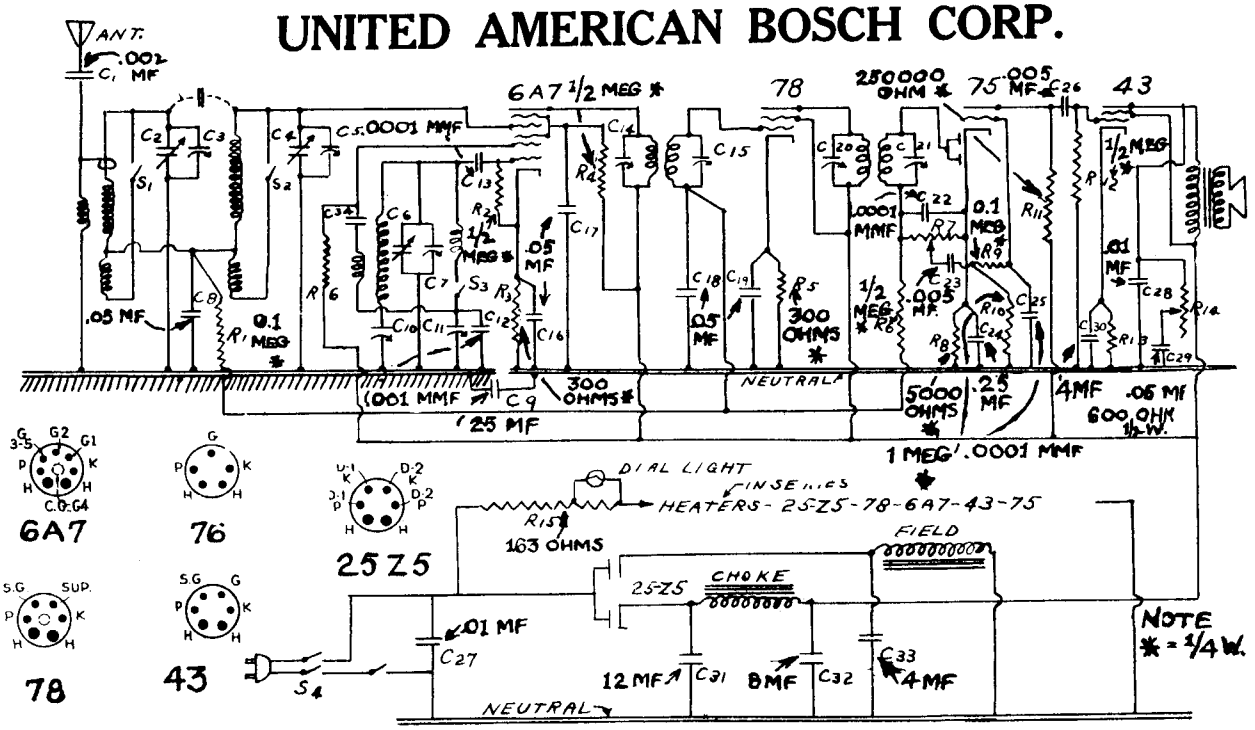
SCHEMATIC WIRING DIAGRAM OF THE MODEL 350

C-1	(	C-15	.05 mfd.	C-28	.01 mfd. 4-ply	R-10	5000 ohms ¼ watt
C-2	(	C-16	.05 mfd.	C-29	8 mfd.	R-11	1 meg. ¼ watt
C-3	(	C-17	.05 mfd.	C-30	6 mfd.	R-12	250,000 ohms ¼ watt
C-4	(Variable gang	C-18	30 to 100 mmf mica	C-31	.0001 mfd. mica	R-13	½ meg. ¼ watt
C-5	(with trimmers	C-19	30 to 100 mmf mica	C-32	.01 mfd. 4-ply	R-14	.1 meg. ¼ watt
C-6	(	C-20	.0001 mfd. mica	R-1	.1 meg ½ watt	R-15	Tone control
C-7	.05 mfd. 2-ply	C-21	.005 mfd. 3-ply	R-2	50,000 ohms ¼ watt	R-16	350 ohms 1 watt
C-8	Trimmer condenser	C-22	.25 mfd. 2-ply	R-3	300 ohms ¼ watt	R-17	½ meg. ¼ watt
C-9	Trimmer condenser	C-23	.0001 mfd. mica	R-4	50,000 ohms ¼ watt	R-18	10,000 ohms ¼ watt
C-10	.001 mfd. mica	C-24	.005 mfd. 3-ply	R-5	300 ohms ¼ watt	R-19	.4 ohms
C-11	.05 mfd. 2-ply	C-25	.05 mfd. 2-ply	R-6	40,000 ohms ½ watt	S-1	Switch
C-12	30 to 100 mmf mica	C-26	.005 mfd. 3-ply	R-8	Volume control	S-2	Switch
C-13	30 to 100 mmf mica	C-27	.05 mfd. 2-ply	R-9	.1 meg. ¼ watt	S-3	Switch
C-14	.05 mfd.						

Stage:	Tube:	Fil.	Plate:	Screen:	Cathode:	Grid:
1st Det.)	2A7	2.4	75	30	0.8	—
Osc.)			60			
1st I. F.	58	2.4	250	75	2.0	—
2nd Det.	2A6	2.4	95	—	1.5	—
Pentode	2A5	2.5	235	250	0	7.0
Rectifier	80	4.7				



UNITED AMERICAN BOSCH CORP.



I - A. C. MEASUREMENT

MODEL 355

Stage	Tube	Fil.	Plate	Screen	Cathode
Det.) Osc.)	6A7	5.1	118 97	45 -	1.4
I. F.	78	5.1	118	118	3.0
2 Det.	76	5.3	50	-	0.7
Pent.	43	22.3	108	118	18
Rect.	25Z5	24	128	-	-

115 volts A. C.
45 watts
.43 amps.

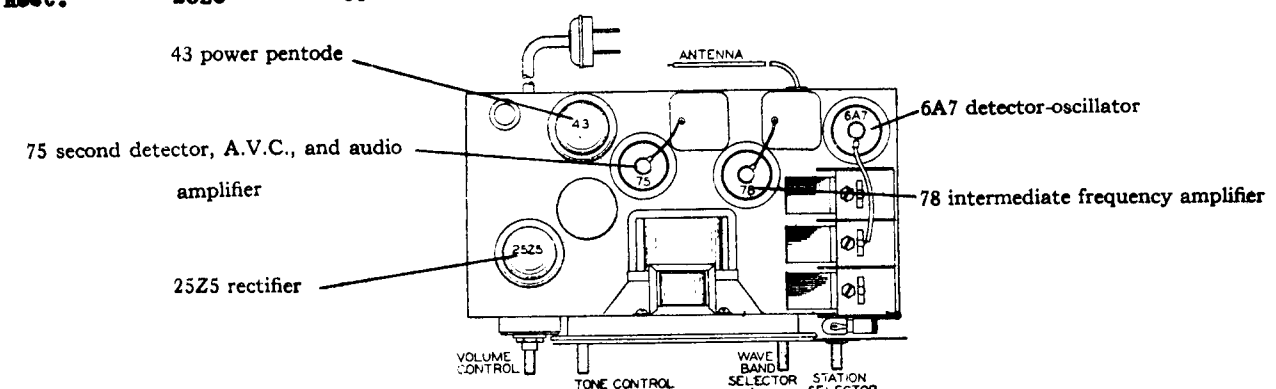
Volts drop across series fil. resistor - 44

Dynamic Field Excitation - 115 volts

II - D. C. MEASUREMENT

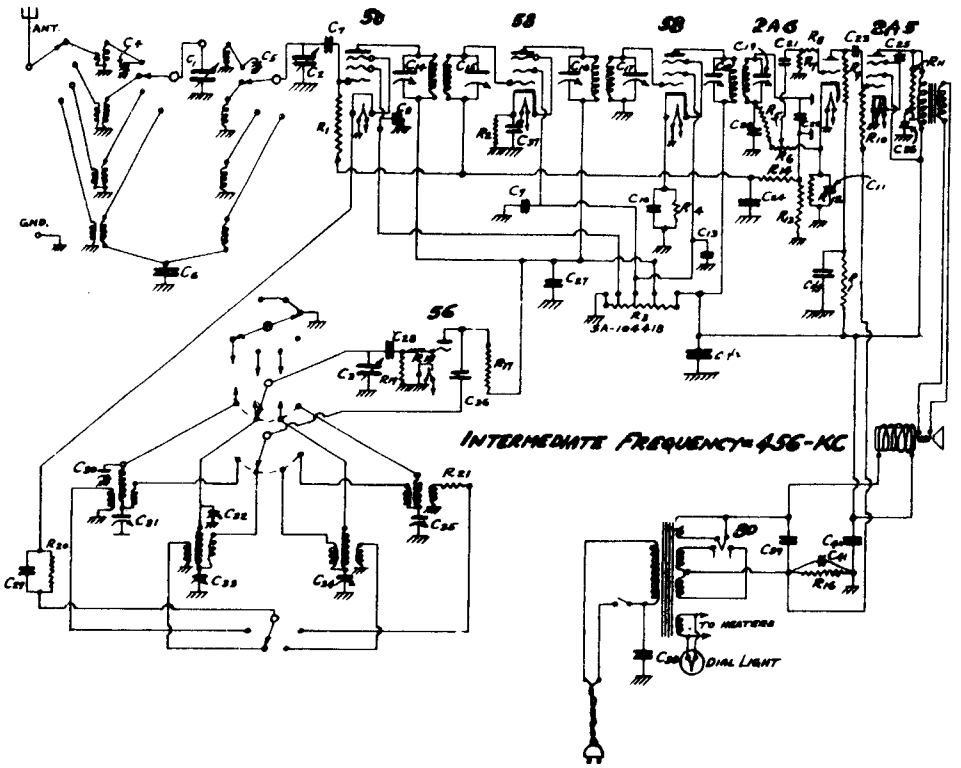
Stage	Tube	Fil.	Plate	Screen	Cathode
Det.) Osc.)	6A7	5.6	.05 .85	40	1.1
I. F.	78	5.5	105	105	2.4
2 Det.	76	5.8	47	-	0.6
Pent.	43	28	97	105	18
Rect.	25Z5	30	115	-	-

Line
Power
Current



UNITED AMERICAN BOSCH CORP.

MODEL 360



C-10 .05 mfd.
C-11 .25 mfd.
C-12 ----
C-13 .05 mfd.
C-14 30 - 100 mmf mica
C-15 " " " "
C-16 " " " "
C-17 " " " "
C-18 " " " "
C-19 " " " "

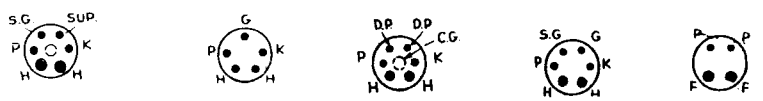
C-20 100 mmf mica
C-21 .005 mfd. 3-ply
C-22 100 mmf mica
C-23 .005 mfd. 3-ply
C-24 .05 mfd. 2-ply
C-25 .005 mfd. 3-ply
C-26 .05 2-ply
C-27 .05 mfd. 3-ply
C-28 100 mmf mica
C-29 .05 mfd. 2-ply
C-30 7 - 70 mmf
C-31 300 mmf variable
C-32 7 - 70 mmf
C-33 1200 mmf variable
C-34 1200 mmf variable
C-35 1500 mmf variable
C-36 .05 mfd. 2-ply
C-37 .05 mfd.
C-38 .01 mfd. 4-ply
C-39 8 mfd. electro
C-40 4 mfd. electro
C-41 20 mfd. electro

R-1 1/2 meg. 1/4 watt
R-2 300 ohms 1/4 watt
R-3 Multiple
R-4 300 ohms 1/4 watt
R-5 5000 ohms 1/4 watt
R-6 500,000 ohms vol.
R-7 2 meg. 1/4 watt
R-8 100,000 ohms 1/4 watt
R-9 250,000 ohms 1/4 watt
R-10 1/2 meg. 1/4 watt
R-11 Variable
R-12 5000 ohms 1/4 watt
R-13 1 meg. 1/4 watt
R-14 1/2 meg. 1/4 watt
R-15 -----
R-16 400 ohms 1 watt
R-17 2500 ohms 1/2 watt
R-18 50 ohms 1/2 watt
R-19 20,000 ohms 1/4 watt
R-20 2000 ohms 1/4 watt
R-21 200 ohms 1/4 watt

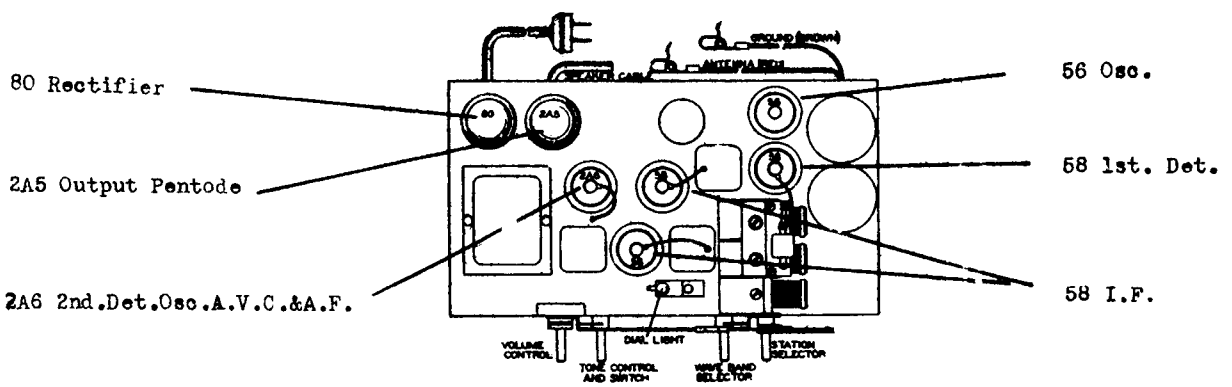
C-1 ----
C-2 Variable condenser
C-3 ----
C-4 Trim condenser
C-5 Trim condenser
C-6 .05 mfd. 2-ply
C-7 100 mmf mica
C-8 .05 mfd.
C-9 .05 mfd.

Stage	Tube	Fil.	Plate	Screen	Cathode	Grid
1st Det.	58	2.65	220	40	2.8	--
1st IF	58	2.65	220	95	2.0	--
2nd IF	58	2.65	240	95	2.7	--
Osc.	56	2.65	75	--	0	25
2nd Det.	2A6	2.65	90	--	1.4	--
Output	2A5	2.65	235	240	0	--
Rectifier	80	4.8	---	---	-	--

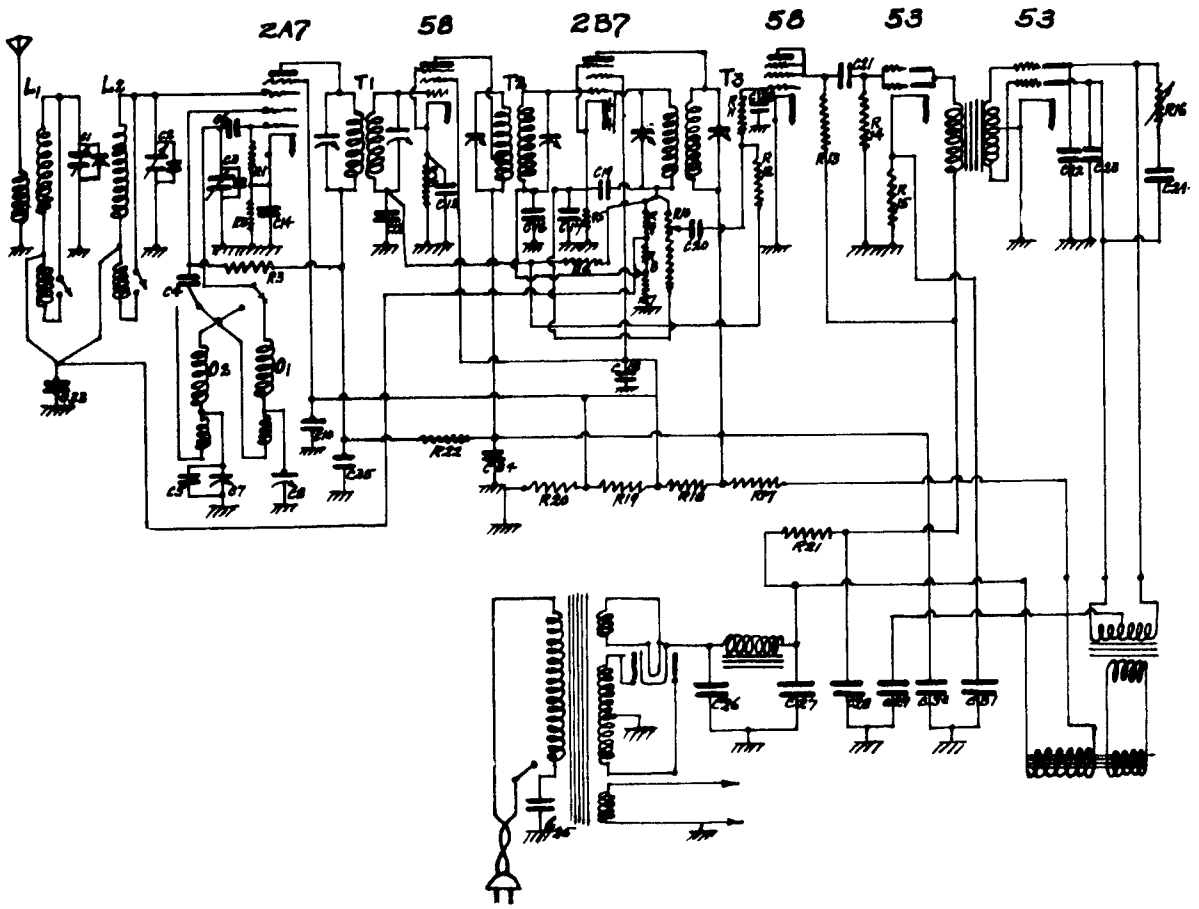
Bias on 2A5 (across 400 ohms) = 22 volts
Output of rectifier 360 volts
Line volts = 115
Power 60 watts

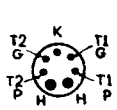


58 56 2A6 2A5 80



UNITED AMERICAN BOSCH CORP.
MODEL 370

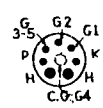




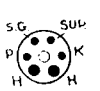
53

83

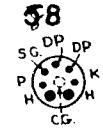
Stage:	Tube:	Fil.	Plate:	Screen:	Cathode:
Det.) Osc.)	2A7	2.4	250 175	45	2.3
1st I. F.	58	2.4	240	110	4.0
2nd I. F.) 2nd Det.)	2B7	2.4	240	110	1.5
1st A. F.	58	2.4	30	--	0
2nd A. F.	53	2.4	280	--	5.2
Output	53	2.4	260	--	0
Rectifier	83 V	4.7	360	--	--



2A7



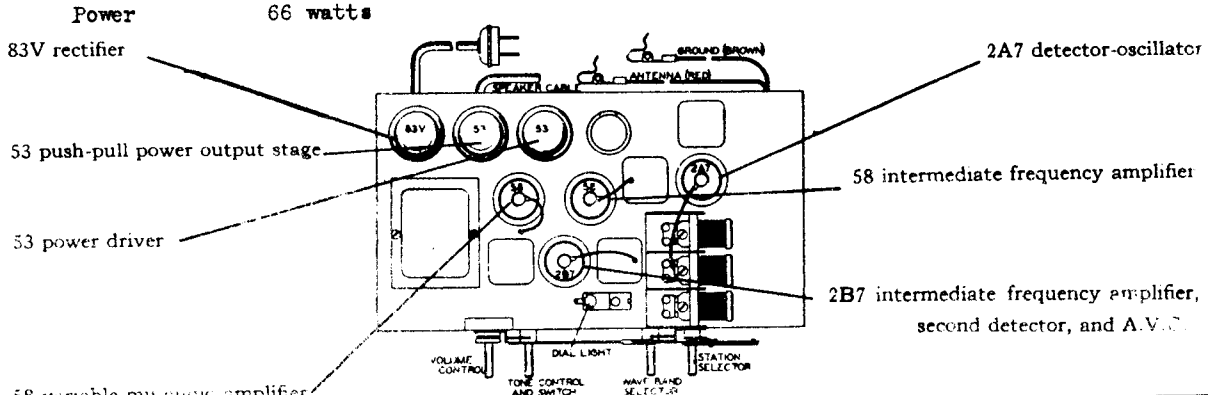
58



2B7

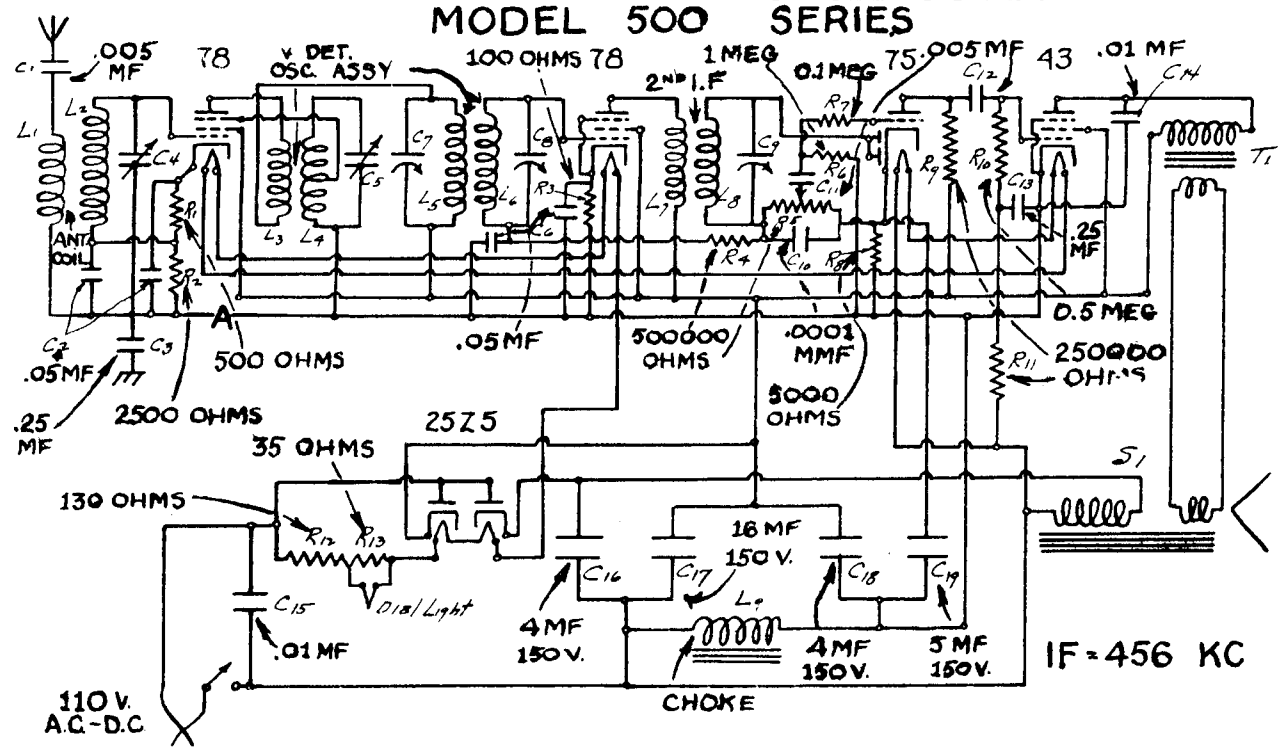
Line voltage = 115 volts
Current 6.1 amps.
Power 66 watts

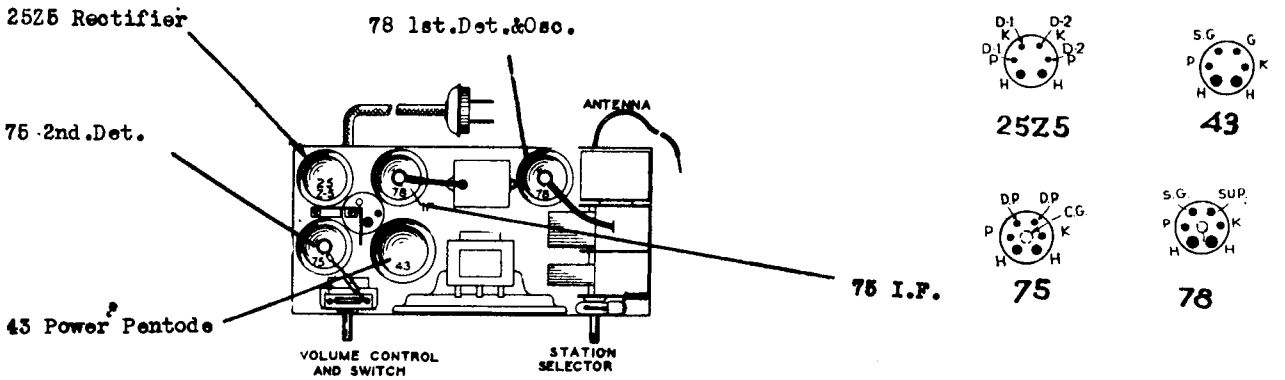
Volts across speaker field - - 68
Volts across filter choke - - 17



UNITED AMERICAN BOSCH CORP.

MODEL 500 SERIES





The following voltage readings were taken with the receiver supplied by 115 volts 60 cycle alternating current. Voltage readings will be slightly lower when D. C. is used and will vary with the type of meter used.

1. (Rectifier 25Z5)	Voltage across	C16	120 V
	"	C12	120 V
	"	Heater	25 V
2. (Power tube 43)	"	Screw to point A	105 V
	"	Plate " " "	96 V
	"	Bias across L9	15 V
	"	Heater	25 V
3. (Second Detector 75)	"	Plate to point A	37 V
	"	Bias cathode to A	.5 V
	"	Heater	6 V
4. (Intermediate 78)	"	Screen to point A	103V
	"	Plate to point A	105V
	"	Bias Cathode point A	1.3V
	"	Heater	6V
5. (Osc. Det. 78)	"	Screen to point A	105 V
	"	Plate " " A	105 V
	"	Grid bias Cathode to coil lug across R.	2.8 V
	"	Suppressor bias cathode to pointA	16.5 V
		Heater	6 V

UNITED AMERICAN BOSCH CORP.
MODEL 501 & 502 RS 501 RS 502

I - A.C. MEASUREMENT

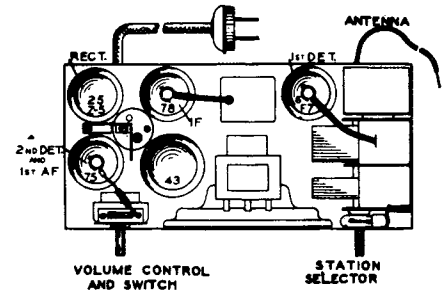
Stage	Tube	Fil	Plate	Screen	Cathode
1 Det.	6.F7	6.0	115	115	12
Osc.			115		
I.F.	78	6.0	115	115	2.8
2 Det.	75	5.9	30	-	0.7
Amp.					
Power	43	22	115	115	17
Rect.	25Z5	25	125	-	-

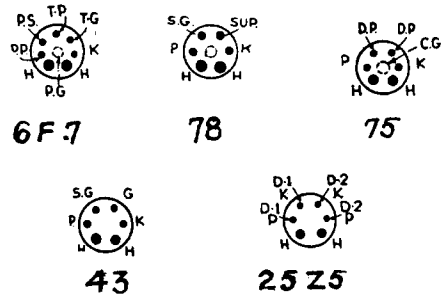
Line Voltage	115	Dynamic Field	108 Volts
Power in Watts	47	Filter Choke Drop	8.8 Volts
Dial Lamp Volts	6.0		
Res. Strip Volts	47		

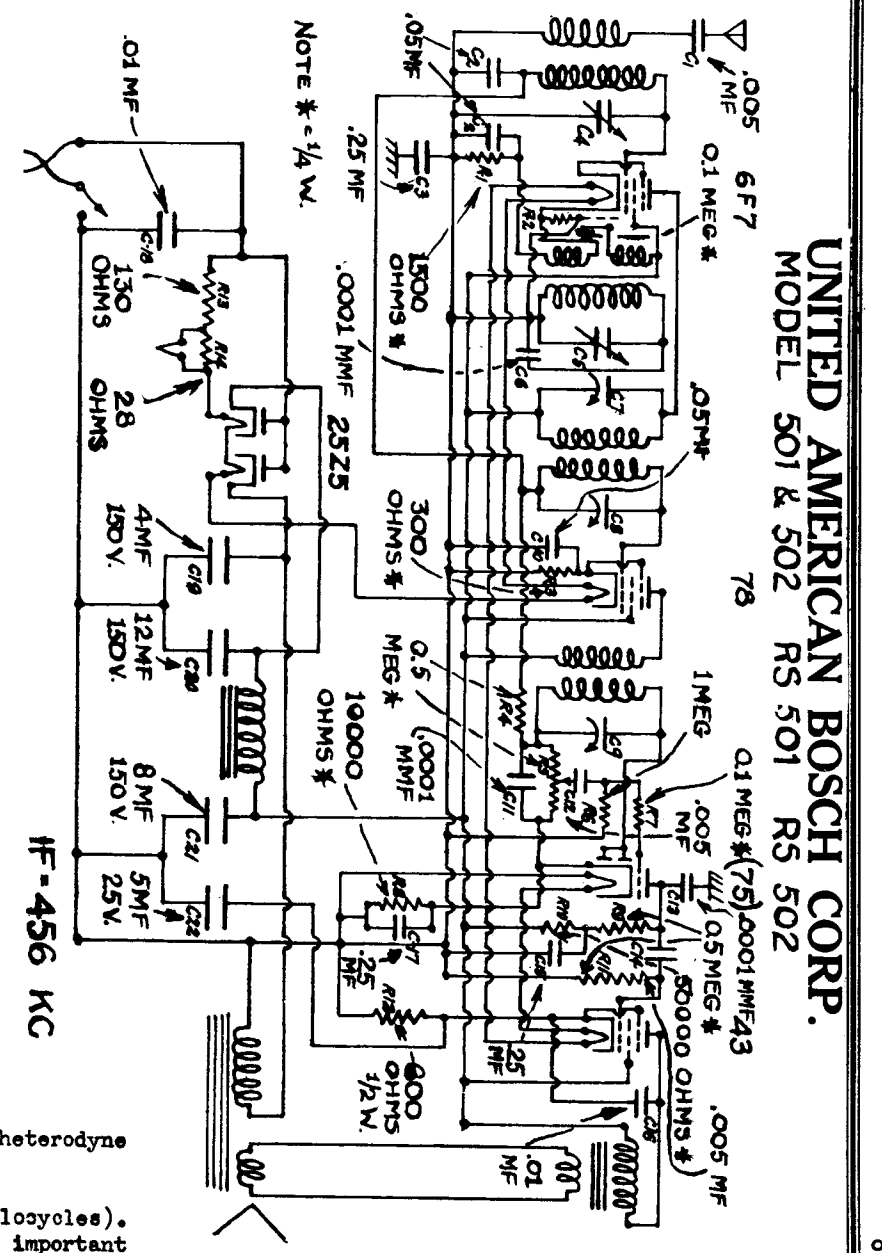
II - D.C. MEASUREMENT

Stage	Tube	Fil	Plate	Screen	Cathode
1 Det.	6.F7	6.2	102	102	8.7
Osc.			102		
I.F.	78	5.9	102	102	2.5
2 Det.	75	5.8	27	-	0.6
Amp.					
Power	43	24	102	102	13
Rect.	25Z5	27	110	-	-

Line Volts	115	Resistance Strip Volts	47
Dial Lamp Volts	6	Dynamic Field Volts	115





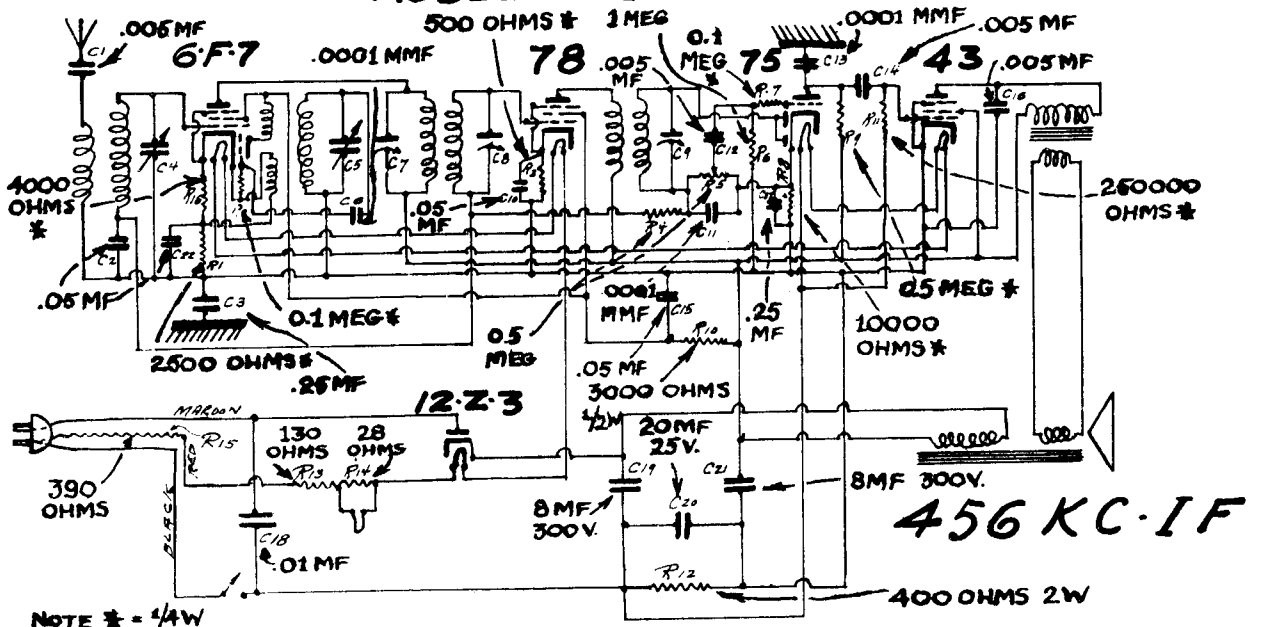


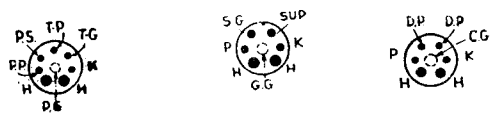
The Model 502 is an extremely compact five-tube, automatic volume control superheterodyne which may be operated from any (100 to 125 volt) A. C. or D. C. supply service.

An important feature of this receiver is its extended tuning range (540 to 1,750 kilocycles). This range includes not only the complete broadcast band, but also many of the important state and city police assignments.

UNITED AMERICAN BOSCH CORP.

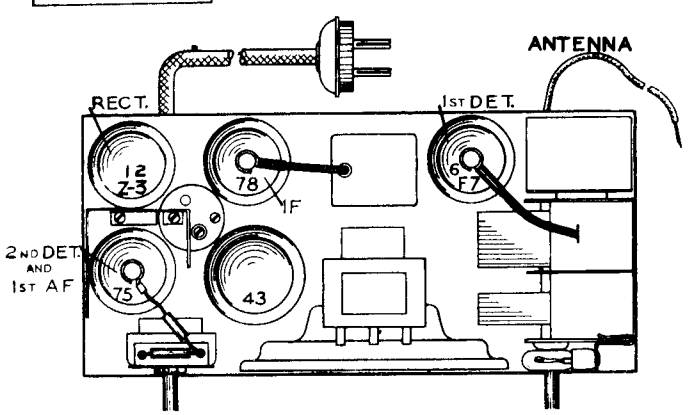
MODEL 503 220 V. SET





6F7 78 75

43 12Z3



I. VOLTAGE MEASUREMENTS WHEN USING 220 VOLT A. C. LINE

Stage	Tube	Fil.	Plate	Screen	Cathode
1st Det.	6F7	6.0	130	112	12.5
Osc.			112		
I. F.	78	6.0	130	112	3.6
2nd Det.					
Amp.	75	6.0	50*	-	.5
Power	43	25	112	130	x21 (bias across 400 ohms)
Rectifier	12Z3	12	Voltage across plate to cathode 248 volts		

Line Voltage	220	Resistor Strip Volts	40
Power in Watts	80	Resistor Cord Volts	117
Dial Lamp Volts	6.0	Dynamic Field	95

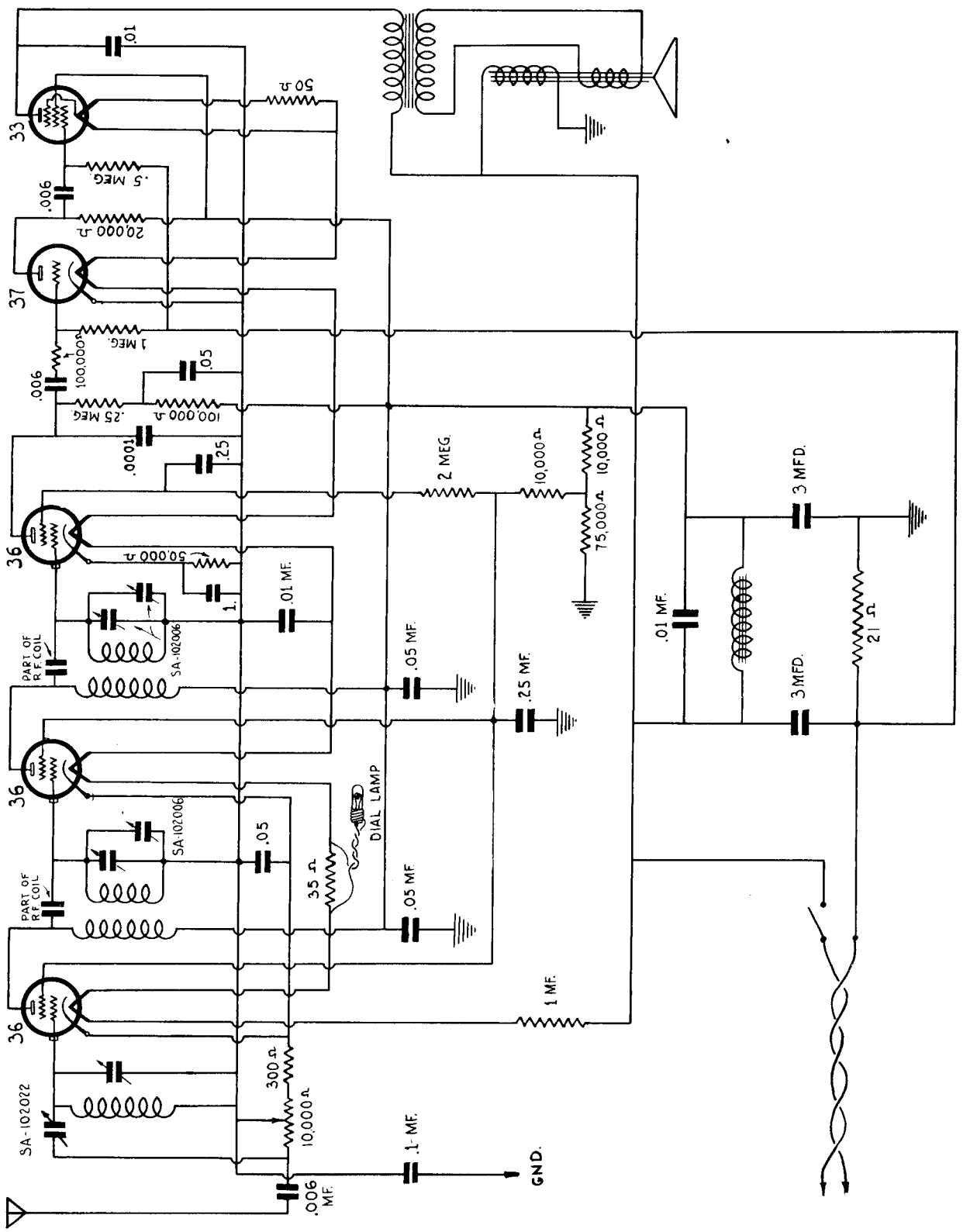
All above voltage measurements taken with reference to "neutral" line marked "AA" on diagram. *Voltmeter of 1000 ohms per volt must be used especially for type 75 tube plate. This bias measured from junction R12, C22 and junction R11, R12. Since filaments in series run constant current, filament voltages may vary considerably from those given above without affecting receiver operation.

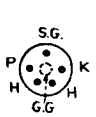
II. VOLTAGE MEASUREMENTS WHEN USING 220 VOLT D. C. LINE

Stage	Tube	Fil.	Plate	Screen	Cathode
1st Det.	6F7	6.0	108	95	9.9
Osc.			95		
I. F.	78	6.0	108	95	2.8
2nd Det.					
Amp.	75	6.0	*45		
Power	43	25	96	108	17.5
Rectifier	12Z3	12	Voltage across plate to cathode 221 volts		

UNITED AMERICAN BOSCH CORP.

MODEL T





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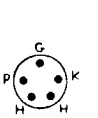

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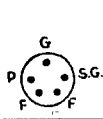

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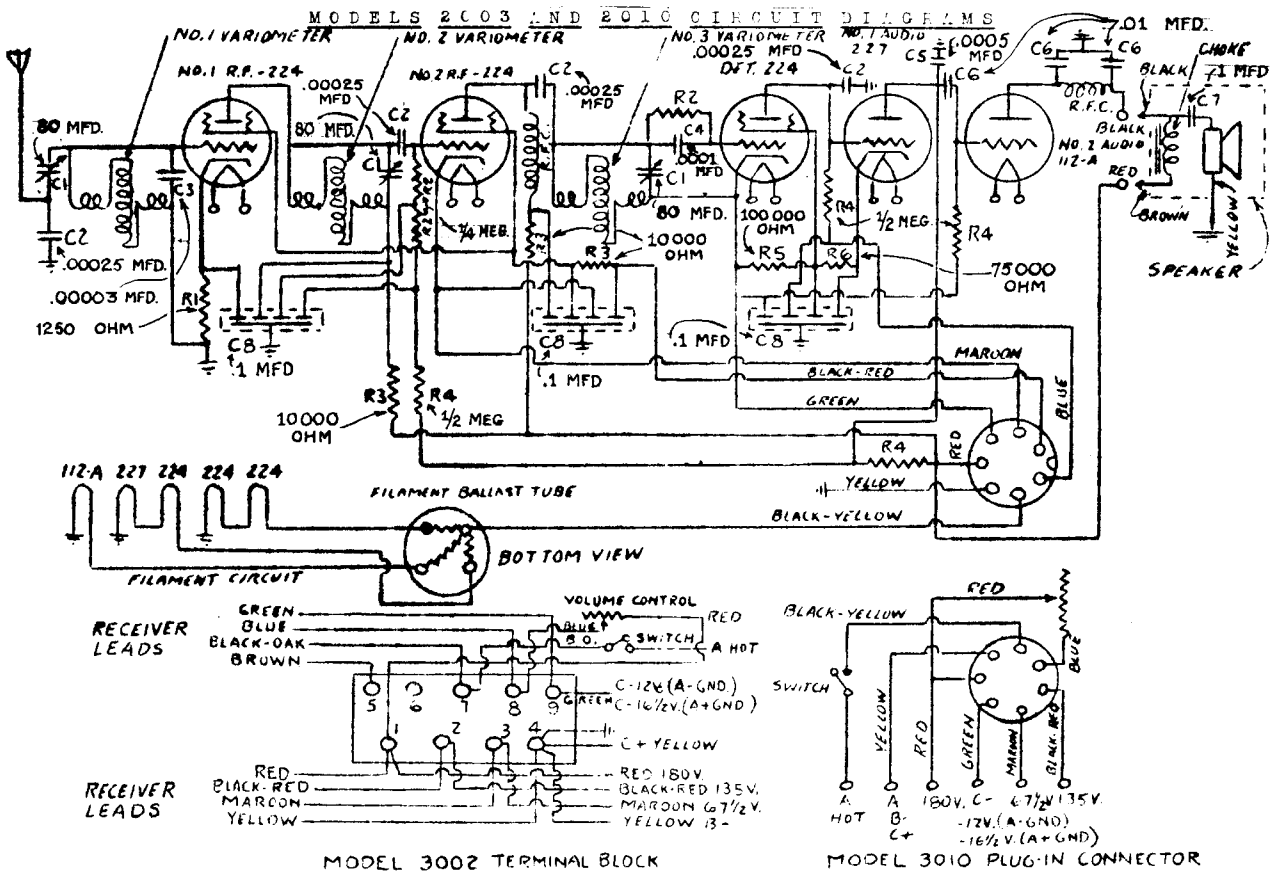
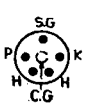
UNITED MOTORS SERVICE CORP.

MODELS 2003 & 2010 AUTO SET



VOLUME CONTROL FULL ON

Type of Tube	Position of Tube	TUBE IN ANALYZER Fil. Volts	Plate Volts	Control Grid Volts	Screen Grid Volts	Normal Plate M.A.	Grid Test M.A.
224	1-R.F.	1.9	145	5.8	103	3	5.4
224	2-R.F.	1.9	110	.3	55	2.2	.2
224	Detector	1.9	32	.4	12	.3	.32
227	1-A.F.	1.9	20	.2	---	.25	.2
112-A	2-A.F.	3.9	170	.4	---	9.	15.5



224

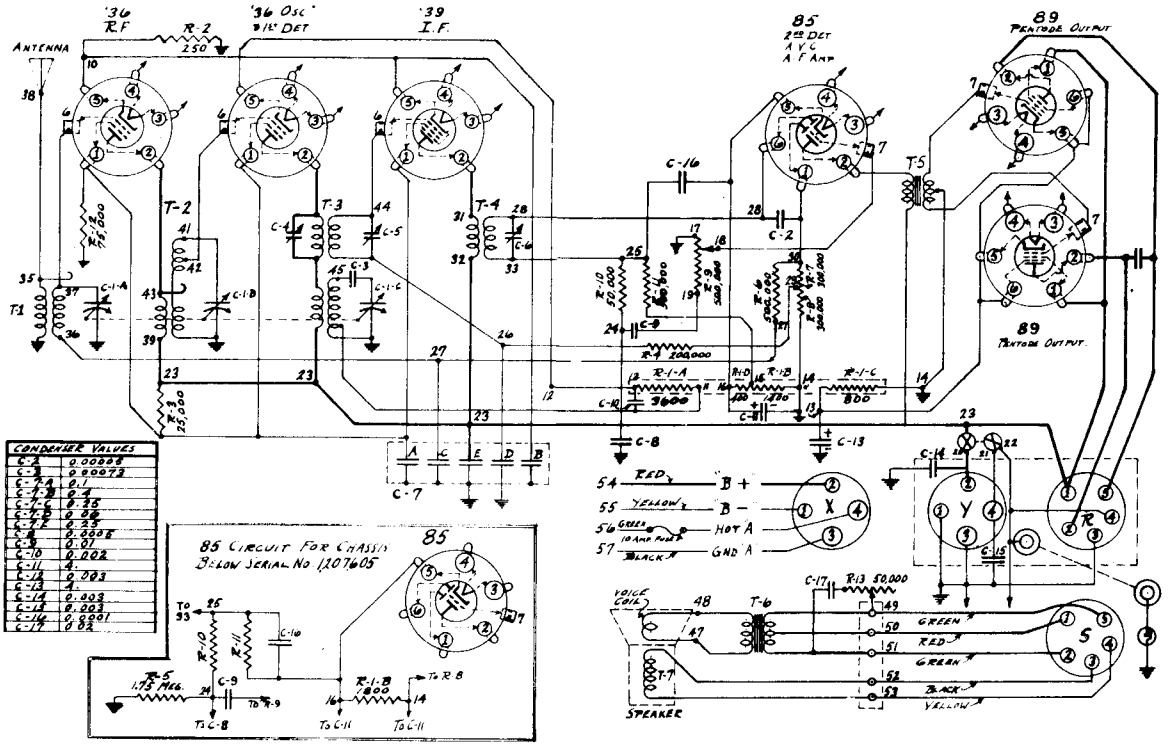
227

112A

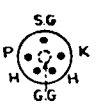
Note: These are average readings and will, therefore, vary somewhat with different set analyzers and with different battery voltages.

UNITED MOTORS SERVICE CORP.

MODEL 2035 AUTO SET



Set "test oscillator" to 262 kilocycles. Some oscillators are not equipped with a frequency of 262 K.C. but do have a frequency of 130 K.C. In this case, the second harmonic of 130 K.C., namely 260 K.C., may be used.



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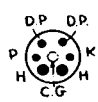
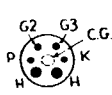
Connect the output leads of the test oscillator to the grid of the 1st Detector tube and to ground (frame of the chassis) Leave grid cap in place.

Turn the tuning condenser rotor to minimum capacity (rotor plates out of stator places).



85

Adjust I. F. Trimmers



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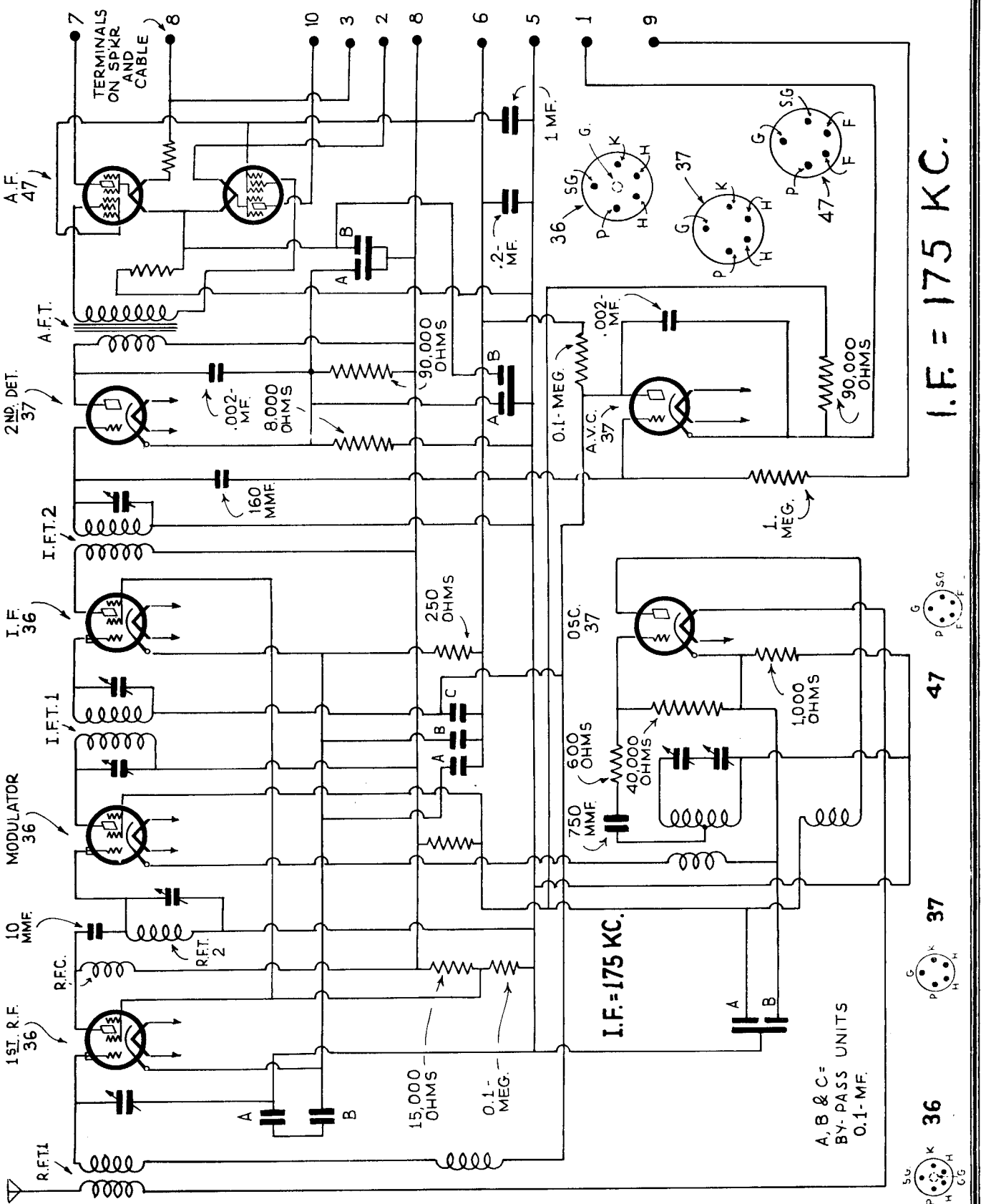
VOLTAGE CHART

Tube	Screen Contact #1	Plate Contact #2	Heater Contact #3	Heater Contact #4	Cathode Contact #5	Suppressor Grid Contact #6
236 RF	80	170	0	6	2.4	- -
236 OSC	80	170	0	6	5.5	- -
239 IF	80	170	0	6	2.4	- -
85 DET	* 0	160	0	6	10.5	0.15**
A-89 AF	170	170	6	0	20.5	20.5
B-89 AF	170	170	0	6	20.5	20.5
Speaker-Socket	170	0	0	6	0	- -

* #1 Terminal on type 85 tube connects to A.V.C. plate
** #6 Terminal on type 85 tube connects to detector plate

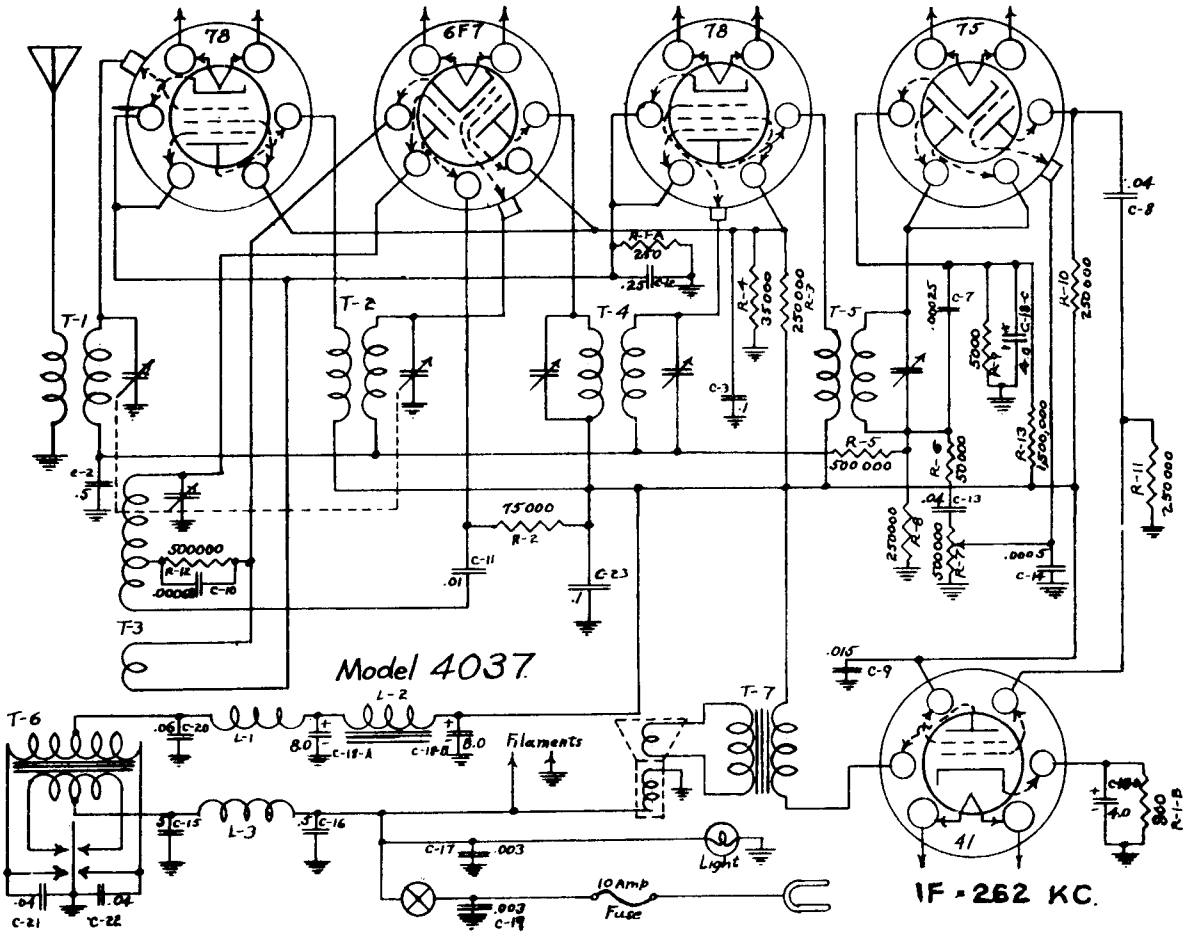
UNITED MOTORS SERVICE CORP.

MODEL 3026



UNITED MOTORS SERVICE CORP.

MODEL 4037



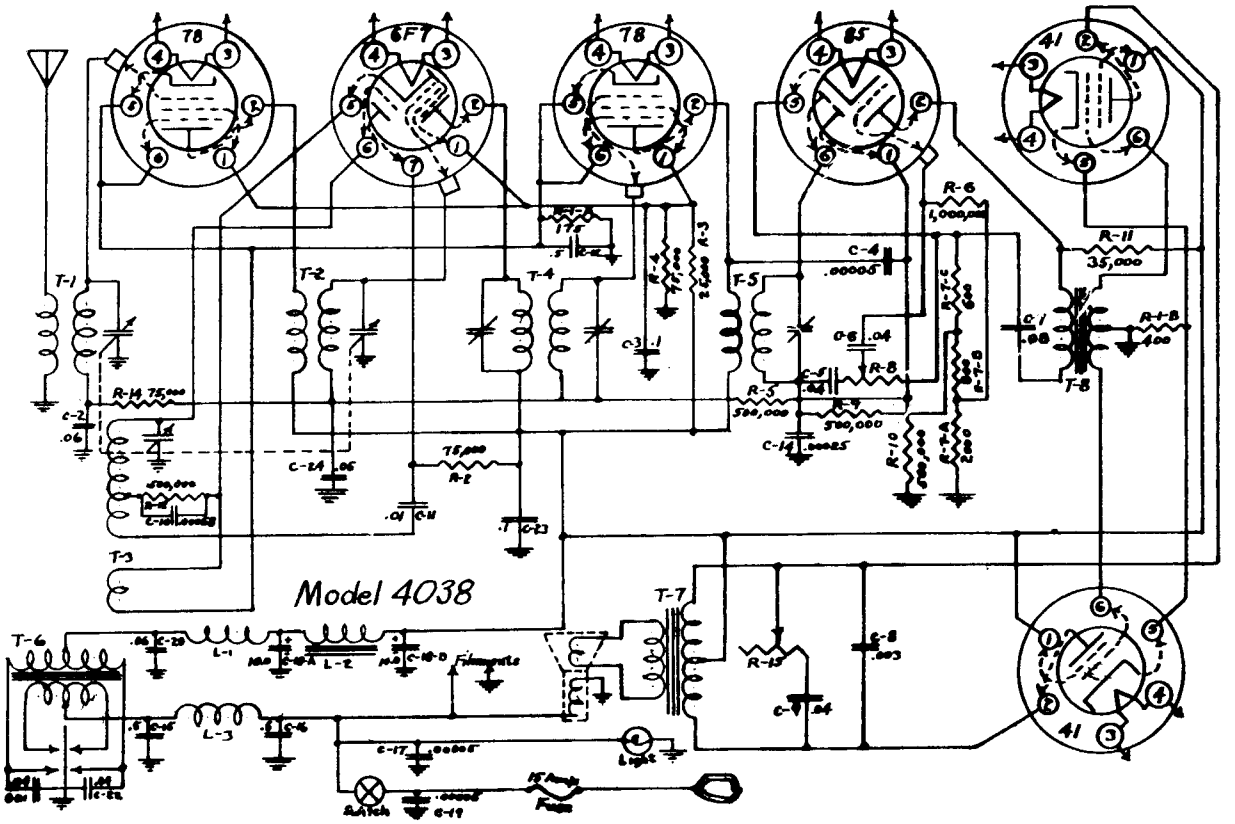
Tube	#1 Screen	#2 Plate	#3 Fil	#4 Fil	#5 Cathode	#6 Grid	#7 Triode Plate
78 R.F.	58	180	7	0	2.3	2.3	
6F7 (Det							
(Osc.	58	180	0	7	2.3	-.8	80
78 I.F.	58	180	7	0	2.3	2.3	
75 (2nd Det.							
(AVC	0	90	0	7	1.2	0	
41 A.F.	180	180	7	0	16	0	

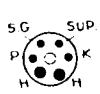
All chassis having a Serial number below Serial #1349259 have a 500,000 ohm resistor connected between the screen (#2) of the 78 I.F. tube and the cathode (#5) of the 75 tube.

All chassis having a serial number above #1349259 have a 1,500,000 ohm resistor between the B plus terminal of the diode coil (2nd I.F.) and the cathode (#5) of the 75 tube.

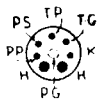
UNITED MOTORS SERVICE CORP.

MODEL 4038





78



6F7

85

41

Tube	#1 Screen	#2 Plate	#3 Fil.	#4 Fil.	#5 Cathode	#6 Cond.	#7 Triode Plate
78	85	210	5.9	0	3.2	3.2	
6F7	85	210	0	5.9	3.2	0	90
78	85	210	5.9	0	3.2	3.2	
85	0	85	0	5.9	8.0	0	
41	210	205	5.9	0	16	0	
41	210	205	5.9	0	16	0	

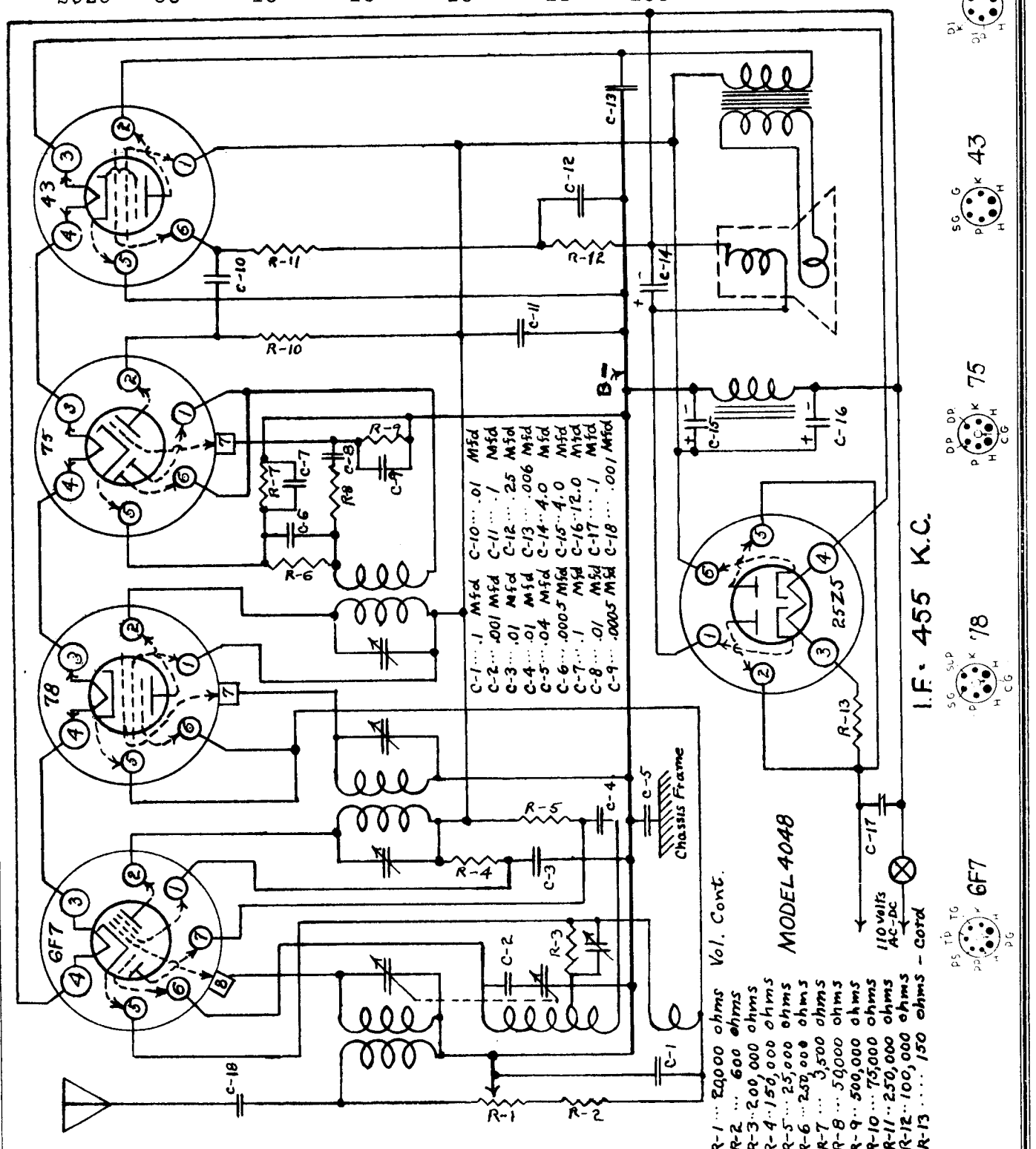
The I.F. stages should be peaked at 262 K.C. **Peak the I.F. trimmer, which is in the I.F. coil can having only one adjusting screw, first.**

Chassis pick-up may occur if the receiver is mounted on a car which has the ignition coil in the cowl compartment. This chassis pick-up can, in most cases, be traced to the speaker cable. Some of the first speakers have speaker cables which do not have shield pig-tails on the plug end of the cable. These cables have a bare copper lead soldered to the shield and to a filament prong of the plug. Make sure that the shield is soldered to the bare lead at a point as close to the plug prong as possible.

UNITED MOTORS SERVICE CORP.

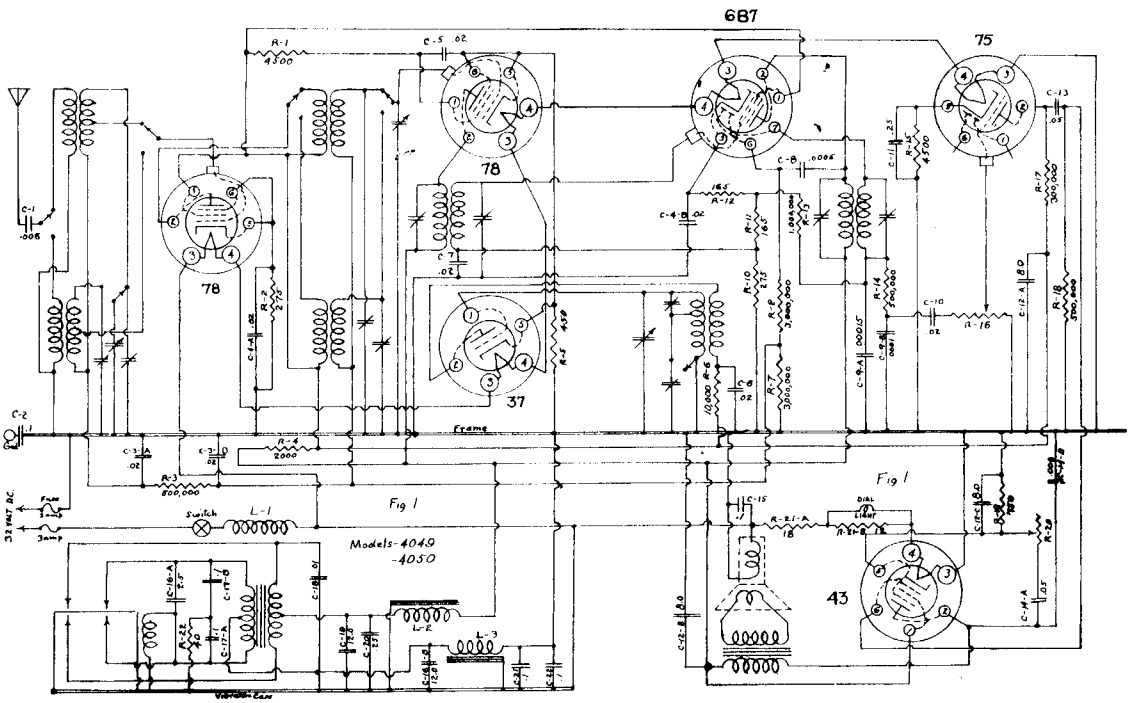
MODEL 4048

Tube	#1	#2	#3	#4	#5	#6	#7
6F7	72.5	100	-18	-18	4.8	0	62.5
78	100	100	-18	-18	4.7	4.7	
75	0	55	-18	-18	.6	0	
43	100	90	-18	-18	0	1.0 on 12.5V scale	
25Z5	80	-18	-18	-18	-18	100	



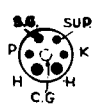
UNITED MOTORS SERVICE CORP.

MODELS 4049-4050 32 V. D.C. SETS



VOLTAGE CHART

Tube	#1 Screen	#2 Plate	From #3 Fil.	To #4 Fil.	#5 Cathode	#6 Grid	#F
78 R.F.	125	125	6.3		3.0	3.0	
78 1st Det.	125	125	6.3		6.5	6.5	
37 Osc.	- -	90	6.3		6.5		
6B7 I.F.-2nd Det.	125	155	6.3		8.0	8.0	
75 A.F.	- -	80	6.3		1.5		
43 Output	155	150	25.		2.0		



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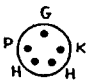

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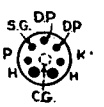
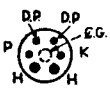
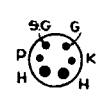


6B7



75



43

NOTE: All readings are taken from indicated tube socket prong to frame except filament voltages. Volume control on full. Supply voltage at 32 volts. Any increase or decrease in the power supply will vary these readings proportionately.

1. Connect the oscillator to the grid cap of the 1st Detetctor (78 tube).

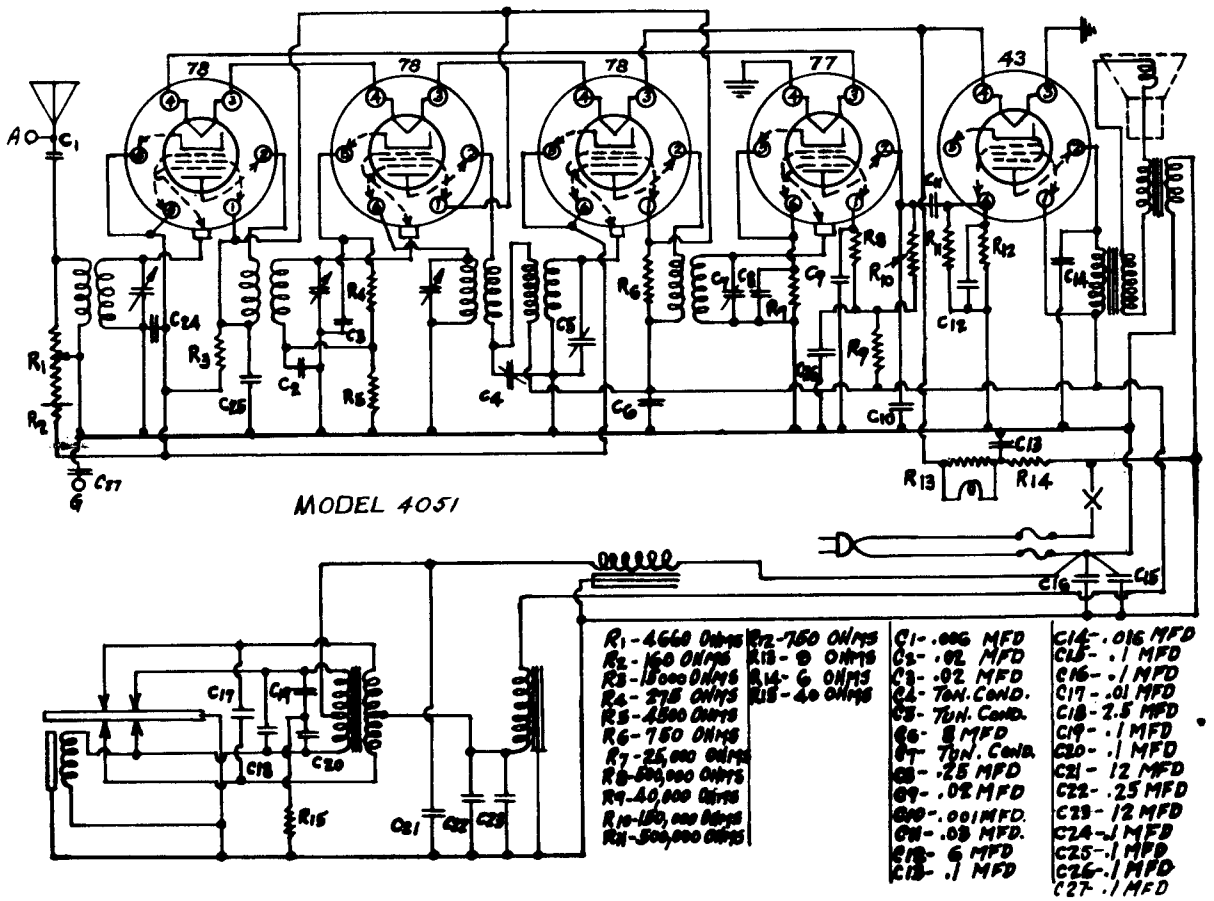
2. Set the Oscillator for 181.5 K.C.

3. Peak the I.F. trimmer condensers, peaking the secondary of the second I.F. coil first and working forward to the primary of the first I.F. coil.

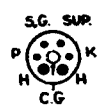
Do NOT connect the chassis of the receiver to the chassis of the vibrator as they are 32 volts apart electrically. Connecting the two chassis together will cause the fuses to blow.

UNITED MOTORS SERVICE CORP.

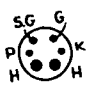
MODEL 4051 - 32 V. SET



Tube	#1	#2	#3	#4	#5	#6
			Filament			
78	135	135	6.4		5.0	5.0
78	135	154	6.4		35.0	0
78	135	154	6.4		5.0	5.0
77	50	77	6.4		5.5	5.5
43	154	148	25.0		22.5	



77 & 78



43

The Intermediate frequency for the Model 4049 and 4050 is 181.5 K.C.

