

**SONY.**

3-753-362-13 (1)

# **CD-ROM Drive Unit**

CDU535 Series

Operating Instructions

# OWNER'S RECORD

The model name and serial numbers are located on the left side. Record these numbers in the space provided below and refer to them whenever you call upon your sales representative regarding this product.

Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

## CAUTION

As the laser beam used in this CDU535 is harmful to the eyes, do not attempt to disassemble the cabinet. Refer servicing to qualified personnel only.

This unit uses CD-ROM discs with the following mark.



When you use this unit as a CD player, use compact discs with the following mark.



CLASS 1  
LASER PRODUCT  
-----  
LASER KLASSE 1

This CD-ROM drive is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT label is located on the bottom.

## INFORMATION

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause 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 the receiving antenna
- Relocate the equipment with respect to the receiver
- Move the equipment away from the receiver
- Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

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# Introduction

CDU535 is a drive unit for CD-ROM (Compact Disc Read-Only Memory) discs, which store as much as 540 Mbytes of digital data.

The drive unit has the following features:

- 5¼ inch half-height drive form factor.
- Capable of audio CD playback provided with audio line output and headphones jack.
- Fast access time assures high-speed reading operations.
- CD Caddy for disc protection.
- Manual loading and power eject.
- Automatic locking of the optical pickup when the caddy is ejected. This insures safety during transport.
- Emergency eject function which allows the caddy to be ejected manually.
- Can be used in either a horizontal or vertical position.
- Capable of real time layered error correction.
- The objective lens of the optical pickup is cleaned automatically every time the caddy is loaded and ejected.
- Selectable audio channel by software (stereo, monaural, reverse and so on).
- Can be used with the CD-ROM XA discs and the CD-I discs.

## Software requirement:

To read data from discs, install the appropriate application software.

To read data from CD-ROM discs with the High Sierra Group (HSG) or ISO-9660 logical format standard for CD-ROM, you can use Sony OPA-332 series MS-DOS CD-ROM Extensions. This software extends MS-DOS\* and is designed for use on IBM PCs, PC/XTs, and PC/ATs\*\*.

## System components:

- Computer (IBM-PC, PC/AT, PC/XT, HP Vectra\*\*\* or equivalent)
- CD-ROM drive unit CDU535
- Host adapter (CDB-240 series Sony Bus Interface Cards are recommended.)
- Floppy disk drive
- Connecting cable (Sony Bus Cable RK-B70F or RK-B20F is recommended.)

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\* MS-DOS is registered trademark of Microsoft Corporation.

\*\* IBM PC, PC/XT, and PC/AT are registered trademarks of International Business Machines Corporation.

\*\*\* HP Vectra is registered trademark of Hewlett-Packard Company.

# Precautions

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## Installation

- Avoid placing the drive in a location subject to:
  - high humidity
  - high temperature
  - excessive dust
  - mechanical vibration
  - direct sunlight
- CDU535 can be used in either a horizontal or vertical position.

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## Operation

- Do not move the drive during operation. This may cause it to malfunction during reading.
- Avoid exposing the drive to sudden changes in temperature as condensation may form inside the unit as a result. Should the surrounding temperature suddenly rise while the drive is on, wait at least one hour before you turn off the power. If you operate the unit right after a sudden increase in temperature, it may malfunction during reading.

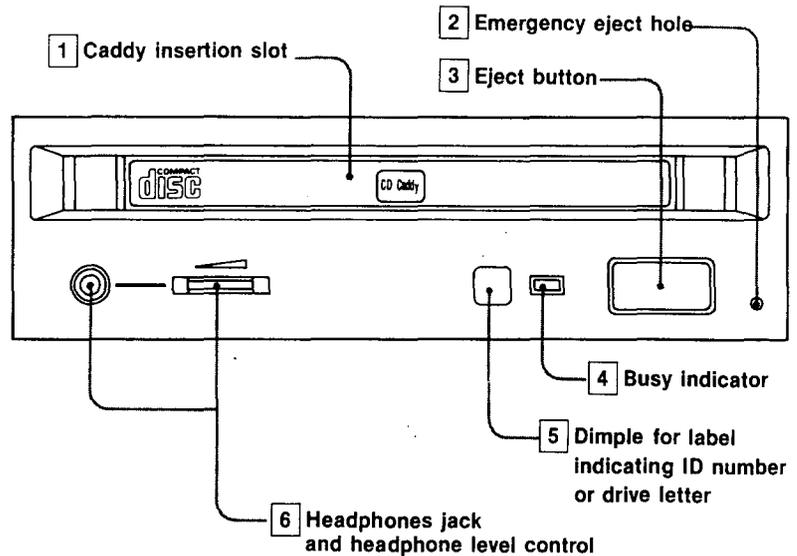
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## Transportation

- Keep the original packing materials for future transportation of the drive.
- Remove the caddy before moving the drive and, if you take the drive out of the computer, repack the drive as you received it.

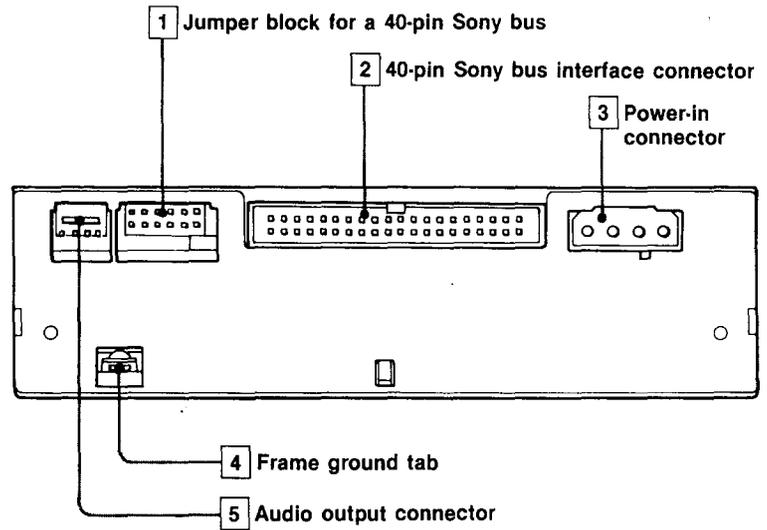
# Location and Function of Parts and Controls

## Front panel



- 1 Caddy insertion slot**  
Accepts a caddy loaded with a CD-ROM disc.
- 2 Emergency eject hole**  
Insert a rod here to eject a caddy manually.
- 3 Eject button**  
Ejects the caddy from the drive unit.
- 4 Busy indicator**  
Lights while data is read from the disc; blinks during seek operations.
- 5 Dimple for label indicating ID number or drive letter**  
Place the supplied drive number label here.
- 6 Headphones jack and headphone level control**  
Connect headphones to the headphones jack and adjust the volume with this headphone level control.

