EPSON

CARD-PC
ROM Writer Manual

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TABLE OF CONTENTS

Preface

The DI05302 Epson CARD-PC ROM Writer writes the BIOS (the basic program of the PC) into flash ROM in a CARD-PC. This ROM Writer is intended only for use with Epson CARD-PCs that have BIOS-ROM installed internally.

This ROM Writer can be used to easily update the contents of the CARD-PC's BIOS-ROM with a third-party BIOS, or with a BIOS that has been modified by a customer (using Epson's ROM Adaptation Kit) for the customer's own applications.

This manual describes the functions and operation of this ROM Writer. This manual also explains (with examples) how to use the ROM Writer Utility Programs* that are provided with this ROM Writer.

* The ROM Writer Utility Program is a special program that is used for transferring data between the ROM Writer and a personal computer.
  The descriptions in the manual apply to ROM Writer Utility Program Version 1.30 and above.

1 ROM Writer Functions

The Epson CARD-PC ROM Writer writes BIOS data into BIOS-ROM (flash ROM) in Epson CARD-PCs.

This ROM Writer, used alone, can load BIOS-ROM data from a floppy disk and then write the data to a CARD-PC, and can also copy the contents of BIOS-ROM from one CARD-PC to another CARD-PC. This unit can be easily operated using just the two button switches on the front panel.

The ROM Writer also has expanded functions that can be used by connecting a VGA CRT and a PS/2-compatible keyboard to the connectors located on the rear of the unit. For example, some of these expanded functions can be used to save the data in a CARD-PC's BIOS-ROM onto a disk, and to verify the data in BIOS-ROM.

2   Names of Parts

2.1   Front of Unit

The following components are located on the front of the ROM Writer.

Floppy Disk Drive

The system startup disk and disks containing BIOS-ROM data are inserted here. The floppy disk drive LED lights while the drive is writing or reading a disk.

Card Slot

This is the slot where the CARD-PC is inserted. This slot can be used to write (program) a CARD-PC and to read from a CARD-PC. The CARD-PC is ejected by using the eject button located on the right.

Lamp (LED) Indicators and Operation Switches

POWER LED

This LED lights when the power is on.

READY LED

This LED lights when the ROM Writer is ready for input. If this lamp is not on, both switch input and keyboard input are ignored. The system does not buffer keyboard input.

ACTIVE LED

This LED lights when power is being supplied to a CARD-PC in the card slot. If a CARD-PC is ejected or inserted while this lamp is on, the CARD-PC will be damaged.
Never eject or insert a CARD-PC while the ACTIVE LED is on.

ERROR LED

This LED lights when an error occurs. The next operation can not commence until the error condition is cleared. The error condition is cleared by pressing the LOAD switch and the PROGRAM switch simultaneously.

LOAD LED and LOAD switch

The LOAD LED lights while the ROM Writer is reading (loading) BIOS-ROM data from a disk or CARD-PC. This LED also flashes when the ROM Writer is ready to perform the loading operation.
The ROM Writer begins the loading operation when the LOAD switch is pressed.

PROGRAM LED and PROGRAM switch

The PROGRAM LED lights while the ROM Writer is writing (programming) BIOS-ROM data to a CARD-PC. This LED also flashes when the ROM Writer is ready to perform the programming operation.

The ROM Writer begins the programming operation when the PROGRAM switch is pressed.

POWER

READY

ACTIVE

ERROR

LOAD

PROGRAM

POWER LED

READY LED

ACTIVE LED

ERROR LED

LOAD SWITCH

LOAD LED

PROGRAM SWITCH

PROGRAM LED

FDD

CARD SLOT

CARD EJECT
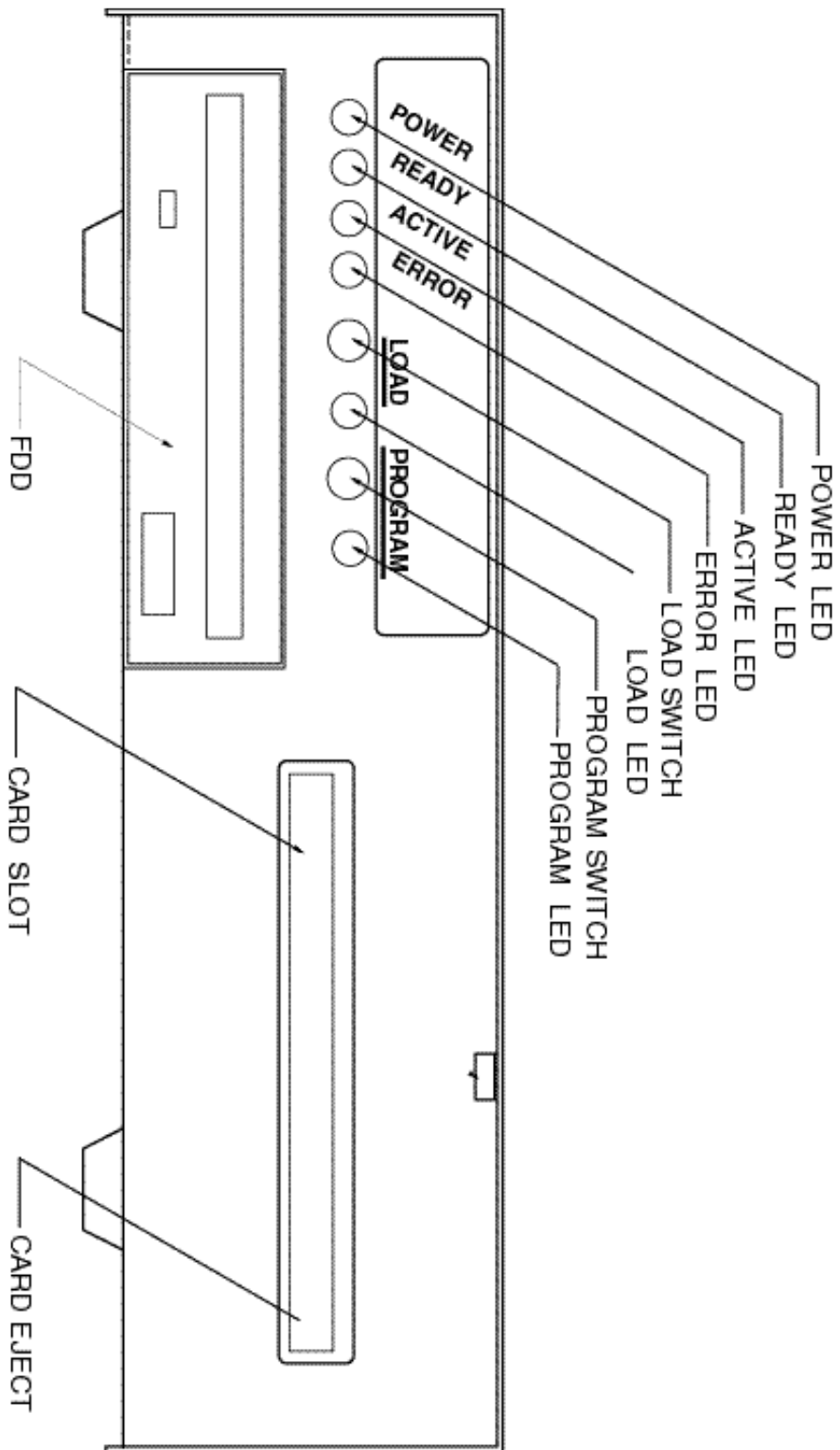
2.2 Rear of Unit

The following components are located on the rear of the ROM Writer.

Power Switch

This is the power switch for the ROM Writer.

External Power Connector

This is the connector for the Epson-specified AC power adapter (which is provided with the ROM Writer).

Keyboard Connector

This is a connector for a keyboard. Connect an IBM PS/2-compatible keyboard to this connector in order to use the ROM Writer's expanded functions. It is not necessary to connect a keyboard if only the basic functions will be used.

Video Connector

This is a connector for a CRT monitor. Connect a VGA-compatible CRT monitor in order to use the ROM Writer's expanded functions, and in order to monitor the operating status of the ROM Writer by checking error messages, etc.

Serial Connector

The serial connector is not used by this ROM Writer.

* Always be sure to turn off the ROM Writer power before connecting or disconnecting equipment to the connectors.

