IBM System x3550 M2 Type 7946

IBM

Problem Determination and Service Guide

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Note: Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 265 and the *IBM Safety Information*, *IBM Environmental Notices and User's Guide*, and the *IBM Warranty and Support Information* document on the IBM *System x Documentation* CD.

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Guidelines for trained service technicians

This section contains information for trained service technicians.

Inspecting for unsafe conditions

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

Consider the following conditions and the safety hazards that they present:
- Electrical hazards, especially primary power. Primary voltage on the frame can cause serious or fatal electrical shock.
- Explosive hazards, such as a damaged CRT face or a bulging capacitor.
- Mechanical hazards, such as loose or missing hardware.

To inspect the product for potential unsafe conditions, complete the following steps:
1. Make sure that the power is off and the power cord is disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cord:
    - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
    - Make sure that the power cord is the correct type, as specified in "Power cords" on page 160.
    - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment

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

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

Safety statements

Important:

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

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

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

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

Statement 1:

DANGER

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

To avoid a shock hazard:

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

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

Statement 2:

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

Do not:
- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

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

Statement 3:

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

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

DANGER

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

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

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

Statement 4:

≥ 18 kg (39.7 lb)   ≥ 32 kg (70.5 lb)   ≥ 55 kg (121.2 lb)
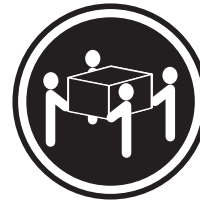
CAUTION:
Use safe practices when lifting.

Statement 5:

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

Statement 8:

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

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

Statement 26:

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

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

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:
   - IBM System x Server Firmware (formerly BIOS firmware)
   - Device drivers
   - Firmware
   - Hardware components
   - Software

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

2. **Collect data.**

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

   a. **Document error codes and system-board LEDs.**
      - **System error codes:** See "POST error codes" on page 31 for information about a specific error code.
      - See "System-board LEDs" on page 25 for the location of the system-board LEDs.
      - **Software or operating-system error codes:** See the documentation for the software or operating system for information about a specific error code. See the manufacturer's Web site for documentation.
      - **Light path diagnostics LEDs:** See "Light path diagnostics LEDs" on page 100 for information about LEDs that are lit.

   b. **Collect system data.**

      Run Dynamic System Analysis (DSA) Preboot diagnostics program to collect information about the hardware, firmware, software, and operating system. Have this information available when you contact IBM or an approved warranty service provider. See "Diagnostic programs and messages" on page 110 for the instructions to run the DSA Preboot program.

      If you need to download the latest version of DSA Preboot, 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.

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

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

3) Under **Popular links**, click **Software and device drivers**.

4) Under **Related downloads**, click **Dynamic System Analysis (DSA)**.

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

1) Go to http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp.

2) In the navigation pane, click **IBM System x and BladeCenter Tools Center**.

3) Click **Tools reference > Error reporting and analysis tools > IBM Dynamic System Analysis**.

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

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

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

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

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

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

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

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

To display a list of available updates for your server, go to http://www.ibm.com/systems/support/supportsite.wss/ docdisplay?brandind=5000008&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 x3550 M2** to display the list of downloadable files for the server.

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

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

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

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

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

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

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

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

Many configuration problems are caused by loose power or signal cables or incorrectly seated adapters. You might be able to solve the problem by turning off the server, reconnecting cables, reseating adapters, and turning the server back on. See "Checkout procedure" on page 79 for the instructions to perform the checkout procedures.

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

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

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

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

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

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

c) From the **Product family** list, select **System x3550 M2**.

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

c. **Check for service bulletins.**

IBM service bulletins document known problems and suggested solutions. To search for service bulletins, complete the following steps.

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

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

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

3) From the **Product family** list, select **System x3550 M2**.

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

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

If a hardware component is not operating within specifications, it can cause unpredictable results. Most hardware failures are reported as error codes in a system or operating-system log. See "Troubleshooting tables" on page 81 and Chapter 4, "Removing and replacing server components," on page 163 for more information. Hardware errors are also indicated by light path diagnostics LEDs (see "Light path diagnostics LEDs" on page 100 for more information).

Troubleshooting procedures are also provided on the IBM Web site. A single problem might cause multiple symptoms. Follow the diagnostic procedure for the most obvious symptom. If that procedure does not diagnose the problem, use the procedure for another symptom, if possible. To locate troubleshooting procedures for your server, complete the following steps.

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

1) Go to http://www.ibm.com/systems/support/.
2) Under **Product support**, click **System x**.
3) From the **Product family** list, select **System x3550 M2**.
4) Under **Support & downloads**, click **Troubleshoot**.
5) Under **Diagnostic**, select the troubleshooting procedure for the symptom that you are observing.

For more troubleshooting information, see Chapter 3, "Diagnostics," on page 27.

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 x3550 M2 Type 7946 server. It describes the diagnostic tools that come with the server, error codes and suggested actions, and instructions for replacing failing components.

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

The four types of replaceable components are:

- **Consumables:** Purchase and replacement of consumables (components, such as batteries and printer cartridges, that have depleting life) is your responsibility. If IBM acquires or installs a consumable component at your request, you will be charged for the service. For a list of consumable parts, see "Consumable parts" on page 159.
- **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 a list of replaceable components for the server, see "Replaceable server components" on page 155.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document on the IBM *System x 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 *System x Documentation* CD. It provides general information about setting up and cabling the server, including information about features, and how to configure the server. It also contains detailed instructions for installing, removing, and connecting some optional devices that the server supports.
- *Rack Installation Instructions*

  This printed document contains instructions for installing the server in a rack.
- *Safety Information*

  This document is in PDF on the IBM *System x Documentation* CD. It contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* document.
- *Warranty and Support Information*

  This document is in PDF on the IBM *System x Documentation* CD. It contains information about the terms of the warranty and getting service and assistance.

- *Environmental Notices and User Guide*

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

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

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

Note: Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.
1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x3550 M2** and click **Go**.

Notices and statements in this document

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

The following notices and statements are used in this document:
- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage might occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Features and specifications

The following information is a summary of the features and specifications of the server. Depending on the server model, some features might not be available, or some specifications might not apply.

Table 1. Features and specifications

Microprocessor:	Hard disk drive expansion bays (depending on the model):	Power supply:
• Supports up to two Intel® Xeon™ microprocessors (one installed), dual-core (two cores per microprocessor with 4 MB shared among cores) or quad-core (four cores per microprocessor with 8 MB shared among cores) • Level-2 cache • QuickPath Interconnect (QPI) links speed up to 6.4 GT per second **Note:** • Use the Setup utility program 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: 1 GB • Maximum: 128 GB • Type: PC3-10600R-999 (single-rank or double-rank), 800, 1067, and 1333 MHz, ECC, DDR3 registered SDRAM DIMMs only • Slots: 16 dual inline • Supports 1 GB, 2 GB, 4 GB, and 8 GB (when available) DIMMs **SATA optical drives (depending on your model):** • CD-RW/DVD-ROM combo (on standard models) • DVD-ROM (optional) • Multi-burner (optional) **Hot-swap fans:** The server comes standard with six dual-motor hot-swap fans.	• Six 2.5-inch hot-swap SAS or hot-swap SATA hard disk drive bays • Four 2.5-inch simple-swap, solid state SATA hard disk drive bays **PCI expansion slots:** Supports two PCI riser slots: • Slot 1 supports low-profile cards (PCI Express Gen2 x16 or PCI-X 1.0a 64-bit/133 MHz). • Slot 2 supports half-length, full-height cards (PCI Express Gen2 x16 or PCI-X 1.0a 64-bit/133 MHz). **Video controller (integrated into IMM):** • Matrox G200 (two analog ports - one front and one rear that can be connected at the same time) **Note:** The maximum video resolution is 1280 x 1024 at 75 Hz. – SVGA compatible video controller – DDR2 250 MHz SDRAM video memory controller – Avocent Digital Video Compression – Video memory is not expandable	• One power supply standard • Maximum of two 675-watt ac (110 or 220 V ac auto-sensing) hot-swap power supplies for redundancy support **Environment:** • Air temperature: – Server on: 10°C to 35°C (50.0°F to 95.0°F); altitude: 0 to 914 m (2998.7 ft) – Server off: -40°C to 60°C (-104°F to 140°F); maximum altitude: 2133 m (6998.0 ft) • Humidity: – Server on: 8% to 80% – Server off: 8% to 80% • Particulate contamination: **Attention:** Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. For information about the limits for particulates and gases, see "Particulate contamination" on page 267. **Heat output:** Approximate heat output: • Minimum configuration: 662 Btu per hour (194 watts) • Maximum configuration: 2302 Btu per hour (675 watts)

Table 1. Features and specifications (continued)

Integrated functions:	RAID controllers:	Electrical input:

• 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
• Broadcom BCM5709 Gb Ethernet controller with TCP/IP Offload Engine (TOE) and Wake on LAN® support
• Five Universal Serial Bus (USB) 2.0 ports (two front and two rear of the chassis, and one on the SAS/SATA RAID riser card in which the optional USB flash device with embedded hypervisor software is installed)
• 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 System Management RJ-45 on the rear to connect to a systems management network. This system management connector is dedicated to the IMM functions. This connector is active with or without the optional IBM Virtual Media Key installed.
• One serial port
	• A ServeRAID-BR10i SAS/SATA adapter that provides RAID levels 0, 1, and 1E (comes standard on some hot-swap SAS and hot-swap SATA models).
	• An optional ServeRAID-MR10i SAS/SATA adapter that provides RAID levels 0, 1, 5, 6, 10, 50, and 60 can also be ordered.
	
	Size:
	• Height: 43 mm (1.69 inches, 1U)
	• Depth: 711 mm (28 inches)
	• Width: 440 mm (17.3 inches)
	• Maximum weight: 15.4 kg (34 lb) when fully configured
	
	Acoustical noise emissions:
	• Sound power, idling: 6.1 bels maximum
	• Sound power, operating: 6.1 bels maximum
		• Sine-wave input (47 - 63 Hz) required
		• Input voltage low range:
		  – Minimum: 100 V ac
		  – Maximum: 127 V ac
		• Input voltage high range:
		  – Minimum: 200 V ac
		  – Maximum: 240 V ac
		• Input kilovolt-amperes (kVA), approximately:
		  – Minimum: 0.194 kVA
		  – Maximum: 0.700 kVA
		
		Notes:
		1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.
		2. 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 noise emission level stated in the declared (upper limit) sound-power level, in bels, for a random sample of system.

Server controls, LEDs, and power

This section describes the controls and light-emitting diodes (LEDs) and how to turn the server on and off. For the location of the LEDs on the system board, see "System-board LEDs" on page 25.

Front view

The following illustration shows the controls, LEDs, and connectors on the front of the server.
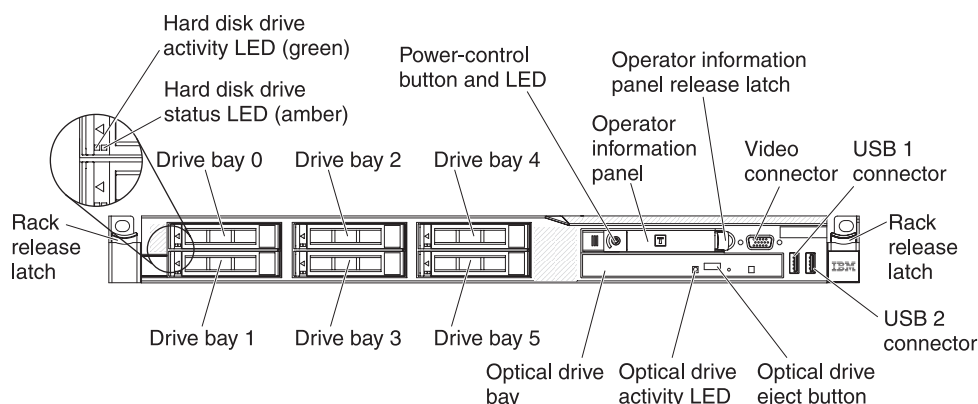
The following illustration shows the controls, LEDs, and connectors on the front of the simple-swap server model.
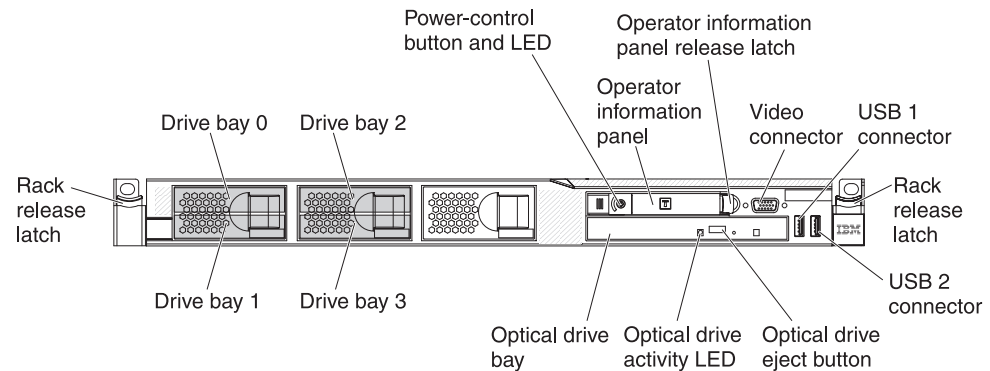
- **Rack release latches:** Press the latches on each front side of the server to remove the server from the rack.
- **Hard disk drive activity LEDs:** This LED is used on SAS or SATA hard disk drives. Each hot-swap hard disk drive has an activity LED, and when this LED is flashing, it indicates that the drive is in use.
- **Hard disk drive status LEDs:** This LED is used on SAS or SATA hard disk drives. When this LED is lit, it indicates that the drive has failed. If an optional IBM ServeRAID™ controller is installed in the server, when this LED is flashing slowly (one flash per second), it indicates that the drive is being rebuilt. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.
- **CD/DVD eject button:** Press this button to release a DVD or CD from the CD/DVD drive.
- **CD/DVD drive activity LED:** When this LED is lit, it indicates that the CD/DVD drive is in use.
- **Operator information panel:** This panel contains controls and LEDs that provide information about the status of the server.
- **Operator information panel release latch:** Slide the blue release latch to the left to pull out the light path diagnostics panel and view the light path diagnostics LEDs and buttons. See "Light path diagnostics panel" on page 11 for more information about the light path diagnostics.
- **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 a USB mouse, keyboard, or other device to any of these connectors.

Operator information panel

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

Ethernet
icon LED

Power-control
button cover

Ethernet
activity LEDs

Information LED

System-error LED

1   2

3   4

Power-control button/
power-on LED

Ethernet
activity LEDs

Locator button/
locator LED

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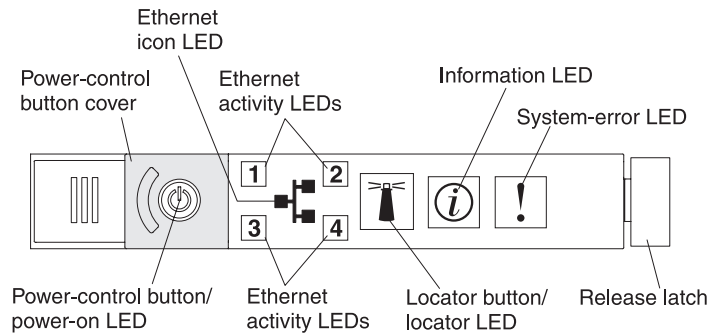
- **Power-control button and power-on LED:** Press this button to turn the server on and off manually or to wake the server from a reduced-power state. The states of the power-on LED are as follows:

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

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

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

    Lit: The server is turned on.

    Fading on and off: The server is in a reduced-power state. To wake the server, press the power-control button or use the IMM Web interface. See "Logging on to the Web interface" on page 252 for information on logging on to the IMM Web interface.

- **Ethernet activity LEDs:** When any of these LEDs is lit, they indicate 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.

- **System-locator button/LED:** Use this blue LED to visually locate the server among other servers. This LED is also used as a presence detection button. You can use IBM Systems Director to light this LED remotely. This LED is controlled by the IMM. When you press the System-locator button, the LED will blink and it will continue to blink until you press it again to turn it off. The locator button is pressed to visually locate the server among the others servers. It is also used as the physical presence for the Trusted Platform Module (TPM).

- **System-information LED:** When this amber LED is lit, it indicates that a noncritical event has occurred. Check the error log for additional information. See "Error logs" on page 29 for information about the error logs.

- **System-error LED:** When this amber LED is lit, it indicates that a system error has occurred. A system-error LED is also on the rear of the server. An LED on the light path diagnostics panel on the operator information panel is also lit to help isolate the error. This LED is controlled by the IMM.

- **Hard drive activity LED:** When this green LED is lit, it indicates that one of the hard disk drives is in use.

    Notes:
    1. For a SAS drive, a hard disk drive activity LED is shown in two places: on the hard disk drive and on the operator information panel.
    2. For a SATA drive, hard disk drive activity is indicated only by the hard disk drive activity LED on the operator information panel.

Light path diagnostics panel

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

Note: The system service label on the underside of the cover also provides information about the location of the light path diagnostics LEDs.

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

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

Operator information panel

Light path diagnostics LEDs

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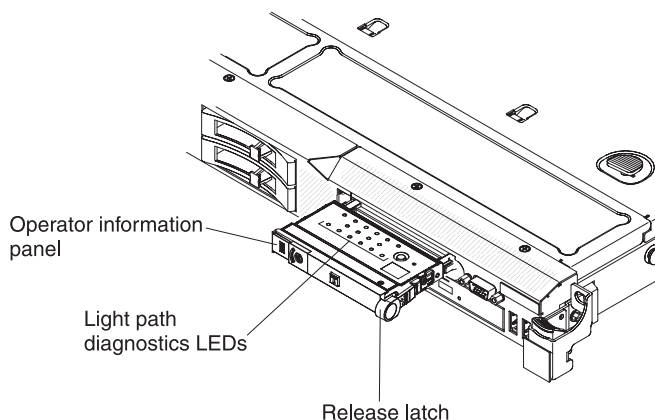
The following illustration shows the LEDs and controls on the light path diagnostics panel.

Light Path Diagnostics

NMI button

Checkpoint code
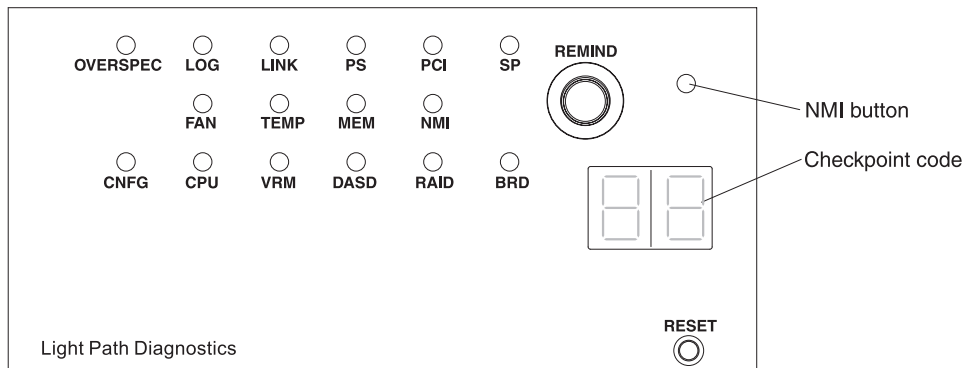
- **Remind button:** This button places the system-error LED on the front panel into Remind mode. In Remind mode, the system-error LED flashes every 2 seconds until the problem is corrected, the system is restarted, or a new problem occurs.

  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. It allows you to blue screen the server and take a memory dump (use this button only when directed by the IBM service support).
- **Checkpoint code display:** This display provides a checkpoint code that indicates the point at which the system stopped during the boot block and POST. A checkpoint code is either a byte or a word value that is produced by UEFI. The display does not provide error codes or suggest components to be replaced.
- **Reset button:** Press this button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button. The Reset button is in the lower right-hand corner of the light path diagnostics panel.

For additional information about the light path diagnostics panel LEDs, see "Light path diagnostics LEDs" on page 100.

Rear view

The following illustration shows the connectors and LEDs on the rear of the server.
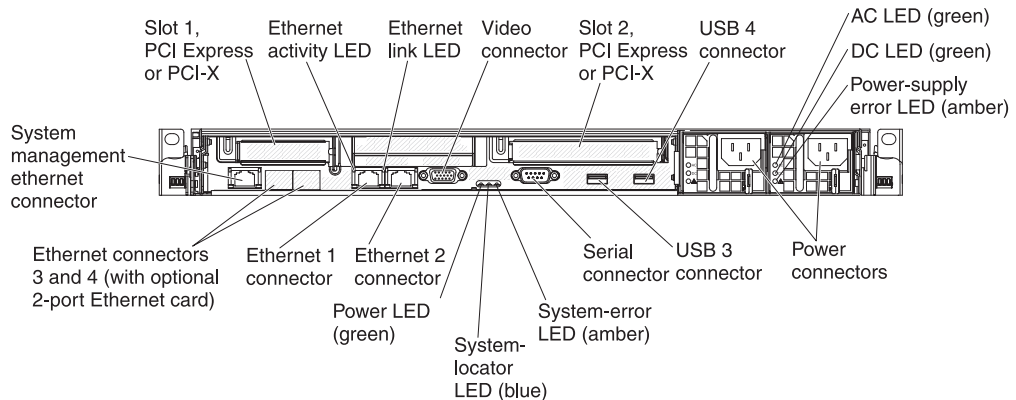
- **PCI slot 1:** Insert a low-profile PCI Express or PCI-X adapter into this slot. Standard models of the server come with two PCI Express rise assemblies installed. You can purchase an optional PCI-X riser-card assembly with a bracket if you want to install a PCI-X adapter in this slot.
- **PCI slot 2:** Insert a half-length, full-height PCI Express or PCI-X adapter into this slot. Standard models of the server come with two PCI Express rise assemblies installed. You can purchase an optional PCI-X riser card assembly with a bracket if you want to install a PCI-X adapter in this slot.
- **Power connector:** Connect the power cord to this connector.
- **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 108.
- **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 108.
- **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.

- **Power-on LED:** When this LED is lit and not flashing, it indicates that the server is turned on. The states of the power-on LED are as follows:

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

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

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

  Lit: The server is turned on.

  Fading on and off: The server is in a reduced-power state. To wake the server, press the power-control button or use the IMM Web interface. See "Logging on to the Web interface" on page 252 for information on logging on to the IMM Web interface.

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

- **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 1280 x 1024 at 75 Hz.

- **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).

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

- **Systems-management Ethernet connector:** Use this connector to connect the server to a network for full systems-management information control.

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

- **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.

- **Ethernet connectors:** Use either of these connectors to connect the server to a network.

Server power features

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

Turning on the server

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

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

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

Note: When 4 GB or more of memory (physical or logical) is installed, some memory is reserved for various system resources and is unavailable to the operating system. The amount of memory that is reserved for system resources depends on the operating system, the configuration of the server, and the configured PCI options.

Turning off the server

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

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

Statement 5:

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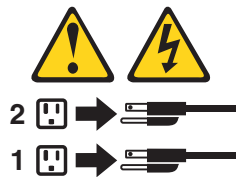
The server can be turned off in any of the following ways:

- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will turn off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if your operating system supports this feature.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- The server can be turned off by Wake on LAN feature with the following limitation:
  - To install any PCI adapter, the power cords must be removed from the power source before you remove the PCI Express riser assembly and the PCI-X

riser assembly. Otherwise, this will cause the active power management event signal to become disabled by the system board logic and Wake on LAN might not work. However, after the server is powered-on locally, the active power management event signal will be enabled by the system board logic.

- The integrated management module (MM) can turn off the server as an automatic response to a critical system failure.

Internal LEDs, connectors, and jumpers

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

System-board internal connectors

The following illustration shows the internal connectors on the system board.
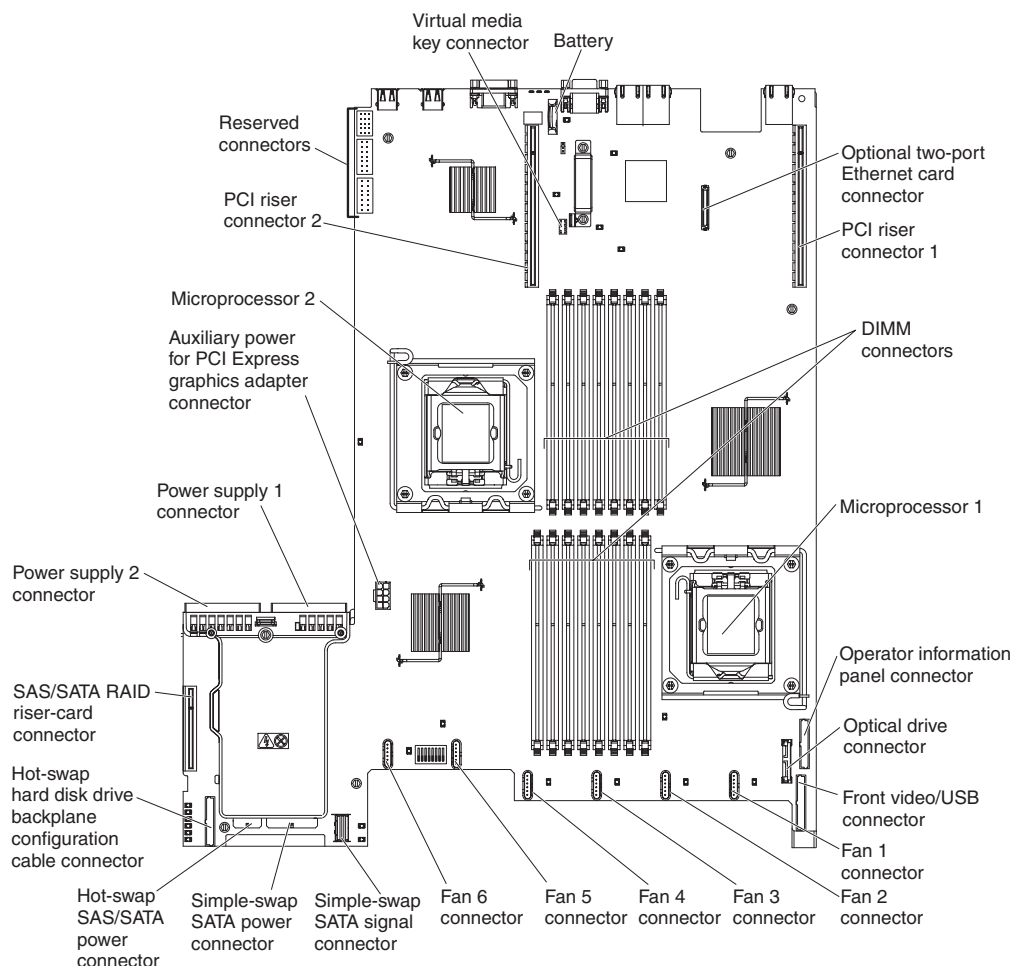
System-board external connectors

The following illustration shows the external connectors on the system board:

USB 1 connector

Video connector

Ethernet 2

USB 2 connector

Serial connector

Ethernet 1

Systems-management Ethernet connector
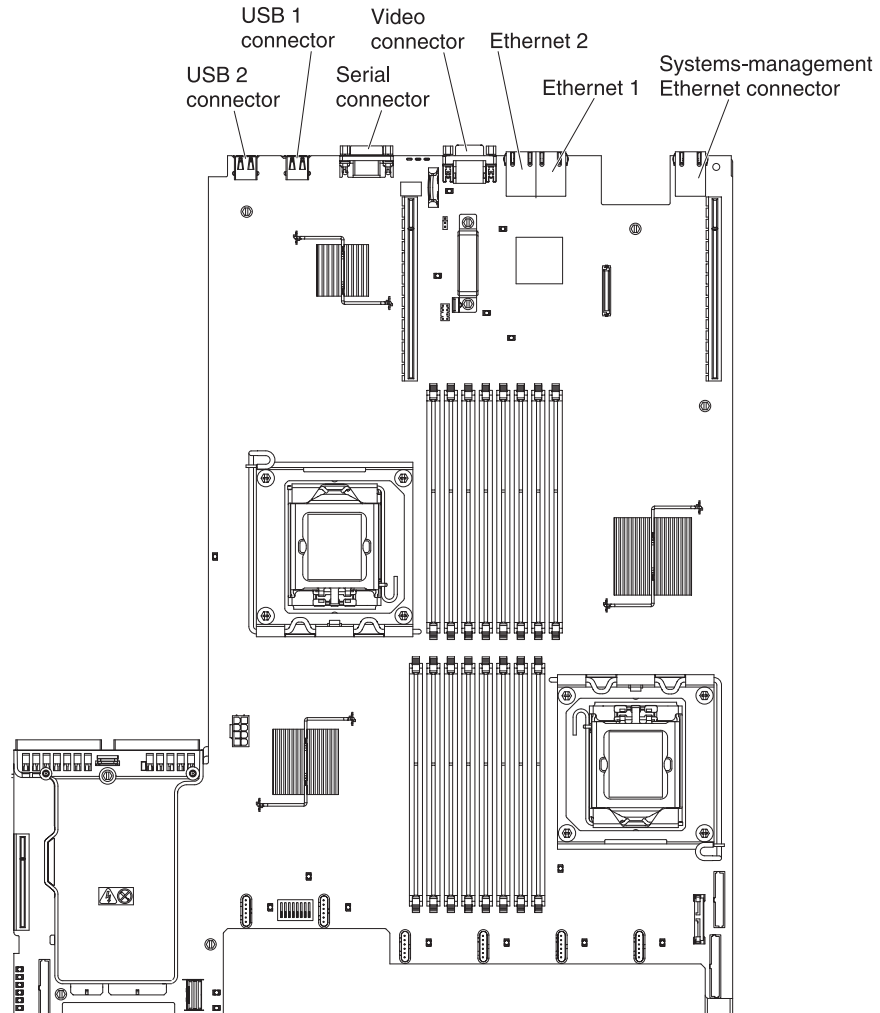
System-board switches and jumpers

Some server models come with the Pass 8 level system board or the Pass 9 level system board. The Pass 8 level system board does not have an identifying mark. The Pass 9 level system board is identifiable by P9, as indicated in the illustration in "Pass 9 level system board" on page 20. If the system board is updated in the future, it will also show the pass level on the system board. The functionality of the two system boards are equivalent except the switch blocks. The functions of the switch blocks on each of these system boards will differ, depending on the level of the system board that is installed in your server. The following sections describe the switches and jumpers for each of these system boards.

Pass 8 level system board

If your server has the Pass 8 level system board, 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 block, you must remove and discard it to access the switch.

UEFI boot recovery jumper (J29)

IMM recovery jumper (J147)

SW3 switch block

SW4 switch block (Reserved)
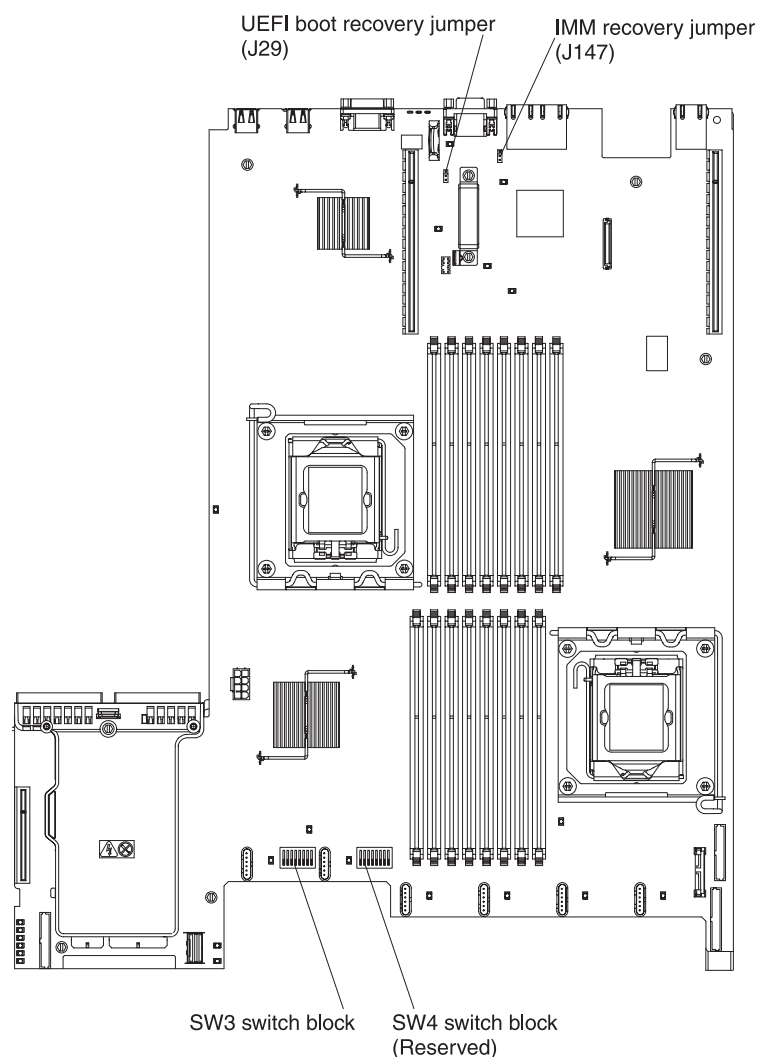
The following table describes the jumpers on the Pass 8 level system board.

Table 2. Pass 8 level system board jumpers

Jumper number	Jumper name	Jumper setting
J29	UEFI boot recovery jumper	• Pins 1 and 2: Normal (default) Loads the primary server (formerly BIOS) firmware ROM page. • Pins 2 and 3: Loads the secondary (backup) server firmware ROM page.
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 table describes the functions of the SW3 switch block on the Pass 8 system board:

Table 3. Pass 8 level system board SW3 switch definition

Switch number	Default position	Description
1	Off	Clear CMOS memory. When this switch is toggled to On, it clears the data in CMOS memory, which clears the power-on password.
2	Off	Reserved.
3	Off	Reserved.
4	Off	Reserved.
5	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 power-on password in overridden. Changing the position of this switch does not affect the administrator password check if an administrator password is set.

Table 3. Pass 8 level system board SW3 switch definition (continued)

Switch number	Default position	Description
6	Off	When you toggle this switch to On and then Off, you force a power-on, which overrides the power-on and power-off button on the server and they become nonfunctional.
7	Off	Reserved.
8	Off	Reserved.

Important:

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 vii, "Installation guidelines" on page 163, "Handling static-sensitive devices" on page 165, and "Turning off the server" on page 14.

2. Any system-board switch or jumper blocks that are not shown in the illustrations in this document are reserved.

Pass 9 level system board

If your server has the Pass 9 level system board, the following illustration shows the location and description of the switches and jumpers. To determine if your system board is a pass 9 level system board, you will see P9 (with a part number to the right of it) on the corner of the system board near the USB connectors on the rear of the server, as shown in the following illustration.

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.
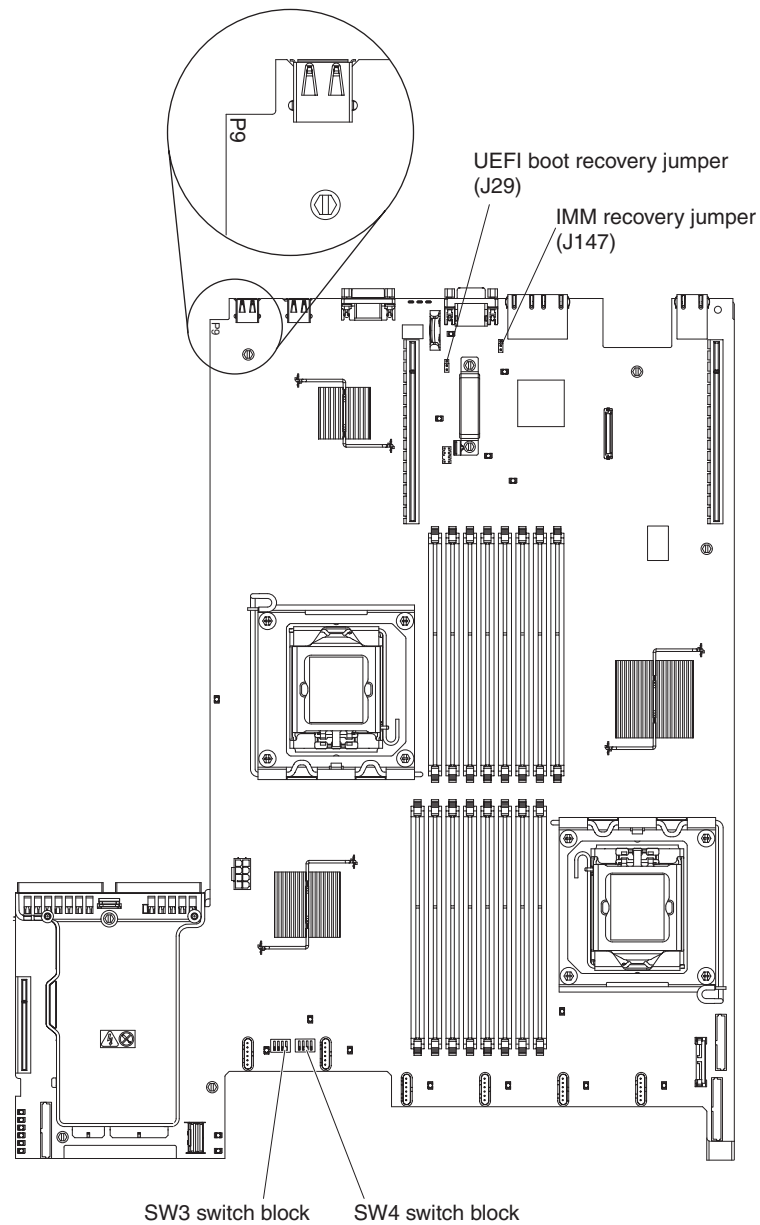
The following table describes the jumpers on the Pass 9 level system board.

