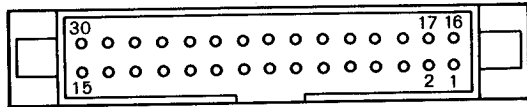


Cartridge interface



Pin No.	Symbol	Direction	Signal Name
1	GND	—	Signal ground
2	CAUD	IN	Digital audio input signal
3	CDB4	I/O	Data bus
4	CRD	I/O	Read signal
5	CDB0	I/O	Data bus
6	CITO	OUT	Interrupt signal to cartridge
7	CCS	I/O	Chip select
8	CRS	OUT	Reset
9	CAB0	I/O	Address bus
10	CSEL	IN	Option select signal
11	GND	—	Signal ground
12	CDB2	I/O	Data bus
13	VB1	—	Battery
14	CRXD	IN	Serial receive data
15	-5V	—	-5V power supply
16	+5V	—	+5V power supply
17	CG	—	Frame ground
18	CDB1	I/O	Data bus
19	CG	—	Frame ground
20	CAB1	I/O	Address bus
21	FPOF	OUT	Power failure signal
22	CDB7	I/O	Data bus
23	CDB3	I/O	Data bus
24	CEN	IN	6301EN signal
25	CWR	I/O	Write signal
26	CTXD	OUT	Serial send data
27	CDB6	I/O	Data bus
28	RS	OUT	Hardware reset
29	CDB5	I/O	Data bus
30	VB2	—	Backup power supply

NOTE:

Signal direction is from the point of view of PX-4.

Chapter 4

OPTIONAL DEVICES

This chapter describes optional devices which can be used with PX-4 and procedures for connecting them.

4.1 Cartridge Options

The cartridge interface located next to PX-4's LCD screen makes it possible to connect a variety of cartridge-type options. The cartridge options are as listed below.

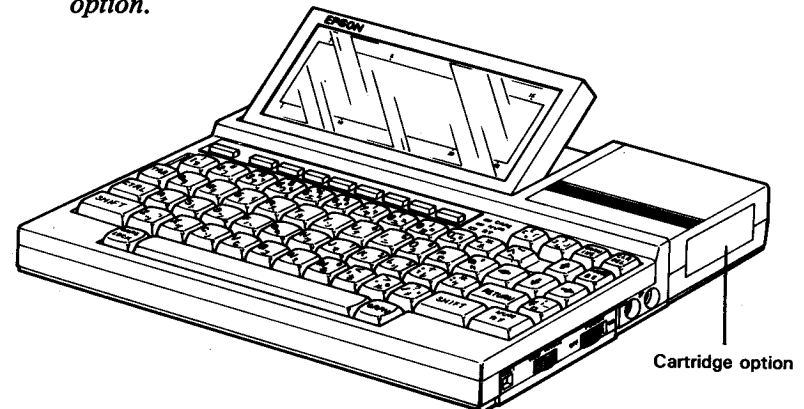
1. RAM cartridge
2. ROM cartridge
3. Microcassette drive
4. Universal cartridge
5. Digital multimeter cartridge
6. Cartridge printer

These optional cartridges are installed in the location indicated in the figure below.



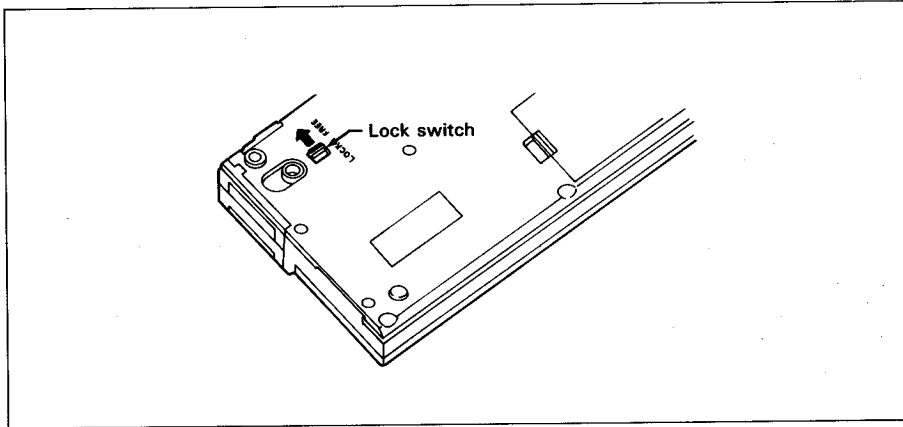
WARNING:

Be sure to turn the power off before installing or removing any cartridge option.

