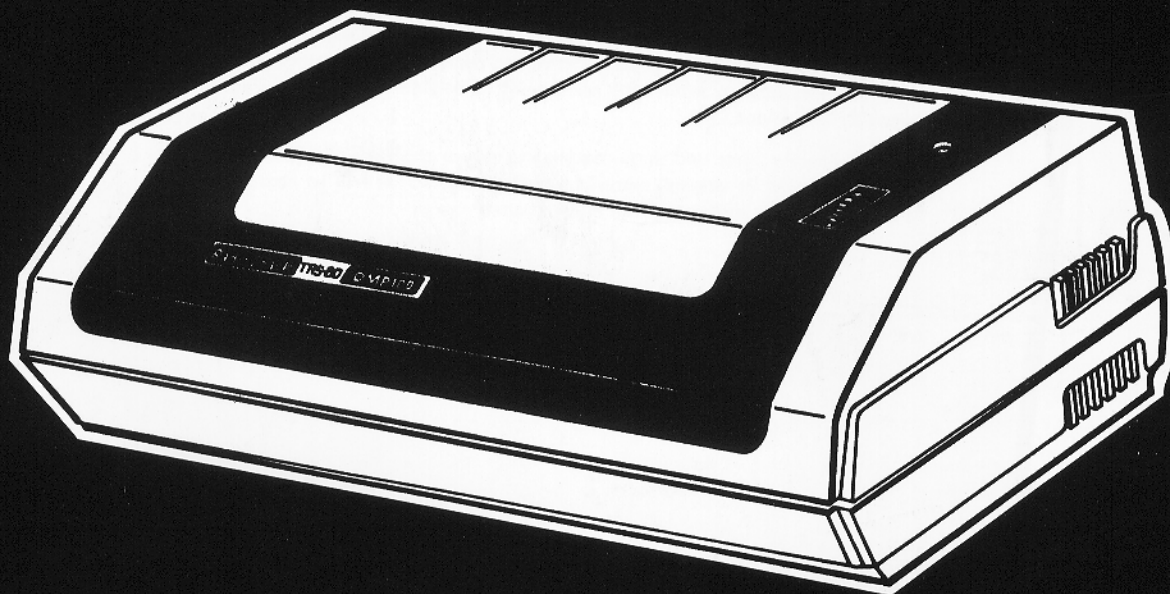


DMP-100

Catalog Number 26-1253

Radio Shack[®]
TRS-80[™]
MICRO
COMPUTER
SYSTEM

HARDWARE



CUSTOM MANUFACTURED FOR RADIO SHACK, A DIVISION OF TANDY CORPORATION

WARNING:

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to sub Part J of Part 15 of FCC rules. Only computers certified to comply with the Class B limit may be attached to this peripheral. Operation with non-certified computers is likely to result in interference to Radio and TV reception.

SERVICE POLICY

Radio Shack's nationwide network of service facilities provides quick, convenient, and reliable repair services for all of its computer products, in most instances. Warranty service will be performed in accordance with Radio Shack's Limited Warranty. Non-warranty service will be provided at reasonable parts and labor costs.

Because of the sensitivity of computer equipment, and the problems which can result from improper servicing, the following limitations also apply to the services offered by Radio Shack:

1. If any of the warranty seals on any Radio Shack computer products are broken, Radio Shack reserves the right to refuse to service the equipment or to void any remaining warranty on the equipment.
2. If any Radio Shack computer equipment has been modified so that it is not within manufacturer's specifications, including, but not limited to, the installation of any non-Radio Shack parts, components, or replacement boards, then Radio Shack reserves the right to refuse to service the equipment boards, then Radio Shack reserves the right to refuse to service the equipment, void any remaining warranty, remove and replace any non-Radio Shack part found in the equipment, and perform whatever modifications are necessary to return the equipment to original factory manufacturer's specifications.
3. The cost for the labor and parts required to return the Radio Shack computer equipment to original manufacturer's specifications will be charged to the customer in addition to the normal repair charge.

**Congratulations for selecting this
Radio Shack Computer Product!**

The DMP-100 is a versatile dot-matrix impact printer.

You can connect it to the Parallel or Serial Interface of your TRS-80 Computer. A built-in microprocessor controls the Printer and communicates with the computer. Basic operating instructions and character patterns are resident in the single-chip microcomputer.

Other exceptional features include:

- Graphic, character, and double-width character modes.
- Graphic patterns that can be repeated as many times as you want with a single command.
- 480-byte full line dot buffer.
- Print position addressable by character or dot column.
- Prints both upper case and lower case characters.
- Switch-selectable inputs: TRS-80 Expansion Interface or Serial Interface (600BPS or 1200BPS)
- Software-selectable line densities (6 or 9 lines per inch).
- Accepts paper width from 4.5 to 9.5 inches.
- Automatic "wrap-around". When the text exceeds the maximum line length, data is not lost because of overflow.
- Underline function.

