IBM System x3630 M3 Type 7377

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 261, the *IBM Safety Information* and *Environmental Notices and User Guide* documents on the *Documentation* CD, and the *Warranty Information* document.

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

Eighth Edition (June 2014)

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Guidelines for trained service technicians

This section contains information for trained service technicians.

Inspecting for unsafe conditions

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

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

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

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

1. Make sure that the power is off and the power cord is disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cord:
   - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
   - Make sure that the power cord is the correct type, as specified in “Power cords” on page 130.
   - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment

Observe the following guidelines when you service electrical equipment:

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

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

Safety statements

Important:

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

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

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

Statement 1:

DANGER

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

To avoid a shock hazard:

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

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

Statement 2:

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

Do not:

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

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

Statement 3:

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

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

DANGER

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

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

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

Statement 4:

≥ 18 kg (39.7 lb)

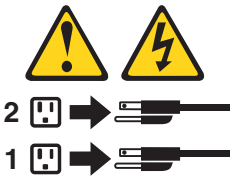
≥ 32 kg (70.5 lb)

≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 5:

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



Statement 8:

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

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

Statement 12:

CAUTION:
The following label indicates a hot surface nearby.

Statement 26:

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

Statement 27:

CAUTION:
Hazardous moving parts are nearby.

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

Chapter 1. Start here

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

Diagnosing a problem

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

1. **Determine what has changed.**

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

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

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

2. **Collect data.**

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

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

      - **System error codes:** See “POST error messages” on page 26 for information about error codes.
      - **Software or operating-system error codes:** See the documentation for the software or operating system for information about a specific error code. See the manufacturer's Web site for documentation.
      - **Operator information panel LEDs:** See “Front view” on page 10 for information about operator information panel LEDs that are lit.
      - **System-board LEDs:** See “System-board LEDs” on page 20 for information about system-board LEDs that are lit.

   b. **Collect system data.**

      Run Dynamic System Analysis (DSA) to collect information about the hardware, firmware, software, and operating system. Have this information available when you contact IBM or an approved warranty service provider. For instructions for running the DSA program, see “IBM Dynamic System Analysis” on page 59.

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

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

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 UEFI code, system firmware, device firmware, or device drivers that are not at the latest levels.

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

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

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

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

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

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

         a) Go to http://www.ibm.com/systems/support/.
         b) Under **Product support**, click **System x**.
         c) Under **Popular links**, click **Software and device drivers**.
         d) Click **System x3630 M3** to display the list of downloadable files for the server.

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

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

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

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

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

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

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

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

Many configuration problems are caused by loose power or signal cables or incorrectly seated adapters. You might be able to solve the problem by turning off the server, reconnecting cables, reseating adapters, and turning the server back on. For information about performing the checkout procedure, see “Checkout procedure” on page 38.

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 x3630 M3**.

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

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

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

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

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

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

3) From the **Product family** list, select **System x3630 M3**.

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

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

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

   If a hardware component is not operating within specifications, it can cause unpredictable results. Most hardware failures are reported as error codes in a system or operating-system log. For more information, see “Troubleshooting tables” on page 40 and Chapter 5, “Removing and replacing server components,” on page 133. Hardware errors are also indicated by light path diagnostics LEDs.

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

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

Undocumented problems

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

Chapter 2. Introduction

This *Problem Determination and Service Guide* contains information to help you solve problems that might occur in your IBM® System x3630 M3 Type 7377 server. It describes the diagnostic tools that come with the server, error codes and suggested actions, and instructions for replacing failing components.

Replaceable components are of four types:

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

For information about the terms of the warranty, see the printed *Warranty Information* document that comes with your server.

Related documentation

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

- *Installation and User's Guide*

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

  This printed document contains the warranty terms and a pointer to the IBM Statement of Limited Warranty on the IBM Web site.
- *Safety Information*

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

  This printed document contains instructions for installing the server in a rack.
- *Environmental Notices and User Guide*

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

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

- *Licenses and Attributions Documents*

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

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

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

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

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x3630 M3** and click **Continue**.

Notices and statements in this document

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

The following notices and statements are used in this document:

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

Features and specifications

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

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

Notes:

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

Table 1. Features and specifications

Microprocessor:
- Supports multi-core Intel Xeon microprocessors, with integrated memory controller and Quick Path Interconnect (QPI) architecture
- Designed for LGA 1366 socket
- Scalable up to six cores
- 32 KB instruction cache, 32 KB data cache, and up to 12 MB L3 cache that is shared among the cores
- Support for Intel Extended Memory 64 Technology (EM64T)

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

Memory:
- Twelve DIMM connectors (six per microprocessor)
- Minimum: 1 GB DIMM per microprocessor
- Maximum: 96 GB
- Type: PC3-10600-999 800, 1066, and 1333 MHz, ECC, DDR3 registered SDRAM DIMMs only
- Sizes: 1 GB single-rank, 2 GB single-rank or dual-rank, 4 GB single-rank or dual-rank, 8 GB dual-rank, and 16 GB quad-rank
- Chipkill supported

Expansion bays (depending on the model):
- Twelve 3.5-inch SAS/SATA hot-swap hard disk drive bays with option to add two more rear 3.5-inch SAS/SATA hot-swap hard disk drive bays
- Twenty-four 2.5-inch SAS/SATA hot-swap hard disk drive bays with option to add four more rear 2.5-inch SAS/SATA hot-swap hard disk drive bays

PCI Expansion slots: Supports three PCI expansion slots:
- One PCIe2 Express x16 slot, x8 electrical wired
- One PCIe2 Express x16 slot, x4 electrical wired
- One PCIe2 Express x8 slot, x8 electrical wired (internal only)

Integrated functions:
- Integrated management module (IMM), which provides service processor control and monitoring functions, video controller, and (when the optional virtual media key is installed) remote keyboard, video, mouse, and remote hard disk drive capabilities
- Integrated SATA controller
- Serial over LAN (SOL) and serial redirection over Telnet or Secure Shell (SSH)
- One systems-management RJ-45 10/100 Ethernet interface for connection to a dedicated systems-management network
- Support for remote management presence through an optional virtual media key
- One Intel dual-port 10/100/1000 Ethernet controller with Wake on LAN support; also support one port as share-nic for system-management
- One serial port, provided by the integrated management module (IMM)
- Five Universal Serial Bus (USB) ports (two on front, two on rear of server, and one internal for an optional USB flash device)
- One video port on rear of server
  Note: Maximum video resolution is 1600 x 1200 at 85 Hz.
- Support for optional hypervisor function

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

Video controller:
- Matrox G200eV video on system board
- Compatible with SVGA and VGA
- DDR2-250MHz SDRAM video memory controller
- Video memory is not expandable
- Avocent digital video compression

RAID (depending on the model):
- ServeRAID-M1015 SAS/SATA adapter that provides RAID levels 0, 1, and 10 with optional RAID 5 and SED (Self Encrypting Disk) upgrade
- Using ServeRAID-M1015 SAS/SATA adapter in 2.5-inch model with 28 hard disk drives, only 16 hard disk drives can be configured as RAID as rest of 12 hard disk drives are in JBOD state
- ServeRAID-M5014 SAS/SATA adapter that provides RAID levels 0, 1, 10, 5, and 50 with and RAID 6/60 and SED upgrade (256 MB cache, with optional battery backup)
- ServeRAID-M5015 SAS/SATA adapter that provides RAID levels 0, 1, 10, 5, and 50 with optional RAID 6/60 and SED upgrade (512 MB cache, with optional battery backup)

Environment:
- Air temperature:
  - Server on: 10°C to 35°C (50°F to 95°F); altitude: 0 to 915 m (3000 ft).
  - Server on: 10°C to 32°C (50°F to 90°F); altitude: 915 m (3000 ft) to 2134 m (7000 ft).
  - Server on: 10°C to 28°C (50°F to 83°F); altitude: 2134 m (7000 ft) to 3050 m (10000 ft).
  - Server off: 5°C to 45°C (41°F to 113°F)
  - Shipping: -40°C to 60°C (-40°F to 140°F)
- Humidity:
  - Server on: 20% to 80%; maximum dew point: 21°C; maximum rate of change: 5 °C/hr
  - Server off: 8% to 80%; maximum dew point: 27°C
  - Shipment: 5% to 100%
- Particulate contamination:

  Attention: Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. For information about the limits for particulates and gases, see “Particulate contamination” on page 263.

Table 1. Features and specifications (continued)

Electrical input with hot-swap ac power supplies: • Sine-wave input (50 - 60 Hz) required • Input voltage range automatically selected • Input voltage low range: – Minimum: 100 V ac – Maximum: 127 V ac • Input voltage high range: – Minimum: 200 V ac – Maximum: 240 V ac • Input kilovolt-amperes (kVA) approximately: – Minimum: 0.22 kVA – Maximum: 0.78 kVA	**Size:** • 2U • Height: 86.5 mm (3.406 in.) • Depth: – EIA flange to rear: 719.39 mm (28.32 in.) – Overall: 749.39 mm (29.5 in.) • Width: – With top cover: 447 mm (17.598 in.) – With front bezel: 487.995 mm (19.212 in.) • Weight: approximately 16.20 kg (35.64 lb) to 29.20 kg (64.24 lb) depending on your configuration **System fans:** Up to four **Hot-swap power supplies (depending on the model):** • Up to two hot-swap power supplies for redundancy support – 675-watt ac – 675-watt high-efficiency ac **Note:** You cannot mix high-efficiency and non-high-efficiency power supplies in the server.	**Acoustical noise emissions:** • Declared sound power, idle: 6.6 bel • Declared sound power, operating: 6.6 bel **Heat output:**Approximate heat output: • Minimum configuration: 762 Btu per hour (223 watts) • Maximum configuration: 2662 Btu per hour (780 watts)

EU Regulation 617/2013 Technical Documentation:

International Business Machines Corporation

New Orchard Road

Armonk, New York 10504 http://www.ibm.com/customersupport/

For more information on the energy efficiency program, go to http://www.ibm.com/systems/x/hardware/energy-star/index.html.

Product Type:

- Computer Server

Year first manufactured:

- 2010

Internal/external power supply efficiency:

- http://www.plugloadsolutions.com/psu_reports/IBM_7001578-XXXX_675W_SO-485_Report.pdf
- http://www.plugloadsolutions.com/psu_reports/ACBEL_FS9032-000G_675W_SO-210_Report.pdf

Maximum power (watts):

- See “Features and specifications” on page 7.

Idle state power (watts):

- 234

Sleep mode power (watts):

- Not applicable for servers.

Off mode power (watts):

- 15

Noise levels (the declared A-weighed sound power level of the computer):

- See “Features and specifications” on page 7.

Test voltage and frequency:

- 230V / 50 Hz or 60 Hz

Total harmonic distortion of the electricity supply system:

- The maximum harmonic content of the input voltage waveform will be equal or less than 2%. The qualification is compliant with EN 61000-3-2.

Information and documentation on the instrumentation set-up and circuits used for electrical testing:

- ENERGY STAR Test Method for Computer Servers; ECOVA Generalized Test Protocol for Calculating the Energy Efficiency of Internal Ac-Dc and Dc-Dc Power Supplies.

Measurement methodology used to determine information in this document:

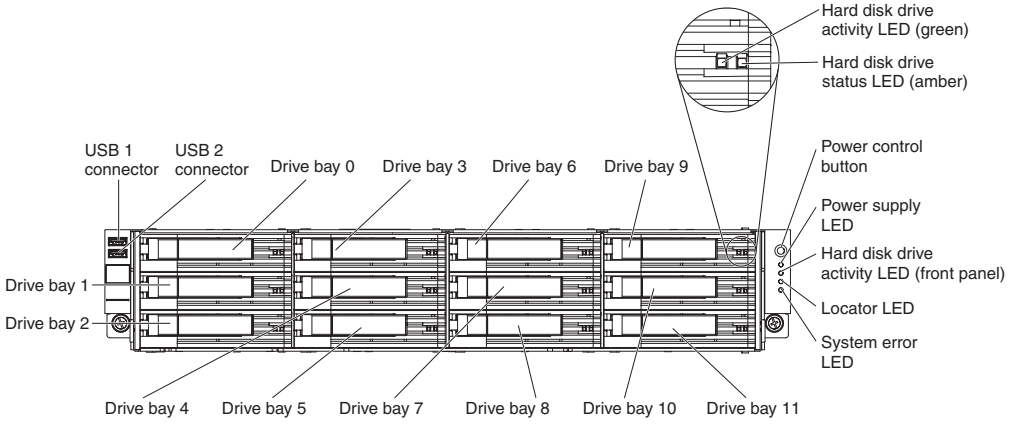
- ENERGY STAR Servers Version 2.0 Program Requirements; ECOVA Generalized Test Protocol for Calculating the Energy Efficiency of Internal Ac-Dc and Dc-Dc Power Supplies.

Server controls, LEDs, and connectors

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

Front view

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



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

Hard disk drive activity LED (front panel): When this LED is flashing, it indicates that the drive is in use. This function is reserved for simple-swap models. For existing models, please see the hot-swap hard disk drive activity and status LEDs (green and amber) that pass from the backplane as the indicators for any activity or warning.

Hard disk drive status LED (amber): This amber LED is used on hot-swap SAS/SATA hard disk drives. Each hot-swap hard disk drive has a status LED. When this LED is lit, it indicates that the drive has failed. When this LED is flashing slowly (one flash per second), it indicates that the drive is being rebuilt as part of a RAID configuration. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.

Operator information panel: This panel contains the power control button and light-emitting diodes (LEDs).

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 green power-on LED are as follows:

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

Flashing rapidly (4 times per second): The server is turned off and is not ready to be turned on. The power-control button is disabled. This will last approximately 20 to 40 seconds.

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 245 for information on logging on to the IMM Web interface.

Hard disk drive activity LED (green): This green LED is used on hot-swap SAS/SATA hard disk drives. Each hot-swap hard disk drive has an activity LED. When this LED is flashing, it indicates that the drive is in use.

Locator LED: Use this blue LED to visually locate the server among other servers. You can use IBM Systems Director to light this LED remotely. This LED is controlled by the IMM.

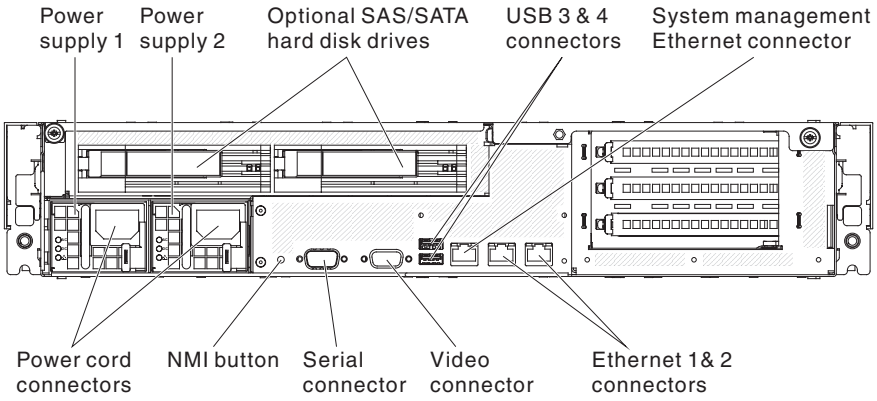
System-error LED: When this amber LED is lit, it indicates that a system error has occurred. This LED is controlled by the IMM.

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

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

Rear view

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



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

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

Note: Power supply 1 is the default/primary power supply. If the server has two power supplies and if any of the power supplies fails, the server will not have redundant power and you must replace the power supply immediately.

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

NMI button: 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).

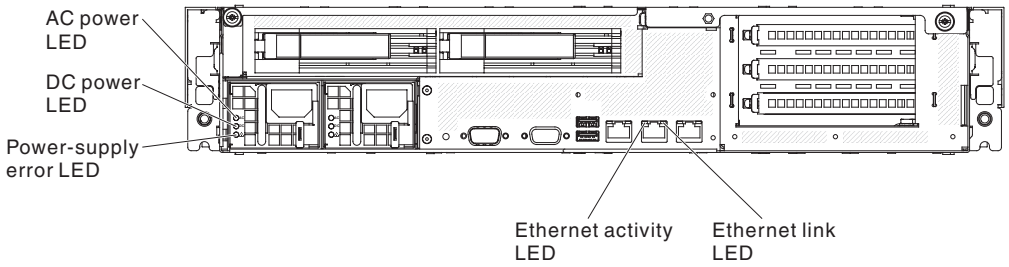
Serial connector: Connect a 9-pin serial device to this connector. The serial port is shared with the integrated management module (IMM). The IMM can take control of the shared serial port to perform text console redirection and to redirect serial traffic, using Serial over LAN (SOL).

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

Note: The maximum video resolution is 1600 x 1200 at 85 Hz.

Systems-management Ethernet connector: Use this connector to connect the server to a network for systems-management information control. This connector is used only by the IMM.

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



Ethernet activity LEDs: When 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.

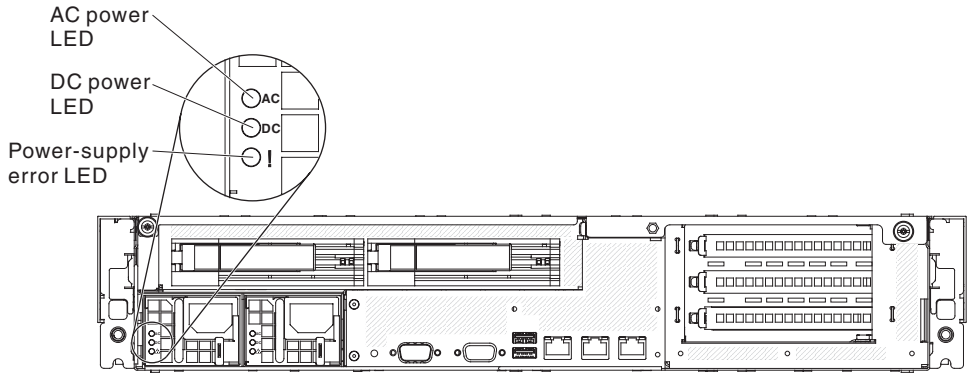
AC power LED: Each hot-swap power supply has an ac power LED and a dc power LED. When the ac power LED is lit, it indicates that sufficient power is coming into the power supply through the power cord. During typical operation, both the ac and dc power LEDs are lit. For any other combination of LEDs,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

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.”

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

Power-supply LEDs

The following illustration shows the power-supply LEDs on the rear of the server. For more information about solving power-supply problems, see “Power problems” on page 51.



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

Table 2. Power-supply LEDs

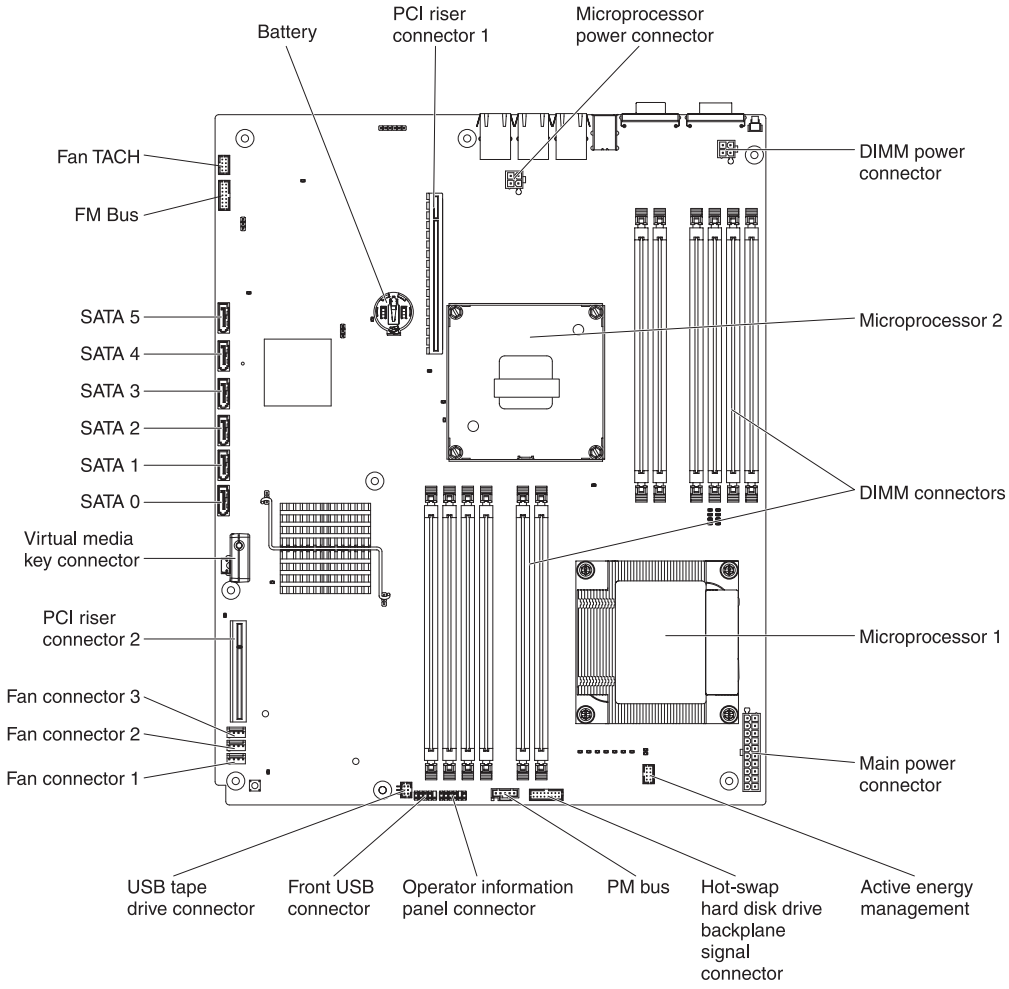
Power-supply LEDs			Description	Action	Notes
AC (green)	**DC (green)**	**Error (amber)**			
On	On	Off	Normal operation		
Off	Off	Off	No ac power to the server or a problem with the ac power source	1. Check the ac power to the server. 2. Make sure that the power cord is connected to a functioning power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

Internal connectors, LEDs, and jumpers

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

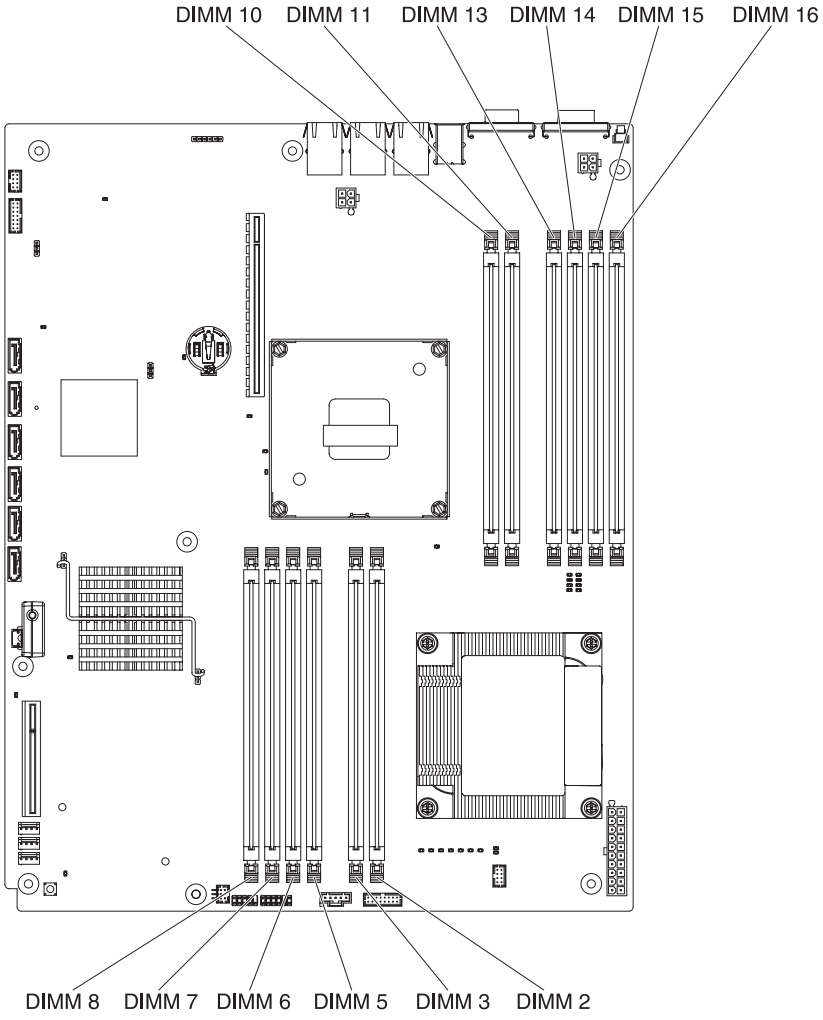
System-board internal connectors

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



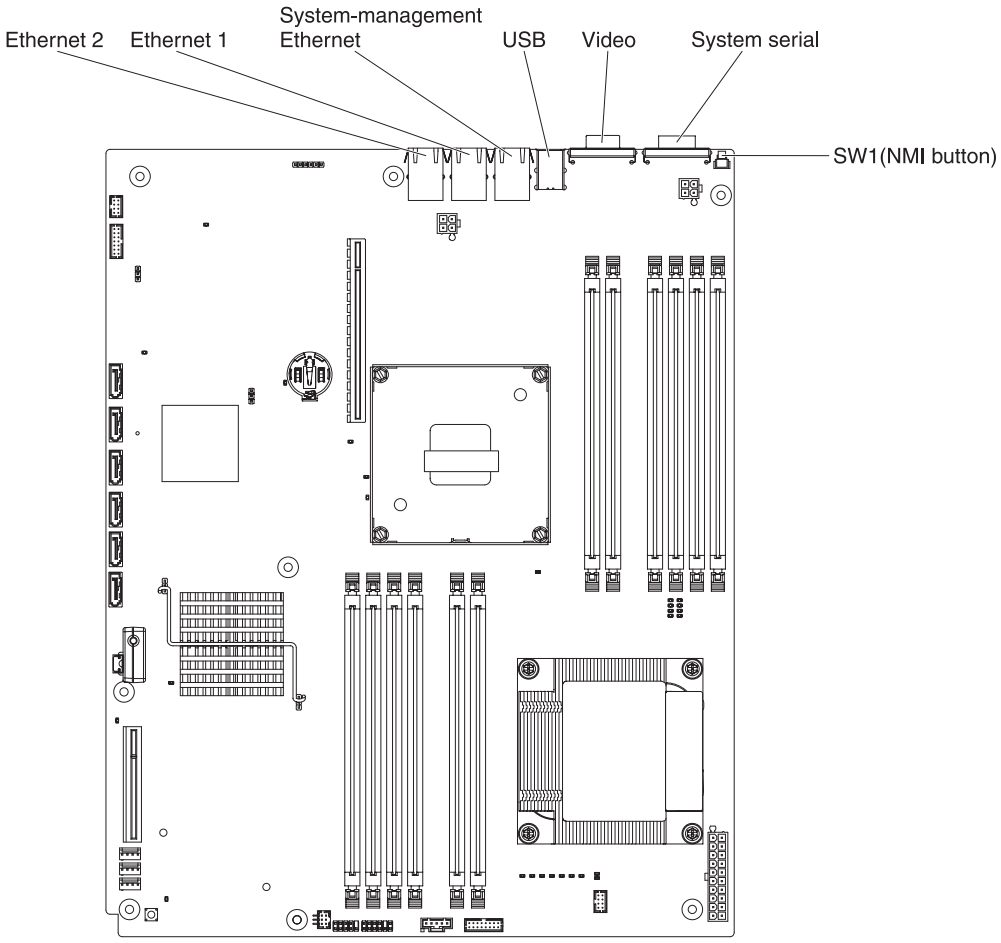
System-board DIMM connectors

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



System-board external connectors

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



System-board jumpers

This section describes the jumpers on the system board.

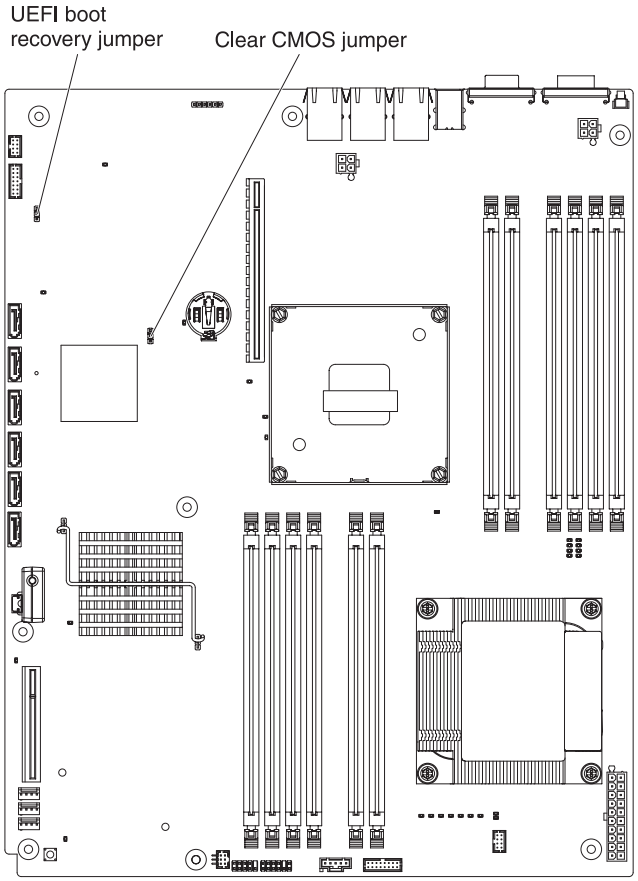


Table 3. System board jumpers

Jumper number	Jumper name	Jumper setting
JP2	Clear CMOS jumper	• Pins 1 and 2: Normal (default) - This keeps the CMOS data. • Pins 2 and 3: This clears the CMOS data such as power-on password and loads the default UEFI settings.
JP3	UEFI boot recovery jumper	• Pins 1 and 2: Normal (default) Loads the primary firmware ROM page. • Pins 2 and 3: Loads the secondary (backup) firmware ROM page.
Notes: • If no jumper is present, the server responds as if the pins are set to 1 and 2. • Changing the position of the UEFI recovery jumper from pins 1 and 2 to pins 2 and 3 before the server is turned on sets the UEFI recovery process. Do not change the jumper pin position after the server is turned on. This can cause an unpredictable problem.		

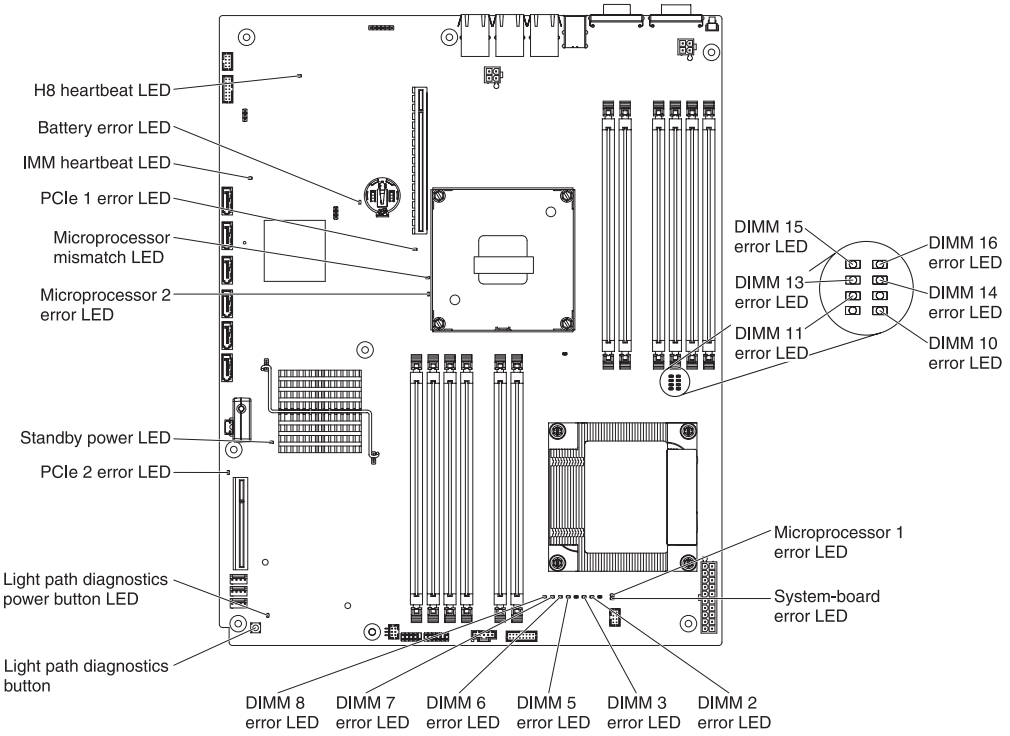
Notes:

1. Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. (Review the information in “Safety” on page vii, “Installation guidelines” on page 133, and “Handling static-sensitive devices” on page 135.)
2. Any system-board switch or jumper blocks that are not shown in the illustrations in this document are reserved.

System-board LEDs

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

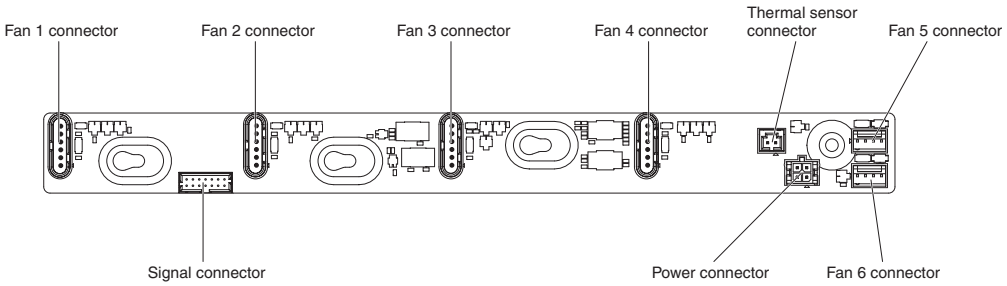
Note: Error LEDs remain lit only while the server is connected to power. If you disconnect power to the server, you can press and hold the light path diagnostics button to light the error LEDs on the system board.



LED name	Description
Error LEDs	When an error LED is lit, it indicates that the associated component has failed.
H8 heartbeat	When this LED is flashing, it indicates that the power management controller is functioning normally.
IMM heartbeat	When this LED is flashing at a constant rate of every other second, it indicates normal operation of the IMM controller. When this LED is flashing at a constant rate of every other half-second, it indicates that the IMM controller is initializing or is not functional.
Microprocessor mismatch	When this LED is lit, it indicates that microprocessor 1 is not installed, or the microprocessors do not have the same cache size and type, and clock speed.
Standby power	When this LED is lit, it indicates that the server is connected to an ac power source and that the power supply has supplied the 5–volt standby voltage to the system board.

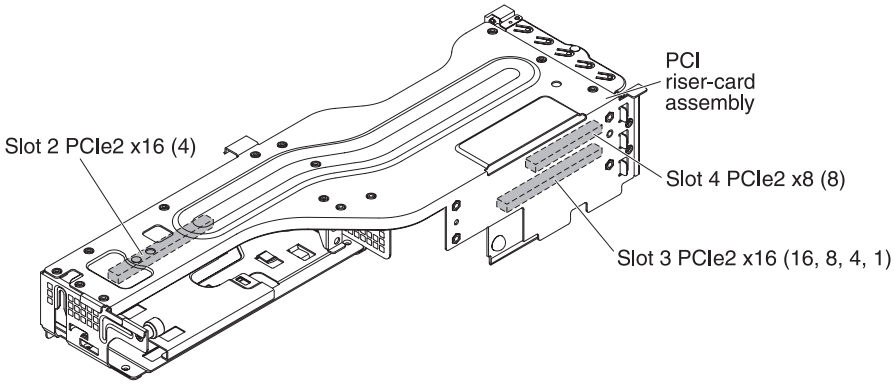
Fan board connectors

The following illustration shows the connectors on the fan board.



PCI riser-card adapter connectors

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



Chapter 3. Diagnostics

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

If you cannot locate and correct a problem by using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 259 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 40.

- **Light path diagnostics**

  Use the light path diagnostics to diagnose system errors quickly. See “System-board LEDs” on page 20 or “Error LEDs” on page 54 for more information.

- **IBM Dynamic System Analysis**

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

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

  For more information, see “IBM Dynamic System Analysis” on page 59.

- **IBM Electronic Service Agent**

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

Note: When you enable software RAID on simple-swap models of the server, you will no longer be able use the IBM Director, Dynamic System Analysis (DSA), and ServerGuide tools to configure, diagnose, or update hard drives on simple-swap models. However, you will still be able use these tools to configure or diagnose other simple-swap server model features and components.

Event logs

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

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

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

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

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

Viewing event logs from the Setup utility

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

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

Viewing event logs without restarting the server

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

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

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

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

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

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

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

Table 4. Methods for viewing event logs

Condition	Action
The server is not hung and is connected to a network.	Use any of the following methods: • Run DSA Portable or DSA Installable to view the event logs or create an output file that you can send to IBM service. • In a Web browser, type the IP address of the IMM and go to the Event Log page. • Use IPMItool to view the system-event log.
The server is not hung and is not connected to a network.	Use IPMItool locally to view the system-event log.

Table 4. Methods for viewing event logs (continued)

Condition	Action
The server is hung.	• If DSA Preboot is installed, restart the server and press F2 to start DSA Preboot and view the event logs. • If DSA Preboot is not installed, insert the DSA Preboot CD and restart the server to start DSA Preboot and view the event logs. • Alternatively, you can restart the server and press F1 to start the Setup utility and view the POST event log or system-event log. For more information, see “Viewing event logs from the Setup utility” on page 24.

POST

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

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

POST error messages

The following table describes the POST error messages and suggested actions to correct the detected problems.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0010002	Microprocessor not supported	1. (Trained service technician only) Reseat the following components one at a time, in the order shown, restarting the server each time: a. Microprocessor 1 b. Microprocessor 2 (if installed) 2. (Trained service technician only) Remove microprocessor 2 and restart the server. 3. (Trained service technician only) Remove microprocessor 1 and install microprocessor 2 in the microprocessor 1 connector. Restart the server. If the error is corrected, microprocessor 1 is bad and must be replaced. 4. (Trained service technician only) Replace the following components one at a time, in the order shown, restarting the server each time: a. Microprocessor 1 b. Microprocessor 2 c. System board
0011000	Invalid microprocessor type	1. Update the system firmware (see "Updating the firmware" on page 233). 2. (Trained service technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type.
0011002	Microprocessor mismatch	1. Run the Setup utility and view the microprocessor information to compare the installed microprocessor specifications. 2. (Trained service technician only) Remove and replace one of the microprocessors so that they both match.
0011004	Microprocessor failed BIST	1. Update the system firmware (see "Updating the firmware" on page 233). 2. (Trained service technician only) Reseat microprocessor 2. 3. (Trained service technician only) Replace the following components one at a time, in the order shown, restarting the server each time: a. Microprocessor b. System board
001100A	Microcode update failed	1. Update the system firmware (see "Updating the firmware" on page 233). 2. (Trained service technician only) Replace the microprocessor.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0018010	Microprocessors of the same model have mismatched stepping ID.	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.
0018009	Microprocessors have mismatched core speed.	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.
001800B	Microprocessors have one or more cache levels with mismatched size.	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.
0018005	Microprocessors have mismatched number of COREs.	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.
0018006	Microprocessors have mismatched QPI speed.	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.
0018007	Microprocessors have mismatched power segments.	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.
0018008	Microprocessors have mismatched internal DDR3 frequency.	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, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0050001	DIMM disabled	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 162). 2. If the DIMM was disabled because of a memory fault, follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).
0051003	Uncorrectable DIMM error	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. If the problem remains, replace the failing DIMM (see "Removing a memory module (DIMM)" on page 161 and "Installing a memory module" on page 162). 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 221 and "Installing a microprocessor and heat sink" on page 223).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0051006	DIMM mismatch detected	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. Make sure that the DIMMs match and are installed in the correct sequence (see "Installing a memory module" on page 162).
0051009	No memory detected	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Make sure one or more DIMMs are installed in the server. 2. Reseat the DIMMs and restart the server (see "Removing a memory module (DIMM)" on page 161 and "Installing a memory module" on page 162). 3. Make sure that the DIMMs match and are installed in the correct sequence (see "Installing a memory module" on page 162). 4. (Trained service technician only) Replace the microprocessor that controls the failing DIMMs (see "Removing a microprocessor and heat sink" on page 221 and "Installing a microprocessor and heat sink" on page 223). 5. (Trained service technician only) Replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230).
005100A	No usable memory detected	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Make sure one or more DIMMs are installed in the server. 2. Reseat the DIMMs and restart the server (see "Removing a memory module (DIMM)" on page 161 and "Installing a memory module" on page 162). 3. Make sure that the DIMMs match and are installed in the correct sequence (see "Installing a memory module" on page 162). 4. Clear CMOS memory to ensure that all DIMM connectors are enabled (see "Removing the system battery" on page 142 and "Installing the system battery" on page 143). Note that all firmware settings will be reset to the default settings.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0058001	PFA threshold exceeded	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 162). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 221 and "Installing a microprocessor and heat sink" on page 223).
0058007	DIMM population is unsupported	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Reseat the DIMMs and restart the server (see "Removing a memory module (DIMM)" on page 161 and "Installing a memory module" on page 162). 2. Make sure that the DIMMs are installed in the proper sequence (see "Installing a memory module" on page 162).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0058008	DIMM failed memory test	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 162 for memory population). 4. If the problem is related to a DIMM, replace the failing DIMM (see "Removing a memory module (DIMM)" on page 161 and "Installing a memory module" on page 162). 5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 7. (Trained service technician only) If the problem is related to microprocessor socket pins, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 8. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 221 and "Installing a microprocessor and heat sink" on page 223).
0058015	Start to activate spare memory channel	Information only. A failed DIMM has been detected to activate the memory online-spare feature. Check the event log for uncorrected DIMM failure events.
00580A1	Invalid DIMM population for mirroring mode	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. If a fault LED is lit, resolve the failure. 2. Install the DIMMs in the correct sequence (see "Installing a memory module" on page 162).
00580A4	Memory population changed	Information only. Memory has been added, moved, or changed.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
00580A5	Mirror failover complete	Information only. Memory redundancy has been lost. Check the event log for uncorrected DIMM failure events (See "Event logs" on page 24 for more information).
00580A6	Spare memory channel activated	Information only. Memory online-spare channel has been activated to back up a failed DIMM. Check the event log for uncorrected DIMM failure events.
0068002	CMOS battery cleared	1. Reseat the battery. 2. Clear the CMOS memory (see "System-board jumpers" on page 18). 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
2011001	PCI-X SERR	1. Check the PCI error LEDs. 2. Reseat all affected adapters and riser cards. 3. Update the PCI device firmware. 4. Remove the adapter from the riser card. 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. Riser card b. (Trained service technician only) System board
2018001	PCI Express uncorrected or uncorrected error	1. Check the PCI error LEDs. 2. Reseat all affected adapters and riser cards. 3. Update the PCI device firmware. 4. Remove any adapters from the riser cards. 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, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
2018002	Option ROM resource allocation failure	Informational message that some devices might not be initialized. 1. If possible, rearrange the order of the adapters in the PCI slots to change the load order of the optional-device ROM code. 2. Run the Setup utility, select **Start Options**, and change the boot priority to change the load order of the optional-device ROM code. 3. Run the Setup utility and disable some other resources, if their functions are not being used, to make more space available: • Select **Start Options** and **Planar Ethernet (PXE/DHCP)** to disable the integrated Ethernet controller ROM. • Select **Advanced Functions**, then **PCI Bus Control**, then **PCI ROM Control Execution** to disable the ROM of adapters in the PCI slots. • Select **Devices and I/O Ports** to disable any of the integrated devices. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Each adapter b. (Trained service technician only) System board
3*xx*0007 (*xx* can be 00 - 19)	Firmware fault detected, system halted	1. Recover the server firmware to the latest level. 2. Undo any recent configuration changes, or clear CMOS memory to restore the settings to the default values. 3. Remove any recently installed hardware.
3038003	Firmware corrupted	1. Run the Setup utility, select **Load Default Settings**, and save the settings to recover the server firmware. 2. (Trained service technician only) Replace the system board. **Note:** Make sure the technician refreshes the VPD.
3048005	Booted secondary (backup) UEFI image	Information only. The backup switch was used to boot the secondary bank.
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, and then turn on the server.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
305000A	RTC date/time is incorrect	1. Adjust the date and time settings in the Setup utility, and then restart the server. 2. Reseat the battery. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Battery b. (Trained service technician only) System board
3058001	System configuration invalid	1. Run the Setup utility, and select **Save Settings**. 2. Run the Setup utility, select **Load Default Settings**, and save the settings. 3. Reseat the following components one at a time in the order shown, restarting the server each time: a. Battery b. Failing device (if the device is a FRU, then it must be reseated by a trained service technician only) 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Battery b. Failing device (if the device is a FRU, then it must be replaced by a trained service technician only) c. (Trained service technician only) System board
3058004	Three boot failures	1. Undo any recent system changes, such as new settings or newly installed devices. 2. Make sure that the server is attached to a reliable power source. 3. Remove all hardware that is not listed on the ServerProven Web site. 4. Make sure that the operating system is not corrupted. 5. Run the Setup utility, save the configuration, and then restart the server. 6. See "Problem determination tips" on page 122.
3108007	System configuration restored to default settings	Information only. This is message is usually associated with the CMOS battery clear event.
3138002	Boot configuration error	1. Remove any recent configuration changes that you made in the Setup utility. 2. Run the Setup utility, select **Load Default Settings**, and save the settings.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
3808000	IMM communication failure	1. Remove power from the server for 30 seconds, and then reconnect the server to power and restart it. 2. Update the IMM firmware. 3. Make sure that the IMM key is seated and not damaged. 4. (Trained service technician only) Replace the system board. **Note:** Make sure the technician refreshes the VPD.
3808002	Error updating system configuration to IMM	1. Remove power from the server, and then reconnect the server to power and restart it. 2. Run the Setup utility and select **Save Settings**. 3. Update the firmware.
3808003	Error retrieving system configuration from IMM	1. Remove power from the server, and then reconnect the server to power and restart it. 2. Run the Setup utility and select **Save Settings**. 3. Update the IMM firmware.
3808004	IMM system event log full	• When out-of-band, use the IMM Web interface or IPMItool to clear the logs from the operating system. • When using the local console: 1. Run the Setup utility. 2. Select **System Event Log**. 3. Select **Clear System Event Log**. 4. Restart the server.
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.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
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 240). 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.
3828004	AEM power capping disabled	1. Check the settings and the event logs. 2. Make sure that the Active Energy Manager feature is enabled in the Setup utility. Select **System Settings**, **Power**, **Active Energy**, and **Capping Enabled**. 3. Update the server firmware. 4. Update the IMM firmware.

Checkout procedure

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

About the checkout procedure

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

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

  Exception: If multiple error codes or light path diagnostics LEDs indicate a microprocessor error, the error might be in the microprocessor or in the microprocessor socket. See “Microprocessor problems” on page 47 for information about diagnosing microprocessor problems.
- Before you run the diagnostic programs, you must determine whether the failing server is part of a shared hard disk drive cluster (two or more servers sharing external storage devices). If it is part of a cluster, you can run all diagnostic programs except the ones that test the storage unit (that is, a hard disk drive in the storage unit) or the storage adapter that is attached to the storage unit. The failing server might be part of a cluster if any of the following conditions is true:
  - You have identified the failing server as part of a cluster (two or more servers sharing external storage devices).
  - One or more external storage units are attached to the failing server and at least one of the attached storage units is also attached to another server or unidentifiable device.
  - One or more servers are located near the failing server.

  Important: If the server is part of a shared hard disk drive cluster, run one test at a time. Do not run any suite of tests, such as “quick” or “normal” tests, because this might enable the hard disk drive diagnostic tests.
- If the server is halted and a POST error code is displayed, see “Event logs” on page 24. If the server is halted and no error message is displayed, see “Troubleshooting tables” on page 40 and “Solving undetermined problems” on page 121.
- For information about power-supply problems, see “Solving power problems” on page 120.
- For intermittent problems, check the error log; see “Event logs” on page 24 and “DSA messages” on page 61.

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 58.
   b. Turn off the server and all external devices.
   c. Check all internal and external devices for compatibility at http://www.ibm.com/servers/eserver/serverproven/compat/us/.
   d. Make sure the server is cabled correctly.
   e. Check all cables and power cords.
   f. Set all display controls to the middle positions.
   g. Turn on all external devices.
   h. Turn on the server. If the server does not start, see “Troubleshooting tables” on page 40.
   i. Check the system-error LED on the operator information panel. If it is flashing, check the light path diagnostics LEDs (see “System-board LEDs” on page 20).
   j. Check for the following results:
      - Successful completion of POST (see “POST” on page 26 for more information).
      - Successful completion of startup, which is indicated by a readable display of the operating-system desktop.

Troubleshooting tables

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

If you cannot find a problem in these tables, see “IBM Dynamic System Analysis” on page 59 for information about testing the server.

If you have just added new software or a new optional device and the server is not working, complete the following steps before you use the troubleshooting tables:

1. Check the system-error LED on the operator information panel; if it is lit, check the LEDs on the system board (see “System-board LEDs” on page 20).
2. Remove the software or device that you just added.
3. Run the diagnostic tests to determine whether the server is running correctly.
4. Reinstall the new software or new device.

General problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, “Parts listing, Type 7377 server,” on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 thumbscrew 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, Type 7377 server,” on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.**

Symptom	Action
A hard disk drive has failed, and the associated amber hard disk drive status LED is lit.	Replace the failed hard disk drive (see “Removing a hot-swap hard disk drive” on page 138 and “Installing a hot-swap hard disk drive” on page 138).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
An installed hard disk drive is not recognized.	1. Observe the associated amber hard disk drive status LED. If the LED is lit, it indicates a drive fault. 2. If the LED is lit, remove the drive from the bay, wait 45 seconds, and reinsert the drive, making sure that the drive assembly connects to the hard disk drive backplane. 3. Observe the associated green hard disk drive activity LED and the amber status LED: • If the green activity LED is flashing and the amber status LED is not lit, the drive is recognized by the controller and is working correctly. Run the DSA hard disk drive test to determine whether the drive is detected. • If the green activity LED is flashing and the amber status LED is flashing slowly, the drive is recognized by the controller and is rebuilding. • If neither LED is lit or flashing, check the hard disk drive backplane (go to step 4). • If the green activity LED is flashing and the amber status LED is lit, replace the drive. If the activity of the LEDs remains the same, go to step 4. If the activity of the LEDs changes, return to step 1. 4. Make sure that the hard disk drive backplane is correctly seated. When it is correctly seated, the drive assemblies correctly connect to the backplane without bowing or causing movement of the backplane. 5. Move the hard disk drives to different bays to determine if the drive or the backplane is not functioning. 6. Reseat the backplane power cable and repeat steps 1 through 3. 7. Reseat the backplane signal cable and repeat steps 1 through 3. 8. Suspect the backplane signal cable or the backplane: a. Replace the affected backplane signal cable. b. Replace the affected backplane. 9. See "Problem determination tips" on page 122.
Multiple hard disk drives fail.	Make sure that the hard disk drive, RAID controller, and server device drivers and firmware are at the latest level. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
Multiple hard disk drives are offline.	1. Review the storage subsystem logs for indications of problems within the storage subsystem, such as backplane or cable problems. 2. See "Problem determination tips" on page 122.
A replacement hard disk drive does not rebuild.	1. Make sure that the hard disk drive is recognized by the controller (the green hard disk drive activity LED is flashing). 2. Review the RAID controller documentation to determine the correct configuration parameters and settings.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
A 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. 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 controller software do not indicate the same status for the drive, complete the following steps: a. Turn off the server. b. Reseat the RAID controller. 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 122.

Hypervisor problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 USB hypervisor key is not listed in the expected boot order, does not appear in the list of boot devices at all, or a similar problem has occurred.	1. Make sure that the optional USB hypervisor key is selected on the boot menu (in the Setup utility and in F12). 2. Make sure that the USB hypervisor key is seated in the connector correctly (see "Removing a USB hypervisor key" on page 169 and "Installing a USB hypervisor key" on page 170). 3. See the documentation that comes with your optional USB hypervisor key 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, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
A problem occurs only occasionally and is difficult to diagnose.	1. Make sure that: • All cables and cords are connected securely to the rear of the server and attached devices. • When the server is turned on, air is flowing from the fan grille. If there is no airflow, the fans are not working. This can cause the server to overheat and shut down. 2. Check the system event log or IMM event log (see "Event logs" on page 24). 3. Make sure that the server and IMM firmware has been updated to the most recent code levels. 4. Review the operating system logs. 5. Contact your operating-system vendor to set up any available tools that are capable of monitoring the server. 6. If an error occurs, run the DSA program and forward the results to IBM service and support for analysis. 7. See "Solving undetermined problems" on page 121.
The server resets (restarts) occasionally.	1. If the reset occurs during POST and the POST watchdog timer is enabled (click **Advanced Setup --> Integrated Management Module (IMM) Setting --> IMM Post Watchdog** in the Setup utility to see the POST watchdog setting), make sure that sufficient time is allowed in the watchdog timeout value (**IMM POST Watchdog Timeout**). See the *Installation and User's Guide* for information about the settings in the Setup utility. If the server continues to reset during POST, see "POST" on page 26 and "DSA messages" on page 61. 2. If the reset occurs after the operating system starts, disable any automatic server restart (ASR) utilities, such as the IBM Automatic Server Restart IPMI Application for Windows, or any ASR devices that are installed. **Note:** ASR utilities operate as operating-system utilities and are related to the IPMI device driver. If the reset continues to occur after the operating system starts, the operating system might have a problem; see "Software problems" on page 53. 3. If neither condition applies, check the system-event log (see "Event logs" on page 24).

USB keyboard, mouse, or pointing-device problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

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

Memory problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **For additional memory troubleshooting information, refer to the "Troubleshooting Memory - IBM BladeCenter and System x" document at http://www-947.ibm.com/support/entry/portal/docdisplay?brand=5000020&Indocid=MIGR-5081319.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The amount of system memory that is displayed is less than the amount of installed physical memory.	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Make sure that: • No DIMM error LEDs are lit on the system board. • Memory mirroring does not account for the discrepancy. • The memory modules are seated correctly. • You have installed the correct type of memory. • 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. • There is no memory mismatch when the server is at the minimum memory configuration. 2. Reseat the DIMMs, and then restart the server. 3. 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, reseat the DIMM; then, run the Setup utility and enable the DIMM. 4. Check that all DIMMs are initialized in the Setup utility; then, run memory diagnostics (see "IBM Dynamic System Analysis" on page 59). 5. Reverse the DIMMs between the channels (of the same microprocessor), and then restart the server. If the problem is related to a DIMM, replace the failing DIMM. 6. Re-enable all DIMMs using the Setup utility, and then restart the server. 7. (Trained service technician only) Install the failing DIMM into a DIMM connector for microprocessor 2 (if installed) to verify that the problem is not the microprocessor or the DIMM connector. 8. (Trained service technician only) Replace the system board. **Note:** Make sure the technician refreshes the VPD.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **For additional memory troubleshooting information, refer to the "Troubleshooting Memory - IBM BladeCenter and System x" document at http://www-947.ibm.com/support/entry/portal/docdisplay?brand=5000020&Indocid=MIGR-5081319.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

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

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, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.** • **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**	
Symptom	**Action**
The server goes directly to the POST Event Viewer when turned on.	1. Correct any errors that are indicated by the LEDs on the front panel. 2. Make sure that the server supports all the microprocessors and that the microprocessors match in speed and cache size. To compare the microprocessor information, run the Setup utility and select **System Information**, then select **System Summary** , and then **Processor Details**. 3. (Trained service technician only) Reseat the microprocessors. 4. (Trained service technician only) Remove microprocessor 2 and restart the server. 5. (Trained service technician only) Replace the following components, in the order shown, restarting the server each time: • Microprocessors • System board

Monitor or video problems

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

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.** • **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**	
Symptom	**Action**
Testing the monitor.	1. Make sure that the monitor cables are firmly connected. 2. Try using the other video port. 3. Try using a different monitor on the server, or try testing the monitor on a different server. 4. Run the diagnostic programs (see "IBM Dynamic System Analysis" on page 59). If the monitor passes the diagnostic programs, the problem might be a video device driver. 5. (Trained service technician only) Replace the system board **Note:** Make sure the technician refreshes the VPD.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The screen is blank.	1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the monitor cable directly to the correct connector on the rear of the server. 2. The IMM remote presence function is disabled if you install an optional video adapter. To use the IMM remote presence function, remove the optional video adapter. 3. Make sure that: • The server is turned on. If there is no power to the server, see "Power problems" on page 51. • The monitor cables are connected correctly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. 4. Make sure that the correct server is controlling the monitor, if applicable. 5. Make sure that damaged server firmware is not affecting the video; see "Recovering the server firmware" on page 89 for information about recovering from server firmware failure. 6. Observe the checkpoint LEDs on the light path diagnostics panel; if the codes are changing, go to the next step. 7. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor b. Video adapter (if one is installed) c. (Trained service technician only) System board 8. See "Solving undetermined problems" on page 121 for information about solving undetermined problems.
The monitor works when you turn on the server, but the screen goes blank when you start some application programs.	1. Make sure that: • The application program is not setting a display mode that is higher than the capability of the monitor. • You installed the necessary device drivers for the application. 2. Run video diagnostics (see "IBM Dynamic System Analysis" on page 59). • If the server passes the video diagnostics, the video is good; see "Solving undetermined problems" on page 121 for information about solving undetermined problems. • If the server fails the video diagnostics, (trained service technician only) replace the system board. **Note:** Make sure the technician refreshes the VPD.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

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

Optional-device problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

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

Power problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The power-control button does not work, and the reset button does not work (the server does not start). **Note:** The power-control button will not function until approximately 40 seconds after the server has been connected to power.	1. Make sure that: • The power cords are correctly connected to the server and to a working electrical outlet. • The LEDs on the power supply do not indicate a problem (see "Power-supply LEDs" on page 58). • Both power supplies installed in the server are of the same type. Mixing different power supplies in the server will cause a system error (the system-error LED on the front panel turns on). • The type of memory that is installed is correct. • The microprocessors are installed in the correct sequence. • The fan power cable is correctly connected to the fan board and the power-supply paddle card. 2. Make sure that the power-control button and the reset button are working correctly: a. Disconnect the server power cords. b. Reseat the operator information panel assembly cable. c. Reconnect the power cords. d. Press the power-control button to restart the server. If the button does not work, replace the operator information panel assembly. e. Press the reset button (on the light path diagnostics panel) to restart the server. If the button does not work, replace the operator information panel assembly. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Hot-swap power supplies b. (Trained service technician only) System board
The server does not turn off.	1. Turn off the server by pressing the power-control button for 5 seconds. 2. Restart the server. 3. If the server fails POST and the power-control button does not work, disconnect the power cord for 20 seconds; then, reconnect the power cord and restart the server. 4. If the problem remains, suspect the system board.
The server unexpectedly shuts down, and the LEDs on the operator information panel are not lit.	See "Solving undetermined problems" on page 121.

Serial device problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

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

ServerGuide problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
The *ServerGuide Setup and Installation* CD will not start.	1. Make sure that the server supports the ServerGuide program and has a startable (bootable) CD or DVD drive. 2. If the startup (boot) sequence settings have been changed, make sure that the CD or DVD drive is first in the startup sequence. 3. If more than one CD or DVD drive is installed, make sure that only one drive is set as the primary drive. Start the CD from the primary drive.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 ServeRAID program cannot view all installed drives, or the operating system cannot be installed.	1. Make sure that there are no duplicate IRQ assignments. 2. Make sure that the hard disk drive is connected correctly. 3. Make sure that the hard disk drive cables are securely connected (see "Internal cable routing and connectors" on page 136).
The operating-system installation program continuously loops.	Make more space available on the hard disk.
The ServerGuide program will not start the operating-system CD.	Make sure that the operating-system CD is supported by the ServerGuide program. For a list of supported operating-system versions, go to http://www.ibm.com/systems/management/serverguide/sub.html, click **IBM Service and Support Site**, click the link for your ServerGuide version, and scroll down to the list of supported Microsoft Windows operating systems.
The operating system cannot be installed; the option is not available.	Make sure that the server supports the operating system. If it does, no logical drive is defined (RAID servers). Run the ServerGuide program and make sure that setup is complete.

Software problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action
A USB device does not work.	1. Make sure that: • The correct USB device driver is installed. • The operating system supports USB devices. 2. Make sure that the USB configuration options are set correctly in the Setup utility menu (see "Setup utility menu choices" on page 236 for more information). 3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server. 4. Move the device cable to a different USB connector. 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. USB device b. (Only if the problem occurred with a front USB connector) Internal USB cable, front USB connector assembly, or USB board

Video problems

See "Monitor or video problems" on page 47.

Error LEDs

The system board has error LEDs that will help to locate the source of the error (see "System-board LEDs" on page 20). Run the diagnostic programs to find out the cause of the error (see "IBM Dynamic System Analysis" on page 59).

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

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

Before working inside the server to view the LEDs, read the safety information that begins on page vii and "Installation guidelines" on page 133.

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

1. Look at the front of the server. If the system-error LED is lit, it indicates that an error has occurred.
2. Check the front and rear of the server to determine whether any component LEDs are lit.

3. View the error LEDs on the system board to isolate the failing component.
   a. Turn off the server and peripheral devices and disconnect all power cords and external cables.
   b. Place the server on a flat, static-protective surface.
   c. Remove the cover (see “Removing the cover” on page 145).
   d. Locate the light path diagnostics button on the system board (see “System-board LEDs” on page 20).
   e. Press and hold the light path diagnostics button to light the error LEDs on the system board. The LEDs will remain lit for as long as you press the button, to a maximum of 45 seconds.

   Certain components inside the server have LEDs that will be lit to indicate the location of a problem. For example, a DIMM error will light the LED next to the failing DIMM on the system board. Look at the system service label inside the cover of the server, which gives an overview of internal components. This information can often provide enough information to correct the error.

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

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, “Parts listing, Type 7377 server,” on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.**

Component LED	Description	Action
DIMM error LEDs	An invalid memory configuration or a memory error has occurred	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Make sure that the DIMM configuration is supported (see “Installing a memory module” on page 162 for DIMM requirements and installation sequence information). 2. Replace the DIMMs with a supported configuration. 3. Update the server firmware to the latest level (see “Updating the firmware” on page 233). 4. Reseat the DIMM. 5. Run the memory test to isolate the problem. 6. If the test indicates that a memory error has occurred (check the system log), replace the failing DIMM, which is indicated by the lit error LED. 7. (Trained service technician only) Replace the system board. **Note:** Make sure the technician refreshes the VPD.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

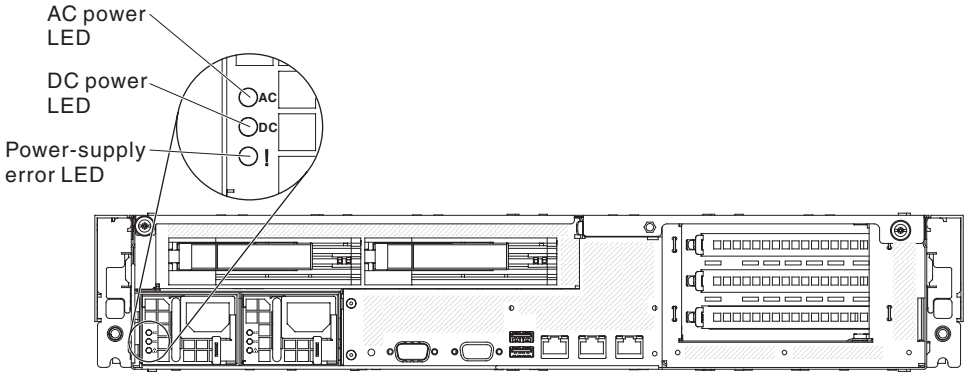
Component LED	Description	Action
Microprocessor error LED	Microprocessor has failed, is missing, or has been incorrectly installed.	1. Check the system event log to determine the reason for the lit LED. 2. (Trained service technician) Reseat the failing microprocessor 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Failing microprocessor b. (Trained service technician only) System board **Note:** Make sure the technician refreshes the VPD.
Microprocessor mismatch LED	An invalid microprocessor configuration or a microprocessor has failed	1. Check that microprocessor 1 is installed. 2. Check the microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 223 for additional information about microprocessor requirements) and use the Setup utility and select **System Information → System Summary → Processor Details** to verify the microprocessors information. 3. (Trained service technician only) Replace the incompatible microprocessor. 4. Check the system-error logs for information about the error. Replace any components that are identified in the error log.
System-board error LED	System-board CPU VRD and/or power voltage regulators have failed and/or system-board cannot power on.	(Trained service technician only) Replace the system board. **Note:** Make sure the technician refreshes the VPD.
Battery error LED	Battery low.	1. Replace the CMOS lithium battery, if necessary. 2. (Trained service technician only) Replace the system board. **Note:** Make sure the technician refreshes the VPD.
H8 heartbeat LED	Indicates the status of power-on and power-off sequencing.	(Trained service technician only) If the server is connected to power and the LED is not flashing, replace the system board. **Note:** Make sure the technician refreshes the VPD.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Component LED	Description	Action
IMM heartbeat LED	Indicates the status of 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. 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 "System-board jumpers" on page 18). b. (Trained service technician only) replace the system board. **Note:** Make sure the technician refreshes the VPD.
PCI error LEDs	An error has occurred on a PCI bus or on the system board. An additional LED is lit next to a failing PCI slot.	1. Check the system event log for information about the error. 2. If you cannot isolate the failing adapter through the LEDs and the information in the system event log, remove one adapter at a time, and restart the server after each adapter is removed. 3. If the failure remains, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL for additional troubleshooting information.
Power error LED	Previous ac power lost event or unexpected system shutdown event detected.	1. Check the ac power to the server. 2. Make sure that the power cord is connected to a functioning power source. 3. Check the power cable connections on the system board. 4. Replace the power-supply. 5. (Trained service technician only) Replace the system board. **Note:** Make sure the technician refreshes the VPD.

Power-supply LEDs

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



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

Table 5. Power-supply LEDs

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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.**

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

IBM Dynamic System Analysis

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

- Drive health information
- Event logs for ServeRAID controllers and service processors

- Hardware inventory, including PCI and USB information
- Installed applications and hot fixes
- Kernel modules
- Light path diagnostics status
- Network interfaces and settings
- Performance data and details about processes that are running
- RAID and controller configuration
- Service processor (integrated management module) status and configuration
- System configuration
- Vital product data and firmware information

For system-specific information about the action that you should take as a result of a message that DSA generates, see the table in “DSA messages” on page 61.

If you cannot find a problem by using DSA, see “Solving undetermined problems” on page 121 for information about testing the server.

Notes:

1. In a multi-node environment, each server has a unique DSA interface. You can view server-specific information, such as error logs, from these unique DSA interfaces.
2. DSA Preboot might appear to be unresponsive when you start the program. This is normal operation while the program loads.

To obtain DSA code and the *Dynamic System Analysis Installation and User's Guide*, 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 **IBM Systems support**, click **System x**.
3. Under **Related downloads**, click **Dynamic System Analysis (DSA)**.

DSA editions

Three editions of Dynamic System Analysis are available:

- **DSA Portable**

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

  If you are able to start the server, use DSA Portable (or DSA Installable).

- **DSA Bootable**

  DSA Bootable is run from a bootable CD; you must restart the server to run it. It is packaged as an ISO image that you download from the Web and copy to a CD. DSA Bootable performs comprehensive collection of hardware and operating-system and includes the same set of diagnostics as DSA Portable and DSA Installable.

If you are unable to start the server and you do not need the more comprehensive diagnostics that DSA Preboot provides, use DSA Bootable.

Attention: If you install a ServeRAID-M1015 SAS/SATA adapter, make sure at least 2 GB of memory is installed in the server before you use DSA Bootable.

- **DSA Preboot**

  DSA Preboot runs outside of the operating system; you must restart the server to run it. It is packaged as an ISO image that you download from the Web, or it is provided in flash memory on the server. In addition to the capabilities of the other editions of DSA, DSA Preboot includes diagnostic routines that would be disruptive to run within the operating-system environment (such as resetting devices and causing loss of network connectivity). It has a graphical user interface that you can use to specify which diagnostics to run and to view the diagnostic and data collection results.

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

DSA messages

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

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

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

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

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

Table 6. DSA messages

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
089-801-xxx	CPU	CPU Stress Test	Aborted	Internal program error.	1. Turn off and restart the system. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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. If the 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.
089-802-xxx	CPU	CPU Stress Test	Aborted	System resource availability error.	1. Turn off and restart the system. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 233. 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.

Table 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
089-901-xxx	CPU	CPU Stress Test	Failed	Test failure.	1. Turn off and restart the system if necessary to recover from a hung state. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-801-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the IMM returned an incorrect response length.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-802-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the test cannot be completed for an unknown reason.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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.
166-803-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the node is busy; try later.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-804-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: invalid command.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-805-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: invalid command for the given LUN.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-806-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: timeout while processing the command.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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.
166-807-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 diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-808-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: reservation canceled or invalid reservation ID.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-809-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: request data was truncated.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-810-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: request data length is invalid.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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.
166-811-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 diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-812-xxx	IMM	IMM I2C Test	Aborted	IMM I2C Test stopped a parameter is out of range.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-813-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot return the number of requested data bytes.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-814-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: requested sensor, data, or record is not present.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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.
166-815-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 diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-816-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the command is illegal for the specified sensor or record type.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-817-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-818-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot execute a duplicated request.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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.
166-819-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 diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-820-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided; the device is in firmware update mode.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code and IMM firmware are at the latest level. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
166-821-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: a command response could not be provided; IMM initialization is in progress.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-822-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: the destination is unavailable.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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.
166-823-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 diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-824-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test stopped: cannot execute the command.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-901-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the H8 bus (Bus 0)	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 6. Run the test again. 7. Remove power from the system. 8. (Trained service technician only) Replace the system board. **Note:** Make sure the technician refreshes the VPD. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-902-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the light path bus (Bus 1).	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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) Reseat the system board. 13. Reconnect the system to the power source and turn on the system. 14. Run the test again. 15. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-903-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the DIMM bus (Bus 2).	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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. (Trained service technician only) Reseat the system board. 14. Reconnect the system to the power source and turn on the system. 15. Run the test again. 16. Turn off the system and disconnect it from the power source. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-904-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the power supply, PCI slot bus (Bus 3).	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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. Reseat PCI adapters one at a time and run the test after each replacement. 11. Run the test again. 12. Turn off the system and disconnect it from the power source. 13. Trained service technician only) Reseat the system board. 14. Reconnect the system to the power source and turn on the system. 15. Run the test again. 16. If the 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-905-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the HDD bus (Bus 4).	**Note:** Ignore the error if the hard disk drive backplane is not installed. 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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) Reseat 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-906-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory configuration bus (Bus 5).	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. (Trained service technician only) Reseat the system board. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-801-xxx	Memory	Memory Test	Aborted	Test canceled: the server firmware programmed the memory controller with an invalid CBAR address	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
201-802-xxx	Memory	Memory Test	Aborted	Test canceled: the end address in the E820 function is less than 16 MB.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that all DIMMs are enabled in the Setup utility. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 5. Run the test again. 6. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
201-803-xxx	Memory	Memory Test	Aborted	Test canceled: could not enable the processor cache.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
201-804-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer request failed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
201-805-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller display/alter write operation was not completed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-806-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller fast scrub operation was not completed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-807-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer free request failed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
201-808-xxx	Memory	Memory Test	Aborted	Test canceled: memory controller display/alter buffer execute error.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-809-xxx	Memory	Memory Test	Aborted	Test canceled program error: operation running fast scrub.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 5. Run the test again. 6. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-810-xxx	Memory	Memory Test	Aborted	Test stopped: unknown error code xxx received in COMMONEXIT procedure.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
201-901-xxx	Memory	Memory Test	Failed	Test failure: single-bit error, failing DIMM z.	1. Turn off the system and disconnect it from the power source. 2. Reseat DIMM z. 3. Reconnect the system to power and turn on the system. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 235). 9. Run the test again. 10. Replace the failing DIMM. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
202-801-xxx	Memory	Memory Stress Test	Aborted	Internal program error.	1. Turn off and restart the system. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
202-802-xxx	Memory	Memory Stress Test	Failed	General error: memory size is insufficient to run the test.	1. Make sure that all memory is enabled by checking the Available System Memory in the Resource Utilization section of the DSA event log. If necessary, enable all memory in the Setup utility (see "Using the Setup utility" on page 235). 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.
217-900-000	SAS/SATA Hard Drive	Disk Drive Test	Failed	The hard drive self-test detected a failure.	1. Reseat all backplane connections at both ends. 2. Reseat all the drives (see "Removing a hot-swap hard disk drive" on page 138 and "Installing a hot-swap hard disk drive" on page 138). 3. Run the test again. 4. Make sure that the firmware is at the latest level. 5. Run the test again. 6. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
217-800-000	SAS/SATA Hard Drive	Disk Drive Test	Aborted	The hard drive self-test was cancelled.	1. Reseat all backplane connections at both ends. 2. Reseat all the drives (see "Removing a hot-swap hard disk drive" on page 138 and "Installing a hot-swap hard disk drive" on page 138). 3. Run the test again. 4. Make sure that the firmware is at the latest level. 5. Run the test again. 6. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
405-901-xxx	Intel Ethernet Device	Test Adapter Registers	Failed	A failure was detected during register test.	1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 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?Indocid=SERV-CALL?brandind=500000....
405-903-xxx	Intel Ethernet Device	Test EEPROM	Failed	A failure was detected during EEPROM test.	1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 6. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
405-904-xxx	Intel Ethernet Device	Test FIFO	Failed	A failure was detected during FIFO test.	1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 233. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Tape alert flags

If a tape drive is installed in the server, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-5079217&brandind=5000008 for the *Tape Storage Products Problem Determination and Service Guide*. This document describes troubleshooting and problem determination information for your tape drive.

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

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

C: Critical
W: Warning
I: Information

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

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

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

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

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

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

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

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

Recovering the server firmware

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

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

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

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

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

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

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

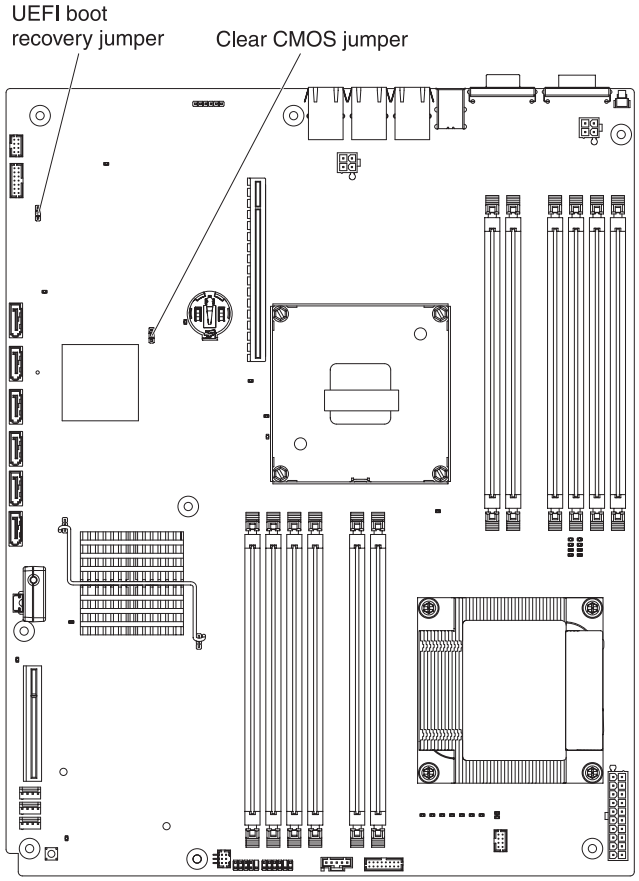
1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3630 M3** to display the matrix of downloadable files for the server.
5. Download the latest server firmware update.

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

In-band manual recovery method

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

1. Read the safety information that begins on page vii and “Handling static-sensitive devices” on page 135. This information will help you work safely.
2. Turn off the server, and disconnect all power cords and external cables.
3. Remove the server cover. See “Removing the cover” on page 145 for more information.
4. Locate the UEFI boot recovery jumper block (JP3) on the system board.



5. Remove any adapters that impede access to the boot recovery jumper block (JP3) (see “Removing an adapter from the PCI riser-card assembly” on page 156).
6. Move the UEFI boot recovery jumper block (JP3) from pins 1 and 2 to pins 2 and 3 to enable the UEFI recovery mode.
7. Reinstall any adapter that you removed before (see “Installing an adapter on the PCI riser-card assembly” on page 157).
8. Reinstall the server cover (see “Installing the cover” on page 146).
9. Reconnect all power cords and external cables and restart the server. The power-on self-test (POST) starts.
10. Boot the server to an operating system that is supported by the firmware update package that you downloaded.
11. Perform the firmware update by following the instructions that are in the firmware update package readme file.

12. Copy the downloaded firmware update package into a directory.
13. From a command line, type *filename*-s, where *filename* is the name of the executable file that you downloaded with the firmware update package. Monitor the firmware update until completion.
14. Turn off the server and disconnect all power cords and external cables, and then remove the server cover (see “Removing the cover” on page 145
15. Remove any adapters that impede access to the UEFI boot recovery jumper block (JP3) (see “Removing an adapter from the PCI riser-card assembly” on page 156).
16. Move the UEFI boot block recovery jumper (JP3) from pins 2 and 3 back to the primary position (pins 1 and 2).
17. Reinstall any adapter that you removed before (see “Installing an adapter on the PCI riser-card assembly” on page 157).
18. Reinstall the server cover (see “Installing the cover” on page 146); then, reconnect all power cords.
19. Restart the server. The power-on self-test (POST) starts. If this does not recover the primary bank, continue with the following steps.
20. Remove the server cover (see “Removing the cover” on page 145).
21. Reset the CMOS by removing the system battery (see “Removing the system battery” on page 142).
22. Leave the system battery out of the server for approximately 5 to 15 minutes.
23. Reinstall the system battery (see “Installing the system battery” on page 143).
24. Reinstall the server cover (see “Installing the cover” on page 146); then, reconnect all power cords.
25. Restart the server. The power-on self-test (POST) starts.
26. If these recovery efforts fail, contact your IBM service representative for support.

See “System-board jumpers” on page 18 for more information about the switches and jumpers.

In-band automated boot recovery method

Note: Use this method if the system board error LED on the system board 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: For information about using the IMM web interface to recover the server firmware, see the IMM documentation.

Automatic boot failure recovery (ABR)

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

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

Nx boot failure

Configuration changes, such as added devices or adapter firmware updates, and firmware or application code problems can cause the server to fail POST (the power-on self-test). If this occurs, the server responds in either of the following ways:

- The server restarts automatically and attempts POST again.
- The server hangs, and you must manually restart the server for the server to attempt POST again.

After a specified number of consecutive attempts (automatic or manual), the Nx boot failure feature causes the server to revert to the default UEFI configuration and start the Setup utility so that you can make the necessary corrections to the configuration and restart the server. If the server is unable to successfully complete POST with the default configuration, there might be a problem with the system board.

To specify the number of consecutive restart attempts that will trigger the Nx boot failure feature, in the Setup utility, click **System Settings → Recovery → POST Attempts → POST Attempts Limit**. The available options are 3, 6, 9, and 255 (disable Nx boot failure).

System event messages log

The system event messages log contains messages of three types:

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

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

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

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

Integrated management module error messages

The following table describes the possible integrated management module error messages and suggested actions to correct the detected problems.

Table 7. Integrated management module error messages

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
%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.
A diagnostic interrupt has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	An operator information panel NMI/diagnostic interrupt has occurred.	If the NMI button on the operator information panel has not been pressed, complete the following steps: 1. Make sure that the NMI button is not pressed. 2. Replace the operator information panel cable. 3. Replace the operator information panel.

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
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.
A Uncorrectable Bus Error has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int CPU)	1. Check the system-event log. 2. Check the microprocessor error LEDs. 3. Remove the failing microprocessor from the system board. 4. Check for a UEFI firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. Make sure that the two microprocessors are matching (see "Installing a microprocessor and heat sink" on page 223 for information about microprocessor requirements). 6. (Trained service technician only) Replace the system board. **Note:** Make sure the technician refreshes the VPD.
An Over-Temperature Condition has been detected on the Processor CPU *n* Status. (*n* = microprocessor number)	Error	An overtemperature condition has occurred for microprocessor *n*. (*n* = microprocessor number)	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffle is in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
An SMBIOS Uncorrectable CPU complex error for Processor CPU *n* Status has asserted. (*n* = microprocessor number)	Error	An SMBIOS uncorrectable CPU complex error has asserted.	1. Check for a UEFI firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Make sure that the installed microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 223 for information about microprocessor requirements). 3. (Trained service technician only) Reseat microprocessor *n*. 4. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
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.
Certificate Authority %1 has detected a %2 Certificate Error. (%1 = IBM_Certificate Authority.CADistinguished Name; %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.
DHCP setting changed to %1 by user %2. (%1 = DHCP addressing mode, %2 = user ID)	Info	A user has changed the DHCP mode.	No action; information only.

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
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.
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.
Ethernet Data Rate modified from %1 to %2 by user %3. (%1 = CIM_Ethernet Port.Speed; %2 = CIM_EthernetPort.Speed; %3 = user ID)	Info	A user has modified the Ethernet port data rate.	No action; information only.

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
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 Duplex setting modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort.Network Addresses; %2 = CIM_EthernetPort.Network Addresses; %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.Enabled State; %2 = user ID)	Info	A user has enabled the Ethernet interface.	No action; information only.
Ethernet locally administered MAC address modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort.Network Addresses; %2 = CIM_EthernetPort.Network Addresses; %3 = user ID)	Info	A user has modified the locally administered Ethernet port MAC address setting.	No action; information only.
Ethernet MTU setting modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort.Active MaximumTransmissionUnit; %2 = CIM_EthernetPort.Active MaximumTransmissionUnit; %3 = user ID)	Info	A user has modified the Ethernet port MTU setting.	No action; information only.

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
Failure Predicted on drive n for array %1. (n = hard disk drive number, %1 = CIM_ComputerSystem. ElementName)	Warning	Predicted failure on a drive.	1. Run the hard disk drive diagnostic test on drive *n*. 2. Reseat the following components: a. Hard disk drive b. Cable from the system board to the backplane 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Hard disk drive b. Cable from the system board to the backplane c. Hard disk drive backplane
Fault in slot System board on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A PCI slot error has occurred.	1. Check the riser-card LEDs. 2. Reseat the affected adapters and riser card. 3. Update the server and adapter firmware (UEFI and IMM). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove both adapters. 5. Replace the PCIe adapter. 6. Replace the riser card. 7. (Trained service technician only) Replace the system board. **Note:** Make sure the technician refreshes the VPD.
Flash of %1 from %2 failed for user %3. (%1 = CIM_ManagedElement. ElementName; %2 = Web or LegacyCLI; %3 = user ID)	Info	An attempt to update a firmware component from the interface and IP address has failed.	Try to update the firmware again.

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
Flash of %1 from %2 succeeded for user %3. (%1 = CIM_ManagedElement. Element Name; %2 = Web or LegacyCLI; %3 = user ID)	Info	A user has successfully updated one of the following firmware components: • IMM main application • IMM boot ROM • UEFI firmware • Diagnostics • System power backplane • Remote expansion enclosure power backplane • Integrated service processor • Remote expansion enclosure processor	No action; information only.
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.
IMM clock has been set from NTP server %1. (%1 = IBM_NTPService.Element Name)	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.
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.
IMM Network Initialization Complete.	Info	An IMM network has completed initialization.	No action; information only.
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 reset was initiated by user %1. (%1 = user ID)	Info	A user has initiated a reset of the IMM.	No action; information only.
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 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
IP address of default gateway modified from %1 to %2 by user %3. (%1 = CIM_IPProtocolEndpoint. GatewayIPv4Address; %2 = CIM_StaticIPAssignment SettingData.Default GatewayAddress; %3 = user ID)	Info	A user has modified the default gateway IP address of the IMM.	No action; information only.
IP address of network interface modified from %1 to %2 by user %3. (%1 = CIM_IPProtocolEndpoint. IPv4Address; %2 = CIM_StaticIPAssignment SettingData.IPAddress; %3 = user ID)	Info	A user has modified the IP address of the IMM.	No action; information only.
IP subnet mask of network interface modified from %1 to %2 by user %3. (%1 = CIM_IPProtocolEndpoint. SubnetMask; %2 = CIM_StaticIPAssignment SettingData.SubnetMask; %3 = user ID)	Info	A user has modified the IP subnet mask of the IMM.	No action; information only.
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.
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 (see "Installing a memory module" on page 162).
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 (see "Installing a memory module" on page 162).
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 (see "Installing a memory module" on page 162).

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
Memory Logging Limit Reached for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	The memory logging limit has been reached.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 162). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 221 and "Installing a microprocessor and heat sink" on page 223).

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
Memory Logging Limit Reached for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Error	The memory logging limit has been reached.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 162 for memory population). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 221 and "Installing a microprocessor and heat sink" on page 223).

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
Memory Logging Limit Reached for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	The memory logging limit has been reached.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 162 for memory population). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 221 and "Installing a microprocessor and heat sink" on page 223).

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
Memory uncorrectable error detected for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	A memory uncorrectable error has occurred.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 162). 4. If the problem follows the DIMM, replace the failing DIMM (see "Removing a memory module (DIMM)" on page 161 and "Installing a memory module" on page 162). 5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). (Continued on the next page)

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
Memory uncorrectable error detected for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	A memory uncorrectable error has occurred.	6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 7. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 221 and "Installing a microprocessor and heat sink" on page 223).

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
Memory uncorrectable error detected for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Error	A memory uncorrectable error has occurred.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 162 for memory population). 4. If the problem follows the DIMM, replace the failing DIMM (see "Removing a memory module (DIMM)" on page 161 and "Installing a memory module" on page 162). 5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). (Continued on the next page)

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
Memory uncorrectable error detected for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Error	A memory uncorrectable error has occurred.	6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 7. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 221 and "Installing a microprocessor and heat sink" on page 223).

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
Memory uncorrectable error detected for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A memory uncorrectable error has occurred.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 162 for memory population). 4. If the problem follows the DIMM, replace the failing DIMM (see "Removing a memory module (DIMM)" on page 161 and "Installing a memory module" on page 162). 5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). (Continued on the next page)

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
Memory uncorrectable error detected for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A memory uncorrectable error has occurred.	6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system board" on page 228 and "Installing the system board" on page 230). 7. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 221 and "Installing a microprocessor and heat sink" on page 223).
Memory DIMM disabled for All DIMMs on Memory Subsystem All DIMMs.	Info	DIMM disabled	1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 162). 2. If the DIMM was disabled because of a memory fault (memory uncorrectable error or memory logging limit reached), follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
Memory DIMM disabled for One of the DIMMs on Memory Subsystem One of the DIMMs.	Info	DIMM disabled	1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 162 for memory population). 2. If the DIMM was disabled because of a memory fault (memory uncorrectable error or memory logging limit reached), follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).
Memory DIMM disabled for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Info	DIMM disabled	1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 162). 2. If the DIMM was disabled because of a memory fault (memory uncorrectable error or memory logging limit reached), follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).
Numeric sensor Ambient Temp going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffle is in place and correctly installed, and that the server cover is installed and completely closed.

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message	Severity	Description	Action
Numeric sensor Ambient Temp going high (upper non-recoverable) has asserted.	Error	An upper nonrecoverable sensor going high has asserted.	Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffle is in place and correctly installed, and that the server cover is installed and completely closed.
Numeric sensor Fan *n* Tach going low (lower critical) has asserted. (*n* = fan number)	Error	A lower critical sensor going low has asserted.	1. Turn off the server and disconnect it from power. 2. Reseat the failing fan. 3. (Trained service technician only) Replace the failing fan.
Numeric sensor Planar 12V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained service technician only) Replace the system board. **Note:** Make sure the technician refreshes the VPD.
Numeric sensor Planar 12V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained service technician only) Replace the system board. **Note:** Make sure the technician refreshes the VPD.
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. **Note:** Make sure the technician refreshes the VPD.
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. **Note:** Make sure the technician refreshes the VPD.
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. **Note:** Make sure the technician refreshes the VPD.
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. **Note:** Make sure the technician refreshes the VPD.
Numeric sensor Planar VBAT going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	Replace the 3V battery.
Numeric sensor Planar VBAT going low (lower non-critical) has asserted.	Warning	A lower non-critical sensor going low has asserted.	Replace the 3V battery.
OS Watchdog response %1 by %2. (%1 = Enabled or Disabled; %2 = user ID)	Info	A user has enabled or disabled an OS Watchdog.	No action; information only.

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
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.
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.
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.
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 Login Successful. Login ID: %1 from %2 at IP address %3. (%1 = user ID; %2 = ValueMap(CIM_Protocol Endpoint.ProtocolIFType; %3 = IP address, *xxx.xxx.xxx.xxx*)	Info	A user has successfully logged in to the IMM.	No action; information only.
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 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
Security: Login ID: '%1' had %2 login failures from CLI at %3. (%1 = user ID; %2 = MaximumSuccessiveLogin Failures (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.
Security: Userid: '%1' had %2 login failures from WEB client at IP address %3. (%1 = user ID; %2 = MaximumSuccessiveLogin Failures (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.
Sensor CPU *n* OverTemp has transitioned to critical from a less severe state. (*n* = microprocessor number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffle is in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
Sensor CPU *n* OverTemp has transitioned to non-recoverable from a less severe state. (*n* = microprocessor number)	Error	A sensor has changed to Nonrecoverable state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffle is in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
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 baffle is in place and correctly installed, and that the server cover is installed and completely closed. 2. If a fan has failed, complete the action for a fan failure. 3. Replace DIMM *n*. (*n* = DIMM number)
Sensor PS *n* Fan Fault has transitioned to critical from a less severe state. (*n* = PS number)	Error	A sensor has changed to Critical state from a less severe state.	Replace the corresponding power supply.
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.
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.
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.
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.

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
The Drive *n* Status has been disabled due to a detected fault. (*n* = hard disk drive number)	Error	A drive has been disabled because of a fault.	1. Run the hard disk drive diagnostic test on drive *n*. 2. Reseat the following components: a. Hard disk drive b. Cable from the system board to the backplane 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Hard disk drive b. Cable from the system board to the backplane c. Hard disk drive backplane (*n* = hard disk drive number)
The Drive *n* Status has been removed from unit Drive 0 Status. (*n* = hard disk drive number)	Error	A drive has been removed.	Reseat hard disk drive *n*. (*n* = hard disk drive number).
The Power Supply %1 has Failed. (%1 = CIM_PowerSupply. ElementName)	Error		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). **Note:** Make sure the technician refreshes the VPD.

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
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 223 for information about microprocessor requirements). 2. (Trained service technician only) Replace the incompatible microprocessor.
The Processor CPU *n* Status has Failed with FRB1/BIST condition. (*n* = microprocessor number)	Error	A processor failed - FRB1/BIST condition has occurred.	1. Check for a UEFI firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Make sure that the installed microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 223 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 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
The Processor CPU *n* Status has Failed with IERR. (*n* = microprocessor number)	Error	A processor failed - IERR condition has occurred.	1. Make sure that the latest levels of firmware and device drivers are installed for all adapters and standard devices, such as Ethernet, SCSI, and SAS. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Run the DSA program for the hard disk drives and other I/O devices. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
The Processor CPU *n* is operating in a Degraded State. (*n* = microprocessor number)	Warning	Throttling has occurred for microprocessor *n*. (*n* = microprocessor number)	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Check the ambient temperature. You must be operating within the specifications. 3. Make sure that the heat sink for microprocessor *n* is installed correctly. 4. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
The System %1 encountered a POST Error. (%1 = CIM_ComputerSystem. ElementName)	Error	A POST error has occurred. (Sensor = Firmware Error)	1. Make sure the server meets the minimum configuration to start (see "Solving undetermined problems" on page 121). 2. Update the UEFI firmware on the primary page. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 3. (Trained service technician only) Replace the system board. **Note:** Make sure the technician refreshes the VPD.
The System %1 encountered a POST Error. (%1 = CIM_ComputerSystem. ElementName)	Error	A POST error has occurred. (Sensor = ABR Status)	1. Make sure the server meets the minimum configuration to start (see "Solving undetermined problems" on page 121). 2. Recover the UEFI firmware from the backup page: a. Restart the server. b. At the prompt, press F3 to recover the firmware. 3. Update the UEFI 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.

Table 7. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Type 7377 server," on page 125 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
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.
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.
Invalid or Unsupported firmware or software was detected on System n. (n = system serial number)	Error	IMM firmware failover has occurred and IMM has reverted to a previous version of the firmware.	1. Check the IBM support website for an applicable firmware update that applies to the rack server. 2. Reboot IMM and verify the IMM is running correct firmware level after firmware update.

Solving power problems

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

1. Turn off the server and disconnect all power cords.
2. Check for loose cables in the power subsystem. Also check for short circuits, for example, if a loose screw is causing a short circuit on a circuit board.
3. If a power error LED on the system board is lit, complete the following steps; otherwise, go to step 5. See “System-board LEDs” on page 20 for the location of the power error LEDs.
   a. Disconnect the cables and power cords to all internal and external devices (see “Internal cable routing and connectors” on page 136). Leave the power-supply cords connected.
   b. Remove each component that is associated with the LED, one at a time, restarting the server each time, until the cause of the overcurrent condition is identified.

      Important: Only a trained service technician should remove or replace a FRU, such as a microprocessor or the system board. See Chapter 4, “Parts listing, Type 7377 server,” on page 125 to determine whether a component is a FRU.
   c. Replace the identified component.
4. If the system-error LED on the front panel is lit, complete the following steps:
   a. Check the IMM-event log. To access the web interface, see “Logging on to the Web interface” on page 245.
   b. If a log indicates that the power configuration is invalid, make sure that both power supplies installed in the server are of the same type.
5. Remove the adapters and disconnect the cables and power cords to all internal and external devices until the server is at the minimum configuration that is required for the server to start (see “Solving undetermined problems” on page 121 for the minimum configuration).
6. Reconnect all power cords and turn on the server. If the server starts successfully, replace the adapters and devices one at a time until the problem is isolated.

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

Solving Ethernet controller problems

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

Try the following procedures:

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

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

  - The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.
  - You must use Category 5 cabling.
- Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller LEDs on the rear panel of the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.
  - The Ethernet link status LED is lit when the Ethernet controller receives a link pulse from the hub. If the LED is off, there might be a defective connector or cable or a problem with the hub.
  - The Ethernet transmit/receive activity LED is lit when the Ethernet controller sends or receives data over the Ethernet network. If the Ethernet transmit/receive activity light is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check the Ethernet activity LED on the rear of the server. The Ethernet activity LED is lit when data is active on the Ethernet network. If the Ethernet activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check for operating-system-specific causes of the problem.
- Make sure that the device drivers on the client and server are using the same protocol.

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

Solving undetermined problems

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

If you suspect that a software problem is causing failures (continuous or intermittent), see “Software problems” on page 53.

Damaged data in CMOS memory or damaged server firmware can cause undetermined problems. To reset the CMOS data, use the CMOS switch to clear the CMOS memory; see “System-board jumpers” on page 18. If you suspect that the server firmware is damaged, see “Recovering the server firmware” on page 89.

Check the LEDs on all the power supplies (see “Power-supply LEDs” on page 58). If the LEDs indicate that the power supplies are working correctly, complete the following steps:

1. Turn off the server.
2. Make sure that the server is cabled correctly.
3. Remove or disconnect the following devices, one at a time, until you find the failure. Turn on the server and reconfigure it each time.
   - Any external devices.
   - Surge-suppressor device (on the server).
   - Modem, printer, mouse, and non-IBM devices.
   - Each adapter.
   - Hard disk drives.
   - Memory modules. The minimum configuration requirement is 1 GB DIMM in connector 3 (see “System-board DIMM connectors” on page 16).

   The following minimum configuration is required for the server to start:
   - One microprocessor (slot 1)

- One 1 GB DIMM per installed microprocessor (slot 3 if only one microprocessor is installed)
- One power supply
- Power cord
- Four system fans

4. Turn on the server. If the problem remains, suspect the following components in the following order:
   a. DIMM
   b. System board
   c. Microprocessor

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 you can encounter, use the following information to assist you in problem determination. If possible, have this information available when you request assistance from IBM.

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

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

- Machine type and model
- UEFI level
- Adapters and attachments, in the same locations
- Address jumpers, terminators, and cabling
- Software versions and levels
- Diagnostic program type and version level
- Setup utility settings

- Operating-system control-file setup

See Appendix A, “Getting help and technical assistance,” on page 259 for information about calling IBM for service.

Chapter 4. Parts listing, Type 7377 server

The following replaceable components are available for all the Series x3630 M3 Type 7377 server models, except as specified otherwise in "Replaceable server components." To check for an updated parts listing on the Web, complete the following steps.

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Parts documents lookup**.
4. From the **Product family** menu, select **System x3630 M3** and click **Go**.