Table 4. Pass 9 level 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 4. Pass 9 level 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 table describes the functions of the SW3 switch block on the Pass 9 level system board.

Table 5. Pass 9 level system board SW3 switch block definition

Switch number	Default position	Description
1	Off	Clear CMOS memory. When this switch is toggled to On, it clears the data in CMOS memory, which clears the power-on password.
2	Off	Reserved.
3	Off	Reserved.
4	Off	Reserved.

The following table describes the functions of the SW4 switch block on the Pass 9 level system board.

Table 6. Pass 9 level system board SW4 switch block definition

Switch number	Default position	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 power-on password in overridden. Changing the position of this switch does not affect the administrator password check if an administrator password is set. See "Passwords" on page 245 for additional information about passwords.
2	Off	When you toggle this switch On and then Off, you force a power-on, which overrides the power-on and power-off button on the server and they become nonfunctional.
3	Off	(Trained service technician only) Forced power permission. Changing the position of this switch overrides the IMM power-on checking process.
4	Off	Reserved.

Important:

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 163, "Handling static-sensitive devices" on page 165, and "Turning off the server" on page 14.

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:

Slot 2 missing PCI riser card LED

Enclosure manager heartbeat LED

Battery LED

IMM heartbeat LED

DIMM 9 - 16 error LEDs

Slot 1 missing PCI riser card LED

Microprocessor 2 error LED

System error LED

SAS/SATA RAID riser-card LED

AUX power channel error LED

Power channel E error LED

Microprocessor 1 error LED

Power channel D error LED

Power channel C error LED

DIMM 1 - 8 error LEDs

Power channel B error LED

Fan 1 error LED

Power channel A error LED

Fan 6 error LED

Fan 5 error LED

Fan 4 error LED

Fan 3 error LED

Fan 2 error LED

240 VA error LED

System-board optional device connectors

The following illustration shows the connectors for user-installable options:
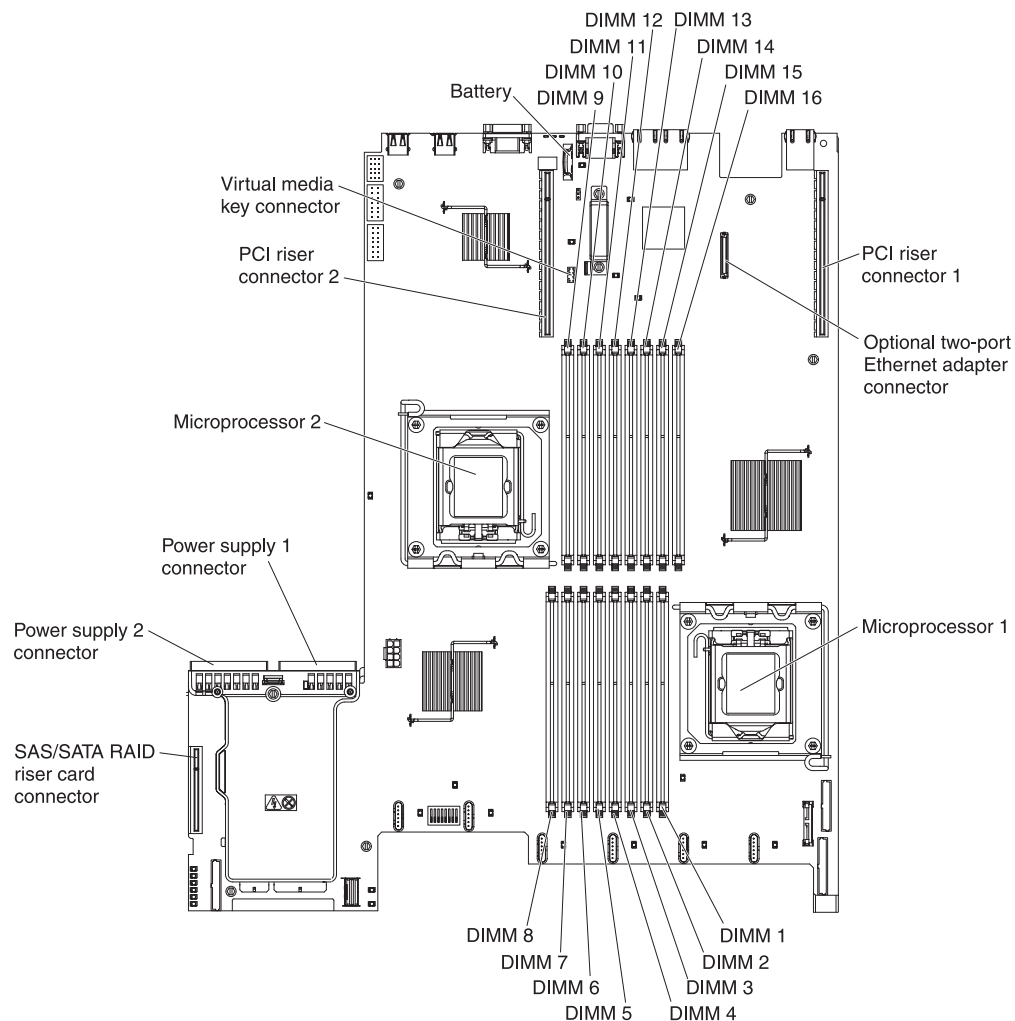
Chapter 3. Diagnostics

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 263 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 81 for more information.

- **Light path diagnostics**

  Use light path diagnostics to diagnose system errors quickly. See "Light path diagnostics" on page 97 for more information.

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

  The DSA Preboot diagnostic programs provide problem isolation, configuration analysis, and error log collection. The diagnostic programs are the primary method of testing the major components of the server and are stored in integrated USB memory. The diagnostic programs collect the following information about the server:
  - System configuration
  - Network interfaces and settings
  - Installed hardware
  - Light path diagnostics status
  - Service processor status and configuration
  - Vital product data, firmware, and UEFI configuration
  - Hard disk drive health
  - RAID controller configuration
  - Controller and service processor event logs, including the following information:
    - System error logs
    - Temperature, voltage, and fan speed information
    - Self-monitoring Analysis, and Reporting Technology (SMART) data
    - Machine check registers
    - USB information
    - Monitor configuration information
    - PCI slot information

  The diagnostic programs create a merged log that includes events from all collected logs. The information is collected into a file that you can send to IBM service and support. Additionally, you can view the server information locally through a generated text report file. You can also copy the log to removable media and view the log from a Web browser. See "Running the diagnostic programs" on page 111 for more information.

- **IBM Electronic Service Agent**

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

configuration information on a scheduled basis so that the information is available to you and your support representative. It uses minimal system resources, and is available free of charge. For more information and to download IBM Electronic Service Agent, go to http://www.ibm.com/support/electronic/

POST

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

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

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

If POST detects a problem an error message is displayed. See "POST error codes" on page 31 for more information.

Error logs

Error codes and messages are displayed in the following types of event logs. Some of the error codes and messages in the logs are abbreviated. When you are troubleshooting PCI-X slots, note that the event logs report the PCI-X buses numerically. The numerical assignments vary depending on the configuration. You can check the assignments by running the Setup utility (see "Using the Setup utility" on page 241 for more information).

- **POST event log:** This log contains the three most recent error codes and messages that were generated during POST. You can view the contents of the POST event log from the Setup utility (see "Starting the Setup utility" on page 241).

- **System-event log:** This log contains messages that were generated during POST and all system status messages from the service processor. You can view the contents of the system-event log from the Setup utility.

  The system-event log is limited in size. When it is full, new entries will not overwrite existing entries; therefore, you must periodically clear the system-event log through the Setup utility. When you are troubleshooting an error, be sure to clear the system-event log so that you can find current errors more easily.

  Each system-event log entry is displayed on its own page. 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.

  The system-event log indicates an assertion event when an event has occurred. It indicates a deassertion event when the event is no longer occurring.

- **Event log:** This log contains a superset of information that is in the system-event log. You can only access the event log through the IMM Web interface. For more information, see "Logging on to the Web interface" on page 252.

- **Diagnostic event log:** This log is generated by the Dynamic System Analysis (DSA) program, and it contains merged contents of the system-event log and the IMM system event log. You can view the diagnostic event log from the DSA program (see "Viewing event logs without restarting the server").

Viewing event logs from the Setup utility

To view the error logs, 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 error logs.
3. Select **System Event Logs** and use one of the following procedures:
   - To view the POST error log, select **POST Event Viewers**.
   - To view the IMM system-event log, select **System Event Log**.

Viewing event logs without restarting the server

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

If you have installed Portable Dynamic System Analysis (DSA), you can use it to view the diagnostic event log, which merges the contents of the system-event log and the IMM system event log. You can also use DSA Preboot to view the diagnostic event log, although you must restart the server to use DSA Preboot. To install Portable DSA or DSA Preboot or download a DSA Preboot CD image, go to

http://www.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=SERV-DSA &brandind=5000008 or complete the following steps.

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

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

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

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

You can view the IMM system event log through the **Event Log** link in the integrated management module (IMM) Web interface. For more information, see "Logging on to the Web interface" on page 252.

The following table describes the methods that you can use to view the event logs, depending on the condition of the server. The first three 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.	Run Portable DSA to view the diagnostic event log or create an output file that you can send to IBM service and support. Alternatively, you can use IPMItool to view the system-event log.
The server is not hung and is not connected to a network.	Use IPMItool locally to view the system-event log.

Table 7. Methods for viewing event logs (continued)

Condition	Action
The server is not hung and the integrated management module (IMM) is connected to a network.	In a Web browser, type the IP address for the IMM and go to the Event Log page. For more information, see "Obtaining the IP address for the IMM" on page 251 and "Logging on to the Web interface" on page 252.
The server is hung.	Restart the server and press F2 to start DSA Preboot and view the diagnostic event log (see "Running the diagnostic programs" on page 111 for more information). 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 29.

Clearing the error logs

To clear the error logs, complete the following steps.

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

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

POST error codes

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

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Error code	Description	Action

0010002	Microprocessor not supported.	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, then 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 server firmware to the latest level (see "Updating the firmware" on page 237). 2. (Trained service technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see "Installing a microprocessor and heat sink" on page 226).
0011002	Microprocessor mismatch.	1. Run the Setup utility and select **System Information** → **System Summary** → **Processor Details** to 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Error code	Description	Action

0011004	Microprocessor failed BIST.	1. Update the server firmware to the latest level (see "Updating the firmware" on page 237).
		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 updated failed.	1. Update the server firmware to the latest level (see "Updating the firmware" on page 237). 2. (Trained service technician only) Replace the microprocessor.
0050001	DIMM disabled.	1. If the server fails the POST memory test, reseat the DIMMs. 2. Remove and replace any DIMM for which the associated error LED is lit (see "Removing a memory module" on page 185 and "Installing a memory module" on page 185). 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA Preboot memory test (see "Running the diagnostic programs" on page 111).
0051003	Uncorrectable DIMM error	1. If the server failed the POST memory test, reseat the DIMMs. 2. Remove and replace any DIMM for which the associated error LED is lit (see "Removing a memory module" on page 185 and "Installing a memory module" on page 185). 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA Preboot memory test (see"Running the diagnostic programs" on page 111).
0051006	DIMM mismatch detected	Make sure that the DIMMs match and are installed in the correct sequence (see "Installing a memory module" on page 185).
0051009	No memory detected.	1. Make sure that the server contains DIMMs. 2. Reseat the DIMMs. 3. Install DIMMs in the correct sequence (see "Installing a memory module" on page 185).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Error code	Description	Action
005100A	No usable memory detected.	1. Make sure that the server contains DIMMs. 2. Reseat the DIMMs. 3. Install DIMMs in the correct sequence (see "Installing a memory module" on page 185). 4. Clear CMOS memory to re-enable all the memory connectors (see Table 2 on page 19).
0058001	PFA threshold exceeded	1. Update the server firmware to the latest level (see "Updating the firmware" on page 237). 2. Reseat the DIMMs and run the memory test (see "Running the diagnostic programs" on page 111). 3. Replace the failing DIMM, which is indicated by a lit LED on the system board.
0058007	DIMM population is unsupported.	1. Reseat the DIMMs, and 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. 3. Return the removed DIMMs, one pair at a time, to their original connectors, restarting the server after each pair, until a pair fails. Replace the DIMMs in the failed pair with identical known good DIMMs, restarting the server after each DIMM is installed. Replace the failed DIMM. Repeat this step until you have tested all removed DIMMs. 4. (Trained service technician only) Replace the system board.

0058008	DIMM failed memory test.	1. Reseat the DIMMs, and then restart the server.
		2. Replace the following components one at a time, in the order shown, then restart the server after each:
		  a. DIMM
		  b. (Trained service technician only) System board

00580A1	Invalid DIMM population for mirroring mode	1. If a fault LED is lit, resolve the failure. 2. Install the DIMMs in the correct sequence (see "Installing a memory module" on page 185).
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.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Error code	Description	Action

0068002	CMOS battery cleared.	1. Reseat the battery.
		2. Clear the CMOS memory (see Table 3 on page 19).
		3. Replace the following components one at a time, in the following order, restarting the server after each one:
		  a. Battery
		  b. (Trained service technician only) System board.

2011001	PCI-X PERR	1. Check the riser-card LEDs.
		2. Reseat all affected adapters and riser cards.
		3. Update the PCI adapter 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 adapter 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

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	
•	**Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**	

Error code	Description	Action

2018002	Option ROM resource allocation failure	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 **Startup Options**, and change the boot priority to change the load order of the optional-device ROM code.
		
		 3. Run the Setup utility and disable some other resources, if their functions are not being used, to make more space available.
		
		     a. Select **Startup Options**, then **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 the adapter in the PCI slots.
		
		     c. Select **Devices and I/O Ports** to disable any of the integrated devices.
		
		 4. Replace the following components one at a time, in the order shown, restarting the server each time:
		
		     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 (see Table 3 on page 19. 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) UEFI Image	Information only. The backup switch was used to boot the secondary bank.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Error code	Description	Action
3048006	Booted secondary (backup) UEFI image because of ABR	1. Run the Setup utility, select **Load Default Settings**, and save the settings to recover the primary UEFI settings. 2. Turn off the server and remove it from the power source. 3. Reconnect the server to the power source, then turn on the server.

3058000A	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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Error code	Description	Action
3058004	Three boot failure	1. Undo any recent system changes, such as new settings or newly installed devices. 2. Make sure that the server is attached to a reliable power source. 3. Remove all hardware that is not listed on the ServerProven Web site at http://www.ibm.com/servers/eserver/serverproven/compat/us/. 4. Make sure that the operating system is not corrupted. 5. Run the Setup utility, save the configuration, and then restart the server. 6. See "Problem determination tips" on page 152.
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 made to the Setup utility. 2. Run the Setup utility, select **Load Default Settings**, and save the settings.
3808000	IMM communication failure	1. Remove power from the server for 30 seconds, and then reconnect the server to power and restart it. 2. Update the IMM firmware to the latest level (see "Updating the firmware" on page 237). 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 IMM firmware to the latest level (see "Updating the firmware" on page 237).
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 to the latest level (see "Updating the firmware" on page 237).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Error code	Description	Action

3808004	IMM system event log full	• When using out-of-band, use the IMM Web interface or IPMItool to clear the logs from the operating system.
		• When using the local console:
		  1. Run the Setup utility.
		  2. Select **System Event Log**.
		  3. Select **Clear System Event Log**.
		  4. Restart the server.

3818001	Core Root of Trust Measurement (CRTM) update failed	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 server firmware bank to the backup bank (see "Starting the backup server firmware" on page 248). 2. Run the Setup utility, select **Load Default Settings**, and save the settings. 3. Switch the bank back to the primary bank. 4. (Trained service technician only) Replace the system board.
3818007	CRTM update capsule signature invalid	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the system board.

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.		
• See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).		
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.		
• Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.		

Error code	Description	Action
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 to the latest level (see "Updating the firmware" on page 237). 4. Update the IMM firmware to the latest level (see "Updating the firmware" on page 237).

System event log

The system event log contains messages of three types:

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

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

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

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

Integrated management module (IMM) error messages

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

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 Ambient Temp going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	1. Reduce the ambient temperature. 2. Check the server airflow. Make sure that nothing is blocking the from coming into or preventing the air from exiting the server.
Numeric sensor Ambient Temp going high (upper non-recoverable) has asserted.	Error	An upper nonrecoverable sensor going high has asserted.	1. Reduce the ambient temperature. 2. Check the server airflow. Make sure that nothing is blocking the from coming into or preventing the air from exiting the server.
Numeric sensor Planar 3.3V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 3.3V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 5V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 5V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar VBAT going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	Replace the 3 V battery.
Numeric sensor 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)

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 connector System board has encountered a configuration error.	Error	An interconnect configuration error has occurred.	Reseat the front video cable on the system board.
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. Update the firmware (UEFI and IMM) to the latest level "Updating the firmware" on page 237). 3. Run the DSA program for the hard disk drives and other I/O devices. 4. Reseat the adapter. 5. Replace the adapter. 6. (Trained service technician only) Replace microprocessor *n*. 7. (Trained service technician only) Replace the system board. (*n* = microprocessor number)

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 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 (front and rear of the server), 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 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**			
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
The Processor CPU *n*Status has Failed with FRB1/BIST condition. (*n* = microprocessor number)	Error	A processor failed - FRB1/BIST condition has occurred.	1. Check for a server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Make sure that the installed microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 226 for information about microprocessor requirements). 3. (Trained service technician only) Reseat microprocessor *n*. 4. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 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 226 for information about microprocessor requirements). 2. Update the server firmware to the latest level (see "Updating the firmware" on page 237). 3. (Trained service technician only) Replace the incompatible microprocessor.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Make sure that the installed microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 226 for information about microprocessor requirements). 3. (Trained service technician only) Reseat microprocessor *n*. 4. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 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 (front and rear of the server), 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)
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 (front and rear of the server), 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 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 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 (front and fear of the server), 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)

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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. (*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 (front and rear of the server), 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 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.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 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. 3. Update all device drives to the latest level. 4. Update the firmware (UEFI and IMM) (see "Updating the firmware" on page 237).

The System %1 encountered a POST Error.
(%1 = CIM_ComputerSystem.ElementName)
	Error	A POST error has occurred.
		(Sensor = ABR Status)
			1. Recover the server firmware from the backup page:
			  a. Restart the server.
			  b. At the prompt, press F3 to recover the firmware.
			2. Update the server firmware to the latest level (see "Updating the firmware" on page 237).
			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. Remove components one at a time, restarting the server each time, to see if the problem goes away.
			4. If the problem remains, (trained service technician) replace the system board.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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. Update the server firmware on the primary page. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. (Trained service technician only) Replace the system board.
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 server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. (Trained service technician only) Replace the system board.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. Make sure that the two microprocessors are matching. 6. (Trained service technician only) Replace the system board.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DIM) | 1. Check the system-event log.
2. Check the DIMM error LEDs.
3. Remove the failing DIMM from the system board.
4. Check for a server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
5. Make sure that the installed DIMMs are supported and configured correctly.
6. (Trained service technician only) Replace the system board. |

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Sensor Sys Board Fault has transitioned to critical from a less severe state.	Error	A sensor has changed to Critical state from a less severe state.	1. Check the system-event log. 2. Check for an error LED on the system board. 3. Replace any failing device. 4. Check for a server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. (Trained service technician only) Replace the system board.

The Power Supply (Power Supply: *n*) has Failed.
(*n* = power supply number)
	Error	Power supply *n* has failed.
		(*n* = power supply number)
			1. If the power-on LED is lit, complete the following steps:
			  a. Reduce the server to the minimum configuration.
			  b. Reinstall the components one at a time, restarting the server each time.
			  c. If the error recurs, replace the component that you just reinstalled.
			2. Reseat power supply *n*.
			3. Replace power supply *n*.
			(*n* = power supply number)

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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* 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)
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 108 and "Power problems" on page 93. 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.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 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.
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. 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 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Sensor Pwr Rail D Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. (Trained service technician only) Remove the microprocessor from 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.
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.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**			
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Sensor PS *n* Therm Fault has transitioned to critical from a less severe state. (*n* = power supply number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that there are no obstructions, such as bundled cables, to the airflow from the power-supply fan. 2. Replace power supply *n*. (*n* = power supply number)
Redundancy Cooling Zone 1 has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Make sure that the connectors on fans 1 and 2 are not damaged. 2. Make sure that the fan 1 and 2 connectors on the system board are not damaged. 3. Make sure that the fans are correctly installed. 4. Reseat the fans. 5. Replace the fans.
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 amber status LEDs to identify the failed hard disk drive or check the RAID controller system management software event logs. 2. Reseat the hard disk drive for which the status LED is lit. 3. Replace the defective hard disk drive.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 removed from unit Drive 0 Status. (*n* = hard disk drive number)	Error	A drive has been removed.	1. Reseat hard disk drive *n*. (*n* = hard disk drive number). Wait 1 minute or more before reinstalling the drive. 2. Replace the hard disk drive. 3. Make sure that the disk firmware and RAID controller firmware is at the latest level. 4. Check the SAS cable.

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 (wait 1 minute or more before reinstalling the 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)

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
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)	1. Make sure that the RAID controller firmware and hard disk drive firmware is at the latest level. 2. Make sure that the SAS cable is connected correctly. 3. Replace the SAS cable. 4. Replace the controller. 5. 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)	1. Make sure that the RAID controller firmware and hard disk drive firmware is at the latest level. 2. Make sure that the SAS cable is connected correctly. 3. Replace the SAS cable. 4. Replace the controller. 5. Replace the hard disk drive that is indicated by a lit status LED.
Memory uncorrectable error detected for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	A memory uncorrectable error has occurred.	1. If the server failed the POST memory test, reseat the DIMMs. 2. Replace any DIMM that is indicated by a lit error LED. **Note:** You do not have to replace DIMMs by pairs. 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA memory test.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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. Update the server firmware to the latest level. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Reseat the DIMMs and run the DSA memory test. 3. Replace any DIMM that is indicated by a lit error LED.
Memory DIMM Configuration Error for All DIMMs on Memory Subsystem All DIMMs.	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.
Memory uncorrectable error detected for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A memory uncorrectable error has occurred.	1. If the server failed the POST memory test, reseat the DIMMs. 2. Replace any DIMM that is indicated by a lit error LED. **Note:** You do not have to replace DIMMs by pairs. 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA memory test.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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. Update the server firmware to the latest level (see "Updating the firmware" on page 237). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Reseat the DIMMs and run the DSA memory test. 3. Replace any DIMM that is indicated by a lit error LED.
Memory DIMM Configuration Error for One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.
Memory uncorrectable error detected for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Error	A memory uncorrectable error has occurred.	1. If the server failed the POST memory test, reseat the DIMMs. 2. Replace any DIMM that is indicated by a lit error LED. **Note:** You do not have to replace DIMMs by pairs. 3. Run the Setup utility to enable all the DIMMs. 4. Run the DSA memory test. 5. (Trained service technician only) Replace the system board.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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. Update the server firmware to the latest level (see "Updating the firmware" on page 237). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Reseat the DIMMs and run the DSA memory test. 3. Replace any DIMM that is indicated by a lit error LED.
Memory DIMM Configuration Error for DIMM *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.
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. Make sure that ambient temperature is within the specifications. 3. If a fan has failed, complete the action for a fan failure. 4. Replace DIMM *n*. (*n* = DIMM number)

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 = All PCI Err)	1. Check the riser-card LEDs. 2. Reseat the affected adapters and riser card. 3. Update the server firmware (UEFI and IMM) and adapter 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. 4. Remove both adapters. 5. Replace the PCIe adapter. 6. Replace the riser card.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 SERR has occurred on system %1. (%1 = CIM_ComputerSystem.ElementName)	Error	A PCI SERR has occurred. (Sensor = All PCI Err)	1. Check the riser-card LEDs. 2. Reseat the affected adapters and riser card. 3. Update the server firmware (UEFI and IMM) and adapter 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. 4. Make sure that the adapter is on the serverproven list. 5. Remove both adapters. 6. Replace the PCIe adapter. 7. Replace the riser card.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 firmware (UEFI and IMM) and adapter 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. 4. Make sure that the adapter is on the serverproven list. 5. Remove the adapter from slot *n*. 6. Replace the PCIe adapter. 7. Replace riser card *n*. (*n* = PCI slot number)

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 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 firmware (UEFI and IMM) and adapter 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. 4. Make sure that the adapter is on the serverproven list. 5. Remove the adapter from slot *n*. 6. Replace the PCIe adapter. 7. Replace riser card *n*. (*n* = PCI slot number)

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 firmware (UEFI and IMM) and adapter 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. 4. Make sure that the adapter is on the serverproven list. 5. Remove both adapters. 6. Replace the PCIe adapter. 7. Replace the riser card. 8. (Trained service technician only) Replace the system board.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 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 firmware (UEFI and IMM) and adapter 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. 4. Make sure that the adapter is on the serverproven list. 5. Remove both adapters. 6. Replace the PCIe adapter. 7. Replace the riser card. 8. (Trained service technician only) Replace the system board.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Fault in slot System board on system %1. (%1 = CIM_ComputerSystem.ElementName)	Error		1. Check the riser-card LEDs. 2. Reseat the affected adapters and riser card. 3. Update the server firmware (UEFI and IMM) and adapter 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. 4. Make sure that the adapter is on the serverproven list. 5. Remove both adapters. 6. Replace the PCIe adapter. 7. Replace the riser card. 8. (Trained service technician only) Replace the system board.
Redundancy Bckup Mem Status has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Check the system-event log for DIMM failure events (uncorrectable or PFA) and correct the failures. 2. Re-enable mirroring in the Setup utility.
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.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
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. ActiveMaximumTransmissionUnit; %2 = CIM_EthernetPort. ActiveMaximumTransmissionUnit; %3 = user ID)	Info	A user has modified the Ethernet port MTU setting.	No action; information only.
Ethernet Duplex setting modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort.NetworkAddresses; %2 = CIM_EthernetPort.NetworkAddresses; %3 = user ID)	Info	A user has modified the Ethernet port MAC address setting.	No action; information only.
Ethernet interface %1 by user %2. (%1 = CIM_EthernetPort.EnabledState; %2 = user ID)	Info	A user has enabled or disabled the Ethernet interface.	No action; information only.
Hostname set to %1 by user %2. (%1 = CIM_DNSProtocolEndpoint.Hostname; %2 = user ID)	Info	A user has modified the host name of the IMM.	No action; information only.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
IP address of network interface modified from %1 to %2 by user %3. (%1 = CIM_IPProtocolEndpoint.IPv4Address; %2 = CIM_StaticIPAssignmentSettingData. IPAddress; %3 = user ID)	Info	A user has modified the IP address of the IMM.	No action; information only.
IP subnet mask of network interface modified from %1 to %2 by user %3s. (%1 = CIM_IPProtocolEndpoint.SubnetMask; %2 = CIM_StaticIPAssignmentSettingData. SubnetMask; %3 = user ID)	Info	A user has modified the IP subnet mask of the IMM.	No action; information only.
IP address of default gateway modified from %1 to %2 by user %3s. (%1 = CIM_IPProtocolEndpoint. GatewayIPv4Address; %2 = CIM_StaticIPAssignmentSettingData. DefaultGatewayAddress; %3 = user ID)	Info	A user has modified the default gateway IP address of the IMM.	No action; information only.
OS Watchdog response %1 by %2. (%1 = Enabled or Disabled; %2 = user ID)	Info	A user has enabled or disabled an OS Watchdog.	No action; information only.
DHCP[%1] failure, no IP address assigned. (%1 = IP address, *xxx.xxx.xxx.xxx*)	Info	A DHCP server has failed to assign an IP address to the IMM.	1. Make sure that the network cable is connected. 2. Make sure that there is a DHCP server on the network that can assign an IP address to the IMM.
Remote Login Successful. Login ID: %1 from %2 at IP address %3. (%1 = user ID; %2 = ValueMap(CIM_ProtocolEndpoint. ProtocolIFType; %3 = IP address, *xxx.xxx.xxx.xxx*)	Info	A user has successfully logged in to the IMM.	No action; information only.
Attempting to %1 server %2 by user %3. (%1 = Power Up, Power Down, Power Cycle, or Reset; %2 = IBM_ComputerSystem.ElementName; %3 = user ID)	Info	A user has used the IMM to perform a power function on the server.	No action; information only.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Security: Userid: '%1' had %2 login failures from WEB client at IP address %3. (%1 = user ID; %2 = MaximumSuccessiveLoginFailures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from a Web browser and has been prevented from logging in for the lockout period.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
Security: Login ID: '%1' had %2 login failures from CLI at %3. (%1 = user ID; %2 = MaximumSuccessiveLoginFailures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from the command-line interface and has been prevented from logging in for the lockout period.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
Remote access attempt failed. Invalid userid or password received. Userid is '%1' from WEB browser at IP address %2. (%1 = user ID; %2 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has attempted to log in from a Web browser by using an invalid login ID or password.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
Remote access attempt failed. Invalid userid or password received. Userid is '%1' from TELNET client at IP address %2. (%1 = user ID; %2 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has attempted to log in from a Telnet session by using an invalid login ID or password.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
The Chassis Event Log (CEL) on system %1 cleared by user %2. (%1 = CIM_ComputerSystem.ElementName; %2 = user ID)	Info	A user has cleared the IMM event log.	No action; information only.
IMM reset was initiated by user %1. (%1 = user ID)	Info	A user has initiated a reset of the IMM.	No action; information only.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
ENET[0] DHCP-HSTN=%1, DN=%2, IP@=%3, SN=%4, GW@=%5, DNS1@=%6. (%1 = CIM_DNSProtocolEndpoint.Hostname; %2 = CIM_DNSProtocolEndpoint.DomainName; %3 = CIM_IPProtocolEndpoint.IPv4Address; %4 = CIM_IPProtocolEndpoint.SubnetMask; %5 = IP address, *xxx.xxx.xxx.xxx*; %6 = IP address, *xxx.xxx.xxx.xxx*)	Info	The DHCP server has assigned an IMM IP address and configuration.	No action; information only.
ENET[0] IP-Cfg:HstName=%1, IP@%2, NetMsk=%3, GW@=%4. (%1 = CIM_DNSProtocolEndpoint.Hostname; %2 = CIM_StaticIPSettingData.IPv4Address; %3 = CIM_StaticIPSettingData.SubnetMask; %4 = CIM_StaticIPSettingData. DefaultGatewayAddress)	Info	An IMM IP address and configuration have been assigned using client data.	No action; information only.
LAN: Ethernet[0] interface is no longer active.	Info	The IMM Ethernet interface has been disabled.	No action; information only.
LAN: Ethernet[0] interface is now active.	Info	The IMM Ethernet interface has been enabled.	No action; information only.
DHCP setting changed to by user %1. (%1 = user ID)	Info	A user has changed the DHCP mode.	No action; information only.
IMM: Configuration %1 restored from a configuration file by user %2. (%1 = CIM_ConfigurationData. ConfigurationName; %2 = user ID)	Info	A user has restored the IMM configuration by importing a configuration file.	No action; information only.
Watchdog %1 Screen Capture Occurred. (%1 = OS Watchdog or Loader Watchdog)	Error	An operating-system error has occurred, and the screen capture was successful.	1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 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 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**			
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Flash of %1 from %2 succeeded for user %3. (%1 = CIM_ManagedElement.ElementName; %2 = Web or LegacyCLI; %3 = user ID)	Info	A user has successfully updated one of the following firmware components: • IMM main application • IMM boot ROM • Server firmware (UEFI) • 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.
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.

Table 8. IMM 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**			
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Security: Userid: '%1' had %2 login failures from an SSH client at IP address %3. (%1 = user ID; %2 = MaximumSuccessiveLoginFailures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from SSH and has been prevented from logging in for the lockout period.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.

Checkout procedure

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

About the checkout procedure

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

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

  Exception: If multiple error codes or light path diagnostics LEDs indicate a microprocessor error, the error might be in the microprocessor or in the microprocessor socket. See "Microprocessor problems" on page 89 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 "Error logs" on page 29. If the server is halted and no error message is displayed, see "Troubleshooting tables" on page 81 and "Solving undetermined problems" on page 152.
- For information about power-supply problems, see "Solving power problems" on page 150.
- For intermittent problems, check the error log; see "Error logs" on page 29 and "Diagnostic programs and messages" on page 110.

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 108).

   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. Check all cables and power cords.

   e. Set all display controls to the middle positions.

   f. Turn on all external devices.

   g. Turn on the server. If the server does not start, see "Troubleshooting tables" on page 81.

   h. Check the system-error LED on the operator information panel. If it is flashing, check the light path diagnostics LEDs (see "Light path diagnostics" on page 97).

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

   i. Check for the following results:

      - Successful completion of POST (see "POST" on page 28 for more information)
      - Successful completion of startup

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 111 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 light path diagnostics LEDs (see "Light path diagnostics" on page 97).
2. Remove the software or device that you just added.
3. Run the diagnostic tests to determine whether the server is running correctly.
4. Reinstall the new software or new device.

CD/DVD drive problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 CD-ROM/DVD-ROM drive is not recognized.	1. Make sure that:
	  • The SATA connector to which the CD or DVD drive is attached (primary or secondary) is enabled in the Setup utility.
	  • All cables and jumpers are installed correctly.
	  • The correct device driver is installed for the CD or DVD drive.
	2. Run the CD or DVD drive diagnostic programs.
	3. Reseat the following components:
	  a. CD or DVD drive
	  b. CD or DVD drive cable
	4. Replace the components listed in step 3 one at a time, in the order shown, restarting the server each time.
	5. (Trained service technician only) Replace the system board.

A CD or DVD 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 CD or DVD drive diagnostic programs. 4. Reseat the CD or DVD drive. 5. Replace the CD or DVD drive.
The CD or 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 CD or DVD drive. 4. Replace the CD or DVD drive.

General problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 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 175 and "Installing a hot-swap hard disk drive" on page 176.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 newly 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. Reseat the backplane power cable and repeat steps 1 through 3.
	
	 6. Reseat the backplane signal cable and repeat steps 1 through 3.
	
	 7. 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.
	
	 8. Run the DSA tests for the SAS/SATA adapter and hard disk drives (see "Running the diagnostic programs" on page 111).
	 • If the adapter passes the test but the drives are not recognized, replace the backplane signal cable and run the tests again.
	 • Replace the backplane.
	 • If the adapter fails the test, disconnect the backplane signal cable from the adapter and run the tests again.
	 • If the adapter fails the test, replace the adapter.
	
	 9. See "Problem determination tips" on page 152.

Multiple hard disk drives fail.	Make sure that the hard disk drive, SAS/SATA RAID adapter, 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.

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
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 152.
A replacement hard disk drive does not rebuild.	1. Make sure that the hard disk drive is recognized by the adapter (the green hard disk drive activity LED is flashing). 2. Review the SAS/SATA RAID adapter 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 disk drive test (see "Running the diagnostic programs" on page 111.
	2. Use one of the following procedures:
	  • If the drive passes the test, replace the backplane.
	  • If the drive fails the test, replace the drive.

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 adapter software do not indicate the same status for the drive, complete the following steps:
	  a. Turn off the server.
	  b. Reseat the SAS/SATA adapter.
	  c. Reseat the backplane signal cable and backplane power cable.
	  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 152.

Hypervisor problems

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.** **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**	

Symptom	Action
If an optional embedded hypervisor flash device is not listed in the expected boot order, does not appear in the list of boot devices, or a similar problem has occurred.	1. Make sure that the optional embedded hypervisor flash device is selected on the boot manager <F12> Select Boot Device) at startup. 2. Make sure that the embedded hypervisor flash device is seated in the connector correctly (see "Removing a USB embedded hypervisor flash device" on page 196 and "Installing a USB embedded hypervisor flash device" on page 197). 3. See the documentation that comes with the optional embedded hypervisor flash device for setup and configuration information. 4. Make sure that other software works on the server.

Intermittent problems

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 fan is not working. This can cause the server to overheat and shut down.
	2. Check the system-error log or IMM system event log (see "Error logs" on page 29).

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 resets (restarts) occasionally.	1. If the reset occurs during POST and the POST watchdog timer is enabled (click **System Settings --> Integrated Management Module --> POST Watchdog Timer** in the Setup utility to see the POST watchdog setting), make sure that sufficient time is allowed in the watchdog timeout value (**POST Watchdog Timer**). If the server continues to reset during POST, see "POST" on page 28 and "Diagnostic programs and messages" on page 110.
	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 be 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 96.
	3. If neither condition applies, check the system-error log or IMM system-event log (see "Error logs" on page 29).

Keyboard, mouse, or pointing-device problems

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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. Make sure that:
	    • The keyboard cable is securely connected.
	    • The server and the monitor are turned on.

	2. If you are using a USB keyboard, run the Setup utility and enable keyboardless operation.
	3. If you are using a USB keyboard and it is connected to a USB hub, disconnect the keyboard from the hub and connect it directly to the server.
	4. Replace the following components one at a time, in the order shown, restarting the server each time:
	a. Keyboard
	b. (Trained service technician only) System board

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 mouse or pointing device does not work.	1. Make sure that: 　• The mouse or pointing-device cable is securely connected to the server. 　• If you are using a pointing device, the keyboard and mouse or pointing-device cables are not reversed. 　• The mouse or pointing-device device drivers are installed correctly. 　• The server and the monitor are turned on. 　• The mouse option is enabled in the Setup utility. 2. If you are using a USB mouse or pointing device and it is connected to a USB hub, disconnect the mouse or pointing device from the hub and connect it directly to the server. 3. Replace the following components one at a time, in the order shown, restarting the server each time: 　a. Mouse or pointing device 　b. (Trained service technician only) System board

Memory problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 amount of system memory that is displayed is less than the amount of installed physical memory.	1. Make sure that:
	   • No error LEDs are lit on the operator information panel.
	   • Memory mirroring does not account for the discrepancy.
	   • The memory modules are seated correctly.
	   • You have installed the correct type of memory.
	   • If you changed the memory, you updated the memory configuration in the Setup utility.
	   • All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled.
	2. Check the POST error log:
	   • If a DIMM was disabled by a systems-management interrupt (SMI), replace the DIMM.
	   • If a DIMM was disabled by the user or by POST, run the Setup utility and enable the DIMM.
	3. Run memory diagnostics (see "Running the diagnostic programs" on page 111).
	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.
	6. Reseat the DIMM.
	7. Restart the server.

