

EXHIBIT 5

PRODUCT USER MANUAL

COMPACT DISC REWRITABLE DRIVE

MP7040A

SPECIFICATIONS

(Preliminary)

RICOH Company, Ltd.

Jun 26, 1998

NOTICE

This equipment has been tested and found to comply with the limits for a Class B digital device , pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates , uses and can radiate radio frequency energy and , if not installed and used in accordance with the instructions , may cause harmful interference to radio communication.

However , there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception , which can be determined by turning the equipment off and on , the user is encouraged to try to correct the interference by one or more of the following measures :

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio / TV technician for help.

FCC WARNING

Changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

- a) Pay careful attention not to let the invisible laser beam emitted from the optical pickup enter into your eyes.
- b) When you find a troubled state of the component in the optical pickup containing the laser diode , change to the specified new optical pickup. Do not open the optical pickup housings.

Akustischer Geräuschpegel

Dieser Drucker überschreitet einen Geräuschpegel von 70 dB (A) während dem Betrieb nicht.



Declaration of Conformity

"The Product complies with the requirements of the EMC Directive 89/336/EEC and the **Low Voltage Directive 73/23/EEC.**"

Revision History

No.	Revised Data	Revision	Contents	Description	Page
1	Jun 26, 1998	Preliminary			

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I. OUTLINE

1. Overview

The Multimedia Printer Series Drive (the CD-R/RW Drive) can do much more than read and write the usual CD-R discs. When you load it with a rewritable CD-RW disc, you can record, read, and edit any kind of data, because these discs allow you to rewrite information that has already been recorded.

2. Features

- 1) Running OPC*1 gives a flatter writing signal that improves reliability.
- 2) An improved anti-heat design means that no cooling fan is needed.
- 3) Easy-to-use tray model.
- 4) Uses the world standard E-IDE (ATAPI) interface.
- 5) Can read not only CD-R and CD-RW discs, but also video CDs, music CDs, and photo CDs.
- 6) Can read data at 20x speed (3.00MB/sec. Data transfer rate) and write data at 4x speed (600KB/sec. Data transfer rate).
- 7) The recorded CD-RW media can be played in a DVD player or multimedia CD-ROM player, maintaining future compatibility.
- 8) Supports packet write for easy writing to CD-R and CD-RW discs.

*1 Continuously monitors the signal level during recording and adjusts the laser power to compensate when the disc is dirty, insuring a flat signal.

II. CONSTRUCTION AND INSTALLATION

1. Basic Construction

The Compact Disc Recorder / Rewriter Drive: MP7040A consists of following parts. The Compact Disc Recorder / Rewriter Drive's configuration, Function Block Diagram and Connector are shown below;

