System x3530 M4
Type 7160

Installation and Service Guide

System x3530 M4
Type 7160

Installation and Service Guide

Note

Before using this information and the product it supports, read the general information in "Notices" on page 371 and the *IBM Safety Information*, and *IBM Environmental Notices and User's Guide* on the IBM *Documentation* CD, and the *IBM Warranty Information* document that comes with the server.

Second Edition (June 2012)

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

.לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

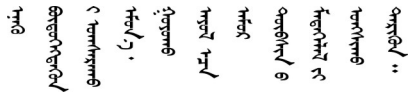
Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.



ཐོན་རྫས་འདི་བདེ་སྒྲིད་མ་བྱས་གོང་། ·སྐོར་གྱི་ཡིད་གཟབ་
བྱ་འདྲ་མིན་ཡོད་པའི་འདོད་སྣེར་བལྟ་དགོས།

.مەزكۇر مەھسۇلاتنى ئورنىتىشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقىڭ

Youq mwngz yungh canjbinj neix gaxgonq, itdingh aeu doeg aen
canjbinj soengq cungj vahgangj ancien siusik.

Important:

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

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

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

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

Statement 1

DANGER

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

To avoid a shock hazard:

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

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

Statement 2

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

Do not:

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

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

Statement 3

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

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

DANGER

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

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

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

Statement 4

≥ 18 kg (39.7 lb.)

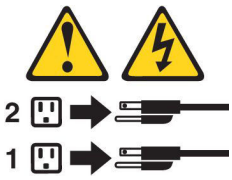
≥ 32 kg (70.5 lb.)

≥ 55 kg (121.2 lb.)

CAUTION:
Use safe practices when lifting.

Statement 5

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



Statement 6

CAUTION:
Do not place any objects on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf.

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 35:

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

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

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

United Kingdom - Notice to Customers:

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

Guidelines for trained technicians

This section contains information for trained technicians.

Inspecting for unsafe conditions

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

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

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

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

1. Make sure that the power is off and the power cord is disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cord:
   - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
   - Make sure that the power cord is the correct type, as specified in “Power cords” on page 270.
   - Make sure that the insulation is not frayed or worn.
4. Remove the top cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.

8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment

Observe the following guidelines when servicing electrical equipment:

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

Chapter 1. The IBM System x3530 M4 Type 7160 server

This *Installation and Service Guide* contains information and instructions for setting up your IBM® System x3530 M4 Type 7160 server, instructions for installing some optional devices, instructions for cabling, configuring the server, removing and replacing devices, and diagnostics and troubleshooting information.

In addition to the instructions in Chapter 2, "Installing optional devices," on page 23 for installing optional hardware devices, updating firmware and device drivers, and completing the installation, IBM Business Partners must also complete the steps in "Instructions for IBM Business Partners" on page 24.

The IBM System x3530 M4 Type 7160 is a 1-U-high rack model, two-socket server for virtualization, database, and computational intensive computing. It is the next generation enterprise server based on Intel's Romley-EN technology. This high-performance, scalable server is ideally suited for enterprise environments that require superior input/output (I/O) flexibility, scalability, and high manageability.

Performance, ease of use, reliability, and expansion capabilities were key considerations in the design of the server. These design features make it possible for you to customize the system hardware to meet your needs today and provide flexible expansion capabilities for the future.

The server comes with a limited warranty. For information about the terms of the warranty and getting service and assistance, see the IBM *Warranty Information* document that comes with the server.

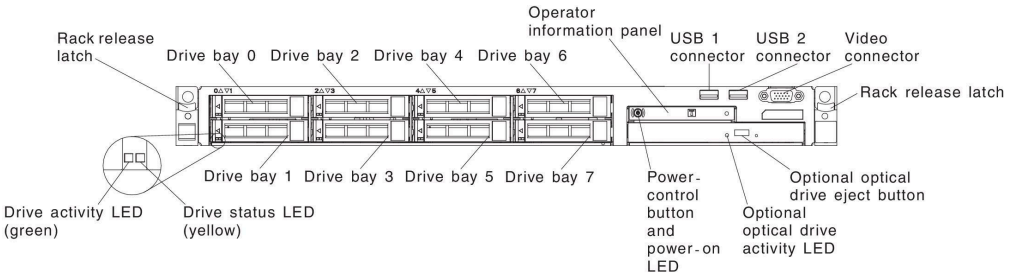
The server contains IBM next generation technologies, which help increase performance and reliability. For more information, see "What your server offers" on page 8 and "Reliability, availability, and serviceability" on page 12.

You can obtain up-to-date information about the server and other IBM server products at http://www.ibm.com/systems/x/. At http://www.ibm.com/support/mysupport/, you can create a personalized support page by identifying IBM products that are of interest to you. From this personalized page, you can subscribe to weekly e-mail notifications about new technical documents, search for information and downloads, and access various administrative services.

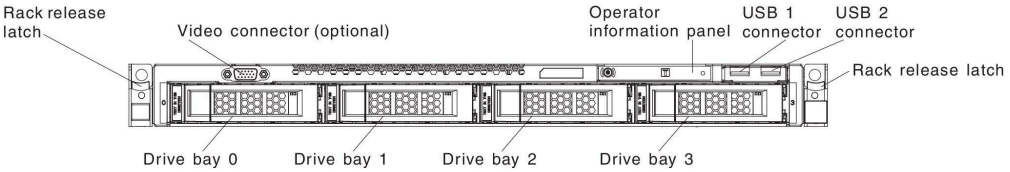
If you participate in the IBM client reference program, you can share information about your use of technology, best practices, and innovative solutions; build a professional network; and gain visibility for your business. For more information about the IBM client reference program, see http://www.ibm.com/ibm/clientreference/.

The server supports up to eight 2.5-inch hot-swap drives, or four 3.5-inch simple-swap or hot-swap drives, using the supported drive backplane configurations. It supports 2.5-inch hot-swap Serial Attached SCSI (SAS) or SATA hard disk drives, 3.5-inch hot-swap SAS or SATA hard disk drives, or 3.5-inch simple-swap SATA hard disk drives. The illustrations in this document might differ slightly from your hardware.

The following illustration shows the front of the server model with eight 2.5-inch hot-swap hard disk drive bays.



The following illustration shows the front of the server model with four 3.5-inch hot-swap hard disk drive bays.



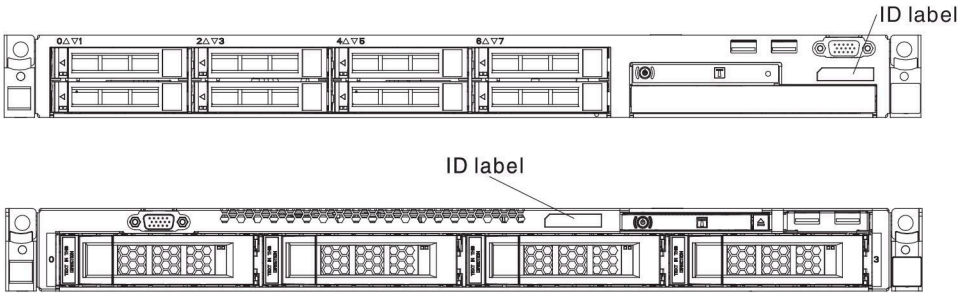
If firmware and documentation updates are available, you can download them from the IBM website. The server might have features that are not described in the documentation that comes with the server, and the documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the server documentation. To check for updates, go to http://www.ibm.com/supportportal/.

Record information about the server in the following table.

Product name	IBM System x3530 M4
Machine type	Type 7160
Model number	_____
Serial number	_____

The model number and serial number are on the ID label on the front of the server. The location of the ID label differs depending on your service model, as shown in the following illustrations.

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



You can download an IBM *ServerGuide Setup and Installation* CD to help you configure the hardware, install device drivers, and install the operating system.

For a list of supported optional devices for the server, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.

See the *Rack Installation Instructions* document on the IBM *Documentation* CD for complete rack installation and removal instructions.

The IBM Documentation CD

The IBM *Documentation* CD contains documentation for the server in Portable Document Format (PDF) and includes the IBM Documentation Browser to help you find information quickly.

Hardware and software requirements

The IBM *Documentation* CD requires the following minimum hardware and software:

- Microsoft Windows XP, Windows 2000, or Red Hat Linux
- 100 MHz microprocessor
- 32 MB of RAM
- Adobe Acrobat Reader 3.0 (or later) or xpdf, which comes with Linux operating systems

Using the Documentation Browser

Use the Documentation Browser to browse the contents of the CD, read brief descriptions of the documents, and view documents, using Adobe Acrobat Reader or xpdf. The Documentation Browser automatically detects the regional settings in use in your server and displays the documents in the language for that region (if available). If a document is not available in the language for that region, the English-language version is displayed.

Use one of the following procedures to start the Documentation Browser:

- If Autostart is enabled, insert the CD into the CD or DVD drive. The Documentation Browser starts automatically.
- If Autostart is disabled or is not enabled for all users, use one of the following procedures:
  - If you are using a Windows operating system, insert the CD into the CD or DVD drive and click **Start -> Run**. In the **Open** field, type

    ```
    e:\win32.bat
    ```

    where *e* is the drive letter of the CD or DVD drive, and click **OK**.
  - If you are using Red Hat Linux, insert the CD into the CD or DVD drive; then, run the following command from the /mnt/cdrom directory:

    ```
    sh runlinux.sh
    ```

Select the server from the **Product** menu. The **Available Topics** list displays all the documents for the server. Some documents might be in folders. A plus sign (+) indicates each folder or document that has additional documents under it. Click the plus sign to display the additional documents.

When you select a document, a description of the document is displayed under **Topic Description**. To select more than one document, press and hold the Ctrl key

while you select the documents. Click **View Book** to view the selected document or documents in Acrobat Reader or xpdf. If you selected more than one document, all the selected documents are opened in Acrobat Reader or xpdf.

To search all the documents, type a word or word string in the **Search** field and click **Search**. The documents in which the word or word string appears are listed in order of the most occurrences. Click a document to view it, and press Crtl+F to use the Acrobat search function, or press Alt+F to use the xpdf search function within the document.

Click **Help** for detailed information about using the Documentation Browser.

Related documentation

This *Installation and Service Guide* contains general information about the server including how to set up and cabling the server, how to install supported optional devices, how to configure the server, and information to help you solve problems yourself and information for service technicians. The following documentation also comes with the server:

- *Warranty Information:*

  This document is in printed format and comes with the server. It contains warranty terms and a pointer to the IBM Statement of Limited Warranty on the IBM website.
- *Important Notices:*

  This document is in printed format and comes with the server. It contains information about the safety, environmental, and electronic emission notices for your IBM product.
- *Environmental Notices and User Guide:*

  This document is in PDF format 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 Document:*

  This document is in PDF on the IBM *Documentation* CD. It provides the open source notices.
- *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.

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

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

The server might have features that are not described in the documentation that you received with the server. The documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the server documentation. These updates are available from the IBM website. To check for updates, go to http://www.ibm.com/supportportal/.

Notices and statements in this document

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

The following notices and statements are used in this document:

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

Server 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.

Table 1. Server features and specifications

Microprocessor (depending on the model): • Supports one Intel Pentium 1400 series microprocessor or up to two Intel Xeon™ EN E5-2400 series microprocessors • Up to 20 MB Level-3 cache • One QuickPath Interconnect (QPI) link speed up to 8 Giga Transfers (GT) per second • Scalable up to eight cores • Three memory channels per microprocessor on the system board that supports two DIMMs per channel **Note:** For a list of supported microprocessors, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.	**Memory (depending on the model):** • Slots: 12 dual inline memory module connectors • Minimum: 2 GB • Maximum: up to 192 GB • Type: DDR3-1066 (PC3-8500), DDR3-1333 (PC3-10600), or DDR3-1600 (PC3-12800), ECC, single-rank or dual-rank, DDR3 registered or unbuffered SDRAM DIMMs • Supports: – UDIMM: 4 GB – RDIMM: 2 GB, 4 GB, 8 GB, 16 GB, or 32 GB (when available)	**Drive expansion bays (depending on the model):** • The server can support up to eight 2.5-inch drives or up to four 3.5-inch drives. The following drives are supported: • 2.5-inch hot-swap SAS/SATA hard disk drive • 3.5-inch hot-swap SAS/SATA hard disk drive • 3.5-inch simple-swap SATA hard disk drive **Note:** For specific models that may be shipped initially with four hard disk drives, configuration may be able to expand to eight hard disk drives via Features on Demand (FoD).
Optional SATA optical drives (depending on your model): • DVD-ROM • Multi-burner **Fans:** • The server comes standard with four speed-controlled fans for one-microprocessor configuration • Supports up to six fans with two microprocessors installed **PCI expansion slots (depending on your model):** • Two x8 low-profile, PCIE 3.0 adapter slots on the system board • One x16 (x16 mechanically) PCIE 3.0 adapter slot • One x4 (x8 mechanically) PCIE 3.0 adapter slot on the optional PCI riser-card for an optional RAID adapter	**Integrated functions:** • Integrated Management Module II (IMM2), which provides service processor control and monitoring functions, video controller, and remote keyboard, video, mouse, and remote hard disk drive capabilities • Onboard Intel Powerville 4-port Gigabit Ethernet controller with Wake on LAN support (by default Ethernet 1 and 2 are enabled, to enable Ethernet 3 and 4, it is done through the Features on Demand (FoD)) • Onboard PCH with LSI software RAID with support for RAID levels 0, 1 and 10 • Light path diagnostics • Seven Universal Serial Bus (USB) 2.0 ports: – Two on the front of the chassis – Four on the rear of the chassis – One internal • One serial port **Note:** In messages and documentation, the term *service processor* refers to the integrated management module II (IMM2).	**Power supply (depending on your model):** • One fixed 460-watt ac power supply • Up to two 460-watt or 675-watt ac hot-swap power supplies for 1+1 redundancy support **Video controller (integrated into IMM, depending on your model):** • Matrox G200eR2 (two analog ports - one optional on front and one rear that can be connected at the same time) **Note:** The maximum video resolution is 1600 x 1200 at 60 or 75 Hz. – SVGA compatible video controller – DDR2 250 MHz SDRAM video memory controller – Avocent Digital Video Compression – Video memory is not expandable

Table 1. Server features and specifications (continued)

RAID controllers:

The following RAID options are available for the server:

- ServeRAID H1110 SAS/SATA Controller for System x
- ServeRAID M1115 SAS/SATA Controller for System x
- ServeRAID M5110 SAS/SATA Controller for IBM System x
- ServeRAID M5120 SAS/SATA Controller for IBM System x
- ServeRAID M5100 Series Battery Kit for IBM System x
- ServeRAID M5100 Series 512MB Cache/RAID 5 Upgrade for IBM System x
- ServeRAID M5100 Series 512MB Flash/RAID 5 Upgrade for IBM System x
- ServeRAID M5100 Series Zero Cache/RAID 5 Upgrade for IBM System x
- ServeRAID M5100 Series 1GB Flash/RAID Upgrade for IBM System x
- ServeRAID C105 for IBM System X

Size:

- Height: 43 mm (1.7 inches, 1U)
- Depth: 673.1 mm (26.5 inches)
- Width: 447 mm (17.6 inches)
- Maximum weight: 15.8 kg (33.8 lb) when fully configured

Acoustical noise emissions:

- Sound power, idling: 6.5 bels
- Sound power, operating: 6.5 bels

Environment:

- Air temperature:
  - Server on: 5°C to 40°C (41°F to 104°F); altitude: 0 to 915 m (3000 ft)
  - Server on: 5°C to 32°C (41°F to 89.6°F); altitude: 915 m (3000 ft) to 2134 m (7000 ft)
  - Server on: 5°C to 28°C (41°F to 82.4°F); altitude: 2134 m (7000 ft) to 3050 m (10000 ft)
  - Server off: 5°C to 45°C (41° to 113°F)
  - Shipment: -40°C to +60°C (-40°F to 140°F)
- Humidity:
  - Server on: 8% to 85%; maximum dew point: 24°C (75.2°F); maximum rate of change 5 °C/hr
  - Server off: 8% to 80%; maximum dew point: 27°C (80°F)
  - Shipment: 5% to 100%
- Design to ASHRAE Class A3:
  - Ambient of 35°C to 40°C (95°F to 104°F), with relaxed support
  - Support cloud like workload with no performance degradation acceptable (Turbo-Off)
  - Under no circumstance, can any combination of worst case workload and configuration result in system shutdown or design exposure at 40°C (104°F)
- 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 373.

Heat output:

Approximate heat output:

- Minimum configuration: 406 Btu per hour (119 watts)
- Maximum configuration: 2627.3 Btu per hour (770 watts)

Electrical input:

- Sine-wave input (50 - 60 Hz) required
- Input voltage 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: 0.12 kVA
  - Maximum: 0.78 kVA

Notes:

1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.
2. The noise emission level stated is the declared (upper limit) sound power level, in bels, for a random sample of machines. All measurements are made in accordance with ISO 7779 and reported in conformance with ISO 9296.

What your server offers

The server uses the following features and technologies:

- **Active Energy Manager**

  The IBM Active Energy Manager solution is an IBM Systems Director extension that measures and reports server power consumption as it occurs. This enables you to monitor power consumption in correlation to specific software application programs and hardware configurations. You can obtain the measurement values through the systems-management interface and view them, using IBM Systems Director. For more information, including the required levels of IBM Systems Director and Active Energy Manager, see the IBM Systems Director documentation on the *IBM Systems Director* DVD, or see http://www.ibm.com/servers/systems/management/director/extensions/actengmgr.html/.

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

  The server comes with the IBM Dynamic System Analysis (DSA) Preboot diagnostic program stored in the integrated USB memory on the server. DSA Preboot collects and analyzes system information to aid in diagnosing server problems, as well as offering a rich set of diagnostic tests of the major components of the server. DSA Preboot 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
  – Light path diagnostics status
  – Microprocessor, input/out hub, and UEFI error logs
  – Network interfaces and settings
  – RAID controller configuration
  – Service processor (integrated management module) status and configuration
  – System configuration
  – Vital product data, firmware, and UEFI configuration

  DSA Preboot also provides diagnostics for the following system components (when they are installed):

  – Intel network adapter
  – IMM I^2C bus
  – Light path diagnostics panel
  – Memory modules
  – Microprocessors
  – Optical devices (CD or DVD)
  – SAS or SATA drives

  For information about both editions (DSA Preboot and Portable) of the Dynamic System Analysis (DSA) diagnostic programs, see “DSA editions” on page 119.

- **IBM next generation technology**

  IBM next generation technology systems combine proven, innovative IBM designs to make your x86-processor-based server powerful, scalable, and reliable. For more information, see http://www.ibm.com/servers/eserver/xseries/xarchitecture/enterprise/index.html.

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

The *ServerGuide Setup and Installation* CD, which you can download from the Web, provides programs to help you set up the server and install a Windows operating system. The ServerGuide program detects installed optional hardware devices and provides the correct configuration programs and device drivers. For more information about the *ServerGuide Setup and Installation* CD, see "Using the ServerGuide Setup and Installation CD" on page 74.

- **IBM Systems Director DVD**

  IBM Systems Director is a platform-management foundation that streamlines the way you manage physical and virtual systems in a heterogeneous environment. By using industry standards, IBM Systems Director supports multiple operating systems and virtualization technologies for IBM and non-IBM x86 platforms. For more information, see the IBM Systems Director documentation on the *IBM Systems Director* DVD and "IBM Systems Director" on page 13.

