



CD-R/RW Drive

CRW6416SX

SERIES

English

Deutsch

Français

Español

OWNER'S MANUAL
BEDIENUNGSANLEITUNG
MODE D'EMPLOI
MANUAL DE INSTRUCCIONES



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 μ W*

- * 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.

VAROITUS

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

ADVARSEL

USYNLIG LASERSTRÅLING VED ÅBNING. UINDGÅ UDSAETTELSE FOR STRÅLING.

VARNING

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

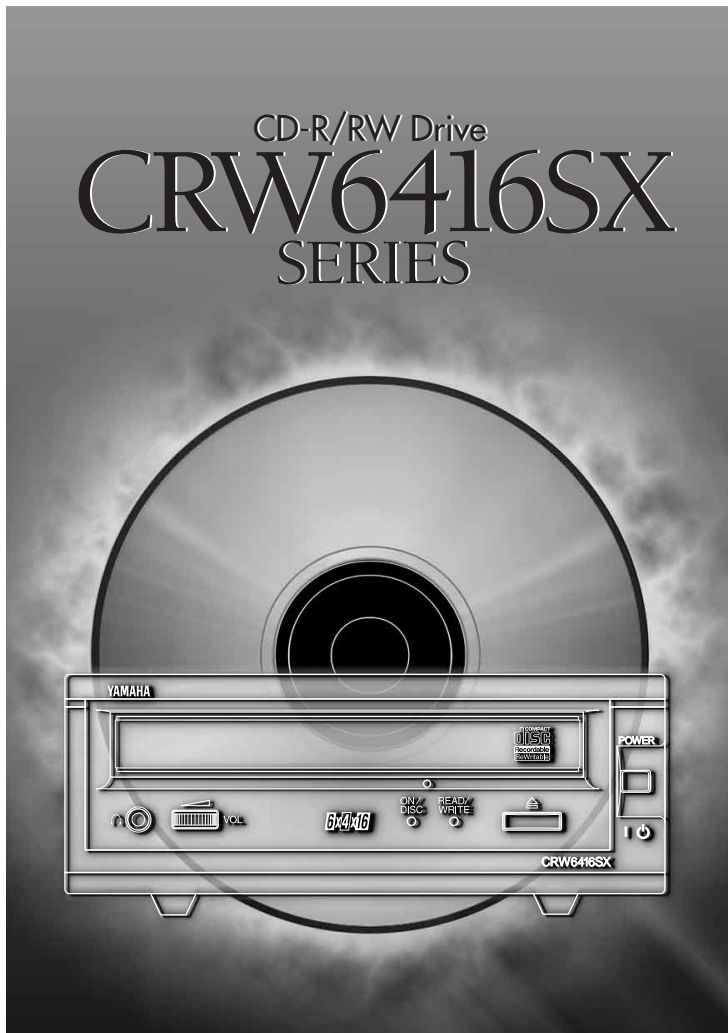
CLASS 1 LASER PRODUCT
LASER KLASSE 1 PRODUKT
LUOKAN 1 LASERLAITE
PRODUIT LASER DE CLASSE 1

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

CAUTION : INVISIBLE LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM.
VORSICHT : UNSICHTBARE LASERSTRÄHLUNG WENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSETZEN.
VARNING : OSYNLIG LASERSTRÅLING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRÄKTA EJ STRÅLEN. STRÅLEN ÄR FARLIG.
VARO! : AVATTAESSA JA SUJALUKITUS OHJETTAESSA OLET ALTITVA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.
ADVARSEL: USYNLIG LASERSTRÅLING VED ÅBNING NÄR SIKKERHETSafbrydere ER UDE AF FUNKTION. UINDGÅ UDSAETTELSE FOR STRÅLING.

Warning instruction for laser radiation.
Varningsanvisning för laserstrålning.

CD-R/RW Drive
CRW6416SX
SERIES



OWNER'S MANUAL

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 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.
- 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.

■ Precautions for Transportation

Before transporting the device, always place the transportation pad on the disc tray and put the device back in its original box . If the device is transported without adequate packing, the internal components can become damaged and cause the device to malfunction.

■ 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.

■ Copyrights

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

■ WARRANTY

YAMAHA AND SUPPLIERS ACCEPT 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 AND SUPPLIERS GUARANTEE THE RELIABILITY OF THE MEDIA.



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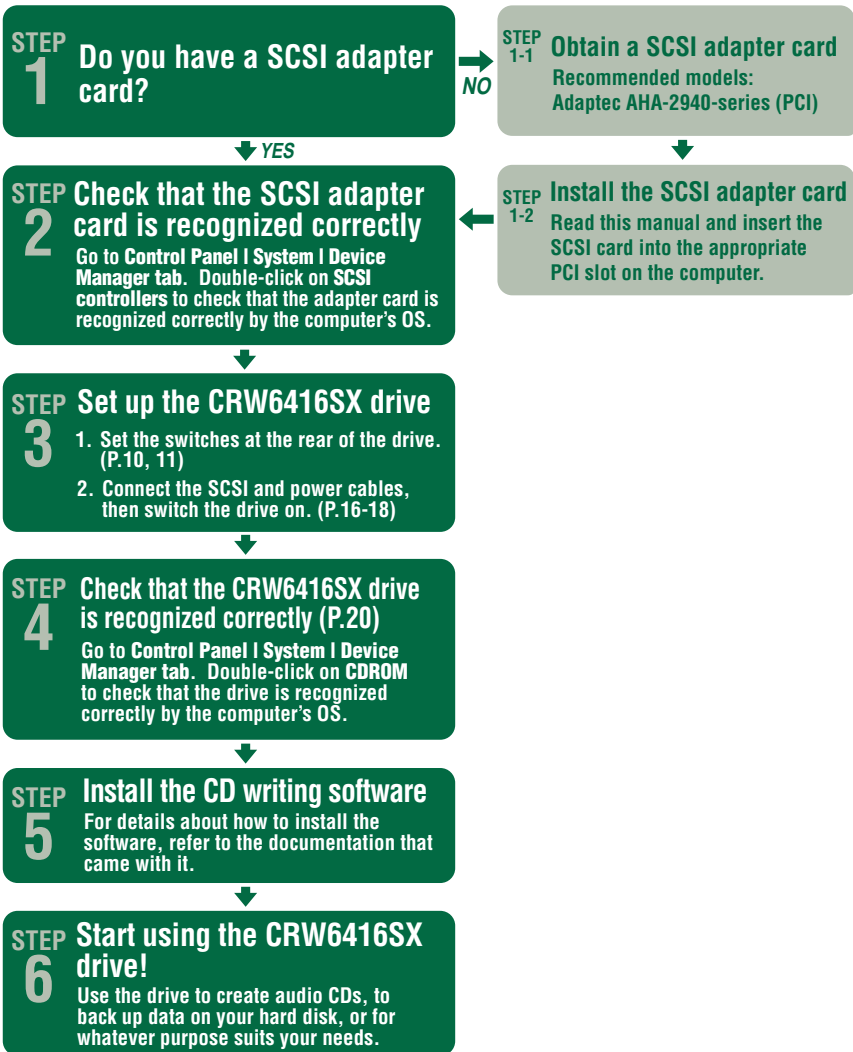
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Setup Flowchart

