



IBM xSeries 236 Type 8841
Option Installation Guide





@server

IBM xSeries 236 Type 8841
Option Installation Guide

Note:

Before using this information and the product it supports, read the general information in “Notices,” on page 57.

First Edition (September 2004)

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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.

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 the server or optional device before you install the device.

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.

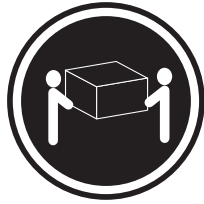


DANGER

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.

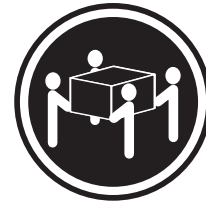
Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



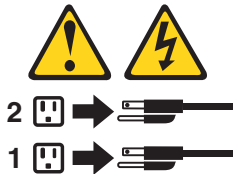
≥ 55 kg (121.2 lb)

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.

Chapter 1. Introduction

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

Related documentation

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

- *User's Guide*

This document is in Portable Document Format (PDF) on the IBM® *xSeries® Documentation CD*. It contains general information about the server, including information about features, how to configure the server, and how to get help.

- *Installation Guide*

This printed document contains instructions for setting up the 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 the server model, additional documentation might be included on the IBM *xSeries Documentation CD*.

The 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 the 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 236**.
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:

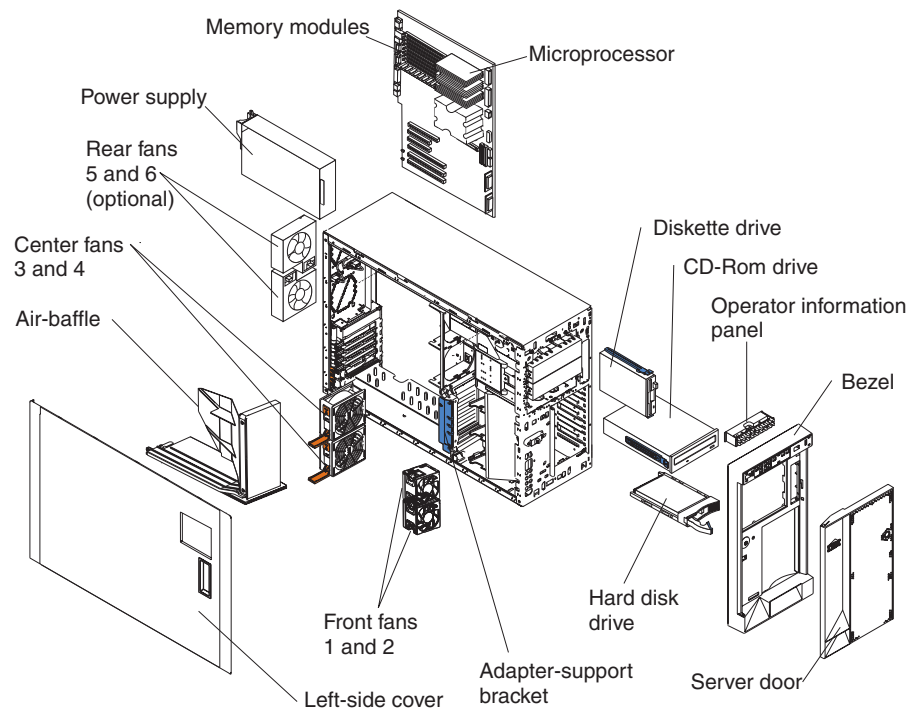
- **Notes:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice 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 236 Type 8841 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.

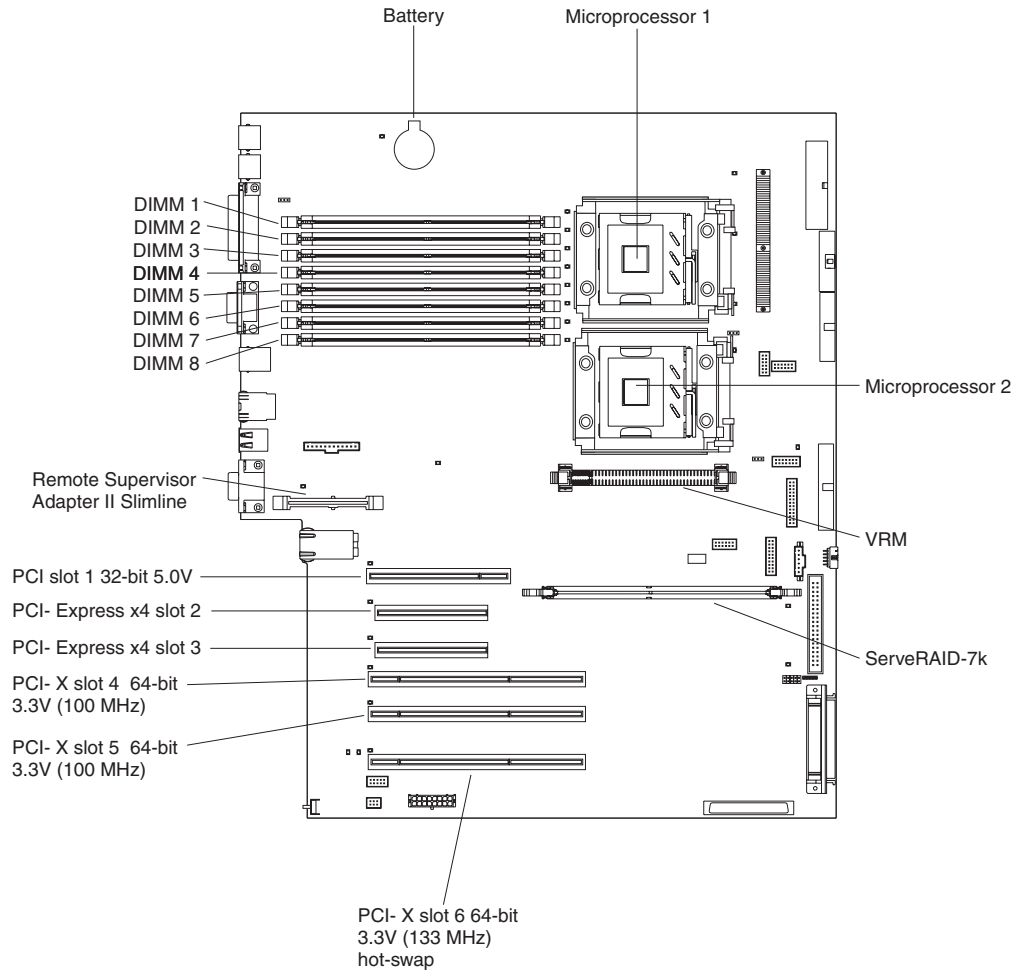
Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points 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 switches and jumpers

The following illustration shows the jumpers on the system board.

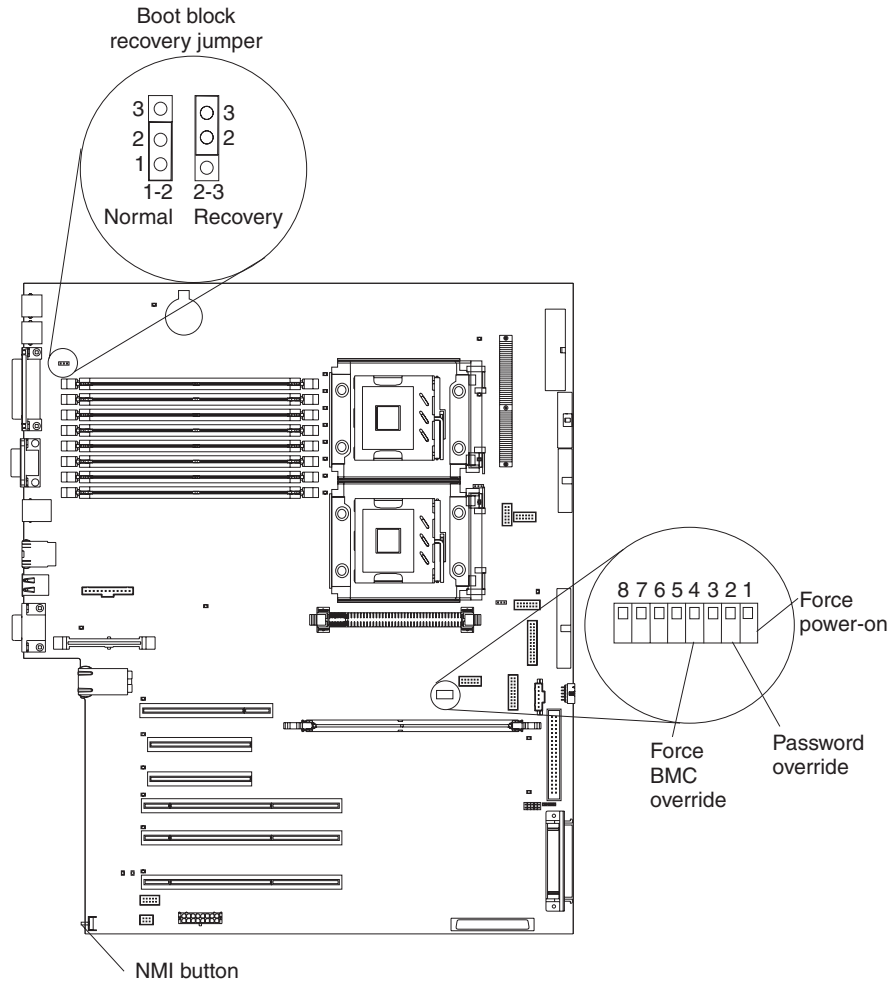


Table 1 describes the function of each switch on the switch block.

Table 1. Switches 1-8

| Switch number | Default value | Switch description |
|---------------|---------------|---|
| 8 | Off | Reserved. |
| 7 | Off | Reserved. |
| 6 | Off | Reserved. |
| 5 | Off | Reserved. |
| 4 | Off | Force baseboard management controller (BMC) override. |
| 3 | Off | Reserved. |

Table 1. Switches 1-8 (continued)

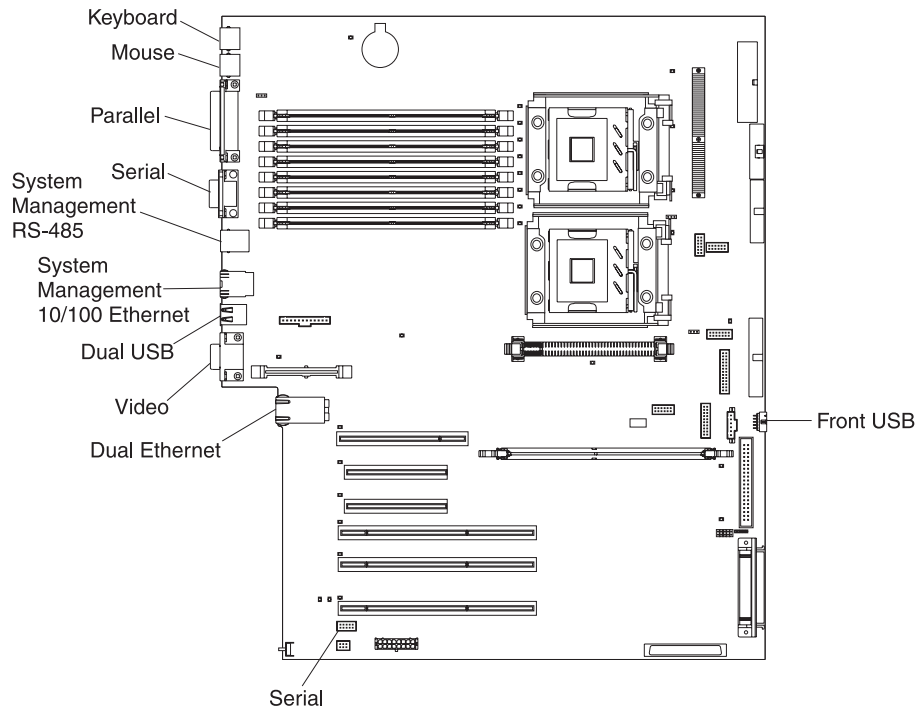
| Switch number | Default value | Switch description |
|---------------|---------------|--|
| 2 | Off | <p>Power-on password override. Changing the position of this switch bypasses the power-on password check the next time the server is turned on and starts the Configuration/Setup Utility program so that you can change or delete the power-on password. Move the switch back to the default position after the password is overridden.</p> <p>Changing the position of this switch does not affect the administrator password check, if an administrator password is set.</p> <p>See the <i>User's Guide</i> on the IBM xSeries Documentation CD for additional information about the power-on password.</p> |
| 1 | Off | Force power-on. When toggled to On, this switch forces the server to turn on, overriding the power-on button. |

Notes:

1. Before moving any jumpers, turn off the server; then, disconnect all power cords and external cables. (Review the information in "Safety" on page v, "Installation guidelines" on page 11, and "Turning off the server" on page 13.)
2. Any system-board switch or jumper blocks that are not shown in the illustrations in this document are reserved.