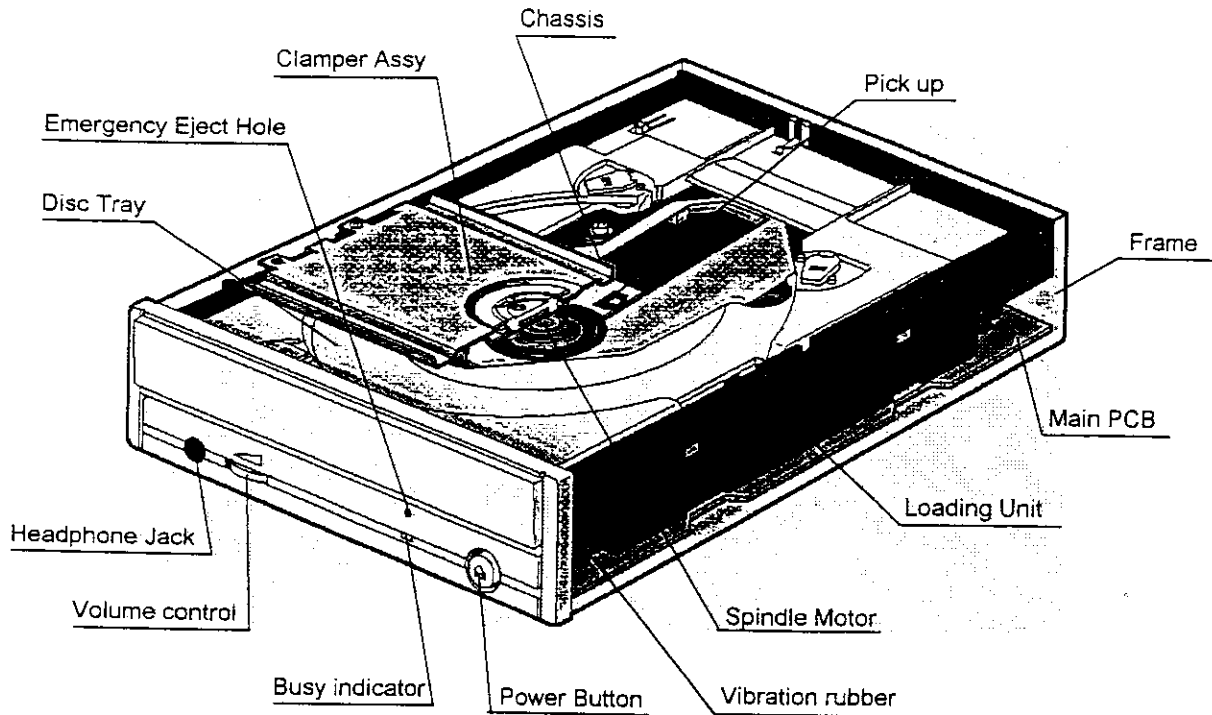


Fig. II - 1 Compact Disc Rewritable Drive configuration

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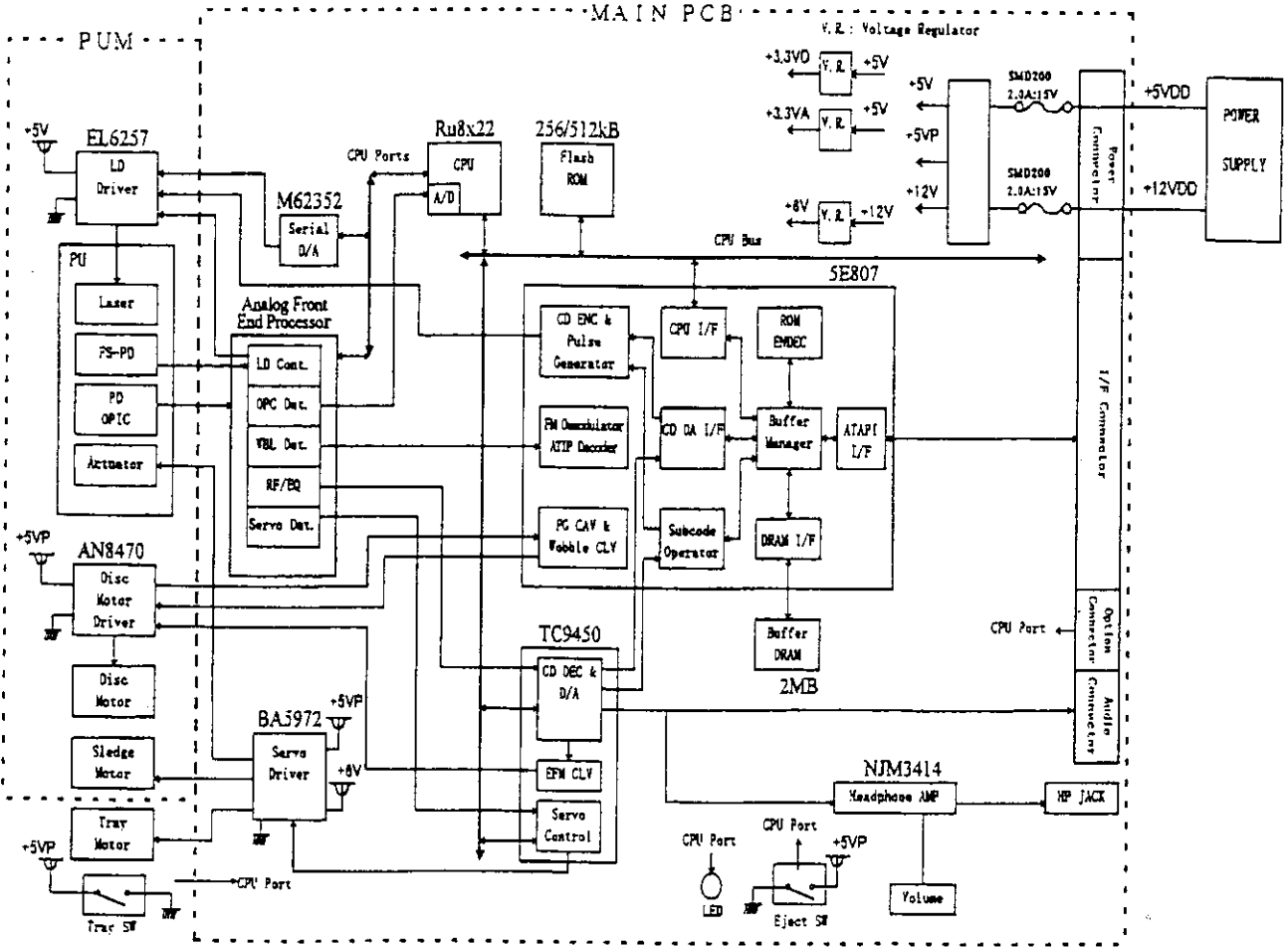


