



System x3200 M3 Types 7327 and 7328
Problem Determination and Service Guide





System x3200 M3 Types 7327 and 7328
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 247, and the *IBM Safety Information*, and *IBM Environmental Notices and User's Guide* on the *IBM System x Documentation* CD, and the *Warranty Information* document that comes with the server.

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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 přečtete 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 or leaking 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 138.
 - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment

Observe the following guidelines when you service electrical equipment:

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

Safety statements

Important:

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

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

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

Statement 1:



DANGER

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

To avoid a shock hazard:

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

To Connect:

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

To Disconnect:

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

Statement 2:



CAUTION:

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

Do not:

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

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

Statement 3:



CAUTION:

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

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



DANGER

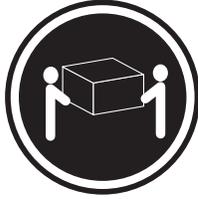
Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

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



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

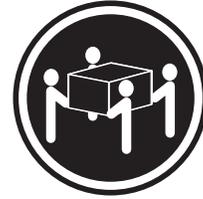
Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:

Use safe practices when lifting.

Statement 5:



CAUTION:

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



Statement 8:



CAUTION:

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



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

Statement 12:



CAUTION:

The following label indicates a hot surface nearby.



Statement 13:



DANGER

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

Statement 15:



CAUTION:

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

Statement 26:



CAUTION:

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



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

Statement 27:



CAUTION:

Hazardous moving parts are nearby.



Chapter 1. Start here

You can solve many problems without outside assistance by following the troubleshooting procedures in this *Problem Determination and Service Guide* and on the IBM Web site. This document describes the diagnostic tests that you can perform, troubleshooting procedures, and explanations of error messages and error codes. The documentation that comes with your operating system and software also contains troubleshooting information.

Diagnosing a problem

Before you contact IBM or an approved warranty service provider, follow these procedures in the order in which they are presented to diagnose a problem with your server:

1. **Determine what has changed.**

Determine whether any of the following items were added, removed, replaced, or updated before the problem occurred:

- IBM System x Server Firmware (server firmware)
- Device drivers
- Firmware
- Hardware components
- Software

If possible, return the server to the condition it was in before the problem occurred.

2. **Collect data.**

Thorough data collection is necessary for diagnosing hardware and software problems.

a. **Document error codes and system-board LEDs.**

- **System error codes:** See “POST error codes” on page 26 for information about a specific error code.
- See “System-board LEDs” on page 19 for the location of the system-board LEDs.
- **Software or operating-system error codes:** See the documentation for the software or operating system for information about a specific error code. See the manufacturer's Web site for documentation.

b. **Collect system data.**

Run the Dynamic System Analysis (DSA) diagnostics program to collect information about the hardware, firmware, software, and operating system. Have this information available when you contact IBM or an approved warranty service provider. See “Running the diagnostic programs” on page 74 for the instructions to run the DSA program.

If you need to download the latest version of DSA, go to <http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-DSA> or 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/systems/support/>.
- 2) Under **Product support**, click **System x**.

- 3) Under **Popular links**, click **Software and device drivers**.
- 4) Under **Related downloads**, click **Dynamic System Analysis (DSA)**.

For information about DSA command-line options, go to http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp?topic=/com.ibm.xseries.tools.doc/erep_tools_dsa.html or complete the following steps:

- 1) Go to <http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp>.
 - 2) In the navigation pane, click **IBM System x and BladeCenter Tools Center**.
 - 3) Click **Tools reference > Error reporting and analysis tools > IBM Dynamic System Analysis**.
3. **Follow the problem-resolution procedures.**

The four problem-resolution procedures are presented in the order in which they are most likely to solve your problem. Follow these procedures in the order in which they are presented:

a. **Check for and apply code updates.**

Most problems that appear to be caused by faulty hardware are actually caused by the server firmware (formerly BIOS firmware), device firmware, or device drivers that are not at the latest levels.

1) **Determine the existing code levels.**

In DSA, click **Firmware/VPD** to view system firmware levels, or click **Software** to view operating-system levels.

2) **Download and install updates of code that is not at the latest level.**

Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

To display a list of available updates for your server, go to <http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=MIGR-4JTS2T> or 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.

- a) Go to <http://www.ibm.com/systems/support/>.
- b) Under **Product support**, click **System x**.
- c) Under **Popular links**, click **Software and device drivers**.
- d) Click **System x3200 M3** to display the list of downloadable files for the server.

You can install code updates that are packaged as an *UpdateXpress* System Pack or *UpdateXpress* CD image. An *UpdateXpress* System Pack contains an integration-tested bundle of online firmware and device-driver updates for your server. Use *UpdateXpress* System Pack Installer to acquire and apply *UpdateXpress* System Packs and individual firmware and device-driver updates. For additional information and to download the *UpdateXpress* System Pack Installer, go to the System x and BladeCenter Tools Center at <http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp> and click **UpdateXpress System Pack Installer**.

Be sure to separately install any listed critical updates that have release dates that are later than the release date of the Update*Xpress* System Pack or Update*Xpress* image.

When you click an update, an information page is displayed, including a list of the problems that the update fixes. Review this list for your specific problem; however, even if your problem is not listed, installing the update might solve the problem.

b. **Check for and correct an incorrect configuration.**

If the server is incorrectly configured, a system function can fail to work when you enable it; if you make an incorrect change to the server configuration, a system function that has been enabled can stop working.

1) **Make sure that all installed hardware and software are supported.**

See <http://www.ibm.com/servers/eserver/serverproven/compat/us/> to verify that the server supports the installed operating system, optional devices, and software levels. If any hardware or software component is not supported, uninstall it to determine whether it is causing the problem. You must remove nonsupported hardware before you contact IBM or an approved warranty service provider for support.

2) **Make sure that the server, operating system, and software are installed and configured correctly.**

Many configuration problems are caused by loose power or signal cables or incorrectly seated adapters. You might be able to solve the problem by turning off the server, reconnecting cables, reseating adapters, and turning the server back on. See “Checkout procedure” on page 55 for the instructions to perform the checkout procedures.

If the problem is associated with a specific function (for example, if a RAID hard disk drive is marked offline in the RAID array), see the documentation for the associated controller and management or controlling software to verify that the controller is correctly configured.

Problem determination information is available for many devices such as RAID and network adapters.

For problems with operating systems or IBM software or devices, 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.

- a) Go to <http://www.ibm.com/systems/support/>.
- b) Under **Product support**, click **System x**.
- c) From the **Product family** list, select **System x3200 M3**.
- d) Under **Support & downloads**, click **Documentation, Install, and Use** to search for related documentation.

c. **Check for service bulletins.**

IBM service bulletins document known problems and suggested solutions. To search for service bulletins, 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/systems/support/>.
- 2) Under **Product support**, click **System x**.
- 3) From the **Product family** list, select **System x3200 M3**.
- 4) Under **Support & downloads**, click **Troubleshoot**.

d. **Check for and replace defective hardware.**

If a hardware component is not operating within specifications, it can cause unpredictable results. Most hardware failures are reported as error codes in a system or operating-system log. See “Troubleshooting tables” on page 57 and Chapter 5, “Removing and replacing server components,” on page 141 for more information.

Troubleshooting procedures are also provided on the IBM Web site. A single problem might cause multiple symptoms. Follow the diagnostic procedure for the most obvious symptom. If that procedure does not diagnose the problem, use the procedure for another symptom, if possible. To locate troubleshooting procedures for your server, 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/systems/support/>.
- 2) Under **Product support**, click **System x**.
- 3) From the **Product family** list, select **System x3200 M3**.
- 4) Under **Support & downloads**, click **Troubleshoot**.
- 5) Under **Diagnostic**, select the troubleshooting procedure for the symptom that you are observing.

For more troubleshooting information, see Chapter 3, “Diagnostics,” on page 23.

If the problem remains, contact IBM or an approved warranty service provider for assistance with additional problem determination and possible hardware replacement. To open an online service request, go to <http://www.ibm.com/support/electronic/>. Be prepared to provide information about any error codes and collected data.

Undocumented problems

If you have completed the diagnostic procedure and the problem remains, the problem might not have been previously identified by IBM. After you have verified that all code is at the latest level, all hardware and software configurations are valid, and no light path diagnostics LEDs or log entries indicate a hardware component failure, contact IBM or an approved warranty service provider for assistance. To open an online service request, go to <http://www.ibm.com/support/electronic/>. Be prepared to provide information about any error codes and collected data and the problem determination procedures that you have used.

Chapter 2. Introduction

This *Problem Determination and Service Guide* contains information to help you solve problems that might occur in the IBM System x3200 M3 Types 7327 or 7328 server. It describes the diagnostic tools that come with the server, error codes and suggested actions, and instructions for replacing failing components.

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

Replaceable components are of four types:

- **Consumable part:** Purchase and replacement of consumable parts (components, such as batteries and printer cartridges, that have depletable life) is your responsibility. If IBM acquires or installs a consumable part at your request, you will be charged for the service.
- **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 the server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

For a list of replaceable components for the server, see “Replaceable server components” on page 133.

For information about the terms of the warranty and getting service and assistance, see the *Warranty Information* document that comes with the server.

Related documentation

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

- *Installation and User's Guide*

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

This printed document contains information about the terms of the warranty.

- *Environmental Notices and User Guide*

This document is in PDF format on the IBM *System x Documentation* CD. It contains translated environmental notices.

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

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

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

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

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x3200 M3** and click **Continue**.

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 *System x Documentation* CD. Each statement is numbered for reference to the corresponding statement in the *Safety Information* document.

The following notices and statements are used in this document:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage might 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 for Machine Type 7327 or 7328. Depending on the server model, some features might not be available, or some specifications might not apply. See the *PDSG* on the *System x Documentation* CD for additional information about the server.

Table 1. Features and specifications

<p>Microprocessor:</p> <ul style="list-style-type: none"> • Supports one Intel quad-core (Xeon 3400 series) or dual-core (Celeron G1101, Pentium G6950, or Core i3 series) processor the IbexPeak 3420 chip set and Multi-chip Package processor architecture • Designed for LGA 1156 socket • Scalable up to four cores • 32 KB instruction cache, 32 KB data cache, and up to 8 MB L3 cache that is shared among the cores • Support for Intel Extended Memory 64 Technology (EM64T) <p>Note:</p> <ul style="list-style-type: none"> • Use the Setup utility to determine the type and speed of the microprocessors. • For a list of supported microprocessors, see http://www.ibm.com/servers/eserver/serverproven/compat/us/. <p>Memory:</p> <ul style="list-style-type: none"> • Minimum: 1 GB • Maximum: 32 GB <ul style="list-style-type: none"> – 16 GB using unbuffered DIMMs (UDIMMs) – 32 GB using registered DIMMs (RDIMMs) • Types: PC3-8500 or PC3-10600 (single-rank or dual-rank), ECC unbuffered or registered double-data-rate 3 (DDR3) 1066 or 1333 MHz registered or unbuffered SDRAM DIMM • Connectors: six dual inline memory module (DIMM) connectors, two-way interleaved • Supports: <ul style="list-style-type: none"> – 1 GB, 2 GB, and 4 GB unbuffered DIMMs – 1 GB, 2 GB, 4 GB, and 8 GB registered DIMMs 	<p>Integrated functions:</p> <ul style="list-style-type: none"> • Integrated management module (IMM), which provides service processor control and monitoring functions, video controller, and (when the optional virtual media key is installed) remote keyboard, video, mouse, and remote hard disk drive capabilities • Intel 82574L Gb Ethernet controller • Integrated Trusted Platform Module (TPM) support • Integrated SATA controller (simple-swap and hot-swap models) • Seven Universal Serial Bus (USB) 2.0 ports (two front and four rear of the chassis), one internal for the optional USB Hypervisor key. • One serial port • Two Ethernet ports • One system-management RJ-45 on the rear to connect to a systems management network. This system management connector is shared to the IMM functions. This connector is active with or without the optional IBM Virtual Media Key installed. • Six SATA II ports (four through the iPASS connector for simple-swap drives and two for the optical DVD and tape drives) 	<p>RAID controllers:</p> <ul style="list-style-type: none"> • A ServeRAID-BR10i v2 SAS/SATA adapter that provides RAID levels 0, 1, and 1E (comes standard on some hot-swap SAS and hot-swap SATA models). • An optional ServeRAID-MR10i SAS/SATA adapter that provides RAID levels 0, 1, 5, 6, and 10 can also be ordered. • An optional ServeRAID-MR10is SAS/SATA adapter that provides RAID levels 0, 1, 5, 6, and 10 can also be ordered. <p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Server on: 10°C to 35°C (50°F to 95°F) Altitude: 0 to 914.4 m (3000 ft) – Server on: 10°C to 32°C (50°F to 89.6°F) Altitude: 914.4 m (3000 ft) to 2133.6 m (7000 ft) – Server off: 10°C to 43°C (50°F to 109.4°F) Maximum altitude: 2133.6 m (7000.0 ft) – Shipping: -40°C to 60°C (-40°F to 140°F) • Humidity (operating and storage): 8% to 80% • Particulate contamination: <p>Attention: Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. For information about the limits for particulates and gases, see “Particulate contamination” on page 249.</p>
<p>Drives (depending on the model):</p> <ul style="list-style-type: none"> • Diskette (optional): External or internal USB FDD drive and memory key • Hard disk drives: Hot-swap SAS, hot-swap SATA, or simple-swap SATA (support AHCI mode) • One of the following SATA attached optical drives: <ul style="list-style-type: none"> – DVD-ROM – Multiburner (optional) <p>Drive bays (depending on the model):</p> <ul style="list-style-type: none"> • Two 5.25 in. half-high bays (one optical drive installed). • One 3.5 in. slim-high removable-media drive bay (optional diskette drive) • Four 3.5 in. slim-high hard disk drive bays (some models) • Eight 2.5 inch slim-high hard disk drive bays (some models) 	<p>Fans:</p> <p>Three speed-controlled fixed fans</p> <p>Power supply:</p> <p>One of the following power supplies:</p> <ul style="list-style-type: none"> • One or two redundant 430-watt (90-240 V ac) with Active Energy Manager • One non-redundant 401-watt (90-240 V ac) without Active Energy Manager <p>Size:</p> <ul style="list-style-type: none"> • Height: 438 mm (17.25 in.) • Depth: 540 mm (21.25 in.) • Width: 216 mm (8.5 in.) • Weight: 19.6 kg (43 lb) to 21.4 kg (47 lb) depending upon configuration 	<p>Heat output:</p> <p>Approximate heat output:</p> <ul style="list-style-type: none"> • Minimum configuration: 188 Btu per hour (55 watts) • Maximum configuration: 1784 Btu per hour (523 watts) <p>Electrical input:</p> <ul style="list-style-type: none"> • Sine-wave input (50 or 60 Hz) required • Input voltage and frequency ranges automatically selected • 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: 0.20 kVA (all models) – Maximum: 0.55 kVA

Table 1. Features and specifications (continued)

<p>Up to six expansion slots (depending on the model):</p> <ul style="list-style-type: none"> • Six expansion slots on the system board <ul style="list-style-type: none"> – Two PCI Express Gen2 x8 slots (x8 links) – One PCI Express Gen2 x4 slot (x4 link) – Two PCI 32-bit/33 MHz slots – One PCI Express Gen2 x4 slot (x4 electrical and mechanical) for the ServeRAID-BR10il v2 SAS/SATA adapter <p>Video controller (integrated into IMM):</p> <ul style="list-style-type: none"> • Matrox G200 video integrated on the system board <ul style="list-style-type: none"> – Compatible with SVGA and VGA <p>Note: The maximum video resolution is 1280 x 1024 at 85 MHz</p>	<p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> • Sound power, idling: 5.0 bel • Sound power, operating: 5.3 bel 	<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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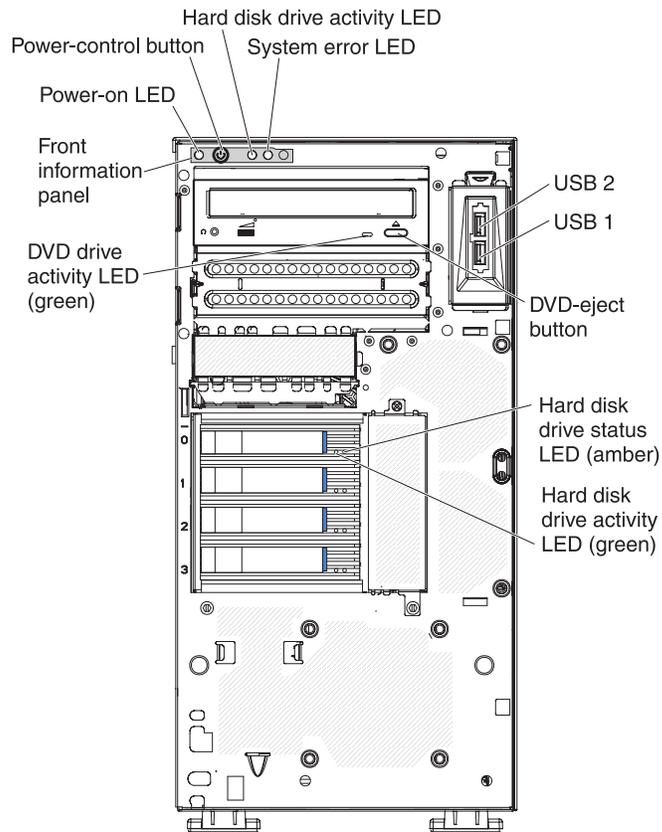
Server controls, LEDs, and power

This section describes the controls, light-emitting diodes (LEDs), and connectors on the front and rear of the server, and how to turn the server on and off. For the location of the LEDs on the system board, see “System-board LEDs” on page 19.

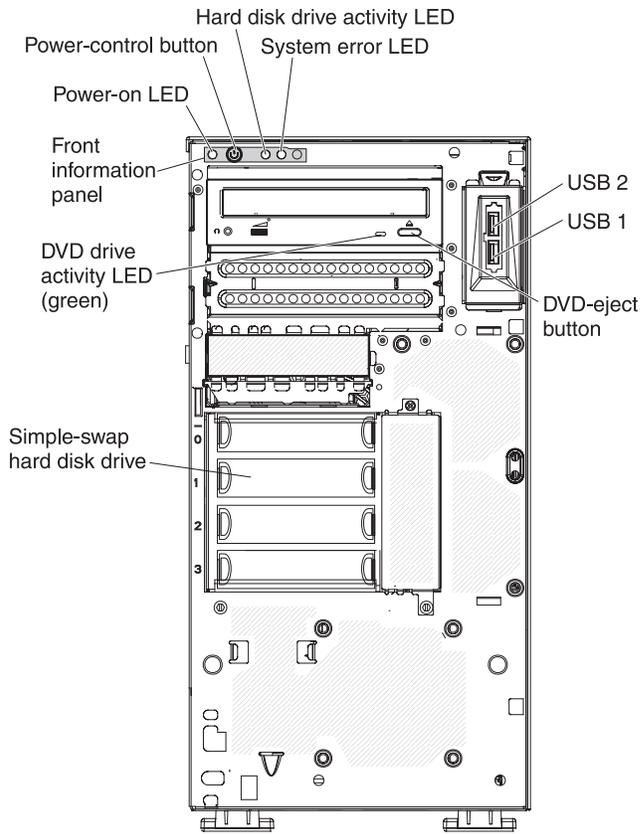
Note: The illustrations in this document might differ slightly from your model.

Front view

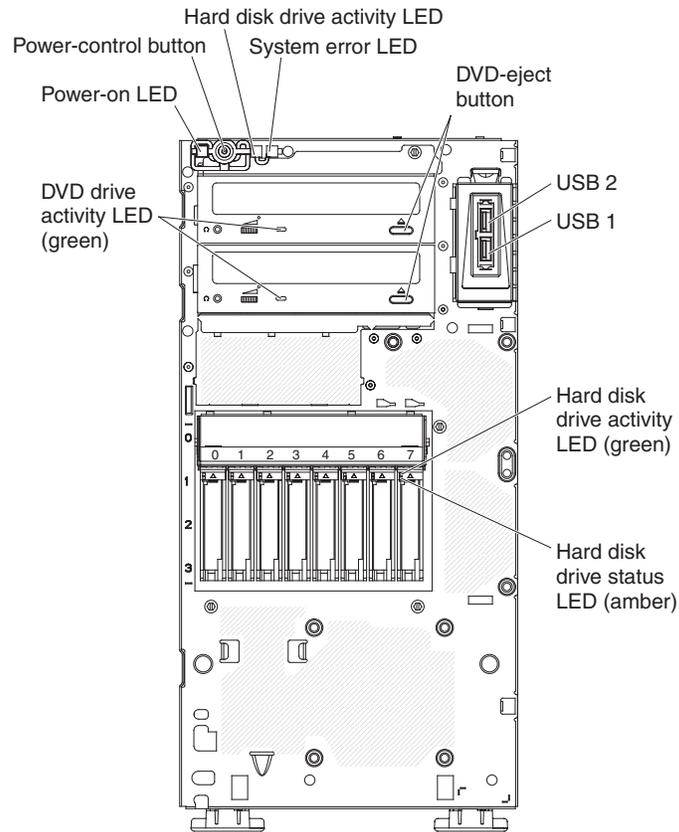
The following illustration shows the 3.5-inch SAS/SATA hot-swap hard disk drive model:



The following illustration shows the 3.5-inch SATA simple-swap hard disk drive model:



The following illustration shows the 2.5-inch SAS/SATA hot-swap hard disk drive model:



Power control button and power-on LED

Press this button to turn the server on and off manually or to wake the server from a reduced-power state. The states of the power-on LED are as follows:

Off: AC power is not present, or the power supply or the LED itself has failed.

Flashing rapidly (4 times per second): The server is turned off and is not ready to be turned on. The power-control button is disabled. This will last approximately 1 to 3 minutes.

Flashing slowly (once per second): The server is turned off and is ready to be turned on. You can press the power-control button to turn on the server.

Lit: The server is turned on.

Fading on and off: The server is in a reduced-power state. To wake the server, press the power-control button or use the IMM Web interface. See “Logging on to the Web interface” on page 232 for information on logging on to the IMM Web interface.

Hard disk drive activity LED

When this LED is flashing, it indicates that the associated hard disk drive is in use.

System-error LED

When this amber LED is lit, it indicates that a system error has occurred. An LED on the system board might also be lit to help isolate the error. See Chapter 3, “Diagnostics,” on page 23 for additional information.

USB connectors

Connect USB devices to these connectors.

DVD-eject button

Press this button to release a CD or DVD from the DVD drive.

DVD drive activity LED

When this LED is lit, it indicates that the DVD drive is in use.

Hot-swap hard disk drive activity LED (some models)

On some server models, each hot-swap drive has a hard disk drive activity LED. When this green LED is flashing, it indicates that the drive is in use.

When the drive is removed, this LED also is visible on the SAS/SATA backplane, next to the drive connector. The backplane is the printed circuit board behind drive bays 4 through 7 (or bays 4 through 11 on some 2.5-inch hard disk drive SAS models).

Hot-swap hard disk drive status LED (some models)

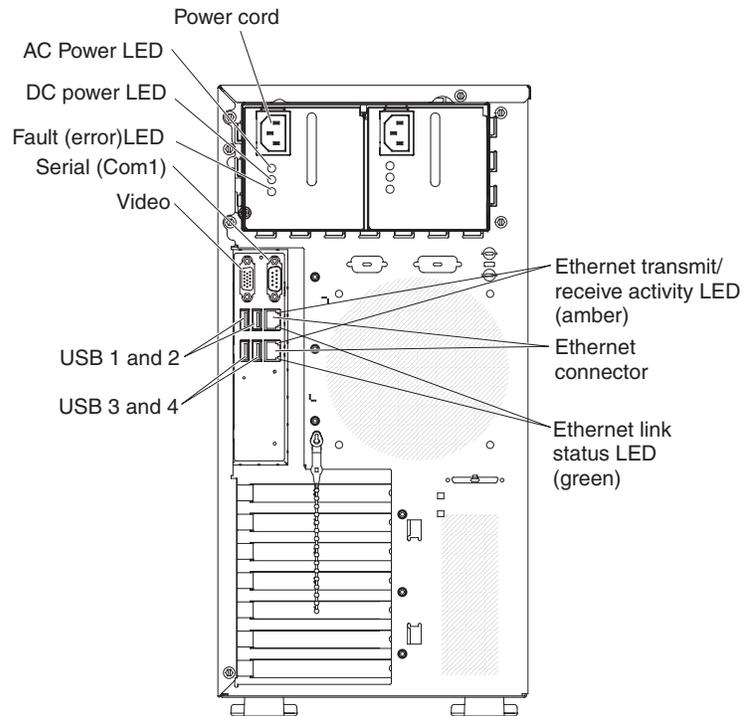
On some server models, each hot-swap hard disk drive has an amber status LED. If this amber status LED for a drive is lit, it indicates that the associated hard disk drive has failed.

If an optional ServeRAID adapter is installed in the server and the LED flashes slowly (one flash per second), the drive is being rebuilt. If the LED flashes rapidly (three flashes per second), the adapter is identifying the drive.

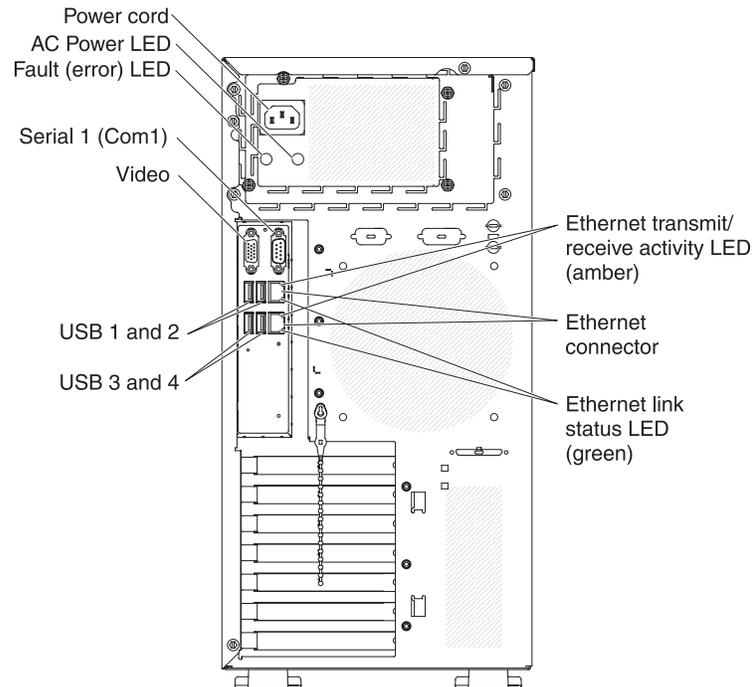
When the drive is removed, this LED also is visible on the SAS/SATA backplane, below the hot-swap hard disk drive activity LED.

Rear view

The following illustration shows the LEDs and connectors on the rear of the hot-swap server model.



The following illustration shows the LEDs and connectors on the rear of the simple-swap server model.



Power-cord connector

Connect the power cord to this connector.

AC power LED

This green LED provides status information about the power supply. During typical operation, both the ac and dc power LEDs are lit. For any other combination of LEDs, see the “Power-supply LEDs” on page 71.

DC power LED

This green LED provides status information about the power supply. During typical operation, both the ac and dc power LEDs are lit. For any other combination of LEDs, see the “Power-supply LEDs” on page 71.

Power-error (!) LED

When this amber LED is lit, it indicates that the power supply has failed.

Serial connector

Connect a 9-pin serial device to this connector.

Video connector

Connect a monitor to this connector.

USB connectors

Connect USB devices to these connectors.

Ethernet connector

Use either of these connectors to connect the server to a network. When you use the Ethernet 1 connector, the network can be shared with the IMM through a single network cable.

Ethernet transmit/receive activity LED

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

Ethernet link status LED

This LED is on the Ethernet connector. When this LED is lit, it indicates that there is an active connection on the Ethernet port.

Server power features

When the server is connected to an ac power source but is not turned on, the operating system does not run, and all core logic except for the service processor (the Integrated Management Module) is shut down; however, the server can respond to requests to the service processor, such as a remote request to turn on the server. The power-on LED flashes to indicate that the server is connected to ac power but is not turned on.

Turning on the server

Approximately 5 seconds after the server is connected to ac power, one or more fans might start running to provide cooling while the server is connected to power and the power-on button LED will blink quickly. Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active (the power-on LED will blink slowly). You can turn on the server by pressing the power-control button.

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

- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If your operating system supports the Wake on LAN feature, the Wake on LAN feature can turn on the server.

Note: When 4 GB or more of memory (physical or logical) is installed, some memory is reserved for various system resources and is unavailable to the

operating system. The amount of memory that is reserved for system resources depends on the operating system, the configuration of the server, and the configured peripheral component interconnect (PCI) options.

Turning off the server

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

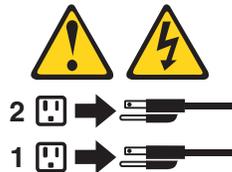
Some operating systems require an orderly shutdown before you turn off the server. See your operating-system documentation for information about shutting down the operating system.

Statement 5:



CAUTION:

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



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

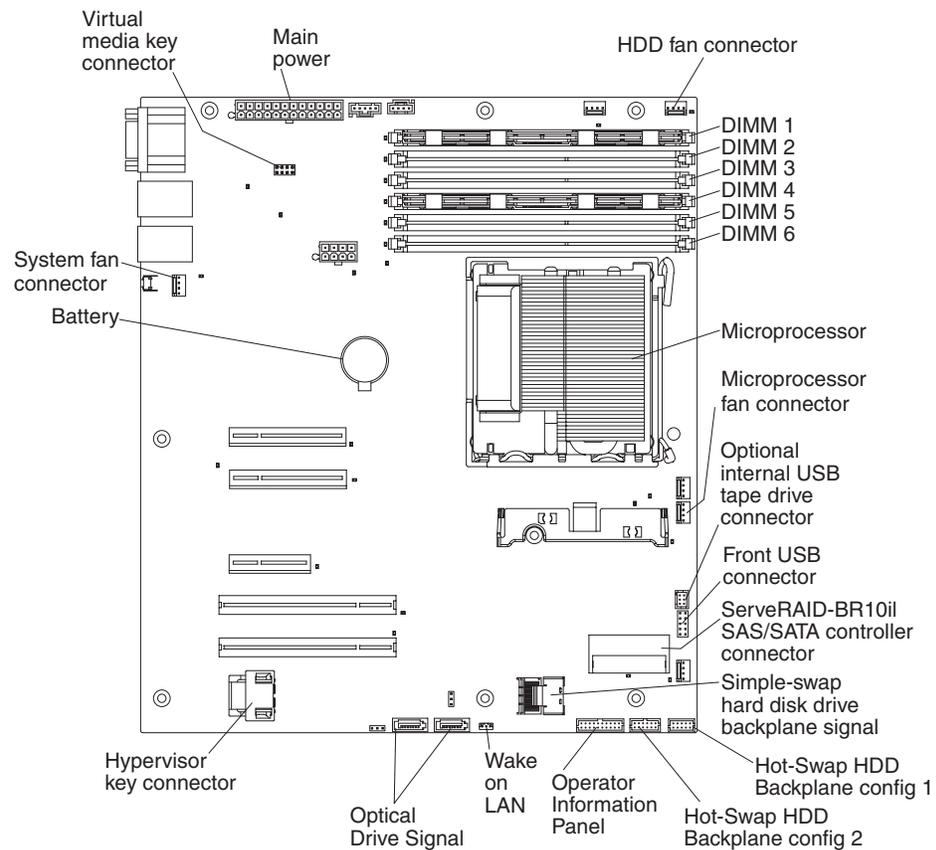
- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if your operating system supports this feature.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- The server can be turned off by Wake on LAN feature.
- The integrated management module (IMM) can turn off the server as an automatic response to a critical system failure.

Internal connectors, LEDs, and switches

The illustrations in this section show the connectors, light-emitting diodes (LEDs), and switches on the system board. The illustrations might differ slightly from your hardware.

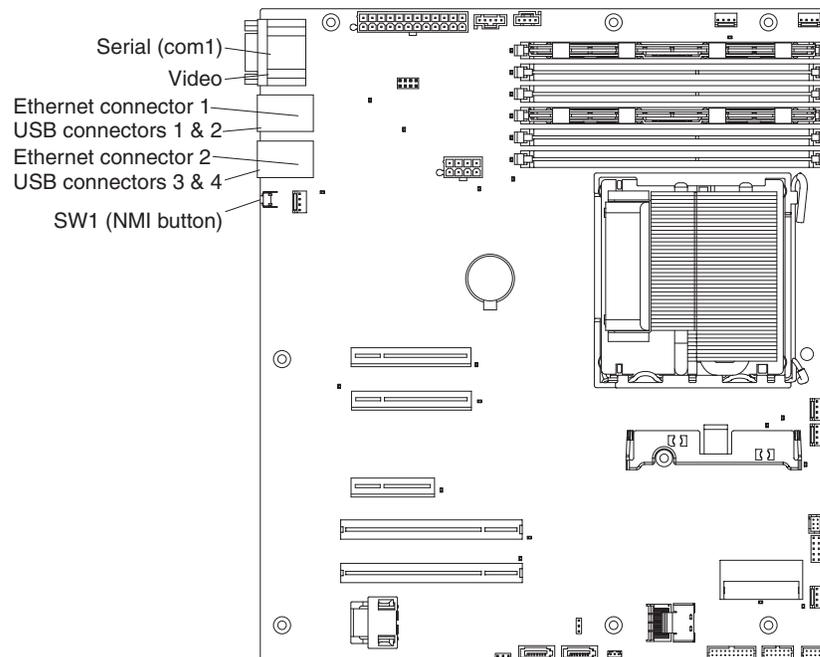
System-board internal connectors

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



System-board external connectors

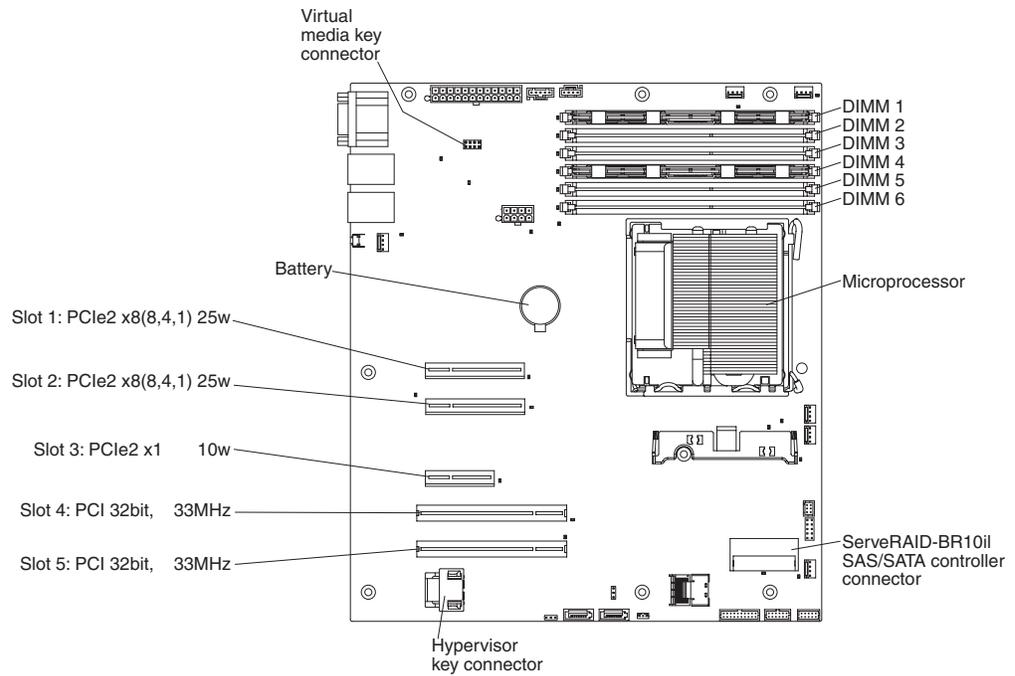
The following illustration shows the external input/output (I/O) connectors on the system board.



Note: When you disconnect the power source from the server, you lose the ability to view the LEDs because the LEDs are not lit when the power source is removed. Before you disconnect the power source, make a note of which LEDs are lit, including the LEDs that are lit on the operation information panel and LEDs inside the server on the system board.

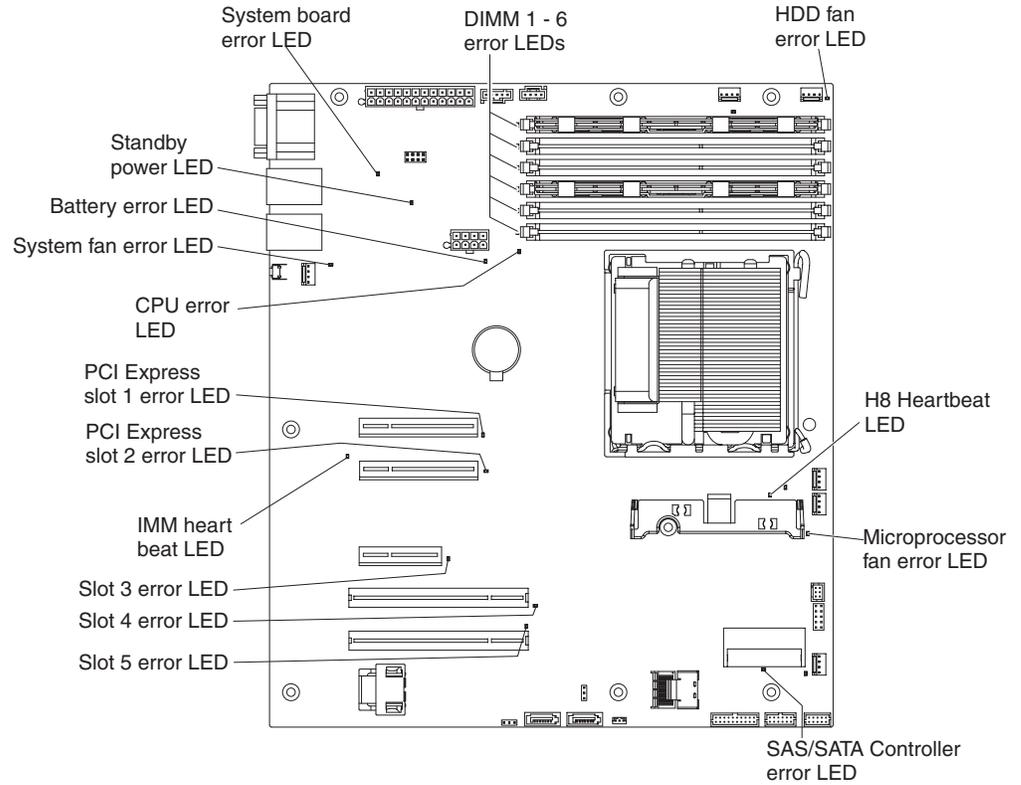
System-board optional-devices connectors

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



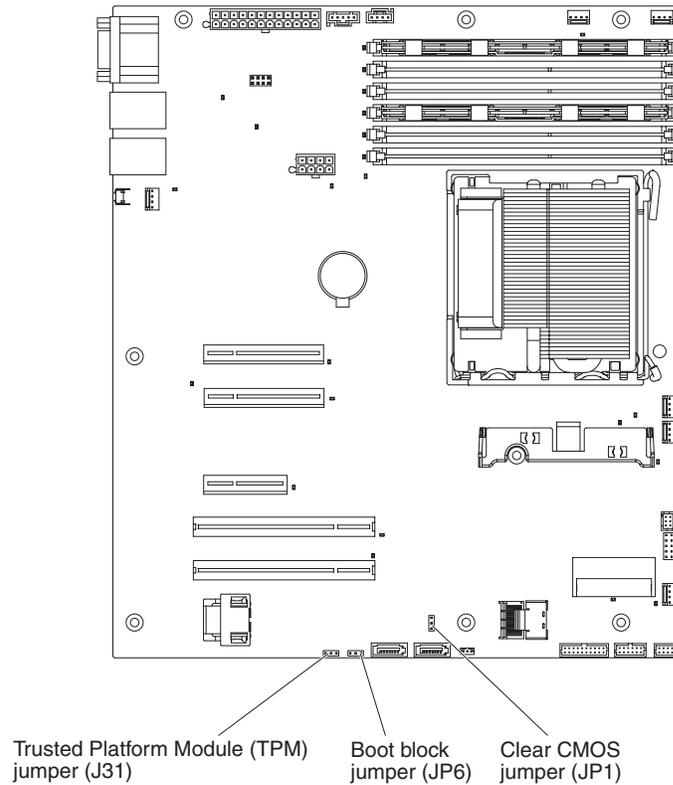
System-board LEDs

The following illustration shows the LEDs on the system board.



System-board jumpers and switches

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



The following table describes the function of each jumper block.

Table 2. System-board jumper blocks

Jumper number	Jumper name	Jumper setting
JP1	Clear CMOS jumper	<ul style="list-style-type: none"> • Pins 1 and 2: Keep CMOS data (default). • Pins 2 and 3: Clear CMOS data (including power-on password).
JP6	Boot block jumper	<ul style="list-style-type: none"> • Pins 1 and 2: Boot from primary BIOS page (default). • Pins 2 and 3: Boot from backup BIOS page.

Table 2. System-board jumper blocks (continued)

Jumper number	Jumper name	Jumper setting
J31	Trusted Platform Module (TPM) jumper	<p>Pins 1 and 2: Enable TPM physical presence. To enable TPM physical presence, complete the following steps:</p> <ol style="list-style-type: none"> 1. Turn off the server and remove all power cords and external cables. 2. Remove the pin jumper from JP6 and install it on J31 pins 1 and 2. Take note which pins the jumper is originally installed on JP6. 3. Turn on the server and access the Setup utility menu to verify that the TPM function has been activated (see "Using the Setup utility" on page 225). 4. Turn off the server and replace the jumper on JP6. 5. Turn on the server.
<p>Notes:</p> <ul style="list-style-type: none"> • If no jumper is present in JP1 or JP6, the server responds as if the pins are set to 1 and 2. • Changing the position of the boot block jumper from pins 1 and 2 to pins 2 and 3 before the server is turned on alters which flash ROM page is loaded. Do not change the jumper pin position after the server is turned on. This can cause an unpredictable problem. 		