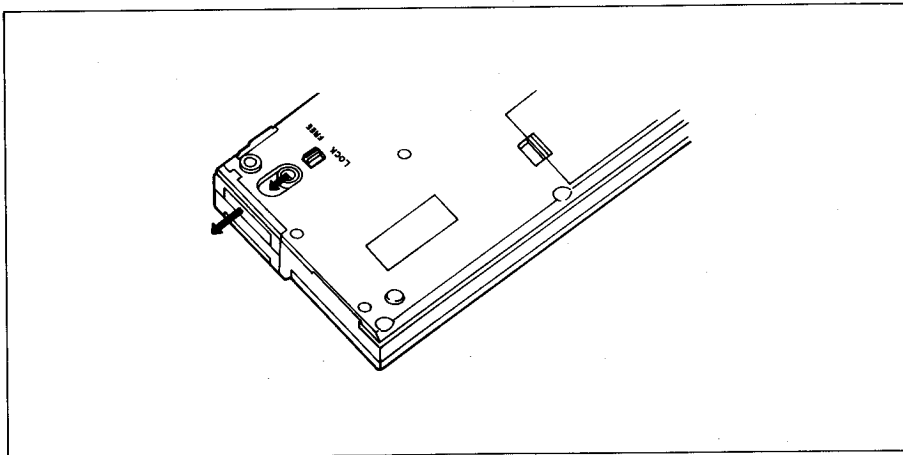


Cartridge option installation

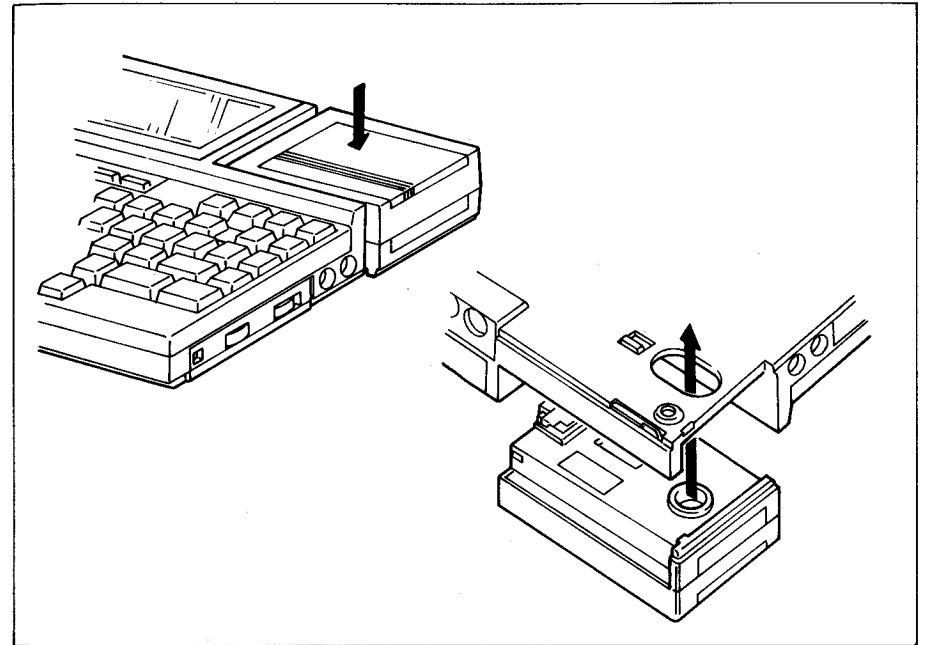
1. Turn off the power switch.
2. Remove the dummy cartridge as follows. First, move the cartridge lock switch toward FREE.



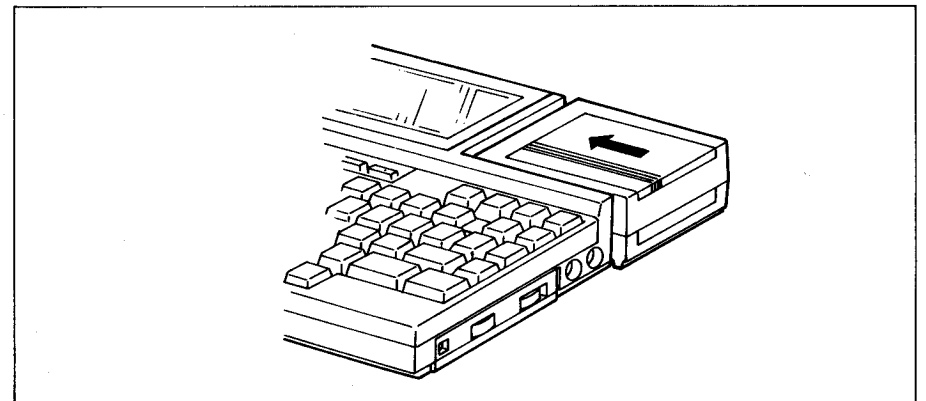
3. Hook your finger in the cartridge release ring at the bottom of the cartridge and pull in the direction indicated by the arrow in the figure below.



4. Next, place the cartridge to be installed in the cartridge slot so that its release ring fits into the hole in PX-4's bottom panel.



5. Push the cartridge in the direction indicated by the arrow to set it in place.

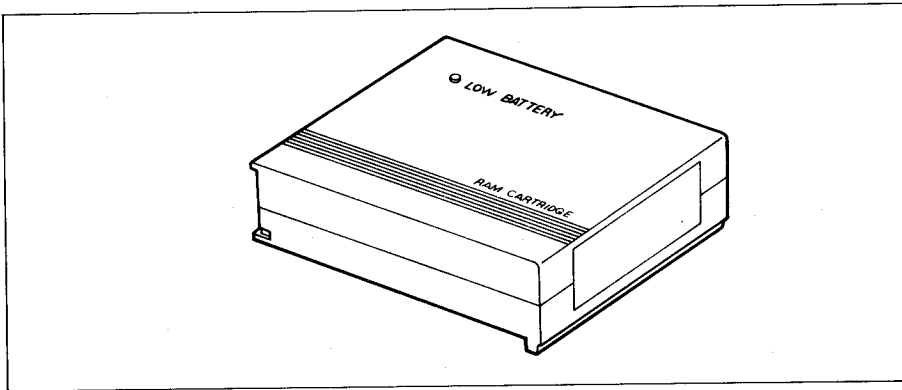


6. Return the cartridge lock switch to the LOCK position.

4.1.1 RAM cartridge

PX-4's RAM cartridge is an external storage device for storage and retrieval of data and programs. The cartridge is connected to PX-4 through the cartridge interface.

