MX series
DOT MATRIX PRINTER
OPTION

user manual

APPLE II INTERFACE KIT

EPSON

P8090023 - 1

TABLE OF CONTENTS

INTRODUCTION

The EPSON MX series dot matrix printers have an option for APPLE II or APPLE II Plus personal computers which is called "APPLE II Interface Kit." This interface kit consists of an interface board and an interface cable, and allows the APPLE II computer to produce printed outputs on any MX series printer. With this compact kit, a complete electronic link is provided between the Printer and the APPLE II. The interface board interprets program commands for the Printer, and handles special control characters peculiar to the Printer. Using this board, your MX printer can be controlled easily by the BASIC or monitor program of the computer to produce:

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

This interface board is readily adaptable to any MX series printer which is provided with an 8-bit parallel interface.

INSTALLATION

To install the Interface Kit, observe the following procedure.

STEP 1. Turn off the power switches of both the APPLE II computer and the Printer.

NOTE: Power should always be turned off when inserting or removing the interface board. Removal or insertion of the I/F board with the power turned on could cause permanent damage to the board itself, as well as to the Printer and the APPLE II computer.

STEP 2. Take off the lid of the APPLE II. A row of 8 connector slots is visible at the rear of the motherboard of the computer.

STEP 3. Plug the interface board into slot No. 1.

STEP 4. Plug the connector of the interface cable (Cat. No. 8230) into the mating connector on the interface board. (See Fig. 1)

NOTE: Be sure to match the marks of both connectors.

STEP 5. Drape the interface cable over the back of the case of the APPLE II and put the lid on.

STEP 6. Plug the other end of the interface cable into the I/O connector located at the left-hand rear of the Printer. (See Fig. 1)

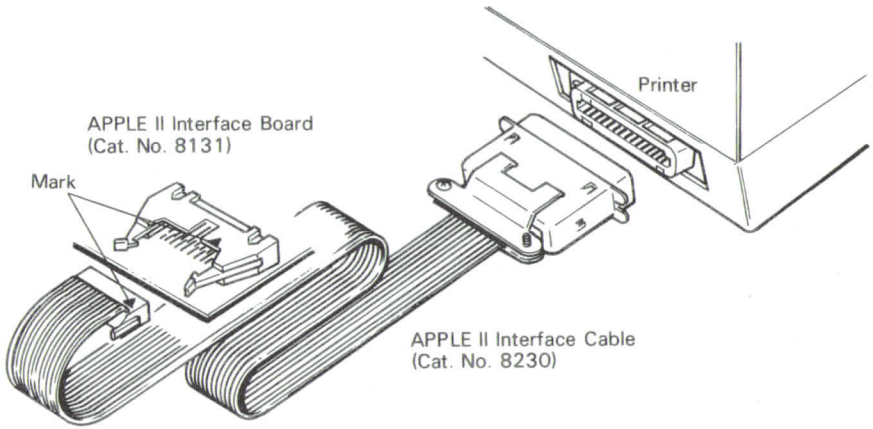

Fig. 1 Cable Connection

PRINTER OPERATION

Once the APPLE II Interface Kit is installed in the APPLE II personal computer, the interface is ready for use. At first, enter manual commands from the keyboard of the APPLE II as follows:

PR # 1 RETURN

Causes the Interface Board to turn on. All data entered from the keyboard are printed on the printer.

NOTE: Graphic data are not printed even if you enter data codes identified by graphic characters.

PRINT "MX-80" RETURN

The statement PRINT "MX-80" and MX-80 (indicating the execution of this command) appear on the TV monitor screen and the MX-80, respectively.

NOTES: 1. Though the TV monitor screen is designed to display a maximum of 40 characters per line, the Printer can print a maximum of 80 characters per line.

2. When you list your program, however, the Printer will print 40 characters (max.) per line (including statements and spaces) as long as the monitor screen display is on.

(1) MX printer control codes

The printer control codes are shown below. Before operating the Printer, refer to the operation manual of the applicable printer and confirm the availability of each code.