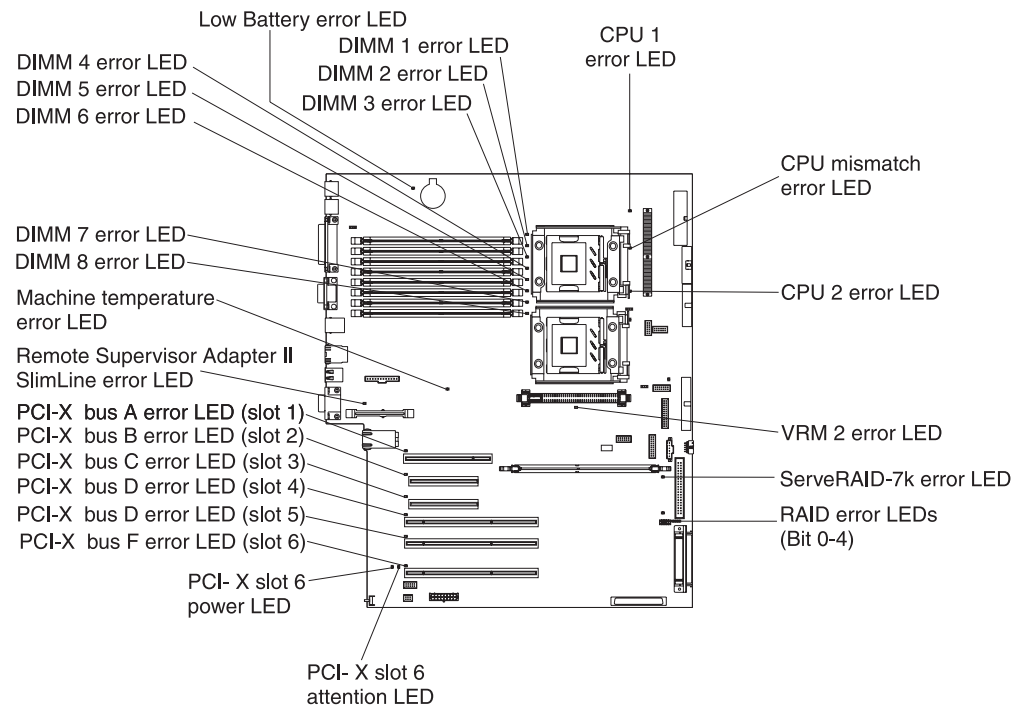
System-board external connectors

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



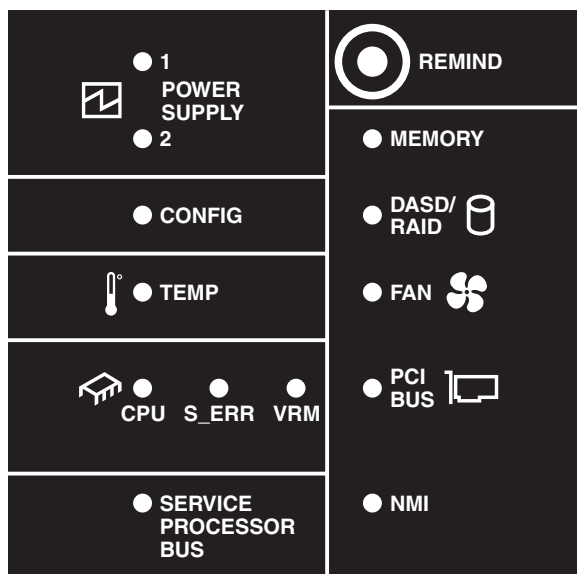
System-board LEDs

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



Light path diagnostics panel

The following illustration shows the remind button and the LEDs on the light path diagnostics panel. The light path diagnostics panel is inside the server under the left-side cover and the error LEDs are also visible through the left-side cover.



Use the remind button on the light path diagnostic panel to acknowledge that an error has occurred without taking further action. When you push the remind button, the system error LED will flash every 2 seconds until the error is fixed. If another error occurs, the system error LED will then stop flashing and return to a solid on state.

For more information about light path diagnostics, see the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM xSeries Documentation CD.

The following table lists the light path diagnostics LEDs, the problems that they indicate, and actions to solve the problems.

| LED | Problem | Action |
|----------------|---|--|
| POWER SUPPLY 1 | Lit LED: Power supply 1 has failed. | <ol style="list-style-type: none"> 1. Remove ac power from the server. 2. Replace the power supply; then, reconnect the server to ac power and restart the server. |
| | Flashing LED: Power supply 1 was removed in a redundant power-supply configuration. | Install a new power supply in the PS1 location. |
| POWER SUPPLY 2 | Lit LED: Power supply 2 has failed. | <ol style="list-style-type: none"> 1. Remove ac power from the server. 2. Replace the power supply; then, reconnect the server to ac power and restart the server. |
| | Flashing LED: Power supply 2 was removed in a redundant power supply configuration. | Install a new power supply in the PS2 location. |
| MEMORY | A memory error has occurred. | Replace the failing DIMM, indicated by the lit LED on the system board. |
| CONFIG | A configuration error has occurred. | Locate the second flashing LED and fix the configuration problem associated with the blinking LED. |

| LED | Problem | Action |
|-----------------------|--|--|
| DASD/RAID | A hard disk drive, integrated SCSI controller, or integrated RAID error has occurred. This LED will also be lit when a hard disk drive is removed from the server. | <ul style="list-style-type: none"> • Check the LEDs on the hard disk drives and replace the indicated drive. • Check the LEDs on the system board and replace the indicated component. • If a hard disk drive LED remains lit after being replaced, call for service. |
| TEMP | The system temperature has exceeded a threshold level. | <ul style="list-style-type: none"> • Determine whether a fan has failed. If it has, replace it. • Make sure that the room temperature is not too high. See "Features and specifications" on page 5 of the <i>Installation Guide</i> for temperature information. • Make sure that the air vents are not blocked. <p>If the problem remains, call for service.</p> |
| FAN | A fan has failed or is operating too slowly. A failing fan can also cause the TEMP LED to be lit. | Replace the failing fan, indicated by the lit LED. |
| CPU | A microprocessor has failed. | <p>If a lit LED on the system board indicates a problem with a microprocessor, make sure that the microprocessor is installed correctly.</p> <p>If the problem remains, call for service.</p> |
| S_ERR | A soft error has occurred. | <ol style="list-style-type: none"> 1. Restart the server. 2. Update the firmware and adapter drivers. 3. Check the POST error log <p>If the problem remains, call for service.</p> |
| VRM | The VRM or integrated VRD has failed. | <ul style="list-style-type: none"> • Remove ac power from the server, and then restart the server. • If the LED next to the VRM is lit, replace the pluggable VRM. • If the LED next to the integrated VRD is lit, call for service. |
| PCI BUS | An error has occurred on a PCI bus. | <ul style="list-style-type: none"> • Check the system error log for information about the error. • If you cannot isolate the failing adapter through the information in the system error log, remove one adapter at a time from the failing PCI bus, and restart the server after each adapter is removed. <p>If the problem remains, call for service.</p> |
| SERVICE PROCESSOR BUS | The service processor has failed. | <p>Remove ac power from the server; then, reconnect the server to ac power and restart the server.</p> <p>If the problem remains, call for service.</p> |
| NMI | A machine check error has occurred. | Check the error log to diagnose the condition. |

Chapter 2. Installing options

This chapter provides detailed instructions for installing hardware options in the server.

Installation guidelines

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

- For a list of supported options for the server, go to <http://www.ibm.com/us/compat/>.
- Read the safety information beginning on page v and the guidelines in “Handling static-sensitive devices” on page 12. This information will help you work safely with the server and options.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- 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 power supplies, hot-swap fans, 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 or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you need to access the inside of the server, you might find it easier to lay the server on its side.

System reliability guidelines

To help ensure proper 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 in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2.0 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 left-side cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the left-side cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap drive within 2 minutes of removal.
- You do not remove the air baffle while the server is running. Operating the server without the air baffle might cause the microprocessor to overheat.
- Microprocessor socket 2 always contains either a microprocessor baffle or a microprocessor and heat sink.

Working inside the server with the power on

The server supports hot-swap devices and is designed to operate safely while it is turned on and the cover is removed. Follow these guidelines when you work inside a server that is turned on:

- Avoid wearing loose-fitting clothing on your forearms. Button long-sleeved shirts before working inside the server; do not wear cuff links while you are working inside the server.
- Do not allow your necktie or scarf to hang inside the server.
- Remove jewelry, such as bracelets, necklaces, rings, and loose-fitting wrist watches.
- Remove items from your shirt pocket, such as pens and pencils, that could fall into the server as you lean over it.
- Avoid dropping any metallic objects, such as paper clips, hairpins, and screws, into the server.

Handling static-sensitive devices

Attention: Static electricity can damage electronic devices, including the 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 damage from 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 the 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 except for the service processor is shut down; however, the server can respond to requests from the service processor (also called the baseboard management controller), such as a remote request to turn on the server. The power-on LED flashes to indicate that the server is connected to ac power 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, one or more fans might start running, 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 the server is connected to an Advanced System Management interconnect network that contains at least one server with an optional Remote Supervisor Adapter II SlimLine installed, the server can be turned on from the Remote Supervisor Adapter II SlimLine user interface.
- If your operating system supports the systems-management software for an optional Remote Supervisor Adapter II SlimLine, the systems-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.

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 requests from the service processor, such as a remote request to turn on the server. While the server remains connected to ac power, one or more fans might continue to run. To remove all power from the server, you must disconnect it from the power source.

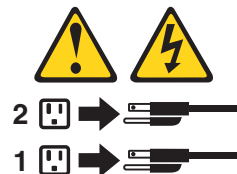
Some operating systems require an orderly shutdown before you turn off the server. See your operating-system documentation for information about shutting down the operating system.

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:

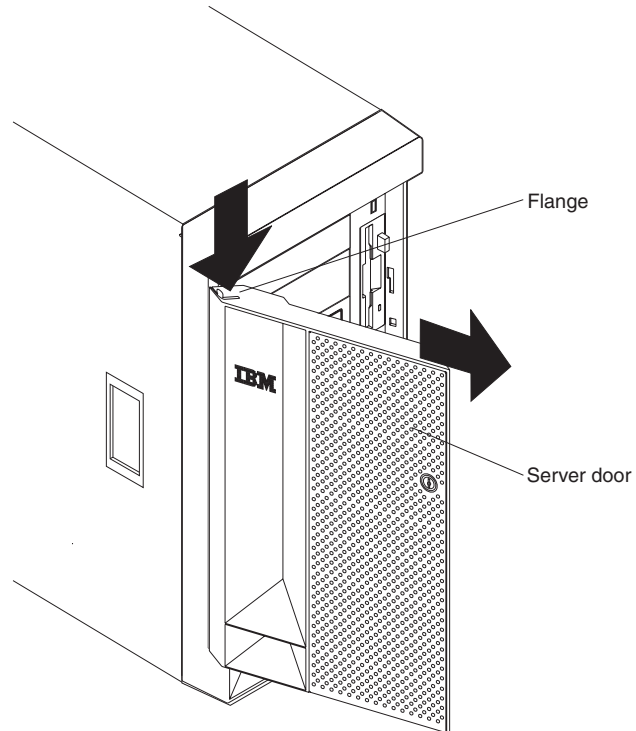
- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.

- 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 the server is connected to an Advanced System Management interconnect network that contains at least one server with an optional Remote Supervisor Adapter II SlimLine installed, the server can be turned off from the Remote Supervisor Adapter II SlimLine user interface.
- If an optional Remote Supervisor Adapter II SlimLine is installed in the server, the server can be turned off from the Remote Supervisor Adapter II SlimLine user interface.
- If the Wake on LAN feature turned on the server, the Wake on LAN feature can turn off the server.
- The integrated system management processor can turn off the server as an automatic response to a critical system failure.
- You can turn off the server through a request from the service processor.

Removing the server door

The following illustration shows how to remove the door from the server.

Note: The illustrations in this document might differ slightly from your hardware.



Complete the following steps to remove the server door:

1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Unlock and open the server door.
3. Locate the flange on the top edge of the door.
4. Press the flange downward while pressing outward on the door; then, lift the door up and off the hinge. Set the door aside in a safe place.

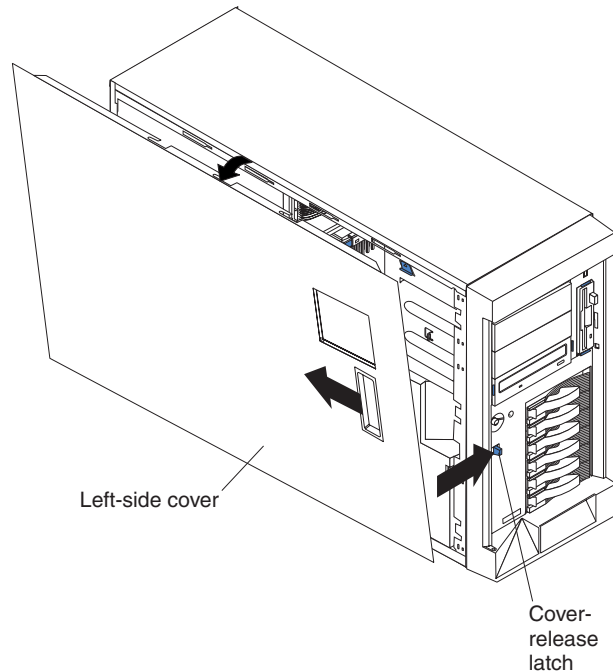
Removing the server left-side cover air baffle and bezel

Before you remove the left-side cover, air-baffle, or bezel, read the safety information beginning on page v and “Installation guidelines” on page 11.

Removing the left-side cover

The following illustration shows how to remove the left-side cover from the server.

Note: If you have not already removed the door, remove it as described in “Removing the server door” on page 15.