These flowcharts show the procedure for setting up the CRW6416SX drive. For easy cross-referencing, the relevant pages in this manual are also given.

Windows Users



Macintosh Users

STEP 1 Does your Macintosh have a built-in SCSI connector?

NO

STEP 1-1 Obtain a SCSI adapter card
Recommended model:
Adaptec PowerDomain 2930U (PCI)

YES

STEP 2 Set up the CRW6416SX drive

1. Set the switches at the rear of the drive. (P.10, 11)
2. Connect the SCSI and power cables, then switch the drive on. (P.16-18)

STEP 1-2 Install the SCSI adapter card
Read this manual and insert the SCSI card into the appropriate PCI slot on the computer.

STEP 3 Install the CD writing software

For details about how to install the software, refer to the documentation that came with it.

STEP 4 Check that the CRW6416SX drive is recognized correctly

Start up the CD writing software and check that the drive is recognized correctly.

STEP 5 Start using the CRW6416SX drive!

Use the drive to create audio CDs, to back up data on your hard disk, or for whatever purpose suits your needs.



Introduction

Features of the CRW6416SX Drive

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

The CRW6416SX drive can write to CD-R at 6X, 4X or 1X 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 CRW6416SX 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 6.

SCSI-2 (Fast SCSI) Compatible

The CRW6416SX is compatible with SCSI-2 (Fast SCSI), 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 CRW6416SX can be set automatically. If there is a conflict between the manually-assigned SCSI ID of the CRW6416SX drive and the ID of another SCSI device on the same chain, the CRW6416SX 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, as used for audio CDs and in mastering), 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 27.



System Configuration

In order to use the CRW6416SX drive, your computer system will need to meet the following set of requirements.

Computer

The minimum system requirements for using the CRW6416SX drive are as follows:

- Any fully PC/AT-compatible computer.
- A Pentium-class CPU running at 133MHz or faster. (200MHz or faster recommended.)

NOTE Macintosh users will require a 68040 or PowerPC CPU and at least 16MB of memory.

- OS: Windows 95, Windows 98, or Windows NT4.0 with Service Pack 3/4/5.

NOTE Macintosh users will require System 7.5.3 or above.

- A spare PCI slot for a SCSI card (if one hasn't been installed yet).
- A SCSI card to connect SCSI devices (including the CRW6416SX) to your computer. Make sure it has a half-pitch 50-pin D-sub external connector. Yamaha recommends any of Adaptec's AHA-2940-series cards (PCI slot).

NOTE Many Apple Macintosh computers have built-in SCSI connectors. However, if your Macintosh does not have a built-in SCSI connector, you will need to obtain a PCI bus SCSI adapter card. (Yamaha recommends Adaptec's PowerDomain 2930U card.)

NOTE For details about how to install the SCSI adapter card, refer to the documentation that came with it.

Software

The software requirements for using the CRW6416SX drive are as follows:

- CD writing software. This software must support the CRW6416SX drive for writing to CD-R or CD-RW.

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



NOTE Please verify the settings for your system setup (hardware, OS, etc.).

- When temporarily storing data on hard disk prior to writing to CD-R/RW, you will need an extra area of 50 ~ 100MB free hard disk space in addition to the amount used by the data itself. So when storing an image file of an audio CD on hard disk, a 74-minute disc (which is about 740MB of data) will require a total of 790 ~ 840MB of free hard disk space. However, this extra area is not needed when directly backing up from CD-ROM.

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 CRW6416SX 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  logo. You can also play back any CD-DA (audio) discs that conform to the Red Book standards, and which bear the  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.

Data CD: Up to 650 megabytes of computer data is stored in standard ISO9660 format.

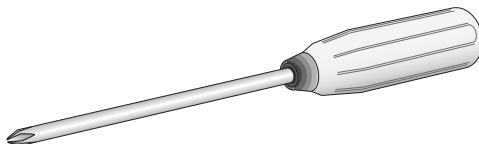
Video CD: These hold movies in which the video and audio data has been compressed using MPEG-1 technology.

Tool

Phillips Screwdriver

You will need to use this when removing the cover of your computer and installing a SCSI adapter card.

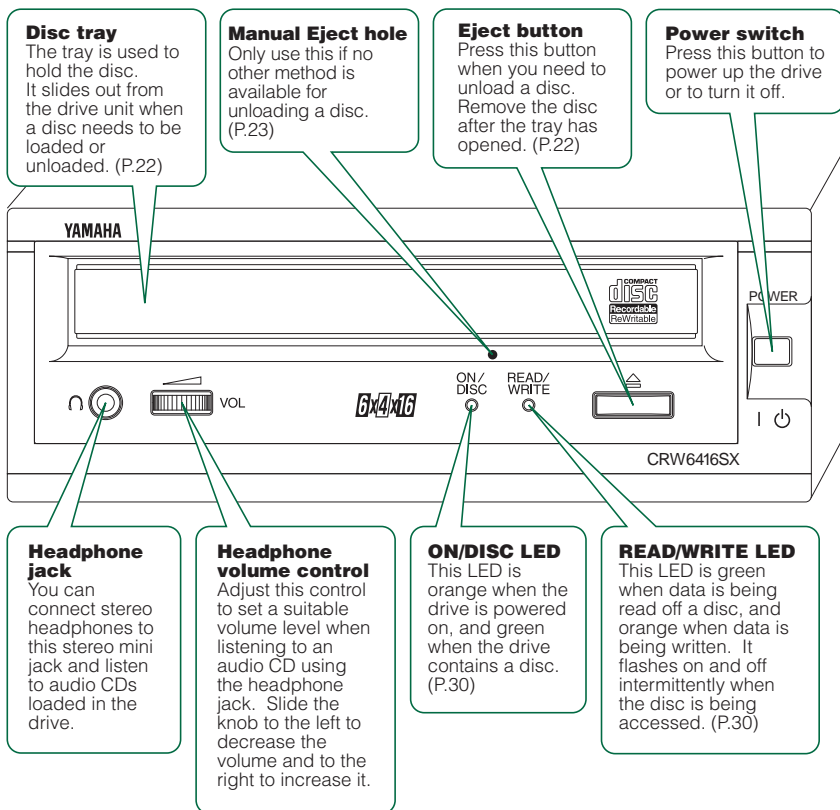
NOTE Make sure your screwdriver's head is the correct size for the screws you need to remove.