1. Connect the oscillator to the grid cap of the 1st Detector (78 tube).

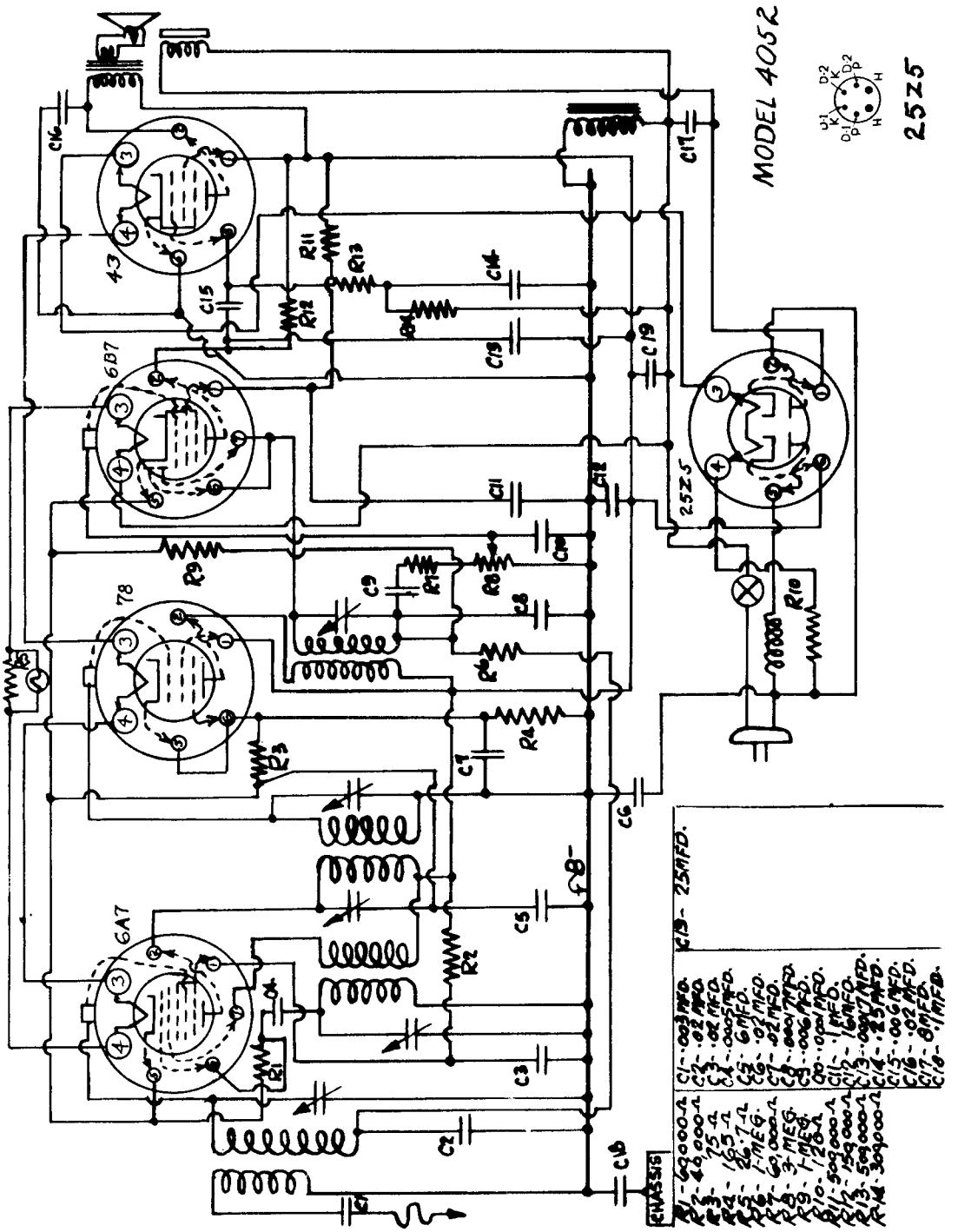
2. Set the Oscillator for 181.5 K.C.

3. Peak the I.F. trimmer condensers, peaking the secondary of the second I.F. coil first and working forward to the primary of the first I.F. coil.

Do NOT connect the chassis of the receiver to the chassis of the vibrator as they are 32 volts apart electrically. Connecting the two chassis together will cause the fuses to blow.

UNITED MOTORS SERVICE CORP.

MODEL 4052 A.C.-D.C.



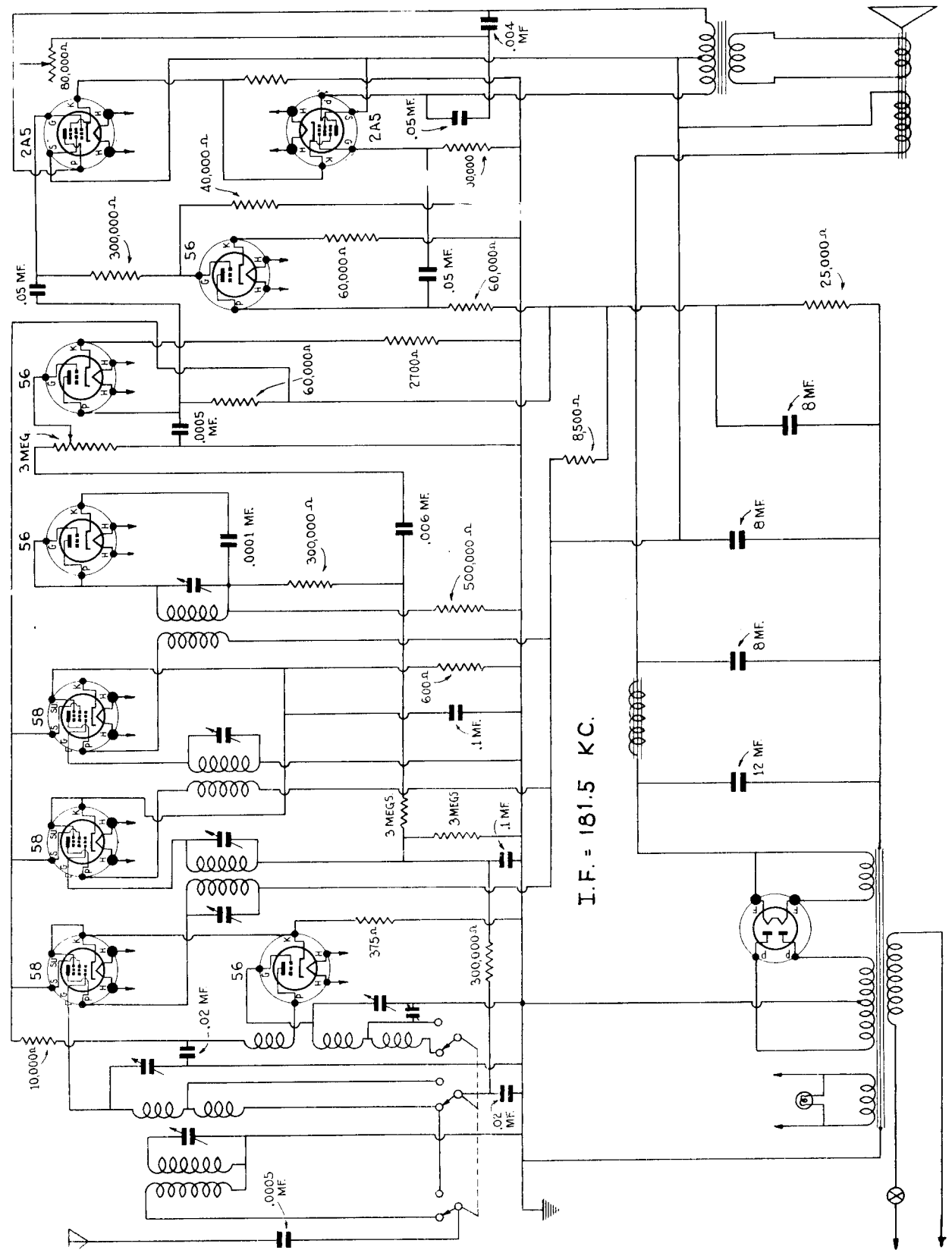
TUBE	TUBE PRONG NUMBERS						
	#1	#2	#3	#4	#5	#6	#7
			Filament				
6A7	46	100	6.3		2.5	-.8	100
78	100	100	6.3		2.2	2.2	
6B7	12.5	13.5	6.3		1.0	0	0
43	100	92.5	25			-5	
25Z5	-20	100	25		-20	100	

*I.F. STAGES

Peak the I.F. circuits of this receiver at 456 K.C. Use a fibre wrench for aligning the I.F. circuits, DO NOT attempt to use a metal wrench for this purpose.

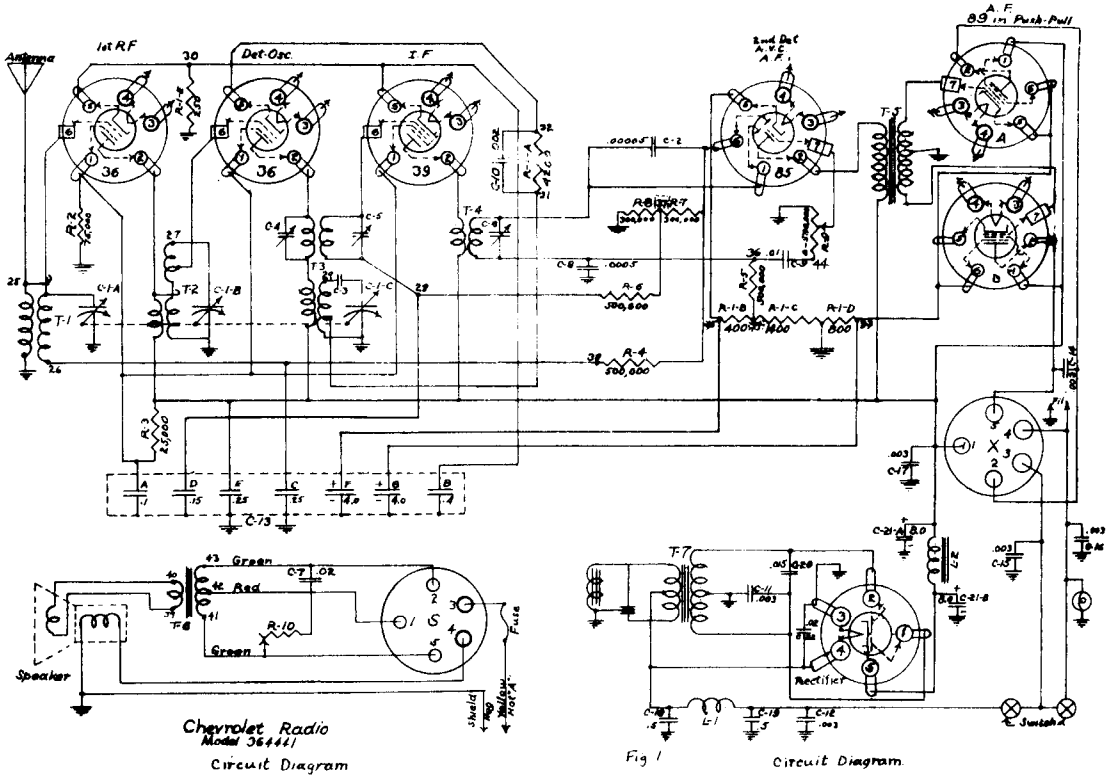
UNITED MOTORS SERVICE CORP.

58 56 MODELS 4053 & 4053A 2A5 80

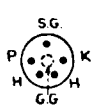


UNITED MOTORS SERVICE CORP.

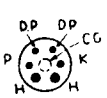
MODEL 36441 CHEVROLET



Tube	Screen Contact #1	Plate Contact #2	Heater Contact #3	Heater Contact #4	Cathode Contact #5	Sup Grid Contact #6
236 RF	100	175	0	6	2.5	
236 OSC	100	150	0	6	7.5	
239 IF	100	175	0	6	2.5	
85 DET.	2 Det.	165	6	0	10.5	0-A.V.C.
A-89 AF	175	175	0	6	19.5	19.5
B-89 AF	175	175	0	6	19.5	19.5
Rectifier			0	6	190.0	



36 & 39



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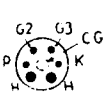
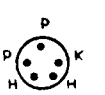


89



84 OR 6Z4

Ground the antenna terminal to the frame of the chassis.

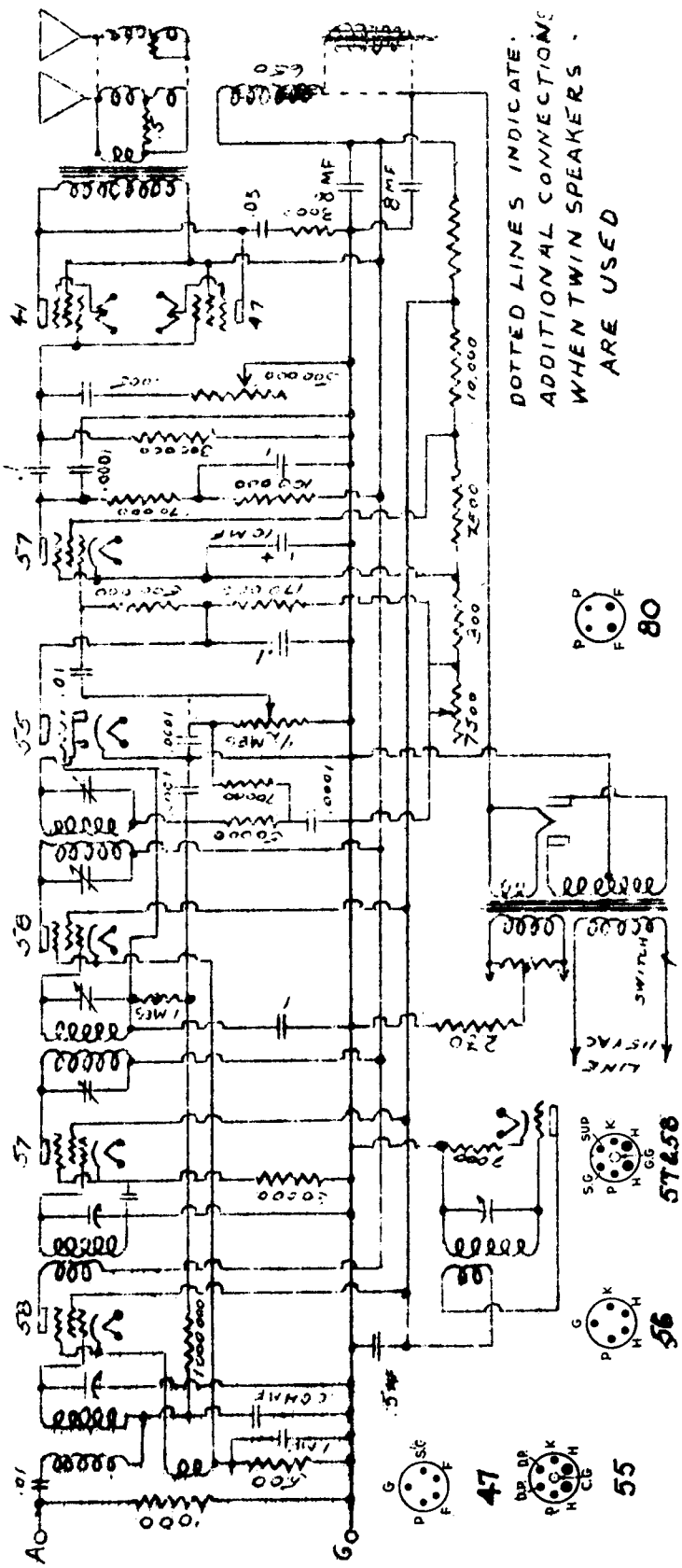
Connect the output leads of the test oscillator to the grid cap of the first 236 tube and to ground (frame of chassis) Leave grid cap in place.

Set the test oscillator at 262 K.C. If the test oscillator does not have 262 K.C. available, use the 130 K.C. setting which gives a second harmonic of 260 K.C. that may be used as a substitute for 262 K.C.

NOTE: In order to obtain a true peak when trimming all circuits, the A.V.C. must not function as it will tend to flatten the peaks as indicated by the output meter.

UNITED MOTORS SERVICE CORP.

DELCO MODELS A1 & B1



Position of tube	Type of tube	Filament Volts	Cathode Volts	Plate Volts	Screen Volts	Control Grid Volts	Suppressor Grid Volts
RF	58	2.50	4.50	265	95	0	0
1st Det.	57	2.50	4.50	265	95	0	0
Oscillator	56	2.50	12.5	90		0	0
IF	58	2.50	4.50	265	95	0	0
2nd Det.	55	2.50				0	0
1st AF	57	2.50	2.50	140	40	0	0
Output	47	2.50	17.5	250	265	0	0
Rectifier	80	5.00		350 AC 450 AC	(Model B-1) (Model A-1)	0	0

1. Set test oscillator to some known frequency between 1400 and 1500 kilocycles
2. Set receiver to this frequency on dial
3. Adjust trimmer condensers for maximum output
4. Follow same procedure at frequencies around 1050 kc., 750 kc., and 600 kc., making adjustments by bending sections of rotor end plates instead of adjusting trimmers.
5. Go over complete receiver a second time to get final delicate adjustment.

UNITED MOTORS SERVICE CORP

DELCO MODELS A3 B3

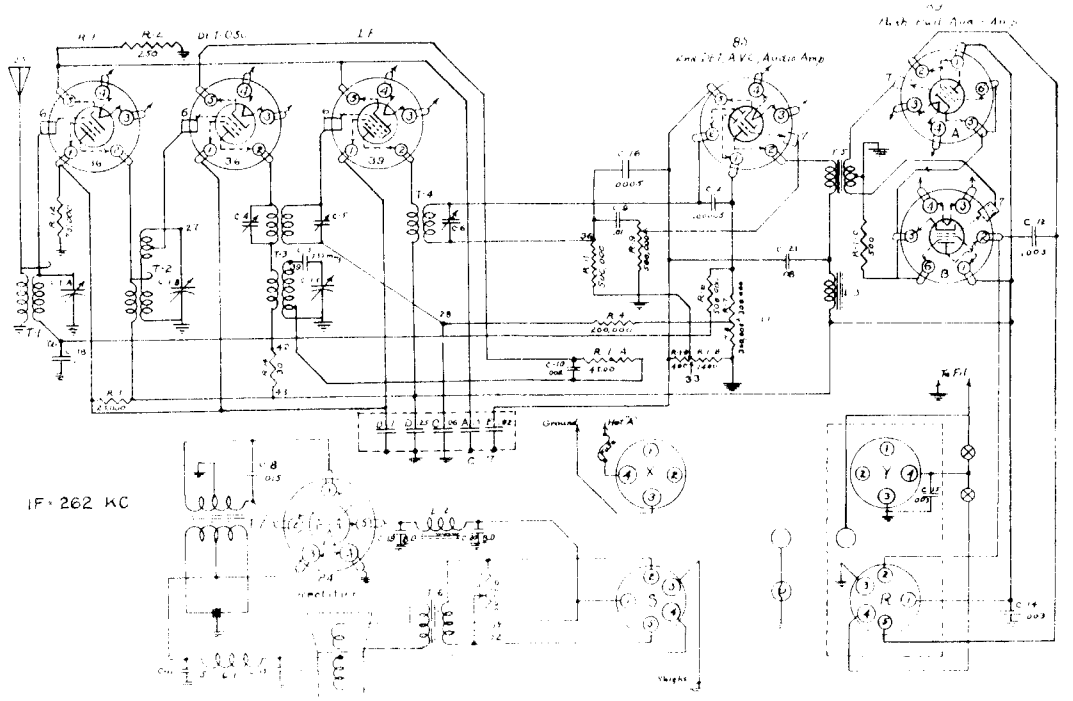
SOCKET LAYOUT

Position of tube	Type	Fil. Volts	Cathode Volts	Plate Volts	Screen Volts	Control Grid
RF	39	5.5	3.0	140	68	0
Osc-Mod.	36	5.5	6.0	140	68	0
IF	39	5.5	3.0	140	68	0
Sec. Det.	37	5.5	0	0	0	0
1st Audio	36	5.5	1.5	-	13.5	0
Audio-Output	38	5.5-5.7	13.5	135	140	0

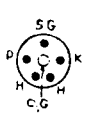
1. Set R.F. test oscillator to some known frequency between 1400 Kc and 1500 Kc.
2. Set receiver to this frequency on dial.
3. Adjust trimmer condensers for maximum output on output meter.
4. Set R.F. test oscillator to some known frequency between 550 Kc and 600 Kc.
5. Set oscillator padding condenser for maximum output on meter.
6. Align circuits approximately 1000 Kc 750 Kc and 550 Kc by bending segments of condenser rotor end plates.

UNITED MOTORS SERVICE CORP.

MODELS B-O-P-4036



Tube	Screen Contact #1	Plate Contact #2	Heater Contact #3	Heater Contact #4	Cathode Contact #5	Suppressor Gnd. Contact #6
236 RF	85	165	0	6.0	2.1	
236 Osc.	85	165	0	6.0	6.0	
239 IF	85	165	0	6.0	2.1	
85 Det.	0-A.V.C.	125	0	6.0	7.5	.2 Det.
A-89 AF	165	160	6.0	0	30.0	30.0
B-89 AF	165	160	0	6.0	30.0	30.0
84 Rect.	3.5	3.5	0	6.0	180	



36 & 39

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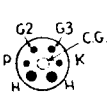

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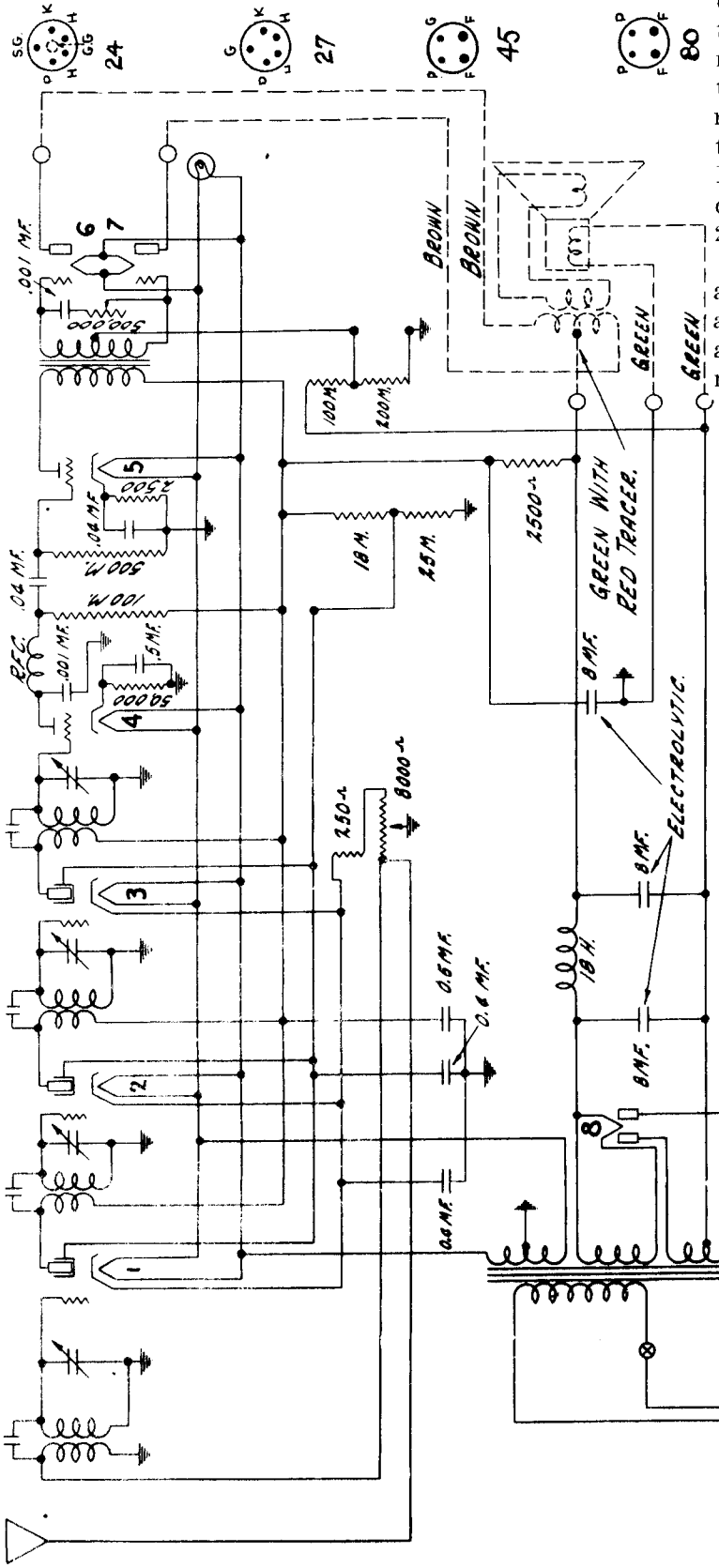
84

U. S. RADIO & TEL. CORP.

MODEL 28 - 28A & 29



The detector plate voltage as shown in the chart is lower than the actual voltage but is the reading obtained with a 1000 ohm per volt meter of 250 volts range. The grid voltage of the 227 first audio tube cannot be satisfactorily read with an ordinary voltmeter because of the 500,000 ohm resistor in the grid circuit. However the grid voltage is the same as the cathode voltage which can be read across the 2500 ohm resistor.

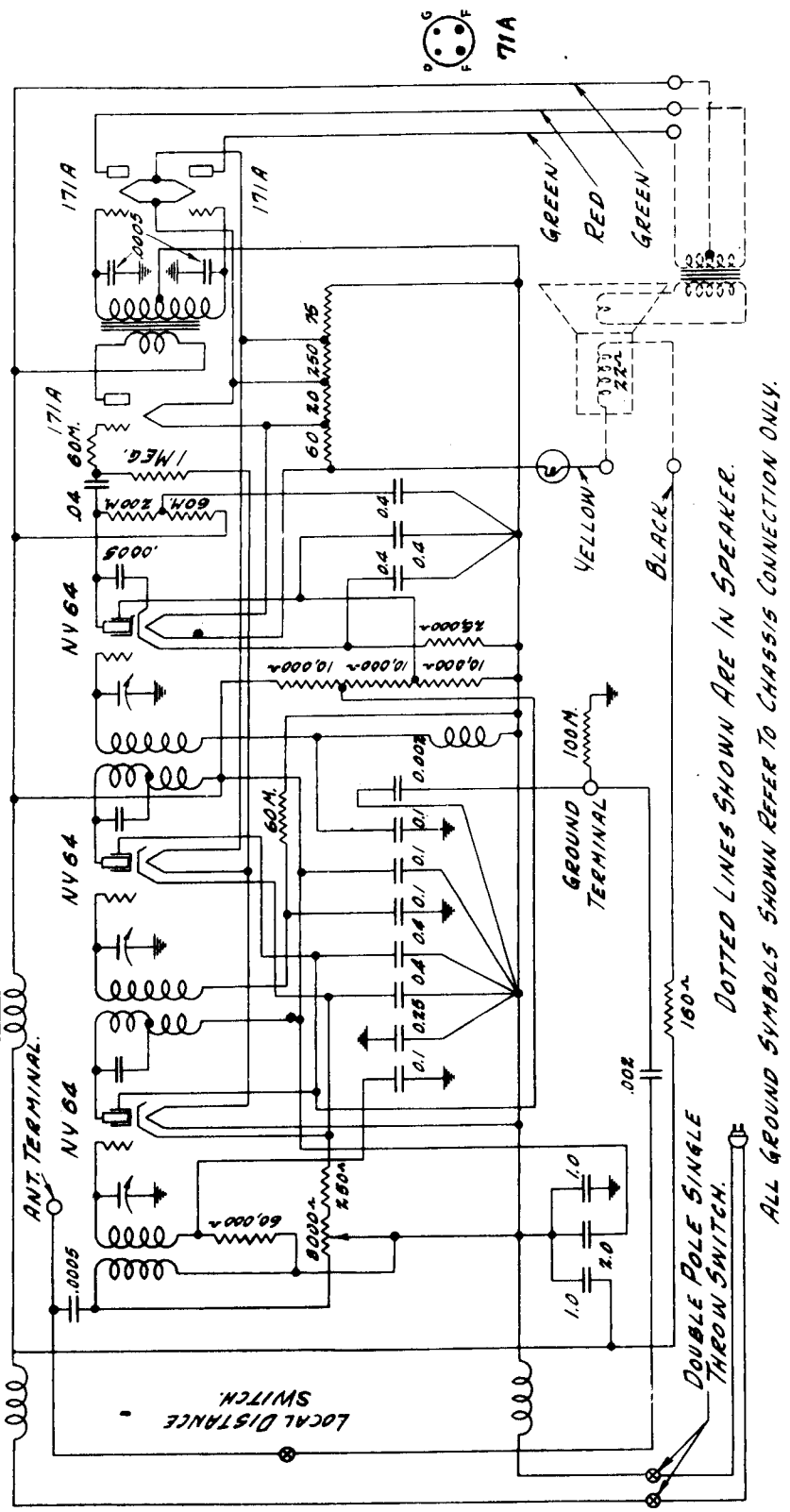
The screen current, plate and grid test milliamps will vary considerably with the tubes used and lower or higher readings than the figures as shown in the voltage chart do not necessarily mean that the tubes or chassis are defective.

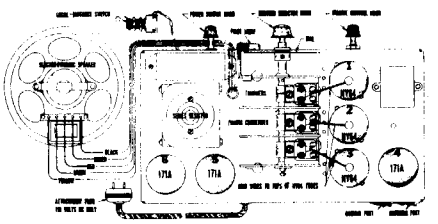
No. 29 CHASSIS—VOLTAGES AT SOCKETS—VOLUME CONTROL AT MAXIMUM LINE VOLTAGE, 115—PLUG IN SOCKET OF RECEIVER—TUBE IN TEST SET

Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Volts	Screen Current MA	Cathode Volts	Plate MA	Grid Test MA
224	1	1st Radio	2.25	205	3.	90	.55	3.	3.4	6.3
224	2	2nd Radio	2.25	205	3.	90	.55	3.	3.4	6.3
224	3	3rd Radio	2.25	205	3.	90	.55	3.	3.4	6.3
227	4	Detector	2.25	140	13.			13.	.35	.45
227	5	1st Audio	2.25	190	13.			13.	5.3	6.5
245	6	2nd Audio	2.35	255	43.				26.	31.
245	7	2nd Audio	2.35	255	43.				26.	31.
280	8	Rectifier	4.9						37. Per Plate	

U. S. RADIO & TEL. CORP.

MODEL 33 110 V. D.C. SET





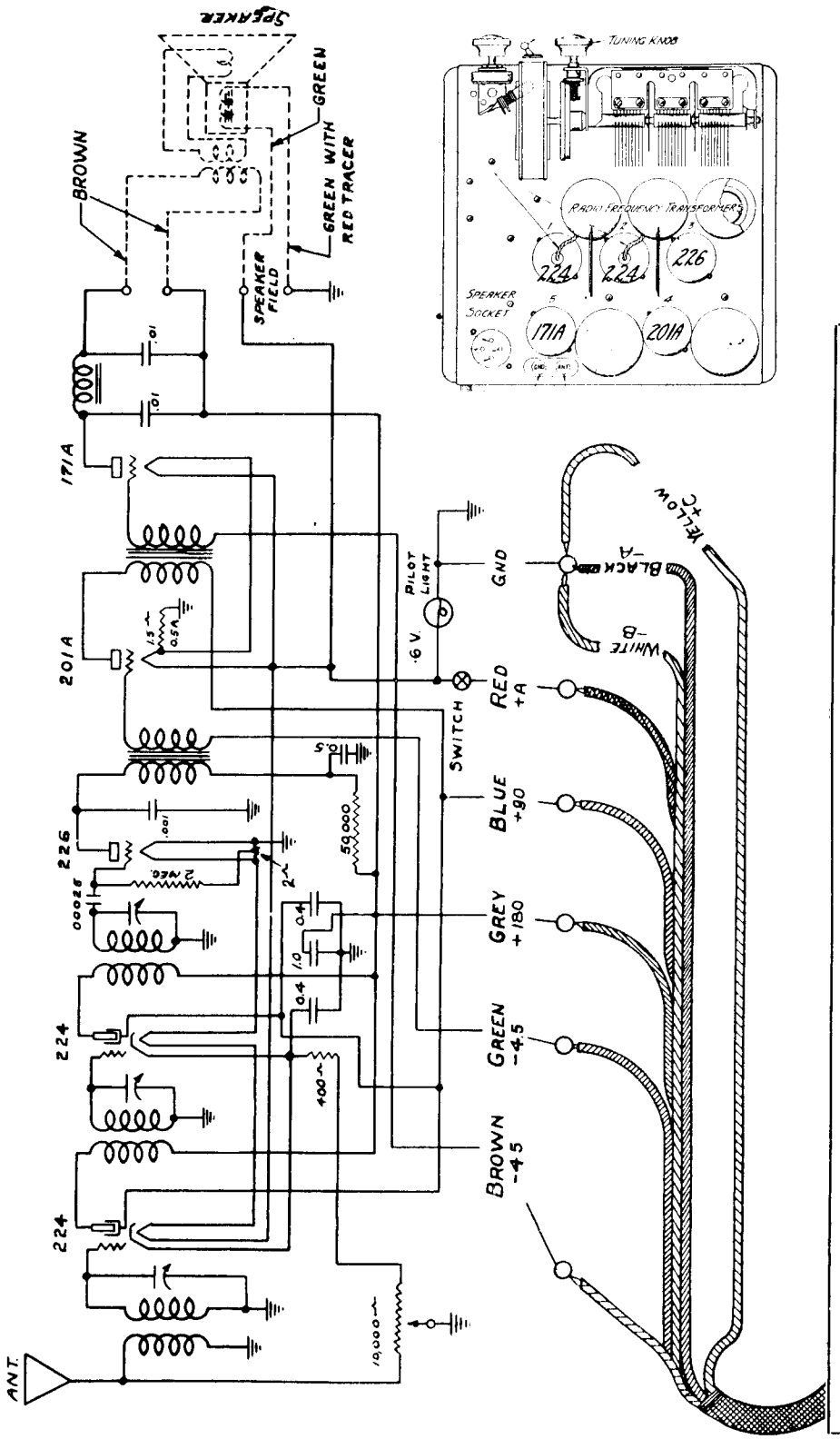
No. 33 CHASSIS—VOLTAGES AT SOCKETS—VOLUME CONTROL AT MAXIMUM LINE VOLTAGE, 118—PLUG IN SOCKET OF RECEIVER—TUBE IN TEST SET

Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Volts	Screen Current MA	Plate MA	Grid Test MA
NY64	1	1st Radio	5.0	114	2.5(1)	65	.6	3.2	4.5
NY64	2	2nd Radio	5.0	114	2.5(1)	65	.6	3.2	4.5
NY64	3	Detector	5.0	60	5. (2)	30	.05	.2	.4
171A	4	1st Audio	5.0	90	11. (3)			20.	27.
171A	5	2nd Audio	5.0	96	12.			22.	29.
171A	6	2nd Audio	5.0	96	12.			22.	29.

U. S. RADIO & TEL. CORP.

MODEL 49 & 55

APEX



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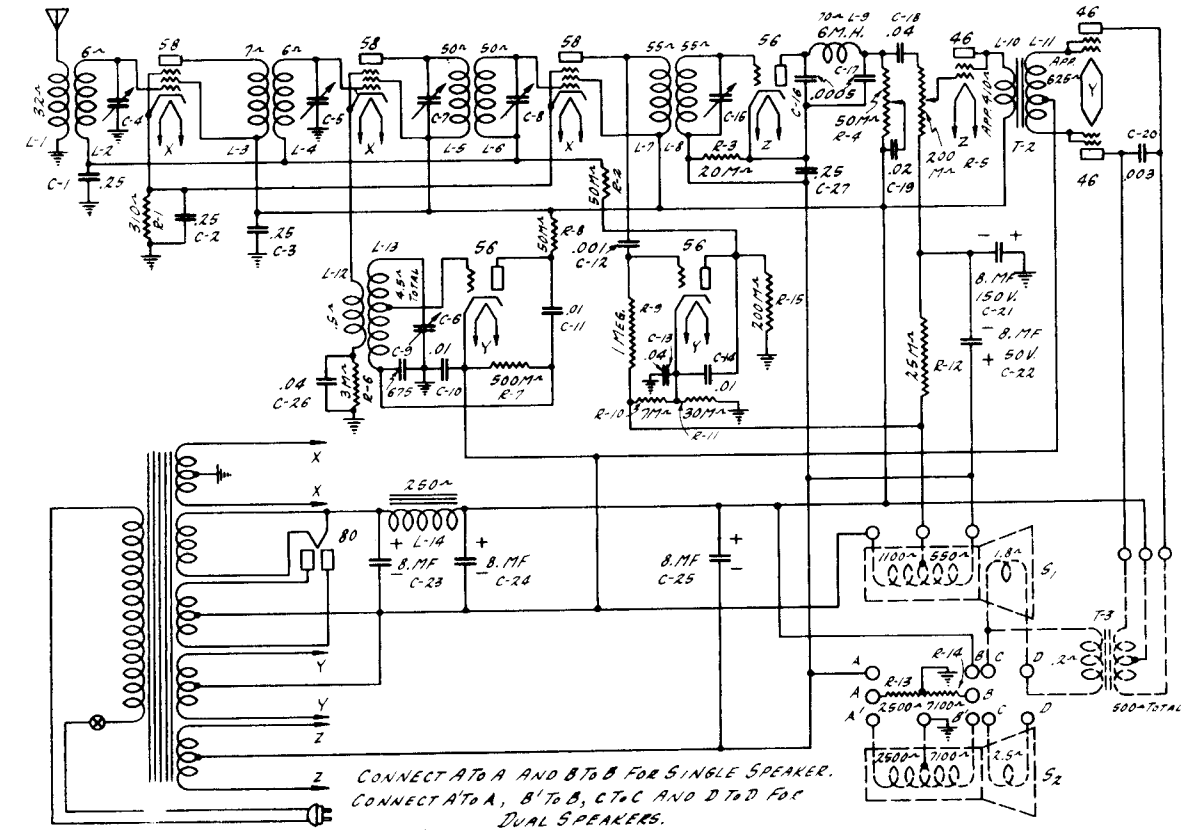
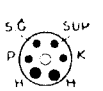
24

VOLUME CONTROL AT MAXIMUM

Type of Tube	Position of Tubes	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Volts	Screen Current MA	Plate MA	Grid Test MA
224	1	2.3	178	3.2	87	.6	5.4	6.8
224	2	2.3	178	3.2	87	.6	3.4	6.8
226	3	1.35	40	0			3.1	3.1
201A	4	5.2	85	5			1.6	4.9
171A	5	5.2	169	42			8.0	12.1

U. S. RADIO & TEL. CORP.
MODEL 1006 & 1007 CLASS B




58

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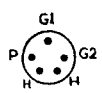

46

IF = 262 KC

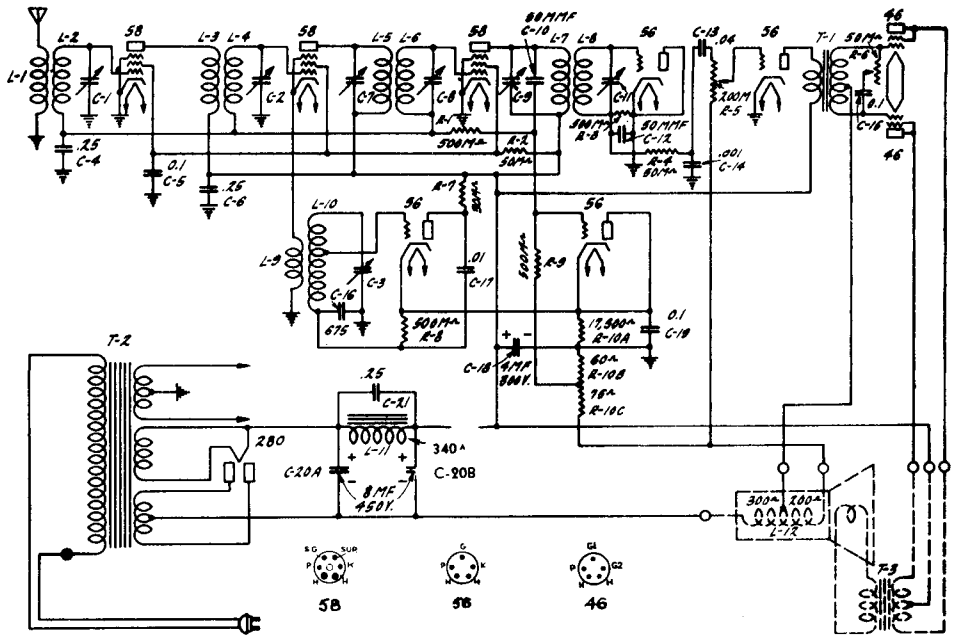
No. 1007 CHASSIS—VOLTAGES AT SOCKETS—LINE VOLTAGE 115 VOLUME CONTROL AT MAXIMUM

Type of Tube	*Position of Tube*	*Function*	*"A" Volts*	*"B" Volts*	*Control Grid "C" Volts*	*Screen Volts*	*Screen Current MA*	*Cathode Volts*	*Plate Current MA*	*Grid Test MA*
58	1	R.F.	2.35	125	.3(1)	125	1.3	5.0	5.6	9.6
58	2	1st Det	2.35	115	5.0(2)	115	.6	10.0	2.9	3.5
58	3	I.F.	2.35	125	.3(1)	125	1.3	5.0	5.6	9.6
56	4	2nd Det.	2.30	170	12.0			12.0	.6	.6
46	5	Driver	2.25	215	18.0(3)				18.0	21.0
56	6	Osc.	2.30	130	7-15(4)			0(4)	3.7	3.8
56	7	AVC	2.25	60(5)	2.0(6)			85.0	0	0
46	8	Class B	2.25	310	0				6.0(7)	13.0
46	9	Class B	2.25	310	0				6.0(7)	13.0
280	10	Rect.	1.2						41 Per Plate	

(1) Actual Voltage measured across 310 ohm biasing resistor—5.0 Volts.
(2) Actual Voltage measured across 3,000 ohm bias resistor—10 Volts.
(3) Read with Volume Control at minimum.
(4) Varies as shown with frequency. Actual voltage measured across 500,000 ohm bias resistor—15 to 35 Volts.
(5) Actual Voltage measured across 30,000 ohm voltage divider resistor—92 Volts
(6) Actual Voltage measured across 7,000 ohm voltage divider resistor—22 Volts.
(7) Plate current at no signal.

U. S. RADIO & TEL. CORP.

MODEL 3070 & 1009 CHASSIS



No. 1009 CHASSIS—VOLTAGES AT SOCKETS
LINE VOLTAGE 115—VOLUME CONTROL AT MAXIMUM

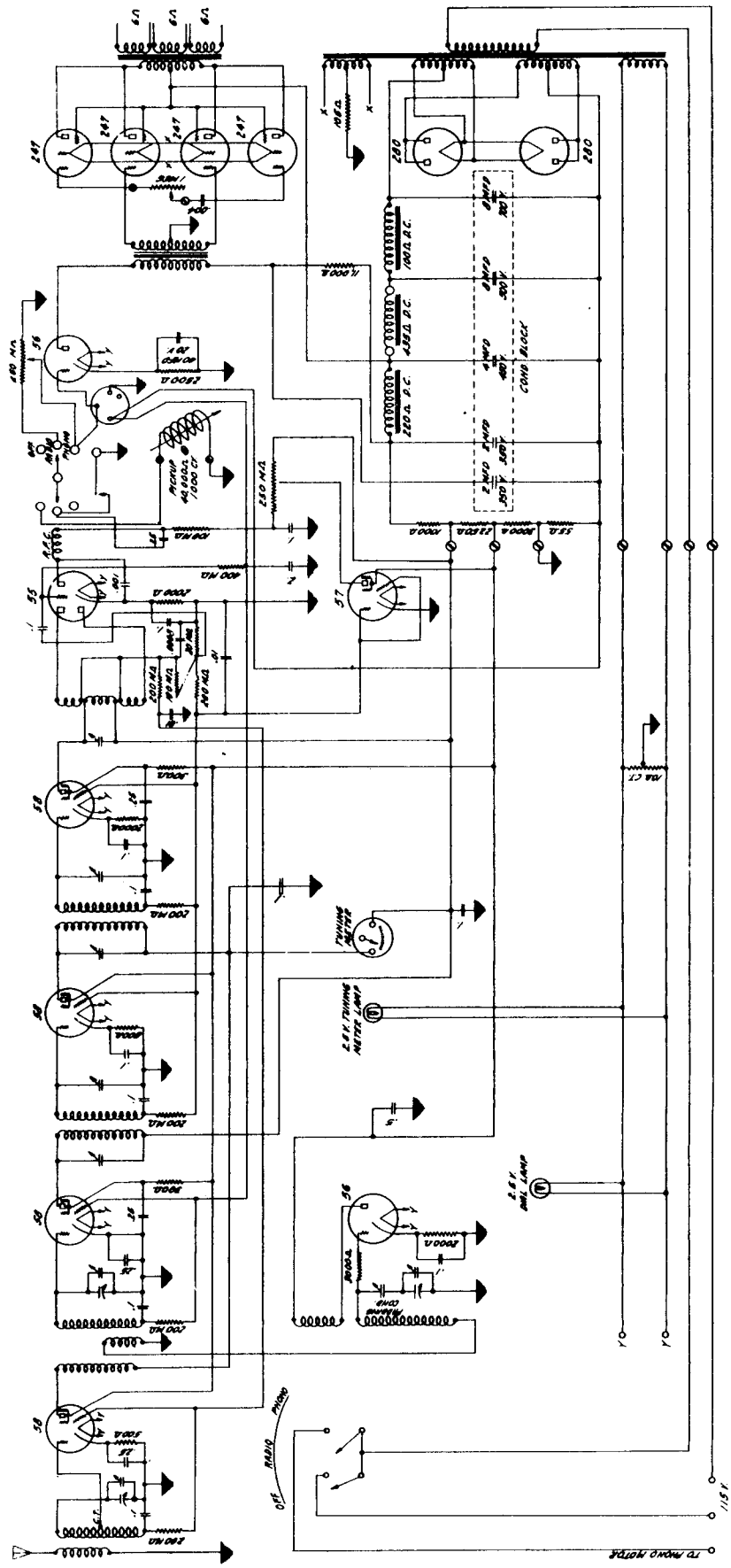
Type of Tube	*Position of Tube*	*Function*	*Filament Voltage*	*Plate Voltage*	*Plate Current MA*	*Screen Grid Voltage*	*Screen Grid Current MA*	*Grid Bias Voltage*	*Cathode Voltage*
58	1	R. F.	2.4	280	4.0	86	1.0	3.0(1)	0
58	2	1st Det	2.4	280	5.4	86	1.0	3.0(1)	0
58	3	I. F.	2.4	280	4.0	86	1.0	3.0(1)	0
56	4	2nd Det	2.4	0	0	—	—	0	0
56	5	1st Andio	2.4	245	11.0	—	—	4.0(2)	0
56	6	Osc	2.4	120	3.4-3.6(3)	—	—	8-14(3)	58
56	7	AVC	2.4	0	0	—	—	18(4)	54(5)
46	8	Power	2.4	275	17.0	—	—	36	
46	9	Power	2.4	275	17.0	—	—	36	
80	10	Rect.	5.0		44 Per Plate				

Aligning Intermediate Condensers—It is essential that the I. F. stages be correctly tuned for maximum deflection upon the output meter before the R. F. and oscillator circuits can be aligned.

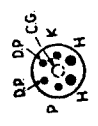
Remove the 56 oscillator tube and connect the signal lead from the signal generator to the control grid contact of the first detector tube. The ground lead from the signal generator is connected to the ground post on the rear of the chassis. Place the signal generator in operation at 262 K. C. and attenuate its output until as low a signal as will give satisfactory deflection on the output meter is obtained. The manual volume control should be set at maximum during alignment.

Then adjust the four intermediate condenser screws until maximum output is indicated on the output meter after all four screws have been adjusted the first time go over them again and check the setting for maximum output. The intermediate condenser screws are accessible from beneath the chassis and protrude through the porcelain bases of the I. F. Transformers.

UTAH PRODUCTS CO.
MODEL 400A SERIES



TUBE	PLATE	SCREEN	SUP. G.	CATHODE	DIODES
58 1st R.F.	200	110	-1.1	2.5	
58 1st Det.	195	110	-1.1	7	
56 Osc.	110			11	
58 1st I.F.	195	110	-1.1	3	
58 2nd I.F.	200	110	-1.1	7	
55 2nd Det.	80			.02	-1.5
57 Squelch	210	110		12	
56 1st Audio	220			-12	
47 2nd Audio	290	295			
80 Rect.	300				



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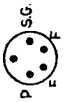
80

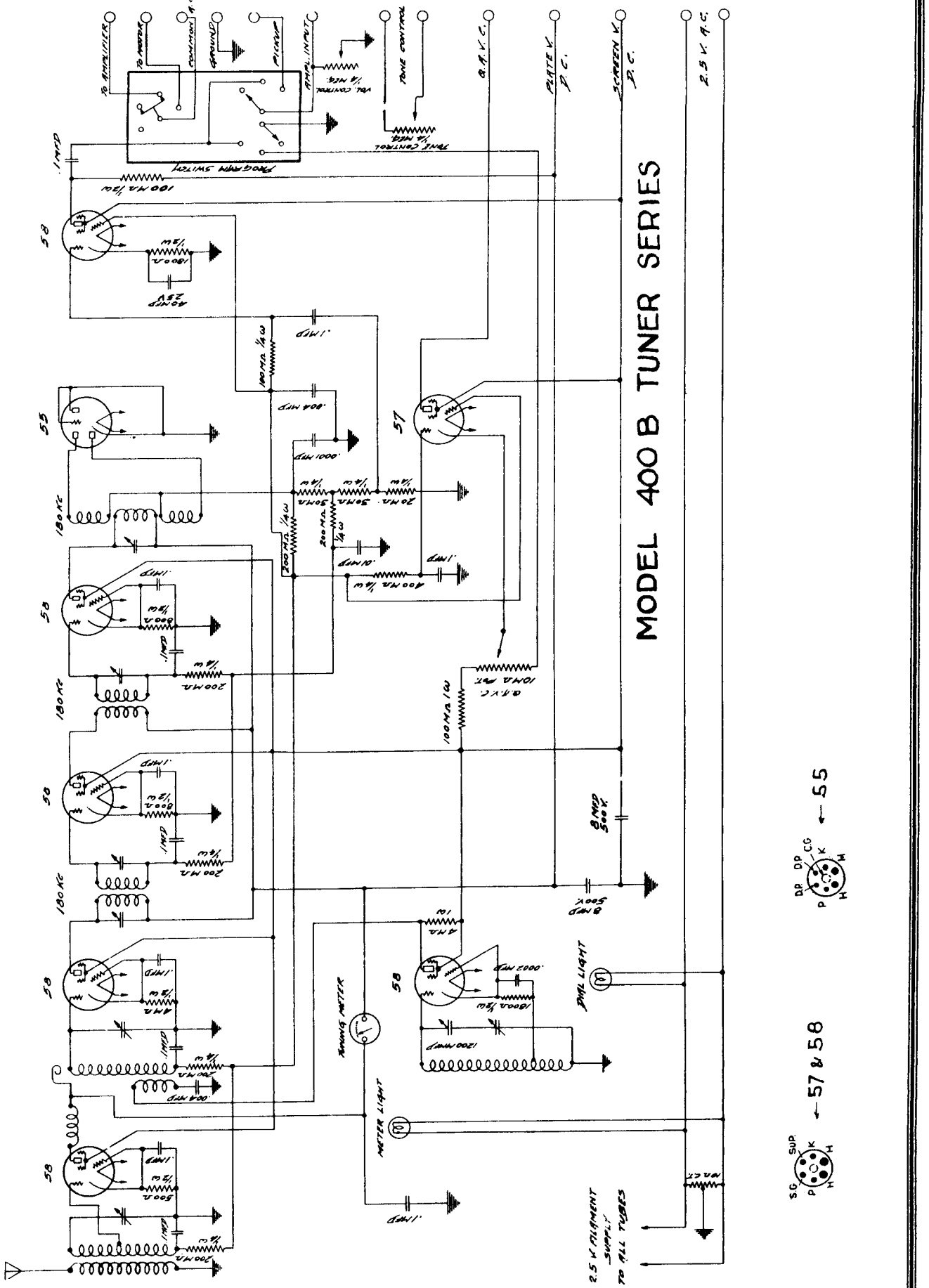
56

58

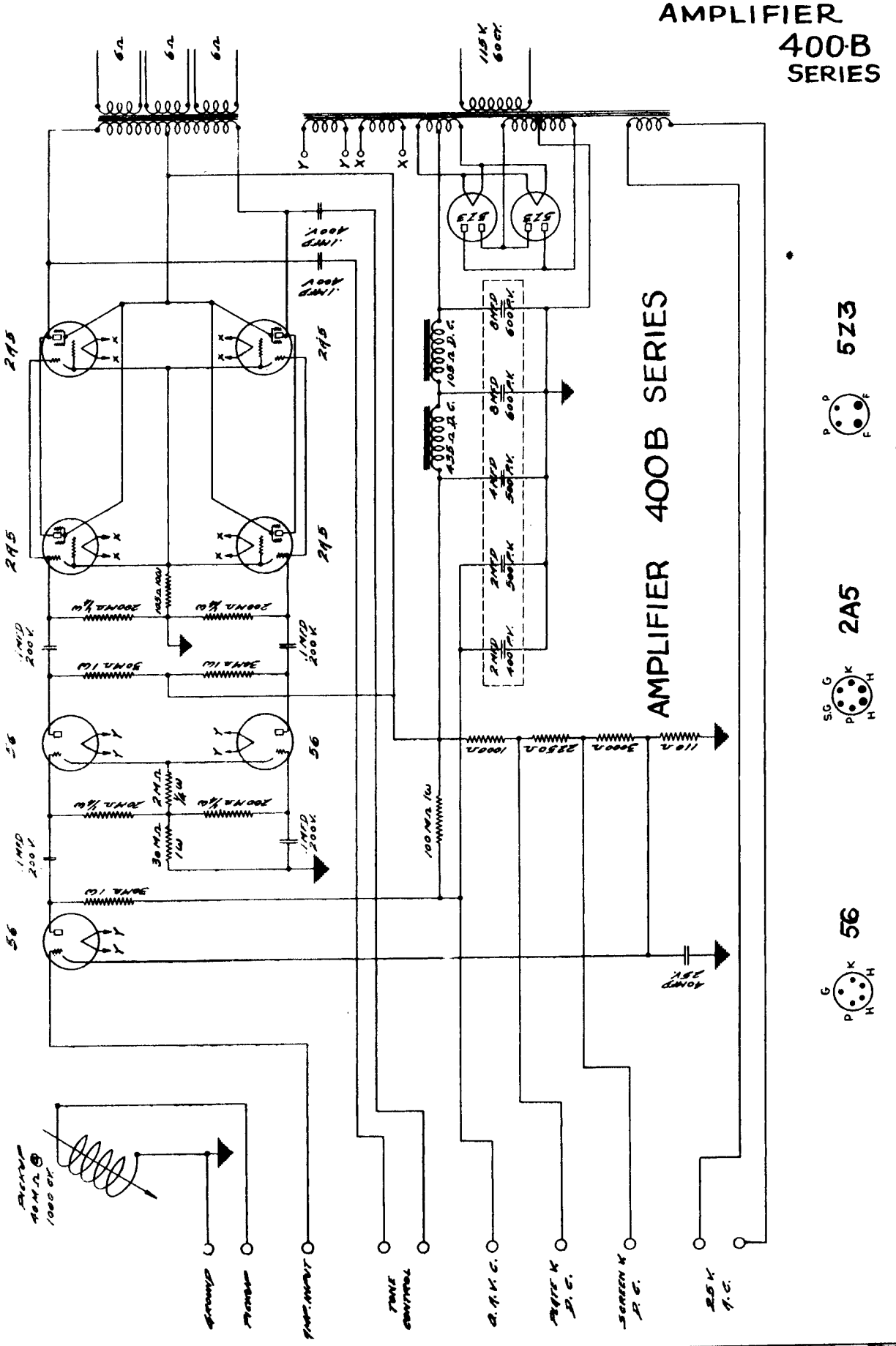


47

UTAH PRODUCTS CO.

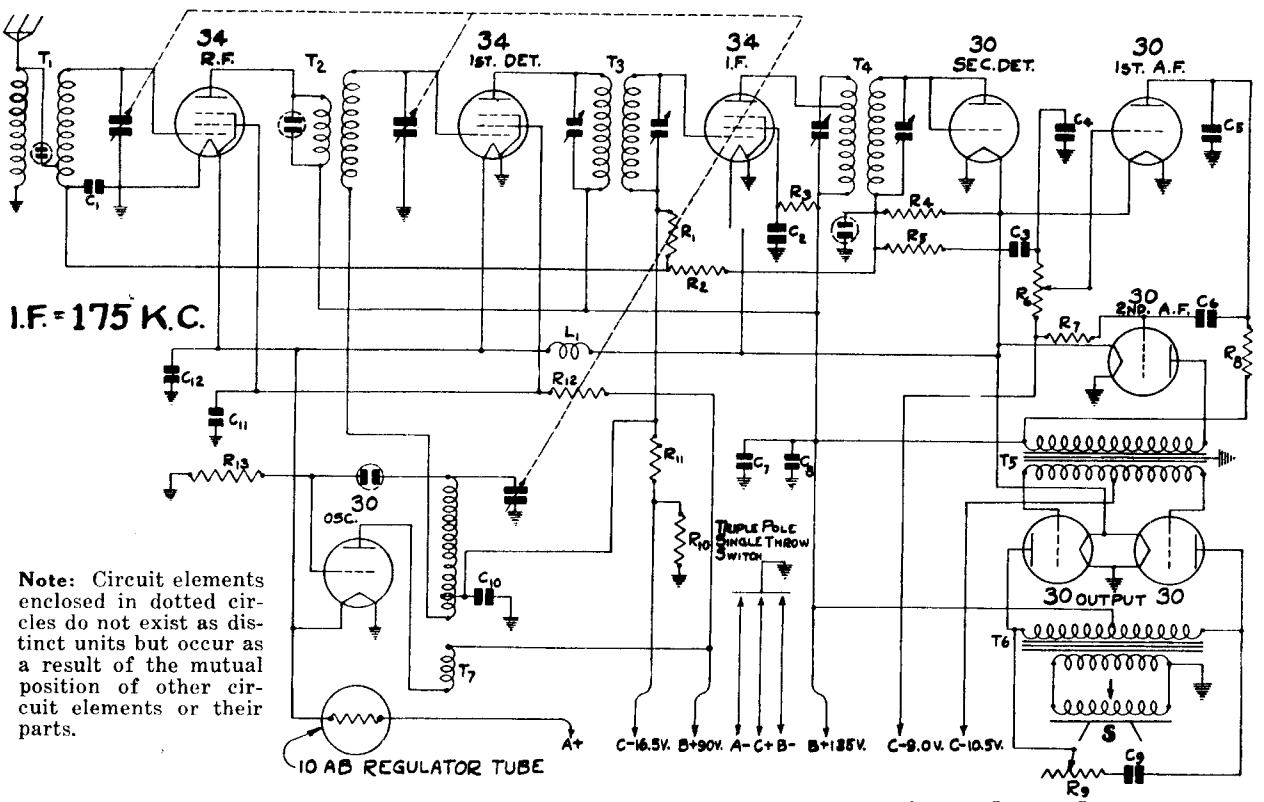


UTAH PRODUCTS CO.



WELLS GARDNER & CO.

MODEL 00A



Note: Circuit elements enclosed in dotted circles do not exist as distinct units but occur as a result of the mutual position of other circuit elements or their parts.

34

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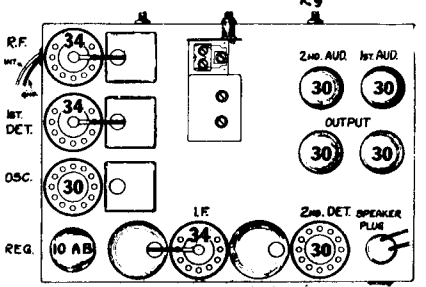

Voltages at Sockets

Antenna Shorted to Ground
Batteries Up to Rated Voltages. See Fig. 1
Voltages Read From Negative Filament Terminal

Type of Tube	Function	Across Filament	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
34	R.F.	2.0	135	65	3.0(1)	2.6
34	1st Det.	2.0	135	65	4.5(1)	2.5
30	Osc.	2.0	90		2–4(2)	3.3
34	I.F.	2.0	135	90	4.5(1)	3.0
30	2nd Det.	2.0				
30	1st Audio	2.0	90		9.0(3)	.45
30	2nd Audio	2.0	130		9.0(4)	3.4
30	Output	2.0	135		10.5	2.5

(1) Computed figure—cannot be read because of high resistance circuit.
(2) Varies with frequency setting.
(3) Volume Control at minimum.
(4) As read at battery.

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80864	C1	.10 mfd.	200 V.	Tubular
P-80862	C2	.050 mfd.	200 V.	Tubular
P-80862	C3	.050 mfd.	200 V.	Tubular
P-80919	C4	.00025 mfd.	600 V.	Moulded
P-80919	C5	.00025 mfd.	600 V.	Moulded
P-80862	*C6	.050 mfd.	200 V.	Tubular
P-80968	C7	4.00 mfd.	150 V.	Electrolytic
P-80862	C8	.050 mfd.	200 V.	Tubular
P-80940	C9	.02 mfd.	400 V.	Tubular
P-80981	C10	.01 mfd.	400 V.	Tubular
P-80888	C11	.25 mfd.	200 V.	Tubular
P-80888	C12	.25 mfd.	200 V.	Tubular
P-80980	Three Gang Variable Condenser			

RESISTORS

Part No.	Code	Resistance	Type
P-A95504	R1	.5 megohm	Carbon
P-A94105	R2	1.0 megohm	Carbon
P-A95353	R3	35,000 ohms	Carbon
P-A94204	R4	200,000 ohms	Carbon
P-A95104	R5	100,000 ohms	Carbon
P- 96009	R6	1 megohm	Volume Control
P-A94105	R7	1 megohm	Carbon
P-A95104	R8	100,000 ohms	Carbon
P- 97005	R9	150,000 ohms	Tone Control
P-A94153	R10	15,000 ohms	Carbon
P-A94405	R11	4 megohms	Carbon
P-A94153	R12	15,000 ohms	Carbon
P-A95504	R13	.5 megohm	Carbon

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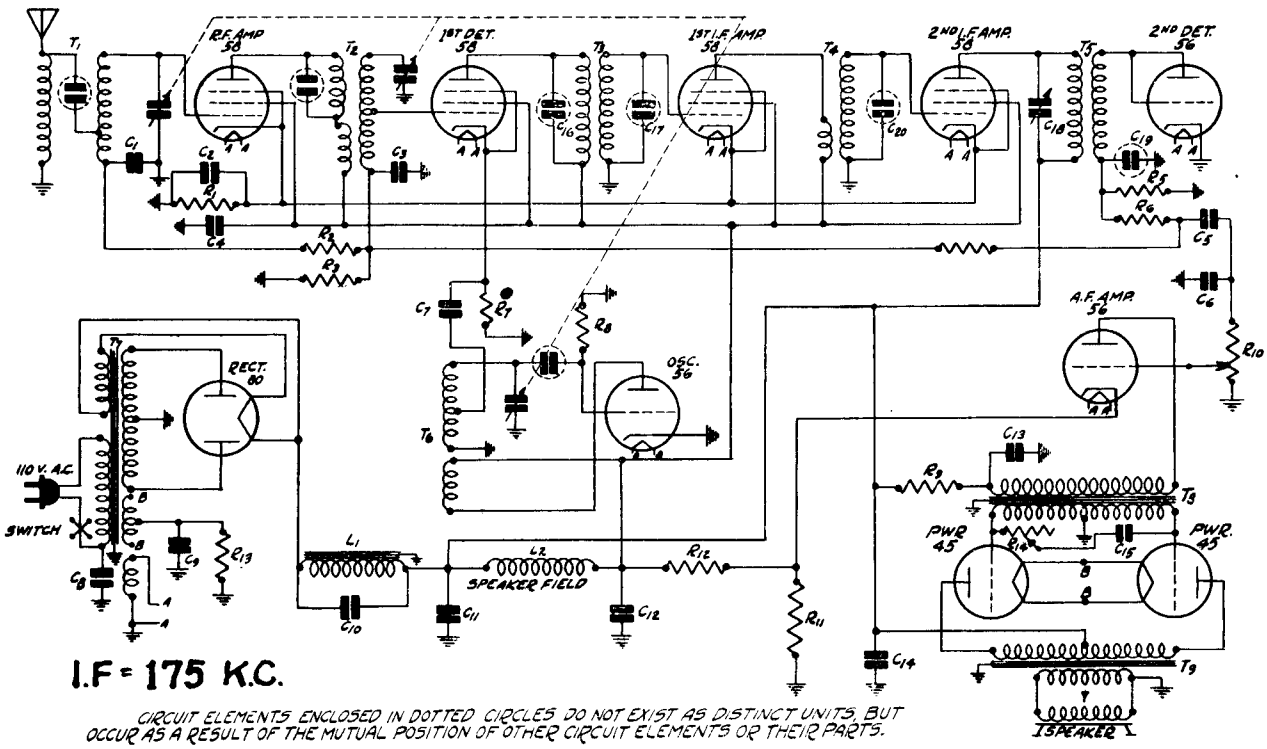
MODEL 00B



CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS, BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

58 56 45 80

Voltages at Sockets

Line Voltage, 115

Antenna Shorted to Ground

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Control Grid to Cathode	Normal Plate M.A.
58	R.F.	2.3	93	93	3 (1)	6.4
58	1st Det.	2.3	85	85	11 (2)	1.7
56	Osc.	2.3	96		2 (3)	2.8
58	1st I.F.	2.3	93	93	3 (1)	6.4
58	2nd I.F.	2.3	315	93	3	6.6
56	2nd Det.	2.3	0		0	0
56	A.F. Amp.	2.3	170		8 (4)	4.4
45	Power Amp.	2.4	255		50	32.
80	Rectifier	4.7	850 Volts A. C. plate to plate			55 per plate.

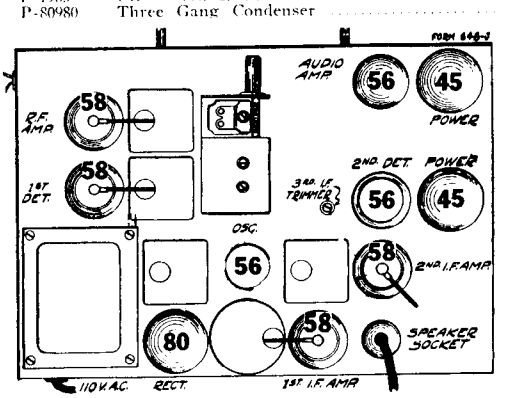
(1) Read across R1
(2) Read across R7
(3) Subject to variation
(4) Read across R11

RESISTORS

Part No.	Code	Resistance	Type
P-A93141	R1	140 ohms	Carbon
P-A95204	R2	200.000 ohms	Carbon
P-A95105	R3	1.0 megohm	Carbon
P-A95205	R4	2.0 megohm	Carbon
P-A94304	R5	300.000 ohms	Carbon
P-A95104	R6	100,000 ohms	Carbon
P-A94502	R7	5.000 ohms	Carbon
P-A95504	R8	500.000 ohms	Carbon
P-C94303	R9	30.000 ohms	Carbon
P- 96011	R10	2 megohm	Volume Control & Switch
P- 98006	R11	460 ohms	Armoured wire wound
	R12	6000 ohms	
	R13	780 ohms	
P- 97009	R14		Tone Control

CAPACITORS

Part No.	Code	Capacity	Voltage	Type
P-80862	C1	0.050 mfd.	200 V.	Tubular
P-80974	C2	0.500 mfd.	120 V.	Tubular
P-80862	C3	0.050 mfd.	200 V.	Tubular
P-80888	C4	0.250 mfd.	200 V.	Tubular
P-80862	C5	0.050 mfd.	200 V.	Tubular
P-80919	C6	0.00025 mfd.	600 V.	Moulded
P-80887	C7	0.100 mfd.	400 V.	Tubular
P-80997	C8	0.010 mfd.	600 V.	Metal can
P-80888	C9	0.250 mfd.	200 V.	Tubular
P-80985	C10	0.150 mfd.	200 V.	Tubular
P-80990	C11	16.0 mfd.	450 V.	Electrolytic
P-81000	C12	8.0 mfd.	150 V.	Electrolytic
	C13	2.0 mfd.	300 V.	
P-80863	C15	0.004 mfd.	600 V.	Tubular
P-1965	C18	3rd I. F. Trimmer	Condenser	
P-80980	Three Gang Condenser			



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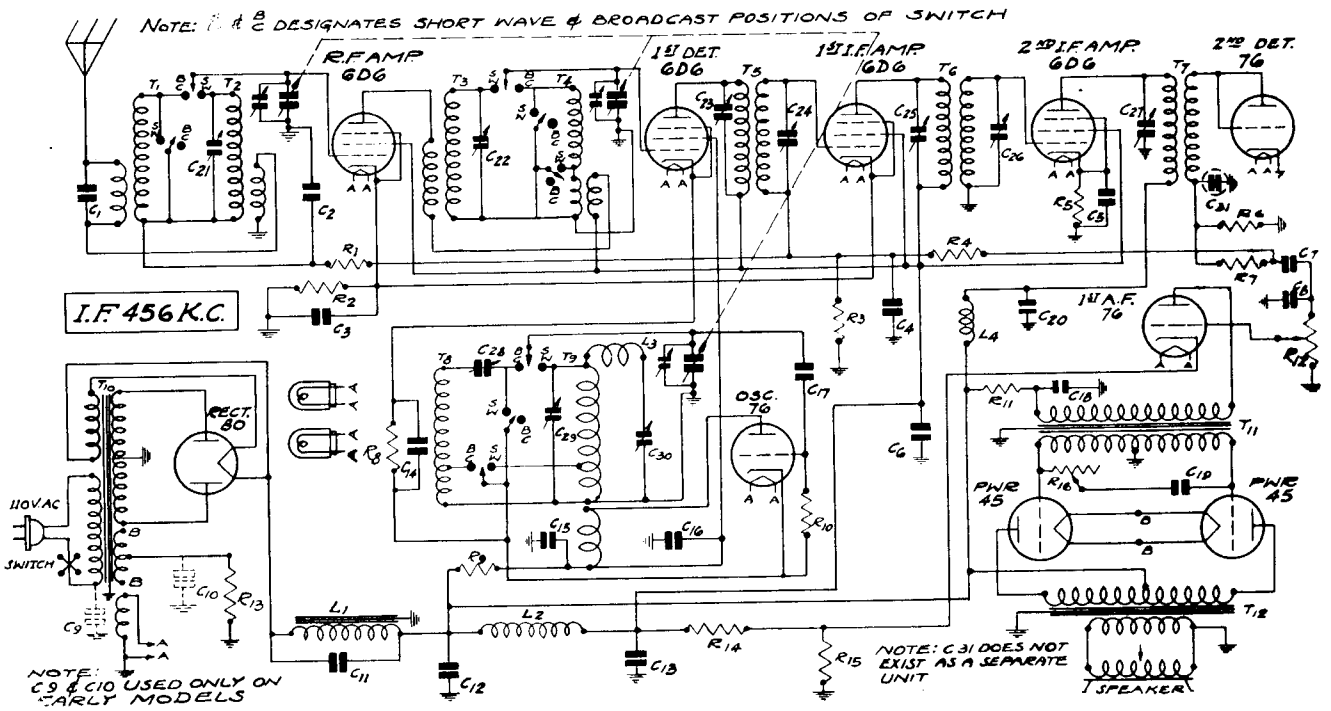
MODEL OC SERIES

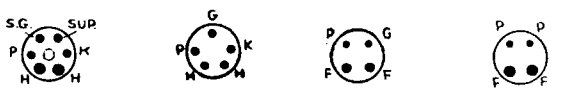


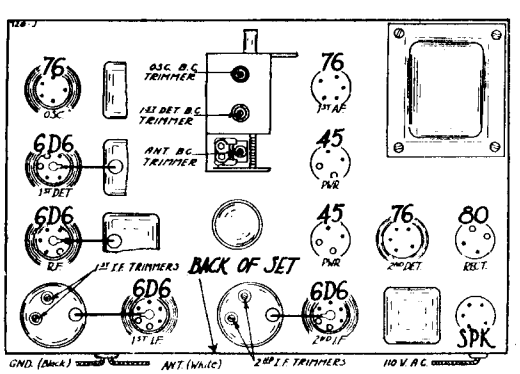
Voltages at Sockets

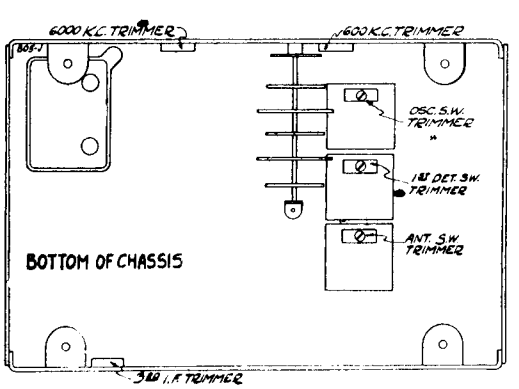
LINE VOLTAGE — 115

ANTENNA SHORTED TO GROUND

Type of Tube	Functior	Across Fila. or Heater	Plate to Cath.	Screen to Cath.	Cath. to Ground	Normal Plate M. A.
6D6	R. F.	6.3	95	95	2.8	7.0
6D6	1st Det.	6.3	88	95	9.2	2.9
76	Osc.	6.3	110	—	—	5.0
6D6	1st I. F.	6.3	95	95	2.8	7.0
6D6	2nd I. F.	6.3	300	95	3.3	6.0
76	2nd Det.	6.3	—	—	—	—
76	1st Audio	6.3	160	—	9.0	4.0
45	Output	2.5	245	—	48.0	30.0
80	Rectifier	5.0	890 V. A. C. pl. to pl.			58.0 per plate







Tube Arrangement & Location of Trimmers

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans - See Fig. 2. The openings to these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION - Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the back panel of the chassis as shown in Fig. 2 and the adjustment screw is reached through a hole in the back panel.