Data stored in the RAM cartridge is backed up by a lithium battery housed inside the cartridge, and thus is maintained even when the cartridge is removed from PX-4. Battery life is approximately 3 years. When the battery voltage becomes low (when the battery wears out), the LOW BATTERY lamp lights to indicate that it must be replaced.



The RAM cartridge has a capacity of 16K bytes, and is accessed as drive I:. Before using the RAM cartridge, it must be formatted from the System Display. Ordinarily, formatting is a one-time process which does not need to be repeated as long as data inside the cartridge is not corrupted.

Formatting the RAM disk

To format the RAM cartridge, press CTRL + HELP to bring the System Display to the screen, then select "1 = RAM cartridge". After doing this, the screen will appear as shown below.

```
* SYSTEM DISPLAY * 05/05 (SAT) 14:41:59
<RAM DISK> 026 KB <ALRM> OFF
<USER BIOS> 000x256 B <AUTO> OFF
<MENU DRIVE> ABC <MENU> ON

-Select or ESC to return.
<RAM FORMAT> 1=no 2=yes
```

If "1" is pressed while this screen is displayed, the RAM cartridge is not formatted; if "2" is pressed, it is formatted.

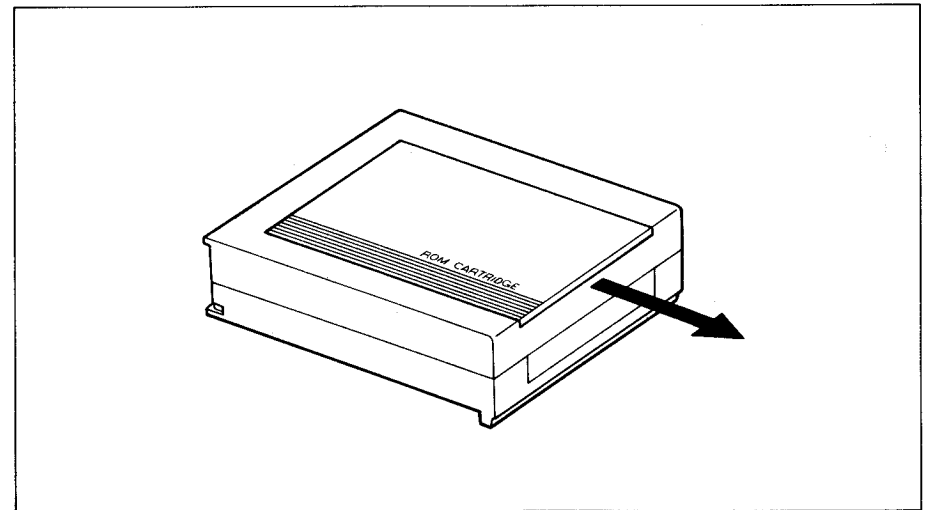
4.1.2 ROM cartridge

PX-4's ROM cartridge is an external read-only storage device which is connected to PX-4 through the cartridge interface. Up to two ROM chips can be installed in the ROM cartridge; together with PX-4's ROM capsules, this makes it possible to install as many as four ROMs in PX-4. ROMs in the ROM cartridge are accessed as disk drives J: and K:.

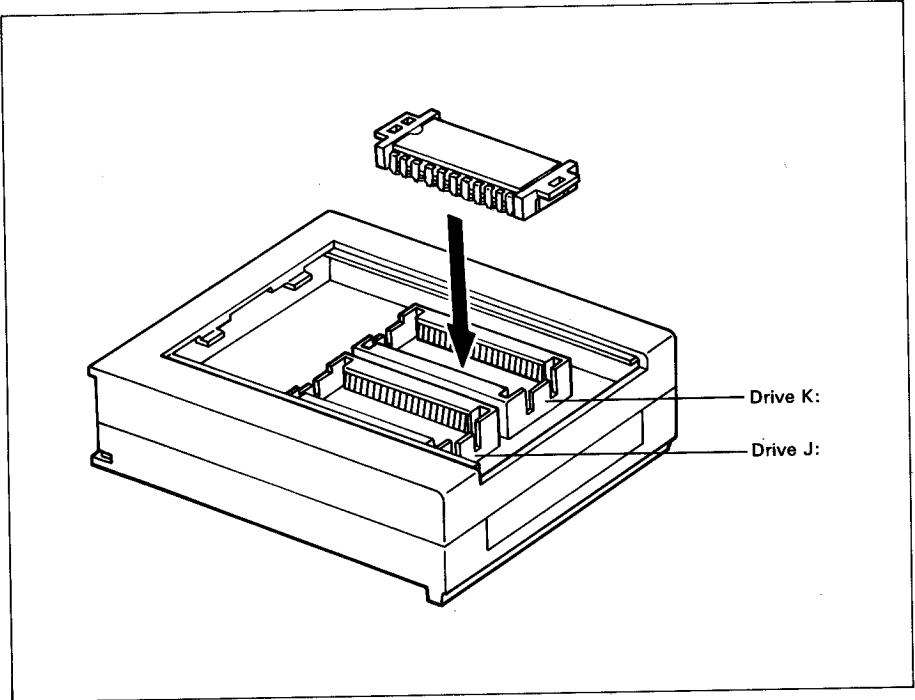
ROMs with a capacity of up to 32K bytes can be installed in the ROM cartridge. Two 32K-byte ROMs can also be used as one device; in this case, the ROM cartridge is accessed as drive J: or K: and has a file capacity of 64K bytes.