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DESCRIPTION OF THE PRINTER

CONTROLS AND FUNCTIONS

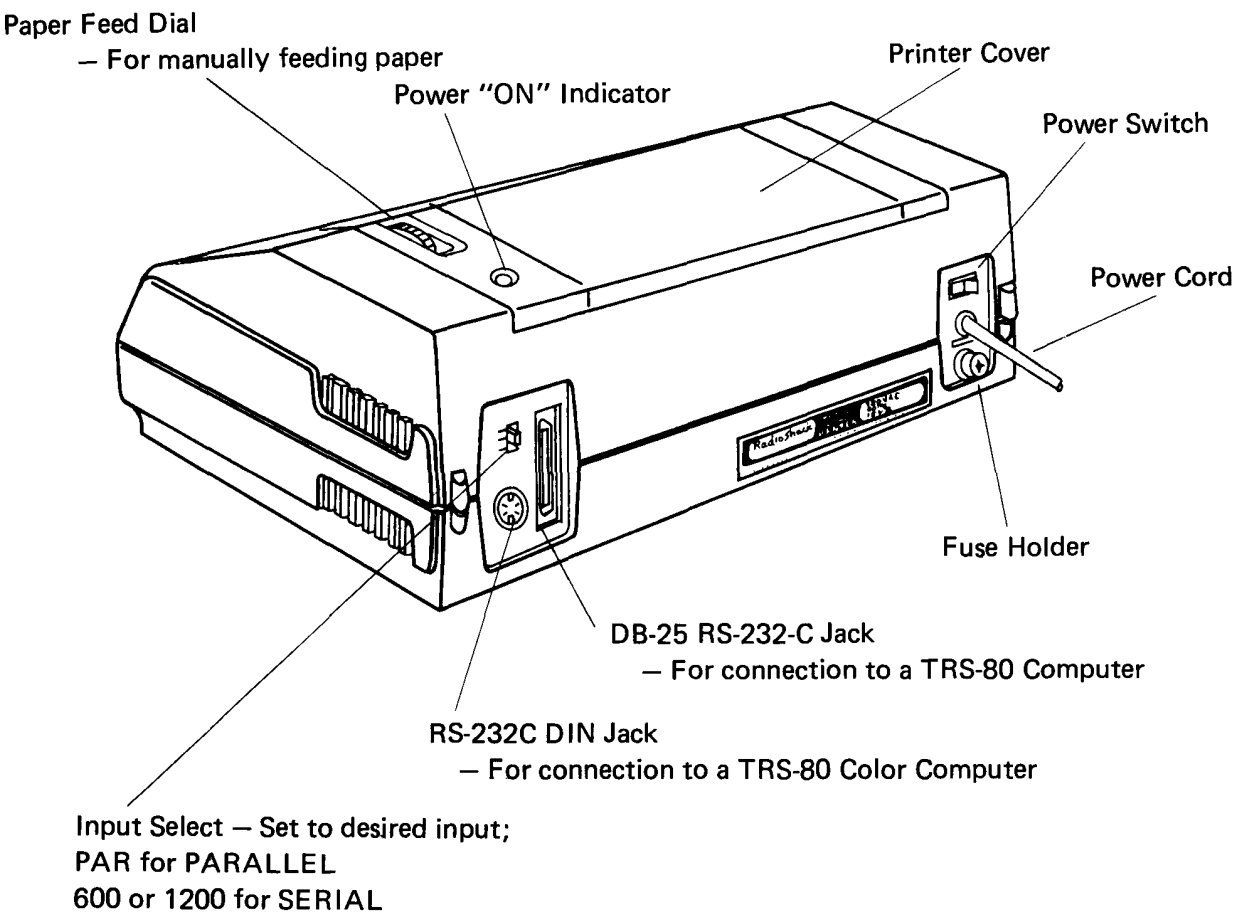


Figure 1

RECOMMENDED PAPER

Use paper that conforms to the following specifications.

Paper width	Paper width 4.5" — 9.5"	(114 — 241 mm)
	Pin to pin 4" — 9"	(102 — 229 mm)
Paper thickness	0.07 — 0.09 mm (2.8 mils to 3.5 mils) for single part	
	0.075 mm (3 mils) paper is recommended	
Paper weight	15 — 16 pounds	

SETTING UP THE PRINTER

PAPER LOADING INSTRUCTIONS

Turn off the power switch before loading the paper.

- (1) Remove the printer cover.
- (2) Lift up the paper holders on both sides.
- (3) Adjust the sprocket unit spacing so that the paper will be neither stretched too tightly nor loose and wrinkled.

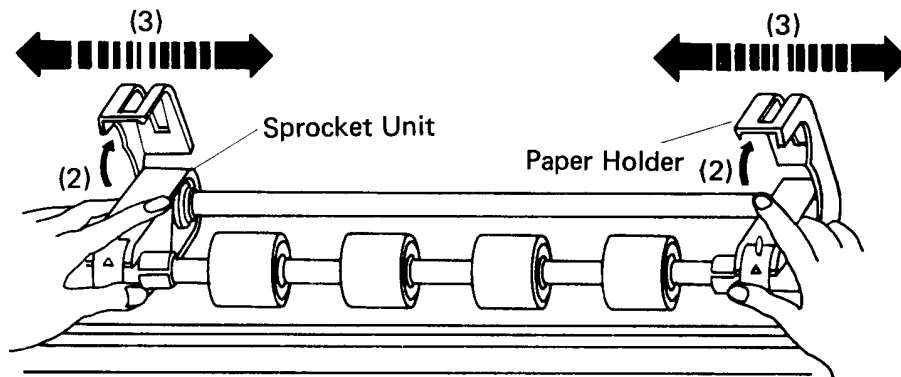


Figure 2

NOTE: When loading the paper into the Printer, you should set the paper at the position shown in Figure 3, leaving approximately 3/4 inch (20 mm) between the left-edge of the Printer and the center of the left sprocket holes.

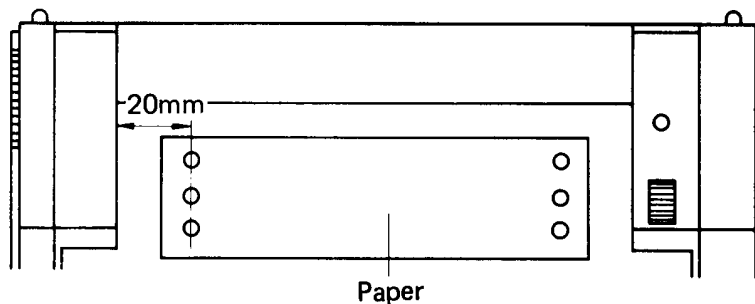


Figure 3

- (4) Insert the paper from the rear of the Printer.
- (5) The paper will appear from between the ribbon and the platen. Fit the paper's punched holes over the sprocket pins and lower the paper holders. Be sure the paper is straight when it enters into the tractor mechanism, (see Figure 4-B). Also be sure to minimize the "drag" of the paper. You may need to position the paper supply level with the Printer.

