IBM System x3500 M3 Type 7380

Problem Determination and Service Guide

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Note: Before using this information and the product it supports, read the general information in Appendix B, “Notices,” on page 329, and the *IBM Safety Information, Environmental Notices and User Guide* documents on the *IBM Documentation* CD, and the *Warranty Information* document that comes with the server.

Eleventh Edition (January 2014)

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Guidelines for trained service technicians

This section contains information for trained service technicians.

Inspecting for unsafe conditions

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

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

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

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

1. Make sure that the power is off and the power cord is disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cord:
   - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
   - Make sure that the power cord is the correct type, as specified in “Power cords” on page 150.
   - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment

Observe the following guidelines when servicing electrical equipment:

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

Safety statements

Important:

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

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

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

Attention: Use No. 26 AWG or larger UL-listed or CSA certified telecommunication line cord.

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:	**To Disconnect:**
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

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)

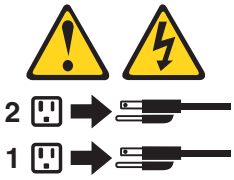
≥ 32 kg (70.5 lb)

≥ 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 11:

CAUTION:
The following label indicates sharp edges, corners, or joints nearby.

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 17:

CAUTION:
The following label indicates moving parts nearby.

Statement 26:

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

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

Chapter 1. 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 “Viewing the test log” on page 102 for information about error codes.
      - **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.
      - **Light path diagnostics LEDs:** See “Light path diagnostics” on page 88 for information about light path diagnostics LEDs that are lit.
      - **System board LEDs:** See “System board LEDs” on page 18 for information about system board LEDs that are lit.

      “Light path diagnostics” on page 88

   b. **Collect system data.**

      Run Dynamic System Analysis (DSA) 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. For instructions for running the DSA program, see “Running the diagnostic programs” on page 101.

      If you have 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 IBM System x Server Firmware (server firmware), system firmware, device firmware, or device drivers that are not at the latest levels.

      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.

      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.**

         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-4JT 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 x3500 M3** to display the list of downloadable files for the server.

         You can install code updates that are packaged as an Update*Xpress* System Pack or Update*Xpress* CD image. An Update*Xpress* System Pack contains an integration-tested bundle of online firmware and device-driver updates for your server. Use Update*Xpress* System Pack Installer to acquire and apply Update*Xpress* System Packs and individual firmware and device-driver updates. For additional information and to download the Update*Xpress* 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. For information about performing the checkout procedure, see “Checkout procedure” on page 72.

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 adapter and management or controlling software to verify that the adapter 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 x3500 M3**.

d) Under **Support & downloads**, click **Documentation**, **Install**, and **Use** to search for related documentation.

c. **Check for troubleshooting procedures and RETAIN tips.**

Troubleshooting procedures and RETAIN tips document known problems and suggested solutions. To search for troubleshooting procedures and RETAIN tips, 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 x3500 M3**.
4) Under **Support & downloads**, click **Troubleshoot**.
5) Select the troubleshooting procedure or RETAIN tip that applies to your problem:
   - Troubleshooting procedures are under **Diagnostic**.
   - RETAIN tips are under **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. For more information, see "Troubleshooting tables" on page 74 and Chapter 5, "Removing and replacing server components," on page 153. Hardware errors are also indicated by light path diagnostics LEDs.

   A single problem might cause multiple symptoms. Follow the troubleshooting procedure for the most obvious symptom. If that procedure does not diagnose the problem, use the procedure for another symptom, if possible.

   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 your IBM® System x3500 M3 Type 7380 server. It describes the diagnostic tools that come with the server, error codes and suggested actions, and instructions for replacing failing components.

Replaceable components are of four types:

- **Consumable parts:** 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 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.

Related documentation

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

- *Environmental Notices and User's Guide*

  This document is in PDF on the IBM *Documentation* CD. It contains translated environmental notices.
- *IBM License Agreement for Machine Code*

  This document is in PDF on the IBM *Documentation* CD. It provides translated versions of the *IBM License Agreement for Machine Code* for your product.
- *Warranty Information*

  This is a document that comes with the server. It contains information about the terms of the warranty and getting service and assistance.
- *Installation and User's Guide*

  This document is in Portable Document Format (PDF) on the IBM *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 optional devices that the server supports.
- *Licenses and Attributions Documents*

  This document is in PDF. It contains information about the open-source notices.
- *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 *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.

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

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

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/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x3500** and click Continue.

Notices and statements in this document

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

The following notices and statements are used in this document:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage 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 of the server. Depending on the server model, some features might not be available, or some specifications might not apply.

Table 1. Features and specifications

Microprocessor:
- Intel Xeon up to six-core with integrated memory controller and Quick Path Interconnect (QPI) architecture
- Designed for LGA 1366 socket
- Scalable up to twelve cores
- 32 KB instruction cache, 32 KB data cache, and 4MB, 8 MB and 12MB cache that is shared among the cores
- Support for up to two microprocessors, second microprocessor with pluggable VRM
- Support for Intel Extended Memory 64 Technology (EM64T)

Note:
- Do not install an Intel Xeon™ 5500 series microprocessor and an Xeon™ 5600 series microprocessor in the same server.
- 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/

.

Memory:
- Sixteen DIMM connectors (eight per microprocessor)
- Minimum: 1 GB
  Note: If you install a ServeRAID-M1015 SAS/SATA adapter, make sure at least 2 GB of memory is installed in the server before you run DSA from a bootable CD.
- Maximum: 192 GB
  - 48 GB using unbuffered DIMMs (UDIMMs)
  - 192 GB using registered DIMMs (RDIMMs)
- Type: Registered or unbuffered ECC double-data-rate 3 (DDR3) 800, 1066, and 1333 MHz DIMMs only
- RDIMMs sizes: 1 GB, 2 GB , 4 GB , 8 GB, and 16 GB single-rank, dual-rank or quad rank
- UDIMMs sizes: 1 GB, 2 GB and, 4 GB single-rank or dual-rank
- Chipkill supported

Drives:
- SATA:
  - DVD (standard)
  - DVD/CD-RW (optional)
  - Maximum of two devices can be installed
- Diskette (optional): External USB 1.44 MB
- Supported hard disk drives:
  - Serial Attached SCSI (SAS)

Expansion bays:
- Twenty-four 2.5-inch HDD bays (one optical DVD drive)
  Note:
  - SAS expander card does not support 3 GB RAID adapters.
  - When using ServeRAID adapter M1015 to support more than sixteen 2.5-inch hard disk drives, the maximum number of RAID supported drives is 16. All the other drives will remain JBOD (the drives are presented to the operating system without a RAID configuration).
  - If the server is configured for RAID operation using a ServeRAID adapter, you might have to reconfigure your disk arrays after you install drives. See the ServeRAID adapter documentation for additional information about RAID operation and complete instructions for using the ServeRAID adapter.
- Eight 3.5-inch HDD bays (only supports UltraSlim DVD drive)
- Three half-high 5.25-inch bays (one DVD drive installed)
  Note: Full-high devices such as an optional tape drive will occupy two half-high
  5.25-inch bays.

PCI and PCI-X expansion slots:
- Six PCI expansion slots on the system board:
  - Four PCI Express x8 (2x8 link, 2x4 link)
  - One PCI Express x16 (x8 link)
  - One PCI 32-bit
- One or two expansion slots on the PCI extender card:
  - Standard - One PCI Express x8 (x4 link) on the PCI-Express extender card
  - Optional - Two PCI-X 64/133 slots on the PCI-X extender card

Power supply:
Note: To upgrade to two 920-watt hot-swap power supplies, install the redundant power and cooling option kit. The kit includes one hot-swap 920-watt power-supply and three hot-swap fans.
- Standard: One 920-watt 110 V or 240 V AC input dual-rated power supply
- Upgradeable to two 920-watt hot-swap power supplies

Hot-swap fans:
- Three (standard)
- Upgradeable to six fans (for redundant cooling)

Note: To upgrade to redundant cooling, install the redundant power and cooling option kit. The kit includes one 920-watt hot-swap power-supply and three hot-swap fans.

Size:
- Tower
  - Height: 440 mm (17.3 in.)
  - Depth: 767 mm (30.2 in.)
  - Width: 218 mm (8.6 in.)
  - Weight: approximately 38.9 kg (85.6 lb) when fully configured or 27.4 kg (60.4 lb) minimum
- Rack
  - 5 U
  - Height: 218 mm (8.6 in.)
  - Depth: 702 mm (27.6 in.)
  - Width: 424 mm (16.7 in.)
  - Weight: approximately 37.2 kg (82 lb) when fully configured or 26.2 kg (57.7 lb) minimum

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

Table 1. Features and specifications (continued)

Integrated functions:

- Integrated Management Module (IMM), which provides service processor control and monitoring functions, video controller, remote keyboard, video, mouse, and remote hard disk drive capabilities
- Dedicated or shared management network connections
- Six-port Serial ATA (SATA) controller embedded
- Serial over LAN (SOL) and serial redirection over Telnet or Secure Shell (SSH)
- USB flash device with embedded hypervisor software.
- Support for remote management presence
- One systems-management RJ-45 for connection to a dedicated systems-management network. This system management connector is dedicated to the IMM functions.
- Light path diagnostics
- Six Universal Serial Bus (USB) ports standard (v2.0 supporting v1.1)
  - Four on rear of server
  - Two on front of server
- One internal USB tape connector
- One Broadcom dual-port 10/100/1000 Ethernet controller with Wake on LAN support and TCP/IP Offload Engine (TOE) support
- One serial connector, shared with the IMM

Note: In messages and documentation, the term *service processor* refers to the integrated management module (IMM).

Video controller:

- Matrox G200eV video on system board
- Compatible with SVGA and VGA

ServeRAID SAS adapter:

- ServeRAID-BR10i SAS/SATA adapter that supports RAID levels 0, 1 and 1E (standard)
- ServeRAID-BR10il SAS/SATA adapter that supports RAID levels 0, 1 and 1E (standard)
- Optional ServeRAID-MR10i SAS/SATA adapter, which supports RAID levels 0, 1, 5, 6, 10
- Optional ServeRAID-MR10is SAS/SATA adapter, which supports RAID levels 0, 1, 5, 6, 10
- Optional ServeRAID-M1015 SAS/SATA adapter, which supports RAID levels 0, 1 and 1E
- Optional ServeRAID-M5014 SAS/SATA adapter, which supports RAID level 0, 1, 5, 10, 50
- Optional ServeRAID-M5015 SAS/SATA adapter, which supports RAID level 0, 1, 5, 10, 50
  Note: If the server is configured for RAID operation using a ServeRAID adapter, you might have to reconfigure your disk arrays after you install drives. See the ServeRAID adapter documentation for additional information about RAID operation and complete instructions for using the ServeRAID adapter.

Acoustical noise emissions:

- Sound power, idle: 5.5 bel declared
- Sound power, operating: 6.0 bel declared

Environment:

- Air temperature:
  - Server on: 10°C to 35°C (50.0°F to 95.0°F); altitude: 0 to 915 m (3000 ft)
  - Server on: 10°C to 32°C (50.0°F to 90.0°F); altitude: 915 m (3000 ft) to 2134 m (7000 ft)
  - Server on: 10°C to 28°C (50.0°F to 83.0°F); altitude: 2134 m (7000 ft) to 3050 m (10000 ft)
  - Server off: 5°C to 45°C (41°F to 113°F)
  - Shipping: -40°C to 60°C (-40.0°F to 140°F)

Humidity:

- Server on: 20% to 80%, maximum dew point 21°C, maximum rate of change 5°C/hour
- Server off: 8% to 80%, maximum dew point 27°C

Heat output:

Approximate heat output:

- Minimum configuration: 2013 Btu per hour (590 watts)
- Maximum configuration: 3610 Btu per hour (1058 watts)

Electrical input:

- Sine-wave input (50-60 Hz) required
- Input voltage low range:
  - Minimum: 100 V AC
  - Maximum: 127 V AC
- Input voltage high range:
  - Minimum: 200 V AC
  - Maximum: 240 V AC
- Approximate input kilovolt-amperes (kVA):
  - Minimum: 0.60 kVA
  - Maximum: 1.10 kVA

Notes:

1. Power consumption and heat output vary depending on the number and type of optional features that are installed and the power-management optional features that are in use.
2. These levels were measured in controlled acoustical environments according to the procedures that are specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average stated values because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.

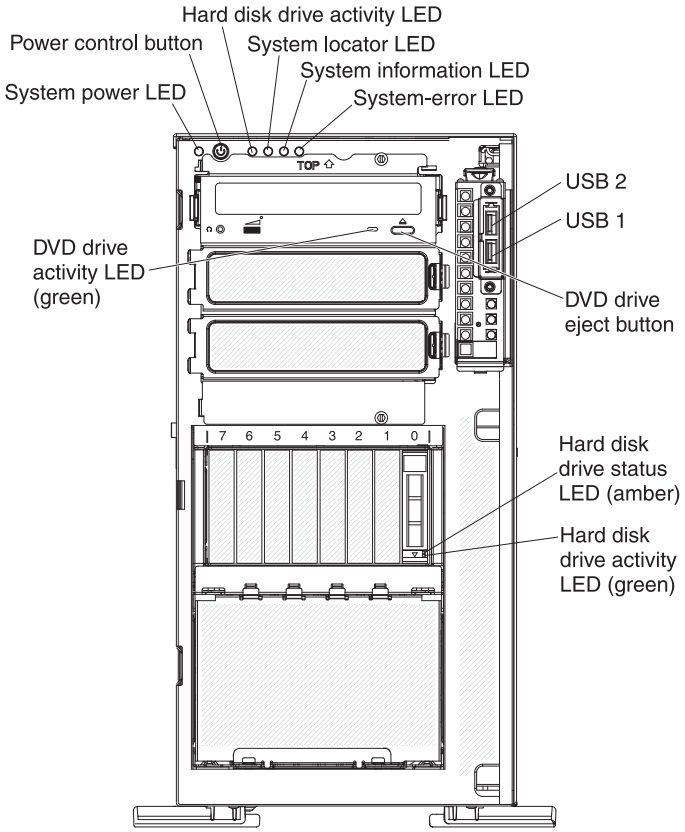
Server controls, LEDs, and connectors

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

Front view

The following illustration shows the controls and LEDs on the front of the server.

Note: The front bezel is not shown so that the drive bays are visible.



System power LED:

- **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 20 to 40 seconds.

  Note: Approximately 20 seconds after the server is connected to ac power, the power-control button becomes active.
- **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.

Power-control button: Press this button to turn the server on and off manually. A power-control-button shield comes with the server. You can install this disk-shaped shield to prevent the server from being turned off accidentally.

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

System locator LED: Use this LED to visually locate the server among other servers. You can use IBM Systems Director or IMM to light this LED remotely.

System-information LED: When this amber LED is on, the server power supplies are nonredundant, or some other noncritical event has occurred. The event is recorded in the error log. Check the light path diagnostics panel or event log for more information. This LED will remain lit until you resolve the problem or you press the remind button. (See “Remind button” on page 98 for more information.)

System-error LED: When this amber LED is lit, it indicates that a system error has occurred. Use the light path diagnostics panel and the system service label on the inside of the left-side cover to further isolate the error.

USB 2: Connect a USB device to this connector.

USB 1: Connect a USB device to this connector.

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

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

Hard disk drive status LED: When this LED is lit, it indicates that the drive has failed. If an optional IBM ServeRAID adapter is installed in the server, when this LED is flashing slowly (one flash per second), it indicates that the drive is being rebuilt. When the LED is flashing rapidly (three flashes per second), it indicates that the adapter is identifying the drive.

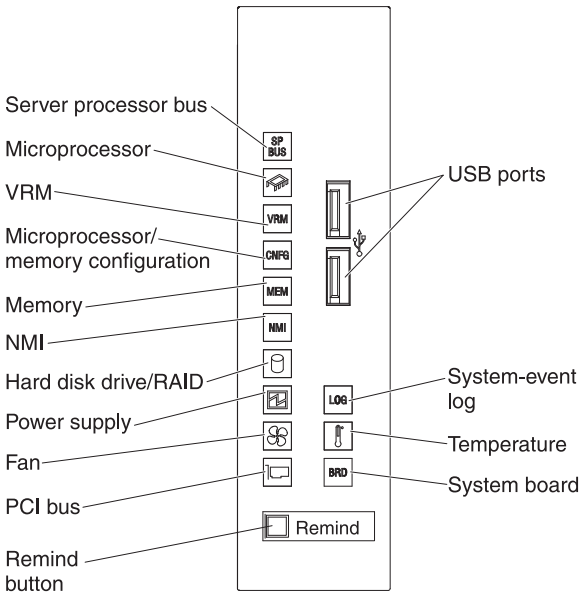
DVD drive activity LED: When this LED is lit, it indicates that the DVD drive is in use.

Please see “Event logs” on page 21 for more information.

Light path diagnostics panel

The following illustration shows the front LEDs on the light path diagnostics panel. The light path diagnostic panel is inside the front bezel.

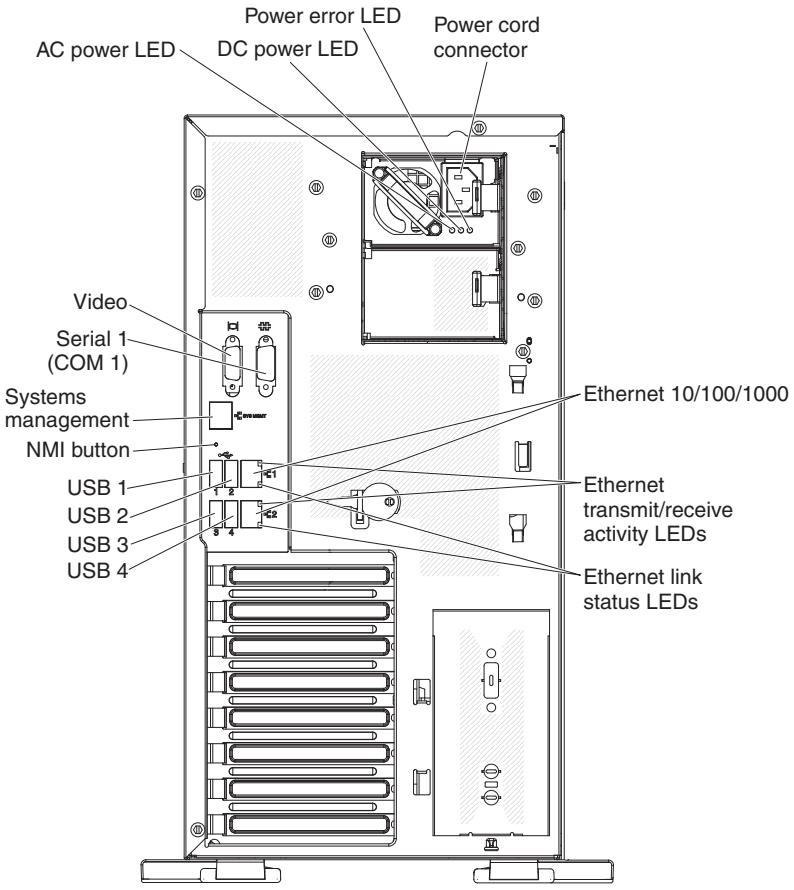
Note: The light path diagnostics LEDs remain lit only while the server is connected to power.



For more information about the light path diagnostics LEDs, see “Light path diagnostics” on page 88.

Rear view

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



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.

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.

Power error LED: This amber LED provides status information about the power supply. When this LED is lit, it indicates a power-supply fault.

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

Ethernet connectors: 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 on the rear of the server. 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 on the rear of the server. When this LED is lit, it indicates that there is an active connection on the Ethernet port.

USB 1-4 connectors: Connect a USB device, such as USB mouse or keyboard, to any of these connectors.

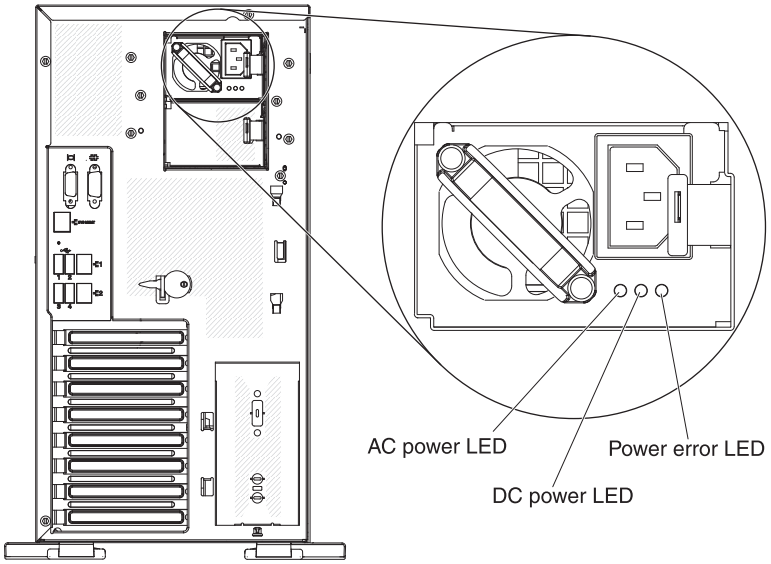
Systems management: Use this connector to connect the server to a system management device.

Serial 1 connector (COM 1): Connect a 9-pin serial device to this connector.

Video connector: Connect a monitor to this connector.

Power-supply LEDs

The following illustration shows the power-supply LEDs on the rear of the server.



The following table describes the problems that are indicated by various combinations of the power-supply LEDs. For more information about solving power-supply problems, see “Power-supply LEDs” on page 99.

Table 2. Power-supply LEDs

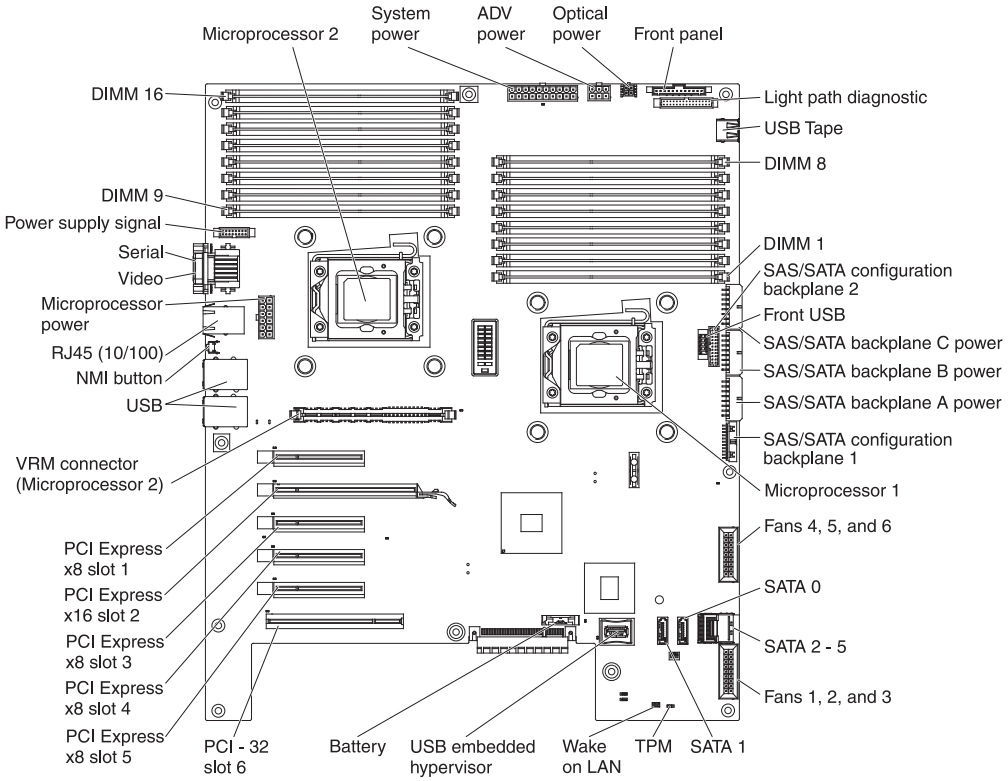
Power-supply LEDs			
AC power	**DC power**	**Power error**	**Description**
Off	Off	Off	No AC power to the server or a problem with the AC power source
Off	Off	On	No AC power to the server or a problem with the AC power source and the power supply has detected an internal problem
Off	On	Off	Faulty power supply
Off	On	On	Faulty power supply
On	Off	Off	Power supply not fully seated, faulty system board, or faulty power supply
On	Off or flashing	On	Faulty power supply
On	On	Off	Normal operation
On	On	On	Power supply is faulty but still operational

Internal LEDs, connectors, and jumpers

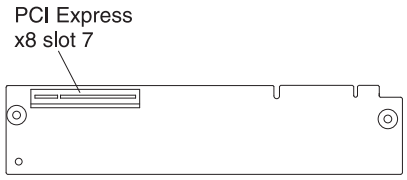
The illustrations in this section show the LEDs, connectors, and jumpers on the internal boards. The illustrations might differ slightly from your hardware.

System board internal connectors

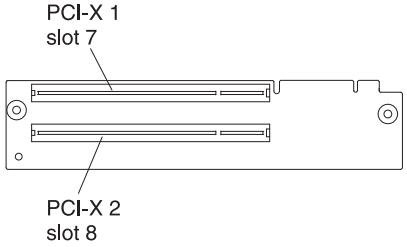
The following illustration shows the internal connectors on the system board.



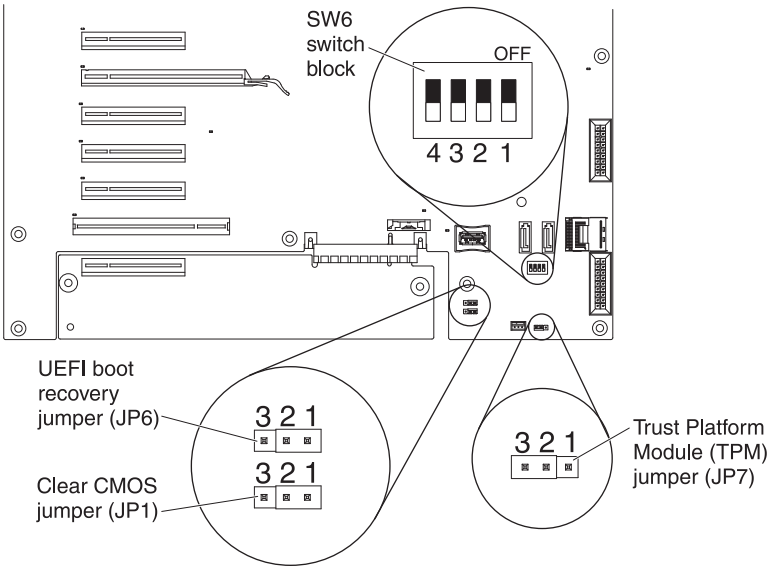
The system board is equipped with a PCI extender card that provides either one or two additional expansion slots. The following illustration shows one additional PCI Express expansion slot that is available on the PCI Express extender card, if equipped.



The following illustration shows two additional PCI-X expansion slots that are available on the PCI-X extender card, if equipped.



System board switches and jumpers



The following tables show the settings of the switches and the jumpers.

See Table 3 and Table 4 for information about the switch and jumper settings.

Table 3. System board jumpers

Jumper number	Jumper name	Jumper setting
JP1	CMOS clear	• Pins 1 and 2: Normal operation (default). • Pins 2 and 3: Clears CMOS memory.
JP6	UEFI boot recovery	• Pins 1 and 2: Normal operation (default). • Pins 2 and 3: Enable the UEFI recovery mode.
JP7	Trust Platform Module (TPM)	• Pins 1 and 2: TPM physical presence is asserted. • Pins 2 and 3: TPM physical presence is not asserted (default). **Note:** The physical presence requires manual setting on the server to change the TPM configuration. The TPM is enabled and physical presence is not asserted by default. The physical presence needs to be asserted to activate, deactivate, clear or change ownership of the TPM.
Note: If no jumper is present, the server responds as on default position.		

Table 4. System board switch 6

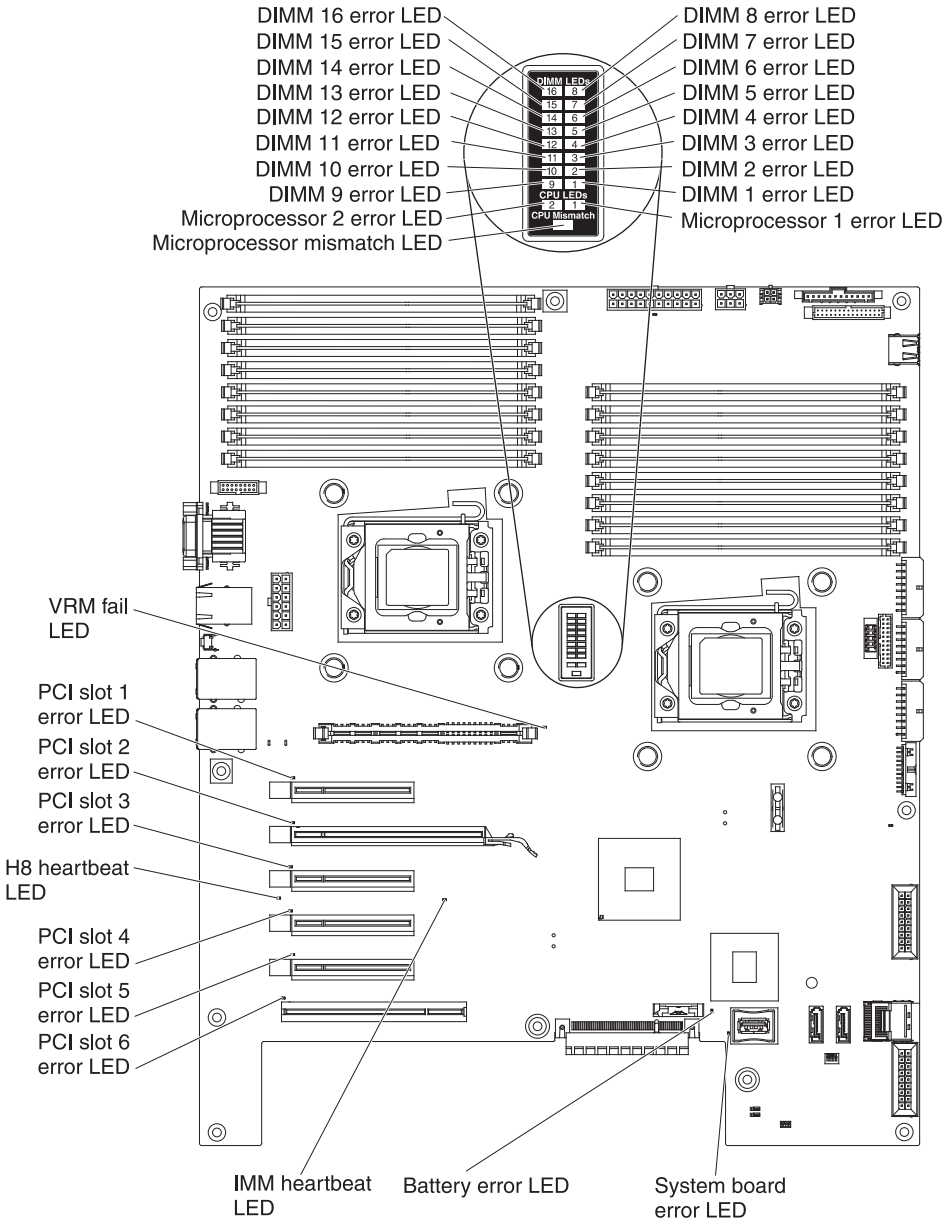
SW 6 Switches	Switch description
1	Reserved (default off)
2	Power-on password override when on. (default off)
3	Reserved (default off)
4	When this switch is off, the primary IMM firmware ROM page is loaded. When this switch is on, the secondary (backup) IMM firmware ROM page is loaded. (default off)

Notes:

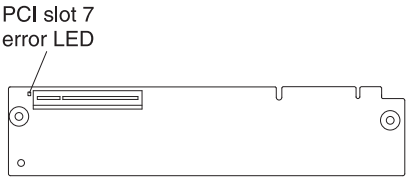
1. Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. (Review the information in “Safety” on page vii, “Installation guidelines” on page 153, and “Handling static-sensitive devices” on page 155.)

System board LEDs

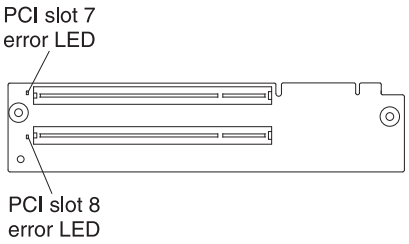
The following illustration shows the LEDs on the system board.



The system board is equipped with a PCI extender card that provides either one or two additional expansion slots. The following illustration shows the LEDs on the PCI Express extender card, if equipped.

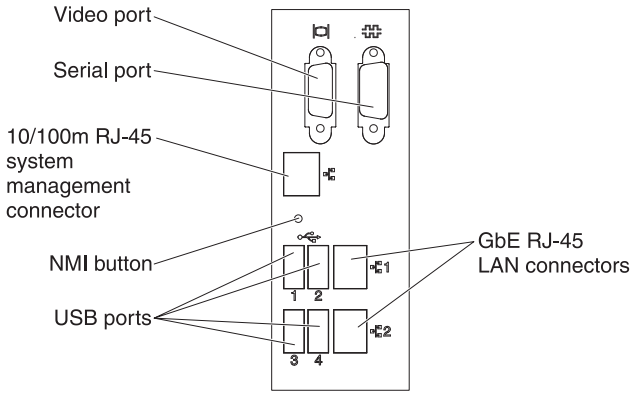


The following illustration shows the LEDs on the PCI-X extender card, if equipped.



System board external connectors

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



Hard disk drive backplane connectors

The following illustrations show the connectors on the 2.5-inch and 3.5-inch hard disk drive backplanes.

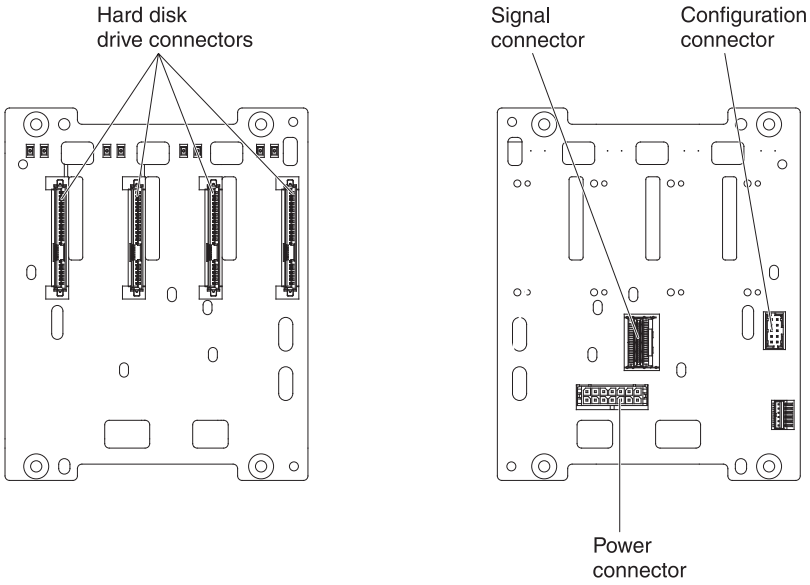


Figure 1. Connectors on the 3.5-inch hard disk drive backplane

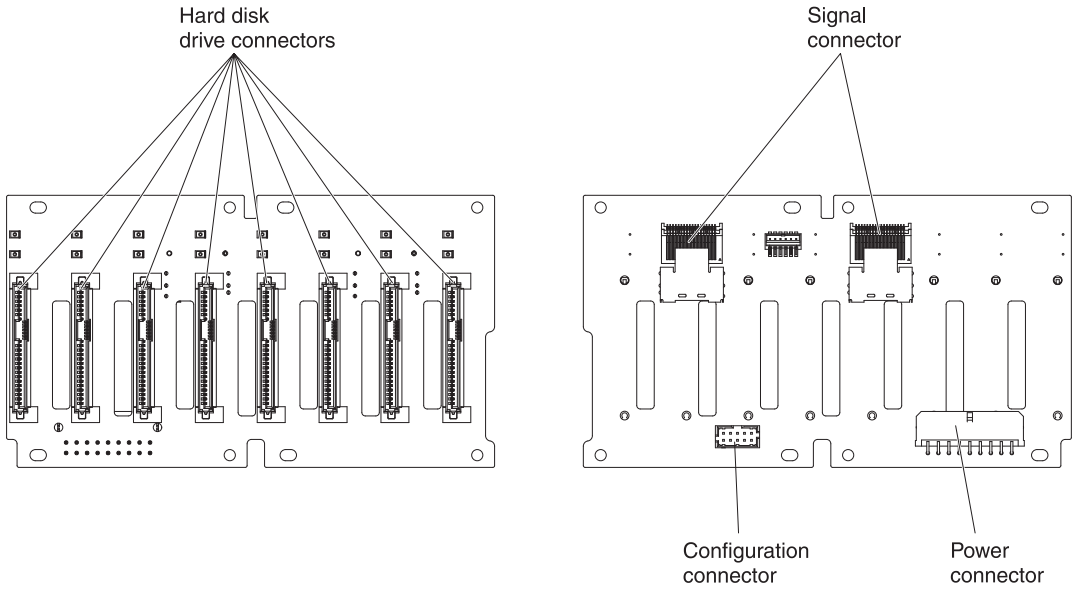


Figure 2. Connectors on the 2.5-inch hard disk drive backplane

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 diagnose and correct a problem by using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 327 for more information.

Diagnostic tools

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

- **POST error messages**

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

- **Event logs**

  For information about the POST event log, the system-event log, the integrated management module (IMM) event log, and the DSA log, see “Event logs” and “System-event log” on page 35.

- **Troubleshooting tables**

  These tables list problem symptoms and actions to correct the problems. See “Troubleshooting tables” on page 74.

- **Light path diagnostics**

  Use the light path diagnostics to diagnose system errors quickly. See “Light path diagnostics” on page 88 for more information.

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

  The diagnostic programs are the primary method of testing the major components of the server. See “Diagnostic programs, messages, and error codes” on page 101 for more information.

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 all IMM, POST, and system management interrupt (SMI) events. You can view the system-event log through the Setup utility and through the Dynamic System Analysis (DSA) program (as the IPMI event log).

  The system-event log is limited in size. When it is full, new entries will not overwrite existing entries; therefore, you must periodically save and then clear the system-event log through the Setup utility when the IMM logs an event that indicates that the log is more than 75% full. When you are troubleshooting, you might have to save and then clear the system-event log to make the most recent events available for analysis.

  Messages are listed on the left side of the screen, and details about the selected message are displayed on the right side of the screen. To move from one entry to the next, use the Up Arrow (↑) and Down Arrow (↓) keys.

Some IMM sensors cause assertion events to be logged when their setpoints are reached. When a setpoint condition no longer exists, a corresponding deassertion event is logged. However, not all events are assertion-type events.

- **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 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 system-event log, select **System Event Log**.

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.

Viewing event logs without restarting the server

If the server is not hung, 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), 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?lndocid=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/config_tools_ipmitool.html 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://www.ibm.com/developerworks/linux/blueprints/ 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 integrated management module (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 5. Methods for viewing event logs

Condition	Action
The server is not hung and is connected to a network.	Use any of the following methods: • Run Portable or Installable DSA to view the event logs or create an output file that you can send to IBM service and support. • Type the IP address of the IMM and go to the Event Log page. • Use IPMItool to view the system-event log.
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.	• 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 through the Setup utility” on page 22.

POST error codes

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

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

If POST is completed without detecting any problems, the server startup is completed.

If POST detects a problem, an error message is sent to the POST event log.

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 x3500 M3 Type 7380," on page 145 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0010002	Microprocessor not supported	1. Reseat the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Microprocessor 1 b. (Trained service technician only) Microprocessor 2 (if one is installed) 2. (Trained service technician only) Remove microprocessor 2 and restart the server. 3. (Trained service technician only) Remove microprocessor 1 and install microprocessor 2 in the microprocessor 1 connector. Restart the server. If the error is corrected, microprocessor 1 is bad and must be replaced. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Microprocessor 1 b. (Trained service technician only) Microprocessor 2 c. (Trained service technician only) System board
0011000	Invalid microprocessor type	1. Update the firmware (see "Updating the firmware" on page 304). 2. (Trained service technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type.

- **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 x3500 M3 Type 7380," on page 145 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0011002	Microprocessor mismatch	1. Run the Setup utility and view the microprocessor information to compare the installed microprocessor specifications. 2. (Trained service technician only) Remove and replace one of the microprocessors so that they both match.
0011004	Microprocessor failed BIST	1. Update the firmware (see "Updating the firmware" on page 304). 2. (Trained service technician only) Reseat microprocessor 2. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
001100A	Microcode update failed	1. Update the server firmware (see "Updating the firmware" on page 304). 2. (Trained service technician only) Replace the microprocessor.
0050001	DIMM disabled	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 234). 2. If the DIMM was disabled because of a memory fault, follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).

- **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 x3500 M3 Type 7380," on page 145 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0051003	Uncorrectable DIMM error	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. If the problem remains, replace the failing DIMM (see "Removing a memory module" on page 233 and "Installing a memory module" on page 234). 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 287 and "Installing a microprocessor and heat sink" on page 289).
0051006	DIMM mismatch detected	Make sure that the DIMMs match and are installed in the correct sequence (see "Installing a memory module" on page 234).

- **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 x3500 M3 Type 7380," on page 145 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0051009	No memory detected	1. Make sure that the server contains DIMMs. 2. Reseat the DIMMs (see "Removing a memory module" on page 233 and "Installing a memory module" on page 234). 3. Install DIMMs in the correct sequence (see "Installing a memory module" on page 234). 4. (Trained service technician only) Replace the failing microprocessor (see "Removing a microprocessor and heat sink" on page 287 and "Installing a microprocessor and heat sink" on page 289). 5. (Trained service technician only) Replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301).
0600369	No memory detected	1. Make sure that the server contains DIMMs. 2. Reseat the DIMMs (see "Removing a memory module" on page 233 and "Installing a memory module" on page 234). 3. Install DIMMs in the correct sequence (see "Installing a memory module" on page 234). 4. (Trained service technician only) Replace the failing microprocessor. 5. (Trained service technician only) Replace the system board.
005100A	No usable memory detected	1. Make sure that the server contains DIMMs. 2. Reseat the DIMMs (see "Removing a memory module" on page 233 and "Installing a memory module" on page 234). 3. Install DIMMs in the correct sequence (see "Installing a memory module" on page 234). 4. Clear CMOS memory to re-enable all the memory connectors (see "System board switches and jumpers" on page 16). Note that all firmware settings will be reset to the default settings.

- **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 x3500 M3 Type 7380," on page 145 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0058001	PFA threshold exceeded	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 234 for memory population). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 287 and "Installing a microprocessor and heat sink" on page 289).
0058007	DIMM population is unsupported	1. Reseat the DIMMs, and then restart the server (see "Removing a memory module" on page 233 and "Installing a memory module" on page 234). 2. Make sure that the DIMMs are installed in the proper sequence (see "Installing a memory module" on page 234).

- **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 x3500 M3 Type 7380," on page 145 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0058008	DIMM failed memory test	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 234 for memory population). 4. If the problem is related to a DIMM, replace the failing DIMM (see "Removing a memory module" on page 233 and "Installing a memory module" on page 234). 5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 7. (Trained service technician only) If the problem is related to microprocessor socket pins, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 8. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 287 and "Installing a microprocessor and heat sink" on page 289).
0058015	Start to Activate Spare Memory Channel	Information only. A failed DIMM has been detected to activate the memory online-spare feature. Check the event log for uncorrected DIMM failure events. **Note:** The memory online-spare feature is supported on server models with an Intel Xeon™ 5600 series 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 x3500 M3 Type 7380," on page 145 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
00580A1	Invalid DIMM population for mirroring mode	1. If a fault LED is lit, resolve the failure. 2. Install the DIMMs in the correct sequence (see "Installing a memory module" on page 234).
00580A4	Memory population changed	Information only. Memory has been added, moved, or changed.
00580A5	Mirror failover complete	Information only. Memory redundancy has been lost. Check the event log for uncorrected DIMM failure events (see "Event logs" on page 21).
00580A6	Spare Memory Channel Activated	Information only. Memory online-spare channel has been activated to back up a failed DIMM. Check the event log for uncorrected DIMM failure events. **Note:** The memory online-spare feature is supported on server models with an Intel Xeon™ 5600 series microprocessor.
0068002	CMOS battery cleared	1. Reseat the battery. 2. Clear the CMOS memory (see "System board switches and jumpers" on page 16). 3. Replace the following components one at a time, in the following order, restarting the server after each one: a. Battery b. (Trained service technician only) System board
2011000	PCI-X PERR	1. Check the extender card LEDs. 2. Reseat all affected adapters and extender cards. 3. Update the PCI device firmware. 4. Remove the adapters from the extender card. 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. Extender card b. (Trained service technician only) System board
2011001	PCI-X SERR	1. Check the extender-card LEDs. 2. Reseat all affected adapters and extender cards. 3. Update the PCI device firmware. 4. Remove the adapters from the extender card. 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. Extender card b. (Trained service technician only) System board

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
2018001	PCI Express uncorrected or uncorrected error	1. Check the extender-card LEDs. 2. Reseat all affected adapters and extender cards. 3. Update the PCI device firmware. 4. Remove both adapters from the extender card. 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. Extender card b. (Trained service technician only) System board
2018002	Option ROM resource allocation failure	Informational message that some devices might not be initialized. 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 **Start 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. 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: a. Each adapter b. (Trained service technician only) System board
3*xx*0007 (*xx* can be 00 - 19)	Firmware fault detected, system halted	1. Recover the server firmware to the latest level. 2. Undo any recent configuration changes, or clear CMOS memory to restore the settings to the default values. 3. Remove any recently installed hardware.
3038003	Firmware corrupted	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) server firmware 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 x3500 M3 Type 7380," on page 145 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
3048006	Booted secondary (backup) server firmware image because of ABR	1. Run the Setup utility, select **Load Default Settings**, and save the settings to recover the primary server firmware settings. 2. Turn off the server and remove it from the power source. 3. Reconnect the server to the power source, and then turn on the server.
305000A	RTC date/time is incorrect	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: a. Battery b. (Trained service technician only) System board
3058001	System configuration invalid	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: a. Battery b. Failing device (if the device is a FRU, it must be reseated by a trained service technician only) 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Battery b. Failing device (if the device is a FRU, it must be replaced by a trained service technician only) c. (Trained service technician only) System board
3058004	Three boot failures	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. 4. Make sure that the operating system is not corrupted. 5. Run the Setup utility, save the configuration, and then restart the server.

- **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 x3500 M3 Type 7380," on page 145 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
3108007	System configuration restored to default settings	Information only. This is message is usually associated with the CMOS battery clear event.
3138002	Boot configuration error	1. Remove any recent configuration changes that you made in the Setup utility. 2. Run the Setup utility, select **Load Default Settings**, and save the settings.
3808000	IMM communication failure	1. Remove power from the server for 30 seconds, and then reconnect the server to power and restart it. 2. Update the IMM firmware. 3. (Trained service technician only) Replace the system board.
3808002	Error updating system configuration to IMM	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 firmware.
3808003	Error retrieving system configuration from IMM	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.
3808004	IMM system-event log full	• When out-of-band, use the IMM Web interface or IPMItool to clear the logs from the operating system. • When using the local console: 1. Run the Setup utility. 2. Select **System Event Logs**. 3. Select **Clear System Event Log**. 4. Restart the server.
3818001	Core Root of Trust Measurement (CRTM) update failed	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	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the system board.
3818003	Core Root of Trust Measurement (CRTM) flash lock failed	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the system board.

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- **See Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
3818004	Core Root of Trust Measurement (CRTM) system error	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	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	1. Switch the firmware bank to the backup bank. 2. Run the Setup utility, select **Load Default Settings**, and save the settings. 3. Switch the bank back to the current bank. 4. (Trained service technician only) Replace the system board.
3818007	CRTM update capsule signature invalid	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	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 Manager>Capping Enabled**. 3. Update the server firmware. 4. Update the IMM firmware.

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 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?lndocid=MIGR-5079770&brandind=5000008.

- **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 x3500 M3 Type 7380," on page 145 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 12V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	Check the power-supply LED on the Light Path diagnostics panel (see "Light path diagnostics" on page 88).
Numeric sensor Planar 12V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	Check the power-supply LED on the Light Path diagnostics panel (see "Light path diagnostics" on page 88).

• **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 x3500 M3 Type 7380," on page 145 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.**			
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 Fan *n* Tach going low (lower critical) has asserted. (*n* = fan number)	Error	A lower critical sensor going low has asserted.	1. Reseat the failing fan *n*, which is indicated by a lit LED on the fan. 2. Replace the failing fan. (*n* = fan number)
The Processor CPU *n*Status has Failed with IERR. (*n* = microprocessor number)	Error	A processor failed - IERR condition has occurred.	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 *n*. (*n* = microprocessor number)
An Over-Temperature Condition has been detected on the Processor CPU *n*Status. (*n* = microprocessor number)	Error	An overtemperature condition has occurred for microprocessor *n*. (*n* = microprocessor number)	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 *n*is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor 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 x3500 M3 Type 7380," on page 145 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 Processor CPU *n*Status has Failed with FRB1/BIST condition. (*n* = microprocessor number)	Error	A processor failed - FRB1/BIST condition has occurred.	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 microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 289 for information about microprocessor requirements). 3. (Trained service technician only) Reseat microprocessor *n*. 4. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
The Processor CPU *n*Status has a Configuration Mismatch. (*n* = microprocessor number)	Error	A processor configuration mismatch has occurred.	1. Make sure that the installed microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 289 for information about microprocessor requirements). 2. (Trained service technician only) Replace the incompatible microprocessor.

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An SM BIOS Uncorrectable CPU complex error for Processor CPU *n*Status has asserted. (*n* = microprocessor number)	Error	An SMBIOS uncorrectable CPU complex error has asserted.	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 microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 289 for information about microprocessor requirements). 3. (Trained service technician only) Reseat microprocessor *n*. 4. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
Sensor CPU *n*OverTemp has transitioned to critical from a less severe state. (*n* = microprocessor number)	Error	A sensor has changed to Critical state from a less severe state.	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 *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor 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 x3500 M3 Type 7380," on page 145 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 *n*OverTemp has transitioned to non-recoverable from a less severe state. (*n* = microprocessor number)	Error	A sensor has changed to Nonrecoverable state from a less severe state.	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 *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
Sensor CPU *n*OverTemp has transitioned to critical from a non-recoverable state. (*n* = microprocessor number)	Error	A sensor has changed to Critical state from Nonrecoverable state.	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 *n*is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
Sensor CPU *n*OverTemp has transitioned to non-recoverable. (*n* = microprocessor number)	Error	A sensor has changed to Nonrecoverable state.	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 *n*is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor 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 x3500 M3 Type 7380," on page 145 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 diagnostic interrupt has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	An operator information panel NMI/diagnostic interrupt has occurred.	If the NMI button on the system board has not been pressed, complete the following steps: 1. Make sure that the NMI button is not pressed. 2. Replace the operator information panel cable. 3. Replace the operator information panel.
A bus timeout has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A bus timeout has occurred.	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.
A software NMI has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A software NMI has occurred.	1. Check the device driver. 2. Reinstall the device driver.
The System %1 encountered a POST Error. (%1 = CIM_ComputerSystem. ElementName)	Error	A POST error has occurred. (Sensor = ABR Status)	1. Recover the server firmware from the backup page (see "Recovering the server firmware" on page 138). 2. 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.

• **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 x3500 M3 Type 7380," on page 145 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 System %1 encountered a POST Error. (%1 = CIM_ComputerSystem. ElementName)	Error	A POST error has occurred. (Sensor = Firmware Error)	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 234). 4. 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. 5. (Trained service technician only) Replace the failing microprocessor. 6. (Trained service technician only) Replace the system board.
An Uncorrectable Bus Error has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int PCI)	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.

• **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 x3500 M3 Type 7380," on page 145 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.**			
An Uncorrectable Bus Error has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int CPU)	1. Check the system-event log. 2. Check the microprocessor error LEDs. 3. Remove the failing microprocessor 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 two microprocessors are matching. 6. (Trained service technician only) Replace the system board.
An Uncorrectable Bus Error has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int DIM)	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.

• **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 x3500 M3 Type 7380," on page 145 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 Sys Board Fault has transitioned to critical from a less severe state.	Error	A sensor has changed to Critical state from a less severe state.	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.
The Power Supply (Power Supply: *n*) has Failed. (*n* = power supply number)	Error	Power supply *n*has failed. (*n* = power supply number)	1. If the power-on LED is lit, complete the following steps: a. Reduce the server to the minimum configuration. b. Reinstall the components one at a time, restarting the server each time. c. If the error recurs, replace the component that you just reinstalled. 2. Reseat power supply *n*. 3. Replace power supply *n*. (*n* = power supply number)
Sensor PS *n* Fan Fault has transitioned to critical from a less severe state. (*n* = power supply number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that there are no obstructions, such as bundled cables, to the airflow from the power-supply fan. 2. Replace power supply *n*. (*n* = power supply 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 x3500 M3 Type 7380," on page 145 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 Pwr Rail A Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. (Trained service technician only) Remove the PCI adapter and microprocessor 1. Reinstall the microprocessor in socket 1 and restart the server. 3. Restart the server. 4. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 5. Replace the failing device. 6. (Trained service technician only) Replace the system board.
Sensor Pwr Rail B Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. (Trained service technician only) Remove the PCI adapter and microprocessor 2. 3. Restart the server. 4. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 5. Replace the failing device. 6. (Trained service technician only) Replace the system board.
Sensor Pwr Rail C Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. Remove the hard disk drives, hard disk drive backplanes, and DIMMs in connectors 1 through 8. 3. Restart the server. 4. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 5. Replace the failing device. 6. (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 x3500 M3 Type 7380," on page 145 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 Pwr Rail D Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. Remove the optical drive and the DIMMs in connectors 9 through 16. 3. Restart the server. 4. Reinstall the microprocessor in socket 1 and restart the server. 5. (Trained service technician only) Replace the failing microprocessor. 6. (Trained service technician only) Replace the system board.
Sensor Pwr Rail E Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. (Trained service technician only) Remove the optical drive and the PCI adapter. 3. Restart the server. 4. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 5. Replace the failing device. 6. (Trained service technician only) Replace the system board.
Sensor Pwr Rail F Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. Remove the hard disk drives and the hard disk drive backplanes. 3. Restart the server. 4. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 5. Replace the failing device. 6. (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 x3500 M3 Type 7380," on page 145 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 PS *n* Therm Fault has transitioned to critical from a less severe state. (*n* = power supply number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that there are no obstructions, such as bundled cables, to the airflow from the power-supply fan. 2. Replace power supply *n*. (*n* = power supply number)
Sensor PS*n* 12V OV Fault has transitioned to non-recoverable. (*n* = power supply number)	Error	A sensor has changed to Nonrecoverable state.	1. Check the power-supply LED on the light path diagnostics panel (see "Light path diagnostics" on page 88). 2. Remove the power supplies. 3. Replace power supply *n*. 4. (Trained service technician only) Replace the system board. (*n* = power supply number)
Sensor PS*n* 12V UV Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Check the power-supply LED on the light path diagnostics panel (see "Light path diagnostics" on page 88). 2. Remove the power supplies. 3. Replace power supply *n*. 4. (Trained service technician only) Replace the system board. (*n* = power supply number)
Sensor PS*n* 12V OC Fault has transitioned to non-recoverable. (*n* = power supply number)	Error	A sensor has changed to Nonrecoverable state.	1. Check the power-supply LED on the light path diagnostics panel (see "Light path diagnostics" on page 88). 2. Remove the power supplies. 3. Replace power supply *n*. 4. (Trained service technician only) Replace the system board. (*n* = power supply number)
Sensor PS *n* VCO Fault has transitioned to non-recoverable. (*n* = power supply number)	Error	A sensor has changed to Nonrecoverable state.	1. Check the power-supply LED on the light path diagnostics panel (see "Light path diagnostics" on page 88). 2. Replace the failing power supply. (*n* = power supply 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 x3500 M3 Type 7380," on page 145 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.**			
Redundancy Power Unit has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Check the LEDs for both power supplies. 2. Follow the actions in "Power-supply LEDs" on page 99.
Redundancy Cooling Zone 1 has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Make sure that the connector on fan 1 and fan 4 (if installed) is not damaged. 2. Make sure that the fan connectors on the system board are not damaged. 3. Make sure that the fan cage is correctly installed. 4. Reseat the fan. 5. Replace the fan.
Redundancy Cooling Zone 2 has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Make sure that the connector on fan 2 and fan 5 (if installed) is not damaged. 2. Make sure that the fan connectors on the system board are not damaged. 3. Make sure that the fan cage is correctly installed. 4. Reseat the fan. 5. Replace the fan.
Redundancy Cooling Zone 3 has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Make sure that the connector on fan 3 and fan 6 (if installed) is not damaged. 2. Make sure that the fan connectors on the system board are not damaged. 3. Make sure that the fan cage is correctly installed. 4. Reseat the fan. 5. Replace the fan.
Sensor RAID Error has transitioned to critical from a less severe state.	Error	A sensor has changed to Critical state from a less severe state.	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.
The Drive *n* Status has been removed from unit Drive 0 Status. (*n* = hard disk drive number)	Error	A drive has been removed.	Reseat hard disk drive *n*. (*n* = hard disk drive 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 x3500 M3 Type 7380," on page 145 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 *n* Status has been disabled due to a detected fault. (*n* = hard disk drive number)	Error	A drive has been disabled because of a fault.	1. Run the hard disk drive diagnostic test on drive *n*. 2. Reseat the following components: 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: a. Hard disk drive b. Cable from the system board to the backplane c. Hard disk drive backplane (*n* = hard disk drive number)
Array %1 is in critical condition. (%1 = CIM_ComputerSystem. ElementName)	Error	An array is in Critical state. (Sensor = Drive *n* Status) (*n* = 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 *n* Status) (*n* = hard disk drive number)	Replace the hard disk drive that is indicated by a lit status LED.

