



IBM System x3250 Types 4364, 4365, and 4366
Problem Determination and Service Guide





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Note: Before using this information and the product it supports, read the general information in Appendix B, “Notices,” on page 119, and the *Warranty and Support Information* document on the IBM *System x Documentation* CD..

The most recent version of this document is available at <http://www.ibm.com/support/>.

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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.

在安裝本產品之前，請仔細閱讀 **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.

Guidelines for trained service technicians

This section contains information for trained service technicians.

Inspecting for unsafe conditions

Use the information in this section to help you identify potential unsafe conditions in an IBM product that you are working on. Each IBM product, as it was designed and manufactured, has required safety items to protect users and service technicians from injury. The information in this section addresses only those items. Use good judgment to identify potential unsafe conditions that might be caused by non-IBM alterations or attachment of non-IBM features or optional devices that are not addressed in this section. If you identify an unsafe condition, you must determine how serious the hazard is and whether you must correct the problem before you work on the product.

Consider the following conditions and the safety hazards that they present:

- Electrical hazards, especially primary power. Primary voltage on the frame can cause serious or fatal electrical shock.
- Explosive hazards, such as a damaged CRT face or a bulging capacitor.
- Mechanical hazards, such as loose or missing hardware.

To inspect the product for potential unsafe conditions, complete the following steps:

1. Make sure that the power is off and the power cord is disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cord:
 - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
 - Make sure that the power cord is the correct type, as specified in "Power cords" on page 22.
 - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment

Observe the following guidelines when you service electrical equipment:

- Check the area for electrical hazards such as moist floors, nongrounded power extension cords, and missing safety grounds.
- Use only approved tools and test equipment. Some hand tools have handles that are covered with a soft material that does not provide insulation from live electrical currents.
- Regularly inspect and maintain your electrical hand tools for safe operational condition. Do not use worn or broken tools or testers.

- Do not touch the reflective surface of a dental mirror to a live electrical circuit. The surface is conductive and can cause personal injury or equipment damage if it touches a live electrical circuit.
- Some rubber floor mats contain small conductive fibers to decrease electrostatic discharge. Do not use this type of mat to protect yourself from electrical shock.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Locate the emergency power-off (EPO) switch, disconnecting switch, or electrical outlet so that you can turn off the power quickly in the event of an electrical accident.
- Disconnect all power before you perform a mechanical inspection, work near power supplies, or remove or install main units.
- Before you work on the equipment, disconnect the power cord. If you cannot disconnect the power cord, have the customer power-off the wall box that supplies power to the equipment and lock the wall box in the off position.
- Never assume that power has been disconnected from a circuit. Check it to make sure that it has been disconnected.
- If you have to work on equipment that has exposed electrical circuits, observe the following precautions:
 - Make sure that another person who is familiar with the power-off controls is near you and is available to turn off the power if necessary.
 - When you are working with powered-on electrical equipment, use only one hand. Keep the other hand in your pocket or behind your back to avoid creating a complete circuit that could cause an electrical shock.
 - When you use a tester, set the controls correctly and use the approved probe leads and accessories for that tester.
 - Stand on a suitable rubber mat to insulate you from grounds such as metal floor strips and equipment frames.
- Use extreme care when you measure high voltages.
- To ensure proper grounding of components such as power supplies, pumps, blowers, fans, and motor generators, do not service these components outside of their normal operating locations.
- If an electrical accident occurs, use caution, turn off the power, and send another person to get medical aid.

Safety statements

Important:

Each caution and danger statement in this document is labeled with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the *Safety Information* document.

For example, if a caution statement is labeled “Statement 1”, translations for that caution statement are in the *Safety Information* document under “Statement 1”.

Be sure to read all caution and danger statements in this document before you perform the procedures. 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

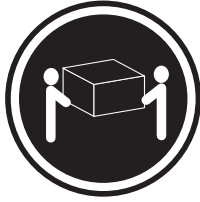
Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

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



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

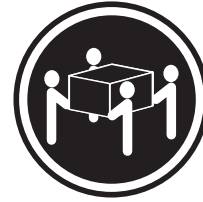
Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:

Use safe practices when lifting.

Statement 5:



CAUTION:

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



Statement 8:



CAUTION:

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



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

Statement 26:



CAUTION:

Do not place any object on top of rack-mounted devices.



This server is suitable for use on an IT power-distribution system whose maximum phase-to-phase voltage is 240 V under any distribution fault condition.

Chapter 1. Introduction

This *Problem Determination and Service Guide* contains information to help you solve problems that might occur in your IBM® System x3250 Type 4364, 4365, or 4366 server. It describes the diagnostic tools that come with the server, error codes and suggested actions, and instructions for replacing failing components.

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

Related documentation

In addition to this document, the following documentation also comes with the server:

- *Installation Guide*

This printed document contains instructions for setting up the server and basic instructions for installing some optional devices.

- *User's Guide*

This document is in Portable Document Format (PDF) on the IBM *System x® Documentation* CD. It provides general information about the server, including information about features, and how to configure the server. It also contains detailed instructions for installing, removing, and connecting optional devices that the server supports.

- *Rack Installation Instructions*

This printed document contains instructions for installing the server in a rack.

- *Safety Information*

This document is in PDF on the IBM *System x 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.

- *Warranty and Support Information*

This document is in PDF on the *System x Documentation* CD. It contains information about the terms of the warranty and getting service and assistance.

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

The System x and xSeries® Tools Center is an online information center that contains information about tools for updating, managing, and deploying firmware, device drivers, and operating systems. The System x and xSeries Tools Center is at <http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp>.

The server might have features that are not described in the documentation that comes 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. To check for updated documentation and technical updates, complete the following steps.

Note: Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://www.ibm.com/servers/eserver/support/xseries/index.html>.
2. From the **Hardware** list, select **System x3250** and click Go.
3. Click the **Install and use** tab.
4. Click **Product documentation**.

Notices and statements in this document

The caution and danger statements in this document are also in the multilingual *Safety Information* document, which is on the IBM *System x 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:

- **Note:** 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.

Features and specifications

The following information is a summary of the features and specifications of the server. Depending on the server model, some features might not be available, or some specifications might not apply.

Racks are marked in vertical increments of 4.45 cm (1.75 inches). Each increment is referred to as a unit, or “U.” A 1-U-high device is 1.75 inches tall.

Table 1. Features and specifications

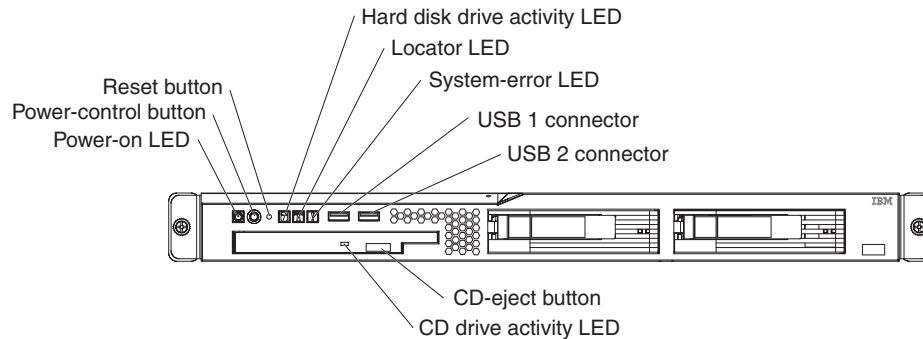
<p>Microprocessor: One Intel® LGA 775 Xeon 3000 series, Pentium® D, or Celeron D, depending on the server model Note: Use the Configuration/Setup Utility program to determine the size of the L2 cache, speed of the microprocessor, and speed of the front-side bus.</p> <p>Memory:</p> <ul style="list-style-type: none"> • Minimum: One or two 512 MB DIMMs, depending on the server model • Maximum: 8 GB • Type: PC2-5300, 667 MHz, ECC, DDR II unbuffered SDRAM DIMMs only • Slots: Four dual inline • Supports 512 MB, 1 GB, and 2 GB DIMMs <p>Drives: Ultrabay Enhanced: CD or CD/DVD</p> <p>Expansion bays: One of the following configurations:</p> <ul style="list-style-type: none"> • Two 3.5-inch slim-high bays for hard disk drives. <ul style="list-style-type: none"> – Hot-swap models: Supports maximum of two serial-attached SCSI (SAS) drives or two serial ATA (SATA) drives. – Simple-swap models: Supports maximum of two SATA drives • Four 2.5-inch small form-factor (SFF) hot-swap bays for hard disk drives. Supports a maximum of four 2.5-inch SAS drives. <p>Expansion slots: Two PCI Express x8 slots, one low-profile and one 3/4-length full height</p> <p>Video controller:</p> <ul style="list-style-type: none"> • ATI ES1000 video on system board • 16 MB DDR video memory 	<p>Power supply: 351 watt (110 or 220 V ac auto-sensing)</p> <p>Size:</p> <ul style="list-style-type: none"> • Height: 43 mm (1.75 inches, 1 U) • Depth: 559 mm (22 inches) • Width: 440 mm (17.32 inches) • Maximum weight: 12.7 kg (28 lb) depending on your configuration <p>Integrated functions:</p> <ul style="list-style-type: none"> • Two Broadcom NetXtreme™ GB Ethernet controllers on the system board with Wake on LAN support • Serial port • Four USB ports (two on front and two on rear of server) • Keyboard port • Mouse port • Systems-management port if an optional Remote Supervisor Adapter II SlimLine is installed <p>Hard disk controllers:</p> <ul style="list-style-type: none"> • Serial ATA (SATA) controller (simple-swap SATA models) • Serial-attached SCSI (SAS) controller with integrated RAID (hot-swap SAS/SATA models) <p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Server on: 10° to 35°C (50.0° to 95.0°F); altitude: 0 to 914.4 m (3000 ft) – Server on: 10° to 32°C (50.0° to 89.6°F); altitude: 914.4 m (3000 ft) to 2133 m (6998.0 ft) – Server off: 10° to 43°C (50.0° to 109.4°F); maximum altitude: 2133 m (6998.0 ft) – Shipping: -40° to 60°C (-40° to 140°F); maximum altitude: 2133 m (6998.0 ft) • Humidity: <ul style="list-style-type: none"> – Server on: 8% to 80% – Server off: 8% to 80% 	<p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> • Sound power, idling: 6.5 bel maximum • Sound power, operating: 6.5 bel maximum <p>Heat output: Approximate heat output in British thermal units (Btu) per hour:</p> <ul style="list-style-type: none"> • Minimum configuration: 341 Btu per hour (100 watts) • Maximum configuration: 1024 Btu per hour (300 watts) <p>Electrical input:</p> <ul style="list-style-type: none"> • Sine-wave input (47 - 63 Hz) required • Input voltage low range: <ul style="list-style-type: none"> – Minimum: 100 V ac – Maximum: 127 V ac • Input voltage high range: <ul style="list-style-type: none"> – Minimum: 200 V ac – Maximum: 240 V ac • Approximate input kilovolt-amperes (kVA): <ul style="list-style-type: none"> – Minimum: 0.102 kVA – Maximum: 0.55 kVA <p>Notes:</p> <ol style="list-style-type: none"> 1. Power consumption and heat output vary depending on the number and type of optional features that are installed and the power-management optional features that are in use. 2. These levels were measured in controlled acoustical environments according to the procedures that are specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average stated values because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.
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Server controls, LEDs, and connectors

This section describes the controls, light-emitting diodes (LEDs), and connectors on the front and rear of the server.

Front view

The following illustration shows the controls, light-emitting diodes (LEDs), and connectors on the front of the server.



Power-on LED: When this LED is lit and not flashing, it indicates that the server is turned on. When this LED is flashing, it indicates that the server is turned off and still connected to an ac power source. When this LED is off, it indicates that ac power is not present, or the power supply or the LED itself has failed.

Note: If this LED is off, it does not mean that there is no electrical power in the server. The LED might be burned out. To remove all electrical power from the server, you must disconnect the power cord from the electrical outlet.

Power-control button: Press this button to turn the server on and off manually. A power-control-button shield comes installed around the button to prevent the server from being turned off accidentally. You can remove this disk-shaped shield if you prefer.

Reset button: Press this button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button.

Hard disk drive activity LED: When this LED is flashing, it indicates that a hard disk drive is in use.

Locator LED: This LED can be lit remotely by the system administrator to aid in visually locating the server. You can use IBM Director to light this LED remotely.

System-error LED: When this LED is lit, it indicates that a system error has occurred. An LED on the system board might also be lit to help isolate the error. See Chapter 5, "Diagnostics," on page 67 for additional information.

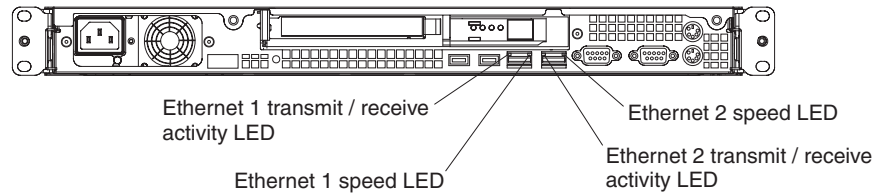
USB connectors: Connect a USB device to either of these connectors.

CD-eject button: Press this button to release a CD from the CD drive.

CD drive activity LED: When this LED is lit, it indicates that the CD drive is in use.

Rear view

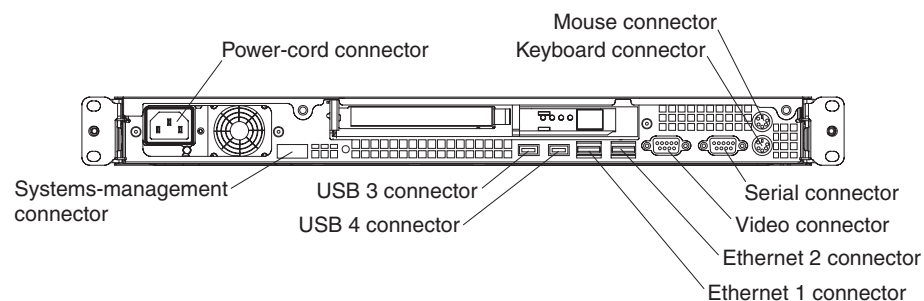
The following illustration shows the LEDs on the rear of the server.



Ethernet transmit/receive activity LED: This LED is on each Ethernet connector. When this LED is lit, it indicates that there is activity between the server and the network.

Ethernet speed LED: This LED is on each Ethernet connector. When this LED is lit, it indicates that the Ethernet network speed is 1 Gbps. When this LED is off, it indicates that the Ethernet network speed is 10 Mbps or 100 Mbps.

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



Power-cord connector: Connect the power cord to this connector.

Keyboard connector: Connect a PS/2 keyboard to this connector.

Mouse connector: Connect a mouse or other PS/2 device to this connector.

Serial connector: Connect a 9-pin serial device to this connector.

Video connector: Connect a monitor to this connector.

Ethernet connector: Use either of these connectors to connect the server to a network.

USB connector: Connect a USB device to either of these connectors.

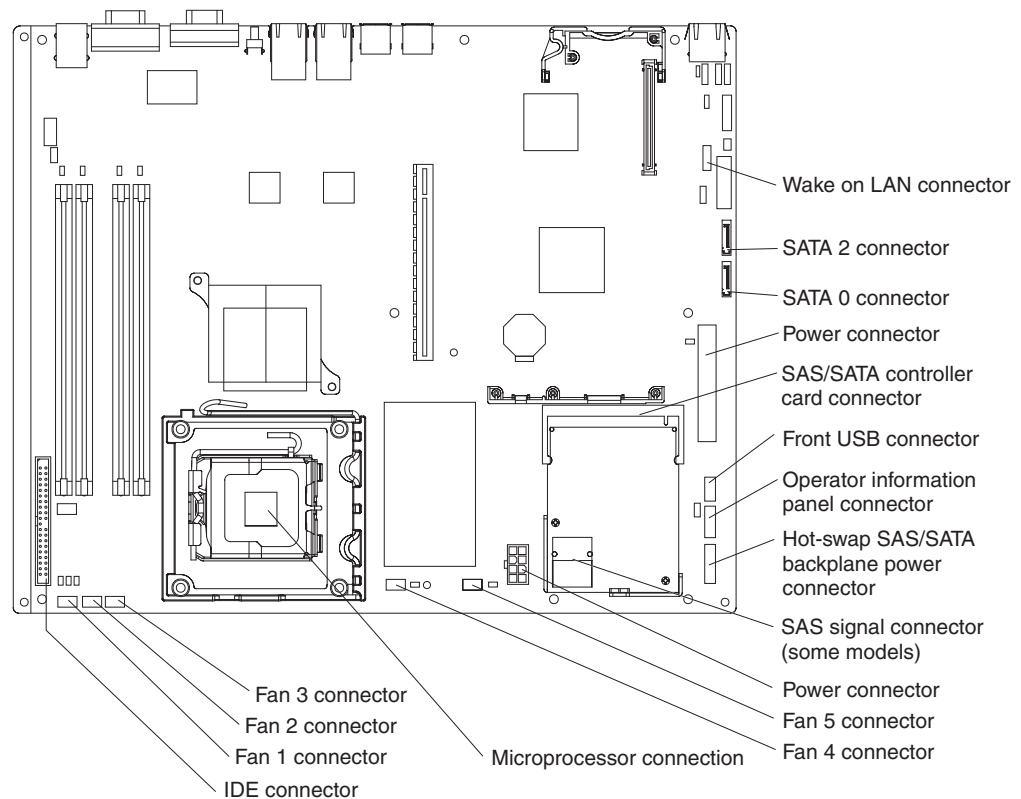
Systems-management connector: Connect the server to a network for systems-management information control. This connector is active only if you have installed a Remote Supervisor Adapter II SlimLine, and it is used only by the Remote Supervisor Adapter II SlimLine.

Internal LEDs, connectors, and jumpers

The following illustrations show the connectors, LEDs, and jumpers on the internal boards. The illustrations might differ slightly from your hardware.

System-board internal connectors

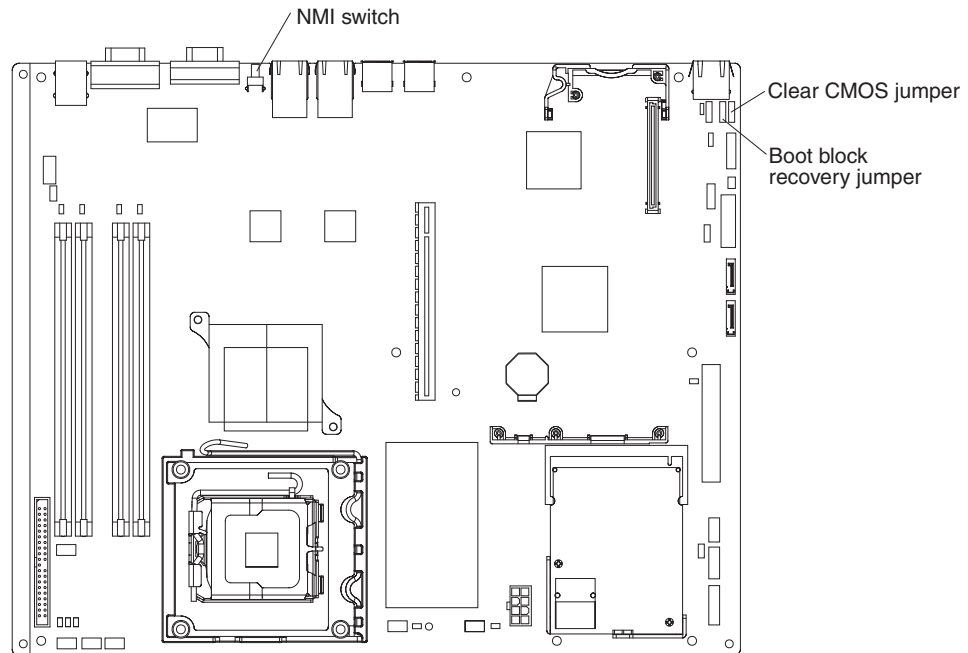
The following illustration shows the internal connectors on the system board.



Important: Use only a supported IBM SAS/SATA controller in the SAS/SATA controller card connector. For a list of supported optional devices for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>

System-board switches and jumpers

The following illustration shows the switches and jumpers on the system board.



The following illustration identifies the pins on a jumper and shows the location of pin 1.

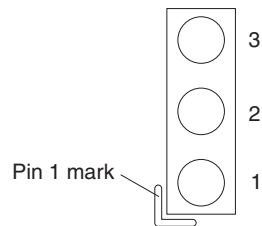
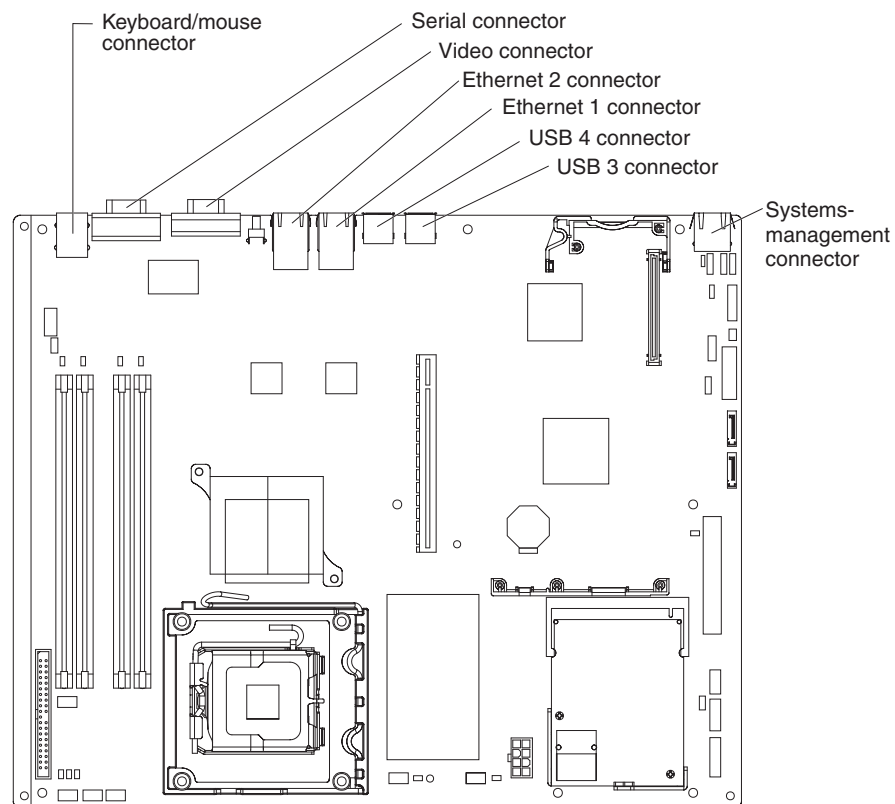


Table 2. Switch and jumper settings

Component	Settings
CMOS jumper (JP3)	<ul style="list-style-type: none">• Pins 1 and 2: Keep CMOS data (default)• Pins 2 and 3: Clear the CMOS data, which clears the power-on password and administrator password
Boot block jumper (JP4)	<ul style="list-style-type: none">• Pins 1 and 2: Normal (default)• Pins 2 and 3: Recover boot block
NMI (non-maskable interrupt) switch (SW1)	<ul style="list-style-type: none">• Normal (default): No NMI issued• The NMI button that is on the rear of server, connected to this switch, has been pressed: NMI issued

System-board external connectors

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



System-board LEDs

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

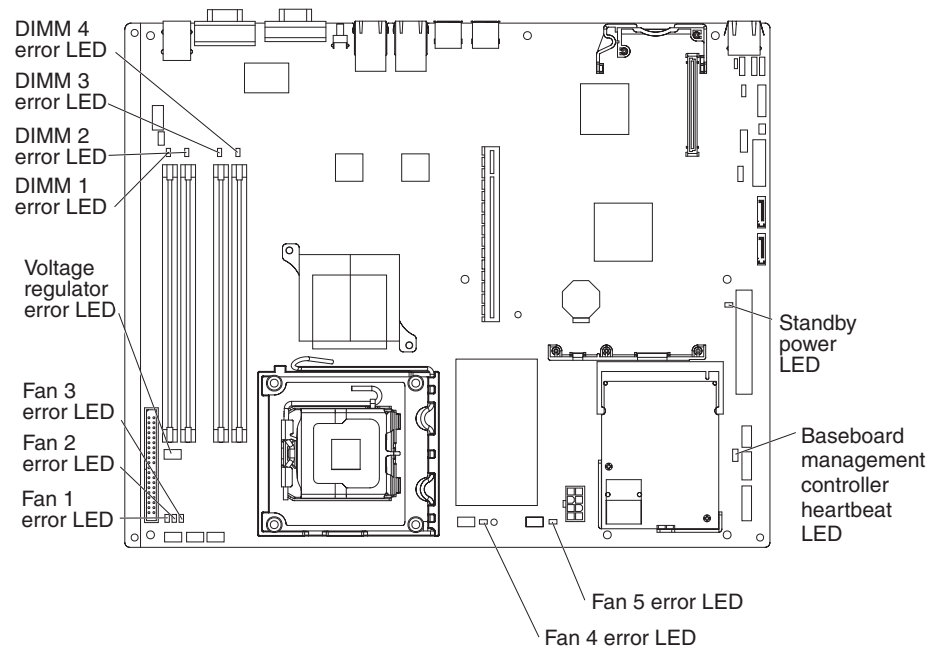
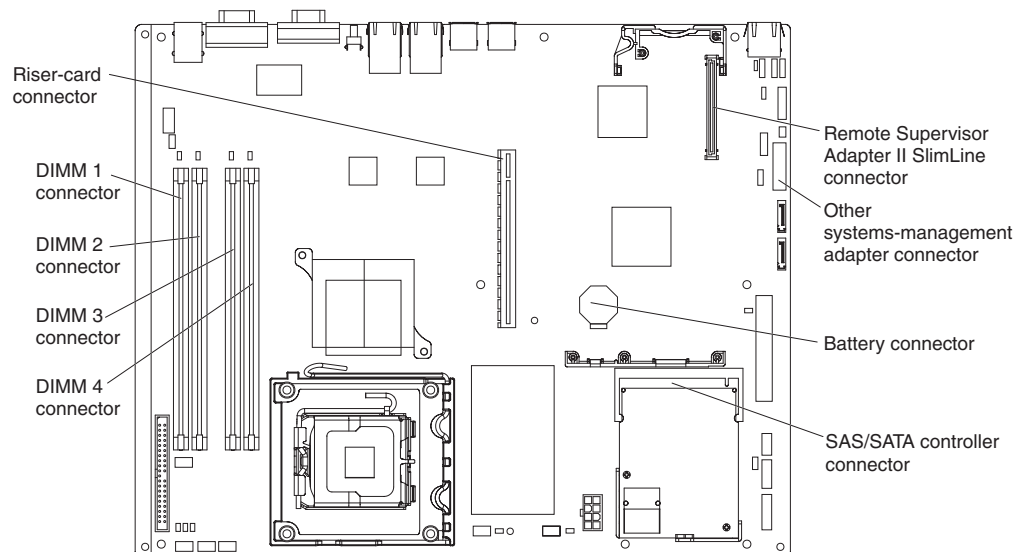


Table 3. System-board LEDs

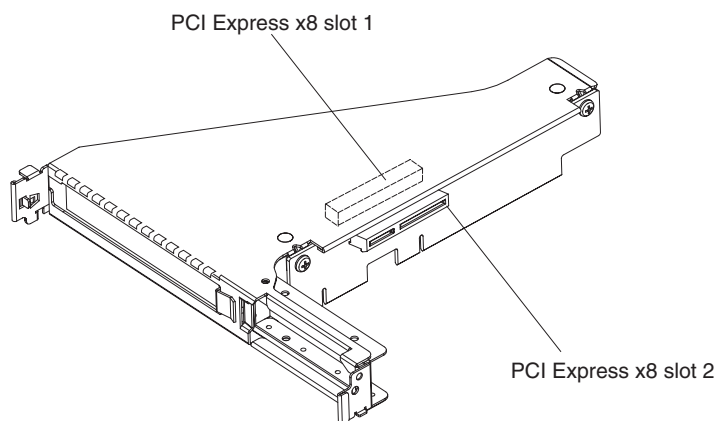
LED	Description
Error LEDs	When one of these LEDs is lit, it indicates that the associated component has failed.
Baseboard management controller heartbeat LED	This LED flashes to indicate that the mini-BMC is functioning normally.
Standby power LED	When this LED is lit, it indicates that the server is connected to ac power.

