MX series

DOT MATRIX PRINTER

OPTION

user manual

TRS-80 INTERFACE KIT

EPSON

P8080021

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INTRODUCTION

The EPSON MX series dot matrix printers have an option for the Tandy Radio Shack computer TRS-80 which is called the TRS-80 Interface Kit. This interface kit consists of a TRS-80 Interface Board (EPSON Cat. No. 8120) and TRS-80 Bus Interface Cable (EPSON Cat. No. 8221), and allows the TRS-80 to produce hard-copy outputs on some types of EPSON MX series printers. (Contact the store where you purchased the Printer, to confirm that this option is applicable to your printer.) With this compact kit, a complete electronic link is provided between the MX printer and the TRS-80. Using this interface kit, your MX printer can be controlled easily by the BASIC program of the computer to produce:

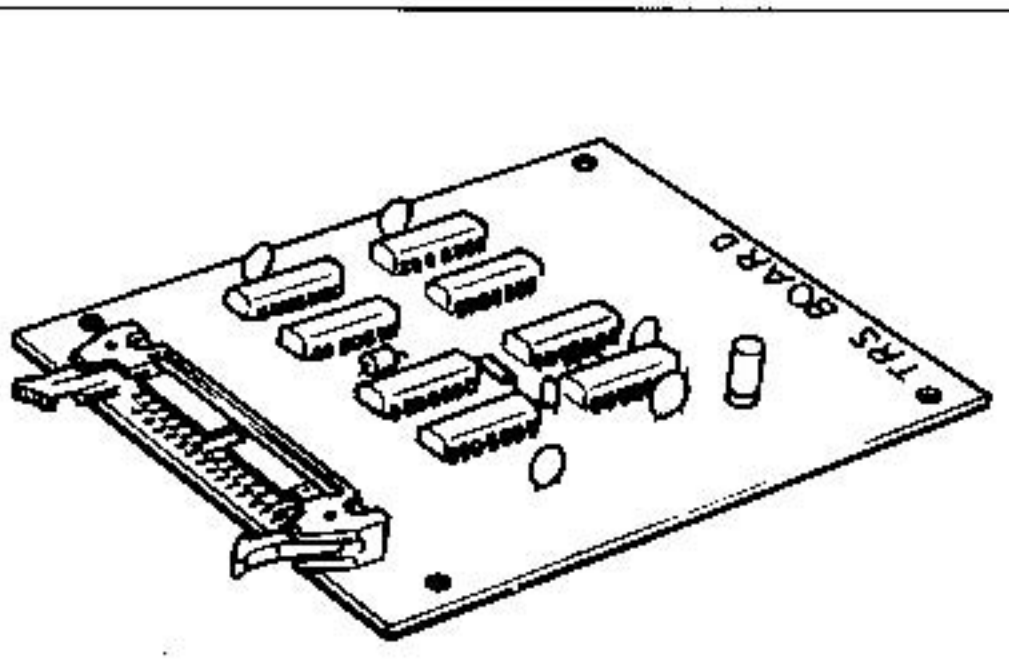
(1) Program listings
(2) Printed records and reports
(3) Debug and memory dump listings

If you have the TRS-80 Expansion Interface, the MX printer can be connected to the TRS-80 via this Expansion Interface by using only the TRS-80 Expansion Interface Cable (EPSON Cat. No. 8220)

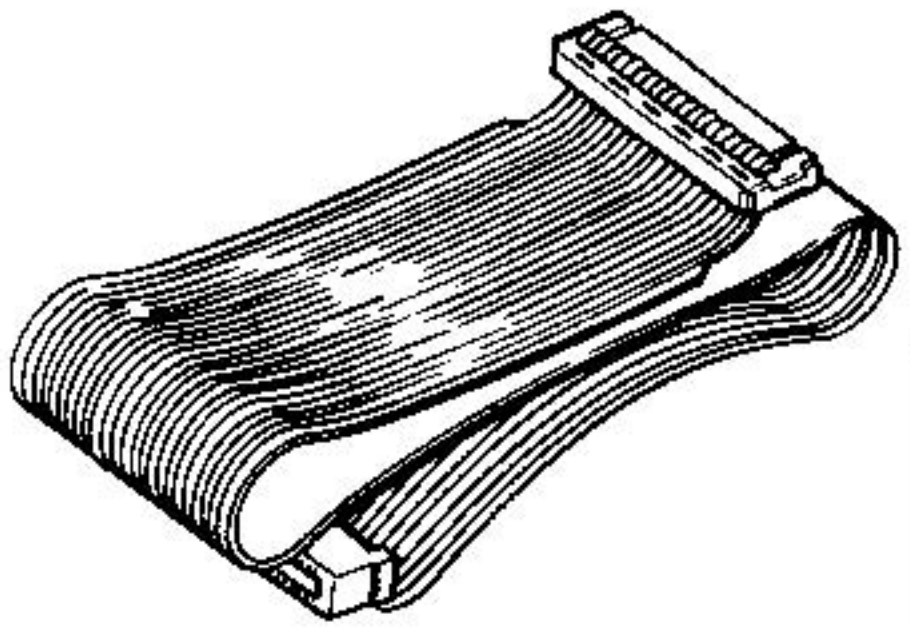
*The contents of this manual are subject to change without notice.

INSTALLATION

Assembly parts of the Interface Kit are shown in Fig. 1. To install the kit in the printer, observe the following procedure:



TRS-80 Interface Board (Cat. No. 8120)



TRS-80 Bus Interface Cable (Cat. No. 8221)

Fig. 1 Assembly Parts

STEP 1. Turn off the power switches of both the Printer and the TRS-80 computer.