Fig. II - 2 Function Block Diagram

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2. Connector

The Connectors are located as shown below. The function of each parts are also described below.

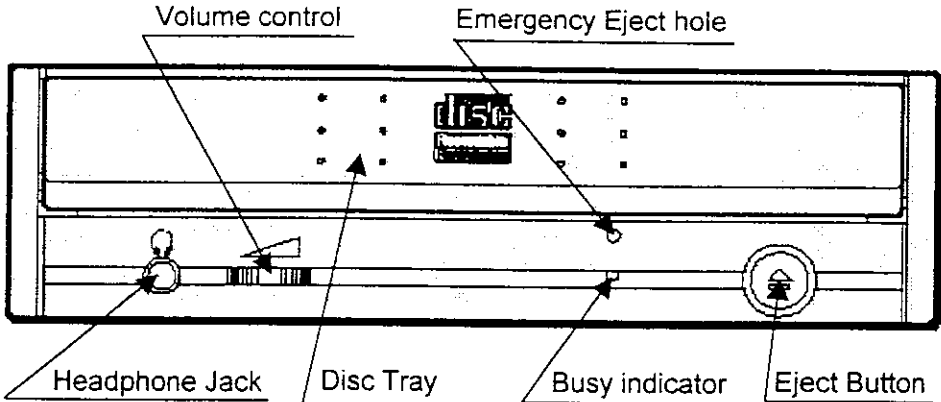


Fig. II - 3 Front

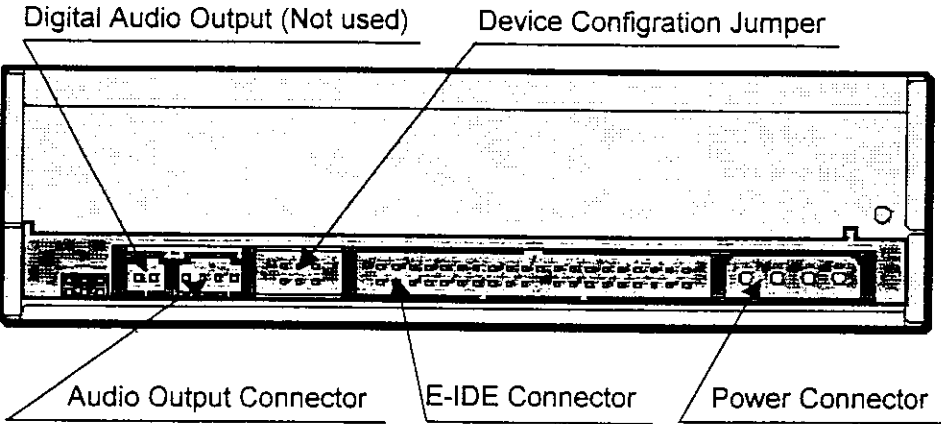


Fig. II - 4 Back

2.1. Disc Tray

This is the tray for the disc. Place the disc on the ejected disc tray, then lightly push the tray (or push the eject button) and the CD will be loaded.