System-board optional device connectors

The following illustration shows the connectors for user-installable optional devices.



The following illustration shows the location of the PCI Express slots on the riser-card assembly.



Chapter 2. Configuration information and instructions

This chapter provides information about updating the firmware and using the configuration utilities.

Updating the firmware

The firmware for the server is periodically updated and is available for download on the Web. Go to <http://www.ibm.com/servers/eserver/support/xseries/index.html> to check for the latest level of firmware, such as BIOS code, vital product data (VPD) code, device drivers, and service processor firmware. Download the latest firmware for the server; then, install the firmware, using the instructions that are included with the downloaded file.

When you replace a device in the server, you might have to either update the server with the latest version of the firmware that is stored in memory on the device or restore the pre-existing firmware from a diskette or CD image.

- BIOS code is stored in ROM on the system board.
- BMC firmware is stored in ROM on the mini-baseboard management controller on the system board.
- Ethernet firmware is stored in ROM on the Ethernet controller.
- ServeRAID firmware is stored in ROM on the ServeRAID adapter.
- SATA firmware (simple-swap models) is stored in ROM on the integrated SATA controller.
- SAS/SATA firmware (hot-swap models) is stored in ROM on the SAS/SATA controller on the system board.

Configuring the server

The *ServerGuide Setup and Installation* CD provides software setup tools and installation tools that are specifically designed for your IBM server. Use this CD during the initial installation of the server to configure basic hardware features and to simplify the operating-system installation.

In addition to the *ServerGuide Setup and Installation* CD, you can use the following configuration programs to customize the server hardware:

- Configuration/Setup Utility program
- LSI Logic Configuration Utility program
- Baseboard management controller SMBridge management utility program

For more information about these programs, see “Configuring the server” in the *User’s Guide* on the IBM *System x Documentation* CD.

Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD provides programs to detect the server model and installed optional hardware devices, configure the server hardware, provide device drivers, and help you install the operating system. For information about the supported operating-system versions, see the label on the CD. If the *ServerGuide Setup and Installation* CD did not come with the server, you can download the latest version from <http://www.ibm.com/pc/qtechinfo/MIGR-4ZKPPT.html>.

To start the *ServerGuide Setup and Installation* CD, complete the following steps:

1. Insert the CD, and restart the server. If the CD does not start, see “ServerGuide problems” on page 90.
2. Follow the instructions on the screen to:
 - a. Select your language.
 - b. Select your keyboard layout and country.
 - c. View the overview to learn about ServerGuide features.
 - d. View the readme file to review installation tips about your operating system and adapter.
 - e. Start the setup and hardware configuration programs.
 - f. Start the operating-system installation. You will need your operating-system CD.

Using the Configuration/Setup Utility program

The Configuration/Setup Utility program is part of the BIOS. You can use it to perform the following tasks:

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time
- Set and change passwords
- Set and change the startup characteristics of the server and the order of startup devices (startup-drive sequence)
- Set and change settings for advanced hardware features
- View and clear the error logs
- Change interrupt request (IRQ) settings
- Enable USB keyboard and mouse support
- Resolve configuration conflicts

Go to <http://www.ibm.com/servers/eserver/support/xseries/index.html> to check for the latest version of the BIOS code.

Starting the Configuration/Setup Utility program

To start the Configuration/Setup Utility program, complete the following steps:

1. Turn on the server.
2. When the message Press F1 for Configuration/Setup is displayed, press F1. If an administrator password has been set, you must type the administrator password to access the full Configuration/Setup Utility menu.
3. Follow the instructions on the screen.

See the *User's Guide* on the IBM *System x Documentation* CD for more detailed information about the Configuration/Setup Utility program.

Using the LSI Logic Configuration Utility program

Use the LSI Logic Configuration Utility program to configure hot-swap hard disk drives that are connected to the SAS/SATA controller.

Important: If the server is a simple-swap SATA model and you have installed an optional SATA RAID Kit, you can use the LSI Logic Configuration Utility program to configure the simple-swap SATA hard disk drives.

- If the server is a simple-swap SATA model and you have installed an optional SATA RAID Kit, you can use the LSI Logic Configuration Utility program to configure the simple-swap SATA hard disk drives.
- If you install an optional RAID controller in the server, such as the ServeRAID 8s controller, use the configuration software that comes with the adapter to configure the hard disk drives.

Starting the LSI Logic Configuration Utility program

To start the LSI Logic Configuration Utility program, complete the following steps:

1. Turn on the server.
2. When the prompt Press CTRL-C to start LSI Logic Configuration Utility... is displayed, press Ctrl+C. If you have set an administrator password, you are prompted to type the password.
3. Use the arrow keys to select the adapter (SAS controller) for which you want to change settings. Use the Help function to see instructions and available actions for this screen. If you select SAS Topology or Advanced Adapter Properties, additional screens are displayed.
4. To change the settings of the selected items, follow the instructions on the screen.
5. Press Enter to save your changes.

Configuring the controller and devices

You can view and change settings for the following items for the selected adapter (controller):

Boot Support

Specify the type of boot support that will be in effect (disabled, BIOS only, OS only, or both BIOS and OS)

RAID Properties

Create a RAID array from the choices that are displayed

SAS Topology

View information about the devices attached to the selected SAS controller.
Format and verify an attached device.

Advanced Adapter Properties

View the SAS properties and change the following items for the selected adapter:

- Global properties
- Cylinder head sector (CHS) mapping
- Link error settings
- Advanced device properties, such as I/O timeouts and LUNs to scan
- Spinup properties
- PHY properties

Configuring the Ethernet controller

The Ethernet controllers are integrated on the system board. They provide an interface for connecting to a 10 Mbps, 100 Mbps, or 1 Gbps network and provide full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the Ethernet ports in the server support auto-negotiation, the controllers detect the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operate at that rate and mode.

You do not have to set any jumpers or configure the controllers. However, you must install a device driver to enable the operating system to address the controllers. For device drivers and information about configuring the Ethernet controllers, see the *Broadcom NetXtreme Gigabit Ethernet Software CD* that comes with the server. To find updated information about configuring the controller, complete the following steps:

Note: Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://www.ibm.com/servers/eserver/support/xseries/index.html>.
2. From the **Hardware** list, select **System x3250** and click **Go**.
3. Click the **Install and use** tab.
4. Click **Product documentation**.

Updating the DMI/SMBIOS data

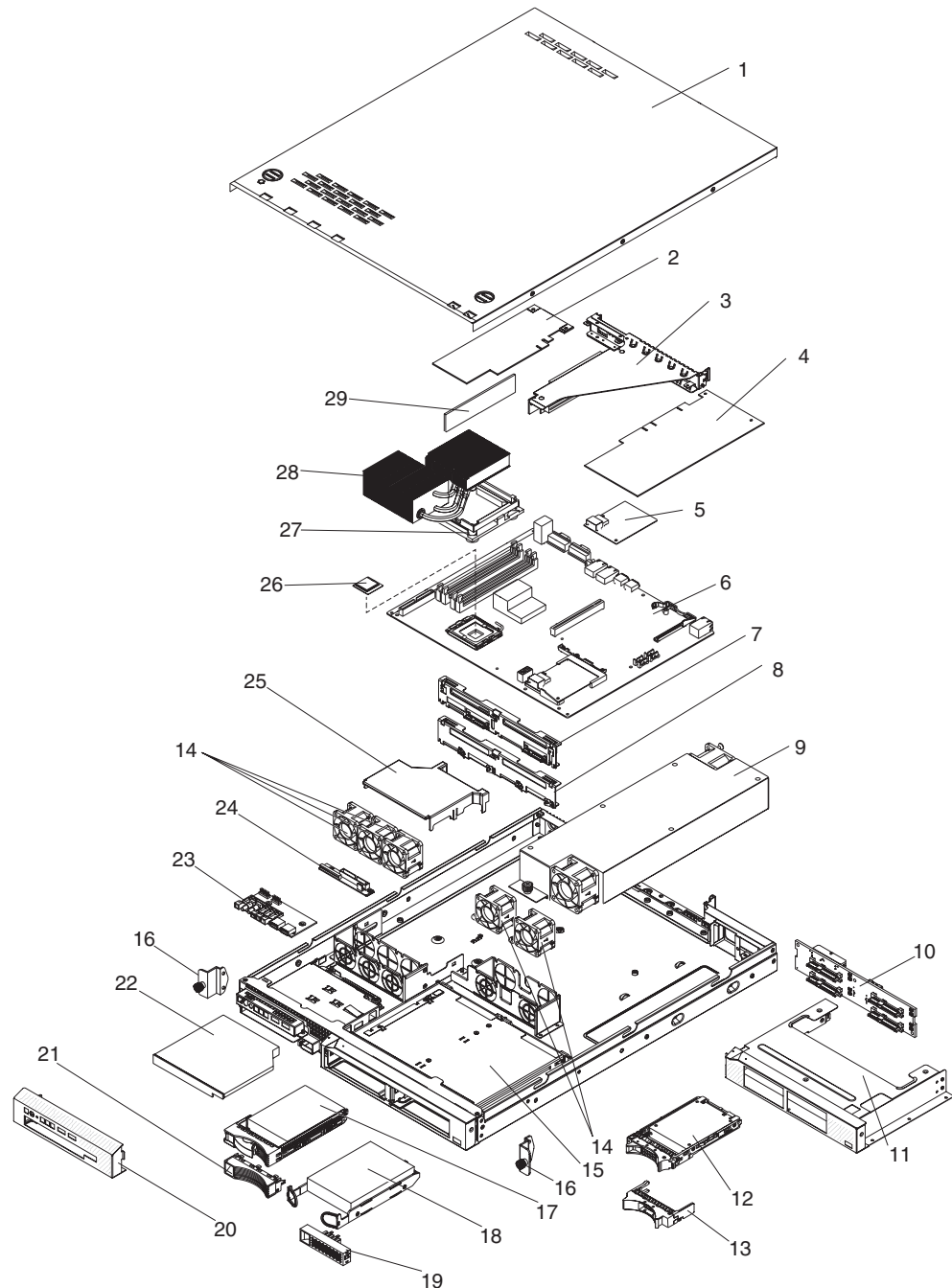
The Desktop Management Interface (DMI) must be updated when the system board is replaced. To update the DMI, complete the following steps:

1. Copy the DMI/SMBIOS utility (flash2.exe) from the BIOS flash diskette to a DOS bootable diskette (see "Updating the firmware" on page 11 for information about downloading and using firmware).
2. Insert the diskette into a diskette drive that is connected to the server.
3. Restart the server from the diskette.
4. At the a:\ prompt, type flash2.exe, and press Enter.
5. To change the machine type and model number, type mtm xxxxyyy where xxxx is the model type and yyy is the model number; then, press Enter.
6. To change the serial number, type sn zzzzzzz where zzzzzzz is the serial number; then, press Enter.
7. To change the asset tag, type asset aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa where aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa is the asset tag number; then, press Enter.
8. Restart the server.

Chapter 3. Parts listing, Type 4364, 4365, or 4366 server

The following replaceable components are available for the System x3250 Type 4364, 4365, and Type 4366 servers. To check for an updated parts listing on the Web, complete the following steps:

1. Go to <http://www.ibm.com/servers/eserver/support/xseries/index.html>.
2. From the **Hardware** list, select **System x3250** and click **Go**.
3. Click the **Install and use** tab.
4. Under **Technical resources**, click **Parts information**.



Replaceable server components

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

/

Table 4. Parts listing, Type 4364, 4365, and 4366

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Cover	42C1284		
2	Low-profile adapter	varies		
3	Riser card		42C1278	
4	3/4-length adapter	varies		
5	SAS/SATA controller card (daughter card) (hot-swap models) (models 44x, 4Dx, 52x, 54x, 5Bx, 5Dx, 62x, 64x, 6Bx, 6Dx, 72x, 7Bx, 82x, 8Bx, 92x 9Bx)		42C1279	
6	System board assembly			43W0291
7	SAS/SATA backplane, 3.5-inch drives (hot-swap models) (models 44x, 4Dx, 52x, 62x, 72x, 82x, 92x 5Bx, 6Bx, 7Bx, 8Bx, 9Bx)		46C7919	
8	SATA simple-swap hard disk drive back plate, 3.5-inch drives (models 12x, 1Bx, 21x, 22x, 2Ax, 2Bx, 32x 3Bx, 42x, 4Bx)		39M4347	
9	Power supply, 351 W	39Y7289		
10	SAS/SATA backplane, 2.5-inch drives (hot-swap models) (models 54x, 64x 5Dx, 6Dx)		39Y9541	
11	Drive cage, 2.5-inch (models 54x, 64x, 5Dx, 6Dx)		42C1287	
12	Hard disk drive, 2.5-inch, 36 GB, 10K, HS SAS (optional)	39R7364		
12	Hard disk drive, 2.5-inch, 73 GB, 10K, HS SAS (optional)	39R7366		
13	Hot-swap SAS filler panel, 2.5-inch (models 54x, 64x, 5Dx, 6Dx)	26K8680		
14	Fan (40 mm)	39M4322		
15	Drive cage, 3.5-inch (models 12x, 1Bx, 21x, 22x, 2Ax, 2Bx, 32x, 3Bx, 42x, 44x, 4Bx, 4Dx, 52x, 5Bx, 62x, 6Bx, 72x, 7Bx 82x, 8Bx, 92x, 9Bx)		42C1286	
16	Bracket ear	39M4351		
17	Hard disk drive, 3.5-inch, 73 GB, 10K, HS SAS (optional)	39R7340		

Table 4. Parts listing, Type 4364, 4365, and 4366 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
17	Hard disk drive, 3.5-inch, 146 GB, 10K, HS SAS (optional)	39R7342		
17	Hard disk drive, 3.5-inch, 300 GB, 10K, HS SAS (optional)	39R7344		
17	Hard disk drive, 3.5-inch, 36 GB, 15K, HS SAS (optional)	39R7346		
17	Hard disk drive, 3.5-inch, 73 GB, 15K, HS SAS (optional)	39R7348		
17	Hard disk drive, 3.5-inch, 146 GB, 15K, HS SAS (optional)	39R7350		
17	Hard disk drive, 3.5-inch, 80 GB, HS SATA (optional)	39M4521		
17	Hard disk drive, 3.5-inch, 160 GB, HS SATA (optional)	39M4525		
17	Hard disk drive, 3.5-inch, 250 GB, HS SATA (optional)	39M4529		
17	Hard disk drive, 3.5-inch, 500 GB, HS SATA (optional)	39M4533		
18	Hard disk drive, 3.5-inch, 80 GB, SS SATA (optional)	39M4503		
18	Hard disk drive, 3.5-inch, 160 GB, SS SATA (optional)	39M4507		
18	Hard disk drive, 3.5-inch, 250 GB, SS SATA (optional)	39M4511		
18	Hard disk drive, 3.5-inch, 500 GB, SS SATA (optional)	39M4517		
19	Simple-swap filler panel (SATA only), 3.5-inch (models 12x, 1Bx, 21x, 22x, 2Ax, 2Bx, 32x 3Bx, 42x, 4Bx)	39M4343		
20	Front bezel	42C1283		
21	Hot-swap filler panel (SAS/SATA), 3.5-inch (models 44x, 4Dx, 52x, 5Bx, 62x, 6Bx, 72x, 82x, 8Bx, 92x 9Bx)	39M4375		
22	CD/DVD drive, 24X (models 12x, 22x, 42x, 44x, 52x, 54x, 62x, 64x, 72x, 82x, 92x)	39M3559		
	CD/DVD drive, 24X (models 12x, 22x, 42x, 44x, 52x, 54x, 62x, 64x, 72x, 82x, 92x)	26K5427		
	CD/DVD drive, 24X (models 12x, 22x, 42x, 44x, 52x, 54x, 62x, 64x, 72x, 82x, 92x)	39M3503		
	CD-RW/DVD drive, 24X (models 1Bx, 2Bx, 4Bx, 4Dx, 5Bx, 5Dx, 6Bx, 6Dx, 7Bx, 8Bx, 9Bx)	39M3541		
	CD-RW/DVD drive, 24X (models 1Bx, 2Bx, 4Bx, 4Dx, 5Bx, 5Dx, 6Bx, 6Dx, 7Bx, 8Bx, 9Bx)	39M3563		
	DVD drive, 24X (optional)	39M3529		
	DVD drive, 24X (optional)	42C0955		
	Operator information panel assembly		42C1513	
	CD/DVD interface board		39M4354	
	Air baffle	39M6296		
	Microprocessor 1.8 GHz /800 Mhz 1M (models 32x, 3Bx)			44E3957
	Microprocessor, 1.86 GHz 2M dual core (models 42x, 44x, 4Bx, 4Dx)			42C1141
	Microprocessor, 2.13 GHz 2M dual core (models 52x, 54x, 5Bx, 5Dx)			42C1143
	Microprocessor quad-core 2.13 GHz /1066 Mhz 2x4M (models 82x, 8Bx)			43W4808
	Microprocessor, 2.4 GHz 4M dual core (models 62x, 64x, 6Bx, 6Dx)			42C1145

Table 4. Parts listing, Type 4364, 4365, and 4366 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	Microprocessor, 2.4 GHz quad core 105 W (models 92x, 9Bx)			43W4809
	Microprocessor 2.66 GHz /1066 Mhz 4M dual core (models 72x, 7Bx)			43W4807
	Microprocessor, 2.93 GHz 256K (models 12x, 1Bx)			42C1147
	Microprocessor 3.0 GHz /800 Mhz 4M dual core (models 21x, 2Ax)			43W4806
	Microprocessor, 3.4 GHz 4M (models 22x 2Bx)			42C1274
	Heat-sink-assembly retention module			39M4360
	Heat-sink assembly			39M4356
	Memory, 512 MB PC2-5300 ECC (models 12x, 1Bx, 21x, 22x, 2Ax, 2Bx, 32x, 3Bx, 42x, 44x, 4Bx, 4Dx, 52x, 54x, 5Bx, 5Dx, 62x, 64x, 6Bx, 6Dx, 72x, 7Bx, 82x, 8Bx, 92x, 9Bx)	41Y2725		
	Memory, 1 GB PC2-5300 ECC (optional)	41Y2728		
	Memory, 2 GB PC2-5300 ECC (optional)	41Y2854		
	Alcohol wipe			59P4739
	Back plate, SS SATA RAID (optional)		42C1527	
	Battery, 3.0 volt		33F8354	
	Battery pack, 8i SAS controller (optional)	25R8118		
	Cable, backplane, hot-swap SAS (models 44x, 4Dx, 52x, 5Bx, 62x, 6Bx, 72x, 7Bx, 82x, 8Bx, 92x 9Bx)		42C1510	
	Cable, SAS to SATA (optional)		42C1267	
	Cable, backplane, hot-swap power (models 44x, 4Dx, 52x, 54x, 5Bx, 5Dx, 62x, 64x, 6Bx, 6Dx, 72x, 7Bx, 82x, 8Bx, 92x, 9Bx)		42C1509	
	Cable, SATA (simple-swap models) (models 12x, 1Bx, 22x, 21x, 2Ax, 2Bx, 32x 3Bx, 42x, 4Bx)		39M6276	
	Cable, operator information panel		39M6266	
	Cable, IDE, for CD/DVD interface card		39M6267	
	Cable, SAS signal, 58 cm (models 54x, 64x 5Dx, 6Dx)		41Y3884	
	Cable, SAS signal, .61 m (optional)		43W4473	
	Chassis assembly			42C1285
	IBM Ultra 320 SCSI PCIe controller (optional)	43W4325		
	Kit, misc. (models 12x, 1Bx, 21x, 22x, 2Ax, 2Bx, 32x, 3Bx, 42x, 44x, 4Bx, 4Dx, 52x, 5Bx, 62x, 6Bx, 72x, 7Bx 82x, 8Bx, 92x, 9Bx)		39M4374	
	Kit, misc. 2		39R8177	
	Kit, rail, 1U, toolless		24P1121	
	Kit, rail, 2-post (optional)		42C1069	
	Label, CRU/FRU	42C1281		

Table 4. Parts listing, Type 4364, 4365, and 4366 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	Label, hard disk drive installation	42C1282		
	Label, system service	42C1280		
	ServeRAID-8s SAS/SATA controller (optional)	46M0839		
	Rack power cord	39M5377		

Product recovery CDs

Table 5 describes the product recovery CD CRUs.

Table 5. Product recovery CDs

Description	CRU part number
Microsoft® Windows® 2003 Server Standard 32b Edition R2 w/SP2, 1-4 Processors, English	44W4046
Microsoft Windows 2003 Server Standard 32b Edition R2 w/SP2, 1-4 Processors, French	44W4047
Microsoft Windows 2003 Server Standard 32b Edition R2 w/SP2, 1-4 Processors, Italian	44W4048
Microsoft Windows 2003 Server Standard 32b Edition R2 w/SP2, 1-4 Processors, German	44W4049
Microsoft Windows 2003 Server Standard 32b Edition R2 w/SP2, 1-4 Processors, Spanish	44W4050
Microsoft Windows 2003 Server Standard 32b Edition R2 w/SP2, 1-4 Processors, Traditional Chinese	44W4051
Microsoft Windows 2003 Server Standard 32b Edition R2 w/SP2, 1-4 Processors, Simplified Chinese	44W4053
Microsoft Windows 2003 Server Standard 32b Edition R2 w/SP2, 1-4 Processors, Japanese	44W4052
Microsoft Windows 2003 Server Standard 32b Edition R2 w/SP2, 1-4 Processors, Korean	44W4054
Microsoft Windows 2003 Server Standard 64b Edition R2 w/SP2, 1-4 Processors, English	44W4055
Microsoft Windows 2003 Server Standard 64b Edition R2 w/SP2, 1-4 Processors, Japanese	44W4056
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-2 Processors, English	44W4057
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-2 Processors, French	44W4058
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-2 Processors, German	44W4059
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-2 Processors, Spanish	44W4060
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-2 Processors, Simplified Chinese	44W4061
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-2 Processors, Traditional Chinese	44W4062

Table 5. Product recovery CDs (continued)

Description	CRU part number
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-2 Processors, Japanese	44W4063
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-2 Processors, Korean	44W4064
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-2 Processors, Italian	44W4078
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-8 Processors, English	44W4065
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-8 Processors, French	44W4066
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-8 Processors, Italian	44W4067
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-8 Processors, German	44W4068
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-8 Processors, Spanish	44W4069
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-8 Processors, Simplified Chinese	44W4070
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-8 Processors, Traditional Chinese	44W4071
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-8 Processors, Japanese	44W4072
Microsoft Windows 2003 Server Enterprise 32b Edition R2 w/SP2, 1-8 Processors, Korean	44W4073
Microsoft Windows 2003 Server Enterprise 64b Edition R2 w/SP2, 1-2 Processors, English	44W4074
Microsoft Windows 2003 Server Enterprise 64b Edition R2 w/SP2, 1-2 Processors, Japanese	44W4075
Microsoft Windows 2003 Server Enterprise 64b Edition R2 w/SP2, 1-8 Processors, English	44W4076
Microsoft Windows 2003 Server Enterprise 64b Edition R2 w/SP2, 1-8 Processors, Japanese	44W4077
Microsoft Windows 2008 Datacenter 32b/64b, Multilingual	49Y0222
Microsoft Windows 2008 Datacenter 32b/64b, Simplified Chinese	49Y0223
Microsoft Windows 2008 Datacenter 32b/64b, Traditional Chinese	49Y0224
Microsoft Windows 2008 Server Standard Edition 32b/64b, 1-4 Processors, Multilingual	49Y0892
Microsoft Windows 2008 Server Standard Edition 32b/64b, 1-4 Processors, Simplified Chinese	49Y0893
Microsoft Windows 2008 Server Standard Edition 32b/64b, 1-4 Processors, Traditional Chinese	49Y0894
Microsoft Windows 2008 Enterprise Edition 32b/64b, 1-8 Processor, Multilingual	49Y0895
Microsoft Windows 2008 Enterprise Edition 32b/64b, 1-8 Processor, Simplified Chinese	49Y0896

Table 5. Product recovery CDs (continued)

Description	CRU part number
Microsoft Windows 2008 Enterprise Edition 32b/64b, 1-8 Processor, Traditional Chinese	49Y0897
Microsoft Windows 2008 Server HPC ROK 1–4 Processor, English	68Y9455
Microsoft Windows 2008 Server HPC ROK 1–4 Processor, Japanese	68Y9456
Microsoft Windows 2008 Server HPC ROK 1–4 Processor, Simplified Chinese	68Y9457

Power cords

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.

IBM power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

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
39M5206	China
39M5102	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea
39M5123	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
39M5130	Denmark
39M5144	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
39M5151	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
39M5158	Liechtenstein, Switzerland
39M5165	Chile, Italy, Libyan Arab Jamahiriya
39M5172	Israel
39M5095	220 - 240 V Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, 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
39M5081	110 - 120 V 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
39M5219	Korea (Democratic People's Republic of), Korea (Republic of)
39M5199	Japan
39M5068	Argentina, Paraguay, Uruguay
39M5226	India
39M5233	Brazil

Chapter 4. Removing and replacing server components

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine whether a component is a Tier 1 CRU, Tier 2 CRU, or FRU.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

Installation guidelines

Before you remove or replace a component, read the following information:

- Read the safety information that begins on page vii, and the guidelines in “Handling static-sensitive devices” on page 26. This information will help you work safely.
- Before you install optional hardware devices, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed, or that a 19990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see Chapter 5, “Diagnostics,” on page 67 for diagnostic information.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the cover is removed, make sure that no one is near the server and that no other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
 - Make sure that you stand safely without slipping.
 - Distribute the weight of the object equally between your feet.
 - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
 - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles
- 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-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 are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.
- For a list of supported optional devices for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

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 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before you turn on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan as soon as possible.
- You have replaced a hot-swap drive within 2 minutes of removal.

Working inside the server with the power on

Attention: Static electricity that is released to internal server components when the server is powered-on might cause the server to halt, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when you work inside the server with the power on.

You might have to have the server turned on while the cover is off, to look at system-board LEDs or to test a replacement power supply. 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 the server and other electronic devices. 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.
- The use of a grounding system is recommended. For example, wear an electrostatic-discharge wrist strap, if one is available. Always use an electrostatic-discharge wrist strap or other grounding system when working inside the server with the power on.
- 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 on the outside 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 you handle devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Returning a device or component

If you are instructed to return a device or component, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Removing and replacing Tier 1 CRUs

Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

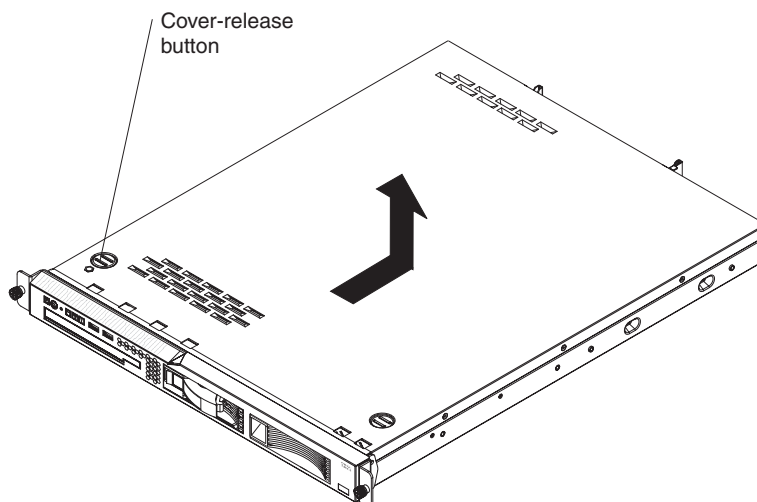
The illustrations in this document might differ slightly from your hardware.

