IBM System x3650 M3 Types 4255, 7945, and 7949

Problem Determination and Service Guide

IBM System x3650 M3 Types 4255, 7945, and 7949

Problem Determination and Service Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, “Notices,” on page 279, the *IBM Safety Information* and *IBM Environmental Notices and User's Guide* on the IBM *System x Documentation* CD, and the *IBM Warranty Information* document that comes with your server.

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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.

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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 165.
   - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment

Observe the following guidelines when you service electrical equipment:

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

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

Safety statements

Important:

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

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

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

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

Statement 1:

DANGER

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

To avoid a shock hazard:

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

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

Statement 2:

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

Do not:

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

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

Statement 3:

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

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

DANGER

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

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

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

Statement 4:

≥ 18 kg (39.7 lb)

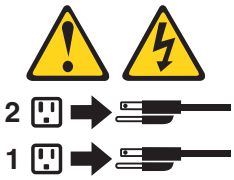
≥ 32 kg (70.5 lb)

≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 5:

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



Statement 8:

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

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

Statement 12:

CAUTION:
The following label indicates a hot surface nearby.

Statement 26:

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

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

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.

Chapter 1. Start here

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

Diagnosing a problem

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

1. **Determine what has changed.**

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

   - BIOS code
   - Device drivers
   - Firmware
   - Hardware components
   - Software

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

2. **Collect data.**

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

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

      - **System error codes:** See “Viewing the test log” on page 73 for information about error codes.
      - **Software or operating-system error codes:** See the documentation for the software or operating system for information about a specific error code. See the manufacturer's Web site for documentation.
      - **Light path diagnostics LEDs:** See “Light path diagnostics LEDs” on page 65 for information about light path diagnostics LEDs that are lit.
      - **System-board LEDs:** See “System-board LEDs” on page 20 for information about system-board LEDs that are lit.

   b. **Collect system data.**

      Run Dynamic System Analysis (DSA) to collect information about the hardware, firmware, software, and operating system. Have this information available when you contact IBM or an approved warranty service provider. For instructions for running the DSA program, see “Running the diagnostic programs” on page 72.

      If you have to download the latest version of DSA, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA or complete the following steps.

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

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1) Go to http://www.ibm.com/systems/support/.
2) Under **Product support**, click **System x**.
3) Under **Popular links**, click **Software and device drivers**.
4) Under **Related downloads**, click **Dynamic System Analysis (DSA)**.

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

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

3. **Follow the problem-resolution procedures.**

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

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

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

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

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

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

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

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

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

         a) Go to http://www.ibm.com/systems/support/.
         b) Under **Product support**, click **System x**.
         c) Under **Popular links**, click **Software and device drivers**.
         d) Click **System x3650 M3** to display the list of downloadable files for the server.

         You can install code updates that are packaged as an Update*Xpress* System Pack or Update*Xpress* CD image. An Update*Xpress* System Pack contains an integration-tested bundle of online firmware and device-driver updates for your server.

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

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

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

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

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

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

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

Many configuration problems are caused by loose power or signal cables or incorrectly seated adapters. You might be able to solve the problem by turning off the server, reconnecting cables, reseating adapters, and turning the server back on. For information about performing the checkout procedure, see “Checkout procedure” on page 41.

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

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

For problems with operating systems or IBM software or devices, complete the following steps.

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

a) Go to http://www.ibm.com/systems/support/.

b) Under **Product support**, click **System x**.

c) From the **Product family** list, select **System x3650 M3**.

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

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

Troubleshooting procedures and RETAIN tips document known problems and suggested solutions. To search for troubleshooting procedures and RETAIN tips, complete the following steps.

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

1) Go to http://www.ibm.com/systems/support/.

2) Under **Product support**, click **System x**.

3) From the **Product family** list, select **System x3650 M3**.

4) Under **Support & downloads**, click **Troubleshoot**.

5) Select the troubleshooting procedure or RETAIN tip that applies to your problem:
   - Troubleshooting procedures are under **Diagnostic**.
   - RETAIN tips are under **Troubleshoot**.

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

   If a hardware component is not operating within specifications, it can cause unpredictable results. Most hardware failures are reported as error codes in a system or operating-system log. For more information, see “Troubleshooting tables” on page 43 and Chapter 5, “Removing and replacing server components,” on page 169. Hardware errors are also indicated by light path diagnostics LEDs.

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

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

Undocumented problems

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

Chapter 2. Introduction

This *Problem Determination and Service Guide* contains information to help you solve problems that might occur in your IBM® System x3650 M3 Type 4255, 7945, or 7949 server. It describes the diagnostic tools that come with the server, error codes and suggested actions, and instructions for replacing failing components.

Replaceable components are of four types:

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

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

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.
- *Warranty and Support Information*

  This printed document contains information about the terms of the warranty.
- *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 product.

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- *Licenses and Attributions Documents*

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

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

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

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

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x3650 M3** and click **Continue**.

Notices and statements in this document

The caution and danger statements in this document are also in the multilingual *Safety Information* document, which is on the *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 model, some features might not be available, or some specifications might not apply.

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

Notes:

1. Power consumption and heat output vary depending on the number and type of optional features that are installed and the power-management optional features that are in use.
2. 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:
- Supports up to two Intel Xeon™ multi-core microprocessors (one installed)
- Level-3 cache
- QuickPath Interconnect (QPI) links speed up to 6.4 GT per second

Note:
- Do not install an Intel Xeon™ 5500 series microprocessor and an Xeon™ 5600 series microprocessor in the same server.
- Use the Setup utility to determine the type and speed of the microprocessors.
- For a list of supported microprocessors, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

Memory:
- Minimum: 2 GB
- Maximum: 192 GB
  - 48 GB using unbuffered DIMMs (UDIMMs)
  - 192 GB using registered DIMMs (RDIMMs)
- Type: PC3-10600R-999, 800, 1067, and 1333 MHz, ECC, DDR3 registered or unbuffered SDRAM DIMMs
- Slots: 18 dual inline
- Supports (depending on the model):
  - 2 GB and 4 GB unbuffered DIMMs
  - 2 GB, 4 GB, 8 GB, and 16 GB registered DIMMs

SATA optical drives (optional):
- DVD-ROM
- Multi-burner

Hard disk drive expansion bays (depending on the model:
- Eight 2.5-inch SAS hot-swap bays for hard disk drive bays with option to add eight more 2.5-inch SAS hot-swap hard disk drive bays
- Four 2.5-inch simple-swap, solid state SATA hard disk drive bays

PCI expansion slots:
- Two PCI Express riser cards with two PCI Express x8 slots (x8 lanes) each, standard
- Support for the following optional riser cards:
  - Two 133 MHz/64-bit PCI-X 1.0a slots
  - One PCI Express x16 slot (x16 lanes)

Size (2U):
- Height: 85.2 mm (3.346 in.)
- Depth: EIA flange to rear - 698 mm (27.480 in.), Overall - 729 mm (28.701 in.)
- Width: With top cover - 443.6 mm (17.465 in.), With front bezel - 482.0 mm (18.976 in.)
- Weight: approximately 21.09 kg (46.5 lb) to 25 kg (55 lb) depending upon configuration

Integrated functions:
- Integrated management module (IMM), which provides service processor control and monitoring functions, video controller, and (when the optional virtual media key is installed) remote keyboard, video, mouse, and remote hard disk drive capabilities
- Dedicated or shared management network connections
- Serial over LAN (SOL) and serial redirection over Telnet or Secure Shell (SSH)
- One systems-management RJ-45 for connection to a dedicated systems-management network
- Support for remote management presence through an optional virtual media key
- Broadcom BCM5709 Gb Ethernet controller with TCP/IP Offload Engine (TOE) and Wake on LAN support
- Four Ethernet ports (two on system board and two additional ports when the optional IBM Dual-Port 1 Gb Ethernet Daughter Card is installed)
- One serial port, shared with the integrated management module (IMM)
- Four Universal Serial Bus (USB) ports (two on front, two on rear of server), v2.0 supporting v1.1, plus one or more dedicated internal USB ports on the SAS riser card
- Two video ports (one on front and one on rear of server)
- One SATA tape connector, one USB tape connector, and one tape power connector on SAS riser card (some models)
- Support for hypervisor function through an optional USB flash device on the SAS riser card (not available on simple-swap models)

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

Video controller (integrated into IMM):
- Matrox G200eV (two analog ports - one front and one rear that can be connected at the same time)
  Note: The maximum video resolution is 1600 x 1200 at 75 Hz.
  - SVGA compatible video controller
  - DDR2 250 MHz SDRAM video memory controller
  - Avocent Digital Video Compression
  - 16 MB of video memory (not expandable)

ServeRAID controller (depending on the model):
- A ServeRAID-BR10il v2 SAS/SATA adapter that provides RAID levels 0, 1, and 1E (comes standard on some hot-swap models).
- An optional ServeRAID-BR10il SAS/SATA adapter that provides RAID levels 0, 1, and 1E can be ordered.
- An optional ServeRAID-MR10i SAS/SATA adapter that provides RAID levels 0, 1, 5, 6, 10, 50, and 60 can be ordered.
- An optional ServerRAID M1015 SAS/SATA adapter that provides RAID levels 0, 1, and 10 with optional RAID 5/50 and SED (Self Encrypting Drive) upgrade.
- An optional ServeRAID-M5014 SAS/SATA adapter that provides RAID levels 0, 1, 5, 10 and 50 with optional battery and RAID 6/60 and SED upgrade.
- An optional ServeRAID-M5015 SAS/SATA adapter with battery that provides RAID levels 0, 1, 5, 10, and 50 with optional RAID 6/60 and SED upgrade

Notes:
1. RAID is supported in hot-swap models only.
2. The ServeRAID controllers are installed in a PCI Express x8 mechanical slot (x4 electrical); however, the controllers run at x4 bandwidth.

Table 1. Features and specifications (continued)

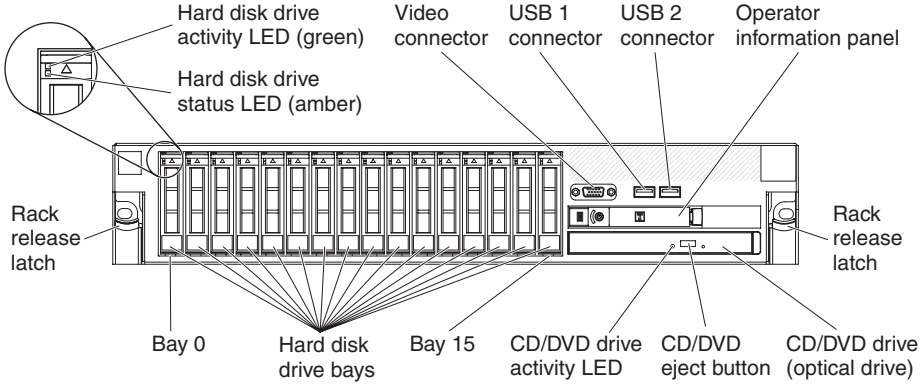
Electrical input with hot-swap ac power supplies: • Sine-wave input (47 - 63 Hz) required • Input voltage range automatically selected • Input voltage low range: – Minimum: 100 V ac – Maximum: 127 V ac • Input voltage high range: – Minimum: 200 V ac – Maximum: 240 V ac • Input kilovolt-amperes (kVA) approximately: – Minimum: 0.090 kVA – Maximum: 0.700 kVA	**Environment:** • Air temperature: – Server on: 10°C to 35°C (50.0°F to 95.0°F); altitude: 0 to 914.4 m (3000 ft). Decrease system temperature by 1°C for every 1000-foot increase in altitude. – Server off: 5°C to 45°C (41.0°F to 113.0°F); maximum altitude: 3048 m (10000 ft) – Shipment: -40°C to +60°C (-40°F to 140°F); maximum altitude: 3048 m (10000 ft) • Humidity: – Server on: 20% to 80%; maximum dew point: 21°C; maximum rate of change 5°C per hour. – Server off: 8% to 80%; maximum dew point: 27°C – Shipment: 5% to 100% • 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 281.	**Hot-swap fans:** Three - provide redundant cooling. **Power supply:** • Up to two hot-swap power supplies for redundancy support – 460-watt ac – 675-watt ac – 675-watt high-efficiency ac – 675-watt dc **Note:** You cannot mix 460-watt and 675-watt power supplies, or high-efficiency and non-high-efficiency power supplies, or ac and dc power supplies in the server. **Acoustical noise emissions:** • Declared sound power, idle: 6.3 bel • Declared sound power, operating: 6.5 bel **Heat output:** Approximate heat output: • Minimum configuration: 662 Btu per hour (194 watts) • Maximum configuration: 2302 Btu per hour (675 watts)

Server controls, LEDs, and connectors

This section describes the controls, light-emitting diodes (LEDs), and connectors.

Front view

The following illustration shows the controls, connectors, and hard disk drive bays on the front of the server.



Hard disk drive activity LED: Each 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 hard disk drive has a status LED. When this LED is lit, it indicates that the drive has failed. When this LED is flashing slowly (one flash per second), it indicates that the drive is being rebuilt as part of a RAID

configuration. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.

Video connector: Connect a monitor to this connector. The video connectors on the front and rear of the server can be used simultaneously.

USB connectors: Connect a USB device, such as USB mouse, keyboard, or other USB device, to either of these connectors.

Operator information panel: This panel contains controls, light-emitting diodes (LEDs), and connectors. For information about the controls and LEDs on the operator information panel, see “Operator information panel.”

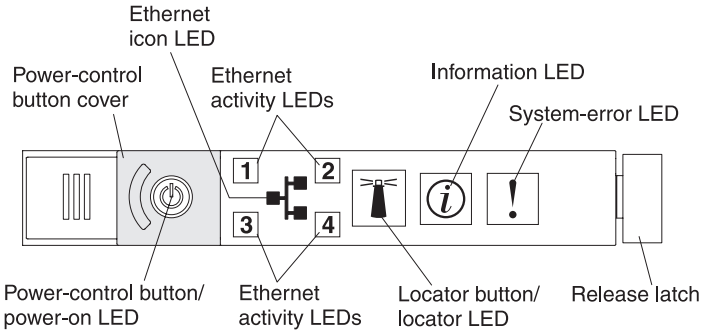
Rack release latches: Press these latches to release the server from the rack.

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

Optional CD/DVD drive activity LED: When this LED is lit, it indicates that the CD-RW/DVD drive is in use.

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. This will last approximately 20 to 40 seconds.

    Note: Approximately 40 seconds after the server is connected to ac power, the power-control button becomes active.
  - **Flashing slowly (once per second):** The server is turned off and is ready to be turned on. You can press the power-control button to turn on the server.
  - **Lit:** The server is turned on.
  - **Fading on and off:** The server is in a reduced-power state. To wake the server, press the power-control button or use the IMM Web interface.

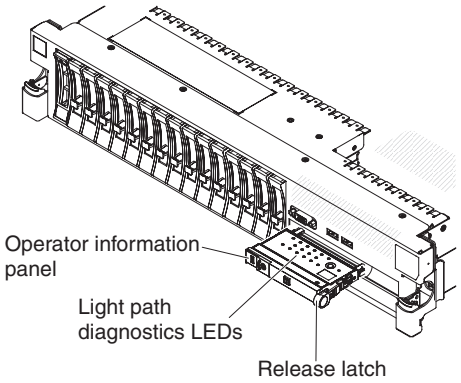
Note: If this LED is off, it does not mean that there is no electrical power in the server. The LED might be burned out. To remove all electrical power from the server, you must disconnect the power cord from the electrical outlet.

- **Ethernet icon LED:** This LED lights the Ethernet icon.
- **Ethernet activity LEDs:** When any 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.
- **Information LED:** When this LED is lit, it indicates that a noncritical event has occurred. An LED on the light path diagnostics panel is also lit to help isolate the error.
- **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.
- **Release latch:** Slide this latch to the left to access the light path diagnostics panel, which is behind the operator information panel.
- **Locator button and locator LED:** Use this LED to visually locate the server among other servers. It is also used as the physical presence for Trusted Platform Module (TPM). Press this button to turn on or turn off this LED locally. You can use IBM Systems Director to light this LED remotely.

Light path diagnostics panel

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

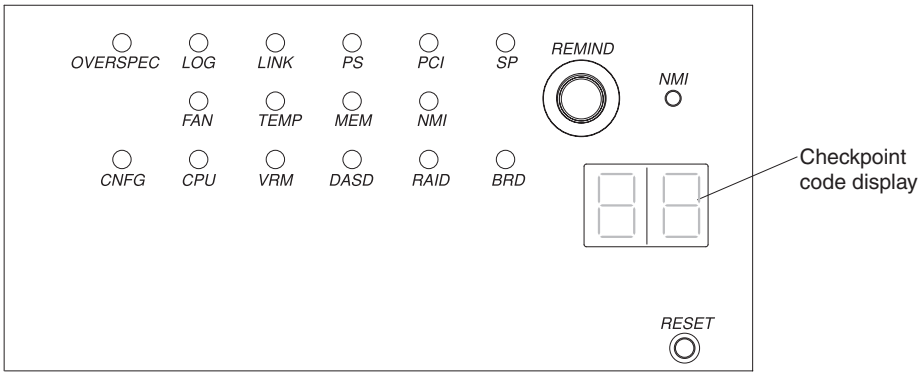
To access the light path diagnostics panel, slide the blue release button on the operator information panel to the left. Pull forward on the operator information panel until the hinge of the panel is free of the server chassis. Then pull down on the operator information panel, so that you can view the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



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

Notes:

1. Do not run the server for an extended period of time 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.

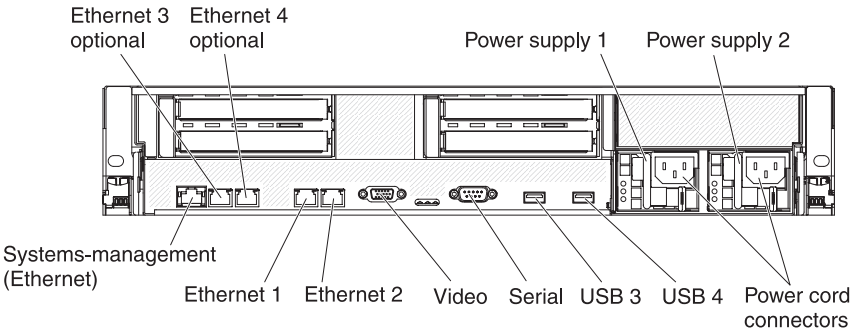


- **Remind button:** This button places the system-error LED on the front panel into Remind mode. In Remind mode, the system-error LED flashes rapidly until the problem is corrected, the server is restarted, or a new problem occurs.

  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 IMM.
- **NMI button:** Press this button to force a nonmaskable interrupt to the microprocessor, if you are directed by IBM service and support.
- **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.



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

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

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

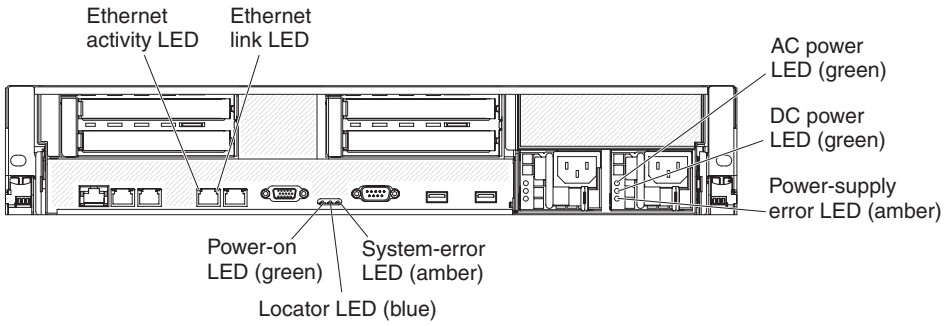
Serial connector: Connect a 9-pin serial device to this connector. The serial port is shared with the integrated management module (IMM). The IMM can take control of the shared serial port to perform text console redirection and to redirect serial traffic, using Serial over LAN (SOL).

Video connector: Connect a monitor to this connector. The video connectors on the front and rear of the server can be used simultaneously.

Note: The maximum video resolution is 1600 x 1200 at 75 Hz.

Systems-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 IMM.

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



Ethernet activity LEDs: When any 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.

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.

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 69.

IN OK power LED: Each hot-swap dc power supply has an IN OK power LED and an OUT OK power LED. When the IN OK power LED is lit, it indicates that sufficient power is coming into the power supply through the power cord. During typical operation, both the IN OK and OUT OK power LEDs are lit. For any other combination of LEDs, see “Power-supply LEDs” on page 69.

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 adequate 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 69.

OUT OK power LED: Each hot-swap dc power supply has an IN OK power LED and an OUT OK power LED. When the OUT OK power LED is lit, it indicates that the power supply is supplying adequate dc power to the system. During typical operation, both the IN OK and OUT OK power LEDs are lit. For any other combination of LEDs, see “Power-supply LEDs” on page 69.

Power-supply error LED: When the power-supply error LED is lit, it indicates that the power supply has failed.

Note: Power supply 1 is the default/primary power supply. If power supply 1 fails, you must replace the power supply immediately.

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 the same as 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 the same as the system-locator LED on the front of the server.

Power-on LED: The states of the power-on LED are as follows:

- **Off:** AC power is not present, or the power supply or the LED itself has failed.
- **Flashing rapidly (4 times per second):** The server is turned off and is not ready to be turned on. The power-control button is disabled. This will last approximately 20 to 40 seconds.

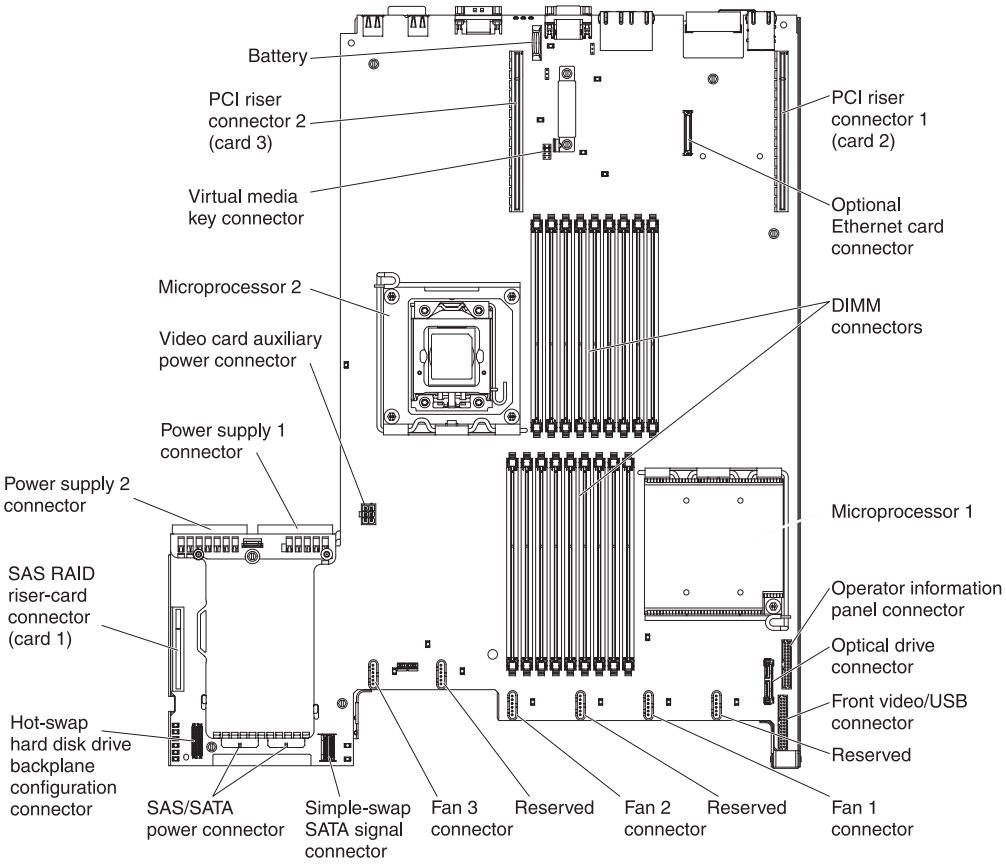
  Note: Approximately 40 seconds after the server is connected to ac power, the power-control button becomes active.
- **Flashing slowly (once per second):** The server is turned off and is ready to be turned on. You can press the power-control button to turn on the server.
- **Lit:** The server is turned on.
- **Fading on and off:** The server is in a reduced-power state. To wake the server, press the power-control button or use the IMM Web interface.

Internal connectors, LEDs, and jumpers

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

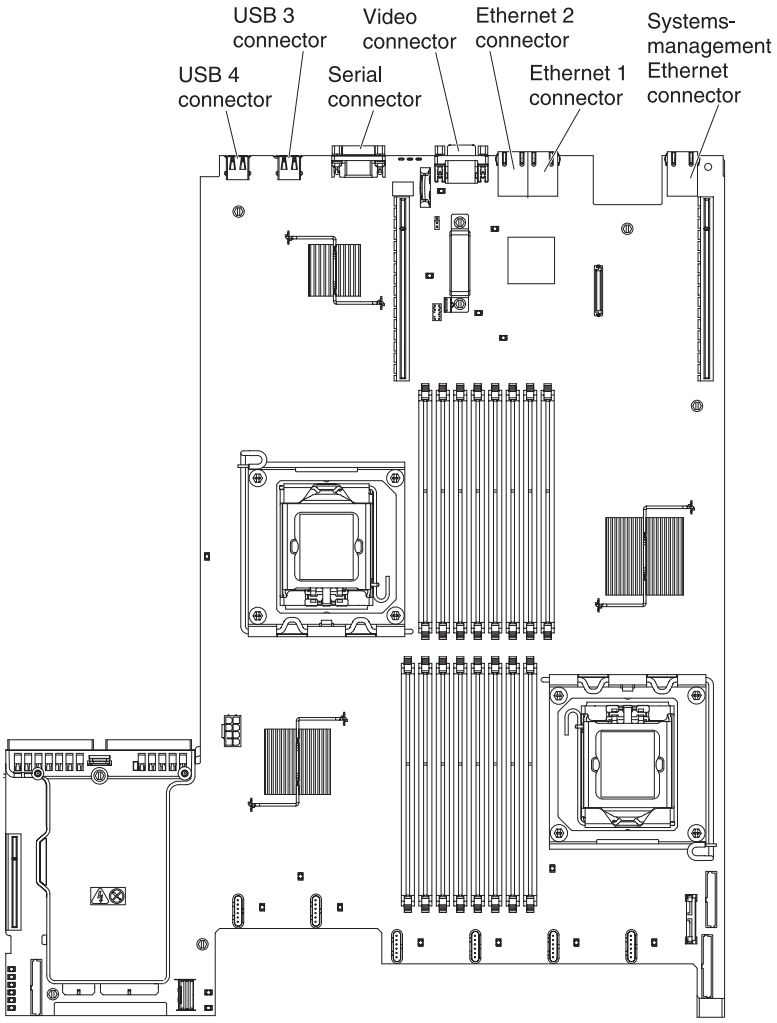
System-board internal connectors

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



System-board external connectors

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

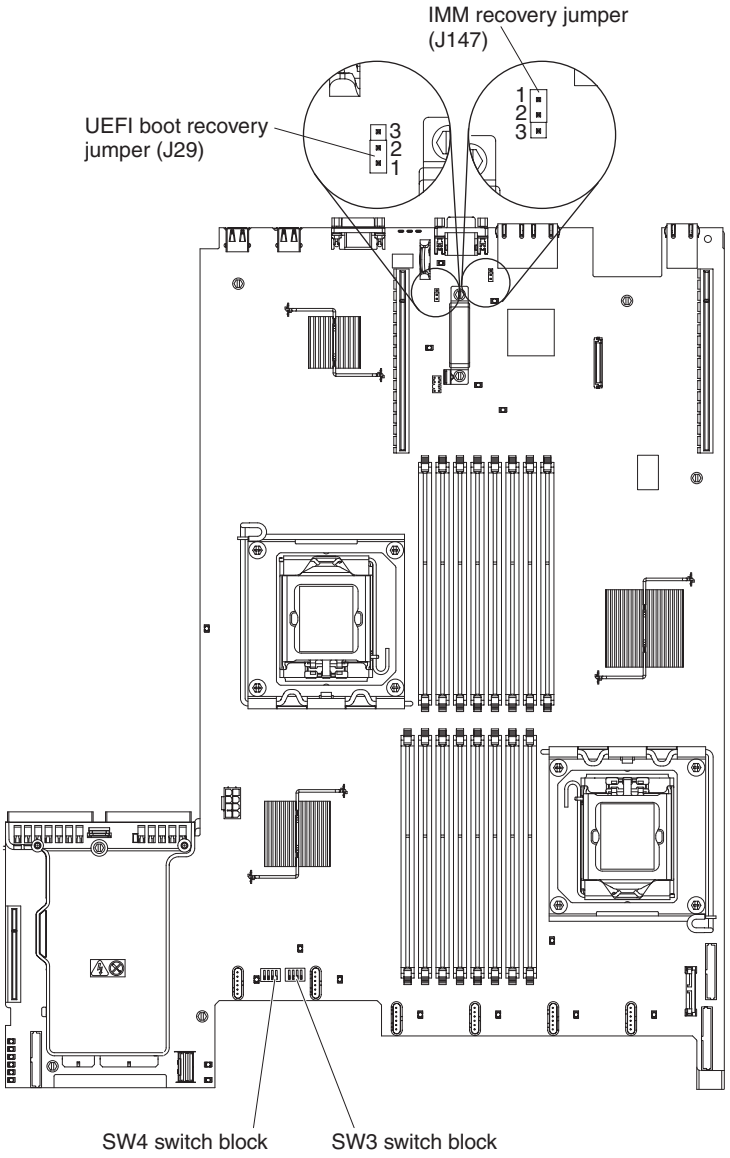


System-board switches and jumpers

The following illustration shows the location and description of the switches and jumpers.

Note: If there is a clear protective sticker on the top of the switch blocks, you must remove and discard it to access the switches.

The default positions for the UEFI and the IMM recovery jumpers are pins 1 and 2.



The following table describes the jumper settings for J29 and J147 on the system board.

Table 2. System board jumpers

Jumper number	Jumper name	Jumper setting
J29	UEFI boot recovery jumper	• Pins 1 and 2: Normal (default) Loads the primary server firmware ROM page. • Pins 2 and 3: Loads the secondary (backup) server firmware ROM page.

Table 2. System board jumpers (continued)

Jumper number	Jumper name	Jumper setting
J147	IMM recovery jumper	• Pins 1 and 2: Normal (default) Loads the primary IMM firmware ROM page. • Pins 2 and 3: Loads the secondary (backup) IMM firmware ROM page.

Notes:

1. If no jumper is present, the server responds as if the pins are set to 1 and 2.
2. 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 alters which flash ROM page is loaded. Do not change the jumper pin position after the server is turned on. This can cause an unpredictable problem.

The following illustration shows the jumper settings for switch blocks SW3 and SW4 on the system board.

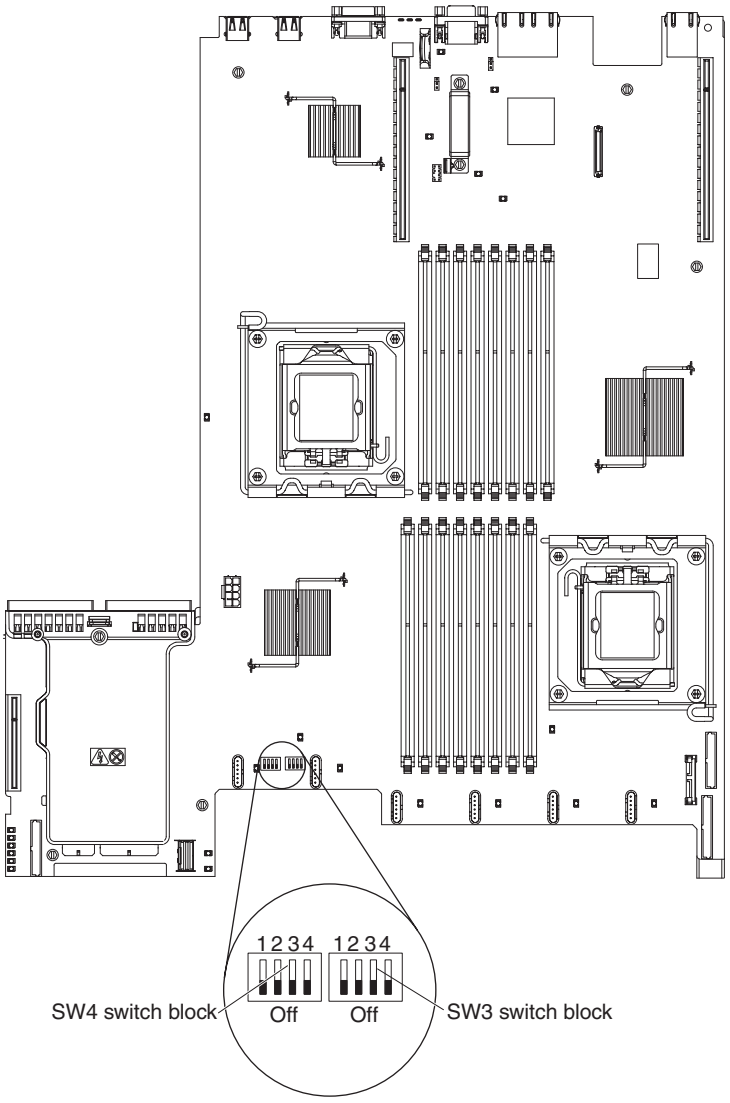


Table 3 on page 19 and Table 4 on page 19 describe the function of each switch on SW3 and SW4 switch blocks on the system board.

Table 3. System board switch block 3, switches 1 - 4

Switch number	Default value	Switch description
1	Off	Clear CMOS memory. When this switch is toggled to On, it clears the data in CMOS memory.
2	Off	Trusted Platform Module (TPM) physical presence. Turning this switch to the on position indicates a physical presence to the TPM.
3	Off	Reserved.
4	Off	Reserved.

Table 4. System board switch block 4, switches 1 - 4

Switch number	Default value	Switch description
1	Off	Power-on password override. Changing the position of this switch bypasses the power-on password check the next time the server is turned on and starts the Setup utility so that you can change or delete the power-on password. You do not have to move the switch back to the default position after the password is overridden. Changing the position of this switch does not affect the administrator password check if an administrator password is set. See “Passwords” on page 257 for additional information about the power-on password.
2	Off	Power-on override. When this switch is toggled to On and then to Off, you force a power-on which overrides the power-on and power-off button on the server and they become nonfunctional.
3	Off	Forced power permission overrides the IMM power-on checking process. (Trained service technician only)
4	Off	Reserved.

Notes:

1. Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. (Review the information in “Safety” on page vii, “Installation guidelines” on page 169, and “Handling static-sensitive devices” on page 171.)
2. Any system-board switch or jumper blocks that are not shown in the illustrations in this document are reserved.

System-board LEDs

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

Note: Error LEDs remain lit only while the server is connected to power.

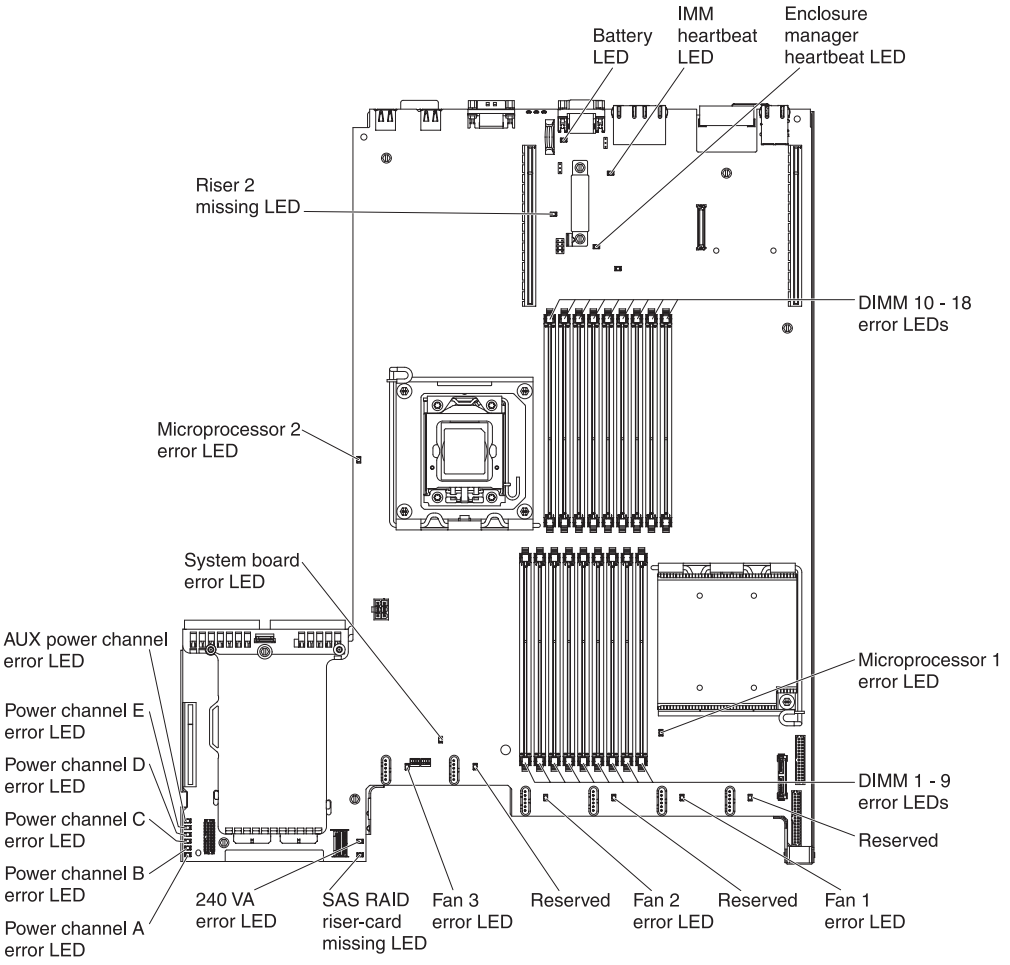


Table 5. System-board LEDs

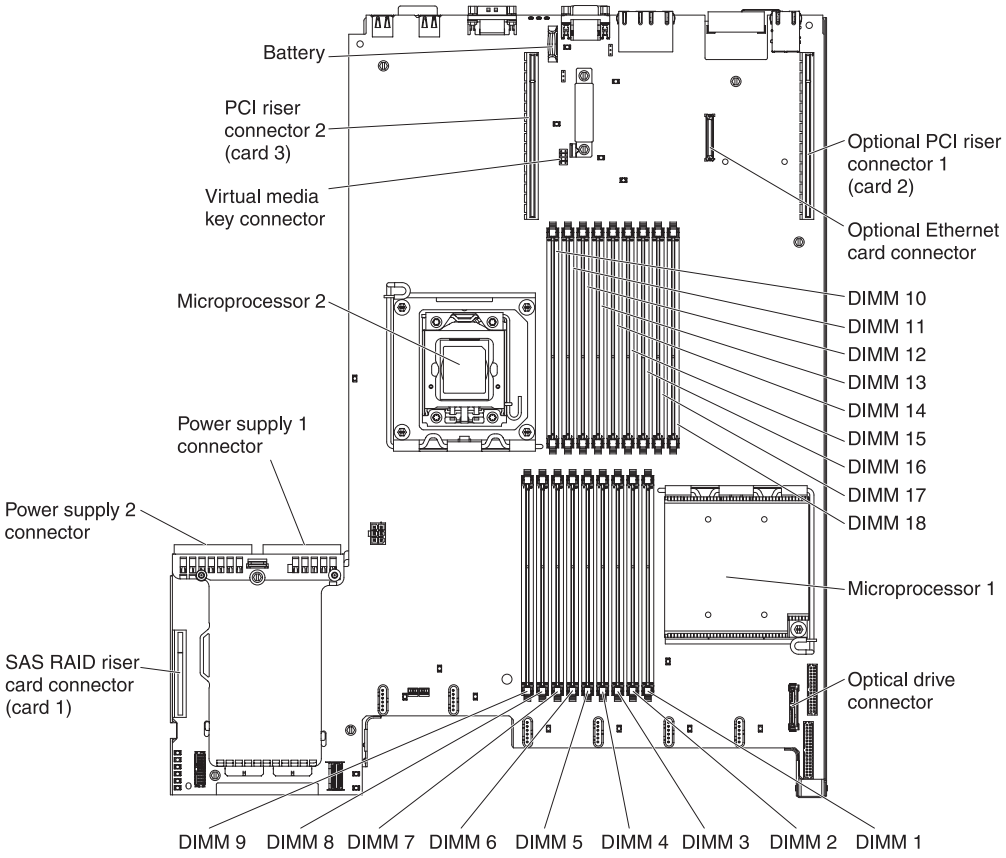
LED	Description
Error LEDs	The associated component has failed.
12-volt power (A, B, C, D, E and AUX) error LEDs	If any of these LEDs are lit, there is a failure in the associated system-board power channel (see “Power problems” on page 55).

Table 6. System Pulse LEDs

LED	Description	Action
Enclosure manager heartbeat	Indicates the status of power-on and power-off sequencing. When the server is connected to power, this LED flashes slowly to indicate that the enclosure manager is working correctly.	(Trained service technician only) If the server is connected to power and the LED is not flashing, replace the system board.
IMM heartbeat	Indicates the status of the boot process of the IMM. When the server is connected to power this LED flashes quickly to indicate that the IMM code is loading. When the loading is complete, the LED stops flashing briefly and then flashes slowly to indicate that the IMM if fully operational and you can press the power-control button to start the server.	If the LED does not begin flashing within 30 seconds of when the server is connected to power, complete the following steps: 1. (Trained service technician only) Use the IMM recovery jumper to recover the firmware (see "System-board switches and jumpers" on page 17). 2. (Trained service technician only) Replace the system board.

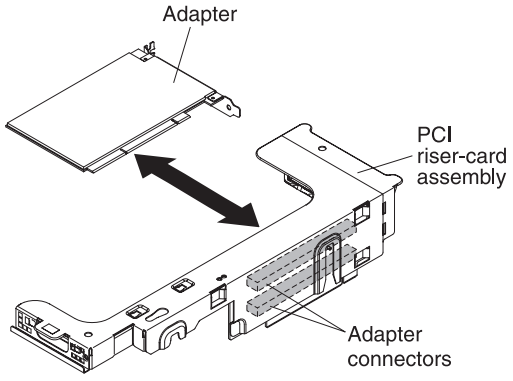
System-board optional device connectors

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



PCI riser-card adapter connectors

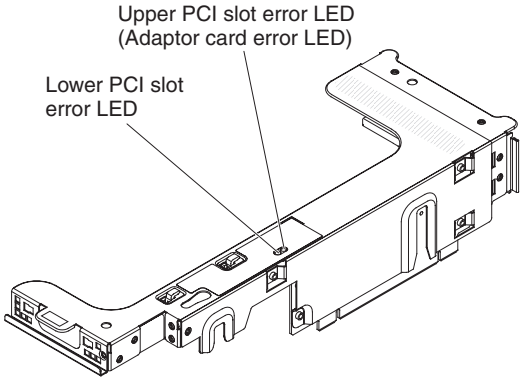
The following illustration shows the connectors on the PCI riser card for user-installable PCI adapters.



PCI riser-card assembly LEDs

The following illustration shows the light-emitting diodes (LEDs) on the PCI riser-card assembly.

Note: Error LEDs remain lit only while the server is connected to power.

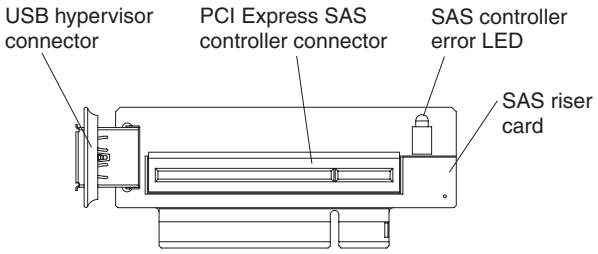


SAS riser-card connectors and LEDs

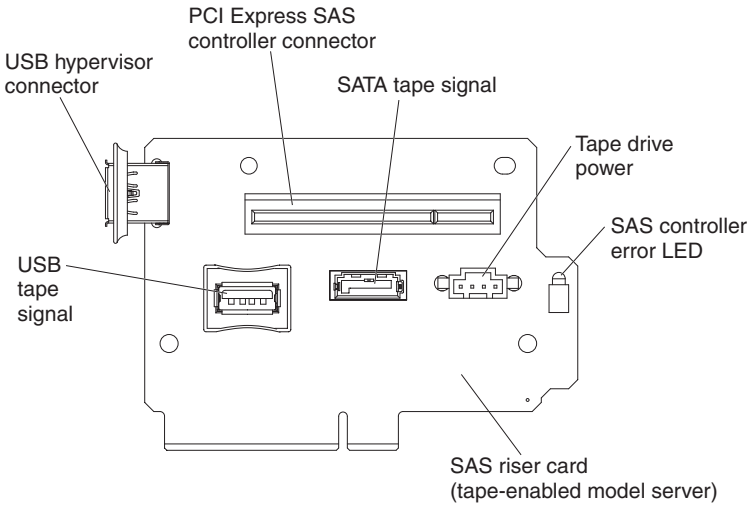
The following illustrations show the connectors and LEDs on the SAS riser cards.

Note: Error LEDs remain lit only while the server is connected to power.

A 12-drive-capable model server contains the riser card that is shown in the following illustration.



A tape-enabled model server contains the riser card that is shown in the following illustration.



Chapter 3. Diagnostics

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

If you cannot locate and correct a problem by using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 277 for more information.

Diagnostic tools

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

- **Troubleshooting tables**

  These tables list problem symptoms and actions to correct the problems. See “Troubleshooting tables” on page 43.

- **Light path diagnostics**

  Use the light path diagnostics to diagnose system errors quickly. See “Light path diagnostics” on page 62 for more information.

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

  The DSA Preboot diagnostic programs provide problem isolation, configuration analysis, and error log collection. The diagnostic programs are the primary method of testing the major components of the server and are stored in integrated USB memory. The diagnostic programs collect the following information about the server:
  - System configuration
  - Network interfaces and settings
  - Installed hardware
  - Light path diagnostics status
  - Service processor status and configuration
  - Vital product data, firmware, and IBM's implementation of UEFI configuration
  - Hard disk drive health
  - RAID controller configuration
  - ServeRAID controller and service processor event logs, including the following information:
    - System-event logs
    - Temperature, voltage, and fan speed information
    - Tape drive presence and read/write test results
    - Systems management analysis and reporting technology (SMART) data
    - USB information
    - Monitor configuration information
    - PCI slot information

  The diagnostic programs create a merged log that includes events from all collected logs. The information is collected into a file that you can send to IBM service and support. Additionally, you can view the server information locally through a generated text report file. You can also copy the log to removable media and view the log from a Web browser. See “Running the diagnostic programs” on page 72 for more information.

- **IBM Electronic Service Agent**

  IBM Electronic Service Agent is a software tool that monitors the server for hardware error events and automatically submits electronic service requests to IBM service and support. Also, it can collect and transmit system configuration

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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/electronic/.

POST

When you turn on the server, it performs a series of tests to check the operation of the server components and some optional devices in the server. This series of tests is called the power-on self-test, or POST. This server does not use beep codes for server status.