EXTERNAL POWER CONNECTOR

KEYBOARD CONNECTOR

SERIAL CONNECTOR

VIDEO CONNECTOR

DC IN 4V

POWER SWITCH
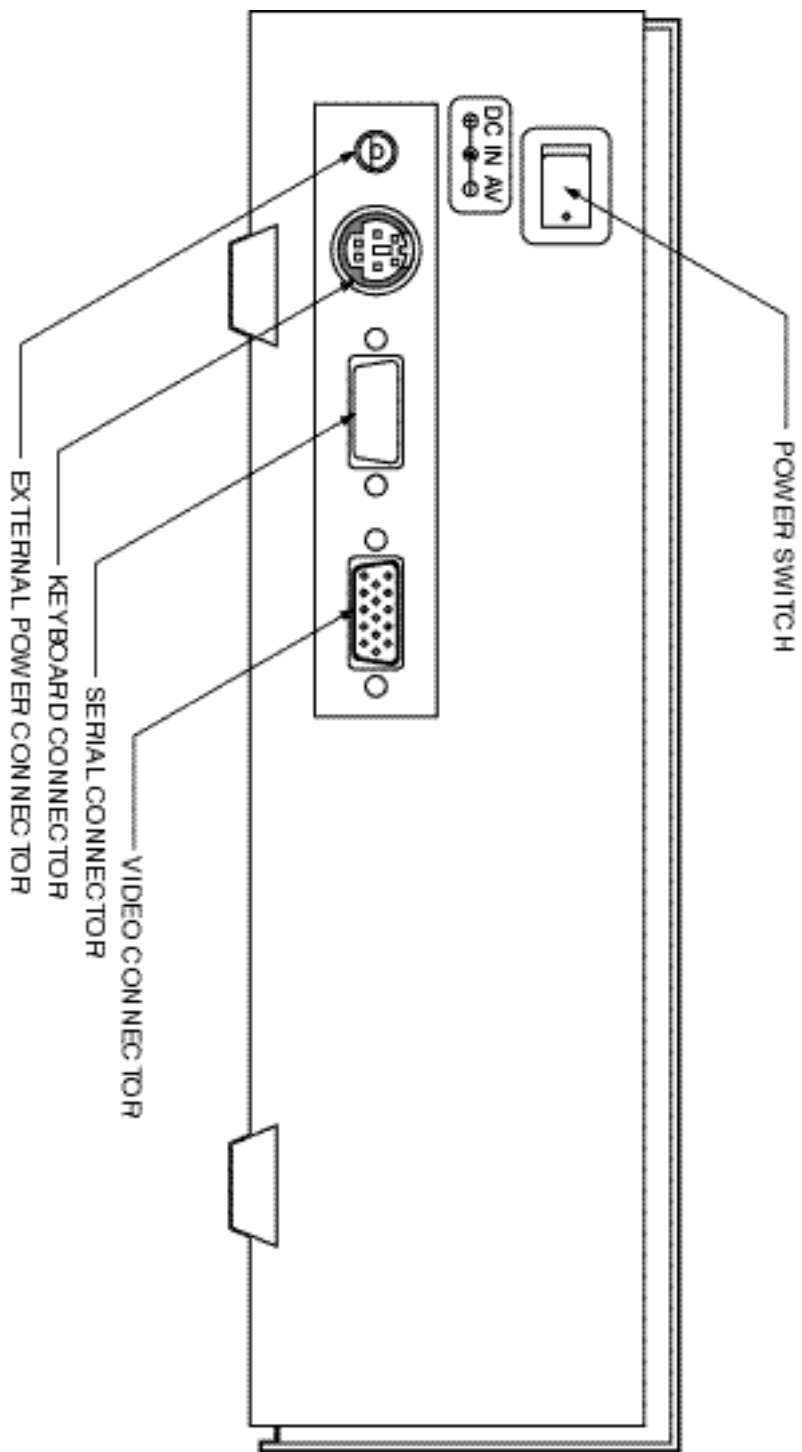
3　Handling

3.1　Handling of the ROM Writer

The following points should be noted when handling the ROM Writer:
- Install the ROM Writer in a horizontal position.
- Do not place heavy objects on top of the ROM Writer.
- Do not remove or insert a CARD-PC while the ACTIVE LED is on.
- Do not turn the power off while the ACTIVE LED is on.
- Do not remove or insert a floppy disk while the FDD access lamp is on.
- Do not turn the power off while the FDD access lamp is on.
- Do not connect or disconnect the keyboard or CRT monitor while the ROM Writer is on.
- The connector that accepts the CARD-PC has a limited service life. It should be replaced approximately every 1000 insertions/removals. For details on the replacement method, refer to Appendix 1, "Connector Replacement."

3.2　Handling of CARD-PCs

The following points should be noted when handling CARD-PCs:
- Because a CARD-PC is a precision device, do not strike it or handle it roughly.
- Do not expose the connector to water, oil, etc., and do not allow foreign debris to accumulate inside of the connector.
- Do not store the CARD-PC in a location that is exposed to high temperatures, humidity, strong electric fields, strong magnetic fields, vibrations, etc.
- Confirm that the ACTIVE LED on the ROM Writer is off before inserting/removing a CARD-PC into/from the card slot.
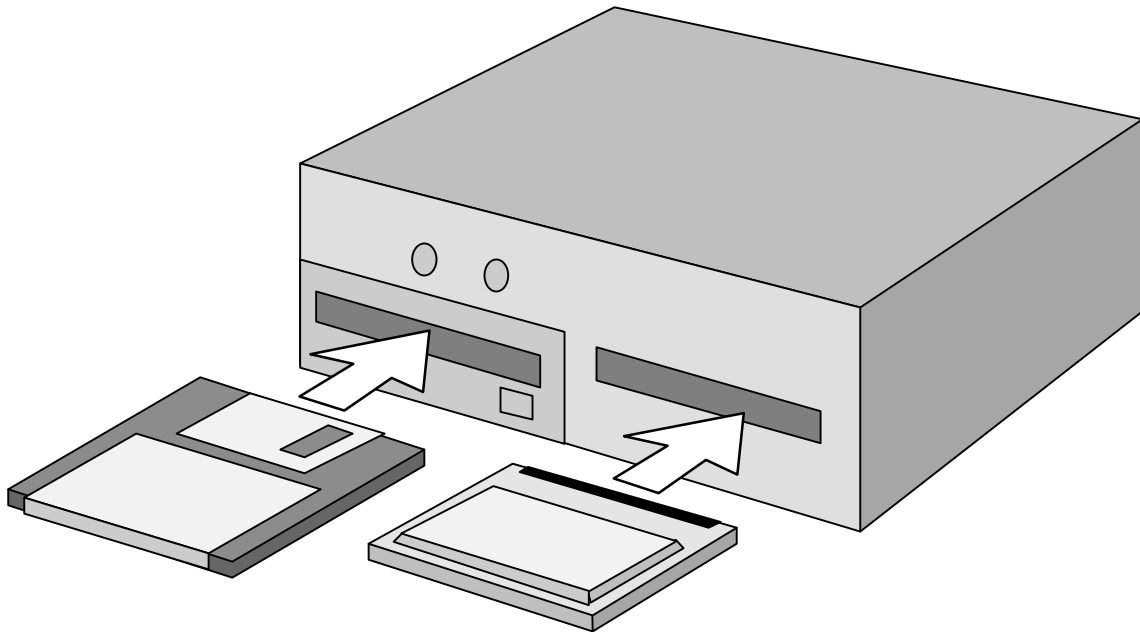
- When installing a CARD-PC into the card slot in the ROM Writer, always be sure to first confirm that the ACTIVE LED is off. Next, with the side of the CARD-PC that bears the serial number facing down, insert the CARD-PC straight into the card slot connector first, applying equal pressure on both sides of the CARD-PC, until the CARD-PC is fully inserted. (Refer to the diagram.) When inserting the CARD-PC, using excessive force can result in damage to the ROM Writer and the CARD-PC.
- To eject the CARD-PC from the card slot, press the Eject button located next to the slot. When the edge of the CARD-PC emerges from the slot, grasp it and pull the CARD-PC straight out of the slot. Removing the CARD-PC from the slot without using the Eject button will damage the ROM Writer and the CARD-PC.

3.3   Handling of Floppy Disks

The following points should be noted when handling floppy disks ("disks," hereafter):
- Observe all of the conditions of use indicated on the disk case, etc.
- The disk format used by the ROM Writer is not compatible with the MS-DOS format. MS-DOS will recognize a disk that is used with the ROM Writer as a floppy disk that contains no files. If a file is written to such a disk using the MS-DOS copy command, all of the ROM Writer data will be lost.
- Use the ROM Writer Utility Program provided with the ROM Writer to create disks for the ROM Writer, and to transfer data between ROM Writer disks and MS-DOS files.

4 Basic Operations

This chapter describes the basic operation methods for the ROM Writer. The button switches on the front panel are used in the basic operations. The basic operations can be used to write BIOS-ROM data that was recorded on a disk to a CARD-PC, and to copy BIOS-ROM data from one CARD-PC to another CARD-PC

4.1 Startup

1   Confirm that the power is off.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
●	●	●	●	⬤ ●	⬤ ●
Off	Off	Off	Off	Off	Off

▲
Confirm

2   Insert the system disk into the floppy disk drive.
The floppy disk drive is located in the lower left corner of the front panel.

3   Turn the power on.
The power switch is located in the upper left corner of the front panel.

4   Confirm that the READY LED is on.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
○	○	●	●	⬤ ◎	⬤ ●
On	On	Off	Off	Flashing	Off

▲
Confirm

5   End of startup operation

4.2   Shutdown

1   Confirm that the ACTIVE LED is off.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
○	○	●	●	○ ○	○ ○
On	On	Off	Off	Don't care	Don't care

Confirm

2   Turn the power supply off.

The power switch is located in the upper left corner of the panel.

4.3　Writing Data from a Disk to a CARD-PC

1　Start up the ROM Writer.
Follow the "Startup" procedure.

2　Remove the system disk.
After completing the "Startup" procedure, remove the system disk from the floppy disk drive.

3　Confirm that the LOAD LED is flashing.
At this point, the READY LED should be on and the LOAD LED should be flashing.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
○	○	●	●	◐ ◯	◐ ●
On	On	Off	Off	Flashing	Off
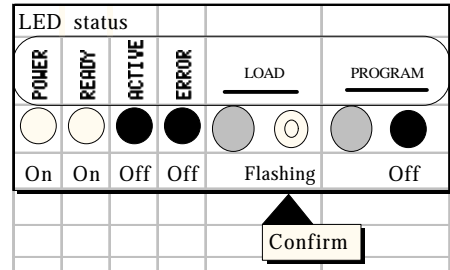
Confirm

4　Insert the data disk.
Insert the disk on which the BIOS-RAM data has been written into the floppy disk drive.

5　Confirm that there is no CARD-PC in the card slot.
Before loading the data from the disk, check the card slot. If there is a CARD-PC in the card slot, press the eject button that is located next to the card slot and then remove the CARD-PC.