- **Integrated Management Module II (IMM2)**

  The Integrated Management module II (IMM2) combines service processor functions, video controller, and remote presence and blue-screen capture features in a single chip. The IMM2 provides advanced service-processor control, monitoring, and alerting function. If an environmental condition exceeds a threshold or if a system component fails, the IMM lights LEDs to help you diagnose the problem, records the error in the IMM2 event log, and alerts you to the problem. Optionally, the IMM2 also provides a virtual presence capability for remote server management capabilities. The IMM2 provides remote server management through the following industry-standard interfaces:

  – Intelligent Platform Management Interface (IPMI) version 2.0
  – Simple Network Management Protocol (SNMP) version 3.0
  – Common Information Model (CIM)
  – Web browser

  For additional information, see "Using the integrated management module II" on page 83 and http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5079770&brandind=5000008.

- **Integrated network support**

  The server comes with an integrated 4-port (2 ports by default, 2 ports by upsell) Gigabit Ethernet controller, which supports connection to a 10 Mbps, 100 Mbps, or 1000 Mbps network. For more information, see "Configuring the Gigabit Ethernet controller" on page 87.

- **Integrated Trusted Platform Module (TPM)**

  This integrated security chip performs cryptographic functions and stores private and public secure keys. It provides the hardware support for the Trusted Computing Group (TCG) specification. You can download the software to support the TCG specification, when the software is available. See http://www.ibm.com/servers/eserver/xseries/scalable_family.html for details about the TPM implementation. You can enable TPM support through the Setup utility under the **System Security** menu choice (see"Using the Setup utility" on page 75).

- **Large data-storage capacity and hot-swap capability**

  The server can support a maximum of eight 2.5-inch drives or four 3.5-inch drives. The server supports 2.5-inch hot-swap SAS/SATA hard disk drives, or 3.5-inch simple-swap SATA or hot-swap SAS/SATA hard disk drives.

  With the hot-swap feature, you can add, remove, or replace hard disk drives without turning off the server.

- **Large system-memory capacity**

The server system board provides 12 DIMM connectors for up to 192 GB of memory.

The server memory controller supports error correcting code (ECC) for up to 12 industry-standard DDR3-1066 (PC3-8500), DDR3-1333 (PC3-10600), DDR3-1600 (PC3-12800) (single-rank or dual-rank), DDR3 (third-generation double-data-rate), registered or unbuffered, synchronous dynamic random access memory (SDRAM) dual inline memory modules (DIMMs).

- **Light path diagnostics**

  Light path diagnostics provides LEDs to help you diagnose problems. For more information about the light path diagnostics and the LEDs, see "Light path diagnostics panel" on page 16 and "Light path diagnostics LEDs" on page 109.

- **Multi-core processors**

  Depending on your server model, the server supports one Intel Pentium 1400 series microprocessor or up to two Intel Xeon™ EN E5-2400 series microprocessors.

- **PCI Express adapter capabilities**

  The system board provides up to three PCIe connectors for two PCI riser-card assemblies. See "Installing an adapter" on page 46 for detailed information.

- **Redundant connection**

  The Intel Gigabit Ethernet controller provides failover capability to a redundant Ethernet connection with the applicable application installed. If a problem occurs with the primary Ethernet connection and the optional Ethernet adapter is installed in the server, all Ethernet traffic that is associated with the primary connection is automatically switched to an optional Ethernet connection. If the applicable device drivers are installed, this switching occurs without data loss and without user intervention.

  A feature upgrade key is required to enable ports 3 and 4 on the Gigatbit Ethernet controller. See https://www-304.ibm.com/systems/x/fod/index.wss for detailed information on product feature activation.

- **Cooling and optional power capabilities**

  The server supports up to six speed-controlled simple-swap fans for a full configuration.

  The server comes with one fixed 460-watt, or one hot-swap 460-watt or 675-watt power supply installed. The server supports a maximum of two 460-watt or two 675-watt hot-swap power supplies.

  For redundancy support on hot-swap models, two power-supplies must be installed in the server. Two power supplies enables continued operation if one of the power supplies fails.

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

  The blue-screen capture feature is an integrated function of the integrated management module (IMM).

  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 feature to assist in determining the cause of the hang condition.

  You can activate the optional remote presence feature in the IMM Premium only to use the following functions: .

  – Remotely viewing video with graphics resolutions up to 1600 x 1200 at 60 or 75 Hz, regardless of the system state

  – Remotely accessing the server, using the keyboard and mouse from a remote client

– Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
– Uploading a diskette image to the IMM memory and mapping it to the server as a virtual drive

For information on product feature activation, see https://www-304.ibm.com/systems/x/fod/index.wss

See "Using the remote presence and blue-screen capture features" on page 86 for additional information.

- **ServeRAID support**

  A ServeRAID adapter provides hardware redundant array of independent disks (RAID) support to create configurations. The server comes with an onboard RAID controller which provides RAID levels 0 and 1. Additional optional RAID adapters are available for purchase that provide RAID level 5.

- **Service Advisor**

  The server comes with the Service Advisor feature that can collect data about the system when a the system detects a fault and sends that data to IBM Service for problem determination. It also includes the call home feature that automatically calls IBM Service when a problem occurs. The Service Advisor feature is integrated into the Integrated Management Module (IMM). You will need to setup and configure the Service Advisor feature before you can use it. For more information about how to setup and configure the Service Advisor feature, see the *Integrated Management Module User's Guide* at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5079770&brandind=5000008.

- **Systems-management capabilities**

  The server comes with an integrated management module (IMM). When the IMM is used with the systems-management software that comes with the server, you can manage the functions of the server locally and remotely. The IMM also provides system monitoring, event recording, and network alert capability. The systems-management connector on the rear of the server is dedicated to the IMM. The dedicated systems-management connector provides additional security by physically separating the management network traffic from the production network. You can use the Setup utility to configure the server to use a dedicated systems-management network or a shared network.

- **UEFI-compliant server firmware**

  The UEFI firmware offers several features, including Unified Extensible Firmware Interface (UEFI) version 2.1 compliance, Active Energy Management (AEM) technology, enhanced reliability, availability, and serviceability (RAS) capabilities, and basic input/output system (BIOS) compatibility support. UEFI replaces the BIOS and defines a standard interface between the operating system, platform firmware, and external devices. The server is capable of booting UEFI-compliant operating systems, BIOS-based operating systems, and BIOS-based adapters as well as UEFI-compliant adapters. For more information about UEFI-compliant firmware, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5083207&brandind=5000008.

  Note: The server does not support DOS.

- **VMware ESXi embedded hypervisor**

  An optional USB flash device with VMware ESXi embedded hypervisor software is available for purchase. Hypervisor is virtualization software that enables

multiple operating systems to run on a host system at the same time. See “Using the embedded hypervisor” on page 84 for additional information.

Reliability, availability, and serviceability

Three important computer design features are reliability, availability, and serviceability (RAS). The RAS features help to ensure the integrity of the data that is stored in the server, the availability of the server when you need it, and the ease with which you can diagnose and correct problems.

Your server has the following RAS features:

- 3-year parts and 3-year labor limited warranty (Machine Type 7160)
- 24-hour support center
- Automatic error retry and recovery
- Automatic restart on nonmaskable interrupt (NMI)
- Automatic restart after a power failure
- Backup basic input/output system switching under the control of the integrated management module (IMM)
- Built-in monitoring for fan, power, temperature, voltage, and power-supply redundancy
- Cable-presence detection on most connectors
- Chipkill memory protection
- Diagnostic support for ServeRAID and Ethernet adapters
- Error codes and messages
- Error correcting code (ECC) L3 cache and system memory
- Full Array Memory Mirroring (FAMM) redundancy
- Hot-swap hard disk drives
- Operator information and light path diagnostics LED panels
- Integrated Management Module (IMM)
- Light path diagnostics LEDs for memory DIMMs, microprocessors, hard disk drives, power supplies, and fans
- Memory mirroring and memory sparing support
- Memory error correcting code and parity test
- Memory down sizing (non-mirrored memory). After a restart of the server after the memory controller detected a non-mirrored uncorrectable error and the memory controller cannot recover operationally, the IMM logs the uncorrectable error and informs POST. POST logically maps out the memory with the uncorrectable error, and the server restarts with the remaining installed memory.
- Menu-driven setup, system configuration, and redundant array of independent disks (RAID) configuration programs
- Microprocessor built-in self-test (BIST), internal error signal monitoring, internal thermal trip signal monitoring, configuration checking, and microprocessor and voltage regulator module failure identification through light path diagnostics
- Nonmaskable interrupt (NMI) button
- Parity checking on the small computer system interface (SCSI) bus and PCI-E buses
- Power management: Compliance with Advanced Configuration and Power Interface (ACPI)
- Power-on self-test (POST)
- Predictive Failure Analysis (PFA) alerts on memory, microprocessors, SAS/SATA hard disk drives or solid state drives, fans, power supplies, and VRM
- Redundant Ethernet capabilities with failover support
- Redundant hot-swap power supplies
- Redundant network interface card (NIC) support
- Remind button to temporarily turn off the system-error LED on the optional advanced operator information panel

- ROM-based diagnostics
- ROM checksums
- Serial Presence Detection (SPD) on memory, VPD on system board, power supply, and hard disk drive or solid state drive backplanes, microprocessor and memory expansion tray, and Ethernet cards
- Single-DIMM isolation of excessive correctable error or multi-bit error by the Unified Extensible Firmware Interface (UEFI)
- Standby voltage for system-management features and monitoring
- Startup (boot) from LAN through remote initial program load (RIPL) or dynamic host configuration protocol/boot protocol (DHCP/BOOTP)
- System auto-configuring from the configuration menu
- System-error logging (POST and IMM)
- Systems-management monitoring through the Inter-Integrated Circuit (I2C) protocol bus
- Uncorrectable error (UE) detection
- Upgradeable POST, Unified Extensible Firmware Interface (UEFI), diagnostics, IMM firmware, and read-only memory (ROM) resident code, locally or over the LAN
- Vital product data (VPD) on microprocessors, system board, power supplies, and SAS/SATA (hot-swap hard disk drive) backplane
- Wake on LAN capability

IBM Systems Director

IBM Systems Director is a platform-management foundation that streamlines the way you manage physical and virtual systems supports multiple operating systems and virtualization technologies in IBM and non-IBM x86 platforms.

Through a single user interface, IBM Systems Director provides consistent views for viewing managed systems, determining how these systems relate to one other, and identifying their statuses, helping to correlate technical resources with business needs. A set of common tasks that are included with IBM Systems Director provides many of the core capabilities that are required for basic management, which means instant out-of-the-box business value. The common tasks include the following:

- Discovery
- Inventory
- Configuration
- System health
- Monitoring
- Updates
- Event notification
- Automation for managed systems

The IBM Systems Director Web and command-line interfaces provide a consistent interface that is focused on driving these common tasks and capabilities:

- Discovering, navigating, and visualizing systems on the network with the detailed inventory and relationships to the other network resources
- Notifying users of problems that occur on systems and the ability to isolate the sources of the problems
- Notifying users when systems need updates and distributing and installing updates on a schedule

- Analyzing real-time data for systems and setting critical thresholds that notify the administrator of emerging problems
- Configuring settings of a single system and creating a configuration plan that can apply those settings to multiple systems
- Updating installed plug-ins to add new features and functions to the base capabilities
- Managing the life cycles of virtual resources

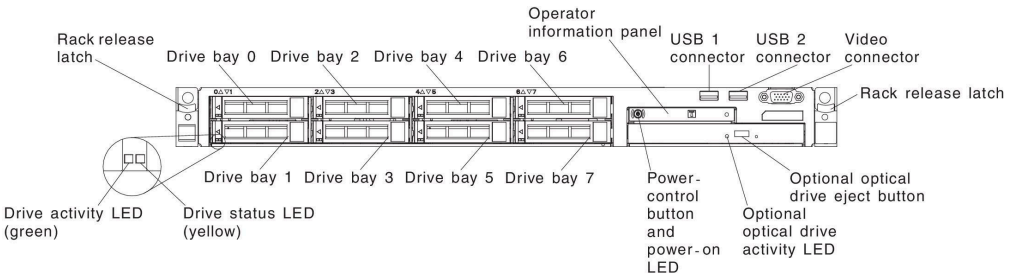
For more information about IBM Systems Director, see the IBM Systems Director Information Center at http://publib.boulder.ibm.com/infocenter/director/v6rlx/indel.jsp?topic=/director_6.1/fqm0_main.html, and the Systems Management web page at http://www.ibm.com/systems/management/, which presents an overview of IBM Systems Management and IBM Systems Director.

Server controls, LEDs, and power

This section describes the controls and light-emitting diodes (LEDs) and how to turn the server on and off. For the locations of other LEDs on the system board, see "System-board LEDs" on page 28.

Front view

The following illustration shows the controls, LEDs, and connectors on the front of the hot-swap server model.



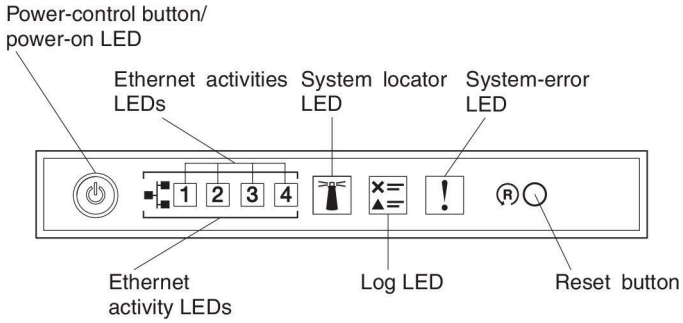
- **Rack release latches:** Press the latches on each front side of the server to slide it out of the rack.
- **Hard disk drive status LEDs:** These LEDs are used on hot-swap SAS or SATA hard disk drives. When one of these LED are lit, it indicates that the drive has failed. If an optional IBM ServeRAID controller is installed in the server, when this LED is flashing slowly (one flash per second), it indicates that the drive is being rebuilt. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.
- **Hard disk drive activity LEDs:** These LEDs are used on SAS or SATA hard disk drives. Each hot-swap drive has an activity LED, and when this LED is flashing, it indicates that the drive is in use.
- **CD-RW/DVD eject button (Optional):** Press this button to release a DVD or CD from the CD/DVD drive.
- **CD-RW/DVD drive activity LED (Optional):** When this LED is lit, it indicates that the CD-RW/DVD drive is in use.
- **Operator information panel:** This panel contains controls and LEDs that provide information about the status of the server. For information about the controls and LEDs on the operator information panel, see "Operator information panel" on page 15.

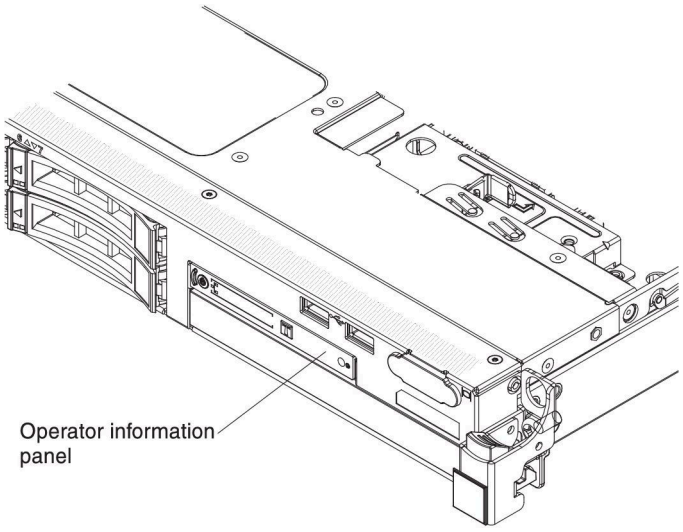
- **Operator information panel release button (Optional):** This release button is on the advanced operator information panel. Push the blue release button and pull out the light path diagnostics panel to view the light path diagnostics LEDs and buttons. See “Operator information panel,” “Light path diagnostics” on page 106, and “Light path diagnostics LEDs” on page 109 for more information about light path diagnostics.
- **Video connector:** Connect a monitor to this connector. The video connectors on the front and rear of the server can be used simultaneously.

  Note: The maximum video resolution is 1600 x 1200 at 75 Hz.
- **USB connectors:** Connect a USB device, such as a USB mouse, keyboard, or other device, to any of these connectors.

Operator information panel

The following illustrations show the location of the operator information panel and the LEDs on the operator information panel respectively.





- **Power-control button and power-on LED:** Press this button to turn the server on and off manually or to wake the server from a reduced-power state. The states of the power-on LED are as follows:
  - **Off:** AC power is not present, or the power supply or the LED itself has failed.
  - **Flashing rapidly (4 times per second):** The server is turned off and is not ready to be turned on. The power-control button is disabled. This lasts approximately 1 to 3 minutes.

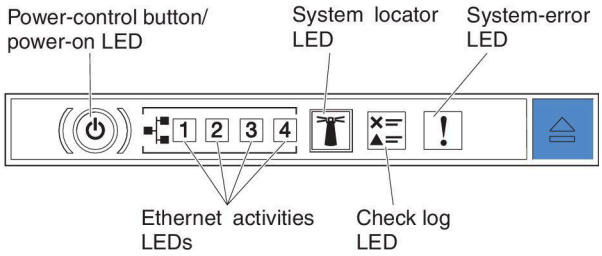
  - **Flashing slowly (once per second):** The server is turned off and is ready to be turned on. You can press the power-control button to turn on the server.
  - **Lit:** The server is turned on.
  - **Fading on and off:** The server is in a reduced-power state. To wake the server, press the power-control button or use the IMM web interface. See "Logging on to the Web interface" on page 87 for information on logging on to the IMM web interface.
- **Ethernet activity LEDs:** When any of these LEDs is flashing or flickering, it indicates that the server is transmitting to or receiving signals from the Ethernet LAN that is connected to the Ethernet port that corresponds to that LED.
- **Locator button/LED:** Use this blue LED to visually locate the server among other servers. This LED is also used as a presence detection button. You can use IBM Systems Director to light this LED remotely. This LED is controlled by the IMM. When you press the locator button, the LED will be lit and it will continue to be lit until you press it again to turn it off. Press the locator button to visually locate the server among the others servers. It is also used as the physical presence for the Trusted Platform Module (TPM).
- **Log LED:** When this yellow LED is lit, it indicates that a noncritical event has occurred. Check the system-event log for additional information. See "Error messages" on page 122 for more information about event logs.
- **System-error LED:** When this yellow LED is lit, it indicates that a system error has occurred. A system-error LED is also on the rear of the server. An LED on the light path diagnostics panel on the operator information panel is also lit to help isolate the error. This LED is controlled by the IMM.
- **Reset button:** Press this button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button.

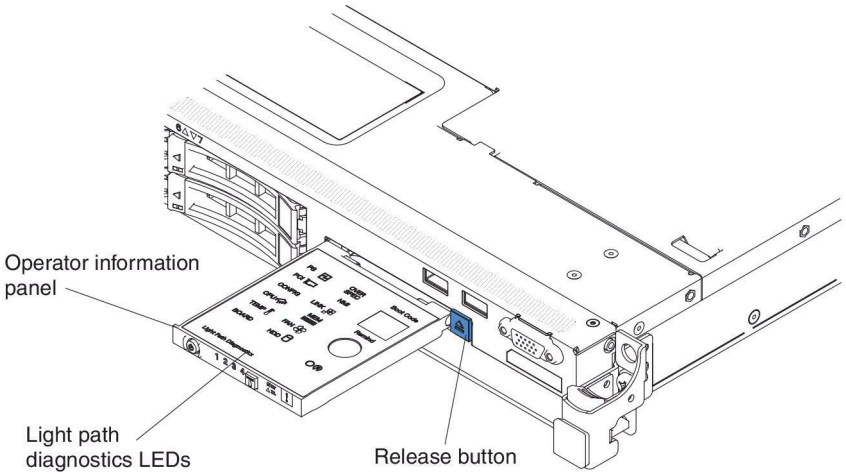
Note: All the operator information is on the operator information panel already. You do not need to pull the panel out for obtaining more information.

