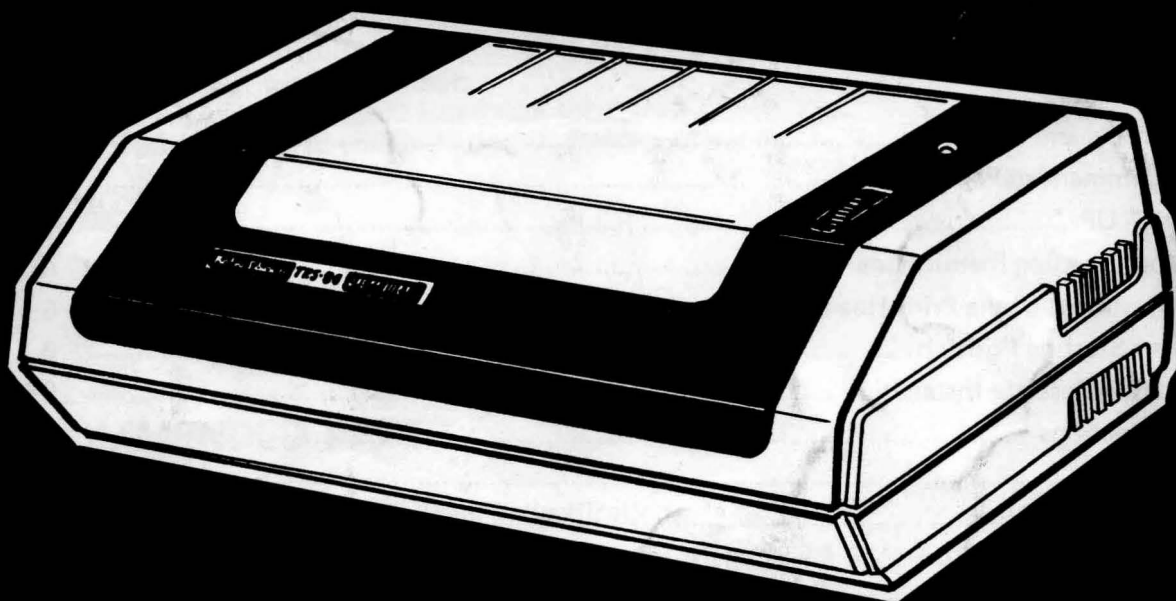


# Line Printer VII

Catalog Number 26-1167

**Radio Shack<sup>®</sup>**  
**TRS-80<sup>™</sup>**  
**MICRO**  
**COMPUTER**  
**SYSTEM**

**HARDWARE**



CUSTOM MANUFACTURED FOR RADIO SHACK



A DIVISION OF TANDY CORPORATION

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

The Line Printer VII is a versatile dot-matrix impact printer.

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

Other exceptional features include:

- Unique printing system different from most other printers.
- Graphic, character, and double width character modes are provided and you can intermix these modes on a single line.
- In the graphic mode, a graphic data pattern can be repeated as many times as you want with a single command.
- 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 (7 or 8 bit serial).
- Software-selectable line densities (6 or 9 lines per inch).
- Accepts paper width from 4.5 to 9.5 inches.
- Prints multiple copies (original plus up to 2 copies).
- Automatic "wrap-around". When the text exceeds the maximum line length no data is lost due to overflow.

