IBM System x3755 M3 Type 7164

# Problem Determination and Service Guide

IBM System x3755 M3 Type 7164

# Problem Determination and Service Guide

**Note:** Before using this information and the product it supports, read the general information in “Notices” on page 257, the *IBM Safety Information* and *Environmental Notices and User Guide* documents on the *Documentation* CD, and the *Warranty Information* document.

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

**Sixth Edition (January 2012)**

# 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 optional devices that are not addressed in this section. If you identify an unsafe condition, you must determine how serious the hazard is and whether you must correct the problem before you work on the product.

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

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

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

1. Make sure that the power is off and the power cord is disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cord:
   - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
   - Make sure that the power cord is the correct type, as specified in “Power cords” on page 147.
   - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

## Guidelines for servicing electrical equipment

Observe the following guidelines when you service electrical equipment:

- Check the area for electrical hazards such as moist floors, nongrounded power extension cords, 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 work with powered-on electrical equipment, use only one hand. Keep the other hand in your pocket or behind your back to avoid creating a complete circuit that could cause an electrical shock.
  - When you use a tester, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on a suitable rubber mat to insulate you from grounds such as metal floor strips and equipment frames.
- Use extreme care when you measure high voltages.
- To ensure proper grounding of components such as power supplies, pumps, blowers, fans, and motor generators, do not service these components outside of their normal operating locations.
- If an electrical accident occurs, use caution, turn off the power, and send another person to get medical aid.

## Safety statements

**Important:**

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

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

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

**Statement 1:**

**DANGER**

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

**To avoid a shock hazard:**

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

| **To Connect:** | **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 15F8409 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.**

*Do not:*

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

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

**Statement 3:**

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

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

**DANGER**

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

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

**Statement 4:**

≥ 18 kg (39.7 lb)

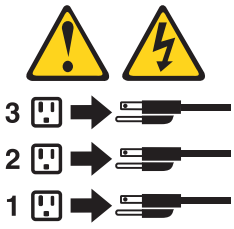
≥ 32 kg (70.5 lb)

≥ 55 kg (121.2 lb)

**CAUTION:**
**Use safe practices when lifting.**

**Statement 5:**

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



**Statement 8:**

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

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

**Statement 26:**

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

**Statement 27:**

**CAUTION:**
**Hazardous moving parts are nearby.**

**Important:** This product is not suitable for use with visual display workplace devices according to Clause 2 of the German Ordinance for Work with Visual Display Units.

**Statement 35:**


**CAUTION:**
**Hazardous energy present. Voltages with hazardous energy might cause heating when shorted with metal, which might result in splattered metal, burns, or both.**

**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.

**Important:** Maschinenlärminformations-Verordnung - 3. GPSGV, der höchste Schalldruckpegel beträgt 70 dB(A) oder weniger.

**United Kingdom - Notice to Customers:**

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

# 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 website. 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:

   - Hardware components
   - Device drivers and firmware
   - System software
   - IBM System x Server Firmware (server firmware)
   - System input power or network connections

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

2. **View the light path diagnostics LEDs and event logs.**

   The server is designed for ease of diagnosis of hardware and software problems.

   - **Light path diagnostics LEDs:** See “Light path diagnostics” on page 47 for information about light path diagnostics LEDs that are lit and actions that you should take.
   - **Event logs:** See “Event logs” on page 24 for information about notification events and diagnosis.
   - **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 website for documentation.

3. **Run IBM Dynamic System Analysis (DSA) and 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 DSA, see the *Dynamic System Analysis Installation and User's Guide*.

   To download the latest version of DSA code and the *Dynamic System Analysis Installation and User's Guide*, go to http://www.ibm.com/support/entry/portal/docdisplay?brand=5000008&lndocid=SERV-DSA.

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

   Fixes or workarounds for many problems might be available in updated IBM System x Server Firmware, device firmware, or device drivers.

   **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.

a. **Install Update*Xpress* system updates.**

   You can install code updates that are packaged as an Update*Xpress* System Pack or Update*Xpress* CD image. For more information, see “Updating the firmware” on page 235.

   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 (see step 4b).

b. **Install manual system updates.**

   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.**

      For information about updating the firmware, see “Updating the firmware” on page 235.

5. **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.

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

      See http://www.ibm.com/systems/info/x86servers/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.

   b. **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 procedures” on page 33. For information about configuring the server, see “Configuring the server” on page 235.

6. **See controller and management software documentation.**

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

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

   For problems with operating systems or IBM software or devices, go to http://www.ibm.com/supportportal/.

7. **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, go to http://www.ibm.com/supportportal/.

8. **Use the troubleshooting tables.**

   See “Troubleshooting tables” on page 35 to find a solution to a problem that has identifiable symptoms.

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/entry/portal/Open_service_request/. 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/entry/portal/Open_service_request/. 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 x3755 M3 Type 7164 server. It describes the diagnostic tools that come with the server, error codes and suggested actions, and instructions for replacing failing components.

For information about the terms of the warranty and getting service and assistance, see the *IBM Warranty Information* document that came with your server. For information about getting service and assistance, see "Getting help and technical assistance" on page 255.

## Related documentation

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

- *Installation and User's Guide*

  This document is in Portable Document Format (PDF) on the IBM *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.
- *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.
- *IBM Warranty Information*

  This printed document contains the warranty terms and a pointer to the IBM Statement of Limited Warranty on the IBM website.
- *Environmental Notices and User 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 server.

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

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

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

These updates are available from the IBM website. To check for updated documentation and technical updates, go to http://www.ibm.com/supportportal/.

## 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 *Documentation* CD. Each statement is numbered for reference to the corresponding statement in your language 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.

**Notes:**

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

*Table 1. Features and specifications*

**Microprocessor:**
- AMD Opteron
- Discrete Level-1 and Level-2 cache for each core
- Shared Level-3 cache
- Support up to two or four multi-core microprocessors

**Note:** Use the Setup utility to determine the type and speed of the microprocessors.

**Memory:**
- 32 DIMM connectors (eight per microprocessor)
- Type: Registered or unbuffered, ECC, PC3-10600, DDR-3, SDRAM
- Sizes:
  - 2 GB and 4 GB unbuffered DIMMs (UDIMMs)
  - 2 GB, 4 GB, 8 GB, and 16 GB registered DIMMs (RDIMMs)
- Minimum: 4 GB
- Maximum: 512 GB

**Optical drives (Optional):**
- Slim CD/DVD-ROM
- Multi-drive

**Expansion bays:**
- Up to eight 3.5-inch hot-swap hard disk drive bays
- Up to six 3.5-inch simple-swap hard disk drive bays

**PCI Expansion slots:**
- One PCI Express x16 slot (full-length, full-height)
- One PCI Express x8 slot (half-length, low-profile)
- One PCI Express x4 slot (half-length, low-profile)
- One PCI Express x8 internal slot (half-length, low-profile)

**RAID (depending on the model):**
- ServeRAID-BR10il SAS/SATA adapter v2 that provides RAID levels 0, 1, and 1E on simple-swap models
- ServeRAID-M1015 SAS/SATA adapter that provides RAID levels 0, 1, and 10 with optional RAID 5/50 and SED (Self Encrypting Drive) upgrade
- ServeRAID-M5014 SAS/SATA adapter that provides RAID levels 0, 1, 5, 10, and 50 with optional RAID 6/60 and SED upgrade
- ServeRAID-M5015 SAS/SATA adapter that comes with a battery and provides RAID levels 0, 1, 5, 10, and 50 with optional RAID 6/60 and SED upgrade

**Upgradeable microcode:**

System UEFI, FPGA, diagnostics, service processor, iBMC, and SAS microcode

**Power supply:**
- Standard: One or two dual-rated power supplies (depending on the model)
- Maximum of three 1100-watt ac (at 100 or 240 V ac) hot-swap power supplies for N+N or N+1 redundancy support (depending on configuration)

**Size:**
- 2U
- Height: 87 mm (3.43 in.)
- Depth: 727.5 mm (28.64 in.), without front panel; 747 mm (29.41 in.) with front panel
- Width: 446 mm (17.56 in.), without rack EIA bracket; 482 mm (18.98 in.) with rack EIA bracket
- Weight: approximately 22 kg (48.6 lb) to 33 kg (72.7 lb) depending on your configuration

**Integrated functions:**
- Integrated baseboard management controller (iBMC), which provides service processor control and monitoring functions, video controller, and remote keyboard, video, mouse, and remote hard disk drive capabilities
- Light path diagnostics
- Five Universal Serial Bus (USB) ports (2.0)
  - Two on rear of server
  - Two on front of server
  - One internal
- Two Broadcom 5709 dual 10/100/1000 MB Ethernet controllers
- AST2050 video
  - 8 MB video memory
  - SVGA compatible
- Serial-attached SCSI (SAS) controller with RAID capabilities
- Serial connector

**Acoustical noise emissions:**
- Sound power, idle: 6.6 bel declared
- Sound power, operating: 6.6 bel declared

**Airflow:**
- Nominal airflow: 54 cubic feet per minute (CFM)
- Typical airflow: 64 CFM
- Maximum airflow: 168 CFM

**Fans:**
- Up to five system fans
- Single-motor (nonredundant) or dual-motor (redundant) depending on the model

**Environment:**
- Air temperature:
  - Server on:
    - 10°C to 35°C (50°F to 95°F); altitude: 0 to 914 m (3000 ft).
    - 10°C to 32°C (50°F to 90°F); altitude: 914 to 2133 m (7000 ft).
  - Server off: 10°C to 43°C (50.0°F to 109.4°F); maximum altitude: 2133 m (7000 ft).
- Humidity:
  - Server on: 8% to 80%
  - Server off: 8% to 80%
- Particulate contamination:

  **Attention:** Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. For information about the limits for particulates and gases, see “Particulate contamination” on page 259.

**Heat output:**

Approximate heat output:
- Minimum configuration: 648 Btu per hour (190 watts)
- Typical configuration: 3753 Btu per hour (1100 watts)
- Design maximum configuration:
  - 5971 Btu per hour (1930 watts) at 110 V ac
  - 6739 Btu per hour (2150 watts) at 220 V ac

**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: 0.20 kVA
  - Typical: 1.12 kVA
  - Maximum: 1.95 kVA (110 V ac)
  - Maximum: 2.17 kVA (220 V ac)

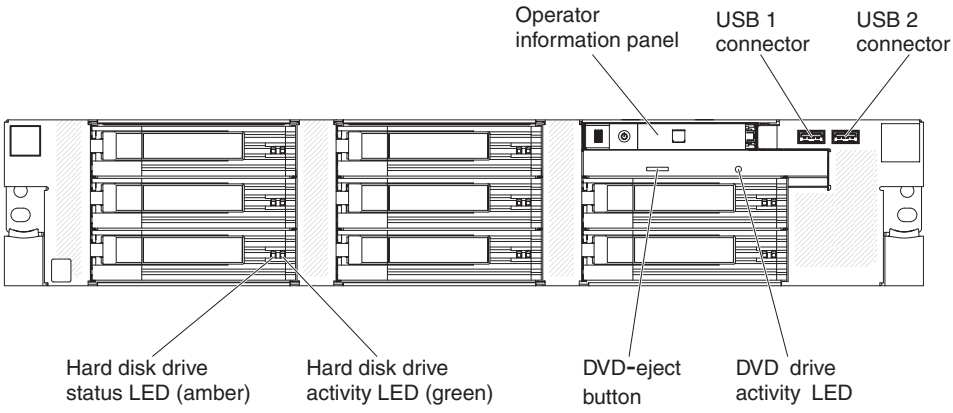
## Server controls, connectors, LEDs, and power

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

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

## Front view

The following illustration shows the controls, LEDs, and connectors on the front of the server. The DVD drive is optional in some models.




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

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

**USB connectors:** Connect USB devices to these connectors.

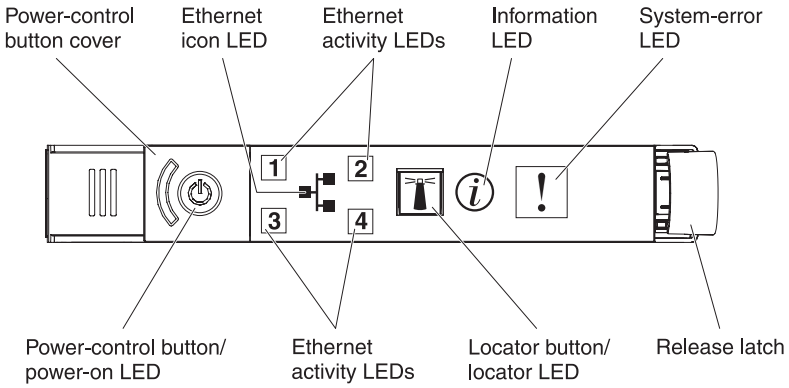
**Operator information panel:** This panel contains controls and LEDs that provide information about the status of the server. See “Operator information panel” on page 10 for more information about the light path diagnostics.

**Hard disk drive activity LED:** Each hot-swap hard disk drive has an activity LED. When this LED is flashing, it indicates that the drive is in use.

**Hard disk drive status LED:** Each hot-swap hard disk drive has a status LED. When this LED is lit, it indicates that the drive has failed. If an optional IBM ServeRAID controller 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 controller is identifying the drive.

## Operator information panel

The following illustration shows the controls and LEDs on the operator information panel.




The following controls and LEDs are on the operator information panel:

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

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

  **Flashing rapidly (4 times per second):** The server is turned off and is not ready to be turned on. The power-control button is disabled. Approximately 1 minute 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.

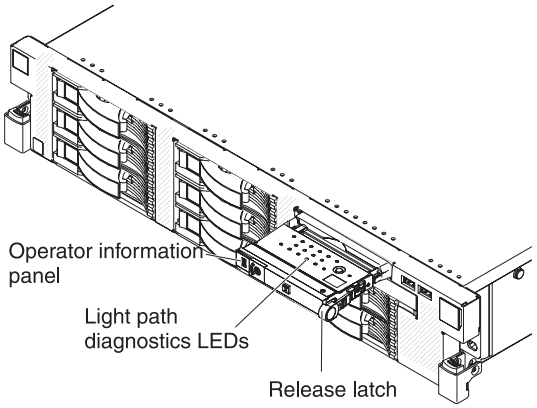
  **Fading on and off:** The server is in a reduced-power state. To wake the server, press the power-control button or use the iBMC web interface. For information about logging on to the iBMC web interface, see “Logging on to the web interface” on page 246.

  **Note:** Approximately 1 minute after the server is turned on, the screen displays the boot process status. Depending on your server configuration, the operating system welcome screen displays after 1 - 3 minutes.
- **Ethernet icon LED:** This LED lights the Ethernet icon.
- **Information LED:** When this LED is lit, it indicates that a noncritical event has occurred. Check the system-event log for additional information. See “Event logs” on page 24 for information about the event logs.
- **System-error LED:** When this LED is lit, it indicates that a system error has occurred. An LED on the light path diagnostics panel is also lit to help isolate the error.
- **Locator button and locator LED:** Use this LED to visually locate the server among other servers. Press this button to turn on or turn off this LED locally. You can use IBM Systems Director to light this LED remotely
- **Ethernet port activity LEDs:** When one of these LEDs is lit, it indicates that the server is transmitting to or receiving signals from the Ethernet LAN that is connected to the Ethernet port that corresponds to that LED.

## Light path diagnostics panel

The light path diagnostics panel is on the top of the operator information panel.

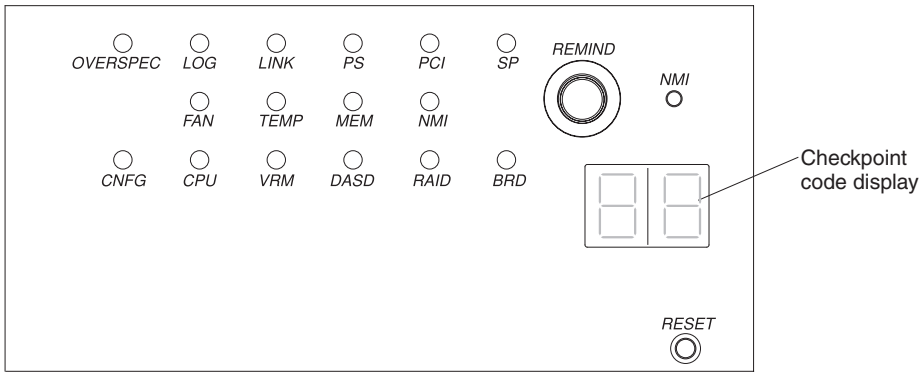
To access the light path diagnostics panel, slide the blue release button on the operator information panel to the left. Pull forward on the operator information panel until the hinge of the panel is free of the server chassis. Then pull down on the operator information panel, so that you can view the light path diagnostics panel information.




The following illustration shows the controls and LEDs on the light path diagnostics panel.

**Notes:**

1. For optimum fan speed, do not run the server for more than 10 minutes while the light path diagnostics panel is pulled out of the server.
2. Light path diagnostics LEDs remain lit only while the server is connected to power.



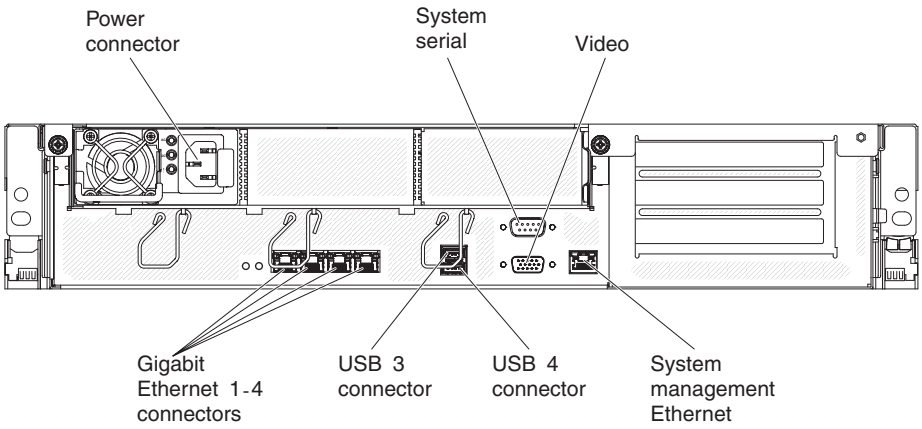

- **Remind button:** This button places the system-error LED on the front panel into Remind mode. In Remind mode, the system-error LED flashes once every 2 seconds.

  By placing the system-error LED indicator in Remind mode, you acknowledge that you are aware of the last failure but will not take immediate action to correct the problem. The remind function is controlled by the iBMC.
- **NMI button:** Press this button to force a nonmaskable interrupt to the microprocessor, if you are directed by IBM service.
- **Checkpoint code display:** This display provides a checkpoint code that indicates the point at which the server stopped during the boot block and POST. A checkpoint code is either a byte or a word value that is produced by UEFI. The display does not provide error codes or suggest components to be replaced.

- **Reset button:** Press this button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button. The reset button is in the lower-right corner of the light path diagnostics panel.

## Rear view

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




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

**System-management Ethernet connector:** Use this connector to connect the server to a network for systems-management information control. This connector is used only by the integrated baseboard management controller (iBMC).

**USB connectors:** Connect USB devices, such as a USB mouse or keyboard, to these connectors.

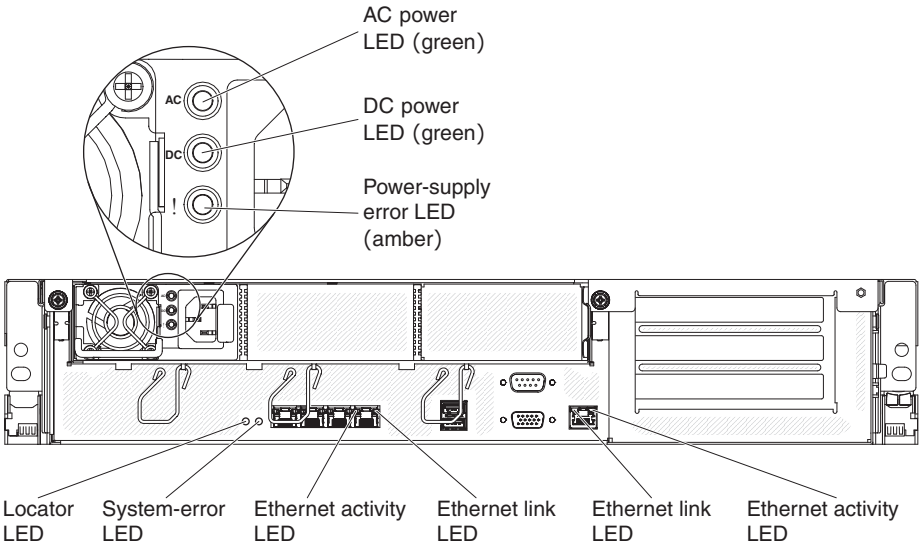
**Video connector:** Connect a monitor to this connector.

**Serial connector:** Connect a 9-pin serial device to this connector. The serial port is shared with the integrated baseboard management controller (iBMC). The iBMC can take control of the shared serial port to perform text console redirection and to redirect serial traffic, using Serial over LAN (SOL).

**Gigabit Ethernet connectors:** Use these connectors to connect the server to a network. When you enable shared Ethernet for iBMC in the Setup utility, you can access the iBMC using either the Ethernet 1 or the system-management Ethernet connector.

## Rear view LEDs

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




**AC power LED:** Each hot-swap power supply has an ac power LED and a dc power LED. When the ac power LED is lit, it indicates that sufficient power is coming into the power supply through the power cord. During typical operation, both the ac and dc power LEDs are lit. For any other combination of LEDs, see “Power-supply LEDs” on page 56.

**DC power LED:** Each hot-swap power supply has a dc power LED and an ac power LED. When the dc power LED is lit, it indicates that the power supply is supplying sufficient dc power to the system. During typical operation, both the ac and dc power LEDs are lit. For any other combination of LEDs, see “Power-supply LEDs” on page 56.

**Power-supply error LED:** When the power-supply error LED is lit, it indicates a problem with the power supply.

**Ethernet activity LEDs:** When these LEDs are lit, they indicate that the server is transmitting to or receiving signals from the Ethernet LAN that is connected to the Ethernet port.

For the system-management port, this LED is on to indicate that there is an active link connection on the 100BASE-T. When this LED is off, this indicates an active link connection on the 10BASE-TX interface.

**Ethernet link LEDs:** When these LEDs are lit, they indicate that there is an active link connection on the 10BASE-T, 100BASE-TX, or 1000BASE-TX interface for the Ethernet port.

**System-error LED:** When this LED is lit, it indicates that a system error has occurred. An LED on the light path diagnostics panel is also lit to help isolate the error. This LED is functionally equivalent to the system-error LED on the front of the server.

**Locator LED:** Use this LED to visually locate the server among other servers. You can use IBM Systems Director to light this LED remotely. This LED is functionally equivalent to the locator LED on the front of the server.

## Server power features

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

### Turning on the server

Approximately 1 minute after the server is connected to ac power, the power-control button becomes active, and one or more fans might start running to provide cooling while the server is connected to power. You can turn on the server and start the operating system by pressing the power-control button.

**Note:** Approximately 1 minute after the server is turned on, the screen displays the boot process status. Depending on your server configuration, the operating system welcome screen displays after 1 - 3 minutes.

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

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

**Note:** Some memory is reserved for various system resources and is unavailable to the operating system. The amount of memory that is reserved for system resources depends on the operating system, the configuration of the server, and the configured PCI options.

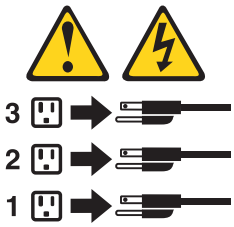
### Turning off the server

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

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

**Statement 5:**

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




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

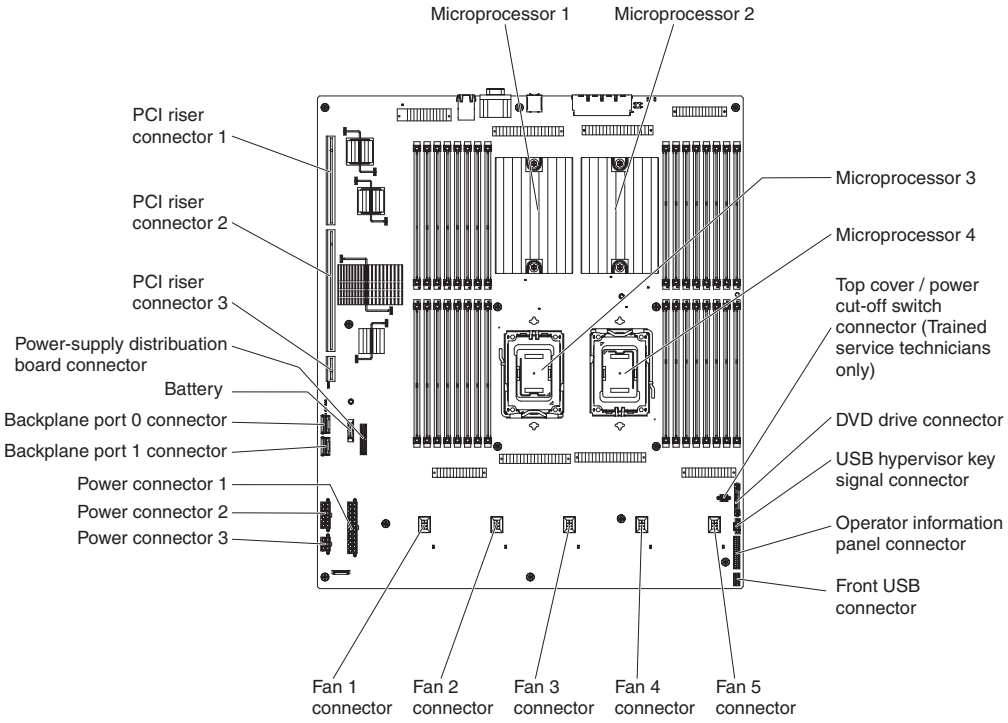
- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn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

## Internal LEDs, connectors, and jumpers

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

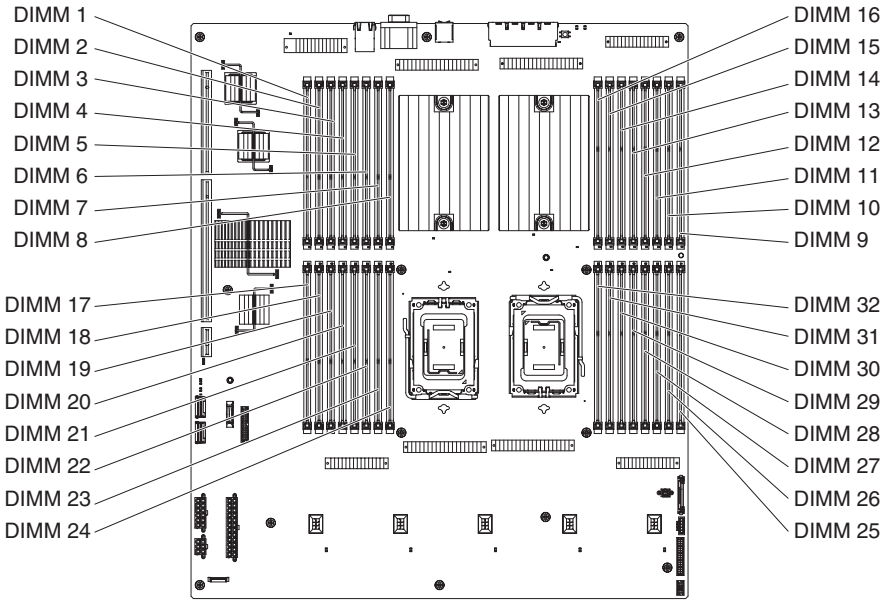
## System-board internal connectors

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



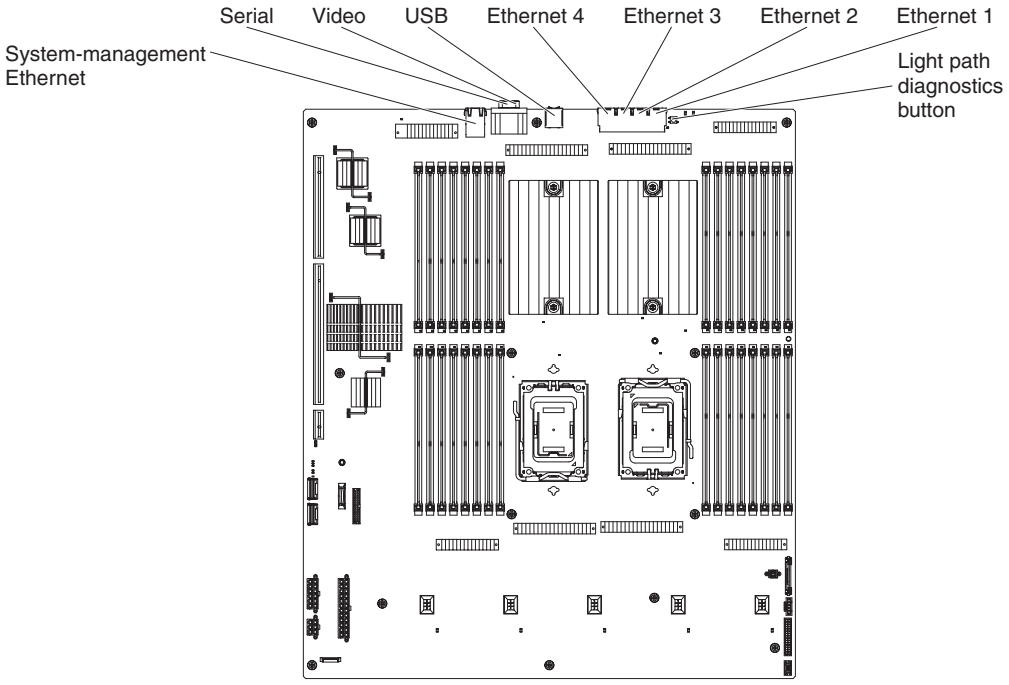
## System-board DIMM connectors

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



## System-board external connectors

The following illustration shows the external connectors and the light path diagnostics button on the system board.



## System-board jumpers

The following illustration shows the jumpers on the system board.

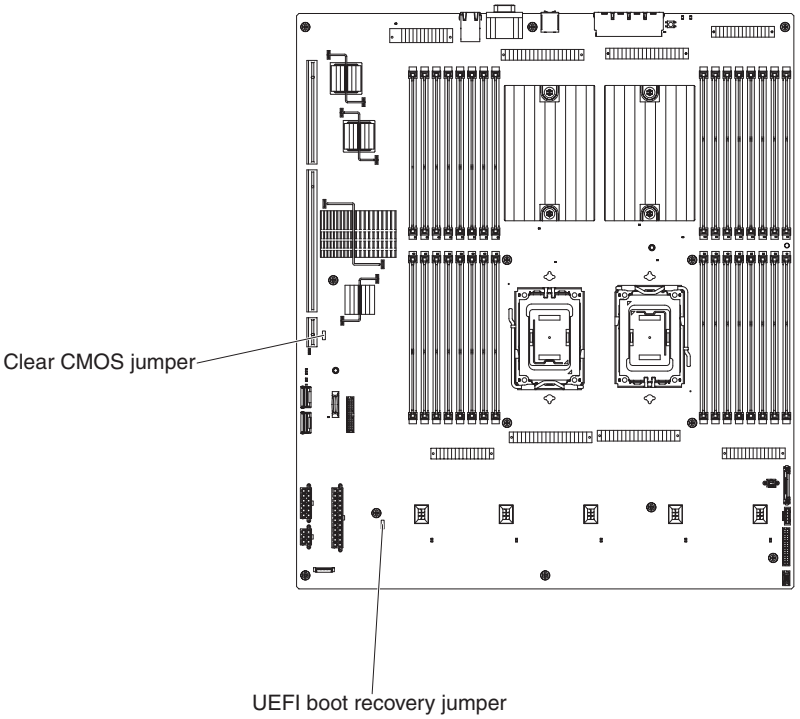



Table 2 describes the function of each jumper block.

*Table 2. System-board jumpers*

| Jumper number | Jumper name | Jumper setting |
|---|---|---|
| J57 | Clear CMOS jumper | • Pins 1 and 2: Normal (default) - This keeps the CMOS data.<br>• Pins 2 and 3: This clears the CMOS data such as power-on password and administrator password, and loads the default UEFI settings.<br>**Notes:**<br>1. If the clear CMOS jumper did not reset the system date and time, use the clear CMOS jumper again to load the default settings.<br>2. You may also use the Advanced Settings Utility (ASU) to load the default UEFI settings (see “IBM Advanced Settings Utility program” on page 248). |

*Table 2. System-board jumpers (continued)*

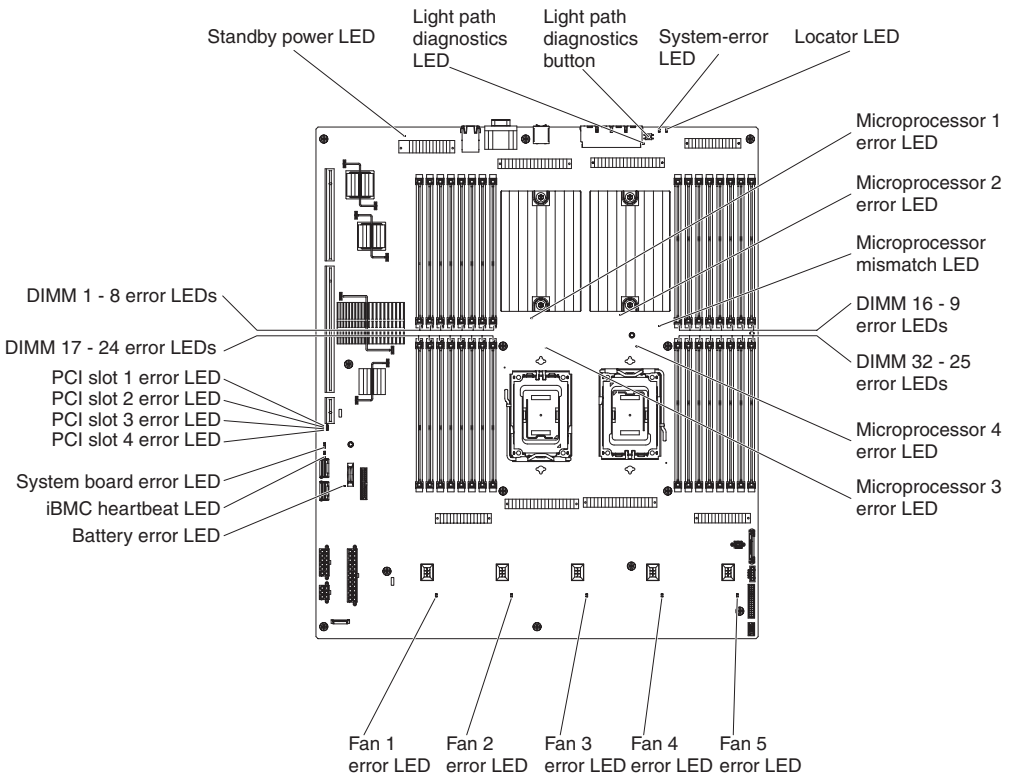
| Jumper number | Jumper name | Jumper setting |
|---|---|---|
| J117 | UEFI boot recovery jumper | • Pins 1 and 2: Normal (default) Loads the primary UEFI firmware ROM page.<br>• Pins 2 and 3: Loads the secondary (backup) UEFI firmware ROM page. |
| Notes:<br>• If no jumper is present, the server responds as if a jumper is on pins 1 and 2.<br>• Changing the position of the UEFI boot recovery jumper from pins 1 and 2 to pins 2 and 3 before the server is turned on sets the UEFI recovery process. Do not change the jumper pin position after the server is turned on. This can cause an unpredictable problem. | | |

## System-board LEDs

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

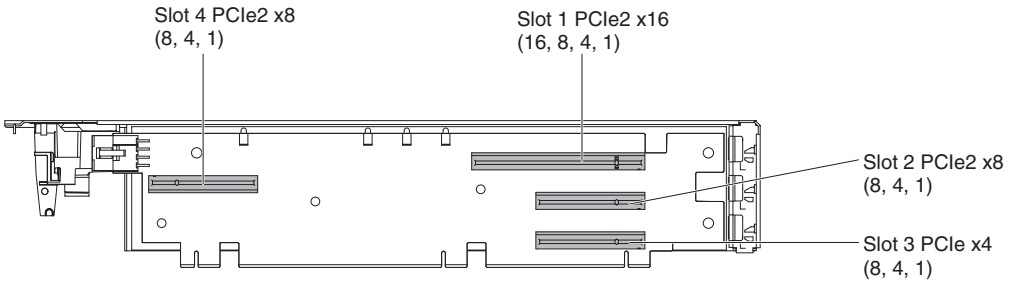
**Notes:**

1. Error LEDs remain lit only while the server is connected to power. If you disconnect power to the server, you can press and hold the light path diagnostics button to light the error LEDs on the system board.
2. You can also view the error LED status on the fan cage and the PCI riser-card assembly.



## PCI riser-card adapter connectors

The following illustration shows the connectors on the PCI riser cards for user-installable PCI adapters.



# 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 “Getting help and technical assistance” on page 255 for more information.

## Diagnostic tools

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

- **Light path diagnostics**

  Use light path diagnostics to diagnose system errors quickly. See “Light path diagnostics” on page 47 for more information.

- **Dynamic System Analysis**

  Dynamic System Analysis (DSA) collects and analyzes system information to aid in diagnosing server problems. DSA collects the following information about the server:
  - Drive health information
  - Event logs for service processors
  - Hardware inventory, including PCI and USB information
  - Installed applications and hot fixes
  - Kernel modules
  - Light path diagnostics status
  - Network interfaces and settings
  - Service processor (integrated baseboard management controller) status and configuration
  - System configuration
  - Vital product data and firmware information

  DSA creates a DSA log, which is a chronologically ordered merge of the system-event log (as the IPMI event log), the integrated baseboard management controller (iBMC) event log, and the operating-system event logs. You can send the DSA log as a file to IBM service or view the information as a text file or HTML file.

  **Note:** Use the latest available version of DSA to make sure that you are using the most recent configuration data.

- **Troubleshooting tables**

  These tables list problem symptoms and actions to correct the problems. See “Troubleshooting tables” on page 35.

- **IBM Electronic Service Agent**

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

- **POST error codes and error logs**

  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 26 for more information.
- **Checkpoint codes**

  Checkpoint codes track the progress of POST routines at system startup or reset. Checkpoint codes are shown on the checkpoint display, which is on the light path diagnostics panel.

## 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 from the Setup utility.
- **System-event log:** This log contains POST and system management interrupt (SMI) events and all events that are generated by the integrated baseboard management controller (iBMC). You can view the system-event log through the Setup utility and through the Dynamic System Analysis (DSA) program (as 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 clear the system-event log through the Setup utility. 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 or the Page Up and Page Down keys.
- **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 iBMC 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 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**.

## Viewing the iBMC log from the DSA program

The iBMC log contains the same information, whether it is viewed from the Setup utility or from the DSA program.

For information about using the DSA program, see “Running DSA Preboot” on page 59).

To view the iBMC log, complete the following steps:

1. If the server is running, turn off the server and all attached devices.
2. Turn on all attached devices; then, turn on the server.
3. When the prompt `F2 Diagnostics` is displayed, press F2. If you have set both a power-on password and an administrator password, you must type the administrator password to run the DSA program.
4. From the top of the screen, select **Hardware Info**.
5. From the list, select **iBMC Log**.

## 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 Dynamic System Analysis (DSA) Portable, you can use it to view the system-event log (as the IPMI event log), the iBMC event log, the operating-system event logs, or the merged DSA log. You can also use DSA Preboot to view these logs, although you must restart the server to use DSA Preboot. To install DSA Portable or DSA Preboot or to download a DSA Preboot CD image, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.

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 an overview of IPMI, go to http://www.ibm.com/developerworks/linux/blueprints/ and click **Using Intelligent Platform Management Interface (IPMI) on IBM Linux platforms**.

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

You can view the iBMC event log through the **Event Log** link in the iBMC web interface.

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

*Table 3. Methods for viewing event logs*

| Condition | Action |
|---|---|
| The server is not hung and is connected to a network. | Use any of the following methods:<br>• Run DSA Preboot to view the event logs or create an output file that you can send to IBM service.<br>• In a web browser, type the IP address of the iBMC and go to the Event Log page.<br>• 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. |

*Table 3. Methods for viewing event logs (continued)*

| Condition | Action |
| --- | --- |
| The server is hung. | • Restart the server and press F2 to start DSA Preboot and view the event logs.<br>• 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 24. |

## 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 or administrator 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 Table 7 on page 144 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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:<br>a. (Trained service technician only) Microprocessor 1<br>b. (Trained service technician only) Microprocessors 2, 3, and 4 (if they are installed)<br>2. (Trained service technician only) Remove microprocessor 2 and restart the server.<br>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 defective and must be replaced. Repeat this step for microprocessors 2, 3, and 4 if necessary.<br>4. Replace the following components one at a time, in the order shown, restarting the server each time:<br>a. (Trained service technician only) Microprocessor 1<br>b. (Trained service technician only) Microprocessors 2, 3, and 4<br>c. (Trained service technician only) System board |
| 0011002 | Microprocessor mismatch | 1. Run the Setup utility and view the microprocessor information to compare the installed microprocessor specifications.<br>2. (Trained service technician only) Remove and replace one of the microprocessors so that they both match. |
| 0011004 | Microprocessor failed built-in self-test (BIST) | 1. Update the firmware (see "Updating the firmware" on page 235).<br>2. (Trained service technician only) Reseat microprocessor 2.<br>3. Replace the following components one at a time, in the order shown, restarting the server each time:<br>a. (Trained service technician only) Microprocessor<br>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 Table 7 on page 144 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|
| 001100A | Microcode update failed | 1. Update the server firmware (see "Updating the firmware" on page 235).<br>2. (Trained service technician only) Replace the microprocessor. |
| 0050001 | DIMM disabled | 1. If the server fails the POST memory test, reseat the DIMMs.<br>2. Remove and replace any DIMM for which the associated error LED is lit (see "Removing a memory module" on page 173 and "Installing a memory module" on page 174).<br>3. Run the Setup utility to enable all the DIMMs.<br>4. Run the DSA memory test. |
| 0051003 | Uncorrectable DIMM error | 1. If the server failed the POST memory test, reseat the DIMMs.<br>2. Remove and replace any DIMM for which the associated error LED is lit (see "Removing a memory module" on page 173 and "Installing a memory module" on page 174).<br>3. Run the Setup utility to enable all the DIMMs.<br>4. Run the DSA memory test. |
| 0051009 | No memory detected | 1. Make sure that the server contains DIMMs.<br>2. Reseat the DIMMs.<br>3. Install the DIMMs in the correct sequence (see "Memory modules (DIMM)" on page 171). |
| 005100A | No usable memory detected | 1. Make sure that the server contains DIMMs.<br>2. Reseat the DIMMs.<br>3. Install the DIMMs in the correct sequence (see "Memory modules (DIMM)" on page 171).<br>4. Run the Setup utility to enable all the DIMMs. |
| 00580A2 | Invalid DIMM population for sparing mode | 1. If a fault LED is lit, resolve the failure.<br>2. Install the DIMMs in the correct sequence (see "Memory modules (DIMM)" on page 171). |
| 0058001 | PFA threshold exceeded | 1. Update the firmware (see "Updating the firmware" on page 235).<br>2. Reseat the DIMMs and run the DSA memory test.<br>3. Replace the failing DIMM, which is indicated by a lit LED on the system board. |

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Table 7 on page 144 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|
| 0058007 | DIMM population is unsupported | 1. Reseat the DIMMs, and then restart the server.<br>2. Remove the lowest-numbered DIMM pair of those that are identified, replace it with an identical pair of known good DIMMs, and then restart the server. Repeat as necessary. If the failures continue, go to step 4.<br>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 the DIMMs in the failed pair with identical known good DIMMs, restarting the server after each DIMM is installed. Replace the failed DIMM. Repeat this step until you have tested all removed DIMMs.<br>4. (Trained service technician only) Replace the system board. |
| 0058008 | DIMM failed memory test | 1. Reseat the DIMMs, and then restart the server.<br>2. Replace the following components one at a time, in the order shown, restarting the server each time:<br>a. DIMMs<br>b. (Trained service technician only) System board |
| 00580A4 | Memory population changed | Information only. Memory has been added, moved, or changed. |
| 0068002 | CMOS battery cleared | 1. Reseat the battery.<br>2. Clear the CMOS memory (see "System-board jumpers" on page 18).<br>3. Replace the following components one at a time, in the order shown, restarting the server each time:<br>a. Battery<br>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 Table 7 on page 144 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|
| 2011000 | PCI-X PERR | 1. Check the LEDs on the PCI riser-card assembly and the system board.<br>2. Reseat all affected adapters.<br>3. Update the PCI device firmware.<br>4. Remove the adapters from the PCI riser-card assembly.<br>5. Replace the following components one at a time in the order shown, restarting the server each time:<br>a. Adapters<br>b. PCI riser-card assembly |
| 2011001 | PCI-X SERR | 1. Check the LEDs on the PCI riser-card assembly and the system board.<br>2. Reseat all affected adapters.<br>3. Update the PCI device firmware.<br>4. Remove the adapters from PCI riser-card assembly.<br>5. Replace the following components one at a time in the order shown, restarting the server each time:<br>a. Adapters<br>b. PCI riser-card assembly |
| 2018001 | PCI Express uncorrected or uncorrected error | 1. Check the LEDs on the PCI riser-card assembly and the system board.<br>2. Reseat all affected adapters.<br>3. Update the PCI device firmware.<br>4. Remove the adapters from the PCI riser-card assembly.<br>5. Replace the following components one at a time in the order shown, restarting the server each time:<br>a. Adapters<br>b. PCI riser-card assembly |

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Table 7 on page 144 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|
| 2018002 | Option ROM resource allocation failure | Informational message that some devices might not be initialized.<br>1. If possible, rearrange the order of the adapters in the PCI slots to change the load order of the optional-device ROM code.<br>2. Run the Setup utility, select **Start Options**, and change the boot priority to change the load order of the optional-device ROM code.<br>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.<br>4. Replace the following components one at a time, in the order shown, restarting the server each time:<br>a. Each adapter<br>b. PCI riser-card assembly |
| 3038003 | Firmware corrupted | 1. Run the Setup utility, select **Load Default Settings**, and save the settings to recover the server firmware.<br>2. (Trained service technician only) Replace the system board. |
| 3048005 | Booted secondary (backup) server firmware image | Information only. The backup jumper was used to boot the secondary bank. |
| 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.<br>2. Turn off the server and remove it from the power source.<br>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.<br>2. Reseat the battery.<br>3. Replace the following components one at a time, in the order shown, restarting the server each time:<br>a. Battery<br>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 Table 7 on page 144 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|
| 3058001 | System configuration invalid | 1. Run the Setup utility, and select **Save Settings**.<br>2. Run the Setup utility, select **Load Default Settings**, and save the settings.<br>3. Reseat the following components one at a time in the order shown, restarting the server each time:<br>a. Battery<br>b. Failing device (if the device is a FRU, it must be reseated by a trained service technician only)<br>4. Replace the following components one at a time, in the order shown, restarting the server each time:<br>a. Battery<br>b. Failing device (if the device is a FRU, it must be replaced by a trained service technician only)<br>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.<br>2. Make sure that the server is attached to a reliable power source.<br>3. Remove all hardware that is not listed on the ServerProven website at http://www.ibm.com/servers/eserver/serverproven/compat/us/.<br>4. Make sure that the operating system is not corrupted.<br>5. Run the Setup utility, save the configuration, and then restart the server. |
| 3108007 | System configuration restored to default settings | Information only. This is message is usually associated with the CMOS battery clear event. |
| 3808000 | iBMC communication failure | 1. Remove power from the server for 30 seconds, and then reconnect the server to power and restart it.<br>2. Update the iBMC firmware.<br>3. (Trained service technician only) Replace the system board. |
| 3808002 | Error updating system configuration to iBMC | 1. Remove power from the server, and then reconnect the server to power and restart it.<br>2. Run the Setup utility and select **Save Settings**.<br>3. Update the firmware. |

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Table 7 on page 144 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|
| 3808003 | Error retrieving system configuration from iBMC | 1. Remove power from the server, and then reconnect the server to power and restart it.<br>2. Run the Setup utility and select **Save Settings**.<br>3. Update the iBMC firmware. |
| 3808004 | IPMI system event log full | • When out-of-band, use the iBMC web interface or IPMItool to clear the logs from the operating system.<br>• When using the local console:<br>1. Run the Setup utility.<br>2. Select **System Event Logs**.<br>3. Select **Clear System Event Log**.<br>4. Restart the server. |

# Checkout procedures

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.
- IBM Dynamic System Analysis (DSA) provides the primary method 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 DSA to confirm that the hardware is working correctly.
- When you run DSA, 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 DSA.

