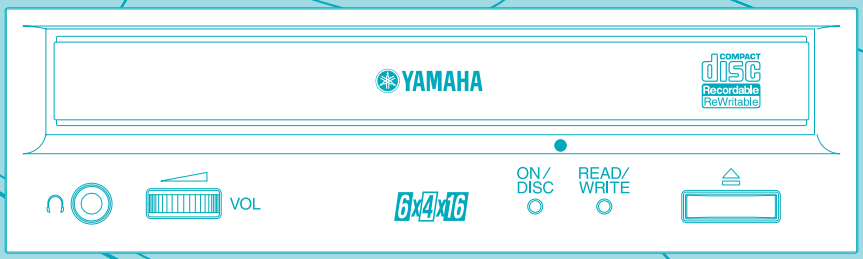
CRW6416S SERIES



Owner's Manual
Bedienungsanleitung
Mode d'emploi
Manual de instrucciones

YAMAHA

FCC INFORMATION (U.S.A.)

1. IMPORTANT NOTICE: DO NOT MODIFY THIS UNIT!
This product, when installed as indicated in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by Yamaha may void your authority, granted by the FCC, to use the product.

2. IMPORTANT: When connecting this product to accessories and/or another product use only high quality shielded cables. Cable/s supplied with this product MUST be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorization to use this product in the USA.

3. NOTE: This product has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class "B" digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in a residential environment will not result in harmful interference with other electronic devices. This equipment generates/uses radio frequencies and, if not installed and used according to the instructions found in the users manual, may cause interference harmful to the operation of other electronic devices. Compliance with FCC regulations does not guarantee that interference will not occur in all installations. If this product is found to be the source of interference, which can be determined by turning the product "OFF" and "ON," please try to eliminate the problem by using one of the following measures:

Relocate either this product or the device that is being affected by the interference.

Utilize power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter/s (only applies to external drives).

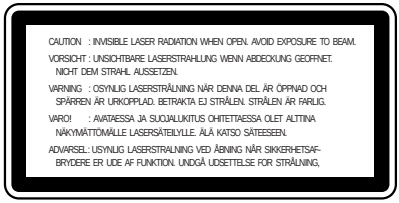
In the case of radio or TV interference, relocate/reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to coaxial type cable.

If these corrective measures do not produce satisfactory results, please contact the local retailer authorized to distribute this type of product. If you can not locate the appropriate retailer, please contact Yamaha Systems Technology, Inc. 100 Century Center Court, San Jose, CA95112, U.S.A.

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

CLASS 1 LASER PRODUCT
LASER KLASSE 1 PRODUKT
LUOKAN 1 LASERLAITE
PRODUIT LASER DE CLASSE 1

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



Warning instruction for laser radiation.
Varningsanvisning för laserstrålning.

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

VAROITUS
LAITTEEN KÄYTTÄMINEN MUULLA KUIN TÄSSÄ KÄYTTÖOHJEESA MAINITULLA TAVALLA SAATTAA ALTISTAA KÄYTTÄJÄN TURVALLISUUSLUOKAN 1 YLITTÄVÄLLE NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE.

ADVARSEL
USYNLIG LASERSTRÅLING VED ÅBNING.
UNDGÅ UDSAETTELSE FOR STRÅLING.

VARNING
OM APPARATEN ANVÄNDS PÅ ANNAT SÄTT ÄN I DENNABRUKSANVISNING SPECIFICERATS, KAN ANVÄNDAREN UTSÄTTAS FÖR OSYNLIG LASERSTRÅLNING, SOM ÖVERSKRIDER GRÄNSEN FÖR LASERKLASS 1.

This manual applies to the CRW6416S and CRW6416S-NB.
The CRW6416S front panel displays the YAMAHA brand name.
The CRW6416S-NB front panel does not display a brand name.

SAFETY PRECAUTIONS

PLEASE READ CAREFULLY BEFORE PROCEEDING

These precautions explain how to use the device correctly and safely, thereby preventing injury to yourself or to others. This section has been sub-divided into a WARNING section and a CAUTION section, according to the likelihood and nature of any potential injuries or damage inflicted. They relate to your personal safety, and also help you minimize the risk of damaging the device. Please read these sections carefully before proceeding.

⚠ WARNING

Always follow the basic precautions listed below to avoid the possibility of serious injury or even death from electrical shock, short-circuiting, damages, fire or other hazards. These precautions include, but are not limited to, the following:

● Do not open the device or attempt to disassemble or modify it.
Otherwise, there is an increased risk of electrical shock or fire. The device contains no user-serviceable parts. If it appears to be malfunctioning, have it inspected by qualified service personnel.

● Do not look inside the device.
If you expose your eyes to the laser inside the device, you risk losing your vision.

● Do not insert fingers or foreign objects into the device.
Otherwise, there is an increased risk of personal injury, electrical shock, damage to the device or fire. Please take particular care if small children are present.

● Do not expose the device to rain, use it near water or in damp or wet conditions or place containers on it containing liquids which might spill into any openings.
Otherwise, there is an increased risk of electrical shock, fire or personal injury.

● Follow the Owner's Manual carefully.
Otherwise, there is an increased risk of personal injury, electrical shock, fire or damage to the unit. Follow the correct procedure when setting up the device.

● If unusual smells, sounds or smoke emanate from the device or if liquids enter the device, switch the computer off immediately and unplug it from the power outlet.
Otherwise, there is an increased risk of electrical shock, fire or damage to the device. Return the device immediately to the store at which it was purchased or alternatively, to the nearest Yamaha Service Center (listed at the back of this manual).

● Make sure the computer is electrically grounded
Otherwise, there is an increased risk of electrical shock.

● When opening up the computer, always unplug the computer from the electrical outlet. Do not touch the plug with wet hands.
Otherwise, there is an increased risk of electrical shock.

● When used in a fan-cooled system, the drive should not be exposed to temperatures outside the range 5°C ~ 40°C (41°F ~ 104°F).

⚠ CAUTION

Always follow the basic precautions listed below to avoid the possibility of physical injury to you or others, or damage to the instrument or other property. These precautions include, but are not limited to, the following:

● Always unplug the computer from the electrical outlet if it will not be used for a prolonged period of time or if there is a risk of lightning.
Otherwise, there is an increased risk of electrical shock, short-circuiting or fire.

● Do not expose the device to excessive heat or vibrations or extreme cold or heat (such as in direct sunlight or near a heater).
Otherwise, the front panel of the may become disfigured or the internal components may be damaged.

● Do not use the device near other electrical products such as televisions, radios or speakers.
Otherwise, this may cause interference which can affect the proper operation of those other products.

● Do not place the device in an unstable position.
Otherwise, it may accidentally fall down and be damaged or cause personal injury.

● Mount the device horizontally.
Otherwise, written data may be destroyed. Set the device up according to the instructions in the Owner's Manual.

● Always remove the disc from the tray before transporting the device.
Otherwise, written data may be destroyed.

● When cleaning the device, never use benzene, paint thinners, detergents, or chemical-impregnated wiping cloths. Also, do not place vinyl, plastic or rubber objects on the device.
Otherwise, the device may be damaged or its front panel may become discolored. Use a soft, dry cloth to wipe the device.

● Do not rest your weight on or place heavy objects on the device and do not use excessive force on the buttons, switches or connectors.
Otherwise, there is an increased risk of damage to the device or personal injury.

● Do not listen to audio with headphones at high volume and for prolonged periods of time.
Otherwise, there is an increased risk of hearing loss.
I Before using the device, set the volume dial to its lowest setting.
Otherwise, sudden bursts of sound can cause hearing loss.

● Do not place the device near sources of magnetic interference, such as computer displays.
Magnetic interference can affect the operation and stability of the device.

● Have the device serviced regularly.
Otherwise, dust can build up inside the device, increasing the risk of fire or damage. For information about servicing charges, contact the store at which the device was purchased or alternatively, the nearest Yamaha Service Center (listed at the back of this manual). The device should be serviced about once a year.

■ About CD-R/RW discs

Please read the following regarding the handling of CD-R/RW discs.

1. Do not expose discs to excessive heat or vibrations or extreme cold or heat (such as in direct sunlight or near a heater).

2. Do not touch disc surfaces.
When handling a disc, hold it by its edges.

3. Remove dust and dirt from disc surfaces.
Use air-based dust removers. The surfaces may be scratched if wiped with a dry cloth.

4. Do not write or stick labels on disc surfaces except where indicated.

5. Do not clean discs with chemicals or detergents.

6. Do not bend or drop discs.

1. **The information contained in this manual is subject to change without prior notice.**
2. **All trademarks contained in this manual belong to their respective owners.**
3. **Yamaha does not bear any responsibility for any outcome as a result of using this device.**
4. **Reproduction of this manual, either in part or in full, is expressly forbidden.**

NOTE Electrical plugs/sockets vary according to country/region.

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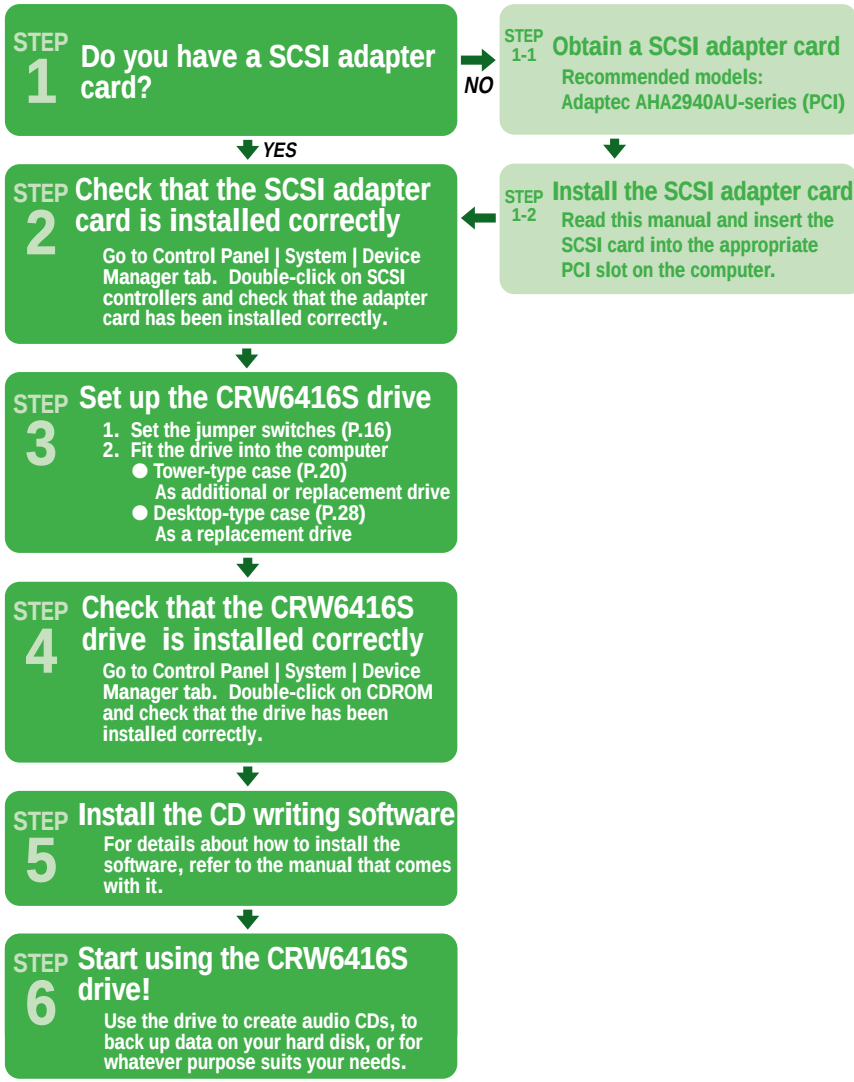
Unix is a registered trademark of UNIX System Laboratories.
All other trademarks are the property of their respective companies.