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# CONTROLS AND FUNCTIONS

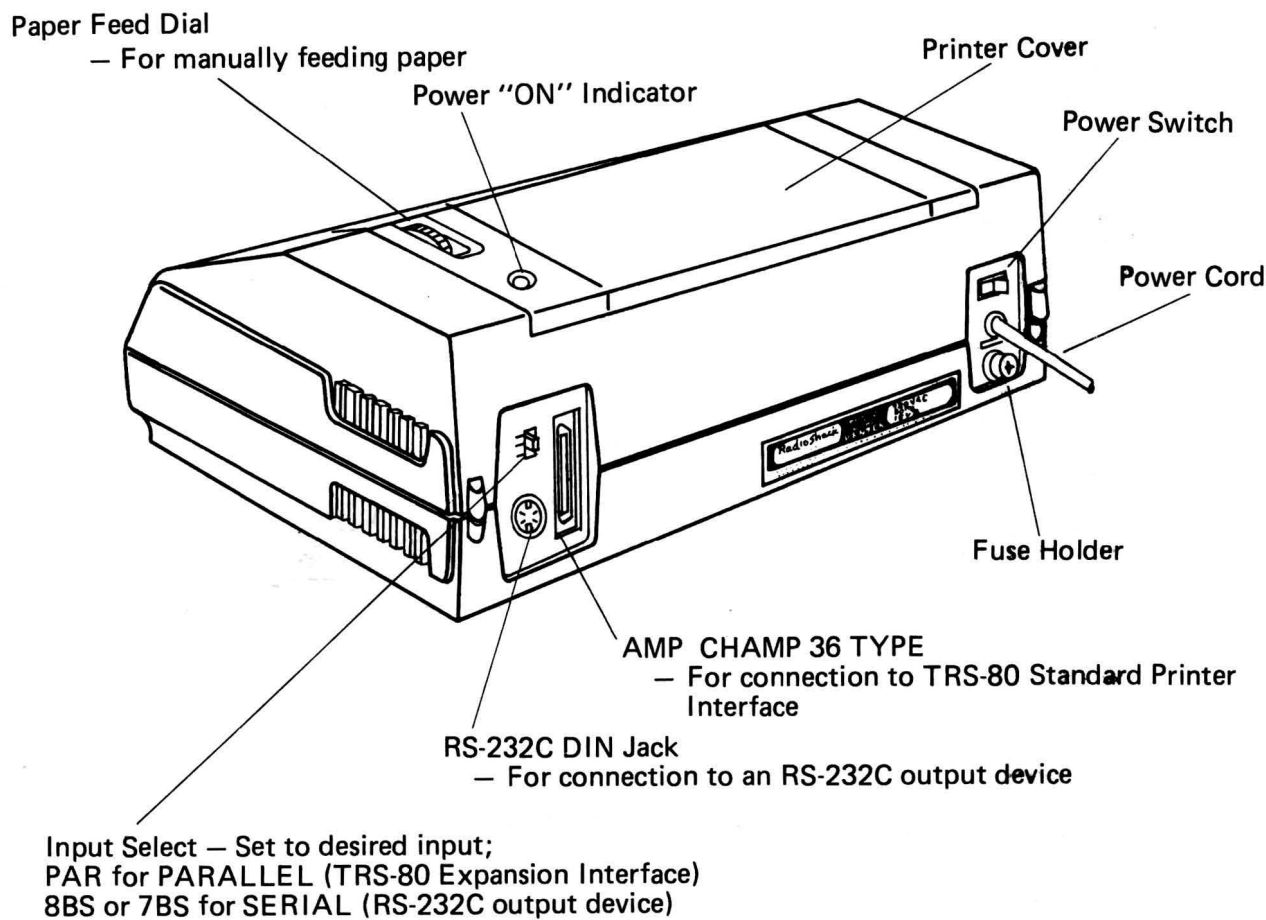


Figure 1

## 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

## 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 to accommodate the paper so that the paper will be neither stretched too tightly nor loose and wrinkled.

