EPSON

PX-4

External RAM Disk Unit

INSTRUCTION MANUAL

Y20699100702

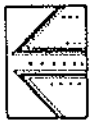
CONTENTS

Introduction

The External RAM disk unit is connected to the system bus of the PX-4 and increases the RAM capacity to 128 KB. It also allows the ROM capacity to be increased by up to 1M bits.

* Prepare the AC adapter and Ni-Cd batteries for the main battery of the PX-4 when using this unit.

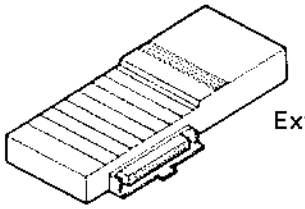
1. Package Contents

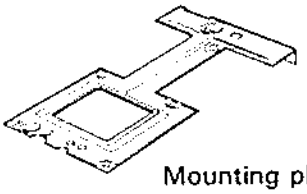

Unit explanation guide

Manual

Seven (7) short screws

Four (4) long screws


External RAM disk unit


Mounting plate

2. Specifications

RAM capacity: 128 KB (DRAM)

Charging time: 9 to 10 hours

Memory backup time: 400 to 500 hours (at room temperature)

ROM capacity: 64 Kbit to 1 Mbit CMOS ROMs can be mounted.

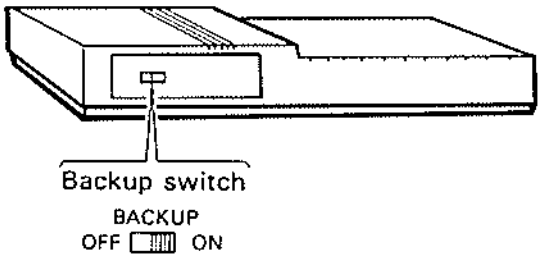
Weight: 450g (incl. the unit mounting plate)

3. Built-in Battery

The External RAM disk unit contains Ni-Cd batteries which supply power to the External RAM disk memory when the power of the PX-4 is off.
If the External RAM disk unit is removed from the PX-4, the data in disk memory is destroyed.

4. Backup Switch

The backup switch prevents unnecessary discharge of the Ni-Cd batteries. Whenever the External RAM disk is connected to the PX-4, this switch must be turned on, otherwise, backup cannot be performed. When the external RAM disk unit is not connected, the switch must be off.



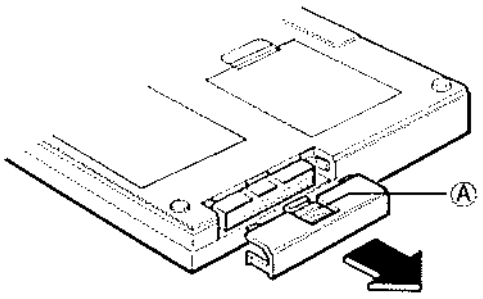
This battery supplies power for the memory for 400 to 500 hours at normal temperature. Thus, the battery requires recharging every 2 to 3 weeks.
When the AC adapter is connected to the PX-4, recharging will start whether the PX-4's power is on or off. The recharging will be completed in 9 to 10 hours. This battery can be continuously recharged for a long period (e.g., one year) without any damage.

5. Connection to the PX-4

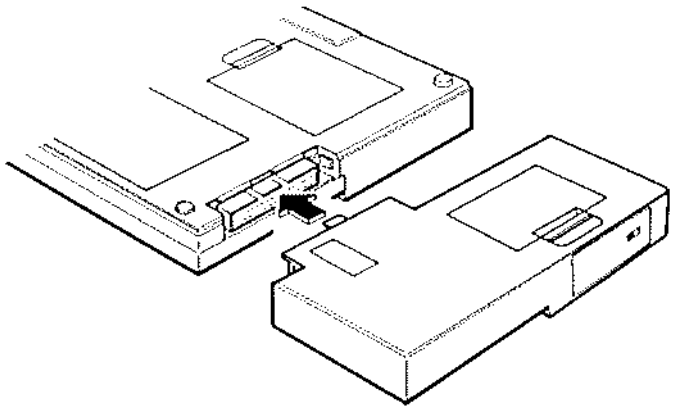
When connecting the External RAM disk unit to the PX-4, system initializing is required. For this, programs on the RAM disk of the PX-4 must be saved in other external storage in advance.

Step 1 Turn off the PX-4's power switch.