Front and Rear of Unit

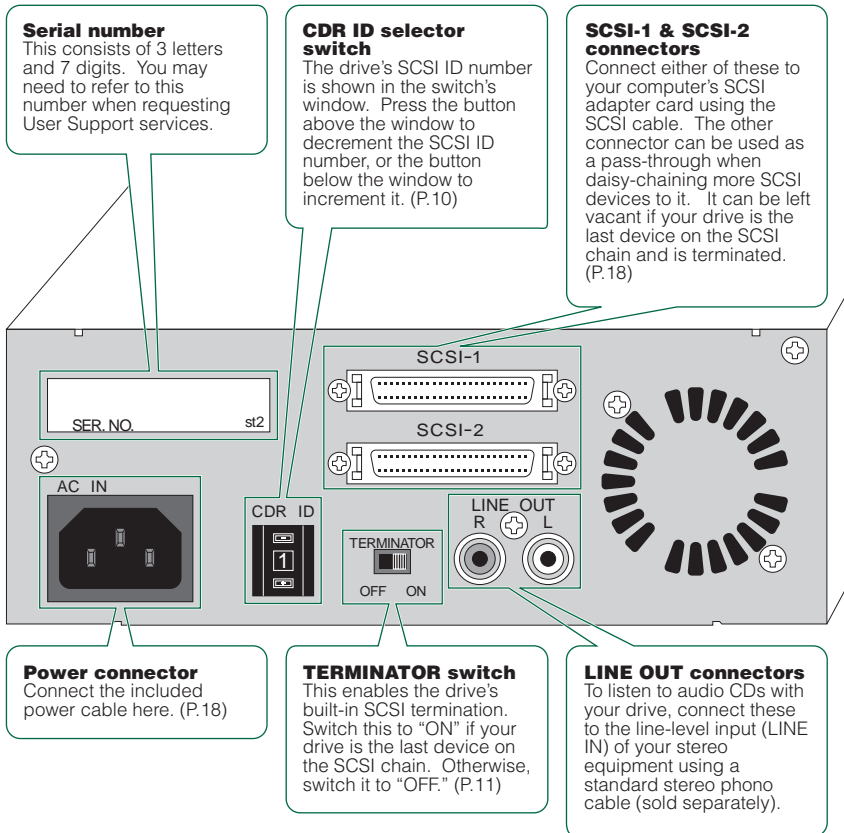
Front Panel

The CRW6416SX drive's front panel features the following:



Rear Panel

The CRW6416SX drive's rear panel features the following:



Installation

This section gives a step-by-step guide to setting up your CRW6416SX drive.

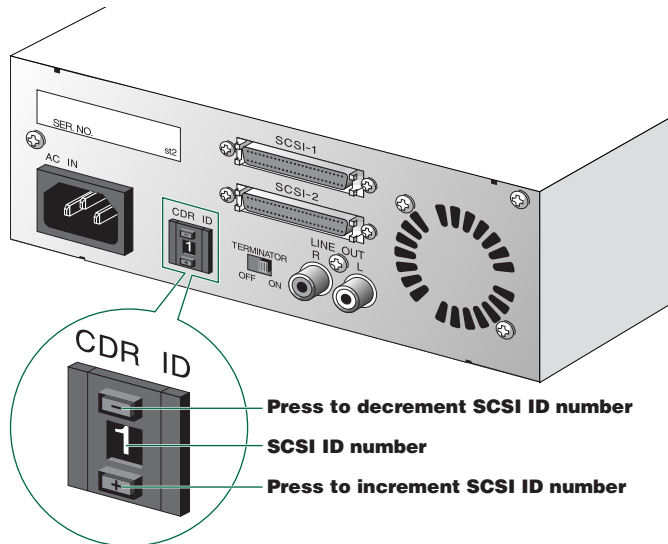
First Steps

Before connecting your CRW6416SX drive to your computer, you need to set up the drive using the switches located at the rear of the unit. You'll need to set the following:

- SCSI ID number
- Termination

1 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, your CRW6416SX drive can actually be assigned an ID number from "0" to "6." Press the top or bottom button of the SCSI ID selector switch to decrement or increment the SCSI ID number, as shown below.

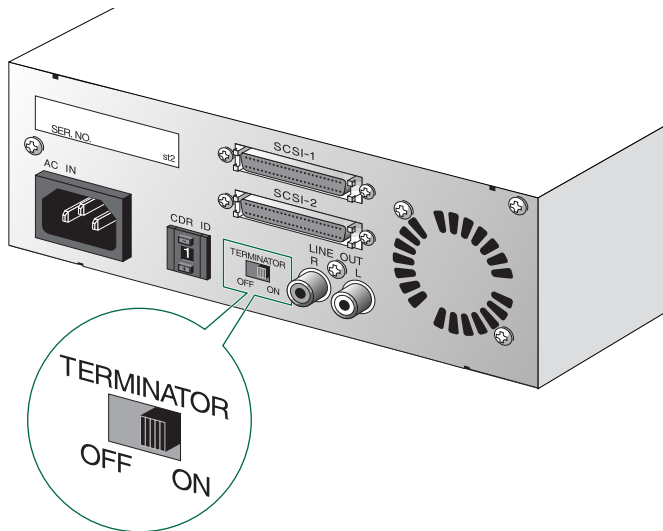
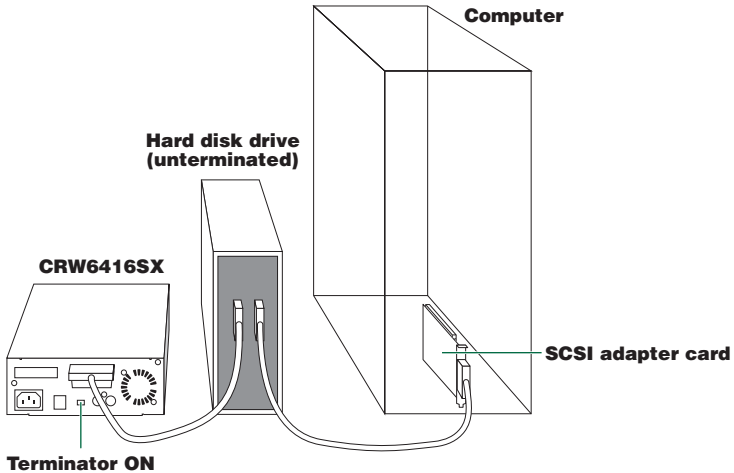