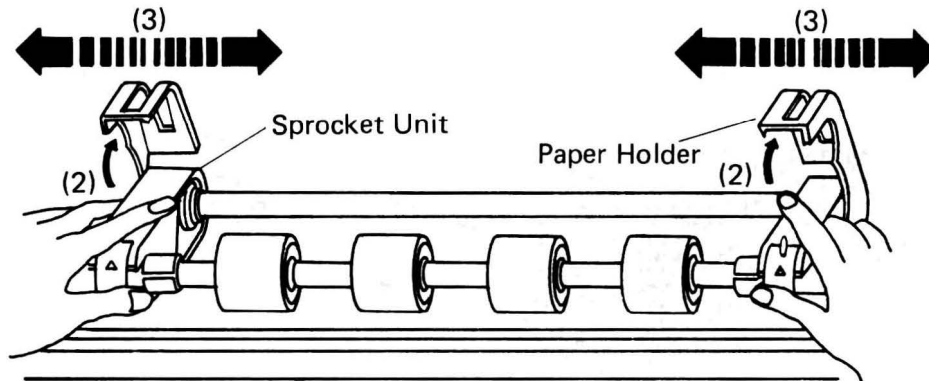


Figure 2

**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.

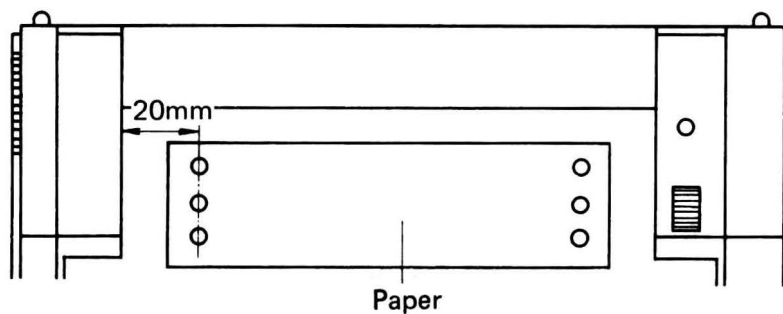


Figure 3

- (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 feeds straight into the tractor mechanism, as shown in Figure 4-B. Also be sure to minimize the "drag" of the paper. When using multipart forms, you may need to position the paper supply close to the level of the tractor, not on the floor.

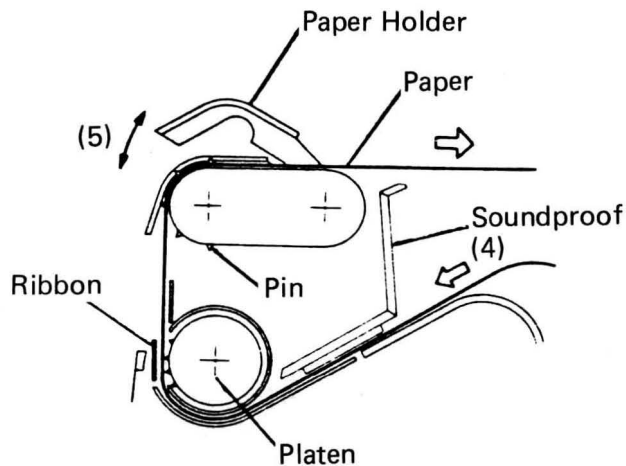


Figure 4-A

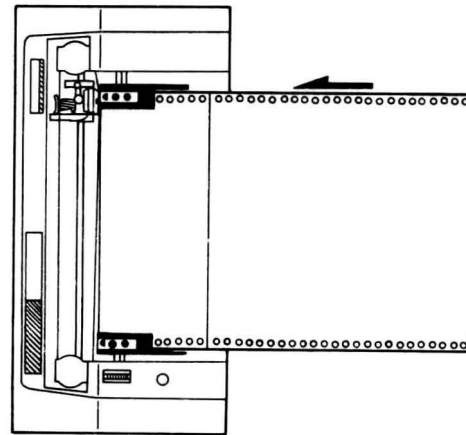


Figure 4-B

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

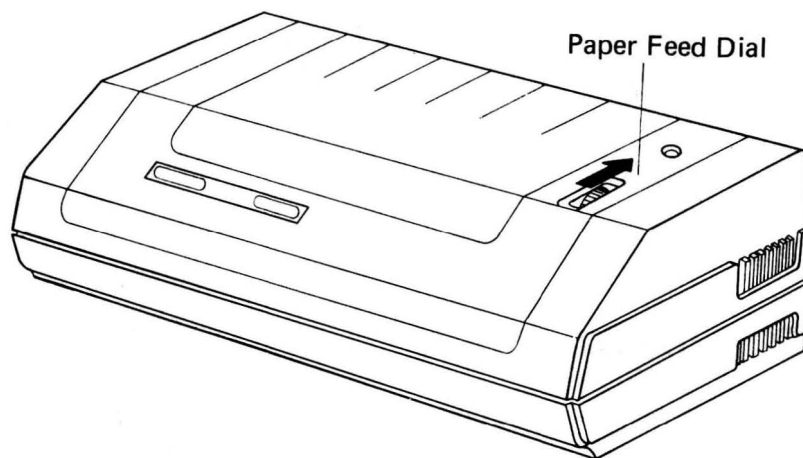


Figure 5

- (7) Put on the printer cover.

