



@server

xSeries 206

Type 8482

Option Installation Guide





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Option Installation Guide

Note:

Before using this information and the product it supports, read the general information in “Notices,” on page 43.

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 **Safety Information** (安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

Statement 1:



DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

To Disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

Statement 2:



CAUTION:

When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.

Statement 3:



CAUTION:

When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

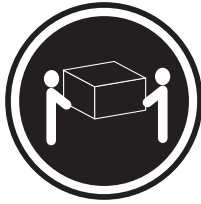


DANGER

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

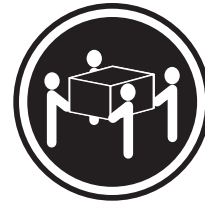
Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:

Use safe practices when lifting.

Statement 5:



CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



Statement 8:



CAUTION:

Never remove the cover on a power supply or any part that has the following label attached.



Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

Statement 12:



CAUTION:

The following label indicates a hot surface nearby.



Statement 13:



DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.

Statement 15:



CAUTION:

Make sure that the rack is secured properly to avoid tipping when the server unit is extended.

WARNING: Handling the cord on this product or cords associated with accessories sold with this product, will expose you to lead, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm. ***Wash hands after handling.***

ADVERTENCIA: El contacto con el cable de este producto o con cables de accesorios que se venden junto con este producto, pueden exponerle al plomo, un elemento químico que en el estado de California de los Estados Unidos está considerado como un causante de cancer y de defectos congénitos, además de otros riesgos reproductivos. ***Lávese las manos después de usar el producto.***

Important:

All caution and danger statements in this documentation begin with a number. This number is used to cross reference an English caution or danger statement with translated versions of the caution or danger statement in the IBM *Safety Information* book.

For example, if a caution statement begins with a number 1, translations for that caution statement appear in the IBM *Safety Information* book under statement 1.

Be sure to read all caution and danger statements in this documentation before performing the instructions. Read any additional safety information that comes with your server or optional device before you install the device.

Chapter 1. Introduction

This *Option Installation Guide* contains instructions for installing, removing, and connecting optional devices that your server supports.

Related documentation

In addition to this *Option Installation Guide*, the following documentation comes with your server:

- *User's Guide*

This document is in Portable Document Format (PDF) on the IBM® *xSeries® Documentation CD*. It contains general information about your server.

- *Installation Guide*

This printed document contains instructions for setting up your server and basic instructions for installing some options.

- *Safety Information*

This document is in PDF on the IBM *xSeries Documentation CD*. It contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* document.

- *Hardware Maintenance Manual and Troubleshooting Guide*

This document is in PDF on the IBM *xSeries Documentation CD*. It contains information to help you solve problems yourself, and it contains information for service technicians.

Depending on your server model, additional documentation might be included on the IBM *xSeries Documentation CD*.

Your server might have features that are not described in the documentation that you received with the server. The documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in your server documentation. These updates are available from the IBM Web site. Complete the following steps to check for updated documentation and technical updates:

1. Go to <http://www.ibm.com/pc/support/>.
2. In the **Learn** section, click **Online publications**.
3. On the "Online publications" page, in the **Brand** field, select **Servers**.
4. In the **Family** field, select **xSeries 206**.
5. Click **Continue**.

Notices and statements used in this document

The caution and danger statements that appear in this document are also in the multilingual *Safety Information* document, which is on the IBM *xSeries Documentation CD*. Each statement is numbered for reference to the corresponding statement in the *Safety Information* document.

The following notices and statements are used in this document:

- **Notes:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.

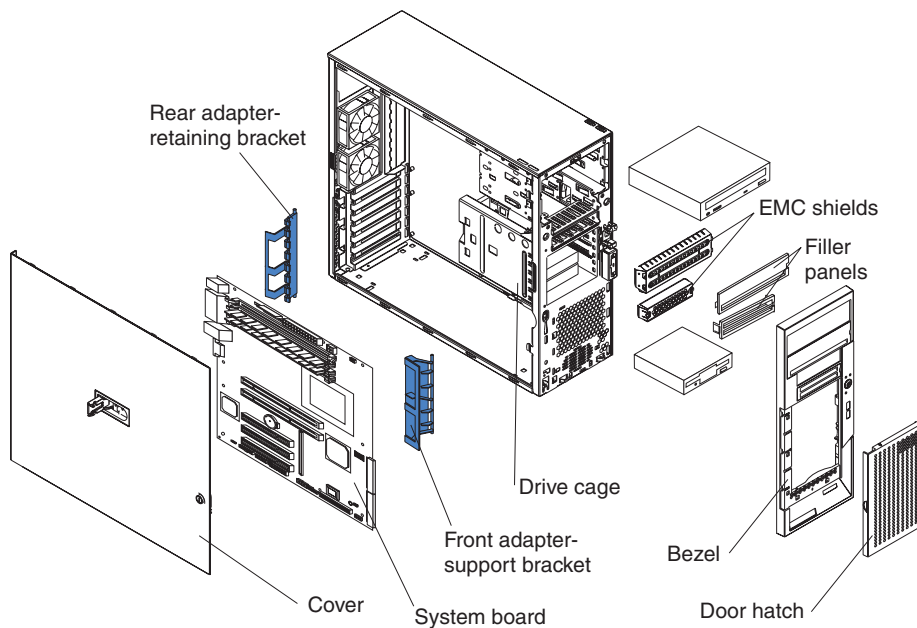
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Major components of the xSeries 206 Type 8482 server

Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.

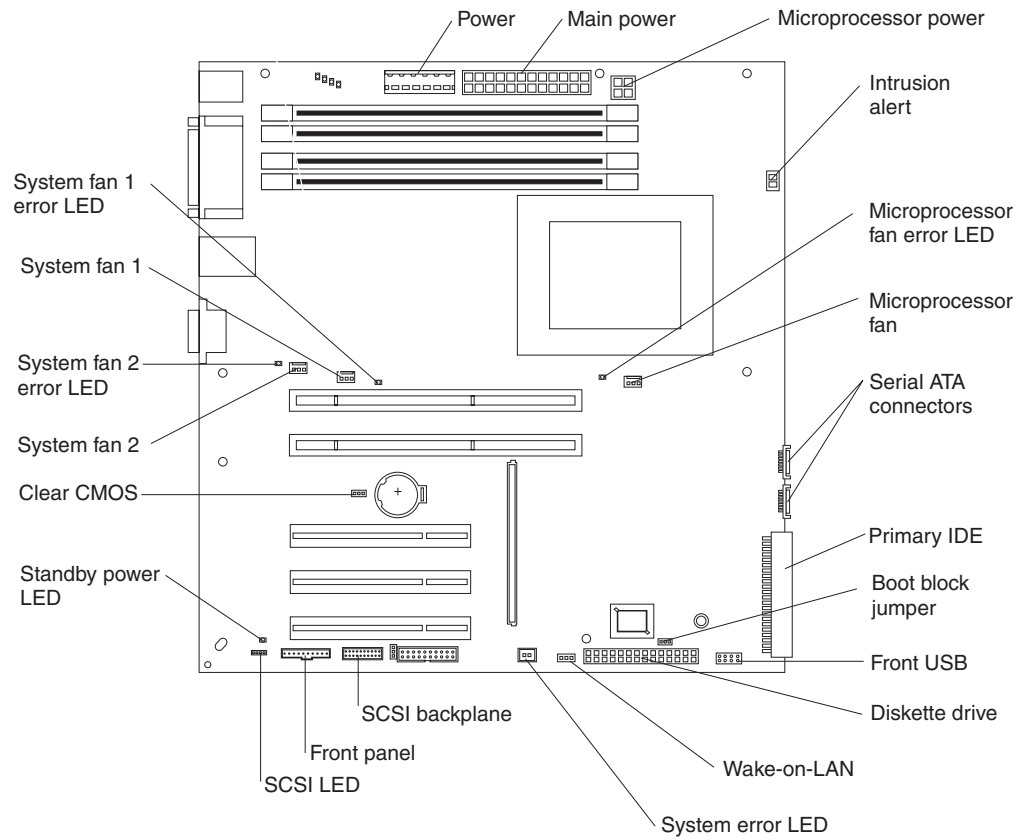
Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.

The following illustration shows the major components in the server. The illustrations in this document might differ slightly from your hardware.



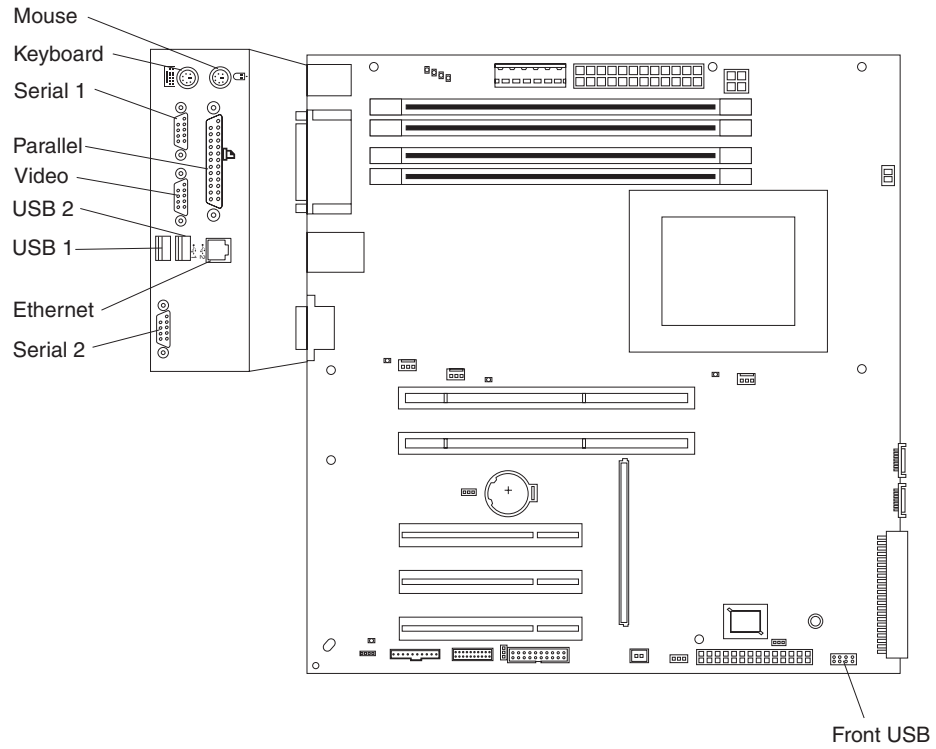
System-board internal connectors

The following illustration shows the internal connectors on the system board.