• **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 x3500 M3 Type 7380," on page 145 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 uncorrectable error detected for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	A memory uncorrectable error has occurred.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 234 for memory population). 4. If the problem follows the DIMM, replace the failing DIMM (see "Removing a memory module" on page 233 and "Installing a memory module" on page 234). (Continued on the next page)

• **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 x3500 M3 Type 7380," on page 145 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 uncorrectable error detected for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	A memory uncorrectable error has occurred.	5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 7. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 287 and "Installing a microprocessor and heat sink" on page 289).

• **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 x3500 M3 Type 7380," on page 145 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.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 234 for memory population). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 287 and "Installing a microprocessor and heat sink" on page 289).
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.

• **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 x3500 M3 Type 7380," on page 145 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 disabled for All DIMMs on Memory Subsystem All DIMMs.	Info	DIMM disabled	1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 234). 2. If the DIMM was disabled because of a memory fault (memory uncorrectable error or memory logging limit reached), follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).

• **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 x3500 M3 Type 7380," on page 145 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 uncorrectable error detected for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A memory uncorrectable error has occurred.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 234 for memory population). 4. If the problem follows the DIMM, replace the failing DIMM (see "Removing a memory module" on page 233 and "Installing a memory module" on page 234). (Continued on the next page)

• **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 x3500 M3 Type 7380," on page 145 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 uncorrectable error detected for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A memory uncorrectable error has occurred.	5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 7. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 287 and "Installing a microprocessor and heat sink" on page 289).

• **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 x3500 M3 Type 7380," on page 145 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 One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	The memory logging limit has been reached.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 234 for memory population). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 287 and "Installing a microprocessor and heat sink" on page 289).
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.

• **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 x3500 M3 Type 7380," on page 145 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 disabled for One of the DIMMs on Memory Subsystem One of the DIMMs.	Info	DIMM disabled.	1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 234). 2. If the DIMM was disabled because of a memory fault (memory uncorrectable error or memory logging limit reached), follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).

• **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 x3500 M3 Type 7380," on page 145 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 uncorrectable error detected for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Error	A memory uncorrectable error has occurred.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 234 for memory population). 4. If the problem follows the DIMM, replace the failing DIMM (see "Removing a memory module" on page 233 and "Installing a memory module" on page 234). (Continued on the next page)

• **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 x3500 M3 Type 7380," on page 145 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 uncorrectable error detected for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Error	A memory uncorrectable error has occurred.	5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 7. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 287 and "Installing a microprocessor and heat sink" on page 289).

• **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 x3500 M3 Type 7380," on page 145 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 *n*Status on Memory Subsystem DIMM*n*Status. (*n* = DIMM number)	Error	The memory logging limit has been reached.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 234 for memory population). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 287 and "Installing a microprocessor and heat sink" on page 289).
Memory DIMM Configuration Error for DIMM *n*Status on Memory Subsystem DIMM *n*Status. (*n* = 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.

• **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 x3500 M3 Type 7380," on page 145 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 disabled for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Info	DIMM disabled.	1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 234). 2. If the DIMM was disabled because of a memory fault (memory uncorrectable error or memory logging limit reached), follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).

• **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 x3500 M3 Type 7380," on page 145 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 scrub failure for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Error	DIMM scrub failure.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 234 for memory population). 4. If the problem is related to a DIMM, replace the failing DIMM (see "Removing a memory module" on page 233 and "Installing a memory module" on page 234). (Continued on the next page)

• **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 x3500 M3 Type 7380," on page 145 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 scrub failure for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Error	DIMM scrub failure.	5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 7. (Trained service technician only) If the problem is related to microprocessor socket pins, replace the system board (see "Removing the system board" on page 299 and "Installing the system board" on page 301). 8. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 287 and "Installing a microprocessor and heat sink" on page 289).
Sensor DIMM *n* Temp has transitioned to critical from a less severe state. (*n* = DIMM number)	Error	A sensor has changed to Critical state from a less severe state.	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 *n*. (*n* = 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 x3500 M3 Type 7380," on page 145 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 PCI PERR has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A PCI PERR has occurred. (Sensor = PCI Slot *n*; *n* = PCI slot number)	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 *n*. 5. Replace the PCIe adapter. 6. Replace extender card *n*. (*n* = PCI slot number)
A PCI SERR has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A PCI SERR has occurred. (Sensor = PCI Slot *n*; *n* = PCI slot number)	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 *n*. 5. Replace the PCIe adapter. 6. Replace extender card *n*. (*n* = PCI slot 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 x3500 M3 Type 7380," on page 145 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 PCI PERR has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A PCI PERR has occurred. (Sensor = One of PCI Err)	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.
A PCI SERR has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A PCI SERR has occurred. (Sensor = One of PCI Err)	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 x3500 M3 Type 7380," on page 145 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.**			
Fault in slot System board on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error		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.
Redundancy Bckup Mem Status has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	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.
IMM Network Initialization Complete.	Info	An IMM network has completed initialization.	No action; information only.
Certificate Authority %1 has detected a %2 Certificate Error. (%1 = IBM_CertificateAuthority. CADistinguishedName; %2 = CIM_PublicKeyCertificate. ElementName)	Error	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.	1. Make sure that the certificate that you are importing is correct. 2. Try importing the certificate again.
Ethernet Data Rate modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort.Speed; %2 = CIM_EthernetPort.Speed; %3 = user ID)	Info	A user has modified the Ethernet port data rate.	No action; information only.

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 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_StaticIPAssignment SettingData.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_StaticIPAssignment SettingData.SubnetMask; %3 = user ID)	Info	A user has modified the IP subnet mask of the IMM.	No action; information only.

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 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_StaticIPAssignment SettingData. 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.	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.	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.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.

• **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 x3500 M3 Type 7380," on page 145 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.	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.	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.
DHCP setting changed to by user %1. (%1 = user ID)	Info	A user has changed the DHCP mode.	No action; information only.

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 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.**			
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.	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.	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.
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.

• **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 x3500 M3 Type 7380," on page 145 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.**			
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_NTPService.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.	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: • IMM main application • IMM boot ROM • Server firmware • Diagnostics • Integrated service processor	No action; information only.
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.

• **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 x3500 M3 Type 7380," on page 145 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 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.	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.	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

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

About the checkout procedure

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

- Read the safety information that begins on page vii.
- The diagnostic programs provide the primary methods of testing the major components of the server, such as the system board, Ethernet controller, keyboard, mouse (pointing device), serial ports, and hard disk drives. You can also use them to test some external devices. If you are not sure whether a problem is caused by the hardware or by the software, you can use the diagnostic programs to confirm that the hardware is working correctly.
- When you run the diagnostic programs, a single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run the diagnostic programs.

  Exception: If 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 80 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 sharing external storage devices). If it is part of a cluster, you can run all diagnostic programs except the ones that test the storage unit (that is, a hard disk drive in the storage unit) or the storage adapter that is attached to the storage unit. The failing server might be part of a cluster if any of the following conditions is true:
  - You have identified the failing server as part of a cluster (two or more servers sharing external storage devices).
  - One or more external storage units are attached to the failing server and at least one of the attached storage units is also attached to another server or unidentifiable device.
  - One or more servers are located near the failing server.

  Important: If the server is part of a shared hard disk drive cluster, run one test at a time. Do not run any suite of tests, such as “quick” or “normal” tests, because this might enable the hard disk drive diagnostic tests.
- If the server is halted and a POST error code is displayed, see “POST error codes” on page 24. If the server is halted and no error message is displayed, see “Troubleshooting tables” on page 74 and “Solving undetermined problems” on page 141.
- For information about power-supply problems, see “Solving power problems” on page 140 and “Power-supply LEDs” on page 99.
- For intermittent problems, check the system-event log; see “Event logs” on page 21, “System-event log” on page 35, and “Diagnostic programs, messages, and error codes” on page 101.

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. Check all internal and external devices for compatibility at http://www.ibm.com/servers/eserver/serverproven/compat/us/.
   d. Set all display controls to the middle positions.
   e. Turn on all external devices.
   f. Turn on the server. If the server does not start, see “Troubleshooting tables” on page 74.
   g. Check the system-error LED on the operator information panel (see “Server controls, LEDs, and connectors” on page 9). If it is flashing, check the light path diagnostics LEDs (see “Light path diagnostics” on page 88).
   h. Check for the following results:
      - Successful completion of POST
      - Successful completion of startup, indicated by a readable display of the operating-system desktop
3. Are there readable instructions on the main menu?
   - **No:** Find the failure symptom in “Troubleshooting tables” on page 74; if necessary, see “Solving undetermined problems” on page 141.
   - **Yes:** Run the diagnostic programs (see “Running the diagnostic programs” on page 101).
     – If you receive an error, see “Diagnostic messages” on page 102.
     – If the diagnostic programs were completed successfully and you still suspect a problem, see “Solving undetermined problems” on page 141.

Troubleshooting tables

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

If you cannot find a problem in these tables, see “Running the diagnostic programs” on page 101 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 you use the troubleshooting tables:

1. Check the operator information panel and the light path diagnostics LEDs (see “Light path diagnostics” on page 88).
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 x3500 M3 Type 7380,” on page 145 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 is not recognized.	1. Make sure that: • The SATA channel to which the DVD drive is attached (primary or secondary) is enabled in the Setup utility. • All cables and jumpers are installed correctly. • The signal cable and connector are not damaged and the connector pins are not bent. • The correct device driver is installed for the DVD drive. 2. Run the DVD drive diagnostic programs. 3. Reseat the following components: a. DVD drive b. DVD drive cables 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. DVD drive b. DVD drive and cables c. (Trained service technician only) System board
A DVD is not working correctly.	1. Clean the DVD. 2. Run the DVD drive diagnostic programs. 3. Reseat the DVD drive. 4. Replace the DVD 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 x3500 M3 Type 7380," on page 145 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.	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. 4. Replace the DVD drive.

General 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 x3500 M3 Type 7380," on page 145 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

- **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 x3500 M3 Type 7380," on page 145 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 tests.	Remove the drive that is indicated by the diagnostic tests; then, run the hard disk drive diagnostic tests again. If the remaining drives are recognized, replace the drive that you removed with a new one.
The server stops responding during the hard disk drive diagnostic test.	Remove the hard disk drive that was being tested when the server stopped responding, and run the diagnostic test again. If the hard disk drive diagnostic test runs successfully, replace the drive that you removed with a new one.
A hard disk drive was not detected while the operating system was being started.	Reseat all hard disk drives and cables; then, run the hard disk drive diagnostic tests again.
A hard disk drive passes the diagnostic Fixed Disk Test, but the problem remains.	Run the diagnostic SCSI Fixed Disk Test (see "Running the diagnostic programs" on page 101). **Note:** This test is not available on servers that have RAID arrays or servers that have SATA hard disk drives.

Hypervisor 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 x3500 M3 Type 7380," on page 145to 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.**

Symptom	Action
If an optional embedded hypervisor flash device is not listed in the expected boot order, does not appear in the list of boot devices, or a similar problem has occurred.	1. Make sure that the optional embedded hypervisor flash device is selected on the boot manager (<F12> Select Boot Device) at startup. 2. Make sure that the embedded hypervisor flash device is seated in the connector correctly (see "Removing a USB embedded hypervisor flash device" on page 238and "Installing a USB embedded hypervisor flash device" on page 239). 3. See the documentation that comes with the optional embedded hypervisor flash device for setup and configuration information. 4. Make sure that other software works on the server.

Intermittent 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 x3500 M3 Type 7380," on page 145 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.	1. Make sure that: • 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-event log or IMM log (see "Event logs" on page 21). 3. See "Solving undetermined problems" on page 141.

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 x3500 M3 Type 7380," on page 145 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.	1. Make sure that: • The keyboard cable is securely connected. • The server and the monitor are turned on. 2. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for keyboard compatibility. 3. If you are using a USB keyboard, run the Setup utility and enable keyboardless operation to prevent the 301 POST error message from being displayed during startup. 4. 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. 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. Keyboard b. (Trained service technician only) System board
The mouse or pointing device does not work.	1. Make sure that: • The mouse or pointing device is compatible with the server. See http://www.ibm.com/servers/eserver/serverproven/compat/us/. • The mouse or pointing-device cable is securely connected to the server. • The mouse or pointing-device device drivers are installed correctly. • The server and the monitor are turned on. • The mouse is enabled in the Setup utility. 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: a. Mouse or pointing device b. (Trained service technician only) System board

Memory problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 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.	1. Make sure that: • No error LEDs are lit on the operator information panel or on the DIMM. • Memory mirroring does not account for the discrepancy. • The memory modules are seated correctly. • You have installed the correct type of memory. • If you changed the memory, you updated the memory configuration in the Setup utility. • All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled. 2. Check the POST error log: • If a DIMM was disabled by a systems-management interrupt (SMI), replace the DIMM. • If a DIMM was disabled by the user or by POST, run the Setup utility and enable the DIMM. 3. Run memory diagnostics (see "Running the diagnostic programs" on page 101). 4. Make sure that there is no memory mismatch when the server is at the minimum memory configuration (one 1 GB DIMM); see the information about the minimum required configuration on page "Solving undetermined problems" on page 141). 5. Add one pair of DIMMs at a time, making sure that the DIMMs in each pair match. 6. Reseat the DIMMs, and then restart the server. 7. Reverse the DIMMs between the channels (of the same microprocessor), and then restart the server. If the problem is related to a DIMM, replace the failing DIMM. 8. (Trained service technician only) Install the failing DIMM into a DIMM connector for microprocessor 2 (if installed) to verify that the problem is not the microprocessor or the DIMM connector. 9. (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 x3500 M3 Type 7380," on page 145 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
Multiple rows of DIMMs in a branch are identified as failing.	1. Reseat the DIMMs; then, restart the server. 2. 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. Repeat as necessary. If the failures continue after all identified pairs are replaced, go to step4. 3. Return the removed DIMMs, one pair at a time, to their original connectors, restarting the server after each pair, until a pair fails. Replace each DIMM in the failed pair with an identical known good DIMM, restarting the server after each DIMM. Replace the failed DIMM. Repeat step 3 until you have tested all removed DIMMs. 4. Replace the lowest-numbered DIMM pair of those identified; then, restart the server. Repeat as necessary. 5. Reverse the DIMMs between the channels (of the same microprocessor), and then restart the server. If the problem is related to a DIMM, replace the failing DIMM. 6. (Trained service technician only) Install the failing DIMM into a DIMM connector for microprocessor 2 (if installed) to verify that the problem is not the microprocessor or the DIMM connector. 7. (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 x3500 M3 Type 7380," on page 145 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The server emits a continuous beep during POST, indicating that the startup (boot) microprocessor is not working correctly.	1. Correct any errors that are indicated by the light path diagnostics LEDs (see "Light path diagnostics" on page 88). 2. Make sure that the server supports all the microprocessors and that the microprocessors match in speed and cache size. 3. (Trained service technician only) Reseat microprocessor 1 4. (Trained service technician only) If there is no indication of which microprocessor has failed, isolate the error by testing with one microprocessor at a time. 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Microprocessor 2 b. VRM 2 c. (Trained service technician only) System board 6. (Trained service technician only) If multiple error codes or light path diagnostics LEDs indicate a microprocessor error, reverse the locations of two microprocessors to determine whether the error is associated with a microprocessor or with a microprocessor socket. • If the error is associated with a microprocessor, replace the microprocessor. • If the error is associated with a VRM, replace the VRM. • If the error is associated with a microprocessor socket, replace the system board.

Monitor problems

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

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 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	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. (Trained service technician only) Replace the system board.
The screen is blank.	1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the monitor cable directly to the correct connector on the rear of the server. 2. Make sure that: • The server is turned on. If there is no power to the server, see "Power problems" on page 84. • The monitor cables are connected correctly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. • No POST errors are generated when the server is turned on. 3. Make sure that the correct server is controlling the monitor, if applicable. 4. See "Solving undetermined problems" on page 141.
The monitor works when you turn on the server, but the screen goes blank when you start some application programs.	1. Make sure that: • 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 101). • If the server passes the video diagnostics, the video is good; see "Solving undetermined problems" on page 141. • (Trained service technician only) If the server fails the video diagnostics, replace the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	1. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. **Attention:** Moving a color monitor while it is turned on might cause screen discoloration. Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor. **Notes:** 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 monitor. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor b. (Trained service technician only) System board
Wrong characters appear on the screen.	1. If the wrong language is displayed, update the server firmware with the correct language (see "Updating the firmware" on page 304). 2. Reseat the monitor 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor b. (Trained service technician only) System board

Optional-device problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 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.	1. Make sure that: • 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. 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.	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. If the failing device is a SCSI device, make sure that: • The cables for all external SCSI devices are connected correctly. • The last device in each SCSI chain, or the end of the SCSI cable, is terminated correctly. • Any external SCSI device is turned on. You must turn on an external SCSI device before you turn on the server. 4. Reseat the failing device. 5. 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 x3500 M3 Type 7380," on page 145 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 power-control button does not work (the server does not start). **Note:** The power-control button will not function until 20 seconds after the server has been connected to AC power.	1. Make sure that the power-control button is working correctly: a. Disconnect the server power cords. b. Reconnect the power cords. c. (Trained service technician only) Reseat the operator information panel cables, and then repeat steps 1a and 1b. If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel. 2. Make sure that: • The power cords are correctly connected to the server and to a working electrical outlet. • The type of memory that is installed is correct. • The DIMM is fully seated. • The LEDs on the power supply do not indicate a problem. • The microprocessors are installed in the correct sequence. 3. Reseat the following components: a. DIMMs b. (Trained service technician only) Power switch connector c. (Trained service technician only) Power backplane 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. DIMMs b. (Trained service technician only) Power switch connector c. (Trained service technician only) Power backplane d. (Trained service technician only) System board 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 "Power-supply LEDs" on page 99. 7. See "Solving undetermined problems" on page 141.
The server does not turn off.	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: a. Press Ctrl+Alt+Delete. b. Turn off the server by pressing the power-control button for 5 seconds. c. Restart the server. d. If the server fails POST and the power-control button does not work, disconnect the power cord for 20 seconds; then, reconnect the power cord and restart the server. 2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.

- **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 x3500 M3 Type 7380," on page 145 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 operator information panel are not lit.	See "Solving undetermined problems" on page 141.

Serial port problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 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.	1. Make sure that: • Each port is assigned a unique address in the Setup utility 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.	1. Make sure that: • 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. 2. Reseat the following components: 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: a. Failing serial device b. Serial cable c. (Trained service technician only) System board

ServerGuide problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 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 *ServerGuide Setup and Installation* CD will not start.	1. Make sure that the server supports the ServerGuide program and has a startable (bootable) DVD drive. 2. If the startup (boot) sequence settings have been changed, make sure that the DVD drive is first in the startup sequence. 3. If more than one 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 Manager program cannot view all installed drives, or the operating system cannot be installed.	1. Make sure that the hard disk drive is connected correctly. 2. Make sure that the SAS hard disk drive cables are securely connected.
The operating-system installation program continuously loops.	Make more space available on the hard disk.
The ServerGuide program will not start the operating-system CD.	Make sure that the operating-system CD is supported by the ServerGuide program. Go to http://www.ibm.com/systems/management/serverguide/sub.html, click **IBM Service and Support Site**, click the link for your ServerGuide version, and scroll down to the list of supported Microsoft Windows operating systems.
The operating system cannot be installed; the option is not available.	Make sure that the server supports the operating system. If it does, either no logical drive is defined (SCSI RAID servers), or the ServerGuide System Partition is not present. Run the ServerGuide program and make sure that setup is complete.

Software 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 x3500 M3 Type 7380," on page 145 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.	1. To determine whether the problem is caused by the software, make sure that: • 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 while you use the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem. 3. Contact the software vendor.

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 x3500 M3 Type 7380," on page 145 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.	1. Run USB diagnostics (see "Running the diagnostic programs" on page 101). 2. Make sure that: • The correct USB device driver is installed. • The operating system supports USB devices. • A standard PS/2 keyboard or mouse is not connected to the server. If it is, a USB keyboard or mouse will not work during POST. 3. Make sure that the USB configuration optional devices are set correctly in the Setup utility (see "Setup utility menu choices" on page 305 for more information). 4. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.

Light path diagnostics

Light path diagnostics is a system of LEDs on various external and internal components of the server. When an error occurs, LEDs are lit throughout the server. By viewing the LEDs in a particular order, you can often identify the source of the error.

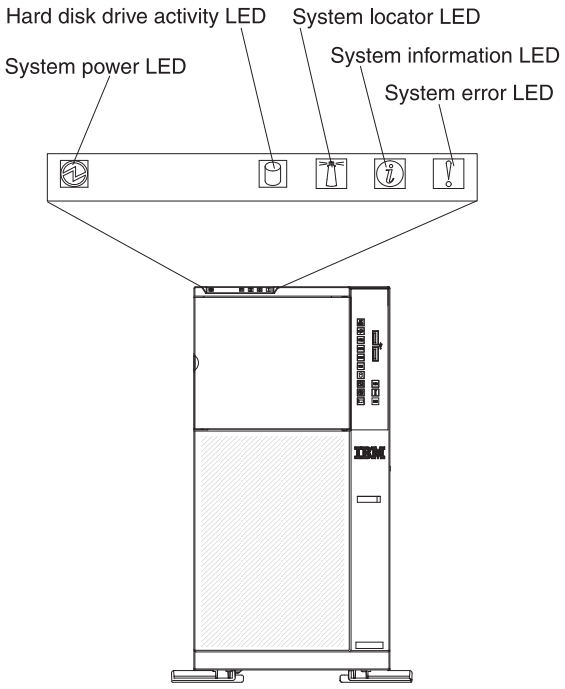
When LEDs are lit to indicate an error, they remain lit when the server is turned off, provided that the server is still connected to power and the power supply is operating correctly.

Before you work inside the server to view light path diagnostics LEDs, read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.

If an error occurs, view the light path diagnostics LEDs in the following order:

1. Look at the operator information panel LEDs on the front of the server.
   - If an operator information panel LED is lit, it indicates that information about a suboptimal condition in the server is available in the system-event log.
   - If the system-error LED is lit, it indicates that an error has occurred; go to step 2 on page 89.

   The following illustration shows the operator information panel LEDs that are visible through the bezel.

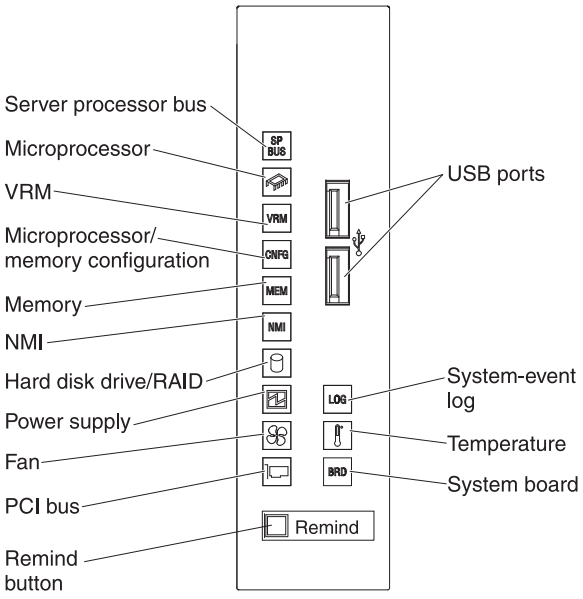


The following table lists the operator information panel LEDs, the problems that they indicate, and actions to solve the problems.

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See the Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 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.**	
Lit light path diagnostics LED with the system-error or information LED also lit	**Description**
System power (green)	• **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 20 to 40 seconds. **Note:** Approximately 20 seconds after the server is connected to ac power, the power-control button becomes active. • **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.
Hard disk drive activity (green)	When this LED is flashing rapidly, it indicates that there is activity on a hard disk drive.
System locator (blue)	Use this LED to visually locate the server among other servers. You can use IBM Systems Director to light this LED remotely.
System information (amber)	When this amber LED is lit, it indicates that information about a suboptimal condition in the server is available in the IMM event log or in the system-event log. Check the light path diagnostics panel for more information.
System error (amber)	When this LED is lit, it indicates that a system error has occurred. Use the light path diagnostics panel and the system service label to further isolate the error.

2. Look at the light path diagnostics panel on the front of the server. Lit LEDs on the light path diagnostics panel indicate the type of error that has occurred.

   The following illustration shows the light path diagnostics panel LEDs that are visible through the bezel.



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

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 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.**

Lit light path diagnostics LED with the system-error or information LED also lit	Description	Action
System-event log (LOG)	A system error occurred.	View the contents of the system-event log (see "Event logs" on page 21).
Temperature	The system temperature has exceeded a threshold level.	1. See the system-event log for the source of the fault (see "System-event log" on page 35). 2. Make sure that the airflow in the server is not blocked. 3. Make sure that the room temperature is neither too hot nor too cold (see "Environment" in "Features and specifications" on page 7).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 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.**

Lit light path diagnostics LED with the system-error or information LED also lit	Description	Action
System board (BRD)	An error occurred on the system board.	1. Check the LEDs on the system board to identify the component that is causing the error. The BRD LED can be lit for the following conditions: • Failed or missing battery • Failed voltage regulator 2. Check the system-event log for information about the error. 3. Replace any failed or missing replaceable components, such as the battery. 4. (Trained service technician only) If a voltage regulator has failed, replace the system board.
PCI bus	A PCI adapter has failed.	1. See the system-event log (see "System-event log" on page 35). 2. Check the LEDs on the PCI slots to identify the component that is causing the error, and reseat the failing adapter. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Failing adapter b. (Trained service technician only) System board
Fan	A fan has failed or is operating too slowly.	1. Reinstall the removed fan. 2. If an individual fan LED is lit, replace the fan. 3. (Trained service technician only) Replace the system board.
Power supply	A power supply has failed or has been removed.	1. Check the individual power-supply LEDs. 2. Reseat the following components: a. Power supply b. (Trained service technician only) Power-supply cage cables 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Power supply b. (Trained service technician only) Power-supply cage

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 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.**

Lit light path diagnostics LED with the system-error or information LED also lit	Description	Action
DASD/RAID	A hard disk drive, SAS adapter, or RAID adapter error has occurred. **Notes:** 1. This LED is also lit when a hard disk drive is removed from the server. 2. The error LED on the failing hard disk drive is also lit. 3. Check the system-event log for a RAID error.	1. Reinstall the removed drive. 2. Reseat the following components: a. Failing hard disk drive b. SAS hard disk drive backplane c. SAS signal and power cables d. System board e. ServeRAID adapter 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time.
NMI	A hardware error has been reported to the operating system.	1. See the system-event log (see "System-event log" on page 35). 2. If the PCI LED is lit, follow the instructions for that LED. 3. If the MEM LED is lit, follow the instructions for that LED. 4. Restart the server.
Memory (MEM)	A memory error has occurred. **Note:** The error LED on the DIMM is also lit.	1. If the MEM LED and the CNFG LED are lit, complete the following step: a. Check the system-event log in the Setup utility or IMM error messages. Follow steps indicated in "POST error codes" on page 24 and "Integrated management module error messages" on page 35. 2. If the CNFG LED is not lit, the system might detect a memory error. Complete the following steps to correct the problem: a. Update the server firmware to the latest level (see "Updating the firmware" on page 304). b. Reseat or swap the DIMMs. c. Check the system-event log in the Setup utility or IMM error messages. Follow steps indicated in "POST error codes" on page 24 and "Integrated management module error messages" on page 35.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 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.**

Lit light path diagnostics LED with the system-error or information LED also lit	Description	Action
Microprocessor/ Memory Configuration (CNFG)	A hardware configuration error has occurred. (This LED is used with the MEM, VRM, and CPU LEDs.)	1. (The system error LED, CPU LED, and this LED are lit when POST detects a microprocessor mismatch.) Remove and install two microprocessors of the same cache size, type, and clock speed. 2. (The system error LED, MEM LED, and this LED are lit when POST detects an invalid memory configuration.) Check the system-event log in the Setup utility or IMM error messages. Follow steps indicated in "POST error codes" on page 24 and "Integrated management module error messages" on page 35. 3. (The system error LED, VRM LED, and this LED are lit when POST detects a missing VRM.) Install a VRM for microprocessor 2 (see "Installing a voltage regulator module" on page 229). 4. Check the system error log for information indicating incompatible components.
VRM	A VRM has failed.	1. Check the system-event log to determine the reason for the lit LED (for a VRM). 2. Determine whether the CNFG LED is also lit. If the CNFG LED is lit, the memory configuration is invalid. Reseat the VRM. 3. If the CNFG LED is not lit, reseat the following components: a. Failing VRM b. (Trained service technician only) Microprocessor associated with the VRM 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Failing VRM b. (Trained service technician only) Microprocessor associated with the VRM c. (Trained service technician only) System board

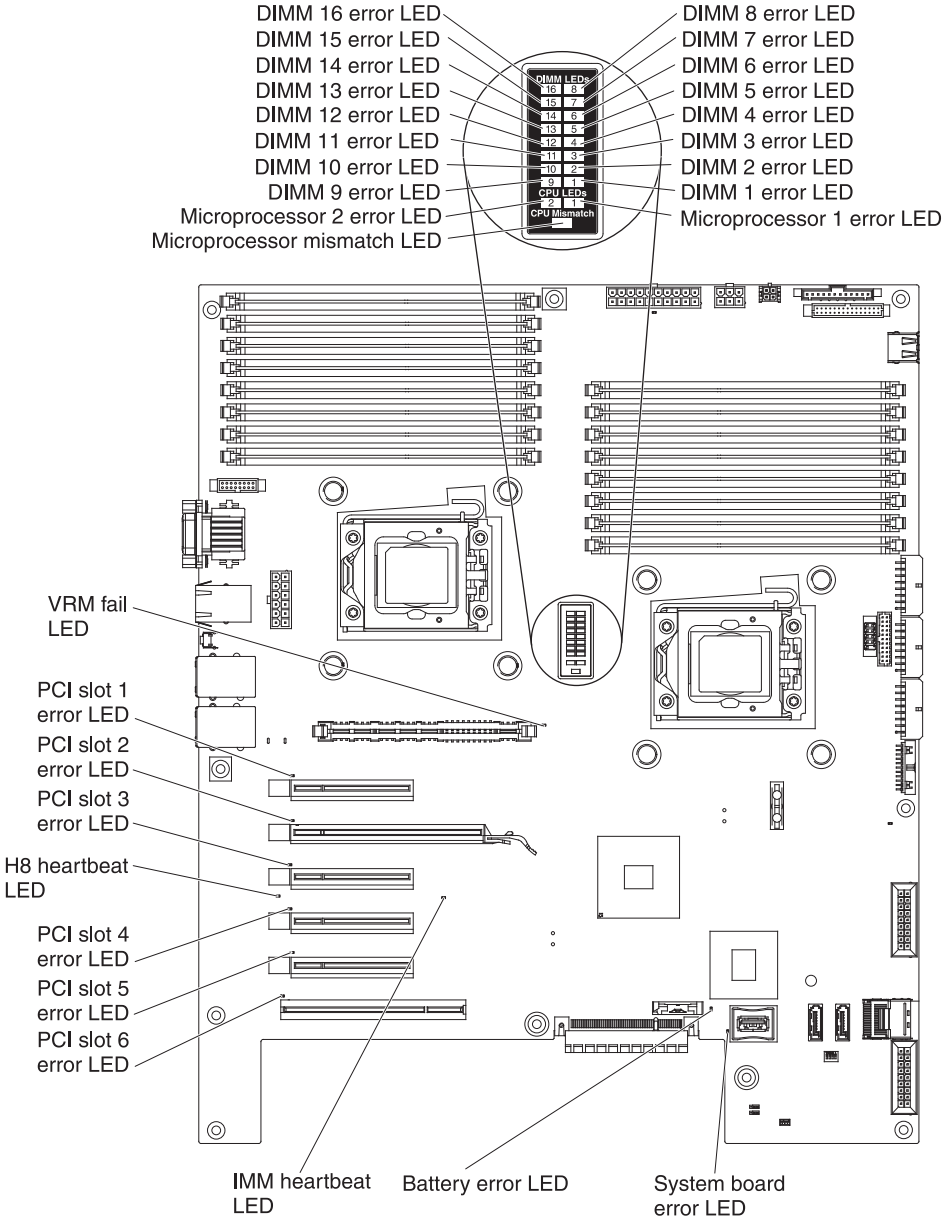
- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See the Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Lit light path diagnostics LED with the system-error or information LED also lit	Description	Action
Microprocessor (CPU)	A microprocessor has failed, or an invalid microprocessor configuration is installed. **Note:** (Trained service technician only) Make sure that the microprocessors are installed in the correct sequence.	1. Check the system-event log to determine the reason for the lit LED. 2. Determine whether the CNFG LED is also lit. If the CNFG LED is not lit, a microprocessor has failed. a. Make sure that the failing microprocessor, which is indicated by the CPU1 or CPU2 error LED on the system board, is installed correctly. b. Replace the following components one at a time, in the order shown, restarting the server each time: 1) (Trained service technician only) Failing microprocessor 2) (Trained service technician only) System board c. If the CNFG LED is lit and the CPU mismatch LED on the system board is also lit, an invalid microprocessor configuration is installed: 1) Make sure that the microprocessors are compatible with each other. They must match in speed and cache size. Use the Setup utility to compare the microprocessor information. 2) (Trained service technician only) Replace the incompatible microprocessor.
Service processor bus (SP BUS)	The IMM detects an internal error.	1. Disconnect the server from AC power; then, reconnect the server to power and restart the server. 2. Update the IMM firmware.

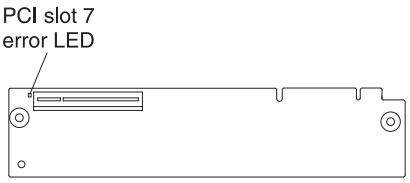
Look at the system service label on the top of the server, which gives an overview of internal components that correspond to the LEDs on the light path diagnostics panel. This information can often provide enough information to diagnose the error.

3. Remove the server cover and look inside the server for lit LEDs. Certain components inside the server have LEDs that are lit to indicate the location of a problem.

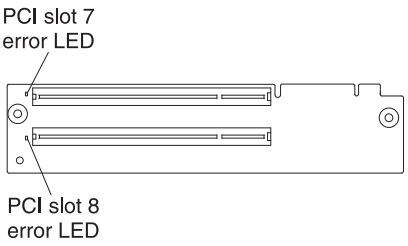
   The following illustration shows the LEDs on the system board.



The system board is equipped with a PCI extender card that provides either one or two additional expansion slots. The following illustration shows the LEDs on the PCI Express extender card, if one is installed.



The following illustration shows the LEDs on the PCI-X extender card, if one is installed.



The following table describes the LEDs on the system board and extender card and suggested actions to correct the detected 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 x3500 M3 Type 7380," on page 145 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.**

Lit light path diagnostics LED with the system-error or information LED also lit	Description	Action
DIMM 1 to DIMM 16 error LEDs	A DIMM has failed or is incorrectly installed.	1. Remove the DIMM that is indicated by a 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: a. DIMM b. (Trained service technician only) System board
CPU 1 error LED	Microprocessor 1 has failed, is missing, or has been incorrectly installed. **Note:** (Trained service technician only) Make sure that the microprocessors are installed in the correct sequence; see "Installing a microprocessor and heat sink" on page 289.	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: a. (Trained service technician only) Failing microprocessor b. (Trained service technician only) System board

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3500 M3 Type 7380," on page 145 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.**

Lit light path diagnostics LED with the system-error or information LED also lit	Description	Action
CPU 2 error LED	Microprocessor 2 has failed, is missing, or has been incorrectly installed. **Note:** (Trained service technician only) Make sure that the microprocessors are installed in the correct sequence; see "Installing a microprocessor and heat sink" on page 289.	1. Check the system-event log to determine the reason for the lit LED. 2. Find the failing, missing, or mismatched microprocessor by checking the LEDs on the system board. 3. (Trained service technician) Reseat the failing microprocessor. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Failing microprocessor b. (Trained service technician only) System board
CPU mismatch LED	A mismatched microprocessor has been installed. **Note:** All microprocessors must have the same speed and cache size.	1. Run the Setup utility and view the microprocessor information to compare the installed microprocessor specifications. 2. (Trained service technician only) Remove and replace one of the microprocessors so that they both match.
VRM failure LED	Microprocessor 2 VRM has failed or is incorrectly installed.	1. Reseat the VRM 2. Replace the following components one at a time, in the order shown, restarting the server each time: a. VRM b. (Trained service technician only) System board 3. Replace the VRM
System board error LED	System board CPU VRD, power voltage regulators, or both have failed.	(Trained service technician only) Replace the system board.
Battery failure LED	Battery low.	1. Replace the CMOS lithium battery, if necessary. 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 x3500 M3 Type 7380," on page 145 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.**

Lit light path diagnostics LED with the system-error or information LED also lit	Description	Action
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 if fully operational and you can press the power-control button to start the server.	If the LED does not begin flashing within 30 seconds of when the server is connected to power, complete the following steps: 1. (Trained service technician only) Use the IMM recovery switch to recover the firmware (see Table 4 on page 16). 2. (Trained service technician only) Replace the system board.
PCI slot 1 to PCI slot 8 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.	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&lndocid=SERV-CALL for additional troubleshooting information. for additional troubleshooting information.
H8 heartbeat LED	Indicates the status of power-on and power-off sequencing.	1. If the H8 heartbeat LED is blinking at a 1 Hz rate, no action is necessary. 2. (Trained service technician only) If the H8 heartbeat LED is not blinking, replace the system board.

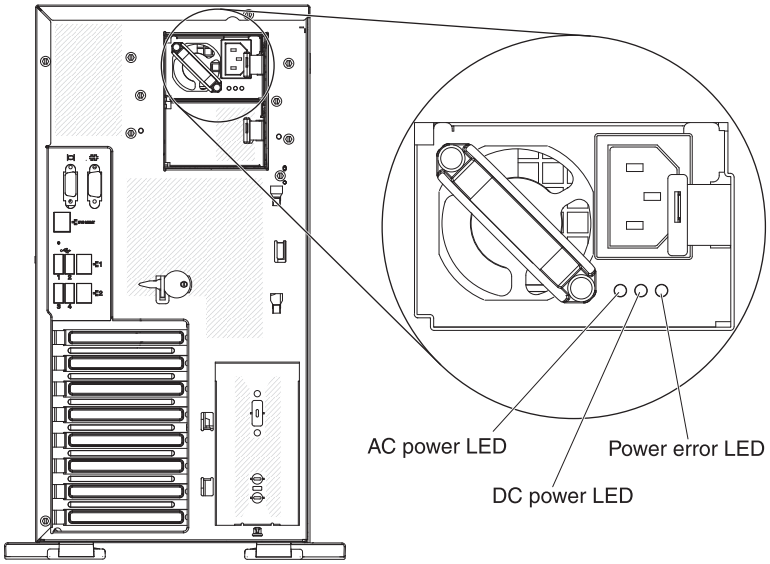
Remind button

You can use the remind button on the light path diagnostics panel to put the system-error LED on the operator information panel into Remind mode. When you press the remind button, you acknowledge the error but indicate that you will not take immediate action. The system-error LED flashes while it is in Remind mode and stays in Remind mode until one of the following conditions occurs:

- All known errors are corrected.
- The server is restarted.
- A new error occurs, causing the system-error LED to be lit again.

Power-supply LEDs

The following illustration shows the power-supply LEDs on the rear of the server.



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

Table 6. 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	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	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	1. Reseat the power supply. 2. If the system board error LED is not lit, replace the power supply. 3. (Trained service technician only) If system board error LED is lit, 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, messages, and error codes

The diagnostic programs are the primary method of testing the major components of the server. As you run the diagnostic programs, text messages and error codes are displayed on the screen and are saved in the test log. A diagnostic text message or error code indicates that a problem has been detected; to determine what action you should take as a result of a message or error code, see the table in "Diagnostic messages" on page 102.

Running the diagnostic programs

To run the diagnostic programs, complete the following steps:

1. If the server is running, turn off the server and all attached devices.
2. Turn on all attached devices; then, turn on the server.
3. When the prompt `Press F2 for Dynamic System Analysis (DSA)` is displayed, press F2.

   Note: DSA Preboot might appear to be unresponsive when you start the program. This is normal operation while the program loads. The loading process may take up to 10 minutes.
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. Type **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 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 80 for information about diagnosing microprocessor problems.

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

Diagnostic text messages

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

Passed: The test was completed without any errors.

Failed: The test detected an error.

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

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

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

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

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

Viewing the test log

To view the DSA log when the tests are completed, select **Utility** from the top of the screen and then select **View Test Log**. To view a detailed test log, press Tab while you view the DSA log. The DSA log data is maintained only while you are running the diagnostic programs. When you exit from the diagnostic programs, the DSA log is cleared.

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

Notes:

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

Diagnostic 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 column.

Table 7. DSA messages

• **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 x3500 M3 Type 7380," on page 145 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 number	**Component**	**Test**	**State**	**Description**	**Action**
089-000-xxx	CPU	CPU Stress test	Pass	CPU passed stress test	No action required.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
089-801-xxx	CPU	CPU Stress Test	Aborted	Internal program error.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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: 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
089-802-xxx	CPU	CPU Stress Test	Aborted	System resource availability error.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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: 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
089-901-xxx	CPU	CPU Stress Test	Failed	Test failure.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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: 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&lndocid=SERV-CALL.
166-801-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the IMM returned an incorrect response length.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 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.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
166-803-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the node is busy; try later.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
166-804-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: invalid command.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
166-805-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: invalid command for the given LUN.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
166-806-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: timeout while processing the command.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
166-807-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: out of space.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
166-808-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: reservation aborted or invalid reservation ID.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
166-809-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: request data was truncated.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
166-810-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: request data length is invalid.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
166-811-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: request data field length limit is exceeded.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
166-812-xxx	IMM	IMM I2C Test	Aborted	IMM I2C Test stopped a parameter is out of range.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
166-813-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot return the number of requested data bytes.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 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.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
166-815-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: invalid data field in the request.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 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.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
166-817-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
166-818-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot execute a duplicated request.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
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.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
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.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
166-821-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided; IMM initialization is in progress.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
166-822-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the destination is unavailable.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
166-823-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot execute the command; insufficient privilege level.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
166-824-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot execute the command.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
166-901-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the H8 bus (Bus 0)	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 6. Run the test again. 7. Remove power from the system. 8. (Trained service technician only) Replace the system board. 9. Reconnect the system to power and turn on the system. 10. Run the test again. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
166-902-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the I/O Expander (Bus 1).	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. Reseat the light path diagnostics panel. 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 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
166-903-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the host bus (Bus 2).	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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 7. DSA 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 x3500 M3 Type 7380," on page 145 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 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).	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 6. Run the test again. 7. Reseat the power supply. 8. Run the test again. 9. Turn off the system and disconnect it from the power source. 10. Trained service technician only) Replace the system board. 11. Reconnect the system to the power source and turn on the system. 12. Run the test again. 13. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
166-905-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the SAS backplane and the Sensor bus (Bus 4)	**Note:** Ignore the error if the hard disk drive backplane is not installed. 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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 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).	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. Trained service technician only) Replace the system board. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 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&lndocid=SERV-CALL.
201-801-xxx	Memory	Memory Test	Aborted	Test aborted: the server firmware programmed the memory controller with an invalid CBAR address	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
201-802-xxx	Memory	Memory Test	Aborted	Test aborted: the end address in the E820 function is less than 16 MB.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
201-803-xxx	Memory	Memory Test	Aborted	Test aborted: could not enable the processor cache.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
201-804-xxx	Memory	Memory Test	Aborted	Test aborted: the memory controller buffer request failed.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
201-805-xxx	Memory	Memory Test	Aborted	Test aborted: the memory controller display/alter write operation was not completed.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
201-806-xxx	Memory	Memory Test	Aborted	Test aborted: the memory controller fast scrub operation was not completed.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
201-807-xxx	Memory	Memory Test	Aborted	Test aborted: the memory controller buffer free request failed.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
201-808-xxx	Memory	Memory Test	Aborted	Test aborted: memory controller display/alter buffer execute error.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
201-809-xxx	Memory	Memory Test	Aborted	Test aborted program error: operation running fast scrub.	1. Turn off and restart the system. 2. Run the test again. 3. 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. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.
201-810-xxx	Memory	Memory Test	Aborted	Test stopped: unknown error code xxx received in COMMONEXIT procedure.	1. Turn off and restart the system. 2. Run the test again. 3. 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. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
201-901-xxx	Memory	Memory Test	Failed	Test failure: single-bit error, failing bank x, failing memory card y, failing DIMM z.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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 305). 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&lndocid=SERV-CALL.
202-801-xxx	Memory	Memory Stress Test	Aborted	Internal program error.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
202-802-xxx	Memory	Memory Stress Test	Failed	General error: memory size is insufficient to run the test.	1. Make sure that all memory is enabled by checking the Available System Memory in the Resource Utilization section of the DSA log. If necessary, enable all memory in the Setup utility (see "Using the Setup utility" on page 305). 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&lndocid=SERV-CALL.
202-901-xxx	Memory	Memory Stress Test	Failed	Test failure.	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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
215-801-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	Unable to communicate with the device driver.	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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
215-802-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	The media tray is open.	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&lndocid=SERV-CALL.
215-803-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Failed	The disc might be in use by the system.	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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
215-901-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	Drive media is not detected.	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&lndocid=SERV-CALL.
215-902-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Failed	Read miscompare.	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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
215-903-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	Could not access the drive.	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&lndocid=SERV-CALL.
215-904-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test Messages and actions apply to both tests.	Failed	A read error occurred.	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&lndocid=SERV-CALL.
217–800–000	SAS/SATA Hard Drive	Disk Drive Test	Aborted	Test aborted.	Run the test again.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
217-900-xxx	SAS/SATA Hard Drive	Disk Drive Test	Failed		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&lndocid=SERV-CALL.
264-901-000	Tape Drive	Tape Drive Test	Failed	An error was found in the tape alert log page.	1. Clean the tape drive using the appropriate cleaning media and install new media. 2. Run the test again. 3. Clear the error log. 4. Run the test again. 5. Make sure that the firmware is at the latest level. Software for tape drives and libraries can be found at http://www.ibm.com/systems/support/. 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&lndocid=SERV-CALL.
264-902-000	Tape Drive	Tape Drive Test	Failed	Media is not detected.	1. Clean the tape drive using the appropriate cleaning media and install new media. 2. Run the test again. 3. Clear the error log. 4. Run the test again. 5. Make sure that the firmware is at the latest level. Software for tape drives and libraries can be found at http://www.ibm.com/systems/support/. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
264-903-000	Tape Drive	Tape Drive Test	Failed	Media error.	1. Clean the tape drive using the appropriate cleaning media and install new media. 2. Run the test again. 3. Clear the error log. 4. Run the test again. 5. Make sure that the firmware is at the latest level. Software for tape drives and libraries can be found at http://www.ibm.com/systems/support/. 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&lndocid=SERV-CALL.
264-904-000	Tape Drive	Tape Drive Test	Failed	Drive hardware error.	1. Check the tape drive cabling for loose or broken connections or damage to the cable. Replace the tape drive cable if damage is present. 2. Clean the tape drive using the appropriate cleaning media and install new media. 3. Run the test again. 4. Clear the error log. 5. Run the test again. 6. Make sure that the firmware is at the latest level. Software for tape drives and libraries can be found at http://www.ibm.com/systems/support/. 7. Run the test again. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
264-905-000	Tape Drive	Tape Drive Test	Failed	Software error: invalid request.	1. If the system has stopped responding, turn off and restart the system and then run the test again. 2. Check system firmware level and upgrade if necessary. The installed firmware level can be found in the DSA Log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/systems/support/. 3. Run the test again. 4. If the system has stopped responding, turn off and restart the system. 5. Make sure that the firmware is at the latest level. Software for tape drives and libraries can be found at http://www.ibm.com/systems/support/. 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&lndocid=SERV-CALL.
264-906-000	Tape Drive	Tape Drive Test	Failed	Unrecognized error.	1. Clean the tape drive using the appropriate cleaning media and install new media. 2. Run the test again. 3. Clear the error log. 4. Run the test again. 5. Make sure that the firmware is at the latest level. Software for tape drives and libraries can be found at http://www.ibm.com/systems/support/. 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
405-901-xxx	Broadcom Ethernet Device	Test Control Registers	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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 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&lndocid=SERV-CALL.
405-901-xxx	Broadcom Ethernet Device	Test MII Registers	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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 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&lndocid=SERV-CALL.
405-902-xxx	Broadcom Ethernet Device	Test EEPROM	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
405-903-xxx	Broadcom Ethernet Device	Test Internal Memory	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 2. Run the test again. 3. Check the interrupt assignments in the PCI Hardware section of the DSA log. If the Ethernet device is sharing interrupts, if possible, use the Setup utility (see "Using the Setup utility" on page 305) 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 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&lndocid=SERV-CALL.
405-904-xxx	Broadcom Ethernet Device	Test Interrupt	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 2. Run the test again. 3. Check the interrupt assignments in the PCI Hardware section of the DSA log. If the Ethernet device is sharing interrupts, if possible, use the Setup utility (see "Using the Setup utility" on page 305) 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 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&lndocid=SERV-CALL.

Table 7. DSA 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 x3500 M3 Type 7380," on page 145 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 number	Component	Test	State	Description	Action
405-905-xxx	Broadcom Ethernet Device	Test Loop back at MAC-Layer	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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 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&lndocid=SERV-CALL.
405-906-xxx	Broadcom Ethernet Device	Test Loop back at Physical Layer	Failed		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 log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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 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&lndocid=SERV-CALL.
405-907-xxx	Broadcom Ethernet Device	Test LEDs	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 304. 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 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&lndocid=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 website. The actual procedure might vary slightly from what is described in this document.

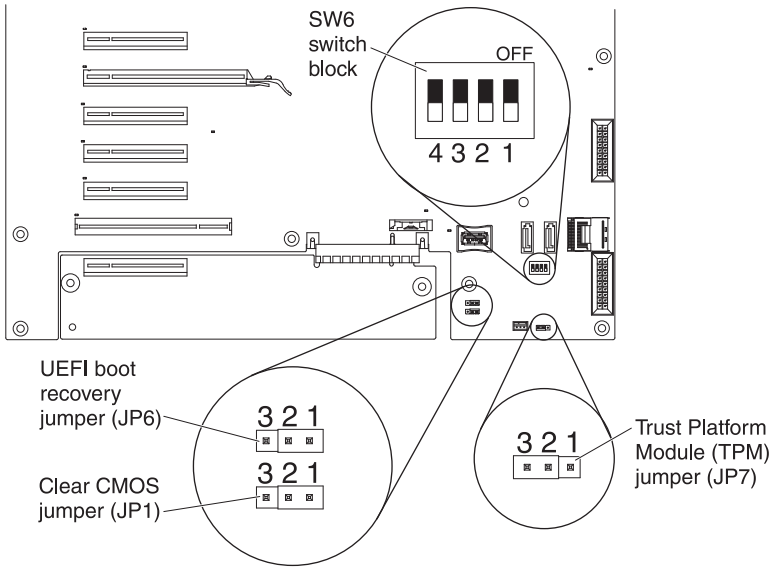
1. Go to http://www.ibm.com/systems/support.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3500 M3** to display the matrix of downloadable files for the server.
5. Download the latest server firmware update.

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 155.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
4. Locate the UEFI boot recovery jumper (JP6) on the system board.



5. Remove any adapters that impede access to the UEFI boot recovery jumper block (JP6) (see “Removing an adapter” on page 219).
6. Move the UEFI boot recovery jumper (JP6) from pins 1 and 2 to pins 2 and 3 to enable the UEFI recovery mode.
7. Reinstall any adapter that you removed (see “Installing an adapter” on page 220).
8. Reinstall the left-side cover (see “Installing the left-side cover” on page 188).
9. Reconnect all external cables and power cords.
10. Restart the server. The power-on self-test (POST) starts.
11. Boot the server to an operating system that is supported by the firmware update package that you downloaded.
12. Perform the firmware update by following the instructions that are in the firmware update package readme file.
13. Copy the downloaded firmware update package into a directory.
14. From a command line, type *filename*-s, where *filename* is the name of the executable file that you downloaded with the firmware update package. Monitor the firmware update until completion.
15. Turn off the server and disconnect all power cords and external cables, and then remove the left-side cover (see “Removing the left-side cover” on page 188).
16. Remove any adapters that impede access to the UEFI boot recovery jumper block (JP6) (see “Removing an adapter” on page 219).
17. Move the UEFI boot recovery jumper (JP6) from pins 2 and 3 back to the primary position (pins 1 and 2).
18. Reinstall any adapter that you removed (see “Installing an adapter” on page 220); then, reinstall the left-side cover (see “Installing the left-side cover” on page 188).
19. Reconnect the external cables and power cords.
20. Restart the server. The power-on self-test (POST) starts. If this does not recover the primary bank, continue with the following steps.
21. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).

22. Reset the CMOS by removing the system battery (see “Removing the battery” on page 165).
23. Leave the system battery out of the server for approximately 5 to 15 minutes.
24. Reinstall the system battery (see “Installing the battery” on page 167).
25. Reinstall the left-side cover (see “Installing the left-side cover” on page 188); then, reconnect all power cords.
26. Restart the server. The power-on self-test (POST) starts.
27. If these recovery efforts fail, contact your IBM service representative for support.

The function of each switch and jumper on the system board is described in “System board switches and jumpers” on page 16.

In-band automated boot recovery method

Note: Use this method if the system board LED on the light path diagnostics panel 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.

The function of each switch and jumper on the system board is described in “System board switches and jumpers” on page 16.

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 141 for the minimum configuration).
4. Reconnect all AC power cords and turn on the server. If the server starts successfully, replace the adapters and devices one at a time until the problem is isolated.

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

Solving Ethernet controller problems

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

Try the following procedures:

- Make sure that the correct device drivers, which come with the server, are installed and that they are at the latest level.
- Make sure that the Ethernet cable is installed correctly.
  - The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.
  - If the Ethernet controller is set to operate at 100 Mbps, you must use Category 5 cabling.
  - If you directly connect two servers (without a hub), or if you are not using a hub with X ports, use a crossover cable. To determine whether a hub has an X port, check the port label. If the label contains an X, the hub has an X port.
- Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller LEDs on the rear panel of the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.
  - The Ethernet link status LED is lit when the Ethernet controller receives a link pulse from the hub. If the LED is off, there might be a defective connector or cable or a problem with the hub.
  - The Ethernet transmit/receive activity LED is lit when the Ethernet controller sends or receives data over the Ethernet network. If the Ethernet transmit/receive activity light is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check the LAN activity LEDs 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 86.

Damaged data in CMOS memory or damaged IBM System x Server Firmware can cause undetermined problems. To reset the CMOS data, use the password switch 2 (SW4) to override the power-on password and clear the CMOS memory; see “Internal LEDs, connectors, and jumpers” on page 15.

Check the LEDs on all the power supplies (see “Power-supply LEDs” on page 99). 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.

     Note: If you install a ServeRAID-M1015 SAS/SATA adapter, make sure at least 2 GB of memory is installed in the server before you run DSA from a bootable CD.

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

- One microprocessor
- One 1 GB DIMM

  Note: If you install a ServeRAID-M1015 SAS/SATA adapter, make sure at least 2 GB of memory is installed in the server before you run DSA from a bootable CD.
- One power supply
- Power cord
- ServeRAID SAS adapter
- System board assembly

4. Turn on the server. If the problem remains, suspect the following components in the following order:
   a. Power supply
   b. Power-supply cage
   c. Memory
   d. Microprocessor
   e. 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 or extender card.

