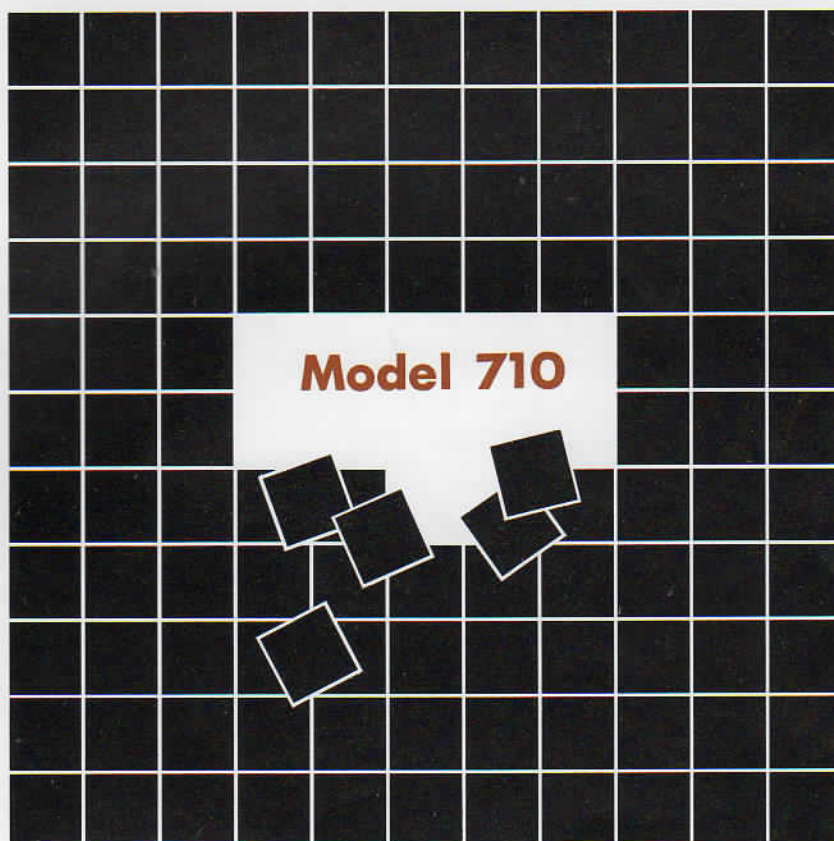


LEADER

THERMAL PRINTER

INSTRUCTION MANUAL



LEADER ELECTRONICS CORP.

1. GENERAL

The Model 710 is a compact thermal printer that prints waveform data displayed on the DMM/SCOPE Model 100P or 200.

The Centronics compatible connectors enable printer use with personal computers.

2. FEATURES

- (1) Compact and light weight. The size is half of the Model 100P, and weighs a mere 400g.
- (2) Since Centronics compatible connector is used, the Model 710 can also be used for conventional instrument.
- (3) Both characters and graphics can be printed.
- (4) Portable due to battery-powered feature.
- (5) Katakana character set available as a built-in feature.
- (6) Built-in international character set for nine foreign countries.
- (7) Uppercase characters can be printed in double width.