Removing the cover

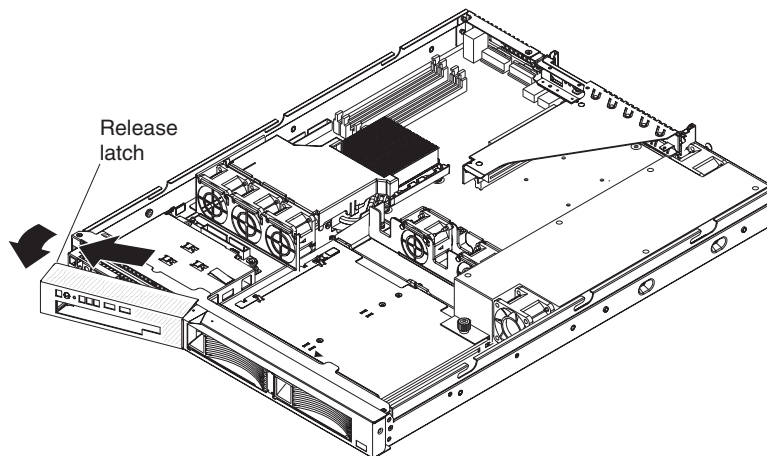
Attention: Operating the server for more than 2 minutes with the cover removed might damage server components. For proper cooling and airflow, replace the cover before you turn on the server.

To remove the cover, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Turn off the server and all peripheral devices, and disconnect the power cords and all external cables.
3. Slide the server out of the rack and place it on a flat, static-protective surface.

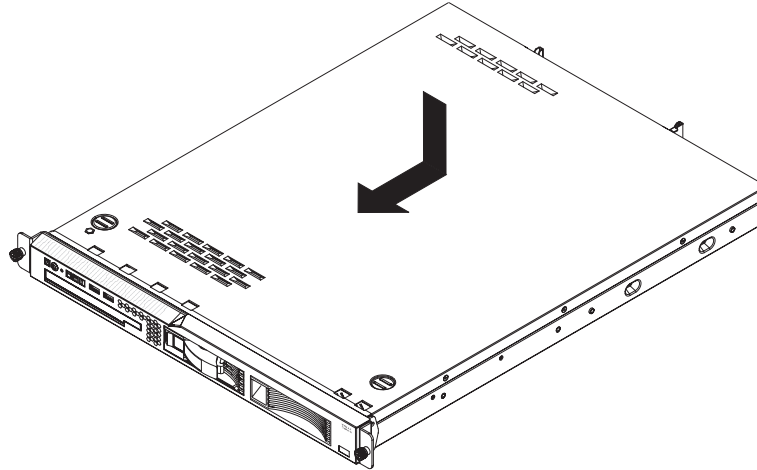


4. Press the cover-release button.
5. Slide the cover back approximately 1.27 cm (0.5 inches); then, lift it off the server.
6. If you are instructed to remove the bezel, complete the following steps.

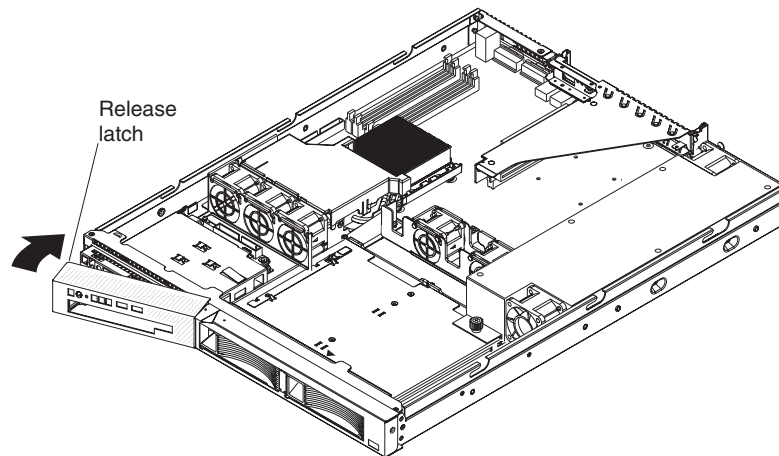


- a. From inside the server, press the bezel release latch toward the left side of the server.
 - b. Pivot the bezel forward and pull it away from the server.
7. If you are instructed to return the cover and bezel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the cover



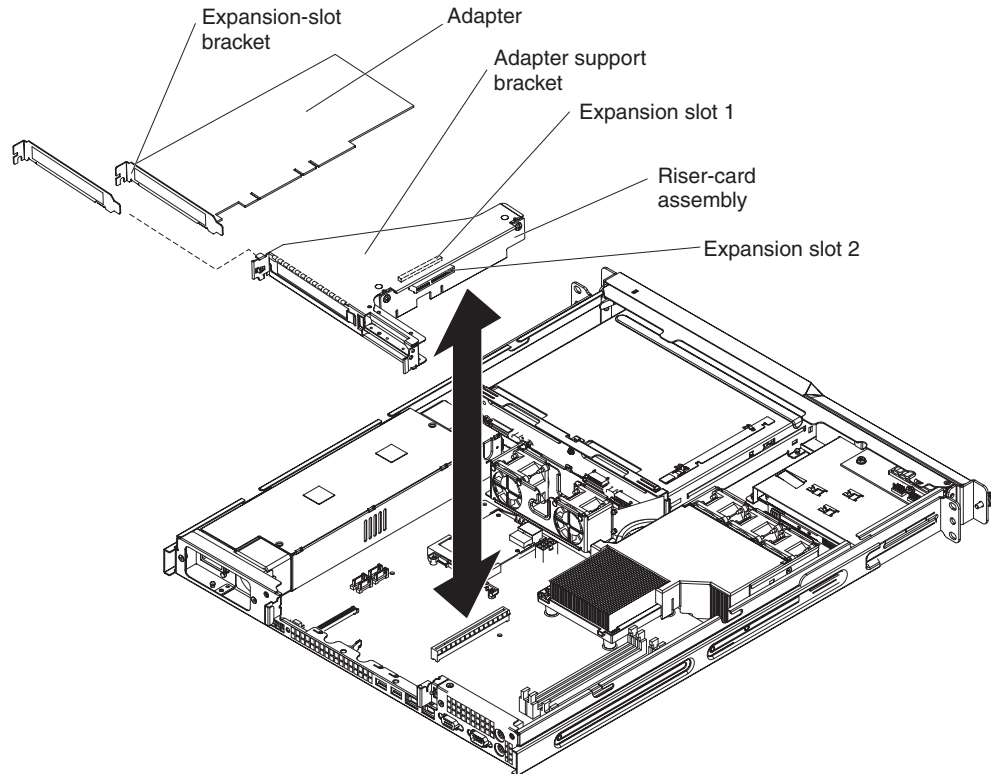
To install the cover and bezel, complete the following steps.



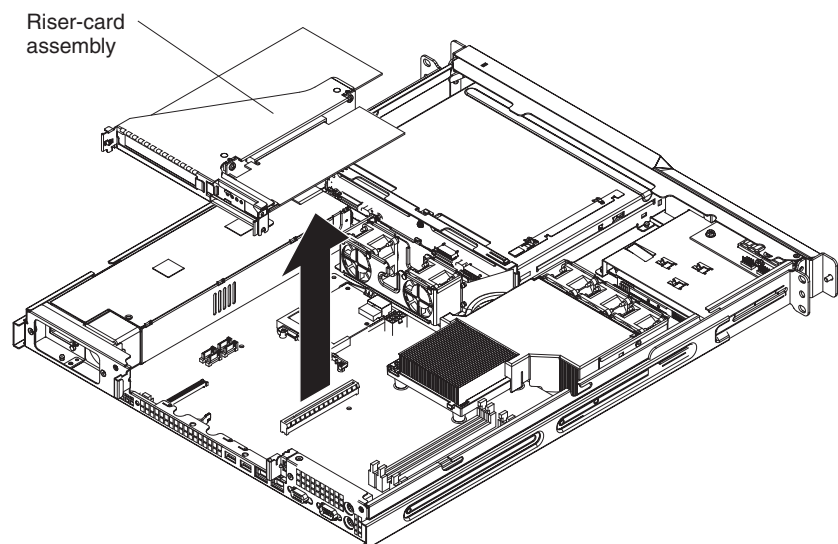
1. To install the left bezel, if you removed it, insert the tab at the right end of the bezel into the front of the chassis and pivot the bezel until it snaps into place.
2. Make sure that all internal cables are correctly routed.
3. Set the cover on top of the server so that approximately 13 mm (0.5 inch) extends from the rear.
4. Slide the cover forward and into position.
5. Slide the server into the rack.

Removing an adapter

To remove a PCI Express adapter, complete the following steps.



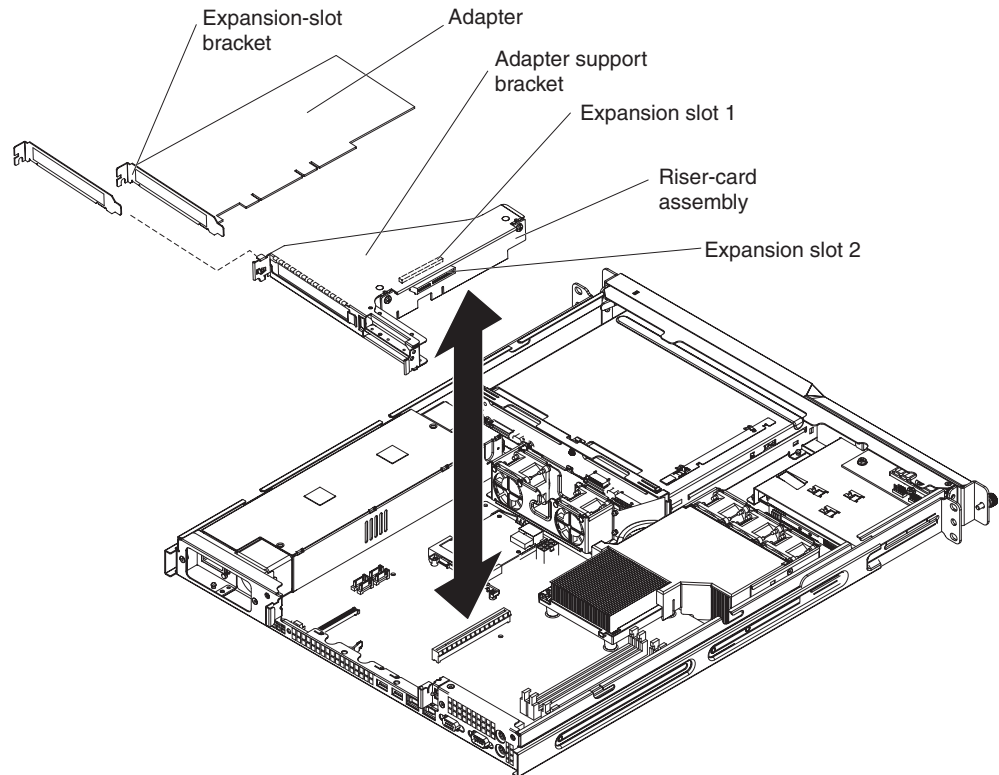
1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server from the rack; then, remove the cover (see “Removing the cover” on page 28).
4. Disconnect any cables from the adapter.
5. Grasp the riser-card assembly at the rear edge and lift to remove it from the server.



6. Place the riser-card assembly on a flat, static-protective surface.
7. Carefully grasp the adapter by its top edge or upper corners, and pull the adapter from the riser-card assembly.
8. If you are instructed to return the adapter, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an adapter

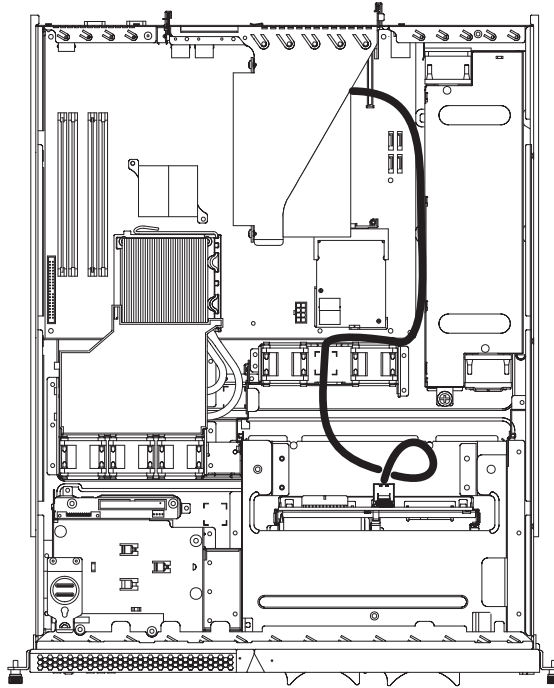
Note: Because of mechanical interference, when the Remote Supervisor Adapter II SlimLine is installed you cannot install an adapter in expansion slot 1.



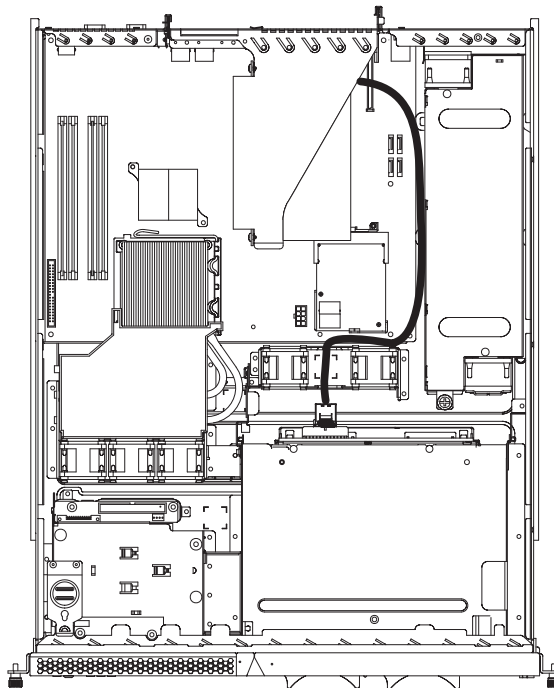
To install a replacement adapter, complete the following steps:

1. See the documentation that comes with the adapter for instructions for setting jumpers or switches and for cabling.
2. Touch the static-protective package that contains the adapter to any unpainted metal surface on the server. Then, remove the adapter from the static-protective package. Avoid touching the components and gold-edge connectors on the adapter.
3. Place the adapter, component side up, on a flat, static-protective surface and set any jumpers or switches as described by the adapter manufacturer, if necessary.
4. To install the adapter in the riser-card assembly, carefully grasp the adapter by its top edge or upper corners, and align it with the expansion slot; then, press the adapter *firmly* into the expansion slot.
5. Follow the cabling instructions, if any, that come with the adapter.
6. Carefully align the riser-card assembly with the guides on the rear of the server and with the riser-card connectors on the system board; then, press down on the assembly. Make sure that the riser-card assembly is fully seated in the riser-card connector on the system board.

7. If you are installing a ServeRAID 8s controller in a server with 2.5-inch drives, make sure that the ServeRAID 8s signal cable is routed as shown in the following illustration and connected to the hard disk drive backplane.



If you are installing a ServeRAID 8s controller in a server with 3.5-inch drives, make sure the ServeRAID 8s signal cable is routed as shown in the following illustration and connected to the hard disk drive backplane.



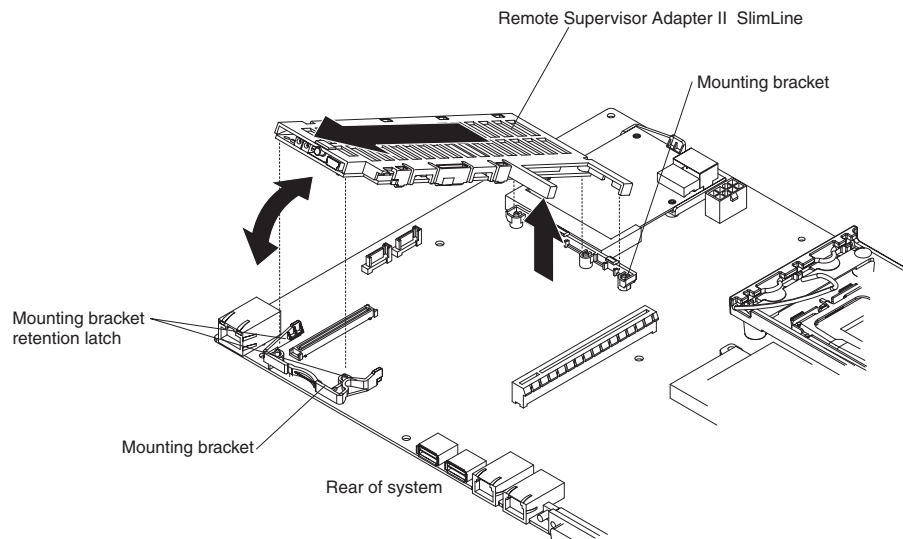
8. Install the cover (see “Installing the cover” on page 29).
9. Slide the server into the rack.
10. Connect the cables and power cords.

11. Turn on all attached devices and the server.

Removing a Remote Supervisor Adapter II SlimLine

To remove a Remote Supervisor Adapter II SlimLine from the server, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables; then, remove the cover.
3. Grasp the riser-card assembly at the rear edge and lift to remove it from the server. Set the riser-card assembly aside on a flat, static-protective surface.



4. Spread the mounting bracket retention latches as you lift the Remote Supervisor Adapter II SlimLine, to disconnect it from the system board; then, lift it out of the server.

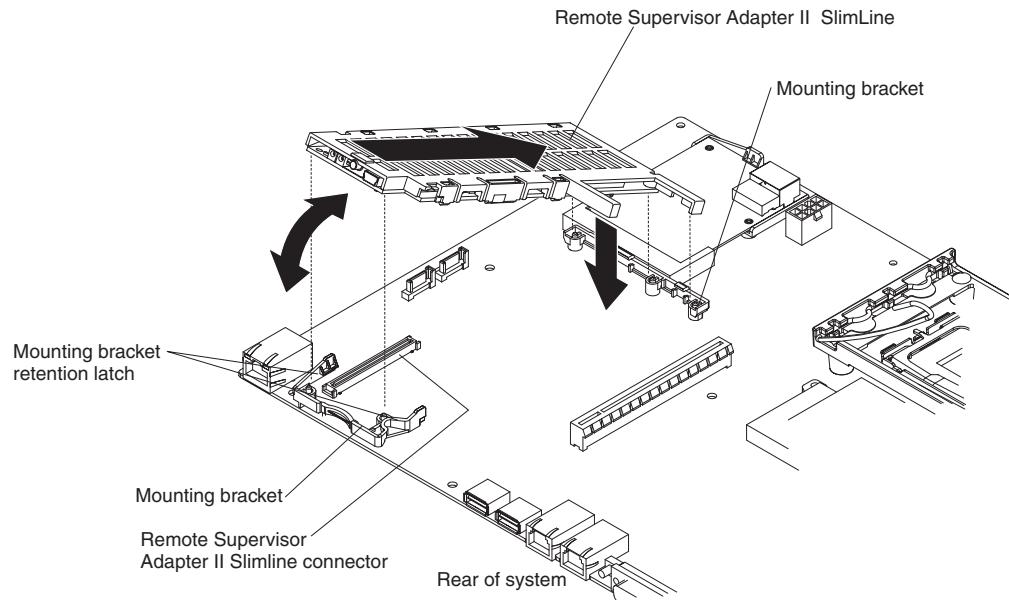
Installing a Remote Supervisor Adapter II SlimLine

See the illustration in “System-board optional device connectors” on page 10 for the location of the dedicated connector for the Remote Supervisor Adapter II SlimLine. After the Remote Supervisor Adapter II SlimLine is installed, the systems-management port on the rear of the server is active.

Notes:

1. When you start the server for the first time after you install a Remote Supervisor Adapter II SlimLine, the startup process will take several minutes longer than a typical startup.
2. Earlier versions of the Remote Supervisor Adapter II SlimLine might not work in this server. See <http://www.ibm.com/servers/eserver/serverproven/compat/us/> for the supported Remote Supervisor Adapter II SlimLine.

To install a Remote Supervisor Adapter II SlimLine, complete the following steps.



1. Put the protective plastic cover on the Remote Supervisor Adapter II SlimLine.
2. Turn the Remote Supervisor Adapter II SlimLine so that the keys on the connector align correctly with the connector on the system board.
3. At a downward angle, insert the free end of the adapter under the tab on the mounting bracket, aligning the holes in the adapter with the posts on the mounting bracket. Rotate the rear of the adapter into the rear mounting bracket, aligning the holes in the adapter with the posts on the rear mounting bracket.
4. Press the Remote Supervisor Adapter II SlimLine firmly into the connector and make sure that all tabs on both mounting brackets secure the adapter in place.
Attention: Incomplete insertion might cause damage to the server or the adapter.
5. Carefully align the riser-card assembly with the guides on the rear of the server and with the riser-card connectors on the system board; then, press down on the assembly. Make sure that the riser-card assembly is fully seated in the riser-card connectors on the system board.
6. Install the cover (see “Installing the cover” on page 29).
7. Slide the server into the rack.
8. Connect the cables and power cords.
9. Turn on all attached devices and the server.
10. See the documentation that comes with the Remote Supervisor Adapter II SlimLine for information about installing the firmware and configuring the adapter. If you have a backup copy of the configuration, restore the configuration.

Hard disk drive

Locate the documentation that comes with the hard disk drive and follow those instructions in addition to the instructions in this section.

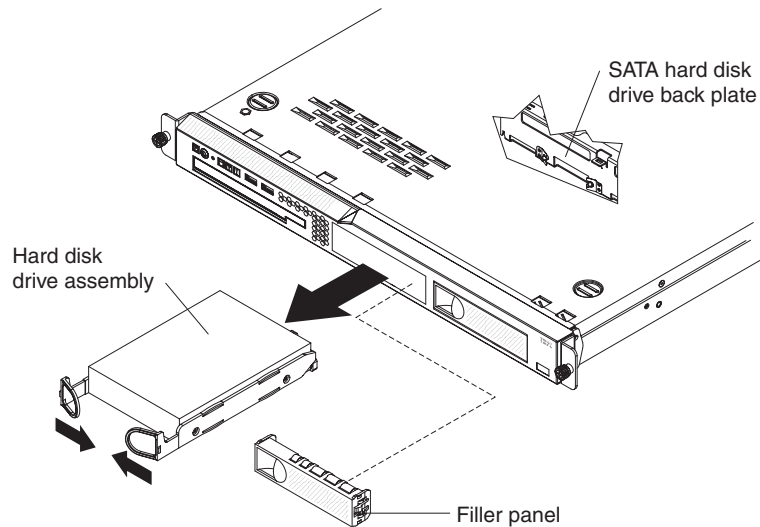
Attention: To avoid damage to the hard disk drive connectors, make sure that the server cover is in place and fully closed whenever you install or remove a hard disk drive.

Note: If a RAID controller or adapter is installed, you might have to reconfigure the disk arrays after you install or remove hard disk drives. See the documentation that comes with the adapter for more information.

Removing a simple-swap Serial ATA hard disk drive

Attention: Simple-swap hard disk drives are not hot-swappable. Disconnect all power from the server before you remove or install a simple-swap hard disk drive.

To remove a simple-swap SATA drive from the bay, complete the following steps.



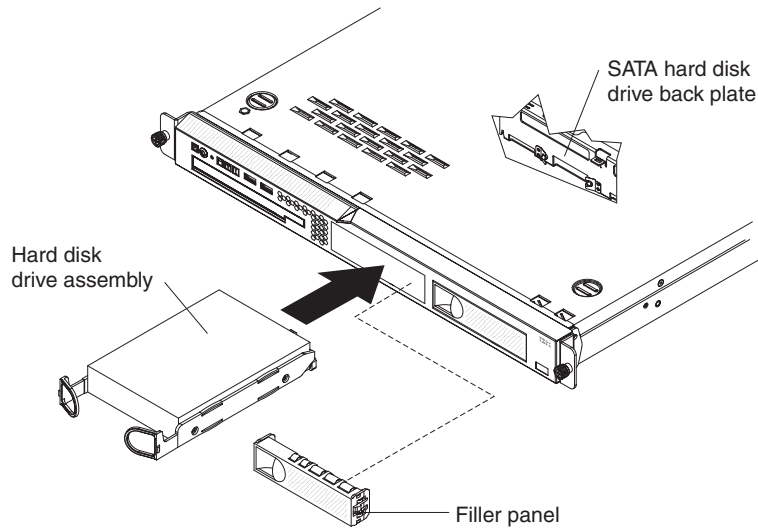
1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Make sure that the server cover is in place and fully closed.
3. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
4. Remove the filler panel from the bay.
5. Pull the loops of the drive tray toward each other and pull the tray out of the bay.

Installing a simple-swap Serial ATA hard disk drive

Attention: Simple-swap hard disk drives are not hot-swappable. Disconnect all power from the server before you remove or install a simple-swap hard disk drive.

To install a simple-swap Serial ATA hard disk drive, complete the following steps.

Note: If you have only one hard disk drive, install it in the left drive bay.

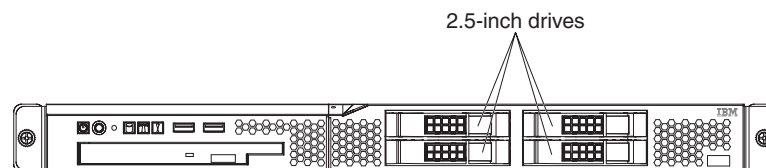


Attention: To avoid damage to the hard disk drive connectors, make sure that the server cover is in place and fully closed whenever you install or remove a hard disk drive.

1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Make sure that the server cover is in place and fully closed.
3. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
4. Remove the filler panel from the bay.
5. Pull the loops of the drive tray toward each other, and slide the drive into the server until the drive connects to the back plate.
6. Release the loops of the drive tray.
7. Insert the filler panel into the bay to cover the drive.
8. Slide the server into the rack.
9. Connect the cables and power cords.
10. Turn on all attached devices and the server.

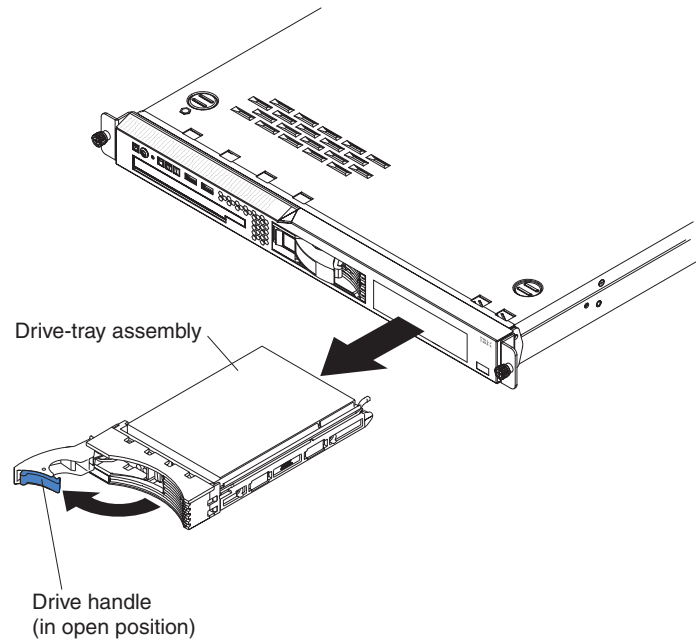
Removing a hot-swap hard disk drive

The 3.5-inch drive hot-swap server models support either two SAS 3.5-inch hard disk drives or two SATA 3.5-inch hard disk drives. The 2.5-inch drive hot-swap server models support four 2.5-inch SAS hard disk drives.



The removal and installation procedures are the same for any of these drives. The illustrations in this procedure show 3.5-inch SAS drives.

To remove a hot-swap hard disk drive, complete the following steps.



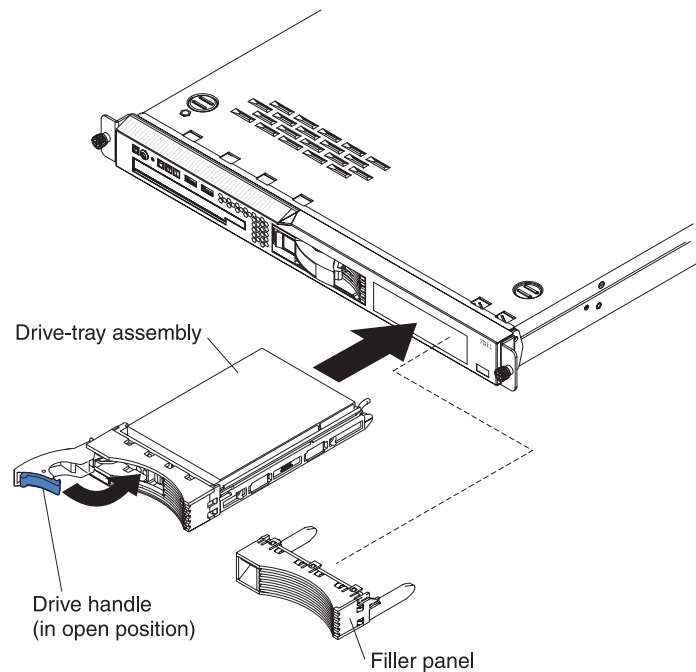
Attention: To avoid damage to the hard disk drive connectors, make sure that the server cover is in place and fully closed whenever you install or remove a hard disk drive.