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

Event logs

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

- **POST event log:** This log contains the three most recent error codes and messages that were generated during POST. You can view the POST event log through the Setup utility.
- **System-event log:** This log contains all BMC, POST, and system management interrupt (SMI) events. You can view the system-event log from the Setup utility and through the Dynamic System Analysis (DSA) program (as the IPMI event log).

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

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

  Some IMM sensors cause assertion events to be logged when their setpoints are reached. When a setpoint condition no longer exists, a corresponding deassertion event is logged. However, not all events are assertion-type events.
- **Integrated management module (IMM) event log:** This log contains a filtered subset of all IMM, POST, and system management interrupt (SMI) events. You can view the IMM event log through the IMM Web interface and through the Dynamic System Analysis (DSA) program (as the ASM event log).
- **DSA log:** This log is generated by the Dynamic System Analysis (DSA) program, and it is a chronologically ordered merge of the system-event log (as the IPMI event log), the IMM event log (as the ASM event log), and the operating-system event logs. You can view the DSA log through the DSA program.

Viewing event logs from the Setup utility

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

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

- To view the system-event log, select **System Event Log**.

Viewing event logs without restarting the server

If the server is not hung, methods are available for you to view one or more event logs without having to restart the server.

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

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Under **Related downloads**, click **Dynamic System Analysis (DSA)** to display the matrix of downloadable DSA files.

If IPMItool is installed in the server, you can use it to view the system-event log. Most recent versions of the Linux operating system come with a current version of IPMItool. For information about IPMItool, see http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp?topic=/com.ibm.xseries.tools.doc/config_tools_ipmitool.html or complete the following steps.

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

1. Go to http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp.
2. In the navigation pane, click **IBM System x and BladeCenter Tools Center**.
3. Expand **Tools reference**, expand **Configuration tools**, expand **IPMI tools**, and click **IPMItool**.

For an overview of IPMI, go to http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp?topic=/com.ibm.xseries.tools.doc/co... or complete the following steps:

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

You can view the IMM event log through the **Event Log** link in the integrated management module (IMM) Web interface.

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

Table 7. Methods for viewing event logs

Condition	Action
The server is not hung and is connected to a network.	Use any of the following methods: • Run Portable or Installable DSA to view the event logs or create an output file that you can send to IBM service and support. • Type the IP address of the IMM and go to the Event Log page. • Use IPMItool to view the system-event log.
The server is not hung and is not connected to a network.	Use IPMItool locally to view the system-event log.
The server is hung.	• If DSA Preboot is installed, restart the server and press F2 to start DSA Preboot and view the event logs. • If DSA Preboot is not installed, insert the DSA Preboot CD and restart the server to start DSA Preboot and view the event logs. • Alternatively, you can restart the server and press F1 to start the Setup utility and view the POST event log or system-event log. For more information, see “Viewing event logs from the Setup utility” on page 26.

POST error codes

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

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0010002	Microprocessor not supported	1. Reseat the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Microprocessor 1 b. (Trained service technician only) Microprocessor 2 (if installed) 2. (Trained service technician only) Remove microprocessor 2 and restart the server. 3. (Trained service technician only) Remove microprocessor 1 and install microprocessor 2 in the microprocessor 1 connector. Restart the server. If the error is corrected, microprocessor 1 is bad and must be replaced. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Microprocessor 1 b. (Trained service technician only) Microprocessor 2 c. (Trained service technician only) System board
0011000	Invalid microprocessor type	1. Update the firmware to the latest level (see "Updating the firmware" on page 251). 2. (Trained service technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type.
0011002	Microprocessor mismatch	1. Run the Setup utility and view the microprocessor information to compare the installed microprocessor specifications. 2. (Trained service technician only) Remove and replace one of the microprocessors so that they both match.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
0011004	Microprocessor failed BIST	1. Update the firmware to the latest level (see "Updating the firmware" on page 251). 2. (Trained service technician only) Reseat microprocessor 2. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Microprocessor b. (Trained service technician only) System board
001100A	Microcode update failed	1. Update the server firmware to the latest level (see "Updating the firmware" on page 251). 2. (Trained service technician only) Replace the microprocessor.
0050001	DIMM disabled	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 215). 2. If the DIMM was disabled because of a memory fault, follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0051003	Uncorrectable DIMM error	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. If the problem remains, replace the failing DIMM (see "Removing a memory module (DIMM)" on page 215 and "Installing a memory module" on page 215). 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 236 and "Installing a microprocessor and heat sink" on page 238).
0051004	DIMM presence detected read/write failure	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Update the server firmware to the latest level (see "Updating the firmware" on page 251). 2. Reseat the DIMMs. 3. Install DIMMs in the correct sequence (see "Installing a memory module" on page 215). 4. Replace the failing DIMM. 5. (Trained service technician only) Replace the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
0051006	DIMM mismatch detected	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. Make sure that the DIMMs match and are installed in the correct sequence (see "Installing a memory module" on page 215).
0051009	No memory detected	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Make sure one or more DIMMs are installed in the server. 2. Reseat the DIMMs and restart the server (see "Removing a memory module (DIMM)" on page 215 and "Installing a memory module" on page 215). 3. Make sure that the DIMMs match and are installed in the correct sequence (see "Installing a memory module" on page 215). 4. (Trained service technician only) Replace the microprocessor that controls the failing DIMMs (see "Removing a microprocessor and heat sink" on page 236 and "Installing a microprocessor and heat sink" on page 238). 5. (Trained service technician only) Replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246).
005100A	No usable memory detected	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Make sure one or more DIMMs are installed in the server. 2. Reseat the DIMMs and restart the server (see "Removing a memory module (DIMM)" on page 215 and "Installing a memory module" on page 215). 3. Make sure that the DIMMs match and are installed in the correct sequence (see "Installing a memory module" on page 215). 4. Clear CMOS memory to ensure that all DIMM connectors are enabled (see "Removing the battery" on page 227 and "Installing the battery" on page 229). Note that all firmware settings will be reset to the default settings.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0058001	PFA threshold exceeded	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 215). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 236 and "Installing a microprocessor and heat sink" on page 238).
0058007	DIMM population is unsupported	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Reseat the DIMMs and restart the server (see "Removing a memory module (DIMM)" on page 215 and "Installing a memory module" on page 215). 2. Make sure that the DIMMs are installed in the proper sequence (see "Installing a memory module" on page 215).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0058008	DIMM failed memory test	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 215). 4. If the problem is related to a DIMM, replace the failing DIMM (see "Removing a memory module (DIMM)" on page 215 and "Installing a memory module" on page 215). 5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 7. (Trained service technician only) If the problem is related to microprocessor socket pins, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 8. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 236 and "Installing a microprocessor and heat sink" on page 238).
0058015	Start to Activate Spare Memory Channel	Information only. A failed DIMM has been detected to activate the memory online-spare feature. Check the event log for uncorrected DIMM failure events.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
00580A1	Invalid DIMM population for mirroring mode	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. If a fault LED is lit, resolve the failure. 2. Install the DIMMs in the correct sequence (see "Installing a memory module" on page 215).
00580A4	Memory population changed	Information only. Memory has been added, moved, or changed.
00580A5	Mirror failover complete	Information only. Memory redundancy has been lost. Check the event log for uncorrected DIMM failure events (See "Event logs" on page 26 for more information).
00580A6	Spare Memory Channel Activated	Information only. Memory online-spare channel has been activated to backup a failed DIMM. Check the event log for uncorrected DIMM failure events.
0068002	CMOS battery cleared	1. Reseat the battery. 2. Clear the CMOS memory (see "System-board switches and jumpers" on page 17). 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Battery b. (Trained service technician only) System board
2011000	PCI-X PERR	1. Check the riser-card LEDs. 2. Reseat all affected adapters and riser cards. 3. Update the PCI device firmware. 4. Remove both adapters from the riser card. 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. Riser card b. (Trained service technician only) System board

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
2011001	PCI-X SERR	1. Check the riser-card LEDs. 2. Reseat all affected adapters and riser cards. 3. Update the PCI device firmware. 4. Remove the adapter from the riser card. 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. Riser card b. (Trained service technician only) System board
2018001	PCI Express uncorrected or uncorrected error	1. Check the riser-card LEDs. 2. Reseat all affected adapters and riser cards. 3. Update the PCI device firmware. 4. Remove both adapters from the riser card. 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. Riser card b. (Trained service technician only) System board

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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. 1. If possible, rearrange the order of the adapters in the PCI slots to change the load order of the optional-device ROM code. 2. Run the Setup utility, select **Start Options**, and change the boot priority to change the load order of the optional-device ROM code. 3. Run the Setup utility and disable some other resources, if their functions are not being used, to make more space available: a. Select **Start Options** and **Planar Ethernet (PXE/DHCP)** to disable the integrated Ethernet controller ROM. b. Select **Advanced Functions**, then **PCI Bus Control**, then **PCI ROM Control Execution** to disable the ROM of adapters in the PCI slots. c. Select **Devices and I/O Ports** to disable any of the integrated devices. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Each adapter b. (Trained service technician only) System board
3*xx*0007 (*xx* can be 00 - 19)	Firmware fault detected, system halted	1. Recover the server firmware to the latest level. 2. Undo any recent configuration changes, or clear CMOS memory to restore the settings to the default values. 3. Remove any recently installed hardware.
3038003	Firmware corrupted	1. Run the Setup utility, select **Load Default Settings**, and save the settings to recover the server firmware. 2. (Trained service technician only) Replace the system board.
3048005	Booted secondary (backup) server firmware image	Information only. The backup switch was used to boot the secondary bank.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
3048006	Booted secondary (backup) server firmware image because of ABR	1. Run the Setup utility, select **Load Default Settings**, and save the settings to recover the primary server firmware settings. 2. Turn off the server and remove it from the power source. 3. Reconnect the server to the power source, and then turn on the server.
305000A	RTC date/time is incorrect	1. Adjust the date and time settings in the Setup utility, and then restart the server. 2. Reseat the battery. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Battery b. (Trained service technician only) System board
3058001	System configuration invalid	1. Run the Setup utility, and select **Save Settings**. 2. Run the Setup utility, select **Load Default Settings**, and save the settings. 3. Reseat the following components one at a time in the order shown, restarting the server each time: a. Battery b. Failing device (if the device is a FRU, then it must be reseated by a trained service technician only) 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Battery b. Failing device (if the device is a FRU, then it must be replaced by a trained service technician only) c. (Trained service technician only) System board

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
3058004	Three boot failures	1. Undo any recent system changes, such as new settings or newly installed devices. 2. Make sure that the server is attached to a reliable power source. 3. Remove all hardware that is not listed on the ServerProven Web site. 4. Make sure that the operating system is not corrupted. 5. Run the Setup utility, save the configuration, and then restart the server. 6. See "Problem determination tips" on page 154.
3108007	System configuration restored to default settings	Information only. This is message is usually associated with the CMOS battery clear event.
3138002	Boot configuration error	1. Remove any recent configuration changes that you made in the Setup utility. 2. Run the Setup utility, select **Load Default Settings**, and save the settings.
3808000	IMM communication failure	1. Shut down the system and remove the power cords from the server for 30 seconds; then, reconnect the server to power and restart it. 2. Update the IMM firmware. 3. Make sure that the virtual media key is seated and not damaged. 4. (Trained service technician only) Replace the system board.
3808002	Error updating system configuration to IMM	1. Remove power from the server, and then reconnect the server to power and restart it. 2. Run the Setup utility and select **Save Settings**. 3. Update the firmware.
3808003	Error retrieving system configuration from IMM	1. Remove power from the server, and then reconnect the server to power and restart it. 2. Run the Setup utility and select **Save Settings**. 3. Update the IMM firmware.
3808004	IMM system event log full	• When out-of-band, use the IMM Web interface or IPMItool to clear the logs from the operating system. • When using the local console: 1. Run the Setup utility. 2. Select **System Event Log**. 3. Select **Clear System Event Log**. 4. 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
3818001	Core Root of Trust Measurement (CRTM) update failed	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the system board.
3818002	Core Root of Trust Measurement (CRTM) update aborted	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the system board.
3818003	Core Root of Trust Measurement (CRTM) flash lock failed	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the system board.
3818004	Core Root of Trust Measurement (CRTM) system error	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the system board.
3818005	Current Bank Core Root of Trust Measurement (CRTM) capsule signature invalid	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the system board.
3818006	Opposite bank CRTM capsule signature invalid	1. Switch the firmware bank to the backup bank. 2. Run the Setup utility, select **Load Default Settings**, and save the settings. 3. Switch the bank back to the current bank. 4. (Trained service technician only) Replace the system board.
3818007	CRTM update capsule signature invalid	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the system board.
3828004	AEM power capping disabled	1. Check the settings and the event logs. 2. Make sure that the Active Energy Manager feature is enabled in the Setup utility. Select **System Settings**, **Power**, **Active Energy**, and **Capping Enabled**. 3. Update the server firmware. 4. Update the IMM firmware.

Checkout procedure

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

About the checkout procedure

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

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

  Exception: If multiple error codes or light path diagnostics LEDs indicate a microprocessor error, the error might be in the microprocessor or in the microprocessor socket. See “Microprocessor problems” on page 51 for information about diagnosing microprocessor problems.
- Before you run the diagnostic programs, you must determine whether the failing server is part of a shared hard disk drive cluster (two or more servers sharing external storage devices). If it is part of a cluster, you can run all diagnostic programs except the ones that test the storage unit (that is, a hard disk drive in the storage unit) or the storage adapter that is attached to the storage unit. The failing server might be part of a cluster if any of the following conditions is true:
  - You have identified the failing server as part of a cluster (two or more servers sharing external storage devices).
  - One or more external storage units are attached to the failing server and at least one of the attached storage units is also attached to another server or unidentifiable device.
  - One or more servers are located near the failing server.

  Important: If the server is part of a shared hard disk drive cluster, run one test at a time. Do not run any suite of tests, such as “quick” or “normal” tests, because this might enable the hard disk drive diagnostic tests.
- If the server is halted and a POST error code is displayed, see “Event logs” on page 26. If the server is halted and no error message is displayed, see “Troubleshooting tables” on page 43 and “Solving undetermined problems” on page 153.
- For information about power-supply problems, see “Solving power problems” on page 152.
- For intermittent problems, check the error log; see “Event logs” on page 26 and “Diagnostic programs, messages, and error codes” on page 72.

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 69.
   b. Turn off the server and all external devices.
   c. Check all internal and external devices for compatibility at http://www.ibm.com/servers/eserver/serverproven/compat/us/.
   d. Make sure the server is cabled correctly.
   e. Check all cables and power cords.
   f. Set all display controls to the middle positions.
   g. Turn on all external devices.
   h. Turn on the server. If the server does not start, see “Troubleshooting tables” on page 43.
   i. 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 62).
   j. Check for the following results:
      - Successful completion of POST (see “POST” on page 26 for more information).
      - Successful completion of startup, which is indicated by a readable display of the operating-system desktop.

Troubleshooting tables

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

If you cannot find a problem in these tables, see “Running the diagnostic programs” on page 72 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 system-error LED on the operator information panel; if it is lit, check the LEDs on the system board (see “System-board LEDs” on page 20).
2. Remove the software or device that you just added.
3. Run the diagnostic tests to determine whether the server is running correctly.
4. Reinstall the new software or new device.

DVD drive problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, “Parts listing, Types 4255, 7945, and 7949 server,” on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The optional DVD drive is not recognized.	1. Make sure that: • The SATA channel to which the DVD drive is attached (primary) is enabled in the Setup utility. • All cables and jumpers are installed correctly (see “Internal cable routing and connectors” on page 172). • The signal cable and connector are not damaged and the connector pins are not bent. • All damaged parts are repaired or replaced. • The correct device driver is installed for the DVD drive. 2. Run the DVD drive diagnostic programs and select the optical drive test. See “Running the diagnostic programs” on page 72. 3. Reseat the following components: a. DVD drive b. DVD drive cable 4. Replace the components listed in step 3 one at a time, in the order shown, restarting the server each time.
The CD or DVD drive is not working correctly.	1. Clean the CD or DVD. 2. Replace the CD or DVD with new CD or DVD media 3. Run the DVD drive diagnostic programs. 4. Reseat the DVD drive. 5. Replace the DVD drive.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The DVD drive tray is not working.	1. Make sure that the server is turned on. 2. Insert the end of a straightened paper clip into the manual tray-release opening. 3. Reseat the DVD drive. 4. Replace the DVD drive.

General problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
A cover latch is broken, an LED is not working, or a similar problem has occurred.	If the part is a CRU, replace it. If the part is a FRU, the part must be replaced by a trained service technician.

Hard disk drive problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
A hard disk drive has failed, and the associated amber hard disk drive status LED is lit.	Replace the failed hard disk drive (see "Removing a hot-swap hard disk drive" on page 208 and "Installing a hot-swap hard disk drive" on page 208).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 installed hard disk drive is not recognized.	1. Observe the associated amber hard disk drive status LED. If the LED is lit, it indicates a drive fault. 2. If the LED is lit, remove the drive from the bay, wait 45 seconds, and reinsert the drive, making sure that the drive assembly connects to the hard disk drive backplane. 3. Observe the associated green hard disk drive activity LED and the amber status LED: • If the green activity LED is flashing and the amber status LED is not lit, the drive is recognized by the controller and is working correctly. Run the DSA hard disk drive test to determine whether the drive is detected. • If the green activity LED is flashing and the amber status LED is flashing slowly, the drive is recognized by the controller and is rebuilding. • If neither LED is lit or flashing, check the hard disk drive backplane (go to step 4). • If the green activity LED is flashing and the amber status LED is lit, replace the drive. If the activity of the LEDs remains the same, go to step 4. If the activity of the LEDs changes, return to step 1. 4. Make sure that the hard disk drive backplane is correctly seated. When it is correctly seated, the drive assemblies correctly connect to the backplane without bowing or causing movement of the backplane. 5. Move the hard disk drives to different bays to determine if the drive or the backplane is not functioning. 6. Reseat the backplane power cable and repeat steps 1 through 3. 7. Reseat the backplane signal cable and repeat steps 1 through 3. 8. Suspect the backplane signal cable or the backplane: • If the server has eight hot-swap bays: a. Replace the affected backplane signal cable. b. Replace the affected backplane. • If the server has 12 hot-swap bays: a. Replace the backplane signal cable. b. Replace the backplane. c. Replace the SAS expander card. 9. See "Problem determination tips" on page 154.
Multiple hard disk drives fail.	Make sure that the hard disk drive, SAS RAID controller, and server device drivers and firmware are at the latest level. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
Multiple hard disk drives are offline.	1. Review the storage subsystem logs for indications of problems within the storage subsystem, such as backplane or cable problems. 2. See "Problem determination tips" on page 154.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 replacement hard disk drive does not rebuild.	1. Make sure that the hard disk drive is recognized by the controller (the green hard disk drive activity LED is flashing). 2. Review the SAS RAID controller documentation to determine the correct configuration parameters and settings.
A green hard disk drive activity LED does not accurately represent the actual state of the associated drive.	1. If the green hard disk drive activity LED does not flash when the drive is in use, run the DSA Preboot diagnostic programs to collect error logs (see "Running the diagnostic programs" on page 72. 2. Use one of the following procedures: • If there is a hard disk error log, replace the affect hard disk drive. • If there is a no hard disk error log, replace the affect backplane.
An amber hard disk drive status LED does not accurately represent the actual state of the associated drive.	1. If the amber hard disk drive LED and the RAID controller software do not indicate the same status for the drive, complete the following steps: a. Turn off the server. b. Reseat the SAS controller. c. Reseat the backplane signal cable, backplane power cable, and SAS expander card (if the server has 12 drive bays). d. Reseat the hard disk drive. e. Turn on the server and observe the activity of the hard disk drive LEDs. 2. See "Problem determination tips" on page 154.

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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
If an optional hypervisor device is not listed in the expected boot order, doesn't appear in the list of boot devices at all, or a similar problem has occurred.	1. Make sure that the optional hypervisor device is selected on the boot menu (in the Setup utility and in F12). 2. Make sure that the hypervisor internal flash memory device is seated in the connector correctly (see "Removing a USB hypervisor memory key" on page 184 and "Installing a USB hypervisor memory key" on page 185). 3. See the documentation that comes with your optional hypervisor device for setup and configuration information. 4. Make sure that other software works on the server.

Intermittent problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
A problem occurs only occasionally and is difficult to diagnose.	1. Make sure that: • All cables and cords are connected securely to the rear of the server and attached devices. • When the server is turned on, air is flowing from the fan grille. If there is no airflow, the fans are not working. This can cause the server to overheat and shut down. 2. Check the system event log or IMM event log (see "Event logs" on page 26). 3. Make sure that the server and IMM firmware has been updated to the most recent code levels. 4. Review the operating system logs. 5. Contact your operating-system vendor to set up any available tools that are capable of monitoring the server. 6. If an error occurs, run the DSA program and forward the results to IBM service and support for analysis. 7. See "Solving undetermined problems" on page 153.
The server resets (restarts) occasionally.	1. If the reset occurs during POST and the POST watchdog timer is enabled (click **Advanced Setup --> Integrated Management Module (IMM) Setting --> IMM Post Watchdog** in the Setup utility to see the POST watchdog setting), make sure that sufficient time is allowed in the watchdog timeout value (**IMM POST Watchdog Timeout**). See the *Installation and User's Guide* for information about the settings in the Setup utility. If the server continues to reset during POST, see "POST" on page 26 and "Diagnostic programs, messages, and error codes" on page 72. 2. If the reset occurs after the operating system starts, disable any automatic server restart (ASR) utilities, such as the IBM Automatic Server Restart IPMI Application for Windows, or any ASR devices that are installed. **Note:** ASR utilities operate as operating-system utilities and are related to the IPMI device driver. If the reset continues to occur after the operating system starts, the operating system might have a problem; see "Software problems" on page 61. 3. If neither condition applies, check the system-event log (see "Event logs" on page 26).

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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
All or some keys on the keyboard do not work.	1. If you have installed a USB keyboard, run the Setup utility and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup. 2. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for keyboard compatibility. 3. Make sure that: • The keyboard cable is securely connected. • The server and the monitor are turned on. 4. Move the keyboard cable to a different USB connector. 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. Keyboard b. (Only if the problem occurred with a front USB connector) Internal USB cable c. (Trained service technician only) System board
The USB mouse or USB pointing device does not work.	1. Make sure that: • The mouse is compatible with the server. See http://www.ibm.com/servers/eserver/serverproven/compat/us/. • The mouse or pointing-device USB cable is securely connected to the server, and the device drivers are installed correctly. • The server and the monitor are turned on. 2. If a USB hub is in use, disconnect the USB device from the hub and connect it directly to the server. 3. Move the mouse or pointing device cable to another USB connector. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Mouse or pointing device b. (Only if the problem occurred with a front USB connector) Internal USB cable c. (Trained service technician only) System board

Memory problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **For additional memory troubleshooting information, refer to the "Troubleshooting Memory - IBM BladeCenter and System x" document at http://www-947.ibm.com/support/entry/portal/docdisplay?brand=5000020&Indocid=MIGR-5081319.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The amount of system memory that is displayed is less than the amount of installed physical memory.	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Make sure that: • No error LEDs are lit on the operator information panel. • Memory mirroring does not account for the discrepancy. • The memory modules are seated correctly. • You have installed the correct type of memory (see "Installing a memory module" on page 215). • If you changed the memory, you updated the memory configuration in the Setup utility. • All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled. 2. Check the POST event log for error message 289: • If a DIMM was disabled by a systems-management interrupt (SMI), replace the DIMM. • If a DIMM was disabled by the user or by POST, run the Setup utility and enable the DIMM. 3. Run memory diagnostics (see "Running the diagnostic programs" on page 72). 4. Make sure that there is no memory mismatch when the server is at the minimum memory configuration (one 1 GB DIMM in slot 3). 5. Add one pair of DIMMs at a time, making sure that the DIMMs in each pair match. Install the DIMMs in the sequence that is described in "Installing a memory module" on page 215. 6. Reseat the DIMMs, and then restart the server. 7. Reverse the DIMMs between the channels (of the same microprocessor), and then restart the server. If the problem is related to a DIMM, replace the failing DIMM. 8. (Trained service technician only) Install the failing DIMM into a DIMM connector for microprocessor 2 (if installed) to verify that the problem is not the microprocessor or the DIMM connector. 9. (Trained service technician only) Replace the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **For additional memory troubleshooting information, refer to the "Troubleshooting Memory - IBM BladeCenter and System x" document at http://www-947.ibm.com/support/entry/portal/docdisplay?brand=5000020&Indocid=MIGR-5081319.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
Multiple rows of DIMMs in a branch are identified as failing.	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Reseat the DIMMs; then, restart the server. 2. Remove the lowest-numbered DIMM pair of those that are identified and replace it with an identical pair of known good DIMMs; then, restart the server. Repeat as necessary. If the failures continue after all identified pairs are replaced, go to step 4. 3. Return the removed DIMMs, one pair at a time, to their original connectors, restarting the server after each pair, until a pair fails. Replace each DIMM in the failed pair with an identical known good DIMM, restarting the server after each DIMM. Replace the failed DIMM. Repeat step 3 until you have tested all removed DIMMs. 4. Replace the lowest-numbered DIMM pair of those identified; then, restart the server. Repeat as necessary. 5. Reverse the DIMMs between the channels (of the same microprocessor), and then restart the server. If the problem is related to a DIMM, replace the failing DIMM. 6. (Trained service technician only) Install the failing DIMM into a DIMM connector for microprocessor 2 (if installed) to verify that the problem is not the microprocessor or the DIMM connector. 7. (Trained service technician only) Replace the system board.
Multiple rows of DIMMs in a branch are identified as failing. **Note:** The highest-numbered DIMM failed disabling other DIMM(s) in the same channel.	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Reseat the DIMMs; then, restart the server. 2. Remove the DIMM with lit error LED and replace it with an identical known good DIMM; then, restart the server. Repeat as necessary. If the failures continue after all identified DIMMs are replaced, go to step 4. 3. Return the removed DIMMs, one at a time, to their original connectors, restarting the server after each DIMM, until a DIMM fails. Replace each failing DIMM with an identical known good DIMM, restarting the server after each DIMM replacement. Repeat step 3 until you have tested all removed DIMMs. 4. Replace the DIMM with lit error LED; then, restart the server. Repeat as necessary. 5. Reverse the DIMMs between the channels (of the same microprocessor), and then restart the server. If the problem is related to a DIMM, replace the failing DIMM. 6. (Trained service technician only) Install the failing DIMM into a DIMM connector for microprocessor 2 (if installed) to verify that the problem is not the microprocessor or the DIMM connector. 7. (Trained service technician only) Replace the system board.

Microprocessor problems

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.** • **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**	
Symptom	**Action**
The server goes directly to the POST Event Viewer when turned on.	1. Correct any errors that are indicated by the LEDs (see "Light path diagnostics LEDs" on page 65). 2. Make sure that the server supports all the microprocessors and that the microprocessors match in speed and cache size. To compare the microprocessor information, run the Setup utility and select **System Information**, then select **System Summary** , and then **Processor Details**. 3. (Trained service technician only) Reseat the microprocessors. 4. (Trained service technician only) Remove microprocessor 2 and restart the server. 5. (Trained service technician only) Replace the following components, in the order shown, restarting the server each time: • Microprocessors • 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.** • **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**	
Symptom	**Action**
Testing the monitor.	1. Make sure that the monitor cables are firmly connected. 2. Try using the other video port. 3. Try using a different monitor on the server, or try testing the monitor on a different server. 4. Run the diagnostic programs (see "Running the diagnostic programs" on page 72). If the monitor passes the diagnostic programs, the problem might be a video device driver. 5. (Trained service technician only) Replace the system board

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The screen is blank.	1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the monitor cable directly to the correct connector on the rear of the server. 2. The IMM remote presence function is disabled if you install an optional video adapter. To use the IMM remote presence function, remove the optional video adapter. 3. Make sure that: • The server is turned on. If there is no power to the server, see "Power problems" on page 55. • The monitor cables are connected correctly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. 4. Make sure that the correct server is controlling the monitor, if applicable. 5. Make sure that damaged server firmware is not affecting the video; see "Recovering the server firmware" on page 109 for information about recovering from server firmware failure. 6. Observe the checkpoint LEDs on the light path diagnostics panel; if the codes are changing, go to the next step. 7. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor b. Video adapter (if one is installed) c. (Trained service technician only) System board 8. See "Solving undetermined problems" on page 153 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: • The application program is not setting a display mode that is higher than the capability of the monitor. • You installed the necessary device drivers for the application. 2. Run video diagnostics (see "Running the diagnostic programs" on page 72). • If the server passes the video diagnostics, the video is good; see "Solving undetermined problems" on page 153 for information about solving undetermined problems. • If the server fails the video diagnostics, (trained service technician only) replace the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	1. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. **Attention:** Moving a color monitor while it is turned on might cause screen discoloration. Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor. **Notes:** a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.). b. Non-IBM monitor cables might cause unpredictable problems. 2. Reseat the monitor cable 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor cable b. Video adapter (if one is installed) c. Monitor 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. 2. Reseat the monitor cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor b. (Trained service technician only) System board

Optional-device problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
An IBM optional device that was just installed does not work.	1. Make sure that: • The device is designed for the server (see http://www.ibm.com/servers/eserver/serverproven/compat/us/). • You followed the installation instructions that came with the device and the device is installed correctly. • You have not loosened any other installed devices or cables. • You updated the configuration information in the Setup utility. Whenever memory or any other device is changed, you must update the configuration. 2. Reseat the device that you just installed. 3. Replace the device that you just installed.
An IBM optional device that used to work does not work now.	1. Make sure that all of the hardware and cable connections for the device are secure. 2. If the device comes with test instructions, use those instructions to test the device. 3. Reseat the failing device. 4. Follow the instructions for device maintenance, such as keeping the heads clean, and troubleshooting in the documentation that comes with the device. 5. Replace the failing device.

Power problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The power-control button does not work, and the reset button does not work (the server does not start). **Note:** The power-control button will not function until approximately 3 minutes after the server has been connected to power.	1. Make sure Make sure that both power supplies installed in the server are of the same type. Mixing different power supplies in the server will cause a system error (the system-error LED on the front panel turns on and the PS and CNFG LEDs on the operator information panel are lit). 2. Make sure that: • The power cords are correctly connected to the server and to a working electrical outlet. • The type of memory that is installed is correct. • The LEDs on the power supply do not indicate a problem (see "Power-supply LEDs" on page 69). • The microprocessors are installed in the correct sequence. 3. Make sure that the power-control button and the reset button are working correctly: a. Disconnect the server power cords. b. Reseat the operator information panel assembly cable. c. Reconnect the power cords. d. Press the power-control button to restart the server. If the button does not work, replace the operator information panel assembly. e. Press the reset button (on the light path diagnostics panel) to restart the server. If the button does not work, replace the operator information panel assembly. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Hot-swap power supplies b. (Trained service technician only) System board 5. See "Solving power problems" on page 152. 6. See "Solving undetermined problems" on page 153.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The OVER SPEC LED on the light path diagnostics panel is lit, and the 12v channel A LED on the system board is lit.	1. Disconnect the server power cords. 2. Remove the following components: • Optical drive • Fans • Hard disk drives • Hard disk drive backplanes 3. Restart the server. If the OVER SPEC and 12v channel LEDs are still lit, (trained service technician only) replace the system board. 4. Reinstall the components listed in step 2 one at a time, in the order shown, restarting the server each time. If the 12v channel A LED is lit, the component that you just reinstalled is defective. Replace the defective component. • Fans • Hard disk drive backplanes • Hard disk drives • Optical drive 5. (Trained service technician only) Replace the system board.
The OVER SPEC LED on the light path diagnostics panel is lit, and the 12v channel B LED on the system board is lit.	1. Disconnect the server power cords. 2. Remove the following components: • PCI riser-card assembly in PCI connector 1 on the system board • All DIMMs • (Trained service technician only) Microprocessor 2 3. Restart the server. If the OVER SPEC and 12v channel LEDs are still lit, (trained service technician only) replace the system board. 4. Reinstall the components listed in step 2 one at a time, in the order shown, restarting the server each time. If the 12v channel B LED is lit, the component that you just reinstalled is defective. Replace the defective component. • (Trained service technician only) Microprocessor 2 • All DIMMs • PCI riser-card assembly in PCI connector 1 5. (Trained service technician only) Replace the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The OVER SPEC LED on the light path diagnostics panel is lit, and the 12v channel C LED on the system board is lit.	1. Disconnect the server power cords. 2. Remove the following components: • Tape drive, if one is installed (see "Removing a tape drive" on page 212for more information) • SAS riser-card assembly • DIMMs 1 through 9 • (Trained service technician only) Microprocessor 1 3. Move switch 2 on switch block 4 (SW4) to the On position to force power on; then, restart the server. If the OVER SPEC and 12v channel LEDs are still lit, (trained service technician only) replace the system board. 4. Reinstall the components listed in step 2 one at a time, in the order shown, restarting the server each time. If the 12v channel C LED is lit, the component that you just reinstalled is defective. Replace the defective component. • (Trained service technician only) Microprocessor 1 • DIMMs 1 through 9 • SAS riser-card assembly • Tape drive, if one is installed (see "Installing a tape drive" on page 214 for more information)
The OVER SPEC LED on the light path diagnostics panel is lit, and the 12v channel D LED on the system board is lit.	1. Disconnect the server power cords. 2. (Trained service technician only) Remove microprocessor 1. 3. Move switch 2 on switch block 4 (SW4) to the On position to force power on; then, restart the server. If the OVER SPEC and 12v channel LEDs are still lit, (trained service technician only) replace the system board. 4. (Trained service technician only) Move switch on switch block back to the Off position; then, reinstall microprocessor 1. 5. Restart the server. If the 12v channel D LED is lit, (trained service technician only) replace microprocessor 1.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The OVER SPEC LED on the light path diagnostics panel is lit, and the 12v channel E LED on the system board is lit.	1. Disconnect the server power cords. 2. Remove the following components: • Optional PCI video graphics adapter power cable, if one is installed (connector J154 on the system board) • Optional PCI video graphics adapter, if one is installed • PCI riser-card assembly in PCI connector 2 on the system board • (Trained service technician only) Microprocessor 2 3. Restart the server. If the OVER SPEC and 12v channel LEDs are still lit, (trained service technician only) replace the system board. 4. Reinstall the components listed in step 2 one at a time, in the order shown, restarting the server each time. If the 12v channel E LED is lit, the component that you just reinstalled is defective. Replace the defective component. a. (Trained service technician only) Microprocessor 2 b. PCI riser-card assembly in PCI connector 2 on the system board c. Optional PCI video graphics adapter, if one was installed d. Power cable from optional PCI video graphics adapter to connector J154 on the system board, if you removed one in step 2.
The OVER SPEC LED on the light path diagnostics panel is lit, and the 240 V AUX failure LED on the system board is lit.	1. Disconnect the server power cords. 2. Remove the following components: • All PCI adapters and PCI riser-card assemblies • SAS riser-card assembly • Operator information panel assembly • Optional two-port Ethernet adapter, if installed 3. Move switch 2 on switch block 4 (SW4) to the On position to force power on; then, restart the server. If the OVER SPEC and the 240 V ac AUX failure LEDs are still lit, (trained service technician only) replace the system board. 4. Reinstall the components listed in step 2, one at a time, in the order shown, restarting the server each time. If the 240 V ac AUX failure LED is lit, the component that you just reinstalled is defective. Replace the defective component. • Operator information panel assembly • SAS riser-card assembly • Optional two-port Ethernet adapter, if installed • All PCI adapters and PCI riser-card assemblies
The server does not turn off.	1. Turn off the server by pressing the power-control button for 5 seconds. 2. Restart the server. 3. If the server fails POST and the power-control button does not work, disconnect the power cord for 20 seconds; then, reconnect the power cord and restart the server. 4. If the problem remains, suspect the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The server unexpectedly shuts down, and the LEDs on the operator information panel are not lit.	See "Solving undetermined problems" on page 153.

Serial 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The number of serial ports that are identified by the operating system is less than the number of installed serial ports.	1. Make sure that: • Each port is assigned a unique address in the Setup utility and none of the serial ports is disabled. • The serial-port adapter (if one is present) is seated correctly. 2. Reseat the serial port adapter, if one is present. 3. Replace the serial port adapter, if one is present.
A serial device does not work.	1. Make sure that: • The device is compatible with the server. • The serial port is enabled and is assigned a unique address. • The device is connected to the correct connector (see "Rear view" on page 12). 2. Reseat the following components: a. Failing serial device b. Serial cable 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Failing serial device b. Serial cable c. (Trained service technician only) System board

ServerGuide problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
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. 2. If the startup (boot) sequence settings have been changed, make sure that the CD or DVD drive is first in the startup sequence. 3. If more than one CD or DVD drive is installed, make sure that only one drive is set as the primary drive. Start the CD from the primary drive.
The ServeRAID program cannot view all installed drives, or the operating system cannot be installed.	1. Make sure that there are no duplicate IRQ assignments. 2. Make sure that the hard disk drive is connected correctly. 3. Make sure that the hard disk drive cables are securely connected (see "Internal cable routing and connectors" on page 172).
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. For a list of supported operating-system versions, go to http://www.ibm.com/systems/management/serverguide/sub.html, click **IBM Service and Support Site**, click the link for your ServerGuide version, and scroll down to the list of supported Microsoft Windows operating systems.
The operating system cannot be installed; the option is not available.	Make sure that the server supports the operating system. If it does, no logical drive is defined (RAID servers). 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
You suspect a software problem.	1. To determine whether the problem is caused by the software, make sure that: • The server has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software. If you have just installed an adapter or memory, the server might have a memory-address conflict. • The software is designed to operate on the server. • Other software works on the server. • The software works on another server. 2. If you received any error messages when using the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem. 3. Contact the software vendor.

Universal Serial Bus (USB) port problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
A USB device does not work.	1. Make sure that: • The correct USB device driver is installed. • The operating system supports USB devices. 2. Make sure that the USB configuration options are set correctly in the Setup utility menu (see the *Installation and User's Guide* for more information). 3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server. 4. Move the device cable to a different USB connector.

Video problems

See "Monitor or video problems" on page 51.

Light path diagnostics

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

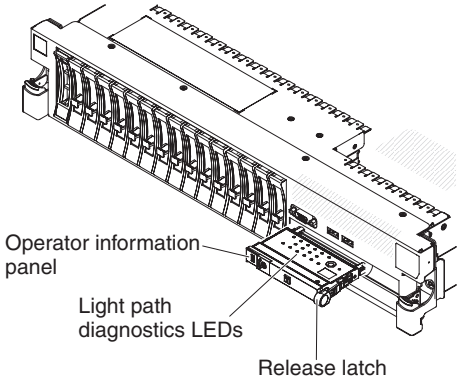
When LEDs are lit to indicate an error, they remain lit when the server is turned off, provided that the server is still connected to power and the power supply is operating correctly.

Before you work inside the server to view light path diagnostics LEDs, read the safety information that begins on page vii and “Handling static-sensitive devices” on page 171.

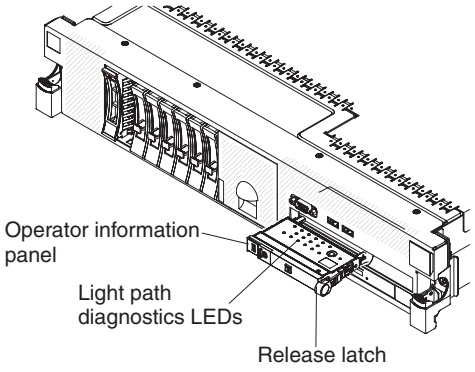
If an error occurs, view the light path diagnostics LEDs in the following order:

1. Look at the operator information panel on the front of the server.
   - If the information LED is lit, it indicates that information about a suboptimal condition in the server is available in the IMM event log or in the system event log.
   - 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.

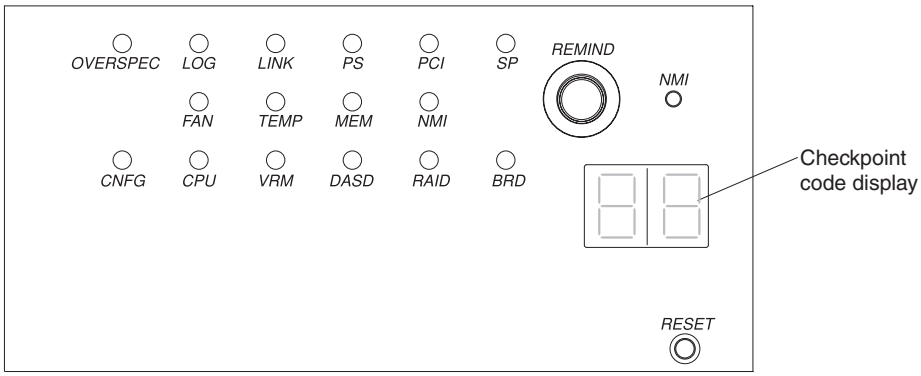


2. To view the light path diagnostics panel, slide the latch to the left on the front of the operator information panel and pull the panel forward. This reveals the light path diagnostics panel. Lit LEDs on this panel indicate the type of error that has occurred.



   The following illustration shows the light path diagnostics panel.

A checkpoint code is either a byte or a word value produced by server firmware and sent to the I/O port indicating the point at which the system stopped during the boot block and power-on self test (POST). It does not provide error codes or suggest replacement components. These codes can be used by IBM service and support for more in-depth troubleshooting.



Note any LEDs that are lit, and then push the light path diagnostics panel back into the server.

Notes:

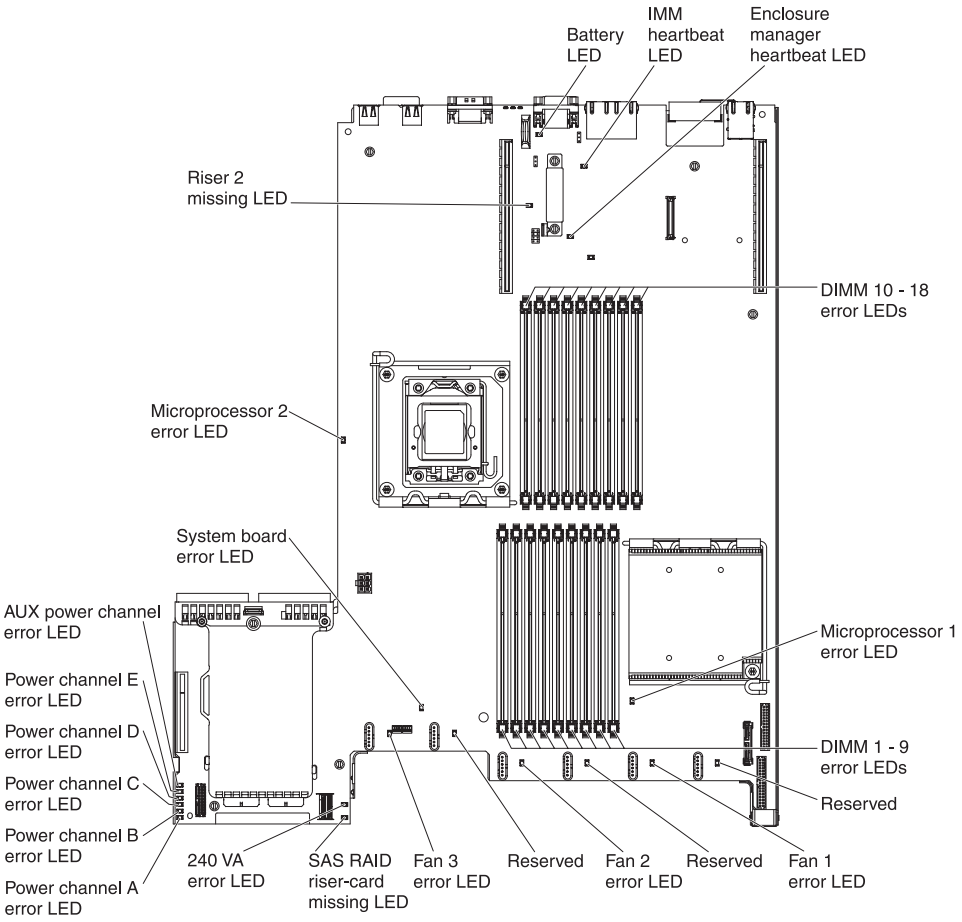
a. Do not run the server for an extended period of time while the light path diagnostics panel is pulled out of the server.

b. Light path diagnostics LEDs remain lit only while the server is connected to power.

Look at the system service label on the top of the server, which gives an overview of internal components that correspond to the LEDs on the light path diagnostics panel. This information and the information in “Light path diagnostics LEDs” on page 65 can often provide enough information to diagnose the error.

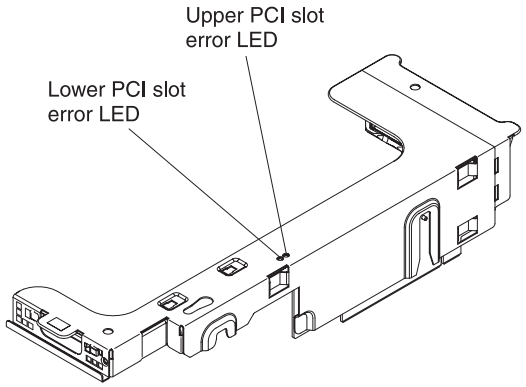
3. Remove the server cover and look inside the server for lit LEDs. A lit LED on or beside a component identifies the component that is causing the error.

   The following illustration shows the LEDs on the system board.



12v channel error LEDs indicate an overcurrent condition. Table 11 on page 152 identifies the components that are associated with each power channel, and the order in which to troubleshoot the components.

The following illustration shows the LEDs on the riser card.



Remind button

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

- All known errors are corrected.

- The server is restarted.
- A new error occurs, causing the system-error LED to be lit again.

Light path diagnostics LEDs

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 and the IMM event log for additional information before you replace a FRU.

LED	Problem	Action
None, but the system-error LED is lit.	An error has occurred and cannot be diagnosed, or the IMM has failed. The error is not represented by a light path diagnostics LED.	Use the Setup utility to check the system-event log for information about the error.
BRD	An error has occurred on the system board.	1. Check the LEDs on the system board to identify the component that is causing the error. The BRD LED can be lit for the following conditions: • Battery • Missing PCI riser-card assembly • Failed voltage regulator 2. Check the system-event log for information about the error. 3. Replace any failed or missing replaceable components, such as the battery (see “Removing the battery” on page 227 for more information) or PCI riser-card assembly (see “Removing a PCI riser-card assembly” on page 186 for more information). 4. If a voltage regulator has failed, replace the system board.
CNFG	A hardware configuration error has occurred. (This LED is used with the MEM and CPU LEDs.)	1. If the CNFG LED and the CPU LED are lit, complete the following steps: 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 238 for additional information about microprocessor requirements). b. (Trained service technician only) Replace the incompatible microprocessor. c. Check the system-error logs for information about the error. Replace any components that are identified in the error log. 2. If the CNFG LED and the MEM LED are lit, complete the following steps: a. Check the system-event log in the Setup utility or IMM error messages. Follow steps indicated in “POST error codes” on page 28 and “Integrated management module error messages” on page 113.