NOTE The SCSI ID number for each device on the chain must be unique. Make sure the CRW6416SX drive's SCSI ID number is not the same as that of any other device on the chain. By factory default, the CRW6416SX is assigned ID number "1" but this can be changed.

NOTE The CRW6416SX 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 CRW6416SX is automatically assigned an alternative vacant SCSI ID by the Plug and Play component of Windows 95 or Windows 98.

2 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 your CRW6416SX drive is the last device on the SCSI chain. If it is not the last device on the chain, the TERMINATOR switch should be set to “OFF.”



NOTE By factory default, the Terminator switch is set to “ON.”



Setting Up The CRW6416SX Drive

There are three stages to setting up your CRW6416SX drive.

● Installing a SCSI adapter card

You will need to open the casing of your computer and insert a SCSI adapter card (sold separately) if one has not been installed already.

NOTE You will need a Phillips screwdriver to open the casing of the computer and to secure the SCSI adapter card in its slot.

● Connecting the drive

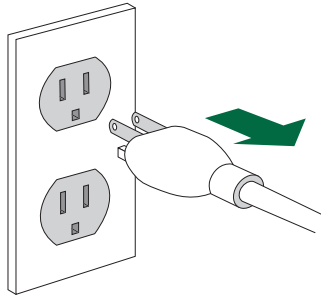
You will need to connect your CRW6416SX drive to your computer's SCSI adapter card using a SCSI cable. You will also need to connect the included power cable between the drive and an electrical outlet.

● Verifying the Hardware Installation

Before you can begin using your CRW6416SX drive, you need to verify that it has been installed and recognized correctly.

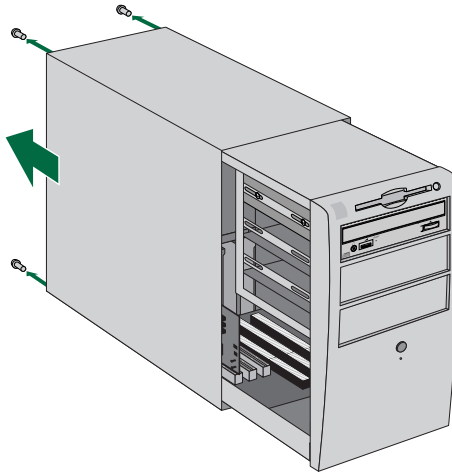
Installing a SCSI Adapter Card

- 1 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 CRW6416SX drive.

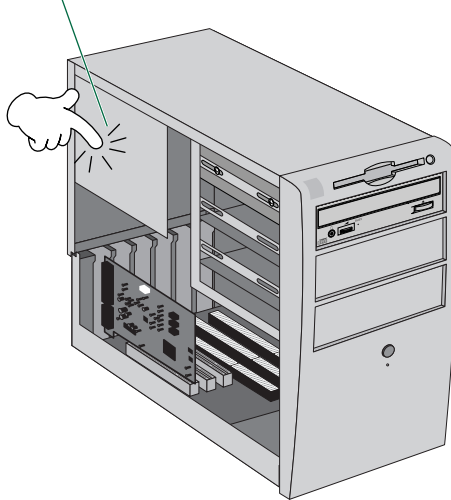
- 2 Remove the outer casing of the computer. If you need to remove screws in the process, make sure you don't lose them.



NOTE The method for removing the can vary depending on the manufacturer. Refer to the documentation that came with your computer for further details.

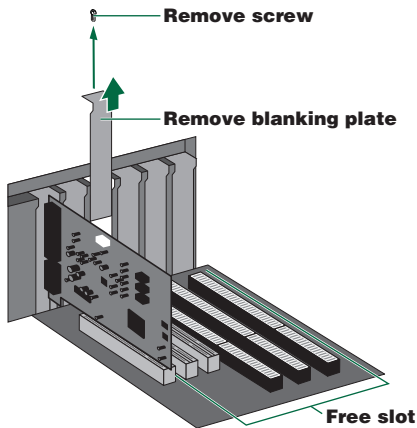
- 3 Touch a metal part of the computer's chassis or power supply unit to drain any static charge that may have built up inside your body.

Drain any static charge

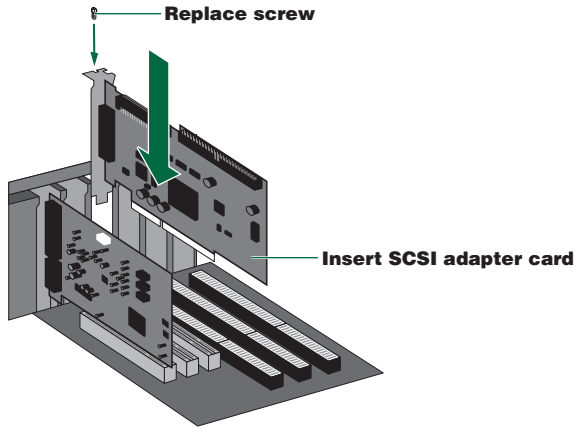


! You can permanently damage equipment if you touch it while there is any static charge in your body.