Replaceable server components

Replaceable components are of four types:

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

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

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

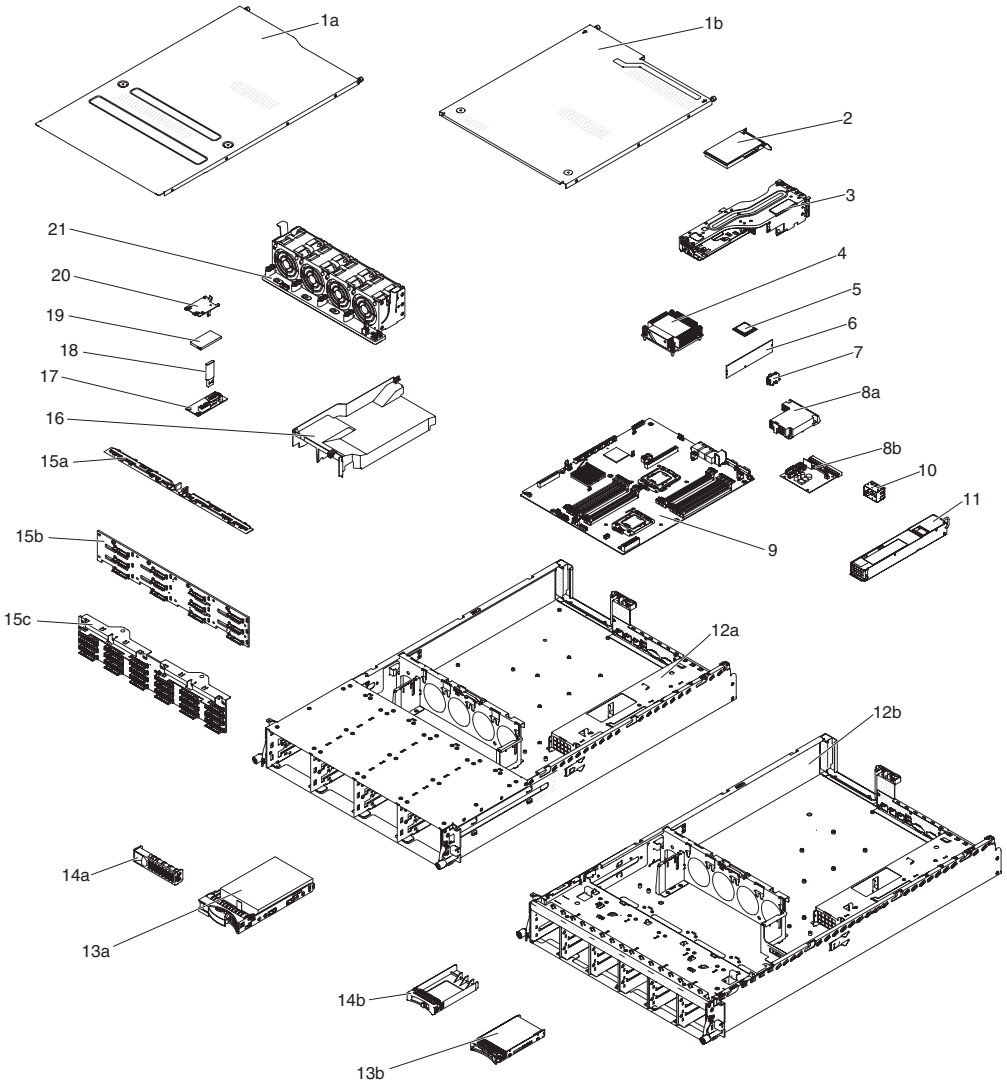


Table 8. Parts listing, Type 7377

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1a	Cover (for 2.5-inch hot-swap hard disk)		69Y4533	
1b	Cover (for 3.5-inch hot-swap hard disk)		69Y5273	
2	ServeRAID-M1015 SAS/SATA adapter (models 32x and 42x)			46M0861
2	ServeRAID-M5015 SAS/SATA adapter (battery not included) (models 62x and E2Y)			46M0851
2	ServeRAID-M5014 SAS/SATA adapter (model 22x)			46M0918
3	PCI riser-card assembly		69Y1053	
4	Heat sink			69Y4249
5	Microprocessor, Intel Xeon L5609 1.86 GHz, 12 MB, 40 W (quad core)			69Y0783
5	Microprocessor, Intel Xeon E5603 1.60 GHz, 4 MB, 80 W (quad core)			81Y5952

Table 8. Parts listing, Type 7377 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
5	Microprocessor, Intel Xeon E5506 2.13 GHz, 4 MB, 80 W (quad core) (models 22x and E1Y)			46D1270
5	Microprocessor, Intel Xeon L5630 2.13 GHz, 12 MB, 40 W (quad core)			59Y3691
5	Microprocessor, Intel Xeon E5606 2.13 GHz, 8 MB, 80 W (quad core)			81Y5953
5	Microprocessor, Intel Xeon E5507 2.26 GHz, 4 MB, 80 W (quad core) (model 32x)			69Y0782
5	Microprocessor, Intel Xeon E5607 2.26 GHz, 8 MB, 80 W (quad core)			81Y5954
5	Microprocessor, Intel Xeon X5672 3.20 GHz, 8 MB, 95 W (quad core)			81Y5957
5	Microprocessor, Intel Xeon L5640 2.26 GHz, 12 MB, 60 W (6 core)			49Y7054
5	Microprocessor, Intel Xeon E5620 2.40 GHz, 12 MB, 80 W (quad core) (model 42x)			49Y7053
5	Microprocessor, Intel Xeon E5645 2.40 GHz, 12 MB, 80 W (6 core)			69Y4714
5	Microprocessor, Intel Xeon E5630 2.53 GHz, 12 MB, 80 W (quad core) (model 52x)			49Y7052
5	Microprocessor, Intel Xeon E5649 2.53 GHz, 12 MB, 80 W (6 core) (model 52x)			81Y5955
5	Microprocessor, Intel Xeon E5640 2.66 GHz, 12 MB, 80 W (quad core)			49Y7051
5	Microprocessor, Intel Xeon X5650 2.66 GHz, 12 MB, 95 W (6 core) (model 62x, 64x)			49Y7040
5	Microprocessor, Intel Xeon X5660 2.80 GHz, 12 MB, 95 W (6 core)			49Y7039
5	Microprocessor, Intel Xeon X5670 2.93 GHz, 12 MB, 95 W (6 core)			49Y7038
5	Microprocessor, Intel Xeon X5675 3.06 GHz, 12 MB, 95 W (6 core)			81Y5958
6	Memory, 1 GB DDR3-1333 single-rank LP RDIMM		49Y1442	
6	Memory, 2 GB single-rank PC3L-10600R-999 LP RDIMM 1.35V		49Y1410	
6	Memory, 2 GB (2 Gb, 1Rx8) RDIMM		49Y1423	
6	Memory, 4 GB DDR3-1333 dual-rank RDIMM 1.35V		49Y1412	
6	Memory, 4 GB (1x4 GB, 1Rx4)		49Y1424	
6	Memory, 4 GB (2R x 4, 1 Gbit)		49Y1445	
6	Memory, 4 GB (2 Gb, 2Rx8) RDIMM		49Y1425	
6	Memory, 8 GB DDR3-1333 dual-rank LP RDIMM		49Y1446	
6	Memory, 8 GB dual-rank PC3L-10600R-999 RDIMM 1.35V		49Y1415	
6	Memory, 8 GB dual-rank PC3L-8500R-777 RDIMM 1.35V		49Y1416	

Table 8. Parts listing, Type 7377 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
6	Memory, 16 GB (2 Gb, 4Rx4) RDIMM		49Y1418	
7	Virtual media key		49Y8425	
8a	Cover, power supply			69Y1046
8b	Power-supply paddle card			94Y8063
9	System board			81Y6746
10	Power-supply bay filler	49Y4821		
11	Power supply, 675 W, ac	39Y7225		
11	Power supply, 675 W, ac	39Y7236		
11	Power supply, 675 W, ac	69Y5919		
11	Power supply, 675 W, ac	39Y7227		
11	Power supply, 675 W, ac	69Y5909		
11	Power supply, 675 W, high-efficiency	39Y7218		
11	Power supply, 675 W, high-efficiency	39Y7239		
11	Power supply, 675 W, high-efficiency	69Y5903		
11	Power supply, 675 W, high-efficiency	69Y5901		
12a	Chassis (for 3.5-inch hot-swap hard disk)			69Y4539
12b	Chassis (for 2.5-inch hot-swap hard disk)			69Y4538
13a	Hard disk drive, hot-swap, 3.5-inch 2 TB SATA	42D0783		
13a	Hard disk drive, hot-swap, 3.5-inch 500 GB SATA	39M4533		
13a	Hard disk drive, hot-swap, 3.5-inch 250 GB SATA	40K6889		
13a	Hard disk drive, hot-swap, 3.5-inch 300 GB SAS (14 K)	44W2235		
13a	Hard disk drive, hot-swap, 3.5-inch 450 GB SAS (15 K)	44W2240		
13a	Hard disk drive, hot-swap, 3.5-inch 600 GB SAS (15 K)	44W2245		
13a	Hard disk drive, hot-swap, 600 GB SFF SAS 10 K	49Y2004		
13b	Hard disk drive, hot-swap, 2.5-inch 146 GB 10 K	42D0633		
13b	Hard disk drive, hot-swap, 2.5-inch 300 GB 10 K	42D0638		
13b	Hard disk drive, hot-swap, 2.5-inch 146 GB 15 K	42D0678		
13b	Hard disk drive, hot-swap, 2.5-inch 500 GB 7.2 K	42D0708		
13b	Hard disk drive, hot-swap, 2.5-inch 160 GB 7.2 K	42D0748		
13b	Hard disk drive, hot-swap, 2.5-inch 500 GB 7.2 K	42D0753		
13b	Hard disk drive, hot-swap, 2.5-inch 2 TB 6 GB SAS (7.2 K)	42D0768		
13b	Hard disk drive, hot-swap, 2.5-inch 1 TB 6 GB SAS (7.2 K)	42D0778		
13b	Hard disk drive, hot-swap, 2.5-inch 1TB SATA	43W7629		
14a	Filler, hot-swap hard disk drive (models 22x, 32x, 42x, and 62x)	42R7992		
14b	Filler, hot-swap hard disk drive (models 52x and 72x)	44T2248		
15a	Bracket, 3.5-inch hot-swap backplane bracket kit			69Y4524

Table 8. Parts listing, Type 7377 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
15b	Backplane, 3.5-inch (4 x 3), without bracket			69Y4741
15c	Backplane, 2.5-inch hot-swap hard disk drive (with bracket)			69Y4526
16	Air baffle		69Y1055	
17	USB board		69Y4244	
18	USB hypervisor key		49Y5375	
21	Fan board			69Y4246
21	Fan cage assembly			69Y1056
	Backplane assembly, 3.5-inch (2 x 1)		69Y4525	
	Backplane assembly, 2.5-inch (2 x 2)		69Y4527	
	Battery, 3.0 volt	33F8354		
	EIA LED board		69Y4245	
	Heat sink bracket		46D1375	
	Fan, with cable (60 x 56 mm)			69Y1054
	Fan, rear			69Y4535
	Filler, power supply	49Y4821		
	Flash memory, 2 GB		42D0545	
	Front IO assembly			69Y1050
	Front USB board assembly			69Y1052
	Cover, front IO assembly			69Y1049
	Cover, front USB			69Y4534
	PCIe riser card (1 x 16 and 1 x 8)		69Y4242	
	PCIe riser card (1 x 4)		69Y4243	
	Cable, 24-inch SATA			25R5635
	Cable, backplane to PDB power		69Y4491	
	Cable, fan power			69Y4211
	Cable, fan signal		69Y4489	
	Cable, I^2C planar to to hot-swap hard disk drive backplane (for 2.5-inch hard disk drive model)		69Y4495	
	Cable, I^2C planar to to hot-swap hard disk drive backplane (for 3.5-inch hard disk drive model)		69Y4497	
	Cable, interposer USB		69Y4212	
	Cable, iPass mini SAS 900 mm, 26-pin		69Y4493	
	Cable, iPass mini SAS 620 mm		69Y4496	
	Cable, iPass mini SAS 840 mm		69Y4494	
	Cable, LED signals 700 mm		69Y4492	
	Cable, ServeRAID battery (with interposer card)		44E8844	
	Cable, Y type power		69Y4490	
	Cage assembly, rear 3.5-inch hot-swap			69Y4536

Table 8. Parts listing, Type 7377 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	Cage assembly, rear 2.5-inch hot-swap			69Y4537
	Filler, rear hard disk drive	69Y1047		
	Latch, hard disk drive backplane		69Y4544	
	Power cord, 2.8 M	39M5377		
	ServeRAID M1000 series feature key			46M0864
	ServeRAID M5000 series feature key		46M0931	
	Rail kit		69Y1044	
	3.5-inch label kit		69Y4531	
	2.5-inch label kit		69Y4530	
	Miscellaneous kit			69Y4532
	Keyboard, USB, US English	42C0060		
	Keyboard, USB UltraNAV, US English	40K9400		
	Remote upgrade		46C7532	
	Mouse, USB wheel, 2-button	39Y9875		
	Mouse, USB optical, 3-button	40K9203		
	Alcohol wipe	59P4739		

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

Table 9. Consumable parts, Type 7377

Index	Description	Part number
20	ServeRAID M5000 series battery (model 62x)	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.

Power cords

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

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

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

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

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

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

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

IBM power cord part number	Used in these countries and regions
39M5172	Israel
39M5095	220 - 240 V Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States of America, Venezuela
39M5081	110 - 120 V Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela
39M5219	Korea (Democratic People's Republic of), Korea (Republic of)
39M5199	Japan
39M5068	Argentina, Paraguay, Uruguay
39M5226	India
39M5233	Brazil

Chapter 5. Removing and replacing server components

Replaceable components are of four types:

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

See Chapter 4, “Parts listing, Type 7377 server,” on page 125 to determine whether a component is a Tier 1 CRU, Tier 2 CRU, or FRU.

For information about the terms of the warranty, see the *Warranty Information* document.

Installation guidelines

Attention:

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

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

- Read the safety information that begins on page vii, and the guidelines in “Handling static-sensitive devices” on page 135. This information will help you work safely.
- When you install your new server, take the opportunity to download and apply the most recent firmware updates.

  Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.This step will help to ensure that any known issues are addressed and that your server is ready to function at maximum levels of performance. To download firmware updates for your server, complete the following steps:

  1. Go to http://www.ibm.com/systems/support/.
  2. Under **Product support**, click **System x**.
  3. Under **Popular links**, click **Software and device drivers**.
  4. Click **System x3630 M3** to display the matrix of downloadable files for the server.

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

- Before you install optional hardware, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed, or that a 19990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see Chapter 3, "Diagnostics," on page 23 for diagnostic information.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the cover is removed, make sure that no one is near the server and that no tools or other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you can stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- To view the error LEDs on the system board and internal components, leave the server connected to power.
- You do not have to turn off the server to install or replace redundant hot-swap ac power supplies or hot-plug Universal Serial Bus (USB) devices. However, you must turn off the server before you perform any steps that involve removing or installing adapter cables or non-hot-swap optional devices or components.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on. It also indicates that non-hot-swap component that you need to turn off the server before performing any action on it.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.
- For a list of supported optional-devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- If the server has redundant power, each of the power-supply bays has a power supply installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap drive within 2 minutes of removal.
- You do not operate the server without the air baffle installed. Operating the server without the air baffle might cause the microprocessor to overheat.

Handling static-sensitive devices

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

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

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

Returning a device or component

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

Internal cable routing and connectors

Attention: To disconnect the optional optical drive cable, you must first press the connector release tab, and then disconnect the cable from the connector on the system board. Do not disconnect the cable by using excessive force. Failing to disconnect the cable properly may damage the connector on the system board. Any damage to the connector may require replacing the system board.

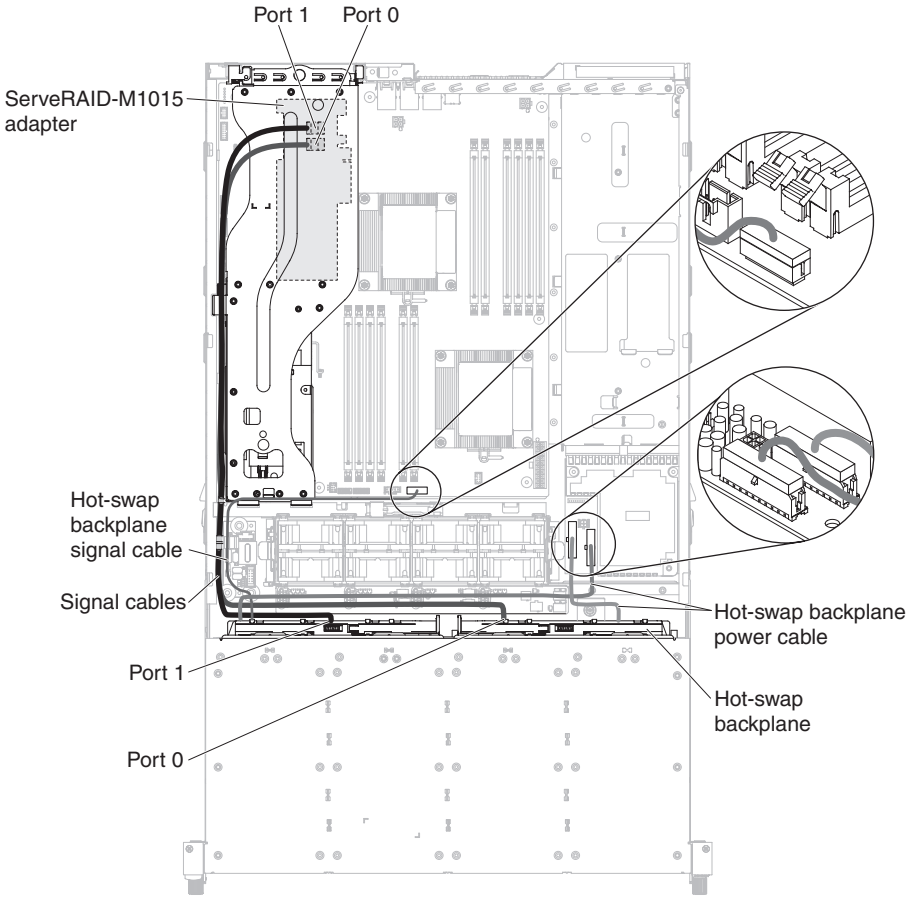
Hot-swap hard disk drive backplane cable connections

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

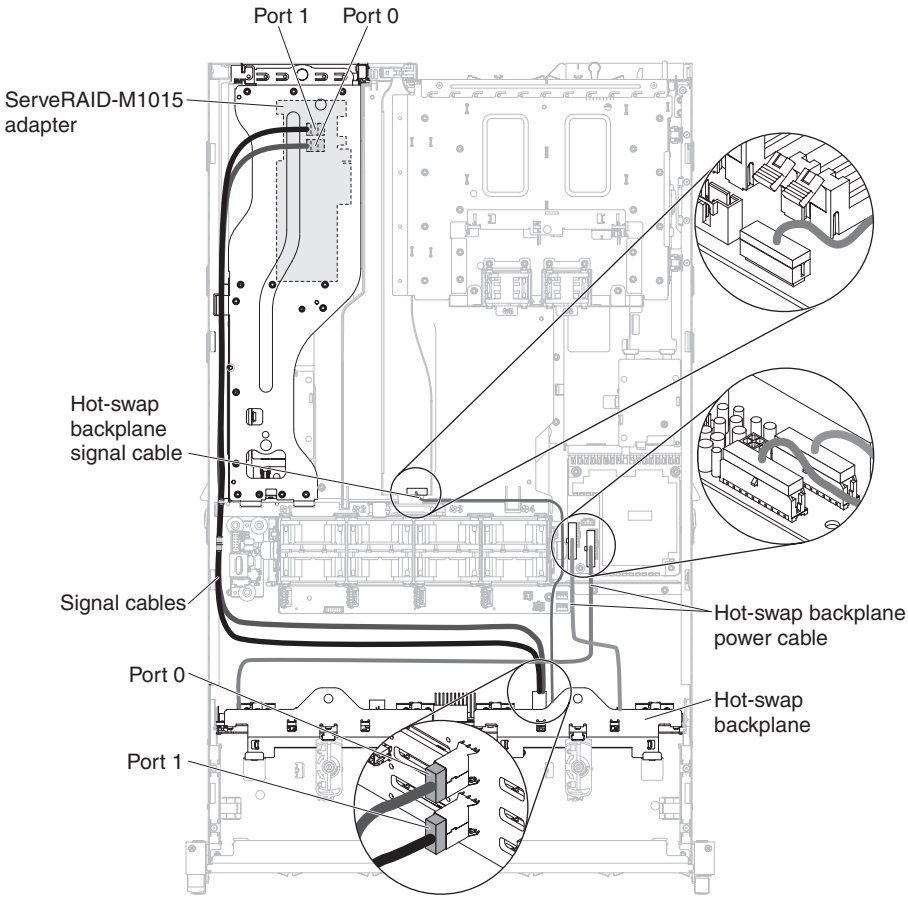
Notes:

1. To connect the hot-swap backplane signal cables, make sure that you first connect the signal cable, and then the power cable.
2. The signal cables are always disconnected first, and then the power cable and the hot-swap backplane signal cable.
3. Make sure the longer signal cable connects to Port 0 and the shorter signal cable connects to Port 1 on the ServeRAID-M1015 adapter.

The following illustration shows the cable routing of the server model with twelve 3.5-inch SAS/SATA hot-swap hard disk drive bays.



The following illustration shows the cable routing of the server model with twenty-four 2.5-inch SAS/SATA hot-swap hard disk drive bays.


Port 1
Port 0
ServeRAID-M1015
adapter
Hot-swap
backplane
signal cable
Signal cables
Hot-swap backplane
power cable
Port 0
Hot-swap
backplane
Port 1

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.

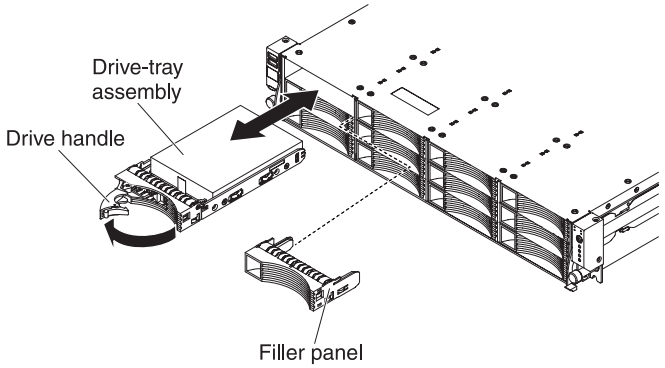
The illustrations in this document might differ slightly from your hardware.

Removing a hot-swap hard disk drive

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

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

1. Read the safety information that begins on page vii, “Handling static-sensitive devices” on page 135, and “Installation guidelines” on page 133.
2. Press on the release latch on the drive front.



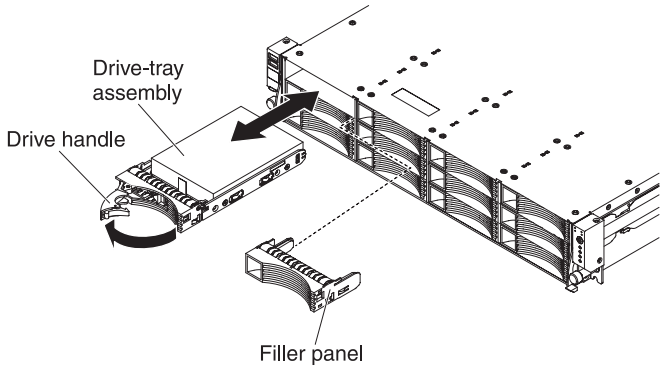
3. Rotate the handle on the drive to the open position.
4. Pull the hot-swap drive assembly out of the bay approximately 25 mm (1 inch). Wait approximately 45 seconds while the drive spins down before you remove the drive assembly completely from the bay.
5. If you are instructed to return the hot-swap drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a hot-swap hard disk drive

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 drive. For a list of supported 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.
- The server supports up to twelve 3.5-inch or twenty-four 2.5-inch hot-swap SAS/SATA hard disk drives. For a list of supported hard disk drives, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.
- All hot-swap drives in the server should have the same throughput speed rating. Using hard disk drives with different speed ratings will cause all drives to operate at the throughput speed of the slowest drive.

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



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

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

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

After you replace a failed hard disk drive, the green activity LED flashes as the disk spins up. The amber LED turns off after approximately 1 minute. If the new drive starts to rebuild, the amber LED flashes slowly, and the green activity LED remains lit during the rebuild process. If the amber LED remains lit, see “Hard disk drive problems” on page 40.

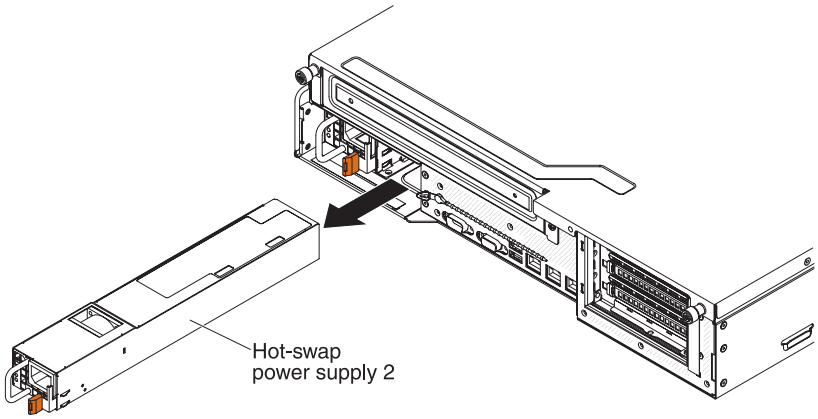
Note: You might have to reconfigure the disk arrays after you install hard disk drives. See the RAID documentation on the IBM *ServeRAID Support* CD for information about RAID controllers.

Removing a hot-swap power supply

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

To remove a power supply, complete the following steps.

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. If only one power supply is installed, turn off the server and peripheral devices.
3. Disconnect the power cord from the power supply that you are removing.
4. Grasp the power-supply handle.
5. Press the orange release latch to the left and hold it in place.



6. Pull the power supply part of the way out of the bay, then release the latch and support the power supply as you pull it the rest of the way out of the bay.
7. If you are instructed to return the power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

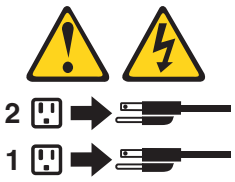
Installing a hot-swap power supply

The server supports a maximum of two hot-swap ac power supplies. Power supply 1 is the default/primary power supply. If the server has two power supplies and if any of the power supplies fails, the server will not have redundant power and you must replace the power supply immediately.

Note: You cannot mix high-efficiency and non-high-efficiency power supplies in the server.

Statement 5:

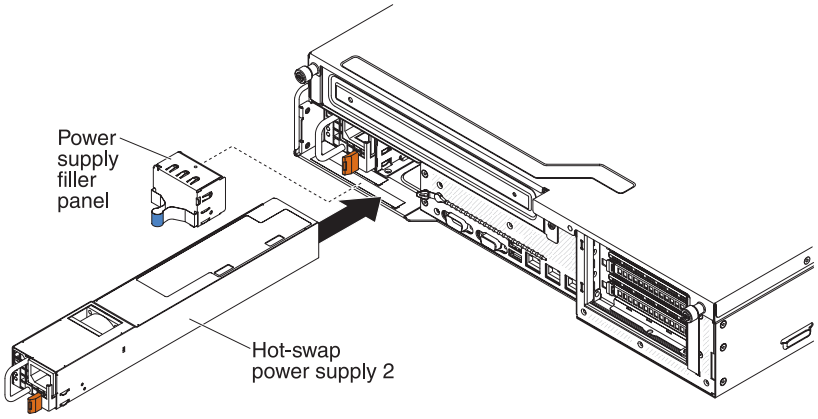
CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from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

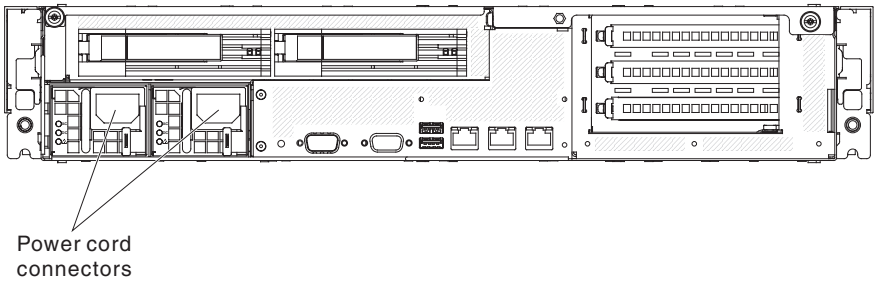


Attention: During normal operation, each power-supply bay must contain either a power supply or power-supply filler for proper cooling.

To install a power supply, complete the following steps:

1. Slide the power supply into the bay until the retention latch clicks into place.
2. Connect the power cord for the new power supply to the power-cord connector on the power supply.

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



3. Route the power cord through the power-supply handle and through any cable clamps on the rear of the server, to prevent the power cord from being accidentally pulled out when you slide the server in and out of the rack.
4. Connect the power cord to a properly grounded electrical outlet.
5. Make sure that the error LED on the power supply is not lit, and that the dc power LED and ac power LED on the power supply are lit, indicating that the power supply is operating correctly.

Removing the system battery

Statement 2:

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

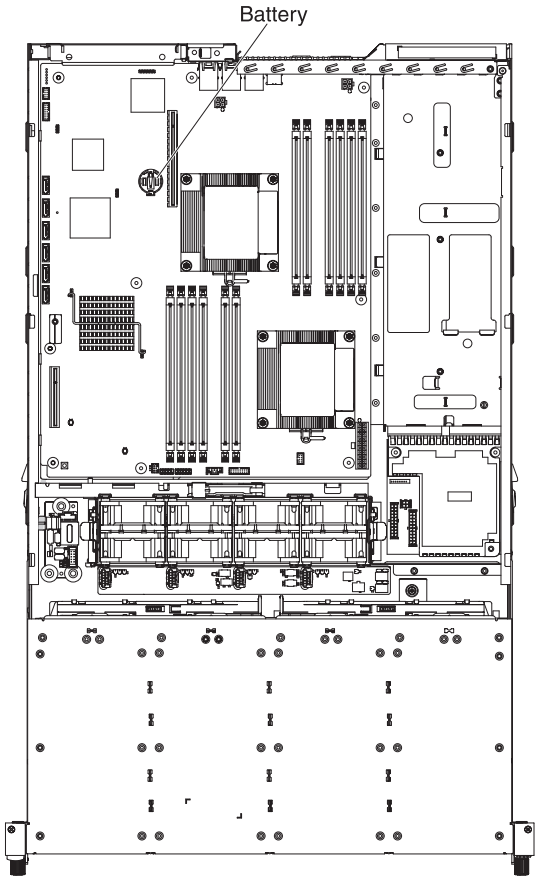
Do not:

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

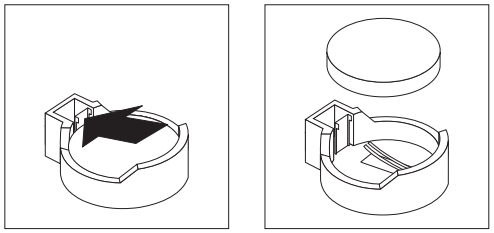
Dispose of the battery as required by local ordinances or regulations.

To remove the battery, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Follow any special handling and installation instructions that come with the battery.
3. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
4. Remove the cover (see “Removing the cover” on page 145).
5. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 150).
6. Locate the battery on the system board.



7. Use one finger to press the top of the battery clip away from the battery. The system battery pops up when it is released.



Attention: Neither tilt nor push the battery by using excessive force.

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

   Attention: Do not lift the battery by using excessive force. Failing to remove the battery properly may damage the socket on the system board. Any damage to the socket may require replacing the system board.

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

Installing the system battery

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

- You must replace the battery with a lithium battery of the same type from the same manufacturer.

- After you replace the battery, you must reconfigure the server and reset the system date and time.
- To avoid possible danger, read and follow the following safety statement.
- To order replacement batteries, call 1-800-IBM-SERV within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your support center or business partner.

Statement 2:

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

Do not:

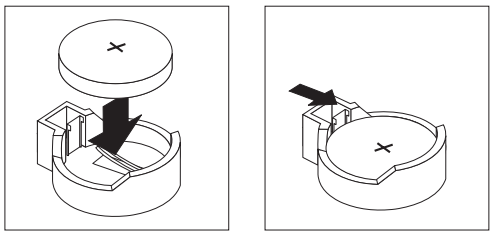
- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

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

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

To install the replacement battery, complete the following steps:

1. Follow any special handling and installation instructions that come with the replacement battery.
2. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.
3. Press the battery down into the socket until it clicks into place. Make sure that the battery clip holds the battery securely.



4. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 151).
5. Install the cover (see “Installing the cover” on page 146).
6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Note: You must wait approximately 2.5 minutes after you connect the power cord of the server to an electrical outlet before the power-control button becomes active.

7. Start the Setup utility and reset the configuration.
   - Set the system date and time.
   - Set the power-on password.
   - Reconfigure the server.

   See Chapter 6, “Configuration information and instructions,” on page 233 for details.

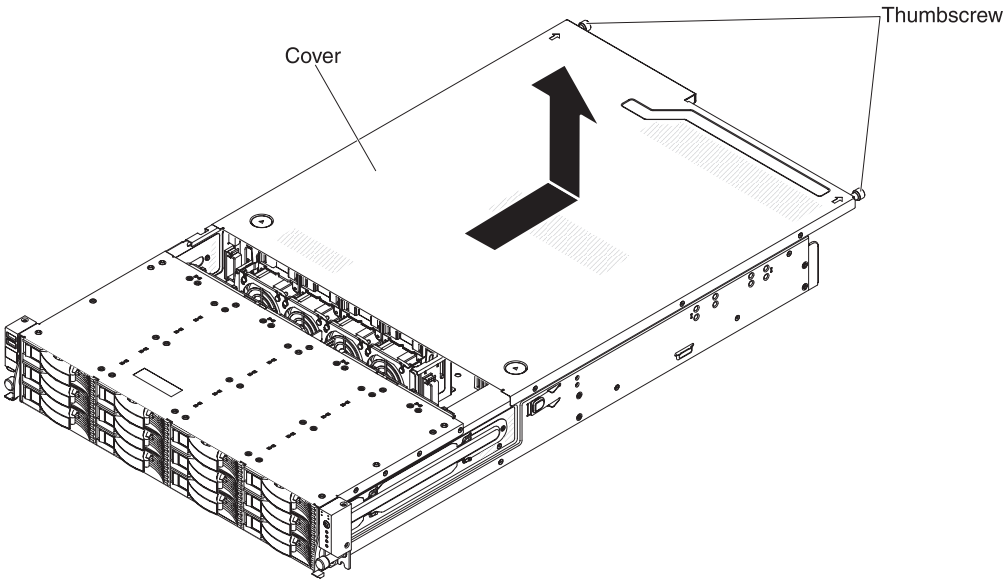
Removing and replacing Tier 2 CRUs

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 cover

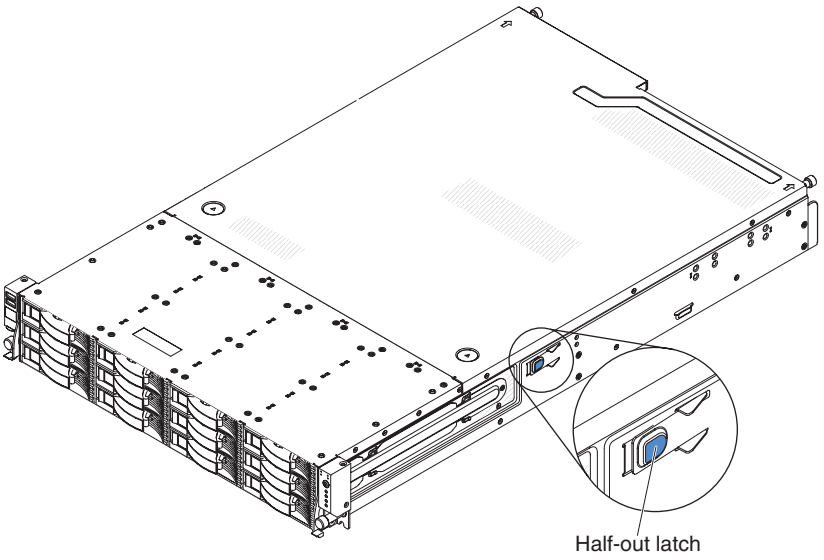
To remove the cover, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. If you are planning to view the error LEDs that are on the system board and components, leave the server connected to power and go directly to step 4.
3. If you are planning to install or remove a microprocessor, memory module, PCI adapter, battery, or other non-hot-swap optional device, turn off the server and all attached devices and disconnect all external cables and power cords.
4. If the server has been installed in a rack, loosen the two thumbscrews on the front of the server and remove the server out of the rack enclosure.

Attention:

- Two or more people are required to remove the system from a rack cabinet.
- To completely remove the server from the rack, press the latches on the sides on the slide rails.



5. Loosen the two thumbscrews that secure the cover to the chassis.
6. Press on the two blue grip points and slide the cover toward the rear; then, lift the cover off the server. Set the cover aside.

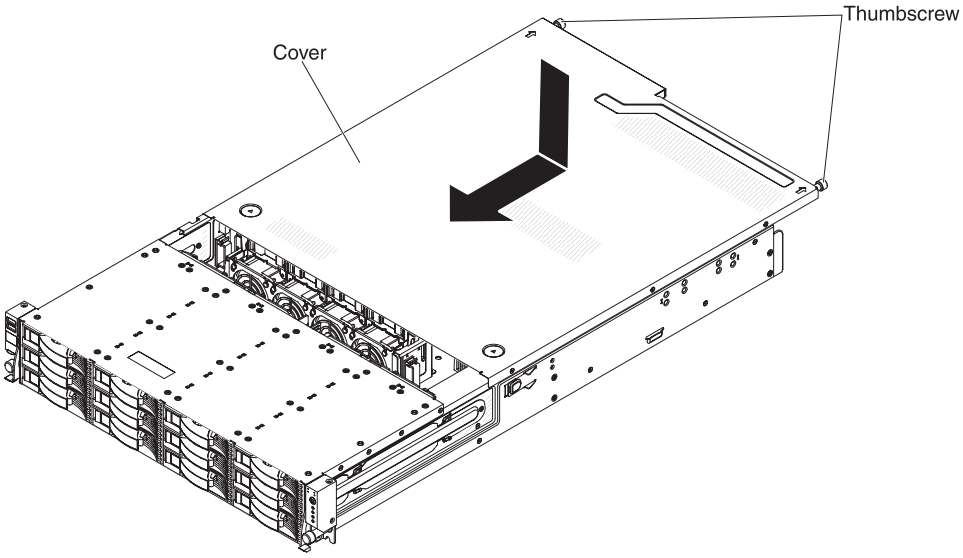
   Attention: For proper cooling and airflow, replace the cover before you turn on the server. Operating the server for extended periods of time (over 30 minutes) with the cover removed might damage server components.
7. If you are instructed to return the cover, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the cover

To install the cover, complete the following steps:

1. Make sure that all internal cables are correctly routed (see “Internal cable routing and connectors” on page 136).
2. Align the cover over the server (toward the rear of the server) until the cover edges slip into position over the chassis.

   Attention: Before sliding 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 hard to remove the cover later.
3. Slide the cover forward toward the front of the server until the cover is completely closed.
4. Tighten the thumbscrews on the rear of the cover to secure the cover to the chassis.

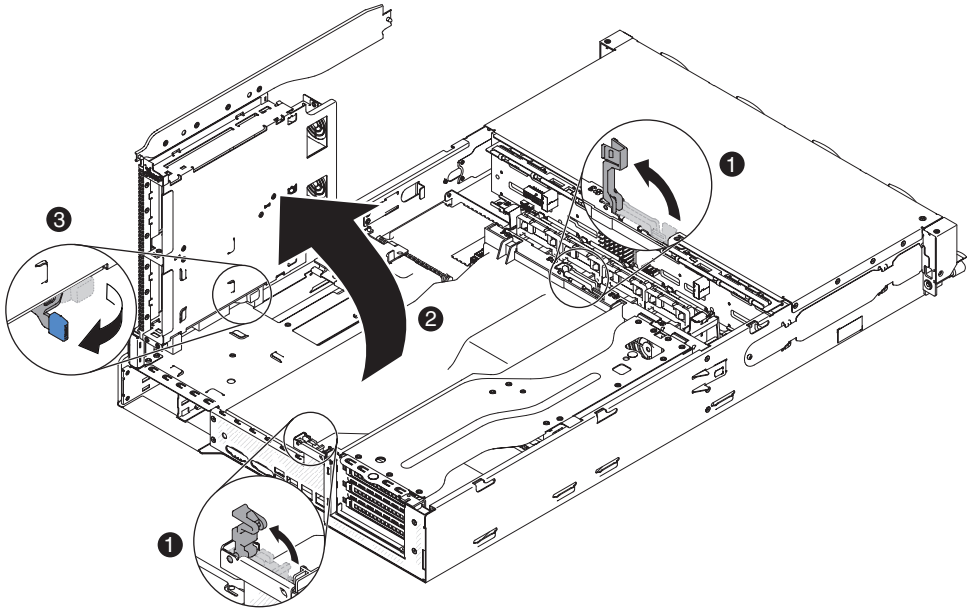


5. Install the server into the rack enclosure and tighten the two front thumbscrews to secure the server in the rack.

   Attention: Two or more people are required to install the system in a rack cabinet.
6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Rotating the optional hot-swap rear hard disk drive cage up

To rotate the optional hot-swap hard disk drive cage up, complete the following steps.

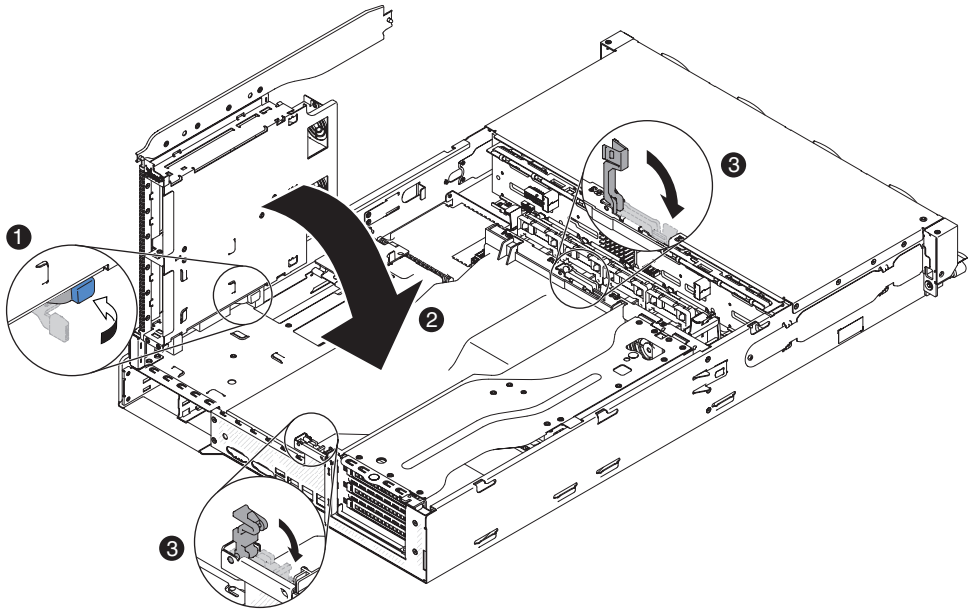


1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).

4. Open the blue latches on the chassis.
5. Rotate the rear hard disk drive cage outwards until it stops.
6. Shift the switch on the rear hard disk drive cage to the lock position so it will not fall down.
7. If you are instructed to return the rear hard disk drive cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Rotating the optional hot-swap rear hard disk drive cage down

To rotate the optional hot-swap hard disk drive cage down, complete the following steps.

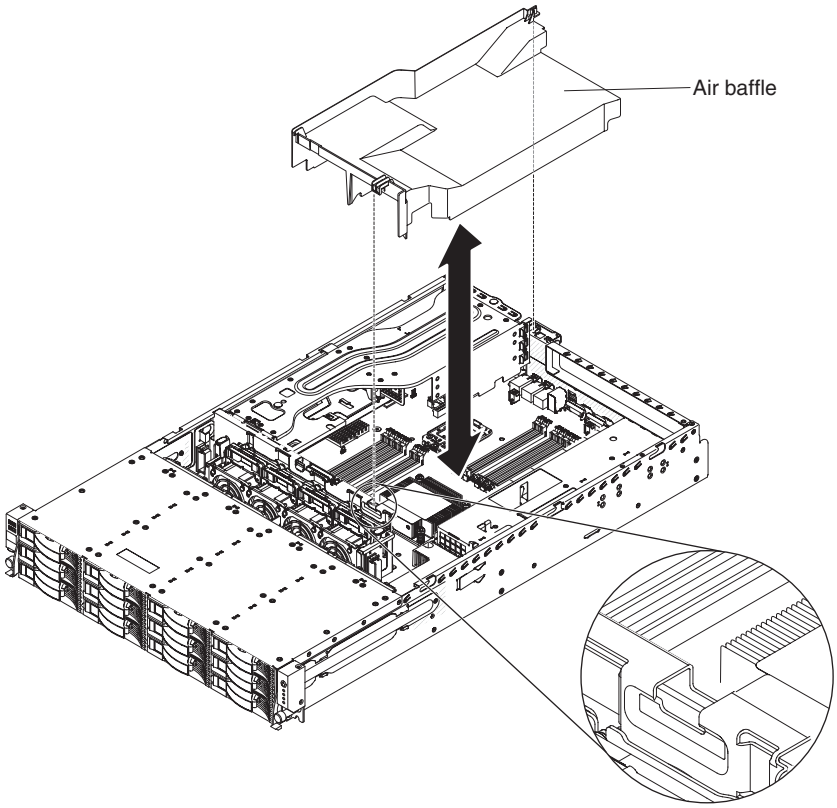


1. Shift the switch on the rear hard disk drive cage to the unlock position.
2. Rotate the cage inward until it sits into place.
3. Close the blue latches on the chassis.
4. Install the cover (see “Installing the cover” on page 146).
5. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the air baffle

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

To remove the air baffle, complete the following steps.

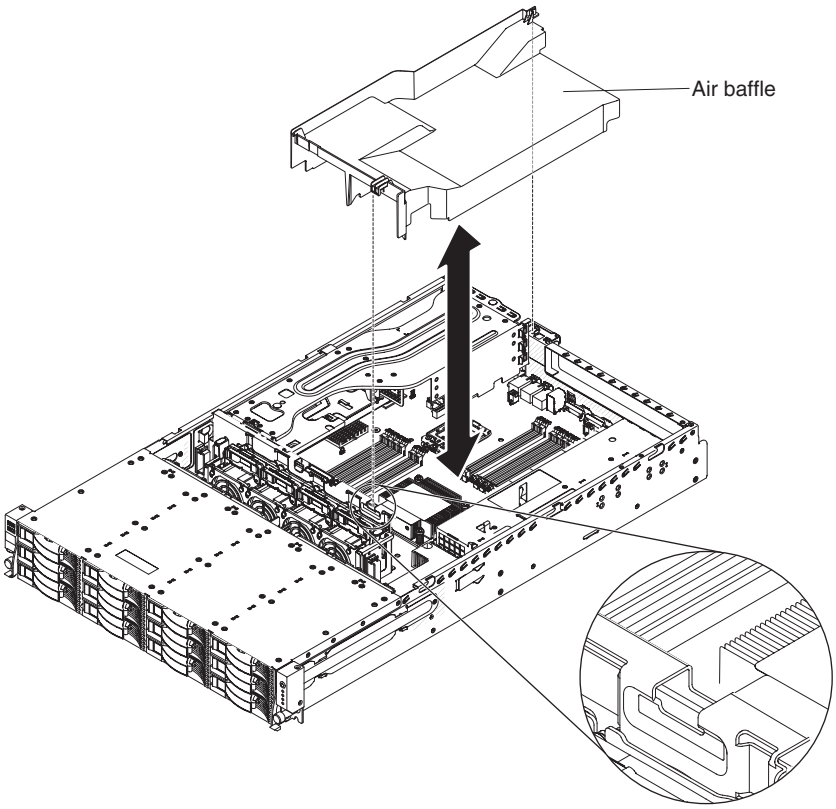


1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 147).
5. Grasp the top of the air baffle and lift the air baffle out of the server.

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

Installing the air baffle

To install the air baffle, complete the following steps.



1. Align the tabs on the air baffle with the slots on the chassis.
2. Lower the air baffle into the server. Make sure that the tabs on the air baffle are inserted into the holes on the chassis (see the illustration).

   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.
3. If you have the optional hot-swap rear hard disk drive cage installed, rotate it down (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 148).
4. Install the cover (see “Installing the cover” on page 146).
5. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

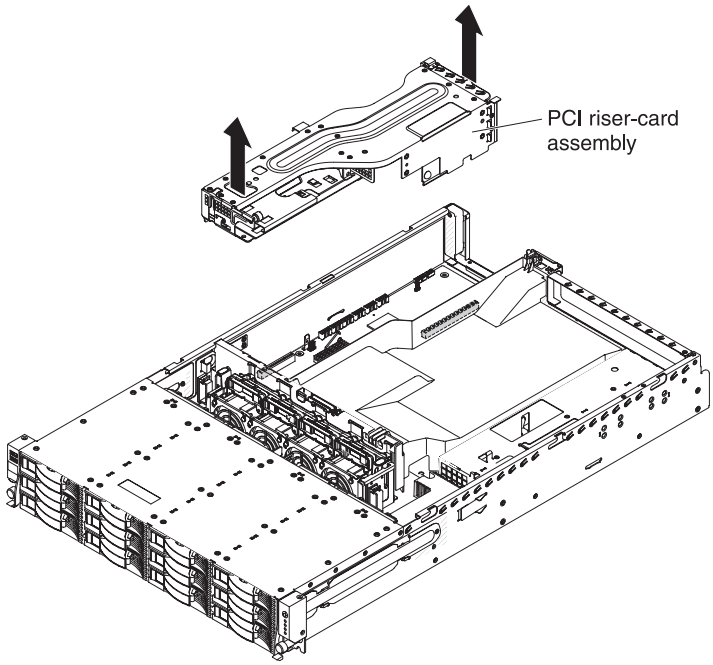
Removing the PCI riser-card assembly

The server comes with one PCI riser-card assembly that contains two PCI Express Gen 2 x16 connectors and one PCI Express x8 connector.

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server cover (see “Removing the cover” on page 145).

4. Grasp the PCI riser-card assembly at the front grip point and rear edge; then, lift to remove it from the server. Disconnect the cables. Place the PCI riser-card assembly on a flat, static-protective surface.

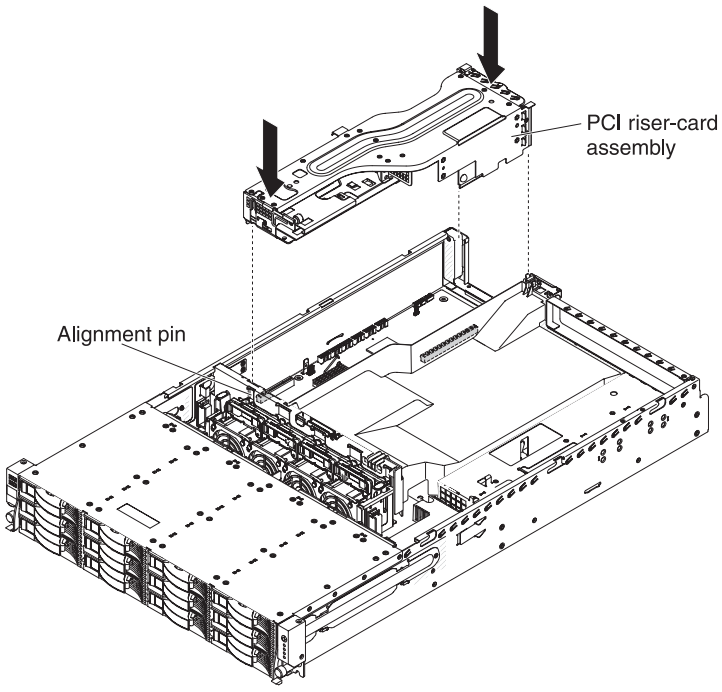


5. If you are instructed to return the PCI riser-card assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the PCI riser-card assembly

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

1. Reinstall any adapters and reconnect any internal cables you might have removed in other procedures (see “Internal cable routing and connectors” on page 136).
2. Connect ServeRAID card signal cables if any.
3. Align the PCI riser-card assembly with the alignment pin and the guide rails on the chassis.