Chapter 3. 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 245 for more information.

Diagnostic tools

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

- **POST error messages and error logs**

The power-on self-test (POST) generates messages to indicate successful test completion or the detection of a problem. See “POST” on page 26, “Event logs” on page 24, and “POST error codes” on page 26 for more information.

- **Troubleshooting tables**

These tables list problem symptoms and actions to correct the problems. See “Troubleshooting tables” on page 57 for more information.

- **Dynamic System Analysis (DSA) Preboot diagnostic programs**

The DSA Preboot diagnostic programs provide problem isolation, configuration analysis, and error log collection. The diagnostic programs are the primary method of testing the major components of the server and are stored in integrated USB memory. The diagnostic programs collect the following information about the server:

- System configuration
- Network interfaces and settings
- Installed hardware
- Service processor status and configuration
- Vital product data, firmware, and UEFI configuration
- Hard disk drive health
- RAID controller configuration
- Controller event logs, including the following information:
 - System error logs
 - Temperature, voltage, and fan speed information
 - Self-monitoring Analysis, and Reporting Technology (SMART) data
 - Machine check registers
 - USB information
 - Monitor configuration information
 - PCI slot information

The diagnostic programs create a merged log that includes events from all collected logs. The information is collected into a file that you can send to IBM service and support. Additionally, you can view the server information locally through a generated text report file. You can also copy the log to removable media and view the log from a Web browser. See “Running the diagnostic programs” on page 74 and “Diagnostic messages” on page 75 for more information.

- **Server LEDs**

Use the LEDs on the server to diagnose system errors quickly. See “Error LEDs” on page 69 for more information.

- **IBM Electronic Service Agent**

IBM Electronic Service Agent is a software tool that monitors the server for hardware error events and automatically submits electronic service requests to IBM service and support. In addition, it can collect and transmit system configuration information on a scheduled basis so that the information is available to you and your support representative. It uses minimal system resources, and is available free of charge. For more information and to download IBM Electronic Service Agent, go to <http://www.ibm.com/support/electronic/>

Event logs

Error codes and messages are displayed in the following types of event logs:

- **POST event log:** This log contains the three most recent error codes and messages that were generated during POST. You can view the POST event log through the Setup utility.
- **System-event log:** This log contains messages that were generated during POST and all system status messages from the service processor. You can view the contents of the system-event log from the Setup utility for more information. The system-event log is limited in size. When it is full, new entries will not overwrite existing entries; therefore, you must periodically clear the system-event log through the Setup utility. When you are troubleshooting, you might have to clear the system-event log to make the most recent events available for analysis. Each system-event log entry is displayed on its own page. Message are listed on the left side of the screen, and details about the selected message is displayed on the right side of the screen. To move from one entry to the next, use the Up Arrow (↑) and Down Arrow (↓) keys. The system-event log indicates an assertion event when an event has occurred. It indicates a de-assertion event when the event is no longer occurring.
- **Integrated management module (IMM) event log:** This log contains a filtered subset of all IMM, POST, and system management interrupt (SMI) events. You can view the IMM event log through the IMM Web interface and through the Dynamic System Analysis (DSA) program (as the ASM event log).
- **DSA log:** This log is generated by the Dynamic System Analysis (DSA) program, and it is a chronologically ordered merge of the system-event log (as the IPMI event log), the IMM chassis-event log (as the ASM event log), and the operating-system event logs. You can view the DSA log through the DSA program.

Viewing event logs through the Setup utility

To view the POST event log or system-event log, complete the following steps:

1. Turn on the server.
2. When the prompt <F1> Setup is displayed, press F1. If you have set both a power-on password and an administrator password, you must type the administrator password to view the event logs.
3. Select **System Event Logs** and use one of the following procedures:
 - To view the POST event log, select **POST Event Viewer**.
 - To view the IMM system-event log, select **System Event Log**.

Viewing event logs without restarting the server

When the server is not hung and the IMM is connected to a network, methods are available for you to view one or more event logs without having to restart the server.

If you have installed Portable or Installable Dynamic System Analysis (DSA), you can use it to view the system-event log (as the IPMI event log), the IMM event log (as the ASM event log), the operating-system event logs, or the merged DSA log. You can also use DSA Preboot to view these logs, although you must restart the server to use DSA Preboot. To install Portable DSA, Installable DSA, or DSA Preboot or to download a DSA Preboot CD image, go to <http://www.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=SERV-DSA&brandind=5000008> or 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/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Under **Related downloads**, click **Dynamic System Analysis (DSA)** to display the matrix of downloadable DSA files.

If IPMItool is installed in the server, you can use it to view the system-event log. Most recent versions of the Linux operating system come with a current version of IPMItool. For information about IPMItool, see <http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp?topic=/com.ibm.xseries.tools.doc/co...> or 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://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp>.
2. In the navigation pane, click **IBM System x and BladeCenter Tools Center**.
3. Expand **Tools reference**, expand **Configuration tools**, expand **IPMI tools**, and click **IPMItool**.

For an overview of IPMI, go to <http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/liaai/ipmi/liaaiipmi.htm> or complete the following steps:

1. Go to <http://publib.boulder.ibm.com/infocenter/systems/index.jsp>.
2. In the navigation pane, click **IBM Systems Information Center**.
3. Expand **Operating systems**, expand **Linux information**, expand **Blueprints for Linux on IBM systems**, and click **Using Intelligent Platform Management Interface (IPMI) on IBM Linux platforms**.

You can view the IMM event log through the **Event Log** link in the IMM Web interface.

The following table describes the methods that you can use to view the event logs, depending on the condition of the server. The first two conditions generally do not require that you restart the server.

Table 3. Methods for viewing event logs

Condition	Action
The server is not hung and is connected to a network.	Use any of the following methods: <ul style="list-style-type: none"> • Run Portable or Installable DSA to view the event logs or create an output file that you can send to IBM service and support. • Alternatively, you can use IPMItool to view the system-event log.

Table 3. Methods for viewing event logs (continued)

Condition	Action
The server is not hung and is not connected to a network.	Use IPMItool locally to view the system-event log.
The server is hung.	<ul style="list-style-type: none"> • If DSA Preboot is installed, restart the server and press F2 to start DSA Preboot and view the event logs. • If DSA Preboot is not installed, insert the DSA Preboot CD and restart the server to start DSA Preboot and view the event logs. • Alternatively, you can restart the server and press F1 to start the Setup utility and view the POST event log or system-event log. For more information, see “Viewing event logs without restarting the server” on page 24.

Clearing the event logs

To clear the event logs, complete the following steps.

Note: The POST event log is automatically cleared each time the server is restarted.

1. Turn on the server.
2. When the prompt <F1> Setup is displayed, press F1. If you have set both a power-on password and an administrator password, you must type the administrator password to view the error logs.
3. Use one of the following procedures:
 - To clear the IMM system-event log, select **System Event Logs --> System Event Log**. Select **Clear System Event Log**; then, press **Enter** twice.

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.

Note: This server does not use beep codes for server status.

If the system-board tray is configured to require entry of a password to complete the system startup, you need to type both the administrator password and power-on password to complete the system startup, if either password is set.

If POST detects a problem, an error message is displayed. See “POST error codes” for more information.

POST error codes

The following table describes the POST error codes and suggested actions to correct the detected problems. These errors can appear as severe, warning, or informational.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Error code	Description	Action
0010002	Microprocessor not supported.	<ol style="list-style-type: none"> 1. (Trained service technician only) Reseat the microprocessor and restart the server. 2. (Trained service technician only) Remove the microprocessor and install a new microprocessor. Restart the server. If the error is corrected, the old microprocessor is bad and must be replaced. 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. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
0011000	Invalid microprocessor type.	<ol style="list-style-type: none"> 1. Update the server firmware to the latest level (see “Updating the firmware” on page 221). 2. (Trained service technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see “Installing a microprocessor and fan sink” on page 211).
0011004	Microprocessor failed BIST.	<ol style="list-style-type: none"> 1. Update the server firmware to the latest level (see “Updating the firmware” on page 221). 2. (Trained service technician only) Reseat microprocessor. 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. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
001100A	Microcode updated failed.	<ol style="list-style-type: none"> 1. Update the server firmware to the latest level (see “Updating the firmware” on page 221). 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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Error code	Description	Action
0050001	DIMM disabled.	<ol style="list-style-type: none"> 1. If the server fails the POST memory test, reseal the DIMMs. 2. Remove and replace any DIMM for which the associated error LED is lit (see “Removing a memory module” on page 168 and “Installing a memory module” on page 169). 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA Preboot memory test (see “Running the diagnostic programs” on page 74).
0051003	Uncorrectable DIMM error	<ol style="list-style-type: none"> 1. If the server failed the POST memory test, reseal the DIMMs. 2. Remove and replace any DIMM for which the associated error LED is lit (see “Removing a memory module” on page 168 and “Installing a memory module” on page 169). 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA Preboot memory test (see “Running the diagnostic programs” on page 74).
0051006	DIMM mismatch detected	Make sure that the DIMMs match and are installed in the correct sequence (see “Installing a memory module” on page 169).
0051009	No memory detected.	<ol style="list-style-type: none"> 1. Make sure that the server contains DIMMs. 2. Reseat the DIMMs. 3. Install DIMMs in the correct sequence (see “Installing a memory module” on page 169).
005100A	No usable memory detected.	<ol style="list-style-type: none"> 1. Make sure that the server contains DIMMs. 2. Reseat the DIMMs. 3. Install DIMMs in the correct sequence (see “Installing a memory module” on page 169). 4. Clear CMOS memory to re-enable all the memory connectors (see “System-board jumpers and switches” on page 20).
0058001	PFA threshold exceeded	<ol style="list-style-type: none"> 1. Update the server firmware to the latest level (see “Updating the firmware” on page 221). 2. Reseat the DIMMs and run the memory test (see “Running the diagnostic programs” on page 74). 3. Replace the failing DIMM, which is indicated by a lit LED on 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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Error code	Description	Action
0058007	DIMM population is unsupported.	<ol style="list-style-type: none"> 1. Make sure the installed DIMMs follow the population rules and sequence described in “Installing a memory module” on page 169. 2. Reseat the DIMMs, and then restart the server. 3. Remove the lowest-numbered DIMM pair of those that are identified and replace it with an identical pair of known good DIMMs, then restart the server. 4. Return the removed DIMMs, one pair at a time, to their original connectors, restarting the server after each pair, until a pair fails. Replace the DIMMs in the failed pair with identical known good DIMMs, restarting the server after each DIMM is installed. Replace the failed DIMM. Repeat this step until you have tested all removed DIMMs. 5. (Trained service technician only) Replace the system board.
0058008	DIMM failed memory test.	<ol style="list-style-type: none"> 1. Reseat the DIMMs, and then restart the server. 2. Replace the following components one at a time, in the order shown, then restart the server after each: <ol style="list-style-type: none"> a. DIMM b. (Trained service technician only) System board
00580A4	Memory population changed.	Information only. Memory has been added, moved, or changed.
0068002	CMOS battery cleared.	<ol style="list-style-type: none"> 1. Reseat the battery. 2. Clear the CMOS memory (see “System-board jumpers and switches” on page 20). 3. Replace the following components one at a time, in the following order, restarting the server after each one: <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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Error code	Description	Action
2011001	PCI-X PERR	<ol style="list-style-type: none"> 1. Reseat all affected adapters. 2. Update the PCI adapter firmware. 3. Remove the adapter. 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. Adapter b. (Trained service technician only) System board
2018001	PCI Express uncorrected or uncorrected error	<ol style="list-style-type: none"> 1. Reseat all affected adapters. 2. Update the PCI adapter firmware. 3. Remove the adapter. 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. Adapter b. (Trained service technician only) System board

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Error code	Description	Action
2018002	Option ROM resource allocation failure	<p>Informational message that some devices might not be initialized.</p> <ol style="list-style-type: none"> 1. If possible, rearrange the order of the adapters in the PCI slots to change the load order of the optional-device ROM code. 2. Run the Setup utility, select Startup Options, and change the boot priority to change the load order of the optional-device ROM code. 3. Run the Setup utility and disable some other resources, if their functions are not being used, to make more space available. <ol style="list-style-type: none"> a. Select Startup Options -> Planar Ethernet (PXE/DHCP) to disable the integrated Ethernet controller ROM. b. Select Advanced Functions -> PCI Bus Control -> PCI ROM Control Execution to disable the ROM of the adapter in the PCI slots. c. Select Devices and I/O Ports to disable any of the integrated devices. 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. (Trained service technician only) System board
3xx0007 (xx can be 00 - 19)	Firmware fault detected, system halted	<ol style="list-style-type: none"> 1. Recover the server firmware to the latest level (see “Updating the firmware” on page 221). 2. Undo any recent configuration changes, or clear CMOS memory to restore the settings to the default values (see “System-board jumpers and switches” on page 20). 3. Remove any recently installed hardware.
3038003	Firmware corrupted	<ol style="list-style-type: none"> 1. Run the Setup utility, select Load Default Settings, and save the settings to recover the server firmware. 2. (Trained service technician only) Replace the system board.
3048005	Booted secondary (backup) UEFI Image	Information only. The backup switch was used to boot the secondary bank.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Error code	Description	Action
3048006	Booted secondary (backup) UEFI image because of ABR	<ol style="list-style-type: none"> 1. Run the Setup utility, select Load Default Settings, and save the settings to recover the primary UEFI settings. 2. Turn off the server and remove it from the power source. 3. Reconnect the server to the power source, then turn on the server.
305000A	RTC date/time is incorrect	<ol style="list-style-type: none"> 1. Adjust the date and time settings in the Setup utility, and then restart the server. 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
3058001	System configuration invalid	<ol style="list-style-type: none"> 1. Run the Setup utility, and select Save Settings. 2. Run the Setup utility, select Load Default Settings, and save the settings. 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. Failing device (if the device is a FRU, it must be reseated by a trained service technician only) c. (Trained service technician only) System board
3058004	Three boot failure	<ol style="list-style-type: none"> 1. Undo any recent system changes, such as new settings or newly installed devices. 2. Make sure that the server is attached to a reliable power source. 3. Remove all hardware that is not listed on the ServerProven Web site at http://www.ibm.com/servers/eserver/serverproven/compat/us/. 4. Make sure that the operating system is not corrupted. 5. Run the Setup utility, save the configuration, and then restart the server.
3108007	System configuration restored to default settings	Information only. This is message is usually associated with the CMOS battery clear event.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Error code	Description	Action
3138002	Boot configuration error	<ol style="list-style-type: none"> 1. Remove any recent configuration changes made to the Setup utility. 2. Run the Setup utility, select Load Default Settings, and save the settings.
3808000	IMM communication failure	<ol style="list-style-type: none"> 1. Remove power from the server for 30 seconds, and then reconnect the server to power and restart it. 2. Update the IMM firmware to the latest level (see “Updating the firmware” on page 221). 3. Make sure that the virtual media key is seated and not damaged. 4. (Trained service technician only) Replace the system board.
3808002	Error updating system configuration to IMM	<ol style="list-style-type: none"> 1. Remove power from the server, and then reconnect the server to power and restart it. 2. Run the Setup utility and select Save Settings. 3. Update the IMM firmware to the latest level (see “Updating the firmware” on page 221).
3808003	Error retrieving system configuration from IMM	<ol style="list-style-type: none"> 1. Remove power from the server, and then reconnect the server to power and restart it. 2. Run the Setup utility and select Save Settings. 3. Update the IMM firmware to the latest level (see “Updating the firmware” on page 221).
3808004	IMM system event log full	<ul style="list-style-type: none"> • When using out-of-band, use the IMM Web interface or IPMItool to clear the logs from the operating system. • When using the local console: <ol style="list-style-type: none"> 1. Run the Setup utility. 2. Select System Event Log. 3. Select Clear System Event Log. 4. Restart the server.
3818001	Core Root of Trust Measurement (CRTM) update failed	<ol style="list-style-type: none"> 1. Run the Setup utility, select Load Default Settings, and save the settings. 2. (Trained service technician only) Replace the system board.
3818002	Core Root of Trust Measurement (CRTM) update aborted	<ol style="list-style-type: none"> 1. Run the Setup utility, select Load Default Settings, and save the settings. 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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Error code	Description	Action
3818003	Core Root of Trust Measurement (CRTM) flash lock failed	<ol style="list-style-type: none"> 1. Run the Setup utility, select Load Default Settings, and save the settings. 2. (Trained service technician only) Replace the system board.
3818004	Core Root of Trust Measurement (CRTM) system error	<ol style="list-style-type: none"> 1. Run the Setup utility, select Load Default Settings, and save the settings. 2. (Trained service technician only) Replace the system board.
3818005	Current Bank Core Root of Trust Measurement (CRTM) capsule signature invalid	<ol style="list-style-type: none"> 1. Run the Setup utility, select Load Default Settings, and save the settings. 2. (Trained service technician only) Replace the system board.
3818006	Opposite bank CRTM capsule signature invalid	<ol style="list-style-type: none"> 1. Switch the server firmware bank to the backup bank (see “Starting the backup server firmware” on page 229). 2. Run the Setup utility, select Load Default Settings, and save the settings. 3. Switch the bank back to the primary bank. 4. (Trained service technician only) Replace the system board.
3818007	CRTM update capsule signature invalid	<ol style="list-style-type: none"> 1. Run the Setup utility, select Load Default Settings, and save the settings. 2. (Trained service technician only) Replace the system board.
3828004	AEM power capping disabled	<ol style="list-style-type: none"> 1. Check the settings and the event logs. 2. Make sure that the Active Energy Manager feature is enabled in the Setup utility. Select System Settings -> Power -> Active Energy -> Capping Enabled. 3. Update the server firmware to the latest level (see “Updating the firmware” on page 221). 4. Update the IMM firmware to the latest level (see “Updating the firmware” on page 221).

System-event log

The system-event log contains 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 or the IMM).

Integrated management module (IMM) error messages

The following table describes the IMM error messages and suggested actions to correct the detected problems. For more information about IMM, see the *Integrated Management Module User's Guide* at <http://www.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-5079770&brandind=5000008>.

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.			
Message	Severity	Description	Action
Numeric sensor Ambient Temp going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	Reduce the ambient temperature.
Numeric sensor Ambient Temp going high (upper non-recoverable) has asserted.	Error	An upper nonrecoverable sensor going high has asserted.	Reduce the ambient temperature.
Numeric sensor Planar 3.3V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 3.3V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 5V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 5V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar VBAT going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	Replace the 3 V battery.
Numeric sensor CPU Fan Tach/HDD Fan Tach/SYS Fan Tach going low (lower critical) has asserted/deasserted. (<i>n</i> = fan number)	Error	A lower critical sensor going low has asserted.	1. Reseat the failing fan <i>n</i> , which is indicated by a lit LED on the fan. 2. Replace the failing fan. (<i>n</i> = fan number)
Fan <i>n</i> detected as present/absent. (<i>n</i> = fan number and FAN 6 is the equivalent of SYS FAN)	Error	A present/absent condition has occurred.	1. Reseat the failing fan <i>n</i> . 2. Replace the failing fan. (<i>n</i> = fan number)

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.

<p>The Processor CPU <i>n</i>Status has Failed with IERR. (<i>n</i> = microprocessor number)</p>	<p>Error</p>	<p>A processor failed - IERR condition has occurred.</p>	<ol style="list-style-type: none"> 1. Make sure that the latest levels of firmware and device drivers are installed for all adapters and standard devices, such as Ethernet, SCSI, and SAS. Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Run the DSA program for the hard disk drives and other I/O devices. 3. (Trained service technician only) Replace microprocessor <i>n</i>. <p>(<i>n</i> = microprocessor number)</p>
<p>An Over-Temperature Condition has been detected on the Processor CPU <i>n</i>Status. (<i>n</i> = microprocessor number)</p>	<p>Error</p>	<p>An overtemperature condition has occurred for microprocessor <i>n</i>. (<i>n</i> = microprocessor number)</p>	<ol style="list-style-type: none"> 1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffle is in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor <i>n</i> is installed correctly. 3. (Trained service technician only) Replace microprocessor <i>n</i>. <p>(<i>n</i> = microprocessor number)</p>

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. 			
<p>The Processor CPU <i>n</i>Status has Failed with FRB1/BIST condition. (<i>n</i> = microprocessor number)</p>	<p>Error</p>	<p>A processor failed - FRB1/BIST condition has occurred.</p>	<ol style="list-style-type: none"> 1. Check for a server firmware update. Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Make sure that the installed microprocessor is compatible with each other (see “Installing a microprocessor and fan sink” on page 211 for information about microprocessor requirements). 3. (Trained service technician only) Reseat microprocessor <i>n</i>. 4. (Trained service technician only) Replace microprocessor <i>n</i>. <p>(<i>n</i> = microprocessor number)</p>
<p>The Processor CPU <i>n</i>Status has a Configuration Mismatch. (<i>n</i> = microprocessor number)</p>	<p>Error</p>	<p>A processor configuration mismatch has occurred.</p>	<ol style="list-style-type: none"> 1. Make sure that the installed microprocessor is compatible with each other (see “Installing a microprocessor and fan sink” on page 211 for information about microprocessor requirements). 2. (Trained service technician only) Replace the incompatible microprocessor.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.

<p>An SM BIOS Uncorrectable CPU complex error for Processor CPU <i>n</i>Status has asserted. (<i>n</i> = microprocessor number)</p>	<p>Error</p>	<p>An SMBIOS uncorrectable CPU complex error has asserted.</p>	<ol style="list-style-type: none"> 1. Check for a server firmware update. Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Make sure that the installed microprocessor is compatible with each other (see “Installing a microprocessor and fan sink” on page 211 for information about microprocessor requirements). 3. (Trained service technician only) Reseat microprocessor <i>n</i>. 4. (Trained service technician only) Replace microprocessor <i>n</i>. <p>(<i>n</i> = microprocessor number)</p>
<p>Sensor CPU <i>n</i>OverTemp has transitioned to critical from a less severe state. (<i>n</i> = microprocessor number)</p>	<p>Error</p>	<p>A sensor has changed to Critical state from a less severe state.</p>	<ol style="list-style-type: none"> 1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffle is in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor <i>n</i> is installed correctly. 3. (Trained service technician only) Replace microprocessor <i>n</i>. <p>(<i>n</i> = microprocessor number)</p>

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. 			
Sensor CPU <i>n</i> OverTemp has transitioned to non-recoverable from a less severe state. (<i>n</i> = microprocessor number)	Error	A sensor has changed to Nonrecoverable state from a less severe state.	<ol style="list-style-type: none"> 1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffle is in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor <i>n</i> is installed correctly. 3. (Trained service technician only) Replace microprocessor <i>n</i>. (<i>n</i> = microprocessor number)
Sensor CPU <i>n</i> OverTemp has transitioned to critical from a non-recoverable state. (<i>n</i> = microprocessor number)	Error	A sensor has changed to Critical state from Nonrecoverable state.	<ol style="list-style-type: none"> 1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffle is in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor <i>n</i> is installed correctly. 3. (Trained service technician only) Replace microprocessor <i>n</i>. (<i>n</i> = microprocessor number)
Sensor CPU <i>n</i> OverTemp has transitioned to non-recoverable. (<i>n</i> = microprocessor number)	Error	A sensor has changed to Nonrecoverable state.	<ol style="list-style-type: none"> 1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffle is in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor <i>n</i> is installed correctly. 3. (Trained service technician only) Replace microprocessor <i>n</i>. (<i>n</i> = microprocessor number)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. 			
A bus timeout has occurred on system %1. (%1 = CIM_ComputerSystem.ElementName)	Error	A bus timeout has occurred.	<ol style="list-style-type: none"> 1. Remove the adapter from the PCI slot that is indicated by a lit LED. 2. Replace the extender card. 3. Remove all PCI adapters. 4. (Trained service technicians only) Replace the system board.
The System %1 encountered a POST Error. (%1 = CIM_ComputerSystem.ElementName)	Error	A POST error has occurred. (Sensor = ABR Status)	<ol style="list-style-type: none"> 1. Make sure the server meets the minimum configuration to start (see “Power-supply LEDs” on page 71). 2. Recover the server firmware from the backup page (see “Recovering the server firmware” on page 124). 3. Update the server firmware to the latest level. Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove components one at a time, restarting the server each time, to see if the problem goes away. 5. If the problem remains, (trained service technician) replace the system board.
The System %1 encountered a POST Error. (%1 = CIM_ComputerSystem.ElementName)	Error	A POST error has occurred. (Sensor = Firmware Error)	<ol style="list-style-type: none"> 1. Update the server firmware on the primary page. Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. (Trained service technician only) Replace the system board.

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- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.

<p>A Uncorrectable Bus Error has occurred on system %1. (%1 = CIM_ComputerSystem.ElementName)</p>	<p>Error</p>	<p>A bus uncorrectable error has occurred. (Sensor = Critical Int PCI)</p>	<ol style="list-style-type: none"> 1. Check the system-event log. 2. Check the PCI error LEDs. 3. Remove the adapter from the indicated PCI slot. 4. Check for a server firmware update. Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. (Trained service technician only) Replace the system board.
<p>A Uncorrectable Bus Error has occurred on system %1. (%1 = CIM_ComputerSystem.ElementName)</p>	<p>Error</p>	<p>A bus uncorrectable error has occurred. (Sensor = Critical Int CPU)</p>	<ol style="list-style-type: none"> 1. Check the system-event log. 2. Check the microprocessor error LEDs. 3. (Trained service technician only) Replace microprocessor. 4. Check for a server firmware update. Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. (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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. 			
<p>A Uncorrectable Bus Error has occurred on system %1. (%1 = CIM_ComputerSystem.ElementName)</p>	<p>Error</p>	<p>A bus uncorrectable error has occurred. (Sensor = Critical Int DIM)</p>	<ol style="list-style-type: none"> 1. Check the system-event log. 2. Check the DIMM error LEDs. 3. Remove the failing DIMM from the system board. 4. Check for a server firmware update. Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. Make sure that the installed DIMMs are supported and configured correctly. 6. (Trained service technician only) Replace the system board.
<p>Sensor Sys Board Fault has transitioned to critical from a less severe state.</p>	<p>Error</p>	<p>A sensor has changed to Critical state from a less severe state.</p>	<ol style="list-style-type: none"> 1. Check the system-event log. 2. Check for an error LED on the system board. 3. Replace any failing device. 4. Check for a server firmware update. Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. (Trained service technician only) Replace the system board.
<p>Sensor RAID Error has transitioned to critical from a less severe state.</p>	<p>Error</p>	<p>A sensor has changed to Critical state from a less severe state.</p>	<ol style="list-style-type: none"> 1. Check the hard disk drive LEDs. 2. Reseat the hard disk drive for which the status LED is lit. 3. Replace the defective hard disk drive.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.

The Drive <i>n</i> Status has been removed from unit Drive 0 Status. (<i>n</i> = hard disk drive number)	Error	A drive has been removed.	Reseat hard disk drive <i>n</i> . (<i>n</i> = hard disk drive number)
The Drive <i>n</i> Status has been disabled due to a detected fault. (<i>n</i> = hard disk drive number)	Error	A drive has been disabled because of a fault.	<ol style="list-style-type: none"> 1. Run the hard disk drive diagnostic test on drive <i>n</i>. 2. Reseat the following components: <ol style="list-style-type: none"> a. Hard disk drive b. Cable from the system board to the backplane 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. Cable from the system board to the backplane c. Hard disk drive backplane (<i>n</i> = hard disk drive number)
Array %1 is in critical condition. (%1 = CIM_ComputerSystem.ElementName)	Error	An array is in Critical state. (Sensor = Drive <i>n</i> Status) (<i>n</i> = hard disk drive number)	Replace the hard disk drive that is indicated by a lit status LED.
Array %1 has failed. (%1 = CIM_ComputerSystem.ElementName)	Error	An array is in Failed state. (Sensor = Drive <i>n</i> Status) (<i>n</i> = hard disk drive number)	Replace the hard disk drive that is indicated by a lit status LED.
Memory uncorrectable error detected for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	A memory uncorrectable error has occurred.	<ol style="list-style-type: none"> 1. If the server failed the POST memory test, reseat the DIMMs. 2. Replace any DIMM that is indicated by a lit error LED. Note: You do not have to replace DIMMs by pairs. 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA memory test.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.

Memory Logging Limit Reached for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	The memory logging limit has been reached.	<ol style="list-style-type: none"> 1. Update the server firmware to the latest level. Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Reseat the DIMMs and run the DSA memory test. 3. Replace any DIMM that is indicated by a lit error LED.
Memory DIMM Configuration Error for All DIMMs on Memory Subsystem All DIMMs.	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.
Memory uncorrectable error detected for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A memory uncorrectable error has occurred.	<ol style="list-style-type: none"> 1. If the server failed the POST memory test, reseat the DIMMs. 2. Replace any DIMM that is indicated by a lit error LED. Note: You do not have to replace DIMMs by pairs. 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA memory test.
Memory Logging Limit Reached for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	The memory logging limit has been reached.	<ol style="list-style-type: none"> 1. Update the UEFI to the latest level. Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Reseat the DIMMs and run the DSA memory test. 3. Replace any DIMM that is indicated by a lit error LED.

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. 			
Memory DIMM Configuration Error for One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.
Memory uncorrectable error detected for DIMM <i>n</i> Status on Memory Subsystem DIMM <i>n</i> Status. (<i>n</i> = DIMM number)	Error	A memory uncorrectable error has occurred.	<ol style="list-style-type: none"> 1. If the server failed the POST memory test, reseat the DIMMs. 2. Replace any DIMM that is indicated by a lit error LED. Note: You do not have to replace DIMMs by pairs. 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA memory test. 5. (Trained service technician only) Replace the system board.
Memory Logging Limit Reached for DIMM <i>n</i> Status on Memory Subsystem DIMM <i>n</i> Status. (<i>n</i> = DIMM number)	Error	The memory logging limit has been reached.	<ol style="list-style-type: none"> 1. Update the UEFI to the latest level. Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Reseat the DIMMs and run the DSA memory test. 3. Replace any DIMM that is indicated by a lit error LED.
Memory DIMM Configuration Error for DIMM <i>n</i> Status on Memory Subsystem DIMM <i>n</i> Status. (<i>n</i> = DIMM number)	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.
Sensor DIMM <i>n</i> Temp has transitioned to critical from a less severe state. (<i>n</i> = DIMM number)	Error	A sensor has changed to Critical state from a less severe state.	<ol style="list-style-type: none"> 1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. If a fan has failed, complete the action for a fan failure. 3. Replace DIMM <i>n</i>. (<i>n</i> = DIMM number)

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.

<p>A PCI PERR has occurred on system %1. (%1 = CIM_ComputerSystem.ElementName)</p>	<p>Error</p>	<p>A PCI PERR has occurred. (Sensor = PCI Slot <i>n</i>; <i>n</i> = PCI slot number)</p>	<ol style="list-style-type: none"> 1. Check the extender-card LEDs. 2. Reseat the affected adapters and extender card. 3. Update the server and adapter firmware (UEFI and IMM). Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove the adapter from slot <i>n</i>. 5. Replace the PCIe adapter. 6. Replace extender card <i>n</i>. <p>(<i>n</i> = PCI slot number)</p>
<p>A PCI SERR has occurred on system %1. (%1 = CIM_ComputerSystem.ElementName)</p>	<p>Error</p>	<p>A PCI SERR has occurred. (Sensor = PCI Slot <i>n</i>; <i>n</i> = PCI slot number)</p>	<ol style="list-style-type: none"> 1. Check the extender-card LEDs. 2. Reseat the affected adapters and extender card. 3. Update the server and adapter firmware (UEFI and IMM). Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove the adapter from slot <i>n</i>. 5. Replace the PCIe adapter. 6. Replace extender card <i>n</i>. <p>(<i>n</i> = PCI slot number)</p>

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.

<p>A PCI PERR has occurred on system %1. (%1 = CIM_ComputerSystem.ElementName)</p>	<p>Error</p>	<p>A PCI PERR has occurred. (Sensor = One of PCI Err)</p>	<ol style="list-style-type: none"> 1. Check the extender-card LEDs. 2. Reseat the affected adapters and riser card. 3. Update the server and adapter firmware (UEFI and IMM). Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove both adapters. 5. Replace the PCIe adapter. 6. Replace the extender card. 7. (Trained service technician only) Replace the system board.
<p>A PCI SERR has occurred on system %1. (%1 = CIM_ComputerSystem.ElementName)</p>	<p>Error</p>	<p>A PCI SERR has occurred. (Sensor = One of PCI Err)</p>	<ol style="list-style-type: none"> 1. Check the extender-card LEDs. 2. Reseat the affected adapters and extender card. 3. Update the server and adapter firmware (UEFI and IMM). Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove both adapters. 5. Replace the PCIe adapter. 6. Replace the extender card. 7. (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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.

<p>Fault in slot System board on system %1. (%1 = CIM_ComputerSystem.ElementName)</p>	<p>Error</p>		<ol style="list-style-type: none"> 1. Check the extender-card LEDs. 2. Reseat the affected adapters and extender card. 3. Update the server and adapter firmware (UEFI and IMM). Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove both adapters. 5. Replace the PCIe adapter. 6. Replace the extender card. 7. (Trained service technician only) Replace the system board.
<p>Redundancy Bckup Mem Status has been reduced.</p>	<p>Error</p>	<p>Redundancy has been lost and is insufficient to continue operation.</p>	<ol style="list-style-type: none"> 1. Check the system-event log for DIMM failure events (uncorrectable or PFA) and correct the failures. 2. Re-enable mirroring in the Setup utility.
<p>IMM Network Initialization Complete.</p>	<p>Info</p>	<p>An IMM network has completed initialization.</p>	<p>No action; information only.</p>
<p>Certificate Authority %1 has detected a %2 Certificate Error. (%1 = IBM_CertificateAuthority.CADistinguishedName; %2 = CIM_PublicKeyCertificate.ElementName)</p>	<p>Error</p>	<p>A problem has occurred with the SSL Server, SSL Client, or SSL Trusted CA certificate that has been imported into the IMM. The imported certificate must contain a public key that corresponds to the key pair that was previously generated by the Generate a New Key and Certificate Signing Request link.</p>	<ol style="list-style-type: none"> 1. Make sure that the certificate that you are importing is correct. 2. Try importing the certificate again.
<p>Ethernet Data Rate modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort.Speed; %2 = CIM_EthernetPort.Speed; %3 = user ID)</p>	<p>Info</p>	<p>A user has modified the Ethernet port data rate.</p>	<p>No action; information only.</p>

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. 			
Ethernet Duplex setting modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort.FullDuplex; %2 = CIM_EthernetPort.FullDuplex; %3 = user ID)	Info	A user has modified the Ethernet port duplex setting.	No action; information only.
Ethernet MTU setting modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort.ActiveMaximumTransmissionUnit; %2 = CIM_EthernetPort.ActiveMaximumTransmissionUnit; %3 = user ID)	Info	A user has modified the Ethernet port MTU setting.	No action; information only.
Ethernet Duplex setting modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort.NetworkAddresses; %2 = CIM_EthernetPort.NetworkAddresses; %3 = user ID)	Info	A user has modified the Ethernet port MAC address setting.	No action; information only.
Ethernet interface %1 by user %2. (%1 = CIM_EthernetPort.EnabledState; %2 = user ID)	Info	A user has enabled or disabled the Ethernet interface.	No action; information only.
Hostname set to %1 by user %2. (%1 = CIM_DNSProtocolEndpoint.Hostname; %2 = user ID)	Info	A user has modified the host name of the IMM.	No action; information only.
IP address of network interface modified from %1 to %2 by user %3. (%1 = CIM_IPProtocolEndpoint.IPv4Address; %2 = CIM_StaticIPAssignmentSettingData.IPAddress; %3 = user ID)	Info	A user has modified the IP address of the IMM.	No action; information only.
IP subnet mask of network interface modified from %1 to %2 by user %3s. (%1 = CIM_IPProtocolEndpoint.SubnetMask; %2 = CIM_StaticIPAssignmentSettingData.SubnetMask; %3 = user ID)	Info	A user has modified the IP subnet mask of the IMM.	No action; 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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. 			
IP address of default gateway modified from %1 to %2 by user %3s. (%1 = CIM_IPProtocolEndpoint.GatewayIPv4Address; %2 = CIM_StaticIPAssignmentSettingData.DefaultGatewayAddress; %3 = user ID)	Info	A user has modified the default gateway IP address of the IMM.	No action; information only.
OS Watchdog response %1 by %2. (%1 = Enabled or Disabled; %2 = user ID)	Info	A user has enabled or disabled an OS Watchdog.	No action; information only.
DHCP[%1] failure, no IP address assigned. (%1 = IP address, xxx.xxx.xxx.xxx)	Info	A DHCP server has failed to assign an IP address to the IMM.	<ol style="list-style-type: none"> 1. Make sure that the network cable is connected. 2. Make sure that there is a DHCP server on the network that can assign an IP address to the IMM.
Remote Login Successful. Login ID: %1 from %2 at IP address %3. (%1 = user ID; %2 = ValueMap(CIM_ProtocolEndpoint.ProtocolIFType; %3 = IP address, xxx.xxx.xxx.xxx)	Info	A user has successfully logged in to the IMM.	No action; information only.
Attempting to %1 server %2 by user %3. (%1 = Power Up, Power Down, Power Cycle, or Reset; %2 = IBM_ComputerSystem.ElementName; %3 = user ID)	Info	A user has used the IMM to perform a power function on the server.	No action; information only.
Security: Userid: '%1' had %2 login failures from WEB client at IP address %3. (%1 = user ID; %2 = MaximumSuccessiveLoginFailures (currently set to 5 in the firmware); %3 = IP address, xxx.xxx.xxx.xxx)	Error	A user has exceeded the maximum number of unsuccessful login attempts from a Web browser and has been prevented from logging in for the lockout period.	<ol style="list-style-type: none"> 1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
Security: Login ID: '%1' had %2 login failures from CLI at %3. (%1 = user ID; %2 = MaximumSuccessiveLoginFailures (currently set to 5 in the firmware); %3 = IP address, xxx.xxx.xxx.xxx)	Error	A user has exceeded the maximum number of unsuccessful login attempts from the command-line interface and has been prevented from logging in for the lockout period.	<ol style="list-style-type: none"> 1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. 			
Remote access attempt failed. Invalid userid or password received. Userid is '%1' from WEB browser at IP address %2. (%1 = user ID; %2 = IP address, xxx.xxx.xxx.xxx)	Error	A user has attempted to log in from a Web browser by using an invalid login ID or password.	<ol style="list-style-type: none"> 1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
Remote access attempt failed. Invalid userid or password received. Userid is '%1' from TELNET client at IP address %2. (%1 = user ID; %2 = IP address, xxx.xxx.xxx.xxx)	Error	A user has attempted to log in from a Telnet session by using an invalid login ID or password.	<ol style="list-style-type: none"> 1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
The Chassis Event Log (CEL) on system %1 cleared by user %2. (%1 = CIM_ComputerSystem.ElementName; %2 = user ID)	Info	A user has cleared the IMM event log.	No action; information only.
IMM reset was initiated by user %1. (%1 = user ID)	Info	A user has initiated a reset of the IMM.	No action; information only.
ENET[0] DHCP-HSTN=%1, DN=%2, IP@=%3, SN=%4, GW@=%5, DNS1@=%6. (%1 = CIM_DNSProtocolEndpoint.Hostname; %2 = CIM_DNSProtocolEndpoint.DomainName; %3 = CIM_IPProtocolEndpoint.IPv4Address; %4 = CIM_IPProtocolEndpoint.SubnetMask; %5 = IP address, xxx.xxx.xxx.xxx; %6 = IP address, xxx.xxx.xxx.xxx)	Info	The DHCP server has assigned an IMM IP address and configuration.	No action; information only.
ENET[0] IP-Cfg:HstName=%1, IP@%2, NetMsk=%3, GW@=%4. (%1 = CIM_DNSProtocolEndpoint.Hostname; %2 = CIM_StaticIPSettingData.IPv4Address; %3 = CIM_StaticIPSettingData.SubnetMask; %4 = CIM_StaticIPSettingData.DefaultGatewayAddress)	Info	An IMM IP address and configuration have been assigned using client data.	No action; information only.
LAN: Ethernet[0] interface is no longer active.	Info	The IMM Ethernet interface has been disabled.	No action; information only.
LAN: Ethernet[0] interface is now active.	Info	The IMM Ethernet interface has been enabled.	No action; 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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. 			
DHCP setting changed to by user %1. (%1 = user ID)	Info	A user has changed the DHCP mode.	No action; information only.
IMM: Configuration %1 restored from a configuration file by user %2. (%1 = CIM_ConfigurationData.ConfigurationName; %2 = user ID)	Info	A user has restored the IMM configuration by importing a configuration file.	No action; information only.
Watchdog %1 Screen Capture Occurred. (%1 = OS Watchdog or Loader Watchdog)	Error	An operating-system error has occurred, and the screen capture was successful.	<ol style="list-style-type: none"> 1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system.
Watchdog %1 Failed to Capture Screen. (%1 = OS Watchdog or Loader Watchdog)	Error	An operating-system error has occurred, and the screen capture failed.	<ol style="list-style-type: none"> 1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system. 6. Update the IMM firmware. Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. 			
Running the backup IMM main application.	Error	The IMM has resorted to running the backup main application.	Update the IMM firmware. Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
Please ensure that the IMM is flashed with the correct firmware. The IMM is unable to match its firmware to the server.	Error	The server does not support the installed IMM firmware version.	Update the IMM firmware to a version that the server supports. Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
IMM reset was caused by restoring default values.	Info	The IMM has been reset because a user has restored the configuration to its default settings.	No action; information only.
IMM clock has been set from NTP server %1. (%1 = IBM_NTPTService.ElementName)	Info	The IMM clock has been set to the date and time that is provided by the Network Time Protocol server.	No action; information only.
SSL data in the IMM configuration data is invalid. Clearing configuration data region and disabling SSL+H25.	Error	There is a problem with the certificate that has been imported into the IMM. The imported certificate must contain a public key that corresponds to the key pair that was previously generated through the Generate a New Key and Certificate Signing Request link.	<ol style="list-style-type: none"> 1. Make sure that the certificate that you are importing is correct. 2. Try to import the certificate again.
Flash of %1 from %2 succeeded for user %3. (%1 = CIM_ManagedElement.ElementName; %2 = Web or LegacyCLI; %3 = user ID)	Info	A user has successfully updated one of the following firmware components: <ul style="list-style-type: none"> • IMM main application • IMM boot ROM • Server firmware • Diagnostics • Integrated service processor 	No action; 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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. 			
Flash of %1 from %2 failed for user %3. (%1 = CIM_ManagedElement.ElementName; %2 = Web or LegacyCLI; %3 = user ID)	Info	An attempt to update a firmware component from the interface and IP address has failed.	Try to update the firmware again.
The Chassis Event Log (CEL) on system %1 is 75% full. (%1 = CIM_ComputerSystem.ElementName)	Info	The IMM event log is 75% full. When the log is full, older log entries are replaced by newer ones.	To avoid losing older log entries, save the log as a text file and clear the log.
The Chassis Event Log (CEL) on system %1 is 100% full. (%1 = CIM_ComputerSystem.ElementName)	Info	The IMM event log is full. When the log is full, older log entries are replaced by newer ones.	To avoid losing older log entries, save the log as a text file and clear the log.
%1 Platform Watchdog Timer expired for %2. (%1 = OS Watchdog or Loader Watchdog; %2 = OS Watchdog or Loader Watchdog)	Error	A Platform Watchdog Timer Expired event has occurred.	<ol style="list-style-type: none"> 1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system.
IMM Test Alert Generated by %1. (%1 = user ID)	Info	A user has generated a test alert from the IMM.	No action; information only.
Security: Userid: '%1' had %2 login failures from an SSH client at IP address %3. (%1 = user ID; %2 = MaximumSuccessiveLoginFailures (currently set to 5 in the firmware); %3 = IP address, xxx.xxx.xxx.xxx)	Error	A user has exceeded the maximum number of unsuccessful login attempts from SSH and has been prevented from logging in for the lockout period.	<ol style="list-style-type: none"> 1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.