Light path diagnostics panel

The light path diagnostics panel is available on the top of the advanced operator information panel. For additional information about the light path diagnostics and LEDs on the light path diagnostics panel, see "Light path diagnostics" on page 106 and "Light path diagnostics LEDs" on page 109.

The following illustration shows the optional advanced light path diagnostics panel.

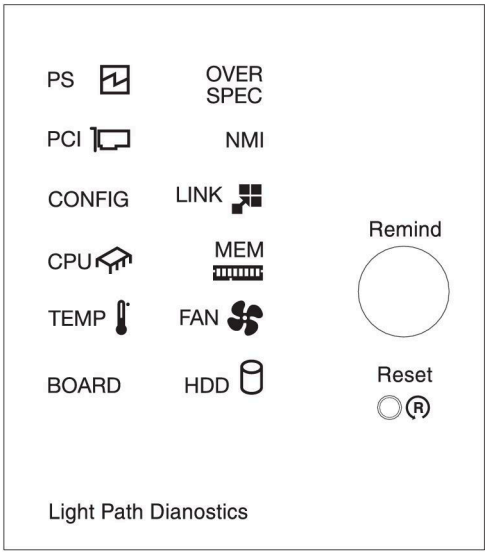




To access the optional advanced light path diagnostics panel, push the blue release button on the advanced operator information panel. Pull forward on the unit until the hinge of the operator panel is free of the server chassis. Then pull down on the unit, so that you can view the light path diagnostics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

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

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



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

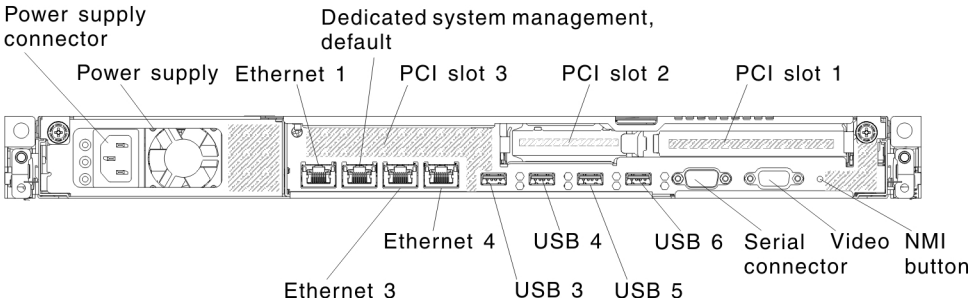
By placing the system-error LED indicator in Remind mode, you acknowledge that you are aware of the last failure but will not take immediate action to correct the problem.

- **Reset button:** Press this button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button.

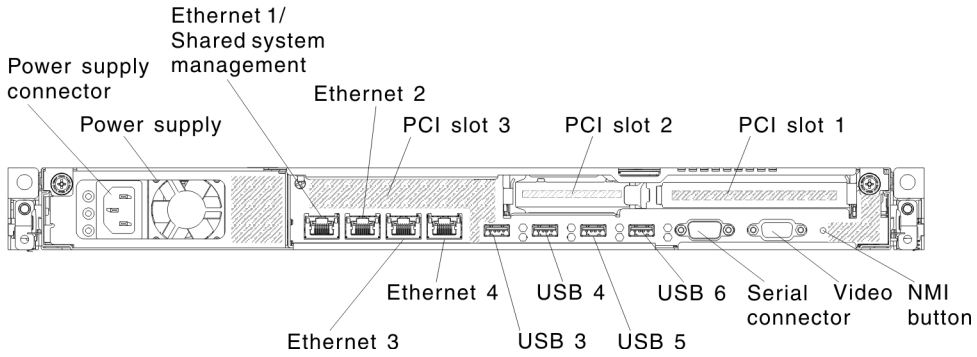
Rear view

The following illustrations show the connectors on the rear of the server.

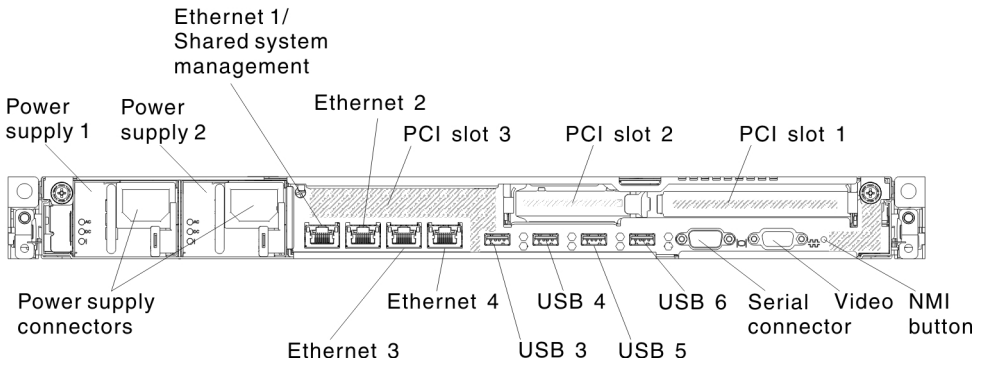
IMM Network Interface Port, Dedicated



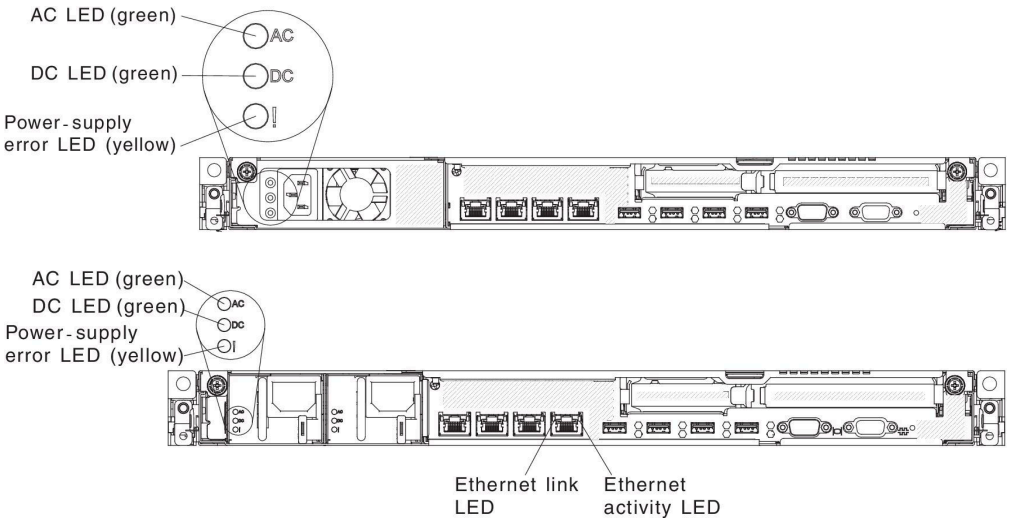
IMM Network Interface Port, Shared



IMM Network Interface Port, Shared



The following illustrations show the locations of the power-supply LEDs for fixed and redundant models respectively on the rear of the server.



- **PCI riser slot 1:** Insert a full-height, half-length PCI Express adapter into this slot. See “Installing an adapter” on page 46 for the supported adapters for these riser-cards.
- **PCI riser slot 2:** Insert a low-profile PCI Express adapter into this slot. See “Installing an adapter” on page 46 for information about adapters that this riser card support.
- **Power connector:** Connect the power cord to this connector.
- **AC power LED:** Each 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 being supplied to the power supply through the power cord. During normal operation, both the ac and dc power LEDs are lit. For any other combination of LEDs, see “Power-supply LEDs” on page 114.
- **DC power LED:** Each 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 normal operation, both the ac and dc power LEDs are lit. For any other combination of LEDs, see “Power-supply LEDs” on page 114.

- **Power-supply error LED:** Each power supply has an ac power LED and a dc power LED. When the power-supply error LED is lit, it indicates that the power supply has failed.
- **Video connector:** Connect a monitor to this connector. The video connectors on the front and rear of the server can be used simultaneously.

  Note: The maximum video resolution is 1600 x 1200 at 75 Hz.
- **Serial connector:** Connect a 9-pin serial device to this connector. The serial port is shared with the integrated management moduleII (IMM2). The IMM2 can take control of the shared serial port to redirect serial traffic, using Serial over LAN (SOL).
- **USB connectors:** Connect a USB device to any of these connectors.
- **Ethernet activity LEDs:** When these LEDs are lit, they indicate that the server is transmitting to or receiving signals from the Ethernet LAN that is connected to the Ethernet port.
- **Ethernet link LEDs:** When these LEDs are lit, they indicate that there is an active link connection on the 10BASE-T, 100BASE-TX, or 1000BASE-TX interface for the Ethernet port.
- **Ethernet and system-management connectors:**
  - IMM2 dedicated mode (default): In this mode, which is the default setting for the server, the Ethernet 2 connector connects to a network for full systems-management information control. A dedicated management network provides additional security by physically separating the management network traffic from the production network. Meanwhile, the Ethernet 1, Ethernet 3 and Ethernet 4 connectors are used to connect to the production network. See “Using the Setup utility” on page 75for more information.
  - IMM2 shared mode : In this mode, the Ethernet 1 connector is used to connect to both the management network and production network. Meanwhile, the Ethernet 2, Ethernet 3 and Ethernet 4 connectors are used to connect to the production network. See “Using the Setup utility” on page 75 for more information.

Server power features

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

Turning on the server

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

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

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

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

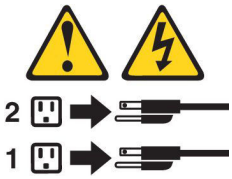
Turning off the server

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

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

Statement 5

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



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

- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will turn off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if your operating system supports this feature.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- The integrated management module (IMM) can turn off the server as an automatic response to a critical system failure.

Chapter 2. Installing optional devices

This chapter provides detailed instructions for installing optional hardware devices in the server.

In addition to the instructions in this chapter for installing optional hardware devices, updating the firmware and device drivers, and completing the installation, IBM Business Partners must also complete the steps in "Instructions for IBM Business Partners" on page 24.

Important: To help ensure that the devices that you install work correctly and do not introduce problems, observe the following precautions:

1. Make sure that the server and the installed firmware levels support the devices that you are installing. If necessary, update the UEFI and IMM firmware and any other firmware that is stored on the system board. For information about where firmware is stored in the server, see"Updating the firmware" on page 71. For a list of supported optional devices for the server, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.
2. Before you install optional hardware devices, make sure that the server is working correctly. Start the server and make sure that the operating system starts, if an operating system is installed, or that a 19990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see "Running the DSA Preboot diagnostic programs" on page 120 for information about how to run diagnostics.
3. Follow the installation procedures in this chapter and use the correct tools. Incorrectly installed device can cause system failure because of damaged pins in sockets or connectors, loose cabling, or loose components.
4. Use the best practices to apply current firmware and device-driver updates for the server and optional devices. To download the *IBM System x Firmware Update Best Practices* document, go to http://www.ibm.com/support/entry/portal/docdisplay?brand=50000020&lndocid=MIGR-5082923. Additional hints and tips are available from the following sites:
   - IBM support: http://www.ibm.com/supportportal/
   - System x configuration tools: http://www.ibm.com/systems/x/hardware/configtools.html

Installing optional hardware devices in the server

This following sections provide detailed instructions for installing optional hardware devices in the server.

Instructions for IBM Business Partners

In addition to the instructions in this chapter for installing optional hardware devices, updating firmware and device drivers, and completing the installation, IBM Business Partners must also complete the following steps:

1. Before you configure a server for a customer, complete the Solution Assurance checklist at http://w3.ibm.com/support/assure/assur30i.nsf/webindex/sa294/.
2. After you have confirmed that the server starts correctly and recognizes the newly installed devices and that no error LEDs are lit, run the Dynamic System Analysis (DSA) stress test. For information about using DSA, see the *Problem Determination and Service Guide*.
3. Shut down and restart the server multiple times to ensure that the server is correctly configured and functions correctly with the newly installed devices.
4. Save the DSA log as a file and send it to IBM. For information about transferring data and logs, see http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp?topic=/dsa/dsa_main.html.
5. To ship the server, repackage it in the original undamaged packing material and observe IBM procedures for shipping.

Support information for IBM Business Partners is available at http://www.ibm.com/partnerworld/pwhome.nsf/weblook/index_us.html.

How to send DSA data to IBM

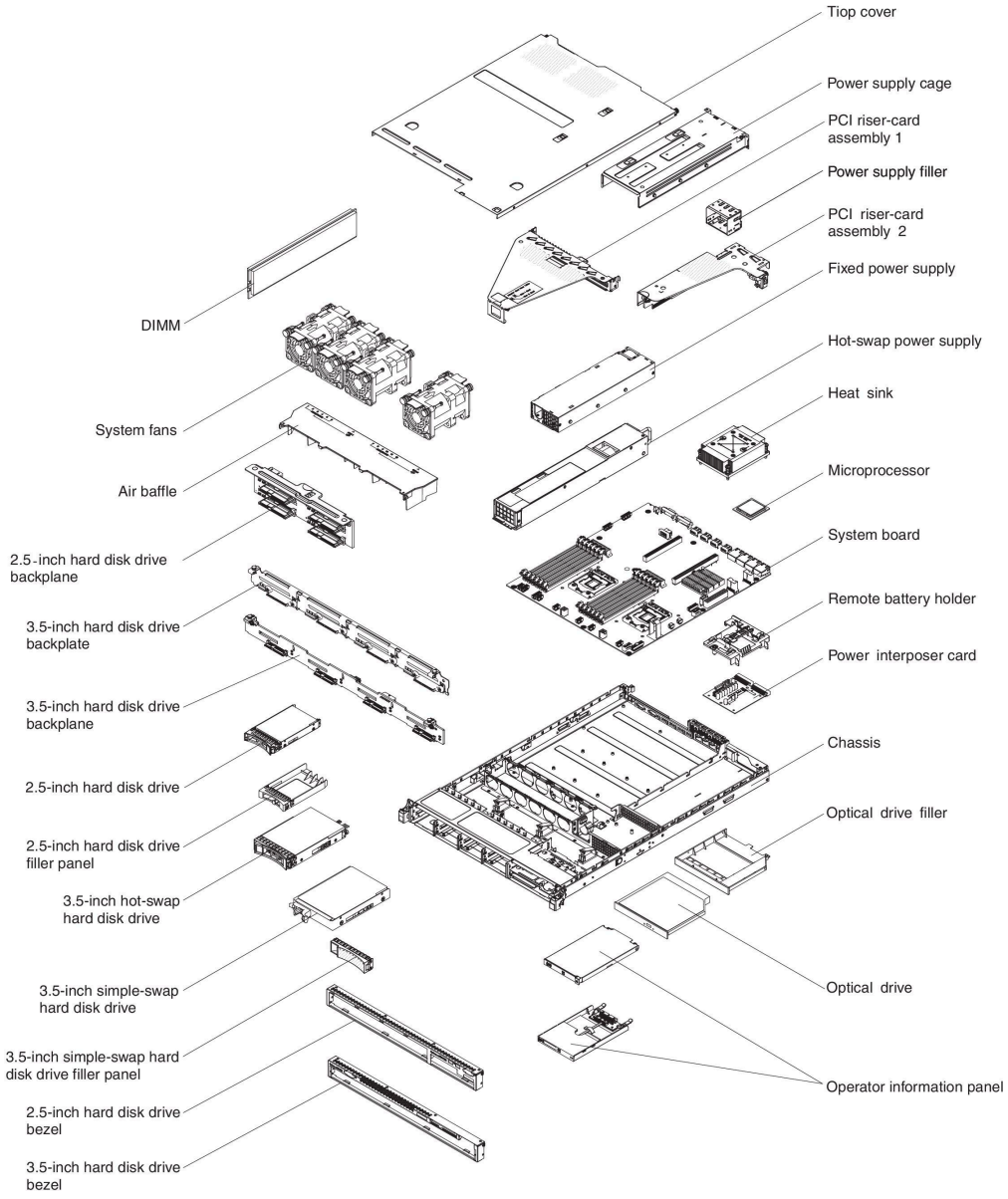
Before you send diagnostic data to IBM, read the terms of use at http://www.ibm.com/de/support/ecurep/terms.html.

You can use any of the following methods to send diagnostic data to IBM:

- **Standard upload:** http://www.ibm.com/de/support/ecurep/send_http.html
- **Standard upload with the system serial number:**http://www.ecurep.ibm.com/app/upload_hw
- **Secure upload:**http://www.ibm.com/de/support/ecurep/send_http.html#secure
- **Secure upload with the system serial number:**https://www.ecurep.ibm.com/app/upload_hw

Server components

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



Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.

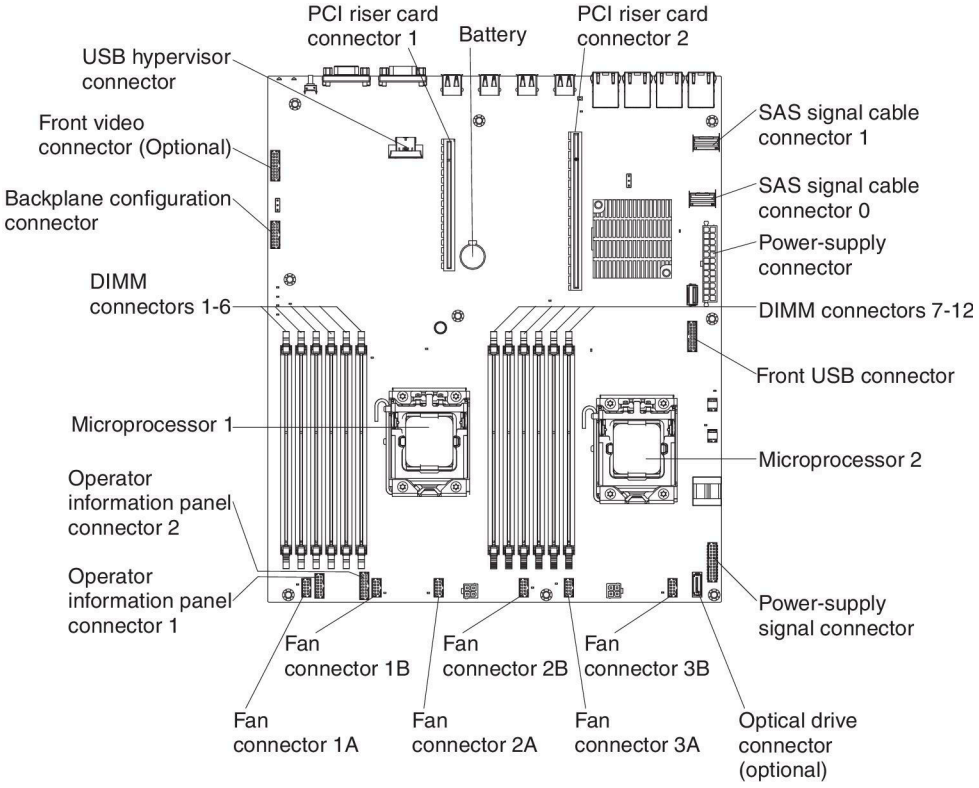
Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.