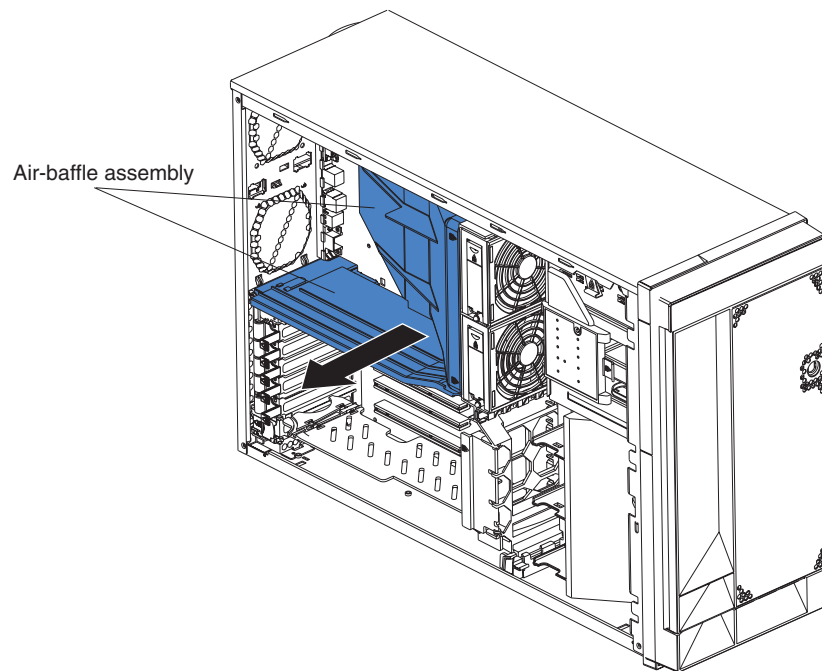
Complete the following steps to remove the server left-side cover:

1. Push the plastic cover-release latch near the edge of the side cover to the right to release the cover.
2. While pushing the plastic cover-release latch, slide the side cover slightly toward the rear of the server; the cover will stop after approximately 25 mm (1 inch). Lift the cover off the server and set the cover aside.

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 air baffle

When working with some options, you must first remove the air baffle to access certain components or connectors on the system board. The following illustration shows how to remove the air baffle.



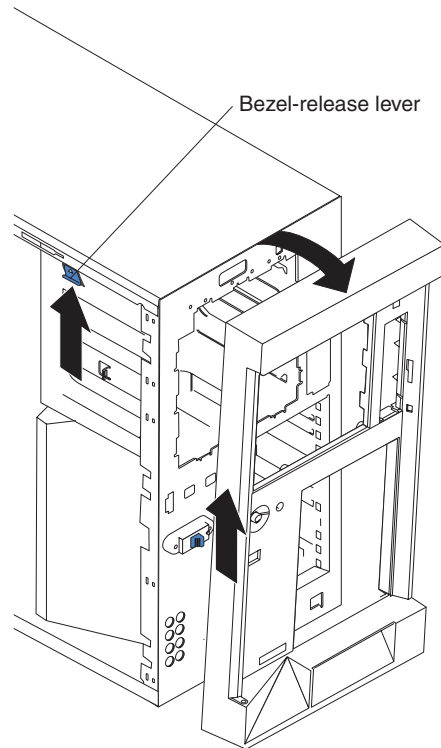
Complete the following steps to remove the air baffle:

1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables (see “Turning on the server” on page 12); then, remove the cover (see “Removing the left-side cover” on page 16).
3. Place your fingers on each side of the air baffle.
4. Press in on the sides and lift the air baffle out of the server.

Attention: For proper cooling and airflow, replace the air baffle before turning on the server. Operating the server with the air baffle removed might damage server components.

Removing the bezel

The following illustration shows how to remove the bezel from the server.



Complete the following steps to remove the bezel:

1. Remove the left-side cover and locate the bezel-release lever.
2. Press up on the bezel-release lever.
3. Pull the top of the bezel away from the chassis; then, lift the bezel to disengage the bottom tabs.
4. Remove the bezel from the server and store the bezel in a safe place.

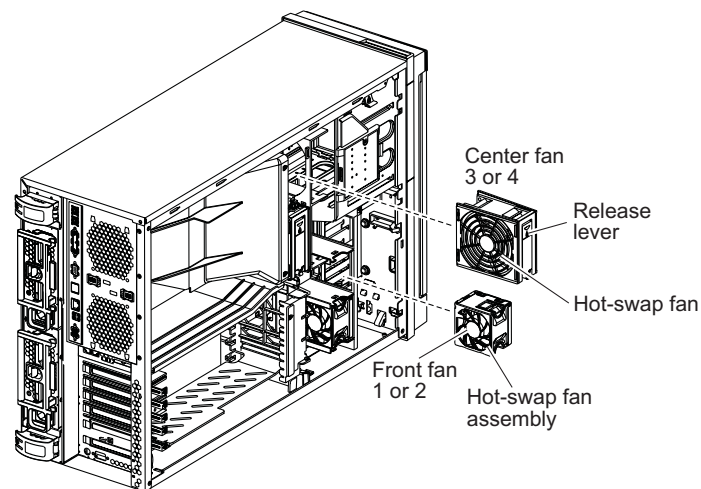
Replacing hot-swap fans

The server comes with four hot-swap fans: two front fans (fans 1 and 2), and two center fans (fans 3 and 4). You do not have to turn off the power to the server to replace a hot-swap fan.

If the server is equipped with the IBM xSeries 670-Watt Hot-swap Power-Supply option, two rear fans (fans 5 and 6) must also be installed on the server. For information on replacing these fans or installing this option, see “Replacing a rear fan (5 or 6)” on page 21 or “Installing the 670-Watt hot-swap power-supply option” on page 23.

Attention: To help ensure proper cooling, if a fan fails, replace it within 48 hours.

The following illustration shows how to replace hot-swap fans.

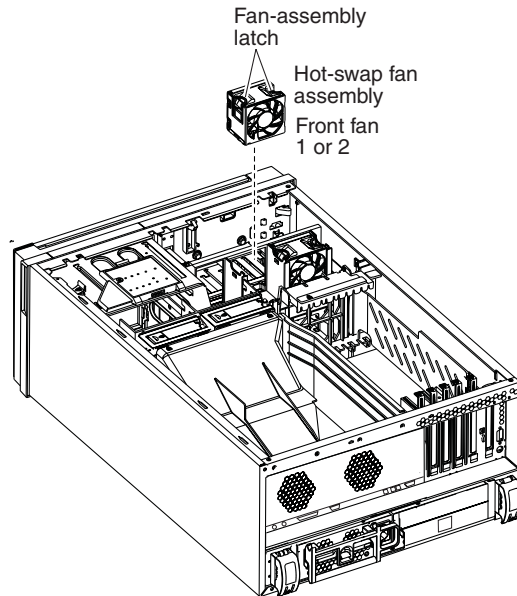


Determine which fan to replace by checking the LEDs on the fans. The front fans, center fans, and rear fans are installed differently from each other. This section contains separate instructions for each group of fans.

Replacing a front fan (1 or 2)

Complete the following steps to replace fan 1 or 2:

Attention: To ensure proper server operation, if a fan fails, replace it within 48 hours.

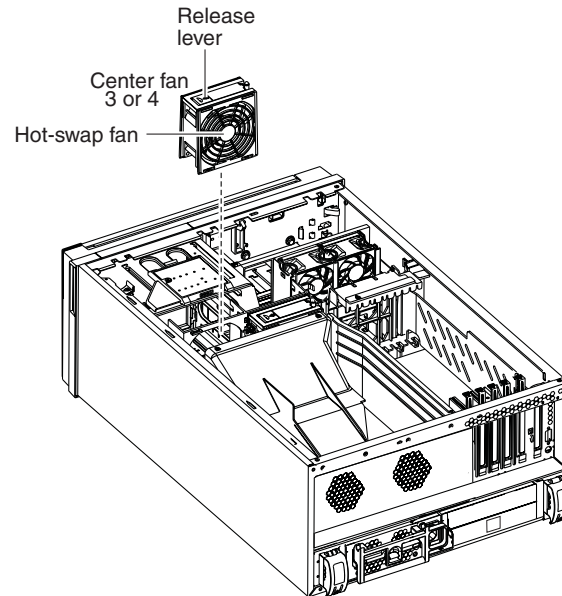


Complete the following steps to replace hot-swap-fan 1 or 2:

1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Remove the cover. See “Removing the left-side cover” on page 16. The LED on the failing fan assembly will be lit.
Attention: To ensure proper system cooling, do not remove the left-side cover for more than 30 minutes during this procedure.
3. Place your fingers into the fan-assembly latch on the top of the failing fan.
4. Squeeze the fan-assembly latch together and lift the fan out of the server.
5. Position the new fan so that the LED on the fan is closest to the front of the server.
6. Push the replacement fan assembly into the server until it clicks into place.
7. Make sure that the FAN LED on the diagnostic LED panel (see the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM xSeries Documentation CD for the location of the LED) is not lit. If the FAN LED is lit, reseal the fan.
8. Replace the cover. See “Installing the server bezel and left-side cover” on page 47.

Replacing a center fan (3 or 4)

Complete the following steps to replace hot-swap fan 3 or 4:

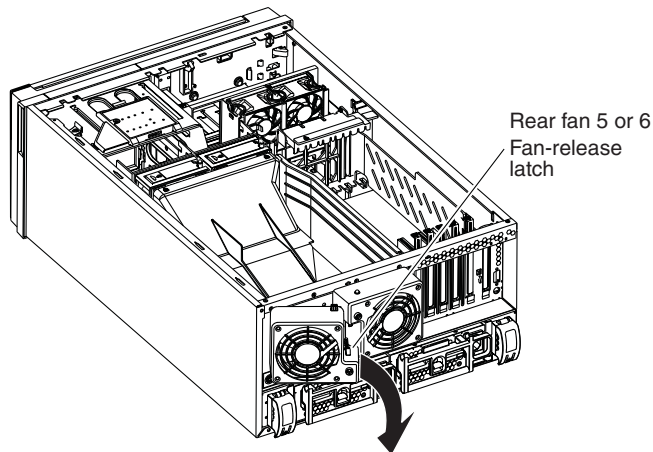


1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Remove the cover. See “Removing the left-side cover” on page 16. The LED on the failing fan assembly will be lit.
Attention: To ensure proper system cooling, do not remove the left-side cover for more than 30 minutes during this procedure.
3. Press the orange fan-release latch in the direction indicated by the arrow on the latch to open the release lever.
4. Pull the fan out of the server using the release lever.
5. Press the orange fan-release latch in the direction indicated by the arrow on the latch and open the release lever on the replacement fan.
6. Position the replacement fan so that the orange fan-release latch is away from you; then, slide the fan into the server. Press the release latch into place and secure the fan in the server.
7. Make sure that the FAN LED on the diagnostic LED panel (see the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM xSeries Documentation CD for the location of the LED) is not lit. If the FAN LED is lit, reset the fan.
8. Reinstall the server cover. See “Installing the server bezel and left-side cover” on page 47.

Replacing a rear fan (5 or 6)

Hot-swap fans 5 and 6 are included in the power-supply option. With these two additional hot-swap fans installed, the server supports the variable fan-speed control and redundant cooling features. For information on installing the option see

“Installing the 670-Watt hot-swap power-supply option” on page 23.

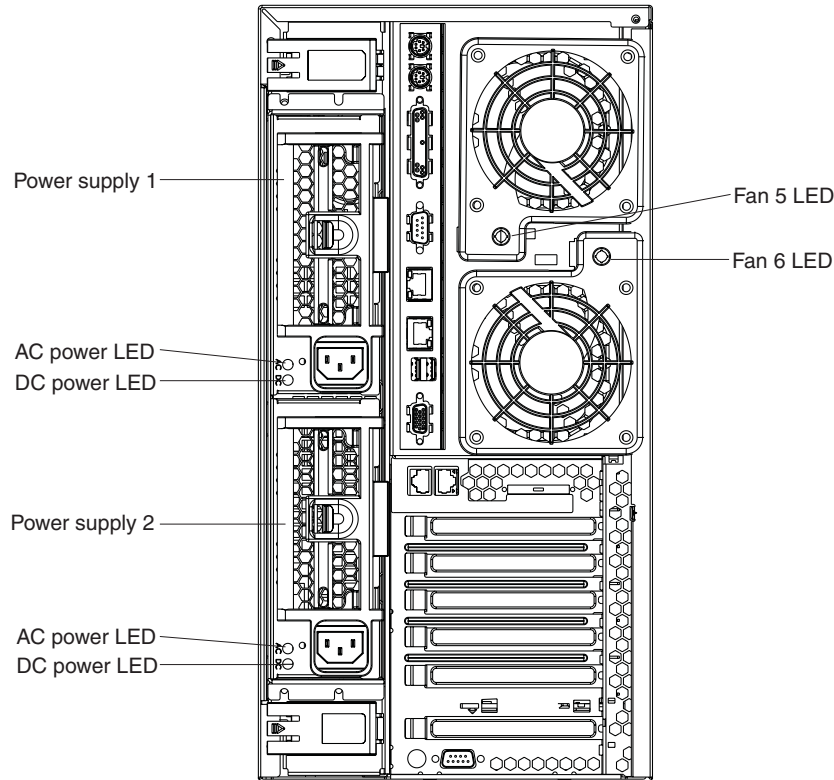


Complete the following steps to replace hot-swap-fans 5 and 6:

1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Press in on the orange fan-release latch on the side of the fan; then, rotate the fan away from the server.
3. Pull the fan off the server.
4. Slide the two tabs of the replacement fan into the back of the server; then, rotate the fan toward the server until the fan-release latch clicks.
5. Make sure that the FAN LED on the diagnostic LED panel (see the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM xSeries Documentation CD for the location of the LED) is not lit. If the FAN LED is lit, reset the fan.

Installing the 670-Watt hot-swap power-supply option

The server comes with a power supply in the power supply 1 (PS1) position and a filler panel in the power supply 2 (PS2) position. You can install a 670-Watt hot-swap power-supply option, which includes a hot-swap power supply and two hot-swap fans.