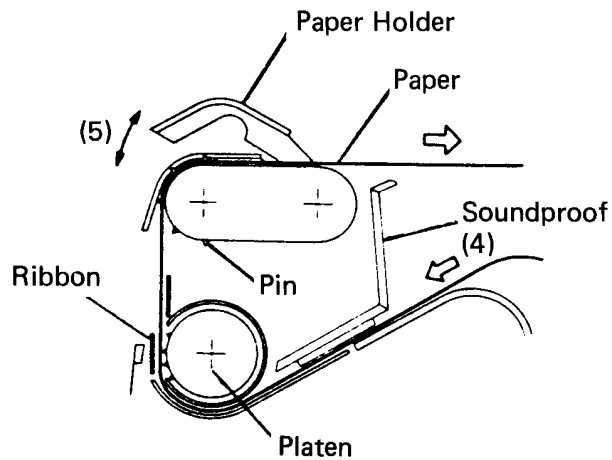


Figure 4-A

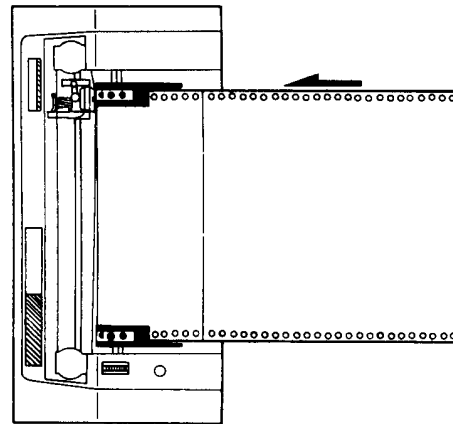


Figure 4-B

- (6) Manually position the paper by rotating the paper feed dial forward. See the Figure below.

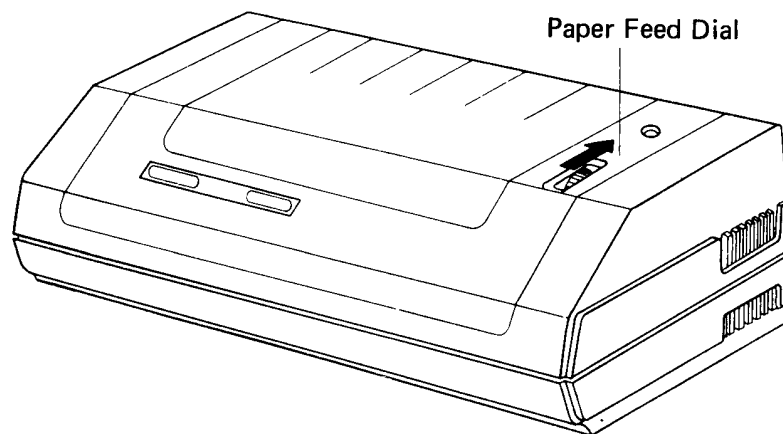


Figure 5

- (7) Replace the printer cover.
NOTE: Keep the paper in line with the sprocket pins so that it will feed smoothly.

ADJUSTMENT OF THE PRINT HEAD IMPACT PRESSURE

You may adjust a lever on the print head according to the thickness of the paper. If smudging occurs or if printing is too dark, move this lever one "click hole" counterclockwise at a time until you are satisfied with the printing quality; if printing is too light, move it clockwise. When adjusting the lever, make sure that it is placed directly in the hole, not "in between" two of them.

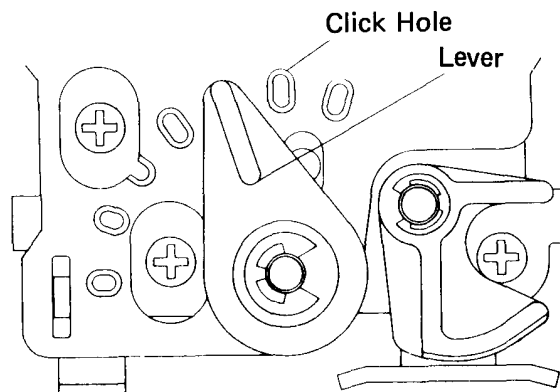


Figure 6

PRINT STARTING POSITION

Printing starts about 1.2 inches (30 mm) away from the left-edge of the Printer. (see Figure 7)

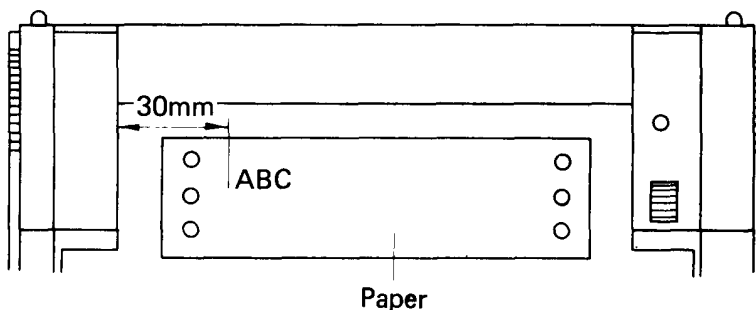


Figure 7

RIBBON CASSETTE INSTALLATION

- (1) Locate the ribbon cassettes which are packed in the carton separately from the Printer.
- (2) Place the ribbon cassettes so the protrusions are facing the front side of the Printer. See Figure 8.



Place ribbon cassettes so the protrusions are facing the front side of Printer.

Figure 8

- (3) Remove the printer cover.
- (4) Place the ribbon cassettes in the positions ①, ②, and ③ as shown in the Figure below.