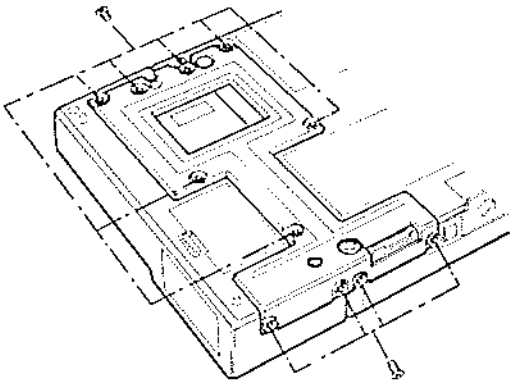
Step 2 Remove the PX-4's system bus connector cover by pressing on Ⓐ and moving it in the direction of the arrow.



Step 3 Mount the unit to the PX-4. Be sure the connector is firmly inserted.



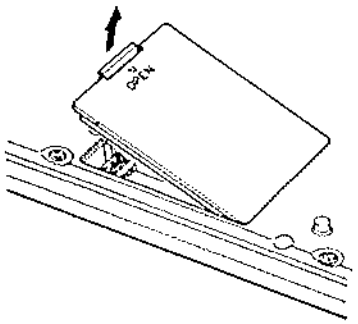
Step 4 Install the unit mounting plate by tightening the ten screws. (⇦ : long screw, ⇦ :short screw)
The ten screws must be tightened temporarily first, then firmly.



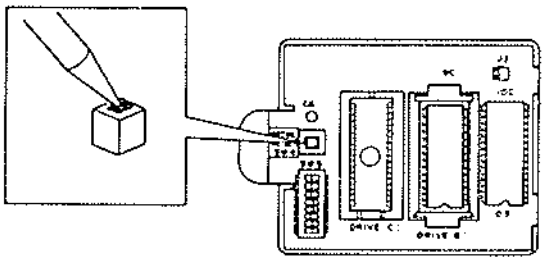
Step 5 Turn on the backup switch of the External RAM disk unit.

Step 6 Format the External RAM disk by initializing the system.

1) Open the ROM capsule cover on the back of the PX-4.



2) Push the initial reset switch (red) which is inside the box.



3) Replace the ROM capsule cover.
4) Turn the power switch ON.
5) System initializing screen will be displayed.
If the characters appearing on the screen are difficult to see, tilt the LCD and/or adjust the view angle.

```
SYSTEM INITIALIZE
DATE/TIME (YYMMDDhhmmss) 000000000000
```

Now enter the date and time. Enter the time as a 24-hour system. If a mistake is made during input, move the cursor using either ← or → to make the corrections. When the input is completed, press RETURN. When RETURN is pressed, the time is set.
For example, the input for May 30, 1984, 3:37, 40 sec, looks like the following:

```
SYSTEM INITIALIZE
DATE/TIME (YYMMDDhhmmss) 840530153740
```

6) After date and time have been input, the following message will be displayed:

```
SYSTEM INITIALIZE
DATE/TIME (YYMMDDhhmmss) 840530153740
WEEK (0 to 6) 0
```

Next enter the day using numbers. Days correspond with numbers as shown.

SUN	MON	TUE	WED	THU	FRI	SAT
0	1	2	3	4	5	6

Continually with the example, since May 30, 1984 is a Wednesday, input 3 and press [RETURN].

```
SYSTEM INITIALIZE
DATE/TIME (YYMMDDhhmmss) 840530153740
WEEK (0 to 6) 3
```

7) After inputting the day, the following message will appear:

```
SYSTEM INITIALIZE
DATE/TIME (YYMMDDhhmmss) 840530153740
WEEK (0 to 6) 3
USERBIOS SIZE (*256 B) 000
```

Press [RETURN]. The following message will be displayed.

```
RAM DISK FORMAT (Y/N) ?
```

8) Enter Y, and press [RETURN] .
The format is executed by following these procedures. The internal RAM disk size in the PX-4 becomes 0. The 128 K external RAM disk becomes operational.

9) Replace the cover.

6. Using a RAM Disk

"A" is used for the drive name of the External RAM disk. Up to 32 files can be stored on this disk. When the unit is connected to the PX-4, the internal RAM disk cannot be used. The external RAM disk unit increases the transient program area to 50.25 KB (up to CA00H). The user area in BASIC cannot be expanded.

When this unit is connected to the PX-4, the following message is displayed at every system initializing:

RAM DISK FORMAT (Y/N)?

If Y is entered and [RETURN] is pressed, this unit is formatted so that the data in RAM are deleted. Therefore, N must be input to preserve the contents.
System initialization is required in order to continue using the PX-4 after the External RAM disk unit is removed. Note that this will erase the contents of the internal memory.

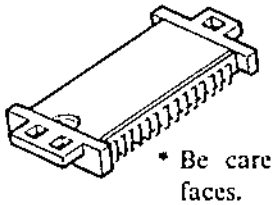
This unit keeps the contents of the RAM by the built-in Ni-Cd batteries. A voltage drop attributable to low batteries can destroy the contents of the memory.
It is preferable to store all data and programs which must be preserved in external storage (e.g., floppy disk).

