YAMAHA
CRW4416S
SERIES

User Guide
Guide de l'utilisateur
Bedienungsanleitung

YAMAHA logo on front panel:
YAMAHA — COMPACT disc Recordable ReWritable
4x4x16 — ON/DISC — READ/WRITE — VOL

YAMAHA

* This manual applies to the CRW4416S and CRW4416S-NB.
  The CRW4416S front panel displays the YAMAHA brand name.
  The CRW4416S-NB front panel does not display a brand name.

Laser Diode Properties
  Material : GaAlAs
  Wavelength : 783-789 nm
  Emission Duration : Continuous
  Laser Output Power : Less than 44.6 μW*
    * This output is value measured at a
      distance 200mm from the objective lens
      surface on the optical pick-up block.
    ANSI Class : Class 1

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

CLASS 1 LASER PRODUCT
LASER KLASSE 1 PRODUKT

This compact disc player is
classified as a CLASS 1
LASER product.
The CLASS 1 LASER
PRODUCT label must be
located on the exterior.

VORSICHT : UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG
GEOFFNET. NICHT DEM STRAHL AUSSETZEN.

VARNING : OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH
SPÄRREN ÄR URKOPPLAD. BETRAKTA EJ STRÅLEN ÄR FARLIG.

VARO! : AVATAESSA JA SUOJALUKITUS OHITETTAESSA OLET
ALTTINA NÄKYMÄTTÖMÄLLE LASERS TEILYLLE. ÄLÄ KATSO SÄTESSEN.

ADVARSEL : USYNLIG LASERSTRALNING VED ÅBNING NÄR SIKKERHETSAF-
BYDERE ER UDE AF FUNKTION. UNDGÅ UDSETTELS FOR STRÅLING.

Varningsanvisning för
laserstrålning.

❗ **WARNING** ❗

- The temperature where CRW4416S is located should be between 5ºC and 40ºC (41ºF – 104ºF), when used in a fan-cooled system.

- Do not disassemble the CRW4416S cover to reduce the risk of electric shock.

- Always remove the disc before transporting CRW4416S.

Important Precautions

Please read the following precautions before attempting to operate the CRW4416S.

- Before recording a disc, be sure to clean the disc and tray using an air aerosol-type dust remover.
  A dust particle on the disc may cause recording to fail, producing an unusable disc.

- Always record in a dust-free environment. If the disc must be removed from the CRW4416S before recording is finished, store the disc in a clean, dust-free environment.

- The CRW4416S contains no user serviceable parts. Refer all servicing to qualified personnel.

- If any of the following should occur, the CRW4416S should be serviced by qualified personnel:

  Metal objects or liquids get inside the CRW4416S.

  The CRW4416S does not operate normally or a marked change in performance is noticed.

- Do not place heavy objects on the CD-RW discs.

- Do not subject the CRW4416S and computer to impact or shock when in use, as this may impair recording or playback.

- Yamaha is not responsible for any data or information losses resulting from the operation of the CRW4416S.

Table of Contents

Introduction

Thank you for purchasing a Yamaha CRW4416S drive.

Please read this manual before using the drive in order to make the best use of the superior CRW4416S functions.

After reading, please retain this manual for future reference.

CRW4416S Features

■ **4xS Recording (Rewritable) - 4xS Recording (Recordable) - 16xS Reading**

The CRW4416S is able to write (overwrite) CD-RW discs at quad speed, double speed, and is able to write CD-R discs at quad speed, double speed, or normal speed.

For both types of media, this drive is able to read at up to 16X speed.

■ **Compatible with Seven Different Formats**

The CRW4416S can both record and read seven different formats: CD-ROM, CD-ROM XA, CD-I, CD-DA, CD-Bridge (multisession), CD-Extra, and Video CD.

The CRW4416S is also equipped with an analog audio output terminal (headphones) for CD-DA.