Server internal LEDs, connectors, and jumpers

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

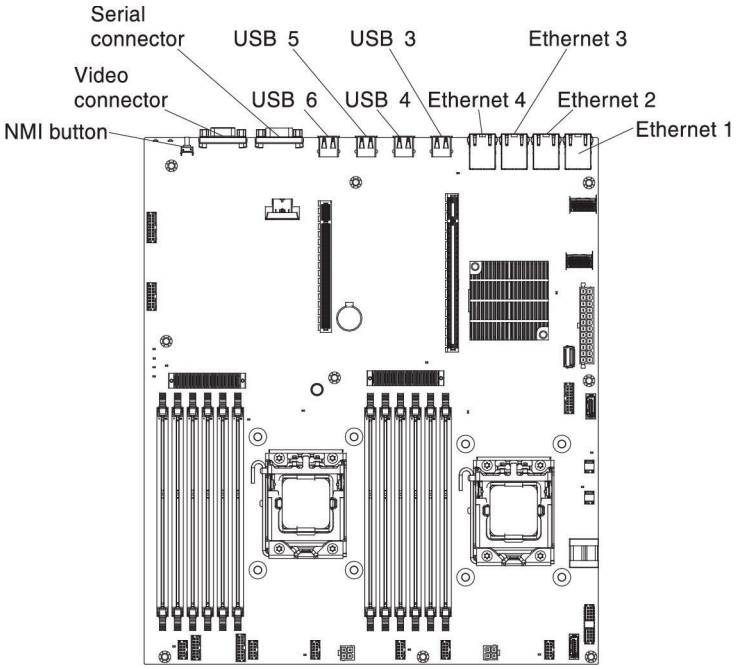
System-board internal connectors

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



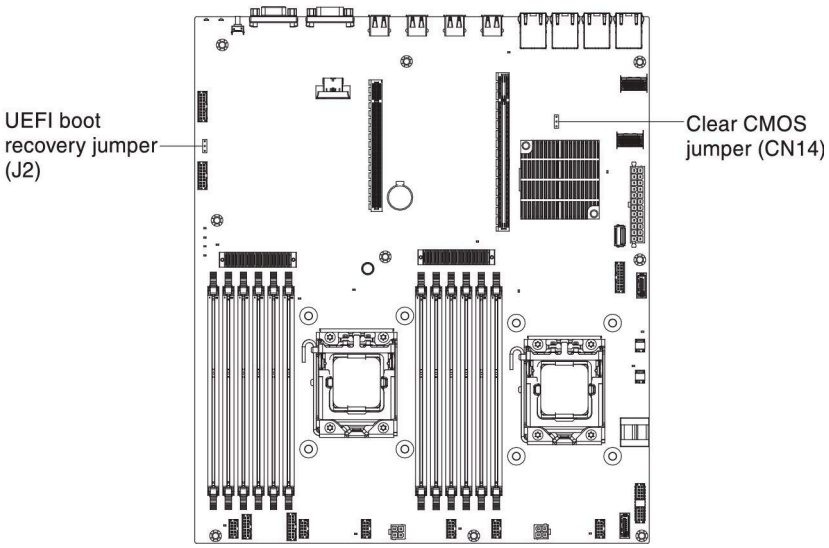
System-board external connectors

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



System-board jumpers

The following illustration shows the location of the jumpers.



The following table describes the jumper on the system board.

Table 2. System board jumpers

Jumper number	Jumper name	Jumper setting
CN14	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.

Table 2. System board jumpers (continued)

Jumper number	Jumper name	Jumper setting
J2	UEFI boot recovery jumper	• Pins 1 and 2: Normal (default) Loads the primary server firmware ROM page. • Pins 2 and 3: Loads the secondary (backup) server firmware ROM page.

Note:

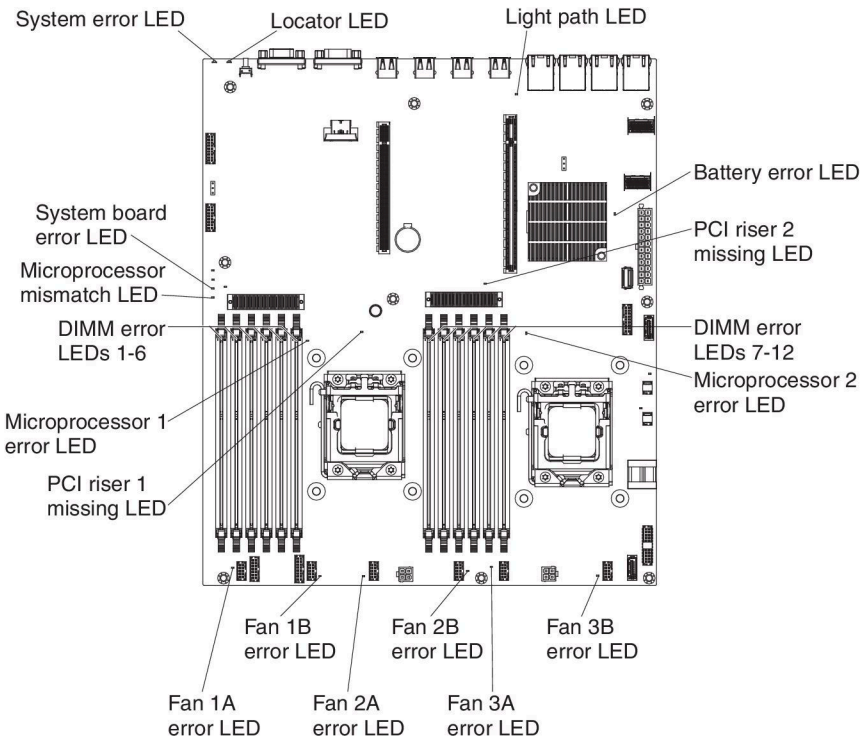
1. If no jumper is present, the server responds as if the pins are set to 1 and 2.
2. Changing the position of the UEFI boot recovery jumper from pins 1 and 2 to pins 2 and 3 before the server is turned on alters which flash ROM page is loaded. Do not change the jumper pin position after the server is turned on. This can cause an unpredictable problem.

Important:

1. Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. Review the information in Safety, "Installation guidelines" on page 30, "Handling static-sensitive devices" on page 32, and "Turning off the server" on page 21.
2. Any system-board switch or jumper blocks that are not shown in the illustrations in this document are reserved.

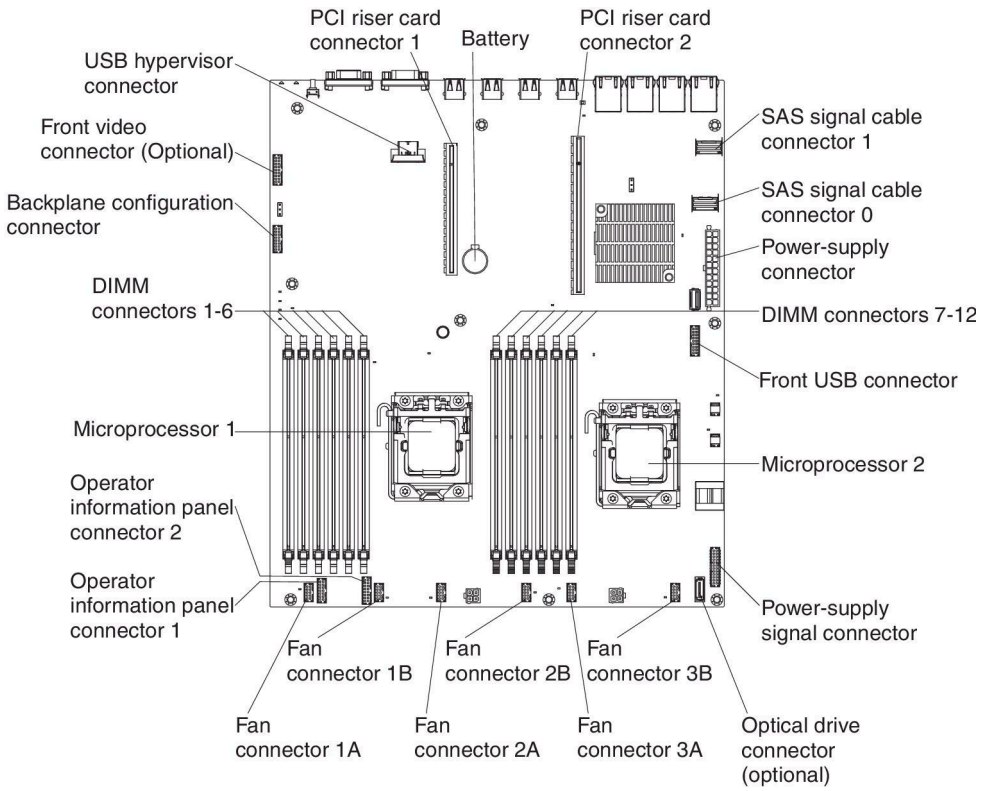
System-board LEDs

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



System-board optional device connectors

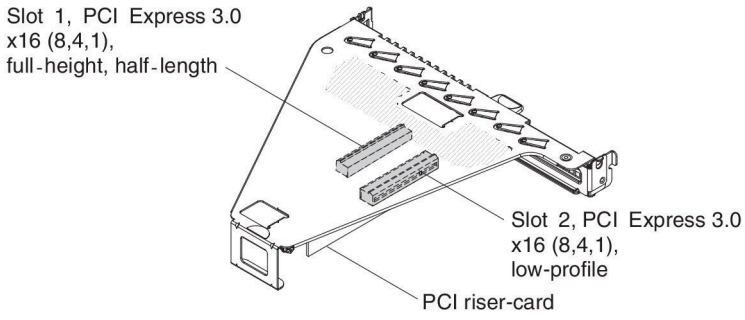
The following illustration shows the connectors on the system board for user-installable optional devices.

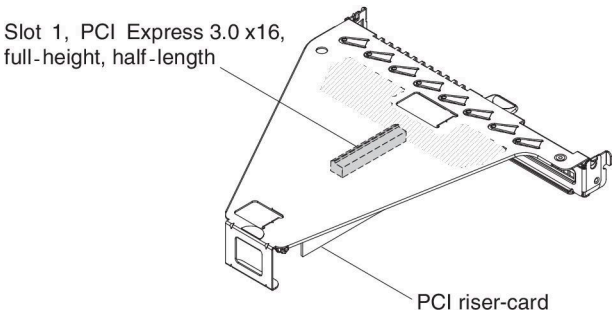


PCI riser cards

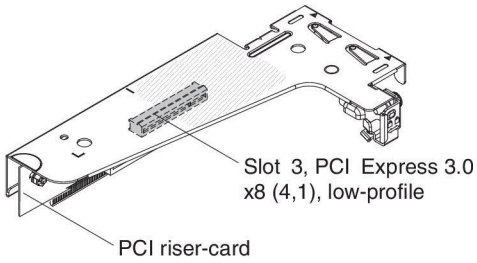
The following illustrations show the connectors on the PCI riser cards in the riser-card assemblies.

The server comes with one PCI riser-card assembly installed in PCI riser connector 1. The riser-card assembly provides either one or two PCI slots, depending on the server model. The following illustrations shows the connectors on PCI riser-card assembly 1.





The optional PCI riser-card assembly 2 is dedicated for an internal ServeRAID adapter. If your server does not come with PCI riser-card assembly 2, you may order it for hardware RAID upgrade or for installing additional hard disk drives.



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 devices.

Before you install optional devices, read the following information:

- Read the safety information that begins on page Safety and the guidelines in "Handling static-sensitive devices" on page 32. This information will help you work safely.
- Make sure that the devices that you are installing are supported.
- Make sure that the devices that you are installing are supported. For a list of supported optional devices for the server, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.
- When you install your new server, take the opportunity to download and apply the most recent firmware updates. This step will help to ensure that any known issues are addressed and that your server is ready to function at maximum levels of performance. To download firmware updates for your server, go to http://www.ibm.com/support/fixcentral/.

  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.

  For additional information about tools for updating, managing, and deploying firmware, see the ToolsCenter for System x and BladeCenter at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp.
- Before you install optional hardware, 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 “Running the DSA Preboot diagnostic programs” on page 120 for information about how to run diagnostics.

- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you can stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- To view the error LEDs on the system board and internal components, leave the server connected to power.
- You do not have to turn off the server to install or replace hot-swap power supplies, hot-swap fans, or hot-plug Universal Serial Bus (USB) devices. However, you must turn off the server before you perform any steps that involve removing or installing adapter cables and you must disconnect the power source from the server before you perform any steps that involve removing or installing a riser card.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.

System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- If the server has redundant power, each of the power-supply bays has a power supply installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before you turn on the server.
- 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 baffles installed. Operating the server without the air baffles 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:

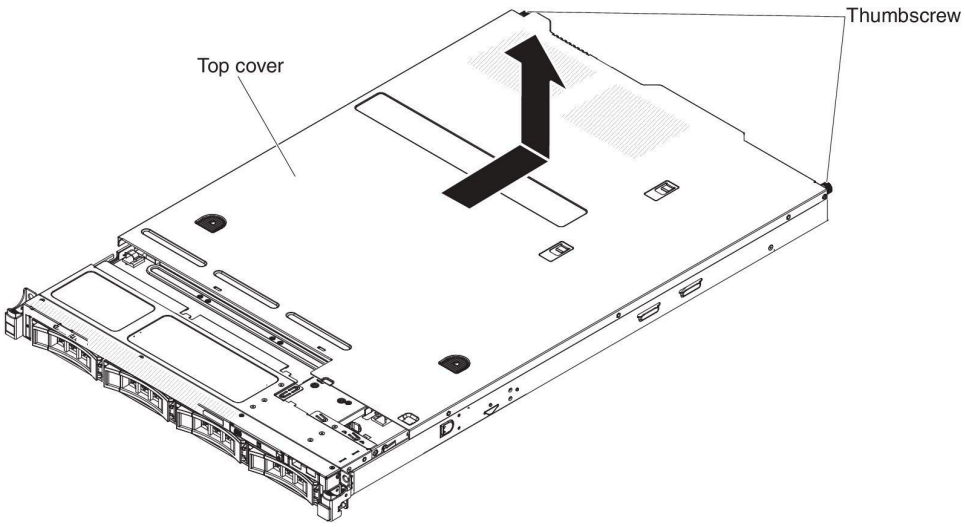
- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still 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.

Removing the server top cover

To remove the server top cover, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. If the server has been installed in a rack, press the two release latches 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.
4. Loosen the two thumbscrews that secure the cover to the rear of the server.
5. Press on the two blue grip points and slide the cover toward the rear; then, lift the cover off the server and set it aside.



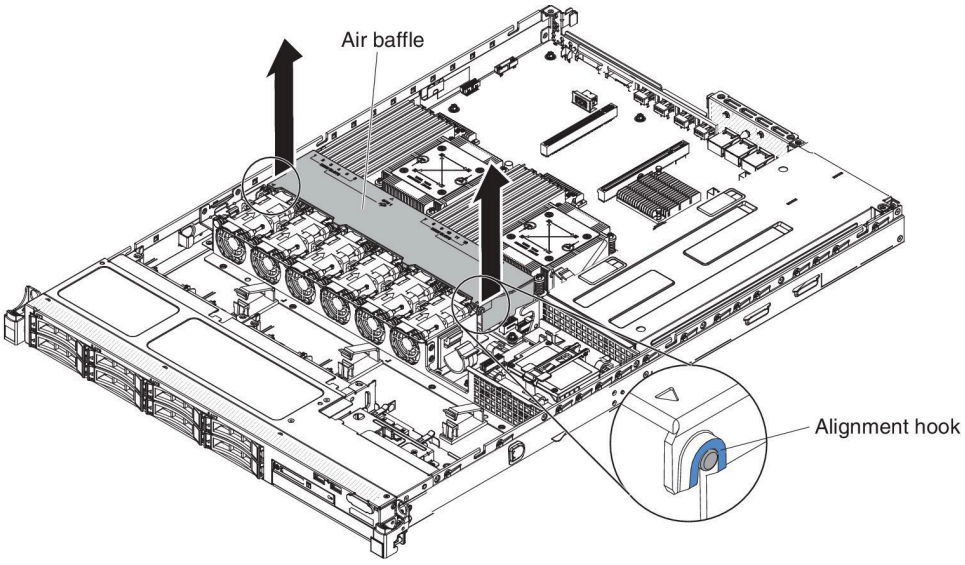
If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 65.

Removing the air baffle

To remove the air baffle, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the top cover (see "Removing the server top cover").
4. Lift the air baffle from the server and set it aside.

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



If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 65.

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 (see "System-board optional device connectors" on page 29 for the location of the DIMM connectors):

- Confirm that the server supports the DIMM that you are installing, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.
- The server supports only industry-standard double-data-rate 3 (DDR3), 1066 MHz PC3-8500, 1333 MHz PC3-10600, or 1600 MHz PC3-12800, (single-rank, dual-rank, or quad-rank in specified models), registered or unbuffered, synchronous dynamic random-access memory (SDRAM) 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.

    *ggggg e*R*ff*-PC3v-*wwwwwm-aa-bb-ccd*

    where:

    - *ggggg* is the total capacity of the DIMM (for example, 1GB, 2GB, or 4GB)
    - *e*R is the number of ranks

      1R = single-rank

      2R = dual-rank

      4R = quad-rank
    - x *ff* is the device organization or bit width (for example, x4, x8, or x16)

      4 = x4 organization (4 DQ lines per SDRAM)

      8 = x8 organization

      16 = x16 organization
    - *wwwww* is the DIMM bandwidth, in MBps

      8500 = 8.53 GBps (DDR3-1066 SDRAMs, 8-byte primary data bus)

      10600 = 10.66 GBps (DDR3-1333 SDRAMs, 8-byte primary data bus)

12800 = 12.80 GBps (DDR3-1600 SDRAMs, 8-byte primary data bus)

14900 = 14.93 GBps (DDR3-1866 SDRAMs, 8 byte primary data bus)

17000 = 17.06 GBps (DDR3-2133 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 DDR3 SDRAM CAS latency, in clocks at maximum operating frequency
- *bb* is the JEDEC SPD Revision Encoding and Additions level
- *cc* is the reference design file for the design of the DIMM
- *d* is the revision number of the reference design of the DIMM

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

- Do not install registered and unbuffered DIMMs in the same server.
- The server supports 1.35-volt (low-voltage) and 1.5-volt DIMMs. Do not install a 1.35-volt and 1.5-volt DIMM in the same server.
- The server supports a maximum of 12 DIMMs (single-rank, dual-rank, or quad-rank) on the system board. If you mix single-rank, dual-rank, or quad-rank DIMMs in the server, quad-rank DIMMs must be installed first. When one quad-rank DIMM is installed, it must be installed in DIMM slot 1.
- The DIMM options that are available for the server are 2 GB, 4 GB, 8 GB, 16 GB, and 32 GB (when available).
- The server system board supports a minimum of 2 GB and a maximum of 96 GB of system memory.