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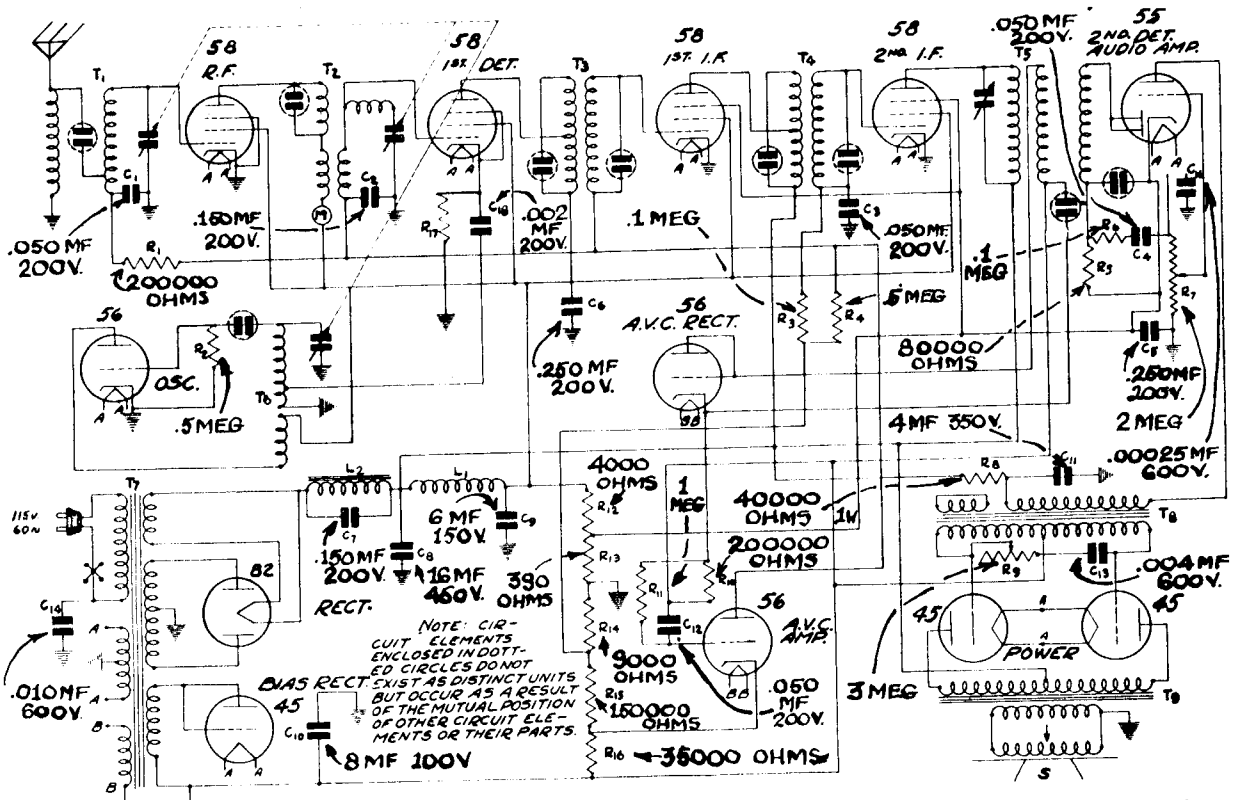
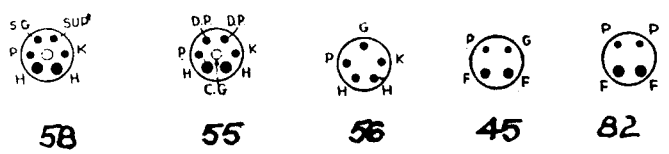
MODELS 02A & 02AA



ALL CONDENSERS = 1.0 WATT
R-5 = .5 WATT. BALANCE OF RESISTORS = .2 WATT



58 55 56 45 82

Voltages at Sockets

LINE VOLTAGE, 115
ANTENNA SHORTED TO GROUND

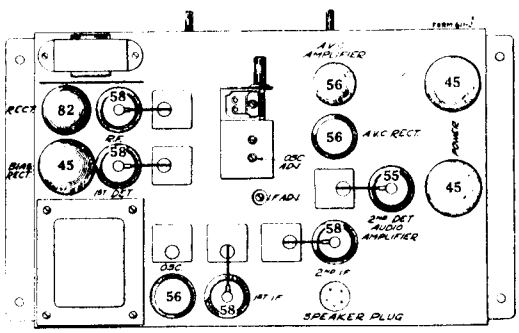
Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Control Grid to Cathode	Suppressor Grid to Cathode	Normal Plate M. A.
58	R. F.	2.5	116	122	4.5(1)		7.5
58	1st Det.	2.5	112	112	13.0(2)		2.2
56	Osc.	2.5	122		0		5.0
58	1st I. F.	2.5	405	120	4.5(1)	13	8.0
58	2nd I. F.	2.5	405	120	4.5(1)	13	8.0
56	A.V.C. Rect.	2.5	0				0
56	A.V.C. Ampl.	2.5	75(3)		17.0(4)		0
55	2nd Det.	2.5	160(5)		13.0(6)		5
45	Power	2.5	405		103		22
45	Bias Rect.	2.5	105				.5
82	Rectifier	2.5	1040 Volts A. C. Plate to Plate				52 per plate

(1) As read across R14
(2) As read across R17 and R14
(3) As read across R15 wtih 1,000,000 ohm meter
(4) As read across R16
(5) Triode Plate to Cathode
(6) Volume Control at Minimum

Set the signal generator for 175 K. C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the 3rd I. F. primary condenser for maximum output. The adjusting screw for this condenser is reached from the top of the sub-panel and will be seen in back of the tuning condenser.

Next set the signal generator for a signal of exactly 1400 K. C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K. C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

The tuning condensers are all adjusted at the factory for the correct relative capacity between the oscillator section and the other two sections. As a rule no adjustment other than at 1400 K. C., as mentioned above, is required



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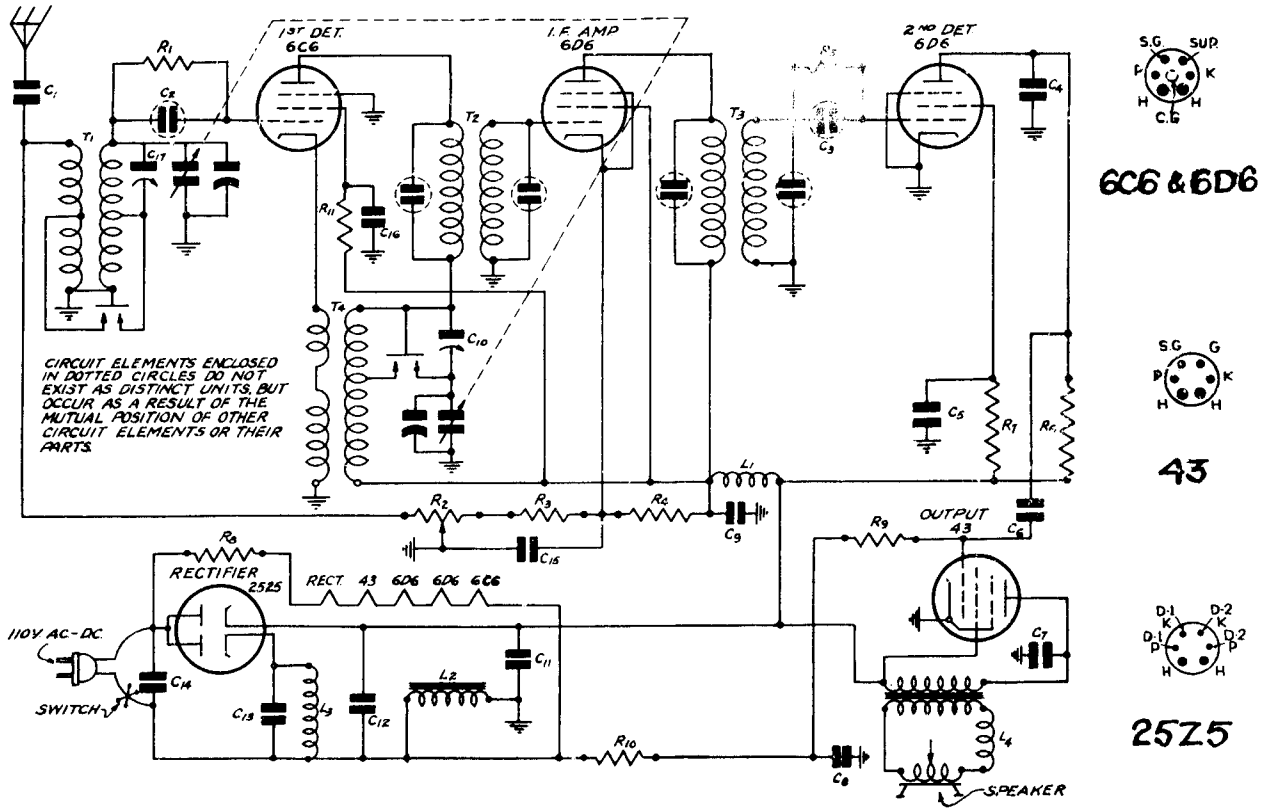
MODEL 05 AA



Voltages at Sockets

Antenna lead connected to subpanel.—Volume Control at Maximum.
CAUTION—Do not put chassis on any grounded surface or let chassis touch any ground.

Type of Tube	Function	A.C. Line Voltage—115 Use High Resistance A.C. Meter, Rectifier Type, for Heater Voltage Measurements					D.C. Line Voltage—110 Use High Resistance D.C. Meter for Heater Voltage Measurements				
		Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
6C6	1st Det.	5.8	108	50		1.0(1)	5.6	90	47		.9(1)
6D6	I.F.	5.8	105	105	3.0	7.5	5.6	86	86	2.4	6.0
6D6	2nd Det.	5.8	20(2)	40(2)	.3	2.3	5.6	17(2)	34(2)	.2	2.0
43	Output	24.0	95	108	17.0(3)	20.0	23.0	80	90	14.0(3)	17.0
25Z5	Rect.	24.0	105 (4) 125			84.0 Total	23.0	6 (4) 7			74.0 Total

(1) Subject to variation.
(2) As read with 1,000,000 ohm meter.
(3) Read across filter choke.
(4) Readings from plate to two cathodes.

RESISTORS

Part No.	Code	Resistance	Type
	R1	1 megohm	(See P-1969 in Misc. list)
P-91019-D	R2	14,500 ohms	Volume Control
P-98004	R3	300 ohms	Wire Wound
P-A95503	R4	50,000 ohms	Carbon
	R5	1 megohm	(See P-1970 in Misc list)
P-A94403	R6	40,000 ohms	Carbon
P-A95104	R7	100,000 ohms	Carbon
P- 91064	R8	160 ohm	Armoured Wire Wound
P-A95504	R9	500,000 ohms	Carbon
P-A94204	R10	200,000 ohms	Carbon
P-A94204	R11	200,000 ohms	Carbon

"A" preceding the number signifies .2 watt
"B" preceding the number signifies .5 watt
"C" preceding the number signifies 1.0 watt

Part No.	Code	Capacity	Voltage	Type
P-5150	C1	500 mmfd.		Wire
	C2	35 mmfd.		(See P-1969 in Misc. list)
	C3	75 mmfd.		(See P-1970 in Misc. list)
P-80914	C4	.002 mfd.	600 V.	Tubular
P-80999	C5	.25 mfd.	140 V.	Tubular
P-80872	C6	.01 mfd.	400 V.	Tubular
P-80898	C7	.006 mfd.	600 V.	Tubular
P-80999	C8	.25 mfd.	140 V.	Tubular
P-80888	C9	.25 mfd.	200 V.	Tubular
P-1539	C10	450–950 mmfd.		Trimmer Condenser
P-80944C	C11	16. mfd.	150 V.	Electrolytic Block
	C12	12. mfd.	150 V.	
	C13	4. mfd.	150 V.	
P-80888	C14	.25 mfd.	200 V.	Tubular
P-80862	C15	.05 mfd.	200 V.	Tubular
P-80954A	2 Gang Condenser			
P-80862	C16	.05 mfd.	200 V.	Tubular
P-80951	C17	10–30 mmfd.		Antenna Trimmer

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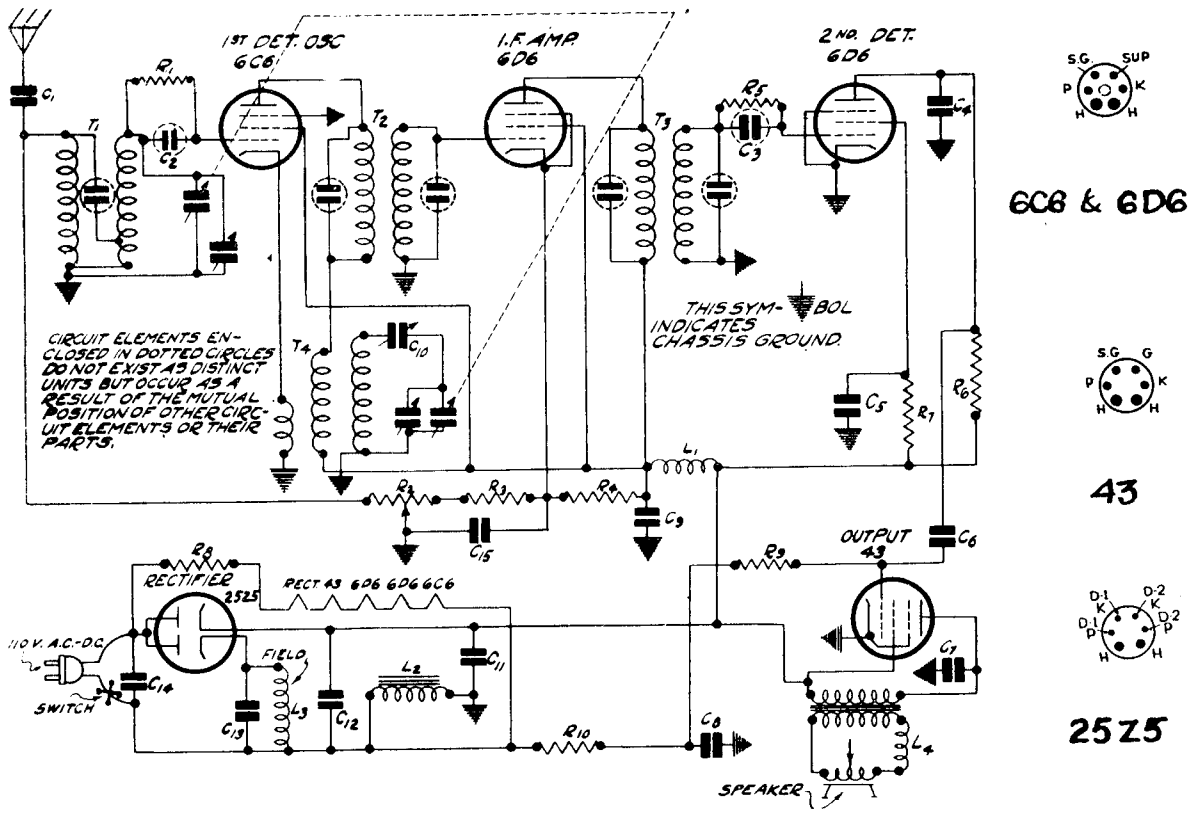
MODEL 05BA



Voltages at Sockets

Antenna lead connected to subpanel.—Volume Control at Maximum.

CAUTION—Do not put chassis on any grounded surface or let chassis touch any ground.

Type of Tube	Function	A.C. Line Voltage—115 Use High Resistance A.C. Meter, Rectifier Type, for Heater Voltage Measurements					D.C. Line Voltage—110 Use High Resistance D.C. Meter for Heater Voltage Measurements				
		Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
6C6	1st Det.	5.8	108	108	12.0(1)	6.0(1)	5.6	90	90	10.0(1)	4.0(1)
6D6	I.F.	5.8	105	105	3.0	7.5	5.6	86	86	2.4	6.0
6D6	2nd Det.	5.8	20(2)	40(2)	.3	2.3	5.6	17(2)	34(2)	.2	2.0
43	Output	24.0	95	108	17.0(3)	20.0	23.0	80	90	14.0(3)	17.0
25Z5	Rect.	24.0	105 / 125 (1)			84.0 Total	23.0	6 / 7 (4)			74.0 Total

(1) Subject to variation.

(2) As read with 1,000,000 ohm meter.

(3) Read across filter choke.

(4) Readings from plate to two cathodes.

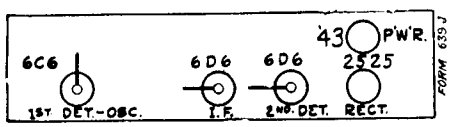


Fig. 1—Tube Arrangement

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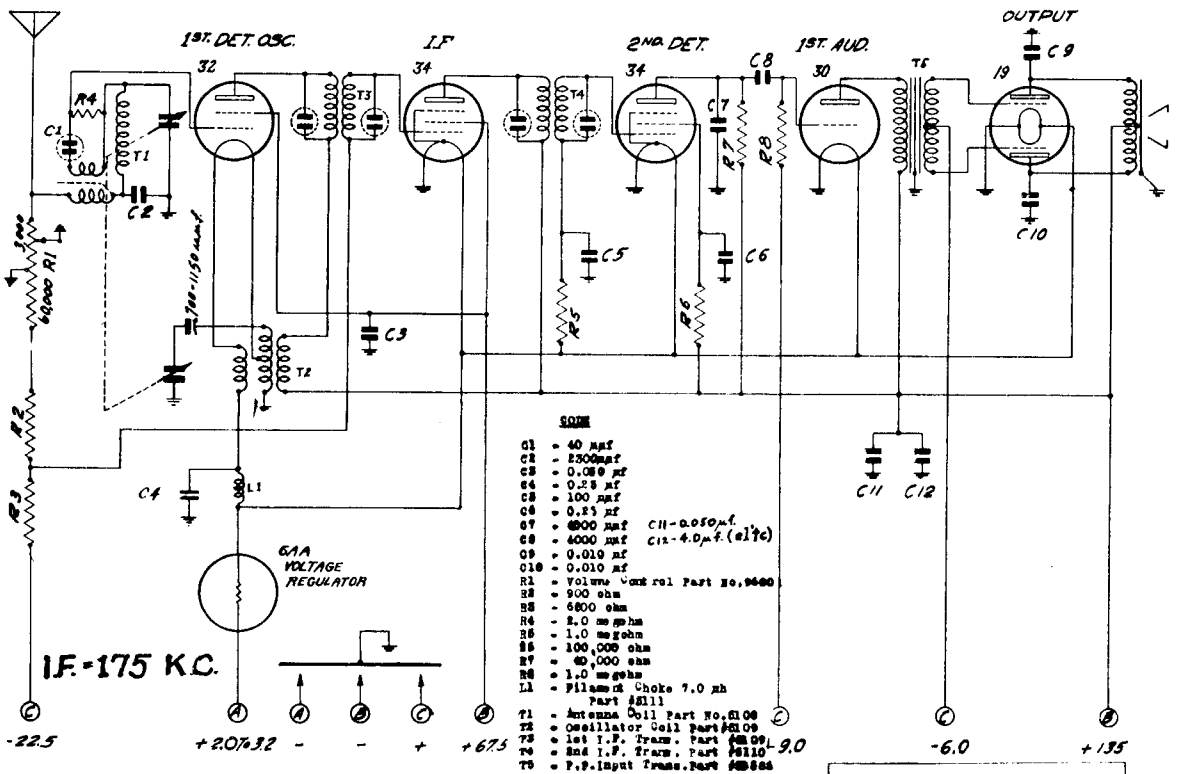
MODEL 06A



32 & 34

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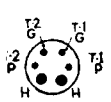

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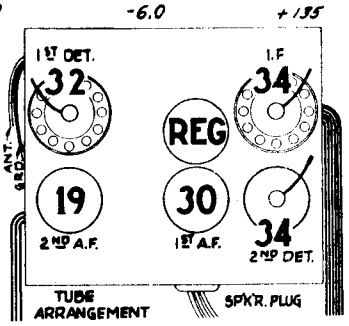

Voltages at Sockets

Volume Control at Maximum—Antenna Shorted to Ground

A—3 Volts, B—140 Volts

Voltages to Most Negative Point of Filament

Type of Tube	Function	Across Filament	Plate to Cathode	Screen to Cathod	Grid to Cathode	Normal Plate M. A.
32	1st Det. & Osc.	2.0	139	70	5(2)	5
34	I.F.	2.2	139	70	2.5	6
34	2nd Det.	2.2	34(1)	40(1)	0	2.5
30	1st Audio	2.2	135		9(3)	3.0
19	Output	2.2	136		6	2.1 Total

(1) With 250,000 ohm meter.

(2) Subject to variation due to oscillatory current.

(3) As read at "C" battery.

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80972	C2	.0023 mfd.	400 V.	Tubular
P-80862	C3	.05 mfd.	200 V.	Tubular
P-80888	C4	.25 mfd.	200 V.	Tubular
P-80977	C5	.0001 mfd.	600 V.	Moulded
P-80888	C6	.25 mfd.	200 V.	Tubular
P-80970	C7 .004 mfd. 400 V. / C8 .004 mfd. 400 V.			Dual Tubular
P-80918	C9 .01 mfd. 600 V. / C10 .01 mfd. 600 V.			Dual Tubular
P-80862	C11	.05 mfd.	200 V.	Tubular
P-80968	C12	4.0 mfd.	150 V.	Electrolytic
P-1442	600 K. C. Trimmer Cond.			
P-80983	Gang Condenser			
P-20711	Shield for Two Gang Cond.			

RESISTORS

Part No.	Code	Resistance	Type
P-96001	R1	63,000 ohm	Volume Control
P-A94901	R2	900 ohm	Carbon Resistor
P-A94652	R3	6,500 ohm	Carbon
P-A94205	R4	2 megohm	Carbon
P-A95105	R5	1 megohm	Carbon
P-A94104	R6	100,000 ohm	Carbon
P-A94403	R7	40,000 ohm	Carbon
P-A95105	R8	1 megohm	Carbon

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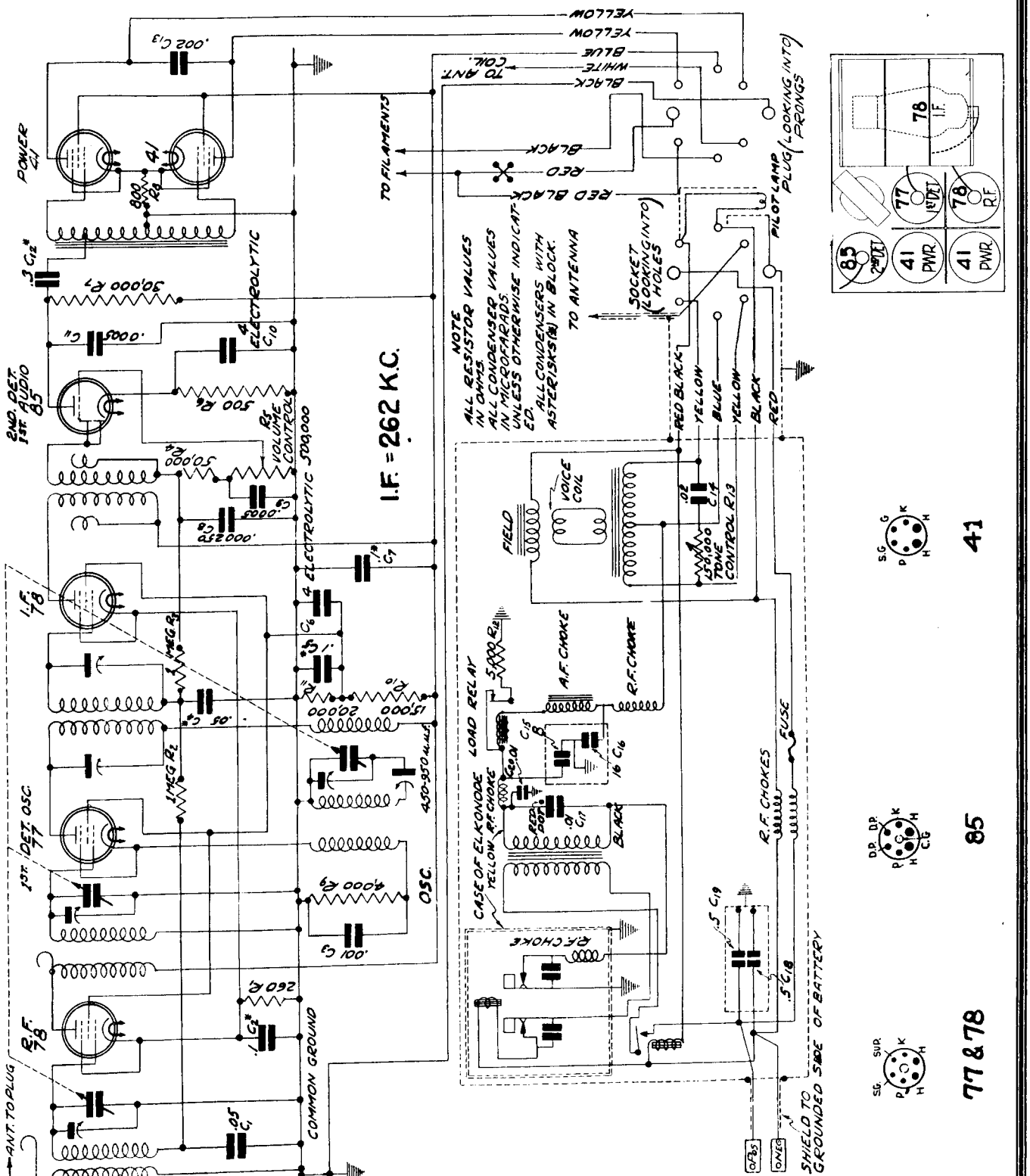
MODEL 06W.



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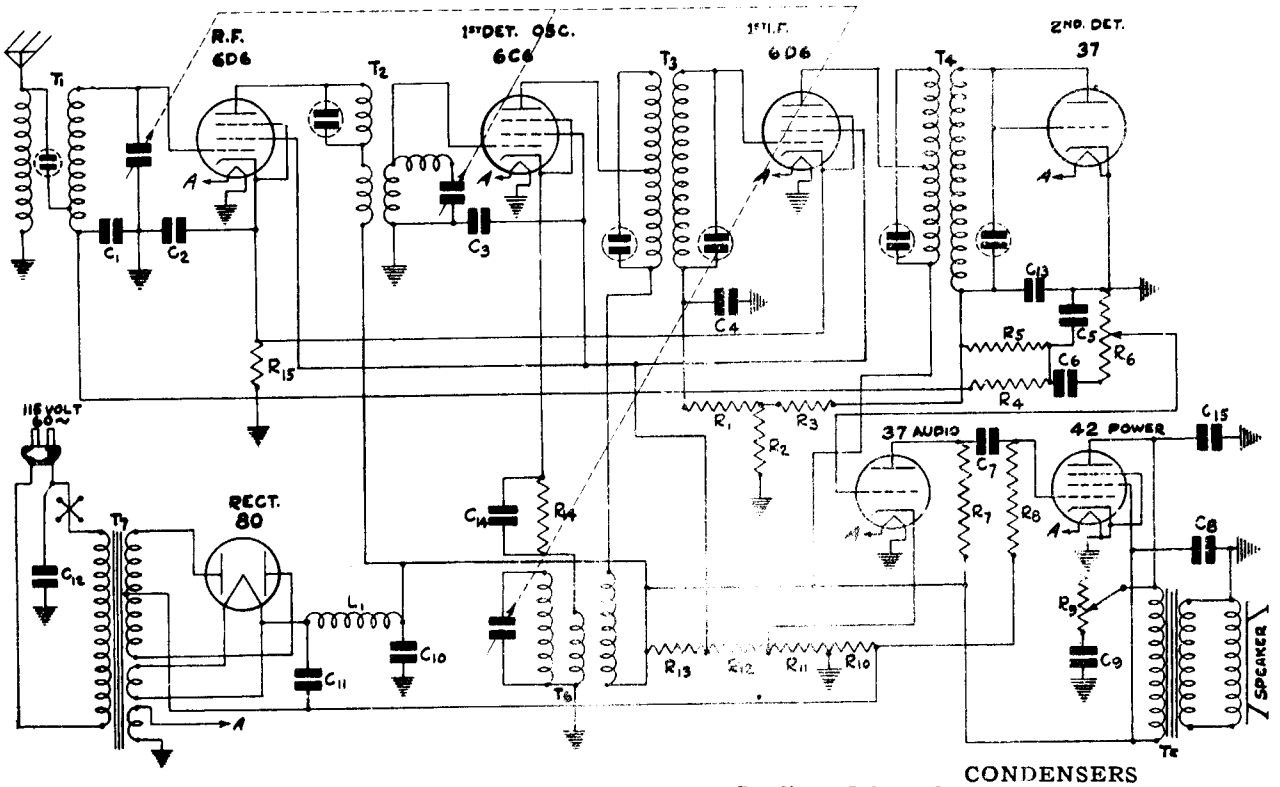
MODEL 07A SERIES



Voltages at Sockets

Line Voltage — 115
Antenna Shorted to Ground

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
6D6	R.F.	6.2	260	100	3.0(1)	8.0
6C6	1st Det.	6.2	255	96	12.0(2)	1.0
6D6	I.F.	6.2	260	100	3.0(1)	8.0
37	2nd Det.	6.2	0		0	0
37	Audio	6.2	60		4.6(1)	0.9
42	Output	6.2	246	263	16.0(3)	33
80	Rect.	5.0	725 V. AC plate to plate			35 per plate

(1) Cathode to ground.

(2) Subject to variation with dial setting.

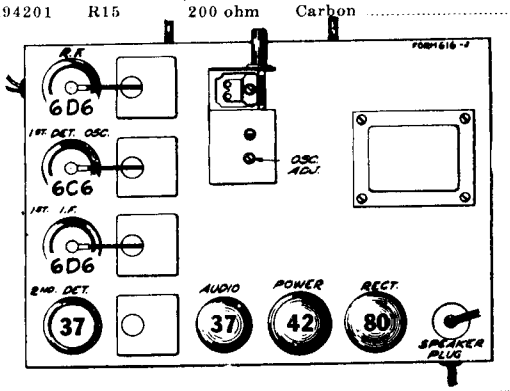
(3) As measured across R10 in Voltage divider.

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80862	C1	.050 mfd.	200 V.	Tubular
P-80864	C2	.10 mfd.	200 V.	Tubular
P-80888	C3	.25 mfd.	200 V.	Tubular
P-80862	C4	.050 mfd.	200 V.	Tubular
P-80919	C5	250 mmfd.	600 V.	Moulded
P-80862	C6	.050 mfd.	200 V.	Tubular
P-80890	C7	.050 mfd.	400 V.	Tubular
P-80930	C8	.25 mfd.	400 V.	Tubular
P-80890	C9	.050 mfd.	400 V.	Tubular
P-80916	C10	8.0 mfd.	450 V.	Electrolytic
P-80990	C11	16.0 mfd.	450 V.	Electrolytic
P-80997	C12	.010 mfd.	600 V.	Metal can
P-80919	C13	250 mmfd.	600 V.	Moulded
P-80914	C14	.002 mfd.	600 V.	Tubular
P-80914	C15	.002 mfd.	600 V.	Tubular
P-80991		Three Gang Condenser		

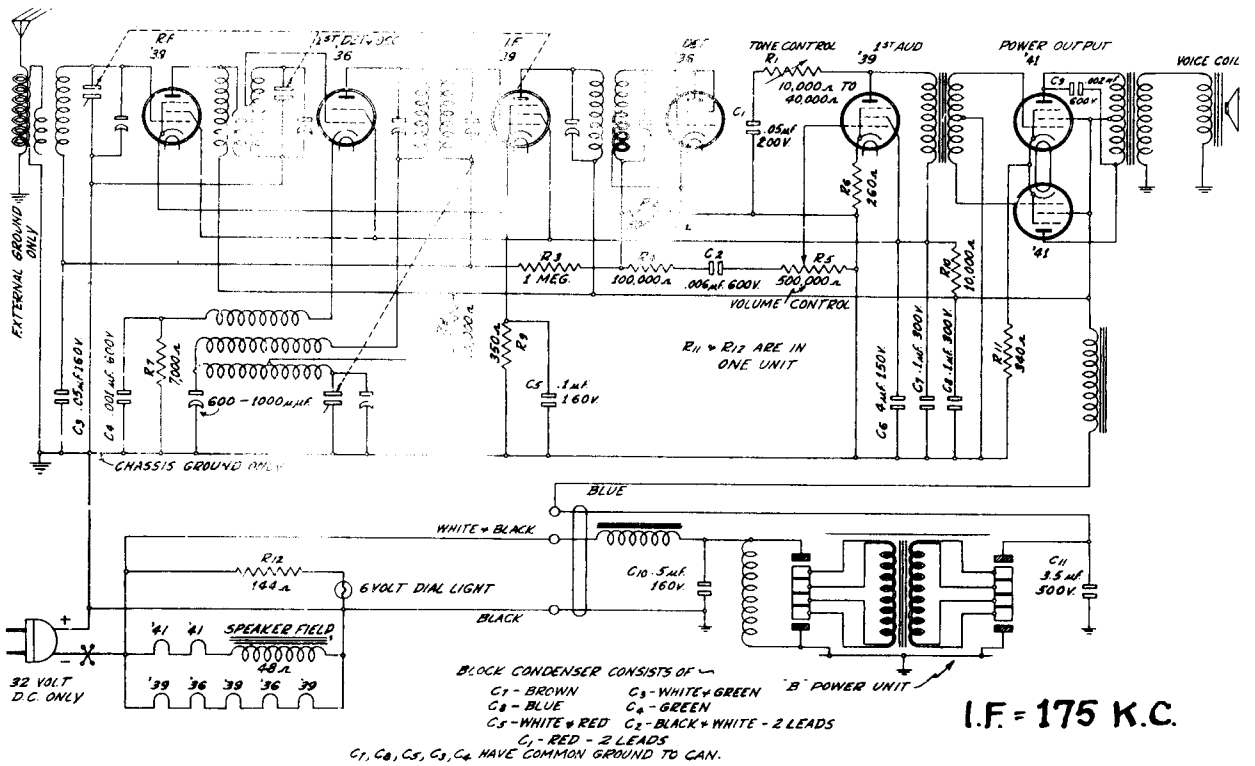
RESISTORS

Part No.	Code	Resistance	Type
P-A95105	R1	1 megohm	Carbon
P-A95503	R2	50,000 ohm	Carbon
P-A95154	R3	150,000 ohm	Carbon
P-A95205	R4	2 megohm	Carbon
P-A95104	R5	100,000 ohm	Carbon
*	R6	1 megohm	Vol. Control & Switch
P-A95204	R7	200,000 ohm	Carbon
P-A95204	R8	200,000 ohm	Carbon
*	R9	150,000 ohm	Tone Control
P-A98002	R10	250 ohm	Armoured Wire Wound
	R11	800 ohm	
	R12	20,000 ohm	
	R13	18,000 ohm	
P-A93452	R14	4,500 ohm	Carbon
P-A94201	R15	200 ohm	Carbon



WELLS GARDNER & CO.

MODEL 073



39 & 36

41

Voltages at Sockets

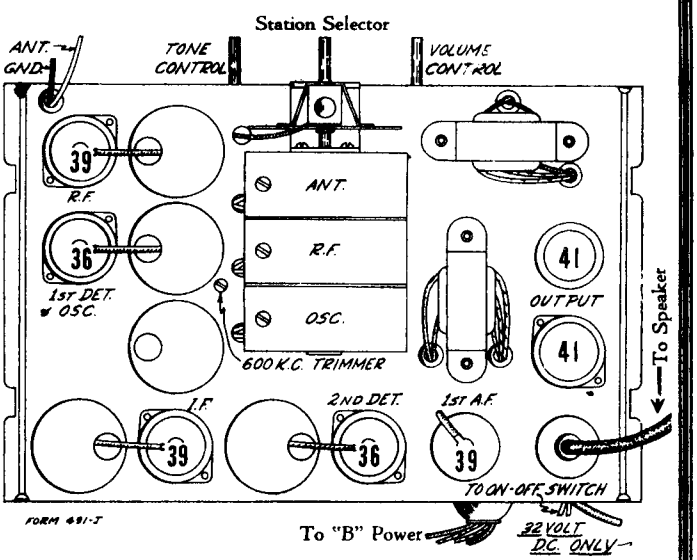
INPUT 32 VOLTS—GROUND R.F. GRID

Type of Tube	Function	Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
'39	R.F.	6.4	190	90	3.0(1)	5.0
'36	1st Det. & Osc.	6.4	170	86	6.5(2)	.6
'39	I.F.	6.4	190	90	3.0(1)	5.0
'36	2nd Det.	6.4	0	0	0	0
'39	1st A.F.	6.4	70	90	1.75(1)	6.0
'41	Output	6.4	180	185	14.0	18.0

(1) Cathode to Ground.

(2) Subject to Variation with dial setting.

An open bypass condenser or open leads to the bypass condensers are a common cause of oscillation. Check the bypass condensers for capacity and the leads to them for continuity of circuit. A quick way to check bypass condensers for opens is to take a good condenser with test leads attached to the terminals and connect the new condenser across the condenser in the chassis. Oscillation may also be caused by poor connections to the chassis and by poor tuning condenser ground contacts. It may also be caused by shorted isolating resistors.



Top view of chass s showing tube arrangement.

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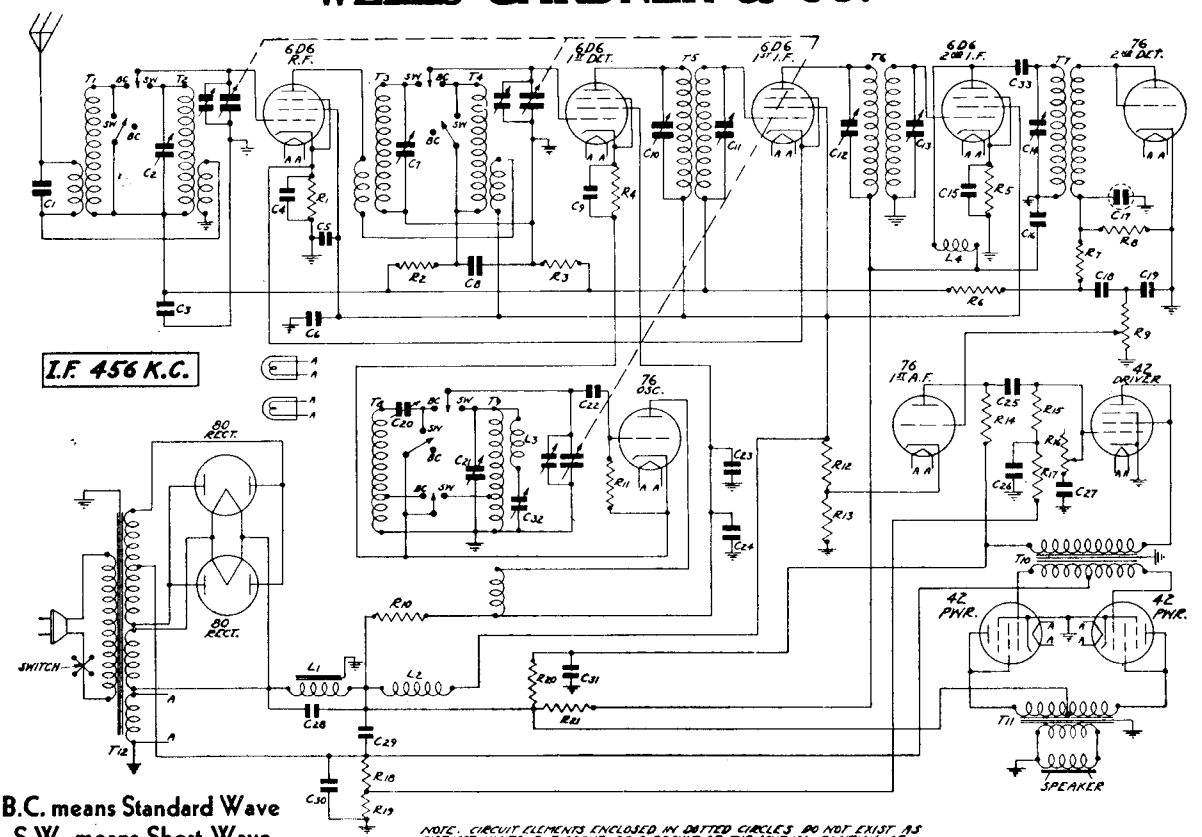
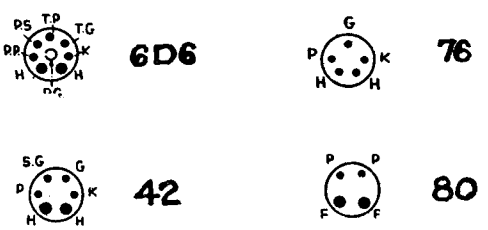


MODEL 2B SERIES



Voltages at Sockets

LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cathode	Grid to Cath.	Normal Plate M. A.
6D6	R. F.	6.3	105	105	2.8	8.8
6D6	1st Detector	6.3	95	105	10.0	3.3
76	Oscillator	6.3	115		0.0	5.8 (1) 7.7 (2)
6D6	1st I. F.	6.3	260	105	2.8	8.8
6D6	2nd I. F.	6.3	260	105	3.2	7.2
76	2nd Detector	6.3				
76	1st Audio	6.3	170		11.0	1.2
42	Driver Stage	6.3	235	235	18 (3)	26.5
42	Output	6.3	350	350	38.0	21.0
80	Rectifier	4.6	435			35.5 per plate

(1) Switch in Standard Wave position.
(2) Switch in Short Wave position (No Signal).
(3) Measured across resistor R19.

RESISTORS

Part No.	Code	Resistance	Wattage	Type	List Price
P-A93141ww	R1	140 Ohm		Wire Wound	$0.15
P-A95204	R2	200,000 Ohm	0.2	Carbon	.15
P-A95105	R3	1.0 Megohm	0.2	Carbon	.15
P-A94252	R4	2,500 Ohm	0.2	Carbon	.15
P-A93401ww	R5	400 Ohm	0.2	Wire Wound	.15
P-A95205	R6	2.0 Megohm	0.2	Carbon	.15
P-A95104	R7	100,000 Ohm	0.2	Carbon	.15
P-A94304	R8	300,000 Ohm	0.2	Carbon	.15
P- 96005	R9	2.0 Megohm		Volume Control and Switch	1.25
P-E94403	R10	40,000 Ohm	3.0	Carbon	.30
P-A95104	R11	100,000 Ohm	0.2	Carbon	.15
P- 98038	R12	4,000 Ohm	2.5	Armored Wire Wound	.80
	R13	390 Ohm	0.5		
	R18	128 Ohm	2.5		
	R19	145 Ohm	3.0		
P-B95603	R14	60,000 Ohm	0.5	Carbon	.15
P-A95603	R15	60,000 Ohm	0.2	Carbon	.15
P- 97011	R16	150,000 Ohm		Tone Control	.75
P-A95203	R17	20,000 Ohm	0.2	Carbon	.15
P- 98037	R20	4,000 Ohm	4.0	Armored Wire Wound	.70
	R21	6,000 Ohm	2.0		

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	List Price
P-80919	C1	250 mmf	600V	Moulded	$0.15
P-2102	C2	3—40 mmf		Short Wave Ant. Trimmer	.15
P-81076	C3	0.05 mf	200V	Tubular	.20
P-81111	C4	0.25 mf	200V	Tubular	.25
P-81117	C5	0.25 mf	200V	Tubular	.25
P-81056	C6	6.0 mf	150V	Dry Electrolytic	1.40
	C24	2.0 mf	350V		
P-2102	C7	3—40 mmf		Short Wave Inter. Trimmer	.15
P-81076	C8	0.05 mf	200V	Tubular	.20
P-81076	C9	0.05 mf	200V	Tubular	.20
P-2103	C10	150—250 mmf		Double (Part of 1st I. F. Trans. Trimmer)	.60
	C11	150—250 mmf			
P-2103	C12	150—250 mmf		Double (Part of 2nd I. F. Trans. Trimmer)	.60
	C13	150—250 mmf			
P-1685	C14	40—100 mmf		3rd I. F. Trans. Pri. Trimmer	.35
P-81076	C15	0.05 mf	200V	Tubular	.20
P-81097	C16	0.10 mf	500V	Tubular	.30
	C17			Integral Part of 3rd I. F. Assem.	
P-81076	C18	0.05 mf	200V	Tubular	.20
P-81081	C19	35 mmf		Wire Capacitor	.15
P-2112	C20	300—500 mmf		Osc. Std. W. Padding Cond.	.45
P-2102	C21	3—40 mmf		Osc. Sho. W. Trimmer	.15
P-81081	C22	35 mmf		Wire Capacitor	.15
P-81118	C23	0.10 mf	400V	Tubular	.30
P-81096	C25	0.25 mf	400V	Tubular	.40
P-81117	C26	25 mf	200V	Tubular	.25
P-81076	C27	0.05 mf	200V	Tubular	.20
P-81099	C28	0.15 mf	220V	AC Tubular	.50
P-81058	C29	16 mf	450V	Wet Electrolytic	1.75
P-82000	C30	30 mf	50V	Dry Electrolytic	1.35
P-81039A	C31	16 mf	400V	Wet Electrolytic	1.50
P-1685	C32	40—100 mmf		Osc. Sho. W. Padding Cond.	.45
P-80919	C33	250 mmf	600V	Moulded	.15

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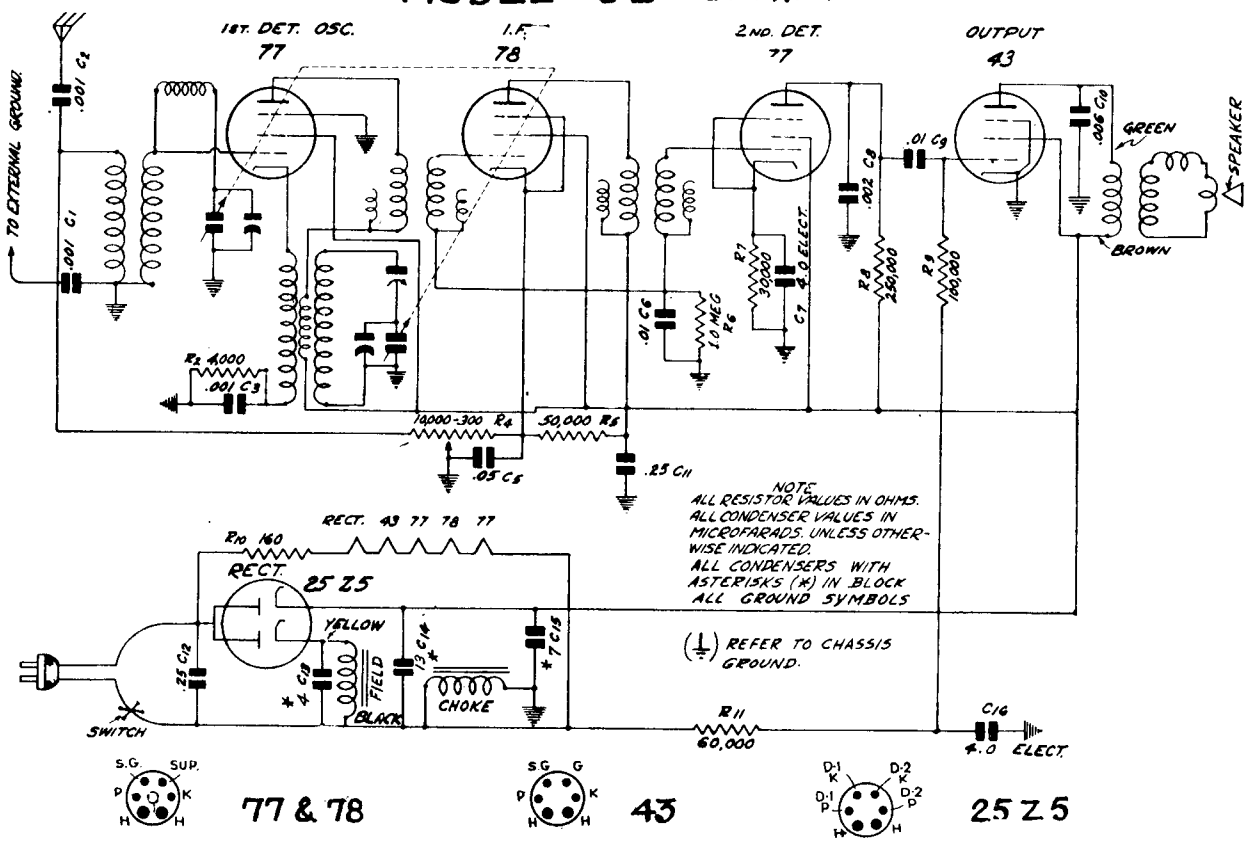
MODEL 5B SERIES



Voltages at Sockets

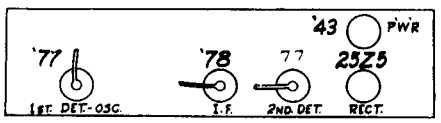
Antenna lead connected to ground lead (not external ground).—Volume Control at Maximum.
CAUTION—Do not put chassis on any grounded surface or let chassis touch any ground.

Type of Tube	Function	A.C. Line Voltage—115 Use High Resistance A.C. Meter, Rectifier Type, for Heater Voltage Measurements: Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	D.C. Line Voltage—110 Use High Resistance D.C. Meter for Heater Voltage Measurements: Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
77	1st Det. Osc.	5.8	106	106	5.2	.8	5.6	87	87	4.3	.6
78	I.F.	5.8	108	108	3.0(1)	7.4	5.6	88	88	2.4(1)	6.0
77	2nd Det.	5.8	65(2)	104	6.0(3)	.14	5.6	58(2)	82	5.0(3)	.11
43	Output	24.	95	110	18.0(4)	22.0	23.0	80	90	15.0(4)	17.0
25Z5	Rect.	24.	110 (5) / 155			84.0 Total	23.0	5.0 (5) / 6.0			74.0 Total

(1) Cathode to Ground.
(2) With 1,000,000 ohm meter—reading will be lower with lower resistance meter.
(3) Cathode to ground—read with 100,000 ohm meter.
(4) Read across filter choke.
(5) Readings from plate to two cathodes with 250,000 ohm meter

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80821.B	C-1	.001 mfd.	600 V.	Moulded
P-80821.B	C-2	.001 "	600 V.	Moulded
P-80905-A	C-3	.001 "	400 V.	Tubular
P-80862-C	C-5	.05 "	200 V.	Tubular
P-80872-B	C-6	.01 "	600 V.	Tubular
P-80936-C	C-7	4.0 "	30 V.	Electrolytic
P-80914	C-8	.002 "	600 V.	Tubular
P-80872-B	C.9	.01 "	600 V.	Tubular
P-80898	C-10	.006 "	600 V.	Tubular
P-80888-A	C-11	.25 "	200 V.	Tubular
P-80888-A	C-12	.25 "	200 V.	Tubular
P.80944	C-13	4.0 "	150	Elec. Block
	C-14	13.0 "	150	
	C-15	7.0 "	150	
P-80878-C	C-16	4.0 "	150 V.	Electrolytic



Tube Arrangement

RESISTORS

Part No.	Code	Resistance	Type
P-A-90947	R-2	4,000 ohm	Carbon
P-91019C	R-4	300-10,000 ohm	Vol. Contr. & Switch
P-A-90941	R-5	50,000 ohm	Carbon
P-A-90948	R-6	1 Megohm	Carbon
P-A.90956	R-7	30,000 ohm	Carbon
P-A-90954	R-8	250,000 ohm	Carbon
P-A-90912	R-9	100,000 ohm	Carbon
P-91064	R.10	160 ohm	Armored Wire Wound
P-A-91036	R-11	60.000 ohm	Carbon

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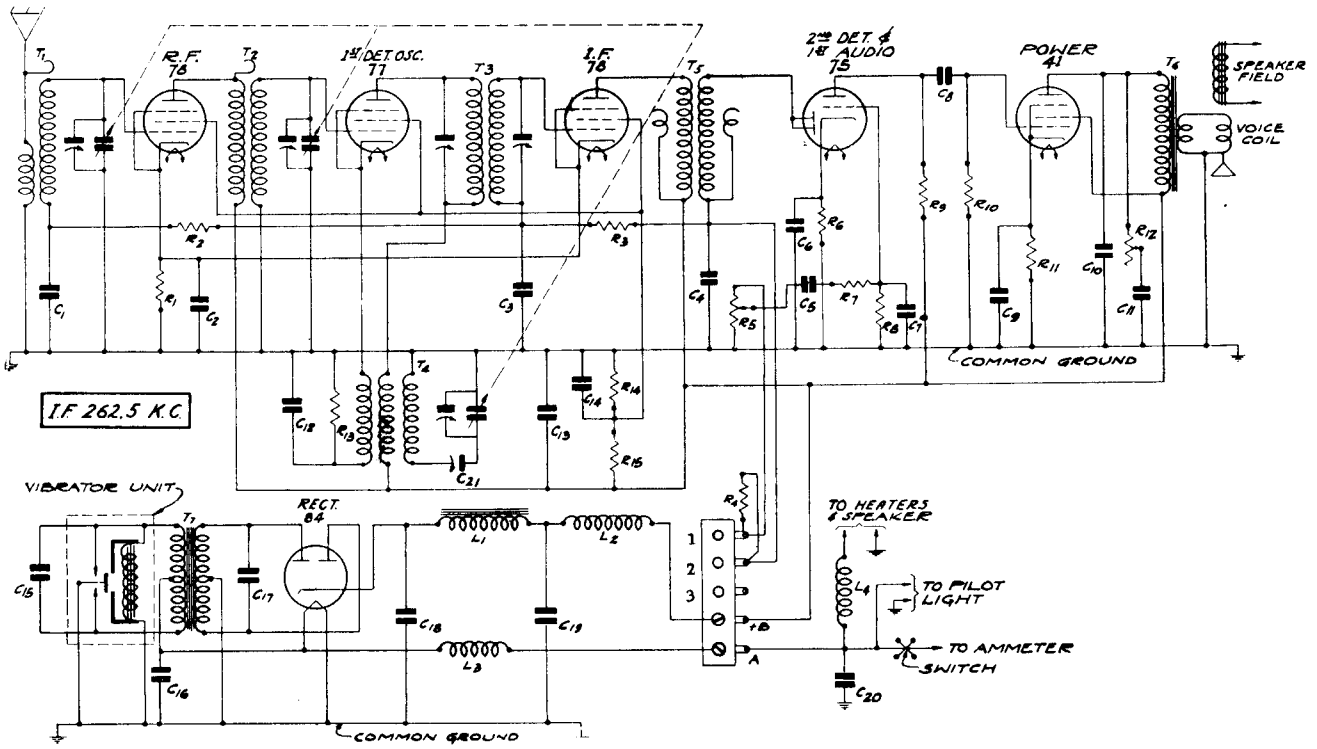
MODEL 6U SERIES



On the following chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected.

The voltages can be read with the chassis in the box, by means of an analyzer plug.

If the chassis unit is taken out of the box all of the socket terminals can easily be reached under the chassis with test prods.

If the chassis is taken out, the power unit must also be taken out. Connect a jumper from chassis base to the metal wall of unit to complete the ground circuit.

Connect the Hot side of battery to the battery cable on the chassis and the ground side of the battery to the metal chassis base.

The reading at the battery should be 6 volts with the set operating.

VOLTAGES AT SOCKETS

Antenna Disconnected—Battery 6 Volts Under Load

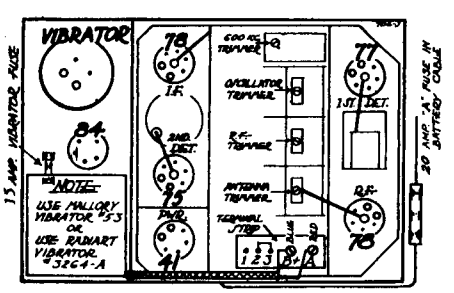
Type of Tube	Function	Across Heater	Plate to Cath.	Screen to Cath.	Cath. to Ground	Normal Plate M.A.
78	R. F.	5.7	220	100	3.5	5.0
77	1st Det. and Osc.	5.7	220	100	8.0 (1)	1.1 (1)
78	I. F.	5.7	220	100	3.5	5.0
75	2nd Det.	5.7	140 (2)		1.0	0.3
41	Output	5.7	200	210	15.5	18.0
84	Rect.	5.7				20. per plate

(1) Subject to variation.
(2) Triode Plate to Cathode—as read with 1,000,000 ohm meter.

Part No.	Code	Resistance	Wattage	Type
P-98009	R1	260 ohm.	0.5	Wire-Wound
P-A95105	R2	1 megohm	0.2	Carbon
P-A95205	R3	2 megohm	0.2	Carbon (In 2nd I.F.)
P-A95204	R4	200,000 ohm	0.2	Carbon
P-96015	R5	250,000 ohm		Volume Control & Switch
P-A94602	R6	6,000 ohms	0.2	Carbon
P-A95104	R7	100,000 ohm	0.2	Carbon (In 2nd I.F.)
P-A95105	R8	1 megohm	0.2	Carbon (In 2nd I.F.)
P-A94254	R9	250,000 ohm	0.2	Carbon
P-A94254	R10*	250,000 ohm	0.2	Carbon
P-98010	R11	800 ohm	0.5	Wire-Wound
P-97012	R12	150,000 ohm		Tone Control
P-A94402	R13	4,000 ohm	0.2	Carbon
P-B95203	R14	20,000 ohm	0.5	Carbon
P-B95153	R15	15,000 ohm	0.5	Carbon

CONDENSERS — IN CHASSIS

Part No.	Code	Capacity	Voltage	Type
P-81009	C1	0.050 mfd.	200 V.	Tubular
P-80919	C4	0.00025 mfd.	600 V.	Moulded (In 2nd I.F.)
P-80862	C5	0.050 mfd.	200 V.	Tubular
P-80919	C7	0.00025 mfd.	600 V.	Moulded (In 2nd I.F.)
P-81025	C11	0.020 mfd.	600 V.	Tubular
P-80821	C12	0.001 mfd.	600 V.	Moulded
P-81024	C20	0.500 mfd.	120 V.	Tubular
P-81026				Three Gang Condenser
P-1539	C21	600 K.C.		Trimmer Condenser
P-81022	C2	0.500 mfd.	200 V.	Condenser Block
	C3	0.050 mfd.	200 V.	
	C8	0.050 mfd.	300 V.	
	C10	0.003 mfd.	600 V.	
	C13	0.500 mfd.	300 V.	
	C14	0.100 mfd.	200 V.	
P-81021	C6	12.00 mfd.	25 V.	Electrolytic Block
	C9	12.00 mfd.	25 V.	



—Location of Tubes.

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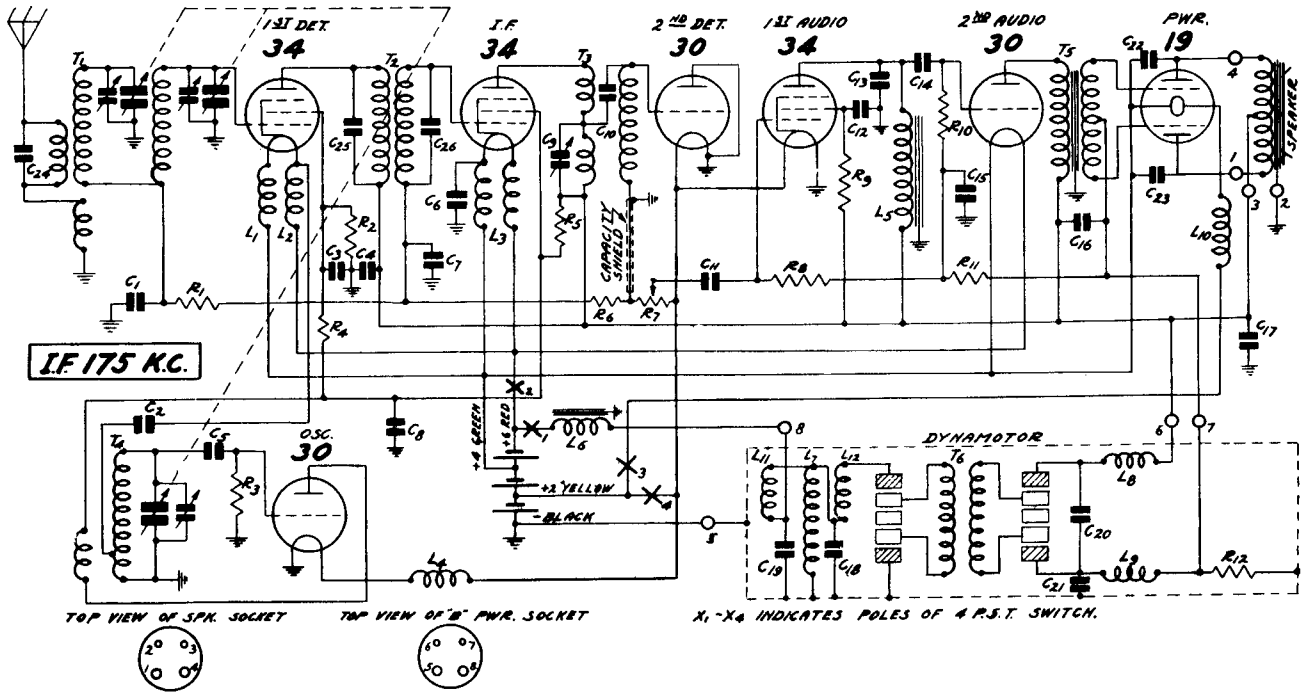
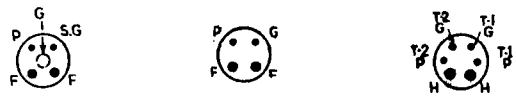
MODEL 7C SERIES





Voltages at Sockets

ANTENNA SHORTED TO GROUND

Type of Tube	Function	Filament Volt.	Plate to Neg. Filament	Screen to Neg. Filament	Grid to Neg. Filament	Normal Plate M. A.
34	1st Detector	2.0	135	55	3.0 av.	1.90
30	Oscillator	2.0	75		0.0	3.70
34	I. F.	2.0	135	70	3.0 av.	3.00
30	2nd Detector	2.0	2			
34	1st A. F.	2.0	140	65	4.0	2.30
30	2nd A. F.	2.0	135		8.0	3.10
19	Output	2.0	137		6.0	1.00 per plate

All of the D.C. voltage readings as shown on the chart are read with a 1000 ohm per volt meter. As high a range as possible should be used. In general, the higher the resistance of the meter, the more accurate the reading will be.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condi-

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	List Price
P-80862	C1	0.050 Mf.	200V	Tubular	$0.15
P-80862	C2	0.050 Mf.	200V	Tubular	.15
P-80862	C3	0.050 Mf.	200V	Tubular	.15
P-80864	C4	0.100 Mf.	200V	Tubular	.20
P-81801	C5	35 Mmf.		Cap. Part of Osc. Coil Assem.	.15
P-80888	C6	0.250 Mf.	200V	Tubular	.25
P-80862	C7	0.050 Mf.	200V	Tubular	.15
P-80988	C8	1.500 Mf.	140V	Tubular	.85
P-1965	C9	70-140 Mmf.		Trimmer	.35
P-81800	C10	50 Mmf.		Cap. Part of 2nd I.F. Coil As.	.15
P-80981	C11	0.010 Mf.	400V	Tubular	.20
P-80888	C12	0.250 Mf.	200V	Tubular	.25
P-80945	C13	500 Mmf.		Moulded	.15
P-80862	C14	0.050 Mf.		Tubular	.15
P-80888	C15	0.250 Mf.	200V	Tubular	.25
P-81014	C16 16.00 Mf. / C17 16.00 Mf.			Electrolytic Block	2.55
P-80914	C22	0.002 Mf.	600V	Tubular	.20
P-80914	C23	0.002 Mf.	600V	Tubular	.20
P-81812	C24	200 Mmf.		Cap. Part of Ant. Assem.	.15
P-81807	C25	70 Mmf.		Cap. Part of 1st I.F. Coil As.	.15
P-81805	C26	45 Mmf.		Cap. Part of 1st I.F. Coil As.	.15
P-81015	Three Gang Condenser				3.55

RESISTORS

Part No.	Code	Resistance	Wattage	Type	List Price
P-A95104	R1	100,000 Ohm	.2	Carbon	$0.15
P-A93803	R2	30,000 Ohm	.2	Carbon	.20
P-A95104	R3	100,000 Ohm	.2	Carbon	.15
P-A93602	R4	6,000 Ohm	.2	Carbon	.20
P-B93902	R5	9,000 Ohm	.5	Carbon	.20
P-A95505	R6	5 Megohm	.2	Carbon	.15
P- 96012	R7	1 Megohm		Volume Control	.75
P-A95505	R8	5 Megohm	.2	Carbon	.15
P-A94603	R9	60,000 Ohm	.2	Carbon	.15
P-A95104	R10	100,000 Ohm	.2	Carbon	.15
P-A95104	R11	100,000 Ohm	.2	Carbon	.15

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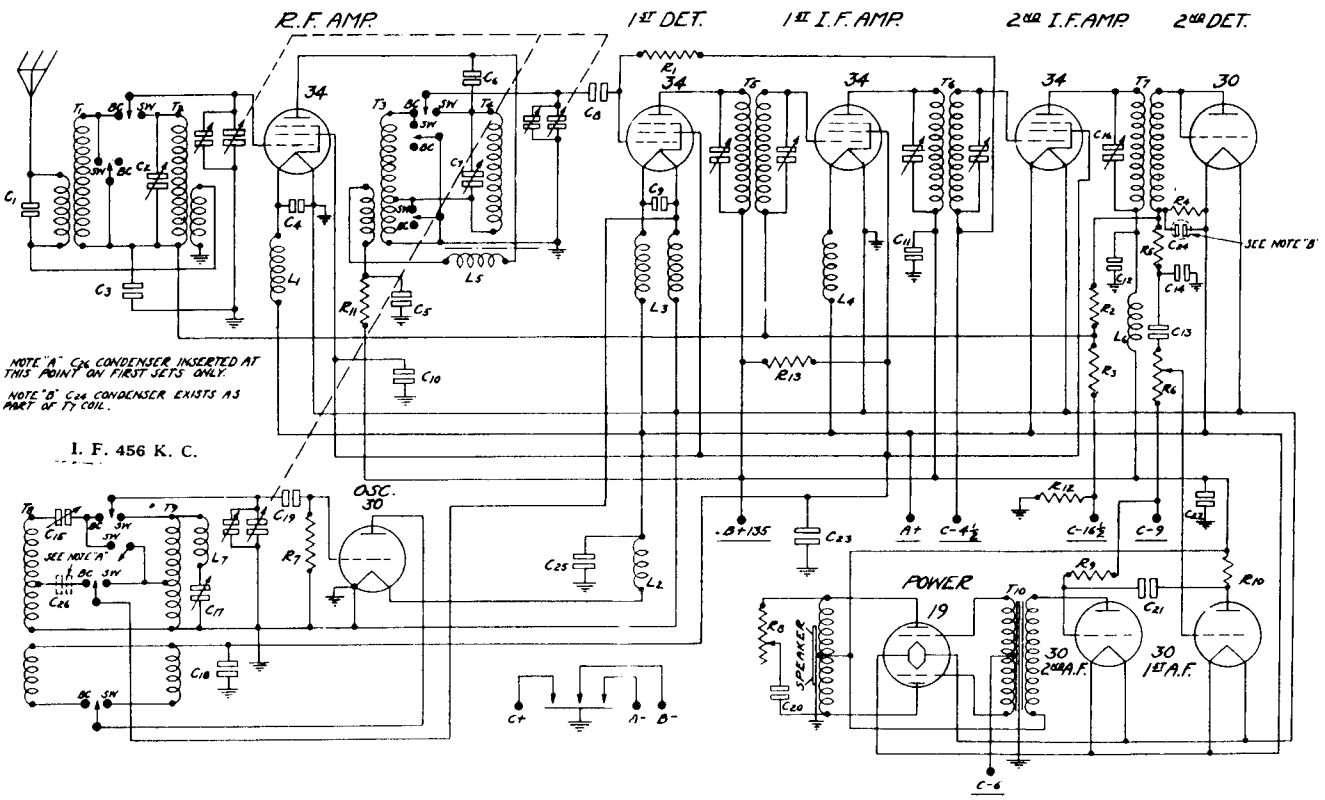
MODEL 9B SERIES



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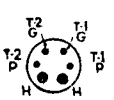


19

Voltages at Sockets

Antenna Shorted to Ground
Batteries Up to Rated Voltages. See Fig. 1
Voltages Read from Negative Filament Terminal

Type of Tube	Function	Across Filament	Plate to Gnd.	Control Grid to Ground	Screen to Gnd.	Normal Plate M. A.
34	R. F.	2.0	135	4.5(1)	80	2.8
34	1st Det.	2.0	135	4.5(1)	80	3.0
30	Osc.	2.0	80			2.8
34	1st I. F.	2.0	135	4.5(1)	80	2.8
34	2nd I. F.	2.0	135	4.5	80	2.8
30	2nd Det.	2.0				
30	1st Audio	2.0	95	9.0(2)		0.35
30	2nd Audio	2.0	135	9.0(2)		3.0
19	Output	2.0	135	6.0		1.3

(1) Computed figure—cannot be read because of high resistance cir.
(2) Volume Control at minimum.
(3) As read at battery.

RESISTORS

Part No.	Code	Resistance	Wattage	Type	List Price
P-A95305	R1	3 Megohm	.2	Carbon	$0.10
P-A95305	R2	3 Megohm	.2	Carbon	.10
P-A94805	R3	8 Megohm	.2	Carbon	.15
P-A94304	R4	300,000 Ohm	.2	Carbon	.15
P-A95104	R5	100,000 Ohm	.2	Carbon	.15
P- 96016	R6	2 Megohm		Volume Control	.80
P-A94104	R7	100,000 Ohm	.2	Carbon	.15
P- 97013	R8	45,000 Ohm		Tone Control	.75
P-A94105	R9	1 Megohm	.2	Carbon	.15
P-A94104	R10	100,000 Ohm	.2	Carbon	.15
P-A95102	R11	1,000 Ohm	.2	Carbon	.10
P-A95153	R12	15,000 Ohm	.2	Carbon	.15
P-B94652	R13	6,500 Ohm	.2	Carbon	.15
*P- 97011		150,000 Ohm		Tone Control	.75
*P-A95603		60,000 Ohm	.2	Carbon	.15

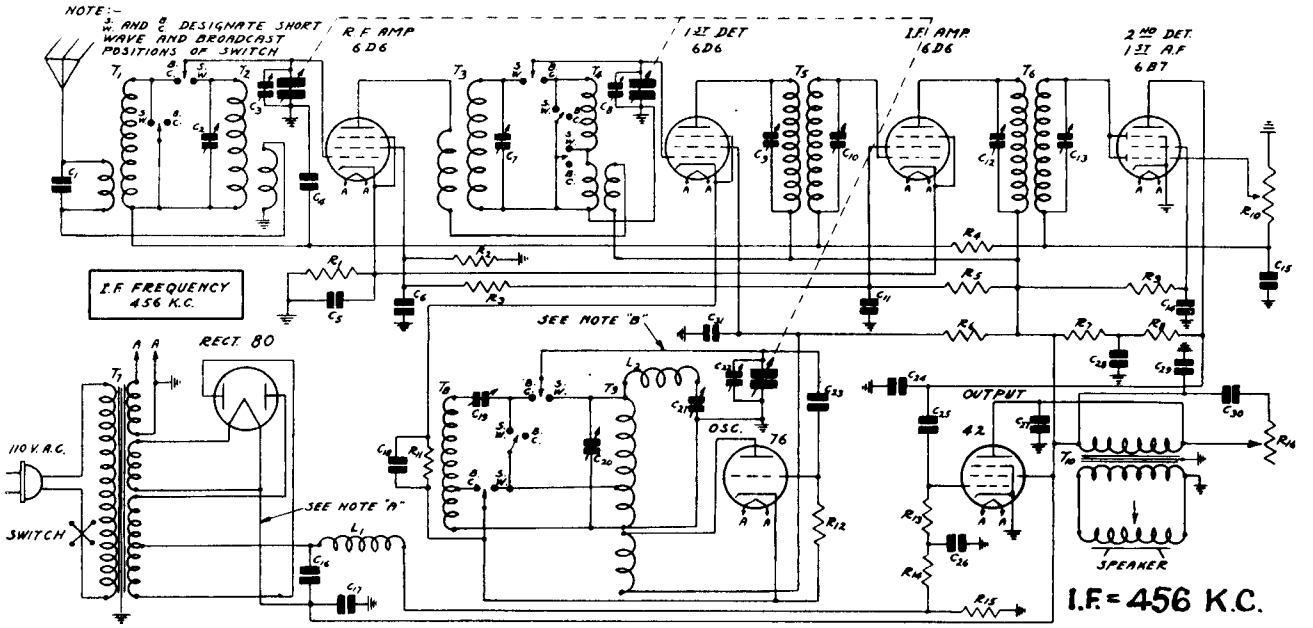
* These parts were used on first models only—see article on "Changes in Early Models."

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	List Price
P-80919	C1	250 mmf.		Moulded	$0.20
P- 2102	C2	3-40 mmf.		Trimmer	.15
P-81076	C3	.05 mf.	200V	Tubular	.15
P-81076	C4	.05 mf.	200V	Tubular	.15
P-81076	C5	.05 mf.	200V	Tubular	.15
P-81094	C6	.006 mf.	600V	Tubular	.15
P- 2102	C7	3-40 mmf.		Trimmer	.15
P-81800	C8	50 mmf.		Wire Capacitor	.15
P-81076	C9	.05 mf.	200V	Tubular	.15
P-81102	C10	.25 mf.	140V	Tubular	.30
P-81110	C11	.25 mf.	200V	Tubular	.15
P-81076	C12	.05 mf.	200V	Tubular	.15
P-81076	C13	.05 mf.	200V	Tubular	.15
P-80977	C14	100 mmf.		Wire Capacitor	.20
P- 2112	C15	300-500 mmf.		Trimmer	.45
P- 1685	C16	40—100 mmf.		Trimmer	.35
P- 1685	C17	40—100 mmf.		Trimmer	.35
P-81076	C18	.05 mf.	200V	Tubular	.15
P-81005	C19	35 mmf.		Moulded	.15
P-81071	C20	.05 mf.	400V	Tubular	.20
P-81094	C21	.006 mf.	600V	Tubular	.15
P-82001	C22	4.0 mf.	150V	Electrolytic	1.35
	C23	8.0 mf.	150V		
	C24	Part of 3rd I. F. Coil Assembly T7			
P-81102	C25	.25 mf.	140V	Tubular	.30
*P-81076	C26	.05 mf.	200V	Tubular	.15
P-81027	3 Gang Condenser				3.35

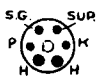
WELLS GARDNER & CO.