■ **SCSI 2 Interface for Data Transfer**

The CRW4416S features SCSI 2, the second generation SCSI interface for connecting computers and peripheral devices.

■ **Compatible with Windows 95 Plug and Play**

SCSI IDs are set automatically by the SCAM protocol (level 1).

■ **Orange Book Part 2, Part 3 Compatible 5-Mode Recording**

The CRW4416S conforms to the five recording modes outlined in the Orange Book Part 2 and 3: Track at Once, Multisession, Disc at Once, Session at Once, and Packet Writing.

Orange Book Compatible Recording

Track at Once

In this mode, data can be recorded to disc one track at a time.
Discs recorded in this mode cannot be played in CD players or CD-ROM drives other than a CD-RW or a CD-R drive until the session is closed.

Multisession

In this mode, data can be recorded to disc in stages (one session at a time).
Additional data can be written later.

Disc at Once

In this mode, data can be recorded to an entire disc in one pass.
It is not possible to write additional data later.

Session at Once

In this mode, data can be recorded to disc one session at a time.
To use this mode, your software must support Session at Once recording.
New sessions can be written later.

Packet Writing

This is useful for data back-up. Smaller units of data can be added to tracks.
To use this mode, your software must support Packet Writing.
The CRW4416S supports both sequential and random packet writing.

Chapter 1 - System Configuration

Before using the CRW4416S, make sure that you have all of the items on the list of included items.

In order to use the CRW4416S, you will require the following.

Computer

The following operating environment is required:

- An IBM/AT compatible computer with a 100 MHz or faster Pentium CPU (in order to write at 4x speed), or a 100 MHz or faster 486 CPU (in order to write at 2x speed)
- A vacant slot in which to install a SCSI card or a pre-installed SCSI card
- A vacant half-height bay
- Windows 95, Windows NT4.0 or Higher
- Sufficient hard disk space

Note: *You will need about twice as much space on your hard disk as that required by the data you wish to write to CD-ROM.*

SCSI card

This is required in order to connect a SCSI device (the Yamaha CRW4416S) to your computer.

We recommend the following:

Adaptec SCSI cards: AHA-2940 (PCI), AHA-284x (VL), AHA-2740 (EISA), AHA-154x (ISA), etc.
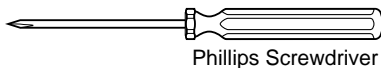
Software

Use writing software or packet writing software which supports the CRW4416S.

Tools

Phillips screwdriver

This is used to remove the
cover of your computer,

Phillips Screwdriver

and to install the Yamaha CRW4416S drive.

Long nose pliers

These are used to insert or remove
the jumper pin when setting the
SCSI ID and parity settings etc.of
the Yamaha CRW4416S drive.

Long nose pliers
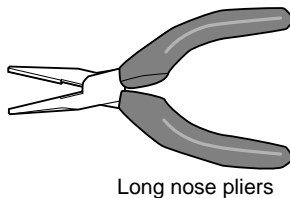
Discs

On the CRW4416S, you can use conventional CD-RW and CD-R discs
that conform to the Recordable Compact Disc Systems Part 2 and 3
(Orange Book).
Yamaha recommends the following Yamaha CD-RW and CD-R discs:

CD-RW Discs

> CRWM74R   (ϕ120mm, 74 minutes)

CD-R Discs

> CDM12Y74M (ϕ120mm, 74 minutes)
> CDM12Y74T   (ϕ120mm, 74 minutes)

Read-only Discs

You can use discs with the [disc] logo which conform to the Compact
Disc Read Only Memory standard (CD-ROM standard, Yellow Book).
If you wish to use the audio functions, use discs with the [disc] logo,
which conform to the Compact Disc Digital Audio standard (Red Book).

# Chapter 2 - Installing the Yamaha CRW4416S Drive

CRW4416S drive settings

Before installing the CRW4416S in your computer, you will need to set the following jumpers.