Table 1 Printer Control Codes

Code*	6K BASIC	10K BASIC	Description
NUL	PRINT "@^{C}"	PRINT CHR$(0)	Termination of tabulation setting sequence
BEL	PRINT "G^{C}"	PRINT CHR$(7)	Buzzer sounds for about 3 seconds.
HT	PRINT "I^{C}"	PRINT CHR$(9)	Horizontal Tab
LF	PRINT "J^{C}"	PRINT CHR$(10)	Line Feed
VT	PRINT "K^{C}"	PRINT CHR$(11)	Vertical Tab
FF	PRINT "L^{C}"	PRINT CHR$(12)	Form Feed
CR	—	PRINT CHR$(13)	Carriage Return
SO	PRINT "N^{C}"	PRINT CHR$(14)	Shift Out (Enlarged character)
SI	PRINT "O^{C}"	PRINT CHR$(15)	Shift In (Condensed character)
DC 2	PRINT "R^{C}"	PRINT CHR$(18)	Cancels Shift In mode
DC 4	PRINT "T^{C}"	PRINT CHR$(20)	Cancels Shift Out mode
CAN	—	PRINT CHR$(24)	Print buffer clear command
ESC	—	PRINT CHR$(27)	Escape ESC Numerical control ESC Alphabetic control

*For detailed information on the respective control codes, refer to the operation manual of the applicable printer.)

(2) Use of printer commands in BASIC programs
Printer control within BASIC programs is accomplished by using the commands in PRINT statement.

Table 2 Commands in Program

6K BASIC	10K BASIC	Description
10 PR # 1	10 PR # 1	Turns on the Interface Board.
20 PRINT"I^{C}A^{C}";	20 PRINT CHR$(9) + CHR$(1);	Changes the printer control character recognized by the printer, from I to A.
30 PRINT"A^{C} No. N";	30 PRINT CHR$(1) + "No. N";	Turns off the monitor screen display and causes the Printer to print n (No., e.g. 80) columns per line.
40 PRINT A^{C}I";	40 PRINT CHR$(1) + "I";	Returns output to TV monitor screen as well as to the printer.
50 PRINT"A^{C}K";	50 PRINT CHR$(1) + "K";	Turns off the Line Feed Code.
60 PR # 0	60 PR # 0	Turns off the Interface Board.

NOTES: 1. Control characters are indicated by superscript C, e.g., I^{C}. A control character is entered by depressing both the CTRL key and the character key simultaneously.
For example, "A^{C} 80N" means:
1) Type character key A while depressing the CTRL key.
2) Enter 80 from the keyboard.
The number following the control character denotes the number of columns per line on the printer. This number may be any number from 40 to 255.
3) Type character key N on the keyboard.
2. When control character I^{C} coincides with the printer control character, change it to other control character.

(3) Examples of program
(a) The following program permits lower case characters to be printed on the Printer. (10K BASIC)

```
10  PR # 1
20  PRINT CHR$(9) + CHR$(1);
30  PRINT CHR$(1) + "80N";
40  FOR I = ASC ("A") TO ASC ("Z")
50  PRINT CHR$(I+32);
60  NEXT I
70  PRINT
80  END
    RUN
```

(b) Printing of double width characters

```
10  PR # 1
20  PRINT CHR$(14);
30  PRINT "EPSON DOT MATRIX PRINTER"
40  END
    RUN
```

HARDWARE DESCRIPTION

The APPLE II Interface Kit is designed to interface with any of the MX series printers which is provided with an 8-bit parallel interface.

In this chapter, the hardware of the APPLE II Interface Board is illustrated with the flow of data and signals between the Printer and APPLE II through the interface board.

(1) Block Diagram 1

Fig. 2 shows the flow of the data and signals between the APPLE II computer and the APPLE II Interface Board and between the Printer and the Interface Board.