! • Don't use force to pull out or push in the disc tray. This might cause damage to the loading section of the drive.

2.2. Eject Button

This is the button used to eject or bring in the disc tray.

2.3. Busy indicator

When the disc tray or disc is being accessed, the light shines or flashes orange. Even when a disc is loaded or a disc is not being accessed, the light goes out. When an illegal disc is loaded or some hardware trouble occurs, the indicator blinks.

2.4. Headphone Jack

This jack is for connecting headphones or mini-speakers.

2.5. Volume control

This is used to adjust the output volume of the headphone jack. It can't be used to adjust the output volume for the audio output connectors on the rear panel.

2.6. Emergency Eject hole

When the drive can not eject the Disc Tray because of power failure, pushing the Emergency Eject hole of the Front Panel by the thin pole makes the drive be able to eject the Disc Tray.

! • This function is only for emergency case. Do not use this function in usual case to prevent from mechanical damage.

2.7. Power Connector

Used to connect to the host computer's power supply (DC 5V / 12V)

! • Be careful not to reverse the power connector when attaching it. A reversed connection may cause damage to the equipment (not covered by the warranty).

2.8. E-IDE Connector

Use a 40 pin double-end flat E-IDE cable to connect to the E-IDE interface.

! • Connecting or disconnecting connectors while power is on may result in a short circuit, causing damage to the equipment. When connecting or disconnecting connectors, make sure to turn off the power beforehand.

2.9. Audio Output Connector

Used to connect to the sound card. (Analog signal.)

2.10. Digital Audio Output (Not used)

Used to connect to the sound card. (Digital signal.) It is not used with this drive.

2.11. Device Configuration Jumper

Used when selecting the Device Configuration of E-IDE. Don't use jumpers to change anything besides the Device Configuration, but keep the drive as initially set ("Master" position). Configuration changes become valid after power is turned off, then on again.

! • Installing jumper pins besides the ones for Device Configuration settings may be the cause of damage or abnormal drive operation.

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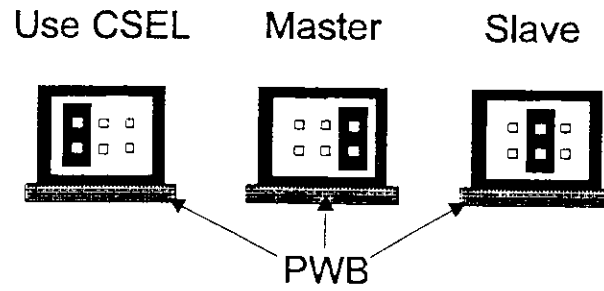


Fig. II-5 Device Configuration Jumper

The Device Configuration Jumper will be set to Master as factory setting.

III. SPECIFICATIONS

1. Functionality

1.1. Recording

Data should be recorded on the optical disc in response to host computer command.

- 1) Drive receives necessary information such as logical block address, number of block and data to be recorded from the host computer.
- 2) Recording to pre-recorded area can not be executed. (CD-R disc)
- 3) Overwriting to pre-recorded area can be executed. (CD-RW disc)

1.2. Reading

Data on optical disc should be read in response to the host computer command. Audio playing (CD-DA) can be executed when receiving the Audio playing command from the host computer.

1.3. Load / Eject of Disc

1) Load

Place the disc on the disc tray. Load the disc by pushing the eject button or by lightly pushing in disc tray.

2) Eject

Operator can eject the Disc Tray (Disc) by pushing this button.

1.4. Spindle Motor Start / Stop

The controller of the drive senses the disc to be set on the turn-table connected with the spindle motor and then starts to rotate the spindle motor, in response to the host computer command

1.5. Seek Motor

The controller of the drive starts to move the optical pick up carriage, in response to the host computer command.

1.7. Eject Button

Operator can eject the Disc Tray (Disc) by pushing this button.

1.8. Busy indicator

When the disc tray or disc is being accessed, the light shines or flashes orange. Even when a disc is loaded or a disc is not being accessed, the light go out. When a illegal disc is loaded or some hardware trouble occurs, the indicator blinks.