- SCSI ID settings
- Parity setting
- Terminator setting
- Block size setting

This setting is set by inserting a jumper pin in the jumper switch located on the rear panel of the CRW4416S drive.

Important: *Use long-nose pliers to remove or insert jumper connectors.*
In the diagrams in this manual, solid black fill is used to indicate locations where a jumper is used to short between pins.

Rear Panel

Jumper Switch
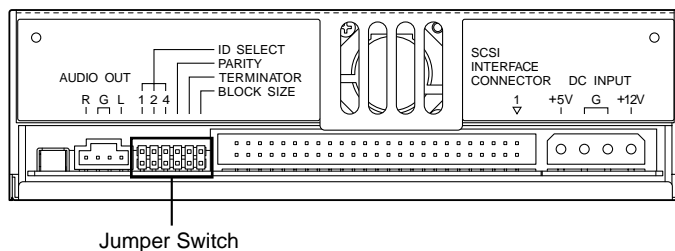
■ SCSI ID settings

The SCSI ID number is used so that the computer will recognize a connected SCSI device. You can assign 0 through 7 as the SCSI ID number. Usually, "7" is reserved for the SCSI card ID number, and "0" is reserved for the first SCSI device in the chain.

Use a number between 1 and 6 for the CRW4416S. Refer to the diagram below for more information on setting the SCSI ID number. The factory set ID number is "3".

Important: *If you are using other SCSI devices, be sure to use a unique ID number for each device.*

Note: *When you are using Windows 95, and if the SCSI ID setting on the rear panel is the same as the number assigned to another SCSI device, the Plug and Play component of Windows 95 will automatically assign an unused number to the CRW4416S (SCAM protocol level 1).*

SCSI ID Setting
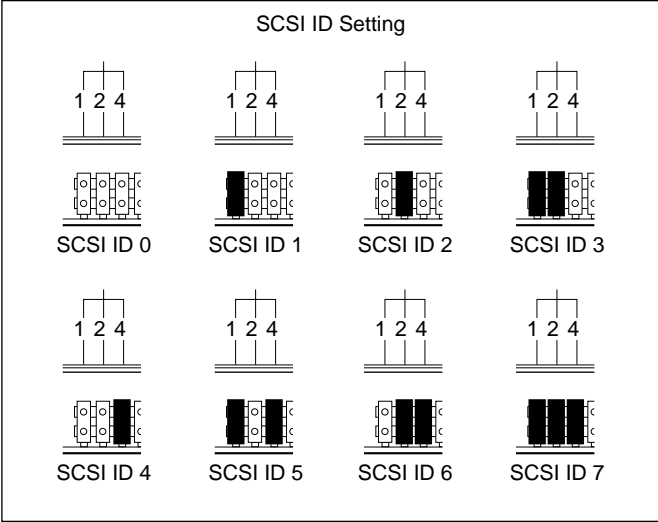
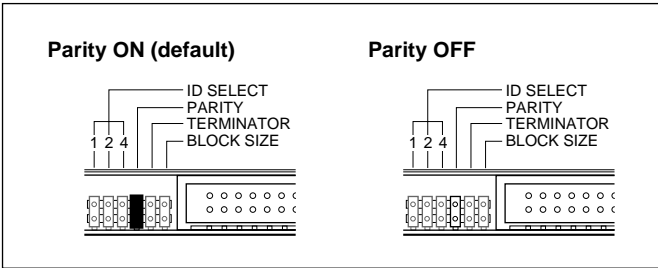* Use jumper connectors to short the locations shown in black.

■ **Parity setting**

Parity ON (with a jumper)

— Parity Check will be performed. **Normally, use this setting.**

Parity OFF (without a jumper)

— Parity Check will not be performed.

* Use jumper connectors to short the locations shown in black.

■ **Terminator setting**

The terminator setting indicates whether or not this device is the last connected SCSI device.

Terminator ON (with a jumper)

— Use this setting if the CRW4416S is the last device in the internal SCSI daisy-chain.