Checkout procedure

This section contains a checkout procedure that you should follow to solve hardware problems in the server.

About the checkout procedure

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

- Read the safety information that begins on page vii.
- The diagnostic programs provide the primary methods of testing the major components of the server, such as the I/O 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 multiple error codes or light path diagnostics LEDs indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 62 for information about diagnosing microprocessor problems.

- Before you run the diagnostic programs, you must determine whether the failing server is part of a shared hard disk drive cluster (two or more servers that share external storage devices). If it is part of a cluster, you can run all diagnostic programs except the ones that test the storage unit (that is, a hard disk drive in the storage unit) or the storage adapter that is attached to the storage unit. The failing server might be part of a cluster if any of the following conditions is true:
 - You have identified the failing server as part of a cluster (two or more servers that share 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 “Event logs” on page 24. If the server is halted and no error message is displayed, see “System-board jumpers and switches” on page 20 and “Solving undetermined problems” on page 130.
- For information about power-supply problems, see “Solving power problems” on page 128 and “Power-supply LEDs” on page 71.
- For intermittent problems, check the error log; see “Event logs” on page 24 and “Diagnostic messages” on page 75.

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 57.
 - f. Check the system-error LED on the control panel. If it is lit, check the LEDs on the system board (see “Error LEDs” on page 69).
 - g. Check for the following results:
 - Successful completion of POST, which is indicated by a single beep
 - Successful completion of startup, which is indicated by a readable display of the operating-system desktop
3. Did a single beep sound and are there readable instructions on the main menu, or was a POST error code displayed?
 - **Yes:** Find the “POST error codes” on page 26; if necessary, see “Solving undetermined problems” on page 130.
 - **No:** Find the failure symptom in “Troubleshooting tables” on page 57; if necessary, run the diagnostic programs (see “Running the diagnostic programs” on page 74).
 - If you receive an error, see “Diagnostic messages” on page 75.
 - If the diagnostic programs were completed successfully and you still suspect a problem, see “Solving undetermined problems” on page 130.

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 74 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 LEDs on the control panel or the system board (see “Error LEDs” on page 69).
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.

DVD drive problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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 DVD-ROM drive is not recognized.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• The SATA channel to which the DVD drive is attached (primary or secondary) is enabled in the Setup utility program.• All cables and jumpers are installed correctly.• The correct device driver is installed for the DVD drive.2. Run the DVD drive diagnostic programs.3. Reseat the DVD drive 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. DVD drive cableb. DVD drivec. (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 DVD drive diagnostic programs.3. Reseat the DVD drive cable.4. Reseat the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. DVD drive cableb. DVD drivec. (Trained service technician only) System board5. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. Replace the DVD drive cableb. Replace the DVD drive

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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 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 DVD drive 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. DVD drive cable b. 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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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 that is indicated by 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.

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
A hard disk drive 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 or SCSI Attached Disk Test, but the problem remains.	Run the diagnostic SCSI Attached Disk Test (see “Running the diagnostic programs” on page 74). Note: This test is supported on server models with RAID arrays that use the ServeRAID-BR10il v2, ServeRAID-MR10i, or ServeRAID-MR10is controllers or servers with SATA hard disk drives that use the onboard SATA/SAS controller to create RAID arrays. 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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
A problem occurs only occasionally and is difficult to diagnose.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • All cables and cords are connected securely to the rear of the server and attached devices. • When the server is turned on, air is flowing from the fan grille. If there is no airflow, the fan is not working. This can cause the server to overheat and shut down. 2. Check the system-error log or IMM system event log (see “Event logs” on page 24).

Keyboard, mouse, or pointing-device problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. Make sure that: <ul style="list-style-type: none"> • The keyboard cable is securely connected. • The server and the monitor are turned on. 2. If you are using a USB keyboard and it is connected to a USB hub, disconnect the keyboard from the hub and connect it directly to the server. 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
The mouse or 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 cable is securely connected to the server. • The mouse or pointing-device drivers are installed correctly. • The server and the monitor are turned on. • The mouse option is enabled in the Setup utility program. 2. If you are using a USB mouse or pointing device and it is connected to a USB hub, disconnect the mouse or pointing device from the hub and connect it directly to the server. 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. 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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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 control-panel assembly or on the system board. • Memory mirroring does not account for the discrepancy. • The memory modules are seated correctly. • You have installed the correct type of memory. • All DIMMs are enabled. The server might have automatically disabled a DIMM when it detected a problem. 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. 3. Run memory diagnostics (see “Running the diagnostic programs” on page 74). 4. Make sure that there is no memory mismatch when the server is over the minimum memory configuration (one 1 GB DIMM) and that you have installed the correct number of DIMMs. 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
Multiple rows of DIMMs in a branch are identified as failing.	<ol style="list-style-type: none"> 1. Reseat the DIMMs; then, restart the server. 2. Replace the lowest-numbered DIMM pair of those that are identified; then, restart the server. Repeat as necessary. 3. (Trained service technician only) Replace the system board.

Microprocessor problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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 microprocessor LED is lit during POST, indicating that the startup (boot) microprocessor is not working correctly.	<ol style="list-style-type: none"> 1. Make sure that the server supports the microprocessor. 2. (Trained service technician only) Make sure that the microprocessor is seated correctly. 3. (Trained service technician only) Reseat the Microprocessor. 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. (Trained service technician only) Microprocessor b. (Trained service technician only) System board

Monitor or video 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.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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 using the monitor that is being tested 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. 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

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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 screen is blank.	<ol style="list-style-type: none"> 1. 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 65. • The monitor cables are connected correctly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. 2. Make sure that the correct server is controlling the monitor, if applicable. 3. Make sure that damaged server firmware is not affecting the video; see “Recovering the server firmware” on page 124. 4. See “Solving undetermined problems” on page 130.
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 74). <ul style="list-style-type: none"> • If the server passes the video diagnostics, the video is good; see “Solving undetermined problems” on page 130. • (Trained service technician only) If the server fails the video diagnostics, replace the system board.
The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	<ol style="list-style-type: none"> 1. If the monitor self-tests show the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. <p>Attention: Moving a color monitor while it is turned on might cause screen discoloration.</p> <p>Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor.</p> <p>Notes:</p> <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: <ol style="list-style-type: none"> a. 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

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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
Wrong characters appear on the screen.	<ol style="list-style-type: none"> 1. If the wrong language is displayed, update the server firmware with the correct language (see “Updating the firmware” on page 221). 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

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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 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

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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 (the server does not start).</p> <p>Note: The power-control button will not function until 1 to 3 minutes after the server has been connected to ac power.</p>	<ol style="list-style-type: none"> 1. Make sure that the control-panel assembly 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. If the server does not start, check the power-control button for damage. 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 power LEDs (AC, DC) are lit correctly. • The server power-on LED on the front information panel is flashing after AC power cord is connected and that it stays on after the power-button is pressed. • The server contains the correct type of DIMMs. • The DIMMs are correctly seated. • A POST beep code did not sound, indicating a memory initialization error. • The LEDs on the power supply do not indicate a problem. • The microprocessor is correctly installed. 3. Reseat the following components: <ol style="list-style-type: none"> a. DIMMs b. Power-supply cables to all internal components 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. DIMMs b. (Trained service technician only) Power supply 5. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports. 6. See “Solving undetermined problems” on page 130.
<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 holding 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. (Trained service technician only) If the problem remains or if you are using an ACPI-aware operating system, suspect 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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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 unexpectedly shuts down, and the LEDs on the control-panel assembly are not lit.	See “Solving undetermined problems” on page 130.

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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
The number of serial ports that are identified by the operating system is less than the number of installed serial ports.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • Each port is assigned a unique address in the Setup utility program and none of the serial ports is disabled. • The serial port adapter (if one is present) is seated correctly. 2. Reseat the serial port adapter. 3. Replace the serial port adapter.
A serial device does not work.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The device is compatible with the server. • The serial port is enabled and is assigned a unique address. • The device is connected to the correct connector (see “Internal connectors, LEDs, and switches” on page 16). 2. Reseat the following components: <ol style="list-style-type: none"> a. Failing serial device b. Serial 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. Failing serial device b. Serial cable c. (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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.	<ul 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.
The ServeRAID program cannot view all installed drives, or the operating system cannot be installed.	<ul style="list-style-type: none"> • Make sure that there are no duplicate IRQ assignments. • Make sure that the hard disk drive is connected correctly.
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 operating system is supported on the server. If the operating system is supported, 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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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 receive 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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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 74).2. Make sure that:<ul style="list-style-type: none">• The correct USB device driver is installed.• The operating system supports USB devices.3. Make sure that the USB configuration options are set correctly in the Setup utility program.4. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.

Error LEDs

The following is an illustration of the system board LEDs. The system board has error LEDs that will help to locate the source of the error. Run the diagnostic programs to find out the cause of the error (see “Running the diagnostic programs” on page 74).

The server is designed so that LEDs remain lit when the server is connected to an ac power source but is not turned on, provided that the power supply is operating correctly. This feature helps you to isolate the problem when the operating system is shut down.

Many errors are first indicated by a lit system-error LED on the control-panel assembly of the server. If this LED is lit, one or more LEDs elsewhere in the server might also be lit and can direct you to the source of the error.

Before working inside the server to view the LEDs, read the safety information that begins on page vii and “Handling static-sensitive devices” on page 144.

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

1. Check the control-panel assembly on the front of the server. If the system-error LED is lit, it indicates that an error has occurred.
2. Check the front and rear of the server to determine whether any component LEDs are lit.
3. Remove the server cover and look inside the server for lit LEDs. 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.

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

The following table describes the LEDs on the system board and PCI extender cards and suggested actions to correct the detected problems.

<ul style="list-style-type: none">• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.• See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.		
Component LED	Description	Action
DIMM error LEDs	A memory DIMM has failed or is incorrectly installed.	<ol style="list-style-type: none">1. Remove the DIMM that has the lit error LED.2. Reseat the DIMM.3. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. DIMMb. (Trained service technician only) System board
Fan error LEDs	A fan has failed, is operating too slowly, or has been removed.	<ol style="list-style-type: none">1. Reseat the failing fan, which is indicated by a lit LED near the fan connector on the system board.2. Replace the failing fan.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.

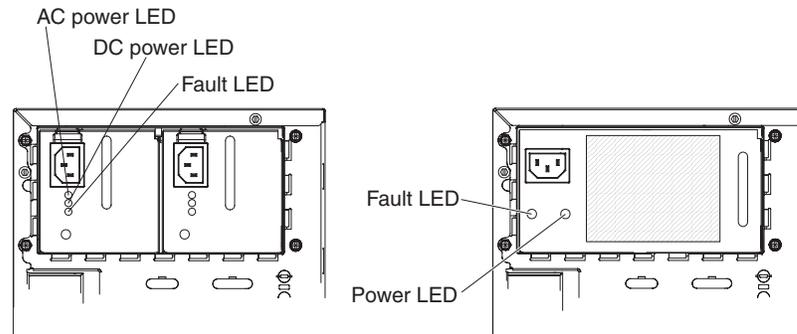
Component LED	Description	Action
CPU error LED	Microprocessor has failed, is missing, or has been incorrectly installed. Note: (Trained service technician only) Make sure that the microprocessor is installed in the correct sequence; see “Installing a microprocessor and fan sink” on page 211.	<ol style="list-style-type: none"> 1. Check the system-event log to determine the reason for the lit LED. 2. (Trained service technician) Reseat the failing microprocessor 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. (Trained service technician only) Failing microprocessor b. (Trained service technician only) System board
System-board error LED	System-board CPU VRD and/or power voltage regulators have failed.	(Trained service technician only) Replace the system board.
Battery failure LED	Battery low.	<ol style="list-style-type: none"> 1. Replace the CMOS lithium battery, if necessary. 2. (Trained service technician only) Replace the system board.
IMM heartbeat LED	Indicates the status of the boot process of the IMM. When the server is connected to power this LED flashes quickly to indicate that the IMM code is loading. When the loading is complete, the LED stops flashing briefly and then flashes slowly to indicate that the IMM is fully operational and you can press the power-control button to start the server.	<p>If the LED does not begin flashing within 30 seconds of when the server is connected to power, complete the following steps:</p> <ol style="list-style-type: none"> 1. (Trained service technician only) Use the IMM recovery switch (on the SW6 switch block) to recover the firmware. 2. (Trained service technician only) Replace the system board.
PCI slots error LEDs	An error has occurred on a PCI bus or on the system board. An additional LED is lit next to a failing PCI slot.	<ol style="list-style-type: none"> 1. Check the system-event log for information about the error. 2. If you cannot isolate the failing adapter through the LEDs and the information in the system-event log, remove one adapter at a time, and restart the server after each adapter is removed. 3. If the failure remains, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL for additional troubleshooting information.
H8 heartbeat LED	power-on and power-off sequencing.	<ol style="list-style-type: none"> 1. If the LED blinks at 1Hz, it is functioning properly and no action is necessary. 2. If the LED is not blinking, (trained service technician only) replace the system board.

Power-supply LEDs

The following minimum configuration is required for the server to start:

- One microprocessor
- One 1 GB DIMM
- Power supply
- Power cord
- ServeRAID SAS/SATA adapter
- System board assembly

The following illustration shows the location of the power supply LEDs:



The following table describes the problems that are indicated by various combinations of the power-supply LEDs and the power-on LED on the front information panel and suggested actions to correct the detected problems.

Table 4. Power-supply LEDs

Power-supply LEDs			Description	Action	Notes
AC	DC	Error			
Off	Off	Off	No ac power to the server or a problem with the ac power source	<ol style="list-style-type: none"> 1. Check the ac power to the server. 2. Make sure that the power cord is connected to a functioning power source. 3. Turn the server off and then turn the server back on. 4. If the problem remains, replace the power supply. 	This is a normal condition when no ac power is present.
Off	Off	On	No ac power to the server or a problem with the ac power source and the power supply had detected an internal problem	<ol style="list-style-type: none"> 1. Replace the power supply. 2. Make sure that the power cord is connected to a functioning power source. 	This happens only when a second power supply is providing power to the server.
Off	On	Off	Faulty power supply	Replace the power supply.	
Off	On	On	Faulty power supply	Replace the power supply.	
On	Off	Off	Power supply not fully seated, faulty system board, or faulty power supply	<ol style="list-style-type: none"> 1. Reseat the power supply. 2. If the system board error (fault) LED is not lit, replace the power supply. 3. If the system board error (fault) LED is lit, (Trained service technician only) replace the system board. 	Typically indicates that a power supply is not fully seated.
On	Off or Flashing	On	Faulty power supply	Replace the power supply.	
On	On	Off	Normal operation		
On	On	On	Power supply is faulty but still operational	Replace the power supply.	

Diagnostic programs and messages

The diagnostic programs are the primary method of testing the major components of the server. As you run the diagnostic programs, text messages are displayed on the screen and are saved in the test log. A diagnostic text message indicates that a problem has been detected and provides the action you should take as a result of the text message.

Make sure that the server has the latest version of the diagnostic programs. To download the latest version, 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/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3200 M3** to display the matrix of downloadable files for the server.

Utilities are available to reset and update the diagnostics code on the integrated USB flash device, if the diagnostic partition becomes damaged and does not start the diagnostic programs. For more information and to download the utilities, go to <http://www.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-5072294&brandind=5000008>.

The DSA diagnostic programs collect information about the following aspects of the system:

- System configuration
- Network interfaces and settings
- Hardware inventory, including PCI and USB information
- Drive health information
- SAS/SATA RAID and controller configuration
- Event logs for ServeRAID controllers and service processors

The DSA diagnostic programs can also provide diagnostics for the following system components, if they are installed in the system:

- Intel Dual Gigabit Ethernet
- Optical drives
- Hard disk drives
- SAS/SATA RAID controller
- Integrated management module (IMM)
- Trusted Platform Module chip
- Memory
- Microprocessor

For additional information about tools for updating, managing, and deploying firmware, see the System x and BladeCenter Tools Center at <http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp>.

Running the diagnostic programs

To run the DSA Preboot 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 <F2> `Diagnostics` is displayed, press F2.

Note: The DSA Preboot diagnostic program might appear to be unresponsive for an unusual length of time when you start the program. This is normal operation while the program loads.

4. Optionally, select **Quit to DSA** to exit from the stand-alone memory diagnostic program.

Note: After you exit from the stand-alone memory diagnostic environment, you must restart the server to access the stand-alone memory diagnostic environment again.

5. Select **gui** to display the graphical user interface, or select **cmd** to display the DSA interactive menu.
6. Follow the instructions on the screen to select the diagnostic test to run.

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 multiple error codes or LEDs indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 62 for information about diagnosing microprocessor problems.

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

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.

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

Viewing the test log

To view the test log when the tests are completed, type the **view** command in the DSA interactive menu, or select **Diagnostic Event Log** in the graphical user interface. To transfer DSA Preboot collections to an external USB device, type the **copy** command in the DSA interactive menu.

Diagnostic messages

The following table describes the messages that the diagnostic programs might generate and suggested actions to correct the detected problems. Follow the suggested actions in the order in which they are listed in the action column.

Table 5. DSA Preboot messages

Message number	Component	Test	State	Description	Action
089-801-xxx	CPU	CPU Stress Test	Aborted	Internal program error.	<ul style="list-style-type: none"> 1. Turn off and restart the system. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 5. Run the test again. 6. Turn off and restart the system if necessary to recover from a hung state. 7. Run the test again. 8. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved: <ul style="list-style-type: none"> a. (Trained service technician only) Microprocessor board b. (Trained service technician only) Microprocessor 9. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
089-802-xxx	CPU	CPU Stress Test	Aborted	System resource availability error.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/support/docview.wss?uid=psg1_MIGR-4JTS2T and select your system to display a matrix of available firmware. 5. Run the test again. 6. Turn off and restart the system if necessary to recover from a hung state. 7. Run the test again. 8. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 9. Run the test again.
089-802-xxx	CPU	CPU Stress Test	Aborted	System resource availability error.	<ol style="list-style-type: none"> 1. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor board b. (Trained service technician only) Microprocessor 2. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. • Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
089-901-xxx	CPU	CPU Stress Test	Failed	Test failure.	<ol style="list-style-type: none"> 1. Turn off and restart the system if necessary to recover from a hung state. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 5. Run the test again. 6. Turn off and restart the system if necessary to recover from a hung state. 7. Run the test again. 8. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved: <ol style="list-style-type: none"> a. (Trained service technician only) Microprocessor board b. (Trained service technician only) Microprocessor 9. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-801-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the IMM returned an incorrect response length.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
166-802-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the test cannot be completed for an unknown reason.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, "Parts listing, System x3200 M3 Types 7327 and 7328," on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
166-803-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the node is busy; try later.	<ol style="list-style-type: none"> Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. After 45 seconds, reconnect the system to the power source and turn on the system. Run the test again. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. Run the test again. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. • Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
166-804-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: invalid command.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-805-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: invalid command for the given LUN.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
166-806-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: timeout while processing the command.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. • Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
166-807-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: out of space.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
166-808-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: reservation canceled or invalid reservation ID.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, "Parts listing, System x3200 M3 Types 7327 and 7328," on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
166-809-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: request data was truncated.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
166-810-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: request data length is invalid.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
166-811-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: request data field length limit is exceeded.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
166-812-xxx	IMM	IMM I2C Test	Aborted	IMM I2C Test stopped a parameter is out of range.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-813-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot return the number of requested data bytes.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
166-814-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: requested sensor, data, or record is not present.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-815-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: invalid data field in the request.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. • Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
166-816-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the command is illegal for the specified sensor or record type.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
166-817-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided.	<ol style="list-style-type: none"> Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. After 45 seconds, reconnect the system to the power source and turn on the system. Run the test again. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. Run the test again. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. • Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
166-818-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot execute a duplicated request.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. • Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
166-819-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided; the SDR repository is in update mode.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
166-820-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided; the device is in firmware update mode.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code and IMM firmware are at the latest level. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
166-821-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided; IMM initialization is in progress.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, "Parts listing, System x3200 M3 Types 7327 and 7328," on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
166-822-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the destination is unavailable.	<ol style="list-style-type: none"> Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. After 45 seconds, reconnect the system to the power source and turn on the system. Run the test again. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. Run the test again. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. • Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
166-823-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot execute the command; insufficient privilege level.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-824-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot execute the command.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
166-901-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the H8 bus (Bus 0)	<ol style="list-style-type: none"> Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. After 45 seconds, reconnect the system to the power source and turn on the system. Run the test again. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. Run the test again. Remove power from the system. (Trained service technician only) Replace the system board. Reconnect the system to power and turn on the system. Run the test again. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-902-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the SAS backplane 1 (Bus 1).	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. Reseat the SAS backplane. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. Turn off the system and disconnect it from the power source. 12. (Trained service technician only) Replace the system board. 13. Reconnect the system to the power source and turn on the system. 14. Run the test again.
166-902-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory bus.	<ol style="list-style-type: none"> 1. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
166-903-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the DIMM bus (Bus 2).	<ul style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 6. Run the test again. 7. Disconnect the system from the power source. 8. Replace the DIMMs one at a time, and run the test again after replacing each DIMM. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. Turn off the system and disconnect it from the power source. 12. Reseat all of the DIMMs. 13. Reconnect the system to the power source and turn on the system. 14. Run the test again. 15. Turn off the system and disconnect it from the power source. 16. (Trained service technician only) Replace the system board. 17. Reconnect the system to the power source and turn on the system. 18. Run the test again. 19. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
166-904-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the power supply bus (Bus 3).	<ol style="list-style-type: none"> Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. After 45 seconds, reconnect the system to the power source and turn on the system. Run the test again. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. Run the test again. Reseat the power supply. Run the test again. Turn off the system and disconnect it from the power source. (Trained service technician only) Replace the system board. Reconnect the system to the power source and turn on the system. Run the test again. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
166-905-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the SAS backplane 2 & sensor bus (Bus 4).	<ul style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. Reseat the hard disk drive backplane. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. Turn off the system and disconnect it from the power source. 12. Trained service technician only) Replace the system board. 13. Reconnect the system to the power source and turn on the system. 14. Run the test again. 15. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
166-906-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the PCI bus (Bus 5).	<ol style="list-style-type: none"> Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. After 45 seconds, reconnect the system to the power source and turn on the system. Run the test again. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. Run the test again. Turn off the system and disconnect it from the power source. Trained service technician only) Replace the system board. Reconnect the system to the power source and turn on the system. Run the test again. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
201-801-xxx	Memory	Memory Test	Aborted	Test canceled: the system UEFI programmed the memory controller with an invalid CBAR address	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
201-802-xxx	Memory	Memory Test	Aborted	Test canceled: the end address in the E820 function is less than 16 MB.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Run the test again. 3. Make sure that all DIMMs are enabled in the Setup utility. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 5. Run the test again. 6. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
201-803-xxx	Memory	Memory Test	Aborted	Test canceled: could not enable the processor cache.	<ol style="list-style-type: none"> Turn off and restart the system. Run the test again. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. Run the test again. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
201-804-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer request failed.	<ol style="list-style-type: none"> Turn off and restart the system. Run the test again. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. Run the test again. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
201-805-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller display/alter write operation was not completed.	<ol style="list-style-type: none"> Turn off and restart the system. Run the test again. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. Run the test again. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. • Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
201-806-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller fast scrub operation was not completed.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
201-807-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer free request failed.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
201-808-xxx	Memory	Memory Test	Aborted	Test canceled: memory controller display/alter buffer execute error.	<ol style="list-style-type: none"> 1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
201-809-xxx	Memory	Memory Test	Aborted	Test canceled program error: operation running fast scrub.	<ol style="list-style-type: none"> Turn off and restart the system. Run the test again. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. Run the test again. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
201-810-xxx	Memory	Memory Test	Aborted	Test stopped: unknown error code xxx received in COMMONEXIT procedure.	<ol style="list-style-type: none"> Turn off and restart the system. Run the test again. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. Run the test again. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
201-901-xxx	Memory	Memory Test	Failed	Test failure: single-bit error, failing DIMM z.	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. 2. Reseat DIMM z. 3. Reconnect the system to power and turn on the system. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 6. Run the test again. 7. Replace the failing DIMMs. 8. Re-enable all memory in the Setup utility (see "Using the Setup utility" on page 225). 9. Run the test again. 10. Replace the failing DIMM. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
201-902-xxx	Memory	Memory Test	Failed	Test failure: single-bit and multi-bit error, failing DIMM z	<ol style="list-style-type: none"> 1. Turn off the system and disconnect it from the power source. 2. Reseat DIMM z. 3. Reconnect the system to power and turn on the system. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 6. Run the test again. 7. Replace the failing DIMMs. 8. Re-enable all memory in the Setup utility see “Using the Setup utility” on page 225). 9. Run the test again. 10. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
202-801-xxx	Memory	Memory Stress Test	Aborted	Internal program error.	<ul style="list-style-type: none"> 1. Turn off and restart the system. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 4. Run the test again. 5. Turn off and restart the system if necessary to recover from a hung state. 6. Run the memory diagnostics to identify the specific failing DIMM. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
202-802-xxx	Memory	Memory Stress Test	Failed	General error: memory size is insufficient to run the test.	<ul style="list-style-type: none"> 1. Make sure that all memory is enabled by checking the Available System Memory in the Resource Utilization section of the DSA event log. If necessary, enable all memory in the Setup utility (see "Using the Setup utility" on page 225). 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Run the test again. 4. Run the standard memory test to validate all memory. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
202-901-xxx	Memory	Memory Stress Test	Failed	Test failure.	<ol style="list-style-type: none"> 1. Run the standard memory test to validate all memory. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Turn off the system and disconnect it from power. 4. Reseat the DIMMs. 5. Reconnect the system to power and turn on the system. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. • Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
215-801-xxx	Optical Drive	<ul style="list-style-type: none"> • Verify Media Installed • Read/ Write Test • Self-Test <p>Messages and actions apply to all three tests.</p>	Aborted	Unable to communicate with the device driver.	<ol style="list-style-type: none"> 1. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 6. Run the test again. 7. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 8. Run the test again. 9. Replace the CD/DVD drive. 10. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
215-802-xxx	Optical Drive	<ul style="list-style-type: none"> • Verify Media Installed • Read/ Write Test • Self-Test <p>Messages and actions apply to all three tests.</p>	Aborted	The media tray is open.	<ol style="list-style-type: none"> 1. Close the media tray and wait 15 seconds. 2. Run the test again. 3. Insert a new CD/DVD into the drive and wait for 15 seconds for the media to be recognized. 4. Run the test again. 5. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 6. Run the test again. 7. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 8. Run the test again. 9. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 10. Run the test again. 11. Replace the CD/DVD drive. 12. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
215-803-xxx	Optical Drive	<ul style="list-style-type: none"> • Verify Media Installed • Read/ Write Test • Self-Test <p>Messages and actions apply to all three tests.</p>	Failed	The disc might be in use by the system.	<ol style="list-style-type: none"> 1. Wait for the system activity to stop. 2. Run the test again 3. Turn off and restart the system. 4. Run the test again. 5. Replace the CD/DVD drive. 6. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
215-901-xxx	Optical Drive	<ul style="list-style-type: none"> • Verify Media Installed • Read/ Write Test • Self-Test <p>Messages and actions apply to all three tests.</p>	Aborted	Drive media is not detected.	<ol style="list-style-type: none"> 1. Insert a CD/DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 6. Run the test again. 7. Replace the CD/DVD drive. 8. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
215-902-xxx	Optical Drive	<ul style="list-style-type: none"> • Verify Media Installed • Read/ Write Test • Self-Test <p>Messages and actions apply to all three tests.</p>	Failed	Read miscompare.	<ol style="list-style-type: none"> 1. Insert a CD/DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 6. Run the test again. 7. Replace the CD/DVD drive. 8. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. • Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
215-903-xxx	Optical Drive	<ul style="list-style-type: none"> • Verify Media Installed • Read/ Write Test • Self-Test <p>Messages and actions apply to all three tests.</p>	Aborted	Could not access the drive.	<ol style="list-style-type: none"> 1. Insert a CD/DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 6. Run the test again. 7. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 8. Run the test again. 9. Replace the CD/DVD drive. 10. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
215-904-xxx	Optical Drive	<ul style="list-style-type: none"> • Verify Media Installed • Read/ Write Test • Self-Test <p>Messages and actions apply to all three tests.</p>	Failed	A read error occurred.	<ol style="list-style-type: none"> 1. Insert a CD/DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 6. Run the test again. 7. Replace the CD/DVD drive. 8. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
217-901-xxx	SAS/SATA Hard Drive	Disk Drive Test	Failed		<ul style="list-style-type: none"> 1. Reseat all hard disk drive backplane connections at both ends. 2. Reseat the all drives. 3. Run the test again. 4. Make sure that the firmware is at the latest level. 5. Run the test again. 6. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
405-901-xxx	Intel Ethernet Device	Test Control Registers	Failed		<ul style="list-style-type: none"> 1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

<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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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. Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
Message number	Component	Test	State	Description	Action
405-901-xxx	Intel Ethernet Device	Test MII Registers	Failed		<ol style="list-style-type: none"> Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. Run the test again. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
405-902-xxx	Intel Ethernet Device	Test EEPROM	Failed		<ol style="list-style-type: none"> Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. Run the test again. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
405-903-xxx	Intel Ethernet Device	Test Internal Memory	Failed		<ul style="list-style-type: none"> 1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 2. Run the test again. 3. Check the interrupt assignments in the PCI Hardware section of the DSA event log. If the Ethernet device is sharing interrupts, if possible, use the Setup utility see "Using the Setup utility" on page 225) to assign a unique interrupt to the device. 4. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
405-904-xxx	Intel Ethernet Device	Test Interrupt	Failed		<ol style="list-style-type: none"> 1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 221. 2. Run the test again. 3. Check the interrupt assignments in the PCI Hardware section of the DSA event log. If the Ethernet device is sharing interrupts, if possible, use the Setup utility see “Using the Setup utility” on page 225) to assign a unique interrupt to the device. 4. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
405-906-xxx	Intel Ethernet Device	Test Loop back at Physical Layer	Failed		<ul style="list-style-type: none"> 1. Check the Ethernet cable for damage and make sure that the cable type and connection are correct. 2. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 3. Run the test again. 4. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
405-907-xxx	Intel Ethernet Device	Test Loop back at MAC-Layer	Failed		<ul style="list-style-type: none"> 1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 5. DSA Preboot messages (continued)

Message number	Component	Test	State	Description	Action
405-908-xxx	Intel Ethernet Device	Test LEDs	Failed		<ul style="list-style-type: none"> 1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 221. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Recovering the server firmware

Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

If the server firmware has become corrupted, such as from a power failure during an update, you can recover the server firmware in one of two ways:

- **In-band method:** Recover server firmware, using either the boot block jumper (Automated Boot Recovery) and a server Firmware Update Package Service Pack.
- **Out-of-band method:** Use the IMM Web Interface to update the firmware, using the latest server firmware update package.

Note: You can obtain a server update package from one of the following sources:

- Download the server firmware update from the World Wide Web.
- Contact your IBM service representative.

To download the server firmware update package from the World Wide Web, 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.

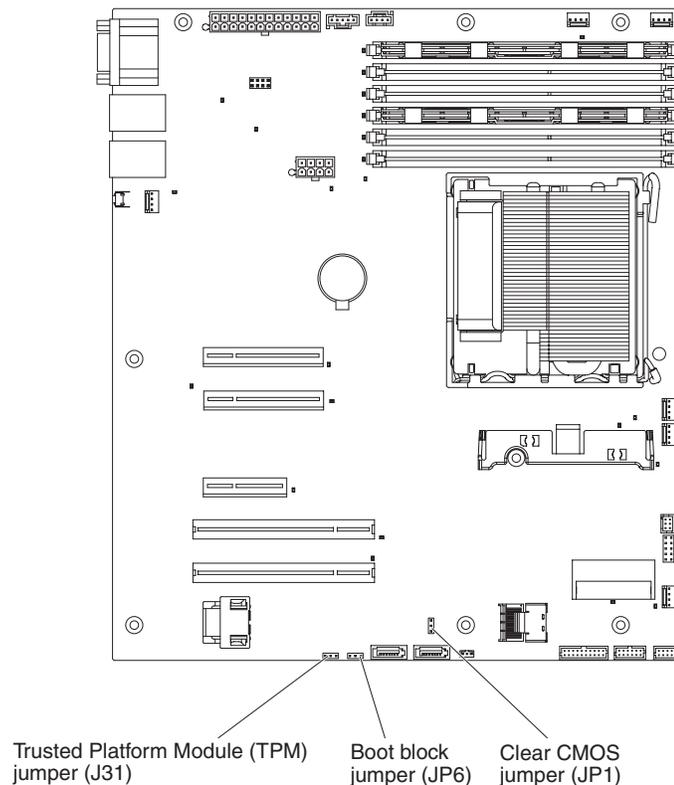
1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3200 M3** to display the matrix of downloadable files for the server.
5. Download the latest server firmware update.

The flash memory of the server consists of a primary bank and a backup bank. It is essential that you maintain the backup bank with a bootable firmware image. If the primary bank becomes corrupted, you can either manually boot the backup bank with the boot block jumper, or in the case of image corruption, this will occur automatically with the Automated Boot Recovery function.

In-band manual recovery method

To recover the server firmware and restore the server operation to the primary bank, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 144.
2. Turn off the server, and disconnect all power cords and external cables.
3. Unlock and remove the server cover. See “Removing the side cover” on page 145 for more information.
4. Locate the boot block jumper (JP6) on the system board.



5. Move the jumper from pins 1 and 2 to pins 2 and 3 to enable the UEFI recovery mode.
6. Reinstall the server cover (see “Installing the side cover” on page 146); then, reconnect all power cords.

7. Restart the server. The power-on self-test (POST) starts.
8. Boot the server to an operating system that is supported by the firmware update package that you downloaded.
9. Perform the firmware update by following the instructions that are in the firmware update package readme file.
10. Copy the downloaded firmware update package into a directory.
11. From a command line, type *filename-s*, where *filename* is the name of the executable file that you downloaded with the firmware update package.
12. Turn off the server and disconnect all power cords and external cables, and then remove the server cover.
13. Move the UEFI boot recovery jumper back to the primary position (pins 1 and 2).
14. Reinstall the server cover, and then reconnect all the power cables.
15. Restart the server.

See “System-board jumpers and switches” on page 20 for a description of the jumpers and switches.

In-band automated boot recovery method

Note: Use this method if the System board error LED is lit and there is a log entry or Booting Backup Image is displayed on the firmware splash screen; otherwise, use the in-band manual recovery method.

1. Boot the server to an operating system that is supported by the firmware update package that you downloaded.
2. Perform the firmware update by following the instructions that are in the firmware update package readme file.
3. Restart the server.
4. At the firmware splash screen, press F3 when prompted to restore to the primary bank. The server boots from the primary bank.

Out-of-band method: See the IMM documentation.

Automated boot recovery (ABR)

If the server is booting up and the IMM detect problems with the server firmware in the primary bank, it will automatically switch to the backup firmware bank and give you the opportunity to recover the primary bank. To recover to the server firmware primary bank, complete the following steps.

1. Restart the server.
2. When the prompt press F3 to restore to primary is displayed, press F3 to recover the primary bank. Pressing F3 will restart the server.

Three boot failure

Configuration changes, such as added devices or adapter firmware updates can cause the server to fail POST (power-on self-test). If this occurs on three consecutive boot attempts, the server will temporarily use the default configuration values and automatically goes to F1 Setup. To solve the problem, complete the following steps:

1. Undo any configuration changes that you made recently and restart the server.
2. Remove any devices that you added recently and restart the server.

3. If the problem remains, go to Setup and select **Load Default Settings**, and then click **Save** to restore the server factory settings.

Solving SCSI problems

Note: This information also applies to Serial Attached SCSI (SAS) problems.

For any SCSI error message, one or more of the following devices might be causing the problem:

- A failing SCSI device (adapter, drive, or controller)
- An incorrect SCSI termination jumper setting
- A missing or incorrectly installed SCSI terminator
- A defective SCSI terminator
- An incorrectly installed cable
- A defective cable

For any SCSI error message, follow these suggested actions in the order in which they are listed until the problem is solved:

1. Make sure that external SCSI devices are turned on before you turn on the server.
2. Make sure that the cables for all external SCSI devices are connected correctly.
3. If an external SCSI device is attached, make sure that the external SCSI termination is set to automatic.
4. Make sure that the last device in each SCSI chain is terminated correctly.
5. Make sure that the SCSI devices are configured correctly.

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 130 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.

Note: The Ethernet controller can be installed only in its dedicated connector, PCI slot 3.

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 67.

Damaged data in CMOS memory or damaged server firmware can cause undetermined problems. To reset the CMOS data, use the clear CMOS jumper to clear the CMOS memory; see “System-board jumpers and switches” on page 20. If you suspect that the server firmware is damaged, see “Recovering the server firmware” on page 124.

Check the LEDs on all the power supplies. If the LEDs indicate that 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 one 1 GB DIMM on the system board.

The following minimum configuration is required for the server to start:

- One microprocessor
 - One 1 GB DIMM on the system board
 - One power supply
 - Power cord
 - ServeRAID SAS/SATA adapter
 - System board
4. Turn on the server. If the problem remains, suspect the following components in the following order:
 - a. Memory module
 - b. Microprocessor
 - c. System board

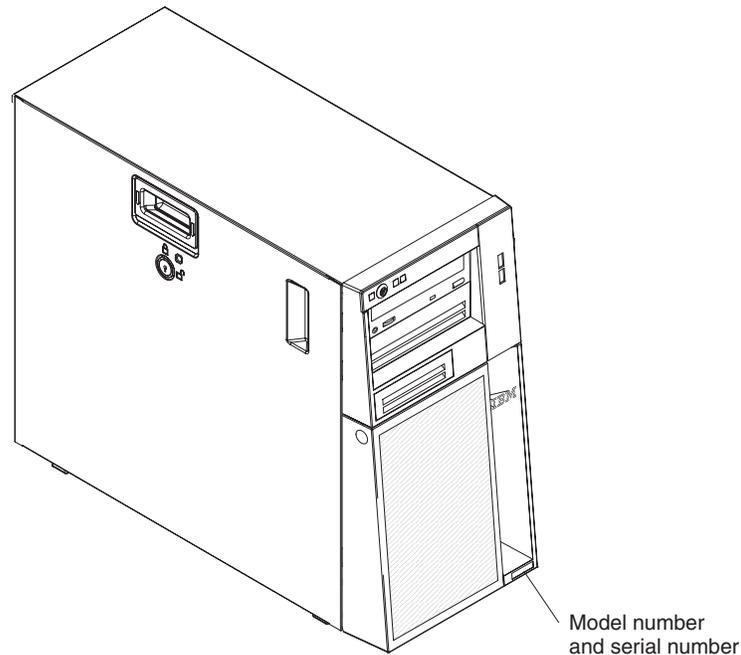
If the problem is solved when you remove an adapter from the server but the problem recurs when you reinstall the same adapter, suspect the adapter; if the problem recurs when you replace the adapter with a different one, suspect the system board.

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

Problem determination tips

Because of the variety of hardware and software combinations that can encounter, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from IBM.

The model number and serial number of the server are located on the bottom on the right side of the bezel, as shown in the following illustration.



- Machine type and model
- Microprocessor or hard disk drive upgrades
- Failure symptom
 - Does the server fail the diagnostic tests?
 - What occurs? When? Where?
 - Does the failure occur on a single server or on multiple servers?
 - Is the failure repeatable?
 - Has this configuration ever worked?
 - What changes, if any, were made before the configuration failed?
 - Is this the original reported failure?
- Diagnostic program type and version level
- Hardware configuration (print screen of the system summary)
- IMM firmware level
- Operating system software

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
- IMM firmware level

- 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

See Appendix A, “Getting help and technical assistance,” on page 245 for information about calling IBM for service.

Chapter 4. Parts listing, System x3200 M3 Types 7327 and 7328

The following replaceable components are available for all models of the System x3200 M3 Types 7327 and 7328 server, except as specified otherwise in Table 6 on page 134. For an updated parts listing on the Web, 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/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Parts documents lookup**.
4. From the **Product family** menu, select **System x3200 M3**, and click **Continue**.