## Rear panel



**1 Jumper block for a 40-pin Sony bus**

Specify assignment of the Sony bus.

**2 40-pin Sony bus interface connector**

Connects the CDU535 to the host adapter using a connecting cable. (Sony Bus Cable RK-B70F or RK-B20F is recommended.)

**3 Power-in connector**

Connects the CDU535 to the power supply within the computer.

**4 Frame ground tab**

Grounds the CDU535 to the host computer when the drive frame itself is not in direct contact with the computer.

**5 Audio output connector**

Refer to page 19 for details.

# Installing the Drive Unit into the Computer

As you go through this section, you may wish to refer to your computer's manual for a more detailed description of how to install internal drives.

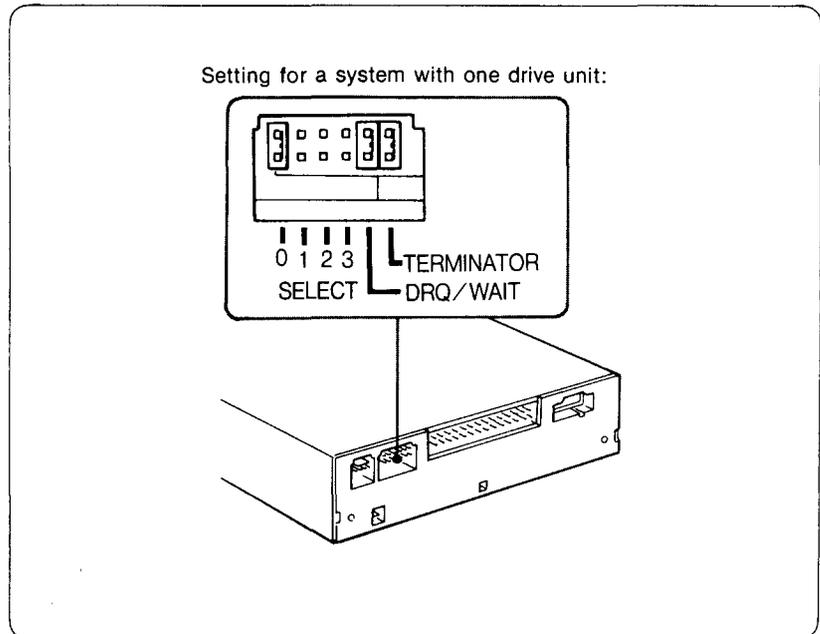
## Getting Started

- Gather the necessary parts and tools that have not been supplied:
  - a flat-blade screwdriver
  - four screws 3 mm in diameter that will extend into the drive no more than 3.5 mm from the outside.
  - two mounting rails if your computer has mounting tracks
- Unplug the computer and disconnect the cables attached to the back to give yourself more room to work. **Do not turn on the power of the computer before completing the entire installation process.**

## Setting the Jumpers

Set the jumpers on the rear panel of the drive unit to correspond to the configuration of your computer system.

The jumpers are pre-set as illustrated at the factory.



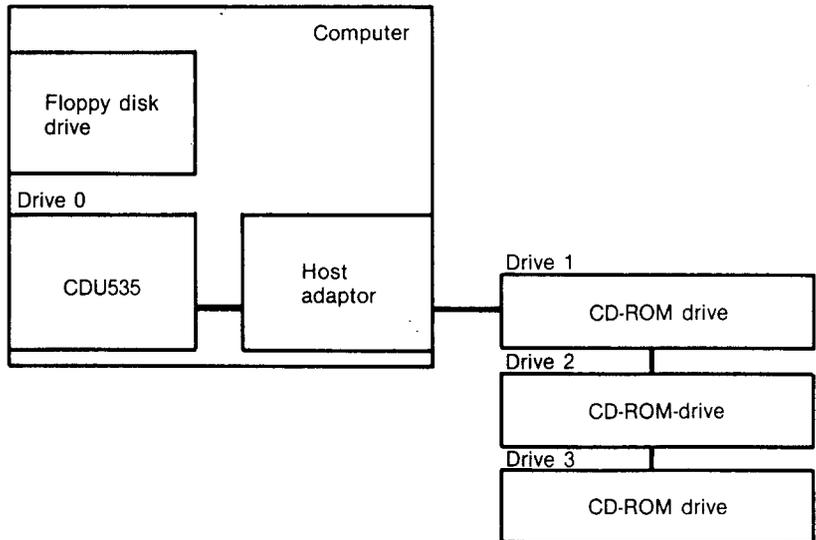
Remove the jumper to set to OFF, and install it to set to ON.  
The recommended jumpers is AMP\* shunts (14270-1), JAE\*\* short socket (PS-2SH4-1) or equivalent.

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## SELECT

There are four jumpers, each of which corresponds to a potential drive unit position.

Install the jumper whose number is that of the drive's position in your system.



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\* AMP is a registered trademark of AMP, Inc.

\*\* JAE is registered trademark of Japan Aviation Electronics Industry, Ltd.

It is important that only one jumper be set to ON per drive. If you plan to use more than one CD-ROM drive, not more than one drive should have the same number jumper ON.

Drive number	Jumper settings			
	SELECT-0	SELECT-1	SELECT-2	SELECT-3
0	ON	OFF	OFF	OFF
1	OFF	ON	OFF	OFF
2	OFF	OFF	ON	OFF
3	OFF	OFF	OFF	ON

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## DRQ/WAIT

Set to ON (DRQ) unless otherwise instructed by the manual of your application software which works with WAIT mode.

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## TERMINATOR

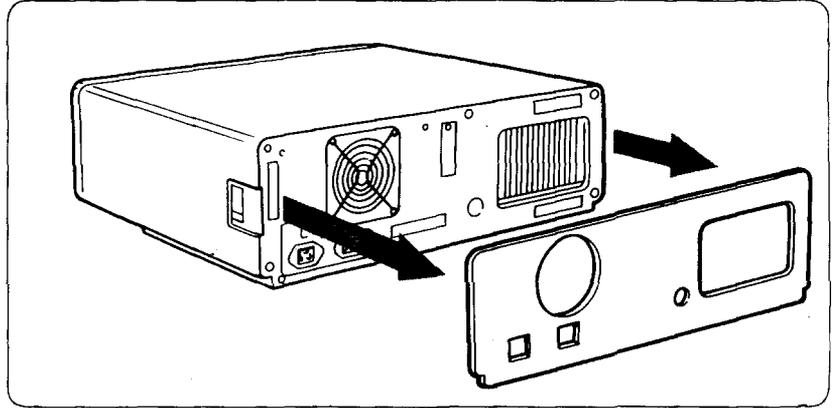
Set to ON, when you install one drive in your system.

When you install more than one internal drive in a daisy-chain, set to ON for the last drive and to OFF for the other drives.