MODEL 70 SERIES

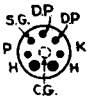


42

80



6D6



6B7

76

Voltages at Sockets

LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

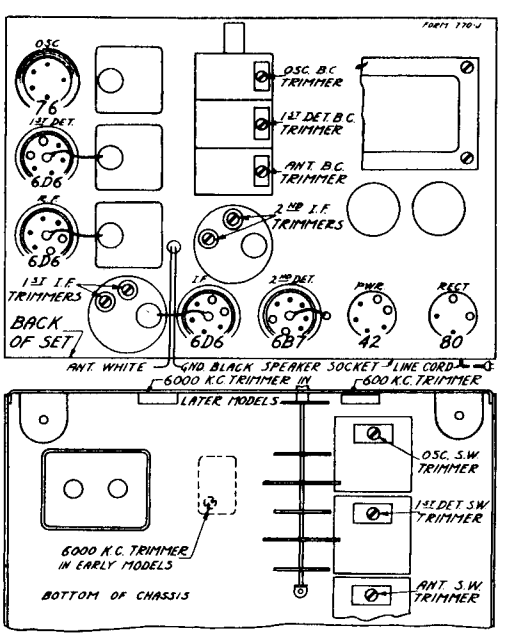
Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cath.	Control Grid to Cath.	Normal Plate M. A.
6D6	R. F.	6.3	246	100	3.6(1)	5.3
6D6	1st Det.	6.3	237	97	8.0(2)	3.4
76	Osc.	6.3	115		0	4.8
6D6	I. F.	6.3	246	130	3.6(1)	8.3
6B7	2nd Det.	6.3	50(3)	40(3)	0	2.7
42	Power	6.3	230	245	17.0(4)	33.0
80	Rectifier	5.0				37.0 per plate

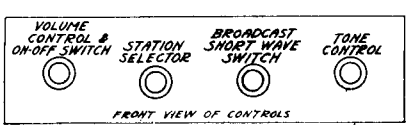
(1) Cathode to ground
(2) Subject to variation
(3) Read with 1,000,000 ohm meter
(4) As read across R15

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Attenuate the signal so that A. V. C. action is not obtained.

Then adjust the four I. F. trimmer condensers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and are in the round I. F. cans—See Fig. 2. The openings to the trimmer condensers are covered over by a small cover plate which is held in position by a screw. Loosen these screws until the cover plates can be swung around.



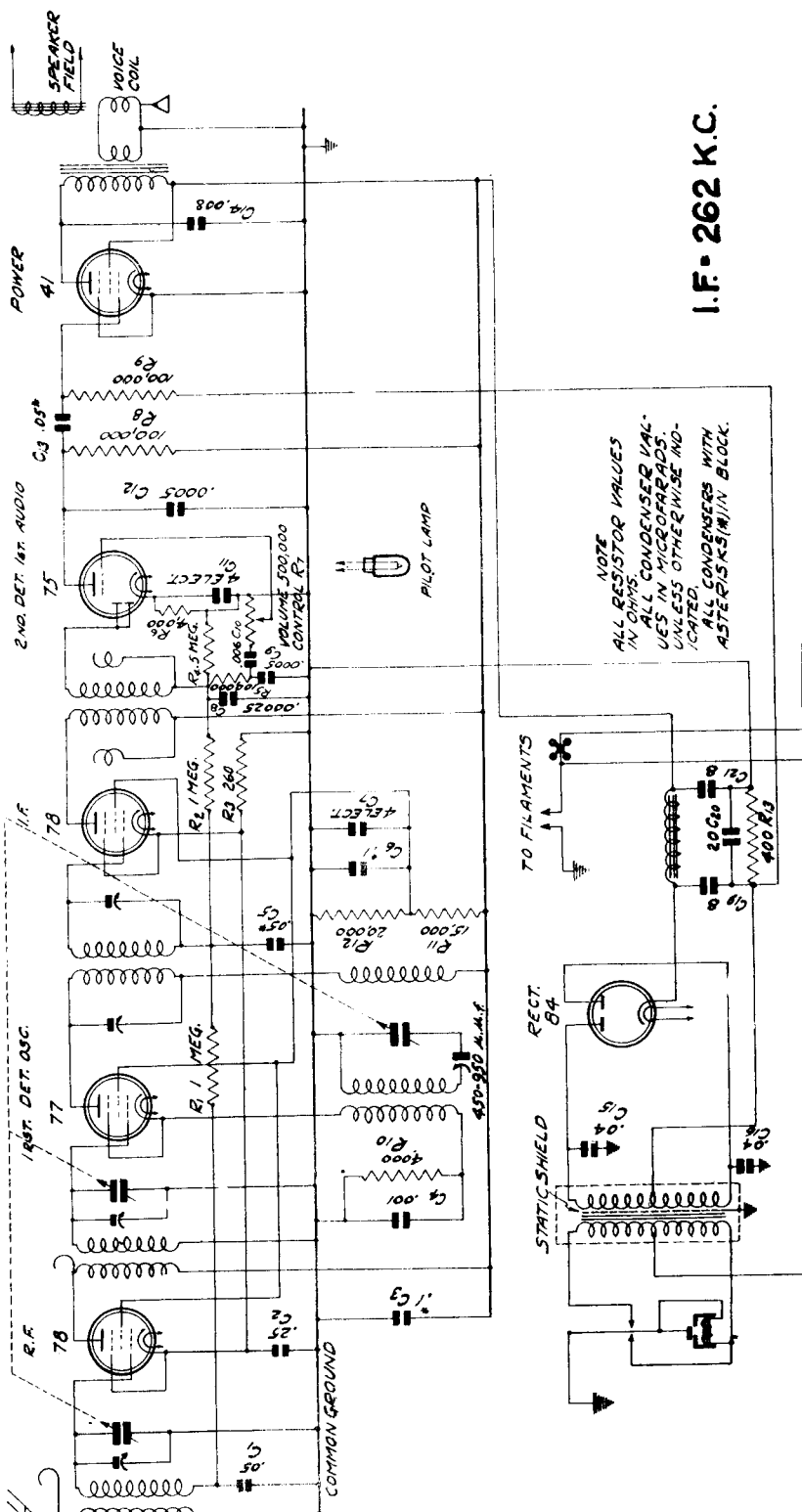


Tube Arrangement and Location of Trimmers

WELLS GARDNER & CO.

MODEL Z6Z1

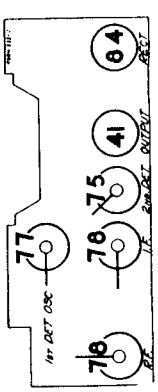
I.F. 262 K.C.

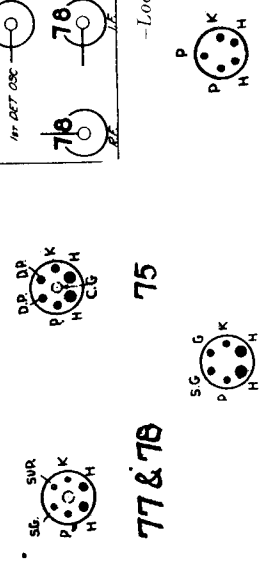


Type of Tube	Function	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78	R. F.	6.1	182	80	3.(1)	7.0
77	1st Det. and Osc.	6.1	178	77	5.(2)	1.3(2)
78	I. F.	6.1	182	80	3.(1)	7.0
75	2nd Det. 1st Audio	6.1	70(3)		1.4(1)	.35
41	Output	6.1	172.5	176.5	12.5(4)	16.0
84	Rect.	6.1	205			17.5 per plate

(1) Cathode to Ground
(2) Subject to Variation
(3) Triode Plate to Cathode
(4) Read Across 400-Ohm Resistor, R13

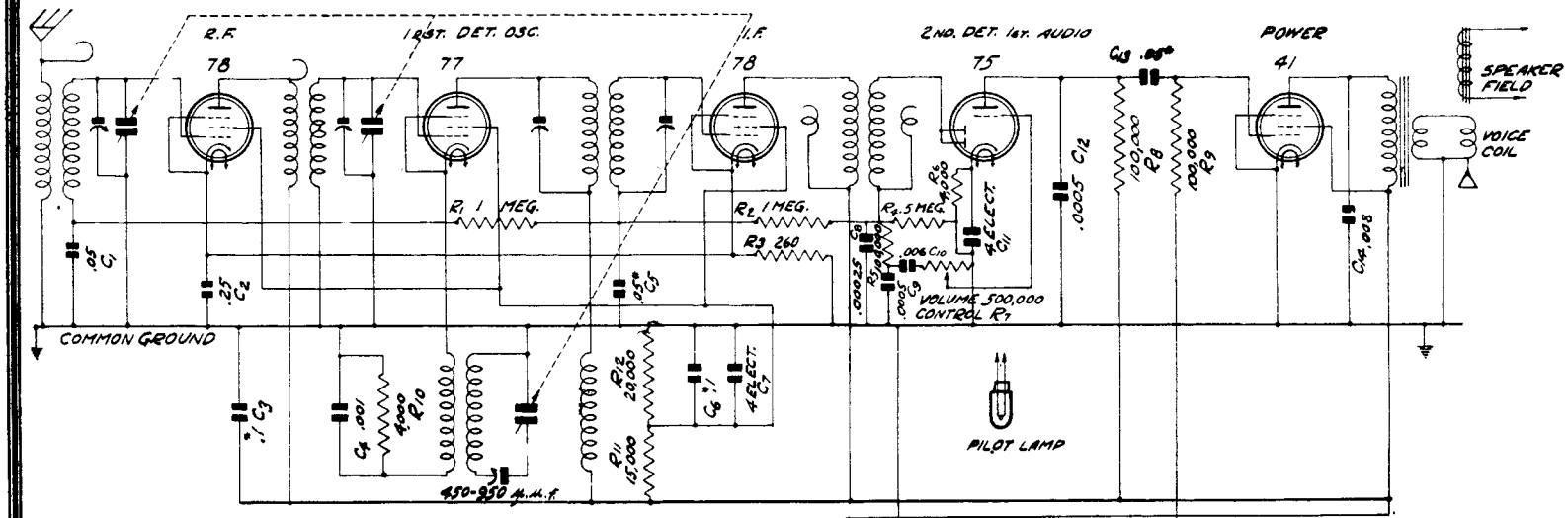
Location of Tubes

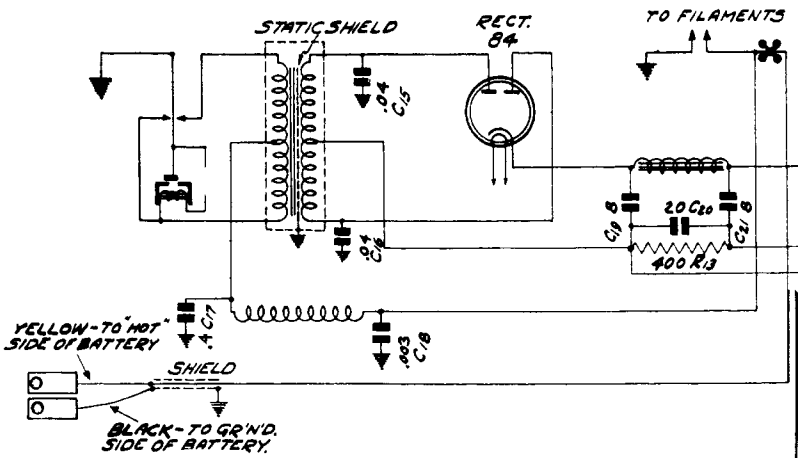




WELLS GARDNER & CO.

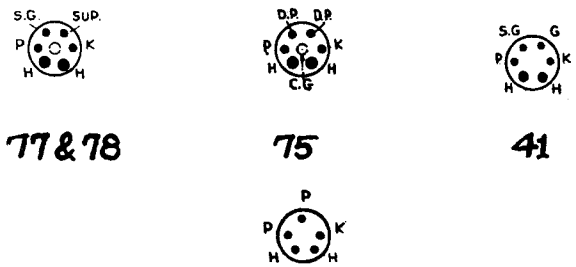
MODEL V6Z2





NOTE
ALL RESISTOR VALUES IN OHMS.
ALL CONDENSER VALUES IN MICROFARADS. UNLESS OTHERWISE INDICATED.
ALL CONDENSERS WITH ASTERISKS(*)IN BLOCK.

I.F.=262 KC.



Type of Tube	Function	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78	R. F.	182	80	3.(1)	7.0
77	1st Det. and Osc.	178	77	5.(2)	1.3(2)
78	I. F.	182	80	3.(1)	7.0
75	2nd Det. 1st Audio	70(3)		1.4(1)	.35
41	Output	172.5	176.5	12.5(4)	16.0
84	Rect.	205			17.5 per plate

WESTINGHOUSE ELECTRIC MFG. CO.

MODEL WR-20

Description:

The *Universal Compact* on the basis of its performance and utility, is the most compact receiver ever made. *It can be used on a direct current (DC) supply of any voltage between* 100 *and* 135 *volts and on an alternating current (AC) supply of any voltage between* 100 *and* 135 *volts.*

Operation on 220-volts AC or DC may be obtained by utilizing a Ballast Adapter.

Four standard type tubes are employed:

1—6C6 Screen Grid Detector
1—6D6 R. F. Amplifier Pentode
1—38 Output Pentode
1—IV Standard Rectifier

The left hand knob is the Combined Volume Control and Switch. The right hand knob is the Station Selector Control.

The aerial wire will be found tucked in a convenient compartment in the rear of the set.

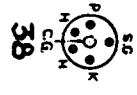
Voltage Readings:

Readings should be taken with Volume Control fully on, Tuning Control set for 550 KC, and antenna outside of set. Use a D. C. voltmeter having a resistance of 1000 ohms per volt.

Chassis	*To— Plate*	*Screen*	*Cathode*
6C6—Detector	10- 15	9- 12	1- 2
6D6—R.F. Amplifier	105-115	105-115	2- 3
38—Output Pentode	105-115	105-115	—

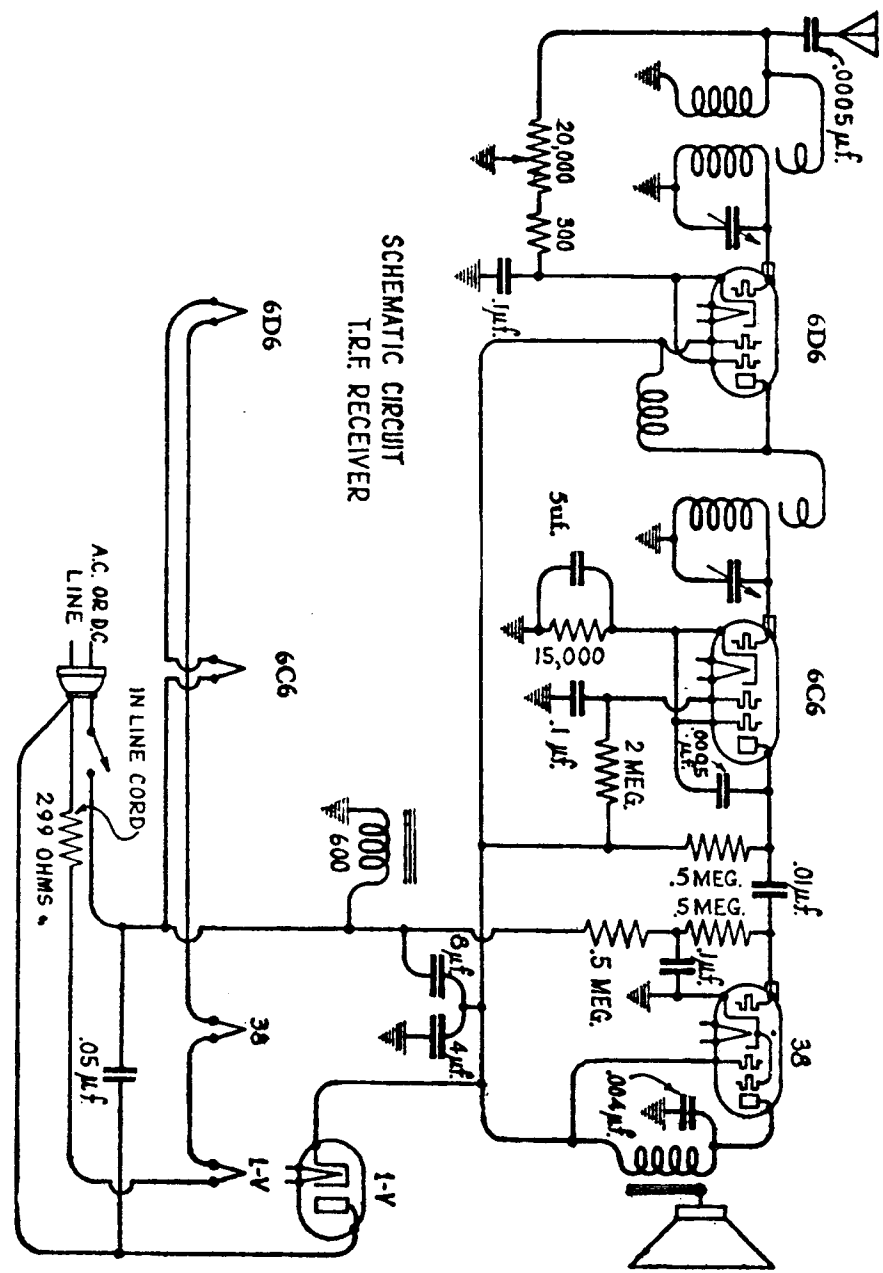
Voltage across filter choke is "C" bias for 38 Tube=10v.

Readings will not change materially regardless of type of power supply.



Trouble Shooting Hints

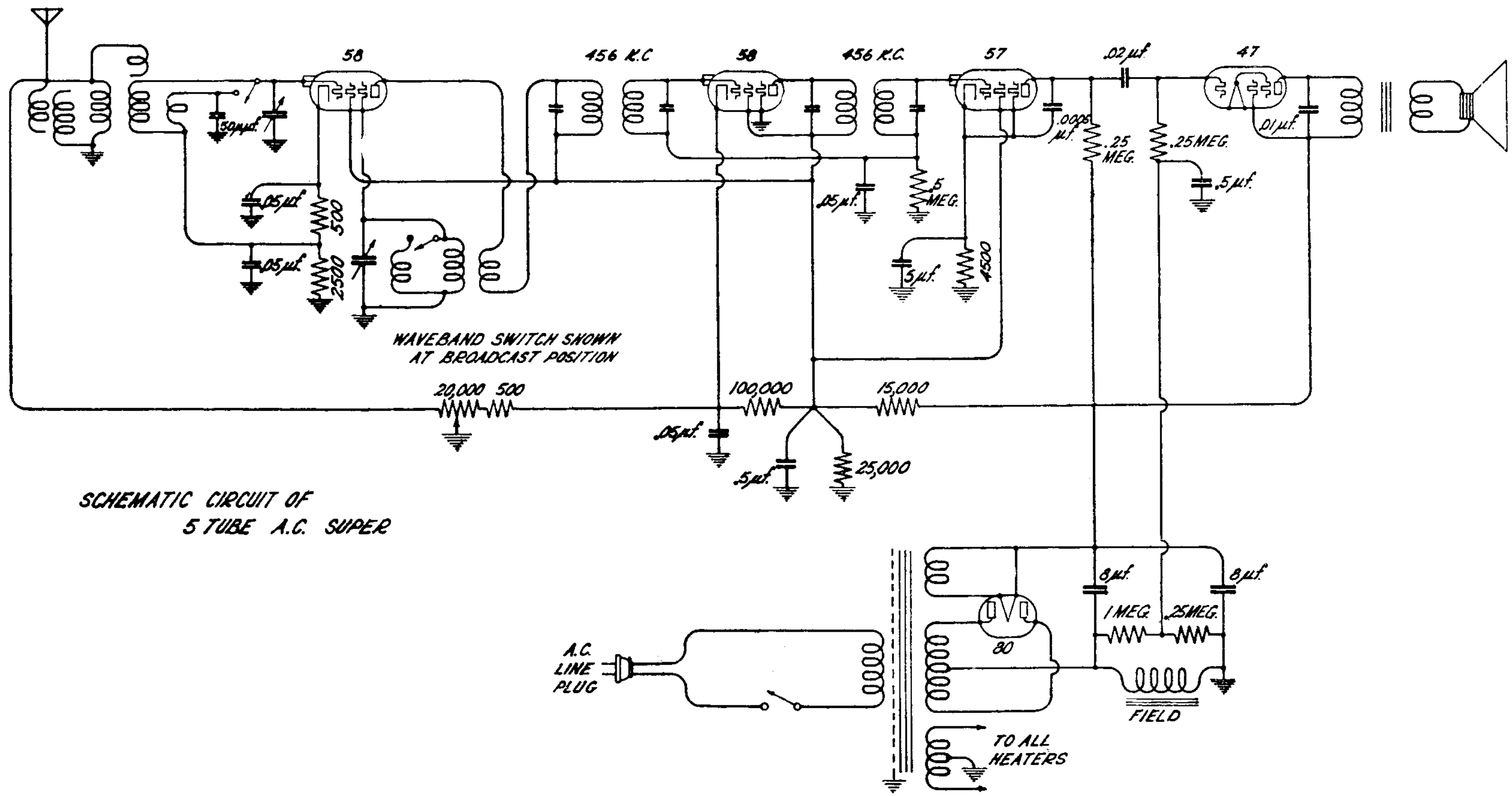
Many of the complaints about this set refer to noisy reception which is usually due to a low pick-up level. This can be improved by a suitable line filter and the use of a longer aerial to over ride the noise. It is also advisable to check the electrolytic condensers and 1 V tube.



WESTINGHOUSE ELECTRIC MFG. CO.
MODEL WR-22

Broadcast
540—1500 Kilocycles
550— 200 Meters

Short Wave
1500—3000 Kilocycles
200— 100 Meters

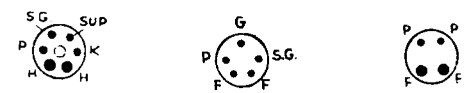


SCHEMATIC CIRCUIT OF 5 TUBE A.C. SUPER

The D.C. Voltmeter used should be 1000 ohms per volt, or over. Line volts 117 A.C.

	Fil.	Ground to Plate	Ground to Screen	Ground to Cathode	Ground to Suppressor
58 Osc. 1st Det.	2.4 A.C.	80 D.C.	80 D.C.	11.0 D.C.	....
58 I. F. Amplifier	2.4 A.C.	80 D.C.	80 D.C.	2.0 D.C.	....
57 2nd Det.	2.4 A.C.	75 D.C.	80 D.C.	4.5 D.C.	4.5 D.C.
47 Output	2.4 A.C.	245 D.C.	255 D.C.	....	....
80 Rectifier	5.0				

Voltage across speaker field, 90.



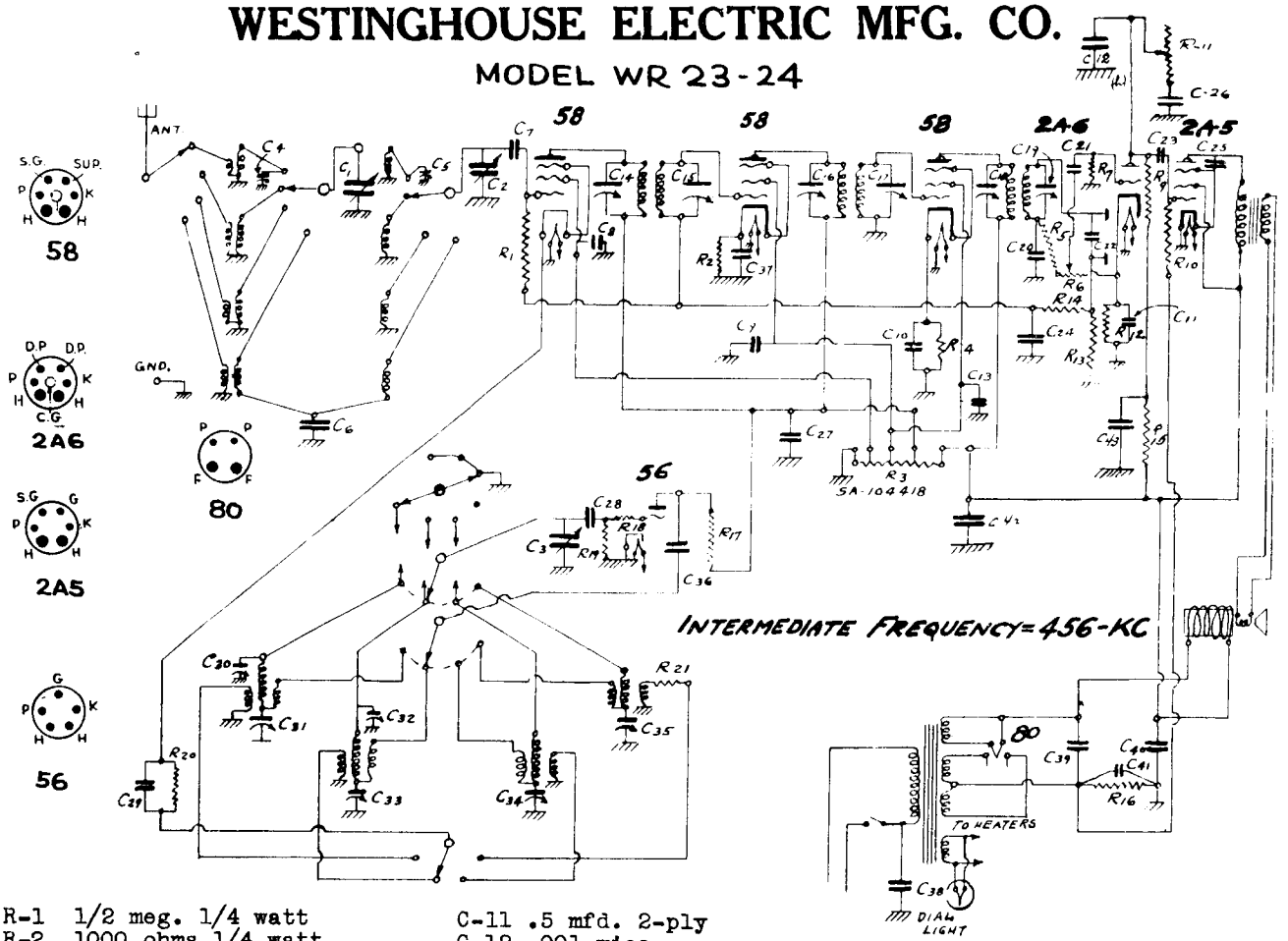
57 & 58 47 80

Trouble Shooting Hints

When this set becomes noisy or stops operating, check the wave-change switch for poor contact or open wiring. For poor quality test the 47 and the two resistors shunted across the speaker field winding.

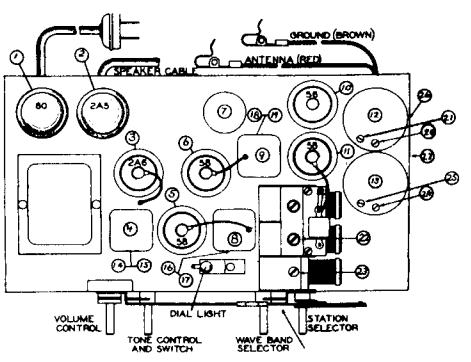
WESTINGHOUSE ELECTRIC MFG. CO.

MODEL WR 23-24



R-1 1/2 meg. 1/4 watt
R-2 1000 ohms 1/4 watt
R-3 Multiple
R-4 1000 ohms 1/4 watt
R-5 50,000 ohms 1/4 watt
R-6 500,000 ohms vol.
R-7 1 meg. 1/4 watt
R-9 250,000 ohms 1/4 watt
R-10 250,000 ohms 1/4 watt
R-11 Variable
R-12 5000 ohms 1/4 watt
R-13 1 meg. 1/4 watt
R-14 1/2 meg. 1/4 watt
R-15 50,000 ohms 1/4 watt
R-16 400 ohms 1 watt
R-17 25,000 ohms 1/2 watt
R-18 50 ohms 1/2 watt
R-19 20,000 ohms 1/4 watt
R-20 2000 ohms 1/4 watt
R-21 200 ohms 1/4 watt
C-1 ----
C-2 Variable cond.
C-3 ----
C-4 Trim condenser
C-5 Trim condenser
C-6 .05 mfd. 2-ply
C-7 100 mmf mica
C-8 .05 mfd. 2-ply
C-9 .05 mfd. 2-ply
C-10 .05 mfd. 2-ply

C-11 .5 mfd. 2-ply
C-12 .001 mica
C-13 .05 mfd. 2-ply
C-14 30 - 100 mmf mica
C-15 30 - 100 mmf mica
C-16 30 - 100 mmf mica
C-17 30 - 100 mmf mica
C-18 30 - 100 mmf mica
C-19 30 - 100 mmf mica
C-20 100 mmf mica
C-21 .005 mfd. 3-ply
C-22 100 mmf mica
C-23 .005 mfd. 3-ply
C-24 .05 mfd. 2-ply
C-25 .005 mfd. 3-ply
C-26 .01 3-ply
C-27 .05 mfd. 3-ply
C-28 100 mmf mica
C-29 .05 mfd. 2-ply
C-30 7 - 70 mmf
C-31 300 mmf variable
C-32 7 - 70 mmf
C-33 1200 mmf variable
C-34 2000 mmf variable
C-35 2000 mmf variable
C-36 .05 mfd. 2-ply
C-37 .05 mfd. 2-ply
C-38 .01 mfd. 4-ply
C-39 8 mfd. electro
C-40 4 mfd. electro
C-41 20 mfd. electro
C-42 .05 mfd. 3-ply
C-43 .1 mfd. 3-ply



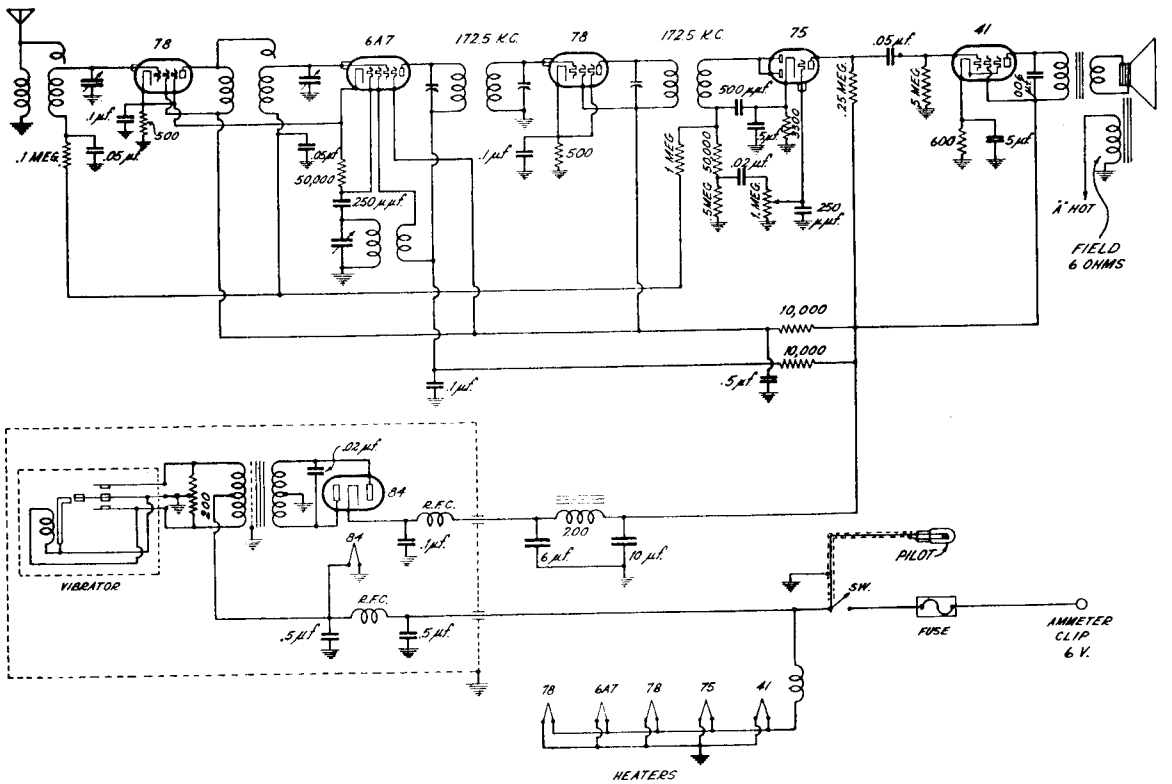
Stage	Tube	Fil.	Plate	Screen	Cathode	Grid
1st Det.	58	2.65	220	40	2.8	--
1st IF	58	2.65	220	95	2.0	--
2nd IF	58	2.65	240	95	2.7	--
Osc.	56	2.65	75	--	0	25
2nd Det.	2A6	2.65	90	--	1.4	--
Output	2A5	2.65	235	240	0	--
Rectifier	80	4.8	---	---	-	--

Bias on 2A5 (across 400 ohms) - 22 volts
Output of rectifier 360 volts

Line volts - 115
Power 60 watts

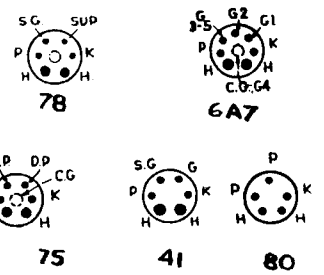
WESTINGHOUSE ELECTRIC MFG. CO.

MODEL WR-25 AUTO SET



Battery volts—6. Volts across heaters—6 scant. Volts across speaker field—6 scant.

Tube	*Plate*	*Screen*	*Cathode*	*Suppressor*	*Osc. plate*
78	110	110	6	6	—
6A7	170	110	6	—	170
75	110	—	1.3	—	—
78	110	110	3.5	3.5	—
41	210	220	15	—	—



Intermediate Transformers

To align the intermediate frequency transformers, use a good modulated oscillator set for 172½ k.c. Set the volume control for maximum volume and turn the dial to a point where little or no signal is received; then ground the antenna.

Connect the oscillator output between the grid of the 6A7 tube and ground. Connect an output meter across the primary of the speaker transformer or across the voice coil. Using the smallest output from the test oscillator that will give a small reading on the meter, adjust the two I.F. transformers for the largest reading obtainable. Use a non-metallic screw driver if possible.

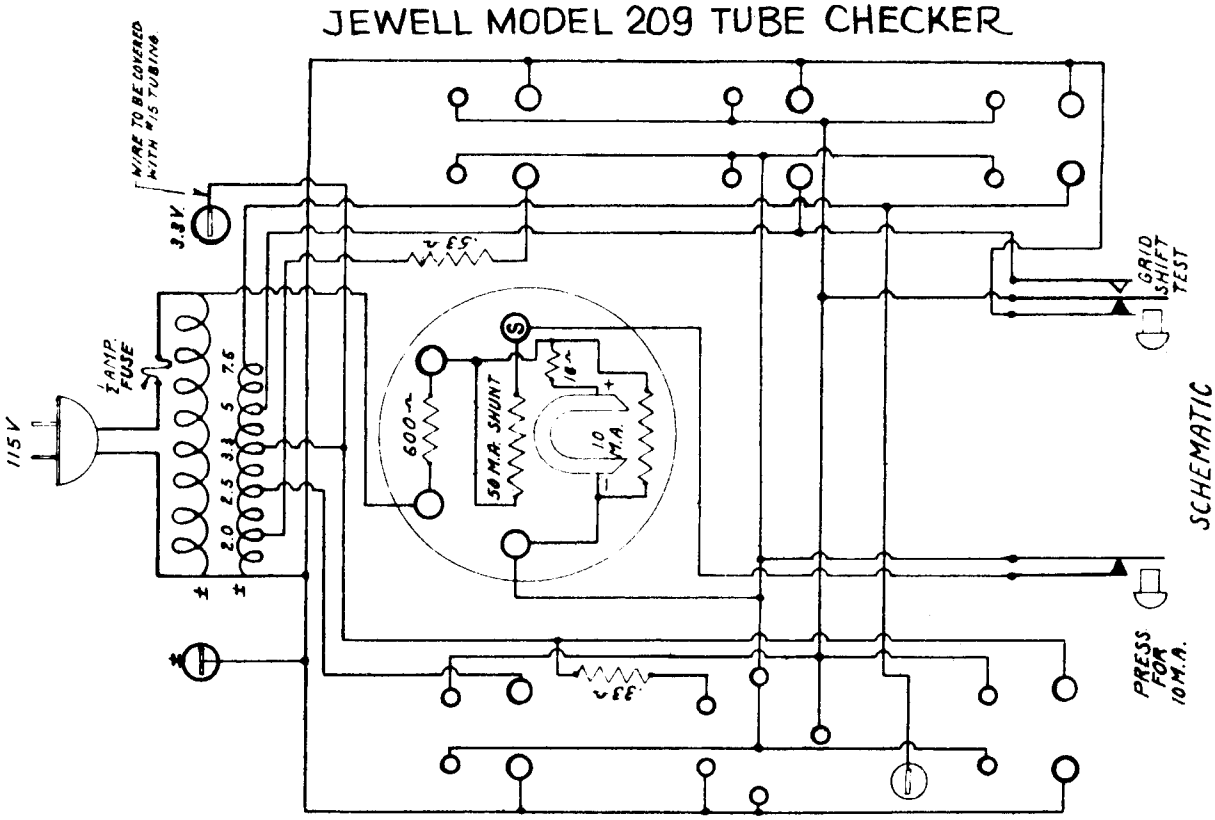
Radio Frequency and Oscillator

To align the R.F. and oscillator sections, couple the oscillator through a standard dummy antenna to the antenna lead and ground of the receiver. Set the test oscillator to some frequency between 1350-1450 k.c. Set the dial to the frequency selected. Adjust trimmers on the variable condenser beginning with the oscillator trimmer. Reduce the output of the test oscillator and repeat. In the absence of an oscillator, the R.F. sections may be aligned on broadcast.

Tune in a weak station between 1350 and 1450 k.c. and align as before. If an output meter is not available, adjust for maximum volume, then reduce the input and repeat.

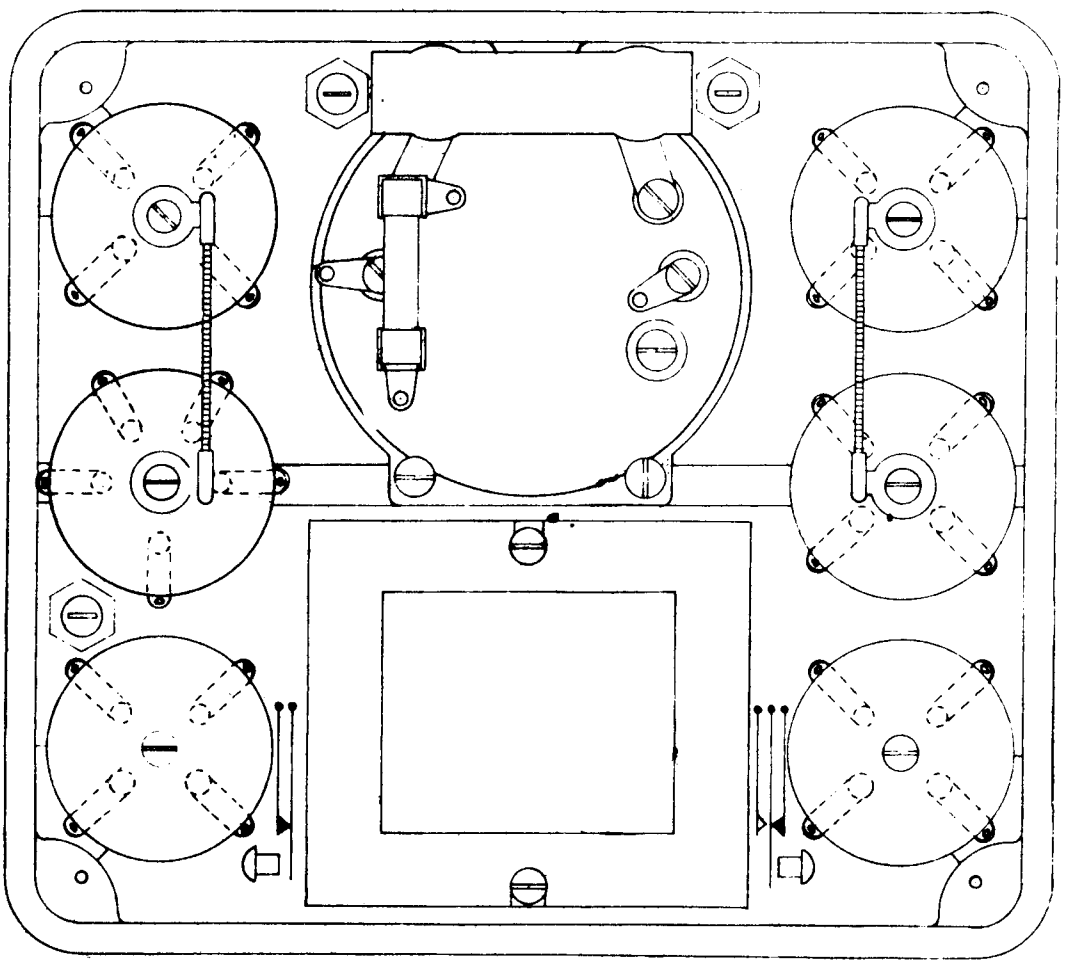
WESTON ELECTRICAL INSTRUMENT CORP.

JEWELL MODEL 209 TUBE CHECKER



SCHEMATIC

LOOKING AT BACK OF CASE

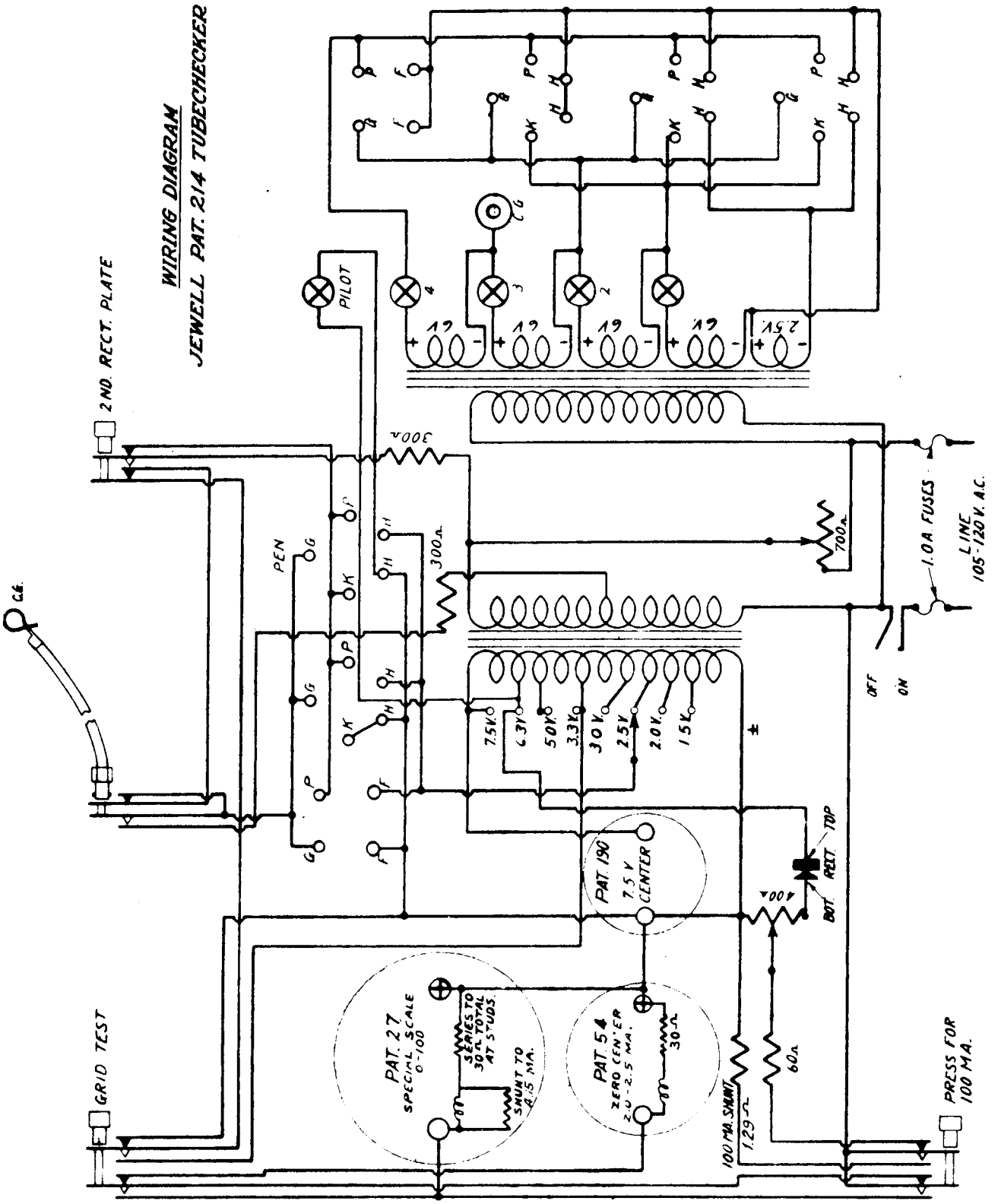


LOOKING AT BACK OF CASE

THIS DIAGRAM APPLIES TO ALL PAT. 209 WITH SERIAL No. 6371 AND OVER
FOR PAT. 209 WITH SERIAL No 1972 TO SERIAL No. 6371 SEE W.D. 209 ISSUE 7.
FOR PAT. 209 WITH SERIAL No. UNDER 1972 SEE W.D. 209 ISSUE 5.

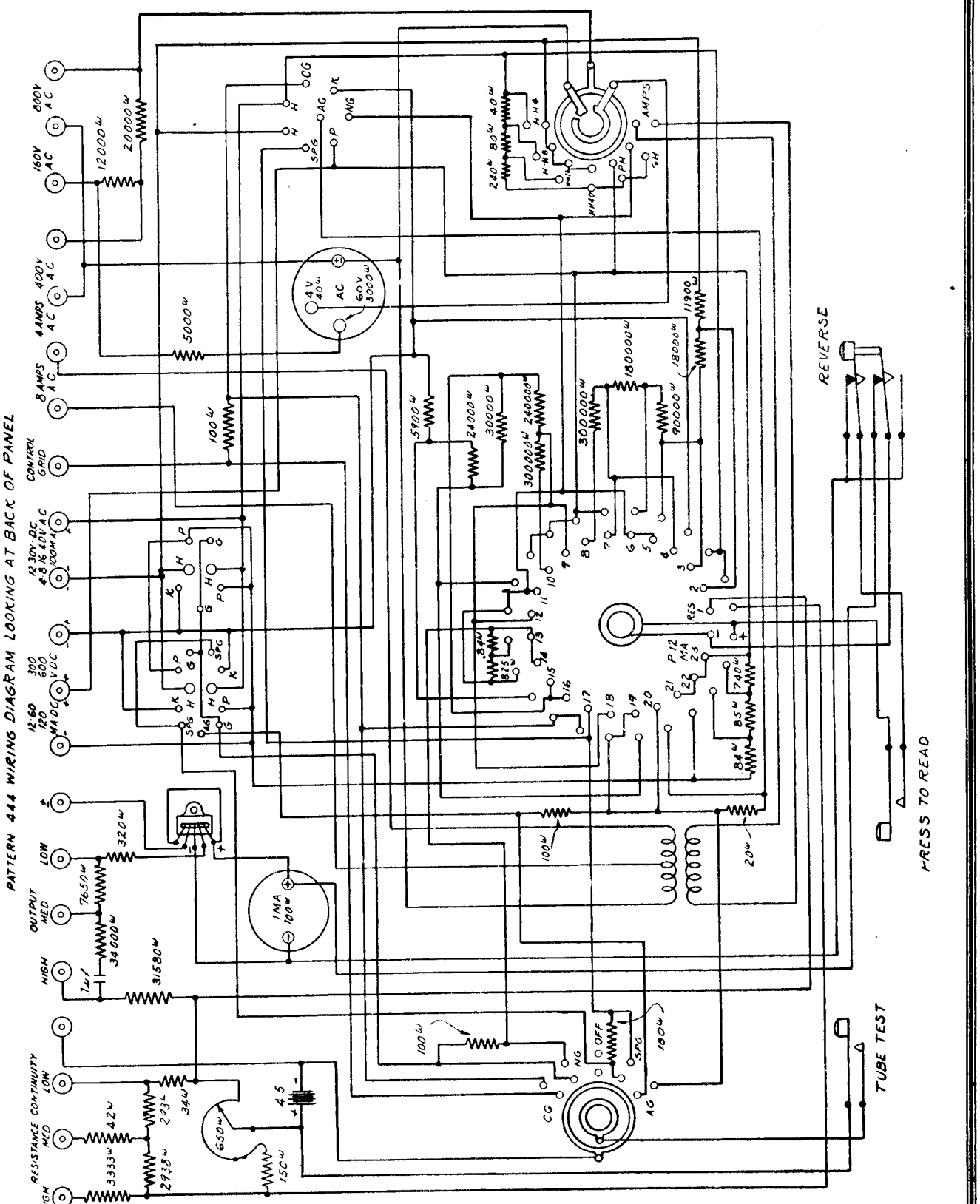
WESTON ELECTRICAL INSTRUMENT CORP.

JEWELL MODEL 214 TUBE CHECKER



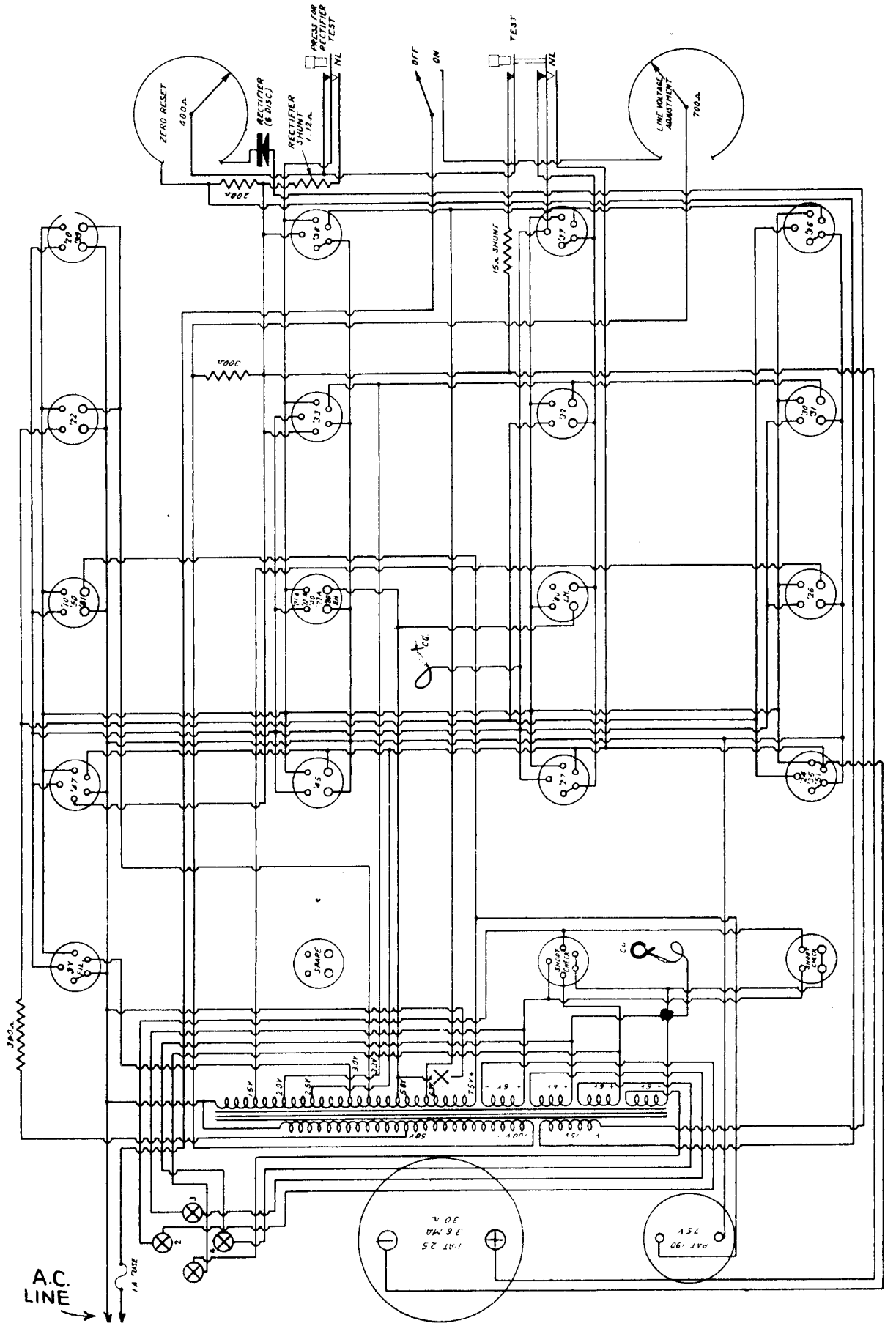
WESTON ELECTRICAL INSTRUMENT CORP.

JEWELL MODEL 444 SET ANALYZER



WESTON ELECTRICAL INSTRUMENT CORP.

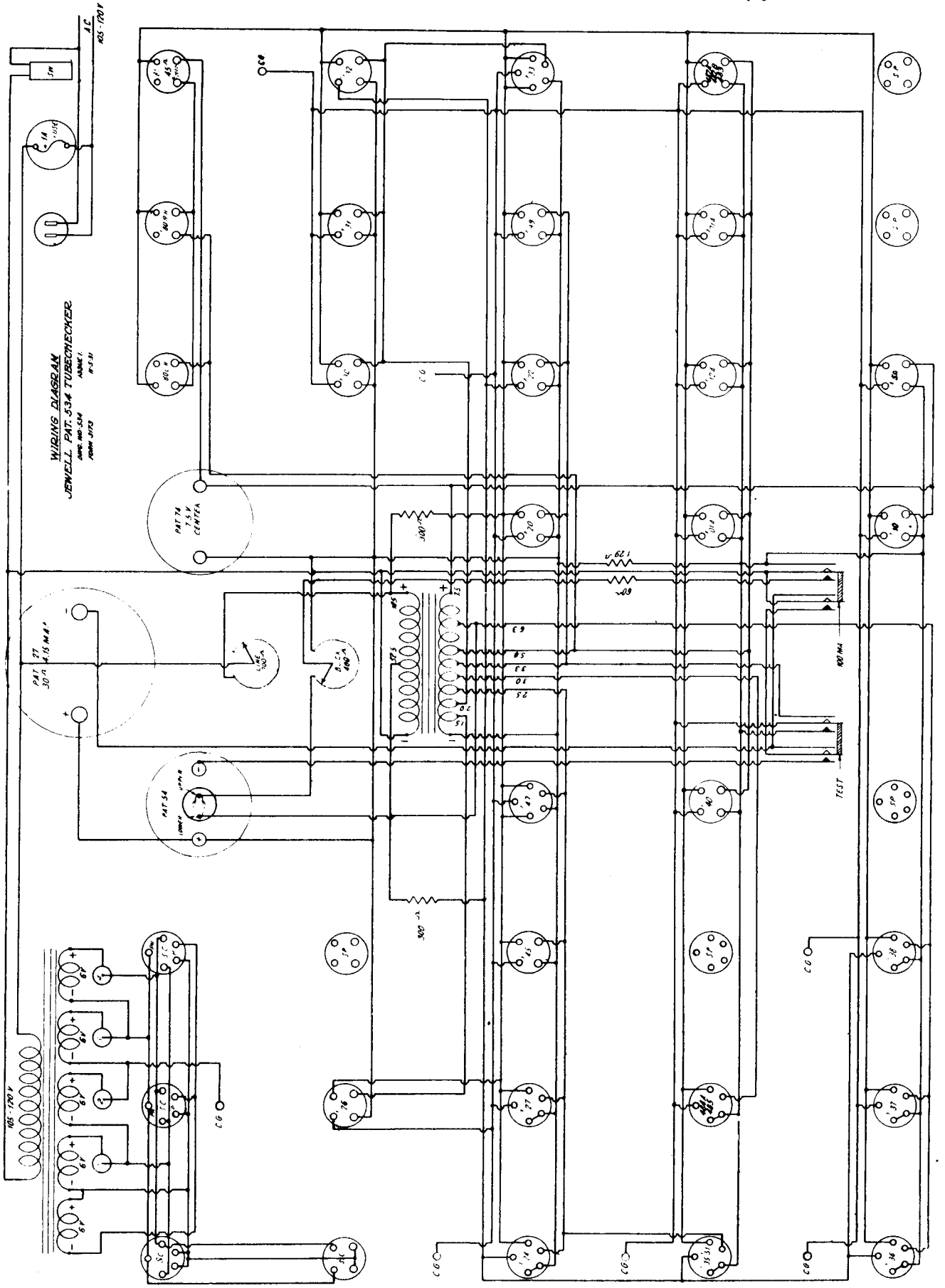
JEWELL MODEL 533 TUBE CHECKER



VIEWING TOP OF PANEL.

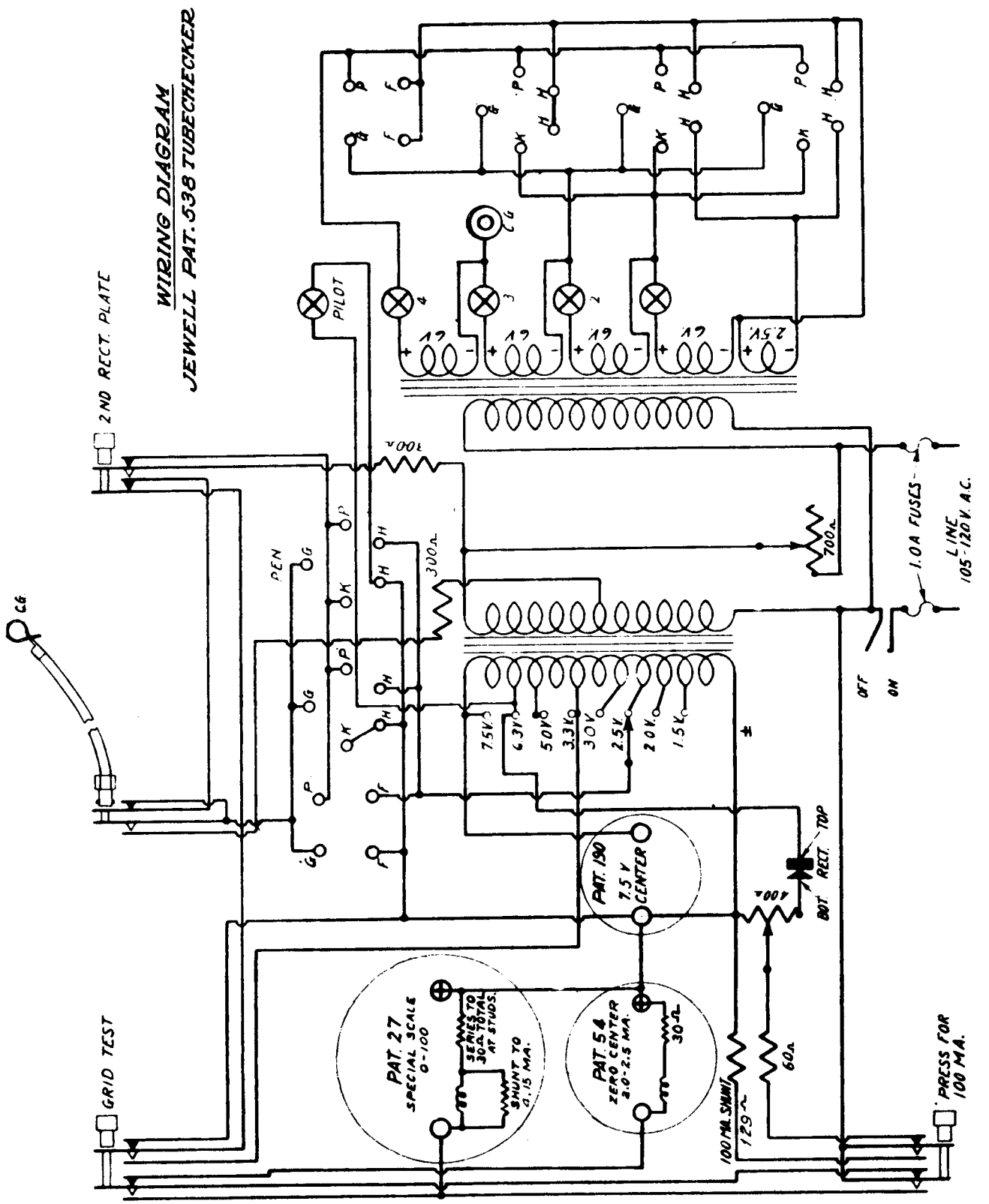
WESTON ELECTRICAL INSTRUMENT CORP.

JEWELL MODEL 534 TUBE CHECKER



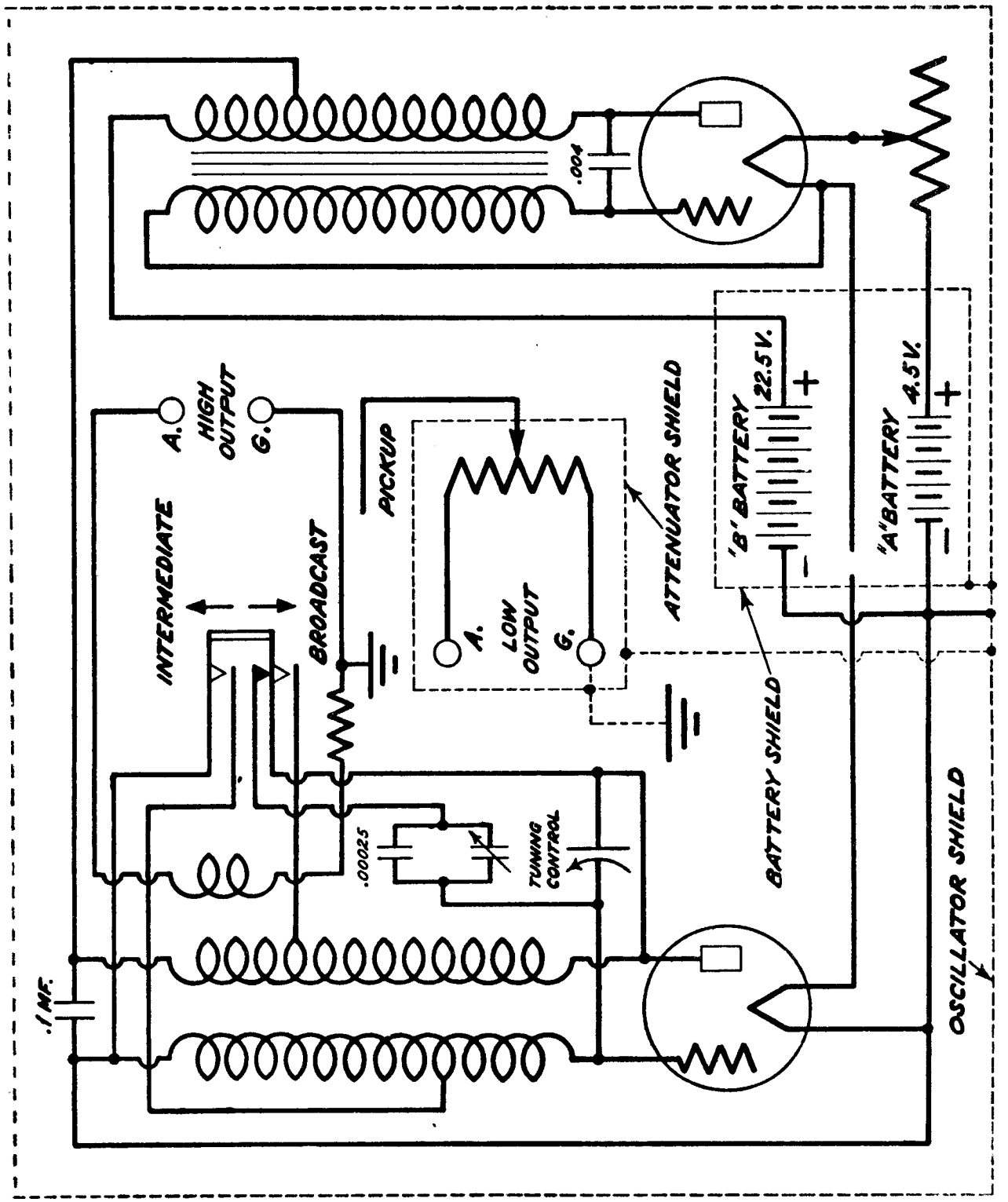
WESTON ELECTRICAL INSTRUMENT CORP.

JEWELL MODEL 538 TUBE CHECKER



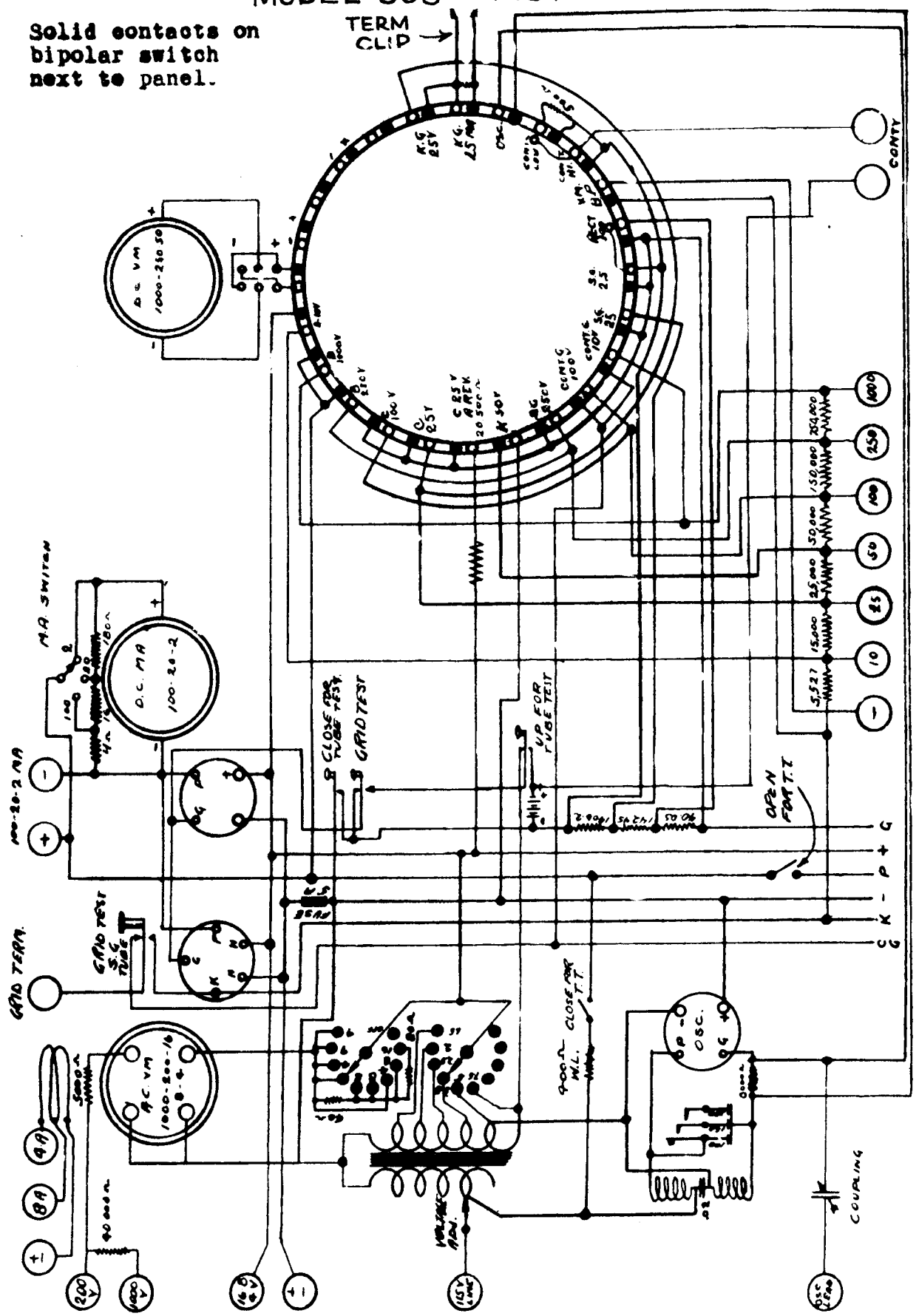
WESTON ELECTRICAL INSTRUMENT CORP.

JEWELL MODEL 560 OSCILLATOR



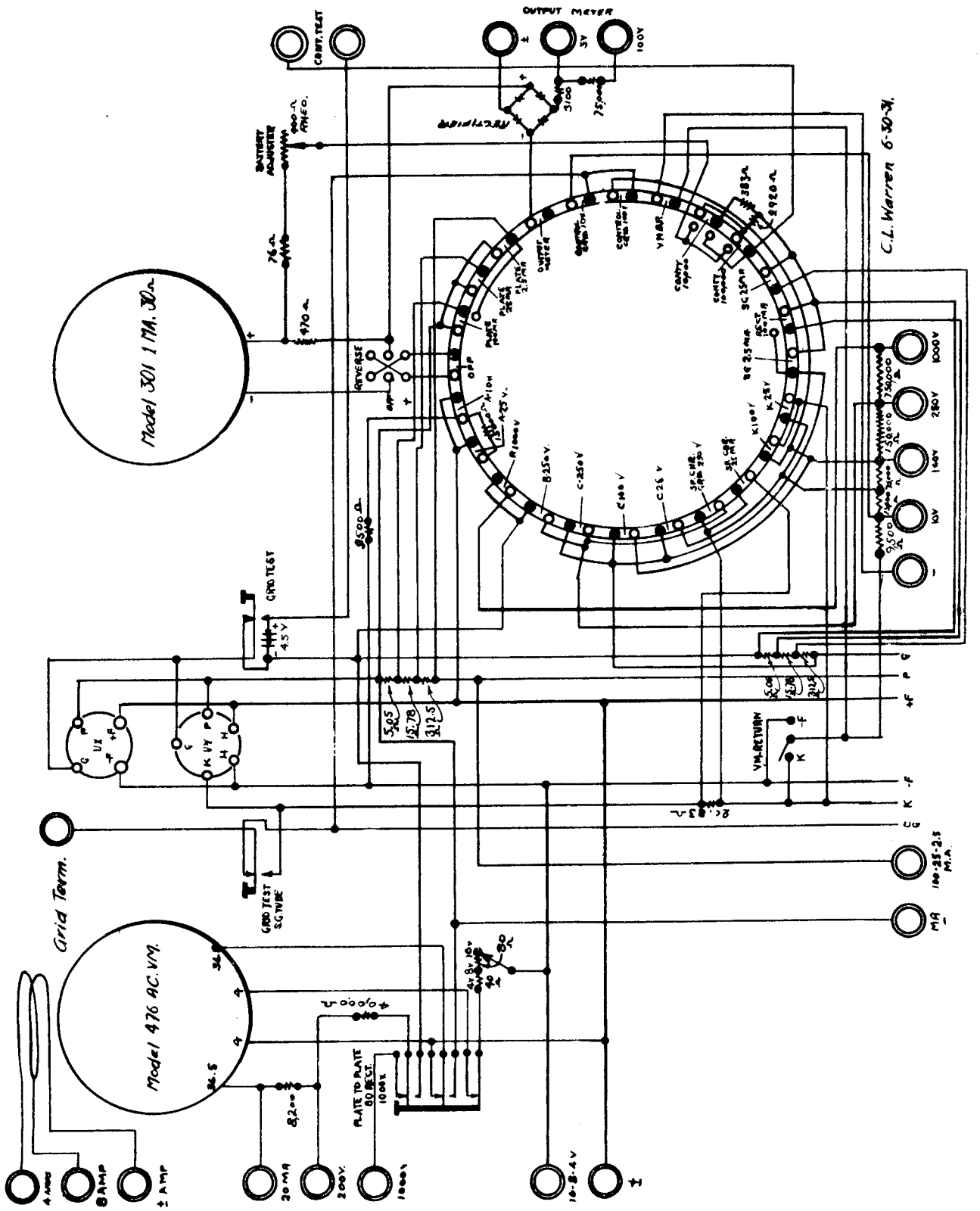
WESTON ELECTRICAL INSTRUMENT CORP.

MODEL 565 TEST SET



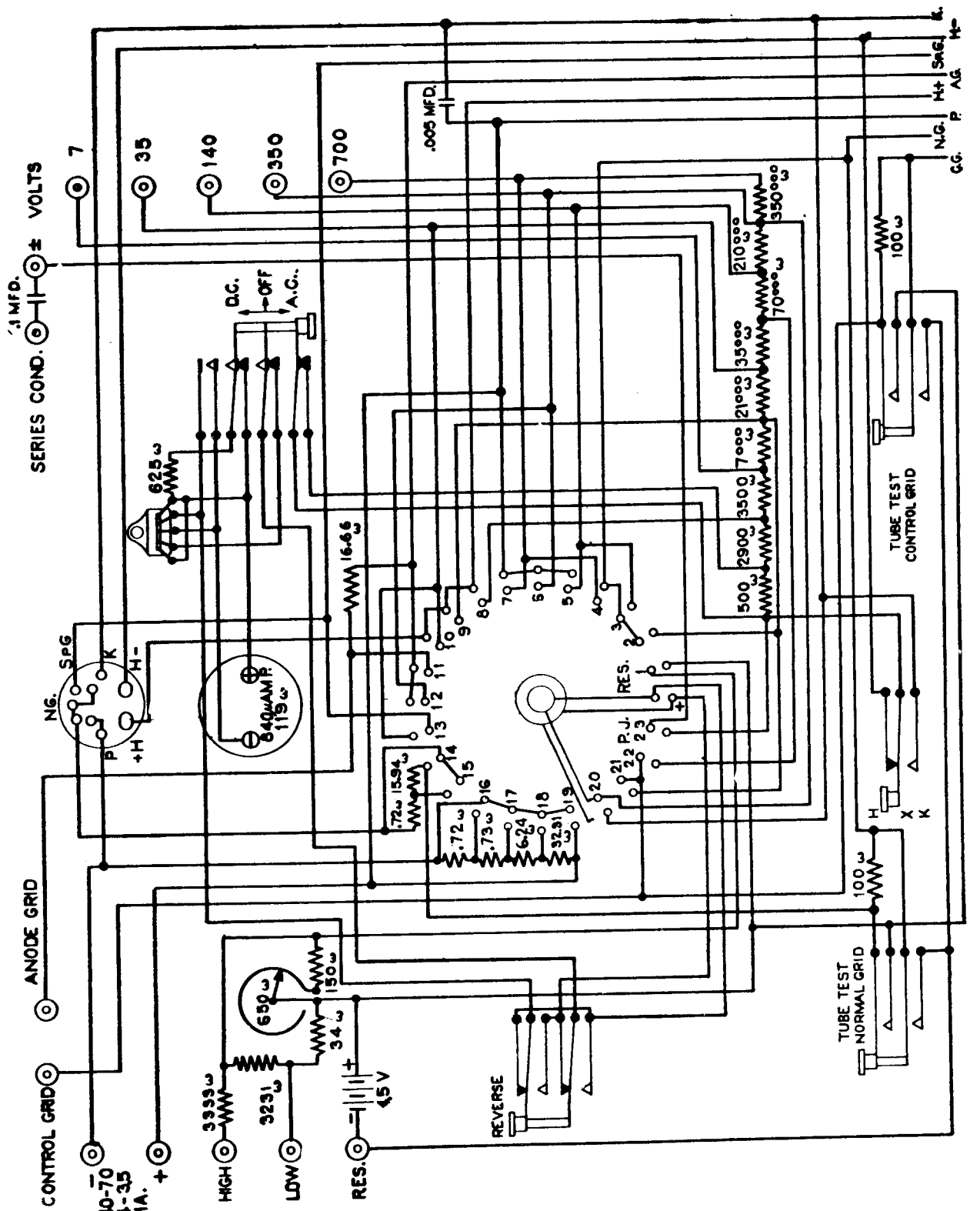
WESTON ELECTRICAL INSTRUMENT CORP.