MP7040A SPECIFICATIONS

2. Basic Specification

Type : Tray Type

Rotation Speed : Write 1x, 2x, 4x
Read 1x,Max.20x

Supported Function (Write / Read / Play)

	Write	Read	Play*1
CD-DA	✓	✓	✓
CD-ROM	✓	✓	
CD-Extra	✓	✓	✓
CD-ROM XA	✓	✓	✓
Photo CD *2	✓	✓	
CD-I *2	✓	✓	
CD-ROM + CD-DA	✓	✓	✓
Video-CD	✓	✓	✓

*1): Play means Audio play back. Read means Data Transfer.

*2): CD-I, Photo-CD requires special reader/player. Photo-CD writing requires Kodak license.

Writing Mode : Track at Onse
Disk at Onse
Multisession
Packet Write

Read Error Rate : 10^{-12} Bits or less

Write Error Rate : 10^{-10} Bits or less

Recording Capacity :
CD-R disc 650 / 550MByte (Type 74 / Type 63)
CD-RW disc 650MByte (Type 74)

Controller :
Host I/F ATAPI (E-IDE)
Data Transfer speed Max.16.7 MBytes/sec.(PIO4, DMA2)

Buffer Memory : 2 Mbytes

3. Audio Specification

Audio output :

Line Output Level	0.57 V±0.1 V rms
Headphone Output Level	0.78 V±0.1 V rms

4. Performance Specification

Rotation Speed :	Write	1x, 2x, 4x
	Read	1x, 2x, 4x, 6x, 20x
Write/Read Speed (Ave.):	20x :	3.00 MB/sec. (Mode1, Mode2 Form1)**1
	20x :	3.40 MB/sec. (Mode2, Form2) **1
	6x :	900 KB/sec. (Mode1, Mode2 Form1) **1
	6x :	1,02 KB/sec. (Mode2, Form2) **1
	4x :	600 KB/sec. (Mode1, Mode2 Form1)
	4x :	681 KB/sec. (Mode2, Form2)
	2x :	300 KB/sec. (Mode1, Mode2 Form1)
	2x :	342 KB/sec. (Mode2, Form2)
	1x :	150 KB/sec. (Mode1, Mode2 Form1)
	1x :	171 KB/sec. (Mode2, From2)
	1x :	172 KB/sec. (CD-DA)

*1 Reading Only

Access Time :	120msec. or less
Power Consumption :	12 W or less (Normal Operation) 6 W or less (Stand by)
Acoustic Noise :	
Idle	40 dB or less (Sound Power Level)
Operating	55 dB or less (Sound Power Level)
Non-Operating	49 dB or less (Sound Pressure Level)

5. Condition for use and Safety standard

5.1. Power Supply :

5V Power Supply :	
Voltage	DC5V±5%
Ripple	50mVp-p or less
Current	2.5A (Typ.), 3.0A or less (peak)
12V Power Supply :	
Voltage	DC12V±10%
Ripple	100mVp-p or less
Current	0.7A (Typ.), 1.5A or less (peak)

5.2. Environment Conditions

Temperature :	
Operating	5~40 °C(Without Fan)
Non-Operating	-30~65 °C(Power OFF, Without disc)
Humidity :	
Operating	5~90 %(No Condensation)
Non-Operating	5~95 %(No Condensation)(Power OFF, Without disc)
Temperature Gradient :	20 °C/hour(Max.)
Humidity Gradient :	10 %/hour(Max.)
Wet-Bulb Gradient :	30 °C(Max.)
Vibration :	
Operating	0.035mm p-p (10~45 Hz) 0.025mm p-p (45~65 Hz) 0.2 x 9.8 m/s ² (0.2 G) (65~150 Hz)
Non-Operating	1 x 9.8 m/s ² (1.0 G) (5~300 Hz) (Power OFF, Without disc)
Shock :	
Operating	2 x 9.8 m/s ² (2.0 G) or less (6msec. Half Sine)
Non-Operating	40 x 9.8 m/s ² (40 G) or less (11msec. Half Sine) (Power OFF, Without disc)
Altitude :	
Operating	-305~3,048 m
Magnetic Condition :	4,000 A/m (50 Oe) or less
Dust :	Class 3,000,000 or less (Typ.)
Illuminance :	3,000 Lux or less

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Installation Conditions :

Mounting direction
Installation Angle

Horizontal / Vertical (Eject Button must be upside.)
15° or less

Compatibility :

Because Compact Disc do not perform error correction and defect alternation at writing, written data may have error. We recommend to verify the written disc if you are writing important data.