NOTE: Power should always be turned off when inserting or removing the interface board. Removal or insertion of the interface board could cause permanent damage to the board itself, as well as to the Printer and the TRS-80.

STEP 2. Take off the upper case of the printer as follows.
(See Fig. 2 and refer to the operation manual of the applicable MX series printer.)

1) Remove the 4 screws situated at the bottom of the lower case.
2) Pull the manual paper feed knob and the connector at the front right corner of the upper case.
3) Take off the upper case and the shield cover.

After the removal of the upper case four poles are visible at the inner rear center of the printer.

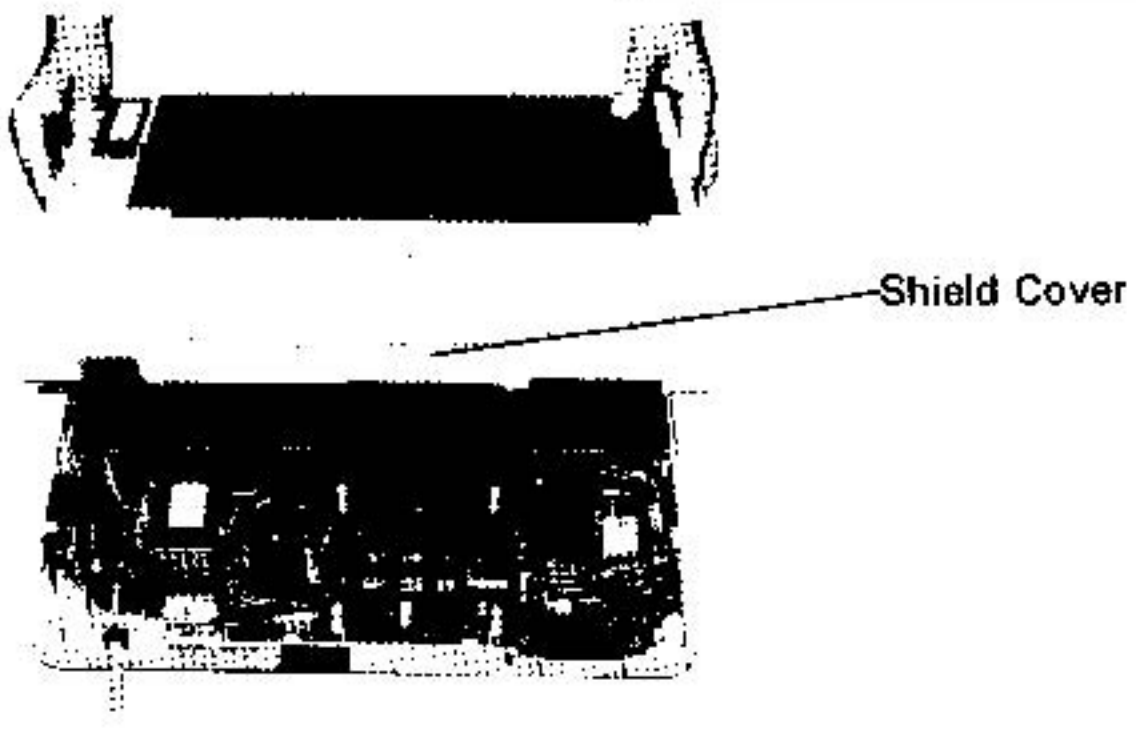


Fig. 2 Removal of Upper Case

STEP 3. Plug the I/F board connector into the connector on the control circuit board of the Printer as shown in Fig. 3.

