

IBM xSeries 306m Types 8849 and 8491



Problem Determination and Service Guide

IBM xSeries 306m Types 8849 and 8491



Problem Determination and Service Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 111.

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.

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφαλείας (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 options 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 64.
 - 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 servicing electrical equipment:

- Check the area for electrical hazards such as moist floors, nongrounded power extension cords, power surges, 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 using 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 measuring 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 documentation begins 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 begins with a number 1, translations for that caution statement appear in the *Safety Information* document under statement 1.

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

Statement 1:



DANGER

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

To avoid a shock hazard:

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

To Connect:

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

To Disconnect:

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

Statement 2:



CAUTION:

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

Do not:

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

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

Statement 3:



CAUTION:

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

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

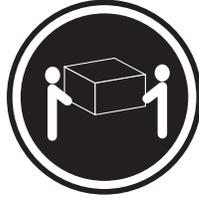


DANGER

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

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

Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



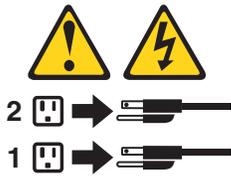
≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 5:



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



Statement 8:



CAUTION:

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



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

Statement 10:



CAUTION:

Do not place any object weighing more than 82 kg (180 lb) on top of rack-mounted devices.



>82 kg (180 lb)

Attention: 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® xSeries® 306m Type 8849 or Type 8491 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 options.

- *User's Guide*

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

- *Warranty and Support Information*

This document is in PDF on the *xSeries 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 *xSeries Documentation* CD.

The server might have features that are not described in the documentation that you received with the server. The documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the server documentation.

These updates are available from the IBM Web site. 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/support/>.
2. Under **Search technical support**, type **xSeries 306m** and click **Search**.

Notices and statements in this document

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

The following notices and statements are used in this document:

- **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.

Table 1. Features and specifications

<p>Microprocessor:</p> <p>One Intel® LGA 775 Pentium® IV w/ 1024 KB (minimum) Level-2 cache Note: Use the Configuration/Setup Utility program to determine the type and speed of the microprocessor.</p> <p>Memory:</p> <ul style="list-style-type: none"> • Minimum: 512 MB • Maximum: 8 GB • Type: PC4200, 533 MHz, ECC, DDR II unbuffered SDRAM DIMMs only • Slots: Four dual inline • Supports 512 MB, 1 GB, and 2 GB DIMMs <p>Drives:</p> <p>CD/DVD: Ultrabay Enhanced</p> <p>Expansion bays:</p> <p>Two 3.5-inch slim-high bays for hard disk drives.</p> <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 <p>Expansion slots:</p> <ul style="list-style-type: none"> • Two 66/100 MHz/64-bit PCI-X slots • Upgradable to one PCI Express x8 slot and one 66/100 MHz/64-bit PCI-X slot <p>Video controller:</p> <ul style="list-style-type: none"> • ATI RN50B video on system board • Compatible with SVGA and VGA • 16 MB DDR video memory 	<p>Power supply:</p> <p>350 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 <p>Hard disk controllers:</p> <ul style="list-style-type: none"> • Serial ATA (SATA) controller with integrated RAID (simple-swap SATA models) • Serial-attached SCSI (SAS) controller with integrated RAID (hot-swap SAS/SATA models) <p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> • Sound power, idling: 65 decibel maximum • Sound power, operating: 65 decibel maximum <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 m (2998.7 ft) – Server off: -40° to 60°C (-104° 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>Heat output:</p> <p>Approximate heat output in British thermal units (Btu) per hour:</p> <ul style="list-style-type: none"> • Minimum configuration: 341 Btu (100 watts) per hour • Maximum configuration: 1024 Btu (300 watts) per hour <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 • Input kilovolt-amperes (kVA), approximately: <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 installed and the power-management optional features in use. 2. These levels were measured in controlled acoustical environments according to the procedures 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 values stated 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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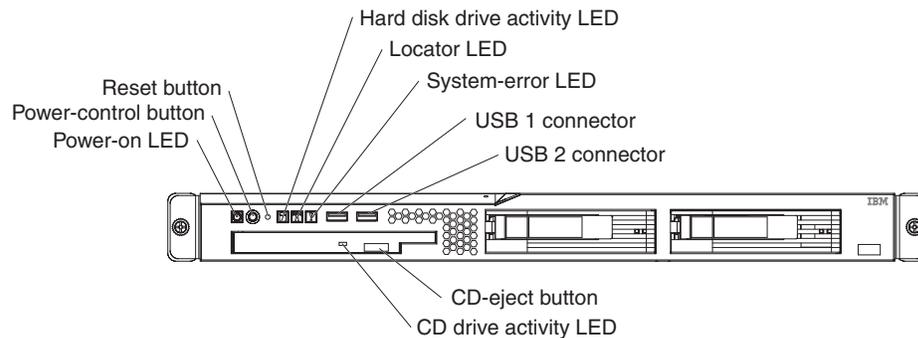
Note: Some operating systems, such as SCO 6.0 and UnixWare 7.14, do not support RAID. See <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

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, it indicates that the server is turned on. 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: When this LED is lit, it has been lit remotely by the system administrator to aid in visually locating the server.

System-error LED: When this LED is lit, it indicates that a system error has occurred.

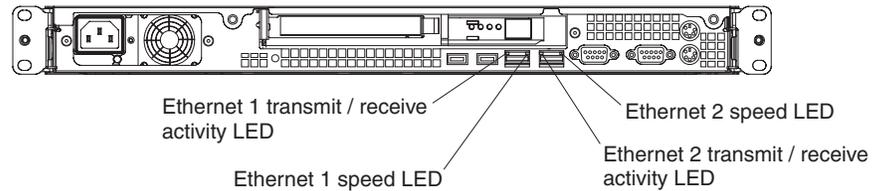
USB connectors: Connect a USB device to either of these connectors.

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

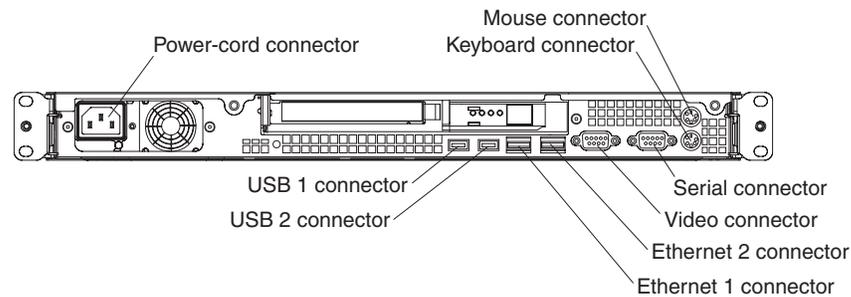
The following illustration shows the LEDs on the rear of the server.



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.

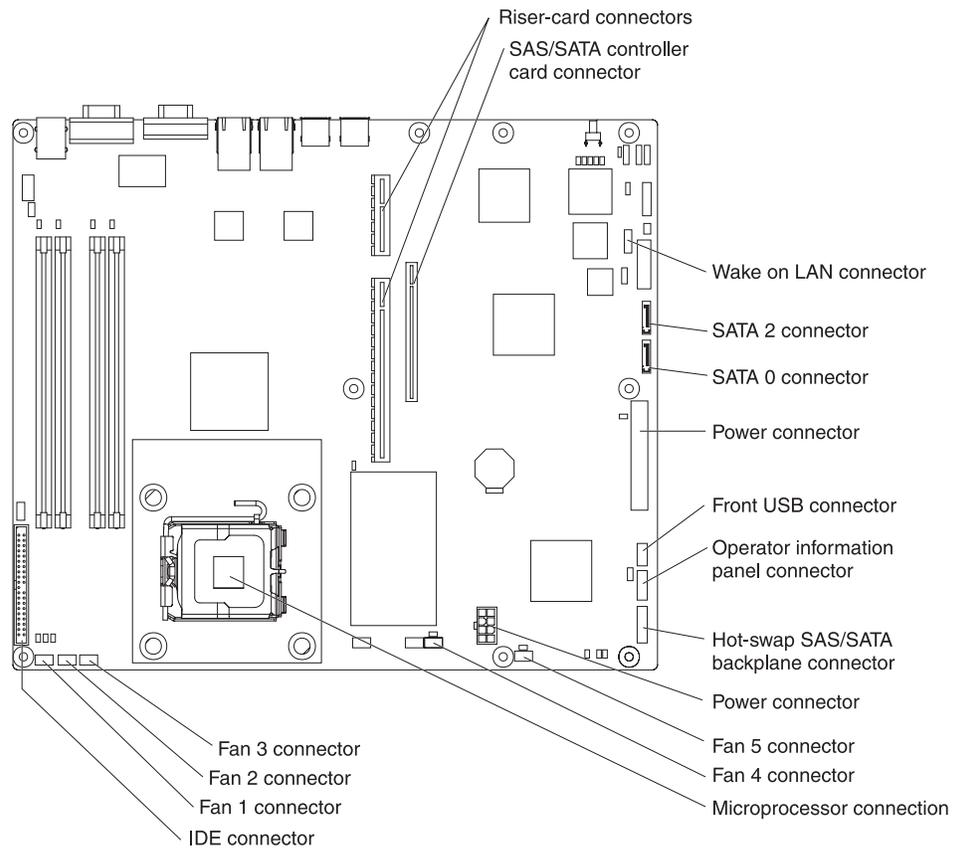
USB connector: Connect a USB device to either of these connectors.

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.

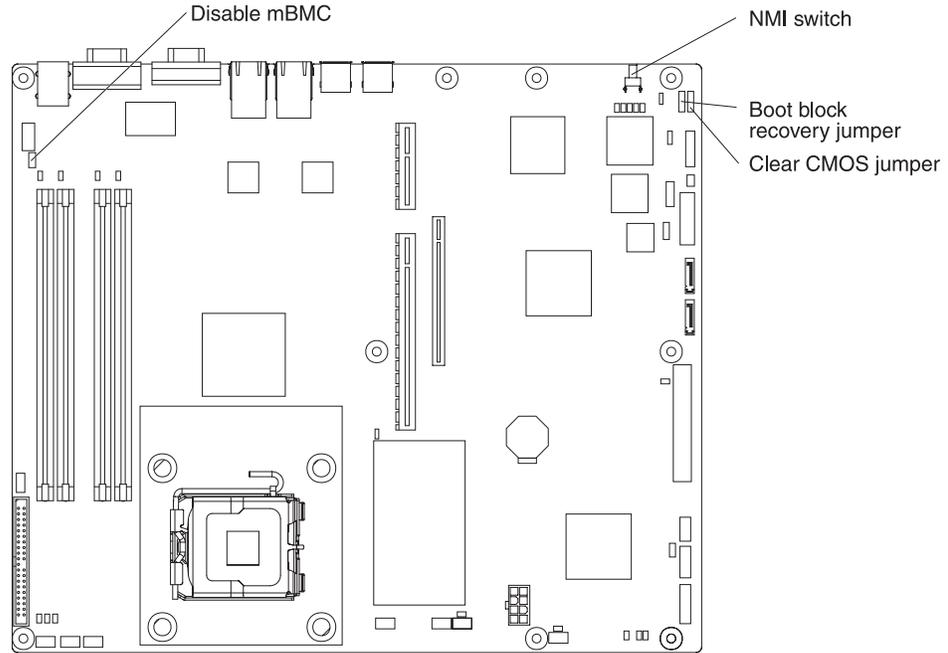
System-board internal connectors

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



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.

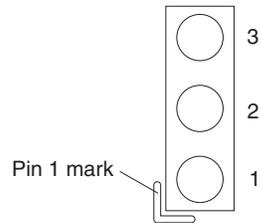
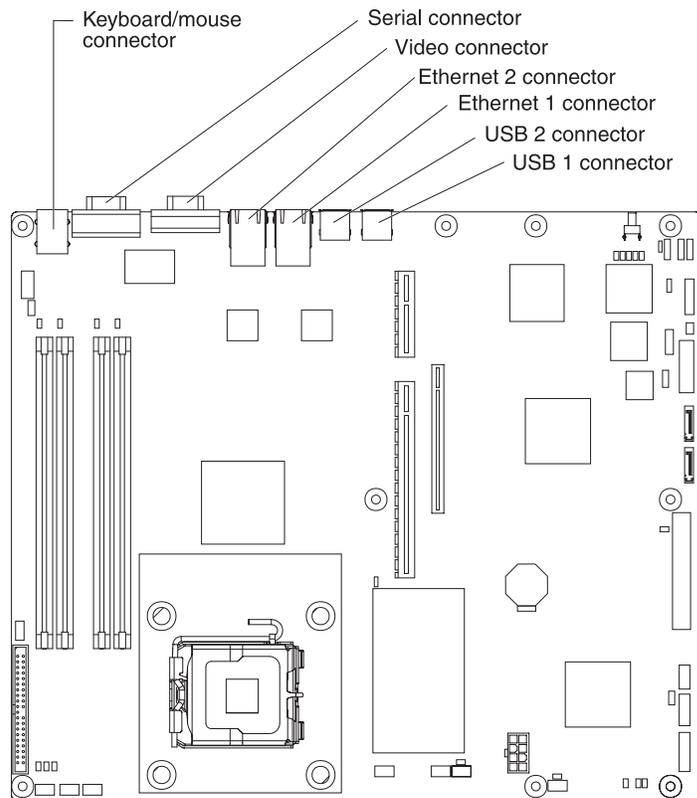


Table 2. Switch and jumper settings

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 • NMI button on rear of server pressed: NMI issued
Mini-BMC jumper (JP6)	<ul style="list-style-type: none"> • Pins 2 and 3: Normal (default) • Pins 1 and 2: Disable the mini-BMC. This setting might be necessary when a service processor adapter other than the optional Remote Supervisor Adapter II is installed.

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.