Multiple rows of DIMMs in a branch are identified as failing.	1. Reseat the DIMMs; then, restart the server. 2. Remove the lowest-numbered DIMM pair of those that are identified and replace it with an identical pair of known good DIMMs; then, restart the server. Repeat as necessary. If the failures continue after all identified pairs are replaced, go to 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. (Trained service technician only) Replace the system board.

Microprocessor problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 it is turned on.	1. Correct any errors that are indicated by the light path diagnostics LEDs (see "Light path diagnostics" on page 97).
	
	 2. Make sure that the server supports all the microprocessors and that the microprocessors match in speed and cache size. To view the microprocessor information, run the Setup utility and select **System Information �ನ System Summary ⇒ Processor Details**.
	
	 3. (Trained service technician only) Make sure that microprocessor 1 is seated correctly.
	
	 4. (Trained service technician only) Remove microprocessor 2 and restart the server.
	
	 5. 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

Monitor and video problems

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

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 a different monitor on the server, or try using the monitor that is being tested on a different server. 3. Run the diagnostic programs. If the monitor passes the diagnostic programs, the problem might be a video device driver. 4. (Trained service technician only) Replace the system board.

The screen is blank.	1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the monitor cable directly to the correct connector on the rear of the server.
	 2. Make sure that:
	 • The server is turned on. If there is no power to the server, see "Power problems" on page 93.
	 • The monitor cables are connected correctly.
	 • The monitor is turned on and the brightness and contrast controls are adjusted correctly.
	 3. Make sure that the correct server is controlling the monitor, if applicable.
	 4. Make sure that damaged server firmware is not affecting the video; see "Updating the firmware" on page 237.
	 5. Observe the checkpoint LEDs on the system board; if the codes are changing, go to step 6.
	 6. 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.
	 7. See "Solving undetermined problems" on page 152.

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 111). • If the server passes the video diagnostics, the video is good; see "Solving undetermined problems" on page 152. • (Trained service technician only) If the server fails the video diagnostics, replace the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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, fluorescents, 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 components listed in step 2 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 to the latest level (see "Updating the firmware" on page 237) with the correct language. 2. Reseat the monitor cable. 3. Replace the components listed in step 2 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.

Optional-device problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 worked previously does not work now.	1. Make sure that all of the cable connections for the device are secure.
	2. If the device comes with test instructions, use those instructions to test the device.
	3. If the failing device is a SCSI device, make sure that:
	  • The cables for all external SCSI devices are connected correctly.
	  • The last device in each SCSI chain, or the end of the SCSI cable, is terminated correctly.
	  • Any external SCSI device is turned on. You must turn on an external SCSI device before you turn on the server.
	4. Reseat the failing device.
	5. Replace the failing device.

Power problems

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 work (the server does not start).
Note: The power-control button will not function until approximately 1 to 3 minutes after the server has been connected to ac power.
	1. Make sure that the power-control button is working correctly:
	  a. Disconnect the server power cords.
	  b. Reconnect the power cords.
	  c. (Trained service technician only) Reseat the operator information panel cables, and then repeat steps 1a and 1b.
	    • (Trained service technician only) If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel.
	    • If the server does not start, bypass the power-control button by using the force power-on jumper (see "Internal LEDs, connectors, and jumpers" on page 16). If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel.
	2. Make sure that the reset button is working correctly:
	  a. Disconnect the server power cords.
	  b. Reconnect the power cords.
	  c. (Trained service technician only) Reseat the light path diagnostics panel cable, and then repeat steps 1a and 1b.
	    • (Trained service technician only) If the server starts, replace the light path diagnostics panel.
	    • If the server does not start, go to step 3.
	3. 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 DIMMs are fully seated.
	  • The LEDs on the power supply do not indicate a problem.
	  • The microprocessors are installed in the correct sequence.
	4. Reseat the following components:
	  a. DIMMs
	  b. Power supplies
	  c. (Trained service technician only) Power switch connector
	5. Replace the components listed in step 4 one at a time, in the order shown, restarting the server each time.
	6. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports.
	7. See "Power-supply LEDs" on page 108.
	8. See "Solving undetermined problems" on page 152.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 does not start.	Check the four 12-volt power LEDs (A, B, C, and D) on the system board. See "Internal LEDs, connectors, and jumpers" on page 16 for the LED locations. 1. If the Channel A power LED is lit, check components in the following order. a. Remove all PCI adapters and riser cards. Try restarting the server. If the server starts, reinstall the PCI adapters and riser cards, one at a time, to isolate the defective adapter. b. (Trained service technician only) System board 2. If the Channel B power LED is lit, check components in the following order: a. Fans 1 and 2 b. (Trained service technician only) Remove microprocessor 2 (if present). Try restarting the server. c. (Trained service technician only) System board 3. If the Channel C power LED is lit, check components in the following order. a. Fans 3 and 4 b. (Trained service technician only) System board c. (Trained service technician only) Microprocessor 1 4. If the Channel D power LED is lit, check components in the following order: a. Remove all DIMMs and restart the server. If the server restarts, reinstall the DIMMs, one pair at a time, to isolate the defective DIMM (see "Installing a memory module" on page 185). b. Fans 5 and 6 c. (Trained service technician only) System board
The server does not turn off.	1. Determine whether you are using an Advanced Configuration and Power Interface (ACPI) or a non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps: a. Press Ctrl+Alt+Delete. b. Turn off the server by pressing the power-control button and hold it down for 5 seconds. c. Restart the server. d. If the server fails POST and the power-control button does not work, disconnect the ac power cord for 20 seconds; then, reconnect the ac power cord and restart the server. 2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.
The server unexpectedly shuts down, and the LEDs on the operator information panel are not lit.	See "Solving undetermined problems" on page 152.

Serial-device problems

Symptom	Action
• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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.	

The number of serial ports that are identified by the operating system is less than the number of installed serial ports.	1. Make sure that:
	    • Each port is assigned a unique address in the Setup utility and none of the serial ports is disabled.
	    • The serial-port adapter (if one is present) is seated correctly.
	 2. Reseat the serial port adapter.
	 3. Replace the serial port adapter.

A serial device does not work.	1. Make sure that:
	    • The device is compatible with the server.
	    • The serial port is enabled and is assigned a unique address.
	    • The device is connected to the correct connector (see "Internal LEDs, connectors, and jumpers" on page 16).
	 2. Reseat the following components:
	    a. Failing serial device
	    b. Serial cable
	 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time.
	 4. (Trained service technician only) Replace the system board.

ServerGuide problems

Symptom	Action
• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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.	
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 MegaRAID Storage Manager program cannot view all installed drives, or the operating system cannot be installed.	1. Make sure that the hard disk drive is connected correctly. 2. Make sure that the SAS/SATA hard disk drive cables are securely connected.

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 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, either no logical drive is defined (SCSI RAID servers), or the ServerGuide System Partition is not present. Run the ServerGuide program and make sure that setup is complete.

Software problems

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 (see "Using the Setup utility" on page 241 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.

Video problems

See "Monitor and video problems" on page 90.

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 "Safety" on page vii and "Handling static-sensitive devices" on page 165.

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 system-event log or in the system-error 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:

Ethernet
icon LED
Power-control
button cover
Ethernet
activity LEDs
Information LED
System-error LED

Power-control button/
power-on LED
Ethernet
activity LEDs
Locator button/
locator LED
Release latch
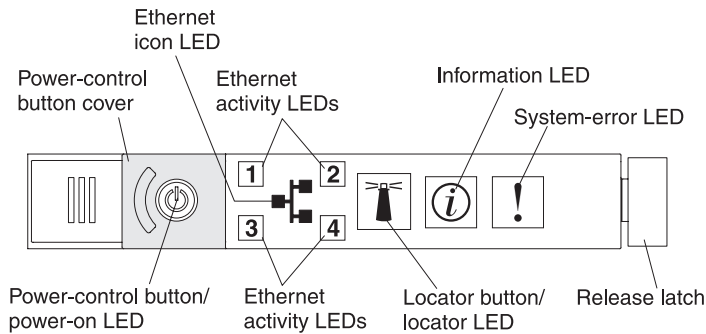
2. To view the light path diagnostics panel, slide the blue release latch on the operator panel to the left. Pull forward on the panel until the hinge of the operator panel is free of the server chassis. Then pull down on the panel so that you can view the light path diagnostics panel information. This reveals the light path diagnostics panel. Lit LEDs on this panel indicate the type of error that has occurred.

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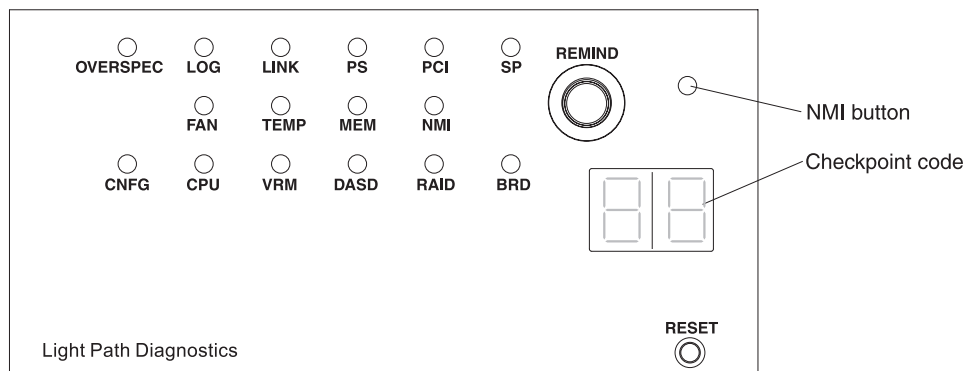
   The following illustration shows the light path diagnostics panel:

OVERSPEC   LOG   LINK   PS   PCI   SP   REMIND

FAN   TEMP   MEM   NMI

CNFG   CPU   VRM   DASD   RAID   BRD

NMI button

Checkpoint code

RESET

Light Path Diagnostics

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

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

   Look at the system service label inside the server cover, which gives an overview of internal components that correspond to the LEDs on the light path diagnostics panel. This information and the information in "Light path diagnostics LEDs" on page 100 can often provide enough information to diagnose the error.

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

   The following illustration shows the LEDs and connectors on the system board.

Labels (clockwise/positioned):
- Slot 2 missing PCI riser card LED
- Enclosure manager heartbeat LED
- Battery LED
- IMM heartbeat LED
- DIMM 9 - 16 error LEDs
- Slot 1 missing PCI riser card LED
- Microprocessor 2 error LED
- System error LED
- SAS/SATA RAID riser-card LED
- Microprocessor 1 error LED
- AUX power channel error LED
- Power channel E error LED
- Power channel D error LED
- Power channel C error LED
- DIMM 1 - 8 error LEDs
- Power channel B error LED
- Fan 1 error LED
- Power channel A error LED
- Fan 6 error LED
- Fan 5 error LED
- Fan 4 error LED
- Fan 3 error LED
- Fan 2 error LED
- 240 VA error LED

- **Remind button:** Press this button to place the system-error LED on the front information panel into Remind mode. By placing the system-error LED indicator in Remind mode, you acknowledge that you are aware of the last failure but will not take immediate action to correct the problem. In Remind mode, the system-error LED flashes rapidly until one of the following conditions occurs:
  – All known errors are corrected.
  – The server is restarted.
  – A new error occurs, causing the system-error LED to be lit again.
- **NMI button:** The NMI button on the front panel will come on when this button is pressed. Press this button to force a nonmaskable interrupt to the microprocessor. You might have to use a pen or the end of a straightened paper clip to press the button. It allows you to blue screen the server and take a memory dump (use this button only when directed by the IBM service support).
- **Checkpoint code display:** This display provides a checkpoint code that indicates the point at which the system stopped during the boot block and POST. A checkpoint code is either a byte or a word value that is produced by UEFI. The display does not provide error codes or suggest components to be replaced.
- **Reset button:** Press this button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button. The Reset button is in the lower-right corner of the light path diagnostics panel.

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-error log or system event log for additional information before replacing a FRU.

Table 9. Light path diagnostics panel LEDs

| • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. |
| • See Chapter 3, "Parts listing", in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). |
| • If a action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician. |

LED	Description	Action
None, but the system error LED is lit.	An error has occurred and cannot be isolated. The error is not represented by a path.	Use the Setup utility to check the system error log for information about the error.
OVER SPEC	The power supplies are using more power than their maximum rating.	If the OVER SPEC LED on the light path diagnostics panel is lit, or any of the six 12 V channel error LEDs (A, B, C, D, E, or AUX) on the system board are lit, use one of the following procedures. If the 12 V channel A error LED is lit, complete the following steps: 1. Turn off the server and disconnect the power from the server. 2. Remove the optical drive, fans, hard disk drives, and hard disk drive backplane. 3. Restart the server to see whether the problem remains. 4. Reinstall each device that you removed in step 2 one at a time, starting the server each time, to isolate the failing device. 5. Replace any failing device. 6. (Trained service technician only) Replace the system board. If the 12 V channel B error LED is lit, complete the following steps: 1. Turn off the server and disconnect the power from the server. 2. Remove the PCI riser card in connector 1, all DIMMs, and the microprocessor in socket 2. 3. Restart the server to see whether the problem remains. 4. Reinstall each device that you removed in step 2 one at a time, starting the server each time, to isolate the failing device. 5. Replace any failing device. 6. (Trained service technician only) Replace the system board. (Continued on the next page)

Table 9. Light path diagnostics panel LEDs (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 3, "Parts listing", in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If a action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

LED	Description	Action
OVER SPEC (Continued)	The power supplies are using more power than their maximum rating.	If the 12 V channel C error LED is lit, complete the following steps: 1. Turn off the server and disconnect the power from the server. 2. Remove the SAS/SATA RAID riser card, DIMMs in connectors 1 through 8, and the microprocessor in socket 1. **Note:** The server will not power-on when the microprocessor in socket 1 or 2 is not installed in the server. Do the following, depending on the level of your system board: • **For the pass 8 level system board**, (trained service technician only) toggle the switch block (SW4), bit 8 to allow the server to power-on. See Table 3 on page 19 for the location of the SW4 switch block on the pass 8 level system board. • **For the pass 9 level system board**, (trained service technician only) toggle the switch block (SW4), bit 3 to allow the server to power-on. See Table 6 on page 23 for the location of the SW4 switch block on the pass 9 level system board. 3. Restart the server to see whether the problem remains. 4. Reinstall each device that you removed in step 2 one at a time, starting the server each time, to isolate the failing device. 5. Replace any failing device. 6. (Trained service technician only) Replace the system board. (Continued on the next page.)

Table 9. Light path diagnostics panel LEDs (continued)

LED	Description	Action
• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.	
• See Chapter 3, "Parts listing", in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).	
• If a action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

LED	Description	Action

OVER SPEC (Continued)		If the 12 V channel D error LED is lit, complete the following steps:
		
		1. Turn off the server and disconnect the power from the server.
		
		2. Remove the microprocessor in socket 1.
		Note: The server will not power-on when the microprocessor in socket 1 or 2 is not installed in the server. Do the following, depending on the level of your system board:
		
		  • **For the pass 8 level system board**, (trained service technician only) toggle the switch block (SW4), bit 8 to allow the server to power-on. See Table 3 on page 19 for the location of the SW4 switch block on the pass 8 level system board.
		
		  • **For the pass 9 level system board**, (trained service technician only) toggle the switch block (SW4), bit 3 to allow the server to power-on. See Table 6 on page 23 for the location of the SW4 switch block on the pass 9 level system board.
		
		3. Restart the server to see whether the problem remains.
		
		4. Reinstall the microprocessor in socket 1 and restart the server.
		
		5. Replace any failing device.
		
		6. (Trained service technician only) Replace the system board.
		
		(Continued on the next page.)

Table 9. Light path diagnostics panel LEDs (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 3, "Parts listing", in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If a action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

LED	Description	Action

OVER SPEC (Continued)	The power supplies are using more power than their maximum rating.	If the 12 V channel E error LED is lit, complete the following steps:
		1. Turn off the server and disconnect the power from the server.
		2. Remove the PCI riser card from PCI riser connector 2 and the microprocessor in socket 2.
		3. Restart the server to see whether the problem remains.
		4. Reinstall each device that you removed in step 2 one at a time, starting the server each time, to isolate the failing device.
		5. Replace any failing device.
		6. (Trained service technician only) Replace the system board.
		
		If the 12 V AUX channel error LED is lit, complete the following steps:
		1. Turn off the server and disconnect the power from the server.
		2. Remove all PCI Express and PCI-X cards, all PCI riser cards, the operator information panel, and the Ethernet adapter (if installed).
		Note: The server will not power-on when the microprocessor in socket 1 is not installed in the server. Do the following, depending on the level of your system board:
		  • **For the pass 8 level system board**, (trained service technician only) toggle the switch block (SW4), bit 6 to allow the server to power-on. See Table 3 on page 19 for the location of the SW4 switch block on the pass 8 level system board.
		  • **For the pass 9 level system board**, (trained service technician only) toggle the switch block (SW4), bit 2 to allow the server to power-on. See Table 6 on page 23 for the location of the SW4 switch block on the pass 9 level system board.
		3. Restart the server to see whether the problem remains.
		4. Reinstall each device that was removed in step 2 one at a time, starting the server each time, to isolate the failing device.
		5. Replace any failing device.
		6. (Trained service technician only) Replace the system board.

LOG	An error occurred.	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.

Table 9. Light path diagnostics panel LEDs (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 3, "Parts listing", in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If a action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

LED	Description	Action
LINK	Reserved.	
PS	Power supply 1 or 2 has failed.	1. Check the power-supply that has an lit amber LED (see "Power-supply LEDs" on page 108). 2. Make sure that the power supplies are seated correctly. 3. Remove one of the power supplies to isolate the failed power supply. 4. Replace the failed power supply.
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 caused the error. 2. Check the system-error log for information about the error. 3. If you cannot isolate the failing adapter by using the LEDs and the information in the system-error log, remove one adapter at a time from the failing PCI bus; and restart the server after each adapter is removed. 4. Replace the following components, in the order shown, restarting the server each time: • PCI riser card • (Trained service technician only) Replace the system board. 5. For more information, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
SP	A service processor error has been detected.	1. Remove power from the server; then, reconnect the server to power and restart the server. 2. Update the IMM firmware (see "Updating the firmware" on page 237). 3. (Trained service technician only) Replace the system board, if the problem remains. 4. For more information, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
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.

Table 9. Light path diagnostics panel LEDs (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 3, "Parts listing", in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If a action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

LED	Description	Action
TEMP	The system temperature has exceeded a threshold level. A failing fan can cause the TEMP LED to be lit.	1. Make sure that the heat sink is seated correctly. 2. Determine whether a fan has failed. If it has, replace it. 3. Make sure that the room temperature is not too high. See Table 1 on page 7 for the server temperature information. 4. Make sure that the air vents are not blocked. 5. For more information, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

MEM	An invalid memory configuration or a memory error has occurred (both the MEM LED and CNFG LED might be lit).	1. If the MEM LED and the CNFG LED are lit, the system issues an invalid memory configuration error. Complete the following steps to correct the problem:
		  a. Make sure that the DIMM configuration is supported (see "Installing a memory module" on page 185 for DIMM requirements and installation sequence information).
		  b. Replace the DIMMs with a supported configuration.
		2. If the CNFG LED is not lit, the system might detect a memory error. Complete the following steps to correct the problem:
		  a. Run the memory test to isolate the problem.
		  b. If the test indicates that a memory error has occurred, replace the failing DIMM, which is indicated by the lit DIMM latch on the system board (the DIMM LED is underneath the DIMM latch).

NMI	A nonmaskable interrupt has occurred, or the NMI button was pressed.	Check the system-error log for information about the error.

Table 9. Light path diagnostics panel LEDs (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 3, "Parts listing", in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If a action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**		

LED	Description	Action
CNFG	A hardware configuration error has occurred.	1. If the CNFG LED and the CPU LED are lit, complete the following steps to correct the problem: 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 226 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. Make sure that the DIMM configuration is supported (see "Installing a memory module" on page 185 for DIMM requirements and installation sequence information). b. Replace the DIMMs with a supported configuration.

Table 9. Light path diagnostics panel LEDs (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 3, "Parts listing", in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If a action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

LED	Description	Action

CPU	An invalid microprocessor configuration or a microprocessor has failed (both the CPU LED and the CNFG LED might be lit).	1. If the CNFG LED is lit, the system issues an invalid microprocessor configuration error. Complete the following steps to correct the problem:
		
		  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 226 for additional information about microprocessor requirements) and use the Setup utility and select **System Information → System Summary → Processor Details** to verify the microprocessors information.
		
		  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 a microprocessor failure occurs, complete the following steps:
		
		  a. (Trained service technician only) Make sure that the failing microprocessor, which is indicated by a lit LED on the system board, is installed correctly. See "Installing a microprocessor and heat sink" on page 226 for information about installation and requirements.
		
		  b. For more information, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

VRM	Reserved.	

Table 9. Light path diagnostics panel LEDs (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 3, "Parts listing", in the *Problem Determination and Service Guide* to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If a action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

LED	Description	Action

DASD	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 82.
		
		4. If the error remains, replace the following components in the order listed, restarting the server after each:
		   a. Replace the hard disk drive.
		   b. Replace the hard disk drive backplane.
		
		5. If the error remains, replace the following components one at a time, in the order listed, restarting the server after each:
		   a. Replace the hard disk drive.
		   b. Replace the hard disk drive backplane.
		
		6. If the problem remains, go to http://www.ibm.com/systems/ support/supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

RAID	Reserved.	

BRD	An error has occurred on the system board.	1. Check the LEDs on the system board to identify the component that caused the error. The BRD LED can be lit due to any of the following reasons:
		   • Battery
		   • Missing PCI riser-card assembly
		   • Failed voltage regulator
		
		2. Check the system-error log for information about the error.
		
		3. Replace any failed or missing replacement components, such as the battery or PCI riser-card assembly.
		
		4. If a voltage regulator has failed, (trained service technician only) replace the system board.

Power-supply LEDs

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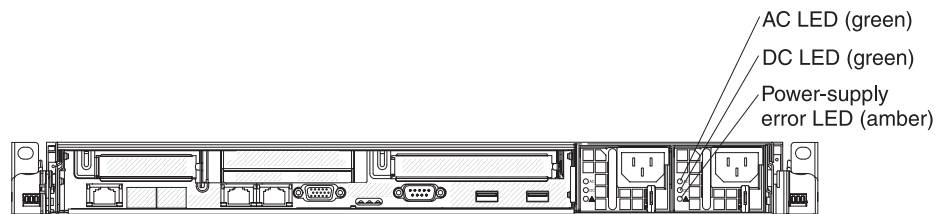- Power supply
- Power cord

The following minimum configuration is required for the server to start:
- One microprocessor in microprocessor socket 1
- One 1 GB DIMM on the system board
- One power supply
- Power cord

- Three cooling fans (one for each zone)

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

AC LED (green)
DC LED (green)
Power-supply
error LED (amber)

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.

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. Restart the server. If the error remains, check the power-supply LEDs. 4. 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.	• Make sure that the power cord is connected to a functioning power source. • Replace the power supply.	This happens only when a second power supply is providing power to the server.
Off	On	Off	Faulty power-supply	Replace the power supply.	
Off	On	On	Faulty power-supply	Replace the power supply.	
On	Off	Off	Power-supply not fully seated, faulty system board, or faulty power-supply	1. Reseat the power supply. 2. If the 240 V failure LED on the system board is not lit, replace the power-supply. 3. If the 240 V failure 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	Off	Normal operation		
On	On	On	Power-supply is faulty but still operational	Replace the power supply.	

System pulse LEDs

The following LEDs are on the system board and monitors the system power-on and power-off sequencing and boot progress (see "System-board LEDs" on page 25 for the location of these LEDs):

Table 10. System pulse LEDs

LED	Description	Action
Enclosure manager heartbeat	power-on and power-off sequencing.	1. If the LED blinks at 1Hz, it is functioning properly and no action is necessary. 2. If the LED is not blinking, (trained service technician only) replace the system board.

IMM heartbeat	IMM heartbeat boot process.	The following steps describe the different stages of the IMM heartbeat sequencing process.
		
		1. When this LED is blinking fast (approximately 4Hz), this indicates, that the IMM code is in the loading process.
		
		2. When this LED goes off momentarily, this indicates that the IMM code has loaded completely.
		
		3. When this LED goes off momentarily and then starts blinking slowing (approximately 1Hz), this indicates that IMM is fully operational. You can now press the power-control button to power-on the server.
		
		4. If this LED does not blink within 30 seconds of connecting a power source to the server, complete the following steps:
		
		  a. (Trained service technician only) use the IMM recovery jumper to recover the firmware (see Table 2 on page 19).
		
		  b. (Trained service technician only) replace the system board.

Diagnostic programs and messages

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

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

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3550 M2** to display the matrix of downloadable files for the server.

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

Running the diagnostic programs

Note: The DSA memory test might take up to 30 minutes to run. If the problem is not a memory problem, skip the memory test.

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 `<F2> Diagnostics` is displayed, press F2.

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

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

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

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

If the diagnostic programs do not detect any hardware errors but the problem remains during normal server operation, 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 89 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 Preboot collections to an external USB device, type the **copy** command in the DSA interactive menu.

Diagnostic messages

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

Table 11. 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, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237.
					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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/support/docview.wss?uid=psg1 MIGR-4JTS2T and select your system to display a matrix of available firmware. 5. Run the test again. 6. Turn off and restart the system if necessary to recover from a hung state. 7. Run the test again. 8. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 9. Run the test again.

089-802-xxx	CPU	CPU Stress Test	Aborted	System resource availability error.	1. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved:
					  a. (Trained service technician only) Microprocessor board
					  b. (Trained service technician only) Microprocessor
					2. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237.
					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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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.
166-802-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the test cannot be completed for an unknown reason.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
• See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
• Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-805-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: invalid command for the given LUN.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 stopped: timeout while processing the command.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
•	**Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-807-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: out of space.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 stopped: 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 stopped: request data was truncated.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 stopped: request data length is invalid.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
• **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 stopped: request data field length limit is exceeded.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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.
166-812-xxx	IMM	IMM I2C Test	Aborted	IMM I2C Test stopped a parameter is out of range.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
•	Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-813-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot return the number of requested data bytes.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 stopped: requested sensor, data, or record is not present.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
•	**Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-815-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: invalid data field in the request.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 stopped: the command is illegal for the specified sensor or record type.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
• See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.
• Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Message number	Component	Test	State	Description	Action
166-817-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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.
166-818-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot execute a duplicated request.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**	
• **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**	

Message number	Component	Test	State	Description	Action
166-819-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided; the SDR repository is in update mode.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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.
166-820-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided; the device is in firmware update mode.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code and IMM firmware are at the latest level. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 stopped: a command response could not be provided; IMM initialization is in progress.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 stopped: the destination is unavailable.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**
•	**Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-823-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot execute the command; insufficient privilege level.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 stopped: cannot execute the command.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 6. Run the test again. 7. Remove power from the system. 8. (Trained service technician only) Replace the system board. 9. Reconnect the system to power and turn on the system. 10. Run the test again. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

Table 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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.
166-902-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory bus.	1. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

Table 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 6. Run the test again. 7. Reseat the power supply. 8. Run the test again. 9. Turn off the system and disconnect it from the power source. 10. Trained service technician only) Replace the system board. 11. Reconnect the system to the power source and turn on the system. 12. Run the test again. 13. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

Table 11. DSA Preboot messages (continued)

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
• See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. Trained service technician only) Replace the system board. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
201-801-xxx	Memory	Memory Test	Aborted	Test canceled: the system UEFI programmed the memory controller with an invalid CBAR address	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 11. DSA Preboot messages (continued)

•	Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
•	See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
• See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 241). 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 11. DSA Preboot messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
• **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 241). 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**					
• **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 241). 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 11. DSA Preboot messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 11. DSA Preboot messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**					
• **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 241) 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 11. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 241) 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 11. DSA Preboot messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 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 DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 237. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &Indocid=SERV-CALL.

Recovering the server firmware

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

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

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

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

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

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

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3550 M2** 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 166 for more information.
3. Locate the UEFI boot recovery jumper block (J29) on the system board.

UEFI boot recovery jumper (J29)

IMM recovery jumper (J147)

1 2 3 4 5 6 7 8

SW3 switch block

OFF
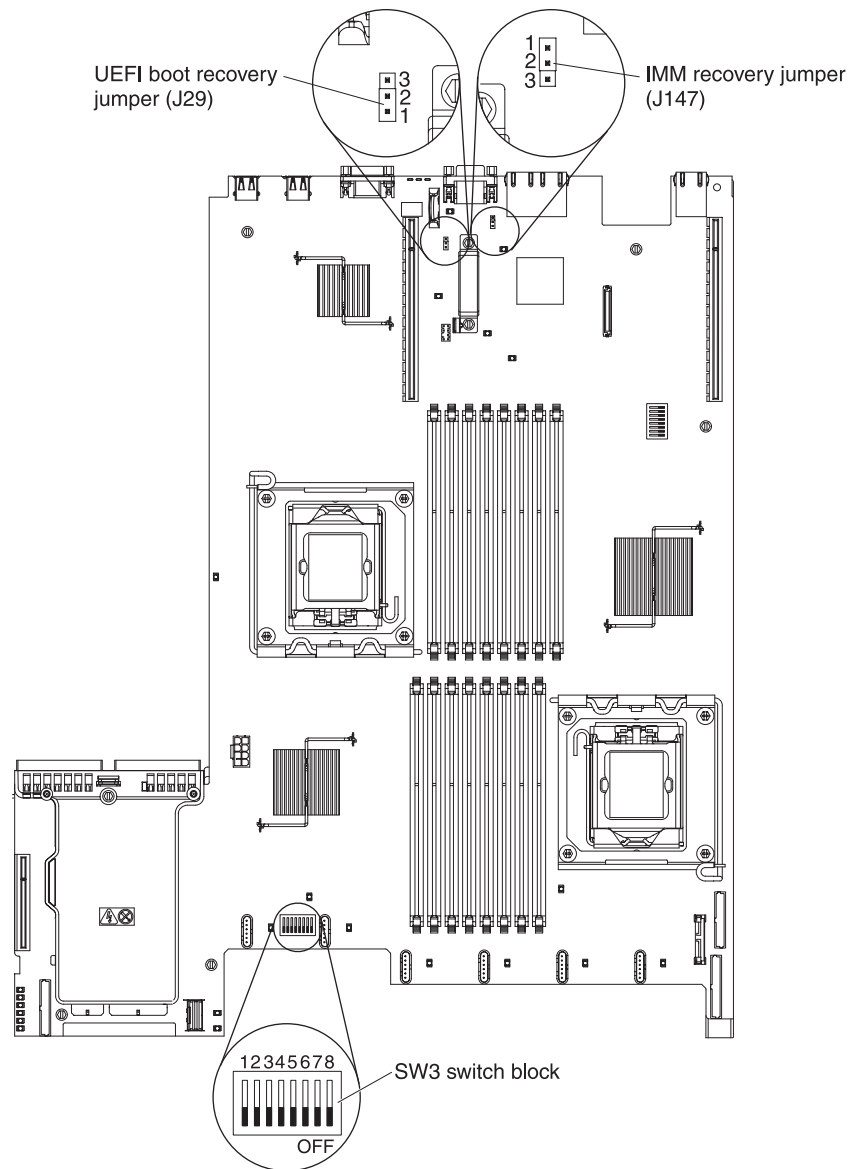
4. Move the jumper from pins 1 and 2 to pins 2 and 3 to enable the UEFI recovery mode.

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.

Automated boot recovery (ABR)

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

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

Three boot failure

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

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

Solving power problems

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

1. Turn off the server and disconnect all ac power cords.
2. Check the power-fault LEDs on the system board (see "Power problems" on page 93).
3. 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.

4. 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 152 for the minimum configuration).

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

If the server does not start from the minimum configuration, see "Power-supply LEDs" on page 108 to replace the components in the minimum configuration one at a time until the problem is isolated.

Solving Ethernet controller problems

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

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

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

Solving undetermined problems

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

If you suspect that a software problem is causing failures (continuous or intermittent), see "Software problems" on page 96.

Damaged data in CMOS memory or damaged server firmware can cause undetermined problems. To reset the CMOS data, use the CMOS jumper to clear the CMOS memory and override the power-on password; see "System-board switches and jumpers" on page 18. If you suspect that the server firmware is damaged, see "Recovering the server firmware" on page 148.

If the power supplies are working correctly, complete the following steps:
1. Turn off the server.
2. Make sure that the server is cabled correctly.
3. Remove or disconnect the following devices, one at a time, until you find the failure. Turn on the server and reconfigure it each time.
   - Any external devices.
   - Surge-suppressor device (on the server).
   - Printer, mouse, and non-IBM devices.
   - Each adapter.
   - Hard disk drives.
   - Memory modules. The minimum configuration requirement is 1 GB DIMM in slots 3.
4. Turn on the server.

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

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

Problem determination tips

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

The model number and serial number are located on the ID label on the front of the server as shown in the following illustration.

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

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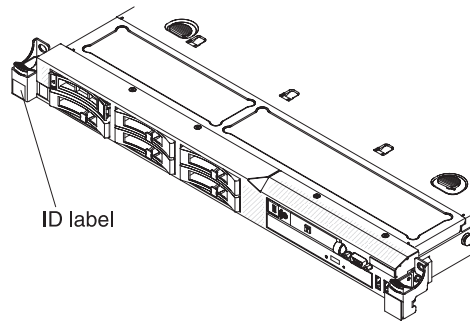
- Machine type and model
- Microprocessor or hard disk drive upgrades
- Failure symptom
  - Does the server fail the diagnostic tests?
  - What occurs? When? Where?
  - Does the failure occur on a single server or on multiple servers?
  - Is the failure repeatable?
  - Has this configuration ever worked?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

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

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

See Appendix A, "Getting help and technical assistance," on page 263 for information about calling IBM for service.

Chapter 4. Parts listing, System x3550 M2 Type 7946

The following replaceable components are available for the System x3550 M2 Type 7946 server, except as specified otherwise in "Replaceable server components." To check for an updated parts listing on the Web, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/
2. Under **Product support**, click **System x**.
3. Under **Popular links**, select **Parts documents lookup**.
4. From the Product family menu, select **System x3550 M2** and click **Go**.

Replaceable server components

The four types of replaceable components are:

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

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

The following illustration shows the major components in the server. The illustrations in this document might differ slightly from your hardware.
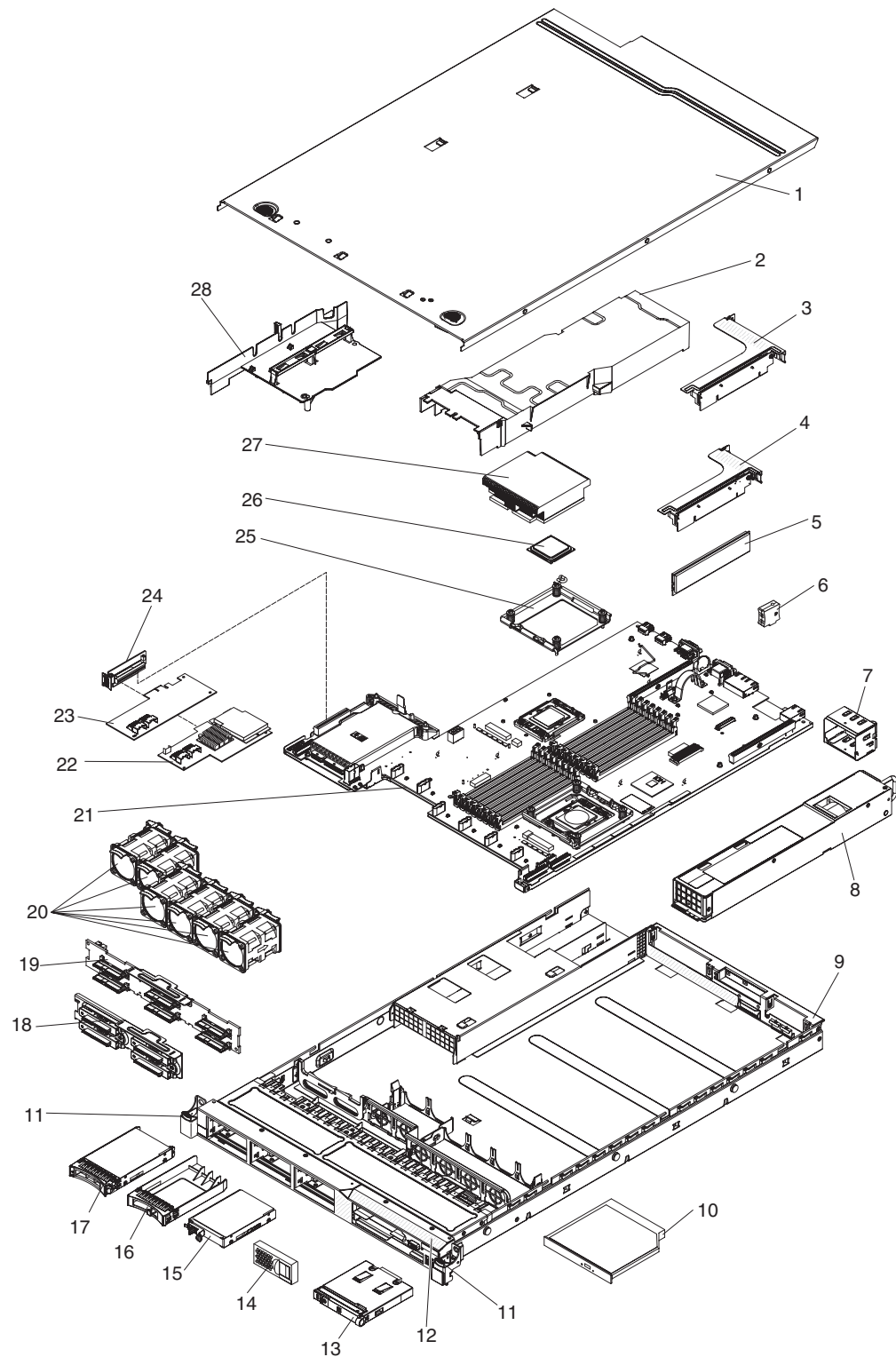
The following table lists the part numbers for the server components.