  Note: The amount of usable memory is reduced depending on the system configuration. A certain amount of memory must be reserved for system resources. To view the total amount of installed memory and the amount of configured memory, run the Setup utility. For additional information, see "Configuring the server" on page 72.
- The server system board provides three memory channels for each microprocessor and each memory channel supports up to two DIMMs. The following table lists the DIMM connectors on each memory channel:

Table 3. DIMM connectors on each memory channel

Microprocessor	Channel 0	Channel 1	Channel 2
Microprocessor 1	DIMM connectors 1 and 2	DIMM connectors 3 and 4	DIMM connectors 5 and 6
Microprocessor 2	DIMM connectors 7 and 8	DIMM connectors 9 and 10	DIMM connectors 11 and 12

- The following table shows the DIMM connectors that are associated with each microprocessor:

Table 4. DIMM connectors associated with each microprocessor

Microprocessor	DIMM connectors associated with the microprocessor
Microprocessor 1	1 through 6
Microprocessor 2	7 through 12

- The maximum operating speed of the server is determined by the slowest DIMM installed in the server.
- A minimum of one DIMM must be installed for each microprocessor. For example, you must install a minimum of two DIMMs if the server has two microprocessors installed. That is, one for microprocessor 1 and one for microprocessor 2.
- The server comes with a minimum of one DIMM installed in slot 1. When you install additional DIMMs, install them in the order shown in the information in the following tables to optimize system performance.
- The server supports independent mode, spare channel mode, and mirroring mode.
- **Independent mode**: When you use the independent mode, install DIMMs as indicated in the following tables.
  - The following table lists the DIMM installation sequence for non-mirroring mode when one or two microprocessors is installed in the server:

Table 5. DIMM population sequence (independent mode)

Number of installed microprocessors	DIMM connector population sequence
1	1, 3, 5, 2, 4, 6
2	1, 7, 3, 9, 5, 11, 2, 8, 4, 10, 6, 12

- **Spare channel mode**: When you use the memory mirroring feature, consider the following information:
  - In spare channel mode, one rank is a spare of the other ranks on the same channel. The spare rank is held in reserve and is not available as system memory. The spare rank must have identical or larger memory capacity than all the other ranks (sparing source ranks) on the same channel. After sparing, the sparing source rank will be lost.
  - DIMMs must be installed in sets of three. The DIMMs in each set must be the same size and type.
  - The following table lists the DIMM installation sequence for rank sparing mode when one or two microprocessors is installed in the server:

Table 6. DIMM population sequence (rank sparing mode)

Number of installed microprocessors	DIMM connector population sequence
1	1, 3, 5 2, 4, 6
2	1, 3, 5 7, 9, 11 2, 4, 6 8, 10, 12

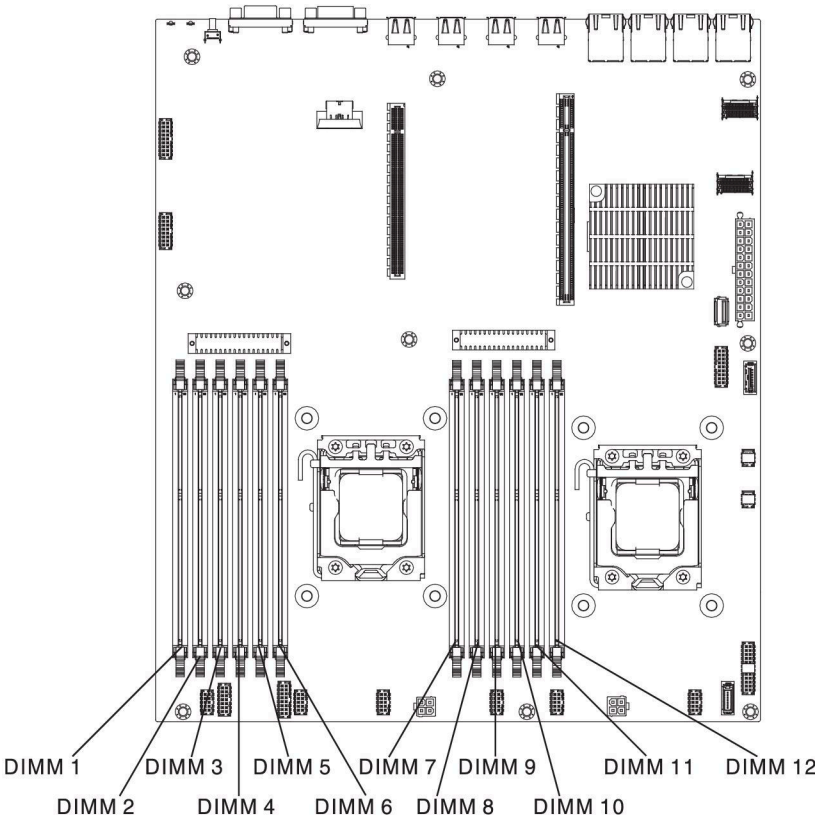
- **Memory-mirroring mode**: When you use the memory mirroring feature, consider the following information:
  - Memory-mirroring mode replicates and stores data on two pairs of DIMMs simultaneously. If a failure occurs, the memory controller switches from the primary pair of memory DIMMs to the backup pair of DIMMs. This mirroring provides redundancy in memory but reduces the total memory capacity to one third. Channel 1 DIMM connectors 3, 4, 9, and 10 are not used in memory-mirroring mode. To enable memory mirroring through the Setup utility, select **System Settings → Memory**. For more information, see "Using the Setup utility" on page 75.
  - DIMMs must be installed in pairs. The DIMMs in each pair must be the same size and type.
  - The maximum available memory is reduced to one third of the installed memory when memory mirroring is enabled. For example, if you install 96 GB of memory, only 32 GB of addressable memory is available when you use memory mirroring.
  - The following table lists the DIMM installation sequence for memory-mirroring mode when one or two microprocessors is installed in the server:

Table 7. DIMM population sequence (memory-mirroring mode)

Number of installed microprocessors	**DIMM connector population sequence**
1	3, 5 4, 6
2	3, 5 9, 11 4, 6 10, 12

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

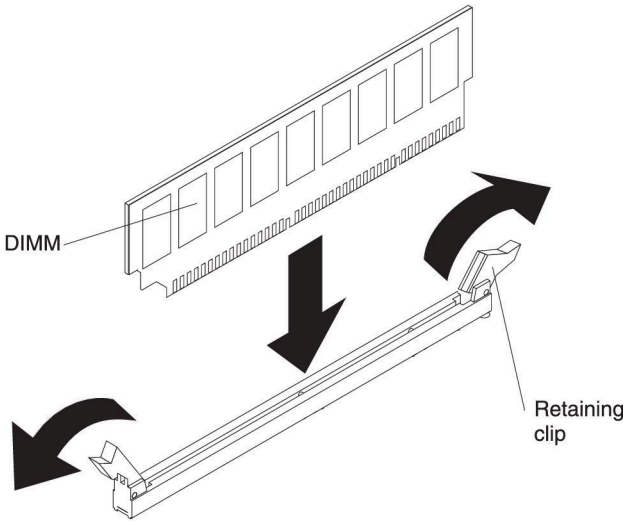
The following illustration shows the location of the DIMMs connectors on the system board.



To install a DIMM, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the top cover (see "Removing the server top cover" on page 362).
4. Open the retaining clip on each end of the DIMM connector.

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



5. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the outside of the server. Then, remove the DIMM from the package.
6. Turn the DIMM so that the DIMM keys align correctly with the connector.
7. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector (see "System-board optional device connectors" on page 29 for the locations of the DIMM connectors).
8. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.

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

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 65.

Installing drives

The following notes describe the type of drives that the server supports and other information that you must consider when you install a drive. To confirm that the server supports the drive that you are installing, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.

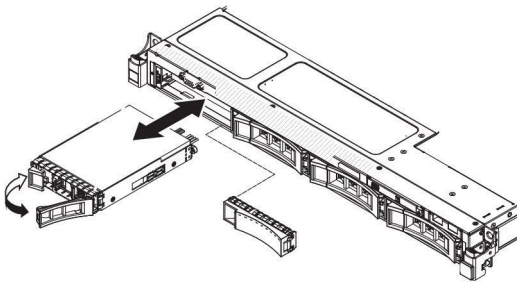
- Locate the documentation that comes with the drive and follow those instructions in addition to the instructions in this chapter.
- Make sure that you have all the cables and other equipment that are specified in the documentation that comes with the drive.
- Select the bay in which you want to install the drive.
- The server supports one optional ultra-slim SATA CD-RW/DVD-ROM optical drive.
- The server can support up to eight 2.5 inch hot-swap SAS/SATA drives, four 3.5-inch hot-swap SAS/SATA drives, or four 3.5-inch simple-swap SATA drives. (see Supported SAS/SATA drive backplane configurations for the supported configurations).
- You can mix hot-swap SAS and SATA hard disk drives in the same server as long as you do not mix drives on the same array.
- The electromagnetic interference (EMI) integrity and cooling of the server are protected by having all bays and PCI Express slots covered or occupied. When you install a drive, save the EMC shield and filler panel from the bay in the event that you later remove the device.

Installing hot-swap drives

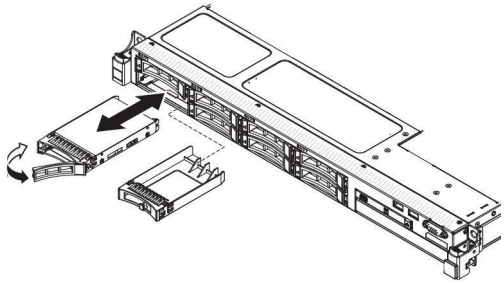
To install a hot-swap SAS or SATA drive, complete the following steps.

Note: If you install only one drive, you must install it in drive bay 0.

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
3. Install a 3.5-inch hot-swap drive:
   a. Remove the filler panel from the empty drive bay.
   b. Make sure that the drive-tray handle is in the open (unlocked) position.
   c. Align the drive assembly with the guide rails in the bay.



   d. Gently push the drive assembly into the drive bay until the drive stops.
   e. Rotate the drive-tray handle to the closed (locked) position.
   f. Skip to step 5.
4. Install a 2.5-inch hot-swap drive:
   a. Remove the filler panel from the empty drive bay.
   b. Make sure that the drive-tray handle is in the open (unlocked) position.
   c. Align the drive assembly with the guide rails in the bay.



   d. Gently push the drive assembly into the drive bay until the drive stops.
   e. Rotate the drive-tray handle to the closed (locked) position.
5. Check the drive status LED to verify that the drive is operating correctly. If the yellow drive status LED for a drive is lit continuously, that drive is faulty and must be replaced. If the green drive activity LED is flashing, the drive is being accessed.

   Note: If the server is configured for RAID operation using a ServeRAID adapter, you might have to reconfigure your disk arrays after you install drives. See the ServeRAID adapter documentation for additional information about RAID operation and complete instructions for using the ServeRAID adapter.
6. If you are installing additional hot-swap drives, do so now.

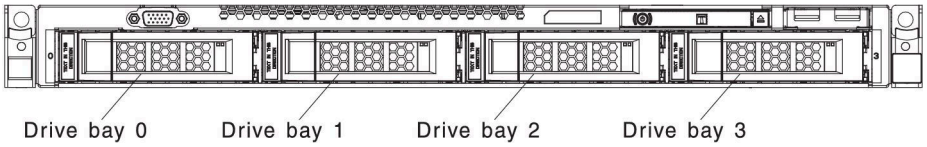
7. Restart the server. Confirm that it starts correctly and recognizes the newly installed devices, and make sure that no error LEDs are lit.
8. Complete the additional steps in "Instructions for IBM Business Partners" on page 24.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 65.

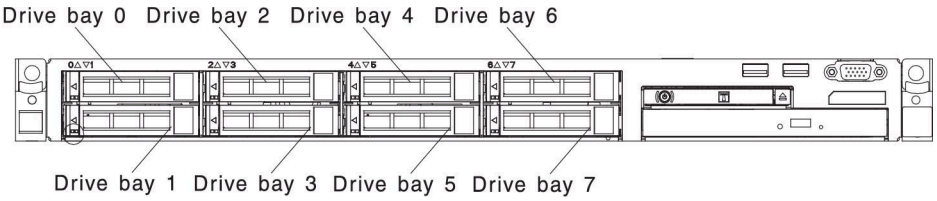
IDs for hot-swap drives

The hot-swap-drive ID that is assigned to each drive is printed on the front of the server. The following illustrations show the location of the IDs of the drives. The ID numbers and the drive bay numbers are the same.

The following illustration shows the drive bay IDs on a 3.5-inch drive server model.



The following illustration shows the drive bay IDs on a 2.5-inch drive server model.

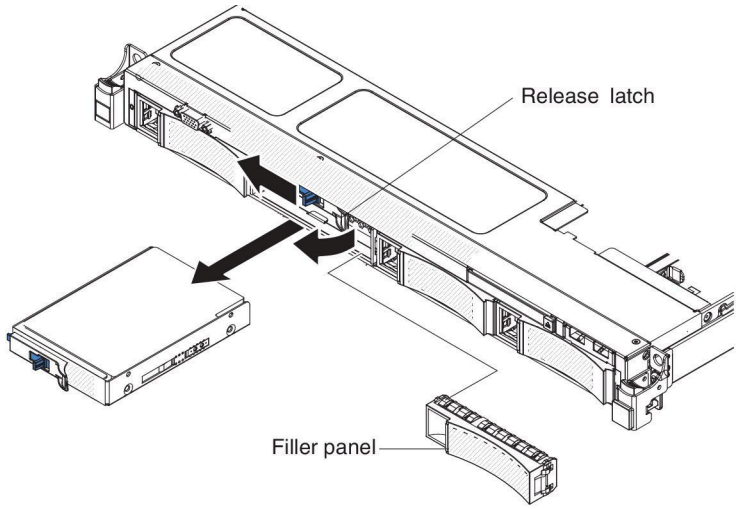


Installing 3.5-inch simple-swap drives

To install a 3.5-inch simple-swap SATA drive, complete the following steps.

Note: If you install only one drive, you must install it in drive bay 0.

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
4. Remove the filler panel from the empty drive bay.
5. Align the drive assembly with the guide rails in the bay.



6. Gently slide the drive assembly into the drive bay until it clicks into place.
7. Install the filler panel.
8. If you are installing additional simple-swap drives, do so now.
9. Restart the server. Confirm that it starts correctly and recognizes the newly installed devices, and make sure that no error LEDs are lit.

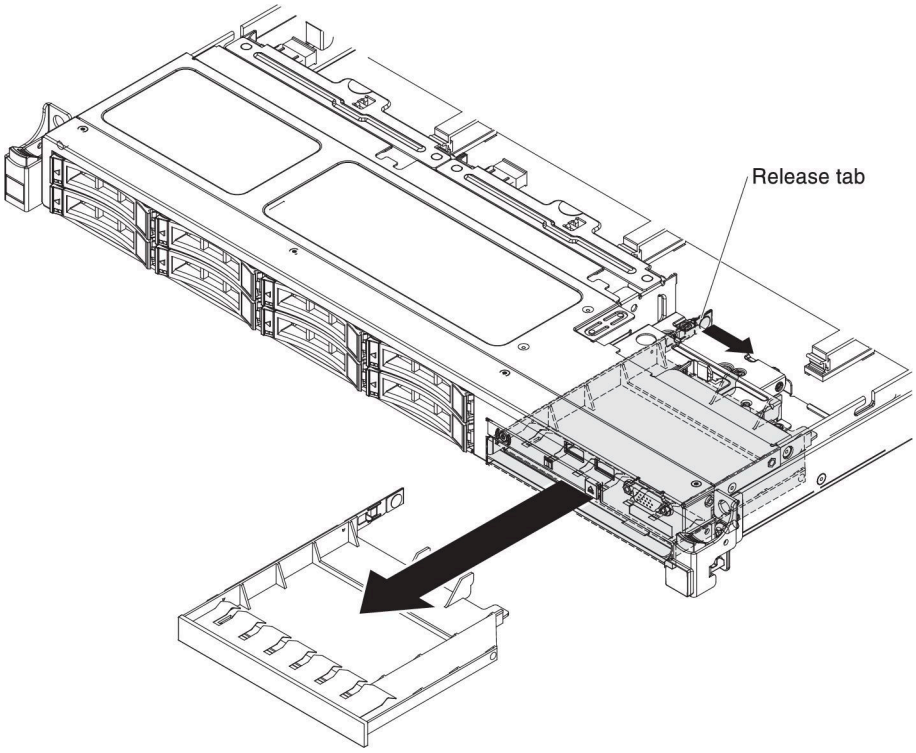
   Note: If the server is configured for RAID operation using a ServeRAID adapter, you might have to reconfigure your disk arrays after you install drives. See the ServeRAID adapter documentation for additional information about RAID operation and complete instructions for using the ServeRAID adapter.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 65.

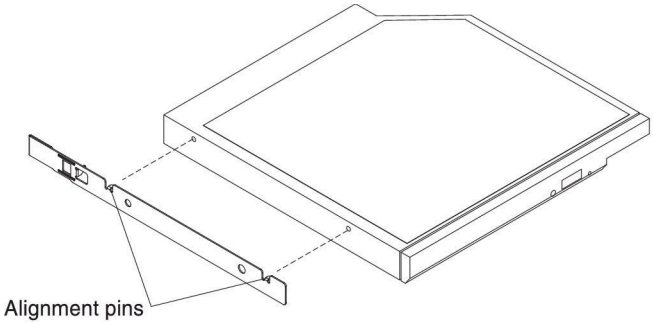
Installing an optional optical drive

To install an optional optical drive, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the top cover (see "Removing the server top cover" on page 33).
4. Locate the blue release tab on the rear of the drive bay; then, while you press the tab, push the optical drive filler toward the front of the server.



5. Pull the optical drive filler out of the front of the server.
6. Remove the retention clip from the side of the drive filler.



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

Statement 3

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

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

DANGER

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

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

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

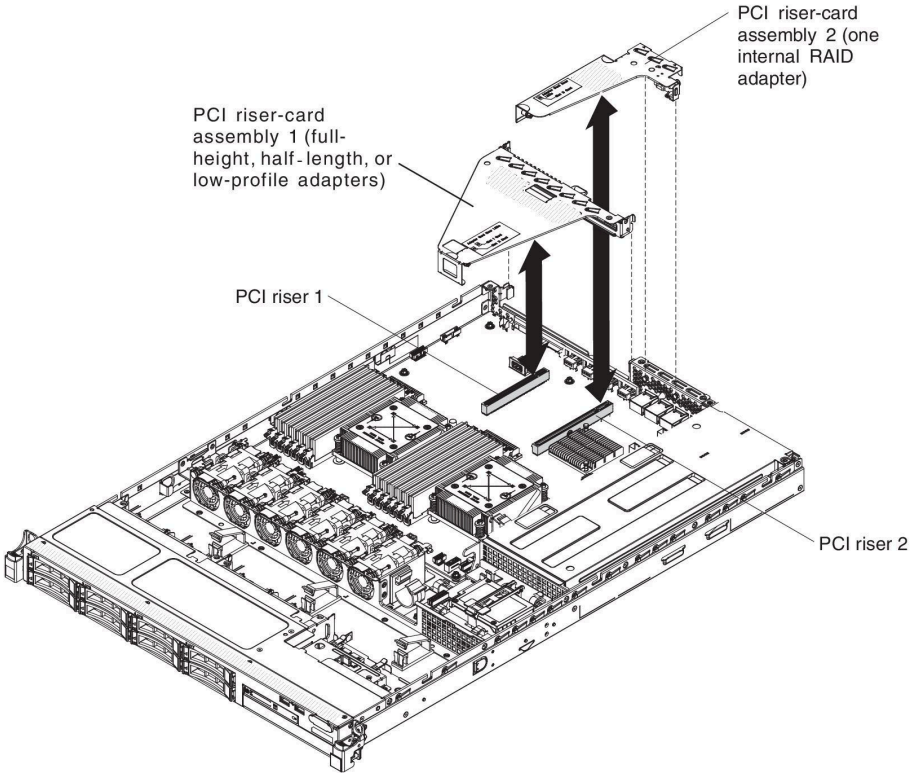
7. Touch the static-protective package that contains the new optical drive to any unpainted metal surface on the server; then, remove the optical drive from the package and place it on a static-protective surface.
8. Attach the drive retention clip that you removed from the previous drive to the side of the new drive.
9. Align the drive in the drive bay and slide the drive into the optical drive bay until the drive clicks into place.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 65.

Installing a PCI riser-card assembly

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

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the top cover (see "Removing the server top cover" on page 33).
4. Install the adapter in the PCI riser-card assembly (see "Installing an adapter" on page 46).
5. Align the PCI riser-card assembly with the PCI slot connector on the system board and align nailheads with the slots on the chassis; then, press down firmly until the riser-card assembly is seated correctly in the connector on the system board.



If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 65.