Setup Flowchart

CRW6416S Setup Flowchart

This flowchart shows the procedure for setting up the CRW6416S drive. For easy cross-referencing, the relevant pages in this manual are also given.



Introduction

Features of the CRW6416S Drive

6X Speed Writing to CD-R, 4X Speed Writing to CD-RW and 16X Speed Reading

The CRW6416S drive can write to CD-R at 6X, 4X or 1X (normal) speed and write/overwrite to CD-RW at 4X or 2X speed. It can also read from CD-R and CD-ROM media at up to 16X speed.

Supports a Wide Range of CD Formats

The CRW6416S drive can read from and write to CD-ROM in standard ISO9660 format and to audio CD in CD-DA format. Use the drive for a wide variety of purposes, such as backing up data, writing your own audio CDs and creating multimedia titles (using CD Extra mode). Just choose the writing/reading format that suits your needs. For more details, refer to page 10.

Fast SCSI-2 Compatible

The CRW6416S is compatible with Fast SCSI-2, the second-generation SCSI protocol for interconnecting computers and peripherals.

Windows 95/98 Plug and Play Compatible

Under Windows 95 or Windows 98, the SCSI ID number of the CRW6416S can be set automatically since the drive supports the SCAM Level 1 protocol. If there is a conflict between the manually-assigned SCSI ID of the CRW6416S drive and the ID of another SCSI device on the same chain, the CRW6416S is automatically assigned a vacant SCSI ID instead.

Supports all Four CD Writing Modes

These modes are Disc-at-Once (the disc is written in a single pass without pausing), Track-at-Once (data can be written incrementally to disc one track at a time), Session-at-Once (each session is written in a single pass without pausing), and Packet Writing (data can be written to disc in small increments just like with a floppy or hard disk). For more details, refer to page 42.

Copyrights

When writing to CD-R/RW, make sure that you are not breaching any copyrights. It is illegal to copy audio CDs for non-personal use. When backing up software, please make sure that you are not breaching any software copyrights for that product.

Distributing discs

When writing important data or preparing data for distribution to others, make sure that the disc can be read properly before writing duplicates.

Warranty

Yamaha accepts no liability for the loss of any data or any problems caused as a result. As a precaution, it is recommended that the discs are tested after they have been written to. Furthermore, under no circumstances does Yamaha guarantee the reliability of the media.

System Configuration

In order to use the CRW6416S drive, your computer system will need to meet the following set of requirements.

Computer

The minimum hardware requirements for using the CRW6416S drive are as follows:

- Any fully PC/AT-compatible computer.
- A Pentium-class or higher CPU running at 133MHz or faster. (200MHz or faster recommended.)
- A 5.25-inch drive bay for mounting the drive.
- A spare expansion slot for a SCSI card (if one hasn't been installed yet).
- A SCSI card to connect SCSI devices (including the CRW6416S) to your computer. Make sure it has an internal bus connector. Yamaha recommends any of Adaptec's AHA2940AU-series cards (PCI slot).

Software

The software requirements for using the CRW6416S drive are as follows:

- OS: Windows 95, Windows 98, or Windows NT4.0 with Service Pack 3.
- CD writing software. This software must support the CRW6416S drive for writing to CD-R or CD-RW.

  NOTE For details about how to install and use the software, refer to the manual that comes with it.

- Sufficient free hard disk space to install the necessary software. You will need a further 750MB of free space, or 800 ~ 850MB for packet writing, if you plan to write an image file to hard disk prior to writing to CD-R or CD-RW.

  NOTE Data is written to disc much more reliably when writing from an image file, eliminating the likelihood of errors occurring. Furthermore, this solution is ideal when making multiple copies of discs since the original data is backed up to hard disk as an image file.

Media

The CRW6416S drive is compatible with discs which meet the following specifications:

- **CD-R discs:**
  Use discs that conform to the Orange Book Part 2 standards. When writing to CD-R at 4X or 6X speed, you should use discs that have been designed for high-speed recording.
- **CD-RW discs:**
  Use discs that conform to the Orange Book Part 3 standards. When writing to CD-RW at 4X speed, you should use discs that have been designed for high-speed recording.
- **Read-only discs:**
  You can read from any CD-ROM discs that conform to the Yellow Book standard, and which bear the COMPACT disc logo. You can also play back any CD-DA (audio) discs that conform to the Red Book standards, and which bear the COMPACT disc DIGITAL AUDIO logo.

NOTE The Orange Book standard defines how all recordable discs (including CD-R and CD-RW) are written. Part 2 of the Orange Book standard relates to CD-R discs and Part 3, to CD-RW discs. The standard was named after the color of the book's pages. Similarly, the Red Book standard relates to audio (CD-DA) discs and the Yellow Book standard relates to CD-ROM discs.

About CD-ROM

A CD-ROM disc is a compact disc containing high-density read-only data. It has many applications, including the playback of music and video, the archiving of data, as well as on-line documentation. The following are descriptions of each CD-ROM format:

CD-DA: Up to 74 minutes of audio is written in 16-bit resolution at a sampling rate of 44.1kHz.

CD Extra: Audio, text, video and so on are written as a multisession disc. Applications are wide and varied, including computer games and on-line publishing.

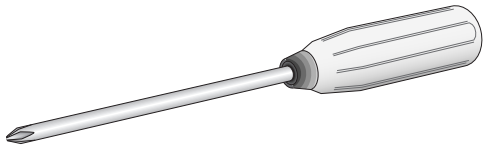
Video CD: Up to 74 minutes of video and audio is compressed in MPEG format for playback.

Tools

You will need the following tools at hand when installing the CRW6416S drive.

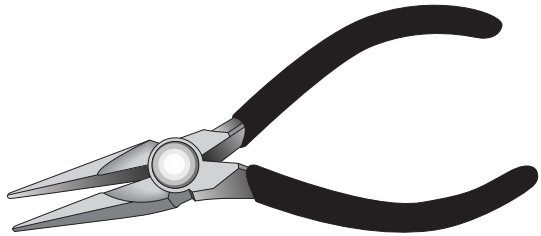
Philips Screwdriver

You will need to use this when removing the cover of your computer and when mounting the drive. You may also need to temporarily remove the sound card to gain access to the CD audio connectors. In which case a small screw retaining the sound card's face plate has to be removed.



Long-Nosed Pliers

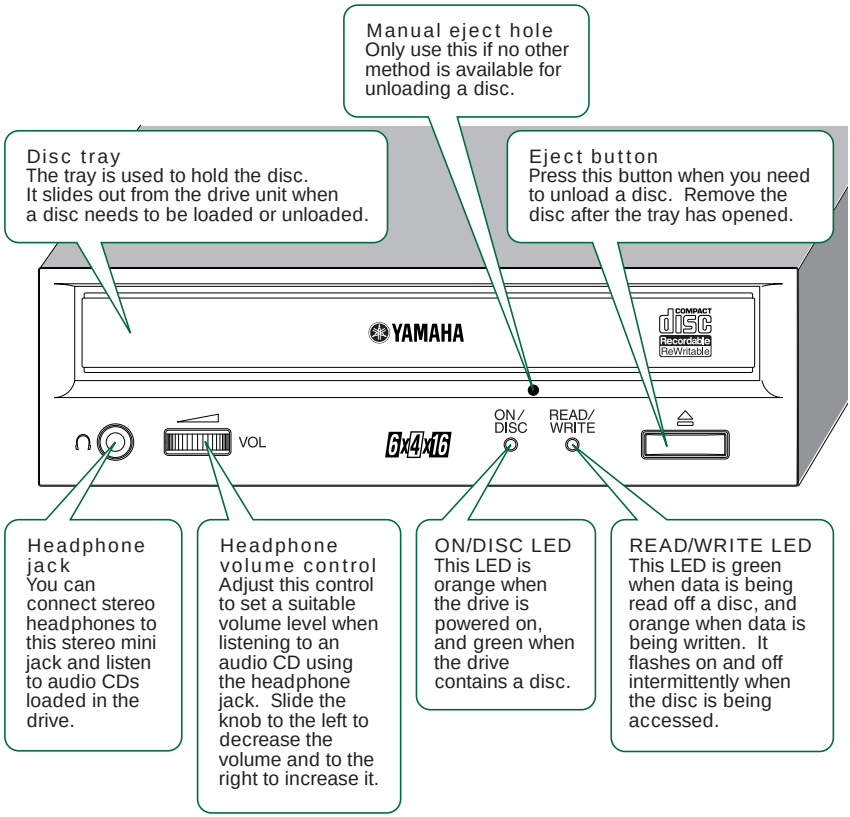
You will need these to insert or remove the plastic jumper shunts when setting the jumper switches at the back of the CRW6416S drive.



Front and Rear of Unit

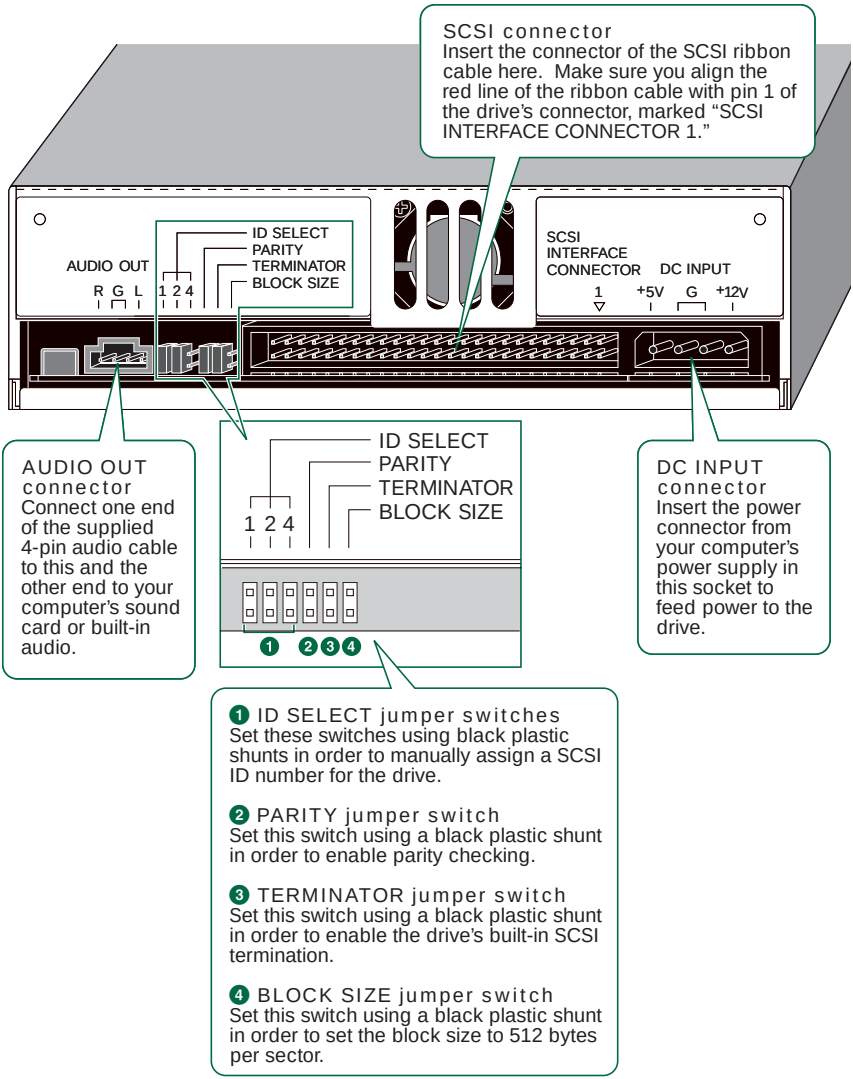
Front Panel

The CRW6416S drive's front panel features the following:



Rear Panel

The CRW6416S drive's rear panel features the following:

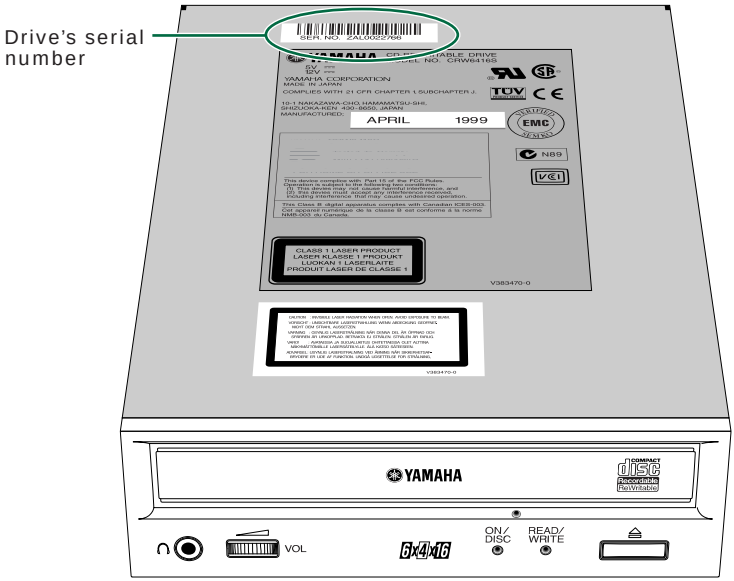


Installation

This section gives a step-by-step guide to installing the CRW6416S drive. Make sure you have all the necessary tools.

First Steps

Once you have taken the CRW6416S drive out of its packaging, you should immediately note down the serial number shown on the top of the drive together with a barcode. There is a box below the following diagram in which you can write down the serial number.

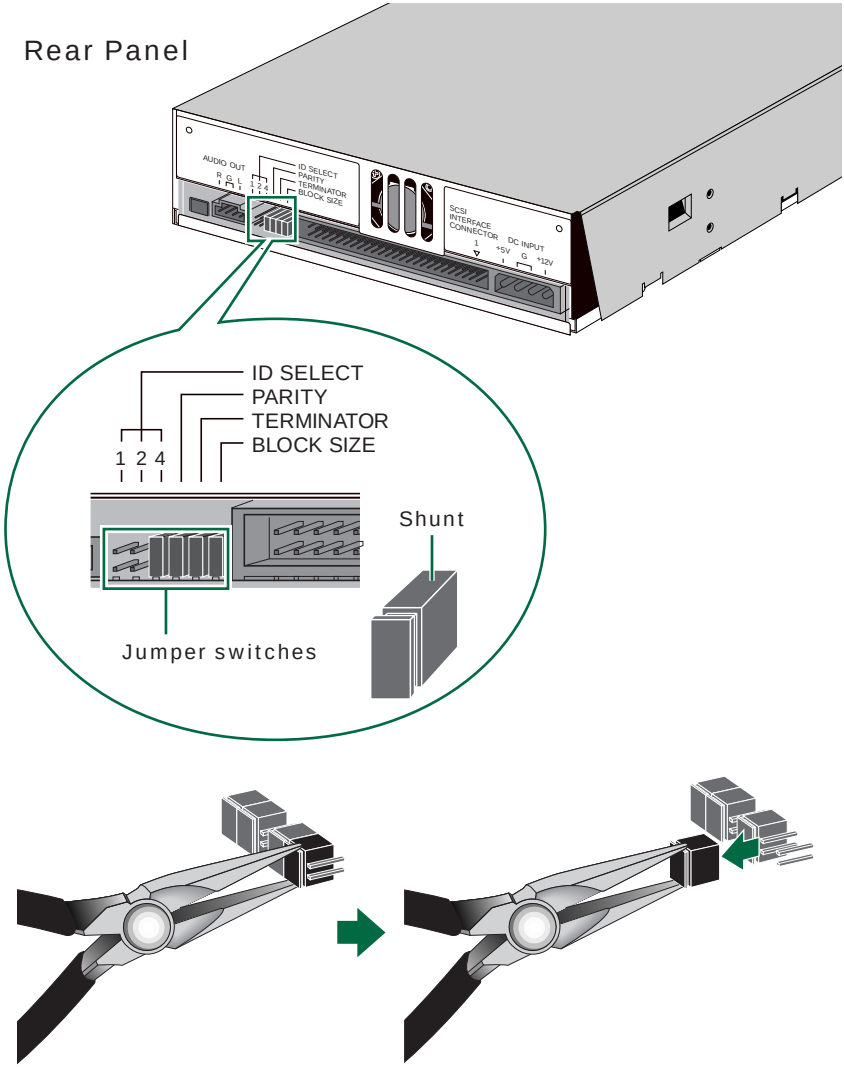


Serial No.	

Before fitting the CRW6416S drive into the computer, you need to set up the drive using the jumper switches located at the rear of the unit. You'll need to set the following:

- SCSI ID number
- Parity check
- Termination
- Block size

To set each jumper switch, you have to bridge the two pins in the respective column of the grid with a plastic shunt. Shunts are already attached to the jumper switches in their default configurations.

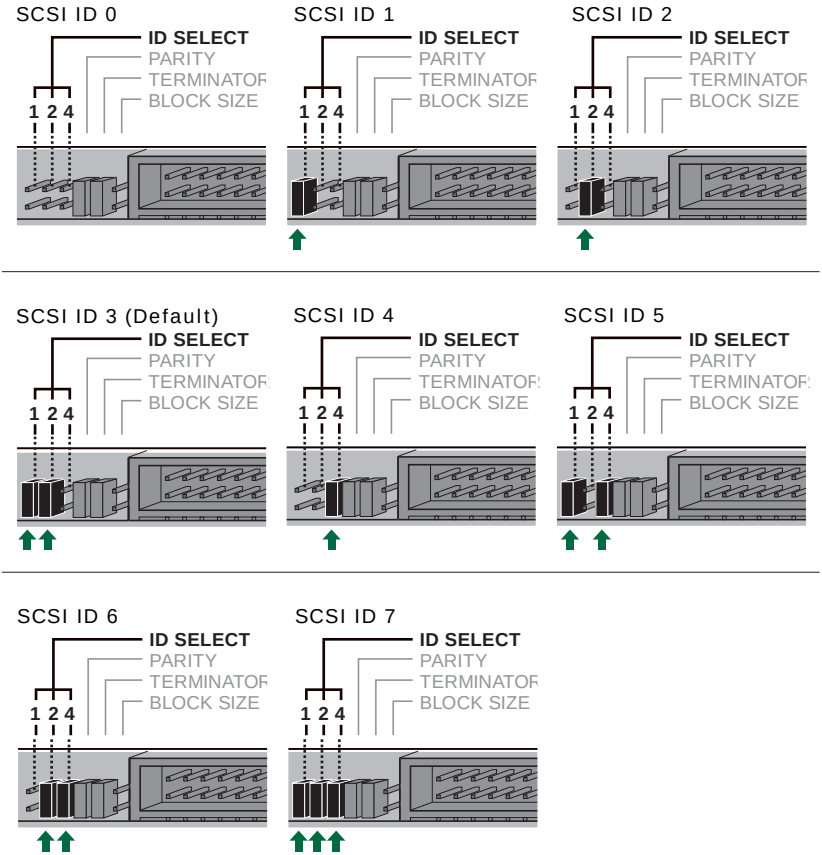


NOTE The plastic shunts actually contain metal for bridging the two pins of a jumper switch, creating an electrical connection between them when attached. When removed, the jumper switch is set to "off." Store unused shunts in a safe place where they will not be lost.

⚠ Use a pair of long-nosed pliers to attach or detach the shunts accordingly. However, make sure that the computer is switched off when doing so.

❶ SCSI ID number

Each of the SCSI devices connected to the computer is identified by its SCSI ID number. You need to assign a number from “0” to “7” for each SCSI device. Commonly, ID number “7” is reserved for the computer's SCSI adapter card itself. Therefore, the CRW6416S can actually be assigned an ID number from “0” to “6.” If it's the first device in the chain, you should assign it ID number “0.” The ID number is set by attaching/detaching the shunts on the ID Select jumper switches according to the diagram shown below.

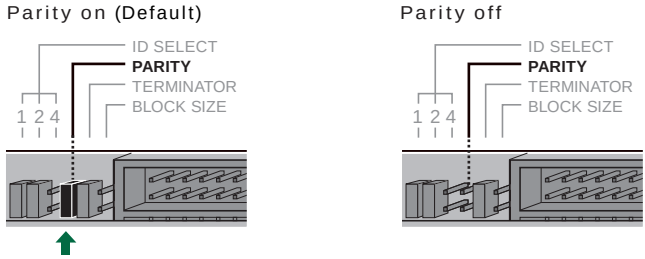


NOTE The SCSI ID number for each device on the chain must be unique. Make sure the CRW6416S drive's SCSI ID number is not the same as that of any other device on the chain. By factory default, the CRW6416S is assigned ID number “3” but this can be changed.

NOTE The CRW6416S is compliant with the SCAM Level 1 protocol. This means that if there is a conflict between the manually-assigned SCSI ID of the drive and the ID of another SCSI device on the same chain, the CRW6416S is automatically assigned an alternative vacant SCSI ID by the Plug and Play component of Windows 95 or Windows 98.

❷ Parity Check

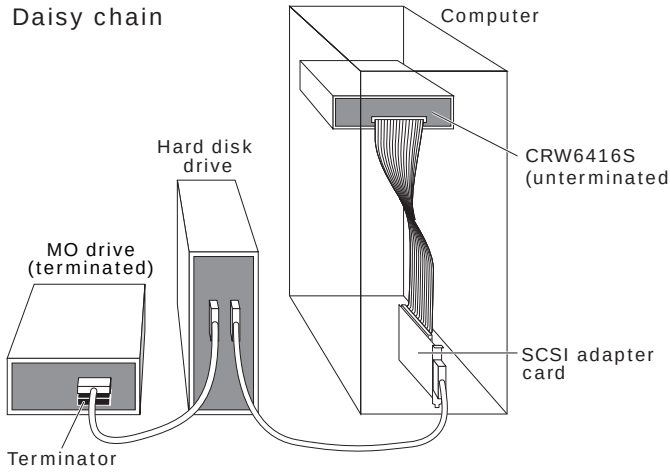
The parity check is used for error correction during data transmissions. If parity-checking has to be disabled, the shunt on the Parity jumper switch should be removed.



NOTE By factory default, the Parity switch is set to "on" and should normally be left in this state.

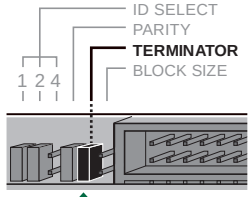
❸ Termination

Terminators prevent SCSI signals from being reflected off the last device in the chain. The SCSI terminator switch should be set to "on" if the CRW6416S is the last device on the internal SCSI chain. If the CRW6416S is not the last device on the internal SCSI chain, the shunt on the Terminator jumper switch should be removed.



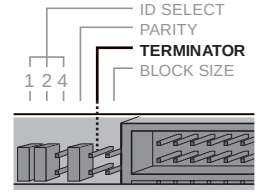
NOTE By factory default, the Terminator switch is set to "on."