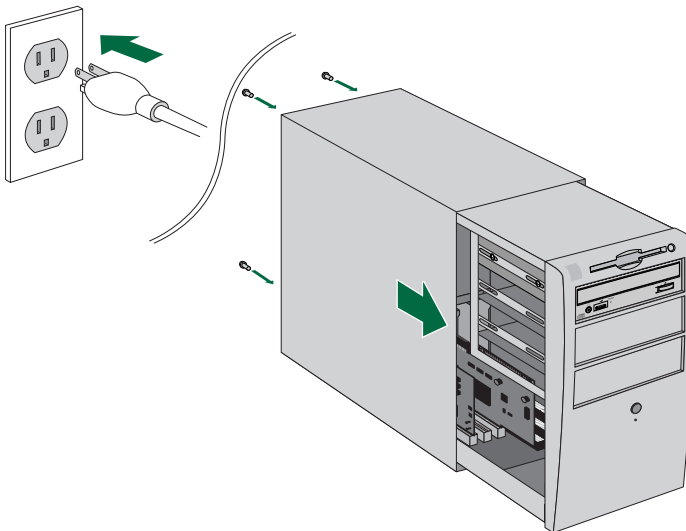
- 4 Locate a free slot for the SCSI adapter card and use a Phillips screwdriver to remove the screw holding the slot's blanking plate.



- 5 Insert your SCSI adapter card into the slot using both hands. Make sure it is seated firmly in the slot. Then secure the card by replacing the screw used for the blanking plate.

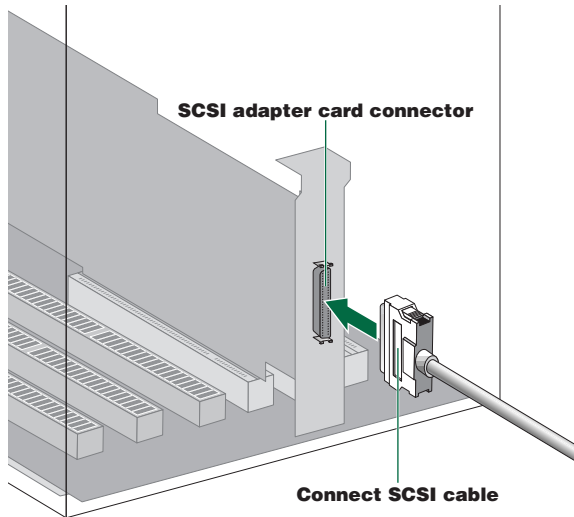


- 6 Attach the outer casing of the computer and any screws that were removed. Then reconnect the computer to the electrical outlet but do not power it up yet.



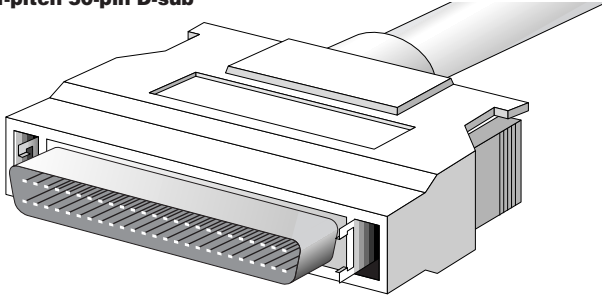
Connecting the Drive

- 1 Connect one end of the SCSI cable to your SCSI adapter card.

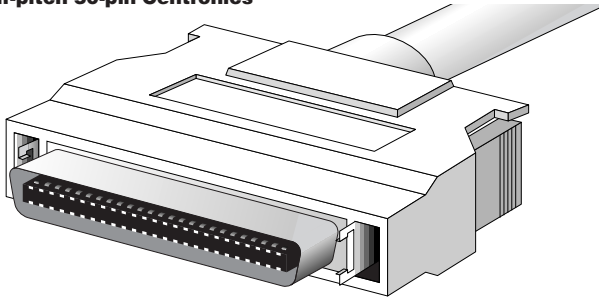


The connector of your SCSI adapter card may vary. The following are the most common types of SCSI connector:

Half-pitch 50-pin D-sub

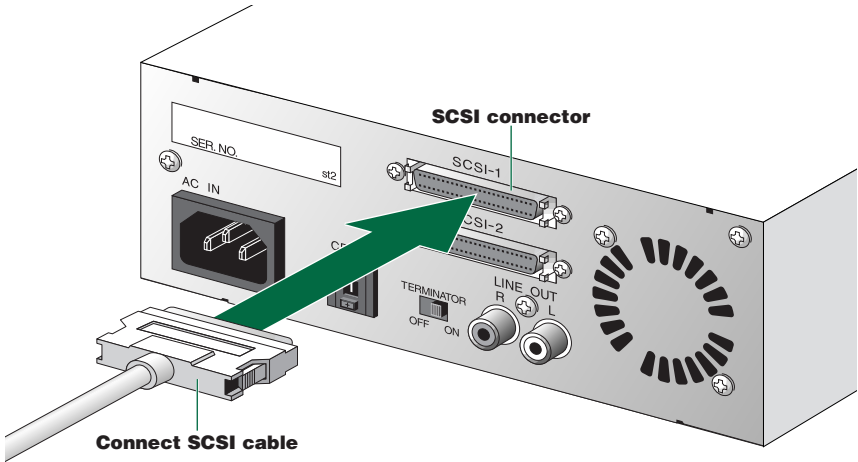


Half-pitch 50-pin Centronics

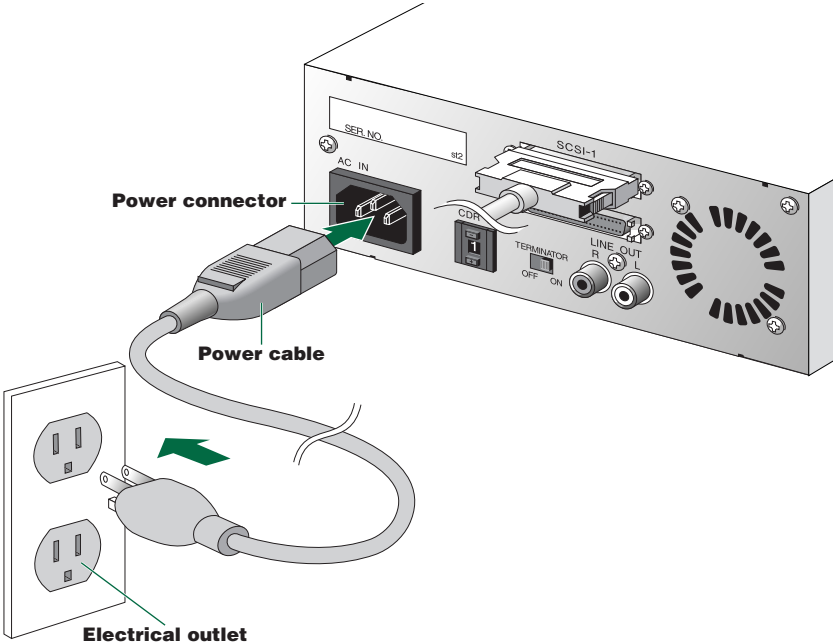


The CRW6416SX drive requires a half-pitch 50-pin D-sub connector. You will need to obtain a SCSI cable with connectors suitable for both your drive and your SCSI adapter card.