6　Press the LOAD switch.
Press the LOAD switch. The ROM Writer then loads the BIOS-RAM data from the disk.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
○	○	●	●	◐ ◯	◐ ●
On	On	Off	Off	Flashing	Off

Press
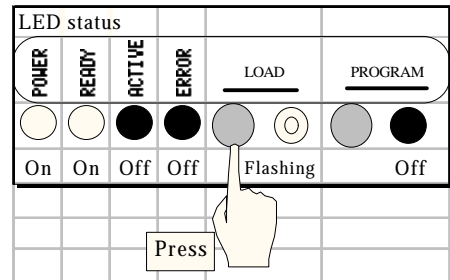
7 Confirm that the LOAD LED is on.

While the ROM Writer is loading the BIOS-ROM data, the READY LED turns off and the LOAD LED lights. In addition, the disk drive LED also lights. The loading operation lasts a few seconds. Wait until it is completed before proceeding.

LED status				LOAD		PROGRAM	
POWER	READY	ACTIVE	ERROR				
○	○	●	●	◑	○	◑	●
On	On	Off	Off	On		Off	
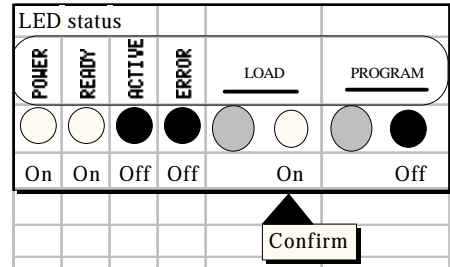
Confirm

8 Confirm that the PROGRAM LED is flashing.

After the loading operation is completed, the READY LED lights and the LOAD LED and PROGRAM LED begin flashing.
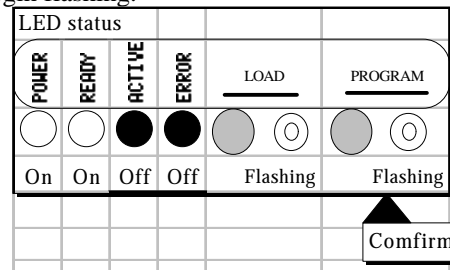
LED status				LOAD		PROGRAM	
POWER	READY	ACTIVE	ERROR				
○	○	●	●	◑	◎	◑	◎
On	On	Off	Off	Flashing		Flashing	

Comfirm

9 Confirm that the ACTIVE LED is off.

Before inserting a CARD-PC into the card slot, always be sure to confirm that the ACTIVE LED is off.

LED status				LOAD		PROGRAM	
POWER	READY	ACTIVE	ERROR				
○	○	●	●	◑	◎	◑	◎
On	On	Off	Off	Flashing		Flashing	

Confirm
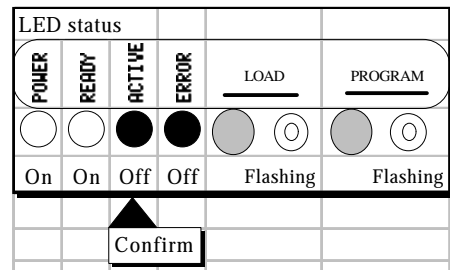
10 Insert the CARD-PC that is to be programmed into the card slot.

If the ACTIVE LED is off, insert the CARD-PC that is to be programmed into the card slot.

11   Press the PROGRAM switch.

Press the PROGRAM switch. The ROM Writer begins writing data to the CARD-PC.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
On	On	Off	Off	Flashing	Flashing

Press

12   Confirm that the PROGRAM LED is on.

The ACTIVE LED and the PROGRAM LED both light while the ROM Writer is writing data to the CARD-PC.
The writing operation lasts a few seconds. Wait until it is completed before proceeding.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
On	On	Off	Off	Off	On

Confirm

13   Confirm that the READY LED is on.

After the programming operation is completed, the ACTIVE LED turns off, the READY LED lights and the LOAD LED and PROGRAM LED begin flashing.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
On	On	Off	Off	Flashing	Flashing

Confirm

14   Confirm that the ACTIVE LED is off.

Before removing the CARD-PC from the card slot, always be sure to confirm that the ACTIVE LED is off.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
On	On	Off	Off	Flashing	Flashing
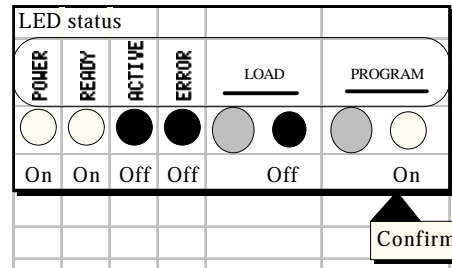
Confirm
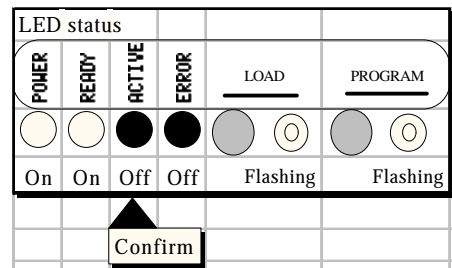
15   **Remove the CARD-PC from the card slot.**

16   **If another CARD-PC is to be programmed with the same data, repeat steps 8 to 15.**

17   **The programming procedure is now complete.**

4.4 Copying BIOS Data from One CARD-PC to Another CARD-PC

1   Start up the ROM Writer.

Follow the "Startup" procedure.

2   Remove the system disk.

After completing the "Startup" procedure, remove the system disk from the floppy disk drive.

3   Confirm that the LOAD LED is flashing.

At this point, the READY LED should be on and the LOAD LED should be flashing.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
On	On	Off	Off	Flashing	Off

Confirm

4   Confirm that the ACTIVE LED is off.

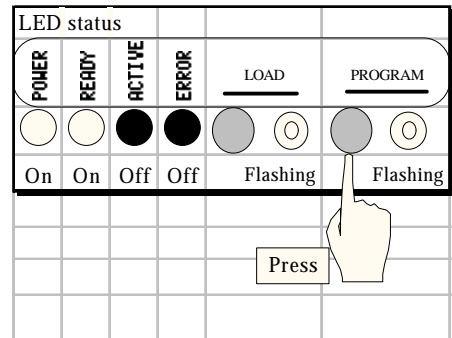Before inserting a CARD-PC into the card slot, always be sure to confirm that the ACTIVE LED is off.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
On	On	Off	Off	Flashing	Flashing
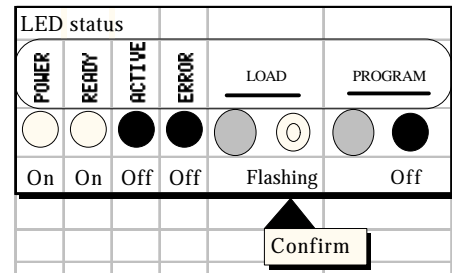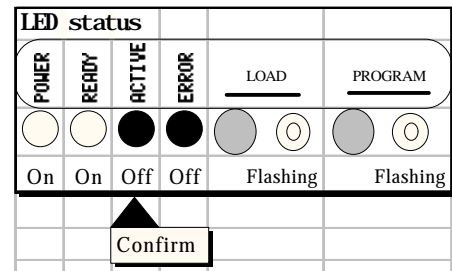
Confirm

5   Insert the CARD-PC that is the source of the data to be copied into the card slot.

6   Confirm that there is no floppy disk in the floppy disk drive.

Data cannot be loaded from a CARD-PC if there is a floppy disk in the floppy disk drive. If there is a floppy disk in the floppy disk drive, press the floppy disk drive's Eject button and remove the floppy disk.

7   Press the LOAD switch.

Press the LOAD switch. The ROM Writer then automatically loads the BIOS-RAM data from the CARD-PC in the card slot (as long as there is no floppy disk in the floppy disk drive).

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
On	On	Off	Off	Flashing	Off

Press

8   Confirm that the LOAD LED is on.

While the ROM Writer is loading the BIOS-ROM data from the CARD-PC, the READY LED turns off and the LOAD LED lights. In addition, the ACTIVE LED also lights.
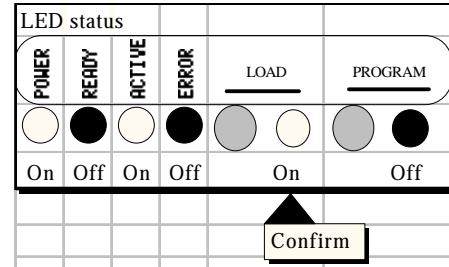
LED status				LOAD	PROGRAM
POWER	READY	ACTIVE	ERROR		
On	Off	On	Off	On	Off

Confirm

9   Confirm that the PROGRAM LED is flashing.

After the loading operation is completed, the ACTIVE LED turns off, the READY LED lights, and the LOAD LED and PROGRAM LED begin flashing.

LED status				LOAD	PROGRAM
POWER	READY	ACTIVE	ERROR		
On	On	Off	Off	Flashing	Flashing

Confirm

10   Confirm that the ACTIVE LED is off.

Before removing the CARD-PC from the card slot, always be sure to confirm that the ACTIVE LED is off.