LED	Problem	Action
CPU	When only the CPU LED is lit, a microprocessor has failed. When the CPU and CNFG LEDs are lit, an invalid microprocessor configuration has occurred.	1. Determine whether the CNFG LED is also lit. If the CNFG LED is not lit, a microprocessor has failed. a. Make sure that the failing microprocessor, which is indicated by a lit LED on the system board, is installed correctly. See “Installing a microprocessor and heat sink” on page 238 for information about installing a microprocessor. b. If the failure remains, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL for additional troubleshooting information. 2. If the CNFG LED is lit, then an invalid microprocessor configuration has occurred. a. Make sure that the microprocessors are compatible with each other. They must match in speed and cache size. To compare the microprocessor information, run the Setup utility and select **System Information**, then select **System Summary**, and then select **Processor Details**. b. (Trained service technician only) Replace an incompatible microprocessor. c. If the failure remains, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL for additional troubleshooting information.
DASD	A hard disk drive error has occurred. A hard disk drive has failed or is missing.	1. Check the LEDs on the hard disk drives for the drive with a lit status LED and reseat the hard disk drive. 2. Reseat the hard disk drive backplane. 3. For more information, see “Hard disk drive problems” on page 44. 4. If the error remains, replace the following components in the order listed, restarting the server after each: a. Replace the hard disk drive (see “Removing a hot-swap hard disk drive” on page 208 for more information). b. Replace the hard disk drive backplane (see “Removing the SAS hard disk drive backplane” on page 233 for more information). 5. If the problem remains, go to http://www.ibm.com/support/docview.wss?uid=psg1SERVCALL.
FAN	A fan has failed, is operating too slowly, or has been removed. The TEMP LED might also be lit.	1. Reseat the failing fan, which is indicated by a lit LED near the fan connector on the system board.. 2. Replace the failing fan, which is indicated by a lit LED near the fan connector on the system board (see “Removing a hot-swap fan” on page 221 for more information). **Note:** If an LED that is next to an *unused* fan connector on the system board is lit, a PCI riser-card assembly might be missing; replace the PCI riser-card assembly. Both PCI riser-card assemblies must always be present.
LINK	Reserved.	

LED	Problem	Action
LOG	An error message has been written to the system-event log	Check the IMM system event log and the system-error log for information about the error. Replace any components that are identified in the error logs. (See “Event logs” on page 26 for more information.)
MEM	When only the MEM LED is lit, a memory error has occurred. When both the MEM and CNFG LEDs are lit, the memory configuration is invalid or the PCI Option ROM is out of resource.	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. If the MEM LED and the CNFG LED are lit, complete the following steps: a. Check the system-event log in the Setup utility or IMM error messages. Follow steps indicated in “POST error codes” on page 28 and “Integrated management module error messages” on page 113. 2. If the CNFG LED is not lit, the system might detect a memory error. Complete the following steps to correct the problem: a. Update the server firmware to the latest level (see “Updating the firmware” on page 251). b. Reseat the DIMM. c. Check the system-event log in the Setup utility or IMM error messages. Follow steps indicated in “POST error codes” on page 28 and “Integrated management module error messages” on page 113.
NMI	A nonmaskable interrupt has occurred, or the NMI button has been pressed.	Check the system-event log for information about the error.
OVER SPEC	The server was shut down because of a power-supply overload condition on one of the power channels. The power supplies are using more power than their maximum rating.	1. If any of the power channel error LEDs (A, B, C, D, E, or AUX) on the system board are lit also, see the section about power-channel error LEDs in “Power problems” on page 55. (See “Internal connectors, LEDs, and jumpers” on page 15 for the location of the power channel error LEDs.) 2. Check the power-supply LEDs for an error indication (AC LED and DC LED are not both lit, or the information LED is lit). Replace a failing power supply. 3. Remove optional devices from the server.
PCI	An error has occurred on a PCI bus or on the system board. An additional LED is lit next to a failing PCI slot.	1. Check the LEDs on the PCI slots to identify the component that is causing the error. 2. Check the system-event log for information about the error. 3. If you cannot isolate the failing adapter through the LEDs and the information in the system-event log, remove one adapter at a time from the failing PCI bus, and restart the server after each adapter is removed. 4. If the failure remains, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL for additional troubleshooting information.
PS	A power supply has failed. Power supply 1 or 2 has failed. When both the PS and CNFG LEDs are lit, the power supply configuration is invalid.	1. Check the power-supply that has an lit amber LED (see “Power-supply LEDs” on page 69). 2. Make sure that the power supplies are seated correctly. 3. Remove one of the power supplies to isolate the failed power supply. 4. Make sure that both power supplies installed in the server are of the same type. 5. Replace the failed power supply.

LED	Problem	Action
RAID	Reserved	
SP	The service processor (the IMM) has failed.	1. Remove power from the server; then, reconnect the server to power and restart the server. 2. Update the firmware on the IMM. 3. If the failure remains, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL for additional troubleshooting information.
TEMP	The system temperature has exceeded a threshold level. A failing fan can cause the TEMP LED to be lit.	1. Check the error log to identify where the over-temperature condition was measured. If a fan has failed, replace it. 2. Make sure that the room temperature is not too high. See “Features and specifications” on page 7 for temperature information. 3. Make sure that the air vents are not blocked. 4. If the failure remains, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL for additional troubleshooting information.
VRM	Reserved.	

Power-supply LEDs

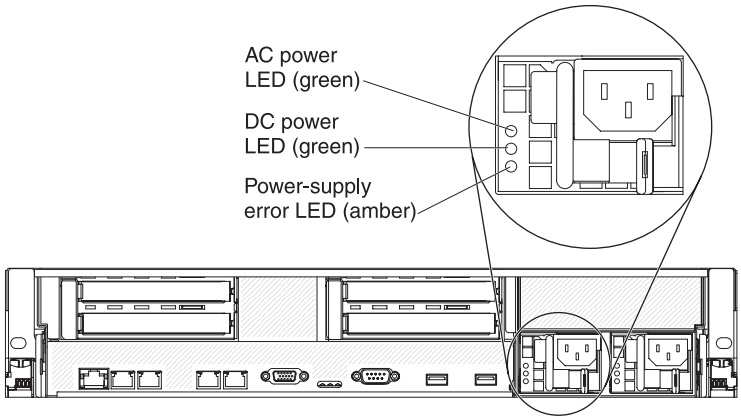
The following minimum configuration is required for the DC LED on the power supply to be lit:

- Power supply
- Power cord

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

- One microprocessor (slot 1)
- One 2 GB DIMM per microprocessor on the system board (slot 3 if only one microprocessor is installed)
- One power supply
- Power cord
- Three cooling fans
- One PCI riser-card assembly in PCI riser connector 2

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 8. Power-supply LEDs

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

AC power-supply LEDs					
AC	**DC**	**Error**	**Description**	**Action**	**Notes**
Off	Off	Off	No ac power to the server or a problem with the ac power source	1. Check the ac power to the server. 2. Make sure that the power cord is connected to a functioning power source. 3. Turn the server off and then turn the server back on. 4. If the problem remains, replace the power supply.	This is a normal condition when no ac power is present.
Off	Off	On	No ac power to the server or a problem with the ac power source and the power supply had detected an internal problem	1. Replace the power supply. 2. Make sure that the power cord is connected to a functioning power source.	This happens only when a second power supply is providing power to the server.
Off	On	Off	Faulty power supply	Replace the power supply.	
Off	On	On	Faulty power supply	Replace the power supply.	
On	Off	Off	Power-supply not fully seated, faulty system board, or faulty power-supply	1. (Trained service technician only) Reseat the power supply. 2. If a power channel error LED on the system board is not lit, replace the power-supply (see the documentation that comes with the power supply for instructions). 3. If a power channel error LED on the system board is lit, (trained service technician only) replace the system board.	Typically indicates that a power supply is not fully seated.
On	Off or Flashing	On	Faulty power supply	Replace the power supply.	
On	On	Off	Normal operation		
On	On	On	Power supply is faulty but still operational	Replace the power supply.	

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

DC power-supply LEDs			Description	Action	Notes
IN OK	**OUT OK**	**Error (!)**			
On	On	Off	Normal operation		
Off	Off	Off	No dc power to the server or a problem with the dc power source.	1. Check the dc power to the server. 2. Make sure that the power cord is connected to a functioning power source. 3. Restart the server. If the error remains, check the power-supply LEDs. 4. Replace the power-supply.	This is a normal condition when no dc power is present.
Off	Off	On	No dc power to the server or a problem with the dc power source and the power-supply had detected an internal problem.	• Make sure that the power cord is connected to a functioning power source. • Replace the power supply (see the documentation that comes with the power supply for instructions).	This happens only when a second power supply is providing power to the server.
Off	On	Off	Faulty power-supply	Replace the power supply.	
Off	On	On	Faulty power-supply	Replace the power supply.	
On	Off	Off	Power-supply not fully seated, faulty system board, or faulty power-supply	1. (Trained service technician only) Reseat the power supply. 2. If a power channel error LED on the system board is not lit, replace the power-supply (see the documentation that comes with the power supply for instructions). 3. If a power channel error LED on the system board is lit, (trained service technician only) replace the system board.	Typically indicates a power-supply is not fully seated.
On	Off	On	Faulty power-supply	Replace the power supply.	
On	On	On	Power-supply is faulty but still operational	Replace the power supply.	

Diagnostic programs, messages, and error codes

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

Make sure that the server has the latest version of the diagnostic programs. To download the latest version, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3650 M3** to display the matrix of downloadable files for the server.

Utilities are available to reset and update the code on the integrated USB flash device, if the diagnostic partition becomes damaged and does not start the diagnostic programs. For more information and to download the utilities, go to http://www.ibm.com/jct01004c/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5072294&brandind=5000008.

Running the diagnostic programs

To run the diagnostic programs, complete the following steps:

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

   Note: The DSA Preboot diagnostic program might appear to be unresponsive for an unusual length of time when you start the program. This is normal operation while the program loads. The loading process may take up to 10 minutes.
4. Optionally, select **Quit to DSA** to exit from the stand-alone memory diagnostic program.

   Note: After you exit from the stand-alone memory diagnostic environment, you must restart the server to access the stand-alone memory diagnostic environment again.
5. Type **gui** to display the graphical user interface, or select **cmd** to display the DSA interactive menu.
6. Follow the instructions on the screen to select the diagnostic test to run.

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

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

Exception: If multiple error codes or light path diagnostics LEDs indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 51 for information about diagnosing microprocessor problems.

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

Diagnostic text messages

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

Passed: The test was completed without any errors.

Failed: The test detected an error.

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

Additional information concerning test failures is available in the extended diagnostic results for each test.

Viewing the test log

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

Diagnostic messages

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

Table 9. DSA Preboot 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
089-801-xxx	CPU	CPU Stress Test	Aborted	Internal program error.	1. Turn off and restart the system. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 5. Run the test again. 6. Turn off and restart the system if necessary to recover from a hung state. 7. Run the test again. 8. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved: a. (Trained service technician only) Microprocessor board b. (Trained service technician only) Microprocessor 9. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
089-802-xxx	CPU	CPU Stress Test	Aborted	System resource availability error.	1. Turn off and restart the system. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 5. Run the test again. 6. Turn off and restart the system if necessary to recover from a hung state. 7. Run the test again. 8. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 9. Run the test again. 10. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved: a. (Trained service technician only) Microprocessor board b. (Trained service technician only) Microprocessor 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
089-901-xxx	CPU	CPU Stress Test	Failed	Test failure.	1. Turn off and restart the system if necessary to recover from a hung state. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 5. Run the test again. 6. Turn off and restart the system if necessary to recover from a hung state. 7. Run the test again. 8. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved: a. (Trained service technician only) Microprocessor board b. (Trained service technician only) Microprocessor 9. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-801-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the IMM returned an incorrect response length.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-802-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the test cannot be completed for an unknown reason.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-803-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the node is busy; try later.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-804-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: invalid command.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-805-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-806-xxx	IMM	IMM I2C Test	Aborted	IMM I2C 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-807-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-808-xxx	IMM	IMM I2C Test	Aborted	IMM I2C 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-809-xxx	IMM	IMM I2C Test	Aborted	IMM I2C 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-810-xxx	IMM	IMM I2C Test	Aborted	IMM I2C 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-811-xxx	IMM	IMM I2C Test	Aborted	IMM I2C 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-812-xxx	IMM	IMM I2C Test	Aborted	IMM I2C 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-813-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-814-xxx	IMM	IMM I2C Test	Aborted	IMM I2C 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-815-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-816-xxx	IMM	IMM I2C Test	Aborted	IMM I2C 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-817-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-818-xxx	IMM	IMM I2C Test	Aborted	IMM I2C 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-819-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
166-820-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code and IMM firmware are at the latest level. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-821-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: a command response could not be provided; IMM initialization is in progress.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-822-xxx	IMM	IMM I2C Test	Aborted	IMM I2C 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-823-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-824-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test canceled: cannot execute the command.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-901-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the H8 bus (Bus 0)	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. Shut down the system and remove the power cords from the server. 8. (Trained service technician only) Replace the system board. 9. Reconnect the system to power and turn on the system. 10. Run the test again. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-902-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. Reseat the light path diagnostics panel. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. Turn off the system and disconnect it from the power source. 12. (Trained service technician only) Replace the system board. 13. Reconnect the system to the power source and turn on the system. 14. Run the test again. 15. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-903-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the 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 IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. Disconnect the system from the power source. 8. Replace the DIMMs one at a time, and run the test again after replacing each DIMM. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. Turn off the system and disconnect it from the power source. 12. Reseat all of the DIMMs. 13. Reconnect the system to the power source and turn on the system. 14. Run the test again. 15. Turn off the system and disconnect it from the power source. 16. (Trained service technician only) Replace the system board. 17. Reconnect the system to the power source and turn on the system. 18. Run the test again. 19. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-904-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the power supply bus (Bus 3).	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. Reseat the power supply. 8. Run the test again. 9. Turn off the system and disconnect it from the power source. 10. Trained service technician only) Reseat the system board. 11. Reconnect the system to the power source and turn on the system. 12. Run the test again. 13. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-905-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the HDD bus (Bus 4).	**Note:** Ignore the error if the hard disk drive backplane is not installed. 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. Reseat the hard disk drive backplane. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. Turn off the system and disconnect it from the power source. 12. Trained service technician only) Replace the system board. 13. Reconnect the system to the power source and turn on the system. 14. Run the test again. 15. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-906-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory configuration bus (Bus 5).	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. Trained service technician only) Reseat the system board. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-801-xxx	Memory	Memory Test	Aborted	Test canceled: the server firmware programmed the memory controller with an invalid CBAR address	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
201-802-xxx	Memory	Memory Test	Aborted	Test canceled: the end address in the E820 function is less than 16 MB.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that all DIMMs are enabled in the Setup utility. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 5. Run the test again. 6. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-803-xxx	Memory	Memory Test	Aborted	Test canceled: could not enable the processor cache.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-804-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer request failed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
201-805-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller display/alter write operation was not completed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-806-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller fast scrub operation was not completed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-807-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer free request failed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
201-808-xxx	Memory	Memory Test	Aborted	Test canceled: memory controller display/alter buffer execute error.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-809-xxx	Memory	Memory Test	Aborted	Test canceled program error: operation running fast scrub.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 5. Run the test again. 6. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
201-810-xxx	Memory	Memory Test	Aborted	Test stopped: unknown error code xxx received in COMMONEXIT procedure.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 5. Run the test again. 6. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-901-xxx	Memory	Memory Test	Failed	Test failure: single-bit error, failing DIMM z.	1. Turn off the system and disconnect it from the power source. 2. Reseat DIMM z. 3. Reconnect the system to power and turn on the system. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. Replace the failing DIMMs. 8. Re-enable all memory in the Setup utility (see "Using the Setup utility" on page 253). 9. Run the test again. 10. Replace the failing DIMM. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
201-902-xxx	Memory	Memory Test	Failed	Test failure: single-bit and multi-bit error, failing DIMM z	1. Turn off the system and disconnect it from the power source. 2. Reseat DIMM z. 3. Reconnect the system to power and turn on the system. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 6. Run the test again. 7. Replace the failing DIMMs. 8. Re-enable all memory in the Setup utility see "Using the Setup utility" on page 253). 9. Run the test again. 10. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
202-801-xxx	Memory	Memory Stress Test	Aborted	Internal program error.	1. Turn off and restart the system. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 4. Run the test again. 5. Turn off and restart the system if necessary to recover from a hung state. 6. Run the memory diagnostics to identify the specific failing DIMM. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
202-802-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 "Using the Setup utility" on page 253). 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Run the test again. 4. Run the standard memory test to validate all memory. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
202-901-xxx	Memory	Memory Stress Test	Failed	Test failure.	1. Run the standard memory test to validate all memory. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Turn off the system and disconnect it from power. 4. Reseat the DIMMs. 5. Reconnect the system to power and turn on the system. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
215-801-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	Unable to communicate with the device driver.	1. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 6. Run the test again. 7. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 8. Run the test again. 9. Replace the CD/DVD drive. 10. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
215-802-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	The media tray is open.	1. Close the media tray and wait 15 seconds. 2. Run the test again. 3. Insert a new CD/DVD into the drive and wait for 15 seconds for the media to be recognized. 4. Run the test again. 5. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 6. Run the test again. 7. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 8. Run the test again. 9. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 10. Run the test again. 11. Replace the CD/DVD drive. 12. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
215-803-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Failed	The disc might be in use by the system.	1. Wait for the system activity to stop. 2. Run the test again 3. Turn off and restart the system. 4. Run the test again. 5. Replace the CD/DVD drive. 6. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
215-901-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	Drive media is not detected.	1. Insert a CD/DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 6. Run the test again. 7. Replace the CD/DVD drive. 8. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
215-902-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Failed	Read miscompare.	1. Insert a CD/DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 6. Run the test again. 7. Replace the CD/DVD drive. 8. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
215-903-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	Could not access the drive.	1. Insert a CD/DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 6. Run the test again. 7. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 8. Run the test again. 9. Replace the CD/DVD drive. 10. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
215-904-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Failed	A read error occurred.	1. Insert a CD/DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 6. Run the test again. 7. Replace the CD/DVD drive. 8. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
217-901-xxx	SAS/SATA Hard Drive	Disk Drive Test	Failed		1. Reseat all hard disk drive backplane connections at both ends. 2. Reseat the all drives. 3. Run the test again. 4. Make sure that the firmware is at the latest level. 5. Run the test again. 6. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
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 diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
405-901-xxx	Broadcom Ethernet Device	Test MII Registers	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
405-902-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 diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
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 diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 2. Run the test again. 3. Check the interrupt assignments in the PCI Hardware section of the DSA event log. If the Ethernet device is sharing interrupts, if possible, use the Setup utility see "Using the Setup utility" on page 253) to assign a unique interrupt to the device. 4. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
405-904-xxx	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 diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 2. Run the test again. 3. Check the interrupt assignments in the PCI Hardware section of the DSA event log. If the Ethernet device is sharing interrupts, if possible, use the Setup utility see "Using the Setup utility" on page 253) to assign a unique interrupt to the device. 4. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
405-906-xxx	Broadcom Ethernet Device	Test Loop back at Physical Layer	Failed		1. Check the Ethernet cable for damage and make sure that the cable type and connection are correct. 2. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 3. Run the test again. 4. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 9. DSA Preboot messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
405-907-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 diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
405-908-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 diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 251. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Tape alert flags

If a tape drive is installed in the server, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-5079217&brandind=5000008 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

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

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

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

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

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

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

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3650 M3** to display the matrix of downloadable files for the server.
5. Download the latest server firmware update.

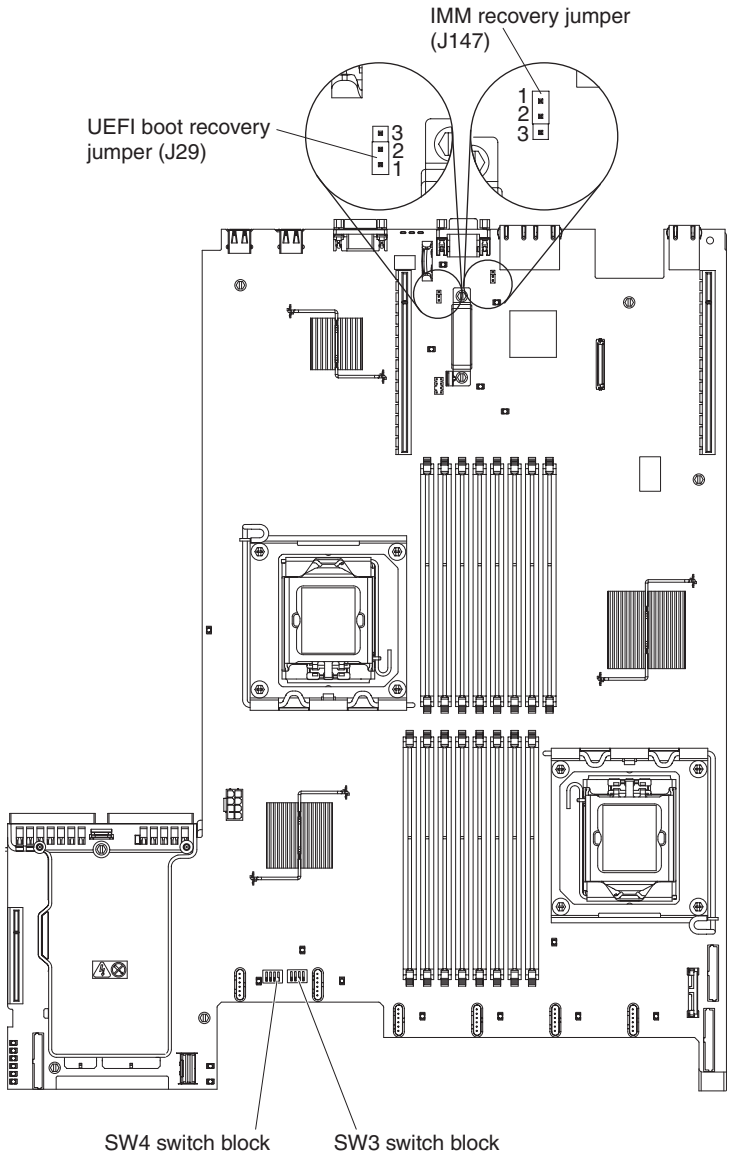
The flash memory of the server consists of a primary bank and a backup bank. It is essential that you maintain the backup bank with a bootable firmware image. If the primary bank becomes corrupted, you can either manually boot the backup bank with the boot block jumper, or in the case of image corruption,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

In-band manual recovery method

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

1. Turn off the server, and disconnect all power cords and external cables.
2. Remove the server cover. See “Removing the cover” on page 175 for more information.

3. Locate the UEFI boot recovery jumper block (J29) on the system board.



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 UEFI 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.

In-band automated boot recovery method

Note: Use this method if the BRD LED on the light path diagnostics panel is lit and there is a log entry or `Booting Backup Image` is displayed on the firmware splash screen; otherwise, use the in-band manual recovery method.

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

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

Automatic boot failure recovery (ABR)

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

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

Three boot failure

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

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

System event messages log

The system event messages log contains messages of three types:

Information
Information messages do not require action; they record significant system-level events, such as when the server is started.

Warning
Warning messages do not require immediate action; they indicate possible problems, such as when the recommended maximum ambient temperature is exceeded.

Error Error messages might require action; they indicate system errors, such as when a fan is not detected.

Each message contains date and time information, and it indicates the source of the message (POST or the IMM).

Integrated management module error messages

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message	Severity	Description	Action
Numeric sensor Ambient Temp going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	Reduce the ambient temperature.
Numeric sensor Ambient Temp going high (upper non-recoverable) has asserted.	Error	An upper nonrecoverable sensor going high has asserted.	Reduce the ambient temperature.
Numeric sensor Planar 3.3V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 3.3V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 5V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 5V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 12V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	Check the OVER SPEC LED and power-channel (A, B, C, D, E, and AUX) error LEDs on the system board. See the information about the OVER SPEC LED in "Light path diagnostics LEDs" on page 65.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Numeric sensor Planar 12V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	Check the OVER SPEC LED and power-channel (A, B, C, D, E, and AUX) error LEDs on the system board. See the information about the OVER SPEC LED in "Light path diagnostics LEDs" on page 65.
Numeric sensor Planar VBAT going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	Replace the 3 V battery.
Numeric sensor Fan *n*A Tach going low (lower critical) has asserted. (*n* = fan number)	Error	A lower critical sensor going low has asserted.	1. Reseat the failing fan *n*, which is indicated by a lit LED near the fan connector on the system board. 2. Replace the failing fan. (*n* = fan number)
Numeric sensor Fan *n*B Tach going low (lower critical) has asserted. (*n* = fan number)	Error	A lower critical sensor going low has asserted.	1. Reseat the failing fan *n*, which is indicated by a lit LED near the fan connector on the system board. 2. Replace the failing fan. (*n* = fan number)
The connector System board has encountered a configuration error.	Error	An interconnect configuration error has occurred.	Reseat the front video cable on the system board.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
The Processor CPU *n*Status has Failed with IERR. (*n* = microprocessor number)	Error	A processor failed - IERR condition has occurred.	1. Make sure that the latest levels of firmware and device drivers are installed for all adapters and standard devices, such as Ethernet, SCSI, and SAS. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Run the DSA program for the hard disk drives and other I/O devices. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
An Over-Temperature Condition has been detected on the Processor CPU *n*Status. (*n* = microprocessor number)	Error	An overtemperature condition has occurred for microprocessor *n*. (*n* = microprocessor number)	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n*is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
The Processor CPU *n*Status has Failed with FRB1/BIST condition. (*n* = microprocessor number)	Error	A processor failed - FRB1/BIST condition has occurred.	1. Check for a UEFI firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Make sure that the installed microprocessors are compatible with each other (see"Installing a microprocessor and heat sink" on page 238 for information about microprocessor requirements). 3. (Trained service technician only) Reseat microprocessor *n*. 4. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
The Processor CPU *n*Status has a Configuration Mismatch. (*n* = microprocessor number)	Error	A processor configuration mismatch has occurred.	1. Make sure that the installed microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 238 for information about microprocessor requirements). 2. (Trained service technician only) Replace the incompatible microprocessor.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
An SM BIOS Uncorrectable CPU complex error for Processor CPU *n*Status has asserted. (*n* = microprocessor number)	Error	An SMBIOS uncorrectable CPU complex error has asserted.	1. Check for a UEFI firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Make sure that the installed microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 238 for information about microprocessor requirements). 3. (Trained service technician only) Reseat microprocessor *n*. 4. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
Sensor CPU *n*OverTemp has transitioned to critical from a less severe state. (*n* = microprocessor number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Sensor CPU *n*OverTemp has transitioned to non-recoverable from a less severe state. (*n* = microprocessor number)	Error	A sensor has changed to Nonrecoverable state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
Sensor CPU *n*OverTemp has transitioned to critical from a non-recoverable state. (*n* = microprocessor number)	Error	A sensor has changed to Critical state from Nonrecoverable state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n*is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
Sensor CPU *n*OverTemp has transitioned to non-recoverable. (*n* = microprocessor number)	Error	A sensor has changed to Nonrecoverable state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
The Processor CPU *n* is operating in a Degraded State. (*n* = microprocessor number)	Warning	Throttling has occurred for microprocessor *n*. (*n* = microprocessor number)	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Check the ambient temperature. You must be operating within the specifications. 3. Make sure that the heat sink for microprocessor *n* is installed correctly. 4. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
A diagnostic interrupt has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	An operator information panel NMI/diagnostic interrupt has occurred.	If the NMI button on the operator information panel has not been pressed, complete the following steps: 1. Make sure that the NMI button is not pressed. 2. Replace the operator information panel cable. 3. Replace the operator information panel.
A bus timeout has occurred on system %1. (%1 = CIM_ComputerSystem .ElementName)	Error	A bus timeout has occurred.	1. Remove the adapter from the PCI slot that is indicated by a lit LED. 2. Replace the riser-card assembly. 3. Remove all PCI adapters. 4. (Trained service technicians only) Replace the system board.
A software NMI has occurred on system %1. (%1 = CIM_ComputerSystem .ElementName)	Error	A software NMI has occurred.	1. Check the device driver. 2. Reinstall the device driver.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
The System %1 encountered a POST Error. (%1 = CIM_ComputerSystem .ElementName)	Error	A POST error has occurred. (Sensor = ABR Status)	1. Make sure the server meets the minimum configuration to start (see "Power-supply LEDs" on page 69). 2. Recover the server firmware from the backup page: a. Restart the server. b. At the prompt, press F3 to recover the firmware. 3. Update the server firmware to the latest level (see "Updating the firmware" on page 251). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove components one at a time, restarting the server each time, to see if the problem goes away. 5. If the problem remains, (trained service technician) replace the system board.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
The System %1 encountered a POST Error. (%1 = CIM_ComputerSystem. ElementName)	Error	A POST error has occurred. (Sensor = Firmware Error)	1. Make sure the server meets the minimum configuration to start (see "Power-supply LEDs" on page 69). 2. Update the server firmware on the primary page. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 3. (Trained service technician only) Replace the system board.
A Uncorrectable Bus Error has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int PCI)	1. Check the system-event log. 2. Check the PCI error LEDs. 3. Remove the adapter from the indicated PCI slot. 4. Check for a UEFI firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. (Trained service technician only) Replace the system board.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
A Uncorrectable Bus Error has occurred on system %1. (%1 = CIM_ComputerSystem .ElementName)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int CPU)	1. Check the system-event log. 2. Check the microprocessor error LEDs. 3. Remove the failing microprocessor from the system board. 4. Check for a UEFI firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. (Trained service technician only) Make sure that the two microprocessors are matching. 6. (Trained service technician only) Replace the system board.
A Uncorrectable Bus Error has occurred on system %1. (%1 = CIM_ComputerSystem .ElementName)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int DIM)	1. Check the system-event log. 2. Check the DIMM error LEDs. 3. Remove the failing DIMM from the system board. 4. Check for a UEFI firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. Make sure that the installed DIMMs are supported and configured correctly. 6. (Trained service technician only) Replace the system board.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Sensor Sys Board Fault has transitioned to critical from a less severe state.	Error	A sensor has changed to Critical state from a less severe state.	1. Check the system-event log. 2. Check for an error LED on the system board. 3. Replace any failing device. 4. Check for a UEFI firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. (Trained service technician only) Replace the system board.
The Power Supply (Power Supply: *n*) has Failed. (*n* = power supply number)	Error	Power supply *n*has failed. (*n* = power supply number)	1. If the power-on LED is lit, complete the following steps: a. Reduce the server to the minimum configuration (see "Power-supply LEDs" on page 69). b. Reinstall the components one at a time, restarting the server each time. c. If the error recurs, replace the component that you just reinstalled. 2. Reseat power supply *n*. 3. Replace power supply *n*. (*n* = power supply number)
Sensor PS *n* Fan Fault has transitioned to critical from a less severe state. (*n* = power supply number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that there are no obstructions, such as bundled cables, to the airflow from the power-supply fan. 2. Replace power supply *n*. (*n* = power supply number)

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 VT Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Check the power-supply LEDs. 2. Follow the actions in "Power-supply LEDs" on page 69 and "Power problems" on page 55. 3. Replace the failing power supply. 4. (Trained service technician only) Replace the system board.
Sensor Pwr Rail A Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. Remove the optical drive, fans, hard disk drives, and hard disk drive backplane. 3. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 4. Replace the failing device. 5. (Trained service technician only) Replace the system board.
Sensor Pwr Rail B Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. Remove the optical drive, fans, hard disk drives, and hard disk drive backplane. 3. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 4. Replace the failing device. 5. (Trained service technician only) Replace the system board.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Sensor Pwr Rail C Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. (Trained service technician only) Remove the SAS/SATA RAID riser card, the DIMMs in connectors 1 through 8, and the microprocessor in socket 1. **Note:** The server will not start when no microprocessor is installed in socket 1. 3. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 4. Replace the failing device. 5. (Trained service technician only) Replace the system board.
Sensor Pwr Rail D Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. (Trained service technician only) Remove the microprocessor from socket 1. **Note:** The server will not start when no microprocessor is installed in socket 1. 3. Reinstall the microprocessor in socket 1 and restart the server. 4. (Trained service technician only) Replace the failing microprocessor. 5. (Trained service technician only) Replace the system board.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Sensor Pwr Rail E Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. (Trained service technician only) Remove the PCI riser card from PCI riser-card connector 2 and the microprocessor from socket 2. 3. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 4. Replace the failing device. 5. (Trained service technician only) Replace the system board.
Sensor PS *n* Therm Fault has transitioned to critical from a less severe state. (*n* = power supply number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that there are no obstructions, such as bundled cables, to the airflow from the power-supply fan. 2. Replace power supply *n*. (*n* = power supply number)
Sensor PS*n* 12V OV Fault has transitioned to non-recoverable. (*n* = power supply number)	Error	A sensor has changed to Nonrecoverable state.	1. Check the OVER SPEC LED and power-channel (A, B, C, D, E, and AUX) error LEDs on the system board. See the information about the OVER SPEC LED in "Power-supply LEDs" on page 69. 2. Remove the power supplies. 3. Replace power supply *n*. 4. (Trained service technician only) Replace the system board. (*n* = power supply number)

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Sensor PS*n* 12V UV Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Check the OVER SPEC LED and power-channel (A, B, C, D, E, and AUX) error LEDs on the system board. See the information about the OVER SPEC LED in "Power-supply LEDs" on page 69. 2. Remove the power supplies. 3. Replace power supply *n*. 4. (Trained service technician only) Replace the system board. (*n* = power supply number)
Sensor PS*n* 12V OC Fault has transitioned to non-recoverable. (*n* = power supply number)	Error	A sensor has changed to Nonrecoverable state.	1. Check the OVER SPEC LED and power-channel (A, B, C, D, E, and AUX) error LEDs on the system board. See the information about the OVER SPEC LED in "Light path diagnostics LEDs" on page 65. 2. Remove the power supplies. 3. Replace power supply *n*. 4. (Trained service technician only) Replace the system board. (*n* = power supply number)
Sensor PS *n* VCO Fault has transitioned to non-recoverable. (*n* = power supply number)	Error	A sensor has changed to Nonrecoverable state.	1. Check the power supply *n* LEDs. 2. Replace the failing power supply. (*n* = power supply number)
Redundancy Power Unit has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Check the LEDs for both power supplies. 2. Follow the actions in "Power-supply LEDs" on page 69.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Redundancy Cooling Zone 1 has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Make sure that the connector on fan 1 is not damaged. 2. Make sure that the fan 1 connector on the system board is not damaged. 3. Make sure that the fan is correctly installed. 4. Reseat the fan. 5. Replace the fan.
Redundancy Cooling Zone 2 has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Make sure that the connector on fan 2 is not damaged. 2. Make sure that the fan 2 connector on the system board is not damaged. 3. Make sure that the fan is correctly installed. 4. Reseat the fan. 5. Replace the fan.
Redundancy Cooling Zone 3 has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Make sure that the connector on fan 3 is not damaged. 2. Make sure that the fan 3 connector on the system board is not damaged. 3. Make sure that the fan is correctly installed. 4. Reseat the fan. 5. Replace the fan.
Sensor RAID Error has transitioned to critical from a less severe state.	Error	A sensor has changed to Critical state from a less severe state.	1. Check the hard disk drive LEDs. 2. Reseat the hard disk drive for which the status LED is lit. 3. Replace the defective hard disk drive.
The Drive *n* Status has been removed from unit Drive 0 Status. (*n* = hard disk drive number)	Error	A drive has been removed.	Reseat hard disk drive *n*. (*n* = hard disk drive number)

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
The Drive *n* Status has been disabled due to a detected fault. (*n* = hard disk drive number)	Error	A drive has been disabled because of a fault.	1. Run the hard disk drive diagnostic test on drive *n*. 2. Reseat the following components: a. Hard disk drive b. Cable from the system board to the backplane 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Hard disk drive b. Cable from the system board to the backplane c. Hard disk drive backplane (*n* = hard disk drive number)
Array %1 is in critical condition. (%1 = CIM_ComputerSystem. ElementName)	Error	An array is in Critical state. (Sensor = Drive *n* Status) (*n* = hard disk drive number)	Replace the hard disk drive that is indicated by a lit status LED.
Array %1 has failed. (%1 = CIM_ComputerSystem .ElementName)	Error	An array is in Failed state. (Sensor = Drive *n* Status) (*n* = hard disk drive number)	Replace the hard disk drive that is indicated by a lit status LED.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Memory uncorrectable error detected for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	A memory uncorrectable error has occurred.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 215). 4. If the problem follows the DIMM, replace the failing DIMM (see "Removing a memory module (DIMM)" on page 215 and "Installing a memory module" on page 215). 5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). (Continued on the next page)

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Memory uncorrectable error detected for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	A memory uncorrectable error has occurred.	6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 7. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 236 and "Installing a microprocessor and heat sink" on page 238).

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Memory Logging Limit Reached for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	The memory logging limit has been reached.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 215). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 236 and "Installing a microprocessor and heat sink" on page 238).
Memory DIMM Configuration Error for All DIMMs on Memory Subsystem All DIMMs.	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Memory DIMM disabled for All DIMMs on Memory Subsystem All DIMMs.	Info	DIMM disabled	1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 215). 2. If the DIMM was disabled because of a memory fault (memory uncorrectable error or memory logging limit reached), follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Memory uncorrectable error detected for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A memory uncorrectable error has occurred.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 215 for memory population). 4. If the problem follows the DIMM, replace the failing DIMM (see "Removing a memory module (DIMM)" on page 215 and "Installing a memory module" on page 215). 5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). (Continued on the next page)

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Memory uncorrectable error detected for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A memory uncorrectable error has occurred.	6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 7. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 236 and "Installing a microprocessor and heat sink" on page 238).

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Memory Logging Limit Reached for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	The memory logging limit has been reached.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 215 for memory population). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 236 and "Installing a microprocessor and heat sink" on page 238).

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Memory DIMM Configuration Error for One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.
Memory DIMM disabled for One of the DIMMs on Memory Subsystem One of the DIMMs.	Info	DIMM disabled	1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 215 for memory population). 2. If the DIMM was disabled because of a memory fault (memory uncorrectable error or memory logging limit reached), follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Memory uncorrectable error detected for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Error	A memory uncorrectable error has occurred.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 215 for memory population). 4. If the problem follows the DIMM, replace the failing DIMM (see "Removing a memory module (DIMM)" on page 215 and "Installing a memory module" on page 215). 5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). (Continued on the next page)

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Memory uncorrectable error detected for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Error	A memory uncorrectable error has occurred.	6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 7. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 236 and "Installing a microprocessor and heat sink" on page 238).

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Memory Logging Limit Reached for DIMM *n*Status on Memory Subsystem DIMM*n*Status. (*n* = DIMM number)	Error	The memory logging limit has been reached.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 215 for memory population). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 245 and "Installing the system board" on page 246). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 236 and "Installing a microprocessor and heat sink" on page 238).

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Memory DIMM Configuration Error for DIMM *n*Status on Memory Subsystem DIMM *n*Status. (*n* = DIMM number)	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.
Memory DIMM disabled for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Info	DIMM disabled	1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 215). 2. If the DIMM was disabled because of a memory fault (memory uncorrectable error or memory logging limit reached), follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).
Sensor DIMM *n* Temp has transitioned to critical from a less severe state. (*n* = DIMM number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. If a fan has failed, complete the action for a fan failure. 3. Replace DIMM *n*. (*n* = DIMM number)

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
A PCI PERR has occurred on system %1. (%1 = CIM_ComputerSystem .ElementName)	Error	A PCI PERR has occurred. (Sensor = PCI Slot *n*; *n* = PCI slot number)	1. Check the riser-card LEDs. 2. Reseat the affected adapters and riser card. 3. Update the server and adapter firmware (UEFI and IMM). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove the adapter from slot *n*. 5. Replace the PCIe adapter. 6. Replace riser card *n*. (*n* = PCI slot number)
A PCI SERR has occurred on system %1. (%1 = CIM_ComputerSystem .ElementName)	Error	A PCI SERR has occurred. (Sensor = PCI Slot *n*; *n* = PCI slot number)	1. Check the riser-card LEDs. 2. Reseat the affected adapters and riser card. 3. Update the server and adapter firmware (UEFI and IMM). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove the adapter from slot *n*. 5. Replace the PCIe adapter. 6. Replace riser card *n*. (*n* = PCI slot number)

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
A PCI PERR has occurred on system %1. (%1 = CIM_ComputerSystem .ElementName)	Error	A PCI PERR has occurred. (Sensor = One of PCI Err)	1. Check the riser-card LEDs. 2. Reseat the affected adapters and riser card. 3. Update the server and adapter firmware (UEFI and IMM). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove both adapters. 5. Replace the PCIe adapter. 6. Replace the riser card. 7. (Trained service technician only) Replace the system board.
A PCI SERR has occurred on system %1. (%1 = CIM_ComputerSystem .ElementName)	Error	A PCI SERR has occurred. (Sensor = One of PCI Err)	1. Check the riser-card LEDs. 2. Reseat the affected adapters and riser card. 3. Update the server and adapter firmware (UEFI and IMM). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove both adapters. 5. Replace the PCIe adapter. 6. Replace the riser card. 7. (Trained service technician only) Replace the system board.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
All PCI error	Error	PCI bridge (IOH) error	1. Check the riser-card LEDs. 2. Reseat all adapters and riser cards. 3. Update the server and adapter firmware (UEFI and IMM). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove all the adapters from slots. 5. Replace the riser cards. 6. (Trained service technician only) Replace the system board.
Fault in slot System board on system %1. (%1 = CIM_ComputerSystem .ElementName)	Error		1. Check the riser-card LEDs. 2. Reseat the affected adapters and riser card. 3. Update the server and adapter firmware (UEFI and IMM). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove both adapters. 5. Replace the PCIe adapter. 6. Replace the riser card. 7. (Trained service technician only) Replace the system board.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Redundancy Bckup Mem Status has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Check the system-event log for DIMM failure events (uncorrectable or PFA) and correct the failures. 2. Re-enable mirroring in the Setup utility.
Sensor Planar Fault has transitioned to critical from a less severe state.	Error	A sensor has changed to Critical state from a less severe state.	(Trained service technician only) Replace the system board.
IMM Network Initialization Complete.	Info	An IMM network has completed initialization.	No action; information only.
Certificate Authority %1 has detected a %2 Certificate Error. (%1 = IBM_CertificateAuthority .CADistinguishedName; %2 = CIM_PublicKeyCertificate .ElementName)	Error	A problem has occurred with the SSL Server, SSL Client, or SSL Trusted CA certificate that has been imported into the IMM. The imported certificate must contain a public key that corresponds to the key pair that was previously generated by the **Generate a New Key and Certificate Signing Request** link.	1. Make sure that the certificate that you are importing is correct. 2. Try importing the certificate again.
Ethernet Data Rate modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort.Speed; %2 = CIM_EthernetPort.Speed; %3 = user ID)	Info	A user has modified the Ethernet port data rate.	No action; information only.
Ethernet Duplex setting modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort. FullDuplex; %2 = CIM_EthernetPort. FullDuplex; %3 = user ID)	Info	A user has modified the Ethernet port duplex setting.	No action; information only.
Ethernet MTU setting modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort. ActiveMaximum TransmissionUnit; %2 = CIM_EthernetPort. ActiveMaximum TransmissionUnit; %3 = user ID)	Info	A user has modified the Ethernet port MTU setting.	No action; information only.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Ethernet Duplex setting modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort .NetworkAddresses; %2 = CIM_EthernetPort. NetworkAddresses; %3 = user ID)	Info	A user has modified the Ethernet port MAC address setting.	No action; information only.
Ethernet interface %1 by user %2. (%1 = CIM_EthernetPort. EnabledState; %2 = user ID)	Info	A user has enabled or disabled the Ethernet interface.	No action; information only.
Hostname set to %1 by user %2. (%1 = CIM_DNSProtocol Endpoint.Hostname; %2 = user ID)	Info	A user has modified the host name of the IMM.	No action; information only.
IP address of network interface modified from %1 to %2 by user %3. (%1 = CIM_IPProtocolEndpoint. IPv4Address; %2 = CIM_StaticIPAssignment SettingData.IPAddress; %3 = user ID)	Info	A user has modified the IP address of the IMM.	No action; information only.
IP subnet mask of network interface modified from %1 to %2 by user %3s. (%1 = CIM_IPProtocolEndpoint .SubnetMask; %2 = CIM_StaticIPAssignment SettingData.SubnetMask; %3 = user ID)	Info	A user has modified the IP subnet mask of the IMM.	No action; information only.
IP address of default gateway modified from %1 to %2 by user %3s. (%1 = CIM_IPProtocolEndpoint. GatewayIPv4Address; %2 = CIM_StaticIPAssignment SettingData.Default GatewayAddress; %3 = user ID)	Info	A user has modified the default gateway IP address of the IMM.	No action; information only.
OS Watchdog response %1 by %2. (%1 = Enabled or Disabled; %2 = user ID)	Info	A user has enabled or disabled an OS Watchdog.	No action; information only.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
DHCP[%1] failure, no IP address assigned. (%1 = IP address, *xxx.xxx.xxx.xxx*)	Info	A DHCP server has failed to assign an IP address to the IMM.	1. Make sure that the network cable is connected. 2. Make sure that there is a DHCP server on the network that can assign an IP address to the IMM.
Remote Login Successful. Login ID: %1 from %2 at IP address %3. (%1 = user ID; %2 = ValueMap(CIM_Protocol Endpoint.ProtocolIFType; %3 = IP address, *xxx.xxx.xxx.xxx*)	Info	A user has successfully logged in to the IMM.	No action; information only.
Attempting to %1 server %2 by user %3. (%1 = Power Up, Power Down, Power Cycle, or Reset; %2 = IBM_ComputerSystem .ElementName; %3 = user ID)	Info	A user has used the IMM to perform a power function on the server.	No action; information only.
Security: Userid: '%1' had %2 login failures from WEB client at IP address %3. (%1 = user ID; %2 = MaximumSuccessive LoginFailures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from a Web browser and has been prevented from logging in for the lockout period.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
Security: Login ID: '%1' had %2 login failures from CLI at %3. (%1 = user ID; %2 = MaximumSuccessive LoginFailures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from the command-line interface and has been prevented from logging in for the lockout period.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
Remote access attempt failed. Invalid userid or password received. Userid is '%1' from WEB browser at IP address %2. (%1 = user ID; %2 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has attempted to log in from a Web browser by using an invalid login ID or password.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
Remote access attempt failed. Invalid userid or password received. Userid is '%1' from TELNET client at IP address %2. (%1 = user ID; %2 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has attempted to log in from a Telnet session by using an invalid login ID or password.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
The Chassis Event Log (CEL) on system %1 cleared by user %2. (%1 = CIM_ComputerSystem .ElementName; %2 = user ID)	Info	A user has cleared the IMM event log.	No action; information only.
IMM reset was initiated by user %1. (%1 = user ID)	Info	A user has initiated a reset of the IMM.	No action; information only.
ENET[0] DHCP-HSTN=%1, DN=%2, IP@=%3, SN=%4, GW@=%5, DNS1@=%6. (%1 = CIM_DNSProtocol Endpoint.Hostname; %2 = CIM_DNSProtocol Endpoint.DomainName; %3 = CIM_IPProtocol Endpoint.IPv4Address; %4 = CIM_IPProtocolEndpoint. SubnetMask; %5 = IP address, *xxx.xxx.xxx.xxx*; %6 = IP address, *xxx.xxx.xxx.xxx*)	Info	The DHCP server has assigned an IMM IP address and configuration.	No action; information only.
ENET[0] IP-Cfg:HstName=%1, IP@%2, NetMsk=%3, GW@=%4. (%1 = CIM_DNSProtocol Endpoint.Hostname; %2 = CIM_StaticIPSettingData. IPv4Address; %3 = CIM_StaticIPSettingData. SubnetMask; %4 = CIM_StaticIPSettingData. DefaultGatewayAddress)	Info	An IMM IP address and configuration have been assigned using client data.	No action; information only.
LAN: Ethernet[0] interface is no longer active.	Info	The IMM Ethernet interface has been disabled.	No action; information only.
LAN: Ethernet[0] interface is now active.	Info	The IMM Ethernet interface has been enabled.	No action; information only.
DHCP setting changed to by user %1. (%1 = user ID)	Info	A user has changed the DHCP mode.	No action; information only.
IMM: Configuration %1 restored from a configuration file by user %2. (%1 = CIM_ConfigurationData. ConfigurationName; %2 = user ID)	Info	A user has restored the IMM configuration by importing a configuration file.	No action; information only.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Watchdog %1 Screen Capture Occurred. (%1 = OS Watchdog or Loader Watchdog)	Error	An operating-system error has occurred, and the screen capture was successful.	1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system.
Watchdog %1 Failed to Capture Screen. (%1 = OS Watchdog or Loader Watchdog)	Error	An operating-system error has occurred, and the screen capture failed.	1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system. 6. Update the IMM firmware. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
Running the backup IMM main application.	Error	The IMM has resorted to running the backup main application.	Update the IMM firmware. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Please ensure that the IMM is flashed with the correct firmware. The IMM is unable to match its firmware to the server.	Error	The server does not support the installed IMM firmware version.	Update the IMM firmware to a version that the server supports. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
IMM reset was caused by restoring default values.	Info	The IMM has been reset because a user has restored the configuration to its default settings.	No action; information only.
IMM clock has been set from NTP server %1. (%1 = IBM_NTPService. ElementName)	Info	The IMM clock has been set to the date and time that is provided by the Network Time Protocol server.	No action; information only.
SSL data in the IMM configuration data is invalid. Clearing configuration data region and disabling SSL+H25.	Error	There is a problem with the certificate that has been imported into the IMM. The imported certificate must contain a public key that corresponds to the key pair that was previously generated through the **Generate a New Key and Certificate Signing Request** link.	1. Make sure that the certificate that you are importing is correct. 2. Try to import the certificate again.
Flash of %1 from %2 succeeded for user %3. (%1 = CIM_ManagedElement. ElementName; %2 = Web or LegacyCLI; %3 = user ID)	Info	A user has successfully updated one of the following firmware components: • IMM main application • IMM boot ROM • UEFI firmware • Diagnostics • System power backplane • Remote expansion enclosure power backplane • Integrated service processor • Remote expansion enclosure processor	No action; information only.
Flash of %1 from %2 failed for user %3. (%1 = CIM_ManagedElement. ElementName; %2 = Web or LegacyCLI; %3 = user ID)	Info	An attempt to update a firmware component from the interface and IP address has failed.	Try to update the firmware again.