Table 12. Parts listing, Type 7946

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Top cover (All models)	43V6933		
2	DIMM air duct	43V7050		
3	PCI-X riser card assembly		43V7068	
4	PCI Express riser card, x16, assembly		43V7066	
5	Memory, 1 GB PC3-10600R-999 DDR3 ECC	44T1490		
5	Memory, 2 GB PC3-10600R-999 DDR3 ECC	44T1491		
5	Memory, 2 GB PC3-10600R-999 DDR3 ECC	44T1492		
5	Memory, 4 GB PC3-10600R-999 DDR3 ECC	44T1493		
5	Memory, 4 GB PC3-10600R-999 DDR3 ECC	46C7452		
5	Memory, 8 GB PC3-10600R-999 DDR3 ECC	46C7453		
6	Virtual media key	46C7528		
7	Power supply bay filler	49Y4821		
8	Power supply, 675 Watt	39Y7201		
9	Chassis assembly (without front bezel)			49Y4813
10	CD-RW/DVD drive	44W3255		
10	CD-RW/DVD-RW drive	44W3256		
10	DVD-ROM drive	44W3254		
11	Rack latch kit	49Y4815		
12	Bezel		49Y4818	
13	Operator information panel assembly		44E4372	
14	Filler panel, simple-swap solid state hard disk drive	46M2775		
15	Hard disk drive, 2.5-inch 31.4 GB simple-swap solid state		43W7693	
15	Hard disk drive, 2.5-inch 50 GB simple-swap solid state		43W7733	
16	Filler, hot-swap hard disk drive	44T2248		
17	Hard disk drive, 2.5-inch, hot-swap 73GB 10K	43W7537		
17	Hard disk drive, 2.5-inch, hot-swap 73GB 15K	43W7546		
17	Hard disk drive, 2.5-inch, hot-swap 146GB 10K	43W7538		
18	Backplate, simple-swap SATA hard disk drive		49Y4854	
19	Backplane, SAS hard disk drive		43V7071	
20	Fan, hot-swap 40 mm	43V6929		
21	System board			43V7072
22	ServeRAID-MR10i adapter		43W4297	
23	ServeRAID-BR10i adapter	44E8690		
24	SAS/SATA riser card	43V7067		
25	Retention module, heat sink			49Y4822
26	Microprocessor, 1.86 GHz, 80W, (models 12x, 12Y, and E1Y)			46D1272
26	Microprocessor, 2.00 GHz, 80W, (models 22x and 22Y)			46D1271

Table 12. Parts listing, Type 7946 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
26	Microprocessor, 2.13 GHz, 60W,			46D1268
26	Microprocessor, 2.13 GHz, 80W, (models 3Ax and 3AY)			46D1270
26	Microprocessor, 2.26 GHz, 60W, (models 42x and 42Y)			46D1269
26	Microprocessor, 2.26 GHz, 80W, (models 32x and 32Y)			46D1267
26	Microprocessor, 2.40 GHz, 80W, (models 52x and 52Y)			46D1266
26	Microprocessor, 2.53 GHz, 80W, (models 62x and 62Y)			46D1265
26	Microprocessor, 2.66 GHz, 95W, (models 72x and 72Y)			46D1264
26	Microprocessor, 2.80 GHz, 95W, (model E3Y)			46D1263
26	Microprocessor, 2.93 GHz, 95W, (model 92x)			46D1262
27	Heat sink assembly			49Y4820
28	Air baffle kit (Microprocessor air baffle, clamp, and DIMM air duct) (all models)	43V6931		
	Cable management arm	49Y4817		
	Cable, hard disk drive configuration	43V7023		
	Cable, operator panel	46C4139		
	Cable, SAS power		46C4148	
	Cable, SAS signal, 120 mm		43V7019	
	Cable, SAS signal, 200 mm		43V6922	
	Cable, SAS signal, 300 mm		49Y4850	
	Cable, SATA DVD	43V6914		
	Cable, USB/video		43V6920	
	Cable assembly, simple-swap		43V7042	
	Cover, safety 240VA			49Y4823
	DVD drive bay filler	49Y4824		
	EMC filler	44T2248		
	Ethernet card	43V7073		
	Labels, chassis	49Y4812		
	Labels, system service	49Y4811		
	Low-profile adapter	varies		
	Miscellaneous parts kit		49Y4814	
	Riser-card bracket: full-height, half-length	43V6936		
	Riser-card bracket: low-profile	43V6939		
	Bracket assembly, rear I/O	43V6938		
	SAS adapter retainer	49Y4852		
	ServeRAID-MR10i battery carrier kit		44E8763	
	Video adapter, NVIDIA FX 1700	43V5765		
	Video adapter, NVIDIA FX 570	43V5782		
	Slide rail kit		49Y4816	
	Thermal grease kit (All models)		41Y9292	

Table 12. Parts listing, Type 7946 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	Hypervisor, embedded USB flash device	42D0545		
	Alcohol wipes	59P4739		

Consumable parts

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, Type 7946

Index	Description	Part number
	Battery, 3.0 volt	33F8354
	ServeRAID-MR10i battery	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

The following table describes the product recovery CD CRUs.

Table 14. Product recovery CDs

Description	CRU part number
VMware ESX Server 31 Version 3.5 (Type 7946)	46D0762
VMware ESX Server 31 Version 3.5 Update 2 (Type 7946)	46M9236
VMware ESX Server 31 Version 3.5 Update 3 (Type 7946)	46M9237
VMware ESX Server 31 Version 3.5 Update 4 (Type 7946)	46M9238
Microsoft® Windows® 2008 DataCenter 32b/64b, Multilingual (Type 7946)	49Y0222
Microsoft Windows 2008 Datacenter 32b/64b, Simplified Chinese (Type 7946)	49Y0223
Microsoft Windows 2008 Datacenter 32b/64b, Traditional Chinese (Type 7946)	49Y0224
Microsoft Windows 2008 Server Standard Edition 32b/64b, 1-4 Processors, Multilingual (Type7946)	49Y0892
Microsoft Windows 2008 Server Standard Edition 32b/64b, 1-4 Processors, Simplified Chinese (Type 7946)	49Y0893
Microsoft Windows 2008 Server Standard Edition 32b/64b, 1-4 Processors, Traditional Chinese (Type 7946)	49Y0894
Microsoft Windows 2008 Enterprise Edition 32b/64b, 1-8 Processors, Multilingual (Type 7946)	49Y0895
Microsoft Windows 2008 Enterprise Edition 32b/64b, 1-8 Processors, Simplified Chinese (Type 7946)	49Y0896
Microsoft Windows 2008 Enterprise Edition 32b/64b, 1-8 Processors, Traditional Chinese (Type 7946)	49Y0897

Power cords

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

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

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

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

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

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

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

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 4. Removing and replacing server components

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by Trained service technicians.

See Chapter 4, "Parts listing, System x3550 M2 Type 7946," on page 155 to determine whether a component is a Tier 1 CRU, Tier 2 CRU, or FRU.

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

Installation guidelines

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

- Read the safety information that begins on page vii and the guidelines in "Working inside the server with the power on" on page 165 and "Handling static-sensitive devices" on page 165. This information will help you work safely.
- When you install your new server, take the opportunity to download and apply the most recent firmware updates. This step will help to ensure that any known issues are addressed and that your server is ready to function at maximum levels of performance. To download firmware updates for your server, complete the following steps:
    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 x3550 M2** 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.
- Before you install optional devices, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed, or that a 19990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see Chapter 1, "Start here," on page 1 and Chapter 3, "Diagnostics," on page 27 for diagnostic information.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the cover is removed, make sure that no one is near the server and that no other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
    - Make sure that you stand safely without slipping.

- Distribute the weight of the object equally between your feet.
- Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
- To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles

- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver, a small Phillips screwdriver, and a T8 torx screwdriver available.
- You do not have to turn off the server to install or replace hot-swap power supplies, hot-swap fans, hot-swap drives, or hot-plug Universal Serial Bus (USB) devices. However, you must turn off the server before you perform any steps that involve removing or installing adapter cables, and you must disconnect the power source before you perform any steps that involve removing or installing riser cards.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.
- For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before you turn on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap fan within 30 seconds of removal.
- You have kept the preinstalled air deflector in place unless directed to remove it in this publication or by IBM Service. See "Removing the microprocessor 2 air baffle" on page 167 for the location of the air deflector in the server.

Working inside the server with the power on

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

You might have to have the server turned on while the cover is off, to look at light path diagnostics LEDs or replace hot swap components. Follow these guidelines when you work inside a server that is turned on:

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

Handling static-sensitive devices

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

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

- Limit your movement. Movement can cause static electricity to build up around you.
- The use of a grounding system is recommended. For example, wear an electrostatic-discharge wrist strap, if one is available. Always use an electrostatic-discharge wrist strap or other grounding system when working inside the server with the power on.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part on the outside of the server for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the server without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the server cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Returning a device or component

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

Removing and replacing 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 server cover, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables, if necessary.

    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 "Light path diagnostics LEDs" on page 100 for information on how to solve the problem.
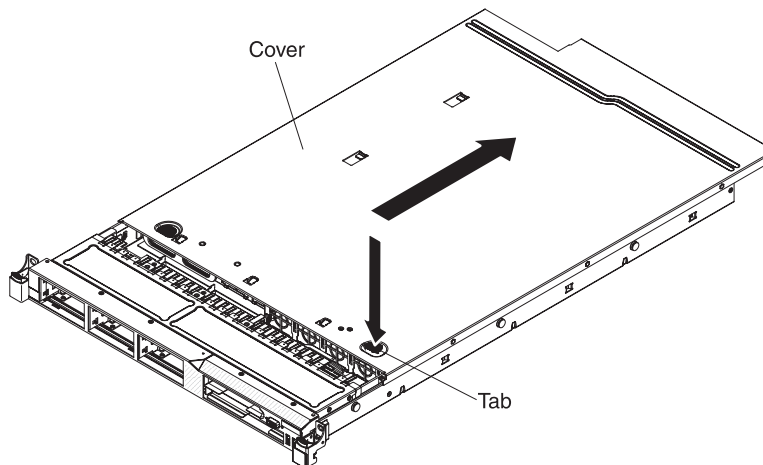
3. If the server has been installed in a rack, slide the server out from the rack enclosure.
4. Press down firmly on the blue tab on the top (near the front of the server) of the cover and slide the cover toward the rear of the server until the cover has disengaged from the chassis.
5. Lift the server cover off the server and set it aside.

    Attention: For proper cooling and airflow, replace the server cover before you turn on the server.

Installing the cover

To install the server cover, complete the following steps:

1. Make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server. Also, make sure that all internal cables are correctly routed.

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

2. Position the cover on top of the server.
3. Slide the cover toward the front of the server.
4. Make sure that the cover correctly engages all the inset tabs on the server.
5. Slide the server all the way into the rack until it latches.
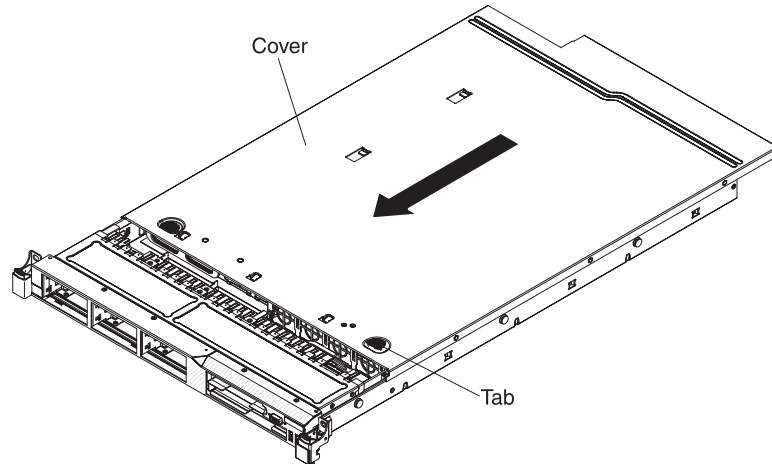
6. Reconnect the external cables and power cords.

Removing the microprocessor 2 air baffle

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 163.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables (see "Turning off the server" on page 14).
3. Lift the air baffle up, making sure that the tab comes out of the hole on the side of the power-supply cage; then, remove the air baffle from the server and set it aside.

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

Baffle tab

Microprocessor 2 air baffle

Hole for baffle tab
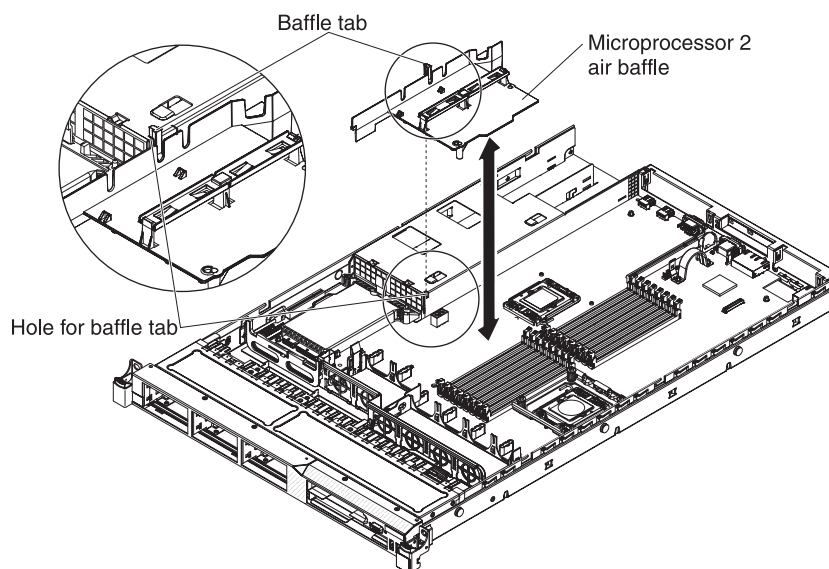
Installing the microprocessor 2 air baffle

To install the air baffle, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Align the microprocessor 2 air baffle tab with the hole on the side of the power-supply cage; then insert the tab into the hole on the cage (make sure that the front end of the air baffle is lined up with the blue touch point tab on the left side of fan 6). Press the air baffle down until the it is securely seated.

3. Install the cover (see "Installing the cover" on page 166).

4. Slide the server into the rack.

5. Reconnect the power cords and any cables that you removed.

6. Turn on the peripheral devices and the server.

Removing the DIMM air baffle

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 163.

2. Turn off the server and peripheral devices and disconnect all power cords and external cables if necessary. Remove the server cover (see "Removing the cover" on page 166).

3. Grasp the DIMM air baffle and lift the baffle up, making sure that the pin comes out of the pin hole on the system board to the left of DIMM connector 8.
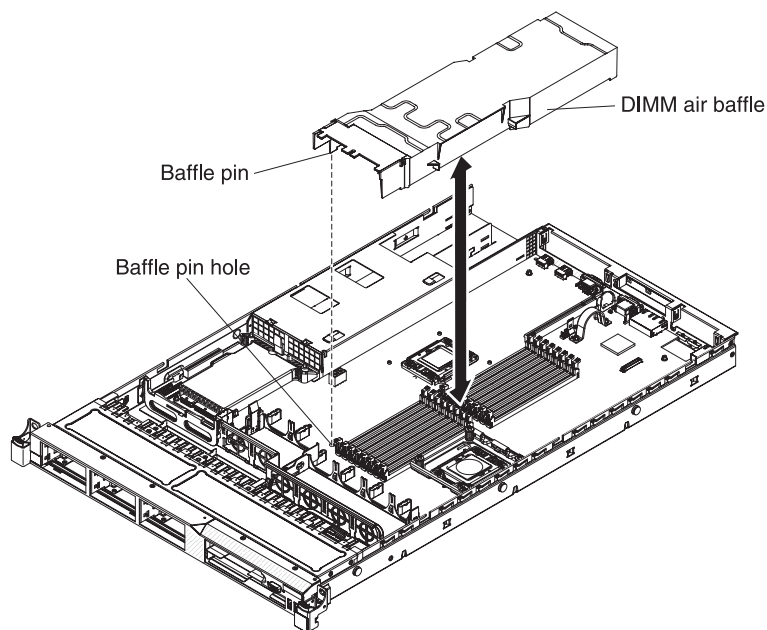
4. Remove it from the server and set it aside.

   Attention: For proper cooling and airflow, replace the air baffle before you turn on the server. Operating the server with an 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 over the DIMMs so that the baffle pin on the left side of the air baffle aligns with the pin hole next to DIMM connector 8 on the system board, and lower it into the server.
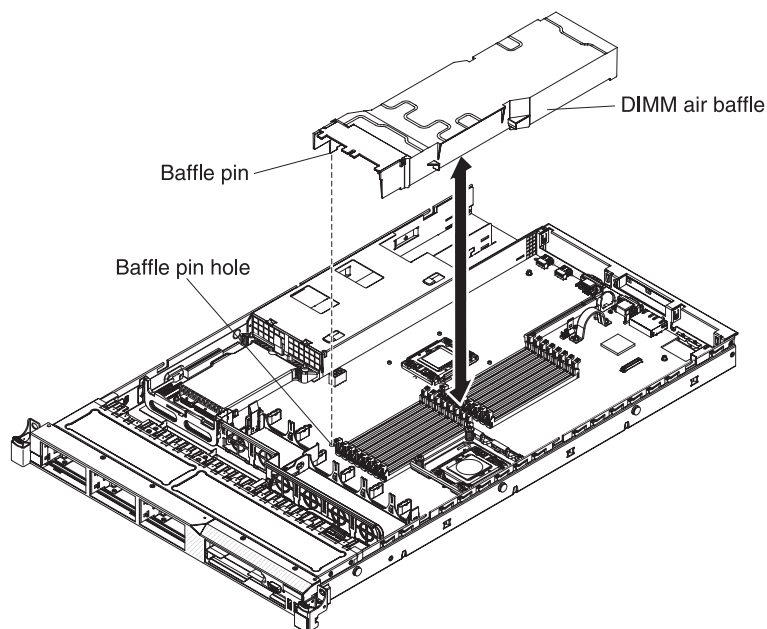
2. Install the cover.
3. Slide the server into the rack.
4. Reconnect the power cord and any cables that you removed.

5. Turn on the peripheral devices and the server.

   Attention: For proper cooling and airflow, replace the air baffle before turning on the server. Operating the server with an air baffle removed might damage server components.

Removing an adapter

To remove an adapter, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Turn off the server and peripheral devices and disconnect all power cords; then, remove the cover (see "Removing the cover" on page 166).

3. Disconnect any cables from the adapter.

4. Grasp the riser-card assembly at the rear edge and lift to remove the riser-card assembly.

5. Place the riser-card assembly on a flat, static-protective surface.

6. Carefully grasp the adapter by its top edge or upper corners, and pull the adapter from the riser-card assembly.
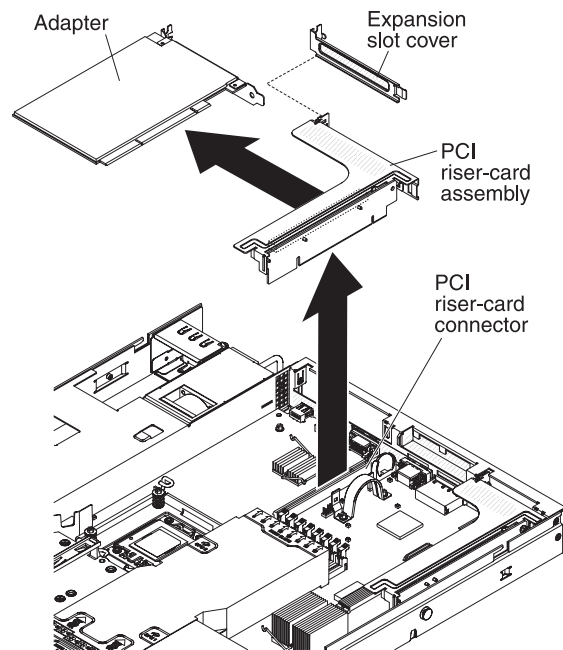
7. If you are instructed to return the adapter, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an adapter

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

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section.
- The server provides one SAS/SATA RAID riser-card slot on the system board. See "System-board optional device connectors" on page 26 for the location of the SAS/SATA RAID riser-card slot. You can replace the IBM ServeRAID-BR10i SAS/SATA adapter with the optional IBM ServeRAID-MR10i SAS/SATA adapter in the slot. The ServeRAID-BR10i adapter comes installed on standard models of the server and supports RAID levels 0, 1, and 1E. The optional ServeRAID-MR10i adapter can be purchased and supports RAID levels 0, 1, 5, 6, 10, 50, and 60. For configuration information, see the ServeRAID documentation at http://www.ibm.com/systems/support/.

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

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

- Do not set the maximum digital video adapter resolution above 1600 x 1200 at 60 Hz for an LCD monitor. This is the highest resolution that is supported for any add-on video adapter that you install in the server.
- Any high-definition video-out connector or stereo connector on any add-on video adapter is not supported
- The server does not support full-length, full-height PCI-X adapters or legacy 5 V PCI adapters.
- When you install any PCI adapter, the power cords must be disconnected from the power source before you remove the PCI Express riser-card assembly and the PCI-X riser-card assembly. Otherwise, the active power management event signal will be disabled by the system-board logic, and the Wake on LAN feature might not work. However, after the server is powered-on locally, the active power manager active power management event signal will be enabled by the system-board logic.
- If you switch the PCI adapter from slot 1 riser assembly to slot 2, you will need to remove the screw from the standard bracket and then replace the standard bracket with the low-profile bracket.
- The server provides two PCI riser-card slots on the system board. Each slot comes with a PCI riser-card assembly with a bracket installed. The following information indicates the riser-card slots and the type of adapters that the riser cards support:
  - Standard models of the server come with two PCI Express riser-card assemblies 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). This slot supports only full-height, half-length adapters.

The following table lists the supported configurations for the PCI rise-cardr slots.

Table 15. PCI riser slots supported configurations

PCI riser-card slot number	Configuration 1	Configuration 2	Configuration 3	Configuration 4
Slot 1	PCI Express Gen 2 (x16) card with a PCI Express riser-card with a low-profile bracket	PCI Express Gen 2 (x16) card with a PCI Express riser-card with a low-profile bracket	PCI-X 1.0a 64-bit/133 MHz care with a PCI-X riser-card with a low-profile bracket	PCI-X 1.0a 64-bit/133 MHz card with a PCI-X riser-card with a low-profile bracket
Slot 2	PCI Express Gen 2 (x16) card with a PCI Express riser-card with a standard bracket	PCI-X 1.0a 64-bit/133 MHz card with a PCI-X riser-card with a standard bracket	PCI Express Gen 2 (x16) card with a PCI Express riser-card with a standard bracket	PCI-X 1.0a 64-bit/133 MHz card with a PCI-X riser-card with a standard bracket

To install an adapter, complete the following steps:

Notes:

1. The instructions in this section apply to any PCI adapter (for example, video graphics adapters or network adapters).

2. Do not set the maximum digital video adapter resolution above 1600 x 1200 at 60 Hz for an LCD monitor. This is the highest resolution that is supported for any add-on video adapter that you install in the server.

3. Any high-definition video-out connector or stereo connector on any add-on video adapter is not supported

1. Read the safety information that begins on page vii and the "Installation guidelines" on page 163.

2. Turn off the server and peripheral devices and disconnect the power cords and all external cables; then, remove the server cover (see "Removing the cover" on page 166).

   Attention: When you install an adapter, make sure that the adapter is correctly seated in the riser-card assembly and that the riser-card assembly is securely seated in the riser-card connector on the system board before you turn on the server. An incorrectly seated adapter might cause damage to the system board, the riser-card assembly, or the adapter.

3. Follow the cabling instructions, if any come with the adapter. Route the adapter cables before you install the adapter.

4. Insert the adapter into the riser-card assembly, aligning the edge connector on the adapter with the connector on the riser-card assembly. Press the edge of the connector *firmly* into the riser-card assembly. Make sure that the adapter snaps into the riser-card assembly securely.
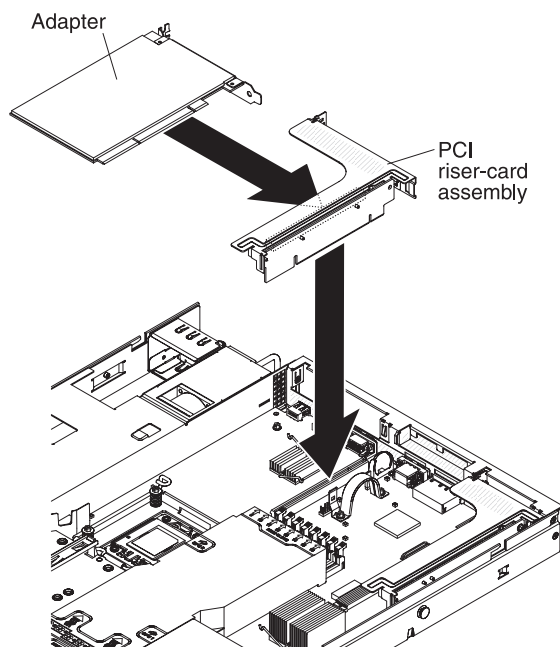
Adapter

PCI
riser-card
assembly

Attention: When you install an adapter, make sure that the adapter is correctly seated in the riser-card assembly and that the riser-card assembly is securely seated in the riser-card connector on the system board before you turn on the server. An incorrectly seated adapter might cause damage to the system board, the riser-card assembly, or the adapter.

5. Install the riser-card assembly in the server (see "Installing a PCI riser-card assembly" on page 217).

6. Perform any configuration tasks that are required for the adapter.

7. Install the cover (see "Installing the cover" on page 166).

8. Slide the server into the rack.

9. Reconnect the power cord and any cables that you removed.

10. Turn on the peripheral devices and the server.

Removing the SAS/SATA RAID riser-card assembly

To remove the SAS/SATA RAID riser-card assembly, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Turn off the server and peripheral devices and disconnect all power cords; then, remove the cover (see "Removing the cover" on page 166).

3. Disconnect the cables from the connectors on the SAS/SATA adapter; then, grasp the adapter and pull it out of the connector on the RAID riser-card assembly.

4. Press the plastic tab (next to the power supply) toward the power supply and remove the entire SAS/SATA RAID riser-card assembly; then, remove the adapter.

5. Remove the flash device from the SAS/SATA RAID riser card, if one is installed (see "Removing a USB embedded hypervisor flash device" on page 196).

SAS/SATA RAID
riser card
ServeRAID-BR10i
controller
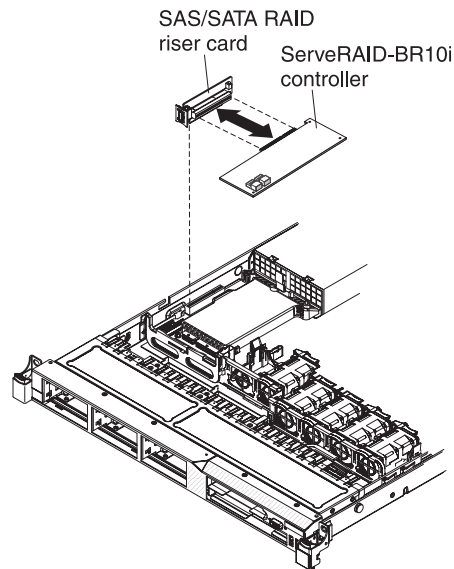
6. If you are instructed to return the RAID riser-card assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the SAS/SATA RAID riser-card assembly

To install the SAS/SATA RAID riser-card assembly, complete the following steps:

1. Read the safety information that begins on page vii and the "Installation guidelines" on page 163.

2. Turn off the server and peripheral devices and disconnect the power cords and all external cables; then, remove the server cover (see "Removing the cover" on page 166).

3. Reinstall the SAS/SATA adapter, if one was removed. See "Installing an IBM ServeRAID-BR10i SAS/SATA Controller" on page 191 or "Installing an optional IBM ServeRAID-MR10i SAS/SATA Controller" on page 194 for information about installing the controller.

4. Reinstall the flash device, if it was removed (see "Installing a USB embedded hypervisor flash device" on page 197).

5. Align the SAS/SATA RAID riser-card assembly keys correctly with the connector on the system board and press down on the assembly until it is seated firmly into the connector on the system board.

6. Connect the signal cables to the SAS/SATA adapter. See "Installing an IBM ServeRAID-BR10i SAS/SATA Controller" on page 191 or "Installing an optional IBM ServeRAID-MR10i SAS/SATA Controller" on page 194 for information about cabling the adapter.
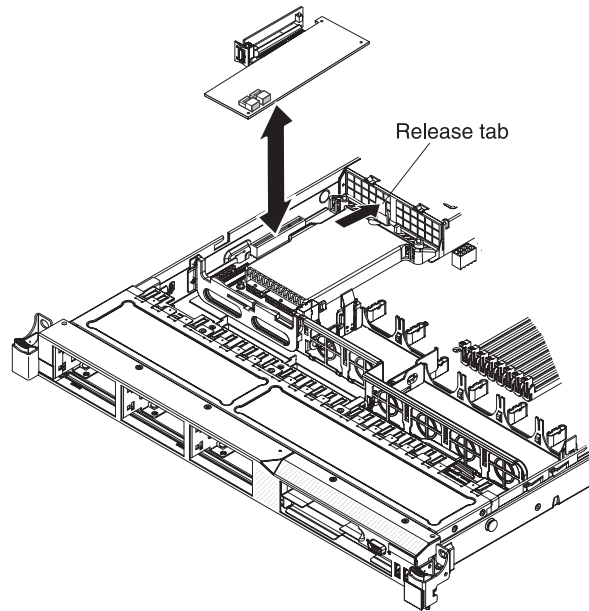
Release tab

7. Install the cover (see "Installing the cover" on page 166).

8. Slide the server into the rack.

9. Reconnect the power cord and any cables that you removed.

10. Turn on the peripheral devices and the server.

Removing a hot-swap hard disk drive

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

Attention:

- To avoid damage to the hard disk drive connectors, make sure that the server cover is in place and fully closed whenever you install or remove a hard disk drive.
- To make sure that there is adequate system cooling, do not operate the server for more than 2 minutes without either a hard disk drive or a filler panel installed in each bay.

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Slide the release latch (orange) gently to the left to unlock the drive handle.

Drive-tray
assembly
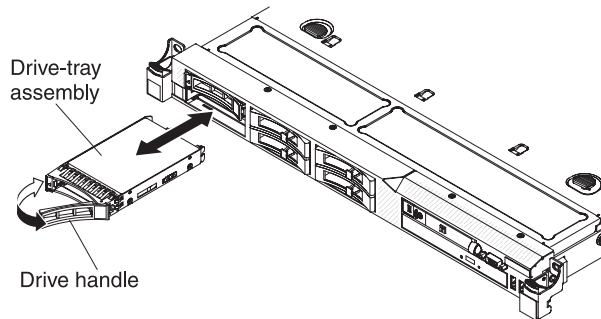
Drive handle

3. Grasp the handle and slide the drive out of the drive bay.

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

Installing a hot-swap hard disk drive

The following notes describe the type of hard disk drives that the server supports and other information that you must consider when you install a hard disk drive. For a list of supported hard disk drives, see http://www.ibm.com/servers/eserver/ serverproven/compat/us/.

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

- Make sure that you have all the cables and other equipment that are specified in the documentation that comes with the drive.

- Select the bay in which you want to install the drive.

- Check the instructions that come with the drive to determine whether you have to set any switches or jumpers on the drive. If you are installing a SAS or SATA device, be sure to set the SAS or SATA ID for that device.

- The server supports six 2.5-inch hot-swap SAS or hot-swap SATA hard disk drives.

- You can mix SAS and SATA hard disk drives in the same server as long as they are not on the same array.

- The electromagnetic interference (EMI) integrity and cooling of the server are protected by having all bays and PCI and PCI Express slots covered or occupied. When you install a drive, PCI, or PCI Express adapter, save the EMC shield and filler panel from the bay or PCI or PCI Express adapter slot cover in the event that you later remove the device.

- For a complete list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

To install a 2.5-inch hot-swap SAS or SATA hard disk drive, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Remove the filler panel from the empty drive bay.

3. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.

4. Install the hard disk drive in the drive bay:

   a. Make sure that the tray handle is in the open (unlocked) position.

b. Align the drive assembly with the guide rails in the bay.
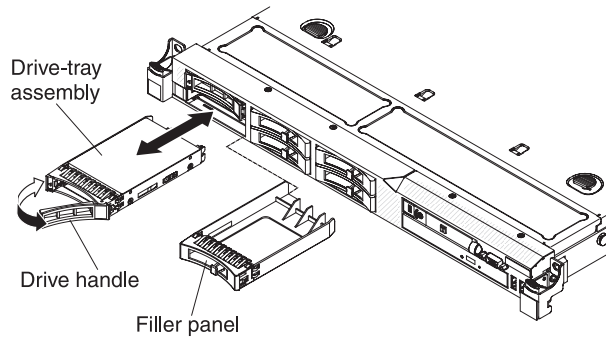
c. Gently push the drive assembly into the bay until the drive stops.

d. Rotate the tray handle to the closed (locked) position.

e. Check the hard disk drive status LED to verify that the hard disk drive is operating correctly. If the amber hard disk drive status LED for a drive is lit continuously, that drive is faulty and must be replaced. If the green hard disk drive activity LED is flashing, the drive is being accessed.

   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.

5. If you are installing additional hot-swap hard disk drives, do so now.

6. Turn on the peripheral devices and the server.

IDs for hot-swap hard disk drives

The hot-swap-drive ID that is assigned to each drive is printed on the front of the server. The following illustration shows the location of the IDs of the hard disk drives. The ID numbers and the drive bay numbers are the same.
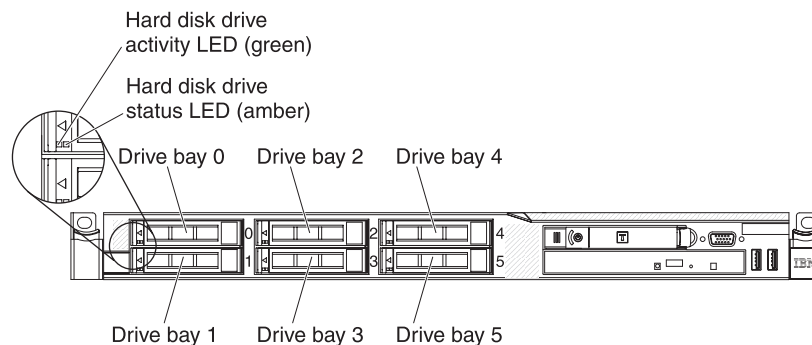
Removing a simple-swap hard disk drive

You must turn off the server before removing simple-swap drives from the server. To remove a simple-swap SATA hard disk drive, complete the following steps.

Attention:

• To avoid damage to the hard disk drive connectors, make sure that the server cover is in place and fully closed whenever you install or remove a hard disk drive.

- To make sure that there is adequate system cooling, do not operate the server for more than 2 minutes without either a hard disk drive or a filler panel installed in each bay.

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

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 the *Problem Determination and Service Guide* for information about how to solve the problem.

3. Remove the filler panel from the drive bay.

4. Slide the blue release latch to the right with one finger (to release the drive) while using another finger to grasp the black drive handle and pull the hard disk drives out of the drive bay.
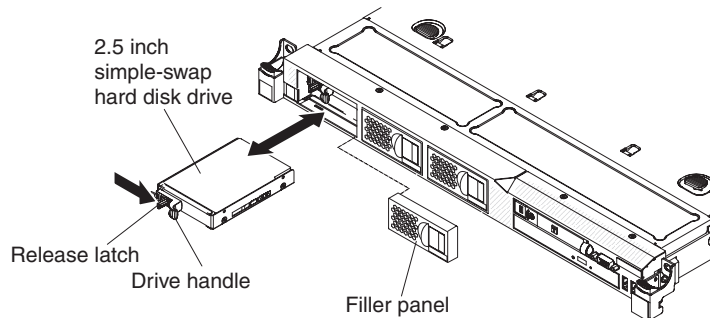
5. If you are instructed to return the drive assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a simple-swap hard disk drive

Some server models support four 2.5-inch simple-swap SATA hard disk drives that are accessible from the front of the server. You must turn off the server before installing simple-swap drives in the server. Before you install a simple-swap SATA hard disk drive, read the following information. For a list of supported hard disk drives, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

- Locate the documentation that comes with the hard disk drive and follow those instructions in addition to the instructions in this chapter.
- Make sure that you have all the cables and other equipment that are specified in the documentation that comes with the drive.
- Select the bay in which you want to install the drive.
- Check the instructions that come with the drive to determine whether you have to set any switches or jumpers on the drive. If you are installing a SATA device, be sure to set the SATA ID for that device.
- You can only install four 2.5-inch simple-swap SATA hard disk drives in the server (only four drives are supported). Do not install hot-swap drives into a simple-swap server model, it is not supported.
- The sequence for installing the hard disk drives is to install the drives starting from bay 0, 1, 2, and 3.