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

Problem determination tips

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

- Machine type and model
- Microprocessor and hard disk drive upgrades
- Failure symptoms
  - 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)
- IBM System x Server Firmware level
- Operating-system type and version level

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

- Machine type and model
- IBM System x Server 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

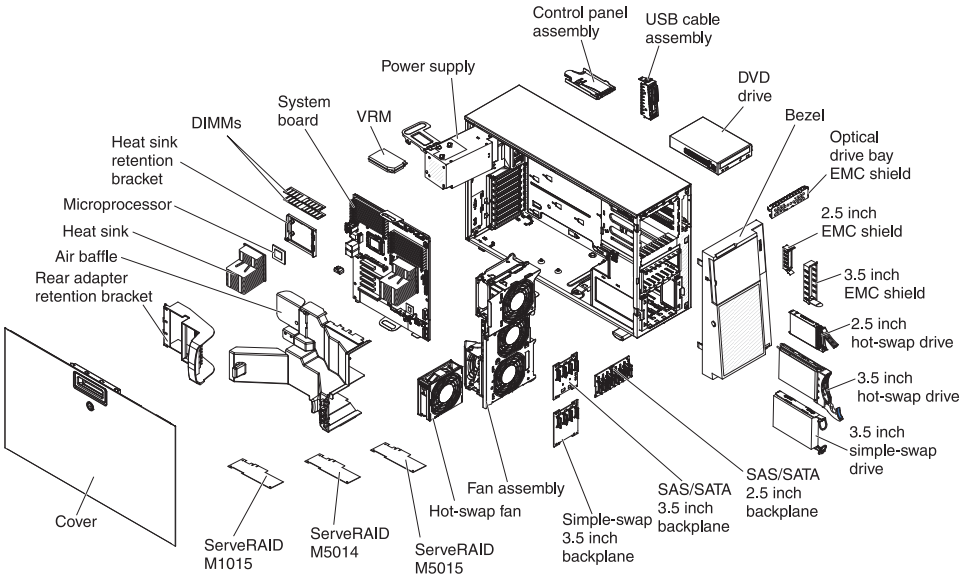
See Appendix A, “Getting help and technical assistance,” on page 327 for information about calling IBM for service.

Chapter 4. Parts listing, System x3500 M3 Type 7380

The following replaceable components are available for all models of the System x3500 M3 Type 7380 server, except as specified otherwise in “Replaceable server components” on page 146. 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 x3500 M3**, and click **Continue**.



Replaceable server components

Replaceable components are of four types:

- **Consumable parts:** 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 your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

Visit http://www.ibm.com/servers/eserver/serverproven/compat/us/ for the latest options supporting plan.

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

Table 8. Parts listing, Type 7380

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Power supply, 920W redundant module	69Y5863		
1	Power supply, 920W redundant module	94Y8259		
2	Filler, power supply	39Y7391		
3	Operator information panel		41Y9080	
4	Light path diagnostics panel with cable		46D1395	
5	Half-high DVD-ROM drive	43W8466		
6	Front bezel assembly		69Y1322	
7	EMC shield kit	69Y1339		
8	Hard disk drive, 2.5-inch SAS hot swap, 146 GB 10 krpm 6 Gbps	42D0633		
8	Hard disk drive, 2.5-inch SAS hot swap, 1 TB 6 GB (7.2 K)	42D0778		
8	Hard disk drive, 2.5-inch SAS hot swap, 2 TB 6 GB (7.2 K)	42D0768		
9	Hard disk drive, 3.5-inch SATA hot swap, 500 GB	39M4533		
9	Hard disk drive, 3.5-inch SATA simple swap, 3 TB	81Y9779		
10	2.5-inch hard disk drive cage		46D1405	
	2.5-inch hard disk drive upgrade cage			69Y1334
	3.5-inch hard disk drive upgrade cage			69Y1335
11	2.5-inch SAS hard disk drive backplane		94Y6670	
12	Fan cage assembly		69Y1320	

Table 8. Parts listing, Type 7380 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
13	Hot-swap fan, 120 mm	44E4563		
14	Adapter, ServeRAID-M5014	46C8929		
15	Adapter, ServeRAID-M5015	46C8927		
16	Adapter, ServeRAID-M1015	46C8933		
	Adapter, QLogic 10 GB Converged Network Adapter	00Y3274		
17	Left-side cover	46D1389		
18	Air baffle	46D1409		
19	Heat sink			46D1407
19	Heat sink (for 130W microprocessor)			69Y1323
20	Microprocessor - 2.13 GHz/8 M 80 W/1066 MHZ quad core, E5606			81Y5953
20	Microprocessor - 2.4 GHz/12 M 80 W/1333 MHZ six core, E5645			69Y4714
20	Microprocessor - 3.06 GHz/12 M 95 W/1333 MHZ six core, X5675			81Y5958
20	Microprocessor - 3.46 GHz/12 M 130 W/1333 MHZ six core, X5690			81Y5960
20	Microprocessor - 2.4 GHz/12 M 80 W/1066 MHZ quad core, E5620			49Y7053
20	Microprocessor - 2.13 GHz/4 M 80 W/800 MHZ quad core			46D1270
20	Microprocessor - 2.26 GHz/4 M 80 W/800 MHZ quad core			69Y0782
20	Microprocessor - 2.40 GHz/12 M 80 W/1066 MHZ quad core			49Y7053
20	Microprocessor - 2.53 GHz/12 M 80 W/1066 MHZ quad core			49Y7052
20	Microprocessor - 2.66 GHz/12 M 80 W/1066 MHZ quad core			49Y7051
20	Microprocessor - 2.53GHz/12 M 80 W/1066 MHZ six core			81Y5955
20	Microprocessor - 2.66 GHz/12 M 95 W/1333 MHZ six core			49Y7040
20	Microprocessor - 2.80 GHz/12 M 95 W/1333 MHZ six core			49Y7039
20	Microprocessor - 2.93 GHz/12 M 95 W/1333 MHZ six core			49Y7038
20	Microprocessor - 3.33 GHz/12 M 130 W/1333 MHZ six core			69Y0849
20	Microprocessor - 3.46 GHz/12 M 130 W/1333 MHZ quad core			69Y0850
20	Microprocessor - 2.93GHz/12 M 130 W/1066 MHZ quad core, X5647			81Y5956

Table 8. Parts listing, Type 7380 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
21	Retention module			46D1397
22	Memory, 1 GB single rank, UDIMM		44T1572	
22	Memory, 1 GB single rank, RDIMM		49Y1442	
22	Memory, 2 GB single rank, UDIMM		49Y1421	
22	Memory, 2 GB single rank, RDIMM		49Y1423	
22	Memory, 4 GB dual rank, RDIMM		49Y1425	
22	Memory, 8 GB dual rank, RDIMM		49Y1415	
22	Memory, 16 GB qual rank, RDIMM		49Y1418	
23	System board			81Y6004
24	VRM		43X3307	
25	Power-supply cage assembly			39Y7389
	Alcohol wipe		59P4739	
	Backplane assembly (for 3.5-inch HDDs)		49Y4462	
	Battery, 3.0 volt	33F8354		
	Bezel, rack assembly (option)	69Y1333		
	Cable, operator information panel			46C6707
	Cable, backplane configuration (2.5-inch HDD)		69Y1331	
	Cable, backplane configuration (3.5-inch HDD)		46D1401	
	Cable, Backplane Power (2.5-inch HDD)		69Y1326	
	Cable, Backplane Power (3.5-inch HDD)		69Y1325	
	Cable, DVD(optical) Signal, SATA		69Y1330	
	Cable, Fan Cage		46D1394	
	Cable, Front USB		26K6096	
	Cable, Optical Power, SATA		69Y1327	
	Cable, SAS Signal (2.5-inch HDD)		69Y1328	
	Cable, SAS Signal (3.5-inch HDD)		69Y1329	
	Cable, SAS Signal (RAID Adapter to ServeRAID expansion Adapter)		94Y5991	
	Cable, Tape Drive Power Converter		49Y6796	
	Cover, top/side		46D1411	
	EMC shield kit, optional rack model	41Y9070		
	EMC shield, 4 x 3.5-inch	46D1402		
	Extender card, PCI Express			49Y4508
	Extender card, PCI-X			49Y4509
	Foot kit, stabilizer, front			26K7345
	Foot kit, rear			13N2985
	Hard disk drive, 500 GB 3.5-inch hot-swap SATA	39M4533		

Table 8. Parts listing, Type 7380 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	Hard disk drive, 500 GB 2.5-inch hot-swap SATA	42D0753		
	Hard disk drive, 1 TB 3.5-inch hot-swap SAS	42D0778		
	Hard disk drive, 2 TB 3.5-inch hot-swap SAS	42D0768		
	Filler, fan	69Y1324		
	Keyboard, US	42C0060		
	Keyboard, Japan	42C0081		
	Keylock assembly		26K7363	
	Mouse, USB optical	39Y9875		
	Multiburner, SATA	43W8467		
	Planar tray			46D1390
	Random lock assembly		26K7364	
	ServeRAID expansion adapter			46M0997
	ServeRAID advance feature key (for M5014)	46M0931		
	Slide assembly, optional rack model		40K6679	
	System service label	69Y1336		
	Thermal grease			41Y9292
	Windows Storage Server 2008 R2 Standard, multilingual	95Y3213		
	Windows Storage Server 2008 R2 Enterprise, multilingu	95Y3214		
	Software preload (DVD-ROM)	00D7763		
	Memory Flash 2 GB USB Key	42D0545		

Consumable parts are not covered by the IBM Statement of Limited Warranty. The following consumable parts are available for purchase from the retail store.

Table 9. Consumable parts, Type 7380

Index	Description	Part number
	ServeRAID battery	46C9040

To order a consumable part, complete the following steps:

1. Go to http://www.ibm.com/.
2. From the **Products** menu, select **Upgrades, accessories & parts**.
3. Click **Obtain maintenance parts**; then, follow the instructions to order the part from the retail store.

If you need help with your order, call the toll-free number that is listed on the retail parts page, or contact your local IBM representative for assistance.

Power cords

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

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

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

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

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

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

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

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

Chapter 5. Removing and replacing server components

Replaceable components are of four types:

- **Consumable parts:** 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 your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

See Chapter 4, “Parts listing, System x3500 M3 Type 7380,” on page 145 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.

Installation guidelines

Before you install optional devices, read the following information:

- Read the safety information that begins on page vii and the guidelines in “Handling static-sensitive devices” on page 155. This information will help you work safely.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the cover is removed, make sure that no one is near the server and that no tools or 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 can stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- You do not have to turn off the server to install or replace hot-swap power supplies, hot-swap fans, or hot-plug Universal Serial Bus (USB) devices.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.

- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.
- You can install a maximum of two IDE devices in the server.
- 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 next:

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- If the server has redundant power, each of the power-supply bays has a power supply installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before you turn on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan as soon as possible.
- You have replaced a hot-swap drive within 2 minutes of removal.
- You do not remove the air baffles or air ducts while the server is running. Operating the server without the air baffle or air ducts might cause the microprocessor to overheat.

  Note: For proper cooling, do not install any card in the slot next in sequence to a ServeRAID adapter with battery backup module (for example, if a ServeRAID adapter with battery backup module is installed in slot 2, do not install any card in slot 3).
- Microprocessor socket 2 always contains either a microprocessor baffle or 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 you work inside the server with the power on.

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

- Avoid wearing loose-fitting clothing on your forearms. Button long-sleeved shirts before you work inside the server; do not wear cuff links while you are you work 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 you work inside the server with the power on.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part on the outside of the server for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the server without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the server cover or on a metal surface.
- Take additional care when you handle devices during cold weather. Heating reduces indoor humidity and increases static electricity.

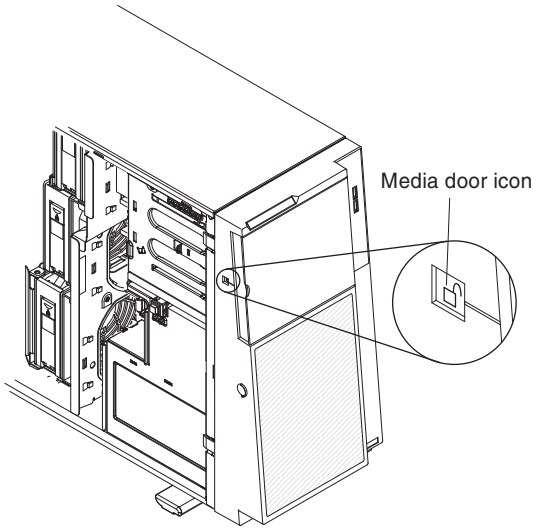
Returning a device or component

If you are instructed to return a device or component, follow the packaging instructions provided with the replacement part. Use any packaging materials for shipping that are supplied to you.

Opening the bezel media door

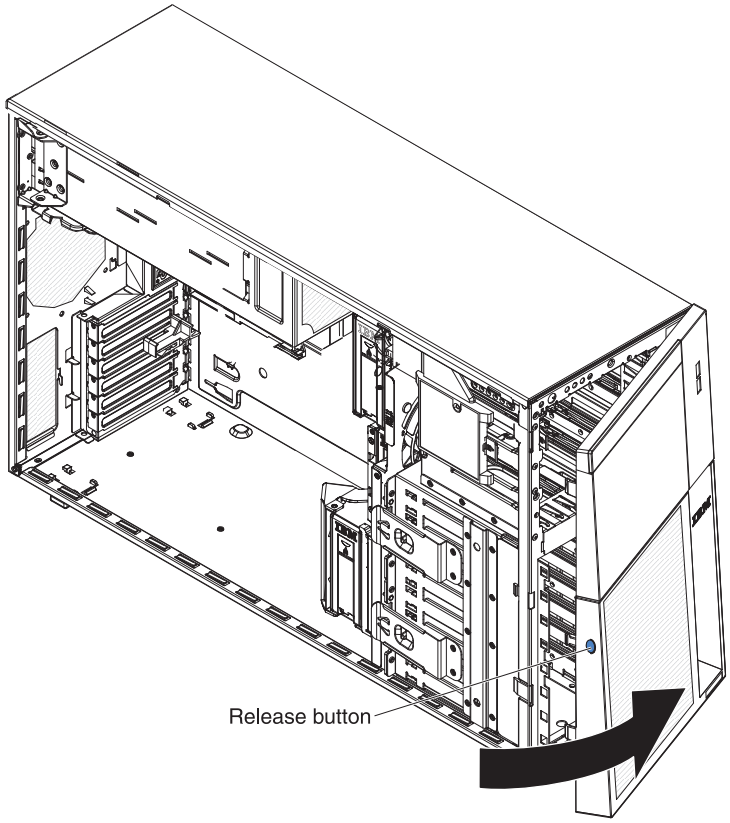
To open the media door, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Check the status of the media door icon. If the icon on the side of the bezel is in the unlocked position, open the bezel media door directly.

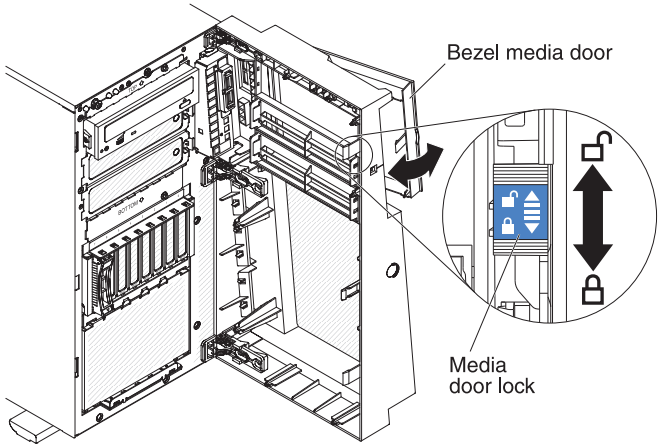


3. Unlock the left-side cover.

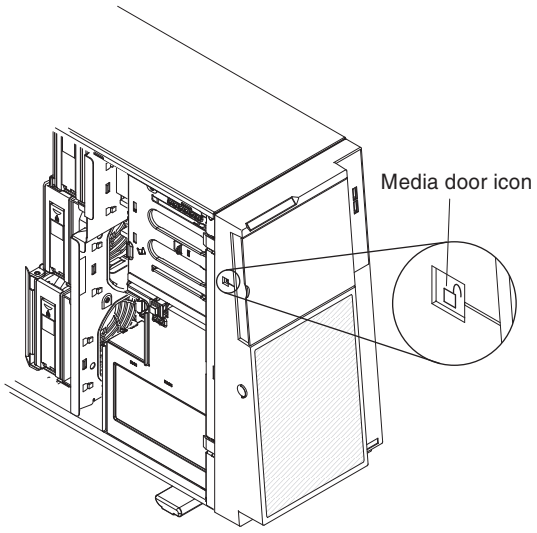
   Note: You must unlock the left-side cover to open or remove the bezel. When you lock the left-side cover, it locks both the cover and the bezel.
4. Open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.



5. From inside of the top section of the bezel door, slide the blue tab up to unlock the bezel media door; then, grasp the depressed area on the media door and pull the door open.



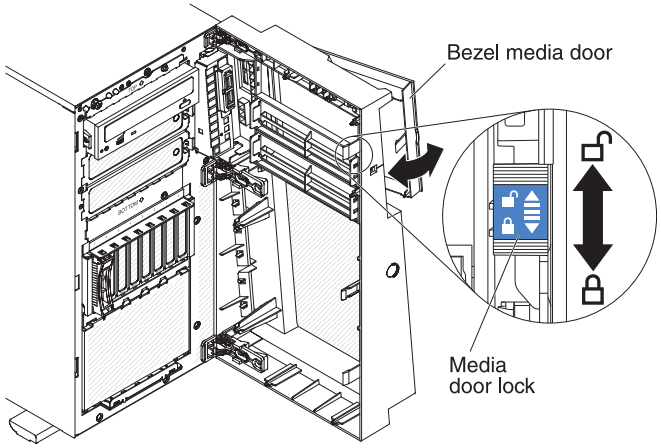
6. When the media door is unlocked, the icon on the side of the bezel will be in the unlocked position.


Media door icon

Closing the bezel media door

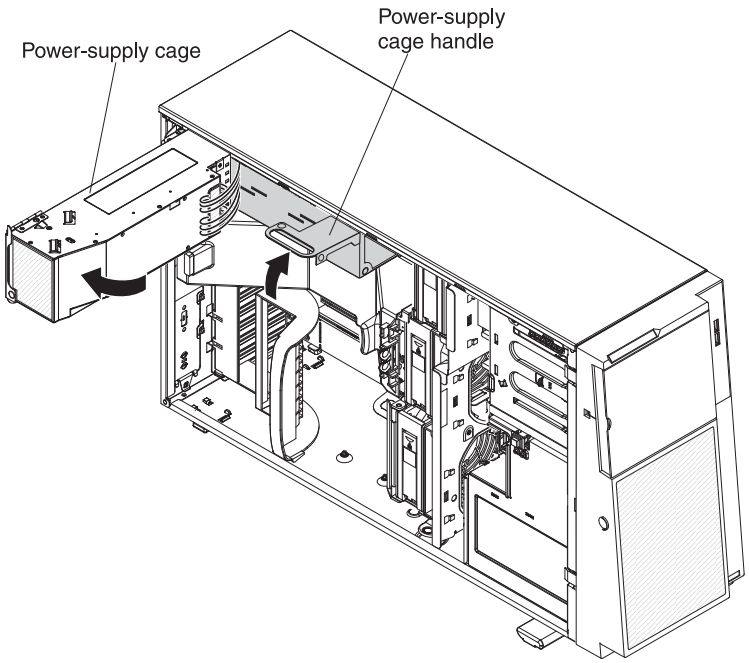
To close the media door, complete the following steps:

1. Swing the bezel media door closed and push it into the bezel to close it.
2. From inside of the top section of the bezel door, slide the blue tab down to lock the bezel media door.



3. Close the bezel.

Opening the power-supply cage



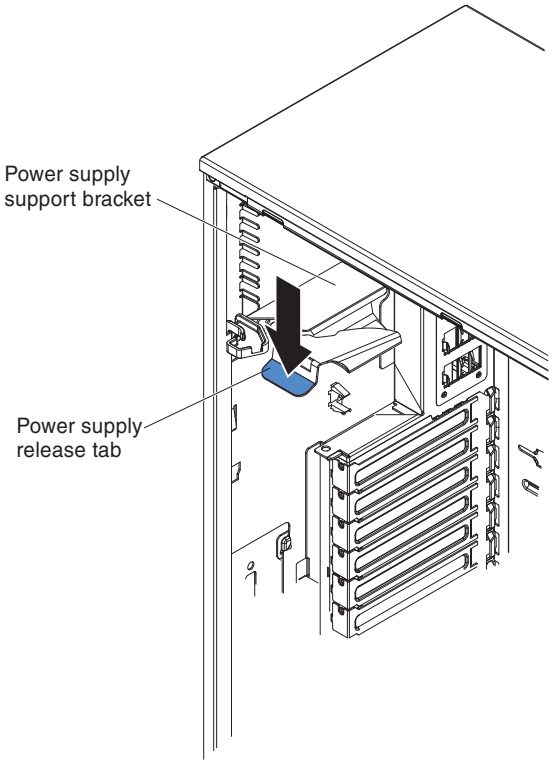
Opening the power-supply cage allows access to the air baffle, microprocessors, and DIMMs. To open the power-supply cage, complete the following steps:

1. Read the safety information that begins on page vii, and “Handling static-sensitive devices” on page 155.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the hot-swap power supply or power supplies and power-supply fillers, if any are installed (see “Removing a hot-swap power supply” on page 276).
4. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
5. Pull up on the power-supply cage handle to unlock the cage; then, rotate the cage out until it stops. The tab on the rear power-supply latch bracket clicks into place when the cage is completely out of the way.
6. Let the power-supply cage rest on the rear power-supply latch bracket.

Closing the power-supply cage

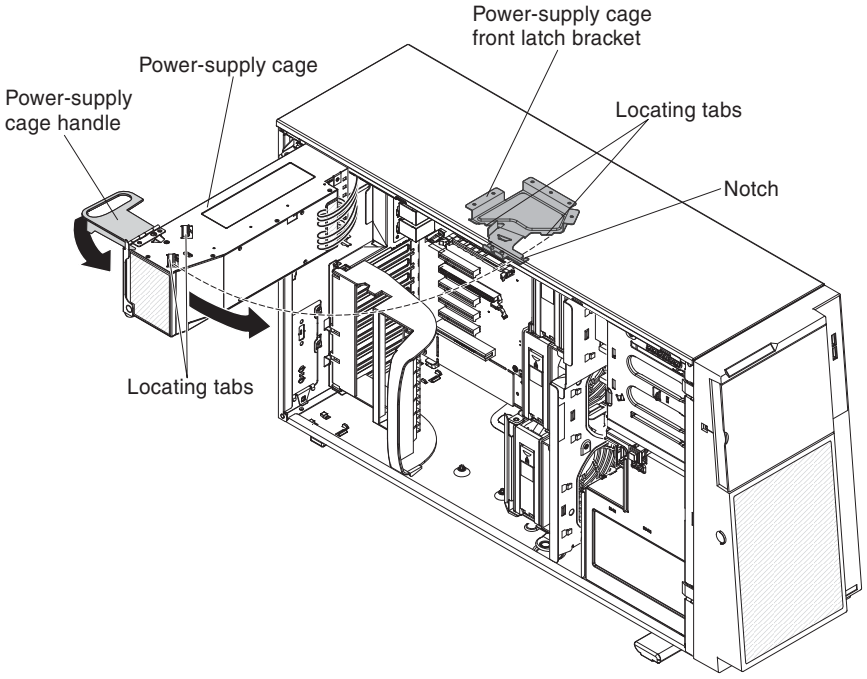
To return the power-supply cage to its closed position, complete the following steps:

1. Rotate the power-supply cage slightly toward the rear side; then, push down on the release tab on the rear power-supply support bracket.



2. Rotate the power-supply cage into the server chassis. The locating tabs on the power-supply cage must fit over the corresponding tabs on the front latch bracket.

   Attention: Do not allow the power-supply cage cables to be caught or pinched while you rotate the power-supply cage into the chassis.



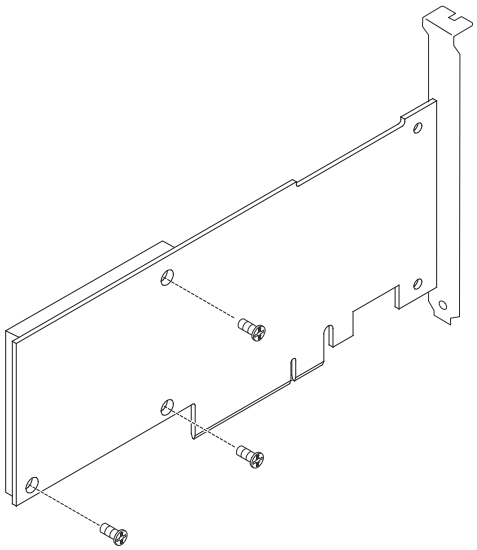
3. Rotate the power-supply cage handle down until the handle tip engages the notch in the front latch bracket; then, lower the handle until it locks in place.
4. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
5. Install the hot-swap power supplies or power-supply filler (see “Installing a hot-swap power supply” on page 277).
6. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing a ServeRAID adapter battery

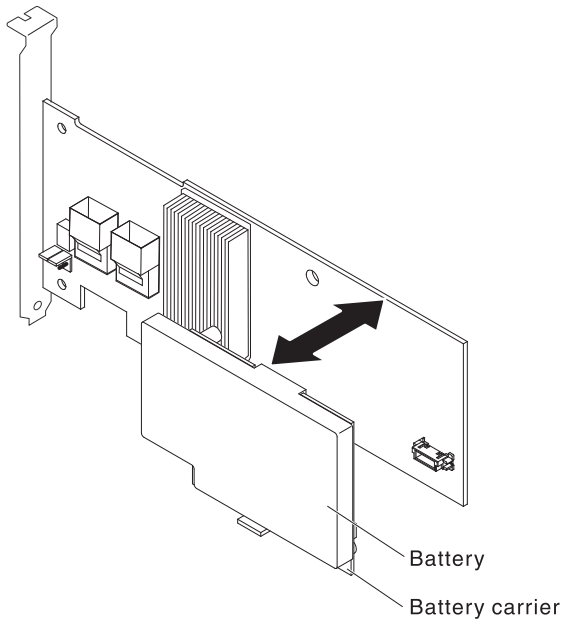
If a ServeRAID adapter has a battery on it and you need to replace it, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and all attached devices.
3. Disconnect all external cables and power cords.
4. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
5. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
6. Remove the ServeRAID adapter with battery from the PCI slot (see “Removing an adapter” on page 219).
7. Remove the screws that hold the battery from the ServeRAID adapter (see the following illustration for the location of the screws). Save the screws for future use.



8. Lift the battery and the battery carrier away from the ServeRAID adapter.



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

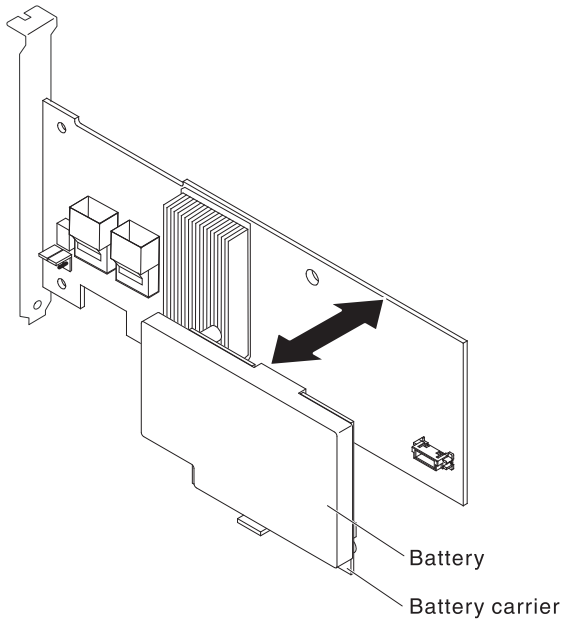
Installing a ServeRAID adapter battery

To install the RAID adapter battery in the server, complete the following steps:

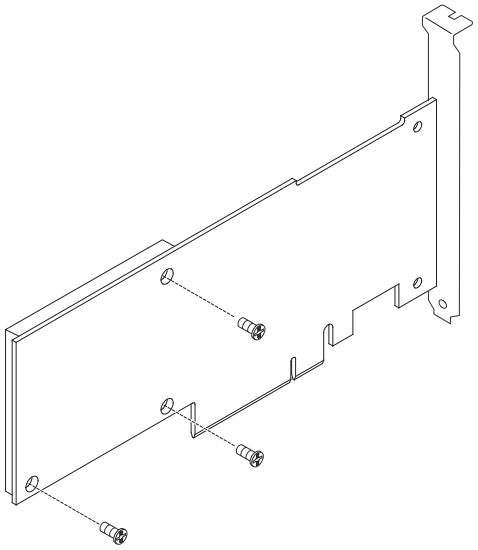
1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and all attached devices.
3. Disconnect all external cables and power cords.
4. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.

5. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
6. Align the holes in the edge of the battery carrier and the adapter battery with the holes on the ServeRAID adapter.



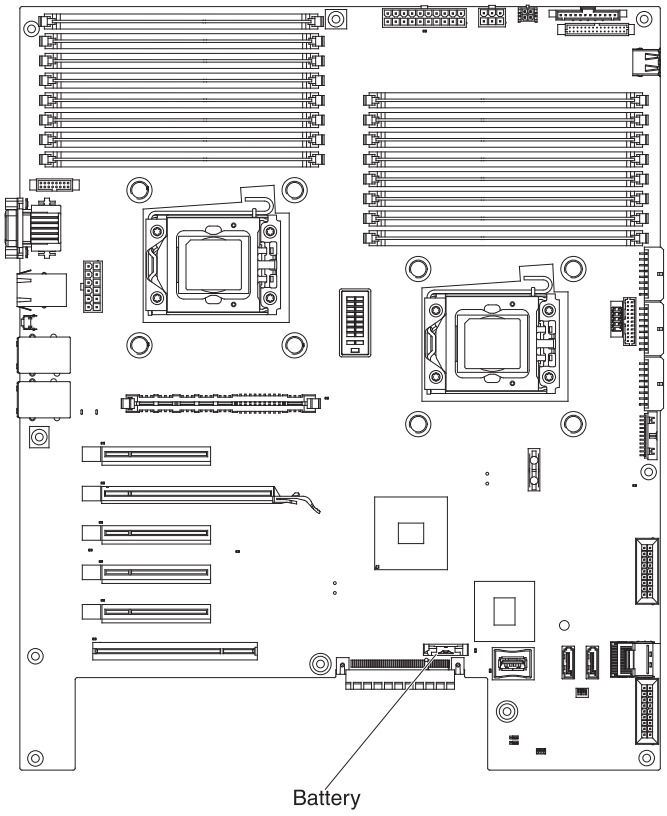
7. Insert the screws to secure the ServeRAID adapter battery in place.



8. Install the ServeRAID adapter on the system board (see “Installing an adapter” on page 220).
9. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
10. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

    Note: You must wait approximately 3 minutes after you connect the server power cord to an electrical outlet before the power-control button becomes active.

Removing the battery



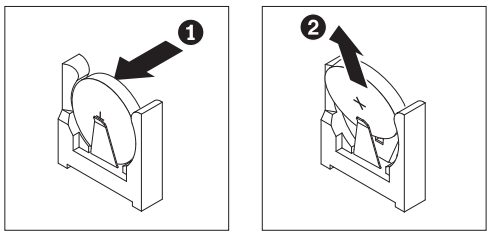
To remove the battery, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and all attached devices.
3. Disconnect all external cables and power cords.
4. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
5. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
6. Remove the battery:
   a. Use one finger to tilt the battery horizontally out of its socket, pushing it away from the socket.

      Attention: Neither tilt nor push the battery by using excessive force.
   b. Lift and remove the battery from the socket.

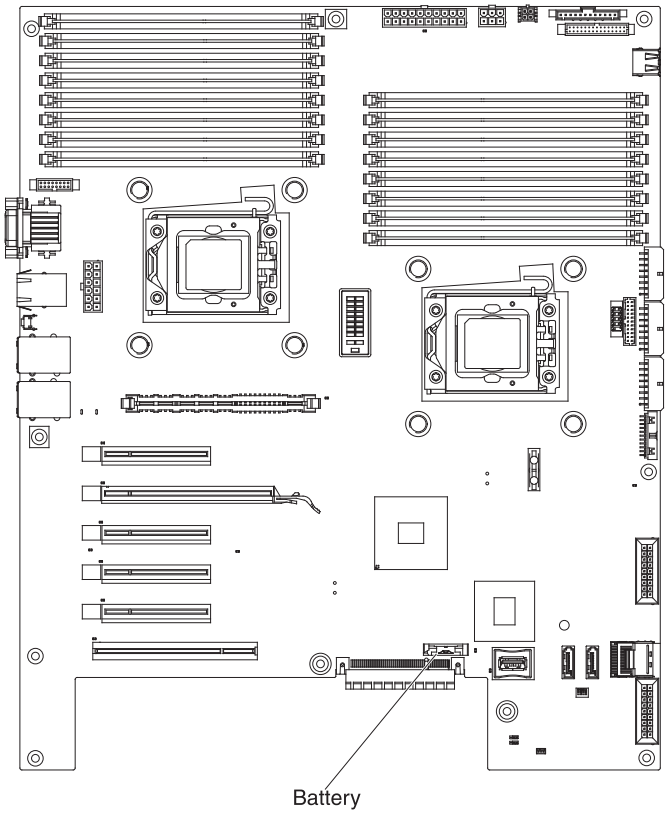
      Attention: Failing to remove the battery properly may damage the socket on the system board. Any damage to the socket may require replacing the system board.



7. Dispose of the battery as required by local ordinances or regulations (see the *Environmental Notices and User Guide* for more information).

Installing the battery

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



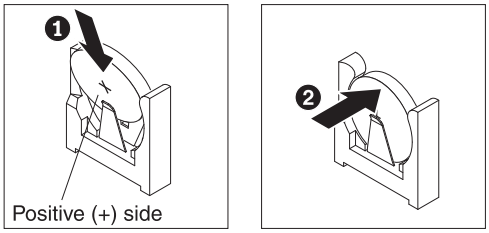
- You must replace the battery with a lithium battery of the same type from the same manufacturer.
- To order replacement batteries, call 1-800-426-7378 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM marketing representative or 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**



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 replacement battery:
   a. Hold the battery in a vertical orientation so that the smaller side is facing the socket.
   b. Tilt the battery and slide the battery into its socket; then, press the battery toward the socket until it clicks into place. Make sure that the battery clip holds the battery securely.
3. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
4. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

   Note: You must wait approximately 3 minutes after you connect the server power cord to an electrical outlet before the power-control button becomes active.
5. Start the Setup utility and reset the configuration:
   - Set the system date and time.
   - Set the power-on password.
   - Reconfigure the server.

   See “Starting the Setup utility” on page 305 for details.

Internal cable routing and connectors

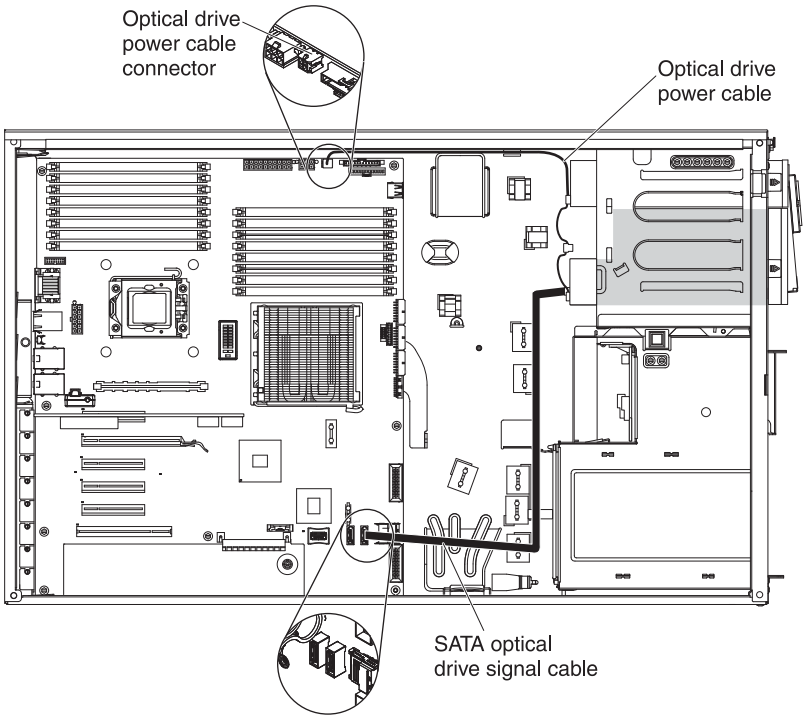
The server uses cables to connect SATA attached, hot-swap SATA, hot-swap SAS and DVD drive devices to the power supply and to the system board.

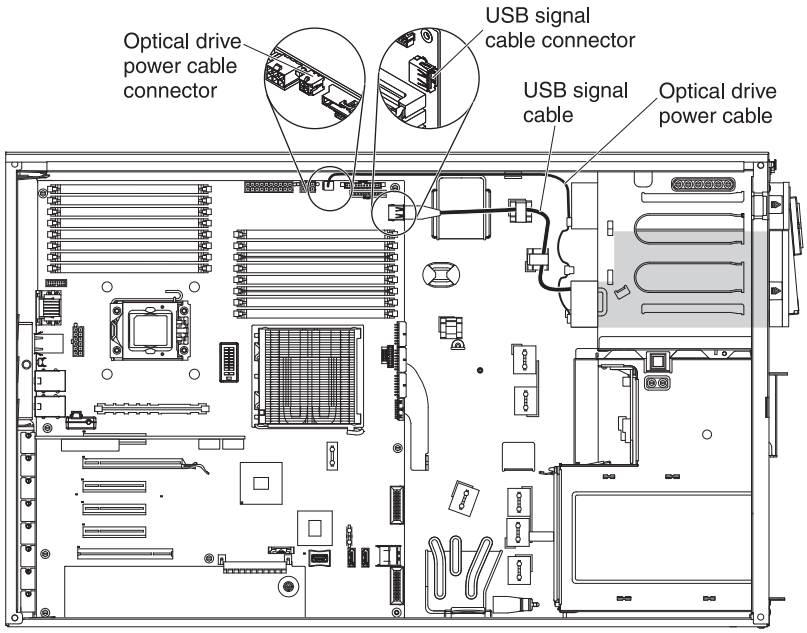
Review the following information before connecting power and signal cables to internal drives:

- The drives that are preinstalled in the server come with power and signal cables attached. If you replace any drives, remember which cable is attached to which drive.
- When you route a cable, make sure that it does not block the airflow to the rear of the drives or over the microprocessor or DIMMs.

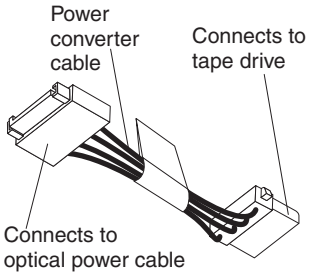
Tape drive cable connection

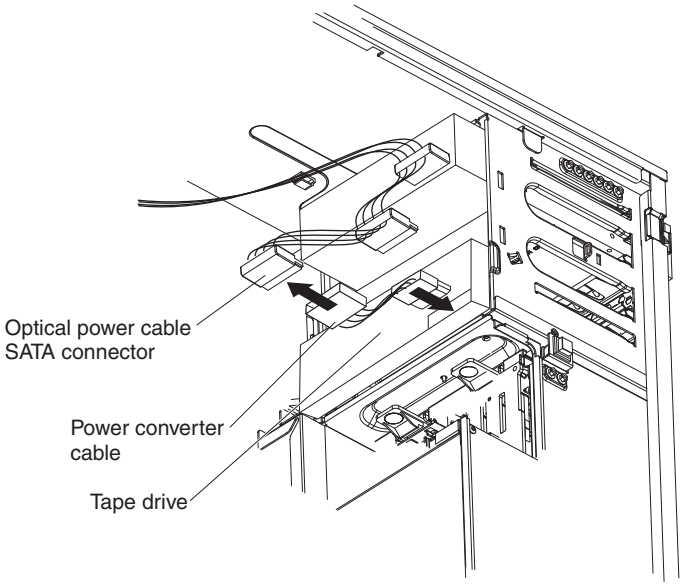
You can install either a USB or SATA tape drive in the server. The following illustration shows the internal cable routing and connectors for both the USB tape drive and the SATA tape drive. It also shows the internal power cable for the optical drives.





The following illustrations show the cabling information for installing the SATA to traditional power converter cable when you install an RDX internal USB tape drive in the server. This cable comes with the server in the plastic bag with the drive rails.

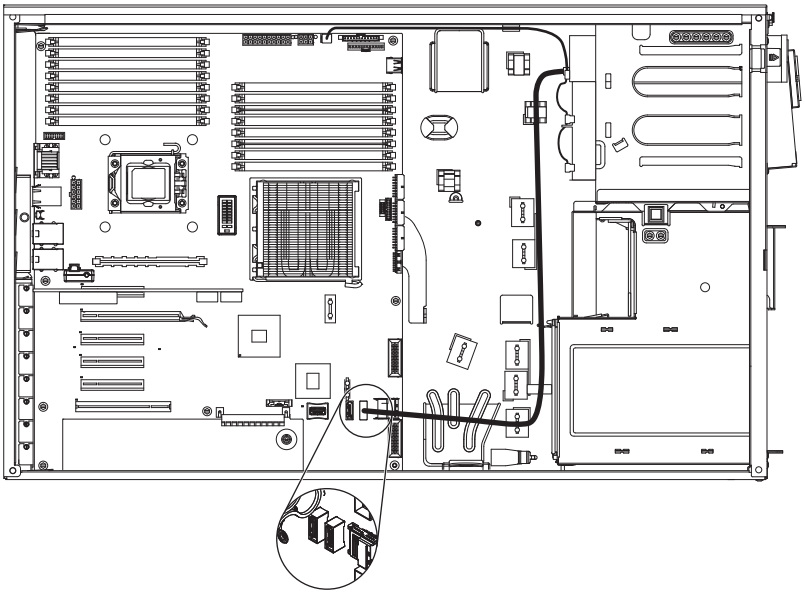



Optical power cable
SATA connector
Power converter
cable
Tape drive

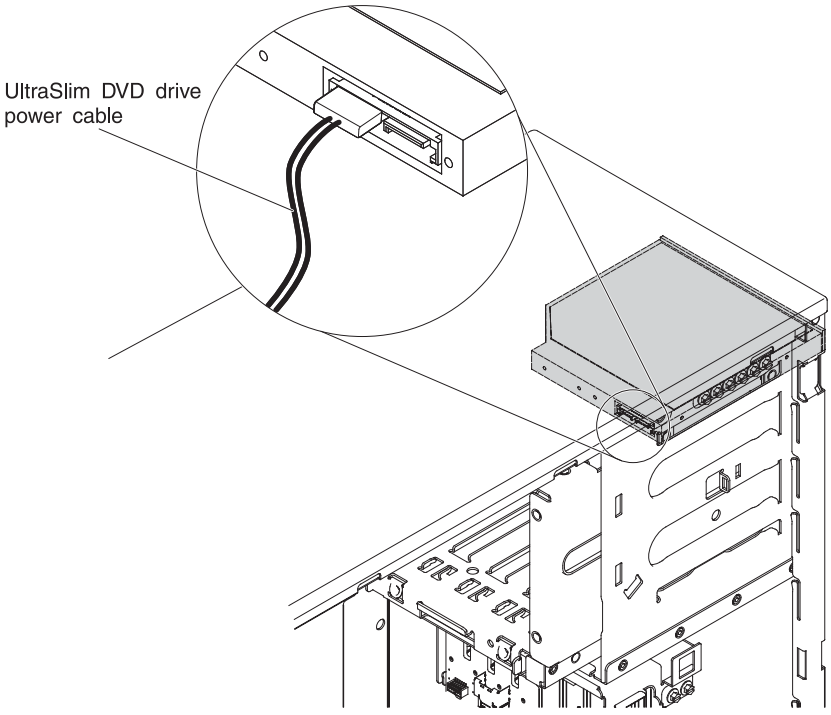
DVD drive cable connection

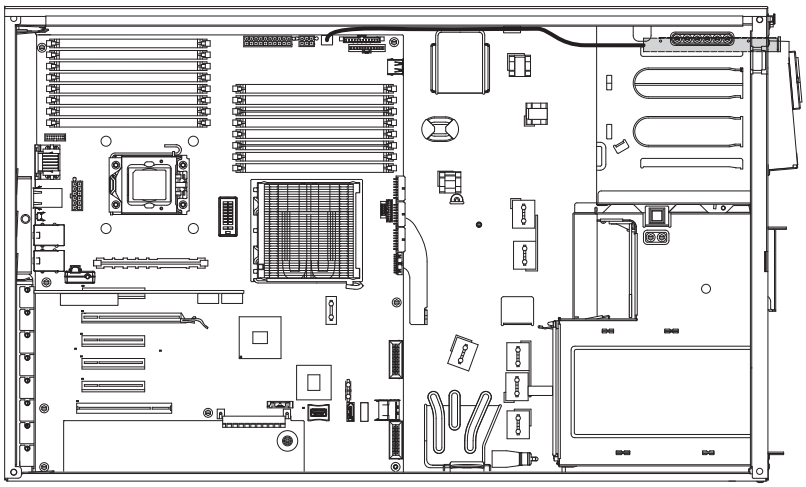
The following illustration shows the internal SATA and power cable routing and the connectors from the DVD drive to the system board.

Note: Do not disconnect the cable by using excessive force. Failing to remove the cable properly may damage the connectors on the system board. Any damage to the connectors may require replacing the system board.

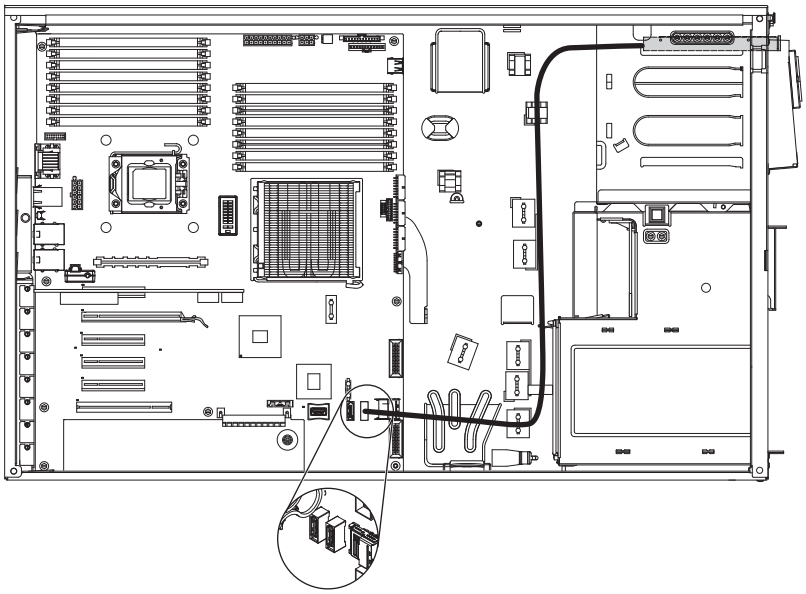


The following illustration shows the internal power cable routing and the connectors from the UltraSlim DVD drive to the system board.



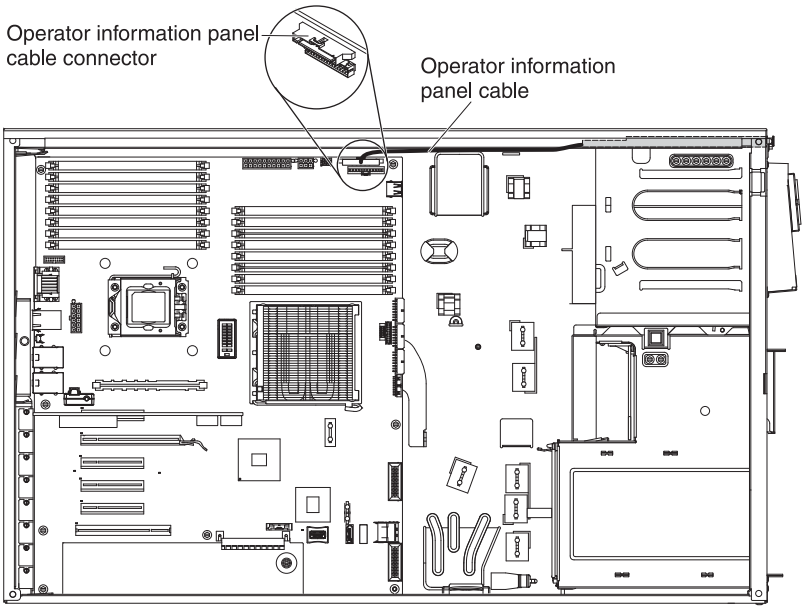


The following illustration shows the internal SATA cable routing and the connectors from the UltraSlim DVD drive to the system board.



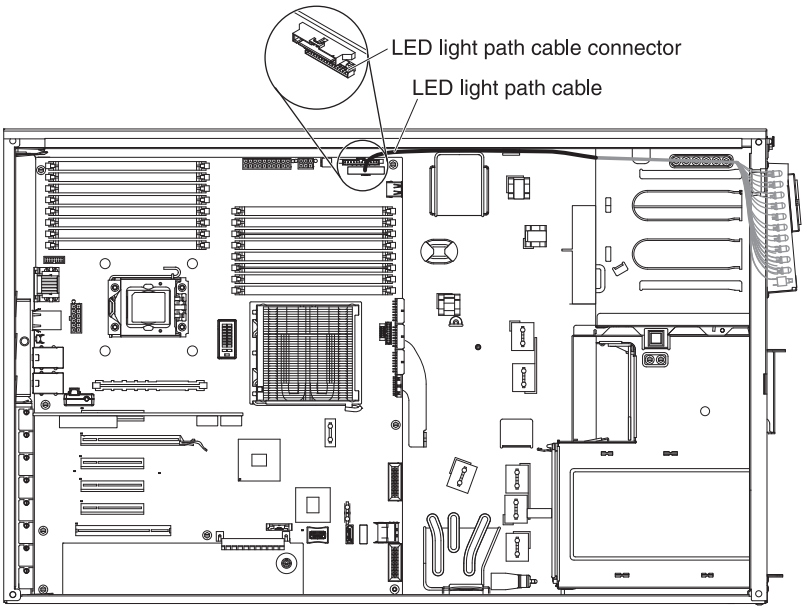
Operator information panel cable connection

The following illustration shows the internal cable routing and connectors from the operator information panel to the system board.



Light path diagnostics LED panel cable connection

The following illustration shows the internal cable routing and connectors from the light path diagnostics LED panel to the system board.



Hard disk drive cable connection

Review the following information before connecting power and signal cables to internal drives:

1. **The following illustrations show the connectors on the 2.5-inch and 3.5-inch hard disk drive backplanes.**

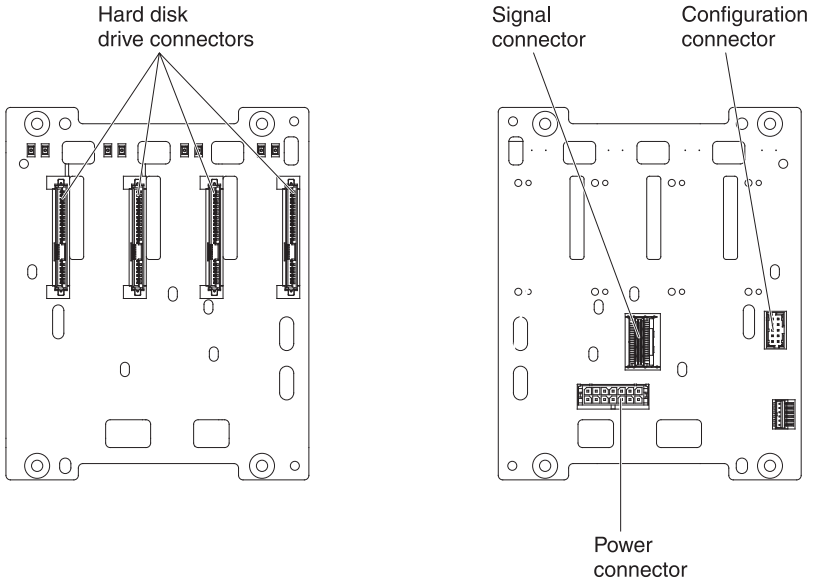


Figure 3. Connectors on the 3.5-inch hard disk drive backplane

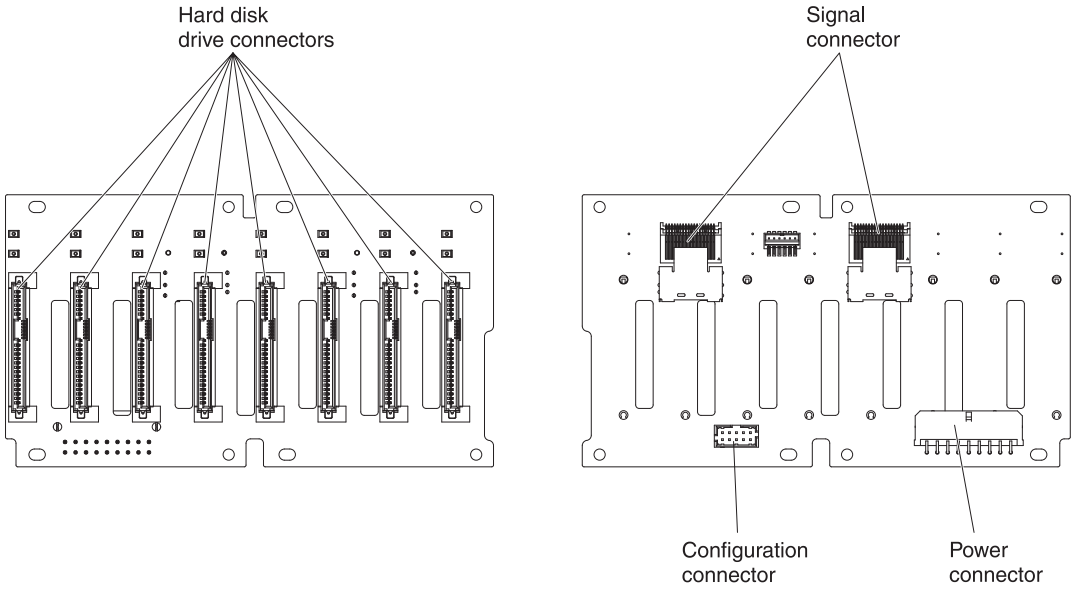


Figure 4. Connectors on the 2.5-inch hard disk drive backplane

2. **The following illustrations show the cable connectors on ServeRAID M1015/M5014/M5015 adapters.**

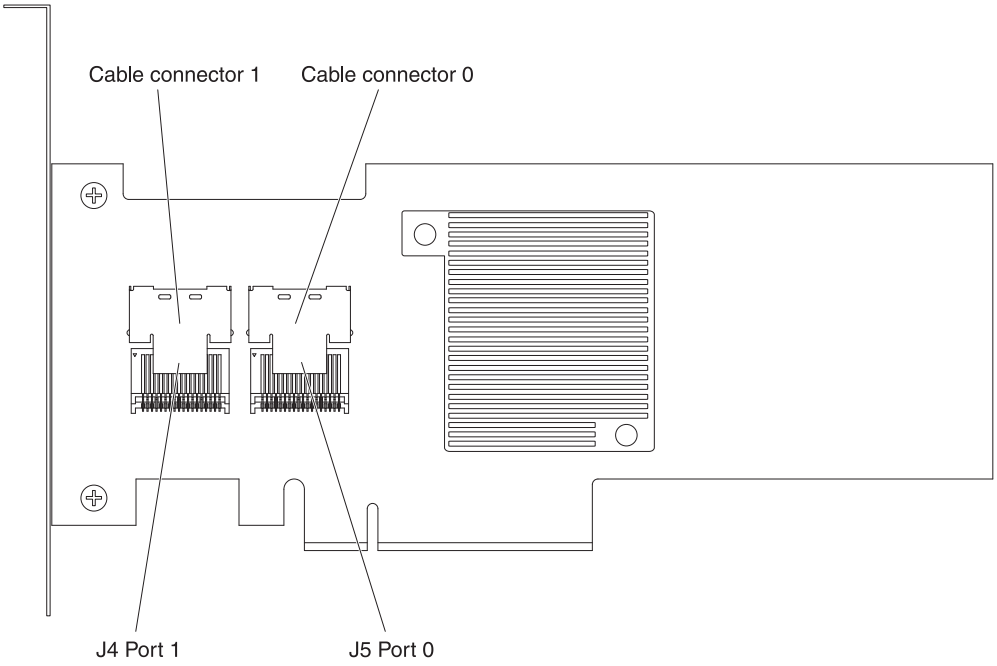


Figure 5. Cable connectors on ServeRAID-M1015 adapter

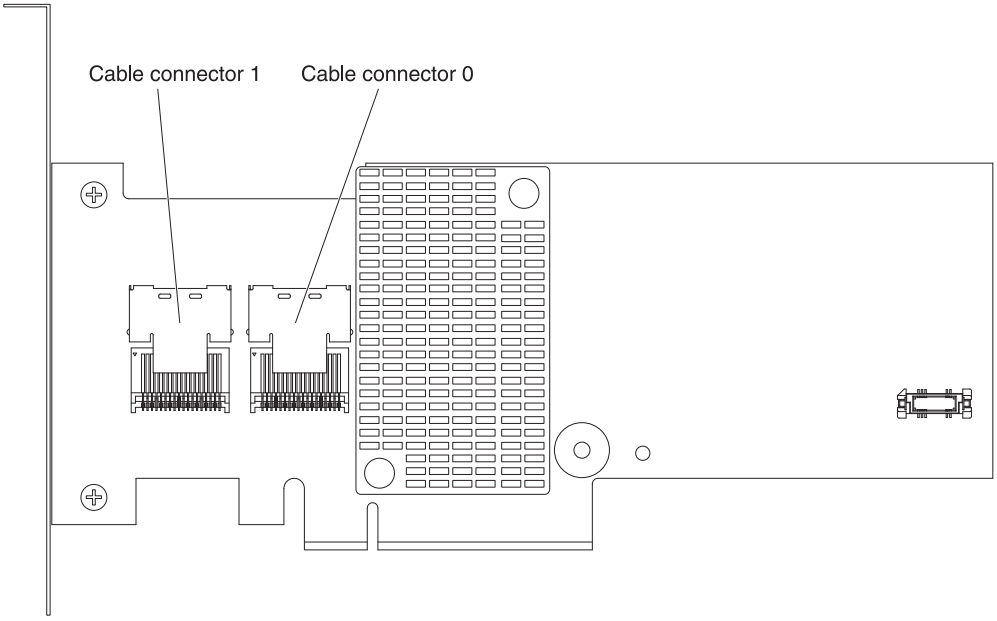


Figure 6. Cable connectors on ServeRAID-M5014 adapter

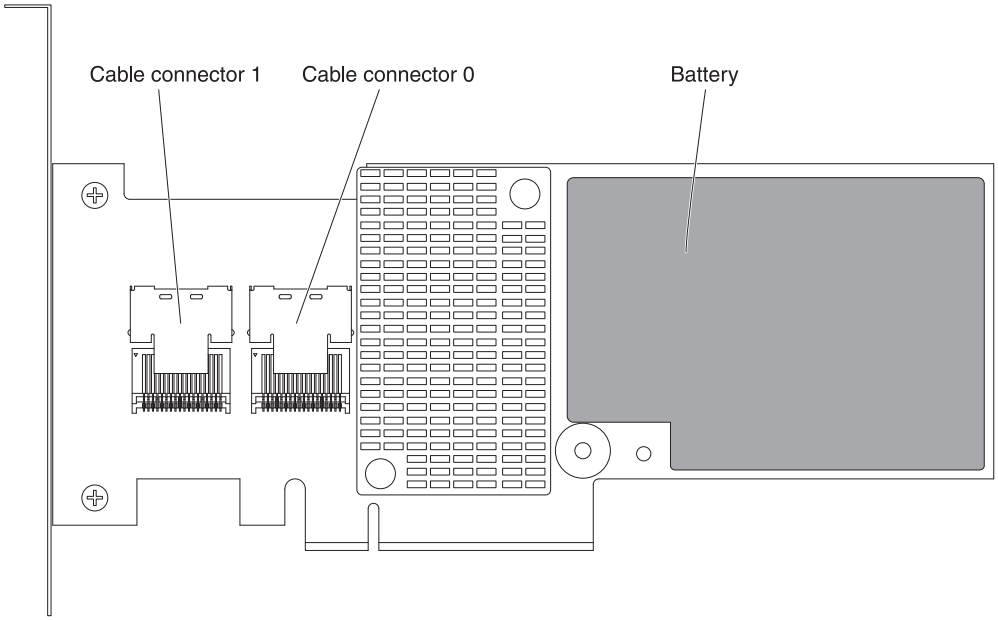


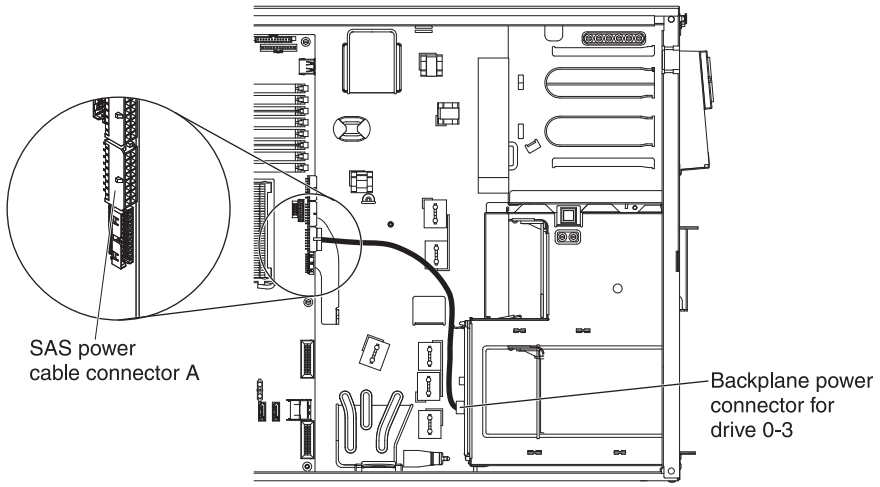
Figure 7. Cable connectors on ServeRAID-M5015 adapter

Note:

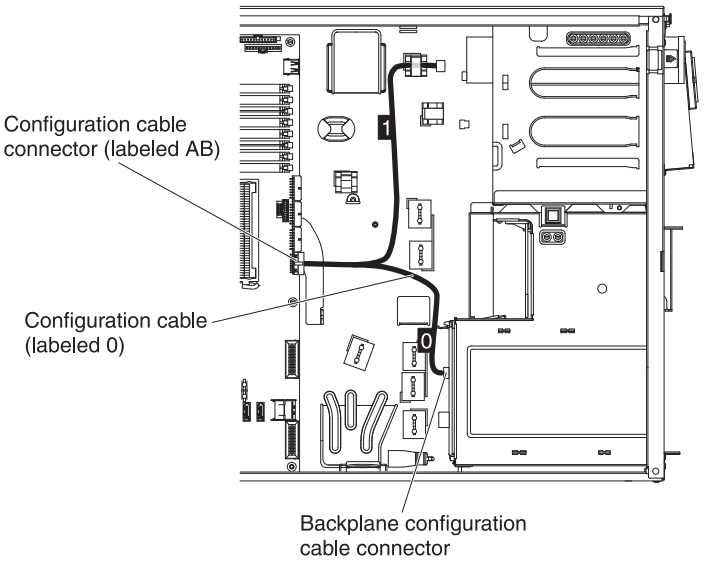
- For proper cooling, do not install any card in the slot next in sequence to a ServeRAID adapter with battery backup module (for example, if a ServeRAID adapter with battery backup module is installed in slot 2, do not install any card in slot 3).
- If the server is configured for RAID operation using a ServeRAID adapter, you might have to reconfigure your disk arrays after you install drives. See the ServeRAID adapter documentation for additional information about RAID operation and complete instructions for using the ServeRAID adapter.