MODEL 566 TYPE 3
SET TESTER



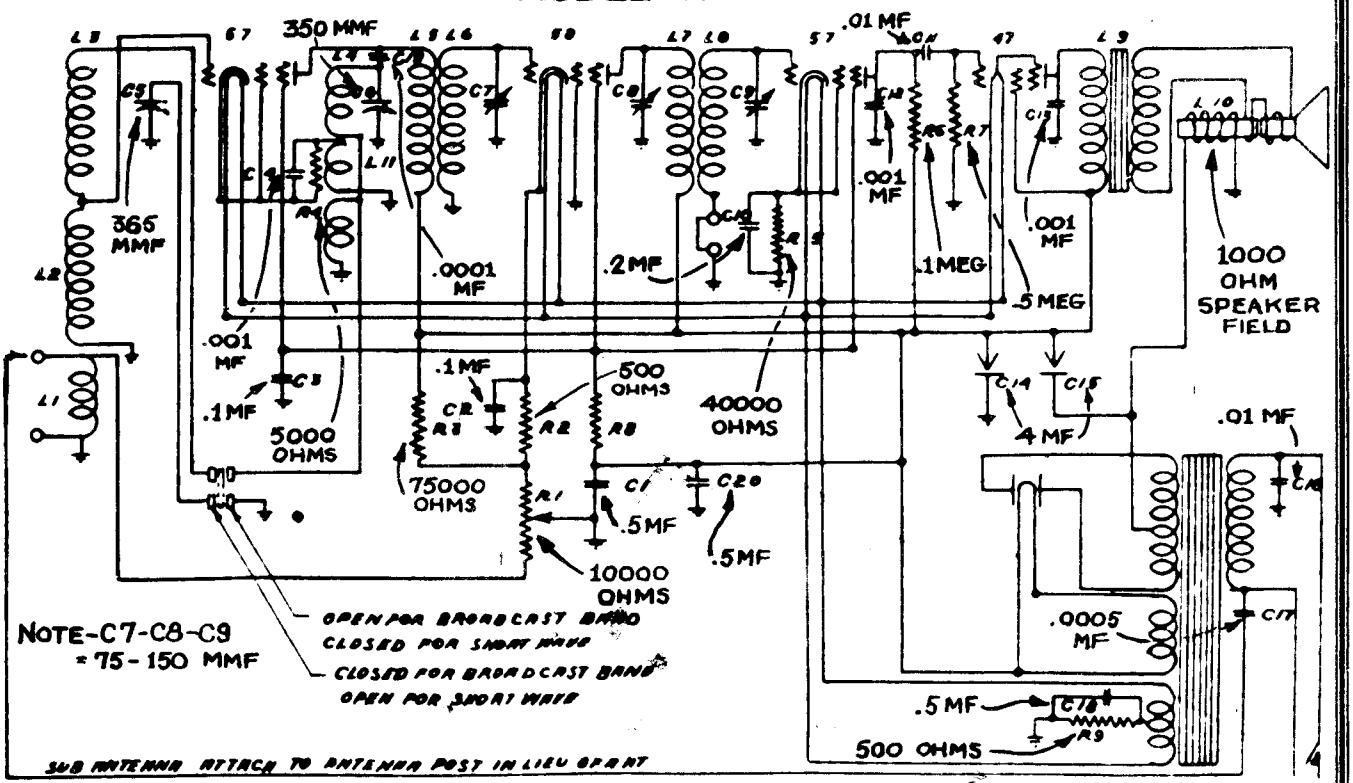
WESTON ELECTRICAL INSTRUMENT CORP.

MODEL 660 TYPE 3
SET ANALYZER



WILCOX-GAY CORP.

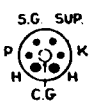
MODEL 2T5



Tubes

This receiver requires for its operation tubes of the types and for purposes as follows:

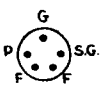
Oscillator and first detector	1 - - '57
Intermediate amplifier	1 - - '58
Second detector	1 - - '57
Power output tube	1 - - '47
Rectifier	1 - - '80



57 & 58

The sockets are all plainly marked for the types of tubes required. Looking at the chassis from the rear, the rectifier is located at the left and near the front of the set. The output tube is directly back of the rectifier. The other three tubes are located near the back of the chassis in the following order starting at the left, second detector, intermediate amplifier and the detector oscillator.

Adjustments



47

There are five adjustable condensers on this radio set. Two of these are variable condenser trimmers located at the top of the condenser. The other three tune the intermediate transformer windings and the adjusting screws are reached through openings in the transformer shields from the back of the chassis.

These condensers are carefully set at the factory and ordinarily will need no further adjustment throughout the life of the set.

Built-In Antenna

80

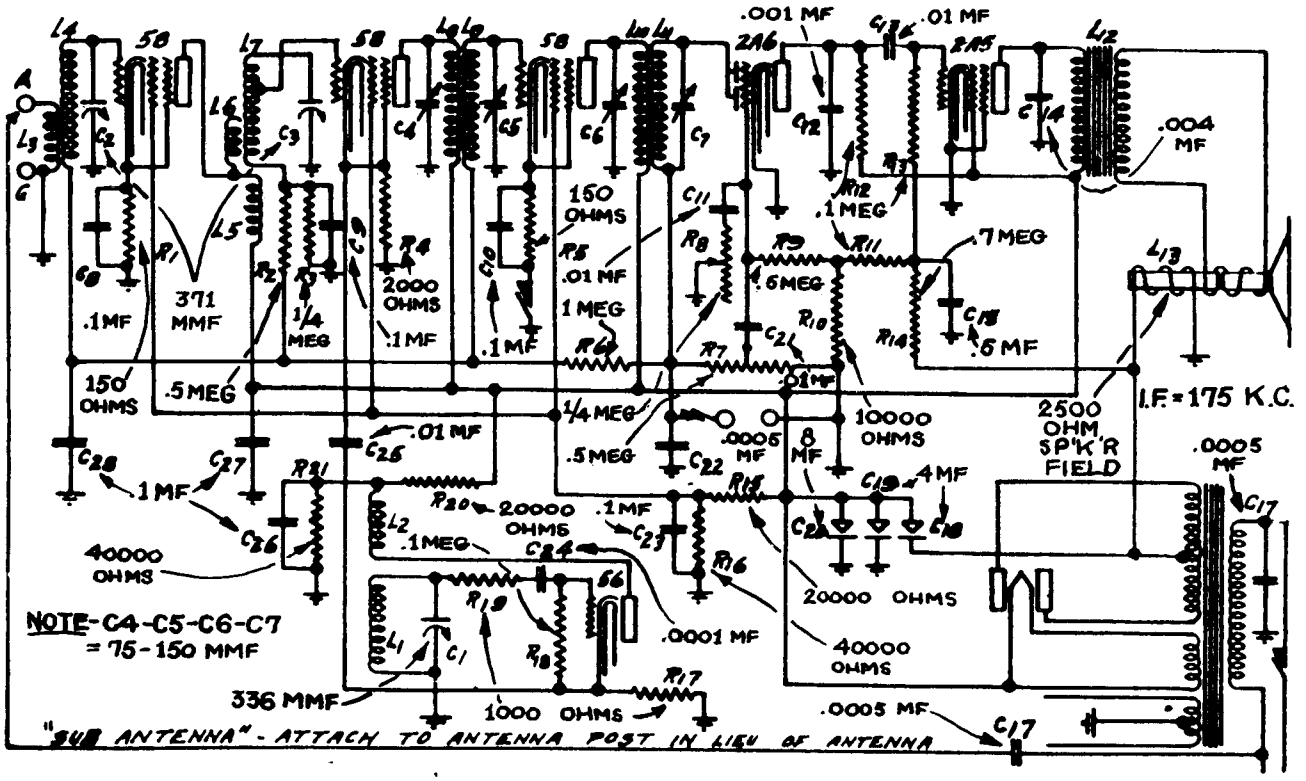
This receiver is provided with a built-in antenna feature which may be used when a standard antenna is unobtainable or inconvenient providing reception is required from only moderate distances. A great variation in the effectiveness of this built-in antenna will be observed because of differing conditions in power supply lines.

To use the built-in antenna simply connect the short wire extending from the rear of the chassis to the antenna post.

Another effective method of using this receiver without an aerial is to attach a ground wire to the antenna post.

WILCOX-GAY CORP.

MODELS-2VB7-2U7 & 2VA7

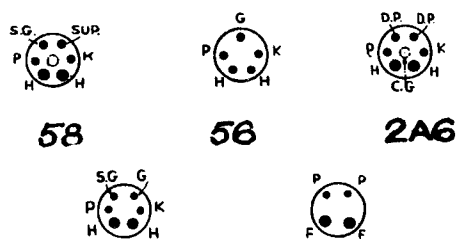


ADJUSTMENTS

There are seven adjustable condensers on this radio set. Three of these are variable condenser trimmers located at the top of the condenser. The other four tune the intermediate transformer windings and the adjusting screws are reached through openings in the transformer shields from the back of the chassis.

These condensers are carefully set at the factory and ordinarily will need no further adjustment throughout the life of the set. In any case the owner should allow no one except a highly skilled service man equipped with the necessary apparatus to make an adjustment of any of these condensers.

I.F. = 175 KC.



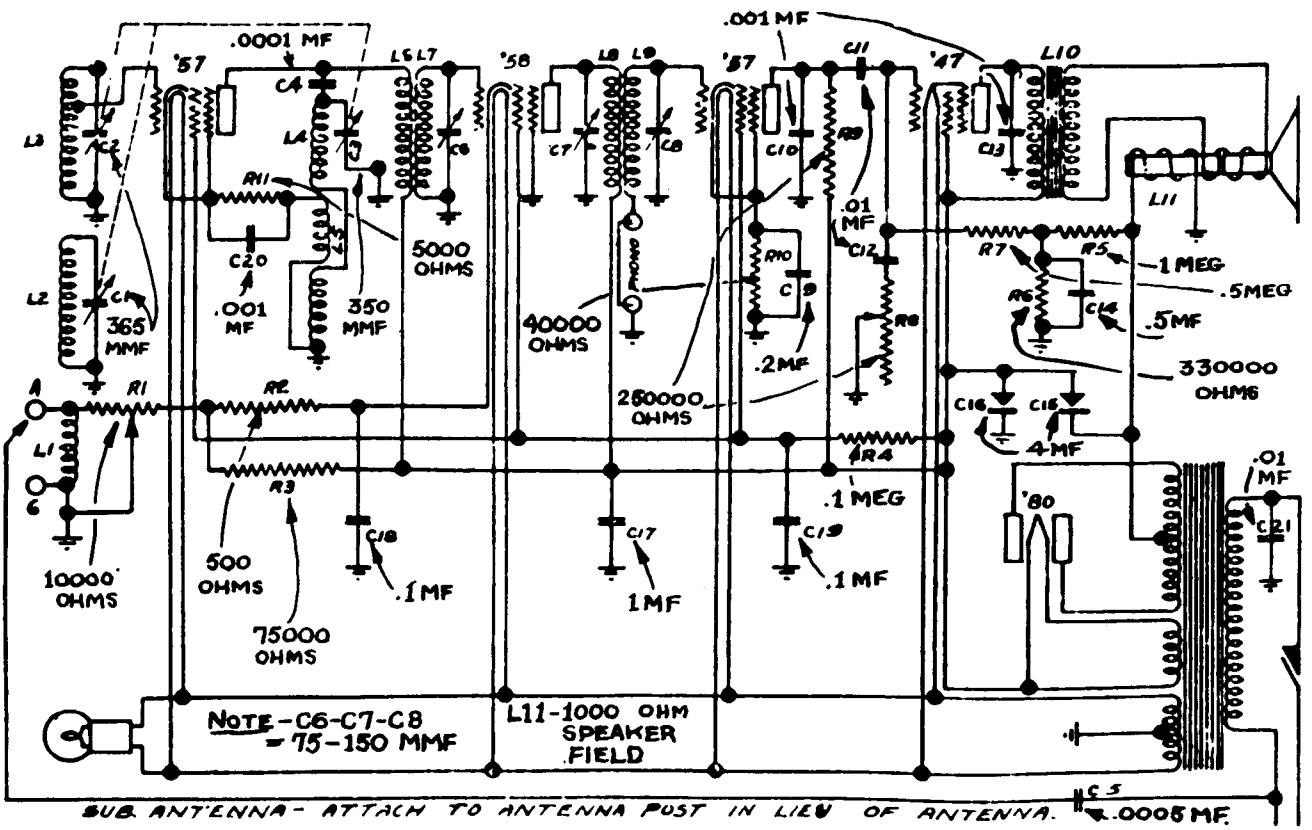
TUBE	CIRCUIT	PLATE TO GROUND	SCREEN GRID TO GROUND	CATHODE TO GROUND
58	R.F. Amplifier	230	95	2.5
58	1st Detector	230	95	5.0
56	Oscillator	100	-	0
58	I.F. Amplifier	230	95	2.5
2A6	2nd Detector	165	-	0
2A5	Power Amplifier	210	230	0
80	Rectifier			

Speaker Field Voltage -- 165V

250 V. Scale -- 1000 Ohms Per Volt

WILCOX-GAY CORP.

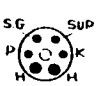
MODEL -3D5



Tubes

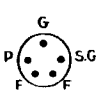
This receiver requires for its operation tubes of the types and for purposes as follows:

Oscillator and first detector	1 - - '57
Intermediate amplifier	1 - - '58
Second detector	1 - - '57
Power output tube	1 - - '47
Rectifier	1 - - '80



57 & 58

The sockets are all plainly marked for the types of tubes required. Looking at the chassis from the rear, the rectifier is located at the left and near the front of the set. The output tube is directly back of the rectifier. The other three tubes are located near the back of the chassis in the following order starting at the left, second detector, intermediate amplifier and the detector oscillator.



47

Adjustments

There are six adjustable condensers on this radio set. Three of these are variable condenser trimmers located at the top of the condenser. The other three tune the intermediate transformer windings and the adjusting screws are reached through openings in the transformer shields from the back of the chassis.

These condensers are carefully set at the factory and ordinarily will need no further adjustment throughout the life of the set.

80

Built-In Antenna

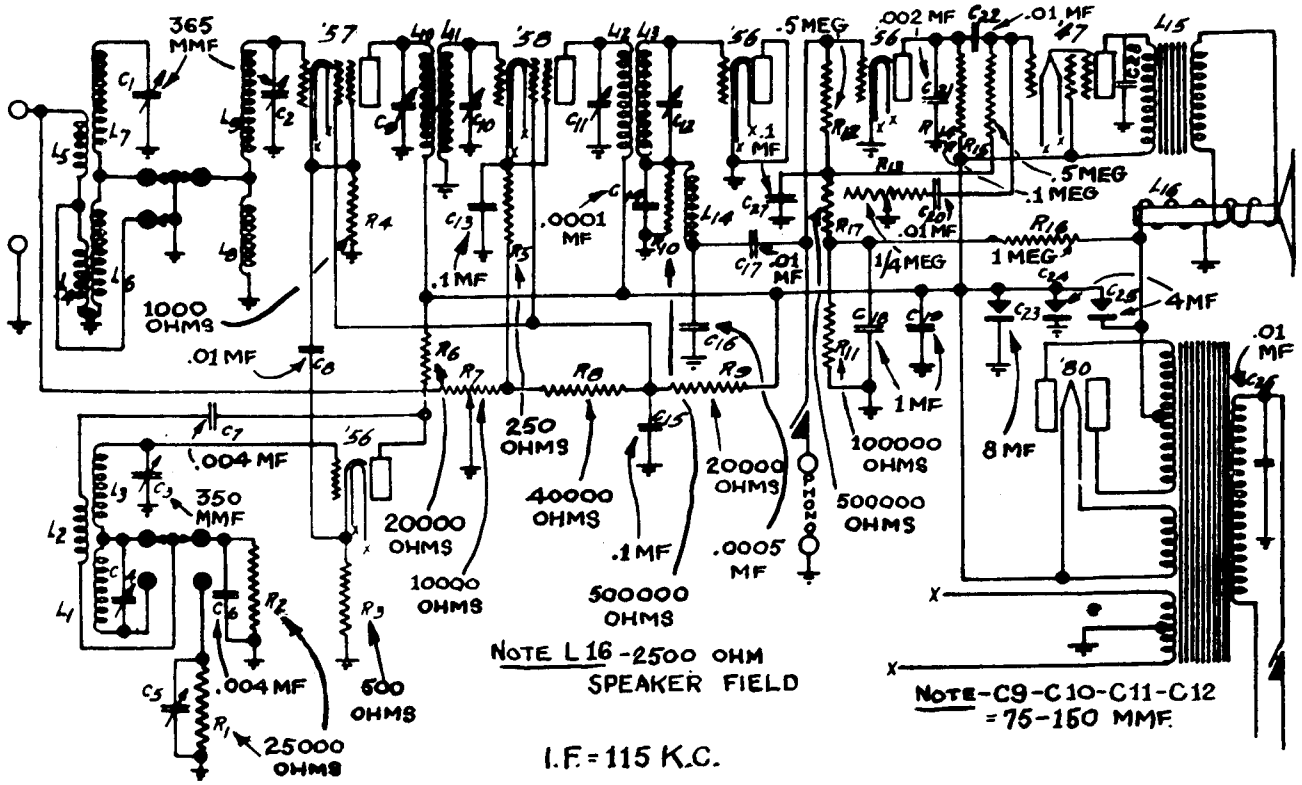
This receiver is provided with a built-in antenna feature which may be used when a standard antenna is unobtainable or inconvenient providing reception is required from only moderate distances. A great variation in the effectiveness of this built-in antenna will be observed because of differing conditions in power supply lines.

To use the built-in antenna simply connect the short wire extending from the rear of the chassis to the antenna post.

Another effective method of using this receiver without an aerial is to attach a ground wire to the antenna post.

WILCOX-GAY CORP.

MODEL 3F7



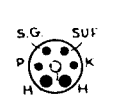
TUBE	CIRCUIT	PLATE TO GROUND	SCREEN GRID TO GROUND	CATHODE TO GROUND
57	First Det ctor	210	105	3
56	Oscillator	100		3.4
58	I.F. Amplifier	210	105	2.8
56	Diode Detector	0		0
56	1st A.F. Detector	80		4.0
47	Power Amplifier	200	210	0
80	Rectifier			

Speaker Field Voltage — 175V

250 V. Scale — 1000 Ohms Per Volt

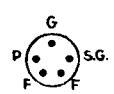
ADJUSTMENTS

This set is provided with numerous adjustable condensers for the tuning of fixed frequency circuits as well as insuring accurate tracking on both wave bands. These condensers are carefully set at the factory and ordinarily will need no further adjustment throughout the life of the set. In any case they should not be altered excepting by someone thoroughly familiar with the circuit and equipped with adequate apparatus to make the proper adjustment.



57 & 58

56

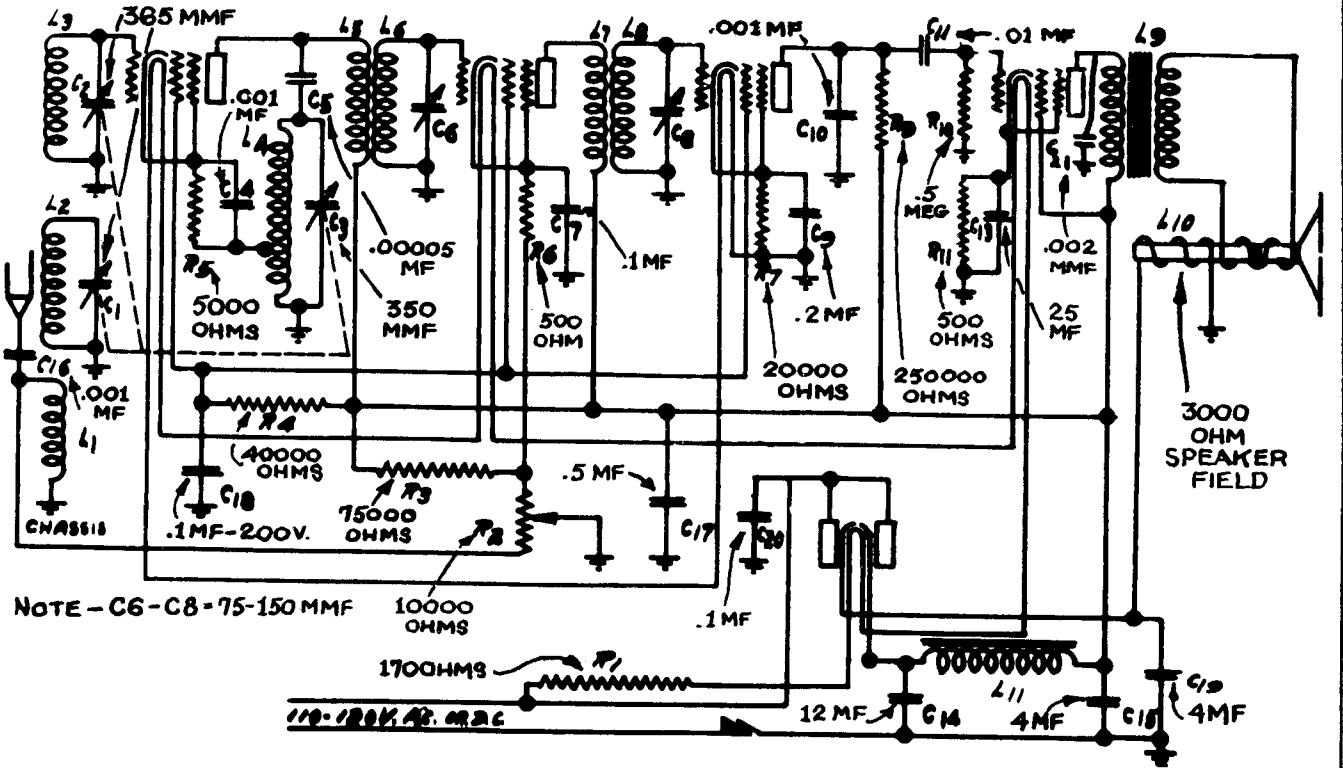


47

80

WILCOX-GAY CORP.

MODELS 3J5-3K5 & 3KD5



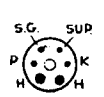
MODELS-3J5-3K5 - I.F. - 175 K.C. MODEL-3KD5 - I.F. = 115 K.C.

TUBE	CIRCUIT	PLATE TO GROUND	SCREEN GRID TO GROUND	CATHODE TO GROUND
77	1st Detector & Oscillator	118	65	3.6
78	I.F. Amplifier	118	65	2.2
77	2nd Detector	52	65	3.2
43	Power Amplifier	111	118	17
25Z5	Rectifier			

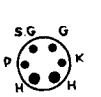
Speaker Field Voltage -- 135V.

250 V. Scale -- 1000 Ohms Per Volt

There are five adjustable condensers on this radio set. Three of these are variable condenser trimmers located at the top of the condenser. The other two tune intermediate transformer windings and the adjusting screws are reached through openings in the transformer shield and in the back of the chassis.

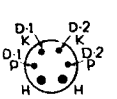


77 & 78



43

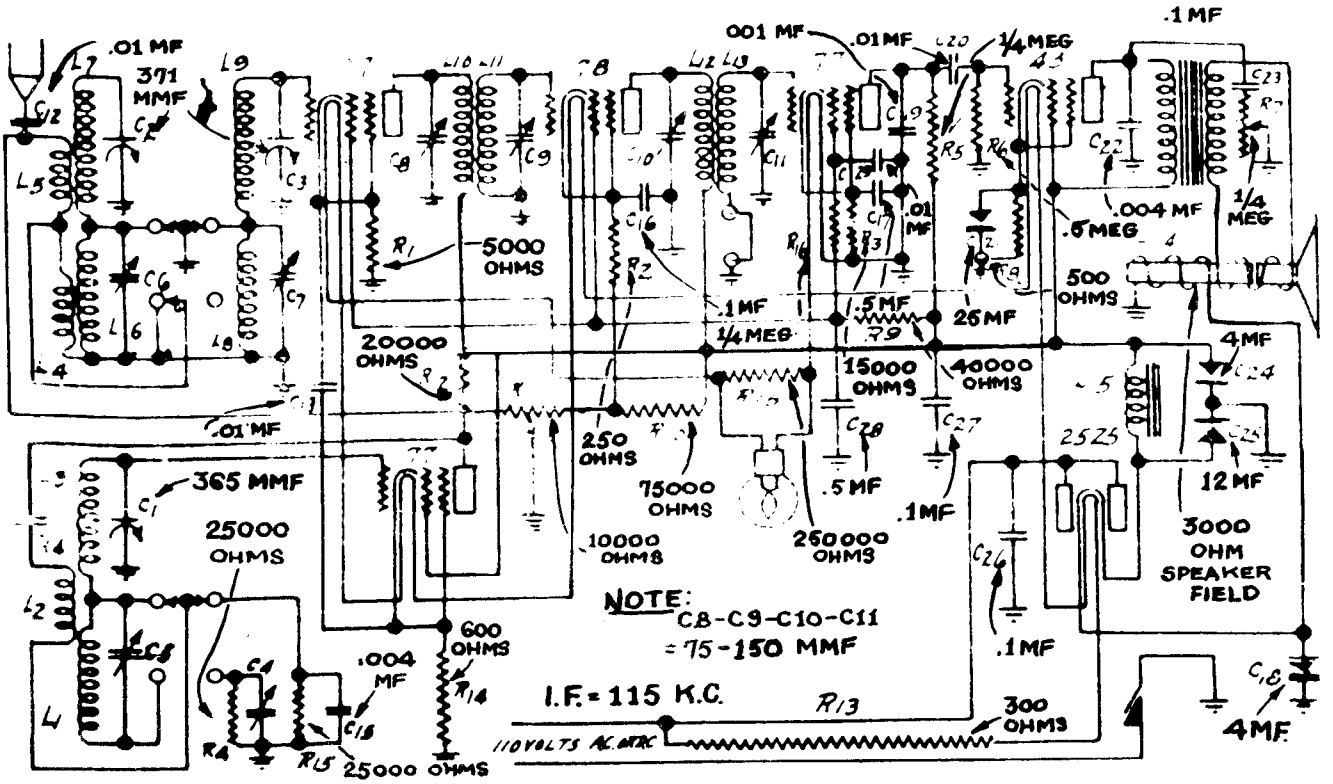
These condensers are carefully set at the factory and ordinarily will need no further adjustment throughout the life of the set. In any case the owner should allow no one but a highly skilled service man equipped with necessary apparatus to make adjustment of any of these condensers.



25Z5

WILCOX-GAY CORP.

MODELS 3P6 & 3PA6



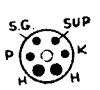
TUBE	CIRCUIT	PLATE TO GROUND	SCREEN GRID TO GROUND	CATHODE TO GROUND
77	1st Detector	118	60	3.75
77	Oscillator	60	118	2.25
78	I.F. Amplifier	118	60	1.5
77	2nd Detector	40	28	2.75
43	Power Amplifier	110	118	14.5
25Z5	Rectifier			

Speaker Field Voltage -- 124V

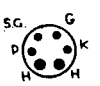
250 V. Scale -- 1000 Ohms Per Volt

ADJUSTMENTS

This set is provided with numerous adjustable condensers for the tuning of fixed frequency circuits as well as insuring accurate tracking on both wave bands. These condensers are carefully set at the factory and ordinarily will need no further adjustment throughout the life of the set. In any case they should not be altered excepting by someone thoroughly familiar with the circuit and equipped with adequate apparatus to make the proper adjustment.



77 & 78



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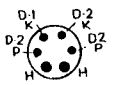
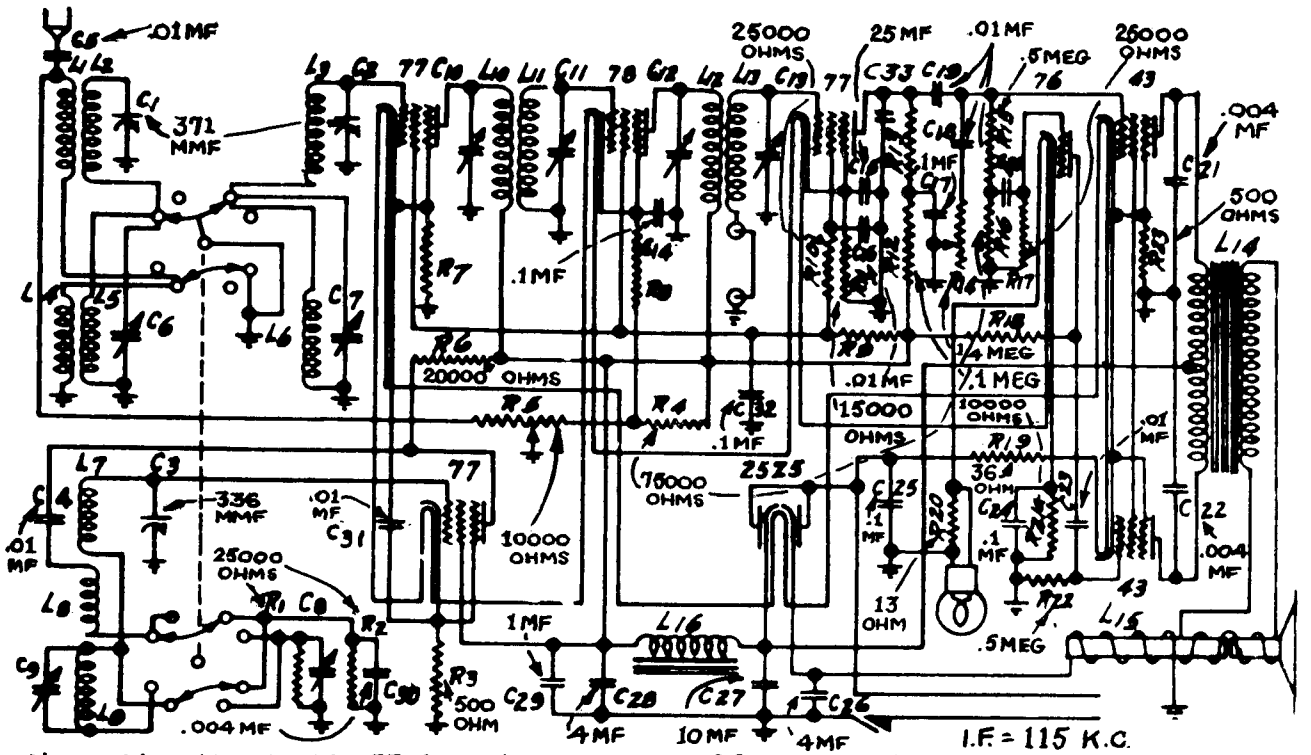


25Z5

WILCOX-GAY CORP.

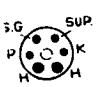
MODEL 3PB8



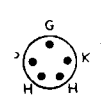
NOTE-C10-C11-C12-C13 = 75-150 MMF L15 = 2500 OHM SP'K'R FIELD

TUBE	CIRCUIT	PLATE TO GROUND	SCREEN GRID TO GROUND	CATHODE TO GROUND
77	1st Detector & Oscillator	120	80	4
77	Oscillator	60	120	2
78	I.F. Amplifier	120	80	2.5
77	2nd Detector	20	40	4
76	Inverter	30	-	4
43	Power Amplifier	115	120	20
43	Power Amplifier	115	120	20

I.F. = 115 KC.

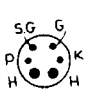


77 & 78



76

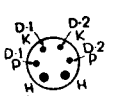
43 Cathode to Grid -- 7 V.
Speaker Field Voltage -- 110 V.



43

250 V. Scale -- 1000 Ohms Per Volt

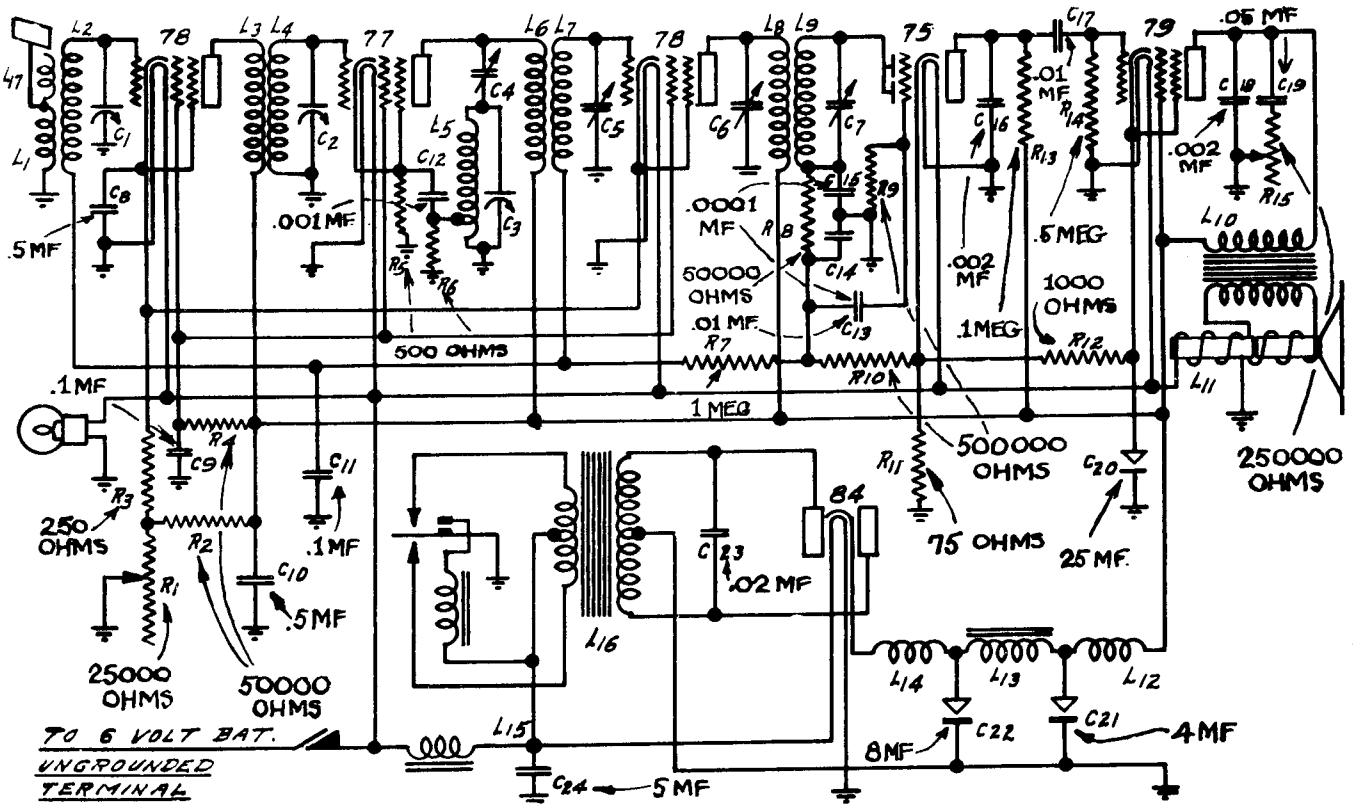
This set is provided with numerous adjustable condensers for the tuning of fixed frequency circuits as well as insuring accurate tracking on both wave bands. These condensers are carefully set at the factory and ordinarily will need no further adjustment throughout the life of the set. In any case they should not be altered excepting by someone thoroughly familiar with the circuit and equipped with adequate apparatus to make the proper adjustment.

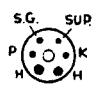


25 Z5

WILCOX-GAY CORP.

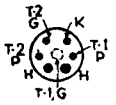
MODEL 3R6





77&78

75



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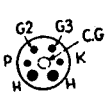


89

84

The four I. F. trimming condensers are adjusted at 175 K. C. Proceed as follows:

Procure a modulated oscillator giving a signal at 175 K. C., a non-metalic screw driver and an out-put meter.

Remove the bottom, top, cap, drive pulley and the speaker leads and remove the chassis. Reconnect the speaker. Connect the oscillator out-put between the first detector grid and ground. Connect out-put meter.

Adjust the tuning condenser so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the oscillator out-put until a small deflection is obtained. Unless this is done the action of the A.V.C. will make it impossible to obtain correct adjustments.

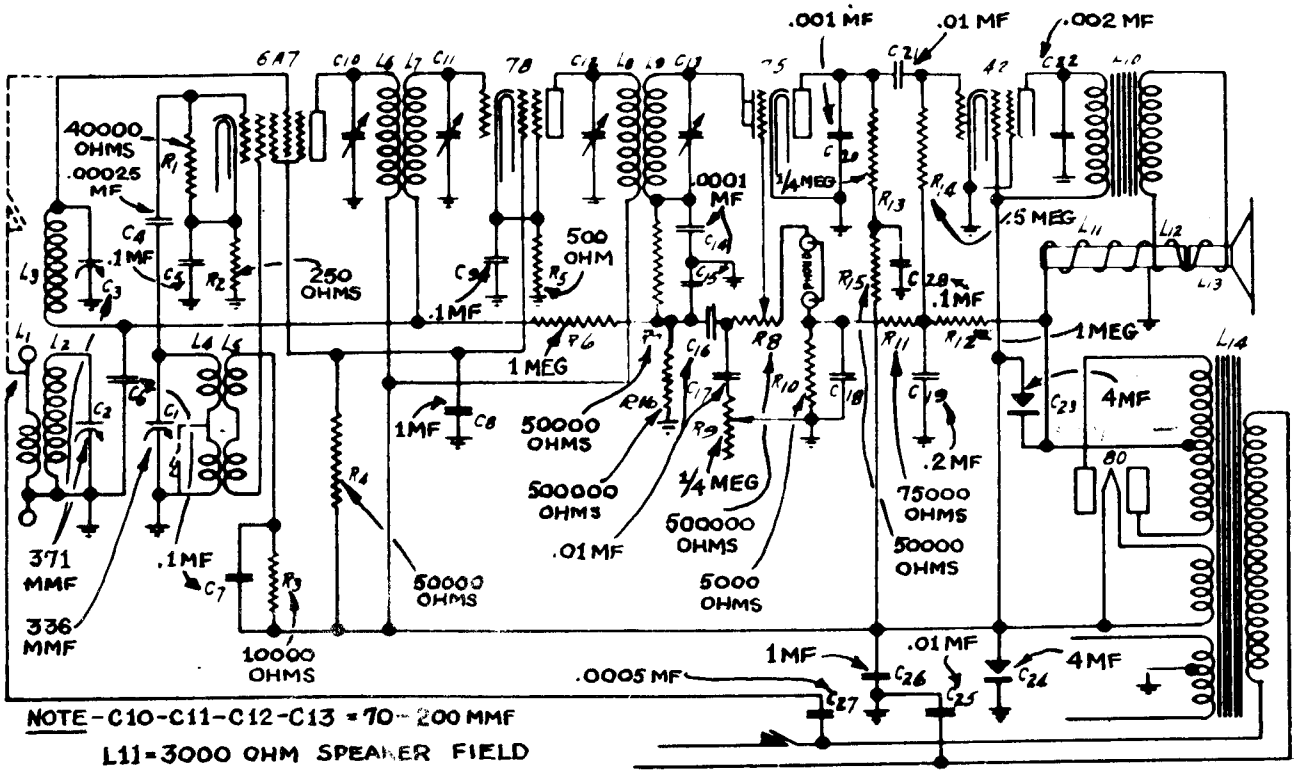
Trim in order C 4, C 5, C 6 and C 7, repeat adjustments and then follow with the R. F. adjustments.

Socket voltages -- with 6.3 volt A battery and volume control full on.

Tube Socket	Cathode to Plate	Cathode to Screen	Plate Current MA	Cathode to Ground	Heater Volts
78	180	80	4	2	6.3
77	180	80	58	4	6.3
78	180	80	4	2	6.3
75	120	--	1	2	6.3
89	180	180	20	17	6.3

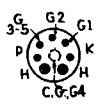
WILCOX-GAY CORP.

MODELS 3S5 & 3SA5

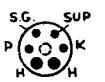


ADJUSTMENTS

There are seven adjustable condensers on this radio set. Three of these are variable condenser trimmers located at the top of the condenser. The other four tune the intermediate transformer windings and the adjusting screws are reached through openings in the transformer shields from the back of the chassis.

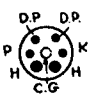


6A7



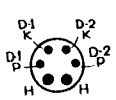
78

These condensers are carefully set at the factory and ordinarily will need no further adjustment throughout the life of the set. In any case the owner should allow no one except a highly skilled service man equipped with the necessary apparatus to make an adjustment of any of these condensers.



75

42



2525

TUBE	CIRCUIT	PLATE TO GROUND	SCREEN GRID TO GROUND	CATHODE TO GROUND
6A7	1st Detector & Oscillator	205	60	1.8
78	I.F. Amplifier	205	60	1.8
75	2nd Detector	78		0
42	Power Amplifier	190	205	0
2525	Rectifier			

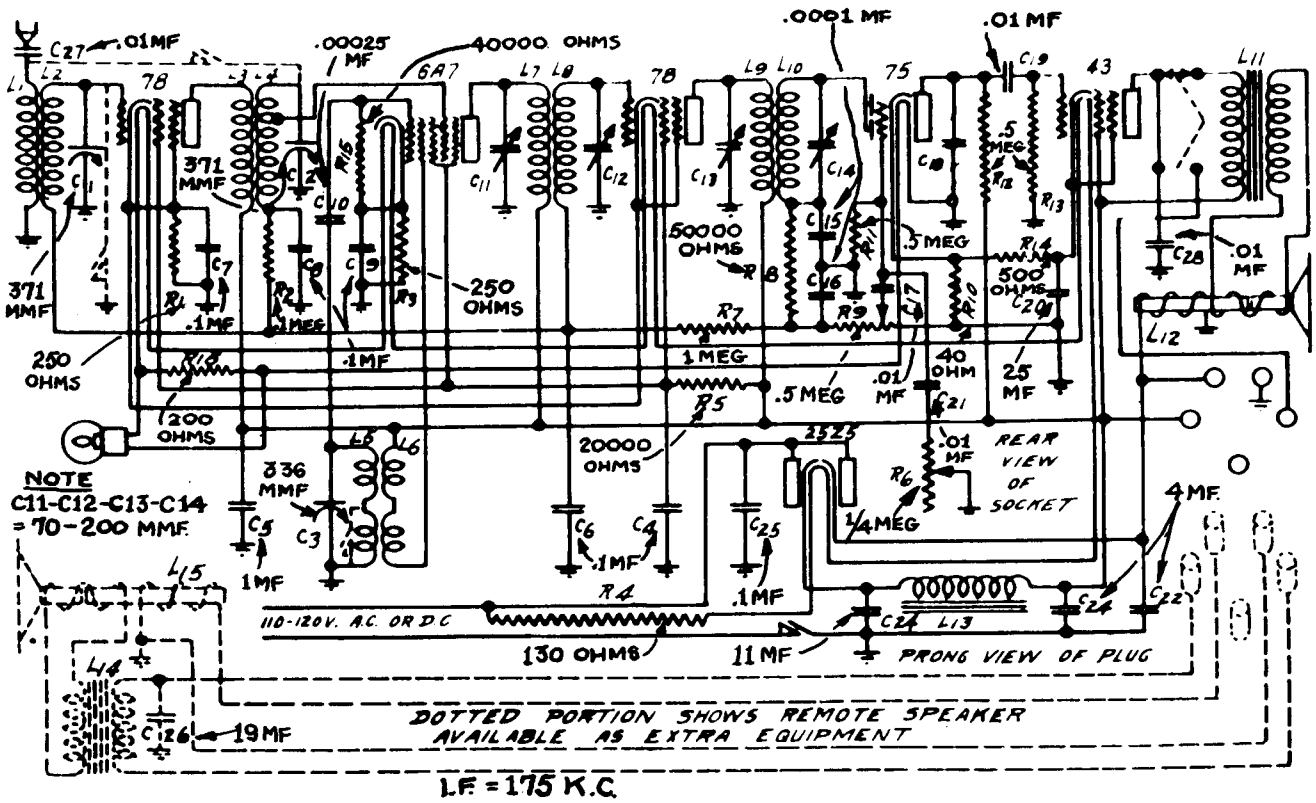
42 Grid to Cathode -- 14 V.
Speaker Field Voltage -- 160 V.

I.F. = 175 KC.

250 V. Scale -- 1000 Ohms Per Volt

WILCOX-GAY CORP.

MODELS 3T6-3TA6

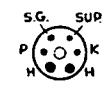


I.F. = 175 KC.

ADJUSTMENTS

There are seven adjustable condensers on this radio set. Three of these are variable condenser trimmers located at the top of the condenser. The other four tune the intermediate transformer windings and the adjusting screws are reached through openings in the transformer shields from the back of the chassis.

These condensers are carefully set at the factory and ordinarily will need no further adjustment throughout the life of the set. In any case the owner should allow no one except a highly skilled service man equipped with the necessary apparatus to make an adjustment of any of these condensers.



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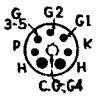
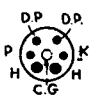


6A7



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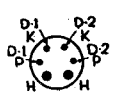
43

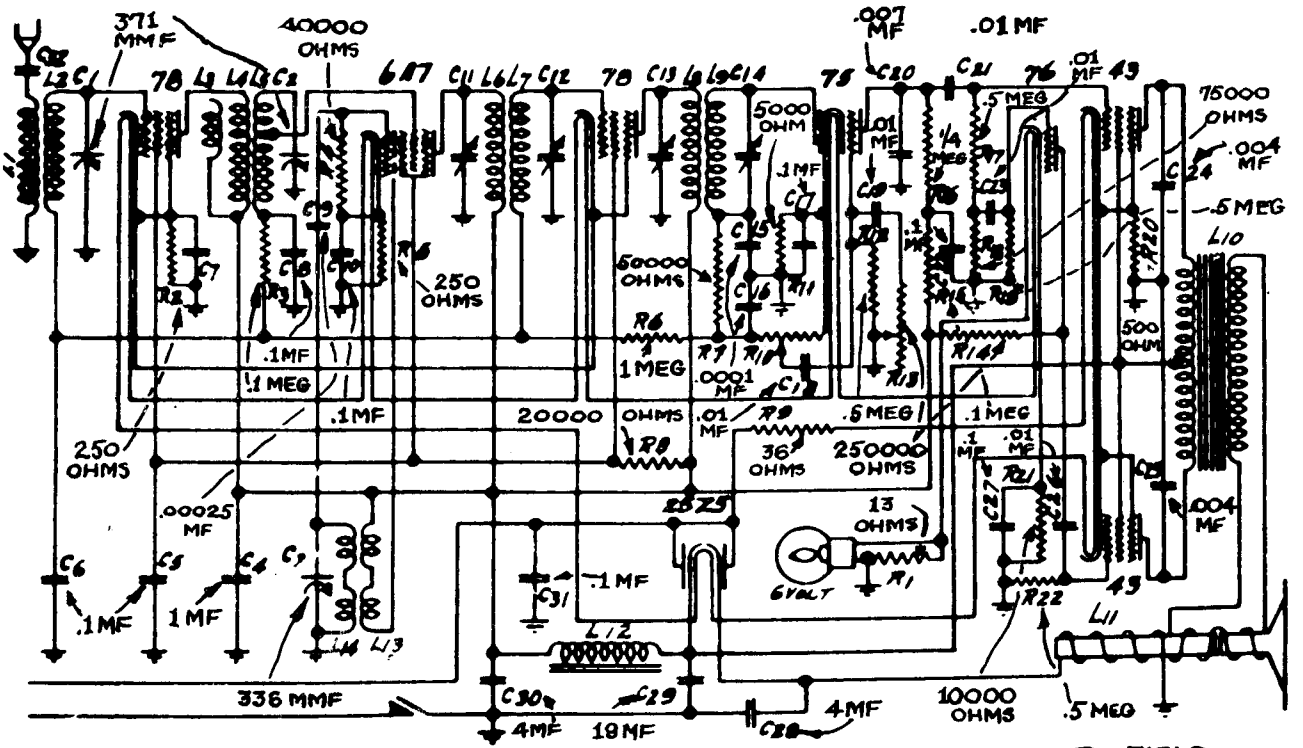


25Z5

TUBE	CIRCUIT	PLATE TO GROUND	SCREEN GRID TO GROUND	CATHODE TO GROUND	SPEAKER FIELD
78	R.F. Amplifier	110	80	1.75	115
6A7	1st Detector & Oscillator	110	80	1.25	
78	I.F. Amplifier	110	80	1.75	
75	2nd Detector	67.5		1.0	
43	Power Amplifier	105	110	15	
25Z5	Rectifier				

WILCOX-GAY CORP.

MODEL 3TB8



NOTE - C11-C12-C13-C14 = 70-200 MMF. L11 = 2500 OHM SPEAKER FIELD

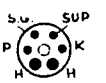
TUBE	CIRCUIT	PLATE V.	S. G. V.	CATHODE V.
78	R.F. Amp.	112	60	2.5
6A7	1st Det.-Osc.	112	60	5.0
78	I.F. Amp.	112	60	2.5
75	2nd Det.	35	-	0
76	Inverter	32	-	2
43	Power Amp.	112	120	20
43	Power Amp.	112	120	20

43 Cathode to Grid-7V.
Speaker Field-100V.

B+ -115 V.

250 V. Scale - 1000 ohms per Volt

I. F.- 175 K.C.

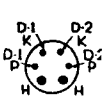


78

76

75

43



25Z5

There are seven adjustable condensers on this radio set. Three of these are variable condenser trimmers located at the top of the condenser. The other four tune the intermediate transformer windings and the adjusting screws are reached through openings in the transformer shields from the back of the chassis.

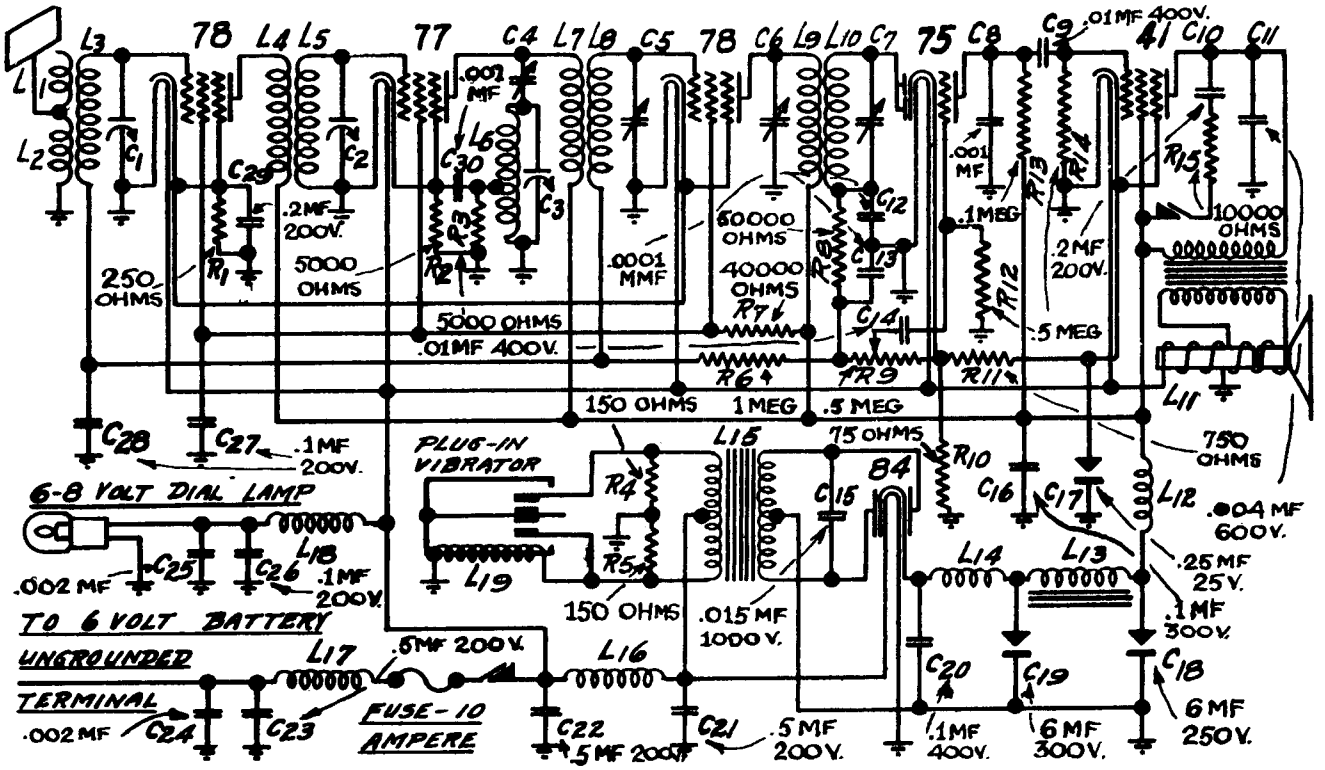
These condensers are carefully set at the factory and ordinarily will need no further adjustment throughout the life of the set. In any case the owner should allow no one except a highly skilled service man equipped with the necessary apparatus to make an adjustment of any of these condensers.

PHONOGRAPH ATTACHMENT

Phonograph jacks are provided at the rear of the chassis for use when the audio system of the receiver is desired for the amplification and reproduction of phonograph music.

WILCOX-GAY CORP.

MODEL 4B6



The first 78 is the Radio Frequency Amplifier, the 77, the First Detector and Oscillator; the second 78, the Intermediate Frequency Amplifier; the 75 the Second Detector and AVC tube; the 41, the Power Out-put tube.

77 &78 | 75 | 41 | 84

I. F. Adjustment:

The four I. F. trimming condensers are adjusted at 175 K.C.. Proceed as follows:

Procure a modulated oscillator giving a signal at 175 K.C., a non-metallic screw driver and an output meter.

Connect the oscillator output between the first detector grid and ground. Connect output meter.

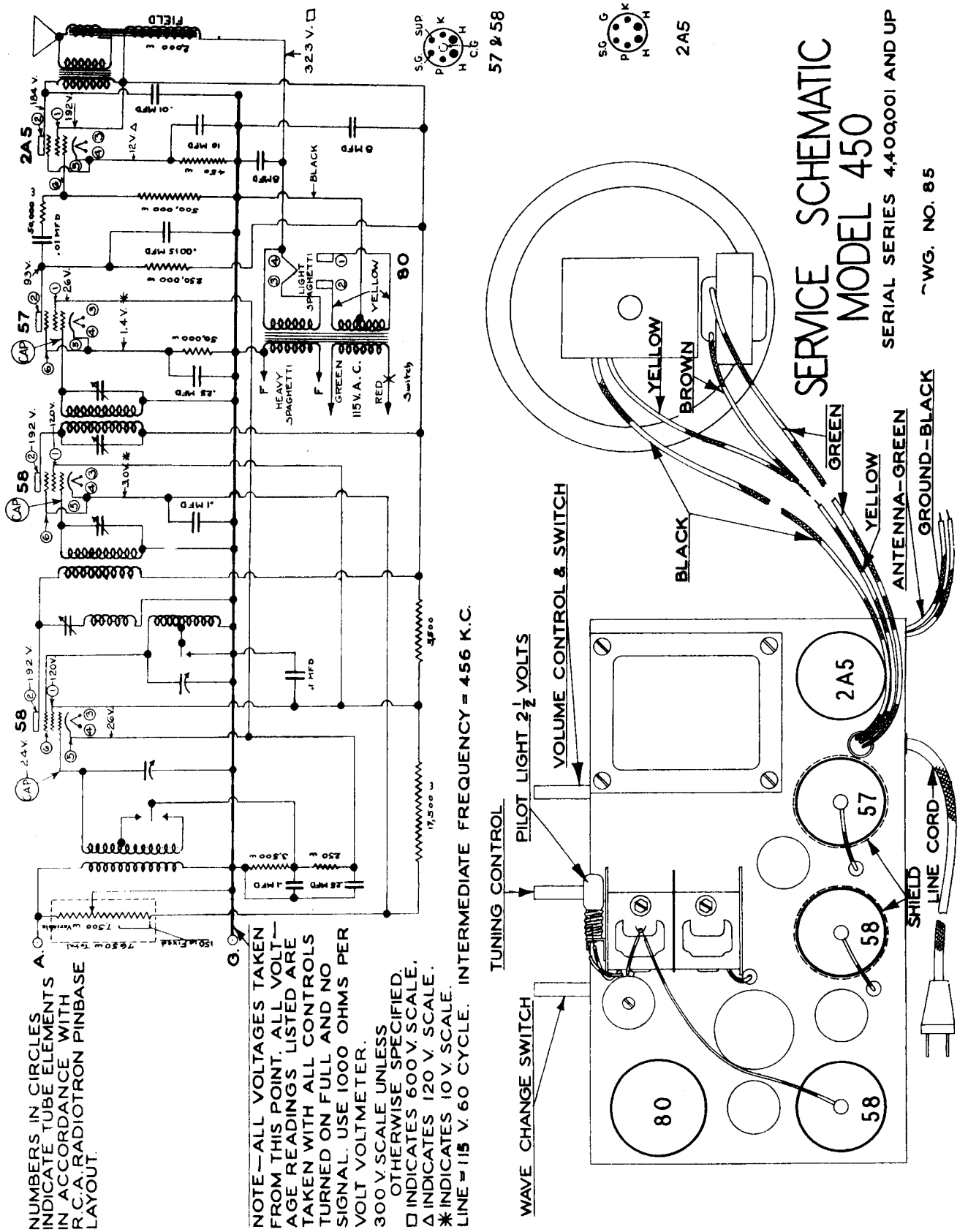
Adjust the tuning condenser so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the oscillator output until a small deflection is obtained. Unless this is done the action of the AVC will make it impossible to obtain correct adjustments.

Trim in order C 4, C 5, C 6 and C 7, repeat adjustments and then follow with the R. F. adjustments.

Tube Socket	Cathode to Plate	Cathode to Screen	Cathode to Ground	Plate Current MA	Heater Volts
78	180	85	2	4	5.5
77	180	85	4	63	5.5
78	180	85	2	4	5.5
75	125	--	2	1	5.5
41	175	180	15	17	5.5

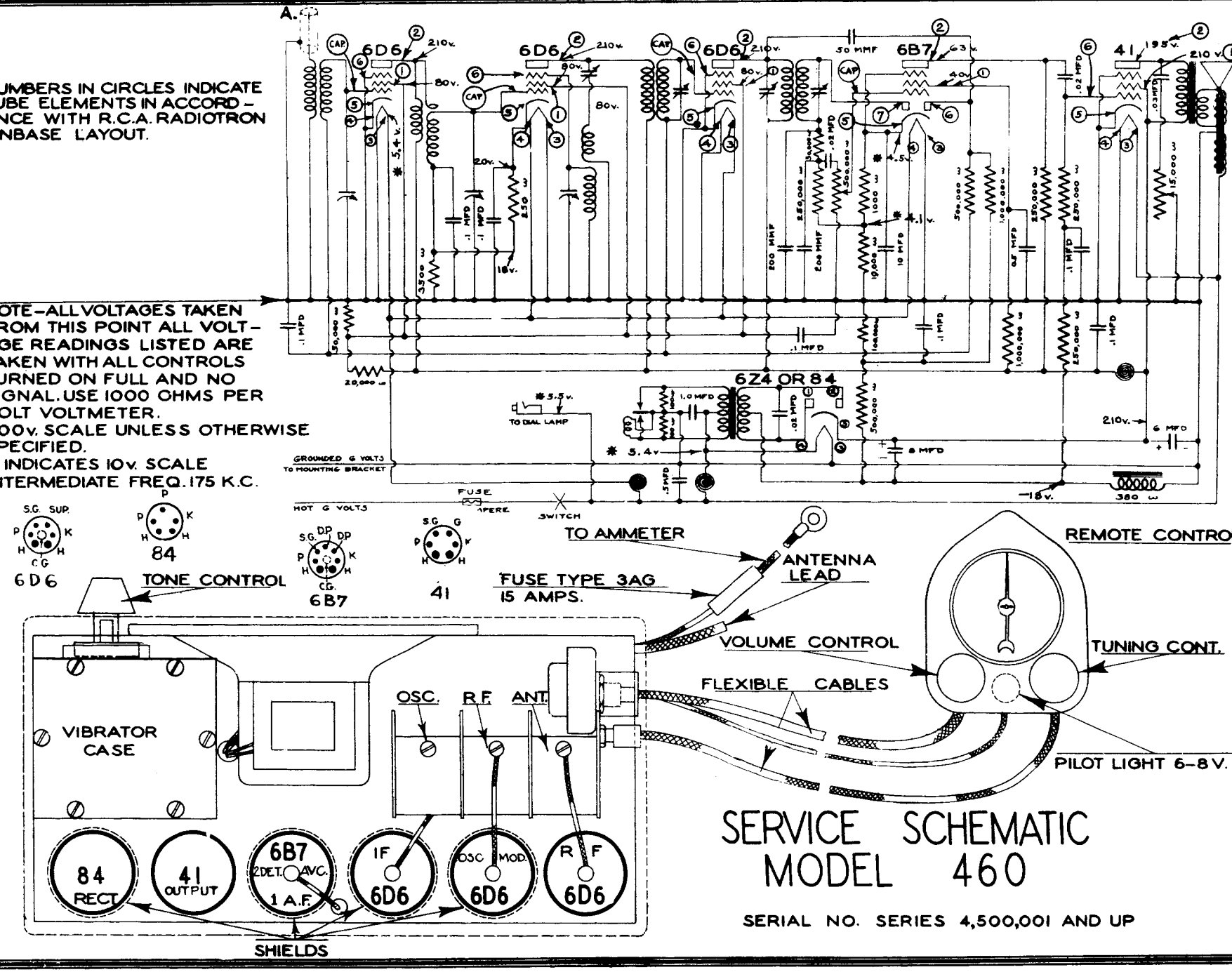
RUDOLPH WURLITZER MFG. CO.

MODEL 450



RUDOLPH WURLITZER MFG. CO.

MODEL 460

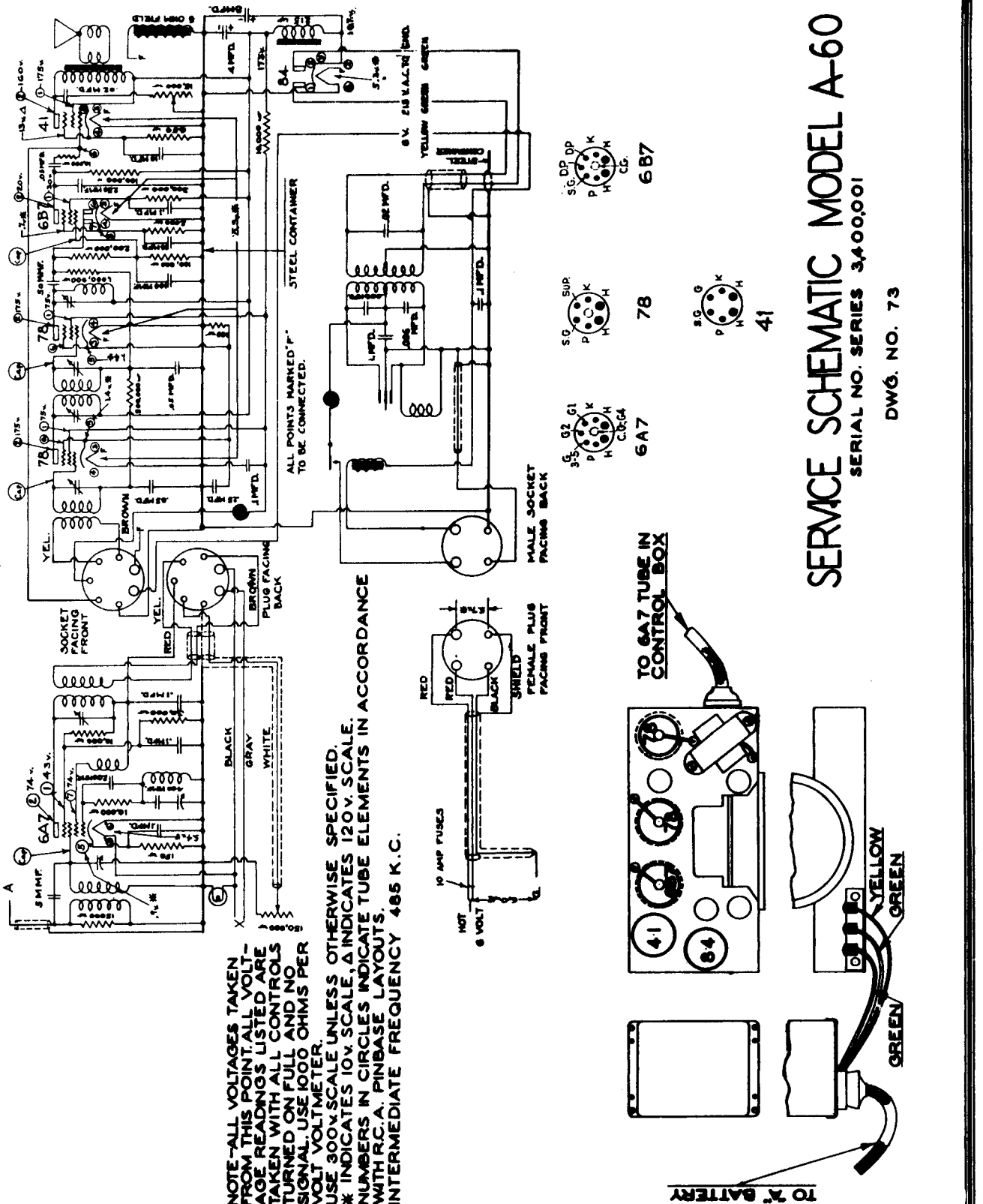


SERVICE SCHEMATIC MODEL 460

SERIAL NO. SERIES 4,500,001 AND UP

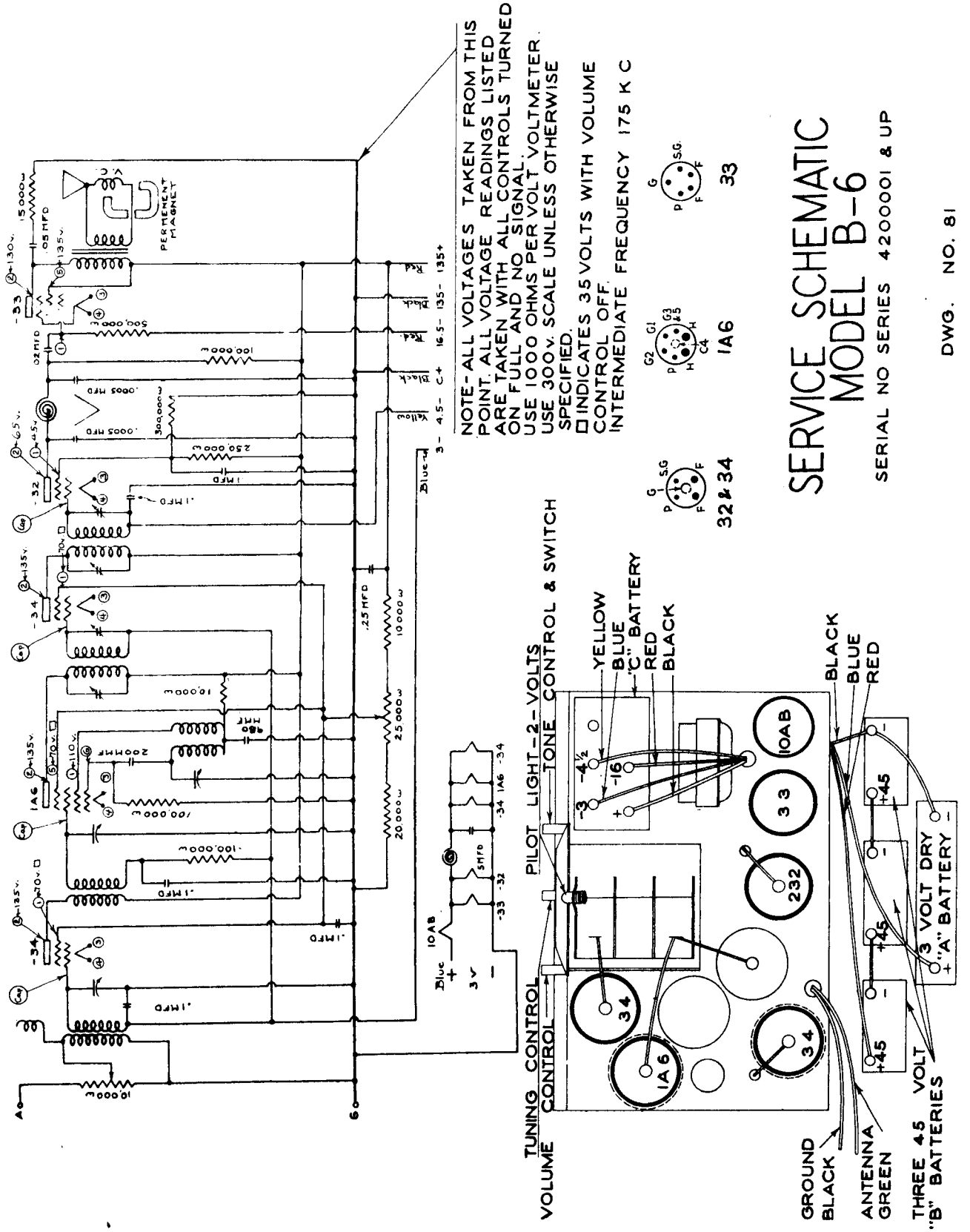
RUDOLPH WURLITZER MFG. CO.

MODEL A-60



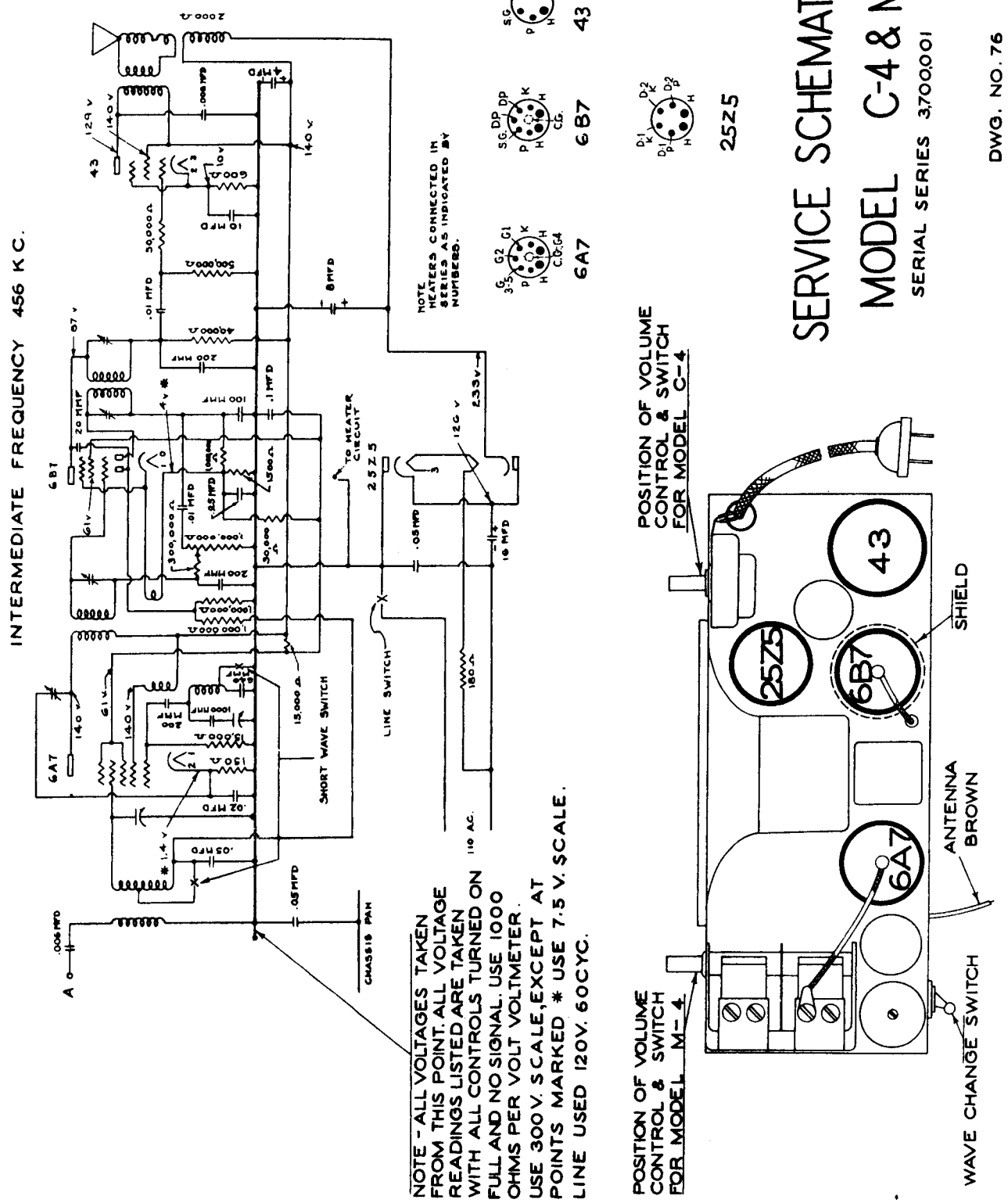
RUDOLPH WURLITZER MFG. CO.