Before you continue, review the following information:

- During normal nonredundant operation, a power supply must be installed in the power supply 1 position and a filler panel in the power supply 2 position.
- During normal redundant operation, a second hot-swap power supply and the two rear hot-swap fans must be installed in the server.

Attention: To help ensure proper cooling, if a fan fails, replace it within 48 hours.

- When the 670-Watt hot-swap power supply option is installed in the server, the addition of the two fans enables the redundant cooling feature. If any of the fans fail the other fans will speed up when needed to help keep the server cool and working properly.
- Two cable-restraint brackets are on the rear of the server. After you install the 670-Watt hot-swap power-supply option and connect the cables to the selected devices, you can use these cable-restraint brackets to manage the cable routing. Route the power cords through the power-cord restraint bracket. Route the remaining cables (for example, the cables that are connected to the I/O connectors) through the I/O cable-restraint bracket.

If you install or remove a power supply, observe the following precautions.

Statement 8:



CAUTION:

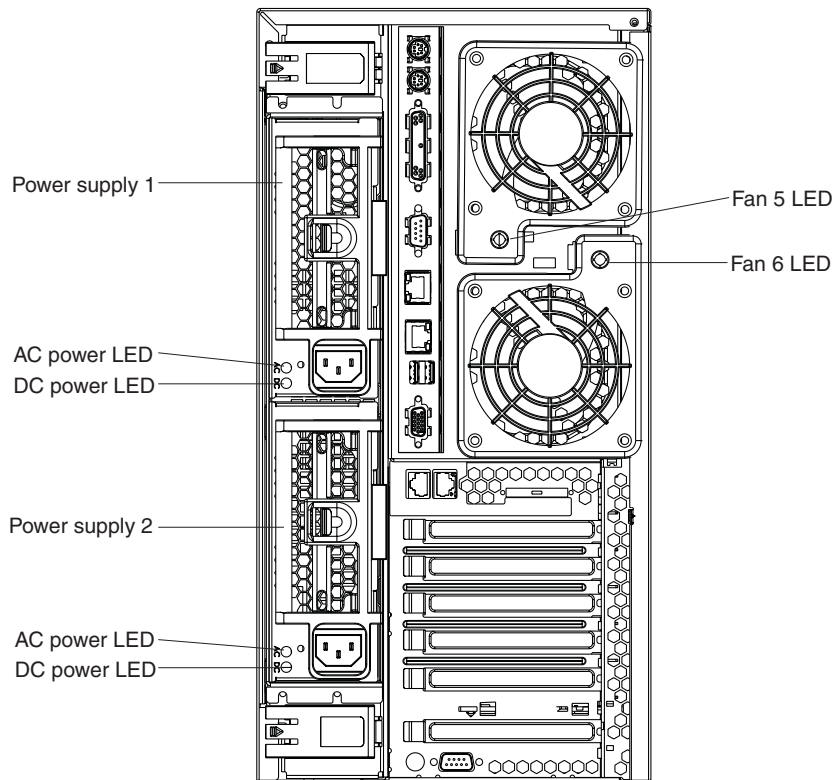
Never remove the cover on a power supply or any part that has the following label attached.



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.

Complete the following steps to install the 670-Watt hot-swap power-supply option:

1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Remove the filler panel from the power supply 2 opening.
3. Install the second hot-swap power-supply.



- a. Make sure that the handle on the power supply is in the open position.

- b. Slide the power supply into the power supply 2 opening until it stops; then, push the handle down into the closed position.
4. Install the fans on the back of the server:
 - a. Position the first fan so that the notched area is facing up and the mounting surface is toward the server.
 - b. Tilt the bottom of the fan toward the server and insert the tabs into the corresponding holes.
 - c. Press in on the top half of the fan until it clicks into place.
 - d. Position the second fan so that the notched area is facing down and the mounting surface is toward the server.
 - e. Repeat steps 5b and 5c; then, continue to step 6.
5. Connect one end of each power cord to the corresponding connector on each power supply; then, connect the other end of each power cord to a properly grounded electrical outlet.

Note: You can route the power cords through the power-cord restraint bracket on the rear of the server.

6. Make sure that the dc power LED and the ac power LED on each power supply is lit, indicating that the power supplies are operating properly.

Replacing a hot-swap power supply

The server comes with one power supply.

If you install or remove a power supply, observe the following precautions.

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.

Complete the following steps to remove and replace a hot-swap power supply:

1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Disconnect the power cord from the power supply.
3. Push on the orange release latch in the center of the power-supply handle; then, pull out on the handle.
4. Extend the handle to the open position and pull the power supply out of the server.
5. Make sure that the handle on the new power supply is in the fully open position and slide it into the opening until it stops.
6. Push down on the handle until the release latch clicks.
7. Connect the power cord to the new power supply.
8. Make sure that the dc power LED and the ac power LED on the power supply is lit, indicating that the power supply is operating properly.

Installing or replacing an adapter

The following notes describe the types of adapters that the 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 must change the switch or jumper settings on the adapter, follow the instructions that come with the adapter.
- Avoid touching the components and gold-edge connectors on the adapter.
- You can install full-length adapters and non-hot-plug adapters in slots 4 and 5.
- A full-length adapter cannot be installed in slot 1 if the ServeRAID-7k option is installed.
- The hot-plug slot (slot 6) supports full and half-length hot-plug and non-hot-plug adapters. The hot-plug feature is operating system dependant. See the documentation that comes with your operating system to see if it supports this feature.
- The 32-bit PCI slot (slot 1) supports 5.0 V and 3.3 V PCI adapters, with the exception that you cannot install a long adapter in slot 1 on servers with ServeRAID-7k installed.
- The 64-bit PCI-X slots 4 through 6 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:
 - Non-hot-plug, 33 MHz 32-bit PCI slot 1 is on PCI bus A.
 - Non-hot-plug, 64-bit PCI Express x4 slot 2 is on PCI bus B (independent of slots 1, 3, 4, 5, and 6).
 - Non-hot-plug, 64-bit PCI Express x4 slot 3 is on PCI bus C (independent of slots 1, 2, 4, 5, and 6).
 - Non-hot-plug, 100 MHz 64-bit PCI-X slots 4 and 5 and the integrated SCSI controller with RAID capabilities are on PCI bus D.
 - Hot-plug, 133 MHz 64-bit PCI-X slot 6 is on PCI bus F.

Note: If an optional ServeRAID controller is installed, it overrides the standard functionality of the integrated SCSI controller with RAID capabilities. The ServeRAID controller must be installed in its dedicated connector on the system board.

- The system scans PCI and PCI-X slots 1 through 6 to assign system resources. The system then starts (boots) the system devices in the following order, if you have not changed the default boot precedence: integrated Ethernet controller, integrated SCSI controller with RAID capabilities, and then PCI and PCI-X slots 1 through 6.

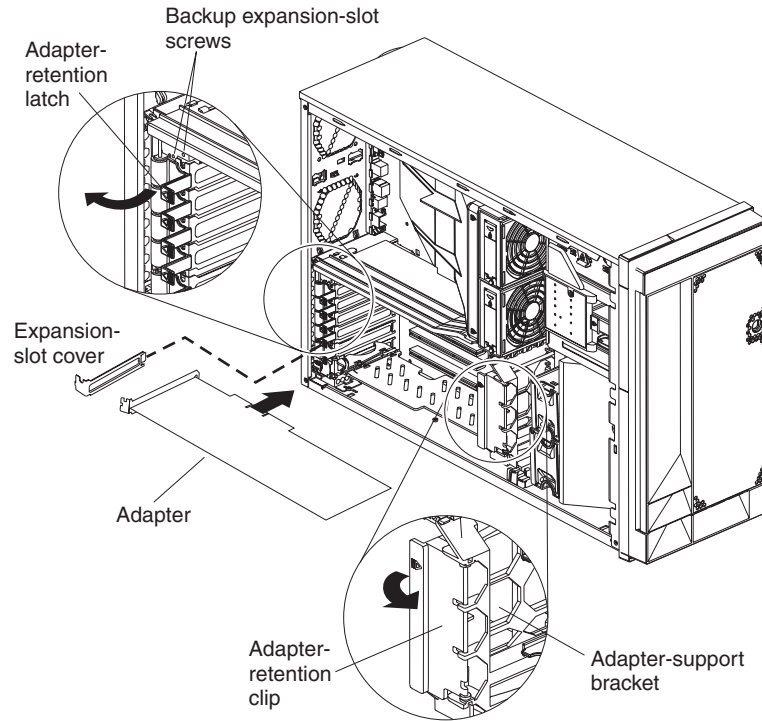
Note: To change the boot precedence for PCI and PCI-X devices, start the Configuration/Setup Utility program and select **Start Options** from the main menu. See the *User's Guide* on the IBM *xSeries Documentation CD* for details about using the Configuration/Setup Utility program.

- The server uses a rotational interrupt technique to configure PCI adapters so that you can install PCI adapters that do not support sharing of PCI interrupts.

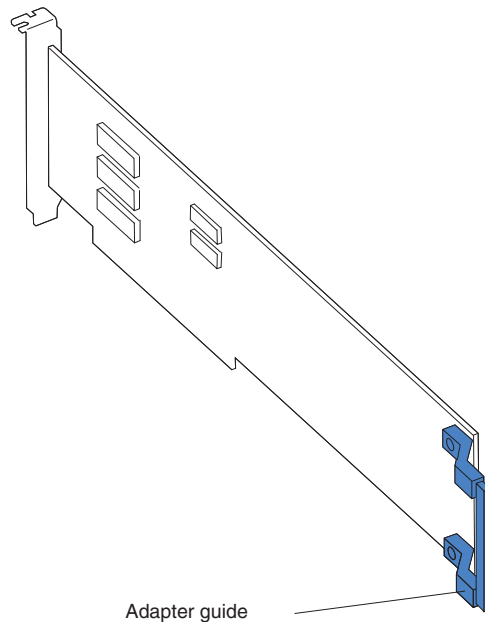
Complete the following steps to install or replace an adapter:

Note: If you are installing a hot-plug adapter go to “Installing or replacing a hot-plug adapter (slot 6)” on page 29.

1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables. Remove the cover.
3. See the documentation that comes with the adapter for any cabling instructions and information about jumper or switch settings. (It might be easier for you to route cables before you install the adapter.)
4. Lift the adapter-retention latch and remove the expansion-slot cover.



5. If you are installing a full-length adapter, remove the blue adapter guide (if any) from the end of the adapter; then, lift the adapter-retention clip on the adapter-support bracket. Otherwise, continue with the next step.

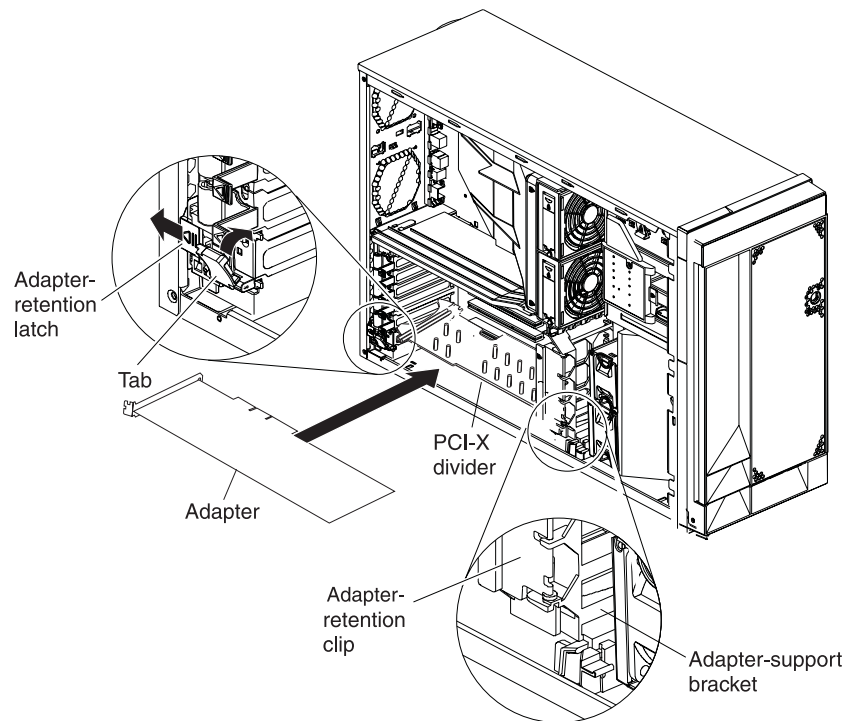


6. Press the adapter *firmly* into the expansion slot, lower the adapter-retention latch, and make sure that the latch is in the locked (closed) position.
Attention: Incomplete insertion might cause damage to the system board or the adapter.
7. Connect any needed cables to the adapter.
8. If you have other options to install or remove, do so now.
9. Replace the cover. Go to “Completing the installation” on page 46.

Installing or replacing a hot-plug adapter (slot 6)

You do not have to turn off the server to install hot-plug adapters in the hot-plug slots. However, you must turn off the server when performing any steps that involve installing or removing cables.

The following illustration shows how to install a PCI or PCI-X hot-plug adapter.

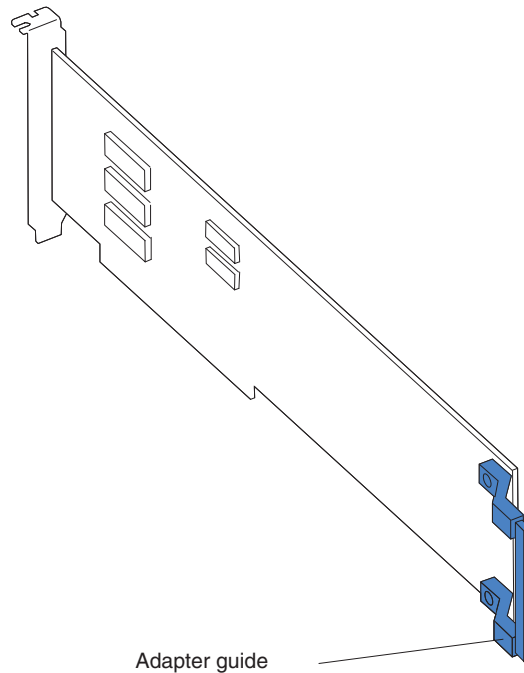


Complete the following steps to install or replace a hot-plug PCI or PCI-X adapter:

1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Remove the cover.
3. Open the adapter-retention latch and remove the expansion-slot cover from the server.