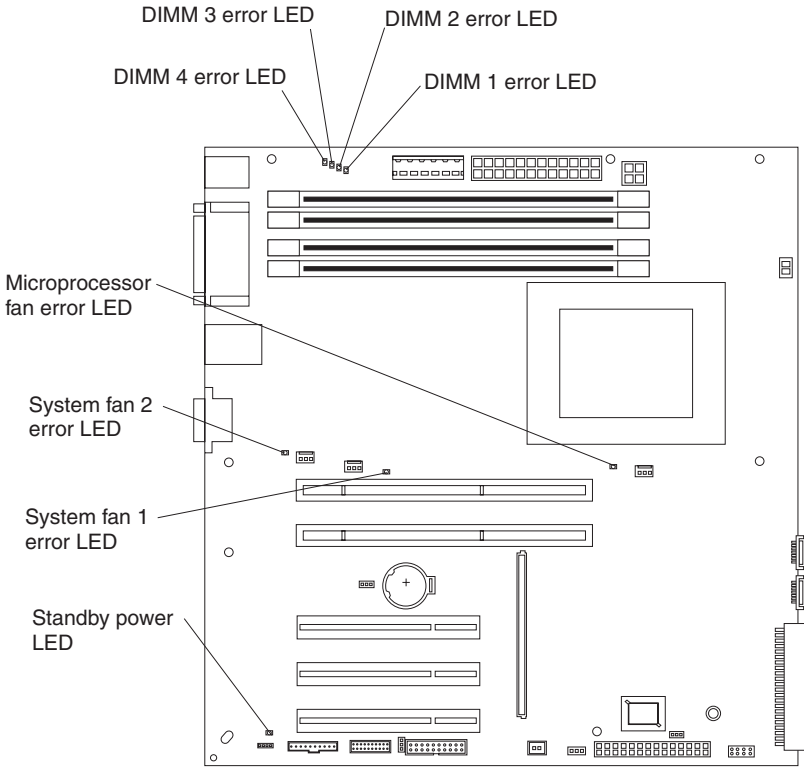
System-board external connectors

The following illustration shows the external input/output port connectors on the system board.



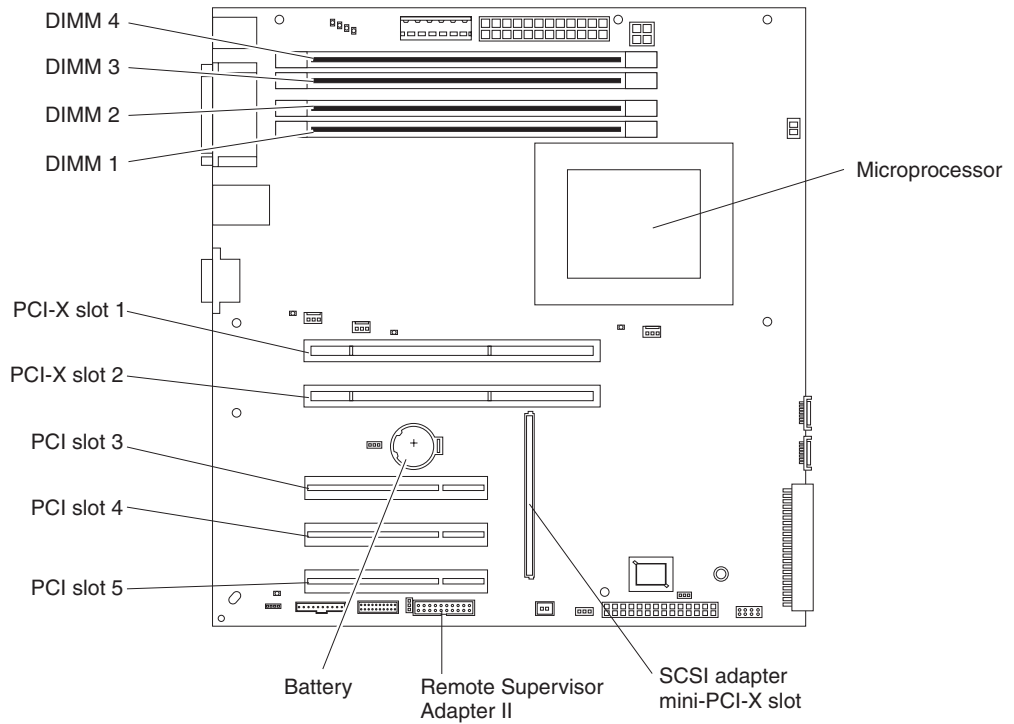
System-board LEDs

The following illustration shows the light-emitting diodes (LEDs) on the system board.



System-board option connectors

The following illustration shows the connectors on the system board for user-installable options.



Chapter 2. Installing options

This chapter provides detailed instructions for adding hardware options to your server.

Installation guidelines

Before you begin installing options in your server, read the following information:

- Read the safety information beginning on page v and the guidelines in “Handling static-sensitive devices” on page 8. This information will help you work safely with your server and options.
- When you need to access the inside of the server to install options, you might find it easier to lay the server on its side.
- Make sure that you have an adequate number of properly grounded electrical outlets for your server, monitor, and other devices that you will connect to the server.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- You do not have to turn off the server to install or replace hot-swap drives or hot-plug Universal Serial Bus (USB) devices.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing and installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- For a list of supported options for your server, go to <http://www.ibm.com/pc/us/compat/> .

System reliability considerations

To help ensure proper system cooling and system reliability, make sure that:

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan as soon as possible.
- You have replaced a hot-swap drive within 2 minutes of its removal.

Handling static-sensitive devices

Attention: Static electricity can damage electronic devices, including your server. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

To reduce the possibility of electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part of the server for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the server without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on your server cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Server power features

When the server is connected to an ac power source but is not turned on, the operating system does not run, and all core logic is shut down; however, the server can respond to remote requests to turn on the server. The power-on LED flashes to indicate that the server is connected to an ac power source but is not turned on.

Turning on the server

Approximately 20 seconds after the server is connected to ac power, the power-control button becomes active, and you can turn on the server and start the operating system by pressing the power-control button.

The server can also be turned on in any of the following ways:

- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If your operating system supports the system-management software for an optional Remote Supervisor Adapter II, the system-management software can turn on the server.
- If your operating system supports the Wake on LAN feature, the Wake on LAN feature can turn on the server.
- If an optional Remote Supervisor Adapter II is installed in the server, the server can be turned on from the Remote Supervisor Adapter II user interface.

Note: When 4 GB or more of memory (physical or logical) is installed, some memory is reserved for various system resources and is unavailable to the operating system. The amount of memory that is reserved for system resources depends on the operating system, the configuration of the server, and the configured PCI options.

Turning off the server

When you turn off the server and leave it connected to ac power, the server can respond to remote requests to turn on the server. To remove all power from the server, you must disconnect it from the power source.

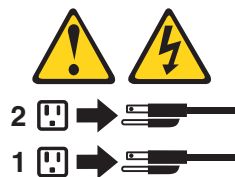
Some operating systems require an orderly shutdown before you turn off the server. See your operating-system documentation for information about shutting down the operating system.

Statement 5:



CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



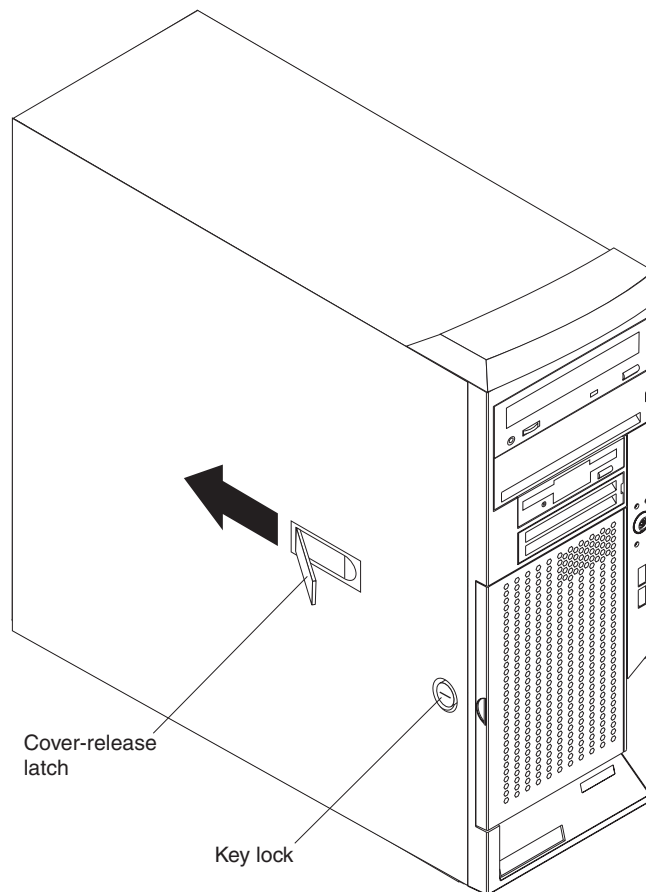
The server can be turned off in any of the following ways:

- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if your operating system supports this feature.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- If an optional Remote Supervisor Adapter II is installed in the server, the server can be turned off from the Remote Supervisor Adapter II user interface.
- If the Wake on LAN feature turned on the server, the Wake on LAN feature can turn off the server.
- The server can turn itself off as an automatic response to a critical system failure.

Removing the side cover

Complete the following steps to remove the server side cover:

1. Review the safety information beginning on page v and “Installation guidelines” on page 7.
2. Turn off the server and all attached devices (see “Turning off the server” on page 9); then, disconnect all power cords and external cables.
3. Lay the server on its side.
4. Unlock the side cover; then, pull the cover-release latch away from the server, and push the cover toward the rear of the server. Lift the side cover off the server and set it aside.



To replace the side cover, see “Replacing the side cover” on page 34.