Review the following information before connecting power, configuration, and signal cables for the drives:

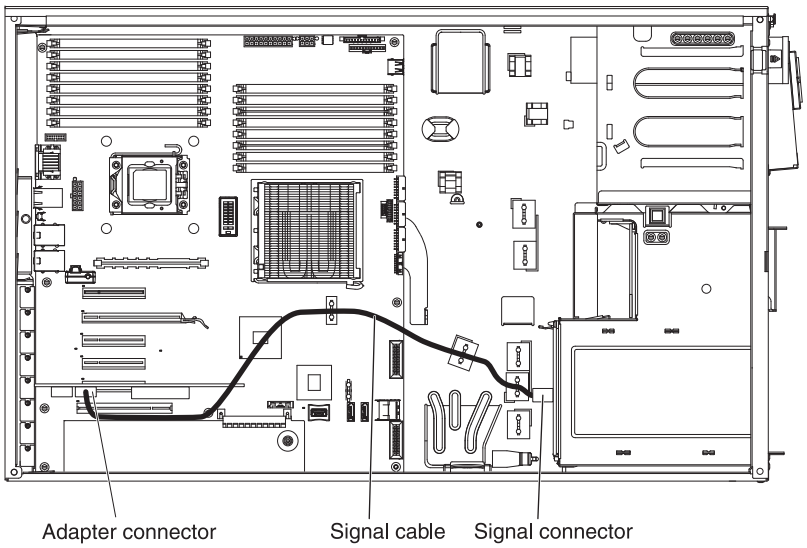
1. **For server models with four 3.5-inch hot-swap hard disk drives.**
   - The following illustration shows the internal power cable routing.



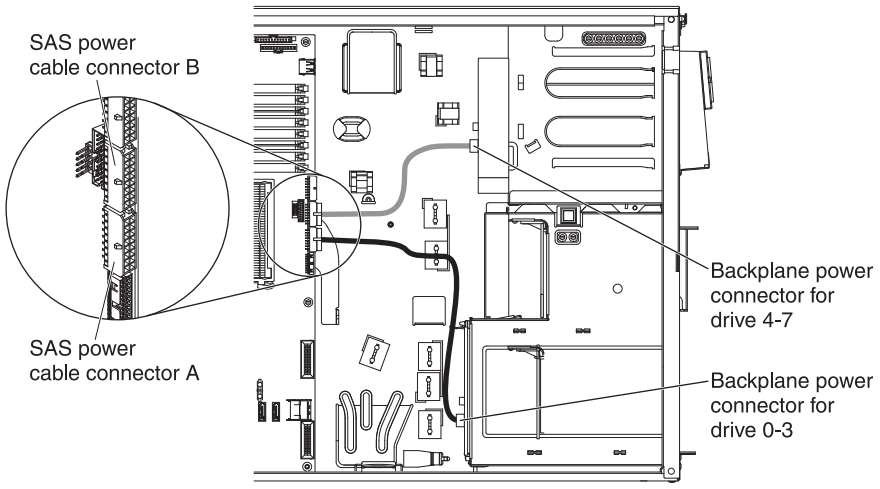
   - The following illustration shows the internal configuration cable routing.



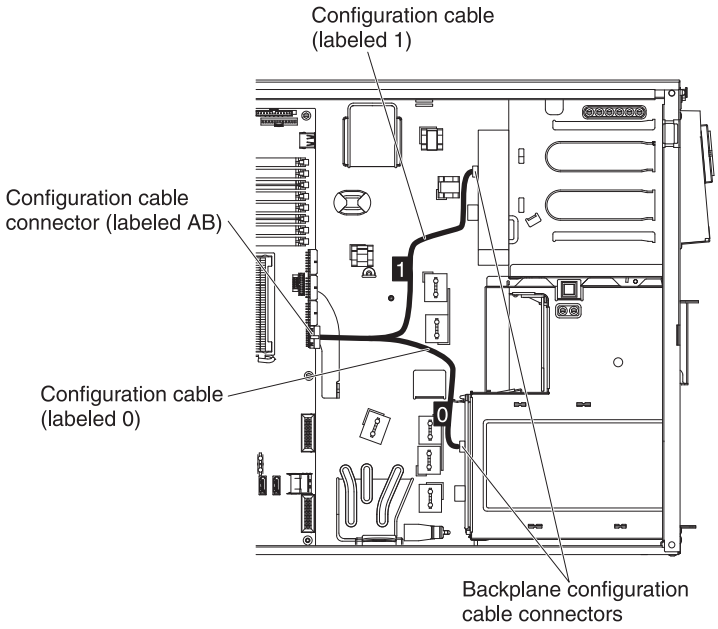
   - The following illustration shows the internal signal cable routing for installing a ServeRAID adapter.


Adapter connector
Signal cable
Signal connector

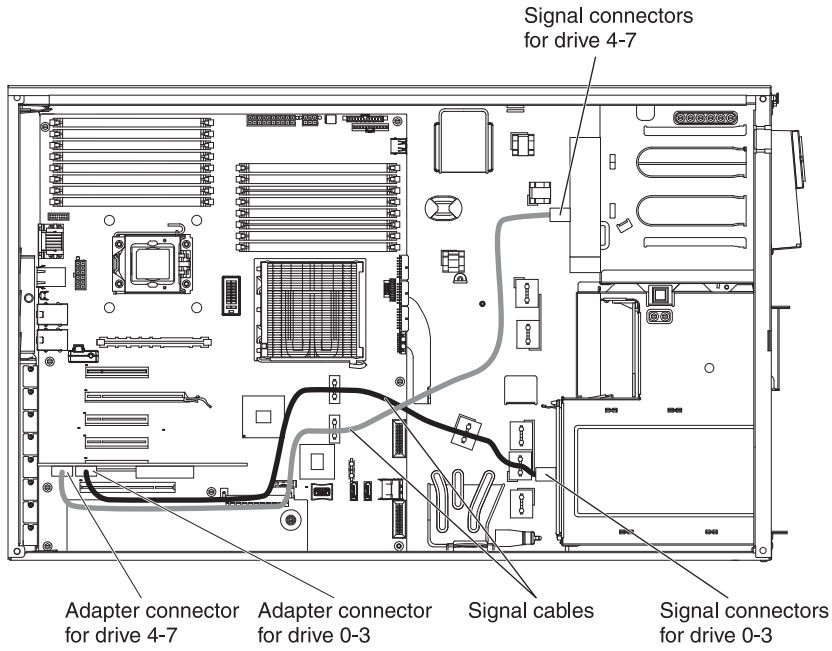
2. **For server models with eight 3.5-inch hot-swap hard disk drives.**
   - The following illustration shows the internal power cable routing.



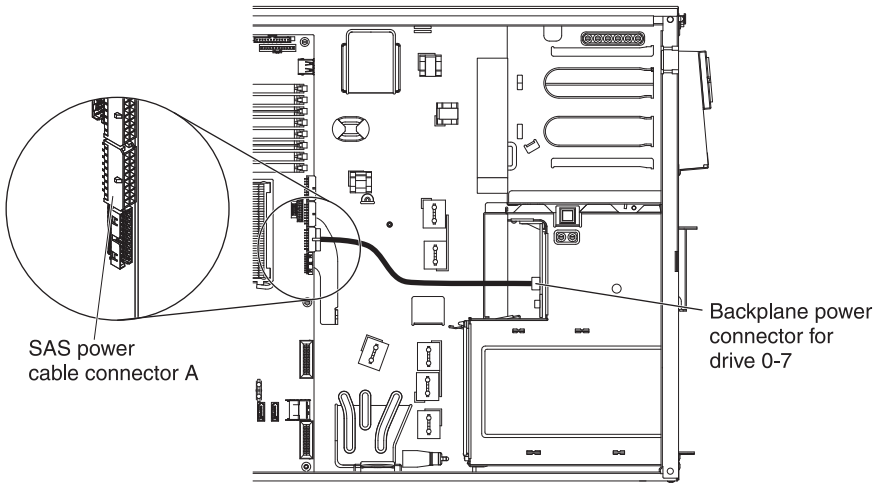
   - The following illustration shows the internal configuration cable routing.



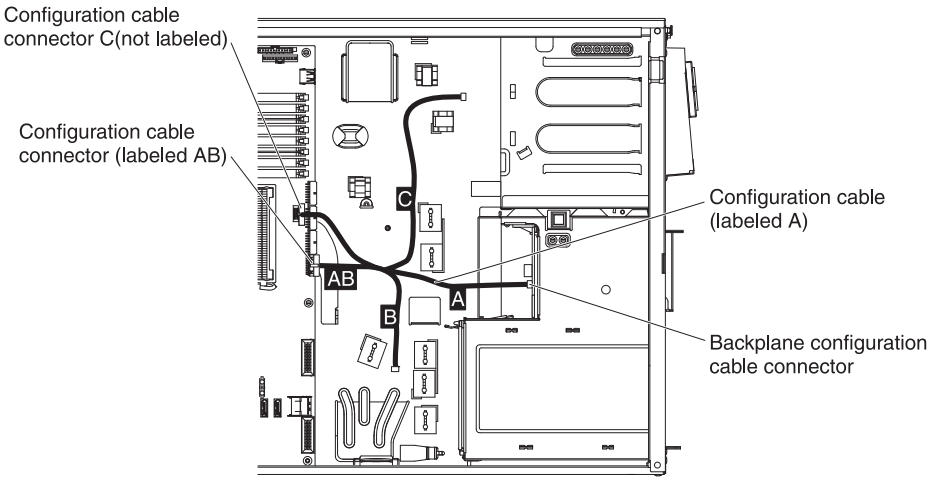
   - The following illustration shows the internal signal cable routing for installing a ServeRAID adapter.


Signal connectors
for drive 4-7
Adapter connector
for drive 4-7
Adapter connector
for drive 0-3
Signal cables
Signal connectors
for drive 0-3

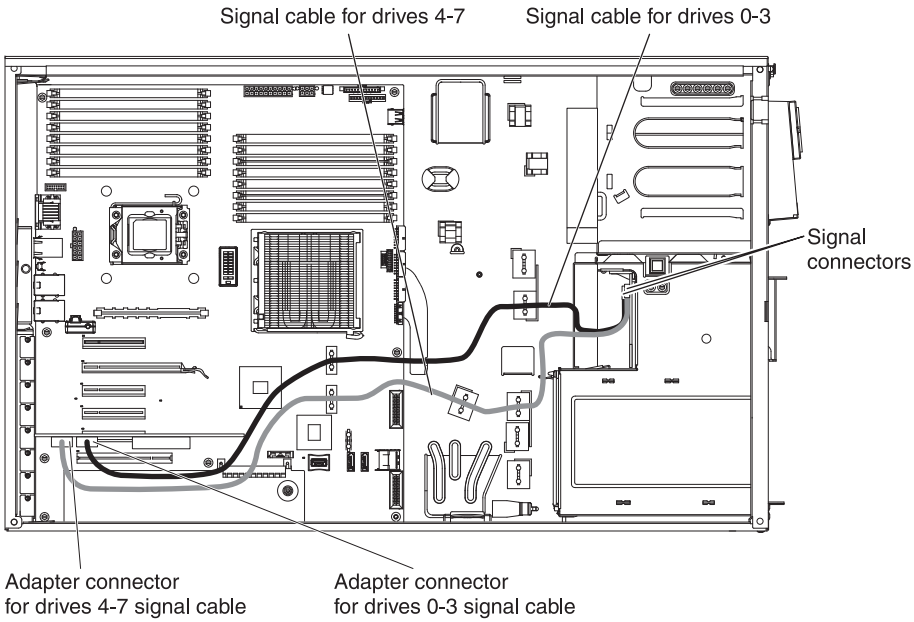
3. **For server models with eight 2.5-inch hot-swap hard disk drives.**
   - The following illustration shows the internal power cable routing.



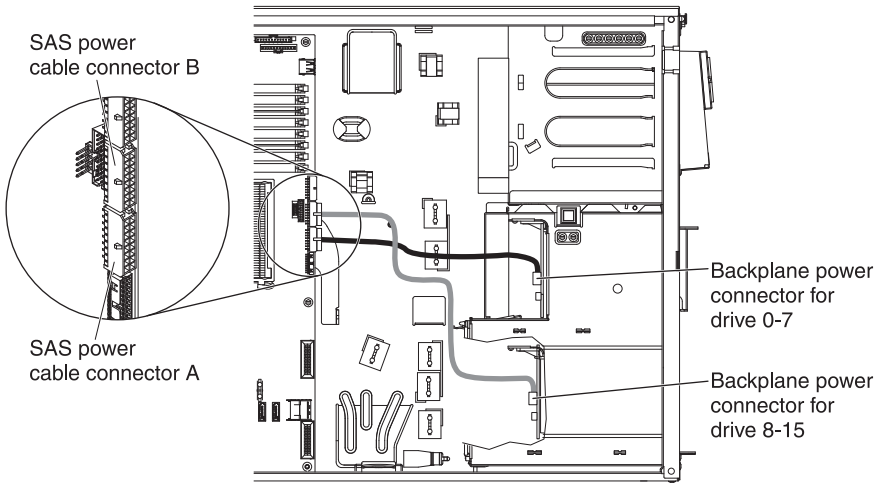
   - The following illustration shows the internal configuration cable routing.



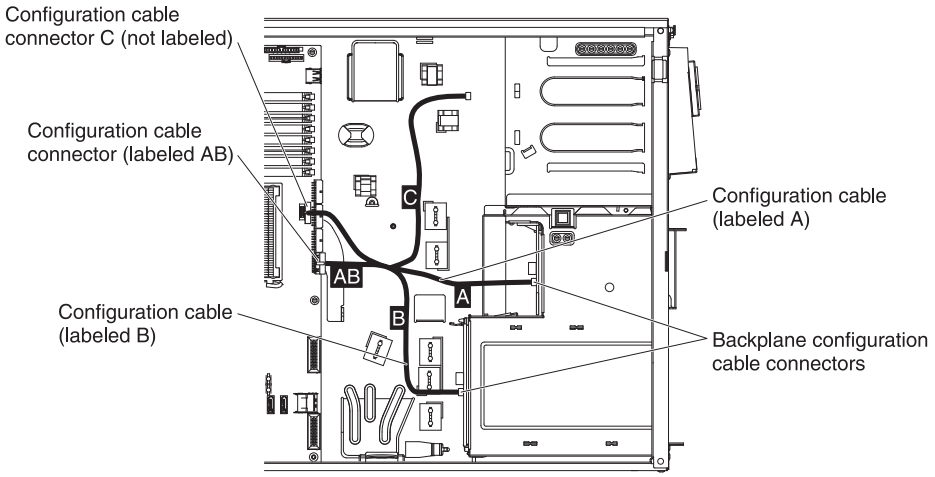
   - The following illustration shows the internal signal cable routing for installing a ServeRAID adapter.


Signal cable for drives 4-7
Signal cable for drives 0-3
Signal connectors
Adapter connector for drives 4-7 signal cable
Adapter connector for drives 0-3 signal cable

4. **For server models with sixteen 2.5-inch hot-swap hard disk drives.**
   - The following illustration shows the internal power cable routing.

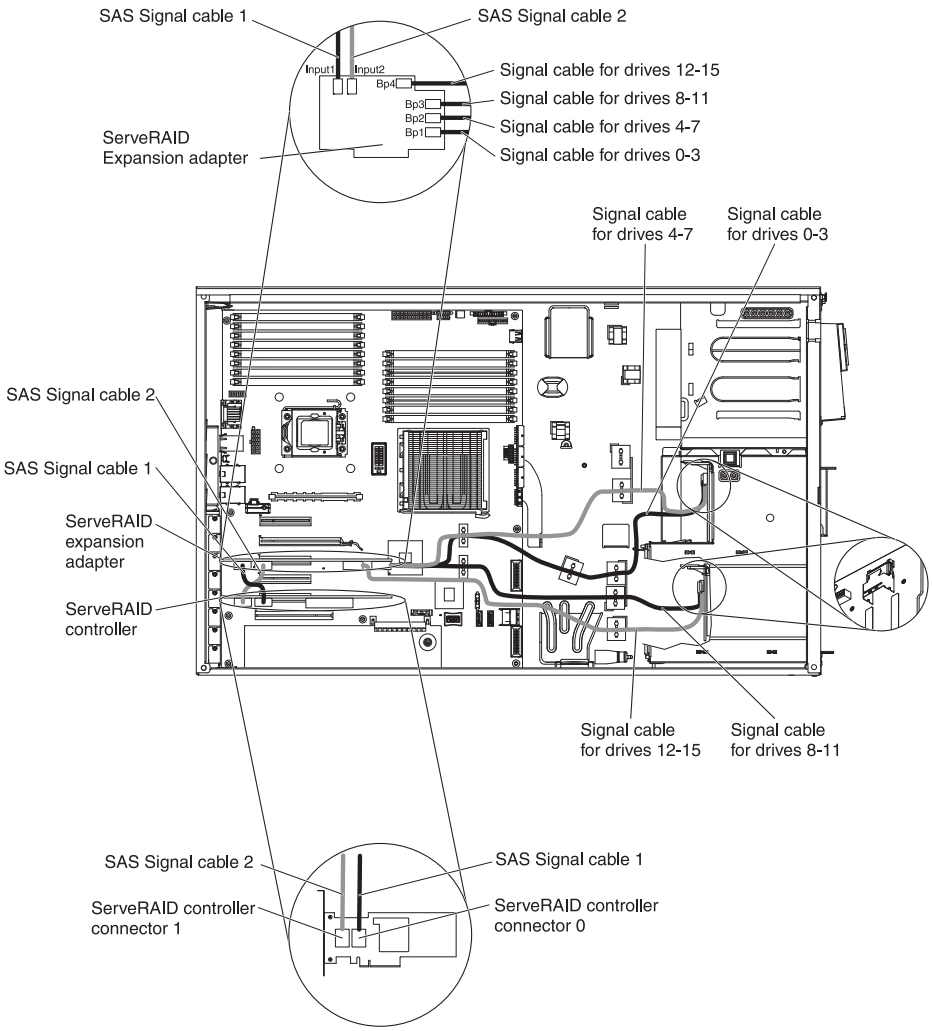


   - The following illustration shows the internal configuration cable routing.

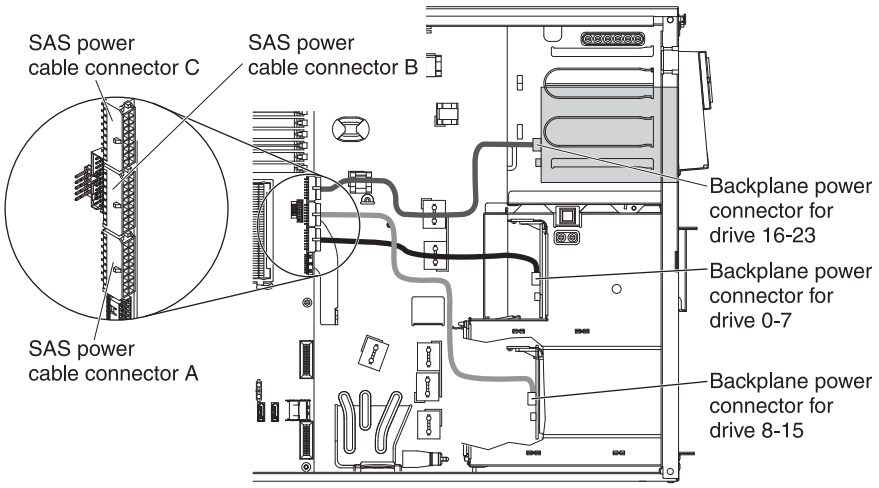


- The following illustration shows the internal signal cable routing for installing a ServeRAID adapter and a ServeRAID expansion adapter.

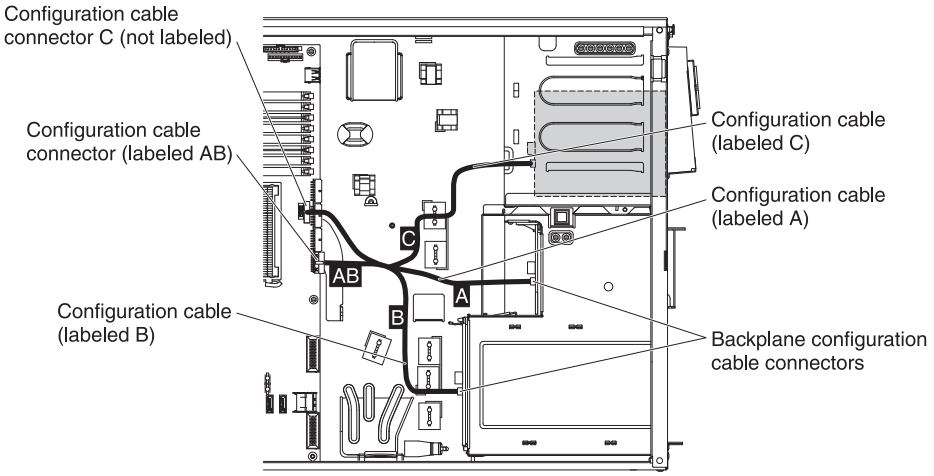
  Note: .
  - SAS expander card does not support 3 GB RAID adapters.
  - Install the ServeRAID expansion adapter to the PCI slot 3.



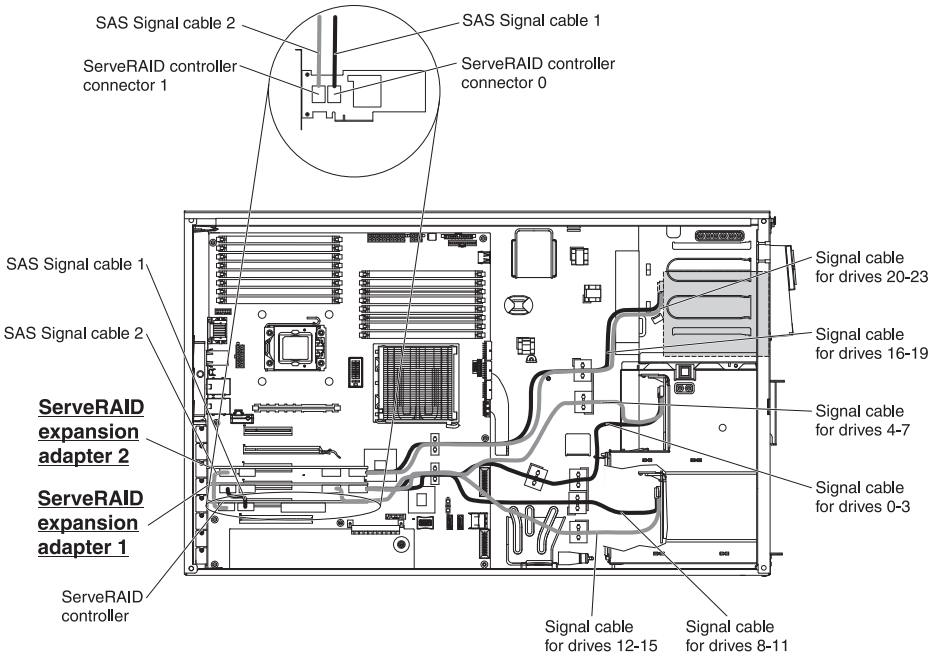
5. **For server models with twenty-four 2.5-inch hot-swap hard disk drives.**
   - The following illustration shows the internal power cable routing.

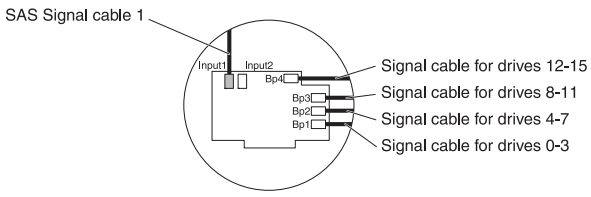


   - The following illustration shows the internal configuration cable routing.

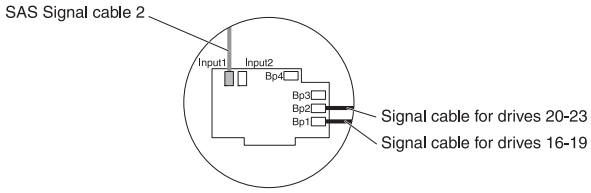


- The following illustration shows the internal signal cable routing for installing a ServeRAID adapter and two ServeRAID expansion adapters.





ServeRAID Expansion adapter 1



ServeRAID Expansion adapter 2

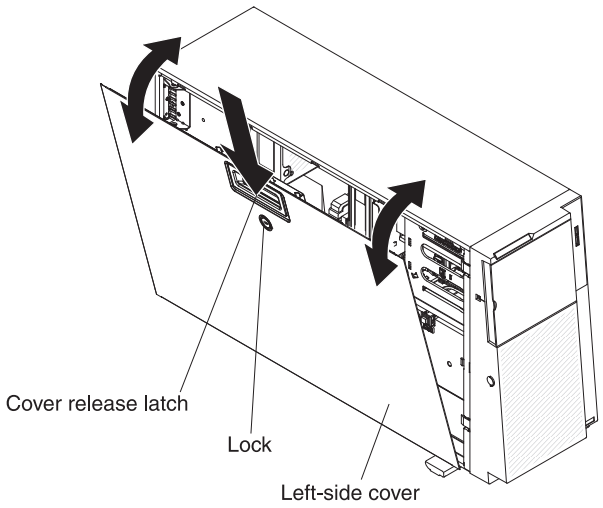
Note:

- SAS expander card does not support 3 GB RAID adapters.
- Install the ServeRAID expansion adapter 2 and 1 to the PCI slot 3 and 4.
- When using ServeRAID adapter M1015 to support more than sixteen 2.5-inch hard disk drives, the maximum number of RAID supported drives is 16. All the other drives will remain JBOD (the drives are presented to the operating system without a RAID configuration).

Removing and replacing Tier 1 CRUs

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

Removing the left-side cover

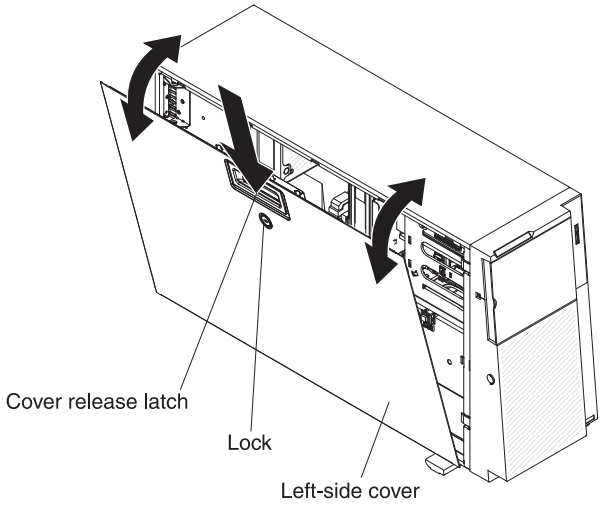


To remove the left-side cover complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. If you are installing or replacing a non-hot-swap component, turn off the server and all peripheral devices, and disconnect the power cords and all external cables.
3. Unlock the left-side cover, using the key that comes with the server.
4. Pull the cover-release latch down while you rotate the top edge of the cover away from the server; then, lift the cover off the server.

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

Installing the left-side cover



To install the left-side cover, complete the following steps:

1. Set the bottom edge of the left-side cover on the bottom ledge of the server.
2. Rotate the top edge of the cover toward the server and press inward on the cover until it clicks into place.
3. Lock the cover, using the key that comes with the server.

Removing and installing drives

Depending on the server model, the server might come with a SATA attached DVD-ROM drive in bay 1.

The following are illustrations of the server and the location of the drive bays. Your hardware might differ, depending on the model.

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

The following illustrations show the location of the drive bays in the 2.5-inch hot-swap SAS or hot-swap SATA hard disk drive server models.

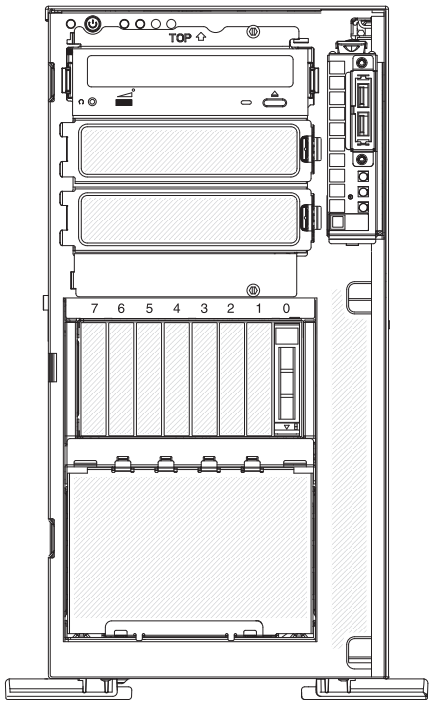


Figure 8. server with eight 2.5-inch hard disk drives

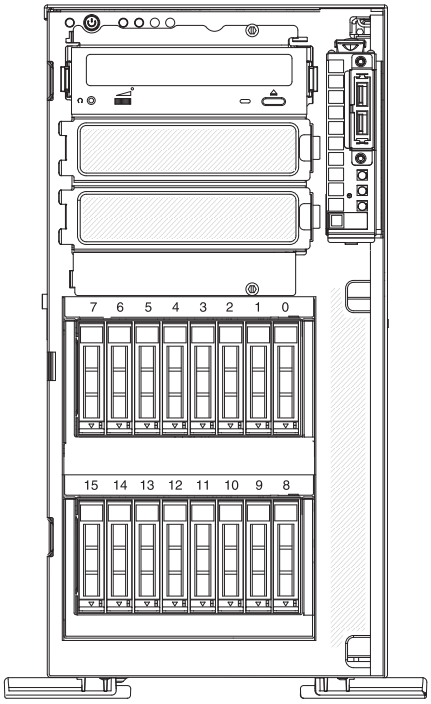


Figure 9. Server with sixteen 2.5-inch hard disk drives

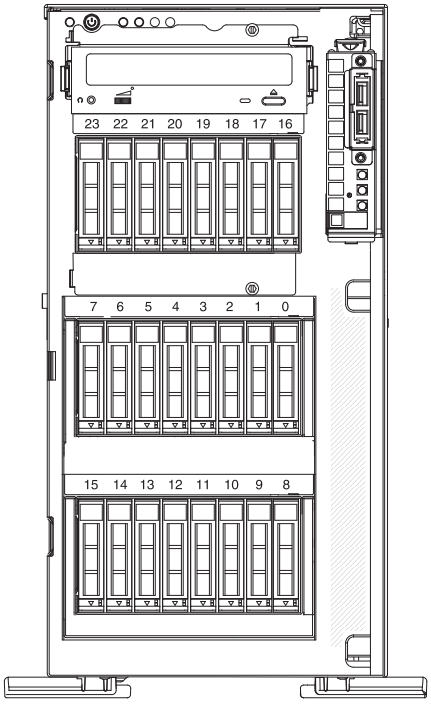


Figure 10. server with twenty-four 2.5-inch hard disk drives

The following illustrations show the location of the drive bays in the 3.5-inch hot-swap SAS or hot-swap SATA hard disk drive server models.

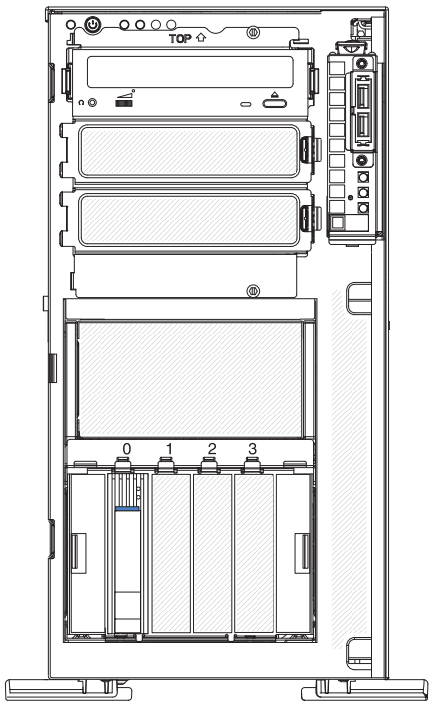


Figure 11. server with four 3.5-inch hard disk drives

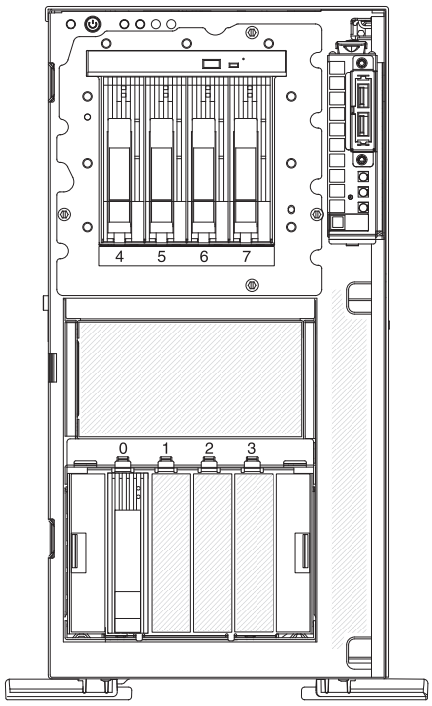


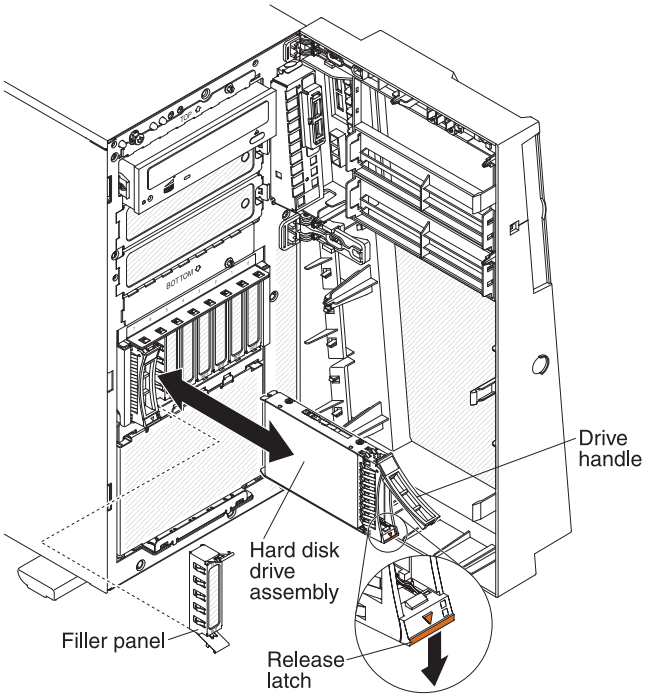
Figure 12. server with eight 3.5-inch hard disk drives

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 and DVD-ROM drives are examples of removable-media drives. You can install removable-media drives only in bays 1, 2, and 3 on models with four 3.5-inch, eight or sixteen 2.5-inch hard disk drives.
- To install a 3.5-in drive in a 5.25-in bay, you must use a 5.25-in 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 2.5-inch hot-swap hard disk drive



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

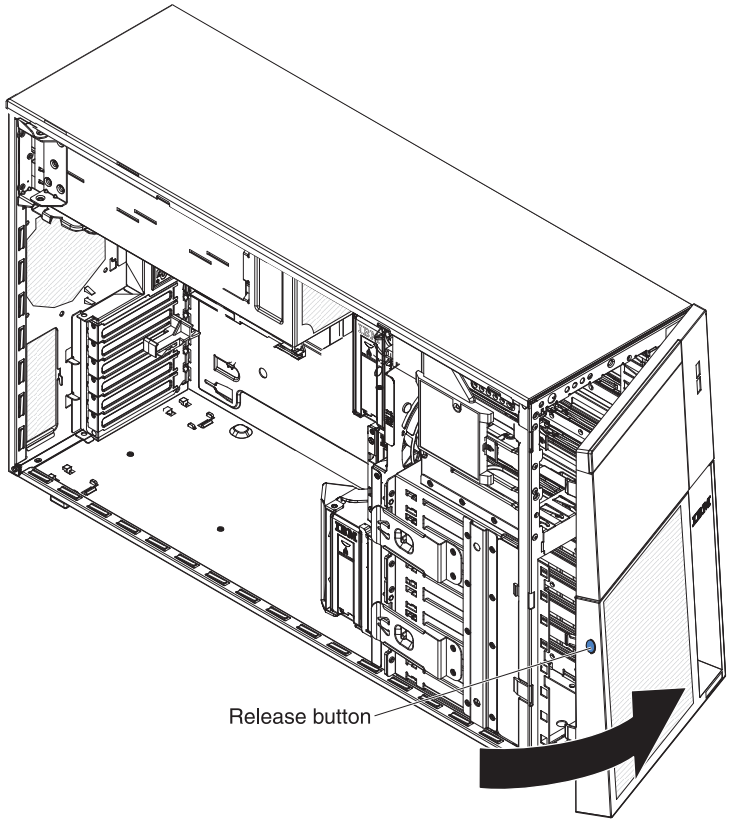
1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.

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

2. Unlock the left-side cover.

   Note: You must unlock the left-side cover to open or remove the bezel. When you lock the left-side cover, it locks both the cover and the bezel.

3. Open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.



4. Press down on the release latch to open the drive handle; then, pull the drive out of the drive bay.
5. If you are instructed to return the hot-swap hard disk drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a 2.5-inch hot-swap hard disk drive

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

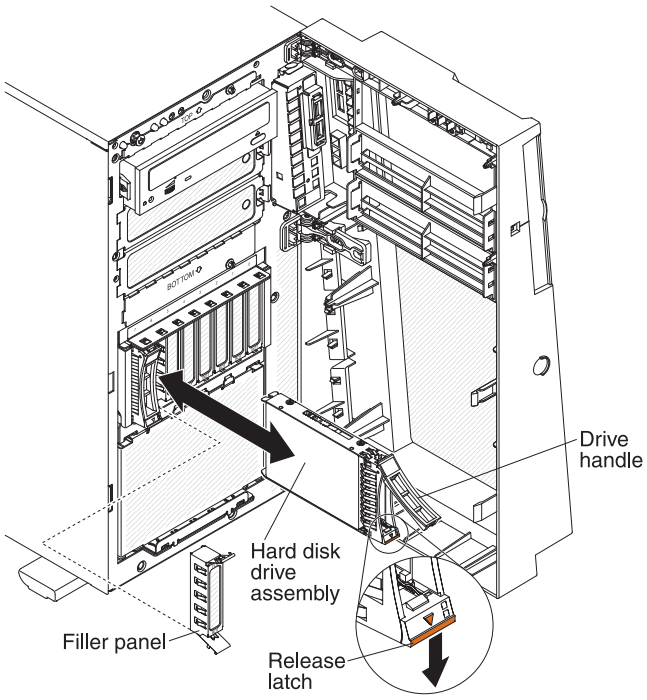
- Depending on the model, the server supports up to eight or up to twenty-four 2.5-inch SAS hot-swap hard disk drives in the hot-swap bays.

  Note:

  – SAS expander card does not support 3 GB RAID adapters.

  – When using ServeRAID adapter M1015 to support more than sixteen 2.5-inch hard disk drives, the maximum number of RAID supported drives is 16. All the other drives will remain JBOD (the drives are presented to the operating system without a RAID configuration).
- For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.
- Inspect the drive and drive bay for signs of damage.
- Make sure that the drive is correctly installed in the drive bay.
- See the documentation for the ServeRAID adapter for instructions for installing a hard disk drive.

  Note: For proper cooling, do not install any card in the slot next in sequence to a ServeRAID adapter with battery backup module (for example, if a ServeRAID adapter with battery backup module is installed in slot 2, do not install any card in slot 3).
- All hot-swap drives in the server must have the same throughput speed rating; using drives with different speed ratings might cause all drives to operate at the speed of the slowest drive.
- You do not have to turn off the server to install hot-swap drives in the hot-swap drive bays. However, you must turn off the server when you perform any steps that involve installing or removing cables.
- The drive ID of each hot-swap hard disk drive is printed above the drive bay.



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

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.

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

2. Touch the static-protective package that contains the disk drive to any unpainted metal surface on the server; then, remove the disk drive from the package.
3. Remove the filler panel from the hot-swap drive bay, if one is installed.
4. Make sure that the tray handle is open; then, install the hard disk drive into the hot-swap bay.
5. Rotate the drive handle down until the drive is seated in the hot-swap bay and the release latch clicks into place.

   Notes:

   a. After you install the hard disk drive, check the disk drive status LEDs to verify that the hard disk drive is operating correctly.

      If the amber hard disk drive status LED is lit continuously, that drive is faulty and must be replaced. If the green hard disk drive activity LED is flashing, the drive is being accessed.

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

6. Close the bezel.

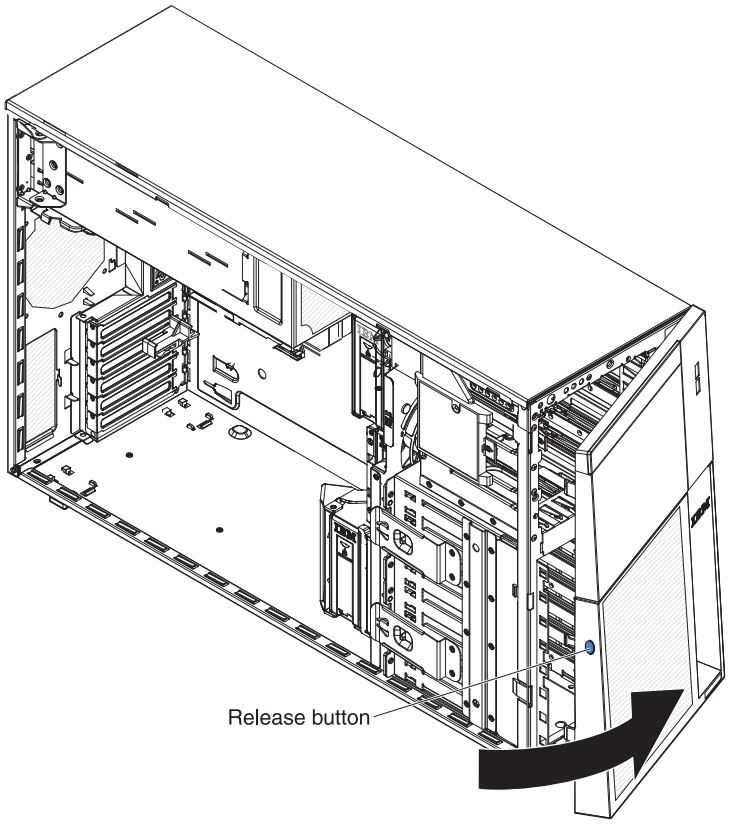
Removing a 3.5-inch hot-swap hard disk drive

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.

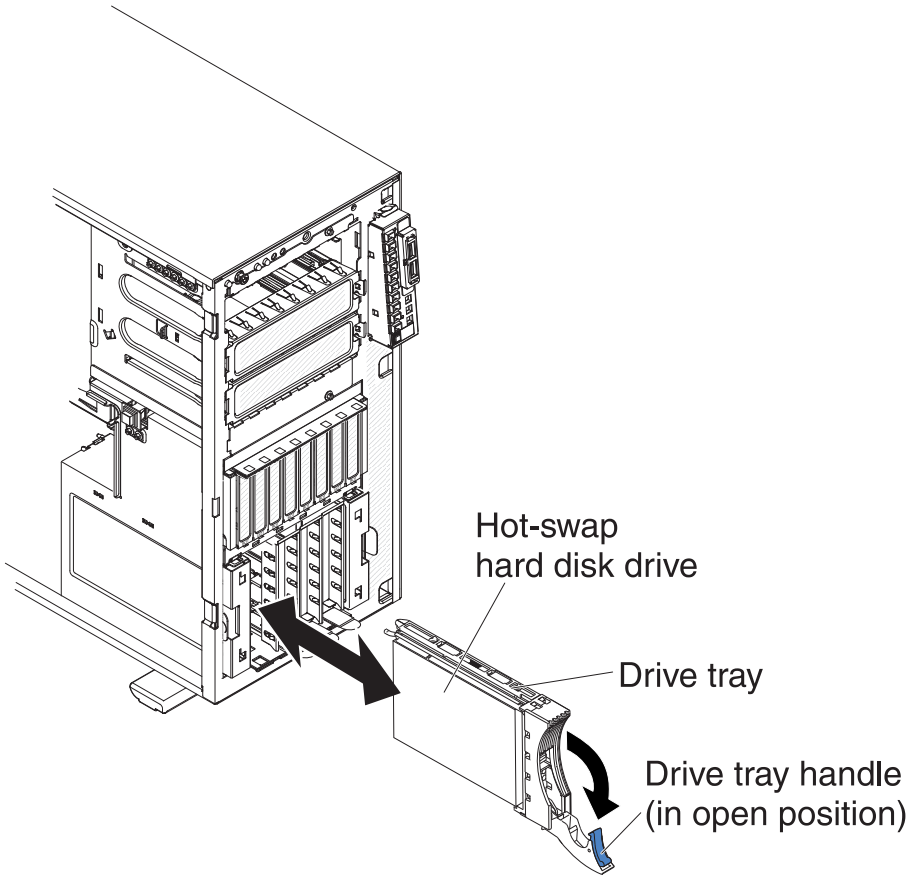
To remove a 3.5-inch hot-swap SAS or hot-swap SATA hard disk drive, complete the following steps.

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Unlock the left-side cover.

   Note: You must unlock the left-side cover to open or remove the bezel. When you lock the left-side cover, it locks both the cover and the bezel.
3. Open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.



4. Rotate the drive tray handle of the drive assembly to the open position.
5. Grasp the handle of the drive and pull the drive out of the bay.



6. If you are instructed to return the 3.5-inch hot-swap hard disk drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

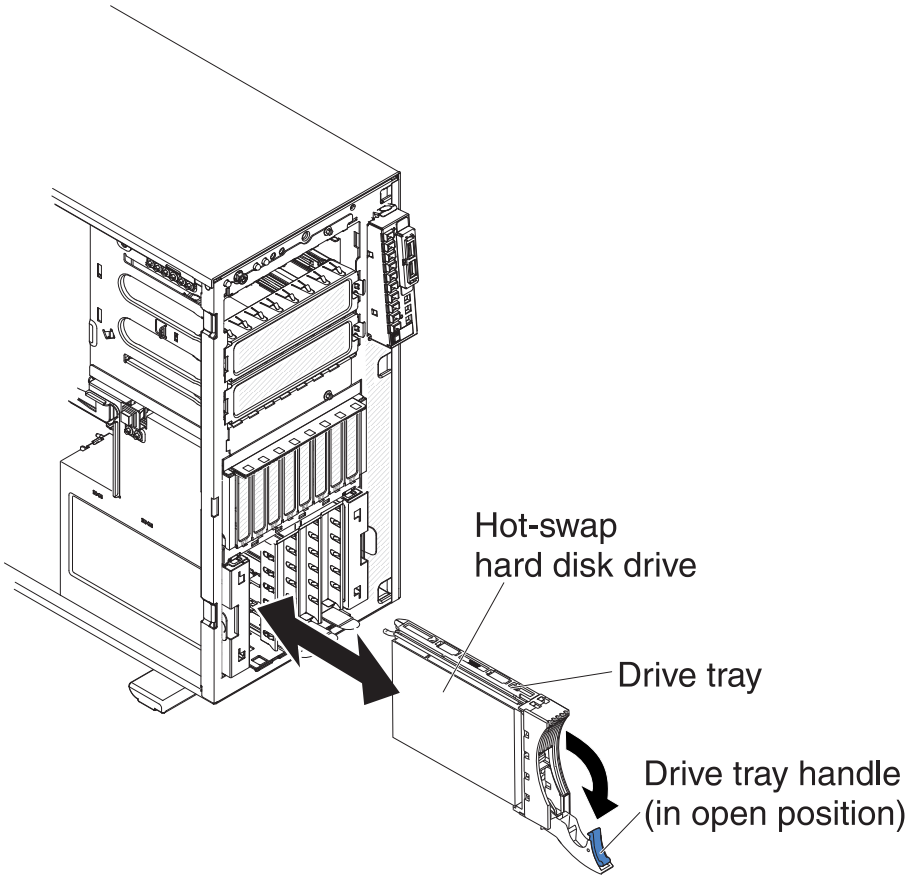
Installing a 3.5-inch hot-swap hard disk drive

Before installing a 3.5–inch hot-swap hard disk drive, read the following information:

- 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.

To install a 3.5–inch hot-swap hard disk drive, complete the following steps.

1. Remove the EMC shield, if one is present.
2. 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.
3. Make sure that the drive tray handle is in the open position.
4. Align the drive assembly with the guide rails in the bay; then, carefully slide the drive assembly into the drive bay until the drive snaps into place.



5. Rotate the drive tray handle to the closed position.
6. Check the hard disk drive status indicator to make sure that the hard disk drive is operating correctly.

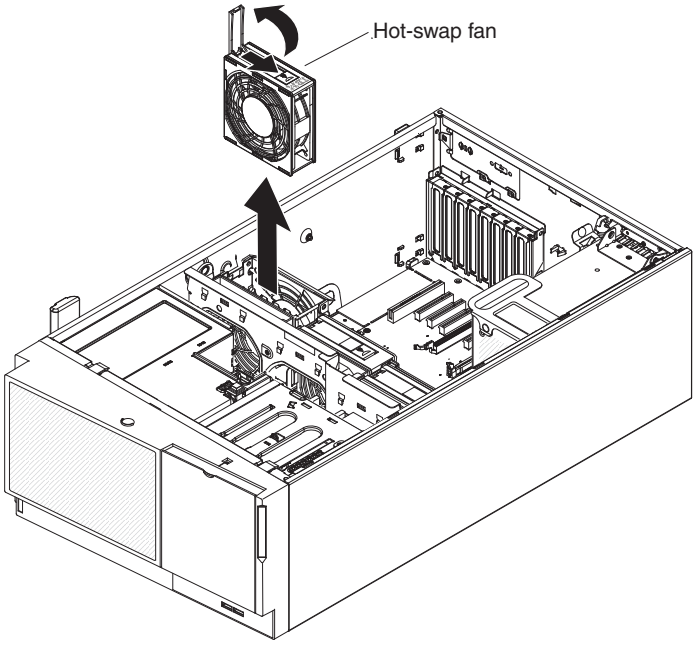
   After you replace a failed hard disk drive, the green activity LED flashes as the disk spins up. The amber LED turns off after approximately 1 minute. If the new drive starts to rebuild, the amber LED flashes slowly, and the green activity LED remains lit during the rebuild process. If the amber LED remains lit, see “Hard disk drive problems” on page 75.

Note: You might have to reconfigure the disk arrays after you install hard disk drives. See the RAID documentation on the IBM Web site at http://www.ibm.com/systems/support/ for information about RAID adapters.

7. Close the bezel.
8. Lock the side cover.

Removing a hot-swap fan

The server comes with three 120 mm x 38 mm hot-swap fans in the fan-support bracket at the front of the server. The following instructions can be used to remove any hot-swap fan in the server.



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

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.