Attention: Expansion slot covers must be installed on all empty slots. This maintains the electronic emissions characteristics of the server and ensures proper cooling of system components.

4. If you are installing a full-length adapter, lift the adapter-retention clip on the adapter-support bracket. Otherwise, continue with the next step.



5. See the documentation that comes with the adapter for any cabling instructions and information about jumper or switch settings.
Attention: Incomplete insertion might cause damage to the system board or the adapter.
6. Press the adapter *firmly* into the expansion slot.
7. Close the adapter-retention latch and, if necessary, the adapter-retention clip.

Important: Power cannot be provided to the adapter slot if the latch is not lowered into place.

8. Connect any needed cables to the adapter. You must turn the server off before installing any cables.

Note: See the documentation that comes with the operating system for information about enabling a hot-plug PCI-X slot.

9. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 46.

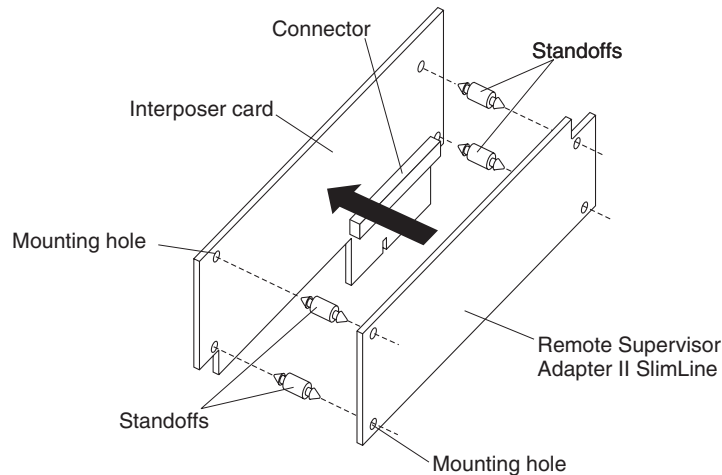
Installing an IBM Remote Supervisor Adapter II SlimLine

This section provides instructions for installing an IBM Remote Supervisor Adapter II SlimLine. The optional IBM Remote Supervisor Adapter II SlimLine must be installed in its dedicated connector on the system board. See “System-board internal connectors” on page 4 for the location of the connector. The Remote Supervisor Adapter II SlimLine is not cabled to the system board.

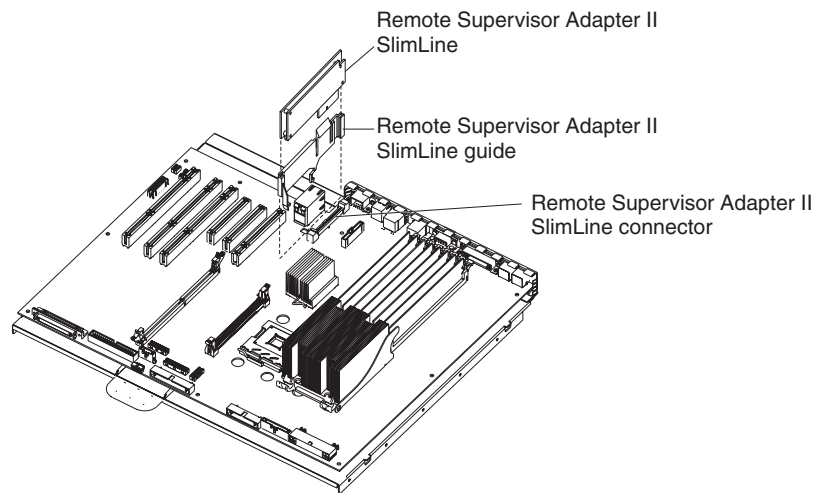
Complete the following steps to install the Remote Supervisor Adapter II SlimLine:

1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables. Remove the cover and air baffle assembly.

3. Assemble the Remote Supervisor Adapter II SlimLine and Interposer card:



- a. Insert the standoffs that come with the option into the mounting holes in the Remote Supervisor Adapter II SlimLine.
 - b. Align the mounting holes in the Interposer card with the standoffs; then, align the connector on the card with the connector on the Remote Supervisor Adapter II SlimLine.
 - c. Press the Interposer card and Remote Supervisor Adapter II SlimLine together until fastened.
4. Press the Remote Supervisor Adapter II SlimLine Guide into place on the system board.



5. Position the entire assembly so that the edge connector on the Interposer card is at the rear of the server.
6. Carefully grasp the assembly by its top edge or upper corners, and align it with the Remote Supervisor Adapter II SlimLine Guide and the connector on the system board.

Attention: Incomplete insertion might cause damage to the system board or the adapter.

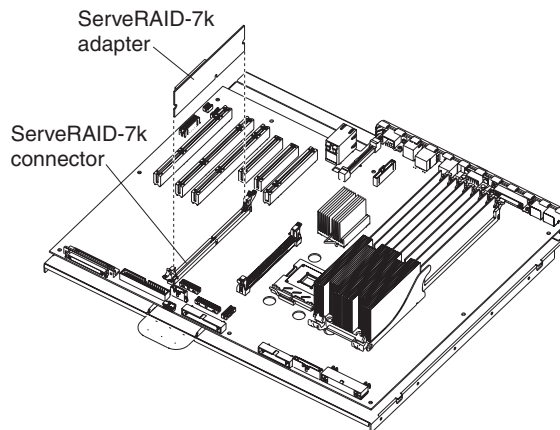
7. Press the assembly firmly into the connector and under the retention latch on the Remote Supervisor Adapter II SlimLine Guide.
8. If you have other options to install or remove, do so now.

9. Replace the air-baffle assembly and cover. Go to “Completing the installation” on page 46.

Installing the ServeRAID-7k adapter

The optional ServeRAID-7k adapter must be installed in its dedicated connector on the system board. See the following illustration for the location of the connector on the system board. The ServeRAID-7k adapter is not cabled to the system board and no rerouting of the SCSI cable is required.

Complete the following steps to install the ServeRAID-7k adapter:



1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables. Remove the cover and air baffle assembly.
Attention: To avoid breaking the retaining clips or damaging the ServeRAID-7k adapter connector, open and close the clips gently.
3. Open the retaining clip on each end of the ServeRAID-7k adapter connector.
4. Touch the static-protective package containing the ServeRAID-7k adapter to any unpainted metal surface on the server. Then, remove the ServeRAID-7k adapter from the package.
5. Turn the ServeRAID-7k adapter so that the ServeRAID-7k adapter keys align correctly with the connector. The green battery pack of the ServeRAID-7k adapter should be facing away from the microprocessor sockets.
Attention: Incomplete insertion might cause damage to the system board or the ServeRAID-7k adapter.
6. Press the ServeRAID-7k adapter firmly into the connector.
7. If you have other options to install or remove, do so now.
8. Replace the air-baffle assembly and cover. Go to “Completing the installation” on page 46.

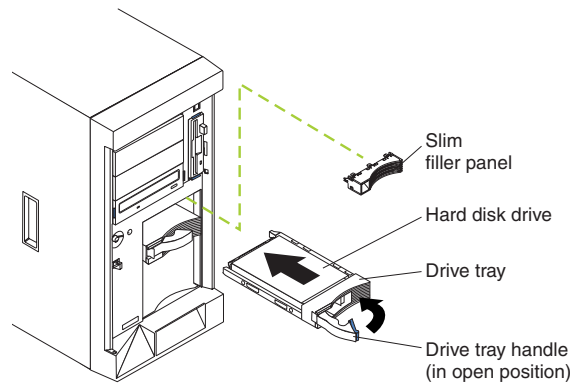
Installing a hot-swap hard disk drive

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

- The server supports up to six 1-inch (26 mm) slim-high, 3.5-inch, hot-swap hard disk drives in the standard hot-swap bays.
- The hot-swap bays are arranged vertically in the standard hard disk drive cage; the bay numbers are 0 through 5 (from bottom to top).

- For a list of supported options for the server, go to <http://www.ibm.com/us/compat/>.
- Inspect the drive tray for signs of damage.
- Make sure that the drive is correctly installed in the tray.
- If the server has an optional RAID adapter, see the documentation that comes with the adapter for instructions on installing a hard disk drive.
- All hot-swap drives in the server should have the same throughput speed rating; mixing speed ratings might cause all drives to operate at the lower throughput speed.
- To minimize the possibility of damage to the hard disk drives when you are installing them in a rack configuration, install the server in the rack before installing the hard disk drives.
- You do not have to turn off the server to install hot-swap drives in the hot-swap drive bays. However, you must turn off the server when performing any steps that involve installing or removing cables.
- You can install three additional hot-swap hard disk drives in the server after you install the 3-Pack Ultra320 Hot-Swap Expansion option. These drives are in the optional hard disk drive cage. Connect the cable to J58 SCSI channel A on the system board. See the instructions that are provided with the option for installation instructions and additional information.
- Some filler panels come with a slim filler.
- The SCSI ID for each hot-swap hard disk drive is printed on the bezel.

The following illustration shows how to install a hot-swap hard disk drive.



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

1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Remove the filler panel from one of the empty hot-swap bays.
3. Make sure that the tray handle is open; then, install the hard disk drive into the hot-swap bay.

Notes:

- a. When you turn on the server, check the hard disk drive status LEDs to verify that the hard disk drive is operating properly.
If the amber hard disk drive status LED for a drive is lit continuously, that drive is faulty and must be replaced. If the green hard disk drive activity LED is flashing, the drive is being accessed.
- b. If the server will be configured for RAID operation using the integrated SCSI controller with RAID capabilities or an optional ServeRAID™ controller, you must configure the disk arrays before installing the operating system. See the ServeRAID documentation on the *IBM ServeRAID Support* CD for additional information about RAID operation and complete instructions for using ServeRAID Manager.

Installing memory modules

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

- The server supports 400 MHz, 1.8 V, 240-pin, single-stacked, double-data-rate (DDR) II, registered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest PC3200 SDRAM Registered DIMM specification. For a list of supported options for the server, go to <http://www.ibm.com/us/compat/>.
- The server comes with a minimum of two 512 MB DIMMs, installed in slots 1 and 2. When you install additional DIMMs, be sure to install them in pairs. All the DIMMs in a single pair must be the same size and type. You can mix compatible DIMMs from various manufacturers.

Table 2. DIMM installation sequence

| Pair | DIMM connectors | Pair | DIMM connectors |
|------|-----------------|------|-----------------|
| 1 | 1 and 2 | 2 | 3 and 4 |

Table 2. DIMM installation sequence (continued)

| Pair | DIMM connectors | Pair | DIMM connectors |
|------|-----------------|------|-----------------|
| 3 | 5 and 6 | 4 | 7 and 8 |

- The second pair does not have to contain DIMMs of the same size, speed, type, and technology as the first pair.
- The server supports Chipkill™ memory if all DIMMs are type x4 and larger than 512 MB. Using any 256 MB DIMMs, or any DIMM that is not of type x4, disables Chipkill memory.

Table 3. Chipkill memory supported configurations

| DIMM type | Minimum DIMM size |
|-----------|-------------------|
| x4 | 512 MB |

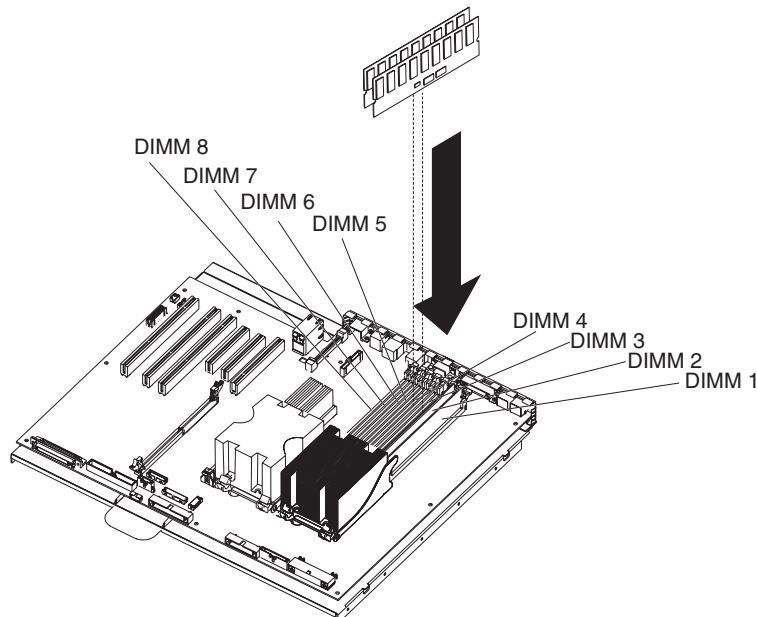
- The server supports Online-Spare memory. See Table 4 for the supported Online-Spare memory configurations.