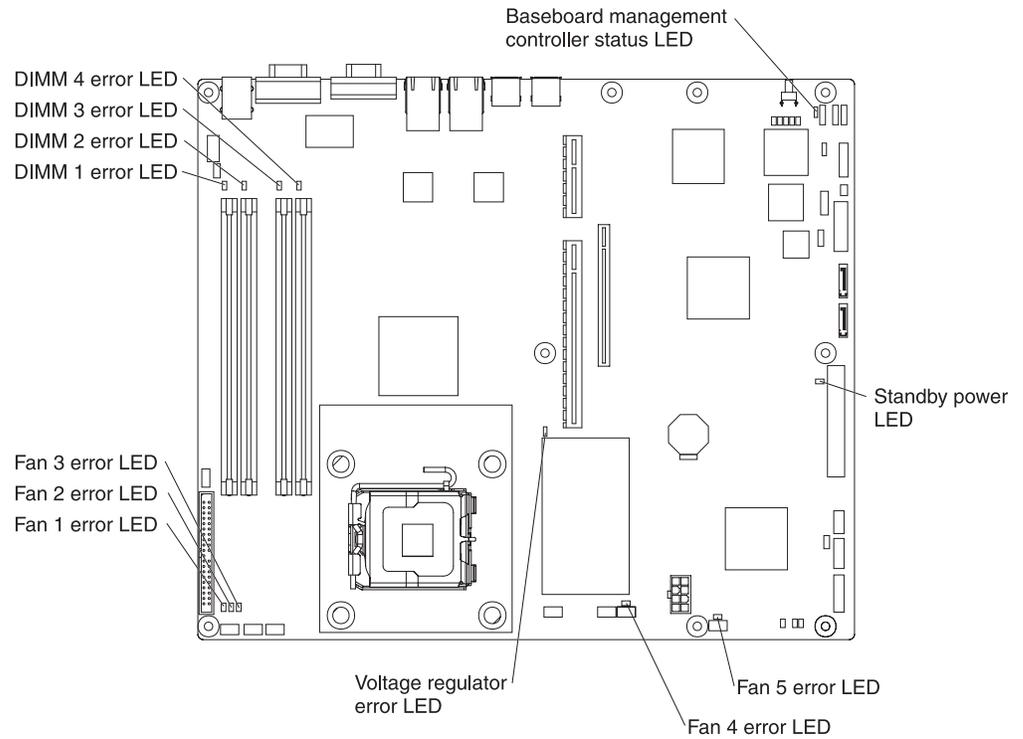
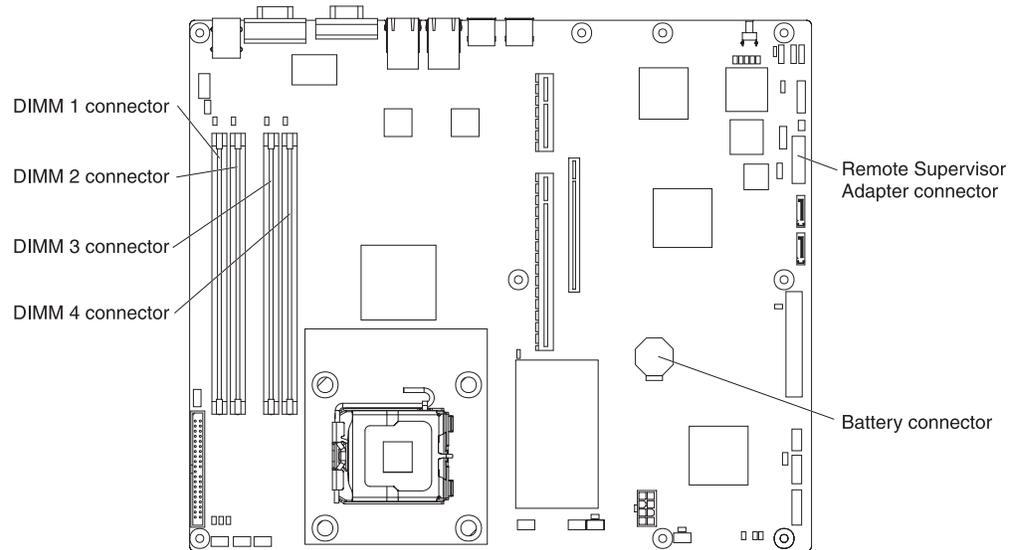


Table 3. System-board LEDs

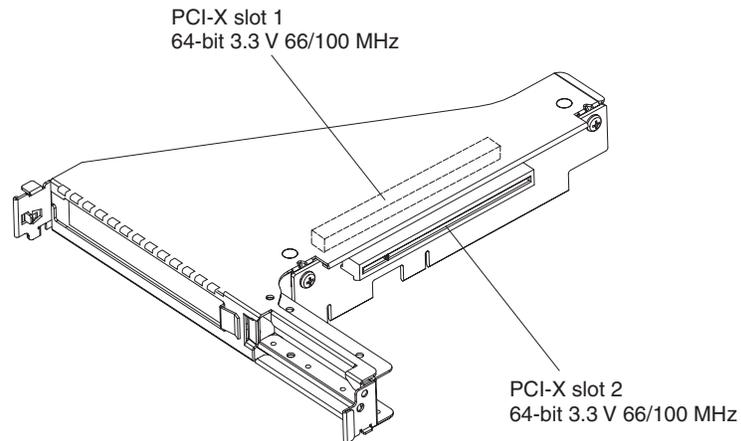
LED	Description
Error LEDs	The associated component has failed.
Baseboard management controller status LED	This LED flashes to indicate that the mini-BMC is functioning normally.
Standby power LED	This LED is lit whenever the server is connected to ac power.

System-board option connectors

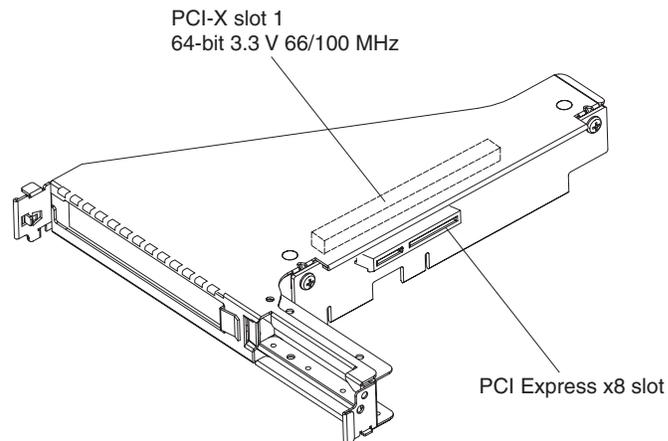
The following illustration shows the connectors for user-installable options.



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



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



Chapter 2. Diagnostics

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

If you cannot locate and correct the problem using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 109 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 24.
- **System board LEDs**

Use the system board LEDs to diagnose system errors quickly. See “System board LEDs” on page 36 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 38 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 prompted, for POST to run.

If POST detects a problem, one or more beeps might sound, or an error message is displayed. See “POST beep codes” and “POST error codes” on page 15 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 29 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 8849 or Type 8491 server,” on page 61 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. 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
1-3-1	1st 64K RAM test 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
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.

- 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 8849 or Type 8491 server,” on page 61 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
2-2-2	Keyboard controller failed.	Replace the following components, one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> 1. Keyboard 2. (Trained service technician only) System board.
2-2-3	CMOS power failure and checksum checks failed.	<ol style="list-style-type: none"> 1. Reseat the battery. 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. Battery b. (Trained service technician only) System board
3-1-4	Time-of-day clock failed.	<ol style="list-style-type: none"> 1. Reseat the battery. 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. Battery b. (Trained service technician only) 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 *POST error log* contains the three most recent error codes and messages that were generated during POST. The *system event log* contains messages that were generated by the mini-BMC. The *system event/error log* is a combined log that contains messages that were generated during POST and all system status messages from the mini-BMC.

The system event/error log and BMC system event log are limited in size. When each log is full, new entries will not overwrite existing entries; therefore, you must periodically clear these logs 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 both the logs so that you can find current errors more easily.

Important: After you complete a repair or correct an error, clear the BMC 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 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 system event/error log entry appears 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-X slots, note that the error logs report the PCI-X 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 appears, 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 BMC system event log, select **Advanced Setup --> Baseboard Management Controller (BMC) Setting --> System Event Log**
 - To view the combined system event/error log, select **Error logs**, and then select **System Event/Error 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 appears, 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 clear the BMC system event log, select **Advanced Setup --> Baseboard Management Controller (BMC) Setting**. Set **Clear System Event Log to Enabled**; then, press Esc.
 - To clear the combined 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.

Error code	Description	Action
062	Three consecutive boot failures using the default configuration.	<ol style="list-style-type: none"> 1. Run the Configuration/Setup Utility program, save the configuration, and restart the server. 2. Update the system firmware to the latest level (see "Updating the firmware" on page 101). 3. 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. (Trained service technician only) Microprocessor c. (Trained service technician only) System board 4. Replace the components listed in step 3, one at a time, in the order shown, restarting the server each time.
101, 102	System and processor error.	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the system board. 2. (Trained service technician only) Replace the system board.
106	System and processor error.	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the system board. 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 8849 or Type 8491 server,” on page 61 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
151	Real-time clock error.	<ol style="list-style-type: none"> 1. Reseat the battery. 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. Battery b. (Trained service technician only) System board
161	Real-time clock battery error.	<ol style="list-style-type: none"> 1. Reseat the battery. 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. Battery b. (Trained service technician only) System board
162	Device configuration 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 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, then the device should be resealed 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, then the device should 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. 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

- 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 8849 or Type 8491 server,” on page 61 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 corrupted or not loaded.	<ol style="list-style-type: none"> 1. Update the firmware on the optional Remote Supervisor Adapter II (see “Updating the firmware” on page 101). 2. Replace the optional Remote Supervisor Adapter II.
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. 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. Run the Configuration/Setup Utility program, set the serial number, and save the configuration. 2. (Trained service technician only) Replace the system board
189	An attempt was 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 user or by the system.	<ol style="list-style-type: none"> 1. If the DIMM was disabled by the user, run the Configuration/Setup Utility program and enable the DIMM. 2. Make sure that the DIMM is installed correctly (see “Installing a memory module (DIMM)” on page 79). 3. Reseat the DIMM. 4. 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 8849 or Type 8491 server,” on page 61 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. 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.
1600	Service processor not functioning	<ol style="list-style-type: none"> 1. Reseat the optional Remote Supervisor Adapter II. 2. Replace the optional Remote Supervisor Adapter II.
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 diagnostics tests on drive x. 2. Reseat the following components: <ol style="list-style-type: none"> a. Hard disk drive b. (Hot-swap model) Cable from SAS/SATA controller to backplane c. (Simple-swap model) Cables from integrated SATA controller to back panel 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. Hard disk drive b. (Hot-swap models) Cable from SAS/SATA controller c. Hard disk drive backplane or back panel d. (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.

- 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 8849 or Type 8491 server,” on page 61 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
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 verify 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
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

- 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 8849 or Type 8491 server,” on page 61 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
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 panel 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 panel d. (Trained service technician only) System board
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 1 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 1	<ol style="list-style-type: none"> 1. Update the BIOS code again. 2. (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 8849 or Type 8491 server,” on page 61 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 1	<ol style="list-style-type: none"> 1. Update the BIOS code again. 2. (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: <ol style="list-style-type: none"> a. Hard disk drive b. Hard disk drive backplane cable or back panel cables 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. (Hot-swap models) Hard disk drive cable b. Hard disk drive c. Hard disk drive backplane or back panel d. (Trained service technician only) System board
I9990305	Operating system not found	Run the Configuration/Setup Utility program to make sure that a bootable operating system is installed on one or more devices that are listed in the boot order.
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 performing the checkout procedure for diagnosing hardware problems, review the following information:

- Read the safety information beginning 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 29 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 sharing 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 14. If the server is halted and no error message is displayed, see “Troubleshooting tables” on page 24 and “Solving undetermined problems” on page 59.
- For information about power-supply problems, see “Solving power problems” on page 57.
- For intermittent problems, check the error log; see “Error logs” on page 14 and “Diagnostic programs, messages, and error codes” on page 38.

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 all cables and power cords.
 - c. Set all display controls to the middle positions.
 - d. Turn on all external devices.
 - e. Turn on the server. If the server does not start, see “Troubleshooting tables” on page 24.
 - f. 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 36).
 - g. Check for the following results:
 - Successful completion of POST (see “POST” on page 11 for more information)
 - Successful completion of startup
 3. Did one or more beeps sound?
 - **No:** Find the failure symptom in “Troubleshooting tables” on page 24; if necessary, run the diagnostic programs (see “Running the diagnostic programs” on page 38).
 - If you receive an error, see “Diagnostic error codes” on page 40.
 - If the diagnostic programs were completed successfully and you still suspect a problem, see “Solving undetermined problems” on page 59.
 - **Yes:** Find the beep code in “POST beep codes” on page 11; if necessary, see “Solving undetermined problems” on page 59.

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 38 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 36).
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

<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 8849 or Type 8491 server,” on page 61 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 correct device driver is installed for the CD or DVD drive.2. Run the CD, CDRW, 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. Reseat the CD or DVD drive.4. Replace the CD or DVD drive.
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 8849 or Type 8491 server,” on page 61 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 8849 or Type 8491 server,” on page 61 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.
A hard disk drive passes the diagnostic Fixed Disk Test but the problem remains.	Run the diagnostic SCSI Fixed Disk Test (see “Running the diagnostic programs” on page 38). Note: This test is not available on servers that have RAID arrays or servers that have SATA hard disk drives. Use the Fixed Disk Test for SATA hard disk drives or servers that have RAID arrays.

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 8849 or Type 8491 server,” on page 61 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"> 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. Check the system-error log (see “Error logs” on page 14).

Keyboard, mouse, or pointing-device 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 8849 or Type 8491 server,” on page 61 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"> 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. 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. Reseat the keyboard cable. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> Keyboard (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 8849 or Type 8491 server,” on page 61 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 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 keyboard cable directly to the correct connector on the rear of the server. 2. Make sure that: <ul style="list-style-type: none"> • 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

USB keyboard, mouse, or pointing-device 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 8849 or Type 8491 server,” on page 61 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 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. Make sure that: <ul style="list-style-type: none"> • The keyboard cable is securely connected and the keyboard and mouse cables are not reversed. • The server and the monitor are turned on. 3. Reseat the keyboard 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. 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 8849 or Type 8491 server,” on page 61 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 USB mouse or USB pointing device does not work.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The mouse or pointing-device USB cable is securely connected to the server, the keyboard and mouse or pointing-device cables are not reversed, and the device drivers are installed correctly. • The server and the monitor are turned on. • Keyboardless operation has been enabled in the Configuration/Setup Utility program. 2. If a USB hub is in use, disconnect the USB device from the hub and connect it directly to the server. 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

<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 8849 or Type 8491 server,” on page 61 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. • Memory mirroring does not account for the discrepancy. • The memory modules are seated correctly. • You have installed the correct type of memory. • If you changed the memory, you updated the memory configuration in the Configuration/Setup Utility program. • All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled. 2. Check the POST error log for error message 289: <ul style="list-style-type: none"> • If a DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. • If a DIMM was disabled by the user or by POST, run the Configuration/Setup Utility program and enable the DIMM. 3. Run memory diagnostics (see “Running the diagnostic programs” on page 38). 4. Add one pair of DIMMs at a time, making sure that the DIMMs in each pair are matching. 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. DIMMs b. (Trained service technician only) System board

Microprocessor 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 8849 or Type 8491 server,” on page 61 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 startup (boot) 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 36). 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. If you cannot diagnose the problem, call for service.

<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 8849 or Type 8491 server,” on page 61 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. Reseat the Remote Supervisor Adapter II (if one is present). 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. Remote Supervisor Adapter II (if one is present) b. (Trained service technician only) 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 33. • The monitor cables are connected correctly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. • No beep codes sound 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 “Updating BIOS code” on page 48. 5. See “Solving undetermined problems” on page 59.
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 38). <ul style="list-style-type: none"> • If the server passes the video diagnostics, the video is good; see “Solving undetermined problems” on page 59. • (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 8849 or Type 8491 server,” on page 61 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 monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.</p>	<ol style="list-style-type: none"> 1. If the monitor self-tests show the that 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 (if one is present) 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 (if one is present) d. (Trained service technician only) System board
<p>Wrong characters appear on the screen.</p>	<ol style="list-style-type: none"> 1. If the wrong language is displayed, update the BIOS code (see “Updating the firmware” on page 101) 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 8849 or Type 8491 server,” on page 61 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 memory or any other 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 hardware and 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

<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 8849 or Type 8491 server,” on page 61 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. (Trained service technician only) If the server does not start, disconnect the server power cords and reseal the operator information panel cables; then, repeat steps 1a through 1c. If the problem remains, replace the operator information panel. 2. Make sure that: <ul style="list-style-type: none"> • The power cords are 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 turns on, 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. (Trained service technician only) Power supply c. (Trained service technician only) System board 6. See “Solving undetermined problems” on page 59.
<p>The server does not turn off.</p>	<ol style="list-style-type: none"> 1. Determine whether you are using an Advanced Configuration and Power Interface (ACPI) or a 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 I/O board.
<p>The server unexpectedly shuts down, and the LEDs on the operator information panel are not lit.</p>	<p>See “Solving undetermined problems” on page 59.</p>

Serial port 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 8849 or Type 8491 server,” on page 61 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"> 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 present) is seated correctly. Reseat the serial port adapter. Replace the serial port adapter.
A serial device does not work.	<ol style="list-style-type: none"> 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 “Internal LEDs, connectors, and jumpers” on page 5). Reseat the following components: <ol style="list-style-type: none"> Failing serial device Serial cable Remote Supervisor Adapter II (if one is present) Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> Failing serial device Serial cable Remote Supervisor Adapter II (if one is present) (Trained service technician only) System board

ServerGuide 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 8849 or Type 8491 server,” on page 61 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"> Make sure that the server supports the ServerGuide program and has a startable (bootable) CD or DVD drive. If the startup (boot) sequence settings have been changed, make sure that the CD or DVD drive is first in the startup sequence. 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 8849 or Type 8491 server,” on page 61 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 option 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 8849 or Type 8491 server,” on page 61 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 8849 or Type 8491 server,” on page 61 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. Run USB diagnostics (see “Running the diagnostic programs” on page 38).2. 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.3. 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).4. 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 30.