7. Using a ROM Capsule (Option)

Although the ROM capsule is not supported by the Operating Systemm, a sample program to read the ROM is provided in a following section.

(1) Attaching a ROM Carrier

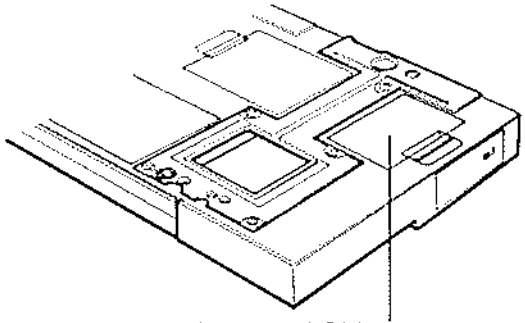
Attach the ROM to the ROM carrier.



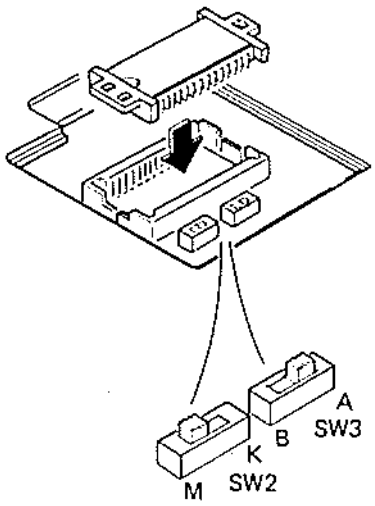
* Be careful which direction the ROM faces.
Check the areas indicated by arrows.

(2) Attaching the ROM Capsule

Step 1 Remove the ROM capsule cover.



Step 2 Insert the ROM capsule into the socket. Be careful which direction the ROM capsule faces.



Step 3 Set switches 2 and 3 according to the ROM type.

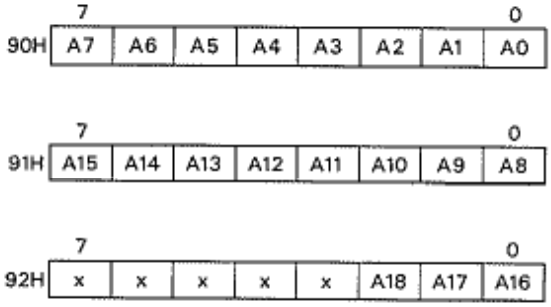
ROM	SW 2	SW 3
64 Kbit	K	B
128 Kbit	K	B
256 Kbit	K	B
512 Kbit	M	B
1 Mbit	M	A

Step 4 Replace the cover.

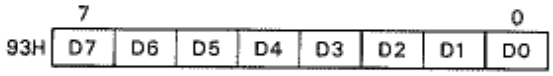
8. Reading from the ROM

The contents of the ROM are read out via the I/O port. The starting address is set in the address port according to the IO instructions then the data is read out from the data port. Every time data is read out, the lower 8 bits of the address are automatically increased at increments of 1 by hardware, so that up to 256 bytes of data can be continuously read out. This incremental increase is performed only on the lower 8 bits of an address.

Address port (WRITE)



Data port (READ)



9. Memory Addresses

RAM (RAM disk)	00000 to 1FFFF
ROM 64Kbit	20000 to 21FFF
128Kbit	20000 to 23FFF
256Kbit	20000 to 27FFF
512Kbit	20000 to 2FFFF
1Mbit	20000 to 3FFFF

As shown in the above table, the memory addresses after 20000H are assigned to the ROM. The physical address 0000H of the ROM corresponds to the memory address 20000H.
When using the 256 Kbit ROM, sequential read-out can be executed by followings either of these procedures. Reading of the sequential data stored on the ROM from its physical address 0H must be started from 4000H. In this case, the memory addresses are specified according to the following order:

24000H → 27FFF, then to 20000H → 23FFF

When assigning the memory address at 20000H, change the method of storing data into the ROM as follows. Data is specified in the ROM address from 4000H according to the following order:

4000H → 7FFF, then to 0H → 3FFFH

10. Sample Program

This program reads the data contained in memory from the address 20000H to 200FFH, and displays it.

```
 10 OUT &H92, 02
 20 OUT &H91, 00
 30 OUT &H90, 00
 40 DIM A (256)
 50 FOR I = 1 TO 256
 60 A (I) = INP (&H93)
 70 NEXT I
 80 FOR I = 1 TO 256
 90 PRINT HEX$ (A(I));" ";
100 NEXT I
110 END
```

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