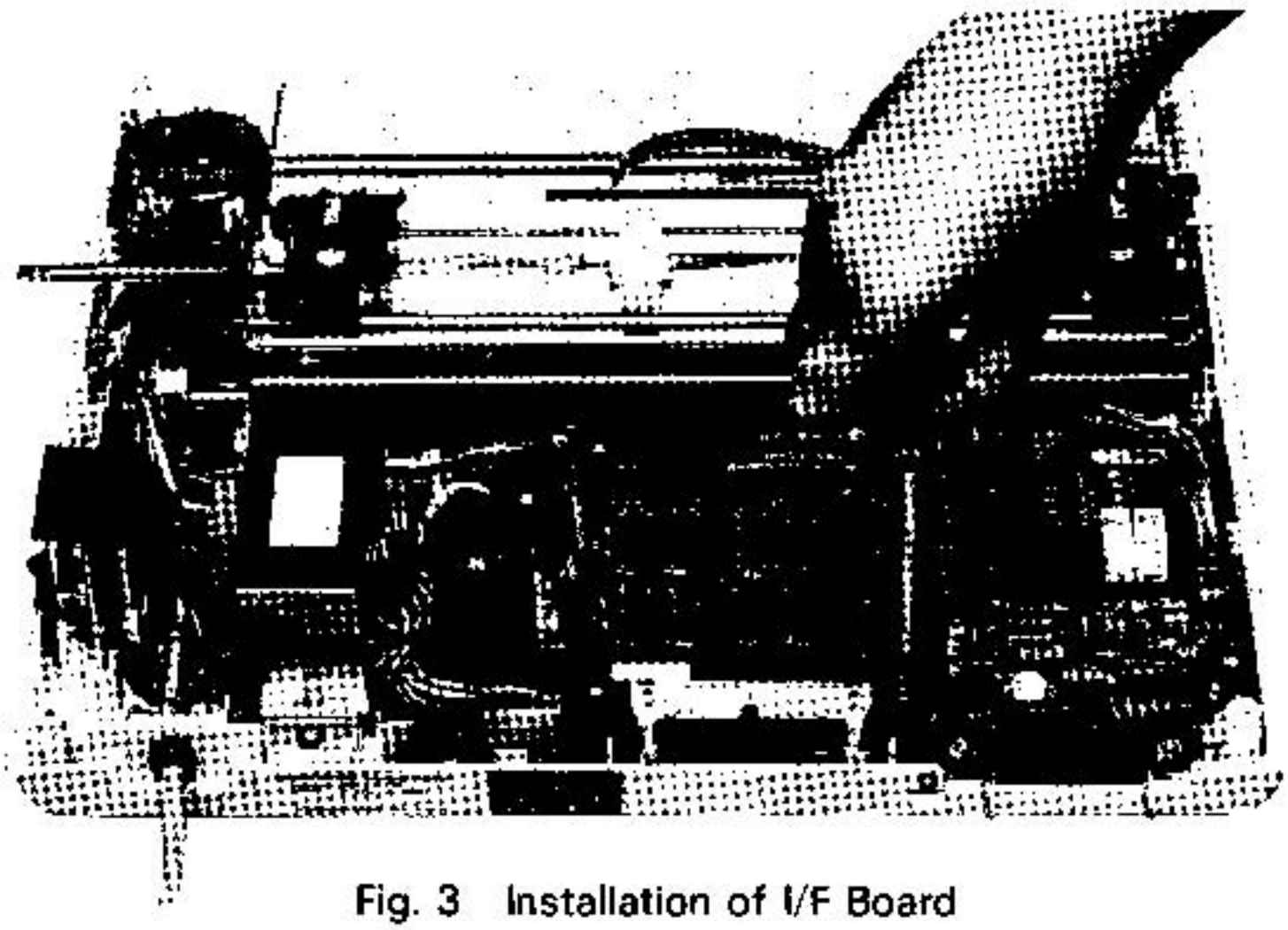


Fig. 3 Installation of I/F Board

STEP 4. Put the 4 screws into 4 poles and tighten them. (See Fig. 4.)

STEP 5. Plug the bus interface cable connector into the connector of the I/F board. (See Fig. 4.)