- Simple-swap models of the server do not support the Hypervisor USB flash device and the installation of the SAS/SATA riser card is not supported.
- The simple-swap server models are available only in non-RAID configurations.
- The electromagnetic interference (EMI) integrity and cooling of the server are protected by having all bays and PCI and PCI Express slots covered or occupied. When you install a drive, PCI, or PCI Express adapter, save the EMC shield and filler panel from the bay or PCI or PCI Express adapter slot cover in the event that you later remove the device.
- For a complete list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

To install a 2.5-inch simple-swap SATA hard disk drive, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Remove the filler panel from the empty drive bay.
3. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
4. Install the hard disk drive in the drive bay:
   a. Grasp the black drive handle and slide the blue release latch to the right and align the drive assembly with the guide rails in the bay.

2.5 inch simple-swap hard disk drive

Release latch

Drive handle
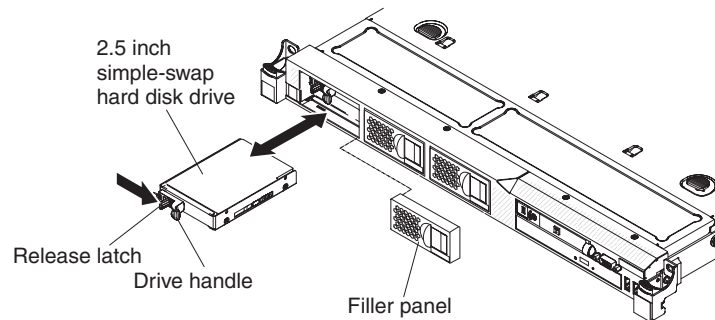
Filler panel

   b. Gently push the drive assembly into the bay until the drive stops.
5. Reinstall the drive bay filler panel that you removed earlier.
6. If you are installing additional simple-swap hard disk drives, do so now.
7. Turn on the peripheral devices and the server.

IDs for simple-swap hard disk drives

The simple-swap-drive ID that is assigned to each drive is printed on the front of the server. The following illustration shows the location of the IDs of the hard disk drives. The ID numbers and the drive bay numbers are the same.

Drive bay 0   Drive bay 2

Drive bay 1   Drive bay 3
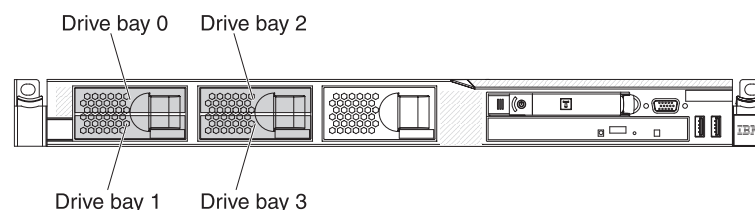
Removing a CD/DVD drive

To remove a CD/DVD drive, complete the following steps:

1. Read the safety information that begins on page "Safety" on page vii and "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect all power cords.
3. Remove the server cover (see "Removing the cover" on page 166).
4. Press and hold the release tab down as you push the drive from the rear to slide it out of the bay.

Release tab

CD-RW/DVD drive
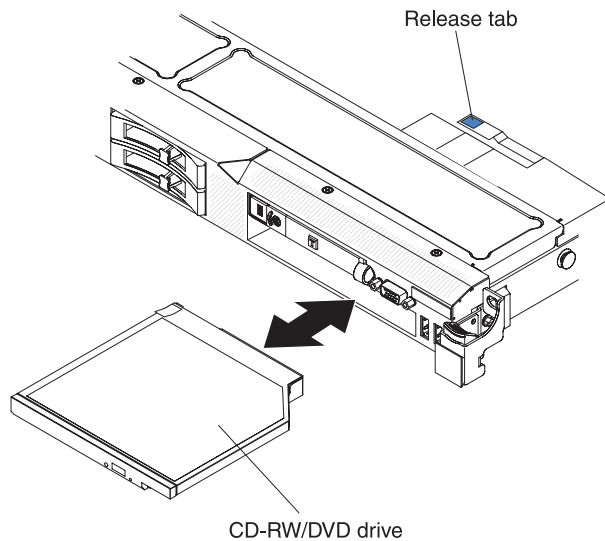
5. Slide the drive-retention clip from the side of the drive. Save the clip to use when you install the replacement drive.
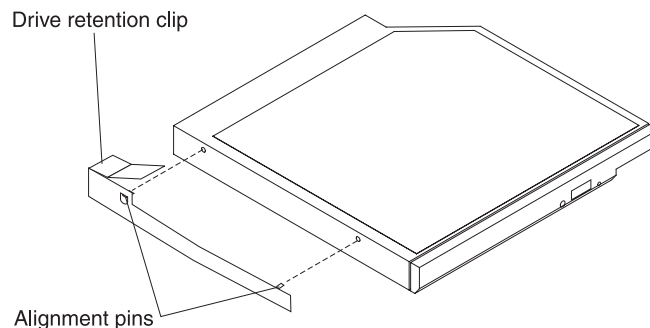
Drive retention clip

Alignment pins

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

Installing a CD/DVD drive

The following notes describe the type of drives that the server supports and other information that you must consider when you install a hard disk drive. For a list of supported drives, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

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

If you need to replace a CD/DVD drive, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables.
3. Remove the cover (see "Removing the cover" on page 166).
4. Disconnect the drive cable from the system board.
5. Locate the blue release tab on the rear of the drive; then, while you press the tab, push the drive toward the front of the server.

Release tab

CD-RW/DVD drive
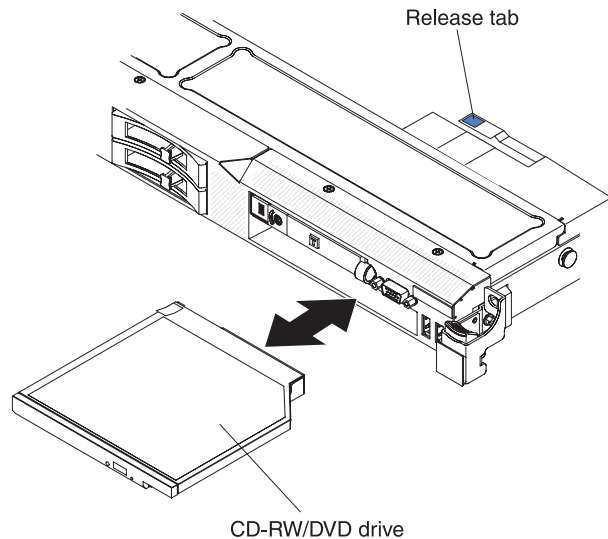
6. Install the retention clip to the side of the drive.

Drive retention clip

Alignment pins
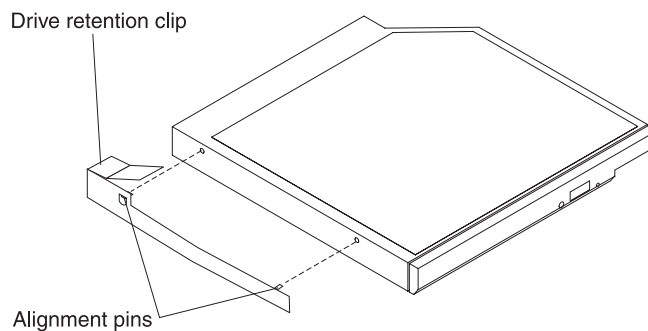
Note: If you are installing a drive that contains a laser, observe the following safety precaution.
Statement 3:

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

- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**

- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

DANGER

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

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

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

7. Slide the drive through the front of the server.
8. Touch the static-protective package that contains the new optical drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
9. Follow the instructions that come with the drive to set any jumpers or switches.
10. Attach the drive retention clip that you removed from the previous drive to the side of the new drive.
11. Align the drive in the drive bay and slide the drive into the CD/DVD drive bay until the drive clicks into place.
12. Connect the drive cable to the system board.

    The following illustration shows the cable routing for the CD/DVD drive:

    Note: The CD/DVD cable should go on the top of the operation information panel cable (in the middle) and the Video/USB cable (on the bottom) when all three cables are installed in the server.
13. Reconnect the power cord and any cables that you removed.
14. Turn on the peripheral devices and the server.

Removing the CD/DVD cable

To remove the CD/DVD cable, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect all power cords.
3. Remove the cover (see "Removing the cover" on page 166).
4. Remove the fans in fan connectors 2, 3, and 4 (see "Removing a hot-swap fan assembly" on page 201).
5. Remove the CD/DVD drive (see "Removing a CD/DVD drive" on page 180).
6. From the front of the server, grasp the cable connector latch and slide it up toward the fan bracket; then, press the spring latch (right of the cable connector) and slide the cable connector to the right.
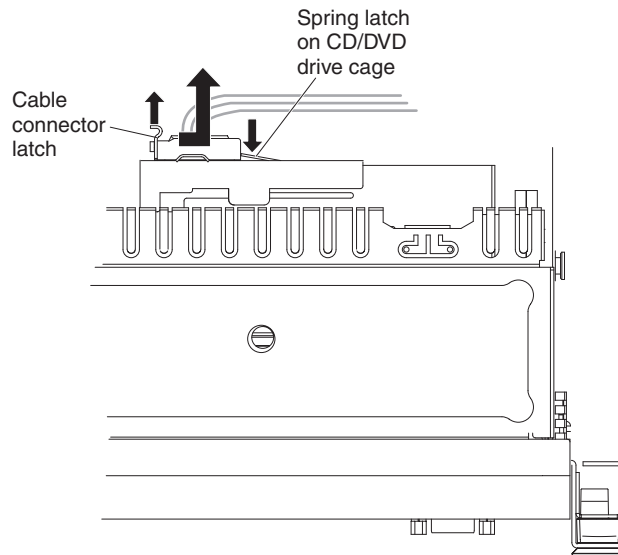
7. Remove the cable from the optical drive cage connector and set it aside.
8. If you are instructed to return the CD/DVD drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the CD/DVD cable

To install the CD/DVD cable, complete the following cable:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables.
3. Align the cable connector with the connector on the rear of the optical drive cage and press the cable connector into the optical drive cage connector until it is firmly seated.
4. Pull the cable connector latch up and hold it there while you slide the cable connector to the left; then, slide the cable connector latch down to lock the cable in place.

Spring latch
on CD/DVD
drive cage

Cable
connector
latch
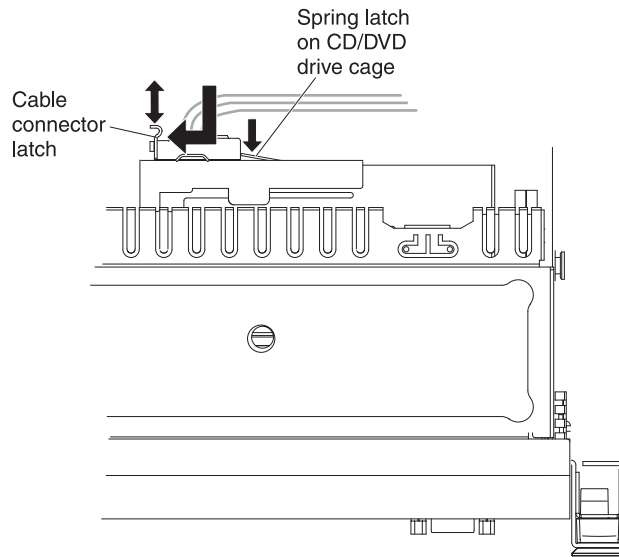
The following shows cable routing for the CD/DVD cable:

CD/DVD optical
drive connector
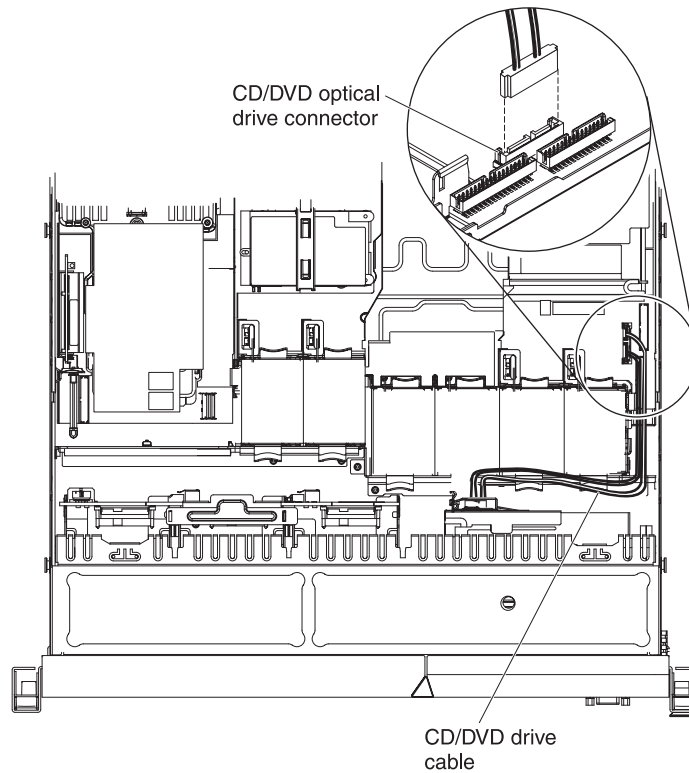
CD/DVD drive
cable

Note: The CD/DVD cable should be routed over the top of the operation information panel cable (in the middle) and the USB/Video cable (on the bottom) when all three cables are installed in the server.

5. Reinstall the CD/DVD drive (see "Installing a CD/DVD drive" on page 180).

6. Reinstall the fans (see "Installing a hot-swap fan assembly" on page 203).

7. Replace the cover (see "Installing the cover" on page 166).

8. Slide the server into the rack.

9. Reconnect the power cord and any cables that you removed.

10. Turn on the peripheral devices and the server.

Removing a memory module

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

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect all power cords.
3. Remove the cover (see "Removing the cover" on page 166).
4. Remove the DIMM air baffle (see "Removing the DIMM air baffle" on page 168).
5. Carefully open the retaining clips on each end of the DIMM connector and remove the DIMM.

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
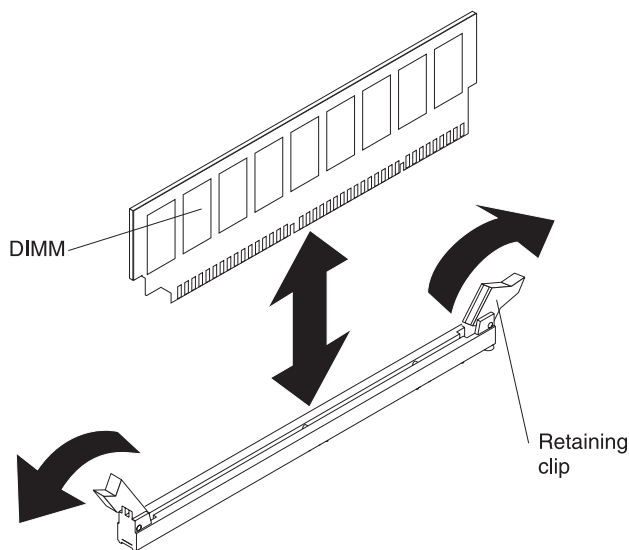
6. If you are instructed to return the DIMM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

# Installing a memory module

The following notes describe the types of DIMMs that the server supports and other information that you must consider when you install DIMMs (see "System-board optional device connectors" on page 26 for the location of the DIMM connectors):

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

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

    ggg *e*R*x*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 server supports a maximum of 16 single-rank or dual-rank DIMMs.

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

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

Table 16. Maximum memory installation using ranked DIMMs

Number of DIMMs	DIMM type	DIMM size	Total memory
16	Single-rank DIMMs	4 GB	64 GB
16	Dual-rank DIMMs	4 GB	64 GB
16	Dual-rank DIMMs	8 GB (if available)	128 GB

- The DIMM options that are available for the server are 1 GB, 2 GB, 4 GB, and 8 GB (when available). The sever supports a minimum of 1 GB and a maximum of 128 GB of system memory.

 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 237.

- 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.

- The maximum operating speed of the server is determined by the slowest DIMM installed in the server.

- The server comes with a minimum of two 1 GB DIMMs, installed in connectors 3 and 6. 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.

Table 17. Non-mirroring (normal) mode DIMM installation sequence

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

- The server supports memory mirroring (mirroring mode):
  - Memory-mirroring mode replicates and stores data on two pairs of DIMMs within two channels simultaneously. If a failure occurs, the memory controller switches from the primary pair of memory DIMMs to the backup pair of DIMMs. To enable memory mirroring through the Setup utility, select **System Settings → Memory**. For more information, see "Using the Setup utility" on page 241. When you use the memory mirroring feature, consider the following information:
    - When you use memory mirroring, you must install a pair of DIMMs at a time. One DIMM must be in channel 0, and the mirroring DIMM must be in the same slot in channel 1. The two DIMMs in each pair must be identical in size, type, and rank (single or dual) , and organization, but not in speed. The channels run at the speed of the slowest DIMM in any of the channels.
    - Channel 2, DIMM connectors 8 ,7, 15, and 16 are not used in memory-mirroring mode.
    - The maximum available memory is reduced to half of the installed memory when memory mirroring is enabled. For example, if you install 64 GB of memory, only 32 GB of addressable memory is available when you use memory mirroring.

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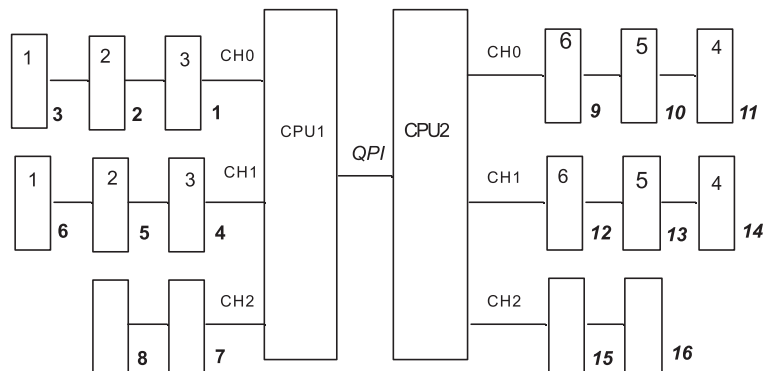
Figure 1. Memory channel interface layout

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

Table 18. Connectors on each memory channel

Memory channel	DIMM connectors
Channel 0	1, 2, 3, 9, 10, 11
Channel 1	4, 5, 6, 12, 13, 14
Channel 2	7, 8, 15, 16

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

Note: You can install DIMMs for microprocessor 2 as soon as you install microprocessor 2; you do not have to wait until all of the DIMM slots for microprocessor 1 are filled.
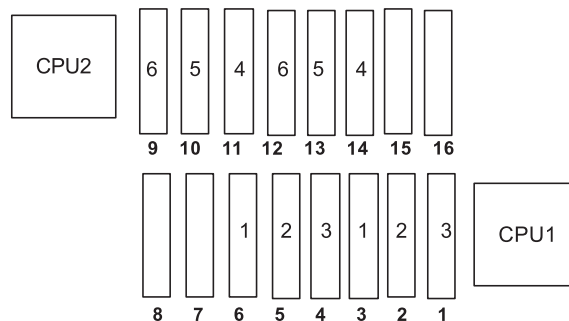
Figure 2. Memory connectors associated with each microprocessor for memory mirroring

The following table shows the installation sequence for installing DIMMs in memory-mirroring mode:

Table 19. Memory-mirroring mode DIMM population sequence

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

- When you install or remove DIMMs, the server configuration information changes. When you restart the server, the system displays a message that indicates that the memory configuration has changed.

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

DIMM 12 connector   DIMM 13 connector
DIMM 11 connector   DIMM 14 connector
DIMM 10 connector   DIMM 15 connector
DIMM 9 connector   DIMM 16 connector

DIMM 8 connector   DIMM 1 connector
DIMM 7 connector   DIMM 2 connector
DIMM 6 connector   DIMM 3 connector
DIMM 5 connector   DIMM 4 connector
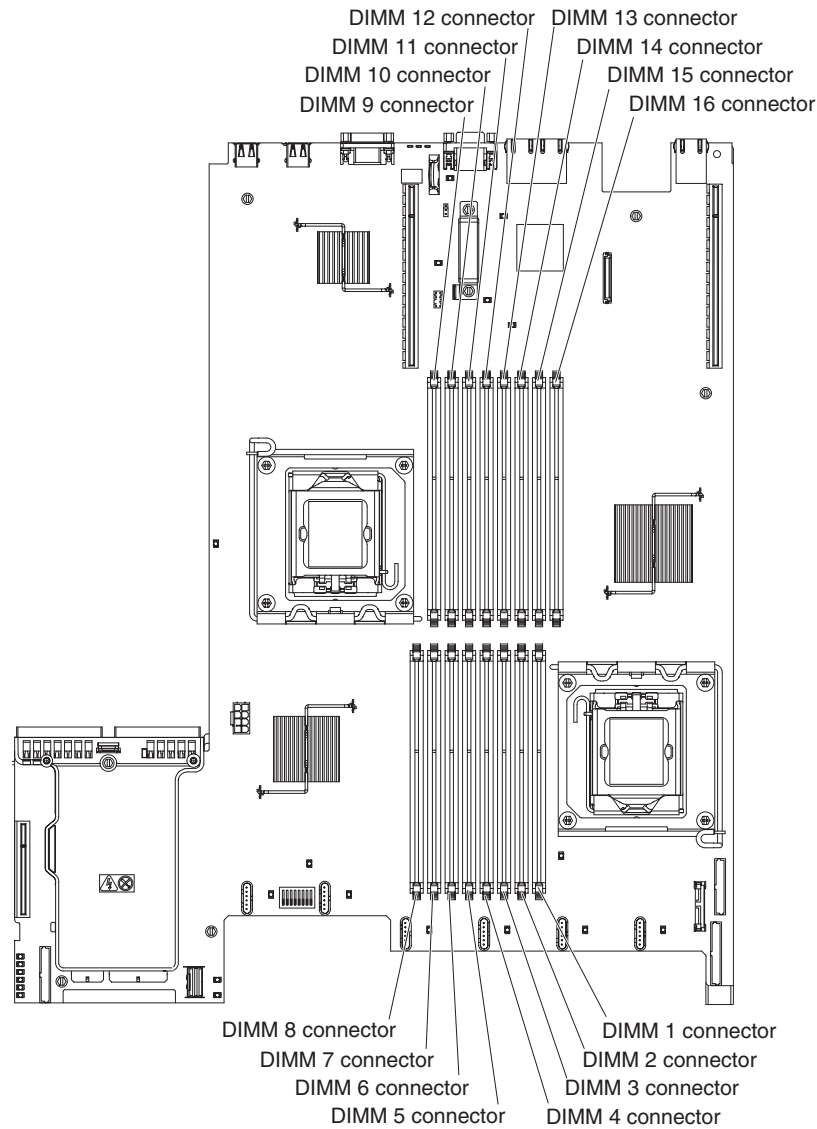
To install a DIMM, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables, if necessary.
3. Remove the cover (see "Removing the cover" on page 166).
4. Open the retaining clip on each end of the DIMM connector.

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

DIMM

Retaining
clip
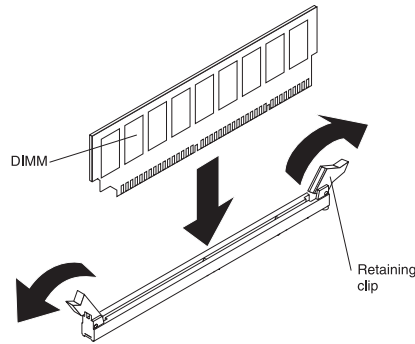
5. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the outside of the server. Then, remove the DIMM from the package.

6. Turn the DIMM so that the DIMM keys align correctly with the connector.

7. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector (see "System-board optional device connectors" on page 26 for the locations of the DIMM connectors).

8. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.

   Note: If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.

9. Reconnect the power cord and any cables that you removed.

10. Replace the cover (see "Installing the cover" on page 166).

11. Turn on the peripheral devices and the server.

Removing an IBM ServeRAID-BR10i SAS/SATA Controller

To remove an IBM ServeRAID-BR10i SAS/SATA controller from the system board, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Turn off the server and peripheral devices and disconnect the power cords.

   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 "Light path diagnostics LEDs" on page 100 for information on how to solve the problem.

3. Remove the cover (see "Removing the cover" on page 166).

4. Disconnect the signal cables that are attached to the drive backplane from the connectors on the adapter.

5. Grasp the SAS/SATA adapter near the end next to the power-supply cage while you press the black plastic tab (next to the power supply) toward the power supply.

6. Pull up on the SAS/SATA adapter until the RAID riser-card assembly disengages from the connector on the system board.

USB embedded hypervisor   RAID adapter connector   Riser card error LED
flash device connector

SAS/SATA RAID
riser-card
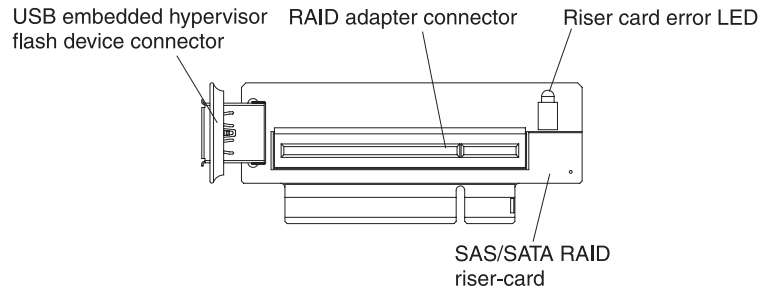
7. Grasp the SAS/SATA adapter and pull it out of the connector on the RAID
    riser-card assembly.
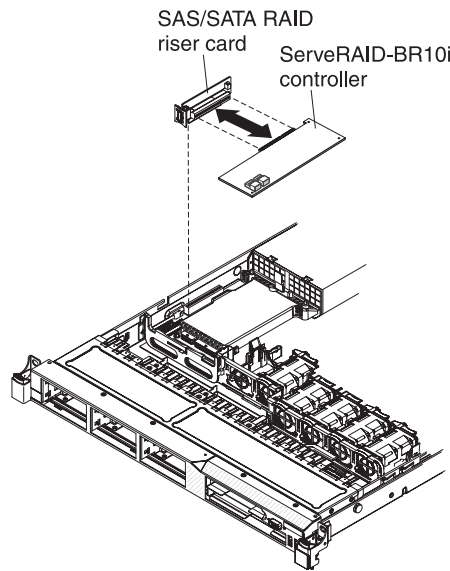
SAS/SATA RAID
riser card   ServeRAID-BR10i
              controller

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

Installing an IBM ServeRAID-BR10i SAS/SATA Controller

Some server models come with an IBM ServeRAID-BR10i SAS/SATA Controller
installed. The adapter can be installed only in the dedicated slot on the SAS/SATA
RAID riser-card assembly on the system board (see "System-board optional device
connectors" on page 26 for the location of the connector). Use the connector on the
SAS/SATA RAID riser-card assembly for the RAID adapters. The IBM
ServeRAID-BR10i SAS/SATA adapter enables integrated RAID levels 0, 1, and 1E
capability on hot-swap hard disk drives. For configuration information, see the
ServeRAID documentation at http://www.ibm.com/systems/support/. To install the
adapter if your server model did not come with this adapter, complete the following
steps to install an IBM ServeRAID-BR10i SAS/SATA Controller.

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

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

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect the power cords.
3. Remove the cover (see "Removing the cover" on page 166).
4. Touch the static-protective package that contains the new ServeRAID-BR10i SAS/SATA adapter to any unpainted surface on the outside of the server; then, grasp the adapter by the top edge or upper corners of the adapter and remove it from the package.
5. Align the ServeRAID-BR10i SAS/SATA adapter so that the keys align correctly with the connector on the SAS/SATA RAID riser-card assembly.
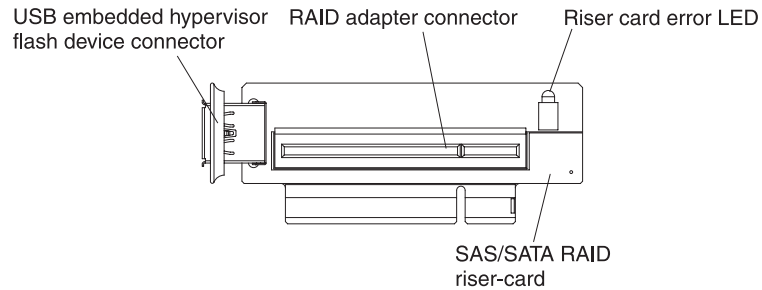
6. Insert the SAS/SATA adapter into the connector on the SAS/SATA RAID riser-card until it is firmly seated.

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

7. Tilt the SAS/SATA RAID riser-card assembly slightly and insert the end of the adapter in the slot on the retention bracket as shown in the following illustration. Make sure that the SAS/SATA RAID riser-card assembly keys align correctly with the connector on the system board and press down on the assembly until it is seated firmly into the connector on the system board.

SAS/SATA RAID riser card
ServeRAID-BR10i adapter
SAS/SATA RAID front retention bracket
Alignment post
Plastic tab

8. Route the signal cables from the drive backplane over the blue adapter retention bracket as shown in the following illustration.

SAS/SATA RAID riser-card
ServeRAID-BR10i adapter
Connector for drive bays 4 - 5 signal cable
Connector for drive bays 0 - 3 signal cable
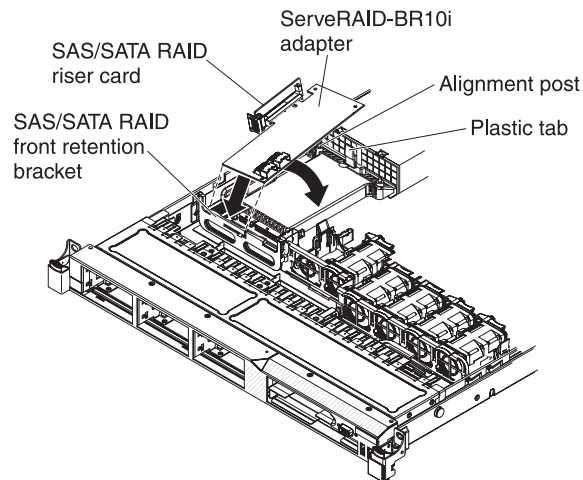
9. Take the signal cable that is attached to the drive backplane for drive bays 4 and 5 and connect it to the SAS/SATA RAID adapter connector that is closest to the power supply cage. Connect the other signal cable so that is attached to the drive backplane for drive bays 0 through 3 and connect it to the other connector on the adapter.

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

10. Reconnect the power cord and any cables that you removed.

11. Replace the cover (see "Installing the cover" on page 166).

12. Turn on the peripheral devices and the server.

Removing an optional IBM ServeRAID-MR10i SAS/SATA Controller

To remove an IBM ServeRAID-MR10i SAS/SATA controller, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Turn off the server and peripheral devices and disconnect the power cords.

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 "Light path diagnostics LEDs" on page 100 for information on how to solve the problem.

3. Remove the cover (see "Removing the cover" on page 166).

4. Disconnect the signal cables and power cables from the existing SAS/SATA adapter.

5. Carefully grasp the end of the SAS/SATA adapter next to the power-supply cage while you press the black plastic tab (next to the power supply cage) toward the power supply.

6. Pull up on the SAS/SATA adapter until the SAS/SATA RAID riser-card assembly disengages from the connector on the system board.

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

Installing an optional IBM ServeRAID-MR10i SAS/SATA Controller

You can purchase an optional IBM ServeRAID-MR10i SAS/SATA controller. It can be installed only in the dedicated slot on the SAS/SATA RAID rise-card assembly on the system board (see "System-board optional device connectors" on page 26 for the location of the connector). Use the connector on the SAS/SATA RAID riser-card assembly to install the RAID adapters. The ServeRAID-MR10i adapter supports RAID levels 0, 1, 5, 6, 10, 50, and 60. For configuration information, see the ServeRAID documentation at http://www.ibm.com/systems/support/.

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

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

To install an IBM ServeRAID-MR10i SAS/SATA adapter, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Turn off the server and peripheral devices and disconnect the power cords.

3. Remove the cover (see "Removing the cover" on page 166).

4. Touch the static-protective package that contains the new ServeRAID-MR10i SAS/SATA adapter to any unpainted surface on the outside of the server; then, grasp the adapter by the top edge or upper corners of the adapter and remove it from the package.

5. Align the ServeRAID-MR10i SAS/SATA adapter so that the keys align correctly with the connector on the SAS/SATA RAID riser-card assembly.

6. Insert the SAS/SATA adapter into the connector on the SAS/SATA RAID riser-card until it is firmly seated.

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

USB embedded hypervisor flash device connector

RAID adapter connector

Riser card error LED

SAS/SATA RAID riser-card

SAS/SATA RAID riser-card

ServeRAID-MR10i adapter

7. Tilt the SAS/SATA RAID riser-card assembly slightly and insert the end of the adapter in the slot on the retention bracket as shown in the following illustration. Make sure that the SAS/SATA RAID riser-card assembly keys align correctly with the connector on the system board and press down on the assembly until it is seated firmly into the connector on the system board.

ServeRAID-MR10i adapter

SAS/SATA RAID riser card

SAS/SATA RAID front retention bracket

Plastic tab

Alignment post

8. Route the signal cables from the drive backplane over the blue adapter retention bracket as shown in the following illustration.

SAS/SATA RAID
riser-card

ServeRAID-MR10i
adapter

Connector for
drive bays 4 - 5
signal cable

Connector for
drive bays 0 - 3
signal cable

9. Take the signal cable that is attached to the drive backplane for drive bays 4 and 5 and connect it to the connector on the SAS/SATA RAID adapter connector that is closest to the power-supply cage. Connect the other signal cable so that is attached to the drive backplane for drive bays 0 through 3 and connect it to the other connector on the adapter.

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

10. Replace the cover (see "Installing the cover" on page 166).

11. Slide the server in the rack.

12. Reconnect the power cord and any cables that you removed.

13. Turn on the peripheral devices and the server.

Removing a USB embedded hypervisor flash device

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

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Turn off the server and peripheral devices and disconnect the power cords.

3. Remove the cover (see "Removing the cover" on page 166).

4. Grasp the flash device blue lockbar (shown in the following illustration) and slide it toward the SAS/SATA riser-card assembly to the unlock position and remove it from the connector.

Lockbar

USB embedded
hypervisor
flash device

SAS/SATA RAID
riser-card
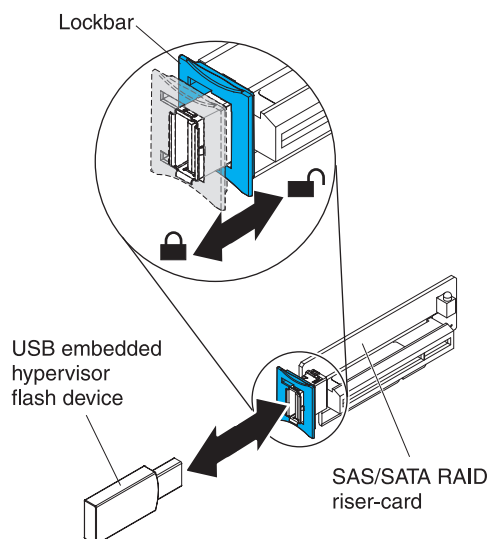
5. If you are instructed to return the flash device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a USB embedded hypervisor flash device

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

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect the power cords.
3. Remove the cover (see "Removing the cover" on page 166).
4. Align the flash device with the connector on the SAS/SATA RAID riser-card assembly and push it into the connector until it is firmly seated.
5. Slide the blue lockbar toward the flash device to the locked position until it is seated firmly.

Lockbar

USB embedded
hypervisor
flash device

SAS/SATA RAID
riser-card
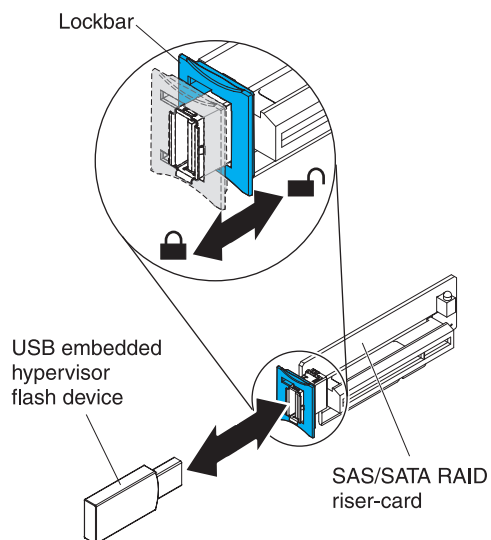
6. Reconnect the power cord and any cables that you removed.
7. Install the cover (see "Installing the cover" on page 166).
8. Slide the server into the rack.
9. Turn on the peripheral devices and the server.

Removing a hot-swap power supply

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

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.
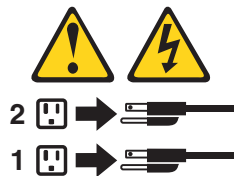
Statement 8:

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.

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

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. If only one power supply is installed, turn off the server and peripheral devices and disconnect all power cords.

3. If the server is in a rack, at the back of the server, pull back the cable management arm to gain access to the rear of the server and the power supply.

4. Press and hold the release tab to the left. Grasp the handle and pull the power supply out of the server.
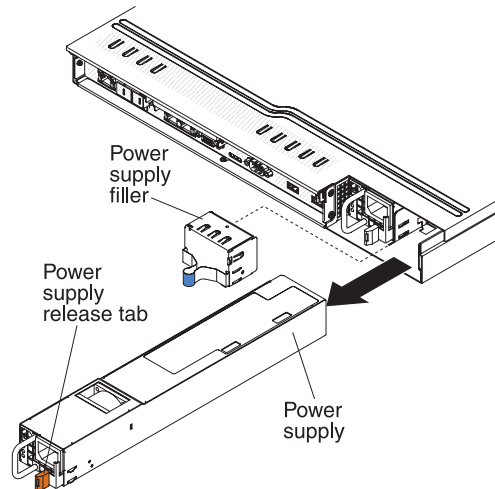
5. If you are instructed to return the power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a hot-swap power supply

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

- The server comes with one 675-watt hot-swap 12-volt output power supply. The input voltage is 110 V ac or 220 V ac auto-sensing.
- 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.