Procedures for installing ROM chips in the ROM cartridge are as follows.

- Turn off the power switch and remove the ROM cartridge.
- Open the ROM cartridge by sliding its cover in the direction indicated in the figure below.



- Remove the ROM chips currently installed in the cartridge and replace them with others in the same manner as when replacing ROM capsules in the back of PX-4.

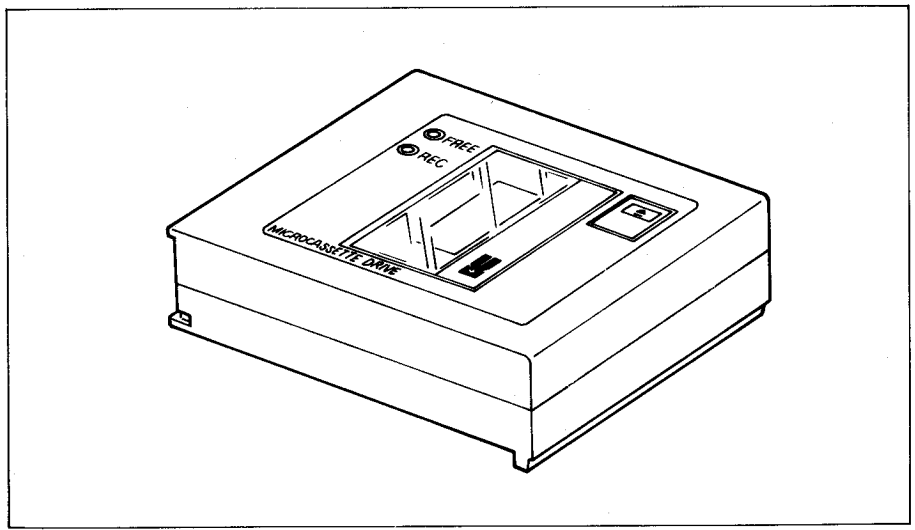



4.1.3 Microcassette drive

The microcassette drive makes it possible to use microcassette tape for storage of sequential files. Use the microcassette drive to store programs which are not used frequently or text data.

Since the standard CP/M operating system is designed for computers which use disk drives, it does not in principle support microcassette drive access. However, the functions of PX-4 CP/M have been extended to allow the microcassette drive to be accessed in much the same manner as a disk drive. Therefore, a directory similar to that used with disk files is written onto the tape by the operating system, and files on the tape are managed using this directory.

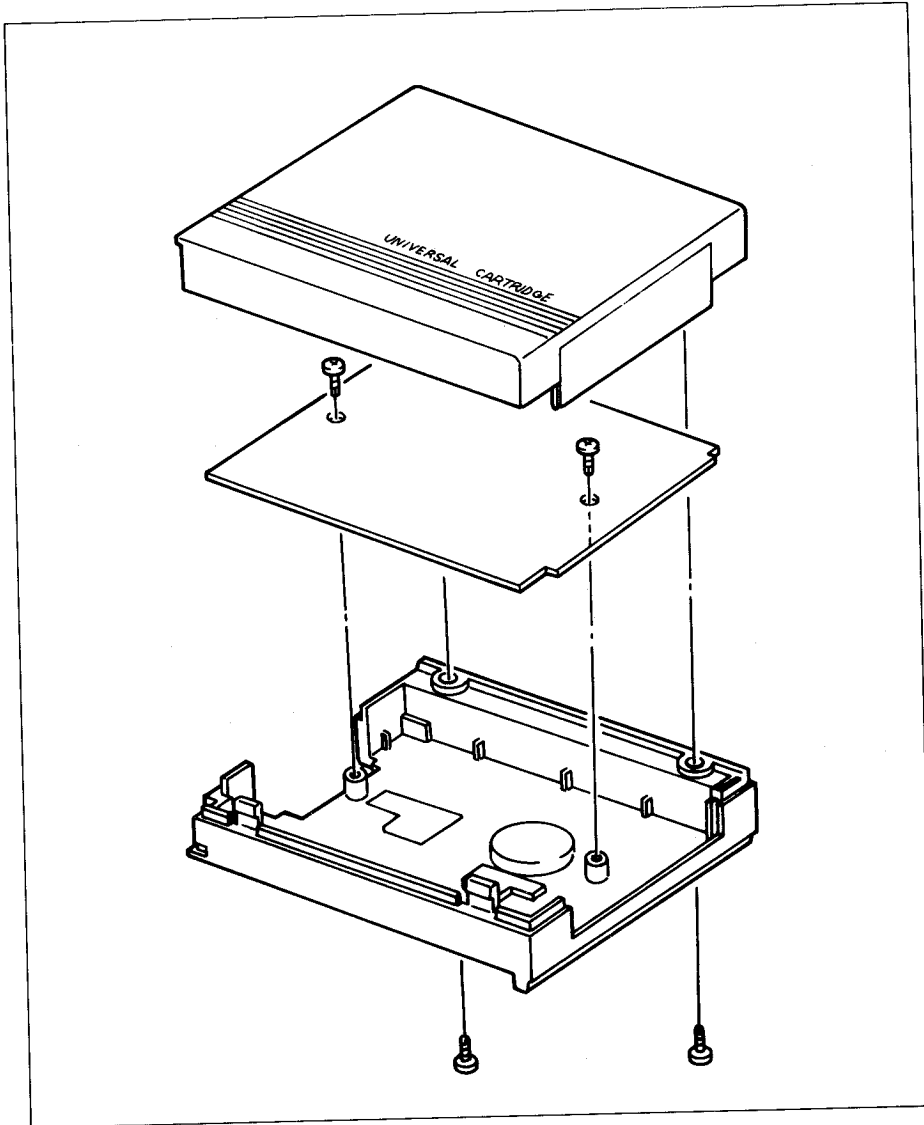
See 2.8 "Microcassette Handling" for details on microcassette drive operation.