  **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 40 for information about diagnosing microprocessor problems.
- Before you run DSA, 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 tests 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 26. If the server is halted and no error message is displayed, see “Troubleshooting tables” on page 35 and “Solving undetermined problems” on page 140.
- For information about power-supply problems, see “Solving power problems” on page 138 and “Power-supply LEDs” on page 56.
- For intermittent problems, check the event logs; see “Event logs” on page 24 and “Dynamic System Analysis” on page 58.

## 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. Check the power-supply LEDs (see “Power-supply LEDs” on page 56).
   b. Turn off the server and all external devices.
   c. Check all internal and external devices for compatibility (see http://www.ibm.com/servers/eserver/serverproven/compat/us/).
   d. Check all cables and power cords.
   e. Set all monitor controls to the middle positions.
   f. Turn on all external devices.
   g. Turn on the server. If the server does not start, see “Troubleshooting tables” on page 35.
   h. Check the system-error LED on the operator information panel. If it is flashing, check the light path diagnostics LEDs (see “Light path diagnostics” on page 47).
   i. Check for the following results:
      - Successful completion of POST
      - Successful completion of startup, which is indicated by a readable display of the operating-system desktop
3. Is there a readable image on the monitor screen?
   - **No:** Find the failure symptom in “Troubleshooting tables” on page 35; if necessary, see “Solving undetermined problems” on page 140.
   - **Yes:** Run DSA (see “Dynamic System Analysis” on page 58).
     – If DSA reports an error, follow the instructions in “DSA messages” on page 59.
     – If DSA does not report an error but you still suspect a problem, see “Solving undetermined problems” on page 140.

## 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 “Dynamic System Analysis” on page 58 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 light path diagnostics LEDs on the operator information panel (see “Light path diagnostics” on page 47).
2. Remove the software or device that you just added.
3. Run IBM Dynamic System Analysis (DSA) to determine whether the server is running correctly (for information about using DSA, see “Dynamic System Analysis” on page 58).
4. Reinstall the new software or new device.

## CD or DVD drive problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, “Parts listing, Type 7164,” on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.**

| Symptom | Action |
|---|---|
| The CD or DVD drive is not recognized. | 1. Make sure that:<br>• The IDE or SATA channel to which the CD or DVD drive is attached (primary or secondary) is enabled in the Setup utility.<br>• The signal cable and connector are not damaged and the connector pins are not bent.<br>• All cables and jumpers are installed correctly.<br>• The correct device driver is installed for the CD or DVD drive.<br>2. Run the CD or DVD drive diagnostic programs (see “Dynamic System Analysis” on page 58).<br>3. Reseat the following components:<br>a. CD or DVD drive (see “Removing the optional DVD drive” on page 178 and “Installing an optional DVD drive” on page 178)<br>b. CD or DVD drive cable<br>4. Replace the components listed in step 3 one at a time, in the order shown, restarting the server each time. |
| A CD or DVD is not working correctly. | 1. Clean the CD or DVD.<br>2. Run the CD or DVD drive diagnostic programs (see “Dynamic System Analysis” on page 58).<br>3. Check the connector and signal cable for bent pins or damage.<br>4. Reseat the CD or DVD drive (see “Removing the optional DVD drive” on page 178 and “Installing an optional DVD drive” on page 178).<br>5. Replace the CD or 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

| Symptom | Action |
|---|---|
| The CD or DVD drive tray is not working. | 1. Make sure that the server is turned on.<br>2. Insert the end of a straightened paper clip into the manual tray-release opening.<br>3. Reseat the CD or DVD drive (see "Removing the optional DVD drive" on page 178 and "Installing an optional DVD drive" on page 178).<br>4. Replace the CD or DVD drive. |

## Embedded 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 embedded hypervisor device is not listed in the expected boot order, or is not in the list of boot devices, or a similar problem has occurred. | 1. Make sure that the embedded hypervisor device is selected in the boot menu (in the Setup utility and in Select Boot Device).<br>2. If the embedded hypervisor is on an internal flash memory device, make sure that the internal flash memory device is seated in the connector correctly (see "Removing the internal flash memory" on page 203 and "Installing the internal flash memory" on page 203).<br>3. See the documentation that comes with the embedded hypervisor for setup and configuration information.<br>4. Make sure that other software works on the server. |

## 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 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 (see "Replaceable server components" on page 144 to determine whether the part is a CRU or a FRU). |

## 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA hard disk drive diagnostic test. | Remove the drive that is indicated by DSA (see "Removing a hot-swap hard disk drive" on page 175); then, run the hard disk drive diagnostic test again (see "Dynamic System Analysis" on page 58). 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 (see "Removing a hot-swap hard disk drive" on page 175), and run the diagnostic test again (see "Dynamic System Analysis" on page 58). If the hard disk drive diagnostic test runs successfully, replace the drive that you removed with a new one (see "Installing a hot-swap hard disk drive" on page 175). |
| A hard disk drive was not detected while the operating system was being started. | Reseat all hard disk drives and cables; then, run the DSA hard disk drive diagnostic test again (see "Dynamic System Analysis" on page 58). |
| A hard disk drive passes the DSA hard disk drive diagnostic test but the problem remains. | Run the diagnostic SAS Fixed Disk Test (see "Dynamic System Analysis" on page 58).<br>**Note:** This test is not available to servers that use RAID or servers with IDE or SATA hard disk drives. |

## 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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:<br>• All cables and cords are connected securely to the rear of the server and attached devices.<br>• When the server is turned on, air is flowing from the fan grill. If there is no airflow, the fan is not working. This can cause the server to overheat and shut down.<br>2. Check the event logs (see "Event logs" on page 24).<br>3. See "Solving undetermined problems" on page 140. |

## USB 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for information about keyboard compatibility.<br>2. Make sure that:<br>• The keyboard cable is securely connected.<br>• The server and the monitor are turned on.<br>3. Reseat the keyboard.<br>4. Replace the keyboard and restart the server. |
| The USB mouse or USB pointing device does not work. | 1. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for information about mouse compatibility.<br>2. Make sure that:<br>• The mouse or pointing-device USB cable is securely connected to the server, and the device drivers are installed correctly.<br>• The server and the monitor are turned on.<br>3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.<br>4. Reseat the mouse or pointing device.<br>5. Replace the components listed in step 4 one at a time, in the order shown, restarting the server each time. |

## Memory problems

| | |
|---|---|
| • **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**<br>• **See Chapter 4, "Parts listing, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**<br>• **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. | **Note:** If you change the memory, you must update the memory configuration in the Setup utility.<br>1. Make sure that:<br>• No error LEDs are lit on the operator information panel or on the system board.<br>• Scalability does not account for the discrepancy.<br>• The memory modules are seated correctly (see "Removing a memory module" on page 173 and "Installing a memory module" on page 174).<br>• You have installed the correct type of memory.<br>• If you changed the memory, you updated the memory configuration in the Setup utility.<br>• 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.<br>2. If a DIMM was disabled, run the Setup utility and enable the DIMM. See Chapter 6, "Configuration information and instructions," on page 235.<br>3. Run memory diagnostics (see "Dynamic System Analysis" on page 58).<br>4. Make sure that there is no memory mismatch when the server is at the minimum memory configuration (two 2 GB DIMMs).<br>5. Reinstall the removed DIMMs one pair at a time, making sure that the DIMMs in each pair match.<br>6. Replace the following components one at a time, restarting the server each time:<br>a. DIMM<br>b. (Trained service technician only) System board<br>7. If the DIMM was disabled, run the Setup utility and enable the DIMM. See Chapter 6, "Configuration information and instructions," on page 235. |

## Microprocessor problems

| • **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**<br>• **See Chapter 4, "Parts listing, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**<br>• **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 does not function after replacing a microprocessor or a microprocessor error LED is lit. | 1. Correct any errors that are indicated by the light path diagnostics LEDs (see "Light path diagnostics" on page 47).<br>2. Make sure that the server supports all the microprocessors and that the microprocessors match in speed and cache size.<br>3. Reseat the following components:<br>a. (Trained service technician only) Microprocessor (see "Removing a microprocessor and heat sink" on page 225)<br>b. (Trained service technician only) System board (see "Removing the system board" on page 230 and "Installing the system board" on page 232)<br>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.<br>5. Replace the following components one at a time, in the order shown, restarting the server each time:<br>a. (Trained service technician only) Microprocessor<br>b. (Trained service technician only) System board<br>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.<br>• (Trained service technician only) If the error is associated with a microprocessor, replace the microprocessor.<br>• (Trained service technician only) If the error is associated with a microprocessor socket, replace the system board. |

## Monitor or video problems

Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, see the documentation that comes with the monitor for instructions for testing and adjusting the monitor. If you cannot diagnose the problem, call for service.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 website 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 |
|---|---|
| Testing the monitor. | 1. Make sure that the monitor cables are firmly connected.<br>2. Try using a different monitor on the server, or try testing the monitor on a different server.<br>3. (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.<br>2. Make sure that:<br>• The server is turned on. If there is no power to the server, see "Power problems" on page 44.<br>• The monitor cables are connected correctly.<br>• The monitor is turned on and the brightness and contrast controls are adjusted correctly.<br>3. Make sure that the correct server is controlling the monitor, if applicable.<br>4. Make sure that damaged server firmware is not affecting the video; see "Recovering the server firmware" on page 128 for information about recovering from server firmware failure.<br>5. Observe the checkpoint code display on the light path diagnostics panel; if the codes are changing, go to the next step.<br>6. Replace the following components one at a time, in the order shown, restarting the server each time:<br>a. Monitor<br>b. Video adapter (if one is installed)<br>c. (Trained service technician only) System board<br>7. See "Solving undetermined problems" on page 140 for information about solving undetermined problems. |
| The monitor works when you turn on the server, but the screen goes blank when you start some application programs. | 1. Make sure that:<br>• The application program is not setting a display mode that is higher than the capability of the monitor.<br>• You installed the necessary device drivers for the application.<br>2. See "Solving undetermined problems" on page 140 for information about solving undetermined 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 website 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 |
|---|---|
| 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.<br>**Attention:** Moving a color monitor while it is turned on might cause screen discoloration.<br>Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor.<br>**Notes:**<br>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.).<br>b. Non-IBM monitor cables might cause unpredictable problems.<br>2. Reseat the monitor cable<br>3. Replace the following components one at a time, in the order shown, restarting the server each time:<br>a. Monitor cable<br>b. Video adapter (if one is installed)<br>c. Monitor<br>d. (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.<br>2. Reseat the monitor cable.<br>3. Replace the following components one at a time, in the order shown, restarting the server each time:<br>a. Monitor<br>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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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:<br>• The device is designed for the server (see http://www.ibm.com/servers/eserver/serverproven/compat/us/).<br>• You followed the installation instructions that came with the device and the device is installed correctly.<br>• You have not loosened any other installed devices or cables.<br>• You updated the configuration information in the Setup utility. Whenever memory or any other device is changed, you must update the configuration.<br>2. Reseat the device that you just installed.<br>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.<br>2. If the device comes with test instructions, use those instructions to test the device.<br>3. If the failing device is a SCSI device, make sure that:<br>• The cables for all external SCSI devices are connected correctly.<br>• The last device in each SCSI chain, or the end of the SCSI cable, is terminated correctly.<br>• Any external SCSI device is turned on. You must turn on an external SCSI device before turning on the server.<br>4. Reseat the failing device.<br>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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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, and the reset button does not work (the server does not start).<br>**Note:** The power-control button will not function for up to 1 minute after the server has been connected to ac power. | 1. Make sure that the top cover is closed and latched correctly.<br>2. Make sure that the power cut-off switch cable is seated correctly.<br>3. (Trained service technician only) Replace the power cut-off switch.<br>4. Make sure that the operator information panel power-control button is working correctly:<br>a. Disconnect the ac power cord for 20 seconds; then, reconnect the ac power cord and restart the server. Avoid disconnecting and reconnecting the ac power cord repeatedly.<br>b. Reseat the operator information panel cables, and then repeat step 4a.<br>• If the server starts, reseat the operator information panel (see "Removing the operator information panel assembly" on page 206 and "Installing the operator information panel assembly" on page 206). If the problem remains, replace the operator information panel.<br>• If the server does not start, reseat the operator information panel. If the problem remains, replace the operator information panel.<br>5. Make sure that the reset button is working correctly:<br>a. Disconnect the server power cords.<br>b. Reconnect the power cords.<br>c. Reseat the light path diagnostics panel cable (the operator information panel ribbon cable), and then repeat step 4a.<br>• If the server starts, replace the operator information panel (see "Removing the operator information panel assembly" on page 206 and "Installing the operator information panel assembly" on page 206).<br>• If the server does not start, go to step 6.<br>6. Make sure that:<br>• The power cords are correctly connected to the server and to a working electrical outlet.<br>• The type of memory that is installed is correct.<br>• The LEDs on the power supply do not indicate a problem.<br>• The microprocessors are installed in the correct sequence.<br>7. Reseat the following components:<br>a. Memory module<br>b. Power supplies<br>c. Operator information panel<br>d. Top cover/power cut-off switch cable<br>e. (Trained service technician only) System board<br>8. Replace the components listed in step 7 one at a time, in the order shown, restarting the server each time.<br>(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.**<br>• **See Chapter 4, "Parts listing, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**<br>• **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, and the reset button does not work (the server does not start). (Continued) | 9. 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.<br>10. See "Power-supply LEDs" on page 56.<br>11. See "Solving undetermined problems" on page 140. |
| The server does not turn off. | 1. Determine whether you are using an Advanced Configuration and Power Management (ACPI) or a non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps:<br>a. Press Ctrl+Alt+Delete.<br>b. Turn off the server by holding the power-control button for 5 seconds.<br>c. Restart the server.<br>d. If the server fails POST and the power-control button does not work, disconnect the ac power cord for 20 seconds; then, reconnect the ac power cord and restart the server.<br>2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board. |
| The server unexpectedly shuts down, and the LEDs on the operator information panel are not lit. | See "Solving undetermined problems" on page 140. |

## Serial-device problems

| • **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**<br>• **See Chapter 4, "Parts listing, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**<br>• **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:<br>• Each port is assigned a unique address in the Setup utility and none of the serial ports is disabled.<br>• The serial-port adapter (if one is present) is seated correctly.<br>2. Reseat the serial port adapter (see "Removing a PCI adapter" on page 170 and "Installing a PCI adapter" on page 170).<br>3. Replace the serial port adapter. |

- **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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 serial device does not work. | 1. Make sure that:<br>• The device is compatible with the server.<br>• The serial port is enabled and is assigned a unique address.<br>• The device is connected to the correct connector (see "Internal LEDs, connectors, and jumpers" on page 15).<br>2. Reseat the following components:<br>a. Failing serial device<br>b. Serial cable<br>3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time. |

## 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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) CD or DVD drive.<br>2. If the startup (boot) sequence settings have been changed, make sure that the CD or DVD drive is first in the startup sequence.<br>3. If more than one CD or DVD drive is installed, make sure that only one drive is set as the primary drive. Start the CD from the primary drive. |
| The operating-system installation program continuously loops. | Make more space available on the hard disk. |
| The ServerGuide program will not start the operating-system CD. | Make sure that the operating-system CD is supported by the ServerGuide program. See http://www.ibm.com/systems/management/serverguide/sub.html for a list of supported operating-system versions. |
| The operating system cannot be installed; the option is not available. | Make sure that the server supports the operating system. If it does, either no logical drive is defined (SCSI RAID systems), 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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:<br>• The server has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software.<br>If you have just installed an adapter, the server might have an adapter-address conflict.<br>• The software is designed to operate on the server.<br>• Other software works on the server.<br>• The software works on another server.<br>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.<br>3. Contact your place of purchase of the software. |

## Universal Serial Bus (USB) port problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 "Dynamic System Analysis" on page 58).<br>2. Make sure that:<br>• The correct USB device driver is installed.<br>• The operating system supports USB devices.<br>3. Make sure that the USB configuration options are set correctly in the Setup utility (see "Configuring the server" on page 235 for more information).<br>4. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server. |

## Video problems

See "Monitor or video problems" on page 41.

# 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.

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

After ac power has been removed from the server, press and hold the light path diagnostics button on the system board to light the error LEDs. Power remains available to these LEDs for up to 24 hours.

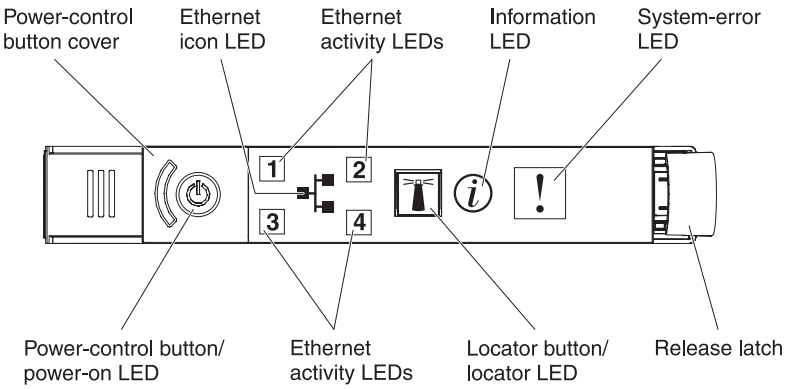
Many errors are first indicated by a lit information LED or system-error LED on the operator information panel on the front of the server. If one or both of these LEDs are lit, one or more LEDs elsewhere in the server might also be lit and can direct you to the source of the error.

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 153.

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

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

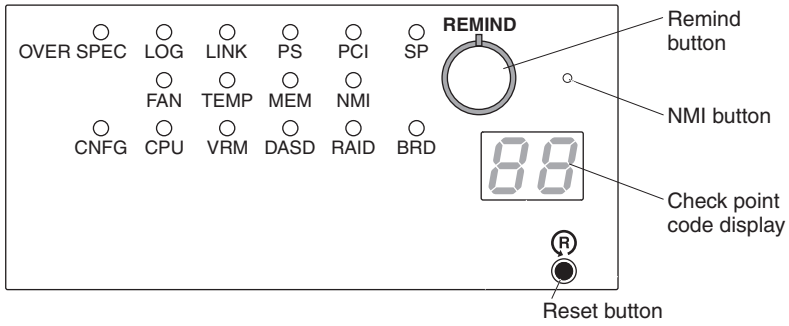
   The following illustration shows the operator information panel.




2. To view the light path diagnostics panel, press the release latch on the front of the operator information panel to the left; then, slide it forward. This reveals the light path diagnostics panel. Lit LEDs on this panel indicate the type of error that has occurred.

   **Note:** When you slide the light path diagnostics panel out of the server to check the LEDs or checkpoint codes, do not run the server continuously with the light path diagnostics panel outside of the server. The panel should be outside of the server for only a short time. The light path diagnostics panel must remain in the server when the server is running to ensure proper cooling.

   The following illustration shows the light path diagnostics panel:




Note any LEDs that are lit, and then return the light path diagnostics panel to the server.

- **Remind button:** Press this button to place the system-error LED on the front information panel into Remind mode. By placing the system-error LED indicator in Remind mode, you acknowledge that you are aware of the last failure but will not take immediate action to correct the problem. In Remind mode, the system-error LED flashes rapidly 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.
- **NMI button:** The NMI button on the front panel is lit when this button is pressed. Press this button to force a nonmaskable interrupt to the microprocessor. You might have to use a pen or the end of a straightened paper clip to press the button. Use this button to terminate all system processes and force a memory dump (use this button only when you are directed to do so by IBM support).

  **Note:** (Trained service technician only) The NMI button is used for operating-system debugging purposes and causes the server to reset if it is pressed.
- **Checkpoint code display:** This display provides a checkpoint code that indicates the point at which the server stopped during the boot block and POST. A checkpoint code is either a byte or a word value that is produced by UEFI. The display does not provide error codes or suggest components to be replaced.
- **Reset button:** Press this button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button. The Reset button is in the lower-right corner of the light path diagnostics panel.

Look at the system service label inside the server cover, which gives an overview of internal components that correspond to the LEDs on the light path diagnostics panel. This information and the information in “Light path diagnostics” on page 47 can often provide enough information to correct the error.

3. Turn off the server and remove the server cover; then, press the light path diagnostic button to look for lit LEDs inside the server (see “System-board LEDs” on page 20). Certain components inside the server have LEDs that will be lit to indicate the location of a problem. For example, a microprocessor error will light the LED next to the failing microprocessor.

The following table describes the LEDs on the light path diagnostics panel and suggested actions to correct the detected problems.

**Note:** Check the system event log for additional information before replacing a FRU.

- **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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 LED or information LED also lit | Description | Action |
|---|---|---|
| All LEDs are off (only the power LED is lit or flashing). | | No action is necessary. |
| All LEDs are off (the power LED is lit or flashing and the system-error LED is lit). | A machine check has occurred. The server is identifying the machine check, the server was interrupted while identifying the machine check, or the server was unable to identify the machine check. | 1. Wait several minutes for the server to identify the machine check, and the server will restart.<br>2. (Trained service technician only) Extract the machine check data, which will be used to identify the machine check. |
| OVERSPEC | There is insufficient power to power the system (both the CNFG and LOG LEDs might be lit). | If the OVERSPEC LED and the CNFG LED are lit, the system issues an invalid power configuration error. Complete the following steps to correct the problem:<br>1. Add a power supply if only one power supply is installed.<br>2. Reseat the power supply (see "Removing a hot-swap power supply" on page 181 and "Installing a hot-swap power supply" on page 182).<br>3. Remove optional devices.<br>4. Replace the failing power supply. |
| LOG | Information is present in the system-event log. | 1. Check the log for possible errors.<br>2. Save the log if necessary and clear it. |
| LINK | Reserved | |
| PS | A power supply has failed or has been removed.<br>**Note:** In a redundant power configuration, the dc power LED on one power supply might be off. | 1. Reinstall the removed power supply (see "Installing a hot-swap power supply" on page 182).<br>2. Check the individual power-supply LEDs to find the failing power supply (see "Rear view LEDs" on page 13).<br>3. Reseat the failing power supply (see "Removing a hot-swap power supply" on page 181 and "Installing a hot-swap power supply" on page 182).<br>4. Make sure that the power cord is fully seated in the power-supply inlet and the ac power source.<br>5. Replace the failing power supply. |

- **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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 LED or information LED also lit | Description | Action |
|---|---|---|
| PCI | A PCI adapter has failed.<br>**Note:** The error LED on the PCI riser-card assembly is also lit. | 1. See the system-event log (see "Event logs" on page 24).<br>2. Reseat the following components:<br>a. Failing adapter (see "Removing a PCI adapter" on page 170 and "Installing a PCI adapter" on page 170)<br>b. PCI riser-card assembly (see "Removing the PCI riser-card assembly" on page 163 and "Installing the PCI riser-card assembly" on page 165).<br>3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time. |
| SP | A service processor error has been detected. | 1. Shut down the system and remove the power cords from the server; then, reconnect the server to power and restart the server.<br>2. Update the server firmware to the latest level (see "Updating the firmware" on page 235).<br>3. (Trained service technician only) Replace the system board, if the problem remains. |
| FAN | A fan has failed or has been removed.<br>**Note:** A failing fan can also cause the TEMP LED to be lit. | 1. Reinstall the removed fan (see "Installing a system fan" on page 180).<br>2. If a fan LED is lit, reseat the fan (see "Removing a system fan" on page 179and "Installing a system fan" on page 180).<br>**Note:** A failing fan might not cause the fan LED to be lit.<br>3. Replace the fan for which the LED is lit.<br>4. (Trained service technician only) Replace the system board. |
| TEMP | A system temperature or component has exceeded specifications.<br>**Note:** A fan LED might also be lit. | 1. See the system-event log for the source of the fault (see "Event logs" on page 24).<br>2. Make sure that the airflow of the server is not blocked.<br>3. If a fan LED is lit, reseat the fan (see "Removing a system fan" on page 179 and "Installing a system fan" on page 180).<br>4. Replace the fan for which the LED is lit.<br>5. Make sure that the room 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 Chapter 4, "Parts listing, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 LED or information LED also lit | Description | Action |
|---|---|---|
| MEM | An invalid memory configuration or a memory error has occurred (both the MEM LED and CNFG LED might be lit). | 1. If the MEM LED and the CNFG LED are lit, the system issues an invalid memory configuration error. Complete the following steps to correct the problem:<br>a. Make sure that the DIMM configuration is supported (see "Memory modules (DIMM)" on page 171 for DIMM requirements and installation sequence information).<br>b. Replace the DIMMs with a supported configuration.<br>2. If the CNFG LED is not lit, the system might detect a memory error. Complete the following steps to correct the problem:<br>a. Update the server firmware to the latest level (see "Updating the firmware" on page 235).<br>b. If the DIMM was disabled, run the Setup utility and enable the DIMM. See "Configuring the server" on page 235.<br>c. Swap the failed DIMM with a known good DIMM, or move the failed DIMM to another connector to see whether the error follows the DIMM or stays with the connector. Restart the server.<br>d. Remove the memory module that has a lit error LED (see "Removing a memory module" on page 173). You can press the light path diagnostics button on the system board to identify the failed DIMM (see "Internal LEDs, connectors, and jumpers" on page 15).<br>e. Reseat the DIMM with the lit LED (see "Removing a memory module" on page 173 and "Installing a memory module" on page 174).<br>f. Replace the following components one at a time, in the order shown, restarting the server each time:<br>1) DIMM<br>2) (Trained service technician only) System board |
| NMI | A nonmaskable interrupt has occurred, or the NMI button was pressed. | 1. Check the system-error log for information about the error (see "Event logs" on page 24).<br>2. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 LED or information LED also lit | Description | Action |
|---|---|---|
| CNFG | A configuration error has occurred. | 1. If the CNFG LED and the CPU LED are lit, complete the following steps to correct the problem:<br>a. Check the microprocessors that were just installed to make sure that they are compatible with each other (see "Installing a microprocessor and heat sink" on page 227 for additional information about microprocessor requirements).<br>b. (Trained service technician only) Replace the incompatible microprocessor.<br>c. Check the system-error logs for information about the error. Replace any components that are identified in the error log.<br>2. If the CNFG LED and the MEM LED are lit, the system issues an invalid memory configuration error. Complete the following steps to correct the problem:<br>a. Make sure that the DIMM configuration is supported (see "Memory modules (DIMM)" on page 171 for DIMM requirements and installation sequence information).<br>b. Replace the DIMMs with a supported configuration.<br>3. (Four-microprocessor and one power supply configuration) If the CNFG LED and the OVERSPEC LED are lit, the system issues an invalid power configuration error. Complete the following steps to correct the problem:<br>a. Add a power supply if only one power supply is installed.<br>b. Reseat the power supply.<br>c. Remove optional devices.<br>d. Replace the failing power supply. |

- **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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 LED or information LED also lit | Description | Action |
|---|---|---|
| CPU | An invalid microprocessor configuration or a microprocessor has failed (both the CPU LED and the CNFG LED might be lit). | 1. If the CNFG LED is lit, the system issues an invalid microprocessor configuration error. Complete the following steps to correct the problem:<br>a. Check the microprocessors that were just installed to make sure that they are compatible with each other (see "Installing a microprocessor and heat sink" on page 227 for additional information about microprocessor requirements) and use the Setup utility and select **System Information → System Summary → Processor Details** to verify the microprocessors information.<br>b. (Trained service technician only) Replace the incompatible microprocessor.<br>c. Check the system-error logs for information about the error. Replace any components that are identified in the error log.<br>2. If the CNFG LED is not lit, a microprocessor failure occurs. Complete the following steps:<br>a. (Trained service technician only) Make sure that the failing microprocessor, which is indicated by a lit LED on the system board, is installed correctly. See "Installing a microprocessor and heat sink" on page 227 for information about installation and requirements.<br>b. (Trained service technician only) Replace the failing microprocessor. |
| VRM | Reserved | |
| DASD | A hard disk drive has failed or has been removed.<br>**Note:** The error LED on the failing hard disk drive is also lit. | 1. Reinstall the removed drive.<br>2. Reseat the following components:<br>a. Failing hard disk drive (see "Removing a hot-swap hard disk drive" on page 175 and "Installing a hot-swap hard disk drive" on page 175)<br>b. SAS hard disk drive backplane (see "Removing the hot-swap hard disk drive backplane" on page 209 and "Installing the hot-swap hard disk drive backplane" on page 210)<br>c. SAS signal cable<br>3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time. |

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 LED or information LED also lit | Description | Action |
|---|---|---|
| RAID | Reserved | |
| BRD | An error has occurred on the system board. | 1. Check the LEDs on the system board to identify the component that caused the error. The BRD LED can be lit due to any of the following reasons:<br>• Battery<br>• Failed voltage regulator<br>2. Check the system-error log for information about the error.<br>3. Replace any failed or missing replacement components, such as the battery.<br>4. If a voltage regulator has failed, (trained service technician only) replace the system board. |

## Power-supply LEDs

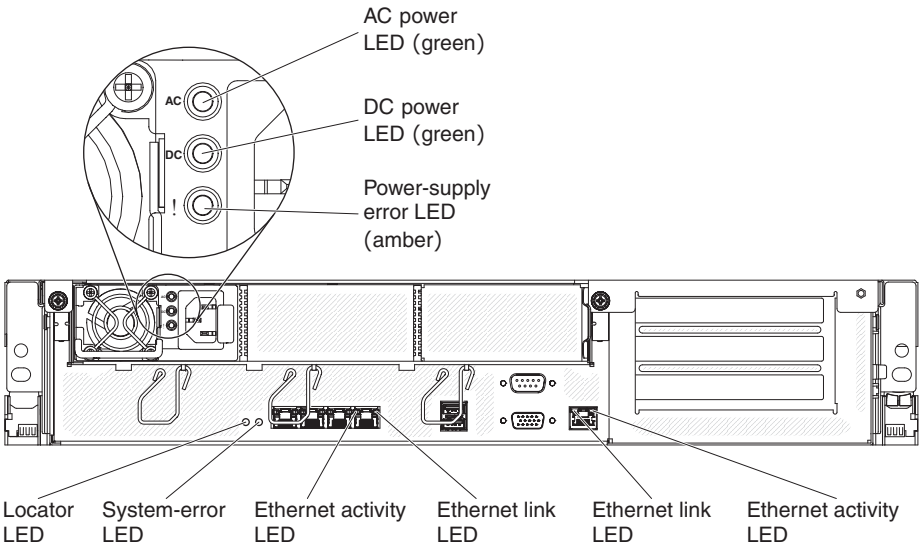
The following minimum configuration is required for the dc LEDs on the power supply to be lit:

- Power supply
- Power cord

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

- One power supply
- Power cord
- Two microprocessors
- Two DIMMs (in DIMM connectors 1 and 9)
- Operator information panel
- PCI riser-card assembly

The following illustration shows the locations of the power-supply LEDs.




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

*Table 4. Power-supply LEDs*

| Power-supply LEDs | | | Description | Action | Notes |
|---|---|---|---|---|---|
| **AC** | **DC** | **Error** | | | |
| Off | Off | Off | No ac power to either power supply or a problem with the ac power source | 1. Check the ac power to the server.<br>2. Make sure that the power cord is connected to a functioning power source.<br>3. Turn the server off and then turn the server back on.<br>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.<br>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 is in off mode | 1. Press the power-control button to turn on the server.<br>2. Reseat the power supply.<br>3. Replace the power supply. | |
| 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. | |

## Dynamic System Analysis

Dynamic System Analysis (DSA) collects and analyzes system information to aid in diagnosing server problems. DSA collects the following information about the server:

- Drive health information
- Event logs for ServeRAID controllers and service processors
- Hardware inventory, including PCI and USB information
- Installed applications and hot fixes
- Kernel modules
- Light path diagnostics status
- Network interfaces and settings
- Performance data and details about processes that are running
- RAID and controller configuration
- Service processor (integrated baseboard management controller) status and configuration
- System configuration
- Vital product data and firmware information

For system-specific information about the action that you should take as a result of a message that DSA generates, see the table in “DSA messages” on page 59.

If you cannot find a problem by using DSA, see “Solving undetermined problems” on page 140 for information about testing the server.

**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.

To obtain DSA code and the *Dynamic System Analysis Installation and User's Guide*, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.

## DSA editions

Three editions of Dynamic System Analysis are available:

- **DSA Portable**

  DSA Portable Edition runs within the operating system; you do not have to restart the server to run it. It is packaged as a self-extracting file that you download from the web. When you run the file, it self-extracts to a temporary folder and performs comprehensive collection of hardware and operating-system information. After it runs, it automatically deletes the temporary files and folder and leaves the results of the data collection and diagnostics on the server.

  If you are able to start the server, use DSA Portable.

- **DSA Preboot**

  DSA Preboot runs outside of the operating system; you must restart the server to run it. It is packaged as an ISO image that you download from the web, or it is provided in flash memory on the server. In addition to the capabilities of the other editions of DSA, DSA Preboot includes diagnostic routines that would be disruptive to run within the operating-system environment (such as resetting

devices and causing loss of network connectivity). It has a graphical user interface that you can use to specify which diagnostic tests to run and to view the diagnostic and data collection results.

If you are unable to start the server or if you need comprehensive diagnostics, use DSA Preboot.

## Running DSA Preboot

To run DSA Preboot, complete the following steps:

1. If the server is running, turn off the server and all attached devices.
2. Turn on all attached devices; then, turn on the server.
3. When the prompt `<F2> Diagnostics` is displayed, press F2.

   **Note:** DSA Preboot might appear to be unresponsive for an unusual length of time when you start the program. This is normal operation while the program loads.
4. (Optional) 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 type **cmd** to display the DSA interactive menu.
6. Follow the instructions on the screen to select the diagnostic test to run. If the diagnostic tests do not detect any hardware errors but the problem remains during normal server operation, a software error might be the cause. If you suspect a software problem, see the information that comes with your software.

## DSA messages

The following table describes the messages that DSA might generate and suggested actions to correct the detected problems.

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

**000** The server passed the test. Do not replace a CRU or FRU.

**195** The Esc key was pressed to end the test. Do not replace a CRU or FRU.

**197** This is a warning error, but it does not indicate a hardware failure; do not replace a CRU or FRU. Take the action that is indicated in the Action column, but *do not replace a CRU or FRU*.

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 server.<br>2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>3. Run the test again.<br>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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>5. Run the test again.<br>6. Turn off and restart the server if necessary to recover from a hung state.<br>7. Run the test again.<br>8. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 server.<br>2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>3. Run the test again.<br>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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>5. Run the test again.<br>6. Turn off and restart the server if necessary to recover from a hung state.<br>7. Run the test again.<br>8. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 server if necessary to recover from a hung state.<br>2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>3. Run the test again.<br>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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>5. Run the test again.<br>6. Turn off and restart the server if necessary to recover from a hung state.<br>7. Run the test again.<br>8. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 166-801-xxx | iBMC | iBMC I2C Test | Aborted | Test aborted: The iBMC returned an incorrectresponse length. | 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 166-803-xxx | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 166-805-xxx | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 166-807-xxx | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Aborted | Test aborted: Reservation canceled 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 166-809-xxx | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 166-811-xxx | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 166-813-xxx | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 166-815-xxx | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 166-817-xxx | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 166-819-xxx | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 166-819-xxx | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 166-821-xxx | iBMC | iBMC I2C Test | Aborted | Test aborted: A command response could not be provided; iBMC 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 166-823-xxx | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Aborted | Test aborted: 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 166-901-xxx | iBMC | iBMC I2C Test | Failed | The iBMC indicates a failure in APML 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>7. Disconnect the system from the power source.<br>8. (Trained service technician only) Replace the system board.<br>9. Reconnect the system to power and turn on the system.<br>10. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Failed | The iBMC indicates a failure in the light path bus (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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>7. Disconnect the system from the power source.<br>8. (Trained service technician only) Replace the system board.<br>9. Reconnect the system to power and turn on the system.<br>10. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Failed | The iBMC indicates failure in DIMM 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>7. Disconnect the system from the power source.<br>8. Reseat the DIMMs.<br>9. Run the test again.<br>10. Disconnect the system from the power source.<br>11. (Trained service technician only) Reseat the system board.<br>12. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Failed | The iBMC indicates failure in RTC 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>7. Disconnect the system from the power source.<br>8. (Trained service technician only) Replace the system board.<br>9. Reconnect the system to power and turn on the system.<br>10. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Failed | The iBMC indicates failure in HWM bus (BUS 4) | 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>7. Disconnect the system from the power source.<br>8. (Trained service technician only) Reseat the system board.<br>9. Reconnect the system to power and turn on the system.<br>10. Run the test again.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | iBMC | iBMC I2C Test | Failed | The iBMC indicates failure in IO 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 iBMC.<br>2. After 45 seconds, reconnect the system to the power source and turn on the system.<br>3. Run the test again.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. Make sure that the iBMC firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>6. Run the test again.<br>7. Disconnect the system from the power source.<br>8. Reseat the following components:<br>• Power-supply distribution board<br>• Power supplies<br>• Hard disk drive backplane or backplate<br>9. Run the test again.<br>10. Disconnect the system from the power source.<br>11. Reseat the PCI adapters one at a time. Run the test after reseating each adapter.<br>12. Disconnect the system from the power source.<br>13. (Trained service technician only) Reseat the system board.<br>14. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 201-811-xxx<br>201-818-xxx | Memory | Standalone Memory Test | Aborted | Test aborted: Could not locate SMBIOS key _SM_. | 1. Turn off and restart the server.<br>2. Run the test again.<br>3. 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>4. Run the test again.<br>5. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |
| 201-812-xxx | Memory | Standalone Memory Test | Aborted | Test aborted: SMBIOS type 0 structure indicates invalid machine ID that is not supported. | 1. Turn off and restart the server.<br>2. Run the test again.<br>3. 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>4. Run the test again.<br>5. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 201-813-xxx | Memory | Standalone Memory Test | Aborted | Test aborted: CPU n: Cannot turn off error reporting. | 1. Turn off and restart the server.<br>2. Run the test again.<br>3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>5. Run the test again.<br>6. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 201-814-xxx | Memory | Standalone Memory Test | Aborted | Test aborted: CPU n: Cannot disable scrubbing. | 1. Turn off and restart the server.<br>2. Run the test again.<br>3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>5. Run the test again.<br>6. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |
| 201-815-xxx<br>201-816-xxx | Memory | Standalone Memory Test | Aborted | Test aborted: Program Error: Quick Memory Menu Item selection problem. | 1. Turn off and restart the server.<br>2. Run the test again.<br>3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>4. Run the test again.<br>5. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 201-819-xxx | Memory | Standalone Memory Test | Aborted | Test aborted: START-END address ranges in the restricted area of memory. | 1. Turn off and restart the server.<br>2. Run the test again.<br>3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>5. Run the test again.<br>6. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 201-826-xxx | Memory | Standalone Memory Test | Aborted | Test aborted: Memory controller is disabled. | 1. Turn off and restart the server.<br>2. 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>3. Run the test again.<br>4. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |
| 201-827-xxx | Memory | Standalone Memory Test | Aborted | Test aborted: ECC feature is disabled. | 1. Turn off and restart the server.<br>2. 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>3. Run the test again.<br>4. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 201-844-xxx | Memory | Standalone Memory Test | Aborted | Test aborted: Cannot mask MSR machine Check control MASK registers. | 1. Turn off and restart the server.<br>2. Run the test again.<br>3. 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>4. Run the test again.<br>5. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |
| 201-845-xxx | Memory | Standalone Memory Test | Aborted | Test aborted: Cannot clear MSR machine Check Control registers | 1. Turn off and restart the server.<br>2. Run the test again.<br>3. 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>4. Run the test again.<br>5. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 201-877-xxx | Memory | Standalone Memory Test | Aborted | Test aborted: Sparing must be turned off in extended PCI space. | 1. Turn off and restart the server.<br>2. In the Setup utility, select **System Settings → Memory** and disable memory online spare.<br>3. 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>4. Run the test again.<br>5. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 201-878-xxx | Memory | Standalone Memory Test | Aborted | Test aborted: Sparing is enabled in PCI space. | 1. Turn off and restart the server.<br>2. In the Setup utility, select **System Settings → Memory** and disable memory online spare.<br>3. 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>4. Run the test again.<br>5. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |
| 201-886-xxx | Memory | Standalone Memory Test | Aborted | Test aborted: E820 function call indicates not enough memory available for testing. | 1. Turn off and restart the server.<br>2. Run the test again.<br>3. 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>4. Run the test again.<br>5. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 201-899-xxx | Memory | Standalone Memory Test | Aborted | User abort | Test was terminated by user before completion. |
| 201-901-xxx | Memory | Memory Test | Failed | Test failed: xxx = Failing CPU [1 – 4] Single Bit Error in DIMMs: PnDimmy or Multi bit error in DIMMs: PnDimmy PnDimmz n=[1 – 4] y=[1 – 4] **Note:** You might have a single failing DIMM recorded during multi bit ECC error. | 1. Turn off the server and disconnect it from the power source. Wait for 45 seconds.<br>2. Reseat the DIMMs for microprocessor n (see"Removing a memory module" on page 173 and "Installing a memory module" on page 174).<br>3. Reconnect the server to power and turn on the system.<br>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>5. 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>6. Run the test again.<br>7. Replace the failing DIMMs.<br>8. Re-enable all memory in the Setup utility (see Chapter 6, "Configuration information and instructions," on page 235).<br>9. Run the test again.<br>10. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 202-801-xxx | Memory | Memory Stress Test | Aborted | Internal program error. | 1. Turn off and restart the server.<br>2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>3. 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>4. Run the test again.<br>5. Turn off and restart the server if necessary to recover from a hung state.<br>6. Run the memory diagnostics to identify the specific failing DIMM.<br>7. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 event log. If necessary, enable all memory in the Setup utility (see Chapter 6, "Configuration information and instructions," on page 235).<br>2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>3. Run the test again.<br>4. Run the standard memory test to validate all memory.<br>5. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 202-901-xxx | Memory | Memory Stress Test | Failed | Test failure. | 1. Run the standard memory test to validate all memory.<br>2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go tohttp://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>3. Turn off the server and disconnect it from power.<br>4. Reseat the DIMMs (see "Removing a memory module" on page 173 and "Installing a memory module" on page 174).<br>5. Reconnect the server to power and turn on the server.<br>6. Run the test again.<br>7. If the failure remains, collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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<br>• Read/ Write Test<br>• Self-Test<br><br>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-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>2. Run the test again.<br>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.<br>4. Run the test again.<br>5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559.<br>6. Run the test again.<br>7. 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>8. Run the test again.<br>9. Replace the CD or DVD drive (see "Removing the optional DVD drive" on page 178 and "Installing an optional DVD drive" on page 178).<br>10. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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<br>• Read/ Write Test<br>• Self-Test<br><br>Messages and actions apply to all three tests. | Aborted | The media tray is open. | 1. Close the media tray and wait 15 seconds.<br>2. Run the test again.<br>3. Insert a new CD or DVD into the drive and wait for 15 seconds for the media to be recognized.<br>4. Run the test again.<br>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.<br>6. Run the test again.<br>7. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>8. Run the test again.<br>9. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559.<br>10. Run the test again.<br>11. Replace the CD or DVD drive (see "Removing the optional DVD drive" on page 178 and "Installing an optional DVD drive" on page 178).<br>12. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 215-803-xxx | Optical drive | • Verify Media Installed<br>• Read/ Write Test<br>• Self-Test<br><br>Messages and actions apply to all three tests. | Failed | The disc might be in use by the system. | 1. Wait for the server activity to stop.<br>2. Run the test again<br>3. Turn off and restart the server.<br>4. Run the test again.<br>5. Replace the CD or DVD drive (see "Removing the optional DVD drive" on page 178 and "Installing an optional DVD drive" on page 178).<br>6. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |
| 215-901-xxx | Optical drive | • Verify Media Installed<br>• Read/ Write Test<br>• Self-Test<br><br>Messages and actions apply to all three tests. | Aborted | Drive media is not detected. | 1. Insert a CD or DVD into the drive or try a new media, and wait for 15 seconds.<br>2. Run the test again.<br>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.<br>4. Run the test again.<br>5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559.<br>6. Run the test again.<br>7. Replace the CD or DVD drive (see "Removing the optional DVD drive" on page 178 and "Installing an optional DVD drive" on page 178).<br>8. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 215-902-xxx | Optical drive | • Verify Media Installed<br>• Read/ Write Test<br>• Self-Test<br><br>Messages and actions apply to all three tests. | Failed | Read miscompare. | 1. Insert a CD or DVD into the drive or try a new media, and wait for 15 seconds.<br>2. Run the test again.<br>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.<br>4. Run the test again.<br>5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559.<br>6. Run the test again.<br>7. Replace the CD or DVD drive (see "Removing the optional DVD drive" on page 178 and "Installing an optional DVD drive" on page 178).<br>8. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, seehttp://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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<br>• Read/ Write Test<br>• Self-Test<br><br>Messages and actions apply to all three tests. | Aborted | Could not access the drive. | 1. Insert a CD or DVD into the drive or try a new media, and wait for 15 seconds.<br>2. Run the test again.<br>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.<br>4. Run the test again.<br>5. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>6. Run the test again.<br>7. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559.<br>8. Run the test again.<br>9. Replace the CD or DVD drive (see "Removing the optional DVD drive" on page 178 and "Installing an optional DVD drive" on page 178).<br>10. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 215-904-xxx | Optical drive | • Verify Media Installed<br>• Read/ Write Test<br>• Self-Test<br>Messages and actions apply to all three tests. | Failed | A read error occurred. | 1. Insert a CD or DVD into the drive or try a new media, and wait for 15 seconds.<br>2. Run the test again.<br>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.<br>4. Run the test again.<br>5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559.<br>6. Run the test again.<br>7. Replace the CD or DVD drive (see "Removing the optional DVD drive" on page 178 and "Installing an optional DVD drive" on page 178).<br>8. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |
| 217-901-xxx | SAS/SATA hard drive | Disk Drive Test | Failed | | 1. Reseat all backplane connections at both ends.<br>2. Reseat all the drives (see "Removing a hot-swap hard disk drive" on page 175 and "Installing a hot-swap hard disk drive" on page 175).<br>3. Run the test again.<br>4. Make sure that the firmware is at the latest level.<br>5. Run the test again.<br>6. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 264-901-000 | Tape drive | • Presence Test<br>• Self Test<br>• Load Tape Test<br>• Tape Alert Check Test<br>• Read/ Write Self Test<br>• Read/ Write Test<br><br>Messages and actions apply to all tests. | Failed | An error was found in the tape alert log page. | 1. Clean the tape drive, using the appropriate cleaning media, and insert new media.<br>2. Run the test again.<br>3. Clear the error log.<br>4. Run the test again.<br>5. Make sure that the drive firmware is at the latest level. For the latest level of drive firmware and software for tape drives and libraries, go to http://www.ibm.com/support/docview.wss?uid=psg1TAPE-FILES.<br>6. Run the test again.<br>7. Note the tape alert flag that is returned in the tape alert log.<br>8. Replace the tape drive if a hardware failure is indicated.<br>9. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 264-902-000 | Tape drive | • Presence Test<br>• Self Test<br>• Load Tape Test<br>• Tape Alert Check Test<br>• Read/ Write Self Test<br>• Read/ Write Test<br><br>Messages and actions apply to all tests. | Failed | Media is not detected. | 1. Check the tape drive cabling for loose or broken connections or damage to the cable. Replace the cable if it is damaged.<br>2. Clean the tape drive, using the appropriate cleaning media, and insert new media.<br>3. Run the test again.<br>4. Make sure that the drive firmware is at the latest level. For the latest level of drive firmware and software for tape drives and libraries, go to http://www.ibm.com/support/docview.wss?uid=psg1TAPE-FILES.<br>5. Run the test again.<br>6. Replace the tape drive.<br>7. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |
| 264-903-000 | Tape drive | • Presence Test<br>• Self Test<br>• Load Tape Test<br>• Tape Alert Check Test<br>• Read/ Write Self Test<br>• Read/ Write Test<br><br>Messages and actions apply to all tests. | Failed | Media error. | 1. Check the tape drive cabling for loose or broken connections or damage to the cable. Replace the cable if it is damaged.<br>2. Clean the tape drive, using the appropriate cleaning media, and insert new media.<br>3. Run the test again.<br>4. Make sure that the drive firmware is at the latest level. For the latest level of drive firmware and software for tape drives and libraries, go to http://www.ibm.com/support/docview.wss?uid=psg1TAPE-FILES.<br>5. Run the test again.<br>6. Replace the tape drive.<br>7. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 264-904-000 | Tape drive | • Presence Test<br>• Self Test<br>• Load Tape Test<br>• Tape Alert Check Test<br>• Read/ Write Self Test<br>• Read/ Write Test<br><br>Messages and actions apply to all tests. | Failed | Drive hardware error. | 1. Check the tape drive cabling for loose or broken connections or damage to the cable. Replace the cable if it is damaged.<br>2. Clean the tape drive, using the appropriate cleaning media, and insert new media.<br>3. Run the test again.<br>4. Make sure that the drive firmware is at the latest level. For the latest level of drive firmware and software for tape drives and libraries, go to http://www.ibm.com/support/docview.wss?uid=psg1TAPE-FILES.<br>5. Run the test again.<br>6. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>7. Run the test again.<br>8. 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your system to display a matrix of available firmware.<br>9. Run the test again.<br>10. Replace the tape drive.<br>11. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | • Presence Test<br>• Self Test<br>• Load Tape Test<br>• Tape Alert Check Test<br>• Read/ Write Self Test<br>• Read/ Write Test<br><br>Messages and actions apply to all tests. | Failed | Software error: invalid request. | 1. Clean the tape drive, using the appropriate cleaning media, and insert new media.<br>2. Run the test again.<br>3. Make sure that the drive firmware is at the latest level. For the latest level of drive firmware and software for tape drives and libraries, go to http://www.ibm.com/support/docview.wss?uid=psg1TAPE-FILES.<br>4. Run the test again.<br>5. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>6. Run the test again.<br>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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your system to display a matrix of available firmware.<br>8. Run the test again.<br>9. Replace the tape drive.<br>10. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 264-906-000 | Tape drive | • Presence Test<br>• Self Test<br>• Load Tape Test<br>• Tape Alert Check Test<br>• Read/ Write Self Test<br>• Read/ Write Test<br><br>Messages and actions apply to all tests. | Failed | Unrecognized error. | 1. Clean the tape drive, using the appropriate cleaning media, and insert new media.<br>2. Run the test again.<br>3. Make sure that the drive firmware is at the latest level. For the latest level of drive firmware and software for tape drives and libraries, go to http://www.ibm.com/support/docview.wss?uid=psg1TAPE-FILES.<br>4. Run the test again.<br>5. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>6. Run the test again.<br>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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your system to display a matrix of available firmware.<br>8. Run the test again.<br>9. Replace the tape drive.<br>10. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 264-907-000 | Tape drive | • Presence Test<br>• Self Test<br>• Load Tape Test<br>• Tape Alert Check Test<br>• Read/ Write Self Test<br>• Read/ Write Test<br><br>Messages and actions apply to all tests. | Failed | An error was found in the block address: WRONG ADDR, block size=512 bytes. SensorKey is XXX | 1. Clean the tape drive, using the appropriate cleaning media, and insert new media.<br>2. Run the test again.<br>3. Make sure that the drive firmware is at the latest level. For the latest level of drive firmware and software for tape drives and libraries, go to http://www.ibm.com/support/docview.wss?uid=psg1TAPE-FILES.<br>4. Run the test again.<br>5. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>6. Run the test again.<br>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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your system to display a matrix of available firmware.<br>8. Run the test again.<br>9. Replace the tape drive.<br>10. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 264-908-000 | Tape drive | • Presence Test<br>• Self Test<br>• Load Tape Test<br>• Tape Alert Check Test<br>• Read/ Write Self Test<br>• Read/ Write Test<br><br>Messages and actions apply to all tests. | Failed | An error was found in getting tape capacity. | 1. Make sure a tape is present in the tape drive.<br>2. Clean the tape drive, using the appropriate cleaning media, and insert new media.<br>3. Run the test again.<br>4. Make sure that the drive firmware is at the latest level. For the latest level of drive firmware and software for tape drives and libraries, go to http://www.ibm.com/support/docview.wss?uid=psg1TAPE-FILES.<br>5. Run the test again.<br>6. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.<br>7. Run the test again.<br>8. 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your system to display a matrix of available firmware.<br>9. Run the test again.<br>10. Replace the tape drive.<br>11. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 235.<br>2. Run the test again.<br>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.<br>4. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |
| 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 235.<br>2. Run the test again.<br>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.<br>4. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 405-902-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 235.<br>2. Run the test again.<br>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.<br>4. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 235.<br>2. Run the test again.<br>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 Chapter 6, "Configuration information and instructions," on page 235) to assign a unique interrupt to the device.<br>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.<br>5. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 405-904-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 235.<br>2. Run the test again.<br>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 Chapter 6, "Configuration information and instructions," on page 235) to assign a unique interrupt to the device.<br>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.<br>5. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>2. Run the test again.<br>3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter (see "Removing a PCI adapter" on page 170 and "Installing a PCI adapter" on page 170). Check the PCI Information and Network Settings information in the DSA log to determine the physical location of the failing component.<br>4. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 405-906-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.<br>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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>3. Run the test again.<br>4. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter (see "Removing a PCI adapter" on page 170 and "Installing a PCI adapter" on page 170). Check the PCI Information and Network Settings information in the DSA log to determine the physical location of the failing component.<br>5. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 405-907-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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware.<br>2. Run the test again.<br>3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter (see "Removing a PCI adapter" on page 170 and "Installing a PCI adapter" on page 170). Check the PCI Information and Network Settings information in the DSA log to determine the physical location of the failing component.<br>4. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 | Intel Ethernet device | Test Adapter Registers | Failed | A failure was detected during register test. | 1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>2. Run the test again.<br>3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component.<br>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?lndocid=SERV-CALL&lndocid=5000008. |
| 405-903-xxx | Intel Ethernet device | Test EEPROM | Failed | A failure was detected during EEPROM test. | 1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>2. Run the test again.<br>3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