Replaceable server components

The four types of replaceable components are:

- **Consumables:** Purchase and replacement of consumables (components, such as batteries and printer cartridges, that have depleting life) is your responsibility. If IBM acquires or installs a consumable component at your request, you will be charged for the service.
- **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 Information* document that comes with the server.

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

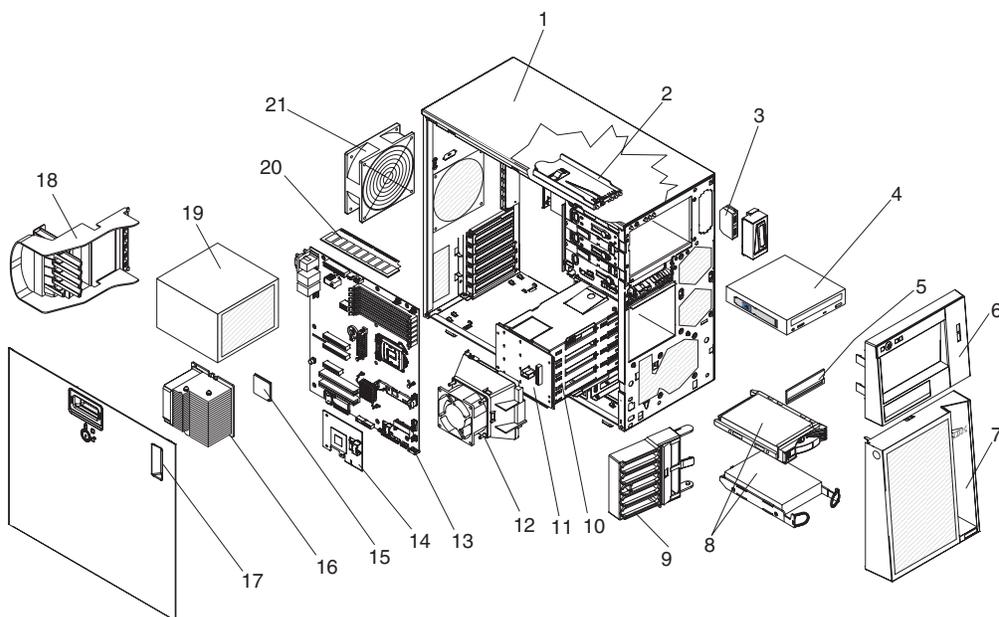


Table 6. Parts listing, Types 7327 and 7328

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Chassis assembly	49Y8457		
2	Operator Information Panel Assembly	49Y8456		
3	Front USB connector assembly		49Y8449	
4	DVD-RAM Drive, SATA (half high)	43W8467		
4	DVD-ROM Drive, SATA	43W8466		
5	Bezel Kit	13N2450		
6	Bezel, upper	49Y8453		
7	Bezel, lower	49Y8454		
8	Hard disk drive, SATA, 3.5- inch 250 GB, fixed/simple-swap, with tray (optional)	39M4511		
8	Hard disk drive, SATA, 3.5-inch 500 GB, fixed/simple-swap, with tray (optional)	39M4517		
8	Hard disk drive, 160 GB (optional)	39M4525		
8	Hard disk drive, 250 GB SATA (optional)	39M4529		
8	Hard disk drive, SATA, 3.5- inch 750 GB, fixed/simple-swap, with tray (optional)	43W7575		
8	Hard disk drive, SATA, 3.5-inch 500 GB, 10K, hot-swap, with tray (optional)	39M4533		
8	Hard disk drive, SATA, 3.5-inch 750 GB, 10K, hot-swap, with tray (optional)	43W7579		
8	Hard disk drive, SAS, 3.5-inch 146 GB, 15K, hot-swap, with tray (optional)	39R7350		
9	Retention bracket (front), adapter	13N2993		
10	Hard disk drive cage, 3.5-inch drives			49Y8451
10	Hard disk drive cage, 2.5-inch drives			49Y8460

Table 6. Parts listing, Types 7327 and 7328 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
11	SAS/SATA hard disk drive backplane (for 3.5-inch drive cage)		49Y4462	
11	SATA backplate, simple-swap		25R8842	
12	Hard disk drive fan assembly (for 3.5-inch drive cage)	39Y9860		
13	System board assembly			81Y6747
14	ServeRAID-BR10il v2 SAS/SATA controller			49Y4737
15	Microprocessor, Celeron 2.26 GHz, 1066 MHz-2MB			49Y4645
15	Microprocessor, Xeon L3406 2.26 GHz, 1066 MHz-4MB, 2C			69Y5220
15	Microprocessor, Xeon 2.67 GHz, 1066MHz-3MB			59Y3175
15	Microprocessor, Xeon 2.8 GHz, 1333MHz-4MB			49Y4646
15	Microprocessor, Xeon X3480 3.06 GHz, 1333 MHz-8MB, 4C			69Y5222
15	Microprocessor, Xeon 2.93 GHz, 1333Mhz-4MB			59Y3176
15	Microprocessor, Xeon 2.93 GHz, 1333 MHz-9MB Processor			46C6775
15	Microprocessor, Xeon 2.4 GHz, 1333 MHz-8MB, 4C, (models C2x and C2Y)			49Y4647
15	Microprocessor, Xeon 2.53 GHz, 1333 MHz-8MB, 4C, (models 42x and 42Y)			49Y4648
15	Microprocessor, Xeon 2.67 GHz, 1333 MHz-8MB, 4C, (models 52x and 52Y)			49Y4649
15	Microprocessor, Xeon 2.8 GHz, 1333 MHz-8MB, 4C, (models 62x and 62Y)			49Y4668
15	Microprocessor, Core-i3 550 3.2 GHz, 1066 MHz-4MB, 2C			69Y5221
16	Fan sink			49Y8390
17	Side cover with lock	49Y8447		
18	Retention bracket (rear), adapter	49Y8450		
19	Power supply, non-redundant 401 watt			46M6678
19	Power supply, redundant, 430 watt	46M6679		
20	Memory, 1 GB single-rank PC3-10600R-999 DDR3 ECC RDIMM	44T1490		
20	Memory, 1 GB 1Rx8 1Gbit UDIMM	44T1572		
20	Memory, 2 GB dual-rank PC3-10600R-999 DDR3 ECC RDIMM	44T1491		
20	Memory, 4 GB dual-rank PC3-10600R-999 DDR3 ECC RDIMM	44T1598		
20	Memory, 8 GB 4Rx8 2Gbit RDIMM	46C7488		
20	Memory, 2 GB dual-rank PC3-10600R-999 DDR3 ECC UDIMM	44T1573		
20	Memory, 4 GB 2Rx8 2Gbit UDIMM	44T1575		
20	Memory, 4 GB quad-rank 1 Gbit DDR3-1066 RDIMM	46C7452		

Table 6. Parts listing, Types 7327 and 7328 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
21	System fan, rear		49Y8445	
	Adapter, 3U SCSI (without battery)		43W4297	
	Adapter, QLogic 10 Gb Dual-Port CNA	42C1802		
	Adapter, Pro/1K PF Server	42C1752		
	Backplane, P3			43V7070
	Battery, 3.0 volt	33F8354		
	Bezel, accent	39R9373		
	Bezel, filler		39R9372	
	Bezel, filler		42C8942	
	Bezel, rack assembly	42C8943		
	Bracket, EIA	39Y9758		
	Ethernet Adapter, NetXtreme II 1000 Express Dual Port	49Y4205		
	Ethernet Adapter, NetXtreme II 1000 Express Quad Port	49Y4222		
	Ethernet Adapter, NetXtreme II 1000 Express	39Y6070		
	Ethernet Adapter, PRO/1K PT DP Srv		39Y6128	
	Ethernet Adapter, PRO/1K PT QP		39Y6138	
	ServeRAID-MR10i adapter	43W4296		
	ServeRAID-MR10is VAULT adapter	44E8695		
	ServerRAID-M1015 SAS/SATA adapter	46M0861		
	Cable, backplane configuration (3.5-inch hot-swap hard disk drive)		49Y8448	
	Cable, backplane Configuration, 650mm		49Y7273	
	Cable, interposer		49Y7275	
	Cable, SAS signal (3.5-inch hot-swap hard disk drive)		46M6498	
	Cable, SATA signal (3.5-inch simple-swap hard disk drive)		49Y8444	
	Cable 1Mx4 SAS-Mini		39R6530	
	Cable 3Mx4 SAS-Mini		39R6532	
	Cable, optical disk drive/tape drive		25R5635	
	Cable, USB FRU		81Y3643	
	Cable management arm	39Y9761		
	Chassis, rack			39Y9760
	Cover, bottom	39R9363		
	Cover, side/top cover	49Y8446		
	DASD duck	39Y9860		
	EMC shield	49Y8455		
	EMC shield kit, optical disk drive/tape drive	13N2997		
	Fan duck assembly, 8x2.5-inch	49Y8461		
	Feet, chassis	13N2985		
	Filler, SAS 3.5-inch	39M4375		

Table 6. Parts listing, Types 7327 and 7328 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	Hard disk drive carrier, 3.5-inch simple-swap	42C7495		
	Hard disk drive shield	44X0388		
	Hardware, misc.	39Y9837		
	Keyboard, US	42C0060		
	Keylock, keyed-alike	26K7363		
	Keylock, keyed-random	26K7364		
	Kit, Retainer (for optical and diskette drives)	39R9369		
	Power supply unit adapter	42C7509		
	Miscellaneous parts kit	39Y9773		
	Mouse, 2-button	39Y9875		
	Mouse, optical, 3-button (optional)	40K9203		
	Power supply cage, 430 watt			49Y8459
	Retention module (for fan sink)			49Y8458
	System service label	49Y8452		
	Tape drive, IBM half-high LTO Gen 4 SAS (optional)	45E1125		
	Tray assembly, 1 TB hot-swap hard disk	43W7629		
	USB hypervisor key	44M2234		
	Virtual media key	46C7532		

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 a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

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

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

IBM power cord part number	Used in these countries and regions
39M5206	China
39M5102	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea
39M5123	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire
39M5130	Denmark
39M5144	Bangladesh, Lesotho, Macao, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda

IBM power cord part number	Used in these countries and regions
39M5151	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe
39M5158	Liechtenstein, Switzerland
39M5165	Chile, Italy, Libyan Arab Jamahiriya
39M5172	Israel
39M5095 220 - 240 V	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, 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
39M5081 110 - 120 V	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
39M5219	Korea (Democratic People's Republic of), Korea (Republic of)
39M5199	Japan
39M5068	Argentina, Paraguay, Uruguay
39M5226	India
39M5233	Brazil

Chapter 5. 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 4, “Parts listing, System x3200 M3 Types 7327 and 7328,” on page 133 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 Information* document that comes with the server.

Installation guidelines

Attention:

- Static electricity that is released to internal server components when the server is powered-on might cause the system to halt, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when removing or installing a hot-swap device.
- This product is not intended to be connected directly or indirectly by any means whatsoever to interfaces of public telecommunications networks, neither to be used in Public Services Network.

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 144. This information will help you work safely.
- When you install your new server, take the opportunity to download and apply the most recent firmware updates. This step will help to ensure that any known issues are addressed and that your server is ready to function at maximum levels of performance. To download firmware updates for your server, 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/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3200 M3** to display the matrix of downloadable files for the server.

For additional information about tools for updating, managing, and deploying firmware, see the System x and BladeCenter Tools Center at <http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp>

- Before you install optional devices, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an

operating system is installed, or that a 19990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see Chapter 1, “Start here,” on page 1 and Chapter 3, “Diagnostics,” on page 23 for diagnostic information.

- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the cover is removed, make sure that no one is near the server and that no other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
 - Make sure that you stand safely without slipping.
 - Distribute the weight of the object equally between your feet.
 - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
 - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver, a small Phillips screwdriver, and a T8 torx screwdriver available.
- You do not have to turn off the server to install or replace hot-swap fans, hot-swap hard disk drives, hot-plug adapters, or hot-plug Universal Serial Bus (USB) devices. However, you must turn off the server before performing any steps that involve removing or installing adapter cables.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.
- For a list of supported optional devices for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

System reliability guidelines

To help ensure proper cooling and system reliability, make sure that the following requirements are met:

- 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 within 48 hours.
- You have replaced a hot-swap fan within 30 seconds of removal.
- You have replaced a hot-swap drive within 10 minutes of removal.
- You do not run the server without the air baffle installed. Operating the server without the air baffle might cause the microprocessor or the DIMMs to overheat.
- The microprocessor socket always contains a microprocessor and heat sink.

Working inside the server with the power on

Attention: Static electricity that is released to internal server components when the server is powered-on might cause the server to halt, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when 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 LEDs or replace hot swap components. 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 you work 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 might 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 consumable parts and Tier 1 CRUs

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

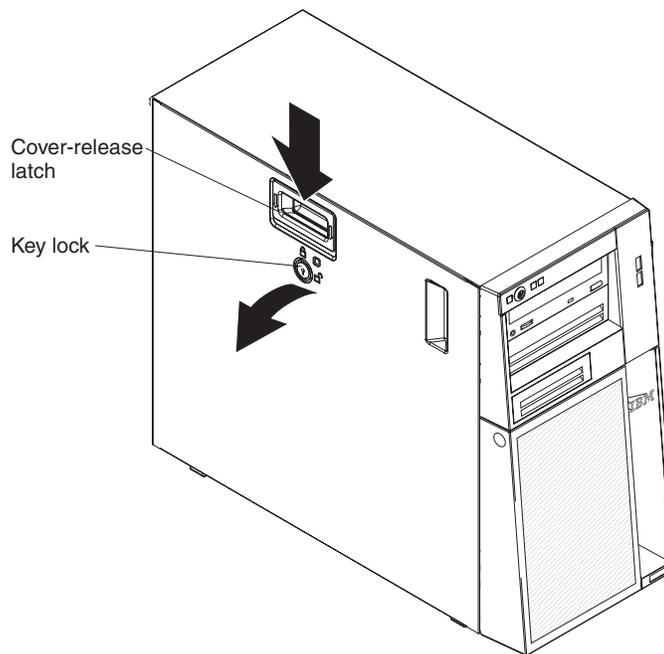
The illustrations in this document might differ slightly from your hardware.

Removing the side cover

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

To remove the side cover, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock the side cover; then, press the cover-release latch down (as shown in the illustration); then, remove the cover and set it aside.



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

Installing the side cover

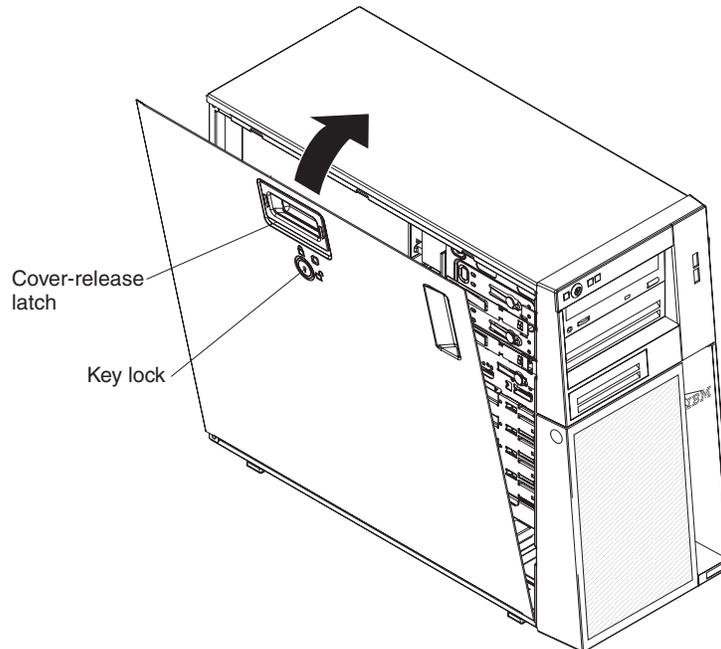
Attention: For proper cooling and airflow, replace the side cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the side cover removed might damage server components.

To install the side cover, complete the following steps:

1. Make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server. Also, make sure that all internal cables are correctly routed.
2. If you removed the upper and lower bezels, reinstall them before you replace the side cover (see “Installing the upper bezel” on page 150 and “Installing the lower bezel” on page 148).

Important: The cover lock must be in the unlocked (opened) position before you install the side cover.

3. Position the lip on the bottom edge of the side cover on the ledge on the bottom of the chassis; then, rotate the cover up to the chassis. Press down on the cover release latch and push the cover completely closed until it latches securely into place.



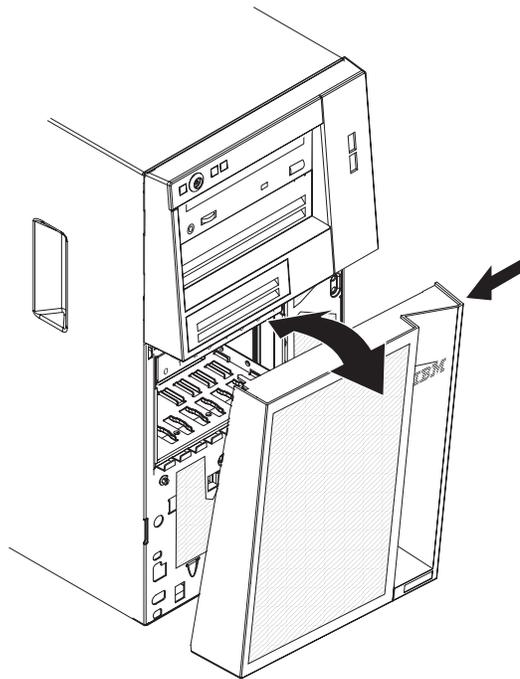
4. Lock the side cover.
5. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the lower bezel

When you work with some devices, such as the drives in bays 4 through 7 (or bays 4 through 11 for some 2.5 inch hard disk drive models), you must first remove the lower bezel to access the devices.

To remove the lower bezel, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. If you are replacing a non-hot-swap component, turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Press the round blue release button on the right side of the lower bezel and rotate the lower bezel downward to disengage and remove it from the chassis.

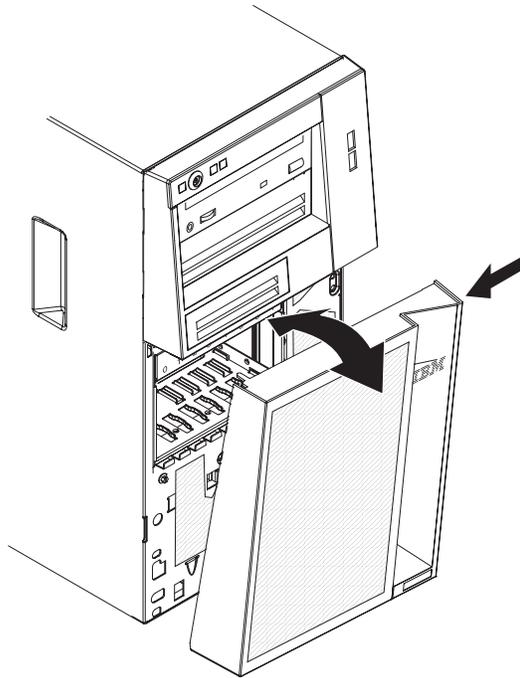


4. If you are instructed to return the lower bezel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the lower bezel

To install the lower bezel, complete the following steps:

1. Insert the two bottom tabs on the lower bezel into the corresponding holes in the front of the chassis.



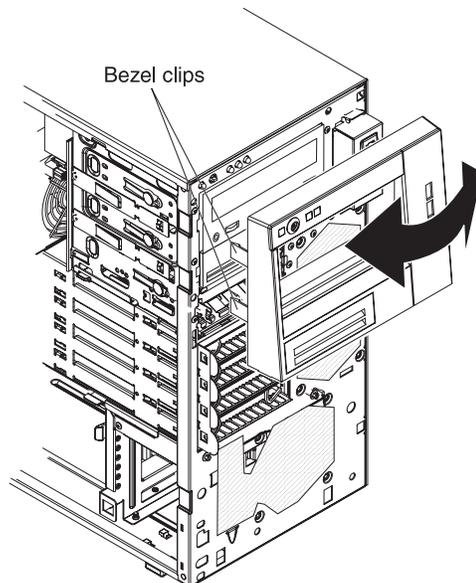
2. Rotate the top of the lower bezel up to the chassis; then, press the blue release tab on the right side of the lower bezel and completely close the lower bezel until it locks securely into place.
3. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the upper bezel

When you work with some devices, such as the drives in bays 1 through 3, you must first remove the upper bezel to access the devices.

To remove the upper bezel, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. If you are replacing a non-hot-swap component, turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).
4. Remove the lower bezel (see “Removing the lower bezel” on page 147).
5. Carefully pull the two bezel clips on the left side of the upper bezel; then, rotate the upper bezel to the right side of the server to disengage the two right-side tabs from the chassis.

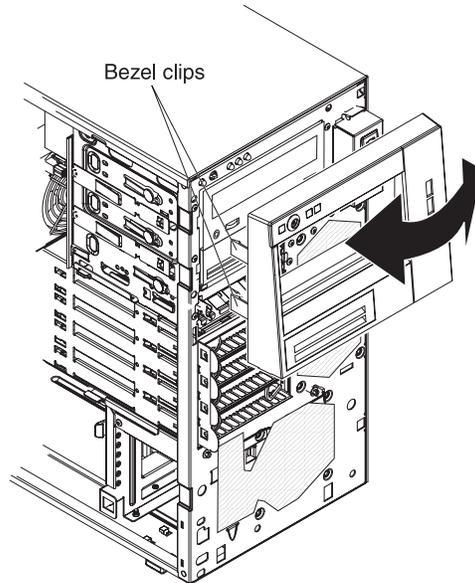


6. If you are instructed to return the upper bezel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the upper bezel

To install the upper bezel, complete the following steps:

1. Insert the two tabs on the right-side of the upper bezel into the corresponding holes on the right side of the chassis.



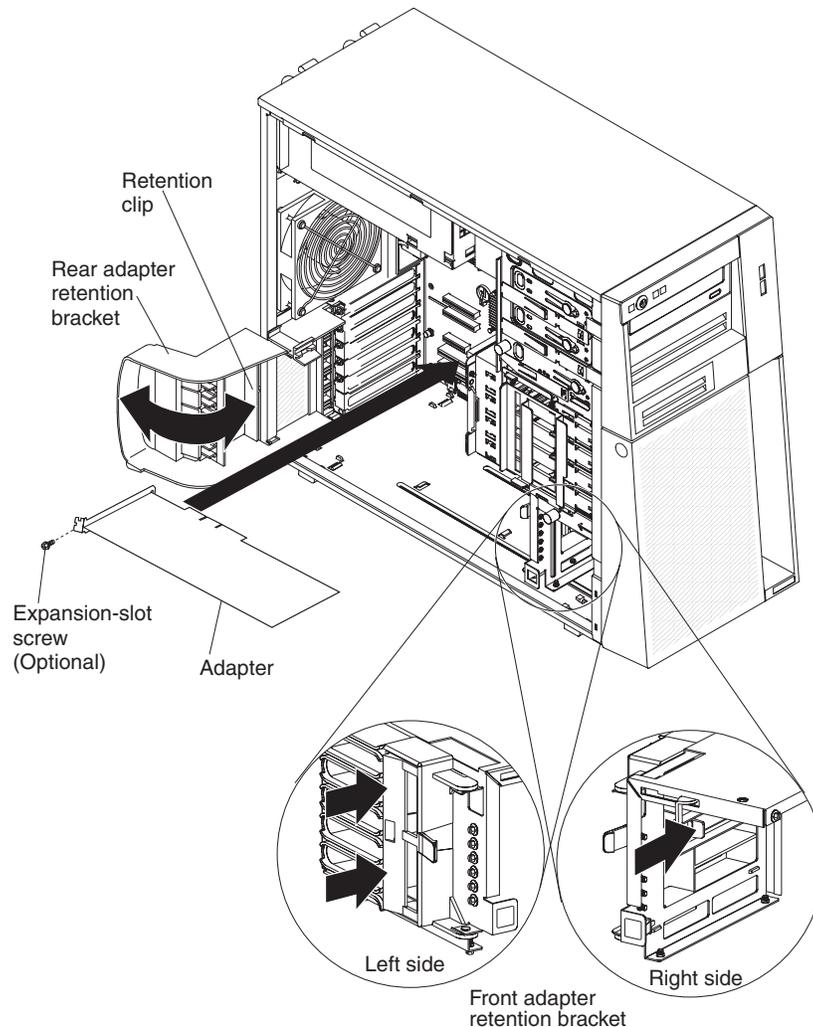
2. Rotate the upper bezel to the left side of the chassis until the bezel clips are aligned with the corresponding indentations on the left side of the chassis and it snaps into place.
3. Install the lower bezel (see “Installing the lower bezel” on page 148).
4. Install the side cover (see “Installing the side cover” on page 146).
5. Lock the side cover.
6. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing an adapter

To remove an adapter, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).
4. Disconnect any cables from the adapter or any cables that impede access to the adapter.
5. Open the rear retention bracket.
6. If you are removing a full-length adapter, press on the retaining tab (two blue pull points) on the left side of the front adapter-retention bracket until the release lever on the right side of the bracket clicks into place.
7. Remove the expansion-slot screw at the rear of the adapter if any.
8. Carefully grasp the adapter by its top edge or upper corners. And pull the adapter from the server.

Attention: Expansion-slot covers must be installed in all empty slots. This maintains the electronic emissions standards of the computer and ensures proper ventilation of computer components.



9. If you are not replacing the adapter, install an expansion-slot cover in the expansion-slot opening.
10. If you are instructed to return the adapter, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

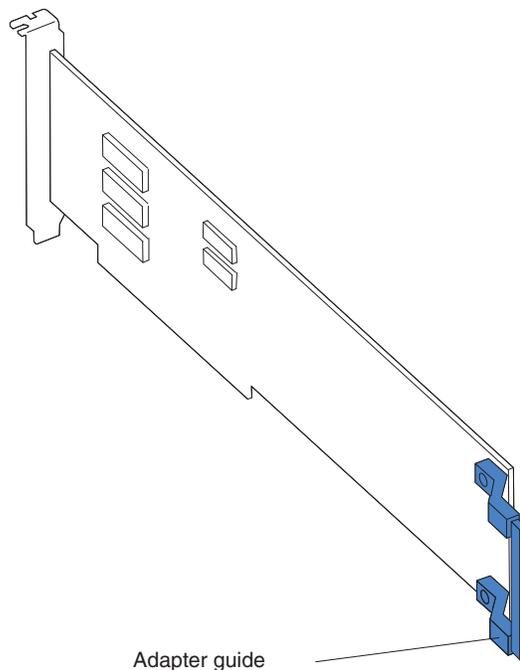
Installing an adapter

For information about the types of adapters that the server supports and other information that you might consider when you install an adapter, see the *Installation and User's Guide*. For the locations of the expansion slots and optional-device connectors see "System-board optional-devices connectors" on page 18.

Note: If you are installing Intel Ethernet Quad Port Server Adapter I340-T4 (part number 49Y4240), you can only install the adaptor in slot 1 or slot 2.

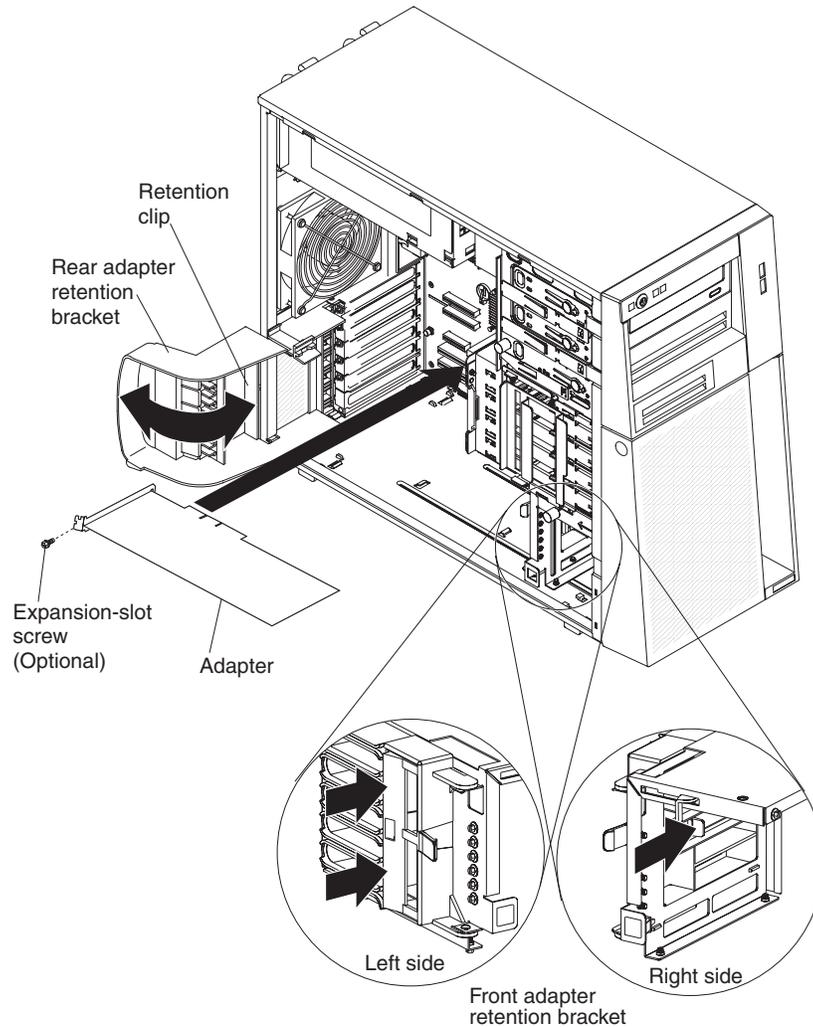
To install a replacement adapter, complete the following steps:

1. Check the instructions that come with the adapter for any requirements, restrictions, or cabling instructions. It might be easier to route cables before you install the adapter.
2. Follow the instructions that come with the adapter to set jumpers or switches, if any.
3. 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.
4. If you are installing a full-length adapter, remove the blue adapter guide (if any) from the end of the adapter.



5. Open the rear retention bracket.
6. Carefully grasp the adapter by the top edge or upper corner, and move the adapter directly from the static-protective package to the expansion slot. Align the adapter with the expansion slot guides; then, press the adapter firmly into the expansion slot. For a full-length adapter, make sure that the front edge of the adapter is correctly seated in the correct slot in the front adapter-retention

bracket.

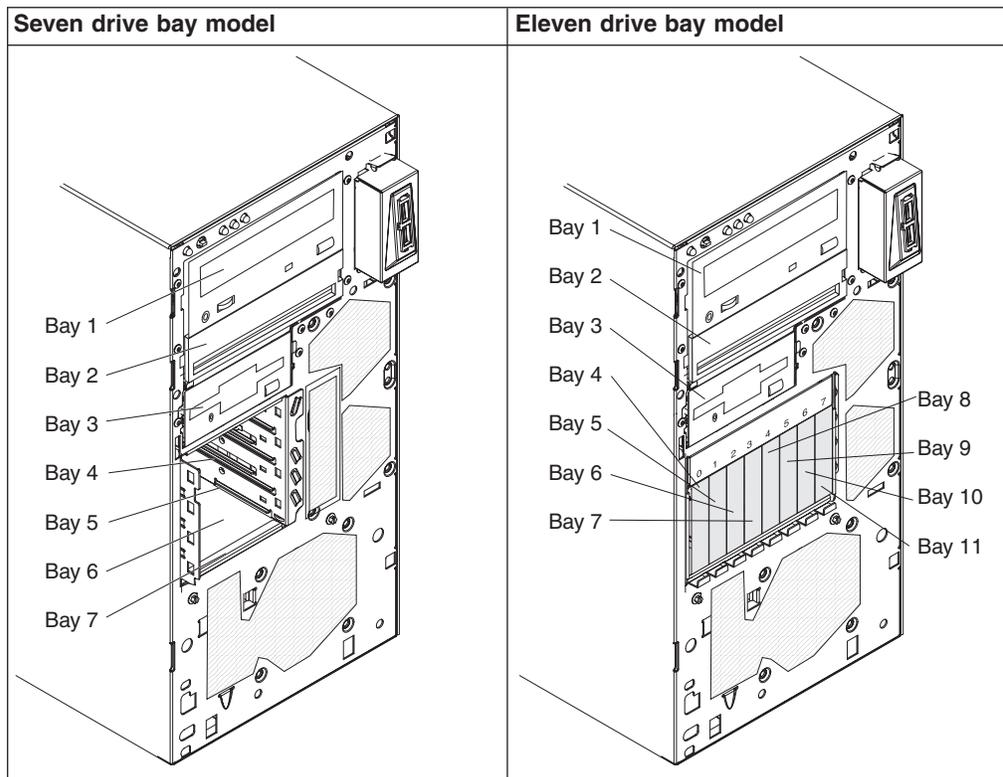


7. (Optional) Install an expansion-slot screw at the rear of the adapter.
8. If you are installing a full-length adapter, press on the release lever on the right side of the front adapter-retention bracket to release the retaining tab on the left side of the bracket.
9. Connect required cables to the adapter. Route cables so that they do not block the flow of air from the fans.
10. Close the rear retention bracket.
11. Install and lock the side cover (see "Installing the side cover" on page 146).
12. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing and installing internal drives

See the *Installation and User's Guide* for information about the types of drives that the server supports and other important information. The following illustrations show the locations of the drive bays. Some models have seven drive bays, and some models have eleven drive bays.

Table 7. Drive bays on the server models



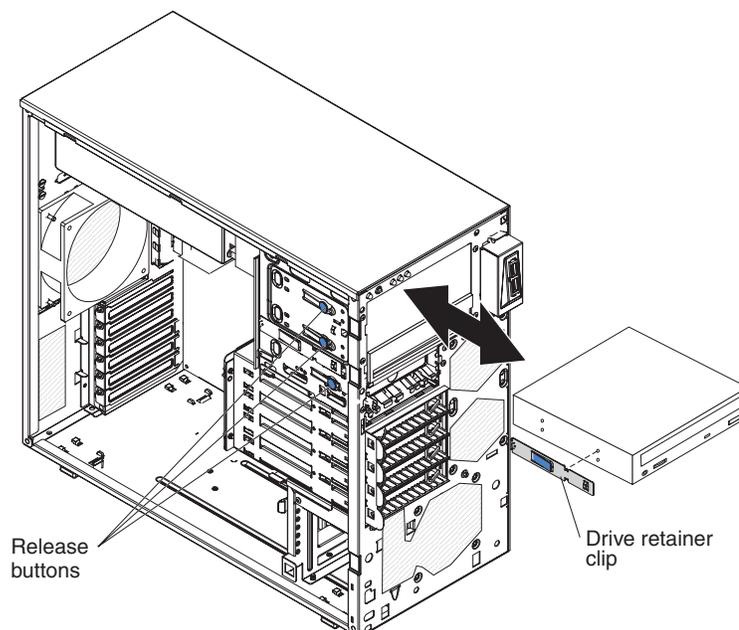
The following notes describe the types of drives that the server supports and other information that you must consider when installing a drive:

- Make sure that you have all the cables and other equipment that is specified in the documentation that comes with the drive.
- Check the instructions that come with the drive to see whether you have to set any switches or jumpers on the drive. If you are installing a SAS or SATA device, be sure to set the SAS or SATA ID for that device.
- Optional external tape drives, DVD-ROM drive are examples of removable-media drives. You can install removable-media drives only in bays 1, 2, and 3.
- To install a 3.5-inch drive in a 5.25-inch bay, you must use a 5.25-inch conversion kit.
- The electromagnetic interference (EMI) integrity and cooling of the server are protected by having all bays and PCI slots covered or occupied. When you install a drive or PCI adapter, save the EMC shield and filler panel from the bay or the PCI adapter slot cover in the event that you later remove the drive or adapter.
- For a complete list of supported options for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

Removing a DVD drive

To remove a DVD drive, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).
4. Remove the lower bezel (see “Removing the lower bezel” on page 147).
5. Remove the upper bezel (see “Removing the upper bezel” on page 149).
6. Disconnect the power and signal cables from the drive that is to be removed.
7. Press and hold the blue release button on the side of the bay to release the drive; then, pull the drive out of the front of the server.



8. Remove the drive retainer clip from the side of the drive. Save the clip to use when you install the replacement drive.
9. If you are instructed to return the drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a DVD drive

To install a DVD drive, complete the following steps:

1. If you are replacing a removed drive with a new drive, make sure that:
 - You have all the cables and other equipment that is specified in the documentation that comes with the new drive.
 - You have checked the instructions that come with the new drive to determine whether you must set any switches or jumpers in the drive.
 - You have removed the blue optical drive rails from the side of the old drive and have them available for installation on the new drive.

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

Statement 3:



CAUTION:

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

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



DANGER

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

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

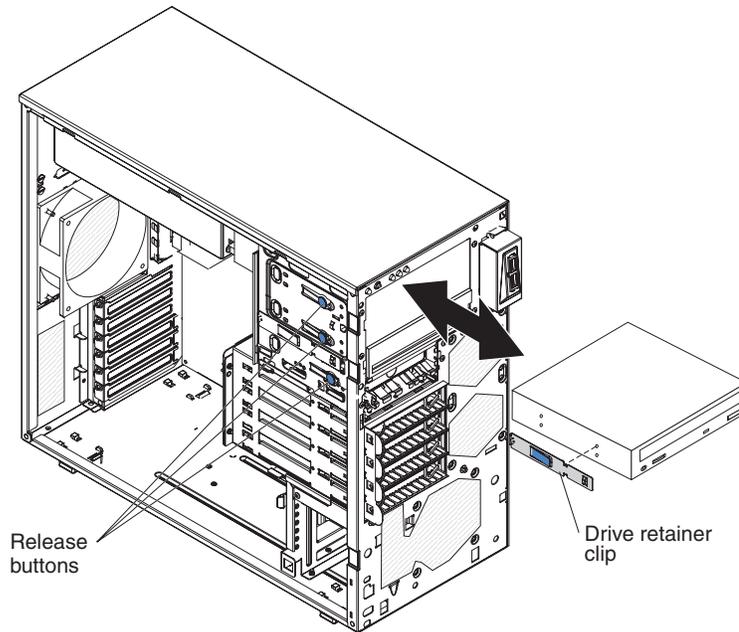


Class 1 Laser Product
Laser Klasse 1
Laser Class 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1

2. Touch the static-protective package that contains the new DVD drive to any unpainted metal surface on the server; then, remove the DVD drive from the package and place it on a static-protective surface.
3. Follow the instructions that come with the drive to set jumpers or switches, if there are any.

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

4. If you are installing a 3.5-inch drive in bay 2, attach a 5.25-inch conversion kit to the 3.5-inch drive. Remove the drive retainer clip from the side of the drive cage of bay 1 or bay 2. Slide the drive retainer clip to the front to remove it from the drive cage; then, snap the drive retainer clip into the screw holes on the side of the drive.



5. Push the drive into the bay.
6. Connect the power and signal cables to the drive.

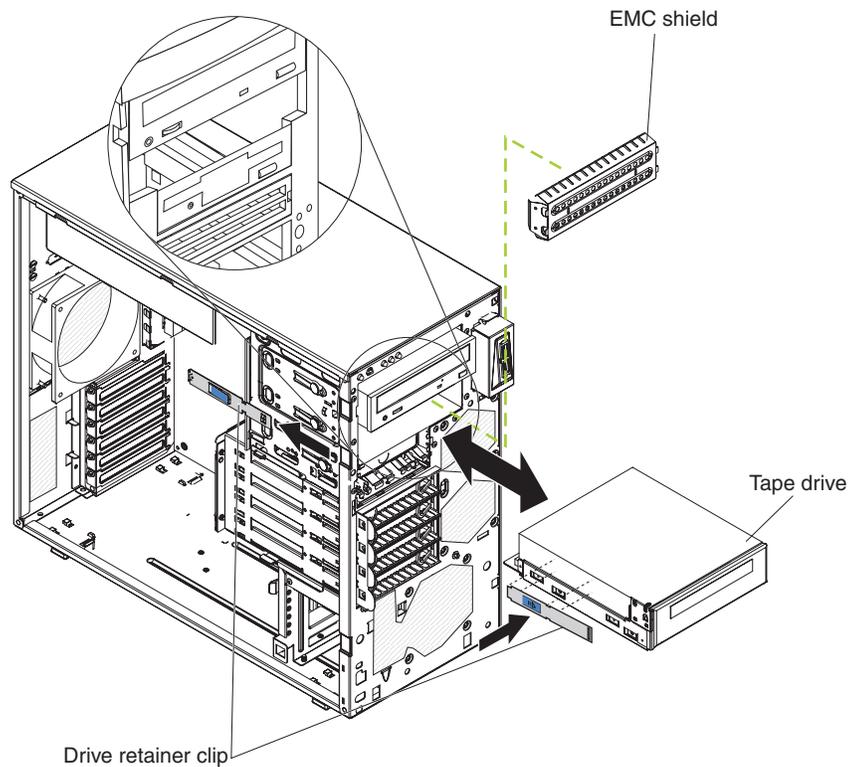
Note: Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor and dual inline memory modules (DIMMs).

7. Install the upper bezel (see “Installing the upper bezel” on page 150).
8. Install the lower bezel (see “Installing the lower bezel” on page 148).
9. Install and lock the side cover (see “Installing the side cover” on page 146).
10. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing a tape drive

To remove a tape drive, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Unlock and remove the side cover (see “Installing the side cover” on page 146).
4. Remove the lower bezel (see “Installing the lower bezel” on page 148).
5. Remove the upper bezel (see “Installing the upper bezel” on page 150).
6. Disconnect the power and signal cables from the drive that is to be removed.
7. Press and hold the blue release button on the side of the bay to release the drive; then, pull the drive out of the front of the server.
8. Remove the drive retainer clip from the side of the drive. Save the clip to use when you install the replacement drive.