Termination on (Default)



Set to “on” if CRW6416S drive is last device on SCSI chain

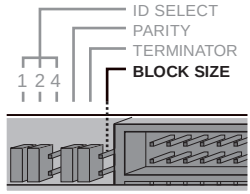
Termination off



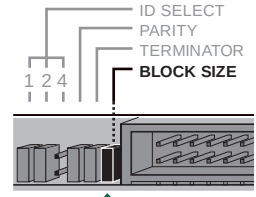
❹ Block Size

The data block size of the CRW6416S can be set to 512 bytes per sector by setting the Block Size jumper switch to “on.” This is necessary when installing the CRW6416S on a UNIX-based workstation.

Block size off (Default)



Block size on



Set to “on” when installing CRW6416S drive on UNIX workstation

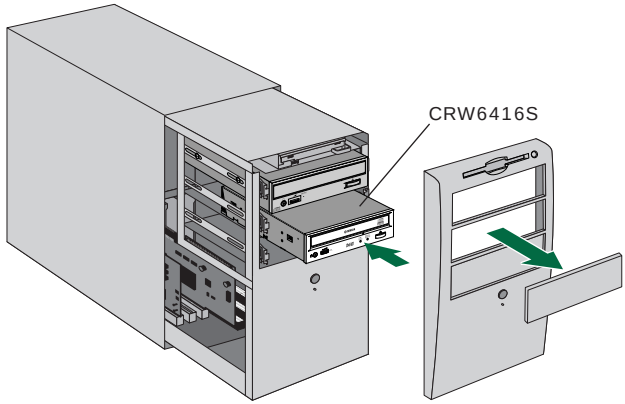
NOTE By factory default, the Block Size jumper switch is set to “off” and should normally be left in this state.

Installing the CRW6416S Drive

You can install the CRW6416S drive in one of two possible ways:

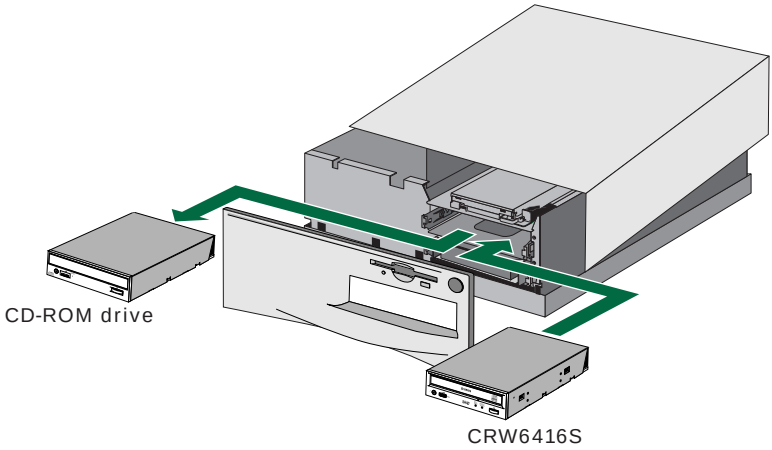
● As an additional drive

If the casing of your computer has a spare 5.25-inch drive bay available, such as with many tower-type designs, you can fit the CRW6416S drive in addition to the computer's existing CD-ROM drive.



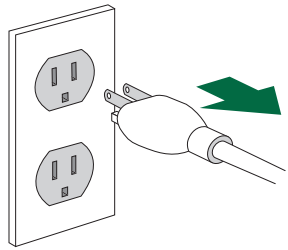
● As a replacement drive

If the casing of your computer does not have a spare 5.25-inch drive bay available, such as with many desktop-type designs, you can replace the computer's existing CD-ROM drive with the CRW6416S drive.



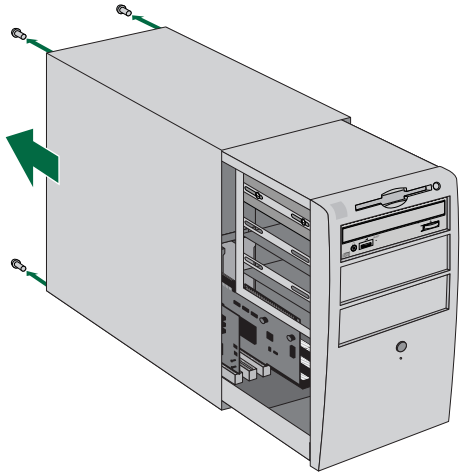
Fitting the CRW6416S as an Additional Drive

❶ Power down your computer and unplug it from the AC outlet.



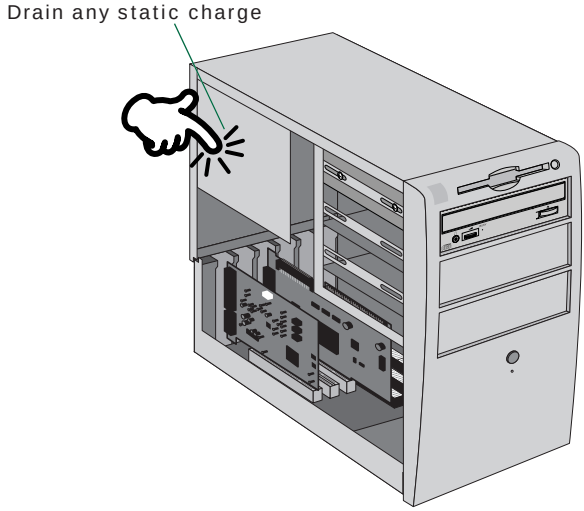
If you proceed without doing this, you run the risk of receiving an electric shock and/or short-circuiting and damaging components including the CRW6416S drive.

❷ Remove the outer casing of the computer. If you need to remove screws in the process, make sure you don't lose them.



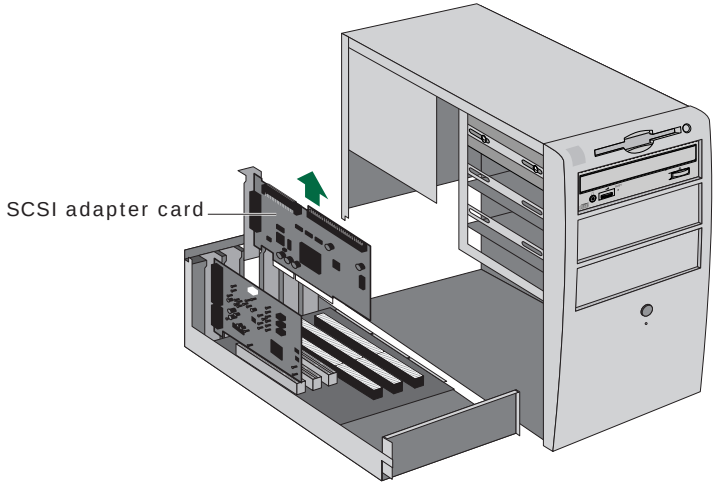
NOTE The method for removing the casing and fitting the drive in the drive bay can vary depending on the manufacturer. Refer to the documentation that came with your computer for further details.

❸ Touch a metal part of the computer's chassis or power supply unit to drain any static charge that may have built up inside your body.



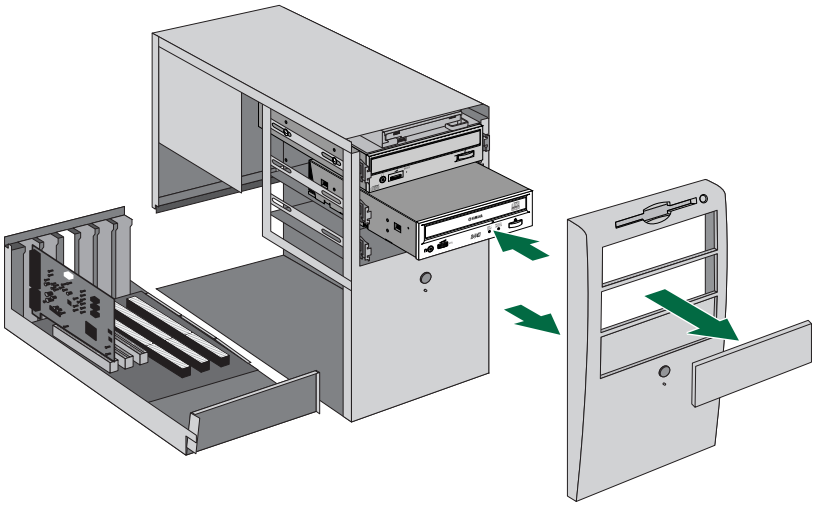
⚠ You can permanently damage equipment if you touch it while there is any static charge in your body.

❹ Remove the SCSI adapter card from the computer and turn its termination OFF so that internal SCSI devices may be connected. Refer to the documentation that came with your SCSI adapter card for further details.



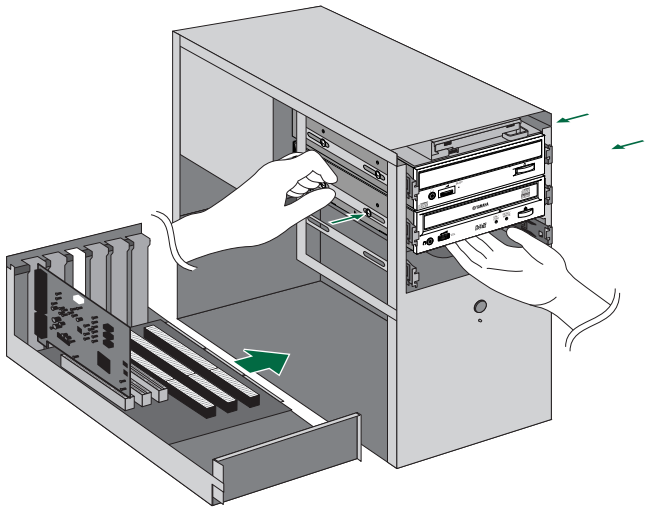
NOTE Some SCSI adapter cards are capable of auto-termination. If your card is of this type, you will not need to remove it from its slot since you will not need to set any of its switches or jumpers.

❺ Remove the front cover of a vacant 5.25-inch drive bay slot in the computer and slide the drive backwards into the slot.



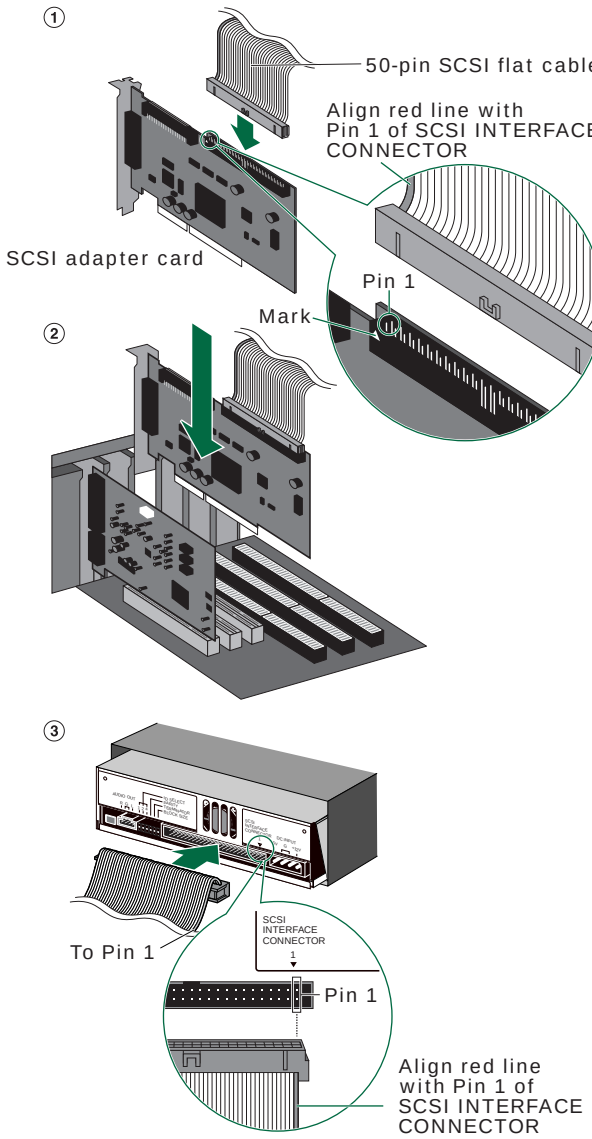
NOTE Do not apply excessive force when sliding the drive back into the drive bay slot.