4. Press down on blue touch points on the PCI riser-card assembly to install the assembly in the server. Make sure that the PCI riser-card assembly is fully seated in the PCI connectors on the system board.

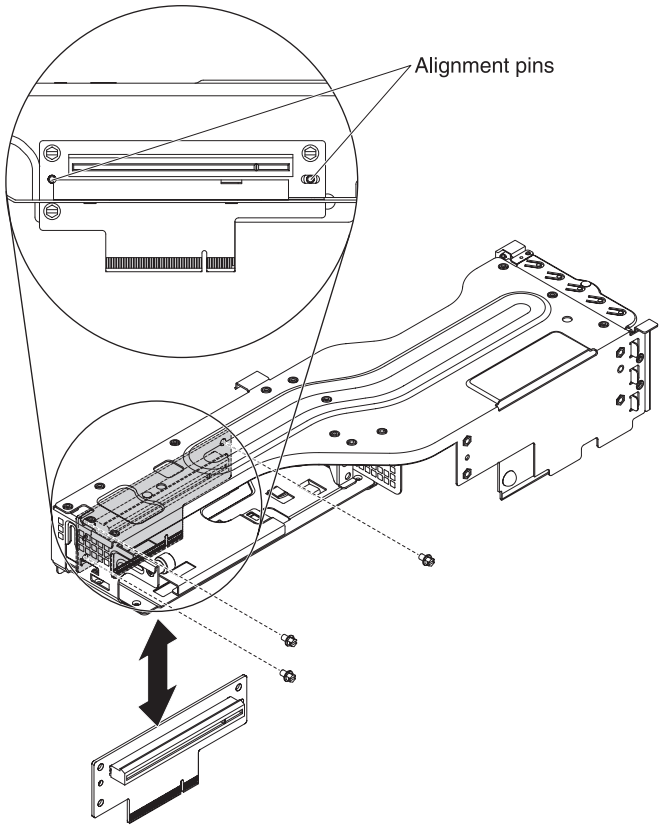
   Attention: Make sure that the cables are not pinched.
5. Install the server cover (see “Installing the cover” on page 146).
6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing a riser card on the PCI riser-card assembly

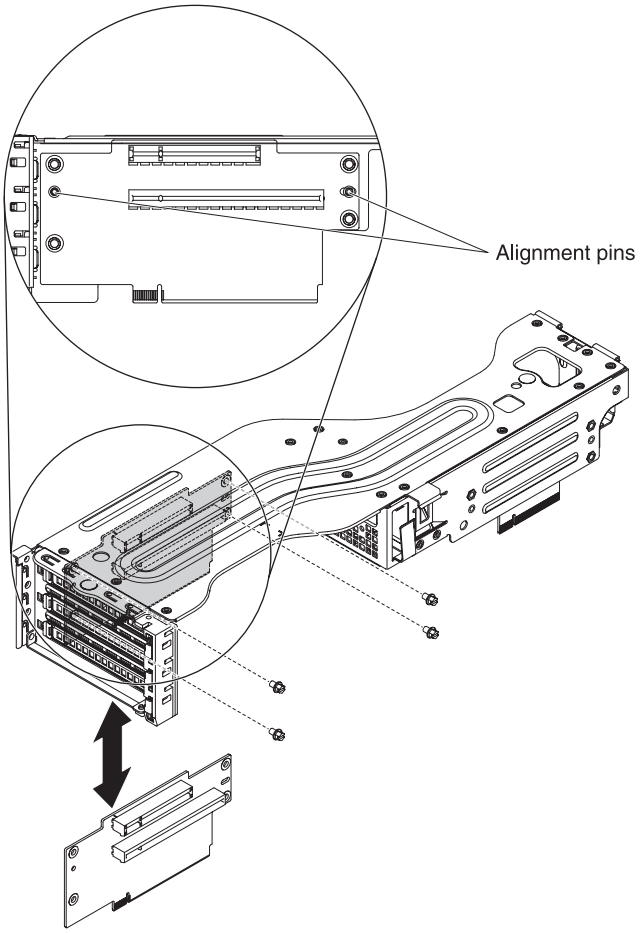
To remove a PCI riser card from the PCI riser-card assembly, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server cover (see “Removing the cover” on page 145).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 150).
5. Remove any adapter on the PCI riser-card assembly (see “Removing an adapter from the PCI riser-card assembly” on page 156).
6. If you are removing PCI riser card 2 that contains the PCI Express Gen 2 x8 connector, you may remove the remote battery trays to obtain more room (see step 5 on page 170 of the “Removing a ServeRAID controller battery from the remote battery tray” on page 170 procedure).
7. Loosen the screws that secure the PCI riser card to the PCI riser-card assembly.

   The following illustration shows how to remove PCI riser card 1 from the PCI riser-card assembly:



The following illustration shows how to remove PCI riser card 2 from the PCI riser-card assembly:



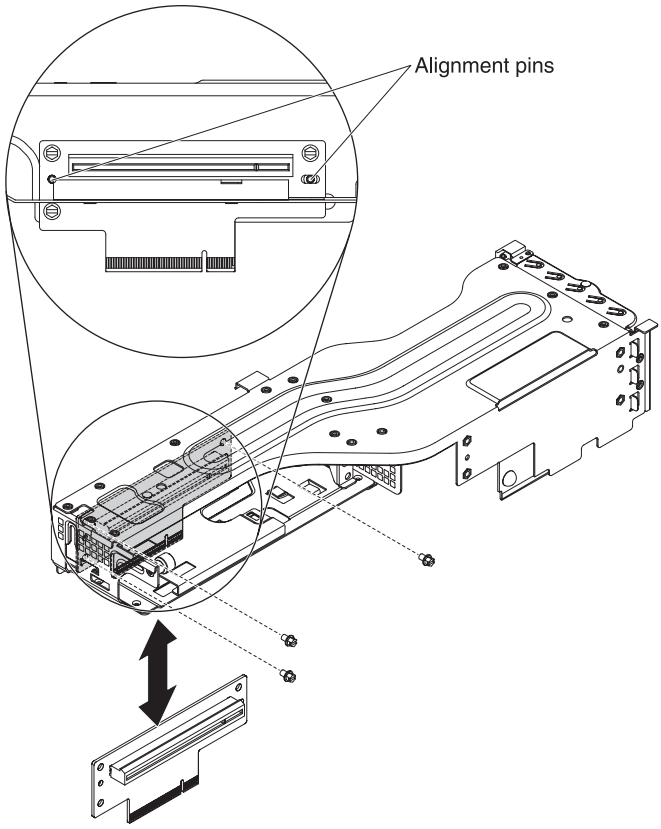
8. Remove the PCI riser card from the PCI riser-card assembly.
9. If you are instructed to return the PCI riser card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a riser card from the PCI riser-card assembly

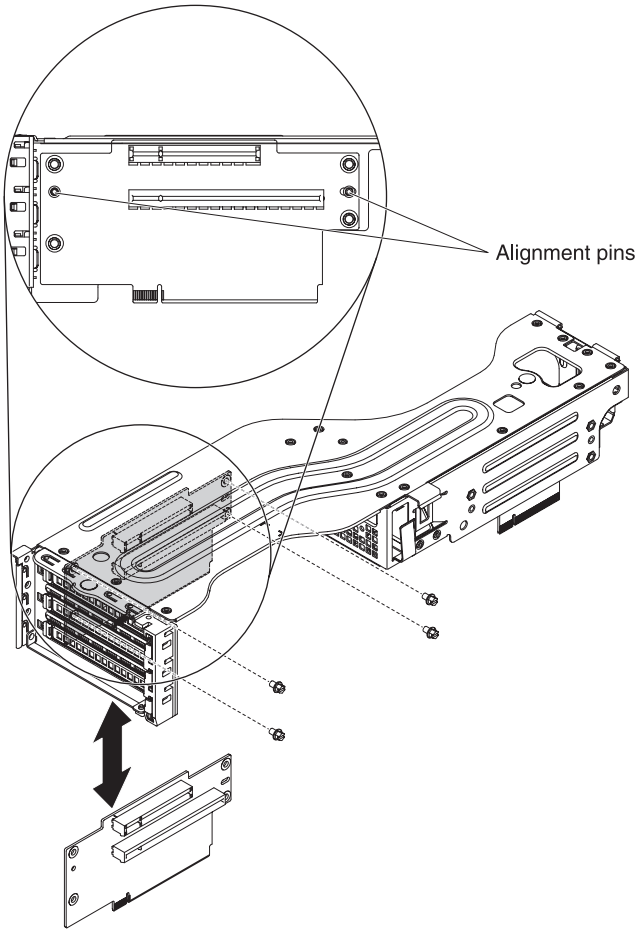
To install a PCI riser card, complete the following steps:

1. Touch the static-protective package that contains the new PCI riser card to any unpainted metal surface on the server. Then, remove the ServeRAID controller from the package.
2. Align the screw holes on the PCI riser card with the screw holes on the PCI riser-card assembly. Make sure the locating pins engages the PCI riser card.

   The following illustration shows how to install PCI riser card 1 on the PCI riser-card assembly:



The following illustration shows how to install PCI riser card 2 on the PCI riser-card assembly:



3. Install the screws to secure the PCI riser card to the PCI riser-card assembly.
4. Install any adapter that you removed (see “Installing an adapter on the PCI riser-card assembly” on page 157).
5. Install the remote battery tray if you removed it (see step 4 on page 174 of the “Installing a ServeRAID controller battery on the remote battery tray” on page 172 procedure).
6. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 151).
7. Install the server cover (see “Installing the cover” on page 146).
8. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

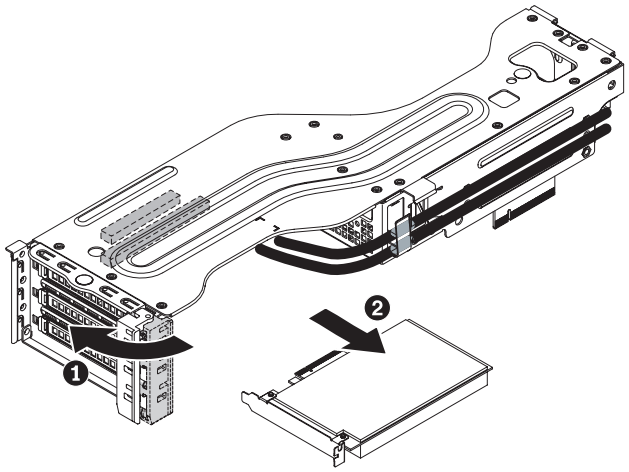
Removing an adapter from the PCI riser-card assembly

This topic describes removing an adapter from a PCI expansion slot in the PCI riser-card assembly. These instructions apply to PCI adapters such as video graphic adapters, and network adapters.

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).

4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 150).
5. Disconnect any cables from the adapter (make note of the cable routing, in case you reinstall the adapter later).
6. Remove the adapter:
   a. If you are removing an adapter from expansion slot 3 or 4, rotate the retention latch on the rear of the PCI riser-card assembly to the open position.



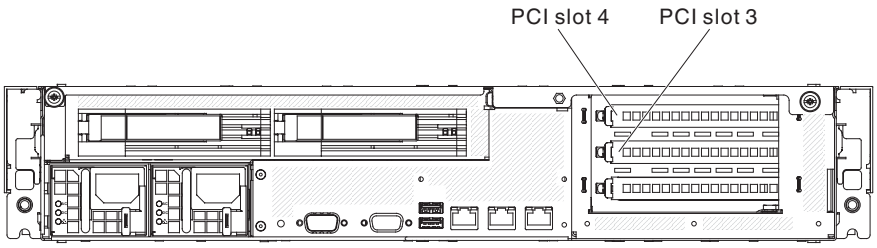
   b. Carefully grasp the adapter by its top edge or upper corners, and pull the adapter from the expansion slot.
7. If you are instructed to return the adapter, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an adapter on the PCI riser-card assembly

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

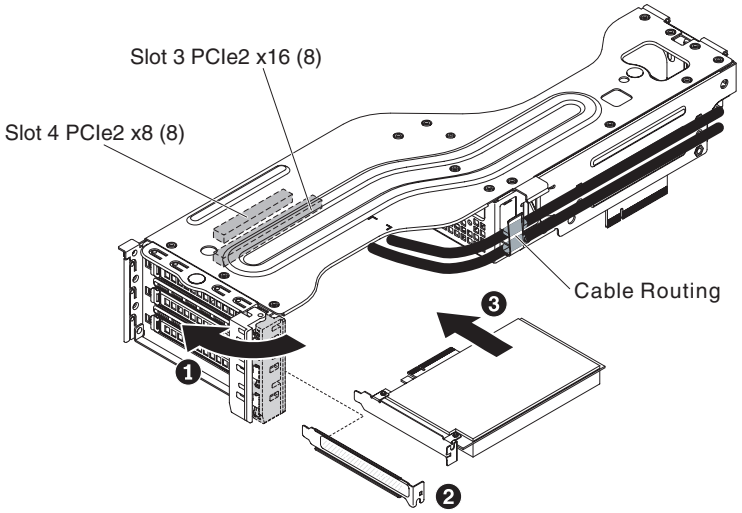
- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you have to change switch settings or jumper settings on the adapter, follow the instructions that come with the adapter.
- The expansion slots in the PCI riser cards accommodate the various form factors of the non-hot-plug adapters as follows:
  – Expansion slot 2: Low-profile with 2U bracket (reserved)
  – Expansion slot 3: Full-height, half-length
  – Expansion slot 4: Full-height, half-length
- Some high performance video adapters are supported by your server. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for more information.
- The optional NVIDIA FX 580 video adapter must be installed in expansion slot 3 on the PCI riser-card assembly.
- The optional ServerRAID M1015 SAS/SATA adapter must be installed in expansion slot 3 on the PCI riser-card assembly if both VMware and ServerRAID M5025 SAS/SATA adapter are installed in the server.

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



To install an adapter, complete the following steps:

1. Touch the static-protective package that contains the new adapter to any unpainted metal surface on the server. Then, remove the adapter from the package.
2. Determine which expansion slot you will use for the adapter.
3. Install the adapter:
   a. If you are installing an adapter in expansion slot 3 or 4, rotate the retention latch on the rear of the PCI riser-card assembly to the open position; then, slide the expansion-slot cover out of the expansion slot.



   b. Align the adapter with the connector on the PCI riser card.
   c. Press the adapter firmly into the connector on the PCI riser card.
4. Connect any required cables to the adapter.

   Attention:

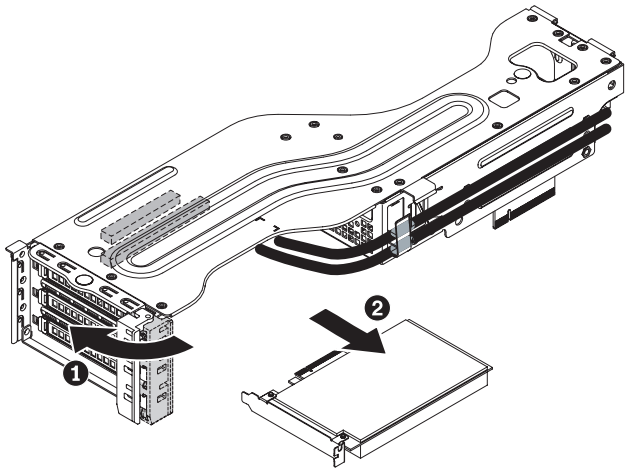
   - When you route cables, do not block any connectors or the ventilated space around any of the fans.
   - Make sure that cables are not routed on top of components that are under the PCI riser-card assembly.
   - Make sure that cables are not pinched by the server components.
5. Rotate the adapter retention latch to secure the adapter on the PCI riser-card assembly.
6. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 151).
7. Perform any configuration tasks that are required for the adapter.
8. Install the server cover (see “Installing the cover” on page 146).

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

Removing a ServeRAID controller from the PCI riser-card assembly

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 150).
5. Disconnect the SAS signal cables from the connectors on the ServeRAID controller and note their locations.
6. Remove the ServeRAID controller:
   a. If you are removing the ServeRAID controller from expansion slot 3 or 4 on the PCI-riser-card assembly, rotate the retention latch on the rear of the PCI riser-card assembly to the open position.

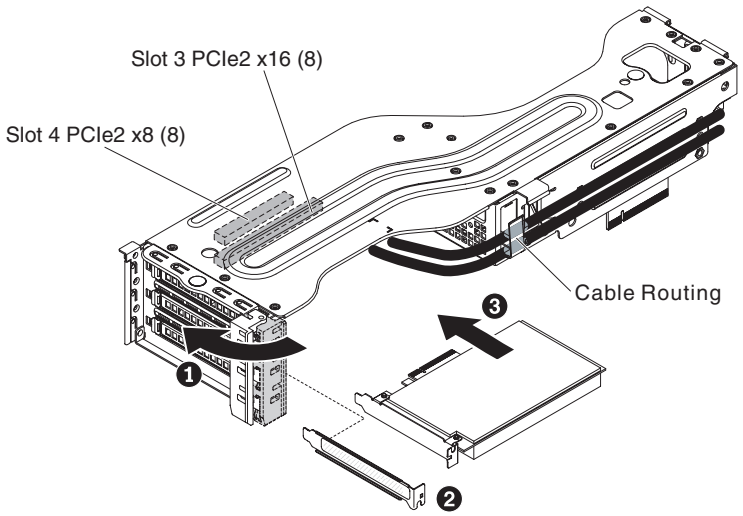


   b. Carefully grasp the ServeRAID controller by its top edge or upper corners, and pull the adapter from the expansion slot.
7. If you are instructed to return the ServeRAID controller, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a ServeRAID controller on the PCI riser-card assembly

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

1. Touch the static-protective package that contains the new ServeRAID controller to any unpainted metal surface on the server. Then, remove the ServeRAID controller from the package.
2. If you are installing a new or replacement ServeRAID controller that uses a battery, complete the following steps:
   a. Remove the battery from the ServeRAID controller package or the battery package.
   b. Install the battery and connect the battery to the ServeRAID controller as instructed in the documentation that comes with the ServeRAID controller or the battery, or see “Installing a ServeRAID controller battery on the remote battery tray” on page 172.
3. Install the ServeRAID controller:
   a. If you are installing the ServeRAID controller in expansion slot 3 or 4, rotate the retention latch on the rear of the PCI riser-card assembly to the open position; then, slide the expansion-slot cover out of the expansion slot.



   b. Align the ServeRAID controller with the connector on the PCI riser card.
   c. Firmly press the ServeRAID controller into the connector on the PCI riser card.
4. Route the signal cables and connect the signal cables to the ServeRAID controller (see “Internal cable routing and connectors” on page 136).
5. Rotate the adapter retention latch back to secure the adapter on the PCI riser-card assembly.
6. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 151).
7. Secure the signal cables with any retention clips.
8. Install the server cover (see “Installing the cover” on page 146).
9. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.
10. Perform any configuration tasks that are required for the ServeRAID controller.

Notes:

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

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

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

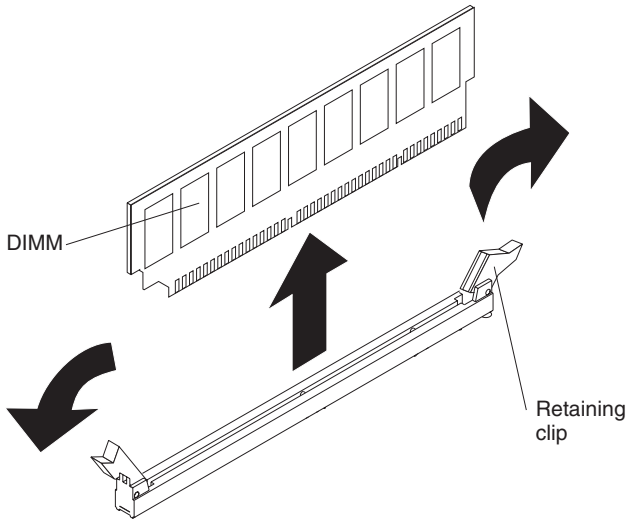
   Until the battery is fully charged, the controller firmware sets the controller cache to write-through mode; after the battery is fully charged, the controller firmware re-enables write-back mode.
2. When you restart the server, you are given the opportunity to import the existing RAID configuration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

Removing a memory module (DIMM)

To remove a DIMM, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 147).
5. Remove the air baffle (see “Removing the air baffle” on page 148).
6. Open the retaining clip on each end of the DIMM connector and lift the DIMM from the connector.

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



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

Installing a memory module

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

- To confirm that the server supports the DIMM that you are installing, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.
- When you install or remove DIMMs, the server configuration information changes. When you restart the server, the system displays a message that indicates that the memory configuration has changed.
- The server supports only industry-standard double-data-rate 3 (DDR3), 800, 1066, or 1333 MHz, PC3-10600R-999, synchronous dynamic random-access memory (SDRAM) registered dual inline memory modules (DIMMs) with error correcting code (ECC).
- The specifications of a DDR3 DIMM are on a label on the DIMM, in the following format.

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

  where:

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

  e is the number of ranks

  1 = single-rank

  2 = dual-rank

  4 = quad-rank

  ff is the device organization (bit width)

  4 = x4 organization (4 DQ lines per SDRAM)

  8 = x8 organization

  16 = x16 organization

  wwwww is the DIMM bandwidth, in MBps

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

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

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

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

  m is the DIMM type

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

  R = Registered DIMM (RDIMM)

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

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

  bb is the JEDEC SPD Revision Encoding and Additions level

  cc is the reference design file for the design of the DIMM
- The maximum memory speed is determined by the combination of the microprocessor, DIMM speed, and the number of DIMMs installed in each channel.
- The following rules apply to DDR3 DIMM speed as it relates to the number of DIMMs in a channel:
  - When you install one DIMM single-rank or dual-rank per channel, the memory runs at 1333 MHz
  - When you install two DIMMs single-rank or dual-rank per channel, the memory runs at 1066 MHz

  - When you install two 1.35 V DIMMs in a channel, the memory runs at 800 MHz. The DIMMs still function at 1.35 V
  - When you install quad-rank DIMMs with single-rank or dual-rank DIMMs in the same channel, the memory runs at 800 MHz
  - All channels in a server run at the fastest common frequency
- In two-DIMM-per-channel configuration, a server with an Intel Xeon X5600 series microprocessor automatically operates with a maximum memory speed of up to 1333 MHz when one of the following conditions is met:
  - Two 1.5 V single-rank or dual-rank RDIMMs are installed in the same channel. In the Setup utility, **Memory speed** is set to **Max performance** mode
  - Two 1.35 V single-rank or dual-ranl RDIMMs are installed in the same channel. In the Setup utility, **Memory speed** is set to **Max performance** and **LV-DIMM power** is set to **Enhance performance** mode. The 1.35 V RDIMMs will function at 1.5 V
- The server supports a maximum of 12 single-rank or dual-rank registered DIMMs (RDIMMs).
- 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 RDIMMs.

Table 10. Maximum memory installation using ranked RDIMMs

DIMM type	Maximum number of DIMMs	DIMM size	Total memory
Single-rank	12	1 GB	12 GB
Singe-rank	12	2 GB	24 GB
Dual-rank	12	2 GB	24 GB
Dual-rank	12	4 GB	48 GB
Dual-rank	12	8 GB	96 GB

- The RDIMM options that are available for the server are 1 GB, 2 GB, 4 GB, and 8 GB. The server supports a minimum of 1 GB and a maximum of 96 GB of system memory.

  For 32-bit operating systems only: Some memory is reserved for various system resources and is unavailable to the operating system. The amount of memory that is reserved for system resources depends on the operating system, the configuration of the server, and the configured PCI devices. To view the total amount of installed memory and the amount of configured memory, run the Setup utility. For additional information, see “Using the Setup utility” on page 235.
- 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. However, to improve system performance, install a minimum of three DIMMs for each microprocessor.

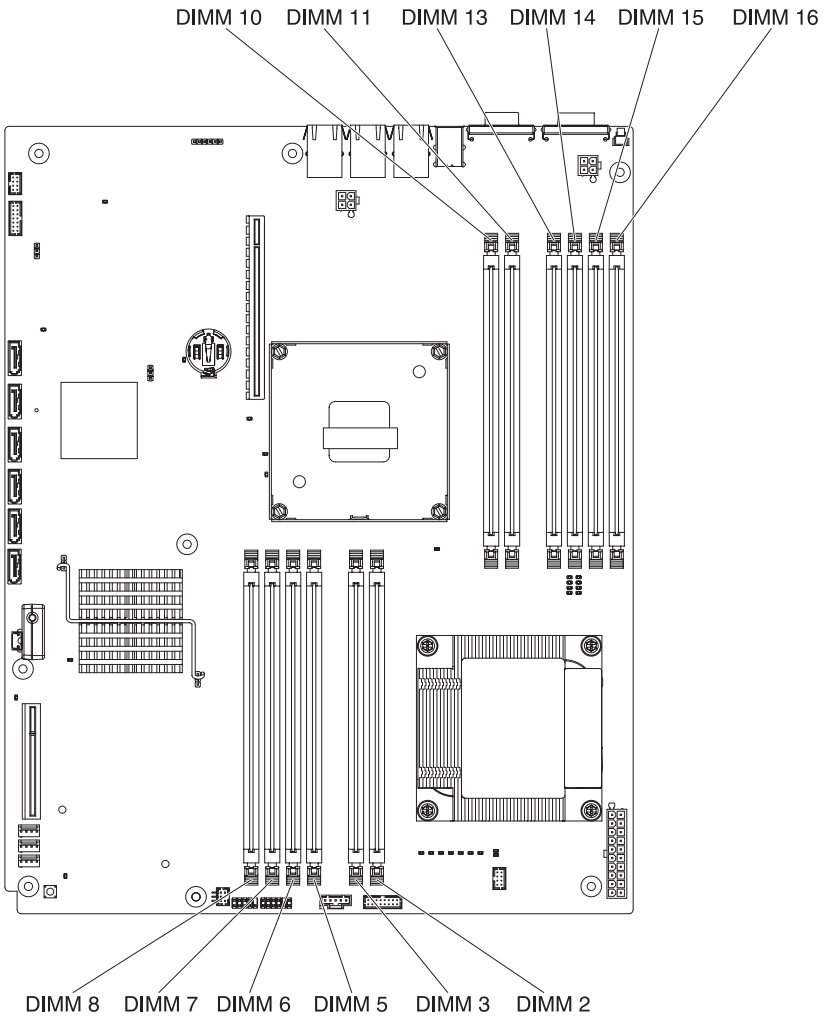
  Note: You can install DIMMs for microprocessor 2 as soon as you install microprocessor 2; you do not have to wait until all of the DIMM connectors for microprocessor 1 are filled.
- When you install one quad-rank RDIMM in a channel, install it in the DIMM connector furthest away from the microprocessor.
- Always install the highest-ranked DIMM in the DIMM connector furthest away from the microprocessor. For example, if you are installing a single-rank,

dual-rank, and quad-rank DIMM in the server, install the quad-rank DIMM first in DIMM connector 8 (for microprocessor 1) or DIMM connector 16 (for microprocessor 2).

- 1.35V DIMMs are only supported on server models with an Intel Xeon™ 5600 series microprocessor.
- If you install a ServeRAID-M1015 SAS/SATA adapter, make sure at least 2 GB of memory is installed in the server before you run DSA from a bootable CD.
- Do not install 1.5V DIMMs and 1.35V DIMMs in the same server.

DIMM installation sequence

The server requires at least one DIMM per microprocessor. Depending on the server models, the server may come with one 2 GB RDIMM or 4 GB RDIMM, or three 4 GB RDIMMs.



When you install additional DIMMs, install them in the order shown in “DIMM installation sequence,” to maintain performance.

Table 11. Non-mirroring (normal) mode DIMM installation sequence

Microprocessors installed	DIMM connector population sequence
1	3, 6, 8, 2, 5, 7
2	3, 11, 6, 14, 8, 16, 2, 10, 5, 13, 7, 15,

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

Table 12. Connectors on each memory channel

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

Memory mirroring

Memory-mirroring mode replicates and stores data on two pairs of DIMMs within two channels simultaneously. If a failure occurs, the memory controller switches from the primary pair of memory DIMMs to the backup pair of DIMMs. You must enable memory mirroring through the Setup utility. For details about enabling memory mirroring, see “Using the Setup utility” on page 235. When you use the memory mirroring feature, consider the following information:

- To support memory mirroring, the DIMMs in each pair must match but the pairs can be different from each other. For example, the first pair of DIMMs must match and the second pair of DIMMs must match; however, the DIMM type for the first and second pair of DIMMs can be different from each other.
- 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.
- Channel 2 DIMM connectors 8 ,7, 15, and 16 are not used in memory-mirroring mode.

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

Table 13. 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
Fourth pair of DIMMs	2	14, 11
Fifth pair of DIMMs	2	13, 10
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.

Online-spare memory

The memory online-spare feature disables the failed memory from the system configuration and activates an online-spare DIMM to replace the failed active DIMM. You can enable either online-spare memory or memory mirroring in the Setup utility (see “Using the Setup utility” on page 235). When you use the memory online-spare feature, consider the following information:

- The memory online-spare feature is supported on server models with an Intel Xeon™ 5600 series microprocessor.
- When you enable the memory online-spare feature, you must install three DIMMs per microprocessor at a time. The first DIMM must be in channel 0, the second

DIMM in channel 1, and the third DIMM in channel 2. The DIMMs must be identical in size, type, rank, and organization, but not in speed. The channels run at the speed of the slowest DIMM in any of the channels.

- The maximum available memory is reduced to 2/3 of the installed memory when memory online-spare mode is enabled. For example, if you install 96 GB of memory using RDIMMs, only 64 GB of addressable memory is available when you use memory online-spare.

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

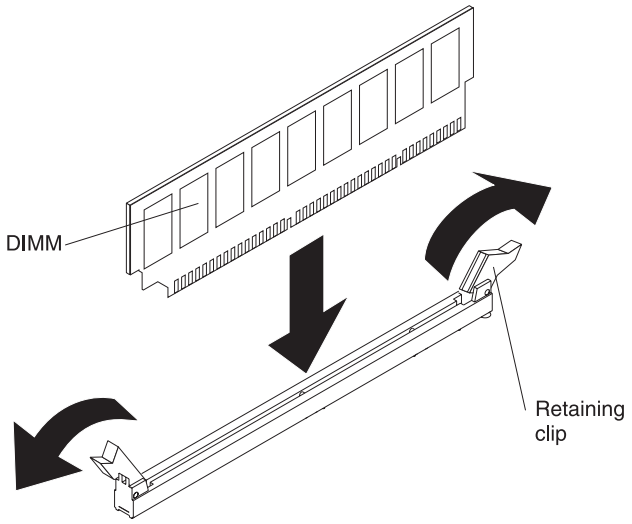
Table 14. Memory online-spare mode DIMM population sequence

Installed Microprocessor	**DIMM connector**
Microprocessor 1	3, 6, 8
	3, 6, 8, 2, 5, 7
Microprocessor 2	11, 14, 16
	11, 14, 16, 10, 13, 15

To install a DIMM, complete the following steps:

1. 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.



2. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.
3. Turn the DIMM so that the DIMM keys align correctly with the connector.
4. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.

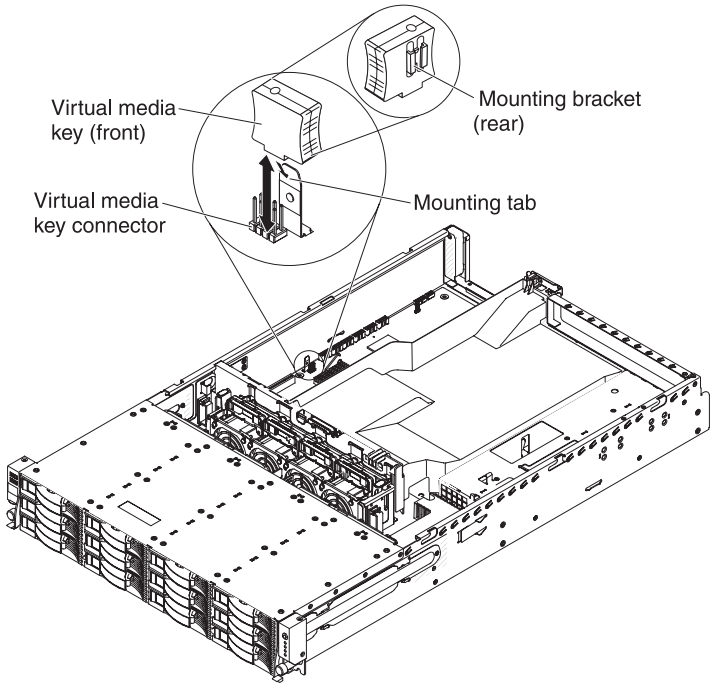
   Attention: If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.
5. Repeat steps 2 through 4 until all the new or replacement DIMMs are installed.

6. Replace the air baffle (see “Installing the air baffle” on page 150), making sure all cables are out of the way.
7. If you have the optional hot-swap rear hard disk drive cage installed, rotate it down (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 148).
8. Install the cover (see “Installing the cover” on page 146).
9. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.
10. Go to the Setup utility and make sure all the installed DIMMs are present and enabled.

Removing an IBM virtual media key

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

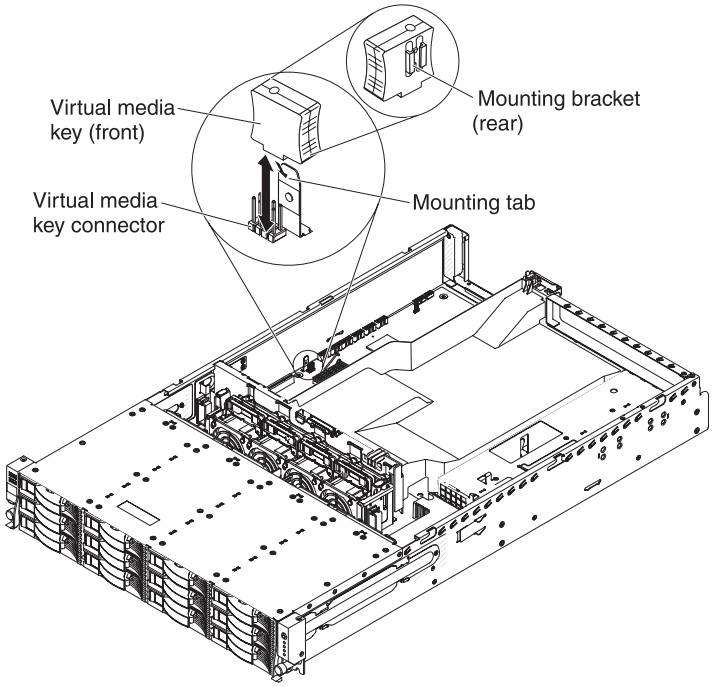
1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 150).
5. Locate the virtual media key on the system board. Grasp it and carefully pull it off the virtual media key connector pins.



Installing an IBM virtual media key

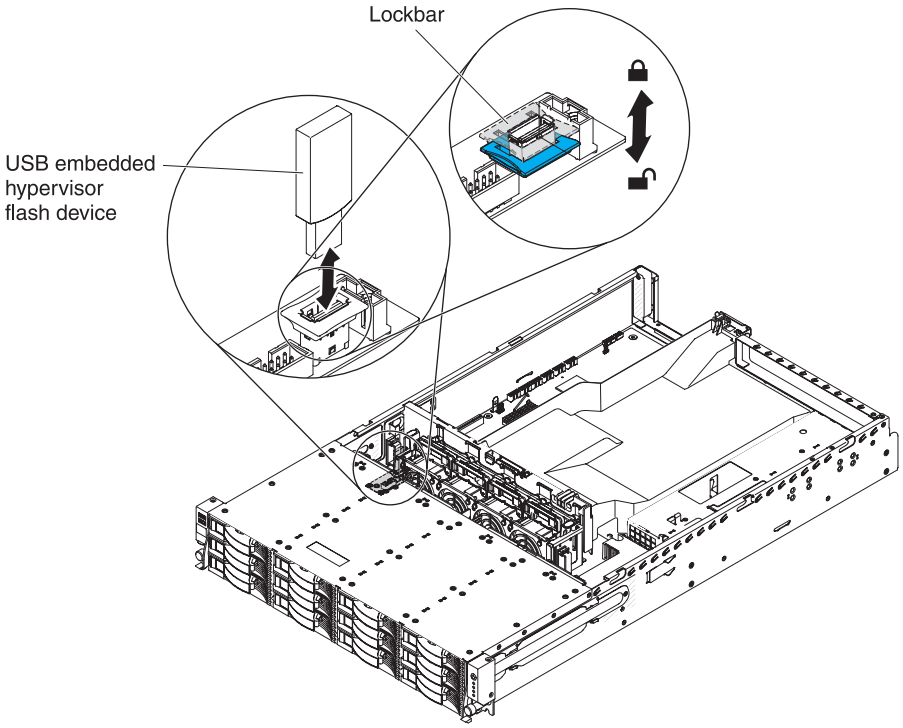
To install a virtual media key, complete the following steps:

1. Align the virtual media key with the virtual media key connector pins on the system board as shown in the illustration.



2. Press the virtual media key down into the connector until it is firmly seated on the system board.
3. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 151).
4. Install the server cover (see “Installing the cover” on page 146).
5. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing a USB hypervisor key

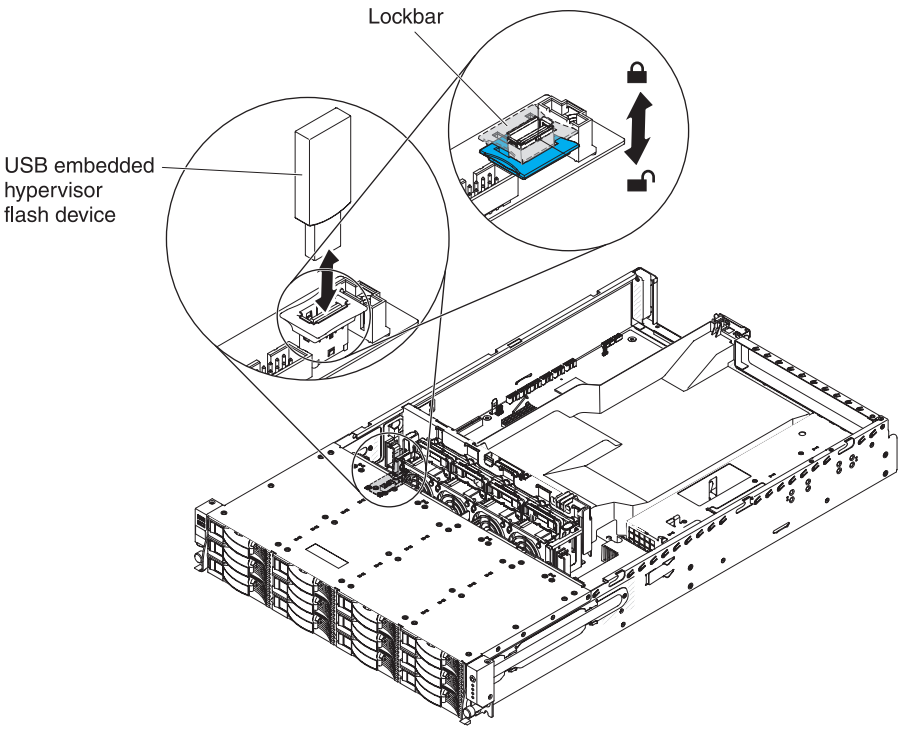


To remove a USB hypervisor key from the server, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. Push down the blue locking collar on the USB hypervisor connector to unlock it from the connector.
5. Pull the hypervisor memory key out of the USB hypervisor connector.
6. If you are instructed to return the hypervisor memory key, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Note: You must configure the server not to look for the hypervisor USB drive. See “Configuring the server” on page 234 for information about disabling hypervisor support.

Installing a USB hypervisor key



To install a USB hypervisor memory key in the server, complete the following steps:

1. Locate the USB hypervisor connector on the USB connector board in the server.
2. Push down the blue locking collar on the USB hypervisor connector (the unlocked position).
3. Insert the hypervisor memory key into the USB hypervisor connector.
4. Pull up the blue lock on the USB hypervisor connector to the locked position, to secure the memory key in position.
5. Install the server cover (see “Installing the cover” on page 146).
6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Note: You will have to configure the server to boot from the hypervisor USB drive. See “Configuring the server” on page 234 for information about enabling the hypervisor memory key.

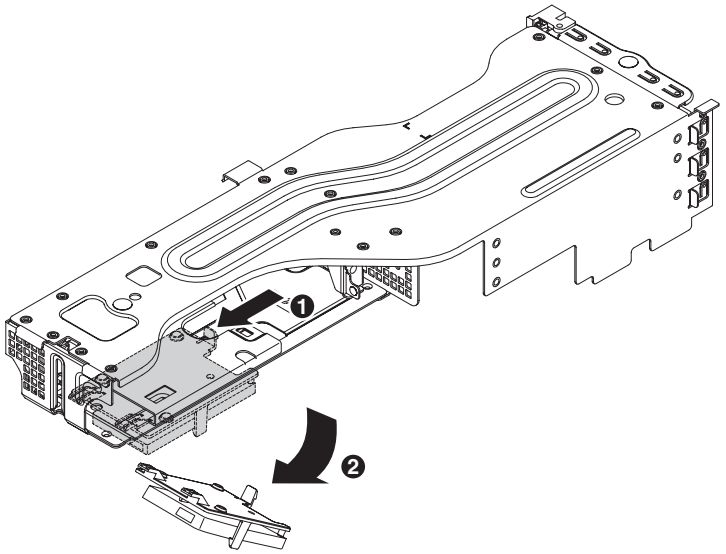
Removing a ServeRAID controller battery from the remote battery tray

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

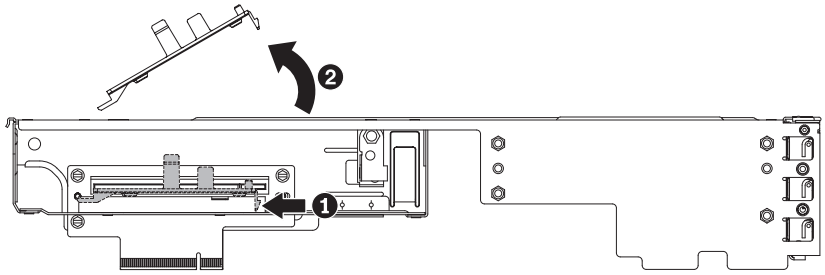
1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 150).
5. Remove the remote battery tray from the PCI riser-card assembly:
   a. Carefully disconnect the remote battery cable from the battery.

b. Press the retention latch to disengage the remote battery tray.

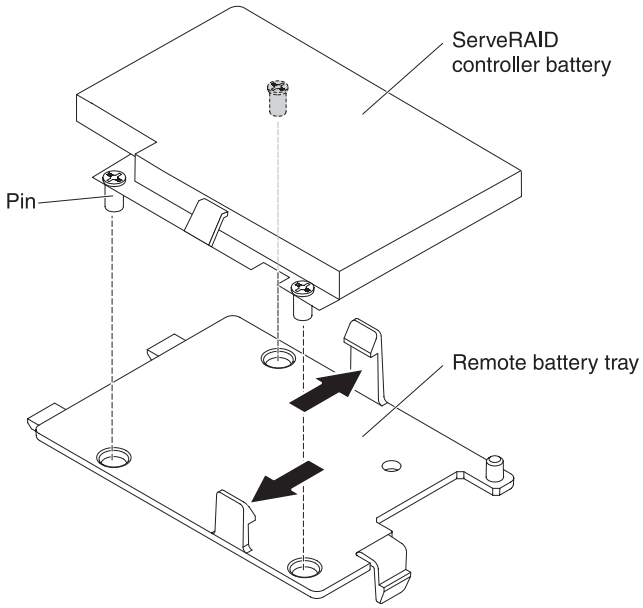
The following illustration shows how to remove the bottom remote battery tray.



The following illustration shows how to remove the top remote battery tray.



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



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

Installing a ServeRAID controller battery on the remote battery tray

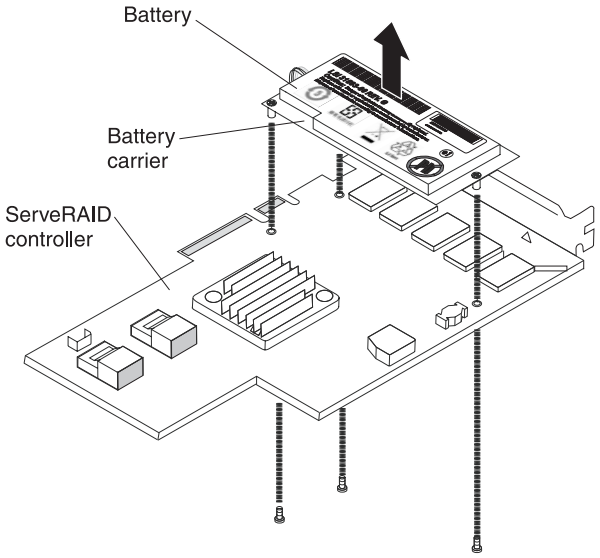
The Intelligent Battery Backup Unit (iBBU) is an optional battery for the ServeRAID adapter. It is referred to as the *battery* throughout this section. You must purchase the remote battery cable and install the battery at a distance from the ServeRAID adapter to avoid overheating.

You can install up to two batteries on the remote battery trays on the PC riser-card assembly.

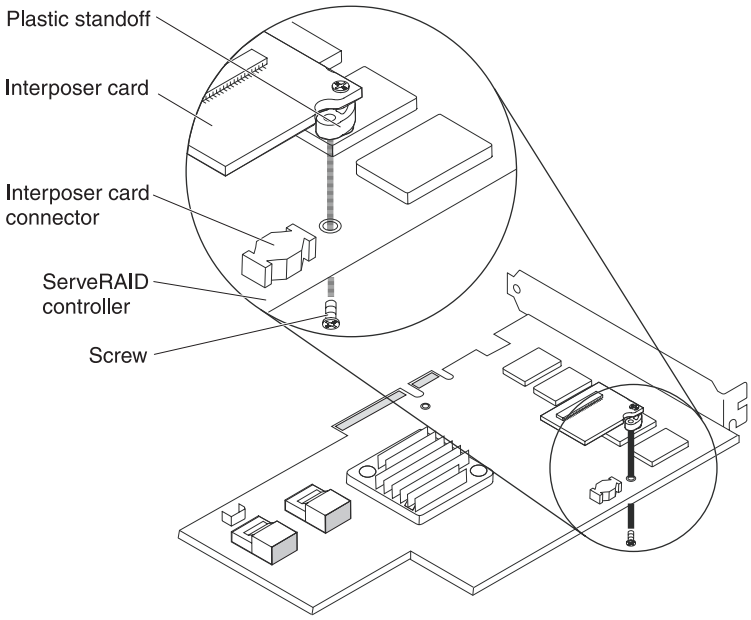
To install a ServeRAID controller battery on the remote battery tray, complete the following steps:

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

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



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

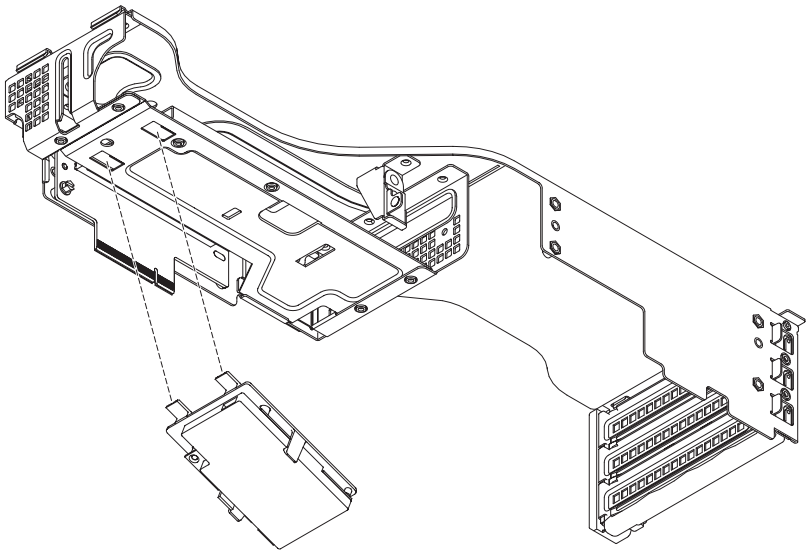


c. Press the interposer card down onto the interposer card connector so that the interposer card is secured.

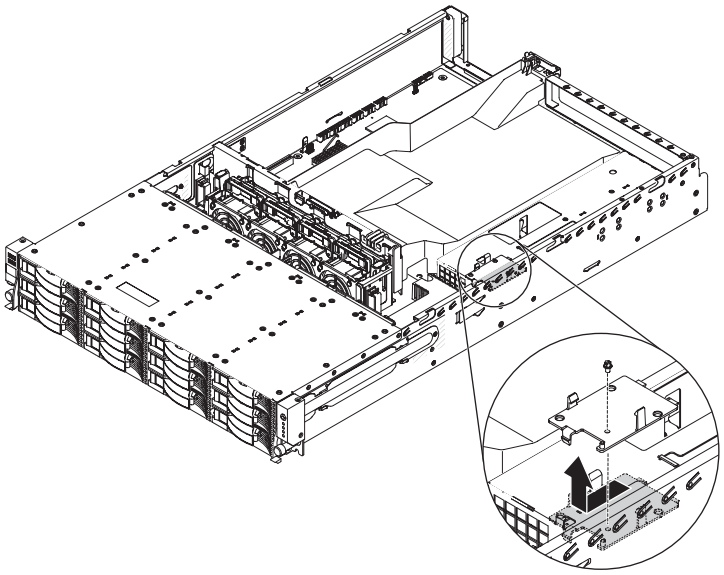
d. From the other side of the ServeRAID controller, insert and tighten the screw to secure the interposer card to the ServeRAID controller.