Terminator OFF (without a jumper)

— Use this setting if devices other than the CRW4416S are in the internal SCSI daisy-chain and the CRW4416S is not the last device.

Terminator ON (default)   **Terminator OFF**

ID SELECT
PARITY
TERMINATOR
BLOCK SIZE
1 2 4
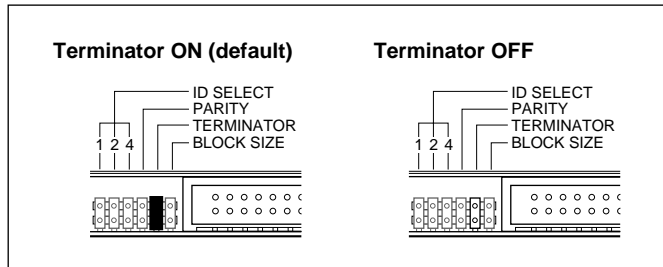
* Use jumper connectors to short the locations shown in black.

■ **Block size setting**
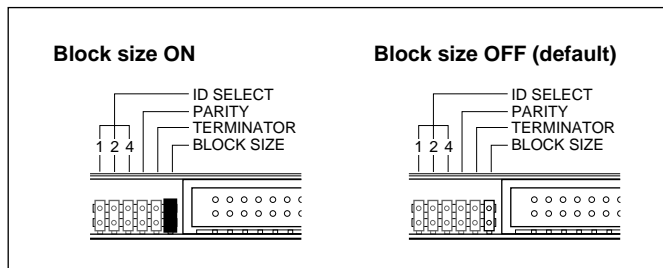
Block size ON (with a jumper)

— Block Size is set to 512Byte/sector. This function is valid only for workstations, such as those that run UNIX.

Block size OFF (without a jumper)

— **Normally, use this setting.**

Block size ON   **Block size OFF (default)**

ID SELECT
PARITY
TERMINATOR
BLOCK SIZE
1 2 4

* Use jumper connectors to short the locations shown in black.

Installing the CRW4416S drive

The following steps will differ slightly depending on the type of computer you are using.

For details on removing the cover from your computer, and installing or removing internal devices, refer to the manual for your computer.
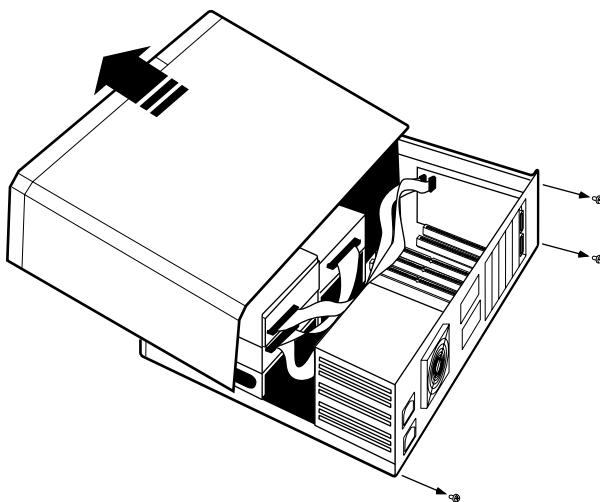
1. Switch off your computer, and unplug it from the AC outlet.