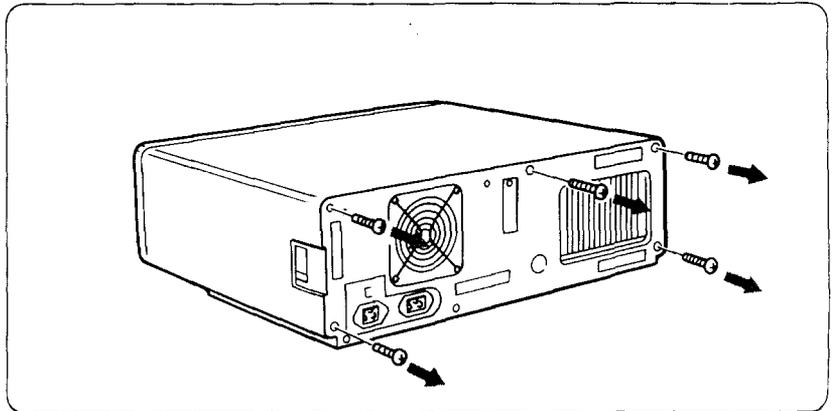
When you connect external drives in a daisy-chain, set to ON for the first and last drives in the chain, to OFF for any drives in between, and remove the terminator resistors from the host adapter. For instructions on how to remove the resistors, refer to the users' manual of the host adapter.

## Opening the Computer

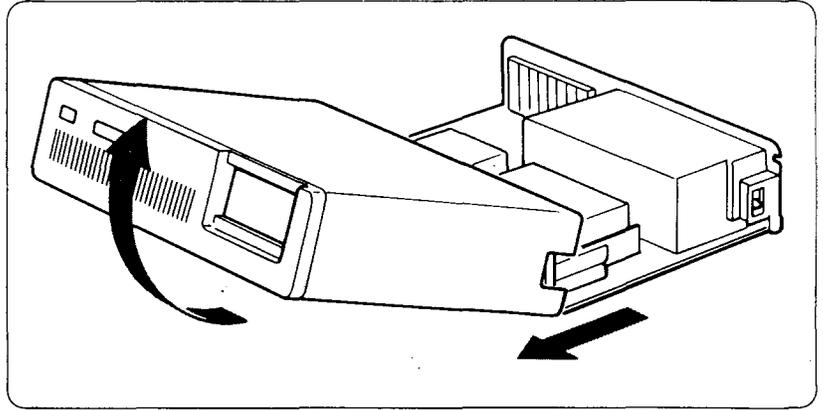
- 1 Your computer may have its rear side covered by a plastic panel attached with plastic fastener strips. Pull the panel off.



- 2 Remove the cover mounting screws.

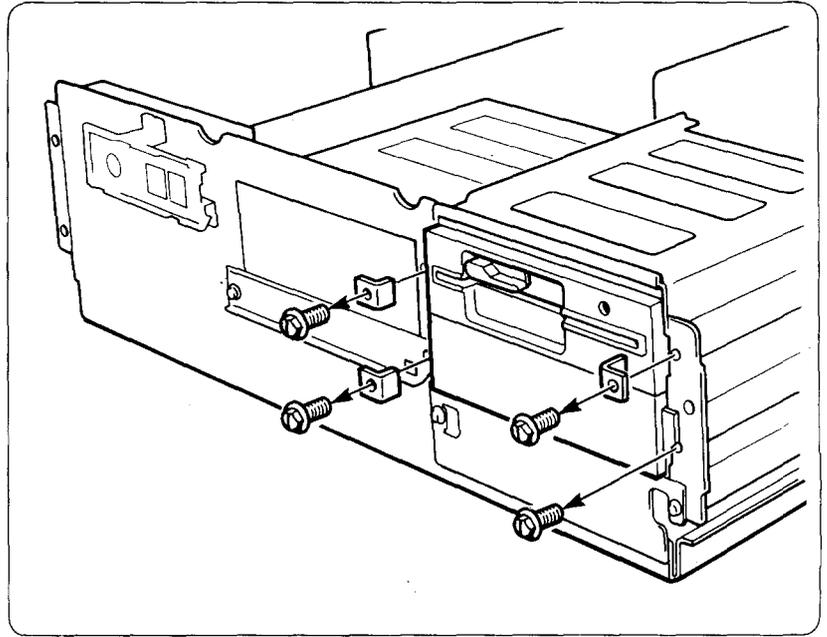


**3** Remove the cover of the computer.

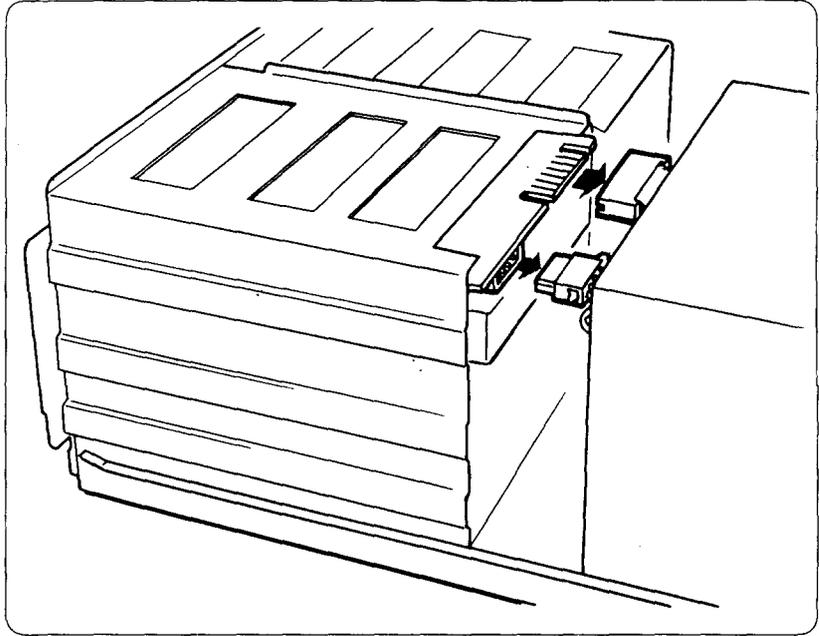


## Preparing a Space for the Drive

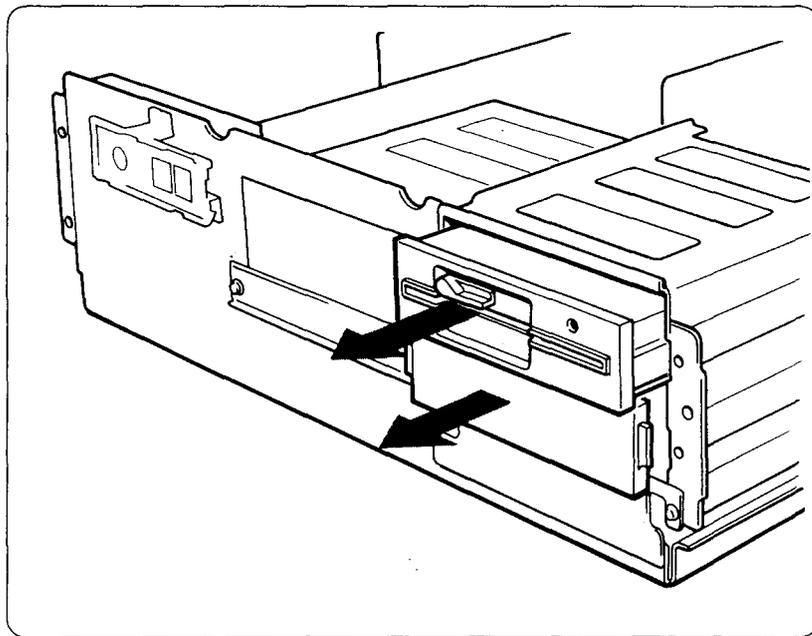
- 1 Remove the screws and brackets from both sides of the drive spaces.