1. Move the handle on the drive to the open position (perpendicular to the drive).
2. Pull the hot-swap drive assembly from the bay

Installing a hot-swap hard disk drive

To install a hot-swap hard disk drive, complete the following steps.

Note: If you have only one hard disk drive, install it in the left or upper-left drive bay.



Attention: To avoid damage to the hard disk drive connectors, make sure that the server cover is in place and fully closed whenever you install or remove a hard disk drive.

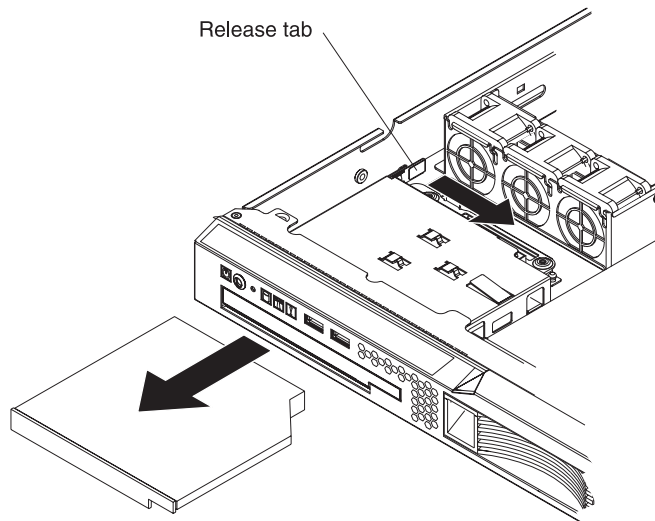
1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Make sure that the server cover is in place and fully closed.

Attention: To maintain proper system cooling, do not operate the server for more than 10 minutes without either a drive or filler panel installed in each bay.

3. Install the hard disk drive in the hot-swap bay:
 - a. Make sure that the tray handle is open (that is, perpendicular to the front of the drive).
 - b. Align the drive assembly with the guide rails in the bay.
 - c. Gently push the drive assembly into the bay until the drive stops.
 - d. Push the tray handle to the closed (locked) position.
 - e. Check the hard disk drive status LED to make sure that the hard disk drive is operating correctly. 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.

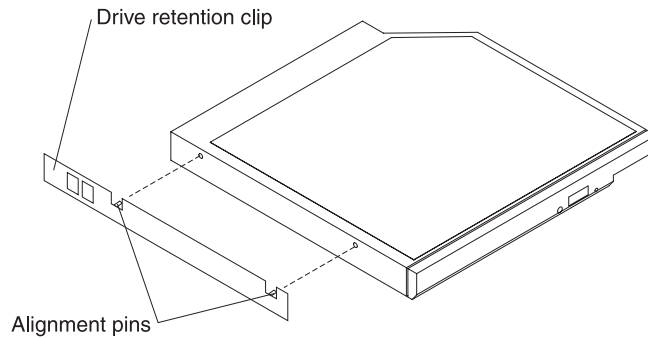
Removing a CD or CD/DVD combination drive

To remove the CD or CD/DVD combination drive, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables. Remove the cover (see “Removing the cover” on page 28).
3. Press the release tab (the rear of the drive-retention clip) toward the drive to release the clip; then, while you press the tab, pull the drive out of the bay.

Note: You might have to push the right-rear corner of the drive toward the front of the server to move the drive initially.

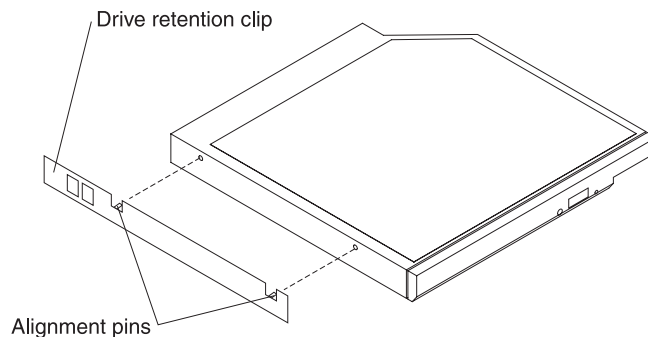


4. Remove the retention clip from the drive and save for future use.
5. If you are instructed to return the CD or CD/DVD drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a CD or CD/DVD combination drive

To install the replacement CD or CD/DVD combination drive, complete the following steps:

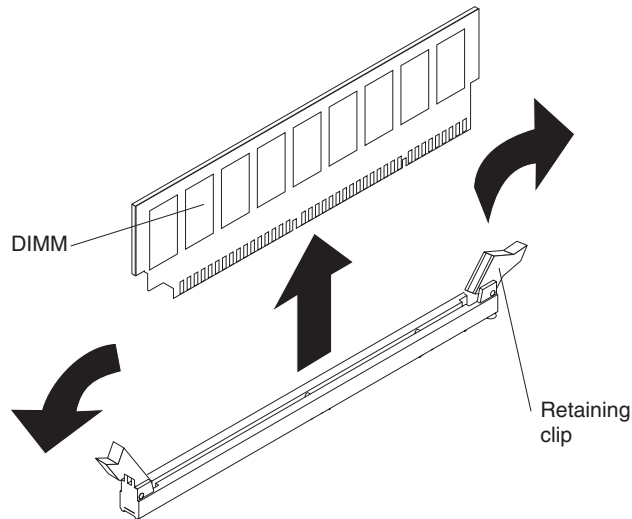
1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables. Remove the cover (see “Removing the cover” on page 28).
3. Follow the instructions that come with the drive to set any jumpers or switches.



4. Attach the drive-retention clip that you removed in “Removing a CD or CD/DVD combination drive” on page 38 to the side of the drive.
5. Slide the drive into the CD/DVD drive bay until the drive clicks into place.
6. Replace the cover (see “Installing the cover” on page 29).
7. Slide the server into the rack.
8. Connect the cables and power cords.
9. Turn on all attached devices and the server.

Removing a memory module (DIMM)

To remove a DIMM, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the cover (see “Removing the cover” on page 28).
Attention: To ensure proper cooling and airflow, do not operate the server for more than 2 minutes with the cover removed.
4. Open the retaining clip on each end of the DIMM connector and remove the DIMM from the connector.
5. If you are instructed to return the DIMM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a memory module (DIMM)

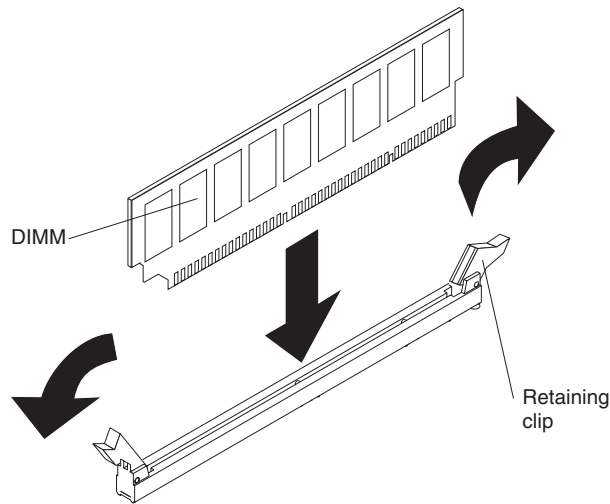
The following notes describe information that you must consider when you install DIMMs:

- The server comes with one 512 MB DIMM installed in DIMM connector 1. Some models come with a second 512 MB DIMM installed in DIMM connector 3. If only one DIMM is installed, when you install an additional DIMM, you must install it in DIMM connector 3, and it must be the same size, speed, type, and technology as the DIMM that is installed in DIMM connector 1. You can mix compatible DIMMs from various manufacturers. The third and fourth DIMMs must be installed as a pair, in DIMM connectors 2 and 4.
- If you install a pair of DIMMs in DIMM connectors 2 and 4, they do not have to be the same size, speed, type, and technology as the DIMMs that are installed in DIMM connectors 1 and 3. However, the size, speed, type, and technology of the DIMMs that you install in DIMM connectors 2 and 4 must match each other.
- If you install a pair of 2 GB DIMMs and a pair of other-size DIMMs, the 2 GB DIMMs must be installed as the first pair (in DIMM connectors 1 and 3).

To install the replacement DIMM, complete the following steps.

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

1. Open the retaining clip on each end of the DIMM connector.
2. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.
3. Turn the DIMM so that the DIMM keys align correctly with the slot.



4. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is seated in the connector. If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.
5. Install the cover (see “Installing the cover” on page 29).
6. Slide the server into the rack.
7. If you disconnected any cables or power cords to replace the DIMM, connect the cables and power cords.
8. Turn on all attached devices and the server.

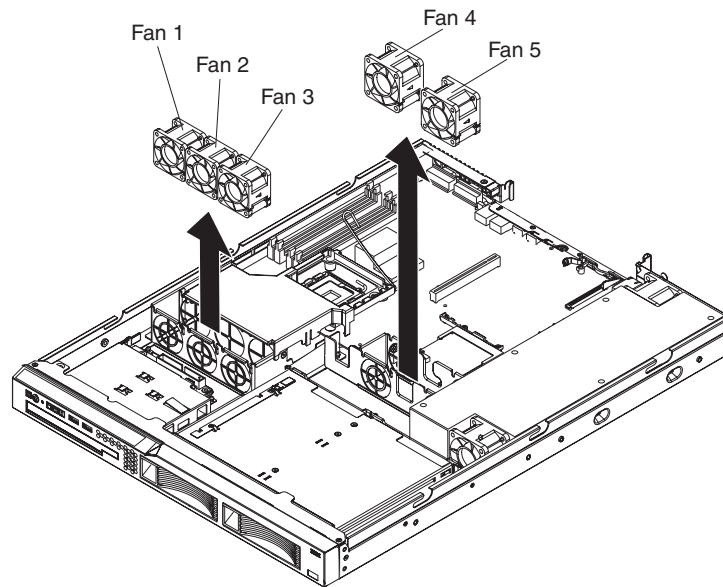
Removing a fan

The server comes with five replaceable fans.

To remove any of the five replaceable fans, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Turn off the server and all peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server from the rack and remove the cover (see “Removing the cover” on page 28).
4. Reconnect the power cord; then, turn on the server.
Attention: For proper cooling and airflow, replace the cover before you turn on the server. Operating the server for extended periods of time (more than 30 minutes) with the cover removed might damage server components.
5. Determine which fan to replace by checking the LEDs on the system board (see “System-board LEDs” on page 9); a lit LED indicates the fan to replace.
6. Turn off the server; then, disconnect the power cord again.

7. Remove the failed fan from the server:
 - a. Disconnect the fan cable from the system board.
 - b. Grasp the top of the fan with your index finger and thumb and lift the fan out of the server.



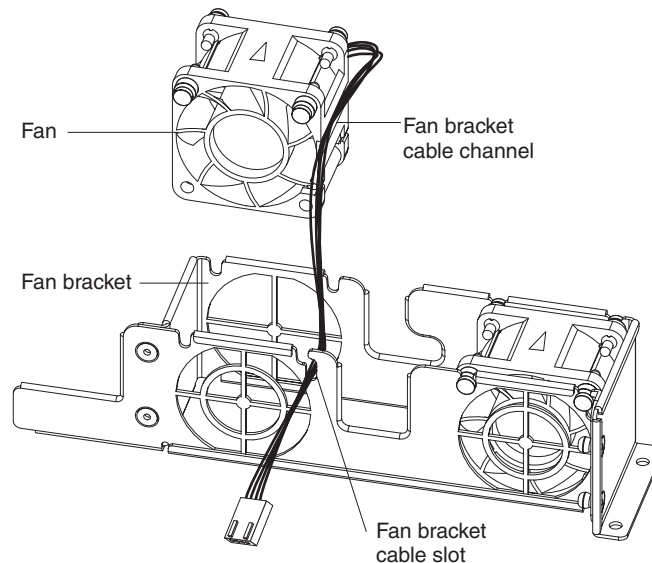
8. If you are instructed to return the fan, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a fan

To install the replacement fan, complete the following steps:

1. Position the replacement fan so that the airflow arrow on the side of the fan points toward the rear of the server.

Note: Correct airflow is from the front to the rear of the server.



2. Install the replacement fan in the bracket:
 - a. Make sure that the fan cable sits in the channel on the side of the fan.

- b. In the location from which you removed the failed fan, route the fan cable into its slot in the fan bracket top.
 - c. Insert the fan into the bracket.
 - d. Make sure that each of the blue soft tabs on the fan is fully seated in its slot in the fan bracket.
3. Connect the replacement fan cable to the system board.
4. Install the cover (see “Installing the cover” on page 29).
5. Slide the server into the rack.
6. Reconnect all external cables and the power cord.
7. Turn on all attached devices and the server.

Removing and replacing Tier 2 CRUs

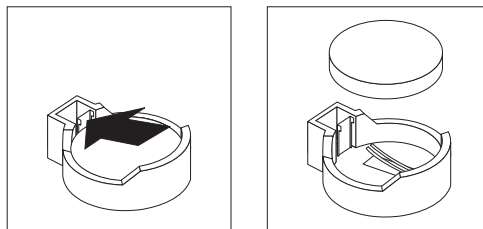
You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.

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

Removing the battery

To remove the battery, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables necessary to replace the device.
3. Remove the cover (see “Removing the cover” on page 28).
4. If necessary, lift the riser-card assembly out of the way (see “Removing the riser-card assembly” on page 49).
5. Remove the battery:
 - a. Use a fingernail to press the top of the battery clip away from the battery. The battery pops up when released.
 - b. Use your thumb and index finger to lift the battery from the socket.



6. Dispose of the battery as required by local ordinances or regulations. See “Battery return program” on page 122 for more information.

Installing the battery

The following notes describe information that you must consider when you replace the battery in the server.

- When replacing the battery, you must replace it with a lithium battery of the same type from the same manufacturer.
- 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 marketing representative or authorized reseller.

- After you replace the battery, you must reconfigure the server and reset the system date and time.
- To avoid possible danger, read and follow the following safety statement.

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.

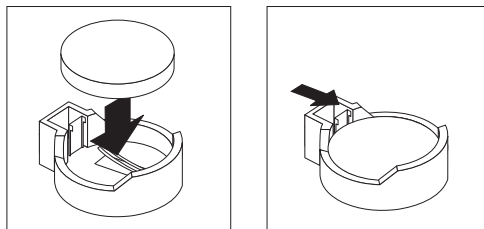
Do not:

- **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.

To install the replacement battery, complete the following steps:

1. Follow any special handling and installation instructions that come with the replacement battery.
2. Insert the new battery:
 - a. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.
 - b. Press the battery down into the socket until it clicks into place. Make sure that the battery clip holds the battery securely.



3. Make sure that the riser-card assembly is fully seated in the connectors on the system board.
4. Install the cover (see “Installing the cover” on page 29).
5. Slide the server into the rack.
6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Note: You must wait approximately 20 seconds after you connect the power cord of the server to an electrical outlet before the power-control button becomes active.

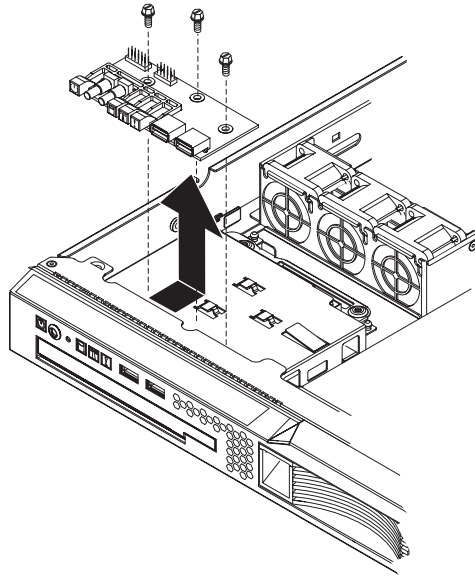
7. Start the Configuration/Setup Utility program and reset the configuration.
 - Set the system date and time.

- Set the power-on password.
- Reconfigure the server.

See “Using the Configuration/Setup Utility program” on page 12 for details.

Removing the operator information panel assembly

To remove the operator information panel assembly, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables necessary to replace the device.
3. Remove the server from the rack and remove the cover (see “Removing the cover” on page 28).
4. Disconnect both cables from the operator information panel board.
5. Remove the screws that secure the operator information panel assembly to the CD/DVD bay housing.
6. Lift the operator information panel assembly out of the server.
7. If you are instructed to return the operator information panel assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the operator information panel assembly

To install the replacement operator information panel assembly, complete the following steps:

1. Guide the operator information panel assembly into position on top of the CD/DVD bay housing. Make sure that the LEDs and the USB connectors are aligned with the openings in the bezel and that the holes in the board align with the screw holes in the top of the bay housing.
2. Use the screws that you removed in step 5 of “Removing the operator information panel assembly” to secure the operator information panel assembly onto the top of the CD/DVD bay housing.
3. Connect the light panel cable and front USB cable to the operator information panel board.

4. Install the cover (see “Installing the cover” on page 29).
5. Slide the server into the rack.
6. Connect the cables and power cords.
7. Turn on all attached devices and the server.

Removing the power supply

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

Statement 8:



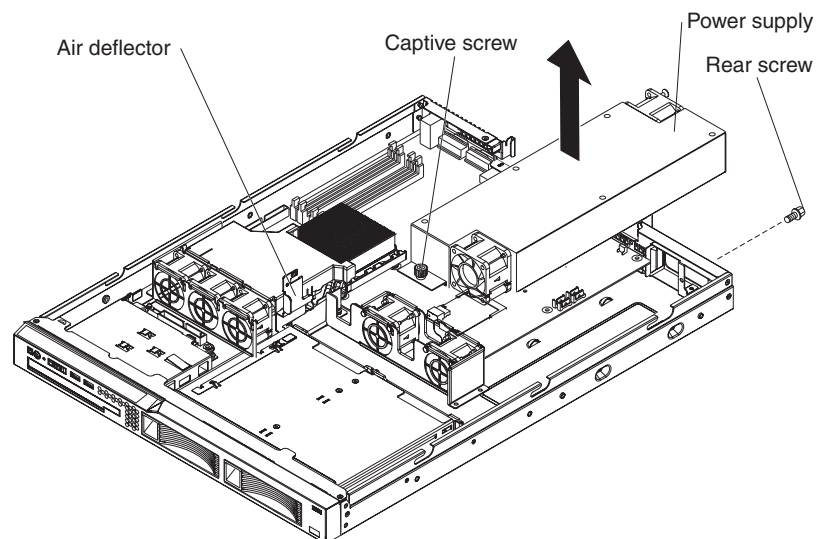
CAUTION:

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.

To remove the power supply, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Disconnect the ac power cord from the connector on the power supply. Disconnect all external cables from the server.

3. Remove the server from the rack and remove the cover (see “Removing the cover” on page 28).

Attention: To ensure proper cooling and airflow, do not operate the server for more than 2 minutes with the cover removed.

4. Rotate (lift) the air deflector out of the way.
5. If the server is a 3.5-inch drive model, remove the hard disk drive back plate or backplane (see “Removing the backplane or back plate (3.5-inch drives)” on page 50).
6. Disconnect the power-supply cables from the connector on the system board and from all devices; then, disengage the cables from any retention-clips that secure them to the chassis.

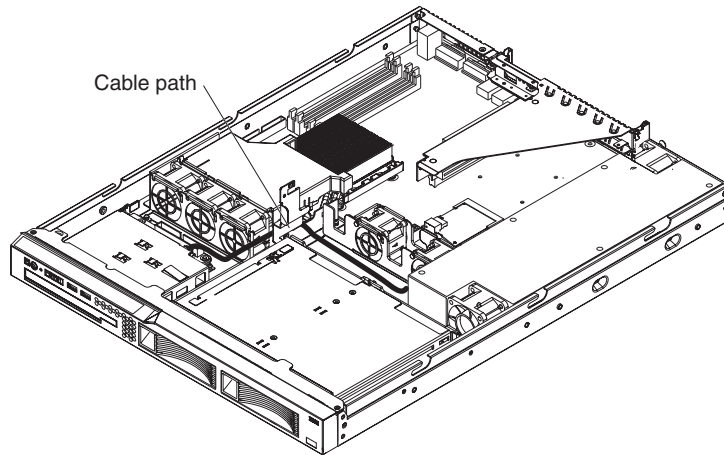
Note: Note the routing of all power-supply cables; you will route the power-supply cables the same way when you install the power supply.

7. Remove the rear screw, which holds the power supply to the rear of the chassis.
8. Loosen the captive thumbscrew at the rear of the power supply that secures the power supply to the chassis bottom.
9. Lift the power supply out of the bay.
10. If you are instructed to return the power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the power supply

To install the replacement power supply, complete the following steps:

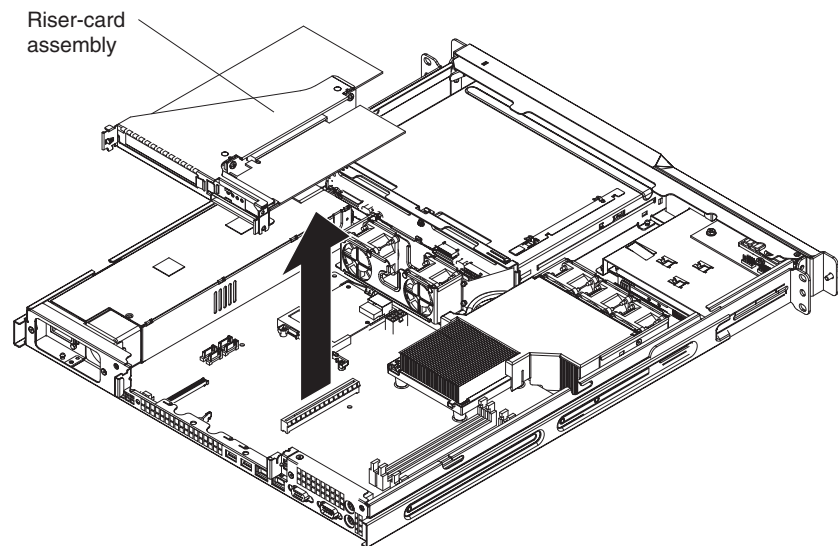
1. Read the safety information in “Working inside the server with the power on” on page 26.
2. Place the new power supply into the bay.
3. Tighten the captive thumbscrew at the rear of the power supply to secure the power supply to the chassis bottom.
4. Replace the rear screw, which holds the power supply to the rear of the chassis (see the illustration on page 46).
5. Make sure that the air deflector is in the open position.
6. Connect the internal power-supply cable from the power supply to the power connector (CN20) on the system board (see “System-board internal connectors” on page 6).
7. Route the other internal power-supply cable, securing it under the retention-clips on the chassis; then, reconnect the cable to the CD/DVD interface card.



8. If the server is a 3.5-inch drive model, replace the hard disk drive back plate or backplane and reconnect all cables (see “Installing the backplane or back plate (3.5-inch drives)” on page 51).
9. Rotate the air deflector into place, making sure that no cables are pinched beneath it, and press it down firmly.
10. Test the power supply:
 - a. Connect one end of the ac power cord for the new power supply into the connector on the back of the power supply, and connect the other end of the power cord into a properly grounded electrical outlet.
 - b. Make sure that the standby power LED on the system board is lit (see “System-board LEDs” on page 9); if the standby power LED is not lit, discontinue this procedure and obtain a new power supply.
 - c. Press the power-control button. Make sure that the power-on LED on the front of the server is lit.

If the server starts, proceed to step 11. If the server does not start, disconnect the ac power cord and call for service.
11. Turn off the server and disconnect the ac power cord.
12. Install the cover (see “Installing the cover” on page 29).
13. Slide the server into the rack.
14. Reconnect the ac power cord into the connector on the back of the power supply.
15. Connect all external cables that you disconnected in step 2 on page 46.
16. Connect the other end of the ac power cord into a properly grounded electrical outlet.
17. Press the power-control button.
18. Make sure that the power-on LED on the front of the server is lit.

Removing the riser-card assembly

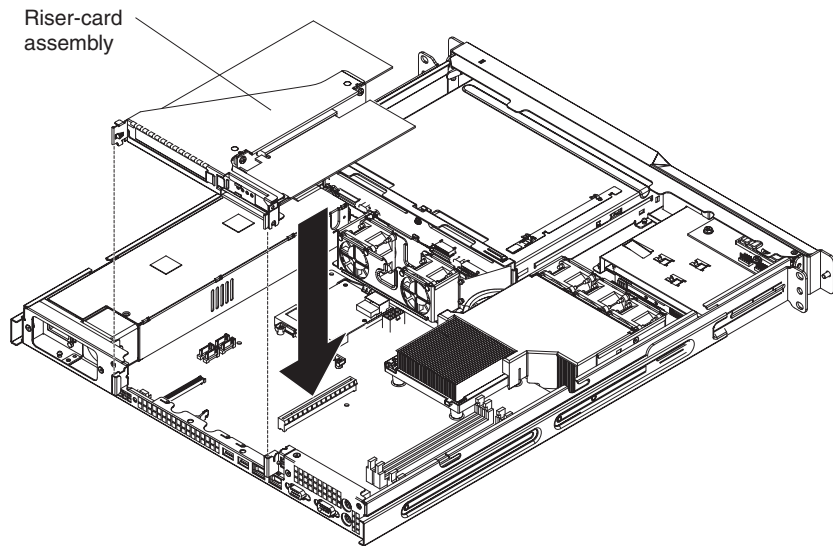


To remove the riser-card assembly, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the server from the rack and place it on a flat, static-protective surface.
4. Remove the cover (see “Removing the cover” on page 28).
5. Disconnect any cables from the adapters in the riser-card assembly.
6. Grasp the riser-card assembly at the rear edge and lift to remove it from the server. Place the riser-card assembly on a flat, static-protective surface.
7. If you are instructed to return the riser-card assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the riser-card assembly

The server comes with one riser-card assembly that contains two PCI Express connectors.



To install the riser-card assembly, complete the following steps:

1. Install the adapters in the riser-card assembly.

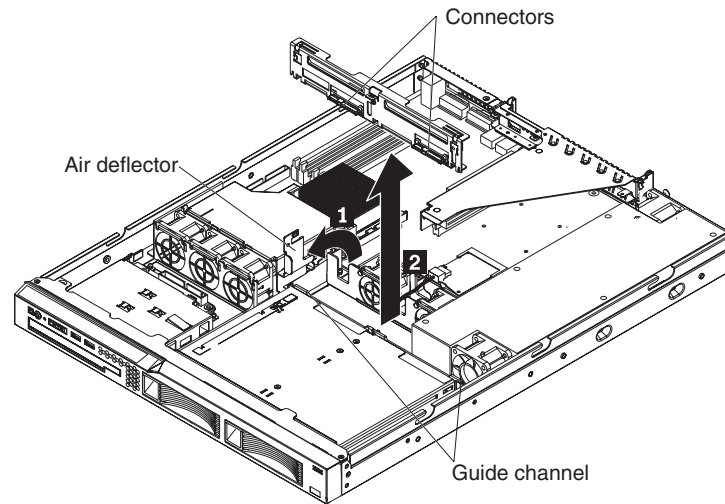
Note: Because of mechanical interference, if you have installed a Remote Supervisor Adapter II SlimLine in the server, you cannot install an adapter in expansion slot 1 on the riser-card assembly.

2. Reconnect any adapter cables that you disconnected when you removed the riser-card assembly.
3. Carefully align the riser-card assembly with the guides on the rear of the server and with the riser-card connectors on the system board; then, press down on the assembly. Make sure that the riser-card assembly is fully seated in the riser-card connectors on the system board.
4. Install the cover (see "Installing the cover" on page 29).
5. Slide the server into the rack.
6. Connect the cables and power cords.
7. Turn on all attached devices and the server.

Removing the backplane or back plate (3.5-inch drives)

To remove the Serial Attached SCSI (SAS) backplane, which is also referred to as the hot-swap SAS/SATA backplane, or to remove the simple-swap SATA back plate, complete the following steps.

Note: The following illustration shows removing the hot-swap SAS/SATA backplane.