If you fail to do this, there is a danger of electric shock and/or of causing short circuits, which may damage the computer and/or CRW4416S drive.
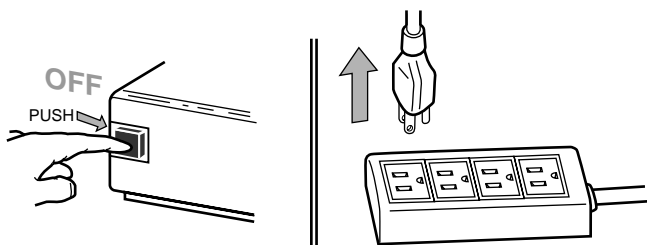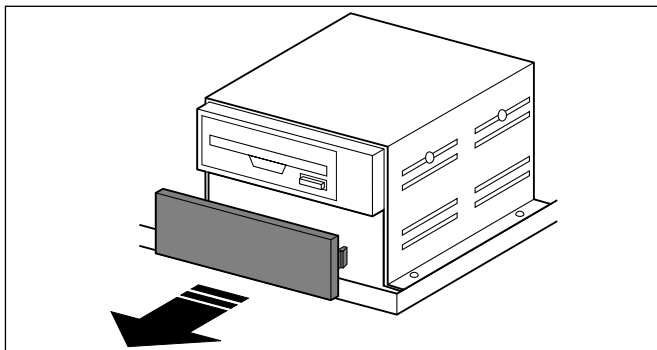

**2. Remove the cover from your computer.**

Be careful not to lose the screws that were removed.

3. Your hands or body may be holding a charge of static electricity. Touch a metallic portion of the chassis or power supply to release any such charge.

4. Remove the front cover of a vacant half-height drive bay.
For details refer to the manual of your computer.

5. Remove the SCSI card, and set the terminator setting of the SCSI internal circuit to the position for internal connected devices. For details refer to the manual of your SCSI card.

6. Slide the CRW4416S drive into the drive bay from the front.
At this time, be careful not to apply excessive force to the drive itself. Finger-tighten the four fastening screws, and check that there is enough room to connect the power supply cable, SCSI cable, and AUDIO cables.
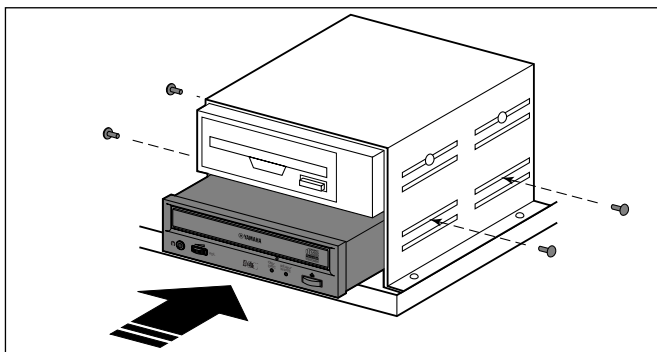
7. Connect the SCSI flat cable.

Connect the 50-pin SCSI flat cable to the SCSI card and to the SCSI
interface located on the rear panel of the CRW4416S drive.

Position the connector so that the colored line is at pin 1 (your lower right).
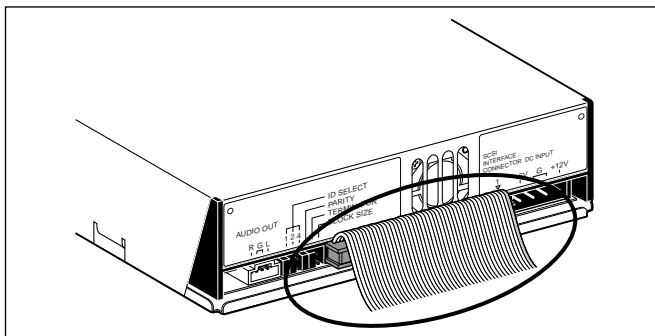
8. Connect the AUDIO cable.
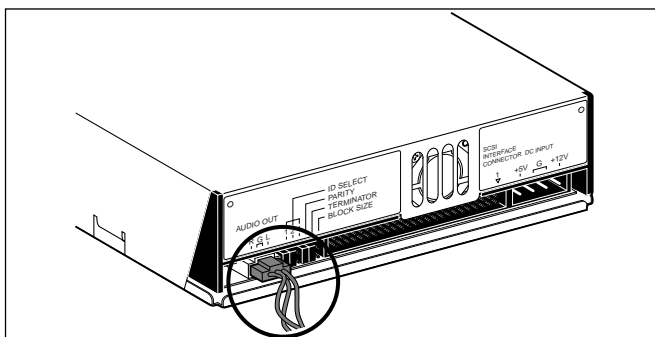
Connect the single 4-pin connector (Sound Blaster compatible) to the
sound card.