3. Install the battery on the remote battery tray:

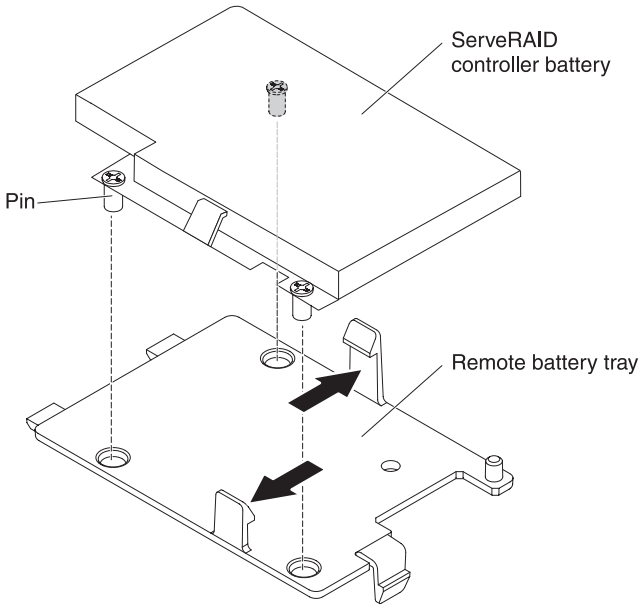
a. Press the retention latch to remove the remote battery tray from the PCI riser-card assembly.



If you are installing a second ServeRAID controller battery, remove the second remote battery tray from the power supply cage.



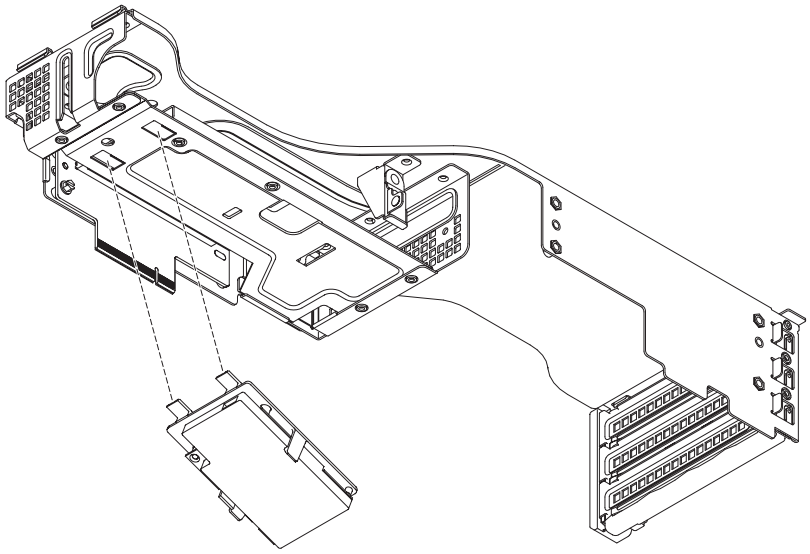
b. On the remote battery tray, find the pattern of recessed rings that matches the posts on the battery carrier.



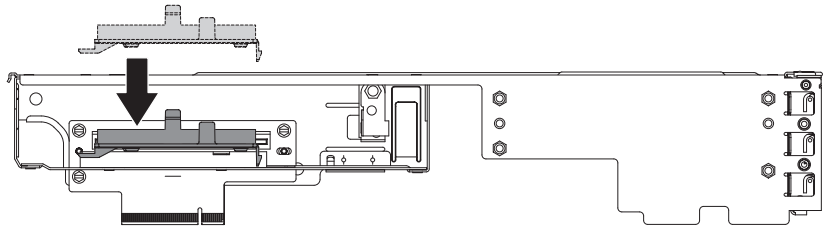
c. Press the posts into the rings on the remote battery tray. Make sure the two retention clips secure the battery and battery carrier on the remote battery tray.

4. Align the two pins on the remote battery tray with the holes on the PCI riser-card assembly and press the retention latch into the slot to secure the remote battery tray on the PCI riser-card assembly.

   The following illustration shows how to instal the bottom remote battery tray.

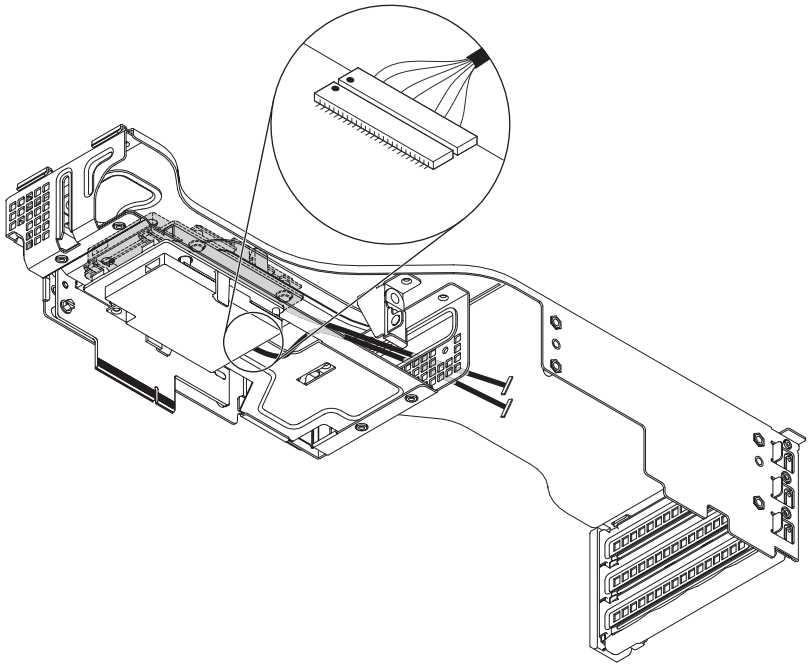


The following illustration shows how to install the top remote battery tray.



5. Route the remote battery cable through the cage hole on the PCI riser-card assembly.

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

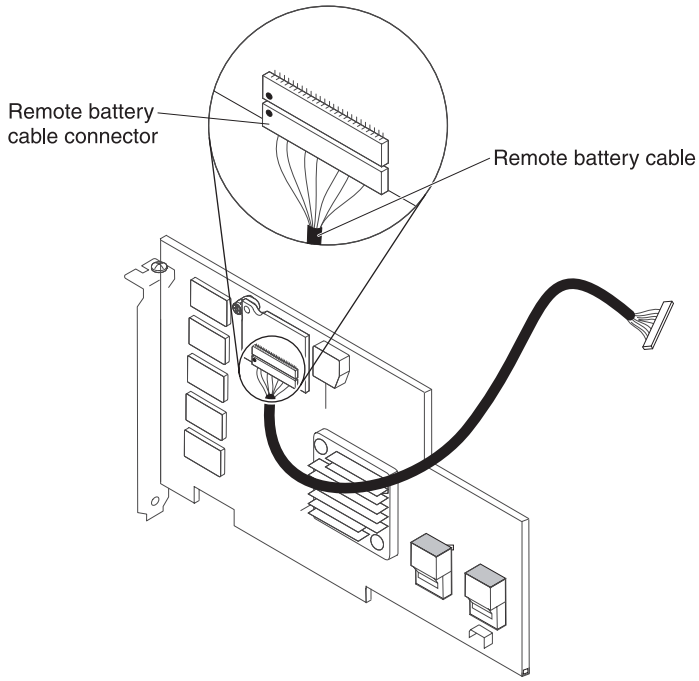


6. Connect the remote battery cable to the battery carrier.

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

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

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

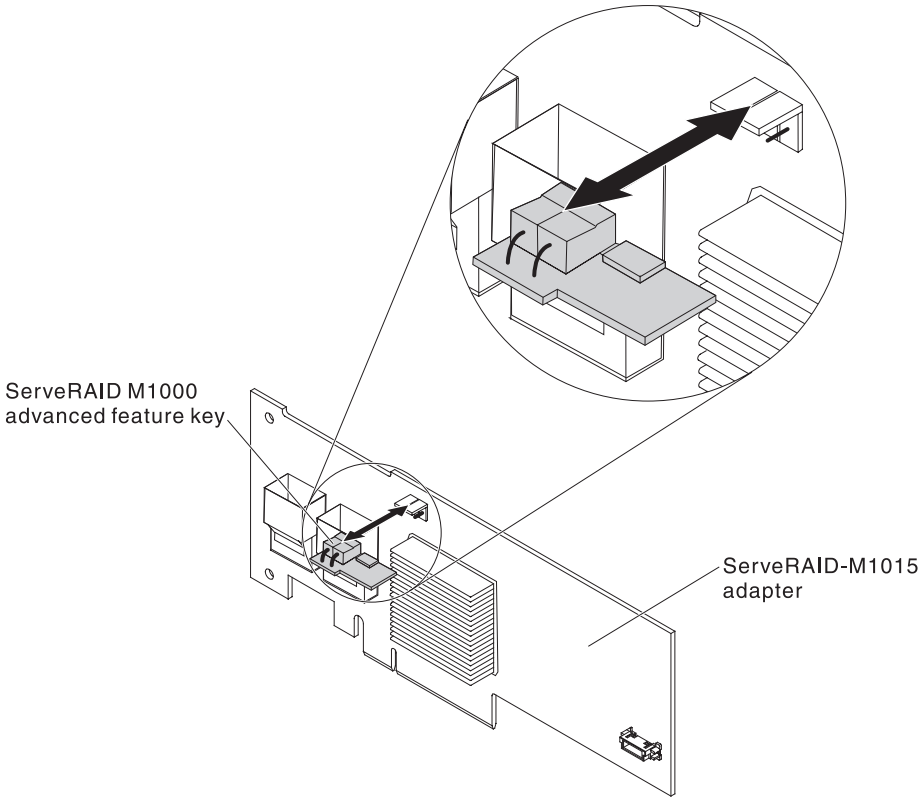


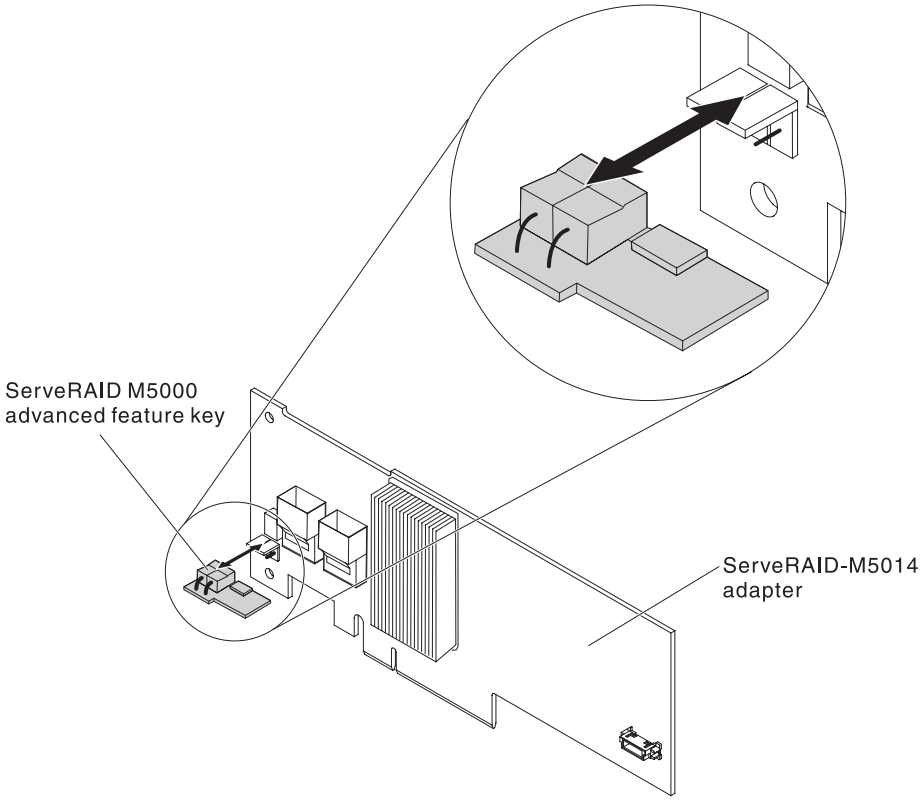
8. Install the ServeRAID controller on the PCI riser-card assembly (see “Installing a ServeRAID controller on the PCI riser-card assembly” on page 159).
9. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 151).
10. Install the cover (see “Installing the cover” on page 146).
11. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing an optional ServeRAID adapter advanced feature key

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 150).
5. Grasp the upgrade key and lift to remove it from connector on the ServeRAID adapter.



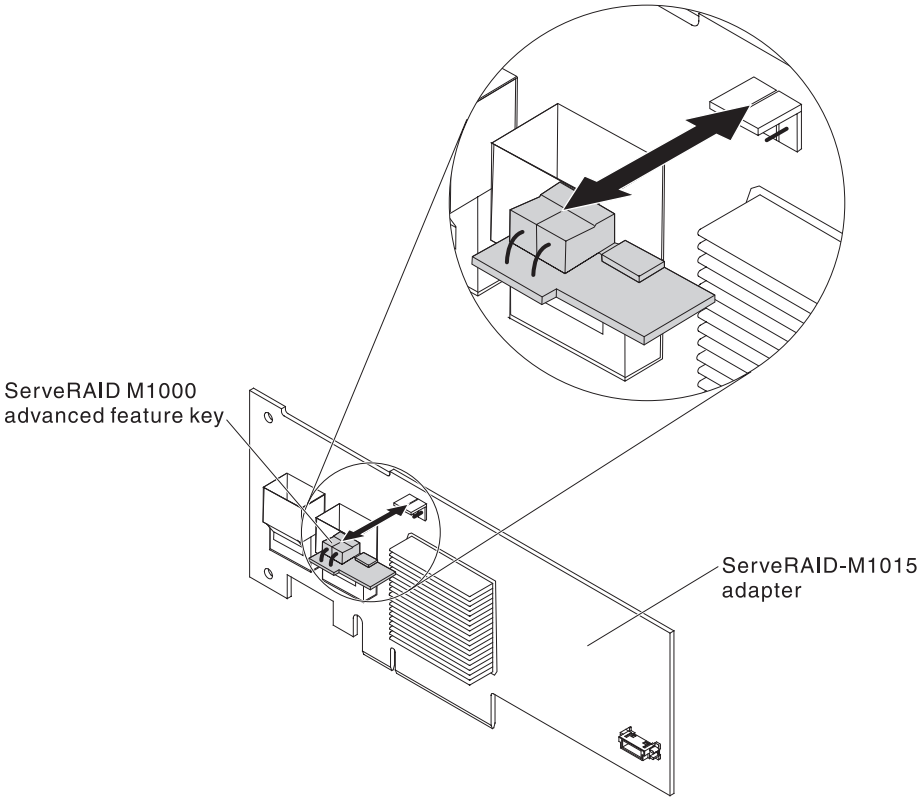


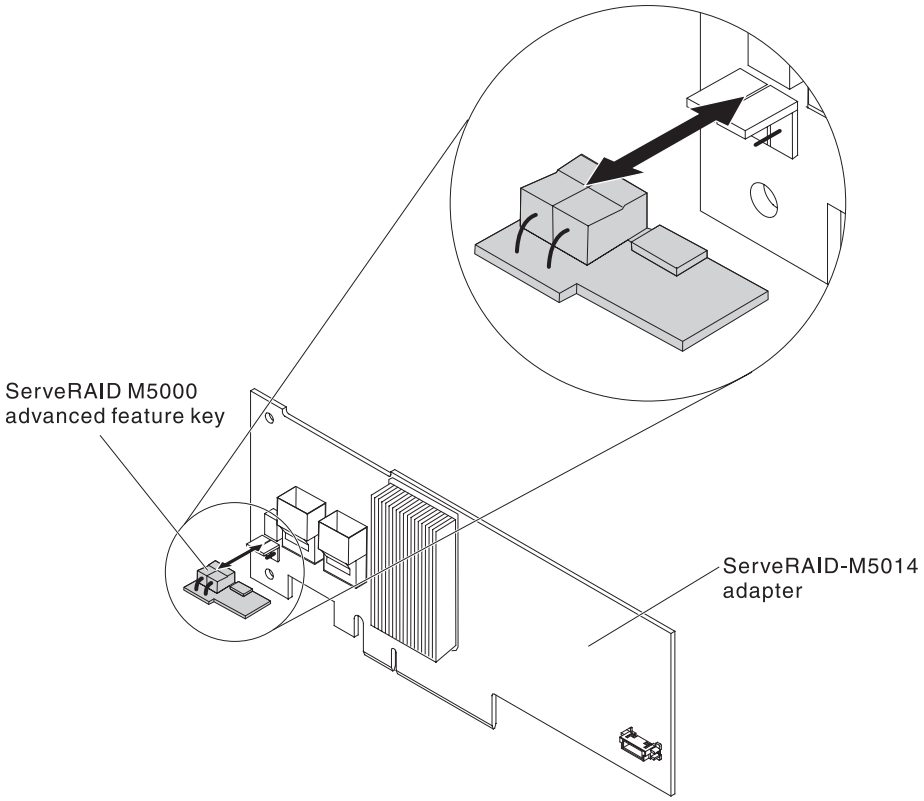
6. If you are instructed to return the flash device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an optional ServeRAID adapter advanced feature key

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

1. Align the upgrade key with the connector on the ServeRAID adapter and push it into the connector until it is firmly seated.



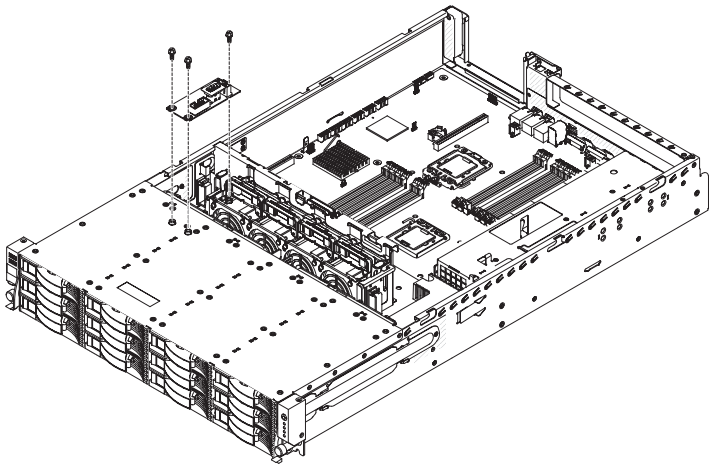


2. Reconnect the power cord and any cables that you removed.
3. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 151).
4. Install the cover (see “Installing the cover” on page 146).
5. Slide the server into the rack.
6. Turn on the peripheral devices and the server.

Removing the USB board

To remove the USB board, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. Remove the screws that secure the USB board to the chassis.

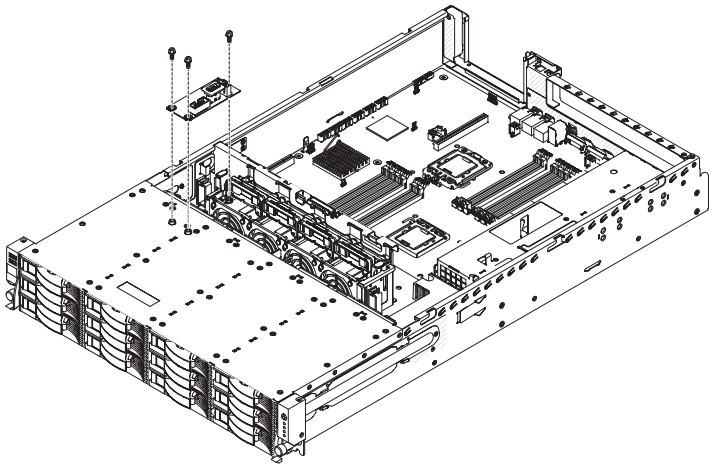


5. Lift the USB board out of the server.
6. Remove the USB hypervisor key if one is installed (see “Removing a USB hypervisor key” on page 169).
7. Make note of where the cables are attached to the USB board; then, disconnect them.
8. If you are instructed to return the USB board, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the USB board

To install the USB board, complete the following steps:

1. Touch the static-protective package that contains the USB board to any *unpainted* metal surface on the outside of the chassis; then, remove the USB board from the package.
2. Align the screw holes on the USB board with the screw holes on the chassis.

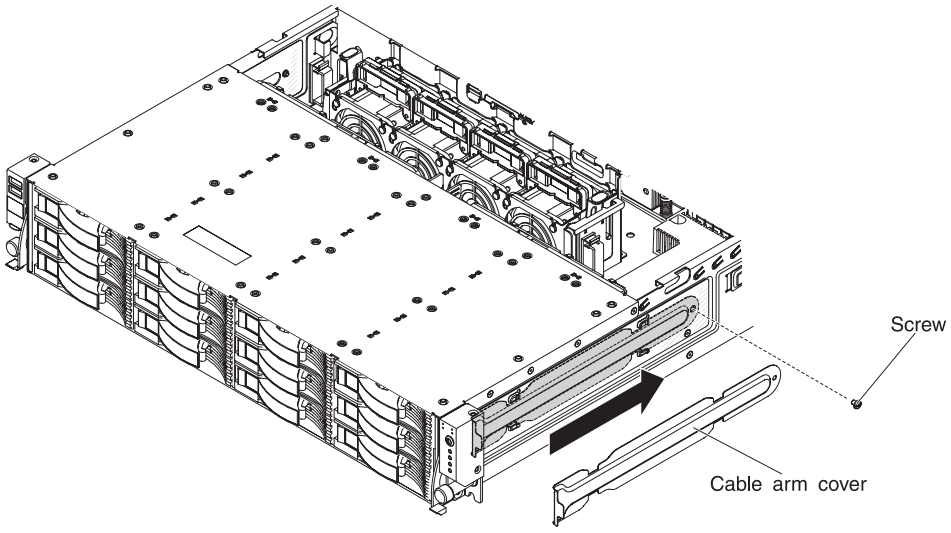


3. Install the USB hypervisor key if you removed it (see “Installing a USB hypervisor key” on page 170).
4. Install the screws to secure the USB board on the chassis.
5. Reconnect the USB board cables.
6. Install the cover (see “Installing the cover” on page 146).
7. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

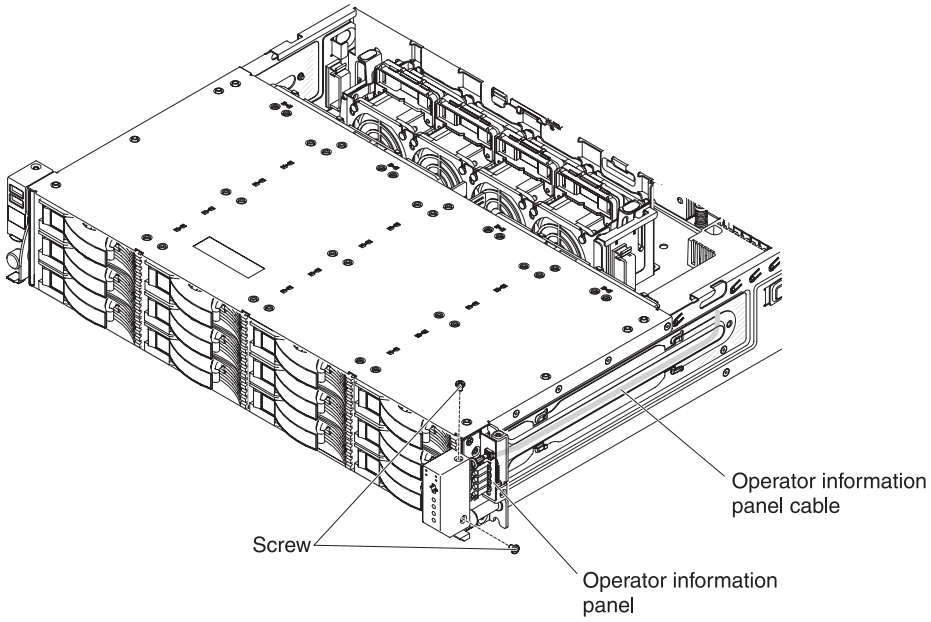
Removing the operator information panel

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 133.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 147).
5. Remove the air baffle (see “Removing the air baffle” on page 148).
6. Remove the screw from the cable arm cover; then, slide the cable arm cover towards the rear of the server and set it aside.



7. Remove the screws from the bracket cover.



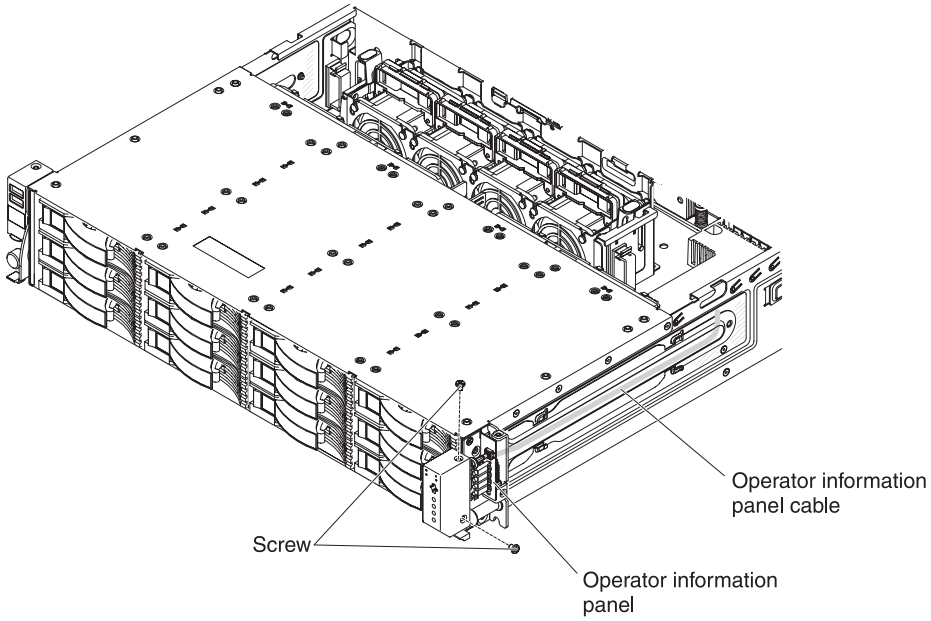
8. Remove the operator information front bezel.

9. Disconnect the cable to the operator information panel.
10. Make note of where the cable is attached to the system board; then, disconnect it.
11. If you are instructed to return the operator information panel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the operator information panel

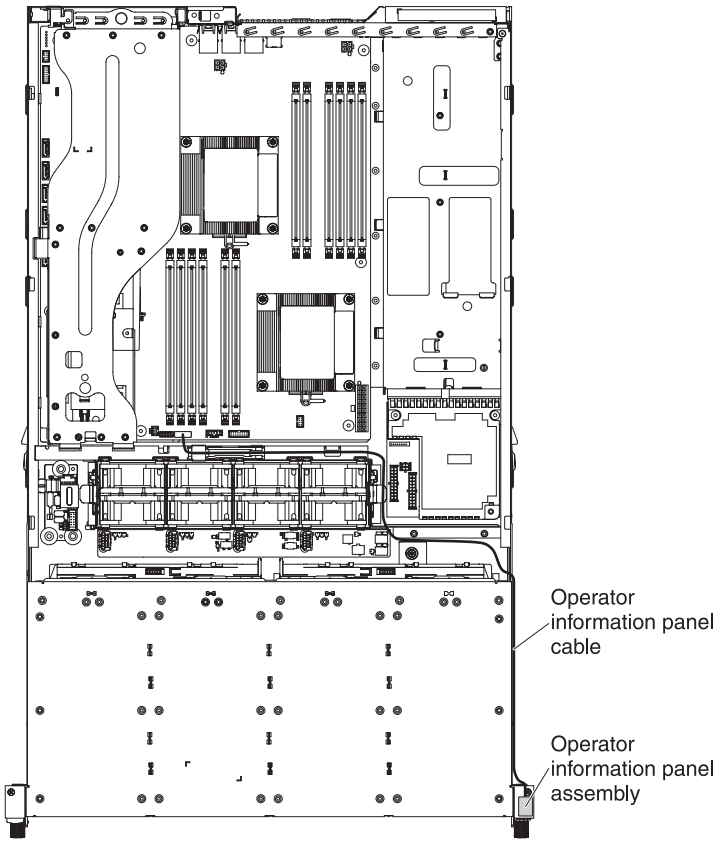
To install the operator information panel, complete the following steps:

1. Touch the static-protective package that contains the operator information panel to any *unpainted* metal surface on the outside of the chassis; then, remove the operator information panel from the package.
2. Reconnect the cable to the operator information panel.



3. Place the operator information panel in the bracket cover. Make sure it is securely seated inside the bracket cover.
4. Install the screws to secure the bracket cover to the server.
5. Connect the cable to the system board. The following illustration shows the internal cable routing and connector for the front operator information panel cable.

   Note: The cable is routed on the outside of the chassis and connected to the system board. The cable must be protected by the cable cover on the side of the chassis.

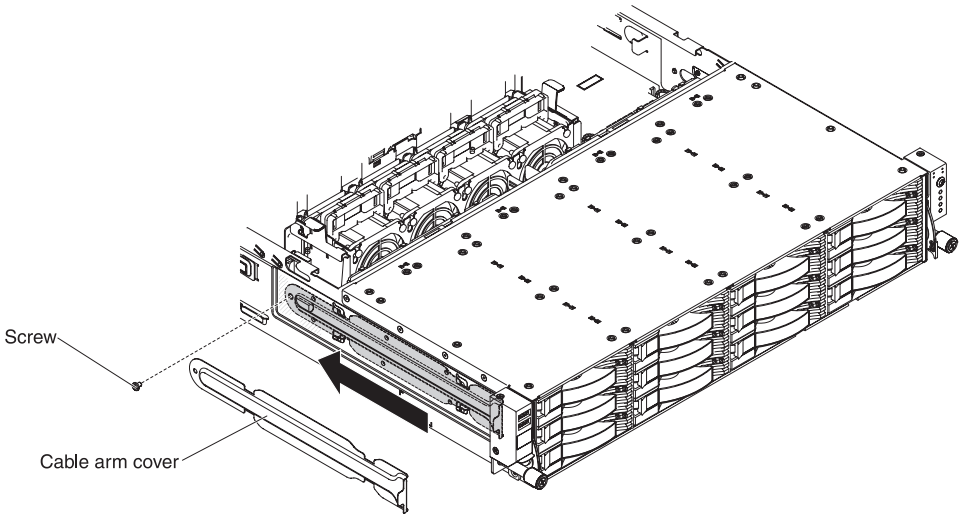


6. Slide the cable arm cover into the retention slots and install the screw to secure it on the side of the chassis.
7. Install the air baffle (see “Installing the air baffle” on page 150).
8. If you have the optional hot-swap rear hard disk drive cage installed, rotate it down (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 148).
9. Install the cover (see “Installing the cover” on page 146).
10. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

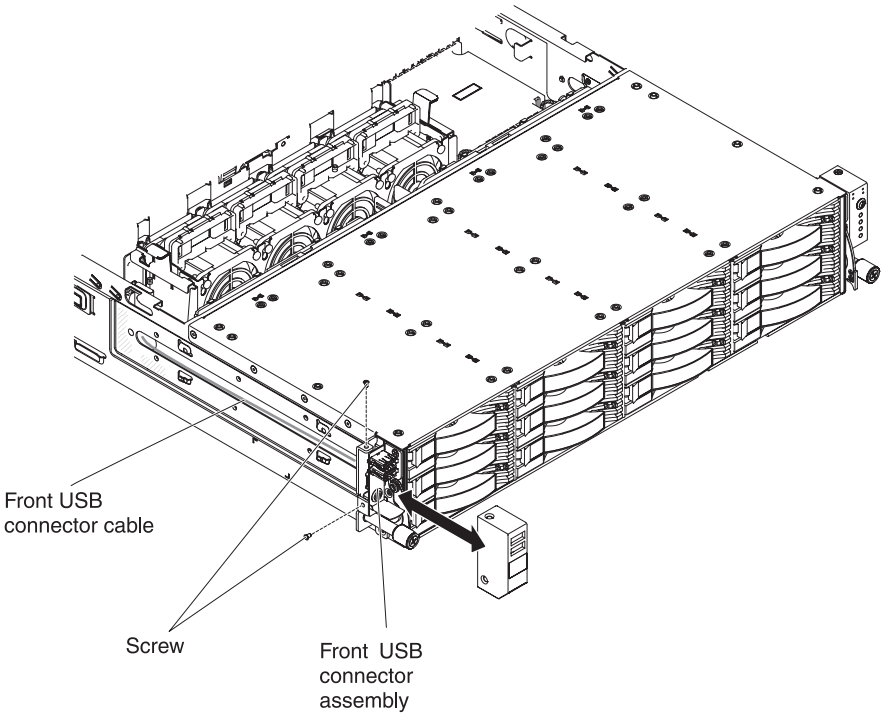
Removing the front USB connector assembly

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. Remove the screw from the cable arm cover; then, slide the cable arm cover towards the rear of the server and set it aside.



5. Remove the screws from the bracket cover.



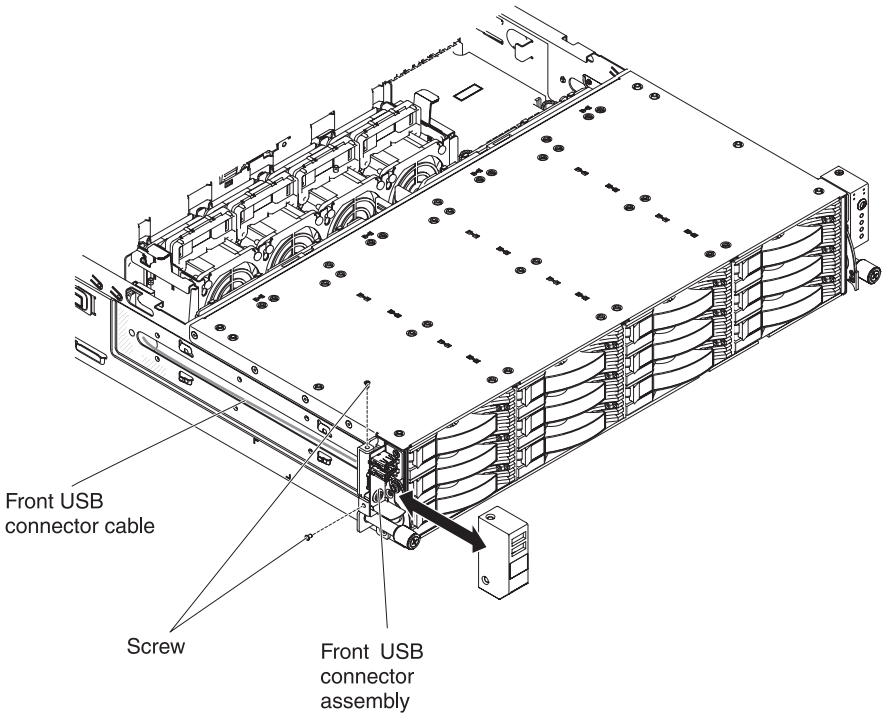
6. Disconnect the cable to the front USB connector assembly.
7. Make note of where the cable is attached to the system board; then, disconnect it.
8. If you are instructed to return the front USB connector assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the front USB connector assembly

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

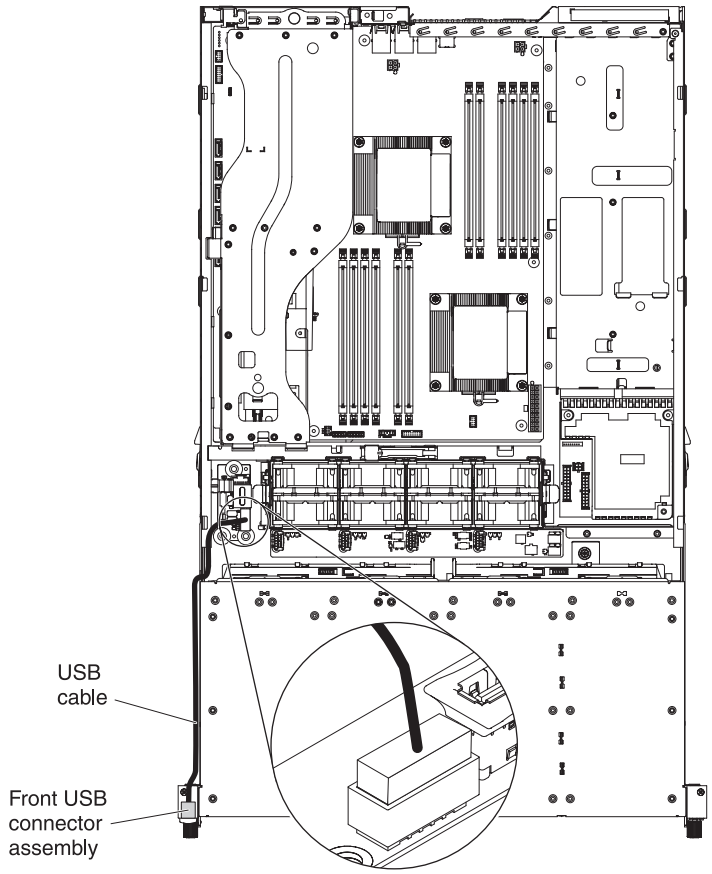
1. Touch the static-protective package that contains the front USB connector assembly to any *unpainted* metal surface on the outside of the chassis; then, remove the front USB connector assembly from the package.

2. Reconnect the cable to the front USB connector assembly.



3. Place the front USB connector assembly in the bracket cover. Make sure it is securely seated inside the bracket cover.
4. Install the screws to secure the bracket cover to the server.
5. Connect the cable to the USB board. The following illustration shows the internal cable routing and connector for the USB cable.

   Note: The cable is routed on the outside of the chassis and connected to the USB connector board. The cable must be protected by the cable cover on the side of the chassis.

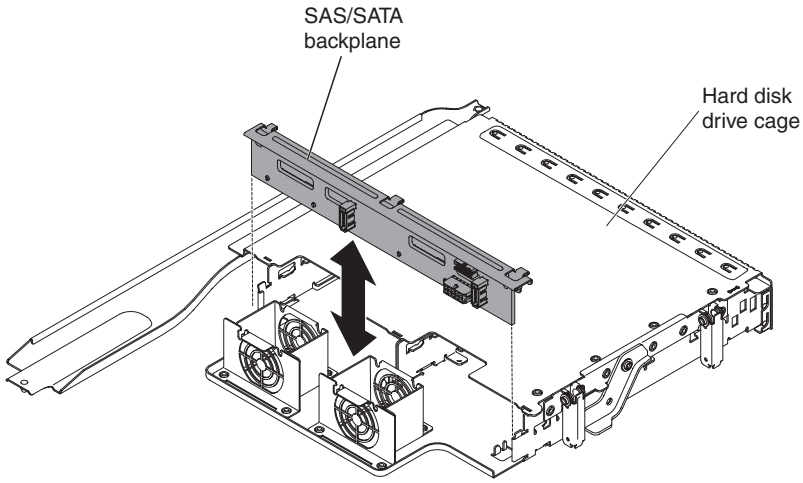


6. Slide the cable arm cover into the retention slots and install the screw to secure it on the side of the chassis.
7. Install the cover (see “Installing the cover” on page 146).
8. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the hot-swap backplane on the optional rear hard disk drive cage

To remove the hot-swap backplane on the optional rear hard disk drive cage, complete the following steps.

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. Remove all hot-swap hard disk drives in the optional rear hard disk drive cage (see “Removing a hot-swap hard disk drive” on page 138).
5. Press the release latches and rotate out the top of the backplane ; then, lift the backplane out of the optional rear hard disk drive cage by pulling and lifting it up.



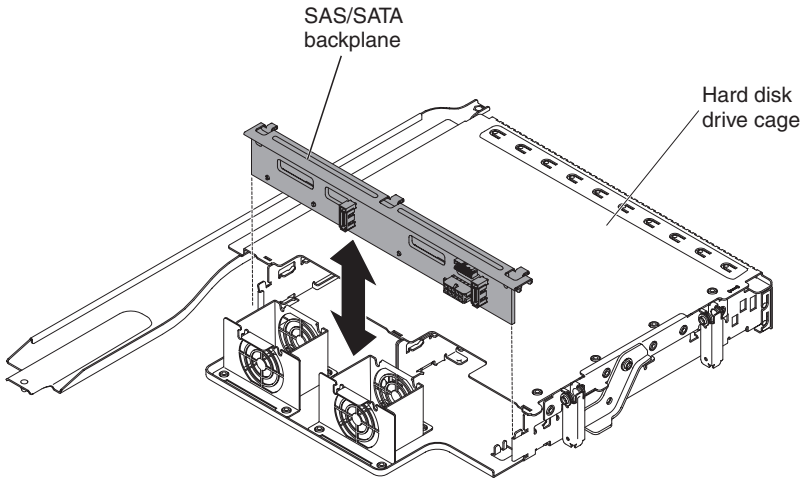
6. If you need to replace the backplane, unplug all attached cables.
7. If you are instructed to return the backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the hot-swap backplane on the optional rear hard disk drive cage

To install the replacement hot-swap backplane on the optional rear hard disk drive cage, complete the following steps.

1. Reconnect the cables to the backplane.
2. Align the backplane with the slot on the optional rear hard disk drive cage.
3. Lower the backplane into the optional rear hard disk drive cage. Make sure the locating plates securely engages the bottom of the backplane.
4. Press the release latches; then, rotate the top of the backplane toward the front of the optional rear hard disk drive cage until it locks into place.

   Note: Make sure the backplane is engaged into place by the locating plates and that it is securely installed in the optional rear hard disk drive cage.



5. Install the hot-swap hard disk drives in the optional rear hard disk drive cage (see “Installing a hot-swap hard disk drive” on page 138).
6. Install the cover (see “Installing the cover” on page 146).

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

Removing and replacing FRUs

FRUs must be installed only by trained service technicians.

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

Statement 27:

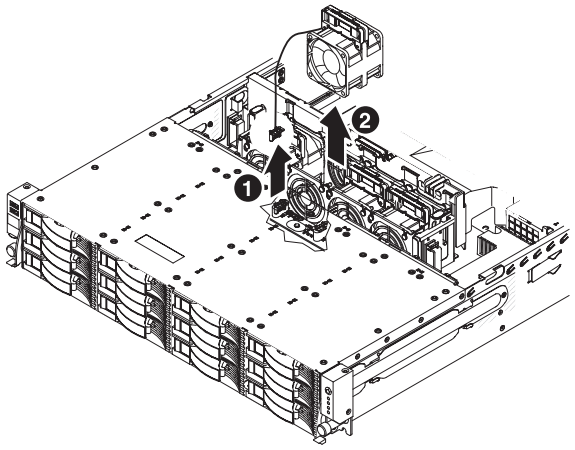
CAUTION:
Hazardous moving parts are nearby.

Removing a system fan

Attention: To ensure proper server operation, if a fan fails, you need to turn off the server first, then replace the fan immediately.

To remove a system fan, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. (For 3.5-inch hard disk drive models only) You may need to remove the signal cables to disconnect the fan cables.
5. Remove the fan:



   a. Disconnect the system fan cable from the connector on the fan board.

b. Pull the blue handle on the system fan; then, lift the system fan out of the server.

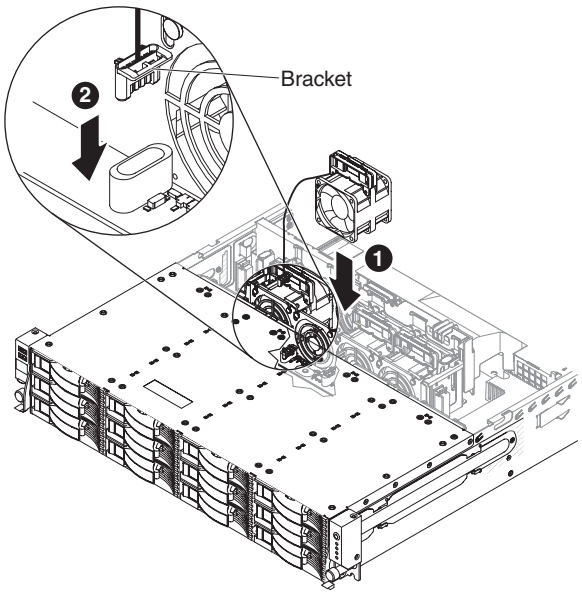
6. If you are instructed to return the fan, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a system fan

For proper cooling, the server requires that all fans in the system be operating at all times.

Attention: To ensure proper server operation, if a fan fails, replace the fan immediately.

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



To install a system fan, complete the following steps:

1. Orient the new system fan over its position in the fan bracket.
2. Lower the system fan until the system fan sits completely in the system fan cage.
3. Orient the system fan cable so that the bracket is on the side of the connector with the white rectangular marking on the fan board (see the illustration); then, connect the cable to the connector on the fan board (see “Fan board connectors” on page 21).
4. Install the cover (see “Installing the cover” on page 146).
5. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

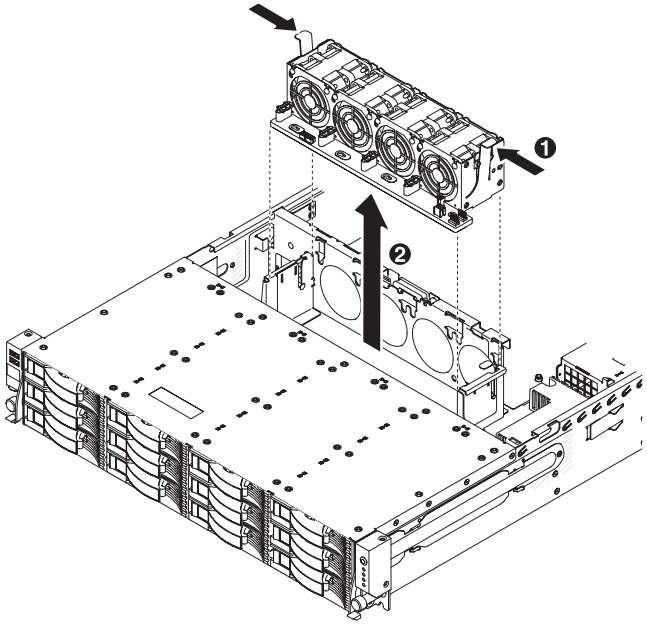
Removing the system fan cage

Attention: To ensure proper server operation, if a fan fails, replace the fan immediately.

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.

2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. (For 3.5-inch hard disk drive models only) Remove the signal cables.
5. Grasp the system fan cage by the blue grip points.
6. Press the retention latches toward each other; then, lift the system fan cage out of the server.



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

Installing the system fan cage

For proper cooling, the server requires that all fans in the server be operating at all times.

Attention:

- To ensure proper server operation, if a fan fails, replace the fan immediately.
- Make sure the power cable on the backplane is well-routed so it will not block the fan cage while installing.

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

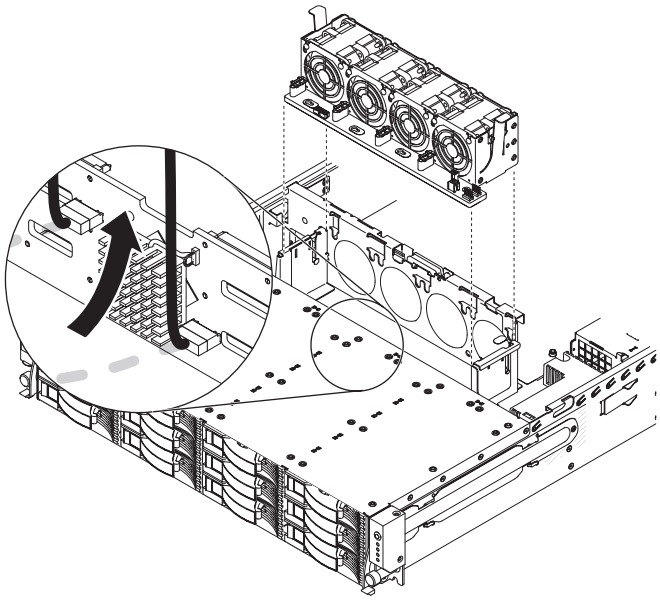
1. Align the system fan cage with the guide rails on the fan cage bracket.
2. If you have removed any cable(s), connect them all except the signal cable.
3. Lower the system fan cage into the fan cage bracket until the system fan cage clicks into place.

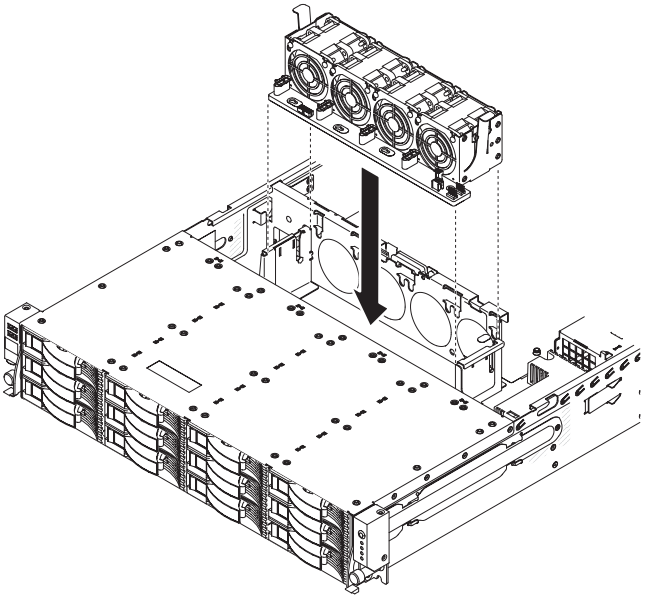
   Notes:

   a. Make sure no cables are pinched.

   b. (For 3.5-inch hard disk drive models only) It will be easier for the installation if you temporary remove the power cable on the hot-swap backplane.

c. (For 3.5-inch hard disk drive models only) If you have the optional hot-swap SAS/SATA rear hard disk drive cage installed, make sure you lift the two SATA cables up a little bit so they will not get damaged by the system fan cage.