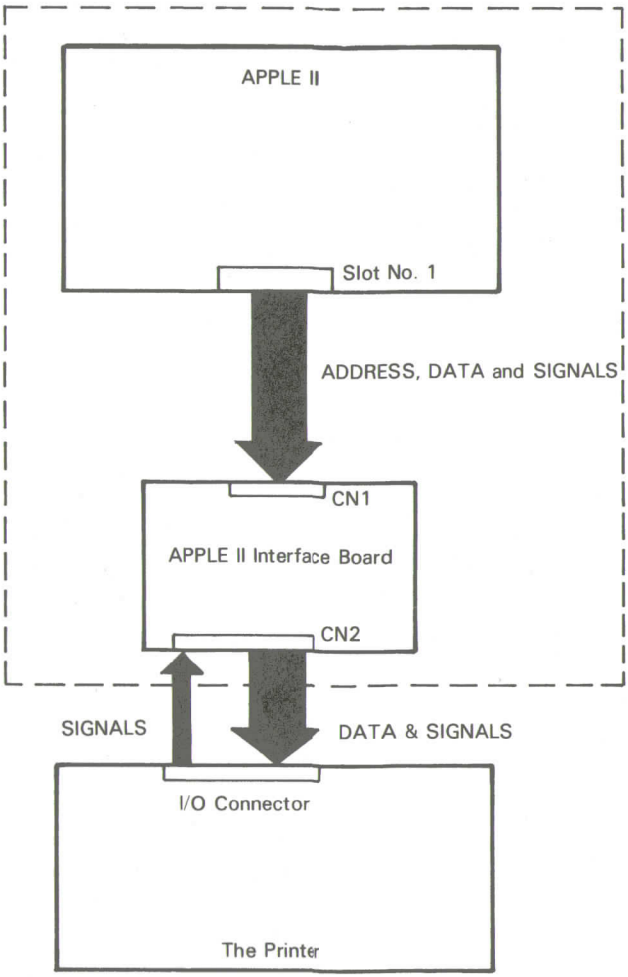

Fig. 2 Block Diagram 1

(2) Block Diagram 2

Fig. 3 shows the flow of data and signals through the internal circuits of the APPLE II Interface Board.

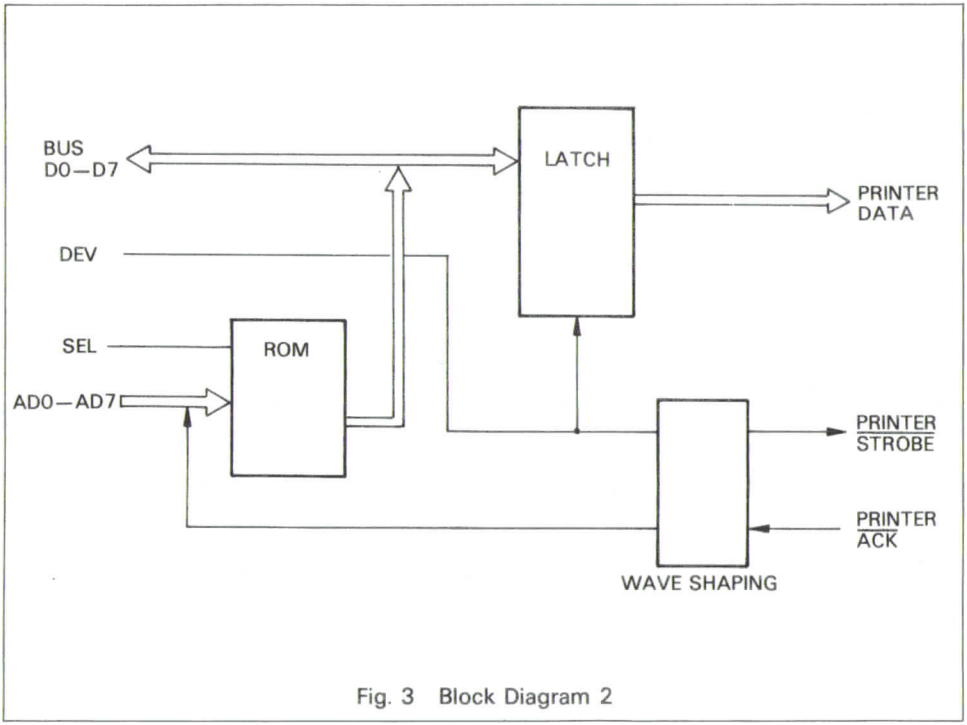

Fig. 3 Block Diagram 2

(3) Interface Cable Connectors

Fig. 4 illustrates the interface cable connectors A and B of the APPLE II Interface Board, and Tables 3 and 4 show the pin assignments and signal names of the respective connectors.