3. SPECIFICATIONS

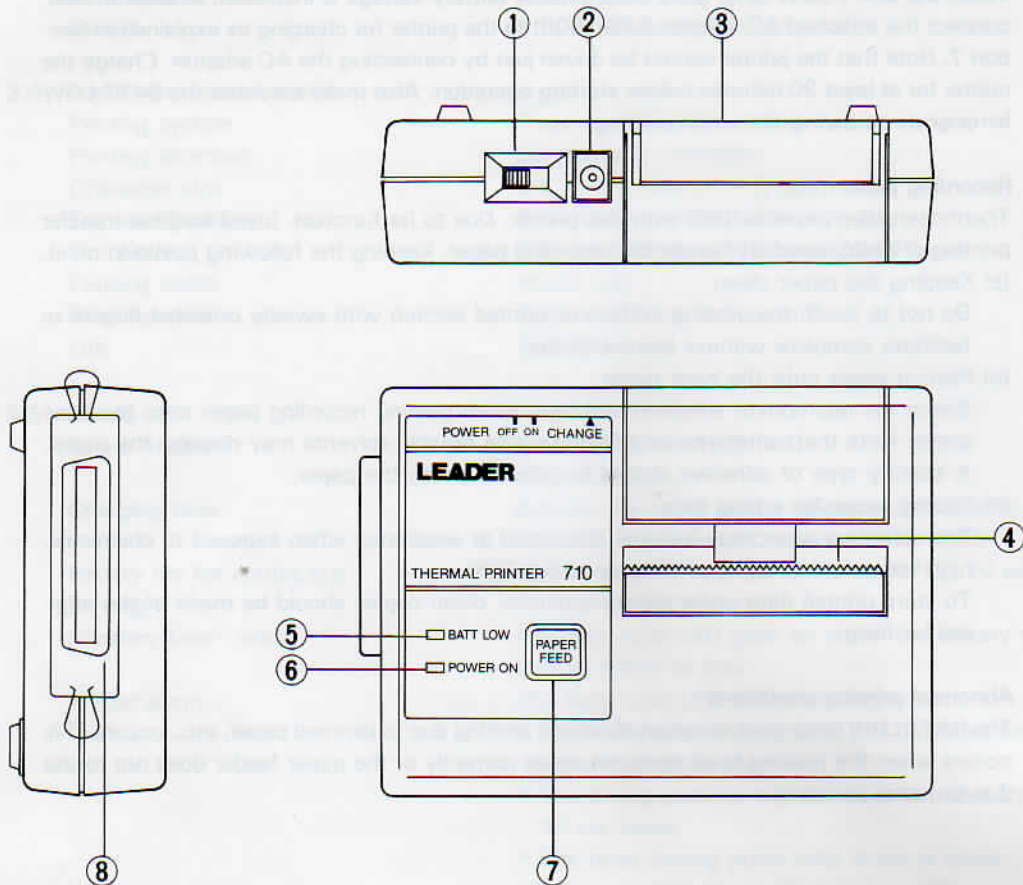
3.1 Printing

Character configuration	Dot: 8 × 166 dots (maximum)
	Character: 7 × 5 dots
Character types	JIS: 159 types
	Int'l character: 32 types
	Special character: 6 types
	Total 197 types
Maximum printing column	Regular-size character: 27
	Double-width character: 13

3.2 Printing signal

Printing signal	8-bit parallel data
	Handshaking by STROBE and BUSY signals
Connector	32-pin Amphenol,
	Simplified Centronics method

5. OPERATION SECTIONS

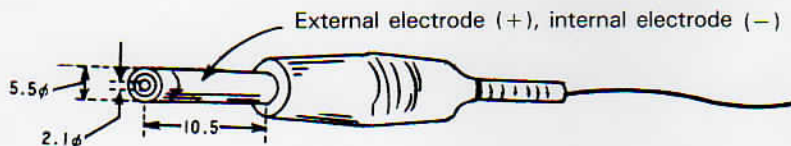


1 POWER switch

To start operation, set this switch to ON.

2 CHARGE plug input jack

A jack to supply DC power to the printer using the AC Adaptor LPS-1908. When supplying external DC power to the printer using the following DC plug, make sure that the input voltage is between 8 V and 9 V and its polarity is correct. (Leader's AC Adaptor LPS-1908 should be used.)



[DC plug]

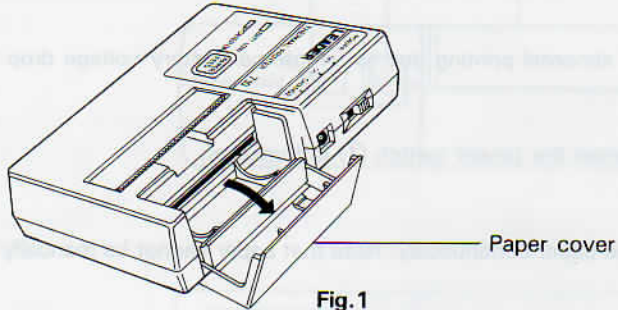
Note) This jack is for internal battery charging. Fully charge the printer before starting operation.

- ③ **Paper case**
Place the paper here.
- ④ **Paper cutter**
Use this cutter to detach the recording paper after printing.
- ⑤ **BATT LOW lamp**
Goes on in case of abnormal printing due to an internal battery voltage drop or jammed paper.
- ⑥ **POWER ON lamp**
Goes on in green when the power switch ① is turned on.
- ⑦ **Paper feed key**
Press this key to feed paper continuously. Note that paper cannot be manually fed during printing.
- ⑧ **Connector**
A Centronics-compatible 36-pin connector. (See the **HARDWARE SPECIFICATIONS** in Section 9 for details.) The lock pins are removable.