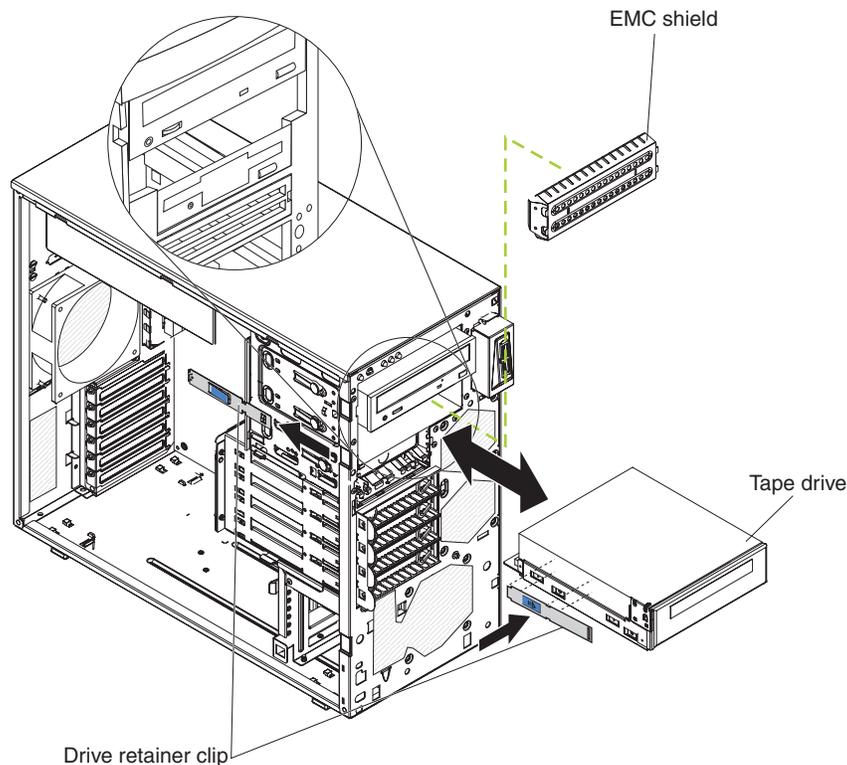


9. If you are instructed to return the drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a tape drive

To install a tape drive, complete the following steps:

1. If you are replacing a removed drive with a new drive, make sure that:
 - You have all the cables and other equipment that is specified in the documentation that comes with the new drive.
 - You check the instructions that come with the new drive to determine whether you must set any switches or jumpers on the drive.
 - You have removed the drive retainer clip on the side of the old drive and have it available for installation on the new drive.
2. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
3. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
4. Unlock and remove the side cover (see “Installing the side cover” on page 146).
5. Remove the lower bezel (see “Installing the lower bezel” on page 148).
6. Remove the upper bezel (see “Installing the upper bezel” on page 150).
7. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
8. Set any jumpers or switches on the drive according to the documentation that comes with the drive.
9. Remove the drive retainer clip from the side of the drive cage of bay 1 or bay 2. Slide the drive retainer clip to the front to remove it from the drive cage; then, snap the drive retainer clip into the screw holes on the side of the drive.



10. Remove the EMC filler.
11. Push the drive into the bay.

Note: A tape drive can be installed in bay 1 or bay 2

12. Connect one end of the applicable signal cable into the rear of the drive and make sure that the other end of this cable is connected into the applicable connector on the system board.
13. Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor and dual inline memory modules (DIMMs).
14. If you have another drive to install or remove, do so now.
15. Connect the power cable to the rear of the drive. The connectors are keyed and can be inserted only one way.

Removing a hot-swap hard disk drive

This procedure applies only to server models that have hot-swap hard disk drives.

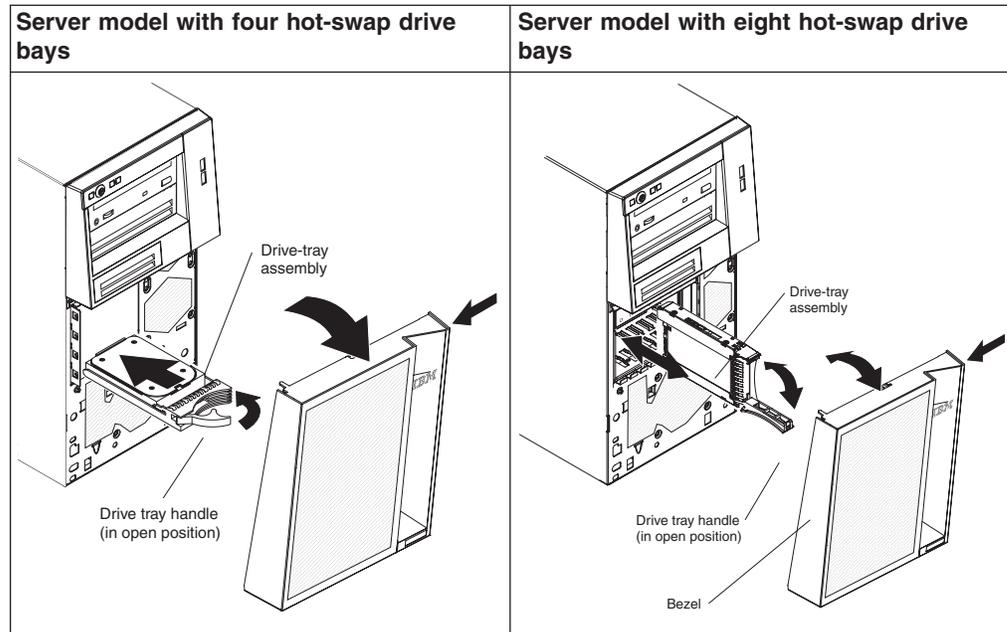
Attention: To maintain proper system cooling, do not operate the server for more than 10 minutes without either a drive or a filler panel installed in each drive bay.

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.

Note: You do not have to turn off the server to remove hot-swap drives from the hot-swap drive bays.

2. Remove the lower bezel (see “Removing the lower bezel” on page 147).
3. Rotate the drive tray handle of the drive assembly that is to be removed to the open position (based on your model).



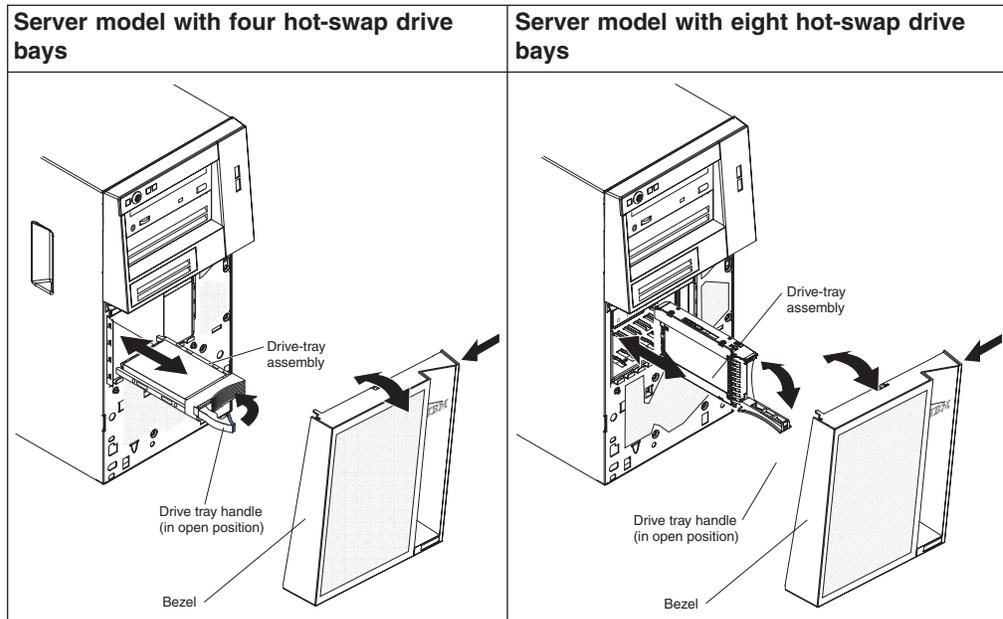
4. Grasp the handle of the drive assembly that is to be replaced and pull the assembly out of the bay.
5. If you are instructed to return the drive assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a hot-swap hard disk drive

This procedure applies only to server models that have hot-swap hard disk drives. Before you install a hot-swap hard disk drive, read the following information:

- The hot-swap drives must be either all SAS hard disk drives or all SATA hard disk drives; the two types cannot be combined.
- Inspect the drive tray for signs of damage.
- To maintain proper system cooling, do not operate the server for more than 10 minutes without either a drive or a filler panel installed in each drive bay.
- You do not have to turn off the server to install hot-swap drives in the hot-swap drive bays.
- See the *Installation and User's Guide* for additional information.

To install a hot-swap hard disk drive (based on your model), complete the following steps.



1. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
2. Make sure that the drive tray handle is in the open position.
3. Align the drive assembly with the guide rails in the bay; then, carefully slide the drive assembly into the drive bay until the drive stops.
4. Rotate the drive tray handle to the closed position.
5. Check the hard disk drive status indicator to make sure that the hard disk drive is operating correctly. (You might have to restart the server for the drive to be recognized.) If the amber hard disk drive status LED for a drive is lit continuously, it indicates that the drive is faulty and must be replaced. If the green hard disk drive activity LED is flashing, this indicates that the drive is being accessed.

Note: If the server is configured for RAID operation using a ServeRAID controller, you might have to reconfigure the disk arrays after you replace hard disk drives. See the ServeRAID documentation for additional information about RAID operation and complete instructions for using ServeRAID Manager.

6. Install the lower bezel (see “Installing the lower bezel” on page 148).
7. Lock the side cover.

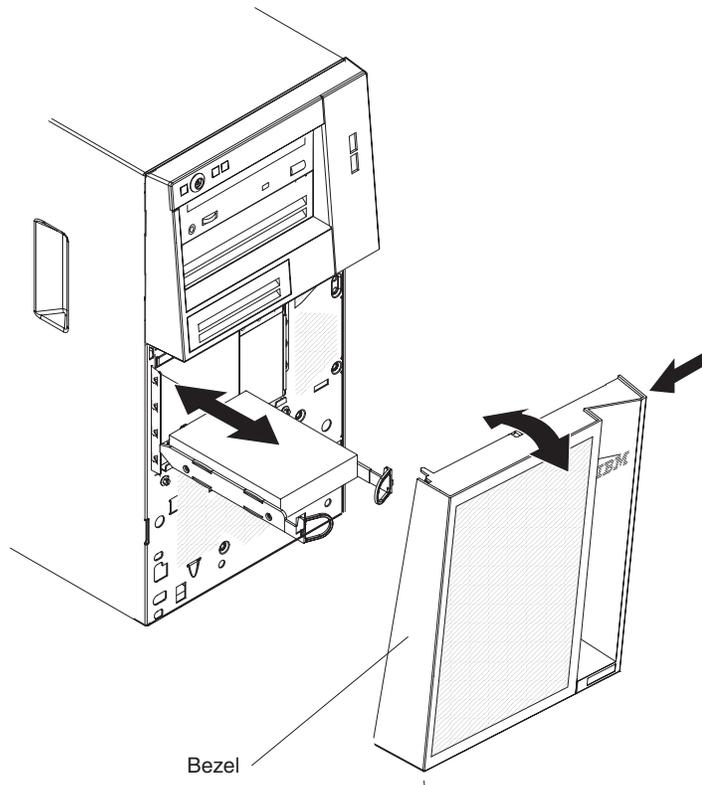
Removing a simple-swap hard disk drive

This procedure applies only to server models that have simple-swap SATA hard disk drives.

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

To remove a simple-swap hard disk drive, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Remove the lower bezel (see “Removing the lower bezel” on page 147).
4. Pull the loops of the drive assembly that is to be removed toward each other; then, pull the assembly out of the bay.



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

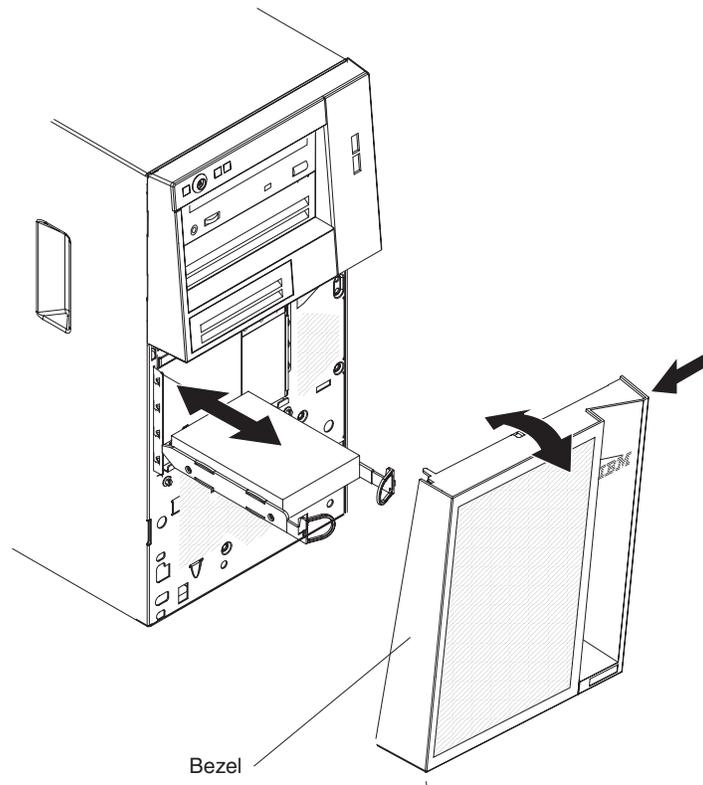
Installing a simple-swap hard disk drive

This procedure applies only to server models that have simple-swap SATA hard disk drives. See the *Installation and User's Guide* for information about the installation sequence and other important information.

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

To install a simple-swap hard disk drive, complete the following steps:

1. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
2. Align the drive assembly with the guide rails in the bay.



3. Pull the loops of the drive assembly toward each other; then, carefully slide the drive assembly into the drive bay until it clicks into place, and release the loops.

Note: Do not release the loops on the drive assembly until it is completely seated.

4. Install the lower bezel (see “Installing the lower bezel” on page 148).
5. Lock the side cover.
6. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing a hot-swap power supply

This procedure applies only to server models that have hot-swap power supplies. See “Removing a non-hot-swap power supply” on page 206 for information about the removal of a non-hot-swap power supply.

When you remove or install a hot-swap power supply, observe the following precautions.

Statement 8:



CAUTION:

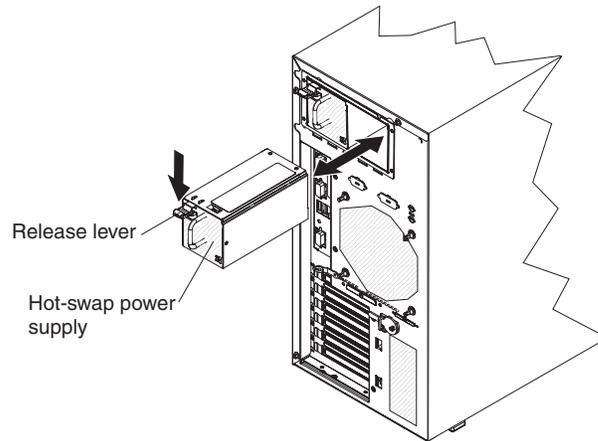
Never remove the cover on a power supply or any part that has the following label attached.



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

To remove a hot-swap power supply, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Disconnect the power cord from the power supply that is to be removed.
3. Press down on the orange release lever and pull the power supply out of the bay, using the handle.



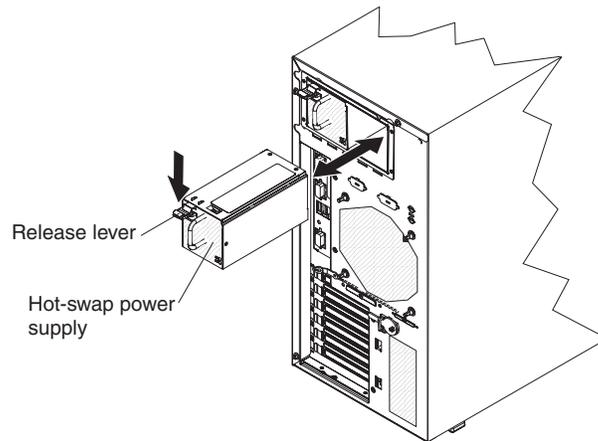
4. If you are instructed to return the power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a hot-swap power supply

This procedure applies only to server models that have hot-swap power supplies. See “Installing a non-hot-swap power supply” on page 208 for information about the installation of a non-hot-swap power supply.

To install a hot-swap power supply, complete the following steps:

1. Place the power supply into the bay guides.



2. Using the handle, push the power supply toward the front of the chassis until it locks into place.
3. Connect one end of the power cord 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.
4. Make sure that both the ac and dc power LEDs on the rear of the power supply are lit, indicating that the power supply is operating correctly.

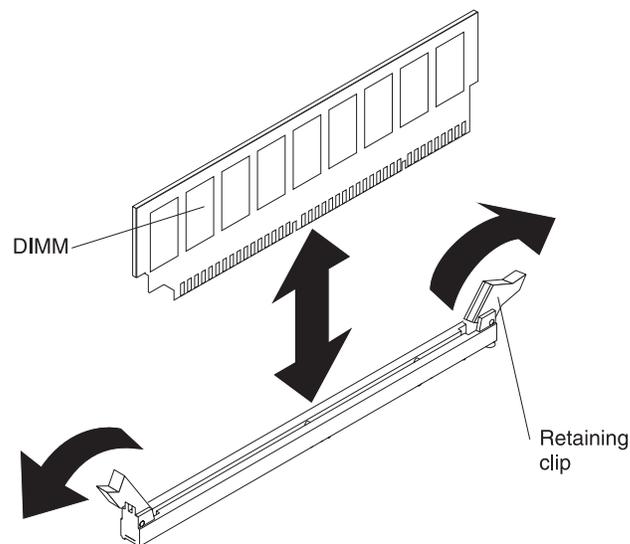
Removing a memory module

To remove a dual inline memory module (DIMM), complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords.
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).
4. Locate the DIMM connector that contains the DIMM that is to be replaced (see “System-board optional-devices connectors” on page 18 for DIMM slot locations).

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

5. Carefully open the retaining clips on each end of the DIMM connector and remove the DIMM.



6. 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

The following notes describe the types of dual inline memory modules (DIMMs) that the server supports and other information that you must consider when you install DIMMs (see “System-board optional-devices connectors” on page 18 for the location of the DIMM connectors):

- The server supports industry-standard, 1066 or 1333 MHz, PC3-10600R-999 (single-rank or dual-rank) double-data-rate 3 (DDR3), registered or unbuffered, synchronous dynamic random-access memory (SDRAM) dual inline memory modules (DIMMs) with error correcting code (ECC). For a list of supported options for the server, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>; then, select your country and navigate to the list of options for the server.
- The maximum amount of memory that the server supports is dependent on the type of memory that you install in the server. See “Unbuffered DIMMs (UDIMMs)” on page 170 and “Registered DIMMs (RDIMMs)” on page 171 for more information.
- The amount of usable memory is reduced, depending on the system configuration. A certain amount of memory must be reserved for system resources. To view the total amount of installed memory and the amount of configured memory, run the Setup utility. For additional information, see “Using the Setup utility” on page 225.
- The maximum operating speed of the server is determined by the slowest DIMM in the server.
- If you install a pair of DIMMs in DIMM connectors 2 and 5, the size and speed of the DIMMs that you install in DIMM connectors 2 and 5 must match each other. However, they do not have to be the same size and speed as the DIMMs that are installed in DIMM connectors 1 and 4.
- You can use compatible DIMMs from various manufacturers in the same pair.
- When you install or remove DIMMs, the server configuration information changes. When you restart the server, the system displays a message that indicates that the memory configuration has changed.

Attention: Static electricity that is released to internal server components when the server is powered-on might cause the server to stop, 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.

- The specifications of a DDR3 DIMM are on a label on the DIMM, in the following format.

ggg eRxff-PC3-wwwwwm-aa-bb-cc

where:

ggg is the total capacity of the DIMM (for example, 1GB, 2GB, or 4GB)

e is the number of ranks

1 = single-rank

2 = dual-rank

4 = quad-rank

ff is the device organization (bit width)

4 = x4 organization (4 DQ lines per SDRAM)

8 = x8 organization

16 = x16 organization

wwwww is the DIMM bandwidth, in MBps

8500 = 8.53 GBps (PC3-1066 SDRAMs, 8-byte primary data bus)
 10600 = 10.66 GBps (PC3-1333 SDRAMs, 8-byte primary data bus)

m is the DIMM type

E = Unbuffered DIMM (UDIMM) with ECC (x72-bit module data bus)

R = Registered DIMM (RDIMM)

U = Unbuffered DIMM with no ECC (x64-bit primary data bus)

aa is the CAS latency, in clocks at maximum operating frequency

bb is the JEDEC SPD Revision Encoding and Additions level

cc is the reference design file for the design of the DIMM

d is the revision number of the reference design of the DIMM

Note: To determine the type of a DIMM, see the label on the DIMM. The information on the label is in the format xxxxx nRxxx PC3-xxxxx-xx-xx-xxx. The numeral in the sixth numerical position indicates whether the DIMM is single-rank (n=1) or dual-rank (n=2).

Unbuffered DIMMs (UDIMMs)

The following notes provide information that you must consider when installing UDIMMs (see “System-board optional-devices connectors” on page 18 for the location of the DIMM connectors):

- The memory channels run at the fastest common frequency of the installed DIMMs.
- Do not use both UDIMMs and RDIMMs in the same server.
- Using ECC and non-ECC UDIMMs in the server will cause the server to run in non-ECC mode.
- The UDIMM options that are available for the server are 1 GB, 2 GB, and 4 GB (when available) memory DIMMs.
- You can install a maximum of 16 GB of memory in some server models when you use UDIMMs.
- The server supports up to two single-rank or dual-rank UDIMMs per channel.
- DIMM slots 3 and 6 are not supported when you install UDIMMs in the server. Do not install DIMMs in these connectors.
- The following table lists the DIMM support compatibility.

Table 8. Supported DIMM compatibility

DIMM configuration	Intel quad-core (Xeon 3400 series)	Intel dual-core (Core i3)	Intel dual-core (Xeon L3406)
UDIMM non-ECC only	Not supported	Not supported	Not supported
UDIMM ECC only	Supported	Supported	Supported
UDIMM mix ECC with non-ECC	Not supported	Not supported	Not supported
RDIMM ECC only	Supported	Not supported	Not supported

- The following table lists the supported UDIMM population.

Table 9. Supported UDIMM population per channel

DIMMs slots per channel	DIMMs installed in each channel	DIMM type	DIMM speed	Ranks per DIMM (any combination)
2	1	Unbuffered DDR3 ECC	1066, 1333	single-rank, dual-rank
2	2	Unbuffered DDR3 ECC	1066, 1333	single-rank, dual-rank

- The following table lists the maximum DIMM population using ranked UDIMM.

Table 10. Maximum memory population using ranked UDIMMs (depending on your model)

Number of UDIMMs	DIMM type	DIMM size	Total memory
4	single-rank UDIMMs	1 GB	4 GB
4	single-rank UDIMMs	2 GB	8 GB
4	dual-rank UDIMMs	2 GB	8 GB
4	dual-rank UDIMMs	4 GB (when available)	16 GB

- The following table lists the UDIMM memory population rule to optimize the system performance.

Table 11. UDIMMs population rule for dual-channel symmetric mode

DIMMs connector 1	DIMMs connector 2	DIMMs connector 3	DIMMs connector 4	DIMMs connector 5	DIMMs connector 6
populated	empty	empty	empty	empty	empty
populated	empty	empty	populated	empty	empty
populated	populated	empty	populated	populated	empty

Registered DIMMs (RDIMMs)

The following notes provide information that you must consider when you install RDIMMs (see “System-board optional-devices connectors” on page 18 for the location of the DIMM connectors):

- The memory channels run at the fastest common frequency of the installed DIMMs.
- Do not use both RDIMMs and UDIMMs in the same server.
- The server supports up to three single-rank, dual-rank, or quad-rank RDIMMs per channel.
- The RDIMM options that are available for the server are 1 GB, 2 GB, 4 GB, and 8 GB (when available) memory DIMMs.
- You can install a maximum of 32 GB of memory in the server when you use RDIMMs.
- The following table lists the supported RDIMM population.

Table 12. Supported RDIMM population per channel

DIMMs slots per channel	DIMMs installed in each channel	DIMM type	DIMM speed	Ranks per DIMM (any combination)
3	1	Registered DDR3 ECC	1066, 1333	single-rank, dual-rank

Table 12. Supported RDIMM population per channel (continued)

DIMMs slots per channel	DIMMs installed in each channel	DIMM type	DIMM speed	Ranks per DIMM (any combination)
3	2	Registered DDR3 ECC	1066, 1333	single-rank, dual-rank
3	3	Registered DDR3 ECC	800	single-rank, dual-rank
3	1	Registered DDR3 ECC	1066	quad-rank
3	2	Registered DDR3 ECC	800	quad-rank

- The following table lists the maximum DIMM population using ranked RDIMM.

Table 13. Maximum memory population using ranked RDIMMs (depending on your model)

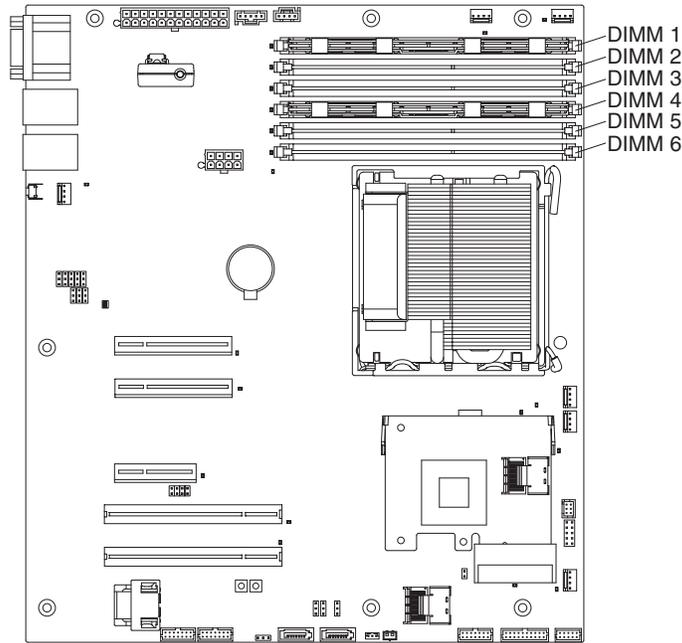
Number of RDIMMs	DIMM type	DIMM size	Total memory
6	single-rank RDIMMs	1 GB	6 GB
6	single-rank RDIMMs	2 GB	12 GB
6	dual-rank RDIMMs	2 GB	12 GB
4	dual-rank RDIMMs	4 GB	16 GB
4	quad-rank RDIMMs	4 GB	16 GB
6	dual-rank RDIMMs	4 GB	24 GB
4	quad-rank RDIMMs	8 GB (when available)	32 GB

- The following table lists the RDIMM memory population rule to optimize the system performance.

Table 14. RDIMMs population rule for dual-channel symmetric mode

DIMMs connector 1	DIMMs connector 2	DIMMs connector 3	DIMMs connector 4	DIMMs connector 5	DIMMs connector 6
populated	empty	empty	empty	empty	empty
populated	empty	empty	populated	empty	empty
populated	populated	empty	populated	populated	empty
populated	populated	populated	populated	populated	populated

The following illustration shows the location of the DIMM connectors on the system board.



To install a DIMM, complete the following steps:

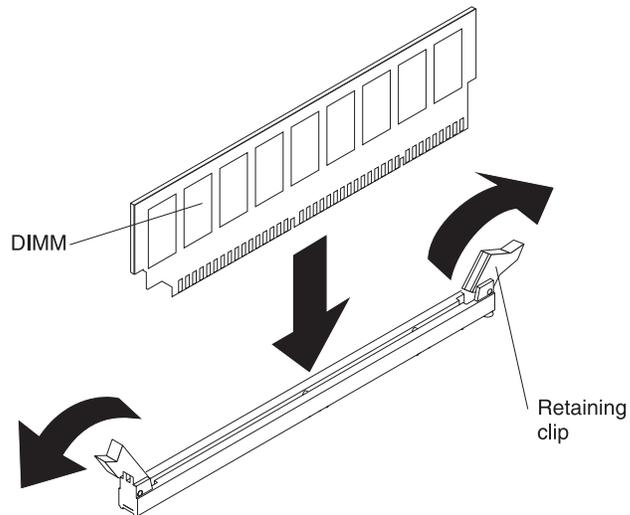
1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Unlock the side cover.
4. Remove the side cover (see “Removing the side cover” on page 145).
5. Locate the DIMM connectors on the system board. Determine the connectors into which you will install the DIMMs. Install the DIMMs in the sequence shown in the following table.

Table 15. DIMM installation sequence

Number of DIMMs	Installation sequence (connectors)
First pair of DIMMs	1, 4
Second pair of DIMMs	2, 5
Third pair of DIMMs	3, 6

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

6. Open the retaining clips and, if necessary, remove any existing DIMM.



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

Removing an optional ServeRAID-MR10i SAS/SATA controller

To remove a ServeRAID-MR10i SAS/SATA adapter, complete the following steps:

1. Read the safety information beginning on page vii, and “Installation guidelines” on page 141.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables. Remove the side cover (see “Removing the side cover” on page 145).
3. Rotate the rear adapter-retention bracket to the open (unlocked) position.
4. Disconnect any cables connected to the adapter.

Attention: To avoid breaking the retaining clips or damaging the ServeRAID-MR10i adapter connector, open and close the clips gently.

5. Carefully grasp the end of the ServeRAID adapter and pull it out of the connector.
6. 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 optional ServeRAID-MR10i SAS/SATA controller

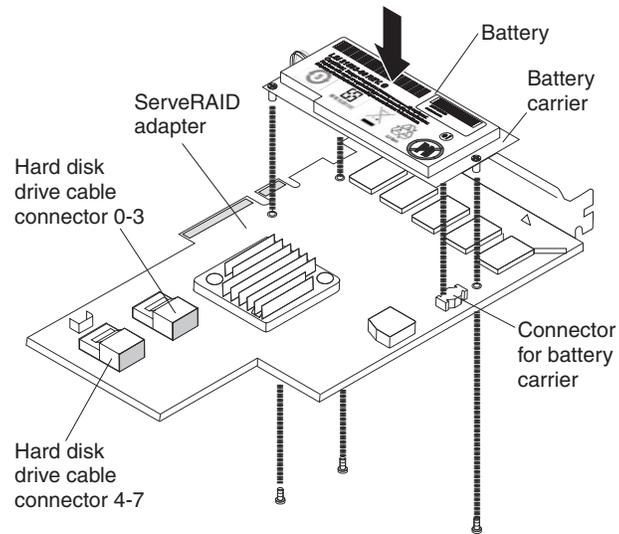
The optional IBM ServeRAID-MR10i SAS/SATA controller can be installed in either PCI slot 1 or slot 2 on the system board. The ServeRAID-MR10i adapter is supported on hot-swap server models only. The IBM ServeRAID-MR10i SAS/SATA adapter enables integrated RAID levels 0, 1, 5, 6, and 10 support capability on hot-swap hard disk drives. For configuration information, see the documentation on the ServeRAID CD that comes with the adapter.

Important: To ensure that any of your ServeRAID 10i, 10is, or 10M adapters function properly on UEFI-based servers, make sure that the adapter firmware level is updated to at least 11.xx-XXX, and the supporting drivers.

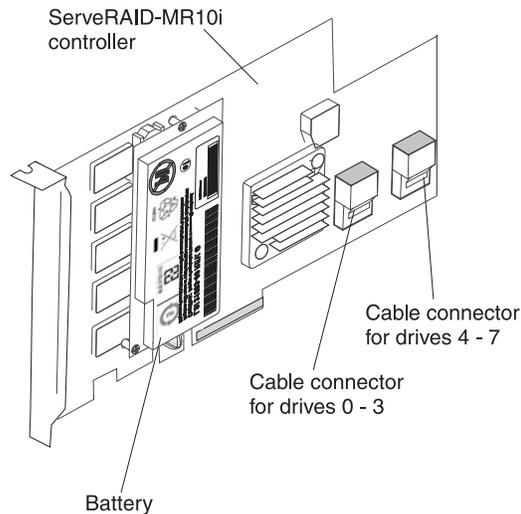
Attention: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

To install a ServeRAID-MR10i adapter, complete the following steps:

1. Read the safety information beginning on page vii, and “Installation guidelines” on page 141.
2. Touch the static-protective package containing the ServeRAID-MR10i adapter to any unpainted metal surface on the server. Then, remove the ServeRAID-MR10i adapter from the package.
3. If the battery pack (battery carrier and battery) did not come installed on the ServeRAID adapter, install the battery pack.
 - a. Align the battery carrier pins and the connector for the battery carrier with the pin holes and connector on the ServeRAID adapter; then, lower the battery carrier onto the ServeRAID adapter.

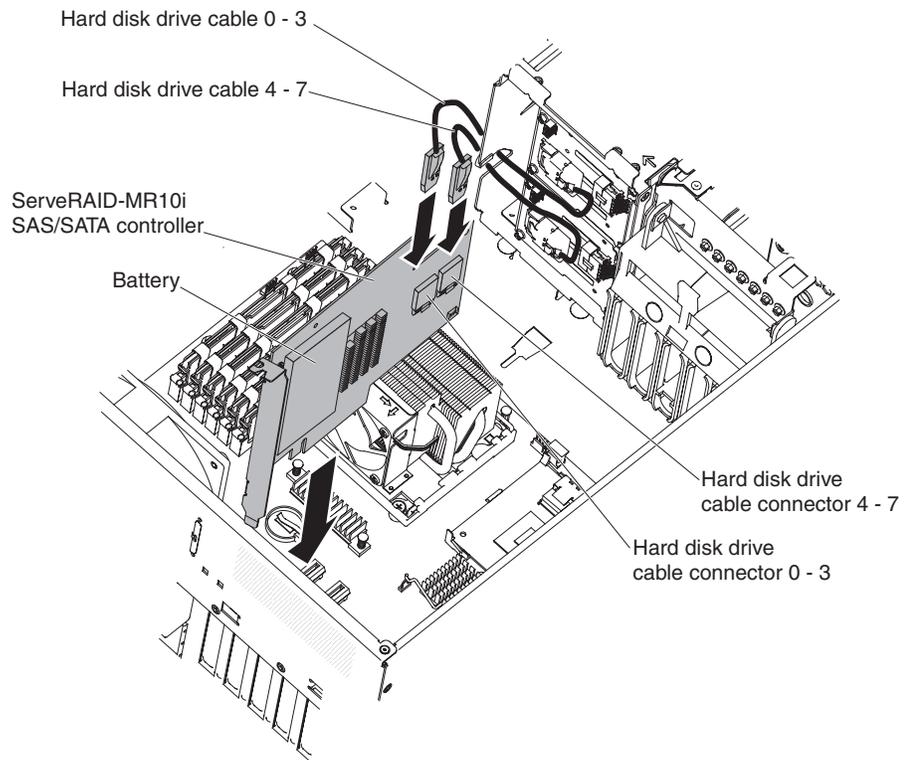


- b. Press the battery carrier into the connector on the ServeRAID adapter until it is firmly connected.
 - c. Secure the battery carrier to the ServeRAID adapter with the screws that came with the battery pack.
 4. Open the rear retention bracket.
 5. Turn the ServeRAID-MR10i adapter so that the ServeRAID-MR10i adapter keys align correctly with the connector.
- Attention:** Incomplete insertion might cause damage to the system board or the ServeRAID-MR10i adapter.
6. Take the signal cable that is attached to the drive backplane and connect it to the ServeRAID adapter. The following illustration shows the connectors on the controller to which you connect the signal cables from the drive backplane.



Note: When you restart the server, you are prompted to import the existing RAID configuration to the new ServeRAID adapter.

7. Press the ServeRAID-MR10i adapter firmly into the connector on the system board.
8. Reconnect the cables to the new ServeRAID-MR10i adapter.



Removing an optional ServeRAID-MR10is VAULT SAS/SATA controller

To remove a ServeRAID-MR10is SAS/SATA adapter, complete the following steps:

1. Read the safety information beginning on page vii, and “Installation guidelines” on page 141.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables. Remove the side cover (see “Removing the side cover” on page 145).
3. Rotate the rear adapter-retention bracket to the open (unlocked) position.
4. Open the rear retention bracket.
5. Disconnect any cables connected to the adapter.

Attention: To avoid breaking the retaining clips or damaging the ServeRAID-MR10is adapter connector, open and close the clips gently.

6. Carefully grasp the end of the ServeRAID adapter and pull it out of the connector.
7. 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 optional ServeRAID-MR10is VAULT SAS/SATA Controller

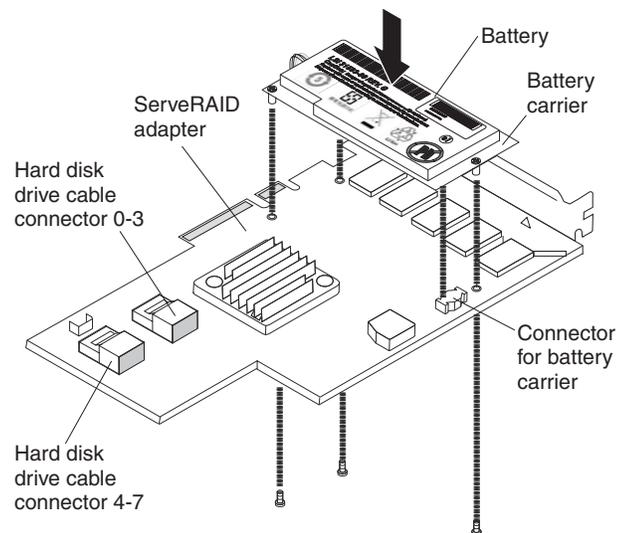
The optional IBM ServeRAID-MR10is VAULT SAS/SATA controller can be installed in either PCI slot 1 or slot 2 on the system board. The ServeRAID-MR10is adapter is supported on hot-swap server models only. The IBM ServeRAID-MR10is SAS/SATA adapter with an encryption 1078 DE chip set enables integrated RAID levels 0, 1, 5, 6, and 10 support capability on hot-swap hard disk drives. For configuration information, see the documentation on the ServeRAID CD that comes with the adapter.

Important: To ensure that any of your ServeRAID 10i, 10is, or 10M adapters function properly on UEFI-based servers, make sure that the adapter firmware level is updated to at least 11.xx-XXX, and the supporting drivers.

Attention: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

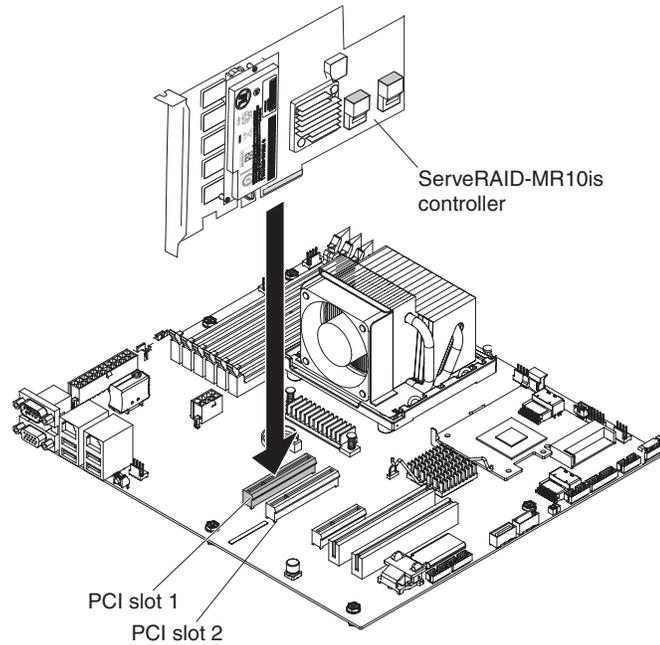
To install the optional ServeRAID-MR10is SAS/SATA adapter, complete the following steps:

1. Read the safety information beginning on page vii, and “Installation guidelines” on page 141.
2. Touch the static-protective package containing the ServeRAID-MR10is adapter to any unpainted metal surface on the server. Then, remove the ServeRAID-MR10is adapter from the package.
3. If the battery pack (battery carrier and battery) did not come installed on the ServeRAID adapter, install the battery pack.
 - a. Align the battery carrier pins and the connector for the battery carrier with the pin holes and connector on the ServeRAID adapter; then, lower the battery carrier onto the ServeRAID adapter.

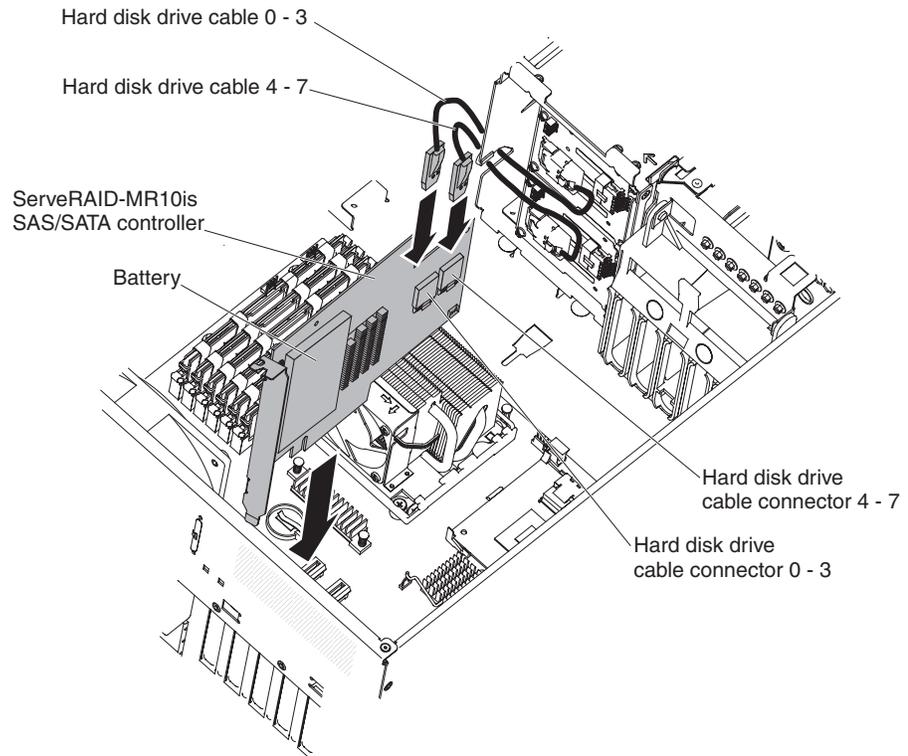


- b. Press the battery carrier into the connector on the ServeRAID adapter until it is firmly connected.
 - c. Secure the battery carrier to the ServeRAID adapter with the screws that came with the battery pack.
4. Turn the ServeRAID-MR10is adapter so that the ServeRAID-MR10is adapter keys align correctly with the connector.