System board LEDs

The system board has error LEDs for the fans, voltage regulator and memory that will help to locate the source of the error. When an error LED is lit, run the diagnostic programs (see “Running the diagnostic programs” on page 38) 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.

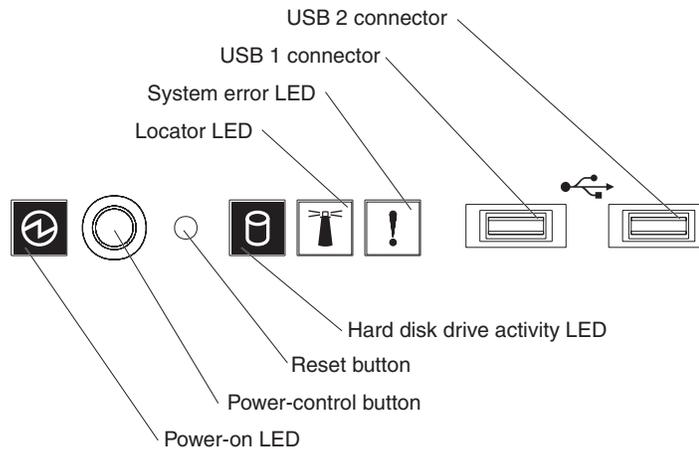
The system board also has some status LEDs. See the illustration in step 7 on page 37 for the location of the status LEDs.

Before working 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 68.

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 37.

The following illustration shows the operator information panel.



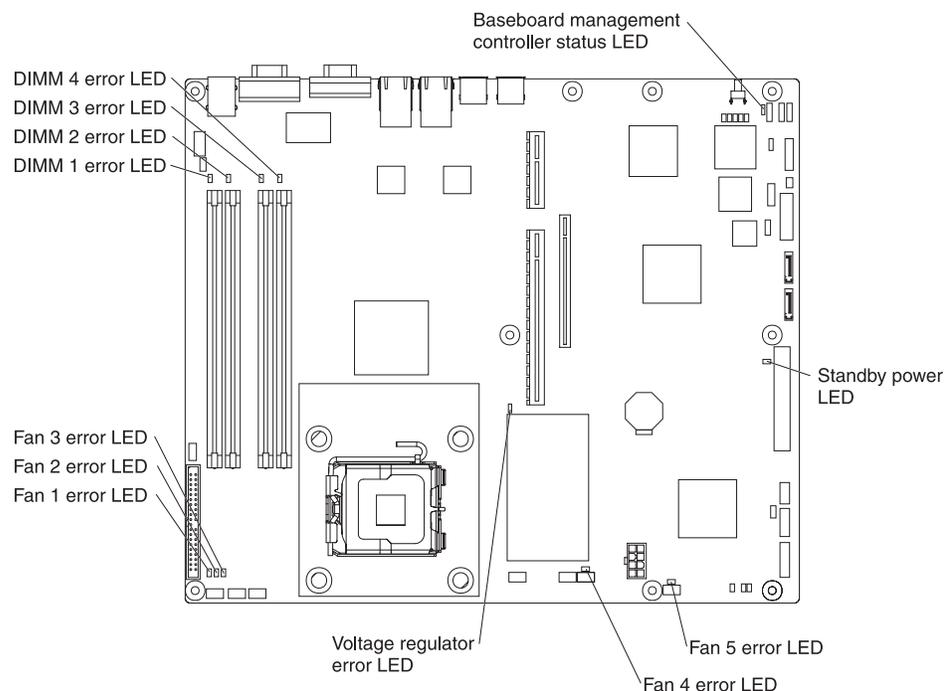
2. Read the safety information that begins on page “Safety” on page vii and “Installation guidelines” on page 67.
3. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
4. Remove the server from the rack and place on a flat, static-protective surface.
5. Remove the cover (see “Removing the cover” on page 70).
6. Reconnect all external cables and the power cord; then, turn on the server.

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

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 status LED flashes to indicate that the mini-BMC is functioning normally.

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 40.

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** appears, press F1.
4. When the **Configuration/Setup Utility** menu appears, 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 Fixed Disk Test** for the most thorough test. Select **Fixed Disk Test** for any of the following situations:

- You want to run a faster test.
- The server contains RAID arrays.
- The server contains simple-swap SATA hard disk drives.

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 40.

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 29 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 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 present 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 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, 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. These numbers appearing in the central position of the code 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 <i>do not replace a CRU or a FRU</i> . See the description of Warning in “Diagnostic text messages” on page 39 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 8849 or Type 8491 server,” on page 61 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 assembly b. (Trained service technician only) System board.
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.

- 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 8849 or Type 8491 server,” on page 61 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
035-253-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.
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 101). 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 101). 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 101). 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 101). 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 8849 or Type 8491 server,” on page 61 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
035-269-0nn	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 101). 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 101). 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 101). 2. Reseat the RAID adapter. 3. Replace the RAID adapter.
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 101). 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 101). 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 101). 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 101). 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 8849 or Type 8491 server,” on page 61 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
035-279-001	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 101). 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 101). 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 = ServerRAID channel number, nn = ID of failing fixed disk drive.	<ol style="list-style-type: none"> 1. Check the system-error log 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.
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 log and replace any indicated failing devices. Note: A FRU must be replaced by a trained service technician only. 2. Reseat the disk with ID nn on adapter in slot s. 3. Replace the disk with ID nn on 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 be sure they are secure.

- 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 8849 or Type 8491 server,” on page 61 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-s99	Failed RAID test: s = number of failing adapter slot	<ol style="list-style-type: none"> 1. Check the system-error log 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
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

- 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 8849 or Type 8491 server,” on page 61 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
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 panel. 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 panel
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.
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

- 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 8849 or Type 8491 server,” on page 61 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
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
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. Complete the following steps to identify the slot on the riser card: <ol style="list-style-type: none"> a. Run the Configuration/Setup Utility program. b. Select Advanced Setup --> PCI Slot/Device Information. <p>In the information for Ethernet Controller, the entry in the Slot column is the PCI slot number for the adapter.</p> <p>Note: If adapters are installed in both slots on the riser card, 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.</p> 2. Reseat the Ethernet adapter in the slot. 3. Replace the Ethernet adapter in the slot.

Updating BIOS code

The BIOS code can be updated by using an external USB diskette drive or by using a Linux or Windows® update package (if available).

The most current level of BIOS code for the server is available at <http://www.ibm.com/support/>. After you make sure that the server has the latest level of baseboard management controller firmware, you can update the BIOS code for the server through one of the following methods:

- Downloading the latest BIOS code from the IBM Web site, creating an update diskette, and using an external USB diskette drive to install the BIOS code.
- Installing an update package for the Linux or Microsoft® Windows operating system, if available.

If power to the server is interrupted while the POST/BIOS code is being updated (flash update), 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 68.
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 “Server controls, LEDs, and connectors” on page 4).
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 POST/BIOS update (flash) diskette into the diskette drive. You can download a file to create this diskette from <http://www.ibm.com/support/>.
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-error log messages