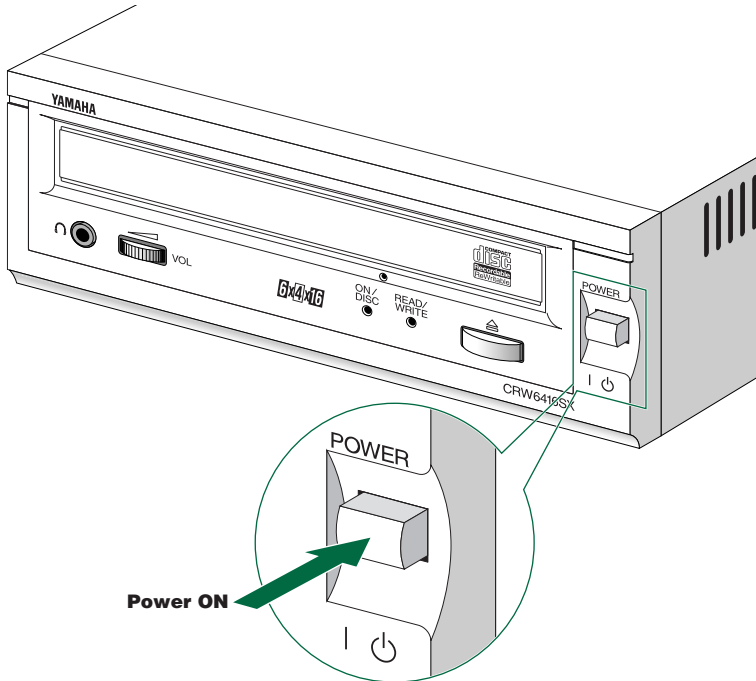
- 2 Connect the other end of the SCSI cable to the rear of your CRW6416SX drive. Either SCSI connector (marked "SCSI-1" and "SCSI-2") may be used.



- 3 Connect the D-shaped end of the included power cable to the power connector at the rear of your CRW6416SX drive. Connect the other end of the cable to an electrical outlet.



- 4 Power up your CRW6416SX drive first, then your computer.



- ⚠ Always power up the devices in your SCSI chain before powering up your computer. This will ensure that they are recognized by the computer's operating system.
- ⚠ Do not disconnect any devices in your SCSI chain while the computer is on.

Verifying the Hardware Installation

Windows Users

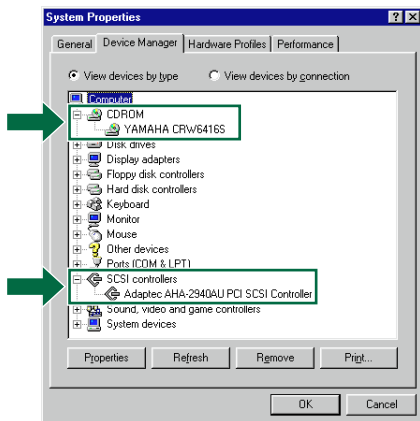
- 1 When the computer's operating system is loading, your SCSI adapter card will be recognized and you will be prompted to install the drivers for it. Follow the on-screen instructions and choose to reboot your computer at the end of the driver installation procedure.

NOTE For further details about installing the drivers for your SCSI adapter card, refer to the documentation that came with it. Also refer to the documentation that came with your computer's operating system.

- 2 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.

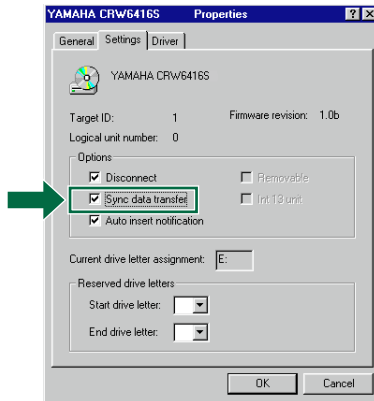
NOTE If there is a **×** or **!** mark etc. next to the icon for the CRW6416SX drive or the SCSI adapter card, this means that it has not been installed correctly.



Setting Up The CRW6416SX Drive

- 3 Double-click “YAMAHA CRW6416S” listed under CDROM, and click the Settings tab. Check the “Sync data transfer” checkbox. With “Sync data transfer” enabled, the data transfer between your CRW6416SX drive and your computer is synchronized, meaning that the maximum possible data transfer rate can be achieved.

NOTE Refer to the documentation that came with your SCSI card for further details.



- 4 Install the CD writing software.

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

Macintosh Users

To check that the CRW6416SX drive is recognized correctly, you need to install the CD writing software. Drivers will be installed that allow your Macintosh to correctly recognize your CRW6416SX drive.

- 1 When your CRW6416SX drive and computer have powered up, install the included CD writing software.

NOTE The installer simplifies the installation process. For details about how to install the software, refer to the documentation that came with it.

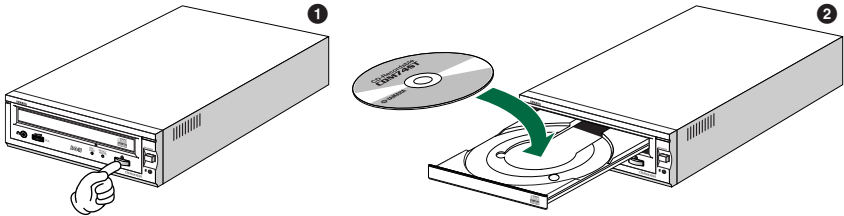
- 2 Restart your computer.
- 3 Start your CD writing software.
- 4 Check that the CRW6416SX drive is recognized correctly.

NOTE For details on how to use the software, see the documentation that came with it.

Operation

This section explains how to operate the CRW6416SX drive after you have installed it.