MODEL B-6



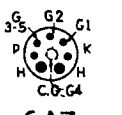
RUDOLPH WURLITZER MFG. CO.

MODEL C4 & M4

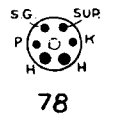


RUDOLPH WURLITZER MFG. CO.

MODEL P5



6A7



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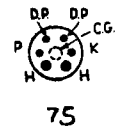

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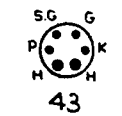


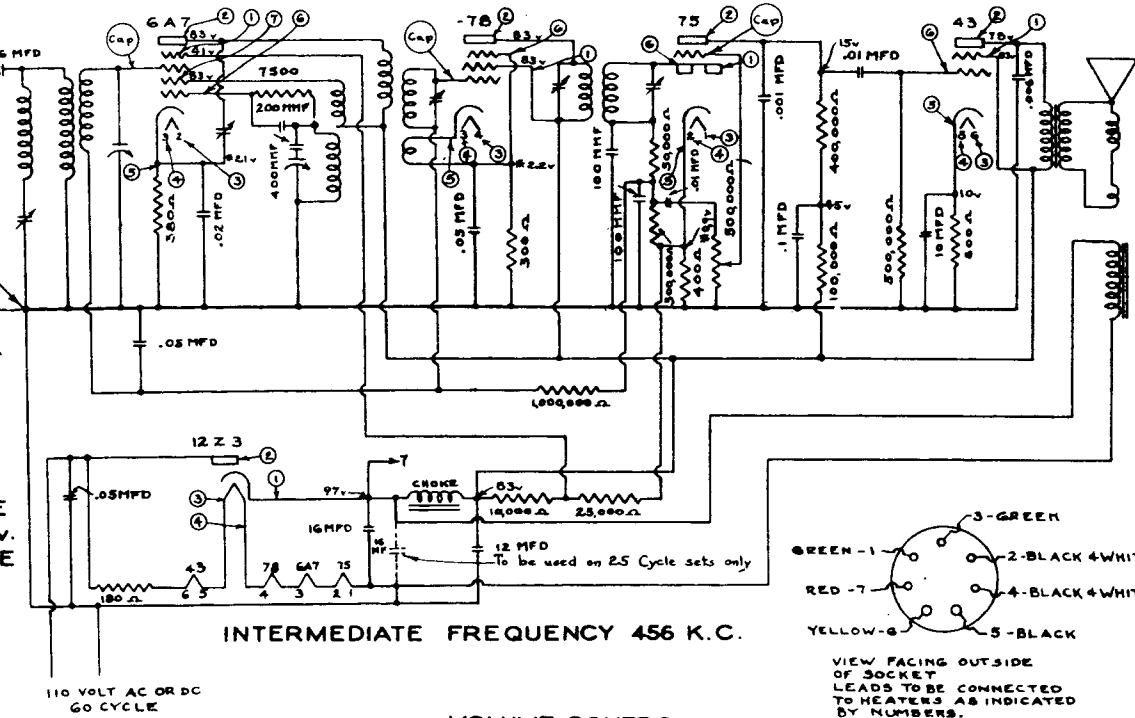
43

12Z3

Note—Numbers in circles indicate tube elements in accordance with R.C.A. Radiotron pinbase layout.

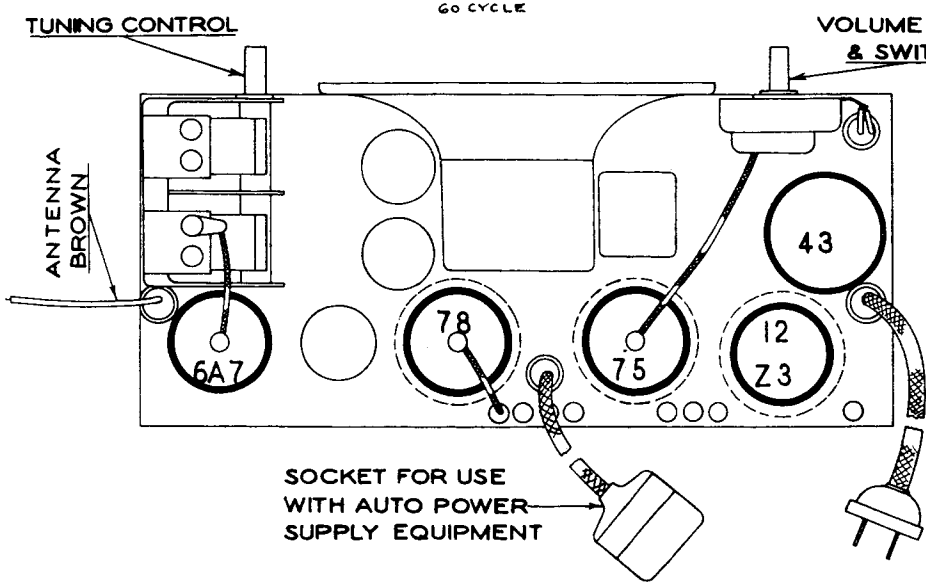
Chassis Pan

NOTE-ALL VOLTAGES TAKEN FROM THIS POINT. ALL VOLTAGE READINGS LISTED ARE TAKEN WITH ALL CONTROLS TURNED ON FULL AND NO SIGNAL. USE 1000 OHMS PER VOLT VOLTMETER.
ALL MEASUREMENTS MADE WITH 1000 ω/v. METER 120v. SCALE UNLESS OTHERWISE SPECIFIED.
LINE VOLTAGE = 115v.
* INDICATES 10v. SCALE



INTERMEDIATE FREQUENCY 456 K.C.

VIEW FACING OUTSIDE OF SOCKET. LEADS TO BE CONNECTED TO HEATERS AS INDICATED BY NUMBERS.



IMPORTANT

WHEN USING D.C. IF SET DOES NOT OPERATE AFTER TUBES ARE HEATED, REVERSE PLUG TO GET PROPER POLARITY.

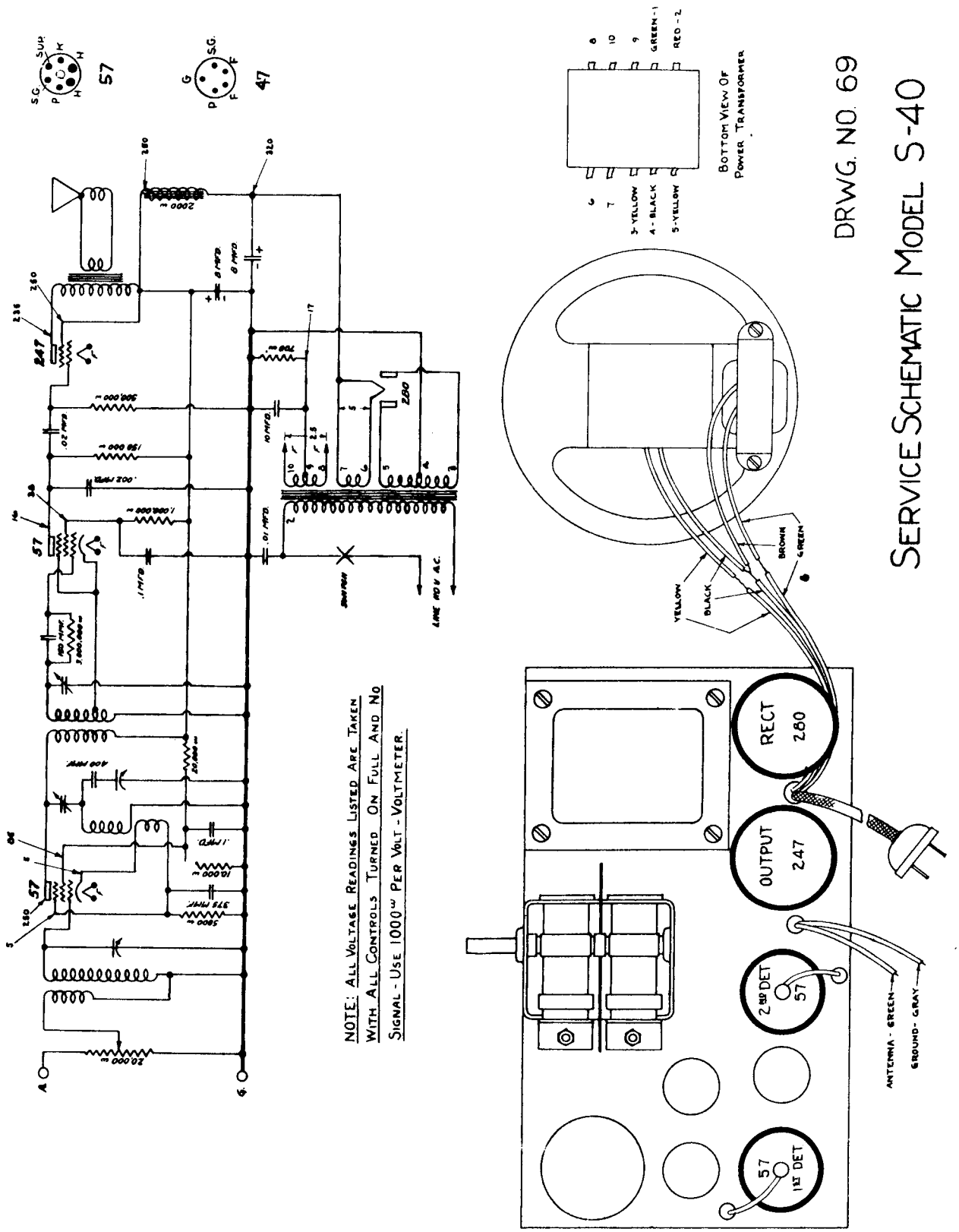
SERVICE SCHEMATIC MODEL P-5

SERIAL NO. SERIES 3,900,001 & UP

DWG. NO. 78

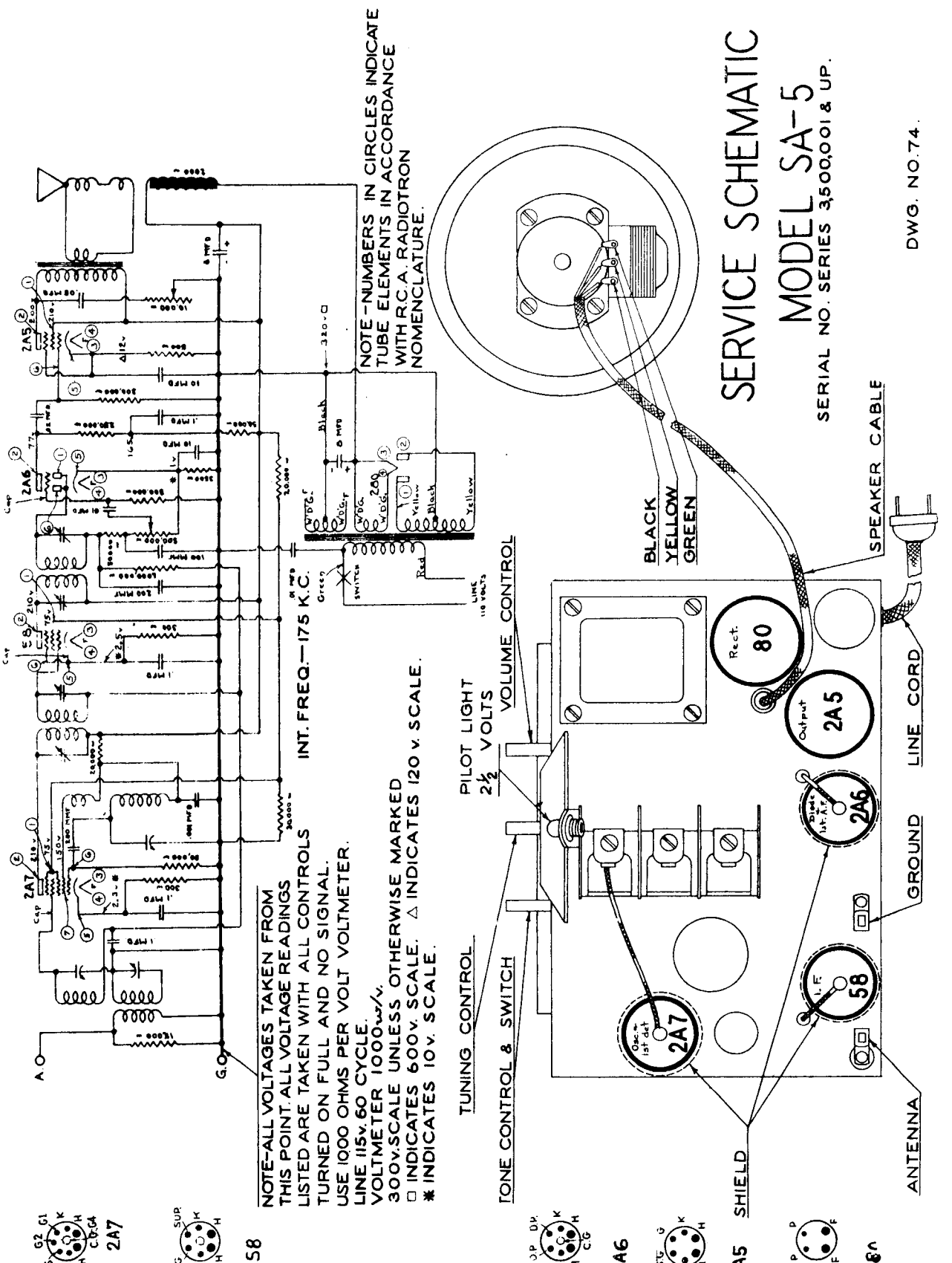
RUDOLPH WURLITZER MFG. CO.

MODEL S-40



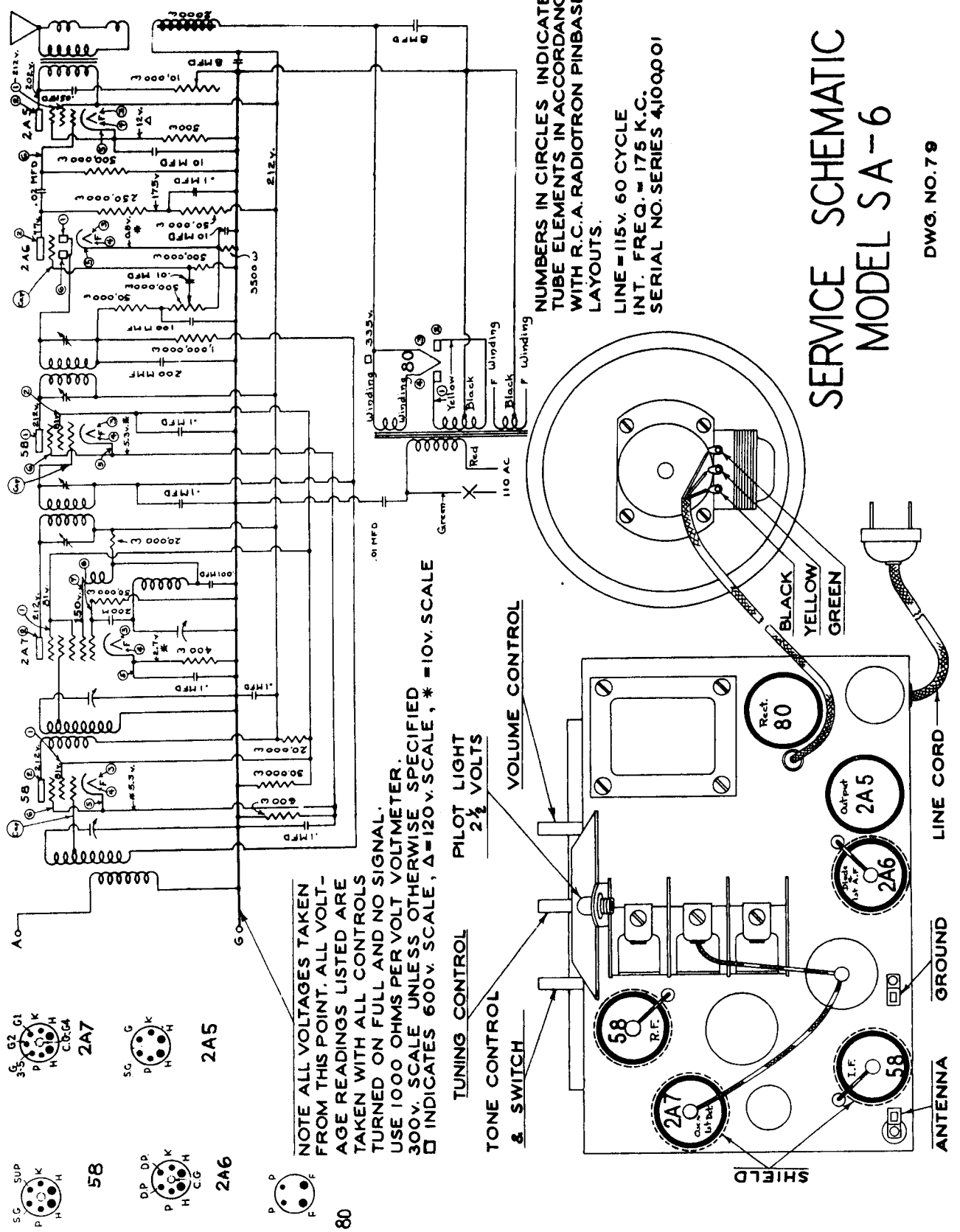
RUDOLPH WURLITZER MFG. CO.

MODEL SA-5



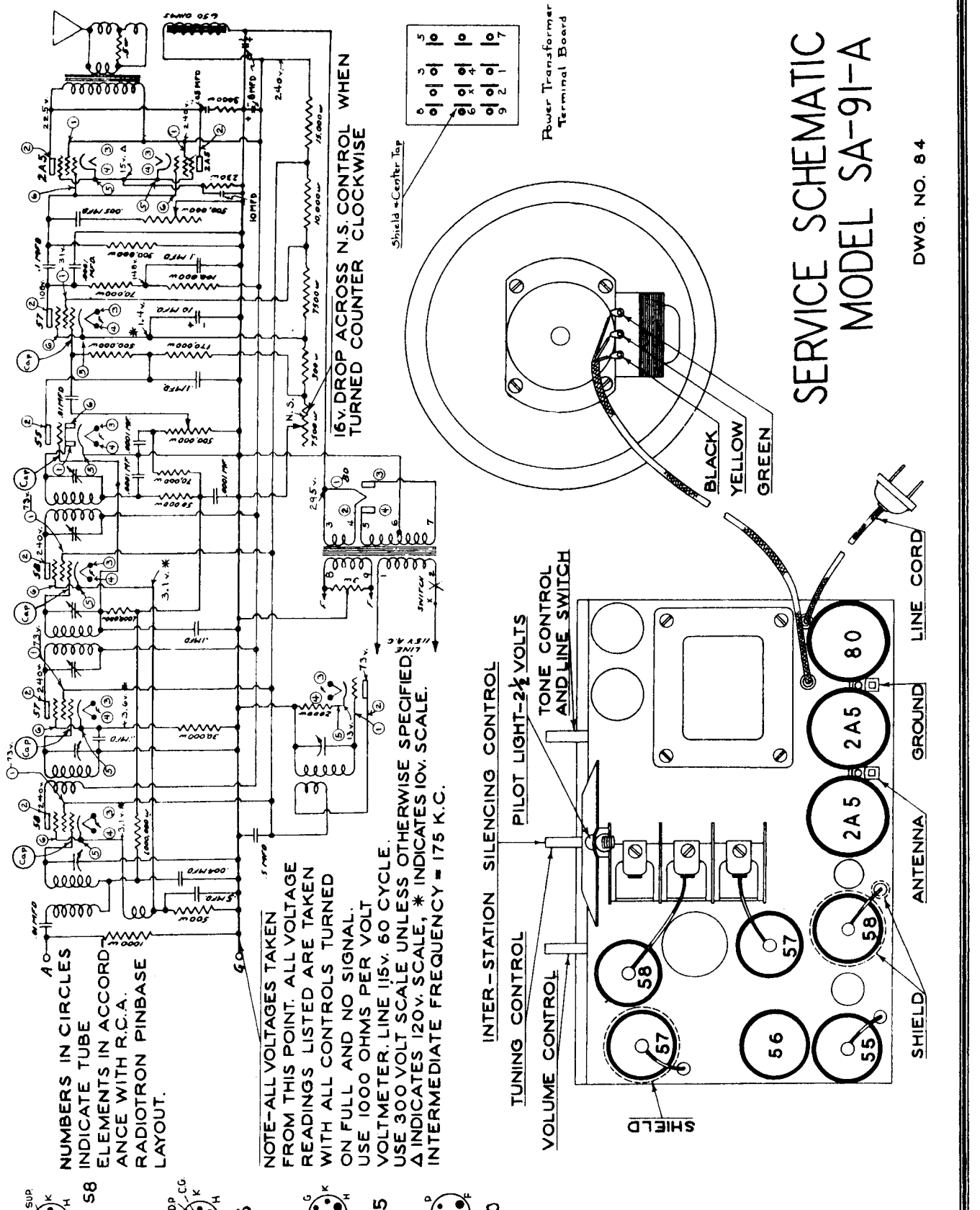
RUDOLPH WURLITZER MFG. CO.

MODEL SA-6



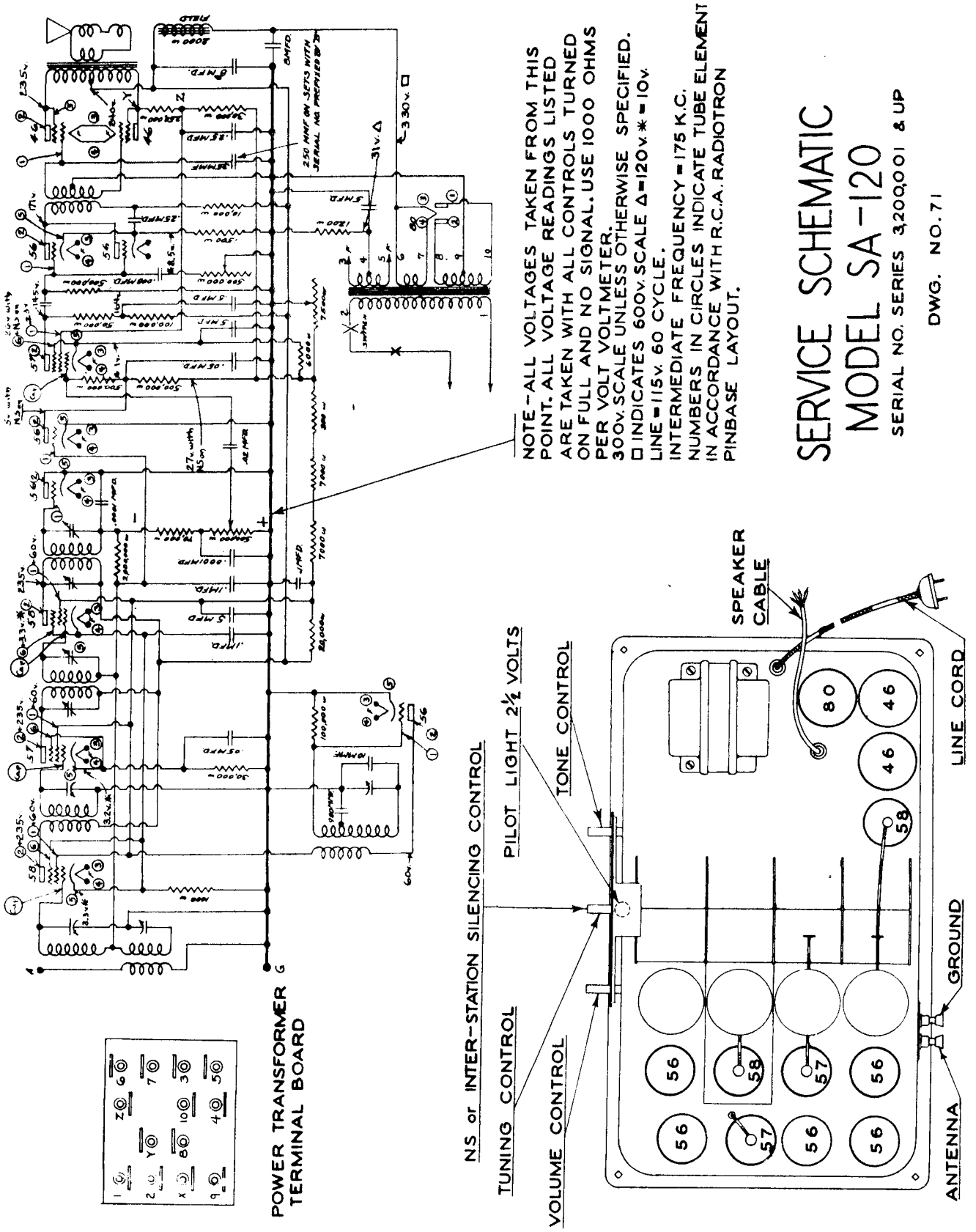
RUDOLPH WURLITZER MFG. CO.

MODEL SA-91-A



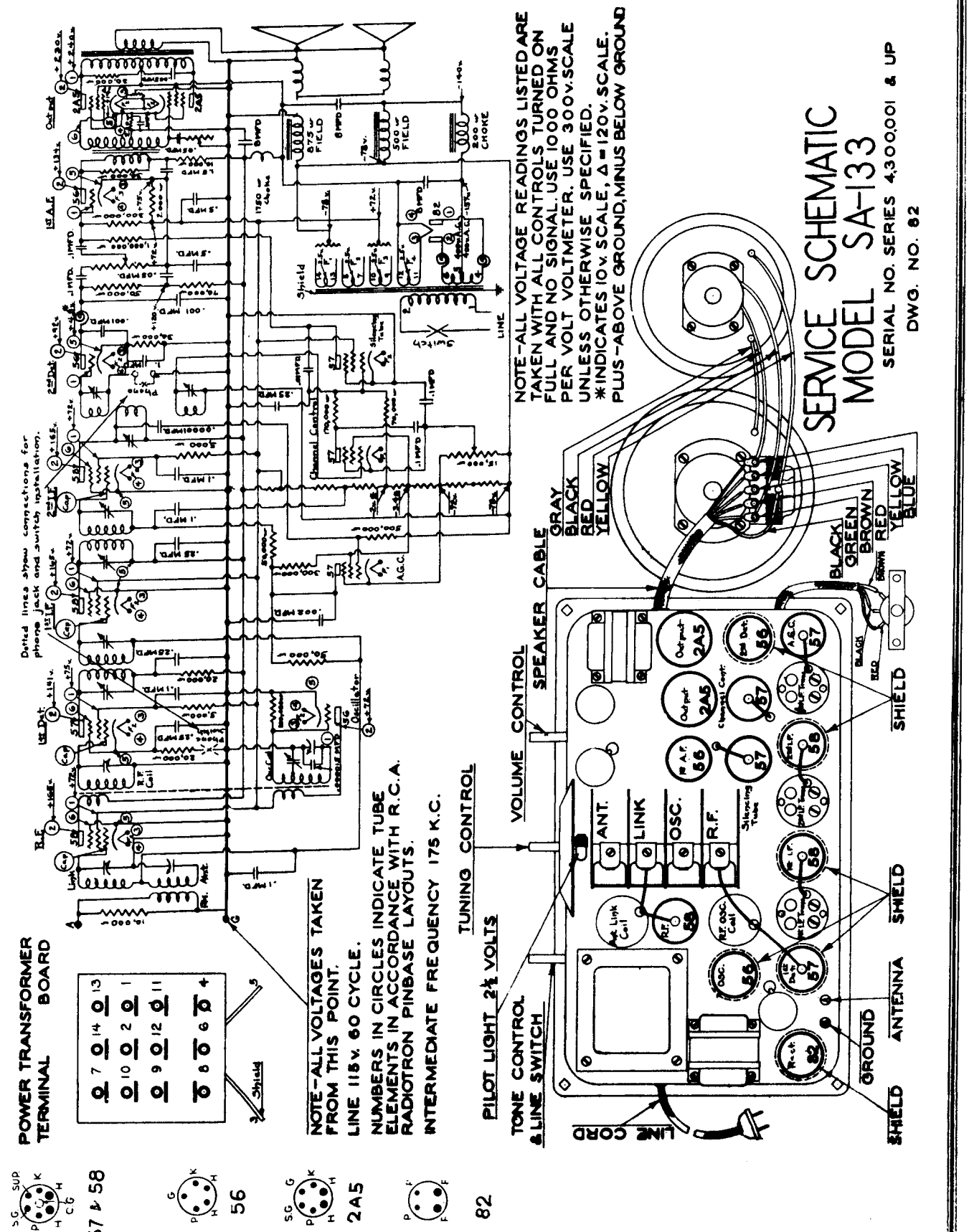
RUDOLPH WURLITZER MFG. CO.

MODEL SA-120



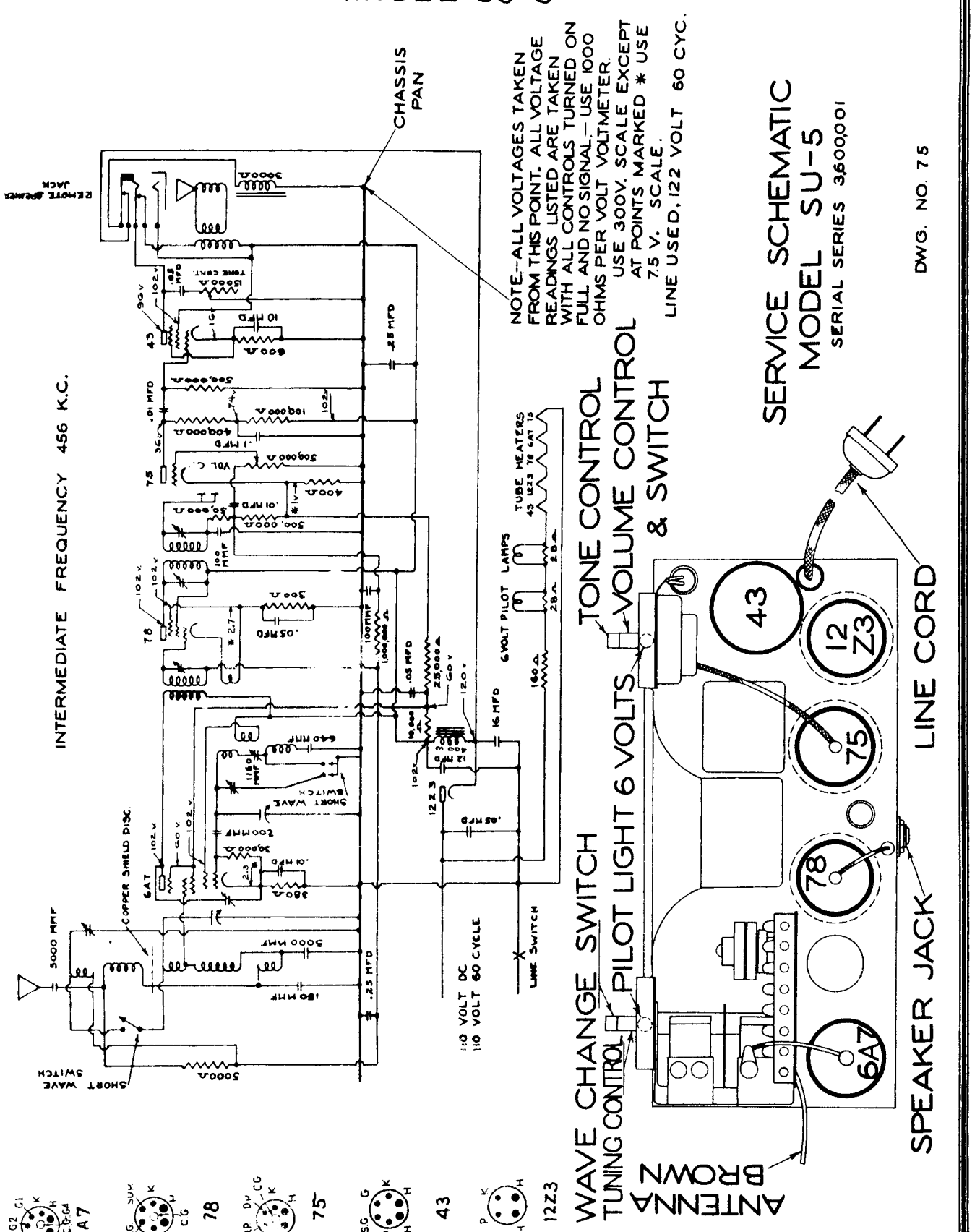
RUDOLPH WURLITZER MFG. CO.

MODEL SA-133



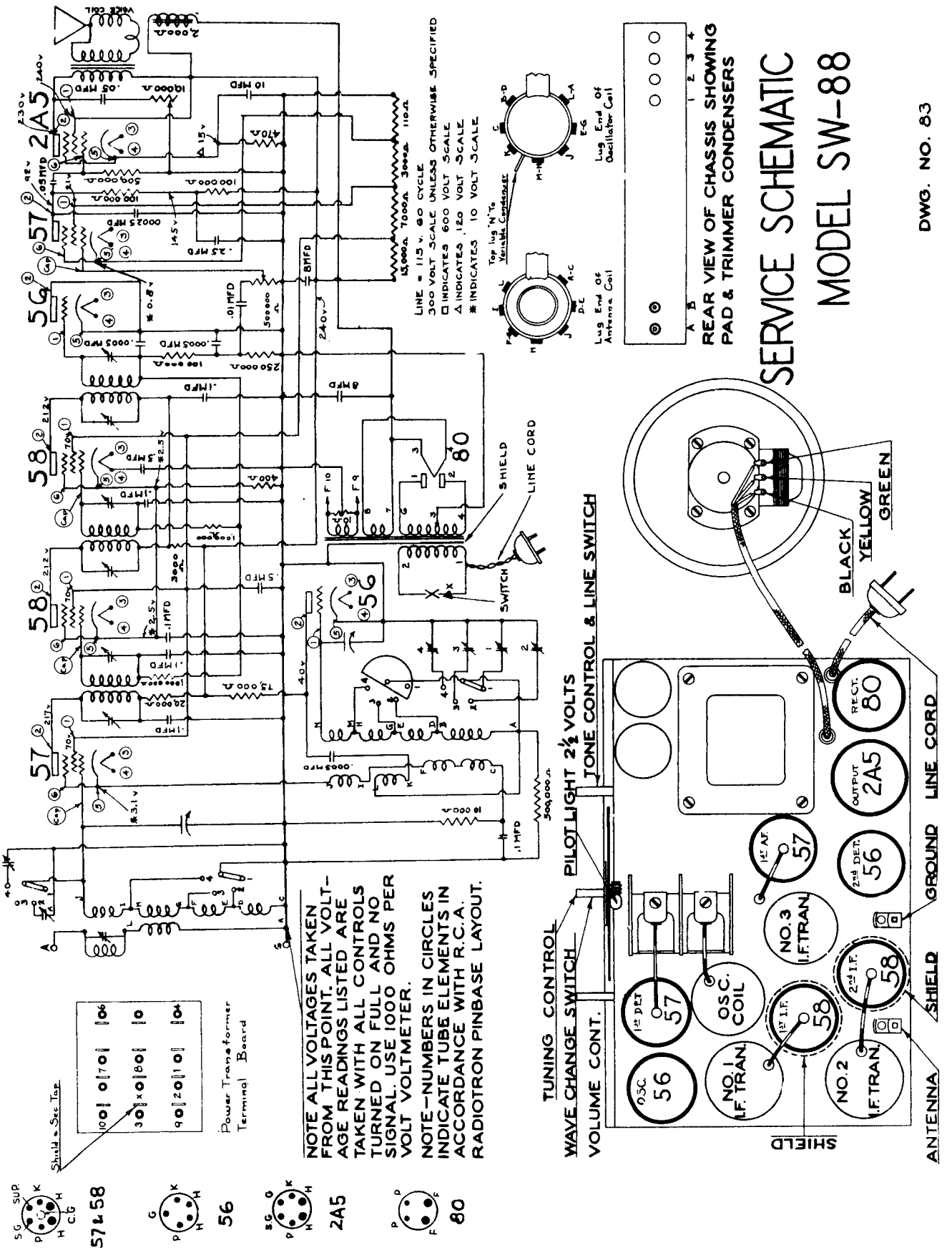
RUDOLPH WURLITZER MFG. CO.

MODEL SU-5



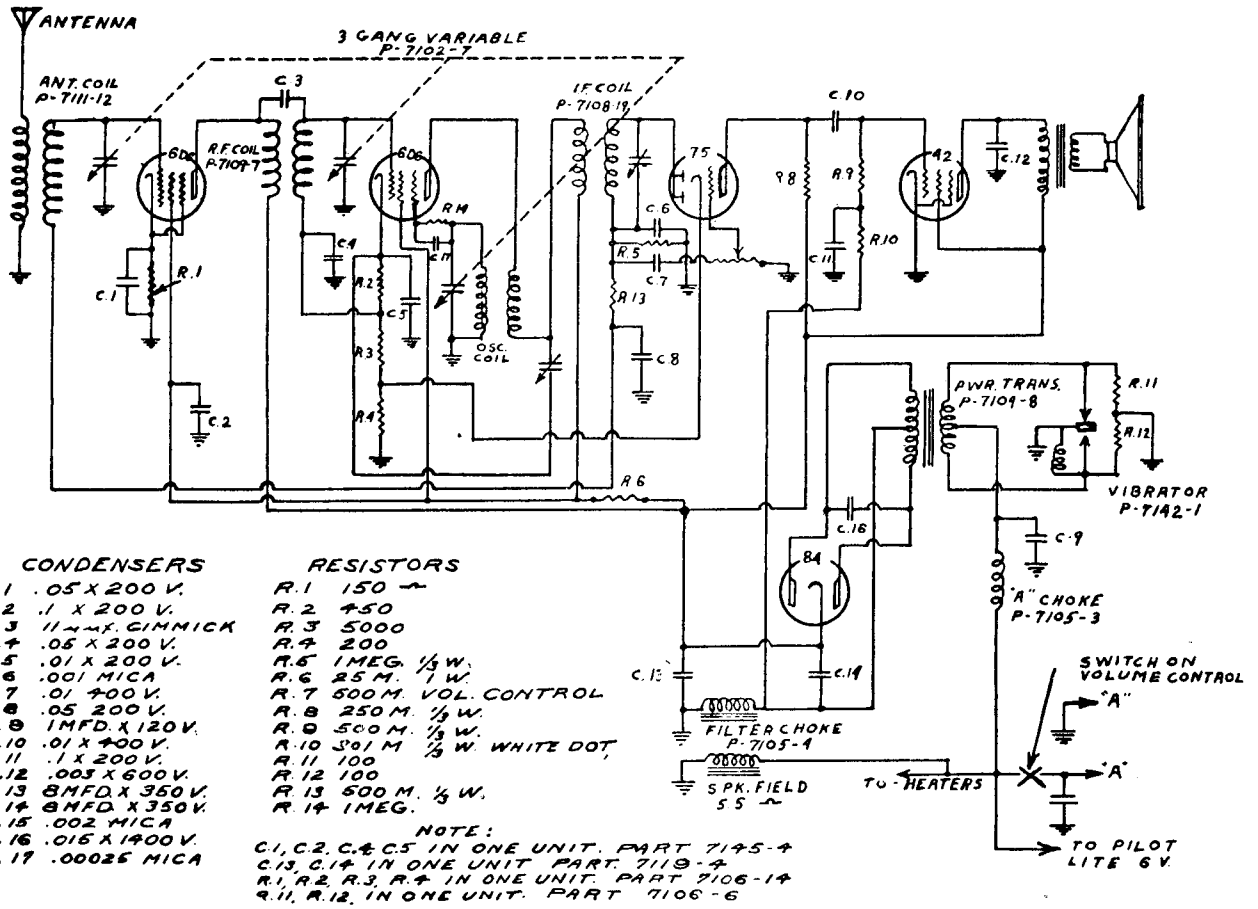
RUDOLPH WURLITZER MFG. CO.

MODEL SW-88



ZENITH RADIO CORP.

MODEL 7



CONDENSERS

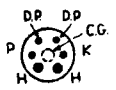
C.1	.05 X 200 V.
C.2	.1 X 200 V.
C.3	11 mmf. GIMMICK
C.4	.05 X 200 V.
C.5	.01 X 200 V.
C.6	.001 MICA
C.7	.01 400 V.
C.8	.05 200 V.
C.9	1 MFD. X 120 V.
C.10	.01 X 400 V.
C.11	.1 X 200 V.
C.12	.003 X 600 V.
C.13	8 MFD. X 350 V.
C.14	8 MFD. X 350 V.
C.15	.002 MICA
C.16	.015 X 1400 V.
C.17	.00025 MICA

RESISTORS

R.1	150 ~
R.2	450
R.3	5000
R.4	200
R.5	1 MEG. 1/3 W.
R.6	25 M. 1 W.
R.7	500 M. VOL. CONTROL
R.8	250 M. 1/3 W.
R.9	500 M. 1/3 W.
R.10	501 M 1/3 W. WHITE DOT
R.11	100
R.12	100
R.13	500 M. 1/3 W.
R.14	1 MEG.

NOTE:
C.1, C.2, C.4 C.5 IN ONE UNIT. PART 7145-4
C.13, C.14 IN ONE UNIT PART 7119-4
R.1, R.2, R.3, R.4 IN ONE UNIT. PART 7106-14
R.11, R.12, IN ONE UNIT. PART 7106-6

6D6



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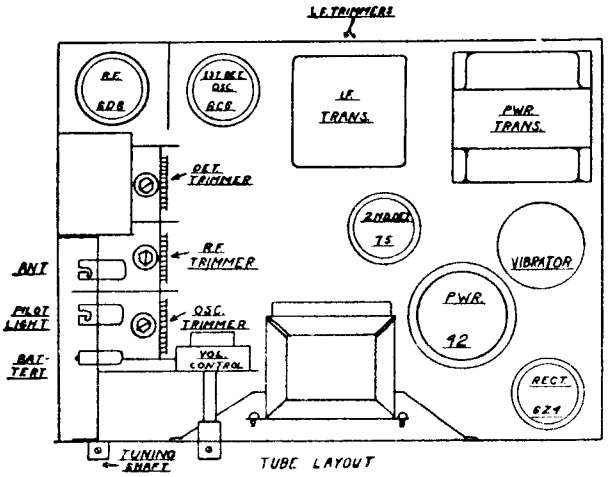
84

42



TUBE LAYOUT

I. F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.
2. Adjust trimming condensers I. F. transformer, part number 7108-19 (see top view of chassis) to resonance with oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer. Maximum deflection on the meter indicates resonance.

Note: The I. F. transformer has two trimmers, both of which are adjustable through the rear of the case.

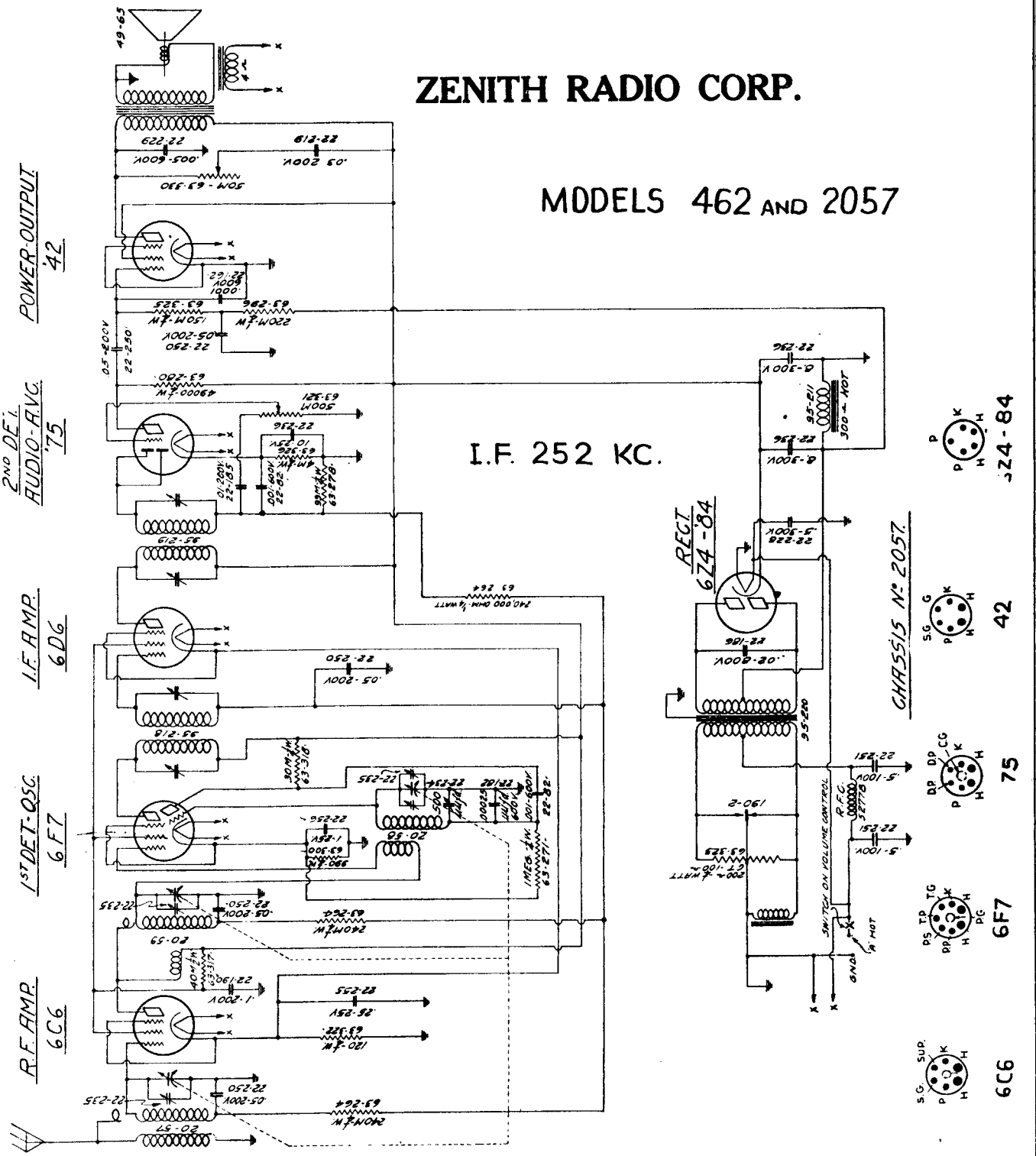
TUBE	POSITION	Ef	Ek	Eg^1	Eg^2	Eg^3	Ep
6D6	R.F.	5.9	1.5	0.	98	1.5	240
6C6	DET.-OSC.	5.9	17.	15.	98	—.5	98
75	1st AUD.	5.9	.5	0	—	—	80
42	PWR.	5.9	0	—5	240	0	220
84	RECT.	5.9	240	—	—	—	—

Ef—Filament. Ek—Cathode. Eg^1—Control Grid. Eg^2—Screen Grid. Eg^3—Suppressor Grid. Ep—Plate.

ZENITH RADIO CORP.

MODELS 462 AND 2057

I.F. 252 KC.

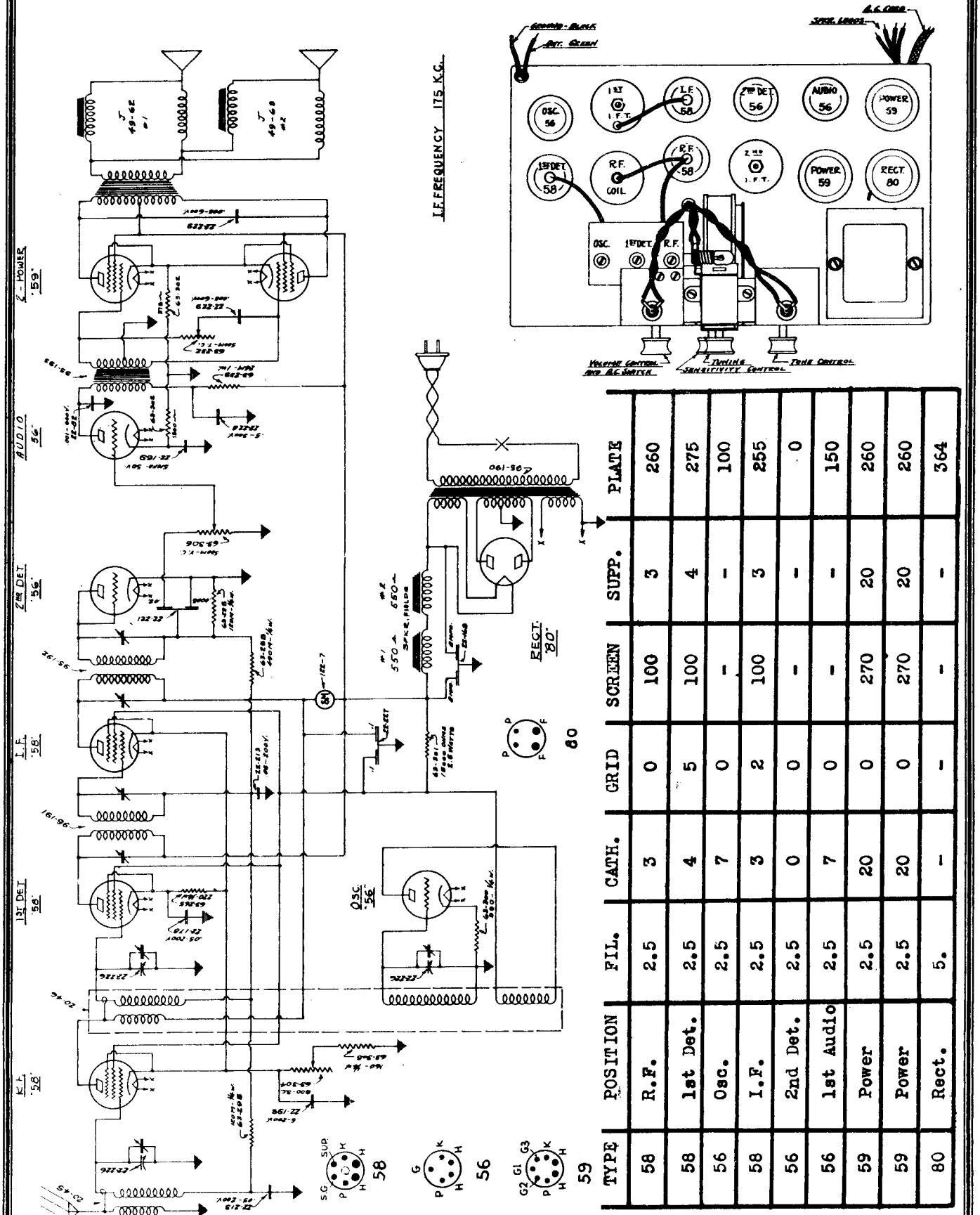


Position	Tube	Ef	Ek	Eg¹	Eg²	Eg³	Ep
R. F. Amplifier	6C6	5.6	1.5	*	1.5	72	174
1st Det.-Osc.	6F7	5.6	3.5	0	3.5	72	Det. 174 Osc. 130
1. F. Amplifier	6D6	5.6	1.5	*	1.5	72	174
2nd Det. A. V. C.	75	5.6	1.2	0	0	—	156
Power Amp.	42	5.6	0	—11.5	0	174.6	165
Rectifier	6Z4	5.6	174.6	—	—	—	—

f—Filament; k—Cathode; g¹—Control Grid; g²—Suppressor Grid; g³—Screen Grid; p—Plate; *—Depends on applied signal strength. All voltages measured from indicated points to ground. Battery voltage 6 volts.

ZENITH RADIO CORP.

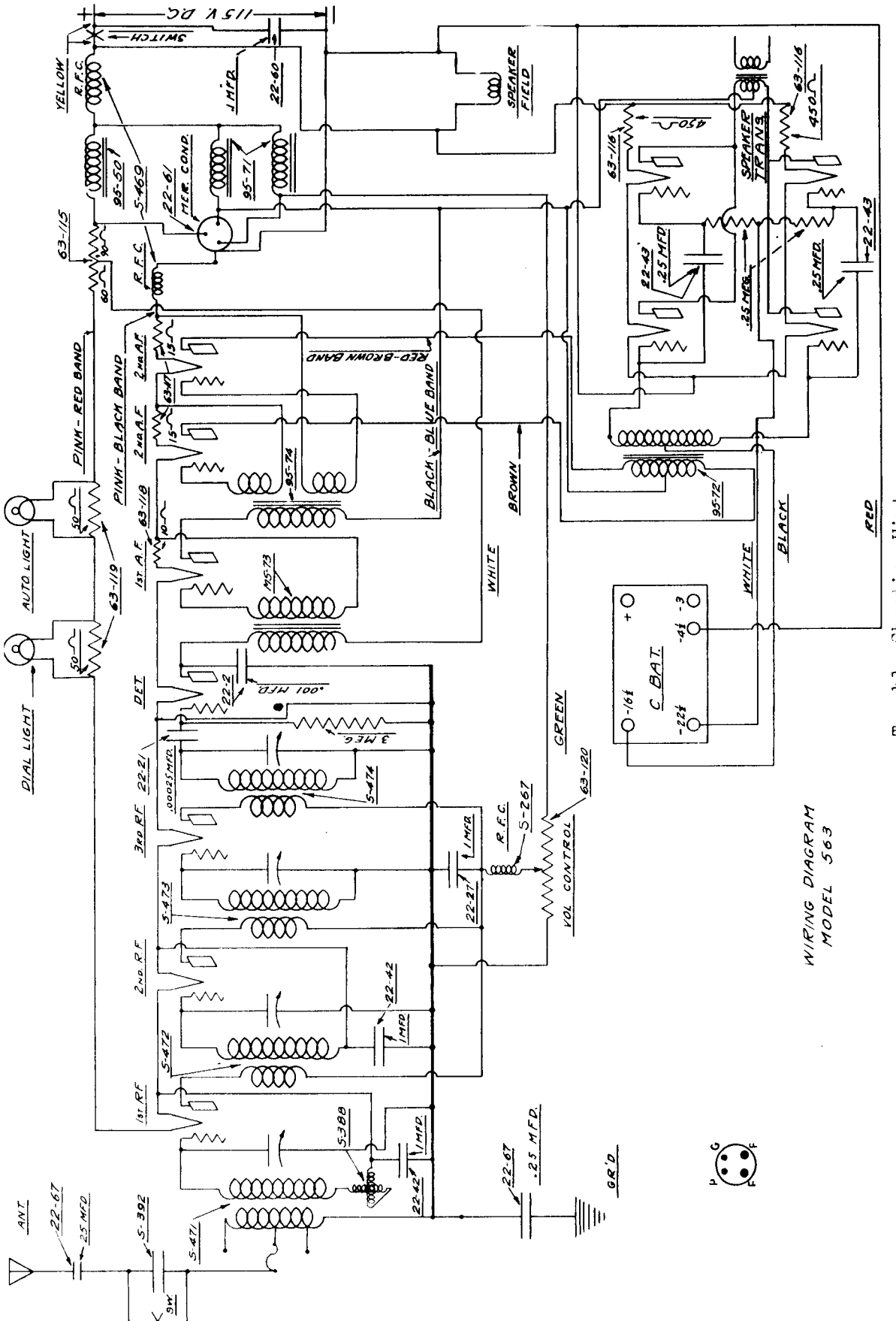
MODELS 475, 760, 765, 767, 2054 & 2054-B



TYPE	POSITION	FIL.	CATH.	GRID	SCREEN	SUPP.	PLATE
58	R.F.	2.5	3	0	100	3	260
58	1st Det.	2.5	4	5	100	4	275
56	Osc.	2.5	7	0	-	-	100
58	I.F.	2.5	3	2	100	3	255
56	2nd Det.	2.5	0	0	-	-	0
56	1st Audio	2.5	7	0	-	-	150
59	Power	2.5	20	0	270	20	260
59	Power	2.5	20	0	270	20	260
80	Rect.	5.	-	-	-	-	364

ZENITH RADIO CORP.

MODEL 563 D.C.

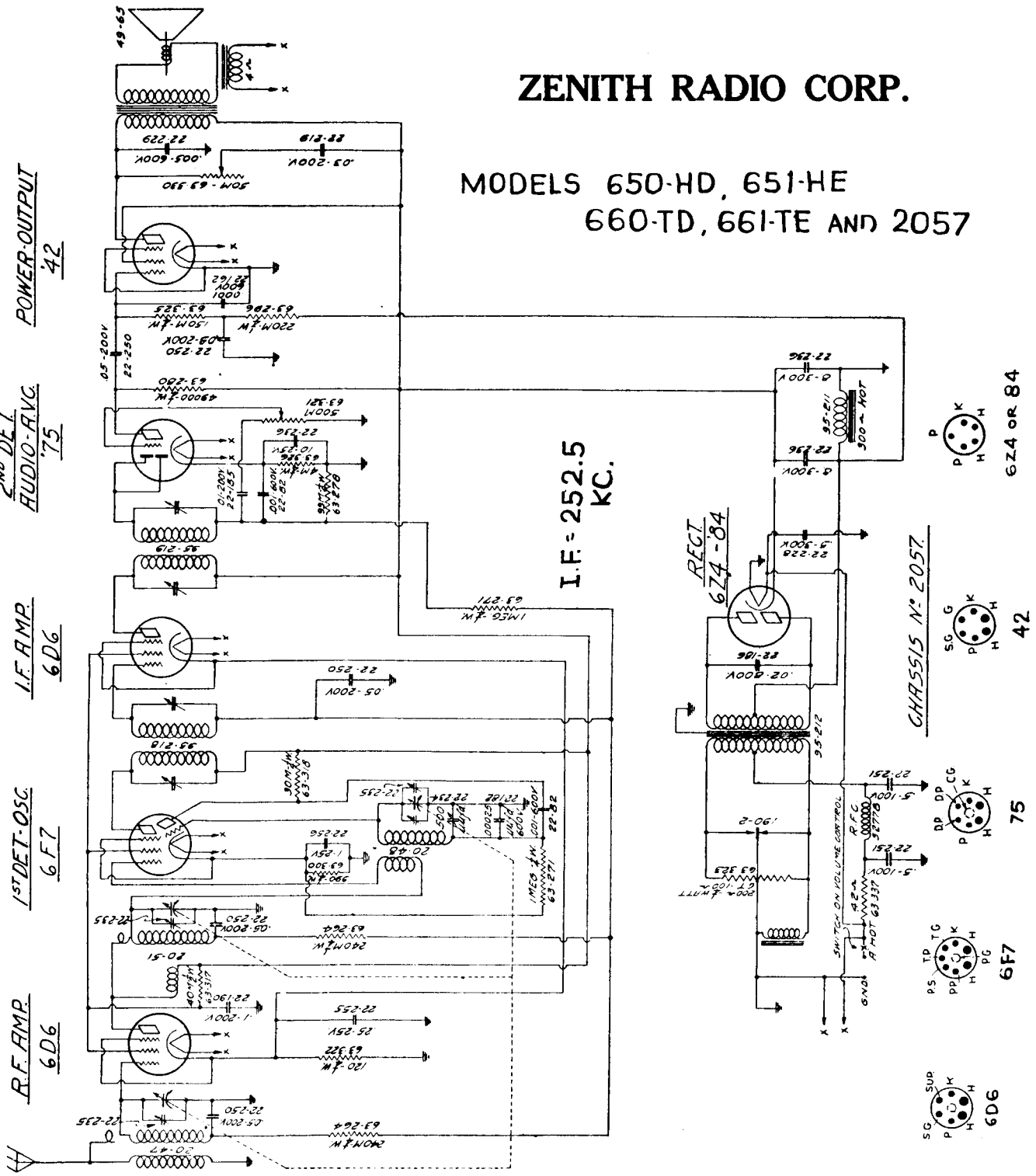


Trouble Shooting Hints

The complaint about this set is usually noisy operation of the volume control. The entire circuit including the R. F. choke and 1 mf. by-pass condenser should be checked as well as the actual potentiometer.

ZENITH RADIO CORP.

MODELS 650-HD, 651-HE 660-TD, 661-TE AND 2057

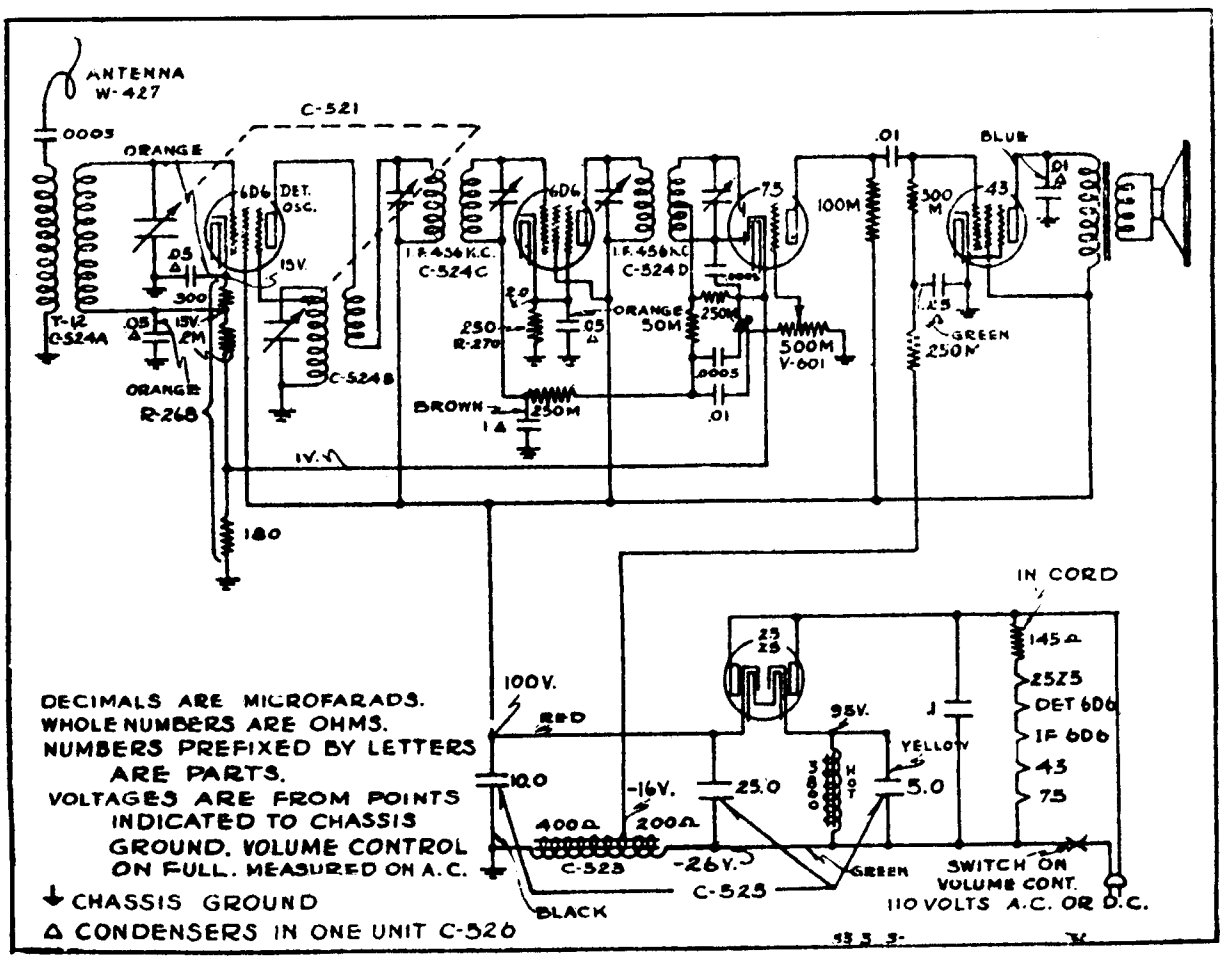


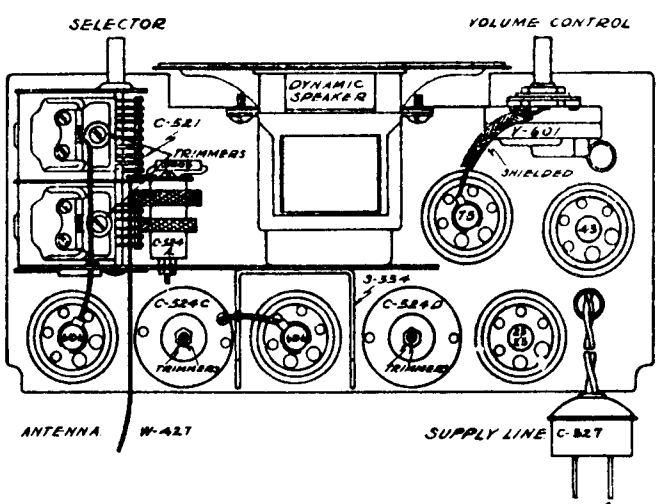
Position	Tube	Ef	Ek	Eg^1	Eg^2	Eg^3	Ep
R. F. Amplifier	6D6	5.6	1.5	*	1.5	72	174
1st Det.-Osc.	6F7	5.6	3.5	0	3.5	72	Det. 174 Osc. 130
1. F. Amplifier	6D6	5.6	1.5	*	1.5	72	174
2nd Det. A. V. C.	75	5.6	1.2	0	0	—	156
Power Amp.	42	5.6	0	—11.5	0	174.6	165
Rectifier	6Z4	5.6	174.6	—	—	—	—

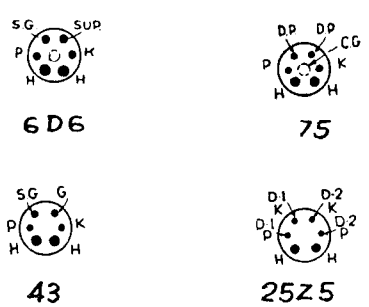
f—Filament; k—Cathode; g^1—Control Grid; g^2—Suppressor Grid; g^3—Screen Grid; p—Plate; *—Depends on applied signal strength. All voltages measured from indicated points to ground. Battery voltage 6 volts.

ZENITH RADIO CORP.

MODEL 701 A.C. - D.C.







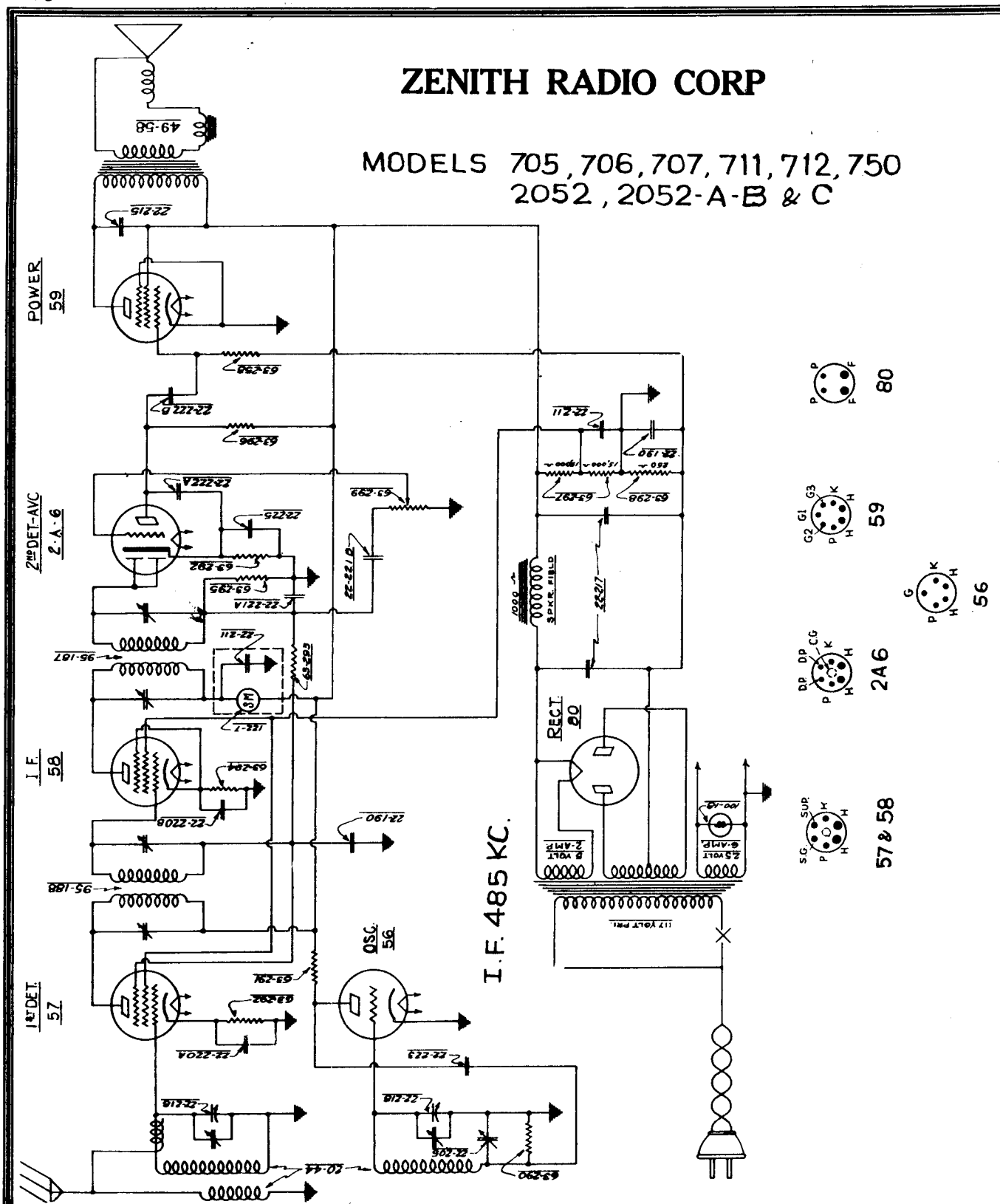
Schematic circuit diagram Model 701 AC-DC Superheterodyne, with automatic volume control

Should it be necessary, at any time, to rebalance this set the procedure is as follows: Attach a 456 kilocycle oscillator to the grid of the 6D6 tube in back of the variable condenser and adjust the trimming condensers of the I. F. transformers to maximum deflection on an output meter connected across the primary of the speaker input transformer. While adjusting these trimmers, the variable condenser should be at the maximum capacity position—at the extreme right of its rotation.

Next disconnect the antenna wire and connect an oscillator in series with a 75 mmf. condenser to the antenna coil. Rotate the condenser plates to the minimum capacity position—extreme left turn, and adjust the trimmer condenser of the rear section of the variable condenser to resonance with an oscillator set at 1725 kilocycles, then adjust the condenser of the front section of the variable condenser to resonance. Align at 1400—1200—1000—800—600—530 kilocycles, bend slotted plates of variable condenser if necessary.

ZENITH RADIO CORP

MODELS 705, 706, 707, 711, 712, 750
2052, 2052-A-B & C

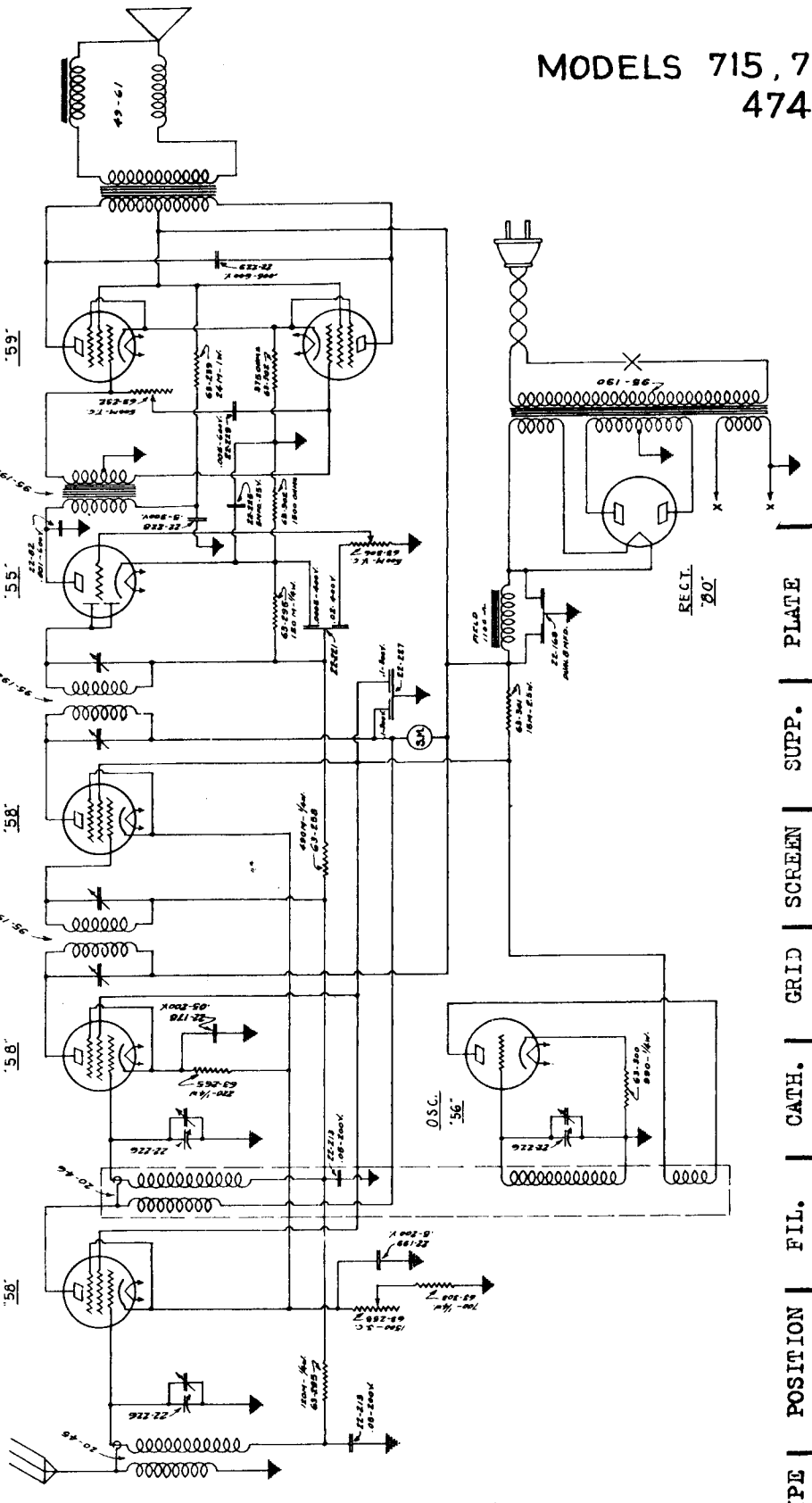


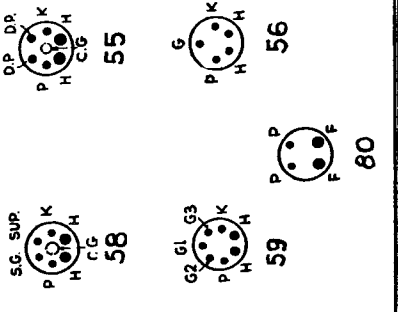
TYPE	POSITION	E_f	E_k	E_{g1}	E_{g2}	E_{g3}	E_p
57	1st Det.	2.5	+5	0	0	95	220
56	Osc.	2.5	0	-22	—	—	120
58	I.F.	2.5	+1	0	+1	95	220
2A6	2nd Det.	2.5	+1.5	0	—	—	150
59	PWR	2.5	0	-11	0	220	210
80	Rect.	5.	—	—	—	—	280

E_f - filament E_k - cathode E_{g1} - control grid E_{g2} - suppressor grid
E_{g3} - screen grid P - plate

ZENITH RADIO CORP.