6. SETTING RECORDING PAPER

Use the specified recording paper (LC-083).

- (1) Turn on the power switch.
- (2) Open the paper case.



- (3) After cutting off the end of the recording paper, correctly insert the paper into the paper inlet. (Folded or wrinkled paper cannot be inserted.)

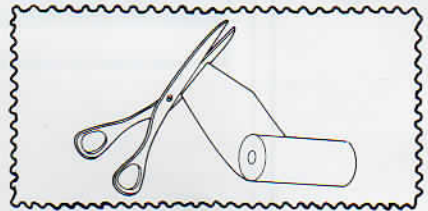
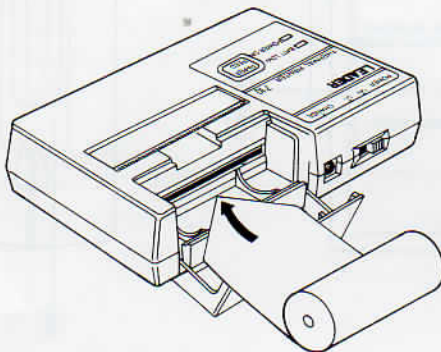


Fig.2

- (4) Press the PAPER FEED key ⑦ to feed the paper until the leading edge of the paper protrudes from the paper cutter position 2 cm to 3 cm.

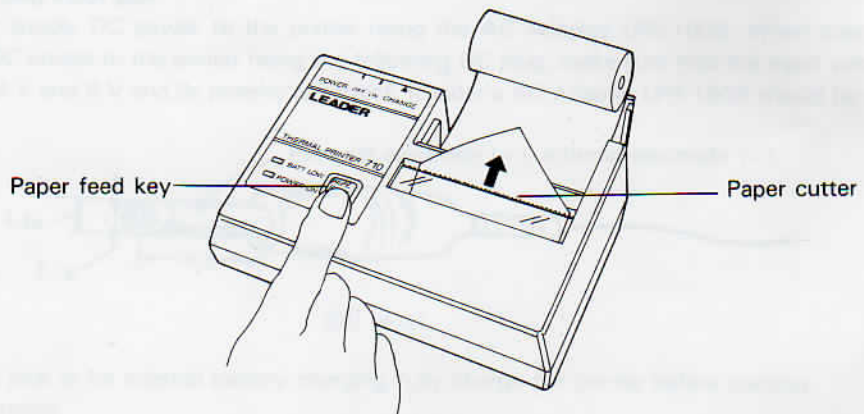


Fig.3

- (5) Place the recording paper in the paper case and close the cover.

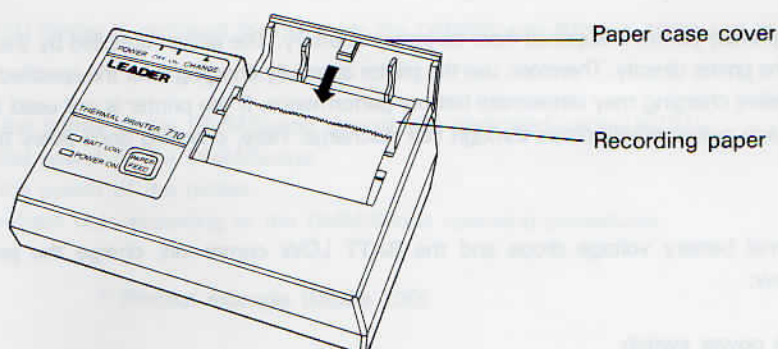


Fig.4

- This printer is provided with a paper-free mechanism. When removing paper from the printer, cut off the paper on the paper case side, then pull the remaining paper out toward the paper cutter side (do not pull it out toward the paper case side.)