A system-error log is generated only if a Remote Supervisor Adapter II is installed. The system-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-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
Error Code: System Complex Powered Up
Error Code:
Error Data:
Error Data:
-----

```

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

Note: These actions have the following meaning:

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 99).
3. Check the system board for damage or loose parts.
4. Make sure 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 100).
5. Make sure to reinstall all removable components on the system board and reconnect all cables to the system board.

Reseat the power supply

(Trained service technician only) Complete the following steps:

1. Remove the power supply from the server (see “Removing the power supply” on page 86).
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 87).

<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 8849 or Type 8491 server,” on page 61 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-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.

- 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 8849 or Type 8491 server,” on page 61 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-error log message	Action
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.
Cable: Service processor not present	<ol style="list-style-type: none"> 1. Check the pins and connectors on the cable that connects the Remote Supervisor Adapter II or other service processor adapter to the Remote Supervisor Adapter connector on the system board (see the illustration on page 10 for the location of the connector). 2. Reseat the cable (both ends) from the Remote Supervisor Adapter II or other service processor adapter to the Remote Supervisor Adapter connector on the system board. 3. Restart the server.
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.

- 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 8849 or Type 8491 server,” on page 61 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-error log message	Action
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 panel to the SATA connectors on the system board. If either of these cables is damaged, replace the back panel. • The power cable or cables to the hard disk drive backplane or back panel. If this cable is damaged, replace the power supply. 2. Reseat the cables listed in step 1, restarting the server after reseating all cables.
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 yyy	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. (Trained service technician only) 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.

- 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 8849 or Type 8491 server,” on page 61 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-error log message	Action
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 diagnostics programs. 2. Replace hard disk drive x. 3. Replace the hard disk drive backplane or back panel.
Internal error CPU fault	Information only. If the message remains: <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.
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[<i>xxx</i>] 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.

<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 8849 or Type 8491 server,” on page 61 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-error log message	Action
Remote access attempt failed. Invalid userid or password received. Userid is 'x' from CMD mode client at IP@=yyy.yyy.yyy.yyy	Information only.
Remote access attempt failed. Invalid userid or password received. Userid is 'x' from WEB browser at IP@=xxx.xxx.xxx.xxx	Information only.
Remote login successful. Login ID: 'x' from CMD mode client at IP@=yyy.yyy.yyy.yyy	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.
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

- 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 8849 or Type 8491 server,” on page 61 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-error log message	Action
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. (Trained service technician only) 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. (Trained service technician only) Power supply 2. (Trained service technician only) Replace the system board.
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. (Trained service technician only) 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. (Trained service technician only) Power supply 2. (Trained service technician only) Replace the system board.
System log 75% full	Clear the current logs.
System log cleared	Information only.
System memory error	<ol style="list-style-type: none"> 1. Reseat the DIMMs. 2. Replace the memory.
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. (Trained service technician only) 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 8849 or Type 8491 server,” on page 61 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-error log message	Action
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. (Trained service technician only) 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. (Trained service technician only) Power supply 2. (Trained service technician only) Replace the system board.
System shutoff due to +1.5V CPU over voltage	<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. (Trained service technician only) 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 shutoff due to +1.5V CPU under voltage	<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. (Trained service technician only) 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 shutoff due to +2.5v 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. (Trained service technician only) Power supply 2. (Trained service technician only) Replace the system board.
System shutoff due to +3.3V 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. (Trained service technician only) Power supply 2. (Trained service technician only) Replace the system board.
System shutoff due to +3.3V 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. (Trained service technician only) 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 8849 or Type 8491 server,” on page 61 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-error log message	Action
System shutoff due to +12v 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. (Trained service technician only) Power supply 2. (Trained service technician only) Replace the system board.
System shutoff due to +12v 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. (Trained service technician only) Power supply 2. (Trained service technician only) Replace the system board.
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. (Trained service technician only) 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. (Trained service technician only) 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. (Trained service technician only) 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.

<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 8849 or Type 8491 server,” on page 61 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-error log message	Action
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. (Trained service technician only) 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. (Trained service technician only) Power supply 2. (Trained service technician only) Replace the system board.
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. (Trained service technician only) 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 59 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 you set the Ethernet controller 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 35.

Damaged data in CMOS memory or damaged BIOS code can cause undetermined problems. To reset the CMOS data, use the 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 “Updating BIOS code” on page 48.

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).
4. Turn on the server.

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.

Calling IBM for service

See Appendix A, “Getting help and technical assistance,” on page 109 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

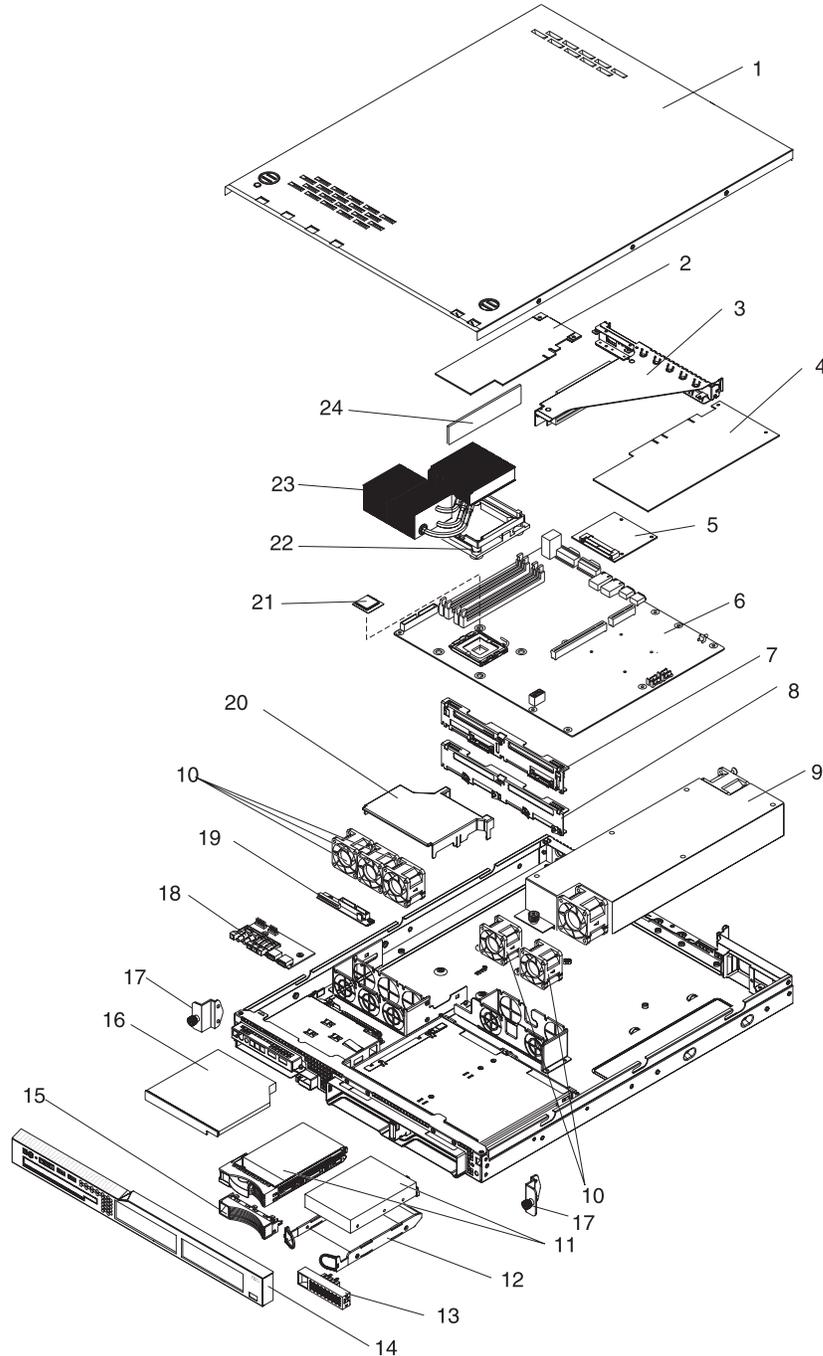
- Hardware configuration (print screen of the system summary)
- BIOS code level
- Operating-system type and version level

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

Chapter 3. Parts listing, Type 8849 or Type 8491 server

The following replaceable components are available for the xSeries 306m Type 8849 and Type 8491 servers (models 10x, 1Ax, 20x, 30x, 3Ax, 40x, 50x).



Attention: Do not remove the preinstalled air deflector unless directed to do so in this publication or by IBM Service. See the illustration on page 87 for the location of the air deflector in the server. An air deflector comes in Misc. kit 2 in the following list.

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 8872 and 8874

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Cover	39M4359		
2	Low-profile adapter	varies		
3	PCI-X / PCI-X riser card		39M4338	
4	3/4-length adapter	varies		
5	SAS/SATA controller card (hot-swap models) (models 1Ax, 20x, 3Ax, 40x, 50x)		39M4341	
6	System board assembly			39M4339
7	SAS/SATA backplane (hot-swap models) (models 1Ax, 20x, 3Ax, 40x, 50x)		39M4349	
8	SATA simple-swap hard disk drive back panel (models 10x, 30x)		39M4347	
9	Power supply, 350 W		24R2674	
10	Fan (40 mm)	39M4322		
11	Hard disk drive, 36 GB, 15K, HS SAS (optional)	26K5700		
11	Hard disk drive, 73 GB, 15K, HS SAS (optional)	26K5701		
11	Hard disk drive, 146 GB, 15K, HS SAS (optional)	26K5702		
11	Hard disk drive, 73 GB, 10K, HS SAS (optional)	26K5712		
11	Hard disk drive, 146 GB, 10K, HS SAS (optional)	26K5713		
11	Hard disk drive, 300 GB, 10K, HS SAS (optional)	26K5714		
11	Hard disk drive, 80 GB, SS SATA (optional)	39M4503		
11	Hard disk drive, 160 GB, SS SATA (optional)	39M4507		
11	Hard disk drive, 250 GB, SS SATA (optional)	39M4511		
11	Hard disk drive, 80 GB, HS SATA (optional)	39M4521		
11	Hard disk drive, 160 GB, HS SATA (optional)	39M4525		
11	Hard disk drive, 250 GB, HS SATA (optional)	39M4529		
12	Simple-swap hard disk drive tray (SATA only)		39M4347	
13	Simple-swap filler panel (SATA only) (models 10x, 30x)	39M4343		
14	Front bezel		39M4355	

Table 4. Parts listing, Type 8872 and 8874 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
15	Hot-swap filler panel (SAS/SATA) (models 1Ax, 20x, 3Ax, 40x, 50x)	39M4375		
16	CD/DVD drive, 24X		39M3503	
16	CD/DVD drive, 24X		39M3543	
17	Bracket ear (models 10x, 1Ax, 20x)	39M4351		
18	Operator information panel assembly		39M4350	
19	CD/DVD interposer board		39M4354	
20	Air baffle	39M6296		
21	Microprocessor, 3.0 GHz 1M Dual (model 20x)			39M6285
21	Microprocessor, 3.0 GHz 1M (models 10x, 1Ax)			39M6286
21	Microprocessor, 3.2 GHz 2M (models 30x, 3Ax)			39M6289
21	Microprocessor, 3.4 GHz 2M (models 40x, 4Ax)			39M6290
21	Microprocessor, 3.6 GHz 2M (models 50x, 5Ax)			39M6291
22	Heat-sink-assembly retention module			39M4360
24	Heat-sink assembly			39M4356
24	Memory, 512 MB PC4200 ECC	30R5151		
24	Memory, 1 GB PC4200 ECC	30R5152		
24	Memory, 2 GB PC4200 ECC	30R5153		
	Alcohol wipe			59P4739
	Battery, 3.0 volt		33F8354	
	Cable, backplane (hot-swap models) (models 1Ax, 20x, 3Ax, 40x, 50x)		25R8851	
	Cable, SATA (simple-swap models) (models 10x, 30x)		39M6276	
	Cable, operator information panel		39M6266	
	Cable, IDE, for CD/DVD interposer card		39M6267	
	Chassis assembly			39M4363
	CRU/FRU label	39M6449		
	iSCSI Server Adapter (optional)		73P3609	
	Kit, 1U, toolless		24P1121	
	Kit, misc.		39M4374	
	Kit, misc. 2		39R8177	
	Kit, rail, 2-post		49P2789	
	NetXtreme 1000 SX+ Fiber Ethernet Adapter (optional)		73P4009	
	NetXtreme 1000 T+ Ethernet adapter (optional)		73P4109	
	NetXtreme 1000 T+ Dual Port Ethernet adapter (optional)		73P4209	