**2** Disconnect the floppy disk drive.

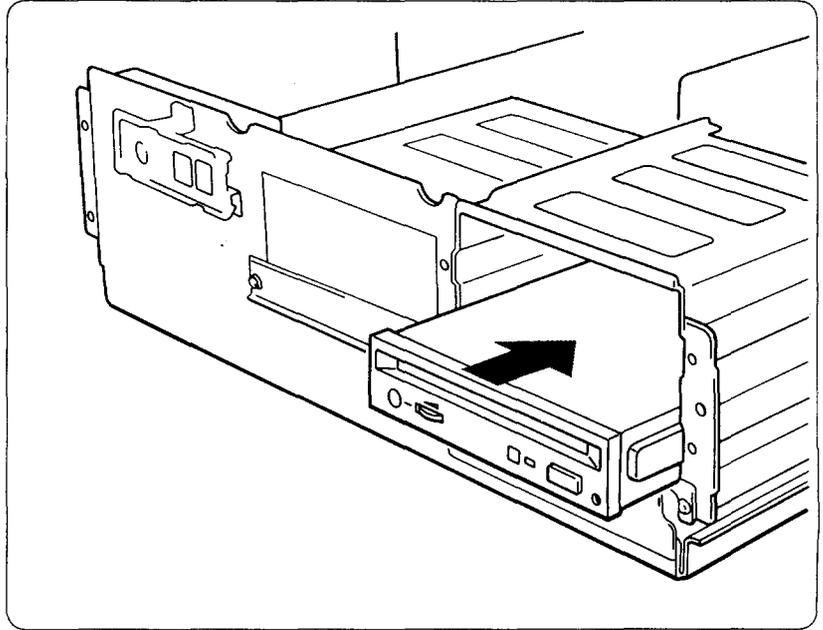


**3** Remove the floppy disk drive and clear the bottom space.



## Mounting the Drive

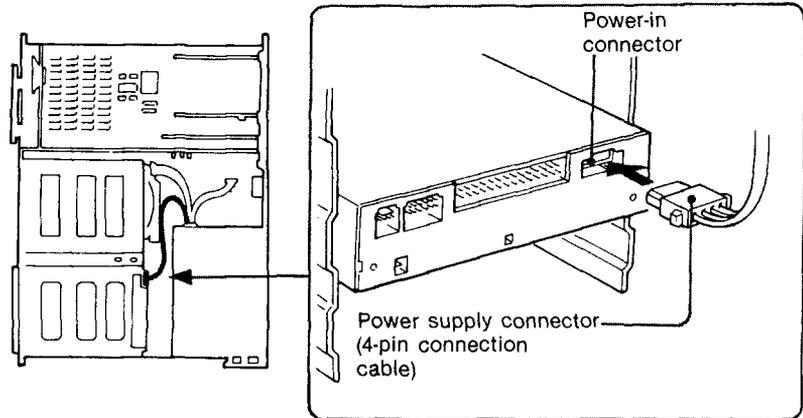
If mounting rails are necessary, attach them to the CDU535 in the same way as the ones on your floppy disk drive and slide the CD-ROM drive into the bottom half-height space. Otherwise, screw the CDU535 in place.



## Connecting the Drive

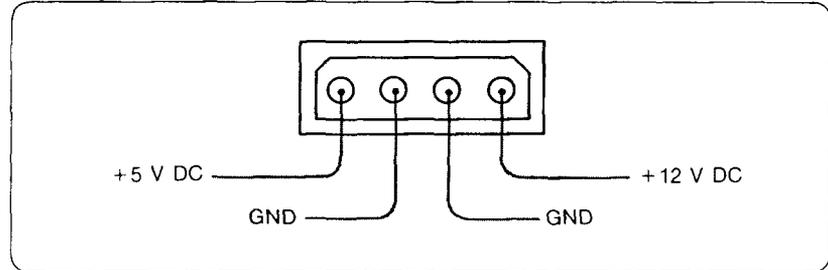
### Power-in connector

Insert the plug and push it firmly in place.



- The power supply connector recommended has Molex\* 89880-03 contacts and a Molex 8981-04P housing.

### Pin assignment:

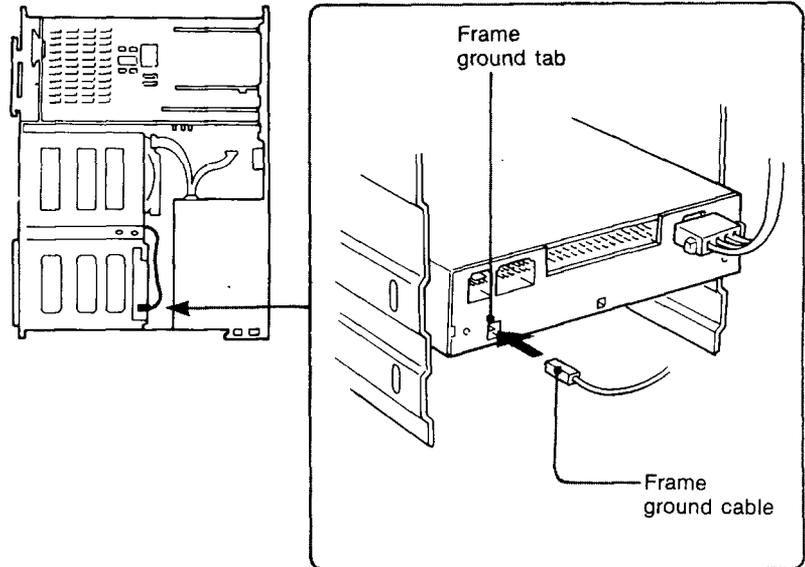


\* Molex is a registered trademark of Molex, Inc.

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## Frame ground

If the CDU535 is mounted on rails, it has no contact with the host computer directly and should be grounded. The computer has within it ground cables. Connect one to the frame ground tab.