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

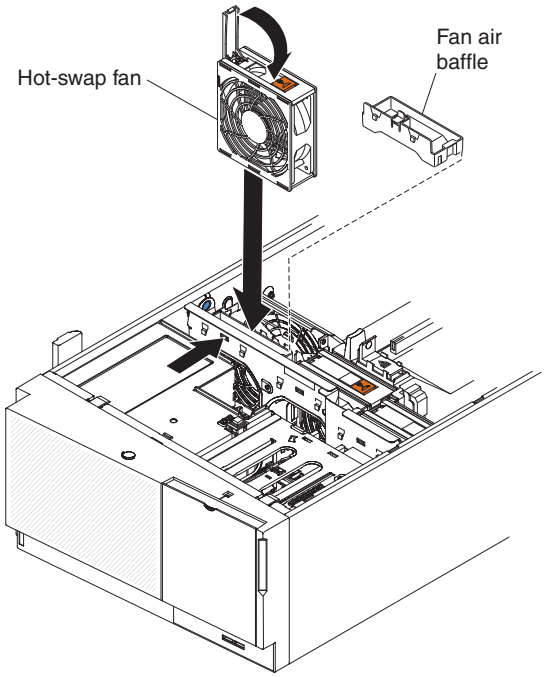
2. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).

   Attention: To ensure proper system cooling, do not leave the top cover off the server for more than 2 minutes.

3. Open the fan-locking handle by sliding the orange release latch in the direction of the arrow.
4. Pull outward on the free end of the handle to remove the fan from the server.
5. If you are instructed to return the hot-swap fan, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a hot-swap fan

The server comes with three 120 mm x 38 mm hot-swap fans in the fan support bracket at the front of the server. The following instructions can be used to install any hot-swap fan in the server.



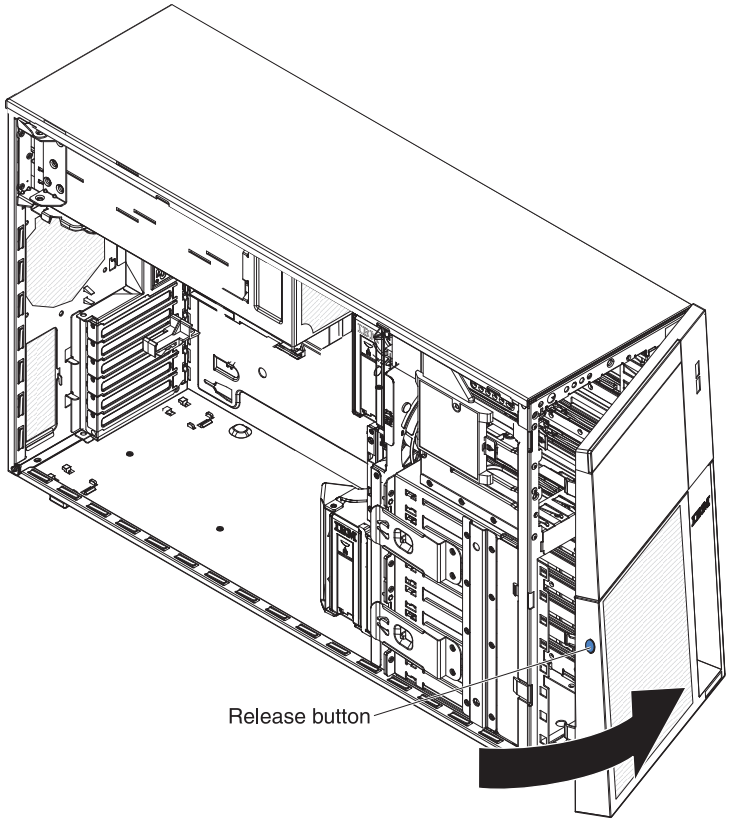
To install a hot-swap fan, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.

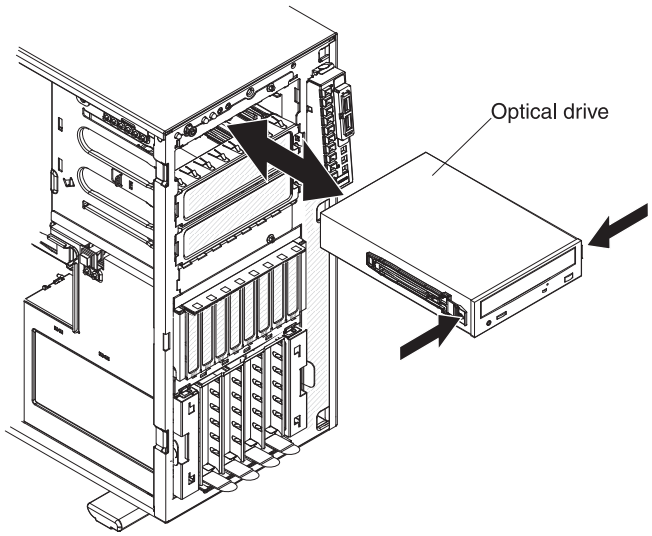
   Attention: Static electricity that is released to internal server components when the server is powered-on might cause the server to halt, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when you work inside the server with the power on.
2. Touch the static-protective package that contains the hot-swap fan to any unpainted metal surface on the server; then, remove the fan from the package.
3. Open the fan-locking handle on the replacement fan.
4. Insert the fan into the socket and close the handle to the locked position.
5. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).

Removing a DVD drive

1. **To remove the DVD drive on models with four 3.5-inch, eight 2.5-ich or sixteen 2.5-inch hard disk drives, complete the following steps:**
   a. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
   b. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
   c. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
   d. Open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.



   e. Disconnect the DVD drive cables from the back of the DVD drive.
   f. Grasp the blue tabs on each side of the DVD drive and press them inward while you pull the drive out of the server.



g. Remove the blue rails from the DVD drive and save them for future use.

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

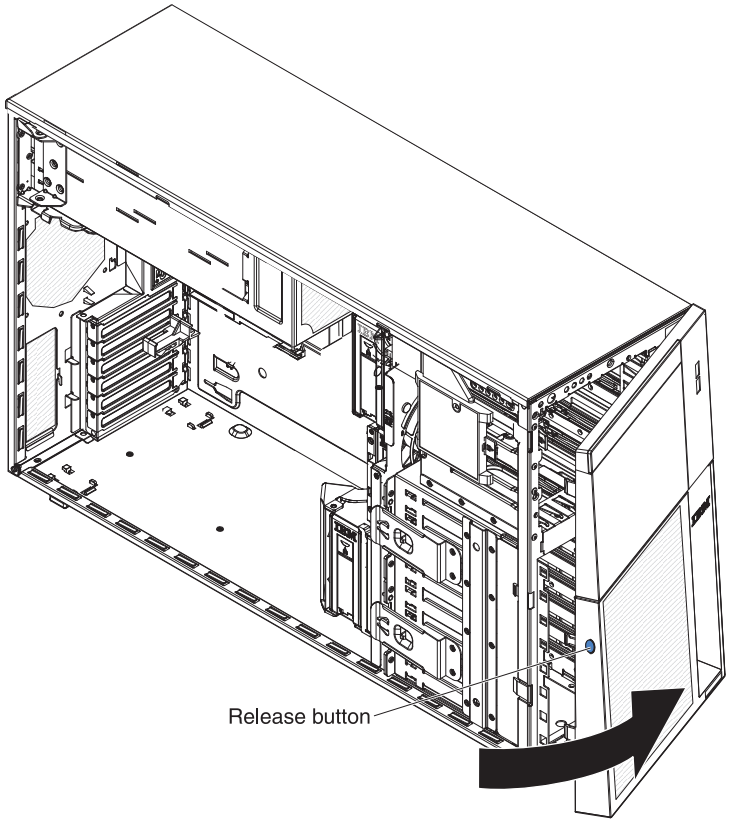
2. **To remove the UltraSlim DVD drive on models with eight 3.5-inch hard disk drives, complete the following steps:**

   a. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.

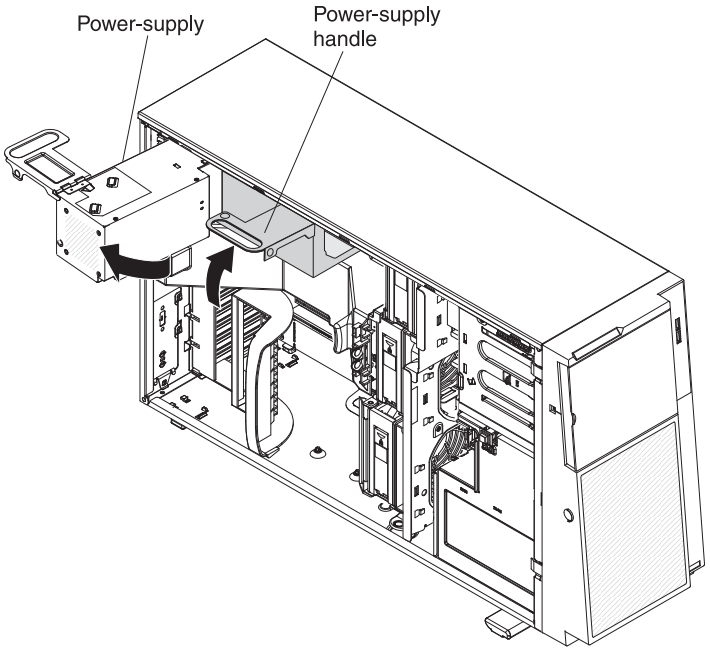
   b. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.

   c. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).

   d. Open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.



e. Rotate the power-supply cage assembly out of the chassis. Lift up the power-supply cage handle and pull the power-supply cage assembly all the way up until the retainer latch locks the cage in place on the chassis.



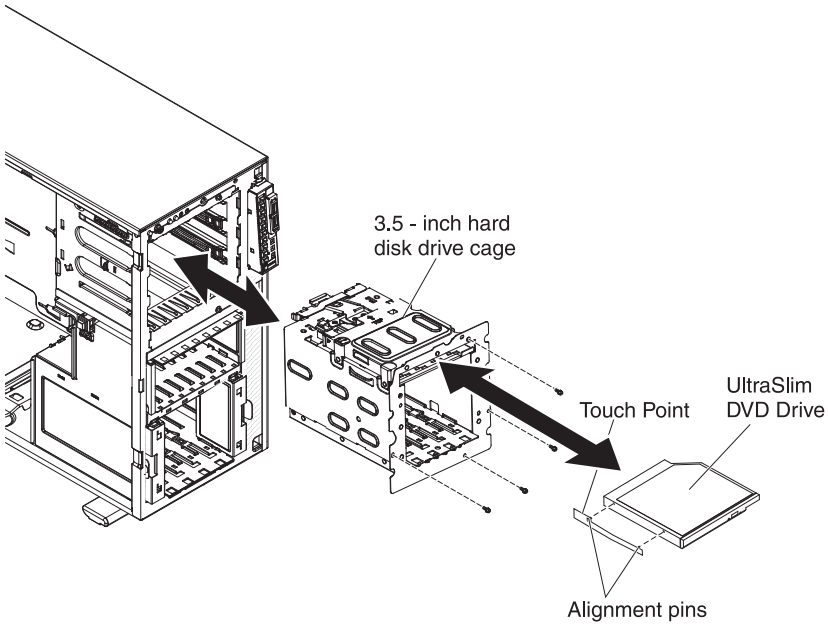
f. Remove the air baffle (see “Removing the air baffle” on page 217).

g. Remove the fan cage assembly (see “Removing the fan cage assembly” on page 247).

h. Disconnect the UltraSlim DVD drive cables from the system board and clips.

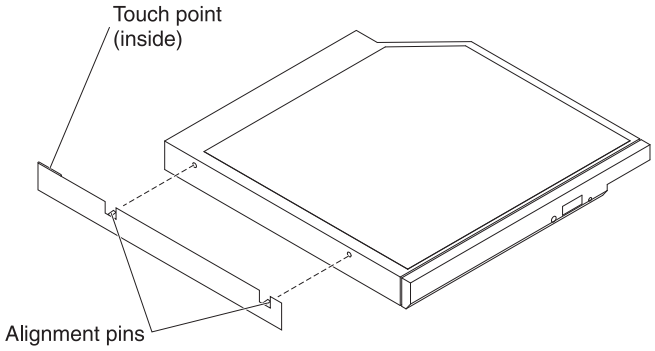
i. Store the cables for future use.

j. Unscrew and remove the 3.5-inch disk drive cage.



k. Press and hold the release tab down as you push the UltraSlim DVD drive from the rear to slide it out from the bay.

l. Slide the drive-retention clip from the side of the drive. Save the clip to use when you install the replacement drive or replace the UltraSlim DVD drive filler.



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

Installing a DVD drive

1. **To install the DVD drive on models with four 3.5-inch, eight 2.5-ich or sixteen 2.5-inch hard disk drives, complete the following steps:**
   a. If you are replacing a drive, make sure that:
      - You have all the cables and other equipment that are 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 Klass 1
      Luokan 1 Laserlaite
      Appareil À Laser de Classe 1

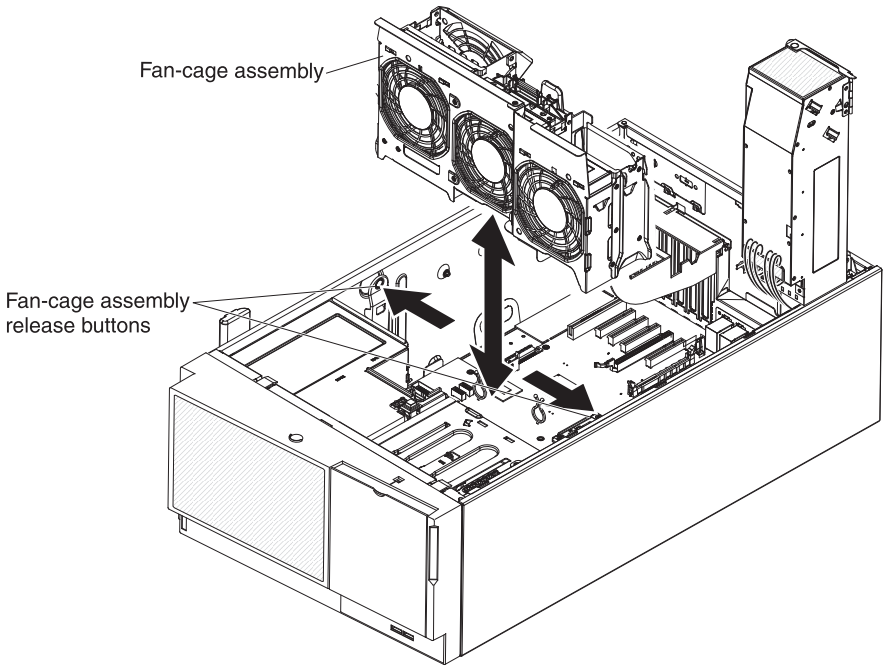
   b. Touch the static-protective package that contains the DVD drive to any unpainted metal surface on the server; then, remove the DVD drive from the package.

c. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.

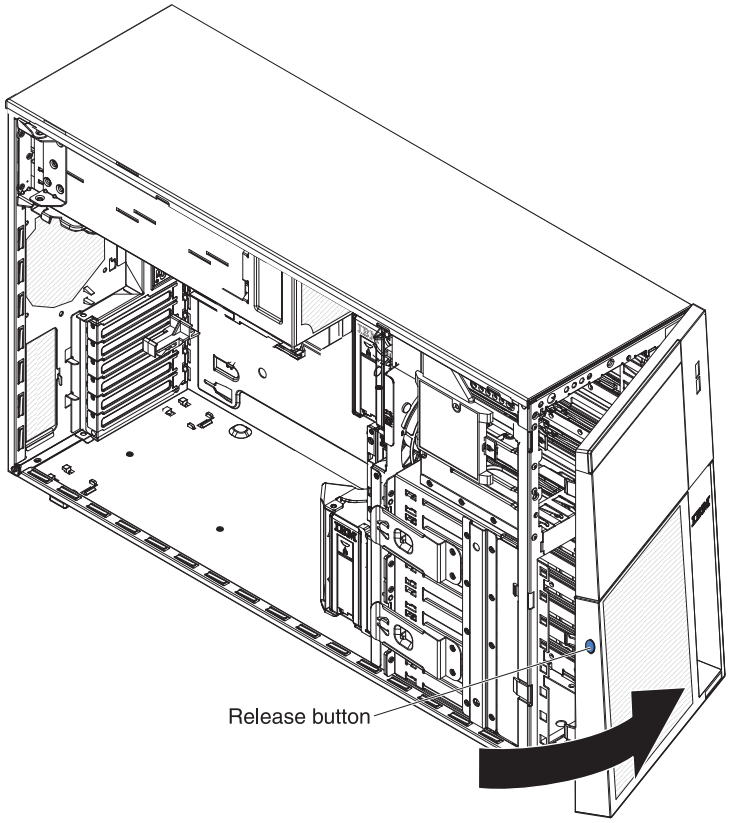
d. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.

e. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).

f. Remove the fan cage assembly (see “Removing the fan cage assembly” on page 247).



g. Open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.

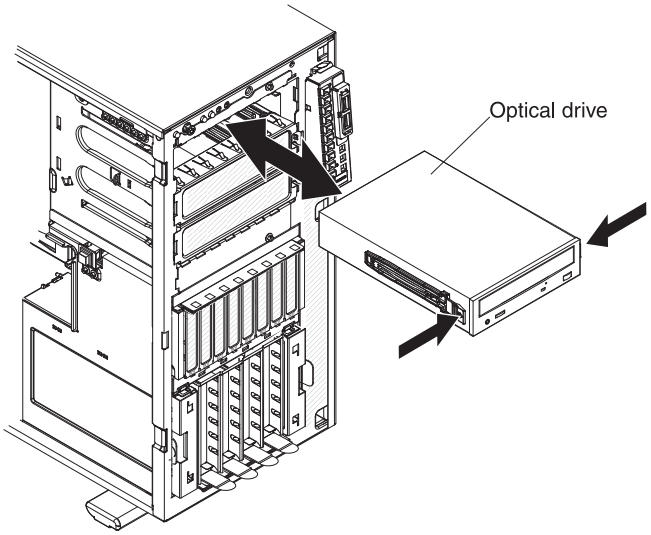


h. Install the blue rails on the DVD drive, using the holes nearest the center of the drive.

i. 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.

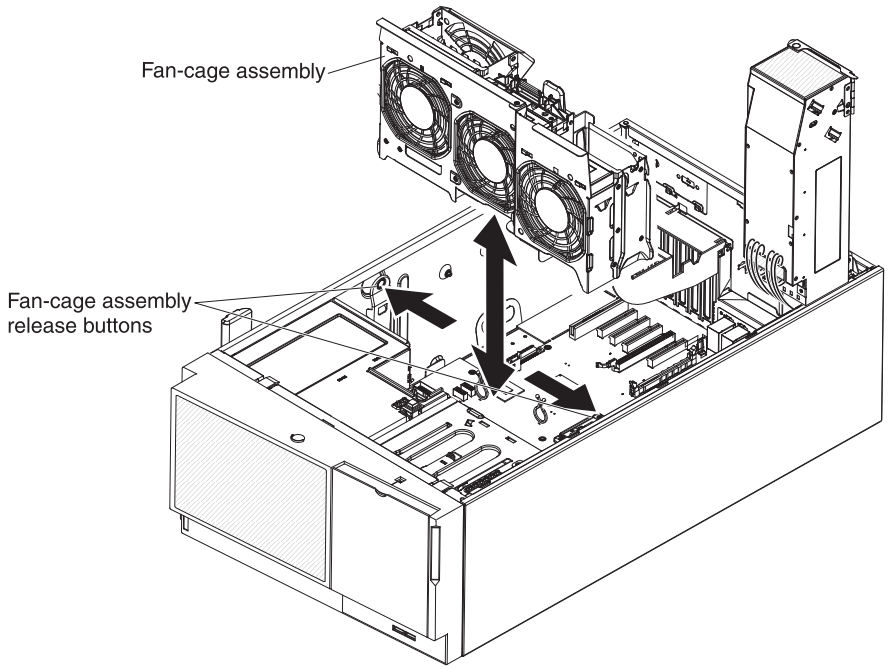
j. Align the rails on the DVD drive with the guides in the drive bay; then, slide the DVD drive into the drive bay until the rails click into place.



k. Connect power and signal cables to the drive and the connectors on the system board. (See “Internal cable routing and connectors” on page 169 for more information.)

l. Reinstall the air baffle.

m. Reinstall the fan cage assembly (see “Installing the fan cage assembly” on page 248.)



n. Rotate the power-supply cage assembly back into the server. Press the power-supply cage release tab and rotate the power-supply cage assembly into the chassis.

o. Close the bezel.

p. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).

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

2. **To install the UltraSlim DVD drive on models with eight 3.5-inch, complete the following steps:**

- Locate the documentation that comes with the drive and follow those instructions in addition to the instructions in this chapter.
- Make sure that you have all the cables and other equipment that are specified in the documentation that comes with the drive.
- The server supports one ultra-slim SATA optical drive.

a. If you are replacing a drive, make sure that:

- You have all the cables and other equipment that are 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.**

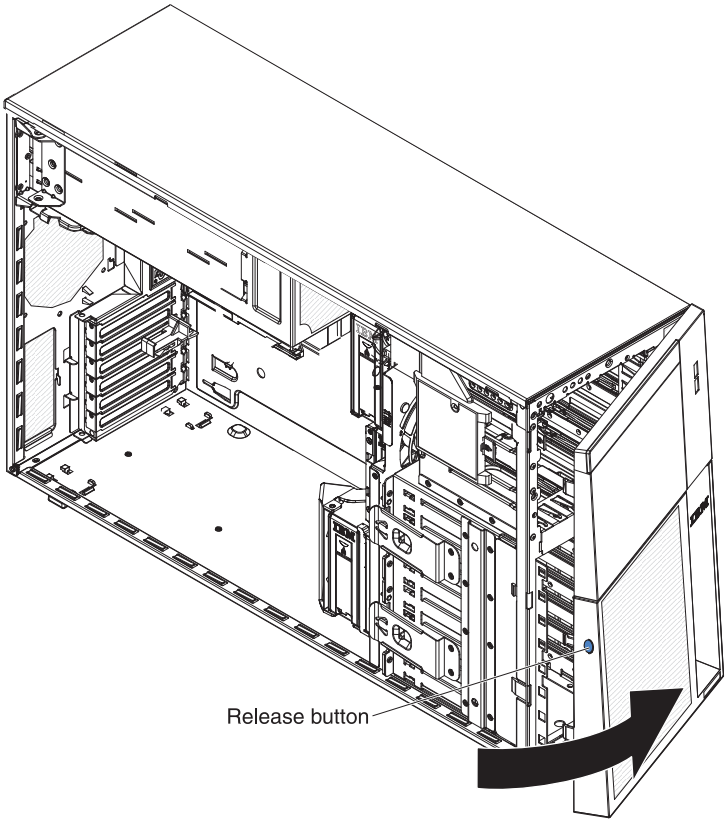
DANGER

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

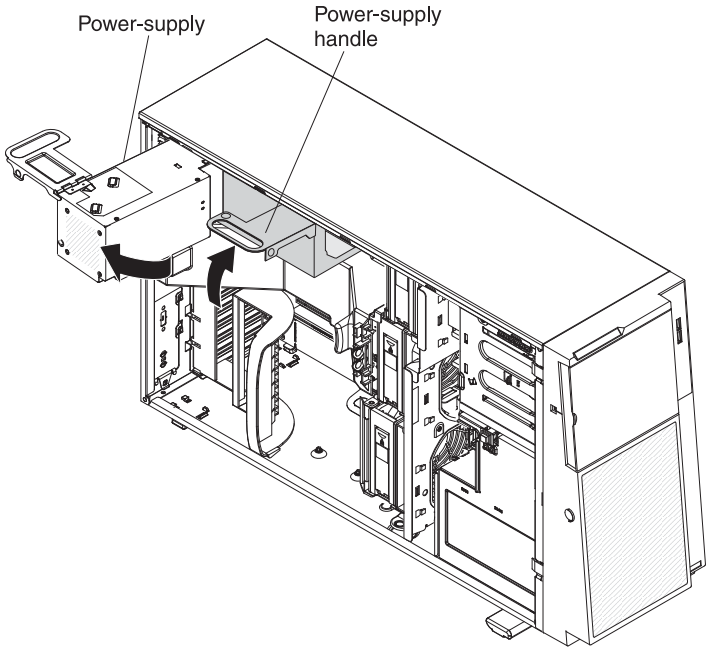
Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

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

b. Touch the static-protective package that contains the UltraSlim DVD drive to any unpainted metal surface on the server; then, remove the UltraSlim DVD drive from the package.
c. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
d. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
e. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
f. Open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.

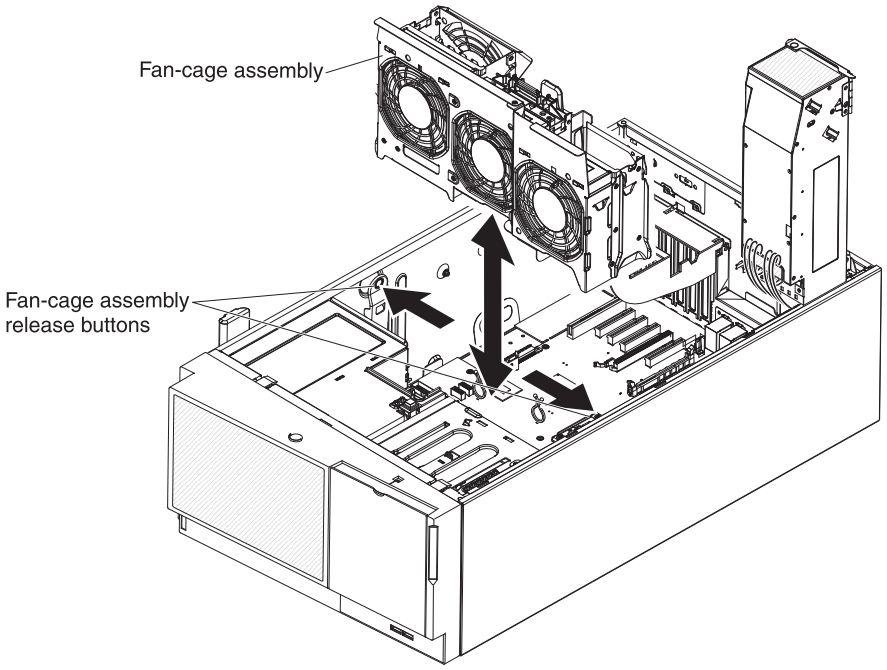


g. Rotate the power-supply cage assembly out of the chassis. Lift up the power-supply cage handle and pull the power-supply cage assembly all the way up until the retainer latch locks the cage in place on the chassis.



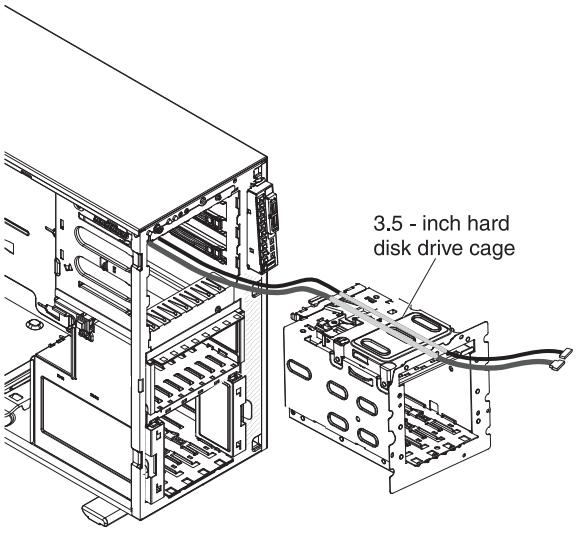
h. Remove the air baffle (see “Removing the air baffle” on page 217).

i. Remove the fan cage assembly (see “Removing the fan cage assembly” on page 247).



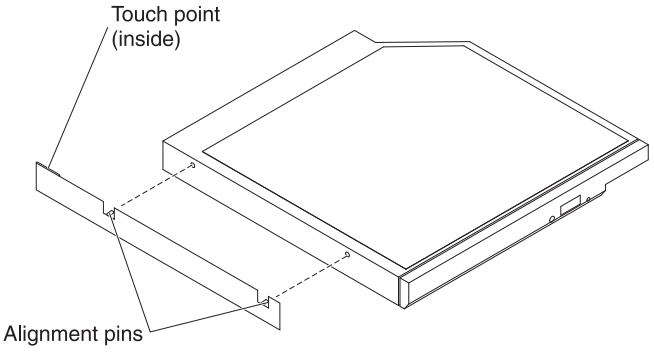
j. Disconnect the power and signal cables of the DVD drive from the system board.

k. Pull the power and signal cables of the UltraSlim DVD drive through the slim slot on top of the 3.5-inch hard disk drive cage.



l. Connect the power and signal cables to the UltraSlim DVD drive. (See “Internal cable routing and connectors” on page 169 for more information.)

m. Attach the drive retention clip to the side of the new drive.

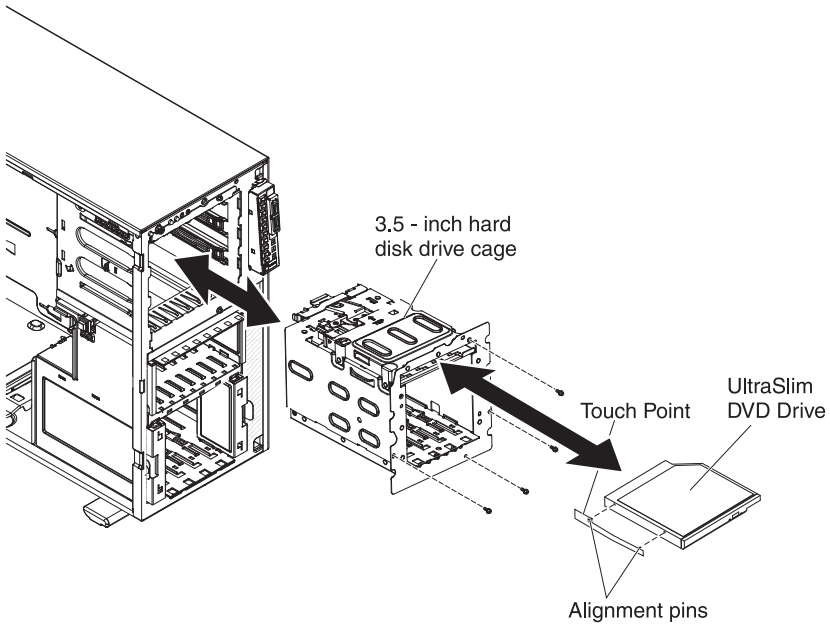


n. Slide the UltraSlim DVD drive into the slim slot on top of the 3.5-inch disk drive cage until the drive clicks into place. (For more information, see “Installing the upper 3.5-inch disk drive cage” on page 273.)

   Note: Pull the power and signal cables of the UltraSlim DVD drive into the slim slot on top of the cage first. Make sure the cables are not stuck when you slide the UltraSlim DVD drive into the cage.

o. Slide the 3.5-inch disk drive cage into the upper opening of the server along the lower edge of the opening.

   Note: Pull the power and signal cables of the UltraSlim DVD drive into the upper opening of the server first. Make sure the cables are not stuck when you slide the disk drive cage into the server.



p. Secure the 3.5-inch disk drive cage with the screws.

q. Reconnect the power and signal cables of the UltraSlim DVD drive to the system board. (See “Internal cable routing and connectors” on page 169 for more information.)

r. Reinstall the air baffle.

s. Reinstall the fan cage assembly (see “Installing the fan cage assembly” on page 248.)

t. Rotate the power-supply cage assembly back into the server. Press the power-supply cage release tab and rotate the power-supply cage assembly into the chassis.

u. Close the bezel.

v. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).

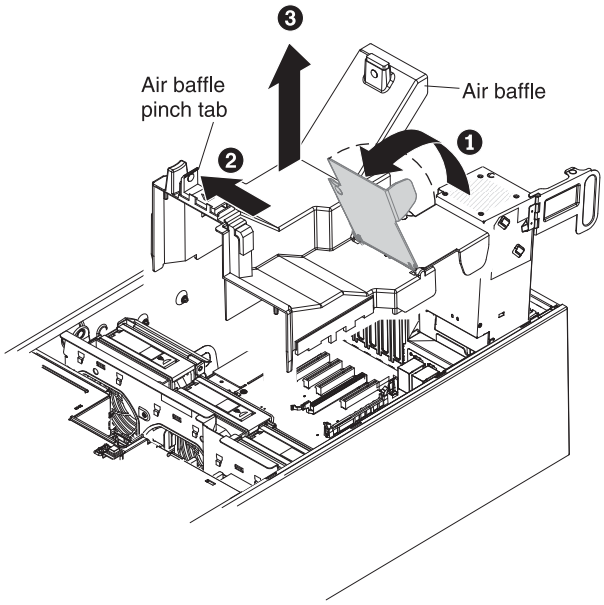
w. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the air baffle

To remove the air baffle, complete the following steps:

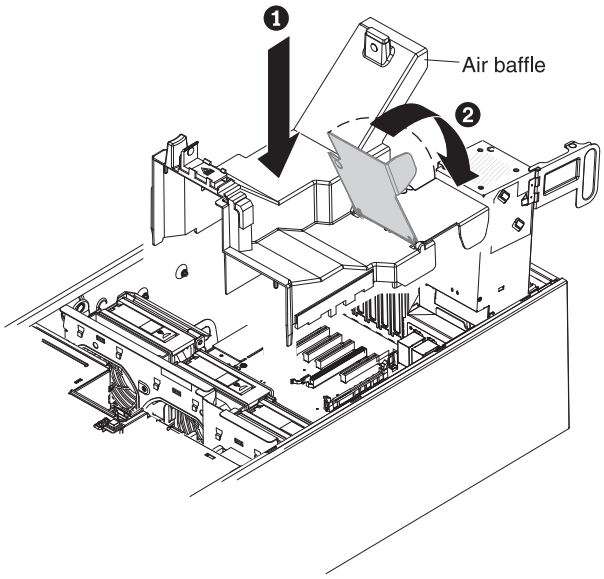
1. Read the safety information that begins on page vii, and “Handling static-sensitive devices” on page 155.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
5. Remove the power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
6. Rotate the power-supply cage to its open position (see “Opening the power-supply cage” on page 160).
7. Remove the air baffle:
   a. Lift the rear (hinged) part of the air baffle up as shown in the illustration.
   b. Press the air baffle pinch tab.
   c. Lift the air baffle up and remove it from the server.



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

Installing the air baffle

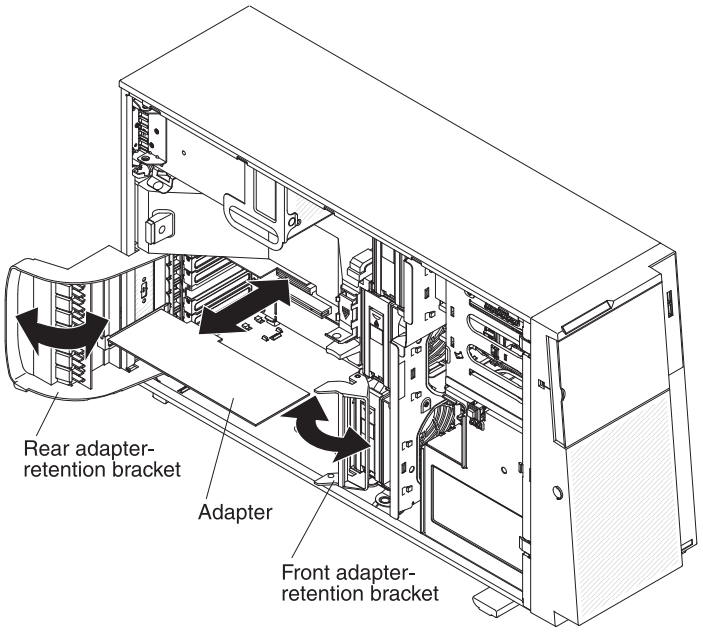


To install the air baffle, complete the following steps:

1. With the rear (hinged) part of the air baffle lifted up, align the positioning pins on the ends of the air baffle with the locating holes in the server chassis and fan cage assembly.
2. Slide the air baffle down into the server until the positioning pins fit into the locating holes; then, press down on the air baffle until the pinch tab clicks into place.
3. Rotate the rear (hinged) part of the air baffle down to the system board.

   Note: Make sure that the power-supply cage cables are not caught under the air baffle.
4. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
5. Install the hot-swap power supply or power supplies (see “Installing a hot-swap power supply” on page 277).
6. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
7. 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 “Handling static-sensitive devices” on page 155.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
5. Rotate the adapter-retention brackets to the open position.
6. Disconnect the cables from the adapter.
7. Remove the screw that secures the adapter to the server chassis.
8. Pull the adapter out of the adapter connector; then, lift the adapter out of the server.
9. If you are instructed to return the adapter, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

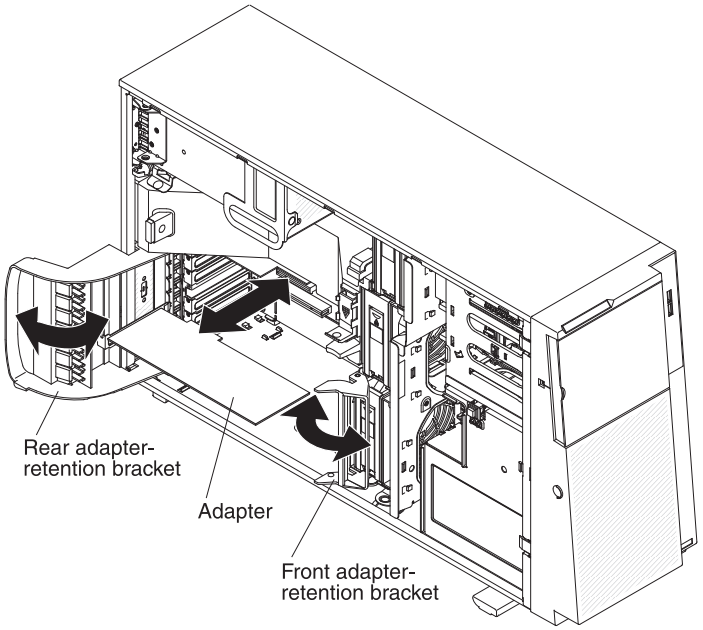
Installing an adapter

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

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you must change the switch or jumper settings on the adapter, follow the instructions that come with the adapter.
- Avoid touching the components and gold-edge connectors on the adapter.
- PCI slots 1 and 6 support half-length PCI adapters only.
- PCI slots 2, 3, 4, and 5 support both full-height and full-length PCI adapters.
- The PCI Express extender card supports a full-length adapter.
- The PCI-X extender card supports two full-length adapters.
- PCI slots 1 and 5 support the RAID adapters.
- PCI slot 2 supports a VGA adapter.
- The PCI configuration:
  - Slot 1 is a PCI Express x8 slot with x8 links, PCI Express 1.0a compliant.
  - Slot 2 is a PCI Express x16 slot with x8 links, PCI Express 1.0a compliant.
  - Slots 3 and 4 are PCI Express x8 slots with x4 links, PCI Express 1.0a compliant.
  - Slot 5 is a PCI Express x8 slot with x8 links, PCI Express 1.0a compliant
  - Slot 6 is a PCI 33/32 slot, PCI 2.2 compliant.
  - PCI Express extender card slot 7 is a PCI Express x8 slot with x4 links, PCI Express 1.0a compliant.
  - PCI-X extender card slots 7 and 8 are PCI-X slots with 64/32 bits, 133/100/66 MHz from PXH.
- The system scans PCI slots 1 through 6 to assign system resources. The system then starts (boots) the system devices in the following order, if you have not changed the default boot precedence: integrated Ethernet controller, ServeRAID adapter, and then PCI, PCI-X, and PCI Express slots.

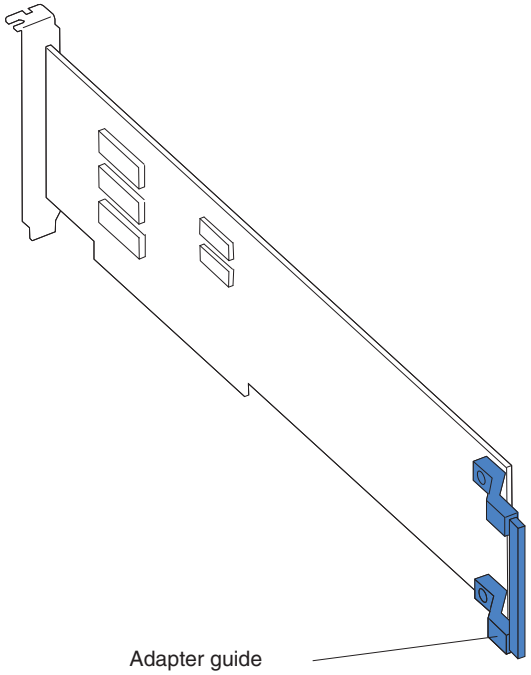
  Note: To change the boot precedence for PCI and PCI-X devices, start the Setup utility and select **Start Options** from the main menu. See “Starting the Setup utility” on page 305 for details about using the Setup utility.
- The server uses a rotational interrupt technique to configure PCI adapters so that you can install PCI adapters that do not support sharing of PCI interrupts.

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



To install an adapter, complete the following steps:

1. See the documentation that comes with the adapter for any cabling instructions and information about jumper or switch settings. (It might be easier for you to route cables before you install the adapter.)
2. Touch the static-protective package that contains the adapter to any unpainted metal surface on the server; then, remove the adapter from the package.
3. Determine the expansion-slot into which you will install the adapter.
4. Remove the expansion-slot cover, if one is installed.
5. If you are installing a full-length adapter, remove the blue adapter guide (if any) from the end of the adapter. Otherwise, continue with the next step.



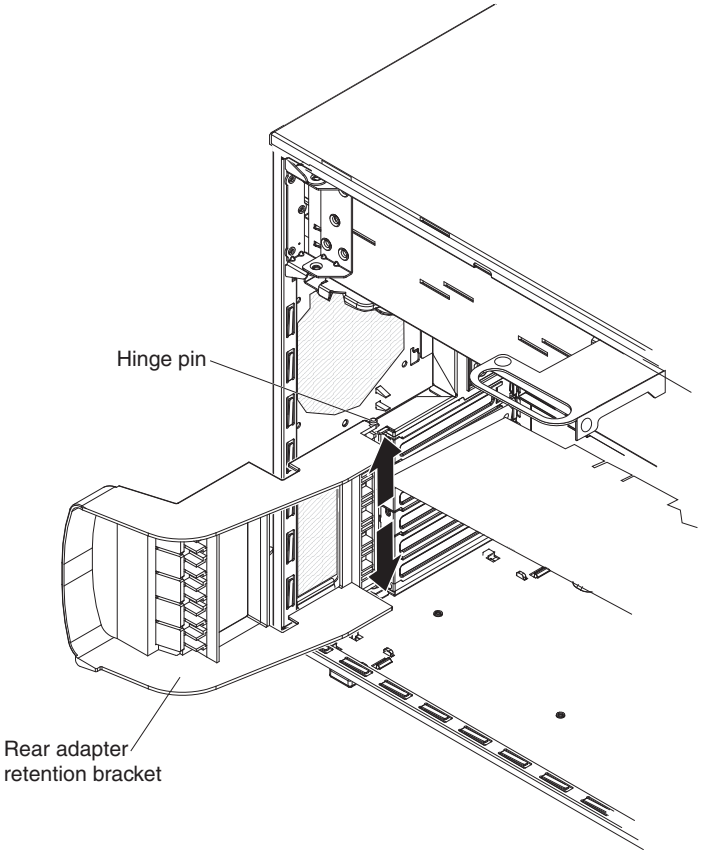
6. Press the adapter *firmly* into the expansion slot.

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

7. Install the screw that secures the adapter to the server chassis.
8. Connect the adapter cables (see “Internal cable routing and connectors” on page 169).
9. Close the rear adapter-retention bracket.
10. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
11. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

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

Removing the rear adapter-retention bracket



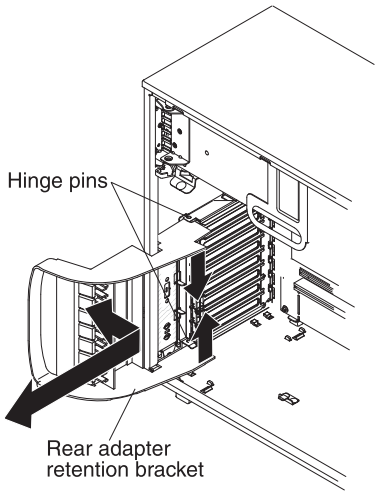
To remove the rear adapter-retention bracket, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
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 left-side cover” on page 188).

4. Remove all adapters and place the adapters on a static-protective surface (see “Removing an adapter” on page 219).

   Note: You might find it helpful to note where each adapter is installed before you remove the adapters.
5. Rotate the adapter-retention brackets to the open position.
6. Press the rear adapter-retention bracket and release the top hinge point; then, release the other hinge point and remove the bracket from the chassis.
7. If you are instructed to return the rear adapter-retention bracket, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the rear adapter-retention bracket



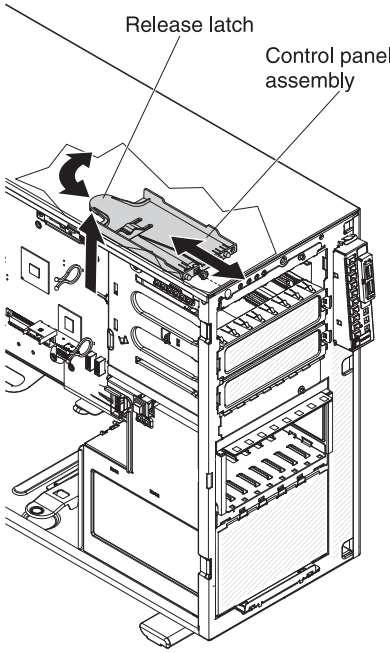
To install the rear adapter-retention bracket, complete the following steps:

1. Insert the bottom hinge point on the rear adapter-retention bracket into the matching hole in the chassis; then, insert the top hinge point into the matching hole.
2. Install the adapters (see “Installing an adapter” on page 220).
3. Close the rear adapter-retention bracket.
4. Install and lock the left-side (see “Installing the left-side cover” on page 188).
5. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing and replacing Tier 2 CRUs

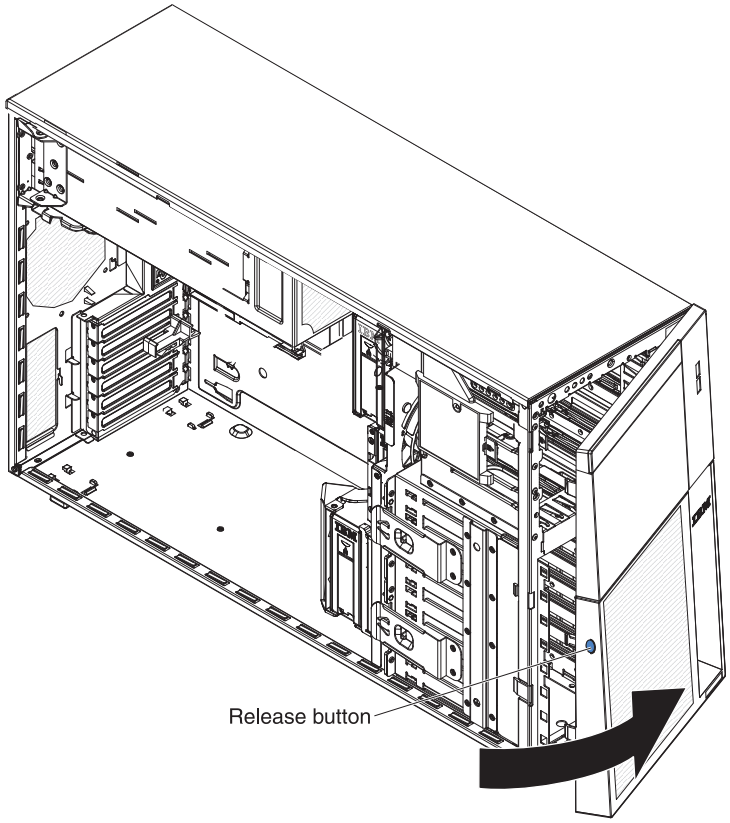
You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.

Removing the operator information panel assembly



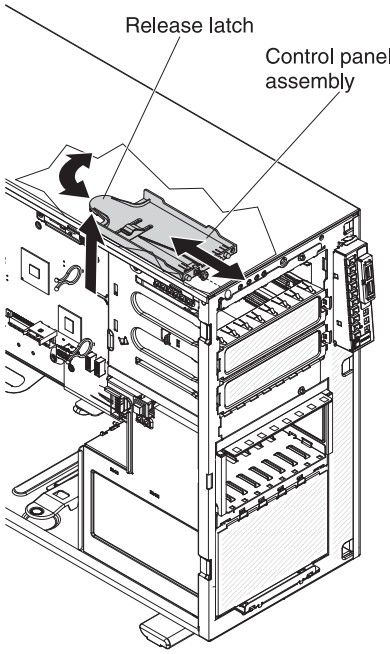
To remove the operator information panel assembly, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
4. Open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.



5. Remove the power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
6. Rotate the power-supply cage to its open position (see “Opening the power-supply cage” on page 160).
7. Remove the air baffle (see “Removing the air baffle” on page 217).
8. Remove the fan cage assembly (see “Removing the fan cage assembly” on page 247).
9. Disconnect the operator information panel assembly cable from the system board (see “System board internal connectors” on page 15).
10. Locate the operator information panel assembly release latch just above the DVD drive.
11. Push up on the release latch while you pull the operator information panel assembly toward the rear of the server; then, angle the back of the assembly toward the system board and remove the assembly from the server.
12. If you are instructed to return the operator information panel assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

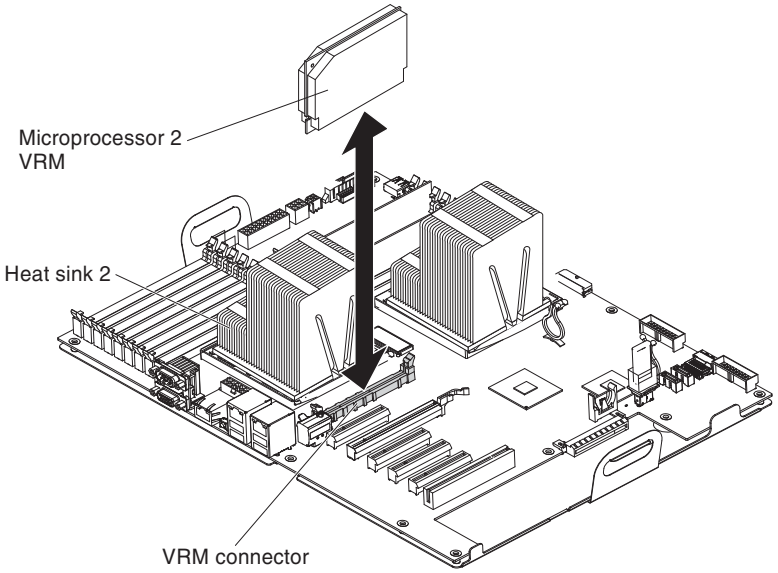
Installing the operator information panel assembly



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

1. Touch the static-protective package that contains the operator information panel assembly to any unpainted metal surface on the server; then, remove the assembly from the package.
2. Angle the operator information panel assembly so that the edge of the assembly is in the guide slot.
3. Slide the operator information panel assembly forward until the release latch clicks into place.
4. Connect the operator information panel assembly cable to the system board (see “System board internal connectors” on page 15 and “Internal cable routing and connectors” on page 169).
5. Install the fan cage assembly (see “Installing the fan cage assembly” on page 248).
6. Install the air baffle (see “Installing the air baffle” on page 218).
7. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
8. Install the hot-swap power supply or power supplies (see “Installing a hot-swap power supply” on page 277).
9. Close the bezel.
10. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
11. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing a voltage regulator module

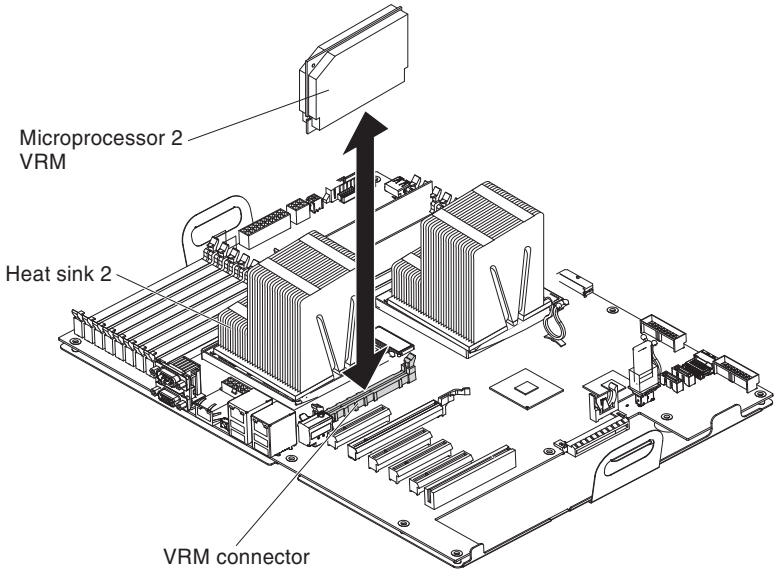


To remove a voltage regulator module (VRM), complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
5. Remove the hot-swap power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
6. Rotate the power-supply cage to its open position (see “Opening the power-supply cage” on page 160).
7. Remove the air baffle (see “Removing the air baffle” on page 217).
8. Locate the voltage regulator module next to microprocessor 2.
9. Open the retaining clips on each end of the VRM connector.
10. Pull the VRM out of the connector.
11. If you are instructed to return the VRM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a voltage regulator module



To install a voltage regulator module, complete the following steps:

1. Locate the VRM connector on the system board, next to the heat sink for microprocessor 2 (see “System board internal connectors” on page 15).
2. Open the retaining clips on each end of the VRM connector.
3. Turn the VRM so that the keys align with the connector.
4. Insert the VRM into the connector by aligning the edges of the VRM with the slots at the end of the VRM connector. Firmly press the VRM straight down into the connector by applying pressure on both ends of the VRM simultaneously. The retaining clips snap into the locked position when the VRM is seated in the connector.
5. Install the air baffle (see “Installing the air baffle” on page 218).
6. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
7. Install the hot-swap power supply or power supplies (see “Installing a hot-swap power supply” on page 277).
8. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
9. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Installing memory

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

Attention: Do not mix UDIMMs and RDIMMs in the same server.

- The server supports industry-standard double-data-rate 3 (DDR3), 800, 1066, or 1333 MHz, PC3-10600R-999 (single-, dual-, or quad-rank), registered, synchronous dynamic random-access memory (SDRAM) dual inline memory modules (DIMMs) with error correcting code (ECC). See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported memory modules for the server.

- At least one DIMM must be installed for each installed microprocessor for the server to operate, but three DIMMs per microprocessor improves server performance.
- When two microprocessors are installed in the server, distribute the DIMMs between the two microprocessors to improve server performance.
- The server supports a maximum of 16 single-, dual-, or quad-rank DIMMs. The maximum number of quad-rank DIMMs the server supports is 12.
- The maximum number of single-, dual-rank, ECC supported UDIMM the server supports is 12.
- The memory controller has three registered DIMM channels per microprocessor (Channels 0, 1, and 2). Channels 0 and 1 support three DIMMS and Channel 2 supports two DIMMs.
- Install DIMMs starting with the connector farthest from the microprocessor within each channel.
- When you install a quad-ranked DIMM in a channel with single- or dual-ranked DIMMs, install the quad-ranked DIMM in the connector farthest from the microprocessor.
- The maximum operating speed of the server is determined by the slowest DIMM in the server.
- The server can operate in three modes: sparing, mirroring and independent channel modes.

  Note: Memory sparing is only available for Intel Xeon 5600 series microprocessor.
- The server supports 1 GB, 2 GB, 4 GB, 8 GB, and 16 GB DIMMs, with a minimum of 1 GB and a maximum of 192 GB of system memory.

  For 32-bit operating systems only: Some memory is reserved for various system resources and is unavailable to the operating system. The amount of memory that is reserved for system resources depends on the operating system, the configuration of the server, and the configured PCI devices.

  Note: If you install a ServeRAID-M1015 SAS/SATA adapter, make sure at least 2 GB of memory is installed in the server before you run DSA from a bootable CD.

Independent channel mode

The server requires at least one installed DIMM per microprocessor. The server comes with a minimum of two 1 GB DIMMs, installed in connectors 3 and 6. (Connectors 3 and 6 are the farthest connectors from the microprocessor 1 for channels 0 and 1.) When you install additional DIMMs, install them in the order shown in Table 10, to maintain server performance.

Note:

- If you have configured the server to use memory mirroring, do not use the order shown in this table; use the installation order that is shown in Table 12 on page 232.
- If you install a ServeRAID-M1015 SAS/SATA adapter, make sure at least 2 GB of memory is installed in the server before you run DSA from a bootable CD.