Table 4. Online-Spare memory supported configurations

| System DIMM Pair | DIMM connectors | Online-Spare DIMM Pair | DIMM connectors |
|------------------|-----------------|------------------------|-----------------|
| 1 | 1 and 2 | 2 | 3 and 4 |
| 3 | 5 and 6 | 4 | 7 and 8 |

- You do not have to save new configuration information when installing or removing DIMMs. The only exception is if you replace a faulty DIMM that was marked as **Disabled** in the **Memory Settings** menu. In this case, you must re-enable that memory row in the Configuration/Setup Utility program or reload the default memory settings. See the *User's Guide* on the IBM xSeries Documentation CD for more information.
- When you restart the server after adding or removing a DIMM, the server displays a message that the memory configuration has changed.

The following illustration shows how to install a pair of DIMMs on the system board.



Complete the following steps to install a pair of DIMMs:

1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables. Remove the cover and air-baffle assembly.
Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
3. Open the retaining clip on each end of the DIMM connector.
4. Touch the static-protective package containing the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.
5. Turn the DIMM so that the DIMM keys align correctly with the slot.
6. Insert the DIMM into the connector.
7. Repeat steps 1 through 6 for the second DIMM; then, continue to step 8. If you are replacing a single DIMM, continue to step 8.
8. If you have other options to install or remove, do so now.
9. Replace the air-baffle assembly and cover. Go to “Completing the installation” on page 46.

Installing a microprocessor

The following notes describe the type of microprocessor that the server supports and other information that you must consider when installing a microprocessor:

- For a list of supported options for the server, go to <http://www.ibm.com/us/compat/>.
- The server supports Intel Xeon™ 2.8 GHz or higher microprocessors in each socket. If you are installing two microprocessors, they must be the same cache size and type, and the same clock speed.
- Read the documentation that comes with the microprocessor to determine whether you must update the basic input/output system (BIOS) code in the server. To download the most current level of BIOS code for the server, go to <http://www.ibm.com/pc/support/>.
- Obtain an SMP-capable operating system. For a list of supported operating systems, go to <http://www.ibm.com/pc/us/compat/>.
- You can use the Configuration/Setup Utility program to determine the specific type of microprocessor in the server.
- If the thermal-grease protective cover (for example, a plastic cap or tape liner) is removed from the heat sink or fan sink, do not touch the thermal grease on the bottom of the heat sink or fan sink or set down the heat sink or fan sink.

Note: Removing the heat sink or fan sink from the microprocessor destroys the even distribution of the thermal grease and requires replacing the thermal grease. Setting down the heat sink or fan sink on any surface when the thermal-grease protective cover is removed will contaminate the thermal grease. If the thermal grease becomes contaminated with particles, it must be replaced.

For information about replacing contaminated thermal grease on the heat sink, contact IBM Service. For support phone numbers, go to <http://www.ibm.com/planetwide/>, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Have the following information ready when you call:

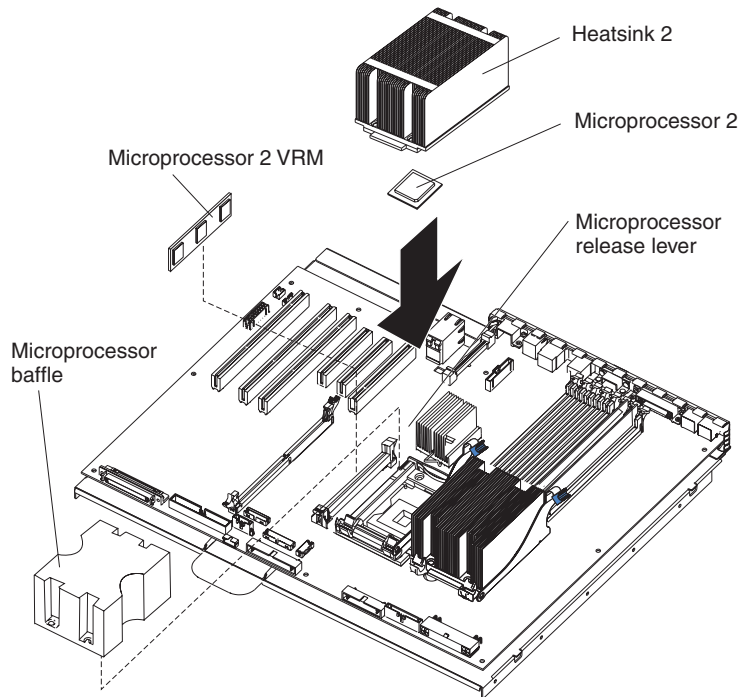
- Machine type and model
- Serial number of the server

Complete the following steps to install a microprocessor:

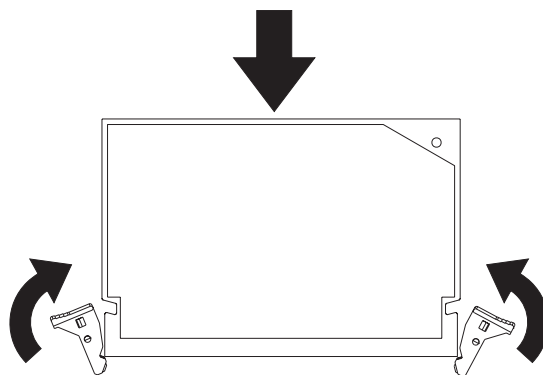
1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables. Remove the cover and air-baffle assembly.

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see “Handling static-sensitive devices” on page 12.

3. Remove the microprocessor baffle and protective film from the second microprocessor socket.

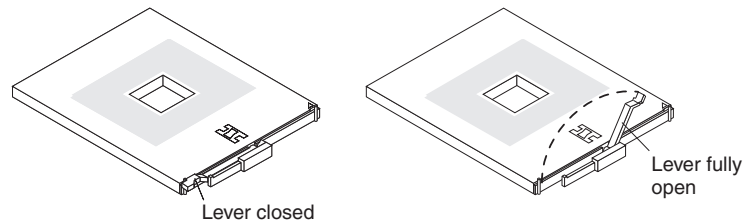


4. Install a VRM in the VRM connector.



- a. Center the VRM over the connector. Make sure that the VRM is oriented and aligned correctly.
- b. Carefully but firmly push down the VRM to seat the VRM in the connector.
- c. Make sure that the VRM clips on both sides of the VRM connector lock.

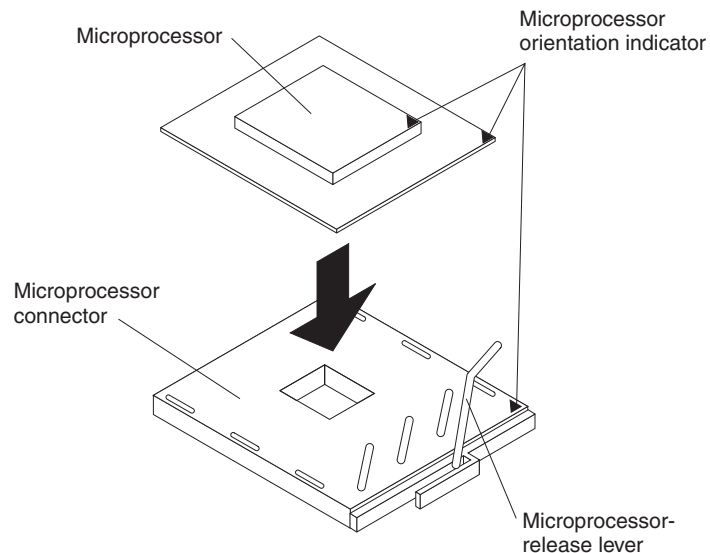
5. Install the microprocessor:
 - a. Touch the static-protective package containing the new microprocessor to any unpainted metal surface on the server; then, remove the microprocessor from the package.
 - b. Rotate the locking lever on the microprocessor socket from its closed and locked position until it stops or clicks in the fully open position (approximately 135° angle).



- c. Center the microprocessor over the microprocessor socket. Align the triangle on the corner of the microprocessor with the triangle on the corner of the socket and carefully press the microprocessor into the socket.

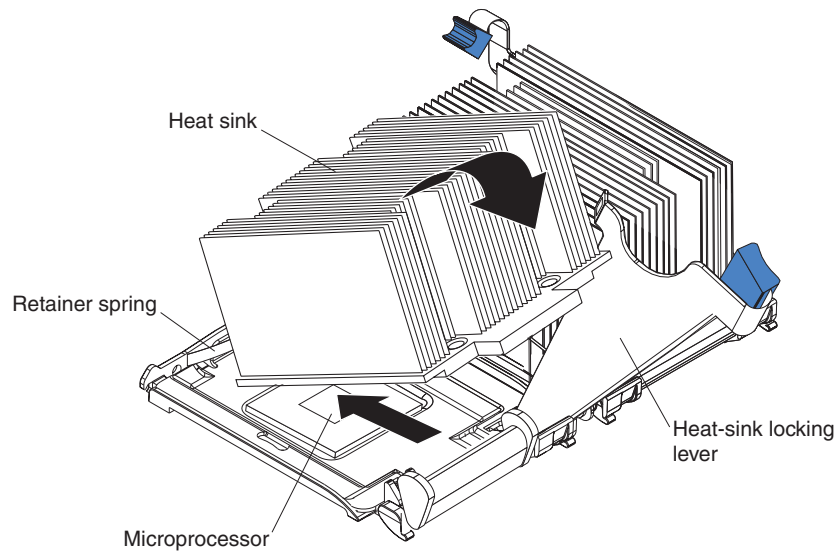
Attention:

- Do not use excessing force when pressing the microprocessor into the socket.
- Make sure that the microprocessor is oriented and aligned correctly with pin number 1 in the socket before you try to close the microprocessor-release lever.



- d. Carefully close the microprocessor-release lever to secure the microprocessor in the socket.

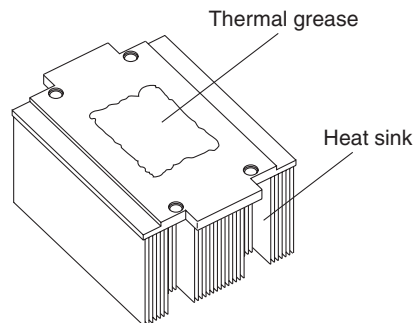
6. Install the heat sink on the microprocessor:



- a. Pull out and lift up on the heat-sink locking lever to open the heat sink retention bracket.
- b. Make sure that the lever is fully extended.
- c. Remove the protective plastic cap from the bottom of the heat sink.

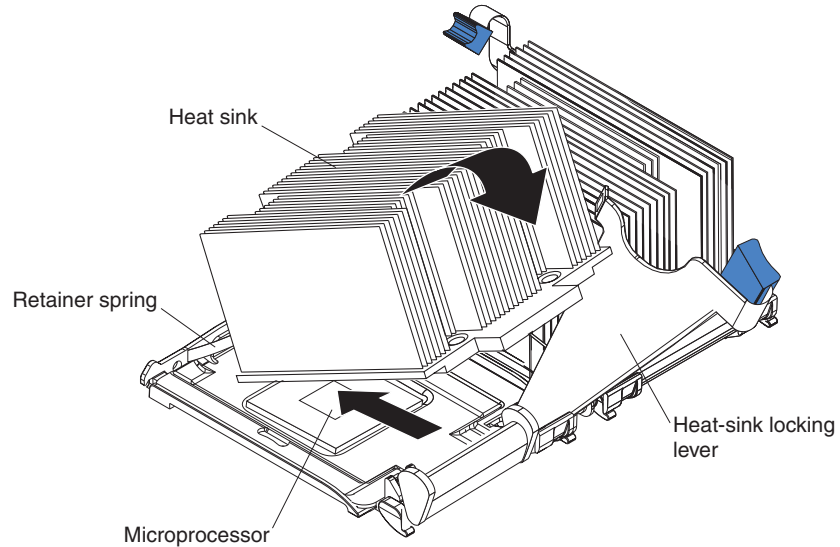
Notes:

- 1) Do not set down the heat sink after you remove the protective plastic cap.



- 2) Do not touch the thermal grease on the bottom of the heat sink. Touching the thermal grease on the bottom will contaminate it. If the thermal grease on the heat sink becomes contaminated, contact your service technician.

- d. Position the heat sink over the microprocessor and slide one of the tabs on the heat sink into the slot under the retainer spring.



- e. Push the heat sink into position firmly; then, let it rest on the microprocessor.
 - f. Close the heat-sink locking lever to secure the heat sink to the microprocessor.
7. If you have other options to install or remove, do so now.
 8. Replace the air-baffle assembly and cover. Go to “Completing the installation” on page 46.

Replacing a microprocessor and heat sink

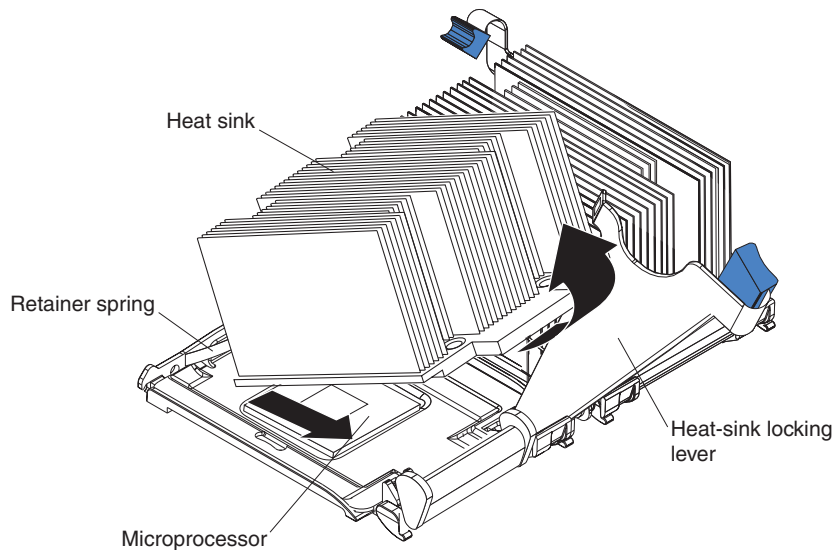
This section provides instructions for replacing a microprocessor and heat sink.