*Table 5. 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 |
|---|---|---|---|---|---|
| 405-904-xxx | Intel Ethernet device | Test FIFO | Failed | A failure was detected during FIFO test. | 1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 235.<br>2. Run the test again.<br>3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component.<br>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?lndocid=SERV-CALL&lndocid=5000008. |

## Tape alert flags

If a tape drive is installed in the server, go to http://www-947.ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5079217 for the *Tape Storage Products Problem Determination and Service Guide*. This document describes troubleshooting and problem determination information for your tape drive.

Tape alert flags are numbered 1 through 64 and indicate specific media-changer error conditions. Each tape alert is returned as an individual log parameter, and its state is indicated in bit 0 of the 1-byte Parameter Value field of the log parameter. When this bit is set to 1, the alert is active.

Each tape alert flag has one of the following severity levels:

C: Critical
W: Warning
I: Information

Different tape drives support some or all of the following flags in the tape alert log:

**Flag 2: Library Hardware B (W)** This flag is set when an unrecoverable mechanical error occurs.

**Flag 4: Library Hardware D (C)** This flag is set when the tape drive fails the power-on self-test or a mechanical error occurs that requires a power cycle to recover. This flag is internally cleared when the drive is powered-off.

**Flag 13: Library Pick Retry (W)** This flag is set when a high retry count threshold is passed during an operation to pick a cartridge from a slot before the operation succeeds. This flag is internally cleared when another pick operation is attempted.

**Flag 14: Library Place Retry (W)** This flag is set when a high retry count threshold is passed during an operation to place a cartridge back into a slot before the operation succeeds. This flag is internally cleared when another place operation is attempted.

**Flag 15: Library Load Retry (W)** This flag is set when a high retry count threshold is passed during an operation to load a cartridge into a drive before the operation succeeds. This flag is internally cleared when another load operation is attempted. Note that if the load operation fails because of a media or drive problem, the drive sets the applicable tape alert flags.

**Flag 16: Library Door (C)** This flag is set when media move operations cannot be performed because a door is open. This flag is internally cleared when the door is closed.

**Flag 23: Library Scan Retry (W)** This flag is set when a high retry count threshold is passed during an operation to scan the bar code on a cartridge before the operation succeeds. This flag is internally cleared when another bar code scanning operation is attempted.

## Recovering the server firmware

The flash memory in the server consists of a primary bank and a backup bank. You must maintain a bootable IBM System x Server Firmware (server firmware) image in the backup bank. If the server firmware in the primary bank has become corrupted, such as from a power failure during an update, you can recover the server firmware using the in-band method through the automatic boot recovery function (automatic) or using the boot recovery jumper and an IMB Flash UEFI Update (manual).

You can obtain an IBM UEFI Flash Update package from http://www.ibm.com/support/fixcentral/ or from your IBM service representative.

## In-band automatic recovery method

If the integrated baseboard management controller (iBMC) detects a problem with the server firmware in the primary bank, the automatic boot recovery function starts the server from the backup bank so that you can restore the server firmware in the primary bank. Use this method if the BRD LED on the light path diagnostics panel is lit and there is an event log entry or if `Booting Backup Image` is displayed on the firmware splash screen; otherwise, use the in-band manual recovery method.

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

1. Boot the server to an operating system that is supported by the IBM Flash UEFI Update package that you downloaded.
2. Install the IBM Flash UEFI Update package, following the instructions in the readme file that comes with the update package.
3. Restart the server.
4. When the prompt `Press F3 to restore to primary` is displayed, press F3 to start the server from the primary bank.

**Note:** You must restore the server firmware in the primary bank before the prompt `Press F3 to restore to primary` is displayed.

## In-band manual recovery method

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

1. Turn off the server, and disconnect all power cords and external cables.
2. Remove the server top cover. See “Removing the top cover” on page 161 for more information.
3. Locate the boot recovery jumper on the system board (see “System-board jumpers” on page 18).
4. Move the jumper from pins 1 and 2 to pins 2 and 3 to enable the server firmware recovery mode.
5. Reinstall the server cover; then, reconnect all power cords.
6. Restart the server. The power-on self-test (POST) starts.
7. Boot the server to an operating system that is supported by the firmware update package that you downloaded.
8. Perform the firmware update by following the instructions that are in the firmware update package readme file.
9. Copy the downloaded firmware update package into a directory.
10. From a command line, type *`filename`*`-s`, where *filename* is the name of the executable file that you downloaded with the firmware update package.
11. Turn off the server and disconnect all power cords and external cables, and then remove the server cover.
12. Move the boot recovery jumper back to the primary position (pins 1 and 2).
13. Reinstall the server cover, and then reconnect all the power cables.
14. Restart the server.

## Automatic boot failure recovery (ABR)

If the server is booting up and the iBMC detects problems with the server firmware in the primary bank, it automatically switches to the backup firmware bank and gives you the opportunity to recover the primary bank. To recover the server firmware primary bank, complete the following steps:

1. Restart the server.
2. When the prompt `Press F3 to restore to primary` is displayed. Press F3 to recover the primary bank and restart the server.

## Three-boot failure

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

1. Undo any configuration changes that you made recently, and restart the server.
2. Remove any devices that you added recently, and restart the server.
3. If the problem remains, start the Setup utility, select **Load Default Settings**, and then select **Save Settings** to restore the server factory settings.

## iBMC event log

The following fields identify an entry in the iBMC event log:

**Event ID:** The identifier used for record access.

**Timestamp:** The date and time the event was logged.

**Sensor name:** The name of sensor.

**Sensor type:** The event class or type of sensor.

**Description:** The type of threshold crossing or trigger that produced the event.

**UNC:** Upper Non-Critical

**UC:** Upper Critical

**UNR:** Upper Non-Recoverable

**LNC:** Lower Non-Critical

**LC:** Lower Critical

**LNR:** Lower Non-Recoverable

**00:** Device Removed/Device Absent, Power Off/Power Down, Predictive Failure deasserted, or State Deasserted

**01:** Device Inserted/Device Present, Power Cycle, Predictive Failure asserted, or State Asserted

The following table lists messages that might be displayed in the integrated baseboard management controller (iBMC) event log. You can view the iBMC event log through the iBMC web interface and through IBM Dynamic System Analysis (as the ASM event log).

*Table 6. Integrated baseboard management controller (iBMC) error 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 name | Sensor type | Description | Message | Action |
|---|---|---|---|---|
| P*n*_TMP (*n* = microprocessor number) | 01h | UNC | Upper Non-Critical - Going High - Asserted | 1. Make sure that the fans are operating, that there are no obstructions to the airflow (front and rear of the server), that the air baffle is in place and correctly installed, and that the server cover and fan door are installed and completely closed.<br>2. Make sure that the heat sink for microprocessor *n* is installed correctly.<br>(*n* = microprocessor number) |

*Table 6. Integrated baseboard management controller (iBMC) error 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 name | Sensor type | Description | Message | Action |
|---|---|---|---|---|
| P1_DIMM_TMP | 01h | UNC, UC, UNR | Upper Non-Critical - Going High - Asserted | Make sure that the fans are operating, that there are no obstructions to the airflow (front and rear of the server), that the air baffle is in place and correctly installed, and that the server cover and fan door are installed and completely closed. |
| P2_DIMM_TMP | 01h | UNC, UC, UNR | Upper Non-Critical - Going High - Asserted | Make sure that the fans are operating, that there are no obstructions to the airflow (front and rear of the server), that the air baffle is in place and correctly installed, and that the server cover and fan door are installed and completely closed. |
| AMBIENT_TMP | 01h | UNC | Upper Non-Critical - Going High - Asserted | Make sure that the fans are operating, that there are no obstructions to the airflow (front and rear of the server), that the air baffle is in place and correctly installed, and that the server cover and fan door are installed and completely closed. |
| P1_VRD_TMP | 01h | UNC | Upper Non-Critical - Going High - Asserted | Make sure that the fans are operating, that there are no obstructions to the airflow (front and rear of the server), that the air baffle is in place and correctly installed, and that the server cover and fan door are installed and completely closed. |
| P2_VRD_TMP | 01h | UNC | Upper Non-Critical - Going High - Asserted | Make sure that the fans are operating, that there are no obstructions to the airflow (front and rear of the server), that the air baffle is in place and correctly installed, and that the server cover and fan door are installed and completely closed. |

*Table 6. Integrated baseboard management controller (iBMC) error 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 name | Sensor type | Description | Message | Action |
|---|---|---|---|---|
| P3_VRD_TMP | 01h | UNC | Upper Non-Critical - Going High - Asserted | Make sure that the fans are operating, that there are no obstructions to the airflow (front and rear of the server), that the air baffle is in place and correctly installed, and that the server cover and fan door are installed and completely closed. |
| P4_VRD_TMP | 01h | UNC | Upper Non-Critical - Going High - Asserted | Make sure that the fans are operating, that there are no obstructions to the airflow (front and rear of the server), that the air baffle is in place and correctly installed, and that the server cover and fan door are installed and completely closed. |
| P1_MM_VRD_TMP | 01h | UNC | Upper Non-Critical - Going High - Asserted | Make sure that the fans are operating, that there are no obstructions to the airflow (front and rear of the server), that the air baffle is in place and correctly installed, and that the server cover and fan door are installed and completely closed. |
| P2_MM_VRD_TMP | 01h | UNC | Upper Non-Critical - Going High - Asserted | Make sure that the fans are operating, that there are no obstructions to the airflow (front and rear of the server), that the air baffle is in place and correctly installed, and that the server cover and fan door are installed and completely closed. |
| P3_MM_VRD_TMP | 01h | UNC | Upper Non-Critical - Going High - Asserted | Make sure that the fans are operating, that there are no obstructions to the airflow (front and rear of the server), that the air baffle is in place and correctly installed, and that the server cover and fan door are installed and completely closed. |

*Table 6. Integrated baseboard management controller (iBMC) error 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 name | Sensor type | Description | Message | Action |
|---|---|---|---|---|
| P4_MM_VRD_TMP | 01h | UNC | Upper Non-Critical - Going High - Asserted | Make sure that the fans are operating, that there are no obstructions to the airflow (front and rear of the server), that the air baffle is in place and correctly installed, and that the server cover and fan door are installed and completely closed. |
| FAN*n*_SPEED (*n* = fan number) | 04h | LC, LNC | Lower-Critical - Going High - Asserted | 1. Reseat fan *n*, which is indicated by a lit LED near the fan connector on the system board (you can also view the lit LED on the fan cage).<br>2. Replace fan *n*.<br>(*n* = fan number) |
| P1_VRD_FAIL | 0Bh | 00: State Deasserted 01: State Asserted | State Asserted - Asserted | (Trained service technician only) Replace the system board. |
| P2_VRD_FAIL | 0Bh | 00: State Deasserted 01: State Asserted | State Asserted - Asserted | (Trained service technician only) Replace the system board. |
| P3_VRD_FAIL | 0Bh | 00: State Deasserted 01: State Asserted | State Asserted - Asserted | (Trained service technician only) Replace the system board. |
| P4_VRD_FAIL | 0Bh | 00: State Deasserted 01: State Asserted | State Asserted - Asserted | (Trained service technician only) Replace the system board. |
| P1_MM_VRD_FAIL | 0Bh | 00: State Deasserted 01: State Asserted | State Asserted - Asserted | (Trained service technician only) Replace the system board. |
| P2_MM_VRD_FAIL | 0Bh | 00: State Deasserted 01: State Asserted | State Asserted - Asserted | (Trained service technician only) Replace the system board. |
| P3_MM_VRD_FAIL | 0Bh | 00: State Deasserted 01: State Asserted | State Asserted - Asserted | (Trained service technician only) Replace the system board. |

*Table 6. Integrated baseboard management controller (iBMC) error 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 name | Sensor type | Description | Message | Action |
|---|---|---|---|---|
| P4_MM_VRD_FAIL | 0Bh | 00: State Deasserted 01: State Asserted | State Asserted - Asserted | (Trained service technician only) Replace the system board. |
| VDD_12V_1 | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted, Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_VLDT_P1 | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted, Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_VLDT_P2 | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted, Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_VLDT_P3 | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted, Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_VLDT_P4 | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted, Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_P1_VDDA | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted, Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_P2_VDDA | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted, Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_P3_VDDA | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted, Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_P4_VDDA | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted, Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_3.3_RUN | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted, Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |

*Table 6. Integrated baseboard management controller (iBMC) error 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 name | Sensor type | Description | Message | Action |
|---|---|---|---|---|
| VDD_1.8_RUN | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted, Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_1.2_RUN | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted, Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_1.1_RUN | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted, Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_3.3_STBY | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted, Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_5_RUN | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted, Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| RTC_BATTERY | 02h | LNR, LC | Lower- Non-Recoverable - Going High - Asserted | Replace the 3 V battery. |
| USB*n*_OverCurrent (*n* = USB connector number) | 03h | 00: State Deasserted 01: State Asserted | State Asserted - Asserted | 1. Reseat the device connected to USB connector *n*.<br>2. Remove the device connected to USB connector *n*.<br>3. (Trained service technician only) Replace the system board.<br>(*n* = USB connector number) |

*Table 6. Integrated baseboard management controller (iBMC) error 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 name | Sensor type | Description | Message | Action |
|---|---|---|---|---|
| HDD*n*_FAULT (*n* = hard disk drive number) | 0Dh | 00: State Deasserted<br>01: State Asserted | State Asserted - Asserted | 1. Reseat hard disk drive *n*. Wait 1 minute or more before you reinstall the drive.<br>2. Replace the hard disk drive.<br>3. Make sure that the disk firmware and RAID controller firmware is at the latest level.<br>4. Check the backplane cable connections.<br>(*n* = hard disk drive number) |
| PDB_CABLE | 1Bh | 00: Device Removed / Device Absent<br>01: Device Inserted / Device Present | Device Removed / Device Absent - Asserted | 1. Reseat the power cable from the power-supply distribution board to the system board.<br>2. Replace the power-supply distribution board. |
| USB_CABLE | 1Bh | 00: Device Removed / Device Absent<br>01: Device Inserted / Device Present | Device Removed / Device Absent - Asserted | 1. Reseat the USB signal cable on the system board.<br>2. Replace the front USB assembly. |
| MINI_SAS_CABLE1 | 1Bh | 00: Device Removed / Device Absent<br>01: Device Inserted / Device Present | Device Removed / Device Absent - Asserted | 1. Reseat SAS signal cable 1.<br>2. Replace the SAS signal cable.<br>3. Replace the hard disk drive backplane. |
| MINI_SAS_CABLE2 | 1Bh | 00: Device Removed / Device Absent<br>01: Device Inserted / Device Present | Device Removed / Device Absent - Asserted | 1. Reseat SAS signal cable 2.<br>2. Replace the SAS signal cable.<br>3. Replace the hard disk drive backplane. |

*Table 6. Integrated baseboard management controller (iBMC) error 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 name | Sensor type | Description | Message | Action |
|---|---|---|---|---|
| HDDBP_I2C_CABLE | 1Bh | 00: Device Removed / Device Absent<br>01: Device Inserted / Device Present | Device Removed / Device Absent - Asserted | 1. Reseat the I2C signal cable.<br>2. Replace the I2C signal cable.<br>3. Replace the hard disk drive backplane. |
| FP_CABLE | 1BH | 00: Device Removed / Device Absent<br>01: Device Inserted / Device Present | Device Removed / Device Absent - Asserted | 1. Reseat the operator information panel cable.<br>2. Replace the operator information panel cable.<br>3. Replace the operator information panel. |
| PSU*n*_FAILURE (*n* = power supply number) | 08h | 00: Device Removed / Device Absent<br>01: Device Inserted / Device Present | State Asserted - Asserted | 1. Check the power-supply LEDs.<br>2. Follow the actions in Table 4 on page 57 and "Power problems" on page 44.<br>3. Replace power supply *n*.<br>(*n* = power supply number) |
| PSU*n*_POWER_CORD (*n* = power supply number) | 1Bh | 00: Device Removed / Device Absent<br>01: Device Inserted / Device Present | Device Removed / Device Absent - Asserted | Reseat the power cord to power supply *n*.<br>(*n* = power supply number) |
| VDD_12V_2 | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted<br>Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_12V_3 | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted<br>Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_12V_4 | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted<br>Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |

*Table 6. Integrated baseboard management controller (iBMC) error 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, Type 7164," on page 143 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 name | Sensor type | Description | Message | Action |
|---|---|---|---|---|
| VDD_12V_5 | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted<br>Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_12V_6 | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted<br>Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| VDD_12V_7 | 02h | LNR, UNR | Lower- Non-Recoverable - Going High - Asserted<br>Upper-Non-Recoverable - Going High - Asserted | (Trained service technician only) Replace the system board. |
| CPU1_PRESENT | 07h | 00: Device Removed / Device Absent<br>01: Device Inserted / Device Present | Device Removed / Device Absent - Asserted | 1. Make sure that a microprocessor is installed in microprocessor socket 1.<br>2. (Trained service technician only) Reseat microprocessor 1. |
| FAN*n*_PFA<br>(*n* = fan number) | 04h | 00: Predictive Failure deasserted<br>01: Predictive Failure asserted | Predictive Failure asserted - Asserted | 1. Reseat the failing fan *n*, which is indicated by a lit LED near the fan connector on the system board (you can also view the lit LED on the fan cage).<br>2. Replace the failing fan.<br>(*n* = fan number) |
| RTC_BATTERY_PFA | 29h | 00: Predictive Failure deasserted<br>01: Predictive Failure asserted | Predictive Failure asserted - Asserted | Replace the 3 V battery. |

## Solving power problems

Power problems can be difficult to solve. For example, there can be a short circuit 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 (see “Removing a PCI adapter” on page 170 and “Installing a PCI adapter” on page 170) 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 140 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 and which switch you are using. See the operating-system and switch 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.
- Determine whether the switch supports auto-negotiation. For auto-negotiation problem determination procedures, see the switch documentation. If the switch does not support auto-negotiation, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the switch.
- 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 switch.
  - The Ethernet link status LED is lit when the Ethernet controller receives a link pulse from the switch. If the LED is off, there might be a defective connector or cable or a problem with the switch.
  - 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 switch and network are operating and that the correct device drivers are installed.
- Check the LAN activity LED on the rear of the server. The LAN activity LED is lit when data is active on the Ethernet network. If the LAN activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check for operating-system-specific causes of the problem.
- Make sure that the device drivers on the client and server are using the same protocol.

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

## Solving undetermined problems

If the Dynamic System Analysis (DSA) 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 47.

Damaged data in CMOS memory or damaged IBM System x Server Firmware (server firmware) can cause undetermined problems. To reset the CMOS data, use the clear CMOS jumper to override the power-on password and clear the CMOS memory; see “System-board jumpers” on page 18.

Damaged memory connector pins or incorrectly installed DIMMs can prevent the server from starting or might cause a POST checkpoint halt. For example, a DIMM that is not completely installed or has bent connector pins might cause the server to continually restart or display an F2 checkpoint halt. Remove and inspect all memory-card connector pins for bent or damaged interface pins (see “Removing a memory module” on page 173 and “Installing a memory module” on page 174). Replace all DIMMs that have damaged pins and make sure that each DIMM is firmly seated in the DIMM connector.

Check the LEDs on all the power supplies (see “Power-supply LEDs” on page 56). 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 (see “Removing a PCI adapter” on page 170 and “Installing a PCI adapter” on page 170).
   - Hard disk drives (see “Removing a hot-swap hard disk drive” on page 175 and “Installing a hot-swap hard disk drive” on page 175).
   - Memory modules. The minimum configuration requirement is 4 GB (two 2 GB DIMMs). (See “Memory modules (DIMM)” on page 171).

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

- One power supply
- Power cord
- Two microprocessors
- Two 2 GB DIMMs (in DIMM connectors 1 and 9)
- Operator information panel
- PCI riser-card assembly

4. Turn on the server. If the problem remains, suspect the following components in the following order:
   a. Power-supply distribution board
   b. Memory
   c. Microprocessor
   d. 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 PCI riser-card assembly.

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 Dynamic System Analysis 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:

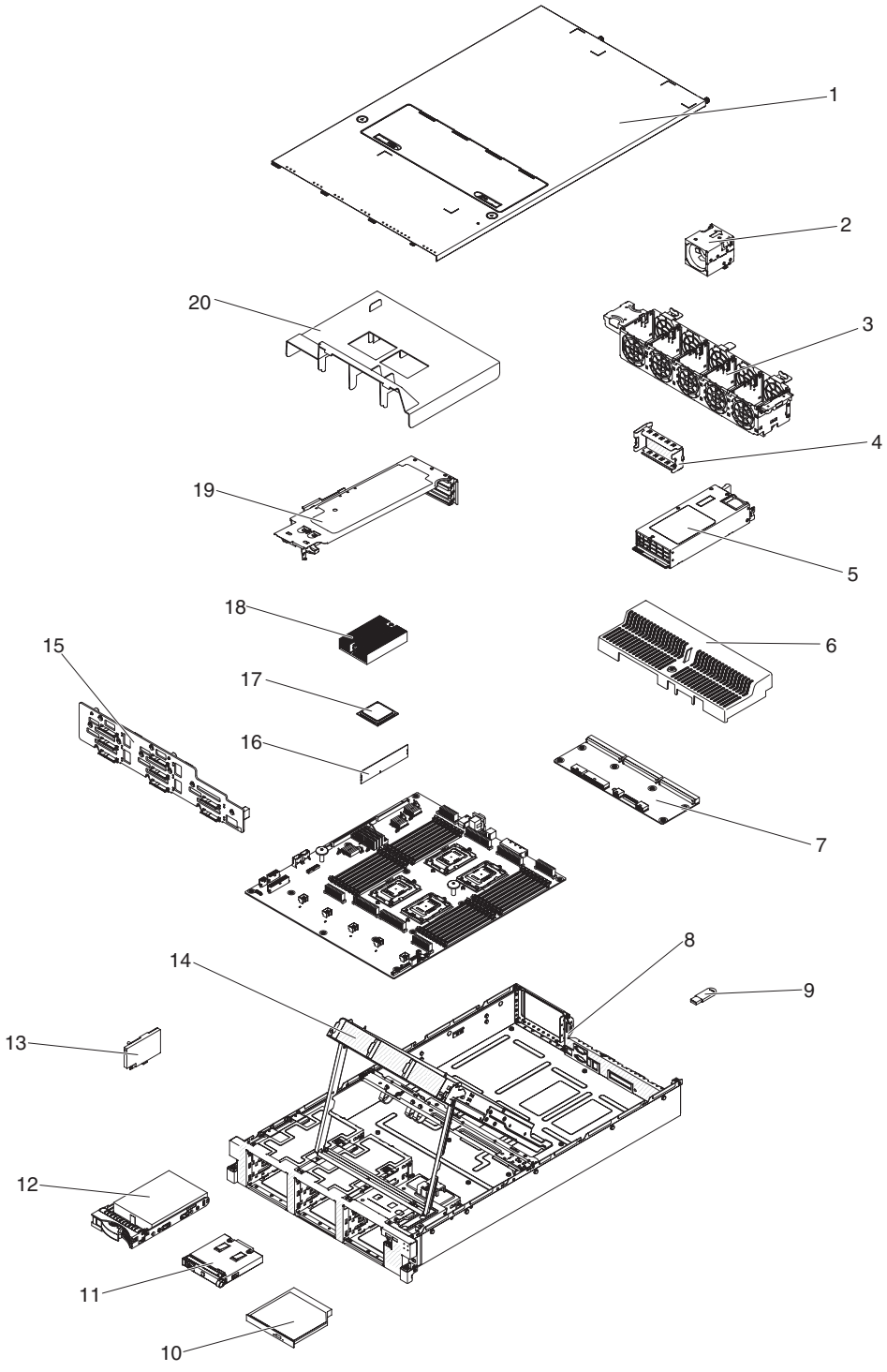
- Machine type and model
- IBM System x Server Firmware level
- Adapters and attachments, in the same locations
- Address jumpers, terminators, and cabling
- Software versions and levels
- Diagnostic program type and version level
- Configuration option settings
- Operating-system control-file setup

See “Getting help and technical assistance” on page 255 for information about calling IBM for service.

See “Getting help and technical assistance” on page 255 for information about calling IBM for service.

# Chapter 4. Parts listing, Type 7164

The following replaceable components are available for the System x3755 M3 Type 7164 except as specified otherwise in Table 7 on page 144. For an updated parts listing, go to http://www.ibm.com/supportportal/.



## Replaceable server components

Replaceable components are of four types:

- **Consumable part:** Purchase and replacement of consumable parts (components, such as batteries and printer cartridges, that have depletable life) is your responsibility. If IBM acquires or installs a consumable part at your request, you will be charged for the service.
- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request with no service agreement, 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.

*Table 7. Parts listing, Type 7164*

| Index | Description | CRU part number (Tier 1) | CRU part number (Tier 2) | FRU part number |
|---|---|---|---|---|
| 1 | Top cover | 69Y4962 | | |
| 2 | Fan, hot-swap, redundant | 69Y4994 | | |
| 2 | Fan, non-hot-swap, non-redundant | 69Y4995 | | |
| 3 | Fan cage | 69Y4988 | | |
| 4 | Filler, power supply | 69Y4974 | | |
| 5 | Power supply, 1100 W | 69Y4934 | | |
| 6 | Safety cover | 69Y4963 | | |
| 7 | Power-supply distribution board | | | 69Y4918 |
| 8 | Chassis | | | 69Y4961 |
| 9 | USB hypervisor key | 44W2612 | | |
| 10 | DVD-ROM drive, SATA | 44W3255 | | |
| 11 | Operator information panel | | 44E4372 | |
| 12 | Hard disk drive, hot-swap, 2 TB 7.2 K, 3.5-inch | 42D0783 | | |
| 12 | Hard disk drive, simple-swap, 2 TB 7.2 K, 3.5-inch | 42D0788 | | |
| 12 | Hard disk drive, hot-swap, 1 TB 7.2 K, 3.5-inch SAS | 42D0778 | | |
| 12 | Hard disk drive, hot-swap, 1 TB 7.2 K, 3.5-inch SATA | 43W7629 | | |
| 12 | Hard disk drive, hot-swap, 300 GB 15K, 3.5-inch SAS | 44W2235 | | |
| 12 | Hard disk drive, hot-swap, 450 GB 15K, 3.5-inch SAS | 44W2240 | | |
| 12 | Hard disk drive, hot-swap, 600 GB 15K, 3.5-inch SAS | 44W2245 | | |
| 12 | Hard disk drive, hot-swap, 250 GB, 3.5-inch SATA | 39M4511 | | |
| 12 | Hard disk drive, hot-swap, 500 GB, 3.5-inch SATA | 39M4533 | | |
| 13 | ServeRAID M5000 series controller battery | 43W4342 | | |
| 14 | Power-supply cage | | | 69Y4987 |
| 15 | Backplane, hot-swap hard disk drive | | | 69Y4919 |
| 15 | Backplate, simple-swap hard disk drive | | | 69Y4965 |
| 16 | Memory, 2 GB PC3-10600R-999 single-rank LP RDIMM | 44T1582 | | |

*Table 7. Parts listing, Type 7164 (continued)*

| Index | Description | CRU part number (Tier 1) | CRU part number (Tier 2) | FRU part number |
|---|---|---|---|---|
| 16 | Memory, 2 GB PC3L-10600R-999 ECC single-rank LP RDIMM, 1.35V | 49Y1423 | | |
| 16 | Memory, 4 GB PC3L-10600R-999 ECC single-rank LP RDIMM, 1.35V | 49Y1424 | | |
| 16 | Memory, 4 GB PC3-10600 ECC DDR3 1333MHz dual-rank LP RDIMM | 49Y1445 | | |
| 16 | Memory, 8 GB PC3-10600 ECC DDR3 1333MHz dual-rank LP RDIMM | 49Y1446 | | |
| 16 | Memory, 16 GB PC3L-8500R-777 quad-rank LP RDIMM, 1.35V | 49Y1418 | | |
| 17 | Microprocessor, AMD Opteron 6124HE (1.8 GHz 12MB 79W 8-core) | | | 69Y4927 |
| 17 | Microprocessor, AMD Opteron 6128 (2.0 GHz 12MB 115W 8-core) | | | 43X5403 |
| 17 | Microprocessor, AMD Opteron 6128HE (2.0 GHz 12MB 79W 8-core) | | | 69Y4924 |
| 17 | Microprocessor, AMD Opteron 6134 (2.3 GHz 12MB 115W 8-core) | | | 69Y4922 |
| 17 | Microprocessor, AMD Opteron 6136 (2.4 GHz 12MB 115W 8-core) | | | 69Y4925 |
| 17 | Microprocessor, AMD Opteron 6140 (2.6 GHz 12MB 115W 8-core) | | | 81Y7586 |
| 17 | Microprocessor, AMD Opteron 6164HE (1.7 GHz 12MB 79W 12-core) | | | 69Y4931 |
| 17 | Microprocessor, AMD Opteron 6168 (1.9 GHz 12MB 115W 12-core) | | | 69Y4933 |
| 17 | Microprocessor, AMD Opteron 6172 (2.1 GHz 12MB 115W 12-core) | | | 69Y4923 |
| 17 | Microprocessor, AMD Opteron 6174 (2.2 GHz 12MB 115W 12-core) | | | 69Y4926 |
| 17 | Microprocessor, AMD Opteron 6176 (2.3 GHz 12MB 115W 12-core) | | | 81Y7585 |
| 17 | Microprocessor, AMD Opteron 6180 (2.5 GHz 12MB 140W 12-core) | | | 81Y7584 |
| 17 | Microprocessor, AMD Opteron 6282SE (2.6Ghz 16MB 140W 16-core) | | | 90Y5371 |
| 17 | Microprocessor, AMD Opteron 6276 (2.3Ghz 16MB 115W 16-core) | | | 90Y5372 |
| 17 | Microprocessor, AMD Opteron 6274 (2.2Ghz 16MB 115W 16-core) | | | 90Y5373 |
| 17 | Microprocessor, AMD Opteron 6272 (2.1Ghz 16MB 115W 16-core) | | | 90Y5374 |
| 17 | Microprocessor, AMD Opteron 6212 (2.6Ghz 16MB 115W 8-core) | | | 90Y5375 |
| 17 | Microprocessor, AMD Opteron 6238 (2.6Ghz 16MB 115W 12-core) | | | 90Y5376 |

*Table 7. Parts listing, Type 7164 (continued)*

| Index | Description | CRU part number (Tier 1) | CRU part number (Tier 2) | FRU part number |
|---|---|---|---|---|
| 17 | Microprocessor, AMD Opteron 6234 (2.4Ghz 16MB 115W 12-core) | | | 90Y5377 |
| 17 | Microprocessor, AMD Opteron 6220 (3.0Ghz 16MB 115W 8-core) | | | 90Y5378 |
| 17 | Microprocessor, AMD Opteron 6262HE (1.6Ghz 16MB 85W 16-core) | | | 90Y5379 |
| 17 | Microprocessor, AMD Opteron 6228HE (2.1Ghz 16MB 85W 12-core) | | | 90Y5380 |
| 18 | Heat sink | | | 69Y4996 |
| 19 | PCI riser-card assembly | 69Y4920 | | |
| 20 | Air baffle | 69Y4975 | | |
| | Battery, 3.0 volt | 33F8354 | | |
| | Top cover, fan door | 69Y4989 | | |
| | System board | | | 94Y6262 |
| | Power-supply cage | | | 69Y4987 |
| | ServeRAID-M1015 SAS/SATA adapter | | 46M0861 | |
| | ServeRAID-M5014 SAS/SATA adapter | | 46M0918 | |
| | ServeRAID-M5015 SAS/SATA adapter | | 46M0851 | |
| | ServeRAID-M1000 series advanced feature key | 46M0864 | | |
| | ServeRAID-M5000 series advanced feature key | 46M0930 | | |
| | Ethernet adapter, dual port | 49Y4232 | | |
| | Ethernet adapter, quad port | 49Y4242 | | |
| | Filler, 3.5-inch simple-swap hard disk drive | 69Y4972 | | |
| | Filler, PCI | 69Y4941 | | |
| | Filler, DVD drive | 49Y4868 | | |
| | Tape enablement kit | | 40K6449 | |
| | Slide rail kit | | | 69Y4969 |
| | CMA kit | 69Y4970 | | |
| | Rack shipping bracket | | | 69Y5578 |
| | Cable, SAS signal, 400 mm | | 69Y4943 | |
| | Cable, SAS signal, 550 mm | | 69Y4942 | |
| | Cable, USB hypervisor signal | | 69Y4948 | |
| | Cable, front USB signal | | 26K8058 | |
| | Cable, optical drive | | 69Y4947 | |
| | Cable, backplane power | | | 69Y4964 |
| | Cable, power signal | | 69Y4944 | |
| | Cable, power, 24 pins | | 69Y4938 | |
| | Cable, power, 12 pins | | 69Y4939 | |
| | Cable, power, 6 pins | | 69Y4940 | |
| | Top cover/power cut-off switch assembly | | | 69Y2284 |

*Table 7. Parts listing, Type 7164 (continued)*

| Index | Description | CRU part number (Tier 1) | CRU part number (Tier 2) | FRU part number |
|---|---|---|---|---|
| | Miscellaneous kit | | | 90Y5325 |
| | System label | 69Y4999 | | |

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 8. Consumable parts, Type 7164*

| Index | Description | Part number |
|---|---|---|
| | ServeRAID M5000 series battery | 43W4342 |

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 |

| IBM power cord part number | Used in these countries and regions |
|---|---|
| 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 |
| 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<br>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<br>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 |

| IBM power cord part number | Used in these countries and regions |
|---|---|
| 39M5068 | Argentina, Paraguay, Uruguay |
| 39M5226 | India |
| 39M5240 | Brazil |

# Chapter 5. Removing and replacing server components

Replaceable components are of three types:

- **Consumable part:** Purchase and replacement of consumable parts (components, such as batteries and printer cartridges, that have depletable life) is your responsibility. If IBM acquires or installs a consumable part at your request, you will be charged for the service.
- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

See Chapter 4, “Parts listing, Type 7164,” on page 143 to determine whether a component is a Tier 1 CRU, Tier 2 CRU, or FRU.

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

## Installation guidelines

**Attention:** Static electricity that is released to internal server components when the server is powered-on might cause the system to halt, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when removing or installing a hot-swap device.

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

- Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 153. This information will help you work safely.
- When you install your new server, take the opportunity to download and apply the most recent firmware updates. This step will help to ensure that any known issues are addressed and that your server is ready to function at maximum levels of performance. To download firmware updates for your server, complete the following steps.

  **Note:** Changes are made periodically to the IBM 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 **IBM Systems support**, click **System x**.
  3. Under **Popular links**, click **Software and device drivers**.
  4. Click **IBM System x3755 M3** to display the matrix of downloadable files for the server.

  For additional information about tools for updating, managing, and deploying firmware, see the ToolsCenter for System x and BladeCenter at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp.
- Before you install optional hardware devices, make sure that the server is working correctly. Start the server, and make sure that the operating system

starts, if an operating system is installed, or that a 19990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see Chapter 3, “Diagnostics,” on page 23 for information about how to run diagnostics.

- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- 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.
- To view the error LEDs on the system board and internal components, press the light path diagnostics button on the system board when the server is not connected to power.
- You do not have to turn off the server to install or replace hot-swap power supplies, hot-swap fans, hot-swap hard disk drives, or hot-plug Universal Serial Bus (USB) devices. However, you must turn off the server before you perform any steps that involve removing or installing adapter cables.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.
- For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

## A single-power-supply server operating at 100 V or 240 V ac

One power supply operating at 100 V or 240 V ac supports a server with minimum two-microprocessor configuration, but it does not support power redundancy.

## System reliability guidelines

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

- Each of the drive bays has a drive or an electromagnetic compatibility (EMC) shield installed in it.
- If the server has redundant power, each of the power-supply bays has a power supply or EMC shield installed in it.

- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the top cover and the fan door before you turn on the server. Operating the server for extended periods of time (more than 30 minutes) with the fan door removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap drive within 2 minutes of removal.
- For redundant and hot-swappable power supply operation, the power supplies are connected to 100-240 V ac.
- Microprocessor sockets 1 - 4 each always contain either a socket dust cover or a microprocessor and heat sink.

**Notes:**

1. The server automatically shuts down when the top cover is removed. The server will not turn on without the top cover installed.
2. Hard disk drive temperature sensing is not supported.

## 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:

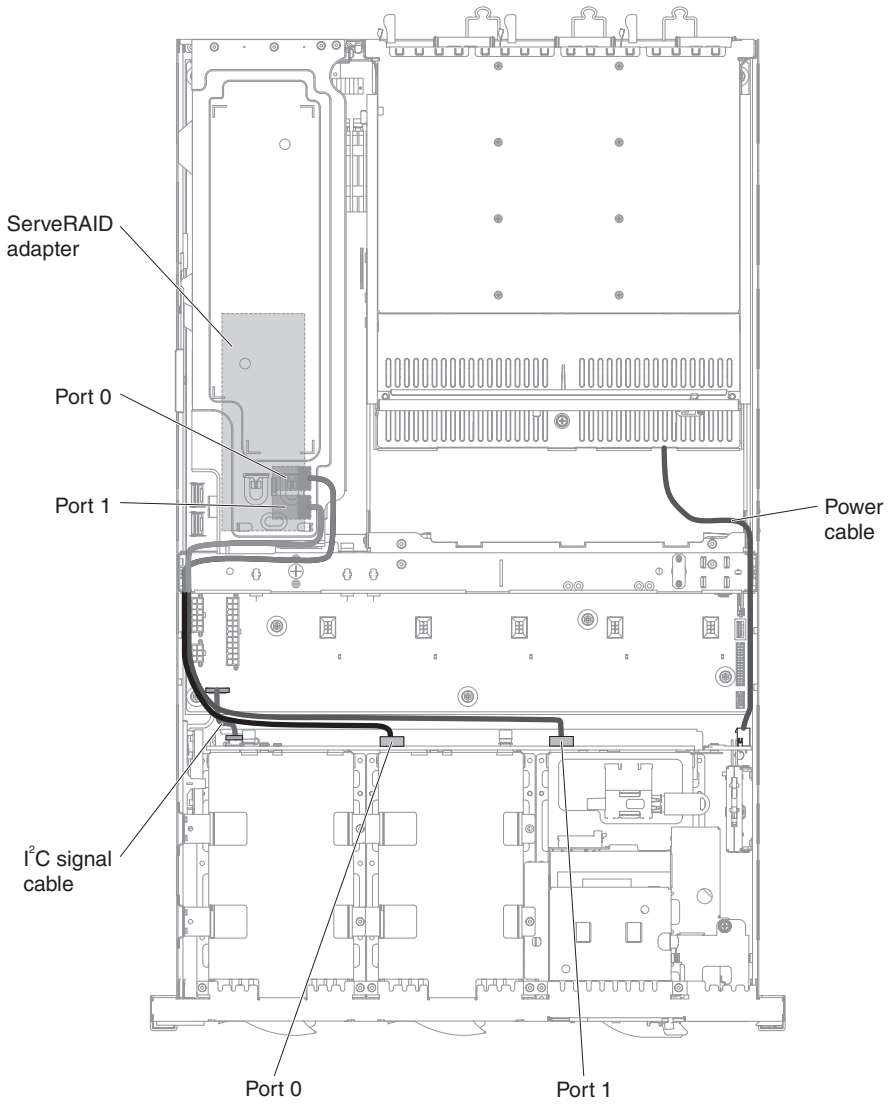
- Limit your movement. Movement can cause static electricity to build up around you.
- Wear an electrostatic-discharge wrist strap, if one is available.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an *unpainted* metal surface 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.

## Internal cable routing and connectors

This section provides information about internal cable routing for major components in the server.