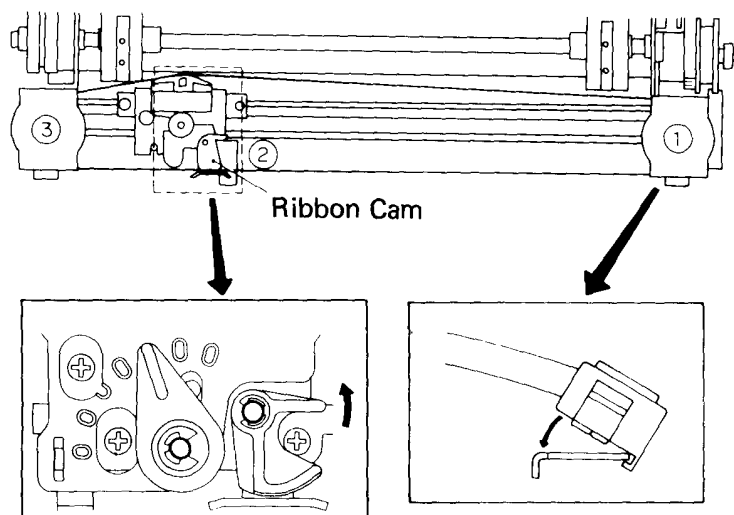


Figure 9

- NOTES:**
1. Check that the ribbon is not twisted.
 2. You can not install the ribbon cassettes if the left and the right cassettes are reversed. (See Figure 8.)
 3. **Do not move the print head manually.**
Forcing it may damage the Printer.
 4. Raise the inner side of the ribbon (the platen side) a little for easy removal and/or installation.

When replacing a worn-out ribbon, use only the specified replacement ribbon (Cat. No. 26-1424). Remove the old ribbon following the above procedure in reverse and replace it with the new ribbon.

CONNECTIONS

Before plugging the power cord into an AC power outlet, check the following:

- Is the AC power line voltage correct (120 V AC for USA and Canada, 220/240 V AC for Europe and Australia)?
- Is the Printer power switch in the OFF position?
- Has the ribbon cassette been installed?
- If you are using paper less than 9-1/2" (24.1 cm) in width, be sure your computer is programmed to end each print-line before the printer carriage passes the right edge of the paper.

CAUTION: Printing on the platen will shorten platen life.

After checking items above, proceed with the connections.

1. Plug the printer into an AC power (rated voltage) outlet.
2. Connect the appropriate cable (see the table below) to the Printer. (Refer to your Computer Owner's Manual.)
3. If you are using a TRS-80 Model I, II, III, 16, or DT-1 Data Terminal, set the Input Select switch to "PAR". If you are using a TRS-80 Color Computer, set the Input Select Switch to "600" for 600 baud serial.

If you want to use the DMP-100 and Color Computer at 1200 baud, set the Input Select Switch to 1200 and type:

POKE (149,0) <ENTER>

POKE (150,41) <ENTER>

If your Color Computer displays Color BASIC 1.0 on power-up, you will need to use the "Eight-Bit Printer Driver – Color Computer" (70-2013) before printing graphics at 600 or 1200 baud. If your Color Computer displays Color BASIC 1.1 on power-up, you will not need the driver. Simply connect the Computer to the Printer, set the Input Select Switch, and print away!

NOTE: When using a parallel interface, moving the Input Select Switch to 600 or 1200 (serial interface) will effectively put the Printer off-line.

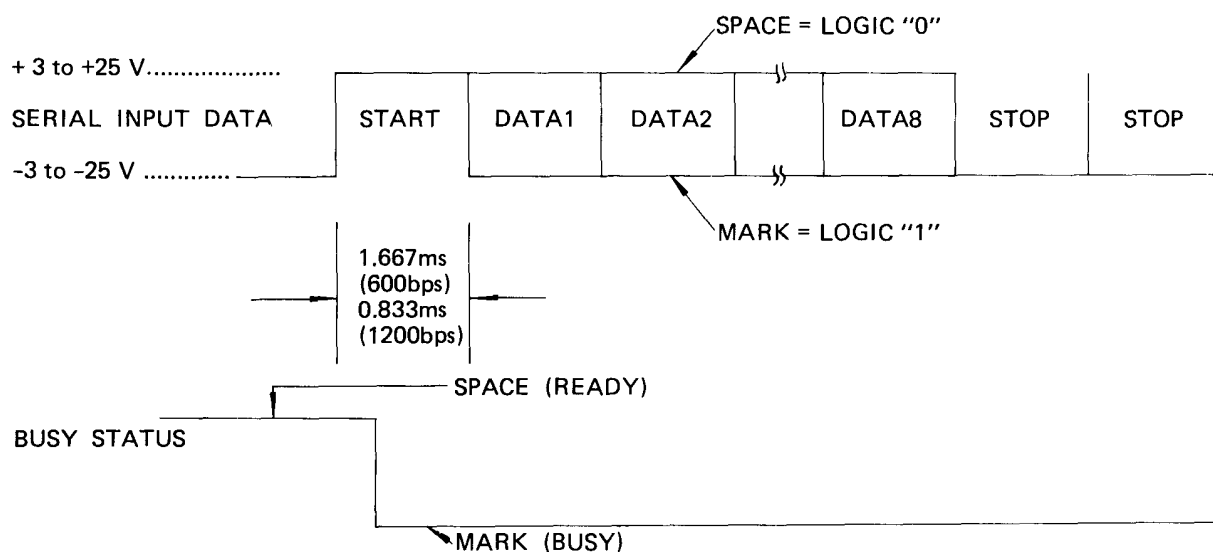
Computer	Cable #	Input Select Switch Setting
Model I (CPU)	26-1411	PAR
Model I (Exp Int)	26-1401	PAR
Model II/16	26-4401	PAR
Model III/DT-1	26-1401	PAR
Color Computer	26-3020	600 or 1200

- Pin Configuration of the Serial RS-232C DIN Jack

Pin No. 1	NOT USED
" 2	STATUS
" 3	GROUND
" 4	DATA

- Time Chart of Serial Input

Baud rate is selectable to 600 bps or 1200 bps.