Attention: Incomplete insertion might cause damage to the system board or the ServeRAID-MR10is adapter.



5. Press the ServeRAID-MR10is adapter firmly into the connector on the system board.
6. Reconnect the cables to the new ServeRAID-MR10is adapter. Make sure that the ServeRAID-MR10is SAS/SATA adapter is cabled.



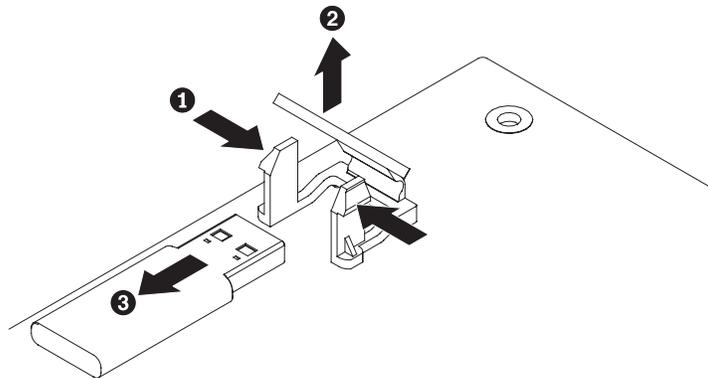
7. Rotate the rear adapter-retention bracket to the closed (locked) position.
8. Install the side cover (see "Installing the side cover" on page 146).
9. Lock the side cover.

10. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing a USB embedded hypervisor flash device

To remove the virtual media key, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and peripheral devices and disconnect all power cords; then, remove the side cover (see “Removing the side cover” on page 145).
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).
4. Unlock the USB retaining latch by squeezing the two retaining clips toward each other. Then, lift up the bracket cover.
5. Grasp the flash device and pull to remove it from the connector.
6. Press down on the retention latch to return it to the locked position.

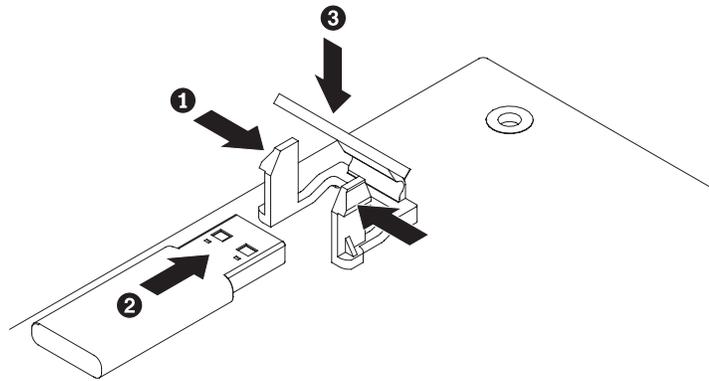


7. If you are instructed to return the flash device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a USB embedded hypervisor flash device

To install the virtual media key, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords.
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).
4. Unlock the USB retaining latch by squeezing the two retaining clips toward each other.
5. Align the flash device with the connector on the system board and push it into the connector until it is firmly seated.
6. Press down on the retaining latch to lock the flash device into the USB connector.

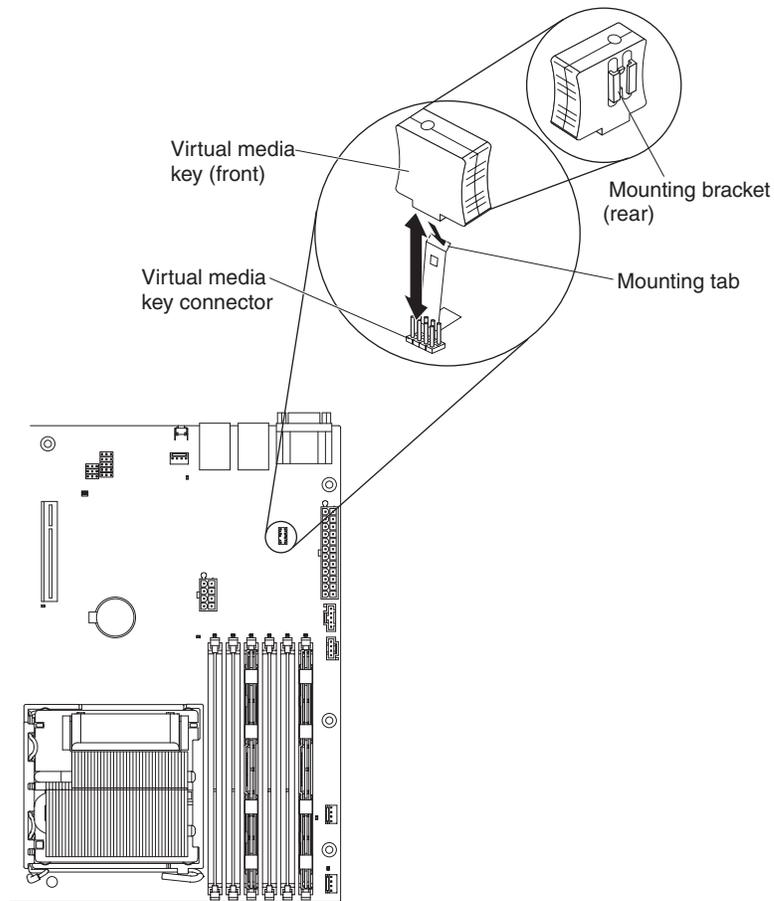


7. Reconnect the power cord and any cables that you removed.
8. Install and lock the side cover (see “Installing the side cover” on page 146).
9. Reconnect the power cord and any cables that you removed.
10. Turn on the peripheral devices and the server.

Removing the virtual media key

To remove the virtual media key, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and peripheral devices and disconnect all power cords; then, remove the side cover (see “Removing the side cover” on page 145).
3. Grasp the virtual media key and gently slide it up and off of the mounting tab.

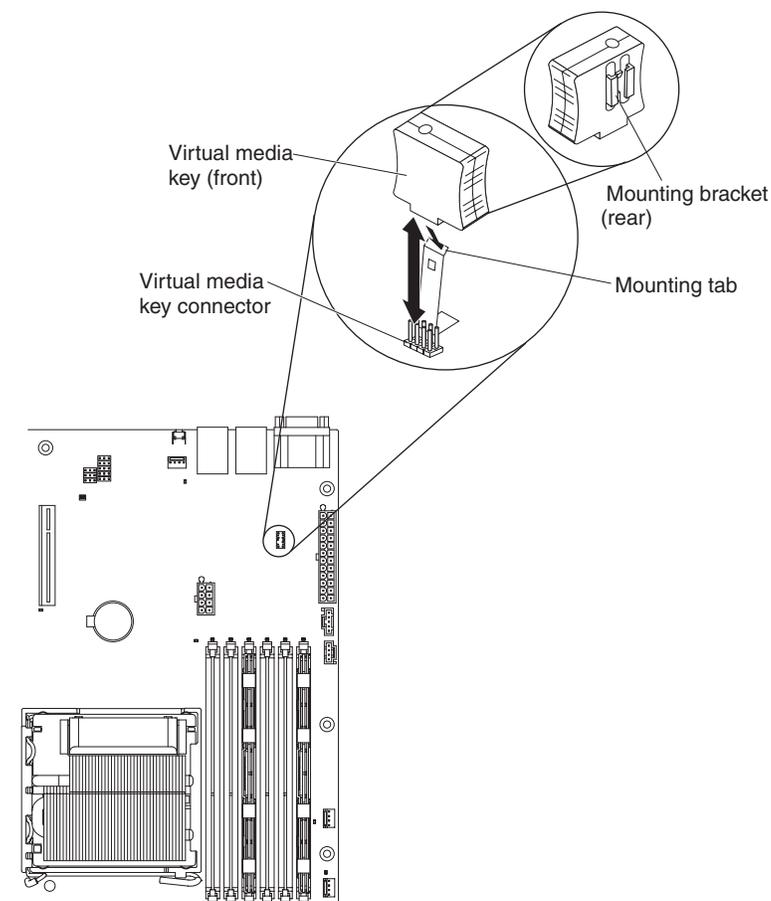


4. If you are instructed to return the virtual media key, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the virtual media key

To install the virtual media key, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords.
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).



4. Align the virtual media key with the mounting tab and slide it down the tab onto the connector on the system board. Press the virtual media key down into the connector until it is firmly seated on the system board.
5. Install and lock the side cover (see “Installing the side cover” on page 146).
6. Reconnect the power cord and any cables that you removed.
7. Turn on the peripheral devices and the server.

Removing the system battery

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

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

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

- If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.
- To order replacement batteries, call 1-800-IBM-SERV within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your support center or business partner.

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

Statement 2:



CAUTION:

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

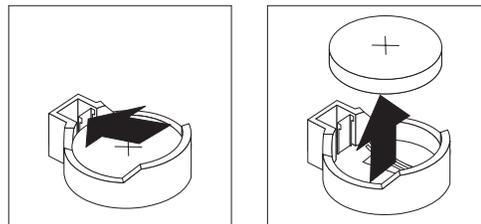
Do not:

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

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

To remove the battery, complete the following steps.

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).
4. Locate the battery on the system board (see “System-board internal connectors” on page 16).
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 it is released.



- b. Use your thumb and index finger to lift the battery from the socket.

Installing the battery

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

- You must replace the battery 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.

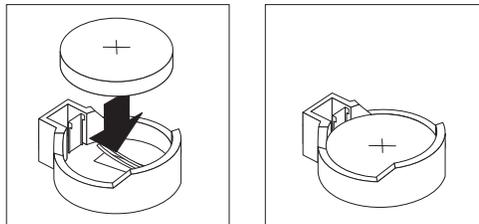
Do not:

- **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. Orient the battery so that the positive side faces up.
 - b. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.



- c. Press the battery down into the socket until it clicks into place. Make sure that the battery clip holds the battery securely.
3. Install the side cover (see “Installing the side cover” on page 146).
 4. Lock the side cover if you unlocked it during removal.
 5. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.
 6. 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 Setup utility” on page 225 for details.

Removing and replacing consumable parts

Replacement of consumable parts is your responsibility. If IBM installs a consumable part at your request, you will be charged for the installation.

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

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 the server.

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

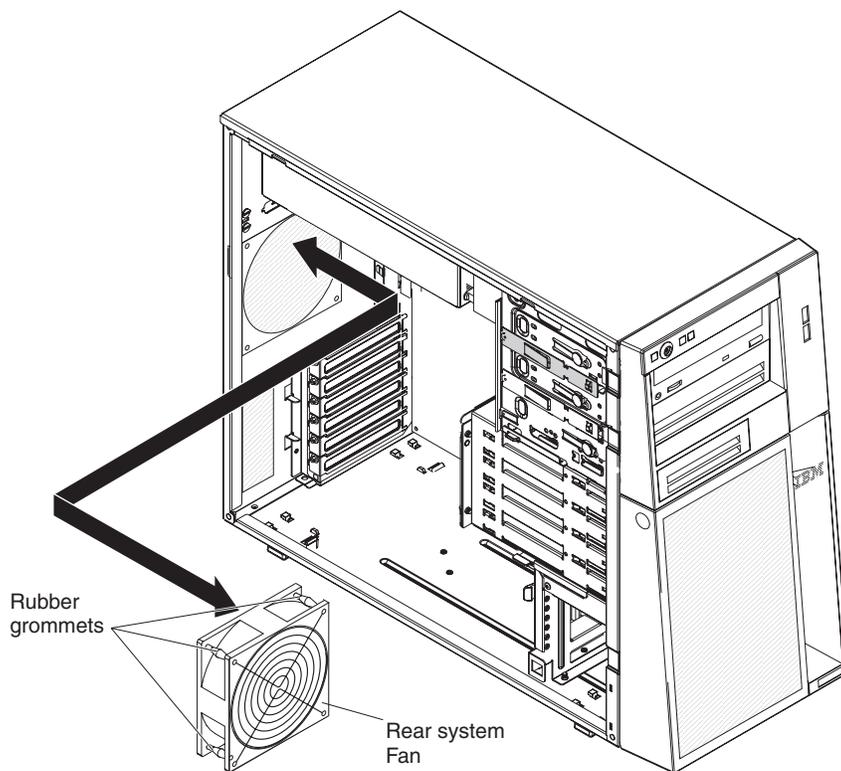
Removing the rear system fan

Attention:

- Replace a failed fan within 48 hours.
- To ensure proper cooling and airflow, do not operate the server for more than 30 minutes with the side cover removed.

To remove the rear system fan, complete the following steps:

1. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
2. Unlock and remove the side cover (see “Removing the side cover” on page 145).
3. Remove any adapters that impede access to the fan and the fan connector on the system board (see “Removing an adapter” on page 151).
4. Disconnect the fan cable from the system board.
5. Grasp the fan with both hands and pull firmly, extending the rubber grommets. The grommets will be pulled through the holes in either the fan or the chassis and can then be removed.



6. Pull the fan up and out of the chassis.
7. If you are instructed to return the fan, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

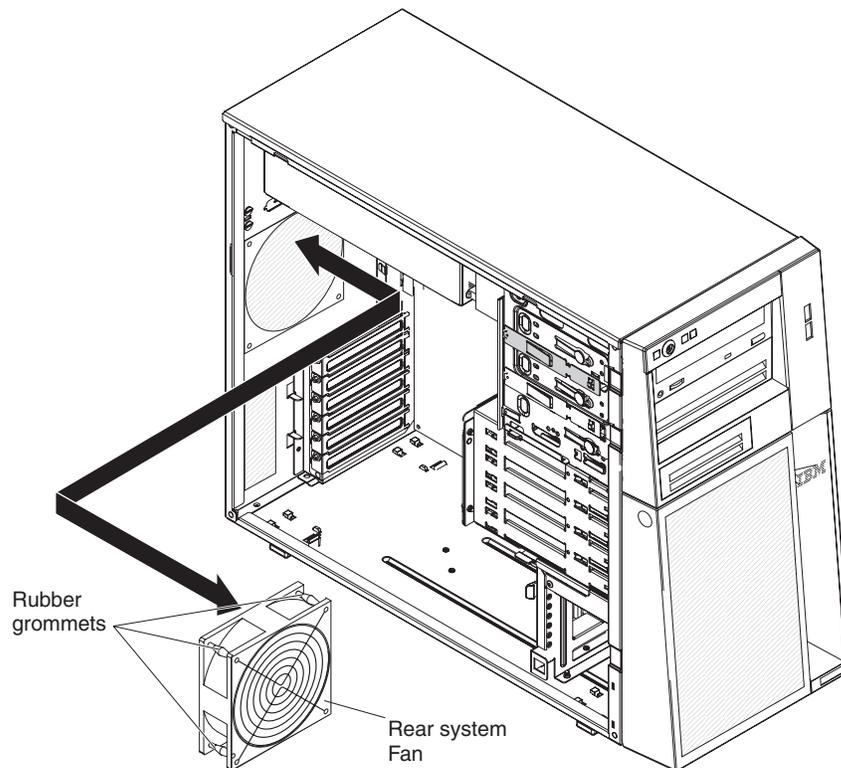
Installing the rear system fan

Attention:

- Replace a failed fan within 48 hours.
- To ensure proper cooling and airflow, do not operate the server for more than 30 minutes with the side cover removed.

To install the rear system fan, complete the following steps:

1. The replacement fan comes with the rubber grommets installed; however, they might have come out during shipment. If any of the rubber grommets are missing from the fan, install them on the fan before you continue. Use needle-nosed pliers to pull the grommets through the holes in the fan.
2. Position the fan so that the grommets protrude through the holes in the chassis; then, use needle-nosed pliers to pull the grommets through the holes from outside the chassis.



3. Connect the fan cable to the system board (see “System-board internal connectors” on page 16 for the location of the rear fan connector).
4. Install any adapters that you removed (see “Installing an adapter” on page 152).
5. Install the side cover (see “Installing the side cover” on page 146).
6. Lock the side cover if you unlocked it during removal.
7. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the hard disk drive fan assembly

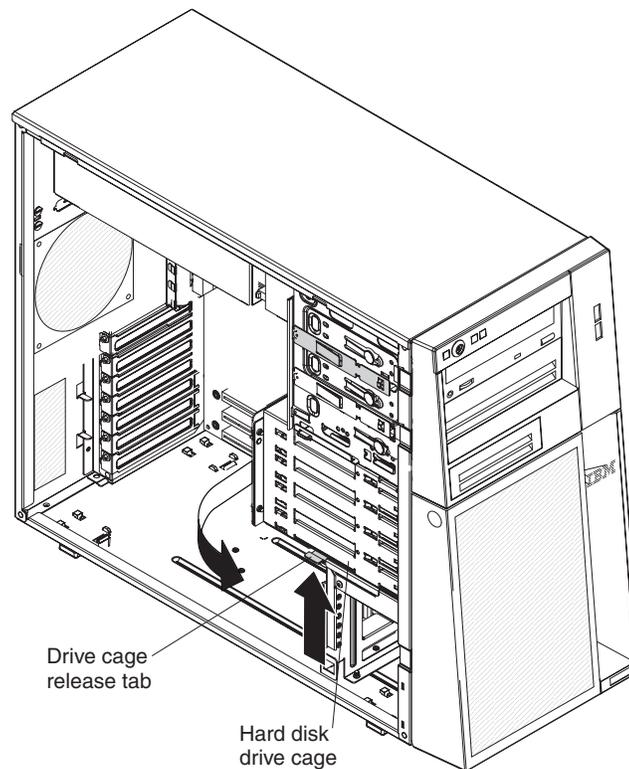
This procedure applies only to server models that have a hard disk drive fan assembly.

Attention:

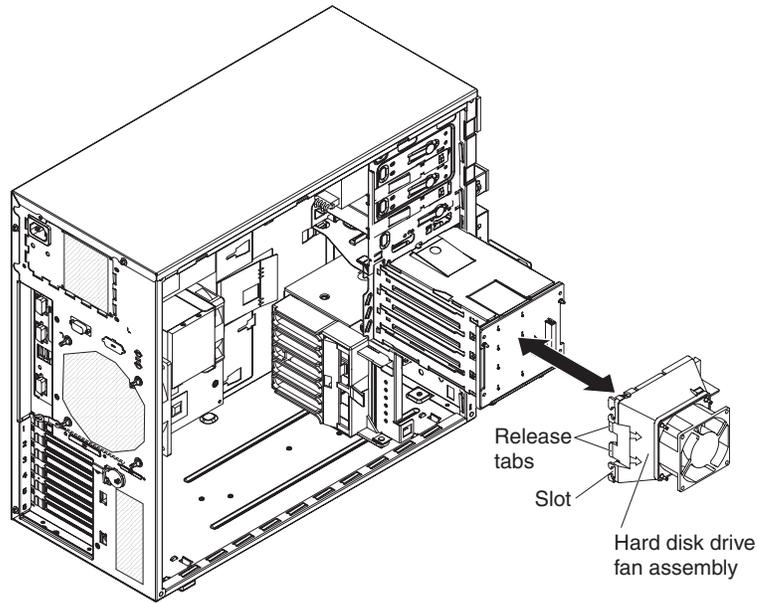
- Replace a failed fan within 48 hours.
- To ensure proper cooling and airflow, do not operate the server for more than 30 minutes with the side cover removed.

To remove the hard disk drive fan assembly, complete the following steps:

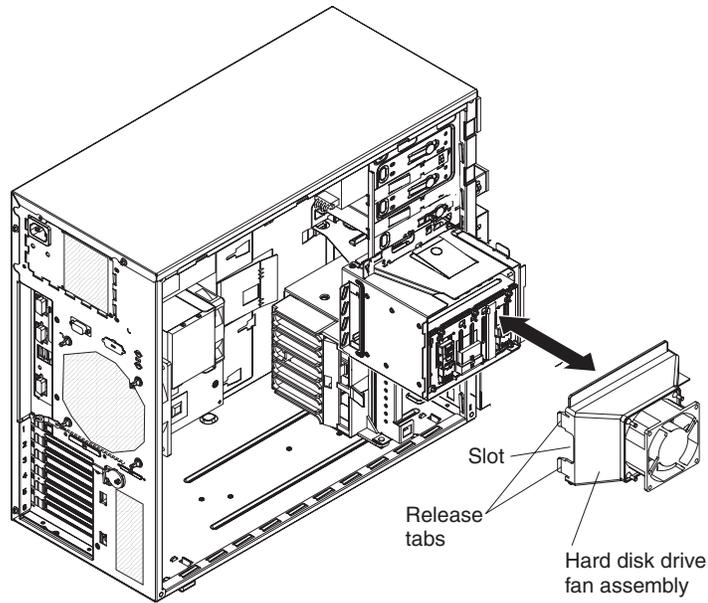
1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).
4. Rotate the rear adapter-retention bracket to the open (unlocked) position.
5. Disconnect the hard disk drive fan assembly cable from the system board, making a note of the cable was connected to the hard disk drive fan connector for later installation.
6. Remove the lower bezel (see “Removing the lower bezel” on page 147).
7. Remove the hard disk drives.
8. Lift up and hold the drive cage release tab; then, rotate the drive cage out of the chassis until the retaining tab on top of the cage locks into place.



9. Pull out on the hard disk drive fan assembly release tabs; then, rotate the assembly away from the drive cage slightly.



If you have the eight-drive, 2.5-inch hot-swap hard disk drive model, the hard disk drive fan assembly looks like the following illustration.



10. Remove the cable from the slot on the hard disk drive fan assembly; then, rotate the assembly away from the drive cage and remove the assembly from the drive cage.
11. If you are instructed to return the hard disk drive fan assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the hard disk drive fan assembly

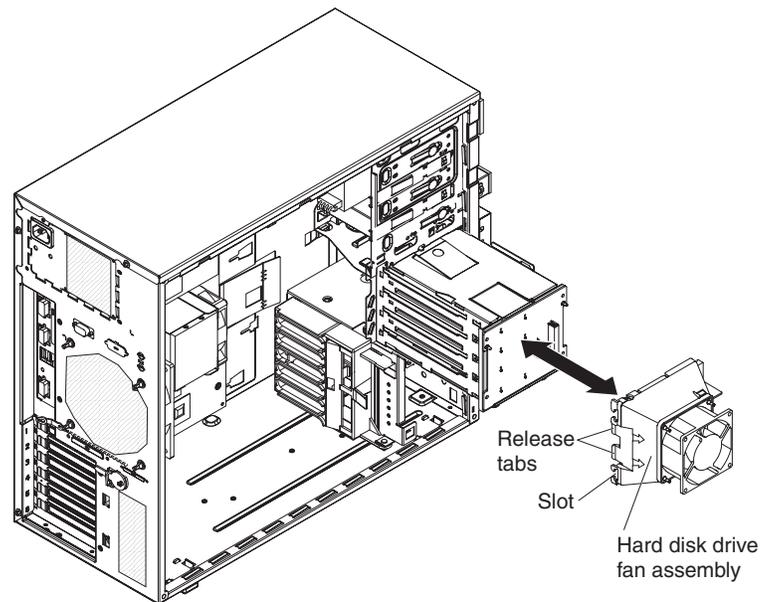
This procedure applies only to server models that have a hard disk drive fan assembly.

Attention:

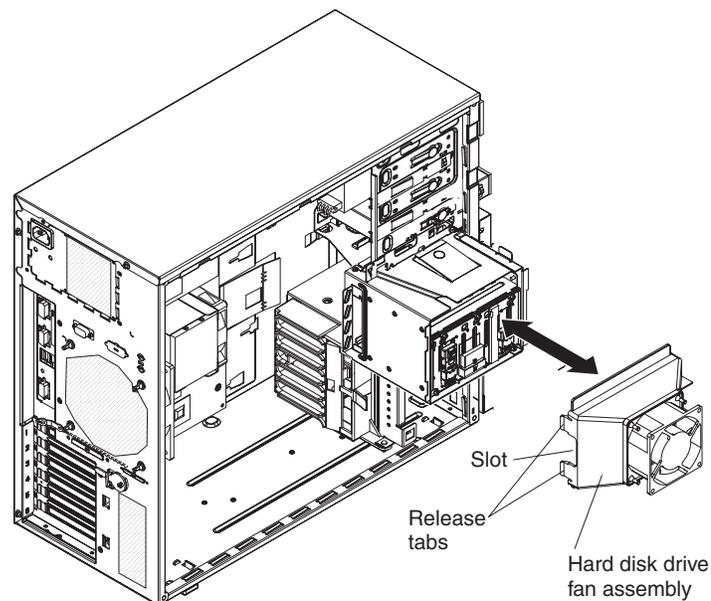
- Replace a failed fan within 48 hours.
- To ensure proper cooling and airflow, do not operate the server for more than 30 minutes with the side cover removed.

To install the hard disk drive fan assembly, complete the following steps:

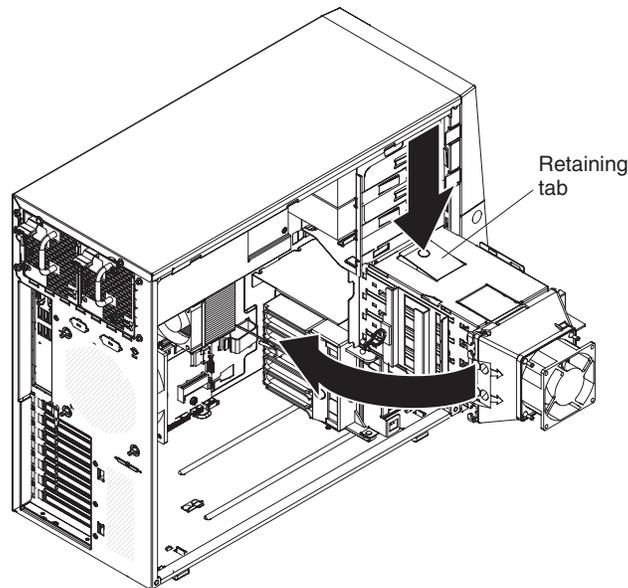
1. Insert the hard disk drive fan assembly retaining tab over the right edge of the hard disk drive backplane; then, rotate the fan assembly toward the backplane. Do not fully close the hard disk drive fan assembly.



If you have the eight-drive, 2.5-inch hot-swap hard disk drive model, the hard disk drive fan assembly looks like the following illustration.



2. Route the hard disk drive signal and power cables through the slots on the edge of the hard disk drive fan assembly. Make sure that the cables will not be pinched between the hard disk drive assembly and the hard disk drive backplane when the assembly is installed.
3. Rotate the hard disk drive fan assembly toward the backplane. Align the right edge of the hard disk drive fan assembly and the right edge of the backplane. Make sure the release tabs are fully engaged on the drive cage.
4. Rotate the drive cage toward the front of the server until it stops; then, lift and hold the retaining tab on top of the drive cage while you rotate the drive cage into the chassis until it locks into place.



5. Connect the hard disk drive fan assembly cable to the system board (see "System-board internal connectors" on page 16 for the location of the hard disk drive fan connector).
 6. Reinstall the hard disk drives.
- Note:** Before you continue, check all internal power cables to be sure that they are connected to the system board and other optional devices.
7. Install the lower bezel (see "Installing the lower bezel" on page 148).
 8. Install the side cover (see "Installing the side cover" on page 146).
 9. Lock the side cover if you unlocked it during removal.
 10. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the simple-swap backplate

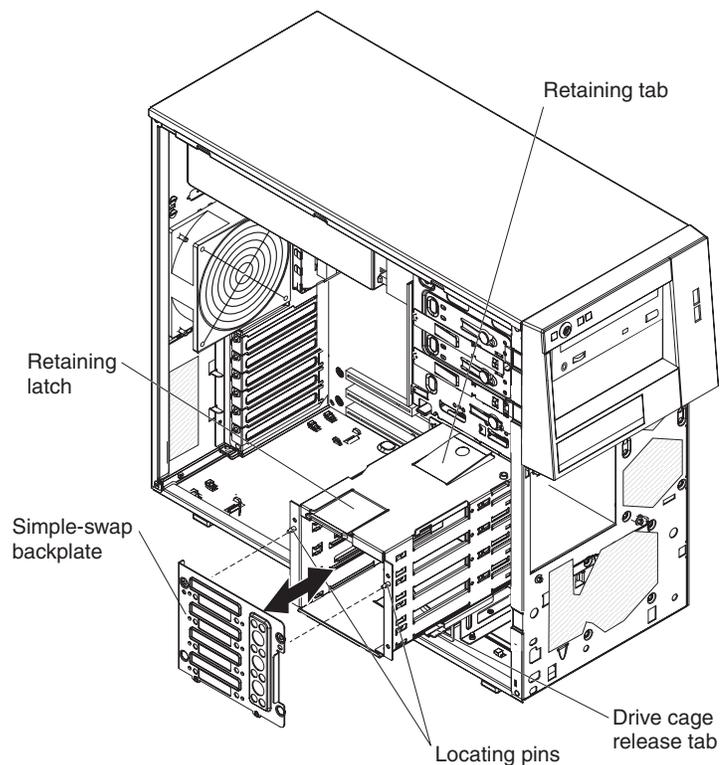
This procedure applies only to server models with the simple-swap SATA backplate installed on the back of the hard disk drive cage.

To remove the simple-swap backplate, complete the following steps:

Note: You need a screwdriver in order to complete the steps.

1. Read the safety information that begins on page vii and "Installation guidelines" on page 141.

2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).
4. Remove the lower bezel (see “Removing the lower bezel” on page 147).
5. Remove the simple-swap hard disk drives that are installed in the hard disk drive cage (see “Removing a simple-swap hard disk drive” on page 163).
6. Remove the hard disk drive fan assembly from the hard disk drive cage (see “Removing the hard disk drive fan assembly” on page 189).
7. Disconnect the power cable from the simple-swap backplate.
8. Disconnect the signal cable from the system board.
9. Press and hold the drive cage release tab; then, rotate the drive cage out of the chassis until the retaining tab on top of the cage locks into place.
10. Lift up on the retaining latch at the top of the drive cage; then, tilt the top of the simple-swap backplate away from the drive cage until it is clear of the locating pins.



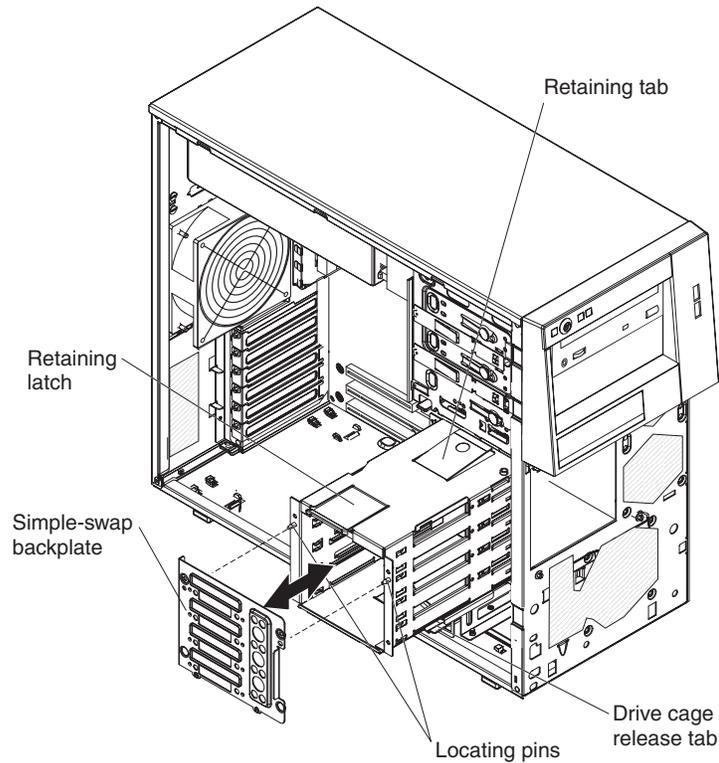
11. Lift the simple-swap backplate out of the lower lip on the drive cage and set it aside.
12. If you are instructed to return the simple-swap backplate, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the simple-swap backplate

This procedure applies only to server models with the simple-swap SATA backplate installed on the back of the hard disk drive cage.

To install the simple-swap backplate, complete the following steps.

1. Position the bottom edge of the simple-swap backplate on the lower lip of the drive cage.



2. Tilt the top of the simple-swap backplate toward the drive cage and over the locating pins until the retaining latch is engaged securely.
3. Press and hold the retaining tab on top of the cage; then, rotate the drive cage into the chassis until it locks into place.
4. Connect the signal cables to the system board (see “System-board internal connectors” on page 16 for the location of the Serial ATA drive connectors).
5. Connect the power cables to the simple-swap backplate.
6. Install the hard disk drive fan assembly on the hard disk drive cage (see “Installing the hard disk drive fan assembly” on page 191).
7. Install the simple-swap hard disk drives that you removed from the hard disk drive cage (see “Installing a simple-swap hard disk drive” on page 164).
8. Install the lower bezel (see “Installing the lower bezel” on page 148).
9. Install the side cover (see “Installing the side cover” on page 146).
10. Lock the side cover if you unlocked it during removal.
11. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

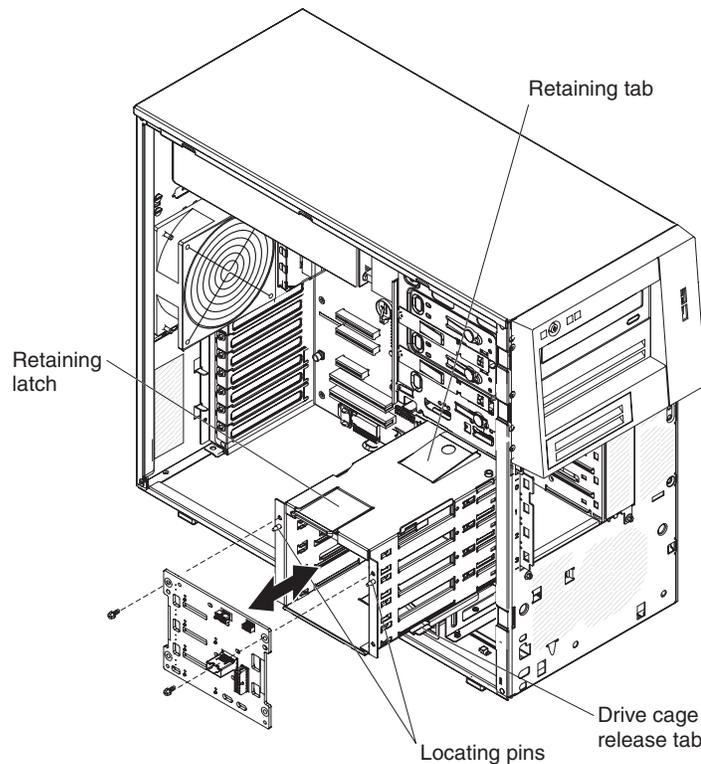
Removing the SAS/SATA hard disk drive backplane

This procedure applies only to hot-swap server models with a SAS/SATA hard disk drive backplane installed on the back of the hard disk drive cage.

Note: A 3.5-inch hard disk drive model is used as an example. It is also applicable for 2.5-inch hard disk drive model.

To remove the SAS/SATA hard disk drive backplane, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).
4. Remove the lower bezel (see “Removing the lower bezel” on page 147).
5. Remove the hot-swap SAS/SATA hard disk drives installed in the hard disk drive cage (see “Removing a hot-swap hard disk drive” on page 160).
6. Remove the hard disk drive fan assembly from the hard disk drive cage (see “Removing the hard disk drive fan assembly” on page 189).
7. Disconnect the power and signal cables from the hard disk drive backplane.
8. Press and hold the drive cage release tab; then, rotate the drive cage out of the chassis until the retaining tab on top of the cage locks into place.
9. Remove the two screws that secure the SAS/SATA hard disk drive backplane to the drive cage.



10. Tilt the top of the hard disk drive backplane away from the drive cage until it is clear of the locating pins.
11. Lift the SAS/SATA hard disk drive backplane out of the lower lip on the drive cage and set it aside.

12. If you are instructed to return the SAS/SATA hard disk drive backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

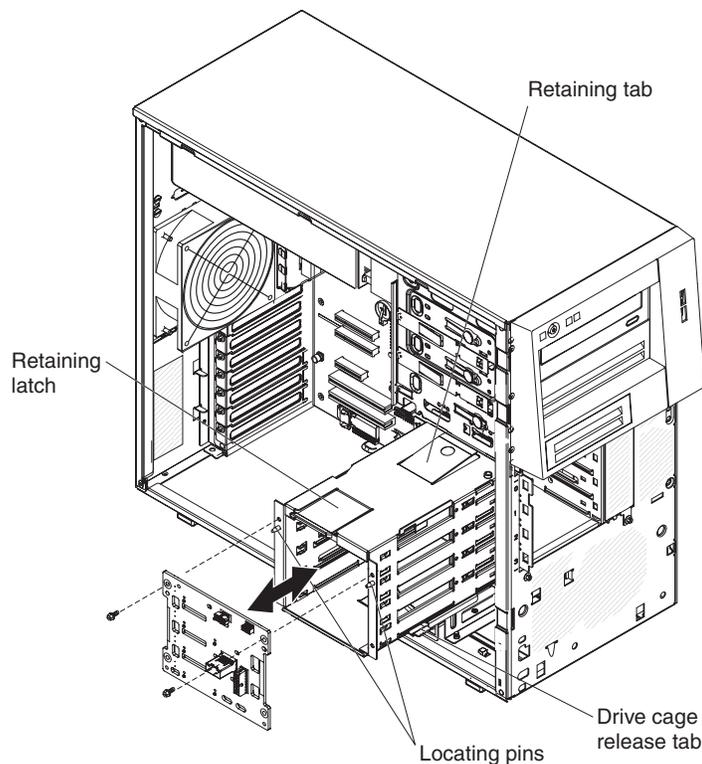
Installing the SAS/SATA hard disk drive backplane

This procedure applies only to hot-swap server models with a SAS/SATA hard disk drive backplane installed on the back of the hard disk drive cage.

Note: A 3.5-inch hard disk drive model is used as an example. It is also applicable for 2.5-inch hard disk drive model.

To install the hard disk drive backplane, complete the following steps:

1. Place the bottom edge of the SAS/SATA hard disk drive backplane in the lower lip of the drive cage.
2. Tilt the top of the SAS/SATA hard disk drive backplane toward the drive cage and over the locating pins.



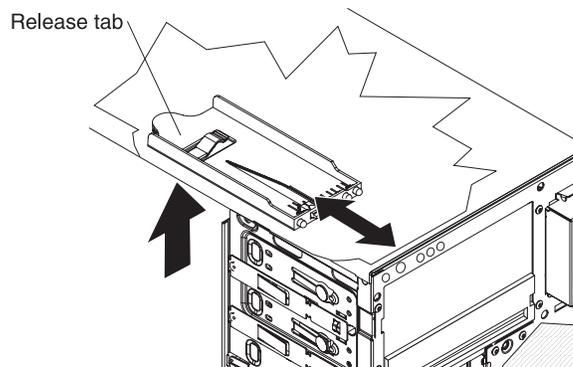
3. Install the two screws that secure the SAS/SATA hard disk drive backplane to the drive cage.
4. Press and hold the retaining tab on top of the cage; then, rotate the drive cage into the chassis until it locks into place.
5. Connect the power and signal cables to the hard disk drive backplane.
6. Install the hard disk drive fan assembly onto the hard disk drive cage (see “Installing the hard disk drive fan assembly” on page 191).
7. Install the hot-swap hard disk drives that you removed from the hard disk drive cage (see “Installing a hot-swap hard disk drive” on page 161).
8. Install the lower bezel (see “Installing the lower bezel” on page 148).
9. Install the side cover (see “Installing the side cover” on page 146).
10. Lock the side cover if you unlocked it during removal.

11. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the front-panel assembly

To remove the front-panel assembly, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).
4. Remove the lower bezel (see “Removing the lower bezel” on page 147).
5. Remove the upper bezel (see “Removing the upper bezel” on page 149).
6. Slide the drives in bay 1 and bay 2 forward slightly (see “Removing a DVD drive” on page 155 for more information). It is not necessary to remove these drives.
7. If the server has hot-swap power supplies, remove the power supplies and the power-supply cage (see “Removing the hot-swap power supply cage” on page 202).
8. Disconnect the front-panel assembly cable from the system board, and note the routing of the cable (see “System-board internal connectors” on page 16 for the location of the front-panel connector).

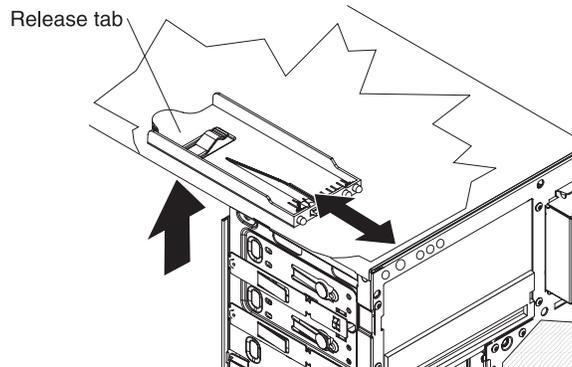


9. Press up on the release tab of the front-panel assembly and pull the assembly toward the rear of the server; then, remove the front-panel assembly from the chassis.
10. If you are instructed to return the front-panel assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the front-panel assembly

To install the front-panel assembly, complete the following steps:

1. Position the front end of the front-panel assembly in the channel above drive bay 1 on the left side of the chassis.

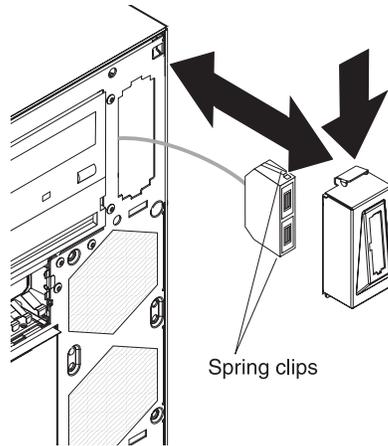


2. Push the front-panel assembly toward the front of the chassis until it clicks into place.
3. Reroute and connect the front-panel assembly cable to the system board (see “System-board internal connectors” on page 16 for the location of the front-panel connector).
4. If the server has hot-swap power supplies, install the power-supply cage and the power supplies (see “Installing the hot-swap power supply cage” on page 204).
5. Push the drives in bay 1 and bay 2 into the drive bays (see “Installing a DVD drive” on page 156 for more information).
6. Install the upper bezel (see “Installing the upper bezel” on page 150).
7. Install the lower bezel (see “Installing the lower bezel” on page 148).
8. Install the side cover (see “Installing the side cover” on page 146).
9. Lock the side cover if you unlocked it during removal.
10. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the front USB connector assembly

To remove the front USB connector assembly, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).
4. Remove the lower bezel (see “Removing the lower bezel” on page 147).
5. Remove the upper bezel (see “Removing the upper bezel” on page 149).
6. Disconnect the front USB cable from the system board, and note the routing of the cable (see “System-board internal connectors” on page 16 for the location of the front USB connector).
7. Press down and hold the release tab on the top of the front USB housing; then, tilt the top of the housing away from the chassis and lift the housing out of the opening in the chassis.