Loading a Disc

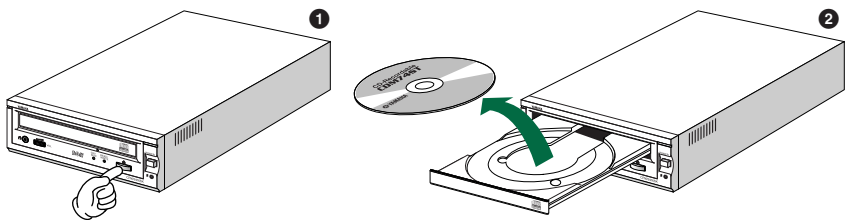


- 1 Press the Eject button on the CRW6416SX drive's front panel.
- 2 Place the disc onto the tray with its label or printing facing upward.
- 3 Press the Eject button to close the tray.

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 30.

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



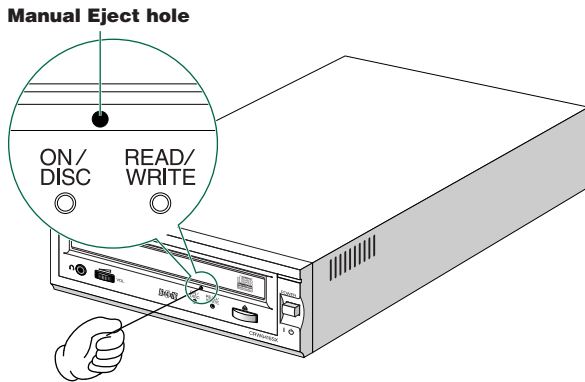
- 1 Press the Eject button on the CRW6416SX drive's front panel.
- 2 Remove the disc from the tray.
- 3 Press the Eject button to close the tray.

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, 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 and the CRW6416SX drive.
- 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 CD-R/RW Drives web site for more information.
YAMAHA CD-R/RW Drives web site URL:
<http://www.yamaha.co.jp/english/product/computer/>

The drive does not power up.

- Is the drive's power cable attached correctly?

The computer does not start up.

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

The CRW6416SX drive is not recognized.

- Is the drive's power cable 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 CRW6416SX drive and SCSI card listed in **Control Panel | System | Device Manager** tab. The drive will be listed as "Yamaha CRW6416S" when you double-click on CDROM and the SCSI card will be listed when you double-click on SCSI controllers. (→P. 20)

When you power up your computer, you can access the machine's hardware SCSI BIOS settings before Windows is loaded. You can set your computer to recognize the SCSI card and CRW6416SX drive in the BIOS.

NOTE Generally, 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. 10)
- Are the pins and holes on the SCSI connectors straight and not deformed?
Check the connectors.

- Is the terminator on the CRW6416SX 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. 11)
- To write to CD-R/RW discs, your CD writing software must support the CRW6416SX drive.
To find out if it does, contact the manufacturer of your CD writing software.

The disc tray does not come out.

- Is the CRW6416SX 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 CRW6416SX drive?

NOTE Even if the disc is of a type compatible with the CRW6416SX 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 in the SCSI chain set to “ON.” Or if it has no built-in termination, has a terminator been attached?
- 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 remains lit in orange after the disc has been loaded (meaning that the disc has not been recognized). (→P. 30)

- Power down the computer. Then disconnect the SCSI cable from your drive but leave the power cable connected. Now try loading the disc.
- There may be problems with the disc itself. If the drive fails to recognize a variety of discs including audio CDs, CD-ROMs and blank CD-R/RW discs (the ON/DISC LED remains lit in orange after any discs have been inserted), you should contact your nearest Yamaha dealer.

Errors occur when backing up at 6X speed from a separate CD-ROM drive to the CRW6416SX drive.

- A possible reason is that the CD-ROM drive is not suitable. Please use a high-speed CD-ROM drive. However, for various possible reasons, you may still encounter errors even if you are using a 32X or 42X speed CD-ROM drive. Therefore, before writing directly at 6X speed, you should check that it is possible to do so by choosing to test before writing.

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 or 5).
 - Disable network access.
 - Close other applications (including screen savers, task schedulers, etc.).

NOTE Errors can occur if you knock the CRW6416SX drive while it is writing to disc.

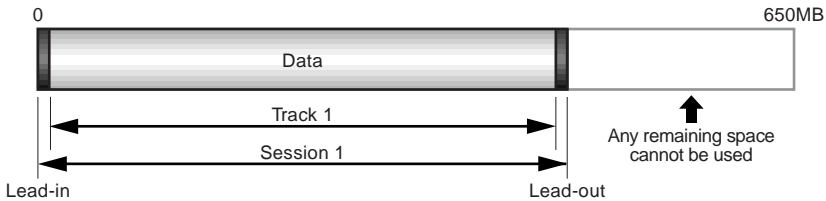
NOTE When using packet writing on a CD-RW disc, the actual data capacity is 100MB less than that stated on the cover of the disc. The difference in capacity is dependent on the writing mode.

Writing Modes

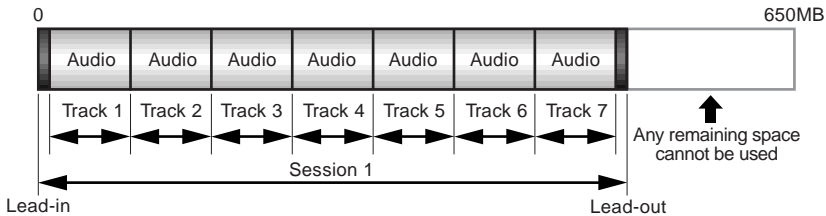
Disc-at-Once (DAO)

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.

Example: General CD-ROM



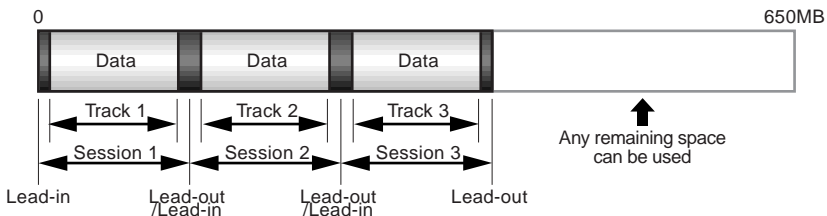
Example: Audio CD



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.

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. This is why Track-at-Once mode is sometimes referred to as Multisession.

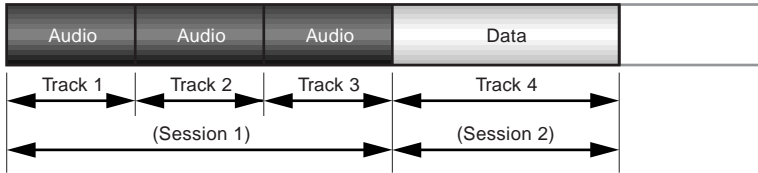


NOTE Only the first session of a multisession disc can be played back on a conventional audio CD player. Single session discs can be played back completely.