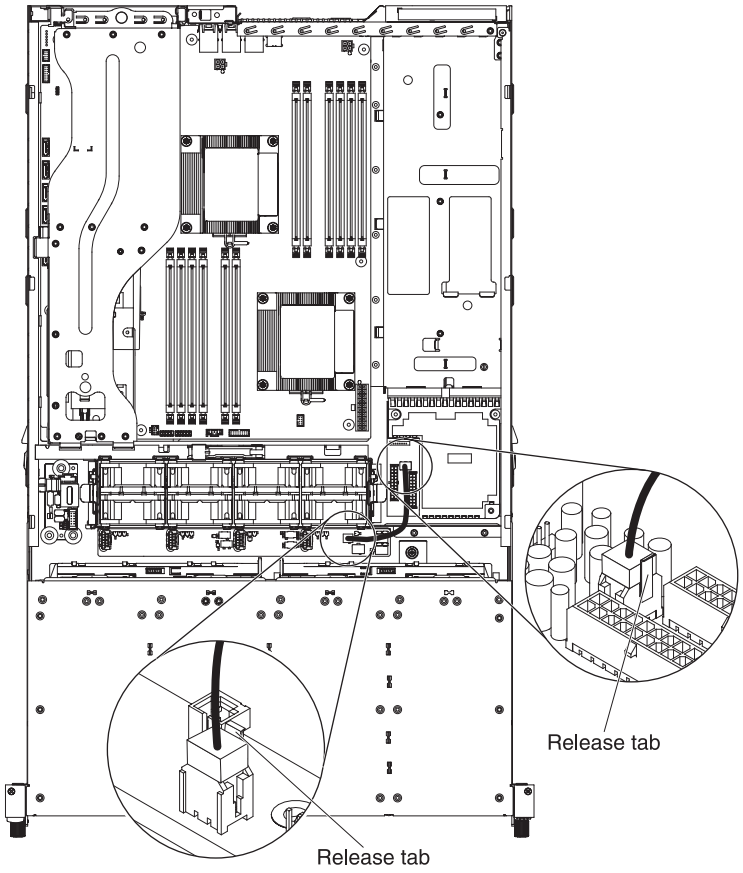




Attention: If the fan power cable is not connected correctly, the server will not start up when you turn on power.

- To connect the fan power cable on the fan board, orient the fan power connector so that the release tab faces the rear of the server; then, connect the cable to the connector on the system board.
- To connect the other end of the fan power cable on the power-supply paddle card, orient the fan power cable so that the release tab faces the front of the server; then, connect the cable to the connector on the power-supply paddle card.

The following illustration shows the correct fan power cable connections.



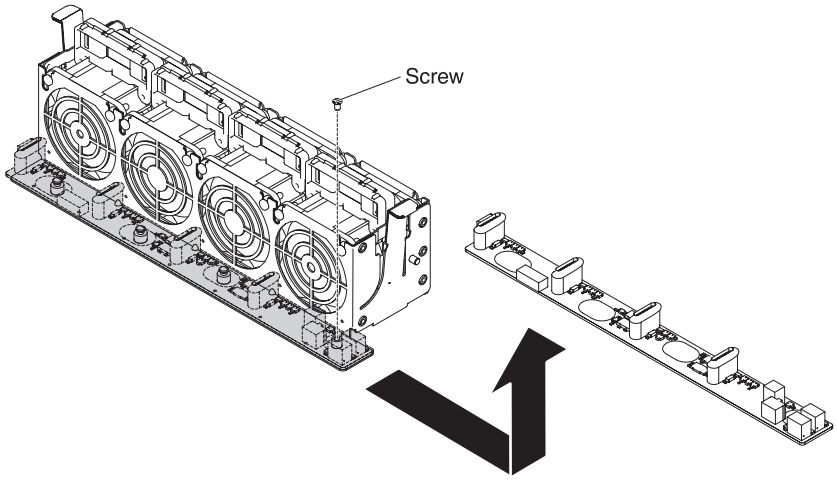
4. Reconnect the signal cable.
5. Install the cover (see “Installing the cover” on page 146).
6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the fan board

To remove the fan board, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. Remove the system fan cage (see “Removing the system fan cage” on page 190).

5. Remove the screw that secures fan board to the fan cage.

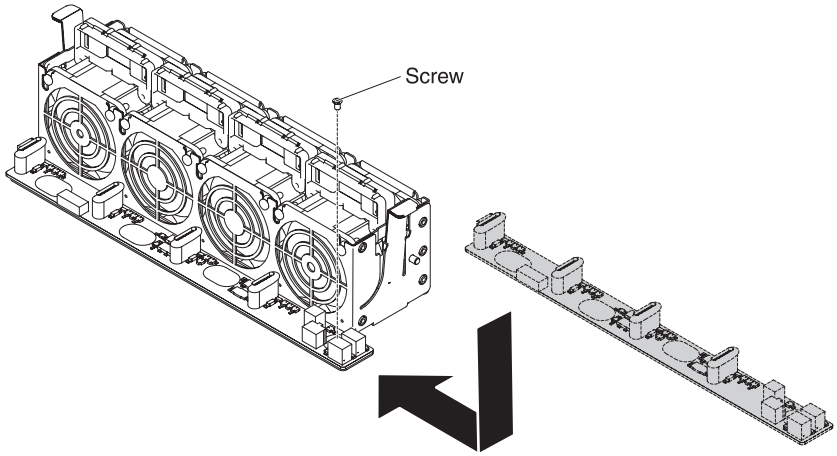


6. Pull to disengage the fan board from the locating pins; then, remove the fan board.
7. If you are instructed to return the fan board, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the fan board

To install the fan board, complete the following steps:

1. Touch the static-protective package that contains the fan board to any unpainted metal surface on the server. Then, remove the fan board from the package.
2. Align the holes on the fan board with the locating pins on the fan cage.

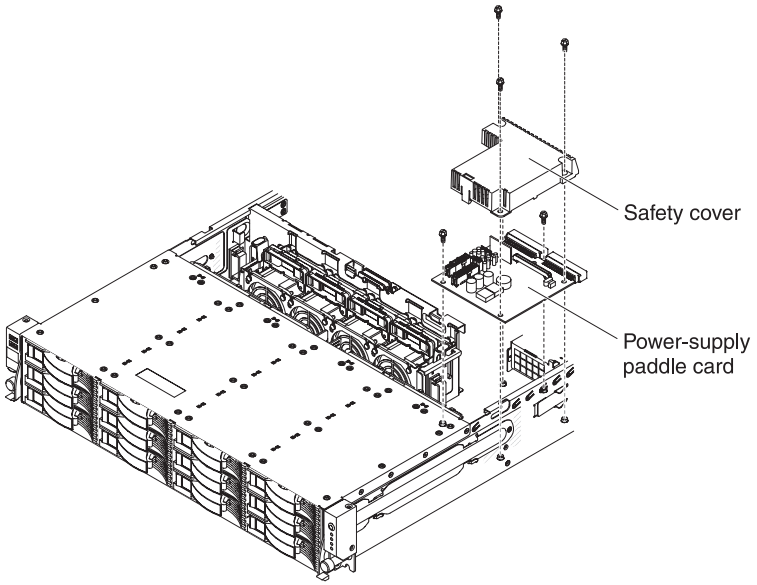


3. Slide the fan board until the locating pins securely engage the fan board.
4. Install the screw to secure the fan board on the system fan cage.
5. Install the system fan cage (see “Installing the system fan cage” on page 191).
6. Install the cover (see “Installing the cover” on page 146).
7. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the power-supply paddle card

To remove a power-supply paddle card, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 147).
5. Remove the air baffle (see “Removing the air baffle” on page 148).
6. Remove the power supplies (see “Removing a hot-swap power supply” on page 139).
7. Make a note of where cables are attached to the power-supply paddle card; then, disconnect them from the connectors on the system board.
8. Remove the three screws that secure the safety cover to the power-supply paddle card and remove the safety cover.

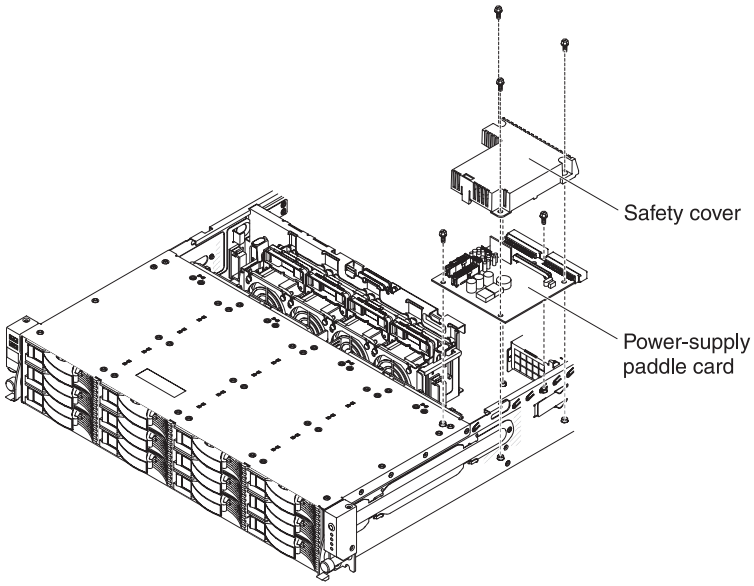


9. Remove the remaining two screws that secure the power-supply paddle card to the chassis.
10. Lift the power-supply paddle card out of the server.
11. If you are instructed to return the power-supply paddle card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the power-supply paddle card

To install the power-supply paddle card, complete the following steps:

1. Touch the static-protective package that contains the power-supply paddle card to any *unpainted* metal surface on the outside of the chassis; then, remove the power-supply paddle card from the package.
2. Place the power-supply paddle card on the mounting studs on the chassis and install the two screws. You might need to tilt the power-supply paddle card a little bit to make the installation easier.

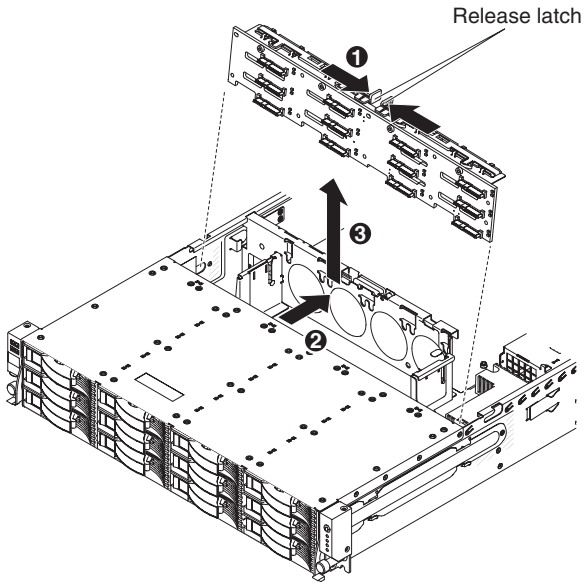


3. Align the screw holes on the safety cover with the screw holes on the power-supply paddle card.
4. Install the screws to secure the safety cover on the power-supply paddle card.
5. Reconnect the power-supply paddle card cables.
6. Install the air baffle (see “Installing the air baffle” on page 150).
7. If you have the optional hot-swap rear hard disk drive cage installed, rotate it down (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 148).
8. Install the cover (see “Installing the cover” on page 146).
9. Install the power supplies.
10. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

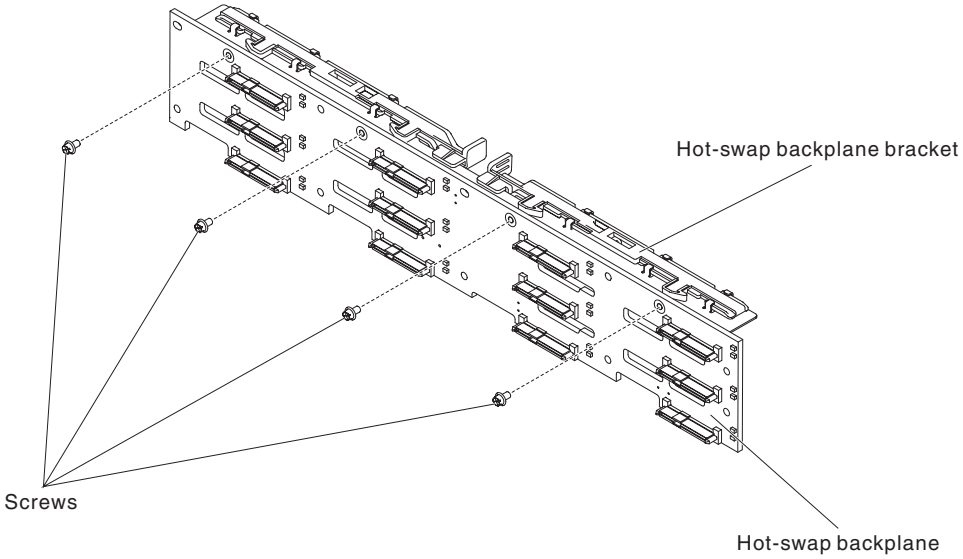
Removing the 3.5-inch HS HDD backplane

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove all hot-swap hard disk drives (see “Removing a hot-swap hard disk drive” on page 138).
4. Remove the cover (see “Removing the cover” on page 145).
5. Disconnect the signal cables.
6. Remove the system fan cage to obtain more room (see “Removing the system fan cage” on page 190).
7. Make note of where the cables are attached to the backplane; then, disconnect them.
8. Press the release latches and rotate out the top of the backplane ; then, lift the backplane out of the server by pulling outwards and lifting it up.



Attention: If you need to replace the 3.5-inch hot-swap hard disk drive backplane, be sure to take off the bracket by removing the 4 screws attached and keep the bracket for further usage.

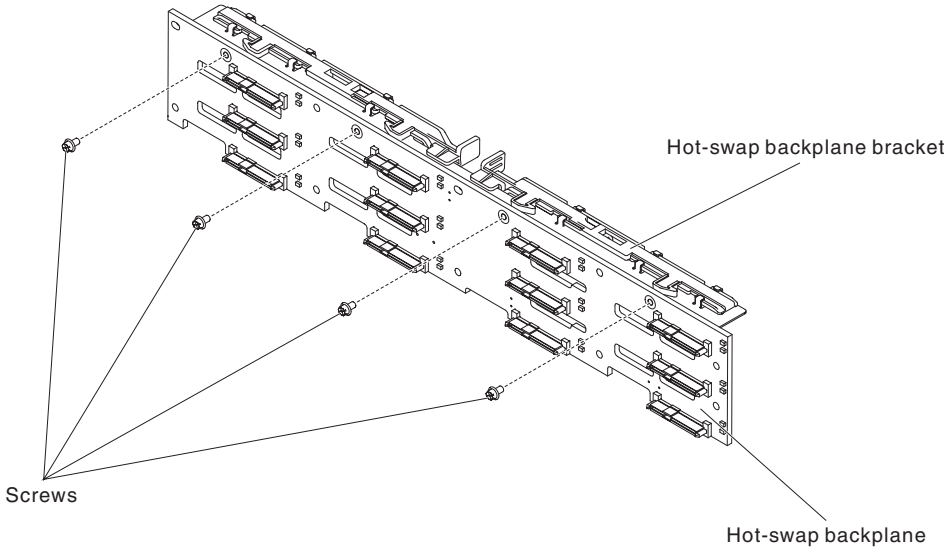


9. If you are instructed to return the backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the 3.5-inch HS HDD backplane

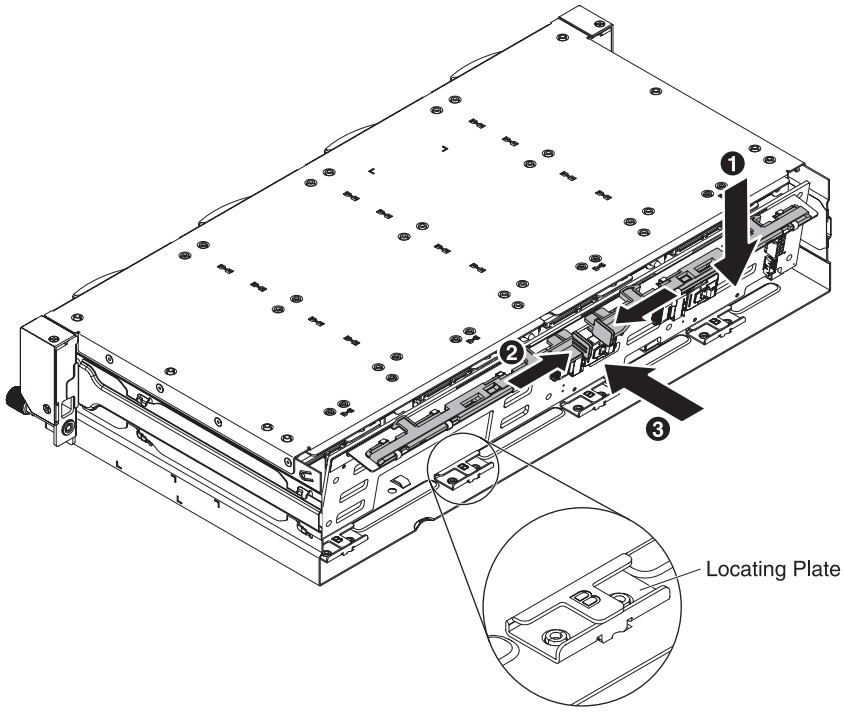
To install the replacement hot-swap hard disk drive backplane, complete the following steps:

1. If the backplane bracket has not been installed, attach the bracket onto the backplane with four screws.



2. Align the backplane with the slot on the chassis.
3. Lower the backplane into the server. Leave the backplane an angle of elevation so the backplane connectors will not get damaged. Make sure the locating plates securely engages the bottom of the backplane.
4. Press the release latches; then, rotate the top of the backplane toward the front of the server until it locks into place.

   Note: Make sure the backplane is engaged into place by the locating plates and that it is securely installed in the server.



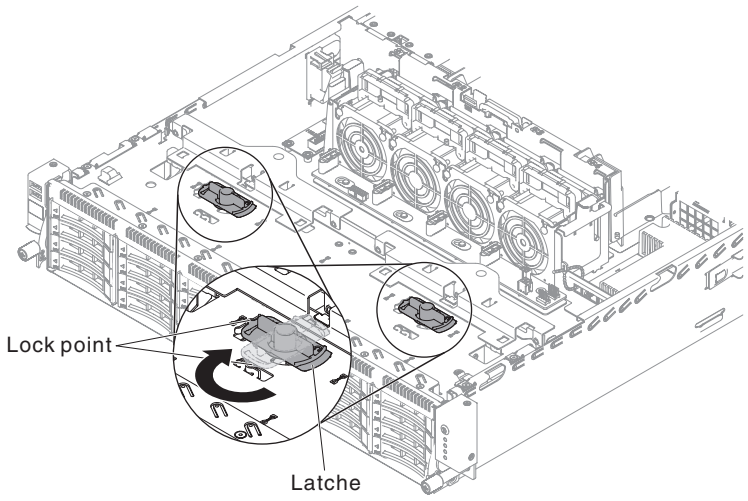
5. Except for the signal cables and the power cable, reconnect all other cables to the backplane.
6. Press the cables downwards to make the cable routing easier.

7. Replace the system fan cage (see “Installing the system fan cage” on page 191).
8. Reconnect the power cable, then the signal cables.
9. Install the cover (see “Installing the cover” on page 146).
10. Install the hot-swap hard disk drives (see “Installing a hot-swap hard disk drive” on page 138).
11. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

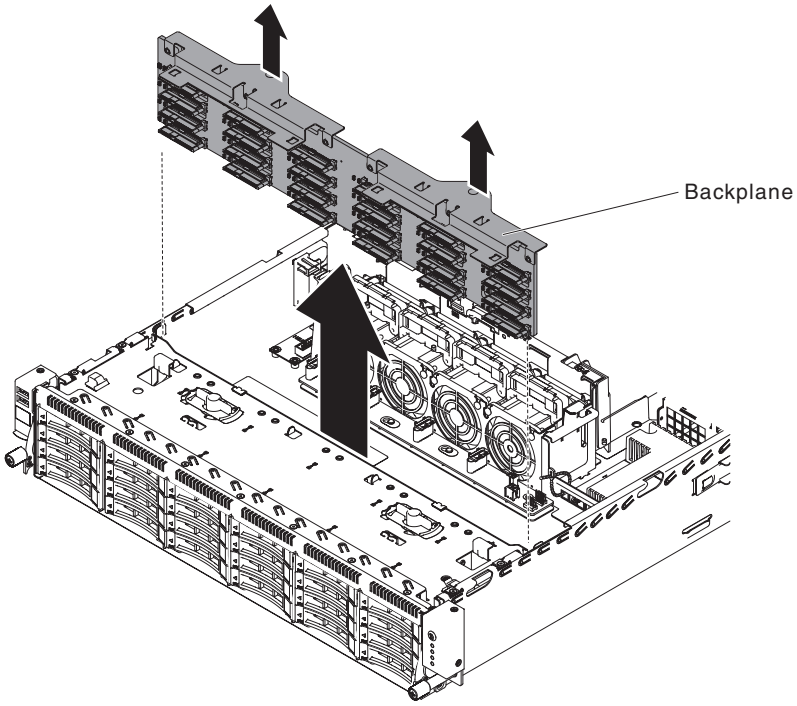
Removing the 2.5-inch HS HDD backplane

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove all hot-swap hard disk drives (see “Removing a hot-swap hard disk drive” on page 138).
4. Remove the cover (see “Removing the cover” on page 145).
5. Rotate the blue latches clockwise till they are in horizontal positions.

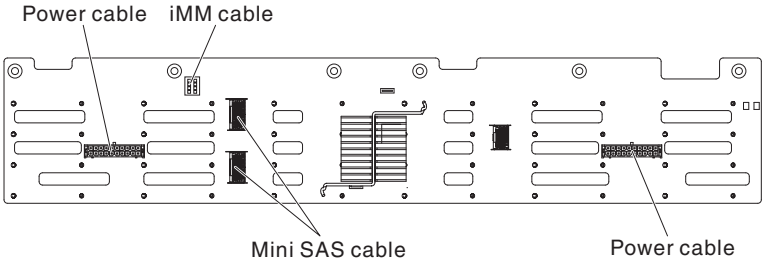


6. Press the release latches and rotate out the top of the backplane; then, remove the backplane out of the server by pulling and lifting it up.



Note: Make sure no cables are pinched.

7. If you need to replace the backplane, unplug all attached cables. The following illustration shows the locations of the cables on the backplane.

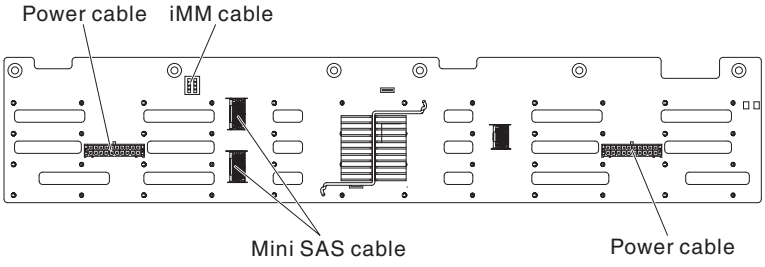


8. If you are instructed to return the backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the 2.5-inch HS HDD backplane

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

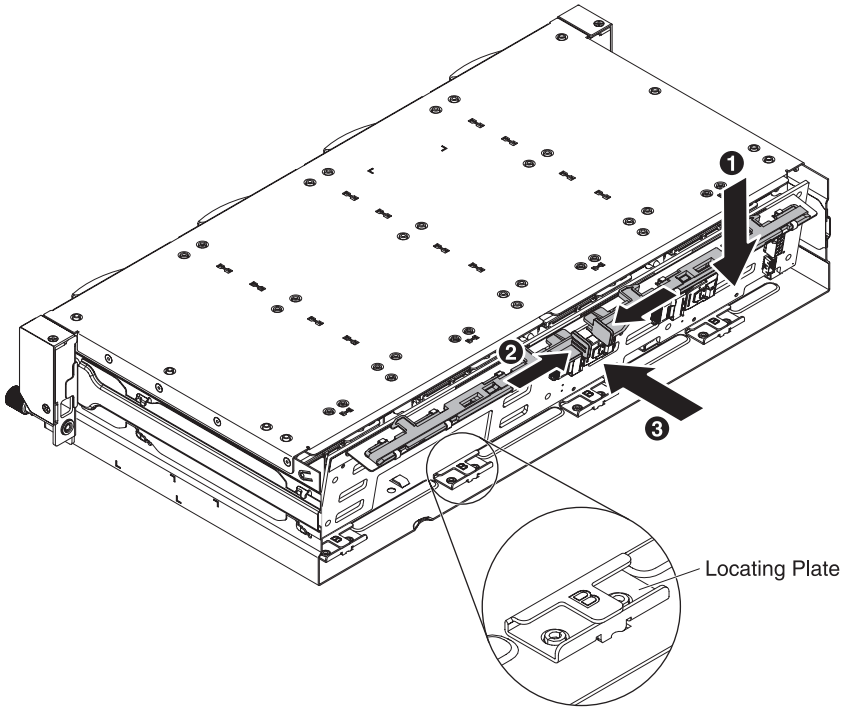
1. Reconnect the cables to the backplane. The following illustration shows the locations of the cables on the backplane.



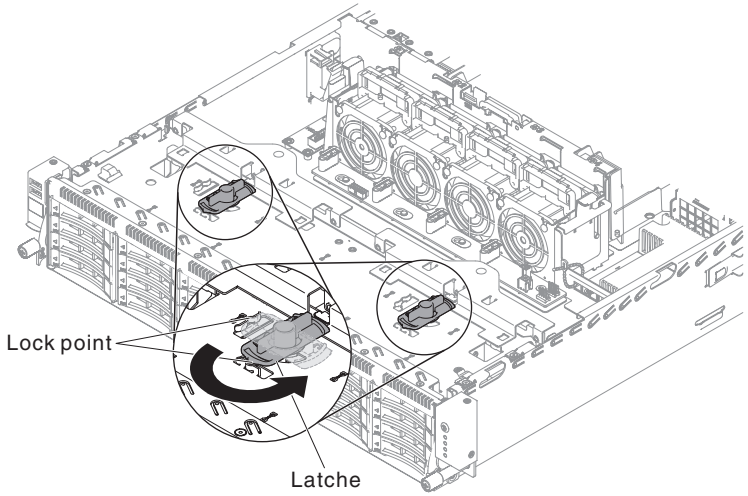
2. Align the backplane with the slot on the chassis.

3. Lower the backplane into the server. Make sure the locating plates securely engages the bottom of the backplane.
4. Press the release latches; then, rotate the top of the backplane toward the front of the server until it locks into place.

   Note: Make sure the backplane is engaged into place by the locating plates and that it is securely installed in the server.

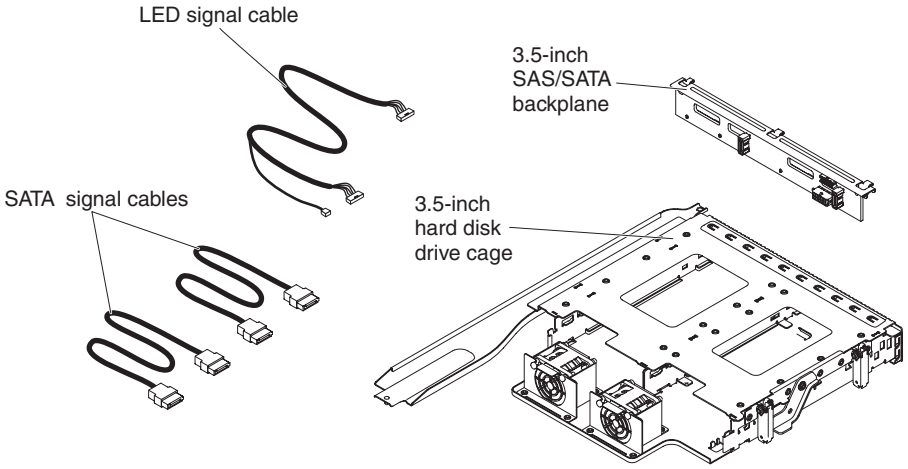


5. Rotate the blue latches counterclockwise till they are in vertical positions.



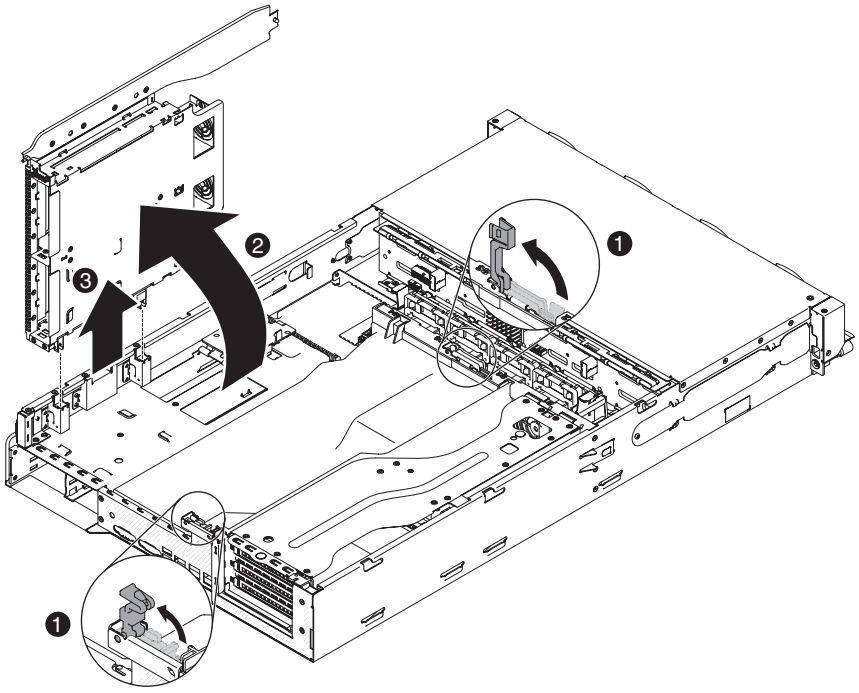
6. Install the cover (see “Installing the cover” on page 146).
7. Install the hot-swap hard disk drives (see “Installing a hot-swap hard disk drive” on page 138).
8. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing an optional hot-swap SAS/SATA rear 3.5-inch hard disk drive cage

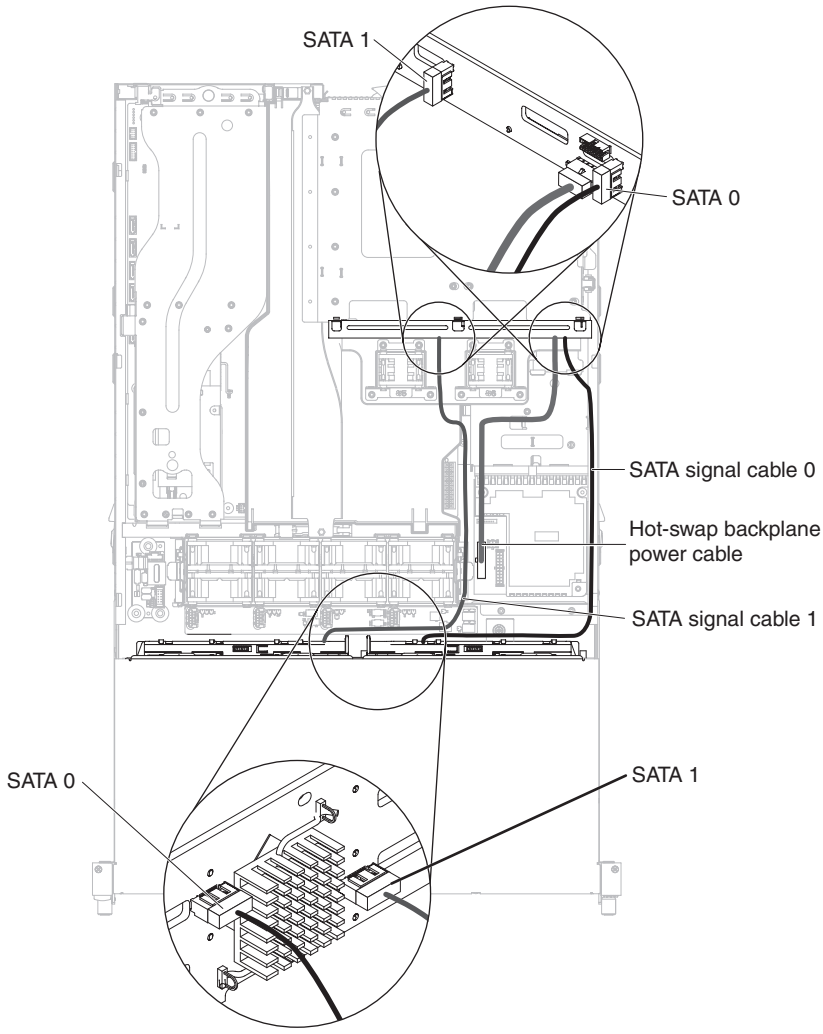


To remove the optional rear hot-swap SAS/SATA hard disk drive cage, complete the following steps:

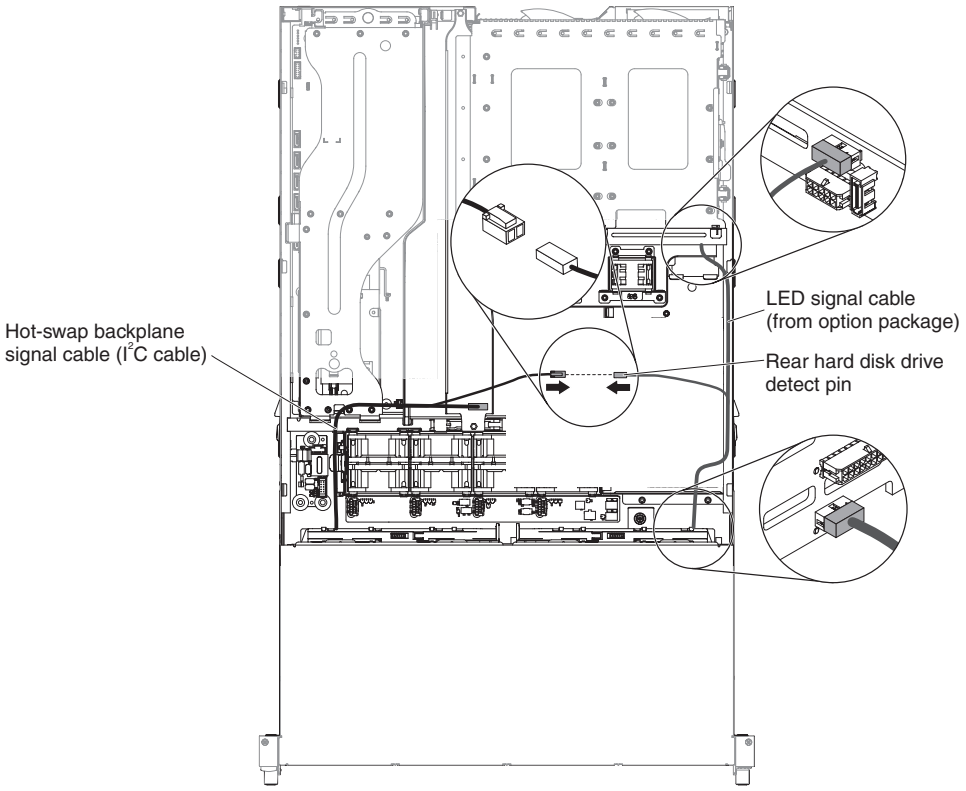
1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. Open the blue latches **1** on the chassis.

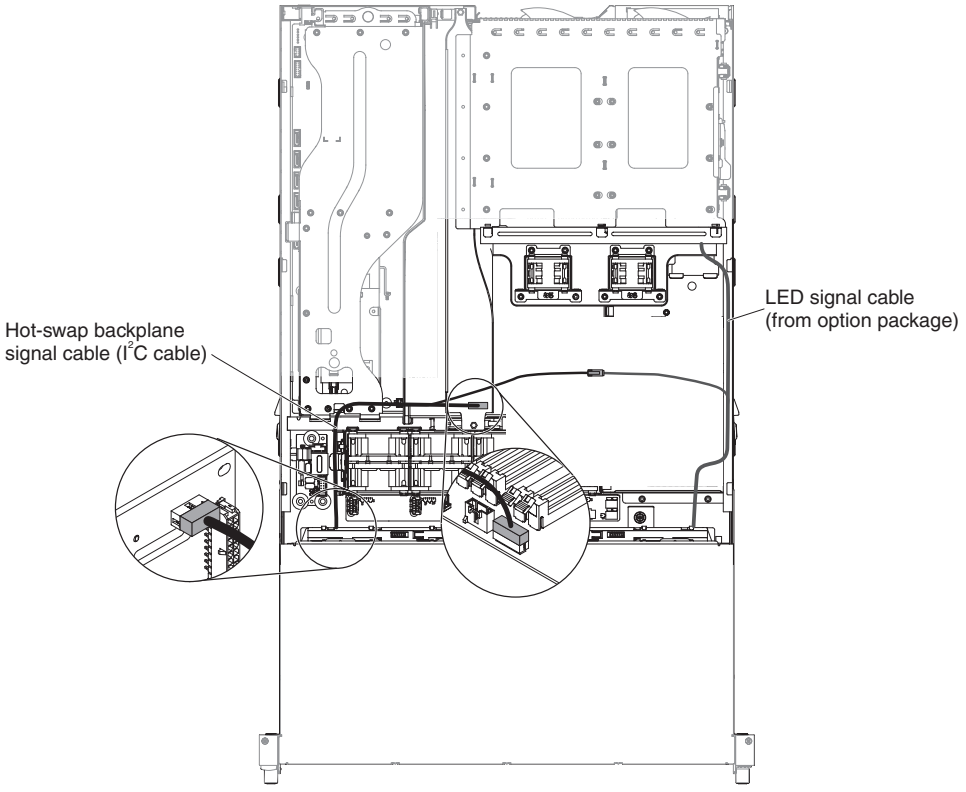


5. Make a note of where cables are attached to; then, disconnect the cables on the rear hard disk drive cage including:
   a. One SATA cables and the LED signal cable on the hot-swap backplane
   b. Two fan power cables from the fan board
   c. One backplane power cable



6. Rotate the rear hard disk drive cage **2** outwards. Then, carefully pull the rear hard disk drive cage **3** out of the chassis.
7. Remove the air baffle (see “Removing the air baffle” on page 148).
8. Find the rear hard disk drive detect pin of the hot-swap backplane (I^2C) cable located near the system fan cage; then, disconnect from the rear hard disk drive detect pin of the LED signal cable.



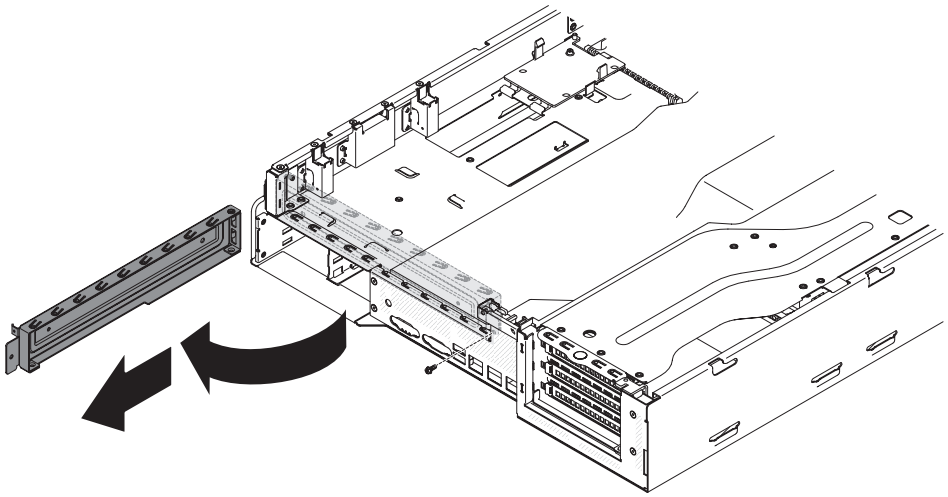


9. If you are instructed to return the rear hard disk drive cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

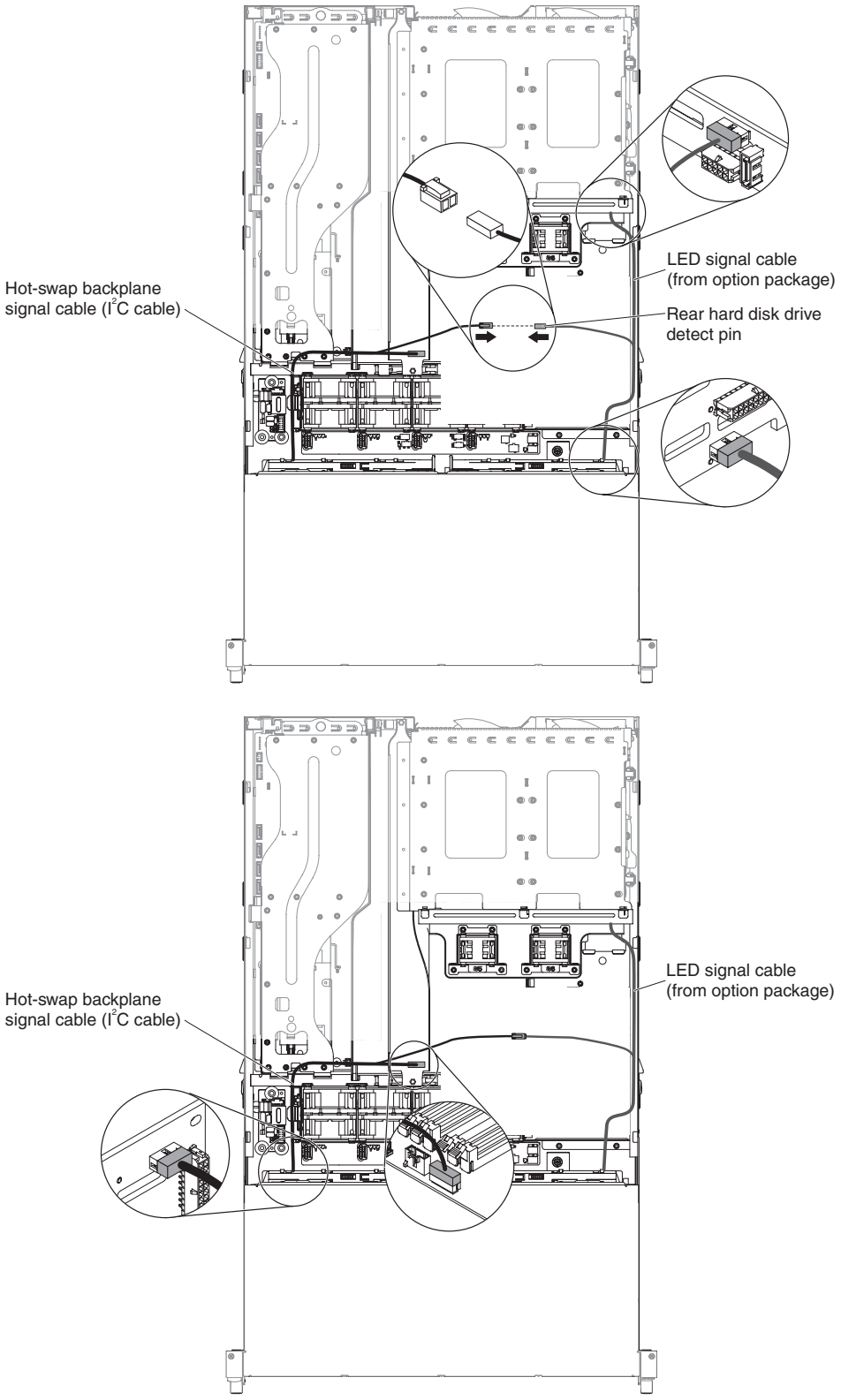
Installing an optional hot-swap SAS/SATA rear 3.5-inch hard disk drive cage

To install the optional rear hot-swap SAS/SATA hard disk drive cage, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. Loosen the screw that secure the drive filler cage to the chassis; then, rotate the drive filler clockwise and remove the drive filler out of the bay from the server.

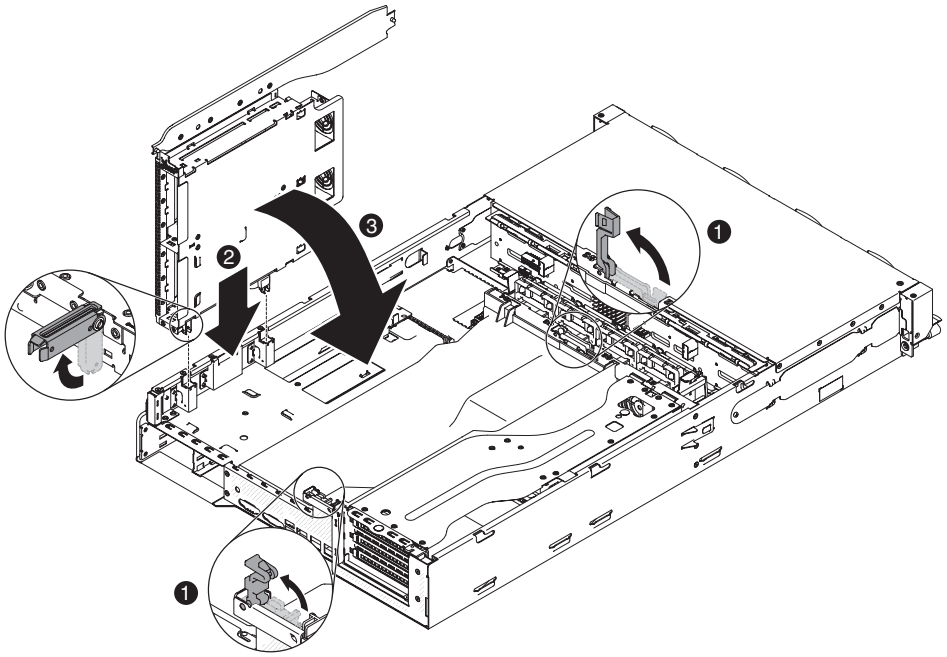


5. Remove the air baffle (see “Removing the air baffle” on page 148).
6. Find the rear hard disk drive detect pin of the hot-swap backplane signal (I^2C) cable located near the system fan cage; then, connect with the rear hard disk drive detect pin of the signal cable from the option package.

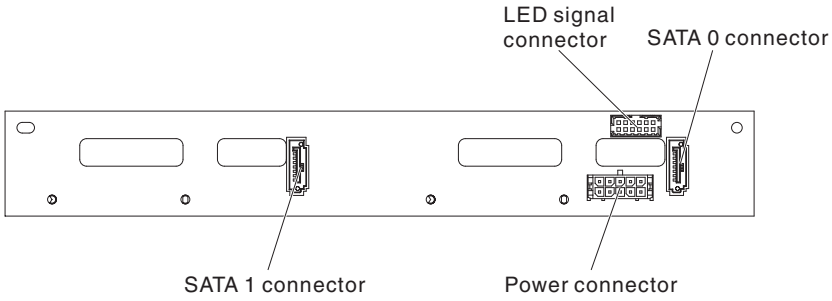


7. Install the air baffle (see “Installing the air baffle” on page 150).
8. Open the latches on the chassis **1** and the pins of the rear hard disk drive cage **2** .
9. Align the edge of the rear hard disk drive cage on the right side of the chassis. Slide the cage into the chassis support bracket until it sits into place. Then,

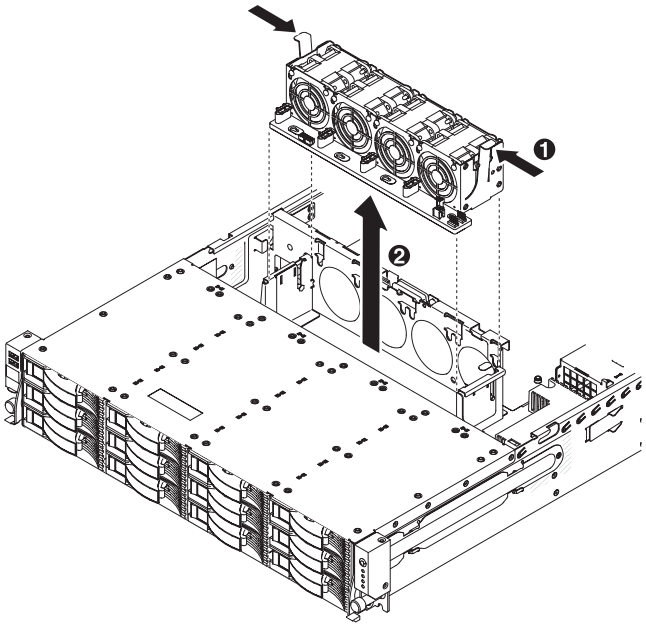
rotate the cage inward until it sits into place **3** .



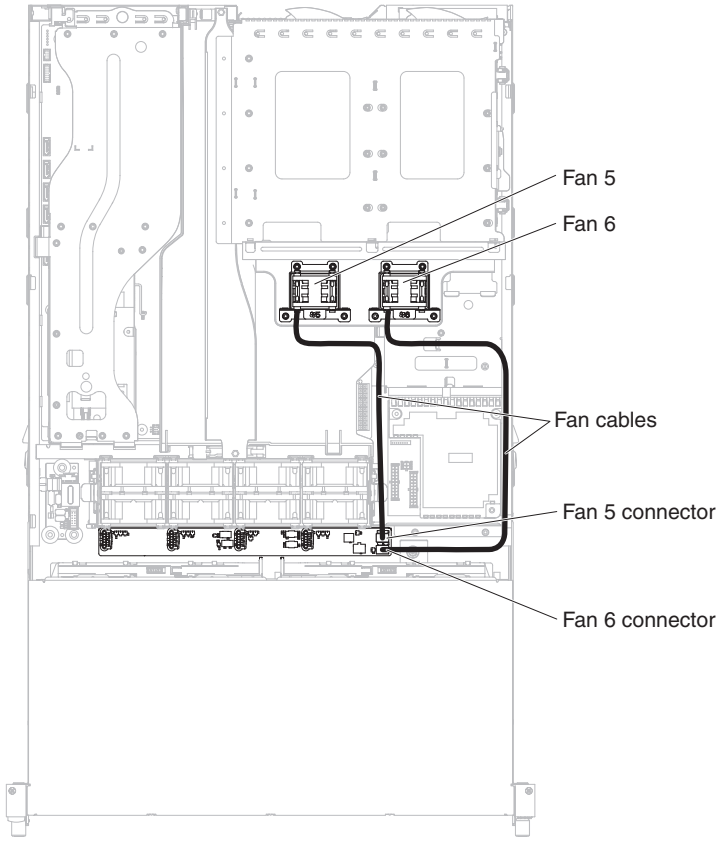
10. Close the latches on the chassis.
11. Connect the LED signal cable and SATA cables from the option package into the backplane assembly on the rear hard disk drive cage.