Table 10. Integrated management module 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, Types 4255, 7945, and 7949 server," on page 157 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
The Chassis Event Log (CEL) on system %1 is 75% full. (%1 = CIM_ComputerSystem. ElementName)	Info	The IMM event log is 75% full. When the log is full, older log entries are replaced by newer ones.	To avoid losing older log entries, save the log as a text file and clear the log.
The Chassis Event Log (CEL) on system %1 is 100% full. (%1 = CIM_ComputerSystem. ElementName)	Info	The IMM event log is full. When the log is full, older log entries are replaced by newer ones.	To avoid losing older log entries, save the log as a text file and clear the log.
%1 Platform Watchdog Timer expired for %2. (%1 = OS Watchdog or Loader Watchdog; %2 = OS Watchdog or Loader Watchdog)	Error	A Platform Watchdog Timer Expired event has occurred.	1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system.
IMM Test Alert Generated by %1. (%1 = user ID)	Info	A user has generated a test alert from the IMM.	No action; information only.
Security: Userid: '%1' had %2 login failures from an SSH client at IP address %3. (%1 = user ID; %2 = MaximumSuccessive LoginFailures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from SSH and has been prevented from logging in for the lockout period.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.

Solving power problems

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

1. Turn off the server and disconnect all 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. Check the LEDs on the operator information panel (see “Light path diagnostics LEDs” on page 65).
4. If a power-channel error LED on the system board is lit, complete the following steps; otherwise, go to step 5. See “System-board LEDs” on page 20 for the location of the power-channel error LEDs. Table 11 identifies the components that are associated with each power channel and the order in which to troubleshoot the components.
   a. Disconnect the cables and power cords to all internal and external devices (see “Internal cable routing and connectors” on page 172). Leave the power-supply cords connected.
   b. Remove each component that is associated with the LED, one at a time, in the sequence indicated in Table 11, restarting the server each time, until the cause of the overcurrent condition is identified.

      Important: Only a trained service technician should remove or replace a FRU, such as a microprocessor or the system board. See Chapter 4, “Parts listing, Types 4255, 7945, and 7949 server,” on page 157 to determine whether a component is a FRU.

      Table 11. Components associated with power-channel error LEDs

Power-channel error LED	Components
A	CD or DVD drive (optical drive), fans, hard disk drives, hard disk drive backplanes
B	PCI riser-card assembly in PCI connector 1 on the system board, DIMMs 1 through 16, microprocessor 2
C	Tape drive if one is installed, SAS riser card assembly, DIMMs 1 through 8, microprocessor 1
D	Microprocessor 1, system board
E	Optional PCI video graphics adapter power cable if one is installed (connector J154 on the system board), optional PCI video graphics adapter if one is installed, PCI riser card assembly in PCI connector 2 on the system board, microprocessor 2
AUX Power	All PCI adapters and PCI riser-card assemblies, SAS riser-card assembly, operator information panel assembly, optional two-port Ethernet card if installed

   c. Replace the identified component.
5. Remove the adapters and disconnect the cables and power cords to all internal and external devices until the server is at the minimum configuration that is required for the server to start (see “Solving undetermined problems” on page 153 for the minimum configuration).

6. Reconnect all power cords and turn on the server. If the server starts successfully, replace the adapters and devices one at a time until the problem is isolated.

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

Solving Ethernet controller problems

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

Try the following procedures:

- Make sure that the correct and current device drivers and firmware, which come with the server, are installed and that they are at the latest level.

  Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
- 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.
  - You must use Category 5 cabling.
- Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller LEDs on the rear panel of the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.
  - The Ethernet link status LED is lit when the Ethernet controller receives a link pulse from the hub. If the LED is off, there might be a defective connector or cable or a problem with the hub.
  - The Ethernet transmit/receive activity LED is lit when the Ethernet controller sends or receives data over the Ethernet network. If the Ethernet transmit/receive activity light is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check the Ethernet activity LED on the rear of the server. The Ethernet activity LED is lit when data is active on the Ethernet network. If the Ethernet activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check for operating-system-specific causes of the problem.
- Make sure that the device drivers on the client and server are using the same protocol.

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

Solving undetermined problems

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

If you suspect that a software problem is causing failures (continuous or intermittent), see “Software problems” on page 61.

Damaged data in CMOS memory or damaged server firmware can cause undetermined problems. To reset the CMOS data, use the CMOS switch to clear the CMOS memory; see “System-board switches and jumpers” on page 17. If you suspect that the server firmware is damaged, see “Recovering the server firmware” on page 109.

Check the LEDs on all the power supplies (see “Power-supply LEDs” on page 69). If the LEDs indicate that the power supplies are working correctly, complete the following steps:

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

   The following minimum configuration is required for the server to start:
   - One microprocessor (slot 1)
   - One 1 GB DIMM per installed microprocessor (slot 3 if only one microprocessor is installed)
   - One power supply
   - Power cord
   - ServeRAID SAS controller
4. Turn on the server. If the problem remains, suspect the 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 riser card.

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

If the problem remains, see “Troubleshooting tables” on page 43.

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 upgrades
- Failure symptom
  - Does the server fail the diagnostics 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?
- Diagnostics program type and version level
- Hardware configuration (print screen of the system summary)
- BIOS code level
- Operating-system type and version level

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

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

See Appendix A, “Getting help and technical assistance,” on page 277 for information about calling IBM for service.

Chapter 4. Parts listing, Types 4255, 7945, and 7949 server

The following replaceable components are available for all the Series x3650 M3 Type 4255, 7945, or 7949 server models, except as specified otherwise in "Replaceable server components." To check for an updated parts listing on the Web, 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 **Parts documents lookup**.
4. From the **Product family** menu, select **System x3650 M3** and click **Go**.

Replaceable server components

Replaceable components are of four types:

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

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

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

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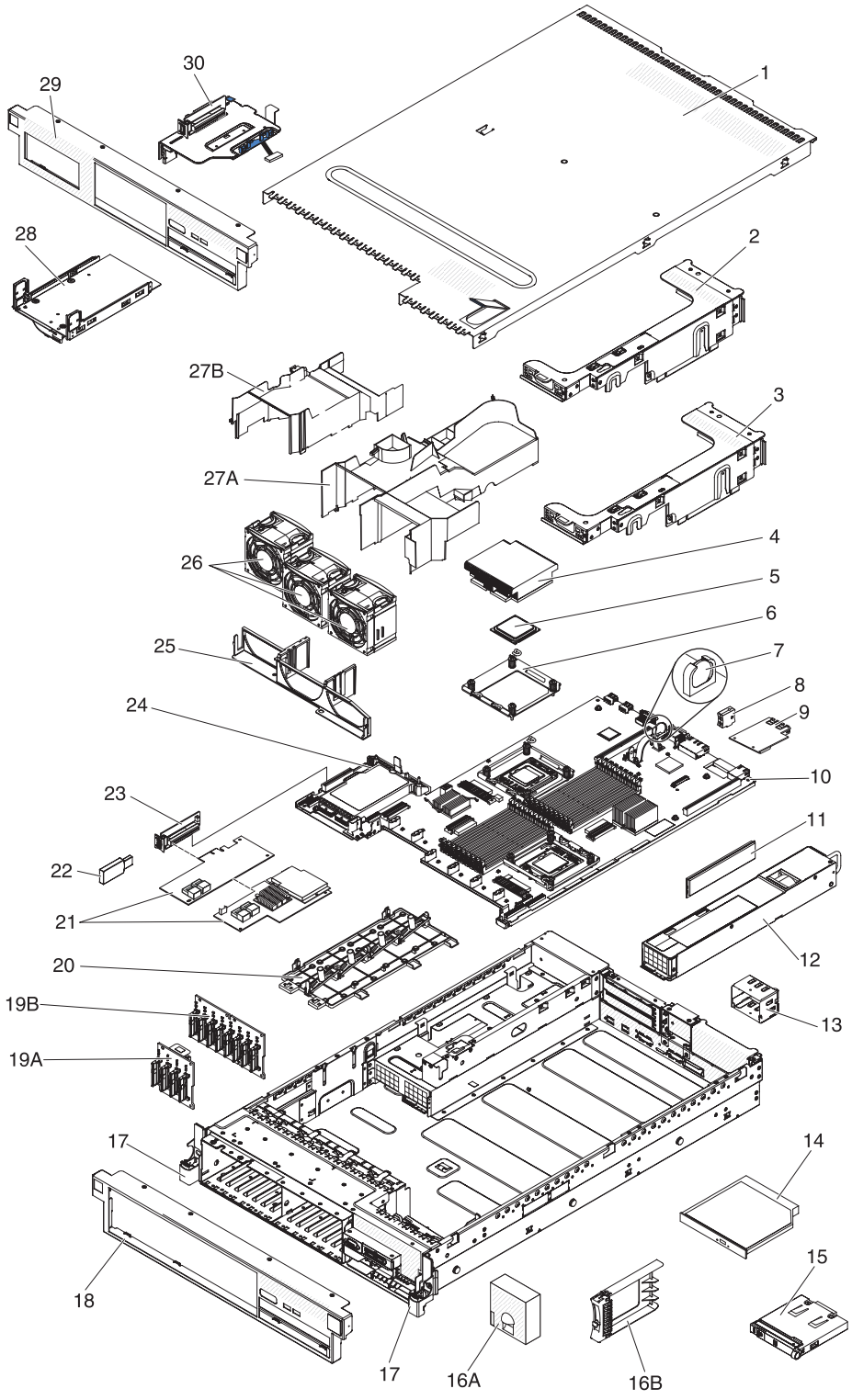
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Table 12. View 1 CRUs and FRUs, Types 4255, 7945, and 7949

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Cover (all models)	59Y3790		
2	PCI Express riser-card assembly (x 8)	69Y4324		
2	PCI Express riser-card assembly (x 8) for Emulex 10 GbE adapter	59Y3818		
2	PCI Express riser-card assembly (x 16)	69Y4325		
3	PCI-X riser-card assembly	69Y4326		
4	Heat sink, 95 watt			49Y4820
4	Heat sink, 130 watt			69Y1207
5	Microprocessor - Quad-Core Intel Xeon X5570 2.93 GHz (8 MB cache) 95 W			46D1262
5	Microprocessor - Quad-Core Intel Xeon X5560 2.80 GHz (8 MB cache) 95 W			46D1263
5	Microprocessor - Quad-Core Intel Xeon X5550 2.66 GHz (8 MB cache) 95 W			46D1264
5	Microprocessor - Quad-Core Intel Xeon E5540 2.53 GHz (8 MB cache) 80 W			46D1265
5	Microprocessor - Quad-Core Intel Xeon E5530 2.40 GHz (8 MB cache) 80 W			46D1266
5	Microprocessor - Quad-Core Intel Xeon E5520 2.26 GHz (8 MB cache) 80 W			46D1267
5	Microprocessor - Quad-Core Intel Xeon E5506 2.13 GHz (4 MB cache) 80 W (model A2x)			46D1270
5	Microprocessor - Quad-Core Intel Xeon E5504 2.00 GHz (4 MB cache) 80 W			46D1271
5	Microprocessor - Hex-Core Intel Xeon X5670 2.93 GHz (12 MB cache) 95 W (model M2x)			49Y7038
5	Microprocessor - Hex-Core Intel Xeon X5660 2.80 GHz (12 MB cache) 95 W (models L2x and L4x)			49Y7039
5	Microprocessor - Hex-Core Intel Xeon X5650 2.66 GHz (12 MB cache) 95 W (models J2x, JSx, and D4x)			49Y7040
5	Microprocessor - Quad-Core Intel Xeon X5667 3.06 GHz (12 MB cache) 95 W			49Y7050
5	Microprocessor - Quad-Core Intel Xeon E5640 2.66 GHz (12 MB cache) 80 W (model G2x)			49Y7051
5	Microprocessor - Quad-Core Intel Xeon E5630 2.53 GHz (12 MB cache) 80 W (model F2x)			49Y7052
5	Microprocessor - Quad-Core Intel Xeon E5620 2.40 GHz (12 MB cache) 80 W (models D2x and D4x)			49Y7053
5	Microprocessor - Hex-Core Intel Xeon L5640 2.26 GHz (12 MB cache) 60 W (models H2x and H4x)			49Y7054
5	Microprocessor - Quad-Core Intel Xeon L5630 2.13 GHz (12 MB cache) 40 W (model C2x)			59Y3691
5	Microprocessor - Quad-Core Intel Xeon E5503 2.00 GHz (4 MB cache) 80 W			69Y0781

Table 12. View 1 CRUs and FRUs, Types 4255, 7945, and 7949 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
5	Microprocessor - Quad-Core Intel Xeon E5507 2.26 GHz (4 MB cache) 80 W (models B2x and 32x)			69Y0782
5	Microprocessor - Quad-Core Intel Xeon L5609 1.86 GHz (12 MB cache) 40 W			69Y0783
5	Microprocessor - Quad-Core Intel Xeon X5680 3.33 GHz 130 W (model N2x)			69Y0849
5	Microprocessor - Quad-Core Intel Xeon X5677 3.46 GHz (12 MB cache) 130 W			69Y0850
5	Microprocessor - Hex-Core Intel Xeon E5645 2.4 GHz (12 MB cache) 80 W			69Y4714
5	Microprocessor - Quad-Core Intel Xeon E5603 1.6 GHz (4 MB cache) 80 W			81Y5952
5	Microprocessor - Quad-Core Intel Xeon E5606 2.13 GHz (8 MB cache) 80 W (model 22x)			81Y5953
5	Microprocessor - Quad-Core Intel Xeon E5607 2.26 GHz (8 MB cache) 80 W			81Y5954
5	Microprocessor - Hex-Core Intel Xeon E5649 2.53 GHz (12 MB cache) 80 W			81Y5955
5	Microprocessor - Quad-Core Intel Xeon X5647 2.93 GHz (12 MB cache) 130 W			81Y5956
5	Microprocessor - Quad-Core Intel Xeon X5672 3.20 GHz (8 MB cache) 95 W			81Y5957
5	Microprocessor - Hex-Core Intel Xeon X5675 3.06 GHz (12 MB cache) 95 W (model 72x)			81Y5958
5	Microprocessor - Quad-Core Intel Xeon X5687 3.60 GHz (12 MB cache) 130 W			81Y5959
5	Microprocessor - Hex-Core Intel Xeon X5690 3.46 GHz (12 MB cache) 130 W (model 82x)			81Y5960
6	Microprocessor retention module (all models)			49Y4822
7	Battery, 3.0 volt	33F8354		
8	Virtual media key (optional)	46C7528		
9	Ethernet adapter (optional)	69Y4509		
10	System board (all models)			81Y6625
10	System board (P12)			69Y5082
11	DIMM - 1 GB 1Rx8 1.5V RDIMM	49Y1442		
11	DIMM - 2 GB 2Rx8 1.5V 1Gbit	49Y1443		
11	DIMM - 2 GB 1Rx4 1.5V 1Gbit	49Y1444		
11	DIMM - 4 GB 2Rx4 1.5V 1Gbit (models A2x, B2x, D2x, G2x, F2x, J2x,L2x, M2x, N2x, and JSx)	49Y1445		
11	DIMM - 8 GB 2Rx4 1.5V 2Gbit	49Y1446		
11	DIMM - 2 GB (1 Gb 2Rx8)	44T1573		
11	DIMM - 2 GB (1 Gb 1Rx8) PC3	44T1582		
11	DIMM - 4 GB (2 Gb 2Rx8) 2GBIT RDIMM	44T1598		

Table 12. View 1 CRUs and FRUs, Types 4255, 7945, and 7949 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
11	DIMM - 2 GB (1 Gb 2Rx8)	49Y1410		
11	DIMM - 16 GB 2Rx4 1.35V RDIMM	49Y1565		
11	DIMM - 16 GB 4Rx4 RDIMM	46C7489		
11	DIMM - 4 GB (1Gb 2Rx8 1.35V) ECC RDIMM	49Y1412		
11	DIMM - 8 GB (2Gb 2Rx4) RDIMM	49Y1415		
11	DIMM - 8 GB (2Gb 2Rx4) RDIMM	49Y1416		
11	DIMM - 16 GB (2Gb 4Rx4) RDIMM	49Y1418		
11	DIMM - 2 GB (1x2GB, 1Rx8) UDIMM	49Y1421		
11	DIMM - 4 GB (2Gb 2Rx8) UDIMM	49Y1422		
11	DIMM - 2 GB (2Gb 1Rx8) RDIMM	49Y1423		
11	DIMM - 4 GB (2Gb 1Rx4) RDIMM	49Y1424		
11	DIMM - 4 GB (2Gb 2Rx8) RDIMM	49Y1425		
12	Power supply, 675 W, high efficiency	39Y7218		
12	Power supply, 675 W, ac	39Y7225		
12	Power supply, 675 W, ac	39Y7227		
12	Power supply, 460 W, ac	39Y7229		
12	Power supply, 460 W, ac	39Y7231		
12	Power supply, 675 W, ac	39Y7236		
12	Power supply, 675 W, dc			39Y7215
13	Power-supply bay filler (all models except F2x and JSx)	49Y4821		
14	DVD drive, SATA	44W3254		
14	DVD drive, SATA (model JSx)	44W3256		
15	Operator information panel	44E4372		
16A	4-drive filler panel, hot-swap	49Y5359		
16A	4-drive filler panel, simple swap	49Y5360		
16B	Hot-swap HDD filler (models A2x, B2x, C2x, D2x, F2x, G2x, H2x, J2x, L2x, M2x, and N2x)	44T2248		
17	Rack latch bracket kit (all models) contains: • Bracket, EIA left assembly (1) • Bracket, EIA right assembly (1) • Screw, M 3.5 steel (2)		49Y5356	
18	Bezel, 16 HDD		59Y3780	
19A	Backplane, SAS, 4 hard disk drives		43V7070	
19B	Backplane, SAS, 8 hard disk drives		69Y0650	
19B	Backplane, SAS, 8 hard disk drives		94Y6670	
20	Remote RAID battery tray	49Y5355		
21	ServeRAID BR10i adapter	44E8690		
21	ServeRAID MR10i adapter		43W4297	
22	2 GB Hypervisor flash device	42D0545		

Table 12. View 1 CRUs and FRUs, Types 4255, 7945, and 7949 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
22	4 GB Hypervisor flash device (field use only)			41Y8279
23	SAS riser card (non-tape models)	43V7067		
24	Cover, 240 VA safety			49Y4823
25	Fan cage	49Y5362		
26	Fans (hot swap dual 60 mm)	49Y5361		
27A	DIMM air baffle (included in air baffle kit)	59Y3779		
27B	Microprocessor air baffle, included in air baffle kit (all models)	59Y3779		
28	Tape kit (optional) contains: • Assembly, mechanical (1) • Clamp, round cable (1) • Filler, tape kit 3.5 inch (1) • Screws, M3x6 MPC (4)		40K6449	
29	Bezel, 8 hard disk drive with tape drive		59Y3781	
30	Tape enabled SAS riser card (optional)	43V7065		
	Hard disk drive, SAS hot swap, 146 GB 10 krpm	42D0633		
	Hard disk drive, SAS hot swap, 73 GB 15 krpm (optional)	42D0673		
	Hard disk drive, SAS hot swap, 146 GB 15 krpm (optional)	42D0678		
	Hard disk drive, SAS hot swap, 300 GB 10 krpm (optional)	42D0638		
	Hard disk drive, SAS hot swap, 500 GB 7.2 krpm (optional)	42D0708		
	Hard disk drive, 2.5-inch hot-swap, 300 GB, Slim-HS, 10 K	44W2265		
	Hard disk drive, 2.5-inch hot-swap, 146 GB, Slim-HS, 15 K	44W2295		
	Hard disk drive, 500 GB 7.2K SFF SAS SAP	49Y1892		
	Hard disk drive, 600 GB 10K SAS Slim hot swap	49Y2004		
	Hard disk drive, 500 GB 7.2K 6 Gbps SATA	81Y9727		
	SAS expander card for 16 hard disk drives	46M0997		
	DVD Blank Filler (all models except JSx)	49Y4868		
	Emulex 10 GbE custom adapter	49Y4202		
	NetXtreme II 1000 Express quad port Ethernet adapter	49Y4222		
	Qlogic 10Gb Dual-Port CN	42C1802		
	Qlogic 10Gb SFP+SR	42C1816		
	Brocade 10Gb SFP+ SR optical transceiver	42C1819		
	Brocade 10Gb CNA for IBM System x	42C1822		
	ServeRAID-BR10il SAS/SATA controller (model A2x)	49Y4737		
	ServeRAID-M5014 SAS/SATA controller (models F2x and G2x)	46M0918		

Table 12. View 1 CRUs and FRUs, Types 4255, 7945, and 7949 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	ServeRAID-M5015 SAS/SATA controller (models J2x, JSx, L2x, and M2x)	46M0851		
	ServeRAID-B5015 SAS/SATA controller	46M0970		
	ServeRAID-M1015 SAS/SATA controller (models B2x, C2x, D2x, H2x, and N2x)	46M0861		
	ServeRAID M5000 series advanced feature key	46M0931		
	ServeRAID M1000 series advanced feature key	46M0864		
	IBM 3Gb SAS HBA v2	44E8701		
	Carrier daughter card		44E8763	
	Daughter card mechanic kit, 1 GB	69Y4586		
	Miscellaneous parts kit (all models) contains: • Bracket, DVD retention (1) • Bracket, PCI fill blank (1) • Bracket, tooless fillerFILLER (1) • Gasket, EMC 112mm (2) • Guide, PCI card (1) • Latch, 2U SAS controller (1) • Latch, expander clip (1) • Latch, PCI card (1) • Screw, 10x32 shoulder (3) • Screw, M3 x 0.5 L5 (10) • Screw, M 3.5 steel (10) • Screw, M6 hex head (3) • Screw, slotted M3X5 (10) • Standoff, shaft (2)		69Y4505	
	Slide rail kit, Enterprise		69Y5085	
	Slide rail kit, Gen-II		69Y4391	
	CMA kit, Gen-II	69Y4392		
	CMA kit	59Y4822		
	Slide rail kit, universal		59Y3792	
	Cable assembly, simple swap		59Y3782	
	Cable management arm		49Y4817	
	Cable, backplane configuration cable for 8 drives		69Y0648	
	Cable, backplane configuration cable for 4 drives		69Y4233	
	Cable, backplane configuration cable for 8 drives with tape		69Y4228	
	Cable, backplane power cable for 4 drives		69Y4234	
	Cable, backplane power cable for 8 drive		69Y0649	
	Cable, operator information panel		46C4139	
	Cable, SAS signal, 245 mm		59Y3786	
	Cable, SAS signal, 250 mm		69Y1332	

Table 12. View 1 CRUs and FRUs, Types 4255, 7945, and 7949 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	Cable, SAS signal, 300 mm		49Y5390	
	Cable, SAS signal, 240 mm		49Y5392	
	Cable, SAS signal, 450 mm		59Y3921	
	Cable, SAS signal, 710 mm		69Y1328	
	Cable, SATA DVD		43V6914	
	Cable, USB/video		46C4146	
	Cable, VGA power		59Y3455	
	Cord, 2.8 meter	39M5377		
	CPU extraction tool			81Y9398
	Alcohol wipes		59P4739	
	Thermal grease		41Y9292	
	Label, service	59Y3789		
	Labels, chassis	59Y3788		
	LP latch		69Y5119	
	Cable, USB power		39M6797	
	HBA adapter, 8 GB	42D0516		
	Mechanical chassis			81Y6842
	NVIDIA FX 3800	43V5894		
	NVIDIA FX 1800	43V5886		
	NVIDIA FX 1700	43V5765		
	NVIDIA FX 580	43V5890		
	NVIDIA FX 570	43V5782		
	DVI-A Dongle adapter	25R9043		
	ServeRAID MR10M battery carrier		44E8844	
	Screw kit	59Y4922		

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 13. Consumable parts, Types 4255 and 7945

Index	Description	Part number
	ServeRAID battery (models J2x, JSx, L2x, and M2x)	43W4342

To order a consumable part, complete the following steps:

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

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

Product recovery CDs

Table 14 describes the product recovery CD CRUs.

Table 14. Product recovery CDs

Description	CRU part number
Microsoft Windows Server 2008 Datacenter 64/64 Bit, Multilingual	49Y0222
Microsoft Windows Server 2008 Datacenter 64/64 Bit, Simplified Chinese	49Y0223
Microsoft Windows Server 2008 Datacenter 64/64 Bit, Traditional Chinese	49Y0224
Microsoft Windows Server 2008 Standard Edition 32/64 Bit 1-4 microprocessors, Multilingual	49Y0892
Microsoft Windows Server 2008 Standard Edition 32/64 Bit 1-4 microprocessors, Simplified Chinese	49Y0893
Microsoft Windows Server 2008 Standard Edition 32/64 Bit 1-4 microprocessors, Traditional Chinese	49Y0894
Microsoft Windows Server 2008 Enterprise Edition 32/64 Bit 1-8 microprocessors, Multilingual	49Y0895
Microsoft Windows Server 2008 Enterprise Edition 32/64 Bit 1-8 microprocessors, Simplified Chinese	49Y0896
Microsoft Windows Server 2008 Enterprise Edition 32/64 Bit 1-8 microprocessors, Traditional Chinese	49Y0897
VMware ESX Server 3i Recovery Tools CDs version 3.5	46D0762
VMware ESX Server 3i Version 3.5 Update 2	46M9236
VMware ESX Server 3i Version 3.5 Update 3	46M9237
VMware ESX Server 3i Version 3.5 Update 4	46M9238
VMware ESX Server 3i Version 3.5 Update 5	68Y9633
VMware ESXi 4.0	49Y8747
VMware ESXi 4.0 Update 1	68Y9634

Power cords

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

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

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

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

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

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

IBM power cord part number	Used in these countries and regions
39M5206	China
39M5102	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea
39M5123	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire
39M5130	Denmark
39M5144	Bangladesh, Lesotho, Macao, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda
39M5151	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe
39M5158	Liechtenstein, Switzerland
39M5165	Chile, Italy, Libyan Arab Jamahiriya
39M5172	Israel
39M5095	220 - 240 V Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States of America, Venezuela

IBM power cord part number	Used in these countries and regions
39M5081	110 - 120 V Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela
39M5219	Korea (Democratic People's Republic of), Korea (Republic of)
39M5199	Japan
39M5068	Argentina, Paraguay, Uruguay
39M5226	India
39M5233	Brazil

Chapter 5. Removing and replacing server components

Replaceable components are of four types:

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

See Chapter 4, “Parts listing, Types 4255, 7945, and 7949 server,” on page 157 to determine whether a component is a Tier 1 CRU, Tier 2 CRU, or FRU.

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

Installation guidelines

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, the guidelines in “Working inside the server with the power on” on page 171, and “Handling static-sensitive devices” on page 171. 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.

  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.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:

  1. Go to http://www.ibm.com/systems/support/.
  2. Under **Product support**, click **System x**.
  3. Under **Popular links**, click **Software and device drivers**.
  4. Click **System x3650 M3** to display the matrix of downloadable files for the server.

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

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- Before you install optional hardware, 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 25 for diagnostic information.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the cover is removed, make sure that no one is near the server and that no tools or other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you can stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- To view the error LEDs on the system board and internal components, leave the server connected to power.
- You do not have to turn off the server to install or replace hot-swap fans, redundant hot-swap ac power supplies, 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 or non-hot-swap optional devices or components.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.
- For a list of supported optional-devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

System reliability guidelines

To help ensure proper cooling and system reliability, make sure that:

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

- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap fan within 30 seconds of removal.
- You do not operate the server without the air baffles installed. Operating the server without the air baffles might cause the microprocessor to overheat.

Working inside the server with the power on

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

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

- Avoid wearing loose-fitting clothing on your forearms. Button long-sleeved shirts before working inside the server; do not wear cuff links while you are working inside the server.
- Do not allow your necktie or scarf to hang inside the server.
- Remove jewelry, such as bracelets, necklaces, rings, and loose-fitting wrist watches.
- Remove items from your shirt pocket, such as pens and pencils, that could fall into the server as you lean over it.
- Avoid dropping any metallic objects, such as paper clips, hairpins, and screws, into the server.

Handling static-sensitive devices

Attention: Static electricity can damage the server and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

To reduce the possibility of damage from electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- The use of a grounding system is recommended. For example, wear an electrostatic-discharge wrist strap, if one is available. Always use an electrostatic-discharge wrist strap or other grounding system when working inside the server with the power on
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.

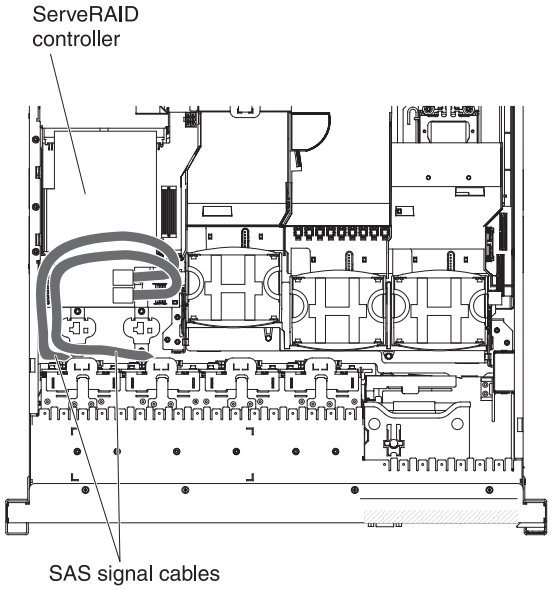
- While the device is still in its static-protective package, touch it to an unpainted metal surface on the outside of the server for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the server without 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 handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Returning a device or component

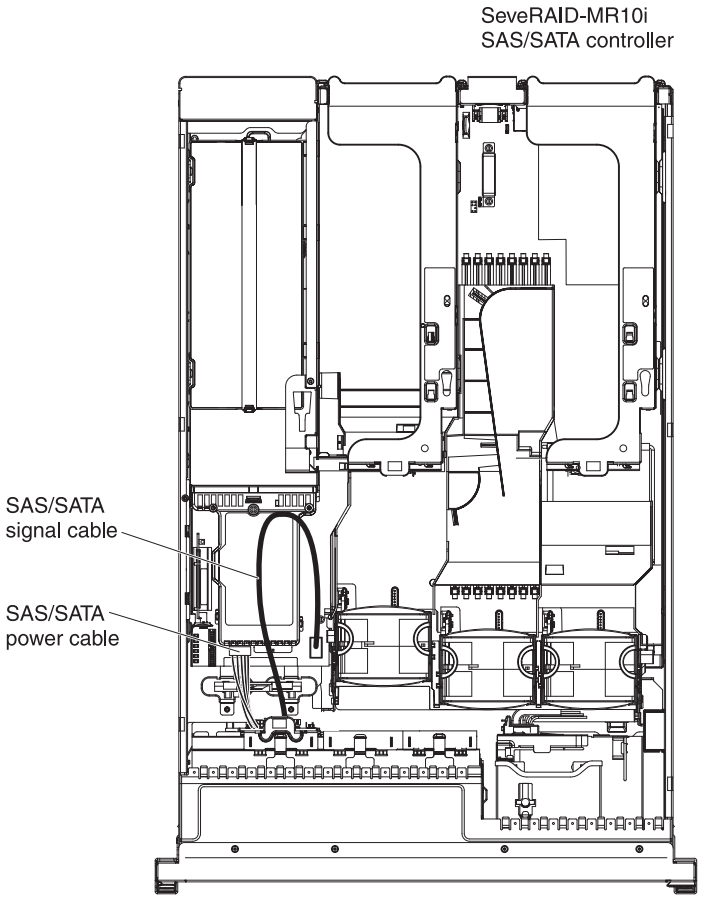
If you are instructed to return a device or component, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Internal cable routing and connectors

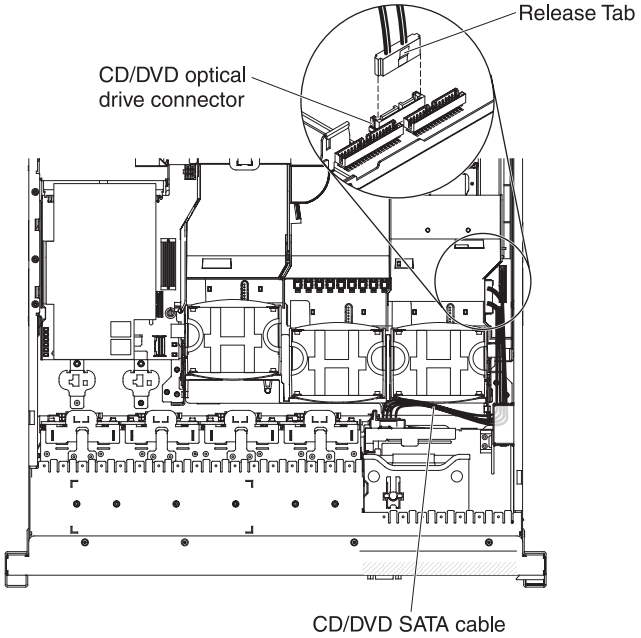
The following illustration shows the internal routing and connectors for the two SAS signal cables.



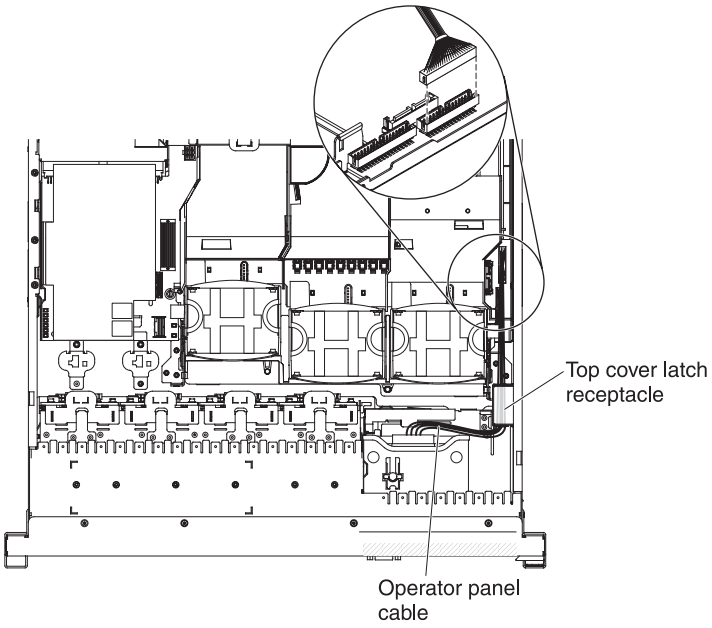
The following illustration shows the internal routing and connectors for the SAS/SATA signal and power cables.



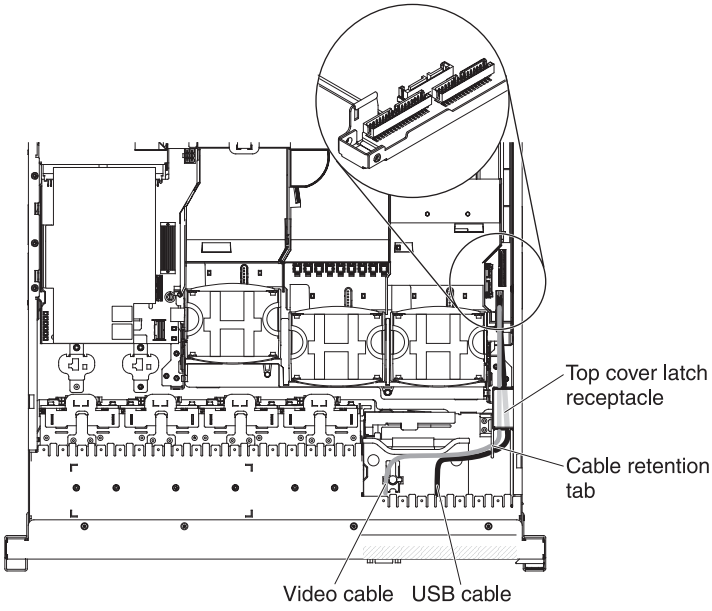
The SATA cable is a combination power and signal cable with a shared connector on both ends. The following illustration shows the internal routing and connector for the SATA cable.



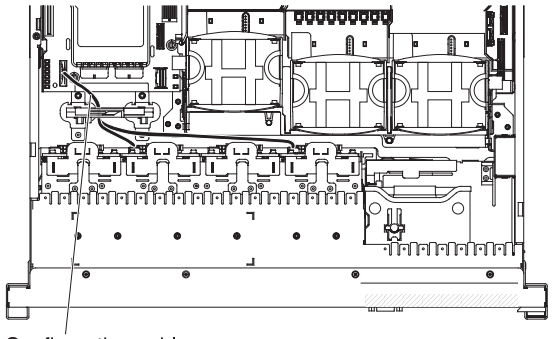
The following illustration shows the internal routing and connector for the operator information panel cable.



The following illustration shows the internal routing and connector for the USB/video cable.



The following illustration shows the internal routing for the configuration cable.



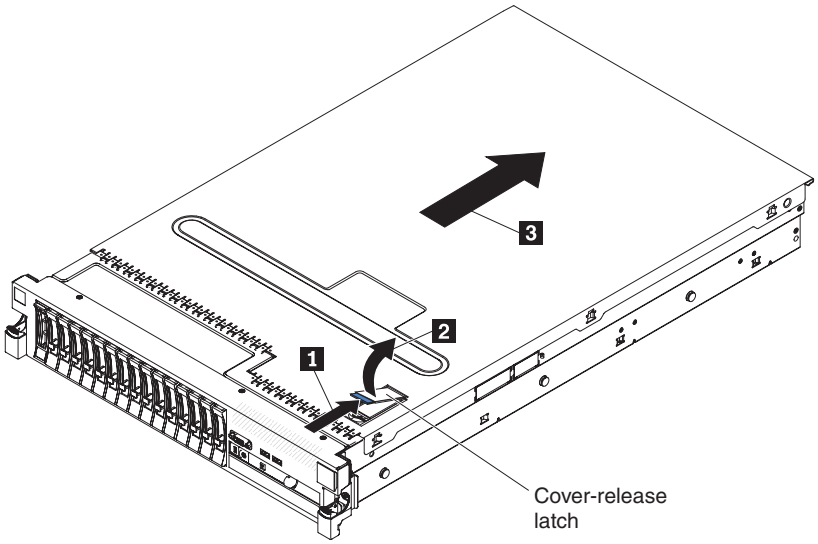
Removing and replacing consumable parts and Tier 1 CRUs

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

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

Removing the cover

To remove the cover, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. If you are planning to view the error LEDs that are on the system board and components, leave the server connected to power and go directly to step 4.
3. If you are planning to install or remove a microprocessor, memory module, PCI adapter, battery, or other non-hot-swap optional device, turn off the server and all attached devices and disconnect all external cables and power cords.

4. Press down on the left and right side latches and slide the server out of the rack enclosure until both slide rails lock.

   Note: You can reach the cables on the back of the server when the server is in the locked position.

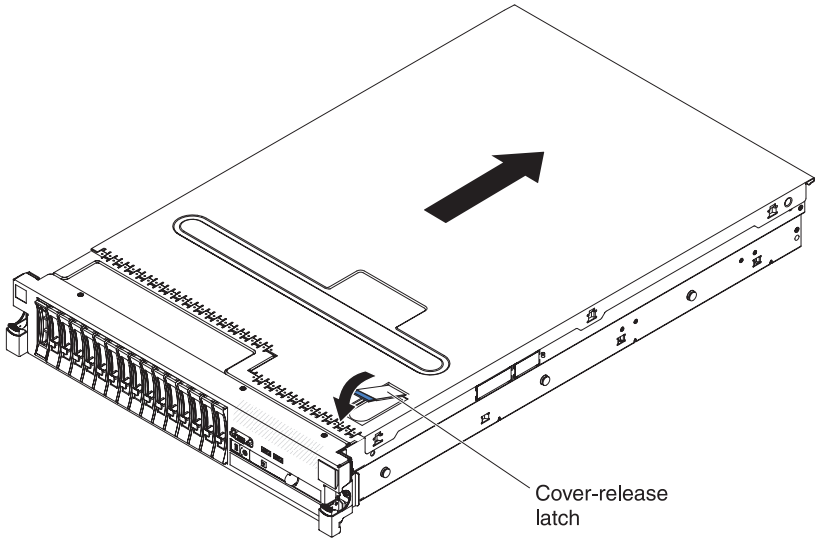
5. Push the cover-release latch back **1**, then lift it up **2**. Slide the cover back **3**, and then lift off the server. Set the cover aside.

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

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 cover

To install the cover, complete the following steps.

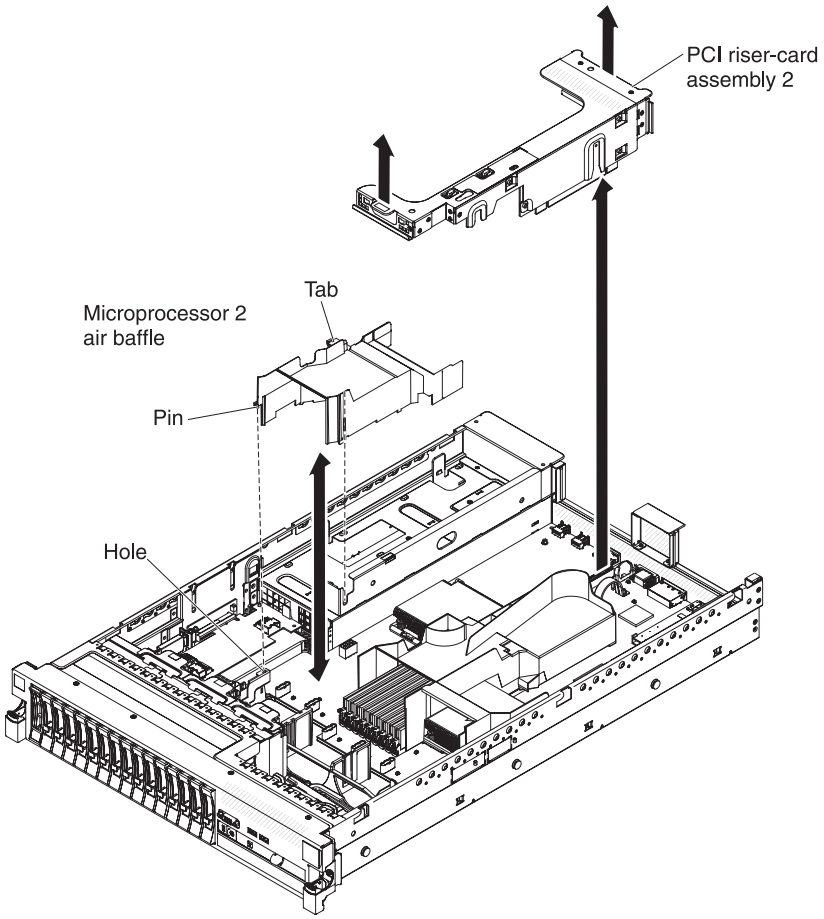


1. Make sure that all internal cables are correctly routed (see “Internal cable routing and connectors” on page 172.)
2. Place the cover-release latch in the open (up) position.
3. Insert the bottom tabs of the top cover into the matching slots in the server chassis.
4. Press down on the cover-release latch to lock the cover in place.
5. Slide the server into the rack.

Removing the microprocessor 2 air baffle

When you work with some optional devices, you must first remove the microprocessor 2 air baffle to access certain components on the system board.

To remove the microprocessor 2 air baffle, complete the following steps.