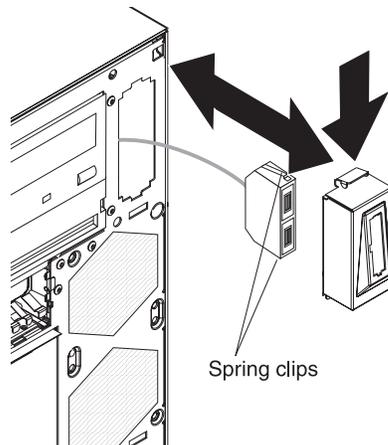


8. Squeeze the spring clips on the sides of the front USB connector assembly and pull the assembly out of the back of the housing.
9. Carefully pull the front USB cable out of the opening in the chassis.
10. If you are instructed to return the front USB connector assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the front USB connector assembly

To install the front USB connector assembly, complete the following steps:

1. Carefully insert the front USB cable through the opening in the front of the chassis.



2. Squeeze the spring clips on the sides of the front USB connector assembly and insert the assembly into the housing through the back of the housing.
3. Place the bottom edge of the housing into the bottom of the opening in the chassis; then, tilt the top of the housing into position until it clicks into place.
4. Reroute and connect the front USB cable to the front USB connector on the system board (see “System-board internal connectors” on page 16 for the location of the front USB connector).
5. Install the upper bezel (see “Installing the upper bezel” on page 150).
6. Install the lower bezel (see “Installing the lower bezel” on page 148).
7. Install the side cover (see “Installing the side cover” on page 146).
8. Lock the side cover if you unlocked it during removal.

9. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

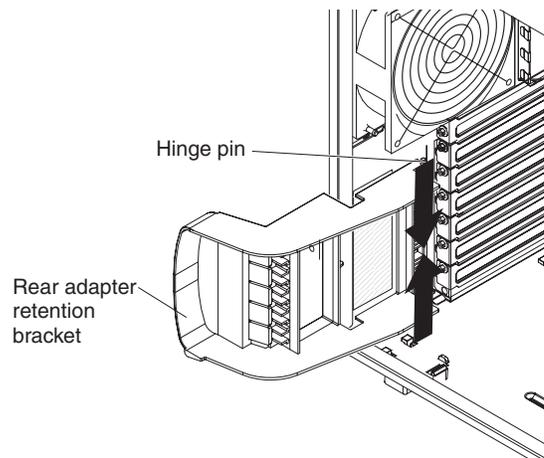
Removing the rear adapter retention bracket

To remove the rear adapter-retention bracket, complete the following steps:

1. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
2. Unlock and remove the side cover (see “Removing the side cover” on page 145).
3. Remove all adapters (if necessary) and place the adapters on static-protective surface.

Note: You might find it helpful to note where each adapter is installed before you remove the adapters.

4. Release the rear adapter-retention bracket by lifting up on the rear adapter-retention bracket, and rotate the bracket partially toward the closed position.
5. Grasp the bracket on one side at the hinge point and pull inward (while you rotate the bracket slightly toward the front of the server) until the bracket is free of the hinge pin; then, grasp the bracket on the other side at the hinge point, pull inward until the bracket is free of the hinge pin, and remove the rear adapter-retention bracket from the server.



Installing the rear adapter retention bracket

To install the rear adapter-retention bracket, complete the following steps:

1. Position the rear adapter retention bracket so that the hole in one of the hinge points is aligned with the hinge pin on the chassis; then, place the hinge pin through the hole on the chassis.
2. Rotate the rear adapter-retention bracket into place so that the hole in the opposite hinge point snaps into place over the hinge pin on the chassis.
3. Install the adapters.
4. Install the side cover (see “Installing the side cover” on page 146).
5. Lock the side cover if you unlocked it during removal.
6. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the front adapter-retention bracket

To remove the front adapter-retention bracket, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).
4. Open the front and rear adapter-retention brackets.
5. Remove all adapters (if necessary) and place them on a static-protective surface.

Note: You might find it helpful to note where each adapter is installed before you remove the adapters.

6. Grasp one side of the bracket at a hinge point and pull outward (while you rotate the bracket slightly toward the rear of the server) until the hinge pin on the bracket is free of the hole; then, grasp the bracket on the other side at the hinge point, pull outward until the bracket is free of the hinge pin, and remove the rear adapter-retention bracket from the server.

Installing the front adapter-retention bracket

To install the front adapter-retention bracket, complete the following steps:

1. Insert one of the hinge pins on the front adapter-retention bracket into the metal hinge point on the fan cage assembly.
2. Rotate the other hinge pin on the front adapter-retention bracket into position and push the hinge pin into the other metal hinge point. The hinge pin will protrude through the hole in the metal hinge point when the adapter-retention bracket is seated correctly.
3. Reinstall any adapters that you removed earlier.
4. Close the front and rear adapter retention brackets.
5. Install the side cover (see “Installing the side cover” on page 146).
6. Lock the side cover.
7. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the hot-swap power supply cage

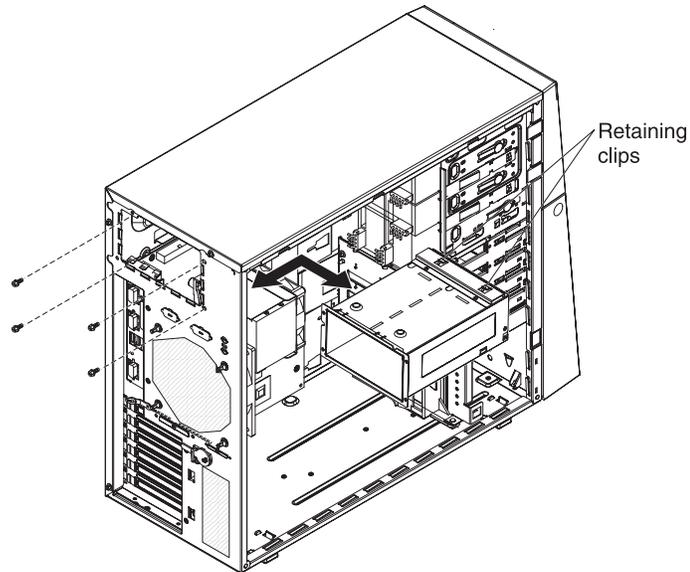
This procedure applies only to server models that have hot-swap power-supplies.

To remove the power-supply cage, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).
4. Remove the hot-swap power supplies (see “Removing a hot-swap power supply” on page 165).

Note: It might be helpful to lay the server on its side for the remainder of this procedure.

5. Disconnect the cables from the power-supply cage to the system board and all internal components.
6. Remove the four black screws that secure the power-supply cage to the chassis; then, slide the cage toward the front of the server to disengage the retaining clips from the top of the chassis and lift the cage out of the chassis.



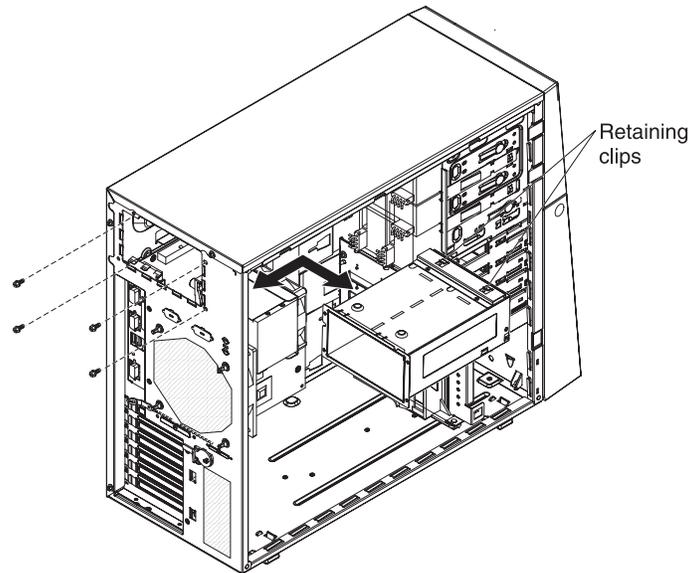
7. If you are instructed to return the power-supply cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the hot-swap power supply cage

This procedure applies only to server models that have hot-swap power-supplies.

To install the hot-swap power supply cage, complete the following steps:

1. Place the power-supply cage into the chassis and slide it toward the rear of the server until the retaining clips engage the top of the chassis.



2. Install the four screws that secure the power-supply cage to the chassis.
3. Connect the cables from the power-supply cage to the system board and all internal components (see “System-board internal connectors” on page 16 for the locations of the internal connectors).
4. Reinstall both hot-swap power supplies (see “Installing a hot-swap power supply” on page 167).
5. Install the side cover (see “Installing the side cover” on page 146).
6. Lock the side cover if you unlocked it during removal.
7. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing and replacing FRUs

Field replaceable units (FRUs) must be installed only by trained service technicians.

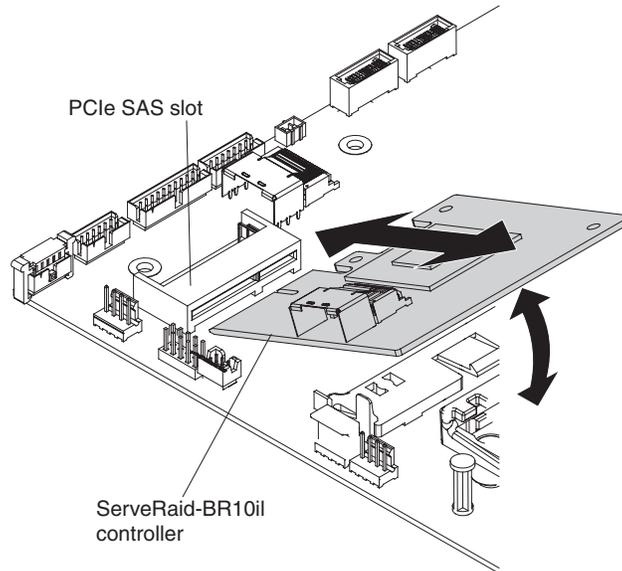
Removing a ServeRAID-BR10il v2 SAS/SATA controller

To remove the mini-SAS/SATA RAID controller, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.

Note: When you disconnect the power source from the server, you lose the ability to view the LEDs because the LEDs are not lit when the power source is removed. Before you disconnect the power source, make a note of which LEDs are lit, including the LEDs that are lit on the operation information panel and LEDs inside the server on the system board.

3. Unlock and remove the side cover (see “Removing the side cover” on page 145).
4. Open the rear adapter-retention bracket until the release lever on the right side of the bracket clicks into place.
5. Squeeze the tabs on both sides of the connector on the signal cable and remove the cable from the SAS/SATA controller.

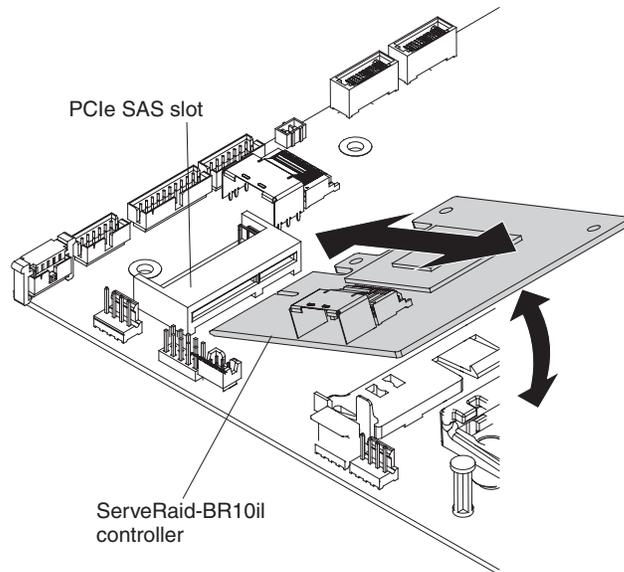


6. Carefully disengage the tabs on each side of the SAS/SATA controller connector and the front of the SAS/SATA controller from the plastic standoff.
7. Grasp the edges of the SAS/SATA controller and pull it out of the connector. If the standoff comes away from the system board with the controller, gently pull it out of the controller and push it back into the hole on the system board.
8. If you are instructed to return the SAS/SATA controller, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a ServeRAID-BR10il v2 SAS/SATA controller

To install the SAS/SATA RAID controller, complete the following steps:

1. Touch the static-protective package that contains the SAS/SATA controller to any unpainted surface on the outside of the server; then, remove the SAS/SATA controller from the package.
2. Position the SAS/SATA controller over the connector and the plastic standoff; then, press the SAS/SATA controller firmly into the connector and onto the plastic standoff.



3. Connect the signal cable to the SAS/SATA controller.
4. Install and lock the side cover (see “Installing the side cover” on page 146).
5. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing a non-hot-swap power supply

This procedure applies only to server models that have a non-hot-swap power supply. See “Removing a hot-swap power supply” on page 165 for information about the removal of a hot-swap power supply.

When you remove or install a non-hot-swap power supply, observe the following precautions.

Statement 8:



CAUTION:

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



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

To remove a non-hot-swap power supply, complete the following steps:

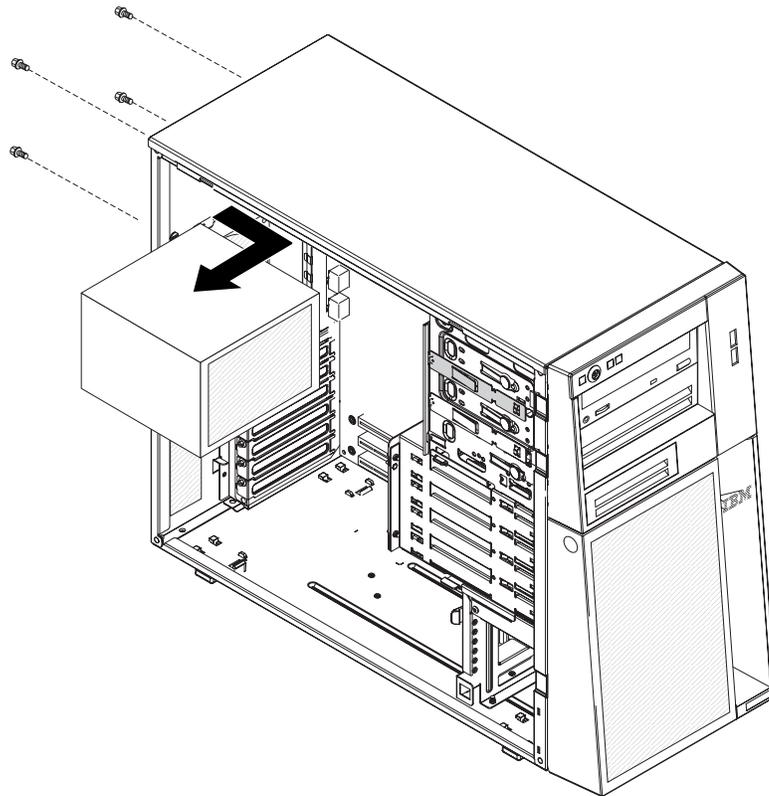
1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the side cover” on page 145).

Note: It might be helpful to lay the server on its side for the remainder of this procedure.

4. Disconnect the cables from the power supply to the system board and all internal components.

Attention: Support the power supply while you remove the mounting screws. After the screws are removed, the power supply is loose and can damage other components in the server.

5. While you support the power supply, remove the four screws that secure it to the chassis; then, lift the power supply out of the chassis. Save the screws to use when you install the replacement power supply.



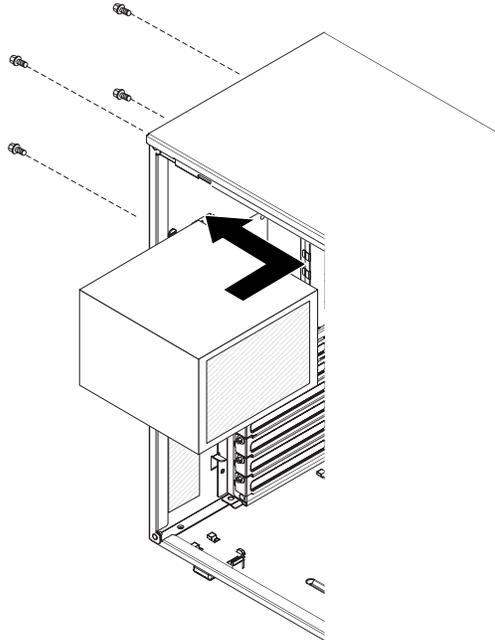
6. If you are instructed to return the power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a non-hot-swap power supply

This procedure applies only to server models that have a non-hot-swap power supply. See “Installing a hot-swap power supply” on page 167 for information about the installation of a hot-swap power supply.

To install a non-hot-swap power supply, complete the following steps:

1. Position the power supply in the chassis so that the screw holes in the power supply are aligned with the corresponding holes in the rear of the chassis.



2. Install the four screws that secure the power supply to the chassis.
3. Connect the cables from the power supply to the system board and all internal components (see “System-board internal connectors” on page 16 for the locations of the internal connectors).
4. Install the side cover (see “Installing the side cover” on page 146).
5. Lock the side cover if you unlocked it during removal.
6. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the microprocessor and fan sink

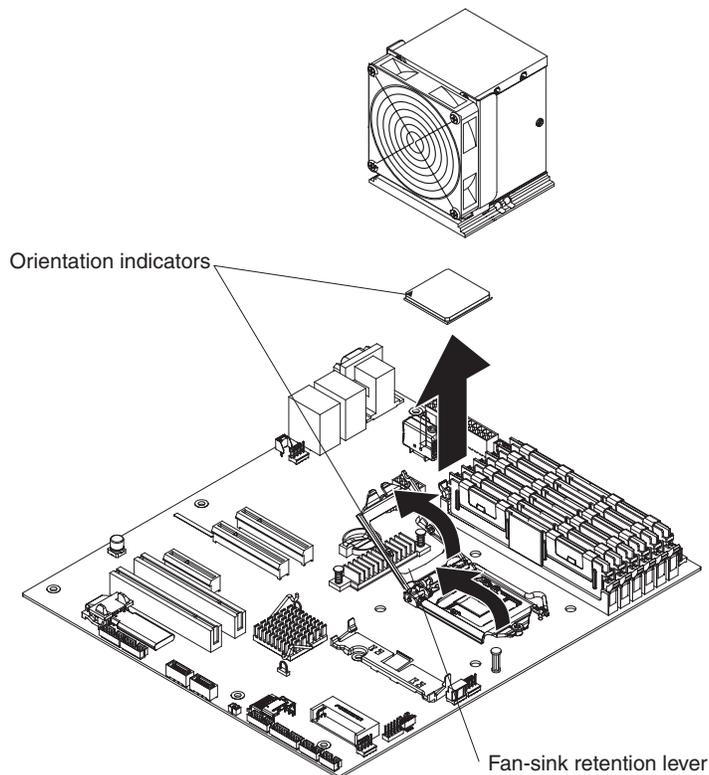
To remove the microprocessor and fan sink, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Turn the server on its side so that it is lying flat, with the cover facing up.
4. Unlock and remove the side cover (see “Removing the side cover” on page 145).
5. Remove the lower bezel (see “Removing the lower bezel” on page 147).
6. Remove the hard disk drives.
7. Press and hold the drive cage release tab; then, rotate the drive cage out of the chassis until the retaining tab on top of the cage locks into place.
8. Disconnect any cables that impede access to the fan sink and microprocessor.

Attention: The fan-sink retention lever is spring-loaded when the fan sink is in place. Releasing the lever too quickly or allowing it to spring upward can damage the fan sink and surrounding components.

9. Remove the fan sink from the microprocessor:
 - a. Disconnect the fan-sink cable from the system board.
 - b. Release the fan-sink retention lever by pressing down on the end, moving it to the side and slowly releasing it to the open (up) position.

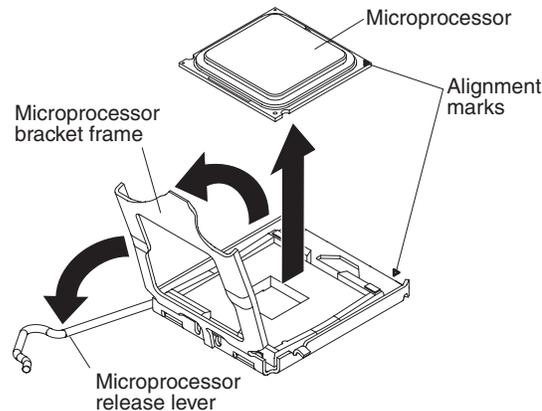
Important: Be careful when you handle the microprocessor and fan sink. If the microprocessor and fan sink will be reused, do not contaminate the thermal material between them.



- c. Tip the top of the fan sink toward the front of the server while you slide it away from the lower flange of the retention module; then, remove it from the server. After removal, place the fan sink on its side on a clean, flat surface.

Attention: The microprocessor retention latch is spring-loaded when the microprocessor is in place. Releasing the latch too quickly or allowing it to spring upward can damage the microprocessor and surrounding components.

10. Release the microprocessor retention latch by pressing down on the end, moving it to the side, and slowly releasing it to the open (up) position.
11. Open the microprocessor bracket frame by lifting up the tab on the top edge.



12. Carefully lift the microprocessor straight up and out of the socket, and place it on a static-protective surface.
13. If you are instructed to return the microprocessor and fan sink, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a microprocessor and fan sink

To install the microprocessor, complete the following steps:

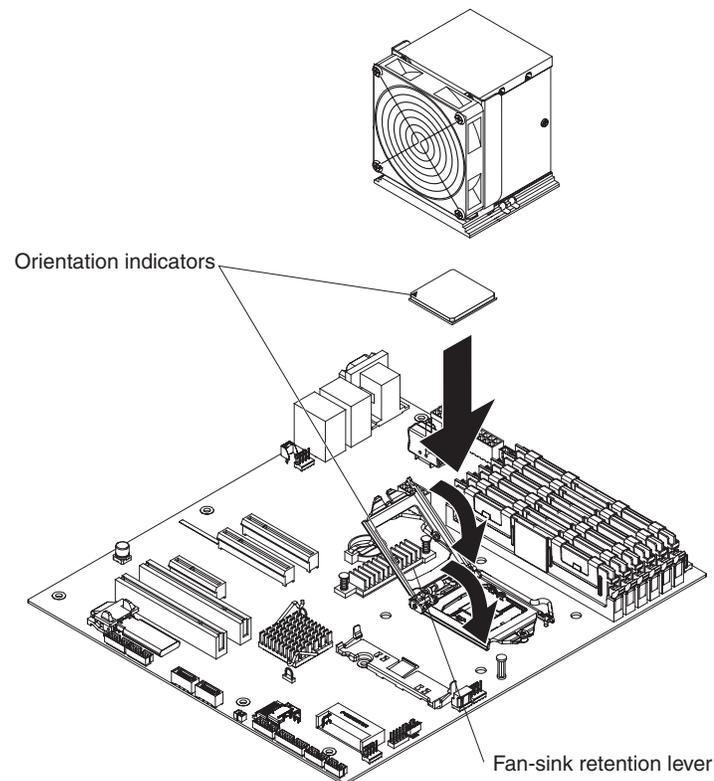
1. Touch the static-protective package that contains the microprocessor to any unpainted metal surface on the server. Then, remove the microprocessor from the package.
2. Remove the protective cover, tape, or label from the surface of the microprocessor socket, if any is present.
3. Rotate the release lever on the microprocessor socket to the fully open position.

Attention: Make sure that the release lever on the microprocessor socket is in the fully open position before you insert the microprocessor in the socket. Failure to do so might result in permanent damage to the microprocessor, microprocessor socket, and system board.

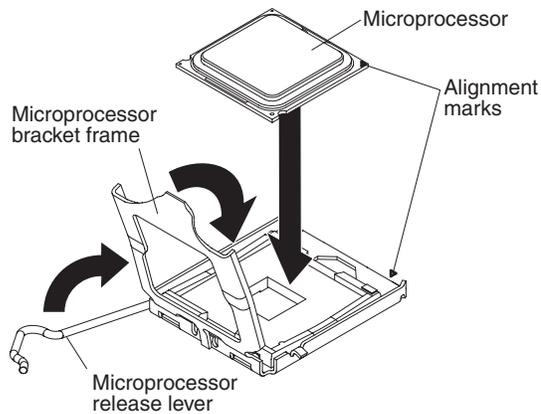
4. Carefully grasp the microprocessor and place the microprocessor into the microprocessor socket.

Note: To maintain correct orientation between the microprocessor and the microprocessor socket during installation, observe the following information:

- The microprocessor has two notches that are keyed to two tabs on the sides of the socket.
- A triangle-shaped indicator on one corner of the microprocessor points to a 45-degree angle on one corner of the socket.
- Do not use excessive force when you press the microprocessor into the socket.



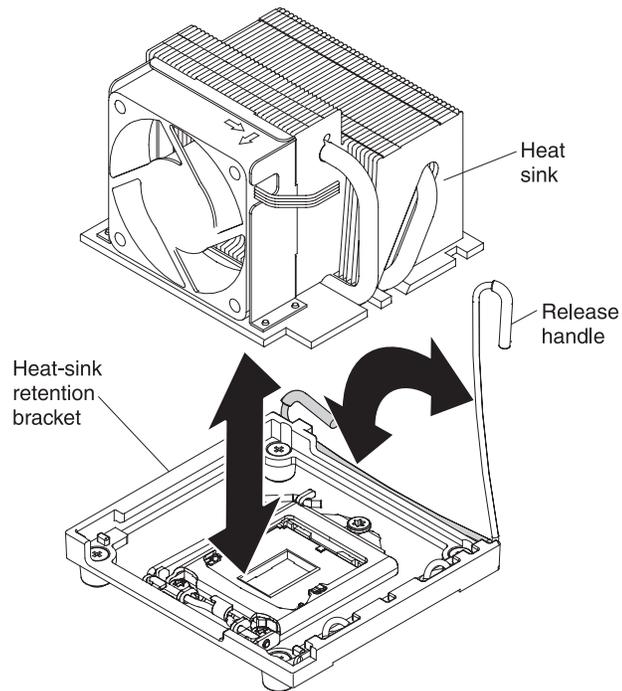
5. Close the microprocessor bracket frame; then, close the microprocessor retention latch and lock it securely in place.



6. Install the fan sink:

- a. Make sure that the fan sink retention lever is in the fully open position.

Important: Be careful when you handle the microprocessor and fan sink. Do not contaminate the thermal material between them.



- b. Slide the bottom edge of the fan sink under the lower flange of the retention module; then, place the top of the fan sink onto the top of the retention module.
 - c. Close the fan sink retention lever and lock it securely in place.
 - d. Reconnect the fan sink cable to the system board (see “System-board internal connectors” on page 16 for the location of the fan-sink connector).
7. Reconnect any cables that you disconnected during the removal of the old microprocessor.
 8. Rotate the drive cage toward the front of the server until it stops; then, lift and hold the retaining tab on top of the drive cage while you rotate the drive cage into the chassis until it locks into place.
 9. Reinstall the hard disk drives.

10. Install the lower bezel (see “Installing the lower bezel” on page 148).
11. Install the side cover (see “Installing the side cover” on page 146).
12. Lock the side cover if you unlocked it during removal.
13. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Thermal grease

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

When you are installing the fan sink on the same microprocessor that is was removed from, make sure that:

- The thermal grease on the fan sink and microprocessor is not contaminated.
- Additional thermal grease is not added to the existing thermal grease on the fan sink and microprocessor.

Note:

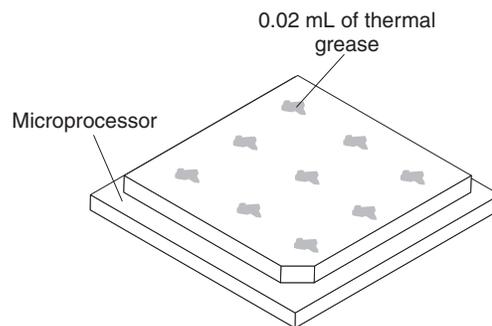
- Read the Safety information on page vii.
- Read the “Installation guidelines” on page 141.
- Read “Handling static-sensitive devices” on page 144.

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

1. Place the fan sink 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 fan sink.

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 9 uniformly spaced dots of 0.02 mL each on the top of the microprocessor. The outermost dots must be within approximately 5 mm of the edge of the microprocessor, this is to ensure uniform distribution of the grease.



Note: If the grease is properly applied, approximately half of the grease will remain in the syringe.

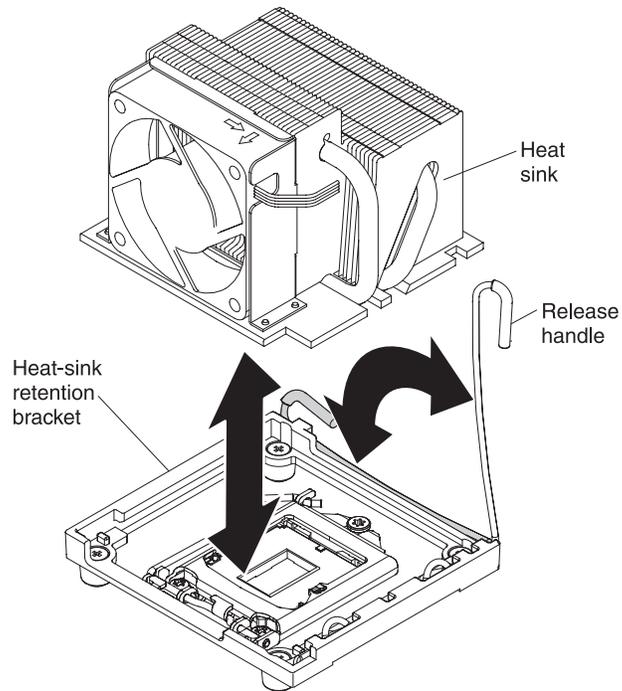
6. Install the fan sink onto the microprocessor as described in “Installing a microprocessor and fan sink” on page 211.

Removing the system board

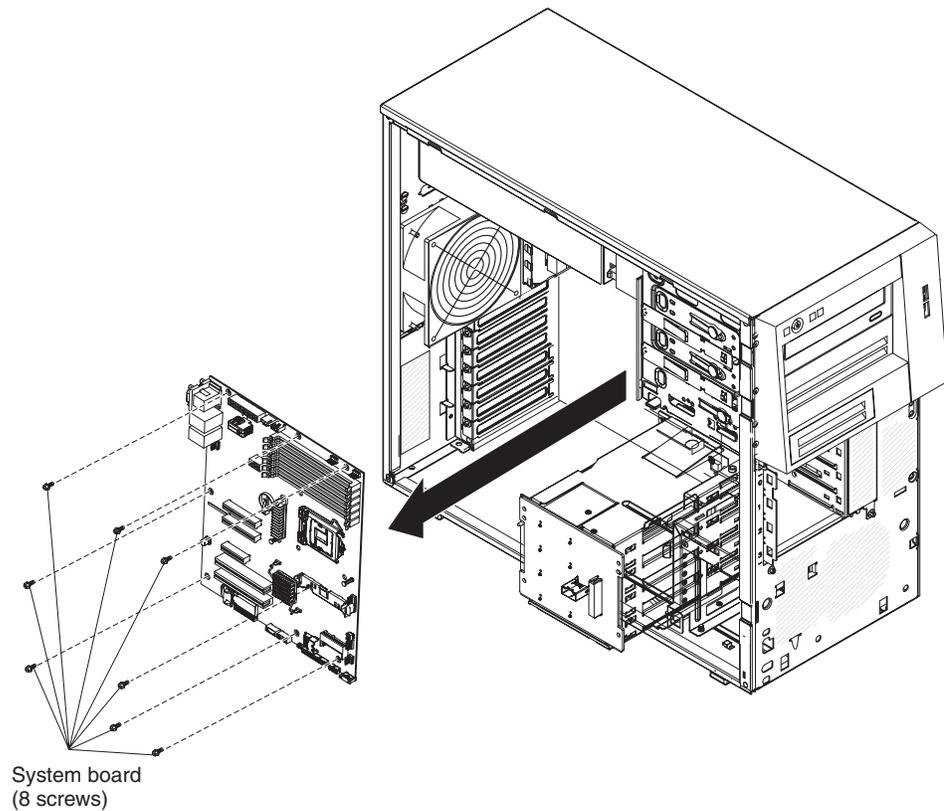
To remove the system board, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 141.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Turn the server on its side so that it is lying flat, with the cover facing up.
4. Unlock and remove the side cover (see “Removing the side cover” on page 145).
5. Note where each cable is connected; then, disconnect all cables from the system board.
6. Press and hold the drive cage release tab; then, rotate the drive cage out of the chassis until the retaining tab on top of the cage locks into place.
7. Remove any of the following components (in addition to others that might not be listed) that are installed on the system board and put them in a safe, static-protective place:
 - Adapters (see “Removing an adapter” on page 151).
 - SAS/SATA controller (see “Removing a ServeRAID-BR10il v2 SAS/SATA controller” on page 204).
 - Virtual media key (see “Removing the virtual media key” on page 181).
 - Microprocessor and fan sink (see “Removing the microprocessor and fan sink” on page 209).
 - DIMMs (see “Removing a memory module” on page 168).
 - Battery (see “Removing the system battery” on page 183).
 - SAS/SATA controller (see “Removing a ServeRAID-BR10il v2 SAS/SATA controller” on page 204).
 - Hypervisor key (see “Removing a USB embedded hypervisor flash device” on page 180).
 - The fan connector covers.
8. Remove the four screws that secure the fan sink retention module and fan sink mounting bracket to the system board; then, set the fan sink retention module, fan sink mounting bracket, and screws aside for use later.

Note: Make sure that you observe the orientation of the fan sink retention module before you move it so that when you reinstall it, you install it in the same orientation.



9. Remove the eight screws (seven in front and one in rear) that secure the system board to the chassis.



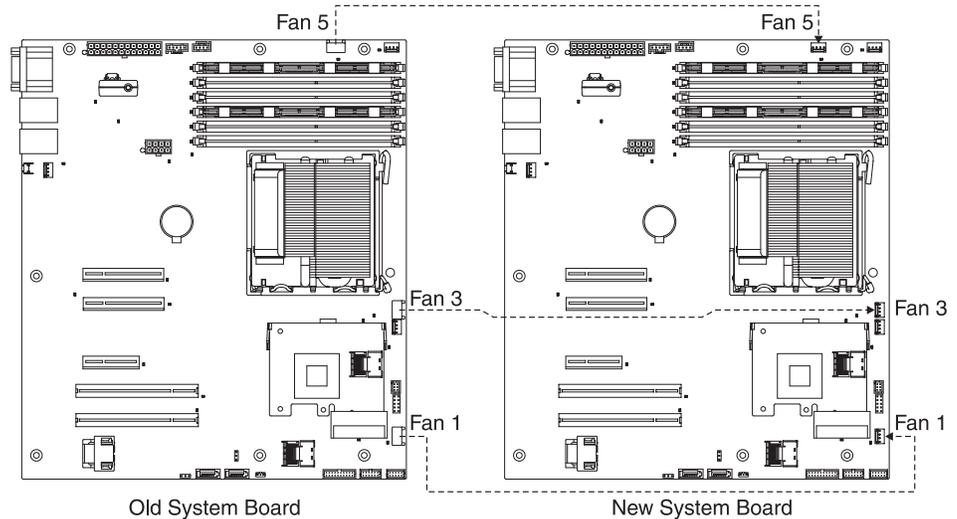
10. Slide the system board toward the front of the server to disengage the tabs on the fan sink mounting bracket from the slots on the bottom of the chassis; then, carefully lift the system board out of the server.

11. Remove the fan connector covers from fan connectors 1, 3, and 5 on the system board. Then, put the fan connector covers aside for use later.
12. If you are instructed to return the system board, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

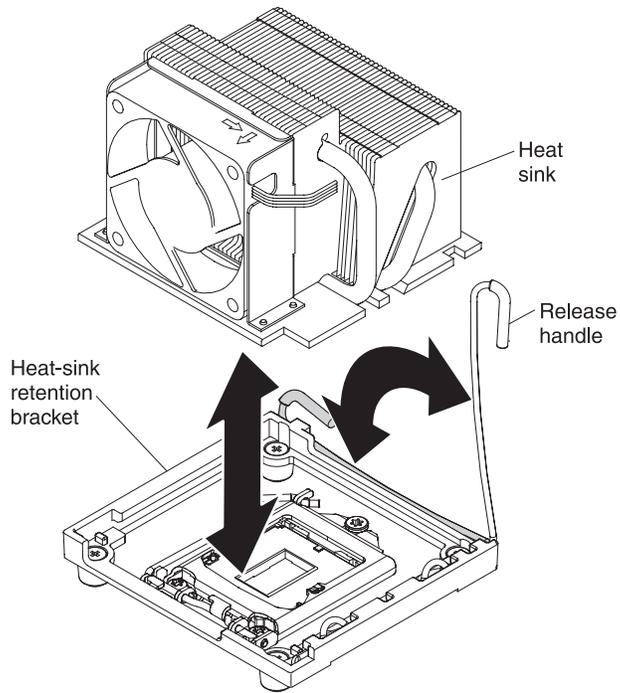
Installing the system board

To install the system board, complete the following steps:

1. Touch the static-protective package that contains the system board to any unpainted metal surface on the server. Then, remove the system board from the package.
2. Install the fan connector covers removed from the old system board onto fan connectors 1, 3, and 5 on the system board.

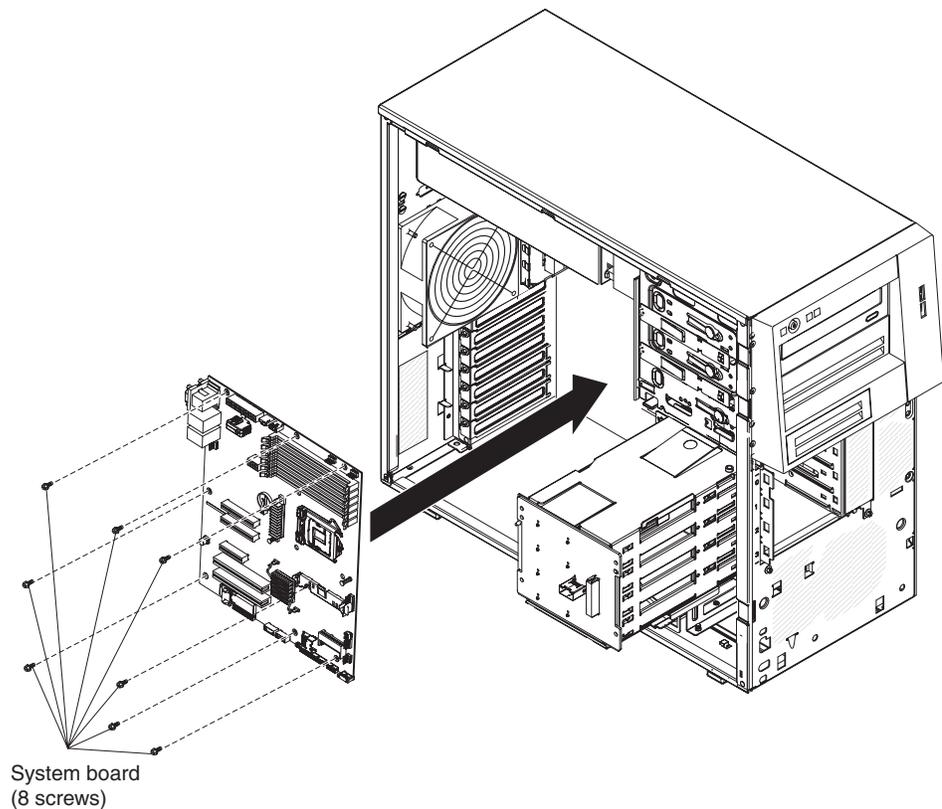


3. Place the fan sink mounting bracket underneath the system board and align the holes on fan sink mounting bracket with the four screw holes for the fan sink retention module slot on system board. Place the fan sink retention module on top of the system board and align it with the four screw holes for the fan sink retention module slot (make sure that the fan sink retention module orientation is correct). Take the four screws that you removed earlier and secure the fan sink mounting bracket and the fan sink retention module to the system board.



4. Insert the system board into the chassis and slide it toward the rear of the server until the tabs on the fan sink mounting bracket is fully engaged in the holes for fan sink mounting bracket slots on the bottom the chassis.

Note: The tabs are fully engaged when the screw holes in the system board are aligned with the corresponding holes in the chassis.