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.
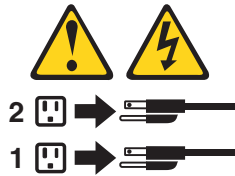
Statement 8

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 with one of these parts, contact a service technician.

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

1. Read the safety information that begins vii and "Installation guidelines" on page 163.

2. Touch the static-protective package that contains the hot-swap power supply to any unpainted metal surface on the server; then, remove the power supply from the package and place it on a static-protective surface.

3. If you are installing a hot-swap power supply into an empty bay, remove the power-supply filler panel from the power-supply bay.
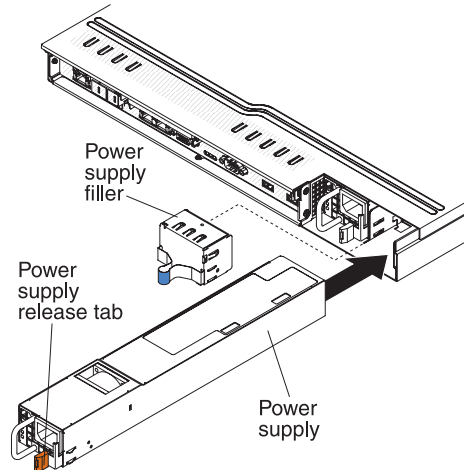
4. Grasp the handle on the rear of the power supply and slide the power supply forward into the power-supply bay until it clicks. Make sure that the power supply connects firmly into the power-supply connector.

5. Route the power cord through the handle so that it does not accidentally become unplugged.

6. Connect the power cord for the new power supply to the power-cord connector on the power supply.

7. Connect the other end of the power cord to a properly grounded electrical outlet.

8. Make sure that the ac power LED and the dc power LED on the power supply are lit, indicating that the power supply is operating correctly. The two green LEDs are to the right of the power-cord connector.

Removing a hot-swap fan assembly

Attention: To ensure proper server operation, replace a failed hot-swap fan within 30 seconds.

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

1. Read the safety information that begins on page "Safety" on page vii and "Installation guidelines" on page 163.

2. Remove the cover (see "Removing the cover" on page 166).

Fan tabs

Fan connector on
the system board

Fan 6

Fan 5
Fan 4
Fan 3
Fan 2
Fan 1

Fan connector

Fan (side view)
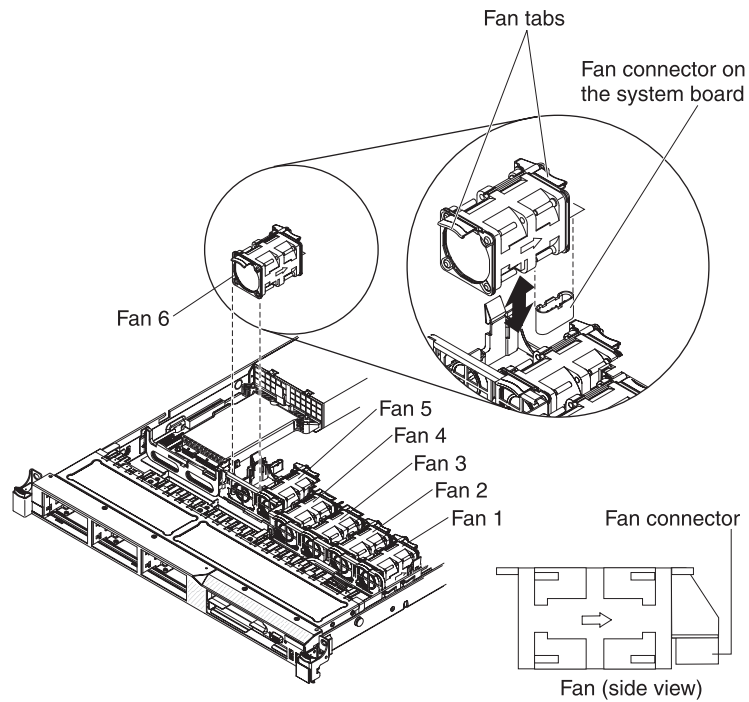
Note: The LED near the connector of the failing fan assembly is lit.

3. Grasp the orange fan tabs on both ends of the existing fan and pull it up out of
   the server. If you are removing fans 3 or 4, lift up the clear tab on the DIMM air
   baffle first.
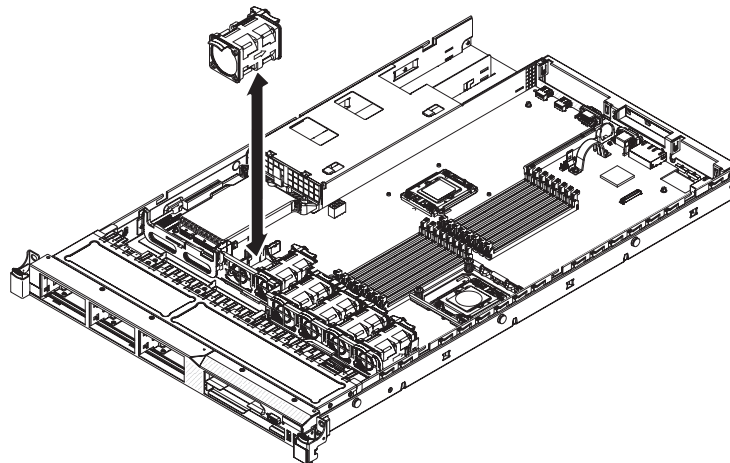
Attention: To ensure proper operation, replace a failed hot-swap fan within 30
seconds.

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

Installing a hot-swap fan assembly

The server comes standard with six dual-motor hot-swap cooling fans.

Attention: To ensure proper operation, replace a failed hot-swap fan within 30 seconds.

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

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Remove the cover (see "Removing the cover" on page 166).
3. Touch the static-protective package that contains the new fan to any unpainted metal surface on the server. Then, remove the new fan from the package.
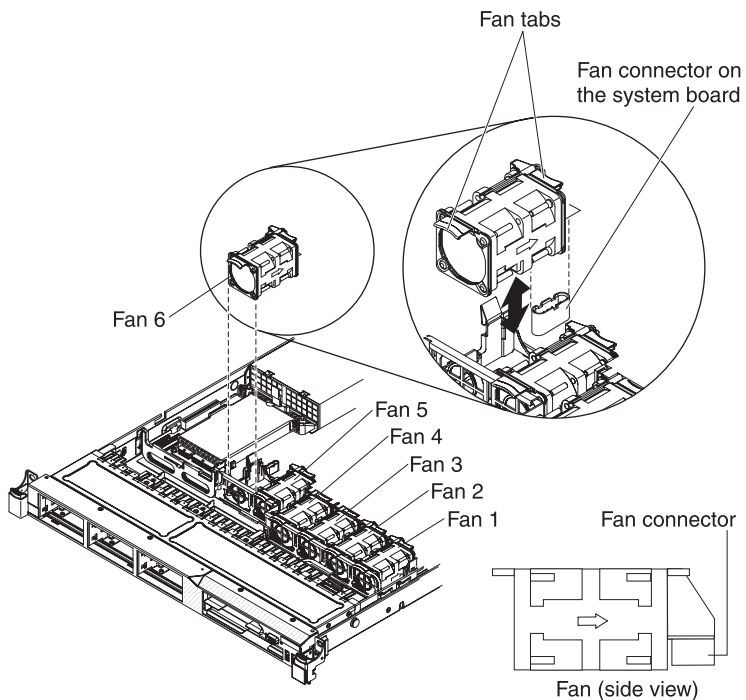
4. Orient the fan over the fan slot in the fan assembly bracket so that the fan connector aligns with the connector on the system board.
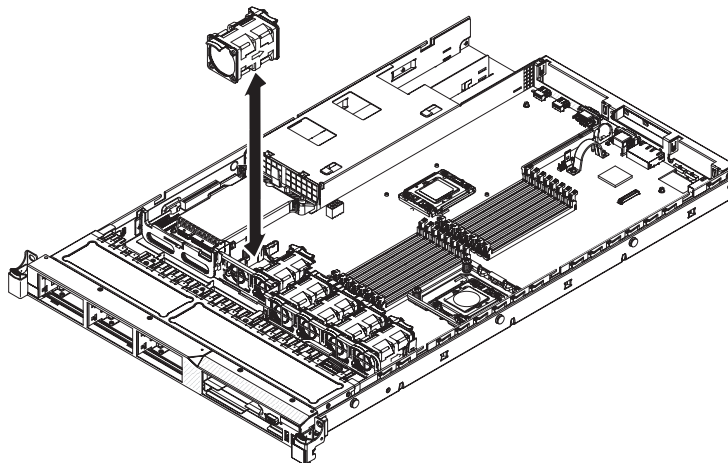
5. Insert the fan into the fan slot in the fan assembly bracket and press it down until it is seated correctly in the slot and the fan connector is seated correctly in the connector on the system board.

6. Install the cover (see "Installing the cover" on page 166).

7. Slide the server into the rack.

Removing the virtual media key

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

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Turn off the server and peripheral devices and disconnect all power cords; then, remove the cover (see "Removing the cover" on page 166).

3. Grasp the virtual media key and gently slide it up and off of the mounting tab.
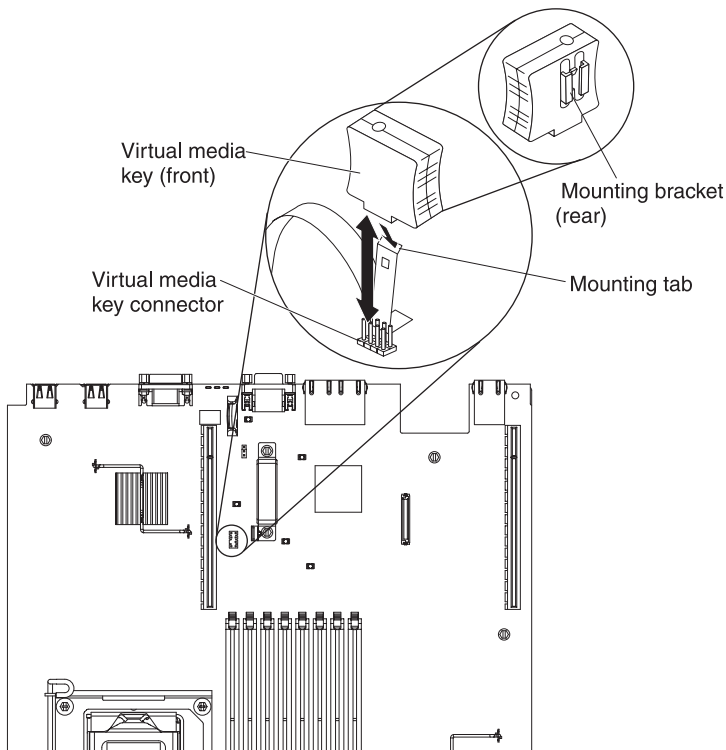
4. If you are instructed to return the virtual media key, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the virtual media key

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

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Remove the cover (see "Removing the cover" on page 166).

3. Align the virtual media key with the mounting tab and slide it down the tab onto the connector on the system board. Press the virtual media key down into the connector until it is firmly seated on the system board.

Virtual media key (front)

Mounting bracket (rear)

Virtual media key connector

Mounting tab
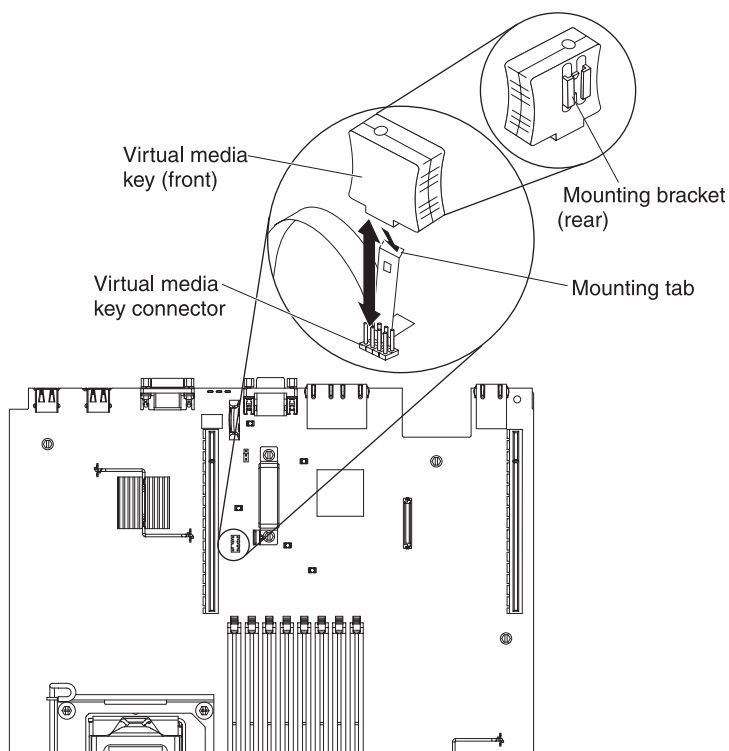
4. Replace the cover (see "Installing the cover" on page 166).

5. Slide the server into the rack.

6. Reconnect the power cord and any cables that you removed.

7. Turn on the peripheral devices and the server.

Removing the optional two-port Ethernet adapter

To remove the Ethernet adapter, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Turn off the server and peripheral devices and disconnect all power cords; then, remove the cover (see "Removing the cover" on page 166).

3. Remove the PCI riser-card assembly from PCI riser connector 1 (see "Removing a PCI riser-card assembly" on page 216.

4. Press the retention tabs away from the adapter.

5. Grasp the Ethernet adapter and disengage it from the connector on the system board; then, slide it out of the slot on the rear of the chassis and lift it out of the server.

Ethernet
adapter

Ethernet
adapter connector
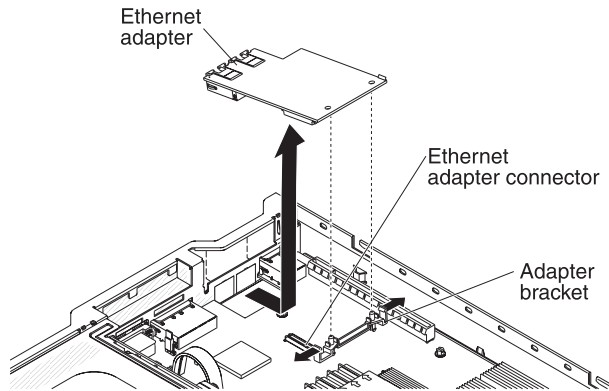
Adapter
bracket

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 the Ethernet adapter, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Remove the cover (see "Removing the cover" on page 166).

3. Touch the static-protective package that contains the Ethernet adapter to any unpainted metal surface on the server. Then, remove the Ethernet adapter from the package.

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

5. Attach the Ethernet adapter bracket to the Ethernet adapter (if the bracket is not already installed on the system board).

6. Align the adapter with the Ethernet adapter connector on the system board.

Ethernet
adapter

Ethernet adapter
filler panel

Adapter
bracket

Ethernet
adapter connector
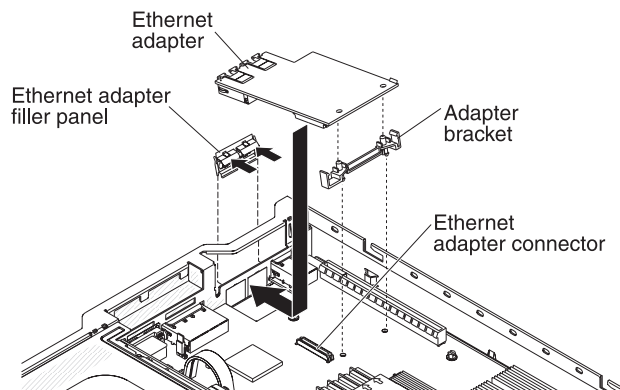
7. Lower the adapter onto the connector and press it firmly into the connector on the system board until it is seated firmly.

8. Reinstall the PCI riser-card assembly in PCI riser connector 1 (see "Installing a PCI riser-card assembly" on page 217.

9. Replace the cover (see "Installing the cover" on page 166).

10. Slide the server into the rack.

11. Reconnect the power cord and any cables that you removed.

12. Turn on the peripheral devices and the server.

Removing the PCI riser-card bracket from the riser card

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

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect all power cords.
3. Remove the cover (see "Removing the cover" on page 166).
4. Remove the PCI riser-card assembly (see "Removing a PCI riser-card assembly" on page 216).
5. Remove the screw that attaches the PCI riser card to the PCI bracket.
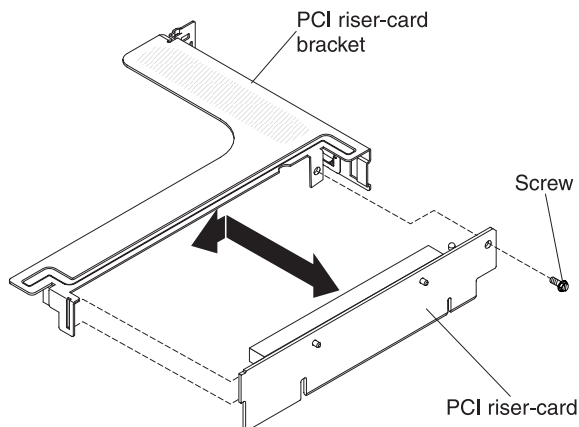
6. If you are instructed to return the PCI bracket, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the PCI riser-card bracket to the riser card

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

1. Read the safety information that begins on page vii and the "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables.
3. Remove the cover (see "Removing the cover" on page 166).
4. Align the holes on the PCI riser card and the PCI bracket and install the screw that attaches the PCI riser-card to the PCI bracket.
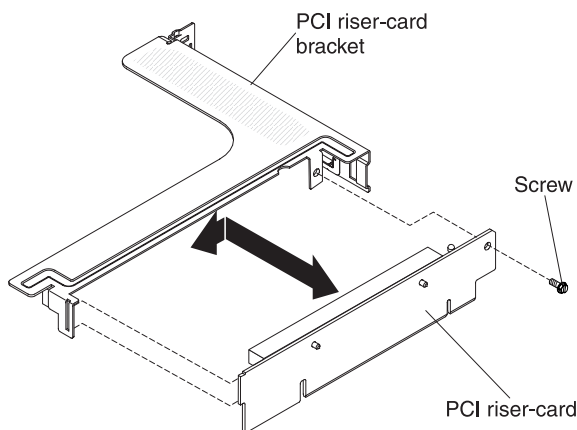
5. If you need to install an adapter, see "Installing an adapter" on page 171.

6. Install the PCI riser card assembly (see "Installing a PCI riser-card assembly" on page 217).

7. Reconnect the cables for the adapter.

8. Install the cover (see "Installing the cover" on page 166).

9. Slide the server into the rack.

10. Reconnect the power cords and any cables that you removed.

11. Turn on the peripheral devices and the server.

Removing and replacing consumable parts and Tier 1 CRUs

Replacement of 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 a remotely installed RAID adapter battery

If a RAID adapter battery is installed remotely on the microprocessor 2 air baffle and you need to replace it, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Turn off the server and peripheral devices and disconnect all power cords; then, remove the cover (see "Removing the cover" on page 166).

3. From the top of the microprocessor 2 air baffle, remove the battery retention clip that holds the battery in place. Press the release tab toward the front of the server and remove the battery retention clip.
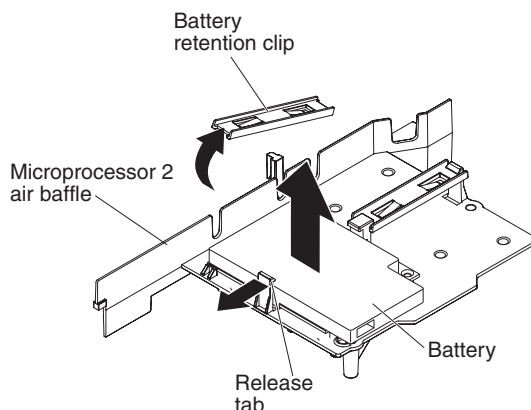
4. Disconnect the remote battery cable from the remote battery cable connector on the battery carrier and lift the battery and battery carrier from the slot. See the following illustration for the location of the connectors on the battery carrier.
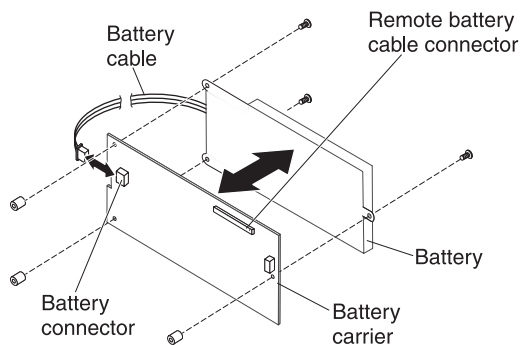
5. Disconnect the battery cable from the battery cable connector on the battery carrier.

6. Remove the three screws that attaches the battery carrier to the battery and remove the battery from the battery carrier.

   Note: If your battery and battery carrier are attached with a clip, squeeze the clip on the side of the battery carrier to remove the battery from the battery carrier.
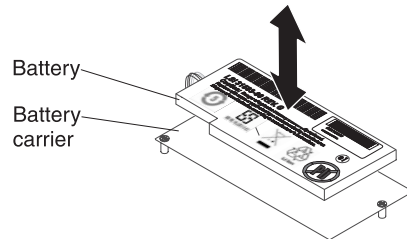
If you are instructed to return the RAID adapter battery, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a RAID adapter battery remotely in the server

When you install any RAID adapter that come with batteries in the PCI slot 1 and PCI slot 2, it is sometimes necessary to install the batteries in another location in the server to prevent the batteries from overheating. The batteries must be installed only on top of the microprocessor 2 air baffle. To install the RAID adapter battery in the server, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Turn off the server and peripheral devices and disconnect all power cords and external devices; then, remove the cover (see "Removing the cover" on page 166).

3. Install the RAID adapter on the riser-card and install the riser-card assembly in the server (see "Installing a PCI riser-card assembly" on page 217).

4. Route the remote battery cable through the notches on the microprocessor 2 air baffle.

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

5. Install the battery on the microprocessor 2 air baffle:

   a. Connect the battery cable to the battery cable connector on the battery carrier.
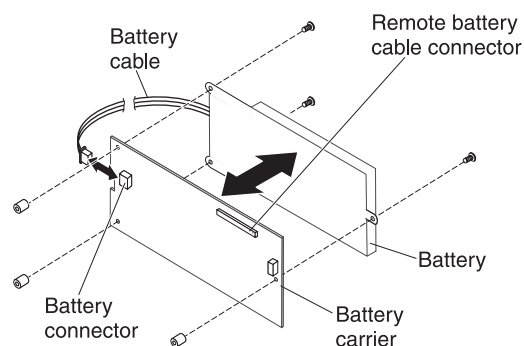
b. Place the battery carrier in the battery mounting slot on the microprocessor 2 air baffle and ensure that battery carrier posts align with the rings on the battery mounting slot so that the battery carrier is secure in the slot.

Note: The positioning of the remote battery depends on the type of remote battery that you install.
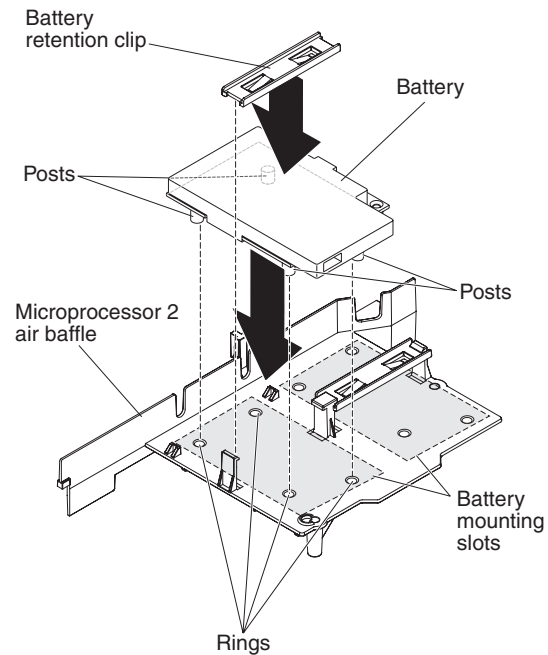
c. Take the battery retention clip and place it underneath the other tab while pressing release tab toward the front of the server; then, press it down until it snaps in place to hold the battery carrier firmly in place.

6. Install the cover.

7. Slide the server into the rack.

8. Reconnect the power cords and all external cables, and turn on the server and peripheral devices.

Removing the system battery

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

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

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

- If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.

- To order replacement batteries, call 1-800-IBM-SERV within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your support center or business partner.

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

Statement 2:

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

Do not:
  – **Throw or immerse into water**
  – **Heat to more than 100°C (212°F)**
  – **Repair or disassemble**

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

To remove the system-board battery, complete the following steps:
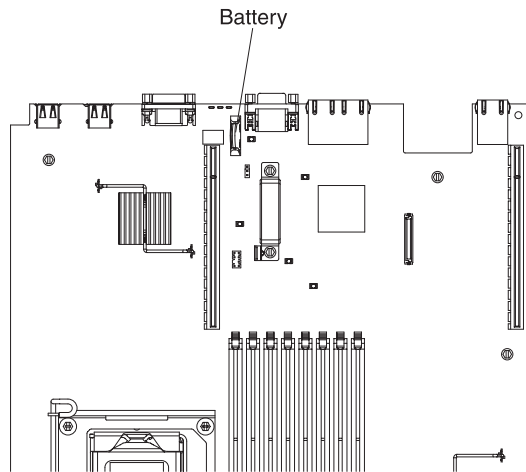
Battery

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect all power cords; then, remove the cover (see "Removing the cover" on page 166).
3. If necessary, lift the riser-card assembly out of the way (see "Removing an adapter" on page 170).

4. Remove the system-board battery:
   a. Use one finger to push the battery horizontally away from the PCI riser card in slot 2 and out of its housing.
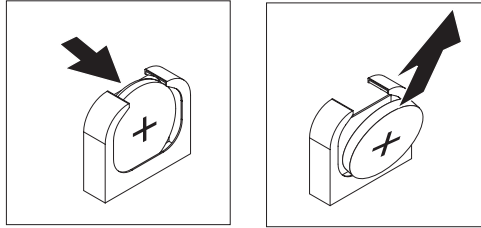
   b. Use your thumb and index finger to lift the battery from the socket.
5. Dispose of the battery as required by local ordinances or regulations. See the *IBM Environmental Notices and User's Guide* on the IBM *System x Documentation* CD for more information.

Installing the system battery

The following notes describe information that you must consider when replacing the system-board battery in the server.

- When replacing the system-board battery, you must replace it with a lithium battery of the same type from the same manufacturer.

- To order replacement batteries, call 1-800-426-7378 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM marketing representative or authorized reseller.

- After you replace the system-board battery, you must reconfigure the server and reset the system date and time.

- To avoid possible danger, read and follow the following safety statement.

Statement 2:

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

Do not:
- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

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

To install the replacement system-board 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.
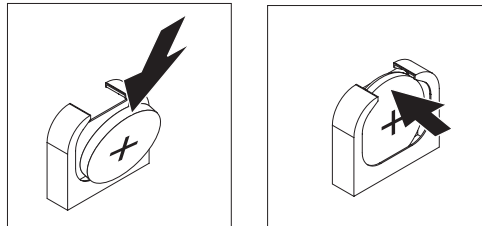
   b. Press the battery down into the socket until it clicks into place. Make sure that the battery clip holds the battery securely.
3. Install the cover (see "Installing the cover" on page 166).
4. Slide the server into the rack.
5. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.
6. 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 241 for details.

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:

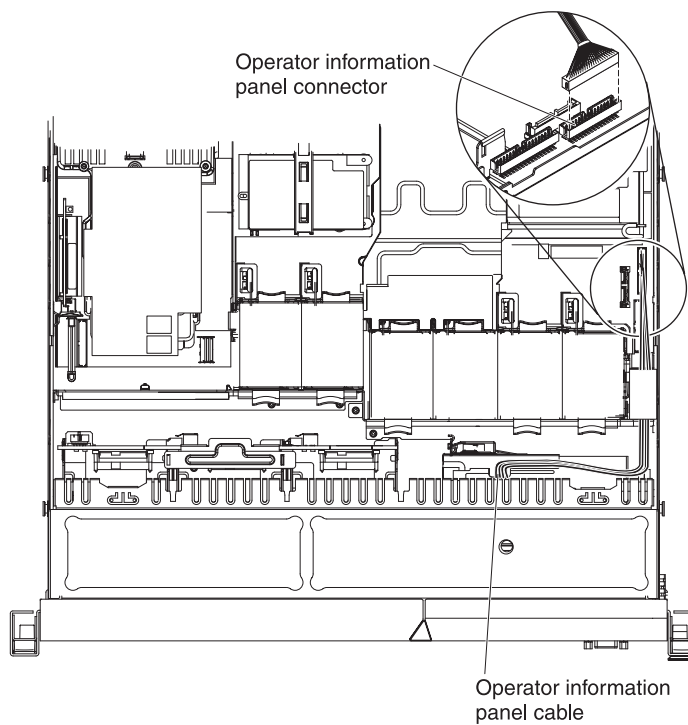1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables (see "Turning off the server" on page 14).
3. Remove the hard disk drives and filler panels from the hard disk drive bays (see "Removing a hot-swap hard disk drive" on page 175).
4. Remove the screws from the bezel.

Bezel screws
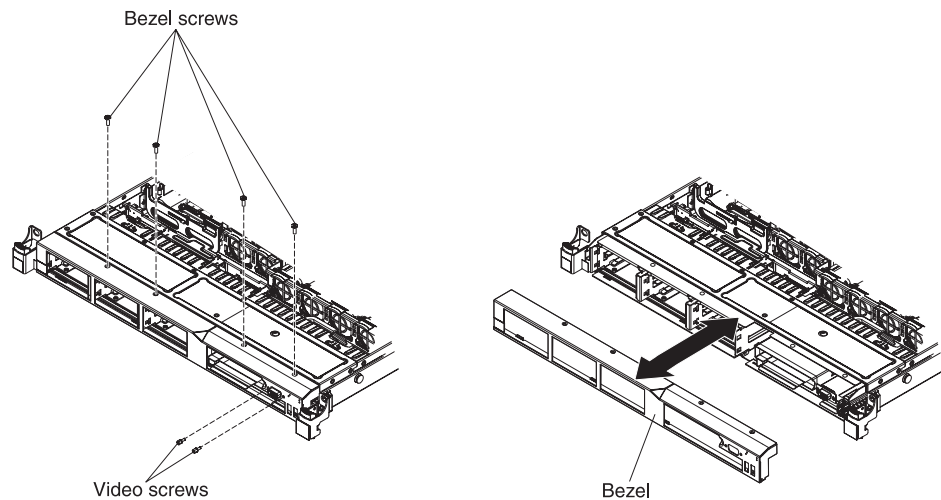
Video screws

Bezel

5. Remove the screws from the video connector.
6. Pull the top of the bezel out slightly; then, rotate it downward until the tabs on the bottom of the bezel disengages from the chassis and set it aside.

Installing the bezel

To install the bezel, complete the following steps:

1. Insert the tabs on the bottom of the bezel into the holes on the chassis.
2. Rotate the bezel upward to the server and reinstall the bezel screws.

Bezel screws

Video screws

Bezel
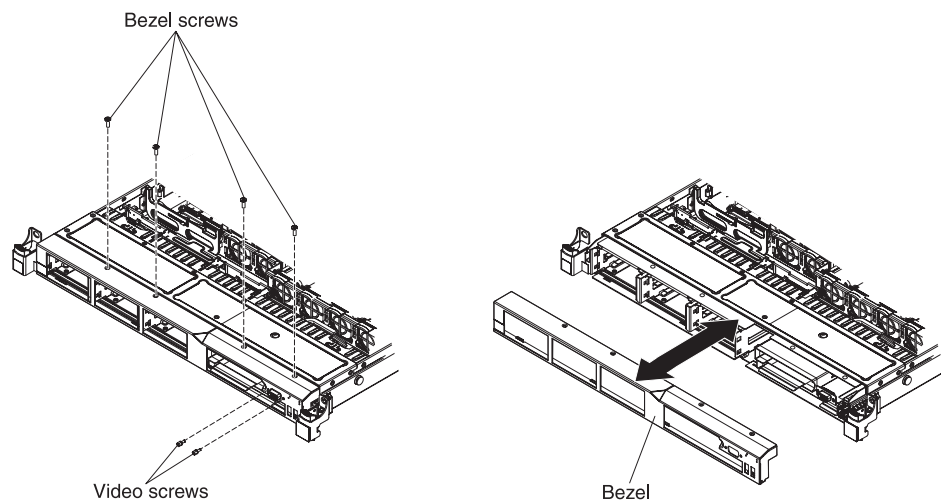
3. Reinstall the video connector screws.
4. Reinstall the hard disk drives and drive bay filler panels into the drive bays.

5. Install the cover (see "Installing the cover" on page 166).
6. Reconnect the power cords and any cables that you removed.
7. Slide the server into the rack.
8. Turn on the peripheral devices and the server.

Removing a PCI riser-card assembly

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

1. Read the safety information that begins on page vii and the "Installation guidelines" on page 163.
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 "Light path diagnostics LEDs" on page 100 for information on how to solve the problem.

3. Remove the cover (see "Removing the cover" on page 166).
4. If an adapter is installed in the PCI riser-card assembly, disconnect any cables that are connected to the adapter.
5. Grasp the rear of the PCI riser-card assembly from the rear and lift it out of the PCI riser-card slot on the system board.
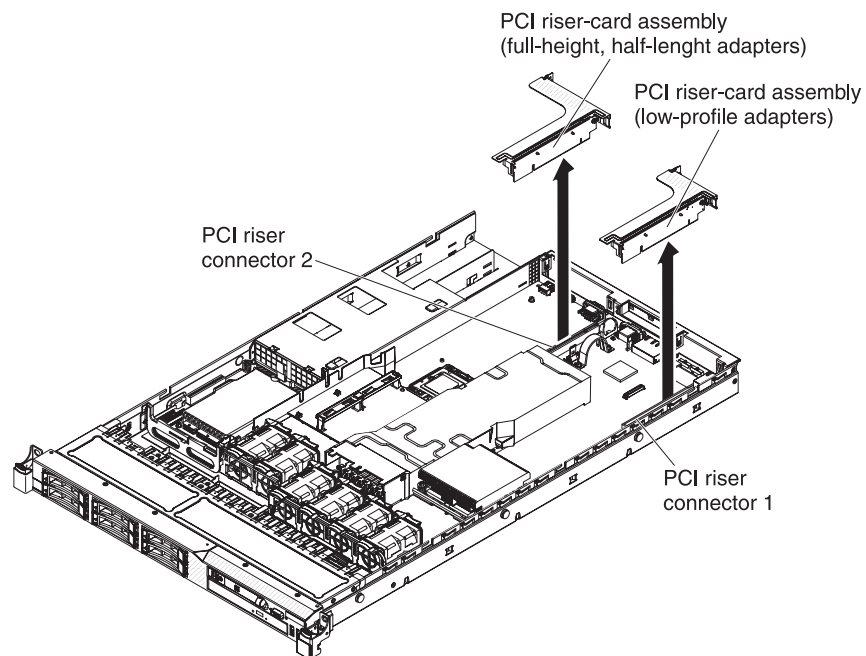
6. Remove the adapter, if one is present, from the PCI riser-card assembly.
7. Set the adapter and PCI riser-card assembly aside.

Installing a PCI riser-card assembly

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

1. Read the safety information that begins on page vii and the "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables.
3. Remove the cover (see "Removing the cover" on page 166).
4. Install the adapter in the new PCI riser-card assembly (see "Installing an adapter" on page 171).
5. Set any jumpers or switches on the adapter as directed by the adapter manufacturer.
6. Align the PCI riser-card assembly with the PCI slot connector on the system board; then, press down firmly until the PCI riser-card assembly is seated correctly in the connector on the system board.

PCI riser card assembly
(full-height, half-lenght adapters)

PCI riser card assembly
(low-profile adapters)

PCI riser
connector 2

PCI riser
connector 1
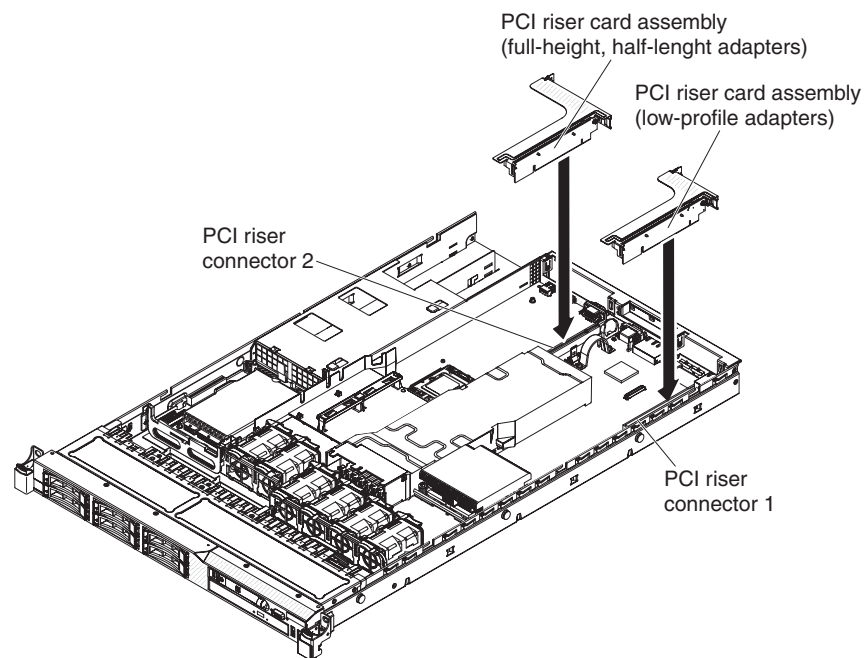
Removing the hot-swap SAS/SATA hard disk drive backplane

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

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect all power cords.
3. Remove the cover (see "Removing the cover" on page 166).
4. Pull the hard disk drives and filler panels out of the server slightly to disengage them from the hard disk drive backplane.
5. Remove fans 4, 5, and 6.
6. Disconnect all cables from the hard disk drive backplane.