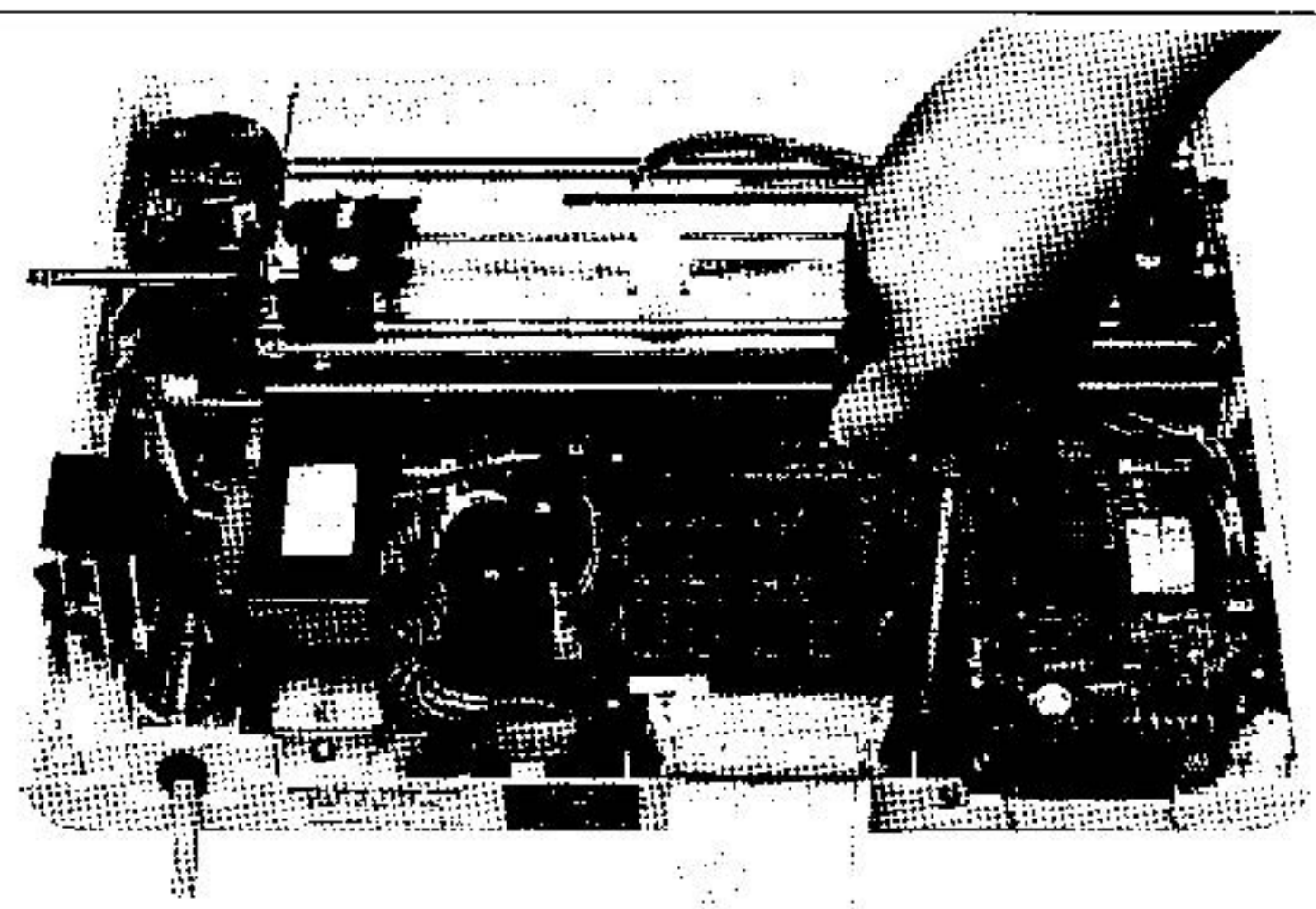


Fig. 4 Plugging Cable into I/F Board Connector

STEP 6. Plug in the connector, set the upper case on the lower case, secure the printer housing with the 4 screws from the bottom of the lower case, and set the manual paper feed knob on the paper feed shaft.

PRINTER OPERATION

If your MX series printer (e.g., MX-80) is capable of setting codes compatible with the TRS-80, the following control codes can be used.

(1) Control Codes

(a) CR (Carriage Return): [0D]H

When the CR code is transmitted to the print buffer, all data stored in the print buffer is printed and the paper is automatically advanced one line after printing. When 80 columns or more of print data (including spaces) are continuously received, the Printer automatically begins to print the data stored in the print buffer and advances the paper by one line after printing.

Note: If no data precedes the CR code, or if all preceding data is "SPACE," or if all the data for 80 columns are "SPACE," the head carriage will not function. The function of the head carriage differs from the above in the case of spaces on the graphic pattern side.

(b) LF (Line Feed): [0A]H

When the LF code is input, the paper is advanced one line. All the data input prior to the LF code are cleared. For example, if the data is transferred in the order of DATA A → LF, the DATA A is ignored.

Note: The LF command alone can be transferred from the TRS-80 computer.

(c) GS (approx. 16.5 characters/inch): [1D]H

When the GS Code is input, approx. 16.5 characters/inch are printed per line. This code may be input at any column position on a line.

(d) RS (10 characters/inch): [1E]H

When the RS code is input, 10 characters/inch are printed per line. This code can be input at any column position on a line. When the power switch is turned on, the Printer is set in this mode.

(e) US (5 characters/inch): [1F]H

When the US code is input, 5 characters/inch are printed per line. This code can be input at any column position on a line. By inputting this code, the number of columns per line becomes 40.

(f) ESC 6 (Condensed Line Spacing Reset): [1B]H, [36]H

Input of an "ESC" followed by ASCII code "6" causes the line spacing to be set at 1/6 inch. This code ([1B]H, [36]H) must be input consecutively. Once the line spacing has been set by this code, the set line spacing will not be changed until the code for a new line spacing is input. When the power switch is turned on, the Printer is set in this mode.

(g) ESC 8 (Condensed Line Spacing Reset): [1B]H, [38]H

Input of an "ESC" followed by ASCII code "8" causes the line spacing to be set at 1/8 inch. This code ([1B]H, [38]H) must be input consecutively. Once the line spacing has been set by this code, the set line spacing will not be changed until the code for a new line spacing is input.

(h) ESC A (Long Line Mode): [1B]H, [41]H
Input of an "ESC" followed by ASCII code "A" causes the print span to be set at 8 inches (Long Line mode). This code can be input at any column position on a line. Once the print span has been set by this code, the set print span will not be changed until the code for a new print span is input. When the power switch is turned on, the Printer is set in this mode.

(i) ESC B (Short Line Mode): [1B]H, [42]H
Input of an "ESC" followed by ASCII code "B" causes the print span to be set at 6.4 inches (Short Line mode). This code can be input at any column position on a line. Once the print span has been set by this code, the set print span will not be changed until the code for a new print span is input.

(j) DELETE (Delete): [7F]H
This code is actually printed as a space ([20]H in hexadecimal code).
Note: The data stored in the print buffer will not be cleared by this code.

(2) Operation with TRS-80 BASIC
Take note of the following points for the TRS-80 BASIC printer handling routine.

1 In the TRS-80 BASIC, LPRINT CHR$(10) and LPRINT CHR$(13) are converted into the CR code ([0D]H in hexadecimal code) for transfer to the printer.
2 In the TRS-80 BASIC, LPRINT CHR$(11) and LPRINT CHR$(12) are converted into the LF code ([0A]H in hexadecimal code) for transfer to the printer. When this code is transferred to the printer, the character data transferred prior to the LF code are ignored.
3 The form feed function can be executed in the following manner.
POKE 16424, n: POKE 16425, P
n: Number of lines per page + 1
P: Setting of line counter
Execution Command: LPRINT CHR$(11)
4 Selection of Print Span
The following table shows the number of characters per line and the codes for print span selection.

	Long line	Short line	Selection code
5 char/inch	40 char.	32 char.	US
10 char/inch	80 char.	64 char.	RS
16.5 char/inch	132 char.	105 char.	GS

NOTE: The above control codes are applicable to the printers for exclusive use of the TRS-80. With the MX-80 printer which can be set for either standard or TRS-80 coding, all the codes can be used. With other MX series printers, however, some types may not be able to recognize these codes without any changes.