### Hot-swap hard disk drive backplane cable connections

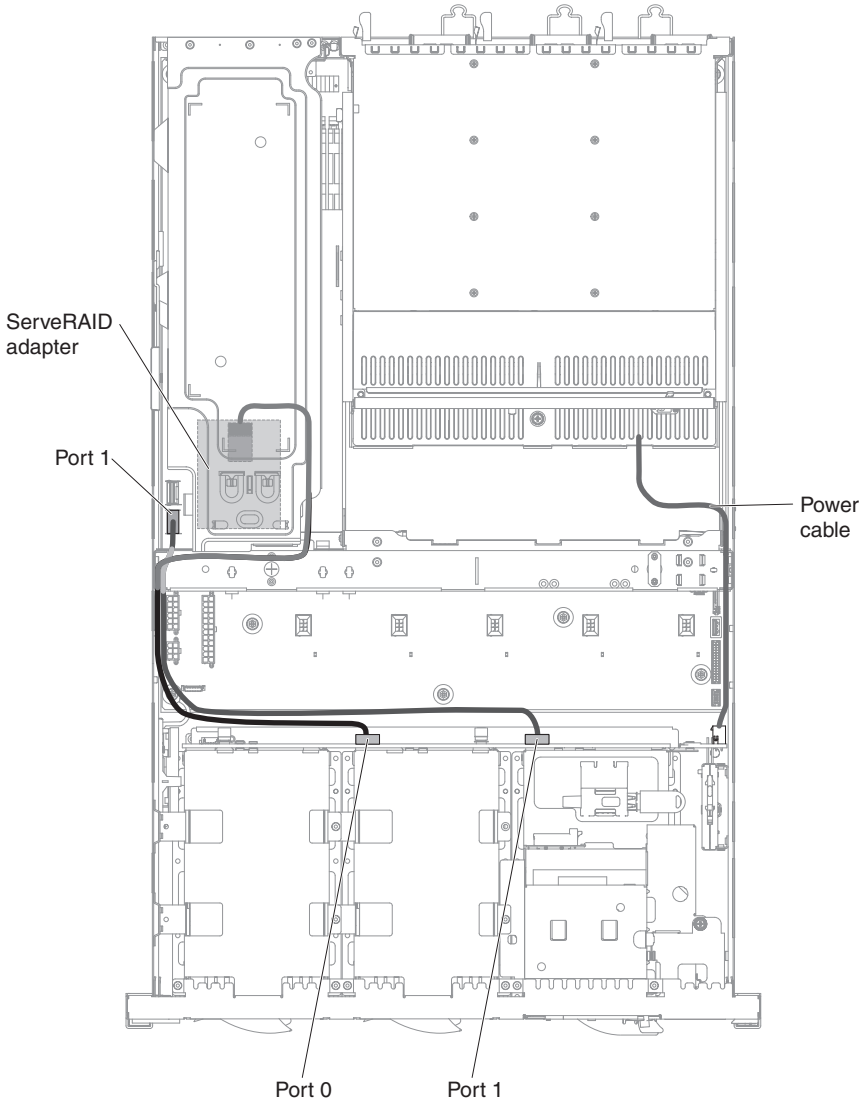
The following illustration shows the internal routing of the hot-swap hard disk drive backplane cables.


ServeRAID adapter
Port 0
Port 1
Power cable
I2C signal cable
Port 0
Port 1

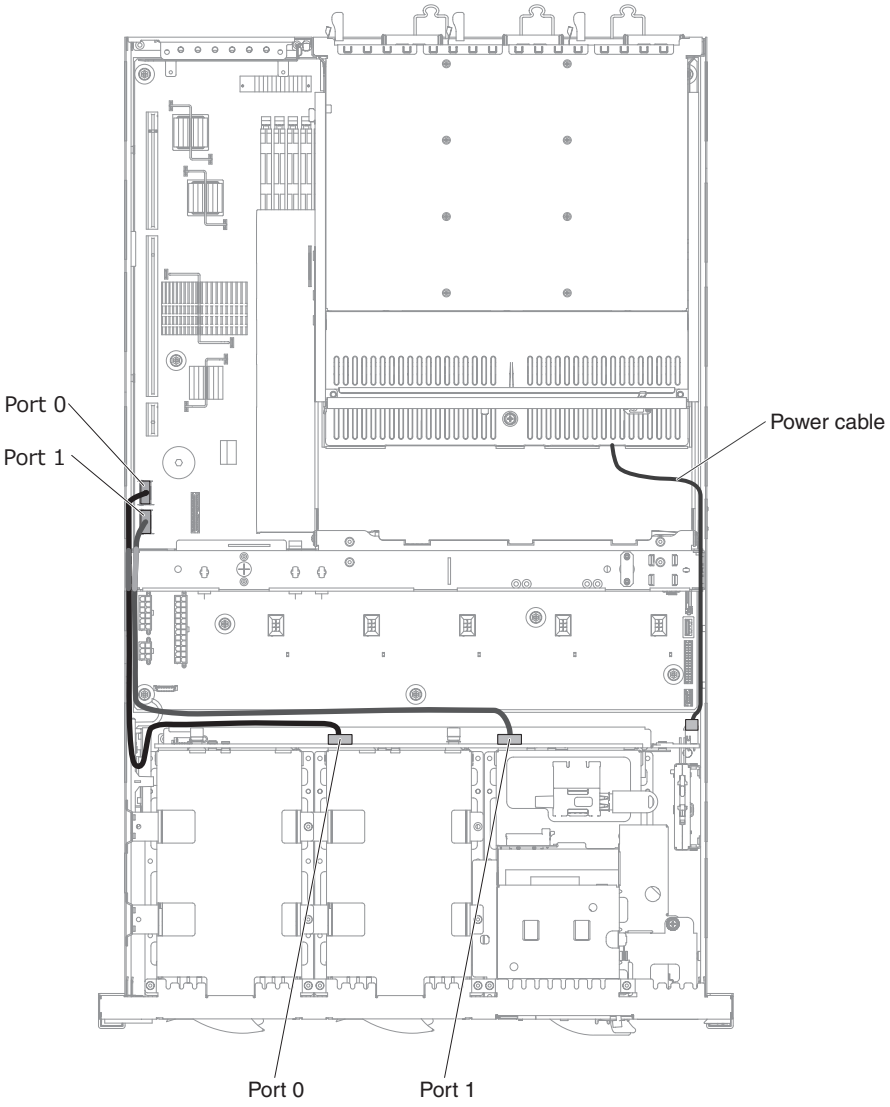
## Simple-swap hard disk drive backplate cable connections

The following illustration shows the internal routing of the simple-swap hard disk drive backplate cables to the connectors on the ServeRAID adapter and system board.

**Note:** You must disengage the signal cable from the cable clip on the backplate to connect it to the adapter.



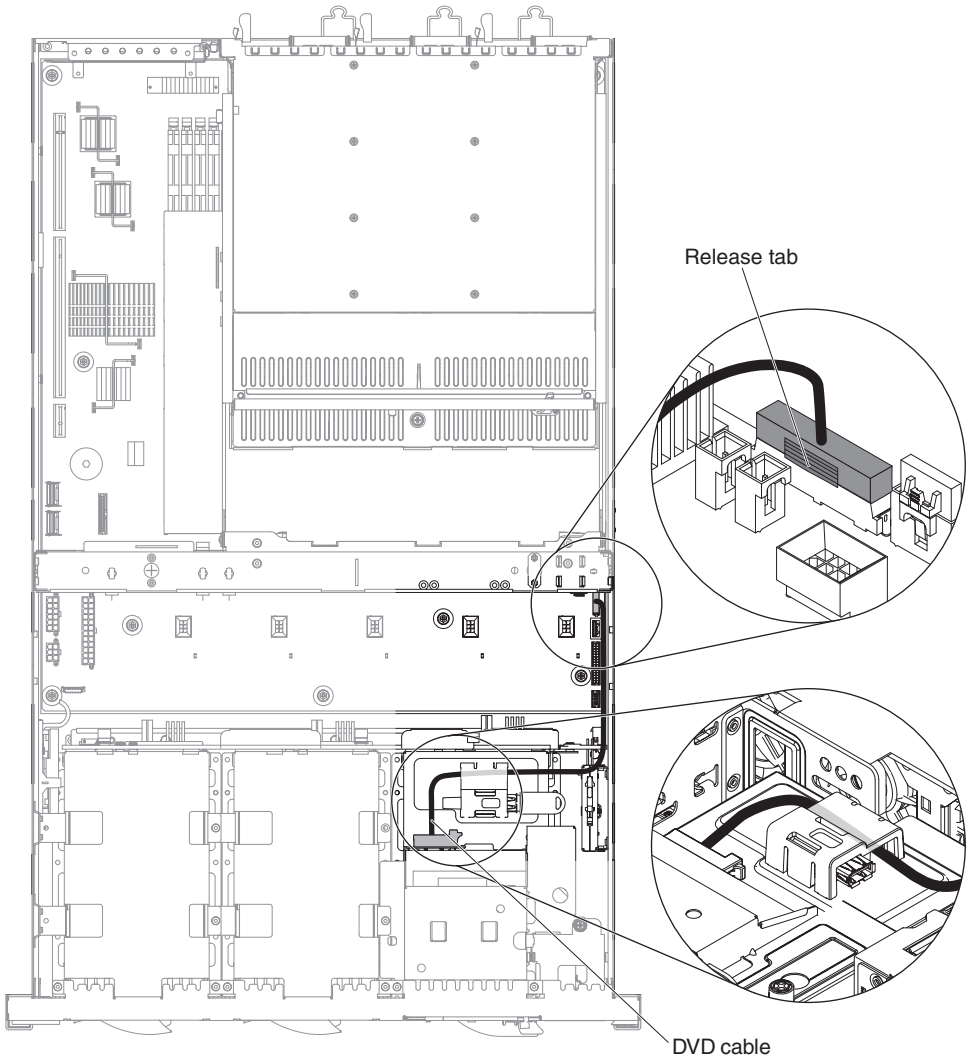
The following illustration shows the internal routing of the simple-swap hard disk drive backplate signal cables to the connectors on the system board.



## DVD drive cable connection

The following illustration shows the internal routing and connectors of the DVD cable.

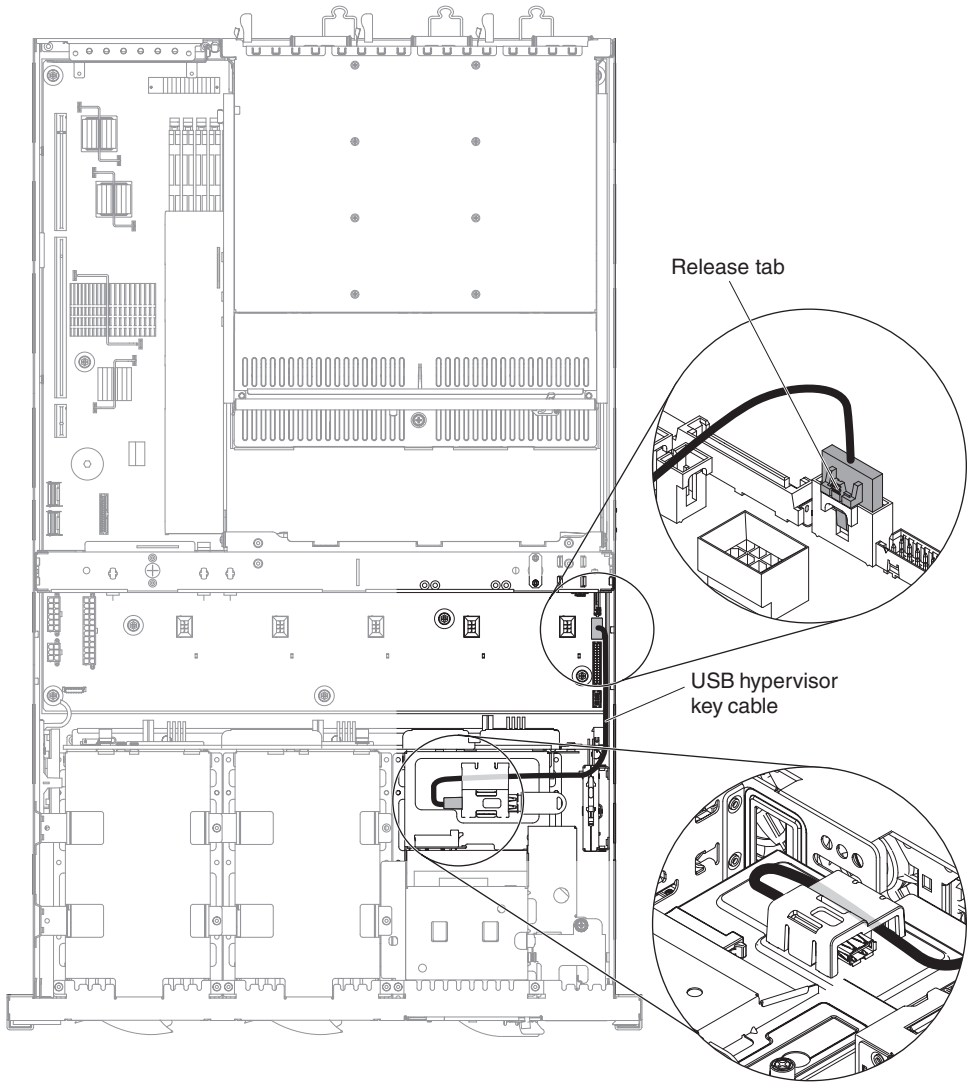
**Attention:** To disconnect the DVD cable, you must first press the connector release tab and then disconnect the cable from the connector on the system board. Do not disconnect the cable by using excessive force.



## Front USB assembly cable connection

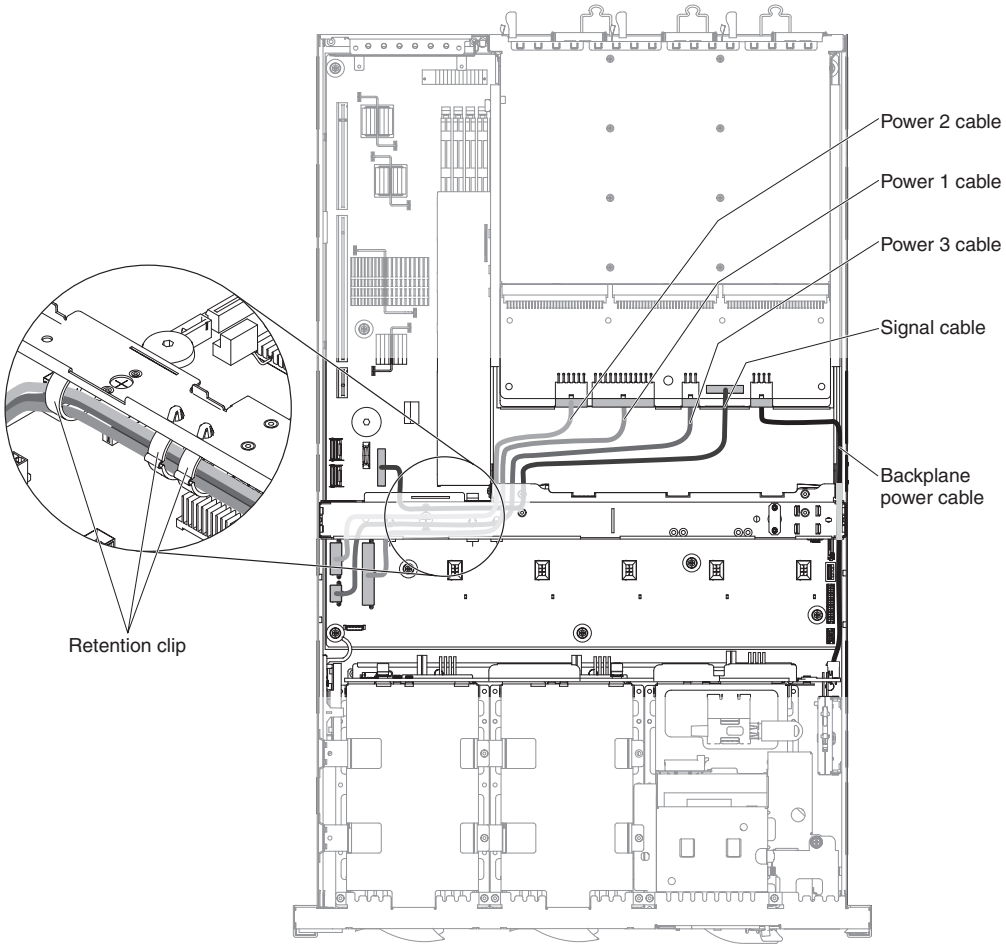
The following illustration shows the routing of the USB hypervisor key signal cable.

**Attention:** To disconnect the USB hypervisor key signal cable, you must first press the connector release tab and then disconnect the cable from the connector on the system board. Do not disconnect the cable by using excessive force.



### Power-supply distribution board cable connections

The following illustration shows the routing of the power-supply distribution board cables. Secure the power cables with the cable tie and retention clips.




## Returning a device or component

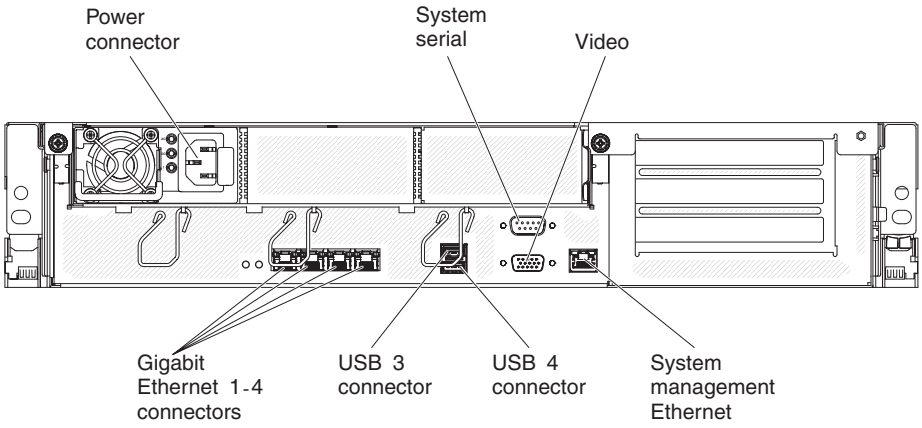
If you are instructed to return a device or component, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Connecting the cables

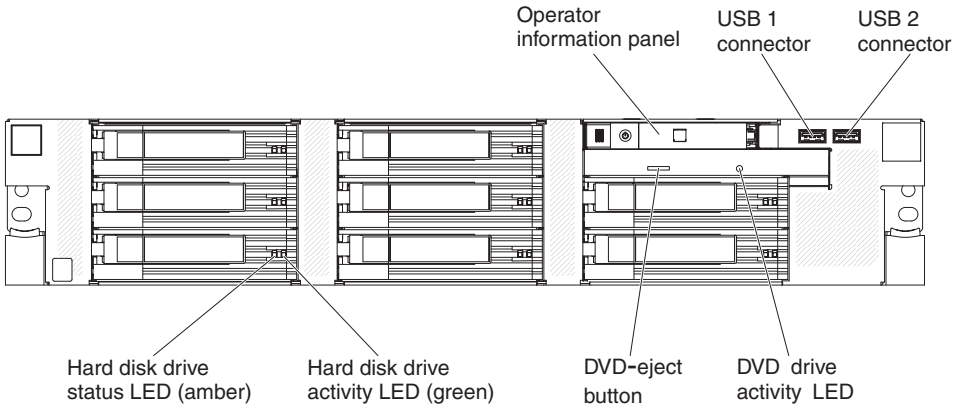
See the documentation that comes with optional devices for additional cabling instructions. It might be easier for you to route cables before you install certain devices.

The following illustrations show the locations of the input and output connectors on the server.

**Rear view**




**Front view**



## Removing and replacing Tier 1 CRUs

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

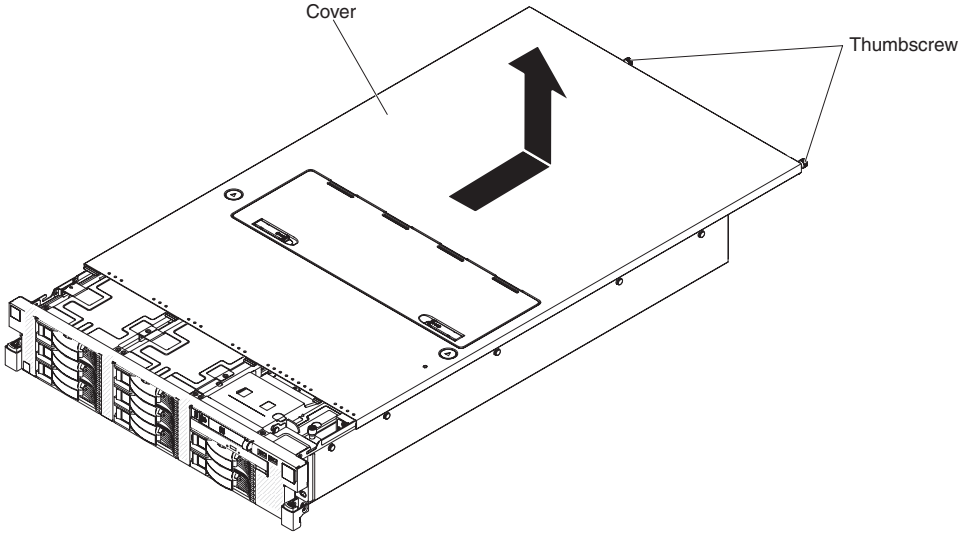
The illustrations in this document might differ slightly from your hardware.

## Removing the top cover

**Important:** The server automatically powers off when the top cover is removed.

To remove the top cover, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and all peripheral devices, and disconnect the power cords and all external cables.
3. Slide the server out of the rack until the slide rails lock into place.
4. Loosen the two thumbscrews that secure the cover to the chassis.



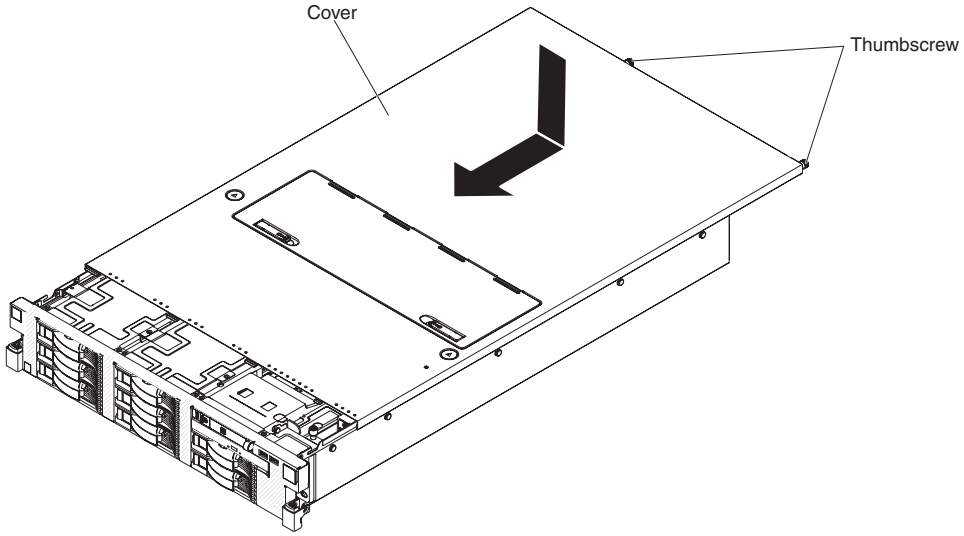

5. Press on the two blue grip points and slide the cover toward the rear; then, lift the cover off the server. Set the cover aside.
6. If you are instructed to return the cover, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the top cover

To install the top cover, complete the following steps:

1. Make sure that all internal cables are correctly routed.
2. Set the cover on top of the server so that approximately 13 mm (0.5 inch) extends from the rear.
3. Align the cover over the server (toward the rear of the server) until the cover edges slip into position over the chassis.

   **Attention:** Before you slide the cover forward, make sure that all the tabs on both the front and side of the cover engage the chassis correctly. If all the tabs do not engage the chassis correctly, it will be hard to remove the cover later.



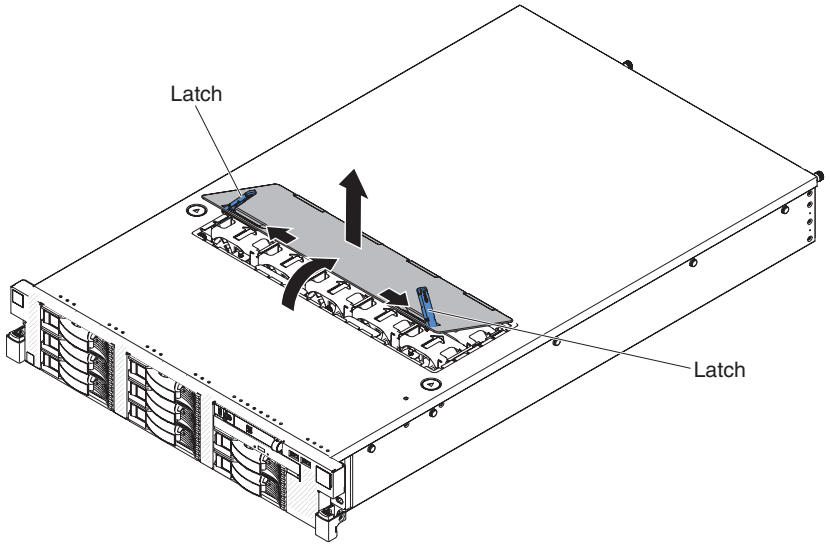

4. Slide the top cover forward and into position; then, tighten the thumbscrews to secure the cover to the chassis.
5. If necessary, reconnect the power cords and all external cables, and then turn on the server.
6. Slide the server into the rack.

## Removing the top-cover fan door

**Attention:** You must turn off the server before you replace a non-hot-swap fan.

To remove the top-cover fan door, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. If you are replacing a non-hot-swap fan, turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Slide the server out of the rack until the slide rails lock into place.
4. Press and rotate up the release latches.

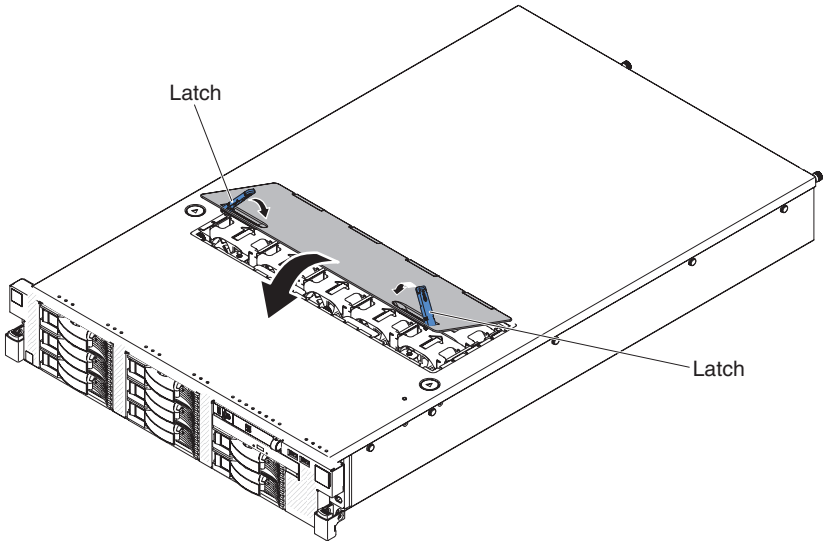


5. Tilt and lift the top-cover fan door from the server.
6. If you are instructed to return the top-cover fan door, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the top-cover fan door

To install the top-cover fan door, complete the following steps:

1. Align the fan door so that the metal tabs line up correctly on the top cover, and then rotate it into place.

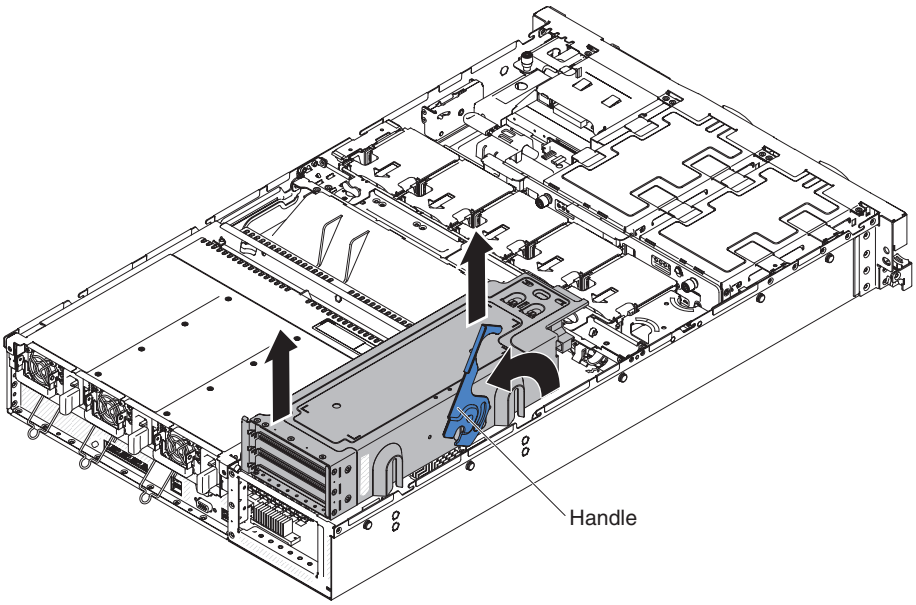



2. Press the release latches on the fan door to lock it in place.
3. If necessary, reconnect the power cords and all external cables, and then turn on the server.
4. Slide the server into the rack.

## Removing the PCI riser-card assembly

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the cover (see “Removing the top cover” on page 161).
4. Pull out the handle to unlatch the PCI riser-card assembly.

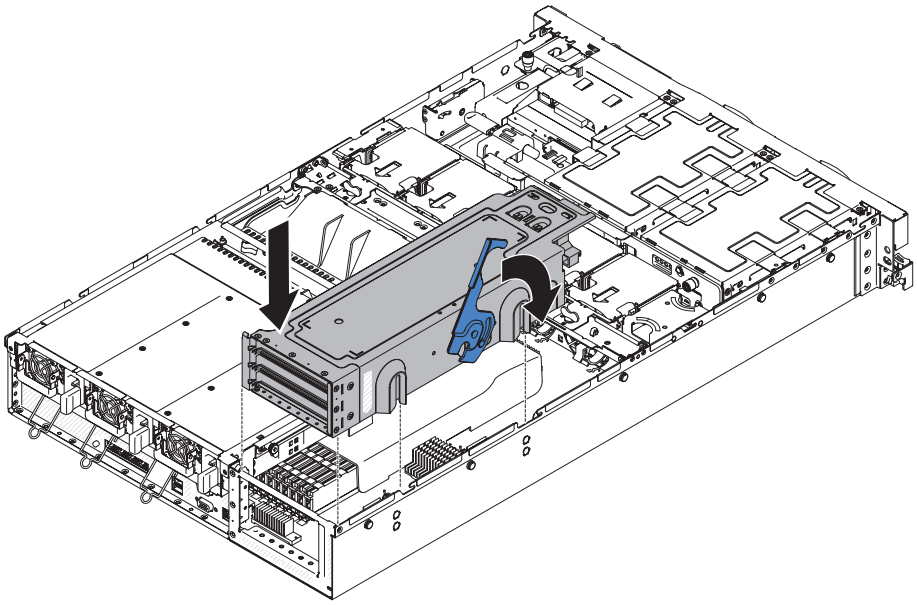



5. Grasp the PCI riser-card assembly at the front grip point and rear edge; then, lift the PCI riser-card assembly to remove it from the server. Place the PCI riser-card assembly on a flat, static-protective surface.
6. Remove any adapters and connected cables, if necessary, from the PCI riser-card assembly.
7. If you are instructed to return the PCI riser-card assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the PCI riser-card assembly

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

1. Install any adapters that you removed (see “Installing a PCI adapter” on page 170).
2. Make sure that all internal cables are correctly routed and that no cables are pinched.

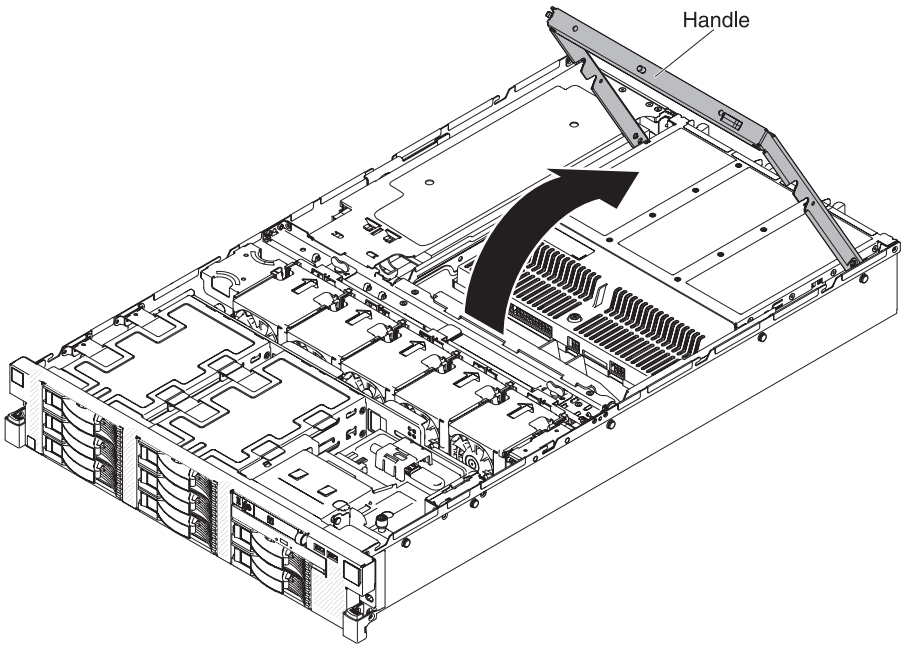


3. Align the PCI riser-card assembly with the PCI connectors on the system board and align the nailheads with the slots on the chassis; then, lower the PCI riser-card assembly into the server.
4. Press the handle down to securely latch the PCI riser-card assembly into place.
5. Install the top cover (see “Installing the top cover” on page 161).
6. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
7. Turn on all attached devices and the server.

## Removing the air baffle

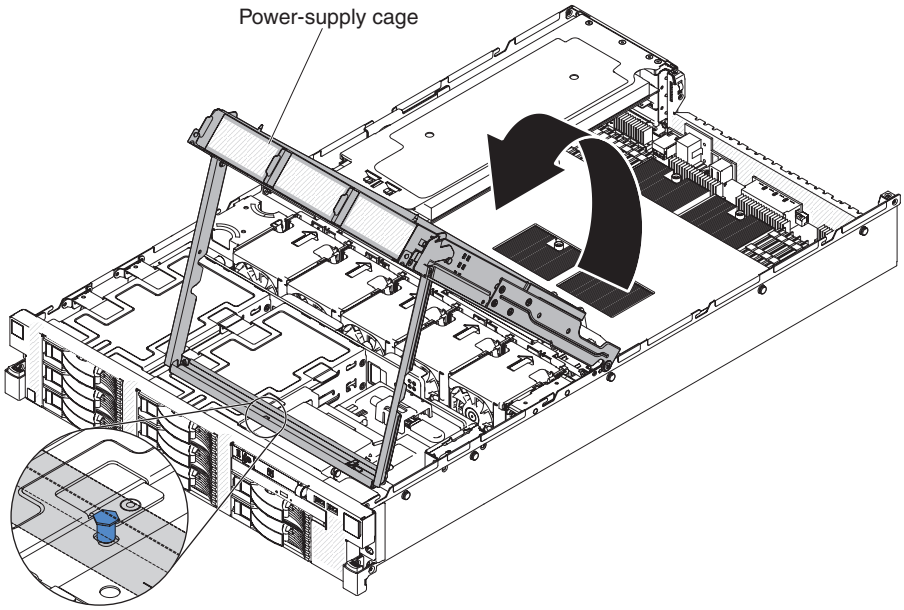
To remove the air baffle, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the cover (see “Removing the top cover” on page 161).
4. Pull up the handle on the power-supply cage until the handle locks into place.

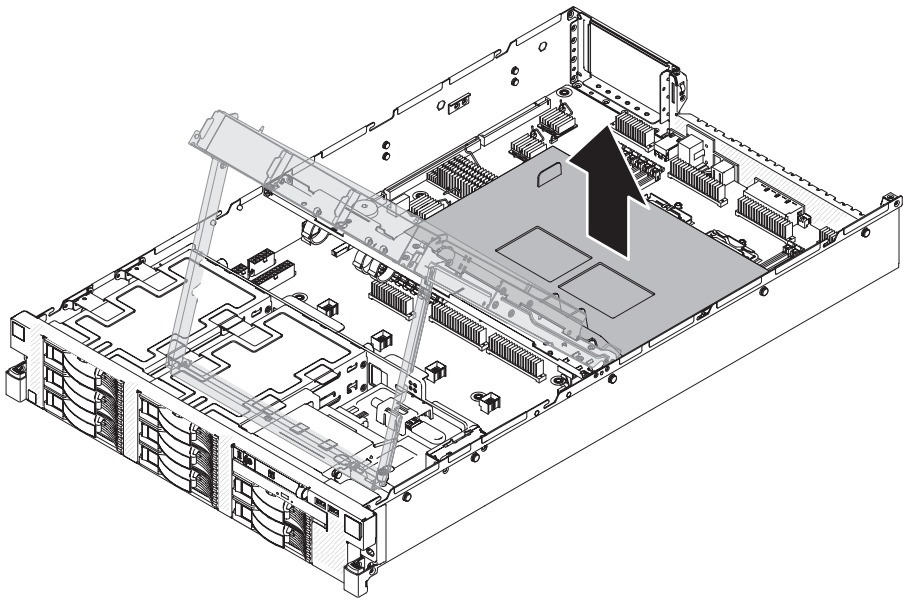



5. Lift and carefully rotate the power-supply cage toward the front of the server; then, align the nailhead on the handle with the hole on the chassis and lower the handle until it clicks into place.

   **Note:** The power-supply cage might be heavy, depending on the number of power supplies that are installed. Support the power-supply cage with both hands while you rotate it into position.



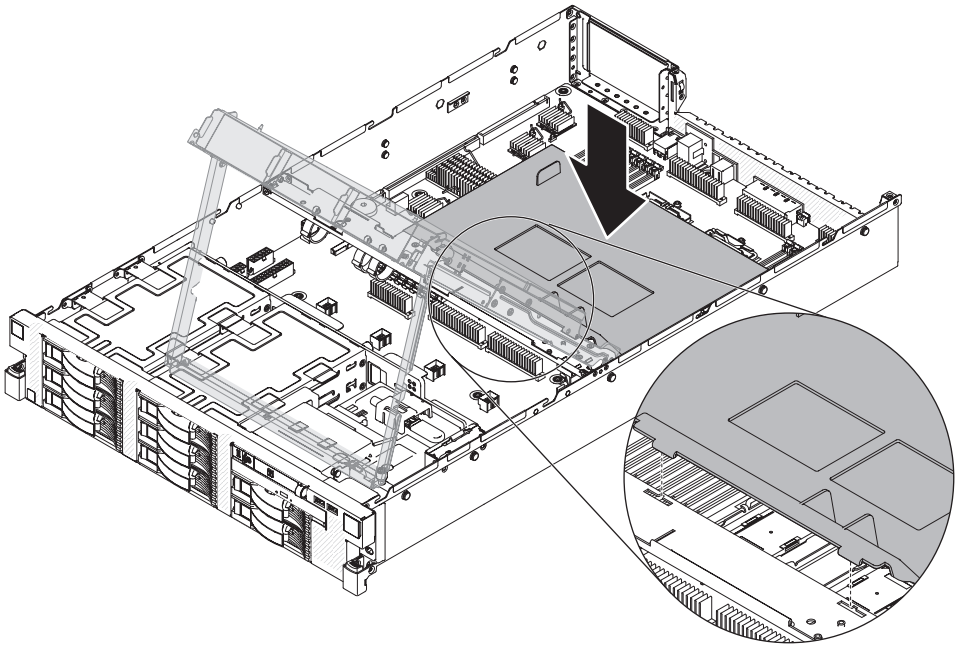

6. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 163).
7. Grasp the air baffle and disengage it from the slots; then, lift the air baffle to remove it from the server.



## Installing the air baffle

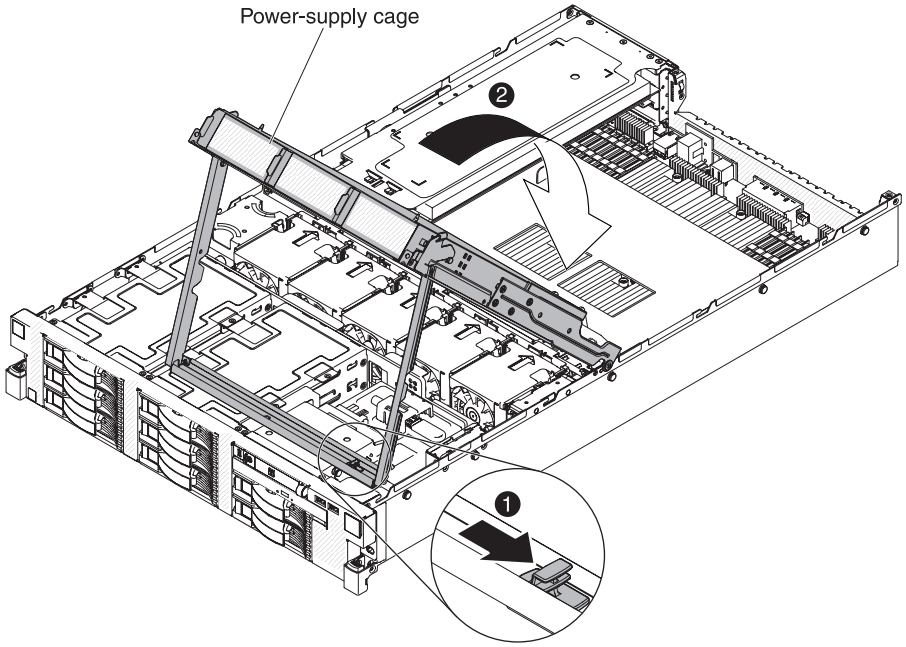
To install the air baffle, complete the following steps:

1. Make sure that all internal cables are correctly routed.
2. Align the air baffle with the slots on the chassis; then, insert the tabs into the slots and lower the air baffle into the server.

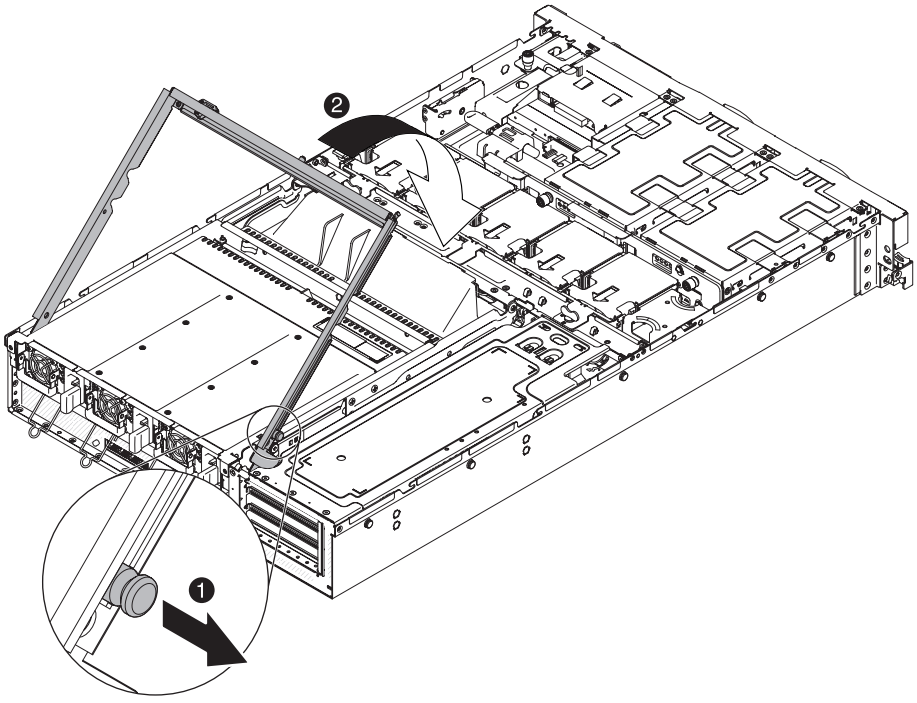


3. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 165).
4. Press the release latch on the handle to disengage the handle from the chassis; then, carefully rotate the power-supply cage toward the rear of the server and lower the power-supply cage into place.

   **Note:** The power-supply cage might be heavy, depending on the number of power supplies that are installed. Support the power-supply cage with both hands while you rotate it into position.




5. While you hold the handle, pull the release pin on the side of the handle and lower the handle into the closed position.

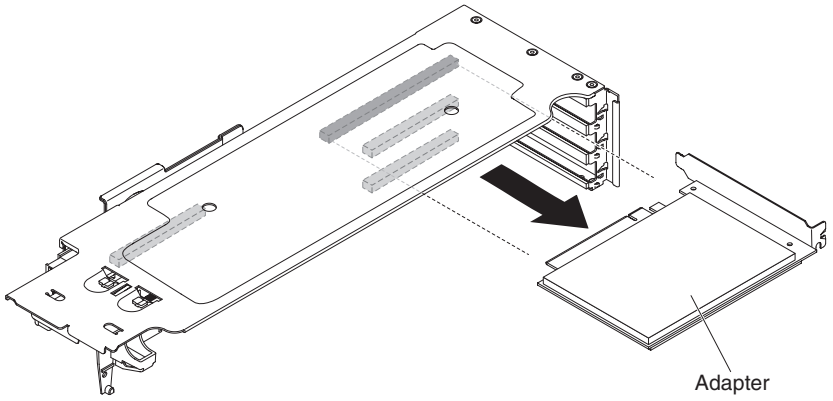



6. Install the top cover (see “Installing the top cover” on page 161).
7. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
8. Turn on all attached devices and the server.

## Removing a PCI adapter

To remove a PCI adapter, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to remove the adapter.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 163).
5. Disconnect any cables from the adapter (make note of the cable routing, in case you reinstall the adapter later).
6. Carefully grasp the adapter by its top edge or upper corners, and pull the adapter from the connector on the PCI riser-card assembly.




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

## Installing a PCI adapter

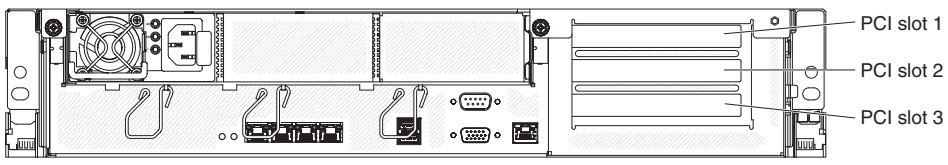
**Note:** You must install a ServeRAID adapter in expansion slot 4 on the PCI riser-card assembly.

To install a replacement PCI adapter, complete the following steps:

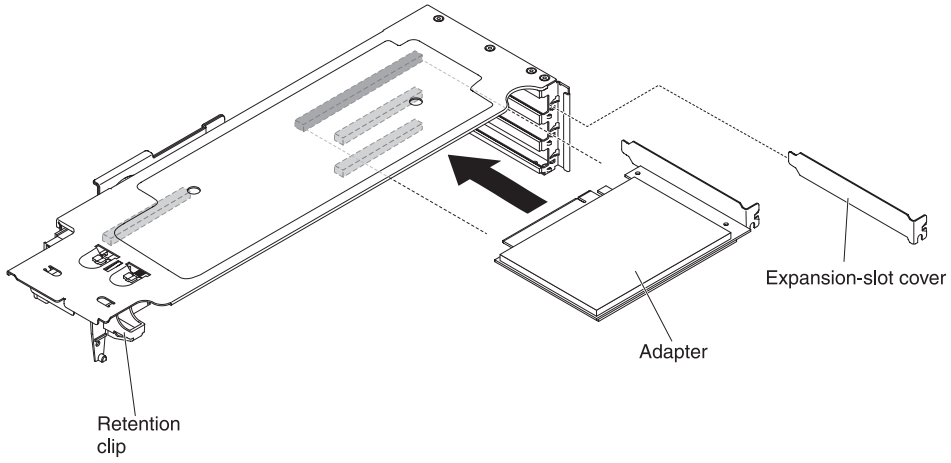
1. See the documentation that comes with the adapter for instructions for setting jumpers or switches and for cabling.

   **Note:** Route adapter cables before you install the adapter.
2. Determine which PCI expansion slot you will use for the adapter. If you are installing an adapter in expansion slot 1, 2, or 3, remove the expansion-slot cover.

   The following illustration shows the locations of the adapter expansion slots from the rear of the server.



3. Touch the static-protective package that contains the adapter to any *unpainted* surface on the outside of the server; then, grasp the adapter by the top edge or upper corners of the adapter and remove it from the package.
4. Align the adapter with the connector on the PCI riser-card assembly.