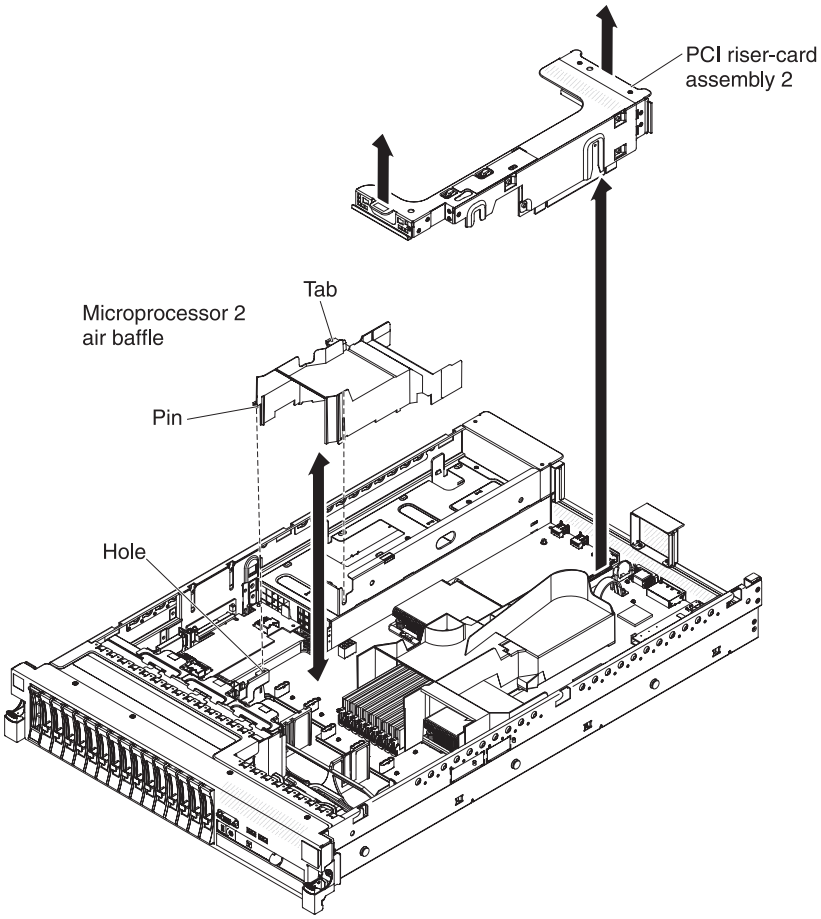


1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 175).
4. Remove PCI riser-card assembly 2 (see “Removing a PCI riser-card assembly” on page 186).
5. Grasp the top of the air baffle and lift the air baffle out of the server.

   Attention: For proper cooling and airflow, replace all air baffles, making sure all cables are out of the way, before you turn on the server. Operating the server with any air baffle removed might damage server components.
6. If you are instructed to return the microprocessor air baffle, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the microprocessor 2 air baffle

To install the microprocessor air baffle, complete the following steps.



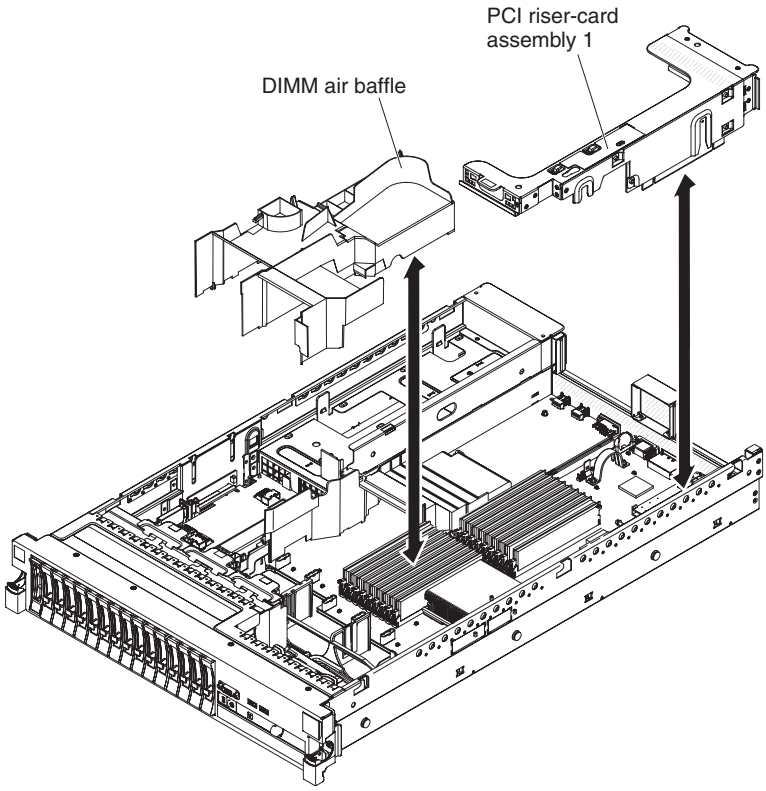
1. Align the tab on the left side of the microprocessor 2 air baffle with the slot in the right side of the power-supply cage.
2. Align the pin on the bottom of the microprocessor air baffle with the hole on the system board retention bracket.
3. Lower the microprocessor 2 air baffle into the server, making sure all cables are out of the way.

   Attention: For proper cooling and airflow, replace all air baffles before you turn on the server. Operating the server with any air baffle removed might damage server components.
4. Install PCI riser-card assembly 2.
5. Install the cover (see “Installing the cover” on page 176).
6. Slide the server into the rack.
7. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the DIMM air baffle

When you work with some optional devices, you must first remove the DIMM air baffle to access certain components or connectors on the system board.

To remove the DIMM air baffle, complete the following steps.

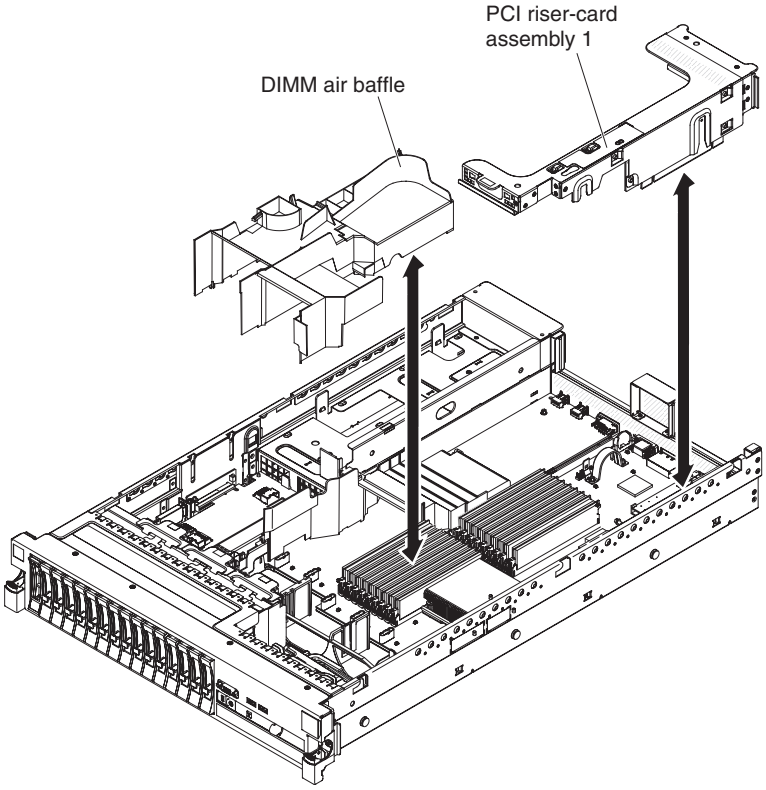


1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 175).
4. If necessary, remove riser-card assembly 1 (see “Removing a PCI riser-card assembly” on page 186).
5. Place your fingers under the front and back of the top of the air baffle; then, lift the air baffle out of the server.

   Attention: For proper cooling and airflow, replace all the air baffles before you turn on the server. Operating the server with any air baffle removed might damage server components.

Installing the DIMM air baffle

To install the DIMM air baffle, complete the following steps.



1. Align the DIMM air baffle with the DIMMs and the back of the fans.
2. Lower the air baffle into place, making sure all cables are out of the way.
3. Replace PCI riser-card assembly 1, if necessary.
4. Install the cover (see “Installing the cover” on page 176).
5. Slide the server into the rack.
6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

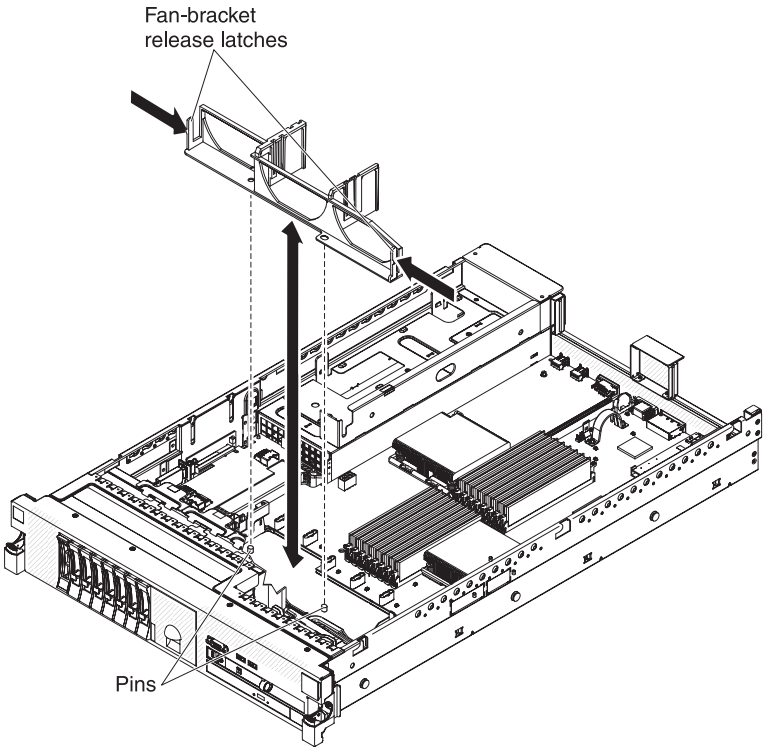
Attention: For proper cooling and airflow, replace all air baffles before you turn on the server. Operating the server with any air baffle removed might damage server components.

Removing the fan bracket

To replace some components or to create working room, you might have to remove the fan-bracket assembly.

Note: To remove or install a fan, it is not necessary to remove the fan bracket. See “Removing a hot-swap fan” on page 221 and “Installing a hot-swap fan” on page 222.

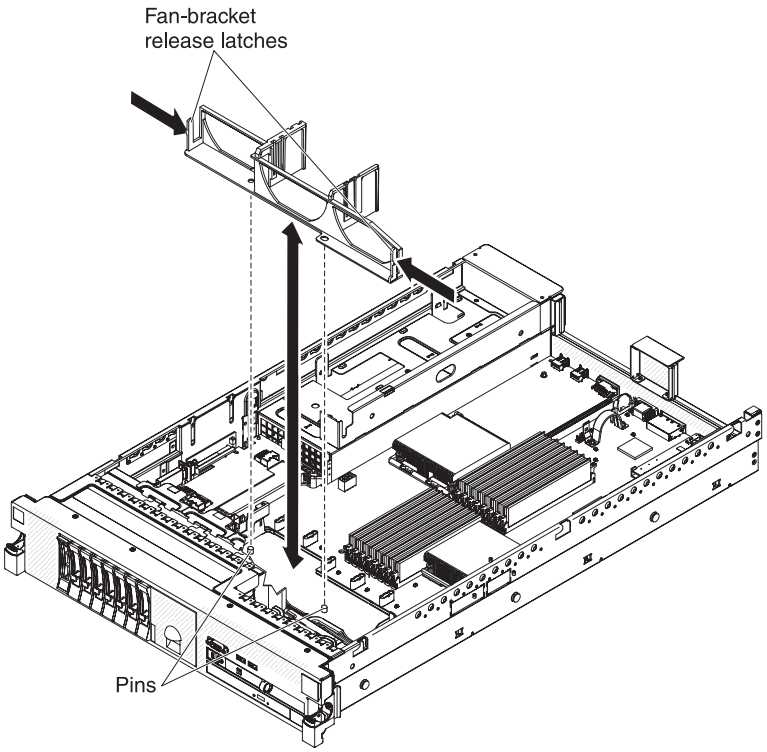
To remove the fan bracket, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 175).
4. Remove the fans (see “Removing a hot-swap fan” on page 221).
5. Remove the PCI riser-card assemblies and the DIMM air baffle (see “Removing a PCI riser-card assembly” on page 186 and “Removing the DIMM air baffle” on page 178).
6. Press the fan-bracket release latches toward each other and lift the fan bracket out of the server.

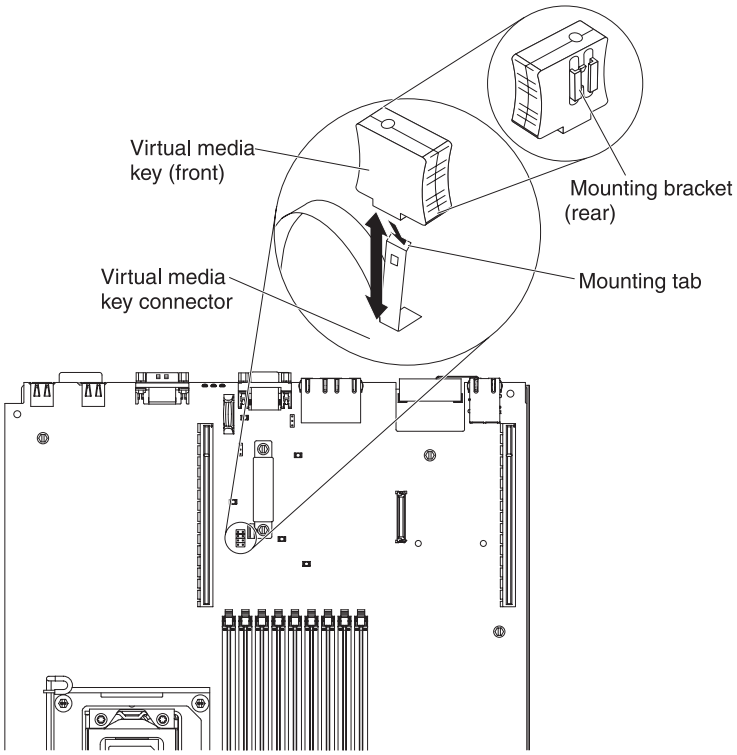
Installing the fan bracket

To install the fan bracket, complete the following steps.



1. Lower the fan bracket into the chassis.
2. Align the holes in the bottom of the bracket with the pins in the bottom of the chassis.
3. Press the bracket into position until the fan-bracket release levers click into place.
4. Replace the fans (see “Installing a hot-swap fan” on page 222).
5. Replace the PCI riser-card assemblies and the DIMM air baffle (see “Installing a PCI riser-card assembly” on page 187 and “Installing the DIMM air baffle” on page 180).
6. Install the cover (see “Installing the cover” on page 176).
7. Slide the server into the rack.
8. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

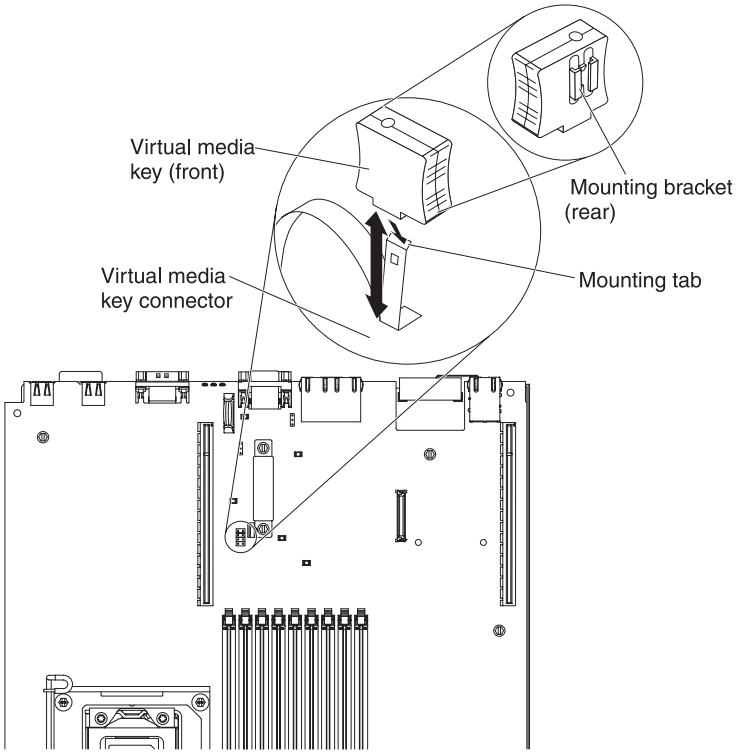
Removing an IBM virtual media key



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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Slide the server out of the rack.
4. Remove the cover (see “Removing the cover” on page 175).
5. Locate the virtual media key on the system board. Grasp it and carefully pull it off the virtual media key connector pins.

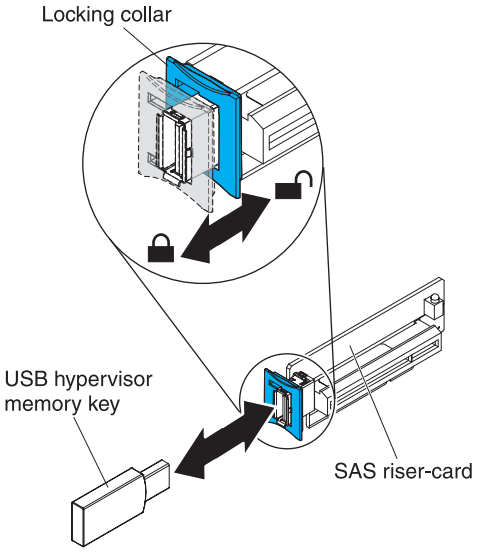
Installing an IBM virtual media key



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

1. Align the virtual media key with the virtual media key connector pins on the system board as shown in the illustration.
2. Insert the virtual media key onto the pins until it clicks into place.
3. Install the server cover (see “Installing the cover” on page 176).
4. Slide the server into the rack.
5. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing a USB hypervisor memory key

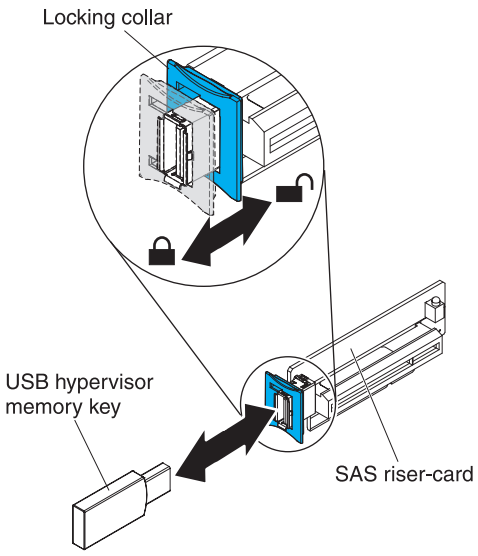


To remove a USB hypervisor memory key from a SAS riser card, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Slide the server out of the rack.
4. Remove the cover (see “Removing the cover” on page 175).
5. Locate the SAS riser-card assembly, which is near the left-front corner of the server.
6. Push the blue locking collar on the USB hypervisor connector back toward the SAS riser card to unlock it from the connector.
7. Pull the hypervisor memory key out of the USB hypervisor connector.
8. If you are instructed to return the hypervisor memory key, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Note: You must configure the server not to look for the hypervisor USB drive. See “Configuring the server” on page 251 for information about disabling hypervisor support.

Installing a USB hypervisor memory key



To install a USB hypervisor memory key in the SAS riser card, complete the following steps:

1. Locate the SAS riser-card assembly, which is near the left-front corner of the server.
2. Push the blue locking collar on the USB hypervisor connector on the SAS riser card toward the SAS riser card (the unlocked position).
3. Insert the hypervisor memory key into the dedicated USB connector.
4. Slide the blue locking collar on the USB hypervisor connector forward, toward the hypervisor memory key as far as it will go, to secure the hypervisor memory key in position.
5. Install the server cover (see “Installing the cover” on page 176).
6. Slide the server into the rack.

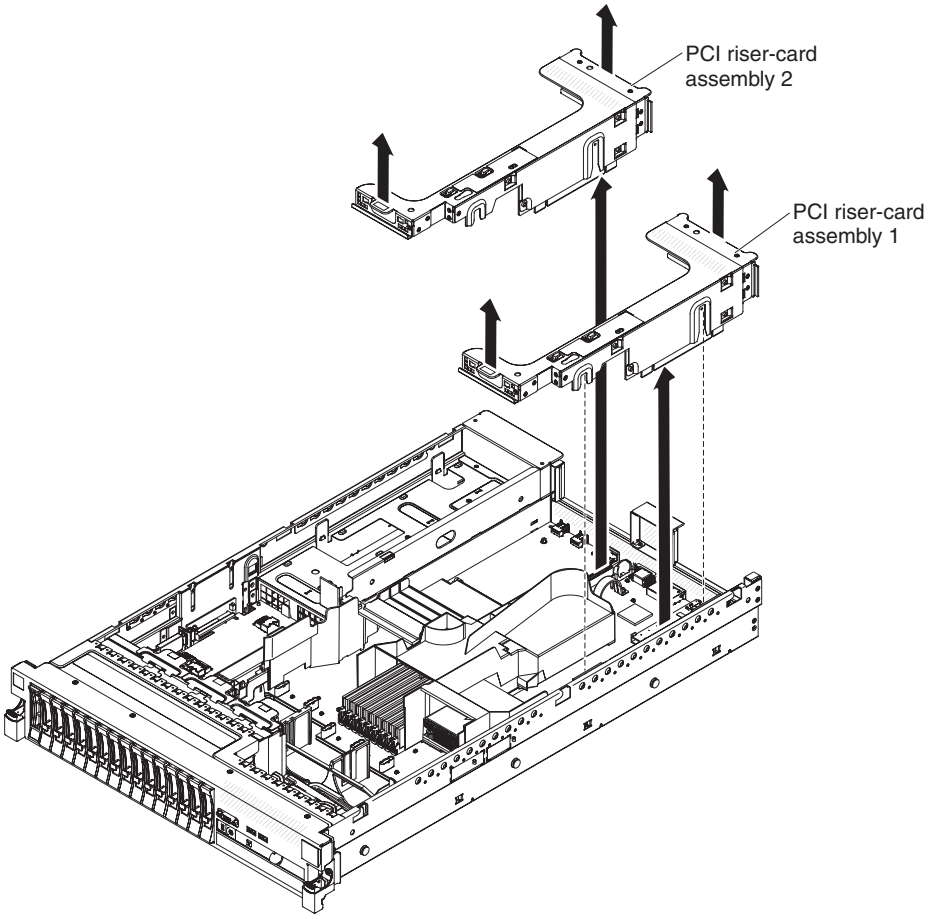
7. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Note: You will have to configure the server to boot from the hypervisor USB drive. See “Configuring the server” on page 251 for information about enabling the hypervisor memory key.

Removing a PCI riser-card assembly

The server comes with one riser-card assembly that contains two PCI Express x8 Gen 2 connectors. You can replace a PCI Express riser-card assembly with a riser-card assembly that contains one PCI Express Gen 2 x16 connector or that contains two PCI-X 64-bit 133 MHz connectors. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of riser-card assemblies that you can use with the server.

To remove a riser-card assembly, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Slide the server out of the rack.
4. Remove the server cover (see “Removing the cover” on page 175).

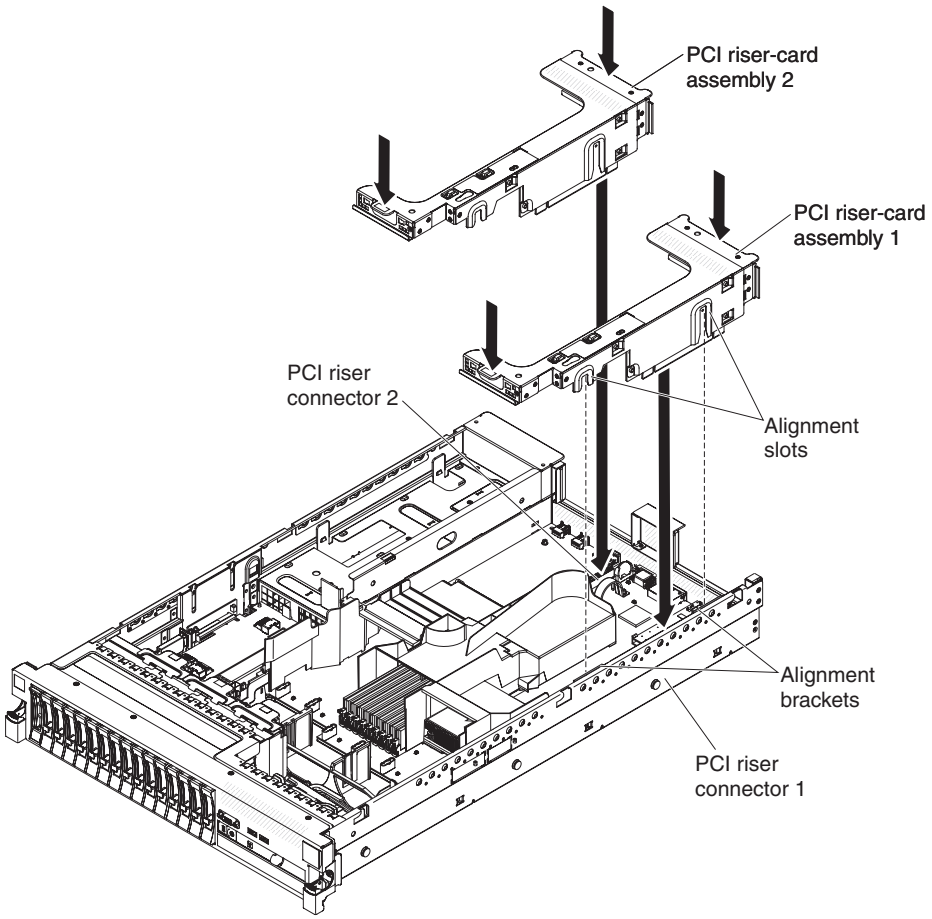
5. Grasp the riser-card assembly at the front tab and rear edge and lift it to remove it from the server. Place the riser-card assembly on a flat, static-protective surface.

Installing a PCI riser-card assembly

The server provides two PCI riser-card slots on the system board. A PCI riser assembly with a bracket is installed in slot 2. The following information indicates the riser-card slots:

- Standard models of the server come with one PCI Express riser-card assembly installed. If you want to replace them with PCI-X riser-card assemblies, you must order the PCI-X riser-card assembly option, which includes the bracket.
- A PCI Express riser-card assembly has a black connector and supports PCI Express adapters, and a PCI-X riser-card assembly has a white (light in color) connector and supports PCI-X adapters.
- PCI riser slot 1 (the farthest slot from the power supplies). This slot supports only low-profile adapters.
- PCI riser slot 2 (the closest slot to the power supplies). You must install a PCI riser-card assembly in slot 2 even if you do not install an adapter.
- Microprocessor 2, aux power, and PCI riser-card assembly 2 share the same power channel that is limited to 230 W.

To install a riser-card assembly, complete the following steps.

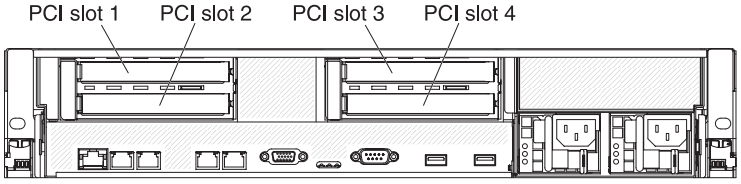


1. Reinstall any adapters and reconnect any internal cables you might have removed in other procedures (see “Internal cable routing and connectors” on page 172.)
2. Align the PCI riser-card assembly with the selected PCI connector on the system board:
   - PCI connector 1: Carefully fit the two alignment slots on the side of the assembly onto the two alignment brackets in the side of the chassis.
   - PCI connector 2: Carefully align the bottom edge (the contact edge) of the riser-card assembly with the riser-card connector on the system board.
3. Press down on the assembly. Make sure that the riser-card assembly is fully seated in the riser-card connector on the system board.
4. Install the server cover (see “Installing the cover” on page 176).
5. Slide the server into the rack.
6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing a PCI adapter from a PCI riser-card assembly

This topic describes removing an adapter from a PCI expansion slot in a PCI riser-card assembly. These instructions apply to PCI adapters such as video graphic adapters and network adapters. To remove a ServeRAID SAS controller from the SAS riser card, go to “Removing a ServeRAID SAS controller from the SAS riser card” on page 199.

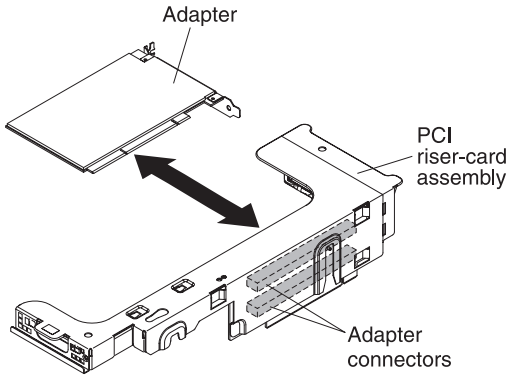
The following illustration shows the locations of the adapter expansion slots from the rear of the server.



Notes:

1. If a PCI Express Gen 2x16 adapter is installed in a PCI riser-card assembly, the second expansion slot is not available.
2. If you are replacing a high power graphics adapter, you might need to disconnect the internal power cable from the system board before removing the adapter.

To remove an adapter from a PCI expansion slot, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Press down on the left and right side latches and slide the server out of the rack enclosure until both slide rails lock; then, remove the cover (see “Removing the cover” on page 175).
4. Remove the PCI riser-card assembly that contains the adapter (see “Removing a PCI riser-card assembly” on page 186).
   - If you are removing an adapter from PCI expansion slot 1 or 2, remove PCI riser-card assembly 1.
   - If you are removing an adapter from PCI expansion slot 3 or 4, remove PCI riser-card assembly 2.
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 PCI expansion slot.
7. If the adapter is a full-length adapter in the upper expansion slot of the PCI riser-card assembly and you do not intend to replace it with another full-length adapter, remove the full-length-adapter bracket and store it on the underside of the top of the PCI riser-card assembly.
8. If you are instructed to return the adapter, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a PCI adapter in a PCI riser-card assembly

To ensure that a ServeRAID-10i, ServeRAID-10is, or ServeRAID-10M adapter works correctly in your server, make sure that the adapter firmware is at the latest level.

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

Some high end video adapters are supported by your server. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for more information.

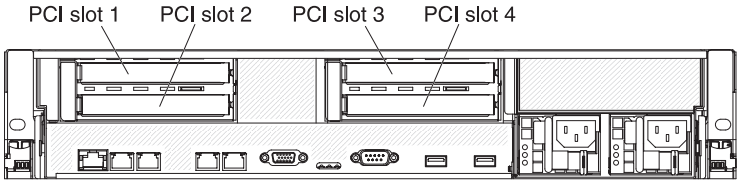
Notes:

1. If you are installing a video adapter in your server, do not set the maximum digital video resolution above 1600 x 1200 at 60 Hz for an LCD monitor. This is the highest resolution supported for any video adapter in this server.

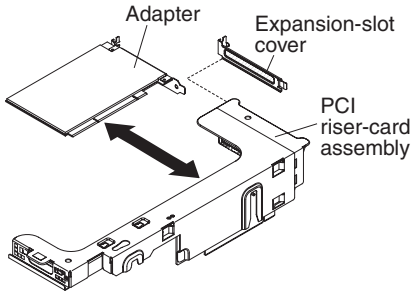
2. Any high-definition video-out connector or stereo connector on the video adapter is not supported.
3. If you are installing x3650 M3 PCI Express Gen 2 x8 riser card (part number 59Y3818), you cannot install any adaptor on slot 1.

This topic describes installing an adapter in a PCI expansion slot in a PCI riser-card assembly. These instructions apply to PCI adapters such as video graphics adapters and network adapters. To install a ServeRAID SAS controller, go to “Installing a ServeRAID SAS controller on the SAS riser card” on page 200.

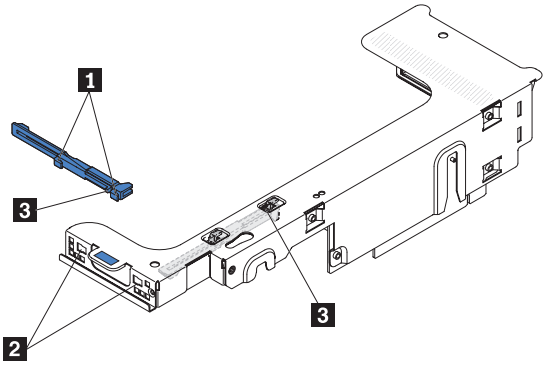
The following illustration shows the locations of the adapter expansion slots from the rear of the server.



To install an adapter, complete the following steps.



1. Install the adapter in the expansion slot.
   a. If the adapter is a full-length adapter for the upper expansion slot (1 or 3) in the riser card, remove the full-length-adapter bracket **1** from underneath the top of the riser-card assembly **3** and insert it in the end of the upper expansion slot **2** of the riser-card assembly.



   b. Align the adapter with the PCI connector on the riser card and the guide on the external end of the riser-card assembly.
   c. Press the adapter firmly into the PCI connector on the riser card.
2. Connect any required cables to the adapter (see “Internal cable routing and connectors” on page 172.)

Attention:

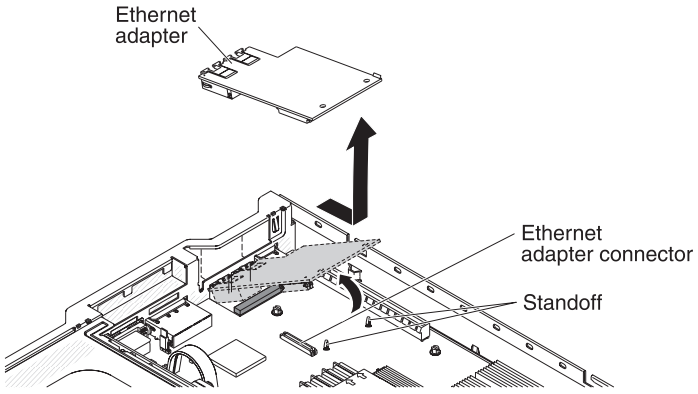
- When you route cables, do not block any connectors or the ventilated space around any of the fans.
- Make sure that cables are not routed on top of components under the PCI riser-card assembly.
- Make sure that cables are not pinched by the server components.

3. Align the PCI riser-card assembly with the selected PCI connector on the system board:
   - PCI-riser connector 1: Carefully fit the two alignment slots on the side of the assembly onto the two alignment brackets on the side of the chassis; align the rear of the assembly with the guides on the rear of the server.
   - PCI-riser connector 2: Carefully align the bottom edge (the contact edge) of the riser-card assembly with the riser-card connector on the system board; align the rear of the assembly with the guides on the rear of the server.
4. Press down on the assembly. Make sure that the riser-card assembly is fully seated in the riser-card connector on the system board.
5. Perform any configuration tasks that are required for the adapter.
6. Install the server cover (see “Installing the cover” on page 176).
7. Slide the server into the rack.
8. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the optional two-port Ethernet adapter

To remove an Ethernet adapter, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 175).
4. Remove the PCI riser-card assembly 1 (see “Removing a PCI riser-card assembly” on page 186).
5. Grasp the Ethernet adapter and disengage it from the standoffs and the connector on the system board; then, slide the Ethernet adapter out of the port openings on the rear of the chassis and remove it from the server.

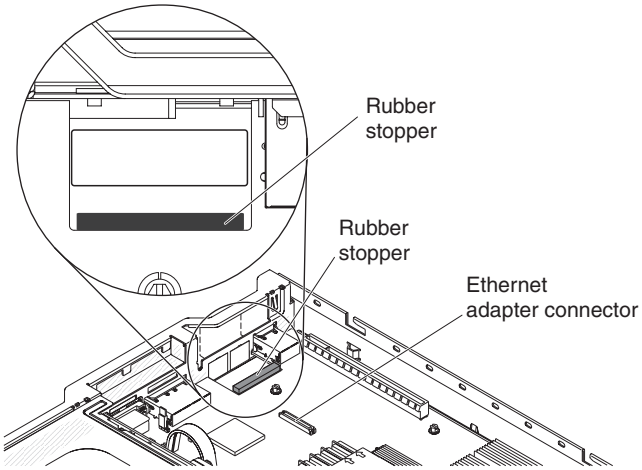


6. If you are instructed to return the Ethernet adapter, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

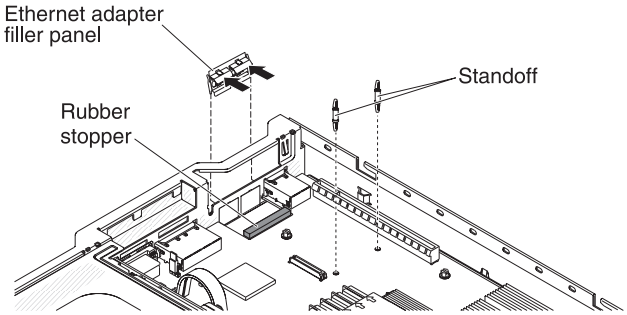
Installing the optional two-port Ethernet adapter

To install an Ethernet adapter, complete the following steps:

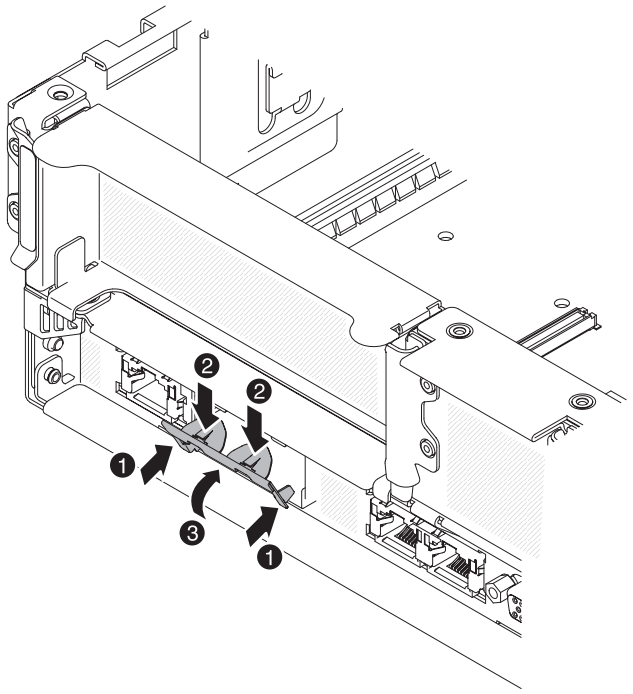
1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Remove the cover (see “Removing the cover” on page 175).
3. Attach the rubber stopper on the chassis, along the edge of the system board, as shown in the following illustration.



4. Remove the adapter filler panel on the rear of the chassis (if it has not been removed already).

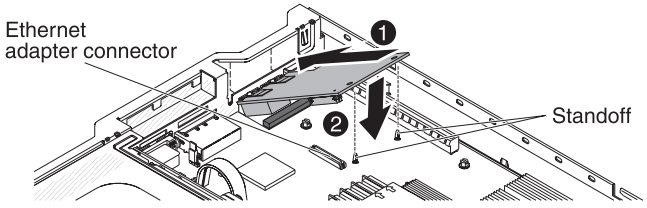


5. Install the two standoffs on the system board.
6. Insert the bottom tabs of the metal clip into the port openings from outside the chassis.



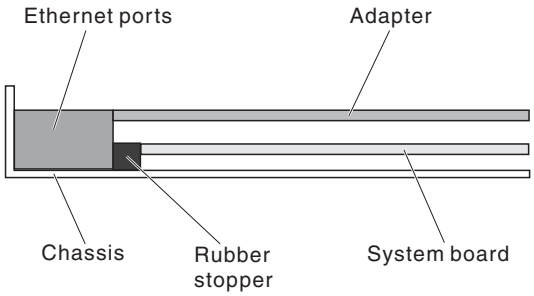
7. While you slightly press the top of the metal clip, rotate the metal clip toward the front of the server until the metal clip clicks into place. Make sure the metal clip is securely engaged on the chassis.

   Attention: Pressing the top of the metal clip with excessive force may cause damage to the metal clip.
8. Touch the static-protective package that contains the new adapter to any unpainted metal surface on the server. Then, remove the adapter from the package.
9. Align the adapter with the adapter connector on the system board; then, tilt the adapter so that the port connectors on the adapter line up with the port openings on the chassis.

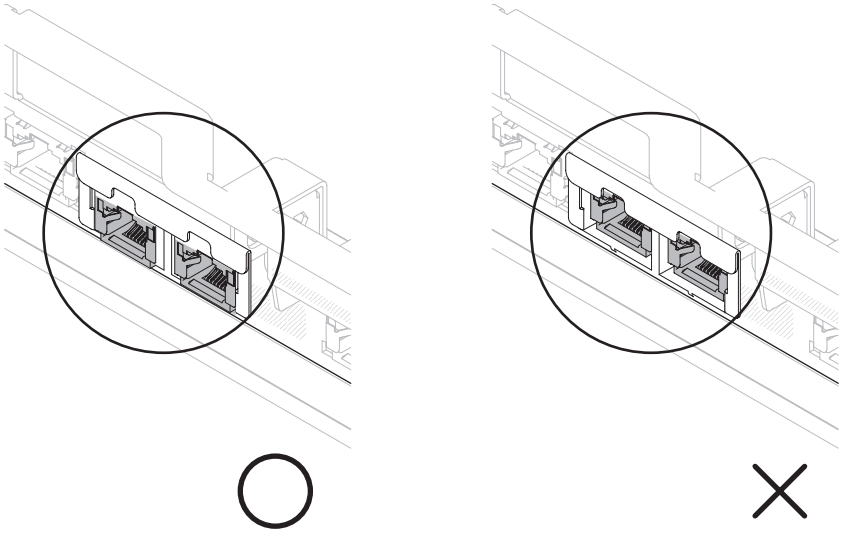


10. Slide the port connectors on the adapter into the port openings on the chassis; then, press the adapter firmly until the two standoffs engage the adapter. Make sure the adapter is securely seated on the connector on the system board.

    Make sure the port connectors on the adapter do not set on the rubber stopper. The following illustration shows the side view of the adapter in the server.



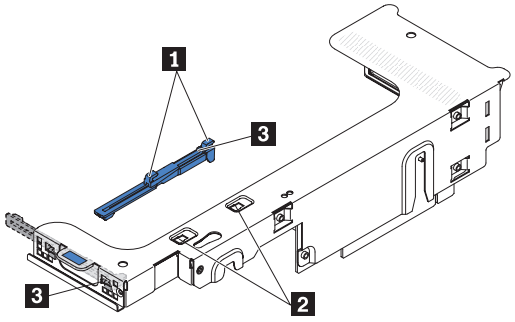
Attention: Make sure the port connectors on the adapter are aligned properly with the chassis on the rear of the server. An incorrectly seated adapter might cause damage to the system board or the adapter.



11. Install PCI riser 1 (see “Installing a PCI riser-card assembly” on page 187).
12. Install the cover (see “Installing the cover” on page 176).
13. Slide the server into the rack.
14. Reconnect the power cord and any cables that you removed.
15. Turn on the peripheral devices and the server.

Storing the full-length-adapter bracket

If you are removing a full-length adapter in the upper riser-card PCI slot and will replace it with a shorter adapter or no adapter, you must remove the full-length-adapter bracket from the end of the riser-card assembly and return the bracket to its storage location.



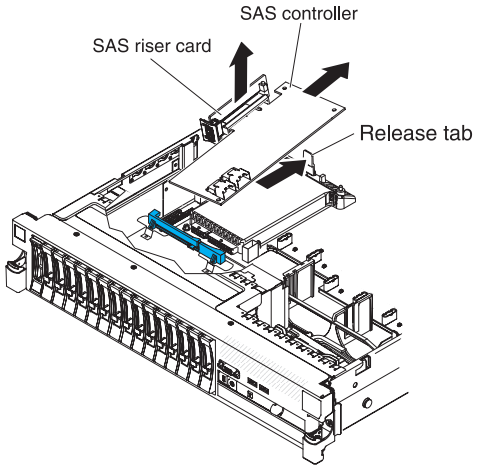
To remove and store the full-length-adapter bracket, complete the following steps:

1. Press the bracket tab **3** and slide the bracket to the left until the bracket falls free of the riser-card assembly.
2. Align the bracket with the storage location on the riser-card assembly as shown.
3. Place the two hooks **1** in the two openings **2** in the storage location on the riser-card assembly.
4. Press the bracket tab **3** and slide the bracket toward the expansion-lot-opening end of the assembly until the bracket clicks into place.

Removing the SAS riser-card and controller assembly

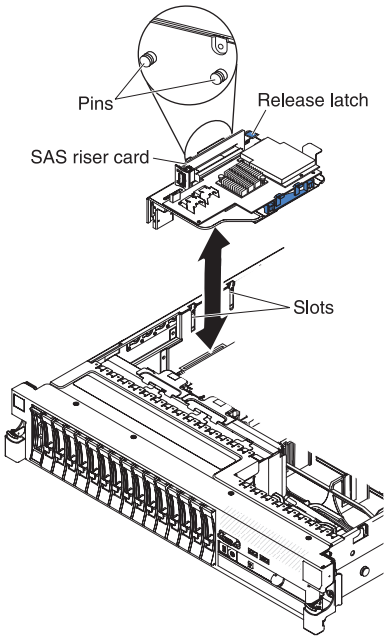
To remove the SAS riser-card and controller assembly from the server, complete the steps for the applicable server model.

- **16-drive-capable server model**



1. Press the release tab toward the rear of the server and lift the back end of the SAS controller card slightly.
2. Place your fingers underneath the upper portion of the SAS riser card and lift the assembly from the system board.
3. Slide the front end of the SAS controller card out of the retention bracket and lift the assembly out of the server.

- **Tape-enabled server model**

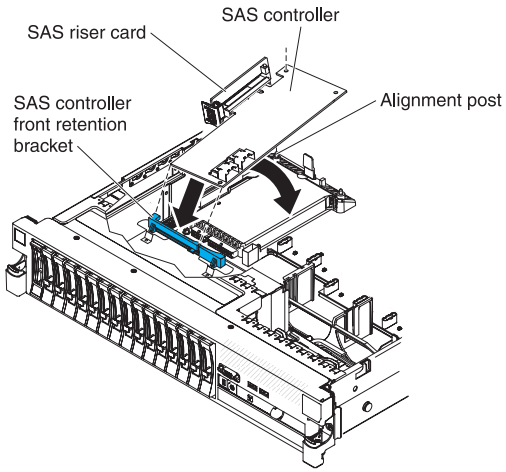


1. Press down on the assembly release latch and lift up on the tab to release the SAS controller assembly, which includes the SAS riser card, from the system board.
2. Lift the front and back edges of the assembly to remove the assembly from the server.