HARDWARE DESCRIPTION

The TRS-80 Interface Kit is designed to interface with any of the MX series printers when installed on the control circuit board of the printer. In this chapter, the hardware of the TRS-80 Interface Kit is illustrated with the flow of data and signals through the Interface Board.

(1) Block Diagram

Fig. 5 shows the flow of data and signals through the internal circuits of the TRS-80 Interface Board.

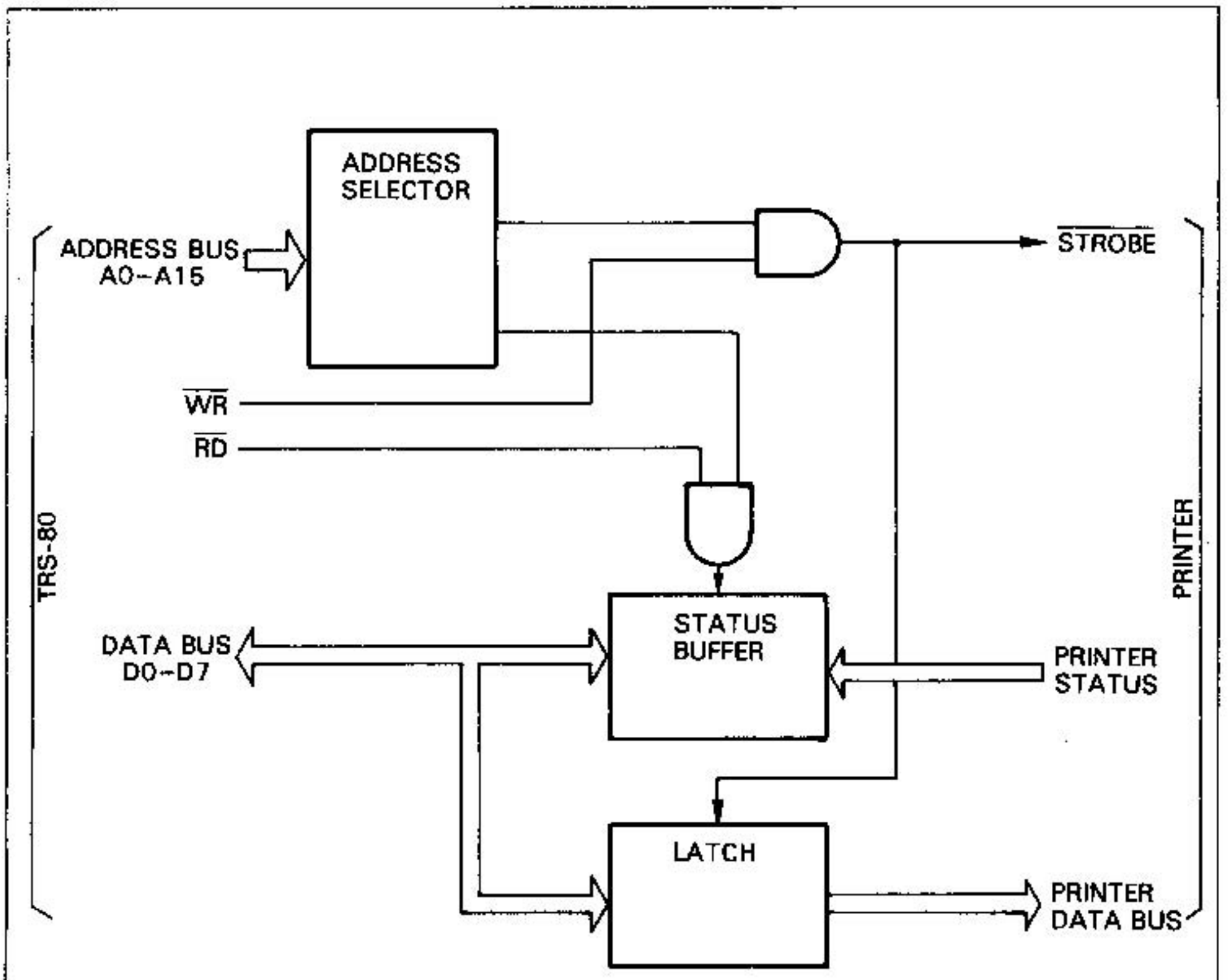


Fig. 5 Block Diagram of I/F Board

(2) Schematic Diagram

Fig. 6 shows the schematic diagram of the TRS-80 Interface Board.