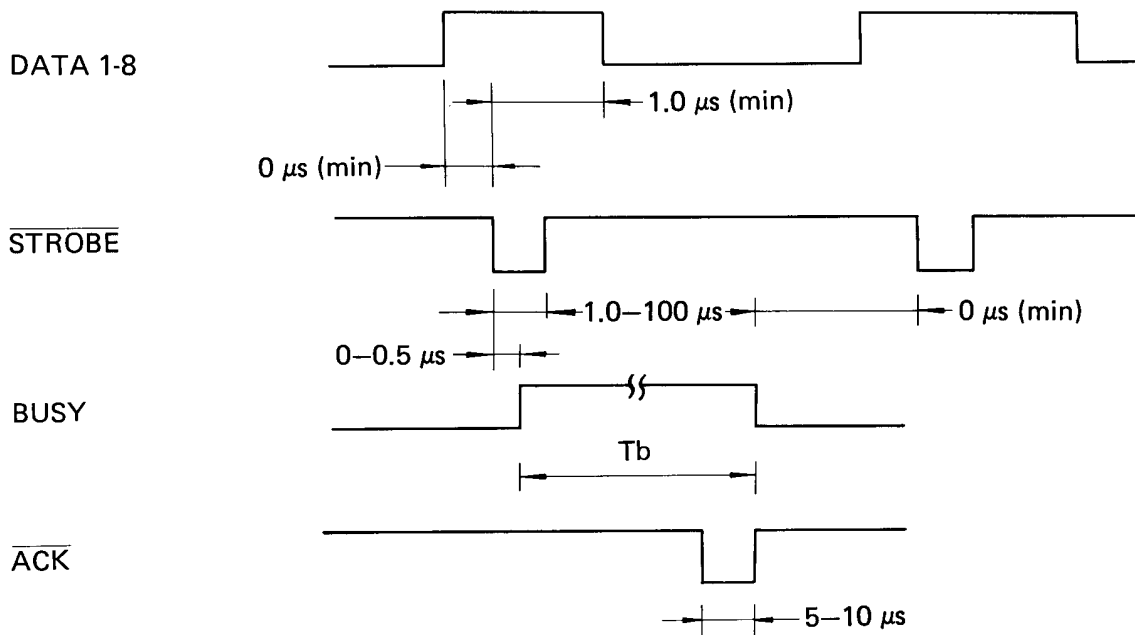
- 8 bit data: 8-bit data, no parity, one or two stop bits

- Pin Configuration of the PARALLEL Connector

PIN		PIN	
1	STROBE	19	TWISTED PAIR GND (PAIR WITH 1 PIN)
2	DATA1	20	" (2)
3	DATA2	21	" (3)
4	DATA3	22	" (4)
5	DATA4	23	" (5)
6	DATA5	24	" (6)
7	DATA6	25	" (7)
8	DATA7	26	" (8)
9	DATA8	27	" (9)
10	ACK	28	" (10)
11	BUSY	29	" (11)
12	GND	30	GND
13	HIGH	31	NC
14	GND	32	HIGH
15	GND	33	NC
16	GND	34	NC
17	GND	35	NC
18	+5V 80mA Max.	36	TEST

- NOTES:** 1. HIGH is terminated by a 10 K Ω resistor to +5 volts.
 2. You can conduct a SELF-TEST by terminating $\overline{\text{TEST}}$ to GND. This line is terminated by a resistor to +5 volts, thus this line can be left open.

● Parallel Input Timing Chart



Tb. CHARACTER CODE 100 μs OR MORE
 CR/LF/SUB CODE PRINT + CARRIAGE RETURN
 (about 3 seconds max.)

Reference: CR = (Hex 0,D), LF = (Hex 0,A), SUB = (Hex 1,A)

USING THE PRINTER

POWER ON/OFF

The power-up sequence varies slightly depending on the Computer system used. See your Computer's owners manual for proper power-up procedures.

The Power lamp will stay lit while the Printer is ON. It is essential that the Printer stay on while connected to the Computer. Turning the Printer off can cause erratic operation of the system. Also remember that if the power is turned on or off while the Computer is running a program, program malfunction and/or a loss of RAM memory may occur.

RECEIVED CONTROL CODES

According to the American Standard Code for Information Interchange (ASCII), there are 32 control codes in addition to the codes for the printable characters. (Control codes are sent as data, but the receiving device interprets them as abbreviated instructions, communications-status messages, etc.)

The DMP-100 recognizes the following control codes, and ignores all other codes.

CODE			SYMBOL	FUNCTION
Decimal	Octal	Hex		
10 or 13	012 or 015	0A or 0D	LF CR	Line feed. Prints out current buffer contents and advance paper one line.
14	016	0E	SO	Disables underline printing
15	017	0F	SI	Enables underline printing
16, nn	020, nn	10, nn	POS	Prints from (nn+1)th character position. nn is a sequence of the ASCII-coded digits from 00 to 79 inclusive.
18	022	12	DC2	Designates graphic mode.
26	032	1A	SUB	Carriage return. Prints buffer: next character will be printed at start of line.
27, 16, hl	033, 020, hl	1B, 10, hl	ESC POS	Prints from (hl+1)th dot position. See note below.
28, aa	034, aa	1C, aa	FS	Next graphic pattern is repeated for aa times. ($0 \leq aa \leq 255$)
30	036	1E	RS	Designates character print mode.
31	037	1F	US	Designates double-width print mode.

NOTE: Positions are numbered from 1 to 480. "hl" is a two-byte sequence specifying a value from 0 to 479 inclusive. "h" is the most significant byte, "l" is the least significant. For dot positions from 1–256, use "h" equals 0, "l" equals desired dot column-1. For dot positions from 257 – 480, use "h" equals 1, "l" equals desired dot column-1-256.

Not available via "LPRINT", requires programming to bypass TRS-80 Printer software. See note on Page 17.