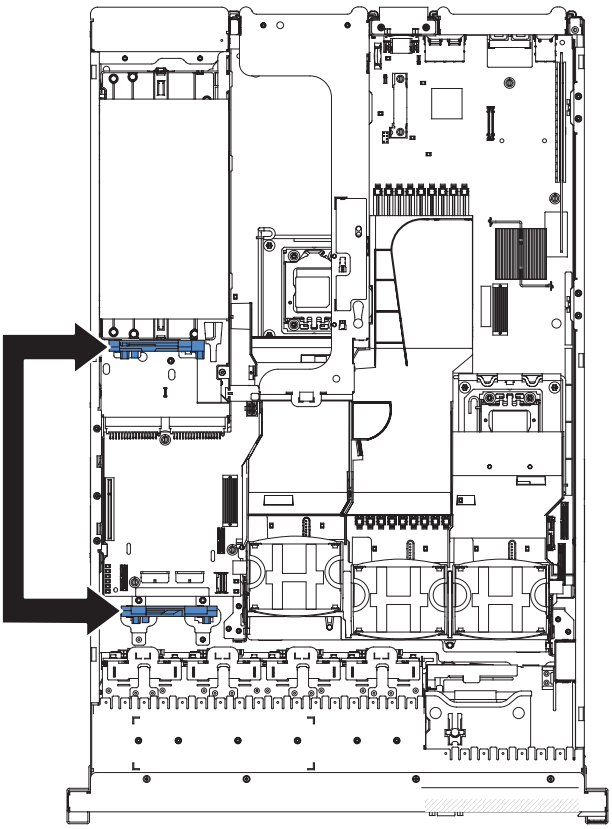
Installing the SAS riser-card and controller assembly

To install the SAS riser-card and controller assembly in the server, complete the steps for the applicable server model.

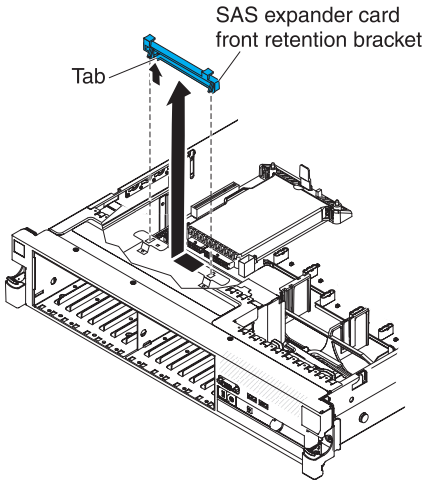
- **16-drive-capable server model**



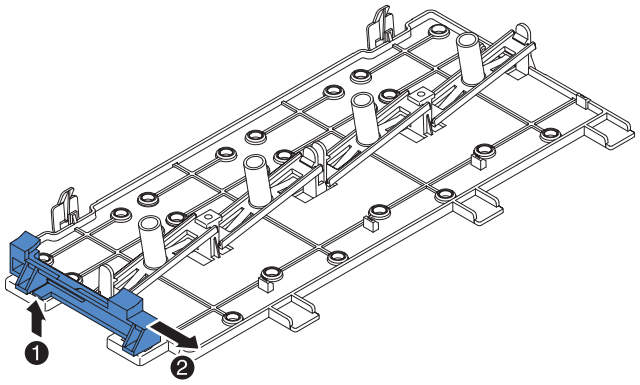
1. If you are replacing a ServeRAID-BR10il v2 SAS/SATA controller with a ServeRAID-M5015/M5014 SAS/SATA controller, you have to swap the controller retention brackets to fit the new SAS controller.



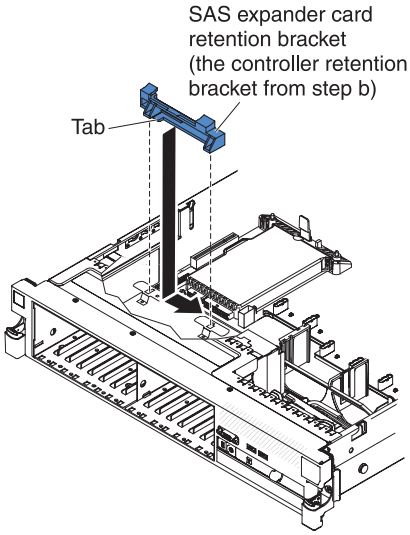
a. Remove the SAS controller front retention bracket from the server.



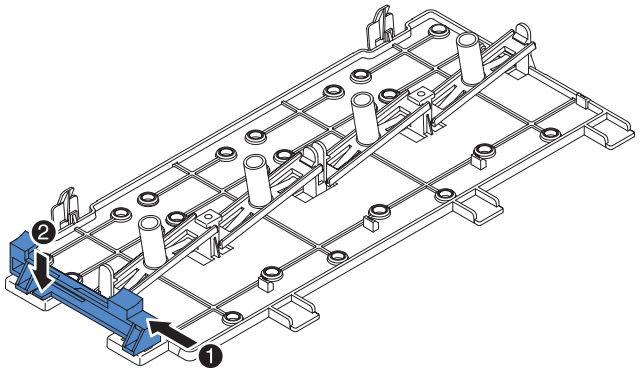
b. Remove the rear controller retention bracket located in the battery bay above the power supplies by pulling up the release tab **1** and sliding the bracket outward **2** .



c. Install the controller retention bracket from step **b** by aligning the retention bracket controller slot and then placing the bracket tabs in the holes on the chassis and slide the bracket to left until it clicks into place.

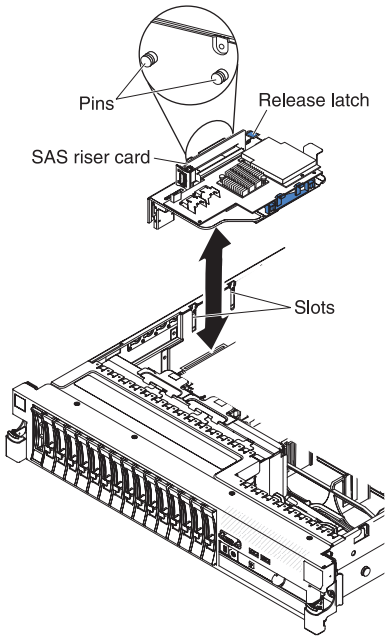


d. Install the controller retention bracket from step **a** by sliding the bracket inward **1** and pressing down the release tab into place **2**.



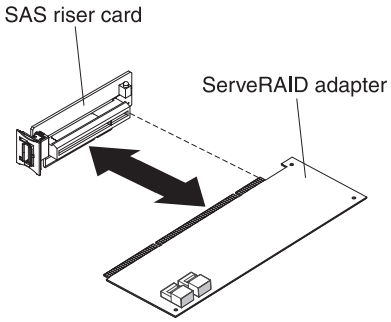
2. Place the front end of the SAS controller in the retention bracket and align the SAS riser card with the SAS riser-card connector on the system board.
3. Press down on the SAS riser card and the rear edge of the SAS controller until the SAS riser card is firmly seated and the SAS controller card retention latch clicks into place. One or two pins (depending on the size of the card) clicks into the corner holes of the SAS controller card when the controller card is correctly seated.

- **Tape-enabled server model**



1. Align the pins on the backside of the riser with the slots on the side of the chassis.
2. Align the SAS riser card of the SAS controller assembly with the SAS riser-card connector on the system board.
3. Press the SAS controller assembly into place; make sure that the SAS riser card is firmly seated and that the release latch and retention latch holds the assembly securely.

Removing a ServeRAID SAS controller from the SAS riser card



Note: For brevity, in this documentation the ServeRAID SAS controller is often referred to simply as the *SAS controller*.

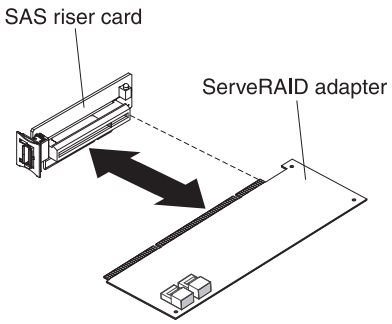
A ServeRAID SAS controller is installed in a dedicated slot on the SAS riser card.

Important: If you have installed a 8-disk-drive optional expansion device in a 16-drive-capable server, the SAS controller is installed in a PCI riser-card assembly and is installed and removed the same way as any other PCI adapter. Do not use the instructions in this topic; use the instructions in “Removing a PCI adapter from a PCI riser-card assembly” on page 188.

To remove a ServeRAID SAS controller from a SAS riser card, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 175).
4. Locate the SAS riser-card and controller assembly near the left-front corner of the server.
5. Disconnect the SAS signal cables from the connectors on the SAS controller (see “Internal cable routing and connectors” on page 172).
6. Remove the SAS controller assembly, which includes the SAS riser card, from the server (see “Removing the SAS riser-card and controller assembly” on page 195).
7. If the server is a tape-enabled-model, press the tab on the SAS-controller retention bracket away from the SAS riser card and lift the right edge of the SAS controller card out of the bracket.
8. Pull the SAS controller horizontally out of the connector on the SAS riser card.
9. If you are replacing the SAS controller card, then remove the battery but keep the cables connected.
10. If you are instructed to return the ServeRAID SAS controller, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a ServeRAID SAS controller on the SAS riser card

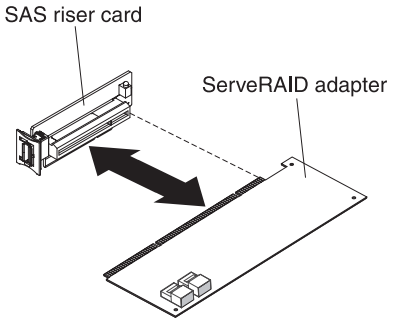


Important: If you have installed a 8-disk-drive optional expansion device in a 16-drive-capable server, the SAS controller is installed in a PCI riser-card assembly and is installed and removed the same way as any other PCI adapter. Do not use the instructions in this topic; use the instructions in “Installing a PCI adapter in a PCI riser-card assembly” on page 189.

To ensure that a RAID adapter works correctly in your server, make sure that the adapter firmware is at the latest level.

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

To install a SAS controller on the SAS riser card, complete the following steps.



1. Touch the static-protective package that contains the new ServeRAID SAS controller to any unpainted metal surface on the server. Then, remove the ServeRAID SAS controller from the package.
2. If you are replacing a SAS controller that uses a battery, you can continue to use that battery with your new SAS controller.
3. If the new SAS controller is a different physical size than the SAS controller that you removed, you might have to move the controller retention bracket (tape-enabled model servers only) to the correct location for the new SAS controller.
4. Turn the SAS controller so that the keys on the bottom edge align correctly with the connector on the SAS riser card in the SAS controller assembly.
5. Firmly press the SAS controller horizontally into the connector on the SAS riser card.
6. (Tape-enabled model server only) Gently press the opposite edge of the SAS controller into the controller retention bracket.
7. Install the SAS riser-card and controller assembly (see “Installing the SAS riser-card and controller assembly” on page 196).
8. Install the server cover (see “Installing the cover” on page 176).
9. Slide the server into the rack.
10. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Notes:

1. When you restart the server for the first time after you install a SAS 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.

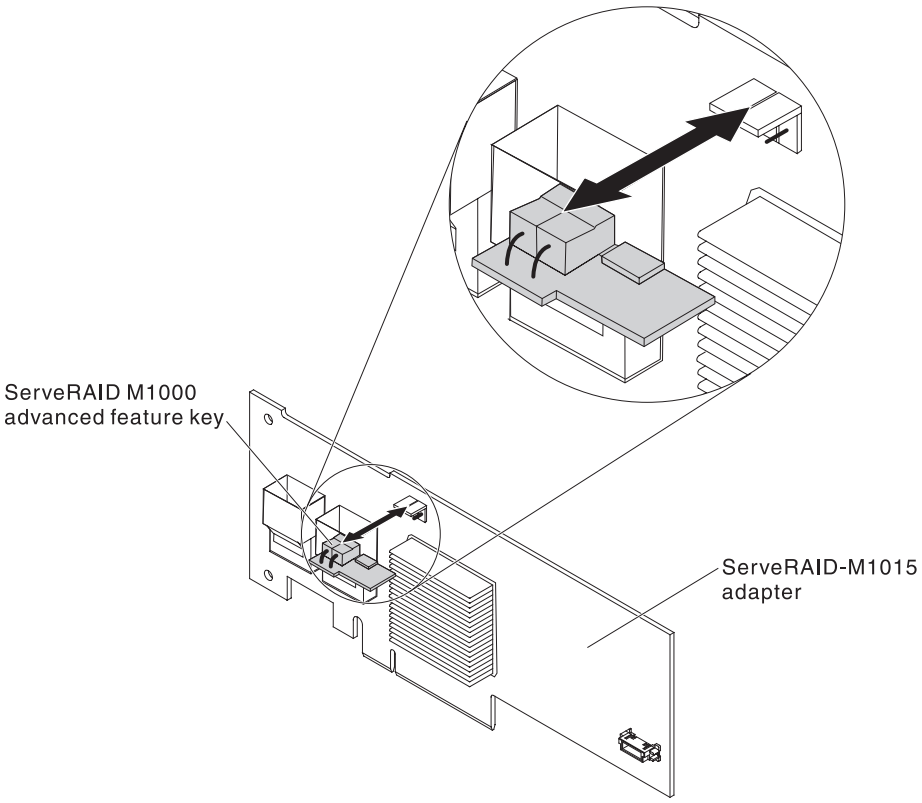
   The battery comes partially charged, at 30% or less of capacity. Run the server for 4 to 6 hours to fully charge the controller battery. The LED just above the battery on the controller remains lit until the battery is fully charged.

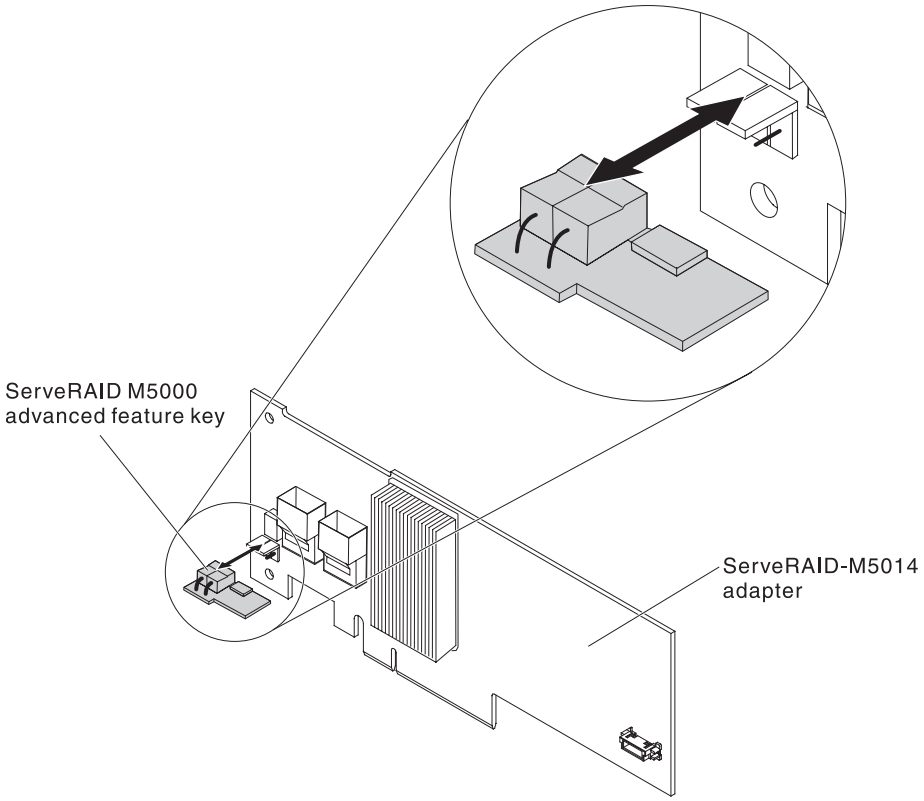
   Until the battery is fully charged, the controller firmware sets the controller cache to write-through mode; after the battery is fully charged, the controller firmware re-enables write-back mode.
2. When you restart the server, you will be given the opportunity to import the existing RAID configuration to the new ServeRAID SAS controller.

Removing an optional ServeRAID adapter advanced feature key

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices and disconnect the power cords.
3. Remove the cover (see “Removing the cover” on page 175).
4. Grasp the feature key and lift to remove it from connector on the ServeRAID adapter.



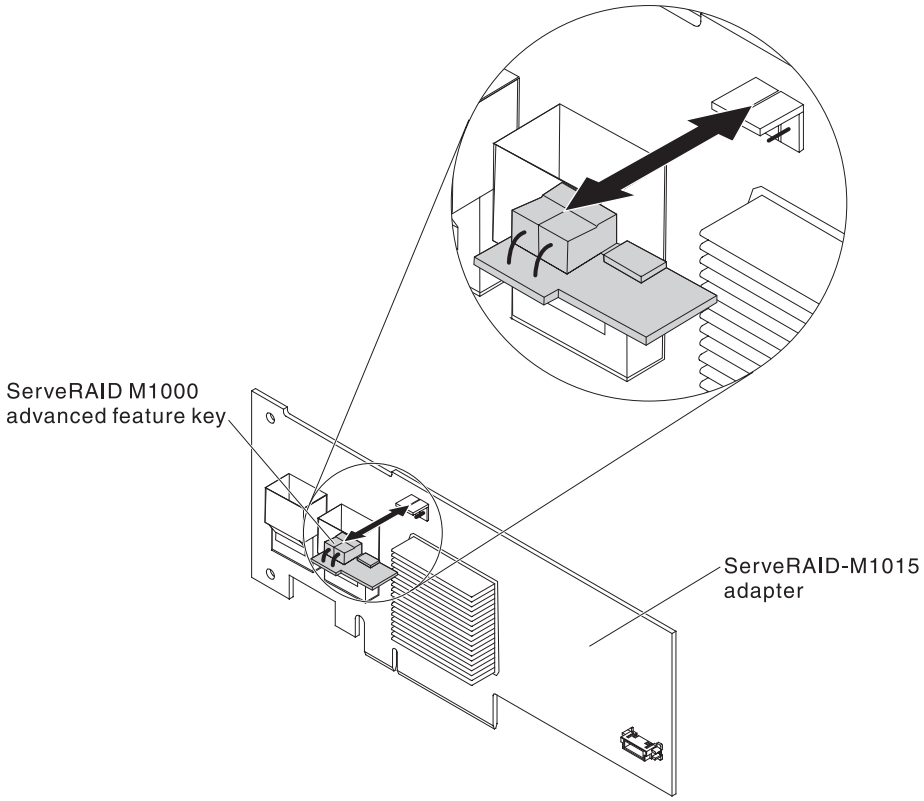


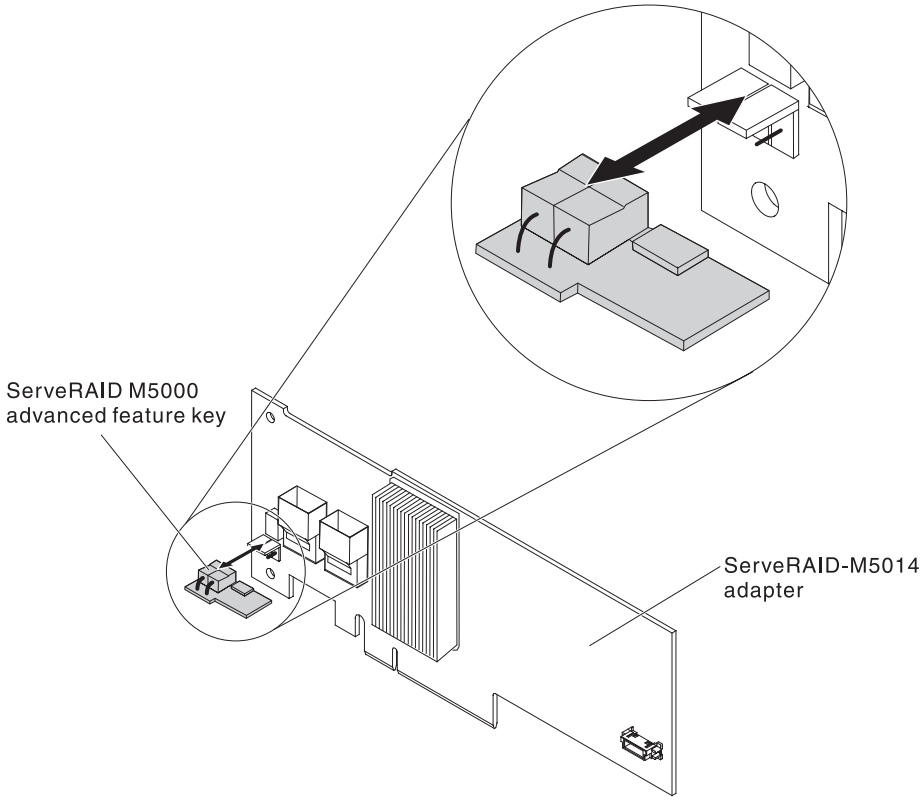
5. If you are instructed to return the feature key, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an optional ServeRAID adapter advanced feature key

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices and disconnect the power cords.
3. Remove the cover (see “Removing the cover” on page 175).
4. Align the feature key with the connector on the ServeRAID adapter and push it into the connector until it is firmly seated.





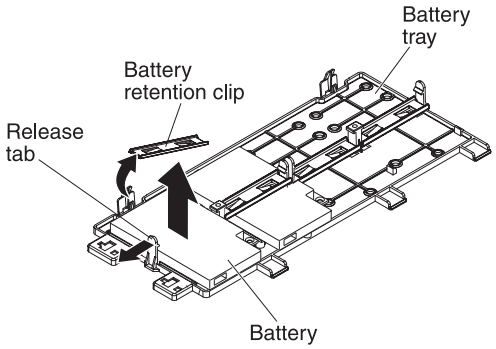
5. Reconnect the power cord and any cables that you removed.
6. Install the cover “Installing the cover” on page 176
7. Slide the server into the rack.

8. Turn on the peripheral devices and the server.

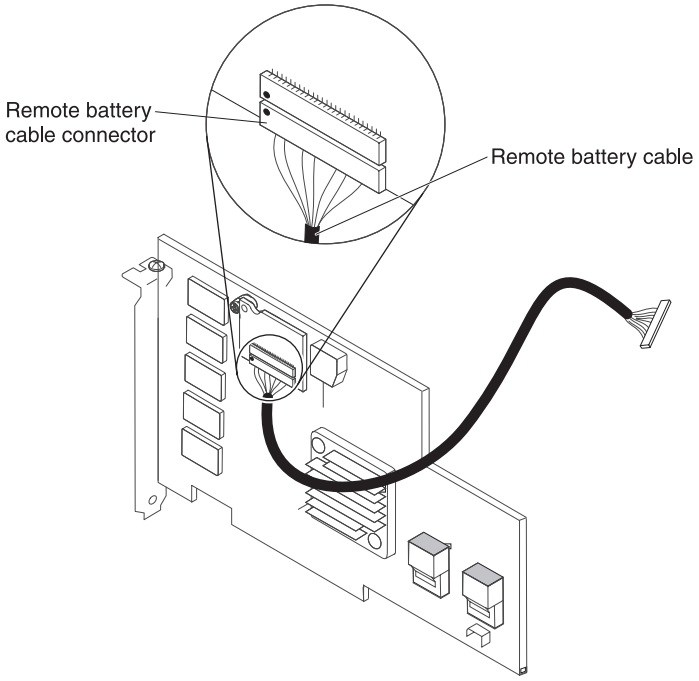
Removing a ServeRAID SAS controller battery from the remote battery tray

To remove a ServeRAID SAS 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 169.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 175).
4. Locate the remote battery tray in the server and remove the battery that you want to replace:
   a. Remove the battery retention clip from the tabs that secure the battery to the remote battery tray.



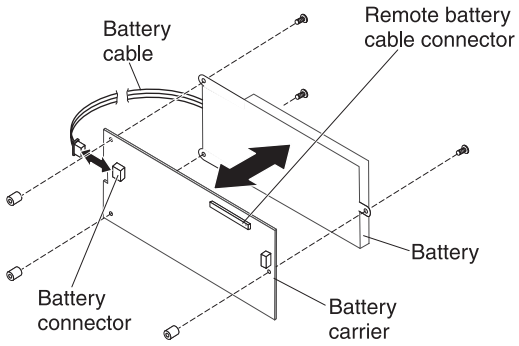
   b. Lift the battery and battery carrier from the tray and carefully disconnect the remote battery cable from the interposer card on the ServeRAID controller.



   c. Disconnect the battery carrier cable from the battery.

d. Squeeze the clip on the side of the battery and battery carrier to remove the battery from the battery carrier.

Note: If your battery and battery carrier are attached with screws instead of a locking-clip mechanism, remove the three screws to remove the battery from the battery carrier.



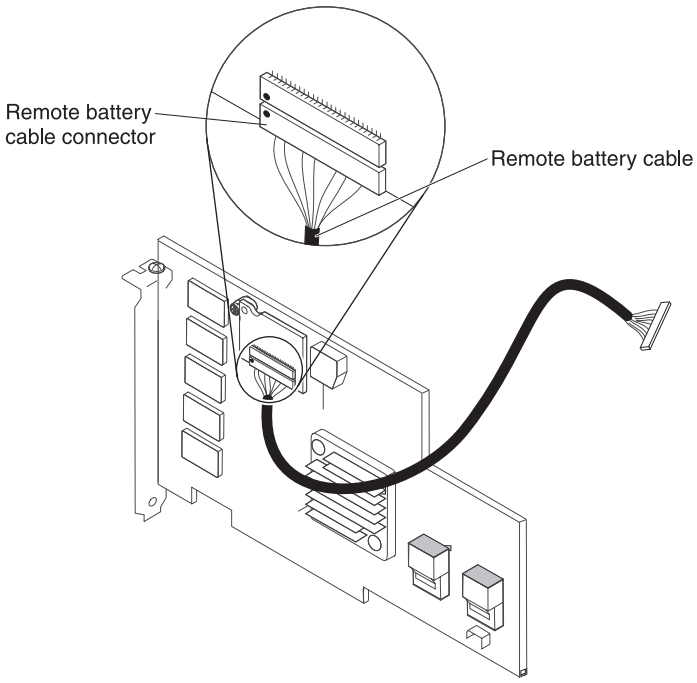
e. If you are instructed to return the ServeRAID SAS controller battery, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a ServeRAID SAS controller battery on the remote battery tray

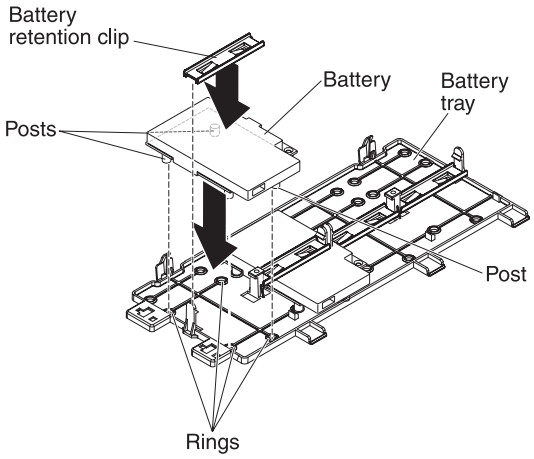
To install a ServeRAID SAS controller battery on the remote battery tray, complete the following steps:

1. Install the replacement battery on the remote battery tray:
   a. Place the replacement battery on the battery carrier from which the former battery had been removed, and connect the battery carrier cable to the replacement battery.
   b. Connect the remote battery cable to the interposer card.

      Attention: To avoid damage to the hardware, make sure that you 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.*



c. On the remote battery tray, find the pattern of recessed rings that matches the posts on the battery and battery carrier.

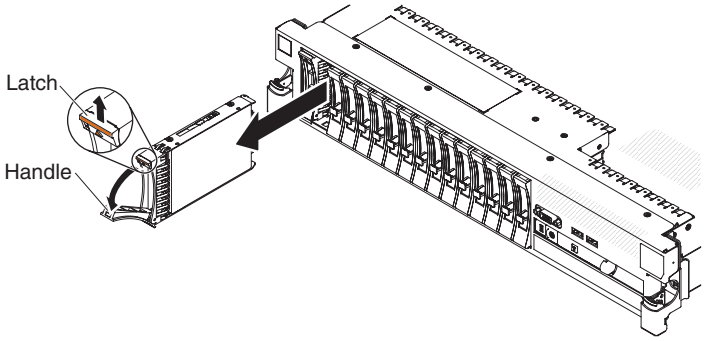


d. Press the posts into the rings and underneath the tabs on the remote battery tray.

e. Secure the battery to the tray with the battery retention clip.

2. Install the cover “Installing the cover” on page 176

Removing a hot-swap hard disk drive



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

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

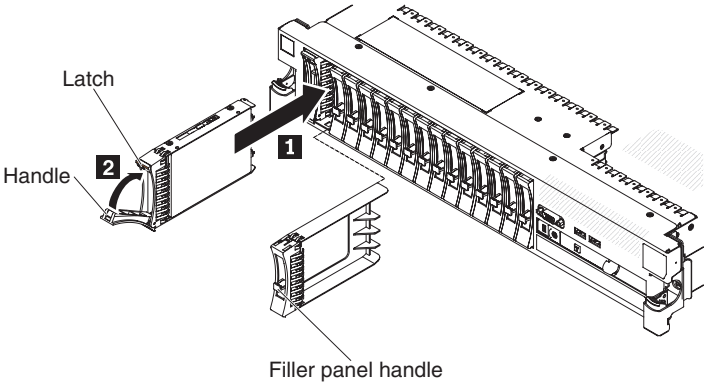
1. Read the safety information that begins on page vii, “Handling static-sensitive devices” on page 171, and “Installation guidelines” on page 169.
2. Press up on the release latch at the top of the drive front.
3. Rotate the handle on the drive downward to the open position.
4. Pull the hot-swap drive assembly out of the bay approximately 25 mm (1 inch). Wait approximately 45 seconds while the drive spins down before you remove the drive assembly completely from the bay.
5. If you are instructed to return the hot-swap drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a hot-swap hard disk drive

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

For information about the type of hard disk drive that the server supports and other information that you must consider when installing a hard disk drive, see the *Installation and User’s Guide* on the IBM *Documentation* CD.

Important: Do not install a SCSI hard disk drive in this server.



To install a drive in a hot-swap bay, complete the following steps.

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

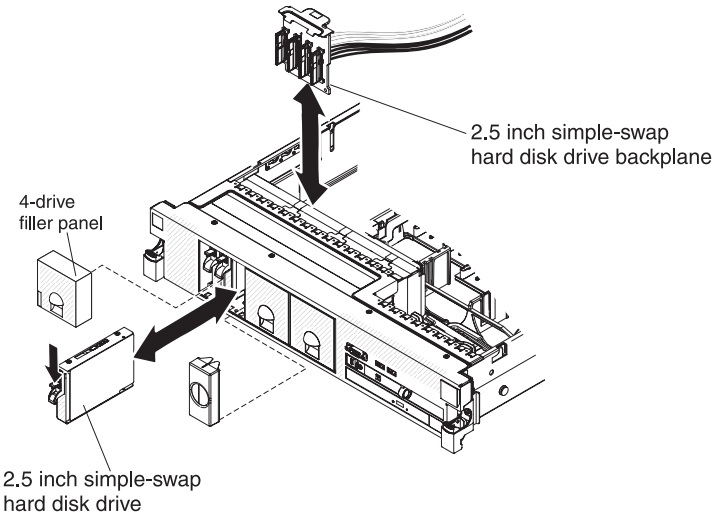
1. Orient the drive as shown in the illustration.
2. Make sure that the tray handle is open.
3. Align the drive assembly with the guide rails in the bay.
4. Gently push the drive assembly into the bay until the drive stops.
5. Push the tray handle to the closed (locked) position.
6. If the system is turned on, check the hard disk drive status LED to verify that the hard disk drive is operating correctly.

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

After you replace a failed hard disk drive, the green activity LED flashes as the disk spins up. The amber LED turns off after approximately 1 minute. If the new drive starts to rebuild, the amber LED flashes slowly, and the green activity LED remains lit during the rebuild process. If the amber LED remains lit, see “Hard disk drive problems” on page 44.

Note: 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.

Removing a simple-swap hard disk drive



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

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

1. Read the safety information that begins on page vii, “Handling static-sensitive devices” on page 171, and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables.

   Note: When you disconnect the power source from the server, you lose the ability to view the LEDs because the LEDs are not lit when the power source is removed. Before you disconnect the power source, make a note of which LEDs

are lit, including the LEDs that are lit on the operation information panel, on the light path diagnostics panel, and LEDs inside the server on the system board; then, see Chapter 3, “Diagnostics,” on page 25 for information about how to solve the problem.

3. Press up on the release latch at the top of the drive front.
4. Rotate the handle on the drive downward to the open position.
5. If you are replacing the 2.5 inch simple-swap hard disk drive backplane, remove it now.
6. If you are instructed to return the simple-swap drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

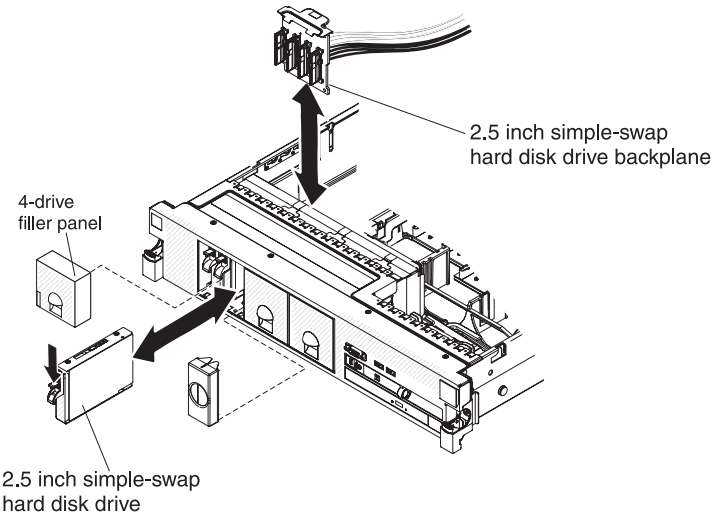
Installing a simple-swap hard disk drive

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

Simple-swap models do not support the SAS hot-swap backplane or the SAS riser card.

For information about the type of hard disk drive that the server supports and other information that you must consider when installing a hard disk drive, see the *Installation and User’s Guide* on the IBM *Documentation* CD.

Important: Do not install a SCSI hard disk drive in this server.



To install a drive in a simple-swap bay, complete the following steps.

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

1. Install the 2.5 inch simple-swap hard disk drive backplane.
2. Remove the drive filler panel from the front of the server.
3. Orient the drive as shown in the illustration.
4. Make sure that the tray handle is open.
5. Align the drive assembly with the guide rails in the bay.
6. Gently push the drive assembly into the bay until the drive stops.
7. Push the tray handle to the closed (locked) position.

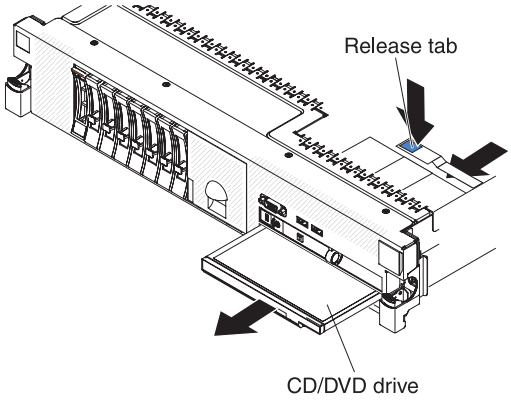
8. If the system is turned on, check the hard disk drive status LED to verify that the hard disk drive is operating correctly.

After you replace a failed hard disk drive, the green activity LED flashes as the disk spins up. The amber LED turns off after approximately 1 minute. If the new drive starts to rebuild, the amber LED flashes slowly, and the green activity LED remains lit during the rebuild process. If the amber LED remains lit, see “Hard disk drive problems” on page 44.

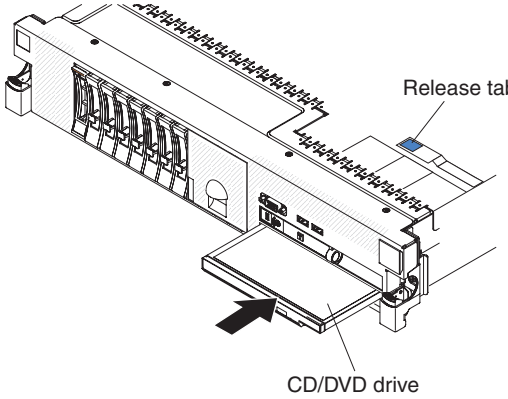
Note: You might have to reconfigure the disk arrays after you install hard disk drives. See the RAID documentation on the IBM *ServeRAID Support* CD for information about RAID controllers.

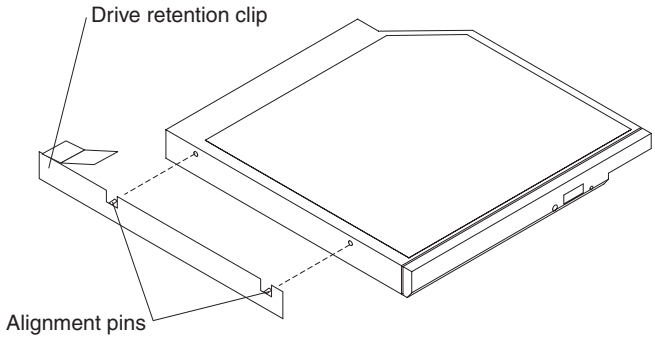
Removing an optional CD-RW/DVD drive

To remove an optional CD-RW/DVD drive, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Slide the server out of the rack; then, remove the cover (see “Removing the cover” on page 175).
4. Press the release tab down to release the drive; then, while you press the tab, push the drive toward the front of the server.
5. From the front of the server, pull the drive out of the bay.

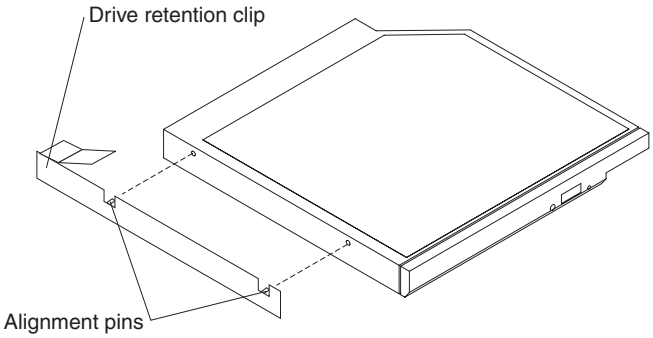




6. Remove the drive retention clip from the drive.
7. If you are instructed to return the CD-RW/DVD drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an optional CD-RW/DVD drive

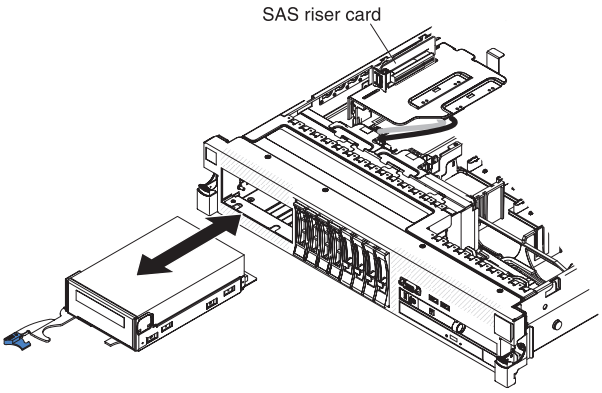
To install the replacement CD-RW/DVD drive, complete the following steps.



1. Remove the drive filler panel.
2. Attach the drive-retention clip to the side of the drive.
3. Slide the drive into the CD/DVD drive bay until the drive clicks into place.
4. Install the cover (see “Installing the cover” on page 176).
5. Slide the server into the rack.
6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

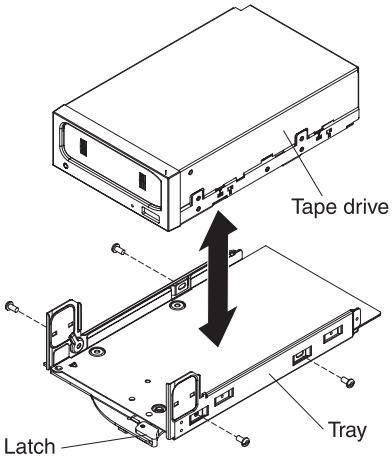
Removing a tape drive

The following illustration shows how to remove an optional tape drive from the server.



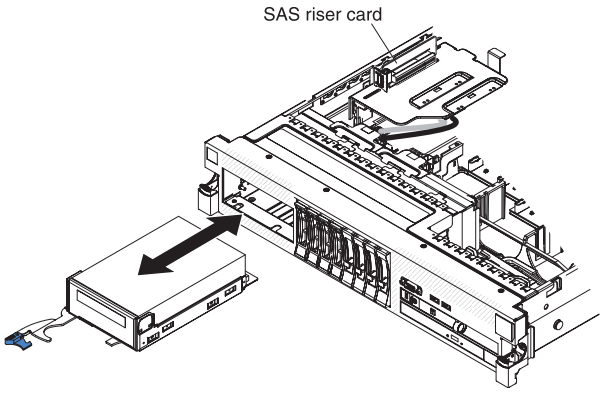
To remove a tape drive from the server, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Slide the server out of the rack; then, remove the cover (see “Removing the cover” on page 175).
4. Open the tape drive tray release latch and slide the drive tray out of the bay approximately 25 mm (1 inch).
5. Disconnect the power and signal cables from the rear of the tape drive.
6. Pull the drive completely out of the bay.
7. Remove the tape drive from the drive tray by removing the four screws on the sides of the tray.



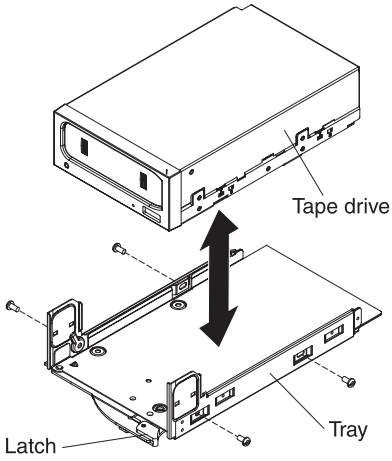
8. If you are not installing another drive in the bay, insert the tape drive filler panel into the empty tape drive bay.
9. If you are instructed to return the drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a tape drive



To install a tape drive, complete the following steps:

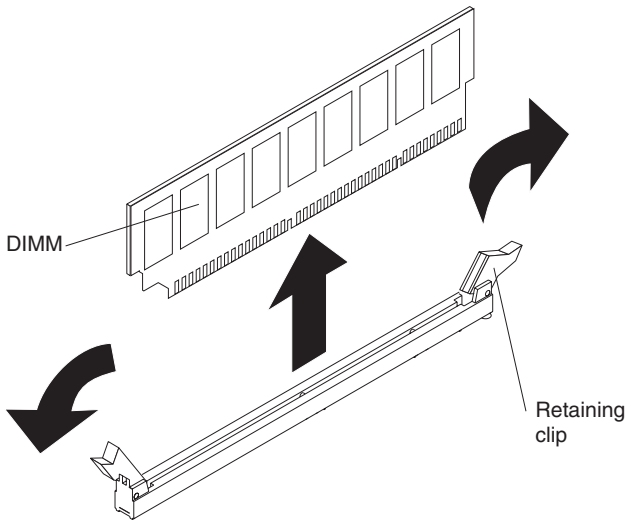
1. If the tape drive came with metal spacers on the installed on the sides, remove the spacers.
2. Install the drive tray on the new tape drive as shown, using the four screws that you removed from the former drive.



3. Prepare the drive according to the instructions that come with the drive, setting any switches or jumpers.
4. Slide the tape-drive assembly most of the way into the tape-drive bay.
5. Using the cables from the former tape drive, connect the signal and power cables to the back of the tape drive.
6. Make sure all the cables are out of the way, and slide the tape-drive assembly the rest of the way into the tape-drive bay.
7. Push the tray handle to the closed (locked) position.
8. Install the cover (see “Installing the cover” on page 176).
9. Slide the server into the rack.
10. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing a memory module (DIMM)

To remove a DIMM, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Slide the server out of the rack.
4. Remove the cover (see “Removing the cover” on page 175).
5. If riser-card assembly 1 contains one or more adapters, remove it (see “Removing a PCI riser-card assembly” on page 186).
6. Remove the air baffle over the DIMMs (see “Removing the DIMM air baffle” on page 178).

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
7. Open the retaining clip on each end of the DIMM connector and lift the DIMM from the connector.
8. If you are instructed to return the DIMM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a memory module

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

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

    *ggg e*Rx*ff*-PC3-*wwwwwm-aa-bb-cc*

where:

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

e is the number of ranks

1 = single-rank

2 = dual-rank

4 = quad-rank

ff is the device organization (bit width)

4 = x4 organization (4 DQ lines per SDRAM)

8 = x8 organization

16 = x16 organization

wwwww is the DIMM bandwidth, in MBps

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

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

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

12800 = 12.80 GBps PC3-1600 SDRAMs, 8-byte primary data bus)

m is the DIMM type

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

R = Registered DIMM (RDIMM)

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

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

bb is the JEDEC SPD Revision Encoding and Additions level

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

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

- The following rules apply to DDR3 DIMM speed as it relates to the number of DIMMs in a channel:
  - When you install 1 DIMM per channel, the memory runs at 1333 MHz
  - When you install 2 DIMMs per channel, the memory runs at 1066 MHz
  - When you install 3 DIMMs per channel, the memory runs at 800 MHz
  - All channels in a server run at the fastest common frequency.
  - Do not install registered and unbuffered DIMMs in the same server.
- The maximum memory speed is determined by the combination of the microprocessor, DIMM speed, and the number of DIMMs installed in each channel.
- In two-DIMM-per-channel configuration, a server with an Intel Xeon X5600 series microprocessor automatically operates with a maximum memory speed of up to 1333 MHz when one of the following conditions is met:
  - Two 1.5 V single-rank or dual-rank RDIMMs are installed in the same channel. In the Setup utility, **Memory speed** is set to **Max performance** mode
  - Two 1.35 V single-rank or dual-ranl RDIMMs are installed in the same channel. In the Setup utility, **Memory speed** is set to **Max performance** and **LV-DIMM power** is set to **Enhance performance** mode. The 1.35 V RDIMMs will function at 1.5 V
- The server supports a maximum of 18 single-rank or dual-rank RDIMMs. The server supports up to 12 single-rank or dual-rank UDIMMs or quad-rank RDIMMs.

  Note: To determine the type of a DIMM, see the label on the DIMM. The information on the label is in the format xxxxx nRxxx PC3-xxxxx-xx-xx-xxx. The

numeral in the sixth numerical position indicates whether the DIMM is single-rank (n=1), dual-rank (n=2), or quad-rank (n=4).