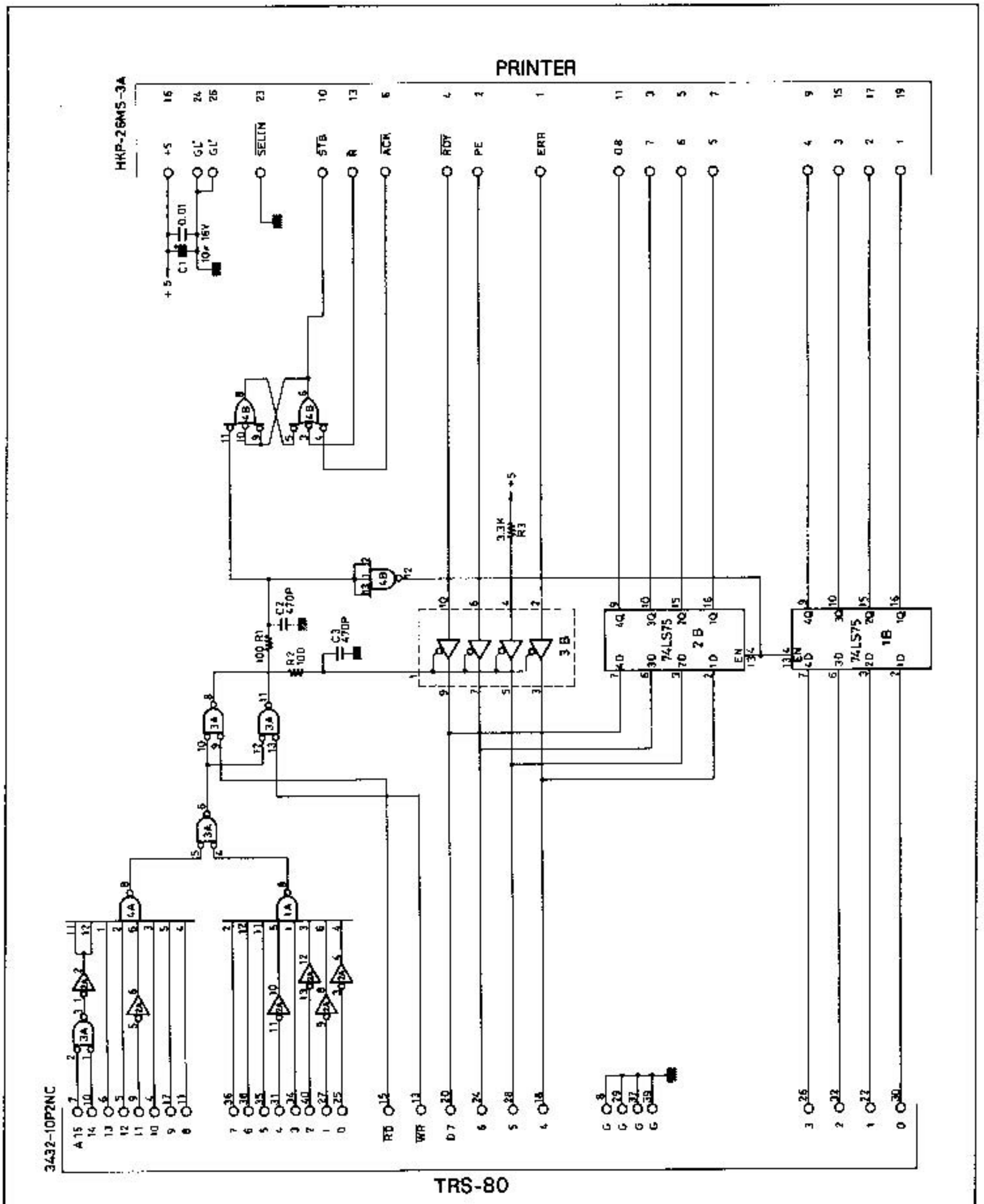


Fig. 6 Schematic Diagram of Interface Board

(3) Bus Interface Cable Connector

Fig. 7 illustrates the bus interface cable connector and Table 1 shows the pin assignment and signal names of the connector.

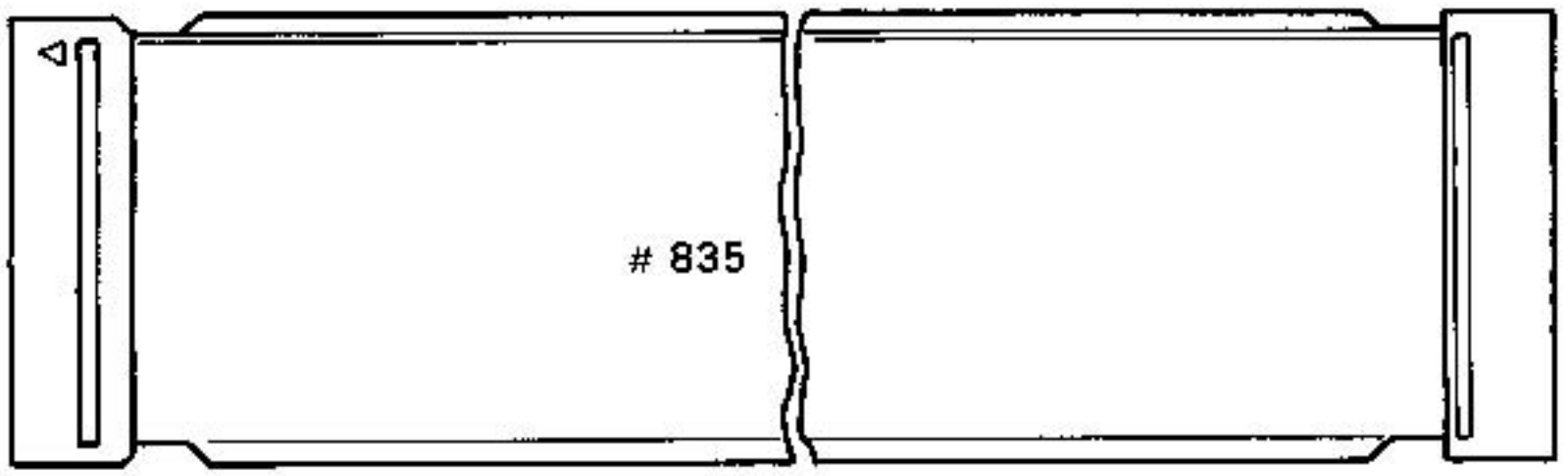


Fig. 7 Bus Interface Cable Connector (Cat. No. 8221)

Table 1 Pin Assignment of Bus Interface Cable Connector

Pin No.	Signal Name	Pin No.	Signal Name
1	—	2	—
3	—	4	A10
5	A12	6	A13
7	A15	8	GND
9	A11	10	A14
11	A8	12	—
13	$\overline{WR}$	14	—
15	$\overline{RD}$	16	—
17	A9	18	D4
19	—	20	D7
21	—	22	D1
23	—	24	D6
25	A0	26	D3
27	A1	28	D5
29	GND	30	D0
31	A4	32	D2
33	—	34	A3
35	A5	36	A7
37	GND	38	A6
39	GND	40	A2

(4) Expansion Interface Cable Connector

Fig. 8 illustrates the expansion interface connector and Table 2 shows the pin assignment and signal names of the connector.