Table 10. DIMM installation sequence for independent channel mode

Installed microprocessors	DIMM connector population sequence
Microprocessor 1	3, 6, 8, 2, 5, 7, 1, 4

Table 10. DIMM installation sequence for independent channel mode (continued)

Installed microprocessors	DIMM connector population sequence
Microprocessor 2	11, 14, 16, 10, 13, 15, 9, 12
Microprocessor 1 and Microprocessor 2	3, 11, 6, 14, 8, 16, 2, 10, 5, 13, 7, 15, 1, 9, 4, 12

Memory mirroring mode

Memory-mirroring mode replicates and stores data on two pairs of DIMMs within two channels simultaneously. If a failure occurs, the memory controller switches from the primary pair of memory DIMMs to the backup pair of DIMMs. You must enable memory mirroring through the Setup utility. For details about enabling memory mirroring, see “Starting the Setup utility” on page 305. When you use the memory-mirroring feature, consider the following information:

- When you use memory mirroring, you must install a pair of DIMMs at a time. One DIMM must be in channel 0, and the mirroring DIMM must be in the same connector in channel 1. The two DIMMs in each pair must be identical in size, type, rank (single, dual, or quad), and organization. They do not have to be identical in speed. The channels run at the speed of the slowest DIMM in any of the channels. See Table 12 on page 232 for the DIMM connectors that are in each pair.
- Channel 2, DIMM connectors 7, 8, 15, and 16 are not used in memory-mirroring mode.
- The maximum amount of available memory is reduced to half of the amount of installed memory when memory mirroring is enabled. For example, if you install 64 GB of memory, only 32 GB of addressable memory is available when you use memory mirroring.

The following illustration shows the memory channel interface layout with the DIMM installation sequence for memory mirroring mode. The numbers within the boxes indicate the DIMM population sequence in pairs within the channels, and the numbers next to the boxes indicate the DIMM connectors within the channels. For example, the following illustration shows that the first pair of DIMMs (indicated by 1s inside the boxes) should be installed in DIMM connector 3 on channel 0 and DIMM connector 6 on channel 1. DIMM connectors 7, 8, 15, and 16 on channel 2 are not used in memory-mirroring mode.

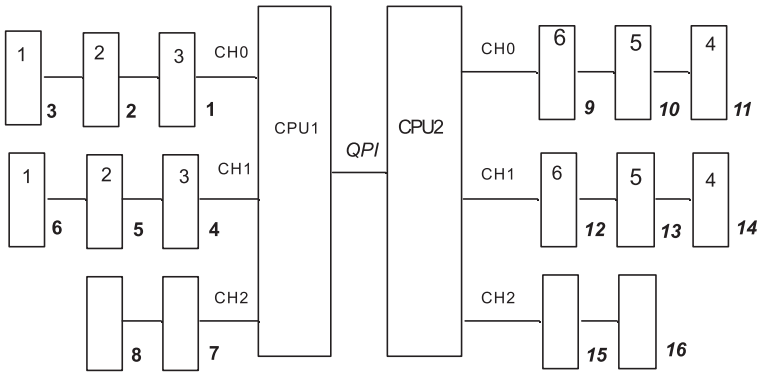


Figure 13. Memory channel interface layout

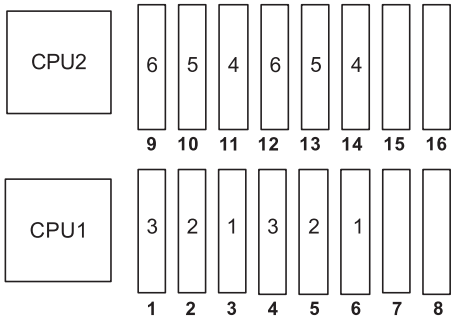
The following table lists the DIMM connectors on each memory channel.

Table 11. Connectors on each memory channel

Memory channel	DIMM connectors
Channel 0	1, 2, 3, 9, 10, 11
Channel 1	4, 5, 6, 12, 13, 14
Channel 2 (not used in memory mirroring)	7, 8, 15, 16

The following illustration shows the memory connector layout that is associated with each microprocessor. For example, DIMM connectors 9, 10, 11, 12, 13, 14, 15, and 16 (DIMM connectors are shown underneath the boxes) are associated with microprocessor 2 socket (CPU2), and DIMM connectors 1, 2, 3, 4, 5, 6, 7, and 8 are associated with microprocessor 1 socket (CPU1). The numbers within the boxes indicate the installation sequence of the DIMM pairs. For example, the first DIMM pair (indicated within the boxes by 1s) should be installed in DIMM connectors 3 and 6, which are associated with microprocessor 1 (CPU1).

Note: You can install DIMMs for microprocessor 2 as soon as you install microprocessor 2; you do not have to wait until all of the DIMM connectors for microprocessor 1 are filled.



The following table lists the installation sequence for installing DIMMs in memory-mirroring mode.

Table 12. DIMM installation sequence for memory-mirroring mode

DIMMs	Number of installed microprocessors	DIMM connector
First pair of DIMMs	1	3, 6
Second pair of DIMMs	1	2, 5
Third pair of DIMMs	1	1, 4
Fourth pair of DIMMs	2	14, 11
Fifth pair of DIMMs	2	13, 10
Sixth pair of DIMMs	2	12, 9
Note: DIMM connectors 7, 8, 15, and 16 are not used in memory-mirroring mode.		

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.

Memory sparing

The server supports memory sparing. This feature disables the failed memory from the system configuration and activates a DIMM to replace the failed active DIMM.

You can enable either memory sparing or memory mirroring in the Setup utility (see “Using the Setup utility” on page 305). When you use the memory sparing feature, consider the following information:

- The memory sparing feature is supported on server models with an Intel Xeon™ 5600 series microprocessor.
- When you enable the memory sparing feature, you must install three DIMMs per microprocessor at a time. The first DIMM must be in channel 0, the second DIMM in channel 1, and the spare DIMM in channel 2. The DIMMs must be identical in size, type, rank, and organization, but not in speed. The channels run at the speed of the slowest DIMM in any of the channels.
- The maximum available memory is reduced to 2/3 of the installed memory when memory sparing mode is enabled. For example, if you install 72 GB of memory using RDIMMs, only 48 GB of addressable memory is available when you use memory sparing.

The following table shows the installation sequence for installing DIMMs for each microprocessor and the sparing DIMM in memory online-spare mode:

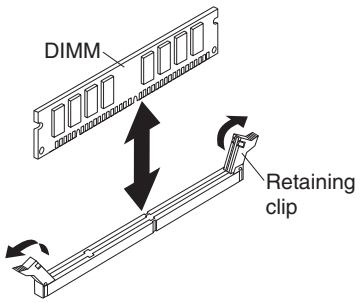
Table 13. Memory sparing mode DIMM population sequence

DIMMs	Number of installed microprocessors	DIMM slots
1st set of DIMMs	1	3, 6, 8
2nd set of DIMMs	1	2, 5, 7
3rd set of DIMMs	2	11, 14, 16
4th set of DIMMs	2	10, 13, 15

Notes:

1. The 3rd and 4th sets of DIMMs can be installed right after microprocessor 2 is installed even 1st and 2nd sets of DIMM slots are not full.
2. DIMM slots 1, 4, 9, and 12 are not used in memory sparing mode.

Removing a memory module



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

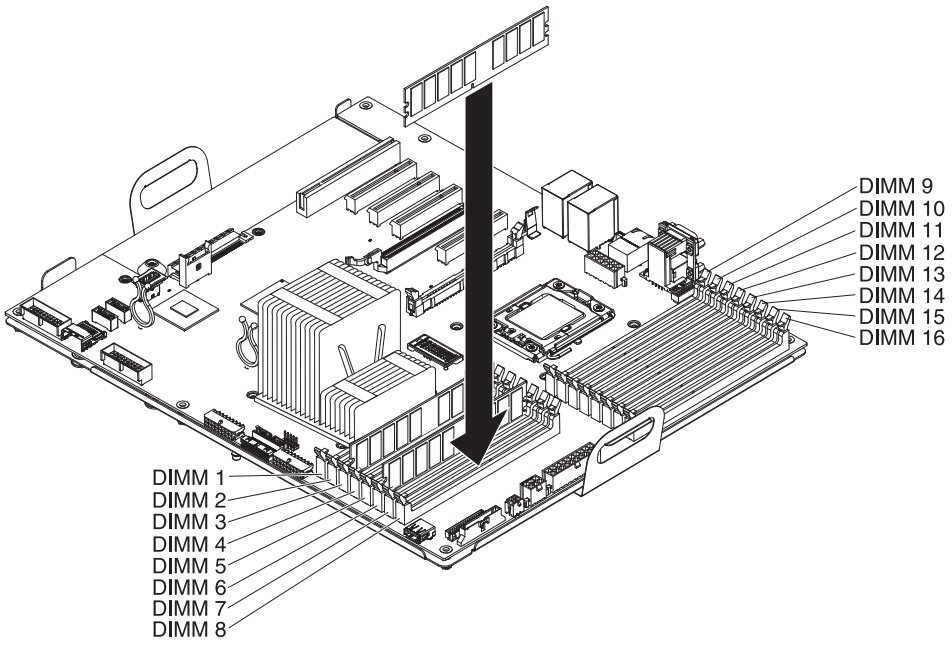
1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).

5. Remove the hot-swap power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
6. Rotate the power-supply cage to its open position (see “Opening the power-supply cage” on page 160).
7. Remove the air baffle (see “Removing the air baffle” on page 217).
8. Locate the DIMM connectors on the system board (see “System board internal connectors” on page 15).

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.
9. Move the DIMM retaining clips on the side of the DIMM connector to the open position by pressing the retaining clips away from the center of the DIMM connector.
10. Using your fingers, lift the DIMM out of the DIMM connector.
11. If you are instructed to return the DIMM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

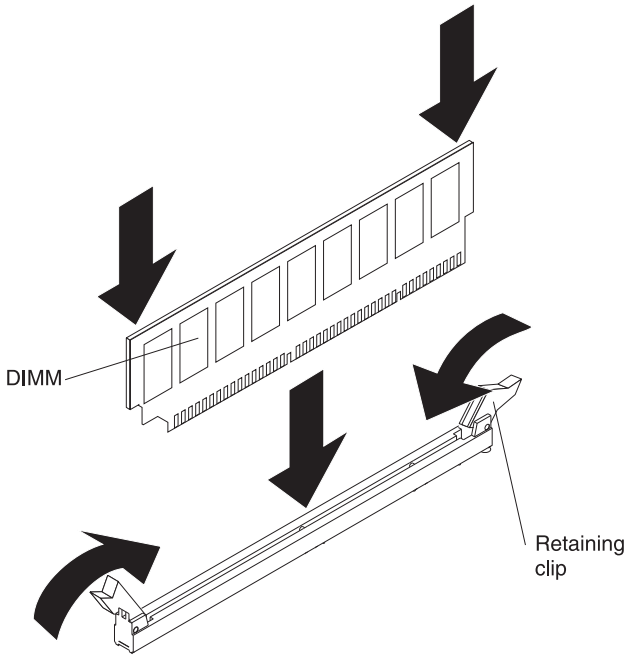
Installing a memory module



To install a memory module, complete the following steps:

1. Locate the DIMM connectors on the system board (see “System board internal connectors” on page 15). Determine the connectors into which you will install the DIMMs.
2. Open the retaining clip on each end of the DIMM connector.
3. Touch the static-protective package containing the DIMM to any unpainted metal surface on the outside of the server. Then, remove the DIMM from the package.
4. Turn the DIMM so that the DIMM keys align correctly with the connector.

5. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector.



6. 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.

   Note: If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.
7. Install the air baffle (see “Installing the air baffle” on page 218).
8. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
9. Install the hot-swap power supply or power supplies (see “Installing a hot-swap power supply” on page 277).
10. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
11. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

In two-DIMM-per-channel configuration, a server with an Intel Xeon X5600 series microprocessor automatically operates with a maximum memory speed of up to 1333 MHz when one of the following conditions is met:

- Two 1.5 V single-rank or dual-rank RDIMMs are installed in the same channel. In the Setup utility, **Memory speed** is set to **Max performance** mode
- Two 1.35 V single-rank or dual-ranl RDIMMs are installed in the same channel. In the Setup utility, **Memory speed** is set to **Max performance** and **LV-DIMM power** is set to **Enhance performance** mode. The 1.35 V RDIMMs will function at 1.5 V

The following notes describe the types of DIMMs that the server supports and other information that you must consider when you install DIMMs.

- 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.
- The server supports only industry-standard double-data-rate 3 (DDR3), 800, 1066, or 1333 MHz, PC3-10600R-999, registered or unbuffered, synchronous dynamic random-access memory (SDRAM) dual inline memory modules (DIMMs) with error correcting code (ECC). See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported memory modules for the server.
  - The specifications of a DDR3 DIMM are on a label on the DIMM, in the following format.

    *ggg e*Rx*ff*-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

    6400 = 6.40 GBps (PC3-800 SDRAMs, 8-byte primary data bus)

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

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

    12800 = 12.80 GBps PC3-1600 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), dual-rank (n=2), or quad-rank (n=4).
- The following rules apply to DDR3 DIMM speed as it relates to the number of DIMMs in a channel:
  - When you install 1 DIMM per channel, the memory runs at 1333 MHz
  - When you install 2 DIMMs per channel, the memory runs at 1066 MHz
  - When you install 3 DIMMs per channel, the memory runs at 800 MHz
  - All channels in a server run at the fastest common frequency
  - Do not install registered and unbuffered DIMMs in the same server

- The maximum memory speed is determined by the combination of the microprocessor, DIMM speed, and the number of DIMMs installed in each channel.
- In two-DIMM-per-channel configuration, a server with an Intel Xeon X5600 series microprocessor automatically operates with a maximum memory speed of up to 1333 MHz when one of the following conditions is met:
  - Two 1.5 V single-rank or dual-rank RDIMMs are installed in the same channel. In the Setup utility, **Memory speed** is set to **Max performance** mode
  - Two 1.35 V single-rank or dual-ranl RDIMMs are installed in the same channel. In the Setup utility, **Memory speed** is set to **Max performance** and **LV-DIMM power** is set to **Enhance performance** mode. The 1.35 V RDIMMs will function at 1.5 V
- The server supports a maximum of 16 single-rank or dual-rank RDIMMs. The server supports up to 12 single-rank or dual-rank UDIMMs or quad-rank RDIMMs.
- The server supports three single-rank or dual-rank DIMMs per channel on channel 0 and 1, two single-rank or dual-rank DIMMs on channel 2. The server supports a maximum of two quad-rank RDIMMs per channel. The following table shows an example of the maximum amount of memory that you can install using ranked DIMMs:

Table 14. Maximum memory installation using ranked DIMMs

Number of DIMMs	DIMM type	DIMM size	Total memory
12	Single-rank UDIMMs	2 GB	24 GB
12	Dual-rank UDIMMs	4 GB	48 GB
16	Single-rank RDIMMs	2 GB	32 GB
16	Dual-rank RDIMMs	2 GB	32 GB
16	Dual-rank RDIMMs	4 GB	64 GB
16	Dual-rank RDIMMs	8 GB	128 GB
12	Quad-rank RDIMMs	16 GB	192 GB

- The RDIMM options that are available for the server are 1 GB, 2 GB, 4 GB, 8 GB, and 16 GB. The server supports a minimum of 1 GB and a maximum of 192 GB of system memory using RDIMMs.

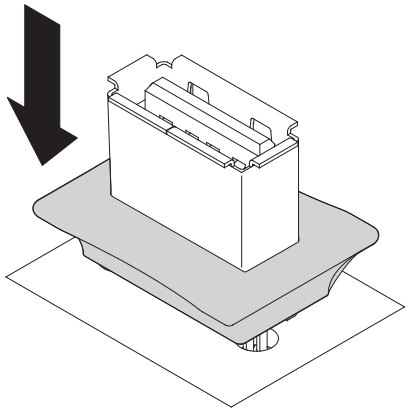
  For 32-bit operating systems only: Some memory is reserved for various system resources and is unavailable to the operating system. The amount of memory that is reserved for system resources depends on the operating system, the configuration of the server, and the configured PCI devices.
- The UDIMM options that are available for the server are 1 GB, 2 GB and 4 GB. The server supports a minimum of 1 GB and a maximum of 48 GB of system memory using UDIMMs.

  Note: 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.
- When you install one quad-rank RDIMM in a channel, install it in the DIMM connector furthest away from the microprocessor.
- Do not install one quad-rank RDIMM in one channel and three RDIMMs in another channel.

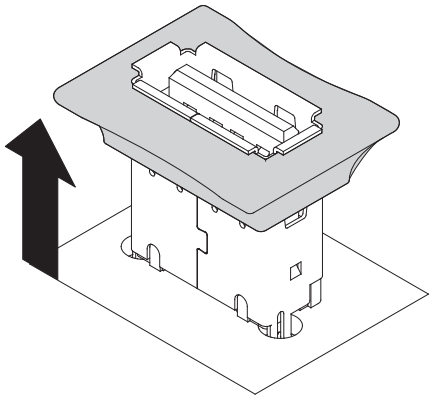
Removing a USB embedded hypervisor flash device

To remove a hypervisor flash device, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 153.
2. Turn off the server and peripheral devices and disconnect the power cords.
3. Remove the cover (see “Removing the left-side cover” on page 188).
4. Unlock the retention latch by pushing it down toward the system board.



5. Grasp the flash device and pull to remove it from the connector.
6. Return the retention latch to the locked position by pulling it away from the system board.

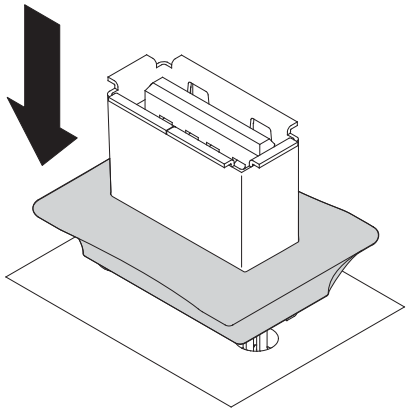


7. If you are instructed to return the flash device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

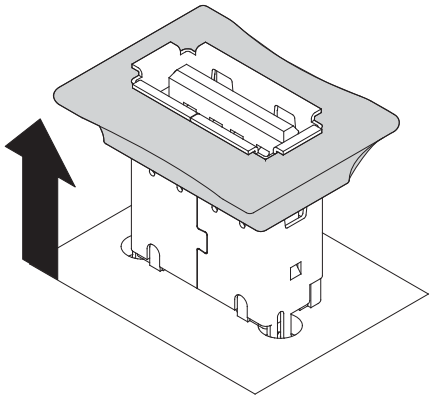
Installing a USB embedded hypervisor flash device

To install a hypervisor flash device, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 153.
2. Turn off the server and peripheral devices and disconnect the power cords.
3. Remove the cover (see “Removing the left-side cover” on page 188).
4. Unlock the retention latch by pushing it down toward the system board.



5. Align the flash device with the USB connector on the system board and push it into the USB connector until it is firmly seated.
6. Return the retention latch to the locked position by pulling it away from the system board.



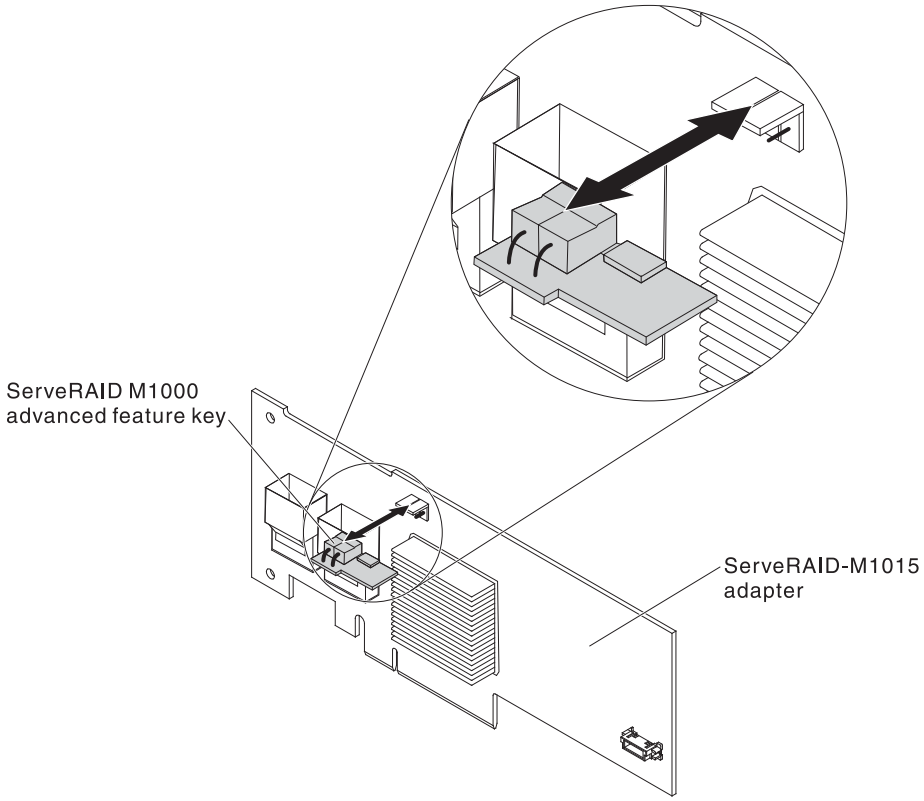
7. Reconnect the power cord and any cables that you removed.
8. Install the cover (see “Installing the left-side cover” on page 188).
9. Turn on the peripheral devices and the server.

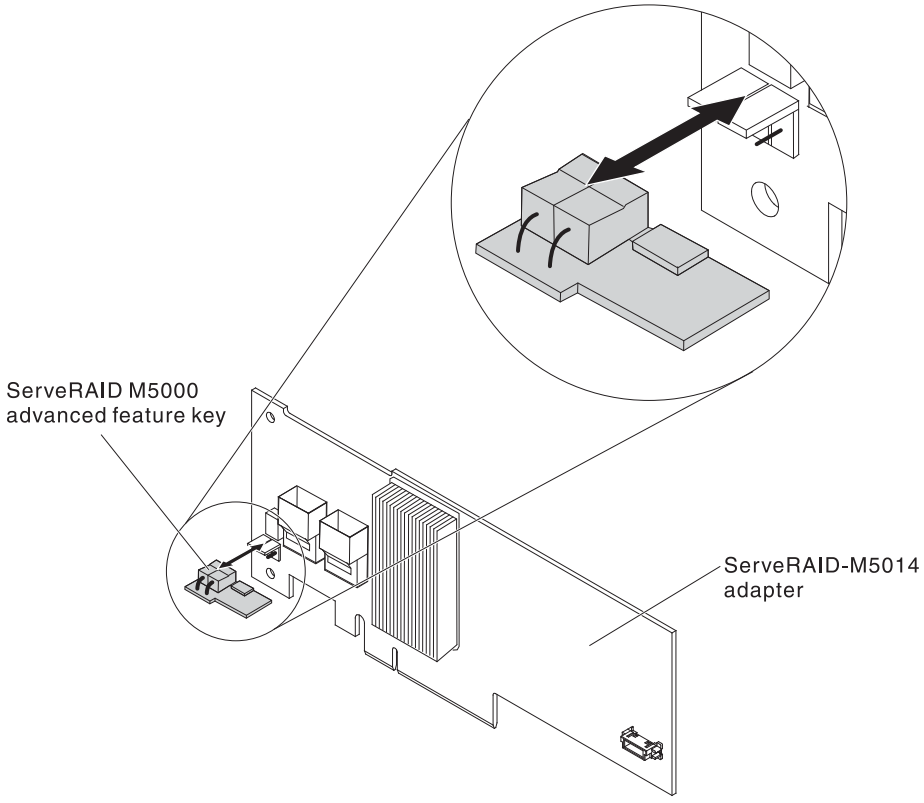
Removing an optional ServeRAID adapter advanced feature key

To remove an optional ServeRAID adapter advanced feature key, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 153.
2. Turn off the server and peripheral devices and disconnect the power cords.
3. Remove the cover (see “Removing the left-side cover” on page 188).
4. Rotate the adapter-retention brackets to the open position.

5. Grasp the upgrade key and lift to remove it from connector on the ServeRAID adapter.





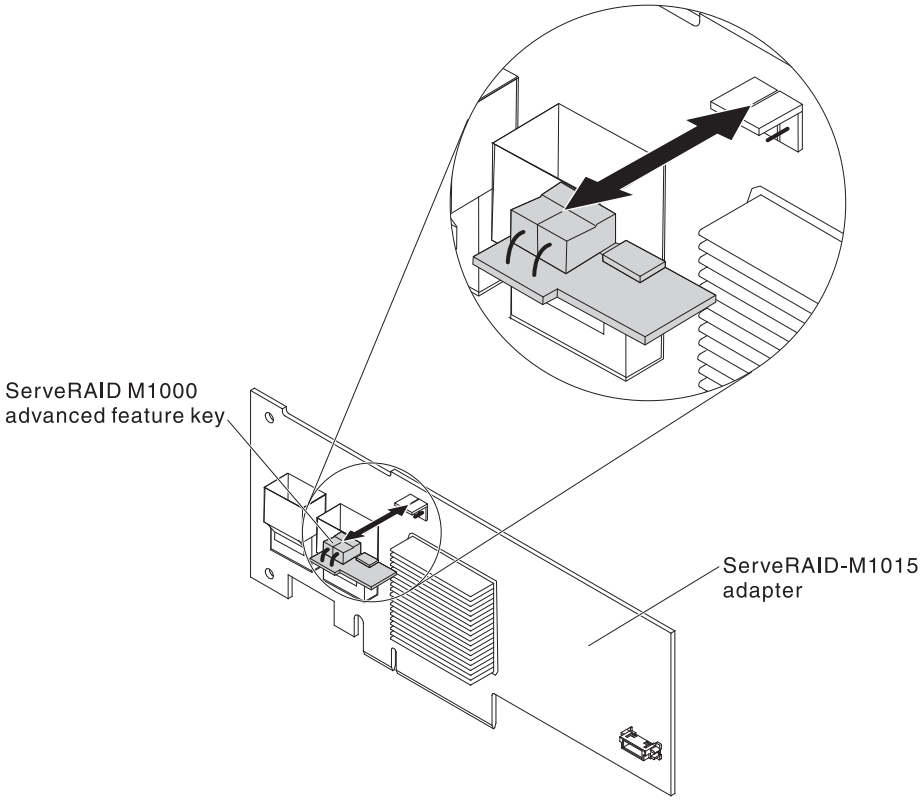
6. Close the rear adapter-retention bracket.

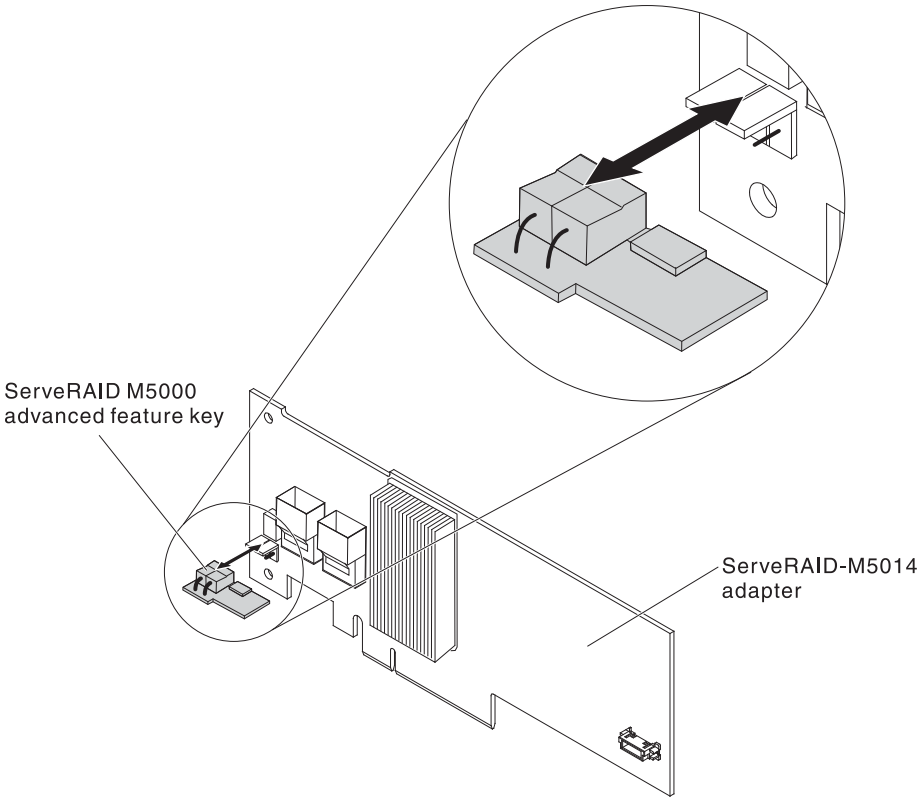
7. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
8. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.
9. If you are instructed to return the feature key, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an optional ServeRAID adapter advanced feature key

To install an optional ServeRAID adapter advanced feature key, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 153.
2. Turn off the server and peripheral devices and disconnect the power cords.
3. Remove the cover (see “Removing the left-side cover” on page 188).
4. Rotate the adapter-retention brackets to the open position.
5. Align the upgrade key with the connector on the ServeRAID adapter and push it into the connector until it is firmly seated.





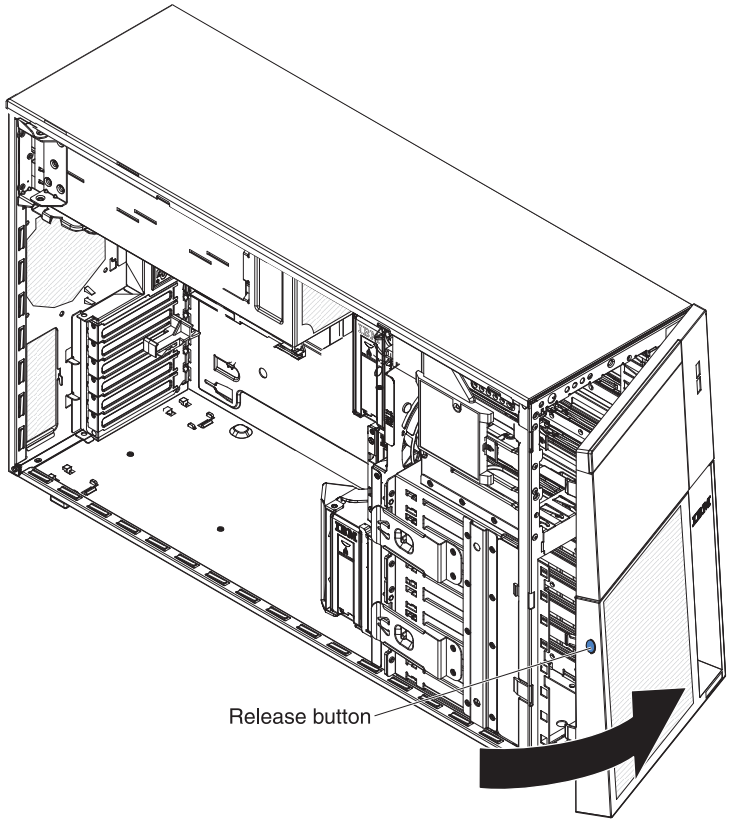
6. Close the rear adapter-retention bracket.
7. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
8. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the bezel

To remove the bezel, complete the following steps:

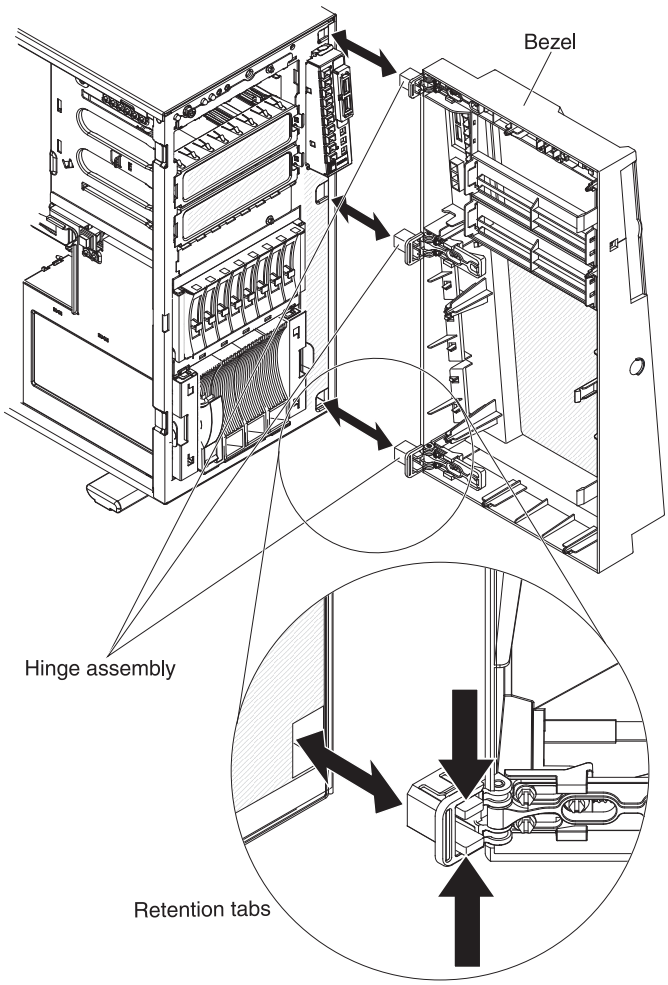
1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Unlock the left-side cover.

   Note: You must unlock the left-side cover to open or remove the bezel. When you lock the left-side cover, it locks both the cover and the bezel.
3. Open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.



4. Press the retention tabs on each hinge assembly toward each other and pull the hinge assemblies out of the chassis.

   Note: You might need a flat-blade screwdriver to pry the hinge assemblies out of the chassis.



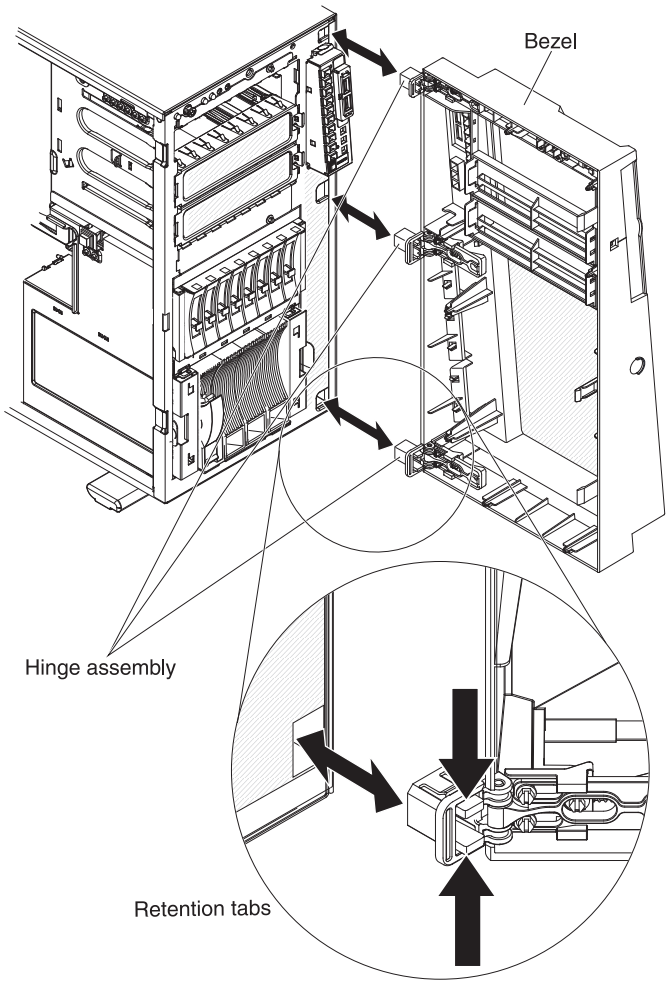
Note: The bezel also disengages from the chassis hinges if you rotate the bezel beyond 180° or if excessive pressure is applied to the bezel. Do not be alarmed, because this is how the bezel was designed. The bezel is designed with breakaway hinges so that you can easily reattach it to the chassis.

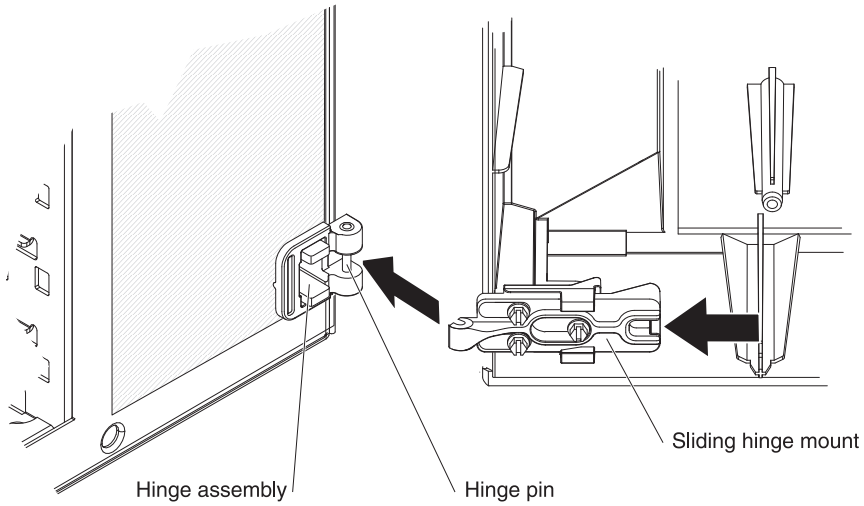
5. If you are instructed to return the bezel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the bezel

To install the bezel, complete the following steps:

1. Align the hinge assemblies with the hinge holes on the chassis.
2. Push the hinges into the holes on the chassis until they snap into place.
3. If you removed the bezel by detaching the sliding hinge mount from the hinge assembly (using the breakaway method as the bezel was designed for), complete the following steps to reattach the bezel:
   a. Press in on the rear of the sliding hinge mount until it extends beyond the edge of the bezel, and hold it in place.



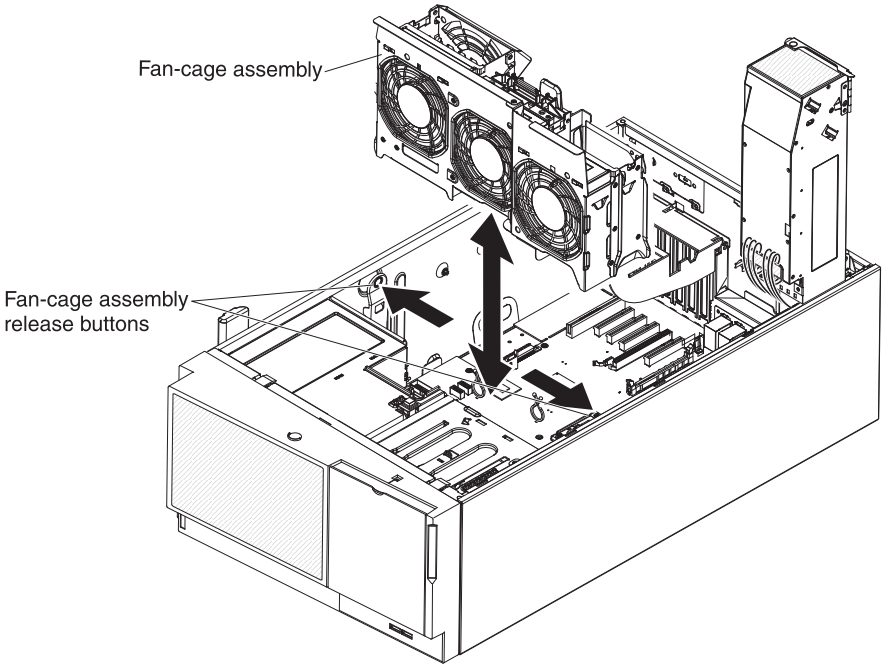


b. Align the sliding hinge mount with the hinge pin on the hinge assembly on the chassis.

c. Press the sliding hinge mount against the hinge pin until the sliding hinge mount snaps onto the hinge pin.

4. Close the bezel.
5. Lock the left-side cover.

Removing the fan cage assembly

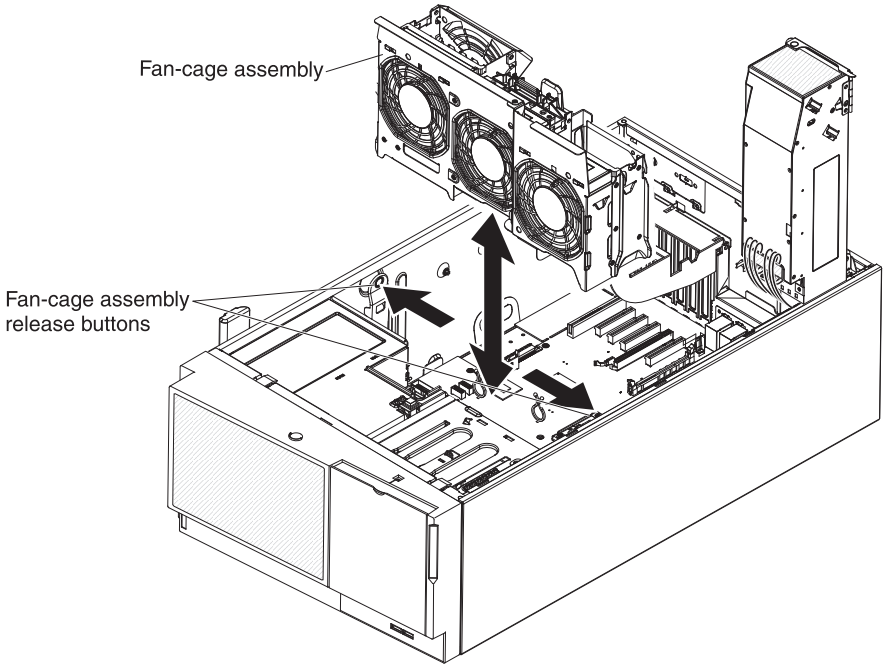


To remove the fan cage assembly, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
5. Remove the hot-swap power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
6. Rotate the power-supply cage to its open position (see “Opening the power-supply cage” on page 160).
7. If any full-length PCI adapters are installed, remove them (see “Removing an adapter” on page 219).
8. Remove the air baffle (see “Removing the air baffle” on page 217).
9. Press the fan cage release latches on each side of the fan cage toward the sides of the server. The fan cage will lift up slightly when the release latches are fully open.
10. Grasp the fan cage assembly and lift it out of the server.
11. If you are instructed to return the fan cage assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the fan cage assembly



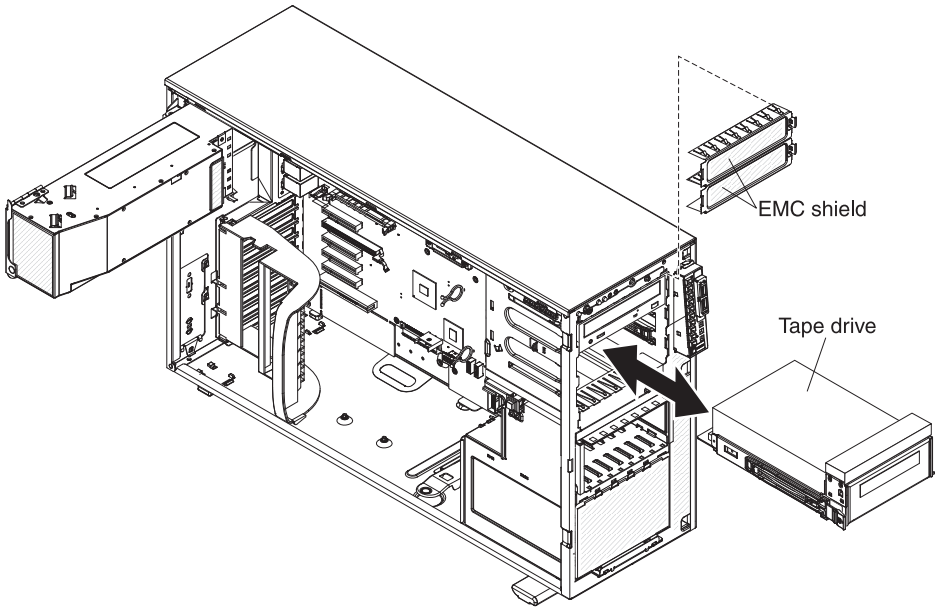
To install the fan cage assembly, complete the following steps.

Attention: Make sure that all wires and cables inside the server are routed correctly before you install the fan cage assembly. Wiring that is not properly routed might be damaged or might prevent the fan cage assembly from seating properly in the server.

1. Align the guides on the fan cage with release latches on each side.
2. Push the fan cage assembly into the server until both release buttons click into place.

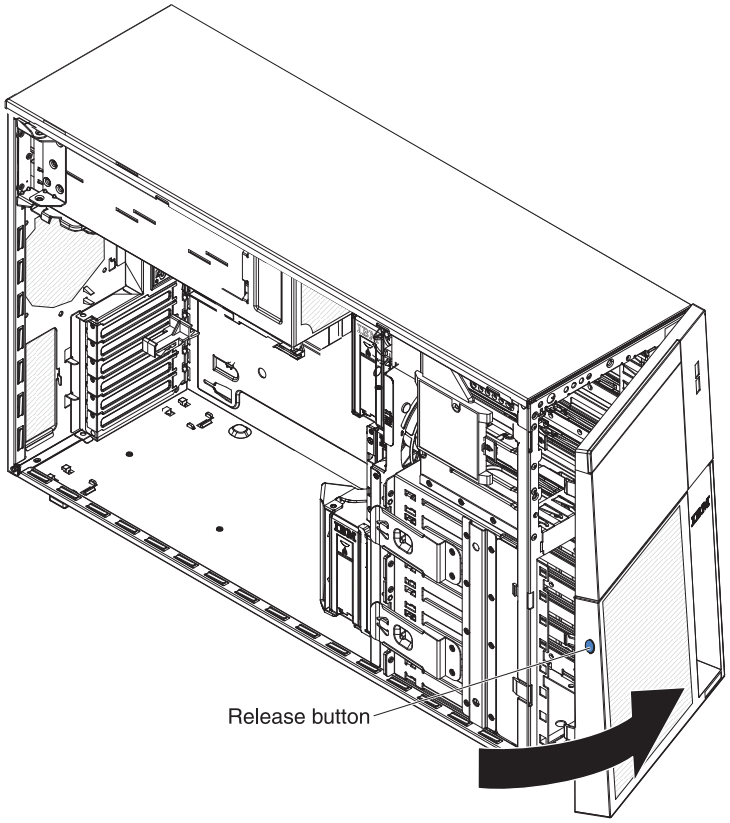
   Note: Make sure that the fan cage is fully seated in the server and that both of the release buttons click into place.
3. If you removed any full-length PCI adapters, install them (see “Installing an adapter” on page 220).
4. Install the air baffle (see “Installing the air baffle” on page 218).
5. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
6. Install the hot-swap power supply or power supplies (see “Installing a hot-swap power supply” on page 277).
7. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
8. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing an optional tape drive



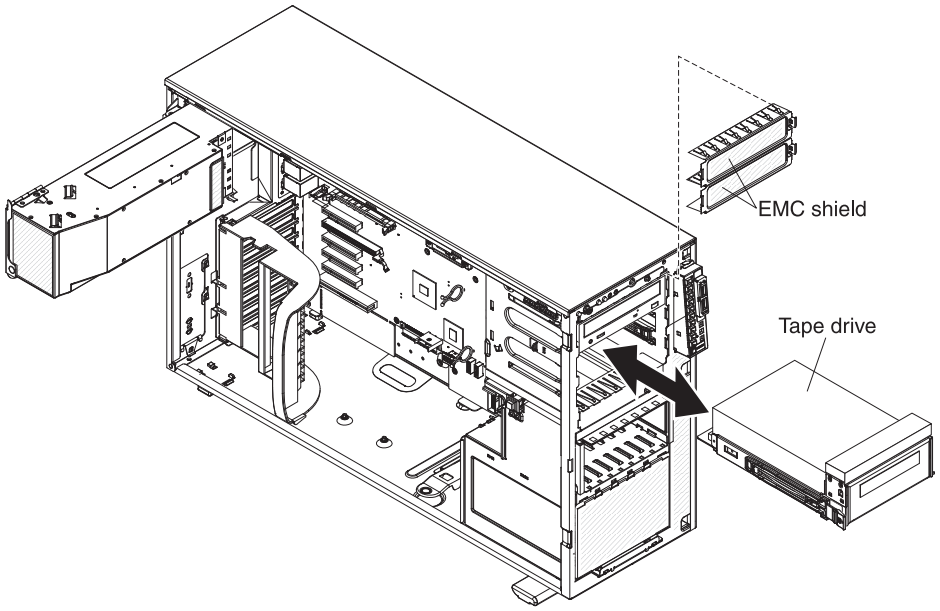
To remove an optional full-high tape drive, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
4. Open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.



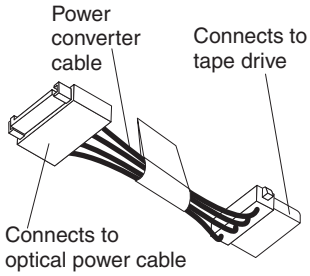
5. Disconnect the power and signal cables from the back of the tape drive.
6. Grasp the blue tabs on each side of the tape drive and press them inward while you pull the drive out of the server.
7. Note the location of the blue rails on the tape drive; then, remove the blue rails and save them for future use.
8. Gently pull the tape drive out of the server.
9. If you are instructed to return the tape drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

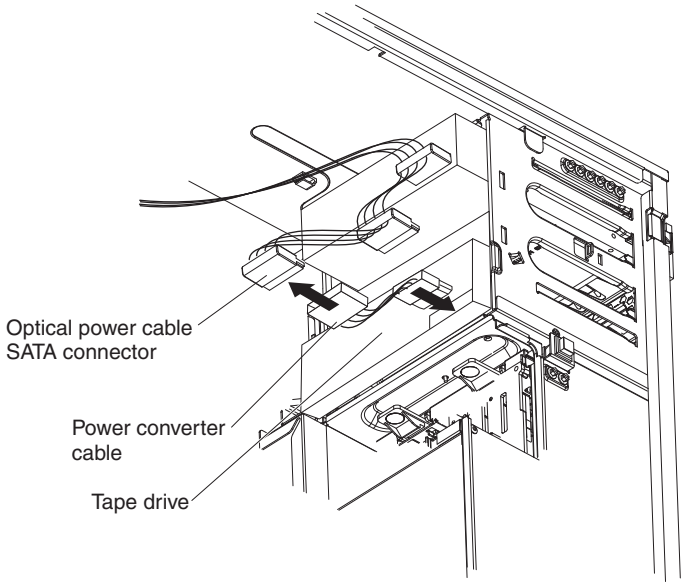
Installing an optional tape drive



To install an optional full-height tape drive, complete the following steps:

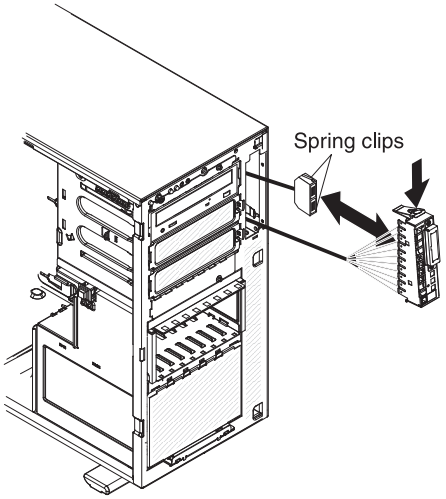
1. Remove the EMC shields from the drive bay, if any are installed.
2. Touch the static-protective package that contains the tape drive to any unpainted metal surface on the server; then, remove the tape drive from the package.
3. Install the blue rails on the tape drive.
4. Align the rails on the tape drive with the guides in the drive bay; then, slide the tape drive into the drive bay until the rails click into place.
5. Connect one of the connectors on the optical drive power cable to the tape drive. If however, you are installing an RDX internal USB tape drive, you will need to install the SATA to traditional power converter cable. Locate the SATA to traditional power converter cable that came with the server in the plastic bag with the drive rails; then connect one end of the converter cable to the third connector (the default connector) on the optical drive power cable and connect the other end of the cable to the tape drive as shown in the following illustrations.





6. Connect one end of the tape drive signal cable to the tape drive and the other end to the connector on the system board. Route the cable through the plastic slots on the bottom of the chassis underneath the fan cage assembly. For more information, see Internal cable routing and connectors.
7. Close the bezel.
8. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
9. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the USB cable and light path diagnostics assembly



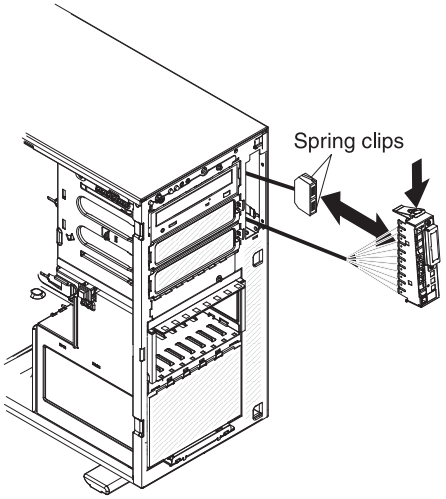
To remove the USB cable and light path diagnostics assembly from the server, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and peripheral devices; then, disconnect the power cords and all external cables.
3. Remove the power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
4. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
5. Carefully lay the server down on its side.
6. Remove the power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
7. Rotate the power-supply cage to its open position (see “Opening the power-supply cage” on page 160).
8. Remove the air baffle (see “Removing the air baffle” on page 217).
9. Remove the fan cage assembly (see “Removing the fan cage assembly” on page 247).
10. Disconnect the light path diagnostics cable from the system board (see “System board internal connectors” on page 15 and “Internal cable routing and connectors” on page 169).
11. Stand the server back up in its vertical position.
12. Open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.
13. Press down on the release latch on the top of the USB cable and light path diagnostics assembly mounting bracket; then, rotate the top of the mounting bracket away from the server.
14. Lift the USB cable and light path diagnostics assembly mounting bracket out and away from the server while you pull the diagnostics cable through the hole.
15. Disconnect the USB cable from the USB cable and light path diagnostics assembly:
    a. Rotate the USB cable and light path diagnostics assembly mounting bracket so that you are looking at the rear of the bracket.

b. Squeeze the retaining clips on each side of the USB cable connector and pull the USB cable away from the mounting bracket.

16. If you are instructed to return the USB cable and light path diagnostics assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the USB cable and light path diagnostics assembly



To install the USB cable and light path diagnostics assembly, complete the following steps:

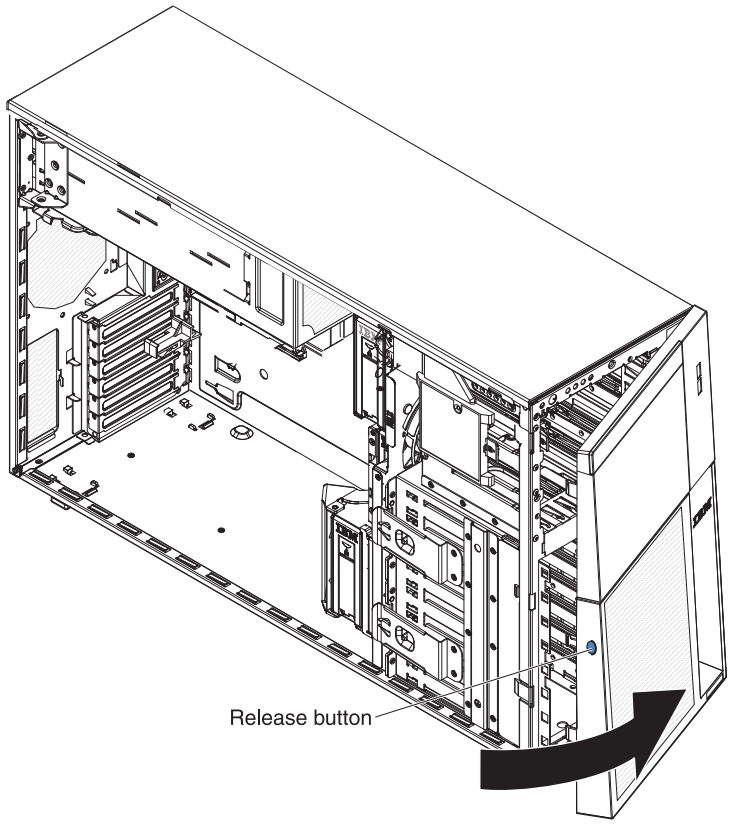
1. Touch the static-protective package that contains the USB cable and light path diagnostics assembly to any unpainted metal surface on the server; then, remove the assembly from the package.
2. Connect the USB cable to the replacement USB cable and light path diagnostics assembly:
   a. Rotate the USB cable and light path diagnostics assembly mounting bracket so that you are looking at the rear of the bracket.
   b. Squeeze the retaining clips on each side of the USB cable connector and align the key on the cable connector with the notch on the mounting bracket.
   c. Insert the connector into the mounting bracket; then, release the retaining clips.
3. Feed the light path diagnostics cable into the server through the opening in the front of the server.
4. Position the bottom of the USB cable and light path diagnostics assembly mounting bracket into the opening and rotate the top of the bracket toward the server until it clicks into place.
5. Connect the light path diagnostics cable to the system board. See “System board internal connectors” on page 15 and“Internal cable routing and connectors” on page 169 to locate the USB and light path diagnostics connectors on the system board.
6. Install the fan cage assembly (see “Installing the fan cage assembly” on page 248).
7. Install the air baffle (see “Installing the air baffle” on page 218).
8. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
9. Install the hot-swap power supply or power supplies (see “Installing a hot-swap power supply” on page 277).
10. Install the bezel (see “Installing the bezel” on page 245).
11. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).