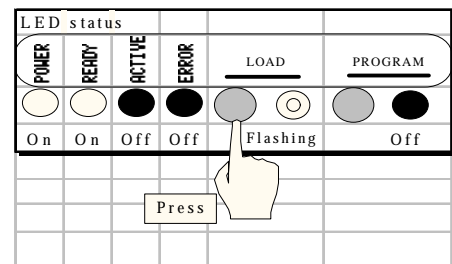| LED status				LOAD	PROGRAM
POWER	READY	ACTIVE	ERROR		
On	On	Off	Off	Flashing	Flashing
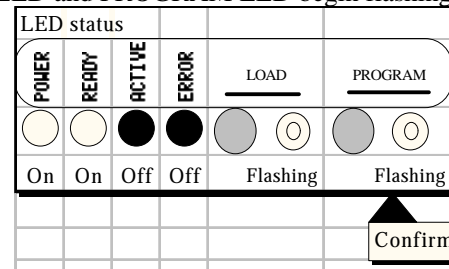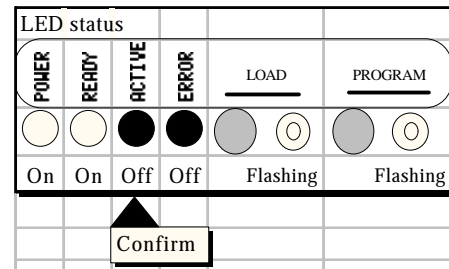
Confirm

11   Remove the source CARD-PC from the card slot.

12   Confirm that the ACTIVE LED is off.

Before inserting the CARD-PC that is to be programmed into the card slot, always be sure to confirm that the ACTIVE LED is off.

LED status				LOAD	PROGRAM
POWER	READY	ACTIVE	ERROR		
On	On	Off	Off	Flashing	Flashing
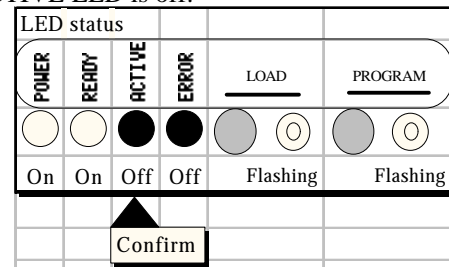
Confirm

13   Insert the CARD-PC that is to be programmed into the card slot.

Insert the CARD-PC that is to be programmed into the card slot.

14 Press the PROGRAM switch.

Press the PROGRAM switch. The ROM Writer begins writing data to the CARD-PC.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
On	On	Off	Off	Flashing	Flashing

Press

15 Confirm that the PROGRAM LED is on.

The ACTIVE LED and the PROGRAM LED both light while the ROM Writer is writing data to the CARD-PC.
The writing operation lasts a few seconds. Wait until it is completed before proceeding.

| LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
On	Off	On	Off	Off	On

Confirm

16 Confirm that the READY LED is on.

After the programming operation is completed, the ACTIVE LED turns off, the READY LED lights and the LOAD LED and PROGRAM LED begin flashing.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
On	On	Off	Off	Flashing	Flashing

Confirm

17 Confirm that the ACTIVE LED is off.

Before removing the CARD-PC from the card slot, always be sure to confirm that the ACTIVE LED is off.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
On	On	Off	Off	Flashing	Flashing
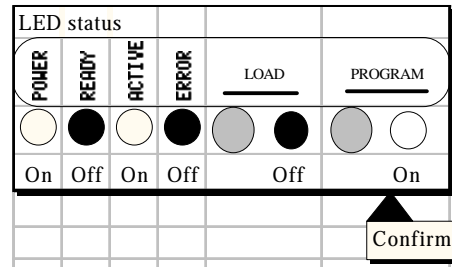
Confirm
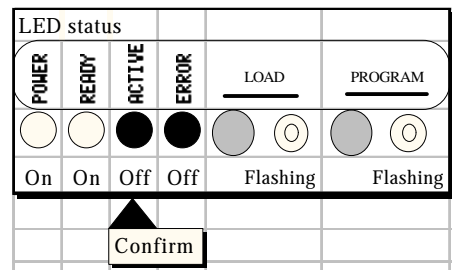
18 Remove the destination CARD-PC from the card slot.

19 If another CARD-PC is to be programmed with the same data, repeat steps 12 to 18.

20 The copying procedure is now complete.

4.5   If an Error Occurs

If an error occurs while the ROM Writer is performing an operation, the ERROR LED on the front panel lights.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
○	●	●	○	⬤ ⬤	⬤ ⬤
On	Off	Off	On	Don't care	Don't care
			▲ Confirm		
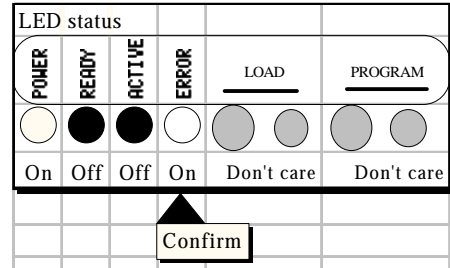
To clear the error condition, press the LOAD button and the PROGRAM button simultaneously.

LED status					
POWER	READY	ACTIVE	ERROR	LOAD	PROGRAM
○	●	●	○	⬤ ⬤	⬤ ⬤
On	Off	Off	On	Don't care	Don't care
				Press	Press
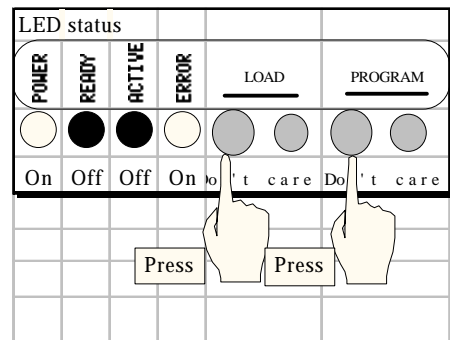
5   Expanded Operations

In expanded operations, a CRT monitor and a keyboard* are connected to the ROM Writer, which can then be operated in the same manner as a computer terminal. Expanded operations make it possible to perform more involved tasks, such as saving BIOS-ROM data to disk or verifying BIOS-ROM data.

> * The CRT monitor and keyboard connect to the connectors located on the rear of the ROM Writer.

5.1   Essential Knowledge for Expanded Operations

Knowledge concerning the operation of the ROM Writer's system program and the disks used by the ROM Writer is required in order to perform expanded operations.

Disk Format

The ROM Writer uses 2HD 3.5-inch floppy disks that are physically formatted for IBM PC/AT compatibles.
The ROM Writer uses a special logical format. Create ROM Writer disks by executing (in an MS-DOS environment) RWFORMAT.EXE, which is included on the ROM Writer utility disk.

Logical Structure of ROM Writer Disks

The ROM Writer disks are divided into five partitions. The ROM Writer can record one batch of BIOS data in one partition.
Each partition is numbered from "1" to "4." When transferring data between disks, always be sure to specify a partition number.

Each partition has specifications for the following four attributes:
    * Data size
    * Partition information
    * Data and system partition distinction
    * Overwrite protection
The "data size" is set automatically when BIOS-ROM data is saved to disk. (Refer to section 5.5.)
The "partition information" consists of headers and memo data so that the BIOS data can be managed efficiently. The ROM Writer is equipped with functions that allow it to freely edit partition information.
The ROM Writer cannot modify the "data and system partition distinction" and "overwrite protection" attributes.

System Disk

The system disk is a disk on which the ROM Writer system program has been written in one of its partitions. The ROM Writer boots up from the system disk in its floppy disk drive.
BIOS-RAM data can be saved in the empty partitions on the system disk.

Internal Memory

The ROM Writer has internal memory that it uses to temporarily store BIOS-ROM data. The internal memory has enough capacity to store one set of BIOS-ROM data.
All operations that involve the movement of data (load, save, program, and verify) are executed by utilizing the ROM Writer's internal memory.

Screen

The initial screen after startup is shown below.

```
CARD-PC ROM Writer system program version 1.30          (C) SEIKO EPSON CORP.   1994
┌─ Data Buffer ────────────────────────────────────────────────────────────────────┐
│  Data Source= [          ]      Data size= [          ]      Checksum= [          ]│
│┌─ Disk Partition ─────────────────────────────────────────────────────────────────│
│      #0=( e )  [EPSON CARD-PC ROM Writer system program version 1.30              ]│
│      #1=( · )  [                                                                  ]│
│      #2=( · )  [                                                                  ]│
│      #3=( · )  [                                                                  ]│
│      #4=( · )  [                                                                  ]│
│┌─ Front panel switch ──────────┬─ [Key] : Command ─────────────────────────────────│
│                                │  [F2]  : Select Data source        = [          ] │
│  (□)LOAD   ( )PROGRAM    ←─┬─→  │  [F3]  : Laod data                               │
│  ( )LOAD   □)PROGRAM     ←─┼─→  │  [F4]  : Program                                 │
│                           │     │  [F5]  : Verify                                  │
│                           │     │  [F6]  : Select Save/Edit destination  = [     ] │
│                           │     │  [F7]  : Save data to disk Partition             │
│                           │     │  [F8]  : Edit Disk Partition information          │
│  (□)LOAD   (□)PROGRAM    ←─┴─→  │  [F10] : Clear Error                             │
│┌─ Message ────────────────────────────────────────────────────────────────────────│
│  Command :  _                                                                      │
│                                                                                    │
└────────────────────────────────────────────────────────────────────────────────────┘
                                    PWR    RDY    ACT    ERR    LOD    PGM
```

Each section of this screen is described below.

Data Buffer Area

The contents of the ROM Writer's internal memory are displayed here.

The "Data source" field shows the source of the BIOS-ROM data that was loaded into the ROM Writer's internal memory. The contents of this field are explained in the following table.

Display	Data Source
(Blank)	No BIOS-ROM data is loaded in memory.
Disk Partition #n	The BIOS-ROM data in memory was loaded from disk partition "n".
CARD-PC Slot	The BIOS-ROM data in memory was loaded from ROM in a CARD-PC (in the card slot).