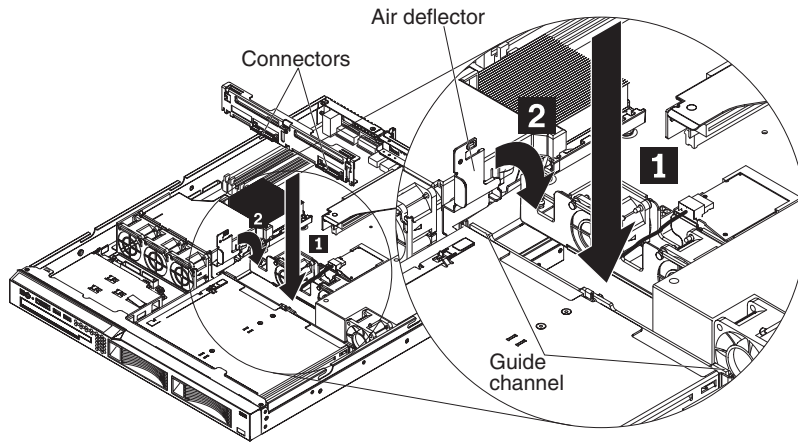


1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables necessary to replace the device.
3. Remove the server from the rack and place it on a flat, static-protective surface.
4. Pull the hard disk drives out of the server slightly to disengage them from the backplane or back plate.
5. Remove the cover (see “Removing the cover” on page 28).
6. Disconnect the backplane or back plate cables:
 - If the server is a hot-swap model, or you have installed an optional SATA RAID kit, disconnect the SAS/SATA controller cable from the backplane or back plate.
 - If the server is a simple-swap model, disconnect the SATA cables from the system board.
7. Rotate (lift) the air deflector out of the way.
8. Lift the backplane or back plate out of the server slightly; then, disconnect the power cable and remove the backplane or back plate.
9. If you are instructed to return the backplane or back plate, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the backplane or back plate (3.5-inch drives)

To install the replacement 3.5-inch hot-swap drives backplane or simple-swap SATA drives back plate, complete the following steps.

Note: The following illustration shows installing the hot-swap SAS/SATA backplane.

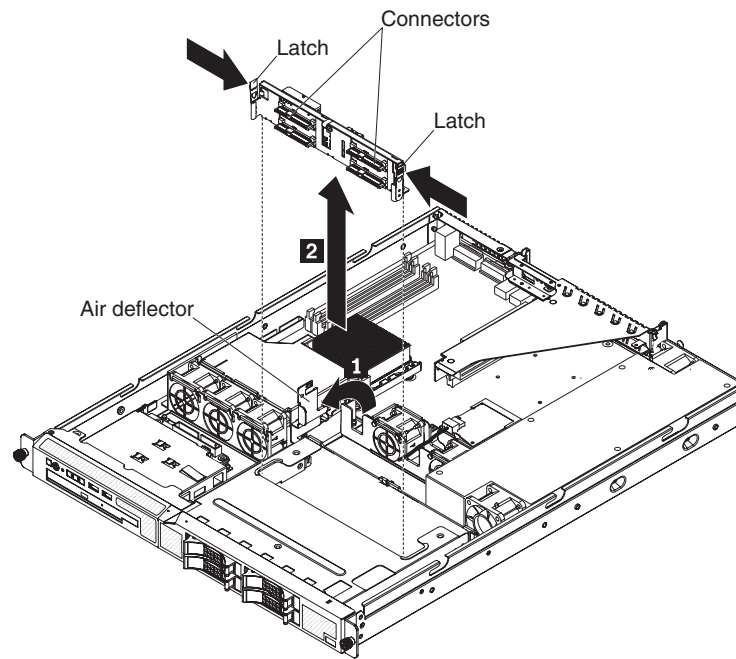


1. Make sure that the air deflector is in the open position.
2. Connect the power cable to the replacement backplane or back plate.
3. Slide the backplane or back plate into the card guides, making sure that any nearby wires or cables are not trapped or pinched.
4. Press firmly until the backplane or back plate is fully seated.
5. Rotate the air deflector into place, making sure that no cables are pinched beneath it, and press it down firmly.
6. Reconnect the backplane or back plate cables.
 - If the server is a hot-swap model, reconnect the SAS/SATA controller cable to the backplane.
 - If the server is a simple-swap model, reconnect the SATA cables to the system board. See “System-board internal connectors” on page 6 for the location of the SATA connectors on the system board.

Note: Make sure that the cable drive number on the back plate matches the connector number on the system board.

7. Install the cover (see “Installing the cover” on page 29).
8. Replace the hard disk drives.
9. Slide the server into the rack.
10. Connect the cables and power cords.
11. Turn on all attached devices and the server.

Removing the SAS backplane (2.5-inch drives)

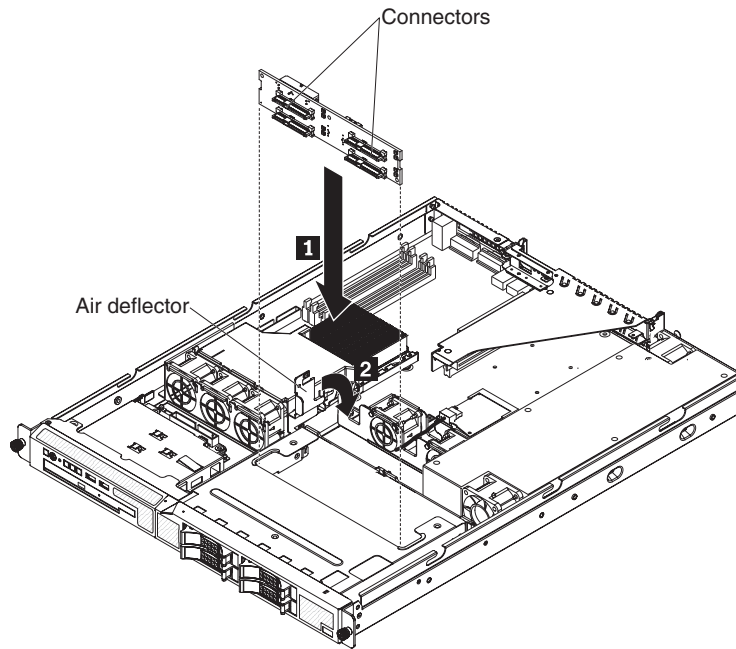


To remove the 2.5-inch drives backplane, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables that are necessary to replace the device.
3. Remove the server from the rack and place it on a flat, static-protective surface.
4. Pull the hard disk drives out of the server slightly to disengage them from the backplane.
5. Remove the cover (see “Removing the cover” on page 28).
6. Disconnect the backplane cables:
 - Disconnect the SAS/SATA controller cable from the backplane.
 - Disconnect the power cable from the backplane.
7. Press the backplane latches toward each other; then, while you press the latches, lift the backplane out of the server.
8. If you are instructed to return the backplane or back plate, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

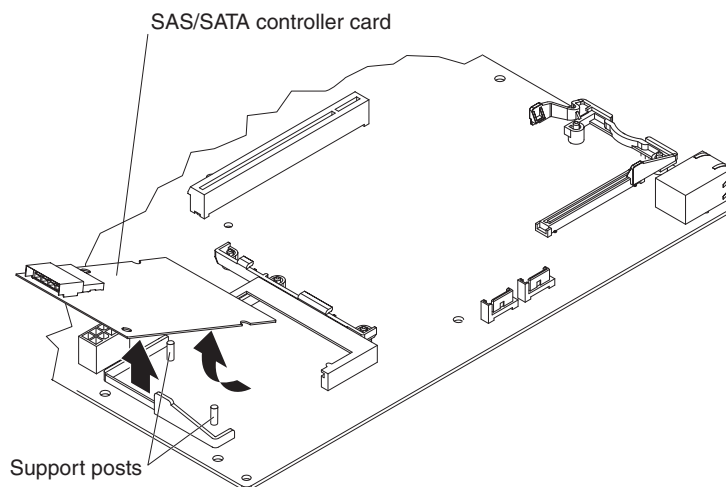
Installing the SAS backplane (2.5-inch drives)

To install the replacement 2.5-inch hot-swap drives backplane, complete the following steps.



1. Make sure that the 2.5-inch drive cage is fully installed in the server (see “Installing a drive cage” on page 59).
2. Connect the power cable to the replacement backplane.
3. Slide the backplane into the card guides, making sure that any nearby wires or cables are not trapped or pinched.
4. Press firmly until the backplane is fully seated and clicks into place.
5. Reconnect the backplane cables.
6. Install the cover (see “Installing the cover” on page 29).
7. Replace the hard disk drives.
8. Slide the server into the rack.
9. Connect the cables and power cords.
10. Turn on all attached devices and the server.

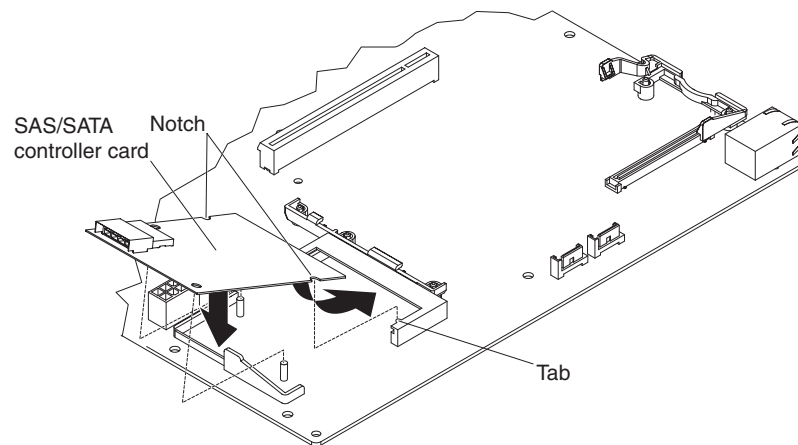
Removing the SAS/SATA controller (hot-swap models)



To remove the SAS/SATA controller from the system board, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server from the rack; then, remove the cover (see “Removing the cover” on page 28).
4. Disconnect the cable from the SAS/SATA controller.
5. Grasp the edges of the SAS/SATA controller.
6. Pinch the top of each of the two plastic alignment pins while you gently lift the controller, until the alignment pins release the controller.
7. Gently pull the controller toward the front of the server slightly; then, lift the controller off the system board.
8. If you are instructed to return the SAS/SATA controller, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the SAS/SATA controller (hot-swap models)



To replace the SAS/SATA controller on the system board, complete the following steps:

1. Grasp the edges of the SAS/SATA controller.
2. Gently insert the controller card into the SAS/SATA controller card connector on the system board (see the illustration on page 6 for the location of the connector) while you align the holes in the card with the two plastic alignment pins on the system board.
3. Press the controller card firmly onto the alignment pins until the card clicks into place. Make sure that the top of each alignment pin has expanded to hold the controller card securely in place.
4. Push the controller card toward the rear of the server, fully into the connector, until the side tabs on the connector rest in the side notches of the controller card.
5. Connect the cable from the hard disk drive backplane to the SAS/SATA controller.
6. Install the riser-card assembly (see “Installing the riser-card assembly” on page 49).

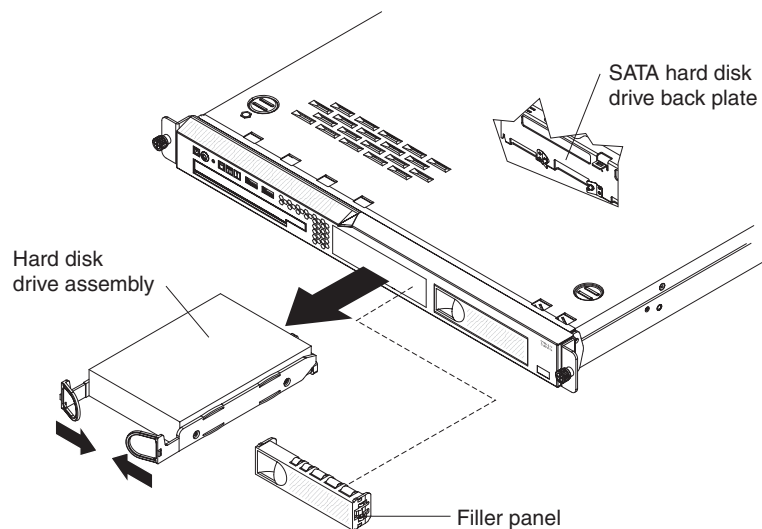
7. Install the cover (see “Installing the cover” on page 29).
8. Slide the server into the rack.
9. Connect the cables and power cords.
10. Turn on all attached devices and the server.

Removing a SATA RAID back plate

If a SATA RAID kit was installed in the server, the cables in the SATA back plate attach to a SAS/SATA controller.

To remove the SATA RAID back plate, complete the following steps:

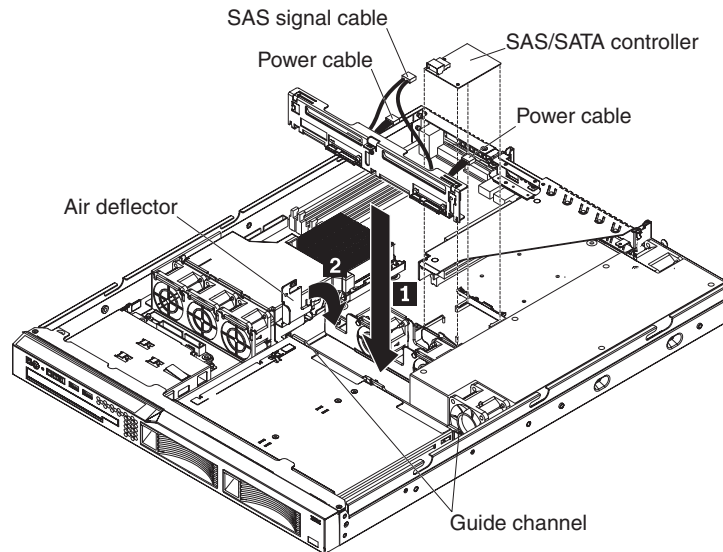
1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the server from the rack and place it on a flat, static-protective surface.
4. Remove the cover (see “Removing the cover” on page 28).



5. Pull the hard disk drives out of the server slightly to disengage them from the backplane or remove the drives completely (see “Removing a simple-swap Serial ATA hard disk drive” on page 35).
6. Disconnect the SAS signal cable from the SAS/SATA controller.
7. Remove the SATA RAID back plate from the server:
 - a. Rotate (lift) the air deflector out of the way.
 - b. Lift the back plate out of the server slightly; then, disconnect the power cables and remove the back plate.

Installing a SATA RAID back plate

If a SATA RAID kit was installed in the server, the cables in the SATA back plate attach to a SAS/SATA controller.

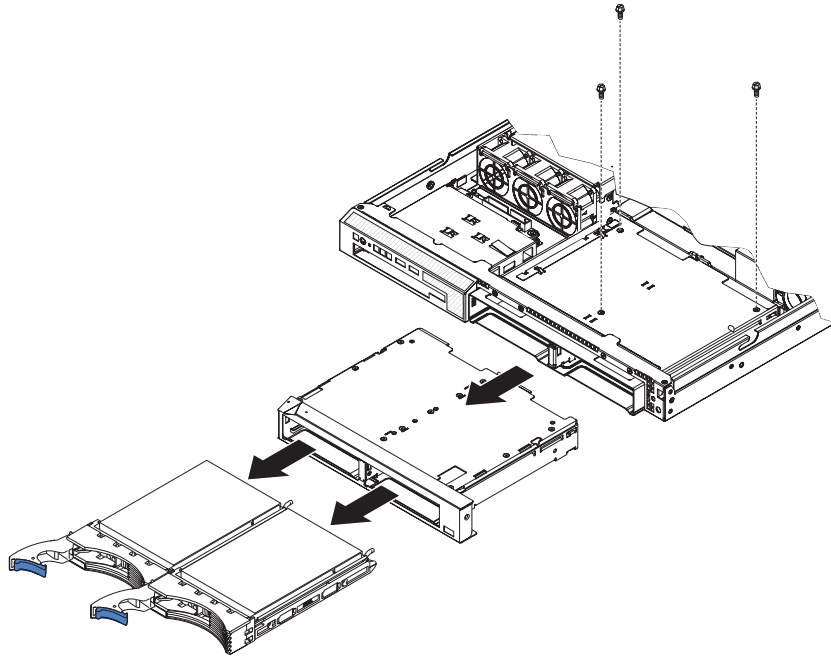


To install the SATA RAID back plate, complete the following steps:

1. Install the back plate:
 - a. Make sure that the air deflector is in the open position.
 - b. Connect the power supply cables to the power cables on the SATA RAID kit back plate.
 - c. Slide the back plate into the card guides, making sure that any nearby wires or cables are not trapped or pinched.
 - d. Press firmly until the back plate is fully seated.
 - e. Rotate the air deflector into place, making certain that no cables are pinched beneath it, and press it down firmly.
 - f. Connect the back plate cable to the signal connector on the SAS/SATA controller.
2. Connect the cable from the back plate to the signal connector on the SAS/SATA controller.
3. Install the cover (see "Installing the cover" on page 29).
4. Insert the hard disk drives that you removed in "Removing a SATA RAID back plate" on page 56 fully into the bays (see "Installing a simple-swap Serial ATA hard disk drive" on page 35).
5. Slide the server into the rack.
6. Connect the cables and power cords.
7. Turn on all attached devices and the server.

Removing a drive cage

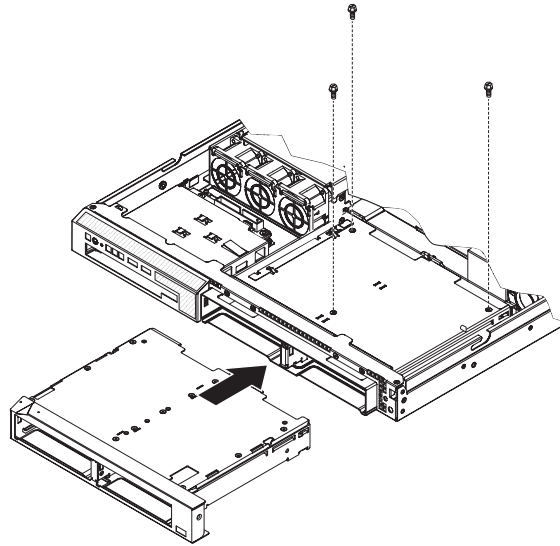
To remove a drive cage, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
 2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
 3. Remove the hard disk drives from the cage.
 4. Remove the cover (see “Removing the cover” on page 28).
- Attention:** To ensure proper cooling and airflow, do not operate the server for more than 2 minutes with the cover removed.
5. Remove the hard disk drive backplane or back plate:
 - **2.5-inch drive models:** Remove the hard disk drive backplane from the cage. See “Removing the SAS backplane (2.5-inch drives)” on page 53 for instructions.
 - **3.5-inch drive models:** You might find it easier to remove the cage if you remove the hard disk drive backplane or back plate first. See “Removing the backplane or back plate (3.5-inch drives)” on page 50 for instructions.
 6. Remove the screws that hold the drive cage in place.
 7. Slide the drive cage forward and remove it from the server.
 8. If you are instructed to return the drive cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a drive cage

To install a drive cage, complete the following steps.



1. If the server is a 2.5-inch drive model, make sure that the 2.5-inch backplane is removed from the drive cage. (See “Removing the SAS backplane (2.5-inch drives)” on page 53 for instructions.)
2. Line up the drive cage with the drive bays on the front of the server.
3. Push the drive cage into the server until it stops.
4. Align the holes in the top of the drive cage with the holes in the top of the chassis; then, insert the screws that secure the drive cage to the chassis.
5. If the server is a 2.5-inch drive model, install the SAS backplane. (See “Installing the SAS backplane (2.5-inch drives)” on page 53 for instructions.)
6. Install the cover (see “Installing the cover” on page 29).
7. Install the hard disk drives.
8. Install the server in the rack.
9. Connect the cables and power cords.
10. Turn on all attached devices and the server.

Removing and replacing FRUs

FRUs must be installed only by trained service technicians.

The illustrations in this document might differ slightly from the hardware.

Microprocessor

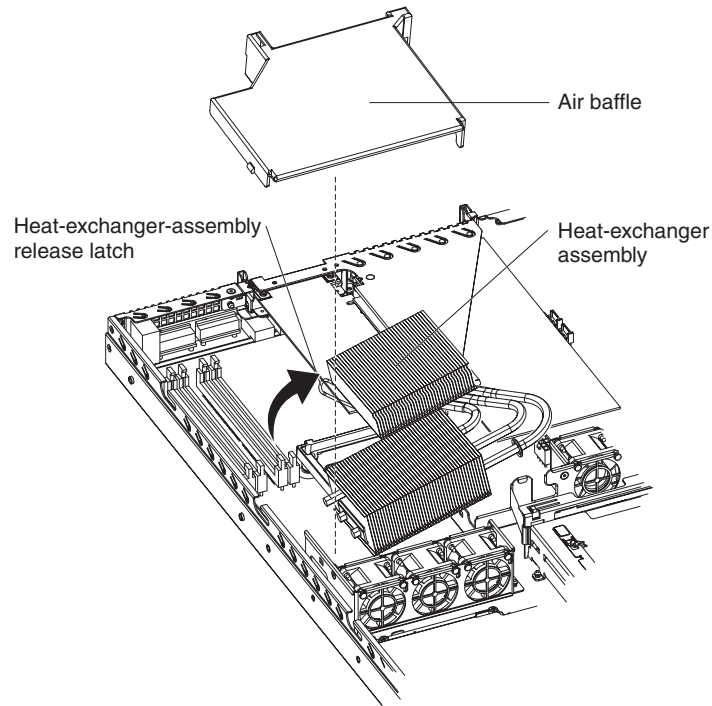
The following notes describe the type of microprocessor that the server supports and other information that you must consider when you install a microprocessor:

- The server supports one Intel land grid array (LGA) 775-land dual-core microprocessor. The type, speed, and L2 cache of the microprocessor depends on the server model.
- Read the documentation that comes with the microprocessor to determine whether you have to update the BIOS code. To download the most current level of BIOS code, go to <http://www.ibm.com/servers/eserver/support/xseries/index.html>.
- The microprocessor uses an integrated voltage regulator on the system board.

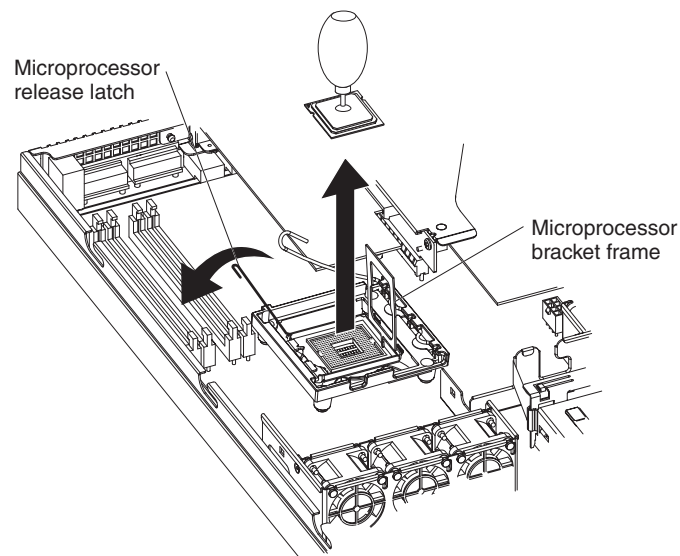
Removing the microprocessor

To remove the microprocessor, complete the following steps.

1. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables necessary to replace the device.
3. Remove the server from the rack; then, remove the cover (see “Removing the cover” on page 28).



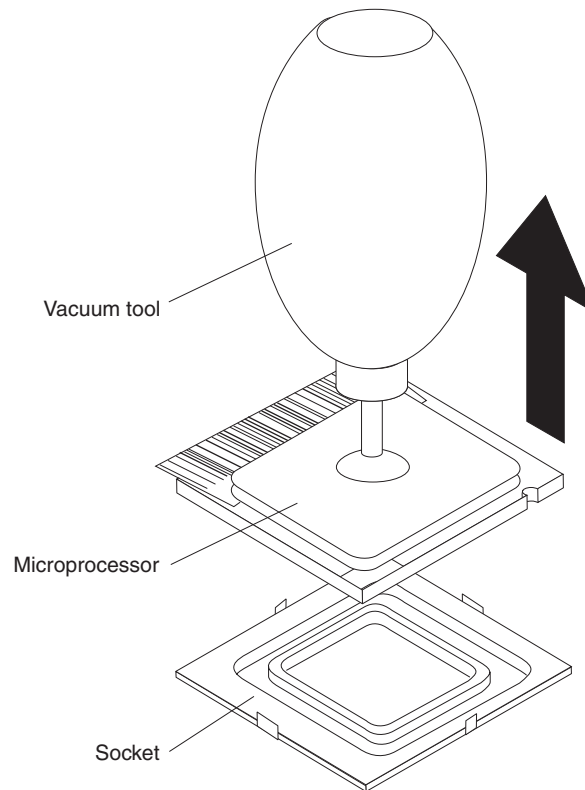
4. Remove the air baffle.
5. Open the heat-exchanger-assembly release latch to the fully open position.
6. Lift the side of the heat-exchanger assembly that is closer to the middle of the server, slide it toward the middle of the server slightly, and lift the entire assembly out of the server.



7. Open the microprocessor release latch to the fully open position.
8. Open the microprocessor bracket frame.

Attention: Use the vacuum tool that comes with the replacement part to remove the microprocessor. Dropping the microprocessor during removal can damage the contacts. Also, contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.

9. Remove the microprocessor.

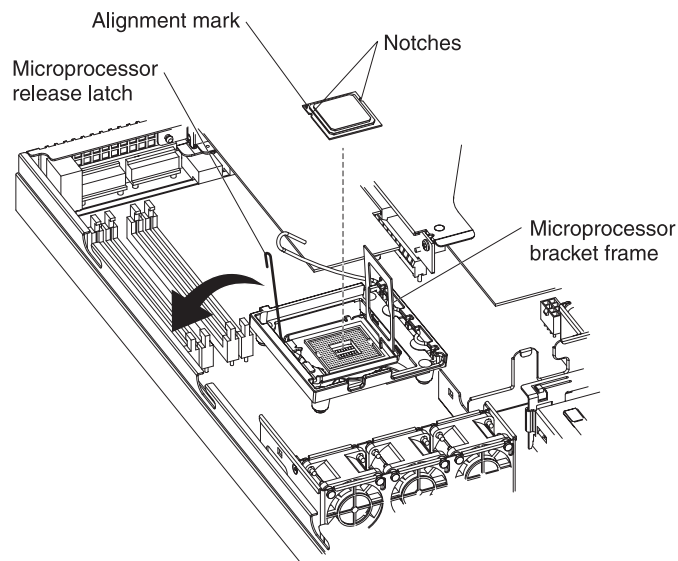


- a. Squeeze and hold the bladder of the tool; then, place the suction cup on the microprocessor and release the bladder.
 - b. Using the tool, carefully lift the microprocessor straight up and out of the socket, and place it on a static-protective surface.
 - c. Squeeze the bladder of the tool to release the microprocessor from the suction cup.
10. If you are instructed to return the microprocessor, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the microprocessor

To install the replacement microprocessor, complete the following steps:

1. Make sure that the microprocessor bracket frame and release latch are both fully open.

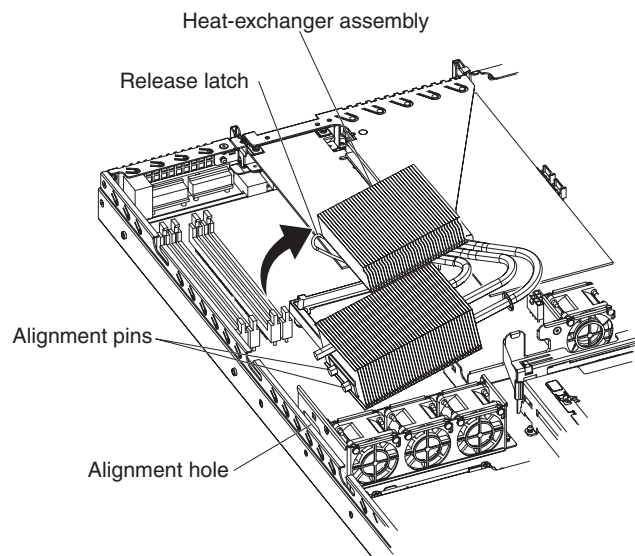


Attention: The microprocessor contacts are fragile; handle the microprocessor very carefully. You can use the vacuum tool to install the microprocessor.