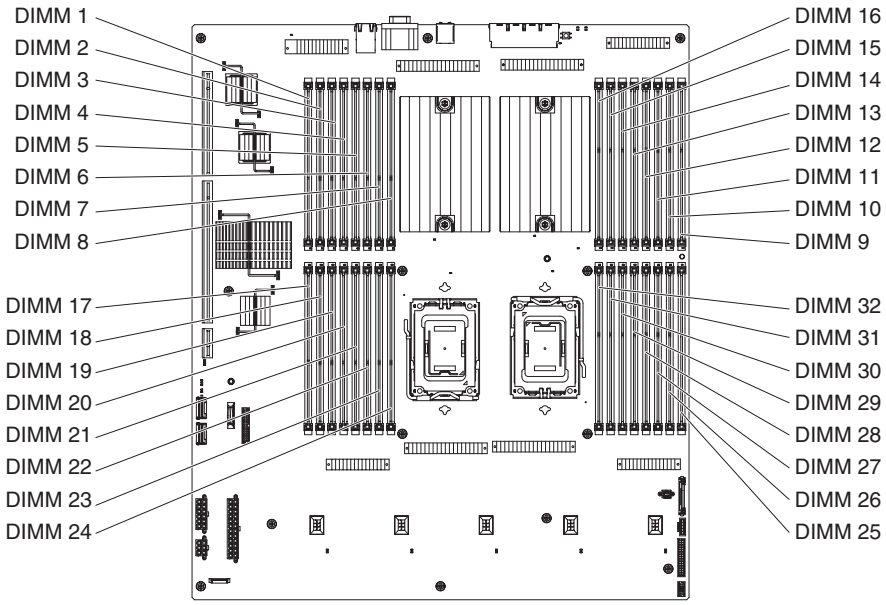



5. Press the adapter *firmly* into the adapter connector. If you install a full-length adapter in slot 1, make sure that the retention clip engages the adapter in place.

   **Attention:** When you install an adapter, avoid touching the components and gold-edge connectors on the adapter. Make sure that the adapter is correctly seated in the connector. Incorrectly seated adapters might cause damage to the PCI riser card or to the adapter.
6. Connect any required cables to the adapter.
7. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 165).
8. Install the top cover (see “Installing the top cover” on page 161).
9. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
10. Turn on all attached devices and the server.

## Memory modules (DIMM)

The server supports up to 32 DIMMs. DIMMs in connectors 1 to 8 support microprocessor 1, DIMMs in connectors 9 to 16 support microprocessor 2, DIMMs in connectors 17 and 24 support microprocessor 3, and DIMMs in connectors 25 to 32 support microprocessor 4. The following illustration shows the DIMM connectors on the system board.




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

- The server supports 2 GB, 4 GB, 8 GB, 16 GB double data-rate (DDR) III, registered or unbuffered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest PC3-10600 or PC3-8500 SDRAM Registered DIMM specifications. For a list of the supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

  **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. For additional information, see “Configuring the server” on page 235.
- At least one pair of DIMMs must be installed for the server to operate.
- You must install at least two DIMMs for each microprocessor in the server before you use the internal flash memory for VMware.
- The following rules apply to ranked DDR3 DIMM speed as it relates to the number of DIMMs in a channel:

*Table 9. DIMM speed*

| RDIMMs in each channel | DIMM type | DIMM speed | |
|---|---|---|---|
| | | 1.5 V | 1.35 V |
| 1 | Single-rank, dual-rank | 1333 | 1333 |
| | Quad-rank | 1333 | 1066 |
| 2 | Single-rank, dual-rank | 1333 | 1333 |
| | Quad-rank, single-rank/dual-rank | 1066 | 800 |
| | Quad-rank | 1066 | 800 |

- Do not install registered and unbuffered DIMMs in the same server.

- When you install additional DIMMs on the server, be sure to install them in pairs. The DIMMs in each pair must match each other.
- You do not have to save new configuration information to the iBMC when you install or remove DIMMs. The only exception is if you replace a DIMM that was designated as disabled in the Setup utility **Memory Settings** menu. In this case, you must re-enable the row in the Setup utility or reload the default memory settings.
- When you restart the server after you add or remove a DIMM, the server displays a message that the memory configuration has changed.
- **Non-sparing (normal) mode:** When you use the non-sparing mode, install DIMMs as indicated in the following tables.

  The following table lists the DIMM installation sequence (per pair) for non-sparing mode when two or four microprocessors are installed in the server.

*Table 10. Non-sparing mode memory installation sequence (in pairs)*

| Number of microprocessors | DIMM connectors |
|---|---|
| 2 | 1, 9, 5, 13, 3, 7, 11, 15, 2, 6, 10, 14, 4, 8, 12, 16 |
| 4 | 1, 9, 17, 25, 5, 13, 21, 29, 3, 7, 11, 15, 19, 23, 27, 31, 2, 6, 10, 14, 18, 22, 26, 30, 4, 8, 12, 16, 20, 24, 28, 32 |

- **Online-spare mode:** The memory online-spare feature disables the failed DIMM from the system configuration and activates an online-spare DIMM to replace the failed active DIMM. You can enable online-spare memory in the Setup utility (see “Setup utility menu choices” on page 237). When you use the memory online-spare feature, consider the following information:
  - The memory online-spare feature does not support quad-rank DIMMs.
  - When you enable the memory online-spare feature, you must install a pair of DIMMs per microprocessor at a time. The DIMMs must be identical in rank and speed.
  - The maximum available memory is reduced to one-half of the installed memory when two single-rank DIMMs are used. The maximum available memory is reduced to one-third of the installed memory when one single-rank DIMM and one dual-rank DIMM are used.
  - The following table lists the DIMM installation sequence for online-spare mode when two or four microprocessors are installed in the server.

*Table 11. Online-spare mode memory installation sequence (in pairs)*

| Number of microprocessors | DIMM connectors |
|---|---|
| 2 | 1, 2, 9, 10, 3, 4, 11, 12, 5, 6, 13, 14, 7, 8, 15, 16 |
| 4 | 1, 2, 9, 10, 17, 18, 25, 26, 3, 4, 11, 12, 19, 20, 27, 28, 5, 6, 13, 14, 21, 22, 29, 30, 7, 8, 15, 16, 23, 24, 31, 32 |

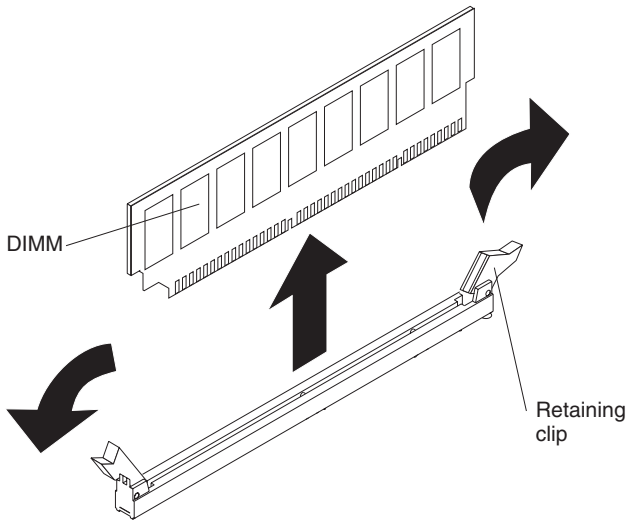
## Removing a memory module

To remove a DIMM, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary.

3. Remove the top cover (see “Removing the top cover” on page 161).
4. Remove the air baffle (see “Removing the air baffle” on page 165).
5. Open the retaining clip on each end of the DIMM connector and remove the DIMM from the connector.

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

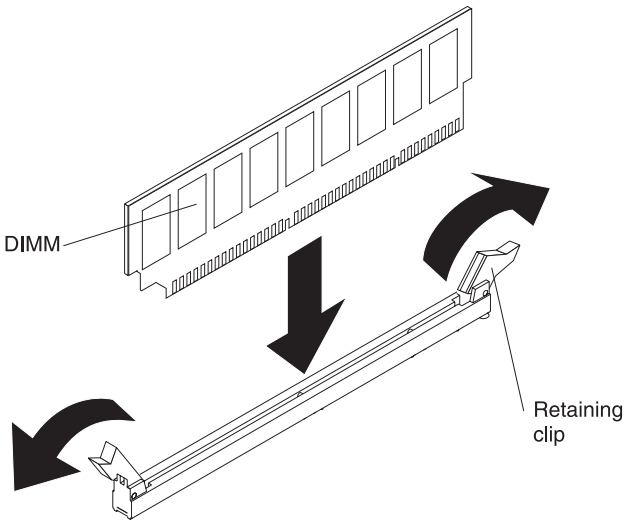



6. If you are instructed to return the DIMM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing a memory module

To install a replacement DIMM, complete the following steps:

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




4. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press both ends of the DIMM straight down into the connector. The retaining clips snap into the locked position when the DIMM is 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.

5. Install the air baffle (see “Installing the air baffle” on page 168).
6. Install the top cover (see “Installing the top cover” on page 161).
7. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
8. Turn on all attached devices and the server.

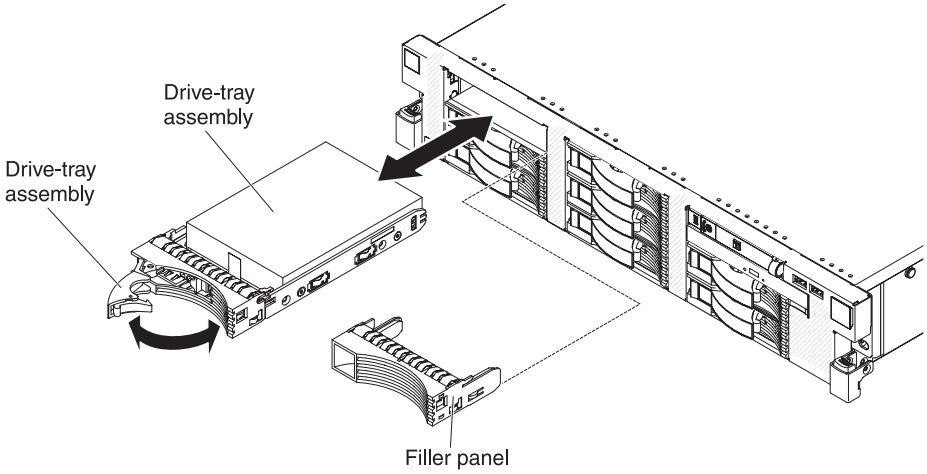
## Removing a hot-swap hard disk drive

**Important:** Before you remove a hot-swap hard disk drive from the server, take the following precautions to save data, firmware, and configuration data:

- Before you make changes to disk drives, disk drive controllers (including controllers that are integrated on the system board), disk drive backplanes, or disk drive cables, back up all important data that is stored on hard disks.
- Before you remove any component of a RAID array, back up all RAID configuration information.

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Be sure to save the data on your drive, especially if it is part of a RAID array, before you remove it from the server.
3. Push the latch on the handle to the left, and then open the drive handle and pull the hard disk drive assembly out of the server.



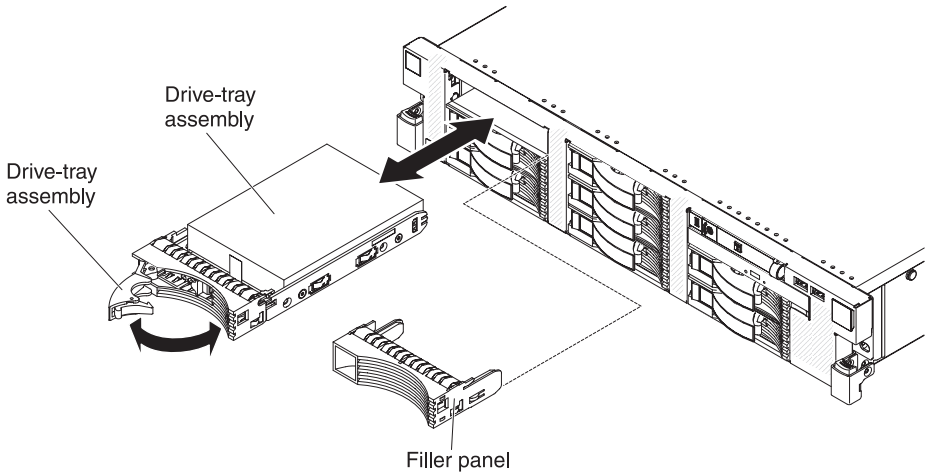

4. If you are instructed to return the hard disk drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing a hot-swap hard disk drive

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

1. Touch the static-protective package that contains the hard disk drive to any *unpainted* surface on the outside of the server; then, remove the hard disk drive from the package.

2. Make sure that the tray handle is open; then, slide the hard disk drive into the hot-swap bay.




3. Close the handle until it latches closed.
4. If the system is turned on, check the hard disk drive status LED to verify that the hard disk drive is operating correctly.

   After you install a 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 37 for hard disk drive problem solutions.

**Notes:**

1. You might have to reconfigure the disk arrays after you install hard disk drives. See the RAID documentation on the IBM *ServeRAID Support* CD for information about RAID controllers.
2. If you install more than one bootable hard disk drive in the server, you must use the LSI Configuration Utility program to select the hard disk drive to boot from. For information on LSI Configuration Utility program, see the documentation that comes with your ServeRAID controller.

## Removing a simple-swap hard disk drive

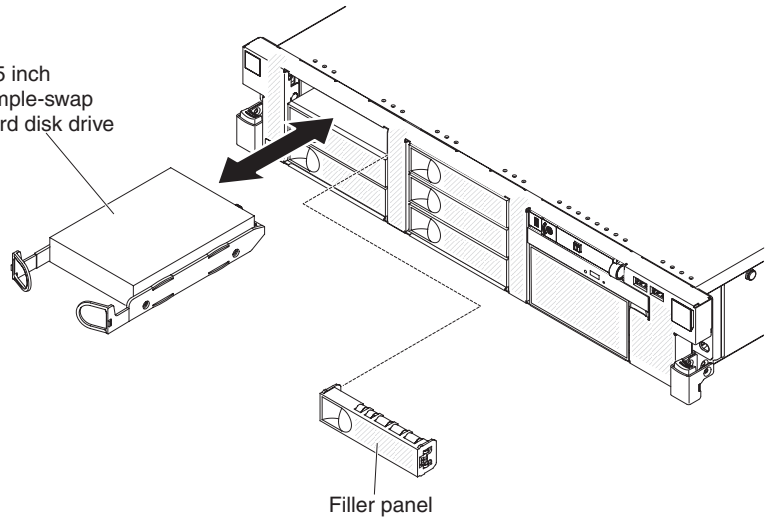
**Important:** Before you remove a simple-swap hard disk drive from the server, take the following precautions to save data, firmware, and configuration data:

- Before you make changes to disk drives, disk drive controllers (including controllers that are integrated on the system board), disk drive backplanes, or disk drive cables, back up all important data that is stored on hard disks.
- Before you remove any component of a RAID array, back up all RAID configuration information.

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Be sure to save the data on your drive, especially if it is part of a RAID array, before you remove it from the server.
3. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
4. Remove the drive filler panel from the front of the server.

5. Pull the round blue loops of the hard disk drive toward each other; then, carefully slide the drive out of the drive bay.

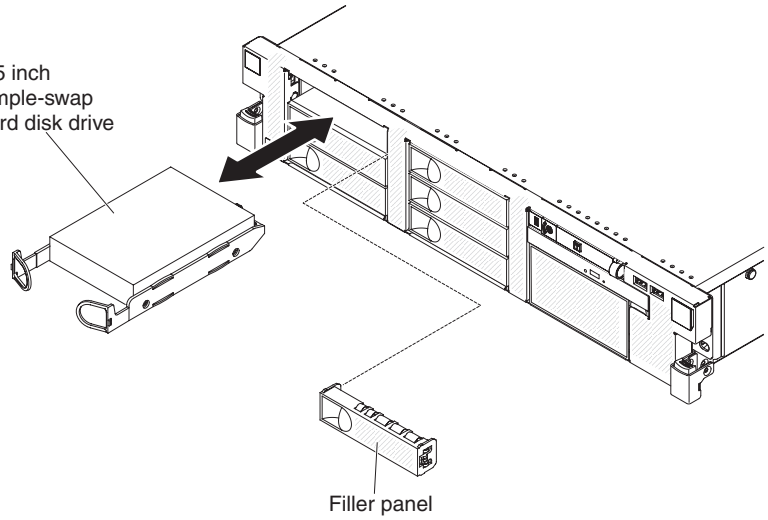



6. If you are instructed to return the hard disk drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing a simple-swap hard disk drive

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

1. Touch the static-protective package that contains the hard disk drive to any *unpainted* surface on the outside of the server; then, remove the hard disk drive from the package.
2. Pull the round blue loops of the hard disk drive toward each other; then, carefully slide the drive into the drive bay until it stops, and release the loops.




3. Install the drive filler panel.
4. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
5. Turn on all attached devices and the server.

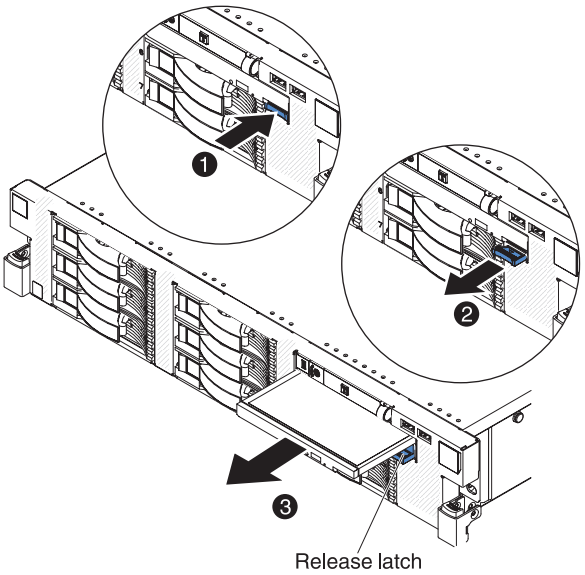
**Notes:**

1. You might have to reconfigure the disk arrays after you install hard disk drives. See the RAID documentation on the IBM *ServeRAID Support* CD for information about RAID controllers.
2. If you install more than one bootable hard disk drive in the server, you must use the LSI Configuration Utility program to select the hard disk drive to boot from. For information on LSI Configuration Utility program, see the documentation that comes with your ServeRAID controller.

## Removing the optional DVD drive

To remove the optional DVD drive, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Press the release latch on the front of the server; then, pull out the release latch to remove the DVD drive slightly out of the server.

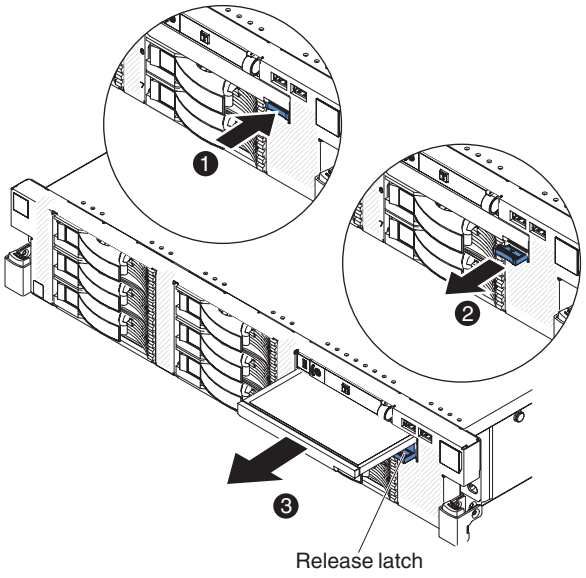



4. Remove the DVD drive completely out of the drive bay.
5. If you are instructed to return the DVD drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

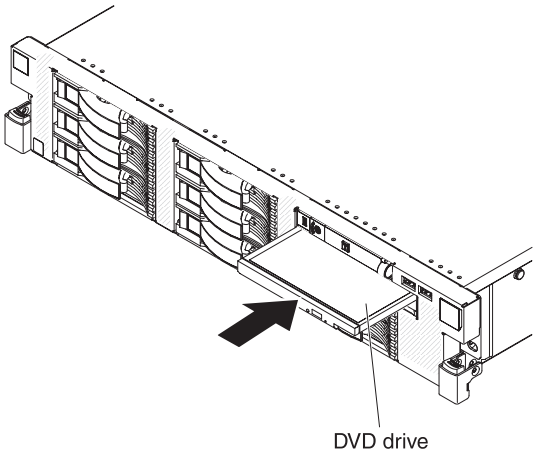
## Installing an optional DVD drive

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

1. Remove the DVD drive filler panel if it is installed. Press the release latch on the front of the server and pull out the release latch to remove the DVD drive filler slightly out of the server; then, remove the DVD drive filler completely out of the drive bay.




2. Slide the DVD drive into the server until it clicks into place.



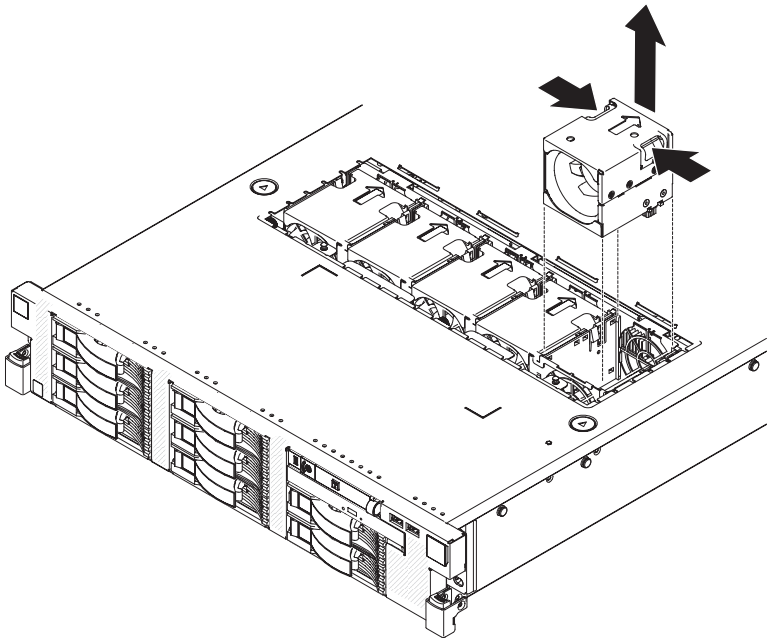

3. Press in the release latch to secure the DVD drive in place.
4. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
5. Turn on all attached devices and the server.

## Removing a system fan

**Attention:** You must turn off the server before you remove or install a non-hot-swap fan.

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. If you are removing a non-hot-swap fan, turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the top-cover fan door (see “Removing the top-cover fan door” on page 162).
4. Squeeze the fan handles together, and then lift the fan out of the server.



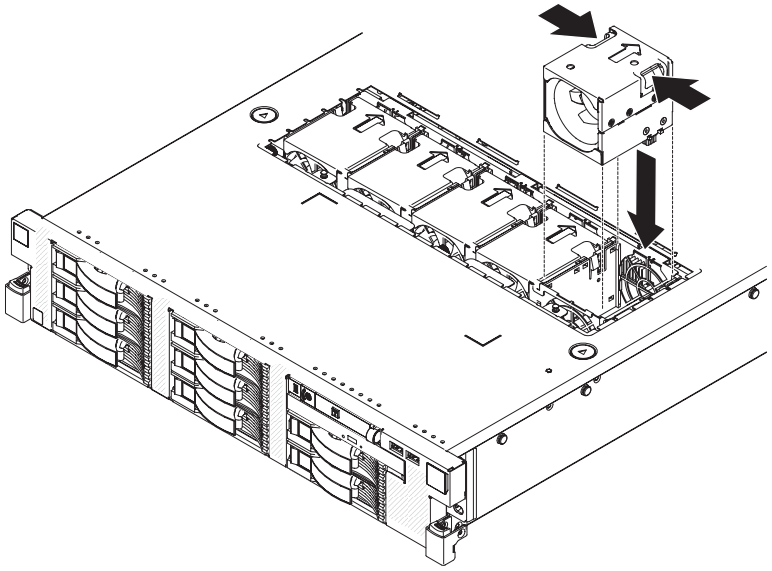
5. If you are instructed to return the fan, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing a system fan

**Attention:** You must turn off the server before you remove or install a non-hot-swap fan.

To install a system fan, complete the following steps:

1. Align the fan so that the airflow arrow points toward the rear of the server.



2. Lower the fan into the socket, and push it downward until it clicks into place.
3. Install the top-cover fan door (see “Installing the top-cover fan door” on page 163).

4. If necessary, reconnect the power cords and all external cables, and then turn on the server.

## Removing a hot-swap power supply

- If the maximum load on the server is less than 935 watts or if a problem occurs with one of the power supplies, the redundant power supply can meet the power requirements. To have redundant power capabilities:
  - install two power supplies in a server with two microprocessors or four 80W microprocessors.
  - install three power supplies in a server with four microprocessors (more than 80W).
- The server can run fully configured with:
  - one power supply when two microprocessors or four 80W microprocessors are installed.
  - three power supply when four microprocessors (more than 80W) are installed.
  -

**Notes:**

1. If you disconnect an ac power cord, wait for 20 seconds before you reconnect the ac power cord and start the server. Avoid disconnecting and reconnecting the ac power cord repeatedly.
2. In a server with two-microprocessor configuration, two power supplies must be installed in the server for either power supply to be considered hot-swap. If the server comes with four microprocessors, three power supplies must be installed in the server for a power supply to be considered hot-swap.

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

**Statement 8:**

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

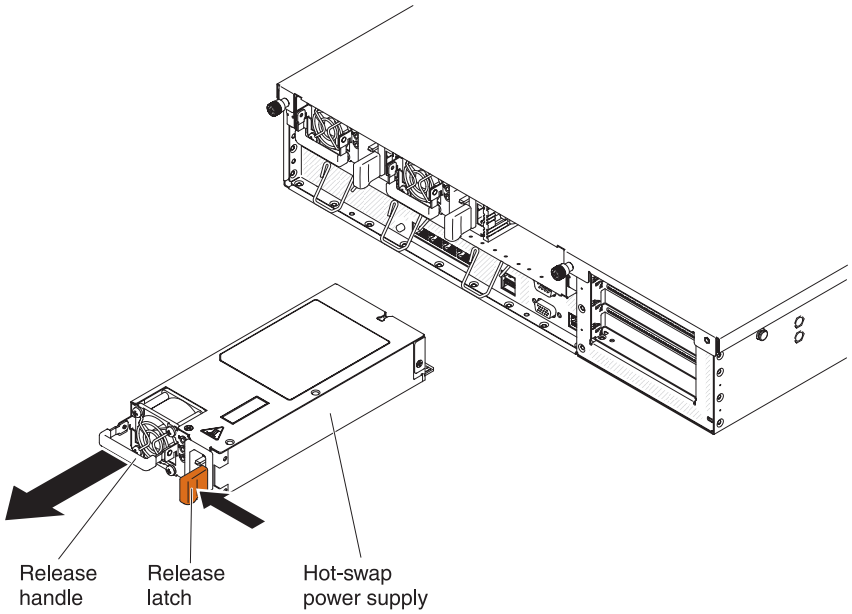
**Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.**

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.

**Note:** If your server has only one power supply, you must turn off the server before you remove the power supply.

2. If only one power supply is installed, turn off the server.
3. Disconnect the power cord from the connector on the back of the power supply.
4. Press the orange release latch and hold it in place.




5. Grasp the handle and pull the power supply out of the bay.
6. 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.

## Installing a hot-swap power supply

The server supports up to three 1100-watt hot-swap power supplies. If the server comes with only one power supply for a two-microprocessor configuration or two power supplies for a four-microprocessor configuration, you can install an additional power supply to add redundant power capabilities. If the maximum load on the server is more than 935 watts or if a problem occurs with one of the power supplies, the other power supply can meet the power requirements.

To provide redundant power capabilities in the server:

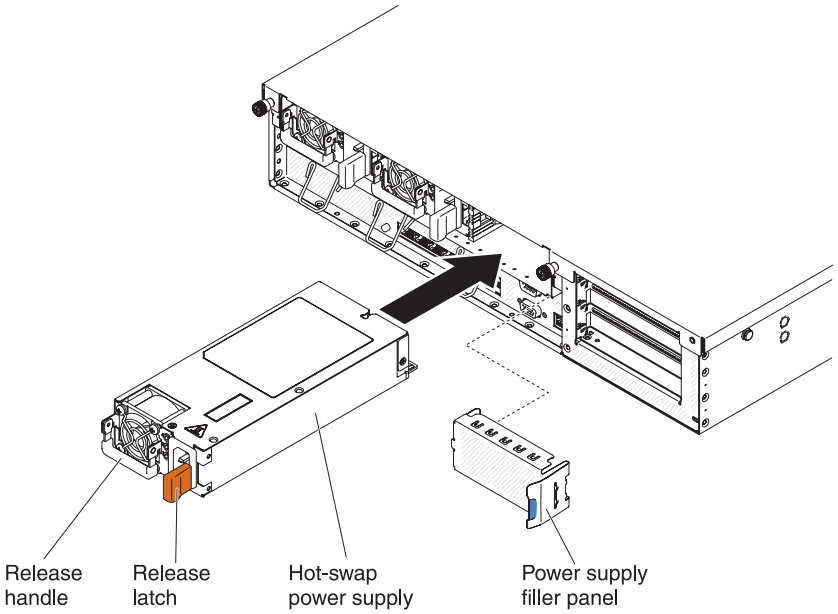
- install two power supplies in a server with two microprocessors or more microprocessors (less than 80W).
- install three power supplies in a server with four microprocessors (greater than 80W).

**Notes:**

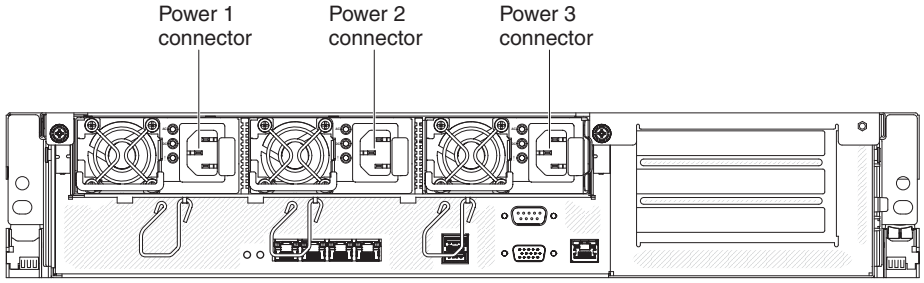
1. In a server with two-microprocessor configuration, two power supplies must be installed in the server for either power supply to be considered hot-swap. If the server comes with four microprocessors, three power supplies must be installed in the server for a power supply to be considered hot-swap.
2. The IBM Power Configurator detects your server power consumption and helps you determine whether an additional power supply is required before you install more components in the server. You can download a free copy of the IBM Power Configurator from the IBM website at http://www-03.ibm.com/systems/bladecenter/resources/powerconfig.html.

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

1. Remove the power-supply filler panel.
2. Touch the static-protective package that contains the power supply to any unpainted surface on the outside of the server; then, remove it from the package.
3. Slide the ac power supply into the bay until the release latch clicks into place.




4. Connect one end of the power cord for the new power supply into the ac connector on the back of the power supply; then, connect the other end of the power cord into a properly grounded electrical outlet.




**Note:** If you disconnect the ac power cord, wait for 20 seconds before you reconnect the ac power cord and start the server. Avoid disconnecting and reconnecting the ac power cord repeatedly.

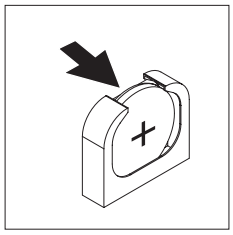
5. Route the power cord through the cable retention hook on the rear of the server so that it does not accidentally become disconnected.
6. If the server is turned off, turn on the server.
7. Make sure that the ac and dc power LEDs on the power supply are lit, indicating that the power supply is operating correctly.

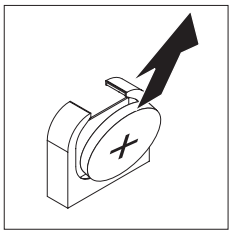
## Removing the system battery

To remove the system battery, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.

2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 163).
5. Remove the battery:
   a. Use one finger to push the battery horizontally away from its housing.
   b. Lift the battery from the socket.





6. Dispose of the battery as required by local ordinances or regulations. See “Battery return program” on page 259 for information about disposing of the battery.

## Installing the system 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.
- 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 15F8409 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.**

*Do not:*

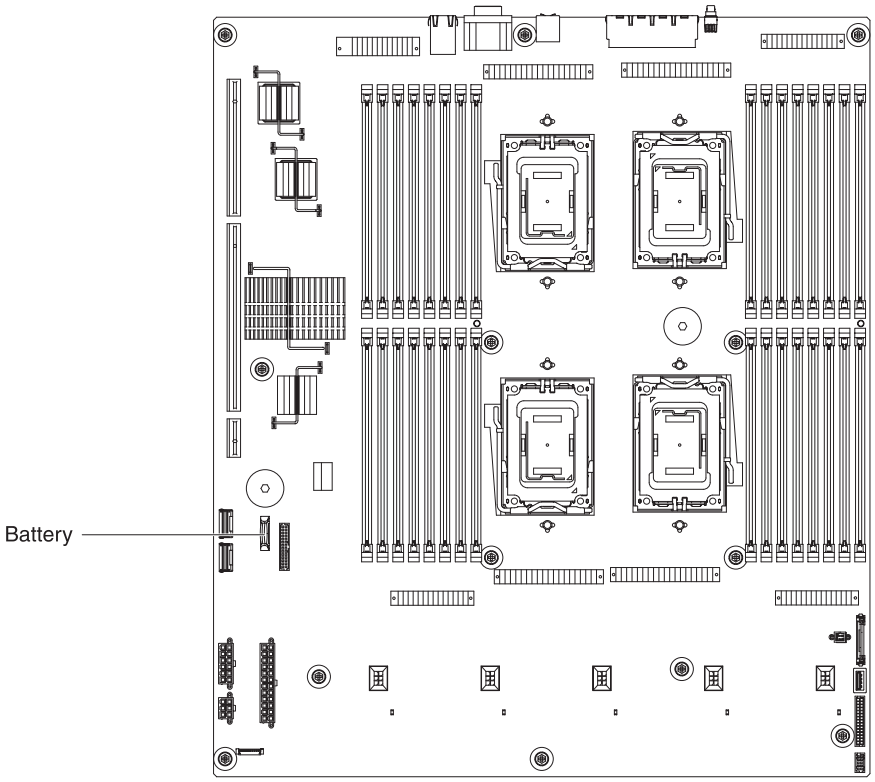
- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

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

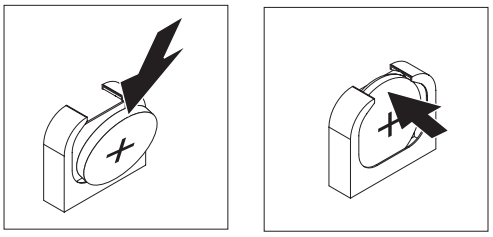
To install the replacement system battery, complete the following steps:

1. Follow any special handling and installation instructions that come with the replacement battery.

2. Locate the battery connector on the system board.




3. Insert the new battery:
   a. Position the battery so that the positive (+) symbol is facing away from the air baffle.
   b. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.
   c. Press the battery down into the socket until it snaps into place.



4. Installing the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 165).
5. Install the top cover (see “Installing the top cover” on page 161).
6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

   **Note:** You must wait approximately 1 minute after you connect the power cord of the server to an electrical outlet before the power-control button becomes active.
7. Start the Setup utility and reset the configuration:
   - Set the system date and time.
   - Set the power-on password (if it is set before you replace the battery).

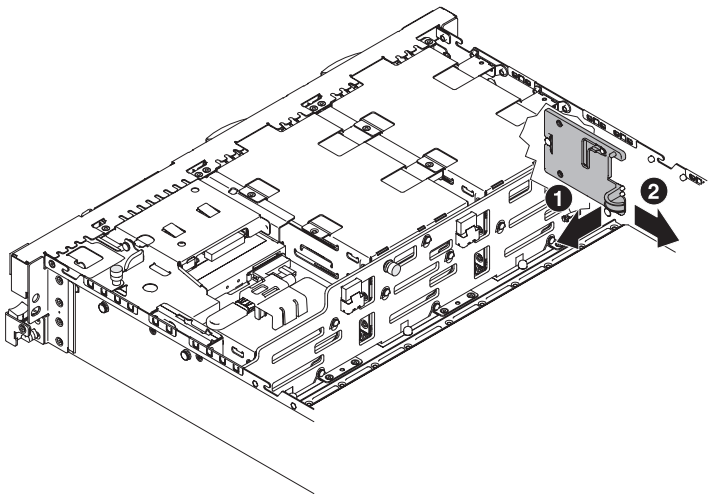
- Reconfigure the server.

See Chapter 6, “Configuration information and instructions,” on page 235 for details.

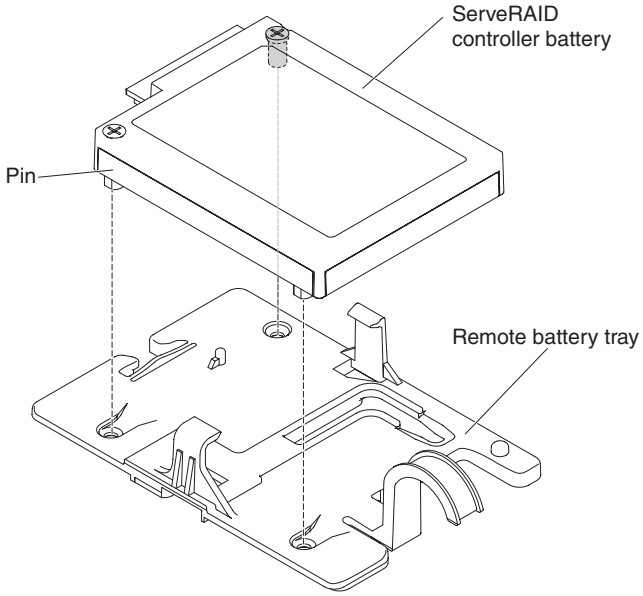
## Removing a ServeRAID SAS controller battery from the remote battery tray

To remove a ServeRAID controller battery from the remote battery tray, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Pull the loop on the remote battery tray away from the chassis; then, slide the tray toward the rear of the server to remove the tray from the side of the chassis.




5. Slightly pull apart the clips on the side of the remote battery tray to remove the ServeRAID controller battery.




6. Disconnect the cable that connects the battery to the battery carrier.
7. If you are instructed to return the ServeRAID controller battery, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

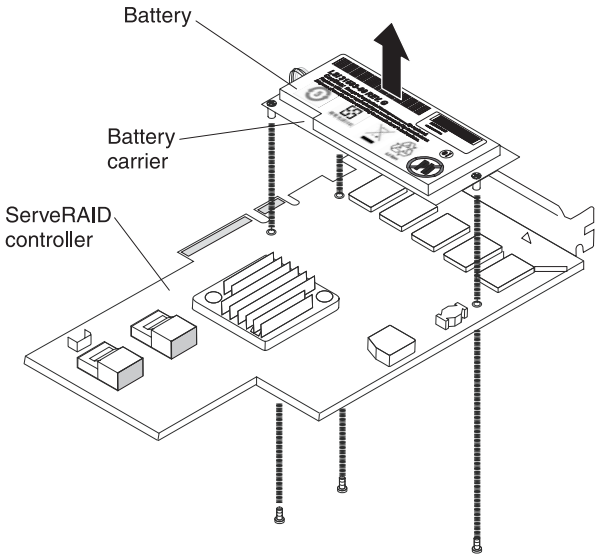
## Installing a ServeRAID controller battery on the remote battery tray

The Intelligent Battery Backup Unit (iBBU) is an optional battery for the ServeRAID SAS/SATA controller. It is referred to as the *battery* throughout this section. You must install the battery at a distance from the ServeRAID controller to avoid overheating.

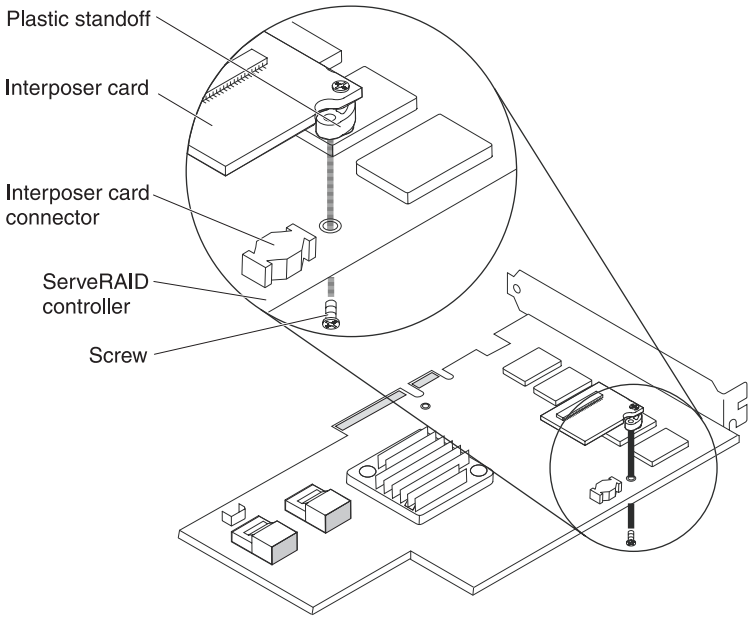
To install a ServeRAID controller battery on the remote battery tray, complete the following steps:

1. If a battery and battery carrier are attached to the ServeRAID controller, remove the three screws that secure the battery carrier to the ServeRAID controller. Set the battery and battery carrier aside.

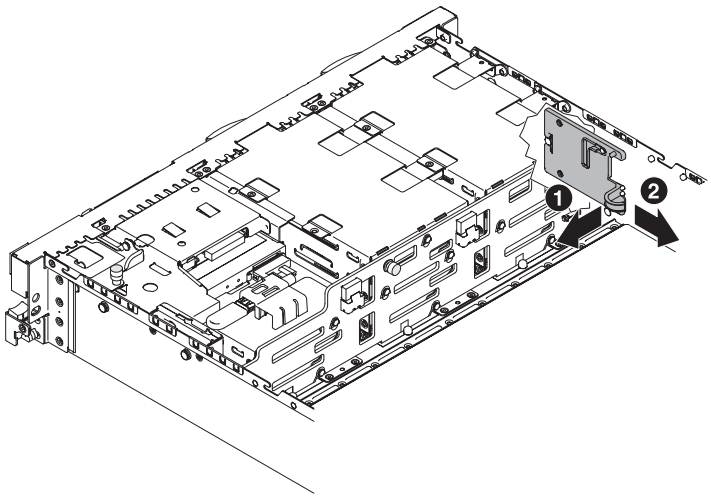
   **Note:** The illustrations in this document might differ slightly from your hardware.



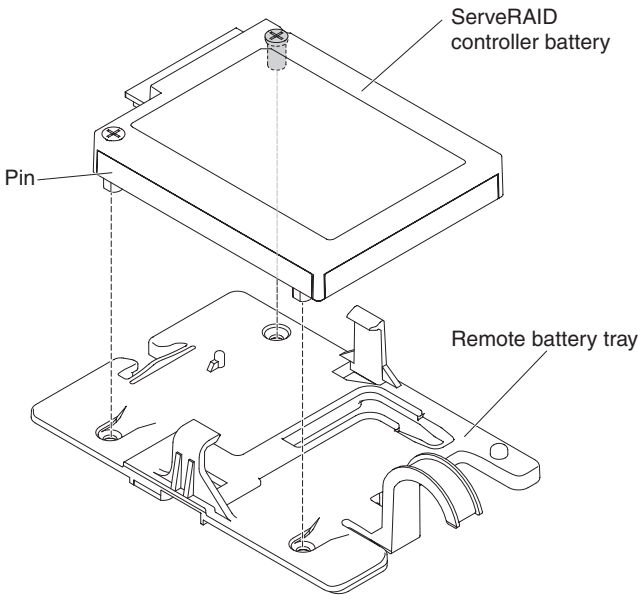

2. Install the interposer card on the interposer card connector on the ServeRAID controller:
   a. Remove the interposer card and the loose screws from the bag.
   b. Rotate the standoff so that it aligns with the hole in the ServeRAID controller, and position the interposer card connector over the ServeRAID controller connector.




   c. Press the interposer card down onto the interposer card connector so that the interposer card is secured.
   d. From the other side of the ServeRAID controller, insert and tighten the screws to secure the interposer card to the ServeRAID controller.
3. Install the battery on the remote battery tray:
   a. Pull the loop on the remote battery tray away from the chassis; then, slide the tray toward the rear of server to remove the tray from the side of the chassis.




b. On the remote battery tray, find the pattern of recessed rings that matches the pins on the battery carrier.

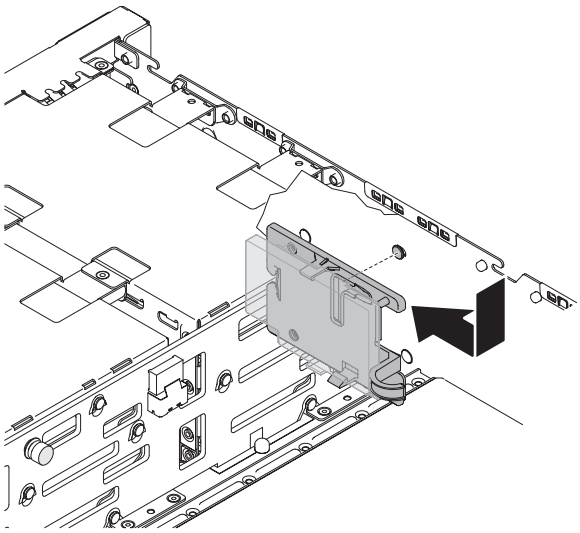



c. Press the pins into the rings on the remote battery tray. Make sure the two retention clips secure the battery and battery carrier on the remote battery tray.

4. Connect the remote battery cable to the battery carrier.

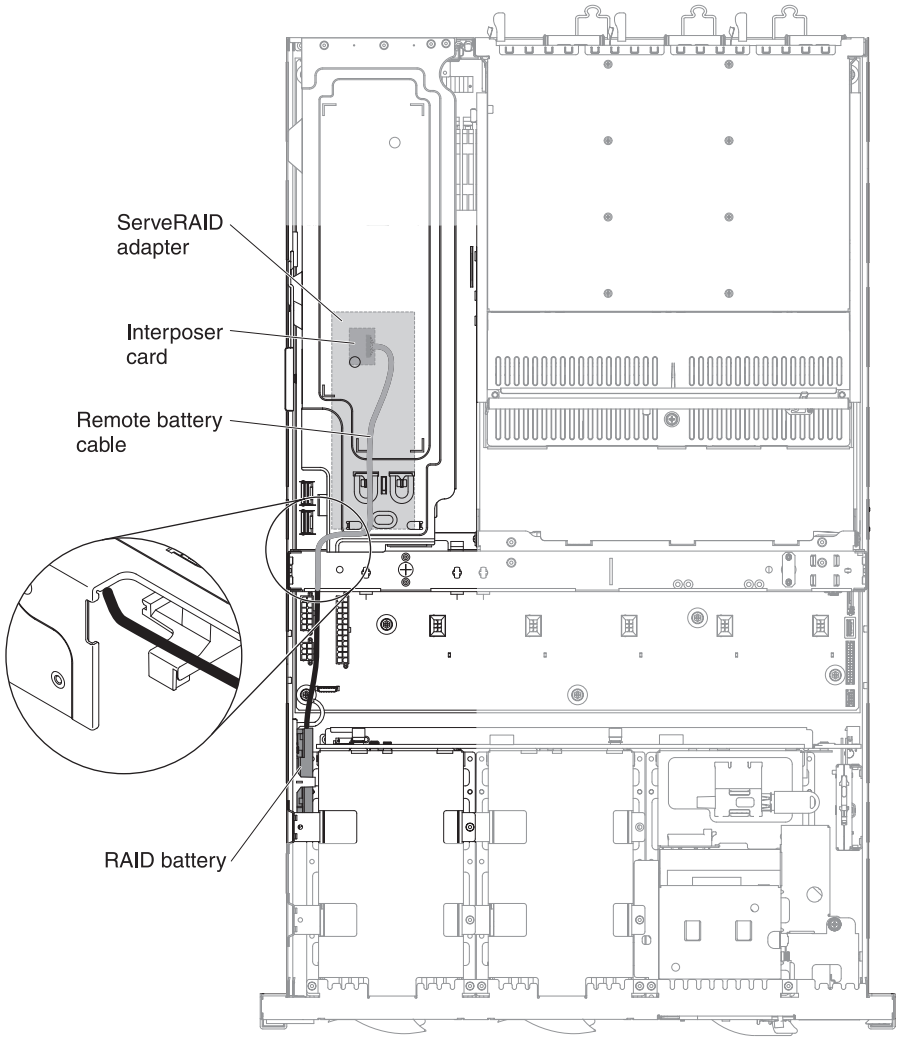
   **Attention:** To avoid damage to the hardware, be sure to align the black dot on the cable connector with the black dot on the connector on the interposer card. *Do not force the remote battery cable into the connector.*

5. Align the slot on the remote battery tray with the nailhead on the chassis; then, push the remote battery tray toward the front of the server until the nailhead slides into the slot to secure the remote battery tray on the chassis.