- The server supports three single-rank or dual-rank DIMMs per channel. The server supports a maximum of two quad-rank RDIMMs per channel. The following table shows an example of the maximum amount of memory that you can install using ranked DIMMs:

Table 15. Maximum memory installation using ranked DIMMs

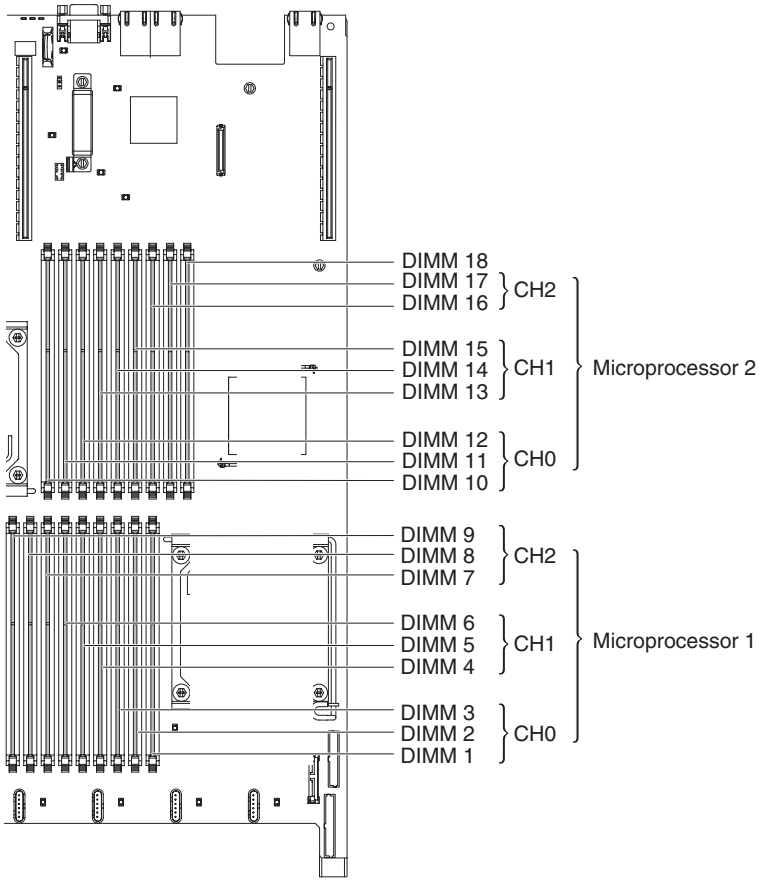
Number of DIMMs	DIMM type	DIMM size	Total memory
12	Single-rank UDIMMs	2 GB	24 GB
12	Dual-rank UDIMMs	4 GB	48 GB
18	Single-rank RDIMMs	2 GB	36 GB
18	Dual-rank RDIMMs	2 GB	36 GB
18	Dual-rank RDIMMs	4 GB	72 GB
18	Dual-rank RDIMMs	8 GB	144 GB
12	Quad-rank RDIMMs	16 GB	192 GB

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

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

  Note: The amount of usable memory is reduced depending on the system configuration. A certain amount of memory must be reserved for system resources. To view the total amount of installed memory and the amount of configured memory, run the Setup utility. For additional information, see “Configuring the server” on page 251.
- A minimum of one DIMM must be installed for each microprocessor. For example, you must install a minimum of two DIMMs if the server has two microprocessors installed. However, to improve system performance, install a minimum of three DIMMs for each microprocessor.
- DIMMs in the same system must be the same type (UDIMM or RDIMM) to ensure that the server will operate correctly.
- When you install one quad-rank RDIMM in a channel, install it in the DIMM connector furthest away from the microprocessor.
- Do not install one quad-rank RDIMM in one channel and three RDIMMs in another channel.

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



DIMM installation sequence

The server comes with a minimum of one 2 GB DIMM installed in slot 3. When you install additional DIMMs, install them in the order shown in the following table to optimize system performance. In non-mirroring mode, all three channels on the memory interface for each microprocessor can be populated in any order and have no matching requirements. When you install additional DIMMs, install them in the order shown in the following table, to maintain performance.

You can install DIMMs for microprocessor 2 as soon as microprocessor 2 is installed. You are not required to fill all the DIMM connectors for microprocessor 1 first.

Important: If you have configured the server to use memory mirroring, do not use the order in Table 16; go to Table 17 on page 219 and Table 18 on page 219 for memory mirroring and use the installation order shown there.

Table 16. DIMM installation sequence

Installed microprocessors	DIMM connector population sequence
Microprocessor socket 1	Install the DIMMs in the following sequence: 3, 6, 9, 2, 5, 8, 1, 4, 7
Microprocessor socket 2	Install the DIMMs in the following sequence: 12, 15, 18, 11, 14, 17, 10, 13, 16

Memory mirroring

You can configure the server to use memory mirroring. Memory mirroring stores data in a pair of DIMMs simultaneously. If a failure occurs, the memory controller switches from the active DIMM to the mirroring DIMM. Memory mirroring reduces the amount of available memory. Enable memory mirroring through the server firmware (see “Configuring the server” on page 251 for details about enabling memory mirroring.

When you use memory mirroring, you must install a pair of DIMMs at a time. One DIMM must be in channel 0, and the mirroring DIMM must be in the same slot in channel 1. The two DIMMs in each pair must be identical in size, type, rank (single, dual, or quad), and organization, but not in speed. The channels run at the speed of the slowest DIMM in any of the channels. See Table 17 and Table 18 for the DIMM connectors that are in each pair.

Table 17. Microprocessor 1 memory-mirroring DIMM installation sequence

Microprocessor number	Pair	DIMM connectors
1	1	3, 6
1	2	2, 5
1	3	1, 4

Table 18. Microprocessor 2 memory-mirroring DIMM installation sequence

Microprocessor number	Pair	DIMM connectors
2	1	15, 12
2	2	14, 11
2	3	13, 10

Note that you can install DIMMs for microprocessor 2 as soon as microprocessor 2 is installed; you are not required to fill all the DIMM connectors for microprocessor 1 first.

Online-spare memory

The server supports online-spare memory. This feature disables the failed memory from the system configuration and activates an online-spare DIMM to replace the failed active DIMM. You can enable either online-spare memory or memory mirroring in the Setup utility (see “Using the Setup utility” on page 253). When you use the memory online-spare feature, consider the following information:

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

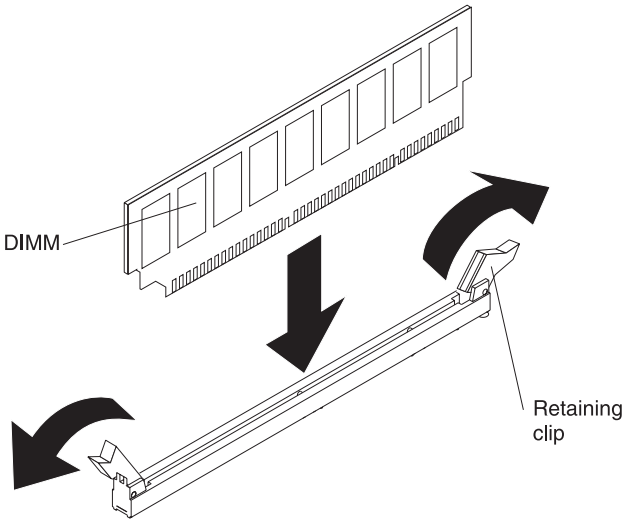
The following table shows the installation sequence for installing DIMMs for each microprocessor in memory online-spare mode:

Table 19. Memory online-spare mode DIMM population sequence

Installed Microprocessor	DIMM connector
Microprocessor 1	3, 6, 9
	3, 6, 9, 2, 5, 8
	3, 6, 9, 2, 5, 8, 1, 4, 7
Microprocessor 2	12, 15, 18,
	12, 15, 18, 11, 14, 17,
	12, 15, 18, 11, 14, 17, 10, 13, 16

Installing a DIMM

To install a DIMM, complete the following steps.



1. If riser-card assembly 1 contains one or more adapters, remove riser-card assembly 1.
2. Remove the DIMM air baffle.

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
3. Open the retaining clip on each end of the DIMM connector.
4. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.
5. Turn the DIMM so that the DIMM keys align correctly with the connector.
6. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.

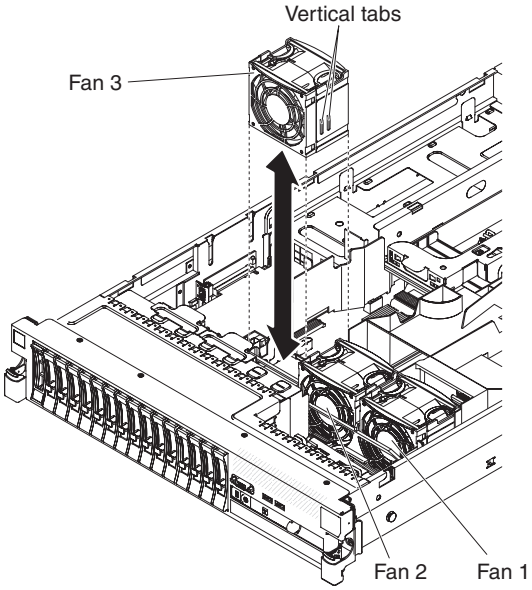
   Attention: If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.
7. Repeat steps 1 through 6 until all the new or replacement DIMMs are installed.

8. Replace the air baffle over the DIMMs (see “Installing the DIMM air baffle” on page 180), making sure all cables are out of the way.
9. Replace the PCI riser-card assemblies (see “Installing a PCI riser-card assembly” on page 187), if you removed them.
10. Install the cover (see “Installing the cover” on page 176).
11. Slide the server into the rack.
12. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.
13. Go to the Setup utility and make sure all the installed DIMMs are present and enabled.

Removing a hot-swap fan

Attention: To ensure proper server operation and cooling, if you remove a fan with the system running, you must install a replacement fan within 30 seconds or the system will shut down.

To remove any of the three replaceable fans, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Leave the server connected to power.
3. Slide the server out of the rack and remove the cover (see “Removing the cover” on page 175). The LED on the system board near the connector for the failing fan will be lit.

   Attention: To ensure proper system cooling, do not remove the top cover for more than 30 minutes during this procedure.
4. Grasp the fan by the finger grips on the sides of the fan.
5. Lift the fan out of the server.
6. Replace the fan within 30 seconds.
7. If you are instructed to return the fan, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

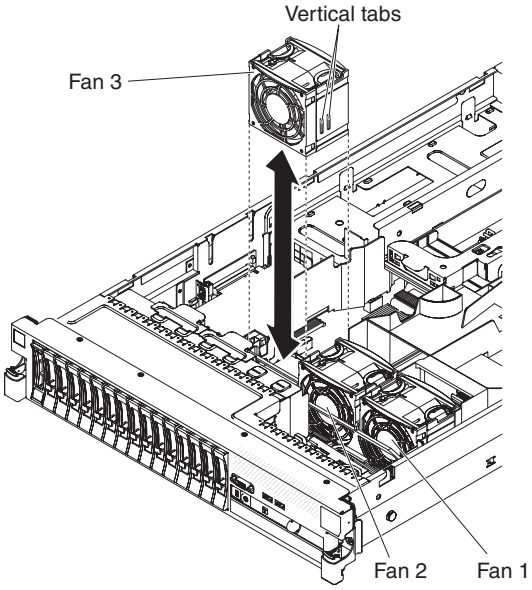
Installing a hot-swap fan

For proper cooling, the server requires that all three fans be installed at all times.

Attention: To ensure proper server operation, if a fan fails, replace it immediately. Have a replacement fan ready to install as soon as you remove the failed fan.

See “System-board internal connectors” on page 15 for the locations of the fan connectors.

To install any of the three replaceable fans, complete the following steps.



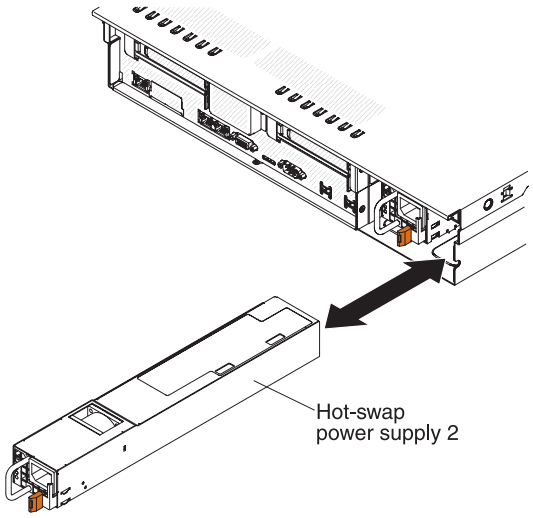
1. Orient the new fan over its position in the fan bracket so that the connector on the bottom aligns with the fan connector on the system board.
2. Align the vertical tabs on the fan with the slots on the fan cage bracket.
3. Push the new fan into the fan connector on the system board. Press down on the top surface of the fan to seat the fan fully. (Make sure that the LED has turned off.)
4. Repeat steps 1 through 3 until all the new or replacement fans are installed.
5. Install the cover (see “Installing the cover” on page 176).
6. Slide the server into the rack.

Removing a hot-swap ac power supply

Important: If the server has two power supplies, and if you remove either of them, the server will not have redundant power; if the server power load then exceeds 675 W, the server might not start or might not function correctly.

Note: The procedure below describes how to remove a hot-swap ac power supply, for instructions on how to remove a hot-swap dc power supply, refer to the documentation that comes with the dc power supply.

To remove a power supply, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. If only one power supply is installed, turn off the server and peripheral devices.
3. Disconnect the power cord from the power supply that you are removing.
4. Grasp the power-supply handle.
5. Press the orange release latch to the left and hold it in place.
6. Pull the power supply part of the way out of the bay, then release the latch and support the power supply as you pull it the rest of the way out of the bay.
7. If you are instructed to return the power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a hot-swap ac power supply

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

- Make sure that the devices that you are installing are supported. For a list of supported optional devices for the server, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.
- Before you install an additional power supply or replace a power supply with one of a different wattage, you may use the IBM Power Configurator utility to determine current system power consumption. For more information and to download the utility, go to http://www-03.ibm.com/systems/bladecenter/resources/powerconfig.html.
- The server comes with one hot-swap 12-volt output power supply that connects to power supply bay 1. The input voltage is 110 V ac or 220 V ac auto-sensing.
- You cannot mix 460-watt and 675-watt power supplies, high-efficiency and non-high-efficiency power supplies, or ac and dc power supplies in the server.
- The following information applies when you install 460-watt power supplies in the server:
  - A warning message is generated if the total power consumption exceeds 400 watts and the server only has one operational 460-watt power supply. In this case, the server can still operate under normal condition. Before you install additional components in the server, you must install an additional power supply
  - The server automatically shuts down if the total power consumption exceeds the total power supply output capacity

– You can enable the power capping feature in the Setup utility to control and monitor power consumption in the server (see “Setup utility menu choices” on page 254)

The following table lists the system status when you install 460-watt power supplies in the server:

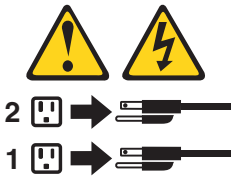
Table 20. System status with 460-watt power supplies installed

Total system power consumption (in watts)	**Number of 460-watt power supplies installed**		
	One	**Two**	**Two with one failure**
< 400	Normal	Normal, redundant power	Normal
400 ~ 460	Normal, status warning	Normal, redundant power	Normal, status warning
> 460	System shutdown	Normal	System shutdown

- Power supply 1 is the default/primary power supply. If power supply 1 fails, you must replace the power supply immediately.
- You can order an optional power supply for redundancy.
- These power supplies are designed for parallel operation. In the event of a power-supply failure, the redundant power supply continues to power the system. The server supports a maximum of two power supplies.
- For instructions on how to install a hot-swap dc power supply, refer to the documentation that comes with the dc power supply.

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.

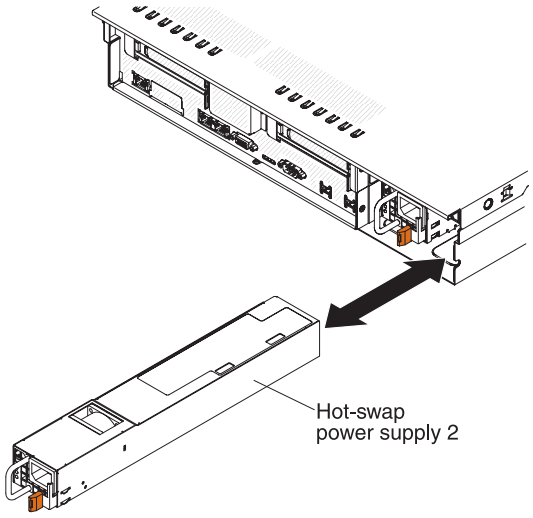


Statement 8:

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.

Note: The procedure below describes how to install a hot-swap ac power supply, for instructions on how to install a hot-swap dc power supply, refer to the documentation that comes with the dc power supply.



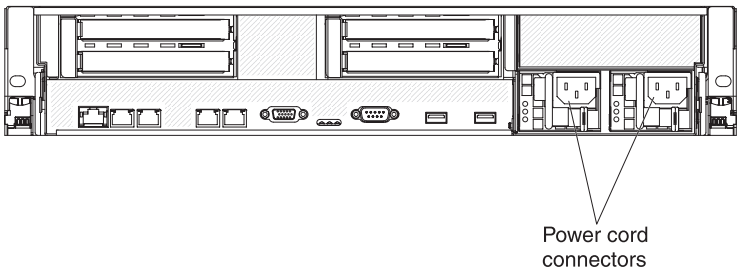
Attention: During normal operation, each power-supply bay must contain either a power supply or power-supply filler for proper cooling.

To install a power supply, complete the following steps:

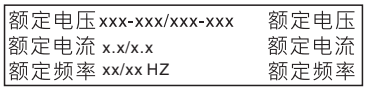
1. Slide the power supply into the bay until the retention latch clicks into place.

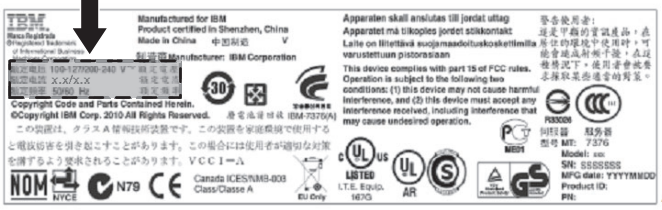
   Attention: Do not install 460-watt and 675-watt power supplies, high-efficiency and non-high-efficiency power supplies, or ac and dc power supplies in the server.
2. Connect the power cord for the new power supply to the power-cord connector on the power supply.

   The following illustration shows the power-cord connectors on the back of the server.



3. Route the power cord through the power-supply handle and through any cable clamps on the rear of the server, to prevent the power cord from being accidentally pulled out when you slide the server in and out of the rack.
4. Connect the power cord to a properly grounded electrical outlet.
5. Make sure that the error LED on the power supply is not lit, and that the dc power LED and ac power LED on the power supply are lit, indicating that the power supply is operating correctly.
6. If you are replacing a power supply with one of a different wattage, apply the power information label provided with the new power supply over the existing power information label on the server.





Removing the battery

Statement 2:

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

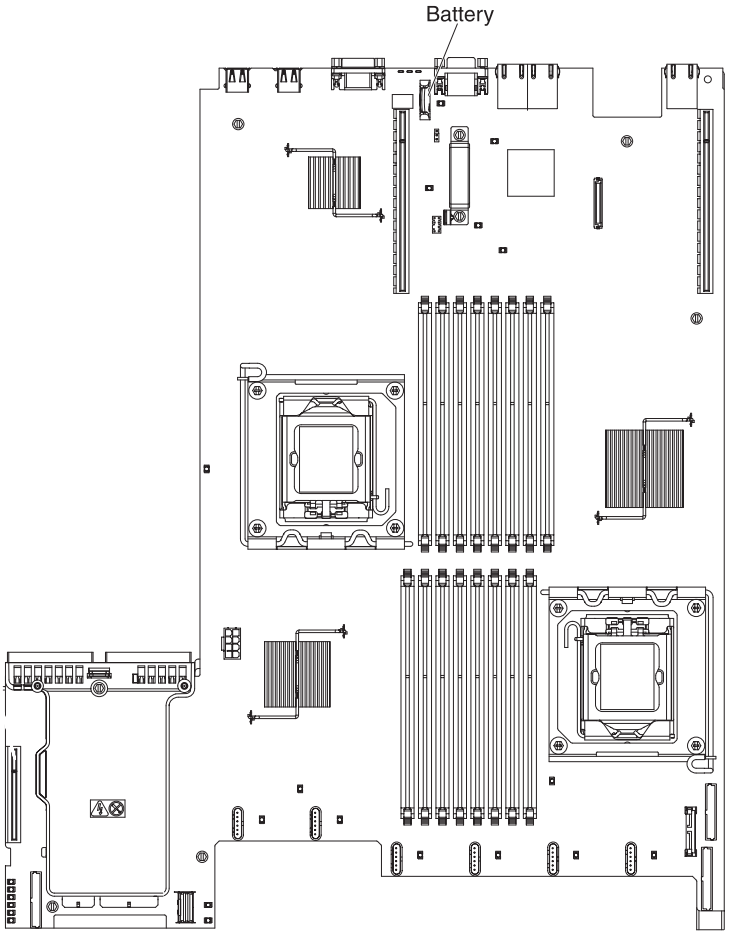
Do not:

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

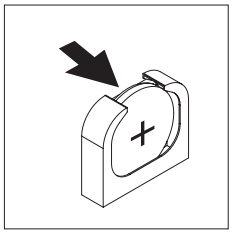
Dispose of the battery as required by local ordinances or regulations.

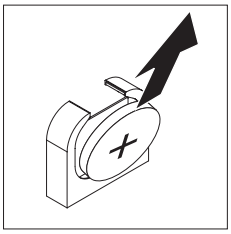
To remove the battery, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Follow any special handling and installation instructions that come with the battery.
3. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
4. Slide the server out of the rack.
5. Remove the cover (see “Removing the cover” on page 175).
6. Disconnect any internal cables, as necessary (see “Internal cable routing and connectors” on page 172).
7. Locate the battery on the system board.



8. Remove the battery:
   a. If there is a rubber cover on the battery holder, use your fingers to lift the battery cover from the battery connector.
   b. Use one finger to push the battery horizontally away from the PCI riser card in slot 2 and out of its housing.





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

9. Dispose of the battery as required by local ordinances or regulations. See the *IBM Environmental Notices and User's Guide* on the IBM *Documentation* CD for more information.

Installing the battery

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

- You must replace the battery with a lithium battery of the same type from the same manufacturer.
- 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.
- To order replacement batteries, call 1-800-IBM-SERV within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your support center or business partner.

Statement 2:

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

Do not:

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

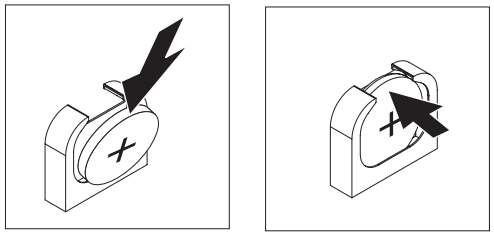
Dispose of the battery as required by local ordinances or regulations.

See the *IBM Environmental Notices and User's Guide* on the IBM *Documentation* CD for more information.

To install the replacement battery, complete the following steps:

1. Follow any special handling and installation instructions that come with the replacement battery.
2. Insert the new battery:

a. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.



b. Press the battery down into the socket until it clicks into place. Make sure that the battery clip holds the battery securely.

c. If you removed a rubber cover from the battery holder, use your fingers to install the battery cover on top of the battery connector.

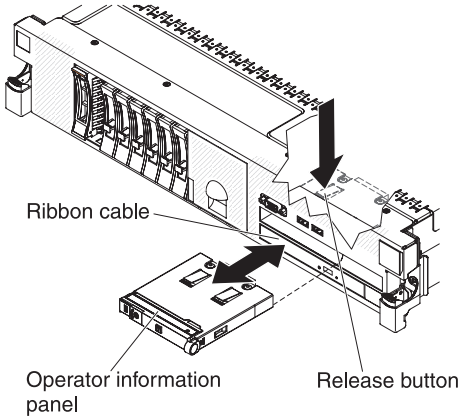
3. Reinstall any adapters that you removed.
4. Reconnect the internal cables that you disconnected (see “Internal cable routing and connectors” on page 172).
5. Install the cover (see “Installing the cover” on page 176).
6. Slide the server into the rack.
7. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

   Note: You must wait approximately 2.5 minutes after you connect the power cord of the server to an electrical outlet before the power-control button becomes active.
8. Start the Setup utility and reset the configuration.
   - Set the system date and time.
   - Set the power-on password.
   - Reconfigure the server.

   See Chapter 6, “Configuration information and instructions,” on page 251 for details.

Removing the operator information panel assembly

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

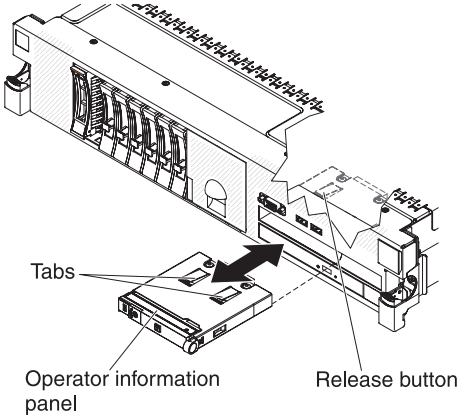


1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Remove the cover (see “Removing the cover” on page 175).

3. Disconnect the cable from the back of the operator information panel assembly.
4. Reach inside the server and press the release tab; then, while you hold the release tab down, push the assembly toward the front of the server.
5. From the front of the server, carefully pull the operator information panel 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. Position the operator information panel assembly so that the tabs face upward and slide it into the server until it clicks into place.
2. Inside the server, connect the cable to the rear of the operator information panel assembly.
3. Install the cover (see “Installing the cover” on page 176).
4. Slide the server into the rack.
5. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

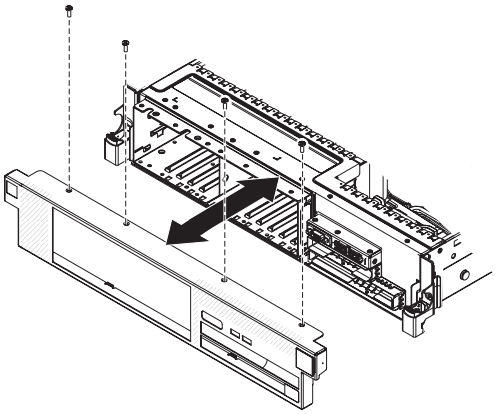
Removing and replacing Tier 2 CRUs

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 bezel

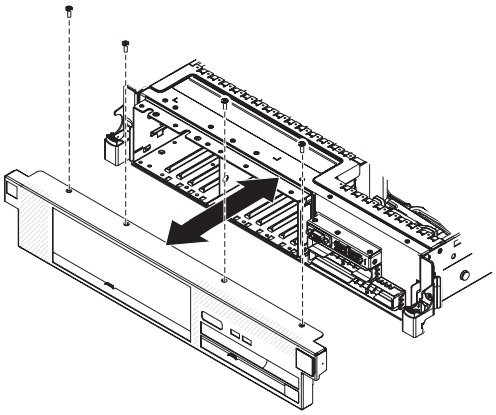
To remove the bezel, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Remove all the cables that are connected to the front of the server.
3. Remove the screws from the bezel.
4. Rotate the top of the bezel away from the server.

Installing the bezel

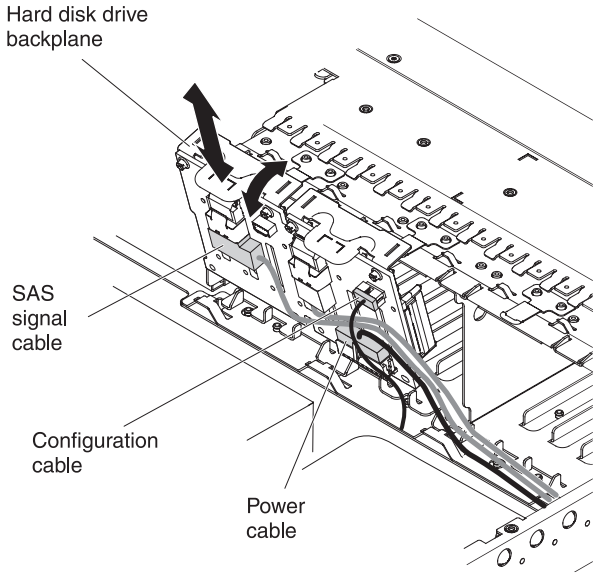
To install the bezel, complete the following steps.



1. Insert the tabs on the bottom of the bezel into the slots on the underside of the chassis and attach it with the screws.
2. Connect any cables you previously removed from the front of the server.

Removing the SAS hard disk drive backplane

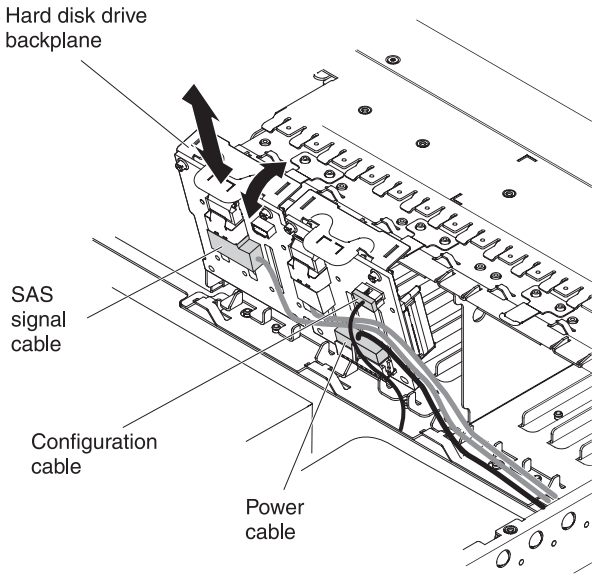
To remove the SAS hard disk drive backplane, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Slide the server out of the rack.
4. Remove the cover (see “Removing the cover” on page 175).
5. Pull the hard disk drives or fillers out of the server slightly to disengage them from the backplane. See “Removing a hot-swap hard disk drive” on page 208 for details.
6. To obtain more working room, remove the fans (see “Removing a hot-swap fan” on page 221).
7. Lift the backplane out of the server by pulling it toward the rear of the server and then lifting it up.
8. Disconnect the backplane power, signal, and configuration cables (see “Internal cable routing and connectors” on page 172).
9. If you are instructed to return the backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the SAS hard disk drive backplane

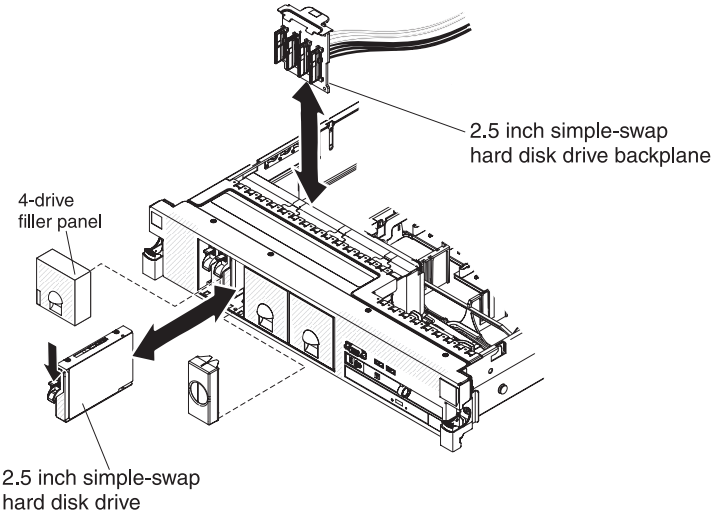
To install the replacement SAS hard disk drive backplane, complete the following steps.



1. Connect the power and signal cables to the replacement backplane (see “Internal cable routing and connectors” on page 172).
2. Align the backplane with the backplane slot in the chassis and the small slots on top of the hard disk drive cage.
3. Lower the backplane into the slots on the chassis.
4. Rotate the top of the backplane until the front tab clicks into place into the latches on the chassis.
5. Insert the hard disk drives and the fillers the rest of the way into the bays.
6. Replace the fan bracket and fans if you removed them (see “Installing the fan bracket” on page 182 and “Installing a hot-swap fan” on page 222).
7. Install the cover (see “Installing the cover” on page 176).
8. Slide the server into the rack.
9. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the simple-swap hard disk drive backplate

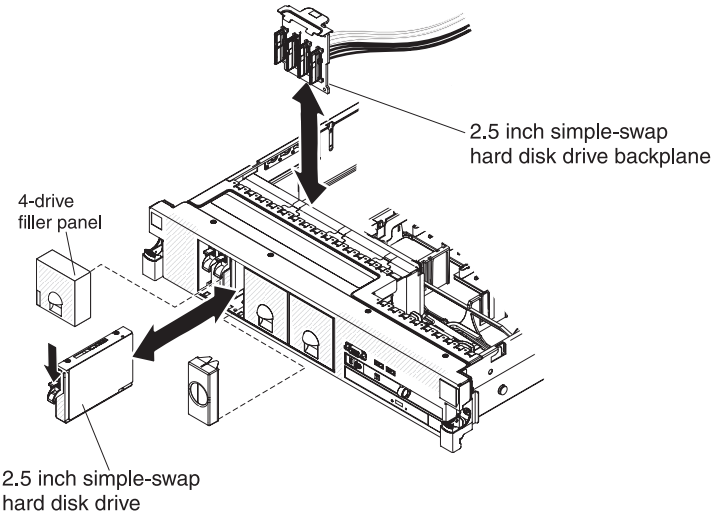
To remove the simple-swap hard disk drive backplate, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Slide the server out of the rack.
4. Remove the cover (see “Removing the cover” on page 175).
5. Pull the hard disk drives or fillers out of the server slightly to disengage them from the backplate. See “Removing a simple-swap hard disk drive” on page 209 for details.
6. To obtain more working room, remove the fans (see “Removing a hot-swap fan” on page 221).
7. Lift the backplate out of the server by pulling it and lifting it up.
8. Disconnect the backplate power, signal, and configuration cables (see “Internal cable routing and connectors” on page 172).
9. If you are instructed to return the 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. Connect the power and signal cables to the replacement backplate (see “Internal cable routing and connectors” on page 172).
2. Align the backplate with the backplate slot in the chassis and the small slots on top of the hard disk drive cage.
3. Lower the backplate into the slots on the chassis.
4. Rotate the top of the backplate until the front tab clicks into place into the latches on the chassis.
5. Insert the hard disk drives and the fillers the rest of the way into the bays.
6. Replace the fan bracket and fans if you removed them (see “Installing the fan bracket” on page 182 and “Installing a hot-swap fan” on page 222).
7. Install the cover (see “Installing the cover” on page 176).
8. Slide the server into the rack.
9. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing and replacing FRUs

FRUs must be installed only by trained service technicians.

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

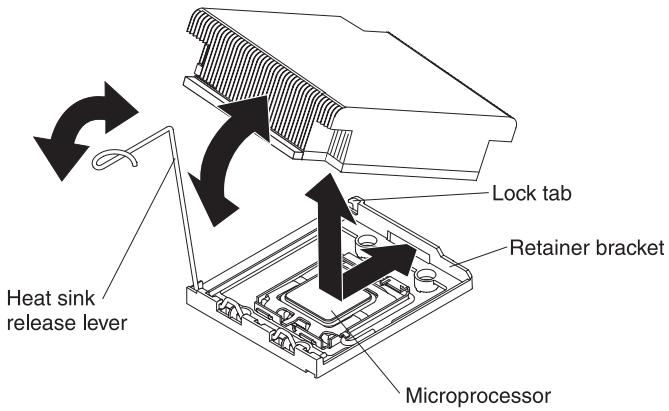
Removing a microprocessor and heat sink

Attention:

- 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.

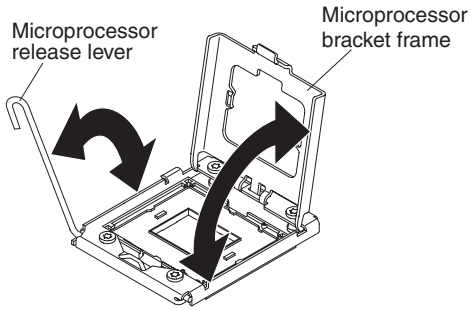
To remove a microprocessor and heat sink, complete the following steps:

1. Read the safety information that begins on page vii, “Handling static-sensitive devices” on page 171, and “Installation guidelines” on page 169.
2. Turn off the server and peripheral devices and disconnect the power cord and all external cables.
3. Remove the cover (see “Removing the cover” on page 175).
4. Depending on which microprocessor you are removing, remove the following components, if necessary:
   - Microprocessor 1: PCI riser-card assembly 1 and DIMM air baffle (see “Removing a PCI riser-card assembly” on page 186 and “Removing the DIMM air baffle” on page 178)
   - Microprocessor 2: PCI riser-card assembly 2 and microprocessor 2 air baffle (see “Removing a PCI riser-card assembly” on page 186 and “Removing the microprocessor 2 air baffle” on page 176).
5. Open the heat-sink release lever to the fully open position.

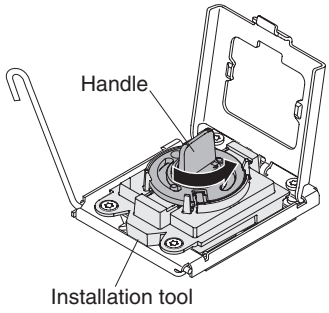


6. Lift the heat sink out of the server. If the heat sink sticks to the microprocessor, slightly twist the heat sink back and forth to break the seal. After removal, place the heat sink on its side on a clean, flat surface.
7. Release the microprocessor retention latch by pressing down on the end, moving it to the side, and releasing it to the open (up) position.

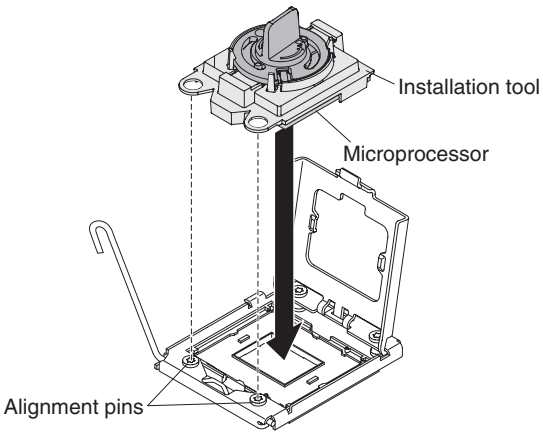
8. Open the microprocessor bracket frame by lifting up the tab on the top edge. Keep the bracket frame in the open position.



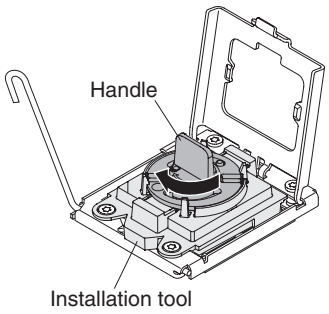
9. Locate the microprocessor installation tool that comes with the new microprocessor.
10. Twist the handle on the microprocessor tool counterclockwise so that it is in the open position.



11. Align the installation tool with the alignment pins on the microprocessor socket and lower the tool down over the microprocessor.



12. Twist the handle on the installation tool clockwise and lift the microprocessor out of the socket.



13. Carefully lift the microprocessor straight up and out of the socket, and place it on a static-protective surface. Remove the microprocessor from the installation tool by twisting the handle counterclockwise.
14. If you do not intend to install a microprocessor in the socket, install the socket dust cover on the socket.

    Attention: The pins on the socket are fragile. Any damage to the pins may require replacing the system board.
15. 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.

Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
To download the most current level of server firmware, complete the following steps:

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3650 M3** to display the matrix of downloadable files for the server.

Important:

- A startup (boot) microprocessor must always be installed in microprocessor connector 1 on the system board.
- Make sure the microprocessor that you are about to install is supported. See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 for a list of supported microprocessors.
- Do not install an Intel Xeon™ 5500 series microprocessor and an Intel Xeon™ 5600 series microprocessor in the same server.
- To ensure correct server operation, make sure that you use microprocessors that are compatible and you have installed an additional DIMM for microprocessor 2. Compatible microprocessors must have the same QuickPath Interconnect (QPI) link speed, integrated memory controller frequency, core frequency, power segment, cache size, and type.

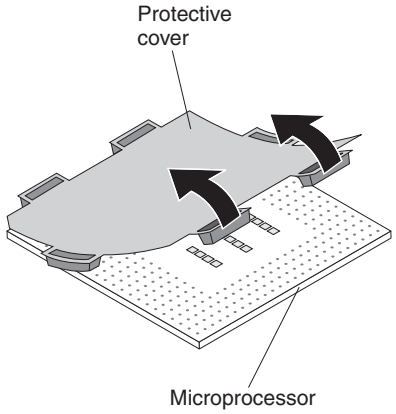
- Microprocessors with different stepping levels are supported in this server. If you install microprocessors with different stepping levels, it does not matter which microprocessor is installed in microprocessor connector 1 or connector 2.
- If you are installing a microprocessor that has been removed, 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 assembly that did not come with thermal grease, see “Thermal grease” on page 242 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 242 for instructions for replacing the thermal grease; then, continue with step 1 of this procedure.
- Microprocessor 2, aux power, and PCI riser-card assembly 2 share the same power channel that is limited to 230 W.

To install a new or replacement microprocessor, complete the following steps. The following illustration shows how to install a microprocessor on the system board.

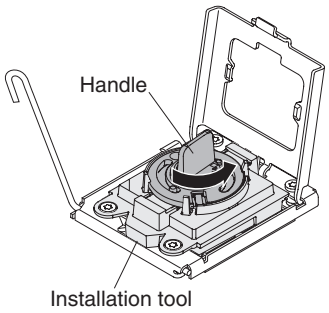
1. Touch the static-protective package that contains the microprocessor to any unpainted metal surface on the server. Then, remove the microprocessor from the package.
2. Rotate the microprocessor release lever on the socket from its closed and locked position until it stops in the fully open position.

   Attention:

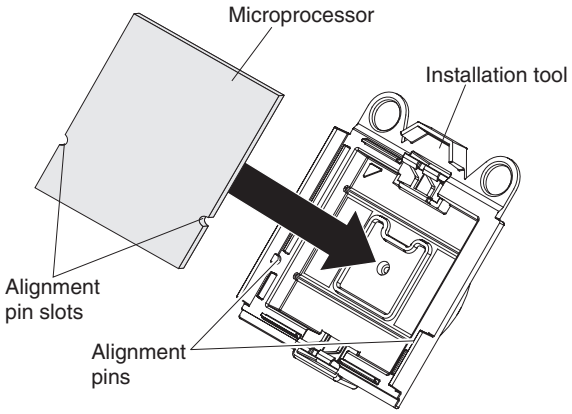
   - Do not touch the microprocessor contact; handle the microprocessor by the edges only. Contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.
   - Handle the microprocessor carefully. Dropping the microprocessor during installation or removal can damage the contacts.
   - 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.
3. If there is a plastic protective cover on the bottom of the microprocessor, carefully remove it.



4. Locate the microprocessor installation tool that comes with the new microprocessor.
5. Twist the handle of the installation tool counterclockwise so that it is in the open position.

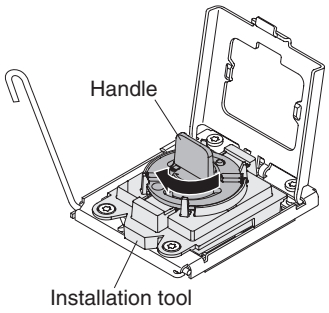


6. Align the microprocessor alignment slots with the alignment pins on the microprocessor installation tool and place the microprocessor on the underside of the tool so that the tool can grasp the microprocessor correctly.



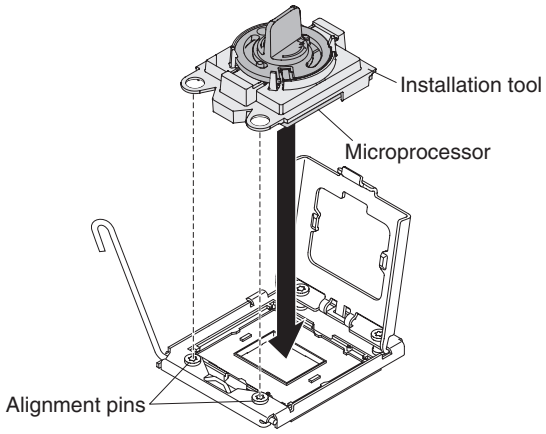
7. Twist the handle of the installation tool clockwise to secure the microprocessor in the tool.

   Note: You can pick up or release the microprocessor by twisting the microprocessor installation tool handle.

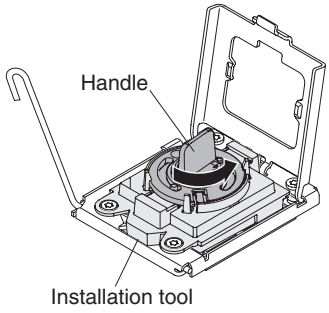


8. Carefully align the microprocessor installation tool over the microprocessor socket.

   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 may require replacing the system board.



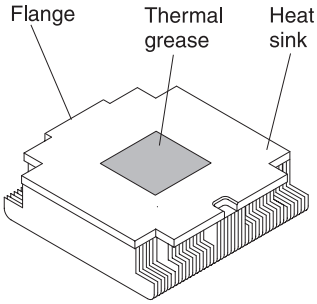
9. Twist the handle on the microprocessor tool counterclockwise to insert the microprocessor into the socket.



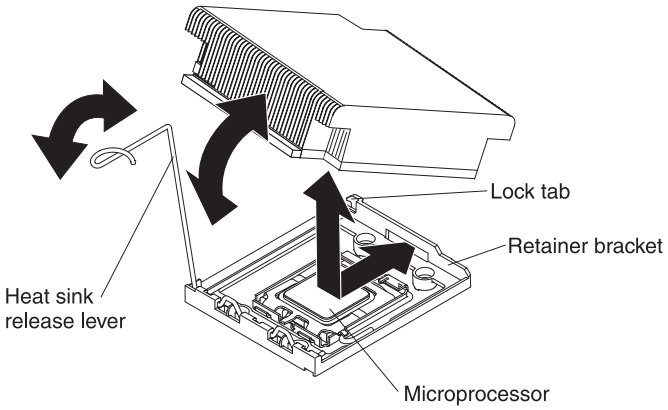
10. Close the microprocessor bracket frame.
11. Carefully close the microprocessor release lever to the closed position to secure the microprocessor in the socket.
12. Install a heat sink on the microprocessor.

    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.

    The following illustration shows the bottom surface of the heat sink.



    a. Make sure that the heat-sink release lever is in the open position.
    b. Remove the plastic protective cover from the bottom of the 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” on page 242).
    d. Align the heat sink above the microprocessor with the thermal grease side down.



e. Slide the flange of the heat sink into the opening in the retainer bracket.

f. Press down firmly on the heat sink until it is seated securely.

g. Rotate the heat-sink release lever to the closed position and hook it underneath the lock tab.

13. Replace the components that you removed in “Removing a microprocessor and heat sink” on page 236:
    - Microprocessor 1: DIMM air baffle and PCI riser-card assembly 1 (see “Installing the DIMM air baffle” on page 180 and “Installing a PCI riser-card assembly” on page 187)
    - Microprocessor 2: Microprocessor 2 air baffle and PCI riser-card assembly 2 (see “Installing the microprocessor 2 air baffle” on page 178 and “Installing a PCI riser-card assembly” on page 187).
14. Install the cover (see “Installing the cover” on page 176).
15. Slide the server into the rack.
16. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

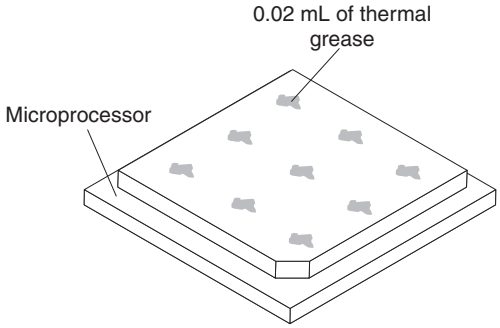
Thermal grease

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.