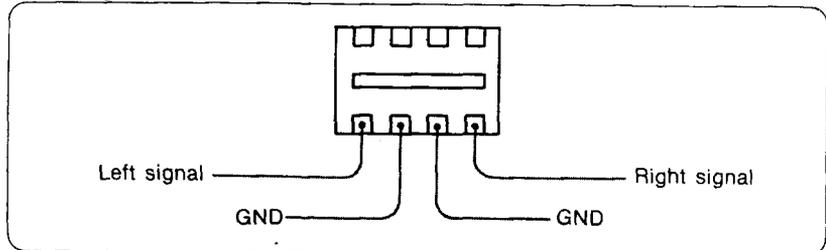
- The frame ground cable recommended has a AMP 1-480435-0 housing and 170203-2 or 60711-1 contacts.

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## Audio output connector

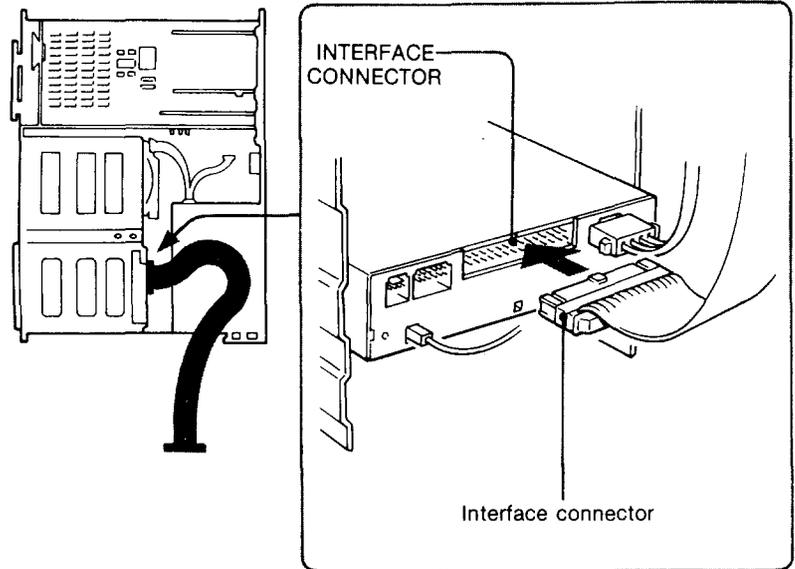
- The audio output connector recommended is Molex 08-50-0113 or 08-50-0114 contacts and a 22-01-3047 housing.

### Pin assignment:

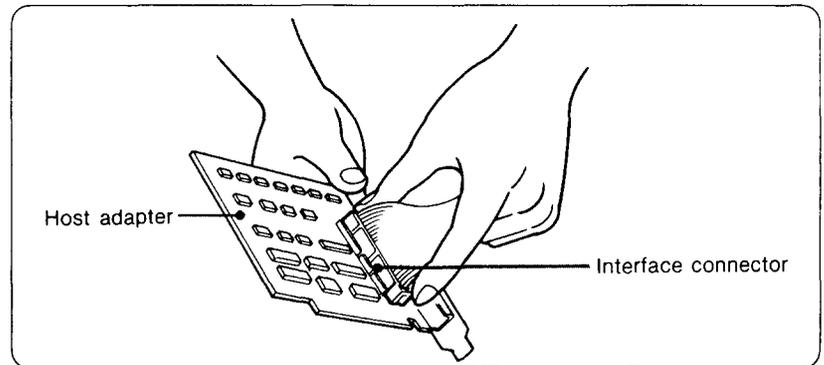


## Interface connector

- 1 Press one end of the interface connector firmly into the CD-ROM drive. (Sony Bus Cable RK-B70F or RK-B20F is the recommended interface cable.)



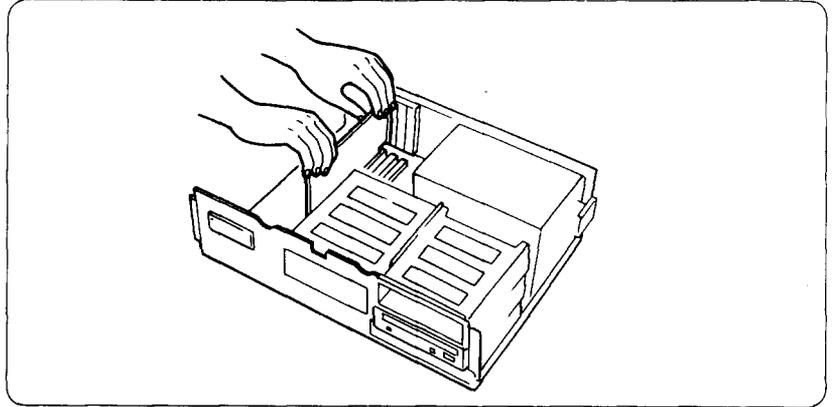
- 2 Attach the other end of the connector to the host adapter.



- The interface connector recommended is a Sony RK-B70F or RK-B20F.

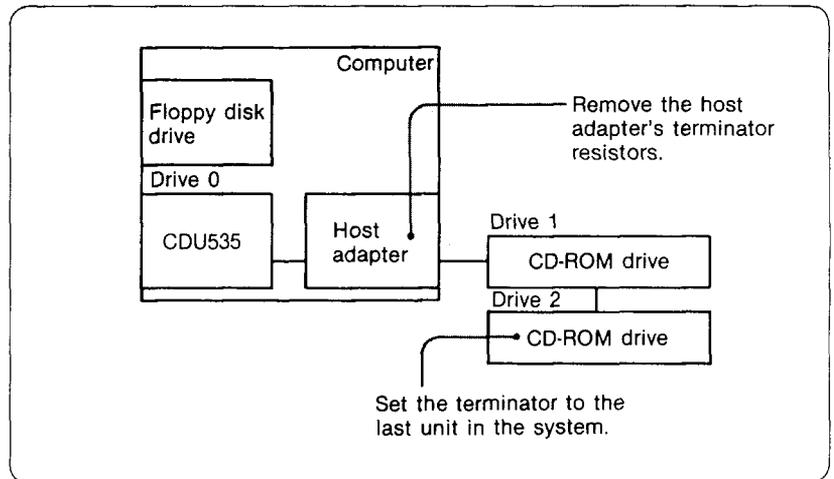
## Mounting the Host Adapter

Install the host adapter\* in the computer by inserting it securely in a system expansion slot. Refer to the users' manual of the host adapter for complete instructions on its installation and the assignment of its switches.