❻ Leave enough room behind the drive for connecting the power, SCSI and audio cables. Then tighten the included four fastening screws on the sides of the unit by hand to hold the drive in place.

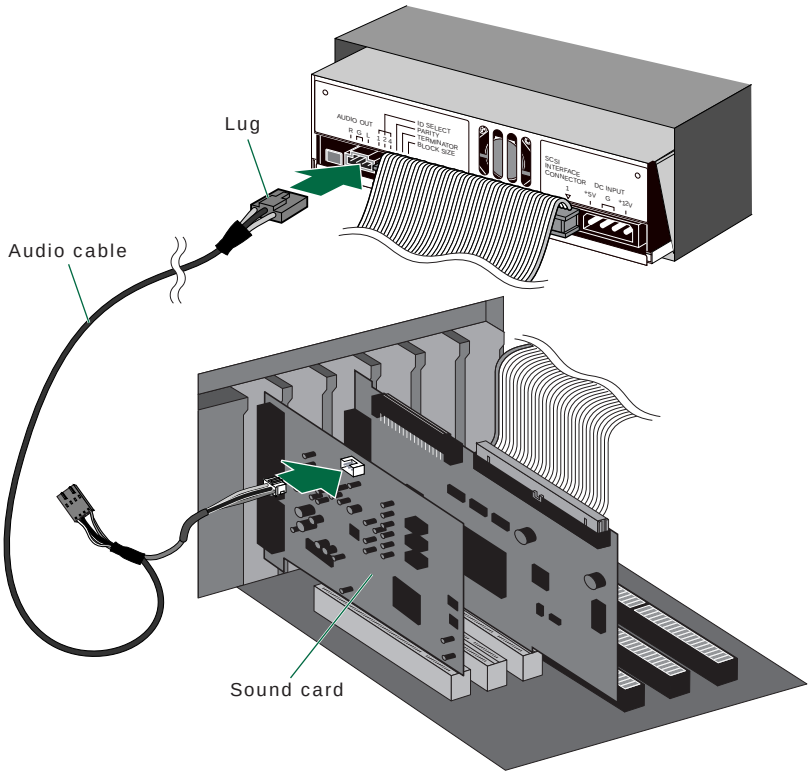


NOTE The four fastening screws are included with the drive.

❼ Connect one end of the 50-pin SCSI flat cable to the computer's SCSI adapter card. Align the red line of the cable with Pin 1 of the card's SCSI connector. Then put the SCSI adapter card back into its original slot in the computer. Next, connect a free 50-pin connector on the SCSI flat cable to the back of the CRW6416S drive such that the red line on the cable is aligned with Pin 1, marked "SCSI INTERFACE CONNECTOR 1."

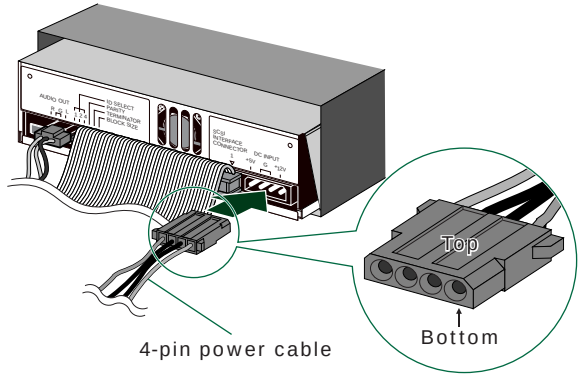


❽ Connect the audio cable between the CRW6416S drive and the computer's sound card, or the motherboard's audio connector if it has built-in audio. One end of the audio cable has two connectors: a smaller type and a larger type. Choose one that matches your sound card's connector. The connector at other end of the cable is connected to "AUDIO OUT" of the CRW6416S drive. Make sure connector's lug is at the top.



NOTE You do not need to connect the audio cable to write audio CDs since the audio is passed over the SCSI bus. It is required for playing back audio CDs on the CRW6416S drive via the computer's sound card. However, if a CD-ROM drive is already connected to the sound card, you should use this drive to play back your audio CDs. To listen to audio CDs without a computer sound card, connect headphones or speakers to the headphone jack on the CRW6416S drive's front panel.

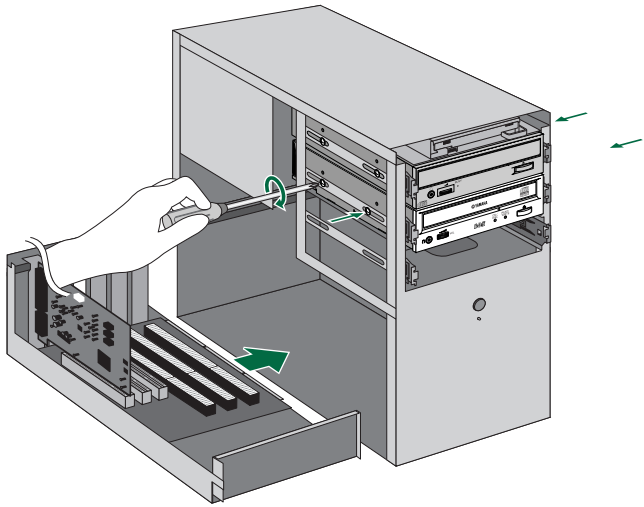
❾ Connect a 4-pin power cable to the power supply connector of the CRW6416S marked “DC INPUT.”



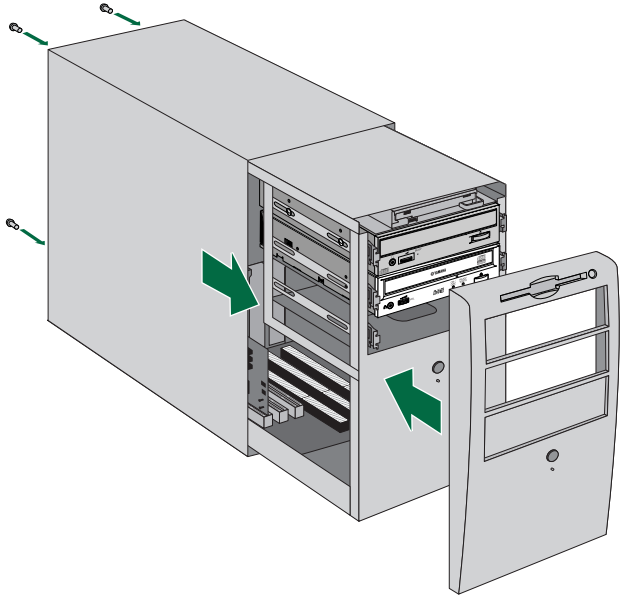
NOTE There may be more than one 4-pin power cable available. Any may be used.

NOTE These connectors are D-shaped so it is only possible to connect the power cables the correct way round. Do not apply excessive force when making this connection.

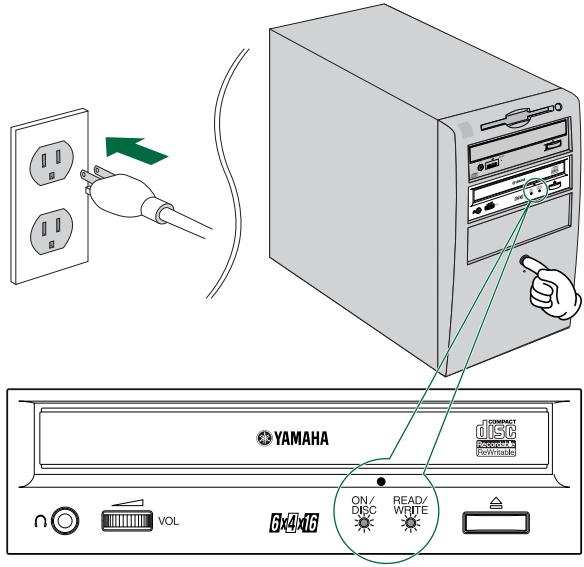
❿ Tighten the four fastening screws on the side of the unit securely using a screwdriver.



⓫ Attach the outer casing of the computer and any screws that were removed.



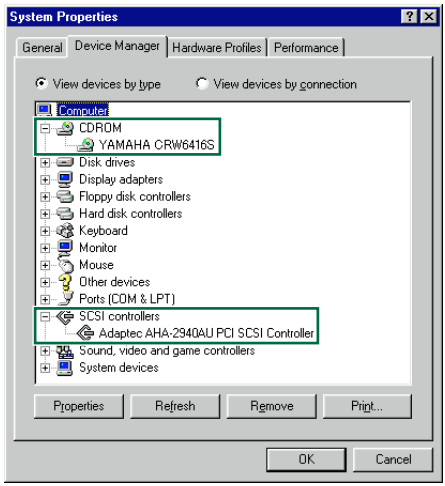
⓬ Reconnect the computer to the AC outlet and power it up.



NOTE When you power up the computer, make sure both LEDs on the front panel of the CRW6416S drive are lit.

⓭ After the computer's operating system has loaded, open the Control Panel and double-click on the System icon. Select the Device Manager tab and double-click on CDROM. If the drive has been correctly installed, it should be listed as shown below. Similarly, double-click on SCSI controllers and the SCSI adapter card should be listed as shown below if it has been properly installed.

NOTE For more information about how to use the operating system, refer to the documentation that came with it.



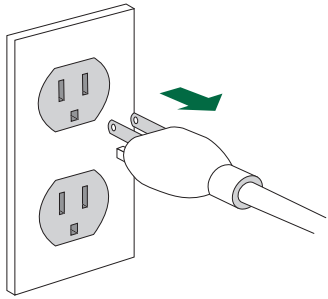
⓮ Install the CD writing software.

NOTE Refer to the documentation that came the CD writing software for further details.

Replacing an Existing CD-ROM Drive with the CRW6416S

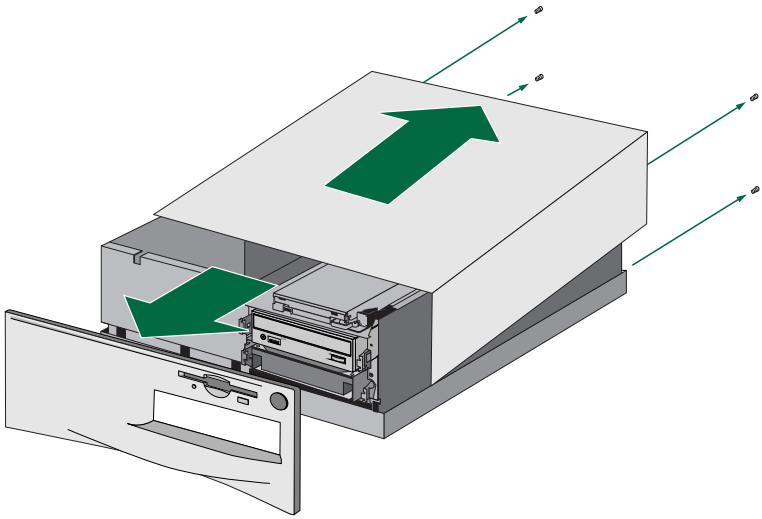
NOTE The existing CD-ROM drive in the computer is assumed to be an IDE-type.