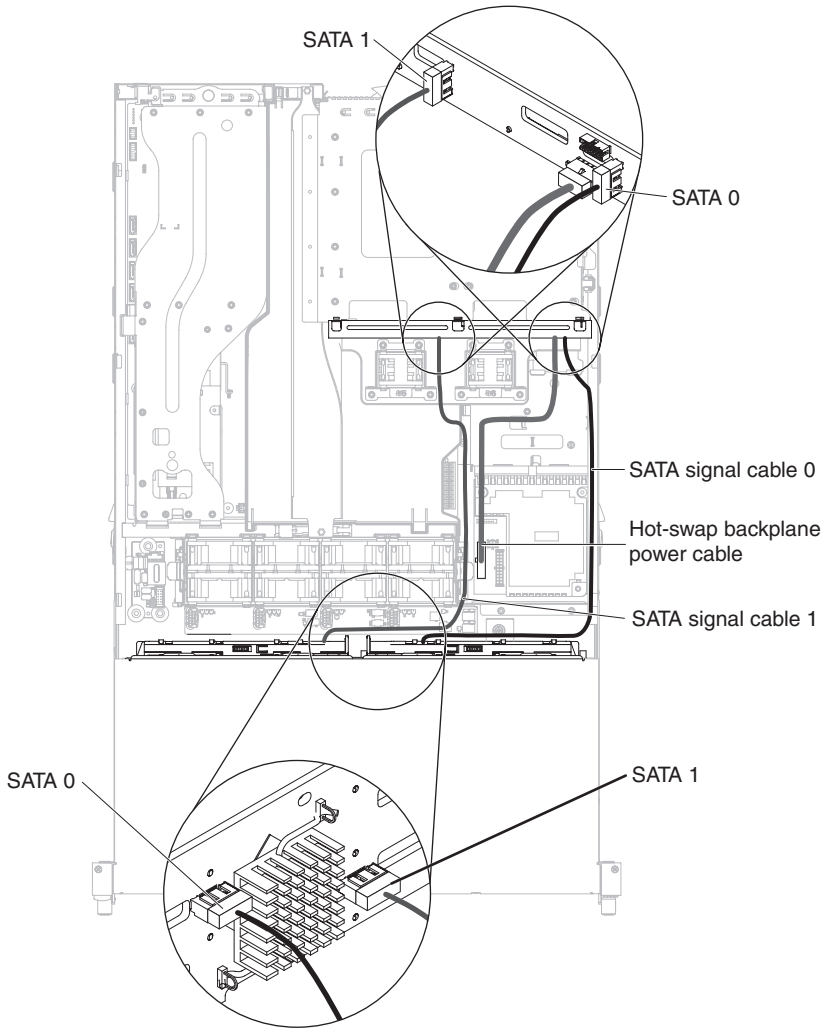
12. Insert the backplane assembly from the option package onto the rear hard disk drive cage (see “Installing the hot-swap backplane on the optional rear hard disk drive cage” on page 187).
13. Remove the system fan cage to obtain more room:
    a. Grasp the system fan cage by the blue grip points.
    b. Press the retention latches toward each other; then, lift the system fan cage out and put it on the bulkhead.



14. Connect to the fan power cables into the connectors on the fan board. Make sure the fan power cables connect the correct connectors on the fan board. Then, route the cables aside.

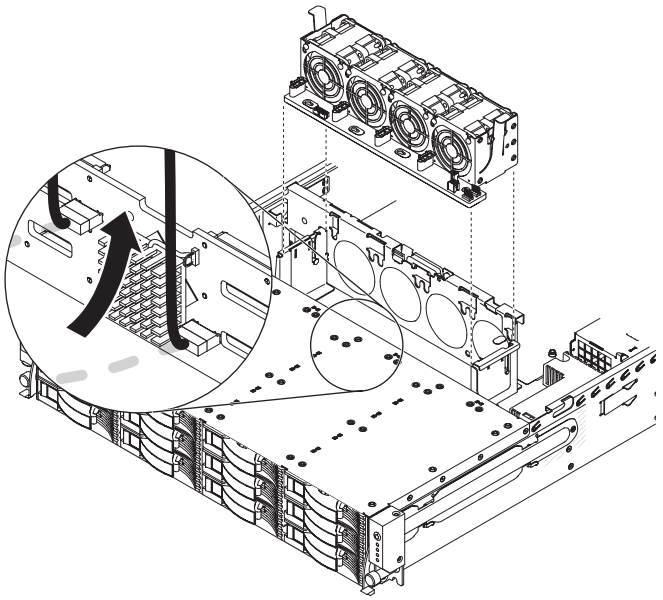


15. Connect the 2 SATA cables to the connectors on the hot-swap backplane. Make sure the labels of both connectors are matched.



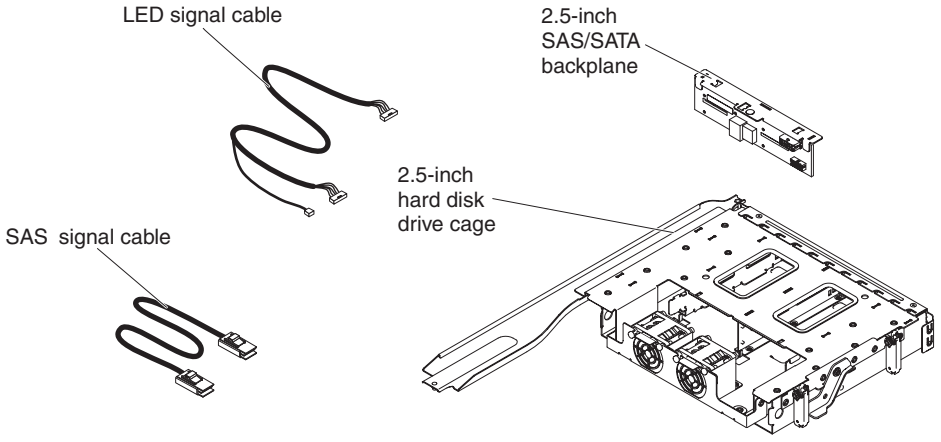
16. Connect the LED signal cable to the connector which is underneath of the power connector of the hot-swap backplane. You can temporary remove the power cable on the hot-swap backplane to make the connection easier.
17. Connect the power cable which you can find near the 240 VA cover into the backplane assembly on the rear hard disk drive cage (see “Internal cable routing and connectors” on page 136); then, secure the cables with any retention clips.
18. Replace the system fan cage:
    a. In order to install the fan cage easier, tightly pull the SATA cables to keep them flat
    b. Align the system fan cage with the guide rails on the fan cage bracket.
    c. Tilt the fan cage a little bit until it passes the SATA cables. Lower the system fan cage into the fan cage bracket until the system fan cage clicks into place.

Note: Make sure no cables are pinched.



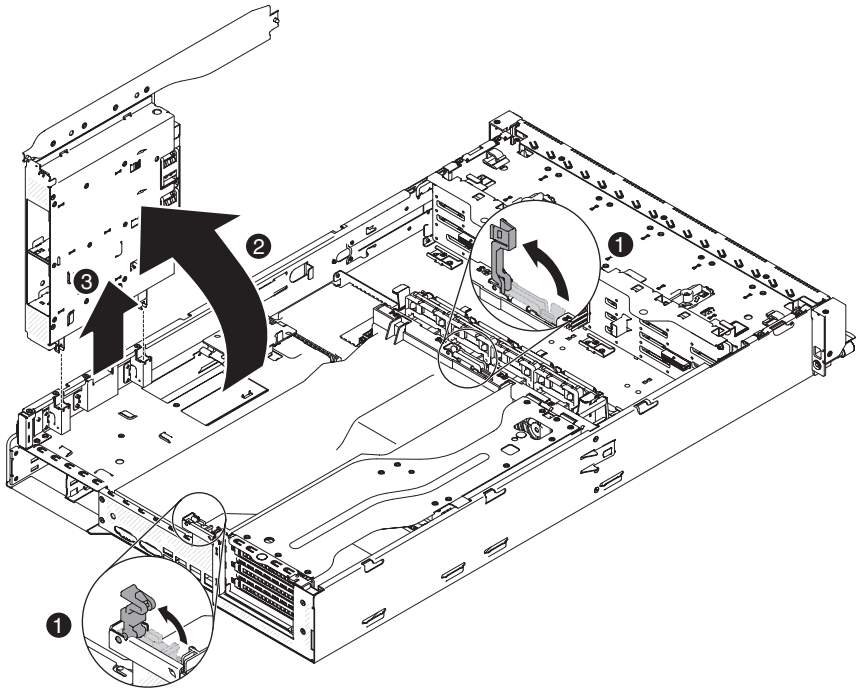
19. Reconnect the hot-swap backplane power cables located on the right hand side of the chassis. Press the hot-swap backplane cables downwards to make the cable routing easier.
20. Reconnect the signal cables to the hot-swap backplane.
21. Make sure the cables are routed in the proper locations without blocking the airflow. It is recommended to press all the cables downwards to make the cable routing easier.

Removing an optional hot-swap SAS/SATA rear 2.5-inch hard disk drive cage

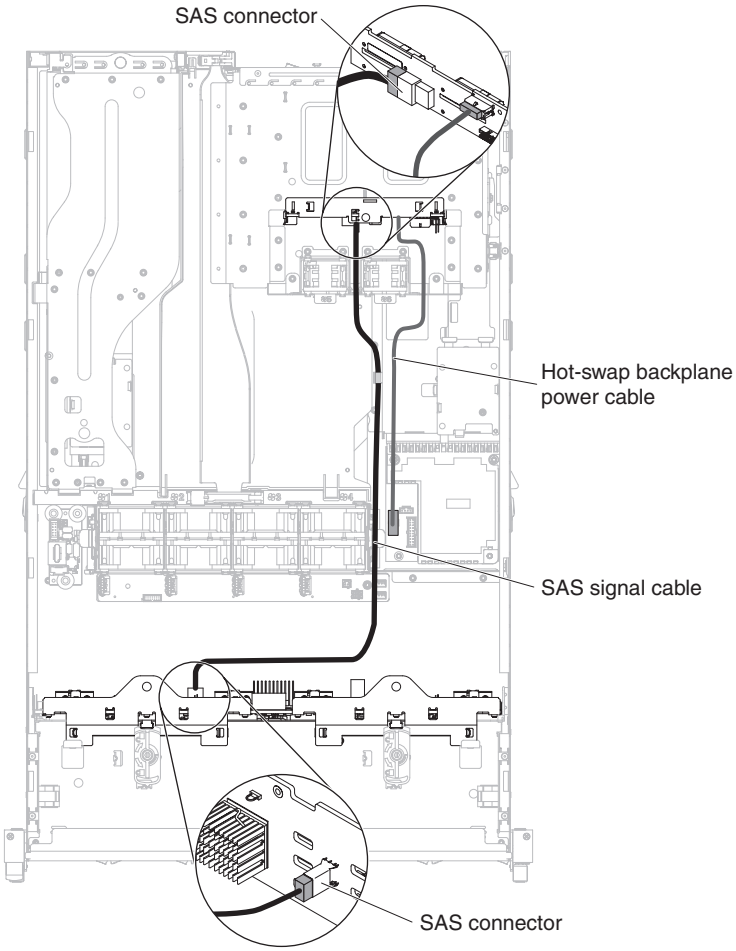


To remove the optional rear hot-swap SAS/SATA hard disk drive cage, complete the following steps:

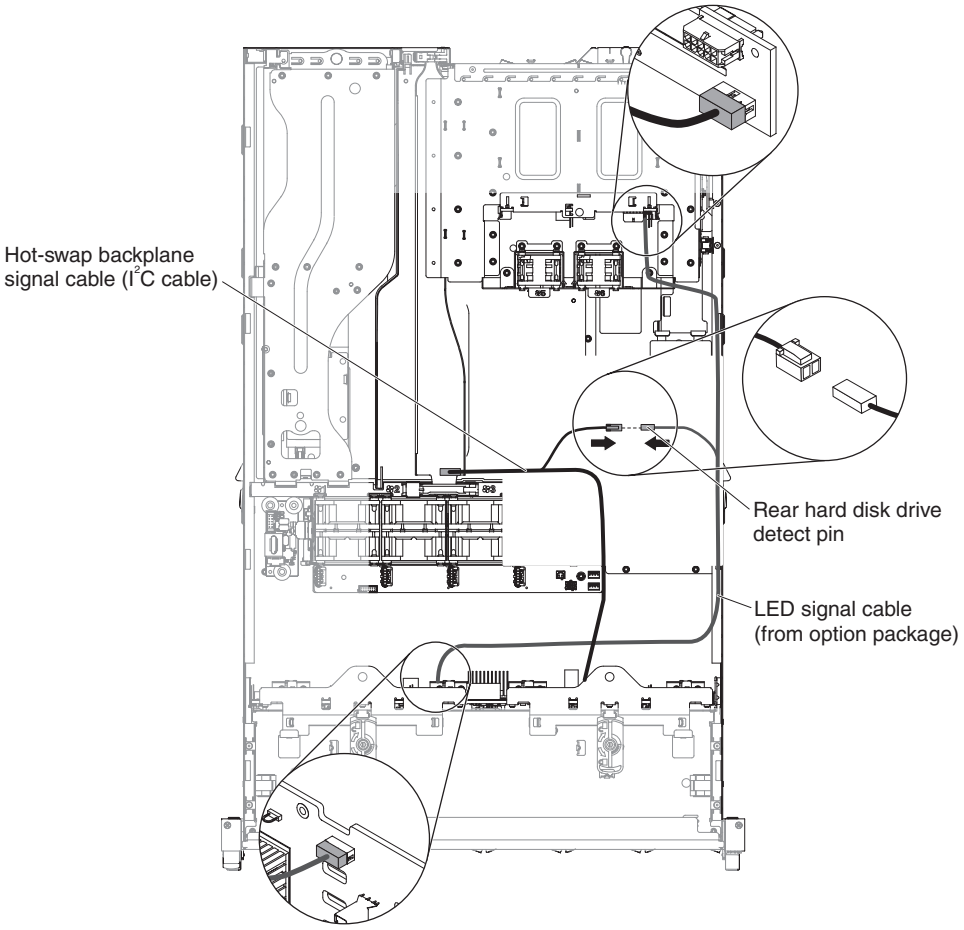
1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. Open the blue latches **1** on the chassis.

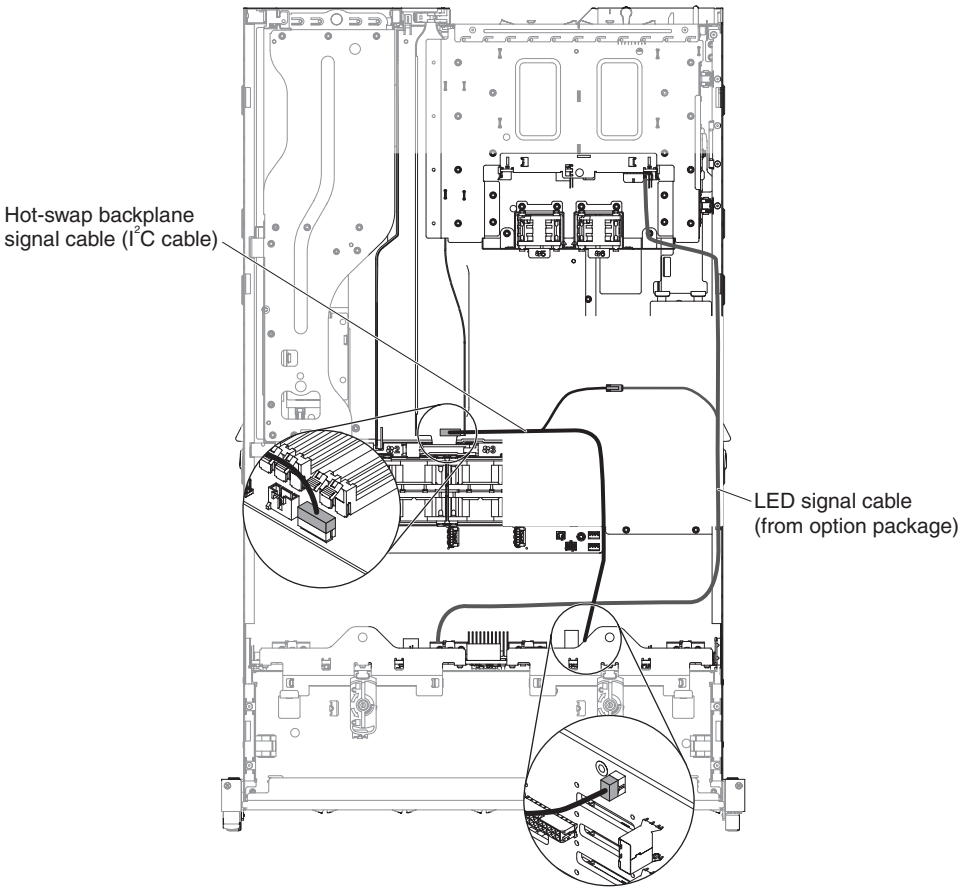


5. Make a note of where cables are attached to; then, disconnect the cables on the rear hard disk drive cage including:
   a. the signal cable and the LED signal cable on the hot-swap backplane
   b. Two fan power cables from the fan board
   c. One backplane power cable



6. Rotate the rear hard disk drive cage **2** outwards. Then, carefully pull the rear hard disk drive cage **3** out of the chassis.
7. Remove the air baffle (see “Removing the air baffle” on page 148).
8. Find the rear hard disk drive detect pin of the hot-swap backplane signal (I^2C) cable located near the system fan cage; then, disconnect from the rear hard disk drive detect pin of the LED signal cable.


Hot-swap backplane
signal cable (I2C cable)
Rear hard disk drive
detect pin
LED signal cable
(from option package)

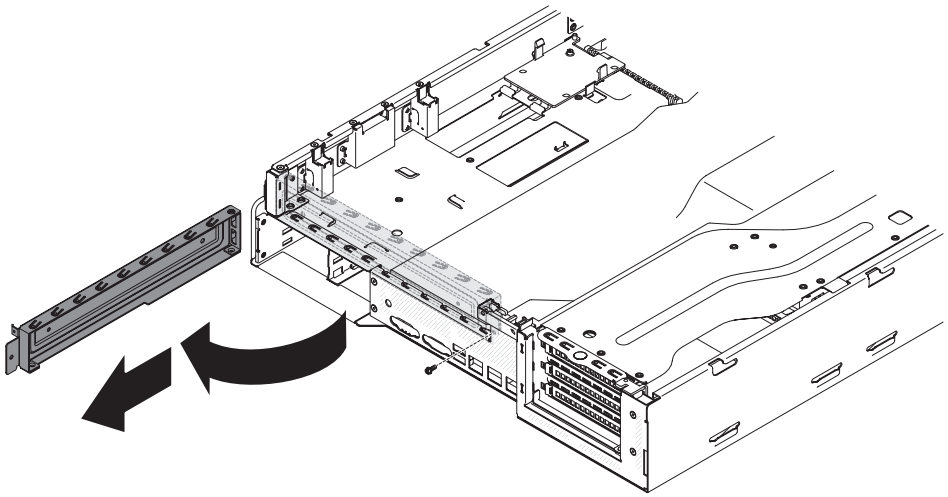


9. If you are instructed to return the rear hard disk drive cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

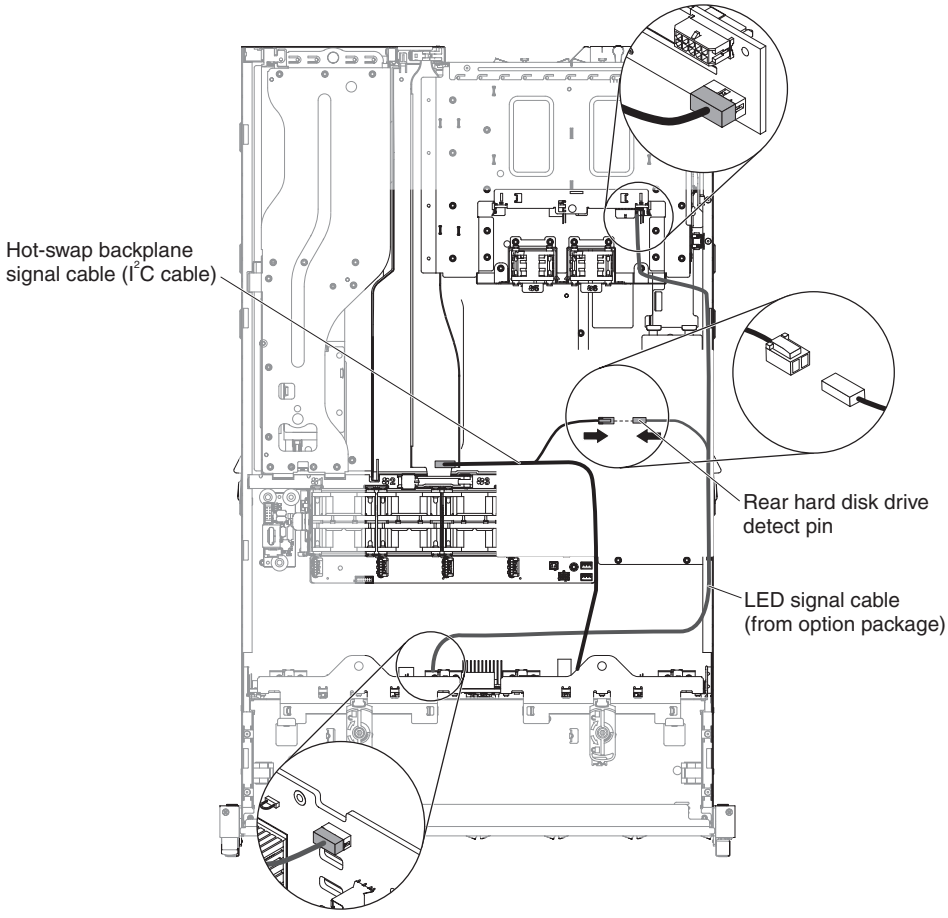
Installing an optional hot-swap SAS/SATA rear 2.5-inch hard disk drive cage

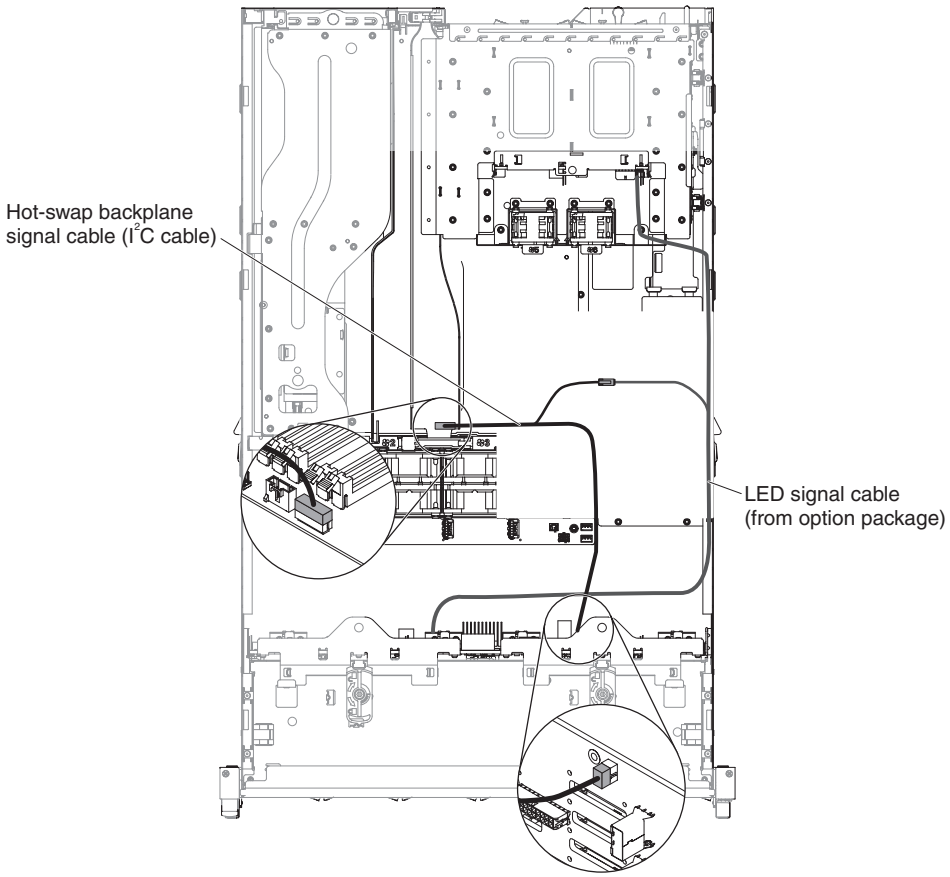
To install the optional rear hot-swap SAS/SATA hard disk drive cage, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. Loosen the screw that secure the drive filler cage to the chassis; then, rotate the drive filler clockwise and remove the drive filler out of the bay from the server.

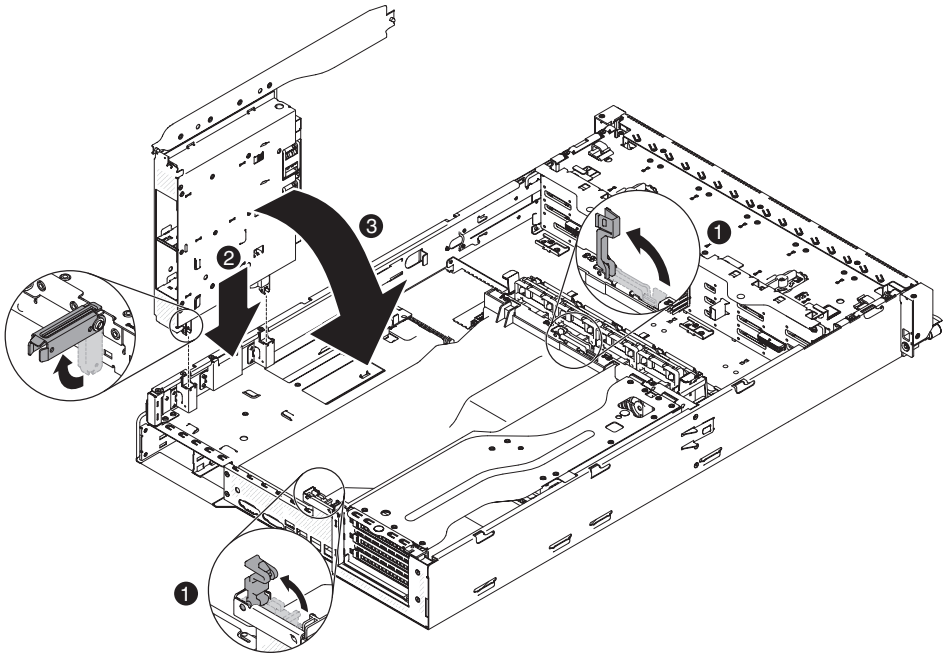


5. Remove the air baffle (see “Removing the air baffle” on page 148).
6. Find the rear hard disk drive detect pin of the hot-swap backplane signal (I^2C) cable located near the system fan cage; then, connect with the rear hard disk drive detect pin of the signal cable from the option package.

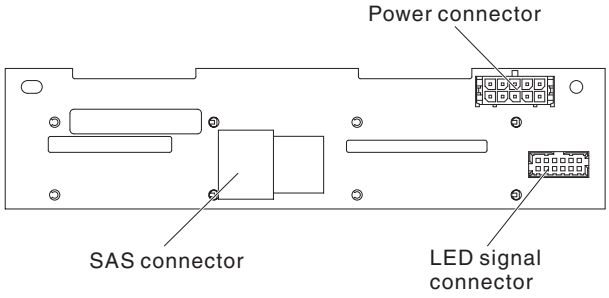




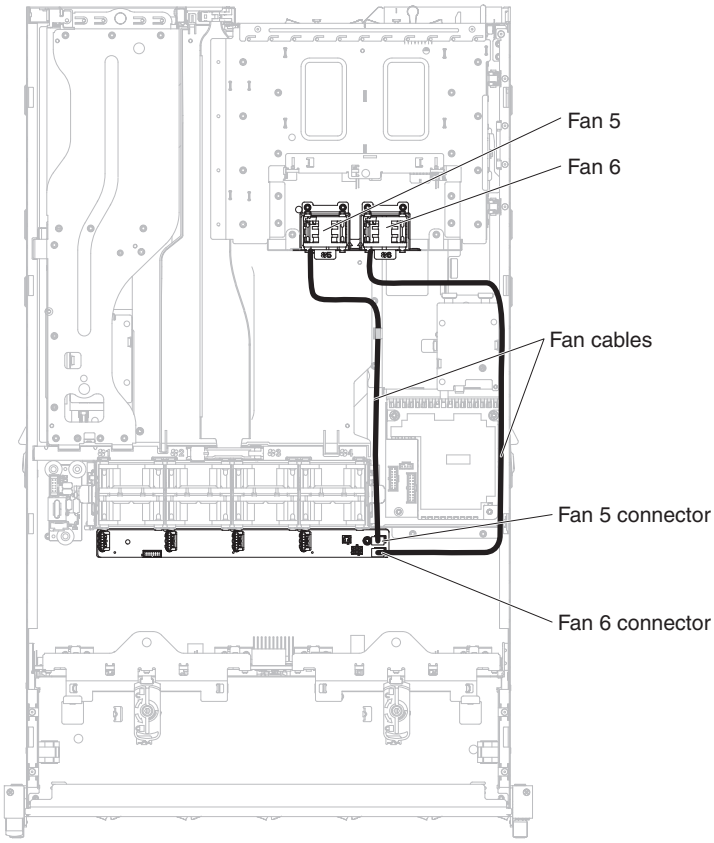
7. Install the air baffle (see “Installing the air baffle” on page 150).
8. Open the latches on the chassis **1** and the pins of the rear hard disk drive cage **2** .
9. Align the edge of the rear hard disk drive cage on the right side of the chassis. Slide the cage into the chassis support bracket until it sits into place. Then, rotate the cage inward until it sits into place **3** .



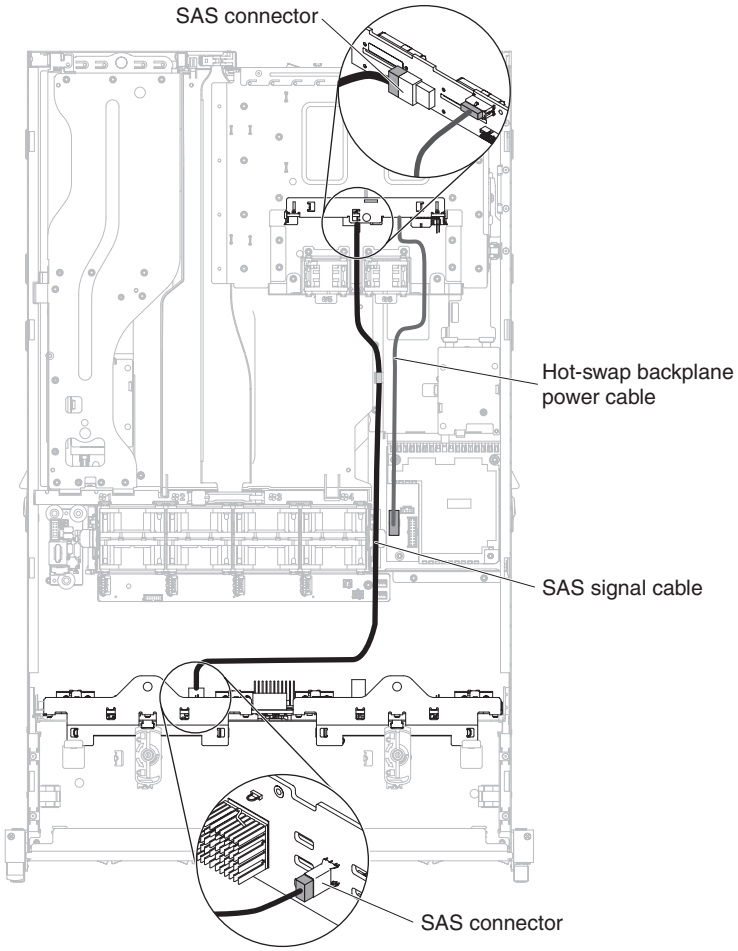
10. Close the chassis latches.
11. Insert the backplane assembly from the option package onto the rear hard disk drive cage.
12. Connect the LED signal cable and signal cable from the option package into the backplane assembly on the rear hard disk drive cage.



13. Connect the fan power cables into the connectors on the fan board. Make sure the fan power cables connect the correct connectors on the fan board. Then, route the cables aside.



14. Connect the SAS cable to the connector on the hot-swap backplane.

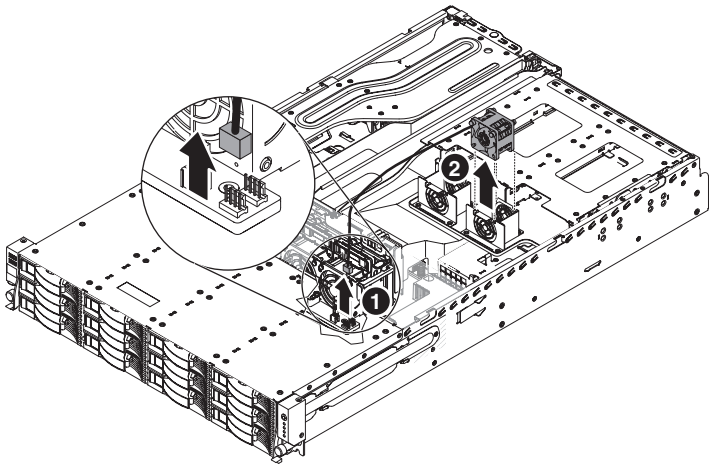


15. Connect the LED signal cable to the connector which is located above the power supply of the hot-swap backplane.
16. Connect the power cable which you can find near the 240 VA cover into the backplane assembly on the rear hard disk drive cage (see “Internal cable routing and connectors” on page 136); then, secure the cables with any retention clips.
17. Make sure the cables are routed in the proper locations without blocking the airflow. Suggest to press all the cables downwards to make the cable routing easier.

Removing the fan from the optional rear hard disk drive cage

To remove the hot-swap backplane from the optional rear hard disk drive cage, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. Unplug the fan cable on the fan board.
5. Carefully grasp the fan and carefully pull it off the fan bracket. Make sure that the fan cable is not tangled with the fan bracket.

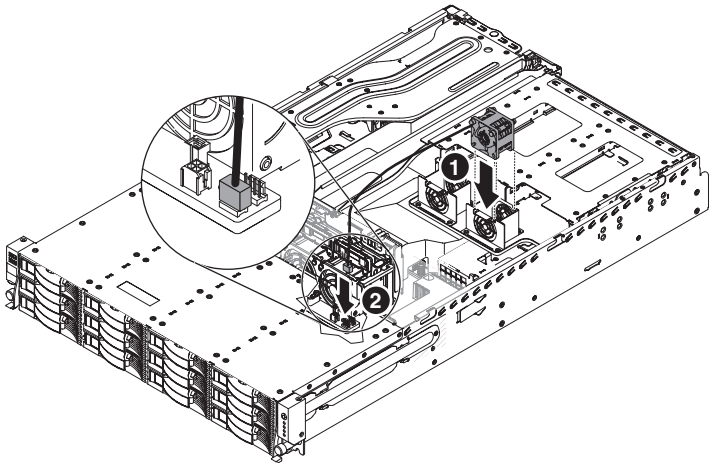


6. If you are instructed to return the backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the fan to the optional rear hard disk drive cage

To install the replacement fan to the optional rear hard disk drive cage, complete the following steps:

1. Orient the new fan over its position in the fan bracket. Make sure that the fan cable is on the cave of the fan bracket and the 4 rubber grommets are on the slots of the fan bracket as well.



2. Reconnect the fan cable to the fan board.
3. Install the cover (see “Installing the cover” on page 146).
4. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

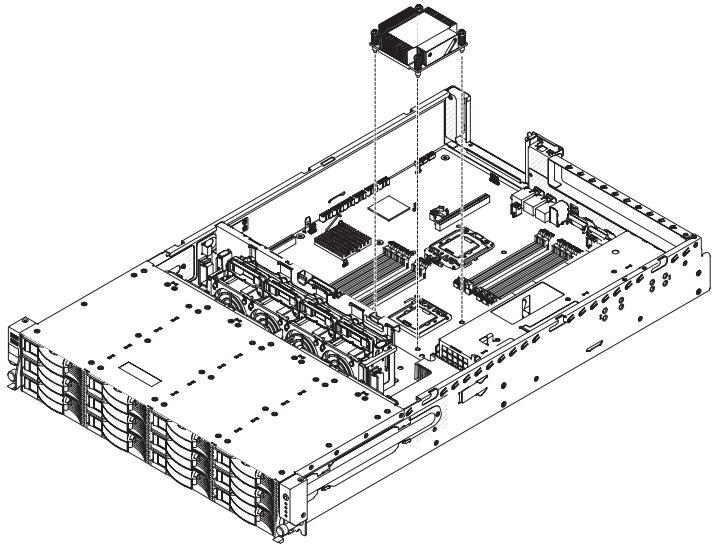
Removing a microprocessor and heat sink

Attention:

- Microprocessors are to be removed only by trained service technicians.
- Always use the microprocessor installation tool to remove a microprocessor. Failing to use the microprocessor installation tool may damage the microprocessor sockets on the system board. Any damage to the microprocessor sockets may require replacing the system board.
- Do not allow the thermal grease on the microprocessor and heat sink to come in contact with anything. Contact with any surface can compromise the thermal grease and the microprocessor socket.
- Dropping the microprocessor during installation or removal can damage the contacts.
- Do not touch the microprocessor contacts; handle the microprocessor by the edges only. Contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.

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

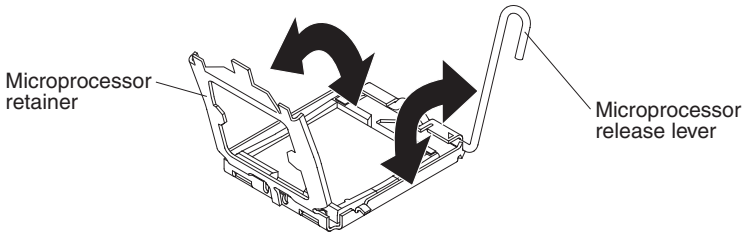
1. Read the safety information that begins on page vii, “Handling static-sensitive devices” on page 135, and “Installation guidelines” on page 133.
2. Turn off the server and peripheral devices and disconnect the power cord and all external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 147).
5. Remove the air baffle (see “Removing the air baffle” on page 148).
6. Loosen the four screws that secure the heat sink to the chassis.



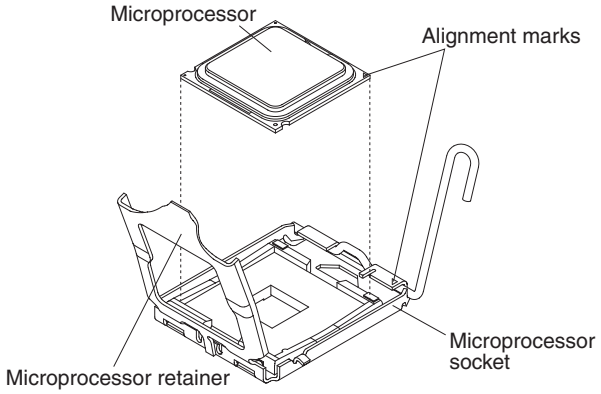
7. Lift the heat sink out of the server. If the heat sink sticks to the microprocessor, slightly twist the heat sink back and forth to break the seal. After removal, place the heat sink on its side on a clean, flat surface.

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

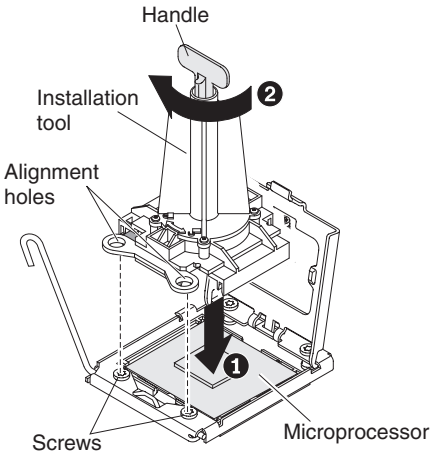
8. Release the microprocessor retention latch by pressing down on the end, moving it to the side, and releasing it to the open (up) position.



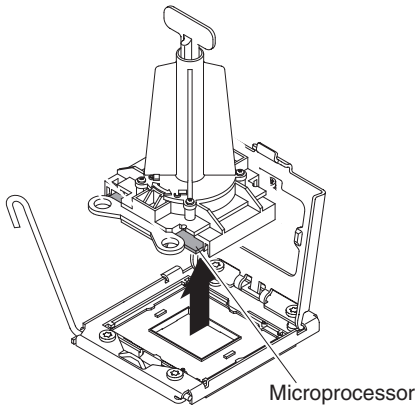
9. Open the microprocessor bracket frame by lifting up the tab on the top edge. Keep the bracket frame in the open position.



10. Locate the microprocessor installation tool that comes with the new microprocessor.
11. Align the holes on the installation tool with the screws on the microprocessor bracket, then place the microprocessor installation tool down over the microprocessor. Twist the handle clockwise to attach the tool to the microprocessor. You can pick up or release the microprocessor by twisting the microprocessor installation tool handle.



12. Carefully lift the microprocessor straight up and out of the socket, and place it on a static-protective surface. Remove the microprocessor from the installation tool by twisting the handle counterclockwise.



13. If you do not intend to install a microprocessor in the socket, install the socket dust cover that you removed in step 2 on page 224 on the socket.

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

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

Installing a microprocessor and heat sink

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

Read the documentation that comes with the microprocessor to determine whether you must update the IBM System x Server Firmware.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3630 M3** to display the matrix of downloadable files for the server.

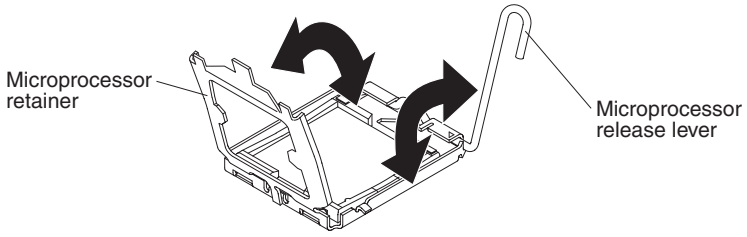
Important:

- Microprocessors are to be installed only by trained service technicians.
- Always use the microprocessor installation tool to install a microprocessor. Failing to use the microprocessor installation tool may damage the microprocessor sockets on the system board. Any damage to the microprocessor sockets may require replacing the system board.
- A startup (boot) microprocessor must always be installed in microprocessor connector 1 on the system board.
- To ensure correct server operation, make sure that you use microprocessors that are compatible and you have installed an additional DIMM for microprocessor 2. Compatible microprocessors must have the same QuickPath Interconnect (QPI) link speed, integrated memory controller frequency, core frequency, power segment, cache size, and type.

- Microprocessors with different stepping levels are supported in this server. If you install microprocessors with different stepping levels, it does not matter which microprocessor is installed in microprocessor connector 1 or connector 2.
- Do not install an Intel Xeon™ 5500 series microprocessor and an Xeon™ 5600 series microprocessor in the same server.
- If you are installing a microprocessor that has been removed, make sure that it is paired with its original heat sink or a new replacement heat sink. Do not reuse a heat sink from another microprocessor; the thermal grease distribution might be different and might affect conductivity.
- If you are installing a new heat sink, remove the protective backing from the thermal material that is on the underside of the new heat sink.
- If you are installing a new heat-sink assembly that did not come with thermal grease, see “Thermal grease” on page 228 for instructions for applying thermal grease.
- If you are installing a heat sink that has contaminated thermal grease, see “Thermal grease” on page 228 for instructions for replacing the thermal grease.

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

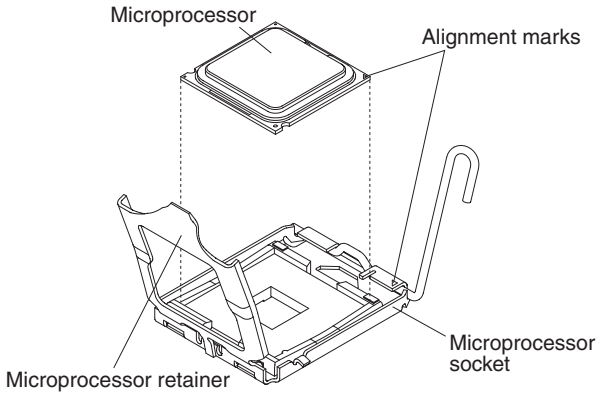
1. Locate the second microprocessor socket on the system board.
2. Remove the microprocessor socket dust cover from the surface of the microprocessor socket, if one is present. Store the dust cover in a safe place.
3. Install the microprocessor:
   a. Rotate the microprocessor release lever on the socket from its closed and locked position until it stops in the fully open position.



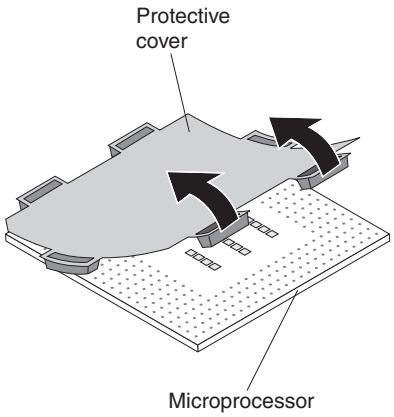
   b. Rotate the hinged microprocessor bracket frame into the open position.
   c. Touch the static-protective package that contains the microprocessor to any unpainted metal surface on the server. Then, remove the microprocessor from the package.

Attention:

- 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. If there is a plastic protective cover on the bottom of the microprocessor, carefully remove it.



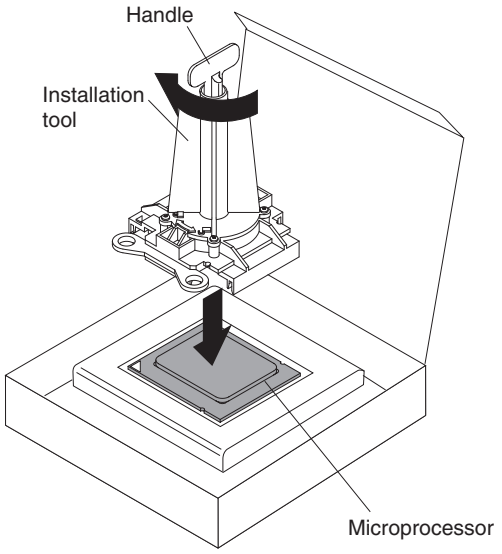
e. Locate the microprocessor installation tool that comes with the new microprocessor.

f. Twist the handle of the installation tool counterclockwise so that it is in the open position.

g. Align the triangle alignment mark on the microprocessor installation tool with the triangle alignment mark on the microprocessor, then place the microprocessor on the underside of the tool so that the tool can grasp the microprocessor correctly onto the bottom of the installation tool.

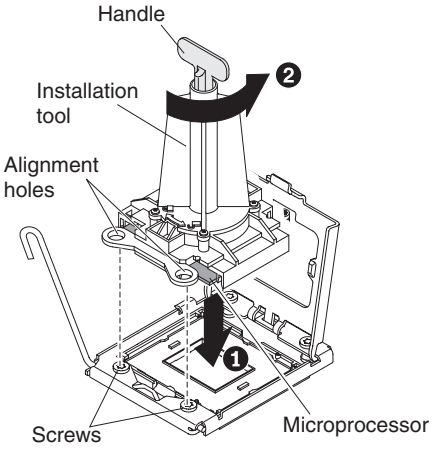
h. Twist the handle of the installation tool clockwise to secure the microprocessor in the tool.

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



i. Carefully align the microprocessor installation tool over the microprocessor socket. Twist the handle of the microprocessor tool counterclockwise to insert the microprocessor into the socket.

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



j. Close the microprocessor bracket frame.

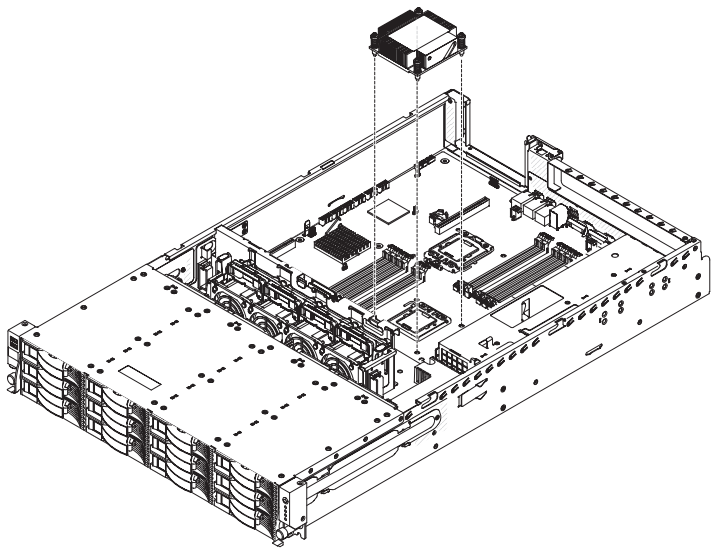
k. Carefully close the microprocessor release lever to secure the microprocessor in the socket.

4. Install a heat sink on the microprocessor.

   Attention: Do not touch the thermal grease on the bottom of the heat sink or set down the heat sink after you remove the plastic cover. Touching the thermal grease will contaminate it.

   a. Remove the plastic protective cover from the bottom of the heat sink.
   b. If the new heat sink did not come with thermal grease, apply thermal grease on the microprocessor before you install the heat sink (see “Thermal grease” on page 228).
   c. Align the heat sink so that the arrows on the label point toward the system fans and place the heat sink on top of the microprocessor, thermal material side down.