-  **EJECT button:** Press this button to remove tapes from the microcassette drive.
- FREE** This lamp indicates whether tape may be removed from the microcassette drive. Tape may be removed when the light is lit.
- REC** This lamp lights when data is being written to the tape in the microcassette drive.

4.1.4 Universal cartridge

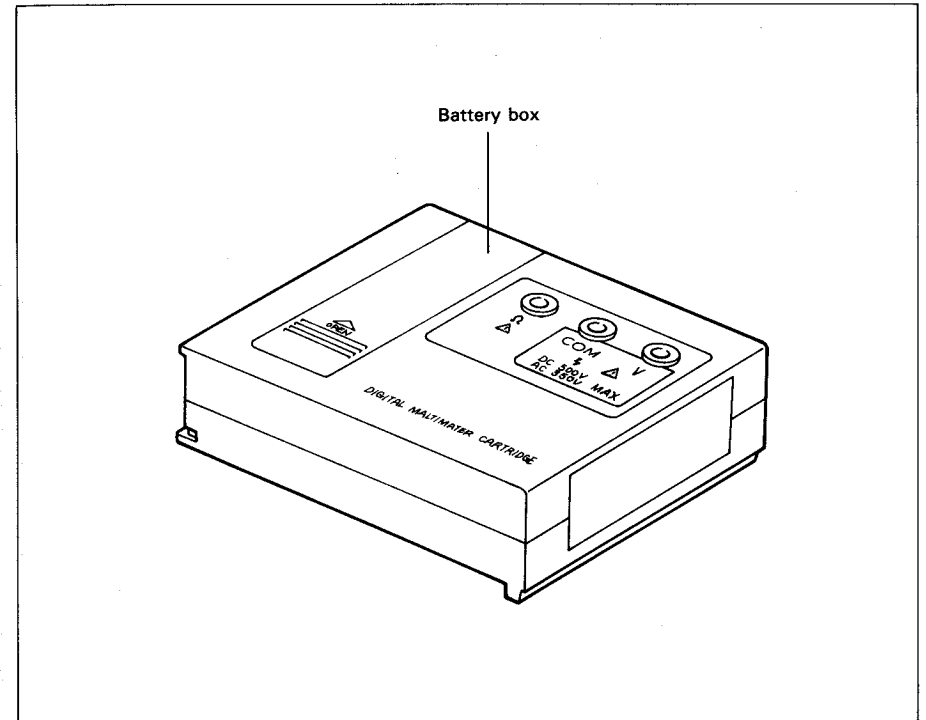
The universal cartridge contains a general purpose circuit board and a connector for plugging the cartridge into PX-4's cartridge interface. Experienced users can prepare their own special-purpose cartridges by installing the appropriate components on this general purpose board.



4.1.5 Digital multimeter cartridge

As its name implies, the digital multimeter cartridge is an option which makes it possible to use PX-4 to measure voltages and resistances. The cartridge converts analog input data into digital form to allow processing by PX-4.

The digital multimeter cartridge is powered by two AAA-size batteries. Install these batteries by opening the battery box. When measuring voltages, connect the test leads to the terminals marked COM and V; when measuring resistances, connect the leads to the terminals marked COM and Ω .



4.1.6 Cartridge Printer

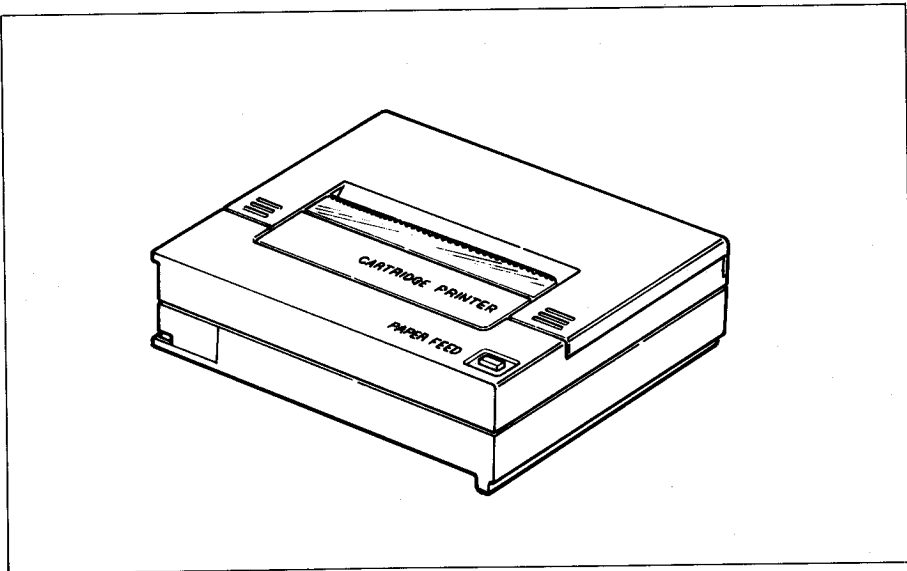
The Cartridge Printer is available for PX-4 as follows.