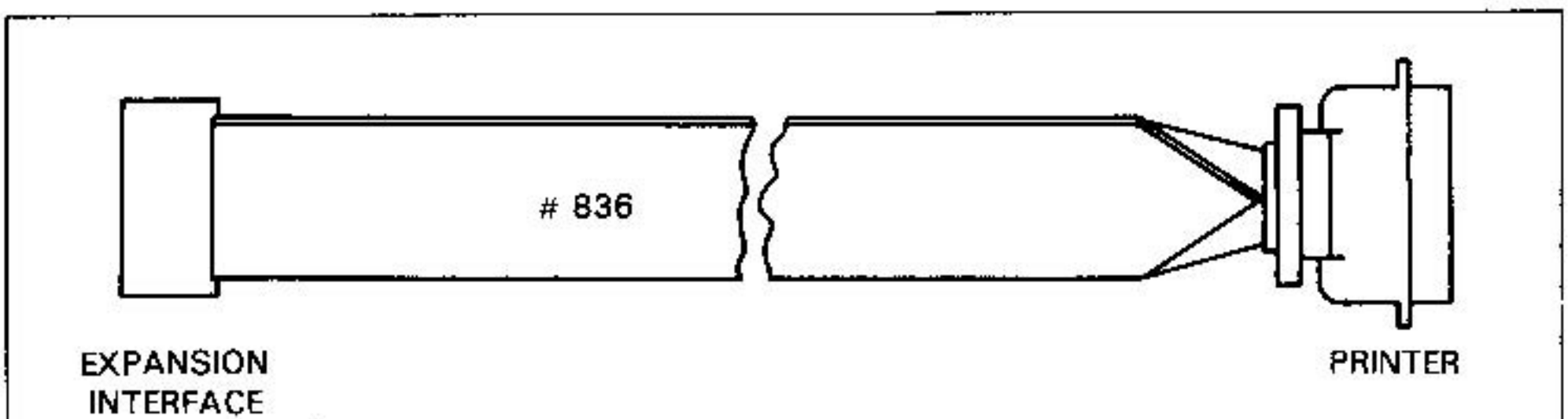


Fig. 8 Expansion Interface Cable Connector (Cat. No. 8120)

Table 2 Pin Assignment of Expansion Interface Cable Connector

Pin No.	Signal Name	Color of lead	Pin No.	Signal Name	Color of lead
1	$\overline{STB}$	Red	2	GND	Gray
3	D1	Gray	4	GND	Gray
5	D2	Yellow Green	6	GND	Gray
7	D3	Gray	8	GND	Gray
9	D4	Gray	10	GND	Yellow Green
11	D5	Gray	12	GND	Gray
13	D6	Gray	14	GND	Gray
15	D7	Yellow Green	16	GND	Gray
17	D8	Gray	18	GND	Gray
19	—	Gray	20	GND	Yellow Green
21	$\overline{RDY}$	Gray	22	—	Gray
23	PE	Gray	24	—	Gray
25	SLCT	Yellow Green	26	—	Gray
27	—	Gray	28	$\overline{ERR}$	Gray
29	—	Gray	30	—	Yellow Green
31	—	Gray	32	—	Gray
33	—	Gray	34	—	Gray

(Expansion Interface side)

Pin No.	Signal Name	Color of lead	Pin No.	Signal Name	Color of lead
1	$\overline{STB}$	Red	19	GND	Gray
2	D1	Gray	20	GND	Gray
3	D2	Yellow Green	21	GND	Gray
4	D3	Gray	22	GND	Gray
5	D4	Gray	23	GND	Yellow Green
6	D5	Gray	24	GND	Gray
7	D6	Gray	25	GND	Gray
8	D7	Yellow Green	26	GND	Gray
9	D8	Gray	27	GND	Gray
10	—	Gray	28	GND	Yellow Green
11	BUSY	Gray	29	—	—
12	PE	Gray	30	—	—
13	SLCT	Yellow Green	31	—	—
14	—	—	32	$\overline{ERR}$	Gray
15	—	—	33	—	—
16	—	—	34	—	—
17	—	—	35	—	—
18	—	—	36	—	—

(Printer side)

PARTS LIST AND LOCATIONS

(1) Parts List

Table 3 shows the list of circuit elements on the TRS-80 Interface Board.