2. Align the microprocessor with the socket (note the alignment mark and the position of the notches); then, carefully place the microprocessor on the socket, close the microprocessor bracket frame, and close the microprocessor release latch.

Note: The microprocessor fits only one way on the socket.

3. If you are installing a new heat-exchanger assembly, peel off the protective backing from the thermal material that is on the underside of the new heat exchanger. If you are reinstalling a heat-exchanger assembly that was previously removed, see "Thermal grease" on page 63 for instructions for replacing the contaminated or missing thermal grease; then, continue with step 4 of this procedure.
4. Make sure that the heat-exchanger assembly release latch is fully opened.



5. With the heat-exchanger assembly at an angle as shown in the illustration, carefully align the heat-exchanger assembly with the microprocessor and the heat exchanger bracket on the system board. Make sure that the alignment pins (the two heat-exchanger nibs that are closer to the microprocessor) protrude through the alignment hole (the opening in the side of the heat exchanger socket) and that the flange of the heat sink rests under the lip of the heat-sink socket.
6. Gently press the assembly into place.
7. Close the heat-exchanger-assembly release latch, catching it under the hook on the socket.
8. Replace the air baffle.
9. Install the cover (see “Installing the cover” on page 29).
10. Slide the server into the rack.
11. Connect the cables and power cords.
12. Turn on all attached devices and the server.

Thermal grease

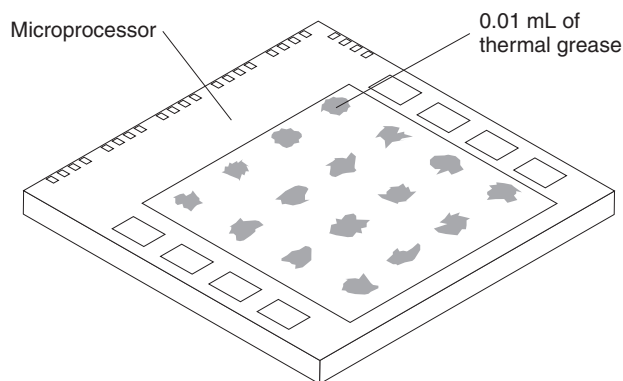
The thermal grease must be replaced whenever the heat exchanger has been removed from the top of the microprocessor and is going to be reused or when debris is found in the grease.

To replace damaged or contaminated thermal grease on the microprocessor and heat exchanger, complete the following steps:

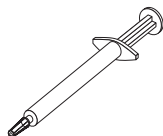
1. Place the heat-exchanger assembly on a clean work surface.
2. Remove the cleaning pad from its package and unfold it completely.
3. Use the cleaning pad to wipe the thermal grease from the bottom of the heat exchanger.

Note: Make sure that all of the thermal grease is removed.

4. Use a clean area of the cleaning pad to wipe the thermal grease from the microprocessor; then, dispose of the cleaning pad after all of the thermal grease is removed.



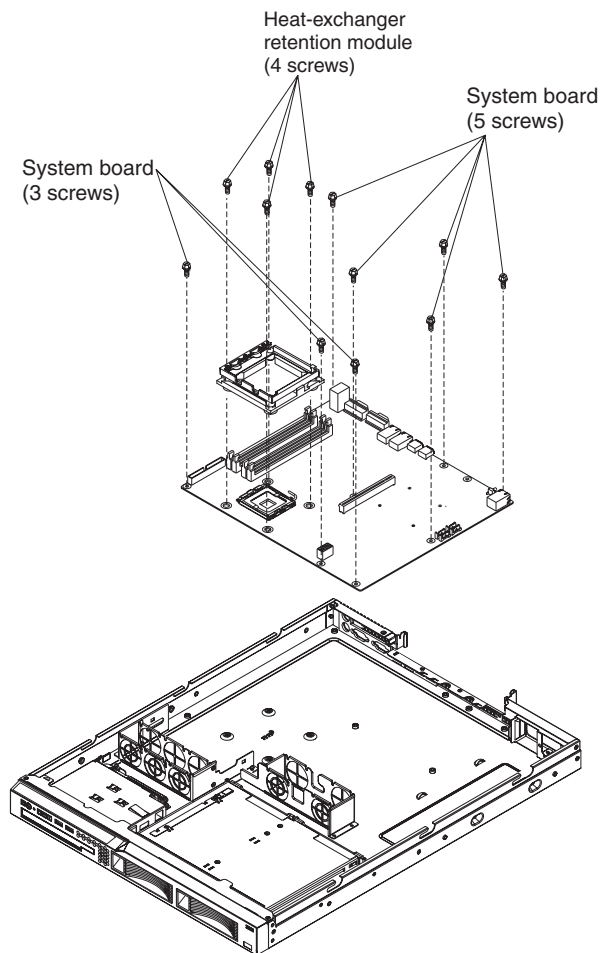
5. Use the thermal-grease syringe to place 16 uniformly spaced dots of 0.01 mL each on the top of the microprocessor.



Note: 0.01mL is one tick mark on the syringe. If the grease is properly applied, approximately half (0.22 mL) of the grease will remain in the syringe.

6. Install the heat exchanger onto the microprocessor as described in “Installing the microprocessor” on page 61.

Removing the system board



To remove the system board, complete the following steps:

1. Read the safety information that begins on page vii, and “Installation guidelines” on page 25.
2. Turn off the server, and disconnect all power cords and external cables; then, remove the server cover (see “Removing the cover” on page 28).
3. Remove the riser-card assembly with adapters, and place them on a static-protective surface for reinstallation (see “Removing an adapter” on page 30).
4. Remove the SAS/SATA controller if one is installed (see “Removing the SAS/SATA controller (hot-swap models)” on page 54) and place it on a static-protective surface for reinstallation.
5. Remove all DIMMs, and place them on a static-protective surface for reinstallation (see “Removing a memory module (DIMM)” on page 40).
6. Disconnect all cables from the system board.

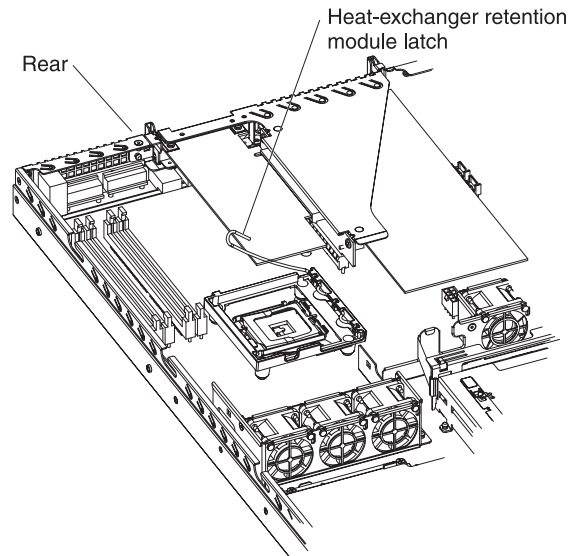
7. Remove the microprocessor heat-exchanger assembly and microprocessor; then, place them on a static-protective surface for reinstallation (see “Removing the microprocessor” on page 60).
8. Note the orientation of the microprocessor retention module.
9. Remove the four screws that hold the microprocessor retention module to the system board; then, lift the retention module out of the server.
10. Remove the remaining eight screws that secure the system board to the chassis, and put the screws in a safe place.
11. Lift the system board out of the server.

Installing the system board

Note: When you reassemble the components in the server, be sure to route all cables carefully so that they are not exposed to excessive pressure.

To reinstall the system board, complete the following steps:

1. Align the system board with the chassis, and replace the eight screws that you removed in step 10 of “Removing the system board” on page 64.



2. Orient the microprocessor retention module as shown in the illustration.
3. Replace the microprocessor retention module. Secure it with the four screws that you removed in step 9 of “Removing the system board” on page 64.
4. Replace the microprocessor and microprocessor heat-exchanger assembly (see “Installing the microprocessor” on page 61).
5. Reconnect to the system board the cables that you disconnected in step 6 of “Removing the system board” on page 64.
6. Replace the SAS/SATA controller if you removed one (see “Installing the SAS/SATA controller (hot-swap models)” on page 55).
7. Replace the DIMMs (see “Installing a memory module (DIMM)” on page 40).
8. Replace the riser-card assembly and adapters.
9. Replace the server cover (see “Installing the cover” on page 29).
10. Slide the server into the rack.
11. Connect all external cables and the power cord; then, turn on the server.

Important: Perform the following updates:

- Either update the server with the latest SAS/SATA or SATA firmware or restore the pre-existing firmware from a diskette or CD image.
- Update the DMI/SMBIOS (see “Updating the DMI/SMBIOS data” on page 14).

Chapter 5. Diagnostics

This chapter describes the diagnostic tools that are available to help you solve problems that might occur in the server.

If you cannot diagnose and correct a problem by using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 117 for more information.

Diagnostic tools

The following tools are available to help you diagnose and solve hardware-related problems:

- **POST beep codes, error messages, and error logs**

The power-on self-test (POST) generates beep codes and messages to indicate successful test completion or the detection of a problem. See “POST” for more information.

- **Troubleshooting tables**

These tables list problem symptoms and actions to correct the problems. See “Troubleshooting tables” on page 81.

- **System-board LEDs**

Use the system-board LEDs to diagnose system errors quickly. See “System-board LEDs” on page 92 for more information.

- **Diagnostic programs, messages, and error messages**

The diagnostic programs are the primary method of testing the major components of the server. The diagnostic programs are on the *IBM Enhanced Diagnostics* CD. See “Diagnostic programs, messages, and error codes” on page 94 for more information.

POST

When you turn on the server, it performs a series of tests to check the operation of the server components and some optional devices in the server. This series of tests is called the power-on self-test, or POST.

If a power-on password is set, you must type the password and press Enter, when you are prompted, for POST to run.

The power-on self-test beep codes indicate the detection of a problem.

- One beep indicates successful completion of POST, with no errors.
- More than one beep indicates that POST detected a problem. Error messages also are displayed during startup if POST detects a hardware-configuration problem. See “POST beep codes” and “POST error codes” on page 71 for more information.

POST beep codes

A beep code is a combination of short or long beeps or series of short beeps that are separated by pauses. For example, a “1-2-3” beep code is one short beep, a pause, two short beeps, and pause, and three short beeps. A beep code indicates that POST has detected a problem.

A single problem might cause more than one error message. When this occurs, correct the cause of the first error message. The other error messages usually will not occur the next time POST runs.

Exception: If there are multiple error codes or diagnostics LEDs that indicate a microprocessor error, the error might be in the microprocessor or in the microprocessor socket. See “Microprocessor problems” on page 85 for information about diagnosing microprocessor problems.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Beep code	Description	Action
1-1-3	CMOS write/read test failed.	<ol style="list-style-type: none"> 1. Reseat the battery. 2. Clear CMOS, see “System-board switches and jumpers” on page 7. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board
1-1-4	BIOS EEPROM checksum failed.	(Trained service technician only) Replace the system board.
1-2-1	Programmable interval timer failed.	(Trained service technician only) Replace the system board.
1-2-2	DMA initialization failed.	(Trained service technician only) Replace the system board.
1-2-3	DMA page register write/read failed.	(Trained service technician only) Replace the system board.
1-2-4	RAM refresh verification failed.	<ol style="list-style-type: none"> 1. Reseat the DIMMs. 2. Replace the following components, one at a time, in the order shown: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) System board

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Beep code	Description	Action
1-3-1	First 64K RAM test failed.	<ol style="list-style-type: none"> 1. Reseat the DIMMs. 2. Replace the lowest-numbered pair of DIMMs with an identical known good pair of DIMMs; then, restart the server. If the beep code error remains, go to 3b. Return one DIMM at a time from the failed pair to its connector, restarting the server after each DIMM, to identify the failed DIMM. 3. Replace the following components, one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) System board
2-1-1	Secondary DMA register failed.	(Trained service technician only) Replace the system board.
2-1-2	Primary DMA register failed.	(Trained service technician only) Replace the system board.
2-1-3	Primary interrupt mask register failed.	(Trained service technician only) Replace the system board.
2-1-4	Secondary interrupt mask register failed.	(Trained service technician only) Replace the system board.
3-3-3	No operational memory in system.	<ol style="list-style-type: none"> 1. Make sure that the server contains the correct number of DIMMs, in the correct order; install or reseat DIMMs; then, restart the server. Important: In some memory configurations, the 3-3-3 beep code might sound during POST, followed by a blank monitor screen. If this occurs and the Boot Fail Count option in the Start Options of the Configuration/Setup Utility program is enabled, you must restart the server three times to reset the configuration settings to the default configuration (the memory connector or bank of connectors enabled). 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) System board

Error logs

The server generates up to three error logs:

- The POST error log contains the three most recent error codes that were generated during POST.
- The system-event/error log contains the complete log of POST error messages since the last time you cleared the log. If an optional Remote Supervisor Adapter II SlimLine is installed, the system-event/error log also contains system error messages from the Remote Supervisor Adapter II SlimLine.
- The system-event log contains messages that were generated by the mini-BMC for monitored events, such as a threshold that is reached or a device that fails.

The system-event/error log and the system-event log are limited in size. When the system-event/error log is full, new entries overwrite older entries. When the system-event log is full, new entries will not overwrite existing entries; therefore, you must periodically clear the log through the Configuration/Setup Utility program (the menu choices are described in the *User's Guide*). When you are troubleshooting an error, be sure to clear the system-event/error log and the system-event log so that you can find current errors more easily.

Important: After you complete a repair or correct an error, clear the system-event log to turn off the system-error LED on the front of the server.

Entries that are written to the system-event/error log and system-event log during the early phase of POST show an incorrect date and time as the default time stamp; however, the date and time are corrected as POST continues.

Each log entry is displayed on its own page. To move from one entry to the next, use the Up Arrow and Down Arrow keys.

You can view the contents of the POST error log, the system-event log, and the system-event/error log from the Configuration/Setup Utility program.

When you are troubleshooting PCI Express slots, note that the error logs report the PCI Express buses numerically. The numerical assignments vary depending on the configuration. You can check the assignments by running the Configuration/Setup Utility program (see the *User's Guide* for more information).

Viewing error logs from the Configuration/Setup Utility program

For complete information about using the Configuration/Setup Utility program, see the *User's Guide*.

To view the error logs, complete the following steps:

1. Turn on the server.
2. When the prompt Press F1 for Configuration/Setup is displayed, press F1. If you have set both a power-on password and an administrator password, you must type the administrator password to view the error logs.
3. Use one of the following procedures:
 - To view the POST error log, select **Error Logs**, and then select **POST Error Log**.
 - To view the system-event/error log, select **Error Logs**, and then select **System Event/Error Log**.
 - To view the system-event log, select **Advanced Setup**, select **IPMI**, and then select **System Event Log**.

Clearing the error logs

For complete information about using the Configuration/Setup Utility program, see the *User's Guide*.

To clear the error logs, complete the following steps:

1. Turn on the server.
2. When the prompt Press F1 for Configuration/Setup is displayed, press F1. If you have set both a power-on password and an administrator password, you must type the administrator password to view the error logs.
3. Use one of the following procedures:
 - a. To clear the BMC system-event log, select **Advanced Setup --> IPMI**. Set **Clear System Event Log** to **Enabled**; then, press Esc. The log will be cleared at the next system startup, which occurs when you save the settings and exit the Configuration/Setup Utility program.
 - b. To clear the system-event/error log, select **Error logs**, and then select **System Event/Error Log**. When any log entry is displayed, press Enter (**Clear event/error logs** is highlighted on each entry page).

Note: The POST error log is automatically cleared with each system restart.

POST error codes

The following table describes the POST error codes and suggested actions to correct the detected problems.

<ul style="list-style-type: none">• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.• See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.		
Error code	Description	Action
062	Three consecutive boot failures using the default configuration.	<ol style="list-style-type: none">1. Update the system firmware to the latest level (see “Updating the firmware” on page 11).2. (Trained service technician only) Replace the system board.
101, 102	System board failure.	(Trained service technician only) Replace the system board
151	Real-time clock error.	<ol style="list-style-type: none">1. Reseat the battery.2. Clear CMOS, see “System-board switches and jumpers” on page 7.3. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. Batteryb. (Trained service technician only) System board

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
161	Real-time clock battery error.	<ol style="list-style-type: none"> 1. Reseat the battery. 2. Clear CMOS, see “System-board switches and jumpers” on page 7. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board
162	Invalid configuration information or CMOS random-access memory (RAM) checksum failure.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. Reseat the following components, one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Battery b. Failing device (if the device is a FRU, the device must be reseated by a trained service technician only) 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Battery b. Failing device (if the device is a FRU, the device must be replaced by a trained service technician only) c. (Trained service technician only) System board
163	Real-time clock error. (time of day not set)	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, make sure that the date and time are correct, and save the settings. 2. Reseat the battery. 3. Clear CMOS, see “System-board switches and jumpers” on page 7. 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board
164	Memory size has changed.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program; then, exit, saving the configuration settings. 2. Reseat the DIMMs.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
175	Service processor code on optional service processor adapter damaged or not loaded. Note: In this case, the service processor is the optional Remote Supervisor Adapter II SlimLine.	<ol style="list-style-type: none"> 1. Update the firmware on the optional Remote Supervisor Adapter II SlimLine (see “Updating the firmware” on page 11). 2. Replace the optional Remote Supervisor Adapter II SlimLine.
184	Power-on password damaged.	<ol style="list-style-type: none"> 1. Restart the server and enter the administrator password; then, run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. Reseat the battery. 3. Clear CMOS, see “System-board switches and jumpers” on page 7. 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Battery b. (Trained service technician only) System board
187	VPD serial number not set.	<ol style="list-style-type: none"> 1. Reseat the optional Remote Supervisor Adapter II SlimLine. 2. (Trained service technician only) Replace the system board.
189	Three attempts were made to access the server with an incorrect password.	Restart the server and enter the administrator password; then, run the Configuration/Setup Utility program and change the power-on password.
289	A DIMM has been disabled by the system.	<ol style="list-style-type: none"> 1. Make sure that the DIMM is installed correctly (see “Installing a memory module (DIMM)” on page 40). 2. Reseat the DIMM. 3. Replace the DIMM.
301	Keyboard or keyboard controller error.	<ol style="list-style-type: none"> 1. If you have installed a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup. 2. Reseat the keyboard cable in the connector. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Keyboard b. (Trained service technician only) System board

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
303	Keyboard controller error.	<ol style="list-style-type: none"> 1. Reseat the keyboard cable in the connector. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Keyboard b. (Trained service technician only) System board.
602	Invalid diskette boot record	<ol style="list-style-type: none"> 1. Replace the diskette. 2. Reseat the diskette drive cables. 3. Replace the diskette drive.
604	Internal diskette drive error	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, select Load Default Settings, and save the settings. 2. Reseat the diskette drive signal cables. 3. Replace the diskette drive.
962	Parallel port configuration error	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and make sure that the parallel port setting is correct. 2. (Trained service technician only) Replace the system board.
1162	Serial port error	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and make sure that the serial port settings are correct. 2. (Trained service technician only) Replace the system board.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
178x	Fixed disk error. Note: x is the drive that has the error	<ol style="list-style-type: none"> 1. Run the hard disk drive diagnostic tests on drive x (see “Running the diagnostic programs” in the <i>Problem Determination and Service Guide</i> on the IBM System x Documentation CD). 2. Reseat the following components, depending on the server model: <ul style="list-style-type: none"> • Hot-swap models: Hard disk drive • Simple-swap models: <ol style="list-style-type: none"> a. Hard disk drive x b. Hard disk drive x cable 3. Replace the following components one at a time, depending on the server model, in the order shown, restarting the server each time: <ul style="list-style-type: none"> • Hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive x b. Hard disk drive backplane c. (Trained service technician only) System board • Simple-swap models: <ol style="list-style-type: none"> a. Hard disk drive x b. Hard disk drive x cable c. (Trained service technician only) System board
1800	Unavailable PCI hardware interrupt.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and adjust the adapter settings. 2. Remove each adapter one at a time, restarting the server each time, until the problem is isolated.
1801	An adapter has requested memory resources that are not available	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and make sure that sufficient memory is installed in the server. 2. Run the Configuration/Setup Utility program and disable some other resources to make more space available. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Each adapter b. (Trained service technician only) System board

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
1805	PCI option ROM checksum error	<ol style="list-style-type: none"> 1. Remove the failing adapter. 2. Reseat each adapter. 3. Reseat the riser card. 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Each adapter b. Riser card c. (Trained service technician only) System board
1810	PCI error	<ol style="list-style-type: none"> 1. Reseat the riser card. 2. Remove both adapters from the riser card. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Riser card b. (Trained service technician only) System board
1962	A hard disk drive does not contain a valid boot sector.	<ol style="list-style-type: none"> 1. Make sure that a startable operating system is installed. 2. Run the hard disk drive diagnostic tests. 3. Reseat the following components: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive backplane cable or back plate cables 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Hot-swap models) Hard disk drive cable b. Hard disk drive c. Hard disk drive backplane or back plate d. (Trained service technician only) System board

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
5962	IDE DVD drive configuration error.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and load the default settings (see “Using the Configuration/Setup Utility program” on page 12). 2. Reseat the following components: <ol style="list-style-type: none"> a. DVD drive cable b. DVD drive c. (Trained service technician only) System board 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time.
8603	Pointing-device error.	<ol style="list-style-type: none"> 1. Reseat the pointing device. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Pointing device b. (Trained service technician only) System board
00012000	Processor machine check error.	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
00019701	Processor failed BIST.	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
01298001	No update data for processor.	<ol style="list-style-type: none"> 1. Update the BIOS code again. 2. (Trained service technician only) Reseat the microprocessor. 3. (Trained service technician only) Replace the microprocessor.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
01298101	Bad update data for processor.	<ol style="list-style-type: none"> 1. Update the BIOS code again. 2. (Trained service technician only) Reseat the microprocessor. 3. (Trained service technician only) Replace the microprocessor.
I9990301	Hard disk drive boot sector error.	<ol style="list-style-type: none"> 1. Reseat the following components, depending on the server model: <ul style="list-style-type: none"> • Hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. SAS/SATA controller • Simple-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive cable 2. Replace the following components one at a time, depending on the server model, in the order shown, restarting the server each time: <ul style="list-style-type: none"> • Hot-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive backplane c. SAS/SATA controller d. (Trained service technician only) System board • Simple-swap models: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive cable c. (Trained service technician only) System board
I9990650	AC power has been restored.	<ol style="list-style-type: none"> 1. Check the power cables. 2. Check for interruption of the power supply.

Checkout procedure

The checkout procedure is the sequence of tasks that you should follow to diagnose a problem in the server.

About the checkout procedure

Before you perform the checkout procedure for diagnosing hardware problems, review the following information:

- Read the safety information that begins on page vii.
- The diagnostic programs provide the primary methods of testing the major components of the server, such as the system board, Ethernet controller,

keyboard, mouse (pointing device), serial ports, and hard disk drives. You can also use them to test some external devices. If you are not sure whether a problem is caused by the hardware or by the software, you can use the diagnostic programs to confirm that the hardware is working correctly.

- When you run the diagnostic programs, a single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run the diagnostic programs.

Exception: If there are multiple error codes or LEDs that indicate a microprocessor error, the error might be in the microprocessor or in the microprocessor socket. See “Microprocessor problems” on page 85 for information about diagnosing microprocessor problems.

- Before running the diagnostic programs, you must determine whether the failing server is part of a shared hard disk drive cluster (two or more servers that share external storage devices). If it is part of a cluster, you can run all diagnostic programs except the ones that test the storage unit (that is, a hard disk drive in the storage unit) or the storage adapter that is attached to the storage unit. The failing server might be part of a cluster if any of the following conditions is true:
 - You have identified the failing server as part of a cluster (two or more servers sharing external storage devices).
 - One or more external storage units are attached to the failing server and at least one of the attached storage units is also attached to another server or unidentifiable device.
 - One or more servers are located near the failing server.

Important: If the server is part of a shared hard disk drive cluster, run one test at a time. Do not run any suite of tests, such as “quick” or “normal” tests, because this might enable the hard disk drive diagnostic tests.

- If the server is halted and a POST error code is displayed, see “Error logs” on page 70. If the server is halted and no error message is displayed, see “Troubleshooting tables” on page 81 and “Solving undetermined problems” on page 114.
- For information about power-supply problems, see “Solving power problems” on page 112.
- For intermittent problems, check the error log; see “Error logs” on page 70 and “Diagnostic programs, messages, and error codes” on page 94.

Performing the checkout procedure

To perform the checkout procedure, complete the following steps:

1. Is the server part of a cluster?
 - **No:** Go to step 2.
 - **Yes:** Shut down all failing servers that are related to the cluster. Go to step 2.
2. Complete the following steps:
 - a. Turn off the server and all external devices.
 - b. Check the internal and external devices for compatibility at <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.
 - c. Check all cables and power cords.
 - d. Set all display controls to the middle positions.
 - e. Turn on all external devices.

- f. Turn on the server. If the server does not start, see “Troubleshooting tables” on page 81.
 - g. Check the system-error LED on the operator information panel. If it is flashing, check the LEDs on the system board (see “System-board LEDs” on page 92).
 - h. Check for the following results:
 - Successful completion of POST (see “POST” on page 67 for more information)
 - Successful completion of startup
3. Did one or more beeps sound?
- **No:** Find the failure symptom in “Troubleshooting tables” on page 81; if necessary, run the diagnostic programs (see “Running the diagnostic programs” on page 94).
 - If you receive an error, see “Diagnostic error codes” on page 96.
 - If the diagnostic programs were completed successfully and you still suspect a problem, see “Solving undetermined problems” on page 114.
 - **Yes:** Find the beep code in “POST beep codes” on page 67; if necessary, see “Solving undetermined problems” on page 114.

Troubleshooting tables

Use the troubleshooting tables to find solutions to problems that have identifiable symptoms.

If you cannot find the problem in these tables, see “Running the diagnostic programs” on page 94 for information about testing the server.

If you have just added new software or a new optional device and the server is not working, complete the following steps before using the troubleshooting tables:

1. Check the system-error LED on the operator information panel; if it is lit, check the LEDs on the system board (see “System-board LEDs” on page 92).
2. Remove the software or device that you just added.
3. Run the diagnostic tests to determine whether the server is running correctly.
4. Reinstall the new software or new device.

CD or DVD drive problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
The CD or DVD drive is not recognized.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• The IDE channel to which the CD or DVD drive is attached (primary) is enabled in the Configuration/Setup Utility program.• All cables and jumpers are installed correctly.• The signal cable and connector are not damaged and the connector pins are not bent.• The correct device driver is installed for the CD or DVD drive.2. Run the CD, CD-RW, or DVD drive diagnostic programs.3. Reseat the following components:<ol style="list-style-type: none">a. CD or DVD driveb. CD or DVD interface board cable4. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. CD or DVD driveb. CD or DVD drive interface board cablec. CD or DVD interface boardd. (Trained service technician only) System board
A CD or DVD is not working correctly.	<ol style="list-style-type: none">1. Clean the CD or DVD.2. Run the CD or DVD drive diagnostic programs.3. Check the connector and signal cable for bent pins or damage.4. Reseat the CD or DVD drive.5. Replace the CD or DVD drive.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
The CD or DVD drive tray is not working.	<ol style="list-style-type: none"> 1. Make sure that the server is turned on. 2. Insert the end of a straightened paper clip into the manual tray-release opening. 3. Reseat the CD or DVD drive. 4. Replace the CD or DVD drive.

General problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
A cover lock is broken, an LED is not working, or a similar problem has occurred.	If the part is a CRU, replace it. If the part is a FRU, the part must be replaced by a trained service technician.