Printer	Character format	Line width	Printing speed
M-164	6 × 8 dots	60 dots (40 characters)	2.5 sec/line*

* During continuous printing with two dots' space between each line.

The Cartridge Printer uses ordinary roll paper and is installed in PX-4's option cartridge slot. When the Cartridge Printer is used, change the DIP switch setting according to the table in section 4.3 Printers.

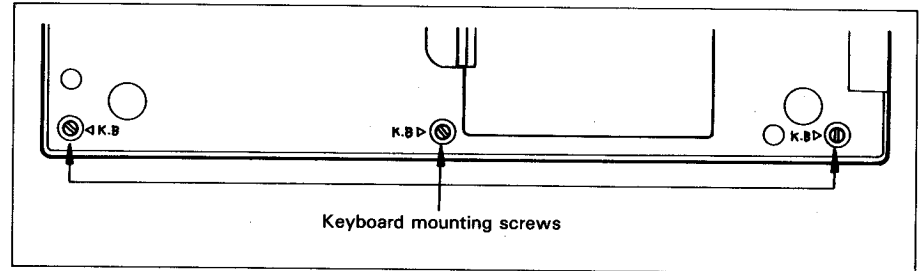
Detailed instructions for using the printer are provided in the Cartridge Printer Operating Manual.



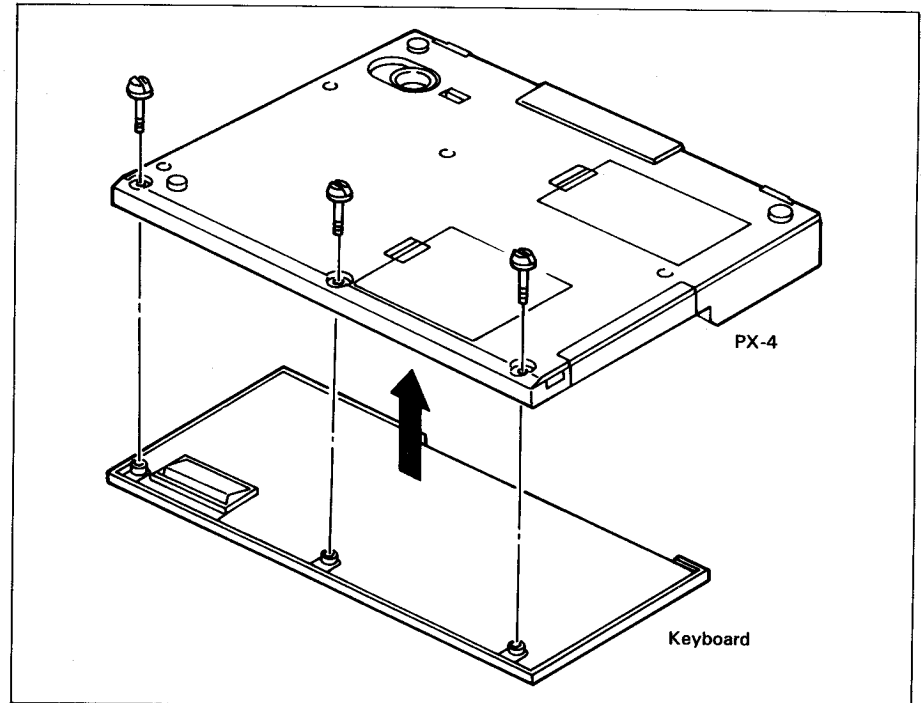
4.2 Keyboards

One of the most important features of PX-4 is that its standard keyboard can be removed and replaced with an optional item keyboard.

The keyboard is fastened to PX-4 by three screws as shown in the figure below.



After removing the keyboard, handle it carefully to avoid damage.



4.3 Printers

Any EPSON printer which is equipped with a parallel interface or an RS-232C interface can be used with PX-4. A list of printers which can be used is shown on the next page.

The printer is connected either to PX-4's parallel interface, or to its RS-232C or serial interface. The interface to which printer output is directed is determined by the settings of the DIP switch located inside the ROM capsule compartment. After changing the DIP switch settings, press the reset switch on the back side of PX-4 (not the reset switch inside the ROM capsule compartment).

DIP switch settings

The diagram shows the internal components of the ROM capsule compartment. On the left, a label 'DIP switch' points to a small switch on the printed circuit board. On the right, a detailed view of the DIP switch is shown with six individual toggles. A text box below the switch states: 'The settings of DIP switch toggles 5 and 6 determine the interface to which printer output is directed.'