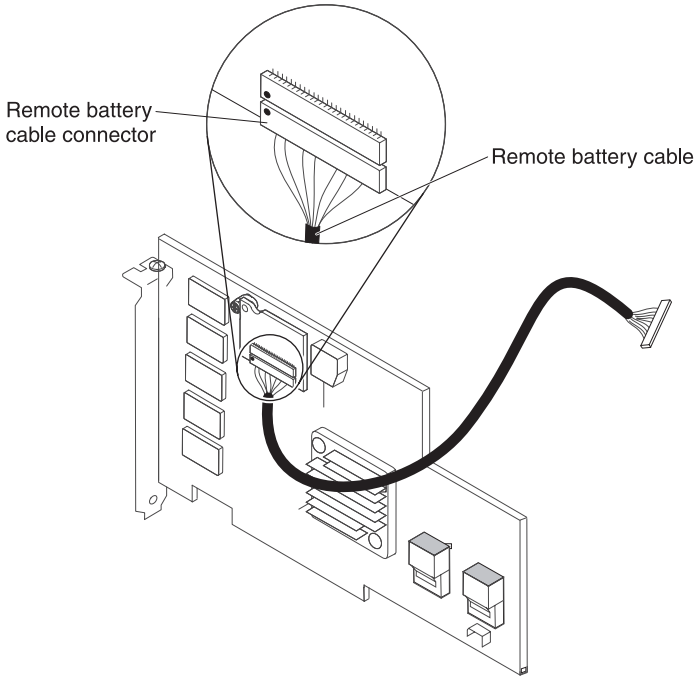
6. Route the remote battery cable through the cage hole on the chassis. You may store the excess battery cable in the space between the hard drive cage and the chassis.

   **Attention:** Make sure that the cable is not pinched and does not cover any connectors or obstruct any components on the system board.




7. Connect the other end of the remote battery cable to the interposer card on the ServeRAID controller. Route the remote battery cable through the opening on the PCI riser-card assembly.

   **Attention:** To avoid damage to the hardware, be sure to align the black dot on the cable connector with the black dot on the connector on the interposer card. *Do not force the remote battery cable into the connector.*

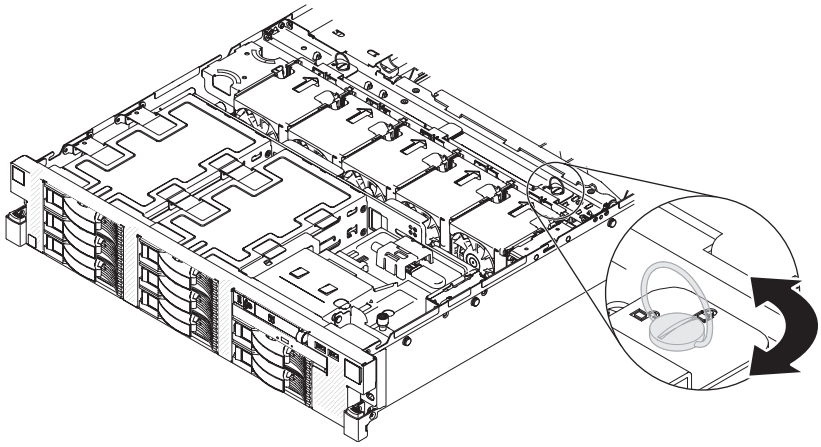



8. Install the ServeRAID controller on the PCI riser-card assembly (see “Installing a PCI adapter” on page 170).
9. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 165).
10. Install the top cover (see “Installing the top cover” on page 161).
11. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

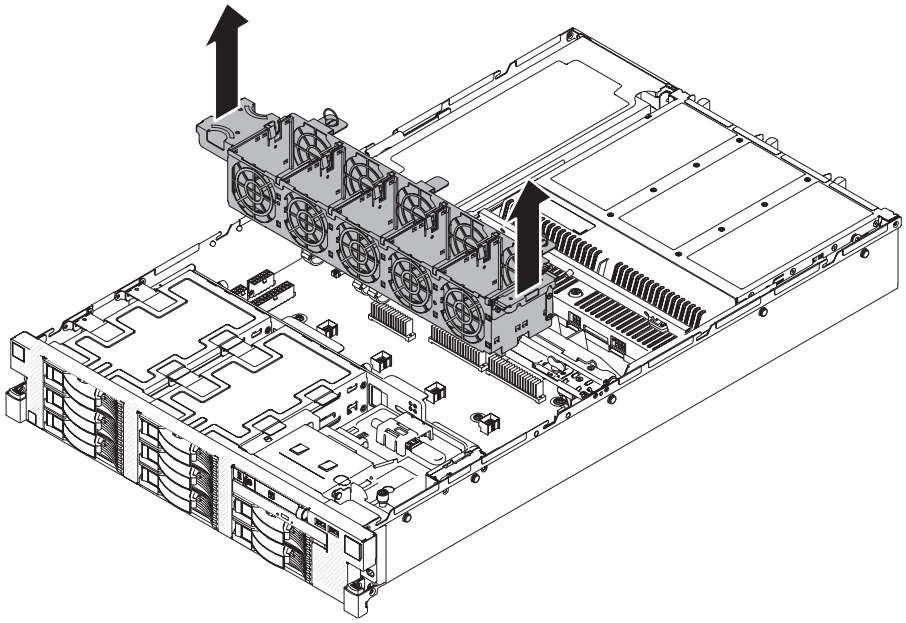
## Removing the fan cage

To remove the fan cage, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Remove the fans (see “Removing a system fan” on page 179).
5. Turn the latches counter-clockwise to the unlock position.



6. Grasp both sides of the fan cage and lift to remove the fan cage from the server.

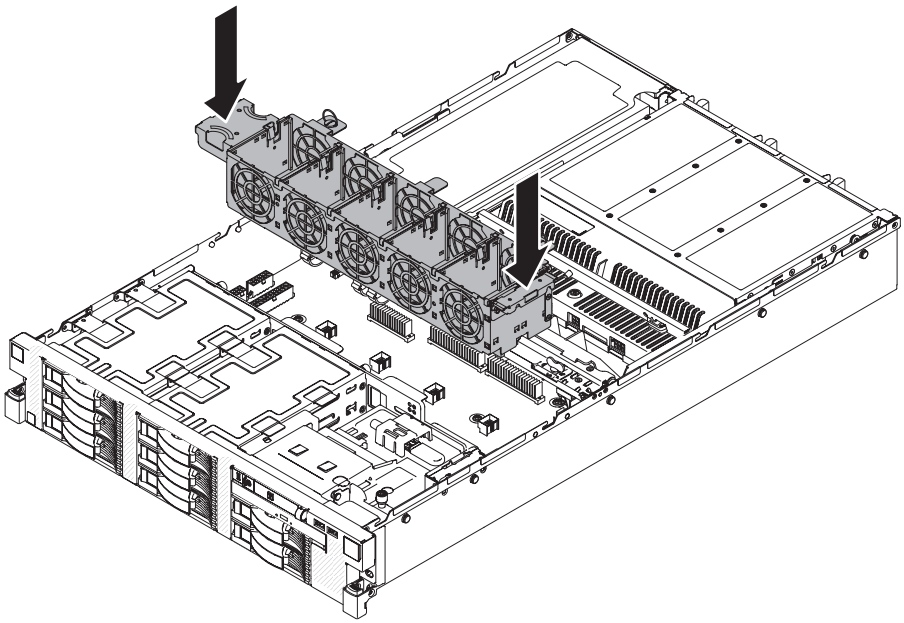


7. If you are instructed to return the fan cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

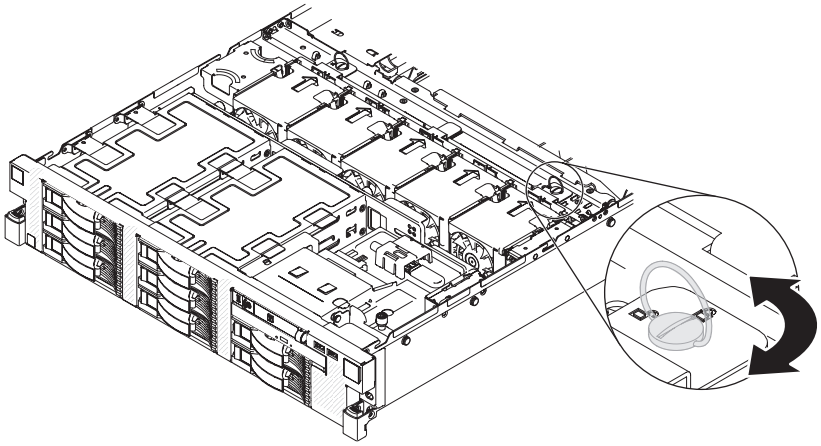
## Installing the fan cage

To install the replacement fan cage, complete the following steps:

1. Align the latches on the fan cage with the holes on the chassis; then, lower the fan cage into the server.



2. Turn the latches clockwise to the lock position to secure the fan cage to the chassis.

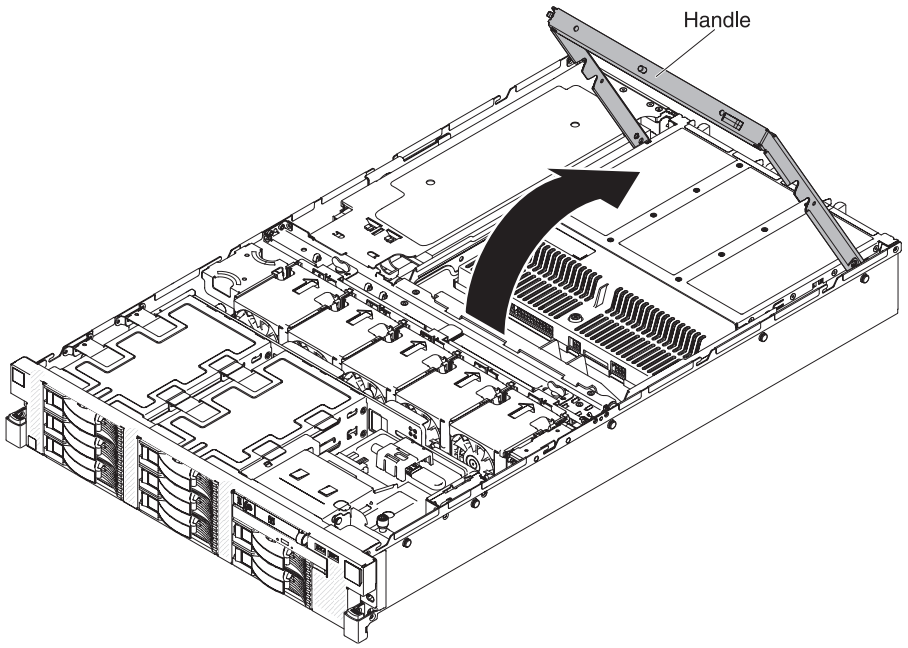


3. Install the fans (see “Installing a system fan” on page 180).
4. Install the top cover (see “Installing the top cover” on page 161).
5. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
6. Turn on all attached devices and the server.

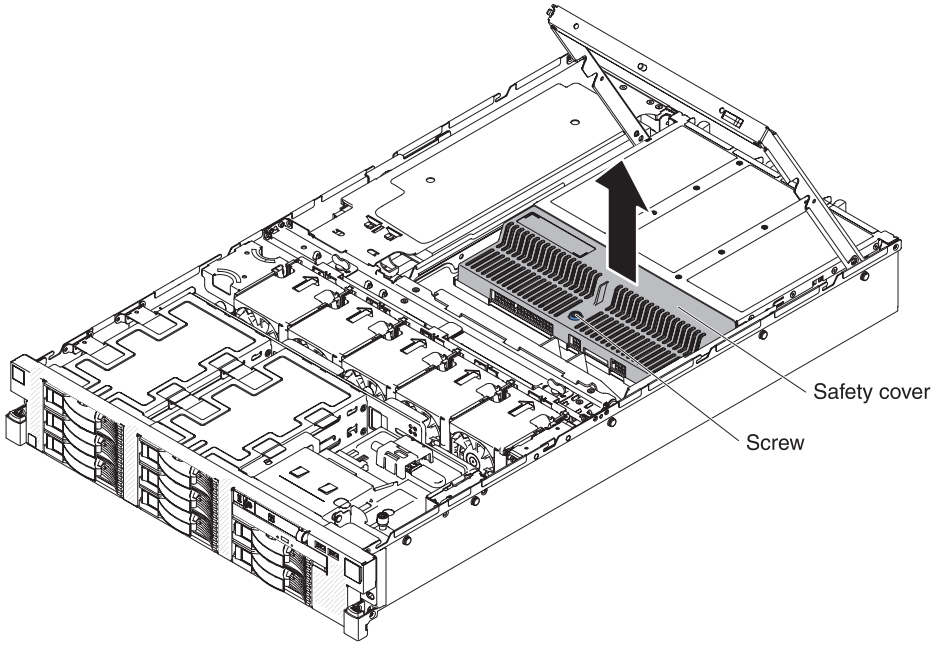
## Removing the power-supply distribution board safety cover

To remove the power-supply distribution board safety cover, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Pull up the handle on the power-supply cage until the handle locks into place.




5. Loosen the screw that secures the safety cover to the power-supply cage; then, remove the safety cover from the server.

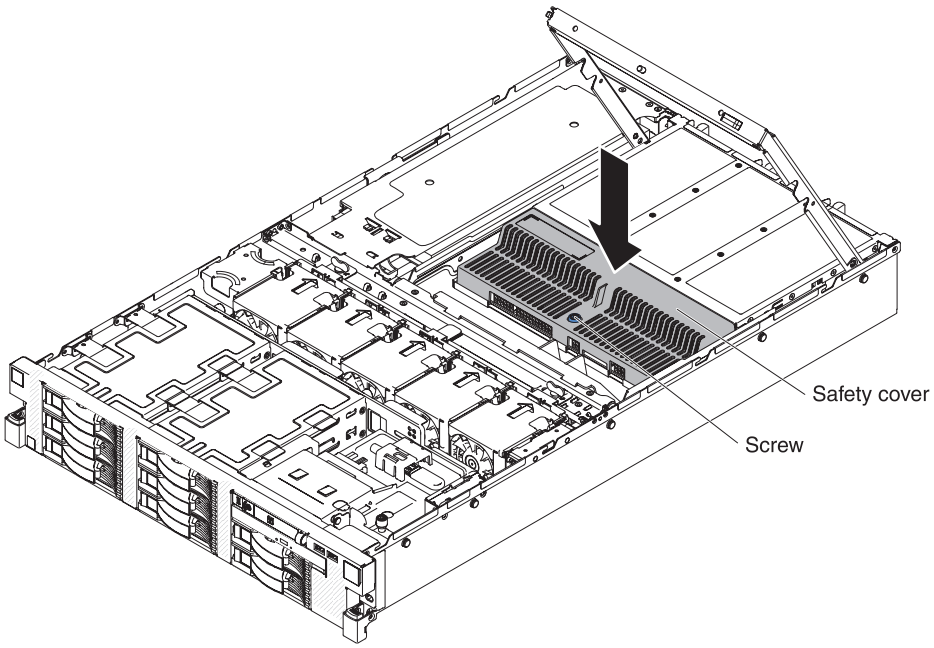



6. If you are instructed to return the safety cover, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

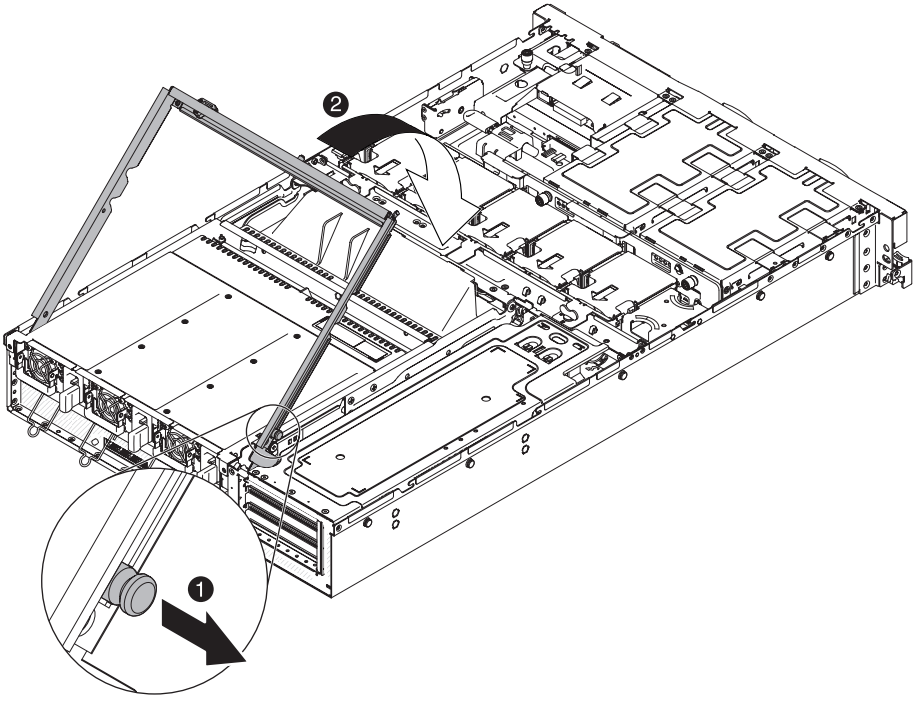
## Installing the power-supply distribution board safety cover

To install the replacement power-supply distribution board, complete the following steps:

1. Align the screw on the safety cover with the screw hole on the power-supply distribution board; then, tighten the screw to install the safety cover.




2. While you hold the handle, pull the release pin on the side of the handle and lower the handle into the closed position.




3. Install the top cover (see “Installing the top cover” on page 161).
4. Install the power supply (see “Installing a hot-swap power supply” on page 182).
5. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
6. Turn on all attached devices and the server.

## Removing and replacing Tier 2 CRUs

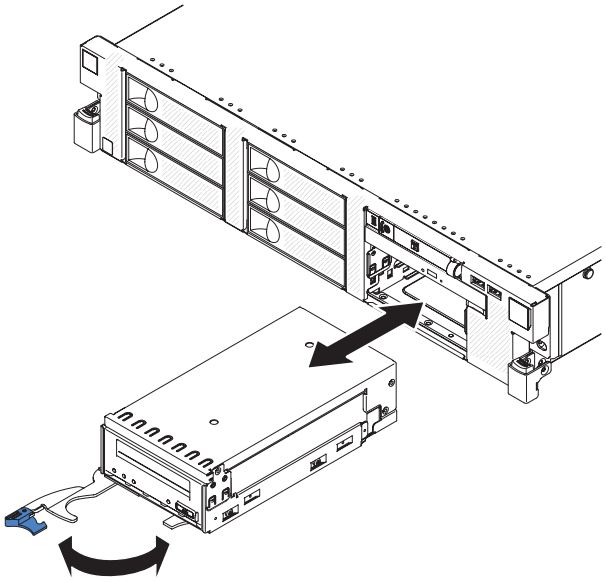
You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.

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

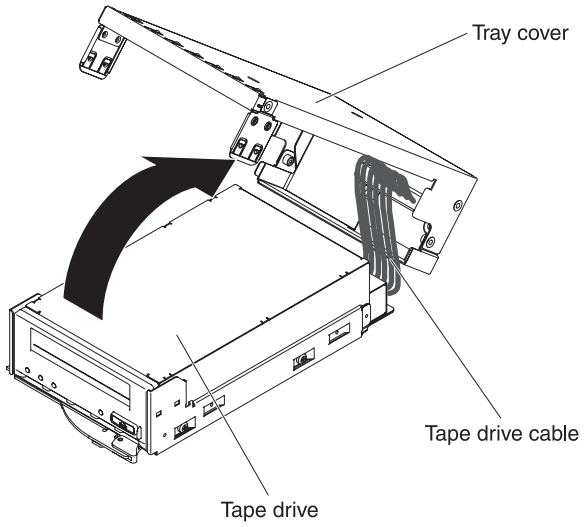
## Removing the optional tape drive enablement kit and tape drive

To remove the optional tape drive from the server, complete the following steps:

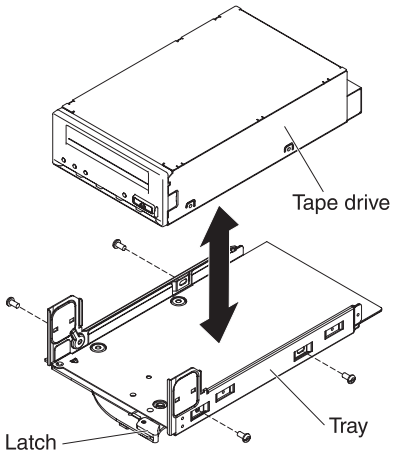
1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary.
3. Open the tape drive tray release latch and slightly slide the drive tray out of the bay; then, pull the drive completely out of the bay.



4. Remove the tape drive tray cover and disconnect the cable from the rear of the tape drive.



5. Remove the tape drive from the drive tray by removing the four screws on the sides of the tray.




6. Remove the bezel from the front of the tape drive. Save the bezel for future use.
7. If you are not installing another drive in the bay, insert the filler panels into the empty drive bays.
8. If you are instructed to return the tape drive or the tape drive enablement kit, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the optional tape drive enablement kit and tape drive

The IBM System x37550 M3 tape drive enablement kit is used to install an optional tape drive in simple-swap models of the server. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported optional devices. To order a tape drive enablement kit, contact your IBM marketing representative or authorized reseller. The IBM System x3755 M3 tape drive enablement kit is compatible only with the following tape drive:

- IBM DDS Generation 5 (DDS5) SATA tape drive

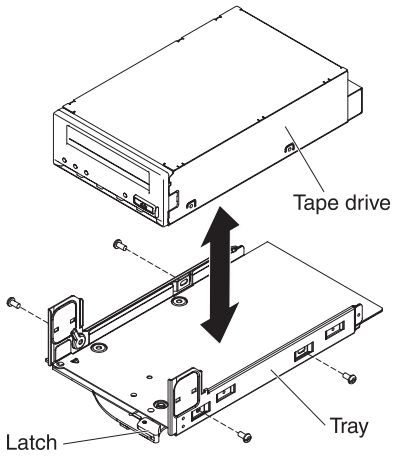
The IBM System x3755 M3 tape drive enablement kit contains the following component:

- One tape drive tray cover (with attached cable)
- One tape drive tray

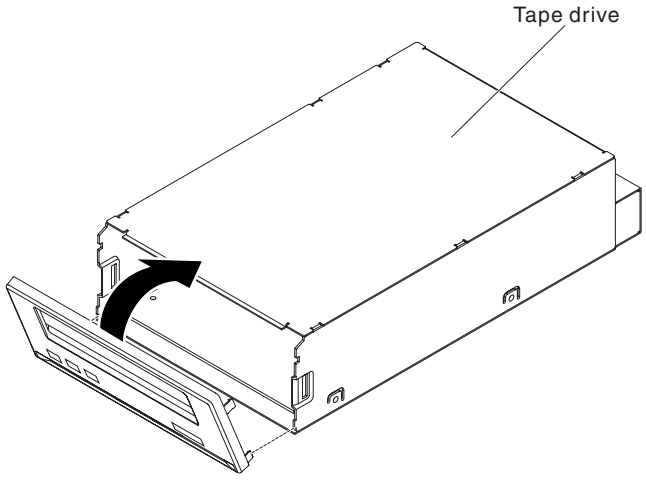
**Note:** The optional tape drive is supported only on simple-swap models of the server (with bezel part number: 25R0009).

To install the optional tape drive enablement kit and tape drive, complete the following steps:

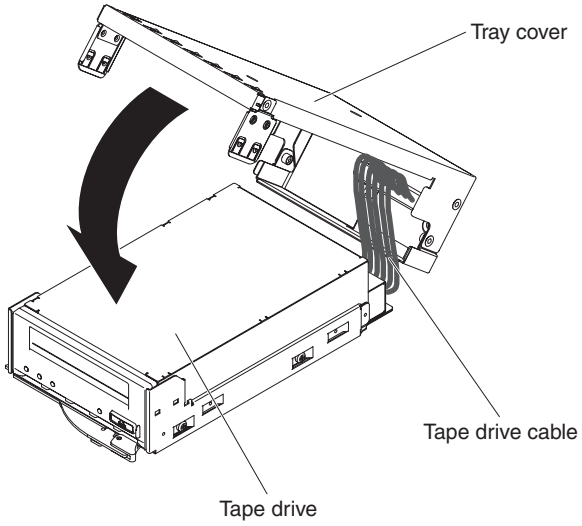
1. If the tape drive comes with a metal spacer attached, remove the spacer before you install the tape drive on the tray.
2. Prepare the drive according to the instructions that come with the drive, setting any switches or jumpers.
3. Install the drive tray on the new tape drive as shown and tighten the four screws to secure the tape drive to the bottom tray.



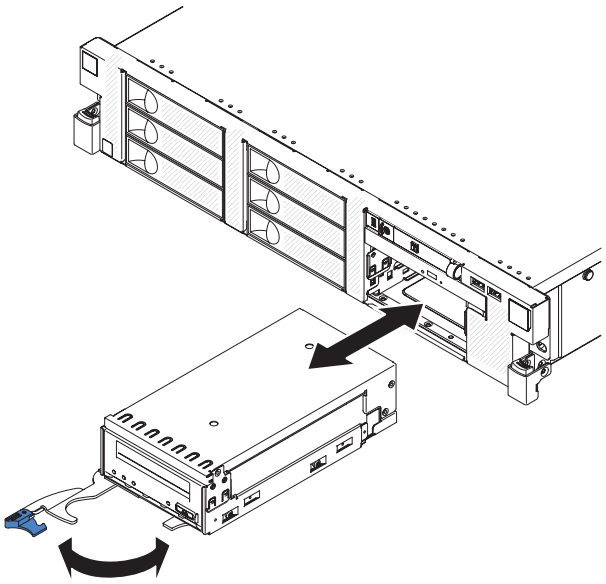

4. Align the tabs on the tape drive bezel with the holes on the tape drive and insert the tabs until they snap into place.




5. Connect the tape drive cable to the tape drive and rotate the top of the bezel toward the tape drive until the retention clips on the side of the bezel securely engages the tape drive




6. Remove the drive filler panel from drive bays 6 and 7.
7. Slide the tape-drive assembly into the server.

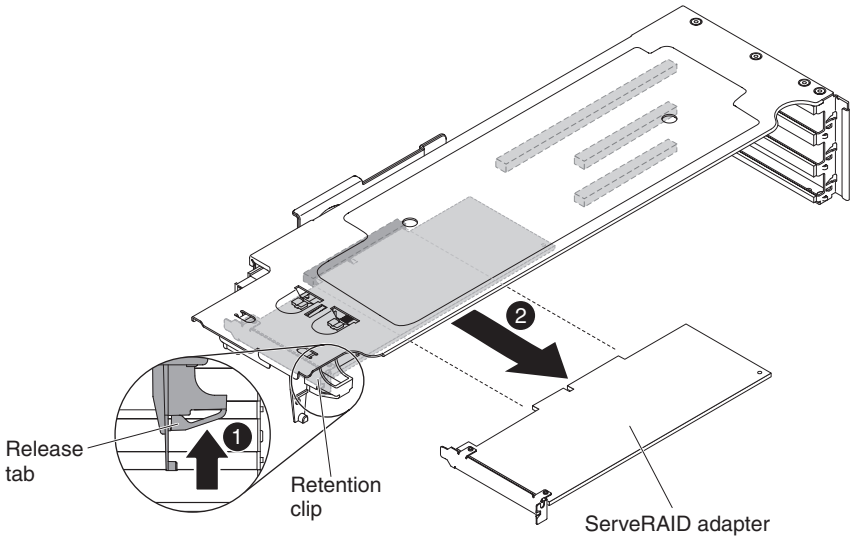


8. Push the tray handle to the closed (locked) position.
9. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
10. Turn on all attached devices and the server.

## Removing a ServeRAID SAS/SATA controller

To remove a ServeRAID controller, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to remove the adapter.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 163).
5. Disconnect any cables from the ServeRAID controller.
6. While you press the release tab on the retention clip, carefully grasp the ServeRAID controller by its top edge or upper corners and pull the ServeRAID controller from the connector on the PCI riser-card assembly.



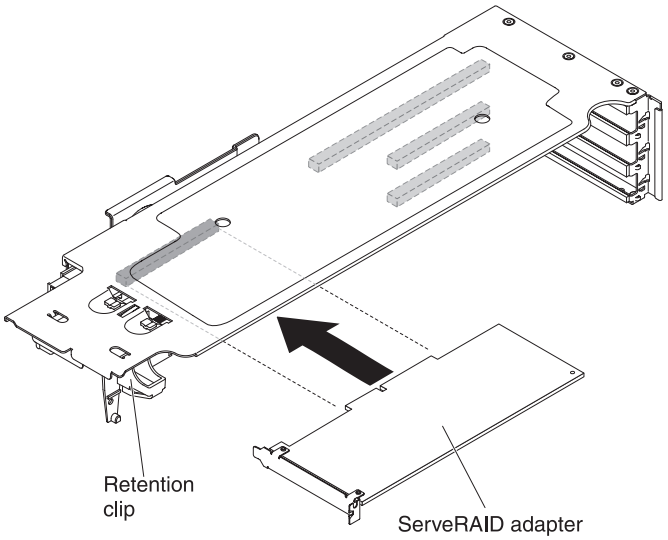

7. If you are instructed to return the ServeRAID controller, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing a ServeRAID SAS/SATA controller

**Note:** You must install a ServeRAID controller in expansion slot 4 on the PCI riser-card assembly.

To install a ServeRAID controller on the PCI riser-card assembly, complete the following steps:

1. Touch the static-protective package that contains the new ServeRAID controller to any *unpainted* metal surface on the server. Then, remove the ServeRAID controller from the package.
2. If you are installing a new or replacement ServeRAID controller that uses a battery, complete the following steps:
   a. Remove the battery from the ServeRAID controller package or the battery package.
   b. Install the battery and connect the battery to the ServeRAID controller as instructed in the documentation that comes with the ServeRAID controller or the battery, or see “Installing a ServeRAID controller battery on the remote battery tray” on page 187.
3. Install the ServeRAID controller.




a. Install the 2U low-profile bracket to the ServeRAID controller (if it is not installed).
b. Align the ServeRAID controller with expansion slot 4 on the PCI riser-card assembly and the guide on the retention tab.
c. Firmly press the ServeRAID controller into the connector. Make sure that the retention clip securely engages the bracket on the ServeRAID controller.

4. Route the signal cables and connect the signal cables to the ServeRAID controller (see “Internal cable routing and connectors” on page 153).
5. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 165).
6. Secure the signal cables with any retention clips.
7. Install the top cover (see “Installing the top cover” on page 161).
8. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.
9. Perform any configuration tasks that are required for the ServeRAID controller.

**Notes:**

1. When you restart the server for the first time after you install a ServeRAID controller with a battery, the monitor screen remains blank while the controller initializes the battery. This might take a few minutes, after which the startup process continues. This is a one-time occurrence.

   **Important:** You must allow the initialization process to be completed. If you do not, the battery pack will not work, and the server might not start.

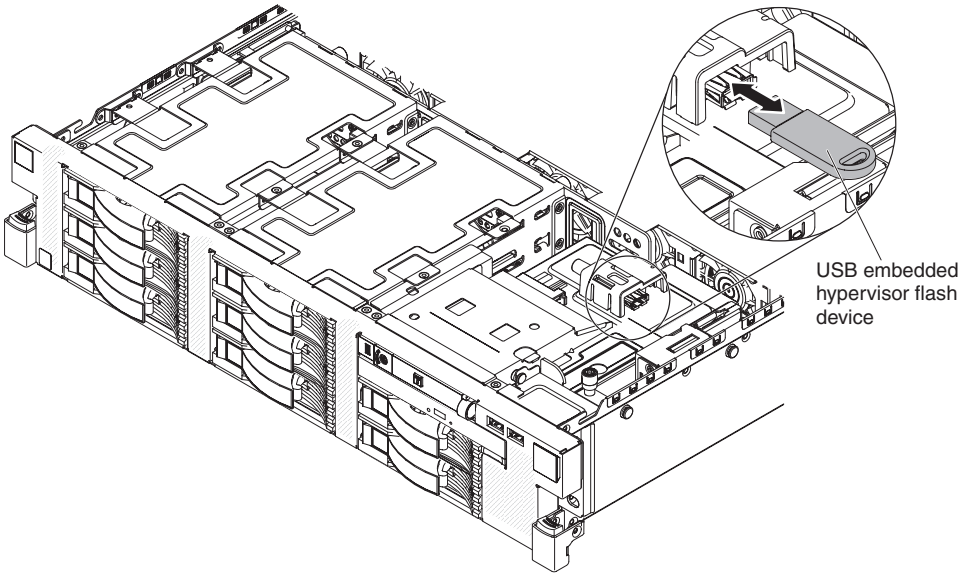
   The battery comes partially charged, at 30% or less of capacity. Run the server for 4 to 6 hours to fully charge the controller battery. The LED just above the battery on the controller remains lit until the battery is fully charged.

   Until the battery is fully charged, the controller firmware sets the controller cache to write-through mode; after the battery is fully charged, the controller firmware re-enables write-back mode.
2. When you restart the server, you are given the opportunity to import the existing RAID configuration to the new ServeRAID controller.
3. Before you install a UEFI operating system on a server with a ServeRAID controller, you must select **UEFI driver** for **Launch storage OpROM** in the Setup utility (see “Typical operating-system installation” on page 243).

## Removing the internal flash memory

To remove the internal flash memory (or hypervisor key), complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Locate the USB connector on the drive cage and remove the internal flash memory from the connector.



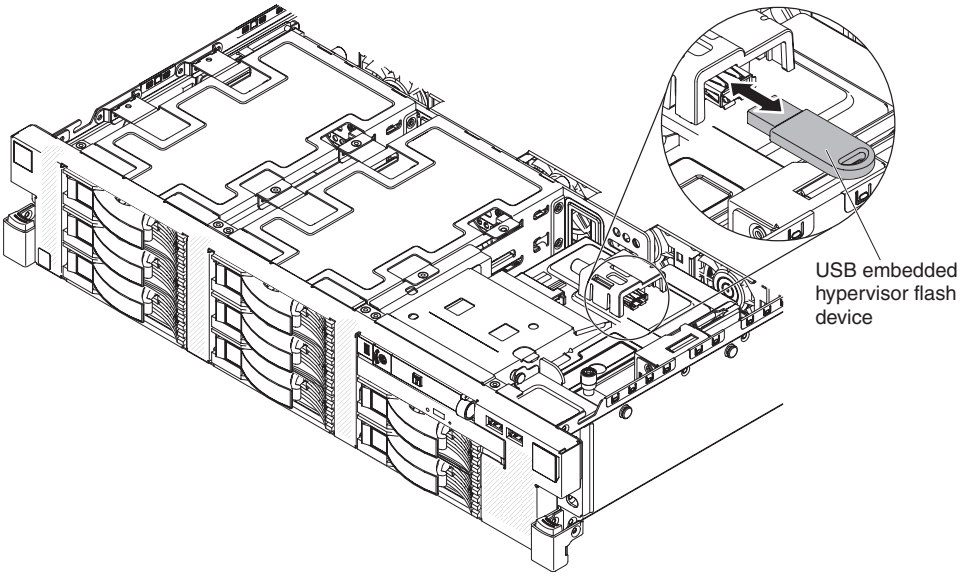

5. If you are instructed to return the internal flash memory, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the internal flash memory

**Attention:** Before you install an internal flash memory for VMware, make sure you install at least two DIMMs for each microprocessor in the server.

To install the replacement internal flash memory (or hypervisor key), complete the following steps:

1. Locate the USB connector on the drive cage and insert the internal flash memory into the connector.

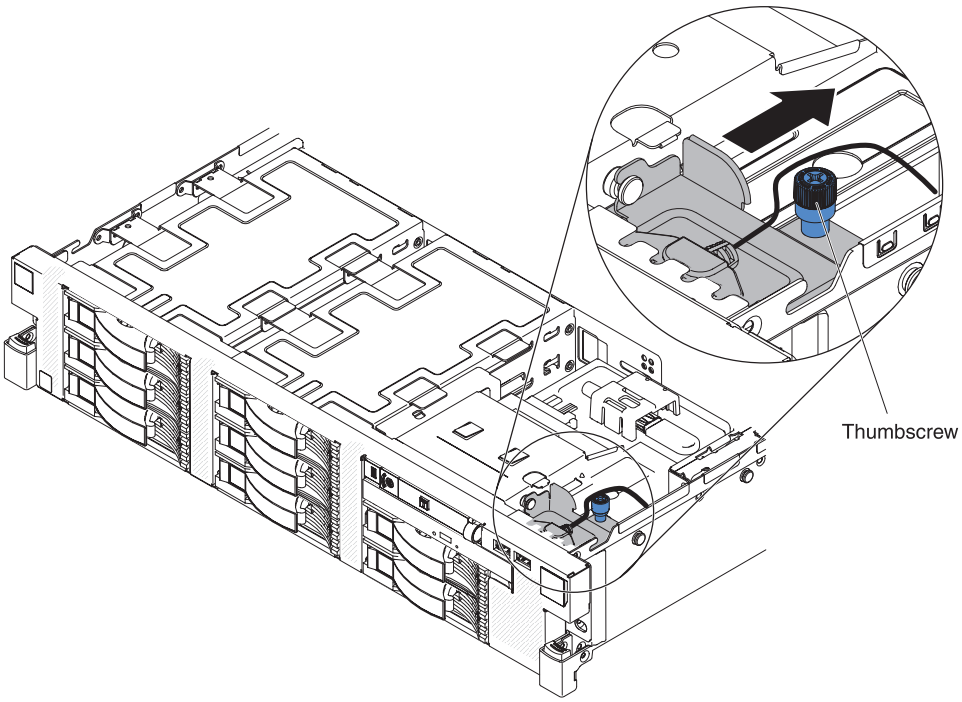



2. Install the top cover (see “Installing the top cover” on page 161).
3. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
4. Turn on all attached devices and the server.

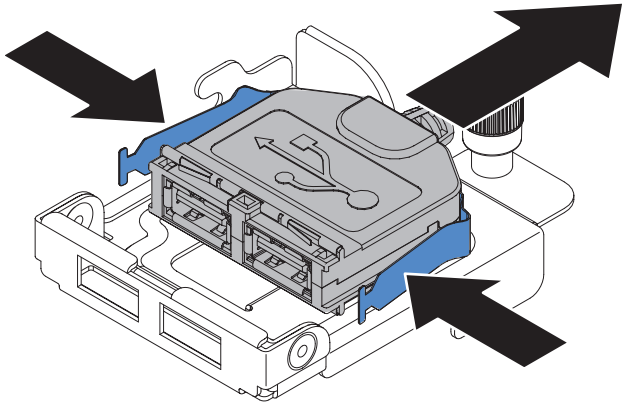
## Removing the front USB assembly

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Remove the fan cage (see “Removing the fan cage” on page 192).
5. You may disconnect the backplane power cable to obtain more room.
6. Disengage the front USB cable from any retention clip or cable tie; then, press the release tabs and disconnect the cable from the connector on the system board.
7. Loosen the thumbscrew that secures the USB mounting bracket to the chassis; then, slide the mounting bracket out of the server.




8. Press the release latches on both sides of the front USB assembly and remove it from the mounting bracket.



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

## Installing the front USB assembly

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

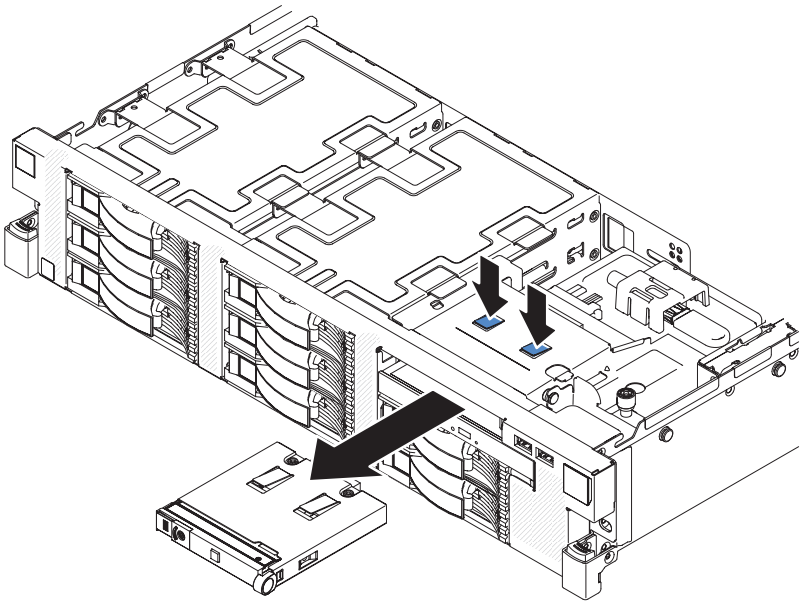
1. Insert the front USB assembly into the opening from inside the mounting bracket and push in the front USB assembly until it clicks into place.
2. Align the hole on the mounting bracket with the nailhead on the chassis; then, slide the mounting bracket into the slot from inside the server.
3. Tighten the thumbscrew to secure the mounting bracket to the chassis.
4. Connect the other end of the front USB cable to the connector on the system board.
5. Connect the power cable to the backplane if you removed it.
6. Install the fan cage (see “Installing the fan cage” on page 193).

7. Install the top cover (see “Installing the top cover” on page 161).
8. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
9. Turn on all attached devices and the server.

## Removing the operator information panel assembly

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Disconnect the cable from the connector on the rear of the operator information panel assembly.
5. Press the release latches on the operator information panel assembly and carefully push the assembly out of the server.

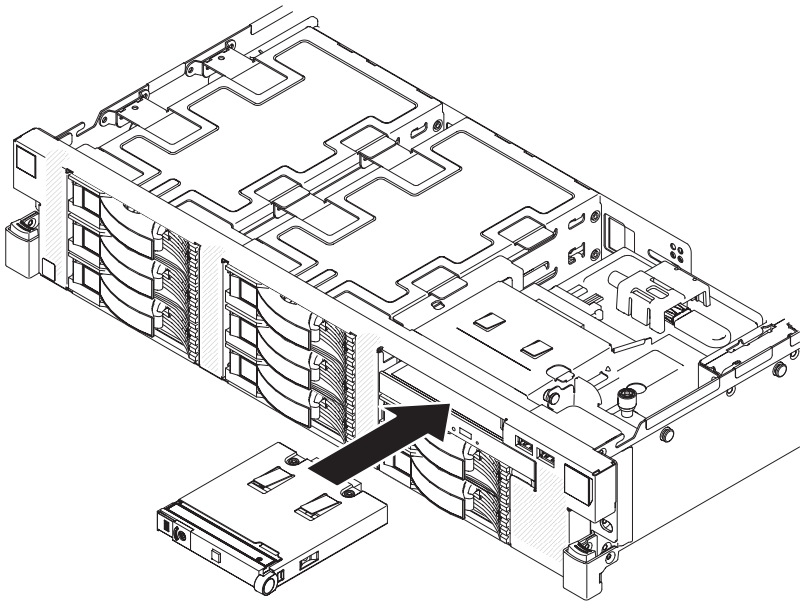


6. If you are instructed to return the operator information panel assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the operator information panel assembly

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

1. Insert the operator information panel assembly into the server until the assembly clicks into place.

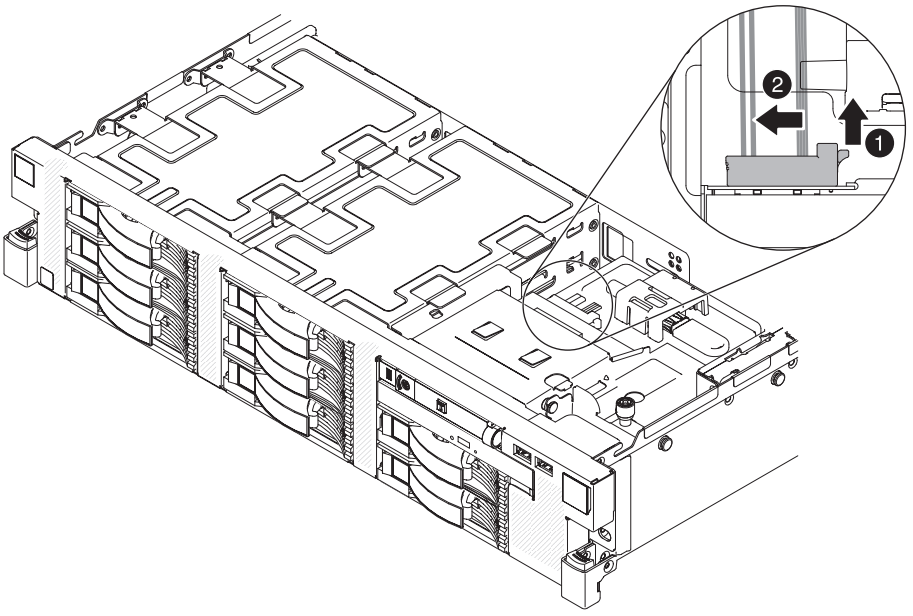


2. Connect the operator information panel cable to the rear of the new operator information panel assembly.
3. Install the top cover (see “Installing the top cover” on page 161).
4. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
5. Turn on all attached devices and the server and check the server for normal operation.