- (6) Perform test printing to test whether printing will be done normally after inserting the recording paper. Turning on the power switch while pressing the FEED key starts the self-printing test. After printing the following pattern, the printer waits for the next data.

```

\33eQ0"300A00Ea1aBsfSRi0E
00NA0!"#%&'()*+,-./012345
6789:;<=>?@ABCDEFGHIJKLMN0P
QRSTUUVWXYZ[*]^_`abcdefshijk
lmnoparstuvwxyz{|}~.1.77
イウエオカキクコサシセソチツ
トナニホヒフヘホマミムモヤユヨ
■=Σ/Ωπδ

```

```

\33eQ0"300A00Ea1aBsfSRi0E
00NA0!"#%&'()*+,-./012345
6789:;<=>?@ABCDEFGHIJKLMN0P
QRSTUUVWXYZ[*]^_`abcdefshijk
lmnoparstuvwxyz{|}~.1.77
イウエオカキクコサシセソチツ
トナニホヒフヘホマミムモヤユヨ
■=Σ/Ωπδ

```

7. CHARGING

To operate the printer, power is supplied from its internal battery. The power supplied by the CHARGE jack ② cannot drive the printer directly. Therefore, use the printer after fully charging it for the specified period of time. Note that excessive charging may deteriorate battery performance. If the printer is not used for a long time, the battery voltage automatically drops through self discharge. Here, charging once every three months is recommended.

When the internal battery voltage drops and the BATT LOW comes on, charge the printer with the procedures below:

- (1) Turn off the power switch.
- (2) Connect the AC adapter (LPS-1908).
- (3) Allow approx. 15 hours to charge the printer.
- (4) Perform a printing test after the BATT LOW lamp goes off. Also make sure that the BATT LOW does not go on during printing.
- (5) After charging, disconnect the AC adapter from the printer.

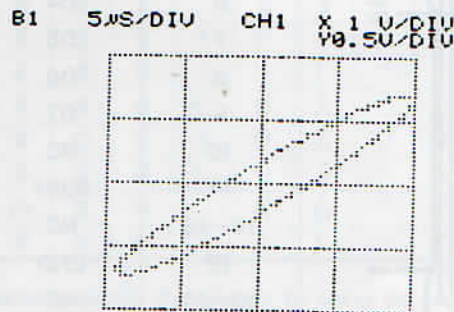
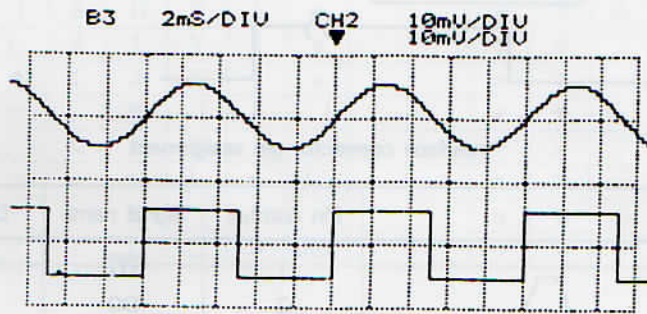
8. USING MODEL 710 WITH THE DMM/SCOPE

The Model 710 Printer is designed for use with the DMM/Scope (Models 100P and 200).

Setup:

- (1) Connect the printer to the DMM/Scope through the dedicated cable (#731).
- (2) Turn on the power of the DMM/Scope.
- (3) Turn on the power of the printer.
- (4) Print waveform data according to the DMM/Scope operating procedures.

° Printout example (Model 200)



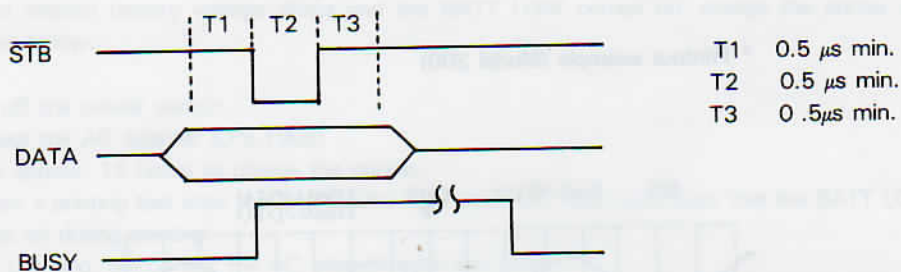
9. USING MODEL 710 WITH A PERSONAL COMPUTER

Because a Centronics compatible connector is installed on the printer, it can also be used with a personal computer.

The Model 710 can be used for graphic printer as well as character printer.