Switch 5	Switch 6	Interface
OFF	OFF	Serial interface
OFF	ON	RS-232C interface
ON	OFF	Cartridge printer
ON	ON	Parallel interface

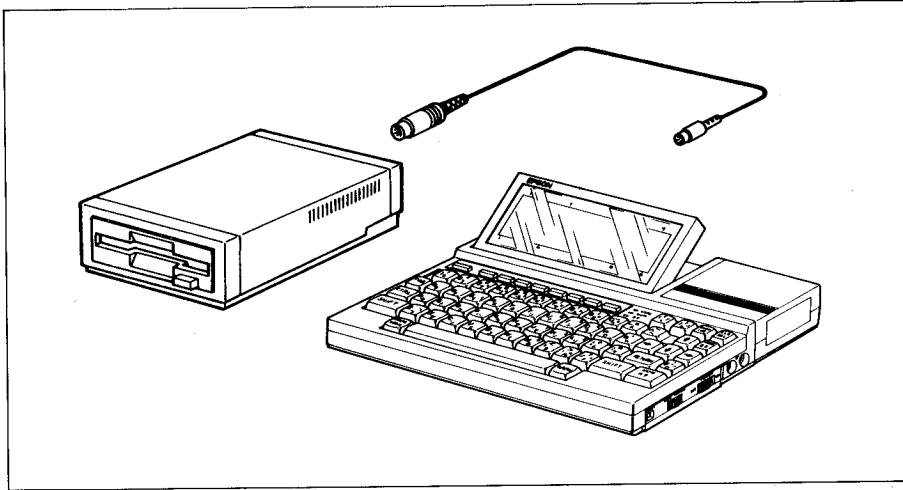
Printer	Interface	Cable	Remarks
MX-80 II,III MX-100 II,III RX-80 RX-100 FX-80 FX-100	Parallel	# 731	If the printer is equipped with a serial interface board, it can also be connected to PX-4's the RS-232C or serial interface. In this case, use cable set # 725.
DX-100	Parallel	# 731	Requires a printer adapter.
C-40	RS-232C Serial	# 731	Built into printer
P-40	RS-232C Serial	# 723	
P-80	RS-232C Serial	# 723	

NOTE:

A special adapter is required in order to connect the DX-100 to PX-4.

4.4 Floppy Disk Unit

Floppy disk units which can be connected to PX-4 are the PF-10 and TF-15.



Disks handled by each of these units and cables used for connecting them to PX-4 are as follows.

PF-10	3.5-inch floppy disk × 1 (cable set #726)
TF-15	5.25-inch floppy disk × 1 or 2 (cable set #726)

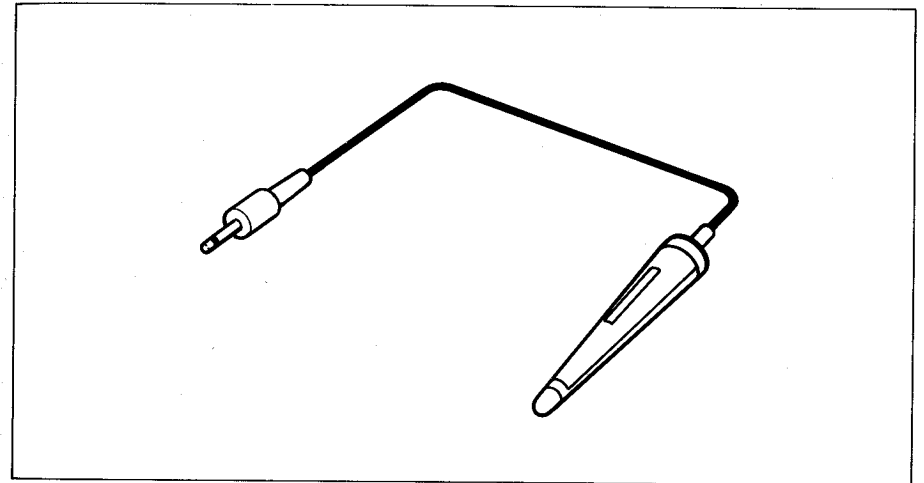
Procedures for using the floppy disk units are described in the various floppy disk unit user's manuals.

4.5 Bar Code Reader

An optional bar code reader is available as below.

H00BR CODE JA (low resolution, 0.3 mm)

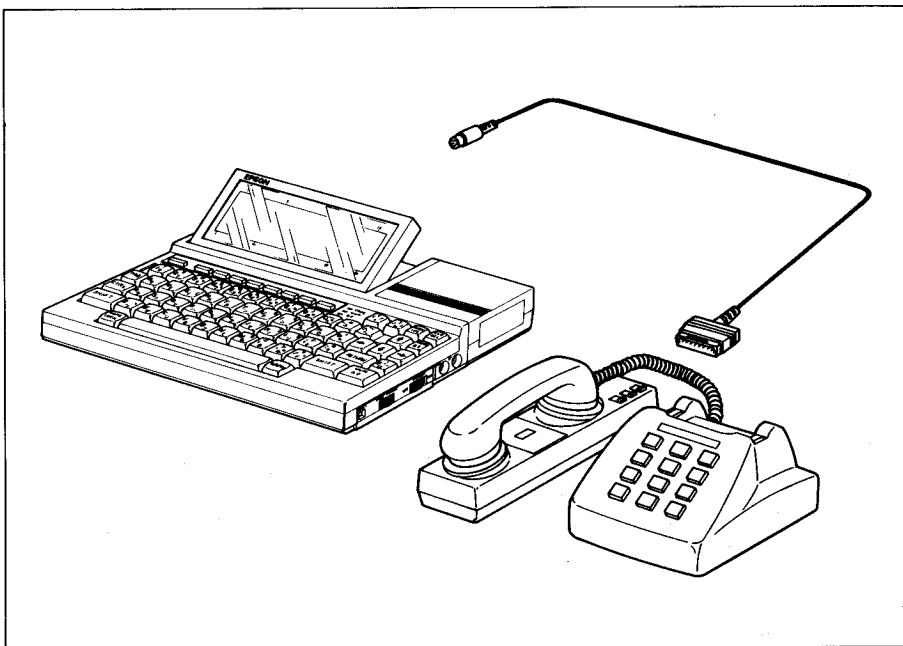
No bar code reader software support is provided with PX-4. If your application requires a bar code reader, consult your dealer for the appropriate bar code reader utility software.