### Note:

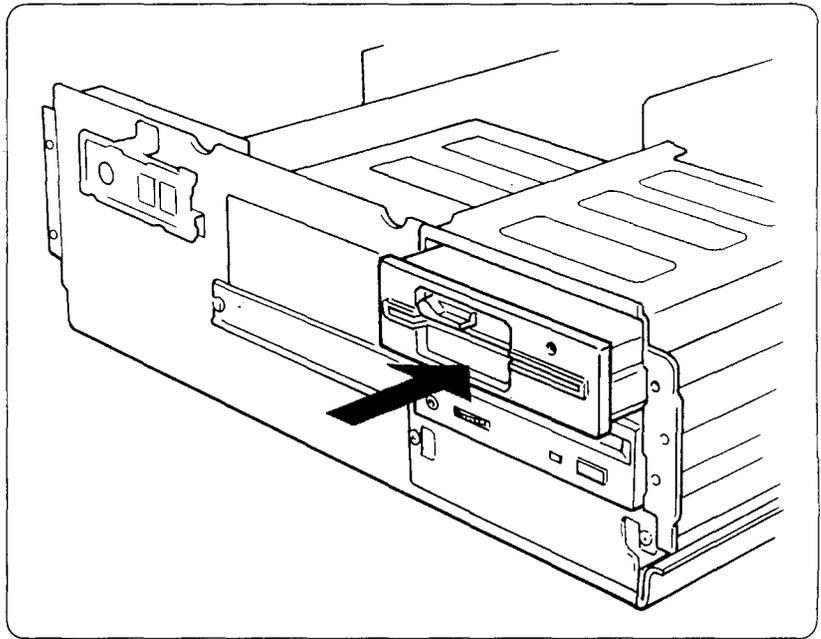
If you decide to connect the external CD-ROM drive(s), you must remove the host adapter's terminator resistors.



\* CDB-240 series are the recommended host adapters.

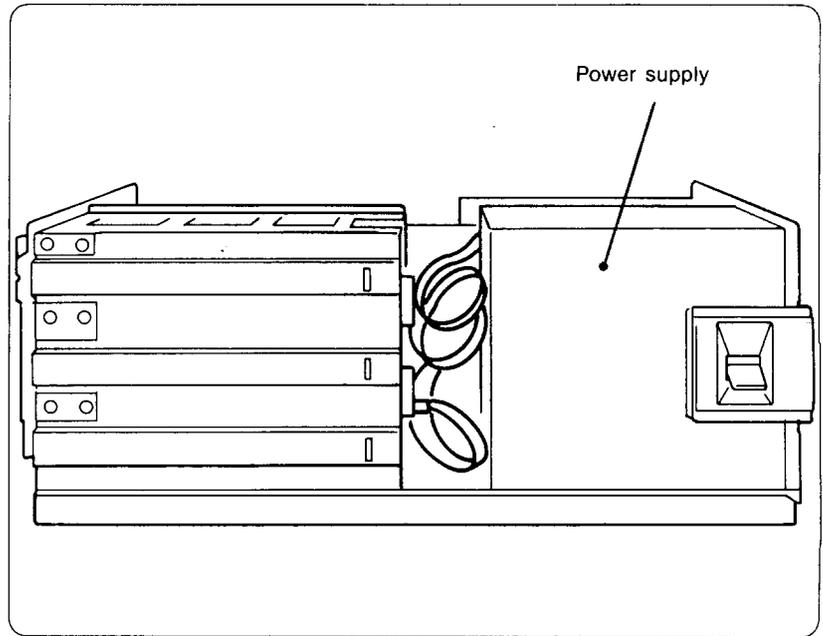
## Reassembling the Computer

- 1 Reinstall the floppy disk drive in the top half-height space.



- 2 Reconnect the original interface cable to the floppy disk drive. If there is more than one connector at the end of the interface cable, insert the last connector into the floppy disk drive.
- 3 Fasten the screws and front brackets that you removed to install the CDU535.

- 4** Tuck the cables behind the drives so that they are no higher than the power supply.



**Check the following before closing the computer:**

- Are the connections between the drive and computer correct?
- Are the switches set to the appropriate positions?

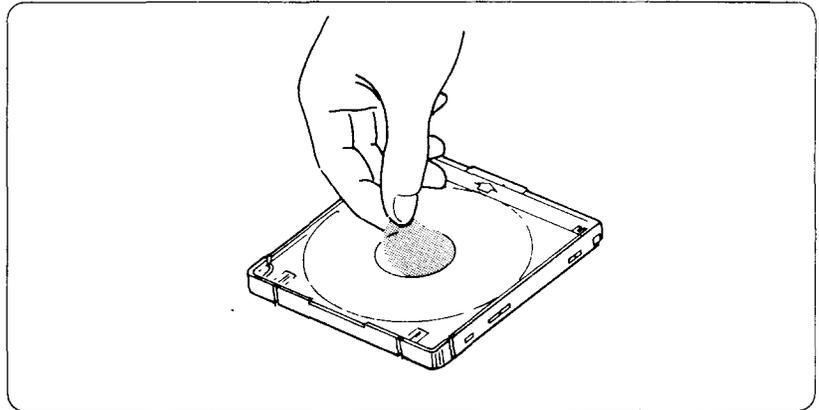
- 5** Slide the computer's cover on and fasten the cover mounting screws at the back of the unit.

- 6** Remount the rear plastic panel if your computer has one.

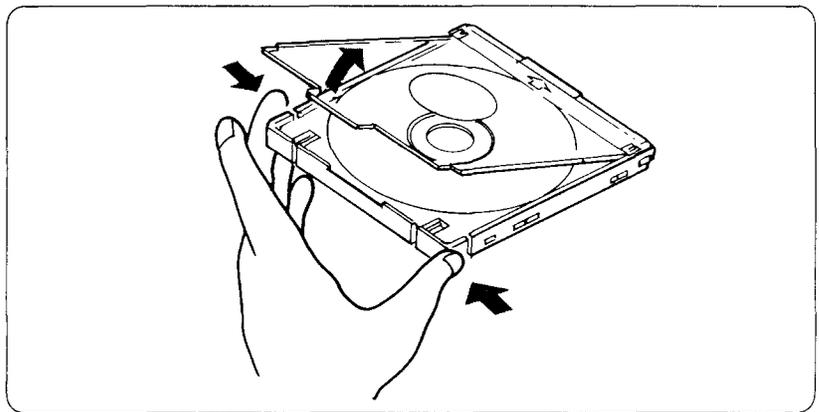
# Using Discs and Caddies

## Loading a Caddy with a Disc

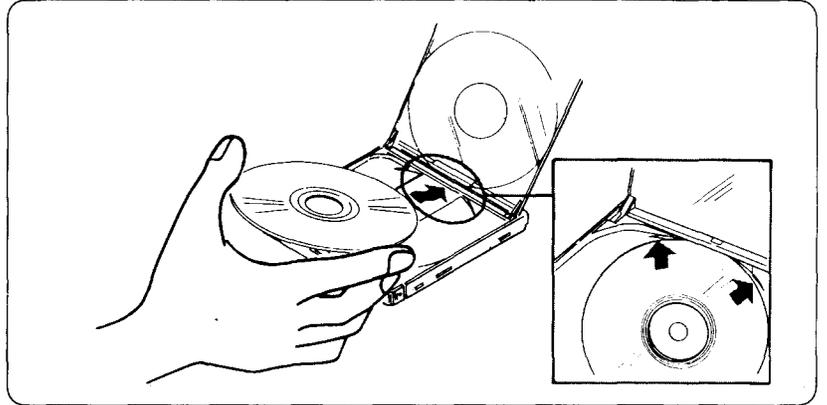
- 1 If there is a protective film on the center of the caddy lid, remove it before using the caddy.