5. Install the eight screws (seven in front and one in rear) that secure the system board to the chassis.
6. Install any of the following components that you removed from the system board:
 - The fan connector covers.
 - Hypervisor key (see “Installing a USB embedded hypervisor flash device” on page 180).
 - Virtual media key (see “Installing the virtual media key” on page 182).
 - SAS/SATA controller (see “Installing a ServeRAID-BR10il v2 SAS/SATA controller” on page 205).
 - Battery (see “Installing the battery” on page 184).
 - DIMMs (see “Installing a memory module” on page 169).
 - Microprocessor and fan sink (see “Installing a microprocessor and fan sink” on page 211).
 - Adapters (see “Installing an adapter” on page 152).
7. Press and hold the retaining tab on top of the cage; then, rotate the drive cage into the chassis until it locks into place.
8. Reconnect any cables to the system board that you disconnected during removal.
9. Install the side cover (see “Installing the side cover” on page 146).
10. Lock the side cover if you unlocked it during removal.
11. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Chapter 6. Configuration information and instructions

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

Updating the firmware

Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

The firmware for the server is periodically updated and is available for download on the IBM Web site. To check for the latest level of firmware, such as the server firmware, vital product data (VPD) code, device drivers, and service processor firmware, 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/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3200 M3** to display the matrix of downloadable files for the server.

Download the latest firmware for the server; then, install the firmware, using the instructions that are included with the downloaded files.

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.

The following items are downloadable from the Web at <http://www.ibm.com/systems/support/>:

- Server firmware is stored in ROM on the system board.
- IMM firmware is stored in ROM on the system board.
- Ethernet firmware is stored in ROM on the Ethernet controller.
- ServeRAID firmware is stored in ROM on the ServeRAID adapter.
- SAS/SATA firmware is stored in ROM on the SAS/SATA controller on the system board.

Major components contain VPD code. You can select to update the VPD code during the server firmware update procedure.

Configuring the server

The *ServerGuide* program provides software-setup tools and installation tools that are designed for the server. Use this CD during the installation of the server to configure basic hardware features, such as an integrated SAS/SATA controller with RAID capabilities, and to simplify the installation of your operating system. For information about using this CD, see “Using the ServerGuide Setup and Installation CD” on page 223.

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

- **Setup utility**

The Setup utility is part of the basic input/output system firmware. Use it to change the startup-device sequence, set the date and time, and set passwords. For information about using this program, see “Using the Setup utility” on page 225.

- **Boot Manager program**

The Boot Manager program is part of the server firmware. Use it to override the startup sequence that is set in the Setup utility and temporarily assign a device to be first in the startup sequence. For more information about using this program, see “Using the Boot Manager program” on page 229.

- **Integrated Management Module**

Use the integrated management module (IMM) for configuration, to update the firmware and sensor data record/field replaceable unit (SDR/FRU) data, and to remotely manage a network. For information about using these programs, see “Using the integrated management module” on page 230.

- **Remote presence capability and blue-screen capture**

The remote presence and blue-screen capture feature are integrated into the Integrated Management Module (IMM). The virtual media key is required to enable the remote presence functions. When the optional virtual media key is installed in the server, it activates the remote presence functions. Without the virtual media key, you will not be able to access the network remotely to mount or unmount drives or images on the client system. However, you will still be able to access the host graphical user interface through the Web interface without the Virtual Media Key. To order the optional IBM Virtual Media Key, contact your IBM marketing representative or authorized reseller. For more information about how to enable the remote presence function, see “Enabling the remote presence feature” on page 231.

- **Ethernet controller configuration**

For information about configuring the Ethernet controller, see “Configuring the Ethernet controller” on page 233.

- **IBM Advanced Settings Utility (ASU) program**

Use this program as an alternative to the Setup utility for modifying UEFI settings. Use the ASU program online or out of band to modify UEFI settings from the command line without the need to restart the server to access the Setup utility. For more information about using this program, see “IBM Advanced Settings Utility program” on page 236.

- **LSI Configuration Utility program**

Use the LSI Configuration Utility program to configure the integrated SAS/SATA controller with RAID capabilities and the devices that are attached to it. For information about using this program, see “Using the LSI Configuration Utility program” on page 234.

The following table lists the different server configurations and the applications that are available for configuring and managing RAID arrays.

Table 16. Server configuration and applications for configuring and managing RAID arrays

Server configuration	RAID array configuration (before operating system is installed)	RAID array management (after operating system is installed)
ServeRAID-BR10il v2 adapter (LSI 1068) installed	LSI Utility (Setup utility, press Ctrl+C), ServerGuide	MegaRAID Storage Manager (for monitoring storage only)

Table 16. Server configuration and applications for configuring and managing RAID arrays (continued)

Server configuration	RAID array configuration (before operating system is installed)	RAID array management (after operating system is installed)
ServeRAID-MR10i adapter (LSI 1078) installed	MegaRAID Storage Manager (MSM),, MegaRAID BIOS Configuration Utility (press C to start), ServerGuide	MegaRAID Storage Manager (MSM)
ServeRAID-MR10is VAULT adapter installed	MegaRAID Storage Manager (MSM),, MegaRAID BIOS Configuration Utility (press C to start), ServerGuide	MegaRAID Storage Manager (MSM)

Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD provides software setup tools and installation tools that are designed for your server. The ServerGuide program detects the server model and hardware options that are installed and uses that information during setup to configure the hardware. The ServerGuide program simplifies operating-system installations by providing updated device drivers and, in some cases, installing them automatically. To download the CD, go to <http://www.ibm.com/systems/management/serverguide/sub.html> and click **IBM Service and Support Site**.

The ServerGuide program has the following features:

- An easy-to-use interface
- Diskette-free setup, and configuration programs that are based on detected hardware
- ServeRAID Manager program, which configures your ServeRAID adapter
- Device drivers that are provided for your server model and detected hardware
- Operating-system partition size and file-system type that are selectable during setup

ServerGuide features

Features and functions can vary slightly with different versions of the ServerGuide program. To learn more about the version that you have, start the *ServerGuide Setup and Installation* CD and view the online overview. Not all features are supported on all server models.

The ServerGuide program requires a supported IBM server with an enabled startable (bootable) CD drive. In addition to the *ServerGuide Setup and Installation* CD, you must have your operating-system CD to install the operating system.

The ServerGuide program performs the following tasks:

- Sets system date and time
- Detects the RAID adapter or controller and runs the SAS/SATA RAID configuration program
- Checks the microcode (firmware) levels of a ServeRAID adapter and determines whether a later level is available from the CD
- Detects installed hardware options and provides updated device drivers for most adapters and devices
- Provides diskette-free installation for supported Windows operating systems

- Includes an online readme file with links to tips for your hardware and operating-system installation

Setup and configuration overview

When you use the *ServerGuide Setup and Installation* CD, you do not need setup diskettes. You can use the CD to configure any supported IBM server model. The setup program provides a list of tasks that are required to set up your server model. On a server with a ServeRAID adapter or SAS/SATA controller with RAID capabilities, you can run the SAS/SATA RAID configuration program to create logical drives.

Note: Features and functions can vary slightly with different versions of the ServerGuide program.

When you start the *ServerGuide Setup and Installation* CD, the program prompts you to complete the following tasks:

- Select your language.
- Select your keyboard layout and country.
- View the overview to learn about ServerGuide features.
- View the readme file to review installation tips for your operating system and adapter.
- Start the operating-system installation. You will need your operating-system CD.

Important: Before you install a legacy operating system (such as VMware) on a server with an LSI SAS controller, you must first complete the following steps:

1. Update the device driver for the LSI SAS controller to the latest level.
2. In the Setup utility, set **Legacy Only** as the first option in the boot sequence in the **Boot Manager** menu.
3. Using the LSI Configuration Utility program, select a boot drive.

For detailed information and instructions, go to <https://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-5083225>.

Typical operating-system installation

The ServerGuide program can reduce the time it takes to install an operating system. It provides the device drivers that are required for your hardware and for the operating system that you are installing. This section describes a typical ServerGuide operating-system installation.

Note: Features and functions can vary slightly with different versions of the ServerGuide program.

1. After you have completed the setup process, the operating-system installation program starts. (You will need your operating-system CD to complete the installation.)
2. The ServerGuide program stores information about the server model, service processor, hard disk drive controllers, and network adapters. Then, the program checks the CD for newer device drivers. This information is stored and then passed to the operating-system installation program.
3. The ServerGuide program presents operating-system partition options that are based on your operating-system selection and the installed hard disk drives.
4. The ServerGuide program prompts you to insert your operating-system CD and restart the server. At this point, the installation program for the operating system takes control to complete the installation.

Installing your operating system without using ServerGuide

If you have already configured the server hardware and you are not using the ServerGuide program to install your operating system, complete the following steps to download the latest operating-system installation instructions from the IBM Web site.

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/systems/support/>.
2. Under **Product support**, click **System x**.
3. From the menu on the left side of the page, click **System x support search**.
4. From the **Task** menu, select **Install**.
5. From the **Product family** menu, select **System x3200 M3**.
6. From the **Operating system** menu, select your operating system, and then click **Search** to display the available installation documents.

Using the Setup utility

Use the Unified Extensible Firmware Interface (UEFI), formerly BIOS, Setup utility to perform the following tasks:

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time
- Set the startup characteristics of the server and the order of startup devices
- Set and change settings for advanced hardware features
- View, set, and change settings for power-management features
- View and clear error logs
- Resolve configuration conflicts

Starting the Setup utility

To start the Setup utility, complete the following steps:

1. Turn on the server.

Note: Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active.

2. When the prompt <F1> Setup is displayed, press F1. If you have set an administrator password, you must type the administrator password to access the full Setup utility menu. If you do not type the administrator password, a limited Setup utility menu is available.
3. Select settings to view or change.

Setup utility menu choices

The following choices are on the Setup utility main menu for the UEFI. Depending on the version of the firmware, some menu choices might differ slightly from these descriptions.

- **System Information**

Select this choice to view information about the server. When you make changes through other choices in the Setup utility, some of those changes are reflected in the system information; you cannot change settings directly in the system information. This choice is on the full Setup utility menu only.

- **System Summary**

Select this choice to view configuration information, including the ID, speed, and cache size of the microprocessors, machine type and model of the server, the serial number, the system UUID, and the amount of installed memory. When you make configuration changes through other options in the Setup utility, the changes are reflected in the system summary; you cannot change settings directly in the system summary.

– **Product Data**

Select this choice to view the system-board identifier, the revision level or issue date of the firmware, the integrated management module and diagnostics code, and the version and date.

This choice is on the full Setup utility menu only.

• **System Settings**

Select this choice to view or change the server component settings.

– **Processors**

Select this choice to view or change the processor settings.

– **Memory**

Select this choice to view or change the memory settings.

– **Devices and I/O Ports**

Select this choice to view or change assignments for devices and input/output (I/O) ports. You can configure the serial ports, configure remote console redirection, enable or disable integrated Ethernet controllers. If you disable a device, it cannot be configured, and the operating system will not be able to detect it (this is equivalent to disconnecting the device).

– **Power**

Select this choice to view or change power capping to control consumption, processors, and performance states.

– **Legacy Support**

Select this choice to view or set legacy support.

- **Force Legacy Video on Boot**

Select this choice to force INT video support, if the operating system does not support UEFI video output standards.

- **Rehook INT 19h**

Select this choice to enable or disable devices from taking control of the boot process. The default is **Disable**.

- **Legacy Thunk Support**

Select this choice to enable or disable UEFI to interact with PCI mass storage devices that are non-UEFI compliant.

– **Integrated Management Module**

Select this choice to view or change the settings for the integrated management module.

- **POST Watchdog Timer**

Select this choice to view or enable the POST watchdog timer.

- **POST Watchdog Timer Value**

Select this choice to view or set the POST loader watchdog timer value.

- **Reboot System on NMI**

Enable or disable restarting the system whenever a nonmaskable interrupt (NMI) occurs. **Enable** is the default.

- **Commands on USB Interface Preference**

Select this choice to enable or disable the Ethernet over USB interface on IMM.

- **Network Configuration**

Select this choice to view the system management network interface port, the IMM MAC address, the current IMM IP address, and host name; define the static IMM IP address, subnet mask, and gateway address, specify whether to use the static IP address or have DHCP assign the IMM IP address, save the network changes.

- **Reset IMM to Defaults**

Select this choice to view or reset IMM to the default settings.

- **Reset IMM**

Select this choice to reset IMM.

- **System Security**

Select this choice to view or configure Trusted Platform Module (TPM) support.

- **Adapters and UEFI Drivers**

Select this choice to view information about the UEFI 1.10 and UEFI 2.0 compliant adapters and drivers installed in the server.

- **Network**

Select this choice to view or configure the network device options, such as iSCSI, PXE, and network devices.

- **Date and Time**

Select this choice to set the date and time in the server, in 24-hour format (*hour:minute:second*).

This choice is on the full Setup utility menu only.

- **Start Options**

Select this choice to view or boot to devices, including the startup sequence, . The server starts from the first boot record that it finds.

This choice is on the full Setup utility menu only.

- **Boot Manager**

Select this choice to view, add, delete, or change the device boot priority, boot from a file, select a one-time boot, or reset the boot order to the default setting. If the server has Wake on LAN hardware and software and the operating system supports Wake on LAN functions, you can specify a startup sequence for the Wake on LAN functions. For example, you can define a startup sequence that checks for a disc in the DVD drive, then checks the hard disk drive, and then checks a network adapter.

- **System Event Logs**

Select this choice to enter the System Event Manager, where you can view the error messages in the system event logs. You can use the arrow keys to move between pages in the error log.

The system event logs contain all event and error messages that have been generated during POST, by the systems-management interface handler, and by the system service processor. Run the diagnostic programs to get more information about error codes that occur. See “Running the diagnostic programs” on page 74 for instructions on running the diagnostic programs.

Important: If the system-error LED on the front of the server is lit but there are no other error indications, clear the IMM system-event log. Also, after you complete a repair or correct an error, clear the IMM system-event log to turn off the system-error LED on the front of the server.

- **POST Event Viewer**
Select this choice to enter the POST event viewer to view the POST error messages.
- **System Event Log**
Select this choice to view the IMM system event log.
- **Clear System Event Log**
Select this choice to clear the IMM system event log.
- **User Security**
Select this choice to set, change, or clear passwords. See “Passwords” for more information.
This choice is on the full and limited Setup utility menu.
 - **Set Power-on Password**
Select this choice to set or change a power-on password. See “Power-on password” on page 229 for more information.
 - **Clear Power-on Password**
Select this choice to clear a power-on password. See “Power-on password” on page 229 for more information.
 - **Set Administrator Password**
Select this choice to set or change an administrator password. An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu. If an administrator password is set, the full Setup utility menu is available only if you type the administrator password at the password prompt. For more information, see “Administrator password” on page 229.
 - **Clear Administrator Password**
Select this choice to clear an administrator password. For more information, see “Administrator password” on page 229.
- **Save Settings**
Select this choice to save the changes that you have made in the settings.
- **Restore Settings**
Select this choice to cancel the changes that you have made in the settings and restore the previous settings.
- **Load Default Settings**
Select this choice to cancel the changes that you have made in the settings and restore the factory settings.
- **Exit Setup**
Select this choice to exit from the Setup utility. If you have not saved the changes that you have made in the settings, you are asked whether you want to save the changes or exit without saving them.

Passwords

From the **User Security** menu choice, you can set, change, and delete a power-on password and an administrator password. The **User Security** choice is on the full Setup utility menu only.

If you set only a power-on password, you must type the power-on password to complete the system startup and to have access to the full Setup utility menu.

An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu. If you set only an administrator

password, you do not have to type a password to complete the system startup, but you must type the administrator password to access the Setup utility menu.

If you set a power-on password for a user and an administrator password for a system administrator, you must type the power-on password to complete the system startup. A system administrator who types the administrator password has access to the full Setup utility menu; the system administrator can give the user authority to set, change, and delete the power-on password. A user who types the power-on password has access to only the limited Setup utility menu; the user can set, change, and delete the power-on password, if the system administrator has given the user that authority.

Power-on password: If a power-on password is set, when you turn on the server, the system startup will not be completed until you type the power-on password. You can use any combination of between six and 20 printable ASCII characters for the password.

If you forget the power-on password, you can regain access to the server in the following way:

- If an administrator password is set, type the administrator password at the password prompt. Start the Setup utility and reset the power-on password.

Administrator password: An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu. You can use any combination of between six and 20 printable ASCII characters for the password.

Attention: If you set an administrator password and then forget it, there is no way to change, override, or remove it. You must replace the system board.

Using the Boot Manager program

The Boot Manager program is a built-in, menu-driven configuration utility program that you can use to temporarily redefine the first startup device without changing settings in the Setup utility.

To use the Boot Manager program, complete the following steps:

1. Turn off the server.
2. Restart the server.
3. When the prompt <F12> Select Boot Device is displayed, press F12. If a bootable USB mass storage device is installed, a submenu item (**USB Key/Disk**) is displayed.
4. Use the Up arrow and Down arrow keys to select an item from the **Boot Selection Menu** and press Enter.

The next time the server starts, it returns to the startup sequence that is set in the Setup utility.

Starting the backup server firmware

The system board contains a backup copy area for the server firmware (formerly BIOS firmware). This is a secondary copy of the server firmware that you update only during the process of updating the server firmware. If the primary copy of the server firmware becomes damaged, use this backup copy.

To force the server to start from the backup copy, turn off the server; then, place the J6 jumper in the backup position (pins 2 and 3).

Use the backup copy of the server firmware until the primary copy is restored. After the primary copy is restored, turn off the server; then, move the J6 jumper back to the primary position (pins 1 and 2).

Using the integrated management module

The integrated management module (IMM) is a second generation of the functions that were formerly provided by the baseboard management controller hardware. It combines service processor functions, video controller, and (when an optional virtual media key is installed) remote presence function in a single chip.

The IMM supports the following basic system management features:

- Environmental monitor with fan speed control for temperature, voltages, fan failure, and power supply failure.
- Light path diagnostics LEDs indicators to report errors that occur with fans, power supplies, microprocessor, hard disk drives, and system errors.
- DIMM error assistance. The Unified Extensible Firmware Interface (UEFI) disables a failing DIMM that is detected during POST, and the IMM lights the associated system error LED and the failing DIMM error LED.
- System event log (SEL).
- ROM-based IMM firmware flash updates.
- Auto Boot Failure Recovery (ABR).
- A virtual media key, which enables remote presence support (remote video, remote keyboard/mouse, and remote storage).
- Automatic microprocessor disable on failure and restart in a two-microprocessor configuration when one microprocessor signals an internal error.
- Nonmaskable interrupt (NMI) detection and reporting.
- Automatic Server Restart (ASR) when POST is not complete or the operating system hangs and the operating system watchdog timer times-out. The IMM might be configured to watch for the operating system watchdog timer and reboot the system after a timeout, if the ASR feature is enabled. Otherwise, the IMM allows the administrator to generate a nonmaskable interrupt (NMI) by pressing an NMI button on the system board for an operating-system memory dump. ASR is supported by IPMI.
- Intelligent Platform Management Interface (IPMI) Specification V2.0 and Intelligent Platform Management Bus (IPMB) support.
- Serial port redirection over telnet or ssh.
- Serial over LAN (SOL).
- Active Energy Manager.
- Query power-supply input power.
- PECI 2 support.
- Power/reset control (power-on, hard and soft shutdown, hard and soft reset, schedule power control).
- Alerts (in-band and out-of-band alerting, PET traps - IPMI style, SNMP, e-mail).
- Operating-system failure blue screen capture.
- Command-line interface.
- Configuration save and restore.
- PCI configuration data.
- Boot sequence manipulation.

The IMM also provides the following remote server management capabilities through the OSA SMBridge management utility program:

- **Command-line interface (IPMI Shell)**

The command-line interface provides direct access to server management functions through the IPMI 2.0 protocol. Use the command-line interface to issue commands to control the server power, view system information, and identify the server. You can also save one or more commands as a text file and run the file as a script.

- **Serial over LAN**

Establish a Serial over LAN (SOL) connection to manage servers from a remote location. You can remotely view and change the UEFI settings, restart the server, identify the server, and perform other management functions. Any standard Telnet client application can access the SOL connection.

Using the remote presence capability and blue-screen capture

The remote presence and blue-screen capture features are integrated functions of the integrated management module (IMM). When the optional IBM Virtual Media Key is installed in the server, it activates the remote presence functions. The virtual media key is required to enable the integrated remote presence and blue-screen capture features. Without the virtual media key, you will not be able to access the network remotely to mount or unmount drives or images on the client system. However, you can still access the Web interface without the key.

After the virtual media key is installed in the server, it is authenticated to determine whether it is valid. If the key is not valid, you receive a message from the Web interface (when you attempt to start the remote presence feature) indicating that the hardware key is required to use the remote presence feature.

The virtual media key has an LED. When this LED is lit and green, it indicates that the key is installed and functioning correctly. When the LED is not lit, it indicates that the key might not be installed correctly.

The remote presence feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1600 x 1200 at 85 Hz, regardless of the system state
- Remotely accessing the server, using the keyboard and mouse from a remote client
- Mapping the DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
- Uploading a diskette image to the IMM memory and mapping it to the server as a virtual drive

The blue-screen capture feature captures the video display contents before the IMM restarts the server when the IMM detects an operating-system hang condition. A system administrator can use the blue-screen capture to assist in determining the cause of the hang condition.

Enabling the remote presence feature

To enable the remote presence feature, complete the following steps:

1. Install the virtual media key into the dedicated slot on the system board (see “System-board optional-devices connectors” on page 18).
2. Turn on the server.

Note: Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active.

Obtaining the IP address for the IMM

To access the Web interface, you need the IP address for IMM. You can obtain the IMM IP address through the Setup utility. The server comes with a default IP address for the IMM of 192.168.70.125. To locate the IP address, complete the following steps:

1. Turn on the server.

Note: Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active.

2. When the prompt <F1> Setup is displayed, press F1. (This prompt is displayed on the screen for only a few seconds. You must press F1 quickly.) If you have set both a power-on password and an administrator password, you must type the administrator password to access the full Setup utility menu.
3. From the Setup utility main menu, select **System Settings**.
4. On the next screen, select **Integrated Management Module**.
5. On the next screen, select **Network Configuration**.
6. Find the IP address and write it down.
7. Exit from the Setup utility.

Logging on to the Web interface

To log onto the Web interface to use the remote presence functions, complete the following steps:

1. Open a Web browser on a computer that connects to the server and in the **address** or **URL** field, type the IP address or host name of the IMM to which you want to connect.

Note: The IMM defaults to DHCP. If a DHCP host is not available, the IMM assigns a static IP address of 192.168.70.125.

2. On the Login page, type the user name and password. If you are using the IMM for the first time, you can obtain the user name and password from your system administrator. All login attempts are documented in the event log.

Note: The IMM is set initially with a user name of USERID and password of PASSWORD (passw0rd with a zero, not a the letter O). You have read/write access. You must change the default password the first time you log on.

3. On the Welcome page, type a timeout value (in minutes) in the field that is provided. The IMM will log you off of the Web interface if your browser is inactive for the number of minutes that you entered for the timeout value.
4. Click **Continue** to start the session. The System Health page provides a quick view of the system status.

Enabling the Intel Gigabit Ethernet Utility program

The Intel Gigabit Ethernet Utility program is part of the server firmware. You can use it to configure the network as a startable device, and you can customize where the network startup option appears in the startup sequence.

To enable the Intel Gigabit Ethernet Utility program, complete the following steps:

1. From the Setup utility main menu, select **Devices and I/O Ports** and press Enter.

2. Select **Enable/Disable onboard device(s)** and press Enter.
3. Select **Ethernet** and press Enter.
4. Select **Enable** and press Enter.
5. Exit to the main menu and select **Save Settings** and press Enter.

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. To find updated information about configuring the controller, complete the following steps.

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

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. From the **Product family** menu, select **System x3200 M3** and click **Go**.

Enabling and configuring Serial over LAN (SOL)

Establish a Serial over LAN (SOL) connection to manage servers from a remote location. You can remotely view and change the BIOS settings, restart the server, identify the server, and perform other management functions. Any standard Telnet client application can access the SOL connection.

To enable and configure the server for SOL, you must update and configure the UEFI code; update and configure the integrated management module (IMM) firmware; update and configure the Ethernet controller firmware; and enable the operating system for an SOL connection.

UEFI update and configuration

To update and configure the UEFI code to enable SOL, complete the following steps:

1. Update the UEFI code:
 - a. Download the latest version of the UEFI code from <http://www.ibm.com/systems/support/>.
 - b. Update the UEFI code, following the instructions that come with the update file that you downloaded.
2. Update the IMM firmware:
 - a. Download the latest version of the IMM firmware from <http://www.ibm.com/systems/support/>.
 - b. Update the IMM firmware, following the instructions that come with the update file that you downloaded.
3. Configure the UEFI settings:

- a. When you are prompted to start the Configuration/Setup Utility program, restart the server and press F1.
- b. Select **System Settings** → **Devices and I/O Ports**.
- c. Select **Console Redirection Settings**; then, make sure that the values are set as follows:
 - **COM Port 1:** Enable
 - **Remote Console:** Enable
 - **Serial Port Sharing:** Enable
 - **Serial Port Access Mode:** Dedicated COM1 Settings
 - **Baud Rate:** 115200
 - **Data Bits:** 8
 - **Parity:** None Stop
 - **Bits:** 1
 - **Thermal Emulation:** ANSI
 - **Active After Boot:** Enable
 - **Flow Control:** Hardware
- d. Press Esc twice to exit the **Devices and I/O Ports** section of the Configuration/Setup Utility program.
- e. Select **Save Settings**; then, press Enter.
- f. Press Enter to confirm.
- g. Select **Exit Setup**; then, press Enter.
- h. Make sure that Yes, exit the Setup Utility is selected; then, press Enter.

Using the LSI Configuration Utility program

Note: There are no RAID support on simple-swap models of the server.

Use the LSI Configuration Utility program to configure and manage redundant array of independent disks (RAID) arrays on hot-swap models of the server. Be sure to use this program as described in this document.

- Use the LSI Configuration Utility program to perform the following tasks:
 - Perform a low-level format on a hard disk drive
 - Create an array of hard disk drives with or without a hot-spare drive
 - Set protocol parameters on hard disk drives

The integrated SAS/SATA controller with RAID capabilities supports RAID arrays. The hot-swap server models come with the ServerRAID-BR10iL adapter installed, which provides RAID levels 0, 1, and 1E support. You can use the LSI Configuration Utility program to configure RAID 1 (IM), RAID 1E (IME), and RAID 0 (IS) for a single pair of attached devices. If you install the optional ServeRAID-MR10i SAS/SATA controller or the optional ServeRAID-MR10is VAULT SAS/SATA controller with an encryption 1078 DE chip, they provide RAID levels 0, 1, 5, 6, and 10 support. If you install a different type of RAID adapter, follow the instructions in the documentation that comes with the adapter to view or change settings for attached devices.

In addition, you can download an LSI command-line configuration program from <http://www.ibm.com/systems/support/>.

When you are using the LSI Configuration Utility program to configure and manage arrays on hot-swap models of the server, consider the following information:

- The integrated SAS/SATA controller with RAID capabilities supports the following features:
 - Integrated Mirroring (IM) with hot-spare support (also known as RAID 1)
Use this option to create an integrated array of two disks plus up to two optional hot spares. All data on the primary disk can be migrated.
 - Integrated Mirroring Enhanced (IME) with hot-spare support (also known as RAID 1E)
Use this option to create an integrated mirror enhanced array of three to eight disks, including up to two optional hot spares. All data on the array disks will be deleted.
 - Integrated Striping (IS) (also known as RAID 0)
Use this option to create an integrated striping array of two to eight disks. All data on the array disks will be deleted.
- Hard disk drive capacities affect how you create arrays. The 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.
- If you use an integrated SAS/SATA controller with RAID capabilities to configure a RAID 1 (mirrored) array after you have installed the operating system, you will lose access to any data or applications that were previously stored on the secondary drive of the mirrored pair.
- If you install a different type of RAID controller, see the documentation that comes with the controller for information about viewing and changing settings for attached devices.

Starting the LSI Configuration Utility program

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

1. Turn on the server.

Note: Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active.

2. When the prompt <F1 Setup> is displayed, press F1. If you have set an administrator password, you are prompted to type the password.
3. Select **System Settings** → **Adapters and UEFI drivers**.
4. Select **Please refresh this page on the first visit** and press Enter.
5. Select **LSI controller_driver_name Driver** and press Enter, where *controller_driver_name* is the name of the SAS/SATA controller driver. For the SAS/SATA controller driver name, see the documentation that comes with your controller.
6. To perform storage-management tasks, follow the procedures in the documentation that comes with the SAS/SATA controller.

When you have finished changing settings, press Esc to exit from the program; select **Save** to save the settings that you have changed.

Formatting a hard disk drive

Low-level formatting removes all data from the hard disk. If there is data on the disk that you want to save, back up the hard disk before you perform this procedure.

Note: Before you format a hard disk, make sure that the disk is not part of a mirrored pair.

To format a drive, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drive that you want to format and press Enter.
2. Select **SAS Topology** and press Enter.
3. Select **Direct Attach Devices** and press Enter.
4. To highlight the drive that you want to format, use the Up Arrow and Down Arrow keys. To scroll left and right, use the Left Arrow and Right Arrow keys or the End key. Press Alt+D.
5. To start the low-level formatting operation, select **Format** and press Enter.

Creating a RAID array of hard disk drives

To create a RAID array of hot-swap hard disk drives, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drives that you want to mirror.
2. Select **RAID Properties**.
3. Select the type of array that you want to create.
4. Use the arrow keys to highlight the first drive in the pair; then, press the Minus (-) or Plus (+) key to change the mirror value to **Primary**.
5. Continue to select the next drive using the Minus (-) or Plus (+) key until you have selected all the drives for your array.
6. Press C to create the disk array.
7. Select **Apply changes and exit menu** to create the array.

IBM Advanced Settings Utility program

The IBM Advanced Settings Utility (ASU) program is an alternative to the Setup utility for modifying UEFI settings. Use the ASU program online or out of band to modify UEFI settings from the command line without the need to restart the system to access the Setup utility.

You can also use the ASU program to configure the optional remote presence features or other IMM settings. The remote presence features provide enhanced systems-management capabilities.

In addition, the ASU program provides limited settings for configuring the IPMI function in the IMM through the command-line interface.

Use the command-line interface to issue setup commands. You can save any of the settings as a file and run the file as a script. The ASU program supports scripting environments through a batch-processing mode.

For more information and to download the ASU program, go to <http://www.ibm.com/systems/support/>.

Updating IBM Systems Director

If you plan to use IBM Systems Director to manage the server, you must check for the latest applicable IBM Systems Director updates and interim fixes.

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

To locate and install a newer version of IBM Systems Director, complete the following steps:

1. Check for the latest version of IBM Systems Director:
 - a. Go to <http://www.ibm.com/systems/management/director/downloads.html>.
 - b. If a newer version of IBM Systems Director than what comes with the server is shown in the drop-down list, follow the instructions on the Web page to download the latest version.
2. Install the IBM Systems Director program.

If your management server is connected to the Internet, to locate and install updates and interim fixes, complete the following steps:

1. Make sure that you have run the Discovery and Inventory collection tasks.
2. On the Welcome page of the IBM Systems Director Web interface, click **View updates**.
3. Click **Check for updates**. The available updates are displayed in a table.
4. Select the updates that you want to install, and click **Install** to start the installation wizard.

If your management server is not connected to the Internet, to locate and install updates and interim fixes, complete the following steps:

1. Make sure that you have run the Discovery and Inventory collection tasks.
2. On a system that is connected to the Internet, go to <http://www.ibm.com/eserver/support/fixes/fixcentral/>.
3. From the **Product family** list, select **IBM Systems Director**.
4. From the **Product** list, select **IBM Systems Director**.
5. From the **Installed version** list, select the latest version, and click **Continue**.
6. Download the available updates.
7. Copy the downloaded files to the management server.
8. On the management server, on the Welcome page of the IBM Systems Director Web interface, click the **Manage** tab, and click **Update Manager**.
9. Click **Import updates** and specify the location of the downloaded files that you copied to the management server.
10. Return to the Welcome page of the Web interface, and click **View updates**.
11. Select the updates that you want to install, and click **Install** to start the installation wizard.

Updating the Universal Unique Identifier (UUID)

The Universal Unique Identifier (UUID) must be updated when the system board is replaced. Use the Advanced Settings Utility to update the UUID in the UEFI-based server. The ASU is an online tool that supports several operating systems. Make sure that you download the version for your operating system. You can download the ASU from the IBM Web site. To download the ASU and update the UUID, 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. Download the Advanced Settings Utility (ASU):
 - a. Go to <http://www.ibm.com/systems/support/>.
 - b. Under Product support, select **System x**.
 - c. Under Popular links, select **Tools and utilities**.
 - d. In the left pane, click **System x and BladeCenter Tools Center**.

- e. Scroll down and click **Tools reference**.
 - f. Scroll down and click the plus-sign (+) for Configuration tools to expand the list; then, select **Advanced Settings Utility (ASU)**.
 - g. In the next window under Related Information, click the **Advanced Settings Utility** link and download the ASU version for your operating system.
2. ASU sets the UUID in the Integrated Management Module (IMM). Select one of the following methods to access the Integrated Management Module (IMM) to set the UUID:
 - Online from the target system (LAN or keyboard console style (KCS) access)
 - Remote access to the target system (LAN based)
 - Bootable media containing ASU (LAN or KCS, depending upon the bootable media)

Note: IBM provides a method for building a bootable media. You can create a bootable media using the Bootable Media Creator (BoMC) application from the Tools Center Web site. In addition, the Windows and Linux based tool kits are also available to build a bootable media.

3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:
 - For Windows based operating systems:
 - ibm_rndis_server_os.inf
 - device.cat
 - For Linux based operating systems:
 - cdc_interface.sh
4. After you install ASU, use the following command syntax to set the UUID:


```
asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> [access_method]
```

Where:

<uuid_value>

Up to 16-byte hexadecimal value assigned by you.

[access_method]

The access method that you selected to use from the following methods:

- Online authenticated LAN access, type the command:


```
[host <imm_internal_ip>] [user <imm_user_id>] [password <imm_password>]
```

Where:

imm_internal_ip

The IMM internal LAN/USB IP address. The default value is 169.254.95.118.

imm_user_id

The IMM account (1 of 12 accounts). The default value is USERID.

imm_password

The IMM account password (1 of 12 accounts). The default value is PASSWORD (with a zero 0 not an O).

Note: If you do not specify any of these parameters, ASU will use the default values. When the default values are used and ASU is unable to access the

IMM using the online authenticated LAN access method, ASU will automatically use the unauthenticated KCS access method.

The following commands are examples of using the userid and password default values and not using the default values:

Example that does not use the userid and password default values:
asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> --user <user_id>
--password <password>

Example that does use the userid and password default values:
asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>

- Online KCS access (unauthenticated and user restricted):

You do not need to specify a value for *access_method* when you use this access method.

Example:

```
asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>
```

The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver be installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer. See the *Advanced Settings Utility Users Guide* for more details. You can access the ASU Users Guide from the IBM Web site.

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

- a. Go to <http://www.ibm.com/systems/support/>.
 - b. Under Product support, select **System x**.
 - c. Under Popular links, select **Tools and utilities**.
 - d. In the left pane, click **System x and BladeCenter Tools Center**.
 - e. Scroll down and click **Tools reference**.
 - f. Scroll down and click the plus-sign (+) for Configuration tools to expand the list; then, select **Advanced Settings Utility (ASU)**.
 - g. In the next window under Related Information, click the **Advanced Settings Utility** link.
- Remote LAN access, type the command:

Note: When using the remote LAN access method to access IMM using the LAN from a client, the *host* and the *imm_external_ip* address are required parameters.

```
host <imm_external_ip> [user <imm_user_id>[[password <imm_password>]]
```

Where:

imm_external_ip

The external IMM LAN IP address. There is no default value. This parameter is required.

imm_user_id

The IMM account (1 of 12 accounts). The default value is USERID.

imm_password

The IMM account password (1 of 12 accounts). The default value is PASSWORD (with a zero 0 not an O).

The following commands are examples of using the userid and password default values and not using the default values:

Example that does not use the userid and password default values:
asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> --host <imm_ip>
--user <user_id> --password <password>

Example that does use the userid and password default values:
asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> --host <imm_ip>

- Bootable media:

You can also build a bootable media using the applications available through the Tools Center Web site at <http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp>. From the left pane, click **IBM System x and BladeCenter Tools Center**, then click **Tool reference** for the available tools.

5. Restart the server.

Updating the DMI/SMBIOS data

The Desktop Management Interface (DMI) must be updated when the system board is replaced. Use the Advanced Settings Utility to update the DMI in the UEFI-based server. The ASU is an online tool that supports several operating systems. Make sure that you download the version for your operating system. You can download the ASU from the IBM Web site. To download the ASU and update the DMI, 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. Download the Advanced Settings Utility (ASU):
 - a. Go to <http://www.ibm.com/systems/support/>.
 - b. Under Product support, select **System x**.
 - c. Under Popular links, select **Tools and utilities**.
 - d. In the left pane, click **System x and BladeCenter Tools Center**.
 - e. Scroll down and click **Tools reference**.
 - f. Scroll down and click the plus-sign (+) for Configuration tools to expand the list; then, select **Advanced Settings Utility (ASU)**.
 - g. In the next window under Related Information, click the **Advanced Settings Utility** link and download the ASU version for your operating system.
2. ASU sets the DMI in the Integrated Management Module (IMM). Select one of the following methods to access the Integrated Management Module (IMM) to set the DMI:
 - Online from the target system (LAN or keyboard console style (KCS) access)
 - Remote access to the target system (LAN based)
 - Bootable media containing ASU (LAN or KCS, depending upon the bootable media)

Note: IBM provides a method for building a bootable media. You can create a bootable media using the Bootable Media Creator (BoMC) application from the Tools Center Web site. In addition, the Windows and Linux based tool kits are also available to build a bootable media.

3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:
 - For Windows based operating systems:
 - `ibm_rndis_server_os.inf`

- device.cat
 - For Linux based operating systems:
 - cdc_interface.sh
4. After you install ASU, Type the following commands to set the DMI:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> [access_method]
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> [access_method]
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> [access_method]
```

Where:

<m/t_model>

The server machine type and model number. Type mtm xxxxyyy, where xxxx is the machine type and yyy is the server model number.

<s/n>

The serial number on the server. Type sn zzzzzzz, where zzzzzzz is the serial number.

<asset_method>

The server asset tag number. Type asset aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa, where aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa is the asset tag number.

[access_method]

The access method that you select to use from the following methods:

- Online authenticated LAN access, type the command:

```
[host <imm_internal_ip>] [user <imm_user_id>] [password
<imm_password>]
```

Where:

imm_internal_ip

The IMM internal LAN/USB IP address. The default value is 169.254.95.118.

imm_user_id

The IMM account (1 of 12 accounts). The default value is USERID.

imm_password

The IMM account password (1 of 12 accounts). The default value is PASSWORD (with a zero 0 not an O).

Note: If you do not specify any of these parameters, ASU will use the default values. When the default values are used and ASU is unable to access the IMM using the online authenticated LAN access method, ASU will automatically use the following unauthenticated KCS access method.

The following commands are examples of using the userid and password default values and not using the default values:

Examples that do not use the userid and password default values:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
--user <imm_user_id> --password <imm_password>
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --user <imm_user_id>
--password <imm_password>
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>
--user <imm_user_id> --password <imm_password>
```

Examples that do use the userid and password default values:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
```

```
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n>
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>
```

- Online KCS access (unauthenticated and user restricted):

You do not need to specify a value for *access_method* when you use this access method.

The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver be installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer. See the *Advanced Settings Utility Users Guide* at <http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=MIGR-55021> for more details.

The following commands are examples of using the userid and password default values and not using the default values:

Examples that do not use the userid and password default values:

```
asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model>
asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n>
asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag>
```

- Remote LAN access, type the command:

Note: When using the remote LAN access method to access IMM using the LAN from a client, the *host* and the *imm_external_ip* address are required parameters.

```
host <imm_external_ip> [user <imm_user_id>[[password <imm_password>]]
```

Where:

imm_external_ip

The external IMM LAN IP address. There is no default value. This parameter is required.

imm_user_id

The IMM account (1 of 12 accounts). The default value is USERID.

imm_password

The IMM account password (1 of 12 accounts). The default value is PASSWORD (with a zero 0 not an O).

The following commands are examples of using the userid and password default values and not using the default values:

Examples that do not use the userid and password default values:

```
asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model> --host <imm_ip>
--user <imm_user_id> --password <imm_password>
asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n> --host <imm_ip>
--user <imm_user_id> --password <imm_password>
asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag>
--host <imm_ip> --user <imm_user_id> --password <imm_password>
```

Examples that do use the userid and password default values:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> --host <imm_ip>
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --host <imm_ip>
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>
--host <imm_ip>
```

- Bootable media:

You can also build a bootable media using the applications available through the Tools Center Web site at <http://publib.boulder.ibm.com/infocenter/toolsctr/>

v1r0/index.jsp. From the left pane, click **IBM System x and BladeCenter Tools Center**, then click **Tool reference** for the available tools.

5. 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 section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your system, 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 *Problem Determination and Service Guide* on the *IBM Documentation CD* that comes with your system.
- Go to the IBM support Web site at <http://www.ibm.com/systems/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 IBM systems also describes the diagnostic tests that you can perform. Most systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Using the documentation

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

Getting help and information from the World Wide Web

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

Software service and support

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

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

Hardware service and support

You can receive hardware service through your IBM reseller or IBM Services. To locate a reseller authorized by IBM to provide warranty service, go to <http://www.ibm.com/partnerworld/> and click **Find a Business Partner** on the right side of the page. For IBM support telephone numbers, see <http://www.ibm.com/planetwide/>. 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.

IBM Taiwan product service

台灣 IBM 產品服務聯絡方式：
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When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1,048,576 bytes, and GB stands for 1,073,741,824 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 can vary depending on operating environments.

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Table 17. Limits for particulates and gases

Contaminant	Limits
Particulate	<ul style="list-style-type: none">The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2¹.Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282.The deliquescent relative humidity of the particulate contamination must be more than 60%².The room must be free of conductive contamination such as zinc whiskers.
Gaseous	<ul style="list-style-type: none">Copper: Class G1 as per ANSI/ISA 71.04-1985³Silver: Corrosion rate of less than 300 Å in 30 days

¹ ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

² The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

³ ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

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The publications for this product are in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when you use the PDF files and want to request a Web-based format or accessible PDF document for a publication, direct your mail to the following address:

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