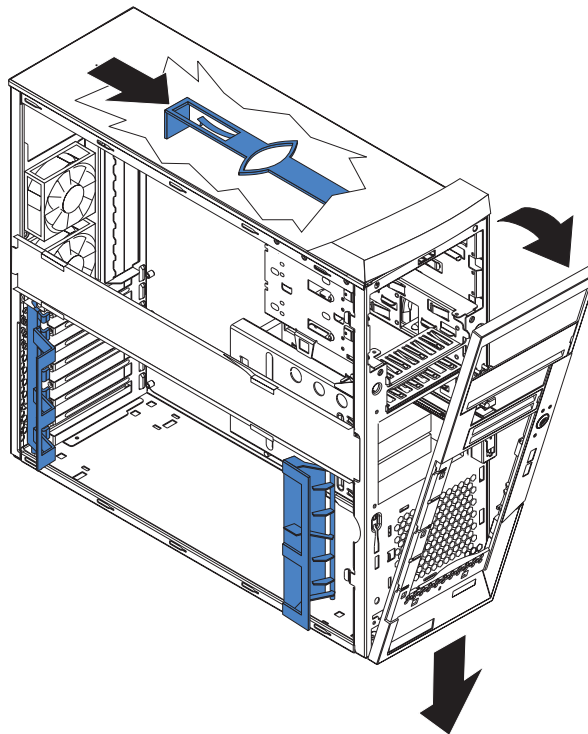
Attention: For proper cooling and airflow, replace the cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the cover removed might damage server components.

Removing the bezel

When working with some devices, such as additional optical drives, you must first remove the bezel to access the device.

Complete the following steps to remove the bezel:

1. Unlock the side-cover lock.
2. Remove the side cover (see “Removing the side cover” on page 10).
3. Locate the bezel-release lever; then, press the bezel-release lever toward the front of the server.
4. Pull the top of the bezel away from the chassis; then, push the bezel down to disengage the bottom tabs.
5. Remove the bezel from the server and store the bezel in a safe place.



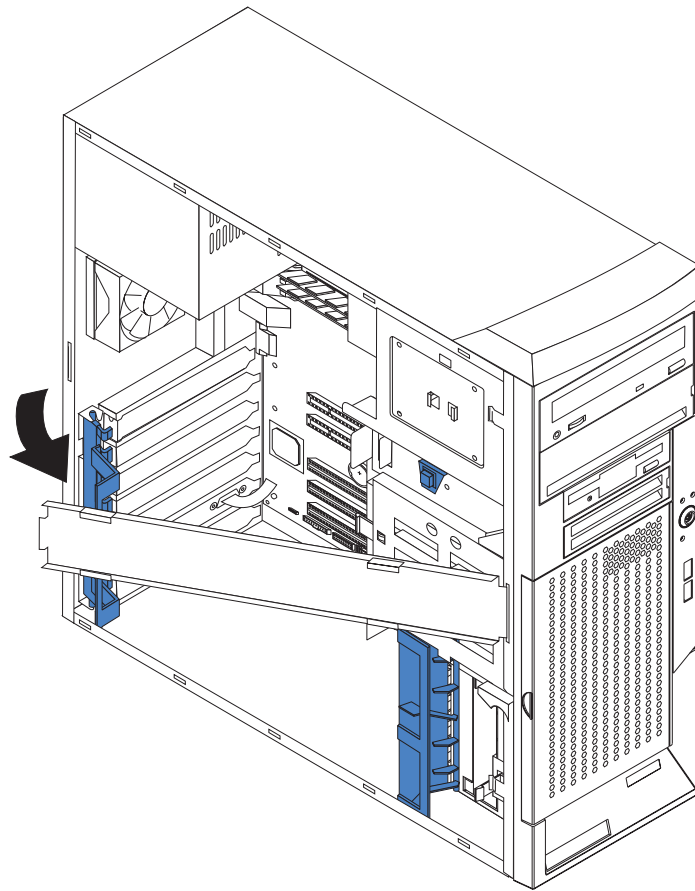
For instructions for replacing the bezel, see “Replacing the bezel” on page 33.

Removing and installing the support bracket

When working with some devices, such as hard disk drives, adapters, and memory modules, you must first remove the support bracket to access the device.

Complete the following steps to remove the support bracket:

1. Read the safety information beginning on page v and “Installation guidelines” on page 7.
2. Remove the side cover (see “Removing the side cover” on page 10).
3. Pull out on the rear end of the support bracket at a 45° angle.
4. Disengage the front end of the support bracket from the server and set the bracket aside.



To reinstall the support bracket, reverse the previous steps for your server.

Installing a memory module

The following notes describe the types of dual inline memory modules (DIMMs) that your server supports and other information that you must consider when installing DIMMs:

- Your server supports industry-standard PC2700 and PC3200 double-data-rate (DDR) dual inline memory modules (DIMMs).
- The system board contains four DIMM connectors and supports two-way memory interleaving.
- You can install 1, 2, or 4 DIMMs in your server, but not 3 DIMMs. It is not supported.
- The DIMM options that are available for your server are 256 MB, 512 MB, and 1 GB. Your server supports a minimum of 256 MB and a maximum of 4 GB of system memory.
- The amount of usable memory will be reduced depending on the system configuration. A certain amount of memory must be reserved for system resources. The BIOS will display the total amount of installed memory and the amount of configured memory.
- Your server comes with one 256 MB or 512 MB DIMM installed in the DIMM 1 memory connector. If your server has one DIMM installed, when you install an additional DIMM, it must be installed in DIMM 3 memory connector, and it must be the same size, speed, type, and technology as the DIMM in the DIMM 1 memory connector. You can mix compatible DIMMs from various manufacturers. When one DIMM is installed, the server runs as a single-channel server. When you add a DIMM in the DIMM 3 memory connector, the server defaults to a dual-channel server.
- DIMMs must be installed in matched pairs. If you install a second pair of DIMMs in the DIMM 2 and DIMM 4 memory connectors, they do not have to be the same size, speed, type, and technology as the DIMMs in the DIMM 1 and DIMM 3 memory connectors. However, the size, speed, type, and technology of the DIMMs you install in the DIMM 2 and DIMM 4 memory connectors must match each other.
- Install only 2.5 V, 184-pin, double-data-rate (DDR), PC2700 or PC3200, unbuffered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest PC2700 and PC3200 SDRAM unbuffered DIMM specification. For a list of supported options for your server, go to <http://www.ibm.com/us/compat/>; then, select your country and navigate to the list of options for your computer.
- When you restart your server after adding or removing a DIMM, the server displays a message that the memory configuration has changed.

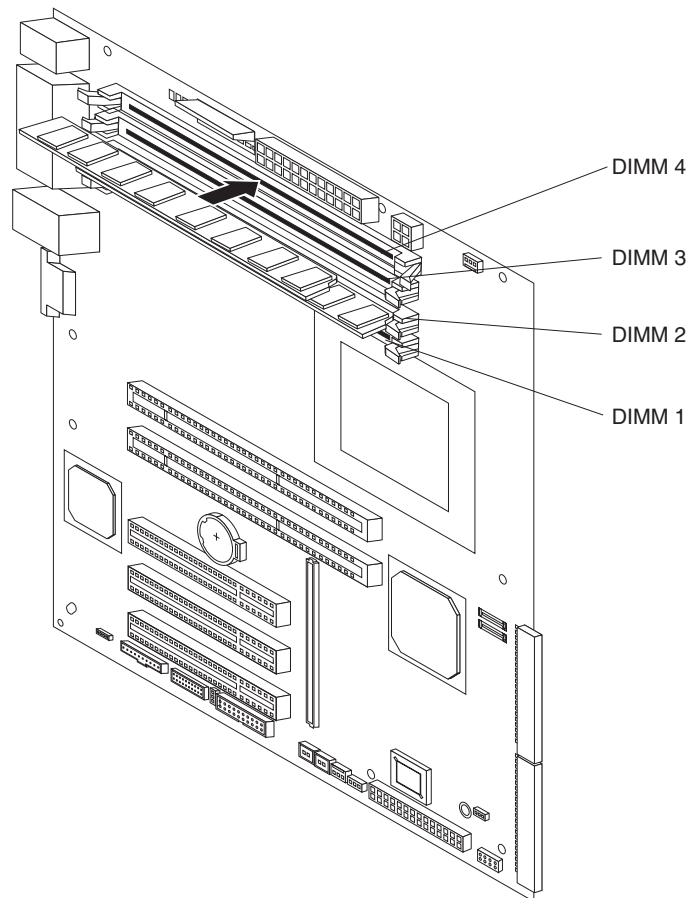
Complete the following steps to install a DIMM:

1. Read the safety information beginning on page v and “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the side cover (see “Removing the side cover” on page 10).
4. Remove the support bracket (see “Removing and installing the support bracket” on page 12).
5. Locate the DIMM connectors on the system board. Determine the connectors into which you will install the DIMMs. Install the DIMMs in the sequence shown in the following table.

Memory installation sequence	
DIMMs	Slots
1 DIMM	1
2 DIMMs	1, 3
4 DIMMs	1, 2, 3, 4
Note: You can install 1, 2, or 4 DIMMs in your server, but not 3 DIMMs. It is not supported.	

Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.

6. Open the retaining clips and, if necessary, remove any existing DIMM.
7. Touch the static-protective package containing the DIMM to any unpainted metal surface on the server. Then, remove the new DIMM from the package.
8. Turn the DIMM so that the DIMM keys align correctly with the slot.
9. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector. If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly installed. Open the retaining clips, remove the DIMM, and then reinsert it.



10. If you have other options to install or remove, do so now; otherwise, replace the support bracket (see “Removing and installing the support bracket” on page 12) and go to “Completing the installation” on page 33.

Installing a drive

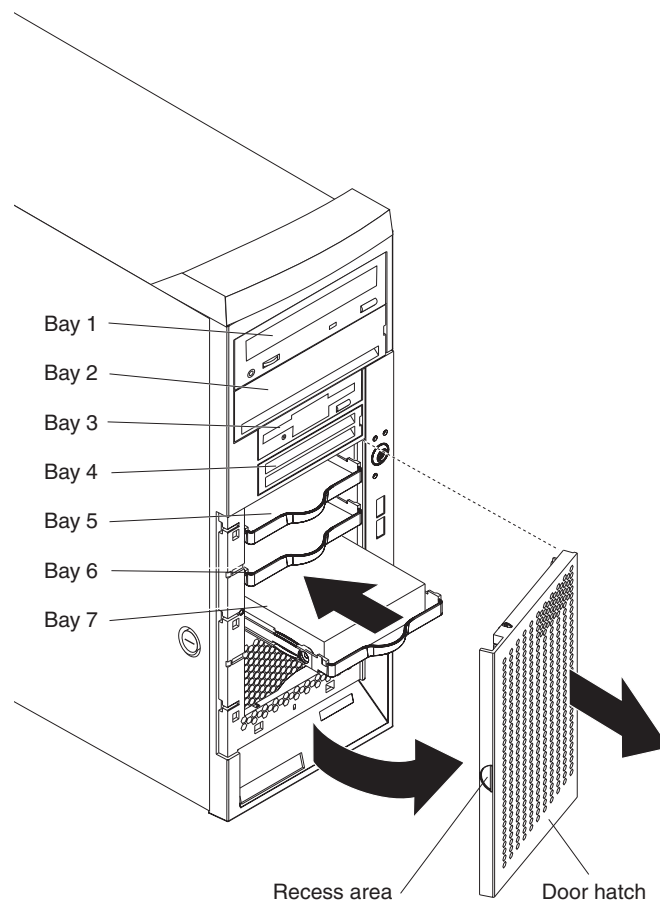
Depending on your server model, one or more of the following drives might be installed in your server:

- Diskette
- Hard disk drive
- CD-ROM, CD-RW, or DVD/CD-RW combo

Some hot-swap models come with an IDE CD-ROM drive in bay 1, a 3.5-in., 1.44 MB diskette drive in bay 3, and three hot-swap hard disk drive bays.