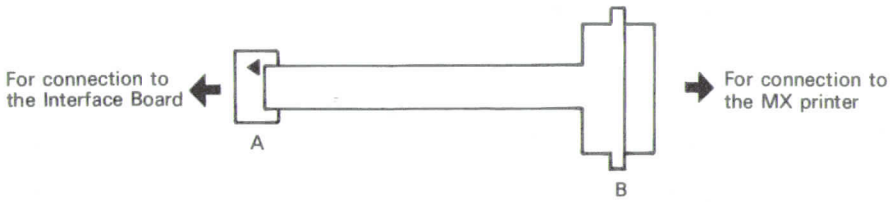

Fig. 4 Interface Cable Connectors

Table 3 Signals and Pin Assignment of Connector A(MFC-16R)

Pin No.	Signal Name	Color of lead wire
1	GND	Red
2	GND	Gray
3	GND	Gray
4	$\overline{\text{STB}}$	Gray
5	N/C	Yellow Green
6	D1	Gray
7	D2	Gray
8	D3	Gray
9	D4	Gray
10	D5	Yellow Green
11	D6	Gray
12	D7	Gray
13	D8	Gray
14	$\overline{\text{ACK}}$	Gray
15	GND	Yellow Green
16	$\overline{\text{SEL IN}}$	Gray

Table 4 Signals and Pin Assignment of Connector B (57-30360)

Pin No.	Signal Name	Color of lead wire
1	STB	Gray
2	D1	Gray
3	D2	Gray
4	D3	Gray
5	D4	Gray
6	D5	Yellow Green
7	D6	Gray
8	D7	Gray
9	D8	Gray
10	$\overline{\text{ACK}}$	Gray
25	GND	Red
26	GND	Gray
27	GND	Gray
28	GND	Yellow Green
29	GND	Yellow Green
36	$\overline{\text{SEL IN}}$	Gray

Call-A.P.P.L.E./Oct, 84
220 PF 50V Non-Polarized
Ceramic Capacitor.
Solder Between Pins
3 & 7 of Chip 6A on
Epson Parallel Interface.
(Used: 221K/KCK)

(4) Schematic Diagram

Fig. 5 shows the schematic diagram of the APPLE II Interface Board.