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

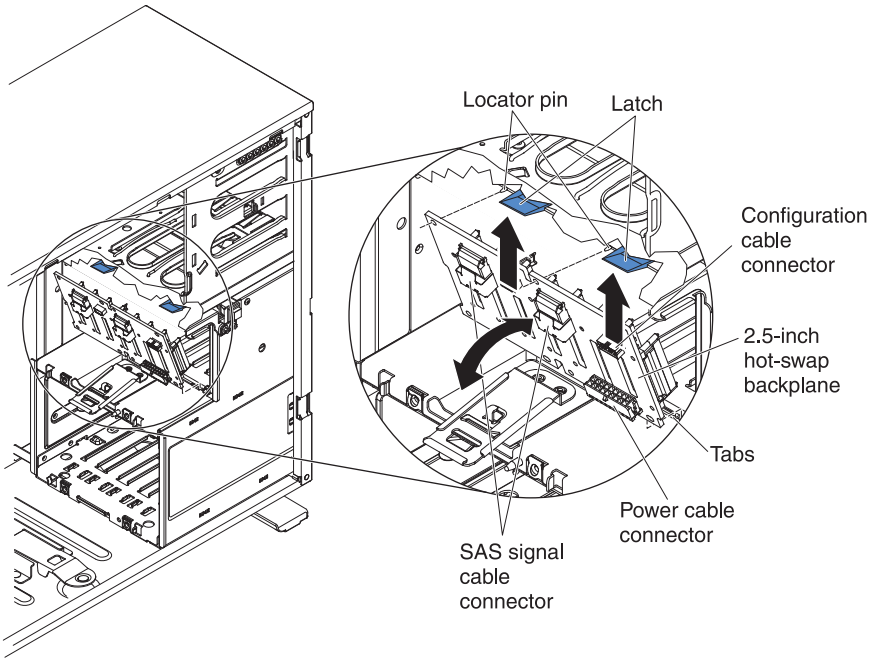
Removing a 2.5-inch disk drive backplane

To remove a 2.5-inch hard disk drive backplane, complete the following steps.

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
4. Open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.



5. Remove the hot-swap hard disk drives (see “Removing a 2.5-inch hot-swap hard disk drive” on page 194).
6. Remove the power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
7. Rotate the power-supply cage to its open position (see “Opening the power-supply cage” on page 160).
8. Remove the air baffle (see “Removing the air baffle” on page 217).
9. Remove the fan cage assembly (see “Removing the fan cage assembly” on page 247).
10. Note where the power, signal, and configuration cables are connected to the 2.5-inch hard disk drive backplane; then, disconnect them (see “Hard disk drive backplane connectors” on page 20).
11. Lift the retention latches that hold the backplane in place; then, grasp the top edge of the backplane and rotate it toward the rear of the server. When the backplane is clear of the drive-cage retention tabs, remove it from the server.

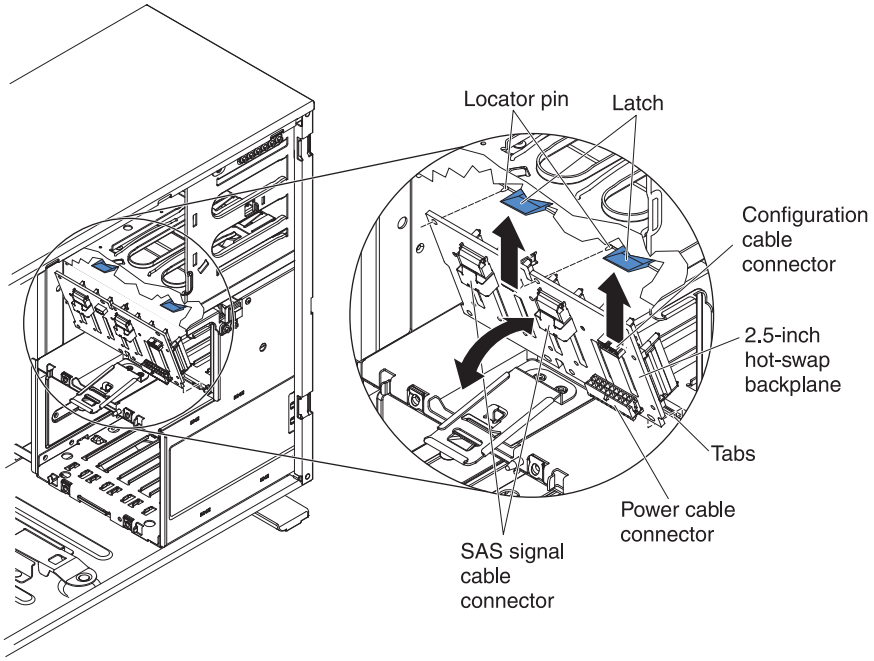


12. If you are removing another SAS backplane, repeat steps 10 on page 257 and 11 on page 257 to remove the remaining backplane.
13. If you are instructed to return the 2.5-inch hard disk drive backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a 2.5-inch disk drive backplane

To install a 2.5-inch hard disk drive backplane, complete the following steps:

1. Touch the static-protective package that contains the hard disk drive backplane to any unpainted metal surface on the server; then, remove the backplane from the package.
2. Position the 2.5-inch hard disk drive backplane in the drive-cage retention tabs; then, rotate the top of the backplane toward the locator pins until the latches click into place.

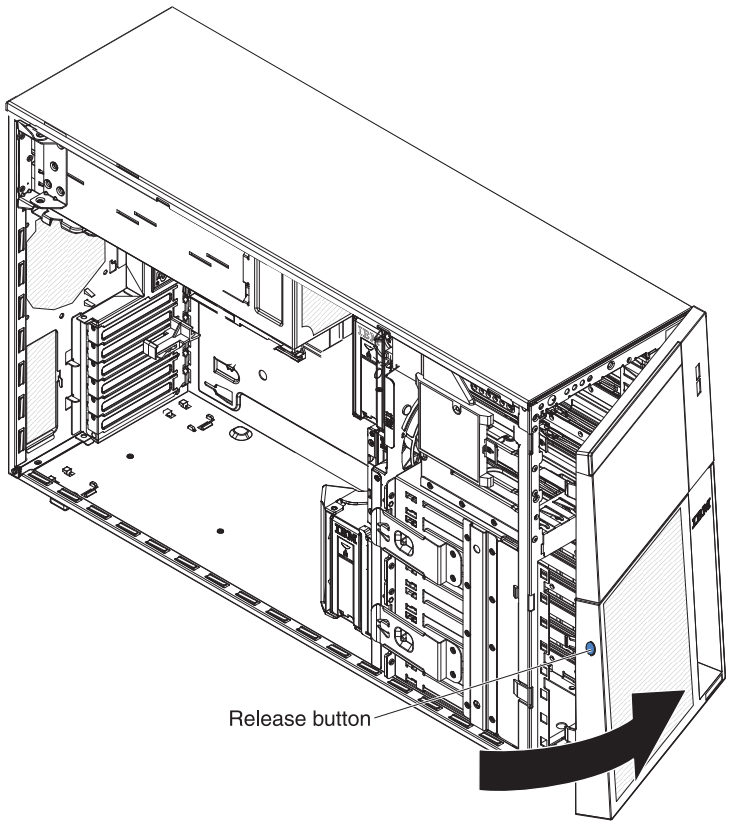


3. Connect the power, signal, and configuration cables to the 2.5-inch hard disk drive backplane (see “Hard disk drive backplane connectors” on page 20 and “Internal cable routing and connectors” on page 169).
4. If you are replacing another 2.5-inch hard disk drive backplane, repeat steps 1 through 3 to install the additional backplane.
5. Install the hot-swap hard disk drives (see “Installing a 2.5-inch hot-swap hard disk drive” on page 196).
6. Close the bezel.
7. Install the fan cage assembly (see “Installing the fan cage assembly” on page 248).
8. Install the air baffle (see “Installing the air baffle” on page 218).
9. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
10. Install the power supplies (see “Installing a hot-swap power supply” on page 277).
11. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
12. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

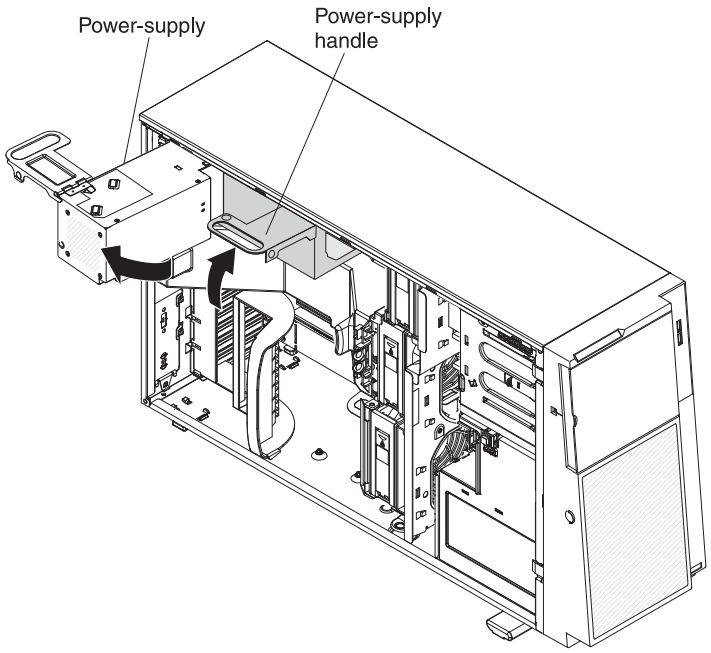
Removing the 3.5-inch hot-swap hard disk drive backplane

To remove the 3.5-inch hot-swap hard disk drive backplane from both the upper and bottom 3.5-inch disk drive cages, complete the following steps.

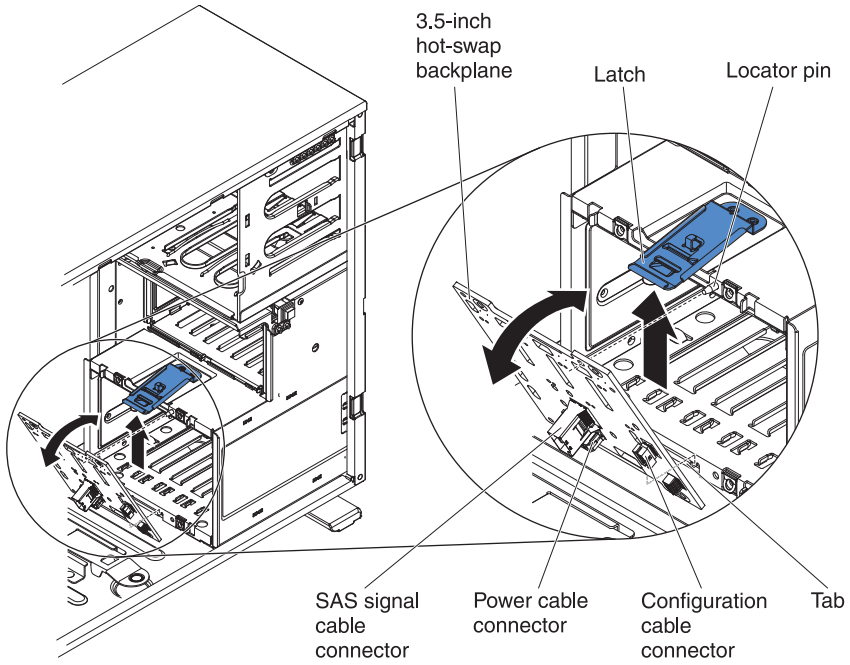
1. Read the safety information that begins on page viiand “Installation guidelines” on page 153.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Unlock and remove the side cover (see “Removing the left-side cover” on page 188).
4. Open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.



5. Remove the fan cage assembly (see “Removing the fan cage assembly” on page 247).
6. Remove the hot-swap hard disk drives that are installed in the hard disk drive cage (see “Removing a 3.5-inch hot-swap hard disk drive” on page 198).
7. Remove the power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
8. Rotate the power-supply cage assembly out of the chassis. Lift up the power-supply cage handle and pull the power-supply cage assembly all the way up until the retainer latch locks the cage in place on the chassis.



9. Remove the air baffle (see “Removing the air baffle” on page 217).
10. Remove the fan cage assembly (see “Removing the fan cage assembly” on page 247).
11. Disconnect the power, signal, and configuration cables from the 3.5-inch hard disk drive backplane.
12. Lift up on the spring-release latch on the drive cage and rotate the backplane away from the drive cage until the backplane tab disengages from the drive cage.

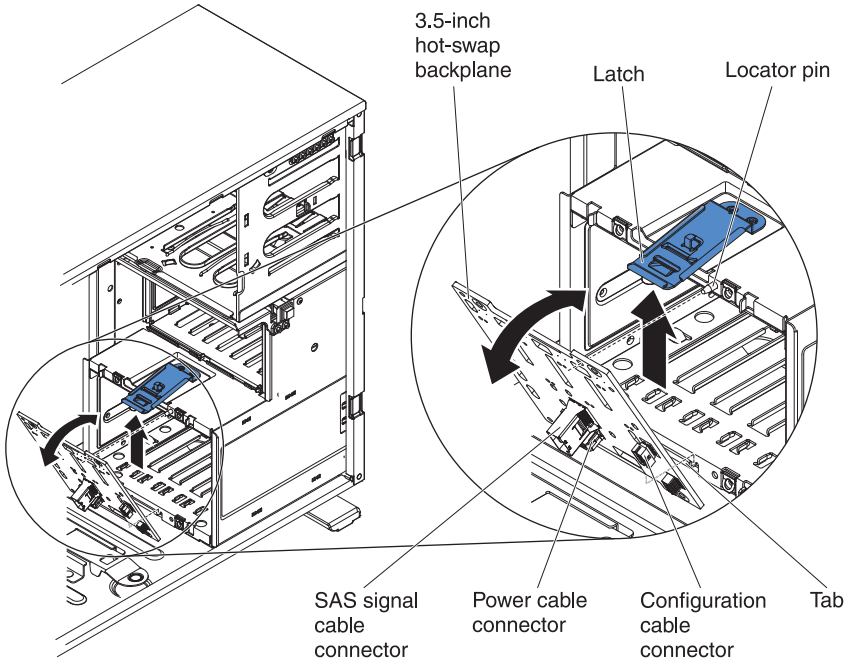


13. If you are instructed to return the 3.5-inch hot-swap hard disk drive backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

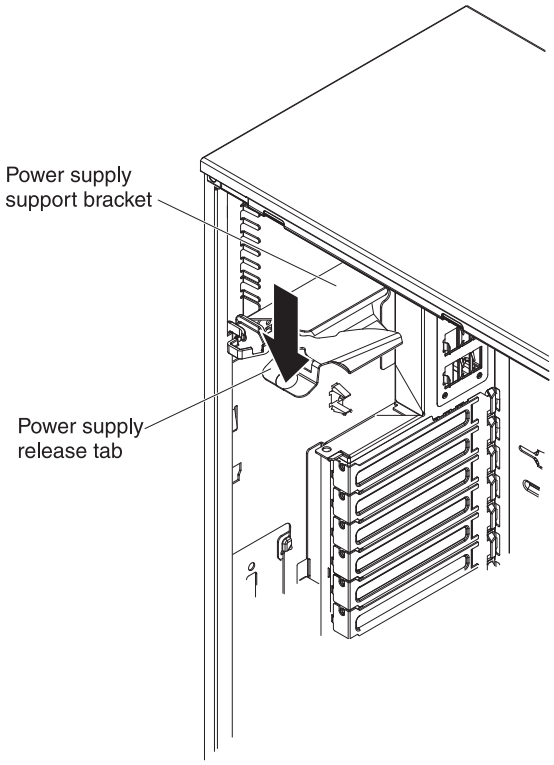
Installing the 3.5-inch hard disk drive backplane

To install the 3.5-inch hard disk drive backplane on both the upper and bottom 3.5-inch disk drive cages, complete the following steps.

1. Insert the bottom tabs of the 3.5–inch hard disk drive backplane onto the lower lip of the drive cage.
2. Rotate the backplane toward the drive cage until it locks in place in the retention tab of the spring-release latch on the drive cage.



3. Reconnect the power, configuration, and signal cables to the 3.5-inch hard disk drive backplane. For more information, see Internal cable routing and connectors.
4. Install the hot-swap hard disk drives that were removed from the hard disk drive cage (see “Installing a 3.5-inch hot-swap hard disk drive” on page 200).
5. Install the fan cage assembly (see “Installing the fan cage assembly” on page 248).
6. Install the air baffle (see “Installing the air baffle” on page 218).
7. Rotate the power-supply cage assembly back into the server. Press the power-supply cage release tab and rotate the power-supply cage assembly into the chassis.



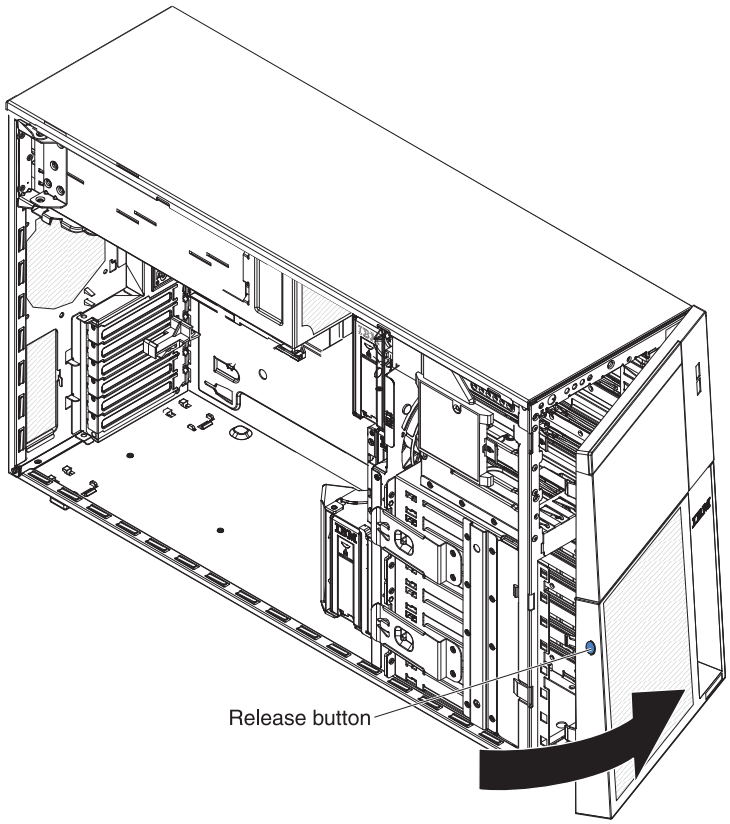
8. Close the bezel.
9. Install the side cover (see “Installing the left-side cover” on page 188).
10. Lock the side cover.
11. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the 2.5-inch disk drive cage

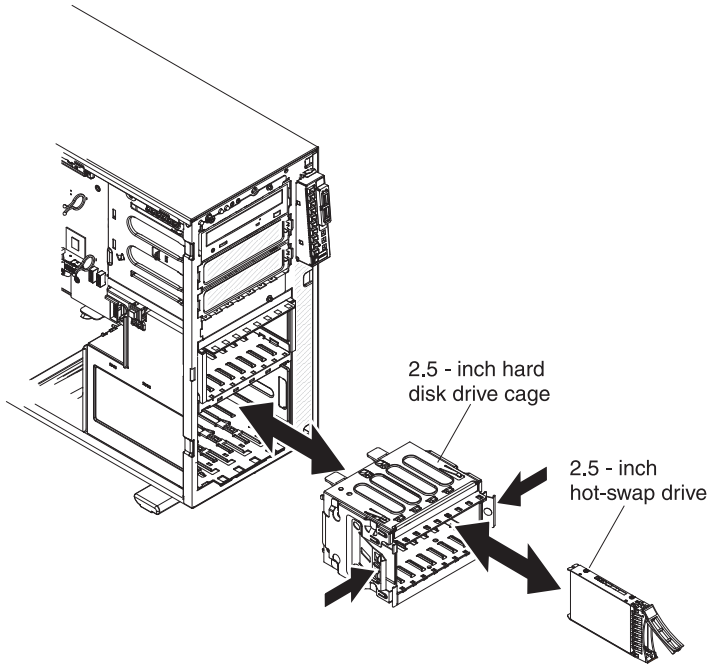
To remove the 2.5-inch hard disk drive cage, complete the following steps.

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
5. Remove the power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
6. Rotate the power-supply cage to its open position (see “Opening the power-supply cage” on page 160).
7. Remove the air baffle (see “Removing the air baffle” on page 217).
8. Remove the fan cage assembly (see “Removing the fan cage assembly” on page 247).
9. Turn the server upright and open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.



10. Remove all of the disk drives from the 2.5-inch disk drive cage (see “Removing a 2.5-inch hot-swap hard disk drive” on page 194).
11. Disconnect the cables from the 2.5-inch disk drive backplane.
12. Press both drive cage release latches inward; then, pull the drive cage out of the front of server.

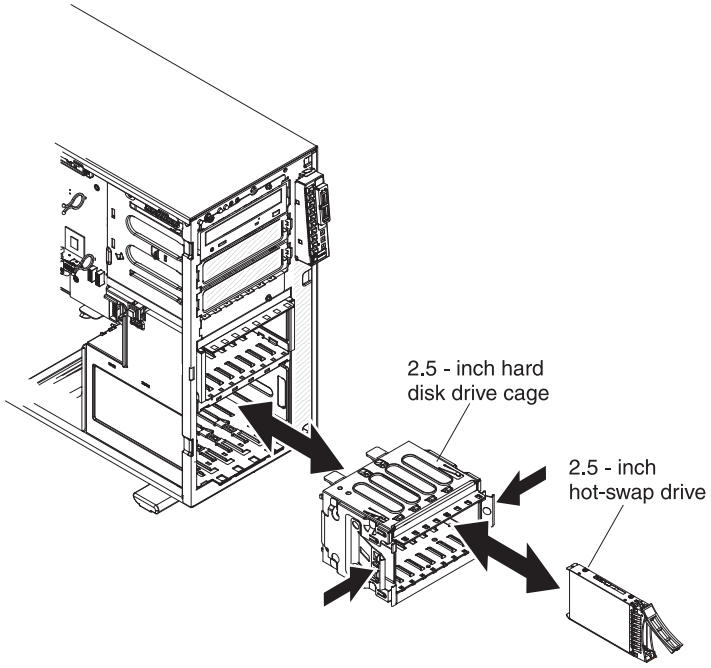


13. Remove the backplane from the 2.5-inch disk drive cage (see “Removing a 2.5-inch disk drive backplane” on page 257).
14. If you are instructed to return the 2.5-inch disk drive cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the 2.5-inch disk drive cage

To install a 2.5-inch hard disk drive cage, complete the following steps:

1. Touch the static-protective package that contains the 2.5-inch disk drive cage to any unpainted metal surface on the server; then, remove the drive cage from the package.
2. Install the 2.5-inch disk drive backplane in the back of the drive cage (see “Installing a 2.5-inch disk drive backplane” on page 259).
3. Slide the 2.5-inch disk drive cage into the opening in the front of the server; then, press drive cage in until the release latches click into place.



4. Install any hot-swap hard disk drives that were removed from the drive cage (see “Installing a 2.5-inch hot-swap hard disk drive” on page 196).
5. Close the bezel.
6. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

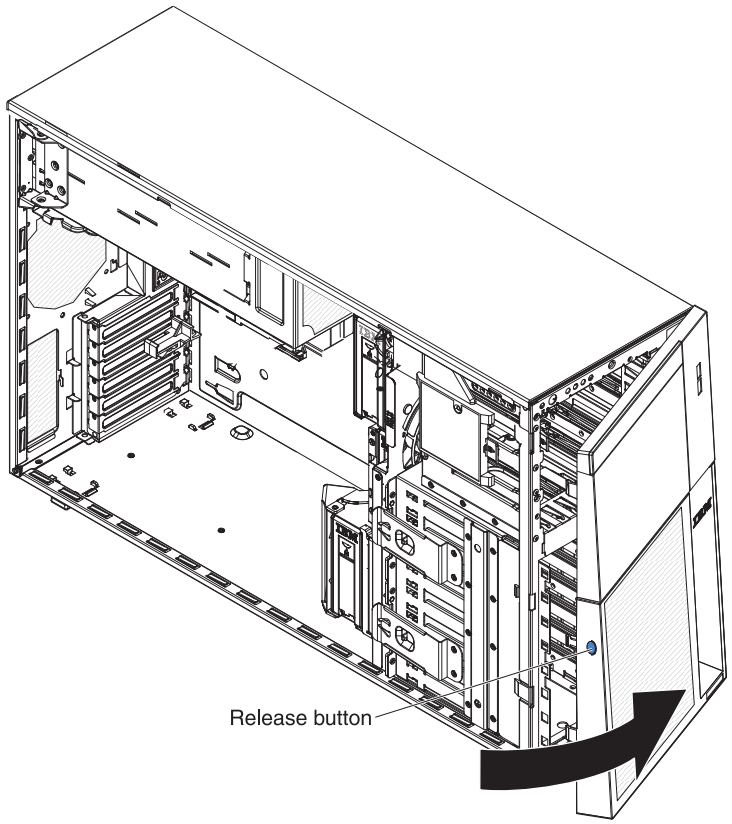
   Attention: Do not allow the server to fall over.
7. Connect the power and signal cables from the system board to the 2.5-inch disk drive backplane (see “Hard disk drive backplane connectors” on page 20 and “Internal cable routing and connectors” on page 169).
8. Install the fan cage assembly (see “Installing the fan cage assembly” on page 248).
9. Install the air baffle (see “Installing the air baffle” on page 218).
10. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
11. Install the power supplies (see “Installing a hot-swap power supply” on page 277).
12. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
13. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the upper 2.5-inch disk drive cage

To remove the upper 2.5-inch hard disk drive cage, complete the following steps.

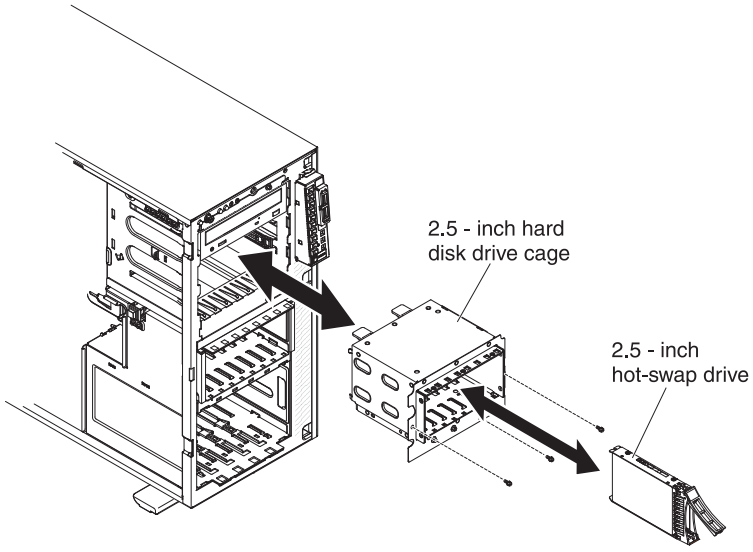
1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
5. Remove the power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
6. Rotate the power-supply cage to its open position (see “Opening the power-supply cage” on page 160).
7. Remove the air baffle (see “Removing the air baffle” on page 217).
8. Remove the fan cage assembly (see “Removing the fan cage assembly” on page 247).
9. Turn the server upright and open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.

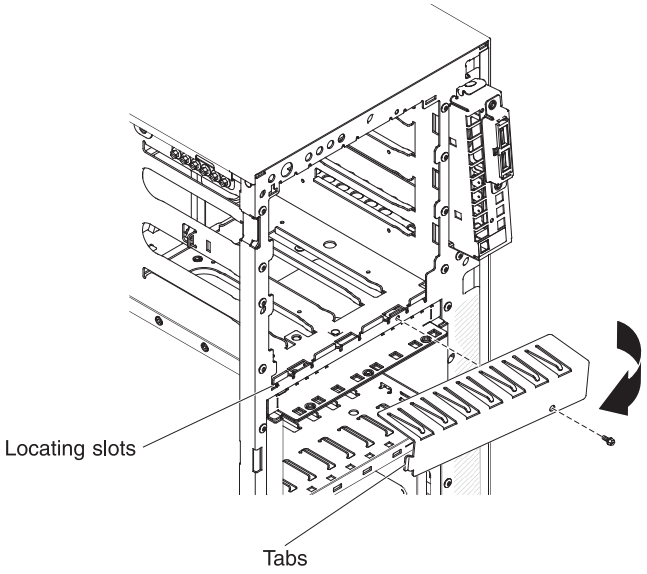


10. Remove all of the disk drives from the 2.5-inch disk drive cage (see “Removing a 2.5-inch hot-swap hard disk drive” on page 194).
11. Disconnect the power and signal cables from the 2.5-inch disk drive backplane (see “Hard disk drive backplane connectors” on page 20 and “Internal cable routing and connectors” on page 169).

12. Remove the screws that hold the 2.5-inch disk drive cage. Save the screws for future use.



13. Pull the drive cage out of the front of server.
14. Remove the backplane from the 2.5-inch disk drive cage (see “Removing a 2.5-inch disk drive backplane” on page 257).
15. Reinstall the bottom EMC shield.

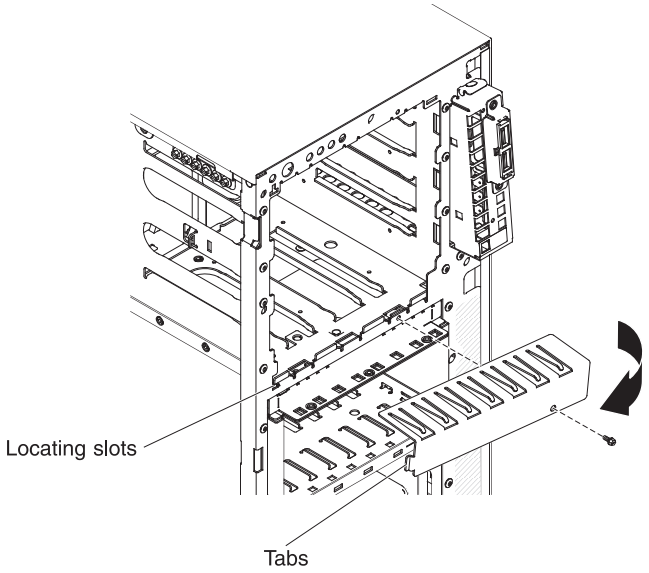


16. Reinstall all the 5.25-inch EMC fillers.
17. If you are instructed to return the 2.5-inch disk drive cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

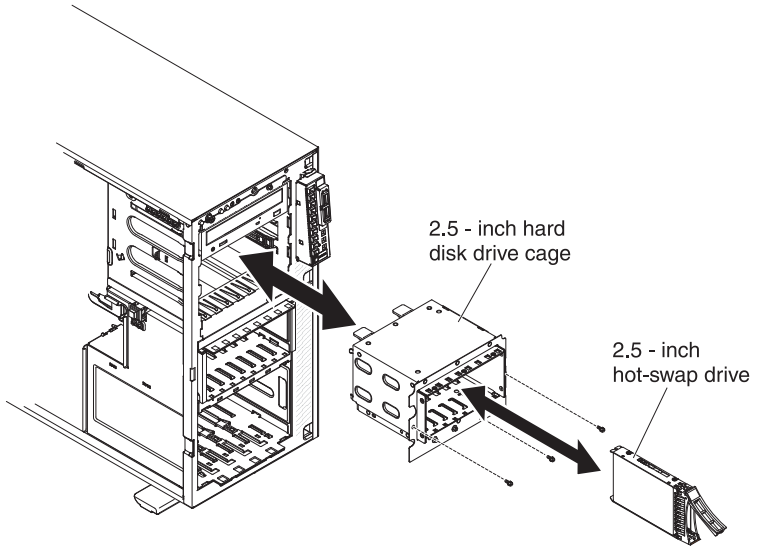
Installing the upper 2.5-inch disk drive cage

To install a 2.5-inch hard disk drive cage, complete the following steps:

1. Remove all the 5.25-inch EMC fillers.
2. Remove the bottom EMC shield and store it for future use.



3. Touch the static-protective package that contains the 2.5-inch disk drive cage to any unpainted metal surface on the server; then, remove the drive cage from the package.
4. Install the 2.5-inch disk drive backplane in the back of the drive cage (see “Installing a 2.5-inch disk drive backplane” on page 259).
5. Slide the 2.5-inch disk drive cage into the upper opening of the server along the lower edge of the opening.
6. Align the holes in the edge of 2.5-inch disk drive cage with the holes in the edge of the server rack.



7. Insert the screws to secure the 2.5-inch disk drive cage in place.
8. Install any hard disk drives that were removed from the drive cage (see “Installing a 2.5-inch hot-swap hard disk drive” on page 196).

9. Close the bezel.
10. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

    Attention: Do not allow the server to fall over.
11. Connect the power and signal cables from the system board to the 2.5-inch disk drive backplane (see “Hard disk drive backplane connectors” on page 20 and “Internal cable routing and connectors” on page 169).
12. Install the fan cage assembly (see “Installing the fan cage assembly” on page 248).
13. Install the air baffle (see “Installing the air baffle” on page 218).
14. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
15. Install the power supplies (see “Installing a hot-swap power supply” on page 277).
16. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
17. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing and replacing FRUs

FRUs must be installed only by trained service technicians.

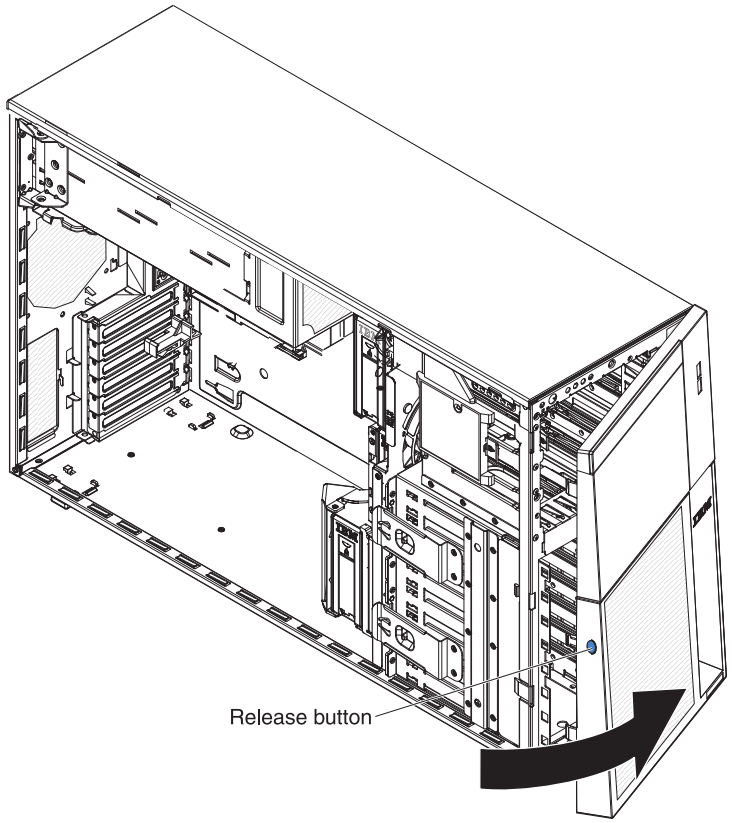
The illustrations in this document might differ slightly from the hardware.

Removing the upper 3.5-inch disk drive cage

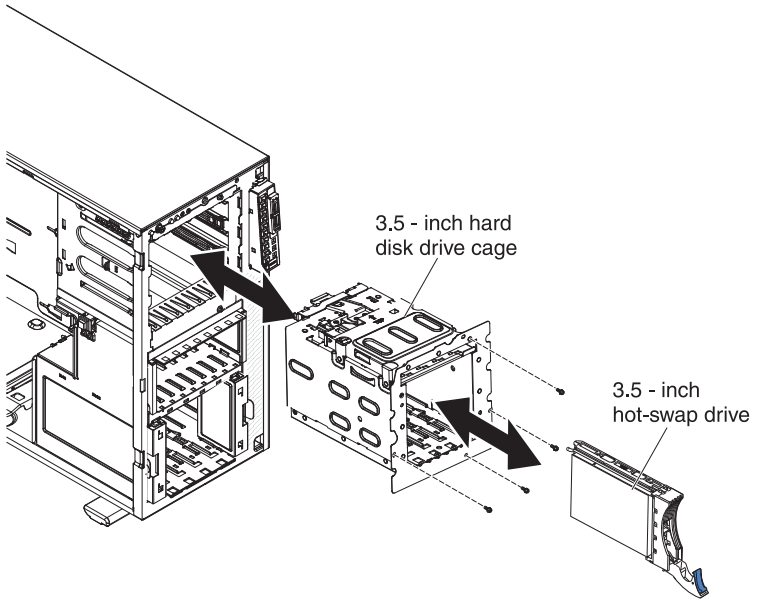
To remove the 3.5-inch hard disk drive cage, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

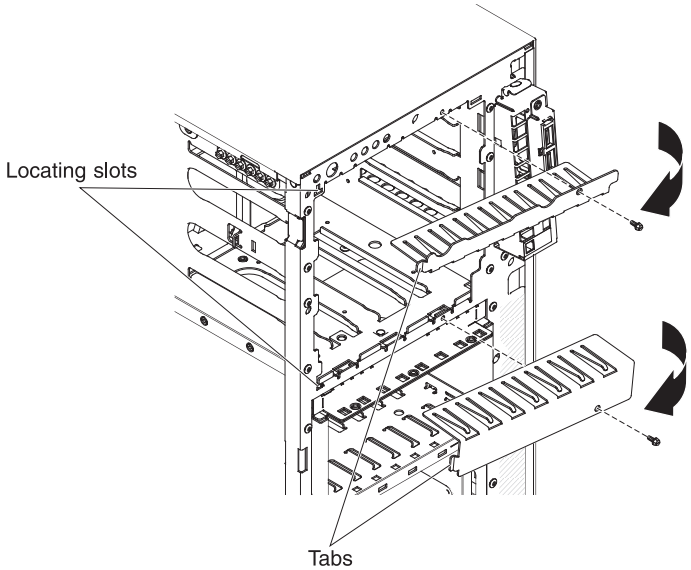
   Attention: Do not allow the server to fall over.
4. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
5. Remove the power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
6. Rotate the power-supply cage to its open position (see “Opening the power-supply cage” on page 160).
7. Remove the air baffle (see “Removing the air baffle” on page 217).
8. Remove the fan cage assembly (see “Removing the fan cage assembly” on page 247).
9. Turn the server upright and open the bezel by pressing the button on the left edge of the bezel, and rotate the left side of the bezel away from the server.



10. Remove all of the disk drives from the 3.5-inch disk drive cage (see “Removing a 3.5-inch hot-swap hard disk drive” on page 198).
11. Disconnect the cables from the 3.5-inch disk drive backplane.
12. Disconnect the UltraSlim DVD drive cables from the system board if any.
13. Remove the screws that hold the 3.5-inch disk drive cage. Save the screws for future use.



14. Pull the drive cage out of the front of server.
15. Remove the UltraSlim DVD drive if installed.
16. Remove the backplane from the 3.5-inch disk drive cage (see “Removing the 3.5-inch hot-swap hard disk drive backplane” on page 260).
17. Install the EMC shields.

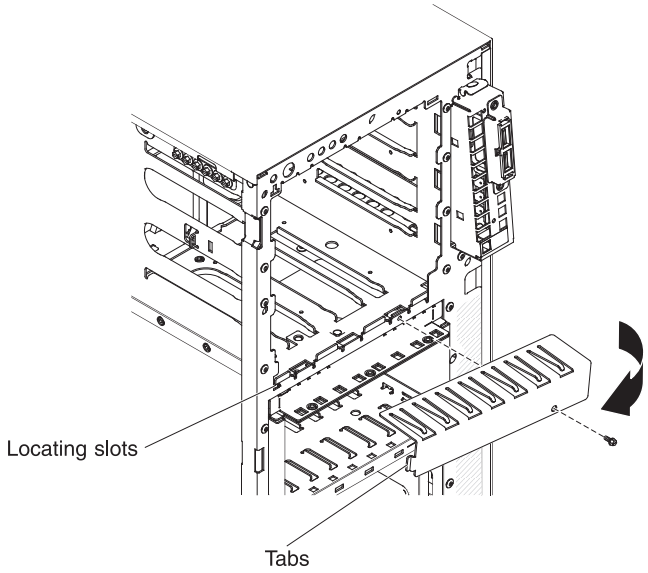


18. Install all the EMC fillers.
19. If you are instructed to return the 3.5-inch disk drive cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the upper 3.5-inch disk drive cage

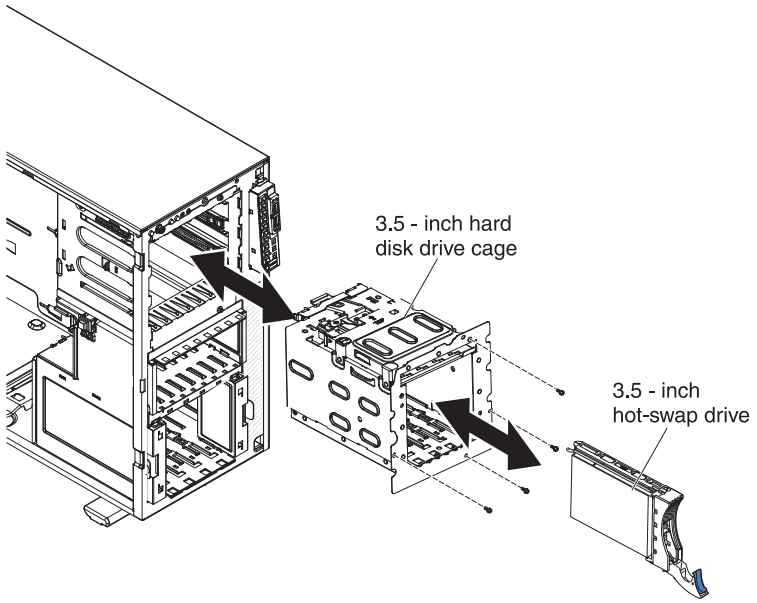
To install a 3.5-inch hard disk drive cage, complete the following steps:

1. Remove all the EMC fillers.
2. Remove the optical DVD drive if installed.
3. Remove the bottom EMC shield and store it for future use.



4. Touch the static-protective package that contains the 3.5-inch disk drive cage to any unpainted metal surface on the server; then, remove the drive cage from the package.
5. Install the UltraSlim DVD drive in to the slim slot on top of the upper 3.5-inch disk drive cage; follow steps from 2 on page 211 to 2o on page 215.
6. Install the 3.5-inch disk drive backplane in the back of the drive cage (see “Installing the 3.5-inch hard disk drive backplane” on page 262).
7. Slide the 3.5-inch disk drive cage into the upper opening of the server along the lower edge of the opening.

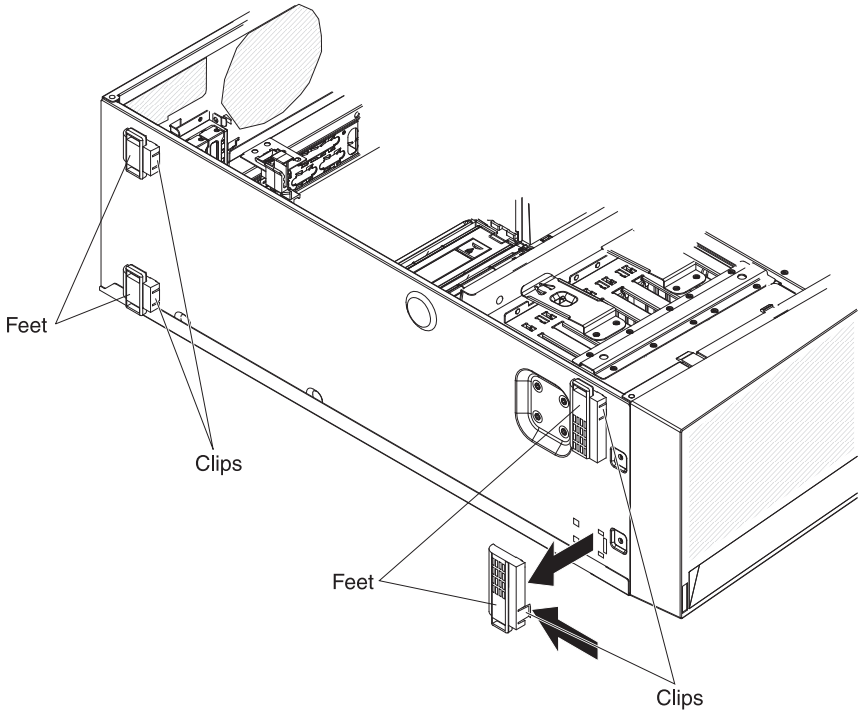
   Note: Pull the power and signal cables of the UltraSlim DVD drive into the upper opening of the server first. Make sure the cables are not stuck when you slide the disk drive cage into the server.



8. Align the holes in the edge of 3.5-inch disk drive cage with the holes in the edge of the server rack.
9. Insert the screws to secure the 3.5-inch disk drive cage in place.
10. Install any hot-swap hard disk drives that were removed from the drive cage (see “Installing a 3.5-inch hot-swap hard disk drive” on page 200).
11. Close the bezel.
12. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

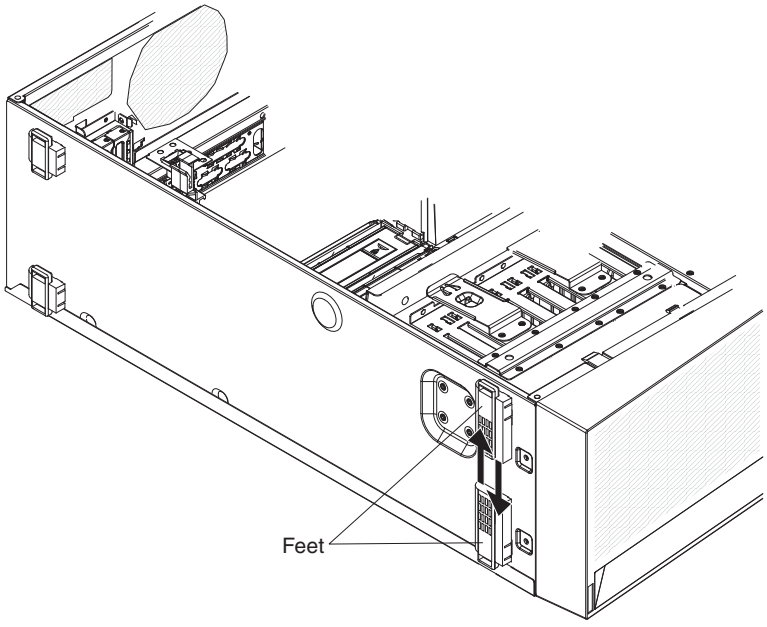
    Attention: Do not allow the server to fall over.
13. Connect the power and signal cables between the system board and the 3.5-inch disk drive backplane and UltraSlim DVD drive (see “Hard disk drive backplane connectors” on page 20 and “Internal cable routing and connectors” on page 169).
14. Install the fan cage assembly (see “Installing the fan cage assembly” on page 248).
15. Install the air baffle (see “Installing the air baffle” on page 218).
16. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
17. Install the power supplies (see “Installing a hot-swap power supply” on page 277).
18. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
19. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Turning the stabilizing feet



To rotate the front feet, complete the following steps:

1. Carefully position the server on a flat surface, with the feet hanging over the edge of the flat surface to ease removal.
2. Press in on the clips that hold the feet in place; then, pry the feet away from the server. In some cases, you might need a screwdriver to press in on the clips.



3. Reinstall the feet in the opposite location, with the tab on the feet extending beyond the edge of the server.

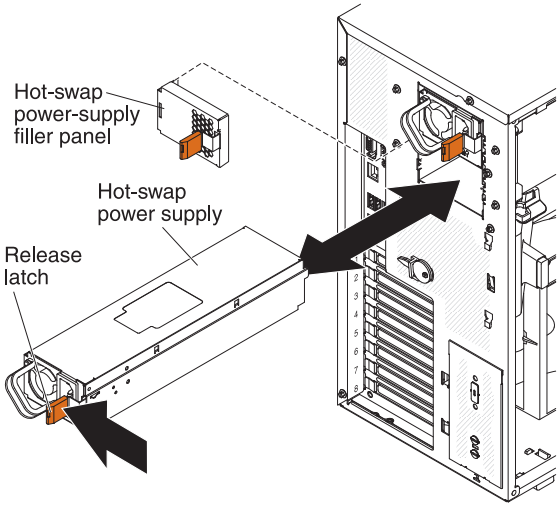
Removing a hot-swap power supply

If you install or remove 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.



Note: If only one hot-swap power supply is installed in the server, you must turn off the server before removing the power supply.

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

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.

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

3. Press the release latch on the power supply and pull the power supply out of the power-supply cage.
4. If you are instructed to return the hot-swap power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Note: All fixed power supply unit should be FRU unless said so.

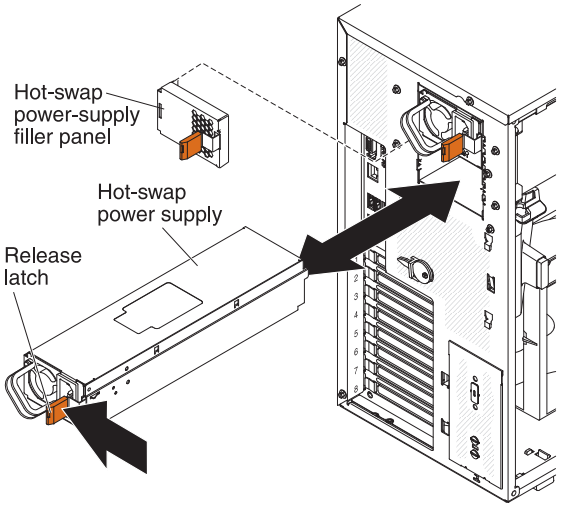
Installing a hot-swap power supply

If you install or remove 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 install a hot-swap power supply, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.

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

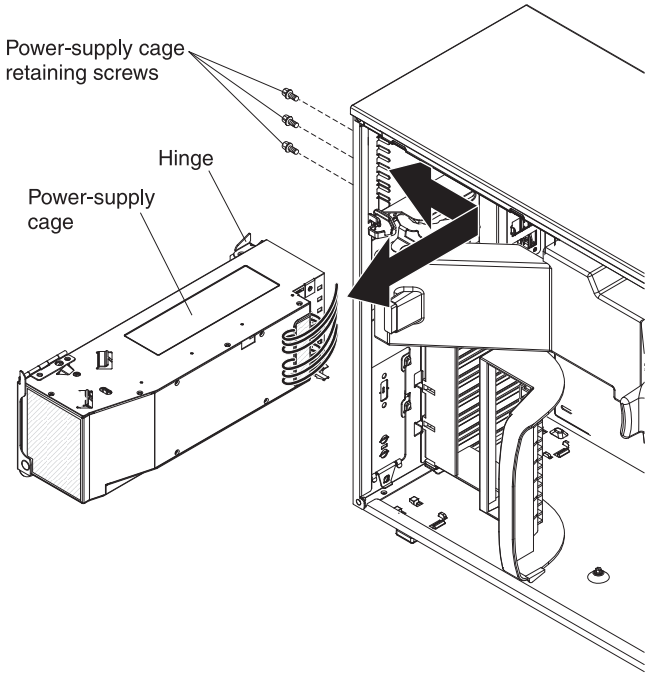
2. Touch the static-protective package that contains the power supply to any unpainted metal surface on the server; then, remove the power supply from the package.
3. Remove the power-supply filler panel from the power bay, if one is installed.
4. Place the power supply into the power-supply cage and push it in until it locks into place.

   Note: If only one hot-swap power supply is installed in the server, a power-supply filler must be installed in the empty power bay.
5. Connect one end of the power cord for the new power supply into the connector on the back of the power supply; then, connect the other end of the power cord to a properly grounded electrical outlet.

   Note: If the server has been turned off, you must wait approximately 3 minutes after you connect the server power cord to an electrical outlet before the power-control button becomes active.
6. Make sure that the AC power LED on the top of the power supply is lit, indicating that the power supply is operating correctly. If the server is turned on, make sure that the DC power LED on the top of the power supply is lit also.

Note: All fixed power supply unit should be FRU unless said so.

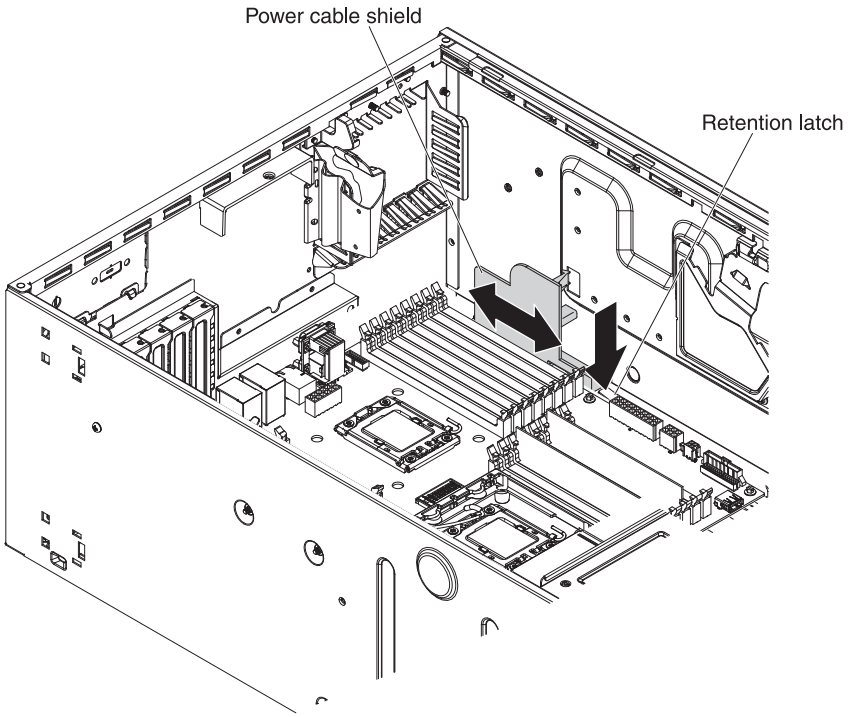
Removing the power-supply cage



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

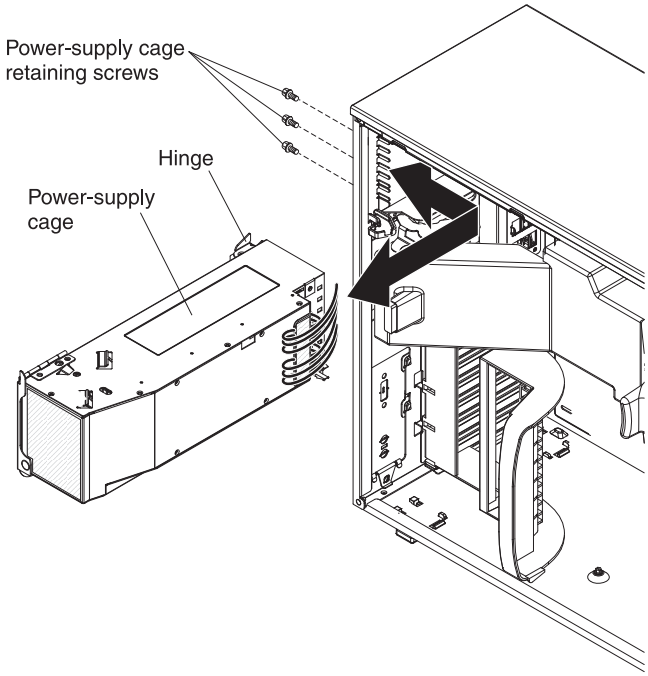
1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
4. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
5. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
6. Rotate the power-supply cage to its open position (see “Opening the power-supply cage” on page 160).
7. Remove the air baffle (see “Removing the air baffle” on page 217).
8. Remove the power cable shield:
   a. Note how the power-supply cage cables are routed behind the power cable shield.
   b. Press down on the power cable shield retention latch.
   c. Slide the power cable shield toward the front of the server to disengage the locating tabs; then, remove the power cable shield.