**NOTE:** Keep the paper to be fed into the Printer 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.

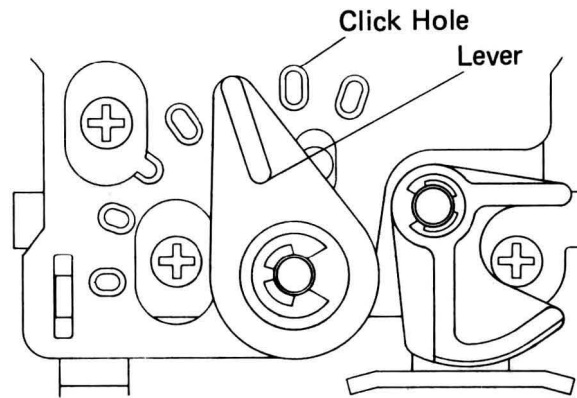


Figure 6

## PRINT STARTING POSITION

As described in Figure 7 below, printing starts at the position about 1.2 inches (30 mm) away from the left-edge of the Printer.

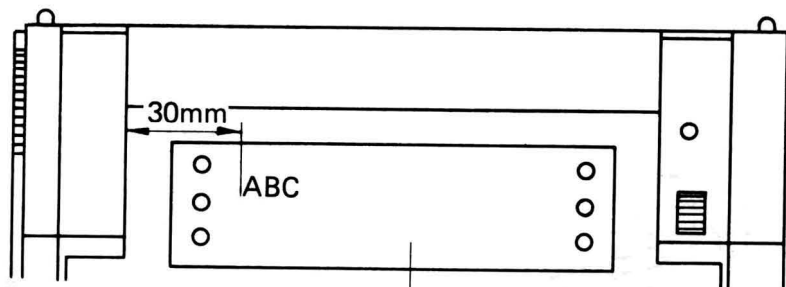
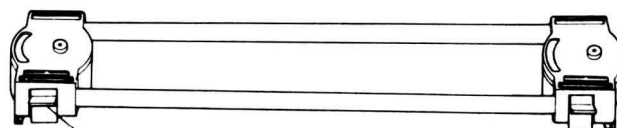


Figure 7

## 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 positions①②, and ③as shown in Figure 9 below.

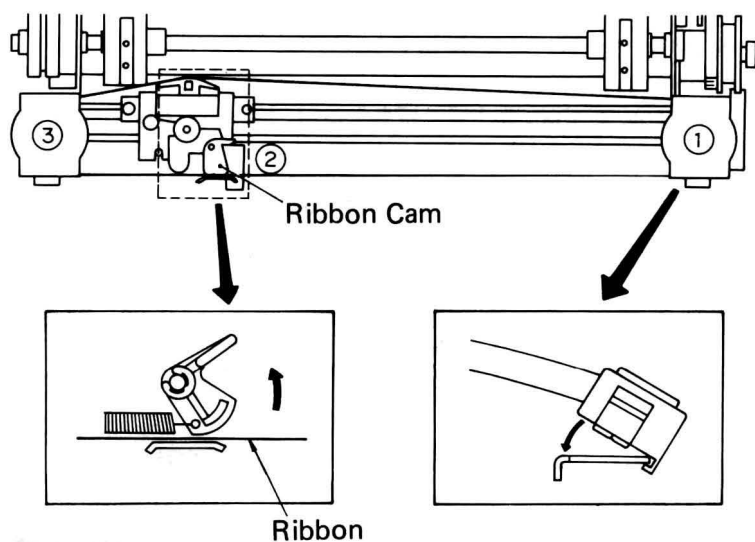


Figure 9

- NOTES:**
1. Confirm 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 try to move the print head manually.**  
**Forcing it to move may damage the Printer.**
  4. Raise the inner side of the ribbon (the platen side) a little for easier 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:

1. Is the AC power line voltage correct (120 V AC for USA and Canada, 220/240 V AC for Europe and Australia)?
2. Is the Printer power switch in the OFF position?
3. Has the ribbon cassette been set in?
4. If you are using paper narrower than 9-1/2" (24.1 cm), be sure that 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 1—4 above, proceed with the connections.