	PCI-X / PCI Express riser card (optional)		39M4337	
	Power cord	6952300		
	PRO/1000 MT Ethernet adapter (optional)		31P9609	

Table 4. Parts listing, Type 8872 and 8874 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	PRO/1000 MT Dual-Port Server adapter (optional)		73P2709	
	ServeRAID-7t SATA controller (optional)		71P8650	
	ServeRAID 8i adapter (optional)		13N2233	
	ServeRAID 8i battery pack (optional)		13N2256	
	System service label	39M4348		
	Ultra320 SCSI controller (optional)		13N2250	
	10/100 Ethernet Server adapter (optional)		06P3609	

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
02K0546	China
13F9940	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea

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

IBM power cord part number	Used in these countries and regions
6952300	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela

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 8849 or Type 8491 server,” on page 61 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 68. This information will help you work safely.
- 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 options 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 turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan as soon as possible.
- You have kept the preinstalled air deflector in place unless directed to remove it in this publication or by IBM Service. See the illustration on page 87 for the location of the air deflector in the server.

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 could result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when working 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 (trained service technicians only) 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 handling 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.

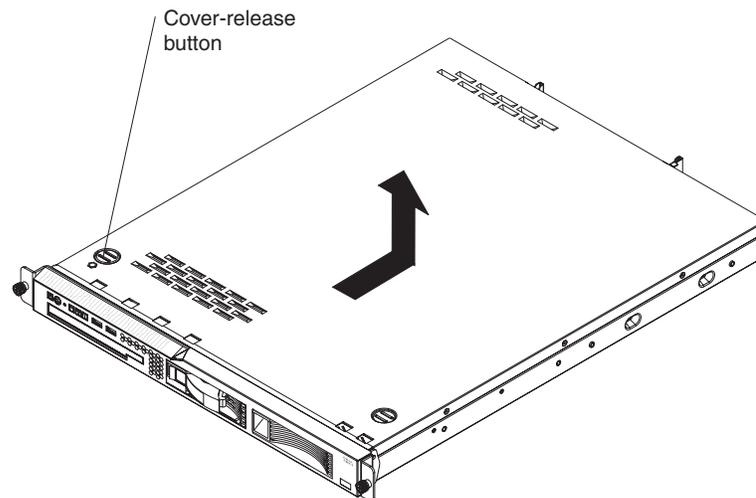
The illustrations in this document might differ slightly from your hardware.

Removing the cover

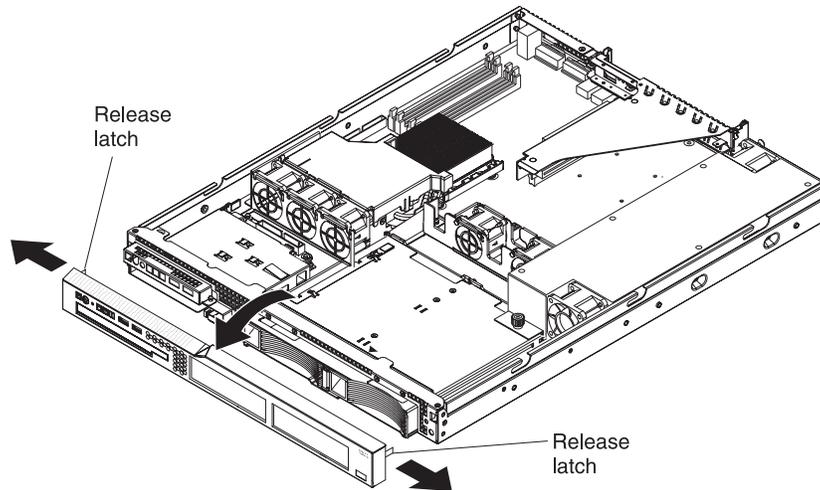
Attention: Operating the server for more than 2 minutes with the cover removed might damage server components. For proper cooling and airflow, replace the cover before turning on the server.

To remove the cover, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 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.

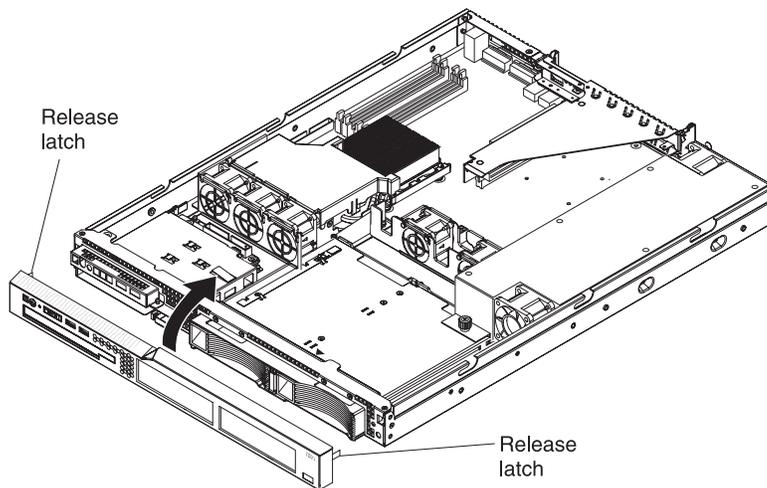


- a. Press the release latches on the inside of both front corners of the server.
 - b. Tilt the bezel forward and pull it away from the server.
7. If you are instructed to return the cover and bezel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the cover

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

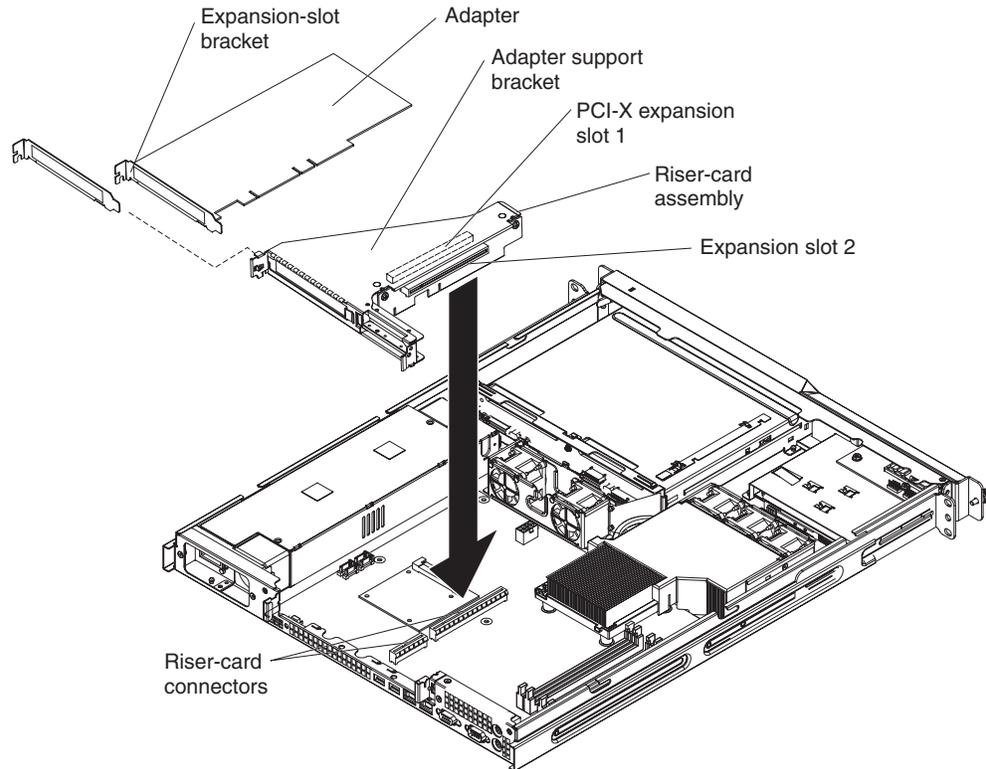
1. Make sure that all internal cables are correctly routed.
2. Set the cover on top of the server so that approximately 13 mm (0.5 inch) extends from the rear.
3. Slide the cover forward and into position.
4. Slide the server into the rack.



5. To install the bezel, if it was removed, tilt the bezel and align the latches with the slots at each front corner of the chassis; then, straighten the bezel and snap it into place.

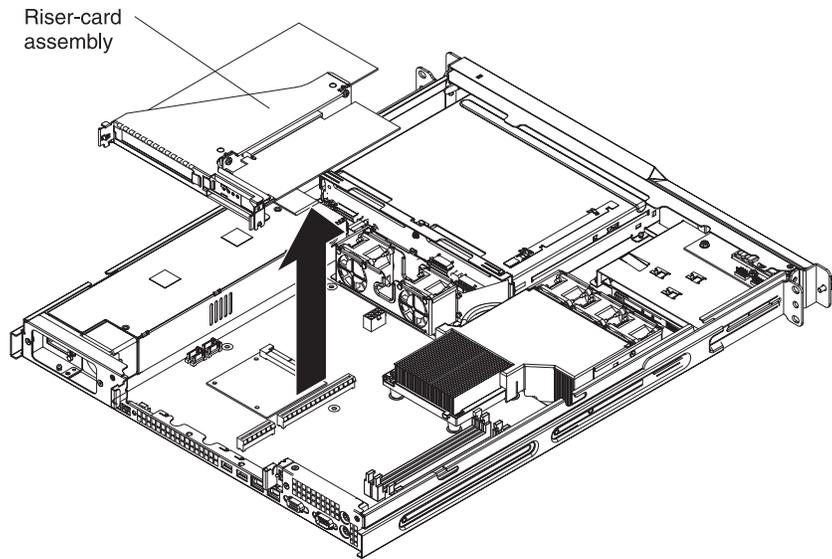
Removing an adapter

To remove a PCI-X or PCI Express adapter, complete the following steps:



Note: Depending on the riser card that is installed, expansion slot 2 is either a PCI-X or a PCI-Express slot.

1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 70).
4. Grasp the riser-card assembly at the rear edge and lift to remove the riser-card assembly.



5. Disconnect any cables from the adapter.
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

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

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you have to change switch settings or jumper settings on the adapter, follow the instructions that come with the adapter.
- The adapter slots are on the riser-card assembly. You must first remove the riser-card assembly to access the adapter slots.
- Depending on the riser-card assembly in the server, the server contains either two peripheral component interconnect-extended (PCI-X) adapter slots or one PCI-X slot and one PCI Express slot. See the ServerProven[®] list at <http://www.ibm.com/servers/eserver/serverproven/compat/us/> for a list of riser-card assemblies and adapters that you can use with the server.
- You can install one full-height three-quarter-length adapter in expansion slot 1 and one low-profile half-length adapter in expansion slot 2.
- The server supports the following adapters:
 - PCI-X: 3.3 V or universal adapters
 - PCI Express: PCI Express x8 1.0a adapters

Note: If you use a legacy PCI adapter (32 bit/33 MHz) or a slower-speed PCI-X adapter in a hot-swap SAS/SATA system, the hard-disk drive performance will be degraded.

- The server uses a rotational interrupt technique to configure PCI-X adapters so that you can install PCI-X adapters that do not support sharing of PCI-X interrupts.
- The optional Remote Supervisor Adapter II can be installed only in PCI-X slot 1.

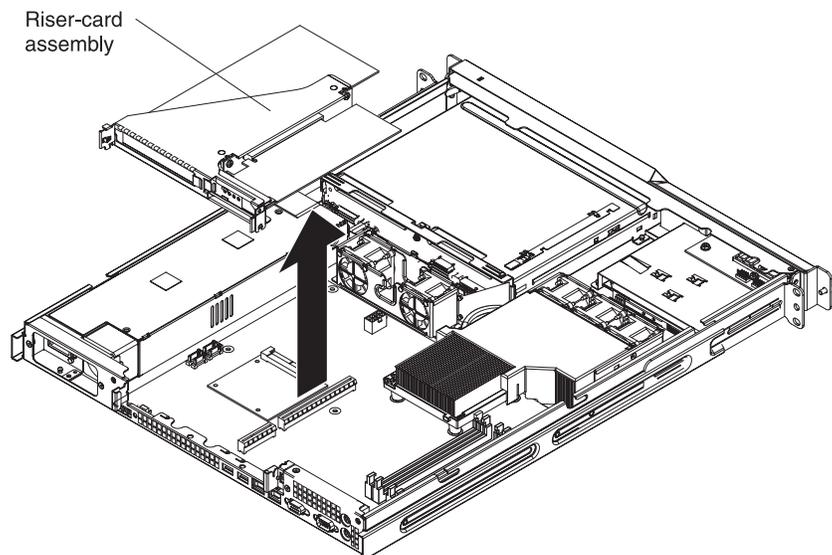
- You can install an optional RAID controller to enable you to configure the internal hard disk drives into disk arrays. See your RAID controller option documentation for complete instructions for installing a RAID controller and for additional information about RAID controllers.

Note: Some operating systems, such as SCO 6.0 and UnixWare 7.14, do not support RAID. See <http://www.ibm.com/servers/eserver/serverproven/compat/us/> to determine whether a supported operating system supports RAID.

- The optional ServeRAID -7t SATA controller can be installed only in PCI-X slot 2. The low-profile bracket that comes with the controller is required for you to install the controller.
- The optional ServeRAID 8i controller can be installed only in PCI-X slot 2. The low-profile bracket that comes with the controller is required for you to install the controller. Remove the blue bracket that comes preinstalled on the controller, and install the low-profile bracket.
- The server scans the PCI-X slots to assign system resources. If you have not changed the default startup sequence, the server starts the devices in the following order: the CD drive first; then, depending on the model, the PCI-X slots 1 and 2, or the PCI-X slot and the PCI Express slot, and then the integrated Ethernet controllers.

To install the replacement PCI or PCI-X 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. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
3. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
4. Remove the server from the rack; then, remove the cover (see “Removing the cover” on page 70).
5. Grasp the riser-card assembly at the rear edge and lift to remove the riser-card assembly.



Attention: PCI expansion-slot covers must be installed on all vacant slots. This maintains the electronic emissions characteristics of the server and ensures proper cooling of server components.

6. 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.
7. If the adapter is a ServeRAID 8i controller, complete the following steps to install the low-profile expansion-slot bracket on the adapter:
 - a. Unscrew the two screws that hold the large expansion-slot bracket on the adapter.
 - b. Remove the large bracket.
 - c. Install the low-profile (small) expansion-slot bracket in the same position on the adapter.
 - d. Reinstall the two screws that you removed in step 7a.

Attention: When you install an adapter, make sure that it is completely and correctly seated in the expansion slot in the riser card. Incomplete insertion might cause damage to the riser card, system board, or the adapter when you turn on the server.

8. 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.
9. Follow the cabling instructions, if any, that come with the adapter. Route the adapter cables before you reinstall the riser-card assembly.
10. 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.
11. Install the cover (see “Installing the cover” on page 71).
12. Slide the server into the rack.
13. Connect the cables and power cords (see “Completing the installation” in the *Installation Guide* or *User’s Guide* for cabling instructions).
14. Turn on all attached devices and the server.

Hard disk drive

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

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.

Removing a simple-swap Serial ATA hard disk drive

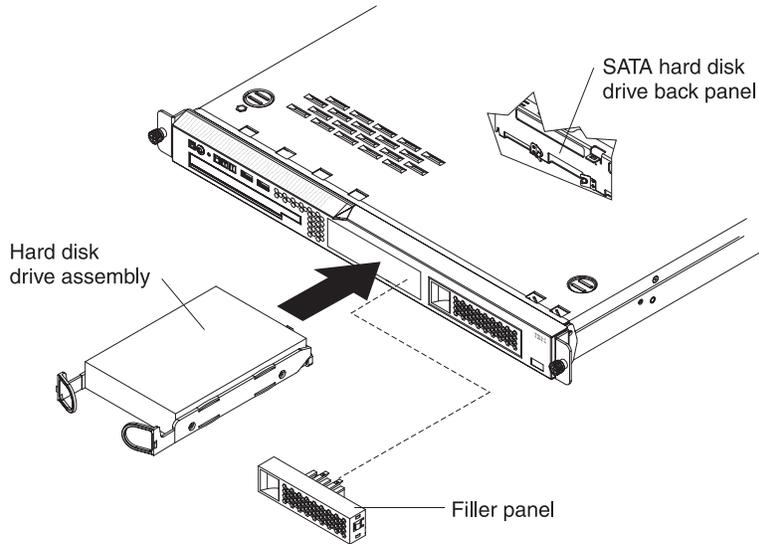
To remove a simple-swap SATA drive from the bay, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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

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.

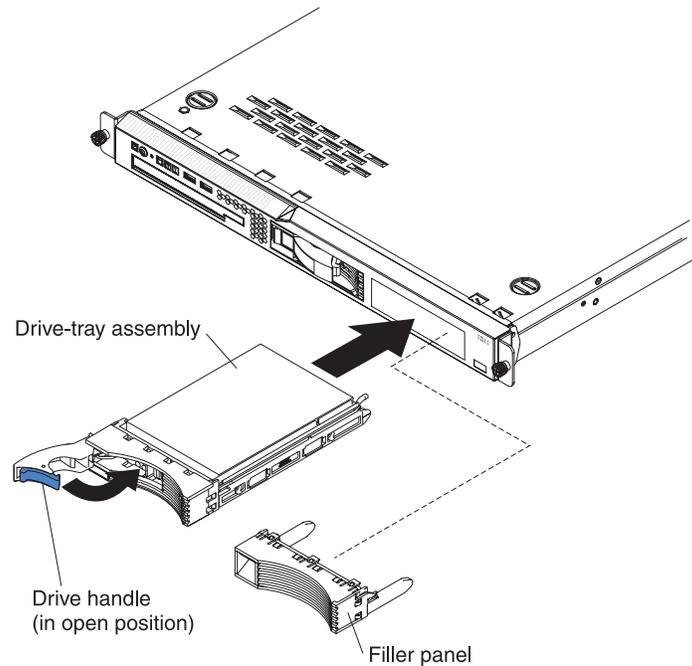
1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. Make sure that the server cover is in place and fully closed.
3. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
4. Remove the filler panel from the bay.
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 panel.
6. Release the loops of the drive tray.
7. Insert the filler panel into the bay to cover the drive.

Note: If the server has a RAID controller or adapter installed, you might need to reconfigure the disk arrays after installing hard disk drives. See the documentation that comes with the adapter for more information.

Removing a hot-swap hard disk drive

The server hot-swap models support either two SAS hard disk drives or two SATA hard disk drives. The removal and installation procedures are the same for either type of drive. The illustrations in this procedure show 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 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.

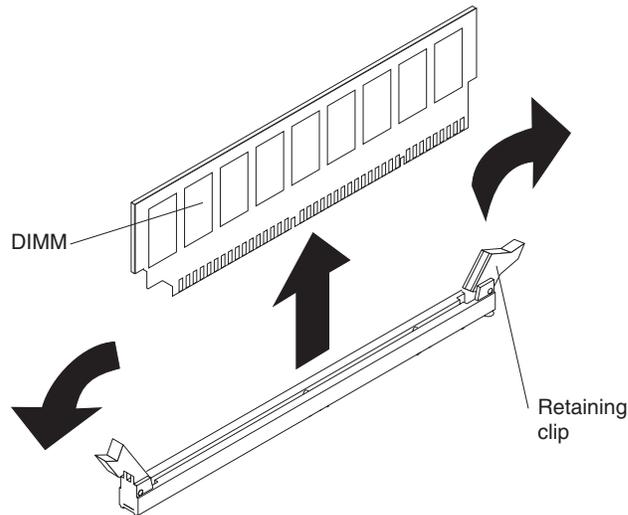
1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. Make sure that the server cover is in place and fully closed.

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.

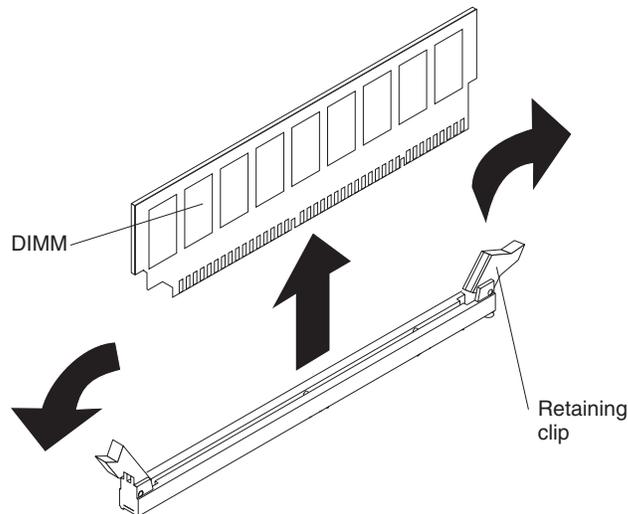
3. Install the hard disk drive in the hot-swap bay:
 - a. Make sure that the tray handle is open (that is, perpendicular to the front of the drive).
 - b. Align the drive assembly with the guide rails in the bay.
 - c. Gently push the drive assembly into the bay until the drive stops.
 - d. Push the 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 needs to be replaced. If the green hard disk drive activity LED is flashing, the drive is being accessed.

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 67.
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 70).
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.
5. Lift the DIMM out of the connector.
6. Open the retaining clip on each end of the DIMM connector and remove the DIMM from the connector.



7. 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)

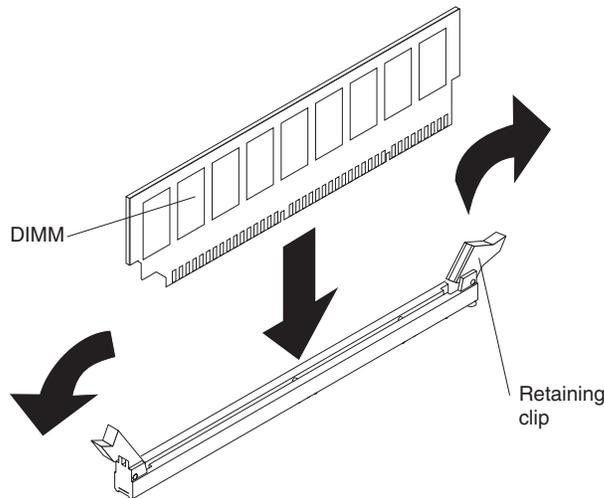
The following notes describe the types of dual inline memory modules (DIMMs) that your server supports and other information that you must consider when installing DIMMs:

- The server supports 512 MB, 1 GB, and 2 GB DIMMs, for a maximum of 8 GB of system memory. See the ServerProven list at <http://www.ibm.com/servers/eserver/serverproven/compat/us/> for a list of memory modules you can use with the server.
- The amount of usable memory will be reduced depending on the system configuration. A certain amount of memory must be reserved for system resources. The BIOS program displays the total amount of installed memory and the amount of configured memory.
- The server comes with one 512 MB DIMM installed in DIMM connector 1. If one DIMM is installed, when you install an additional DIMM, it must be installed 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.
- Install only 1.8 V, 240-pin, double-data-rate II (DDR II), PC4200, unbuffered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest PC4200 SDRAM unbuffered DIMM specification.