The "Data size" field shows (as a hexadecimal number) the amount of data loaded into the ROM Writer's internal memory. Normally, "4000h" (256KB) is displayed in this field. If a different value is displayed, it is possible that bad data was loaded into memory.

The "Checksum" field shows the checksum for the data loaded into the ROM Writer's internal memory.

Disk Partition Area

This area displays information on disk partitions #0 to #4 on the floppy disk that is currently loaded in the floppy disk drive. The "S" indicator (indicating the partition that is specified as the data source) and the "D" indicator (indicating the partition that is specified as the destination partition) are displayed in the space to the left of the partition numbers. Information on the partition status and the data type is displayed within the parentheses. The meanings of the symbols displayed between the parentheses are explained below.

Display	Explanation
(e)	The partition contains an execution program (system program).
(d)	The partition contains BIOS-ROM data (binary image data).
()	The partition contains no data; it is empty.
(X)	The partition is unusable because a sector error, etc., was detected.
(-)	Either there is no disk in the floppy disk drive, or the disk has not been formatted for the ROM Writer.

Partitions for which the symbol in parentheses is highlighted are protected against overwrites. If an attempt is made to write data to such a partition, the ROM Writer will ask for confirmation before actually overwriting the data.

Front Panel Switch Area

The ROM Writer's front panel switches are modeled in this section. Each switch has the same function as the command to which it is linked by an arrow in the "[key]:Command" area.

[key]:Command Area

This area lists the commands that can be accepted from the keyboard.

Key	Description
F2	Each time the F2 key is pressed, the data source for the F3 key command changes. The selected data source is displayed to the right.
F3	This command loads data from the selected data source.
F4	This command writes the data in the ROM Writer's memory to BIOS-ROM in a CARD-PC.
F5	This command verifies (compares) the BIOS-ROM data in a CARD-PC with the data in the ROM Writer's memory.
F6	Each time the F6 key is pressed, the destination partition for the F7 key command and the F8 key command changes. The selected destination is displayed to the right.
F7	This command writes the data in the ROM Writer's memory to the destination partition that was selected with the F6 key.
F8	This command opens partition information editing mode for the destination partition that was selected by the F6 key. Keyboard input guide information is displayed in the Message area.
F10	This command clears the error condition.

Message Area

Messages from the ROM Writer are displayed here.

Bottom of Screen

The status of the ROM Writer's front panel LEDs is displayed here. The correspondence between the display and the LEDs is shown below.

Display	LED		Display	LED
PWR	POWER		ERR	ERROR
RDY	READY		LOD	LOAD
ACT	ACTIVE		PGM	PROGRAM

Relationship to Basic Operations

Pressing the F3 key (Load Data) has the same function as pressing the LOAD switch.
Pressing the F4 key (Program) has the same function as pressing the PROGRAM switch.
Pressing the F10 key (Clear Error) has the same function as pressing the LOAD and PROGRAM switches simultaneously.

Other Functions (Shortcut Keys)

Although these keys are not listed in the [key]:Command area, there are a number of other keys that the ROM Writer will accept as input. These keys function as shortcut keys.

Key	Description
0 to 4	Pressing one of these keys selects the corresponding partition as the data source and then loads the data from that disk partition into the ROM Writer's memory.
7 and 8	Pressing these keys loads BIOS-ROM data from the CARD-PC that is currently in the card slot.
0 to 4, while holding down ALT	These key combinations save the data that is currently in the ROM Writer's memory to the corresponding disk partition.
Space	This functions in the same manner as the F10 key (Clear Error).

If an error occurs during a shortcut key operation, the ROM Writer does not wait for the error to be cleared.

5.2   Cautions When Using the Expanded Functions

The cautions that must be heeded when using the expanded functions are identical to those that apply to basic operations. In particular, never insert or remove a CARD-PC while the ACTIVE LED is lit, since doing so could damage the CARD-PC.

5.3   Loading Data from a Disk into ROM Writer Memory

1   Select the partition that is to be the data source.

Use the F2 key to select the partition that is to be the data source. Each time the F2 key is pressed, the data source that can be used changes.

2   Press the F3 key.

Press the F3 key to load the BIOS-ROM data. If this operation terminates normally, the source, size, and checksum for the data that was loaded is displayed in the Data Buffer area. Normally, the data size is 4000h (256K). If a different value is displayed, it is possible that bad data was loaded.

3   End

Notes

If a different disk was inserted in the disk drive before this operation, the ROM Writer reads the disk information when the F2 key is pressed and then updates the information displayed in the Disk Partition area. The lowest partition number in which BIOS-ROM data is recorded is then selected automatically.

If there is no disk in the floppy disk drive, or if the disk in the floppy disk drive does not contain BIOS-ROM data, only the CARD-PC in the card slot can be selected as the data source.

If the disk is removed after the partition was selected and then the F3 key is pressed, the BIOS-ROM data is loaded from the CARD-PC in the card slot. If the card slot is empty, the ROM Writer displays an error message and then waits for the error condition to be cleared.

Shortcut Operation

If the data partition containing the desired BIOS-ROM data is already known, press the numeric key corresponding to that partition. The ROM Writer then begins loading the data from the partition corresponding to that number.

5.4   Loading Data from a CARD-PC into ROM Writer Memory

1   Select "CARD-PC slot" for the data source.

Use the F2 key to select "CARD-PC slot."

2   Press the F3 key.

After confirming that the CARD-PC is in the card slot, press the F3 key to load the data. If this operation terminates normally, the information on the data that was loaded is displayed in the Data Buffer area.

3   End

Notes

If the card slot is empty when the F3 key is pressed, the ROM Writer displays an error message and then waits for the error condition to be cleared.

Shortcut Operation

If the "7" or "8" key is pressed, the ROM Writer begins loading data from the CARD-PC in the card slot.

5.5   Saving Data to Disk from ROM Writer Memory

1   Specify the destination partition.

Use the F6 key to specify the destination partition on the disk for the save operation.

2   Press the F7 key. (Save the data to disk.)

Press the F7 key to save the contents of ROM Writer memory to the specified partition. If overwrite protection is specified for the destination partition (indicated by the symbol in parentheses in the Disk Partition area being highlighted), the ROM Writer asks whether or not it can overwrite the data in that partition. Press "y" to overwrite partition, or "n" to cancel the operation. After the save operation is completed, the ROM Writer automatically enters partition information editing mode.

3   Edit the partition information.

Because the cursor moves to the partition (in the Disk Partition area) to which data was just saved, the partition information can be edited. Guidance concerning which keys can be used for editing is displayed in the Message area. When the Enter key is pressed, the edited partition information is written to the disk.

Partition information can be edited later by pressing the F8 key.

4   End

Shortcut Operation

When a numeric key from 0 to 4 is pressed while holding down the ALT key, the ROM Writer begins saving data to the partition corresponding to the numeric key that was pressed.

5.6 Programming a CARD-PC with the Contents of ROM Writer Memory

1   Write the data to the CARD-PC.

Insert a CARD-PC in the card slot, press the F4 key, and write the contents of ROM Writer memory to the CARD-PC.

2   End

Notes

If there is no data loaded in the ROM Writer's memory, input from the F4 key and the Program switch is ignored. Note that no error message is displayed in these cases.

5.7 Comparing the Contents of the CARD-PC with ROM Writer Memory (Verify)

1 Compare (Verify) the contents of BIOS-ROM in the CARD-PC with ROM Writer memory.

Press the F5 key to compare the contents of BIOS-ROM in the CARD-PC with the contents of ROM Writer memory. If the contents of both do not match, the ROM Writer displays an error message in the Message area, along with the number (in hexadecimal) of bytes of data that do not match.

2 End

Notes

If there is no data loaded in the ROM Writer's memory, input from the F5 key is ignored. Note that no error message is displayed in these cases.

5.8 Error Messages

The error messages that may be displayed by the ROM Writer are listed below.

Warning: Data buffer is empty now. Command canceled.

No data has been loaded into the ROM Writer's memory. It is necessary to first load the data that is to be written to the CARD-PC.

Warning: Data already exist on the Disk partition. Overwrite? (y/n)

The partition that was specified as the destination partition for the save operation already contains data. To overwrite the partition, press the "y" key.

Warning: Executable code exist on the Disk partition. Overwrite? (y/n)

The partition that was specified as the destination partition for the save operation already contains the ROM Writer system program. To overwrite the partition, press the "y" key.

Warning: Write-protected Disk partition. Are you sure to overwrite? (y/n)

The partition that was specified as the destination partition is write-protected. To overwrite the partition anyway, press the "y" key.

Warning: Number of partitions is invalid. This Disk is not usable.

The disk in question is not a valid disk. Either reformat the disk, or replace it with a new disk.

Warning: Error occurred while reading partition information.

An error occurred and processing was interrupted while data was being read from a disk. Either reformat the disk, or replace it with a new disk.

Warning: Error occurred while writing partition information.

An error occurred and processing was interrupted while data was being written to a disk. It is possible that data cannot be correctly read from or written to the partition in question. Either specify a different partition, or replace the disk with a new, formatted disk.

Warning: Disk is not ready, or Disk has been changed. Command canceled.

After the destination partition for a save or editing operation was specified, either the disk was changed or there is no disk in the floppy disk drive. After confirming that there is a disk in the floppy disk drive, use the Select Save/Edit Destination function (the F6 key) to specify the destination partition again.

Warning: Destination Disk Partition is not specified. Command canceled.