- A. Plug the printer into an AC power (rated voltage) outlet.
- B. Connect the appropriate cable (see the table below) to the Printer. (Refer to your Computer Owner's Manual.)

Set the input select switch to "PAR" except when using the TRS-80 Color Computer, for which the select switch must be set to "7BS".

**NOTE:** When using a parallel interface, moving the switch to the serial mode will effectively take the Printer "off-line".

Computer	Cable #	Select Switch Setting
MOD-I CPU	26-1411	PAR
MOD-I + EI	26-1401	PAR
MOD-II	26-4401	PAR
MOD-III	26-1401	PAR
Color Computer	26-3020	7BS

**NOTE:** The 7 bit serial interface will not support graphics.

You can connect other types of RS-232C compatible instruments. However, fairly extensive knowledge is required for proper operation. Unless you are technically oriented, do not do it by yourself. Contact a competent technician. He will need the following information.

Note to TRS-80 Color Computer users

To use the graphic features of this Printer, you will need a special software driver available from Radio Shack. Order the "Eight-bit Color Computer Printer Driver", Catalog Number 70-2013. With this driver installed, select the 8BS setting on the printer. You will then be able to output graphics as well as text.

When using this Printer with a Class B computer such as the TRS-80 Model III, you must use a shielded cable to maintain compliance with the rules for Class B certification. For the Model III use the shielded version of the 26-1401. This version is called 26-1401-A.

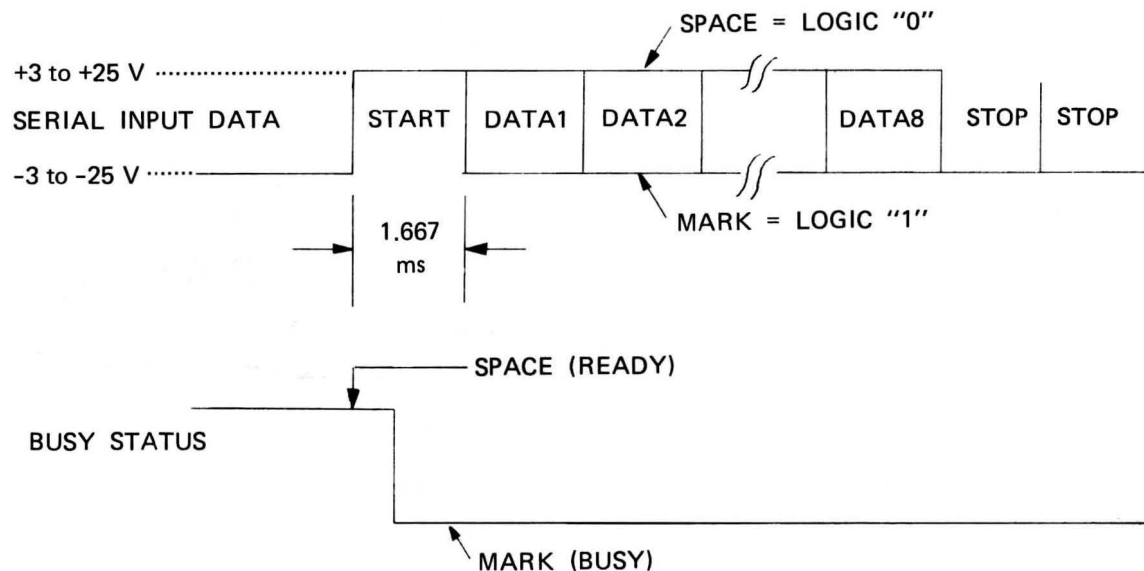


● Pin Configuration of the Serial RS-232C DIN Jack

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

● Time Chart of Serial Input

Baud rate is set to 600 bps.