Some non-hot-swap models come with an IDE CD-ROM drive in bay 1, a 3.5-in., 1.44 MB diskette drive in bay 3, and a SCSI hard disk drive in bay 7.

Some simple-swap Serial ATA models come with an IDE CD-ROM drive in bay 1, a 3.5-in., 1.44 MB diskette drive in bay 3, and a simple-swap Serial ATA hard disk drive in bay 7.



The following notes describe the types of drives that your server supports and other information that you must consider when installing a hard disk drive:

- Make sure that you have all the cables and other equipment specified in the documentation that comes with the drive.
- Select the bay in which you want to install the drive.

- Check the instructions that come with the drive to see whether you need to set any switches or jumpers on the drive. If you are installing a SCSI device, be sure to set the SCSI ID for that device.
- Diskette drives, tape drives, CD-ROM, CD-RW, and DVD drives are examples of removable-media drives. You can install removable-media drives in bays 1, 2, 3, and 4 only.
- The integrated IDE controller in your server supports the connection of up to two IDE devices.
- You can install a 3.5-in. slim-high or 5.25-in. half-high removable-media drive, such as a tape backup drive, CD-RW, or DVD drive, in bay 2.
- The server supports only one diskette drive.
- To install a 3.5-in. drive in a 5.25-in. bay, you must use the 5.25-in. conversion kit. Contact IBM to order the conversion kit.
- The electromagnetic interference (EMI) integrity and cooling of the server are protected by having all bays and PCI slots covered or occupied. When you install a drive or PCI adapter, save the EMC shield and filler panel from the bay or the PCI adapter slot cover in the event you later remove the option.
- For a complete list of supported options for your server, go to <http://www.ibm.com/pc/support/>.

Installing a drive in bay 2 or 4

Complete the following steps to install a drive in bay 2 or 4:

1. Read the safety information beginning on page v and “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the side cover (see “Removing the side cover” on page 10).
4. Remove the support bracket (see “Removing and installing the support bracket” on page 12).
5. Remove the bezel (see “Removing the bezel” on page 11).
6. Use a screwdriver to pry the filler panel and EMC shield away from the server.

Note: If you are installing a drive that contains a laser, observe the following safety precaution.

Statement 3



CAUTION:

When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

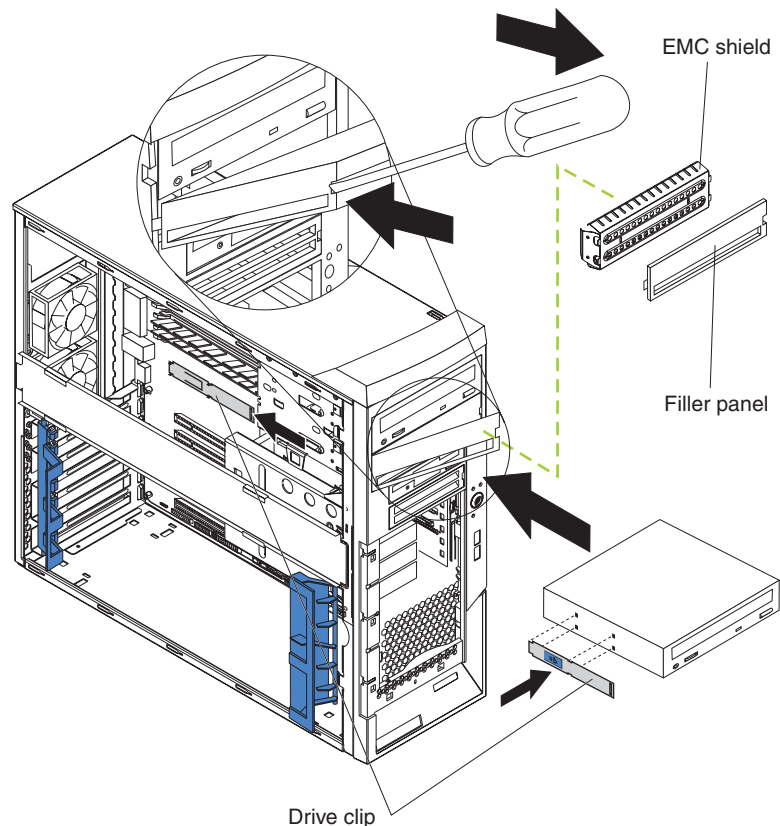
- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.



Danger

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following. Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1



7. Touch the static-protective package containing the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
8. Set any jumpers or switches on the drive according to the documentation that comes with the drive.

Note: You might find it easier to install the new drive from the front and then attach the cables.

9. Remove the drive clip from the side of the drive cage of bays 1 and 2 (see figure above). Slide the drive clip to the left to remove it from the drive cage; then, snap the drive clip into the screw holes on the side of the drive (the blue side of the drive clip should be facing outward).
10. If you are installing a 5.25-in. drive in bay 2, push the drive into the bay. If you are installing a 3.5-in. drive in bay 2, you must attach the 5.25-in. conversion kit, which you can order from IBM, to the 3.5-in. drive.

Note: Only a 3.5-in. device can be installed in bay 4.

11. Determine whether the drive is an IDE or SCSI device; then, connect one end of the applicable signal cable into the back of the drive and make sure that the other end of this cable is connected into the applicable IDE or SCSI connector on the system board.
12. Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor and memory.
13. If you have another drive to install or remove, do so now.
14. Connect the power cable to the back of the drive. The connectors are keyed and can be inserted only one way.

15. If you have other options to install or remove, do so now; otherwise, replace the support bracket (see “Removing and installing the support bracket” on page 12), replace the bezel (see “Replacing the bezel” on page 33), and then go to “Completing the installation” on page 33.

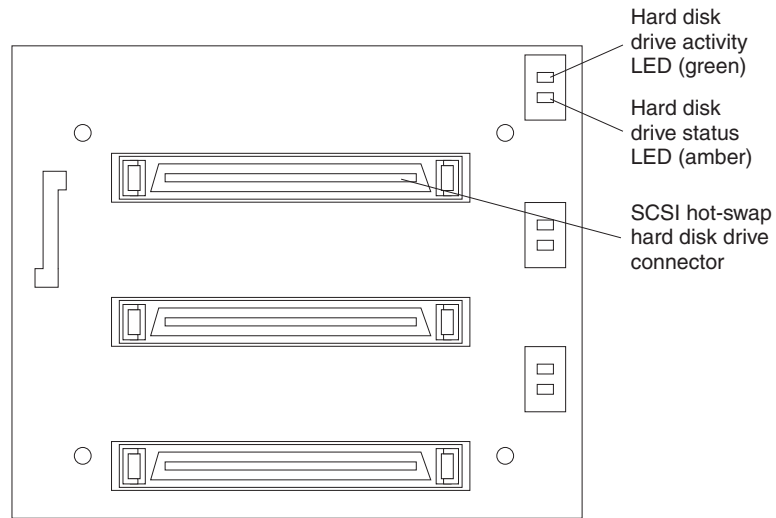
Installing a hot-swap SCSI hard disk drive in bay 5, 6, or 7

Some server models come with hot-swap hard disk drives. Before you install a hot-swap hard disk drive, read the following information:

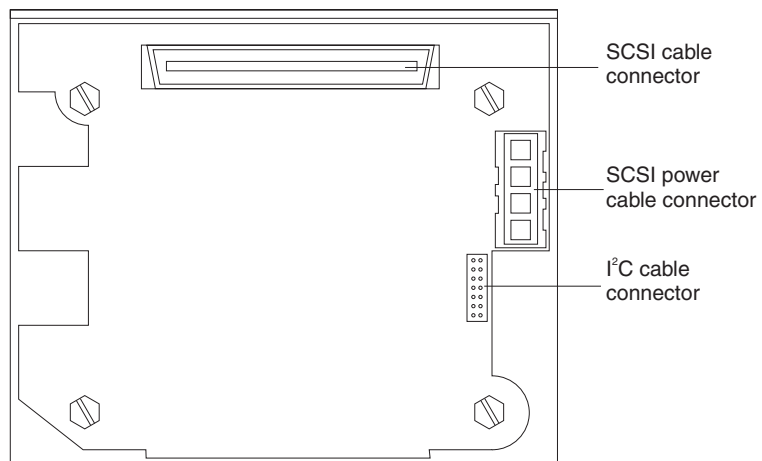
- Inspect the drive tray for signs of damage.
- Make sure that the drive is correctly installed in the tray.
- To maintain proper system cooling, do not operate the server for more than 10 minutes without either a drive or a filler panel installed in each drive bay.
- All hot-swap drives being used in the server must have the same speed rating; mixing speed ratings will cause all drives to operate at the speed of the slowest drive.
- You do not have to turn off the server to install hot-swap drives in the hot-swap drive bays.
- Install hot-swap hard disk drives in this sequence: bay 7, bay 6, and bay 5.
- If your server has an optional RAID adapter, see the documentation that comes with the adapter for instructions for installing a hard disk drive.
- Each hot-swap drive has two LEDs: the hard disk drive activity LED and the hard disk drive status LED. When the green hard disk drive activity LED is flashing, it indicates that the controller is accessing the hard disk drive. When the amber hard disk drive status LED is lit continuously, it indicates that the drive is faulty and must to be replaced.

The server hot-swap bays are connected to a SCSI backplane. This backplane is the printed circuit board behind the bay. The backplane controls the SCSI IDs for the hot-swap drives.