   Note: You can also choose to disconnect the cables after removing the backplane from the brackets, if that is easier for you.

7. Lift the hard disk drive backplane up to disengage the backplane tabs from the slots on the backplane bracket; then, push the backplane backwards until it is clear of the slots on the bracket and remove it from the server.
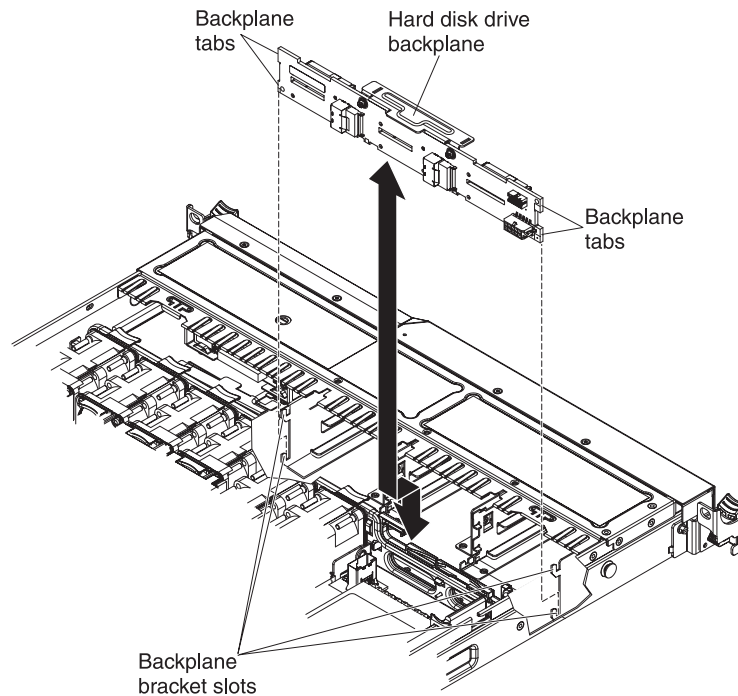
8. If you are instructed to return the hard disk drive backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the hot-swap SAS/SATA hard disk drive backplane

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

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Align the tabs on the hard disk drive backplane with the slots on the backplane bracket.
3. Insert the hard disk drive backplane tabs into slots on the backplane bracket and push the hard disk drive backplane down until the backplane is fully seated and the tabs locked in place.

   Note: You can reconnect the cables to the hard disk drive backplane before installing the backplane onto the brackets or you can connect the cables after you install the backplane, if that is easier for you.

Backplane tabs   Hard disk drive backplane

Backplane tabs

Backplane bracket slots
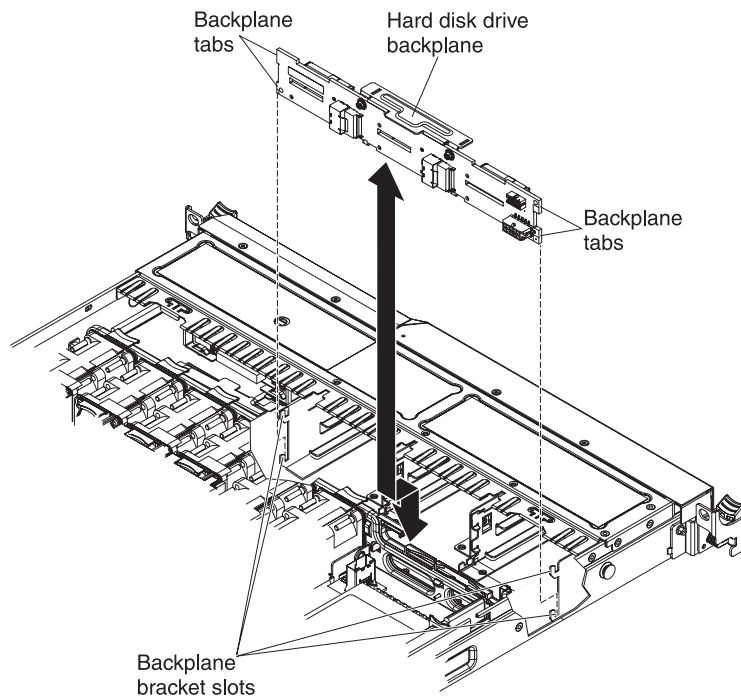
4. Reconnect the cables to the hard disk drive backplane.

5. Reinstall the fans.

6. Reinstall the hard disk drives and filler panels.

7. Install the cover (see "Installing the cover" on page 166).

8. Slide the server into the rack.

9. Reconnect the power cords and any cables that you removed.

10. Turn on the peripheral devices and the server.

Removing the simple-swap SATA hard disk drive backplate assembly

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

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Turn off the server and peripheral devices and disconnect all power cords.

3. Remove the cover (see "Removing the cover" on page 166).

4. Slide the blue release tab to the right with one finger while using another finger to grasp the black drive handle and pull the hard disk drives out of the server slightly (also the filler panels) to disengage them from the hard disk drive backplate.

5. Disconnect the power and signal cables from the system board.

    Note: You can also choose to disconnect the cables after you remove the backplate from the brackets, if that is easier for you.

6. Lift the hard disk drive backplate up to disengage the backplate assembly from the backplane bracket; then, push the backplate assembly backwards until it is clear of the bracket and remove it from the server.

Hard disk drive
backplate

Backplate
tabs

Backplate
bracket slots
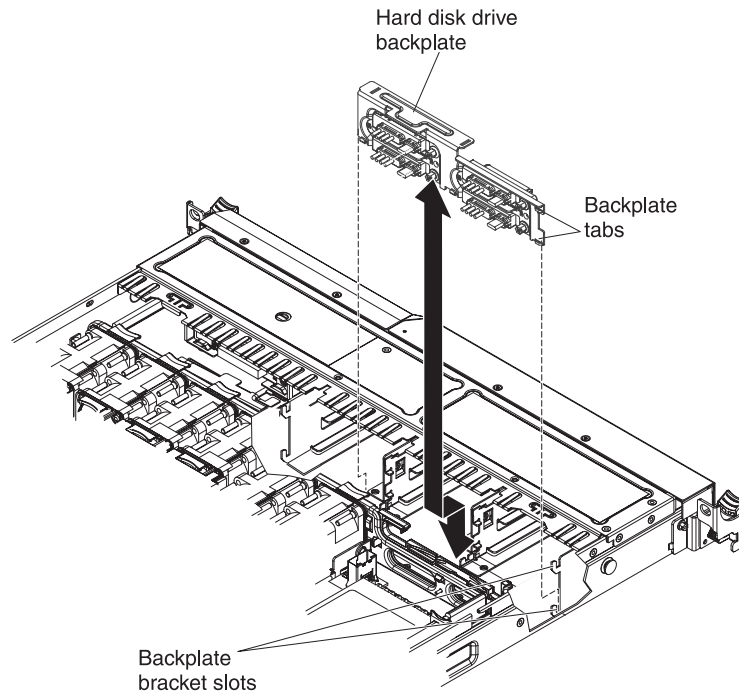
7. If you are instructed to return the hard disk drive backplate assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the simple-swap SATA hard disk drive backplate assembly

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

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Align the tabs on the hard disk drive backplate assembly with the slots on the backplane bracket.

Hard disk drive
backplate

Backplate
tabs

Backplate
bracket slots
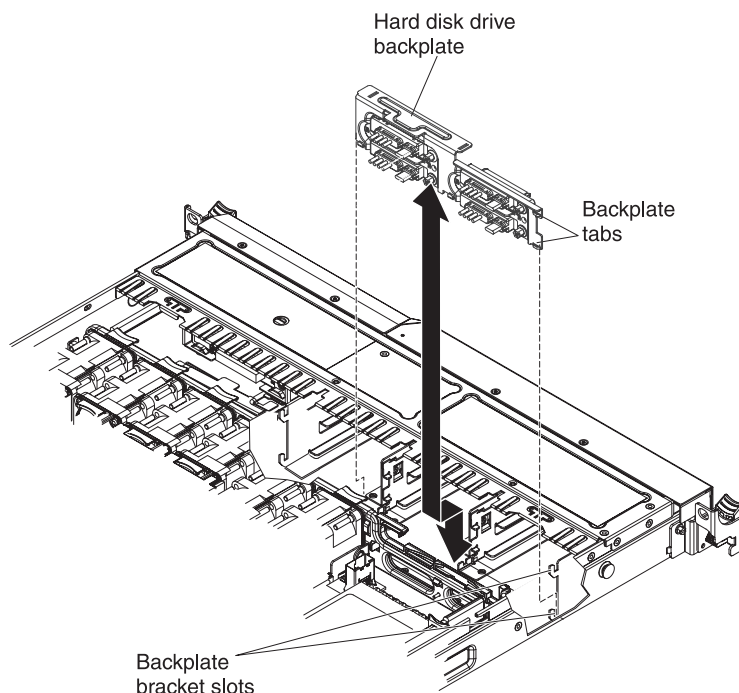
3. Insert the hard disk drive backplate tabs into the slots on the backplate bracket
   and push the hard disk drive backplate assembly down and to the left until the
   backplate is seated firmly.

4. Connect the power and signal cables to the system board. Route the power
   cable from the drive backplate through the hole on the right of the blue adapter
   retention bracket and connect it to the **Simple-swap SATA power connector**
   (see "System-board internal connectors" on page 16); then, route the signal
   cable from the drive backplate over the blue adapter retention bracket and
   connect it to the **Simple-swap SATA signal connector**, as shown in the
   following illustration.

Simple-swap
SATA signal
cable

Simple-swap
SATA power
cable
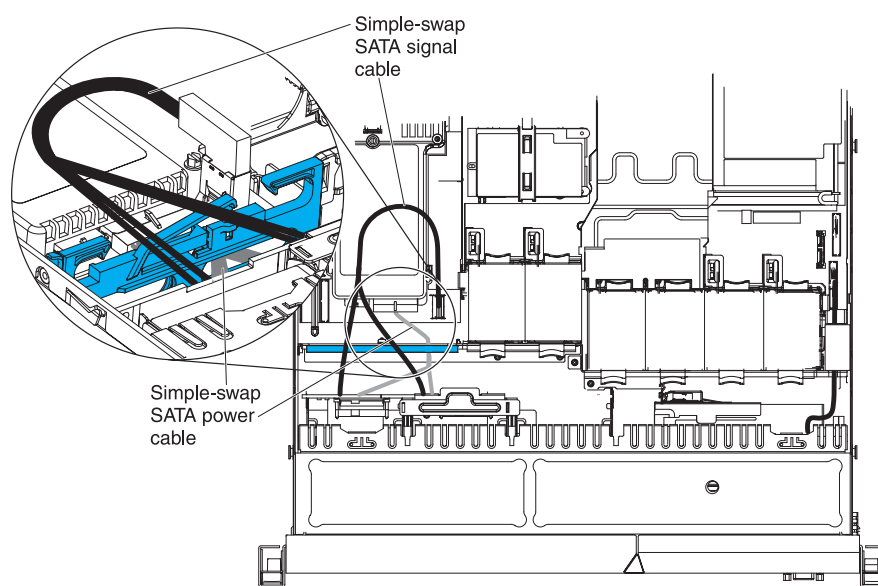
5. Reinstall the hard disk drives and filler panels.

6. Install the cover (see "Installing the cover" on page 166).

7. Slide the server into the rack.

8. Reconnect the power cords and any cables that you removed.

9. Turn on the peripheral devices and the server.

Removing the operator information panel assembly

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

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Turn off the server and peripheral devices and disconnect all power cords; then, remove the cover (see "Removing the cover" on page 166).

3. Disconnect the cable from the back of the operator information panel assembly.

4. Use an object to push down on the release tab; hold down the release tab and push the blue push point on the rear of the panel to the front of the server.

Release tab

Operator information
panel
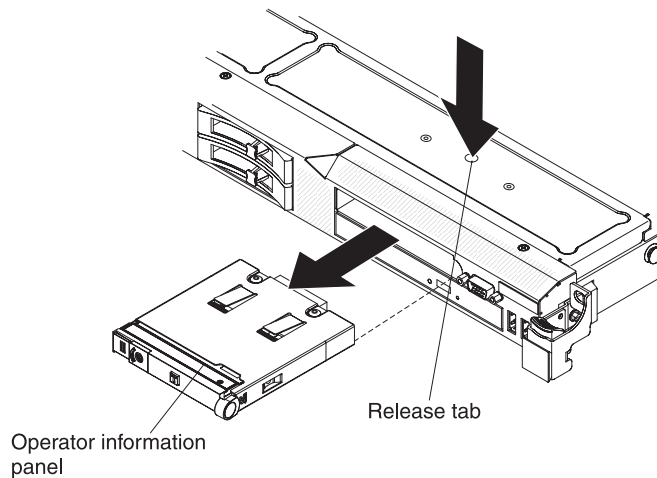
5. From the front of the server, carefully pull the assembly out of the server while you move it slightly from side to side.

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 operator information panel, complete the following steps.

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. From the front of the server, slide the operator information panel into the server until it clicks into place.

3. Inside the server, connect the cable to the rear of the operator information panel assembly.

Release tab

Operator information
panel
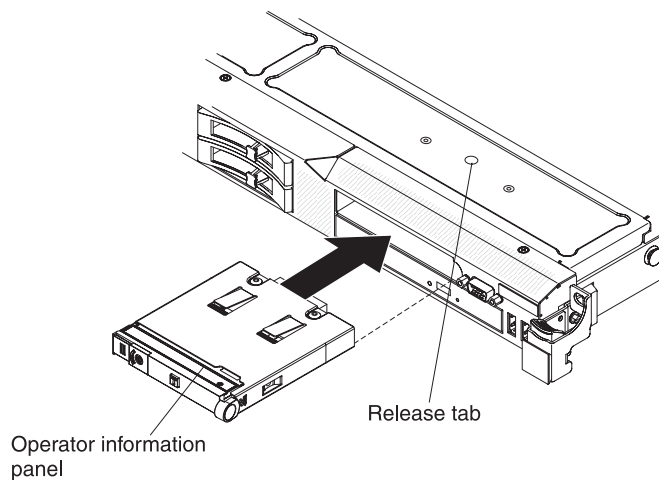
The following illustration shows the cable routing for the operator information
panel:

Note: The operation information panel cable should go in between the
Video/USB cable (on the bottom) and the CD/DVD cable (on the top) when all
three cables are installed in the server.

Operator information
panel connector

Operator information
panel cable

4. Install the cover (see "Installing the cover" on page 166).
5. Slide the server into the rack.
6. Reconnect the power cords and any cables that you removed.
7. Turn on the peripheral devices and the server.

Removing and replacing FRUs

FRUs must be replaced or installed only by trained service technicians.

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

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 163.
2. Turn off the server and peripheral devices and disconnect all power cords; then, remove the cover (see "Removing the cover" on page 166).
3. Remove the SAS/SATA riser-card assembly (see "Removing a PCI riser-card assembly" on page 216).
4. Remove the screw from the safety cover.
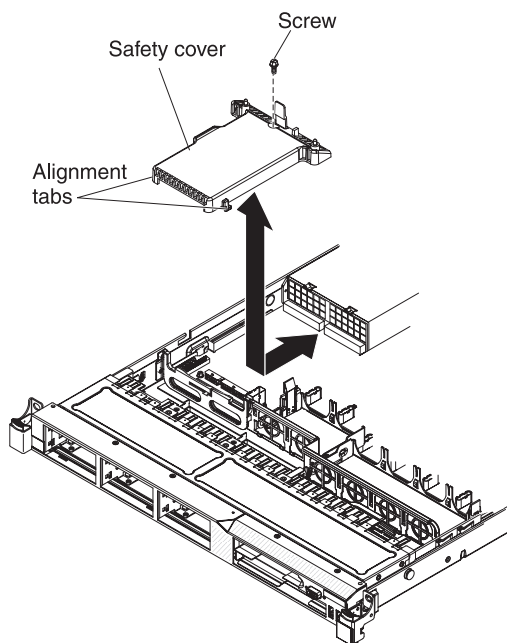
5. Disconnect the hard disk drive backplane cables from the connector on the front of the safety cover.
6. Slide the safety cover forward to disengage it from the system board, then lift it out of the server.
7. If you are instructed to return the safety cover, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the 240 VA safety cover

To install the 240 VA safety cover, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Align the tabs on the bottom of the safety cover with the slots on the system board and lower the safety cover into the system board.
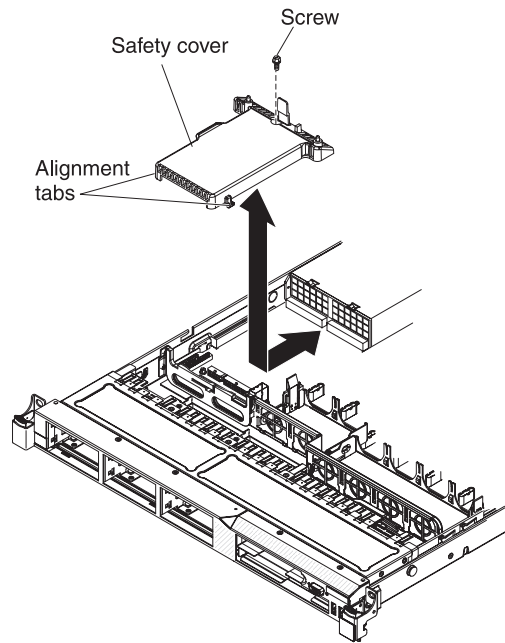
3. Slide the safety cover toward the back of the server until it is secure.
4. Connect the hard disk drive backplane cables into the connector in front of the safety cover.
5. Install the screw to secure the safety cover.
6. Install the SAS/SATA riser-card assembly (see"Installing the SAS/SATA RAID riser-card assembly" on page 174).
7. Install the cover (see "Installing the cover" on page 166).
8. Slide the server into the rack.
9. Reconnect the power cords and any cables that you removed.
10. Turn on the peripheral devices and the server.

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.
- 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 and "Installation guidelines" on page 163.
2. Turn off the server and peripheral devices and disconnect all power cords; then, remove the cover (see "Removing the cover" on page 166).
3. Disconnect any cables that impede access to the heat sink and microprocessor.
4. Open the heat sink release lever to the fully open position.
5. Lift the heat sink out of the server. After removal, place the heat sink on its side on a clean, flat surface.

Lock tab

Retainer bracket

Heat sink release lever
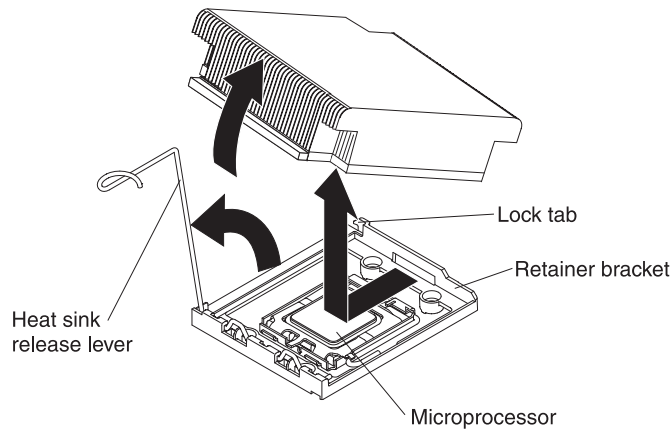
Microprocessor

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

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

Microprocessor

Microprocessor bracket frame

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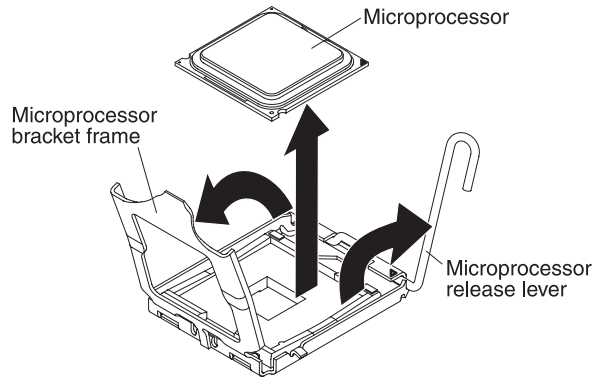
8. Carefully lift the microprocessor straight up and out of the socket, and place it on a static-protective surface.

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

Installing a microprocessor and heat sink

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

- The server supports up to two Intel Xeon® dual-core or quad-core microprocessors. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported microprocessors.

- Do not mix dual-core and quad-core microprocessors in the same server.

- The upgrade of microprocessors are not supported on this server. For example, if the server came with a 2.0 GHz microprocessor, you cannot upgrade the microprocessor to a 2.3 GHz microprocessor, it is not supported.

- The first microprocessor must always be installed in microprocessor socket 1 on the system board.

- When one microprocessor is installed, a heat sink filler is not required for microprocessor socket 2, however, the microprocessor 2 air baffle and the DIMM air baffle must be installed to provide proper system cooling.

- Do not remove the first microprocessor from the system board when you install the second microprocessor.
- When you install the second microprocessor, you must also install additional memory. See "Installing a memory module" on page 185 for details about the installation sequence.
- To ensure proper server operation when you install an additional microprocessor, use microprocessors that have the same QuickPath Interconnect (QPI) link speed, integrated memory controller frequency, core frequency, power segment, internal cache size, and type.
- Mixing microprocessors of different stepping levels within the same server model is supported.
- When mixing microprocessors with different stepping levels within the same server model, you do not have to install the microprocessor with lowest stepping level and features in microprocessor socket 1.
- Both microprocessor voltage regulator modules are integrated on the system board.
- If you have to replace a microprocessor, call for service.
- Read the documentation that comes with the microprocessor, so that you can determine whether you have to update the server firmware. To download the latest level of server firmware and other code updates for your server, complete the following steps:
  1. Go to http://www.ibm.com/systems/support/.
  2. Under **Product support**, click **System x**.
  3. Under **Popular links**, click **Software and device drivers**.
  4. Click **IBM System x3550 M2** to display the matrix of downloadable files for the server.
- The microprocessor speeds are automatically set for this server; therefore, you do not have to set any microprocessor frequency-selection jumpers or switches.
- If the thermal-grease protective cover (for example, a plastic cap or tape liner) is removed from the heat sink, do not touch the thermal grease on the bottom of the heat sink or set down the heat sink. For more information about applying or working with thermal grease, see "Thermal grease" on page 229.

  Note: Removing the heat sink from the microprocessor destroys the even distribution of the thermal grease and requires replacing the thermal grease.
- To order an additional optional microprocessor, contact your IBM marketing representative or authorized reseller.

To install an additional microprocessor and heat sink, complete the following steps:

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see "Handling static-sensitive devices" on page 165.

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Install the microprocessor:
   a. Press down and out on the release lever on microprocessor socket and lift up the microprocessor release lever until it stops in the fully open position.

b. Lift the hinged microprocessor bracket frame into an open position and remove the microprocessor dust cover, tape, or label from the surface of the microprocessor socket, if one is present. Store the dust cover in a safe place.

   Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see "Handling static-sensitive devices" on page 165.

c. Touch the static-protective package that contains the new microprocessor to any *unpainted* metal surface on the server; then, remove the microprocessor from the package.

   Attention:

   - 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.
   - 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.

d. Align the microprocessor with the socket (note the alignment mark and the position of the notches); then, carefully place the microprocessor on the socket and close the microprocessor bracket frame.

   Note: The microprocessor fits only one way on the socket.
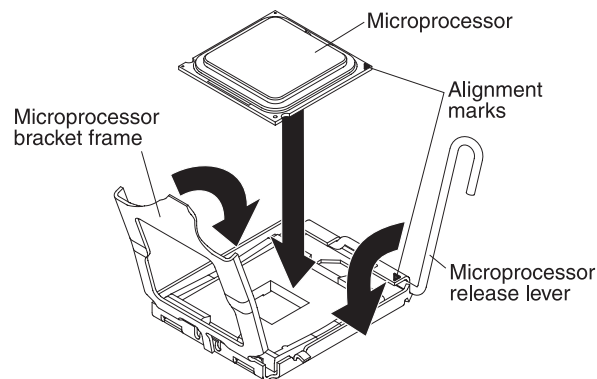
e. Carefully close the microprocessor release lever to the closed position to secure the microprocessor in the socket.

3. Install the heat sink:

   a. Clean the grease from the heat sink and apply new grease on the microprocessor.
   b. Align the heat sink on top of the microprocessor.
   c. Lower the rear flange of the heat sink into the opening in the retainer bracket and press down firmly on the front of the heat sink until it is seated securely.

Lock tab

Retainer bracket

Heat sink
release lever
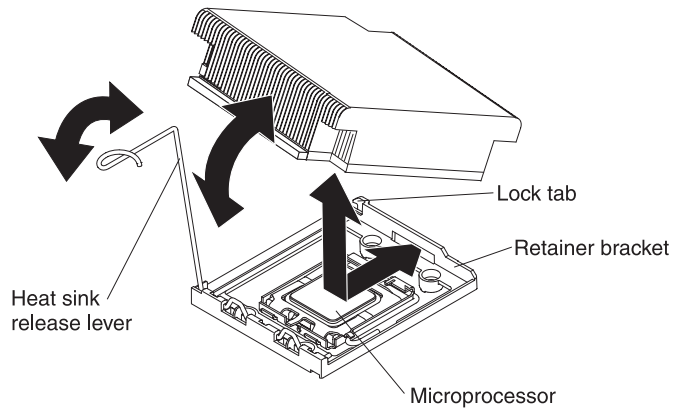
Microprocessor

    d. Rotate the heat-sink release lever to the closed position and hook it underneath the lock tab.

4. If you removed the microprocessor 2 air baffle, install it (see "Installing the microprocessor 2 air baffle" on page 168).

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.

When you are installing the heat sink on the same microprocessor that is was removed from, make sure that the following requirements are met:

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

Note:

- Read the Safety information on page vii.
- Read the "Installation guidelines" on page 163.
- Read "Handling static-sensitive devices" on page 165.

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

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

    Note: Make sure that all of the thermal grease is removed.

4. Use a clean area of the cleaning pad to wipe the thermal grease from the microprocessor; then, dispose of the cleaning pad after all of the thermal grease is removed.
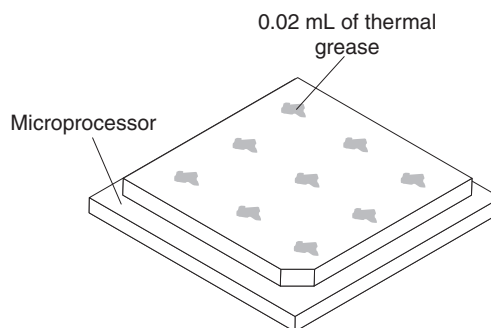
5. Use the thermal-grease syringe to place 9 uniformly spaced dots of 0.02 mL each on the top of the microprocessor. The outermost dots must be within approximately 5 mm of the edge of the microprocessor; this is to ensure uniform distribution of the grease.
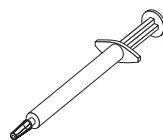
   Note: If the grease is properly applied, approximately half of the grease will remain in the syringe.
6. Install the heat sink onto the microprocessor as described in "Installing a microprocessor and heat sink" on page 226.

Removing the 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 163.
2. Turn off the server and any attached devices.
3. Turn off the peripheral devices and disconnect all power cords; then, remove the cover (see "Removing the cover" on page 166).
4. Remove the applicable air baffle.
5. Remove the microprocessor and heat sink (see "Removing the microprocessor 2 air baffle" on page 167).

   Attention: When you remove a microprocessor and heat sink, be sure to keep each heat sink with its microprocessor for reinstallation.
6. Use a screwdriver and remove the four screws that secure the retention module to the system board; then, lift the retention module from the system board.
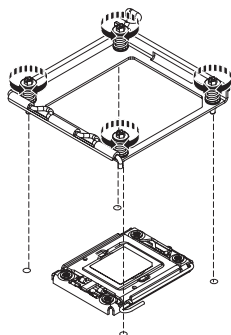
7. If you are instructed to return the heat sink retention module, follow all the packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a heat sink retention module

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

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Align the retention module with the holes on the system board.
3. Use a screwdriver to reinstall the four screws that you removed earlier.
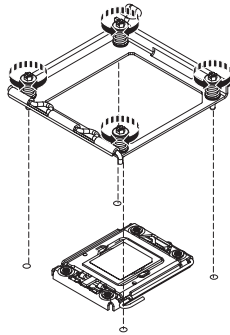
4. Reinstall the microprocessor and heat sink (see "Installing a microprocessor and heat sink" on page 226).
5. Reinstall the air baffle.
6. Install the cover (see "Installing the cover" on page 166).
7. Slide the server into the rack.
8. Reconnect the power cords and any cables that you removed.
9. Turn on the peripheral devices and the server.

Removing the system board

To remove the system board, complete the following steps.

Notes:

1. When you replace the system board, make sure that you remove the virtual media key and place it on the new system board. For information about the location of the key, see "Removing the virtual media key" on page 204.
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.

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.
2. Turn off the server and any attached devices.
3. Turn off the peripheral devices and disconnect all power cords; then, remove the cover (see "Removing the cover" on page 166).

   Note: 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.

4. Remove all PCI riser-card assemblies and adapters (see "Removing a PCI riser-card assembly" on page 216 and "Removing an adapter" on page 170).

5. Remove the SAS/SATA RAID riser-card assembly and then remove the base (see "Removing an IBM ServeRAID-BR10i SAS/SATA Controller" on page 190).

6. Remove the microprocessor 2 and DIMM air baffles from the system board (see "Removing the microprocessor 2 air baffle" on page 167 and "Removing the DIMM air baffle" on page 168).

7. Remove all heat sinks and microprocessors, and set them aside on a static-protective surface for reinstallation (see "Removing a microprocessor and heat sink" on page 225).

8. Remove the memory modules and set them aside on a static-protective surface for reinstallation (see "Removing a memory module" on page 185).

   Note: Make a note of the location of each DIMM as you remove it, so that you can later reinstall it in the same connector.

9. Remove the virtual media key from the system board and set it aside. You will have to install the virtual media key on the new system board.

10. Disconnect all cables from the system board. Make a list of each cable as you disconnect it; you can then use this as a checklist when you install the new system board.

11. Remove the hot-swap fans (see "Removing a hot-swap fan assembly" on page 201).

12. Press the fan brackets release latches (one is to the left of fan 6 and one is to the right of fan 1) inward toward the fans and rotate the fan assembly brackets up toward the front of the server.

13. Grasp the system board handle and lift up the right side of the system board slightly so that it disengages from the locator pin; then, slide the system board slightly toward the left of the server.

System board handle

Fan assembly bracket
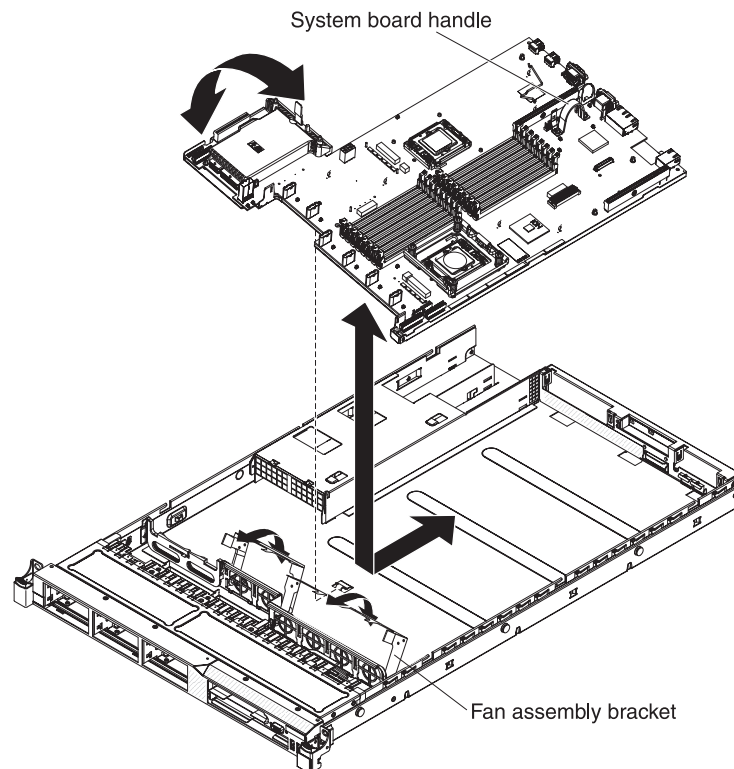
14. Lift up the system board and carefully remove it from the server, being careful not to damage any surrounding components.

15. Remove the socket covers from the microprocessor sockets on the new system board and place them on the microprocessor sockets of the old system board that you are removing.

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

Installing the system board

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.

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 237, "Updating the Universal Unique Identifier (UUID)" on page 256, and "Updating the DMI/SMBIOS data" on page 258 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

To install the system board, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 163.

2. Align the system board with the chassis; then, lower the system board into the chassis and slide the system board toward the rear of the server until the system board is seated firmly into the locator pins on the chassis.

System board handle

Fan assembly bracket
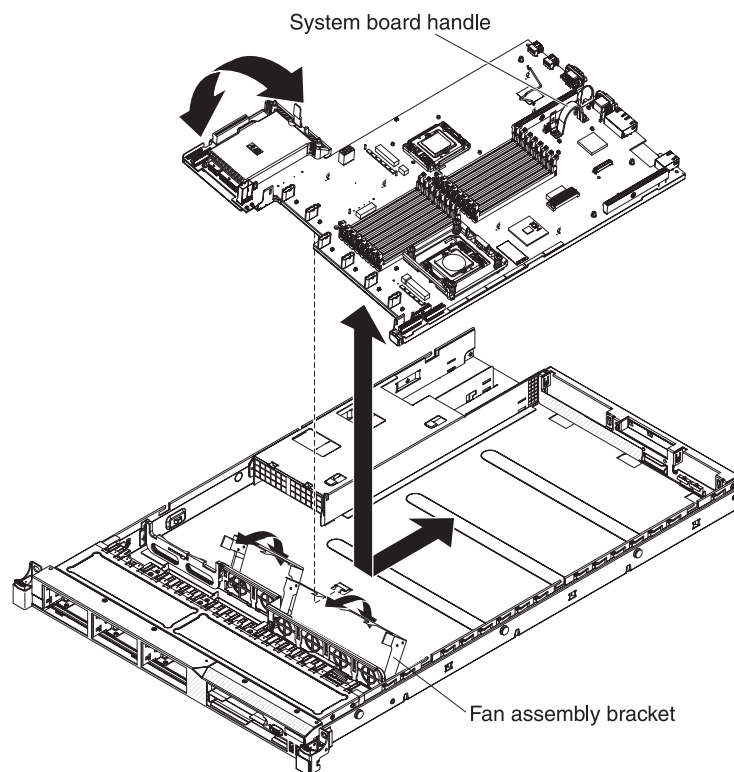
3. Grasp the fan assembly brackets and rotate them down toward the chassis.

4. Reinstall the hot-swap fans (see "Installing a hot-swap fan assembly" on page 203).

5. Reinstall the microprocessor and heat sink (see "Installing a microprocessor and heat sink" on page 226).

6. Reinstall the SAS/SATA RAID riser-card assembly base (see "Installing a PCI riser-card assembly" on page 217).

7. Reinstall the DIMMs (see "Installing a memory module" on page 185).

8. Reinstall the microprocessor 2 and DIMM air baffles (see "Installing the microprocessor 2 air baffle" on page 168 and "Installing the DIMM air baffle" on page 169).

9. Reinstall the PCI riser-card assemblies and adapters, if any were installed (see "Installing a PCI riser-card assembly" on page 217 and "Installing an adapter" on page 171).

10. Reinstall the virtual media key (see "Installing the virtual media key" on page 204).

11. Reconnect to the system board the cables that you disconnected in step 11 of "Removing the system board" on page 231.

12. Install the cover (see "Installing the cover" on page 166).

13. Slide the server into the rack.

14. Reconnect the power cords and any cables that you removed.

15. Turn on the peripheral devices and the server.

Important: Perform the following updates:

- Either update the server with the latest RAID firmware or restore the pre-existing firmware from a diskette or CD image.

- Update the UUID (see "Updating the Universal Unique Identifier (UUID)" on page 256).
- Update the DMI/SMBIOS (see "Updating the DMI/SMBIOS data" on page 258).

Chapter 5. Configuration information and instructions

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

Updating the firmware

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

The firmware for the server is periodically updated and is available for download on the IBM Web site. To check for the latest level of firmware, such as the server firmware, vital product data (VPD) code, device drivers, and service processor firmware complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3550 M2** 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.

The following items are downloadable at http://www.ibm.com/systems/support/:
- Server firmware is stored in ROM on the system board.
- IMM firmware is stored in ROM on the system board.
- Ethernet firmware is stored in ROM on the Ethernet controller.
- ServeRAID firmware is stored in ROM on the ServeRAID adapter.
- SAS/SATA firmware is stored in ROM on the SAS/SATA controller on the system board.

Configuring the server

The *ServerGuide* program provides software-setup tools and installation tools that are designed for the server. Use this CD during the installation of the server to configure basic hardware features, such as an integrated SAS/SATA controller with RAID capabilities, and to simplify the installation of your operating system. For information about using this CD, see "Using the ServerGuide Setup and Installation CD" on page 239.

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

The Setup utility is part of the basic input/output system firmware. Use it to change 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 241.

- **Boot Manager program**

  The Boot Manager program is part of the server firmware. Use it to override the startup sequence that is set in the Setup utility and temporarily assign a device to be first in the startup sequence. For more information about using this program, see "Using the Boot Manager program" on page 248.