❶ Power down your computer and unplug it from the AC outlet.



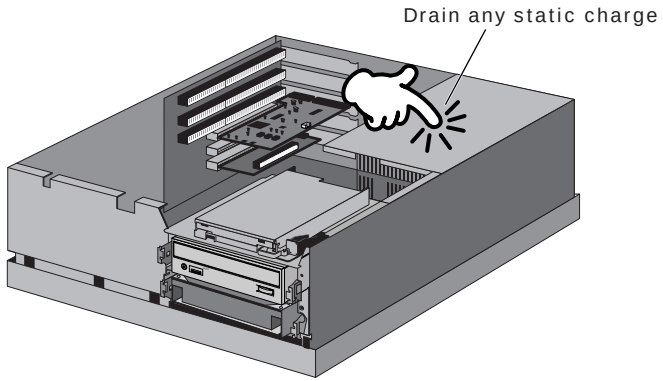
⚠ If you proceed without doing this, you run the risk of receiving an electric shock and/or short-circuiting and damaging components including the CRW6416S drive.

❷ Remove the outer casing of the computer. If you need to remove screws in the process, make sure you don't lose them.



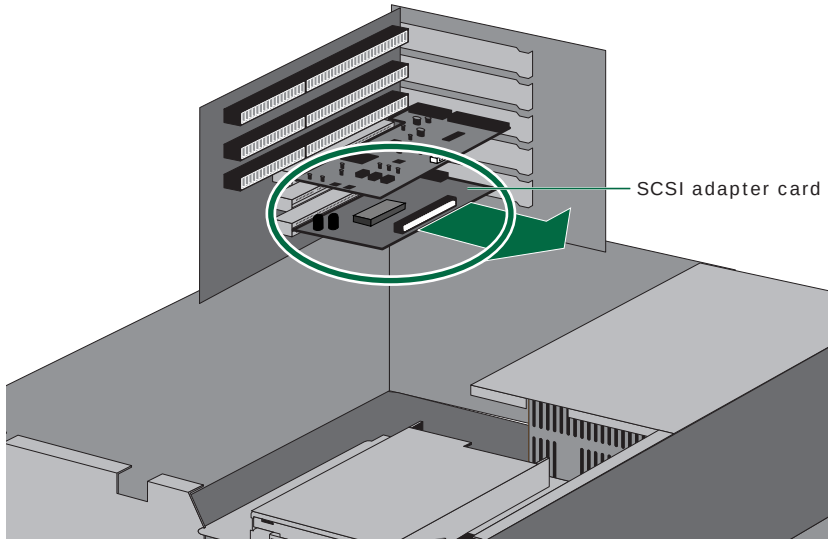
NOTE The method for removing the casing and fitting the drive in the drive bay can vary depending on the manufacturer. Refer to the documentation that came with your computer for further details.

❸ Touch a metal part of the computer's chassis or power supply unit to drain any static charge that may have built up inside your body.



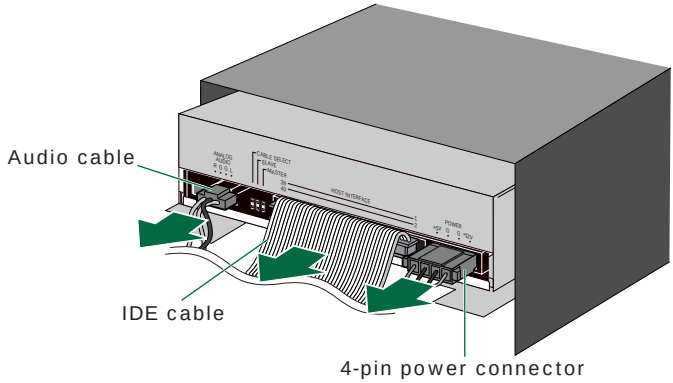
⚠ You can permanently damage equipment if you touch it while there is any static charge in your body.

❹ Remove the SCSI adapter card from the computer and turn its termination OFF so that internal SCSI devices may be connected. Refer to the documentation that came with your SCSI adapter card for further details.

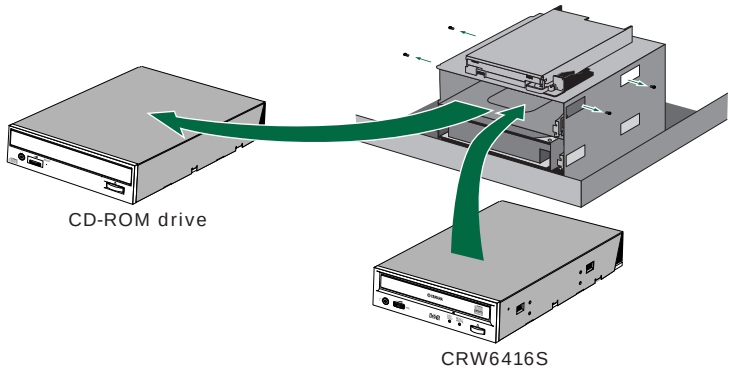


NOTE Some SCSI adapter cards are capable of auto-termination. If your card is of this type, you will not need to remove it from its slot since you will not need to set any of its switches or jumpers.

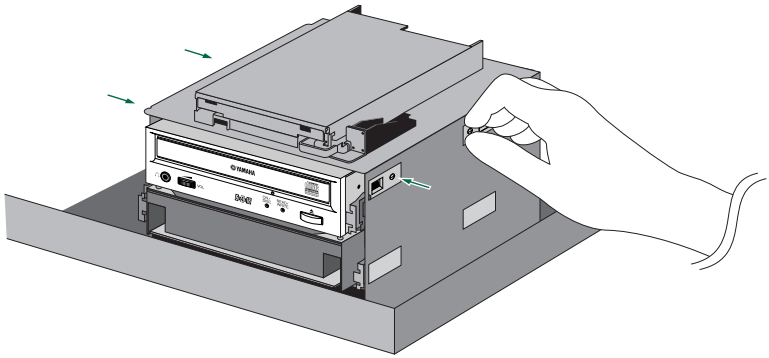
❺ Disconnect all the cables connected to the rear of the existing CD-ROM drive, and also disconnect the audio cable from the sound card or motherboard's audio connector.



❻ Remove the four screws holding the CD-ROM drive in place, then slide the drive forward and out from the drive bay.
Slide the CRW6416S drive backwards into the now-vacant bay without applying excessive force.

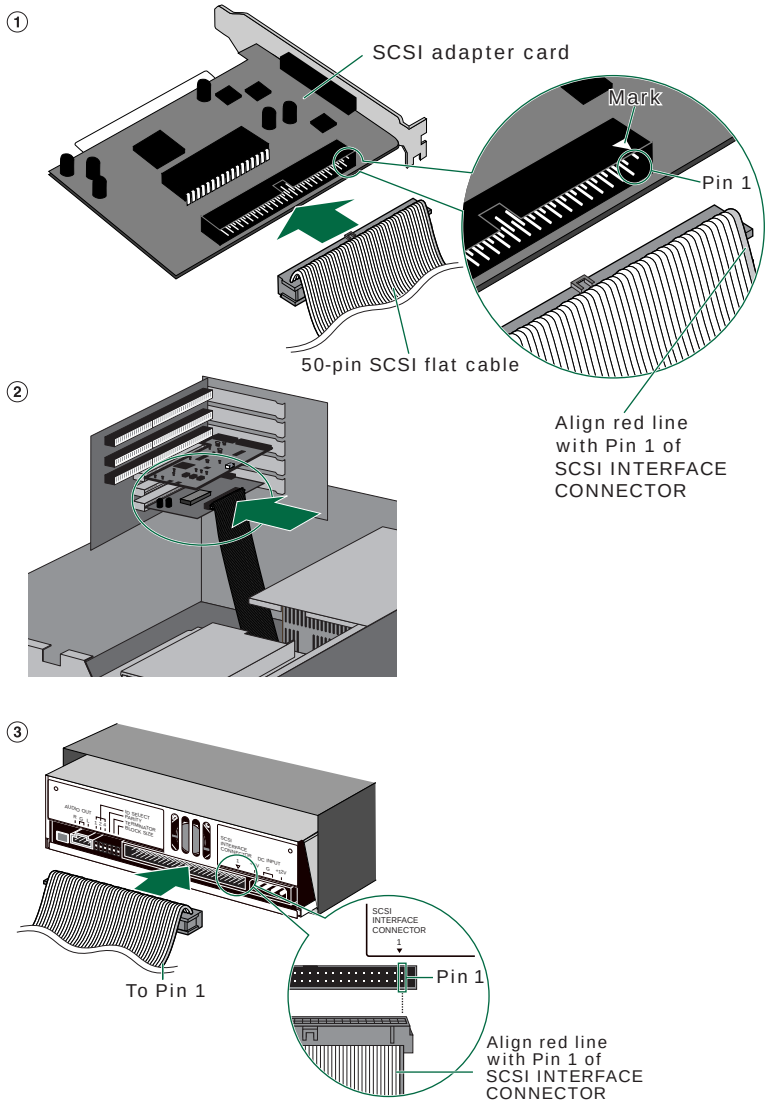


❼ Leave enough room behind the drive for connecting the power, SCSI and audio cables. Then tighten the four fastening screws on the sides of the unit by hand to hold the drive in place.

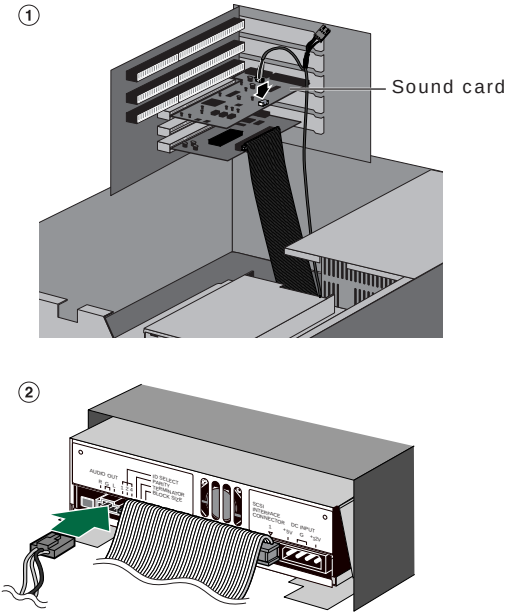


NOTE The four fastening screws are included with the drive.

❽ Connect one end of the 50-pin SCSI flat cable to the computer's SCSI adapter card. Align the red line of the cable with Pin 1 of the card's SCSI connector. Then put the SCSI adapter card back into its original slot in the computer. Next, connect a free 50-pin connector on the SCSI flat cable to the back of the CRW6416S drive such that the red line on the cable is aligned with Pin 1, marked "SCSI INTERFACE CONNECTOR 1."

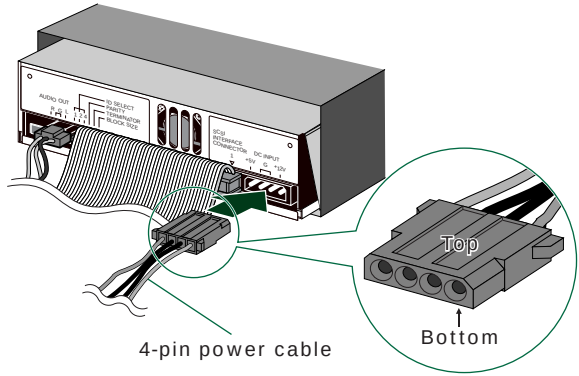


❾ Connect the audio cable between the CRW6416S drive and the computer's sound card, or the motherboard's audio connector if it has built-in audio. One end of the audio cable has two connectors: a smaller type and a larger type. Choose one that matches your sound card's connector. The connector at other end of the cable is connected to “AUDIO OUT” of the CRW6416S drive. Make sure connector's lug is at the top.