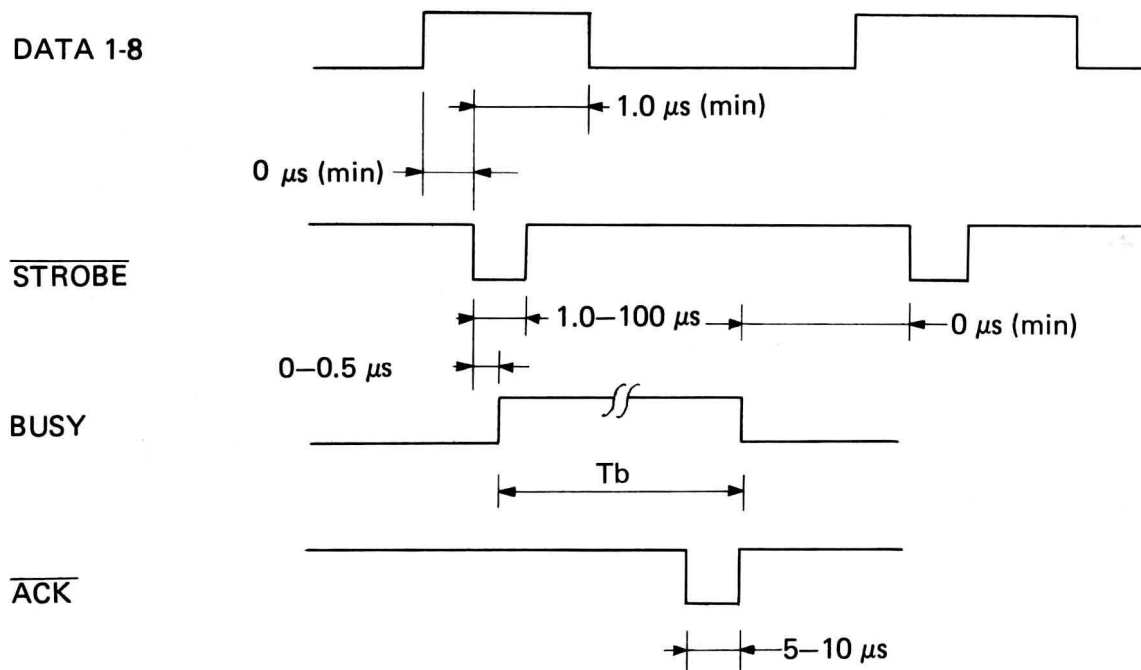
- 8 bit mode: 8-bit data, no parity, one or two stop bits
- 7 bit mode: 7-bit data, 8th bit = 0, one or two stop bits

● Pin Configuration of the PARALLEL Connector

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

- NOTES:** 1. HIGH is terminated by a 10 K $\Omega$  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



$T_b$ ; CHARACTER CODE ..... 100  $\mu\text{s}$  to 500  $\mu\text{s}$   
 CR/LF/SUB CODE ..... PRINT + CARRIAGE RETURN  
 (about 3 seconds max.)

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

# OPERATION

## POWER ON/OFF

The power-up sequence varies slightly depending on the Computer system used. With the Model I and Model III systems, all peripherals (printers included) should be turned on before turning on the CPU. The following is the recommended procedure for Model II systems:

when the "INSERT DISKETTE" message appears, turn on the Printer and the other peripherals — then insert the system diskette.

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 removed or applied to the Printer while the CPU is running a program, voltage spikes could cause a program malfunction and/or a loss of RAM memory.

## 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 Line Printer VII recognizes nine 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.
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 15.

# PRINTABLE CHARACTERS

The Line Printer VII 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 minutely 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.