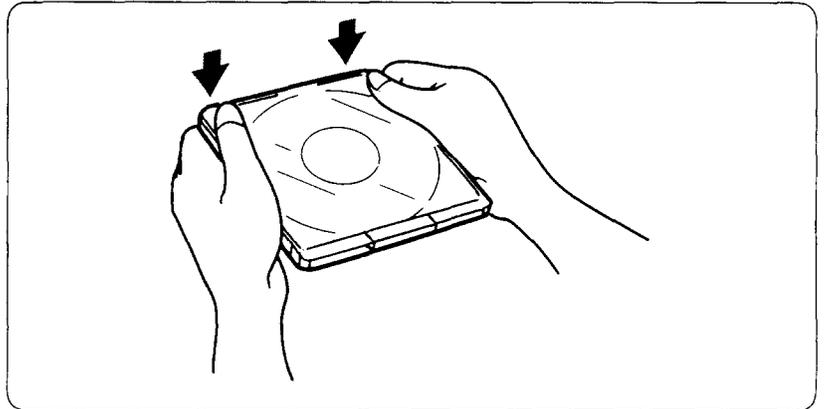
- 2 To open the lid of the caddy, press the tabs on both its sides at the end opposite the shutter.



**3** Set a disc, with its label upward, in the caddy.

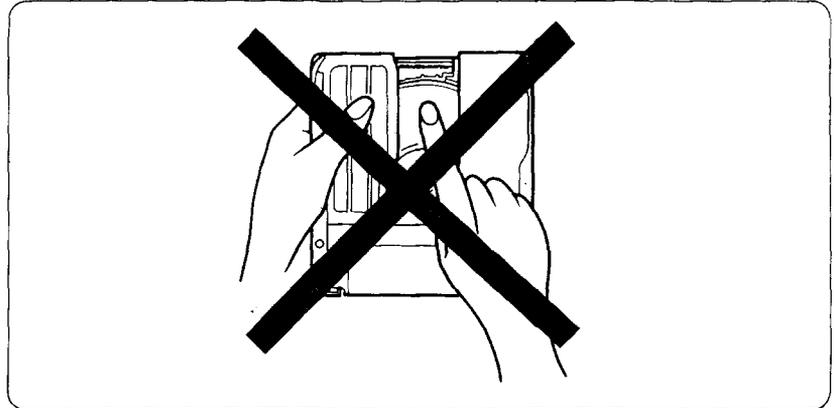


**4** Close the lid firmly.



**Important:**

- Do not drop the disc or the caddy.
- The caddy is designed so that its shutter automatically opens when it is inserted in the drive unit. Do not open the shutter manually and touch the disc.



- The caddy is precisely adjusted at the factory. Do not disassemble it.

### **Storing Discs and Caddies**

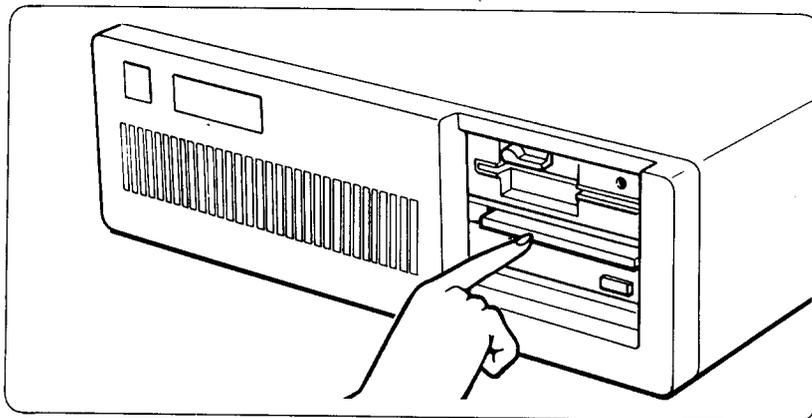
- Remove the caddy from the drive unit before moving the drive.
- Do not store the disc and caddy in a location subject to:
  - high humidity
  - high temperature
  - excessive dust
  - direct sunlight

# Operating the Drive

Make sure that the application software is installed in the host computer before using the drive.

## Starting Up

- 1 Turn the power supply on.
- 2 Insert the caddy into the slot of the drive with the disc's label facing up, and the caddy will be loaded automatically.



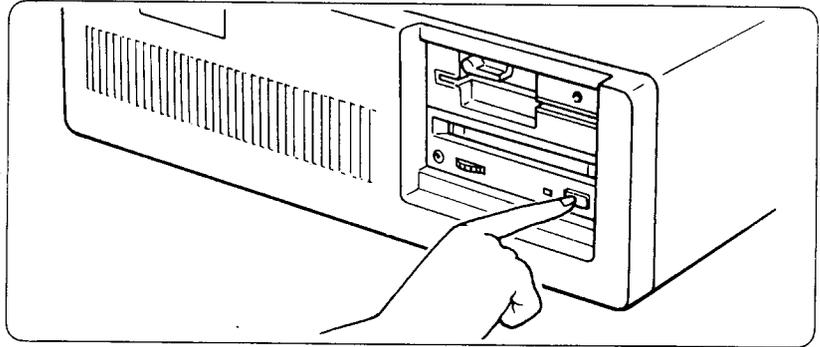
The drive will begin reading the Table of Contents (TOC). The BUSY indicator will light while the TOC is being read.

The caddy will be ejected if the enclosed disc is upside-down, if it is not properly nested in the caddy, or if any other conditions prevent the drive from reading the disc.

- 3 When the BUSY indicator goes off, the drive is ready to receive commands and data may be retrieved from the CD-ROM disc.
- 4 From here on, follow the instructions provided with the application software.

## Ejecting a Caddy

Press the eject button on the drive unit.