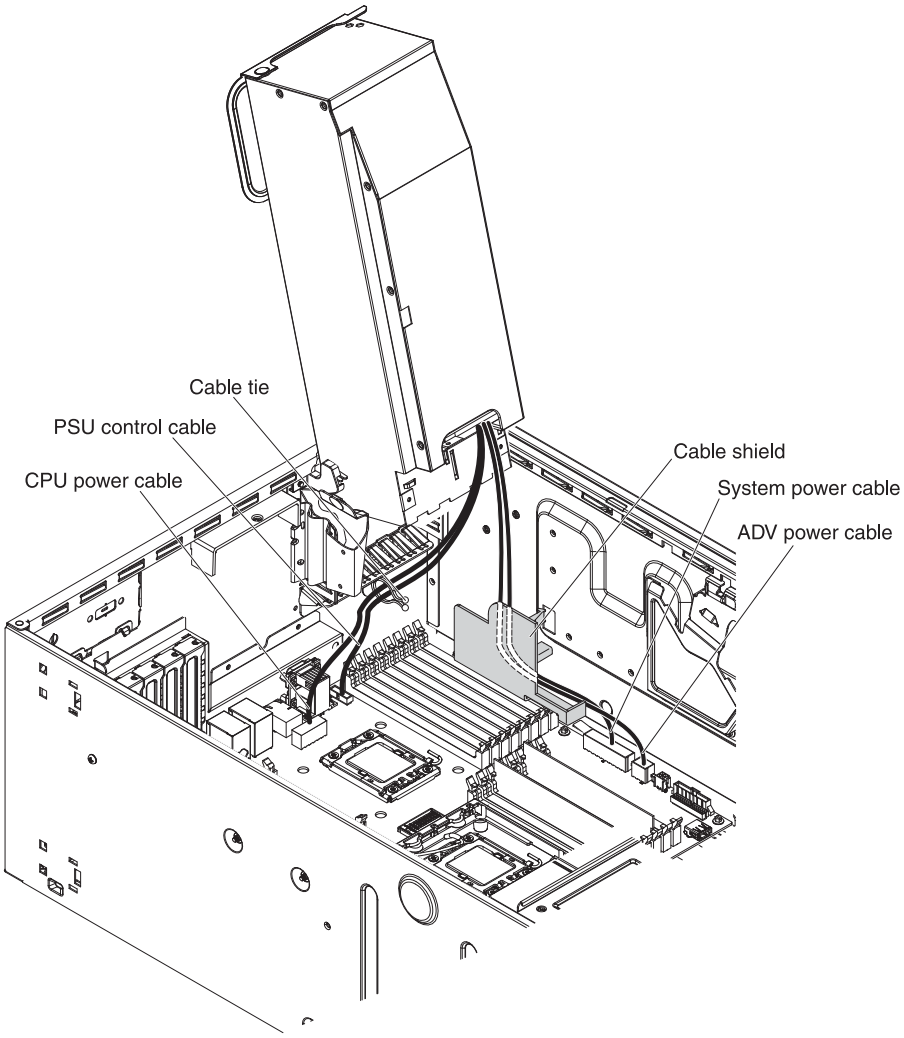
9. Disconnect the power-supply cage cables from the system board.
10. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
11. Remove the three screws on the rear of the server that secure the cage to the server chassis; then, remove the cage from the server.
12. 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 power-supply cage



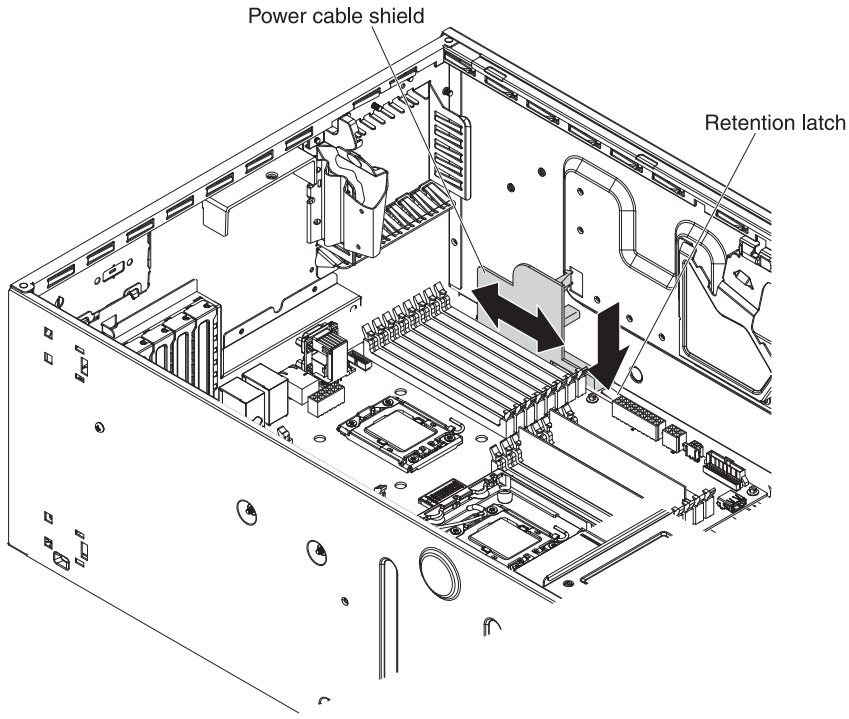
To install the power-supply cage, complete the following steps:

1. Touch the static-protective package that contains the power-supply cage to any unpainted metal surface on the server; then, remove the power-supply cage from the package.
2. Position the hinge so that the power-supply cage would be in the open position if it were installed in the server.
3. Move the hinge inside the server chassis and align the screw holes with the holes in the chassis.
4. Secure the power-supply cage to the chassis, using three screws.
5. Connect the power-supply cage cables and install the power cable shield:
   a. Route the system power and ADV power cables behind the power cable shield as shown in the illustration; then, connect the cables to the system board (see “System board internal connectors” on page 15).



b. Place the power cable shield over the power cables and align the locating tabs on the cable shield with the corresponding slots in the server chassis.

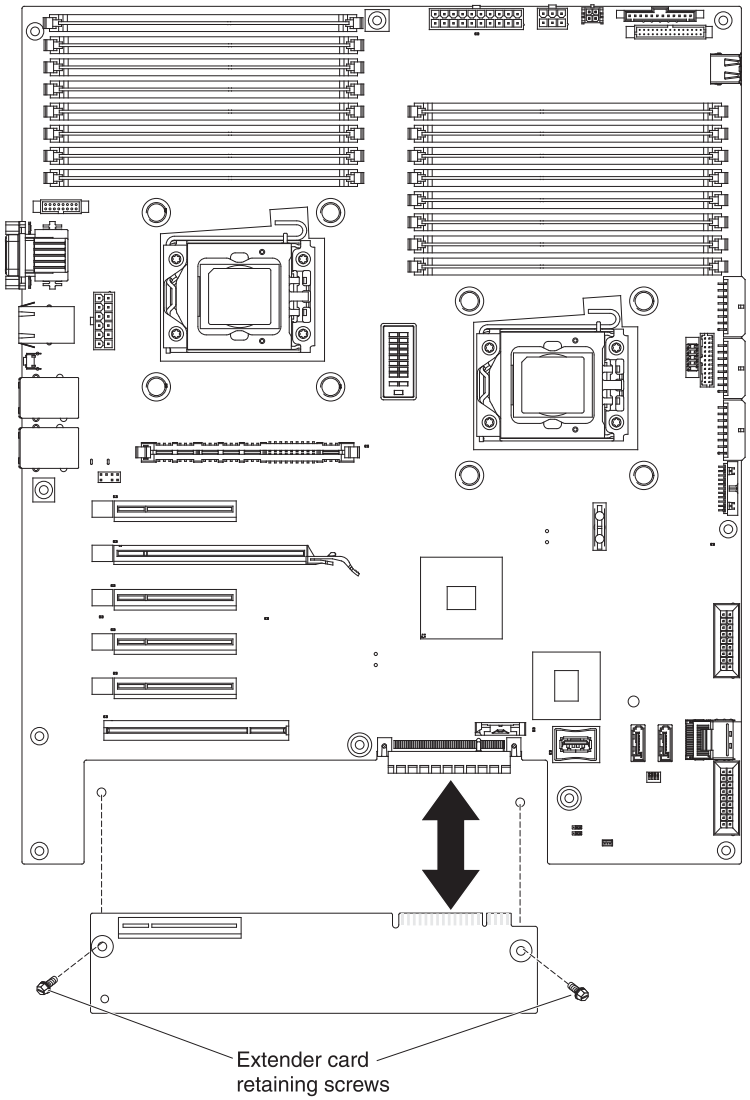
c. Press down on the power cable shield and slide it toward the rear of the server until it clicks into place.



d. Route the CPU power and PSU control cables through the cable tie on the rear of server chassis; then, connect the cables to the system board (see “System board internal connectors” on page 15)

6. Install the air baffle (see “Installing the air baffle” on page 218).
7. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
8. Install the power supplies (see “Installing a hot-swap power supply” on page 277).
9. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
10. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing an extender card



To remove an extender card, complete the following steps:

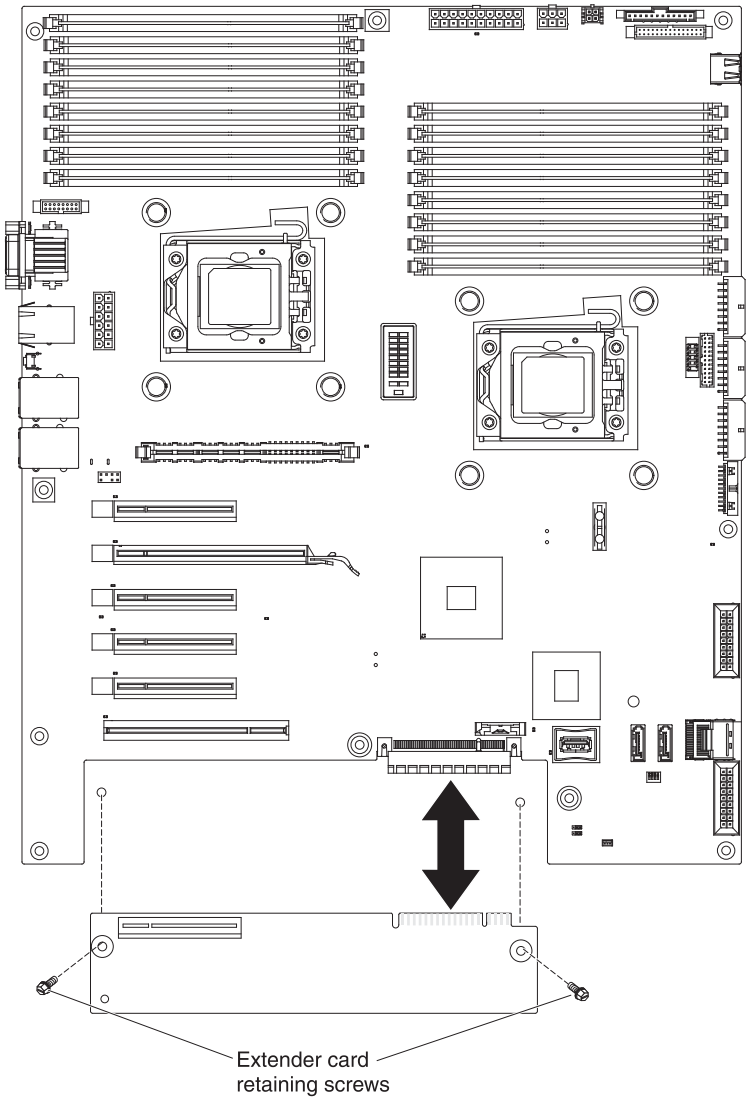
1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the side cover (see “Removing the left-side cover” on page 188).
5. Remove any adapters that are installed in the expansion slots (see “Removing an adapter” on page 219).
6. Remove the system board and place it on a static-protective surface (see “Removing the system board” on page 299).

   Note: Do not remove the DIMMs, heat sinks, microprocessors, VRM, or battery from the system board.

7. Remove the two screws that secure the extender card to the system board tray.
8. Pull the extender card out of the system board connector.
9. If you are instructed to return the extender card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an extender card



To install an extender card, complete the following steps:

1. Touch the static-protective package that contains the extender card to any unpainted metal surface on the server; then, remove the extender card from the package.
2. Align the extender card with its connector on the system board; then, slide the extender card into the connector.
3. Install the two screws that secure the extender card to the system board tray.
4. Install the system board in the server (see “Installing the system board” on page 301).
5. Install any adapters that you removed from the expansion slots (see “Installing an adapter” on page 220).
6. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
7. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

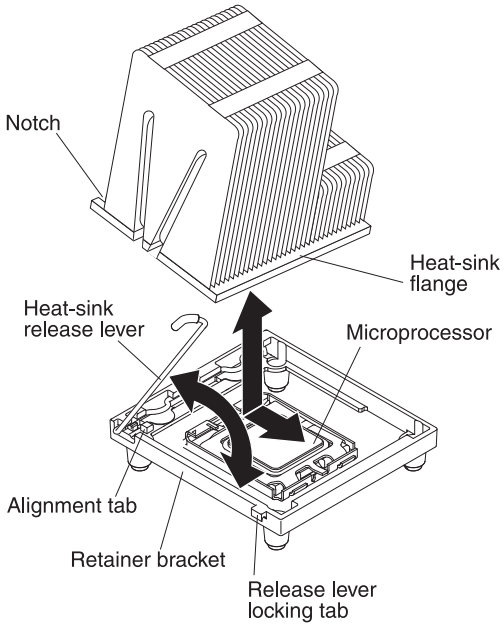
Removing a microprocessor and heat sink

To remove a microprocessor, complete the following steps:

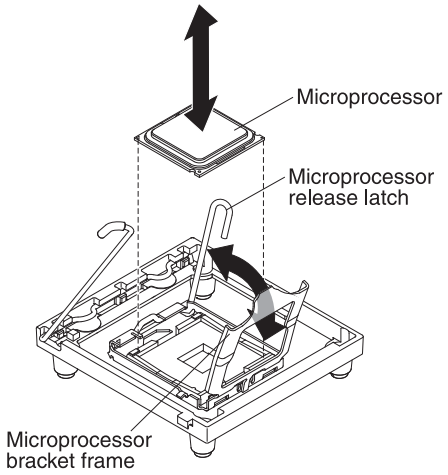
1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the left-side cover (see “Removing the left-side cover” on page 188).
5. Remove the power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
6. Rotate the power-supply cage to its open position (see “Opening the power-supply cage” on page 160).
7. Remove the air baffle (see “Removing the air baffle” on page 217).
8. Remove the microprocessor heat sink:
   a. Lift the heat-sink release lever to the fully open position.
   b. Rotate the back of the heat sink out of the retention bracket and remove the heat sink from the server.

      Attention: Do not touch the thermal grease on the bottom of the heat sink. Touching the thermal grease will contaminate it. If the thermal grease on the microprocessor or heat sink becomes contaminated, you must replace it. See “Thermal grease” on page 294 for more information.



9. Lift the microprocessor-release latch to the fully open position (approximately 135° angle); then, lift the bracket frame and remove the microprocessor from the socket.

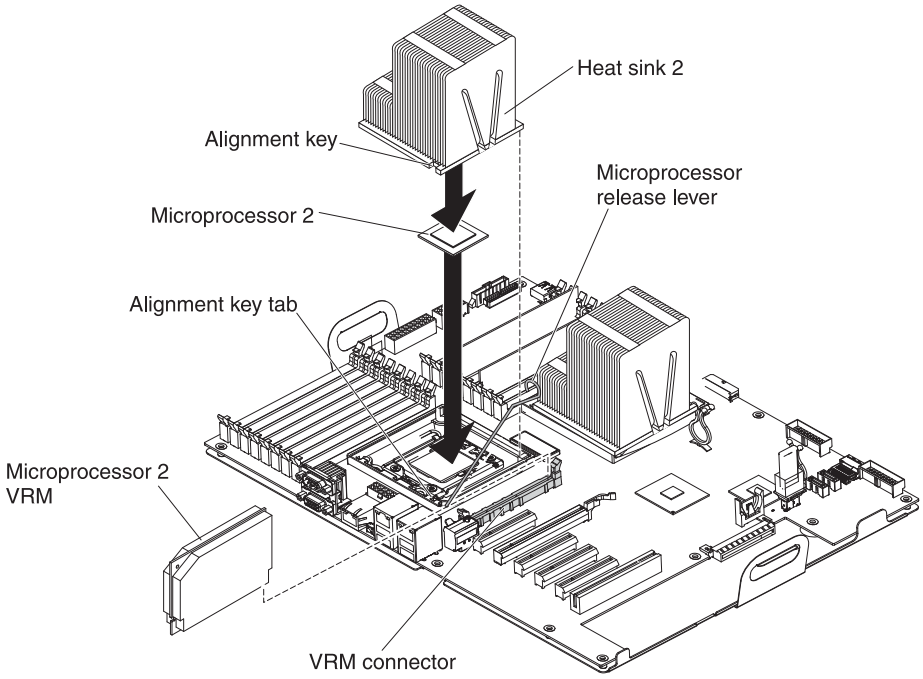


10. If you are removing microprocessor 2, remove the voltage regulator module (VRM) from the connector next to microprocessor socket 2.
    a. Open the retaining clips on each end of the VRM connector.
    b. Pull the VRM out of the connector.
11. If you are instructed to return the microprocessor, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a microprocessor and heat sink

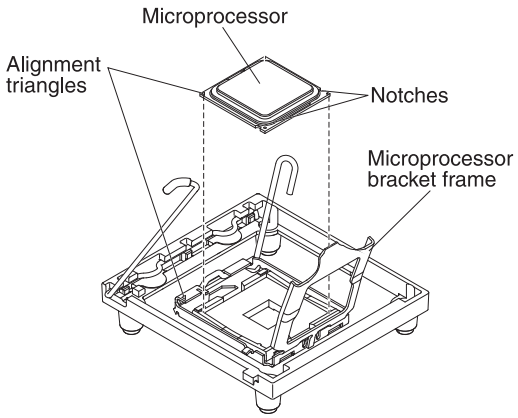
The following notes describe the types of microprocessor that the server supports and other information that you must consider when you install a microprocessor:

- The server supports certain Intel Xeon scalable multi-core microprocessors, which are designed for the LGA 1366 socket. These microprocessors are 64-bit dual-core or quad-core microprocessors with an integrated memory controller, quick-path interconnect, and shared last cache. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported microprocessors.
- The server supports up to two microprocessors. If the server comes with one microprocessor, you can install a second microprocessor.
- Both microprocessors must have the same QuickPath Interconnect (QPI) link speed, integrated memory controller frequency, core frequency, power segment, cache size, and type.
- Read the documentation that comes with the microprocessor to determine whether you must update the server firmware. To download the most current level of server firmware and many other code updates for your server, complete the following steps:
  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 x3500 M3** to display the matrix of downloadable files for the server.
- (Optional) Obtain an SMP-capable operating system. For a list of supported operating systems and optional devices, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.
- To order additional microprocessor optional devices, contact your IBM marketing representative or authorized reseller.
- The microprocessor speeds are automatically set for this server; therefore, you do not have to set any microprocessor frequency-selection jumpers or switches.
- If you have to replace a microprocessor, call for service.
- The heat-sink FRU is packaged with the thermal grease applied to the underside:
  - If the thermal-grease protective cover (for example, a plastic cap or tape liner) is removed from the heat sink, do not touch the thermal grease on the bottom of the heat sink or set down the heat sink.
  - You must replace the thermal grease if it becomes contaminated or has come in contact with another object other than its paired microprocessor.
  - The thermal grease is available as a separate FRU.
- Do not remove the first microprocessor from the system board to install the second microprocessor.
- Some models support dual-core processors and quad-core processors. Do not use dual-core processors and quad-core processors in the same server. Install all dual-core or all quad-core processors in the server.



To install a 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. Open the microprocessor socket by pressing down on the end of the release lever, moving it to the side, and slowly releasing it to the open (up) position.



3. Open the microprocessor bracket frame and remove the microprocessor filler, if one is installed.

   Attention:

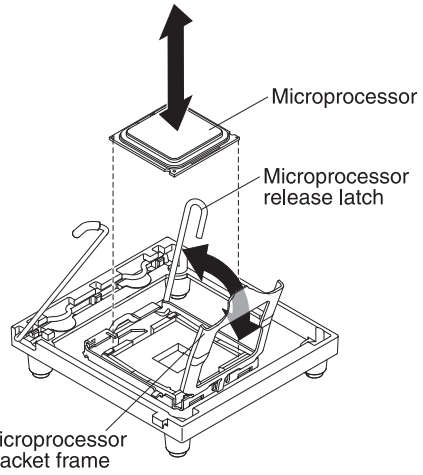
   a. Do not touch the microprocessor contacts; handle the microprocessor by the edges only. Contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.
   b. Handle the microprocessor carefully. Dropping the microprocessor during installation or removal can damage the contacts.
   c. Do not use excessive force when you press the microprocessor into the socket.

d. Make sure that the microprocessor is oriented, aligned, and positioned in the socket before you try to close the lever.

4. Install the microprocessor:
   a. Touch the static-protective package that contains the microprocessor to any unpainted metal surface on the server. Then, remove the microprocessor from the package.
   b. Remove the protective cover, tape, or label from the surface of the microprocessor socket, if any is present.
   c. Align the microprocessor with the socket. 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.
   d. Carefully place the microprocessor into the socket. Do not use excessive force when you press the microprocessor into the socket.

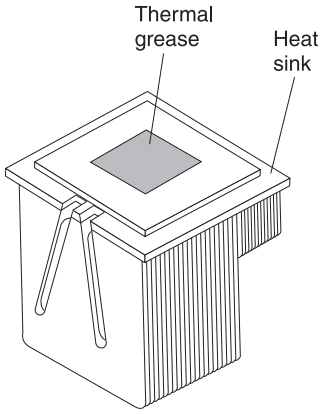
      Note: The microprocessor fits only one way on the socket.

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

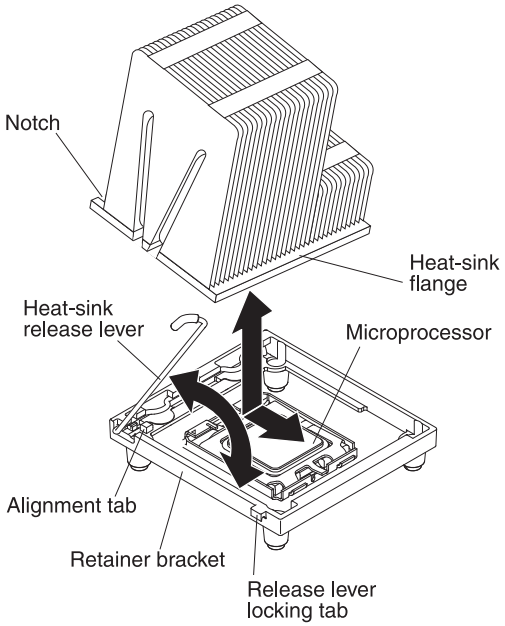


6. Install a heat sink on the microprocessor.

Attention: Do not touch the thermal grease on the bottom of the heat sink or set down the heat sink after you remove the plastic cover. Touching the thermal grease will contaminate it. If the thermal grease is contaminated, call IBM service to request a replacement thermal grease kit. For information about installing the replacement thermal grease, see “Thermal grease” on page 294.



a. Make sure that the heat-sink release lever is in the fully open position.
b. Remove the plastic protective cover from the bottom of the heat sink, if one is installed.
c. Position the heat sink above the microprocessor with the thermal-grease side down.



Attention: The heat sink is keyed to the retention module. Make sure that the notch on the heat sink fits over the alignment tab on the retention module.

d. Align the notch on the heat sink with the alignment tab on the retainer module.
e. Slide the rear flange of the heat sink into the opening in the retainer bracket.
f. Press down firmly on the front of the heat sink until it is seated securely.
g. Rotate the heat-sink release lever to the closed position and hook it underneath the locking tab.

7. If you are installing microprocessor 2, install a VRM in the connector next to microprocessor socket 2 (see “System board internal connectors” on page 15 for the VRM connector location).

   Note: A VRM must be installed for microprocessor 2. The server will not start if microprocessor 2 is installed without a VRM.

   a. Open the retaining clips on each end of the VRM connector.
   b. Turn the VRM so that the keys align with the connector.
   c. Insert the VRM into the connector by aligning the edges of the VRM with the slots at the end of the VRM connector. Firmly press the VRM straight down into the connector by applying pressure on both ends of the VRM simultaneously. The retaining clips snap into the locked position when the VRM is seated in the connector.
8. Install the air baffle (see “Installing the air baffle” on page 218).
9. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
10. Install the power supplies (see “Installing a hot-swap power supply” on page 277).
11. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
12. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

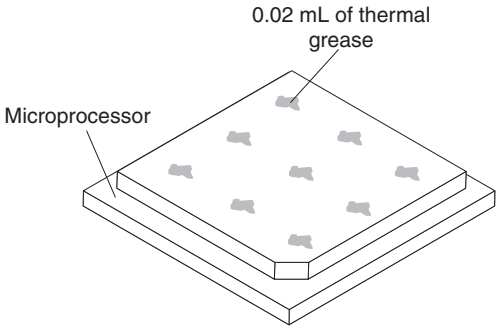
Thermal grease

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

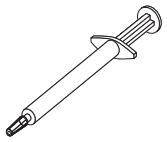
To replace damaged or contaminated thermal grease on the microprocessor and heat sink, complete the following steps:

1. Place the heat 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 heat 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.

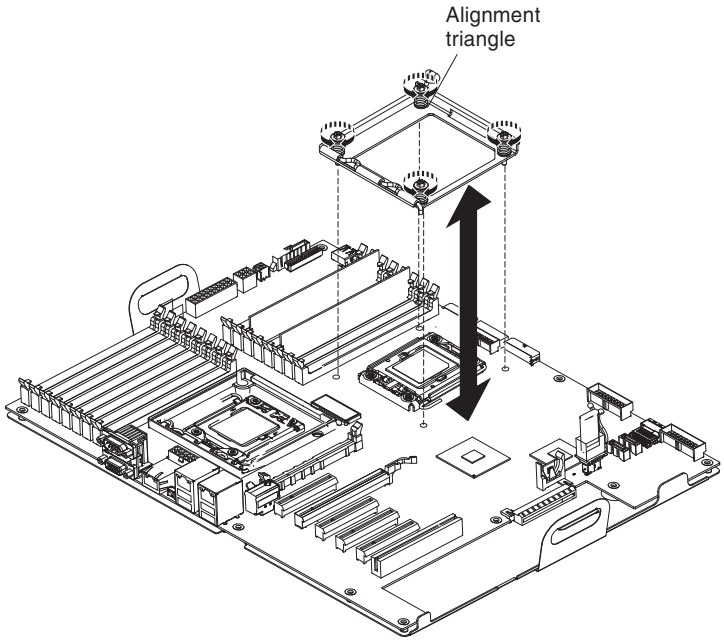


5. Use the thermal-grease syringe to place 9 uniformly spaced dots of 0.02 mL each on the top of the microprocessor. The outermost dots must be within approximately 5 mm of the edge. This is to ensure uniform distribution.



   Note: 0.01 mL is one tick mark on the syringe. If the grease is properly applied, approximately half (0.22 mL) of the grease will remain in the syringe.
6. Install the heat sink onto the microprocessor as described in “Installing a microprocessor and heat sink” on page 289.

Removing a heat-sink retention module

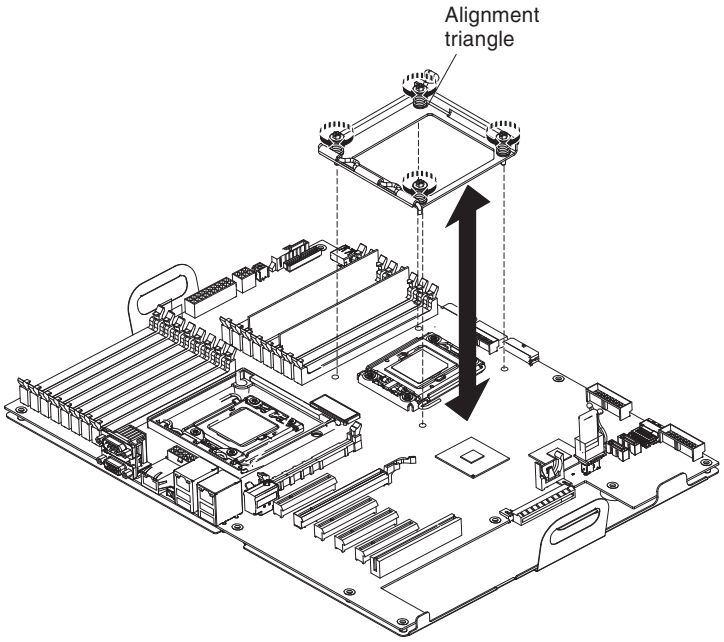


To remove a heat-sink retention module, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the side cover (see “Removing the left-side cover” on page 188).
5. Remove the power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
6. Rotate the power-supply cage to its open position (see “Opening the power-supply cage” on page 160).
7. Remove the air baffle (see “Removing the air baffle” on page 217).
8. Remove the heat sink (see “Removing a microprocessor and heat sink” on page 287).
9. Using a Phillips screwdriver, remove the four screws that secure the heat-sink retention module to the system board; then, lift the heat-sink retention module from the system board.
10. If you are instructed to return the heat-sink retention module, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a heat-sink retention module

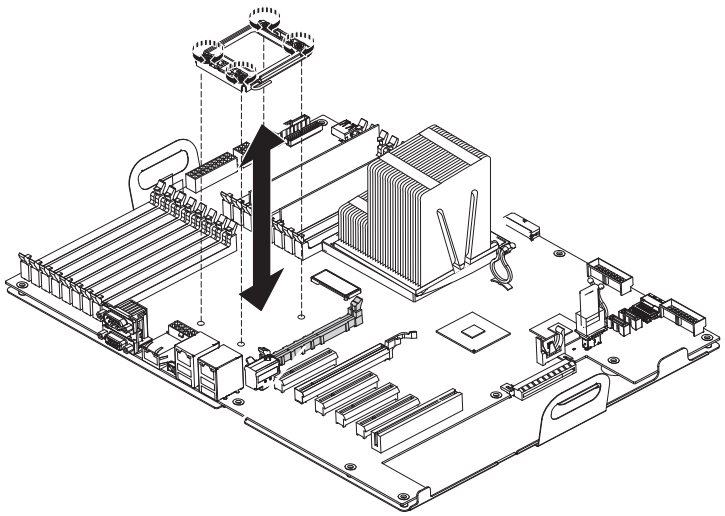


To install a heat-sink retention module, complete the following steps:

1. Place the heat-sink retention module in the microprocessor location on the system board.
2. Using a Phillips screwdriver, install the four screws that secure the module to the system board.
3. Install the heat sink (see “Installing a microprocessor and heat sink” on page 289).

   Attention: Make sure that you install each heat sink with its paired microprocessor.
4. Install the air baffle (see “Installing the air baffle” on page 218).
5. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
6. Install the power supplies (see “Installing a hot-swap power supply” on page 277).
7. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
8. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing a microprocessor retention module

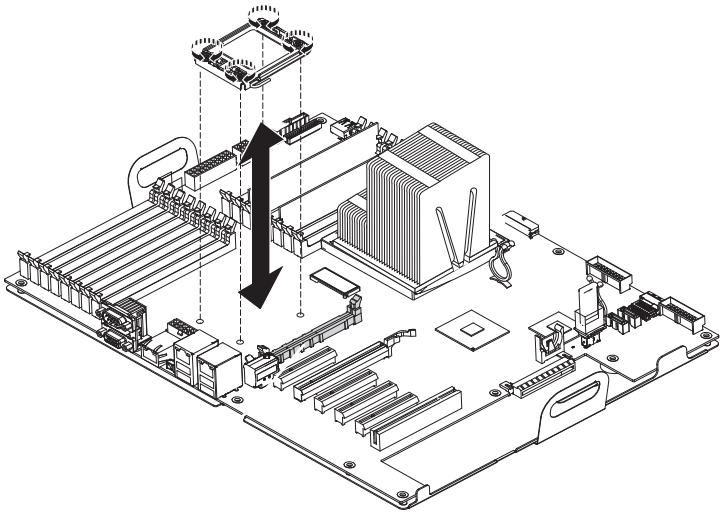


To remove a microprocessor retention module, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the side cover (see “Removing the left-side cover” on page 188).
5. Remove the power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
6. Rotate the power-supply cage to its open position (see “Opening the power-supply cage” on page 160).
7. Remove the air baffle (see “Removing the air baffle” on page 217).
8. Remove the heat sink and the microprocessor (see “Removing a microprocessor and heat sink” on page 287).
9. Using a T8 Torx screwdriver, remove the four screws that secure the microprocessor retention module to the system board; then, lift the microprocessor retention module from the system board.
10. If you are instructed to return the microprocessor retention module, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a microprocessor retention module

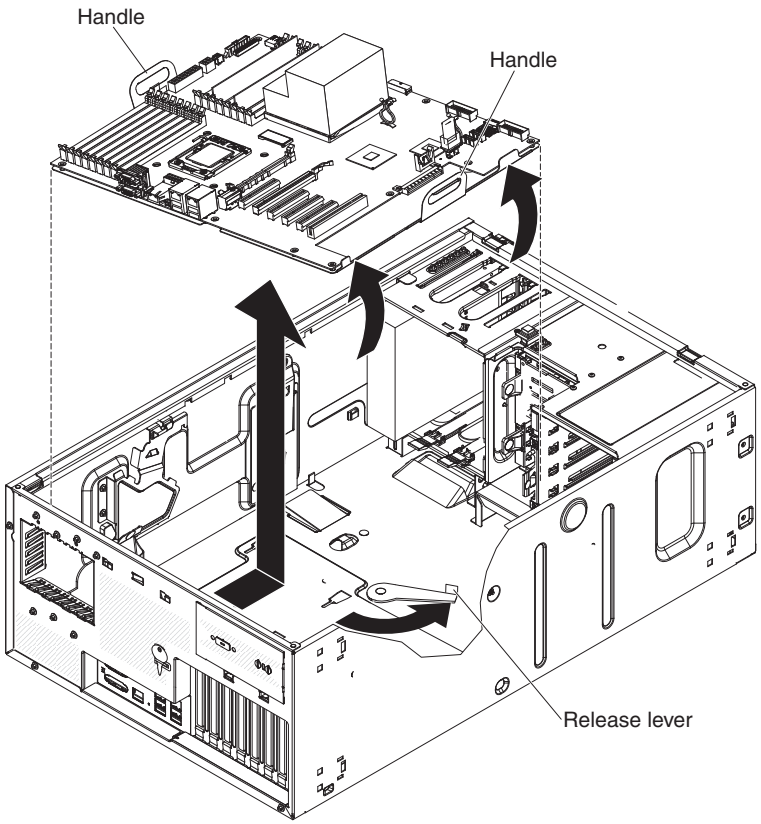


To install a microprocessor retention module, complete the following steps:

1. Orient the triangle-shaped indicator on one corner of the microprocessor retention module to the corresponding alignment triangle on the system board; then, place the retention module on the system board.
2. Using a T8 Torx screwdriver, install the four screws that secure the module to the system board.
3. Install the microprocessor and heat sink (see “Installing a microprocessor and heat sink” on page 289).

   Attention: Make sure that you install each heat sink with its paired microprocessor.
4. Install the air baffle (see “Installing the air baffle” on page 218).
5. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
6. Install the power supplies (see “Installing a hot-swap power supply” on page 277).
7. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
8. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the server.

Removing the system board



To remove the system board, complete the following steps:

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 155.
2. Turn off the server and all attached devices; then, disconnect all power cords and external cables.
3. Carefully turn the server on its side so that it is lying flat, with the cover facing up.

   Attention: Do not allow the server to fall over.
4. Unlock and remove the side cover (see “Removing the left-side cover” on page 188).
5. Remove the power supply or power supplies from the power-supply cage (see “Removing a hot-swap power supply” on page 276).
6. Rotate the power-supply cage to its open position (see “Opening the power-supply cage” on page 160).
7. Remove the air baffle (see “Removing the air baffle” on page 217).
8. Remove the fan cage assembly (see “Removing the fan cage assembly” on page 247).
9. Note where the cables are connected to the system board; then, disconnect them.

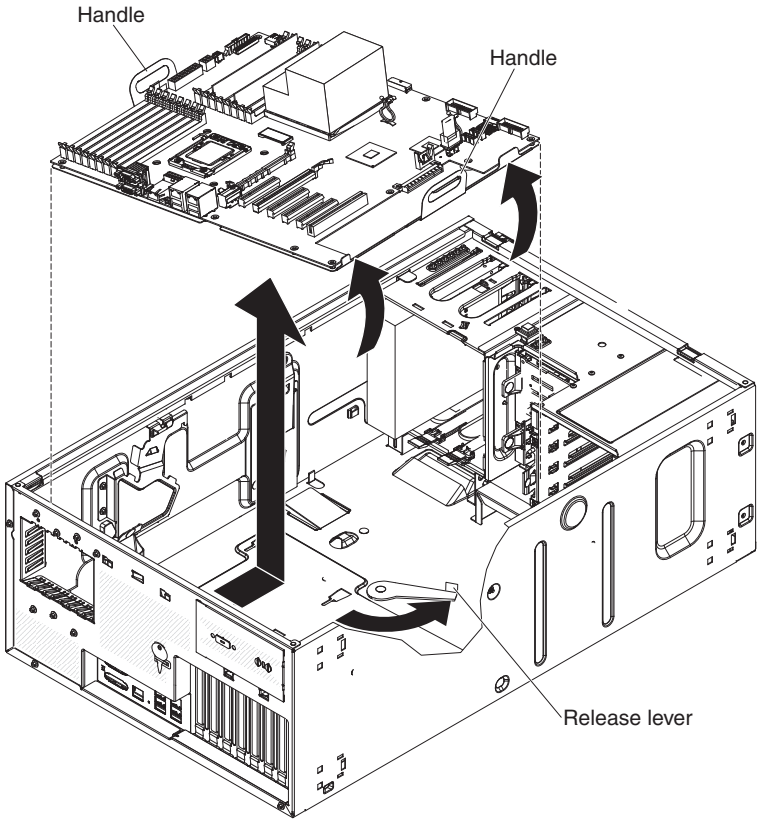
   Attention: Disengage all latches, release tabs or locks on cable connectors when you disconnect all cables from the system board (see “Internal cable routing and connectors” on page 169) for more information. Failing to release them before removing the cables will damage the cable sockets on the system board. The cable sockets on the system board are fragile. Any damage to the cable sockets may require replacing the system board.

10. Remove any of the following components that are installed on the system board and put them in a safe, static-protective place:
    - Adapters (see “Removing an adapter” on page 219).
    - Extender card (see “Removing an extender card” on page 284).
    - DIMMs (see “Removing a memory module” on page 233).
    - Microprocessors and heat sinks (see “Removing a microprocessor and heat sink” on page 287).
    - Battery (see “Removing the battery” on page 165).
    - Hypervisor (see “Removing a USB embedded hypervisor flash device” on page 238).
11. Rotate the release lever toward the front of the chassis.
12. Slide the system board toward the front of the server to disengage the tabs from the chassis; then, grasp the handles and carefully lift the system board out of the server.

    Attention: When you lift the system board out of the server, being careful neither to damage any surrounding components nor to bend the pins inside the microprocessor sockets.
13. Remove the socket dust covers from the microprocessor sockets on the new system board and place them on the microprocessor sockets of the old system board that you are removing.

    Attention: Make sure to place the socket covers for the microprocessor sockets on the system board before you return the old system board.
14. 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. Hold the system board by the handles and insert the system board into the chassis at an angle; then, slide it toward the rear of the server.

   Note: Make sure that none of the server cables are caught under the system board.
3. Press down on the retention modules; then, rotate the release lever toward the rear of the chassis to secure the system board.
4. Install any of the following components that you removed from the system board:
   - Microprocessors and heat sinks (see “Installing a microprocessor and heat sink” on page 289).
   - DIMMs (see “Installing a memory module” on page 234).
   - Extender card (see “Installing an extender card” on page 286).
   - Adapters (see “Installing an adapter” on page 220)
   - Battery (see “Installing the battery” on page 167).
   - Hypervisor (see “Installing a USB embedded hypervisor flash device” on page 239).
5. Reconnect any cables to the system board that you disconnected during removal (see “System board internal connectors” on page 15 and “Internal cable routing and connectors” on page 169).

6. Install the fan cage assembly (see “Installing the fan cage assembly” on page 248).
7. Install the air baffle (see “Installing the air baffle” on page 218).
8. Return the power-supply cage to its closed position (see “Closing the power-supply cage” on page 161).
9. Install the power supplies (see “Installing a hot-swap power supply” on page 277).
10. Install and lock the left-side cover (see “Installing the left-side cover” on page 188).
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

The following configuration programs come with the server:

- **Setup utility**

  The Setup utility (formerly called the Configuration/Setup Utility program) is part of the IBM System x Server 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 305.

- **Boot Selection Menu program**

  The Boot Selection Menu program is part of the IBM System x 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.

- **IBM *ServerGuide Setup and Installation* CD**

  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 adapter with RAID capabilities, and to simplify the installation of your operating system. For information about obtaining and using this CD, see “Using the ServerGuide Setup and Installation CD” on page 311.

- **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 the IMM, see “Using the integrated management module” on page 314.

- **VMware ESXi embedded hypervisor**

  The VMware ESXi embedded hypervisor is available on the server models that come with an installed USB embedded hypervisor flash device. The USB flash device is installed in the USB connector on the system board. Hypervisor is virtualization software that enables multiple operating systems to run on a host system at the same time. For more information about using the embedded hypervisor, see “Using the embedded hypervisor” on page 315.

- **Ethernet controller configuration**

  For information about configuring the Ethernet controller, see “Configuring the Gigabit Ethernet controller” on page 317.

- **LSI Configuration Utility**

  Use the LSI Configuration Utility to configure the integrated SAS/SATA adapter with RAID capabilities and the devices that are attached to it. For information about using this program, see “Using the LSI Configuration Utility” on page 318.

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

Table 15. 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-BR10i adapter (LSI 1068E)	LSI Utility (Setup utility, press Ctrl+H), ServerGuide	CFGGEN configuration for IBM and LSI basic and integrated RAID adapters IBM BladeCenter and System x

Table 15. 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-BR10il v2 adapter (LSI 1064E)	LSI Utility (Setup utility, press Ctrl+H), ServerGuide	CFGGEN configuration for IBM and LSI basic and integrated RAID adapters IBM BladeCenter and System x
ServeRAID-MR10i adapter (LSI 1078)	MegaRAID BIOS Configuration Utility, ServerGuide	MegaRAID Storage Manager (MSM), Director
ServeRAID-M5014 adapter (LSI SAS2108)	MegaRAID BIOS Configuration Utility, ServerGuide	MegaRAID Storage Manager (MSM), Director
ServeRAID-M5015 adapter (LSI SAS2108)	MegaRAID BIOS Configuration Utility, ServerGuide	MegaRAID Storage Manager (MSM), Director
ServeRAID-M1015 adapter (LSI SAS2008)	MegaRAID BIOS Configuration Utility, ServerGuide	MegaRAID Storage Manager (MSM), Director

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

  Use this program as an alternative to the Setup utility for modifying UEFI settings and IMM 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” on page 320.

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 from the Web. To check for the latest level of firmware, such as 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 x3500 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 firmware that is stored in memory on the device or restore the pre-existing firmware from a diskette or CD image.

- IBM System x Server Firmware code is stored in ROM on the system board.
- IMM firmware is stored in ROM on the IMM on the system board.
- Ethernet firmware is stored in ROM on the Ethernet controller.
- ServeRAID firmware is stored in ROM on the ServeRAID adapter.
- SATA firmware is stored in ROM on the integrated SATA adapter.
- SAS/SATA firmware is stored in ROM on the SAS/SATA adapter on the system board.

Using the Setup utility

Use the Setup utility, formerly called the Configuration/Setup Utility program, 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 20 seconds 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 the settings to view or change.

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.

Setup utility menu choices

The following choices are on the Setup utility main menu. 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 choices 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.

• **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. To configure memory mirroring, select **System Settings → Memory**, and then select **Memory Channel Mode → Mirroring**.

– **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, the SAS/SATA adapter, SATA optical drive channels, and PCI slots. 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 the UEFI to interact with PCI mass storage devices that are not 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. **Enabled** 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; and save the network changes.

- **Reset IMM to Defaults**

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

– **Adapters and UEFI Drivers**

  Select this choice to view information about the adapters and drivers in the server that are compliant with EFI 1.10 and UEFI 2.0.

• **Network**

  Select this choice to view or configure the network options, such as the iSCSI, PXE, and network devices. There might be additional configuration choices for optional network devices that are compliant with UEFI 2.1 and later.

• **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 the startup sequence or boot to devices. 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, 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 CD-RW/DVD drive, then checks the hard disk drive, and then checks a network adapter.

• **System Event Logs**

  Select this choice to view the system-event log and the POST event log. For more information about these logs, see “Event logs” on page 21.

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

– **POST Event Viewer**

  Select this choice to enter the POST event viewer to view the error messages in the POST event log.

– **System Event Log**

  Select this choice to view the error messages in the system-event log.

– **Clear System Event Log**

  Select this choice to clear the system-event log.

• **User Security**

Select this choice to set, change, or clear passwords. See “Passwords” on page 309 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. For more information, see “Power-on password” on page 309.

– **Clear Power-on Password**

  Select this choice to clear a power-on password. For more information, see “Power-on password” on page 309.

– **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 310.

  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.

– **Clear Administrator Password**

  Select this choice to clear an administrator password. For more information, see “Administrator password” on page 310.

- **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 can type either 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.

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.

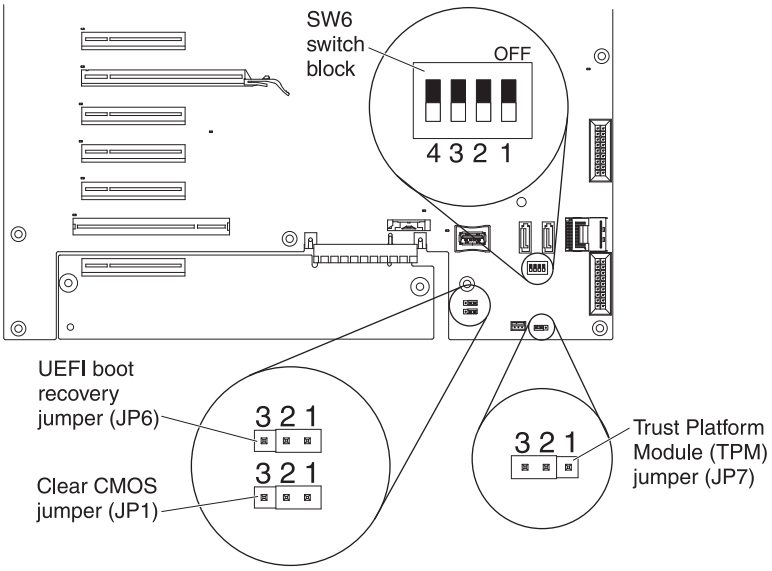
Power-on password

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 up to seven characters (A - Z, a - z, and 0 - 9) for the password.

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

- If an administrator password is set, type the administrator password at the password prompt. Start the Setup utility and reset the power-on 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.
- Change the position of the power-on password switch (enable switch 2 of the system board switch block (SW6)) to bypass the power-on password check.



Attention: Before you change any switch settings or moving any jumpers, turn off the server; then, disconnect all power cords and external cables. See the safety information that begins on page “Safety” on page vii. Do not change settings or move jumpers on any system board switch or jumper blocks that are not shown in this document.

While the server is turned off, move switch 2 of the switch block (SW6) to the On position to enable the power-on password override. You can then start the server, run the Setup utility, and reset the power-on password. You do not have to return the switch to the previous position.

The power-on password override switch does not affect the administrator password.

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, you must type the administrator password for access to the full Setup utility menu. You can use any combination of up to seven characters (A - Z, a - z, and 0 - 9) 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 Selection Menu program

The Boot Selection Menu program is used to temporarily redefine the first startup device without changing boot options or settings in the Setup utility.

To use the Boot Selection Menu program, complete the following steps:

1. Turn off the server.
2. Restart the server.
3. Press F12 (**Select Boot Device**). 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 IBM System x Server Firmware (server firmware). This is a secondary copy of server firmware that you update only during the process of updating 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 UEFI boot recovery jumper (JP6) 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 UEFI boot recovery JP6 jumper back to the primary position (pins 1 and 2).

Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD contains a setup and installation program that is designed for your server. The ServerGuide program detects the server model and optional hardware devices 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.

You can download a free image of the *ServerGuide Setup and Installation* CD or purchase the CD from the ServerGuide fulfillment Web site at http://www.ibm.com/systems/management/serverguide/sub.html. To download the free image, click **IBM Service and Support Site**.

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

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 or integrated SCSI controller with RAID capabilities
- Device drivers that are provided for the 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 RAID configuration program (with LSI chip sets for ServeRAID adapters only)
- Checks the microcode (firmware) levels of a ServeRAID adapter and determines whether a later level is available from the CD
- Detects installed optional hardware devices 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 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 integrated SCSI controller with RAID capabilities, you can run the SCSI 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?lndocid=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 adapters, 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 x3500 M3**.
6. From the **Operating system** menu, select your operating system, and then click **Search** to display the available installation documents.

Changing the Power Policy option to the default settings after loading UEFI defaults

The default settings for the Power Policy option are set by the IMM. To change the Power Policy option to the default settings, complete the following steps:

1. Turn on the server.

   Note: Approximately 20 seconds 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 **System Settings → Integrated Management Module → Reset IMM to Defaults**.
4. Wait several minutes while IMM initializes all of the default values.
5. Go back and check the Power Policy setting to verify that it is set to **Restore** (the default).

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 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 remote presence function in a single chip.

The IMM supports the following basic systems-management features:

- Active Energy Manager.
- Alerts (in-band and out-of-band alerting, PET traps - IPMI style, SNMP, e-mail).
- Auto Boot Failure Recovery.
- Automatic Server Restart (ASR) when POST is not complete or the operating system hangs and the OS watchdog timer times out. The IMM might be configured to watch for the OS watchdog timer and restart the server after a timeout, if the ASR feature is enabled. Otherwise, the system administrator can generate an NMI by pressing an NMI button on the system board for an operating-system memory dump. ASR is supported by IPMI.
- Boot sequence manipulation.
- Command-line interface.
- Configuration save and restore.
- 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.
- Environmental monitor with fan speed control for temperature, voltages, fan failure, and power supply failure.
- Intelligent Platform Management Interface (IPMI) Specification V2.0 and Intelligent Platform Management Bus (IPMB) support.
- Invalid system configuration (CNFG) LED support.
- Light path diagnostics LEDs to report errors that occur with fans, power supplies, microprocessor, hard disk drives, and system errors.
- NMI detection and reporting.
- Operating-system failure blue screen capture.
- PCI configuration data.
- PECI 2 support.
- Power/reset control (power-on, hard and soft shutdown, hard and soft reset, schedule power control).
- Query power-supply input power.
- ROM-based IMM firmware flash updates.
- Serial redirect.
- Serial over LAN (SOL).
- System-event log.
- When one of the two microprocessors reports an internal error, the server disables the defective microprocessor and restarts with the one good microprocessor.

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 embedded hypervisor

The VMware ESXi embedded hypervisor is available on server models that come with an installed USB embedded hypervisor flash device. The USB flash device comes installed in the USB connector on the system board. Hypervisor is virtualization software that enables multiple operating systems to run on a host system at the same time. The USB flash device is required to activate the hypervisor functions.

To start using the embedded hypervisor functions, you must add the USB flash device to the boot order in the Setup utility.

To add the USB flash device to the boot order, complete the following steps:

1. Turn on the server.

   Note: Approximately 20 seconds after the server is connected to AC power, the power-control button becomes active.
2. When the prompt `<F1> Setup` is displayed, press F1.
3. From the Setup utility main menu, select **Boot Manager**.
4. Select **Add Boot Option**; then, select **Embedded Hypervisor**. Press Enter, and then select Esc.
5. Select **Change Boot Order** and then select **Commit Changes**; then, press Enter.
6. Select **Save Settings** and then select **Exit Setup**.

If the embedded hypervisor flash device image becomes corrupt, you can use the *VMware Recovery* CD that comes with the system to recover the flash device image. To recover the flash device image, complete the following steps:

1. Turn on the server.

   Note: Approximately 20 seconds after the server is connected to AC power, the power-control button becomes active.
2. Insert the VMware Recovery CD into the DVD drive.
3. Follow the instructions on the screen.

For additional information and instructions, see the *VMware ESXi Server 3i Embedded Setup Guide*

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).

The remote presence feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1600 x 1200 at 85Hz, regardless of the system state
- Remotely accessing the server, using the keyboard and mouse from a remote client
- Mapping the CD or 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.

Obtaining the IP address for the Web interface access

To access the Web interface and use the remote presence feature, you need the IP address for the IMM. You can obtain the IMM IP address through the Setup utility. To locate the IP address, complete the following steps:

1. Turn on the server.

   Note: Approximately 20 seconds 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 both a power-on password and an administrator password, you must type the administrator password to access the full Setup utility menu.

   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.
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 on to 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.

   Notes:

   a. If you are logging on to the IMM for the first time after installation, the IMM defaults to DHCP. If a DHCP host is not available, the IMM uses the default static IP address 192.168.70.125.

   b. You can obtain the DHCP-assigned IP address or the static IP address from the server UEFI or from your network administrator.

   The Login page is displayed.

2. 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 the system administrator. All login attempts are documented in the event log. A welcome page opens in the browser.

   Note: The IMM is set initially with a user name of USERID and password of PASSW0RD (passw0rd with a zero, not the letter O). You have read/write access. For enhanced security, change this default password during the initial configuration.
3. On the Welcome page, type a timeout value (in minutes) in the field that is provided. The IMM logs you off 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 browser opens the System Status page, which displays the server status and the server health summary.

Enabling the Broadcom Gigabit Ethernet Utility

The Broadcom Gigabit Ethernet Utility 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. Enable and disable the Broadcom Gigabit Ethernet Utility from the Setup utility.

To enable the Broadcom Gigabit Ethernet Utility, 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 main menu and select **Save Settings**.

Configuring the Gigabit Ethernet controller

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

You do not have to set any jumpers or configure the controllers. However, you must install a device driver to enable the operating system to address the controllers. To find updated information about configuring the controllers, 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 x3500 M3** and click **Go**.

Using the LSI Configuration Utility

Use the LSI Configuration Utility program to configure and manage redundant array of independent disks (RAID) arrays. 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 adapter with RAID capabilities supports RAID arrays. You can use the LSI Configuration Utility to configure RAID 1 (IM), RAID 1E (IME), and RAID 0 (IS) for a single pair of attached devices. 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, consider the following information:

- The integrated SAS/SATA adapter 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. 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. 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 adapter treats them as if they all have the capacity of the smallest hard disk drive.
- If you use an integrated SAS/SATA adapter 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 adapter, see the documentation that comes with the adapter for information about viewing and changing settings for attached devices.

Starting the LSI Configuration Utility program

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

1. Turn on the server.

   Note: Approximately 20 seconds 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 **System Settings → Adapters and UEFI drivers**.
4. Select **Please refresh this page first** and press Enter.
5. To perform storage-management tasks, see the SAS adapter documentation, which you can download from the disk adapter and RAID software matrix:
   a. Go to http://www.ibm.com/systems/support/.
   b. Under **Product support**, click **System x**.
   c. Under **Popular links**, click **Storage Support Matrix**.

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.

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 adapter (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 hard disk drives, complete the following steps:

1. From the list of adapters, select the adapter (channel) for which you want to create an array.
2. Select **RAID Properties**.
3. Select the type of array that you want to create.
4. In the RAID Disk column, use the Spacebar or Minus (-) key to select **Yes** (select) or **No** (deselect) to select or deselect a drive from a RAID disk.
5. Continue to select drives, using the Spacebar or Minus (-) key, until you have selected all the drives for your array.
6. Press C to create the disk array.
7. Select **Save changes then exit this menu** to create the array.
8. Exit the Setup utility.

IBM Advanced Settings Utility

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 server 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.
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 PASSW0RD (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 PASSW0RD (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.
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 aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa`, where *aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa* 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 PASSW0RD (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.

  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 PASSW0RD (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.

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Using the documentation

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Appendix B. Notices

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Important notes

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

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

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.

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

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Particulate contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server that is described in this document. Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the server to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If IBM determines that the levels of particulates or gases in your environment have caused damage to the server , IBM may condition provision of repair or replacement of servers or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 16. Limits for particulates and gases

Contaminant	Limits
Particulate	• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2[1]. • 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	• Copper: Class G1 as per ANSI/ISA 71.04-1985[3] • Silver: 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.

Documentation format

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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This product is not intended to be connected directly or indirectly by any means whatsoever to interfaces of public telecommunications networks, nor is it intended to be used in a public services network.

Electronic emission notices

Note: When attaching a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices supplied with the monitor.

Federal Communications Commission (FCC) statement

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

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

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

Industry Canada Class A emission compliance statement

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Avis de conformité à la réglementation d'Industrie Canada

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

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914-499-1900

European Community contact:
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IBM-Allee 1, 71137 Ehningen, Germany
Telephone: +49 7032 15-2937
Email: tjahn@de.ibm.com

Germany Class A statement

Deutschsprachiger EU Hinweis:

Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

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Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

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Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:

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Der verantwortliche Ansprechpartner des Herstellers in der EU ist:

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IBM-Allee 1, 71137 Ehningen, Germany
Telephone: +49 7032 15-2937
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Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

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高調波ガイドライン適合品

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