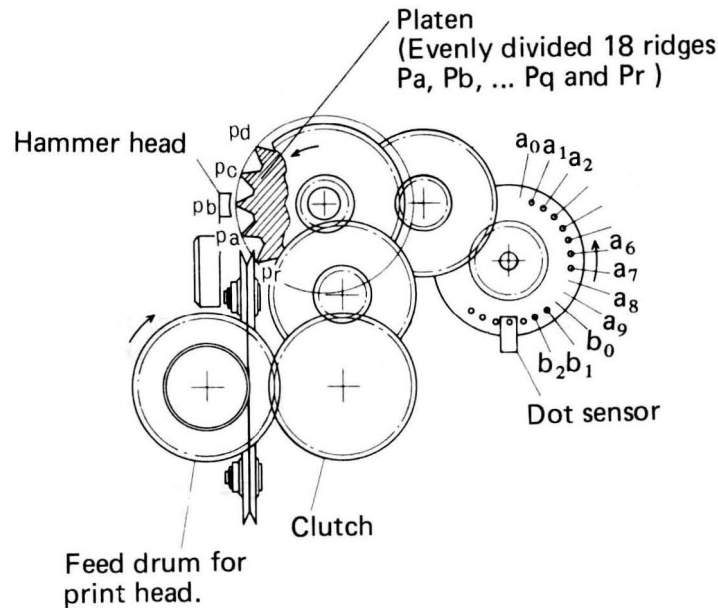


Figure 10

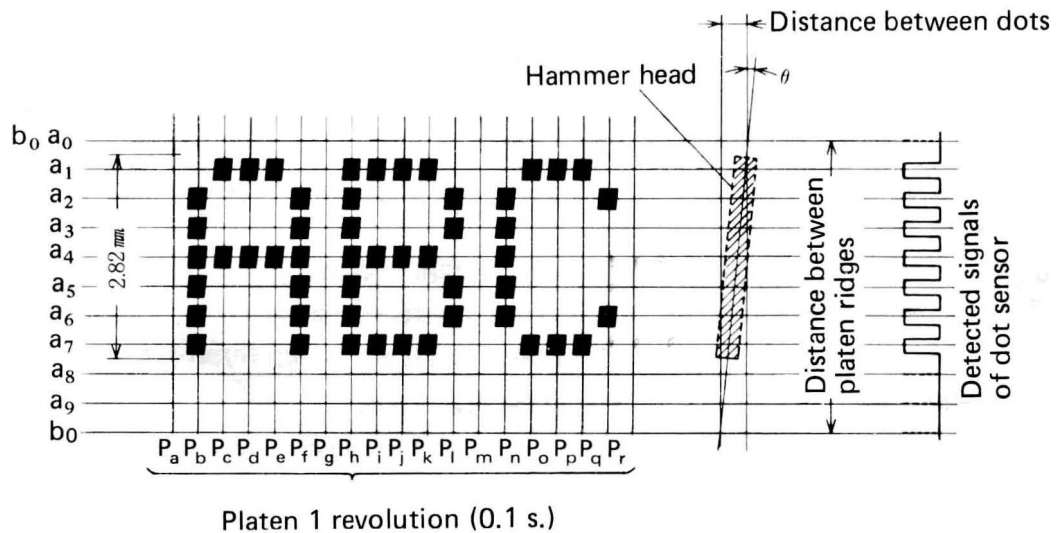


Figure 11

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 a programmer 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 buffer can hold up to 90 bytes of data, including control codes.

## 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 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.

## 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

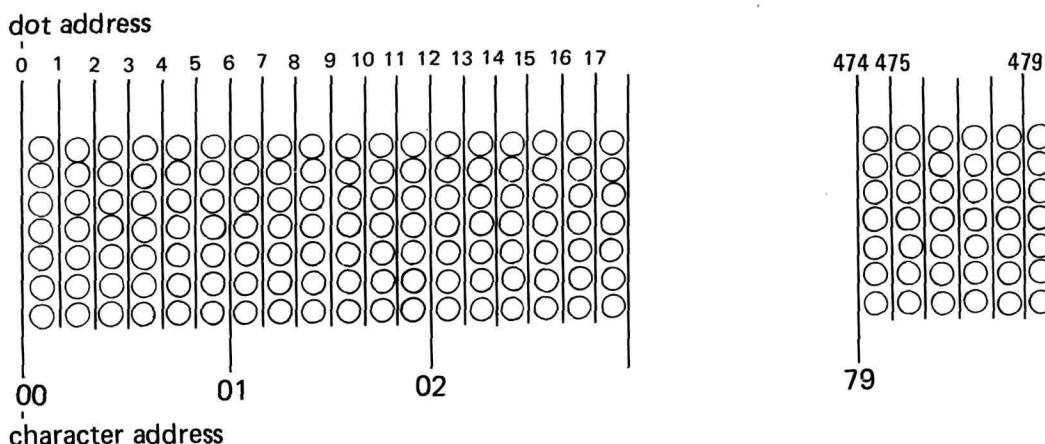
and all seven dots will be printed.