- 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).
- When you restart the server after adding or removing a DIMM, a message is displayed indicating that the memory configuration has changed.

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 71).
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 (see “Completing the installation” in the *Installation Guide* or *User’s Guide* for cabling instructions).
8. Turn on all attached devices and the server.

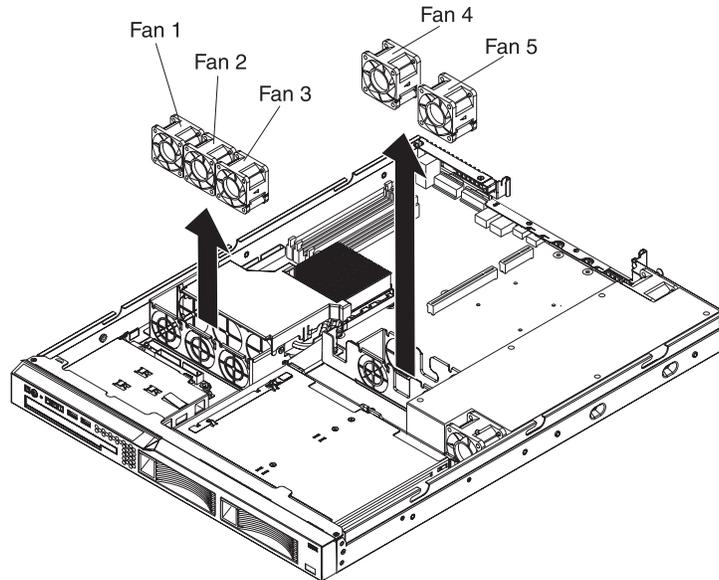
Replacing a fan

The server comes with five replaceable fans.

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

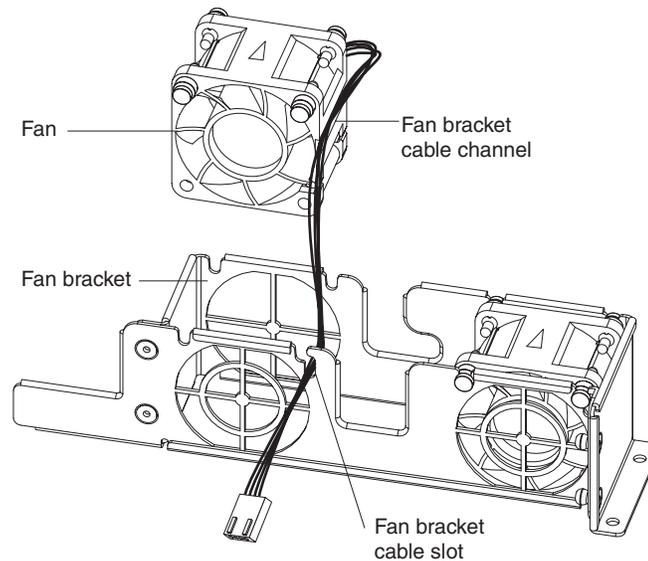
1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. Turn off the server and all peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server from the rack and remove the cover (see “Removing the cover” on page 70).
4. Reconnect the power cord; then, turn on the server.

Attention: For proper cooling and airflow, replace the cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the cover removed open 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. Position the replacement fan so that the airflow arrow on the side of the fan is pointing toward the rear of the server.

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



9. To install the replacement fan in the bracket, complete the following steps:
 - 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.
10. Connect the replacement fan cable to the system board.
11. Install the cover (see "Installing the cover" on page 71).
12. Slide the server into the rack.
13. Reconnect all external cables and the power cord (see "Completing the installation" in the *Installation Guide* or *User's Guide* for cabling instructions).

14. Turn on all attached devices and the server.
15. If you are instructed to return the fan, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Removing and replacing Tier 2 CRUs

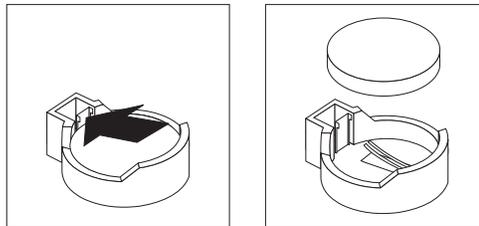
You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.

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 67.
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 70).
4. If necessary, lift the riser-card assembly out of the way (see “Removing the riser-card assembly” on page 89).
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 114 for more information.

Installing the battery

The following notes describe information that you must consider when replacing 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.

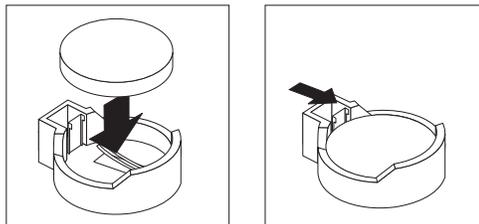
Do not:

- **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 the battery clip holds the battery securely.



3. Make sure the riser-card assembly is fully seated in the connectors on the system board.
4. Install the cover (see “Installing the cover” on page 71).
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.

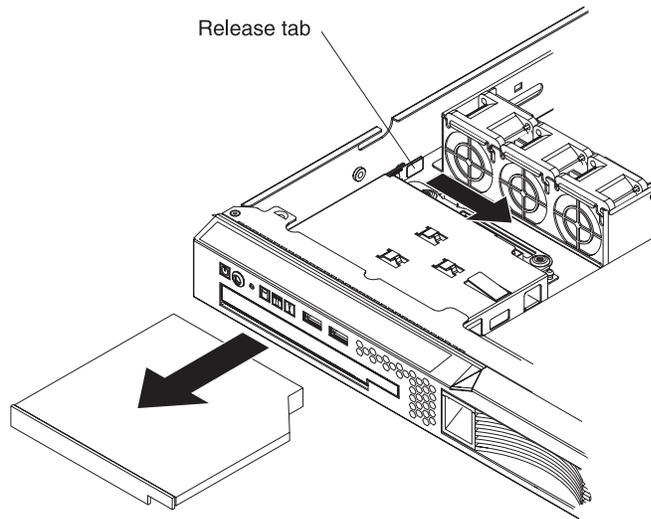
Note: You must wait approximately 20 seconds after you connect the power cord of the server to an electrical outlet before the power-control button becomes active.

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 102 for details.

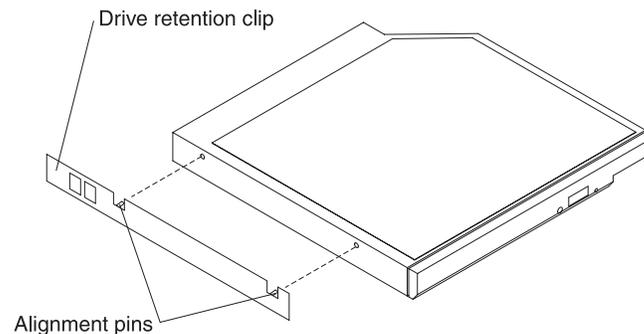
Removing a CD or DVD drive

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



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 70).
3. Press the release tab (the rear of the drive-retention clip) toward the drive to release the clip; then, while pressing 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.

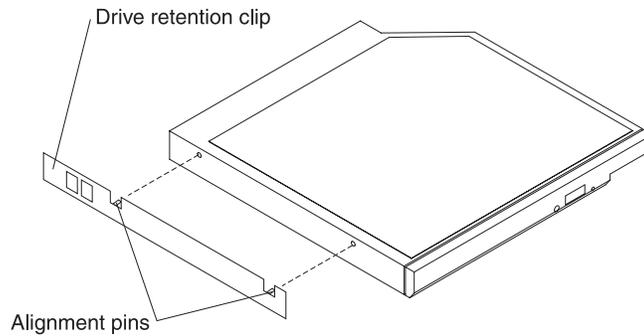


4. Remove the retention clip from the drive.
5. If you are instructed to return the CD or DVD drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a CD or DVD drive

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

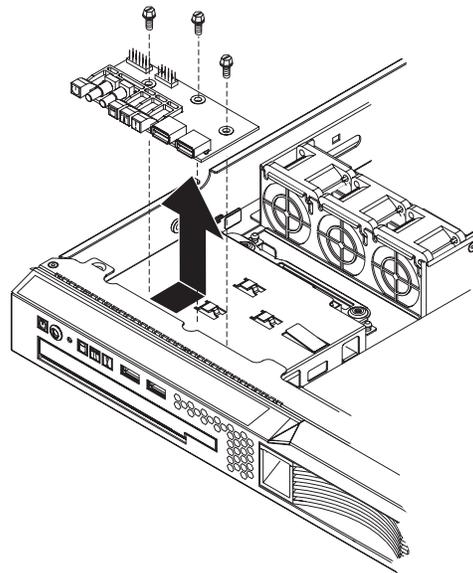
1. Follow the instructions that come with the drive to set any jumpers or switches.



2. Attach the drive-retention clip to the side of the drive.
3. Slide the drive into the CD/DVD drive bay until the drive clicks into place.
4. Replace the cover (see “Installing the cover” on page 71).
5. Slide the server into the rack.
6. Connect the cables and power cords (see “Completing the installation” in the *Installation Guide* or *User’s Guide* for cabling instructions).
7. Turn on all attached devices and the server.

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 67.
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 70).
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 4 on page 85 of “Removing the operator information panel assembly” on page 85 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 71).
5. Slide the server into the rack.
6. Connect the cables and power cords (see “Completing the installation” in the *Installation Guide* or *User’s Guide* for cabling instructions).
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:

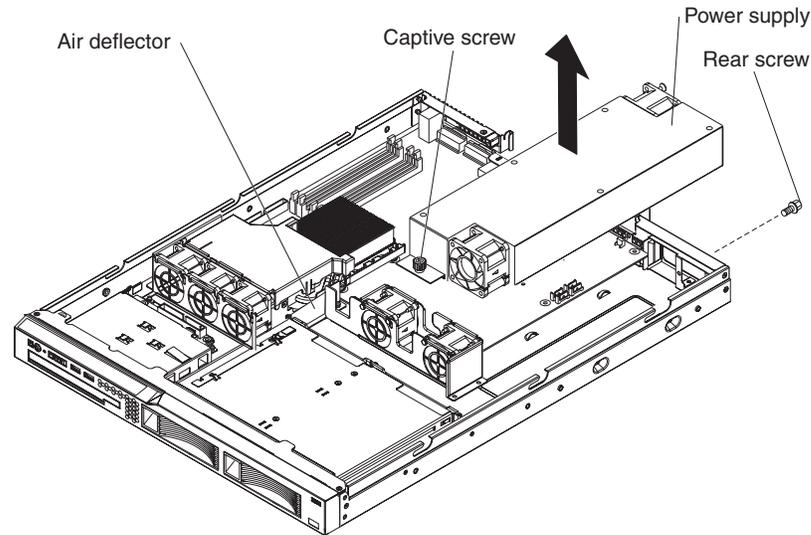
Never remove the cover on a power supply or any part that has the following label attached.



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.

Attention: 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.

To remove the power supply, complete the following steps:



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 70).

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

4. Remove the air deflector.
5. Remove the hard disk drive back panel or backplane (see “Removing the SAS/SATA backplane or SATA back panel” on page 90).
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.

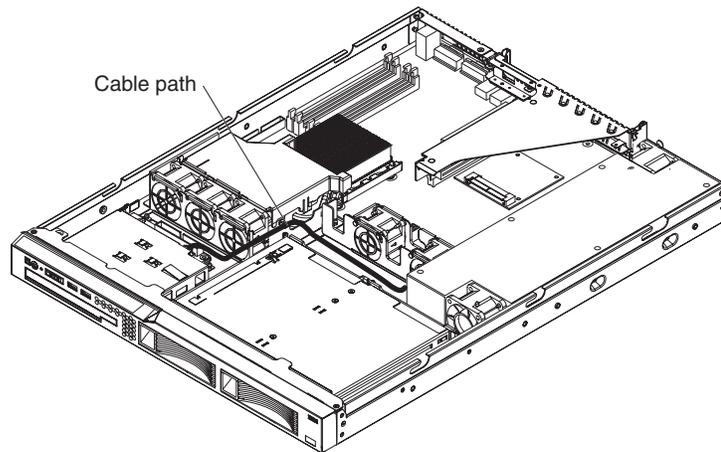
7. Remove the rear screw, which holds the power supply to the rear of the chassis.
8. Loosen the captive thumbscrew at the rear of the power supply that secures the power supply to the chassis bottom.
9. Lift the power supply out of the bay.
10. If you are instructed to return the power supply, follow 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 68.
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.

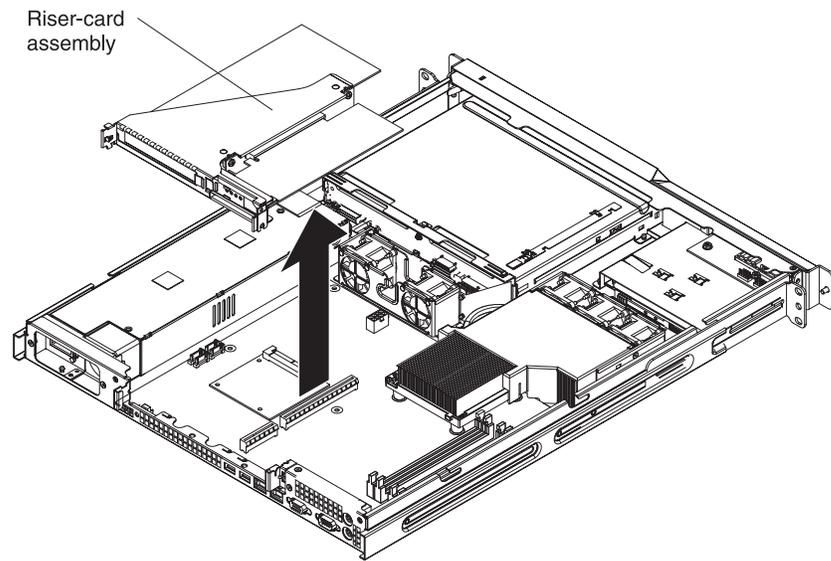
4. Replace the rear screw, which holds the power supply to the rear of the chassis (see the illustration on page 87).
5. Connect the internal power-supply cable from the power supply to the power connector (CN20) on the system board (see “System-board internal connectors” on page 6).
6. Route the other internal power-supply cable, securing it under the retention-clips on the chassis; then, reconnect the cable to the CD/DVD interposer card.



7. Replace the hard disk drive back panel or backplane and reconnect all cables (see “Installing the SAS/SATA backplane or SATA back panel” on page 91).
8. Replace the air deflector.
9. Test the power supply by completing the following steps:
 - 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 10. If the server does not start, disconnect the ac power cord and call for service.
10. Turn off the server and disconnect the ac power cord.
11. Install the cover (see “Installing the cover” on page 71).
12. Slide the server into the rack.
13. Reconnect the ac power cord into the connector on the back of the power supply.
14. Connect all external cables that you disconnected in step 2 on page 87.
15. Connect the other end of the ac power cord into a properly grounded electrical outlet.
16. Press the power-control button.
17. Make sure that the power-on LED on the front of the server is lit.

Removing the riser-card assembly

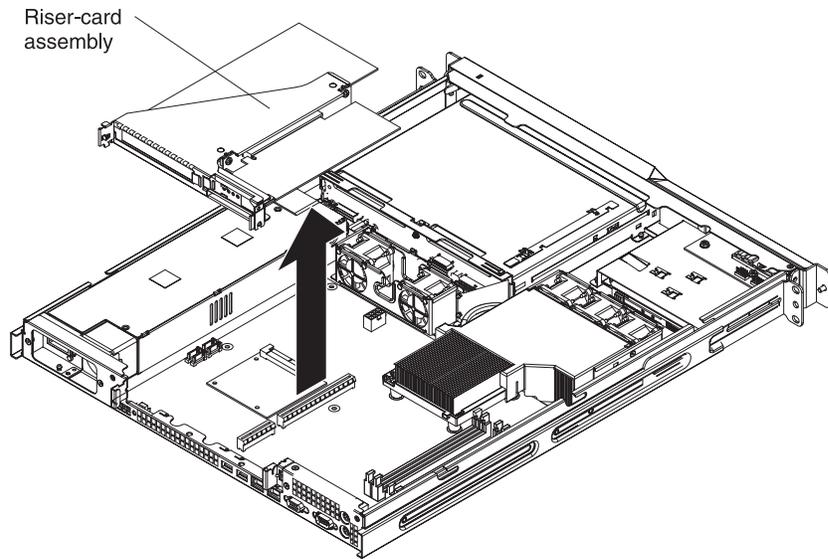


Complete the following steps to remove the riser-card assembly:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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, non-conductive surface.
4. Remove the cover (see “Removing the cover” on page 70).
5. 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.
6. 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-X connectors. You can replace the riser-card assembly with one that contains one PCI-X connector and one PCI Express connector. See the ServerProven list at <http://www.ibm.com/servers/eserver/serverproven/compat/us/> for a list of riser-card assemblies that you can use with the server.



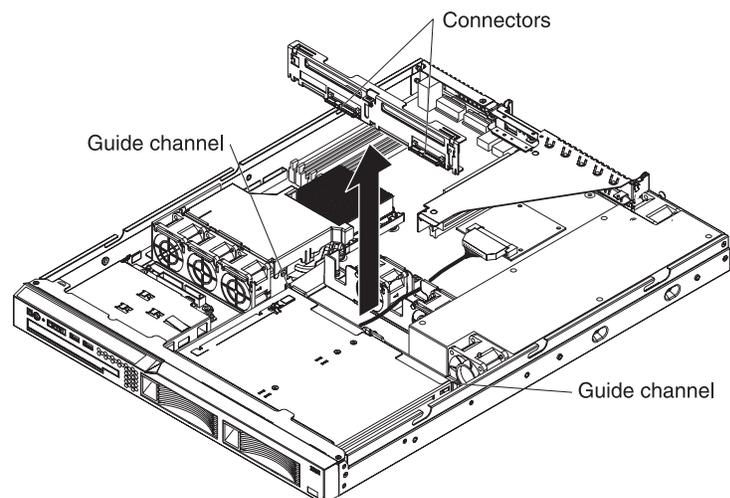
Complete the following steps to install the riser-card assembly.

1. Install the adapters in 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.

Removing the SAS/SATA backplane or SATA back panel

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 panel, 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 67.

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, non-conductive surface.
4. Pull the hard disk drives out of the server slightly to disengage them from the backplane or back panel.
5. Remove the cover (see “Removing the cover” on page 70).
6. Disconnect the backplane or back panel cables.
 - If the server is a hot-swap model, disconnect the SAS/SATA controller cable from the SAS/SATA backplane.
 - If the server is a simple-swap model, disconnect the SATA cables from the system board, and disconnect the power cables from the back panel.
7. Lift the backplane or back panel out of the server slightly; then, disconnect the power cable and remove the backplane or back panel.
8. If you are instructed to return the backplane or back panel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the SAS/SATA backplane or SATA back panel

To install the replacement backplane or back panel, complete the following steps.

Important: The server cover must be in place and fully closed when you install a hard disk drive.

1. Connect the power cable to the replacement backplane or back panel.
2. Slide the backplane or back panel into the card guides, making sure not to trap or pinch any nearby wires or cables.
3. Press firmly until the backplane or back panel is fully seated.
4. Reconnect the backplane or back panel 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 and reconnect the power cables to the back panel. 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 panel matches the connector number on the system board.

5. Install the cover (see “Installing the cover” on page 71).
6. Replace the hard disk drives.
7. Slide the server into the rack.
8. Connect the cables and power cords (see “Completing the installation” in the *Installation Guide* or *User’s Guide* for cabling instructions).
9. Turn on all attached devices and the server.

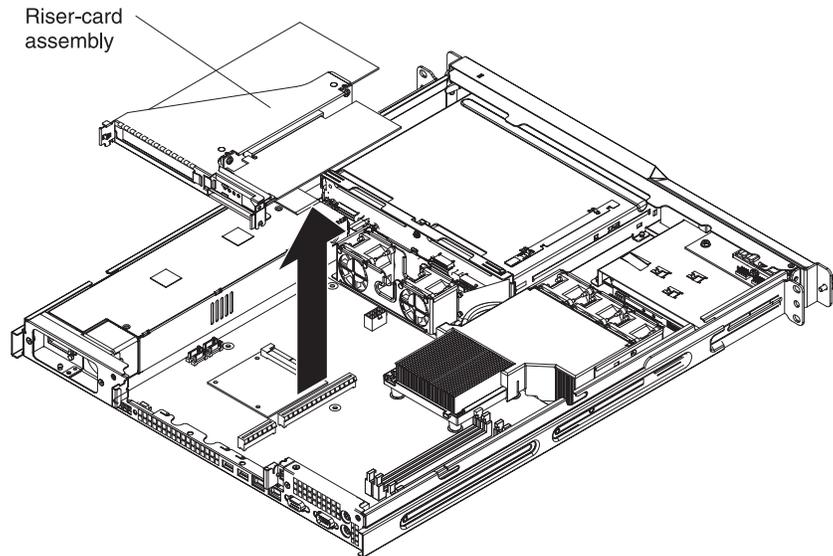
SAS/SATA controller

On a hot-swap model server, you might have to remove temporarily, reseal or replace the SAS/SATA controller on the system board. A simple-swap SATA model has an integrated SATA controller that is not removable.

Removing the SAS/SATA controller

Complete the following steps to remove the SAS/SATA controller from the system board:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 70).
4. Grasp the riser-card assembly at the rear edge and lift to remove the riser-card assembly.



5. Disconnect any cables from the adapters; then, set the riser-card assembly aside.
6. Disconnect the cable from the SAS/SATA controller to the SAS/SATA backplane.
7. Grasp the edges of the SAS/SATA controller.
8. Pinch the top of each of the four plastic alignment pins while gently lifting the controller, until the alignment pins release the controller.
9. Lift the controller off the system board.
10. 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

Complete the following steps to replace the SAS/SATA controller on the system board:

1. Grasp the edges of the SAS/SATA controller.
2. Align the controller with the SAS/SATA controller card connector on the system board (see the illustration on page 6 for the location of the connector), and align the holes in the card with the four plastic alignment pins on the system board.
3. Press the controller gently onto the alignment pins and into the SAS/SATA controller card connector on the system board. Make sure that the top of each alignment pin has expanded to hold the controller card securely in place.