Hard disk drive problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
Not all drives are recognized by the hard disk drive diagnostic test (the Fixed Disk test).	Remove the drive indicated on the diagnostic tests; then, run the hard disk drive diagnostic test again. If the remaining drives are recognized, replace the drive that you removed with a new one.
The server stops responding during the hard disk drive diagnostic test.	Remove the hard disk drive that was being tested when the server stopped responding, and run the diagnostic test again. If the hard disk drive diagnostic test runs successfully, replace the drive that you removed with a new one.
A hard disk drive was not detected while the operating system was being started.	Reseat all hard disk drives and cables; then, run the hard disk drive diagnostic tests again.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
A hard disk drive passes the diagnostic Fixed Disk Test but the problem remains.	<p>Run the diagnostic SCSI Attached Disk Test (see “Running the diagnostic programs” on page 94).</p> <p>Note: Use the SCSI Attached Disk test for drives that are part of RAID arrays. Use the Fixed Disk Test for SATA drives that are not part of RAID arrays.</p>

Intermittent problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
A problem occurs only occasionally and is difficult to diagnose.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • All cables and cords are connected securely to the rear of the server and attached devices. • When the server is turned on, air is flowing from the fan grille. If there is no airflow, the fan is not working. This can cause the server to overheat and shut down. 2. Check the system-error logs (see “Error logs” on page 70). 3. See Solving undetermined problems.

Keyboard, mouse, or pointing-device problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
All or some keys on the keyboard do not work.	<ol style="list-style-type: none"> 1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the keyboard cable directly to the correct connector on the rear of the server. 2. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for keyboard compatibility. 3. If you have installed a USB keyboard, run the Configuration/Setup Utility program and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup. 4. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server. 5. Make sure that: <ul style="list-style-type: none"> • The keyboard cable is securely connected to the server and the keyboard and mouse cables are not reversed. • The server and the monitor are turned on. 6. Reseat the keyboard cable. 7. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Keyboard b. (Trained service technician only) System board
The mouse or pointing device does not work.	<ol style="list-style-type: none"> 1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the mouse or pointing-device cable directly to the correct connector on the rear of the server. 2. Make sure that: <ul style="list-style-type: none"> • The mouse is compatible with the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/. • The mouse or pointing-device cable is securely connected and the keyboard and mouse cables are not reversed. • The mouse device drivers are installed correctly. • The mouse is enabled in the Configuration/Setup Utility program. 3. Reseat the mouse or pointing device cable. 4. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Mouse or pointing device b. (Trained service technician only) System board

Memory problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
The amount of system memory that is displayed is less than the amount of installed physical memory.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• No error LEDs are lit on the operator information panel.• The memory modules are seated correctly.• You have installed the correct type of memory.• All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem.2. Check the POST error log for error message 289; if a DIMM was disabled by a system-management interrupt (SMI), replace the DIMM.3. Run memory diagnostics (see “Running the diagnostic programs” on page 94).4. Add one pair of DIMMs at a time, making sure that the DIMMs in each pair match.5. Reseat the DIMMs.6. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. DIMMsb. (Trained service technician only) System board

Microprocessor problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
The server emits a continuous beep during POST, indicating that the microprocessor is not working correctly.	<ol style="list-style-type: none">1. Correct any errors that are indicated by the LEDs (see “System-board LEDs” on page 92).2. Make sure that the server supports the microprocessor.3. (Trained service technician only) Make sure that the microprocessor is seated correctly.4. (Trained service technician only) Replace the microprocessor.

Monitor problems

Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, see the documentation that comes with the monitor for instructions for testing and adjusting the monitor.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
Testing the monitor	<ol style="list-style-type: none"> 1. Make sure that the monitor cables are firmly connected. 2. Try using a different monitor on the server, or try testing the monitor on a different server. 3. Run the diagnostic programs. If the monitor passes the diagnostic programs, the problem might be a video device driver. 4. (Trained service technician only) Replace the system board.
The screen is blank.	<ol style="list-style-type: none"> 1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the monitor cable directly to the correct connector on the rear of the server. 2. Make sure that: <ul style="list-style-type: none"> • The server is turned on. If there is no power to the server, see “Power problems” on page 89. • The monitor cables are connected correctly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. • Only a single beep sounds when the server is turned on. <p>Important: In some memory configurations, the 3-3-3 beep code might sound during POST, followed by a blank monitor screen. If this occurs and the Boot Fail Count option in the Start Options of the Configuration/Setup Utility program is enabled, you must restart the server three times to reset the configuration settings to the default configuration (the memory connector or bank of connectors enabled).</p> 3. Make sure that the correct server is controlling the monitor, if applicable. 4. Make sure that damaged BIOS code is not affecting the video; see “Recovering from BIOS update failure” on page 103. 5. See “Solving undetermined problems” on page 114.
The monitor works when you turn on the server, but the screen goes blank when you start some application programs.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The application program is not setting a display mode that is higher than the capability of the monitor. • You installed the necessary device drivers for the application. 2. Run video diagnostics (see “Running the diagnostic programs” on page 94). <ul style="list-style-type: none"> • If the server passes the video diagnostics, the video is good; see “Solving undetermined problems” on page 114. • (Trained service technician only) If the server fails the video diagnostics, replace the system board.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	<ol style="list-style-type: none"> 1. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. Attention: Moving a color monitor while it is turned on might cause screen discoloration. Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor. Notes: <ol style="list-style-type: none"> a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.). b. Non-IBM monitor cables might cause unpredictable problems. 2. Reseat the following components: <ul style="list-style-type: none"> • Monitor cable • Remote Supervisor Adapter II SlimLine (if one is installed) 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Monitor cable b. Monitor c. Remote Supervisor Adapter II SlimLine (if one is installed) d. (Trained service technician only) System board
Wrong characters appear on the screen.	<ol style="list-style-type: none"> 1. If the wrong language is displayed, update the BIOS code (see “Updating the firmware” on page 11) with the correct language. 2. Reseat the monitor cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Monitor b. (Trained service technician only) System board

Optional-device problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
An IBM optional device that was just installed does not work.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• The device is designed for the server (see http://www.ibm.com/servers/eserver/serverproven/compat/us/).• You followed the installation instructions that came with the device and the device is installed correctly.• You have not loosened any other installed devices or cables.• You updated the configuration information in the Configuration/Setup Utility program. Whenever a device is changed, you must update the configuration.2. Reseat the device that you just installed.3. Replace the device that you just installed.
An IBM optional device that used to work does not work now.	<ol style="list-style-type: none">1. Make sure that all of the cable connections for the device are secure.2. If the device comes with test instructions, use those instructions to test the device.3. Reseat the failing device.4. Replace the failing device.

Power problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
<p>The power-control button does not work, and the reset button does work (the server does not start).</p> <p>Note: The power-control button will not function until 20 seconds after the server has been connected to ac power.</p>	<ol style="list-style-type: none"> 1. Make sure that the power-control button is working correctly: <ol style="list-style-type: none"> a. Disconnect the server power cords. b. Reconnect the power cords. c. Press the power-control button. d. If the server does not start, disconnect the server power cords and reseal the operator information panel cables; then, repeat steps 1b through 1c. If the problem remains, replace the operator information panel. 2. Make sure that: <ul style="list-style-type: none"> • The ac power cord is correctly connected to the server and to a working electrical outlet. • The server contains the correct type of DIMMs. • The DIMMs are correctly seated. • (Trained service technician only) The microprocessor is correctly installed. 3. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports. 4. Reseat the following components: <ol style="list-style-type: none"> a. DIMMs b. (Trained service technician only) Power-supply cables to all internal components c. (Trained service technician only) Power connector on the system board 5. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. DIMMs b. Power supply c. (Trained service technician only) System board 6. See “Solving undetermined problems” on page 114.
The server does not turn off.	<ol style="list-style-type: none"> 1. Determine whether you are using an Advanced Configuration and Power Interface (ACPI) or non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps: <ol style="list-style-type: none"> a. Press Ctrl+Alt+Delete. b. Turn off the server by pressing the power-control button for 5 seconds. c. Restart the server. d. If the server fails POST and the power-control button does not work, disconnect the ac power cord for 20 seconds; then, reconnect the ac power cord and restart the server. 2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.
The server unexpectedly shuts down, and the LEDs on the operator information panel are not lit.	See “Solving undetermined problems” on page 114.

Serial port problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
The number of serial ports that are identified by the operating system is less than the number of installed serial ports.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• Each port is assigned a unique address in the Configuration/Setup Utility program and none of the serial ports is disabled.• The serial-port adapter (if one is installed) is seated correctly.2. Reseat the serial port adapter.3. Replace the serial port adapter.
A serial device does not work.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• The device is compatible with the server.• The serial port is enabled and is assigned a unique address.• The device is connected to the correct connector (see “Server controls, LEDs, and connectors” on page 4).2. Reseat the following components:<ol style="list-style-type: none">a. Failing serial deviceb. Serial cable3. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. Failing serial deviceb. Serial cablec. (Trained service technician only) System board

ServerGuide problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
The <i>ServerGuide Setup and Installation</i> CD will not start.	<ol style="list-style-type: none">1. Make sure that the server supports the ServerGuide program and has a startable (bootable) CD or DVD drive.2. If the startup (boot) sequence settings have been changed, make sure that the CD or DVD drive is first in the startup sequence.3. If more than one CD or DVD drive is installed, make sure that only one drive is set as the primary drive. Start the CD from the primary drive.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
The ServeRAID program cannot view all installed drives, or the operating system cannot be installed.	<ol style="list-style-type: none"> 1. Make sure that there are no duplicate IRQ assignments. 2. Make sure that the hard disk drive is connected correctly. 3. Make sure that the hard disk drive cables are securely connected.
The operating-system installation program continuously loops.	Make more space available on the hard disk.
The ServerGuide program will not start the operating-system CD.	Make sure that the operating-system CD is supported by the ServerGuide program. See the <i>ServerGuide Setup and Installation</i> CD label for a list of supported operating-system versions.
The operating system cannot be installed; the optional device is not available.	Make sure that the server supports the operating system. If it does, no logical drive is defined (RAID servers). Run the ServerGuide program and make sure that setup is complete.

Software problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
You suspect a software problem.	<ol style="list-style-type: none"> 1. To determine whether the problem is caused by the software, make sure that: <ul style="list-style-type: none"> • The server has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software. If you have just installed an adapter or memory, the server might have a memory-address conflict. • The software is designed to operate on the server. • Other software works on the server. • The software works on another server. 2. If you received any error messages when using the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem. 3. Contact your place of purchase of the software.

Universal Serial Bus (USB) port problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
A USB device does not work.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• The correct USB device driver is installed.• The operating system supports USB devices.• A standard PS/2 keyboard or mouse is not connected to the server. If it is, a USB keyboard or mouse will not work during POST.2. Make sure that the USB configuration options are set correctly in the Configuration/Setup Utility program menu (see the <i>User's Guide</i> for more information).3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.

Video problems

See “Monitor problems” on page 85.

System-board LEDs

The system board has error LEDs for the fans, voltage regulator, and memory that help to locate the source of an error. When an error LED is lit, run the diagnostic programs (see “Running the diagnostic programs” on page 94) to find the cause of the error.

Many errors are first indicated by a lit information LED or system-error LED on the operator information panel on the front of the server. If one or both of these LEDs are lit, one or more LEDs on the system board might also be lit and can direct you to the source of the error.

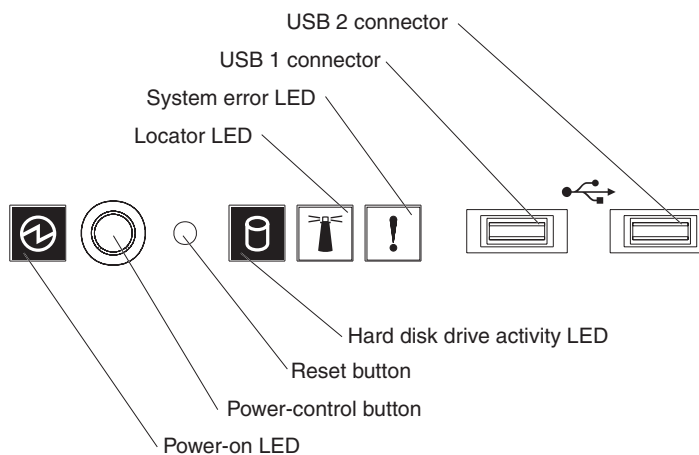
The system board also has some status LEDs. See the illustration in step 7 on page 93 for the location of the status LEDs.

Before looking inside the server to view error LEDs or status LEDs, read the safety information that begins on page vii and “Handling static-sensitive devices” on page 26.

If an error occurs, view the system LEDs in the following order:

1. Check the operator information panel on the front of the server. If the system-error LED is lit, it indicates that an error has occurred; go to step 2 on page 93.

The following illustration shows the operator information panel.



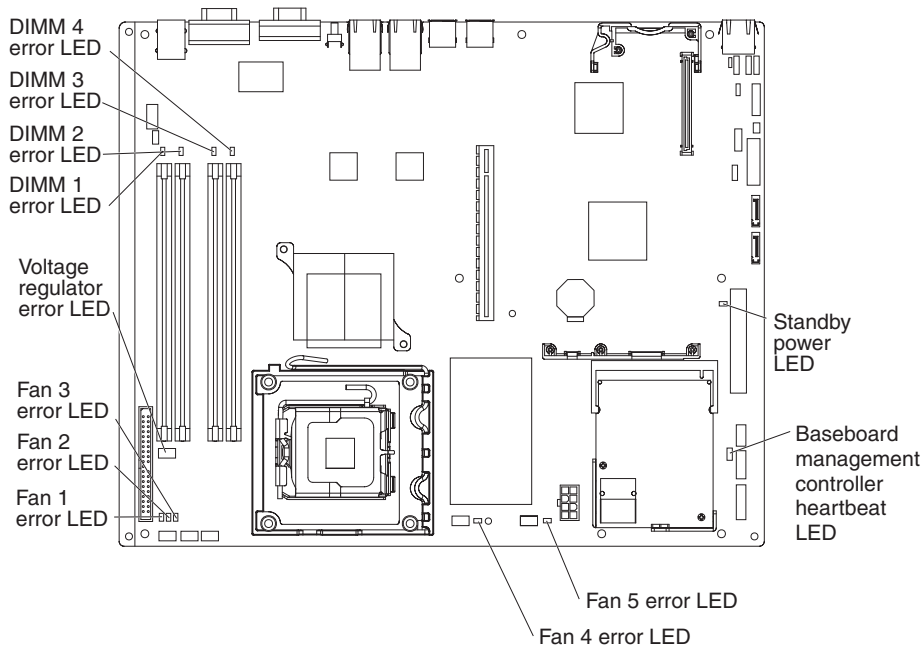
2. Read the safety information that begins on page vii and “Installation guidelines” on page 25.
3. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
4. Remove the server from the rack and place on a flat, static-protective surface.
5. Remove the cover (see “Removing the cover” on page 28).
6. Reconnect all external cables and the power cord; then, turn on the server.

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

Certain components inside the server have LEDs that will be lit to indicate the location of a problem. For example, a DIMM error will light the LED next to the failing DIMM on the system board.

7. Look at the system service label on the underside of the server cover, which gives an overview of internal components. This information can often provide enough information to correct the error.

The following illustration shows the LEDs on the system board.



The baseboard management controller heartbeat LED flashes to indicate that the mini-BMC is functioning correctly.

The standby power LED is lit whenever the server is connected to ac power.

Diagnostic programs, messages, and error codes

The diagnostic programs are the primary method of testing the major components of the server. As you run the diagnostic programs, text messages and error codes are displayed on the screen and are saved in the test log. A diagnostic text message or error code indicates that a problem has been detected; to determine what action you should take as a result of a message or error code, see the table in “Diagnostic error codes” on page 96.

Running the diagnostic programs

To run the diagnostic programs, complete the following steps:

1. If the server is running, turn off the server and all attached devices.
2. Turn on all attached devices; then, turn on the server.
3. When the prompt **Press F1 For Configuration/Setup** is displayed, press F1.
4. From the Configuration/Setup Utility menu, select **Start Options**.
5. From the **Start Options** menu, select **Startup Sequence**.
6. Note the device that is selected as the first startup device. Later, you must restore this setting.
7. Select **CD-ROM** as the first startup device.
8. Press Esc two times to return to the Configuration/Setup Utility menu.
9. Insert the *IBM Enhanced Diagnostics* CD into the CD drive.
10. Select **Save & Exit Setup** and follow the prompts. The diagnostic programs start.
11. From the diagnostic programs screen, select the test that you want to run, and follow the instructions on the screen.

When you are diagnosing hard disk drives, select **SCSI Attached Disk Test** for the most thorough test or if the drives are part of a RAID array. Select **Fixed Disk Test** for any of the following situations:

- You want to run a faster test.
- The server contains simple-swap SATA hard disk drives that are not part of a RAID array.

To determine what action you should take as a result of a diagnostic text message or error code, see the table in “Diagnostic error codes” on page 96.

If the diagnostic programs do not detect any hardware errors but the problem remains during normal server operations, a software error might be the cause. If you suspect a software problem, see the information that comes with your software.

A single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run the diagnostic programs.

Exception: If there are multiple error codes or diagnostics LEDs that indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 85 for information about diagnosing microprocessor problems.

If the server stops during testing and you cannot continue, restart the server and try running the diagnostic programs again. If the problem remains, replace the component that was being tested when the server stopped.

The keyboard and mouse (pointing device) tests assume that a keyboard and mouse are attached to the server. If no mouse or a USB mouse is attached to the server, you cannot use the **Next Cat** and **Prev Cat** buttons to select categories. All other mouse-selectable functions are available through function keys. You can use the regular keyboard test to test a USB keyboard, and you can use the regular mouse test to test a USB mouse. You can run the USB interface test only if no USB devices are attached. The USB test will not run if a Remote Supervisor Adapter II SlimLine is installed.

To view server configuration information (such as system configuration, memory contents, interrupt request (IRQ) use, direct memory access (DMA) use, device drivers, and so on), select **Hardware Info** from the top of the screen.

Diagnostic text messages

Diagnostic text messages are displayed while the tests are running. A diagnostic text message contains one of the following results:

Passed: The test was completed without any errors.

Failed: The test detected an error.

User Aborted: You stopped the test before it was completed.

Not Applicable: You attempted to test a device that is not installed in the server.

Aborted: The test could not proceed because of the server configuration.

Warning: The test could not be run. There was no failure of the hardware that was being tested, but there might be a hardware failure elsewhere, or another problem prevented the test from running; for example, there might be a configuration problem, or the hardware might be missing or is not being recognized.

The result is followed by an error code or other additional information about the error.

Viewing the test log

To view the test log when the tests are completed, select **Utility** from the top of the screen and then select **View Test Log**. The summary test log is displayed. To view the detailed test log, press the Tab key while you are viewing the summary log.

The test-log data is maintained only while you are running the diagnostic programs. When you exit from the diagnostic programs, the test log is cleared.

To save the test log to a file on a diskette or to the hard disk, click **Save Log** on the diagnostic programs screen and specify a location and name for the saved log file.

Notes:

1. To create and use a diskette, you must add an optional external diskette drive to the server.

2. To save the test log to a diskette, you must use a diskette that you have formatted yourself; this function does not work with preformatted diskettes. If the diskette has sufficient space for the test log, the diskette can contain other data.

Diagnostic error codes

The following table describes the error codes that the diagnostic programs might generate and suggested actions to correct the detected problems.

If the diagnostic programs generate error codes that are not listed in the table, make sure that the latest levels of BIOS, Remote Supervisor Adapter II SlimLine, and ServeRAID code are installed.

In the error codes, x can be any numeral or letter. However, if the three-digit number in the central position of the code is 000, 195, or 197, *do not* replace a CRU or FRU. When these numbers are in the central position of the code, they have the following meanings:

- 000** The server passed the test. Do not replace a CRU or FRU.
- 195** The Esc key was pressed to end the test. Do not replace a CRU or FRU.
- 197** This is a warning error, but it does not indicate a hardware failure; do not replace a CRU or FRU. Take the action that is indicated in the Action column but *do not replace a CRU or a FRU*. See the description of **Warning** in "Diagnostic text messages" on page 95 for more information.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, "Parts listing, Type 4364, 4365, or 4366 server," on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
005-xxx-000	Failed video test.	<ol style="list-style-type: none">1. Reseat the video adapter, if one is installed.2. (Trained service technician only) Replace the system board.
011-xxx-000	Failed COM1 serial port test.	<ol style="list-style-type: none">1. Check the loopback plug that is connected to the externalized serial port.2. Check the cable from the externalized serial port to the system board.3. (Trained service technician only) Replace the system board.
020-xxx-000	Failed PCI Interface test.	<ol style="list-style-type: none">1. Reseat the riser-card assembly.2. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. Riser-card assemblyb. (Trained service technician only) System board

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
035-002-0nn	ServeRAID interface timeout.	<ol style="list-style-type: none"> 1. Make sure that the ServeRAID controller is configured correctly. Obtain the basic and extended configuration status bytes and see the ServeRAID adapter <i>Hardware Maintenance Manual</i> for more information. 2. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap SAS/SATA hard disk drive backplane cables b. ServeRAID adapter 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time.
035-253-0nn	ServeRAID controller 0nn initialization failure; 0nn = the controller number.	<ol style="list-style-type: none"> 1. The ServeRAID controller might not be configured correctly. See the ServeRAID <i>Hardware Maintenance Manual</i> for more information. 2. Reseat the following components: <ol style="list-style-type: none"> a. Hot-swap SAS/SATA hard disk drive backplane cables b. ServeRAID adapter 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time.
035-253-s99	RAID adapter initialization failure.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. ServeRAID adapter b. Hot-swap SAS/SATA hard disk drive backplane cable 2. Replace the components listed in step 1 one at a time, in the order shown, restarting the server each time.
035-254-0nn	Setup error; unable to allocate memory to run test.	Check the system resources and make more memory available; then, run the test again.
035-255-0nn	Internal error.	<ol style="list-style-type: none"> 1. Reseat the hot-swap SAS/SATA hard disk drive backplane cable. 2. Replace the hot-swap SAS/SATA hard disk drive backplane.
035-260-0nn	System to controller interface failure.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. ServeRAID adapter b. Riser card 2. Replace the components listed in step 1 one at a time, in the order shown, restarting the server each time.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
035-265-0nn	Adapter Communication error.	<ol style="list-style-type: none"> 1. Update the RAID controller firmware on the RAID adapter (see “Updating the firmware” on page 11). 2. Reseat the RAID adapter. 3. Replace the RAID adapter.
035-266-0nn	Adapter CPU test error.	<ol style="list-style-type: none"> 1. Update the RAID controller firmware on the RAID adapter (see “Updating the firmware” on page 11). 2. Reseat the RAID adapter. 3. Replace the RAID adapter.
035-267-0nn	Adapter Local RAM test error.	<ol style="list-style-type: none"> 1. Update the RAID controller firmware on the RAID adapter (see “Updating the firmware” on page 11). 2. Reseat the RAID adapter. 3. Replace the RAID adapter.
035-268-0nn	Adapter NVSRAM test error.	<ol style="list-style-type: none"> 1. Update the RAID controller firmware on the RAID adapter (see “Updating the firmware” on page 11). 2. Reseat the RAID adapter. 3. Replace the RAID adapter.
035-269-0nn	Adapter Cache test error.	<ol style="list-style-type: none"> 1. Update the RAID controller firmware on the RAID adapter (see “Updating the firmware” on page 11). 2. Reseat the RAID adapter. 3. Replace the RAID adapter.
035-271-0nn	Adapter XOR engine test error.	<ol style="list-style-type: none"> 1. Update the RAID controller firmware on the RAID adapter (see “Updating the firmware” on page 11). 2. Reseat the RAID adapter. 3. Replace the RAID adapter.
035-272-0nn	Adapter Drive test error.	Replace the attached drive.
035-273-0nn	Adapter Drive error.	Replace the attached drive.
035-274-0nn	Adapter Parameters set error.	<ol style="list-style-type: none"> 1. Update the RAID controller firmware on the RAID adapter (see “Updating the firmware” on page 11). 2. Reseat the RAID adapter. 3. Replace the RAID adapter.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
035-275-001	Adapter Communication error.	<ol style="list-style-type: none"> 1. Update the RAID controller firmware on the RAID adapter (see “Updating the firmware” on page 11). 2. Reseat the RAID adapter. 3. Replace the RAID adapter.
035-276-001	Adapter CPU test error.	<ol style="list-style-type: none"> 1. Update the RAID controller firmware on the RAID adapter (see “Updating the firmware” on page 11). 2. Reseat the RAID adapter. 3. Replace the RAID adapter.
035-277-001	Adapter Local RAM test error.	<ol style="list-style-type: none"> 1. Update the RAID controller firmware on the RAID adapter (see “Updating the firmware” on page 11). 2. Reseat the RAID adapter. 3. Replace the RAID adapter.
035-278-001	Adapter NVSRAM test error.	<ol style="list-style-type: none"> 1. Update the RAID controller firmware on the RAID adapter (see “Updating the firmware” on page 11). 2. Reseat the RAID adapter. 3. Replace the RAID adapter.
035-279-001	Adapter Cache test error.	<ol style="list-style-type: none"> 1. Update the RAID controller firmware on the RAID adapter (see “Updating the firmware” on page 11). 2. Reseat the RAID adapter. 3. Replace the RAID adapter.
035-280-001	Adapter Drive test error.	Replace the attached drive.
035-281-001	Adapter Drive error.	Replace the attached drive.
035-282-001	Adapter Parameters set error.	<ol style="list-style-type: none"> 1. Update the RAID controller firmware on the RAID adapter (see “Updating the firmware” on page 11). 2. Reseat the RAID adapter. 3. Replace the RAID adapter.
035-283-001	Adapter Battery error.	Replace the battery module on the RAID adapter.
035-xxx-cnn	c = ServeRAID channel number, nn = ID of failing fixed disk drive.	<ol style="list-style-type: none"> 1. Check the system-error logs and replace any indicated failing devices. Note: A FRU must be replaced by a trained service technician only. 2. Reseat the hard disk drive on channel C, ID nn. 3. Replace the hard disk drive on channel C, ID nn.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
035-xxx-snn	Failed hard disk drive with ID nn on RAID adapter in slot s.	<ol style="list-style-type: none"> 1. Check the system-error logs and replace any indicated failing devices. Note: A FRU must be replaced by a trained service technician only. 2. Reseat the hard disk drive that has ID nn, that is connected to the RAID adapter in slot s. 3. Replace the hard disk drive that has ID nn, that is connected to the RAID adapter in slot s.
035-xxx-099	No adapters were found.	If an adapter is installed: <ol style="list-style-type: none"> 1. Reseat the adapter. 2. Check the adapter cables to make sure that they are secure.
035-xxx-s99	Failed RAID test: s = number of failing adapter slot	<ol style="list-style-type: none"> 1. Check the system-error logs and replace any indicated failing devices. Note: A FRU must be replaced by a trained service technician only. 2. Reseat the following components: <ol style="list-style-type: none"> a. RAID adapter in slot s b. Cable for the RAID adapter in slot s c. Riser card 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. RAID adapter in slot s b. Cable for the RAID adapter in slot s c. Riser card d. (Trained service technician only) System board
075-xxx-000	Failed power supply test.	Replace the power supply.
089-xxx-0nn	Failed microprocessor test.	<ol style="list-style-type: none"> 1. Make sure that the BIOS code is at the latest level. 2. (Trained service technician only) Reseat the microprocessor. 3. (Trained service technician only) Replace the microprocessor.
201-xxx-00n	Failed memory test. Note: n = slot number of failing DIMM	Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> 1. DIMM identified by nn 2. (Trained service technician only) System board

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
201-xxx-n99	Multiple DIMM failure. Note: n = bank number of failing pair	<ol style="list-style-type: none"> 1. See the error text to identify the failing DIMMs. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. DIMMs in bank n b. (Trained service technician only) System board
206-xxx-000	Failed diskette drive test.	<ol style="list-style-type: none"> 1. Run the diskette drive test again, using another diskette. 2. Reseat the diskette drive cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Diskette drive b. (Trained service technician only) Operator information panel assembly
215-xxx-000	Failed CD or DVD test.	<ol style="list-style-type: none"> 1. Run the test again with a different CD or DVD. 2. Reseat the following components: <ol style="list-style-type: none"> a. CD or DVD drive b. (Trained service technician only) Operator information panel assembly 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. CD or DVD drive b. (Trained service technician only) CD/DVD interface card
217-198-xxx	Could not establish drive parameters.	<ol style="list-style-type: none"> 1. Check the drive cables from the controller to the backplane or back plate. 2. Reseat the hard disk drive. 3. Replace the following components in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Hard disk drive b. Drive cable c. (Hot-swap models) SAS/SATA controller d. Hard disk drive backplane or back plate
217-xxx-000	Failed fixed disk test.	<ol style="list-style-type: none"> 1. Reseat hard disk drive 1. 2. Replace hard disk drive 1.
217-xxx-001	Failed fixed disk test.	<ol style="list-style-type: none"> 1. Reseat hard disk drive 2. 2. Replace hard disk drive 2.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Error code	Description	Action
301-xxx-000	Failed keyboard test. Note: After installing a USB keyboard, you might have to use the Configuration/Setup Utility program to enable keyboardless operation and prevent the POST error message 301 from being displayed during startup.	<ol style="list-style-type: none"> 1. Reseat the keyboard cable. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Keyboard b. (Trained service technician only) System board
302-xxx-xxx	Failed mouse test.	<ol style="list-style-type: none"> 1. Reseat the mouse cable. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Mouse b. (Trained service technician only) System board
305-xxx-xxx	Failed video monitor test.	<ol style="list-style-type: none"> 1. Reseat the monitor cable. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Monitor b. (Trained service technician only) System board
405-199-00n	Failed. No good link! Check loopback plug For single/dual port, n >= 0	<ol style="list-style-type: none"> 1. Make sure that the loopback plug is a gigabit loopback plug. 2. Make sure that the loopback plug is tight in the slot (a green LED flashes on the port). 3. On a dual-port server, use two loopback plugs at the same time, one in each port. 4. Replace the loopback plug.
405-xxx-000	Failed Ethernet test on Ethernet controller	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program and make sure that the Ethernet adapter is not disabled and that the BIOS code is at the latest level. 2. Reseat the Ethernet adapter. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Ethernet adapter b. (Trained service technician only) System board

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 		
Error code	Description	Action
405-xxx-00n	Failed Ethernet test on adapter in PCI slot. <ul style="list-style-type: none"> • For single port, n > 0 • For dual port, n > 1 	<ol style="list-style-type: none"> 1. If adapters are installed in both slots on the riser card, run the Configuration/Setup Utility program and select Devices and I/O Ports → System MAC Addresses. The failing adapter is the one whose MAC address in the Ethernet controller information matches the MAC address on the diagnostics screen where the failure occurs. 2. Reseat the Ethernet adapter in the slot. 3. Replace the Ethernet adapter in the slot.