Installing an adapter

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

- To confirm that the server supports the adapter that you are installing, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.
- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section.
- Do not set the maximum digital video adapter resolution above 1280 x 1024 at 75 Hz for an LCD monitor. This is the highest resolution that is supported for any add-on video adapter that you install in the server.
- Any high-definition video-out connector or stereo connector on any add-on video adapter is not supported.
- The server provides two PCI riser slots on the system board. The riser cards provide up to three PCIE 3 adapter slots (see "PCI riser cards" on page 29 for the location of the PCI-e slots on the riser cards). The following table lists the PCI-e slots on the riser-card and the system board, the microprocessor to which each slot is connected, and the supported adapters that you can install in each slot:

Table 8. PCI riser slots supported configurations

PCI riser-card assembly	PCI-e slot number	Microprocessor to which the slot is connected	Configuration 1	Configuration 2
1	1	Microprocessor 1	PCIE 3.0 x16 (x16 mechanically) full-height, half-length adapter	PCIE 3.0 x8 (x16 mechanically) full-height, half-length adapter
1	2	Microprocessor 1	N/A	PCIE 3.0 x8 (x16 mechanically) low-profile adapter
2	3	Microprocessor 1	PCIE 3.0 x4 low-profile, internal RAID adapter	PCIE 3.0 x4 low-profile, internal RAID adapter
Note: PCI-e slot 3 on PCI riser-card assembly 2 is reserved for an optional internal RAID adapter. Do not install any internal RAID adapter in PCI riser-card assembly 1.				

- Depending on your server model, the server comes with an onboard RAID controller which provides basic RAID levels 0 and 1 functionality. The server supports the following optional RAID adapters that you can purchase for additional RAID support. For configuration information, see the documentation that comes with the adapter or the ServeRAID documentation at http://www.ibm.com/supportportal/.

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

  – ServeRAID controllers:
    - ServeRAID H1110 SAS/SATA Controller for System x
    - ServeRAID M1115 SAS/SATA Controller for System x
    - ServeRAID M5120 SAS/SATA Controller for IBM System x

- ServeRAID M5110 SAS/SATA Controller for IBM System x

– ServeRAID controller upgrade options:
  - ServeRAID M5100 Series 512 MB Cache/RAID 5 Upgrade for IBM System x
  - ServeRAID M5100 Series 512 MB Flash/RAID 5 Upgrade for IBM System x
  - ServeRAID M5100 Series 1 GB Flash/RAID 5 Upgrade for IBM System x
  - ServeRAID M5100 Series RAID 6 Upgrade for IBM System x
  - ServeRAID M5100 Series Performance Key

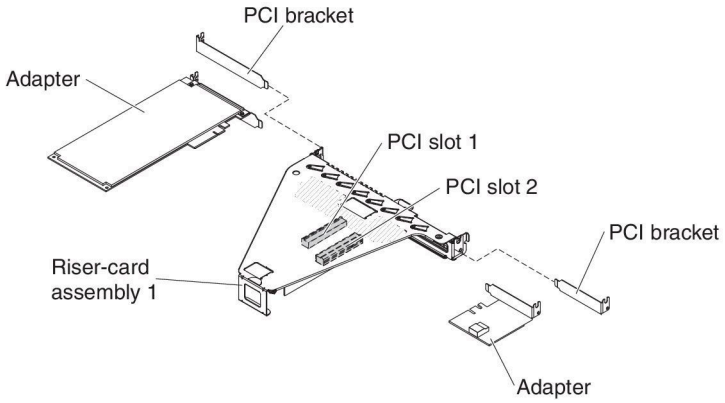
Notes:

- The instructions in this section apply to any supported adapter (for example, video graphics adapters or network adapters).
- You must install an internal ServeRAID adapter in PCI riser-card assembly 2.
- When you install an adapter, make sure that the adapter is correctly seated in the riser-card assembly and that the riser-card assembly is securely seated in the riser-card connector on the system board before you turn on the server. An incorrectly seated adapter might cause damage to the system board, the riser-card assembly, or the adapter.
- Do not set the maximum digital video adapter resolution above 1600 x 1200 at 75 Hz for an LCD monitor. This is the highest resolution that is supported for any add-on video adapter that you install in the server.
- Any high-definition video-out connector or stereo connector on any add-on video adapter is not supported
-

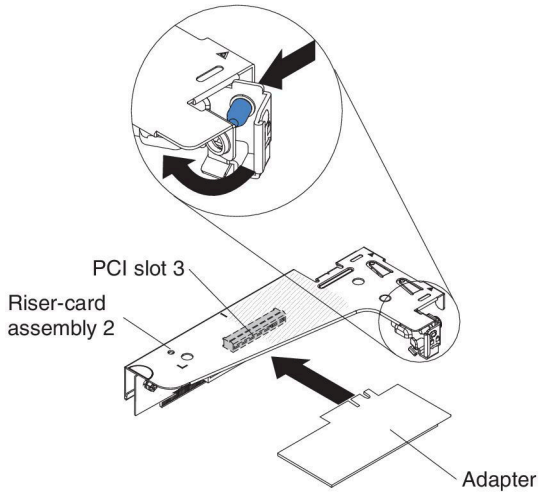
To install an adapter, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the top cover (see "Removing the server top cover" on page 33).
4. Follow the cabling instructions, if any come with the adapter. Route the adapter cables before you install the adapter.
5. Installing an adapter in PCI riser-card assembly 1:

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



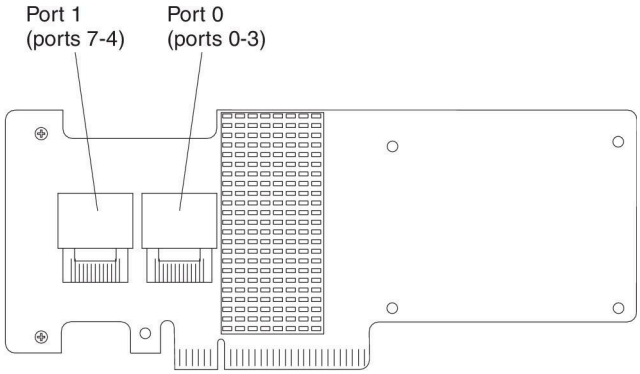
6. Installing a ServeRAID adapter in PCI riser-card assembly 2:
   a. Pull the release pin to unlock the release latch.
   b. Rotate the retention latch to the open position.
   c. Insert the adapter into the PCI riser-card assembly, aligning the edge connector on the adapter with the connector on the PCI riser-card assembly. Press the edge of the connector *firmly* into the PCI riser-card assembly. Make sure that the adapter snaps into the PCI riser-card assembly securely.
   d. Rotate the retention latch to the close position. Make sure the retention latch engages the adapter securely; then, push in the release pin to lock the retention latch.



7. Install the PCI riser-card assembly in the server (see "Installing a PCI riser-card assembly" on page 45).
8. Perform any configuration tasks that are required for the adapter.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 65.

Installing an optional IBM ServeRAID SAS/SATA Controller



You can purchase an optional IBM ServeRAID SAS/SATA controller. You must install the optional ServeRAID adapter in PCI slot 3 on PCI riser-card assembly 2. If the server does not already come with PCI riser-card assembly 2, you must purchase the PCI riser-card assembly option. For configuration information, see the ServeRAID documentation at http://www.ibm.com/systems/support/.

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

Note:

1. Follow the general rule for connecting the SAS signal cables to the adapter and drive backplane, port 0 on the adapter to port 0 on the drive backplane; then port 1 on the adapter to port 1 on the drive backplane (depending on the drive backplane you install in the server).
2. When you install an IBM ServeRAID SAS/SATA adapter that has a battery, you must install the ServeRAID battery remotely on the remote battery holder in the server (see “Installing a RAID adapter battery remotely in the server” on page 60).

To install an IBM ServeRAID adapter, complete the following steps:

1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.
2. Turn off the server (see “Turning off the server” on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the top cover (see “Removing the server top cover” on page 33).
4. Carefully grasp PCI riser-card assembly 2 by the blue touch points and pull it until the PCI riser-card assembly disengages from the connector on the system board.
5. Pull the release pin on the rear of the PCI riser-card assembly to unlock the retention latch; then rotate the retention latch to the open position.
6. Touch the static-protective package that contains the ServeRAID adapter to any unpainted surface on the outside of the server; then, grasp the adapter by the top edge or upper corners of the adapter and remove it from the package.
7. Align the ServeRAID adapter so that the keys align correctly with the connector on the PCI riser-card assembly.

8. Insert the ServeRAID adapter into the connector on the riser-card until it is firmly seated.

   Attention: Incomplete insertion might cause damage to the server or the adapter.
9. Rotate the retention latch to the closed position, making sure the retention latch engages the ServeRAID adapter. Then, push in the release pin to lock the retention latch in place.
10. Connect the power/configuration cable to the drive backplane and the system board.
11. Connect the signal cable to the drive backplane and to the adapter. Be sure to route the signal cables as shown in the following illustration. Secure the cables with any cable clips on the system board so that they do not get in the way or get damaged.
12. Reinstall PCI riser-card assembly 2 onto the system board.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 65.

Installing an additional microprocessor and heat sink

Note: If your server comes with one Intel Pentium 1400 series microprocessor, the second microprocessor socket is not used. The server supports only one Intel Pentium microprocessor. If you plan to install two Intel Xeon microprocessors in the server, you must first remove the Intel Pentium microprocessor that came with the server.

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

- A microprocessor must be replaced or serviced by a trained technician.
- Be extremely careful, the pins on the socket are fragile. Any damage to the pins may require replacing the system board.
- The microprocessor tool assembly comes with the microprocessor and microprocessor cover attached to the tool. The microprocessor comes protected between the tool and the microprocessor cover. Store the microprocessor tool in a safe location for future use.
- Use the microprocessor tool to install or remove a microprocessor in the server. Failure to use the microprocessor tool may cause damage to the pins in the socket. Any damage to the pins may require replacing the system board.
- The server supports one Intel Pentium 1400 series microprocessor or up to two Intel Xeon four-core, six-core, or eight-core microprocessors (depending on your model). To confirm that the server supports the microprocessor, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ for a list of supported microprocessors.
- Do not mix four-core, six-core, and eight-core microprocessors in the same server.
- The microprocessor options that IBM supports are limited by the capacity and capability of the server. Any microprocessor options that you install must have the same specifications as the microprocessor(s) that came with the server.
- The first microprocessor must always be installed in microprocessor socket 1 on the system board.

- Do not remove the first microprocessor from the system board when you install the second microprocessor.
- When you install the second microprocessor, you must also install additional memory and the fourth and sixth fans. See “Installing a memory module” on page 34 for details about the memory installation sequence.
- To ensure proper server operation when you install an additional microprocessor, use microprocessors that have the same QuickPath Interconnect (QPI) link speed, integrated memory controller frequency, core frequency, power segment, internal cache size, and type.
- Mixing microprocessors of different stepping levels within the same server model is supported.
- When mixing microprocessors with different stepping levels within the same server model, you do not have to install the microprocessor with lowest stepping level and features in microprocessor socket 1.
- Both microprocessor voltage regulator modules are integrated on the system board.
- Read the documentation that comes with the microprocessor, so that you can determine whether you have to update the server firmware. To download the latest level of the server firmware and other code updates for your server, go to http://www.ibm.com/supportportal/.
- If the thermal-grease protective cover (for example, a plastic cap or tape liner) is removed from the heat sink, do not touch the thermal grease on the bottom of the heat sink or set down the heat sink. For details, see Thermal grease.

  Note: Removing the heat sink from the microprocessor destroys the even distribution of the thermal grease and requires replacing the thermal grease.
- To order an additional optional microprocessor, contact your IBM marketing representative or authorized reseller.
- The following table shows the DIMM connectors on the system board and the DIMM connectors that are associated with each microprocessor:

Table 9. DIMM connectors associated with each microprocessor

Microprocessor	DIMM connectors
Microprocessor socket 1	1 through 6
Microprocessor socket 2	7 through 12

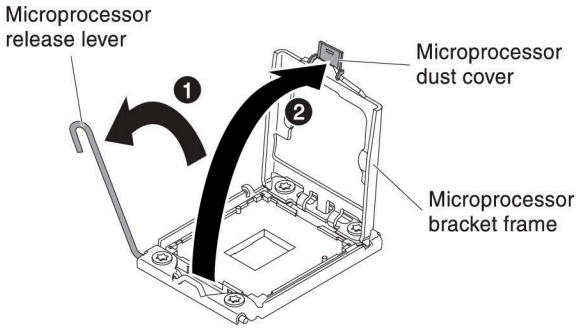
To install an additional microprocessor and heat sink, complete the following steps:

1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.
2. Turn off the server (see “Turning off the server” on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.

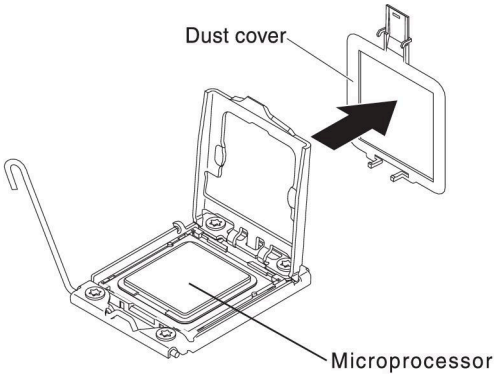
   Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see “Handling static-sensitive devices” on page 32.
3. Remove the top cover (see “Removing the server top cover” on page 33).
4. Remove the air baffle (see “Removing the air baffle” on page 33).
5. Locate microprocessor socket 2 on the system board.
6. Remove the heat-sink filler, if one is present.
7. Open the microprocessor socket release lever and retainer.

a. Press down and out on the release lever on microprocessor socket 2 and lift up the microprocessor release lever until it stops in the fully open position.
b. Lift the hinged microprocessor bracket frame into an open position.

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see "Handling static-sensitive devices" on page 32.



8. Install the microprocessor:
   a. Remove the socket cover from the microprocessor socket.

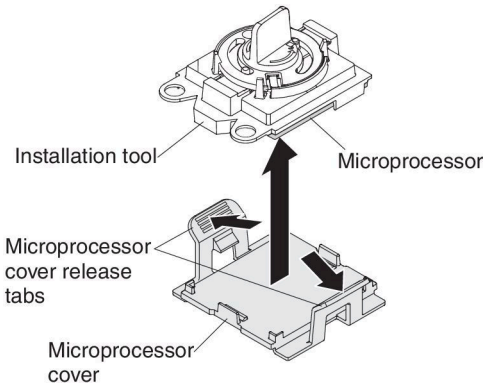


   b. Touch the static-protective package that contains the new microprocessor to any *unpainted* metal surface on the server.
   c. Remove the microprocessor installation tool assembly from the package. The microprocessor installation tool assembly comes with the microprocessor and microprocessor cover attached to the tool. The microprocessor comes protected between the tool and the microprocessor cover.

      Attention:
      - Do not rotate the handle on the tool until you are ready to install the microprocessor into the microprocessor socket.
      - Do not touch the microprocessor contacts; handle the microprocessor by the edges only. Contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.
      - Handle the microprocessor carefully. Dropping the microprocessor during installation or removal can damage the contacts.

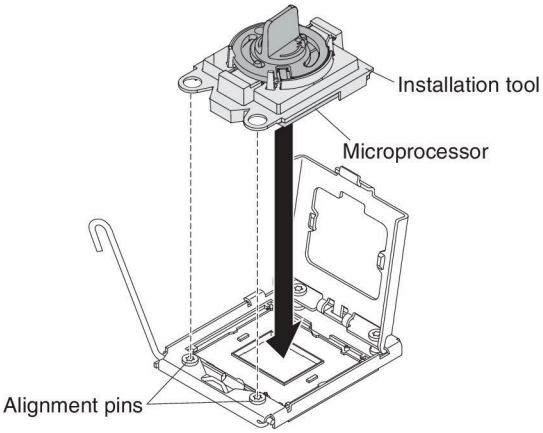
   d. Remove the cover from the bottom of the microprocessor installation tool. Press both microprocessor cover release tabs outward (in opposite directions as shown in the illustration) and remove the microprocessor

installation tool with the microprocessor attached.

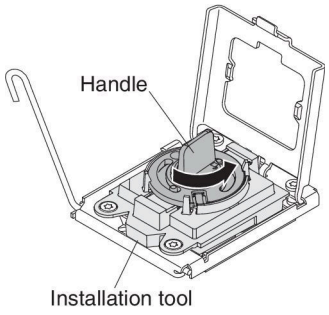


e. Carefully align the microprocessor installation tool over the microprocessor socket. .

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



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



g. Take off the microprocessor installation tool from the microprocessor socket and close the microprocessor bracket frame.

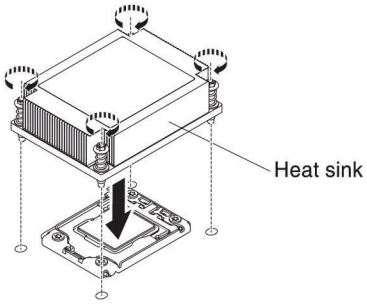
h. Carefully close the microprocessor release lever to the closed position to secure the microprocessor in the socket.

9. Install the heat sink that came with the microprocessor:

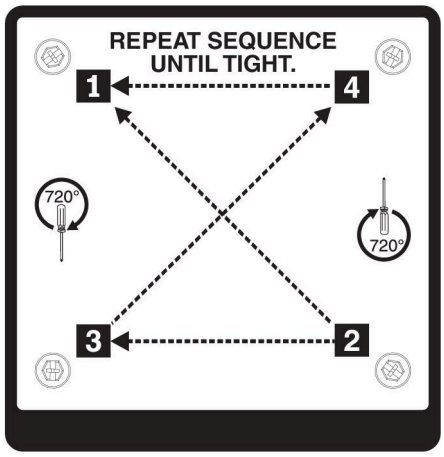
a. Remove the plastic protective cover from the bottom of the heat sink.

Attention: Do not touch the thermal grease on the bottom of the heat sink after you remove the plastic cover. Touching the thermal grease will contaminate it. See Thermal grease for more information.

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



c. Press firmly on the captive screws and tighten them with a screwdriver. The follow illustration shows the sequence in tightening the screws, which is also shown on top of the heat sink. Begin with the screw labeled as "1", then "2", "3" and finally "4". 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. If you are using a torque wrench, tighten the screws to 8.5 Newton-meters (Nm) to 13 Nm (6.3 foot-pounds to 9.6 foot-pounds).



10. If you installed the second microprocessor, install the two fans on Fan connector 4 and Fan connector 6 of the system board respectively (see Replacing a hot-swap fan assembly).
11. Reinstall the air baffle, (see Replacing the microprocessor air baffle).
12. Reconnect any cables that you have disconnected from the adapters or system board.

If you have other devices to install or remove, do so now. Otherwise, go to “Completing the installation” on page 65.

Thermal grease

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

When you are installing the heat sink on the same microprocessor that is was removed from, make sure that the following requirements are met:

- The thermal grease on the heat sink and microprocessor is not contaminated.
- Additional thermal grease is not added to the existing thermal grease on the heat sink and microprocessor.

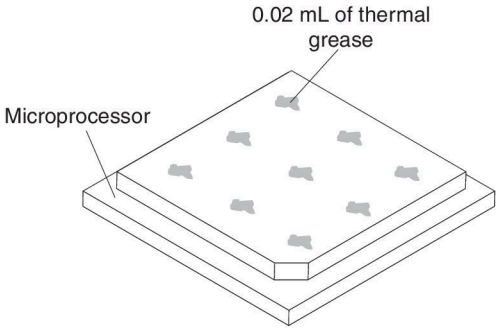
Note:

- Read the Safety information on page Safety.
- Read the "Installation guidelines" on page 30.
- Read "Handling static-sensitive devices" on page 32.

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

1. Place the heat sink on a clean work surface.
2. Remove the cleaning pad from its package and unfold it completely.
3. Use the cleaning pad to wipe the thermal grease from the bottom of the heat sink.

   Note: Make sure that all of the thermal grease is removed.
4. Use a clean area of the cleaning pad to wipe the thermal grease from the microprocessor; then, dispose of the cleaning pad after all of the thermal grease is removed.