Once set to the graphic mode, all codes except control codes and graphic codes are ignored. Use code 30 (hex 1E) to return to the character mode. Also, when in the character mode all graphic codes are ignored.

Like code 16 (Hex 10) in the character mode, the code sequence 27, 16 (Hex 1B, 10) in the graphics mode moves the head to the desired position. In the character mode, the number of characters is used for positioning, but in the graphic mode the number of dot columns is used.

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)

Alternately, you may purchase a special graphics printer software called "LPG". This software will allow everything you print to go directly to the Printer without interception.



### 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.

**IMPORTANT NOTE:** ALL THE GRAPHIC FUNCTIONS ARE POSSIBLE ONLY WHEN USING AN 8-BIT CODE. FOR A 7-BIT SERIAL CODE SYSTEM, GRAPHIC FUNCTIONS ARE NOT AVAILABLE.

### Some Programming Notes

Both positioning codes, 16 and 27, 16 codes, count spaces from the left margin, not the current head position. If the designated position is to the left of the current head position, the codes are ignored.

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 as last executed. So when you stay in one mode — either graphic or character — there is no 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 "UNDERLINE";
20 LPRINT CHR$(26):: 'CARRIAGE RETURN
30 LPRINT CHR$(18):: 'DESIGNATES GRAPHIC MODE
40 LPRINT CHR$(28); CHR$(54); CHR$(192): 'REPEAT DOT FOR 54 TIMES (EQUALS NINE
CHARACTERS
```

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) Printer 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.

## 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.

# 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 .....	7 or 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 .....	30 characters/sec at 10 CPI 80 columns
H.	Characters/inch .....	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.	Number of Copies .....	Up to 3 copies including orig. (carbonless type) Orig. 0.06 mm (2.4 mils) Copies 0.055 ~ 0.06 mm (2.2 ~ 2.4 mils)
O.	Inked Ribbon .....	Inked roller built-in cassette type. (Cat. No. 26-1424.)
P.	Measurements .....	5.32 x 16.0 x 8.25 inches 135 x 408 x 209 mm (H x W x D)
Q.	Weight .....	8.6 lbs (3.9 kg)

## ENVIRONMENT

A.	Power Requirements .....	120 ± 15 VAC, 60 Hz for USA and Canada, 220/240 VAC for Europe and Australia.
B.	Power Consumption .....	15 watts max. (character printing) 5 watts (idling)
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)

# 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 apply power while you are plugging in or unplugging an input connector.
- Never turn off the power while the Printer is in motion.
- Never try to move the print head manually, regardless if power is on or off.
- 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. This is especially important with multi-part forms. You may need to put the paper supply close to the Printer-level not on the floor.
- Regarding printing duty.

In graphic mode, using patterns of too high dot density will wear out the print head faster. We recommend that you use patterns whose dot density is equal to that of ordinary alphanumerics. The continuous printing of high dot density patterns may badly affect the longevity of the print head.

## MAINTENANCE

The Line Printer VII 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.

### 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, 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.

## 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.

EXCEPT AS SPECIFICALLY PROVIDED IN THIS WARRANTY OR IN THE RADIO SHACK COMPUTER SALES AGREEMENT, THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL RADIO SHACK BE LIABLE FOR LOSS OF PROFITS OR BENEFITS, INDIRECT, SPECIAL, CONSEQUENTIAL OR OTHER SIMILAR DAMAGES ARISING OUT OF ANY BREACH OF THIS WARRANTY OR OTHERWISE.

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