Recovering from BIOS update failure

You can update the BIOS code by using an external USB diskette drive or by using a Linux or Windows update package (if available). See “Updating the firmware” on page 11 for information about downloading the files for updating.

If power to the server is interrupted while the BIOS code is being updated (flash update), or if the primary BIOS page in protected memory otherwise becomes damaged, the server might not restart correctly or might not display video (no video). If this happens, use the following procedure to recover:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 26.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords; remove the server from the rack and place it on a flat, static-protective surface; then, remove the cover.
3. Locate the boot block recovery jumper (JP4 on the system board) (see “System-board switches and jumpers” on page 7).
4. Move the boot block recovery jumper from pins 1 and 2 to pins 2 and 3.
5. Replace the server cover.
6. Connect the server to the power source, keyboard, monitor, and mouse.
7. Insert the BIOS update (flash) diskette into the diskette drive. You can download a file to create this diskette from <http://www.ibm.com/servers/eserver/support/xseries/index.html>.
8. Turn on the server and the monitor.
9. After the update session is completed, turn off the server and monitor.
10. Remove the diskette from the diskette drive.
11. Disconnect all power cords; then, remove the server cover.
12. Return the boot block recovery jumper to pins 1 and 2.
13. Reinstall the server cover; then, reconnect all external cables and power cords and turn on the peripheral devices.
14. Turn on the server to restart the operating system.

System-event/error log messages

The system-event/error log contains POST messages and messages generated by a Remote Supervisor Adapter II SlimLine, if one is installed. The system-event/error log can contain messages of three types:

Information	Information messages do not require action; they record significant system-level events, such as when the server is started.
Warning	Warning messages do not require immediate action; they indicate possible problems, such as when the recommended maximum ambient temperature is exceeded.
Error	Error messages might require action; they indicate system errors, such as when a fan is not detected.

Each message contains date and time information, and it indicates the source of the message (POST/BIOS or the service processor).

In the following example, the system-event/error log message indicates that the server was turned on at the recorded time.

```
-----  
Date/Time: 2002/05/07 15:52:03  
DMI Type:  
Source: SERVPROC  
Message Code: System Complex powered Up  
Message Code:  
Message Data:  
Message Data:  
-----
```

The following table describes the possible system-event/error log messages and suggested actions to correct the detected problems.

Note: These actions have the following meanings:

Reseat the system board

(Trained service technician only) Complete the following steps:

1. Disconnect all cables from the system board.
2. Remove all removable components from the system board, including the microprocessor; then, remove the system board from the chassis (see “Removing the system board” on page 64).
3. Check the system board for damage or loose parts.
4. Make sure that the system board area in the chassis is free of objects; then, replace the system board in the chassis (see “Installing the system board” on page 65).
5. Reinstall all removable components on the system board and reconnect all cables to the system board.

Reseat the power supply

Complete the following steps:

1. Remove the power supply from the server (see “Removing the power supply” on page 46).
2. Check the power supply for damage and for crimped or damaged cables.
3. Install the power supply in the server (see “Installing the power supply” on page 47).

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
System-event/error log message	Action
A system NMI was detected.	Make sure that the system software is operating correctly and does not conflict with other software; the system software has created a software NMI, or your pressing the NMI button has created a service NMI.
Alert accepted by remote system x; type: y, ID: z	Information only.
Alert accepted from system x; type: y, sender's ID: z	Information only.
Alert ID x will be retried by sender; when accepted by a remote system, it will have a different ID.	Information only.
Alert not accepted from system x; type: y, sender's ID: z	Information only.
Alert not accepted by remote system x; type: y, ID: z	Information only.
ASM reset -- reason unknown	Information only.
ASM reset due to watchdog timeout	Information only.
ASM reset due to x, instruction fault: y	Information only.
ASM reset was caused by restoring default values	Information only.
ASM reset was initiated by the user	Information only.
Configuration error recovery on the interconnect network	Information only.
CPU over temperature.	<ol style="list-style-type: none"> 1. Make sure that the fans have good airflow and are not obstructed. 2. (Trained service technician only) Reseat the microprocessor heat-exchanger assembly.
DASD controller removal	<ol style="list-style-type: none"> 1. Check the following cables for damage. Make sure that the cables are not broken, crimped, or caught by any components. <ul style="list-style-type: none"> • (Hot-swap models only) The cable from the SAS/SATA controller to the hard disk drive backplane. If this cable is damaged, replace the cable. • (Simple-swap models only) The cables from the hard disk drive back plate to the SATA connectors on the system board. If either of these cables is damaged, replace the back plate. • The power cable or cables to the hard disk drive backplane or back plate. If this cable is damaged, replace the power supply. 2. Reseat the cables listed in step 1, restarting the server after reseating all cables.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

System-event/error log message	Action
DHCP failure, no IP@ assigned-RETRYING!, rc=xxx, count=yyy	Information only.
Dialback failed for userid x. Could not connect at phone number yyy yyy yyyy	Information only.
ENET[eee] DHCP-HstNme=a, DN=b, IP@=ccc.ccc.ccc.ccc GW@=ddd.ddd.ddd.ddd, NMSk=fff.fff.fff.fff, DNS1@=ggg.ggg.ggg.ggg, DNS2@=hhh.hhh.hhh.hhh	Information only.
ENET[eee] IP-Cfg: HstName=x, IP@=ccc.ccc.ccc.ccc, GW@=ddd.ddd.ddd.ddd, NetMsk=fff.fff.fff.fff	Information only.
Failure reading an I2C device, possible bus failure.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. AC power cord b. (Trained service technician only) System board c. Power supply 2. (Trained service technician only) Replace the system board.
Fan x Outside Recommended Speed.	<ol style="list-style-type: none"> 1. Make sure that fan x is not obstructed. 2. Reseat the following components: <ol style="list-style-type: none"> a. Fan x b. Fan x cable 3. Replace fan x.
Fan x Failure	<ol style="list-style-type: none"> 1. Make sure that fan x is not obstructed. 2. Reseat the following components: <ol style="list-style-type: none"> a. Fan x b. Fan x cable 3. Replace fan x.
Flash of x via y failed for user z...z	Information only.
Flash of x by y via z was successful...w	Information only.
Flash succeeded for x (address : y)	Information only.
Hard drive x removal detected.	Reseat hard disk drive x and restart the server.
Hard drive x fault	<ol style="list-style-type: none"> 1. Run the diagnostic programs. 2. Replace hard disk drive x. 3. Replace the hard disk drive backplane or back plate.
Internal error CPU fault	<p>Information only. If the message remains:</p> <ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the microprocessor. 2. (Trained service technician only) Replace the microprocessor.
Invalid userid or password received. Userid is x	Information only.
LAN: Command mode tamper triggered. Possible break-in attempt	Information only.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

System-event/error log message	Action
LAN: Ethernet interface is no longer active	Information only.
LAN: Ethernet interface is now active	Information only.
LAN: Telnet tamper triggered. Possible break-in attempt	Information only.
LAN: Web Server tamper delay triggered. Possible break-in attempt	Information only.
No ISMP gateway defined for the interconnect network. RSA x is assuming the gateway	Information only.
OS Watchdog response enabled by x	Information only.
OS Watchdog response disabled by x	Information only.
PFA Alert, see preceding error in system error log.	Information only. See the preceding entry in the system-error log.
Possible ASM reset occurred --- reason unknown	Information only.
Power off	Information only.
Power on	Information only.
PPP_1: Client connected at <i>nnnn</i> bps	Information only.
PPP_1: User requested to abort PPP interface	Information only.
PPP[xxx] PPP-Cfg, Local-IP@= <i>aaa.aaa.aaa.aaa</i> , Remote-IP@= <i>bbb.bbb.bbb.bbb</i> NetMsk= <i>ccc.ccc.ccc.ccc</i> , Auth= <i>ddd</i>	Information only.
Received alert from system x; type: y, sender's ID: z	Information only.
Remote access attempt failed	Information only.
Remote access attempt failed. Invalid userid or password received. Userid is 'x' from TELNET client at IP@= <i>yyy.yyy.yyy.yyy</i>	Information only.
Remote access attempt failed. Invalid userid or password received. Userid is 'x' from CMD mode client at IP@= <i>yyy.yyy.yyy.yyy</i>	Information only.
Remote access attempt failed. Invalid userid or password received. Userid is 'x' from WEB browser at IP@= <i>xxx.xxx.xxx.xxx</i>	Information only.
Remote login successful. Login ID: 'x' from CMD mode client at IP@= <i>yyy.yyy.yyy.yyy</i>	Information only.
Retry count exceeded. Incorrect password entered too many times for userid x	Information only.
RSA x became the ISMP gateway	Information only.
RS485 broadcast from x ignored; more than y devices present on the RS485 network	Information only.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

System-event/error log message	Action
RS485 connection to system x has ended	Information only.
RS485 network overload has cleared; y or fewer devices are present on the RS485 network	Information only.
Retried alert accepted from system x; type: y, sender's ID: z	Information only.
Running the backup ASM main application	Information only.
Secondary device event [00 x UNKNOWN-y]	Information only.
Sending alert to remote system x; type: y, ID: z	Information only.
Serial tamper delay triggered. Possible serial port break-in attempt	Information only.
System board is over recommended temperature.	<ol style="list-style-type: none"> 1. Make sure that the fans have good airflow and are not obstructed. 2. (Trained service technician only) Reseat the system board. 3. (Trained service technician only) Replace the system board.
System board is under recommended temperature.	<ol style="list-style-type: none"> 1. Make sure that the fans have good airflow and are not obstructed. 2. (Trained service technician only) Reseat the system board. 3. (Trained service technician only) Replace the system board.
System complex powered down	Information only.
System error log full	Clear the current logs.
System is over recommended voltage on VRM 1.	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
System is over recommended voltage for +1.5V CPU	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board c. Power supply 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) System board b. (Trained service technician only) Microprocessor
System is over recommended voltage on +3.3V	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) System board b. Power supply 2. (Trained service technician only) Replace the system board.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

System-event/error log message	Action
System is under recommended voltage on VRM 1.	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
System is under recommended voltage for +1.5V CPU	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board c. Power supply 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) System board b. (Trained service technician only) Microprocessor
System is under recommended voltage on +3.3V	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) System board b. Power supply 2. (Trained service technician only) Replace the system board.
System log 75% full	Clear the system-event/error log.
System log cleared	Information only.
System memory error	<ol style="list-style-type: none"> 1. Reseat the DIMMs. 2. Replace the DIMMs.
System over recommended voltage for +12v.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) System board b. Power supply 2. (Trained service technician only) Replace the system board.
System over recommended voltage on +2.5v.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) System board b. Power supply 2. (Trained service technician only) Replace the system board.
System over recommended voltage on continuous +5v.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) System board b. Power supply 2. (Trained service technician only) Replace the system board.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

System-event/error log message	Action
System shutoff due to +1.5V CPU over voltage	<ol style="list-style-type: none"> Reseat the following components: <ol style="list-style-type: none"> (Trained service technician only) Microprocessor (Trained service technician only) System board Power supply Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> (Trained service technician only) System board (Trained service technician only) Microprocessor
System shutoff due to +1.5V CPU under voltage	<ol style="list-style-type: none"> Reseat the following components: <ol style="list-style-type: none"> (Trained service technician only) Microprocessor (Trained service technician only) System board Power supply Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> (Trained service technician only) System board (Trained service technician only) Microprocessor
System shutoff due to +2.5v over voltage.	<ol style="list-style-type: none"> Reseat the following components: <ol style="list-style-type: none"> (Trained service technician only) System board Power supply (Trained service technician only) Replace the system board.
System shutoff due to +3.3V over voltage	<ol style="list-style-type: none"> Reseat the following components: <ol style="list-style-type: none"> (Trained service technician only) System board Power supply (Trained service technician only) Replace the system board.
System shutoff due to +3.3V under voltage	<ol style="list-style-type: none"> Reseat the following components: <ol style="list-style-type: none"> (Trained service technician only) System board Power supply (Trained service technician only) Replace the system board.
System shutoff due to +12v over voltage.	<ol style="list-style-type: none"> Reseat the following components: <ol style="list-style-type: none"> (Trained service technician only) System board Power supply (Trained service technician only) Replace the system board.
System shutoff due to +12v under voltage.	<ol style="list-style-type: none"> Reseat the following components: <ol style="list-style-type: none"> (Trained service technician only) System board Power supply (Trained service technician only) Replace the system board.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
System-event/error log message	Action
System shutoff due to continuous +5v over voltage.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) System board b. Power supply 2. (Trained service technician only) Replace the system board.
System shutoff due to continuous +5v under voltage.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) System board b. Power supply 2. (Trained service technician only) Replace the system board.
System shutoff due to VRM 1 over voltage.	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
System shutoff due to VRM 1 under voltage.	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the microprocessor. 2. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
System shutoff due to +2.5v under voltage.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) System board b. Power supply 2. (Trained service technician only) Replace the system board.
System shutoff due to CPU over temperature.	<ol style="list-style-type: none"> 1. Make sure that the fans have good airflow and are not obstructed. 2. (Trained service technician only) Reseat the microprocessor heat-exchanger assembly.
System shutoff due to board over temperature.	<ol style="list-style-type: none"> 1. Make sure that the fans have good airflow and are not obstructed. 2. (Trained service technician only) Reseat the system board. 3. (Trained service technician only) Replace the system board.
System under recommended voltage on continuous +5v.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) System board b. Power supply 2. (Trained service technician only) Replace the system board.
System under recommended voltage for +12v.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) System board b. Power supply 2. (Trained service technician only) Replace the system board.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 3, “Parts listing, Type 4364, 4365, or 4366 server,” on page 15 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
System-event/error log message	Action
System under recommended voltage on +2.5v.	<ol style="list-style-type: none"> 1. Reseat the following components: <ol style="list-style-type: none"> a. (Trained service technician only) System board b. Power supply 2. (Trained service technician only) Replace the system board.
System shut off due to system board under temperature.	<ol style="list-style-type: none"> 1. Make sure that the fans have good airflow and are not obstructed. 2. (Trained service technician only) Reseat the system board. 3. (Trained service technician only) Replace the system board.
System x started a RS485 connection with us	Information only.
We started a RS485 connection with remote system x	Information only.
We will retry sending alert ID x; when accepted by a remote system, it will have a different ID	Information only.
Windows blue screen has been captured	Information only.

Solving power problems

Power problems can be difficult to solve. For example, a short circuit can exist anywhere on any of the power distribution buses. Usually, a short circuit will cause the power subsystem to shut down because of an overcurrent condition. To diagnose a power problem, use the following general procedure:

1. Turn off the server and disconnect all ac power cords.
2. Check for loose cables in the power subsystem. Also check for short circuits, for example, if a loose screw is causing a short circuit on a circuit board.
3. Remove the adapters and disconnect the cables and power cords to all internal and external devices until the server is at the minimum configuration that is required for the server to start (see “Solving undetermined problems” on page 114 for the minimum configuration).
4. Reconnect all ac power cords and turn on the server. If the server starts successfully, replace the adapters and devices one at a time until the problem is isolated.

If the server does not start from the minimum configuration, replace the components in the minimum configuration one at a time until the problem is isolated.

Solving Ethernet controller problems

The method that you use to test the Ethernet controller depends on which operating system you are using. See the operating-system documentation for information about Ethernet controllers, and see the Ethernet controller device-driver readme file.

Try the following procedures:

- Make sure that the correct device drivers, which come with the server are installed and that they are at the latest level.
- Make sure that the Ethernet cable is installed correctly.
 - The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.
 - If the Ethernet controller is set to operate at 100 Mbps, you must use Category 5 cabling.
 - If you directly connect two servers (without a hub), or if you are not using a hub with X ports, use a crossover cable. To determine whether a hub has an X port, check the port label. If the label contains an X, the hub has an X port.
- Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller LEDs on the rear panel of the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.
 - The Ethernet link status LED is lit when the Ethernet controller receives a link pulse from the hub. If the LED is off, there might be a defective connector or cable or a problem with the hub.
 - The Ethernet transmit/receive activity LED is lit when the Ethernet controller sends or receives data over the Ethernet network. If the Ethernet transmit/receive activity light is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check the LAN activity LED on the rear of the server. The LAN activity LED is lit when data is active on the Ethernet network. If the LAN activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check for operating-system-specific causes of the problem.
- Make sure that the device drivers on the client and server are using the same protocol.

If the Ethernet controller still cannot connect to the network but the hardware appears to be working, the network administrator must investigate other possible causes of the error.

Solving undetermined problems

If the diagnostic tests did not diagnose the failure or if the server is inoperative, use the information in this section.

If you suspect that a software problem is causing failures (continuous or intermittent), see “Software problems” on page 91.

Damaged data in CMOS memory or damaged BIOS code can cause undetermined problems. To reset the CMOS data, use the clear-CMOS jumper to clear the CMOS memory and override the power-on password; see “System-board switches and jumpers” on page 7. If you suspect that the BIOS code is damaged, see “Recovering from BIOS update failure” on page 103.

If the power supplies are working correctly, complete the following steps:

1. Turn off the server.
2. Make sure that the server is cabled correctly.
3. Remove or disconnect the following devices, one at a time, until you find the failure. Turn on the server and reconfigure it each time.
 - Any external devices.
 - Surge-suppressor device (on the server).
 - Modem, printer, mouse, and non-IBM devices.
 - Each adapter.
 - Hard disk drives.
 - Memory modules. The minimum configuration requirement is 512 MB (one 512 MB DIMM in DIMM slot 1).

The following minimum configuration is required for the server to turn on:

- One microprocessor
 - One 512 MB DIMM on the system board
 - One power supply
 - Power cord
 - System board
4. Turn on the server. If the problem remains, suspect the following components in the following order:
 - a. System board
 - b. Memory module
 - c. Microprocessor
 - d. PCI-X expansion card

If the problem is solved when you remove an adapter from the server but the problem recurs when you reinstall the same adapter, suspect the adapter; if the problem recurs when you replace the adapter with a different one, suspect the riser card.

If you suspect a networking problem and the server passes all the system tests, suspect a network cabling problem that is external to the server.

Problem determination tips

Due to the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

- Machine type and model
- Microprocessor or hard disk upgrades

- Failure symptom
 - Do diagnostics fail?
 - What, when, where, single, or multiple systems?
 - Is the failure repeatable?
 - Has this configuration ever worked?
 - If it has been working, what changes were made prior to it failing?
 - Is this the original reported failure?
- Diagnostics version
 - Type and version level
- Hardware configuration
 - Print (print screen) configuration currently in use
 - BIOS level
- Operating system software
 - Type and version level

Note: To eliminate confusion, identical systems are considered identical only if they:

1. Are the exact machine type and models
2. Have the same BIOS level
3. Have the same adapters/attachments in the same locations
4. Have the same address jumpers/terminators/cabling
5. Have the same software versions and levels
6. Have the same diagnostics code (version)
7. Have the same configuration options set in the system
8. Have the same setup for the operation system control files

Comparing the configuration and software setup between “working” and “non-working” systems will often lead to problem resolution.

Calling IBM for service

See Appendix A, “Getting help and technical assistance,” on page 117 for information about calling IBM for service.

When you call for service, have as much of the following information available as possible:

- Machine type and model
- Microprocessor and hard disk drive upgrades
- Failure symptoms
 - Does the server fail the diagnostic programs? If so, what are the error codes?
 - What occurs? When? Where?
 - Is the failure repeatable?
 - Has the current server configuration ever worked?
 - What changes, if any, were made before it failed?
 - Is this the original reported failure, or has this failure been reported before?
- Diagnostic program type and version level
- Hardware configuration (print screen of the system summary)
- BIOS code level

- Operating-system type and version level

You can solve some problems by comparing the configuration and software setups between working and nonworking servers. When you compare servers to each other for diagnostic purposes, consider them identical only if all the following factors are exactly the same in all the servers:

- Machine type and model
- BIOS level
- Memory amount, type, and configuration
- Adapters and attachments, in the same locations
- Address jumpers, terminators, and cabling
- Software versions and levels
- Diagnostic program type and version level
- Configuration option settings
- Operating-system control-file setup

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This appendix contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your system or optional device, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Hardware Maintenance Manual and Troubleshooting Guide* or *Problem Determination and Service Guide* on the IBM Documentation CD that comes with your system.

Note: For some IntelliStation models, the *Hardware Maintenance Manual and Troubleshooting Guide* is available only from the IBM support Web site.

- Go to the IBM support Web site at <http://www.ibm.com/servers/eserver/support/xseries/index.html> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with IBM systems also describes the diagnostic tests that you can perform. Most systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/servers/eserver/support/xseries/index.html> and follow the instructions. Also, some documents are available through the IBM Publications Center at <http://www.ibm.com/shop/publications/order/>.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM systems, optional devices, services, and support. The address for IBM System x and xSeries information is <http://www.ibm.com/systems/x/>. The address for IBM IntelliStation information is <http://www.ibm.com/intellistation/>.

You can find service information for IBM systems and optional devices at <http://www.ibm.com/servers/eserver/support/xseries/index.html>.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with System x and xSeries servers, BladeCenter products, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, see <http://www.ibm.com/services/sl/products/>.

For more information about Support Line and other IBM services, see <http://www.ibm.com/services/>, or see <http://www.ibm.com/planetwide/> for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Hardware service and support

Important: When you call for service, you will be asked to provide the four-digit machine type of your system, which is 4364, 4365, or 4366.

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台灣國際商業機器股份有限公司
台北市松仁路 7 號 3 樓
電話：0800-016-888

IBM Taiwan product service contact information:

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Taipei, Taiwan
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Important notes

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.

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

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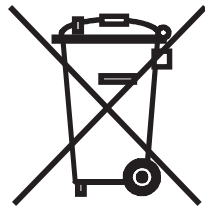
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Product recycling and disposal

This unit must be recycled or discarded according to applicable local and national regulations. IBM encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. IBM offers a variety of product return programs and services in several countries to assist equipment owners in recycling their IT products. Information on IBM product recycling offerings can be found on IBM's Internet site at <http://www.ibm.com/ibm/environment/products/prp.shtml>.

Esta unidad debe reciclarse o desecharse de acuerdo con lo establecido en la normativa nacional o local aplicable. IBM recomienda a los propietarios de equipos de tecnología de la información (TI) que reciclen responsablemente sus equipos cuando éstos ya no les sean útiles. IBM dispone de una serie de programas y servicios de devolución de productos en varios países, a fin de ayudar a los propietarios de equipos a reciclar sus productos de TI. Se puede encontrar información sobre las ofertas de reciclado de productos de IBM en el sitio web de IBM <http://www.ibm.com/ibm/environment/products/prp.shtml>.



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This appliance is labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

注意: このマークは EU 諸国およびノルウェーにおいてのみ適用されます。

この機器には、EU 諸国に対する廃電気電子機器指令 2002/96/EC(WEEE) のラベルが貼られています。この指令は、EU 諸国に適用する使用済み機器の回収とリサイクルの骨子を定めています。このラベルは、使用済みになった時に指令に従って適正な処理をする必要があることを知らせるために種々の製品に貼られています。

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L'étiquette du système respecte la Directive européenne 2002/96/EC en matière de Déchets des Equipements Electriques et Electroniques (DEEE), qui détermine les dispositions de retour et de recyclage applicables aux systèmes utilisés à travers l'Union européenne. Conformément à la directive, ladite étiquette précise que le produit sur lequel elle est apposée ne doit pas être jeté mais être récupéré en fin de vie.

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Battery return program

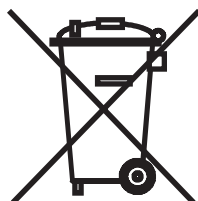
This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries outside the United States, go to <http://www.ibm.com/ibm/environment/products/index.shtml> or contact your local waste disposal facility.

In the United States, IBM has established a return process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and battery packs from IBM equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Have the IBM part number listed on the battery available prior to your call.

For Taiwan: Please recycle batteries.



For the European Union:



Notice: This mark applies only to countries within the European Union (EU).

Batteries or packaging for batteries are labeled in accordance with European Directive 2006/66/EC concerning batteries and accumulators and waste batteries and accumulators. The Directive determines the framework for the return and recycling of used batteries and accumulators as applicable throughout the European Union. This label is applied to various batteries to indicate that the battery is not to be thrown away, but rather reclaimed upon end of life per this Directive.

Les batteries ou emballages pour batteries sont étiquetés conformément aux directives européennes 2006/66/EC, norme relative aux batteries et accumulateurs en usage et aux batteries et accumulateurs usés. Les directives déterminent la marche à suivre en vigueur dans l'Union Européenne pour le retour et le recyclage des batteries et accumulateurs usés. Cette étiquette est appliquée sur diverses batteries pour indiquer que la batterie ne doit pas être mise au rebut mais plutôt récupérée en fin de cycle de vie selon cette norme.

バッテリーあるいはバッテリー用のパッケージには、EU 諸国に対する廃電気電子機器指令 2006/66/EC のラベルが貼られています。この指令は、バッテリーと蓄電池、および廃棄バッテリーと蓄電池に関するものです。この指令は、使用済みバッテリーと蓄電池の回収とリサイクルの骨子を定めているもので、EU 諸国にわたって適用されます。このラベルは、使用済みになったときに指令に従って適正な処理をする必要があることを知らせるために種々のバッテリーに貼られています。

In accordance with the European Directive 2006/66/EC, batteries and accumulators are labeled to indicate that they are to be collected separately and recycled at end of life. The label on the battery may also include a chemical symbol for the metal concerned in the battery (Pb for lead, Hg for mercury, and Cd for cadmium). Users of batteries and accumulators must not dispose of batteries and accumulators as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and treatment of batteries and accumulators. Customer participation is important to minimize any potential effects of batteries and accumulators on the environment and human health due to the potential presence of hazardous substances. For proper collection and treatment, contact your local IBM representative.

This notice is provided in accordance with Royal Decree 106/2008 of Spain: The retail price of batteries, accumulators, and power cells includes the cost of the environmental management of their waste.

For California:

Perchlorate material – special handling may apply. See <http://www.dtsc.ca.gov/hazardouswaste/perchlorate/>.

The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5 Chapter 33. Best Management Practices for Perchlorate Materials. This product/part may include a lithium manganese dioxide battery which contains a perchlorate substance.

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.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

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

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用する
と電波妨害を引き起こすことがあります。この場合には使用者が適切な対策
を講ずるよう要求されることがあります。 VCCI-A

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