9.1 Hardware Specifications

Interface signal timing



Interface connector pin assignment

	Pin number	Signal name	Direction
	1	STB	Input
	2	D0	Input
	3	D1	Input
	4	D2	Input
	5	D3	Input
	6	D4	Input
	7	D5	Input
	8	D6	Input
	9	D7	Input
	10	NC	
	11	BUSY	Output
	12-18	NC	
	19	GND	
	20-24	NC	
	25	GND	
	29	+5V	
	30-31	NC	
	32	+5V	
	33-36	NC	

Note) Pin 29 is pulled up to +5 V through a 100k Ω resistor. Pin 32 is pulled up to +5 V through a 4.7k Ω resistor. These two pins do not conform to Centronics standards. Moreover, pin 29 has a special function for automatically controlling DPU-411 Printers and Model 710 Printers.

9.2 Software Specifications

9.2.1 Tables 9-1 and 9-2 list the character codes and their meanings

Table 9-1 Normal Characters

High Low Order	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			SP	0	@	P	`	p			SP	ー	タ	ミ		
1			!	1	A	Q	a	q			。	ア	チ	ム		
2			"	2	B	R	b	r			「	イ	ツ	メ		
3			#	3	C	S	c	s			」	ウ	テ	モ		
4			\$	4	D	T	d	t			、	エ	ト	ヤ		
5			%	5	E	U	e	u			、	オ	ナ	ユ		
6			&	6	F	V	f	v			ヲ	カ	ニ	ヨ		
7			'	7	G	W	g	w			ア	キ	ヌ	ラ		
8		CAN	(	8	H	X	h	x			イ	ク	ネ	リ		■
9			)	9	I	Y	i	y			ウ	ケ	ノ	ル		÷
A	LF		*	:	J	Z	j	z			エ	コ	ハ	レ		Σ
B		ESC	+	:	K	[	k				オ	サ	ヒ	ロ		μ
C			,	<	L	¥	l				ヤ	シ	フ	ワ		Ω
D	CR		-	=	M	]	m				ユ	ス	ヘ	ン		π
E	SO		.	>	N	^	n	~			ヨ	セ	ホ	◇		δ
F	SI		/	?	O	_	o	DEL			ッ	ソ	マ	・		

Table 9-2 International Characters

	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
America	#	\$	@	[	\	]	^	`				~
France	#	\$	à	°	ç	§	^	`	e	ù	è	~
Germany	#	\$	§	Ä	Ö	U	^	`	ä	ö	ü	β
England	£	\$	@	[	\	]	^	`				~
Denmark	#	\$	@	Æ	Ø	Å	^	`	æ	ø	å	~
Sweden	#	Ö	É	Ä	Ö	Å	Û	é	ä	ö	å	ü
Italy	#	\$	@	°	\	é	^	ù	à	ò	è	i
Spain	Pt	\$	@		Ñ	Ç	^	`	~	ñ		~
Japan	#	\$	@	[	¥	]	^	`				~

For international characters, specify the country by using the control command. (See the control commands under 9.2.2 below for details)

9.2.2 Control commands

- (1) Carriage return [CR] <OD>_H, <13>_{DEC}

Feeds printing characters to the next line. When 27 or more characters are detected on the same line, this feature automatically shifts subsegment characters to the next line.

- (2) Line feed [LF] <OA>_H, <10>_{DEC}

Feeds lines. When both CR and LF are specified, only the CR functions (for feeding printing lines only).

- (3) Cancel [CAN] <18>_H, <24>_{DEC}

Clears the print data buffer. Executing this command before printing clears all printing data on the same line.

$\langle 7F \rangle_H, \langle 127 \rangle_{DEC}$

Clears the last data set into the print data buffer.