No destination partition has been specified for a save or editing operation. After confirming that there is a disk in the floppy disk drive, use the Select Save/Edit Destination function (the F6 key) to specify the destination partition.

Warning: Illegal Disk format. Command canceled.

The disk is not formatted for use with the ROM Writer. Insert a disk that has been formatted for use with the ROM Writer into the floppy disk drive.

Warning: Disk is not ready, or illegal format. Command canceled.

Either there is no disk in the floppy disk drive, or the disk is not formatted for use with the ROM Writer. Insert a disk that has been formatted for use with the ROM Writer into the floppy disk drive.

Warning: Disk has no valid partition. Command canceled.

The partitions on the disk are bad and cannot be used. Either reformat the disk, or replace it with a new disk.

Error!!: Bad Disk Partition. Command canceled.

The partitions on the disk are bad and cannot be used. Either specify a different partition, or replace the disk with a new, formatted disk.

Error!!: Disk read operation failed.

An error occurred while data was being read from a disk. Determine the cause of the error, clear the error condition, and then begin the operation again.

Error!!: Disk write operation failed.

An error occurred while data was being written to a disk. Determine the cause of the error, clear the error condition, and then begin the operation again.

Error!!: CARD-PC is not in a slot, or detected Flash ROM [????] is not supported.

An error occurred in the processing that confirms the presence of a CARD-PC in the card slot. Determine the cause of the error, clear the error condition, and then begin the operation again. (See note.)

Error!!: Flash ROM read failure.

An error occurred while data was being read from the CARD-PC in the card slot. Determine the cause of the error, clear the error condition, and then begin the operation again. (See note.)

Error!!: Data size does not match to the detected Flash ROM.

The size of the CARD-PC data that is to be written does not match the size of the BIOS ROM in the CARD-PC that is in the card slot. Determine the cause of the error, clear the error condition, and then begin the operation again. (See note.)

Error!!: Flash ROM program failure.

An error occurred while data was being written to the CARD-PC that is in the card slot. Determine the cause of the error, clear the error condition, and then begin the operation again. (See note.)

Error!!: Verification failed. Number of different bytes = ????????h

The contents of the BIOS ROM in the CARD-PC that is in the card slot were compared with the data in the ROM Writer's memory, and they did not match. ????????h bytes of data did not match. Determine the cause of the error, clear the error condition, and then begin the operation again. (See note.)

Note

If an error occurs even though the CARD-PC being used is normal and the correct procedures are being followed, it is possible that the connector in the card slot that connects the CARD-PC to the ROM Writer has deteriorated. For details on the CARD-PC connector, refer to Appendix 1, "Connector Replacement."

6 ROM Writer Utility Program

6.1 What is the ROM Writer Utility Program?

The floppy disk format that is used by the CARD-PC ROM Writer is not compatible with the MS-DOS file system.

The ROM Writer Utility Program is a DOS program that is used to exchange data between the computer that is used for BIOS development work and the disks used for the ROM Writer. Specifically, the Utility Program is used to format ROM Writer disks, create system disks, and copy, reference, and delete data.

Structure of the Utility Program

The ROM Writer Utility Program is provided with the CARD-PC ROM Writer on a 3.5-inch floppy disk.

The floppy disk contains the following MS-DOS files.

- RWFORMAT.EXE Formats disks for use with the ROM Writer.
- RWCOPY .EXE   Copies files to and from disks.
- RWDEL   .EXE   Deletes data from a disk.
- RWDIR   .EXE   Displays a list of the data files on a disk.
- ROMWRITE.BIN   This is the ROM Writer system program
       (binary file).

Required System Configuration

The following is the required system configuration in order to be able to use the ROM Writer Utility Program.

- An IBM PC/AT-compatible that is equipped with a 3.5-inch 2HD (1.44MB) floppy disk drive and a hard disk drive.
- MS-DOS, or an OS that provides a DOS-compatible window.

6.2   Overview of ROM Writer Disks

A "ROM Writer disk" is a floppy disk that has been logically formatted for use with the CARD-PC ROM Writer.

Types of Floppy Disks That Can Be Used

The following types of floppy disks can be used with the ROM Writer and the ROM Writer Utility Program:

- 3.5-inch 2HD (1.44MB) floppy disks
- 3.5-inch 27D (720K) floppy disks

Disk Format

A ROM Writer disk is divided into data storage areas called "partitions." One partition can hold one set of data or one ROM Writer system program.
The RWFORMAT.EXE command partitions a 2HD (1.44MB) floppy disk into five partitions, and a 2DD (720K) floppy disk into two partitions.
Note that no time stamp information (indicating the date and time when data was recorded) is added to the data stored in the partitions. Use the partition information (explained below) to manage ROM Writer data according to date of creation, etc.

Partition Numbers

Each partition on a ROM Writer disk is assigned a number (called a "partition number"), starting from "0." The partition number must be specified when copying files or deleting data.

An example of how to use the copy command is shown below:

RWCOPY C:BIOSFILE.BIN A:1

This command copies the file named BIOSFILE.BIN from drive C to partition 1 on a ROM Writer disk in drive A.

Partition Information

Up to 64 normal-width alphanumeric characters can be appended to each partition as "partition information." Note that normal-width katakana and double-width characters cannot be used. Because the RWDIR.EXE command can be used to reference partition information, the partition information can be used to store header data, date information, revision numbers, comments, and other information that can be useful for data management.
To record partition information, input text enclosed in double quotes (") after the copy destination partition specification when using RWCOPY.EXE to copy a file to disk.

An example of how to record partition information is shown below:
RWCOPY C:BIOSFILE.BIN A:1"For Evaluation, Test build 01,   Nov/96"
This command records the text "For Evaluation, Test build 01, Nov/96" as partition information when copying BIOSFILE.BIN to partition 1 in drive A.

6.3   Installing the Utility Program

Preparation

Ready the floppy disk bearing the label "ROM Writer Utility Program" that was provided with the CARD-PC ROM Writer.

Copying the Program Files

Copy all of the files contained in the Utility Program disk to the IBM PC/AT-compatible computer that is to be used for development work.
The following files need to be copied:

        RWFORMAT.EXE
        RWCOPY   .EXE
        RWDEL   .EXE
        RWDIR   .EXE
        ROMWRITE .BIN

Create a directory and establish a search path as necessary. The following commands copy the files to the directory C:\RWUTIL\ and set up the search path.

        C:\>md rwutil
        C:\>cd rwutil
        C:\RWUTIL>copy a:*.*
        C:\RWUTIL>path c:\rwutil;%path%

Note

If older versions of the ROM Writer Utility Program files and ROMWRITE.BIN are installed on the computer, delete all of those files.
When using the RWFORMAT.EXE system disk creation function (the "/S" option), it is essential to note that ROMWRITE.BIN must reside in the current directory.

6.4   Utility Program Command Reference

This section explains all of the ROM Writer Utility Program commands.

In the command format, the items enclosed in square brackets ([]) are optional parameters that may be omitted. If an optional parameter is omitted, the effect is the same as if that option were not specified.

6.4.1   RWFORMAT

This command formats a floppy disk as a ROM Writer disk.

Format
RWFORMAT drive [/S or /SF] [/Q] [/F:720]

Parameters

drive

> Specify the drive that contains the floppy disk that is to be formatted. Be certain to include a colon (:) after the drive name. (For example, specify "A:" for drive A.)

/S

> This option is used to create a ROM Writer system disk.
> In order to use this option, ROMWRITE.BIN must reside in the current directory. For details on how to create a system disk, refer to section 6.5, "Creating a System Disk."

/SF

> This option is used to create a Production Line ROM Writer Disk.
> In order to use this option, Version 1.30 or later of ROMWRITE.BIN must reside in the current directory. Because Production Line ROM Writer Disks are handled in a different manner from normal ROM Writer system disks, be certain to refer to section 6.6, "Creating a Production Line ROM Writer Disk."

/Q

> This option omits physical formatting of the disk. This option can be used to save time when reformatting a disk that was previously formatted with the RWFORMAT command or the MS-DOS FORMAT command.

/F:720

> Specify this option when formatting a 2DD (720K) floppy disk.

Example

C:\TOOL>rwformat a: /s

> This command formats the disk in drive A and creates a ROM Writer system disk. In this example, ROMWRITE.BIN must reside in the C:\TOOL directory.

6.4.2 RWCOPY

This command either copies an MS-DOS file to a partition on a ROM Writer disk, or else copies a partition on a ROM Writer disk to an MS-DOS file.

Format

When copying a file to a ROM Writer disk partition:
RWCOPY file_name partition [partition_info] [/P] [/E]

When copying from a ROM Writer disk partition to a file:
RWCOPY partition file_name

Parameters

file_name

Specify the MS-DOS file name. The path name can also be specified.

partition

Specify the copy destination (or source) partition by specifying "drive name:partition number". (For example, to specify partition 0 on drive A, specify "A:0".)

partition_info

Partition information can be set when copying a file to a ROM Writer disk.
Input partition information by enclosing the text in double quotes (").

/P

This option is used to protect the file (data) that is copied to a disk partition from being overwritten.
If a file is copied with this option specified, a confirmation message is output the next time that an attempt is made to copy a file to the same partition using RWCOPY, an attempt is made to delete the data in that same partition using RWDEL, or an attempt is made to save BIOS-ROM data from ROM Writer memory to that same partition.s

/E

This option copies an executable format program to a disk partition. This option is normally not used.

Example

C:\>c:\tool\rwcopy c:\work\c386\bios.bin a:3 "CARD-386 BIOS. 1997/7/7"

In this example, RWCOPY resides in the tool directory in drive C, the copy source data is BIOS.BIN in the C:\WORK\C386 directory, the copy destination is partition 3 in drive A, and the partition information is "CARD-386 BIOS. 1997/7/7".