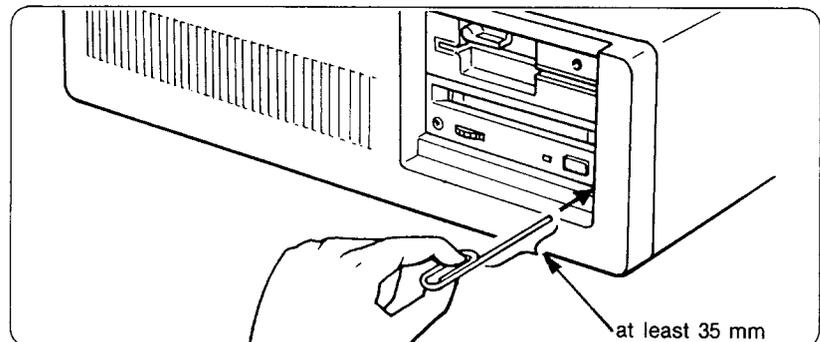


If the eject button is incapacitated by the computer, the button will not work.

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## Ejecting a caddy manually

- 1 Turn off the power to the drive unit.
- 2 Insert a steel rod 1.2 mm in diameter into the emergency eject hole and push hard.



For further information on the operation of the CD-ROM disc drive, refer to the appropriate software manuals.

# Specifications

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## General

### Disc

Acceptable discs: CD-ROM mode-1 data discs  
CD-ROM mode-2 data discs  
CD-Audio discs  
Audio-combined CD-ROM discs  
CD-ROM XA discs  
CD-I discs

Disc diameter: 12 cm, 8 cm

### Rotational speed (varies from disc to disc)

Innermost track: 530 rpm at CLV = 1.4 meters/sec  
Outermost track: 200 rpm at CLV = 1.2 meters/sec

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## Drive performance

### Data transfer rate

Sustained rate: 150 KByte/sec  
Burst rate: 600 KByte/sec

### Access time

Full stroke: 0.53 sec (typical)  
Average ( $\frac{1}{3}$  stroke): 0.34 sec (typical)

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## Reliability

### Read error rate (includes 5 retries)

L-EC on: 1 Block /  $10^{12}$  bits  
L-EC off: 1 Block /  $10^9$  bits

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## Audio

### Output level

Line out: 0.5 V at 47 k $\Omega$   
Headphone: 0.55 V at 32  $\Omega$

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## Environmental conditions

### Operating

Temperature	5 °C to 50 °C
Humidity	10 % to 90 %
Absolute humidity	30 grams/m <sup>3</sup> (max wet bulb temperature: 29 °C)
Atmosphere	Noncondensing

### Non-operating/Transportation

Temperature	-30 °C to 55 °C
Humidity	10 % to 90 %
Atmosphere	Noncondensing

### Vibration

Operating	0.2 Go-p at 5 Hz to 300 Hz (horizontal use) 0.12 Go-p at 5 Hz to 300 Hz (vertical use)
Non-operating	2 Go-p at 5 Hz to 300 Hz
Transportation	0.015 G <sup>2</sup> /Hz at 5 Hz to 50 Hz (with standard package)

### Shock

Operating	0.4 Go-p at 11 ms half sine wave
Non-operating	50 Go-p at 11 ms half sine wave
Transportation	76 cm drop (with standard package)

Damage boundary	65 ips/40 G
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## Dimensions and weight

Dimensions	146×41×203 mm (w/h/d) (5 <sup>3</sup> / <sub>4</sub> ×1 <sup>5</sup> / <sub>8</sub> ×8 inches)
Weight	1.3 Kg (2 lb 14 oz)

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## Power requirement

Voltage	+5 V DC ±5 % and +12 V DC ±10 %
Ripple	+5 V: 0.05 Vp-p at 500 mA +12 V: 0.1 Vp-p at 800 mA
Current	+5 V: 500 mA +12 V: 800 mA at Read and Seek 1500 mA at Spin-up (for 400 ms)

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## Connectors

Power-in connector	Molex 8981
Interface connector	3M* #3595-500SE
Audio connectors	Molex 5046-04A

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## Laser

Type	Semiconductor laser GaAlAs
Wave length	780 nm
Output power	0.6 mW

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## Supplied accessory

- Drive number label (1 set)

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## Optional accessories

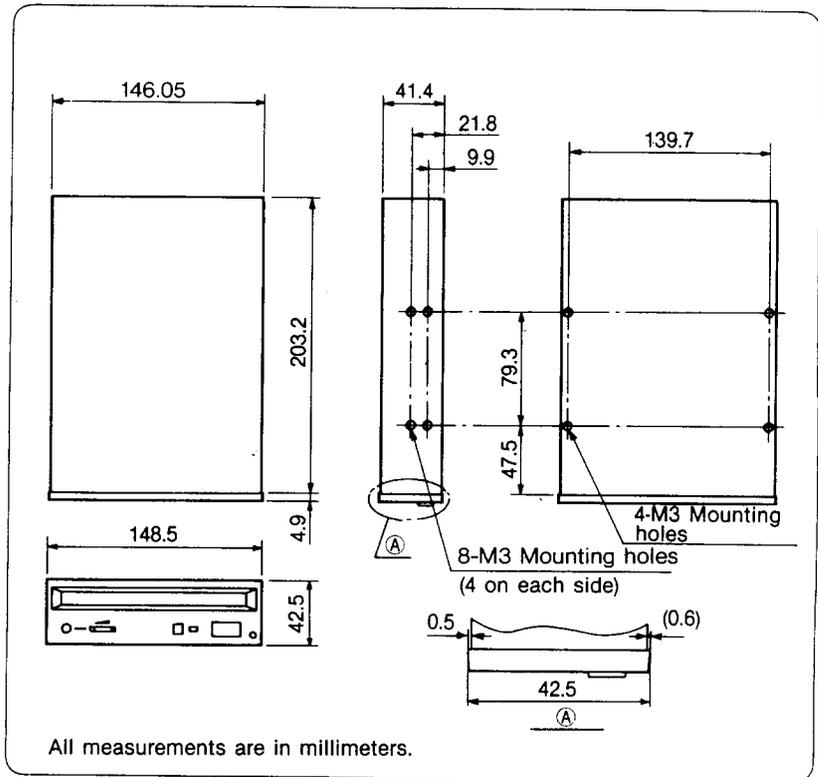
- CD-ROM discs: YHDS-50 "CD-ROM Test Disc Type 1.3"  
(equivalent to YHDS-4)  
YHDS-100 "CD-ROM Test Disc Type 2.0"  
(audio-combined)
- Additional caddies: OPA-1011
- Host adapter: CDB-240 series for IBM PC, PC/XT, PC/AT,  
HP Vectra or equivalent.
- Interface cable: RK-B70F (70 cm cable)  
RK-B20F (20 cm cable)  
(These cables are for internal connection of the  
drive to the host adapter.)
- Interface software: Sony MS-DOS CD-ROM Extensions OPA-332 series  
for IBM PC, PC/XT, PC/AT, HP Vectra or equivalent.

Design and specifications are subject to change without notice.

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\*3M is a registered trademark of the Minnesota Mining and Manufacturing Company.

Location of the mounting holes of the CDU535:



**Important:**

The overhang of the screws should not exceed 4.0 mm from the surface of the side pannels or the bottom plate.