(5) Enlarged characters

Double-width specification: $\langle 0E \rangle_H$, $\langle 14 \rangle_{DEC}$

Double-width release: $\langle 0F \rangle_H, \langle 15 \rangle_{DEC}$

[illegible]

0123456789ABCDEF GHIJKLMNOPQRSTUVWXYZ
0123456789ABCDEFGHIJKL MNOPQRSTUVWXYZ

(6) Setting international characters [ESC + "R" + n]

 $\langle 1B \rangle_H, \langle 52 \rangle_H, \langle n \rangle$ $\langle 27 \rangle_{\text{DEC}}, \langle 82 \rangle_{\text{DEC}}, \langle n \rangle$

Specify one of the following country codes in <n> to add appropriate character codes for the specified country. The initial setting after power-on is n=8 (Japan). See Character List under Table 9-2 above for details.

n	Country code
0	America
1	France
2	Germany
3	England
4	Denmark
5	Sweden
6	Italy
7	Spain
8	Japan

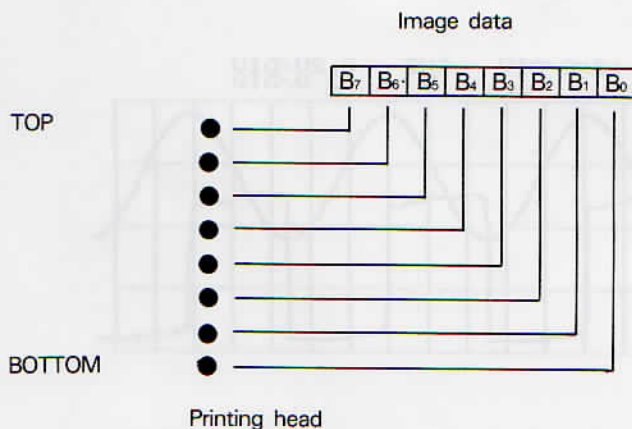
9.2.3 Graphics printing [ESC + "K" + n₁ + n₂]

 $\langle 1B \rangle_H \quad \langle 4B \rangle_H \quad \langle n_1 \rangle \quad \langle n_2 \rangle$

$\langle 27 \rangle_{\text{DEC}}$ $\langle 75 \rangle_{\text{DEC}}$ $\langle n_1 \rangle$ $\langle n_2 \rangle$

This command is used to print graphics (bit images). To change from the character mode to the graphics mode, enter the above codes. Code n_1 sends the number of bit image data items. The maximum number 166 (dots). Always set n_2 to 0.

The bit image data on this line is sent as follows. The head and related printing data are:



After printing, control automatically returns to the character mode.

9.2.4 PRINTOUT EXAMPLES

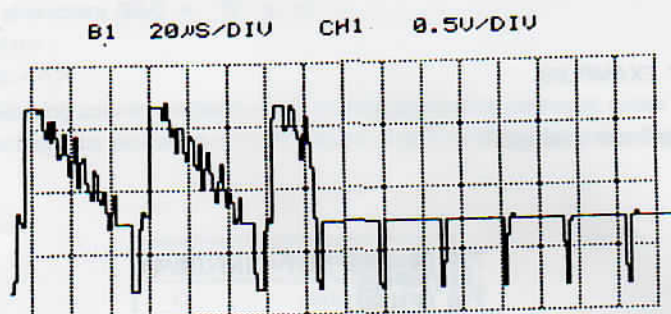
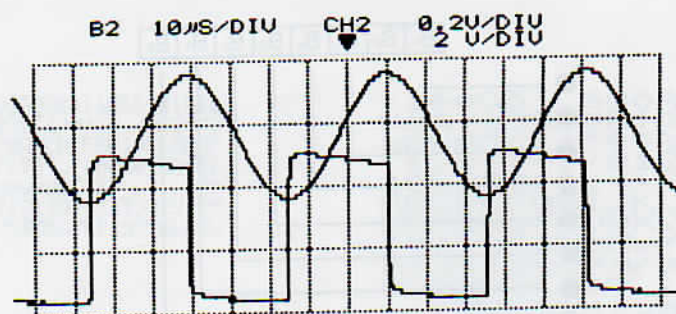
Character printout example

```

720 0#=1000-F#:P=CINT(0#/4)
    ,R(U)=P+25
730 RETURN
740 *UNIT8
750 E$=MID$(D$,4,7)
760 F#=VAL(E$):F#=F#+100
770 0#=1000-F#:P=CINT(0#/4)
    ,R(U)=P+25
780 RETURN
790 *UNIT9
800 E$=MID$(D$,4,8)
810 F#=VAL(E$):F#=F#+1000
820 0#=1000-F#:P=CINT(0#/4)
    ,R(U)=P+25
830 RETURN
840 *DIFFE
850 IF U=0 THEN GOTO 880
860 H#=F#-6#
870 RETURN
880 H#=0
890 RETURN

```

Graphics printout examples





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