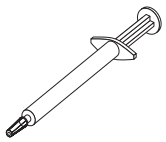
To replace damaged or contaminated thermal grease on the microprocessor and heat exchanger, complete the following steps:

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

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



5. Use the thermal-grease syringe to place nine uniformly spaced dots of 0.02 mL each on the top of the microprocessor.



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

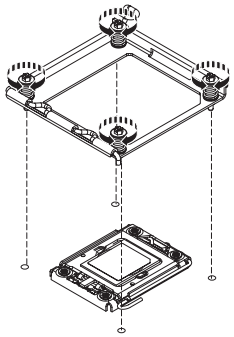
6. Continue with step 12d on page 241 of the “Installing a microprocessor and heat sink” on page 238 procedure.

Removing a heat-sink retention module

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server, and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 175).

   Attention: In the following step, keep each heat sink paired with its microprocessor for reinstallation.
4. Remove the applicable air baffle; then, remove the heat sink and microprocessor. See “Removing a microprocessor and heat sink” on page 236 for instructions; then, continue with step 5.

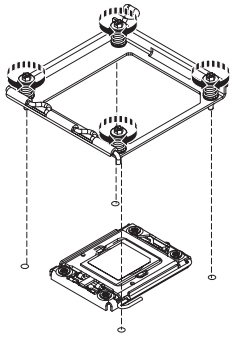


5. Remove the four screws that secure the heat-sink retention module to the system board; then, lift the heat-sink retention module from the system board.
6. If you are instructed to return the heat-sink retention module, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a heat-sink retention module

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

1. Place the heat-sink retention module in the microprocessor location on the system board.



2. Install the four screws that secure the module to the system board.

   Attention: Make sure that you install each heat sink with its paired microprocessor (see steps 3 and 4).
3. Install the microprocessor, heat sink, and applicable air baffle (see “Installing a microprocessor and heat sink” on page 238).
4. Install the cover (see “Installing the cover” on page 176).
5. Slide the server into the rack.

6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

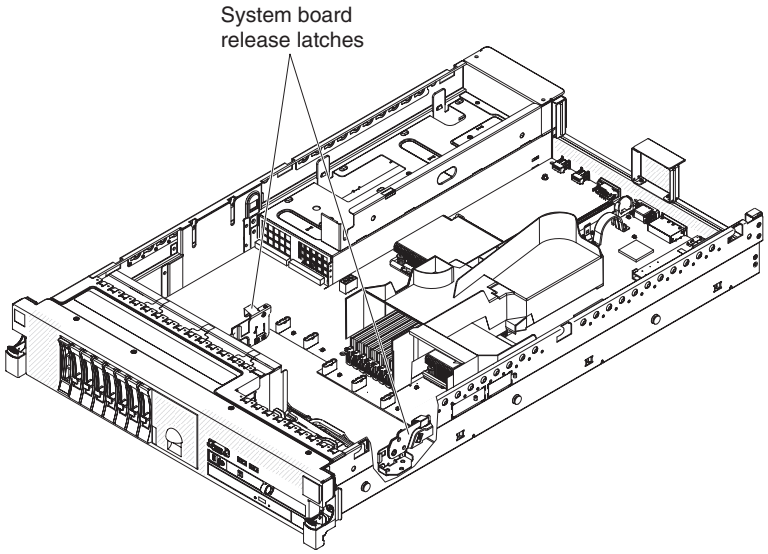
Removing the system board

To remove the system board, complete the following steps.

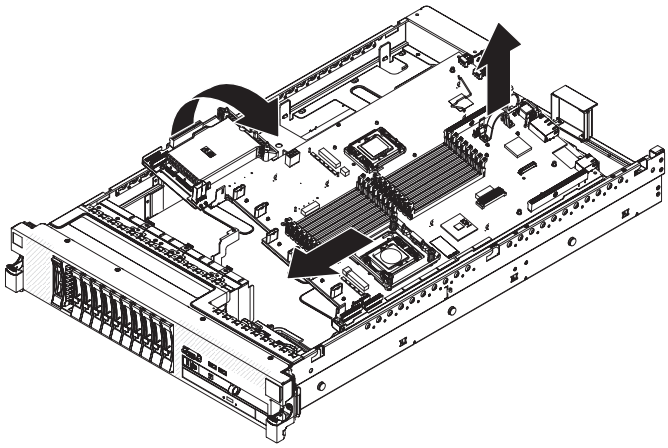
1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server, and disconnect all power cords and external cables.
3. Pull the power supplies out of the rear of the server, just enough to disengage them from the server.
4. Remove the server cover (see “Removing the cover” on page 175).
5. Remove the following components and place them on a static-protective surface for reinstallation:
   - The riser-card assemblies with adapters (see “Removing a PCI riser-card assembly” on page 186)
   - The SAS riser-card and controller assembly (see “Removing the SAS riser-card and controller assembly” on page 195)
6. If an Ethernet adapter is installed in the server, remove it.
7. If a virtual media key is installed in the server, remove it (see “Removing an IBM virtual media key” on page 183 for instructions).
8. Remove the air baffles (see “Removing the DIMM air baffle” on page 178 and “Removing the microprocessor 2 air baffle” on page 176).

   Important: Before you remove the DIMMs, note which DIMMs are in which connectors. You must install them in the same configuration on the replacement system board.
9. Remove all DIMMs, and place them on a static-protective surface for reinstallation (see “Removing a memory module (DIMM)” on page 215).
10. Remove the fans (see “Removing a hot-swap fan” on page 221).
11. Disconnect all cables from the system board (see “Internal cable routing and connectors” on page 172).

    Attention: In the following step, do not allow the thermal grease to come in contact with anything, and keep each heat sink paired with its microprocessor for reinstallation. Contact with any surface can compromise the thermal grease and the microprocessor socket; a mismatch between the microprocessor and its original heat sink can require the installation of a new heat sink.
12. Remove each microprocessor heat sink and microprocessor; then, place them on a static-protective surface for reinstallation (see “Removing a microprocessor and heat sink” on page 236).
13. Push in and lift up the two system-board release latches on each side of the fan cage.



14. Slide the system board forward and tilt it away from the power supplies. Using the two lift handles on the system board, pull the system board out of the server.



15. 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.
16. Remove the socket covers from the microprocessor sockets on the new system board and place them on the microprocessor sockets of the system board you are removing.

Installing the system board

Notes:

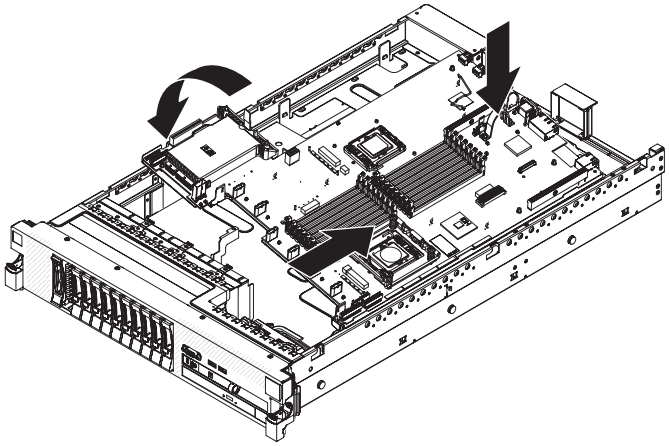
1. When you reassemble the components in the server, be sure to route all cables carefully so that they are not exposed to excessive pressure (see “Internal cable routing and connectors” on page 172).
2. When you replace the system board, you must either update the server with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image. Make sure that you have the latest firmware or a copy of the pre-existing firmware before you proceed. See “Updating the

firmware" on page 251, "Updating the Universal Unique Identifier (UUID)" on page 269, and "Updating the DMI/SMBIOS data" on page 272 for more information.

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.

3. Update the vital product data (VPD) through the server firmware update procedure.
4. If you see the error message *Non-compatible/non-supported CPU, see PDSG for more information* appears, the microprocessor that you installed is not supported. See Chapter 4, "Parts listing, Types 4255, 7945, and 7949 server," on page 157 for a list of supported microprocessors.

To reinstall the system board, complete the following steps.



1. Align the system board at an angle, as shown in the illustration; then, rotate and lower it flat and slide it back toward the rear of the server. Make sure that the rear connectors extend through the rear of the chassis.
2. Reconnect to the system board the cables that you disconnected in step 11 of "Removing the system board" on page 245 (see "Internal cable routing and connectors" on page 172).
3. Rotate the system-board release latch toward the rear of the server until the latch clicks into place.
4. Install the fans.
5. Install each microprocessor with its matching heat sink (see "Installing a microprocessor and heat sink" on page 238).
6. Install the DIMMs (see "Installing a memory module" on page 215).
7. Install the air baffles (see "Installing the DIMM air baffle" on page 180) and "Removing the microprocessor 2 air baffle" on page 176, making sure that all cables are out of the way.
8. Install the SAS riser-card and controller assembly (see "Installing the SAS riser-card and controller assembly" on page 196).
9. If necessary, install the Ethernet adapter.
10. If necessary, install the virtual media key.
11. Install the PCI riser-card assemblies and all adapters (see "Installing a PCI riser-card assembly" on page 187).
12. Install the cover (see "Installing the cover" on page 176).

13. Push the power supplies back into the server.
14. Slide the server into the rack.
15. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Important: Perform the following updates:

- Start the Setup utility and reset the configuration.
  - Set the system date and time.
  - Set the power-on password.
  - Reconfigure the server.

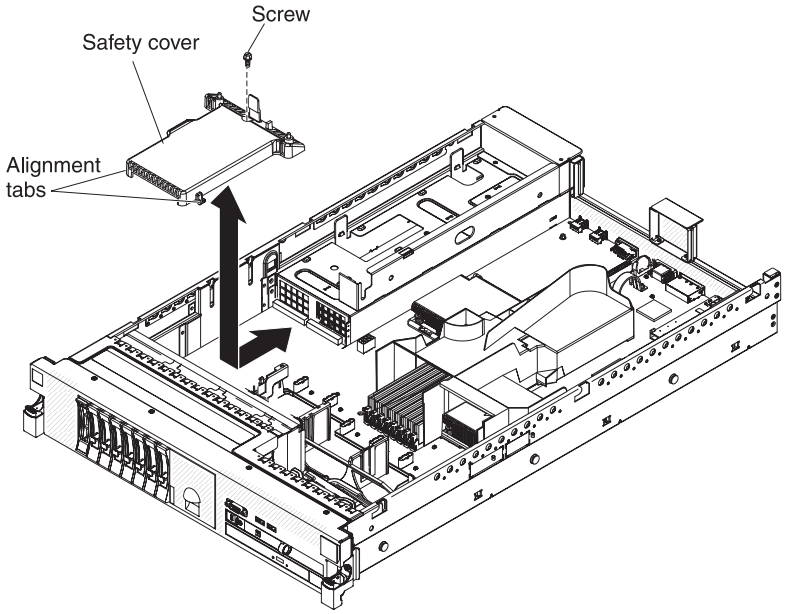
  See “Using the Setup utility” on page 253 for details.
- Either update the server with the latest RAID firmware or restore the pre-existing firmware from a diskette or CD image (see “Updating the firmware” on page 251).
- Update the UUID (see “Updating the Universal Unique Identifier (UUID)” on page 269).
- Update the DMI/SMBIOS (see “Updating the DMI/SMBIOS data” on page 272).

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.

Removing the 240 VA safety cover

To remove the 240 VA safety cover, complete the following steps:

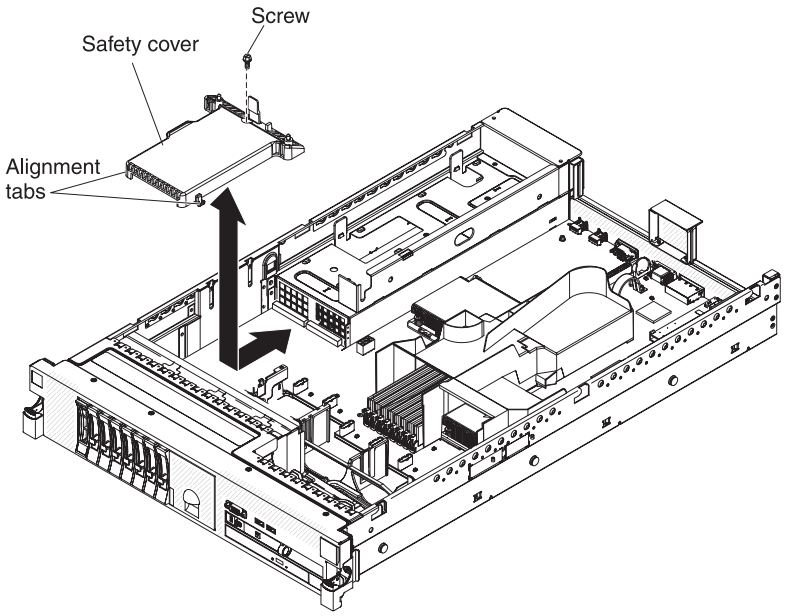
1. Read the safety information that begins on page vii and “Installation guidelines” on page 169.
2. Turn off the server, and disconnect all power cords and external cables.
3. Pull the server out of the rack.
4. Remove the server cover (see “Removing the cover” on page 175).
5. Remove the SAS riser card assembly (see “Removing the SAS riser-card and controller assembly” on page 195).



6. Remove the screw from the safety cover.
7. Disconnect the hard disk drive backplane power cables from the connector in front of the safety cover.
8. Slide the cover forward to disengage it from the system board, and then lift it out of the server.
9. If you are instructed to return the 240 VA safety cover, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the 240 VA safety cover

To install the 240 VA safety cover, complete the following steps.



1. Line up and insert the tabs on the bottom of the safety cover into the slots on the system board.
2. Slide the safety cover toward the back of the server until it is secure.
3. Connect the hard disk drive backplane power cables to the connector in front of the safety cover.
4. Install the screw into the safety cover.
5. Install the SAS riser-card assembly (see “Installing the SAS riser-card and controller assembly” on page 196).
6. Install the server cover (see “Installing the cover” on page 176).
7. Slide the server into the rack.
8. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Chapter 6. Configuration information and instructions

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

Updating the firmware

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

The firmware for the server is periodically updated and is available for download from the Web. To check for the latest level of firmware, such as server firmware, vital product data (VPD) code, device drivers, and service processor firmware complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3650 M3** to display the matrix of downloadable files for the server.

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

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

- BIOS code is stored in ROM on the system board.
- IMM firmware is stored in ROM on the IMM on the system board.
- Ethernet firmware is stored in ROM on the Ethernet controller.
- ServeRAID firmware is stored in ROM on the ServeRAID adapter.
- SATA firmware is stored in ROM on the integrated SATA 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 change interrupt request (IRQ) settings, change the startup-device sequence, set the date and time, and set passwords. For information about using this program, see “Using the Setup utility” on page 253.
- **Boot Menu program**

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The Boot 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.

- **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 258.

- **Integrated management module**

  Use the integrated management module (IMM) for configuration, to update the firmware and sensor data record/field replaceable unit (SDR/FRU) data, and to remotely manage a network. For information about using the IMM, see “Using the integrated management module” on page 261.

- **VMware embedded USB hypervisor**

  The VMware embedded USB hypervisor is available on the server models that come with an installed IBM USB Memory Key for VMware hypervisor. The USB memory key is installed in the USB connector on the SAS riser card. Hypervisor is virtualization software that enables multiple operating systems to run on a host computer at the same time. For more information about using the embedded hypervisor, see “Using the USB memory key for VMware hypervisor” on page 262.

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

  The remote presence and blue-screen capture feature are integrated into the integrated management module (IMM). The virtual media key is required to enable these features. When the optional virtual media key is installed in the server, it activates the remote presence functions. Without the virtual media key, you will not be able to access the network remotely to mount or unmount drives or images on the client system. However, you will still be able to access the host graphical user interface through the Web interface without the virtual media key. You can order an optional IBM Virtual Media Key, if one did not come with your server. For more information about how to enable the remote presence function, see “Using the remote presence capability and blue-screen capture” on page 263.

- **Ethernet controller configuration**

  For information about configuring the Ethernet controller, see “Configuring the Gigabit Ethernet controller” on page 265.

- **LSI Configuration Utility program**

  Use the LSI Configuration Utility program to configure the integrated SAS/SATA controller with RAID capabilities and the devices that are attached to it. For information about using this program, see “Using the LSI Configuration Utility program” on page 266.

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

Table 21. Server configurations and applications for configuring and managing RAID arrays

Server configuration	RAID array configuration (before operating system is installed)	RAID array management (after operating system is installed)
ServeRAID-BR10i SAS/SATA Controller (LSI 1068) installed	LSI Utility (invoked from the Setup utility), ServerGuide	MegaRAID Storage Manager (for monitoring storage only)
ServeRAID-MR10i SAS/SATA Controller (LSI 1078) installed	MegaRAID Storage Manager (MSM), MegaRAID BIOS Configuration Utility (press C to start), ServerGuide	MegaRAID Storage Manager (MSM)

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

  Use this program as an alternative to the Setup utility for modifying server firmware settings and IMM settings. Use the ASU program online or out of band to modify server firmware settings from the command line without the need to restart the server to access the Setup utility. For more information about using this program, see “IBM Advanced Settings Utility program” on page 268.

Using the Setup utility

Use the Setup utility, formerly called the Configuration/Setup Utility program, to perform the following tasks:

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

Starting the Setup utility

To start the Setup utility, complete the following steps:

1. Turn on the server.

   Note: Approximately 3 minutes after the server is connected to ac power, the power-control button becomes active.
2. When the prompt `<F1> Setup` is displayed, press F1. If you have set an administrator password, you must type the administrator password to access the full Setup utility menu. If you do not type the administrator password, a limited Setup utility menu is available.
3. Select 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 firmware, some menu choices might differ slightly from these descriptions.

- **System Information**

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

  This choice is on the full Setup utility menu only.

  – **System Summary**

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

  – **Product Data**

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

- **System Settings**

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

  – **Processors**

    Select this choice to view or change the processor settings.

  – **Memory**

    Select this choice to view or change the memory settings. To configure memory mirroring, select **System Settings → Memory**, and then select **Memory Channel Mode → Mirroring**.

  – **Devices and I/O Ports**

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

  – **Power**

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

  – **Operating Modes**

    Select this choice to view or change the operating profile (for example, performance and power utilization).

  – **Legacy Support**

    Select this choice to view or set legacy support.

    - **Force Legacy Video on Boot**

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

    - **Rehook INT 19h**

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

- **Legacy Thunk Support**

  Select this choice to enable or disable the server firmware to interact with PCI mass storage devices that are not UEFI-compliant.

– **Integrated Management Module**

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

  - **POST Watchdog Timer**

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

  - **POST Watchdog Timer Value**

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

  - **Reboot System on NMI**

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

  - **Network Configuration**

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

  - **Reset IMM to Defaults**

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

– **Adapters and UEFI Drivers**

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

- **Network**

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

- **Storage**

  Select this choice to view or configure the storage devices options. There might be additional configuration choices for optional storage devices that are compliant with UEFI 2.1 and later.

- **Video**

  Select this choice to view or configure the video device options installed in the server. There might be additional configuration choices for optional video devices that are compliant with UEFI 2.1 and later.

- **Date and Time**

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

  This choice is on the full Setup utility menu only.

- **Start Options**

  Select this choice to view 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 start 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.

This choice is on the full Setup utility menu only.

- **Boot Manager**

  Select this choice to view, add, or change the device boot priority, boot from a file, select a one-time boot, or reset the boot order to the default setting.

- **System Event Logs**

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

  The system-event logs contain all event and error messages that have been generated during POST, by the systems-management interface handler, and by the system service processor. Run the diagnostic programs to get more information about error codes that occur.

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

  – **POST Event Viewer**

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

  – **System Event Log**

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

  – **Clear System Event Log**

    Select this choice to clear the system-event log.

- **User Security**

  Select this choice to set, change, or clear passwords. See “Passwords” on page 257 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 257.

  – **Clear Power-on Password**

    Select this choice to clear a power-on password. For more information, see “Power-on password” on page 257.

  – **Set Administrator Password**

    Select this choice to set or change an administrator password. An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu. If an administrator password is set, the full Setup utility menu is available only if you type the administrator password at the password prompt. For more information, see “Administrator password” on page 258.

  – **Clear Administrator Password**

    Select this choice to clear an administrator password. For more information, see “Administrator password” on page 258.

- **Save Settings**

  Select this choice to save the changes that you have made in the settings.

- **Restore Settings**

Select this choice to cancel the changes that you have made in the settings and restore the previous settings.

- **Load Default Settings**

  Select this choice to cancel the changes that you have made in the settings and restore the factory settings.

- **Exit Setup**

  Select this choice to exit from the Setup utility. If you have not saved the changes that you have made in the settings, you are asked whether you want to save the changes or exit without saving them.

Passwords

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

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

An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu. If you set only an administrator password, you do not have to type a password to complete the system startup, but you must type the administrator password to access the Setup utility menu.

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

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

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.
- Remove the battery from the server and then reinstall it. (See “Removing the battery” on page 227 and “Installing the battery” on page 229 for more information.)
- Change the position of the power-on password switch (enable switch 1 of the system board switch block (SW4) to bypass the power-on password check (see “System-board switches and jumpers” on page 17 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 “Safety” on page vii. Do not change settings or move jumpers on any system-board switch or jumper blocks that are not shown in this document.

The default for all of the switches on switch block (SW4) is Off.

While the server is turned off, move switch 1 of the switch block (SW4) to the On position to enable the power-on password override. You can then start the Setup utility and reset the power-on password. You do not have to return the switch to the previous position.

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

Administrator password: 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 between six and 20 printable ASCII characters for the password.

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

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

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

Starting the backup server firmware

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

To force the server to start from the backup copy, turn off the server; then, place the UEFI boot recovery J29 jumper in the backup position (pins 2 and 3).

Use the backup copy of the server firmware until the primary copy is restored. After the primary copy is restored, turn off the server; then, move the UEFI boot recovery J29 jumper back to the primary position (pins 1 and 2).

Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD contains a setup and installation program that is designed for your server. The ServerGuide program detects the server model and optional hardware devices that are installed and uses that

information during setup to configure the hardware. The ServerGuide program simplifies operating-system installations by providing updated device drivers and, in some cases, installing them automatically.

You can download a free image of the *ServerGuide Setup and Installation* CD or purchase the CD from the ServerGuide fulfillment Web site at http://www.ibm.com/systems/management/serverguide/sub.html. To download the free image, click **IBM Service and Support Site**.

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

The ServerGuide program has the following features:

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

ServerGuide features

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

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

The ServerGuide program performs the following tasks:

- Sets system date and time
- Detects the RAID adapter or controller and runs the SAS RAID configuration program (with LSI chip sets for ServeRAID adapters only)
- Checks the microcode (firmware) levels of a ServeRAID adapter and determines whether a later level is available from the CD
- Detects installed optional hardware devices and provides updated device drivers for most adapters and devices
- Provides diskette-free installation for supported Windows operating systems
- Includes an online readme file with links to tips for hardware and operating-system installation

Setup and configuration overview

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

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

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

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

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

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

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

Typical operating-system installation

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

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

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

Installing your operating system without using ServerGuide

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

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. From the menu on the left side of the page, click **System x support search**.
4. From the **Task** menu, select **Install**.

5. From the **Product family** menu, select **System x3650 M3**.
6. From the **Operating system** menu, select your operating system, and then click **Search** to display the available installation documents.

Using the integrated management module

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

The IMM supports the following basic systems-management features:

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

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

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

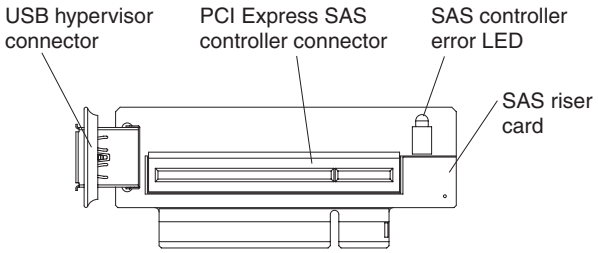
  The command-line interface provides direct access to server management functions through the IPMI 2.0 protocol. Use the command-line interface to issue commands to control the server power, view system information, and identify the server. You can also save one or more commands as a text file and run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

- **Serial over LAN**

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

Using the USB memory key for VMware hypervisor

The VMware hypervisor is available on server models that come with an installed IBM USB Memory Key for VMware Hypervisor. The USB memory key comes installed in the USB hypervisor connector on the SAS riser card (see the following illustration). Hypervisor is virtualization software that enables multiple operating systems to run on a host computer at the same time. The USB memory key is required to activate the hypervisor functions.



To start using the embedded hypervisor functions, you must add the USB memory key to the startup sequence (boot order) in the Setup utility.

To add the USB hypervisor memory key to the boot order, complete the following steps:

1. Turn on the server.

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

2. When the prompt `F1 Setup` is displayed, press F1.
3. From the Setup utility main menu, select **Boot Manager**.
4. Select **Add Boot Option**; then, select **Hypervisor**. Press Enter, and then press Esc.
5. Select **Change Boot Order** and then select **Commit Changes**; then, press Enter.
6. Select **Save Settings** and then select **Exit Setup**.

If the embedded hypervisor image becomes corrupt, you can use the *VMware Recovery* CD that comes with the server to recover the image. To recover the flash device image, complete the following steps:

1. Turn on the server.

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

2. Insert the *VMware Recovery* CD into the CD or DVD drive.
3. Follow the instructions on the screen.

For additional information and instructions, see the *VMware ESXi Server 31 Embedded Setup Guide* at http://www.vmware.com/pdf/vi3_35/esx_3i_e/r35/vi3_35_25_3i_setup.pdf/.

Using the remote presence capability and blue-screen capture

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

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

The virtual media key has an LED. When this LED is lit and green, it indicates that the key is installed and functioning correctly.

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 IMM memory and mapping it to the server as a virtual drive

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

Enabling the remote presence feature

To enable the remote presence feature, complete the following steps:

1. Install the virtual media key into the dedicated slot on the system board (see “Installing an IBM virtual media key” on page 184).
2. Turn on the server.

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

Obtaining the IP address for the Web interface access

To access the Web interface and use the remote presence feature, you need the IP address for the IMM. You can obtain the IMM IP address through the Setup utility. To locate the IP address, complete the following steps:

1. Turn on the server.

   Note: Approximately 3 minutes after the server is connected to ac power, the power-control button becomes active.
2. When the prompt `F1 Setup` is displayed, press <F1>. If you have set both a power-on password and an administrator password, you must type the administrator password to access the full Setup utility menu.
3. From the Setup utility main menu, select **System Settings**.
4. On the next screen, select **Integrated Management Module**.
5. On the next screen, select **Network Configuration**.
6. Find the IP address and write it down.
7. Exit from the Setup utility.

Logging on to the Web interface

To log on to the Web interface to use the remote presence functions, complete the following steps:

1. Open a Web browser on a computer that connects to the server and in the **address** or **URL** field, type the IP address or host name of the IMM to which you want to connect.

   Notes:

   a. If you are logging in to the IMM for the first time after installation, the IMM defaults to DHCP. If a DHCP host is not available, the IMM uses the default static IP address 192.168.70.125.

   b. You can obtain the DHCP-assigned IP address or the static IP address from the server firmware or from your network administrator.

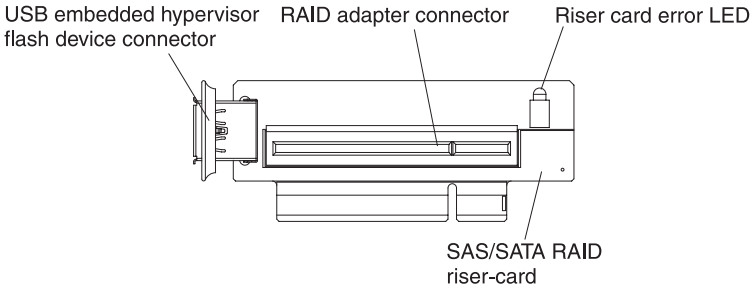
   The Login page is displayed.
2. Type the user name and password. If you are using the IMM for the first time, you can obtain the user name and password from your system administrator. All login attempts are documented in the event log. A welcome page opens in the browser.

   Note: The IMM is set initially with a user name of USERID and password of PASSW0RD (passw0rd with a zero, not the letter O). You have read/write access. For enhanced security, change this default password during the initial configuration.
3. On the Welcome page, type a timeout value (in minutes) in the field that is provided. The IMM will log you off the Web interface if your browser is inactive for the number of minutes that you entered for the timeout value.
4. Click **Continue** to start the session. The browser opens the System Status page, which displays the server status and the server health summary.

Using the embedded hypervisor

The VMware ESXi embedded hypervisor is available on server models that come with an installed USB embedded hypervisor flash device. The USB flash device comes installed in the USB connector on the SAS/SATA RAID riser card (see the following illustration). Hypervisor is virtualization software that enables multiple

operating systems to run on a host system at the same time. The USB flash device is required to activate the hypervisor functions.



To start using the embedded hypervisor functions, you must add the USB flash device to the boot order in the Setup utility.

To add the USB flash device to the boot order, complete the following steps:

1. Turn on the server.

   Note: Approximately 20 to 40 seconds after the server is connected to power, the power-control button becomes active.
2. When the prompt `<F1> Setup` is displayed, press F1.
3. From the Setup utility main menu, select **Boot Manager**.
4. Select **Add Boot Option**; then, select **Embedded Hypervisor**. Press Enter, and then select Esc.
5. Select **Change Boot Order** and then select **Commit Changes**; then, press Enter.
6. Select **Save Settings** and then select **Exit Setup**.

If the embedded hypervisor flash device image becomes corrupt, you can use the *VMware Recovery* CD to recover the flash device image. To recover the flash device image, complete the following steps:

1. Turn on the server.

   Note: Approximately 20 to 40 seconds after the server is connected to power, the power-control button becomes active.
2. Insert the VMware Recovery CD into the CD or DVD drive.
3. Follow the instructions on the screen.

For additional information and instructions, see the *ESXi Embedded and vCenter Server Setup Guide* at http://www.vmware.com/pdf/vsphere4/r40_u1/vsp_40_u1_esxi_e_vc_setup_guide.pdf.

Enabling the Broadcom Gigabit Ethernet Utility program

The Broadcom Gigabit Ethernet Utility program is part of the server firmware. You can use it to configure the network as a startable device, and you can customize where the network startup option appears in the startup sequence. Enable and disable the Broadcom Gigabit Ethernet Utility program from the Setup utility.

Configuring the Gigabit Ethernet controller

The Ethernet controllers are integrated on the system board. They provide an interface for connecting to a 10 Mbps, 100 Mbps, or 1 Gbps network and provide

full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the Ethernet ports in the server support auto-negotiation, the controllers detect the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operate at that rate and mode.

You do not have to set any jumpers or configure the controllers. However, you must install a device driver to enable the operating system to address the controllers. To find updated information about configuring the controllers, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. From the **Product family** menu, select **System x3650 M3** and click **Go**.

Using the LSI Configuration Utility program

Use the LSI Configuration Utility program to configure and manage redundant array of independent disks (RAID) arrays. Be sure to use this program as described in this document.

- Use the LSI Configuration Utility program to perform the following tasks:
  - Perform a low-level format on a hard disk drive
  - Create an array of hard disk drives with or without a hot-spare drive
  - Set protocol parameters on hard disk drives

The integrated SAS/SATA controller with RAID capabilities supports RAID arrays. You can use the LSI Configuration Utility program to configure RAID 1 (IM), RAID 1E (IME), and RAID 0 (IS) for a single pair of attached devices. If you install a different type of RAID adapter, follow the instructions in the documentation that comes with the adapter to view or change settings for attached devices.

In addition, you can download an LSI command-line configuration program from http://www.ibm.com/systems/support/.

When you are using the LSI Configuration Utility program to configure and manage arrays, consider the following information:

- The integrated SAS/SATA controller with RAID capabilities supports the following features:
  - Integrated Mirroring (IM) with hot-spare support (also known as RAID 1)

    Use this option to create an integrated array of two disks plus up to two optional hot spares. All data on the primary disk can be migrated.
  - Integrated Mirroring Enhanced (IME) with hot-spare support (also known as RAID 1E)

    Use this option to create an integrated mirror enhanced array of three to eight disks, including up to two optional hot spares. All data on the array disks will be deleted.
  - Integrated Striping (IS) (also known as RAID 0)

    Use this option to create an integrated striping array of two to eight disks. All data on the array disks will be deleted.

- Hard disk drive capacities affect how you create arrays. The drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.
- If you use an integrated SAS/SATA controller with RAID capabilities to configure a RAID 1 (mirrored) array after you have installed the operating system, you will lose access to any data or applications that were previously stored on the secondary drive of the mirrored pair.
- If you install a different type of RAID controller, see the documentation that comes with the controller for information about viewing and changing settings for attached devices.

Starting the LSI Configuration Utility program

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

1. Turn on the server.

   Note: Approximately 3 minutes after the server is connected to ac power, the power-control button becomes active.
2. When the prompt `<F1> Setup` is displayed, press F1. If you have set an administrator password, you must type the administrator password to access the full Setup utility menu. If you do not type the administrator password, a limited Setup utility menu is available.
3. Select **System Settings → Adapters and UEFI drivers**.
4. Select **Please refresh this page first** and press Enter.
5. Select the device driver that is applicable for the SAS controller in the server. For example, **LSI Logic Fusion MPT SAS Driver**.
6. To perform storage-management tasks, see the SAS controller documentation, which you can download from the Disk controller and RAID software matrix:
   a. Go to http://www.ibm.com/systems/support/.
   b. Under **Product support**, click **System x**.
   c. Under **Popular links**, click **Storage Support Matrix**.

When you have finished changing settings, press Esc to exit from the program; select **Save** to save the settings that you have changed.

Formatting a hard disk drive

Low-level formatting removes all data from the hard disk. If there is data on the disk that you want to save, back up the hard disk before you perform this procedure.

Note: Before you format a hard disk, make sure that the disk is not part of a mirrored pair.

To format a drive, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drive that you want to format and press Enter.
2. Select **SAS Topology** and press Enter.
3. Select **Direct Attach Devices** and press Enter.
4. To highlight the drive that you want to format, use the Up Arrow and Down Arrow keys. To scroll left and right, use the Left Arrow and Right Arrow keys or the End key. Press Alt+D.
5. To start the low-level formatting operation, select **Format** and press Enter.

Creating a RAID array of hard disk drives

To create a RAID array of hard disk drives, complete the following steps:

1. From the list of adapters, select the controller (channel) for which you want to create an array.
2. Select **RAID Properties**.
3. Select the type of array that you want to create.
4. In the RAID Disk column, use the Spacebar or Minus (-) key to select **Yes** (select) or **No** (deselect) to select or deselect a drive from a RAID disk.
5. Continue to select the next drive using the Spacebar or Minus (-) key until you have selected all the drives for your array.
6. Press C to create the disk array.
7. Select **Save changes then exit this menu** to create the array.
8. Exit the Setup utility.

IBM Advanced Settings Utility program

The IBM Advanced Settings Utility (ASU) program is an alternative to the Setup utility for modifying server firmware settings. Use the ASU program online or out-of-band to modify server firmware settings from the command line without the need to restart the server to access the Setup utility.

You can also use the ASU program to configure the optional remote presence features or other IMM settings. The remote presence features provide enhanced systems-management capabilities.

In addition, the ASU program provides limited settings for configuring the IPMI function in the IMM through the command-line interface.

Use the command-line interface to issue setup commands. You can save any of the settings as a file and run the file as a script. The ASU program supports scripting environments through a batch-processing mode.

For more information and to download the ASU program, go to http://www.ibm.com/systems/support/.

Updating IBM Systems Director

If you plan to use IBM Systems Director to manage the server, you must check for the latest applicable IBM Systems Director updates and interim fixes.

To install the IBM Systems Director updates and any other applicable updates and interim fixes, complete the following steps.

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

To locate and install a newer version of IBM Systems Director, complete the following steps:

1. Check for the latest version of IBM Systems Director.
   a. Go to http://www.ibm.com/systems/management/director/downloads.html.
   b. If a newer version of IBM Systems Director than what comes with the server is shown in the drop-down list, follow the instructions on the Web page to download the latest version.

2. Install IBM Systems Director program.

If your management server is connected to the Internet, to locate and install updates and interim fixes, complete the following steps:

1. Make sure that you have run the Discovery and Inventory collection tasks.
2. On the Welcome page of the IBM Systems Director Web interface, click **View updates**.
3. Click **Check for updates**. The available updates are displayed in a table.
4. Select the updates that you want to install, and click **Install** to start the installation wizard.

If your management server is not connected to the Internet, to locate and install updates and interim fixes, complete the following steps:

1. Make sure that you have run the Discovery and Inventory collection tasks.
2. On a system that is connected to the Internet, go to http://www.ibm.com/eserver/support/fixes/fixcentral/.
3. From the **Product family** list, select **IBM Systems Director**.
4. From the **Product** list, select **IBM Systems Director**.
5. From the **Installed version** list, select the latest version, and click **Continue**.
6. Download the available updates.
7. Copy the downloaded files to the management server.
8. On the management server, on the Welcome page of the IBM Systems Director Web interface, click the **Manage** tab, and click **Update Manager**.
9. Click **Import updates** and specify the location of the downloaded files that you copied to the management server.
10. Return to the Welcome page of the Web interface, and click **View updates**.
11. Select the updates that you want to install, and click **Install** to start the installation wizard.

Updating the Universal Unique Identifier (UUID)

The Universal Unique Identifier (UUID) must be updated when the system board is replaced. Use the Advanced Settings Utility to update the UUID in the UEFI-based server. The ASU is an online tool that supports several operating systems. Make sure that you download the version for your operating system. You can download the ASU from the IBM Web site. To download the ASU and update the UUID, complete the following steps.

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

1. Download the Advanced Settings Utility (ASU):
   a. Go to http://www.ibm.com/systems/support/.
   b. Under Product support, select **System x**.
   c. Under Popular links, select **Tools and utilities**.
   d. In the left pane, click **System x and BladeCenter Tools Center**.
   e. Scroll down and click **Tools reference**.
   f. Scroll down and click the plus-sign (+) for Configuration tools to expand the list; then, select **Advanced Settings Utility (ASU)**.
   g. In the next window under Related Information, click the **Advanced Settings Utility** link and download the ASU version for your operating system.

2. ASU sets the UUID in the Integrated Management Module (IMM). Select one of the following methods to access the Integrated Management Module (IMM) to set the UUID:
   - Online from the target system (LAN or keyboard console style (KCS) access)
   - Remote access to the target system (LAN based)
   - Bootable media containing ASU (LAN or KCS, depending upon the bootable media)
3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:
   - For Windows based operating systems:
     - ibm_rndis_server_os.inf
     - device.cat
   - For Linux based operating systems:
     - cdc_interface.sh
4. After you install ASU, use the following command syntax to set the UUID:

   `asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> [access_method]`

   Where:

   <uuid_value>
   Up to 16-byte hexadecimal value assigned by you.

   [access_method]
   The access method that you selected to use from the following methods:

   - Online authenticated LAN access, type the command:

     `[host <imm_internal_ip>] [user <imm_user_id>][password <imm_password>]`

     Where:

     imm_internal_ip
     The IMM internal LAN/USB IP address. The default value is 169.254.95.118.

     imm_user_id
     The IMM `account` (1 of 12 accounts). The default value is USERID.

     imm_password
     The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

     Note: If you do not specify any of these parameters, ASU will use the default values. When the default values are used and ASU is unable to access the IMM using the online authenticated LAN access method, ASU will automatically use the unauthenticated KCS access method.

     The following commands are examples of using the userid and password default values and not using the default values:

     Example that does not use the userid and password default values:

     `asu set SYSTEM_PROD_DATA.SYsInfoUUID <uuid_value> user <user_id> password <password>`

Example that does use the userid and password default values:
```
asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>
```

- Online KCS access (unauthenticated and user restricted):

  You do not need to specify a value for *access_method* when you use this access method.

  Example:
  ```
  asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>
  ```
  The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver be installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer. See the *Advanced Settings Utility Users Guide* for more details. You can access the ASU Users Guide from the IBM Web site.

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

  a. Go to http://www.ibm.com/systems/support/.
  b. Under Product support, select **System x**.
  c. Under Popular links, select **Tools and utilities**.
  d. In the left pane, click **System x and BladeCenter Tools Center**.
  e. Scroll down and click **Tools reference**.
  f. Scroll down and click the plus-sign (+) for Configuration tools to expand the list; then, select **Advanced Settings Utility (ASU)**.
  g. In the next window under Related Information, click the **Advanced Settings Utility** link.

- Remote LAN access, type the command:

  Note: When using the remote LAN access method to access IMM using the LAN from a client, the *host* and the *imm_external_ip* address are required parameters.
  ```
  host <imm_external_ip> [user <imm_user_id>[[password <imm_password>]
  ```
  Where:

  imm_external_ip
  The external IMM LAN IP address. There is no default value. This parameter is required.

  imm_user_id
  The IMM `account` (1 of 12 accounts). The default value is USERID.

  imm_password
  The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

  The following commands are examples of using the userid and password default values and not using the default values:

  Example that does not use the userid and password default values:
  ```
  asu set SYSTEM_PROD_DATA.SYsInfoUUID <uuid_value> host <imm_ip>
  user <user_id> password <password>
  ```

  Example that does use the userid and password default values:
  ```
  asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> host <imm_ip>
  ```

- Bootable media:

You can also build a bootable media using the applications available through the Tools Center Web site at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp. From the left pane, click **IBM System x and BladeCenter Tools Center**, then click **Tool reference** for the available tools.

5. Restart the server.

Updating the DMI/SMBIOS data

The Desktop Management Interface (DMI) must be updated when the system board is replaced. Use the Advanced Settings Utility to update the DMI in the UEFI-based server. The ASU is an online tool that supports several operating systems. Make sure that you download the version for your operating system. You can download the ASU from the IBM Web site. To download the ASU and update the DMI, complete the following steps.

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

1. Download the Advanced Settings Utility (ASU):
   a. Go to http://www.ibm.com/systems/support/.
   b. Under Product support, select **System x**.
   c. Under Popular links, select **Tools and utilities**.
   d. In the left pane, click **System x and BladeCenter Tools Center**.
   e. Scroll down and click **Tools reference**.
   f. Scroll down and click the plus-sign (+) for Configuration tools to expand the list; then, select **Advanced Settings Utility (ASU)**.
   g. In the next window under Related Information, click the **Advanced Settings Utility** link and download the ASU version for your operating system.
2. ASU sets the DMI in the Integrated Management Module (IMM). Select one of the following methods to access the Integrated Management Module (IMM) to set the DMI:
   - Online from the target system (LAN or keyboard console style (KCS) access)
   - Remote access to the target system (LAN based)
   - Bootable media containing ASU (LAN or KCS, depending upon the bootable media)
3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:
   - For Windows based operating systems:
     – ibm_rndis_server_os.inf
     – device.cat
   - For Linux based operating systems:
     – cdc_interface.sh
4. After you install ASU, type the following commands to set the DMI:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> [access_method]
asu set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> [access_method]
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> [access_method]
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> [access_method]
```

Where:

<m/t_model>
The server machine type and model number. Type `mtm xxxxyy`, where *xxxx* is the machine type and *yyy* is the server model number.

<system model>
The system model. Type `system yyyyyyy`, where *yyyyyyy* is the product identifier such as x3650M3.

<s/n> The serial number on the server. Type `sn zzzzzzz`, where *zzzzzzz* is the serial number.

<asset_method>
The server asset tag number. Type `asset aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa`, where *aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa* is the asset tag number.

[access_method]
The access method that you select to use from the following methods:

- Online authenticated LAN access, type the command:

  `[host <imm_internal_ip>] [user <imm_user_id>][password <imm_password>]`

  Where:

  imm_internal_ip
  The IMM internal LAN/USB IP address. The default value is 169.254.95.118.

  imm_user_id
  The IMM account (1 of 12 accounts). The default value is USERID.

  imm_password
  The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

  Note: If you do not specify any of these parameters, ASU will use the default values. When the default values are used and ASU is unable to access the IMM using the online authenticated LAN access method, ASU will automatically use the following unauthenticated KCS access method.

  The following commands are examples of using the userid and password default values and not using the default values:

  Examples that do not use the userid and password default values:

  ```
  asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model> user
   <imm_user_id> password <imm_password>
  asu set SYSTEM_PROD_DATA.SYsInfoProdIdentifier <system model> user
   <imm_user_id> password <imm_password>
  asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n> user
   <imm_user_id> password <imm_password>
  asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag> user
   <imm_user_id> password <imm_password>
  ```

  Examples that do use the userid and password default values:

  ```
  asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
  asu set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model>
  asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n>
  asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>
  ```

- Online KCS access (unauthenticated and user restricted):

You do not need to specify a value for *access_method* when you use this access method.

The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver be installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer. See the *Advanced Settings Utility Users Guide* at http:://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=MIGR-55021 for more details.

The following commands are examples of using the userid and password default values and not using the default values:

Examples that do not use the userid and password default values:

```
asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model>
asu set SYSTEM_PROD_DATA.SYsInfoProdIdentifier <system model>
asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n>
asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag>
```

- Remote LAN access, type the command:

  Note: When using the remote LAN access method to access IMM using the LAN from a client, the *host* and the *imm_external_ip* address are required parameters.

  ```
  host <imm_external_ip> [user <imm_user_id>[[password <imm_password>]
  ```

  Where:

  imm_external_ip
  The external IMM LAN IP address. There is no default value. This parameter is required.

  imm_user_id
  The IMM account (1 of 12 accounts). The default value is USERID.

  imm_password
  The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

  The following commands are examples of using the userid and password default values and not using the default values:

  Examples that do not use the userid and password default values:

  ```
  asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model> host <imm_ip>
  user <imm_user_id> password <imm_password>
  asu set SYSTEM_PROD_DATA.SYsInfoProdIdentifier <system model> host <imm_ip>
  user <imm_user_id> password <imm_password>
  asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n> host <imm_ip>
  user <imm_user_id> password <imm_password>
  asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag> host <imm_ip>
  user <imm_user_id> password <imm_password>
  ```

  Examples that do use the userid and password default values:

  ```
  asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> host <imm_ip>
  asu set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> host <imm_ip>
  asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> host <imm_ip>
  asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> host <imm_ip>
  ```

- Bootable media:

  You can also build a bootable media using the applications available through the Tools Center Web site at http://publib.boulder.ibm.com/infocenter/toolsctr/

v1r0/index.jsp. From the left pane, click **IBM System x and BladeCenter Tools Center**, then click **Tool reference** for the available tools.

5. Restart the server.

Appendix A. Getting help and technical assistance

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

Before you call

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Problem Determination and Service Guide* on the IBM *Documentation* CD that comes with your system.
- Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.

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

Using the documentation

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

Getting help and information from the World Wide Web

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

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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

Appendix B. Notices

This information was developed for products and services offered in the U.S.A.

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Table 22. Limits for particulates and gases

Contaminant	Limits
Particulate	• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2[1]. • Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. • The deliquescent relative humidity of the particulate contamination must be more than 60%[2]. • The room must be free of conductive contamination such as zinc whiskers.
Gaseous	• Copper: Class G1 as per ANSI/ISA 71.04-1985[3] • Silver: Corrosion rate of less than 300 Å in 30 days

[1] ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

[2] The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

[3] ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

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