PRINTABLE CHARACTERS

The DMP-100 can produce all ASCII characters from decimal 32 through decimal 127 (hex 20 through 7F). Here's what they look like:

Code			Char.	Code			Char.	Code			Char.
Dec.	Hex	Oct.		Dec.	Hex	Oct.		Dec.	Hex	Oct.	
32	20	040	(Blank)	64	40	100	@	96	60	140	`
33	21	041	!	65	41	101	A	97	61	141	a
34	22	042	"	66	42	102	B	98	62	142	b
35	23	043	#	67	43	103	C	99	63	143	c
36	24	044	\$	68	44	104	D	100	64	144	d
37	25	045	%	69	45	105	E	101	65	145	e
38	26	046	&	70	46	106	F	102	66	146	f
39	27	047	'	71	47	107	G	103	67	147	g
40	28	050	(	72	48	110	H	104	68	150	h
41	29	051	)	73	49	111	I	105	69	151	i
42	2A	052	*	74	4A	112	J	106	6A	152	j
43	2B	053	+	75	4B	113	K	107	6B	153	k
44	2C	054	,	76	4C	114	L	108	6C	154	l
45	2D	055	-	77	4D	115	M	109	6D	155	m
46	2E	056	.	78	4E	116	N	110	6E	156	n
47	2F	057	/	79	4F	117	O	111	6F	157	o
48	30	060	0	80	50	120	P	112	70	160	p
49	31	061	1	81	51	121	Q	113	71	161	q
50	32	062	2	82	52	122	R	114	72	162	r
51	33	063	3	83	53	123	S	115	73	163	s
52	34	064	4	84	54	124	T	116	74	164	t
53	35	065	5	85	55	125	U	117	75	165	u
54	36	066	6	86	56	126	V	118	76	166	v
55	37	067	7	87	57	127	W	119	77	167	w
56	38	070	8	88	58	130	X	120	78	170	x
57	39	071	9	89	59	131	Y	121	79	171	y
58	3A	072	:	90	5A	132	Z	122	7A	172	z
59	3B	073	;	91	5B	133	[	123	7B	173	{
60	3C	074	<	92	5C	134	\	124	7C	174	|
61	3D	075	=	93	5D	135	]	125	7D	175	}
62	3E	076	>	94	5E	136	^	126	7E	176	~
63	3F	077	?	95	5F	137	_	127	7F	177	(Blank)

THEORY OF OPERATION

This Printer uses a single printing hammer system which is different from other impact dot matrix printing systems. Notice the platen, with its series of raised ridges. These ridges are part of the secret. The carriage movement, the motion of the hammer, and the revolution of the platen are all synchronized. See Figure 10 for the mechanical construction of the hammer, platen, and dot sensor. Figure 11 shows the relationship between the hammer, the printed dot position, and the dot sensor signal.

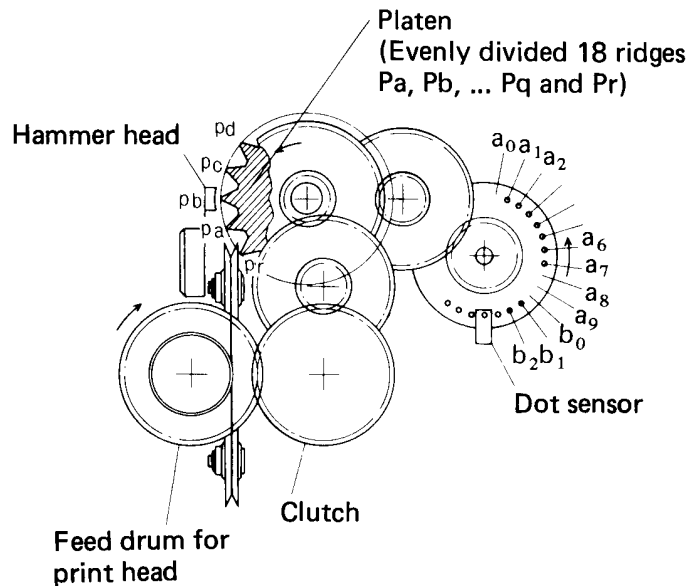


Figure 10

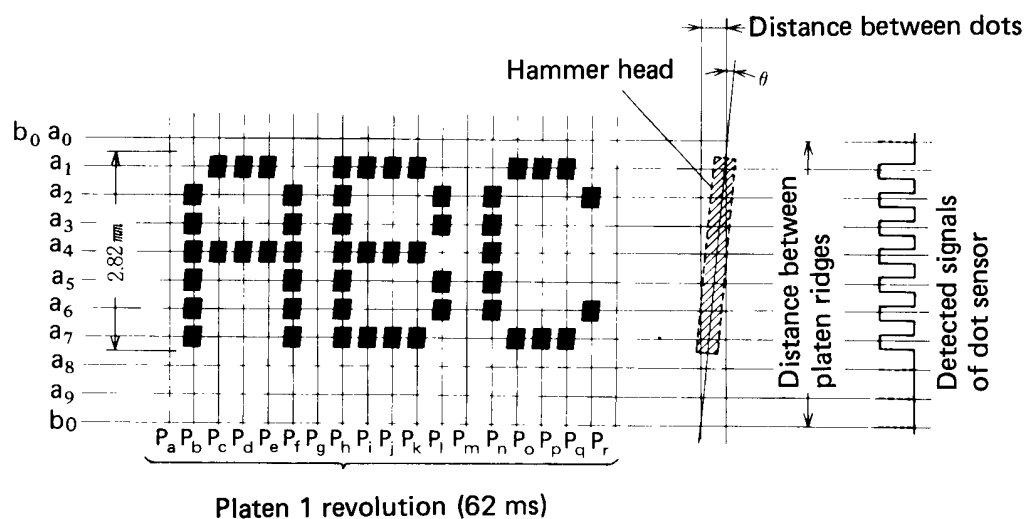


Figure 11

The ridges on the platen are set to account for ten dots, which is the height of one column. (The top and bottom dots are not printed. They are used for spacing between the lines.) While the platen rotates for each ridge, seven dot signals are sent to the head hammer. Each signal activates or deactivates the head according to the command being executed. The head is activated and deactivated seven separate times while one ridge passes by the hammer head. The hammer head is slanted to compensate for the constant rightward motion of the head position. Each pass of a ridge causes one column to be printed. There are 18 ridges on the platen, therefore 18 columns (three characters) are printed for each revolution of the platen.

In the graphic mode, eight bit data is used to address each dot in a seven dot column. The first bit of the eight is always 1 to tell the Printer that the data is for the graphic mode.

BUFFER SIZE

If you are trying to maximize "throughput", the following information may be useful. When the Printer's storage buffer is filled (or when it receives an end-of-line code), the line is automatically printed. If more than 80 text characters are received without a carriage return, the Printer will wrap around to the next line without losing any data. The dot buffer can hold up to 480-bytes for all the dots to be printed.