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.

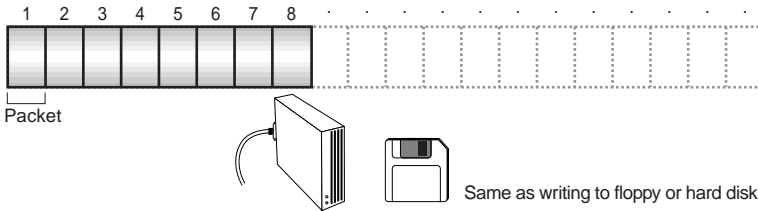
Example: CD Extra



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.



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 CRW6416SX 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 CRW6416SX drive, updates to the firmware will be made available. You can find information about the most recent firmware for the drive on YAMAHA CD-R/RW Drives web site.

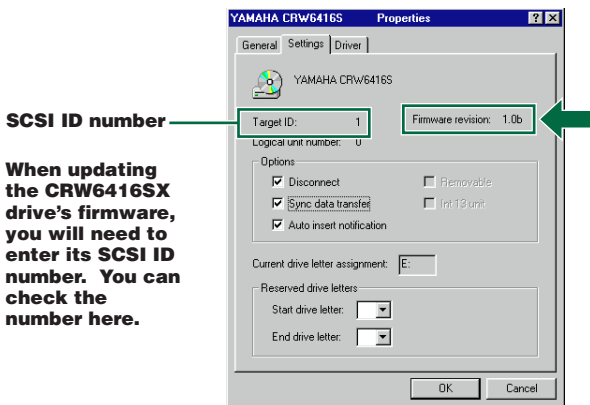
URL for YAMAHA CD-R/RW Drives web site
<http://www.yamaha.co.jp/english/product/computer/>

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 CRW6416SX drive (in Windows 95/98)

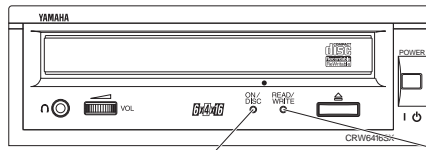
Go to Control Panel | System | Device Manager tab, double-click on CDROM, then double-click on Yamaha CRW6416S.



Macintosh Users

Use your CD writing software to check the firmware version of your CRW6416SX drive. For details on how to use the software, see the documentation that came with it.

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

CRW6416SX 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								
Writing/Reading Speed	<table border="0"> <tr> <td>Writing</td> <td>CD-R 1X, 4X, 6X CD-RW 2X, 4X</td> </tr> <tr> <td>Reading</td> <td>9X-16X (max) Partial CAV Note) • CD-DA extraction: 10X (max) • Drive can play CD-DA at 1X speed only • Video CD: 6X (max) • Disc (session closed) CD-R: 16X (max) (10X max for packet writing) CD-RW: 6X (max) (6X max for packet writing) • Disc (session not closed): 6X (max)</td> </tr> <tr> <td>CD-R</td> <td>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</td> </tr> <tr> <td>CD-RW</td> <td>2X, 4X Writing/ReWriting: Orange Book Part III Version 2.0-specified RW discs Note) When writing at 2X speed, Orange Book Part III Version 1.0-specified RW discs available</td> </tr> </table>	Writing	CD-R 1X, 4X, 6X CD-RW 2X, 4X	Reading	9X-16X (max) Partial CAV Note) • CD-DA extraction: 10X (max) • Drive can play CD-DA at 1X speed only • Video CD: 6X (max) • Disc (session closed) CD-R: 16X (max) (10X max for packet writing) CD-RW: 6X (max) (6X max for packet writing) • Disc (session not closed): 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/ReWriting: Orange Book Part III Version 2.0-specified RW discs Note) When writing at 2X speed, Orange Book Part III Version 1.0-specified RW discs available
Writing	CD-R 1X, 4X, 6X CD-RW 2X, 4X								
Reading	9X-16X (max) Partial CAV Note) • CD-DA extraction: 10X (max) • Drive can play CD-DA at 1X speed only • Video CD: 6X (max) • Disc (session closed) CD-R: 16X (max) (10X max for packet writing) CD-RW: 6X (max) (6X max for packet writing) • Disc (session not closed): 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/ReWriting: Orange Book Part III Version 2.0-specified RW discs Note) When writing at 2X speed, Orange Book Part III 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: 1,500 KB/sec 16X: 2,400 KB/sec								
Burst Transfer Rate	5MB/sec (max) (asynchronous) 10MB/sec (max) (synchronous)								
Data Buffer Size	2MB (666 sectors)								
Average Random Access Time	180 msec (reading)								

Sector Size	2048 ~ 2352 B 512 B (read only)
Interface	SCSI-2 (Fast SCSI)
Installing style	Horizontal
Disc Loading Type	Tray loading
Audio Out	Line Out Frequency Range: 20 ~ 20,000Hz Output Level: 1 Vrms
Voltage Rating	100 ~ 240V AC
Current Draw	0.4 A
Power Consumption	17 W
Operating Environment	Temperature +5°C ~ +40°C Humidity 25% ~ 80% RH (no condensation)
Dimensions (includes projection)	Width: 170 mm Height: 67 mm Depth: 324 mm
Weight	2.6 kg

The CRW6416SX 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	EN55024 EN61000-3-2 EN61000-3-3	Residential, Commercial and Light Industrial Areas
		Emission	EN55022	Class B Equipment
Australia New Zealand	EMC	Emission	AS/NZ 3548	Class B Equipment
Japan	Safety	Electrical	Japan's Legal Requirements for Electrical Appliances and Materials	Conform to the Technical Standard Appendix 8
	EMC	Emission	VCCI	Class B Equipment

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

Bei weiteren Fragen wenden Sie sich bitte an Ihren Händler oder eine der folgenden Firmen.

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

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Yamaha Corporation
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203 Matsunokijima, Toyooka-mura, Iwata-gun,
Shizuoka-ken, 438-0192 JAPAN
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Internet: <http://www.yamaha.co.jp/english>

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TEL: +1 408 467 2330
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FAX: +886 2 2713 8666
Internet: <http://www.yamahakhs.com/>



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