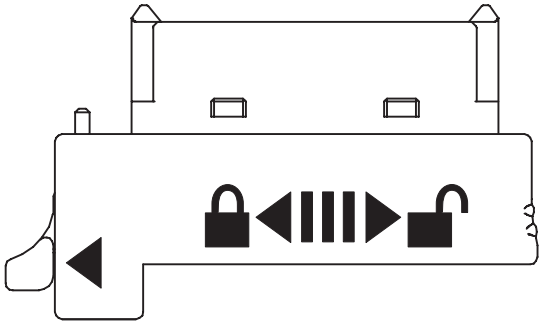
## Removing the DVD cable

To remove the DVD cable, complete the following steps:

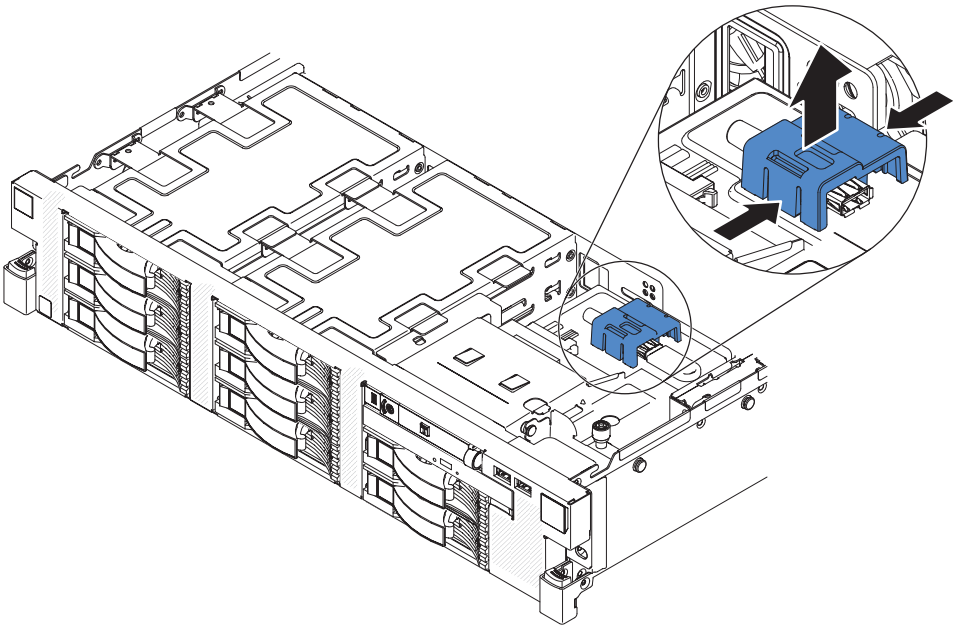
1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Remove the fan cage (see “Removing the fan cage” on page 192).
5. Remove the DVD drive (see “Removing the optional DVD drive” on page 178).
6. Disconnect the cable from the rear of the DVD housing. From the front of the server, press the cable connector latch and slide the DVD cable to the unlocked position; then, pull out the DVD cable from the connector and set it aside.




The following illustration shows the label on the DVD cable.



7. Press both sides of the cable retention clip to disengage the DVD cable.



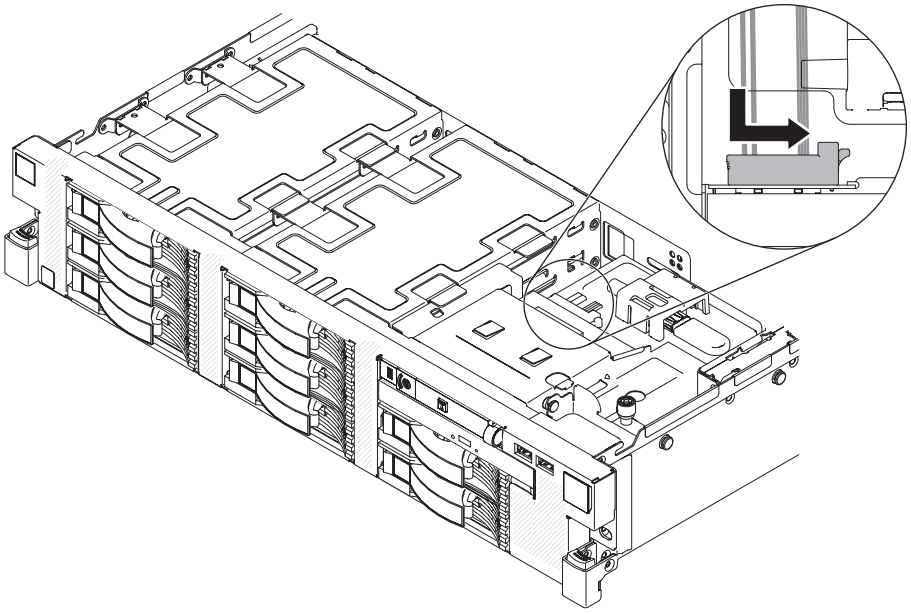
8. Disconnect the DVD cable from the connector on the system board and remove the cable from the server.

   **Attention:** To disconnect the DVD cable, you must first press the connector release tab and then disconnect the cable from the connector on the system board. Do not disconnect the cable by using excessive force.
9. If you are instructed to return the DVD cable, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the DVD cable

To install the replacement DVD cable, complete the following steps:

1. Route the DVD cable in the server and connect it to the connector on the system board (see “Internal cable routing and connectors” on page 153).
2. Connect the other end of the DVD cable to the rear of the DVD housing and slide the DVD cable to the locked position until it clicks into place.



3. Secure the DVD cable and other cables with the cable retention clip.
4. Install the fan cage (see “Installing the fan cage” on page 193).
5. Install the top cover (see “Installing the top cover” on page 161).
6. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
7. Turn on all attached devices and the server.

# Removing and replacing FRUs

FRUs must be installed only by trained service technicians.

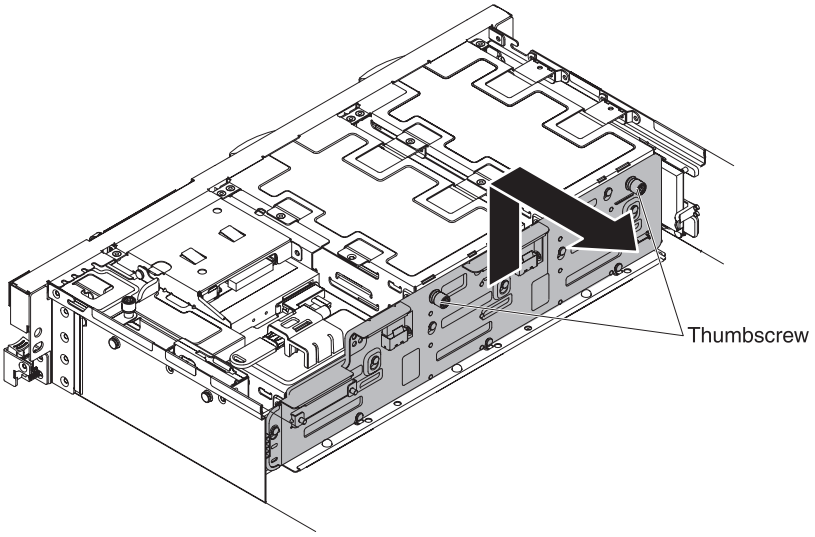
## Removing the hot-swap hard disk drive backplane

**Important:** Before you remove the hot-swap hard disk drive backplane from the server, take the following precautions to save data, firmware, and configuration data:

- Before you make changes to disk drives, disk drive controllers (including controllers that are integrated on the system board), disk drive backplanes, or disk drive cables, back up all important data that is stored on hard disks.
- Before you remove any component of a RAID array, back up all RAID configuration information.

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Remove the fan cage (see “Removing the fan cage” on page 192).
5. Pull the hard disk drives out of the server slightly to disengage them from the backplane. If you remove the drives from the server, be sure to note the location of each drive so that you will be able to reinstall them in the correct drive bay.
6. Make note of where the cables are attached to the backplane; then, disconnect them.
7. Loosen the two thumbscrews that secure the backplane to the chassis.



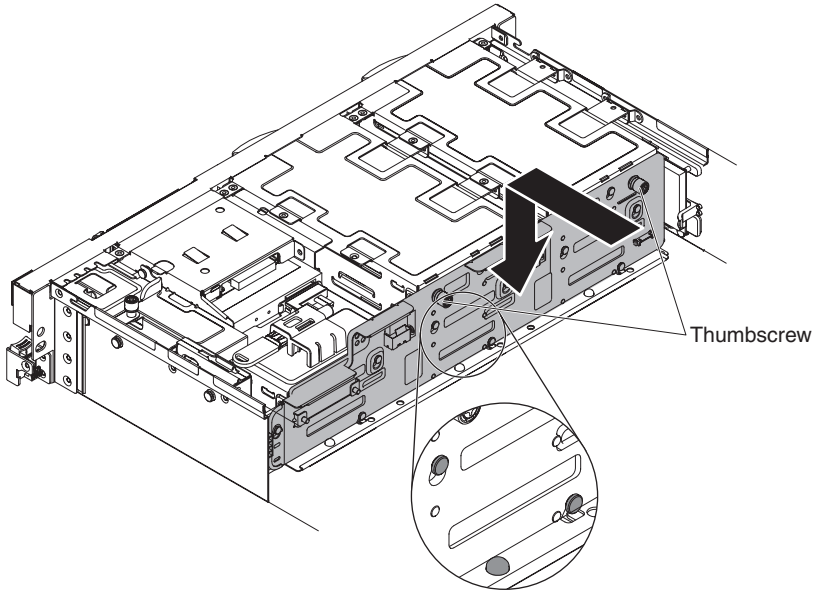

8. Pull up the backplane slightly to disengage it from the nailheads; then, remove the backplane from the server.
9. If you are instructed to return the hard disk drive backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the hot-swap hard disk drive backplane

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

1. Touch the static-protective package that contains the new backplane to any *unpainted* metal surface on the server. Then, remove the backplane from the package.
2. Reconnect the signal cables and power cable to the backplane (see “Internal cable routing and connectors” on page 153).

3. Align the holes on the backplane with the nailheads on the chassis; then, slide the hard disk drive backplane into the server until the nailheads securely engage the backplane.




4. Tighten the thumbscrews to secure the backplane to the chassis.
5. Reinstall the hard disk drives.
6. Install the fan cage (see “Installing the fan cage” on page 193).
7. Install the top cover (see “Installing the top cover” on page 161).
8. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
9. Turn on all attached devices and the server.
10. Restore the RAID configuration information that you backed up before you removed the hard disk drive backplane.

## Removing the simple-swap hard disk drive backplate

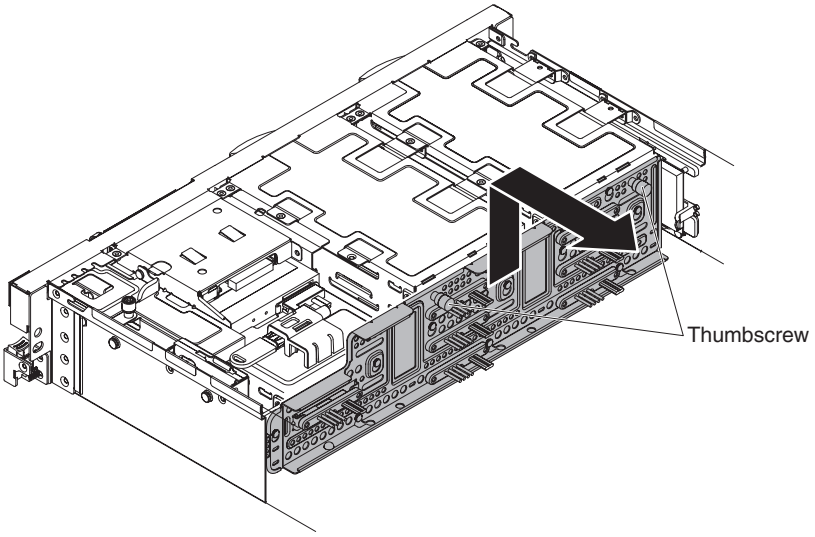
**Important:** Before you remove the simple-swap hard disk drive backplate from the server, take the following precautions to save data, firmware, and configuration data:

- Before you make changes to disk drives, disk drive controllers (including controllers that are integrated on the system board), disk drive backplates, or disk drive cables, back up all important data that is stored on hard disks.
- Before you remove any component of a RAID array, back up all RAID configuration information.

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Remove the fan cage (see “Removing the fan cage” on page 192).

5. Pull the hard disk drives and the optional tape drive out of the server slightly to disengage them from the backplate. If you remove the drives from the server, be sure to note the location of each drive so that you will be able to reinstall them in the correct drive bay.
6. Make note of where the cables are attached to the backplate; then, disconnect them.
7. Loosen the two thumbscrews that secure the backplate to the chassis.

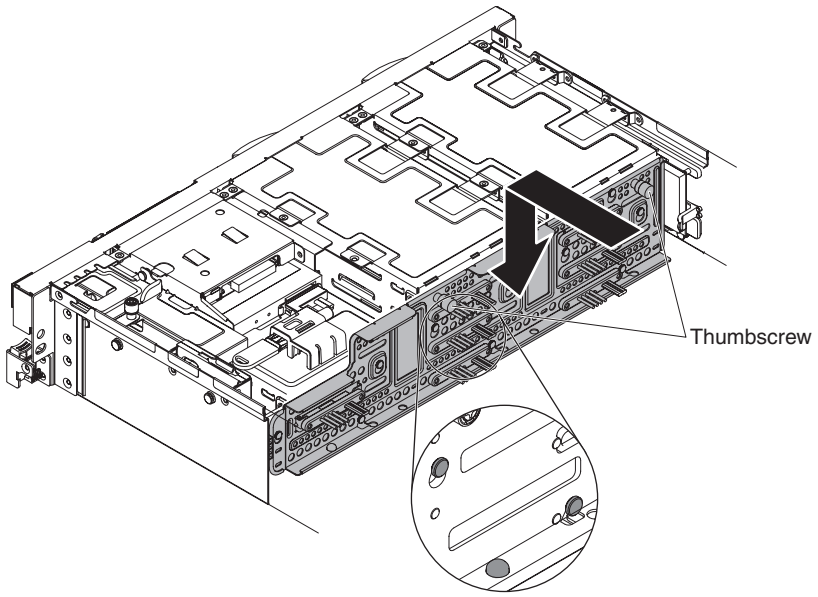



8. Pull up the backplate slightly to disengage it from the nailheads; then, remove the backplate from the server.
9. If you are instructed to return the hard disk drive backplate, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the simple-swap hard disk drive backplate

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

1. Touch the static-protective package that contains the new backplate to any *unpainted* metal surface on the server. Then, remove the backplate from the package.
2. Reconnect the signal cable and power cable to the backplate (see “Internal cable routing and connectors” on page 153).
3. Align the holes on the backplate with the nailheads on the chassis; then, slide the backplate into the server until the nailheads securely engage the backplate.

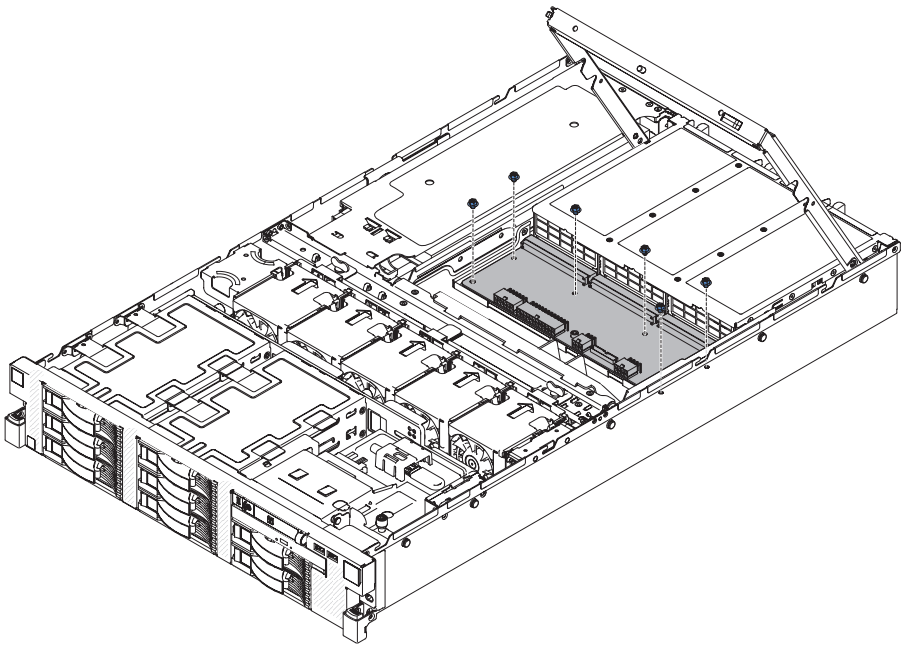



4. Tighten the thumbscrews to secure the backplate to the chassis.
5. Reinstall the hard disk drives and the optional tape drive.
6. Install the fan cage (see “Installing the fan cage” on page 193).
7. Install the top cover (see “Installing the top cover” on page 161).
8. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
9. Turn on all attached devices and the server.
10. Restore the RAID configuration information that you backed up before you removed the hard disk drive backplate.

## Removing the power-supply distribution board

To remove the power-supply distribution board, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Remove all power supplies (see “Removing a hot-swap power supply” on page 181).
5. Remove the safety cover on the power-supply distribution board (see “Removing the power-supply distribution board safety cover” on page 194).
6. Remove the screws that secure the power-supply distribution board to the power-supply cage; then, remove the power-supply distribution board from the server.



7. While you hold the edge of the power-supply distribution board, press the release latch and slowly pull each cable straight out from the connector. To disconnect Power 1 cable, you may need to slightly turn the cable side ways to loosen the cable from the connector.

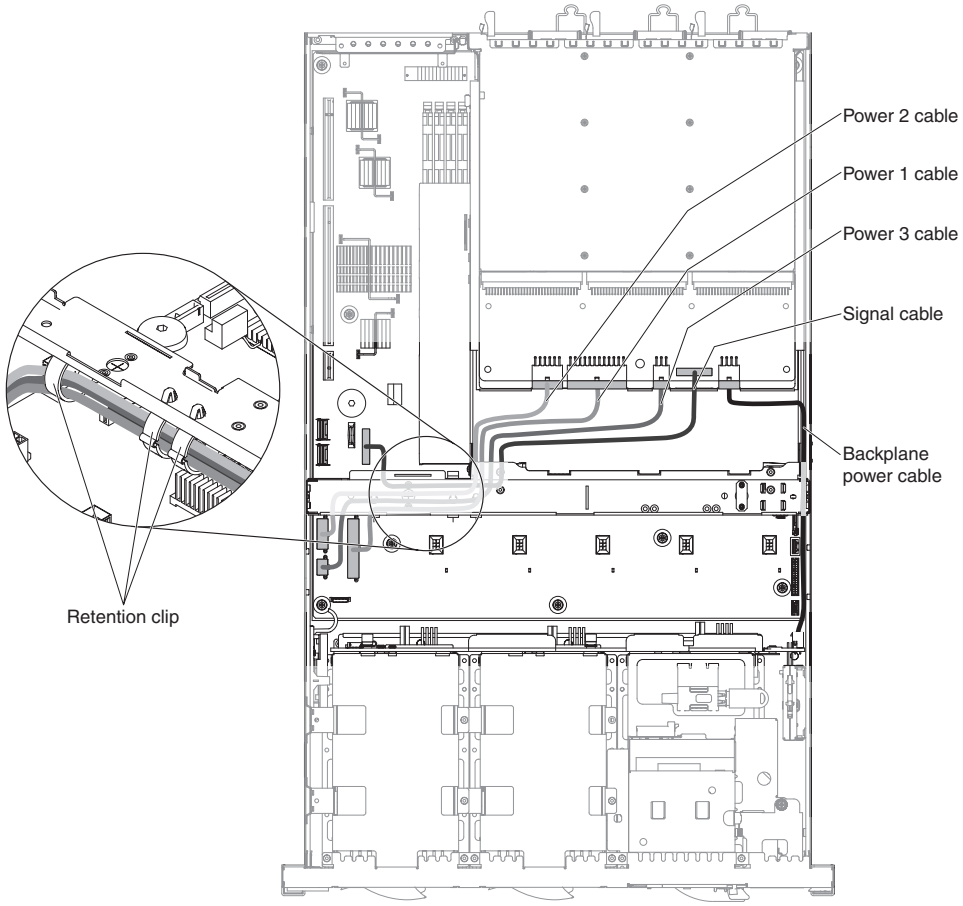
   **Note:** Disconnecting the cable by using excessive force may cause damage to the cable connector.
8. If you are instructed to return the power-supply distribution board, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the power-supply distribution board

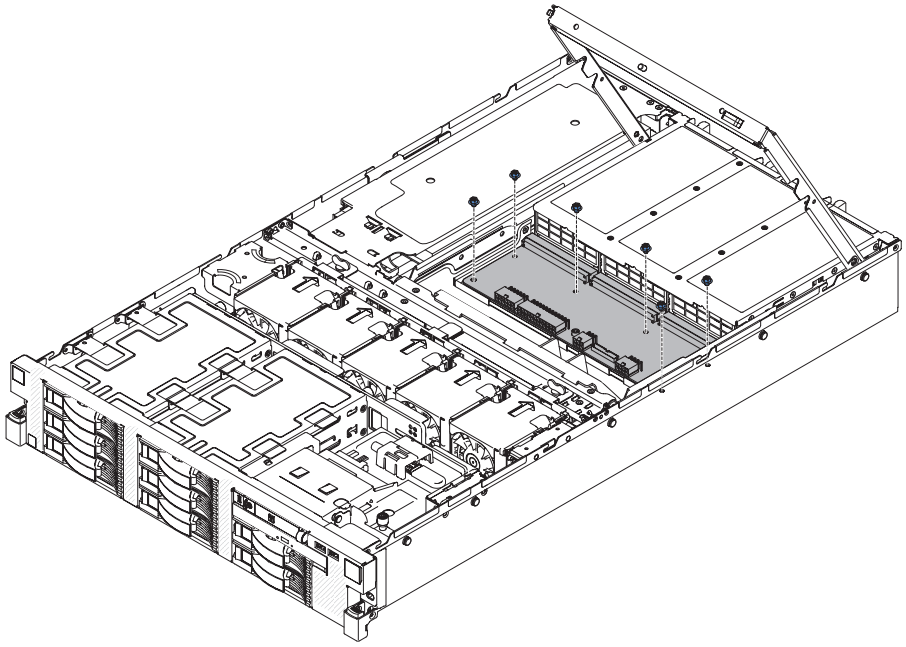
To install the replacement power-supply distribution board, complete the following steps:

1. Connect the cables to the connectors on the power-supply distribution board. Make sure the release latch securely locks each cable in the connector.

   **Attention:** Do not pull the cables tightly through the middle bar. Increase cable slack at the ends of the cables on the system board.




2. Align the screw holes on the power-supply distribution board with the screw holes on the power-supply cage.



3. Install the screws to secure the power-supply distribution board to the power-supply cage.

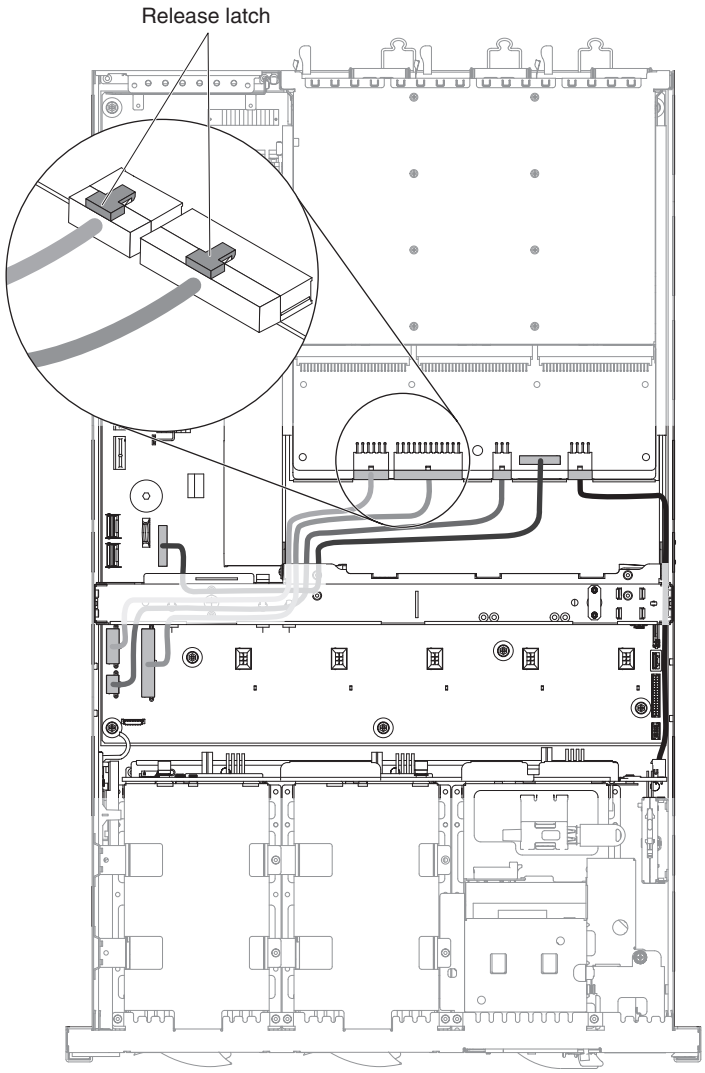
4. Install the power-supply distribution board safety cover (see “Installing the power-supply distribution board safety cover” on page 195).
5. Install the power supply (see “Installing a hot-swap power supply” on page 182).
6. Install the top cover (see “Installing the top cover” on page 161).
7. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
8. Turn on all attached devices and the server.

## Removing the power-supply distribution board cables

To remove the power-supply distribution board cables, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Remove all power supplies (see “Removing a hot-swap power supply” on page 181).
5. Remove the fan cage (see “Removing the fan cage” on page 192).
6. Remove the safety cover on the power-supply distribution board (see “Removing the power-supply distribution board safety cover” on page 194).
7. You may remove the power-supply distribution board to obtain more room (see “Removing the power-supply distribution board” on page 213).
8. Press the release latch and slowly pull each cable straight out from the connector. To disconnect Power 1 cable, you may need to slightly turn the cable side ways to loosen the cable from the connector.

   **Note:** Disconnecting the cable by using excessive force may cause damage to the cable connector.

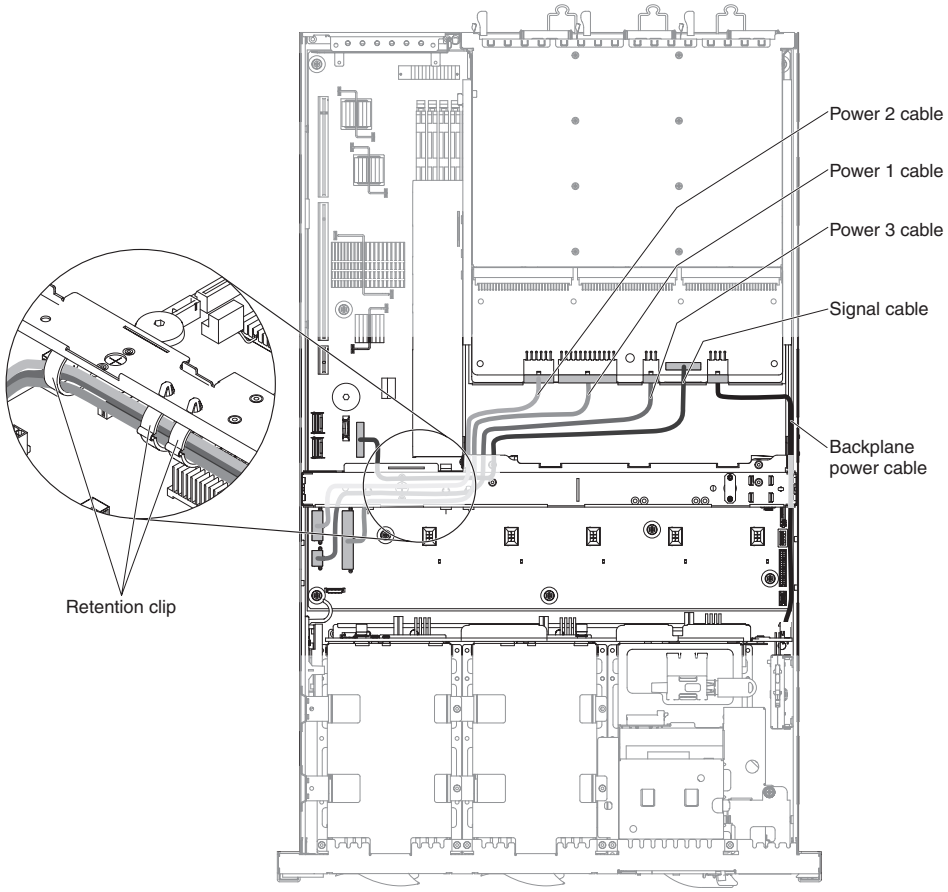



9. While you press the release latch, disconnect the cables from the connectors on the system board.
10. Remove the air baffle (see “Removing the air baffle” on page 165).
11. Disengage the cables from any retention clips and remove the cables from the server.
12. If you are instructed to return the power-supply distribution board cables, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the power-supply distribution board cables

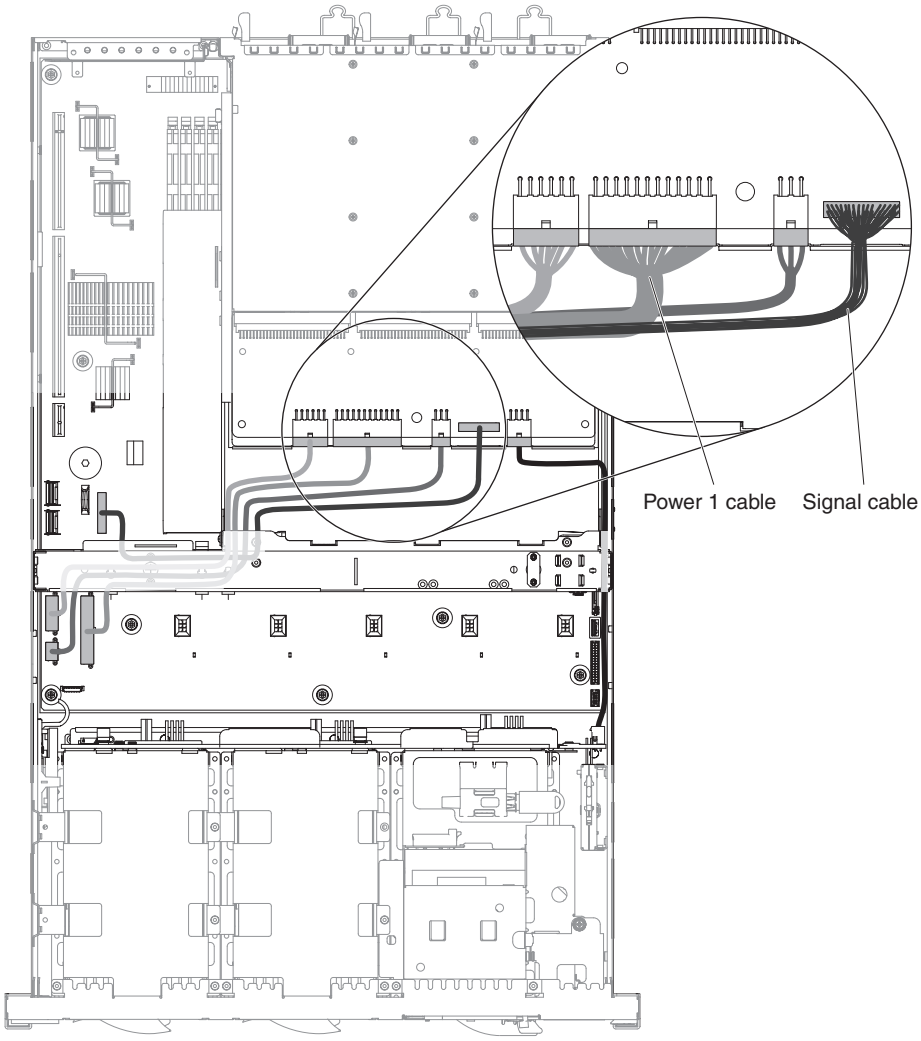
To install the power-supply distribution board cables, complete the following steps:

1. Connect the cables to the connectors on the power-supply distribution board. Make sure the release latch securely locks each cable in the connector.



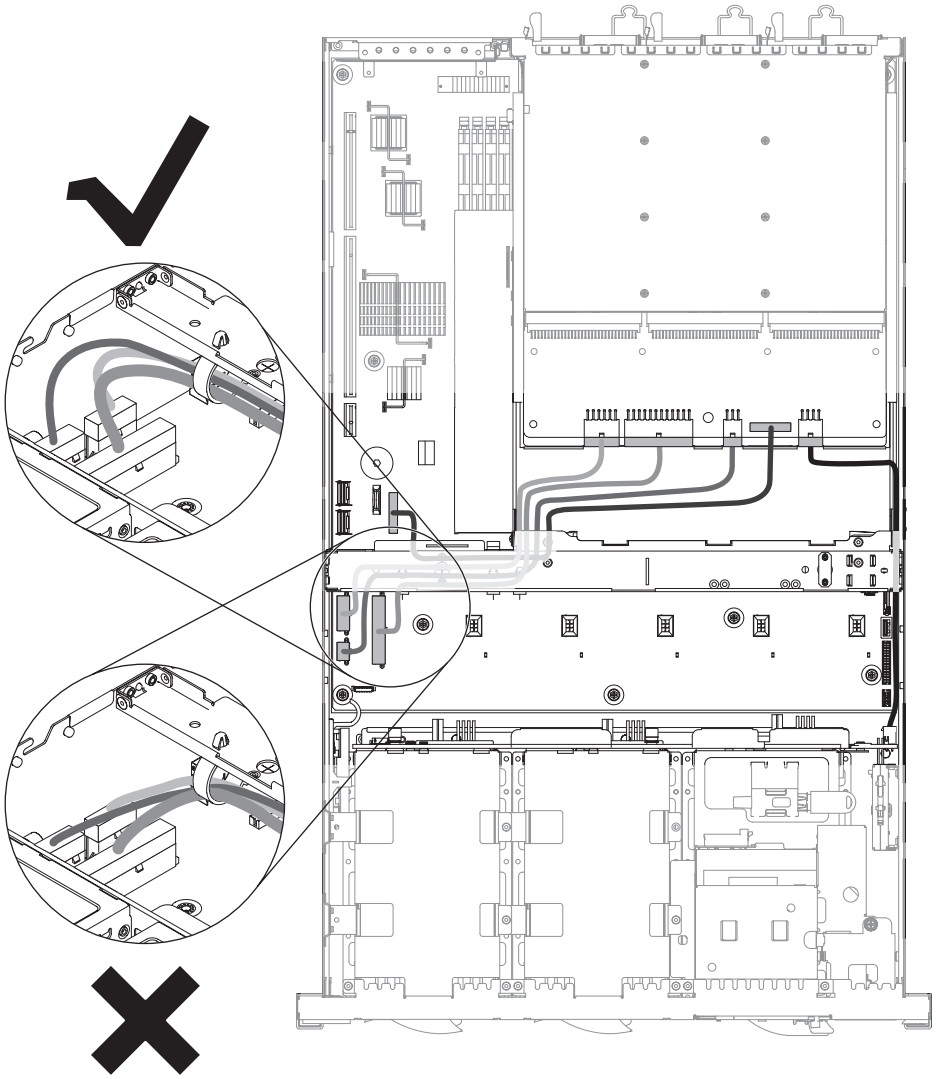

2. Route the cables under the chassis middle bar.

   **Note:** Make sure Power 1 cable and the signal cable are routed on top of the other power cables.




3. Install the power-supply distribution board if you removed it (see “Installing the power-supply distribution board” on page 214).
4. Connect the other ends of the cables to the connectors on the system board. Make sure the release latch securely locks each cable in the connector.
5. Secure the cables with the retention clips.

   **Attention:** Do not pull the cables tightly through the middle bar. Increase cable slack at the ends of the cables on the system board.



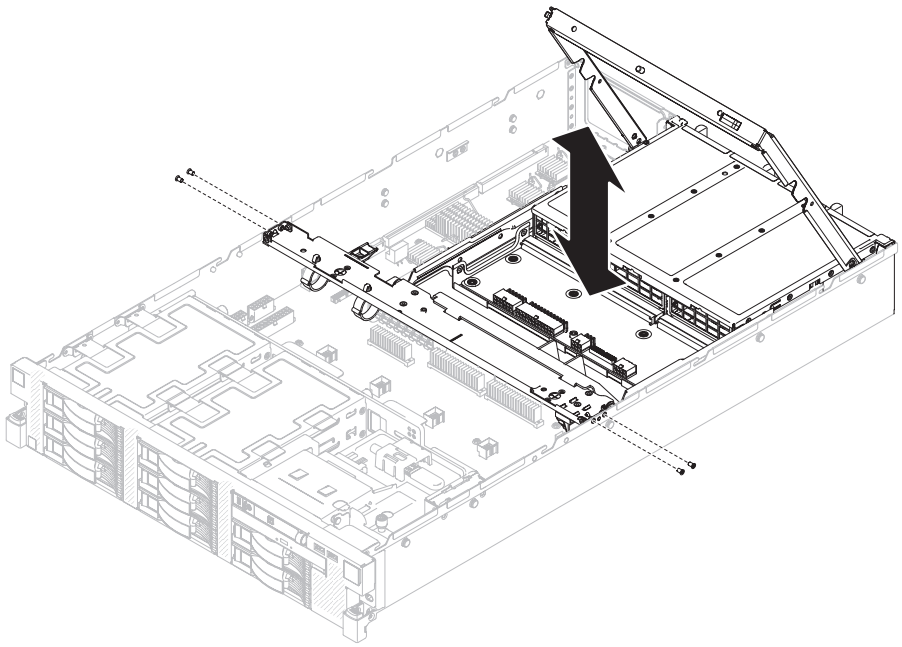
6. Install the air baffle (see “Installing the air baffle” on page 168).
7. Install the power-supply distribution board safety cover (see “Installing the power-supply distribution board safety cover” on page 195).
8. Install the fan cage (see “Installing the fan cage” on page 193).
9. Install the power supply (see “Installing a hot-swap power supply” on page 182).
10. Install the top cover (see “Installing the top cover” on page 161).
11. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
12. Turn on all attached devices and the server.

## 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 “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.

3. Remove all power supplies (see “Removing a hot-swap power supply” on page 181).
4. Remove the top cover (see “Removing the top cover” on page 161).
5. Remove the fan cage (see “Removing the fan cage” on page 192).
6. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 163).
7. Make note of where the cables are attached to the system board and the hard disk drive backplane; then, disconnect them.
8. Loosen the screws that secure the power-supply cage to the chassis; then, lift to remove the power-supply cage from the server.

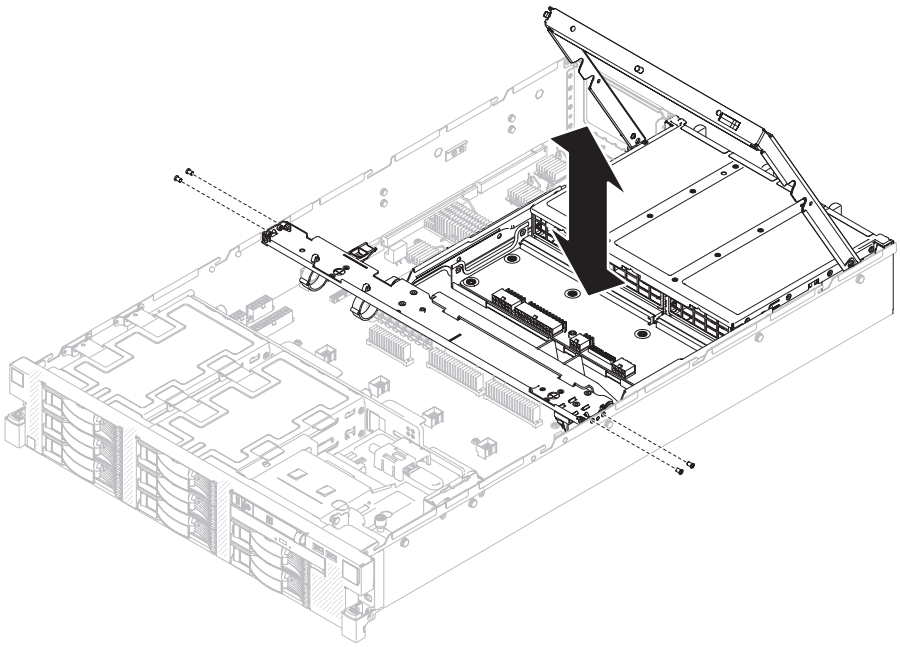


9. If you are instructed to return the power-supply cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the power-supply cage

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

1. Align the screw holes on the power-supply cage with the screw holes on both sides of the chassis.

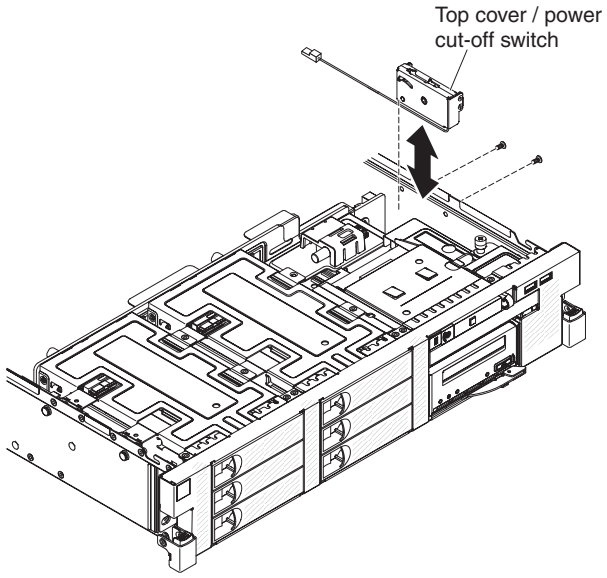


2. Install the screws to secure the power-supply cage to the chassis.
3. Reconnect the cables to the connectors on the power-supply distribution board (see “Internal cable routing and connectors” on page 153). You may remove the air baffle to get more space.
4. Install the air baffle if you removed it previously (see “Installing the air baffle” on page 168).
5. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 165).
6. Install the fan cage (see “Installing the fan cage” on page 193).
7. Install the top cover (see “Installing the top cover” on page 161).
8. Install the power supply (see “Installing a hot-swap power supply” on page 182).
9. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
10. Turn on all attached devices and the server.

## Removing the top cover/power cut-off switch assembly

To remove the top-cover/power cut-off switch, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Remove the fan cage (see “Removing the fan cage” on page 192).
5. Disconnect the signal cable from the connector on the system board.

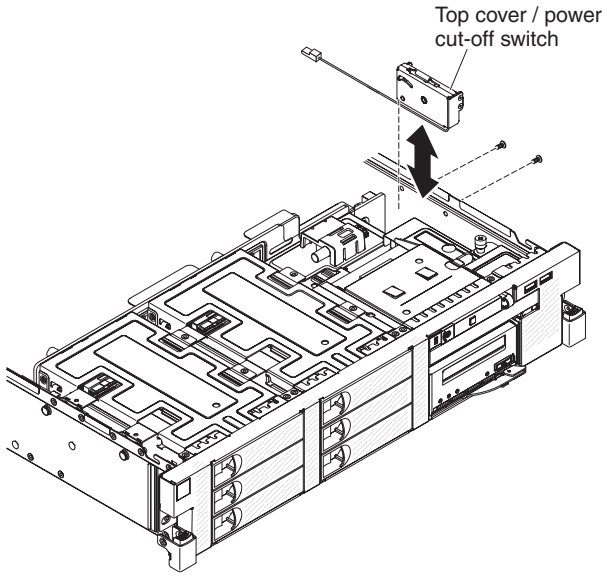



6. Remove the screws from the side of the chassis.
7. Grasp the assembly and lift it out of the server.
8. If you are instructed to return the top cover/power cut-off switch assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing the top cover/power cut-off switch assembly

To install the top-cover/power cut-off switch, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Align the screw holes on the assembly with the holes on the chassis wall and secure the assembly to the chassis with the screws you removed earlier.
3. Connect the signal cable to the top cover/power cut-off switch connector on the system board.



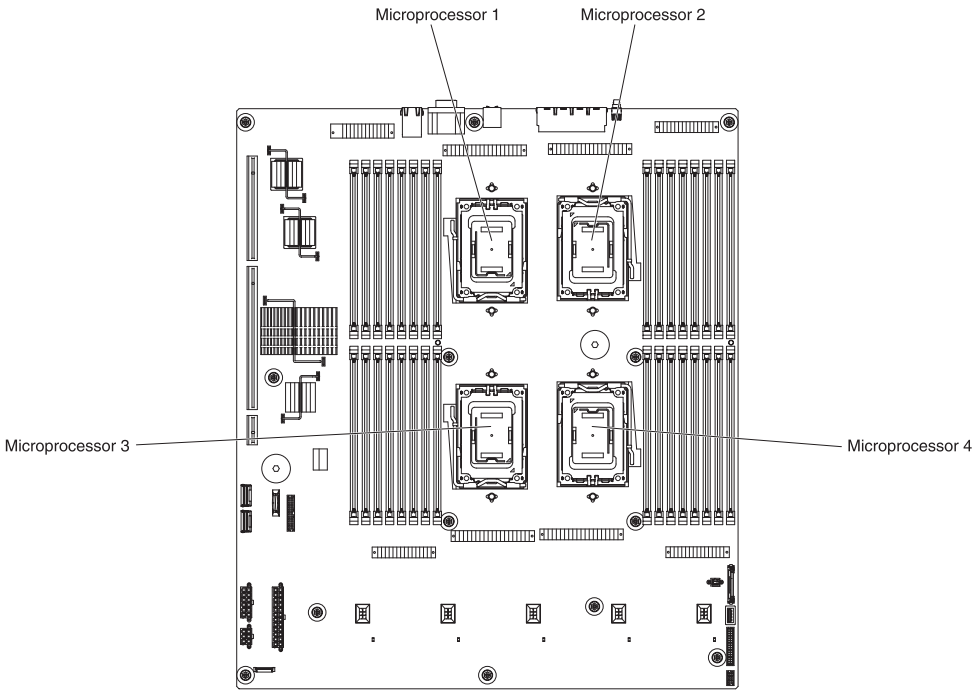

4. Install the fan cage (see “Installing the fan cage” on page 193).

5. Install the top cover (see “Installing the top cover” on page 161).
6. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
7. Turn on all attached devices and the server.

## Microprocessor

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

- For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.
- The server supports up to four AMD Opteron microprocessors. If you are installing two or more microprocessors, they must be the same cache size and type, and the same clock speed.
- The server can operate as a symmetric multiprocessing (SMP) server. With SMP, certain operating systems and application programs can distribute the processing load among the microprocessors. This enhances performance for database and point-of-sale applications, integrated manufacturing solutions, and other applications.
- Read the documentation that comes with the microprocessor to determine whether you have to update the IBM System x Server Firmware (server firmware). To download the most current level of server firmware, go to http://www.ibm.com/systems/support/.
- Obtain an SMP-capable operating system. For a list of supported operating systems, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.
- As of the date of this document, SUSE Linux Enterprise Server 11 Service Pack 1 does not support XEN virtualization on a server using AMD Opteron 6200 series microprocessors.
- You can use the Setup utility to determine the specific type of microprocessor in the server.
- Each microprocessor socket must always contain either a socket dust cover or a microprocessor and heat sink.
- The pins on the sockets are fragile. Any damage to the pins might require replacing the system board.
- Populate the microprocessor sockets in the following order: 1, 2, 3, 4. The following illustration shows the locations of the microprocessor sockets on the system board.



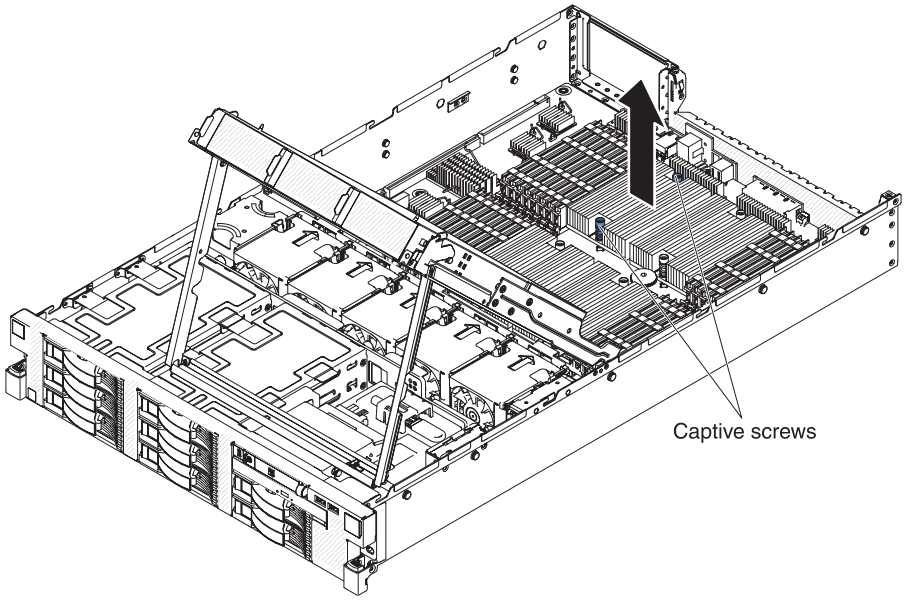

## Removing a microprocessor and heat sink

**Attention:**

- Microprocessors are to be removed only by trained service technicians.
- Do not allow the thermal grease on the microprocessor and heat sink to come in contact with anything. Contact with any surface can compromise the thermal grease and the microprocessor socket.
- Dropping the microprocessor during installation or removal can damage the contacts.
- 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.
- The pins on the sockets are fragile. Any damage to the pins might require replacing the system board.