4. Connect the cable from the SAS/SATA controller to the SAS/SATA backplane.

5. Install the riser-card assembly (see “Installing the riser-card assembly” on page 89).
6. Install the cover (see “Installing the cover” on page 71).
7. Slide the server into the rack.
8. Connect the cables and power cords (see “Completing the installation” in the *Installation Guide* or *User’s Guide* for cabling instructions).
9. 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

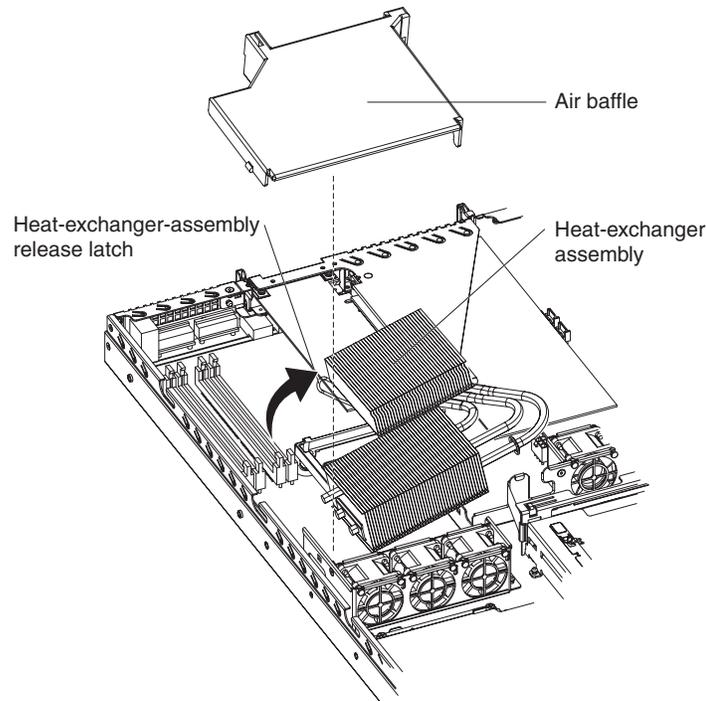
The following notes describe the type of microprocessor that the server supports and other information that you must consider when installing a microprocessor:

- The server supports one Intel land grid array (LGA) 775-land dual-core Pentium IV with a 1024 KB (minimum) Level-2 cache.
- 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/support/>.
- Depending on the microprocessor that is used, the server has a front-side bus speed of 533 or 800 megatransfers per second (MT/s).
- The microprocessor uses an integrated voltage regulator on the system board.

Removing the microprocessor

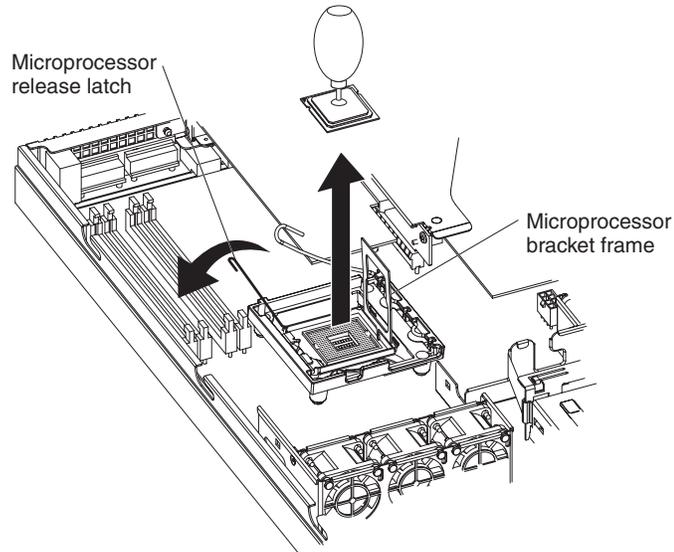
To remove the microprocessor, complete the following steps.

1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 70).



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

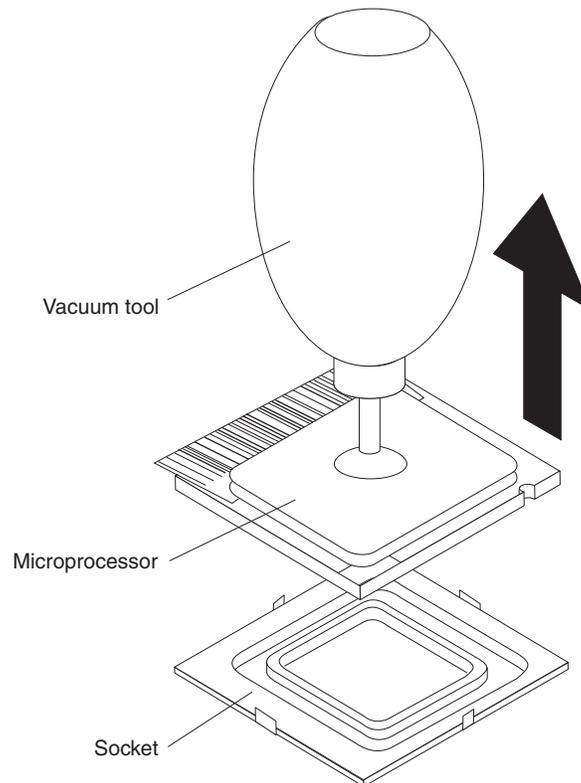
assembly out of the server.



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

Attention: Use the vacuum tool provided 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 using the vacuum tool and the following procedure:

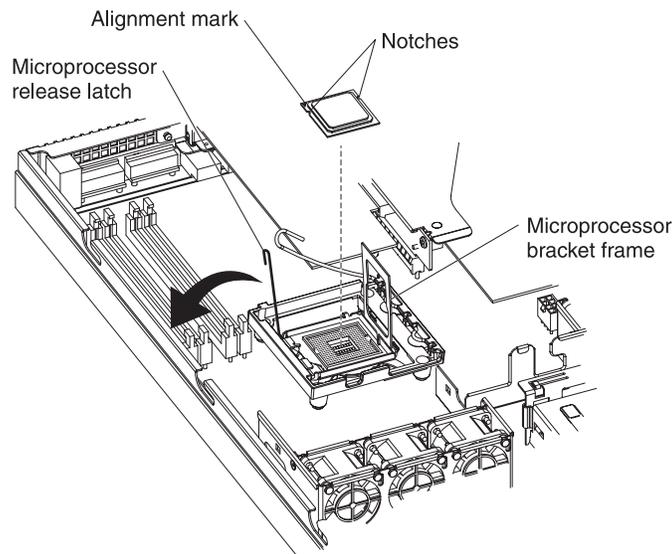


- a. Squeeze and hold the bladder of the tool; then, place the suction cup on the microprocessor and release the bladder.
 - b. Using the tool, carefully lift the microprocessor straight up and out of the socket, and place it on a static-protective surface.
 - c. Squeeze the bladder of the tool to release 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 the microprocessor bracket frame and release latch are both fully open.

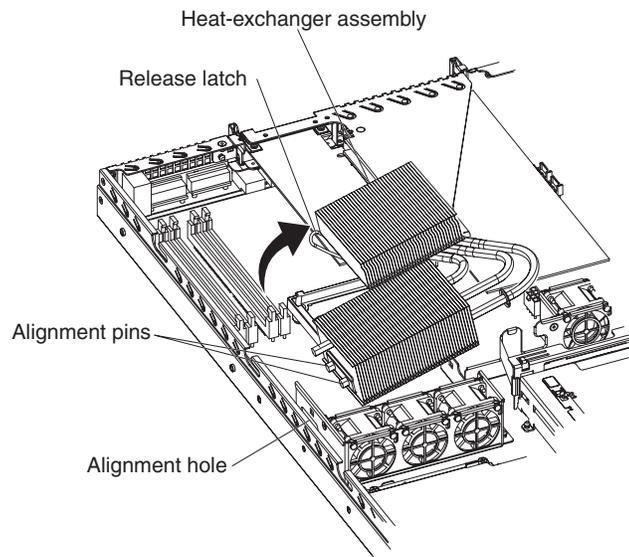


Attention: The microprocessor contacts are fragile; handle the microprocessor very carefully.

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 97 for instructions on replacing the contaminated or missing thermal grease; then, return here and continue with step 4.
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 71).
10. Slide the server into the rack.
11. Connect the cables and power cords (see “Completing the installation” in the *Installation Guide* or *User’s Guide* for cabling instructions).
12. Turn on all attached devices and the server.

Thermal grease

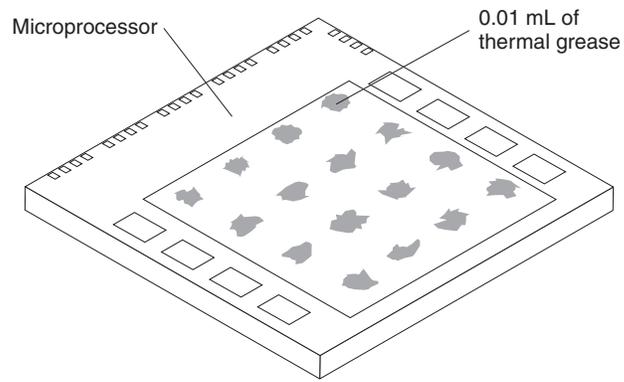
The thermal grease must be replaced whenever the heat exchanger has been removed from the top of the microprocessor and is going to be reused or when debris is found in the grease.

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

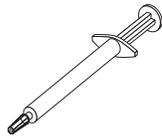
1. Place the heat-exchanger assembly on a clean work surface.
2. Remove the cleaning pad from its package and unfold it completely.
3. Use the cleaning pad to wipe the thermal grease from the bottom of the heat exchanger.

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.



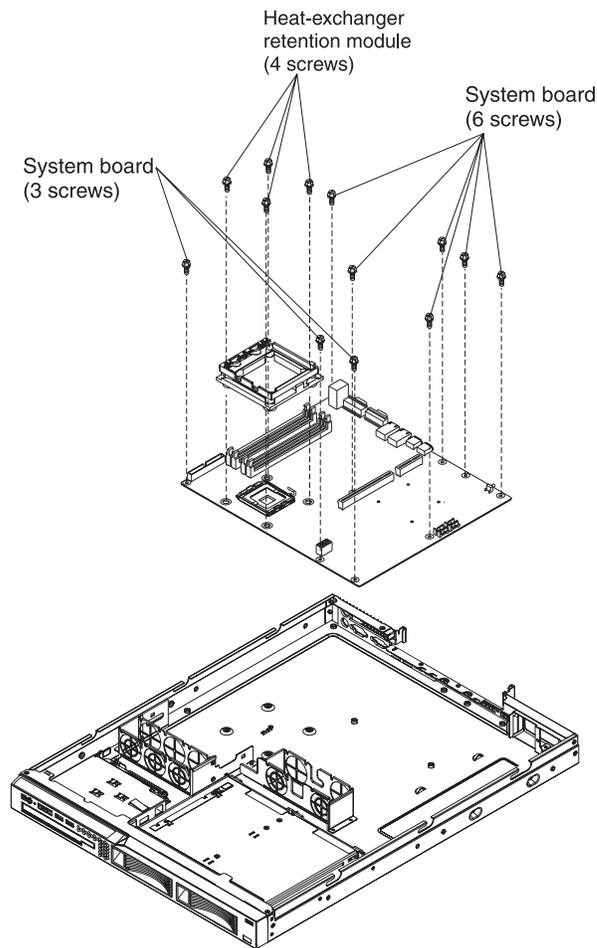
5. Use the thermal-grease syringe to place 16 uniformly spaced dots of 0.01 mL each on the top of the microprocessor.



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 96.

Removing the system board



To remove the system board, complete the following steps:

1. Read the safety information that begins on page vii, “Installation guidelines” on page 67, and “Handling static-sensitive devices” on page 68.
2. Turn off the server, and disconnect all power cords and external cables; then, remove the server cover (see “Removing the cover” on page 70).
3. Remove the riser-card assembly with adapters, and place them on a static-protective surface for reinstallation (see “Removing an adapter” on page 72).
4. (Hot-swap model only) Remove the SAS/SATA controller (see “Removing the SAS/SATA controller” on page 92) 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 78).
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 94).
8. Note the orientation of the microprocessor retention module.
9. Unscrew the four screws that hold the microprocessor retention module to the system board; then, lift the retention module out of the server.

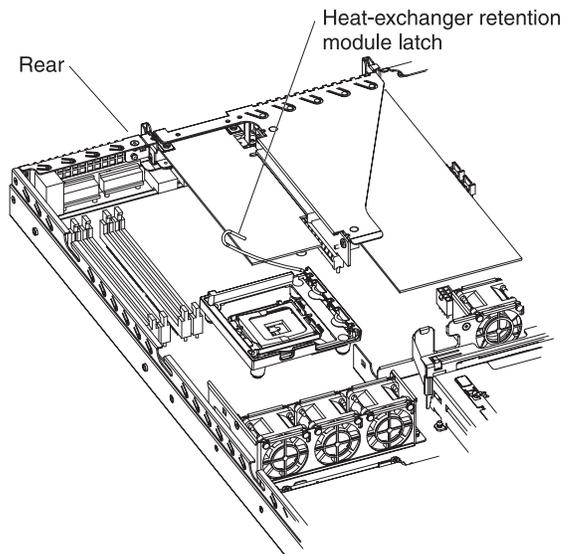
10. Remove the remaining nine screws that secure the system board to the chassis, and put the screws in a safe place.
11. Lift the system board out of the server.

Installing the system board

Note: When reassembling 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 nine screws that you removed in step 10 of “Removing the system board” on page 99.



2. Orient the microprocessor retention module as shown in the illustration.
3. Replace the microprocessor retention module. Secure it with the four screws you removed in step 9 of “Removing the system board” on page 99.
4. Replace the microprocessor and microprocessor heat exchanger assembly (see “Installing the microprocessor” on page 96).
5. Reconnect to the system board the cables that you disconnected in step 6 of “Removing the system board” on page 99.
6. (Hot-swap model only) Replace the SAS/SATA controller (see “Installing the SAS/SATA controller” on page 92).
7. Replace the DIMMs (see “Installing a memory module (DIMM)” on page 79).
8. Replace the riser-card assembly and adapters.
9. Replace the server cover (see Installing the cover).
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 UUID (see “Updating the UUID” on page 107).
- Update the DMI/SMBIOS (see “Updating the DMI/SMBIOS data” on page 107).

Chapter 5. Configuration information and instructions

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

Updating the firmware

The firmware in the server is periodically updated and is available for download on the Web. Go to <http://www.ibm.com/support/> to check for the latest level of firmware, such as BIOS code, vital product data (VPD) code, device drivers, and service processor firmware.

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.
- Major components contain vital product data (VPD) code. You can select to update the VPD code during the BIOS code update procedure.

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
- SAS/SATA Configuration Utility program
- Adaptec HostRAID configuration programs

Note: Some operating systems, such as SCO 6.0 and UnixWare 7.14, do not support RAID. See <http://www.ibm.com/servers/eserver/serverproven/compat/us/> to determine whether a supported operating system supports RAID.

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

Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation CD* provides state-of-the-art programs to detect the server model and hardware options that are installed, 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 34.
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 code. 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 log
- Change interrupt request (IRQ) settings
- Enable USB keyboard and mouse support
- Resolve configuration conflicts

Go to <http://www.ibm.com/support/> 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 appears, 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 xSeries Documentation* CD for more detailed information about the Configuration/Setup Utility program.

Using the SAS/SATA Configuration Utility program

Use the SAS/SATA Configuration Utility program to view or change the SAS/SATA controller settings.

Go to <http://www.ibm.com/support/> to check for the latest version of the SAS/SATA Configuration Utility firmware.

Starting the SAS/SATA Configuration Utility

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

1. Turn on the server.
2. When the prompt <<< Press <CTRL><A> for SAS/SATA Configuration Utility! >>> appears, press Ctrl+A. If you have set an administrator password, you are prompted to type the password.

Note: If the prompt <<< Press <CTRL><A> for SAS/SATA Configuration Utility! >>> does not appear, start the Configuration/Setup Utility (see “Starting the Configuration/Setup Utility program” on page 102), select **Devices and I/O Ports --> Advanced Chipset Control --> Serial ATA** and make sure that the Serial ATA options are set to the following values:

Native Mode Operation:	Auto
SATA Controller Mode Option:	Enhanced
SATA RAID	Enabled

3. To select a choice from the menu, use the arrow keys.
4. To change the settings of the selected items, follow the instructions on the screen. Be sure to press Enter to save your changes.

SAS/SATA Configuration Utility menu choices

The following choices are on the SAS/SATA Configuration Utility menu:

- **Array Configuration Utility**

Select this choice to create, manage, or delete arrays, add or delete a hot-spare drive, or initialize drives.

- **SerialSelect Utility**

Note: This choice appears on a hot-swap SAS or SATA system only. It does not appear on a simple-swap SATA system.

Select this choice to configure the controller interface definitions or to configure the physical transfer and SAS address of the selected drive.

- **Disk Utilities**

Select this choice to format a disk or verify the disk media. For SAS disks, you can also turn on the indicator LED on the disk, set the disk to be bootable, change the write cache settings, or set the connection rate. Select a device from the list and read the instructions on the screen carefully before making a selection.

Configuring the Ethernet controller

The Ethernet controller is integrated on the system board. It provides an interface for connecting to a 10-Mbps, 100-Mbps, or 1-Gbps network and provides 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 controller detects the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operates at that rate and mode.

You do not have to set any jumpers or configure the controller. However, you must install a device driver to enable the operating system to address the controller. For device drivers and information about configuring the Ethernet controller, see the

Broadcom NetXtreme Gigabit Ethernet Software CD that comes with the server. For updated information about configuring the controller, go to <http://www.ibm.com/pc/support/>.

Using the Adaptec HostRAID configuration programs

Note: Some operating systems, such as SCO 6.0 and UnixWare 7.14, do not support RAID. See <http://www.ibm.com/servers/eserver/serverproven/compat/us/> to determine whether a supported operating system supports RAID.

Use the Adaptec RAID Configuration Utility programs and SAS/SATA Configuration Utility to add RAID level-0 and level-1 functionality to the integrated Serial ATA (SATA) controller (simple-swap models) or the SAS/SATA controller (hot-swap models). RAID level-0 (striping) causes the drives to be seen as a single volume, and improves performance. RAID level-1 (mirroring) causes the contents of one drive to be copied to the other drive to create redundancy, so that if one drive fails, no data is lost. Be sure to use these programs as described in this document. Use these programs to perform the following tasks:

- Configure a redundant array of independent disks (RAID) array
- View or change the RAID configuration and associated devices

When you are using the Adaptec RAID Configuration Utility programs and SAS/SATA Configuration Utility program to configure and manage arrays, consider the following information:

- Configure a redundant array of independent disks (RAID) array
- View or change the RAID configuration and associated devices

Consider the following information when using the Adaptec RAID Configuration Utility programs and SAS/SATA Configuration Utility program to configure and manage arrays:

- The SAS/SATA controller with integrated RAID (hot-swap models) or the integrated SATA controller (simple-swap models) with integrated RAID support RAID level-0 and level-1. An optional ServeRAID controller provides additional RAID levels.
- Hard disk drive capacities affect how you create arrays. Drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.
- To help ensure signal quality, do not mix drives with different speeds and data rates.
- To update the firmware and BIOS code for an optional ServeRAID controller, you must use the IBM *ServeRAID Support* CD that comes with the ServeRAID option.
- If you install a different type of RAID controller (adapter) in the server, use the method that is described in the instructions that come with the adapter to view or change SAS settings for attached devices.

Using the Adaptec RAID Configuration Utility programs (for Serial ATA HostRAID)

Use the Array Configuration Utility, in the Adaptec RAID Configuration Utility programs, to add RAID level-0 and level-1 functionality to the integrated SATA controller (simple-swap models). This utility is part of the BIOS code.

Note: To add RAID functionality to a hot-swap SATA model, see “Using the SAS/SATA Configuration Utility program (for SAS/SATA HostRAID)” on page 106. For additional information about using the Adaptec RAID Configuration Utility programs, see the documentation on the IBM *ServeRAID-8e (Adaptec HostRAID) Support CD*. If this CD did not come with the server, you can download it from <http://www.ibm.com/support/>.

The integrated SATA RAID feature (SATA HostRAID) comes disabled by default. You must enable it and install the device drivers before you can use it. The SATA RAID feature configuration utilities, device drivers, and information are available on the *ServeRAID-8e (Adaptec HostRAID) Support CD*.

Enabling the Serial ATA HostRAID feature: To enable the SATA RAID feature, complete the following steps:

1. Turn on the server.
2. When the prompt Press F1 for Configuration/Setup appears, press F1. If you have set an administrator password, you are prompted to type the password.
3. Select **Devices and I/O Ports --> Advanced Chipset Control --> Serial ATA**.
4. Select **SATA Controller Mode Option**. Change the value to **Enhanced**.
5. Scroll down and select **SATA RAID Enable**.
6. Select **Enabled**.
7. Press Esc; then, select **Yes** to save your changes.

Using the Serial ATA HostRAID feature: The instructions in this section are for using the Array Configuration Utility program to access and perform an initial RAID level-1 configuration. If you install a RAID adapter, use the method described in the instructions that come with the adapter to view or change settings for the attached devices.

For additional information about using the Array Configuration Utility program to create, configure, and manage arrays, see the documentation on the *ServeRAID-8e (Adaptec HostRAID) Support CD*.

Configuring the controller: To use the Array Configuration Utility program to configure a level-1 RAID for the server, complete the following steps.

1. Turn on the server.
2. When the prompt Press <CTRL><A> for Adaptec RAID Configuration Utility appears, press Ctrl+A.
3. Select **Array Configuration Utility (ACU)**.
4. Select **Create Array**.
5. From the list of ready drives, select the two drives that you want to group into the array.
6. When you are prompted to select the RAID level, select **RAID-1**.
7. (Optional) Type an identifier for the array.
8. When you are prompted for the array build method, select **Quick Int**.
9. Follow the instructions on the screen to complete the configuration, and select **Done** to exit.
10. Restart the server.

Viewing the configuration: To view information about the Serial ATA controller, complete the following steps:

1. Start the Array Configuration Utility.

2. From the Array Configuration Utility window, select **Manage Arrays**.
3. Select an array and press Enter.
4. Press Esc to exit from the program.

Using the SAS/SATA Configuration Utility program (for SAS/SATA HostRAID)

Use the SAS/SATA Configuration Utility to add RAID level-0 and level-1 functionality to the SAS/SATA controller (hot-swap models only). This utility is part of the BIOS.

Note: To add RAID functionality to the integrated SATA controller (simple-swap models), see “Using the Adaptec RAID Configuration Utility programs (for Serial ATA HostRAID)” on page 104.

The integrated SAS/SATA RAID feature comes disabled by default. You must enable it and install the device drivers before you can use it. The SAS RAID configuration utilities, device drivers, and information are available on the *ServeRAID-8e (Adaptec HostRAID) Support CD*. If this CD did not come with the server, you can download it from <http://www.ibm.com/support/>.

Enabling the SAS HostRAID feature: To enable the SAS HostRAID feature, complete the following steps:

1. Turn on the server.
2. When the message Press <CTRL><A> for SAS/SATA Configuration Utility appears, press Ctrl+A.
3. Select **SerialSelect Utility**; then, select **Controller Configuration**.
4. Select **RAID Support**.
5. Select **Enabled**.
6. Press Esc; then, select **Yes** to save the changes.

Using the SAS/SATA HostRAID feature: The instructions in this section describe how to access the SAS/SATA HostRAID feature (hot-swap models only) from the SAS/SATA Configuration Utility program and perform an initial RAID level-1 configuration. If you install a RAID adapter in the server, use the method that is described in the instructions that come with the adapter to view or change SAS settings for attached devices.

For additional information about how to use the SAS/SATA HostRAID feature, see the documentation on the *ServeRAID-8e (Adaptec HostRAID) Support CD*.

Configuring the controller: To use the SAS HostRAID feature to configure a RAID level-1 array on the server, complete the following steps:

1. Turn on the server.
2. When the message Press <CTRL><A> for SAS/SATA Configuration Utility appears, press Ctrl+A.
3. Select **Array Configuration Utility (ACU)**.
4. Select **Create Array**.
5. From the list of ready drives, select the two drives that you want to group into the array.
6. When you are prompted to select the RAID level, select **RAID-1**.
7. (Optional) Type an identifier for the array.
8. When you are prompted for the array build method, select **Quick Int**.

9. Follow the instructions on the screen to complete the configuration; then, select **Done** to exit.
10. Restart the server.

Viewing the configuration: To view information about the SAS/SATA controller, complete the following steps:

1. Start the SAS/SATA Configuration Utility program.
2. From the SAS/SATA Configuration Utility window, select **Manage Arrays**.
3. Select an array and press Enter.
4. To exit from the program, press Esc.

Updating the UUID

The Universal Unique Identifier (UUID) must be updated when the system board is replaced. To update the UUID, complete the following steps:

1. Copy the UUID utility (uuid.exe) from the BIOS flash diskette to a DOS bootable diskette.
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 `UUID /wr`, and press Enter. The utility generates a random identifier.
5. Restart the server.

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 (extrmdmi.exe) from the BIOS flash diskette to a DOS bootable diskette.
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 `extrmdmi.exe`, and press Enter.
5. To change the machine type and model number, type `mtm xxxxyyy` where `xxx` 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 aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa` where `aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa` is the asset tag number; then, press Enter.
8. Restart the server.

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 xSeries or IntelliStation® 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/support/> 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 xSeries and IntelliStation systems also describes the diagnostic tests that you can perform. Most xSeries and IntelliStation 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 xSeries or IntelliStation 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/support/> and follow the instructions. Also, some documents are available through the IBM Publications Ordering System at <http://www.elink.ibm.com/public/applications/publications/cgibin/pbi.cgi>.

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 xSeries and IntelliStation systems, optional devices, services, and support. The address for IBM xSeries and BladeCenter® information is <http://www.ibm.com/eserver/xseries/>. 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/support/>.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with 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

You can receive hardware service through IBM Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. See <http://www.ibm.com/planetwide/> for support telephone numbers, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

Appendix B. Notices

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C2T Interconnect	TechConnect
Chipkill	ThinkPad
EtherJet	Tivoli
FlashCopy	Tivoli Enterprise
IBM	Update Connector
IBM (logo)	Wake on LAN
IntelliStation	XA-32
NetBAY	XA-64
Netfinity	X-Architecture
NetView	XcelL4
OS/2 WARP	XpandOnDemand
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Important notes

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

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

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

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

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

Maximum memory may require replacement of the standard memory with an optional memory module.

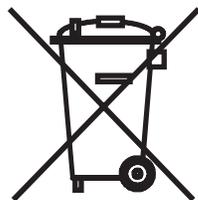
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Product recycling and disposal

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>.



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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

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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/batteryrecycle.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.

In the Netherlands, the following applies.



For Taiwan: Please recycle batteries.



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.

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Avis de conformité à la réglementation d'Industrie Canada

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

United Kingdom telecommunications safety requirement

Notice to Customers

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European Union EMC Directive conformance statement

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

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

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Chinese Class A warning statement

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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
02K0546	China
13F9940	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea
13F9979	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire
13F9997	Denmark
14F0015	Bangladesh, Lesotho, Macao, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda
14F0033	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Italy, Libyan Arab Jamahiriya

IBM power cord part number	Used in these countries and regions
14F0087	Israel
1838574	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Costa Rica, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States of America, Venezuela
24P6858	Korea (Democratic People's Republic of), Korea (Republic of)
34G0232	Japan
36L8880	Argentina, Paraguay, Uruguay
49P2078	India
49P2110	Brazil
6952300	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela

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