The following illustration shows the location of the components on the hot-swap-drive backplane as seen from the front of the server drive cage.

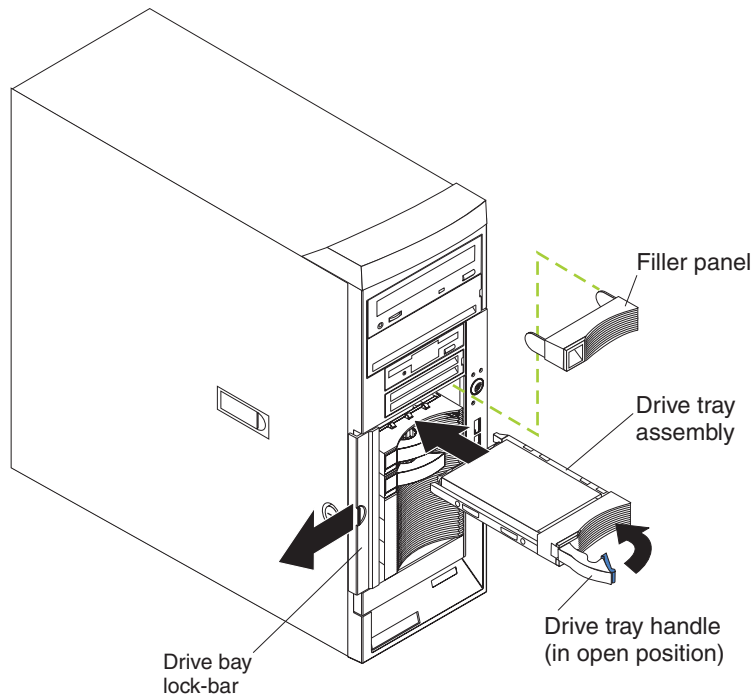


The following illustration shows the rear connectors on the hot-swap-drive backplane as seen from the rear of the server drive cage.



Complete the following steps to install a hot-swap hard disk drive:

1. Read the safety information beginning on page v and the “Installation guidelines” on page 7.
2. Unlock the side cover.
3. Slide the drive-bay lock bar to the left to access the drive bays.
4. Remove the filler panel from one of the empty hot-swap bays by inserting your finger into the depression at the left side of the filler panel and pulling it away from the server.
5. Touch the static-protective package containing the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
6. Install the hard disk drive in the hot-swap bay:
 - a. Make sure that the tray handle is open (that is, perpendicular to the drive).
 - b. Align the drive assembly with the guide rails in the bay.
 - c. Gently slide the drive assembly into the drive bay until the drive stops.



- d. Push the tray handle to the closed (locked) position.
- e. Check the hard disk drive status indicator to make sure that the hard disk drive is operating properly. (You might have to restart the server before the drive is recognized.) If the amber hard disk drive status LED for a drive is lit continuously, it indicates that the drive is faulty and must to be replaced. If the green hard disk drive activity LED is flashing, this indicates that the drive is being accessed.

Note: If your server is configured for RAID operation using an optional ServeRAID™ controller, you might have to reconfigure your disk arrays after installing hard disk drives. See the ServeRAID documentation on the *IBM ServeRAID Support CD* for additional information about RAID operation and complete instructions for using ServeRAID Manager.

7. If you are installing additional hot-swap hard disk drives, do so now.

8. If you have other options to install or remove, do so now; otherwise go to “Completing the installation” on page 33.

SCSI IDs for hot-swap hard disk drives

The hot-swap-drive backplane controls the SCSI IDs for the internal hot-swap drive bays. The SCSI ID for each hot-swap hard disk drive is printed on the hot-swap lock bar. The following table lists the SCSI IDs for the hard disk drives and backplane that are connected to one channel in hot-swap hard disk drive models. In the typical configuration, the standard hard disk drives and backplane are connected to channel A.

Device	SCSI ID
AIC 7901 controller (mini-PCI-X slot)	7
Hot-swap backplane	9
Drive bay 7	12
Drive bay 6	13
Drive bay 5	14

Installing a non-hot-swap SCSI hard disk drive in bay 4, 5, 6, or 7

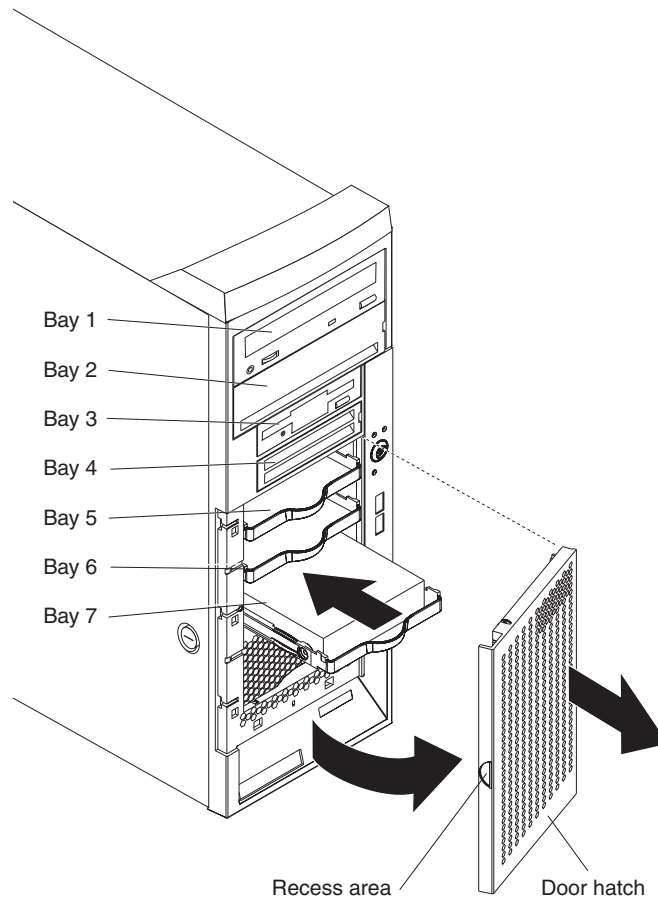
Some server models come with non-hot-swap SCSI hard disk drives. Before you install a non-hot-swap SCSI hard disk drive, read the following information:

- Read the documentation that comes with the drive for cabling instructions.
- Route the cable before you install the drive. Do not block the airflow from the fans.
- You can install up to four non-hot-swap hard disk drives in your server.
- Install non-hot-swap SCSI hard disk drives in this sequence: bay 7, bay 6, bay 5, and bay 4. See “Installing a drive in bay 2 or 4” on page 16 for information on how to install a hard disk drive in bay 4.

Complete the following steps to install a non-hot-swap SCSI hard disk drive:

1. Read the safety information beginning on page v and the “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords.
3. Unlock the side cover (the door hatch will not disengage from the server if the cover is locked).
4. Remove the side cover (see “Removing the side cover” on page 10).
5. Remove the support bracket (see “Removing and installing the support bracket” on page 12).

6. Grasp the recess area on the door hatch and rotate the door hatch outward until it disengages from the server.



7. Remove the empty drive tray from the drive bay in which you want to install the drive.
8. Touch the static-protective package containing the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
9. Set any jumpers or switches on the drive according to the documentation that comes with the drive.
10. Attach the hard disk drive to the drive tray with the four screws that are attached to the drive tray (use the plastic pins on the drive tray to help line up the drive with the drive tray screw holes).
11. Align the drive assembly with the guide rails in the bay (the connector end of the drive goes in first).
12. Gently slide the drive assembly into the drive bay as far as it will go.
13. Connect one end of the SCSI signal cable into the back of the drive and make sure that the other end of this cable is connected into the SCSI connector on the system board. See "Power and signal cables for internal drives" on page 26 for additional information about cabling drives and "System-board internal connectors" on page 3 for the location of the SCSI connectors on the system board. If there are open connectors on the cables connecting existing SCSI drives, you can use these cables to connect the new drive.
14. Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor and memory.

15. Connect the power cable to the back of the drive. The connectors are keyed and can be inserted only one way.
16. If you have other options to install or remove, do so now. Otherwise, reinstall the frame-support bracket (see “Removing and installing the support bracket” on page 12); then, go to “Completing the installation” on page 33.

Installing a simple-swap Serial ATA hard disk drive in bay 5, 6, or 7

Some server models come with simple-swap Serial ATA (SATA) hard disk drives, which are easily accessible from the front of the server. Before you install a simple-swap SATA hard disk drive, read the following information:

- Read the documentation that comes with the drive for cabling instructions.
- Route the cable before you install non-hot-swap drives. Do not block the airflow from the fans.
- You can install two simple-swap SATA hard disk drives in your server.

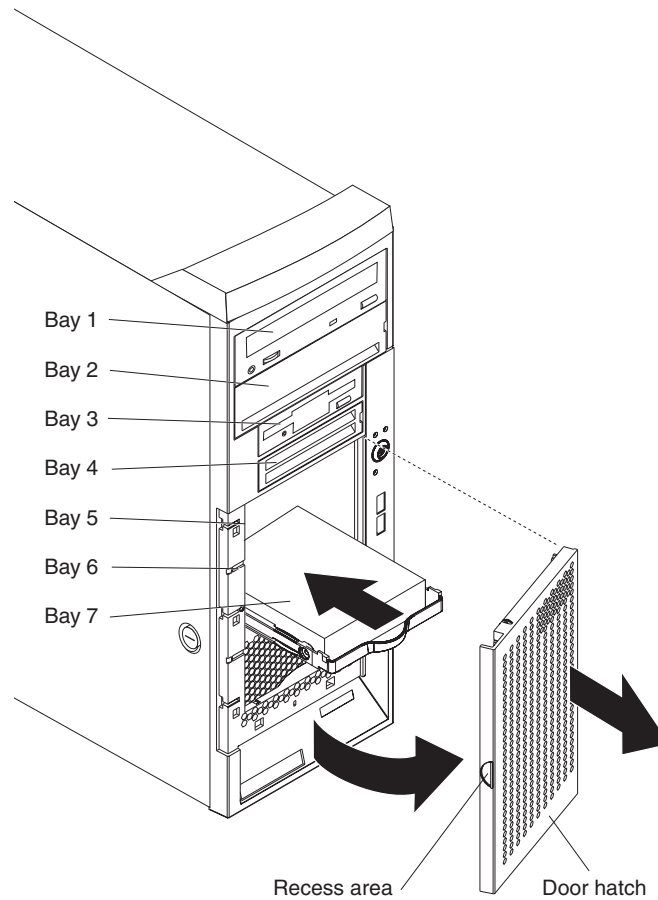
Note: You can install a third and fourth SATA drive if you install an optional ServeRAID-7t S-ATA controller in your server. The optional ServeRAID-7t S-ATA controller comes with two cables that you can use to cable the third and fourth SATA drives. In addition, if you install the optional ServeRAID-7t S-ATA controller to add a third and fourth drive, all four SATA drives must then be connected to the ServeRAID-7t S-ATA controller instead of the system board. See the optional ServeRAID-7t S-ATA controller documentation for cabling instructions.