MODELS 715, 755, -756 474 AND 2053-B

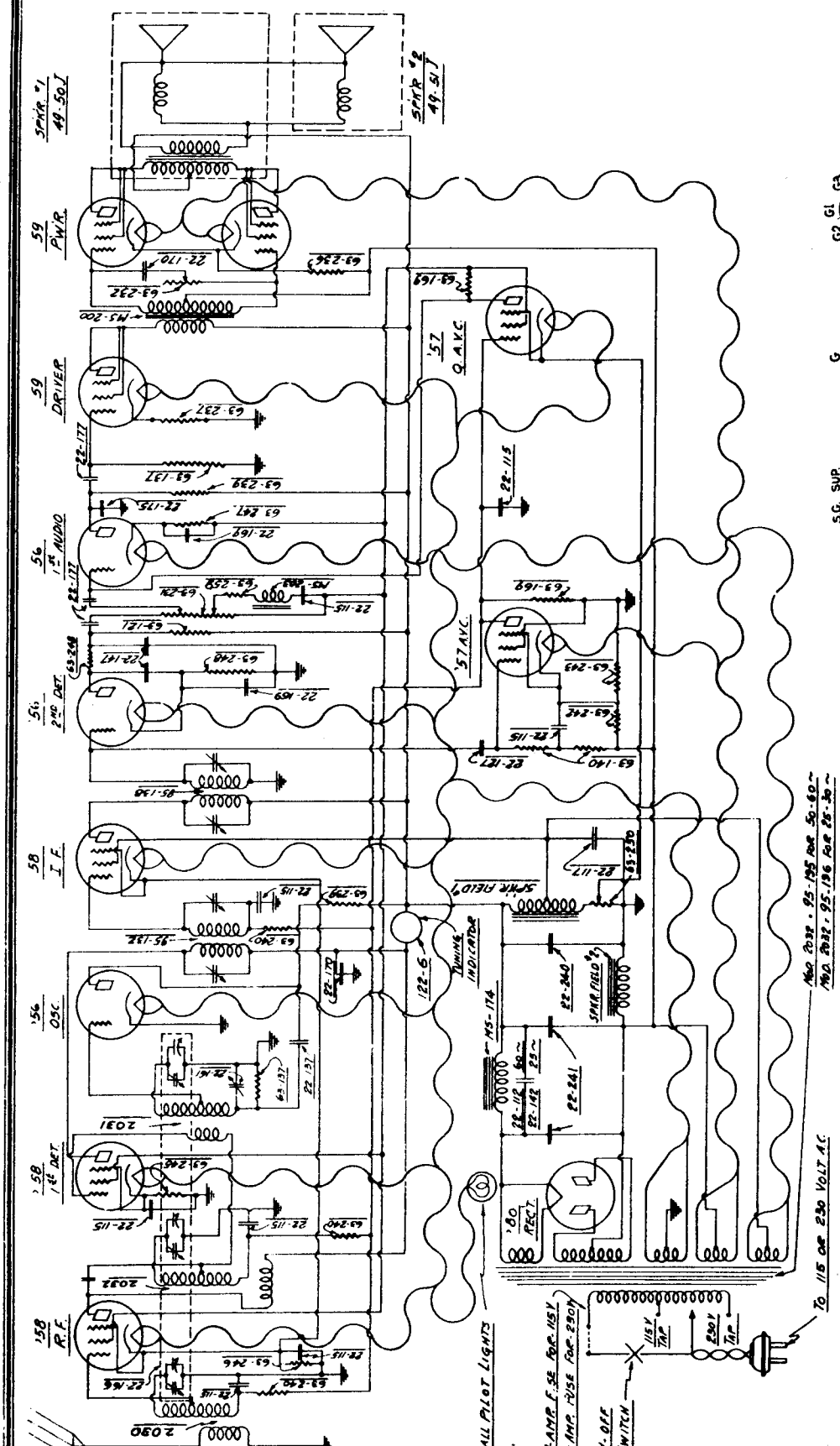


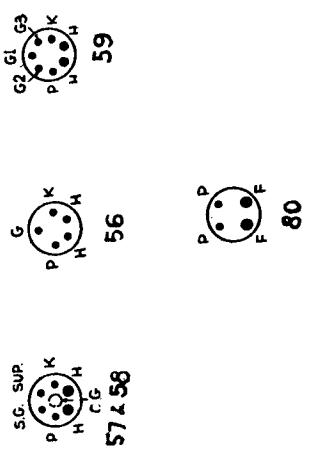


TYPE	POSITION	FIL.	CATH.	GRID	SCREEN	SUPP.	PLATE
58	R.F.	2.5	10	0	83	10	258
58	1st Det.	2.5	12	5	83	12	260
56	Osc.	2.5	8	0	--	--	80
58	I.F.	2.5	11	2	83	11	258
55	2nd Det.	2.5	8	0	--	--	126
59	Power	2.5	21	0	255	21	249
59	Power	2.5	21	0	255	21	249
80	Rect.	5.	--	-	--	--	372

ZENITH RADIO CORP.

MODELS 770, 775, 780, 476, 476A, & 2032

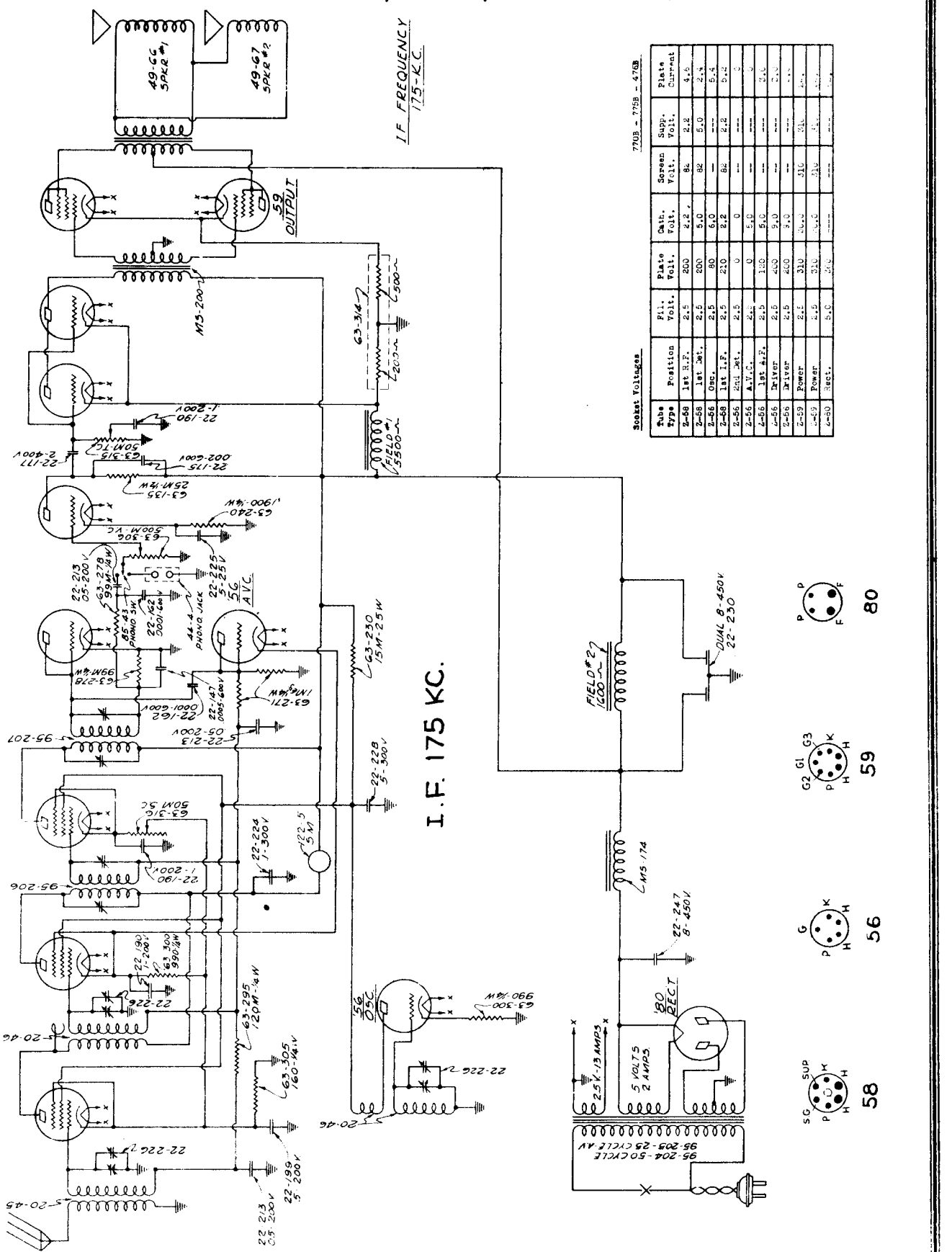




Tube Type	Position	Fil. Volt.	Plate Volt.	Cath. Volt.	Screen Volt.	Supp. Volt.	Plate Current
2-59	1st R.F.	2.5	175	2.2	75	2.2	5.7
1-58	1st Det.	2.5	190	4.5	75	4.5	2.3
1-56	Osc.	2.5	100	0	-	-	3.5
1-56	1st I.F.	2.5	200	2.2	75	2.2	5.5
1-56	2nd Det.	2.5	110	10	-	-	.3
2-56	1st Audio	2.5	170	80	-	-	.8
1-57	A.V.C.	2.5	-	-85	-	-85	.8
2-57	Q.A.V.C.	2.5	30	13	75	13	-
2-59	Driver	2.5	190	20	190	190	13
1-58	Power	2.5	195	-70	195	195	22
1-80	Power	2.5	195	-70	195	195	82
[illegible]	[illegible]	[illegible]	360	-	-	-	64

ZENITH RADIO CORP.

MODELS 770-B, 775-B, 476-B & 2059



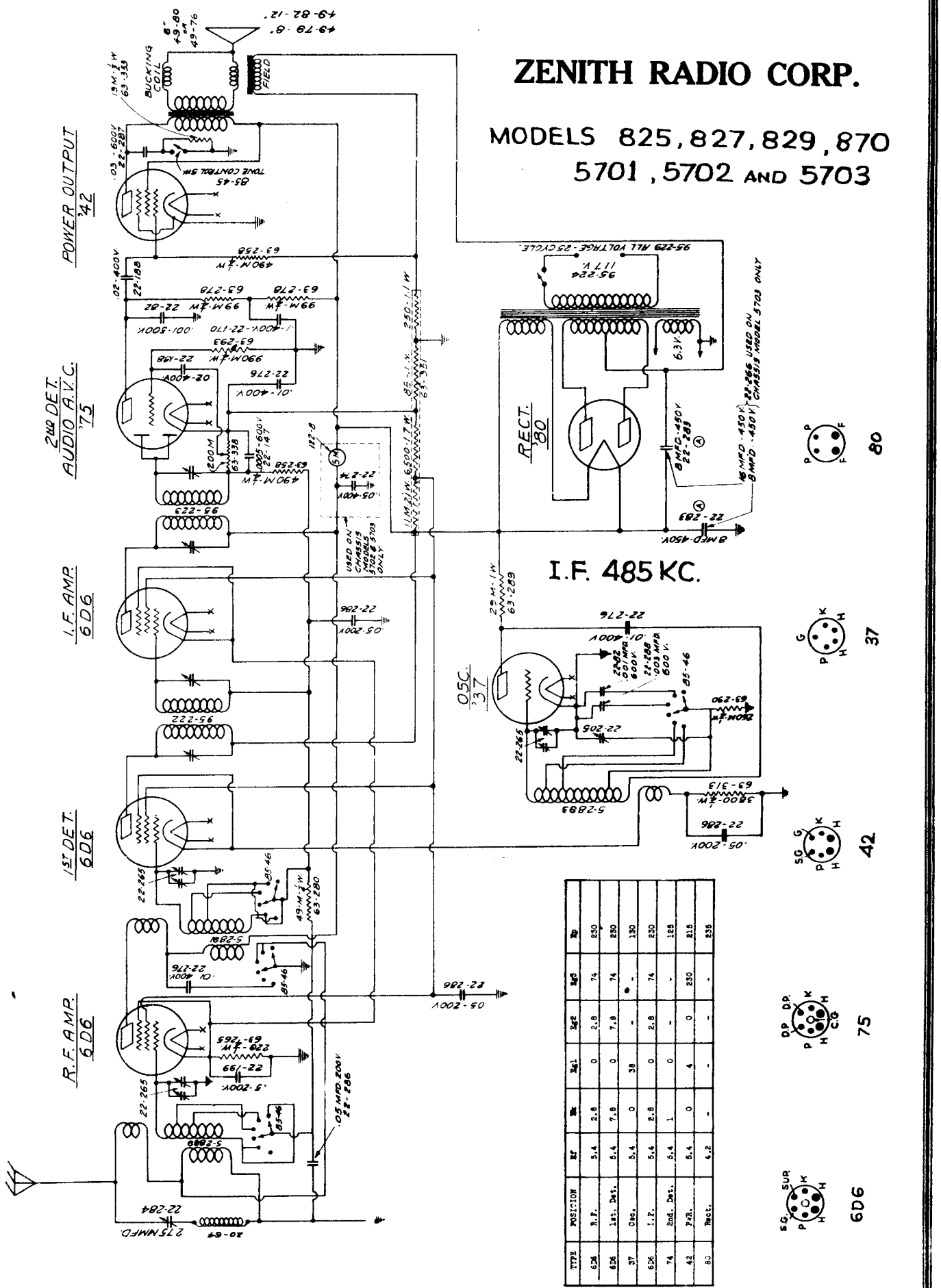
Socket Voltages

770B - 775B - 476B

Tube Type	Position	Fil. Volt.	Plate Volt.	Cath. Volt.	Screen Volt.	Supp. Volt.	Plate Current
2-58	1st R.F.	2.5	260	4.2	84	2.2	4.6
2-58	1st Det.	2.5	200	5.0	82	5.0	2.4
2-56	Osc.	2.5	80	6.0	—	---	5.4
2-58	1st I.F.	2.5	210	2.2	82	2.2	5.2
2-56	2nd Det.	2.5	0	0	---	---	0
2-56	A.V.C.	2.5	0	5.0	---	---	0
2-56	1st A.F.	2.5	130	5.0	---	---	2.0
2-56	Driver	2.5	400	9.0	---	---	2.0
2-56	Driver	2.5	400	9.0	---	---	---
2-59	Power	2.5	310	30.0	310	310	54.
2-59	Power	2.5	310	30.0	310	310	54.
4-80	Rect.	5.0	375	---	---	---	---

ZENITH RADIO CORP.

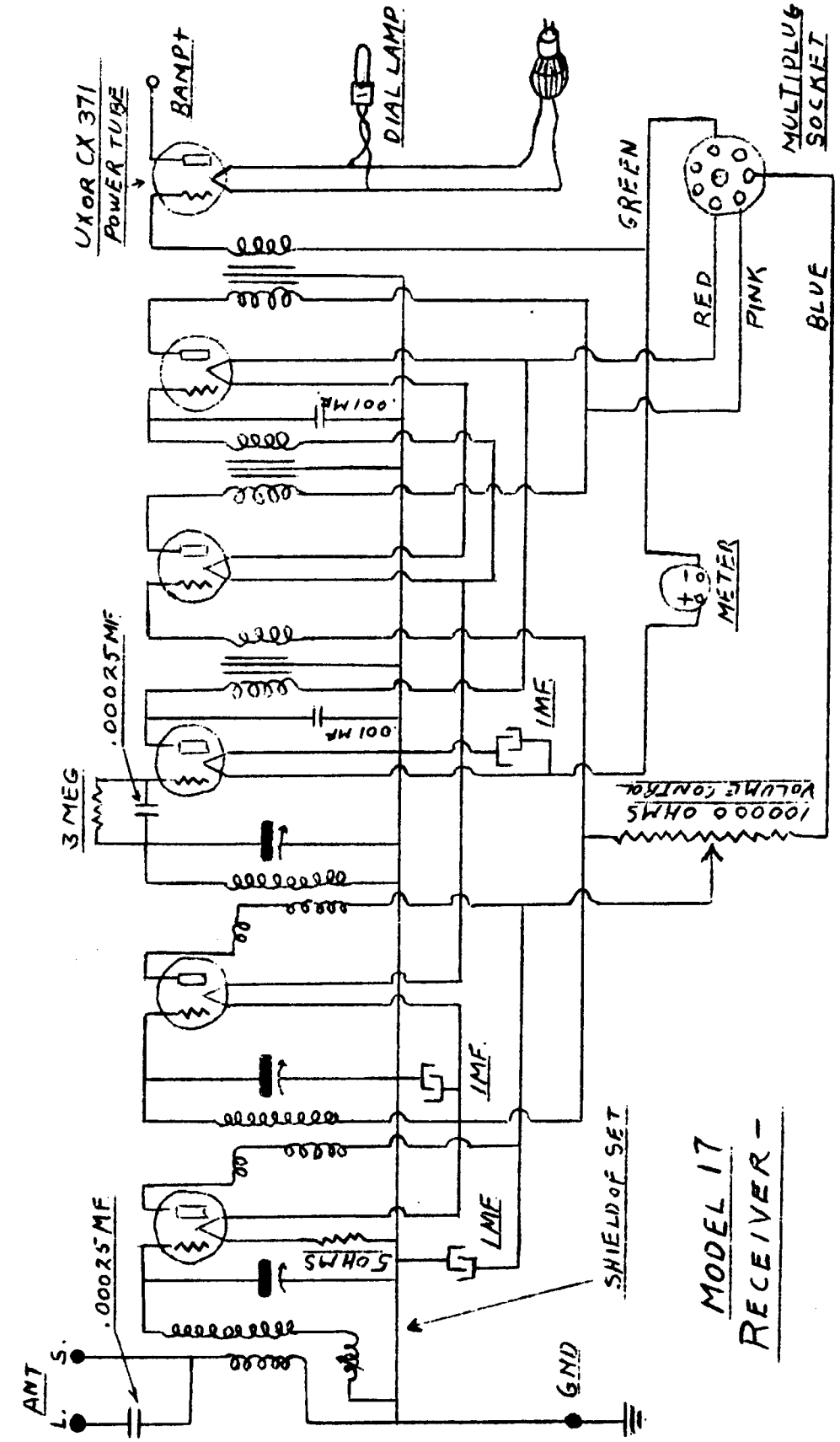
MODELS 825, 827, 829, 870 5701, 5702 AND 5703



TYPE	POSITION	Ef	Ik	Eg1	Eg2	Ig2	Ep
6D6	R.F.	6.4	2.8	0	2.8	7.4	250
6D6	1st. Det.	6.4	7.8	0	7.8	7.4	250
37	Osc.	6.4	0	38	-	-	100
6D6	I.F.	6.4	2.8	0	2.8	7.4	250
75	2nd. Det.	6.4	1	0	-	-	185
42	P.A.	6.4	0	4	0	250	215
80	Rect.	4.2	-	-	-	-	235

ZENITH RADIO CORP.

MODEL 17



MODEL 17
RECEIVER -

USE WITH :-
XE5 POWER PACK
XE6 FILTER

ZENITH

71A A.F. POWER

99 R.F. & DET.

QUESTION COUPONS

OFFICIAL RADIO SERVICE MANUAL 25
Question Coupon
NAME
ADDRESS
THIS COUPON IS GOOD FOR ONE QUESTION.

OFFICIAL RADIO SERVICE MANUAL 24
Question Coupon
NAME
ADDRESS
THIS COUPON IS GOOD FOR ONE QUESTION.

OFFICIAL RADIO SERVICE MANUAL 23
Question Coupon
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OFFICIAL RADIO SERVICE MANUAL 22
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OFFICIAL RADIO SERVICE MANUAL 21
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OFFICIAL RADIO SERVICE MANUAL 20
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OFFICIAL RADIO SERVICE MANUAL 19
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OFFICIAL RADIO SERVICE MANUAL 18
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OFFICIAL RADIO SERVICE MANUAL 17
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OFFICIAL RADIO SERVICE MANUAL 16
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OFFICIAL RADIO SERVICE MANUAL 15
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OFFICIAL RADIO SERVICE MANUAL 14
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OFFICIAL RADIO SERVICE MANUAL 13
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OFFICIAL RADIO SERVICE MANUAL 12
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OFFICIAL RADIO SERVICE MANUAL 11
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OFFICIAL RADIO SERVICE MANUAL 10
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OFFICIAL RADIO SERVICE MANUAL 9
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OFFICIAL RADIO SERVICE MANUAL 8
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OFFICIAL RADIO SERVICE MANUAL 7
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OFFICIAL RADIO SERVICE MANUAL 6
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OFFICIAL RADIO SERVICE MANUAL 5
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OFFICIAL RADIO SERVICE MANUAL 4
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OFFICIAL RADIO SERVICE MANUAL 3
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OFFICIAL RADIO SERVICE MANUAL 2
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NAME
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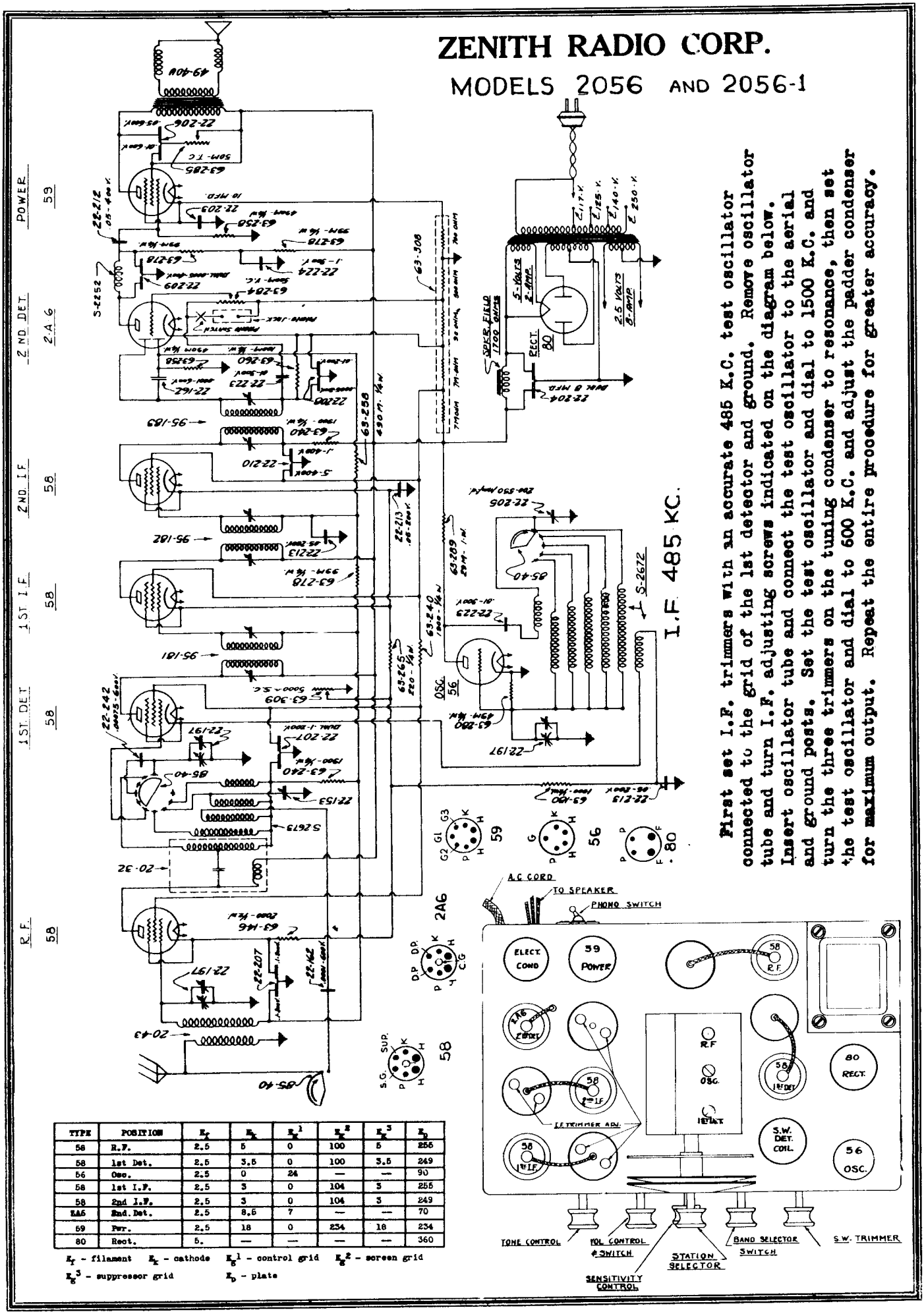
OFFICIAL RADIO SERVICE MANUAL 1
Question Coupon
NAME
ADDRESS
THIS COUPON IS GOOD FOR ONE QUESTION.

ZENITH RADIO CORP.

MODELS 2056 AND 2056-1



First set I.F. trimmers with an accurate 485 K.C. test oscillator connected to the grid of the 1st detector and ground. Remove oscillator tube and turn I.F. adjusting screws indicated on the diagram below. Insert oscillator tube and connect the test oscillator to the aerial and ground posts. Set the test oscillator and dial to 1500 K.C. and turn the three trimmers on the tuning condenser to resonance, then set the test oscillator and dial to 600 K.C. and adjust the padder condenser for maximum output. Repeat the entire procedure for greater accuracy.

TYPE	POSITION	E_f	E_k	E_{g1}	E_{g2}	E_{g3}	E_p
58	R.F.	2.5	5	0	100	5	255
58	1st Det.	2.5	3.5	0	100	3.5	249
56	Osc.	2.5	0	24	—	—	90
58	1st I.F.	2.5	3	0	104	3	255
58	2nd I.F.	2.5	3	0	104	3	249
2A5	2nd Det.	2.5	8.5	7	—	—	70
59	Pwr.	2.5	18	0	234	18	234
80	Rect.	5.	—	—	—	—	360

E_f - filament E_k - cathode E_{g1} - control grid E_{g2} - screen grid
E_{g3} - suppressor grid E_p - plate

INTERMEDIATE FREQUENCIES
COMPILED BY NATIONAL UNION RADIO CORP.

Model	K.C.
AIR KING	
37-39-52-54	456
ALLIED	
Knigh. 118 AVC	175
" 6 tube	175
" 7 tube	175
" P	175
" F9541	175
" F9616	175
" E9830	177.5
" E9831	177.5
" 12 tubes	177.5
" F9660	177.5
" F9640	177.5
" F9505	456
" F9511	456
" F9515	456
" F9531	456
" F9591	456
" F9501	456
" F9571	456
" F9631	456
" F9610	485
ATWATER KENT	
137	125
91-91B-91C	262.5
81-155-246-266	262.5
555-636-756-756B	262.5
165Q-525Q	264
217-427-667-217D	264
427D-667D-275-387	264
427Q-424-425-665	264
534	450
480-708-808-711	472.5
808A	472.5
93 Converter	1000
All Other Models	130
ALL AMERICAN MOHAWK CORP.	
See R. Wurlitzer	
ANSLEY RADIO CORP.	
All Models	175
ARBIOLA RADIO CO.	
1931 Super-Hets	175
5W-33T4-3365	456
3387-335105W-3465LW	456
3365B-3405AC-DC	456
3465AVC	456
All Others	177.5
BALKEIT RADIO CO.	
L7-L8-55-85-100	175
BELMONT RADIO CORP.	
81	105
625-650-660	175
670-750-1050	175
71C	175
775	370
525-530-540	456
550	456
BOSCH RADIO CO.	
See United American Bosch	
BROWNING DRAKE RADIO CORP.	
40-80	175
BRUNSWICK	
11-12-16	175
33AC-17-24-25	175
3NC8-5NC8	180
3NW8	180
BULOVA WATCH CO.	
All Models	175
CAPEHART CORP.	
All Models	180
CLARION RADIO	
See Transformer Corp. of America	
COLONIAL RADIO CORP.	
Laboratory Models 132 & 139	450
150	480
55	1000
All Others	175
COLUMBIA PHONOGRAPH CO., INC.	
All Models	175
CROSLEY RADIO CORP.	
120-121-122-123-124	175
124-1—125-126-126-1—127	175
127-1—128-131	175
148-154-155-156-159	456
163-165-167-169-172	456
173-173-5—174	456
All Others	181.5
DELCO APPLIANCE CORP.	
32 Volt DC Super 110 Volt AC Super	175
DELCO RADIO	
3026	175

Model	K.C.
De WALD	
AC746-7M - BAH-62	175
BLG	115
500A	130
58R-60-81-81R	455
55X 58EX-59-61-563	456
570-630	456
ECHOPHONE RADIO MFG. CO., LTD.	
62-72-92	115
All Others	175
ELEC. RESEARCH LAB., INC. Erla -- Sentinel	
1020A-1030A	115
513-570*	262
560-561-510-563	265
540-599-600-602	265
501-502-570*	465
622-623-634-635	465
5000-5010-6101-6102	465
6317-6321	465
All Others	175
ELEC. AUTO LITE	
062A-072A	262
EMERSON	
L-755 - 50-L	115
375-LW	125
35-30-250-300-B10	172.5
H5-77-667-678-965	172.5
JS-KS-CS-M-AC-7-B-AC-10	175
40-375-M-755-50M	175
350-LW - H5L - 30LW	132
250LW-321LW	132
AW55	445
26-30AW-33AW	456
250AW-321AW-350AW	456
39-59-71-770-S-755	456
S50	456
ERLA	
See Electrical Research Lab.	
EMPIRE ELEC. PRODUCTS	
74	462.5
All Others	175
FADA RADIO & ELEC. CORP.	
RX93-RX95-RX	125
RN106-RN107-RN105	470
RY-RS112	470
131-132RU-133-134-135	265
78-10-79-10-97-10-141NA	265
151-152NE	265
All Others	175
FEDERATED PURCHASER	
31-40	175
FORDSON	
F.U.-F.W.-F.P.32V-F.P.	456
FRANKLIN	
63L	130
100-102-200	175
94	450
53-54L	456
FREED TEL. & RADIO CORP.	
76	115
61DC-72-74-MB7-360	175
360X	175
58-70-72-74	177.5
A7-A9-355-365-365X	456
94-95-77	456
78	462.5
JESSE FRENCH	
Models - U-1 up	175
GALVIN MFG. CO.	
J-8-810	175
Dual 6 - Twin 8	262
44-55-66-77-77A	456
GENERAL ELECTRIC CO.	
K64-M65-M66	370
K80-K80X-K85	445
M41-K43-M49	460
All Others	175
GENERAL HOUSEHOLD UTILITIES	
700-701-801-901-902-1101	262
5Q1-502-503	455
GENERAL MOTORS	
281	535
All Others	175
GRAYBAR ELEC.	
340	180
All Others	175
GREBE	
61R	456
All Others	175
GRIGSBY-GRUNOW CO.	
260A-280B	125
44-49-194-440-560	456
566-195-55-59-75	456
116-370-400	456
10	1000
All Others	175

Model	K.C.
GULBRANSEN CO.	
10-13-20-23-53	175
92-93-322-130-135	175
235-236-237-530-535	175
925-3225-3226	175
3925-8726	175
V6Z2-Z6Z1-352	262
362-06W-3521	262
3528-3622	262
HALSON	
All Models	456
HAMMARLUND MFG. CO.	
All Models	465
CHARLES HOODWIN CO.	
Models 11 tube rec.	465
All Others	175
H. H. HORN	
59-69-90-70-71-101B	175
102-101-110	175
24-36-58-156-158	456
HOWARD RADIO CO.	
EX	140
Q	170
Auto receivers	260
5-3	456
A S W Converter	680
All Others	175
INSULINE CORP.	
AC Super 7L.W.-AC Super 6L.W.	115
Super Conqueror Uni-nine	115
5 tube Una.adio-Elite-Classic	132
Super 7-AVC Super 6	175
INTERNATIONAL	
JS-KS-CS	175
Kaydette A-8-A8-9-10-CM	262.5
A7-BW-CD-D11-12-14	262.5
AW55	445
JACKSON BELL	
25-27-28-29-89	175
205	465
33	840
KELLER-FULLER MFG. CO., LTD.	
Radiette Models 70-80-90	175
120-50S	175
COLIN B. KENNEDY CORP.	
Model 67 (Export)	110
" 52 (Export)	135
538W-545W	1000
54	1525
All Others	175
KOLSTER RADIO, INC.	
All Models	175
LANG RADIO CORP.	
All Models	175
C. R. LEUTZ, INC.	
C1C	47
Special Short Wave Receiver	450
LINCOLN RADIO CORP.	
Deluxe SW-33	480
DC-SW10 - R9	480
LYRIC RADIO	
See R. Wurlitzer Co.	
MAJESTIC	
See Grigsby-Grunow	
MID-WEST	
Miraco Pentode 11 tube super.	175
RT9-G9-F9-H9-RT16	456
A16-B16-D16-P.R.16-RM16	456
MISSION BELL	
10A-11-19-19A-25A	252
14-40	456
MONTGOMERY WARD	
62-11-62-12-62-14-62-27	175
62-19-62-20-62-20X-62-25	175
1111-62-1611-811-62-17R1	175
62-29-11-12-17-62-1-62-2	175
62-7-62-8-62-9-62-89	175
62-91-62-93-62-103-62-105	175
62-106-62-107-62-121-77	175
95-11-11X-811X-62-14X	175
62-19X-62-4C-62-31-62-31X	175
62-54-62-54X-62-58X	175
62-52-62-64-62-64X	175
62-76-62-76X-62-74-62-74X	175
62-80-62-82-62-23-62-41	175
62-83-62-16-62-16X-62-18	175
62-13-62-15-11-12-17	175
22-1040	175
1236-1838-1838X-62-26	262

INTERMEDIATE FREQUENCIES (CON'T)

Model	K.C.
MONTGOMERY WARD (Contd.)	
62-26X-62-46-62-46X-1356	262
1355X-1955-62-22-62-22X	262
62-30-62-30X-62-42-62-42X	262
62-46-62-48X-62-36	262
62-36X-62-34-62-34X-62-38	262
62-38X-62-44-62-44X-62-50	262
62-50X-62-56-62-56X	262
62-21-13-15-16X-16	262
17-18-18X-62-1838	262
62-1955-62-40	262
Auto Radio-62-96-62-98	262
62-97-62-99-62-97X	262
62-99X-62-101-62-101X	262
62-104-67	262
62-70-62-70X-62-72	455
62-72X-62-81-62-81X	455
MOTOMETER GAUGE & EQUIP.	
10A	175
MOTOROLA AUTO RADIO	
See Galvin Mfg. Co.	
NATIONAL CO.	
A.C.S.	500
NOBLETT SPARKS	
10A-30A	175
20A-20B	175
NORCO	
4 Super	250
PACKARD	
4-24-24C	235
4 tube Super 5	465
85 - 6 tube auto	470
PATTERSON RADIO CO.	
Straight Models	177.5
Amateur	467.5
70AW-107AW-207AW-210AW	262
80AW-84AW-108AW	262
104AW-510AW	262
PHILCO RADIO & TEL. CORP.	
7-8-12-15-17-37-48	175
51-51A-90-90A-111-111A-52	175
112-112A-116-116A-211-	175
211A-212-212A-Broadcast IF.	175
8-10-11-14-91-18-19-128	260
32-35-71-70-70A-270	260
270A-89-19-90-91A (with 2-47)	260
91-121-221-22L-23X 47DC	260
Broadcast I.F. 503	260
700-22-23-36-37-47DC Series	260
43-53-80	450
5-16-34-34A-36-38A	460
44-57-60-81-84-144	460
504-505-80	460
4-470-470A SW-I.F.-490 SW-I.F.	1000
4 & 4C Series	3600
PILOT RADIO & TUBE CORP.	
8-81-10AC-11-28-39-41	115
1010	115
S148-S154-C162-C165	175
C153-C154-149	175
2-B2-F14-18-20-D-3	456
81	482
4 tube D.C.	482.5
PLAZA MUSIC (HAMILTON LLOYD RADIOS)	
711 Super-6 tube LW-7 tube Super	175
5 tube Super	456
RADIO BAR	
505	175
508-526-210B-510	262
RADIO CHASSIS	
L6D	115
L6W	125
Auto Set-A6D-LSA37	175
AC-36-QAC-36-LSA36	175
L5D	456
RCA-VICTOR CO., INC.	
R7LW	110
R51-62-64	180
121-122-221-Duo 320	370
Duo 321	370
140-141-141E-240-Duo 340	445
9 tube General Purpose-340-340E	445
301	460
SW Adapter	1000
SWAZ-RO-23 (SWIF)	1075
All Others	175
RADOLEK	
951	265
956-958	465
RADIOTROPE	
70R-71R-72R-73R	262
REMLEE CO., LTD.	
Best 115KC	115
10-15-3-17-19-15-21	180
10-3-21-3	250
21-4-26-30-40-11-12-13	450
REPUBLIC INDUSTRIES	
8L6	115
SL8D-8L6D	175
Sky Hawk Patrician-S.K.RC5-RC6	175
SCOTT LABS., INC.	
All Wave Super	470
SEARS ROEBUCK	
1320-1322-1324-1390-1400	175
1402-1404-1406-1430	175
1462-1480-1482-14e4	175
1580-1582-1584-1570	175
1572-1574-1590-1592	175
1630-1640-1700	175
1705	175
1708-1709-1710-1711	175
7090-1712-1713-1714	175
1715-1720-1725-7065	175
1721-1722-1732-1726X	175
1730-1750	175
1704-7070-7071-7072-7073	480
7074-1706-1707-1711A	480
7090A-1760-7075-7076	480
7077-7078A-7091-7092	480
7093-7094	480
1600	1000
SENTINEL RADIO	
See Elec. Research Lab.	
SILVER-MARSHALL, INC.	
36A-Bearcat Midget-714	175
716-683-724-726-728	175
773-A-B-C-D-E-G-J-R	175
4801-4802-41-724B-726SW	175
782-1040-F	175
727-729SW-Z10-Q-QD-R-RT-V-X-Y	465
Z DEluxe Z13	472.5
738	1000
SIMPLEX RADIO CO.	
E-K-J-L-N-P-Q	175
P-AC-P-32V-W	456
V-T	465
SONORA	
70-71-72-73-84-85-86-87	262
SPARKS-WITHINGTON CO.	
10-12-14-15-16-16AW-18-25-26.	172.5
26AW-27-27A-30-33-34-36	172.5
45-56-72-74-78-28-30A-35	172.5
61-62-71-71P-81-82-333	456
STEINITE	
All Models	175
STEWART-WARNER	
102A-B & E-R102-A-B & E	177.5
R104A-B & E Broadcast I.F.	177.5
1090-91-92-93-94-95-96-97-98-1099	177.5
R106-R110-R117-R119-R120	177.5
R111-R115-R112-R116	456
105 (SWIF)	1525
STROMBERG-CARLSON	
33	260
All Others 175 KC	175
SUPERTONE PRODUCTS	
Superba	465
L. TATRO PRODUCTS	
L-74-N74-AK54-AM54-094	175
084-P54	177.5
TRANSFORMER CORP. OF AMERICA	
125 (Export Model	100
80-81-90-90A-91-84-85-94-95-94	175
100-120-139-160-25-160-220-260	175
280-300-320-340-420	175
422-423-425-440-460	465
240	490
200	600-1000-1500
TRAVELOR RADIO & TEL. CO.	
S-8 - S-9 - S-10	175
UNITED AIR CLEANER	
All Models	175
UNITED AMERICAN BOSCH	
10-20J-20K-20L-31-32-36-37	175
40-41-92-100 Auto-108-150	175
160-236-237-242-243-250-251	175
312-313-226-310	175
140A-305A-360-500-502	456
305-405-805-117-127-500	456
260-261	517.5
325-20-22-36-40-91	125
100-150-224	125
UNITED MOTORS SERVICE	
2035-4036-4037 & BOP receivers	262
4048	455
U.S. RADIO & TELEVISION	
7-8-10-10C-9-19-12-120	262
99-99-1006-1007-3070-9A-9B	262
12B-19B-120B	262
5A-7D-24-25-3040-3056-25A	455
VICTOR RADIO	
See RCA Victor	
WARE MFG. CO.	
All Models	175
WELLS GARDNER, INC.	
00A-02A-06A-07A-022	175
073-092-40-40A-50	175
92-93-502-572	175
03A-03AA-05BA-06W-072	262
052-062-3R-V622-V621	262
5V	262.5
7D	456
WESTINGHOUSE	
Vlat top in some cases	175
WESTARK RADIO, INC.	
Knight 7 & 9 tube	175
WHOLESALE RADIO	
10-20-L1-80M-80MA	175
L-20 - Auto Radio	262
WILCOX-GAY	
3PA 6-66	115
2S5-2T5-2VA7-3D5	175
3R6-3J5-3K5-37566	175
3T665	175
WONDER BAR RADIO CORP.	
All Models	175
RUDOLPH WURLITZER CO.	
LW5	125
SA-133-SA120-SA99-SA5-SA6	175
B6-SA130-SA110-SA111-SA91	175
SA91A-S50-S63-SA65-B80	175
S7-S6-S8-S10-DC65-S80	175
SA130-460	175
C4-M4-P5-SU5-A60-U500	456
U50-S40	456
SW8-LU5-450	456
SW8-A60-SW80-SW88	485
U50-U55	485
ZENITH RADIO CORP.	
91-92-AH-CH-RH-BH-LH-WH	175
MH-103-210-220-230-240-245	175
Broadcast I.F. 410-411-420-430	175
440-500-501-503-514-515	175
600-604-606-610-616-618-715	175
755-756-474-730-735-740	175
770-760-765-767-475-775	175
780-476-476A-770B-775B	175
215-216-217-221-225-241	175
244-263-271-412-414-441	175
442-443-470-502-516-520	175
521-530-531-532-602-603	175
605-607-608-611-612-614-615	175
617-619-620-621-622-623	175
210-5 - 211-5 - 270-5 - 510-5	125
462-850HD-651HE-660TD	252.5
661TE	232.5
701	456
460-705-706-707-711-517	485
712-750-2056-2056-1	485
518 - 550	485
250-251-252-260-261	485
272-472-473	175 & 1000
CANADIAN RECEIVERS	
Brunswick of Canada	175
Canadian Marconi Co.	175
Canadian Westinghouse Co., Ltd...Models 89, 90,99,99A, 110,120	171
Columaires 8, 10 and Models 101, 801, 802	178
DeForest Crosley	175
Grimes Radio Corp.	175
C. B. Kennedy of Canada, Ltd.	175
Mohawk Radio Ltd.	175
Northern Elec. Co., Ltd.	175
Rogers Majestic Co., Ltd.	175
Sonora Corp. of Canada	175
Stewart Warner of Canada	175
Stromberg Carlson	175
Spartan of Canada	172.5
Temple of Canada	178

TRADE NAME CHART

TRADE NAME	MANUFACTURER
	A
Abbey	Splitdorf Radio Corp.
Abbeywood	Grigsby Grunow
AC Dayton	A. C. Dayton Co.
Ace	Simplex Radio Co.
Acme	Acme Apparatus Corp.
Acme	Acme Electric Co.
Acme	Acme Mfg. & Electric Co.
Acme	Acme Radio Mfg. Co.
Acratest	Acratest Products Co., Inc.
Acratone	Federated Purchaser
Acrocycle	J. M. P. Mfg. Co.
Adam	Try-Mo Radio Co., Inc.
Adams	Grigsby Grunow
Admiral	L. Tatro Products Corp.
Adrian	Sears Roebuck & Co.
Advance	Advance Radio Corp.
Adventurer	Crosley Radio Corp.
Aero	Chas. Hoodwin Co.
Aerodyne	Chas. Hoodwin Co.
Airex	Airex Co., Inc.
Air King	Air King Products Co., Inc.
Airline	Montgomery Ward & Co. (Wells Gardner & Co.)
Air Master	Automatic Radio Mfg. Co.
Ajax	Commonwealth Radio Mfg. Co.
Akaformer	Amy, Aceves & King
Alderman	Crosley Radio Corp.
Alexander	Sears Roebuck & Co.
Alhambra	RCA Victor
All American	All American Radio Co.
Allied	Allied Engineering Institute
Allied	Allied Radio Corp.
Ambassador	Crosley Radio Corp.
Ambrola	United American Bosch
American	American Sales Co.,
American Beauty	Diamont Radio Mfgrs.
American Bosch	United American Bosch Corp.
Amertran	American Transformer Co.
Amplex	Amplex Instrument Labs.
Amrad	Amrad Division-Crosley
Announcer	Crosley Radio Corp.
Ansley	Ansley Radio Corp.
Ansley Universal	Ansley Radio Corp.
Apex	United States Radio & Tel. Co.
Arbiter or 77B	Crosley Radio Corp.
Arborphone	Gray Electric Co. (United Reproducers Corp.)
Arborphone	Precision Products Co.
Arcadia	Wells Gardner & Co.
Arco	Arco Electric Corp.
Arco	Arco Tube Co.
Arcturus	Arcturus Radio Tube Co.
Ardmore	Grigsby Grunow
Argus	Argus Radio Corp.
Aristocrat	Kurz-Kasch Co.
Armada	Pilot Radio & Tube Corp.
Arvin	Noblitt-Sparks Industries, Inc.
Atchison	Atchison Radio Mfg. Co.
Atwater Kent	Atwater Kent Mfg. Co.
Audiola	Audiola Radio Co.
Autocrat	Autocrat Radio Co.
Auto Dial	J. M. P. Mfg. Co.
Auto-Lectric	Automatic Radio Mfg. Co.
Automatic	Automatic Radio Mfg. Co.
Auto Master	Automatic Radio Mfg. Co.
Auto Rola	Automatic Radio Mfg. Co.
Autoverter	Keller-Fuller Mfg. Co., Inc.
Auto Vox	J. A. Brookman Co.
Auto Vox	Link Piano Co.
Aztec	Aztec Radio Co.
Aztec	Stein, Fred.W.
	B
Baby	Trojan Radio Corp.
Baby Grand	Diamond Radio Mfgrs.
Baird	Short Wave & Tel. Labs., Inc.
Baird	Try-Mo Radio Co., Inc.
Baird Portaradic	Short Wave & Tel. Labs., Inc.
Balboa	Montgomery Ward & Co.
Balder	Balder Electric Co.
Baldwin	Nathaniel Baldwin Co.
Balkeit	Balkeit Radio Co.
Balkeit	Nat'l. Transformer Mfg. Co.
Balmoral	De Forest Radio Corp.
Bandbox	Crosley Radio Corp.
Bandbox Jr.	De Forest Crosley Ltd.
Barcarolle	De Forest Crosley Ltd.
Baronet	King Mfg. Corp.
Beede	Beede Elec. Instrument Co.
Bel Canto	Amrad Corp.
Belden	Belden Radio Mfg. Co.
Belmont	Belmont Radio Co.
Berkshire	Grigsby Grunow Co.
Berwick	Amrad Corp.
Berwick	De Forest Radio Corp.
Berwick	De Forest Crosley Ltd.
Best	Best Mfg. Co.
Bigfella	Crosley Radio Corp.
Bonniboy	Crosley Radio Corp.
Bon Voyage	Vaga Mfg. Corp.
Borgia	RCA Victor Inc.
Bosch	United American Bosch Corp.
Brandes	Kolster Radio Inc.
Bremer Tully	Brunswick Radio Corp.
Brentwood	Grigsby Grunow Co.
Browning Drake	Browning Drake Corp.
Brucewood	Grigsby Grunow Co.
Bruno	Bruno Labs.
Brunswick	Brunswick Radio Corp.
Buckingham	Buckingham Radio Co.
Buckingham	Splitdorf Radio Corp.
Bud	Bud Radio Inc.
Buddy	Crosley Radio Corp.
Burly	United Air Cleaner
Bush & Lane	Bush & Lane Piano Co.
	C
Cable-Nelson	Howard Radio Co.
Cameo	Remler Co., Ltd.
Cameo	Wilcox-Gay Corp.
Cameo Hilo	Wilcox-Gay Corp.
Cantata	Wilcox Gay Corp.
Cantol	E. C. Atkins & Co.
Capehart	Capehart Corp.
Captain	L. Tatro Prods. Corp.
Cardinal	Cardinal Radio Mfg. Co.
Cardinal	Lang Radio Co.
Carillon	Wilcox-Gay Corp.
Caroler	Crosley Radio Corp.
Carter	Carter Radio Division
Carteret	Carteret Radio Labs.
Car-uso	Laurehk Radio Mfg. Labs.
Casa	Crosley Radio Corp.
Castlewood	Grigsby Grunow Co.

TRADE NAME CHART

TRADE NAME	MANUFACTURER
Cavalier	Montgomery Ward & Co.
Cavendish	De Forest Radio Corp.
Cedar King	E. C. Atkins & Co.
Centralab	Central Radio Labs.
Century	Century Radio Products
Challenger	Montgomery Ward & Co.
Chambers	A. C. Dayton Co.
Champion	Champion Radio
Champion	Champion Radio Mfg. Corp.
Champion	Champion Radio Works, Inc.
Champion	Consolidated Elec. Lamp Co.
Champion Jr.	Gulbransen Co.
Champion Jr.	Simplex Radio Co.
Champion Jr.	Wells Gardner & Co.
Cheerio	Crosley Radio Corp.
Chelsea	Barty Radio Co.
Cheltenwood	Grigsby Grunow Co.
Chevalier	King Mfg. Co.
Chief	Diamond Radio Mfgrs.
Chief	L. Tatro Prods. Corp.
Chieftain	Crosley Radio Corp.
Chum	Crosley Radio Corp.
Clarion	Transformer Corp. of America
Clearodyne	Cleartone Radio Corp.
Cleartone	Cleartone Radio Corp.
Coast-to-Coast	Coast to Coast Radio Corp.
Collingwood	Grigsby Grunow Co.
Colonial	Colonial Radio Corp.
Columbia	Allied Radio Corp.
Columbia	Brandes Products Co.
Comet	Hammarlund Mfg. Co.
Comet D. C.	Colin B. Kennedy Corp.
Commander	King Mfg. Co.
Commander	L. Tatro Prods. Corp.
Commissioner	Crosley Radio Corp.
Commonwealth	Commonwealth Radio Mfg. Co.
Compact	Atwater Kent Mfg. Co.
Compact	Cleartone Radio Co.
Companion	Crosley Radio Corp.
Concerto	Amrad Corp.
Concerto	De Forest Crosley Ltd.
Concerto	Splitdorf Radio Corp.
Concertone	Sterling Mfg. Co.
Confidence	Apparatus Design Co.
Congressional	Cleartone Radio Co.
Congressman	Crosley Radio Corp.
Conqueror	Insuline Corp. of America
Continental	Continental Mfg. Co.
Conway	De Forest Crosley Ltd.
Corona	Wilcox-Gay Corp.
Coronado	Coronado Mfg. Co.
Coronado	Wells Gardner & Co.
Coronet	Wilcox-Gay Corp.
Corsair	Apex Electric Mfg. Co.
Corsair	Pilot Radio & Tube Corp.
Cortez	Montgomery Ward & Co.
Cosmatone	Cosmatone, Inc.
Counterphase	Bremer-Tully Mfg. Co. (Brunswick)
Courier	United Reproducer
Crescent	Crescent Radio Mfg. Co.
Crescentyne	Crescent Radio Mfg. Co.
Criterion	E. C. Atkins & Co.
Cromwell	Sears Roebuck & Co.
Crony or 26J	Crosley Radio Corp.
Crosley	Crosley Radio Corp.
Crown	Custom Built Radio Co.
Croyden	Grigsby Grunow Co.
Cruiser	United American Bosch Corp.
Crusader	King Mfg. Corp.
Cub	Clago Radio Corp.
Cub	Audiola Radio Co.
	D
Daven	Daven Radio Co.
Day-Craft	General Motors Radio Corp.
Day-Fan	General Motors Radio Corp.
Day-Mar	General Motors Radio Corp.
Day Rad	Radio Products Co.
Day-Royal	General Motors Radio Corp.
DeForest	DeForest Radio Corp.
Delco	Delco Appliance Corp.
Delco	Delco Radio Corp. (General Motors)
De Luxe	Krantz & Sell Co.
De Luxe	Harry Ward Co.
De Sota	Montgomery Ward & Co.
Detrola	Detrola Radio Corp.
De Wald Dynette	Pierce Airo. Inc.
De Wald Motortone	Pierce Airo, Inc.
Dexter	E. C. Atkins & Co.
Diamond Special	Diamond Radio Mfgrs.
Dictator	Montgomery Ward & Co.
Director	Crosley Radio Corp.
Discoverer	Crosley Radio Corp.
Doerle	Radio Trading Co.
Dragon Emperor	Pilot Radio & Tube Corp.
Dragon Monarch	Pilot Radio & Tube Corp.
Duet	All American Radio Co.
Duo	Internat'l All-Wave Corp.
Duophonic	A. C. Dayton Co.
Duo Symphonic Jr.	Wholesale Radio Service Co.
Dynaphone	Ansley Radio Corp.
Dynette	Pierce-Airo, Inc.
	E
Eagle	Eagle Electric Mfg. Co., Inc.
Earl	Chas. Freshman Co., Inc.
Eby	H. H. Eby Mfg. Co.
Echophone	Echophone Radio Mfg. Co.
Economy	E. C. Atkins & Co.
Edison	Edison, Thos. A, Inc.
Electrad	Electrad Inc.
Electric Chassis	Sleeper Radio & Mfg. Corp.
Electrola	RCA Victor, Inc.
Electrostatic	Gray Electric Co. (United Reproducers Corp.)
Elgin	Elgin Radio & Television Corp.
Elkay	Langbein-Kaufman Radio Co.
Ellswood	Grigsby Grunow
El Rey	El Rey Radio Mfg. Co.
Embassy	De Forest Radio Corp.
Emerson	Emerson Electric Mfg. Co.
Emerson	Emerson Radio & Phono. Corp.
Empire	Empire Electric Prods. Co.
Ensign	L. Tatro Products Corp.
Ensign	Radio Chassis
Envoy	Insuline Corp. of America
Envoy Midget	Insuline Corp. of America
Equaphase	Chas. Freshman Co., Inc.
Erla	Electrical Research Labs.
Erla Monodie	Electrical Research Labs.
Etude	De Forest Crosley Ltd.
Eureka	E. C. Atkins & Co.
Evening Hour	QT Radio Prods. Co.
Eveready	Nat'l. Carbon Co., Inc.
Excelsior	E. C. Atkins & Co.
Explorer	Grigsby Grunow Co.

TRADE NAME CHART

TRADE NAME	MANUFACTURER
	F
Fada	Fada Radio & Electric Corp.
Fairfax	Grigsby Grunow Co.
Falck	Advance Electric Co.
Famous Player	Keller-Fuller Mfg. Co., Ltd.
Fanhal-LaSalle	Halson Radio Mfg. Corp.
Fearnola	Wells Gardner & Co.
Featherweight	E. C. Atkins & Co.
Federal	Federal Radio Corp.
Ferguson	Ferguson Radio Corp.
Ferranti	Ferranti, Inc.
Ferrolite	E. C. Atkins & Co.
Filter-Flex	Filter-Flex Radio Corp.
Find-All	Allied Engineering Institute
First National	First National Radio Corp.
Fisher-Smith	Fisher & Smith
Fleetwood	Fleetwood Radio Corp.
Flint	Flint Radio Co., Inc.
Florenza	RCA Victor, Inc.
Ford Radio Marvel	Well-Ton Radio Corp.
Fordson	Fordson Radio Mfg. Co.
Forte	All American Radio Co.
Fortuna	Fortuna Mfg. & Supply Co., Inc
Franklin	Franklin Radio Corp.
Franklin	H. H. Franklin Mfg. Co.
Freed	Freed Television & Radio Corp.
Freed Eisemann	Freed Television & Radio Corp.
Freshman	Freed Radio Co.
Freshman-Belmont	Belmont Radio Corp.
Frost Minton	Frost Minton Corp.
Fyfewood	Grigsby Grunow Co.
	G
Galvin	Galvin Mfg. Corp.
Gardner	Gardner Electric Mfg. Co.
Gem	Jefferson Electric Co.
General	Simplex Radio Co.
General Motors	General Motors Radio Corp.
Gen-Ral	General Mfg. Co.
Giant	Trojan Radio Corp.
Gilbert	R. W. Gilbert
Gilfillan	Gilfillan Bros., Inc.
Gipsy	Kingston Radio Co., Inc.
Gloritone	U. S. Radio & Television Corp.
Goldcrest	Cleartone Radio Corp.
Golden Arrow	Pilot Radio & Tube Corp.
Goldentone	Fordson Radio Mfg. Co.
Gold Seal	Remler Co., Ltd.
Governor	Crosley Radio Corp.
Granada	Wells Gardner & Co.
Grand	Brooklyn Radio Labs.
Graybar	Graybar Electric Co.
Grayson	Remler Co., Ltd.
Great Northern	Wells Gardner & Co.
Grebe	Grebe Co., A. H.
Green Diamond	Howard Radio Co.
Grenadier	Montgomery Ward & Co. (Wells Gardner & Co.)
Grimes	Pilot Radio & Tube Corp.
Grunow	Gen'l. Household Utilities Co.
Gulbransen	Wells Gardner & Co.
Gypsy	Grand Rapids Radio Mfg. Co.
	H
Halldorson	Halldorson Co.
Hallicrafters	Silver Marshall Mfg. Co.
Halson	Halson Radio Mfg. Corp.

TRADE NAME	MANUFACTURER
Halson-Diamond	Halson Radio Mfg. Corp.
Hamilton Lloyd	Plaza Music Co.
Hammarlund	Hammarlund Mfg. Co.
Happy Hour	Crosley Radio Corp.
Harco	Harrison Radio Co.
Harmonic	Jones Radio Co.
Harmonique	Arco Tube Co.
Harrison	Pioneer Radio Labs.
Havenwood	Grigsby Grunow Co.
Hawley	Hawley Products Co.
Heikau	Heintz & Kaufman
Heritage	Clago Radio Corp.
Heyco	Remler Co., Ltd.
High Frequency	High Frequency Labs.
Home Builder	E. C. Atkins & Co.
Homer	Homer Products, Inc.
Howard	Howard Radio Co.
Hudson	Wells Gardner & Co.
Hyatt Portable	Hyatt Electric Corp.
	I
Ideal	E. C. Atkins & Co.
Imperial	Imperial Furniture Co.
Imperial Console	Sleeper Radio & Mfg. Corp.
Imperial Cruiser	United American Bosch Corp.
Intermezzo	Splitdorf Radio Corp.
International	International Radio Corp.
	J
Jackson Bell	Jackson Bell Co.
Jenkins	Jenkins Television
Jenkins-Adair	Jenkins & Adair, Inc.
Jensen	Jensen Radio Mfg. Co.
Jesse French	French, Jesse & Sons, Co.
Judge	Crosley Radio Corp.
Junior	Pfanstiehl Radio Co.
Junior	Trojan Radio Corp.
Junior Mechanic	E. C. Atkins & Co.
Justice	Crosley Radio Corp.
	K
Kadette	International Radio Corp.
Karadio	Karadio Corp.
Kayo	Kayo Mfg. Co.
Kellogg	Kellogg Switchboard & Supply
Kemper	Kemper Radio Corp.
Kennedy	Colin B. Kennedy Corp.
Ken-Rad	Ken-Rad Corp.
King	Colonial Radio Corp.
King	King Mfg. Co.
King	King Radio Corp.
Knickerbocker	Balder Radio Co.
Knight	Simplex Radio Co.
Knight	Wextark Radio, Inc.
Kolster	Kolster Radio Corp.
Kwik-Kut	E. C. Atkins & Co.
Kylectron	Gray Electric Co.
	L
Lafayette	Montgomery Ward & Co.
La Fayette	Wells Gardner & Co.
La Fayette	Wholesale Radio Service Co.
Lang	Lang Radio Co.
La Salle	Champion Radio

TRADE NAME CHART

TRADE NAME	MANUFACTURER
Laurehk	Laurehk Radio Mfg. Labs.
Legislator	Crosley Radio Corp.
Le Pilote	Imperial Radio Co.
Leutz	Eastern Research Labs.
Lincoln	Lincoln Radio Corp.
Link	Link Piano Co.
Litlboy	Crosley Radio Corp.
Litlfella	Crosley Radio Corp.
Little Colonel	Halson Radio Mfg. Corp.
Loftin-White	Electrad, Inc.
Lorenzo	Splitdorf Radio Corp.
Lorraine	All American Radio Co.
Los Angeles	Los Angeles Radio Mfg. Co.
Louis XIV	Maxwell Radio Corp.
Louvain	Federal Radio Corp.
L. Tatro	L. Tatro Products Corp.
Luxor	Luxor Radio Mfg. Co.
Lyric	Apex Electric Mfg. Co.
Lyric	Arco Tube Co.
Lyric	Rudolph Wurlitzer Mfg. Co.
	Mc
Mc Millan	Mc Millan Radio Co.
Mc Murdo Silver	Mc Murdo Silver, Inc.
	M
Mackey	Parkway Radio Mfg. Co.
Madison	Grigsby Grunow Co.
Maestro	Splitdorf Radio Corp.
Majestic	Grigsby Grunow Co.
Majestic	United Radio & Mfg. Co.
Majestic Grand	United Radio & Mfg. Co.
Mandarin	Federal Radio Corp.
Marconi	Canadian Marconi Co.
Marquette	Radio Chassis, Inc.
Marti	Marti Radio Corp.
Mascot	Insuline Corp. of America
Master	Master Radio Mfg. Co., Ltd.
Masterpiece	McMurdo Silver, Inc.
Mate or 53E	Crosley Radio Corp.
Mayfair	Clago Radio Corp.
Mayfair	De Forest Radio Corp.
Mayflower	Clago Radio Corp.
Mayflower Compact	Cleartone Radio Co.
Mayola	Wells Gardner & Co.
Mayor	Crosley Radio Corp.
Melburn	Melburn Radio Mfg. Co.
Melody	Harvey Mfg. Co.
Melorad Cathedral	Federated Purchaser
Merrymaker	Crosley Radio Corp.
Metro	Simplex Radio Co.
Metropolitan	Chas. Goodwin Co.
Michigan	Imperial Radio Corp.
Midwest	Midwest Radio Corp.
Milan	Federal Radio Corp.
Minatrol	Westinghouse Elec. & Mfg. Co.
Minerva	Minerva Radio Co.
Miniature	Brooklyn Radio Labs.
Minstrel	Apex Electric Mfg. Co.
Minuet	High Frequency Labs.
Minuette	Remler Co., Ltd.
Miraco	Midwest Radio Corp.
Mission	Mission Bell Radio Mfg. Co.
Moderne	Fada Radio & Elec. Corp.
Mohawk	Rudolph Wurlitzer Mfg. Co.
Mon-Arc	Wells Gardner & Co.
Monarch	King Mfg. Co.
Monotrol	Sleeper Radio & Mfg. Corp

TRADE NAME	MANUFACTURER
Monroe	Grigsby Grunow Co.
Monterey	Keller Fuller Mfg. Co., Ltd.
Montrose	De Forest Radio Corp.
Morfloat	E. C. Atkins & Co.
Motor Master	Automatic Radio Mfg. Co.
Moto Radio	Carteret Radio Labs., Inc.
Motorola	Galvin Mfg. Corp.
Motortone	Pierce-Airo, Inc.
Motoset	Fada Radio & Electric Corp.
Motovox	Moto Meter Gauge & Equipment Corp.
Musique	Atlas Television Co., Inc.
My-Own	My-Own Radio, Inc.
	N
National	National Co.
National	Mc Culla Mfg. Co.
Navigator	A. C. Dayton Co.
New Buddy or 54G	Crosley Radio Corp.
Niagara	Laurehk Radio Mfg. Labs.
Nocturne	Amrad Corp.
Nomad	Crosley Radio Corp.
Norco	Remler Co., Ltd.
Norden-Hauck	Norden-Hauck, Inc.
Northern Electric	Northern Electric Co., Ltd.
	O
Opera	Amrad Corp.
Operadio	Operadio Mfg. Co.
Ord-O-Pam	S. H. Couch Co.
Ortho-sonic	Federal Radio Corp.
Overtone	Pfanstiehl Radio Co.
Oxford	Federal Radio Corp.
Ozarka	Ozarka, Inc.
	P
Packard	Packard Radio Corp.
Pal or 53F	Crosley Radio Corp.
Panatrope	Brunswick - Balke - Collander
Paramount	Simplex Radio Co.
Parkway	Parkway Radio Mfg. Co.
Partner or 26K	Crosley Radio Corp.
Patterson	Patterson Radio Corp.
Peerless	Gray Electric Co.
Perfection	E. C. Atkins & Co.
Perfection	Radio Chassis, Inc.
Perfectone	Perfectone, Inc.
Perry	Perry Products, Inc.
Personal	United American Bosch Corp.
Peter Pan	Jackson Bell Co., Ltd.
Petite	Polymet Mfg. Corp.
Philco	Philco Radio & Tel. Corp.
Phoenix	Simplex Radio Co.
Phono Automatic	Crosley Radio Corp.
Pierce-Airo	Pierce-Airo, Inc.
Pilot	Pilot Radio & Tube Co.
Pilot	L. Tatro Products Corp.
Pilot Dragon	Pilot Radio Corp.
Pioneer	Pioneer Radio Co.
Playboy	Crosley Radio Corp.
Playtime	Crosley Radio Corp.
Plymouth	Plymouth Radio Corp.
Postal	Postal Radio Corp.
Powerack	Radio Chassis, Inc.
Powerton	Try-Mo Radio Co.
Pribnow	E. C. Atkins & Co.
Priess	Priess Radio Co.

TRADE NAME CHART

TRADE NAME	MANUFACTURER
Princess	Montgomery Ward & Co.
Pup	Crosley Radio Corp.
	R
Radiette	Keller Fuller Mfg. Co.
Radiobar	Radiobar Co., of America
Radiokeg	R. K. Radio Labs., Inc.
Radiola	RCA Victor, Inc.
Radiotrope	U. S. Radio & Tel. Corp.
Radolek	Radolek Co.
Remington	Coast to Coast Radio Corp.
Remler	Remler Co., Ltd.
Repose	Crosley Radio Corp.
Repose Jr.	Crosley Radio Corp.
Republic	Republic Radio Co.
Reveler	Crosley Radio Corp.
Revere	Revere Radio Corp.
Roadmaster	Halson Radio Mfg. Corp.
Roamio	Crosley Radio Corp.
Roland	Sears Roebuck & Co.
Rondeau	Crosley Radio Corp.
Roosevelt	Commonwealth Radio Mfg. Co.
Roots	Roots Auto Radio Mfg. Corp.
Royal	Harrison Radio Co.
Royal	Brooklyn Radio Labs.
Royal	Royal Radio Mfg. Co.
Royal Cruiser	United American Bosch Corp.
	S
Sailor	L. Tatro Products Corp.
Sara	J. & L. Sara Co.
Sargent	E. M. Sargent
Scott	E. H. Scott Radio Labs., Inc.
Scout	Sleeper Radio & Mfg. Co.
Secretary	Crosley Radio Corp.
Senator	Crosley Radio Corp.
Sentinel	Sentinel Radio Corp.
Serenader	Montgomery Ward & Co.
Serenader	Sleeper Radio & Mfg. Corp.
Seven Seas	C. R. Leutz, Inc.
Sevette	Crosley Radio Corp.
Sextet	All American Radio Co.
Sheffield	Grigsby Grunow Co.
Sheffield	E. C. Atkins & Co.
Shelburne	Shelburne Radio Mfg. Co.
Sheldon	Sheldon Radio Corp.
Sherwood	Grigsby Grunow Co.
Showboy	Crosley Radio Corp.
Silver	Silver Marshall, Inc.
Silver	McMurdo Silver, Inc.
Silver Ghost	C. R. Leutz, Inc.
Silvertone	Sears Roebuck & Co.
Simplex	Simplex Electric Co., Inc.
Sky Hawk	Republic Industries
Sky Rover	Wells Gardner & Co.
Sleeper	Sleeper Radio & Mfg. Corp.
Smooth Cut	E. C. Leutz, Inc.
Solar	Solar Mfg. Corp.
Sondo or 84D	Crosley Radio Corp.
Sonata	Amrad Corp.
Sonora	Sonora Phonograph Co., Inc.
Sovereign	All American Radio Corp.
Sparton	Sparks Withington Co.
Splitdorf	Splitdorf Radio Corp.
Standard	Cleartone Radio Co.
Stanrad	Howard Radio Co.
Star	Wells Gardner & Co.
Star Raider	Continental Radio Corp.

TRADE NAME	MANUFACTURER
Steinite	Jackson Radio & Tel. Co.
Sterling	Sterling Mfg. Co.
Stewart Warner	Stewart Warner Corp.
Stratford	Grigsby Grunow Co.
Stromberg Carlson	Stromberg Carlson Tel. Mfg. Co
Super Fadalette	Fada Radio & Electric Corp.
Superflex	Radio Products Corp.
Super Synchrophase	A. H. Grebe & Co., Inc.
Super Test	Radio City Products Co.
Supertone	Simplex Radio Co.
Sussex	Sears Roebuck & Co.
Symphonic	Wholesale Radio Service Co.
	T
Tatro, L.	L. Tatro Prods. Corp.
Temple	Temple Corp.
Tenstrike	Crosley Radio Corp.
Thermiodyne	Algonquin Electric Co., Inc.
Tiffany Tone	Herbert H. Horn
Tobe	Tobe Deutschmann Corp.
Tom Thumb	Automatic Radio Mfg. Co.
Tonebean	Atwater Kent
Transitone	Philco Radio & Tel. Corp.
Transoceanic	C. R. Leutz, Inc.
Trav-ler	Trav-ler Mfg. Co.
Treasure Chest	Coronado Mfg. Co.
Triumph	Remler Co., Ltd.
Trojan	Trojan Radio Corp.
Troubadour	Apex Electric Mfg. Co.
Troubadour	Montgomery Ward & Co.
Travette	Crosley Radio Corp.
Travo	Crosley Radio Corp.
Truetone	Wells Gardner & Co.
Trutest	Wholesale Radio Service Co.
20th Century	Pilot Radio & Tube Corp.
Tynamite	Crosley Radio Corp.
	U
U. S. Apex	U. S. Radio & Tel. Corp.
U. S. Radio	U. S. Radio & Tel. Corp.
United	United Motors Service Inc.
Universal	Simplex Radio Co.
Universal	Universal Auto Radio Corp.
Utah	Utah Radio Prods. Co.
	V
Vagabond	Crosley Radio Corp.
Vagabond	Vaga Mfg.
Vibro Power	United American Bosch Corp.
Victor	E. C. Atkins & Co.
Victor	RCA Victor
Victoreen	Victoreen Radio Co.
Victory	Champion Radio
Viking	Grigsby Grunow
Viking	Halson Radio Mfg. Corp.
Viking	King Mfg. Co.
Viking	Ozarka, Inc.
Virtuoso	Splitdorf Radio Corp.
Visionola	Sparks Withington Co.
Vitatone	Zaney Gill Corp.
	W
Wallace	E. C. Atkins & Co.
Wallace	Try-Mo Radio Co., Inc.
Walton	Northwest Specialty Service
Ware	Ware Mfg. Corp.

TRADE NAME CHART

TRADE NAME	MANUFACTURER
Warwick	Amrad Corp.
Warwick	Sears Roebuck & Co.
Warwick	Splitdorf Radio Co.
Wellington	Sears Roebuck & Co.
Wells Gardner	Wells Gardner & Co.
Westinghouse	Westinghouse Elec. & Mfg.
Westminster	Sears Roebuck & Co.
Whitehall	Grigsby Grunow Co.
Wilcox-Gay	Wilcox Gay Corp.
Windsor	Amrad Corp.
Windsor	De Forest Radio Corp.
Winthrop	Splitdorf Radio Corp.
Wolverine	Laurehk Radio Mfg. Labs.
Wonder Bar	Wonder Bar Radio Corp.
Woods Desk	Crosley Radio Corp.
World	Simplex Radio Corp.
World Cruiser	Remler Co., Ltd.
Wurlitzer	Rudolph Wurlitzer Piano Co.
	Y
York	De Forest Radio Corp.
	Z
Zaney Gill	Zaney Gill Corp.
Zenette	Zenith Radio Corp.
Zenith	Zenith Radio Corp.