6.4.3 RWDEL

This command deletes data recorded in a partition on a ROM Writer disk.

Format

RWDEL partition

Parameter

partition

Specify the partition to be deleted by specifying "drive name:partition number".
(For example, to specify partition 0 on drive A, specify "A:0".)

6.4.4 RWDIR

This command displays a list of the contents of a ROM Writer disk.

Format

RWDIR drive

Parameter

drive

Specify the drive that contains the disk the contents of which are to be listed. Be certain to include a colon (:) after the drive name.
(For example, specify "A:" for drive A.)

Explanation of List Results

Examples of list results for partitions in different states are explained below.

Empty partition that contains no data

```
Partition # 0 ----------------------
 Vacant
 Partition size = 276480 bytes
```

- "Vacant" is displayed in the line that follows the partition number.
- The partition size is displayed as a decimal number.

Partition that contains BIOS-ROM data

```
Partition # 1 ----------------------
 Data type     = Data
 Data size     = 262144 bytes
 Overwrite     = Permit
 Partition size = 276480 bytes
```

- "Data" is displayed in the "Data type =" field.
- The number of bytes in the BIOS-ROM data is displayed as a decimal number in the "Data size =" field.
- If the /P option was not specified when RWCOPY was executed, "Permit" is displayed in the "Overwrite =" field, indicating that the partition can be overwritten without permission.

```
Partition # 1 ----------------------
 Information   = "Master BIOS for mass prod..
 Data type     = Data
 Data size     = 262144 bytes
 Overwrite     = Inhibit
 Partition size = 276480 bytes
```

- If partition information has been recorded, that information is displayed in double quotes (") in the "Information =" field.
- If the /P option was specified when RWCOPY was executed, "Inhibit" is displayed in the "Overwrite =" field, indicating that the partition can not be overwritten without permission.

Partition that contains a program (the system program)

```
Partition # 0 ----------------------
  Information   = "EPSON CARD-....version 1.30
  Data type     = Executable data
  Data size     = 23318 bytes
  Overwrite     = Inhibit
  Partition size = 276480 bytes
```

- "Executable data" is displayed in the "Data type =" field.
- If the program is the system program, the version number is displayed in the "Information =" field.
- "Overwrite = Inhibit" is always displayed if the program is the system program.

Unusable partition

```
Partition # 5 ----------------------
  Unavailable partition
```

- Any partition in which a defect was found when formatting, reading, or writing a sector is displayed as an "Unavailable partition" which can not be used

A disk that is not a ROM Writer disk

```
This disk is not formatted.
```

- In the case of a disk that is not a ROM Writer disk, this type of message is displayed. Use the RWFORMAT command to format the disk.

6.5   Creating a System Disk

What is a System Disk?

A system disk is a ROM Writer disk onto which the ROM Writer system program has been copied, in one of its partitions. The system program is ROMWRITE.BIN, which is included in the ROM Writer Utility Program. The ROM Writer boots up from a system disk after the power is turned on.

Although a system disk can be created by executing the RWCOPY command with the /E option specified, RWFORMAT.EXE version 1.20 and later has a system disk creation function; in this chapter, RWFORMAT will be used.

Creation Procedure

1   Prepare a floppy disk.

Prepare a 3.5-inch 2HD (1.44MB) floppy disk. The floppy disk does not have to already be formatted. Insert the floppy disk in the floppy disk drive.

2   Prepare ROMWRITE.BIN.

Perform whatever operations are necessary on the development PC so that ROMWRITE.BIN resides in the current directory.

For the purposes of this example, assume that the ROM Writer Utility Program has been installed in a directory named C:\RWUTIL\.
    C:\>cd \RWUTIL

3   Execute RWFORMAT with the "/S" option specified.

When the "/S" option is specified, RWFORMAT creates a system disk by copying ROMWRITE.BIN from the current directory to partition 0 when the formatting operation is completed.

In the following input example, the disk to be formatted is in drive A.
    C:\RWUTIL>rwformat a: /s

When the system disk has been successfully created, the message "Transferring system program ...completed" is displayed on the RWFORMAT end screen.
If a different message is displayed, it is possible that you are using an older version of RWFORMAT.EXE. Install version 1.20 or later of the ROM Writer Utility Program and then begin this procedure over.

4   End

6.6   Creating a Production Line ROM Writer Disk

What Is a Production Line ROM Writer Disk

On a production line, it is necessary to simplify the operation of the ROM Writer in order to prevent misoperation. Executing RWFORMAT with the "/SF" option specified creates a system disk that is functionally limited as follows:

- When the ROM Writer boots up, the BIOS-ROM data in partition 1 loads automatically.
- The LOAD switch on the front panel is disabled.
  (Only the PROGRAM switch is enabled.)

By storing BIOS-ROM data in partition 1 on a system disk that was functionally limited by using the "/SF" option, it becomes possible to simplify the task of repeatedly writing data to a CARD-PC (in a production line). A disk created in this manner for this special application is called a "Production Line ROM Writer Disk."
ROM Writer Utility Program Version 1.30 and later is capable of creating Production Line ROM Writer Disks.

Creation Procedure

1   Prepare a floppy disk.
This step is the same as in the system disk creation procedure.

2   Prepare ROMWRITE.BIN.
This step is the same as in the system disk creation procedure.

3   Prepare the production line BIOS-ROM file
Prepare the BIOS-ROM data file that is to be copied to the Production Line ROM Writer Disk.

4   Execute RWFORMAT with the "/SF" option specified.
When the "/SF" option is specified, RWFORMAT creates a Production Line ROM Writer Disk.

In the following input example, the disk to be created is in drive A.
> **C:\RWUTIL>rwformat a: /sf**

When the disk has been successfully created, the message "Transferring system program ...completed" is displayed on the RWFORMAT end screen.
If a different message is displayed, it is possible that you are using an older version of RWFORMAT.EXE or ROMWRITE.BIN. Install version 1.30 or later of the ROM Writer Utility Program and then begin this procedure over.

5   Copy the production line BIOS-ROM data to partition 1.
Using RWCOPY, copy the production line BIOS-ROM data file that was prepared in step 3 to partition 1. When doing so, it is best to specify the "/P" option (write protection) and to append appropriate partition information that can be used later to clearly identify what the data is.

In the following input example, the data is copied to drive A.

C:\RWUTIL>rwcopy c:\mp\mpbios0.bin a:1 /p‟MP BIOS #0, Nov/96‟

In this example, the file MPBIOS0.BIN in the C:MPdirectory is being copied, with "MP BIOS #0, Nov/96" added as partition information.

6   Confirm the contents of partitions 0 and 1.

In step 4, a functionally limited system program for use in a production line was stored in partition 0. In order to identify the system program as being intended for use in a production line, RWFORMAT automatically added the text string "(Factory)" to the partition information.

In step 5, the customer's BIOS-ROM data intended for mass production was copied to partition 1.

Use the RWDIR command to display the contents of the disk, in order to confirm the results of steps 3 and 4.

In the following input example, the contents of the disk in drive A are checked.

      C:\RWUTIL>rwdir a:

```
Partition # 0 -----------------------
 Information    = "EPSON CARD-PC ROM... version X.XX (Factory) "
 Data type      = Executable data
 Data size      = XXXXX bytes
 Overwrite      = Inhibit
 Partition size = 276480 bytes
Partition # 1 -----------------------
 Information    = "MP BIOS #0, Nov/96"
 Data type      = Data
 Data size      = XXXXXX bytes
 Overwrite      = Inhibit
 Partition size = 276480 bytes
```

- Confirm that the text string "(Factory)" has been added to the right of the ROM Writer system program version number in the "Information =" field for partition 0.
- Confirm that the Partition #1 "Data type =" field is "Data", and that the partition information that was set in step 5 is displayed in the "Information =" field.

7   Confirm operation with the ROM Writer.

Insert the newly created disk in the ROM Writer and then turn the power on. If the ROM Writer starts up and then, after a moment, only the PROGRAM LED on the front panel is flashing, it indicates that the automatic loading of the BIOS-ROM data has been executed correctly.

Next, program one CARD-PC of the target type and check the results. If a programming error occurs, the size of the BIOS-ROM data does not match the size of the BIOS-ROM in the target CARD-PC. Re-check the work that was performed in steps 3 and 5.

8   End

For extra protection, set the write-protect notch on the floppy disk to the "write-protected" state.

Remarks

If the ROM Writer is booted up from a Production Line ROM Writer Disk, the message **"Specialized for Factory Use"** is displayed in the lower left corner of the screen.

Appendix 1.   Connector Replacement

The connector in the ROM Writer card slot that connects CARD-PCs to the ROM Writer should be replaced after about 1000 CARD-PC insertions/removals. Replacement connectors (DI05312) are available separately.

The connector replacement procedure is described below. Before replacing the connector, be certain to first disconnect the AC adapter from the ROM Writer's external power supply jack.