6. Reliability and Usable Life

MTBF :	100000 hours
MTTR :	30 min.
Equipment Life :	5 Years
MSBF :	20,000 times or more (Drive)
Error Rate :	
Unrecoverable Errors	Once per 10^{12} bits or less

7. Safety Standards

Application Standard :	UL, cUL, TÜV, CE, CDRH
Radio Interference :	Vcci-II, FCC-ClassB, EN55022-ClassB

8. Storage Conditions

8.1. Storage Conditions

Temperature :	-30~65 °C (Max.)
Humidity :	5~95 % (No Condensation)
Temperature Gradient :	20 °C/Hour (Max.)
Humidity Gradient :	10 %/Hour (Max.)
Wet-Bulb Gradient :	30°C (No Condensation)
Vibration :	1.0 x 9.8 m/s ² (1.0 G) or less (5~300 Hz)
Shock :	40 x 9.8 m/s ² (40.0 G) or less (11 msec. Halfsine)
Drop :	60.0 cm (JIS Z0202)
Altitude :	-305~15,240 m
Illuminance :	3,000 Lux or less
Preservation term :	1 year or less

8.2. Transportation Condition

Container :	Cardboard Packing Case
Means of Transportation :	Mixed loading possible
Stacking Layers :	6 or less
Attached Articles :	Caution

9. Emergency Eject

This unit is equipped with a mechanism for manually ejecting the Disc Tray in an emergency, such as when the loading mechanism has failed or power has been lost. To eject the Disc Tray manually, perform the following procedure.

! • Don't use this feature except in an emergency. This feature is a last measure to be used only in an emergency. Using it excessively will cause malfunction.

- ① Turn the system power to OFF.
- ② Push a pin* straight into the emergency eject hole located to the right of the eject button to eject the Disc Tray.

*Diameter:
1.5 to 1.9 mm
Length:
80 to 100 mm

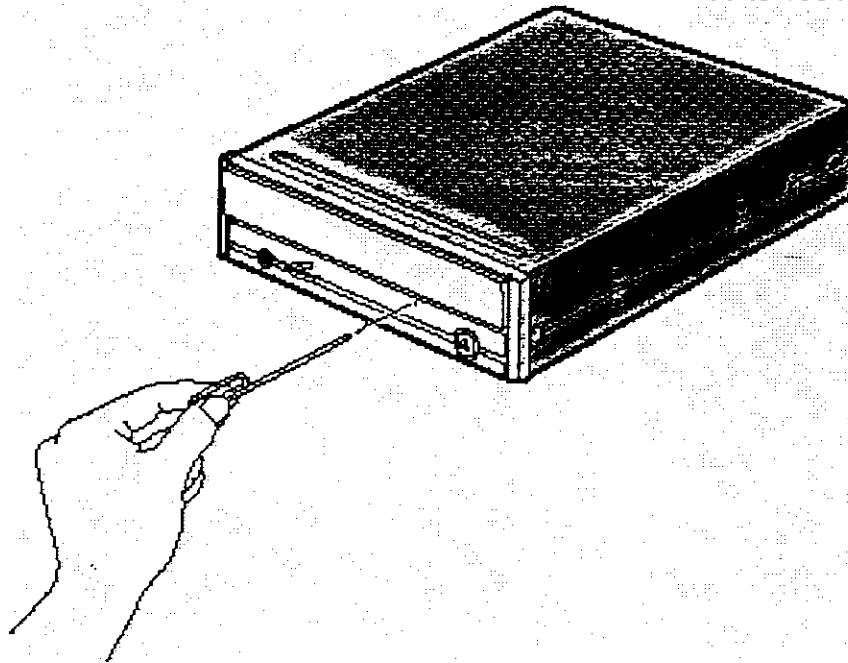


Fig. III-1 Emergency Eject

10. Disc

Dimensions :

Outside Diameter	$\phi 120 \pm 0.3 \text{ mm}$
Inside Diameter	$\phi 15 +0.1/-0.0 \text{ mm}$
Thickness	$1.2 +0.3/-0.1 \text{ mm}$