Complete the following steps to replace a microprocessor and heat sink:

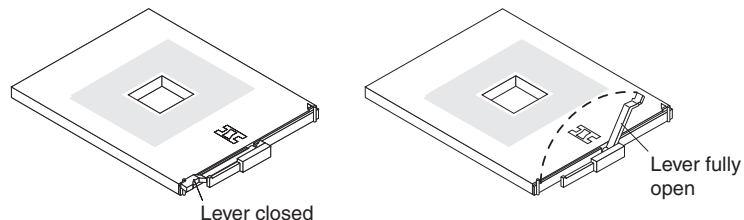
1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables. Remove the cover and air-baffle assembly.

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see “Handling static-sensitive devices” on page 12.

3. Remove the heat sink from the microprocessor:



- a. Pull out and lift up on the heat-sink locking lever.
- b. Lift the heat sink up and out of the server.
4. Remove the microprocessor:
 - a. Pull out and lift up on the microprocessor-release lever to unlock the microprocessor socket.
 - b. Remove the microprocessor from the socket and discard it.
5. Install the VRM. If you are replacing the microprocessor in socket 1, go to step 6.
 - a. Center the VRM over the connector. Make sure that the VRM is orientated and aligned correctly.
 - b. Carefully but firmly push down the VRM to seat the VRM in the connector.
 - c. Make sure that the VRM clips on both sides of the VRM connector lock.
6. Install the new microprocessor:
 - a. Touch the static-protective package containing the new microprocessor to any unpainted metal surface on the server; then, remove the microprocessor from the package.
 - b. Rotate the locking lever on the microprocessor socket from its closed and locked position until it stops or clicks in the fully open position (approximately 135° angle).

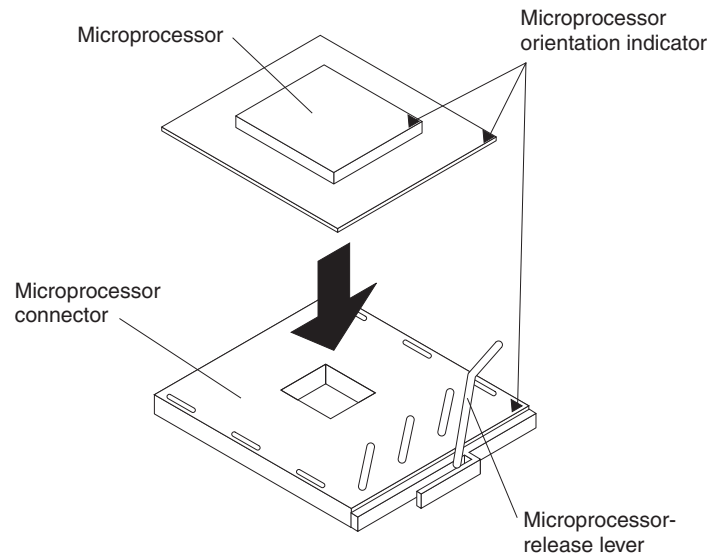


- c. Center the microprocessor over the microprocessor socket. Align the triangle on the corner on the microprocessor with the triangle on the corner of the socket and carefully press the microprocessor into the socket.

Attention:

- Do not use excessive force when pressing the microprocessor into the socket.

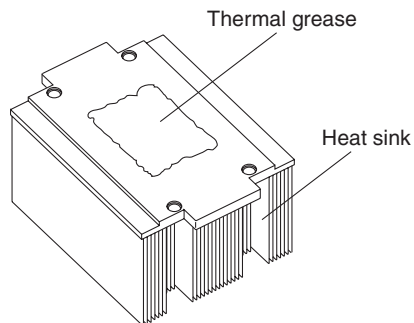
- Make sure that the microprocessor is oriented and aligned correctly with pin number 1 in the socket before you try to close the microprocessor release lever.



- Carefully close the microprocessor-release lever to secure the microprocessor in the socket.
7. Install a heat sink on the microprocessor.

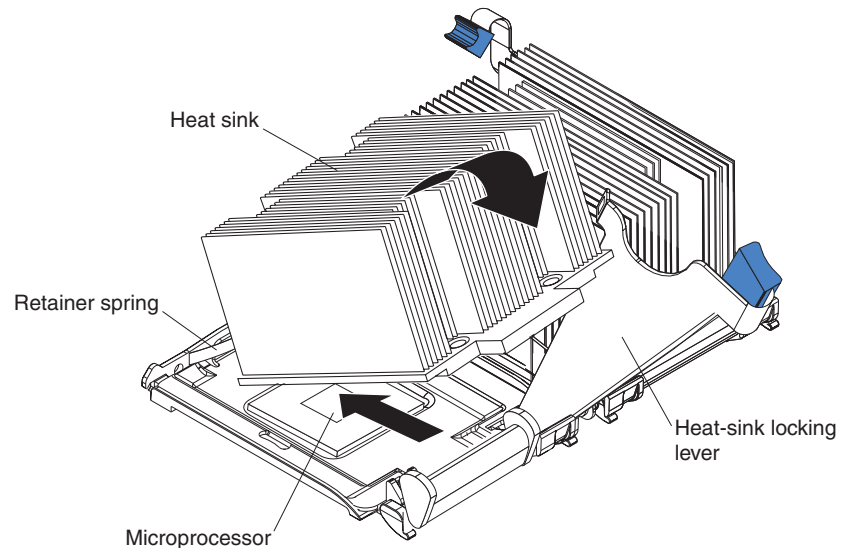
Attention:

- Do not set down the heat sink after you remove the plastic cover.



- Do not touch the thermal grease on the bottom of the heat sink or set down the heat sink. Touching the thermal grease will contaminate it. For details, see the information about thermal grease on page 36.
 - a. Remove the plastic protective cover from the bottom of the heat sink.
 - b. Make sure that the heat-sink lever is in the open position.

- c. Position the heat sink over the microprocessor and slide one of the tabs on the heat sink into the slot on the retention bracket.



- d. Push the heat sink into position firmly; then, let it rest on the microprocessor.
 - e. Close the heat-sink locking lever to secure the heat sink to the microprocessor.
8. Replace the air-baffle assembly and cover. Go to “Completing the installation” on page 46.

Replacing the battery

The following notes describe information that you must consider when replacing the battery:

- When the battery voltage becomes low, the Battery Error LED on the system board is lit and the battery should be replaced as quickly as possible.
- 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 the 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:

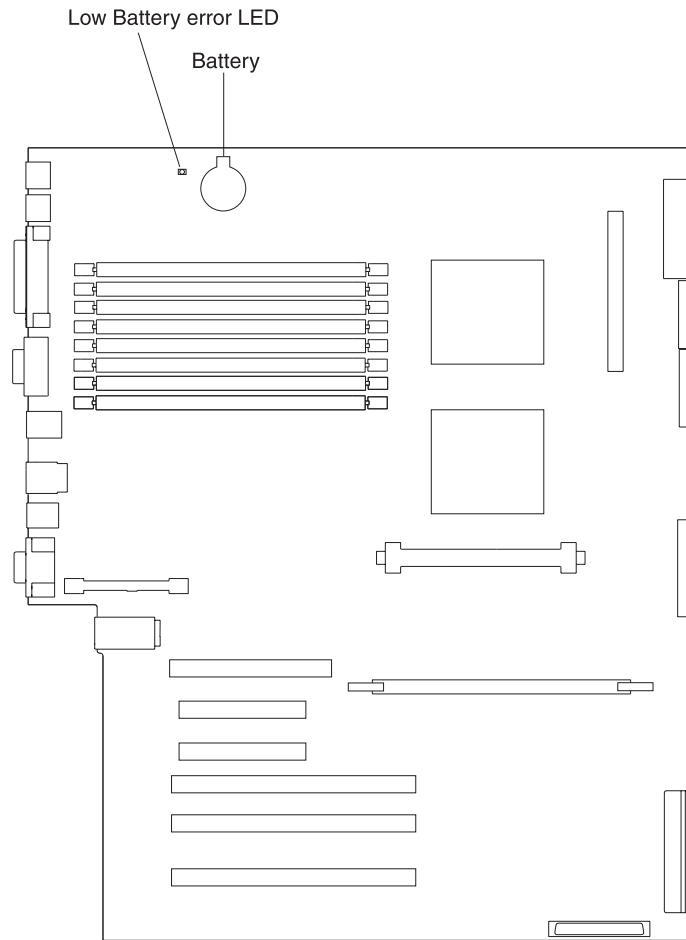
- **Throw or immerse into water.**
- **Heat to more than 100° C (212° F)**
- **Repair or disassemble**

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

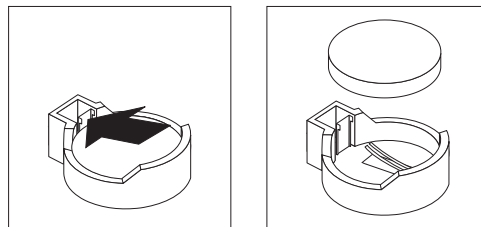
Complete the following steps to replace the battery:

1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Follow any special handling and installation instructions that come with the battery.
3. Turn off the server and all attached devices and disconnect all power cords and external cables (see “Turning off the server” on page 13); then, remove the server cover (see “Removing the left-side cover” on page 16).
4. Remove the air baffle. See “Removing the air baffle” on page 17.
5. Disconnect any internal cables, as necessary.

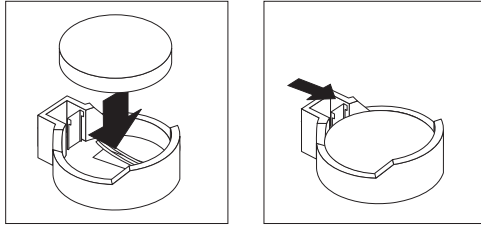
6. Locate the battery connector on the system board.



7. Remove the battery:
 - a. Use one finger to press on the tab that secures the battery to its housing.
 - b. Use one finger to slide the battery from the socket.



8. Insert the new battery:
 - a. Hold the battery so that the larger side is facing up.
 - b. Place the battery into its socket, and press the battery down until it snaps into place.



9. Reconnect the internal cables that you disconnected.
10. Connect all external cables and all power cords.
11. Reinstall the air baffle.
12. Reinstall the server cover. See “Completing the installation.”
13. Start the Configuration/Setup Utility program and set configuration parameters as needed. See the *User's Guide* on the IBM xSeries Documentation CD for additional information about using the Configuration/Setup Utility program.

Completing the installation

To complete the installation, reinstall the bezel, reinstall the server cover, reinstall the door, reconnect all the cables that you disconnected earlier, and for certain options, run the Configuration/Setup Utility program. Follow the instructions in this section.

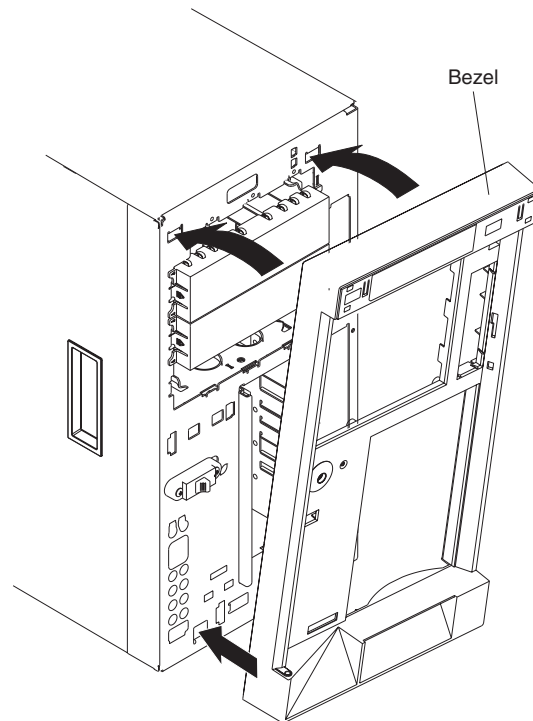
Attention:

- For proper cooling and airflow, replace the server cover before or shortly after turning on the server. Operating the server for extended periods of time (over 30 minutes) with the server cover removed might damage server components.
- To ensure proper server operation, do not remove the air-baffle assembly from the server except when installing or removing the components that are under the air-baffle cover.

Note: If you have just connected the power cords to electrical outlets, you must wait approximately 20 seconds before pressing the power-control button.

Installing the server bezel and left-side cover

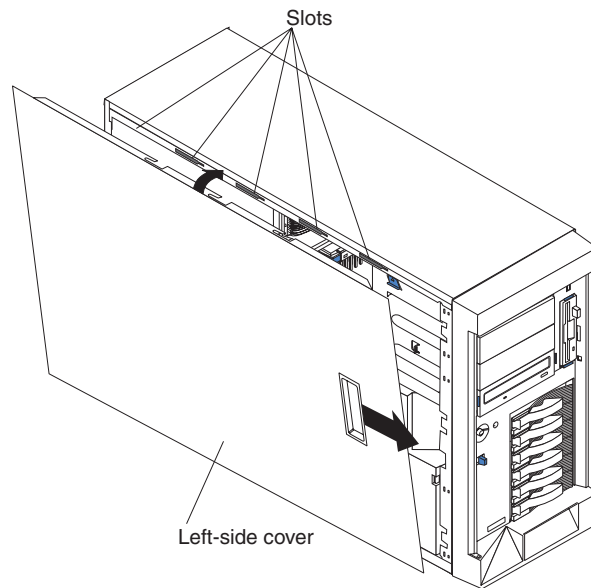
The following illustration shows how to install the bezel on the server.