NOTE You do not need to connect the audio cable to write audio CDs since the audio is passed over the SCSI bus. It is required for playing back audio CDs on the CRW6416S drive via the computer's sound card. However, if a CD-ROM drive is already connected to the sound card, you should use this drive to play back your audio CDs. To listen to audio CDs without a computer sound card, connect headphones or speakers to the headphone jack on the CRW6416S drive's front panel.

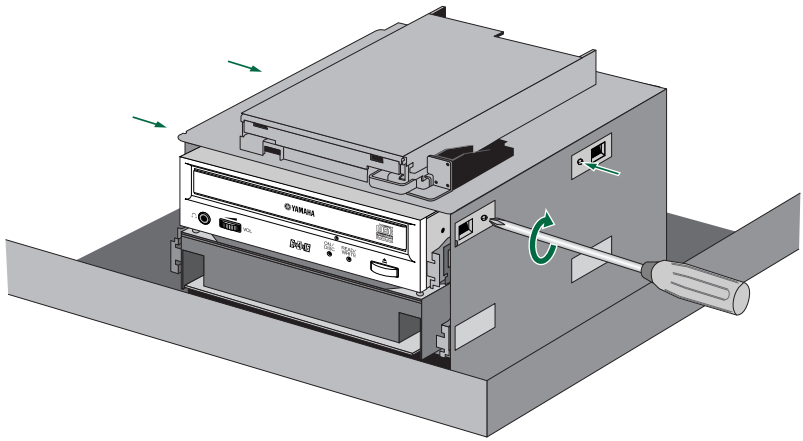
⓾ Connect the 4-pin power cable to the power supply connector of the CRW6416S marked “DC INPUT.”



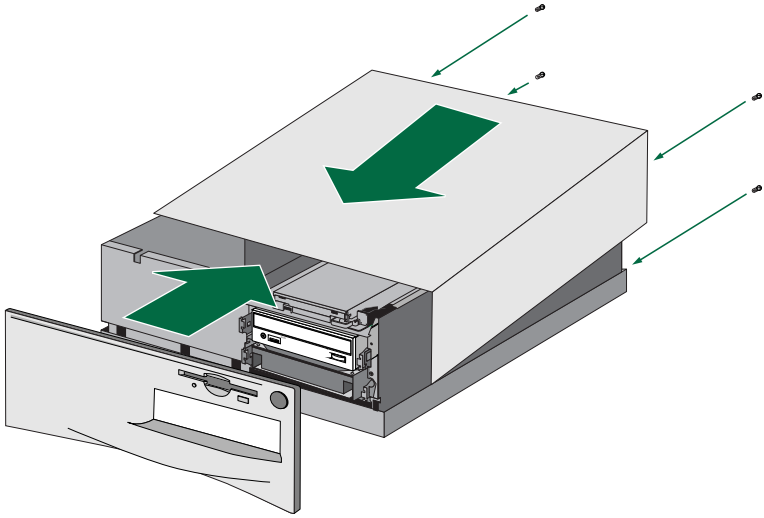
NOTE There may be more than one 4-pin power cable available. Any may be used.

NOTE These connectors are D-shaped so it is only possible to connect the power cables the correct way round. Do not apply excessive force when making this connection.

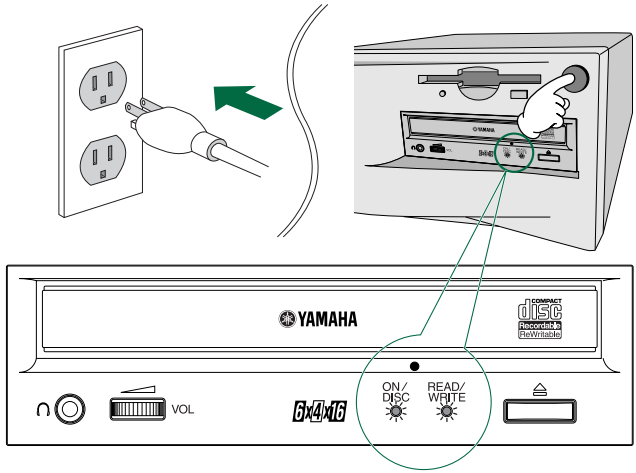
⓫ Tighten the four fastening screws on the side of the unit securely using a screwdriver.



⓬ Attach the outer casing of the computer and any screws that were removed.



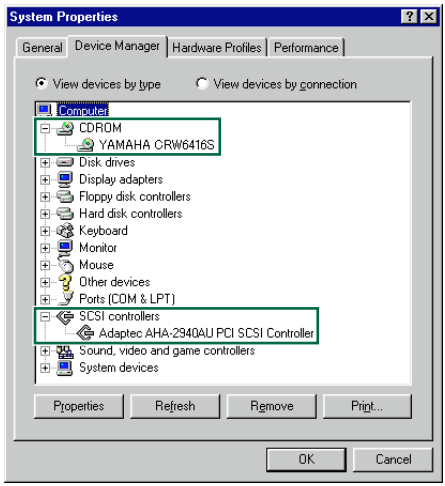
⓭ Reconnect the computer to the AC outlet and power it up.



NOTE When you power up the computer, make sure both LEDs on the front panel of the CRW6416S drive are lit.

⓮ After the computer's operating system has loaded, open the Control Panel and double-click on the System icon. Select the Device Manager tab and double-click on CDROM. If the drive has been correctly installed, it should be listed as shown below. Similarly, double-click on SCSI controllers and the SCSI adapter card should be listed as shown below if it has been properly installed.

NOTE For more information about how to use the operating system, refer to the documentation that came with it.



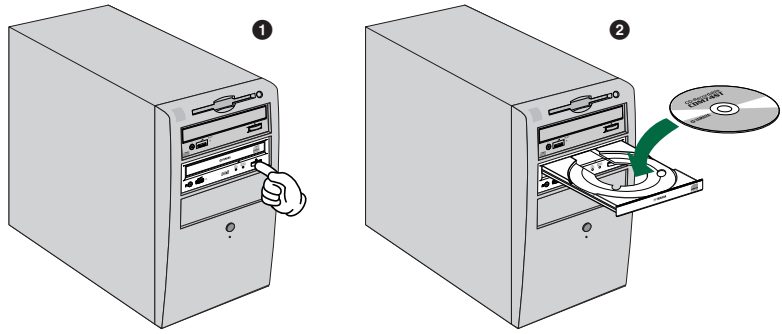
⓯ Install the CD writing software.

NOTE Refer to the documentation that came the CD writing software for further details.

Operation

This section explains how to operate the CRW6416S drive after you have installed it.

Loading a Disc



❶ Press the Eject button on the CRW6416S drive's front panel.

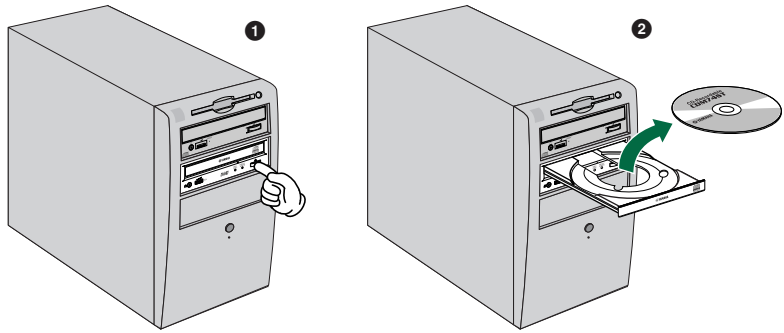
❷ Place the disc onto the tray with its label or printing facing upward.

❸ Press the Eject button to close the tray.

NOTE When a disc is loaded, the ON/DISC LED is lit up in orange first, then changes to green. For more details, refer to page 44.

NOTE Do not push or pull the tray using excessive force. Doing so can damage the drive or the disc. Instead, always use the Eject button to open or close the tray.

Ejecting the Disc



❶ Press the Eject button on the CRW6416S drive's front panel.

❷ Remove the disc from the tray.

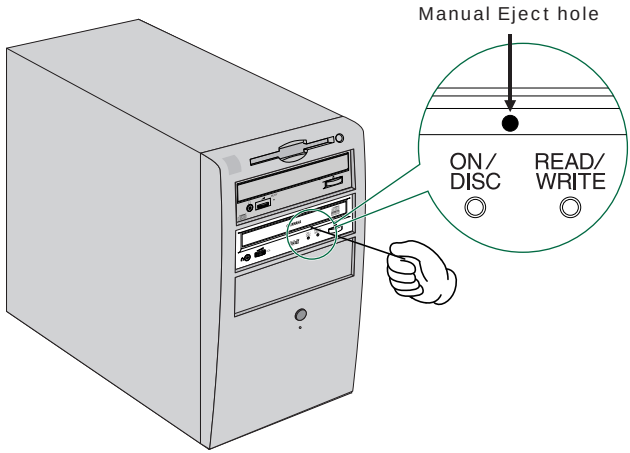
❸ Press the Eject button to close the tray.

NOTE The disc tray will not open if the computer is not switched on. Also, depending on the SCSI adapter card settings, it may not open if the drive is busy reading a disc.

NOTE Only remove the disc after the disc tray has opened fully. Otherwise, you risk damaging the drive or the disc.

Manually Ejecting a Disc

If the disc tray fails to open for some reason, such as a power outage, the it can be opened manually.



⚠ You should only attempt to eject a disc manually as a last resort. Malfunctions may occur if you do this too frequently.

1. Power down the computer.
2. Find a pin-like tool with a diameter of 2mm or less to fit through the Manual Eject hole on the drive's front panel.

NOTE A straightened paper clip is ideal for this purpose.

3. Push the tool gently into the Manual Eject hole until the spring-loaded mechanism ejects the tray and disc.

Troubleshooting

Please also refer to the Yamaha web site for more information.
Yamaha web site URL: http://www.yamaha.co.jp/english/product/computer/

The drive does not power up.

- Is the 4-pin power cable from the computer's power supply attached correctly?

The computer does not start up.

- Is the SCSI card installed correctly? Please read the instructions that came with your SCSI card for details.

The CRW6416S drive is not recognized.

- Is the 4-pin power cable from the computer's power supply attached correctly, and does the drive power up? Also, is the SCSI cable connected correctly?

  If the system has started up normally, you will be able to see the CRW6416S drive and SCSI card listed in Control Panel | System | Device Manager tab. The drive will be listed when you double-click on CDROM and the SCSI card will be listed when you double-click on SCSI controllers. (→P. 27, 36)

  When you power up your computer, you can access the machine's hardware BIOS settings before Windows is loaded. You can set your computer to recognize the SCSI card and CRW6416S drive in the BIOS.

NOTE The BIOS (Basic Input / Output System) is a small program that resides on a ROM chip on the computer's motherboard as well as on some expansion cards. It checks the system and its devices (such as serial ports and hard disk controllers) before loading the operating system (OS).

- Are you using the correct SCSI driver?

  If the SCSI card has not been installed correctly under Windows 95/98, make sure that you have installed the most recent drivers supplied by the SCSI card manufacturer.

  If the SCSI card has not been installed correctly under Windows NT, update to the most recent ASPI drivers supplied by the manufacturer of the SCSI card or the CD-writing software.

  For information about the latest version of any driver, please contact the respective hardware/software manufacturers.

- Is the SCSI adapter card recognized correctly by the operating system (OS)?

  The drivers for your SCSI adapter card may be incorrect. For more details, contact the manufacturer of your SCSI adapter card.