Recording area (User area) : $\phi 50 \sim 116 \text{ mm}$

Recording capacity :

Media Type	Type63	Type74
CD-R	550 MB	650 MB
CD-RW	-----	650 MB

Track pitch : $1.6 \pm 0.1 \mu\text{m}$

Recording material :

CD-R	Organic pigment (phthalocyanine) / Au lamination (Organic protective layer attached)
CD-RW	Ag-In-Sb-Te phase change recording material

Substrate material : PC (Polycarbonate)

Reflectance :

CD-R	65 % or more
CD-RW	15~20%

Eccentricity : $70 \mu\text{m}$ or less

Maximum camber angle : 0.4° or less

Recommend recording power :

CD-R	6~7mW (at $\lambda = 785\text{nm}$, NA=0.5)
CD-RW	8~14mW (at $\lambda = 785\text{nm}$, NA=0.5)

Playback power : 1mW or less

Playback stability :

CD-R	10^6 times or more (0.7mW)
CD-RW	10^6 times or more (1.0mW)

Storage life :

CD-R	10 years or more (5~25°C, 5~60%RH, Avoiding direct sunlight)
CD-RW	30years or more (5~25°C, 5~60%RH)

Environment for use :

CD-R	-5~55 °C , 5~95 %RH
CD-RW	10~40°C , 10~80 %RH

IV. INSTALLATION

1. Cautions During Installation



• Dismantling the drive to attempt repairs or for other reasons is dangerous because the laser may radiate outside the unit. Do not disassemble the drive.



- Install the drive in accordance with the specifications. Be careful to avoid locations likely to cause vibration or shock.
- Avoid locations where there is high humidity, much dust, or poor ventilation.
- Avoid locations in direct sunlight, with severe changes in humidity, or places where there are extremely high or low temperatures.
- Don't use the drive near radio or television receivers. It may interfere with their reception.

2. Cautions During Use



- Don't suddenly move the drive from a cold place to a warm one, or suddenly raise the room temperature. Condensation may occur, causing abnormal operation.
- Make sure to remove the disc before moving the drive. The disc may be damaged, causing data loss.
- Be careful to prevent foreign objects such as liquids or metal from entering the drive. Should by chance a foreign object enter the drive, please consult the dealer where the drive was purchased.
- Don't use benzene or thinner to clean dirt from the drive. Don't allow chemicals such as insecticides to contact the drive. Use a soft cloth to wipe the drive, or moisten a cloth with neutral detergent diluted with water and use it to clean particularly dirty areas.
- Don't cutoff the electric power while the drive is operating.
- When connecting the E-IDE cable, observe the following points.
- Keep the total length of the E-IDE cable within 18 inch (457.2mm).
- When connecting the E-IDE cable to the drive, make sure the power is OFF.
- Never insert a damaged disc into the drive.
- In wintertime, don't use a disc soon after bringing in from outdoors. Use it only after it has reached room temperature.

3. Cautions Concerning Disc Cleaning

- Remove the disc by pressing the eject button.
- Use compressed air to clear dust from the drive. (Spray the compressed air for about 5 seconds). (See Fig. I-1)
- Check to see if there is dirt on the surface of the disc. Be careful not to touch the disc with the fingers when doing this. (See Fig. I-2)
- After cleaning the disc with compressed air, place it on the disc tray and load in the drive.

* We suggest using Perfect Duster II (80z.) as compressed air for cleaning.