- Install simple-swap SATA hard disk drives in this sequence: bay 7, bay 6, bay 5, and bay 4.
- Bays 5, 6, and 7 are simple-swap bays and do not require cabling. Bay 4 is a non-hot-swap drive bay and requires cabling as you would normally cable a non-hot-swap drive. See “Installing a drive in bay 2 or 4” on page 16 for information about how to install a hard disk drive in bay 4.

Complete the following steps to install a simple-swap hard disk drive:

1. Read the safety information beginning on page v and the “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords.
3. Unlock the side cover (the door hatch will not disengage from the server if the cover is locked).

4. Grasp the recess area on the door hatch and rotate the door hatch outward until it disengages from the server.



5. Touch the static-protective package containing the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
6. Align the drive assembly with the guide rails in the bay (the connector end of the drive goes in first).
7. Gently slide the drive assembly into the drive bay until the drive attaches to the back plate connector at the back of the drive bay (you should hear a click).

Note: If you install a drive in bay 4, you will have to cable it as you would normally cable a non-hot-swap hard disk drive.

8. If you have other options to install or remove, do so now. Otherwise, replace the frame-support bracket (see “Removing and installing the support bracket” on page 12); then, go to “Completing the installation” on page 33.

Power and signal cables for internal drives

Your server uses cables to connect parallel IDE, simple-swap Serial ATA, and SCSI devices to the power supply and to the system board. (See “System-board internal connectors” on page 3 for the location of system-board connectors.) Review the following information before connecting power and signal cables to internal drives:

- The drives that are preinstalled in your server come with power and signal cables attached. If you replace any drives, remember which cable is attached to which drive.
- When you install a drive, make sure that one of the signal cable drive connectors is connected to the drive and that the connector at the other end of the signal cable is connected to the system board.
- If you have only one IDE device on a cable, it must be set as a master device.
- If two IDE devices are used on a single cable, one must be designated as the master device and the other as the subordinate device; otherwise, the server might not recognize some of the IDE devices. The master and subordinate designation is determined by switch or jumper settings on each IDE device.

The following cables are provided:

- **Power cables:** Four-wire power cables connect the drives to the power supply. At the end of these cables are plastic connectors that can be attached to different drives; these connectors vary in size. Use either a four-wire power cable or Serial ATA power cable with Serial ATA drives, but do not use both at the same time (use one or the other).
- **Signal cables:** Signal cables are typically flat cables, also called ribbon cables, that connect parallel IDE, Serial ATA, SCSI, and diskette drives to the system board. Two or three types of signal cables come with your server:
 - **IDE:** The wider IDE signal cable has three connectors. One of these connectors is attached to the drive, one is a spare, and the third is attached to the primary or secondary IDE connector on the system board. The spare connector can be used to connect an additional IDE drive to your server.
The CD-ROM drive is attached to an ATA 100 signal cable. ATA 100 signal cables are color-coded. The blue connector is attached to the system board. The black connector is attached to the master IDE device. The gray middle connector is attached to the subordinate IDE device.
 - **Diskette drive:** The narrower signal cable has two connectors. One is attached to the diskette drive, and the other is attached to the connector (FDD1) on the system board.
 - **Serial ATA (SATA):** The narrower, black signal cable has two connectors. One is connected to the simple-swap Serial ATA drive, and the other is connected to the connector on the system board. Each simple-swap Serial ATA drive comes with a cable. If you install an additional Serial ATA drive, you will need an additional cable.
If you install the optional ServeRAID-7t S-ATA controller to add a third and fourth SATA drive, all four SATA drives must then be connected to the ServeRAID-7t S-ATA controller instead of the system board. The optional ServeRAID-7t S-ATA controller comes with two cables that you can use to cable the third and fourth SATA drives. See the optional ServeRAID-7t S-ATA controller documentation for cabling instructions.
 - **SCSI:** A round SCSI cable connects SCSI devices to the iSCSI controller on the system board.

- A round SCSI cable connects external SCSI devices to the SCSI controller on the system board. For more information about connecting SCSI devices, see the SCSI documentation.
- An Ultra320 twisted ribbon cable connects the internal Ultra320 SCSI hard disk drive to the SCSI connector on the system board. This cable has four additional connectors for attaching more internal SCSI devices. For hot-swap models, the maximum cable length that supports Ultra320 SCSI hard disk drives is 40 cm (16 in.).

Installing an adapter

The following notes describe the types of adapters that your server supports and other information that you must consider when installing an adapter.

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you need to change the switch setting or jumper settings on the adapter, follow the instructions that come with the adapter.
- Read the documentation that comes with your operating system.
- Your server comes with five PCI slots.
- The standard SCSI adapter is installed in the mini-PCI-X slot.
- You can install full-length adapters in all five PCI slots.
- You can install only 32-bit adapters in the 32-bit PCI slots 3 through 5 and 64-bit adapters in the 64-bit PCI-X slots 1 and 2.
- The 32-bit PCI slots 3 through 5 support 5.0 V signaling PCI adapters; they do not support 3.3 V signaling adapters. However, 64-bit adapters are supported if they are universal adapters.
- The 64-bit PCI-X slots 1 and 2 support 3.3 V signaling PCI or PCI-X adapters; they do not support 5.0 V signaling adapters.
- The PCI bus configuration is as follows:
 - The 32-bit PCI slots 3 through 5 and the onboard ATI 7000M video adapter are on the 33 MHz PCI bus.
 - The 64-bit PCI-X slots 1 and 2 and the mini-PCI-X slot are on the 66 MHz PCI-X bus.
- The optional IBM Remote Supervisor Adapter II can be installed only in PCI-X slot 2. Use the ribbon cable that comes with this adapter to connect it to the Remote Supervisor Adapter II connector on the system board.
- The optional ServeRAID-6i+ controller can be installed only in PCI-X slot 1.
- The server scans the PCI-X slot 2, PCI-X slot 1, mini-PCI-X slot, and PCI slots 5, 4, and 3 to assign system resources. Then, the server starts the PCI devices in the following order, if you have not changed the default startup sequence: PCI-X slot 2, PCI-X slot 1, mini-PCI-X slot, system-board integrated drive electronics (IDE) or SCSI devices (including the optional ServeRAID-6i+ controller), and then PCI slots 5, 4, and 3.
- For a list of supported options for your server, go to <http://www.ibm.com/pc/support/> .

See “System-board option connectors” on page 6 for the locations of expansion slots on the system board.

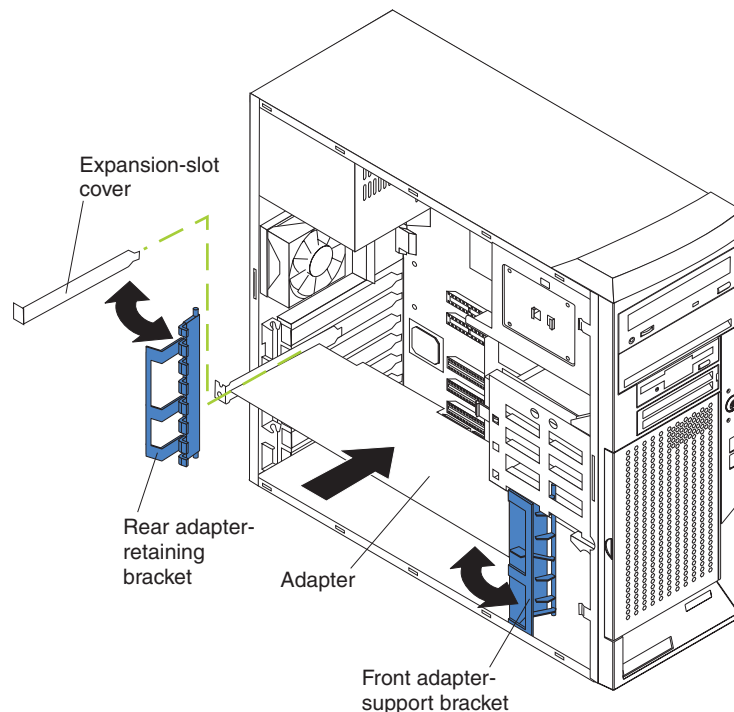
Complete the following steps to install an adapter:

1. Read the safety information beginning on page v and “Installation guidelines” on page 7.

2. Turn off the server and peripheral devices and disconnect all external cables and power cords; then, remove the side cover. See “Removing the side cover” on page 10.
3. Follow the cabling instructions, if any, that come with the adapter. Route the adapter cables before you install the adapter.
4. Follow the instructions that come with the adapter to set jumpers or switches, if any.
5. Remove the frame-support bracket. See “Removing and installing the support bracket” on page 12.
6. Rotate the rear adapter-retention bracket to the open (unlocked) position and remove it from the server. Rotate the front adapter-retention bracket to the open position. If you are installing a smaller adapter, remove only the rear adapter-retention bracket.
7. Remove the expansion-slot cover. From the rear of the server, press on the slot cover. Grasp it and pull it out of the expansion slot. Store it in a safe place for future use.

Note: Expansion-slot covers must be installed on all vacant slots. This maintains the electronic emissions standards of the server and ensures proper ventilation of server components.

8. Touch the static-protective package containing the adapter to any unpainted metal surface on the server. Then, remove the adapter from the static-protective package. Avoid touching the components and gold-edge connectors on the adapter.
9. Carefully grasp the adapter by the top edge or upper corners, and align it with the expansion slot guides; then, press the adapter *firmly* into the expansion slot. Move the adapter directly from the static-protective package to the expansion slot.



10. Connect required cables to the adapter. Route cables so that they do not block the flow of air from the fans. If you are installing an optional SCSI adapter, see “Cabling an optional SCSI adapter” on page 30 for additional information.
11. If you have other options to install or remove, do so now.
12. If you have installed a full-length adapter, rotate the front adapter-support bracket to the closed (locked) position.
13. Reinstall the rear adapter-retention bracket; then, rotate the bracket to the closed (locked) position.