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

   Note: If the grease is properly applied, approximately half of the grease will remain in the syringe.
6. Install the heat sink onto the microprocessor as described in "Installing an additional microprocessor and heat sink" on page 50.

Installing a hot-swap power supply

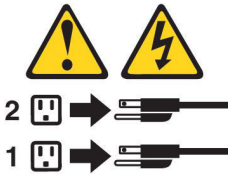
The following notes describe the type of power supply that the server supports and other information that you must consider when you install a power supply:

- To confirm that the server supports the power supply that you are installing, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.
- Before you install an additional power supply or replace a power supply with one of a different wattage, you may use the IBM Power Configurator utility to determine current system power consumption. For more information and to download the utility, go to http://www-03.ibm.com/systems/bladecenter/resources/powerconfig.html.
- The server comes standard with one of the following power supplies that connects to power supply bay 1. The input voltage is 100-127 V ac or 200-240 V ac auto-sensing.
  - 460-watt fixed power supply
  - 460-watt hot-swap power supply
  - 675-watt high-efficiency, hot-swap power supply

  Note: You cannot mix 110 V ac and 220 V ac, or 460-watt and 675-watt power supplies in the server, it is not supported.
- Power supply 1 is the default/primary power supply. If power supply 1 fails, you must replace the power supply with the same wattage immediately.
- The server supports a maximum of two hot-swap power supplies. These power supplies are designed for parallel operation. In the event of a power-supply failure, the redundant power supply continues to power the system.
- The server can run fully configured with one power supply. For redundancy support, you must install the second hot-swap power supply.

Statement 5

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



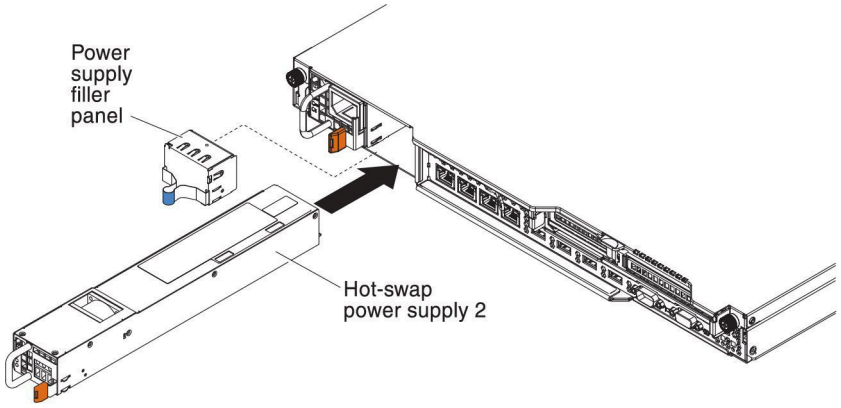
Statement 8

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

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

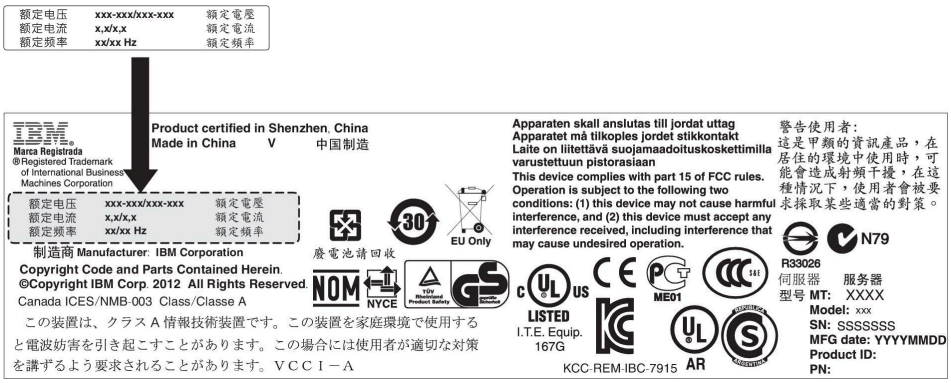
To install a hot-swap power supply, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Touch the static-protective package that contains the hot-swap power supply to any unpainted metal surface on the server; then, remove the power supply from the package and place it on a static-protective surface.
3. If you are installing a hot-swap power supply into an empty bay, remove the power-supply filler panel from the power-supply bay.

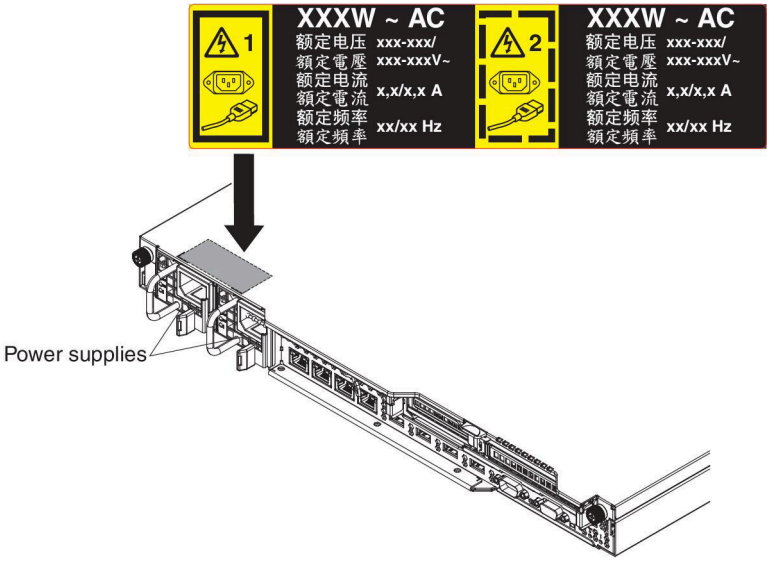


4. Grasp the handle on the rear of the power supply with the gold contact ; then, slide the power supply forward into the power-supply bay until it clicks. Make sure that the power supply connects firmly into the power-supply connector.
5. Route the power cord through the cable retainer clip on the rear of the server so that it does not accidentally become unplugged.
6. Connect the power cord for the new power supply to the power-cord connector on the power supply.
7. Connect the other end of the power cord to a properly grounded electrical outlet.
8. Make sure that the ac power LED and the dc power LED on the power supply are lit, indicating that the power supply is operating correctly. The two green LEDs are to the right of the power-cord connector.
9. If you are replacing a power supply with one of a different wattage in the server, apply the new power information label provided over the existing power information label on the server. Power supplies in the server must be

with the same power rating or wattage to ensure that the server will operate correctly.



10. If you are adding a power supply to the server, attach the redundant power information label that comes with this option on the server cover near the power supplies.

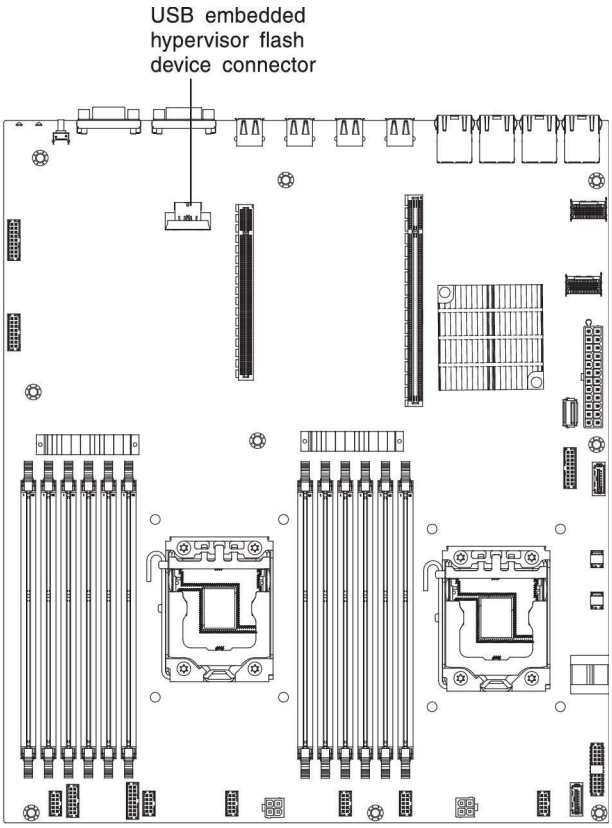


11. Restart the server. Confirm that it starts correctly and recognizes the newly installed device, and make sure that no error LEDs are lit.

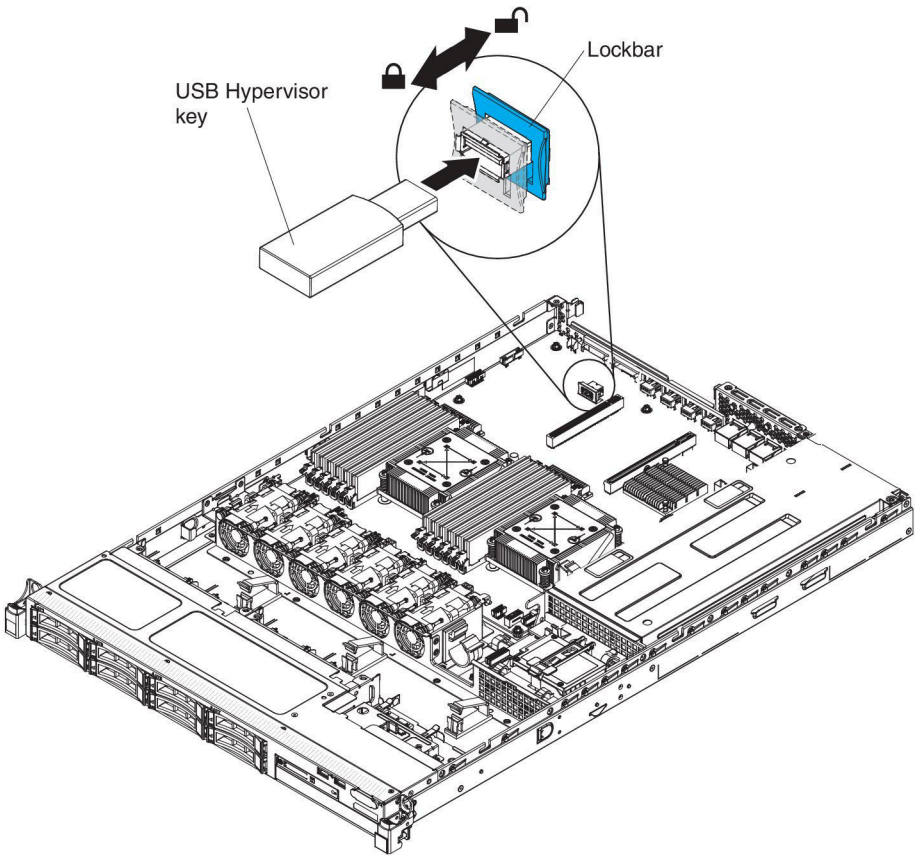
Installing a USB embedded hypervisor flash device

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

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the top cover (see "Removing the server top cover" on page 33).
4. Remove PCIe riser-card assembly 1 (see "Removing a PCI riser-card assembly" on page 328).
5. Locate the embedded hypervisor USB flash device connector on the system board as shown in the following illustration:



6. Slide the lockbar toward the riser-card assembly to the locked position until it is seated firmly.



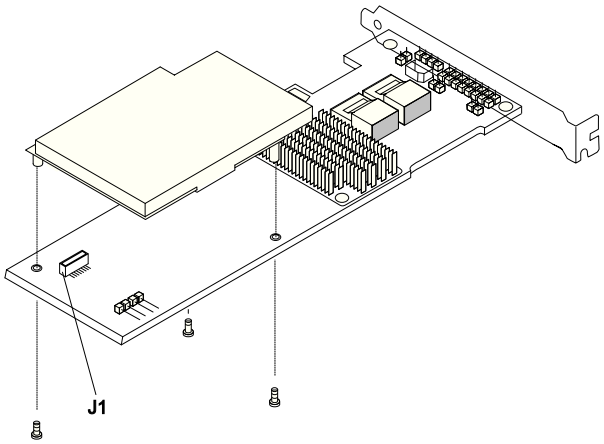
If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 65.

Installing a RAID adapter battery remotely in the server

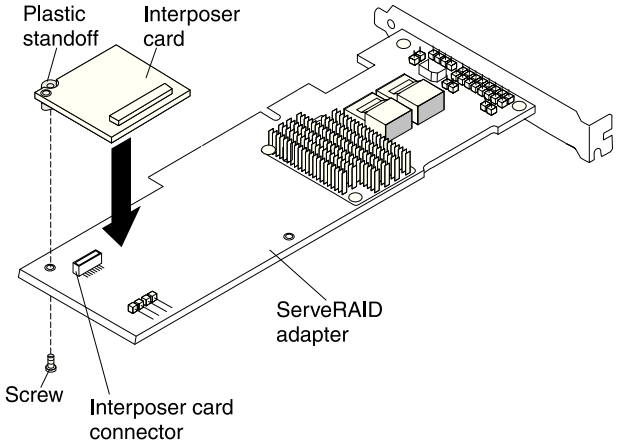
When you install a RAID adapter in the server that come with a battery or a power module (Supercap pack), the RAID battery or power module must be installed remotely to prevent it from overheating. The battery or power module must be installed in the RAID battery tray on top of the power interposer card.

To install a RAID adapter battery or power module remotely in the server, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. If the RAID adapter was shipped with a battery and battery carrier attached, disconnect the battery carrier cable from the battery and remove the three screws that secure the battery carrier to the adapter. Set the battery and battery carrier aside.

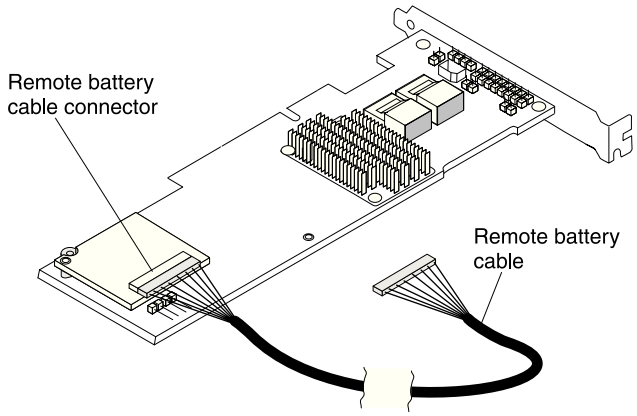


4. Install the interposer card in the interposer card connector on the RAID adapter:
   a. Remove the interposer card and the screw from the bag.
   b. Rotate the plastic standoff on the interposer card so that it aligns with the hole on the RAID adapter; then, align the connector on interposer card with the interposer card connector on the RAID adapter.



   c. Press the interposer card down onto the interposer card connector on the RAID adapter until it is firmly seated.
   d. From underneath the RAID adapter, insert the screw that you took from the bag and tighten the screw to secure the interposer card to the RAID adapter.
5. Connect one end of the remote battery cable to the interposer card.

   Attention: To avoid damage to the hardware, make sure that the black dot on the remote battery cable connector faces away from the interposer card on the adapter. Do not force the remote battery cable into the connector.



6. Install the RAID adapter on the riser card and install the PCI riser-card assembly in the server (see "Installing a PCI riser-card assembly" on page 45).
7. Connect the other end of the remote battery cable to the remote battery cable connector on the battery carrier.

   Attention: To avoid damage to the hardware, make sure that the black dot on the remote battery cable connector faces away from the interposer card on the adapter. Do not force the remote battery cable into the connector.
8. Route the remote battery cable in server as shown in the following illustration.

   Attention: Make sure that the cable is not pinched and does not cover any connectors or obstruct any components on the system board.
9. Install the battery on the safety cover:
   a. Orient the battery as shown in the following illustration; then, lower the battery onto the safety cover. If the battery comes with a battery carrier, ensure that battery carrier posts align with the rings on the battery mounting slot so that the battery carrier is secure in the slot.

      Note: The positioning of the remote battery depends on the type of remote battery that you install.
   b. Rotate the retention clip to the close position and press down on the retention clip until it snaps in place to hold the battery in place.
10. Connect the remote battery cable to the remote battery cable connector to the ServeRAID adapter. Route the remote battery cable in the server as shown in the following illustration.

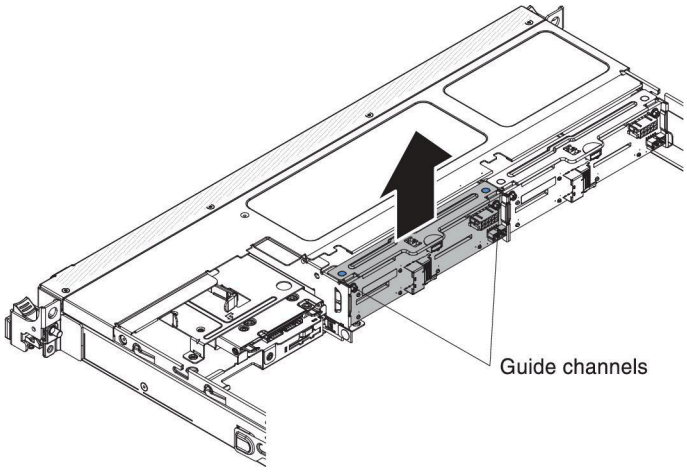
    Attention: Make sure that the cable is not pinched and does not cover any connectors or obstruct any components on the system board.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 65.

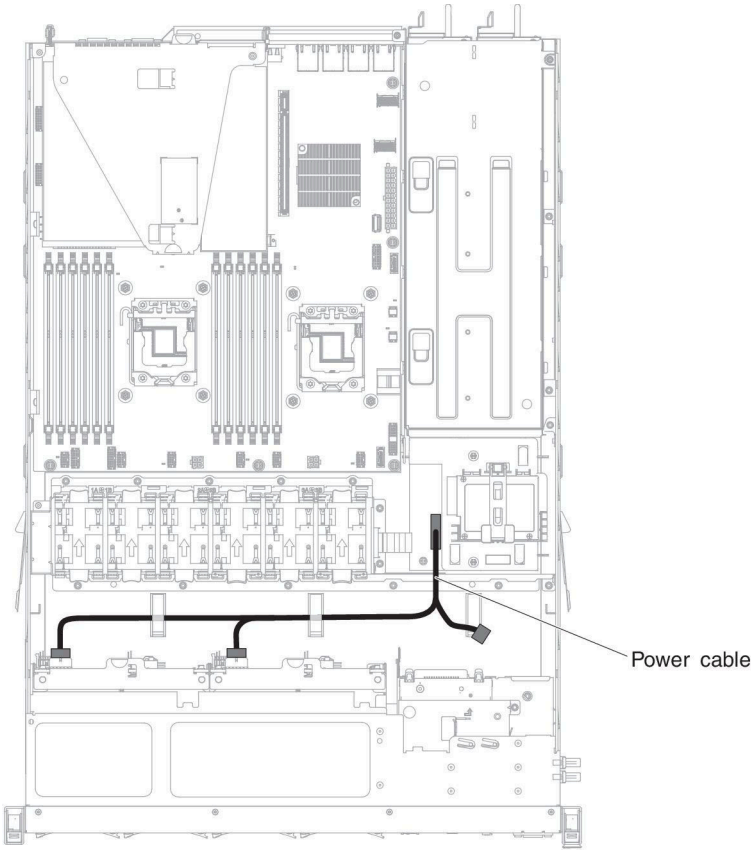
Installing an optional 4x2.5-inch hot-swap drive backplane

To install an optional 4x2.5-inch hot-swap drive backplane, complete the following steps:

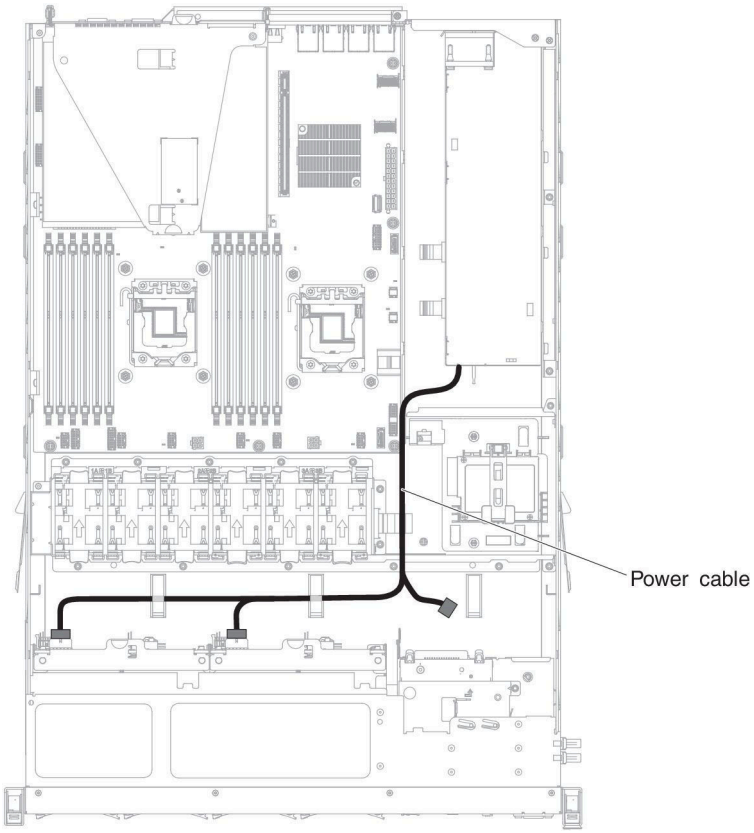
1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the top cover (see "Removing the server top cover" on page 33).
4. Connect the configuration, signal, and power cables to the connectors on the backplane, if they are not already connected.
5. Slide the backplane into the guide channels, making sure that any nearby wires or cables are not trapped or pinched.