(1)   Remove the six screws from the ROM Writer's case top. (Fig. 1)
(2)   Remove the ROM Writer's case top.
(3)   Remove the two screws that hold the CARD-PC connector in place.
         (Fig. 2)
(4)   Remove the old connector (board), and insert the replacement connector. (Fig. 3)
(5)   Secure the replacement connector with two screws.
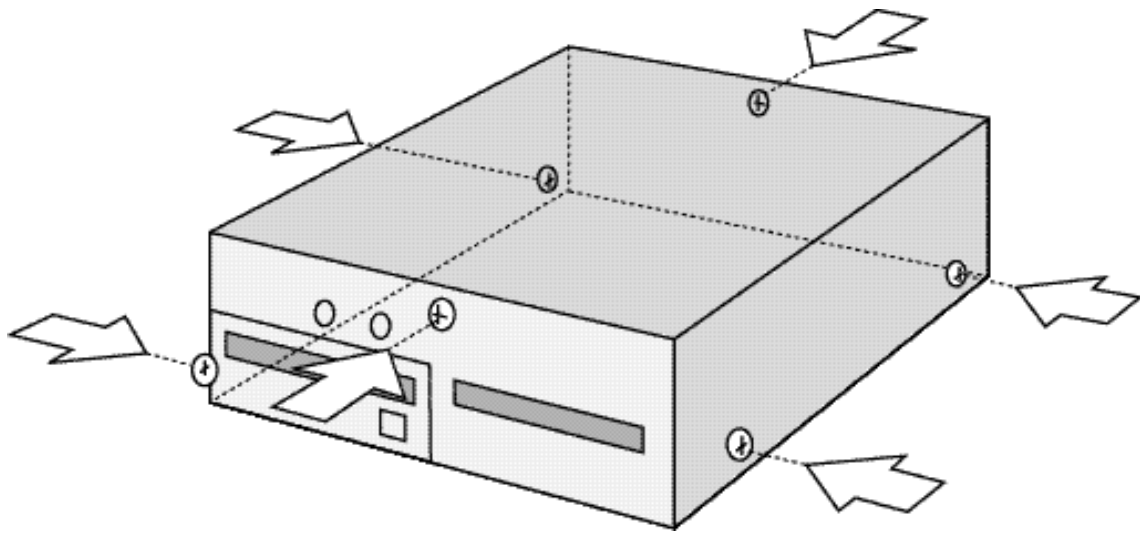(6)   Install the case top.
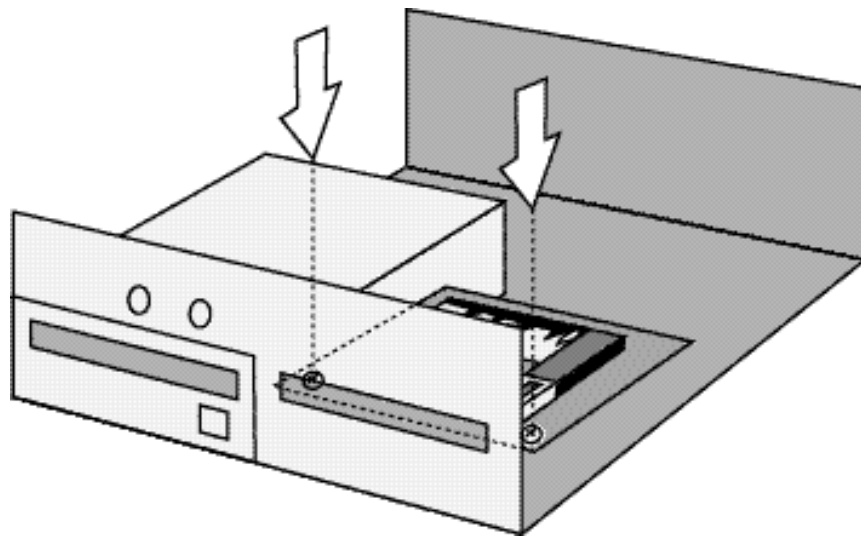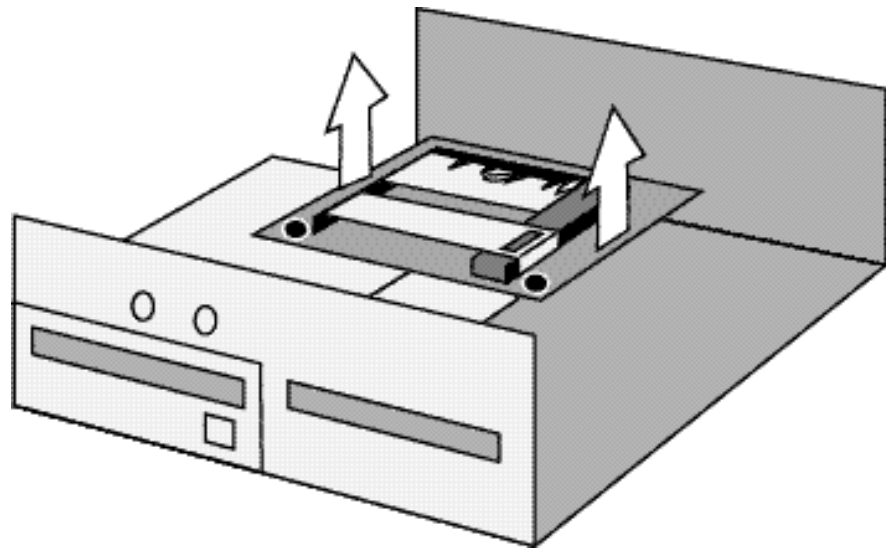(7)   Secure the case top with six screws.

Fig1.

Fig.2

Fig.3

EPSON International Sales Operations

AMERICA

EPSON ELECTRONICS AMERICA, INC.
HEADQUARTERS
1960 E. Grand Avenue
El Segundo, CA 90245, U.S.A.
Phone : +1-310-955-5300   Fax : +1-310-955-5400

SALES OFFICES
West
150 River Oaks Parkway
San Jose, CA 95134, U.S.A.
Phone : +1-408-922-0200   Fax : +1-408-922-0238

Central
101 Virginia Street, Suite 290
Crystal Lake, IL 60014, U.S.A.
Phone : +1-815-455-7630   Fax : +1-815-455-7633

Northeast
301 Edgewater Place, Suite 120
Wakefield, MA 01880, U.S.A.
Phone : +1-781-246-3600   Fax : +1-781-246-5443

Southeast
3010 Royal Blvd. South, Suite 170
Alpharetta, GA 30005, U.S.A.
Phone : +1-877-EEA-0020   Fax : +1-770-777-2637

EUROPE

EPSON EUROPE ELECTRONICS GmbH
HEADQUARTERS
Riesstrasse 15
80992 Muenchen, GERMANY
Phone : +49- (0) 89-14005-0   Fax : +49- (0) 89-14005-110

- GERMANY -
SALES OFFICE
Altstadtstrasse 176
51379 Leverkusen, GERMANY
Phone : +49- (0) 217-15045-0   Fax : +49- (0) 217-15045-10

- UNITED KINGDOM -
UK BRANCH OFFICE
2.4 Doncastle House, Doncastle Road
Bracknell, Berkshire RG12 8PE, ENGLAND
Phone : +44- (0) 1344-381700   Fax : +44- (0) 1344-381701

- FRANCE -
FRENCH BRANCH OFFICE
1 Avenue de l' Atlantique, LP 915 Les Conquerants
Z.A. de Courtaboeuf 2, F-91976 Les Ulis Cedex, FRANCE
Phone : +33- (0) 1-64862350   Fax : +33- (0) 1-64862355

ASIA

- CHINA -
EPSON (CHINA)CO.,LTD.
28F, Beijing Silver Tower 2# North RD DongSanHuan
ChaoYang District, Beijing,CHINA
Phone : 64106655   Fax : 64107320

SHANGHAI BRANCH
4F, Bldg., 27, No. 69, Gui Jing Road
Caohejing, Shanghai, CHINA
Phone : 21-6485-5552   Fax : 21-6485-0775

- HONG KONG, CHINA -
EPSON HONG KONG LTD.
20/F., Harbour Centre, 25 Harbour Road
Wanchai, HONG KONG
Phone : +852-2585-4600   Fax : +852-2827-4346
Telex : 65542 EPSCO HX

- TAIWAN, R.O.C. -
EPSON TAIWAN TECHNOLOGY & TRADING LTD.
10F, No. 287,Nanking East Road, Sec. 3
Taipei, TAIWAN, R.O.C.
Phone : 02-2717-7360   Fax : 02-2712-9164
Telex : 24444 EPSONTB

HSINCHU OFFICE
13F-3, No.295, Kuang-Fu Road, Sec. 2
HsinChu 300, TAIWAN, R.O.C.
Phone : 03-573-9900   Fax : 03-573-9169

- SINGAPORE -
EPSON SINGAPORE PTE., LTD.
No. 1 Temasek Avenue, #36-00
Millenia Tower, SINGAPORE 039192
Phone : +65-337-7911   Fax : +65-334-2716

- KOREA -
SEIKO EPSON CORPORATION
KOREA OFFICE
50F, KLI 63 Bldg., 60 Yoido-Dong
Youngdeungpo-Ku, Seoul, 150-010, KOREA
Phone : 02-784-6027   Fax : 02-767-3677

- JAPAN -

SEIKO EPSON CORPORATION
ELECTRONIC DEVICES MARKETING DIVISION

Electronic Device Marketing Department
Card Products & Marketing Group
421-8, Hino, Hino-shi, Tokyo 191-8501, JAPAN
Phone: +81-(0)42-587-7503   Fax: +81-(0)42-587-8423

ED International Marketing Department I
(Europe & U.S.A.)
421-8, Hino, Hino-shi, Tokyo 191-8501, JAPAN
Phone: +81-(0)42-587-5812   Fax: +81-(0)42-587-5564

ED International Marketing Department II (Asia)
421-8, Hino, Hino-shi, Tokyo 191-8501, JAPAN
Phone: +81-(0)42-587-5814   Fax: +81-(0)42-587-5110

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CARD-PC
ROM Writer Manual

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