Note: If any adapters in your server are large or have heavy cables attached to them, you can remove the rear adapter-retention bracket and secure all of the adapters with expansion-slot screws. The expansion-slot screws are stored on the frame-support bracket.

14. Replace the frame-support bracket. See “Removing and installing the support bracket” on page 12; then, go to “Completing the installation” on page 33.

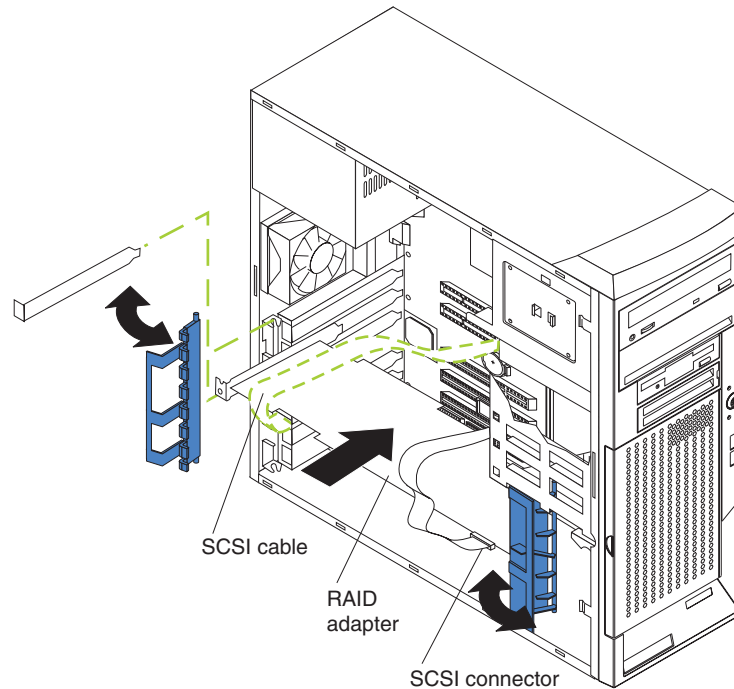
Cabling an optional SCSI adapter

You can install an optional SCSI adapter in your server to control the internal hard disk drives. With a SCSI adapter installed, you can configure the internal hard disk drives into disk arrays. You can also cable a SCSI adapter to external hard disk drives. See your SCSI adapter option documentation for complete instructions for installing a SCSI adapter in your server and for additional information about SCSI adapters.

Note: An optional SCSI adapter or cable option is required to connect external SCSI devices.

Complete the following steps to cable an optional SCSI adapter:

1. Install the SCSI adapter (see “Installing an adapter” on page 27).
2. Connect the SCSI signal cable to the adapter and to one or more of the signal-cable connectors to the rear of the SCSI devices.
3. Connect the SCSI-activity-indicator cable to the adapter and to the SCSI LED connector on the system board. See “System-board internal connectors” on page 3 for the location of the SCSI LED connector.



4. Complete the installation of the optional SCSI adapter.

Installing a security rope clip

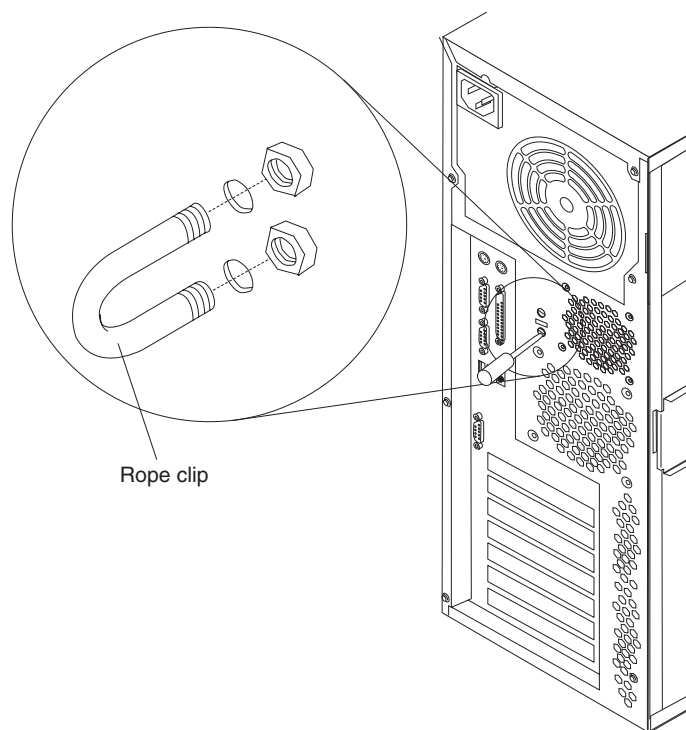
To help prevent hardware theft, you can add a security rope clip and cable to your server. After you add the security cable, make sure that it does not interfere with other cables that are connected to the server.

Before you begin, obtain the following items:

- A flat-blade screwdriver
- An adjustable wrench
- A 19 mm (0.75 in.) rope clip or wire rope (similar to National Manufacturing number 3230, stock number 176-735)
- Threaded nuts that fit the rope clip
- A security cable
- A lock, such as a combination lock or padlock

Complete the following steps to install a rope clip:

1. Turn off the server and all attached devices. Disconnect all external cables and power cords; then, remove the side cover. See “Removing the side cover” on page 10.
2. Use a screwdriver to remove the two metal knockouts.
3. Insert the rope clip through the rear panel; then, attach and tighten the nuts.
4. Thread the cable through the rope clip and around an object that is not part of or permanently secured to the building structure or foundation, and from which the cable cannot be removed. Fasten the cable ends together with a lock. After you add the security cable, make sure that it does not interfere with other cables that are connected to the server.



5. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 33.

Replacing the battery

IBM has designed this product with your safety in mind. The lithium battery must be handled correctly to avoid possible danger. If you replace the battery, you must adhere to the following instructions.

Note: In the U. S., call 1-800-IBM-4333 for information about battery disposal.

If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.

To order replacement batteries, call 1-800-426-7378 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM reseller or IBM marketing representative.

Note: After you replace the battery, you must reconfigure your server and reset the system date and time.

Statement 2:



CAUTION:

When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

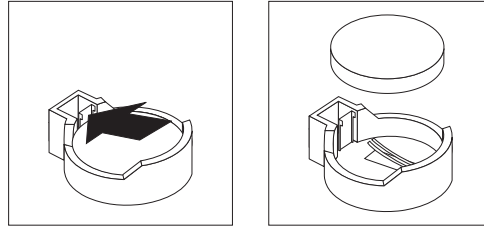
- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

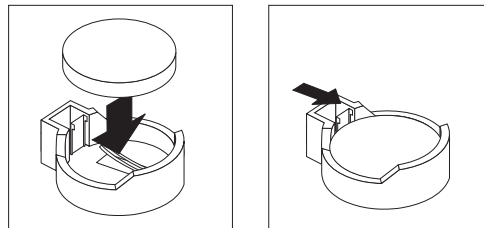
Complete the following steps to replace the battery:

1. Review the safety information beginning on page v and “Installation guidelines” on page 7.
2. Follow any special handling and installation instructions supplied with the replacement battery.
3. Turn off the server and all attached devices.
4. Disconnect all power cords; then, disconnect all external cables.
5. Remove the side cover and frame-support bracket (see “Removing the side cover” on page 10 and “Removing and installing the support bracket” on page 12).
6. Remove any adapters that impede access to the battery.
7. Remove the battery:

- a. Use a fingernail to press the top of the battery clip away from the battery. The battery pops up when released.
- b. Use your thumb and index finger to lift the battery from the socket.



8. Insert the new battery:
 - a. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.
 - b. Press the battery down into the socket until it clicks into place. Make sure the battery clip holds the battery securely.



9. Replace the frame-support bracket and side cover. (See “Removing and installing the support bracket” on page 12 and “Replacing the side cover” on page 34).
10. Connect all external cables; then, connect the power cords.
11. Turn on the server.
12. Start the Configuration/Setup Utility program and set configuration parameters as needed. See the *User's Guide* on the IBM xSeries Documentation CD.

Completing the installation

To complete the installation, you must reinstall the bezel, reinstall the frame-support bracket (see “Removing and installing the support bracket” on page 12), reinstall the side cover, connect all the cables and, for certain options, run the Configuration/Setup Utility program. Follow the instructions in this section.

Replacing the bezel

Complete the following steps to replace the bezel:

1. Insert the two tabs on the bottom of the bezel into the matching holes on the server chassis.
2. Push the top of the bezel toward the server until the two tabs at the top of the bezel snap into place.
3. For non-hot-swap and simple-swap models, reinstall the door hatch on the server.
4. For hot-swap models, make sure that the side cover is unlocked; then, slide the drive-bay lock bar to the right. The lock bar locks when you lock the side cover key lock.
5. Lock the side cover.

Replacing the side cover

If you removed the support bracket or bezel, reinstall it before you replace the side cover. See “Removing and installing the support bracket” on page 12 and “Replacing the bezel” on page 33.

Note: The rear adapter retaining bracket rests against the server side cover. You might find it easier to lay the server on its side to replace the side cover.

Complete the following steps to replace the side cover:

1. Before installing the cover, check that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server.

2. Insert the tabs inside the cover into the slots on the server chassis.

Note: The cover-release latch must be in the unlocked (opened) position before you install the side cover.

3. Close the cover-release latch to secure the side cover in place.

Note: Make sure that each tab on the side cover is in its corresponding slot before closing the cover-release latch.

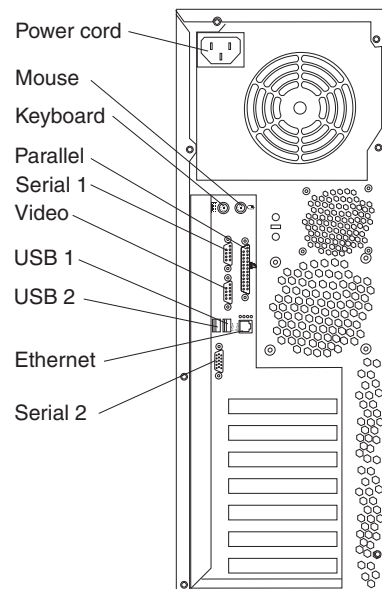
4. Lock the side cover.

Connecting the cables

If your server cables and connector panel have color-coded connections, match the color of the cable end with the color of the connector. For example, match a blue cable end with a blue panel connector, a red cable end with a red connector, and so on.

Attention: To prevent damage to equipment, connect the power cords last.