PROGRAMMING EXAMPLES

The BASIC statements LPRINT and LLIST output to the Line Printer. For details of syntax, see the BASIC Reference Manual for your Computer Model.

NOTE: If you are using a Color Computer, substitute PRINT #-2 for LPRINT in all of the following examples.

Examples:

LLIST

Lists the resident program to the Printer.
Only functions when in the character mode.

LPRINT "THIS IS A TEST"

Prints the message in quotes and tells the Printer that the next printable character begins a new line.

LPRINT "THIS IS PART OF A LINE"; LPRINT "THIS IS THE REST"

Prints both of the messages on the same line (because of the semicolon). The next printable character received starts a new line.

LPRINT "SMALL"; CHR\$(31); "LARGE"; CHR\$(30); "SMALL AGAIN"

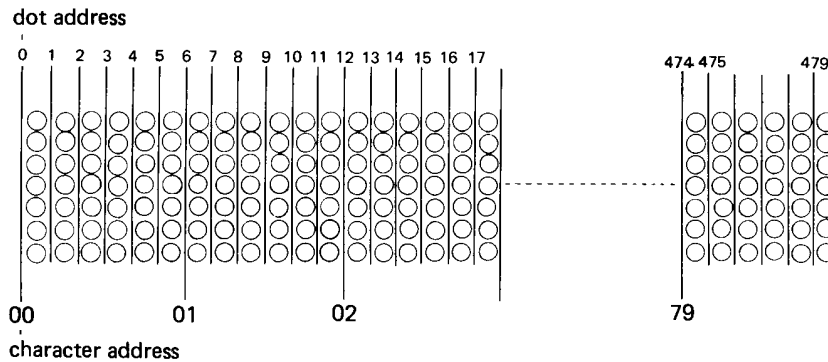
This shows the Printer's ability to print normal and double-size characters on the same line.

LPRINT CHR\$(16); "1"; "0"; "THIS IS THE 11TH POSITION"

LPRINT CHR\$(16); "10"; "THIS IS THE 11TH POSITION"

LPRINT CHR\$(16); CHR\$(49); CHR\$(48); "THIS IS THE 11TH POSITION"

Printing starts at the 11th character position (10 + 1). Put numbers in ASCII code or put each digit in quotes. Check to see that each of these three statements do the same thing.



Dot Positioning

(ESC POS n1 n2)

When you want to specify a dot column position for printing to begin, you must first use CHR\$ to send an ESCape POSition code (decimal 27 and decimal 16 — see Received Control Codes earlier in this manual) to the printer followed by a two-byte value which specifies the dot column:

ESC code	POS code	first byte	second byte
----------	----------	------------	-------------

If you wish to specify a dot position from 0-255, the first byte must be binary 0; if you want a dot position greater than 255, the first byte must be binary 1.

The second byte is a binary value between 0-255 decimal.

NOTE: The true position you want to start printing at is always one position greater than what you specify. That is, if you specify column 150, printing will actually start at column 151. Therefore, always specify one dot position less than the desired dot position. For example, to specify dot 200, use CHR\$ (199).

(Even though dot positions between 0—479 decimal are available, you cannot send values greater than 255. That is, CHR\$ (400) is not allowed — specify the dot position as a two-byte value.)

If you specify a dot position less than 255, send the ESC POS code followed by the (decimal) dot position you want to start printing at. For instance:

```
LPRINT CHR$ (27); CHR$ (16); CHR$ (0); CHR$ (50); "JON"
```

and the name JON will begin printing at dot position 51.

For dot positions greater than 256, specify the first byte as "1" and the second byte as "(position — 256) — 1". For example, if you want to start printing at dot position 400, specify the first byte as 1 (CHR\$ (1)) and the second byte as (400 — 256) — 1 = 143 (CHR\$ (143)).

```
LPRINT CHR$ (27); CHR$ (16); CHR$ (1); CHR$ (143); "JON"
```

The name JON would be printed beginning at the 400th dot position.

This code sequence requires that the dot position be given in binary, not ASCII, characters. But the TRS-80 Printer Software intercepts certain binary values like 0, 10 and 12. Therefore you cannot specify every possible dot column with a LPRINT statement. For this reason, you will need to bypass the Printer Software via POKE, OUT or machine-language (see one of Radio Shack's advanced programming manuals).

Graphics

The graphic pattern codes are stored in decimal 128 to 255 (hex 80 to FF). Run the following program to see each code and the kind of graphic pattern it represents.

```
10 N = 128
20 FOR M = 1 TO 16
30 FOR P = 1 TO 8
40 LPRINT CHR$(30);" N ="; N;
50 LPRINT CHR$(18);CHR$(N),
60 N = N + 1
70 NEXT P
80 LPRINT CHR$(10);
90 NEXT M
100 LPRINT CHR$(30)
```

You can't remember the pattern codes? OK, let's explain.

The most significant bit (always "1") denotes that this is a graphic pattern code.

The remaining 7 bits correspond to the 7 dots which form one column. The least significant bit controls the top dot and the next least significant bit controls the second dot from the top...down to the second most significant bit which controls the bottom dot. When the corresponding bit is "1", the dot is printed.

For example, decimal 128 (hex 80) is

1 0 0 0 0 0 0

Since all seven dots are "0" nothing is printed.

decimal 171 (hex AB) is

1 0 1 0 1 0 1

In this example the first, second, fourth, and sixth dots will be printed.

And, of course, decimal 255 (hex FF) will be

1 1 1 1 1 1 1

and all seven dots will be printed.

In the graphic mode, all codes except control codes and graphic codes are ignored. Use code 30 (hex 1E) to return to the character mode. In the character mode all graphic codes are ignored.

Repeat Code

Getting tired of inputting the same "CHR\$(nn)"? For such instances, we provide a graphic repeat code (decimal 28, hex 1C).

Example:

```
LPRINT CHR$(28); CHR$(120); CHR$(255)
```

This example will print a solid line of 120-column length. Repetition is possible for up to 256 times: for 256, input 0 as the repetition number.