Complete the following steps to install the bezel:

1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Insert the two tabs on the bottom of the bezel into the matching holes on the server chassis.
3. Push the top of the bezel toward the server until the two tabs at the top of the bezel snap into place.

The following illustration shows how to install the left-side cover on the server.



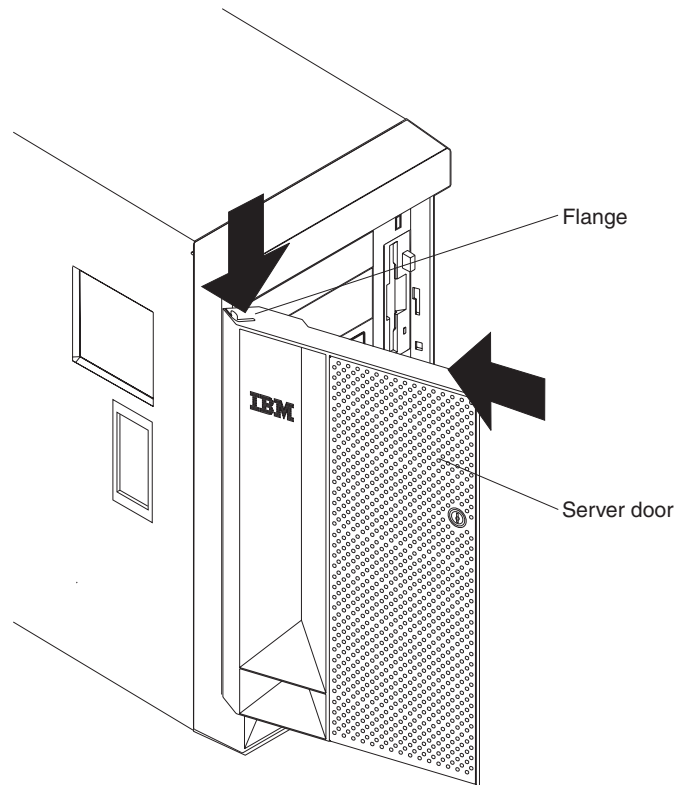
Complete the following steps to install the server left-side cover:

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. Place the bottom lip of the left-side cover over the bottom edge of the server chassis.
3. Rotate the left-side cover to a vertical position, inserting the tabs at the top of the left-side cover into the matching slots in the server chassis.
4. Slide the left-side cover forward until it locks in place.
5. If you disconnected any cables from the back of the server, reconnect the cables; then, connect the power cords to properly grounded electrical outlets.

Note: If necessary, see Chapter 3, “Input/output connectors,” on page 53 for connector locations.

Installing the server door

The following illustration shows how to install the door on the server.



Complete the following steps to install the server door:

1. Read the safety information beginning on page v and “Installation guidelines” on page 11.
2. Set the door on the bottom hinge.
3. Locate the flange on the top edge of the door.
4. Press the flange downward while pressing the top of the door toward the server until the flange connects with the top hinge. Release the flange.
5. Close the server door.

Attention: Be sure to maintain a clearance of at least 100 mm (4 inches) on the front and rear of the server to allow for air circulation.

Connecting the cables

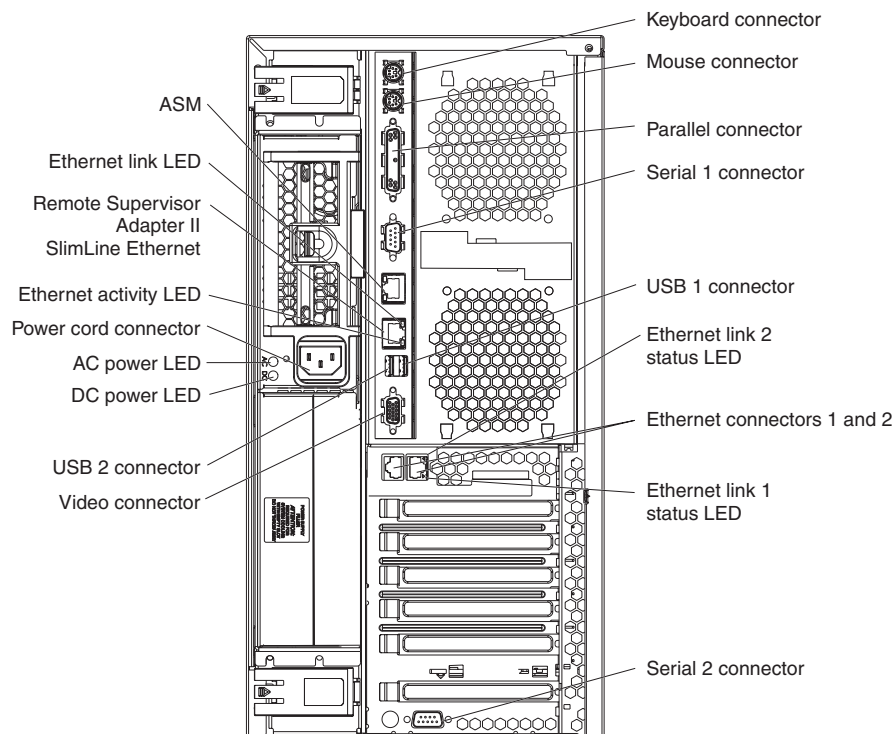
Notes:

1. Make sure you turn off the server before connecting any cables to or disconnecting any cables from the server or hot-plug adapter.
2. For additional cabling instructions, see the *User's Guide* on the IBM xSeries Documentation CD and the documentation that comes with the options. It might be easier for you to route any cables before you install certain options.
3. Cable identifiers are printed on the cables that come with the server and options. Use these identifiers to connect the cables to the correct connectors. For example, the hard disk drive cables are labeled "HDD option."

Two cable-restraint brackets are on the rear of the server. Route the power cords through the power-cord restraint bracket. After you connect the cables to the selected devices, route the cables (for example, the cables that are connected to the I/O connectors) through the I/O cable-restraint bracket.

See the following illustrations for the locations of the input and output connectors on the server.

Note: The USB 3 connector is on the front of the server.



Updating the server configuration

When you start the server for the first time after you add or remove an internal option or 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. For more information, see the section about configuring the server in the *User's Guide* on the IBM xSeries Documentation CD.

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

The server comes with at least one microprocessor. If more than one microprocessor is installed, the server can operate as a symmetric multiprocessing (SMP) server. You might have to upgrade the operating system to support SMP. For more information, see the section about using the *ServerGuide™ Setup and Installation* CD in the *User's Guide* and the operating-system documentation.

If the server has an optional RAID adapter and you have installed or removed a hard disk drive, see the documentation that comes with the RAID adapter for information about reconfiguring the disk arrays.

If you have installed a Remote Supervisor Adapter II SlimLine to manage the server remotely, see the *Remote Supervisor Adapter II SlimLine and Remote Supervisor Adapter II User's Guide*, which comes with the adapter, for information about setting up, configuring, and using the adapter.

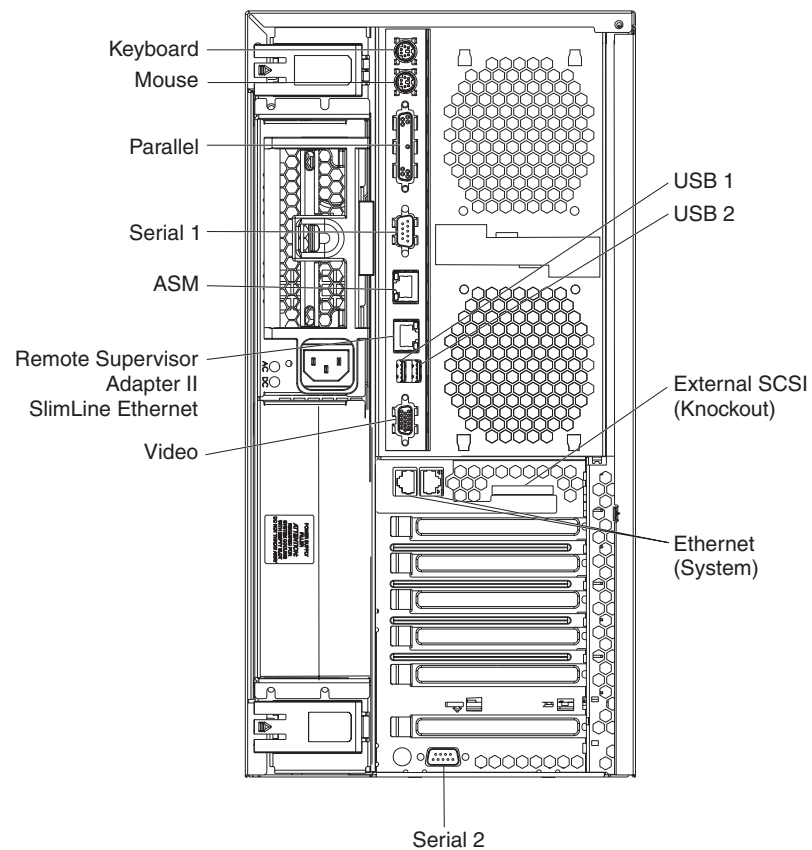
For information about configuring the integrated Gigabit Ethernet controller, see the *User's Guide*.

Chapter 3. Input/output connectors

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

- One auxiliary-device (mouse)
- Two Gigabit Ethernet (RJ-45)
- Two integrated system management (Remote Supervisor Adapter II SlimLine Ethernet and ASM)
- One keyboard
- One parallel
- Two serial
- Three Universal Serial Bus (USB)
 - Two on the rear of the server
 - One on the front of the server (not shown)
- One video

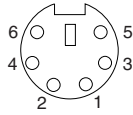
The following illustration shows the locations of the connectors on the rear of the server.



The following sections describe these connectors.

Auxiliary-device connector

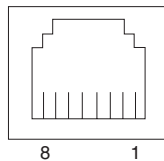
Use this connector to connect a mouse or other pointing device. The following illustration shows an auxiliary-device connector.



Ethernet connector

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

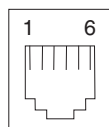
For more information about the Ethernet controllers, see the *User's Guide*.



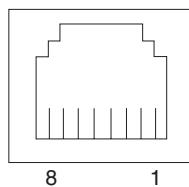
Integrated system management (Remote Supervisor Adapter II SlimLine Ethernet and ASM) connector

Use these connectors to connect an optional Remote Supervisor Adapter II SlimLine. The following illustrations show the integrated system management connectors.

ASM (RS-485)

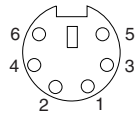


Remote Supervisor Adapter II SlimLine Ethernet (RJ-45)



Keyboard connector

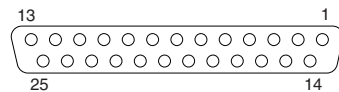
Use this connector to connect a PS/2 (non-USB) keyboard to the server. The following illustration shows a keyboard connector.



If you attach a keyboard to this connector, USB ports and devices are disabled during POST.

Parallel port connector

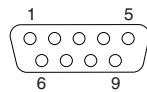
Use this connector to connect a parallel device. The following illustration shows a parallel connector.



The parallel connector supports three 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 EPP and ECP 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-port connectors

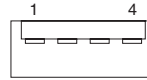
Use a serial connector to connect a serial device. The following illustration shows a serial connector.



Universal Serial Bus connectors

The server has one Universal Serial Bus (USB) version 2.0 connector on the front of the server and two USB version 2.0 connectors on the rear of the server.

USB is a serial interface standard for telephony and multimedia devices. It uses Plug and Play technology to determine the type of device that is attached to the connector.



Notes:

1. If you attach a standard (non-USB) keyboard to the keyboard connector, the USB ports and devices will be disabled during the power-on self-test (POST).
2. If you install a USB keyboard that has a mouse port, the USB keyboard emulates a mouse, and you will not be able to disable the mouse settings in the Configuration/Setup Utility program.
3. Check to make sure that your NOS supports USB devices.
4. For additional information about USB version 1.1 or 2.0 devices, go to <http://www.usb.org/>.

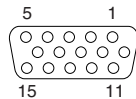
Use a 4-pin cable to connect a device to a USB connector. If you need to connect more USB devices than the server has USB connectors for, use a USB hub to connect additional devices.

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 this connector to connect a monitor to the server. The connector is dark blue to help you identify it. The following illustration shows a video connector.



Appendix. Notices

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| NetBAY | Xcel4 |
| Netfinity | XpandOnDemand |
| NetView | xSeries |
| OS/2 WARP | |

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Processor speeds indicate the internal clock speed of the microprocessor; other factors also affect application performance.

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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.

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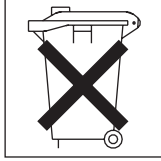
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In the Netherlands, the following applies.



Electronic emission notices

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. 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.

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

United Kingdom telecommunications safety requirement

Notice to Customers

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

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Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Taiwanese Class A warning statement

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Chinese Class A warning statement

聲 明
此為 A 級產品。在生活環境中，該產品可能會造成無線電干擾。在這種情況下，可能需要用戶對其干擾採取切实可行的措施。

Japanese Voluntary Control Council for Interference (VCCI) statement

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For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

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For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

IBM power cords for a specific country or region are usually available only in that country or region.

| IBM power cord part number | Used in these countries and regions |
|-----------------------------------|---|
| 02K0546 | China |
| 13F9940 | Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea |
| 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, Macao, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda |

| IBM power cord part number | Used in these countries and regions |
|-----------------------------------|---|
| 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 |
| 24P6873 | Korea (Democratic People's Republic of), Korea (Republic of) |
| 34G0223 | Japan |
| 36L8880 | Argentina, Paraguay, Uruguay |
| 14F0015 | India |
| 49P2110 | Brazil |
| 6952300 | Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela |

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Part Number: 25K9165

Printed in USA

(1P) P/N: 25K9165