Connect the 4-pin connector at the other end of the cable (the larger
connector) to the AUDIO OUT connector on the CRW4416S drive.

The polarizing lug should be at the top.

AUDIO cable

To the CRW4416S
4-pin connector (large)

To the Sound Card (Sound Blaster compatible)
4-pin connector (small)
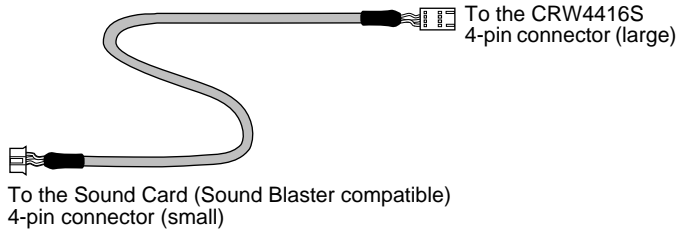
9. Connect the power supply cable.

Connect the +12V and +5V 4-pin power cable to the power supply
interface located on the rear panel of the CRW4416S drive.

The shape of the connector makes it impossible to reverse the connec-
tions.

If you have difficulty when inserting the connector, try wiggling the
connector left and right while inserting it.

10. Tighten the four fastening screws securely.
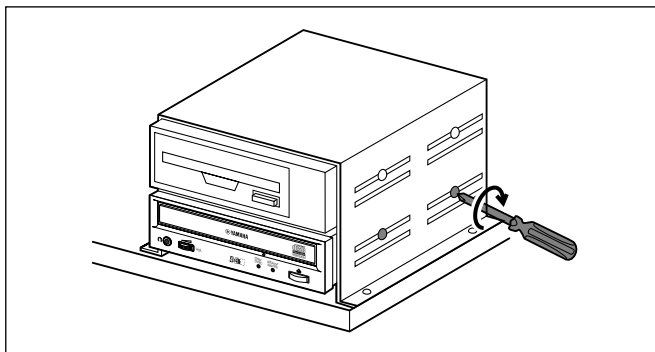
11. Attach the cover of your computer.
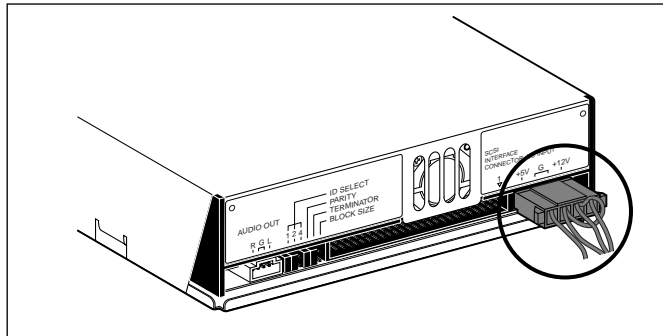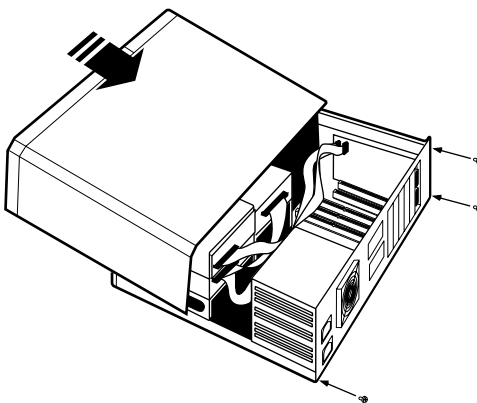

12. Connect the power cable to an AC outlet, and switch on your computer.

Make sure that the LED located on the panel of the CRW4416S drive is lit.

13. Start up your operating system.

For the procedure, refer to the manual for your operation system.

14. Install the writing software.

For the installation procedure, refer to the manual for your writing software.