4.6 Acoustic Coupler

The EPSON CX-21 acoustic coupler makes it possible to use PX-4 for communication with other computers over a telephone line.

To use the CX-21, connect it to PX-4's RS-232C interface using cable set #724.



In addition to making it possible to communicate with other personal computers, the CX-21 allows PX-4 to be used as a remote terminal of any main frame computer system which can be accessed via the public telephone system. See the User's Manual for procedures for using the CX-21.

4.7 External RAM Disk

The size of PX-4's RAM disk can be expanded by installing the optional external RAM disk unit. This unit is accessed as drive A, and provides 128K bytes of random access storage capacity and up to 128K bytes of read only storage capacity. Read only memory is installed in the unit in the form of interchangeable capsules.

4.7.1 External RAM Disk power supply

Power for external RAM disk operation is supplied through the expansion port from PX-4. A NiCd battery pack must be used as PX-4's power supply whenever the external RAM disk unit is installed.

4.7.2 Backup power

The external RAM disk contains a built-in battery which backs up the contents of RAM when PX-4's main power is turned off. Memory backup becomes effective when the backup power ON/OFF switch is set to the ON position (see section 4.7.3 below); however, the contents of RAM are not maintained if the external RAM disk unit is disconnected from PX-4.

The backup battery is recharged together with PX-4's NiCd battery pack when the AC adapter is connected.

NOTE:

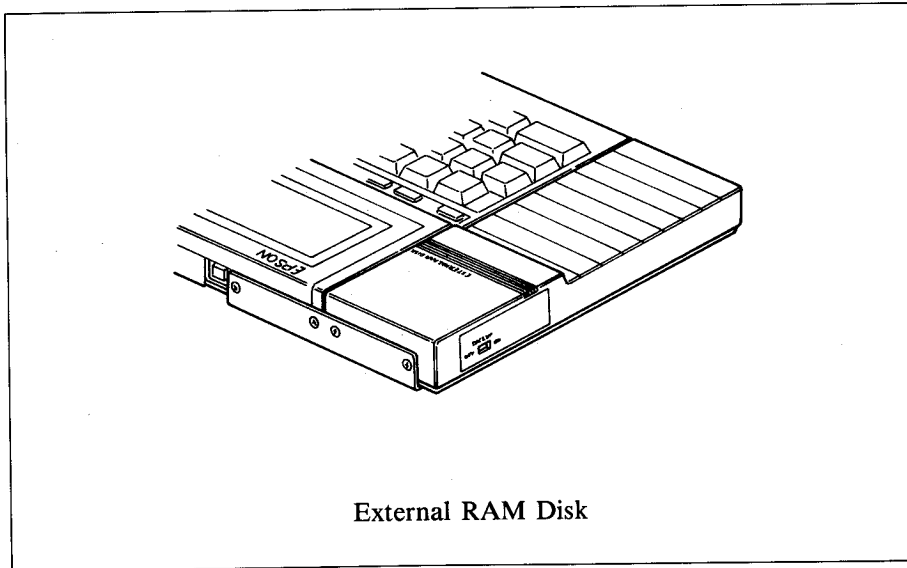
Ordinarily, RAM in PX-4 and that in the external RAM disk unit are backed up independently by their respective backup batteries. However, when the charge of either backup battery is reduced below a certain level, the remaining battery is used to maintain the contents of memory in both units. This assures that memory in both units will be maintained for the same amount of time.

4.7.3 DIP switch settings

Bit 1 of the DIP switch turns memory backup on or off, and bits 2 and 3 are set according to ROM capacity. Switch settings for different ROM capacities are as follows.

ROM capacity/type	SW2 setting	SW3 setting
8K bytes (27064)	K	A
16K bytes	K	A
32K bytes (270256)	K	A
64K bytes	1M	A
128K bytes (HN62301, etc.)	1M	A

Further information is given in the external RAM disk instructions and with instructions supplied with ROM capsules.



External RAM Disk

Chapter 5

UTILITY ROM

EPSON supplies many useful utility programs for PX-4, and some of these are available in ROM form. The utility ROM contains standard CP/M transient commands (PIP and STAT) and utilities which have been developed by EPSON for PX-4 (CONFIG, TERM and FILINK).

The utility ROM must be installed in a ROM capsule. See Section 2.10 for ROM capsule installation instructions.

5.1 CONFIG

The CONFIG program is used to set those system parameters which are not changed very often. It is complementary to the System Display, and the current values of some of the parameters changed by the CONFIG program are shown on the System Display. The CONFIG program can also be used to check the settings of parameters not shown on the System Display.



WARNING:

Do not switch off PX-4 (either manually or by allowing the auto power-off function to operate) after changing the RAM disk or USER BIOS size without exiting from the CONFIG program. If PX-4 is switched off, the RAM disk contents could be destroyed and it might be necessary to re-initialise the system.

When CONFIG is started, (either from the MENU or CP/M command line), the screen shows the following:

```

*** MAIN MENU ***          CONFIG V1.0
Select alphanumeric or ESC to exit.
0=consecutive setting    6=disk drives
1=auto power off        7=RAMdisk, user BIOS
2=CP/M function key     8=communication
3=country              9=screen mode
4=cursor               A=printer (serial)
5=date & time
    
```