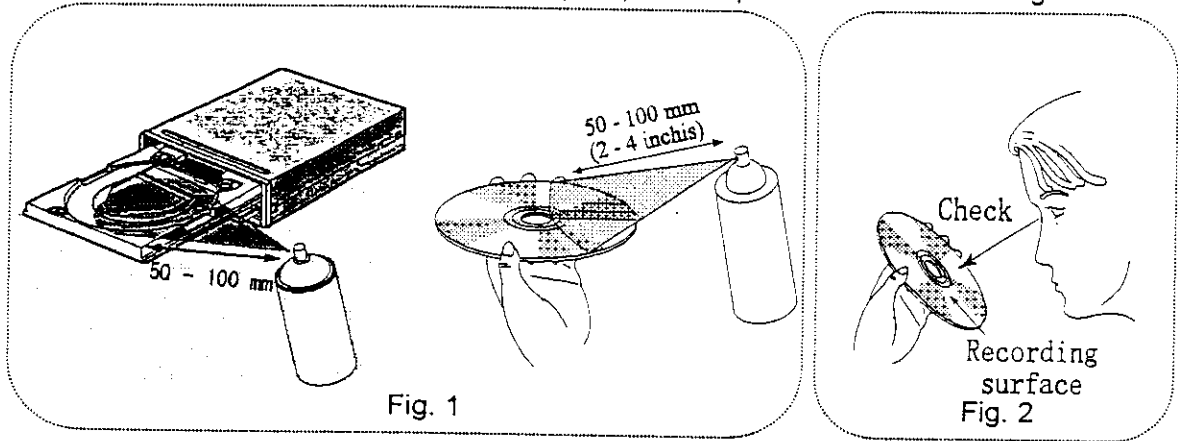


Fig. IV-1 Cautions Concerning Disc Cleaning

4. Other Cautions



- When moving the equipment, make sure that the disc has been removed from the drive.
- When not using the drive for a long period, dust may adhere to the disc tray. Before using the drive again, use dry air cleaner to remove the dust from the tray.



- When connecting connectors, make sure that the power is OFF. If the power is ON, there is a possibility of short circuit.

5. How to Use the Discs



- When using CD-ROM discs, CD-R discs or CD-RW discs, don't attach any stickers or labels to the discs. Using discs with them attached not only causes read and write errors, but data on the disc may be lost due to damage to the disc itself.

Load the disc

① Press the eject button.

② Place the disc on the disc tray.



- When using a 120 mm CD, place it in the large round depression. When using 80 mm CD, place it in the small round depression. The face with the label on it should be up. Never place both discs in the tray at the same time.

- Be careful not to touch the recording surface of the disc.

③ Load the disc by pressing the eject button or by lightly pushing in the disc tray.

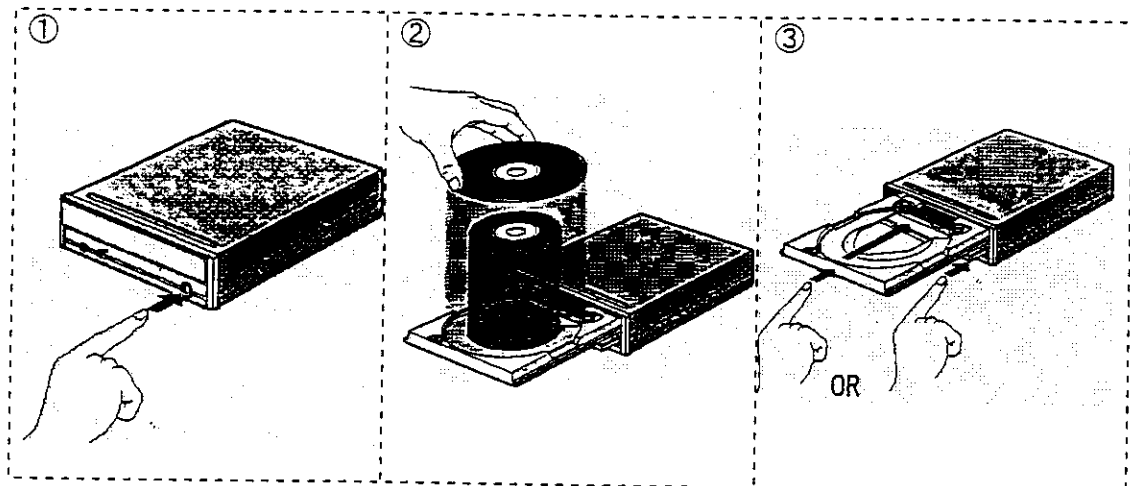


Fig. IV - 2 Load the disc

Disc ejection

① Press the eject button.

② Slowly take the disc out of the disc tray.

③ Press the eject button or push the disc tray and the tray will be brought back into the drive.



- After ejecting the disc, return the tray inside the unit quickly. When the tray is in the ejected position, dust and other debris will enter, possibly causing read errors, write errors, or drive failure.

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