TYPE	NAME	BASE	SOCKET CONNECTIONS	DIMENSIONS MAXIMUM OVERALL — LENGTH X DIAMETER	CATHODE TYPE ■	RATING — FILAMENT OR HEATER VOLTS	RATING — FILAMENT OR HEATER AMPERES	RATING — PLATE MAX. VOLTS	RATING — SCREEN MAX. VOLTS	USE — Values to right give operating conditions and characteristics for indicated typical use	PLATE SUPPLY VOLTS	GRID VOLTS ■	SCREEN VOLTS	SCREEN MILLI-AMP.	PLATE MILLI-AMP.	A-C PLATE RESISTANCE OHMS	MUTUAL CONDUCTANCE MICROMHOS	VOLTAGE AMPLIFICATION FACTOR	LOAD FOR STATED POWER OUTPUT OHMS	POWER OUTPUT WATTS	TYPE
1A6	PENTAGRID CONVERTER ●	SMALL 6-PIN	FIG. 26	$4\frac{17}{32}$″ x $1\frac{9}{16}$″	D-C FILAMENT	2.0	0.06	180	67.5	CONVERTER	180	{ −3.0 min. }	67.5	2.4	1.3	500000	Anode-Grid (#2) 135 max. volts, 2.3 ma. Oscillator Grid (#1) Resistor, 50000 ohms. Conversion conductance, 300 micromhos.				1A6
1C6	PENTAGRID CONVERTER ●	SMALL 6-PIN	FIG. 26	$4\frac{17}{32}$″ x $1\frac{9}{16}$″	D-C FILAMENT	2.0	0.12	180	67.5	CONVERTER	180	{ −3.0 min. }	67.5	2.0	1.5	750000	Anode Grid (#2) 135 max. volts, 3.3 ma. Oscillator Grid (#1) Resistor, 50000 ohms. Conversion conductance, 325 micromhos.				1C6
2A3	POWER AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	$5\frac{3}{8}$″ x $2\frac{1}{16}$″	FILAMENT	2.5	2.5	250	—	CLASS A AMPLIFIER	250	−45	—	—	60.0	800	5250	4.2	2500	3.5	2A3
								300	—	PUSH-PULL AMPLIFIER	300	−62	Self-bias		40.0	Power Output is for 2 tubes at			5000	10.0	
								300	—		300	−62	Fixed-bias		40.0	stated load, plate-to-plate			3000	15.0	
2A5	POWER AMPLIFIER PENTODE	MEDIUM 6-PIN	FIG. 15A	$4\frac{11}{16}$″ x $1\frac{13}{16}$″	HEATER	2.5	1.75	250	250	CLASS A AMPLIFIER	250	−16.5	250	6.5	34.0	100000	2200	220	7000	3.0	2A5
2A6	DUPLEX-DIODE HIGH-MU TRIODE	SMALL 6-PIN	FIG. 13	$4\frac{17}{32}$″ x $1\frac{9}{16}$″	HEATER	2.5	0.8	250	—	TRIODE UNIT AS CLASS A AMPLIFIER	250 ✖	−1.35	—	—	0.4	—	—	Gain per stage = 50-60			2A6
2A7	PENTAGRID CONVERTER ●	SMALL 7-PIN	FIG. 20	$4\frac{17}{32}$″ x $1\frac{9}{16}$″	HEATER	2.5	0.8	250	100	CONVERTER	250	{ −3.0 min. }	100	2.2	3.5	360000	Anode Grid (#2) 200 max. volts, 4.0 ma. Oscillator Grid (#1) Resistor, 50000 ohms. Conversion conductance, 520 micromhos.				2A7
2B7	DUPLEX-DIODE PENTODE	SMALL 7-PIN	FIG. 21	$4\frac{17}{32}$″ x $1\frac{9}{16}$″	HEATER	2.5	0.8	250	125	PENTODE UNIT AS R-F AMPLIFIER	100	−3.0	100	1.7	5.8	300000	950	285	—	—	2B7
											250	−3.0	125	2.3	9.0	650000	1125	730	—	—	
										PENTODE UNIT AS A-F AMPLIFIER	250✖	−4.5	50	—	0.65	—	—	—	—	—	
6A4 *also LA*	POWER AMPLIFIER PENTODE	MEDIUM 5-PIN	FIG. 6	$4\frac{11}{16}$″ x $1\frac{13}{16}$″	FILAMENT	6.3	0.3	180	180	CLASS A AMPLIFIER	100	−6.5	100	1.6	9.0	83250	1200	100	11000	0.31	6A4 *also LA*
											180	−12.0	180	3.9	22.0	45500	2200	100	8000	1.40	
6A7	PENTAGRID CONVERTER ●	SMALL 7-PIN	FIG. 20	$4\frac{17}{32}$″ x $1\frac{9}{16}$″	HEATER	6.3	0.3	250	100	CONVERTER	250	{ −3.0 min. }	100	2.2	3.5	360000	Anode Grid (#2) 200 max. volts, 4.0 ma. Oscillator Grid (#1) Resistor, 50000 ohms. Conversion conductance, 520 micromhos.				6A7
6B7	DUPLEX-DIODE PENTODE	SMALL 7-PIN	FIG. 21	$4\frac{17}{32}$″ x $1\frac{9}{16}$″	HEATER	6.3	0.3	250	125	PENTODE UNIT AS R-F AMPLIFIER	100	−3.0	100	1.7	5.8	300000	950	285	—	—	6B7
											250	−3.0	125	2.3	9.0	650000	1125	730	—	—	
										PENTODE UNIT AS A-F AMPLIFIER	250✖	−4.5	50	—	0.65	—	—	—	—	—	
6C6	TRIPLE-GRID DETECTOR AMPLIFIER	SMALL 6-PIN	FIG. 11	$4\frac{15}{16}$″ x $1\frac{9}{16}$″	HEATER	6.3	0.3	250	100	SCREEN GRID R-F AMPLIFIER	250	−3.0	100	0.5	2.0	exceeds 1.5 meg	1225	exceeds 1500	—	—	6C6
										BIAS DETECTOR	250	−1.95	50	Cathode current 0.65 ma.		—	Plate coupling resistor 250000 ohms. Grid coupling resistor 250000 ohms.**			
6D6	TRIPLE-GRID SUPER-CONTROL AMPLIFIER	SMALL 6-PIN	FIG. 11	$4\frac{15}{16}$″ x $1\frac{9}{16}$″	HEATER	6.3	0.3	250	100	SCREEN GRID R-F AMPLIFIER	250	{ −3.0 min. }	100	2.0	8.2	800000	1600	1280	—	—	6D6
										MIXER IN SUPERHETERODYNE	250	−10.0	100	—	—		Oscillator peak volts = 7.0.				

■ Grids #3 and #5 are screen. Grid #4 is signal-input control-grid.

✖ Applied through plate coupling resistor of 200000 ohms. **For grid of following tube.

✖ Applied through plate coupling resistor of 250000 ohms.

6F7	TRIODE-PENTODE	SMALL 7-PIN	FIG. 27	$4\frac{17}{32}$″ x $1\frac{9}{16}$″	HEATER	6.3	0.3	100	—	TRIODE UNIT AS AMPLIFIER	100	−3.0	—	—	3.5	17800	450	8	—	—	6F7
								250	100	PENTODE UNIT AS AMPLIFIER	250	{ −3.0 min. }	100	1.5	6.5	850000	1100	900	—	—	
								250	100	PENTODE UNIT AS MIXER	250	−10.0	100	0.6	2.8	Oscillator peak volts = 7.0. Conversion conductance = 300 micromhos.					
'00-A	DETECTOR TRIODE	MEDIUM 4-PIN	FIG. 1	$4\frac{11}{16}$″ x $1\frac{13}{16}$″	D-C FILAMENT	5.0	0.25	45	—	GRID LEAK DETECTOR	45	Grid Return to (−) Filament			1.5	30000	666	20	—	—	'00-A
01-A	DETECTOR★ AMPLIFIER	MEDIUM 4-PIN	FIG. 1	$4\frac{11}{16}$″ x $1\frac{13}{16}$″	D-C FILAMENT	5.0	0.25	135	—	CLASS A AMPLIFIER	90	−4.5	—	—	2.5	11000	725	8.0	—	—	01-A
											135	−9.0			3.0	10000	800	8.0			
10	POWER AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	$5\frac{3}{8}$″ x $2\frac{1}{16}$″	FILAMENT	7.5	1.25	425	—	CLASS A AMPLIFIER	350	−31.0	—	—	16.0	5150	1550	8.0	11000	0.9	10
											425	−39.0			18.0	5000	1600	8.0	19200	1.6	
11	DETECTOR★ AMPLIFIER TRIODE	WD 4-PIN	FIG. 12	$4\frac{1}{8}$″ x $1\frac{3}{16}$″	D-C FILAMENT	1.1	0.25	135	—	CLASS A AMPLIFIER	90	−4.5	—	—	2.5	15500	425	6.6	—	—	11
12		MEDIUM 4-PIN	FIG. 1	$4\frac{11}{16}$″ x $1\frac{7}{16}$″							135	−10.5			3.0	15000	440	6.6			12
19	TWIN-TRIODE AMPLIFIER	SMALL 6-PIN	FIG. 25	$4\frac{1}{4}$″ x $1\frac{9}{16}$″	D-C FILAMENT	2.0	0.26	135	—	CLASS B AMPLIFIER	135	0	—	—	Power output value is for one tube at stated load, plate-to-plate.				10000	2.1	19
											135	−3.0							10000	1.9	
'20	POWER AMPLIFIER TRIODE	SMALL 4-PIN	FIG. 1	$4\frac{1}{8}$″ x $1\frac{3}{16}$″	D-C FILAMENT	3.3	0.132	135	—	CLASS A AMPLIFIER	90	−16.5	—	—	3.0	8000	415	3.3	9600	0.045	'20
											135	−22.5			6.5	6300	525	3.3	6500	0.110	
22	R-F AMPLIFIER TETRODE	MEDIUM 4-PIN	FIG. 4	$5\frac{1}{32}$″ x $1\frac{13}{16}$″	D-C FILAMENT	3.3	0.132	135	67.5	SCREEN GRID R-F AMPLIFIER	135	−1.5	45	0.6*	1.7	725000	375	270	—	—	22
											135	−1.5	67.5	1.3*	3.7	325000	500	160			
24-A	R-F AMPLIFIER TETRODE	MEDIUM 5-PIN	FIG. 9	$5\frac{1}{32}$″ x $1\frac{13}{16}$″	HEATER	2.5	1.75	275	90	SCREEN GRID R-F AMPLIFIER	180	−3.0	90	1.7*	4.0	400000	1000	400	—	—	24-A
											250	−3.0	90	1.7*	4.0	600000	1050	630			
										BIAS DETECTOR	250●	{ −5.0 approx. }	20 to 45	—	Plate current to be adjusted to 0.1 milliampere with no signal.					

★ For Grid-leak Detection—plate volts 45, grid return to + filament or to cathode.

■ Either A. C. or D. C. may be used on filament or heater, except as specifically noted. For use of D. C. on A-C filament types, decrease stated grid volts by ½ (approx.) of filament voltage.

● Applied through plate coupling resistor of 250000 ohms or 500-henry choke shunted by 0.25 megohm resistor.

▼ Applied through plate coupling resistor of 100000 ohms.

*Maximum.

TYPE	NAME	BASE	SOCKET CONNECTIONS	DIMENSIONS MAXIMUM OVERALL LENGTH X DIAMETER	CATHODE TYPE ■	RATING: FILAMENT OR HEATER VOLTS	RATING: FILAMENT OR HEATER AMPERES	RATING: PLATE MAX. VOLTS	RATING: SCREEN MAX. VOLTS	USE (Values to right give operating conditions and characteristics for indicated typical use)	PLATE SUPPLY VOLTS	GRID VOLTS ■	SCREEN VOLTS	SCREEN MILLIAMP.	PLATE MILLIAMP.	A-C PLATE RESISTANCE OHMS	MUTUAL CONDUCTANCE MICROMHOS	VOLTAGE AMPLIFICATION FACTOR	LOAD FOR STATED POWER OUTPUT OHMS	POWER OUTPUT WATTS	TYPE
26	AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	4 1/16" x 1 13/16"	FILAMENT	1.5	1.05	180	—	CLASS A AMPLIFIER	90 180	− 7.0 −14.5	—	—	2.9 6.2	8900 7300	935 1150	8.3 8.3	—	—	26
27	DETECTOR★ AMPLIFIER TRIODE	MEDIUM 5-PIN	FIG. 8	4 1/4" x 1 9/16"	HEATER	2.5	1.75	275	—	CLASS A AMPLIFIER	135 250	− 9.0 −21.0	—	—	4.5 5.2	9000 9250	1000 975	9.0 9.0	—	—	27
										BIAS DETECTOR	250	−30.0 (approx.)	—	—	Plate current to be adjusted to 0.2 milliampere with no signal.						
30	DETECTOR★ AMPLIFIER TRIODE	SMALL 4-PIN	FIG. 1	4 1/4" x 1 9/16"	D-C FILAMENT	2.0	0.06	180	—	CLASS A AMPLIFIER	90 135 180	− 4.5 − 9.0 −13.5	—	—	2.5 3.0 3.1	11000 10300 10300	850 900 900	9.3 9.3 9.3	—	—	30
★For Grid-leak Detection—plate volts 45, grid return to + filament or to cathode.										● Applied through plate coupling resistor of 250000 ohms or 500-henry choke shunted by 0.25 megohm resistor.										*Maximum.	
31	POWER AMPLIFIER TRIODE	SMALL 4-PIN	FIG. 1	4 1/4" x 1 9/16"	D-C FILAMENT	2.0	0.13	180	—	CLASS A AMPLIFIER	135 180	−22.5 −30.0	—	—	8.0 12.3	4100 3600	925 1050	3.8 3.8	7000 5700	0.185 0.375	31
32	R-F AMPLIFIER TETRODE	MEDIUM 4-PIN	FIG. 4	5 1/32" x 1 13/16"	D-C FILAMENT	2.0	0.06	180	67.5	SCREEN GRID R-F AMPLIFIER	135 180	− 3.0 − 3.0	67.5 67.5	0.4* 0.4*	1.7 1.7	950000 1200000	640 650	610 780	—	—	32
										BIAS DETECTOR	180▼	−6.0 (approx.)	67.5	—	Plate current to be adjusted to 0.2 milliampere with no signal.						
33	POWER AMPLIFIER PENTODE	MEDIUM 5-PIN	FIG. 8	4 1/16" x 1 13/16"	D-C FILAMENT	2.0	0.26	180	180	CLASS A AMPLIFIER	180	−18.0	180	5.0	22.0	55000	1700	90	6000	1.4	33
34	SUPER-CONTROL R-F AMPLIFIER PENTODE	MEDIUM 4-PIN	FIG. 4A	5 1/32" x 1 13/16"	D-C FILAMENT	2.0	0.06	180	67.5	SCREEN GRID R-F AMPLIFIER	135 180	− 3.0 min. 67.5	67.5 67.5	1.0 1.0	2.8 2.8	600000 1000000	600 620	360 620	—	—	34
35	SUPER-CONTROL R-F AMPLIFIER TETRODE	MEDIUM 5-PIN	FIG. 9	5 1/32" x 1 13/16"	HEATER	2.5	1.75	275	90	SCREEN GRID R-F AMPLIFIER	180 250	− 3.0 min. 90	90 90	2.5* 2.5*	6.3 6.5	300000 400000	1020 1050	305 420	—	—	35
36	R-F AMPLIFIER TETRODE	SMALL 5-PIN	FIG. 9	4 17/32" x 1 9/16"	HEATER	6.3	0.3	250	90	SCREEN GRID R-F AMPLIFIER	100 180 250	− 1.5 − 3.0 − 3.0	55 90 90	— — 1.7*	1.8 3.1 3.2	550000 500000 550000	850 1050 1060	470 525 595	—	—	36
										BIAS DETECTOR	100● 250●	− 5.0 − 8.0	55 90	—	Plate current to be adjusted to 0.1 milliampere with no signal.						
37	DETECTOR★ AMPLIFIER TRIODE	SMALL 5-PIN	FIG. 8	4 1/4" x 1 9/16"	HEATER	6.3	0.3	250	—	CLASS A AMPLIFIER	90 180 250	− 6.0 −13.5 −18.0	—	—	2.5 4.3 7.5	11500 10200 8400	800 900 1100	9.2 9.2 9.2	—	—	37
										BIAS DETECTOR	90 250	−10.0 −28.0	—	—	Plate current to be adjusted to 0.2 milliampere with no signal.						
38	POWER AMPLIFIER PENTODE	SMALL 5-PIN	FIG. 9A	4 17/32" x 1 9/16"	HEATER	6.3	0.3	250	250	CLASS A AMPLIFIER	100 180 250	− 9.0 −18.0 −25.0	100 180 250	1.2 2.4 3.8	7.0 14.0 22.0	140000 115000 100000	875 1050 1200	120 120 120	15000 11600 10000	0.27 1.00 2.50	38
39-44	SUPER-CONTROL R-F AMPLIFIER PENTODE	SMALL 5-PIN	FIG. 9A	4 17/32" x 1 9/16"	HEATER	6.3	0.3	250	90	SCREEN GRID R-F AMPLIFIER	90 180 250	− 3.0 min. 90 90	90 90 90	1.6 1.4 1.4	5.6 5.8 5.8	375000 750000 1000000	960 1000 1050	360 750 1050	—	—	39-44
40	VOLTAGE AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	4 1/16" x 1 13/16"	D-C FILAMENT	5.0	0.25	180	—	CLASS A AMPLIFIER	135■ 180■	− 1.5 − 3.0	—	—	0.2 0.2	150000 150000	200 200	30 30	—	—	40
41	POWER AMPLIFIER PENTODE	SMALL 6-PIN	FIG. 15A	4 1/4" x 1 9/16"	HEATER	6.3	0.4	250	250	CLASS A AMPLIFIER	100 180 250	− 7.0 −13.5 −18.0	100 180 250	1.6 3.0 5.5	9.0 18.5 32.0	103500 81000 68000	1450 1850 2200	150 150 150	12000 9000 7600	0.33 1.50 3.40	41
42	POWER AMPLIFIER PENTODE	MEDIUM 6-PIN	FIG. 15A	4 1/16" x 1 13/16"	HEATER	6.3	0.7	250	250	CLASS A AMPLIFIER	250	−16.5	250	6.5	34.0	100000	2200	220	7000	3.00	42
43	POWER AMPLIFIER PENTODE	MEDIUM 6-PIN	FIG. 15A	4 1/16" x 1 13/16"	HEATER	25.0	0.3	135	135	CLASS A AMPLIFIER	95 135	−15.0 −20.0	95 135	4.0 7.0	20.0 34.0	45000 35000	2000 2300	90 80	4500 4000	0.90 2.00	43
45	POWER AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	4 1/16" x 1 13/16"	FILAMENT	2.5	1.5	275	—	CLASS A AMPLIFIER	180 250 275	−31.5 −50.0 −56.0	180 250 275	—	31.0 34.0 36.0	1650 1610 1700	2125 2175 2050	3.5 3.5 3.5	2700 3900 4600	0.82 1.60 2.00	45
46	DUAL-GRID POWER AMPLIFIER	MEDIUM 5-PIN	FIG. 7	5 5/8" x 2 3/16"	FILAMENT	2.5	1.75	250	—	CLASS A AMPLIFIER □	250	−33.0	—	—	22.0	2380	2350	5.6	6400	1.25	46
								400	—	CLASS B AMPLIFIER ♦	300 400	0 0	—	—	Power output values are for 2 tubes at indicated plate-to-plate load.				5200 5800	16.0 20.0	
47	POWER AMPLIFIER PENTODE	MEDIUM 5-PIN	FIG. 6	5 3/8" x 2 1/16"	FILAMENT	2.5	1.75	250	250	CLASS A AMPLIFIER	250	−16.5	250	6.0	31.0	60000	2500	150	7000	2.7	47
48	POWER AMPLIFIER TETRODE	MEDIUM 6-PIN	FIG. 15	5 3/8" x 2 1/16"	D-C HEATER	30.0	0.4	125	100	CLASS A AMPLIFIER	96 125	−19.0 −20.0	96 100	9.0 9.5	52.0 56.0	— —	3800 3900	— —	1500 1500	2.0 2.5	48

★For Grid-leak Detection—plate volts 45, grid return to + filament or to cathode.
■Either A. C. or D. C. may be used on filament or heater, except as specifically noted. For use of D. C. on A-C filament types, decrease stated grid volts by ½ (approx.) of filament voltage.

●Applied through plate coupling resistor of 250000 ohms or 500-henry choke shunted by 0.25 megohm resistor.
▼Applied through plate coupling resistor of 100000 ohms.

*Maximum.

TYPE	NAME	BASE	SOCKET CONNECTIONS	DIMENSIONS MAXIMUM OVERALL LENGTH X DIAMETER	CATHODE TYPE ■	RATING: FILAMENT OR HEATER VOLTS	RATING: FILAMENT OR HEATER AMPERES	RATING: PLATE MAX. VOLTS	RATING: SCREEN MAX. VOLTS	USE (Values to right give operating conditions and characteristics for indicated typical use)	PLATE SUPPLY VOLTS	GRID VOLTS ■	SCREEN VOLTS	SCREEN MILLIAMP.	PLATE MILLIAMP.	A-C PLATE RESISTANCE OHMS	MUTUAL CONDUCTANCE MICROMHOS	VOLTAGE AMPLIFICATION FACTOR	LOAD FOR STATED POWER OUTPUT OHMS	POWER OUTPUT WATTS	TYPE
49	DUAL-GRID POWER AMPLIFIER	MEDIUM 5-PIN	FIG. 7	4 11/16" x 1 13/16"	D-C FILAMENT	2.0	0.12	135	—	CLASS A AMPLIFIER □	135	−20.0	—	—	6.0	4175	1125	4.7	11000	0.17	49
								180	—	CLASS B AMPLIFIER ◆	180	0	—	—	Power output values are for 2 tubes at indicated plate-to-plate load.				12000	3.5	
50	POWER AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	6 1/4" x 2 11/16"	FILAMENT	7.5	1.25	450	—	CLASS A AMPLIFIER	300	−54.0	—	—	35.0	2000	1900	3.8	4600	1.6	50
											400	−70.0	—	—	55.0	1800	2100	3.8	3670	3.4	
											450	−84.0	—	—	55.0	1800	2100	3.8	4350	4.6	
53	TWIN-TRIODE AMPLIFIER	MEDIUM 7-PIN#	FIG. 24	4 11/16" x 1 13/16"	HEATER	2.5	2.0	300	—	CLASS B AMPLIFIER	250	0	—	—	Power output value is for one tube at stated load, plate-to-plate.				8000	8.0	53
											300	0	—	—					10000	10.0	
55	DUPLEX-DIODE TRIODE	SMALL 6-PIN	FIG. 13	4 1/32" x 1 9/16"	HEATER	2.5	1.0	250	—	TRIODE UNIT AS CLASS A AMPLIFIER	135	−10.5	—	—	3.7	11000	750	8.3	25000	0.075	55
											180	−13.5	—	—	6.0	8500	975	8.3	20000	0.160	
											250	−20.0	—	—	8.0	7500	1100	8.3	20000	0.350	
56	SUPER-TRIODE AMPLIFIER DETECTOR★	SMALL 5-PIN	FIG. 8	4 1/4" x 1 9/16"	HEATER	2.5	1.0	250	—	CLASS A AMPLIFIER	250	−13.5	—	—	5.0	9500	1450	13.8	—	—	56
										BIAS DETECTOR	250	−20.0 (approx.)	—	—	Plate current to be adjusted to 0.2 milliampere with no signal.						
57	TRIPLE-GRID DETECTOR AMPLIFIER	SMALL 6-PIN	FIG. 11	4 13/16" x 1 9/16"	HEATER	2.5	1.0	250	100	SCREEN GRID R-F AMPLIFIER	250	− 3.0	100	0.5	2.0	exceeds 1.5 meg.	1225	exceeds 1500	—	—	57
										BIAS DETECTOR	250	− 1.95	50	Cathode current 0.65 ma.		Plate coupling resistor 250000 ohms. Grid coupling resistor 250000 ohms**				

★For Grid-leak Detection—plate volts 45, grid return to + filament or to cathode
Requires different socket from small 7-pin.
□ Grid next to plate tied to plate. ◆ Two grids tied together. **For grid of following tube.
✕ Applied through plate coupling resistor of 250000 ohms.

TYPE	NAME	BASE	SOCKET CONNECTIONS	DIMENSIONS MAXIMUM OVERALL LENGTH X DIAMETER	CATHODE TYPE ■	RATING: FILAMENT OR HEATER VOLTS	RATING: FILAMENT OR HEATER AMPERES	RATING: PLATE MAX. VOLTS	RATING: SCREEN MAX. VOLTS	USE (Values to right give operating conditions and characteristics for indicated typical use)	PLATE SUPPLY VOLTS	GRID VOLTS ■	SCREEN VOLTS	SCREEN MILLIAMP.	PLATE MILLIAMP.	A-C PLATE RESISTANCE OHMS	MUTUAL CONDUCTANCE MICROMHOS	VOLTAGE AMPLIFICATION FACTOR	LOAD FOR STATED POWER OUTPUT OHMS	POWER OUTPUT WATTS	TYPE
58	TRIPLE-GRID SUPER-CONTROL AMPLIFIER	SMALL 6-PIN	FIG. 11	4 13/16" x 1 9/16"	HEATER	2.5	1.0	250	100	SCREEN GRID R-F AMPLIFIER	250	− 3.0 min.	100	2.0	8.2	800000	1600	1280	—	—	58
										MIXER IN SUPERHETERODYNE	250	−10.0	100	—	—	Oscillator peak volts = 7.0.				
59	TRIPLE-GRID POWER AMPLIFIER	MEDIUM 7-PIN#	FIG. 18	5 3/8" x 2 1/16"	HEATER	2.5	2.0	250	—	AS TRIODE ¶ CLASS A AMPLIFIER	250	−28.0	—	—	26.0	2300	2600	6.0	5000	1.25	59
								250	250	AS PENTODE ■■ CLASS A AMPLIFIER	250	−18.0	250	9.0	35.0	40000	2500	100	6000	3.00	
								400	—	AS TRIODE ⊕ CLASS B AMPLIFIER	300	0	—	—	Power output values are for 2 tubes at indicated plate-to-plate load.				4600	15.0	
											400	0							6000	20.0	
71-A	POWER AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	4 11/16" x 1 13/16"	FILAMENT	5.0	0.25	180	—	CLASS A AMPLIFIER	90	−19.0	—	—	10.0	2170	1400	3.0	3000	0.125	71-A
											180	−43.0			20.0	1750	1700	3.0	4800	0.790	
75	DUPLEX-DIODE HIGH-MU TRIODE	SMALL 6-PIN	FIG. 13	4 1/32" x 1 9/16"	HEATER	6.3	0.3	250	—	TRIODE UNIT AS CLASS A AMPLIFIER	250✕	−1.35	—	—	0.4	—	—	Gain per stage = 50-60			75
76	SUPER-TRIODE AMPLIFIER DETECTOR★	SMALL 5-PIN	FIG. 8	4 1/4" x 1 9/16"	HEATER	6.3	0.3	250	—	CLASS A AMPLIFIER	250	−13.5	—	—	5.0	9500	1450	13.8	—	—	76
										BIAS DETECTOR	250	−20.0	—	—	Plate current to be adjusted to 0.2 milliampere with no signal.						
77	TRIPLE-GRID DETECTOR AMPLIFIER	SMALL 6-PIN	FIG. 11	4 1/32" x 1 9/16"	HEATER	6.3	0.3	250	100	SCREEN GRID R-F AMPLIFIER	100	− 1.5	60	0.4	1.7	650000	1100	715	—	—	77
											250	− 3.0	100	0.5	2.3	1500000	1250	1500			
										BIAS DETECTOR	250	− 1.95	50	Cathode current 0.65 ma.			Plate coupling resistor 250000 ohms. Grid coupling resistor 250000 ohms**				
78	TRIPLE-GRID SUPER-CONTROL AMPLIFIER	SMALL 6-PIN	FIG. 11	4 1/32" x 1 9/16"	HEATER	6.3	0.3	250	125	SCREEN GRID R-F AMPLIFIER	90	− 3.0 min.	90	1.3	5.4	315000	1275	400	—	—	78
											180		75	1.0	4.0	1000000	1100	1100			
											250		100	1.7	7.0	800000	1450	1160			
											250		125	2.6	10.5	600000	1650	990			
79	TWIN-TRIODE AMPLIFIER	SMALL 8-PIN	FIG. 19	4 1/32" x 1 9/16"	HEATER	6.3	0.6	250	—	CLASS B AMPLIFIER	180	0	—	—	Power output value is for one tube at stated load, plate-to-plate.				7000	5.5	79
											250	0							14000	8.0	
85	DUPLEX-DIODE TRIODE	SMALL 6-PIN	FIG. 13	4 1/32" x 1 9/16"	HEATER	6.3	0.3	250	—	TRIODE UNIT AS CLASS A AMPLIFIER	135	−10.5	—	—	3.7	11000	750	8.3	25000	0.075	85
											180	−13.5			6.0	8500	975	8.3	20000	0.160	
											250	−20.0			8.0	7500	1100	8.3	20000	0.350	
89	TRIPLE-GRID POWER AMPLIFIER	SMALL 6-PIN	FIG. 14	4 1/32" x 1 9/16"	HEATER	6.3	0.4	250	250	AS TRIODE ¶ CLASS A AMPLIFIER	160	−20.0	—	—	17.0	3300	1425	4.7	7000	0.300	89
											180	−22.5			20.0	3000	1550	4.7	6500	0.400	
											250	−31.0			32.0	2600	1800	4.7	5500	0.900	
										AS PENTODE ■■ CLASS A AMPLIFIER	100	−10.0	100	1.6	9.5	104000	1200	125	10700	0.33	
											180	−18.0	180	3.0	20.0	80000	1550	125	8000	1.50	
											250	−25.0	250	5.5	32.0	70000	1800	125	6750	3.40	
										AS TRIODE ⊕ CLASS B AMPLIFIER	180	0	—	—	Power output values are for 2 tubes at indicated plate-to-plate load.				13600	2.50	
																			9400	3.50	
V-'99 X-'99	DETECTOR★ AMPLIFIER TRIODE	SMALL 4-NUB SMALL 4-PIN	FIG. 10 FIG. 1	3 3/8" x 1 1/16" 4 1/8" x 1 3/16"	D-C FILAMENT	3.3	0.063	90	—	CLASS A AMPLIFIER	90	− 4.5	—	—	2.5	15500	425	6.6	—	—	V-'99 X-'99
112-A	DETECTOR★ AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	4 11/16" x 1 13/16"	D-C FILAMENT	5.0	0.25	180	—	CLASS A AMPLIFIER	90	− 4.5	—	—	5.0	5400	1575	8.5	—	—	112-A
											180	−13.5			7.7	4700	1800	8.5			

★For Grid-leak Detection—plate volts 45, grid return to + filament or to cathode.
■ Either A. C. or D. C. may be used on filament or heater, except as specifically noted. For use of D. C. on A-C filament types, decrease stated grid volts by ½ (approx.) of filament voltage.
Requires different socket from small 7-pin.

■■ Grid #1 is control grid. Grid #2 is screen. Grid #3 tied to cathode.
¶ Grid #1 is control grid. Grids #2 and #3 tied to plate. ✕ Applied through plate coupling resistor of 250000 ohms.
⊕ Grids #1 and #2 connected together. Grid #3 tied to plate. **For grid of following tube.

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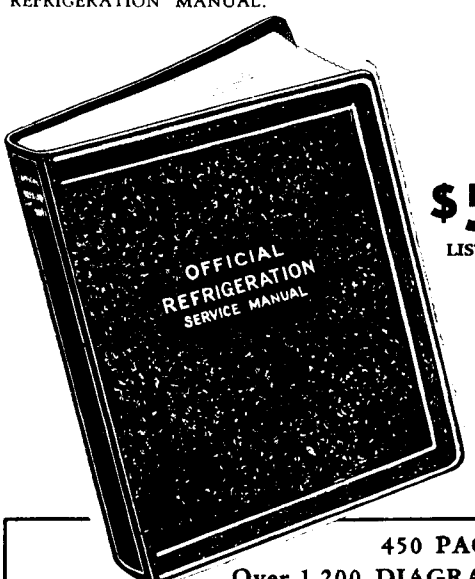

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RECTIFIERS

5Z3	FULL-WAVE RECTIFIER	MEDIUM 4-PIN	FIG. 2	$5\frac{3}{8}$" x $2\frac{1}{16}$"	FILAMENT	5.0	3.0	—	—	Maximum A-C Voltage per Plate.....500 Volts, RMS Maximum D-C Output Current.....250 Milliamperes	5Z3
12Z3	HALF-WAVE RECTIFIER	SMALL 4-PIN	FIG. 22	$4\frac{1}{2}$" x $1\frac{9}{16}$"	HEATER	12.6	0.3	—	—	Maximum A-C Plate Voltage.....250 Volts, RMS Maximum D-C Output Current..... 60 Milliamperes	12Z3
25Z5	RECTIFIER-DOUBLER	SMALL 6-PIN	FIG. 5	$4\frac{1}{4}$" x $1\frac{9}{16}$"	HEATER	25.0	0.3	—	—	Maximum A-C Voltage per Plate.....125 Volts, RMS Maximum D-C Output Current.....100 Milliamperes	25Z5
1-V°	HALF-WAVE RECTIFIER	SMALL 4-PIN	FIG. 22	$4\frac{1}{2}$" x $1\frac{9}{16}$"	HEATER	6.3	0.3	—	—	Maximum A-C Plate Voltage.....350 Volts, RMS Maximum D-C Output Current..... 50 Milliamperes	1-V°
80	FULL-WAVE RECTIFIER	MEDIUM 4-PIN	FIG. 2	$4\frac{11}{16}$" x $1\frac{13}{16}$"	FILAMENT	5.0	2.0	—	—	A-C Voltage per Plate (Volts RMS)... 350 400 550 D-C Output Current (Maximum MA.) 125 110 135 The 550 volt rating applies to filter circuits having an input choke of at least 20 henries.	80
'81	HALF-WAVE RECTIFIER	MEDIUM 4-PIN	FIG. 3	$6\frac{1}{4}$" x $2\frac{7}{16}$"	FILAMENT	7.5	1.25	—	—	Maximum A-C Plate Voltage.....700 Volts, RMS Maximum D-C Output Current..... 85 Milliamperes	'81
82	FULL-WAVE ▶ RECTIFIER	MEDIUM 4-PIN	FIG. 2	$4\frac{11}{16}$" x $1\frac{13}{16}$"	FILAMENT	2.5	3.0	—	—	Maximum A-C Voltage per Plate.....500 Volts, RMS Maximum D-C Output Current.....125 Milliamperes Maximum Peak Inverse Voltage.....1400 Volts Maximum Peak Plate Current..... 400 Milliamperes	82
83	FULL-WAVE ▶ RECTIFIER	MEDIUM 4-PIN	FIG. 2	$5\frac{3}{8}$" x $2\frac{1}{16}$"	FILAMENT	5.0	3.0	—	—	Maximum A-C Voltage per Plate.....500 Volts, RMS Maximum D-C Output Current.....250 Milliamperes Maximum Peak Inverse Voltage.....1400 Volts Maximum Peak Plate Current..... 800 Milliamperes	83
84 *also 6Z4*	FULL-WAVE RECTIFIER	SMALL 6-PIN	FIG. 23	$4\frac{1}{4}$" x $1\frac{9}{16}$"	HEATER	6.3	0.5	—	—	Maximum A-C Voltage per Plate.....350 Volts, RMS Maximum D-C Output Current..... 50 Milliamperes	84 *also 6Z4*

▶ Mercury Vapor Type. ° Interchangeable with Type 1.

INDEX OF TYPES BY USE AND BY CATHODE VOLTAGE

CATHODE VOLTS	POWER AMPLIFIERS	VOLTAGE AMPLIFIERS *Including Duplex-Diode Types*	CONVERTERS IN SUPERHETERODYNES	DETECTORS	MIXER TUBES IN SUPERHETERODYNES	RECTIFIERS	CATHODE VOLTS
1.1	———	11, 12	—	11, 12	———	—	1.1
1.5	———	26	—	———	———	—	1.5
2.0	19, 31, 33, 49	30, 32, 34	1A6, 1C6	30, 32	1A6, 1C6, 34	—	2.0
2.5	2A3, 2A5, 45, 46, 47, 53, 59	2A6, 2B7, 24-A, 27, 35, 55, 56, 57, 58	2A7	2A6, 2B7, 24-A, 27, 55, 56, 57	2A7, 24-A, 35, 57, 58	82	2.5
3.3	'20	22, '99	—	'99	———	—	3.3

INDEX OF TYPES BY USE AND BY CATHODE VOLTAGE

CATHODE VOLTS	POWER AMPLIFIERS	VOLTAGE AMPLIFIERS *Including Duplex-Diode Types*	CONVERTERS IN SUPERHETERODYNES	DETECTORS	MIXER TUBES IN SUPERHETERODYNES	RECTIFIERS	CATHODE VOLTS
5.0	112-A, 71-A	01-A, 40, 112-A	—	00-A, 01-A, 40, 112-A	———	5Z3, 80, 83	5.0
6.3	6A4, 38, 41, 42, 79, 89	6B7, 6C6, 6D6, 6F7, 36, 37, 39-44, 75, 76, 77, 78, 85	6A7, 6F7	6B7, 6C6, 6F7, 36, 37, 75, 76, 77, 85	6A7, 6C6, 6D6, 6F7, 36, 39-44, 77, 78	1-v, 84	6.3
7.5	10, 50	———	—	———	———	'81	7.5
12.6	———	———	—	———	———	12Z3	12.6
25.0	43	———	—	———	———	25Z5	25.0
30.0	48	———	—	———	———	—	30.0

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Sparks-Withington Corp.
Stewart Radio & Tel. Corp
Stewart-Warner Corp.
Stromberg-Carlson Tel. Mfg. Co.
Transformer Corp. of Am.
United Amer. Bosch Corp.
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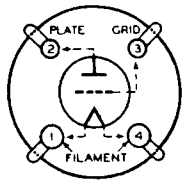

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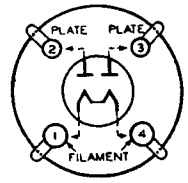

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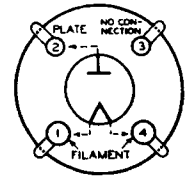

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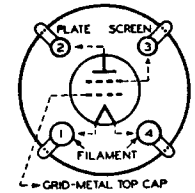


FIG.4

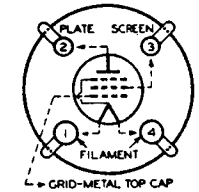


FIG.4A

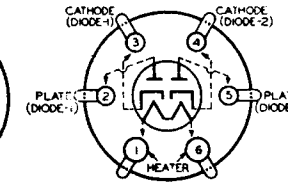
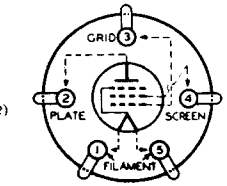


FIG.5



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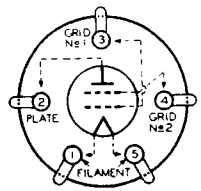
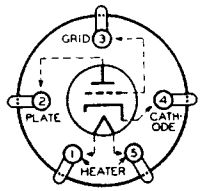


FIG.7



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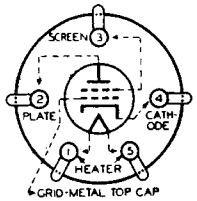


FIG.9

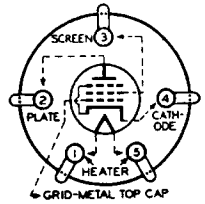


FIG.9A

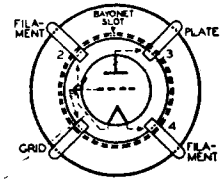
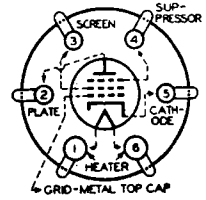


FIG.10



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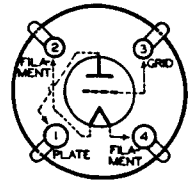
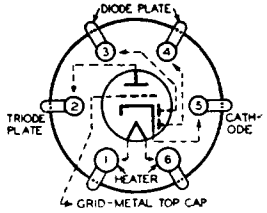


FIG.12



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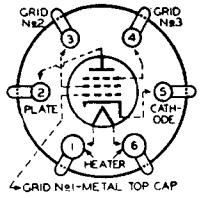


FIG.14

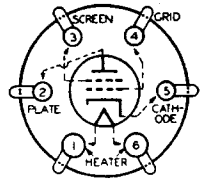


FIG.15

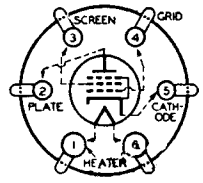


FIG.15A

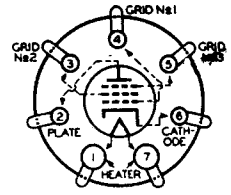
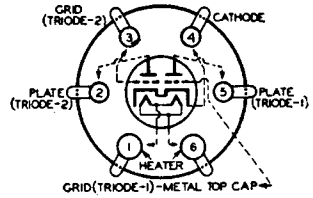


FIG.18



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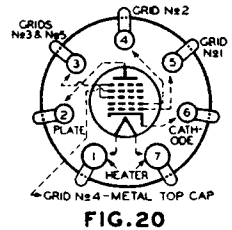


FIG.20

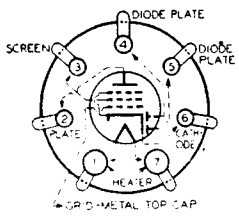
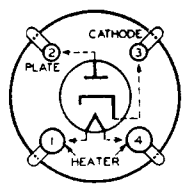


FIG.21



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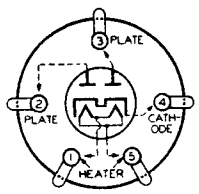

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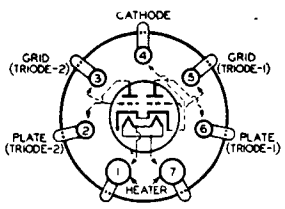

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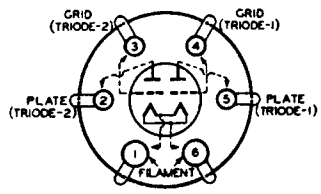

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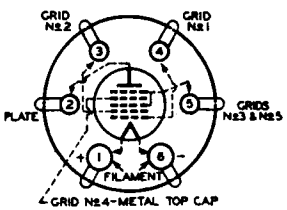

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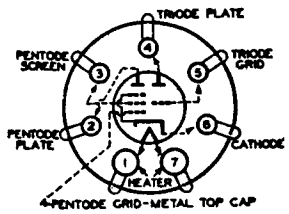

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Lyric K	908-150-650-40-250 2000-1700
AMRAD	
7 A.C.	2175-1555-350
70	5000-3600
82	475-300-1000-700
27	10700-8400-4700
ANSLEY RADIO	
U2	3000-4000
U3	1500-4500
U8	350-150-1500-4500
APEX	-550
8	500-1000-1200-600-600-
10	500-1000-1800-600-425
20	55-1250-3750
26	1000-2640
26P	640-360-2640
27	4700-8400-10700
28	7000-700-2200-70
48	700-2200-700
ARBORPHONE	
A.C. Model	1500-20000-0-1300-275
Model R-11	1100-250
Model R-11	8500-2000
ARGUS	
B-125	300-435-735
B-195	4000-460-700-65-280
BALKEIT	
AB6-180A-180B	6000-3000-1800
C	3600-770
F	4500-650
B7-89	7700-12000-4300
A7	10000-3200
AB6-135-135B	6000-3500
BOSCH (United American Bosch Corp.)	
28	5000
29-825	10000-10000
29-825	2000
28	1200
48	950-1450-2000
49	1650-800-1950
58	2050-1950-180-950
54D.C.	5 ohms
54D.C.	22 ohms
60-61	1300-2380-160-950
62-63 A.C.	1400-2600-250
62-63 A.C.	20000-50000-900-150
260R	3700-2270-1510
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BD	800-2200-1800-1000-2500
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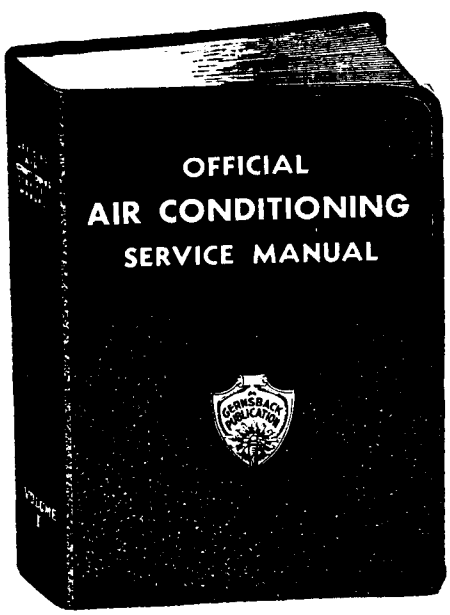
3KR8-AP736	7230 ohms
3KR8-AP736	1500-197-1970-1370-1129
3NW8	310-3850-310 (Bias)
3NW8	2200-300-4000-1280
3NW8	1500-1000-250-130-160
3-8-10-11-13	4920-900-700-90-40-120
PR-6	4250-4250-3200
D.C.	30-30
P-14	300-100-100-2600-7000

Name and Model	Resistance
CLARION	
A.C.160-25-160	3800-4300-2900-1150-1100-175
Series 100	11000-4100-4100-230
A.C.94-25-94	3800-4300-1800-1300-435-400-210
Series 120	40000-20000-15000
84 & 85	15000-20000
40	11000-4100-4100-120
80-81-90-91	15000-20000
D.C.61-25-61-A.C.70	13000-10000
A.C.60-25-60	167-13400-8200-4600
A.C.51-53-55 25-51-25-53-25-55	11500-25000
340	11250-6500-1000
300	2700-3060-350
A.C.280-25-280	10000-8100-1000
A.C.260-25-260	10000-8300-400
241	10000-8300-400
A.C.240-25-240	11000-8200-200
220	11000-4100-4100-220
COLONIAL	
28	8500-7000
28	2200-4000-1000
28	50000-50000-25000
32 A.C.	100-40
32 A.C.	210-210
33-34	60000-50000-11000-Orig.
32-33-34	2400-1800
32 D.C.	34.9 ohms
32 D.C.	1.43 ohms
32 D.C.	5.7 ohms
36-39 A.C.	100000-65000
36 D.C.	1.83-17.6-68
T345-C399	20000-50000-200-400 V.P.
C595	8000-15000-300
C695	8000-15000-400
C995	6000-50-1500-180-60
250AC-279AC-300AC	20000-50000-350
60E-67E	30000-30000-150 V.P.
131-Auto	40000-80000-600
134-Auto	40000-80000-1000
31A.C.	37000-37000-37000
31D.C.	Large Filament Resistor used 60 ohms
V.P. -- Variable Potentiometer	
COLUMBIA RADIO	
Screen-Grid 8	7500-10000
COLUMBIA KOLSTER	
C1-C3	3000-3000-220-60-840
C2-C4	900-120-90
C5-961-(205)	7200-60-90-700
C5-(310)	3400-3800-55-80-140-360
930-300	2000-140-500
C500	2000-135-500
902-903-980	2100-120-430
920	1650-410
931	6000-2200-135-700
940	2500-45-410
950	9000-3200-140-70-700
950	30000-20000
980	6000-55-100
CROSLEY	
704AC-602 Jewel Box	540-55-55
704AC-602	3475-1525
77-77-1 - 120	1750-2000-225-320
705	95-45
DAYFAN	
6 Jr.-5524-5525	2000-3000-1300 650
5050 Power Unit	1400-3500-5800-7000-180-
5080 Power Unit	1100-100-2000-3300-950
EARL	
31-31S-32-32S-41-33-33S	4000-0-750
31-32-33-41	5000 ohms
ECHOPHONE RADIO	
S4-S5-70-72-81	20000-50000
60-62-80-90-92	20000-25000
40	50000-50000
50	30000-25000
4	50000-40000
5-12-14-38	25000-25000
35-36	10000-500-7500-2500
10-15-16-20-17-18	25000-15000

Get Your Copy of this Book NOW!

Official Air Conditioning Service Manual



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A GOLDEN OPPORTUNITY FOR ALERT MEN IN THE NEXT GREAT INDUSTRY

THE idea of electricians, radio service men and other mechanically inclined men servicing Air Conditioning and Refrigeration Units is self-evident and the thought has occurred to some untold thousands ever since air conditioning equipment has been installed in public auditoriums, theatres, studios, department stores, office buildings and manufacturing plants. The tremendously broad possibilities in this new industry are bound to give employment and success to men far-sighted enough to see its advancement and development. We quote an excerpt from Mr. Hugo Gernsback's editorial which appeared in a recent issue of Everyday Science and Mechanics:

"I advise young and progressive men to go into the air-conditioning business during the next few years; because this, without a doubt, is the coming industry in this country. Thousands of small firms will spring up, undertaking to air-condition private houses, small business offices, factories, etc. We are not going to tear down every building in the United States immediately. It will be a gradual growth; yet small installation firms will air-condition small houses, and even single offices in small buildings."

This is only partial proof of the certain success of this new field. Further assurance is that engineering schools have already added many important courses on air conditioning to their regular curriculum. Architects and building contractors are giving considerable thought to installation of this equipment in structures which are now being planned and built. The beginning of this business will probably be similar to the auto and radio industry, but in a few short years it will surpass these two great fields.

The OFFICIAL AIR CONDITIONING SERVICE MANUAL is edited by L. K. Wright, an expert and a leading authority on air conditioning and refrigeration. He is a member of the American Society of Refrigerating Engineers, American Society of Mechanical Engineers, National Association of Practical Refrigerating Engineers; also author of the OFFICIAL REFRIGERATION SERVICE MANUAL and other volumes.

In this Air Conditioning Service Manual nearly every page is illustrated; every modern installation and individual part carefully explained; diagrams furnished of all known equipment; special care given to the servicing and installation end. The tools needed are illustrated and explained; there are plenty of charts and page after page of service data.

Remember there is a big opportunity in this new field and plenty of money to be made in the servicing end. There are thousands of firms selling installations and parts every day and this equipment must be cared for frequently. Eventually air conditioning systems will be as common as radios and refrigerators in homes, offices and industrial plants. Why not start now—increase your earnings with a full- or spare-time service business.

Here are some of the chapter heads of the AIR CONDITIONING SERVICE MANUAL:

CONTENTS IN BRIEF

History of Air Conditioning; Fundamental Laws; Methods of Refrigeration; Ejector System of Refrigeration; Compression System of Refrigeration; Refrigerants; Lubricating Oils; Liquid Throttle Devices; Servicing Expansion and Float Valves; Servicing Refrigerating Systems; Control Devices; Thermodynamics of Air Conditioning; Weather in the United States; The Field of Air Conditioning; Insulating Materials; Heat Transmission Through Walls; Complete Air Conditioning Systems; Estimating Requirements for the Home, Small Store, Restaurant; Layout of Duct Systems; Starting Up a System; Operating and Servicing Air Conditioning Systems; Air Filtration, Ventilating and Noise Eliminating Devices; Portable Electric Humidifiers and Room Coolers; Automatic Humidifiers; Air Conditioning Units for Radiator Systems and Warm Air Systems; Central Conditioning Units, etc.

MAIL COUPON TODAY!

GERNSBACK PUBLICATIONS Dept. OR-35
99 Hudson Street, New York, N. Y.

Gentlemen: Enclosed you will find my remittance of Five Dollars for which you are to send me One Copy of the OFFICIAL AIR CONDITIONING SERVICE MANUAL, **POSTAGE PREPAID.**

Name .....

Address .....

City ..... State .....

(Send remittance in form of check, money order or unused U. S. Postage Stamps. Register letter if it contains stamps or currency.)

GERNSBACK PUBLICATIONS, INC.
99 Hudson Street New York, N. Y.

VOLTAGE DIVIDER CHART (CON'T)

Name and Model	Resistance
EDISON	
R1-R2-C2	12500
R4-R5-C4	10000
R1-R2-C2	750-750
All other Models	8000
EMERSON RADIO & PHONOGRAPH CORP.	
S7	35000-50000
L755	1000-12500-15000
MAC7-M755	12000-20000
LAC7-L559-L557	23000-25000
L556	25000-25000
LAC4-L460-L456	25000-30000
BAC10-B10 Chassis	Tap on Speaker Field
DC4-L459-L457-L456	10000-30000
ERLA RADIO & ELEC. RESEARCH LAB.	
R1-A Power Units	8660-9000-55
510-(263)	25000-20000-0-400
530-540	25000-20000-0-400
520-(261)	None
550-560	Line Resistor 190 ohms
570	Line Resistor 145 ohms
610-(264)	25000-25000-0-500
810	None
1010-1020-1030	3340-3000-3500-220-2350-1040
248-249-252	None
FADA	
42-44-46-41-47	800-300-100
K.F.-K.G.	5000-20000-25000-3000-300, 2nd Divider, 750-800
KO-KOC	3000-15000-15000-7500
KU	13000-13000-7500
KW	25000-13000-75000
66KY	25000-10000-5000-125
RA-RC	25000-30000
RE	35000-35000
RG	35000-25000
FEDERAL	
D-E-F-G Units	135-2000-200-350
H Unit	3500-13000
FREED	
78-78S-79-79S-95S	4000-0-750
90-90S-65-95	5000 ohms
85-65	
FREED EISMANN	
NR-11	7.5 ohms
NR-11	360-90-90
NR-11	1750 ohms
NR-57 - NR-60	1750 ohms
NR-70	1150-2000-350
NR-80 - NR-85	2000-350
NR-485	1900-2000-350
NR-60	2000-350-0-4000
NR-80	2000-1750
NR-80	4000-0-350
NR-85	1900-2000-0-350
FRESHMAN	
N-11 - N-12	2200-6600-3300-4500-1500
Model G	2100-3000-4300-1250-300
GS60	1800-4500-3000-2000
GENERAL ELECTRIC	
K62	14300-18000-150
H72-H32	14000-10000-170
S22-S22X-S42-J70-J75	16000-8000-150-4350
J105-J100-J107-J109	100000-100000-4500-120
J88	10000-14000-170-30000
J125A	3000-600-1300-2900
J83-J87	4500-2800-10000
H31-H51-H51R-H71R	14300-18000-170-6000
K60-K65-K60P-K65P	10000-10000
J72	10000-2500-6500-7500
J82-86	10000-14000-170
J83A	10000-28000-10000
T12	20000-13000
S22D-S42D	4500-8000-150-450
A60	20000
H91-H91R	14300-18000-170
K50-51-50P-51P-54P	14000-14000-3000
S42B	180000 Series
J80-J85	16000-8000-150
K40A	10000-12000
L50-L51-K106	8000-20000-4500
141	4200-830-120-715
S132	16000-18000-150
B40	30000 Serica
T41	32000-830-120-715

Name and Model	Resistance
GENERAL MOTORS	
A Chassis 120-130	1400-3500-5800-7000
140-150-160	180-650-800-59-1863 2000-465-6900-7600-4800
GOLDEN LEUTZ	
Models	9000-3500-4000-4500-11000-9000
GRAYBAR ELEC.	
17	1690-205-2140-3750-410
400	2800-900-3600-1100-(No.1)
400	500-0-1460-540-0-80(No.2)
311	1600-1900-440
500	400-350-350-190 (Bias)
500	2250 (Plate Resistor)
600	375-90 (Bias)
600	4800 (Plate Resistor)
678	3200-830-120-715
GREBE	
SK4	677-2200-62
SX4	7000-10000-1500
AC6	750-2800-5900
AC6	6300-95-695
AC7	20000-60000
GRIGSBY-GRUNOW	- See Majestic
GRUNOW	- See Household Utilities
GULBRANSEN	
AC8	3100-9473-11250-150
HAMMERLUND	
Hi-Q 30	800-2000-1400-3000-2000
Hi-Q 31	2400-2800-1850-150
CHARLES HOODWIN	
All Models	25000-50000
HOWARD RADIO	
135	17500-16000-12000-1600
SGA, SGC	2300-1600-900
AP	1500-900-2570
B	3200-2700-1500
DL	2700-2270-1740-490-120
F	3200-2700-970
H	2570-4100-780
AVH	450-3000-3750-2250-450-210
K	4000-3150
L-M	3900-3730-2200
O	2570-4100-680
AVO	500-2150-2500-1820-440-425
T	2800-8000-9800-750
135AC	1600-12000-16000
KELLOGG	
523-528	1000-3000-1500-1000-130
KENNEDY	
20B	2000-1500-750
32	2800-400-1800-750
KOLSTER	
6J-6K-6R	3000-3000-220-900
6H	500-4000-940
K20-21-23	90-125-900
K-24	3400-3800-55-80-140-360
K-38	3600-55-75-700
K-42	840-140-2600
K-43	1600-1000-3800
K-44-45	1450-650-200-350
K-48	1500-2000-100-2000
K-50	1525-2500-280-400
K-60-62	4000-1500-1500-200
K-70-72	3000-3000-2000-200
K-90-92-80-82	6000-7000-3000-250
K110-112-120-122-130-132	25000-25000
K-140-142	25000-25000
K250	7800-60-90-700
K22-25-27	3000-3000-220-60-840
LANG	
D.C.	30-27-27-27-27-15-80

SERVICE MEN'S ESSENTIALS FOR ALL MEMBERS OF THE ORSMA

WHAT ARE THE SERVICE MEN'S ESSENTIALS?

THE OFFICIAL RADIO SERVICE MEN'S ASSOCIATION has arranged to supply a number of "Service Men's essentials" for its members and associate members only.

These essentials are priced at cost, plus a small additional fee which is the only source of income that the Association has. No one obtains any profit or benefit, except the Association itself. Whatever profit accrues, is reinvested for the furtherance and enlargement of the Association.

By using the letterheads, billheads, etc., you present the business-like appearance to your customers. In addition, the Association has made arrangements with most of the prominent manufacturers to allow special discounts to members, providing ORSMA letterheads are used when ordering.

No. 14—50c each
(Plus 10c for Postage)

No. 1 ORSMA LETTERHEADS

These letterheads, shown on the right, are furnished with your name, address and telephone number, printed on excellent paper. They are sold in lots of 100 or multiples thereof, with a distinct saving for single orders of 1,000 or more. Per 100, 60c; per 1000, $3.00.

No. 2 ORSMA ENVELOPES

These are furnished to match the letterheads, printed with your name and address and seal of the Association. They go hand in hand with the letterheads and are usually ordered in the same quantity. Per 100, 60c; per 1000, $3.00.

No. 3 ORSMA SERVICE RECORD CARDS

These serve a double purpose; whenever you complete a job you fill out the report-bill and hand it to the customer; this is the "psychological moment" to collect. By the use of carbon paper a permanent record is kept. Furnished with name, address and telephone number. Per pad of 50, 60c; per 10 pads, each of 50, $3.00.

No. 4 ORSMA INSPECTION LABELS

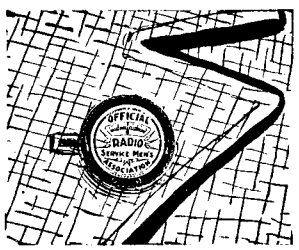
The label is to be filled in with the proper dates, and pasted inside the set or cabinet where the customer will see it. It is a continuous reminder to him that when service is needed, he can call you again. The advantage is apparent. Per 100, 60c; per 1000, $3.00.

No. 5 ORSMA LAPEL BUTTON

At the suggestion of many members a handsome lapel button bearing the name and emblem of the Association has been designed. It signifies that you belong to the ORSMA; and in addition it gives your customers a better appreciation of the professional nature of your work. 50c each.

No. 6 ORSMA BUSINESS CARDS

These are furnished on a fine grade of paper in two colors with a blotter back. Thus they present an incentive to customers to keep them in a prominent place. They are printed with your name, address and telephone and bear the official seal of the Association. Per 100, 75c; per 1000, $4.00.



No. 5—50c each

Nos. 9 & 10 ORSMA EMBLEM CUTS

These cuts for printing, advertising, etc., are furnished in two styles and sizes. They may be used for newspaper or telephone-book advertisements or for printing of any kind. Large size, 1¼ x 1¼ in., $1.35 each; small size, ¾ x ¾ in., $1.20 each.

No. 11 ORSMA MEMBERSHIP SIGN

A set of three signs, printed on heavy cards, and having holes punched in order to hang in office or store. These are sold to members and associate members. Large enough to be quite prominent and the two tone effect makes them attractive. Set of three, 50c.

No. 12 ORSMA ADVERTISING DISPLAY SIGN

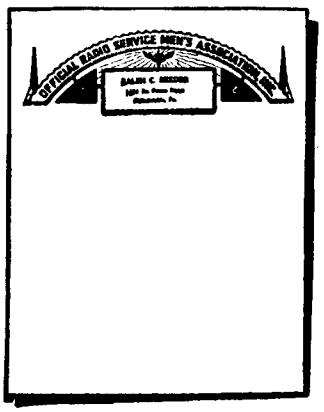
A two color sign printed in large letters with your name, address and telephone, with the seal of the Association. This sign is sold in quantities of 25 or more and is ideal for hanging in stores, offices, etc., for advertising purposes. Set of 25 cards, $3.00.

No. 13 RADIO SERVICE MEN'S ASSORTMENT PACKAGE

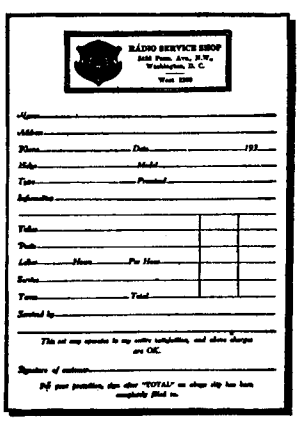
This includes one gold filled lapel button, 100 letterheads, 100 envelopes, 50 service record cards, and 100 labels printed with your name and address as described above. The whole assortment costs only—$3.00—a worth-while saving. Complete, $3.00.

No. 14 ORSMA MEMBER CERTIFICATE

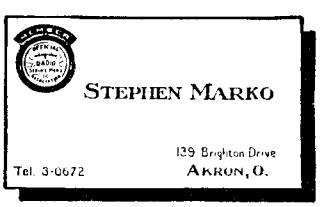
A handsome diploma-like certificate engraved on stiff vellum-bond. The certificate is personally signed by the President and Executive Secretary and the corporation stamp of the Association is impressed on a red seal attached to it. Your name, certificate number and date of registration are lettered by hand and the Certificate is mailed in a cardboard tube to insure safe delivery. Each 50c, plus 10c for postage.



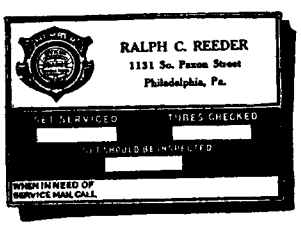
No. 1—60c per 100
$3.00 per 1000



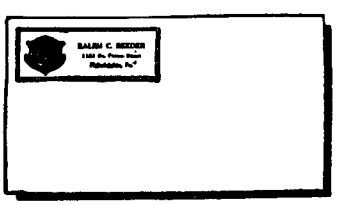
No. 3—60c per pad of 50
$3.00 per ten pads, each of 50



No. 6—75c per 100
$4.00 per 1000



No. 4—60c per 100
$3.00 per 1000



No. 2—60c per 100
$3.00 per 1000

Application for Membership in ORSMA

Executive Secretary, ORSMA
99 Hudson Street, New York, N. Y.

Kindly send an application blank for
☐ Full Membership
☐ Associate Membership

Name .....

Street or Box .....

City..... State.....

OR-35

OFFICIAL RADIO SERVICE MEN'S ASSOCIATION

99 Hudson Street, New York, N. Y. **OR-35**

Please send me the following RADIO SERVICE MEN'S ESSENTIALS which I have selected from this advertisement. My remittance for $..... is enclosed. *Send remittance in form of check or money order. Register letter if it contains cash, currency or unused U. S. Postage Stamps.*

.....

.....

.....

.....

.....

Name ..... ORSMA No. .....

Address .....City and State.....

VOLTAGE DIVIDER CHART (CON'T)

Name and Model	Resistance
MAJESTIC (Grigsby-Grunow)	
10	20000-10000
15	30000-25000
20	4125-7500-20000-VC-158-G770
25	15000-15000-VC
25B	15000-20000-800-160
30	25000-2360-3800-3460-VC101-G750
35	*10000-9000-400-140
50	*2680-*4170-*4030-*VC116
M50	10000-23000-250-140-Open 230
55	30000-25000
60	4300-5700-4100-600-VC500-G800B
70A	15000-*4180-*G1000
70B	15000-*2230-*G1000
90-90B-100-100B	*3600-*G800B
130	*4875-5230-3340-7900-*VC154
160	4300-5700-4100-600-VC500-G800B
180	3920-(2) *1400B
200	7000-3500-3000-110-G180B
210	15000-20000-800-150
220	7000-3500-3000-110-G180B
230	*4875-5230-3340-7900-*VC154
260A	*400-SF-8000-6000-250
280	4700-3600-3000-125-G165-500-open-230B
290	6700-2400-18000-G180-700-open-400B, open-230B
300	4900-72-20000-210-110-G230B
310A	10000-25000
310B	8000-9000-350-also 2000-G350-500B
320	4900-72-20000-210-110-G230
330	600-10000-18000 also 2000-G350-500B
340	36-1730-open 2000-G140-500
360	1500-9000-125-18740-200-G225
370	7000-50000-VC also 300-3000
390	6000-600 also 2000B-G350B-500B
400	60000VC

W.W. -- *
Multiple W.W. --
V.C. -- Volume Control
G -- Ground

MONTGOMERY-WARD	
62-1040	3500-11000
62-080-090-100	1700-4000-8000
11-12-17	14000-5000-5000
62-16-18-13-15 16X-18X	3000-11000-10000-300
62-14	4500-75-1420-450-1570-520-206
62-83	10000
62-82	15000-25000
62-80	15000-25000
62-74	25000-27000
62-76	6250-9700
62-64-64X	3140-860-136
62-52	8000-8400
62-20-20X	12500-9000
62-14-62-12 62-14X	4500-75-1420-450-1420-670
111-811 also X	2500-1500
1238-1838-1238X	500-1000-1200-600-600-550
1355-1955-1355X	500-1000-1800-600-425
62-22-62-30 also X	800-1800-225-290-200
62-36-62-34 also X	16000-25000
62-38-62-44-62-50 also X	10000-30000-33000-10000
62-68-62-68X	1000-25000-10000
62-43-62-43X	40000-40000
62-86	10000-30000-850-5000-4100-2500-1600
62-70-62-72 also X	8000-800
62-81-62-81X	250000
62-520	3750-1250-55
3295	700-2200-400-70
62-31-45-14000-62000	18000-25000
11000-62-050	5240-30000-62000
15000	4700-8400-10700
62-020-62-010	25000-167-13400-8200-4600
62-070-62-060	1000-2640
3035-3037-3065-3067	8400-10700
2895-2897-2822-2827	700-2200-400-70
2955-2957	3100-9473-11250-150
62-030-62-232	8000-8000
62-040-62-181	5000-5000-15000
62-360-62-367	28000-20000-260-4600
26P-26PX	2640-360-640

MOTOMETER GAUGE & EQUIPMENT CORP.
No Voltage Divider Used

Name and Model	Resistance
MOTOROLA	
7T47A	180 Volts of B Tap at 90V
88-61	75000-100000
6T12PL-6T12-5T71	50000 ohms series resis.
NORDEN HAUCK	
Model	6500-6000-1500
PEERLESS	
Courier Model 22	100000-50000-50000-25000
K70	2500-8000-8500
PHILCO	
20-20A	1400-187-75-0-2470-975
65	2000-700
76-77-77A-30	800-250
76-77-77A	2000-1500-1400
87	3785-157-0-640
70	180-70-0-2300-1060
86	2100-1000-150-1500
511	12500-5500-0-300-2400
R.C.A. RADIOLA	
17-50	1690-205-2140-3750-410
18-33-51	1600-1900-440
30A	3000-2000-300-500-900
41 Receptor	12300-8000-5000
41 Sterling	17400-8600
41 Sterling	4200-380-1420
44-#1	2800-900-3600-1100
44-#2-46	500-0-1460-540-0-80
46-47-#1	2800-900-3600-1100
46-47-#2	1460-540-0-80
42-48	3200-830-120-715
60-62	400-350-350-190 (Bias)
60-62	2250 (Plate)
64	1280-4000-300-2200
64	1500-1000-250-130-160
64-67	310-3850-310 (Bias)
66	375-90 (Bias)
66	4800 ohms (Plate Resis.)
67	2400-960-240-115-215-100
67	1435-3400-300-2200
105 Loud Speaker	1325-65-140-1446-No.1
105 Loud Speaker	1050-1300-1325-No.2
105 Loud Speaker	4000 ohms. Nos. 3 & 4
17	1900-200-2500-4000-500
28	2000-300-500
30	4920-Resistor #4
30	620-3380-Nos. 2 & 3
30	2600-1400 Resistor No.1
30A	300 ohms
32	4920
32	438-286-1590-1700
33-44-46D.C.	16-16-16
44	500-0-1460-540-0-80
44-46 D.C.	2250-1925-1190

All R.C.A. receivers since 1930 use a series method of Voltage Supply in lieu of Bleeder System. See Service notes for resistance issued by R.C.A.

REMLER RADIO
No Voltage Dividers Used

SAMSON "PAM"	
Pam 25	30000-800
Pam 25	60000
Pam 210	1540-19300
Pam 210	1560-775-11000
PABC 2	740-90-90
PABC 2	1500-2000-500
PABC 3	460-60-50
PABC 5	5000-1100-1100
PABC 4	1750-1100
DeLuxe	45-45-310-30
SEARS ROEBUCK - SILVERTONE	
1462	4000-400-50-2400-600
1290-1292-1296-1300-1302	200000 ohm on C Battery
1580-1582-1584-1586-1588-1589	30000-30000-200 Var.Potentiometer
1590-1592-1594 1596-1600	20000-30000-150 Var.Pot.
1630	8000-5000-100-2000-800-250
1640	15000-40000-50-1500-180-60
1650	8000-15000-400
1670-1675	20000-50000-200-400V.P.

Let these eminent Radio authors guide you thru your service work for 1935

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VOLTAGE DIVIDER CHART (CON'T)

NAME AND MODEL	RESISTANCE
SENTINEL RADIO	
See Erla	
SILVER-MARSHALL	
651	3800-4200-730-990
651	6200-1000
655	11350-ohms divider
659	10300-ohms divider
660	6000-4000-1500
672-669	3000-0-1250-1250
SIMPLEX RADIO	
Up to 1933 No Voltage Dividers Used	
Model	430-210-750
SONORA	
B30-B31	800-1000-1200-4000
880	2500-5500-4500
885	150-650
885	5000-150-700-2900-5000
C885	2500-3000-3000-675
B31	750-1200-1500-3500
SPARTAN	
A.C.7-62-63	2200-70
110	20000-2000-7000
110 DeLuxe	7000
110 DeLuxe	900
Sparks Ensemble	3000
301	7000 ohms
SPLITDORF	
Abbey	12500
Abbey	10000
Abbey	8000
Abbey	2500-3000-3000-3000
171	2000-3500-4000-150-2000
Model	750-750
Model	650-150-4500-5400-2500
STEINITE	
22	1700-4000-6000
26	8000-8000
40	3000-11740-4270-1190
50-102	8100-11750-5200-827
70-80-95	10000-10000-2440
991	1000-1000-250-250
STERLING	
41	4000-450-900
41	20000-9000
STEWART-WARNER	
950	850-2400
950	10000-5500
950	3500-3500-2800
STROMBERG CARLSON	
10-11	4000-100-780
10-11	4760-3200-1900
12-14	4000-4000-3005
12-14	5000-100-1210-260
403B	27-6
403B-523-403A	3000-2500
403B	3000-70-700
635-636	2500-3000-3000-770
638	2500-6000-500
846-848	6000-3200
846-848	4350-1700-330
846-848	725 ohms
403-403A	2500-3000-3000-70-770
641-642-652-654	1450-4000-3000-1300
641-642-652-654	7800-3200
641-642-652-654	170 ohms
641-642-652-654-651	7800-4500-3000-4000
48	4400-175-425
10-11	4750-3250-2000
523	3000-70-700

NAME AND MODEL	RESISTANCE
638D.C.	30 ohms
12-14	6000-3200
641-642-652-654	7800-4500-3000-4000
10-11	400-100-4000
638 D.C.	10 ohms
638 D.C.	12 ohms
638 D.C.	30 ohms
638 D.C.	200 ohms
Early Models of 10-11	4760-3200-5900-100-780
10-11	4760-3200
10-11	5900-100-780
10-11	1100-2000
10-11	3000-3000
TEMPLE	
D.C.	11-22
7-60, 7-80	8000-1600-8000-4000
8-60, 8090	900-5200-750
THORDARSON	
R.171-Power Unit	2000-3000-3000-3000-2000
UNITED MOTORS SERVICE	
2035	3600-1400-800-400
4036 & B.O.P.	200-1400-500-400
Chevrolet Receiver	4200-400-1400-800-250
4048 -- No Voltage Divider Color coded resistor units used.	
U.S. RADIO & TELEVISION	
5A	300-10000-10650
79	7500-5000-225
9A-9B	1000-25000-10000
12B-120B	850-5000-4100-25000-1600
19B	1000-2500-10000
24	500 ohms
25A	300-10000-10650
69	250-750
3056	1500-850
VICTOR	
7-11-7-25-7-26	1690-205-2140-3750-410
9-18-9-54	1280-4000-300-2200
9-18-9-54	1500-1000-250-130-160
9-18-9-54	310-3850-310 (Bias)
R32-RE45	2000-1350-200-775
R52-RE75	3200-830-120-715
14-15-17	
WESTINGHOUSE	
WR4	3200-830-120-715
WONDER BAR RADIO	
No Voltage Dividers used. A network of various resistances supplying proper voltages to tubes.	
ZANEY-GILL	
Vitatone 54	2100-7500-7500-1350
ZENITH RADIO	
ZE10-ZE12-ZE13 ZE16-ZE15-Power Units	6000-7800-8000-2500
ZE18 Power Units	13000-11000-9500-1800
ZE11 Power Units	3200-1200-1200-1600
ZE50-ZE60-ZE70 Series Power Units	2800-2350-850
ZE80 and 70 Jr.	900-2600-2600-4300
Z10	6000-7500-8500-2500
Z10 Power Pack	12000-5200-5500
Z12	1000-3500-1000-2000
ZE10-12-13-15-16	6000-7500-8500-2500
50-60-70 Series	850-2350-2800

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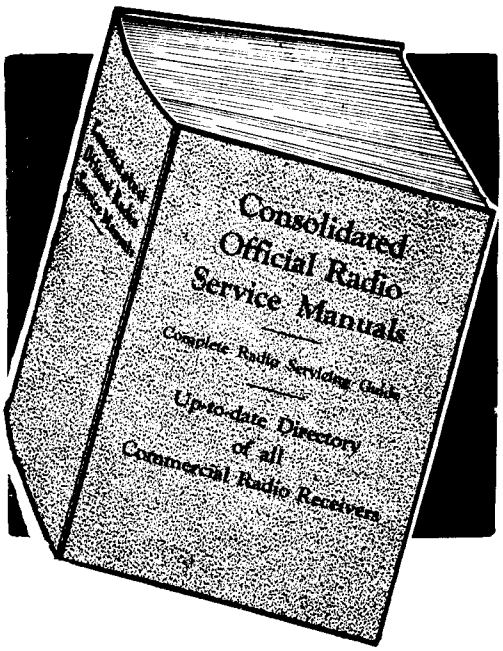

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