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



   e. Tighten the screws with a screwdriver, alternating among the screws until they are tight. If possible, each screw should be rotated two full rotations at a time. Repeat until the screws are tight. Do not overtighten the screws by using excessive force.
5. Install the air baffle (see “Installing the air baffle” on page 150).
6. If you have the optional hot-swap rear hard disk drive cage installed, rotate it down (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 148).
7. Install the cover (see “Installing the cover” on page 146).
8. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

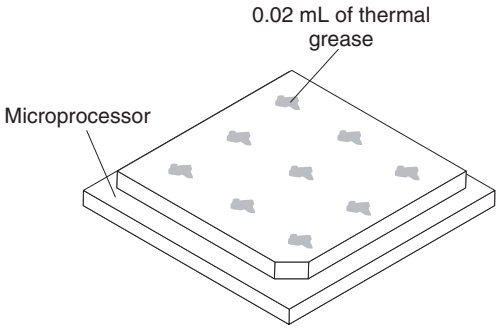
Thermal grease

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

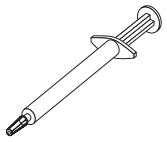
To replace damaged or contaminated thermal grease on the microprocessor and heat exchanger, complete the following steps:

1. Place the heat-sink assembly on a clean work surface.
2. Remove the cleaning pad from its package and unfold it completely.
3. Use the cleaning pad to wipe the thermal grease from the bottom of the heat exchanger.

   Note: Make sure that all of the thermal grease is removed.
4. Use a clean area of the cleaning pad to wipe the thermal grease from the microprocessor; then, dispose of the cleaning pad after all of the thermal grease is removed.



5. Use the thermal-grease syringe to place nine uniformly spaced dots of 0.02 mL each on the top of the microprocessor.



   Note: 0.01mL is one tick mark on the syringe. If the grease is properly applied, approximately half (0.22 mL) of the grease will remain in the syringe.
6. Continue with step4c on page 227 of the “Installing a microprocessor and heat sink” on page 223 procedure.

Removing the system board

To remove the system board, complete the following steps.

1. Read the safety information that begins on page vii and “Installation guidelines” on page 133.
2. Turn off the server, and disconnect all power cords and external cables.
3. Remove the cover (see “Removing the cover” on page 145).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 147).
5. Remove the air baffle (see “Removing the air baffle” on page 148).

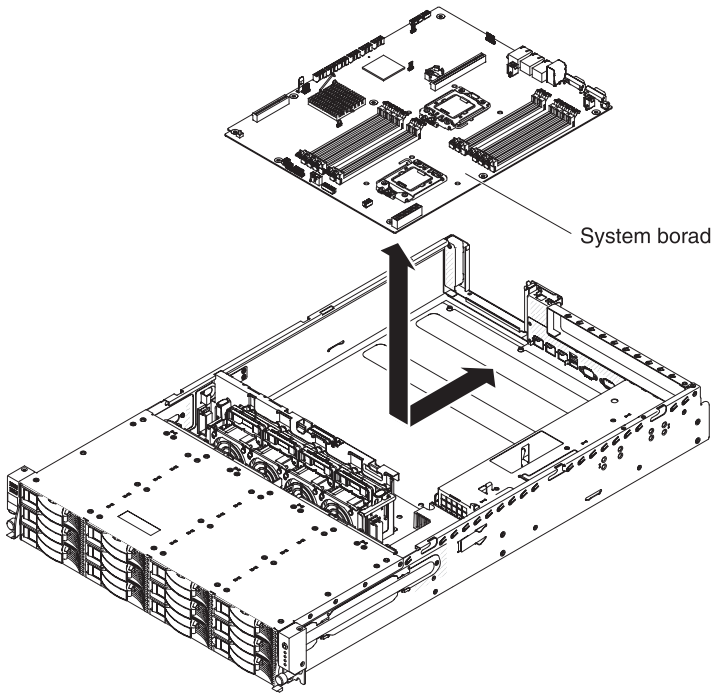
6. Remove the optional rear hard disk drive cage (see “Removing an optional hot-swap SAS/SATA rear 3.5-inch hard disk drive cage” on page 202 or “Removing an optional hot-swap SAS/SATA rear 2.5-inch hard disk drive cage” on page 210).
7. Remove the PCI riser-card assembly with adapters (see “Removing the PCI riser-card assembly” on page 150) and place it on a static-protective surface for reinstallation.
8. If a virtual media key is installed in the server, remove it (see “Removing an IBM virtual media key” on page 167 for instructions).
9. Remove all DIMMs, and place them on a static-protective surface for reinstallation (see “Removing a memory module (DIMM)” on page 161).

   Important: Before you remove the DIMMs, note which DIMMs are in which connectors. You must install them in the same configuration on the replacement system board.
10. Disconnect all cables from the system board, note the cable routing and connectors (see “Internal cable routing and connectors” on page 136).

    Important: Pay special attention while you are removing the power cable of the Power Management Bus (PM Bus) from connector. Make sure that you press the locking of the power cable first. Then pull the cable out of the connector vertically so the housing of the connector still remains on the system board.

    Attention:

    - In the following step, do not allow the thermal grease to come in contact with anything, and keep each heat sink paired with its microprocessor for reinstallation. Contact with any surface can compromise the thermal grease and the microprocessor socket; a mismatch between the microprocessor and its original heat sink can require the installation of a new heat sink.
    - Disengage all latches, release tabs or locks on cable connectors when you disconnect all cables from the system board. Please refer to “Internal cable routing and connectors” on page 136 for more information. Failing to release them before removing the cables will damage the cable sockets on the system board. The cable sockets on the system board are fragile. Any damage to the cable sockets may require replacing the system board.
11. (Trained service technician only) Remove each microprocessor heat sink and microprocessor; then, place them on a static-protective surface for reinstallation (see “Removing a microprocessor and heat sink” on page 221).
12. Remove the screws that secure the system board to the chassis.
13. Lift up to remove the system board out of the server.



14. Remove the socket dust covers from the microprocessor sockets on the new system board and place them on the microprocessor sockets of the old system board that you are removing.

    Attention: Make sure to place the socket covers for the microprocessor sockets on the system board before you return the old system board.

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

Installing the system board

Notes:

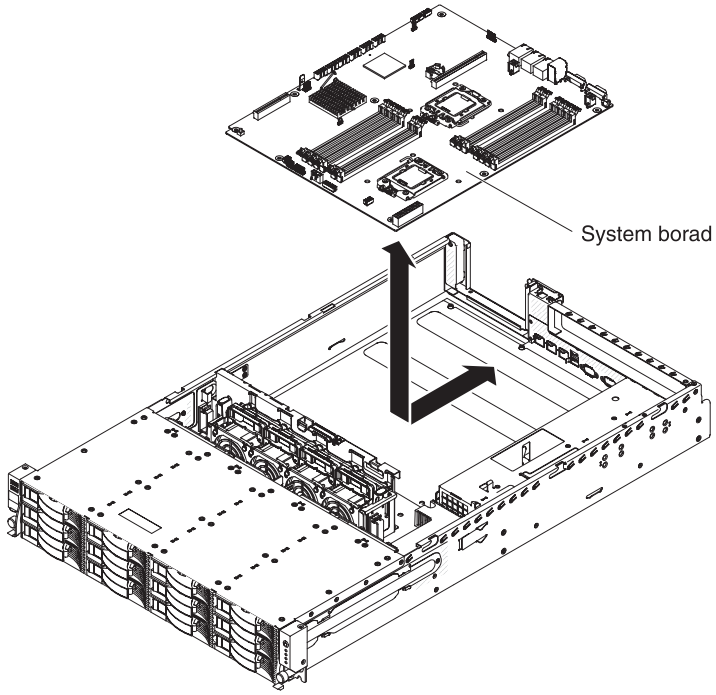
1. When you reassemble the components in the server, be sure to route all cables carefully so that they are not exposed to excessive pressure (see “Internal cable routing and connectors” on page 136).
2. When you replace the system board, you must either update the server with the latest firmware or 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 233, “Updating the Universal Unique Identifier (UUID)” on page 253, and “Updating the DMI/SMBIOS data” on page 255 for more information.

   Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
3. Update the vital product data (VPD) through the server firmware update procedure.

To reinstall the system board, complete the following steps:

1. Align the screw holes on the system board with the screw holes on the chassis; then, lower it into the server. Make sure that the rear connectors

extend through the rear of the chassis.



2. Reconnect to the system board the cables that you disconnected in step 10 of "Removing the system board" on page 228 (see "Internal cable routing and connectors" on page 136).
3. (Trained service technician only) Install each microprocessor with its matching heat sink (see "Installing a microprocessor and heat sink" on page 223).
4. Install the DIMMs (see "Installing a memory module" on page 162).
5. If necessary, install the virtual media key (see "Installing an IBM virtual media key" on page 167).
6. Install the air baffle ("Installing the air baffle" on page 150), making sure that all cables are out of the way.
7. If you have the optional hot-swap rear hard disk drive cage installed, rotate it down (see "Rotating the optional hot-swap rear hard disk drive cage down" on page 148).
8. Install the PCI riser-card assembly (see "Installing the PCI riser-card assembly" on page 151), making sure that all cables are out of the way.
9. Install the cover (see "Installing the cover" on page 146).
10. Push the power supplies back into the server.
11. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Important: Either update the server with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image. See "Updating the firmware" on page 233, "Updating the Universal Unique Identifier (UUID)" on page 253, and "Updating the DMI/SMBIOS data" on page 255 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.

Chapter 6. Configuration information and instructions

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

Updating the firmware

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

The firmware for the server is periodically updated and is available for download from the Web. To check for the latest level of firmware, such as server firmware, vital product data (VPD) code, device drivers, and service processor firmware complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3630 M3** to display the matrix of downloadable files for the server.

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

When you replace a device in the server, you might have to either update the firmware that is stored in memory on the device or restore the pre-existing firmware from a diskette or CD image.

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

The following items are downloadable at http://www.ibm.com/systems/support/:

- Diagnostics programs
- IMM firmware
- Ethernet firmware

Important: To avoid problems and to maintain proper system performance, always make sure that the UEFI code, service processor, and other firmware levels are consistent for all System x3630 M3 servers.

Configuring the server

The following configuration programs come with the server:

- **Setup utility**

  The Setup utility (formerly called the Configuration/Setup Utility program) is part of the IBM System x Server Firmware. Use it to change interrupt request (IRQ) settings, change the startup-device sequence, set the date and time, and set passwords. For information about using this program, see “Using the Setup utility” on page 235.

- **Boot Menu program**

  The Boot Menu program is part of the server firmware. Use it to override the startup sequence that is set in the Setup utility and temporarily assign a device to be first in the startup sequence.

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

  The ServerGuide program provides software-setup tools and installation tools that are designed for the server. Use this CD during the installation of the server to configure basic hardware features, such as an integrated SAS controller with RAID capabilities, and to simplify the installation of your operating system. For information about obtaining and using this CD, see “Using the ServerGuide Setup and Installation CD” on page 240.

- **Integrated management module**

  Use the integrated management module (IMM) for configuration, to update the firmware and sensor data record/field replaceable unit (SDR/FRU) data, and to remotely manage a network. For information about using the IMM, see “Using the integrated management module” on page 242.

- **VMware embedded USB hypervisor**

  The VMware embedded USB hypervisor is available on the server models that come with an installed IBM USB Memory Key for VMware hypervisor. The USB memory key is installed in the USB connector on the SAS riser card. Hypervisor is virtualization software that enables multiple operating systems to run on a host computer at the same time. For more information about using the embedded hypervisor, see “Using the USB memory key for VMware hypervisor” on page 245.

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

  The remote presence and blue-screen capture feature are integrated into the integrated management module (IMM). The virtual media key is required to enable these features. When the optional virtual media key is installed in the server, it activates the remote presence functions. Without the virtual media key, you will not be able to access the network remotely to mount or unmount drives or images on the client system. However, you will still be able to access the host graphical user interface through the Web interface without the virtual media key. You can order an optional IBM Virtual Media Key, if one did not come with your server. For more information about how to enable the remote presence function, see “Using the remote presence capability and blue-screen capture” on page 243.

- **Ethernet controller configuration**

  For information about configuring the Ethernet controller, see “Configuring the Gigabit Ethernet controller” on page 246.

- **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 Setup utility.”

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

Table 15. Server configuration and applications for configuring and managing RAID arrays

Server configuration	RAID array configuration (before operating system is installed)	RAID array management (after operating system is installed)
ServeRAID-BR10il v2 adapter (LSI 1064E)	LSI Utility (Setup utility, press Ctrl+C), ServerGuide	MegaRAID Storage Manager (MSM), Director
ServeRAID-M5014 adapter (LSI SAS2108)	MegaRAID BIOS Configuration Utility, ServerGuide	MegaRAID Storage Manager (MSM), Director
ServeRAID-M5015 adapter (LSI SAS2108)	MegaRAID BIOS Configuration Utility, ServerGuide	MegaRAID Storage Manager (MSM), Director
ServeRAID-M1015 adapter (LSI SAS2008)	MegaRAID BIOS Configuration Utility, ServerGuide	MegaRAID Storage Manager (MSM), Director

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

  Use this program as an alternative to the Setup utility for modifying server firmware settings and IMM settings. Use the ASU program online or out of band to modify server firmware settings from the command line without the need to restart the server to access the Setup utility. For more information about using this program, see “IBM Advanced Settings Utility program” on page 251.

Using the Setup utility

Use the Setup utility, formerly called the Configuration/Setup Utility program, to perform the following tasks:

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

Starting the Setup utility

To start the Setup utility, complete the following steps:

1. Turn on the server.

   Note: Approximately 40 seconds after the server is connected to ac power, the power-control button becomes active.

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

3. Select the settings to view or change.

Setup utility menu choices

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

- **System Information**

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

  - **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, and the revision level or issue date of the integrated management module firmware and diagnostics code.

- **System Settings**

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

  - **Processors**

    Select this choice to view or change the processor settings.

  - **Memory**

    Select this choice to view or change the memory settings. To configure memory mirroring, select **System Settings → Memory** , and then select **Memory Channel Mode → Mirroring**.

  - **Devices and I/O Ports**

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

  - **Power**

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

  - **Operating Modes**

    Select this choice to view or change the operating profile (performance and power utilization).

    Note: When you change from Custom Mode to Performance Mode and back to Custom Mode again, the Turbo Mode field still displays in the screen. You cannot configure Turbo Mode settings in Custom Mode. To have this screen display configurable fields properly, you may restore the Setup utility to the factory default settings.

  - **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.

- **Commands on USB Interface Preference**

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

- **Network Configuration**

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

  Note: Ignore the IMM IP address displayed before getting the IP from the DHCP server. You will see the correct IMM IP address after IMM gets the IP from the DHCP server.

- **Reset IMM to Defaults**

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

- **Reset IMM**

  Select this choice to reset IMM.

– **Legacy Support**

  Select this choice to view or set legacy support.

- **Force Legacy Video on Boot**

  Select this choice to force INT video support, if the operating system does not support UEFI Video Output Standards.

- **Rehook INT 19h**

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

- **Legacy Thunk Support**

  Select this choice to enable or disable legacy thunk support.

– **Adapters and UEFI Drivers**

  Select this choice to view information about the adapters and UEFI drivers in the server. You can also select an adapter that you want to configure and start a configuration program.

– **Network**

  Select this choice to see all of the device options, such as the iSCSI, PXE, and Ethernet parameters.

• **Date and Time**

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

• **Start Options**

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

The startup sequence specifies the order in which the server checks devices to find a boot record. The server starts from the first boot record that it finds. If the server has Wake on LAN hardware and software and the operating system supports Wake on LAN functions, you can specify a startup sequence for the Wake on LAN functions. For example, you can define a startup sequence that checks for a disc in the CD-RW/DVD drive, then checks the hard disk drive, and then checks a network adapter.

This choice is on the full Setup utility menu only.

- **Boot Manager**

  Select this choice to view, add, or change the device boot priority, boot from a file, select a one-time boot, or reset the boot order to the default setting.

  Notes:

  1. To have the server boot from a floppy disk, you must select **Legacy Only** as the first option in the boot sequence.
  2. When the server is unable to boot from a bootable device using the default boot sequence, the server will automatically boot from a connected hypervisor key or from an iSCSI source (if the server is connected to a target iSCSI server) even when the hypervisor key and iSCSI options are not included in the default boot sequence.

- **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 event 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 the *Problem Determination and Service Guide* for instructions for 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 system-event log. Also, after you complete a repair or correct an error, clear the system-event log to turn off the system-error LED on the front of the server.

  – **POST Event Viewer**

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

  – **System Event Log**

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

  – **Clear System Event Log**

    Select this choice to clear the system-event log.

- **User Security**

  Select this choice to set, change, or clear passwords. See “Passwords” on page 239 for more information.

  This choice is on the full and limited Setup utility menu.

  – **Set Power-on Password**

    Select this choice to set or change a power-on password. For more information, see “Power-on password” on page 239.

  – **Clear Power-on Password**

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

  - **Set Admin Password**

    Select this choice to set or change an administrator password. An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu. If an administrator password is set, the full Setup utility menu is available only if you type the administrator password at the password prompt. For more information, see “Administrator password” on page 240.

  - **Clear Admin Password**

    Select this choice to clear an administrator password. For more information, see “Administrator password” on page 240.

- **Save Settings**

  Select this choice to save the changes that you have made in the settings.

- **Restore Settings**

  Select this choice to cancel the changes that you have made in the settings and restore the previous settings.

- **Load Default Settings**

  Select this choice to cancel the changes that you have made in the settings and restore the factory settings.

- **Exit Setup**

  Select this choice to exit from the Setup utility. If you have not saved the changes that you have made in the settings, you are asked whether you want to save the changes or exit without saving them.

Passwords

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

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

An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu. If you set only an administrator password, you do not have to type a password to complete the system startup, but you must type the administrator password to access the Setup utility menu.

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

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

When a power-on password is set, you can enable the Unattended Start mode, in which the keyboard and mouse remain locked but the operating system can start. You can unlock the keyboard and mouse by typing the power-on password.

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

- Clear the password by clearing CMOS memory.
- Remove the battery from the server and then reinstall it. (See “Removing the system battery” on page 142 and “Installing the system battery” on page 143 for more information.)

Administrator password: An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu.

If an administrator password is set, you must type the administrator password for access to the full Setup utility menu. You can use any combination of between six and 20 printable ASCII characters for the password.

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

Using the Boot Selection Menu program

The Boot Selection Menu is used to temporarily redefine the first startup device without changing boot options or settings in the Setup utility.

To use the Boot Selection Menu program, complete the following steps:

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

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

Starting the backup server firmware

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

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

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

Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD contains a setup and installation program that is designed for your server. The ServerGuide program detects the server model and optional hardware devices that are installed and uses that

information during setup to configure the hardware. The ServerGuide program simplifies operating-system installations by providing updated device drivers and, in some cases, installing them automatically.

You can download a free image of the *ServerGuide Setup and Installation* CD or purchase the CD from the ServerGuide fulfillment Web site at http://www.ibm.com/systems/management/serverguide/sub.html. To download the free image, click **IBM Service and Support Site**.

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

The ServerGuide program has the following features:

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

ServerGuide features

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

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

The ServerGuide program performs the following tasks:

- Sets system date and time
- Detects the RAID adapter or controller and runs the SAS RAID configuration program (with LSI chip sets for ServeRAID adapters only)
- Checks the microcode (firmware) levels of a ServeRAID adapter and determines whether a later level is available from the CD
- Detects installed optional hardware devices and provides updated device drivers for most adapters and devices
- Provides diskette-free installation for supported Windows operating systems
- Includes an online readme file with links to tips for hardware and operating-system installation

Setup and configuration overview

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

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

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

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

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, you can download operating-system installation instructions for the server from http://www.ibm.com/systems/support/.

Using the integrated management module

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

The IMM supports the following basic systems-management features:

- Environmental monitor with fan speed control for temperature, voltages, fan failure, and power supply failure.
- Light path diagnostics LEDs to report errors that occur with fans, power supplies, microprocessor, hard disk drives, and system errors.
- DIMM error assistance. The IBM System x Server Firmware disables a failing DIMM that is detected during POST, and the IMM lights the associated system-error LED and the failing DIMM error LED.
- System-event log.
- ROM-based IMM firmware flash updates.

- Auto Boot Failure Recovery.
- A virtual media key, which enables full systems-management support (remote video, remote keyboard/mouse, and remote storage).
- When one of the two microprocessors reports an internal error, the server disables the defective microprocessor and restarts with the one good microprocessor.
- NMI detection and reporting.
- Automatic Server Restart (ASR) when POST is not complete or the operating system hangs and the OS watchdog timer times out. The IMM might be configured to watch for the OS watchdog timer and restart the server after a timeout, if the ASR feature is enabled. Otherwise, the IMM allows the administrator to generate an NMI by pressing an NMI button on the rear of the server for an operating-system memory dump. ASR is supported by IPMI.
- Intelligent Platform Management Interface (IPMI) Specification V2.0 and Intelligent Platform Management Bus (IPMB) support.
- Serial redirect.
- Serial over LAN (SOL).
- Active Energy Manager.
- Query power-supply input power.
- PECI 2 support.
- Power/reset control (power-on, hard and soft shutdown, hard and soft reset, schedule power control).
- Alerts (in-band and out-of-band alerting, PET traps - IPMI style, SNMP, e-mail).
- Operating-system failure blue screen capture.
- Command-line interface.
- Configuration save and restore.
- PCI configuration data.
- Boot sequence manipulation.

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

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

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

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

Using the remote presence capability and blue-screen capture

The remote presence and blue-screen capture features are integrated functions of the integrated management module (IMM). When an optional virtual media key is installed in the server, it activates full systems-management functions. The virtual media key is required to enable the integrated remote presence and blue-screen

capture features. Without the virtual media key, you cannot remotely mount or unmount drives or images on the client system. However, you still can access the Web interface without the key.

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

The virtual media key has an LED. When this LED is lit and green, it indicates that the key is installed and functioning correctly.

The remote presence feature provides the following functions:

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

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

Enabling the remote presence feature

To enable the remote presence feature, complete the following steps:

1. Install the virtual media key into the dedicated slot on the system board (see “Installing an IBM virtual media key” on page 167).
2. Turn on the server.

   Note: Approximately 40 seconds after the server is connected to ac power, the power-control button becomes active.

Obtaining the IP address for the Web interface access

To access the Web interface and use the remote presence feature, you need the IP address for the IMM. You can obtain the IMM IP address through the Setup utility. To locate the IP address, complete the following steps:

1. Turn on the server.

   Note: Approximately 40 seconds after the server is connected to ac power, the power-control button becomes active.
2. When the prompt `F1 Setup` is displayed, press <F1>. If you have set both a power-on password and an administrator password, you must type the administrator password to access the full Setup utility menu.
3. From the Setup utility main menu, select **System Settings**.
4. On the next screen, select **Integrated Management Module**.
5. On the next screen, select **Network Configuration**.
6. Find the IP address and write it down.
7. Exit from the Setup utility.

Logging on to the Web interface

To log on to the Web interface to use the remote presence functions, complete the following steps:

1. Open a Web browser on a computer that connects to the server and in the **Address** or **URL** field, type the IP address or host name of the IMM to which you want to connect.

   Notes:

   a. If you are logging in to the IMM for the first time after installation, the IMM defaults to DHCP. If a DHCP host is not available, the IMM uses the default static IP address 192.168.70.125.

   b. You can obtain the DHCP-assigned IP address or the static IP address from the server firmware or from your network administrator.

   The Login page is displayed.

2. Type the user name and password. If you are using the IMM for the first time, you can obtain the user name and password from your system administrator. All login attempts are documented in the event log. A welcome page opens in the browser.

   Note: The IMM is set initially with a user name of USERID and password of PASSW0RD (passw0rd with a zero, not the letter O). You have read/write access. For enhanced security, change this default password during the initial configuration.

3. On the Welcome page, type a timeout value (in minutes) in the field that is provided. The IMM will log you off the Web interface if your browser is inactive for the number of minutes that you entered for the timeout value.

4. Click **Continue** to start the session. The browser opens the System Status page, which displays the server status and the server health summary.

Using the USB memory key for VMware hypervisor

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

Note: VMware 4.0 U1 does not support JBOD (Just a Bunch of Disks) hard disk drives in a server with ServeRAID M1015 SAS/SATA adapter installed.

To start using the embedded hypervisor functions, you must add the USB memory key to the startup sequence in the Setup utility.

To add the USB hypervisor memory key to the boot order, complete the following steps:

1. Turn on the server.

   Note: Approximately 40 seconds after the server is connected to ac power, the power-control button becomes active.

2. When the prompt `F1 Setup` is displayed, press F1.

3. From the Setup utility main menu, select **Boot Manager**.

4. Select **Add Boot Option**; then, select **Hypervisor**. Press Enter, and then press Esc.

5. Select **Change Boot Order** and then select **Commit Changes**; then, press Enter.
6. Select **Save Settings** and then select **Exit Setup**.

For additional information and instructions, see the *ESXi Embedded and vCenter Server Setup Guide* at http://www.vmware.com/pdf/vsphere4/r40_u1/vsp_40_u1_esxi_e_vc_setup_guide.pdf.

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.

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 find device drivers and information about configuring the Ethernet controllers, complete the following steps:

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. From the **Product family** menu, select **System x3630 M3** and click **Go**.

Notes:

1. The integrated Ethernet controllers on the system board do not support Intel I/O Acceleration Technology (I/OAT).
2. Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

Enabling and configuring Serial over LAN (SOL)

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

To enable and configure the server for SOL, you must update and configure the UEFI code; update and configure the integrated management module (IMM) firmware; update and configure the Ethernet controller firmware; and enable the operating system for an SOL connection.

UEFI update and configuration

To update and configure the UEFI code to enable SOL, complete the following steps:

1. Update the UEFI code:
   a. Download the latest version of the UEFI code from http://www.ibm.com/systems/support/.

b. Update the UEFI code, following the instructions that come with the update file that you downloaded.

2. Update the IMM firmware:
   a. Download the latest version of the IMM firmware from http://www.ibm.com/systems/support/.
   b. Update the IMM firmware, following the instructions that come with the update file that you downloaded.
3. Configure the UEFI settings:
   a. When you are prompted to start the Configuration/Setup Utility program, restart the server and press F1.
   b. Select **System Settings** → **Devices and I/O Ports**.
   c. Select **Console Redirection Settings**; then, make sure that the values are set as follows:
      - **COM Port 1**: Enable
      - **Remote Console**: Enable
      - **Serial Port Sharing**: Enable
      - **Serial Port Access Mode**: Dedicated COM1 Settings
      - **Baud Rate**: 115200
      - **Data Bits**: 8
      - **Parity**: None Stop
      - **Bits**: 1
      - **Thermal Emulation**: ANSI
      - **Active After Boot**: Enable
      - **Flow Control**: Hardware
   d. Press Esc twice to exit the **Devices and I/O Ports** section of the Configuration/Setup Utility program.
   e. Select **Save Settings**; then, press Enter.
   f. Press Enter to confirm.
   g. Select **Exit Setup**; then, press Enter.
   h. Make sure that Yes, exit the Setup Utility is selected; then, press Enter.

Using the LSI Logic Configuration Utility program

Use the information in this section to configure an optional LSI RAID controller. If you need to configure an optional ServeRAID controller, see “Configuring a ServeRAID controller” on page 249. You can also select **System Settings** and **Adapters and UEFI Drivers** on the Setup utility to view a list of UEFI device drivers that support configuration; then, select the adapter that you want to configure to start a configuration program (see “Using the Setup utility” on page 235).

Use the LSI Logic Configuration Utility program to configure and manage redundant array of independent disks (RAID) arrays. Be sure to use the program as described in this document. Use the LSI Logic Configuration Utility program to perform the following tasks:

- Perform a low-level format of a hard disk drive
- View or change IDs for attached devices
- Set device scan order
- Set protocol parameters on hard disk drives

- Configure arrays
- View your RAID configuration and associated devices
- Monitor operation of your RAID controllers
- Create a mirrored pair of hard disk drives with or without a hot-spare drive

You can download an LSI command-line configuration program (CFG1030) from http://www.ibm.com/systems/support/. For more information about the RAID controller, go to http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-65723&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 **Hardware upgrades**.
3. Under **Product family**, click **RAID**.
4. Under **Type**, click on the type of RAID controller that is installed in your server.

When you use the LSI Logic Configuration Utility program to configure and manage arrays, review the following information:

- When you create a RAID level-1 (mirrored) pair, all drives must be on the same channel.
- 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.
- You can set up a mirror after the operating system is installed on the primary drive only if you are using an integrated SAS/SATA controller with RAID capabilities. You must make sure that the primary drive has the lower RAID ID (for example, 0).

  Important: If you use an integrated SAS/SATA controller with RAID capabilities to configure a RAID level-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, follow the instructions in the documentation that comes with the controller to view or change RAID settings for attached devices.

The following sections provide instructions for starting the LSI Logic Configuration Utility program and performing selected functions.

Starting the LSI Logic Configuration Utility program

To start the LSI Logic Configuration Utility program, complete the following steps:

1. Turn on the server.
2. When the prompt `<<< Press <CTRL><C> to start LSI Logic Configuration Utility >>>` is displayed, press Ctrl+C. If you have set an administrator password, you are prompted to type the password.
3. To select a controller (channel) from the list of adapters, use the arrow keys and press Enter.
4. To change the settings of the selected items, follow the instructions on the screen. If you select **Device Properties** or **Mirroring Properties**, additional screens are displayed.

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. From the list of adapters, select the controller (channel) for the drive that you want to format. Select **Mirroring Properties** and make sure that the mirroring value for the drive is **None**.

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.
2. Select **Device Properties**.
3. 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.
4. To start the low-level formatting operation, select **Format** and press Enter .

Creating a mirrored pair of hard disk drives

To create a mirrored pair 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 **Mirroring Properties**.
3. Use the arrow keys to highlight the first drive in the pair; then, press the Minus key to change the mirroring value to **Primary**.
4. Use the arrow keys to highlight the second drive in the pair; then, press the Minus key to change the mirroring value to **Secondary**.
5. To establish a third drive that will take over the function of either mirrored drive in the event of a failure, use the arrow keys to highlight the drive that you want to use for that purpose; then, press the Minus key to change the mirroring value to **Hot Spare**.

Configuring a ServeRAID controller

Use the information in this section to configure an optional ServeRAID controller. If you need to configure an optional LSI RAID controller, see “Using the LSI Logic Configuration Utility program” on page 247. You can also select **System Settings** and **Adapters and UEFI Drivers** on the Setup utility to view a list of UEFI device drivers that support configuration; then, select the adapter that you want to configure to start a configuration program (see “Using the Setup utility” on page 235).

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 update the firmware and server firmware for an optional ServeRAID controller, you must use the IBM *ServeRAID Support* CD that comes with the controller.

For more information about the ServeRAID controller, go to http://www-304.ibm.com/jct01004c/systems/support/supportsite.www/docdisplay?lndocid=MIGR-4JTS2T&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 **Hardware upgrades**.
3. Under **Product family**, click **RAID**.
4. Under **Type**, click on the type of RAID controller that is installed in your server.

Starting the Intel Matrix Storage Manager option ROM program

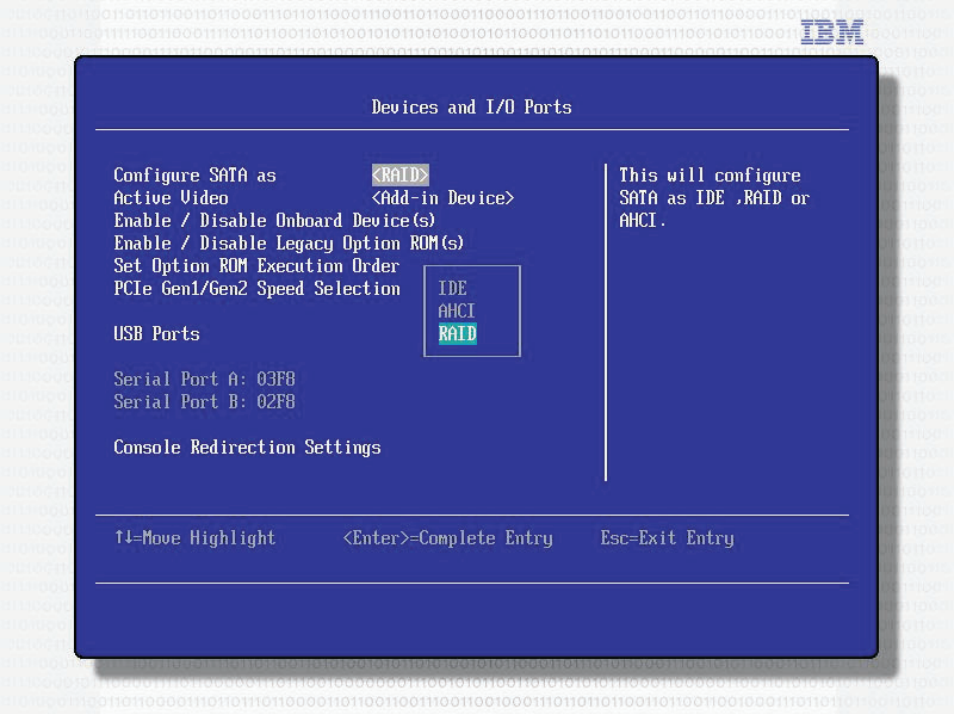
The system firmware provides software RAID capabilities that supports RAID levels 0 and 1 on simple-swap models. The following describes the information you must consider when you configure software RAID:

- Software RAID is only supported on servers running Windows Server 2008 R2.
- When you enable software RAID on simple-swap models of the server, you will no longer be able use the IBM Director, Dynamic System Analysis (DSA), and ServerGuide tools to configure, diagnose, or update hard drives on simple-swap models. However, you will still be able use these tools to configure or diagnose other simple-swap server model features and components.
- When configuring software RAID, do not install a hard disk drive or create a boot volume that is bigger than 2 TB.

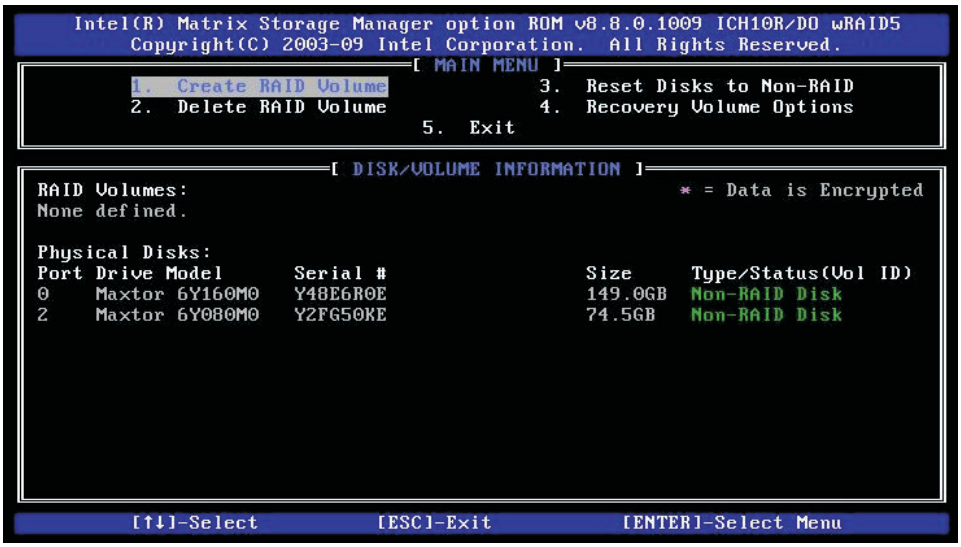
To start the Intel Matrix Storage Manager option ROM program, complete the following steps:

1. Turn on the server.

   Note: If you are connecting the server to an ac power source for the first time, do not press the power-control button until the power LED flashes.
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 → Devices and IO ports**.
4. In **Configure SATA as**, select **RAID**.



5. Save the changes and exit Setup utility.
6. When the prompt `Press <CTRL>-I to enter Configuration Utility ..` displays, press Ctrl+I.
7. Follow the instruction on the screen to configure RAID.



IBM Advanced Settings Utility program

The IBM Advanced Settings Utility (ASU) program is an alternative to the Setup utility for modifying server firmware settings. Use the ASU program online or out-of-band to modify server firmware settings from the command line without the need to restart the server to access the Setup utility.

You can also use the ASU program to configure the optional remote presence features or other IMM settings. The remote presence features provide enhanced systems-management capabilities.

In addition, the ASU program provides limited settings for configuring the IPMI function in the IMM through the command-line interface.

Use the command-line interface to issue setup commands. You can save any of the settings as a file and run the file as a script. The ASU program supports scripting environments through a batch-processing mode.

For more information and to download the ASU program, go to http://www.ibm.com/systems/support/.

Updating IBM Systems Director

If you plan to use IBM Systems Director to manage the server, you must check for the latest applicable IBM Systems Director updates and interim fixes.

To install the IBM Systems Director updates and any other applicable updates and interim fixes, complete the following steps.

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

To locate and install a newer version of IBM Systems Director, complete the following steps:

1. Check for the latest version of IBM Systems Director.
   a. Go to http://www.ibm.com/systems/management/director/downloads.html.
   b. If a newer version of IBM Systems Director than what comes with the server is shown in the drop-down list, follow the instructions on the Web page to download the latest version.
2. Install IBM Systems Director program.

If your management server is connected to the Internet, to locate and install updates and interim fixes, complete the following steps:

1. Make sure that you have run the Discovery and Inventory collection tasks.
2. On the Welcome page of the IBM Systems Director Web interface, click **View updates**.
3. Click **Check for updates**. The available updates are displayed in a table.
4. Select the updates that you want to install, and click **Install** to start the installation wizard.

If your management server is not connected to the Internet, to locate and install updates and interim fixes, complete the following steps:

1. Make sure that you have run the Discovery and Inventory collection tasks.
2. On a system that is connected to the Internet, go to http://www.ibm.com/eserver/support/fixes/fixcentral/.
3. From the **Product family** list, select **IBM Systems Director**.
4. From the **Product** list, select **IBM Systems Director**.
5. From the **Installed version** list, select the latest version, and click **Continue**.
6. Download the available updates.

7. Copy the downloaded files to the management server.
8. On the management server, on the Welcome page of the IBM Systems Director Web interface, click the **Manage** tab, and click **Update Manager**.
9. Click **Import updates** and specify the location of the downloaded files that you copied to the management server.
10. Return to the Welcome page of the Web interface, and click **View updates**.
11. Select the updates that you want to install, and click **Install** to start the installation wizard.

Updating the Universal Unique Identifier (UUID)

The Universal Unique Identifier (UUID) must be updated when the system board is replaced. Use the Advanced Settings Utility to update the UUID in the UEFI-based server. The ASU is an online tool that supports several operating systems. Make sure that you download the version for your operating system. You can download the ASU from the IBM Web site. To download the ASU and update the UUID, complete the following steps.

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

1. Download the Advanced Settings Utility (ASU):
   a. Go to http://www.ibm.com/systems/support/.
   b. Under Product support, select **System x**.
   c. Under Popular links, select **Tools and utilities**.
   d. In the left pane, click **System x and BladeCenter Tools Center**.
   e. Scroll down and click **Tools reference**.
   f. Scroll down and click the plus-sign (+) for Configuration tools to expand the list; then, select **Advanced Settings Utility (ASU)**.
   g. In the next window under Related Information, click the **Advanced Settings Utility** link and download the ASU version for your operating system.
2. ASU sets the UUID in the Integrated Management Module (IMM). Select one of the following methods to access the Integrated Management Module (IMM) to set the UUID:
   - Online from the target system (LAN or keyboard console style (KCS) access)
   - Remote access to the target system (LAN based)
   - Bootable media containing ASU (LAN or KCS, depending upon the bootable media)
3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:
   - For Windows based operating systems:
     – ibm_rndis_server_os.inf
     – device.cat
   - For Linux based operating systems:
     – cdc_interface.sh
4. After you install ASU, use the following command syntax to set the UUID:

   ```
   asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> [access_method]
   ```

   Where:

<uuid_value>
Up to 16-byte hexadecimal value assigned by you.

[access_method]
The access method that you selected to use from the following methods:

- Online authenticated LAN access, type the command:

  `[host <imm_internal_ip>] [user <imm_user_id>][password <imm_password>]`

  Where:

  imm_internal_ip
  The IMM internal LAN/USB IP address. The default value is 169.254.95.118.

  imm_user_id
  The IMM `account` (1 of 12 accounts). The default value is USERID.

  imm_password
  The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

  Note: If you do not specify any of these parameters, ASU will use the default values. When the default values are used and ASU is unable to access the IMM using the online authenticated LAN access method, ASU will automatically use the unauthenticated KCS access method.

  The following commands are examples of using the userid and password default values and not using the default values:

  Example that does not use the userid and password default values:
  `asu set SYSTEM_PROD_DATA.SYsInfoUUID <uuid_value> user <user_id> password <password>`

  Example that does use the userid and password default values:
  `asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>`

- Online KCS access (unauthenticated and user restricted):

  You do not need to specify a value for *access_method* when you use this access method.

  Example:
  `asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>`

  The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver be installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer. See the *Advanced Settings Utility Users Guide* for more details. You can access the ASU Users Guide from the IBM Web site.

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

  a. Go to http://www.ibm.com/systems/support/.
  b. Under Product support, select **System x**.
  c. Under Popular links, select **Tools and utilities**.
  d. In the left pane, click **System x and BladeCenter Tools Center**.
  e. Scroll down and click **Tools reference**.

f. Scroll down and click the plus-sign (+) for Configuration tools to expand the list; then, select **Advanced Settings Utility (ASU)**.

g. In the next window under Related Information, click the **Advanced Settings Utility** link.

- Remote LAN access, type the command:

  Note: When using the remote LAN access method to access IMM using the LAN from a client, the *host* and the *imm_external_ip* address are required parameters.

  ```
  host <imm_external_ip> [user <imm_user_id>[[password <imm_password>]
  ```

  Where:

  imm_external_ip
  The external IMM LAN IP address. There is no default value. This parameter is required.

  imm_user_id
  The IMM `account` (1 of 12 accounts). The default value is USERID.

  imm_password
  The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

  The following commands are examples of using the userid and password default values and not using the default values:

  Example that does not use the userid and password default values:
  ```
  asu set SYSTEM_PROD_DATA.SYsInfoUUID <uuid_value> host <imm_ip>
  user <user_id> password <password>
  ```

  Example that does use the userid and password default values:
  ```
  asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> host <imm_ip>
  ```

- Bootable media:

  You can also build a bootable media using the applications available through the Tools Center Web site at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp. From the left pane, click **IBM System x and BladeCenter Tools Center**, then click **Tool reference** for the available tools.

5. Restart the server.

Updating the DMI/SMBIOS data

The Desktop Management Interface (DMI) must be updated when the system board is replaced. Use the Advanced Settings Utility to update the DMI in the UEFI-based server. The ASU is an online tool that supports several operating systems. Make sure that you download the version for your operating system. You can download the ASU from the IBM Web site. To download the ASU and update the DMI, complete the following steps.

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

1. Download the Advanced Settings Utility (ASU):
   a. Go to http://www.ibm.com/systems/support/.
   b. Under Product support, select **System x**.
   c. Under Popular links, select **Tools and utilities**.
   d. In the left pane, click **System x and BladeCenter Tools Center**.

e. Scroll down and click **Tools reference**.

f. Scroll down and click the plus-sign (+) for Configuration tools to expand the list; then, select **Advanced Settings Utility (ASU)**.

g. In the next window under Related Information, click the **Advanced Settings Utility** link and download the ASU version for your operating system.

2. ASU sets the DMI in the Integrated Management Module (IMM). Select one of the following methods to access the Integrated Management Module (IMM) to set the DMI:
   - Online from the target system (LAN or keyboard console style (KCS) access)
   - Remote access to the target system (LAN based)
   - Bootable media containing ASU (LAN or KCS, depending upon the bootable media)
3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:
   - For Windows based operating systems:
     - ibm_rndis_server_os.inf
     - device.cat
   - For Linux based operating systems:
     - cdc_interface.sh
4. After you install ASU, type the following commands to set the DMI:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> [access_method]
asu set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> [access_method]
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> [access_method]
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> [access_method]
```

   Where:

   <m/t_model>
   The server machine type and model number. Type `mtm xxxxyy`, where *xxxx* is the machine type and *yyy* is the server model number.

   <system model>
   The system model. Type `system yyyyyyy`, where *yyyyyyy* is the product identifier such as x3630M3.

   <s/n> The serial number on the server. Type `sn zzzzzzz`, where *zzzzzzz* is the serial number.

   <asset_method>
   The server asset tag number. Type `asset aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa`, where *aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa* is the asset tag number.

   [access_method]
   The access method that you select to use from the following methods:

   - Online authenticated LAN access, type the command:

     ```
     [host <imm_internal_ip>] [user <imm_user_id>][password
     <imm_password>]
     ```

     Where:

     imm_internal_ip
     The IMM internal LAN/USB IP address. The default value is 169.254.95.118.

imm_user_id
The IMM account (1 of 12 accounts). The default value is USERID.

imm_password
The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

Note: If you do not specify any of these parameters, ASU will use the default values. When the default values are used and ASU is unable to access the IMM using the online authenticated LAN access method, ASU will automatically use the following unauthenticated KCS access method.

The following commands are examples of using the userid and password default values and not using the default values:

Examples that do not use the userid and password default values:
```
asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model> user
 <imm_user_id> password <imm_password>
asu set SYSTEM_PROD_DATA.SYsInfoProdIdentifier <system model> user
 <imm_user_id> password <imm_password>
asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n> user
 <imm_user_id> password <imm_password>
asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag> user
 <imm_user_id> password <imm_password>
```

Examples that do use the userid and password default values:
```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
asu set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model>
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n>
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>
```

- Online KCS access (unauthenticated and user restricted):

  You do not need to specify a value for *access_method* when you use this access method.

  The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver be installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer. See the *Advanced Settings Utility Users Guide* at http:://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=MIGR-55021 for more details.

  The following commands are examples of using the userid and password default values and not using the default values:

  Examples that do not use the userid and password default values:
  ```
  asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model>
  asu set SYSTEM_PROD_DATA.SYsInfoProdIdentifier <system model>
  asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n>
  asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag>
  ```

- Remote LAN access, type the command:

  Note: When using the remote LAN access method to access IMM using the LAN from a client, the *host* and the *imm_external_ip* address are required parameters.

  ```
  host <imm_external_ip> [user <imm_user_id>[[password <imm_password>]
  ```

  Where:

imm_external_ip
The external IMM LAN IP address. There is no default value. This parameter is required.

imm_user_id
The IMM account (1 of 12 accounts). The default value is USERID.

imm_password
The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

The following commands are examples of using the userid and password default values and not using the default values:

Examples that do not use the userid and password default values:

```
asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model> host <imm_ip>
user <imm_user_id> password <imm_password>
asu set SYSTEM_PROD_DATA.SYsInfoProdIdentifier <system model> host <imm_ip>
user <imm_user_id> password <imm_password>
asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n> host <imm_ip>
user <imm_user_id> password <imm_password>
asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag> host <imm_ip>
user <imm_user_id> password <imm_password>
```

Examples that do use the userid and password default values:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> host <imm_ip>
asu set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> host <imm_ip>
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> host <imm_ip>
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> host <imm_ip>
```

- Bootable media:

  You can also build a bootable media using the applications available through the Tools Center Web site at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp. From the left pane, click **IBM System x and BladeCenter Tools Center**, then click **Tool reference** for the available tools.

5. Restart the server.

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your system, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Problem Determination and Service Guide* on the IBM *Documentation* CD that comes with your system.
- Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with IBM systems also describes the diagnostic tests that you can perform. Most systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to http://www.ibm.com/systems/support/ and follow the instructions. Also, some documents are available through the IBM Publications Center at http://www.ibm.com/shop/publications/order/.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM systems, optional devices, services, and support. The address for IBM System x® and xSeries information is http://www.ibm.com/systems/x/. The address for IBM BladeCenter® information is http://www.ibm.com/systems/bladecenter/. The address for IBM IntelliStation® information is http://www.ibm.com/intellistation/.

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

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Alert on LAN	Netfinity	Wake on LAN
BladeCenter	Predictive Failure Analysis	XA-32
Chipkill	ServeRAID	XA-64
e-business logo	ServerGuide	X-Architecture
@server	ServerProven	XpandOnDemand
FlashCopy	System x	xSeries
i5/OS		

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.

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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 16. Limits for particulates and gases

Contaminant	Limits
Particulate	• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2[1]. • Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. • The deliquescent relative humidity of the particulate contamination must be more than 60%[2]. • The room must be free of conductive contamination such as zinc whiskers.
Gaseous	• Copper: Class G1 as per ANSI/ISA 71.04-1985[3] • Silver: Corrosion rate of less than 300 Å in 30 days

Table 16. Limits for particulates and gases (continued)

Contaminant	Limits
[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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This product is not intended to be connected directly or indirectly by any means whatsoever to interfaces of public telecommunications networks, nor is it intended to be used in a public services network.

Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A statement

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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.

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Responsible manufacturer:

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
914-499-1900

European Community contact:

IBM Technical Regulations, Department M456
IBM-Allee 1, 71137 Ehningen, Germany
Telephone: 0049 (0) 7032 15-2937
E-mail: tjahn@de.ibm.com

Germany Class A statement

Deutschsprachiger EU Hinweis:

Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

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Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem “Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)”. Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:

IBM Deutschland
Technical Regulations, Department M456
IBM-Allee 1, 71137 Ehningen, Germany
Telephone: 0049 (0) 7032 15-2937
E-mail: tjahn@de.ibm.com

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

Japan VCCI Class A statement

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This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

Japan Electronics and Information Technology Industries Association (JEITA) statement

高調波ガイドライン適合品

Japanese Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guideline (products less than or equal to 20 A per phase)

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警告使用者:
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策。

Index

E

F

G

H

I

J

L

M

N

O

P

R

S

T

U

V

W

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