To remove a microprocessor and heat sink, complete the following steps:

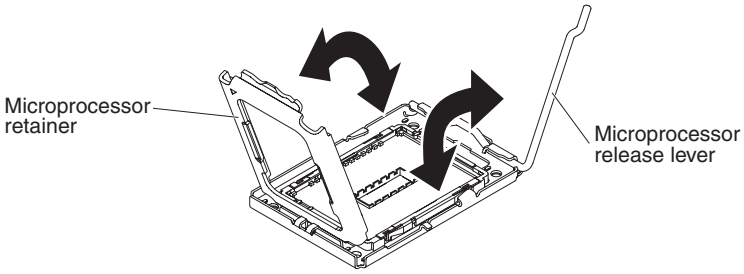
1. Read the safety information that begins on page vii, “Handling static-sensitive devices” on page 153, and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices and disconnect the power cord and all external cables.
3. Remove the top cover (see “Removing the top cover” on page 161).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 163).
5. Remove the air baffle (see “Removing the air baffle” on page 165).
6. Loosen the screws on the heat sink with a screwdriver, alternating among the screws until they are loose. If possible, each screw should be rotated two full rotations at a time.



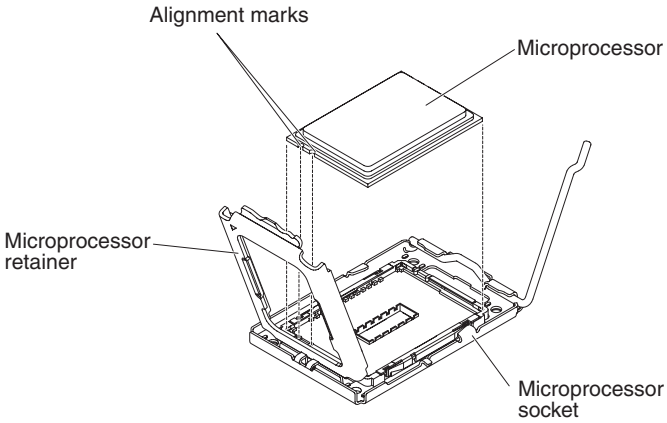

7. Gently pull the heat sink off the microprocessor. Lift the heat sink out of the server. If the heat sink sticks to the microprocessor, slightly twist the heat sink back and forth to break the seal. After removal, place the heat sink on its side on a clean, flat surface.

   **Attention:** Do not touch the thermal material on the bottom of the heat sink. Touching the thermal material will contaminate it. If the thermal material on the microprocessor or heat sink becomes contaminated, you must replace it.

8. Release the microprocessor retention latch by pressing down on the end, moving it to the side, and releasing it to the open (up) position.




9. Open the microprocessor bracket frame by lifting up the tab on the top edge. Keep the bracket frame in the open position.



10. Carefully lift the microprocessor straight up and out of the socket, and place it on a static-protective surface.

    **Attention:** The pins on the sockets are fragile. Any damage to the pins might require replacing the system board.

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

For information about the type of microprocessor that the server supports and other information that you must consider when you install a microprocessor, see the *Installation and User's Guide* on the IBM *Documentation* CD.

Read the documentation that comes with the microprocessor to determine whether you must update the IBM System x Server Firmware. To download the most current level of server firmware, complete the following steps:

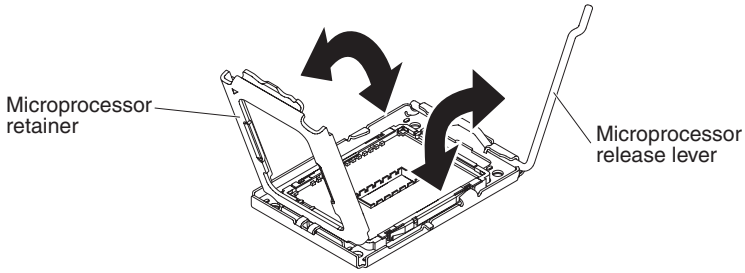
1. Go to http://www.ibm.com/systems/support/.
2. Under **IBM Systems support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3755 M3** to display the matrix of downloadable files for the server.

**Important:**

- The pins on the sockets are fragile. Any damage to the pins might require replacing the system board.
- A startup (boot) microprocessor must always be installed in microprocessor socket 1 on the system board.
- Microprocessors with different stepping levels are supported in this server. If you install microprocessors with different stepping levels, it does not matter which microprocessor is installed in the microprocessor sockets.
- If you are installing a microprocessor that has been removed, make sure that it is paired with its original heat sink or a new replacement heat sink. Do not reuse a heat sink from another microprocessor; the thermal grease distribution might be different and might affect conductivity.
- If you are installing a new heat sink, remove the protective backing from the thermal material that is on the underside of the new heat sink.
- If you are installing a new heat sink that did not come with thermal grease, see "Thermal grease" on page 229 for instructions for applying thermal grease; then, continue with step 1 of this procedure.
- If you are installing a heat sink that has contaminated thermal grease, see "Thermal grease" on page 229 for instructions for replacing the thermal grease; then, continue with step 1 of the following procedure.

To install a new or replacement 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. Install the microprocessor:
   a. Rotate the microprocessor release lever on the socket from its closed and locked position until it stops in the fully open position.



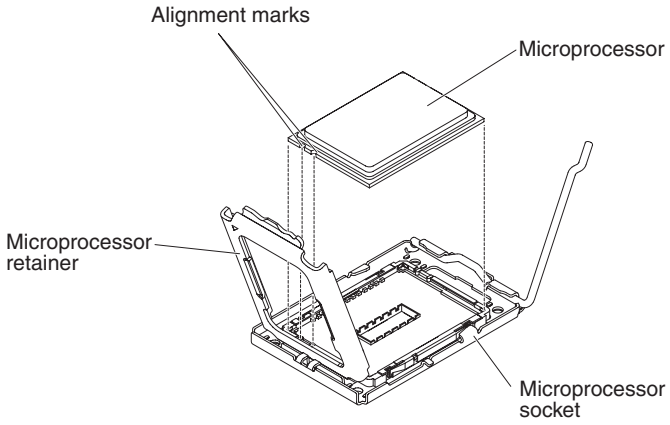

b. Rotate the hinged microprocessor bracket frame into the open position.

c. Remove the microprocessor socket dust cover from the surface of the microprocessor socket, if one is present. Store the dust cover in a safe place.

d. Touch the static-protective package that contains the microprocessor to any *unpainted* metal surface on the server. Then, remove the microprocessor from the package.

**Attention:**

- Handle the microprocessor carefully. Dropping the microprocessor during installation or removal can damage the contacts.
- 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.
- Do not use excessive force when you press the microprocessor into the socket.
- Make sure that the microprocessor is oriented and aligned and positioned in the socket before you try to close the lever.




e. Align the microprocessor with the socket (note the alignment mark and the position of the notches); then, carefully place the microprocessor straight down on the socket. Close the microprocessor bracket frame.

**Attention:** The microprocessor fits only one way on the socket. You must place a microprocessor straight down on the socket to avoid damaging the pins on the socket. The pins on the socket are fragile. Any damage to the pins might require replacing the system board.

f. Carefully close the microprocessor release lever to secure the microprocessor in the socket.

3. 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.

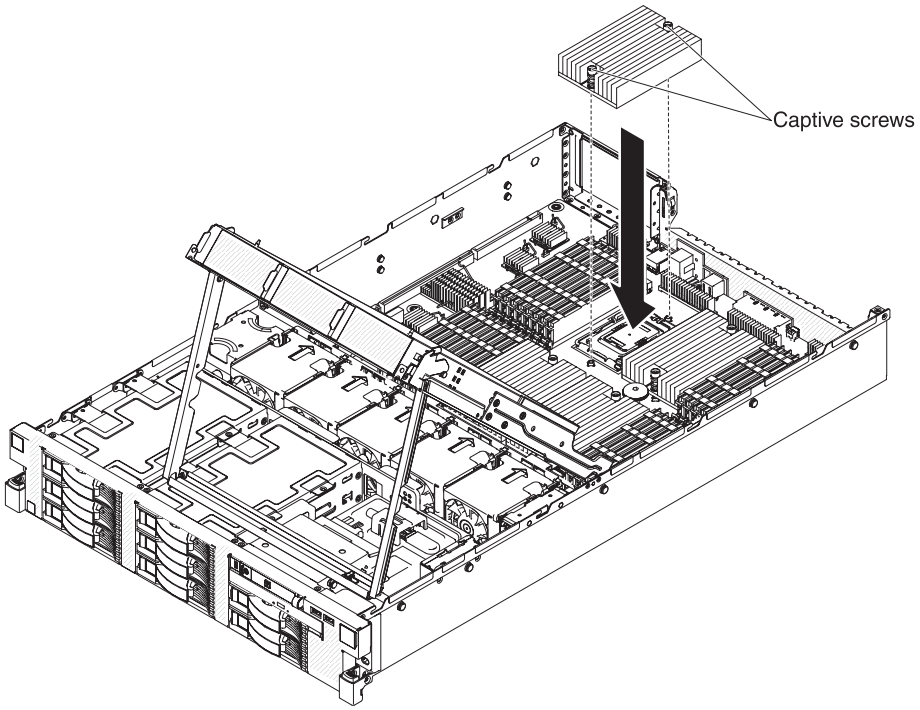
a. Remove the screws (if installed) from the heat sink screw holes on the system board.

b. Remove the plastic protective cover from the bottom of the new heat sink.

c. If the new heat sink did not come with thermal grease, apply thermal grease on the microprocessor before you install the heat sink (see “Thermal grease”).

d. Orient the heat sink so that the side with the number **1** on the label faces the front of the server.

e. Align the screws on the heat sink with the screw holes on the system board; then, place the heat sink on the microprocessor with the thermal-grease side down.




f. Tighten the screws with a screwdriver, alternating among the screws until they are tight. If possible, each screw should be rotated two full rotations at a time. Repeat until the screws are tight. Do not overtighten the screws by using excessive force.

4. Install the air baffle (see “Installing the air baffle” on page 168).
5. Install the top cover (see “Installing the top cover” on page 161).
6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

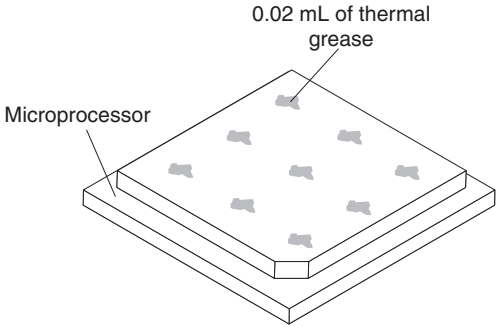
## Thermal grease

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.

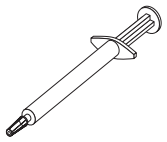
To replace damaged or contaminated thermal grease on the microprocessor and heat sink, complete the following steps:

1. Place the heat sink on a clean work surface.
2. Remove the alcohol wipe from its package and unfold it completely.
3. Use the alcohol wipe to clean 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 alcohol wipe to clean the thermal grease from the microprocessor; then, dispose of the alcohol wipe 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 5 mm of the edge.



   **Note:** 0.01mL is one tick mark on the syringe. If the grease is properly applied, approximately half 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 227.

## Removing the system board

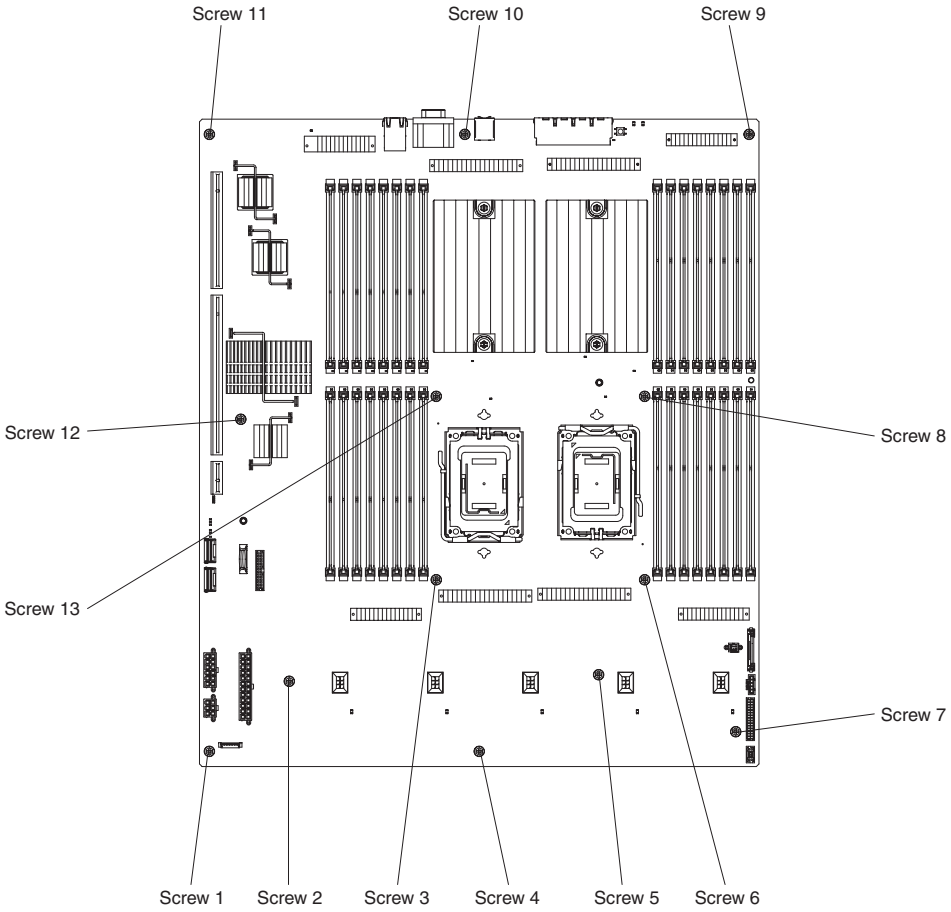
**Important:** This procedure is to be performed only by trained service technicians. Before you remove the microprocessor-board assembly from the server, take the following precautions to save data, firmware, and configuration data:

- Record all system configuration information, such as iBMC IP addresses, vital product data, and the machine type, model number, and serial number of the server.
- Using the IBM Advanced Settings Utility (ASU), save the system configuration to external media.
- Save the system-event log to external media.

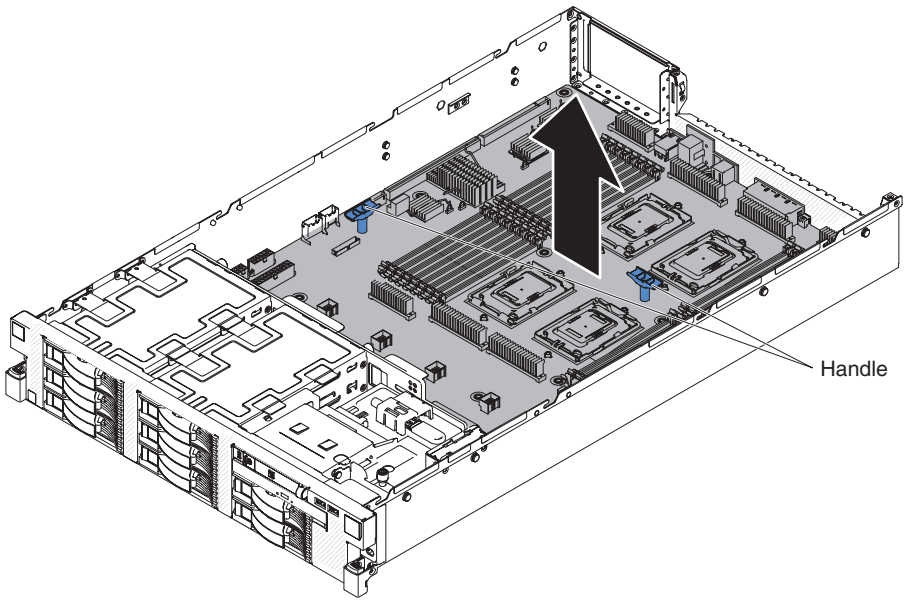
To remove the system board, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 151.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing the top cover” on page 161).

4. Remove the fan cage (see “Removing the fan cage” on page 192).
5. Remove the power-supply cage (see “Removing the power-supply cage” on page 220).
6. Remove the air baffle (see “Removing the air baffle” on page 165).
7. Remove the memory modules (see “Removing a memory module” on page 173).
8. (Trained service technician only) Remove the heat sinks and microprocessors (see “Removing a microprocessor and heat sink” on page 225).
9. Remove the server battery (see “Removing the system battery” on page 183).
10. Make a note of where cables are attached to the system board; then, disconnect them from the connectors on the system board.
11. Remove all the screws that secure the system board to the chassis.




12. Grasp the system-board handles; then, lift the system board out of the server.

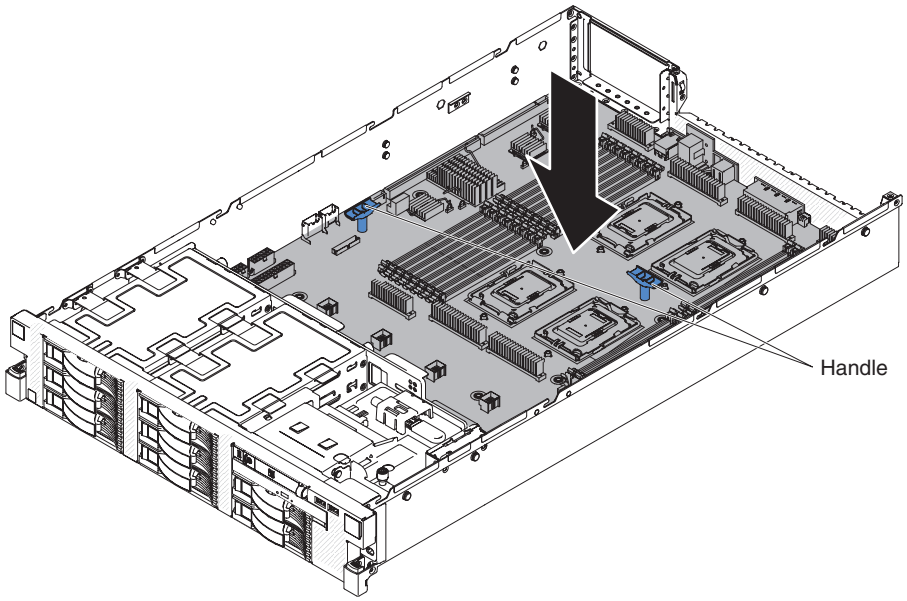



13. Remove the microprocessor socket dust covers from the new system board and install them on the empty microprocessor sockets on the old system board before you pack the system board for shipping.
14. If you are instructed to return the system board, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

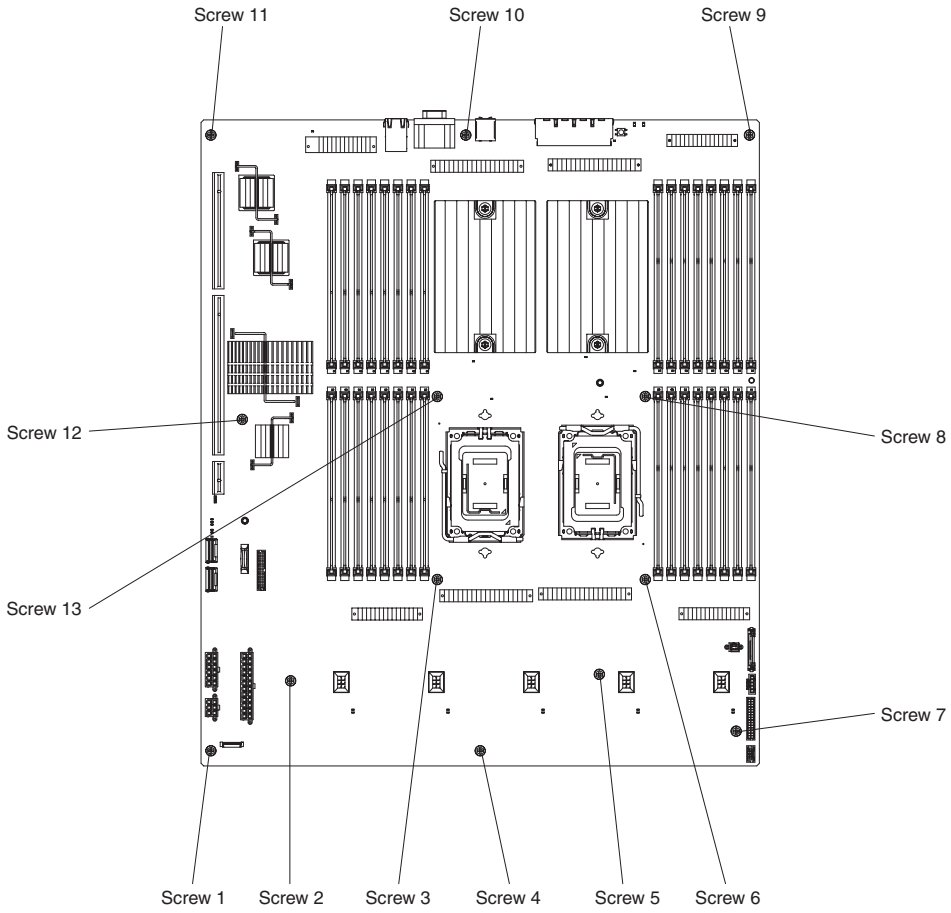
## Installing the system board

To install the replacement system board, complete the following steps:

1. Align the screw holes on the system board with the screw holes on the chassis and lower the system board into the server.




2. Install the screws to secure the system board on the chassis.




3. Connect the following cables: front USB, optical drive power, operator information panel, and USB hypervisor key signal. Secure the cables with any retention clips.
4. (Trained service technician only) Reinstall the microprocessors and heat sinks (see “Installing a microprocessor and heat sink” on page 227).
5. Install the memory modules (see “Installing a memory module” on page 174).
6. Install the server battery (see “Installing the system battery” on page 184).
7. Install the power-supply cage (see “Installing the power-supply cage” on page 221).
8. Install the air baffle (see “Installing the air baffle” on page 168).
9. Route the hard disk drive backplane signal cables through the cage hole next to fan 1 connector and connect the cables to the connectors on the system board or ServeRAID adapter (see “Internal cable routing and connectors” on page 153).
10. Install the fan cage (see “Installing the fan cage” on page 193). Make sure that all the cables are clear of the cage as you install it in the server.
11. Install the top cover (see “Installing the top cover” on page 161).
12. Connect the cables and power cords (see “Connecting the cables” on page 160 for cabling instructions).
13. Turn on all attached devices and the server.
14. Using the ASU program, restore the system configuration to the new system board.

# Chapter 6. Configuration information and instructions

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

## Updating the firmware

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 IBM System x Server Firmware, vital product data (VPD) code, device drivers, and integrated baseboard management controller (iBMC) firmware, 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 **IBM Systems support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3755 M3** to display the matrix of downloadable files for the server.

**Attention:** Before you update the firmware, be sure to back up any keys that are stored in the Trusted Platform Module (TPM), in case any of the TPM characteristics are changed by the new firmware. For instructions, see your encryption software documentation.

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 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 is stored in ROM on the system board.
- iBMC firmware is stored in ROM on the iBMC 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 controller.
- SAS/SATA firmware is stored in ROM on the SAS/SATA controller on the system board.

## Configuring the server

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 perform configuration tasks such

as changing the startup-device sequence, setting the date and time, and setting passwords. For information about using this program, see “Configuring the server” on page 235.

- **Boot Selection Menu program**

  The Boot Selection Menu program is part of the server firmware. Use it to override the startup sequence that is set in the Setup utility and temporarily assign a device to be first in the startup sequence. For more information about using this program, see “Using the Boot Selection Menu program” on page 241.

- **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 controller 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 242.

- **Integrated baseboard management controller**

  Use the integrated baseboard management controller (iBMC) for configuration, to update the firmware and sensor data record/field replaceable unit (SDR/FRU) data, and to remotely manage the server. For information about using the iBMC, see “Using the integrated baseboard management controller” on page 244.

- **VMware embedded USB hypervisor**

  The VMware embedded USB hypervisor is available on the server models that come with an installed USB Memory Key for VMware hypervisor. The USB memory key is installed in the USB connector in the server. Hypervisor is virtualization software that enables multiple operating systems to run on a host computer at the same time.

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

  The remote presence feature provides the following functions:

  – Remotely viewing video with graphics resolutions up to 1280 x 1024 at 75 Hz, 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 iBMC memory and mapping it to the server as a virtual drive

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

  For more information, see “Using the remote presence and blue-screen capture features” on page 246

- **Ethernet controller configuration**

  For information about configuring the Ethernet controller, see “Configuring the Broadcom Gigabit Ethernet controller” on page 247.

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

  Use this program as an alternative to the Setup utility for modifying UEFI settings. Use the ASU program inband or out of band to modify UEFI settings

from the command line without the need to restart the server to run the Setup utility. For information about using this program, see “IBM Advanced Settings Utility program” on page 248.

## Starting the Setup utility

To start the Setup utility, complete the following steps:

1. Turn on the server.

   **Note:** Approximately 1 minute after the server is turned on, the screen displays the boot process status.
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.

## Setup utility menu choices

The following choices are on the Setup utility main menu. Depending on the version of the IBM System x Server Firmware (server 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.

  – **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 and the revision level or issue date of the server firmware, integrated baseboard management controller (iBMC), and diagnostics code.
- **System Settings**

  Select this choice to view or change the server component settings. This choice is on the full Setup utility menu only.

  – **Processors**

    Select this choice to view or change the processor settings.

  – **Memory**

    Select this choice to view or change the memory settings.

  – **Devices and I/O Ports**

    Select this choice to view or change assignments for devices and input/output (I/O) ports. You can configure the serial ports; configure remote console redirection; enable or disable integrated Ethernet controllers, the SAS/SATA controller, SATA optical or tape drive channels, USB ports, 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 settings.

  - **Power Saving Features**

    Select this choice to enable or disable the power saving features. If you enable the features, the Power Save Features application will limit the maximum power that is consumed by the server.

  - **Power Restore Policy**

    Select this choice to determine the mode of operation to which the server will be restored after a power outage occurs. You can select **Disabled**, **Power on**, **Power off**, or **Last State** to restore the server the state it was in at the time of the power outage.

– **Operating Modes**

  Select this choice to select the memory speed or to specify a preset operating mode to configure the server for maximum power savings, maximum efficiency, or maximum performance.

– **Legacy Support**

  Select this choice to view or set legacy support.

  - **GateA20 Active**

    Select this choice to enable or disable GateA20, which controls access to memory above 1 MB.

  - **Option ROM Messages**

    Select this choice to view or change the display settings for the option ROM.

  - **Rehook INT 19h**

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

– **Integrated Baseboard Management Controller**

  Select this choice to view or change the settings for the integrated baseboard management controller (iBMC).

  - **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 server whenever a nonmaskable interrupt (NMI) occurs. **Disabled** is the default.

  - **Network Configuration**

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

  - **Reset iBMC to Defaults**

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

  - **Reset iBMC**

    Select this choice to reset the iBMC settings.

– **System Security**

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

  - **Network**

    Select this choice to view or configure the network options. 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*).

- **Start Options**

  Select this choice to view or change the start options, including the startup sequence, keyboard NumLock state, PXE boot option, and PCI device boot priority. Changes in the startup options take effect when you restart the server.

  The startup sequence specifies the order in which the server checks devices to find a boot record. The server starts from the first boot record that it finds. 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.

- **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.

  **Note:** If you change the boot option, you must save the changes and exit from the Setup utility to make the changes take effect.

- **System Event Logs**

  Select this choice to access the System Event Manager, where you can view the POST event log and the system-event log.

  The POST event log contains the three most recent error codes and messages that were generated during POST.

  The system-event log contains POST and system management interrupt (SMI) events.

  **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.

  - **Clear System Event Log**

    Select this choice to clear the system-event log.

  - **View POST Event Log**

    Select this choice to access the POST event viewer to view the POST event log.

  - **View System Event Log**

    Select this choice to view the system-event log.

- **User Security**

  Select this choice to set, change, or clear passwords. See “Passwords” on page 240 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 241.

  - **Clear Power-on Password**

    Select this choice to clear a power-on password. For more information, see “Power-on password” on page 241.

  - **Set Admin 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 241.

  - **Clear Admin Password**

    Select this choice to clear an administrator password. For more information, see “Administrator password” on page 241.

- **Save Changes**

  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 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.

### 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 6 - 20 printable ASCII characters for the password.

When a power-on password is set, you can enable the Unattended Start mode, in which the keyboard and mouse remain locked but the operating system can start. You can unlock the keyboard and mouse by typing the power-on 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.
- Clear the password by clearing CMOS memory (see “System-board jumpers” on page 18).
- Remove the battery from the server and then reinstall it. (See see “Removing the system battery” on page 183 and “Installing the system battery” on page 184 for more information.)

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

### 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 6 - 20 printable ASCII characters for the password.

If you forget the administrator password, you can clear the password by clearing CMOS memory (see “System-board jumpers” on page 18).

## Using the Boot Selection Menu program

The Boot Selection Menu 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. When the prompt `<F12> Select Boot Device` is displayed, press F12. If a bootable USB mass storage device is installed, a submenu item (**USB Key/Disk**) is displayed.
4. Use the Up Arrow and Down Arrow keys to select an item from the menu and press Enter.

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

**Attention:** If you install more than one bootable hard disk drive in the server, you must use the LSI Configuration Utility program to select the hard disk drive to boot from. For information on LSI Configuration Utility program, see the documentation that comes with your ServeRAID controller.

## 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 the server firmware that you update only during the process of updating the server firmware. If the primary copy of the server firmware becomes damaged, use this backup copy.

To force the server to start from the backup copy of the server firmware, turn off the server; then, move the UEFI boot recovery jumper (J117) to the backup position (pins 2 and 3). See “System-board jumpers” on page 18 for more information.

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 jumper back to the primary position (pins 1 and 2).

## Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD provides software setup tools and installation tools that are designed for your server. The ServerGuide program detects the server model and 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 website 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 website. The actual procedure might vary slightly from what is described in this document.

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.

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

1. Insert the CD, and restart the server. If the CD does not start, see "ServerGuide problems" in the *Problem Determination and Service Guide* on the IBM *Documentation* CD.
2. Follow the instructions on the screen to complete the following tasks:
   a. Select your language.
   b. Select your keyboard layout and country.
   c. View the overview to learn about ServerGuide features.
   d. View the readme file to review installation tips for your operating system and adapter.
   e. Start the operating-system installation. you will need your operating-system CD.

## 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 has the following features:

- An easy-to-use interface
- Diskette-free setup, and configuration programs that are based on detected hardware
- 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

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.

## Typical operating-system installation

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

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

1. After you have completed the setup process, the operating-system installation program starts. (You will need your operating-system CD to complete the installation.)
2. The ServerGuide program stores information about the server model, service processor, hard disk drive controllers, and network adapters. Then, the program checks the CD for newer device drivers. This information is stored and then passed to the operating-system installation program.

3. The ServerGuide program presents operating-system partition options that are based on your operating-system selection and the installed hard disk drives.
4. The ServerGuide program prompts you to insert your operating-system CD and restart the server. At this point, the installation program for the operating system takes control to complete the installation.

**Important:** Before you install a UEFI operating system on a server with a ServeRAID controller, you must first complete the following steps:

1. Update the device driver for the SAS controller to the latest level.
2. In the Setup utility, select **System Settings → Device and I/O ports**.
3. Select **Launch storage OpROM**; then, select **UEFI driver**.
4. Save the settings and exit from the Setup utility.

**Important:** To enable the server to boot from a legacy operating-system CD, complete the following steps:

1. In the Setup utility, select **Boot Manager**.
2. Select **CD/DVD Drive BBS Priorities**; then, select the optical device name without the "UEFI" prefix.
3. Save the settings and exit from the Setup utility.

## 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 website.

**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. 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 x3755 M3**.
6. From the **Operating system** menu, select your operating system, and then click **Search** to display the available installation documents.

## Using the integrated baseboard management controller

The integrated baseboard management controller (iBMC) 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 iBMC supports the following basic systems-management features:

- Alerts (in-band and out-of-band alerting, PET traps - IPMI style, SNMP, email).
- Auto Boot Failure Recovery.
- Automatic Server Restart (ASR) when POST is not complete or the operating system hangs and the operating-system watchdog timer times out. The iBMC might be configured to watch for the operating-system watchdog timer and restart the server after a timeout, if the ASR feature is enabled. Otherwise, the iBMC allows the administrator to generate an NMI by pressing a nonmaskable interrupt

button on the information panel for an operating-system memory dump. ASR is supported by the Intelligent Platform Management Interface (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 iBMC 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 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.
- Nonmaskable interrupt (NMI) detection and reporting.
- Operating-system failure blue screen capture.
- Power/reset control (power-on, hard and soft shutdown, hard and soft reset, schedule power control).
- Query power-supply input power.
- ROM-based iBMC firmware flash updates.
- Serial port redirection over Telnet or SSH.
- System-event log.

The iBMC 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.

## Obtaining the IP address for web interface access

The iBMC MAC address tag is tied to the rear of the server. The hostname of the iBMC is "iBMC-" plus the last twelve characters of the MAC address. Because the default setting of the iBMC is DHCP, after the iBMC Ethernet port is connected to a management network, it can obtain an IP address from the network and it is difficult to identify on the network. Viewing the tag is one way to find the iBMC after the server is connected to the network.

To access the web interface, you need the IP address of the iBMC which you can obtain through the Setup utility. To obtain the IP address, complete the following steps:

1. Turn on the server.

**Note:** Approximately 1 minute after the server is turned on, the screen displays the boot process status.

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.
3. Select **System Settings** → **Integrated Baseboard Management Controller** → **Network Configuration**.
4. Locate the IP address.
5. Exit from the Setup utility.

## Logging on to the web interface

To log on to the iBMC web interface, 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 iBMC to which you want to connect.

   **Note:** If you are logging on to the iBMC for the first time after installation, the iBMC defaults to DHCP. If a DHCP host is not available, the iBMC assigns a static IP address of 192.168.70.125.
2. On the Login page, type the user name and password. If you are using the iBMC for the first time, you can obtain the user name and password from your system administrator. All login attempts are documented in the event log.

   **Notes:**

   a. The iBMC is set initially with a user name of USERID and password of PASSW0RD (with a zero, not the letter O). You have read/write access. You must change this default password the first time you log on.

   b. The default timeout value is 10 minutes. The iBMC will log you off the web interface if your browser is inactive for 10 minutes.
3. Click **Login** to start the session. The System Status page, provides a quick view of the server status.

## Using the remote presence and blue-screen capture features

The remote presence and blue-screen capture features are integrated functions of the integrated baseboard management controller (iBMC).

The remote presence feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1600 x 1200 at 75 Hz, 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 iBMC memory and mapping it to the server as a virtual drive

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

## Enabling the Broadcom Gigabit Ethernet Utility program

You can configure the Broadcom Gigabit ports as a startable device and customize them in the startup sequence. Enable, disable, and customize the startup sequence of the Broadcom Gigabit Ethernet ports from the Setup utility.

## Configuring the Broadcom 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. For device drivers and information about configuring the Ethernet controllers, 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. From the **Product family** menu, select **System x3755 M3** and click **Go**.

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

## Configuring RAID arrays

Through the Setup utility, you can access utilities to configure RAID arrays. The specific procedure for configuring arrays depends on the RAID controller that you are using. For details, see the documentation for your RAID controller. To access the utility for your RAID controller, complete the following steps:

1. Turn on the server.

   **Note:** Approximately 1 minute after the server is turned on, the screen displays the boot process status.
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. Press Enter to refresh the list of device drivers.
5. Select the device driver for your RAID controller and press Enter.
6. Follow the instructions in the documentation for your RAID controllers.

For more information about RAID arrays, see the IBM Redbooks® publications about RAID arrays at http://www.redbooks.ibm.com/abstracts/tips0054.html.

## IBM Advanced Settings Utility program

The IBM Advanced Settings Utility (ASU) program is an alternative to the Setup utility for modifying UEFI settings. Use the ASU program online or out of band to modify UEFI settings from the command line without the need to restart the server to access the Setup utility. You can also use the ASU program to configure the system production data or system unique identifier.

ASU provides limited settings for configuring the settings in the iBMC through the command-line interface.

You can save any of the settings into a file, and the ASU program can use this file to replicate settings to another system.

The ASU program supports scripting environments through a batch-processing mode. You can create a list of settings as input to the ASU program to run in batch-processing mode.

For more information and to download the ASU program, 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. On the left side of the page, click **Systems Management software**.
4. Under **Configuration**, click **Advanced Settings Utility**.

## 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 website. 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-03.ibm.com/systems/software/director/downloads/.
   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, go to http://www.ibm.com/systems/support/.

1. ASU sets the UUID in the Integrated Baseboard Management Controller (iBMC). Select one of the following methods to access iBMC 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)
2. 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
3. After you install ASU, use the following command syntax to set the UUID:

   ```
   asu set SystemProductData_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 <ibmc_internal_ip>] [user <ibmc_user_id>][password
  <ibmc_password>]
  ```

  Where:

  *ibmc_internal_ip*
  The iBMC internal LAN/USB IP address. The default value is 169.254.95.118.

  *ibmc_user_id*
  The iBMC `account` (1 of 12 accounts). The default value is USERID.

  *ibmc_password*
  The iBMC 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 BMC 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 SystemProductData_SysInfoUUID <uuid_value> --user <user_id>
  --password <password>
  ```

  Example that does use the userid and password default values:
  ```
  asu set SystemProductData_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 SystemProductData_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 “IBM Advanced Settings Utility program” on page 248 or the *Advanced Settings Utility Users Guide* for more details.

- Remote LAN access, type the command:

  **Note:** When using the remote LAN access method to access iBMC using the LAN from a client, the *host* and the *ibmc_external_ip* address are required parameters.

  ```
  host <ibmc_external_ip> [user <ibmc_user_id>][password
  <ibmc_password>]
  ```

  Where:

  *ibmc_external_ip*
  The external iBMC LAN IP address. There is no default value. This parameter is required.

  *ibmc_user_id*
  The iBMC `account` (1 of 12 accounts). The default value is USERID.

*ibmc_password*
The iBMC 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 SystemProductData_SysInfoUUID <uuid_value> --host <ibmc_ip>
--user <user_id> --password <password>
```

Example that does use the userid and password default values:
```
asu set SystemProductData_SysInfoUUID <uuid_value> --host <ibmc_ip>
```

- Bootable media:

  You can also build a bootable media using the applications available through the Tools Center website 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.

4. 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 website. To download the ASU and update the DMI, go to http://www.ibm.com/systems/support/.

1. ASU sets the DMI in the Integrated Baseboard Management Controller (iBMC). Select one of the following methods to access iBMC 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)
2. 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
3. After you install ASU, Type the following commands to set the DMI:

   ```
   asu set SystemProductData_SysInfoProdName <m/t_model> [access_method]
   asu set SystemProductData_SysInfoProdIdentifier <system model> [access_method]
   asu set SystemProductData_SysInfoSerialNum <s/n> [access_method]
   asu set SystemProductData_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.

*< system model>*
The product identifier. Type `system yyyyyyy`, where *yyyyyyy* is the product identifier such as x3755M3.

*<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 <ibmc_internal_ip>] [user <ibmc_user_id>][password <ibmc_password>]`

  Where:

  *ibmc_internal_ip*
  The iBMC internal LAN/USB IP address. The default value is 169.254.95.118.

  *ibmc_user_id*
  The iBMC account (1 of 12 accounts). The default value is USERID.

  *ibmc_password*
  The iBMC 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 iBMC 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 SystemProductData_SysInfoProdName <m/t_model>
  --user <ibmc_user_id> --password <ibmc_password>
  asu set SystemProductData_SysInfoProdIdentifier <system model>
  --user <ibmc_user_id> --password <ibmc_password>
  asu set SystemProductData_SysInfoSerialNum <s/n> --user <ibmc_user_id>
  --password <ibmc_password>
  asu set SystemProductData_SysEncloseAssetTag <asset_tag>
  --user <ibmc_user_id> --password <ibmc_password>
  ```

  Examples that do use the userid and password default values:

  ```
  asu set SystemProductData_SysInfoProdName <m/t_model>
  asu set SystemProductData_SysInfoProdIdentifier <system model>
  asu set SystemProductData_SysInfoSerialNum <s/n>
  asu set SystemProductData_SysEncloseAssetTag <asset_tag>
  ```

- Online KCS access (unauthenticated and user restricted):

You do not need to specify a value for *access_method* when you use this access method.

The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver be installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer. See the *Advanced Settings Utility Users Guide* at http://www.ibm.com/support/entry/portal/docdisplay?lndocid=TOOL-ASU for more details.

The following commands are examples of using the userid and password default values and not using the default values:

Examples that do not use the userid and password default values:

```
asu set SystemProductData_SysInfoProdName <m/t_model>
asu set SystemProductData_SysInfoProdIdentifier <system model>
asu set SystemProductData_SysInfoSerialNum <s/n>
asu set SystemProductData_SysEncloseAssetTag <asset_tag>
```

- Remote LAN access, type the command:

  **Note:** When using the remote LAN access method to access iBMC using the LAN from a client, the *host* and the *ibmc_external_ip* address are required parameters.

  ```
  host <ibmc_external_ip> [user <ibmc_user_id>][password
  <ibmc_password>]
  ```

  Where:

  *ibmc_external_ip*
  : The external iBMC LAN IP address. There is no default value. This parameter is required.

  *ibmc_user_id*
  : The iBMC account (1 of 12 accounts). The default value is USERID.

  *ibmc_password*
  : The iBMC 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 <ibmc_ip>
  --user <ibmc_user_id> --password <ibmc_password>
  asu set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> --host <ibmc_ip>
  --user <ibmc_user_id> --password <ibmc_password>
  asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --host <ibmc_ip>
  --user <ibmc_user_id> --password <ibmc_password>
  asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> --host <ibmc_ip>
  --user <ibmc_user_id> --password <ibmc_password>
  ```

  Examples that do use the userid and password default values:

  ```
  asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> --host <ibmc_ip>
  asu set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> --host <ibmc_ip>
  asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --host <ibmc_ip>
  asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> --host <ibmc_ip>
  ```

- Bootable media:

  You can also build a bootable media using the applications available through the Tools Center website 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.

4. Restart the server.

# 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 website at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.

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

## Using the documentation

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

## Getting help and information from the World Wide Web

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

You can find service information for IBM systems and optional devices at http://www.ibm.com/systems/support/.

## Software service and support

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

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

## Hardware service and support

You can receive hardware service through your IBM reseller or IBM Services. To locate a reseller authorized by IBM to provide warranty service, go to http://www.ibm.com/partnerworld/ and click **Find a Business Partner** on the right side of the page. For IBM support telephone numbers, see http://www.ibm.com/planetwide/. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

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

## IBM Taiwan product service

台灣 IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路 7 號 3 樓
電話：0800-016-888

IBM Taiwan product service contact information:
IBM Taiwan Corporation
3F, No 7, Song Ren Rd.
Taipei, Taiwan
Telephone: 0800-016-888

# Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

*IBM Director of Licensing*
*IBM Corporation*
*North Castle Drive*
*Armonk, NY 10504-1785*
*U.S.A.*

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION “AS IS” WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this IBM product, and use of those websites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

## Trademarks

IBM, the IBM logo, and ibm.com are trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at “Copyright and trademark information” at http://www.ibm.com/legal/copytrade.shtml.

Adobe and PostScript are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc., in the United States, other countries, or both and is used under license therefrom.

Intel, Intel Xeon, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Java and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, and Windows NT are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

## 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.

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

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.

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

IBM makes no representation or warranties regarding non-IBM products and services that are ServerProven®, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

## 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 server parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

*Table 12. 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].<br>• 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.<br>• The deliquescent relative humidity of the particulate contamination must be more than 60%[2].<br>• The room must be free of conductive contamination such as zinc whiskers. |
| Gaseous | • Copper: Class G1 as per ANSI/ISA 71.04-1985[3]<br>• 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.

## Battery return program

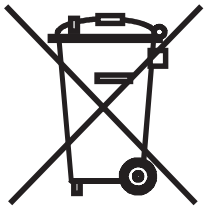
This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area.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

In the United States, IBM has established a return process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride,

and battery packs from IBM equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Have the IBM part number listed on the battery available prior to your call.

**For Taiwan:** Please recycle batteries.


**For the European Union:**



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

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

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

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

In accordance with the European Directive 2006/66/EC, batteries and accumulators are labeled to indicate that they are to be collected separately and recycled at end of life. The label on the battery may also include a chemical symbol for the metal concerned in the battery (Pb for lead, Hg for mercury, and Cd for cadmium). Users of batteries and accumulators must not dispose of batteries and accumulators as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and treatment of batteries and accumulators. Customer

participation is important to minimize any potential effects of batteries and accumulators on the environment and human health due to the potential presence of hazardous substances. For proper collection and treatment, contact your local IBM representative.

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

**For California:**

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

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

## German Ordinance for Work gloss statement

The product is not suitable for use with visual display work place devices according to clause 2 of the German Ordinance for Work with Visual Display Units.

Das Produkt ist nicht für den Einsatz an Bildschirmarbeitsplätzen im Sinne § 2 der Bildschirmarbeitsverordnung geeignet.

## 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:

*Information Development*
*IBM Corporation*
*205/A015*
*3039 E. Cornwallis Road*
*P.O. Box 12195*
*Research Triangle Park, North Carolina 27709-2195*
*U.S.A.*

In the request, be sure to include the publication part number and title.

When you send information to IBM, you grant IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

## Telecommunication regulatory statement

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

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are 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

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

## Avis de conformité à la réglementation d'Industrie Canada

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

## Australia and New Zealand Class A statement

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

## European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

**Attention:** This is an EN 55022 Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Responsible manufacturer:
International Business Machines Corp.
New Orchard Road

Armonk, New York 10504
914-499-1900

European Community contact:
IBM Technical Regulations, Department M456
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**

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: “Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen.”

### Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem “Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)”. Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

### Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:
International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:
IBM Deutschland
Technical Regulations, Department M456
IBM-Allee 1, 71137 Ehningen, Germany
Telephone: +49 7032 15-2937
Email: tjahn@de.ibm.com

**Generelle Informationen:**

**Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.**

## VCCI Class A statement

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

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

## Japan Electronics and Information Technology Industries Association (JEITA) statement

高調波ガイドライン適合品

Japanese Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guideline (products less than or equal to 20 A per phase)

## Korea Communications Commission (KCC) statement

이 기기는 업무용(A급)으로 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

This is electromagnetic wave compatibility equipment for business (Type A). Sellers and users need to pay attention to it. This is for any areas other than home.

## Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ! Настоящее изделие относится к классу А.
В жилых помещениях оно может создавать радиопомехи, для снижения которых необходимы дополнительные меры

## People's Republic of China Class A electronic emission statement

中华人民共和国“A类”警告声明

声 明

此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

## Taiwan Class A compliance statement

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

# Index

## E



## F



## G



## H

# I



# J



# L

# M



# N



# O



# P

## R



## S

# T



# U



# V



# W

Part Number: 00D3216

Printed in USA

(1P) P/N: 00D3216