Chapter 3 - Operation

Front Panel

① **Disc tray**

The disc is inserted and ejected here. Pressing the eject button will open the tray.

② **Headphone jack**

This stereo mini jack allows you to connect headphones and listen to audio.

③ **Headphone volume control**

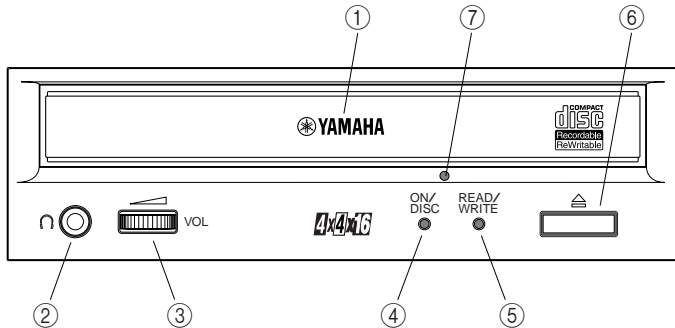This control adjusts the volume level of the headphone output. Rotating the control clockwise will increase the volume level.

④ **ON/DISC LED**

This indicator lights up in orange when the CRW4416S is powered on, and lights up in green when the CRW4416S contains a disc.

⑤ **READ/WRITE LED**

This indicator lights up in green when data is being read, and flashes when data is being accessed. It also lights up in orange when data is being recorded on a disc.

⑥ **Eject button**

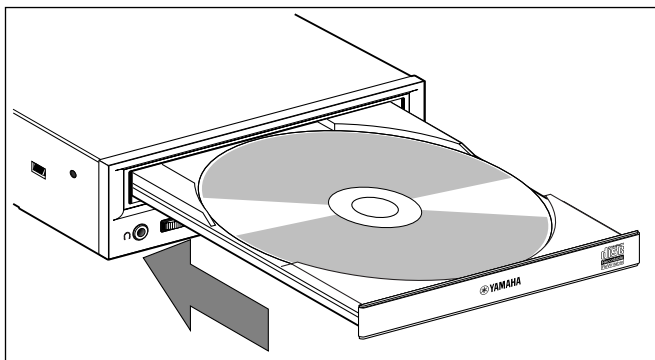This button is used to open or close the tray.

⑦ **Manual Eject hole**

This is used to manually eject a disc that cannot be ejected in the normal way. It is for emergency use only.

Loading a Disc

1. Press the eject button to open the tray.

2. Carefully place the disc, label-side up, on the disc tray.

3. Press the disc tray softly or press the eject button again to close the disc tray.

Ejecting the Disc

If the CRW4416S is powered on:

Press the eject button to eject the disc.

Note: *You cannot eject the disc if the SCSI command prohibits the eject operation while the CRW4416S is reading data.*

Caution: *Be sure to remove the disc after it is completely ejected. (Trying to remove the disc before it is completely ejected may cause the drive to malfunction.)*

Press the eject button
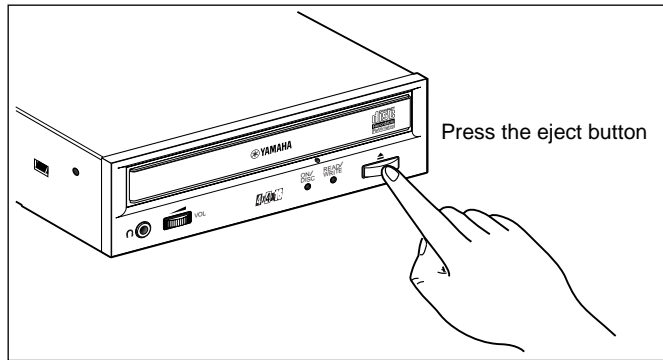
If the CRW4416S is not powered on:

Pressing the eject button will not eject the disc.