Table 3 Parts List

Part Name	Location No.	Standard	Qty
[Interface Board Unit (Cat. No. 8120)]			
TTL-IC	2A	74LS04	1
TTL-IC	1A, 4A	74LS30	2
TTL-IC	3A	74LS32	1
TTL-IC	4B	74LS10	1
TTL-IC	1B, 2B	74LS75	2
TTL-IC	3B	74LS367	1
Electrolytic Capacitor	C1	ECE-A1CV100S	1
Ceramic Capacitor	C2, C3	ECK-F1H471KB2	2
Ceramic Capacitor	C4 - C7	ECK-F1H103ZF	4
Fixed carbon composition resistor	R1, 2	ERC-146K101	2
Fixed carbon composition resistor	R3	ERC-14GK332	1
Connector	CN1	3432-1002LC No. 11	1
Connector	CN2	HKP-26MS-3B	1
[Bus Interface Cable (Cat. No. 8221)] Cable Set 835			1
[Expansion Interface Cable (Cat. No. 8220)] Cable Set 836			1

(2) Parts Locations

Fig. 9 shows the component layout of the TRS-80 Interface Board.

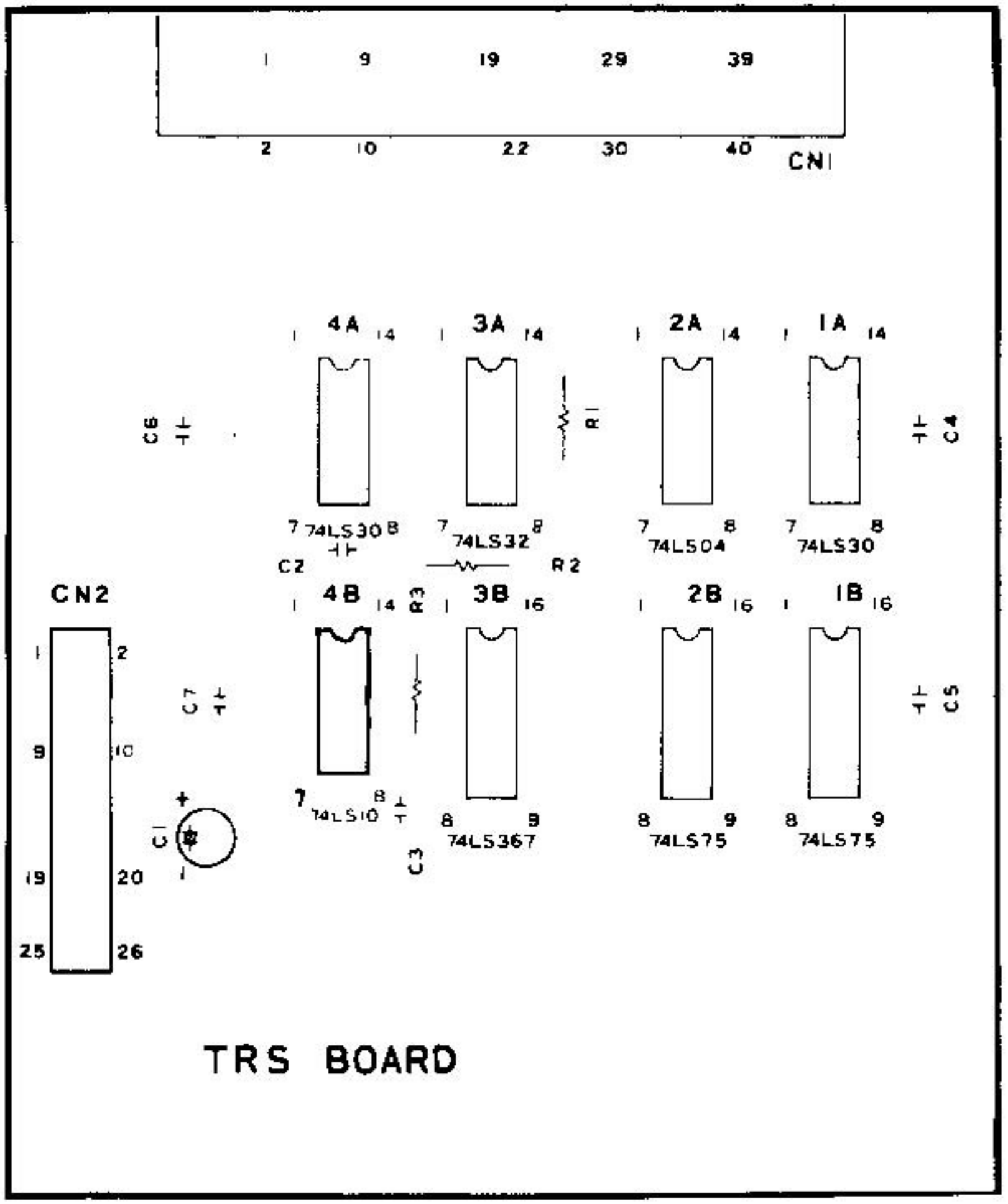


Fig. 9 Component Layout

EPSON

SHINSHU SEIKI CO., LTD.

EPSON OVERSEAS MARKETING LOCATIONS

EPSON AMERICA, INC. (L.A.)
23844 Hawthorne Blvd.,
Torrance, Calif. 90505
Phone: (213) 378-2220
Telex: (25) 9103447390

EPSON AMERICA, INC. (N.Y.)
98 Cutter Mill Road
Great Neck, New York
Phone: (516) 487-0660
Telex: (25) 510223-0743

EPSON DEUTSCHLAND GMBH
Am Seestern 24
4000 Dusseldorf 11,
F.R. Germany
Phone: 0211-593080 Telex: (41) 8584786

EPSON U.K. LTD.
Sherwood House 176 Northolt Road
South Harrow
HA2 OEB U.K.
Phone: (01) 422-5612 Telex: 8814169

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