- Is the drive's SCSI ID number the same as that of another device on the SCSI chain? (→P. 16)

- Are the pins and holes on the SCSI connectors straight and not deformed?

  Check the connectors.

- Is the terminator on the CRW6416S drive set correctly?

  It should be set to ON only if it is the last device on the SCSI chain. Otherwise, it should be set to OFF. (→P. 17)

- Is the termination on the SCSI card set such that internal SCSI devices can be connected?

  Please read the instructions that came with your SCSI card for details.

- To write to CD-R/RW discs, your CD writing software must support the CRW6416S drive.

  To find out if it does, contact the manufacturer of your CD writing software.

The disc tray does not come out.

- Is the CRW6416S drive powered up?

- Some CD writing applications will lock the disc tray once loaded.

  In which case, use the eject command from within the application. Alternatively, read the manual that came with the application.

The disc keeps being ejected.

- Has the disc been placed on the disc tray correctly?

The drive does not operate correctly.

- Is the disc compatible with the CRW6416S drive?

NOTE Even if the disc is of a type compatible with the CRW6416S drive, some varieties of discs can still be unreadable on it.

- Is there dust on the disc tray or on the disc itself?

- Is the terminator of the last device on the SCSI chain set to “on”? Or if it has no built-in termination, has a terminator been attached?

- Does the computer have a sufficient power supply?

  The CRW6416S has a power consumption of 11W (when reading and writing).

- Does your computer have several different CD writing applications installed?

  If you use more than one CD writing application simultaneously, the behavior of the drive can become unpredictable.

The drive ejects or fails to read the disc, or the ON/DISC LED continues to blink in orange after the disc has been loaded (meaning that the disc has not been recognized).

- Disconnect the SCSI cable from the drive but leave the power cable connected, then load a disc.

- You may be trying to write to an unusable disc. If the drive fails to write to a variety of different discs, it may be faulty and you should contact your nearest Yamaha dealer.

The “Buffer Underrun” error message is displayed.

- Try the following:
  - Lower the writing speed setting (e.g., from 4x speed to 2x speed).
  - Create an image file of the CD on the computer's hard disk.
  - Defragment the hard disk.
  - Turn hard disk power management off.
  - Deactivate the Active Desktop (if you are using Internet Explorer 4).
  - Disable network access.
  - Close other applications (including screen savers, task schedulers, etc.).

NOTE Errors can occur if you knock the CRW6416S drive while it is writing to disc.

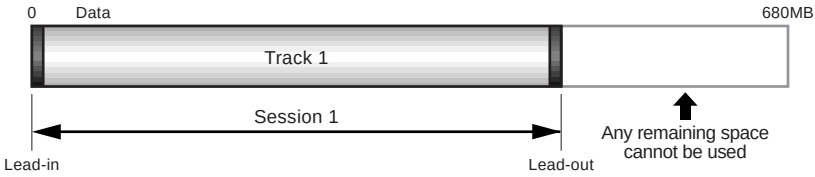
NOTE When using packet writing on a CD-RW disc, the actual data capacity is 100MB less than that stated on the cover of the disc. The difference in capacity is dependent on the writing mode.

Appendix

Writing Modes

Disc-at-Once (DAO)

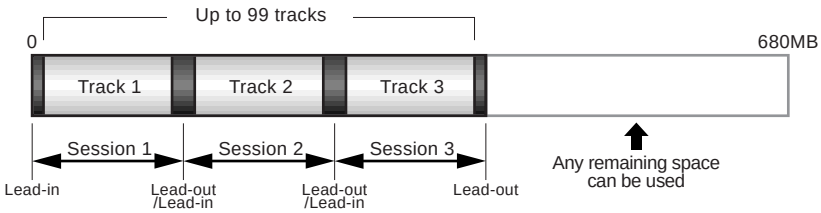
This mode is used when writing a complete disc in a single pass without pausing. Data cannot be added later, even if the full capacity of the blank disc has not been used. Although the data written from start to finish is known as a "session," no further sessions can be added later. This is why Disc-at-Once mode is sometimes referred to as Single Session.



NOTE The lead-in and lead-out areas signify the beginning and end points of a session. They are not part of the data but contain information about the session itself. Basically, a session consists of a lead-in, data, and a lead-out. However, the maximum number of tracks (of either audio or data) that can be written within a session is 99.

Track-at-Once (TAO)

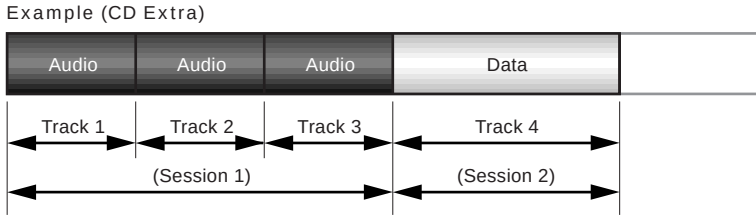
This mode is used when writing data to a disc one track at a time. More tracks can be added later if there is enough space left on the disc, provided the total number of tracks does not exceed 99. This is why Track-at-Once mode is sometimes referred to as Multisession.



NOTE Only the first session of a multisession disc can be played back on a conventional audio CD player. Single session discs can be played back completely.

Session-at-Once (SAO)

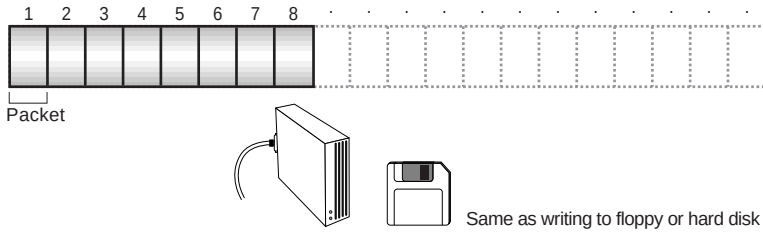
This mode is used when writing each session in a single pass without pausing. More sessions can be added later if there is enough space left on the disc.



NOTE With CD Extra, the audio is written in the first session and the data is written in the second. A maximum of 99 tracks can be written.

Packet Writing

This mode is used when writing to a track of a disc using small blocks of data called “packets,” in a manner similar to a floppy disk. This mode is useful when making small incremental backups of data. You will need to use software which specifically supports packet writing, such as Adaptec’s DirectCD. The CRW6416S drive supports sequential (contiguous) and random (non-contiguous) packet writing.



NOTE Discs must be formatted before they can be used for packet writing. With CD-RW, erased data can be overwritten until the disc is completely full.
With CD-R, the space used by the erased data cannot be reused and is “masked” so that it is no longer visible. This can be done up to 100 times.

About the firmware

The “firmware” is a small piece of software built into the CRW6416S drive, and is used to control its basic operation. Since it resides in flash memory, it can be overwritten and updated.

To ensure the correct operation of the CRW6416S drive, updates to the firmware will be made available. You can find information about the most recent firmware for the drive on Yamaha's web site.

URL for Yamaha's web site
http://www.yamaha.co.jp/english/product/computer/

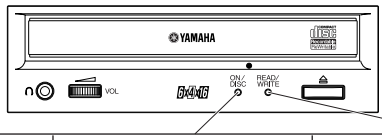
The most recent user support information, including firmware updates, can be found in the CD-R area of Yamaha's web site. Please check this information regularly.

NOTE The firmware is completely unrelated to the CD writing application software.

Determining the firmware version of the CRW6416S drive (in Windows 95/98)

Go to Control Panel | System | Device Manager tab, double-click on CDROM, then double-click on Yamaha CRW6416S.

LED Indicator Messages



Status	ON/DISC LED	READ/WRITE LED
Power on (reset)	● → —	● → —
Ready (no disc)	●	—
Loading disc	☀ → ☼	—
Ejecting disc	☀	—
Ready (disc loaded)	○	—
Seeking	○	☼
Preparing to write	○	☀
Writing	○	●
Writing (test mode)	○	☀
Reading	○	○

● Lit: Orange
○ Lit: Green
☀ Blinking: Orange
☼ Blinking: Green
—: Off

CRW6416S Specifications

Supported Write/Read Format		CD-DA CD-ROM CD-ROM XA CD-I CD-Bridge CD Extra Video CD Note) Excludes ADPCM Encode/Decode & Video Encode/Decode functions.
Writing Methods		Disc-at-Once (DAO) Session-at-Once (SAO) Track-at-Once (TAO) Packet writing (variable, fixed)
Writing/Reading Speed	Writing	CD-R 1X, 4X, 6X CD-RW 2X, 4X
	Reading	9X-16X (max) Partial CAV Note) • CD-DA extraction: 10X (max) • Video CD: 6X (max) • Drive can play CD-DA at 1X speed only. • Finalized disc CD-R: 16X (max) (10X max for packet writing) CD-RW: 6X (max) (6X max for packet writing) • Unfinalized disc: 6X (max)
	CD-R	1X, 4X, 6X Writing: Orange Book Part II Ver.2.0-specified WO disc Note) When writing at 6X speed, use discs made for high speed recording.
	CD-RW	2X, 4X Writing/ReWiting: Orange Book Part III Version 2.0-specified RW discs Note) When writing at 2X speed, Orange Book PartIII Version 1.0-specified RW discs available.
Data Capacity		650MB (74 min.) 550MB (63 min.)
Data Transfer Rate		1X: 150 KB/sec 2X: 300 KB/sec 4X: 600 KB/sec 6X: 900 KB/sec 10X: 1500KB/sec 16X: 2400 KB/sec
Burst Transfer Rate		5 MB/sec (max) (asynchronous) 10 MB/sec (max) (synchronous)
Data Buffer Size		2 MB (666 sectors)
Average Random Access Time		180 msec (reading)

Sector Size	2048 ~ 2352 B 512 B (read only)
Interface	Fast SCSI-2
Installing style	Horizontal
Disc Loading Type	Tray loading
Audio Out	Line Out Frequency Range: 20 ~ 20,000Hz Output Level: 1 Vrms
Power Consumption	11W (when writing or reading)
Power Supply	5V DC ±5% 12V DC ±10%
Operating Environment	Temperature +5°C ~ +40°C Humidity 25% ~ 80% RH (no condensation)
Dimension	Width: 146.0 mm Height: 41.3 mm (excludes 0.5 mm projection at bottom) Depth: 193.1 mm (excludes front panel)
Weight	0.95 kg

The CRW6416S series complies with the following specifications.

Country / Region	Compliance Specifications			Details
	Category	Item	Standards	
USA	Safety	Electrical	UL1950	Information Technology Equipment
		Laser	21CFR1040.10 FDA Chapter 1, Subchapter J	Class 1 Laser Product
	EMC	Emission	47CFR15 FCC Part 15, Subpart B	Class B Computing Device
Canada	Safety	Electrical	CSA C22.2 No. 950	Information Technology Equipment
	EMC	Emission	ICES-003	Class B Computing Device
EU	Safety	Electrical	EN60950	Information Technology Equipment
		Laser	EN60825	Class 1 Laser Product
	EMC	Immunity	EN50082-1	Residential, Commercial and Light Industrial Areas
		Emission	EN55022	Class B Equipment
Australia New Zealand	EMC	Emission	AS/NZ 3548	Class B Equipment
Japan	EMC	Emission	VCCI	Class B Equipment

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Distributors and Head Offices

English: If you have any questions, please contact your dealer or one of the following companies.

French: Pour plus de détails sur les produits, veuillez vous adresser à Yamaha ou au distributeur le plus proche figurant dans la liste suivante :

German: Bei weiteren Fragen wenden Sie sich Sitte an Ihren Händler oder eine der folgenden Firmen.

Spanish: Si tiene alguna pregunta, por favor póngase en contacto con su distribuidor o una de las siguientes empresas:

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FAX: +81 539 62 5346
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