Manual Eject (emergency use)

Here we explain how to eject the disc when it cannot be ejected in the normal way; for example, the power is shut off inadvertently or the loading mechanism fails. This technique should be used only as a last resort. Frequent use may lead to malfunction.

You'll need a pin-like object of 2 mm or less in diameter to do this. A straightened paper clip makes an ideal tool.

1. Insert the pin-like tool into the manual eject hole and push gently.

The spring-loaded mechanism ejects the disc.
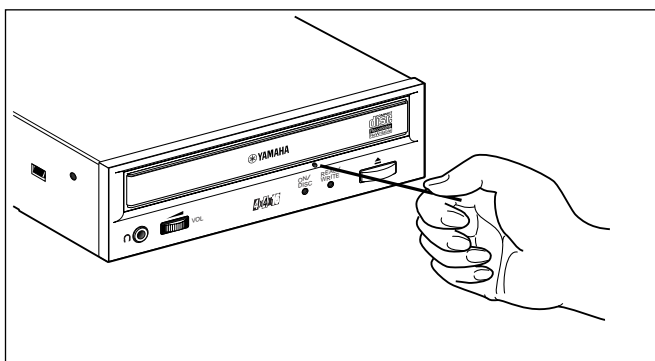
2. After manually ejecting a disc, you must turn off the power supplied to the CRW4416S, then turn it on before continuing.

Troubleshooting

If CRW4416S is not performing as expected, look up the symptoms in the following table, and take the appropriate corrective action.

Symptoms	Corrective action
The power to the CRW4416S is off	• Check the DC power cable connection.
The CRW4416S is not recognized by the computer	• Check the SCSI cable connection. • Make sure that SCSI ID numbers are assigned exclusively. • Make sure that the last device in the SCSI daisy chain is terminated correctly.
The CRW4416S does not operate correctly	• Install the SCSI driver software again.
The disc tray will not open	• Make sure that the power to the drive is turned on.
The disc ejects	• Make sure that the disc is seated in the tray correctly.
Incorrect operation	• Make sure that the disc is seated in the tray correctly. • Make sure that you are using the correct disc. • Make sure that there is no dust, dirt, or condensation on the disc or tray.

Note: *In the case of CD-RW fixed packet writing, the recordable capacity will be approximately 100 Mbytes less than the capacity indicated on the blank disc. This is due to differences in the recording format.*

Appendix

Specifications

Interface	SCSI 2
Data Capacity	650MB (74 minutes disc)
	550MB (63 minutes disc)
Record/Read Speed	Writing (CD-RW): 2X speed, 4Xspeed
	Writing (CD-R): Normal speed, 2X speed, 4Xspeed
	Reading: Maximum 16X speed
Data Transfer Rate	150 - 2400KB/sec
Burst Transfer Rate	Maximum 13.3 MB/sec
Buffer Size	2MB (666 sectors)
Access Speed	160 ms (Random access at reading)
Installation	Horizontal
Disc Loading	Tray
Audio Out	Frequency Response 20 - 20,000Hz (Line Out)
(normal speed)	Output Level 1 Vrms (Line Out)
Power Consumption	11W (read/write)
Power Supply	5V ±5%, 12V ±10%
Environment	Temperature: +5°C - +40°C (read/write, when used in a fan-cooled system)
	Humidity: 5 - 85% (condensation must not occur)
Dimensions (WxHxD)	146 x 41.3 x 193.1 mm (excluding front panel)
Weight	950g

Specifications are subject to change without prior notice.

Front Panel Indicator Key

● on: green   ☀ flashing: green   — off

❍ on: orange   ☼ flashing: orange

Status	ON/DISC	READ/WRITE
Reset	❍ ➡ —	❍ ➡ —
Ready (no disc)	❍	—
Inserting disc	☼ ➡ ☀	—
Ejecting disc	☼	—
Ready (disc inserted)	●	—
Seeking	●	☀
Preparing to write	●	☼
Writing	●	❍
Writing (test mode)	●	☼
Playback	●	●