The following illustration shows the input/output (I/O) connectors on the server.



Updating your server configuration

When you start the server for the first time after you add or remove an internal option or an external SCSI device, you might receive a message that the configuration has changed. The Configuration/Setup Utility program starts automatically so that you can save the new configuration settings. See the *User's Guide* for additional information.

Some options have device drivers that you must install. See the documentation that comes with each option for information about installing device drivers.

If the server has a ServeRAID controller installed and you have installed or removed a hard disk drive, see the ServeRAID documentation that comes with your server for information about reconfiguring the disk arrays.

Connecting external options

If you install an optional SCSI adapter, you can attach external SCSI devices, such as a SCSI storage expansion enclosure, to your server.

Complete the following steps to attach an external device:

1. Review the safety information beginning on page v, "Installation guidelines" on page 7, and the documentation that comes with your options.
2. Turn off the server and all attached devices.
3. Follow the instructions that come with the option to prepare it for installation and to connect it to the server.

Note: If you are attaching an external SCSI device, see "Ultra320 SCSI connector" on page 39 for information about SCSI cabling and SCSI IDs.

Installing the server in a rack

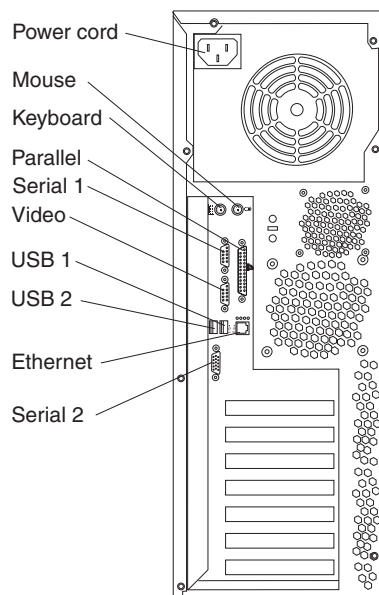
An optional Tower-to-Rack Kit is needed to convert your server from a tower model to a rack model. You can then install the server in a rack cabinet. To order a Tower-to-Rack Kit for your server, contact your IBM marketing representative or authorized reseller.

Chapter 3. Input/output connectors

Your server has the following input/output (I/O) connectors:

- One mouse
- One keyboard
- One parallel
- Two serial
- One video
- One Ethernet (RJ-45)
- One Ultra320 SCSI (some models)
- Four Universal Serial Bus (USB) V 2.0 (two on front and two on rear)

The following illustration shows the locations of these connectors.

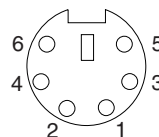


The following sections describe these connectors.

If you have an optional Remote Supervisor Adapter II (systems-management adapter) installed in PCI-X slot 2, your server also has an additional Ethernet connector, an additional serial connector, and an Advanced System Management (ASM) Interconnect connector. See the documentation that comes with the Remote Supervisor Adapter II for more information about the ASM Interconnect network. In addition, if you install the optional Remote Supervisor Adapter II, you must disconnect the video cable from the system board and connect it to the optional Remote Supervisor Adapter II.

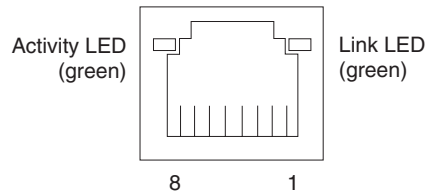
Auxiliary-device (pointing-device) connector

Use this connector to connect a mouse or other pointing device. The following illustration shows an auxiliary-device connector.



Ethernet (RJ-45) connector

The following illustration shows an Ethernet connector.

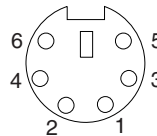


Connect a Category 3, 4, or 5 unshielded twisted-pair (UTP) cable to this connector. The 100BASE-TX and 1000BASE-T Fast Ethernet standards require Category 5 or higher cabling.

For more information about the Ethernet controller, see the *User's Guide*.

Keyboard connector

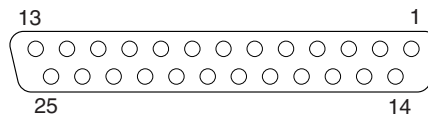
Use this connector to connect a PS/2 (non-USB) keyboard to the server. The following illustration shows a keyboard connector.



If you attach a keyboard to this connector, USB ports and devices are disabled during the power-on self-test (POST).

Parallel connector

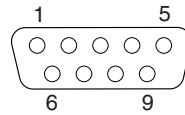
Use this connector to connect a parallel device. The following illustration shows a parallel connector.



The parallel connector supports three standard Institute of Electrical and Electronics Engineers (IEEE) 1284 modes of operation: Standard Parallel Port (SPP), Enhanced Parallel Port (EPP), and Extended Capability Port (ECP). If you configure the parallel port to operate in bidirectional mode, it supports the ECP and EPP modes of operation. To configure the parallel port, use the **Devices and I/O Ports** option in the Configuration/Setup Utility program. See the *User's Guide* for more information. If you configure the parallel port to operate in bidirectional mode, use an IEEE 1284-compliant cable that does not exceed 3 meters (9.8 ft).

Serial connectors

Use the serial connectors to connect serial devices. The following illustration shows a serial connector.



Ultra320 SCSI connector

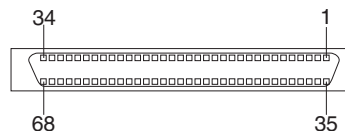
You can install up to four internal SCSI devices using the SCSI cable that comes with some models of the server. Other server models might come with one SCSI cable that is connected from the internal SCSI connector to the standard hot-swap-drive backplane. You can attach additional internal SCSI devices to the other internal SCSI connector, or you can use the connector to attach external SCSI devices. To connect external SCSI devices, remove the SCSI knockout from the rear of the server and secure the free end of an optional cable in the new opening.

If you want to attach external SCSI devices to the server without using the internal SCSI channel, you must install an optional SCSI adapter.

Notes:

1. External SCSI devices connected to internal SCSI channel will operate asynchronously.
2. If you install a PCI RAID adapter to configure and manage the internal hot-swap drives, you must move the SCSI cable from the system-board SCSI connector to an internal channel connector on the RAID adapter. See “Cabling an optional SCSI adapter” on page 30 for additional information.

An optional external SCSI connector might be installed on the rear of the server. Use this connector to connect external SCSI devices. The following illustration shows a SCSI standard 68-pin, female D-shell SCSI connector.



Your server has a single-channel SCSI controller. This single-channel controller supports one Ultra320 SCSI channel. The SCSI connector for the channel is on the system board. The channel supports up to 15 SCSI devices. This controller uses:

- Double-transition clocking to achieve up to 320 MB-per-second data-transfer rates
- Domain name validation to negotiate compatible data-transfer speeds with each device
- Cyclic-redundancy checking (CRC), instead of the usual parity checking, to improve data reliability
- An active terminator for SCSI bus termination

Each SCSI device that is connected to a SCSI controller must have a unique SCSI ID. This ID enables the SCSI controller to identify the device and ensure that

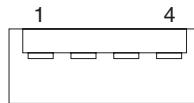
different devices on the same SCSI channel do not attempt to transfer data simultaneously. SCSI devices that are connected to different SCSI channels can have duplicate SCSI IDs.

The hot-swap-drive backplane controls the SCSI IDs for the internal hot-swap drive bays. However, when you attach an external SCSI device to an optional SCSI adapter, you must set a unique ID for the device. See the information that comes with the device for instructions to set its SCSI ID.

You can install four internal SCSI devices using the SCSI signal cable that comes with some server models. If you plan to attach external SCSI devices, you must order an additional SCSI adapter. To select and order the correct adapter for use with external devices, contact your IBM marketing representative or authorized reseller. When using an optional SCSI adapter, you must also connect the SCSI adapter to the SCSI LED connector on the system board to receive an indication of SCSI hard disk drive activity. See “System-board internal connectors” on page 3 for the location of the SCSI connectors. For information about the maximum length of SCSI cable, see the American National Standards Institute (ANSI) SCSI standards on the ANSI Web site at <http://www.ansi.org/>. Adhering to these standards will help to ensure that your server operates correctly.

Universal Serial Bus connectors

Use a Universal Serial Bus (USB) 2.0 connector to connect a USB device. USB 2.0 technology transfers data at up to 480 Mb per second (Mbps) with a maximum of 127 devices and a maximum signal distance of 5 meters (16 ft) per segment (if the device that is attached to the server is a USB 2.0 device). If multiple USB devices are attached to the server, the USB hub must be 2.0; otherwise, all USB 2.0 devices will transfer data at 12 Mbps. Using Plug and Play technology, USB devices are configured automatically. The following illustration shows a USB connector.



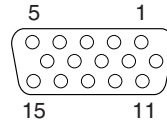
Use a 4-pin cable to connect a device to a USB connector. If you need to connect more USB devices than the server has USB connectors for, use a USB hub to connect additional devices.

If you connect a PS/2 (non-USB) keyboard to the keyboard connector, USB ports and devices are disabled during POST.

If you connect a USB keyboard that has a mouse port, the keyboard emulates a mouse, and you cannot disable the mouse settings in the Configuration/Setup Utility program.

Video connector

Use the video connector to connect a monitor to the server. The connector is dark blue to help you identify it. The following illustration shows an industry-standard 15-pin analog video connector on the rear of the server.



Appendix. Notices

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CD-ROM drive speeds list the variable read rate. Actual speeds vary and are often less than the maximum possible.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity may vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives available from IBM.

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IBM @server xSeries 206 Type 8482

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Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an IBM authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from IBM authorized dealers. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible party:
International Business Machines Corporation
New Orchard Road
Armonk, NY 10504
Telephone: 1-919-543-2193

 Tested To Comply
With FCC Standards
FOR HOME OR OFFICE USE

Industry Canada Class B emission compliance statement

This Class B digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

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IBM power cord part number	Used in these countries and regions
02K0546	China

IBM power cord part number	Used in these countries and regions
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13F9979	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire
13F9997	Denmark
14F0015	Bangladesh, Lesotho, Maceo, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda
14F0033	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Italy, Libyan Arab Jamahiriya
14F0087	Israel
1838574	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Costa Rica, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States of America, Venezuela
24P6858	Korea (Democratic People's Republic of), Korea (Republic of)
34G0232	Japan
36L8880	Argentina, Paraguay, Uruguay
49P2078	India
49P2110	Brazil

IBM power cord part number	Used in these countries and regions
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