Some Programming Notes

- The positioning codes, 16 and 27, (16 codes), count spaces from the left margin, not the current head position.
- If the position parameter is larger than 79 in 16 code or 479 in 27, 16 code, the instruction is ignored.
- After one print command is executed, the Printer will stay in the same mode (graphic or character) as last executed. Therefore, you do not need to designate the mode with each line.
- The line feed is different in each mode.
Character 6 lines per inch
Graphic 9 lines per inch
- You can change the mode during the printing of the same line.

```
10 LPRINT CHR$(15);  
20 LPRINT "UNDERLINE"  
30 LPRINT CHR$(14)
```

This program will print an underline to the word "UNDERLINE".

The CHR\$(10) code (line feed) is intercepted by our TRS-80 BASIC interpreter and will not be received by the Printer. You should never need to use this command since line feeds are handled automatically by the Printer. If you need to use this code you will have to bypass the Printer software. (See one of Radio Shack's advanced programming manuals.)

IF YOU HAVE PROBLEMS

We hope you don't ... but just in case ... see if you can solve them by using the table below. If you can't, then try to determine which component in your system is at fault, and bring it into your local Radio Shack store for repair. We'll have it back to you as soon as we can.

Problems	Probable Causes/Solutions
Printer won't print. Power Indicator 'OFF'.	1) Print power is 'OFF'. Check the connection and the power switch. 2) Fuse may be blown. Replace only with a fuse of the same rating.
Printer won't print Power Indicator 'ON'.	1) Improper connection. Check the wiring of input data to the Printer. 2) Wrong Input selected. Check the Input select switch. 3) Improper ribbon setting. Reset the ribbon.
Many errors are occurring In the Serial Interface Model	Improper connection; bad electrical ground. Check the wiring to your DIN plug and ensure that the Printer is grounded at the power source.
Printer okay, but the paper won't advance.	Paper is jammed. Remove and reload the paper.
Printed characters are too light or smudging.	1) Improper stroke. Adjust the lever's position on the print head. 2) Wrong ribbon setting. Reset the ribbon. 3) Old or worn-out ribbon. Replace the ribbon.

CARE AND MAINTENANCE

CAUTION

- Wait at least two seconds to turn on the power after it is turned off, otherwise the Printer will not be initialized properly.
- Never place the Printer where it is exposed to direct sunlight.
- Never turn the power on or off while you are plugging in or unplugging a Computer connector.
- Never turn off the power while the Printer is in motion.
- Never try to move the print head manually.
- Do not stop the print head motion while it is printing.
- Do not print without paper and/or ribbon because the print head might be damaged.
- Be sure the paper is not dragging as it feeds into the tractor mechanism. You may need to put the paper supply close to the Printer-level not on the floor.
- In graphic mode, the continuous printing of too high dot density patterns may affect the longevity of the print head. We recommend that you avoid printing all black patterns continuously.

MAINTENANCE

The DMP-100 requires very little maintenance. Simply treat it with the same care you would give to any electro-mechanical device — avoid physical shocks, keep it dry, etc.

SPECIFICATIONS

GENERAL SPECIFICATIONS

A.	Print Method	Impact dot matrix print
B.	Character Matrix	5 x 7 dot matrix
C.	Alphanumeric Characters	96 characters (ASCII standard)
D.	Graphics	Dot addressable. 7 vertical dots per column, max 480 col.
E.	Character Codes	8 bit ASCII serial or 8 bit ASCII parallel.
F.	Character Size	Height: 7 dots (1/9 inch) (2.82 mm) Width: 5 dots (1/12 inch) (2.11 mm)
G.	Print Speed	Nominal 50 characters/set at 10 CPI 80 columns 27 LPM at self test mode
H.	Characters/line	80 characters max at 10 CPI
I.	Characters/inch	a. 10 CPI at 80 columns b. 5 CPI at 40 columns
J.	Lines/inch	a. 6 Alphanumeric mode b. 9 Graphic mode
K.	Line Feeds/sec	a. 5 Alphanumeric mode b. 7.5 ... Graphic mode
L.	Paper Feed	Pin feed
M.	Paper Width	4.5 to 9.5 inches acceptable pin to pin (subtract .5 inch)
N.	Inked Ribbon	Inked roller built-in cassette type. (Cat. No. 26-1424.)
O.	Measurements	5.32 x 16.0 x 8.25 inches 135 x 408 x 209 mm (H x W x D)
P.	Weight	8.6 lbs (3.9 kg)
Q.	Baud Rate	600 bps/1,200 bps selectable.
R.	Buffer Size	480 byte full line dot buffer.

ENVIRONMENT

A.	Power Requirements	120 ± 15 VAC, 60 Hz for USA and Canada, 220/240 VAC 50 Hz for Europe and Australia.
B.	Power Consumption	20 watts max. (character printing) 10 watts (standby)
C.	Temperature	Operation 32° F to 109° F 0° C to 43° C Storage -40° F to 160° F -40° C to 71° C
D.	Humidity	20% to 80% (non-condensing)

LIMITED WARRANTY

For a period of 90 days from the date of delivery, Radio Shack warrants to the original purchaser that the computer hardware unit shall be free from manufacturing defects. This warranty is only applicable to the original purchaser who purchased the unit from Radio Shack company-owned retail outlets or duly authorized Radio Shack franchisees and dealers. This warranty is voided if the unit is sold or transferred by purchaser to a third party. This warranty shall be void if this unit's case or cabinet is opened, if the unit has been subjected to improper or abnormal use, or if the unit is altered or modified. If a defect occurs during the warranty period, the unit must be returned to a Radio Shack store, franchisee, or dealer for repair, along with the sales ticket or lease agreement. Purchaser's sole and exclusive remedy in the event of defect is limited to the correction of the defect by adjustment, repair, replacement, or complete refund at Radio Shack's election and sole expense. Radio Shack shall have no obligation to replace or repair expendable items.

Any statements made by Radio Shack and its employees, including but not limited to, statements regarding capacity, suitability for use, or performance of the unit shall *not* be deemed a warranty or representation by Radio Shack for any purpose, nor give rise to any liability or obligation of Radio Shack.

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