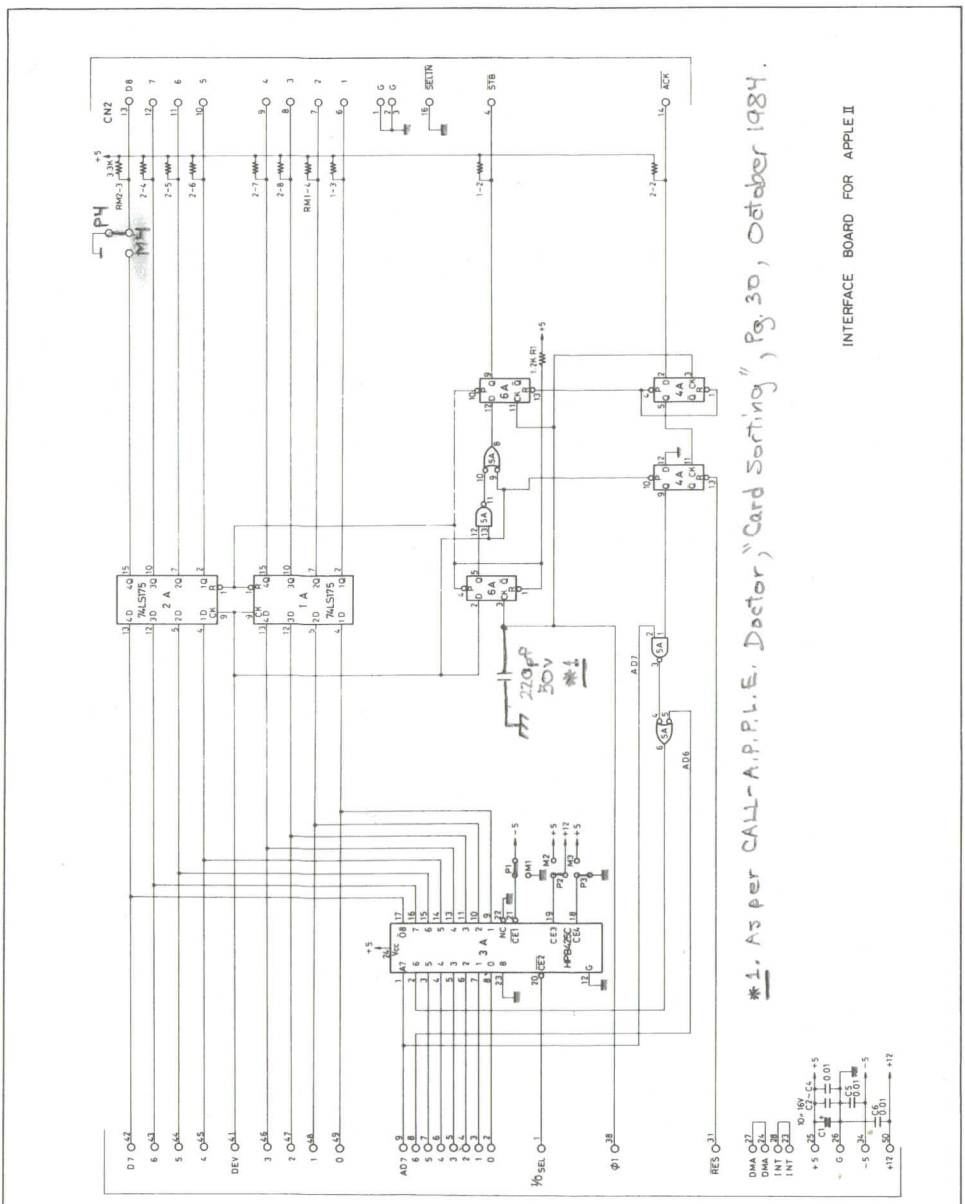

Fig. 5 Schematic Diagram of APPLE II Interface Board

PARTS LIST AND LOCATIONS

(1) Parts List

Table 5 shows the list of circuit elements on the APPLE II Interface Board.

Table 5 Parts List

Part Name	Location No.	Standard	Qty
(Interface Board)			
TTL-IC	5A	74LS00	1
TTL-IC	4A, 6A	74LA74	2
TTL-IC	1A, 2A	74LS175	2
P-ROM	3A	2708	1
Electolytic Capacitor	C1	ECE-A1CV100S	1
Ceramic Capacitor	C2—C6	ECK-F1H103ZF	5
Resistor Array	RM1, RM2	EXB-P87332K	2
Fixed Carbon Composition Resistor	R1	ERC-14GK122	1
IC Socket	3A	DILB24P-8J	1
Connector	CN2	MFC-16R	1
Jumper Wire	P1—P4	Tinned Wire	4
(Interface Cable)			
Cable Set 837	—	—	1

(2) Parts Locations

Fig. 6 shows the component layout of the APPLE II Interface Board.

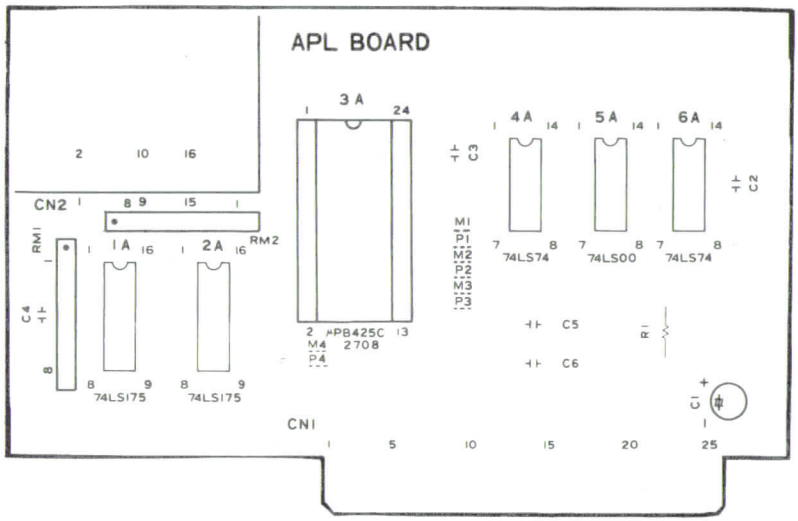

Fig. 6 Component Layout

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