- **Integrated Management Module**

  Use the integrated management module (IMM) for configuration, to update the firmware and sensor data record/field replaceable unit (SDR/FRU) data, and to remotely manage a network. For information about using these programs, see "Using the integrated management module" on page 248.

- **VMware ESXi embedded hypervisor**

  The VMware ESXi embedded hypervisor is available on the server models that come with an installed USB embedded hypervisor flash device. The USB flash device is installed in the USB connector on the SAS/SATA RAID riser-card. Hypervisor is virtualization software that enables multiple operating systems to run on a host system at the same time. For more information about using the embedded hypervisor, see "Using the embedded hypervisor" on page 249.

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

  The remote presence and blue-screen capture feature are integrated into the Integrated Management Module (IMM). The virtual media key is required to enable the remote presence functions. When the optional virtual media key is installed in the server, it activates the remote presence functions. Without the virtual media key, you will not be able to access the network remotely to mount or unmount drives or images on the client system. However, you will still be able to access the host graphical user interface through the Web interface without the Virtual Media Key. You can order the 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 250.

- **Ethernet controller configuration**

  For information about configuring the Ethernet controller, see "Configuring the Gigabit Ethernet controller" on page 252.

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

  Use this program as an alternative to the Setup utility for modifying UEFI settings. Use the ASU program online or out of band to modify UEFI settings from the command line without the need to restart the server to access the Setup utility. For more information about using this program, see "IBM Advanced Settings Utility program" on page 254.

- **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 253.

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

Table 20. Server configuration and applications for configuring and managing RAID arrays

Server configuration	RAID array configuration (before operating system is installed)	RAID array management (after operating system is installed)
ServeRAID-BR10i adapter (LSI 1068) installed	LSI Utility (Setup utility, press Ctrl+C), ServerGuide	MegaRAID Storage Manager (for monitoring storage only)
ServeRAID-MR10i adapter (LSI 1078) installed	MegaRAID Storage Manager (MSM),, MegaRAID BIOS Configuration Utility (press C to start), ServerGuide	MegaRAID Storage Manager (MSM)

Using the ServerGuide Setup and Installation CD

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

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

ServerGuide features

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

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

The ServerGuide program performs the following tasks:
- Sets system date and time
- Detects the RAID adapter or controller and runs the SAS/SATA RAID configuration program
- Checks the microcode (firmware) levels of a ServeRAID adapter and determines whether a later level is available from the CD
- Detects installed hardware options and provides updated device drivers for most adapters and devices
- Provides diskette-free installation for supported Windows operating systems
- Includes an online readme file with links to tips for your hardware and operating-system installation

Setup and configuration overview

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

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 x3550 M2**.

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

Using the Setup utility

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

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

Starting the Setup utility

To start the Setup utility, complete the following steps:

1. Turn on the server.

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

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

3. Select settings to view or change.

Setup utility menu choices

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

- **System Information**

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

    – **System Summary**

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

    – **Product Data**

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

    This choice is on the full Setup utility menu only.

- **System Settings**

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

  – **Processors**

    Select this choice to view or change the processor settings.

  – **Memory**

    Select this choice to view or change the memory settings.

  – **Devices and I/O Ports**

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

    - **Rehook INT**

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

    - **Legacy Thunk Support**

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

  – **Integrated Management Module**

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

    - **POST Watchdog Timer**

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

    - **POST Watchdog Timer Value**

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

    - **Reboot System on NMI**

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

    - **Disallow commands on USB Interface**

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

    - **Network Configuration**

      Select this choice to view the system management network interface port, the IMM MAC address, the current IMM IP address, and host name; define the static IMM IP address, subnet mask, and gateway address, specify

whether to use the static IP address or have DHCP assign the IMM IP address, save the network changes, and reset the IMM.

- **Reset IMM to Defaults**

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

- **Reset IMM**

  Select this choice to reset IMM.

– **System Security**

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

– **Adapters and UEFI Drivers**

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

– **Network**

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

Note: The configuration forms for UEFI 2.1 and greater compliant add-on network devices might be located here.

– **Storage**

Select this choice to view or configure the storage device options.

Note: The configuration forms for UEFI 2.1 and greater compliant add-on storage devices might be located here.

– **Video**

Select this choice to view or configure the video device options.

Note: The configuration forms for UEFI 2.1 and greater compliant add-on video devices might be located here.

• **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, delete, or change the device boot priority, boot from a file, select a one-time boot, or reset the boot order to the default setting.

• **System Event Logs**

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

The system event logs contain all event and error messages that have been generated during POST, by the systems-management interface handler, and by the system service processor. Run the diagnostic programs to get more information about error codes that occur. See "Running the diagnostic programs" on page 111 for instructions on running the diagnostic programs.

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

– **POST Event Viewer**

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

– **System Event Log**

Select this choice to view the IMM system event log.

– **Clear System Event Log**

Select this choice to clear the IMM system event log.

• **User Security**

Select this choice to set, change, or clear passwords. See "Passwords" on page 245 for more information.

This choice is on the full and limited Setup utility menu.

– **Power-on Password**

Select this choice to set or change a power-on password. See "Power-on password" on page 245 for more information.

– **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 248.

• **Save Settings**

Select this choice to save the changes that you have made in the settings.

• **Restore Settings**

Select this choice to cancel the changes that you have made in the settings and restore the previous settings.

• **Load Default Settings**

Select this choice to cancel the changes that you have made in the settings and restore the factory settings.

• **Exit Setup**

Select this choice to exit from the Setup utility. If you have not saved the changes that you have made in the settings, you are asked whether you want to save the changes or exit without saving them.

Passwords

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

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

An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu. If you set only an administrator password, you do not have to type a password to complete the system startup, but you must type the administrator password to access the Setup utility menu.

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

Power-on password: If a power-on password is set, when you turn on the server, the system startup will not be completed until you type the power-on password. You can use any combination of up to seven characters (A - Z, a - z, and - 9) 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 system battery" on page 211 for instructions on removing the battery.
- **For the pass 8 level system board**, change the position of the power-on password switch (enable switch 5 of the system board switch block (SW3) to bypass the power-on password check (see Table 3 on page 19 for more information).
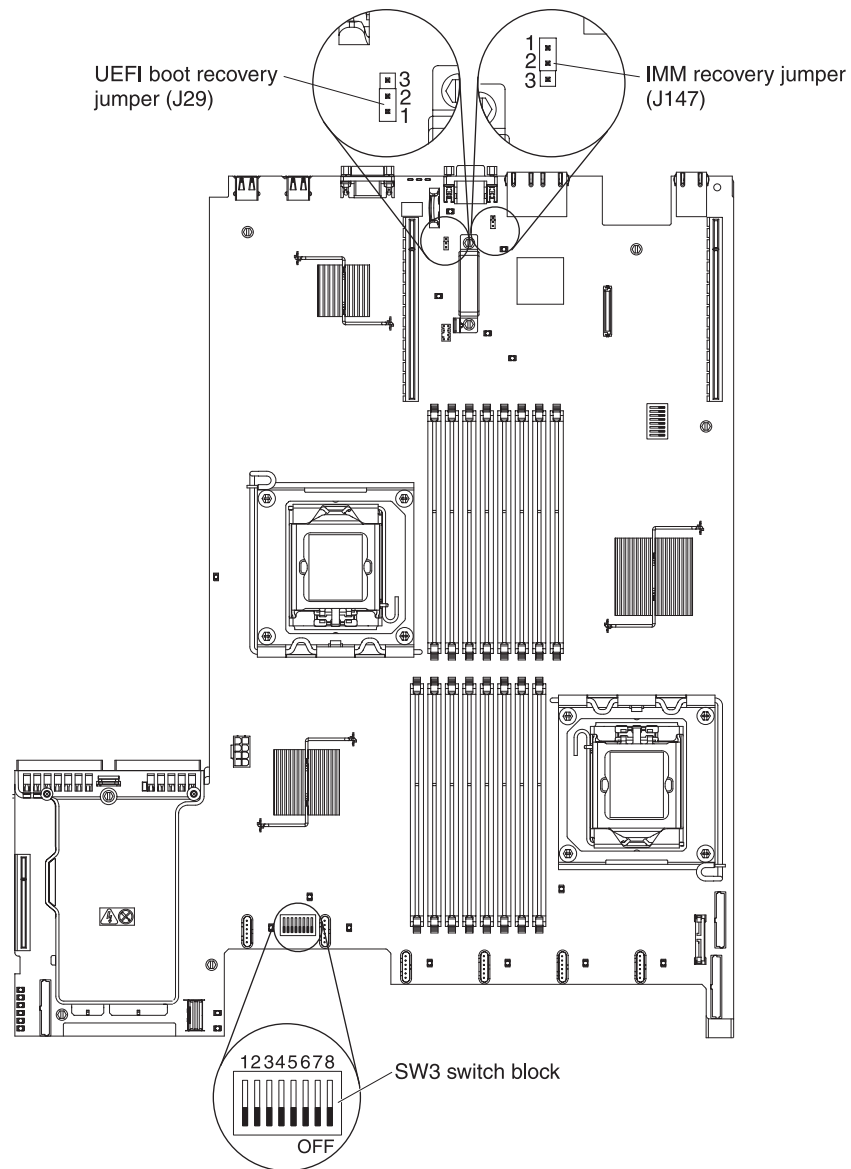
UEFI boot recovery jumper (J29)

IMM recovery jumper (J147)

SW3 switch block

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 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 (SW3) is Off.

While the server is turned off, move switch 5 of the switch block (SW3) 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.

- **For the pass 9 level system board**, 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 Table 6 on page 23 for more information). To determine if your system board is a pass 9 level system board,

you will see P9 (with a part number to the right of it) on the corner of the system board near the USB connectors on the rear of the server, as shown in the following illustration.

SW3 switch block   SW4 switch block
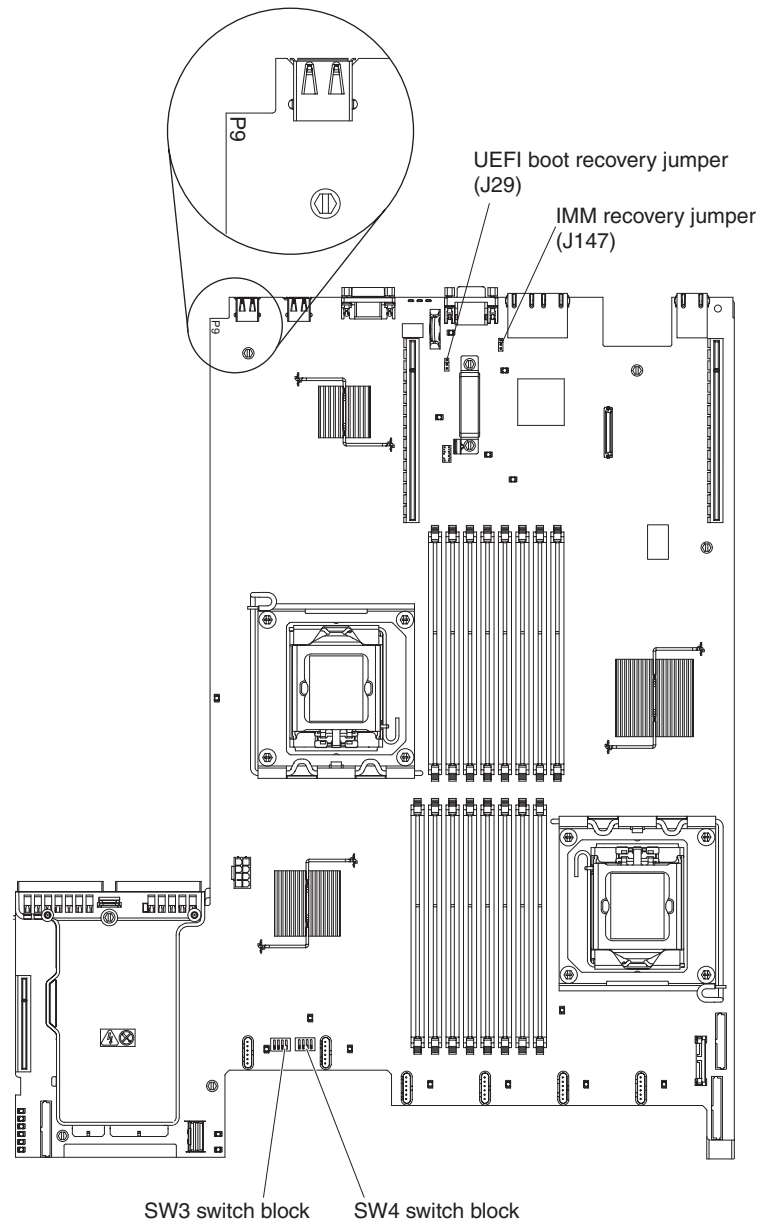
Attention: Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. See the safety information that begins on page vii. Do not change settings or move jumpers on any system-board switch or jumper blocks that are not shown in 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 up to seven characters (A - Z, a - z, and 0 - 9) for the password.

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

Using the Boot Manager program

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

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

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

Starting the backup server firmware

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

To force the server to start from the backup copy, turn off the server; then, place the 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 J29 jumper back to the primary position (pins 1 and 2).

Using the integrated management module

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

The IMM supports the following basic system management features:
- Environmental monitor with fan speed control for temperature, voltages, fan failure, and power supply failure.
- Light path diagnostics LEDs indicators to report errors that occur with fans, power supplies, microprocessor, hard disk drives, and system errors.
- DIMM error assistance. The Unified Extensible Firmware Interface (UEFI) disables a failing DIMM that is detected during POST, and the IMM lights the associated system error LED and the failing DIMM error LED.
- System event log (SEL).

- ROM-based IMM firmware flash updates.
- Auto Boot Failure Recovery (ABR).
- A virtual media key, which enables remote presence support (remote video, remote keyboard/mouse, and remote storage).
- Automatic microprocessor disable on failure and restart in a two-microprocessor configuration when one microprocessor signals an internal error.
- Nonmaskable interrupt (NMI) detection and reporting.
- Automatic Server Restart (ASR) when POST is not complete or the operating system hangs and the operating system watchdog timer times-out. The IMM might be configured to watch for the operating system watchdog timer and reboot the system after a timeout, if the ASR feature is enabled. Otherwise, the IMM allows the administrator to generate a nonmaskable interrupt (NMI) by pressing an NMI button on the light path diagnostics 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 port redirection over telnet or ssh.
- Serial over LAN (SOL).
- Active Energy Manager.
- Query power-supply input power.
- PECI 2 support.
- Power/reset control (power-on, hard and soft shutdown, hard and soft reset, schedule power control).
- Alerts (in-band and out-of-band alerting, PET traps - IPMI style, SNMP, e-mail).
- Operating-system failure blue screen capture.
- Command-line interface.
- Configuration save and restore.
- PCI configuration data.
- Boot sequence manipulation.

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

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

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

- **Serial over LAN**

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

Using the 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.

USB embedded hypervisor flash device connector
RAID adapter connector
Riser card error LED
SAS/SATA RAID riser-card
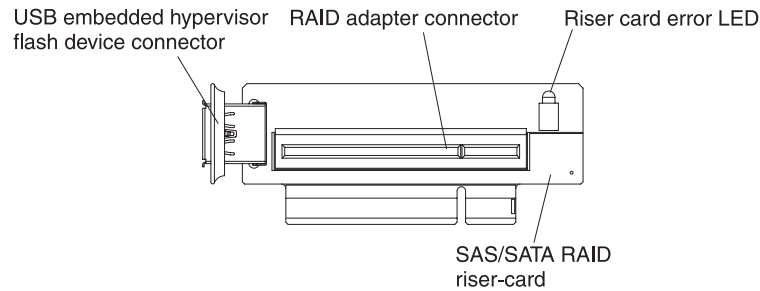
To start using the embedded hypervisor functions, you must add the USB flash device to the boot order in the Setup utility.

To add the USB flash device to the boot order, complete the following steps:

1. Turn on the server.

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

2. When the prompt `<F1> Setup` is displayed, press F1.
3. From the Setup utility main menu, select **Boot Manager**.
4. Select **Add Boot Option**; then, select **Embedded Hypervisor**. Press Enter, and then select Esc.
5. Select **Change Boot Order** and then select **Commit Changes**; then, press Enter.
6. Select **Save Settings** and then select **Exit Setup**.

If the embedded hypervisor flash device image becomes corrupt, you can use the *VMware Recovery* CD that comes with the system to recover the flash device image. To recover the flash device image, complete the following steps:

1. Turn on the server.

   Note: Approximately 1 to 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 the optional IBM Virtual Media Key is installed in the server, it activates the remote presence functions. The virtual media key is required to enable the integrated remote presence and blue-screen capture features. Without the virtual media key, you will not be able to access the network remotely to mount or unmount drives or images on the client system. However, you can still access the Web interface without the key.

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

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

The remote presence feature provides the following functions:
- Remotely viewing video with graphics resolutions up to 1280 x 1024 at 75 Hz, regardless of the system state
- Remotely accessing the server, using the keyboard and mouse from a remote client
- Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
- Uploading a diskette image to the IMM memory and mapping it to the server as a virtual drive

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

Enabling the remote presence feature

To enable the remote presence feature, complete the following steps:
1. Install the virtual media key into the dedicated slot on the system board (see "System-board optional device connectors" on page 26).
2. Turn on the server.

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

Obtaining the IP address for the IMM

To access the Web interface, you need the IP address for IMM. You can obtain the IMM IP address through the Setup utility. The server comes with a default IP address for the IMM of 192.168.70.125. To locate the IP address, complete the following steps:
1. Turn on the server.

   Note: Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active.
2. When the prompt `<F1> Setup` is displayed, press F1. (This prompt is displayed on the screen for only a few seconds. You must press F1 quickly.) If you have set both a power-on password and an administrator password, you must type the administrator password to access the full Setup utility menu.
3. From the Setup utility main menu, select **System Settings**.
4. On the next screen, select **Integrated Management Module**.
5. On the next screen, select **Network Configuration**.
6. Find the IP address and write it down.
7. Exit from the Setup utility.

Logging on to the Web interface

To log onto the Web interface to use the remote presence functions, complete the following steps:

1. Open a Web browser and in the **address** or **URL** field, type the IP address or host name of the IMM to which you want to connect.

   Note: The IMM defaults to DHCP. If a DHCP host is not available, the IMM assigns a static IP address of 192.168.70.125.

2. On the Login page, type the user name and password. If you are using the IMM for the first time, you can obtain the user name and password from your system administrator. All login attempts are documented in the event log.

   Note: The IMM is set initially with a user name of USERID and password of PASSW0RD (passw0rd with a zero, not a the letter O). You have read/write access. You must change the default password the first time you log on.

3. On the Welcome page, type a timeout value (in minutes) in the field that is provided. The IMM will log you off of the Web interface if your browser is inactive for the number of minutes that you entered for the timeout value.

4. Click **Continue** to start the session. The System Health page provides a quick view of the system status.

Enabling the 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. For device drivers and information about configuring the Ethernet controllers, see the *Broadcom NetXtreme II Gigabit Ethernet Software* CD that comes with the server. 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 x3550 M2** 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 the optional ServeRAID-MR10i SAS/SATA controller, it provides RAID levels 0, 1, 5, 6, 10, 50, and 60 support. If you install a different type of RAID adapter, follow the instructions in the documentation that comes with the adapter to view or change settings for attached devices.

In addition, you can download an LSI command-line configuration program from http://www.ibm.com/systems/support/.

When you are using the LSI Configuration Utility program to configure and manage arrays, consider the following information:

- The integrated SAS/SATA controller with RAID capabilities supports the following features:
  - Integrated Mirroring (IM) with hot-spare support (also known as RAID 1)

    Use this option to create an integrated array of two disks plus up to two optional hot spares. All data on the primary disk can be migrated.
  - Integrated Mirroring Enhanced (IME) with hot-spare support (also known as RAID 1E)

    Use this option to create an integrated mirror enhanced array of three to eight disks, including up to two optional hot spares. All data on the array disks will be deleted.
  - Integrated Striping (IS) (also known as RAID 0)

    Use this option to create an integrated striping array of two to eight disks. All data on the array disks will be deleted.
- Hard disk drive capacities affect how you create arrays. The drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.
- If you use an integrated SAS/SATA controller with RAID capabilities to configure a RAID 1 (mirrored) array after you have installed the operating system, you will lose access to any data or applications that were previously stored on the secondary drive of the mirrored pair.
- If you install a different type of RAID controller, see the documentation that comes with the controller for information about viewing and changing settings for attached devices.

Starting the LSI Configuration Utility program

To start the LSI Configuration Utility program, complete the following steps:

1. Turn on the server.

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

2. When the prompt `<F1 Setup>` is displayed, press F1. If you have set an administrator password, you are prompted to type the password.

3. Select **System Settings → Adapters and UEFI drivers**.

4. Select **Please refresh this page on the first visit** and press Enter.

5. Select **LSI** *controller_driver_name Driver* and press Enter, where *controller_driver_name* is the name of the SAS/SATA controller driver. For the SAS/SATA controller driver name, see the documentation that comes with your controller.

6. To perform storage-management tasks, follow the procedures in the documentation that comes with the SAS/SATA controller.

When you have finished changing settings, press Esc to exit from the program; select **Save** to save the settings that you have changed.

Formatting a hard disk drive

Low-level formatting removes all data from the hard disk. If there is data on the disk that you want to save, back up the hard disk before you perform this procedure.

Note: Before you format a hard disk, make sure that the disk is not part of a mirrored pair.

To format a drive, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drive that you want to format and press Enter.

2. Select **SAS Topology** and press Enter.

3. Select **Direct Attach Devices** and press Enter.

4. To highlight the drive that you want to format, use the Up Arrow and Down Arrow keys. To scroll left and right, use the Left Arrow and Right Arrow keys or the End key. Press Alt+D.

5. To start the low-level formatting operation, select **Format** and press Enter.

Creating a RAID array of hard disk drives

To create a RAID array of hard disk drives, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drives that you want to mirror.

2. Select **RAID Properties**.

3. Select the type of array that you want to create.

4. Use the arrow keys to highlight the first drive in the pair; then, press the Minus (-) or Plus (+) key to change the mirror value to **Primary**.

5. Continue to select the next drive using the Minus (-) or Plus (+) key until you have selected all the drives for your array.

6. Press C to create the disk array.

7. Select **Apply changes and exit menu** to create the array.

IBM Advanced Settings Utility program

The IBM Advanced Settings Utility (ASU) program is an alternative to the Setup utility for modifying UEFI settings. Use the ASU program online or out of band to modify UEFI settings from the command line without the need to restart the system to access the Setup utility.

You can also use the ASU program to configure the optional remote presence features or other IMM settings. The remote presence features provide enhanced systems-management capabilities.

In addition, the ASU program provides limited settings for configuring the IPMI function in the IMM through the command-line interface.

Use the command-line interface to issue setup commands. You can save any of the settings as a file and run the file as a script. The ASU program supports scripting environments through a batch-processing mode.

For more information and to download the ASU program, go to http://www.ibm.com/systems/support/.

Updating IBM Systems Director

If you plan to use IBM Systems Director to manage the server, you must check for the latest applicable IBM Systems Director updates and interim fixes.

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

To locate and install a newer version of IBM Systems Director, complete the following steps:
1. Check for the latest version of IBM Systems Director:
    a. Go to http://www.ibm.com/systems/management/director/downloads.html.
    b. If a newer version of IBM Systems Director than what comes with the server is shown in the drop-down list, follow the instructions on the Web page to download the latest version.
2. Install the IBM Systems Director program.

If your management server is connected to the Internet, to locate and install updates and interim fixes, complete the following steps:
1. Make sure that you have run the Discovery and Inventory collection tasks.
2. On the Welcome page of the IBM Systems Director Web interface, click **View updates**.
3. Click **Check for updates**. The available updates are displayed in a table.
4. Select the updates that you want to install, and click **Install** to start the installation wizard.

If your management server is not connected to the Internet, to locate and install updates and interim fixes, complete the following steps:
1. Make sure that you have run the Discovery and Inventory collection tasks.
2. On a system that is connected to the Internet, go to http://www.ibm.com/eserver/support/fixes/fixcentral/.
3. From the **Product family** list, select **IBM Systems Director**.
4. From the **Product** list, select **IBM Systems Director**.
5. From the **Installed version** list, select the latest version, and click **Continue**.
6. Download the available updates.
7. Copy the downloaded files to the management server.
8. On the management server, on the Welcome page of the IBM Systems Director Web interface, click the **Manage** tab, and click **Update Manager**.

9. Click **Import updates** and specify the location of the downloaded files that you copied to the management server.

10. Return to the Welcome page of the Web interface, and click **View updates**.

11. Select the updates that you want to install, and click **Install** to start the installation wizard.

Updating the Universal Unique Identifier (UUID)

The Universal Unique Identifier (UUID) must be updated when the system board is replaced. Use the Advanced Settings Utility to update the UUID in the UEFI-based server. The ASU is an online tool that supports several operating systems. Make sure that you download the version for your operating system. You can download the ASU from the IBM Web site. To download the ASU and update the UUID, complete the following steps.

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

1. Download the Advanced Settings Utility (ASU):

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

   b. Under Product support, select **System x**.

   c. Under Popular links, select **Tools and utilities**.

   d. In the left pane, click **System x and BladeCenter Tools Center**.

   e. Scroll down and click **Tools reference**.

   f. Scroll down and click the plus-sign (+) for Configuration tools to expand the list; then, select **Advanced Settings Utility (ASU)**.

   g. In the next window under Related Information, click the **Advanced Settings Utility** link and download the ASU version for your operating system.

2. ASU sets the UUID in the Integrated Management Module (IMM). Select one of the following methods to access the Integrated Management Module (IMM) to set the UUID:

   • Online from the target system (LAN or keyboard console style (KCS) access)

   • Remote access to the target system (LAN based)

   • Bootable media containing ASU (LAN or KCS, depending upon the bootable media)

     Note: IBM provides a method for building a bootable media. You can create a bootable media using the Bootable Media Creator (BoMC) application from the Tools Center Web site. In addition, the Windows and Linux based tool kits are also available to build a bootable media. These tool kits provide an alternate method to creating a Windows Professional Edition or Master Control Program (MCP) based bootable media, which will include the ASU application.

3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:

   • For Windows based operating systems:

     – ibm_rndis_server_os.inf

     – device.cat

   • For Linux based operating systems:

     – cdc_interface.sh

4. After you install ASU, use the following command syntax to set the UUID:

   `asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> [access_method]`

   Where:

   <uuid_value>
   > Up to 16-byte hexadecimal value assigned by you.

   [access_method]
   > The access method that you selected to use from the following methods:

   - Online authenticated LAN access, type the command:

     `[host <imm_internal_ip>] [user <imm_user_id>][password <imm_password>]`

     Where:

     imm_internal_ip
     > The IMM internal LAN/USB IP address. The default value is 169.254.95.118.

     imm_user_id
     > The IMM `account` (1 of 12 accounts). The default value is USERID.

     imm_password
     > The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

     Note: If you do not specify any of these parameters, ASU will use the default values. When the default values are used and ASU is unable to access the IMM using the online authenticated LAN access method, ASU will automatically use the unauthenticated KCS access method.

     The following commands are examples of using the userid and password default values and not using the default values:

     Example that does not use the userid and password default values:
     `asu set SYSTEM_PROD_DATA.SYsInfoUUID <uuid_value> --user <user_id> --password <password>`

     Example that does use the userid and password default values:
     `asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>`

   - Online KCS access (unauthenticated and user restricted):

     You do not need to specify a value for *access_method* when you use this access method.

     Example:
     `asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>`

     The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver be installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer. See the *Advanced Settings Utility Users Guide* for more details. You can access the ASU Users Guide from the IBM Web site.

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

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

     b. Under Product support, select **System x**.

c. Under Popular links, select **Tools and utilities**.

   d. In the left pane, click **System x and BladeCenter Tools Center**.

   e. Scroll down and click **Tools reference**.

   f. Scroll down and click the plus-sign (+) for Configuration tools to expand the list; then, select **Advanced Settings Utility (ASU)**.

   g. In the next window under Related Information, click the **Advanced Settings Utility** link.

- Remote LAN access, type the command:

   Note: When using the remote LAN access method to access IMM using the LAN from a client, the *host* and the *imm_external_ip* address are required parameters.

   `host <imm_external_ip> [user <imm_user_id>][password <imm_password>]`

   Where:

   imm_external_ip
   > The external IMM LAN IP address. There is no default value. This parameter is required.

   imm_user_id
   > The IMM `account` (1 of 12 accounts). The default value is USERID.

   imm_password
   > The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

   The following commands are examples of using the userid and password default values and not using the default values:

   Example that does not use the userid and password default values:
   `asu set SYSTEM_PROD_DATA.SYsInfoUUID <uuid_value> --host <imm_ip> --user <user_id> --password <password>`

   Example that does use the userid and password default values:
   `asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> --host <imm_ip>`

- Bootable media:

   You can also build a bootable media using the applications available through the Tools Center Web site at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp. From the left pane, click **IBM System x and BladeCenter Tools Center**, then click **Tool reference** for the available tools.

5. Restart the server.

Updating the DMI/SMBIOS data

The Desktop Management Interface (DMI) must be updated when the system board is replaced. Use the Advanced Settings Utility to update the DMI in the UEFI-based server. The ASU is an online tool that supports several operating systems. Make sure that you download the version for your operating system. You can download the ASU from the IBM Web site. To download the ASU and update the DMI, complete the following steps.

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

1. Download the Advanced Settings Utility (ASU):

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

b. Under Product support, select **System x**.

c. Under Popular links, select **Tools and utilities**.

d. In the left pane, click **System x and BladeCenter Tools Center**.

e. Scroll down and click **Tools reference**.

f. Scroll down and click the plus-sign (+) for Configuration tools to expand the list; then, select **Advanced Settings Utility (ASU)**.

g. In the next window under Related Information, click the **Advanced Settings Utility** link and download the ASU version for your operating system.

2. ASU sets the DMI in the Integrated Management Module (IMM). Select one of the following methods to access the Integrated Management Module (IMM) to set the DMI:

- Online from the target system (LAN or keyboard console style (KCS) access)

- Remote access to the target system (LAN based)

- Bootable media containing ASU (LAN or KCS, depending upon the bootable media)

  Note: IBM provides a method for building a bootable media. You can create a bootable media using the Bootable Media Creator (BoMC) application from the Tools Center Web site. In addition, the Windows and Linux based tool kits are also available to build a bootable media. These tool kits provide an alternate method to creating a Windows Professional Edition or Master Control Program (MCP) based bootable media, which will include the ASU application.

3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:

- For Windows based operating systems:

  – ibm_rndis_server_os.inf

  – device.cat

- For Linux based operating systems:

  – cdc_interface.sh

4. After you install ASU, Type the following commands to set the DMI:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> [access_method]
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> [access_method]
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> [access_method]
```

Where:

<m/t_model>
      The server machine type and model number. Type `mtm xxxxyyy`, where *xxxx* is the machine type and *yyy* is the server model number.

<s/n>   The serial number on the server. Type `sn zzzzzzz`, where *zzzzzzz* is the serial number.

<asset_method>
      The server asset tag number. Type `asset aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa`, where *aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa* is the asset tag number.

[access_method]
      The access method that you select to use from the following methods:

- Online authenticated LAN access, type the command:

```
[host <imm_internal_ip>] [user <imm_user_id>][password
<imm_password>]
```

Where:

imm_internal_ip
> The IMM internal LAN/USB IP address. The default value is
> 169.254.95.118.

imm_user_id
> The IMM account (1 of 12 accounts). The default value is USERID.

imm_password
> The IMM account password (1 of 12 accounts). The default value is
> PASSW0RD (with a zero 0 not an O).

Note: If you do not specify any of these parameters, ASU will use the default
values. When the default values are used and ASU is unable to access the
IMM using the online authenticated LAN access method, ASU will
automatically use the following unauthenticated KCS access method.

The following commands are examples of using the userid and password
default values and not using the default values:

Examples that do not use the userid and password default values:
```
asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model>
--user <imm_user_id> --password <imm_password>
asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n> --user <imm_user_id>
--password <imm_password>
asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag>
--user <imm_user_id> --password <imm_password>
```

Examples that do use the userid and password default values:
```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n>
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>
```
- Online KCS access (unauthenticated and user restricted):

You do not need to specify a value for *access_method* when you use this
access method.

The KCS access method uses the IPMI/KCS interface. This method requires
that the IPMI driver be installed. Some operating systems have the IPMI
driver installed by default. ASU provides the corresponding mapping layer.
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.SYsInfoSerialNum <s/n>
asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag>
```
- Remote LAN access, type the command:

Note: When using the remote LAN access method to access IMM using the LAN from a client, the *host* and the *imm_external_ip* address are required parameters.

```
host <imm_external_ip> [user <imm_user_id>][password <imm_password>]
```

Where:

imm_external_ip

> The external IMM LAN IP address. There is no default value. This parameter is required.

imm_user_id

> The IMM account (1 of 12 accounts). The default value is USERID.

imm_password

> The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

The following commands are examples of using the userid and password default values and not using the default values:

Examples that do not use the userid and password default values:
```
asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model> --host <imm_ip>
--user <imm_user_id> --password <imm_password>
asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n> --host <imm_ip>
--user <imm_user_id> --password <imm_password>
asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag> --host <imm_ip>
--user <imm_user_id> --password <imm_password>
```

Examples that do use the userid and password default values:
```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> --host <imm_ip>
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --host <imm_ip>
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> --host <imm_ip>
```

- Bootable media:

  You can also build a bootable media using the applications available through the Tools Center Web site at http://publib.boulder.ibm.com/infocenter/toolsctr/ v1r0/index.jsp. From the left pane, click **IBM System x and BladeCenter Tools Center**, then click **Tool reference** for the available tools.

5. Restart the server.

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your system, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Problem Determination and Service Guide* on the IBM *Documentation* CD that comes with your system.
- Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with IBM systems also describes the diagnostic tests that you can perform. Most systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to http://www.ibm.com/systems/support/ and follow the instructions. Also, some documents are available through the IBM Publications Center at http://www.ibm.com/shop/publications/order/.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM systems, optional devices, services, and support. The address for IBM System x® and xSeries® information is http://www.ibm.com/systems/x/. The address for IBM BladeCenter® information is http://www.ibm.com/systems/bladecenter/. The address for IBM IntelliStation® information is http://www.ibm.com/intellistation/.

You can find service information for IBM systems and optional devices at
http://www.ibm.com/systems/support/.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage,
configuration, and software problems with System x and xSeries servers,
BladeCenter products, IntelliStation workstations, and appliances. For information
about which products are supported by Support Line in your country or region, see
http://www.ibm.com/services/sl/products/.

For more information about Support Line and other IBM services, see
http://www.ibm.com/services/, or see http://www.ibm.com/planetwide/ for support
telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV
(1-800-426-7378).

Hardware service and support

You can receive hardware service through your IBM reseller or IBM Services. To
locate a reseller authorized by IBM to provide warranty service, go to
http://www.ibm.com/partnerworld/ and click **Find a Business Partner** on the right
side of the page. For IBM support telephone numbers, see http://www.ibm.com/
planetwide/. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

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

IBM Taiwan product service

台灣 IBM 產品服務聯絡方式：
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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> *IBM Corporation*
> *North Castle Drive*
> *Armonk, NY 10504-1785*
> *U.S.A.*

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Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc., in the United States, other countries, or both and is used under license therefrom.

Intel, Intel Xeon, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc., in the United States, other countries, or both.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, and Windows NT are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other company, product, or service names may be trademarks or service marks of others.

Important notes

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

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

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

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

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

IBM makes no representation or warranties regarding non-IBM products and services that are ServerProven®, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Particulate contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server that is described in this document. Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the server to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If IBM determines that the levels of particulates or gases in your environment have caused damage to the server, IBM may condition provision of repair or replacement of servers or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 21. Limits for particulates and gases

Contaminant	Limits
Particulate	• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2[1]. • Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. • The deliquescent relative humidity of the particulate contamination must be more than 60%[2]. • The room must be free of conductive contamination such as zinc whiskers.
Gaseous	• Copper: Class G1 as per ANSI/ISA 71.04-1985[3] • Silver: Corrosion rate of less than 300 Å in 30 days
[1] ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.	
[2] The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.	
[3] ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.	

Documentation format

The publications for this product are in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when you use the PDF files and want to request a Web-based format or accessible PDF document for a publication, direct your mail to the following address:

Information Development
IBM Corporation
205/A015

3039 E. Cornwallis Road
P.O. Box 12195
Research Triangle Park, North Carolina 27709-2195
U.S.A.

In the request, be sure to include the publication part number and title.

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Electronic emission notices

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A statement

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

United Kingdom telecommunications safety requirement

Notice to Customers

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

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

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

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   Pascalstr. 100, Stuttgart, Germany 70569
   Telephone: 0049 (0)711 785 1176
   Fax: 0049 (0)711 785 1283
   E-mail: tjahn@de.ibm.com

Taiwanese Class A warning statement

警告使用者:
這是甲類的資訊產品,在
居住的環境中使用時,可
能會造成射頻干擾,在這
種情況下,使用者會被要
求採取某些適當的對策。

Germany Electromagnetic Compatibility Directive

Deutschsprachiger EU Hinweis:

Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der

IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung des EMVG ist die IBM Deutschland GmbH, 70548 Stuttgart.

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

People's Republic of China Class A warning statement

声　　明
此为 A 级产品。在生活环境中，
该产品可能会造成无线电干扰。
在这种情况下，可能需要用户对其
干扰采取切实可行的措施。

Japanese Voluntary Control Council for Interference (VCCI) statement

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。　　　VCCI-A

Korean Class A warning statement

이 기기는 업무용으로 전자파 적합등록을 받은 기기
이오니, 판매자 또는 사용자는 이점을 주의하시기
바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에
서 비업무용으로 교환하시기 바랍니다.

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