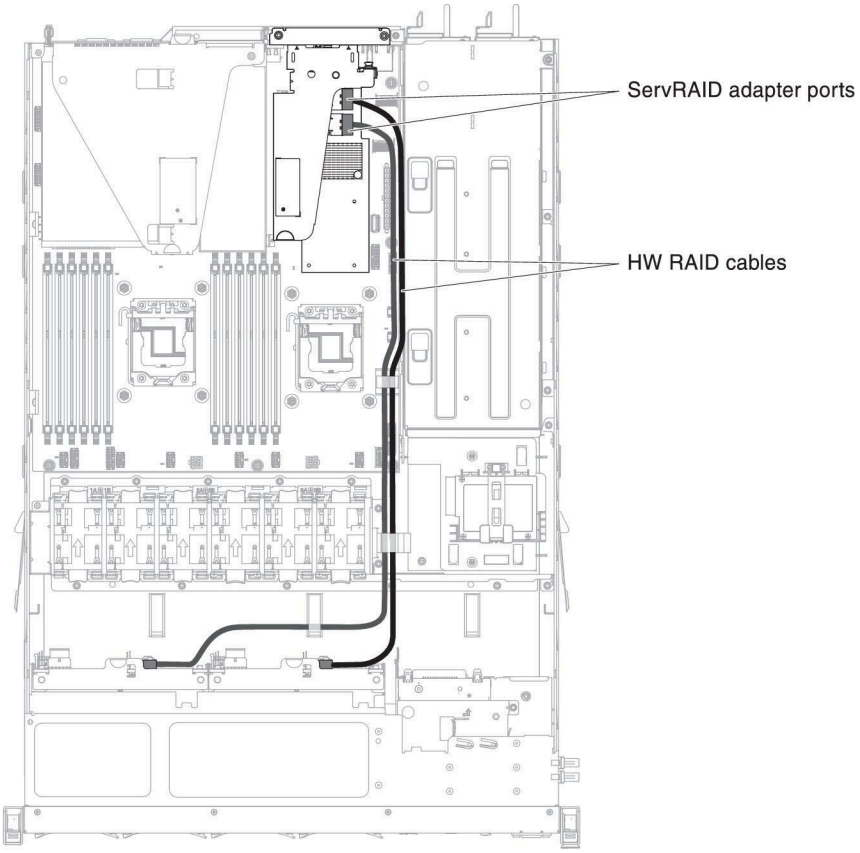
6. Connect the cables:
   a. Connect the other end of the power cable to the power connector to the power supply.
      1) The redundant power model:



2) The fixed power model:



b. Connect the other end of the signal cable to the Port 1 connector on the RAID adapter or the connector on the system board. Be sure to route the signal cable through the cage hole next to the power distribution board.



c. Use the cable clips on the chassis to secure the cables so that they do not get in the way or get damaged.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation."

Completing the installation

To complete the installation, complete the following steps:

1. If you removed the air baffle, reinstall it (see "Replacing the air baffle" on page 66).
2. If you removed a PCIe riser-card assembly, reinstall it (see "Replacing a PCI riser-card assembly" on page 66).
3. If you removed the server cover, replace it (see "Replacing the server top cover" on page 67).
4. Install the server in the rack cabinet (see the *Rack Installation Instructions* that come with the server for instructions).
5. Reconnect the cables and power cords (see "Connecting the cables" on page 68).
6. Start the server. Confirm that is starts correctly and recognizes the newly installed devices, and make sure that no error LEDs are lit.
7. Update the server configuration (see "Updating the server configuration" on page 69).

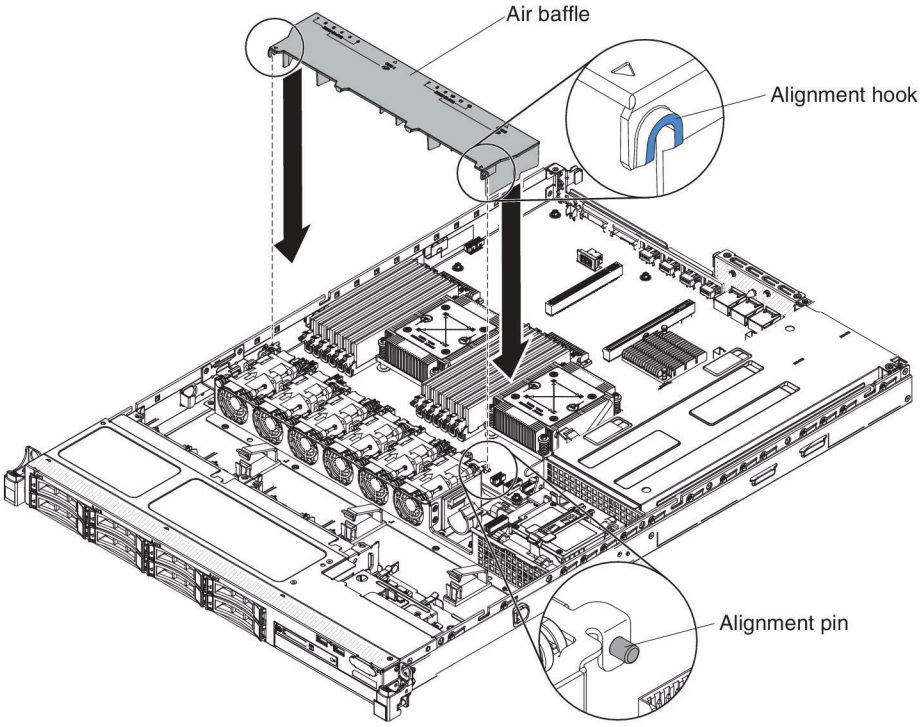
8. Complete the additional steps in "Instructions for IBM Business Partners" on page 24.

Replacing the air baffle

To install the air baffle, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Align the tabs on the sides of the air baffle with the slots on the fan cage and lower the air baffle into the server.

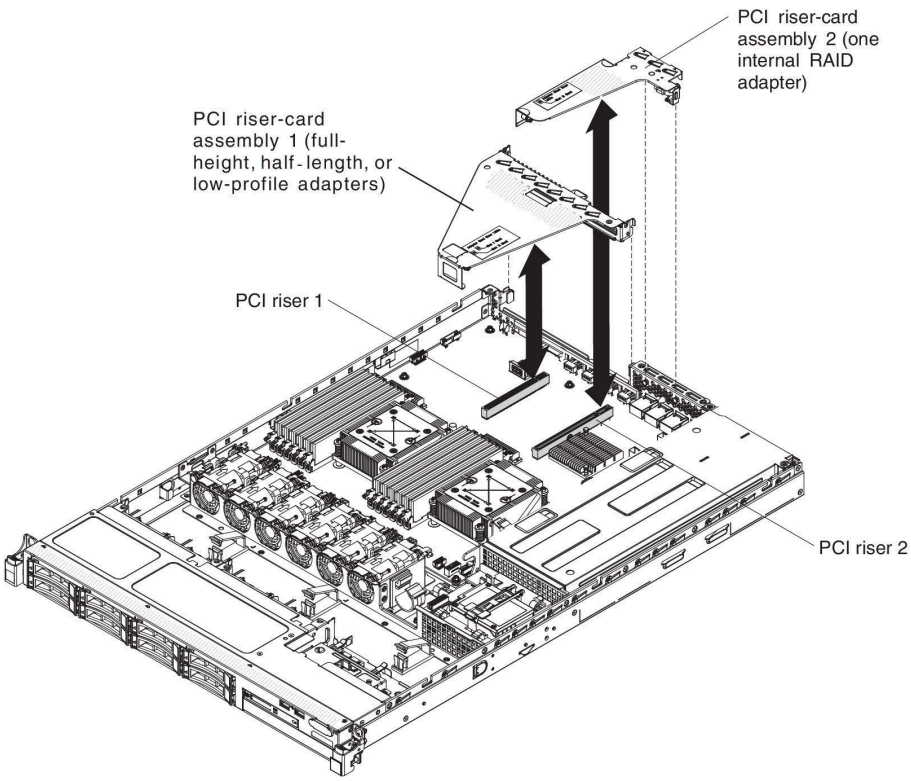
   Note: Make sure that no cable is pinched.



Replacing a PCI riser-card assembly

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

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Install the adapter in the PCI riser-card assembly (see "Installing an adapter" on page 46).
3. Align the PCI riser-card assembly with the PCIe slot connector on the system board and align nailheads with the slots on the chassis; then, press down firmly until the riser-card assembly is seated correctly in the connector on the system board.

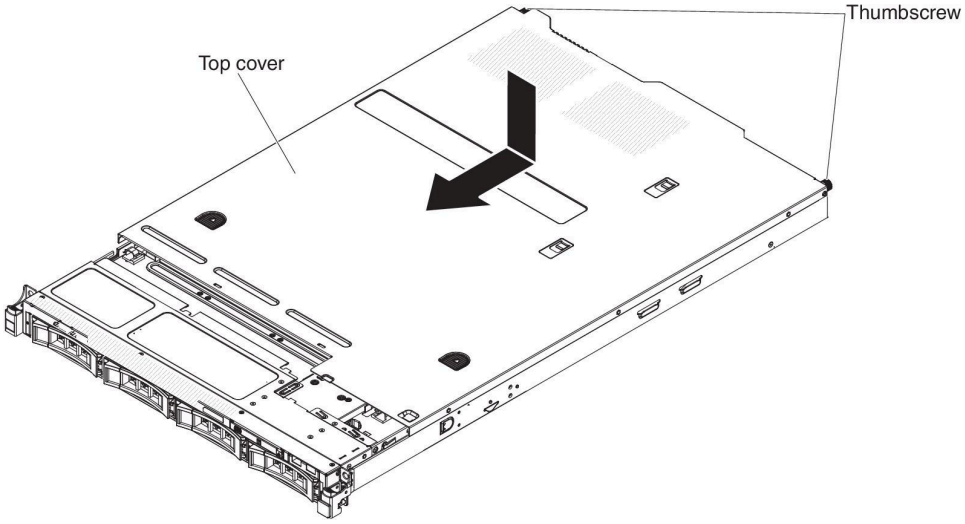


Replacing the server top cover

To replace the server cover, complete the following steps:

1. Make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server. Also, make sure that all internal cables are correctly routed.
2. Align the cover over the server (toward the rear of the server) until the cover edges slip into position over the chassis.

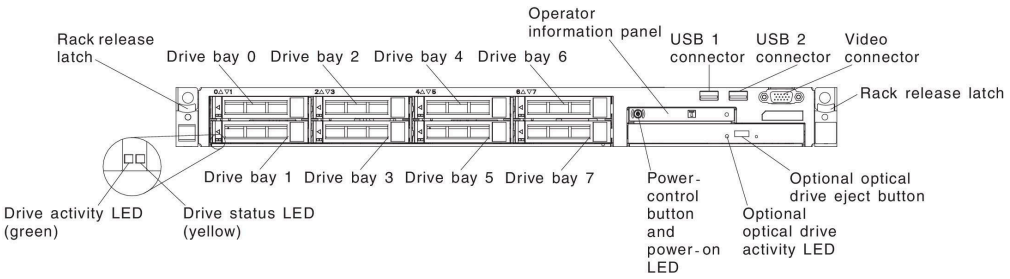
   Important: Before you slide the cover forward, make sure that all the tabs on the cover engage the chassis correctly. If all the tabs do not engage the chassis correctly, it will be hard to remove the cover later.



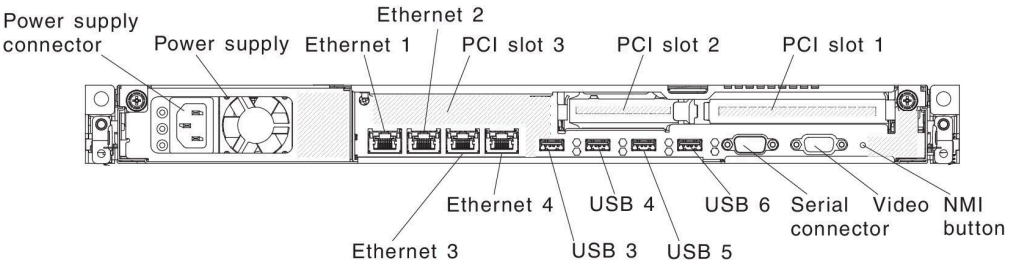
3. Slightly slide the cover toward the front of the server until the inset tabs start to engage on the server; then, tighten the thumbscrews to secure the cover to the chassis.
4. Install the server into the rack enclosure and push the server into the rack until it clicks into place.

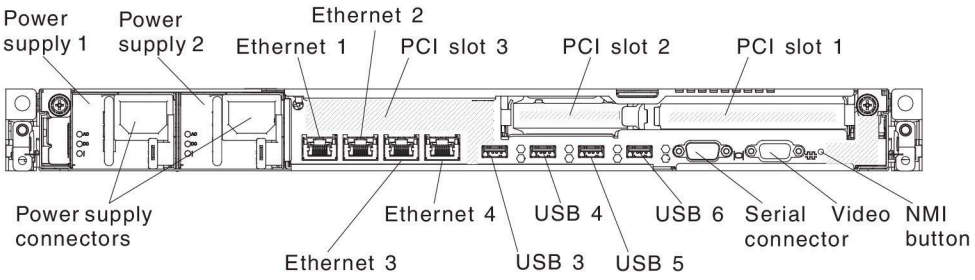
Connecting the cables

The following illustration shows the locations of the input and output connectors on the front of the server.



The following illustration shows the locations of the input and output connectors for both non-hot-swap and hot-swap power supplies respectively on the rear of the server.





You must turn off the server before you connect or disconnect cables.

See the documentation that comes with any external devices for additional cabling instructions. It might be easier for you to route cables before you connect the devices to the server.

Updating the server configuration

When you start the server for the first time after you add or remove a device, you might receive a message that the configuration has changed. The Setup utility starts automatically so that you can save the new configuration settings.

Some optional devices have device drivers that you must install. For information about installing device drivers, see the documentation that comes with each device.

If the server has an optional RAID adapter and you have installed or removed a hard disk drive, see the documentation that comes with the RAID adapter for information about reconfiguring the disk arrays.

The server comes with at least one microprocessor. If more that one microprocessor is installed, the server can operate as a symmetric multiprocessing (SMP) server. You might have to upgrade the operating system to support SMP. For more information, see "Typical operating-system installation" on page 75 and the operating-system documentation.

For information about configuring the integrated Gigabit Ethernet controller, see "Configuring the Gigabit Ethernet controller" on page 87.

Chapter 3. 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.

You can install code updates that are packaged as an Update*Xpress* System Pack or Update*Xpress* CD image. An Update*Xpress* System Pack contains an integration-tested bundle of online firmware and device-driver updates for your server. Use Update*Xpress* System Pack Installer to acquire and apply Update*Xpress* System Packs and individual firmware and device-driver updates. For additional information and to download the Update*Xpress* System Pack Installer, go to the ToolsCenter for System x and BladeCenter at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp9.42.212.195/ and click **UpdateXpress System Pack Installer**.

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.

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.

The firmware for the server is periodically updated and is available for download on the IBM wb site. To check for the latest level of firmware, such as the UEFI firmware, vital product data (VPD) code, device drivers, and integrated management module (IMM) firmware, go to http://www.ibm.com/support/fixcentral/.

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

Download the latest firmware for the server; then, install the firmware, using the instructions that are included with the downloaded files.

When you replace a device in the server, you might have to either update the firmware that is stored in memory on the device or restore the pre-existing firmware from a diskette or CD image.

The following list indicates where the firmware is stored:

- UEFI firmware is stored in ROM on the system board.
- IMM firmware is stored in ROM on the system board.
- Ethernet firmware is stored in ROM on the Ethernet controller.

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

Configuring UEFI compatible devices

Use this information to configure UEFI compatible devices.

UEFI compatible expansion cards can be configured through the Setup utility. To configure a UEFI compatible expansion card, complete the following steps:

Note: Before configuring a UEFI compatible device, it is recommended to update the firmware for your server. See "Updating the firmware" on page 71 for information on how to update the firmware for your server.

1. Run the Setup utility (see "Using the Setup utility" on page 75).
2. Select **System Settings** → **Network** or **Storage** depending on the type of your adapters.

   Note: Select **System Settings** → **Adapters and UEFI drivers** for UEFI 2.0 (and prior) compliant adapters and drivers installed in the server.
3. Select **Please refresh this page first** and press Enter.
4. Select the device driver that you want to configure and press Enter.
5. When you have finished changing settings, press Esc to exit from the program; select **Save** to save the settings that you have changed.

Configuring the server

The following configuration programs come with the server:

- **Setup utility**

  The UEFI Setup Utility program is part of the basic input/output system firmware. Use it to change interrupt request (IRQ) settings, change the startup-device sequence, set the date and time, and set passwords. For information about using this program, see "Using the Setup utility" on page 75.
- **Boot Manager program**

  The Boot Manager program is part of the server firmware. Use it to override the startup sequence that is set in the Setup utility and temporarily assign a device to be first in the startup sequence. For more information about using this program, see "Using the Boot Manager program" on page 82.
- **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/SATA controller with RAID capabilities, and to simplify the installation of your operating system. For information about using this CD, see "Using the ServerGuide Setup and Installation CD" on page 74.
- **Integrated Management Module**

  Use the integrated management module II (IMM2) 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 II" on page 83 and the *Integrated Management Module User's Guide* at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5079770&brandind=5000008.

- **VMware ESXi embedded hypervisor**

  An optional USB flash device with VMware ESXi embedded hypervisor software is available for purchase. Hypervisor is virtualization software that enables multiple operating systems to run on a host system at the same time. The USB embedded hypervisor flash device installs in the USB connector on the system board. For more information about using the embedded hypervisor, see "Using the embedded hypervisor" on page 84.

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

  The remote presence and blue-screen capture features are integrated functions of the Integrated Management Module II (IMM2). The remote presence feature provides the following functions:

  – Remotely viewing video with graphics resolutions up to 1600 x 1200 at 75 Hz, regardless of the system state
  – Remotely accessing the server, using the keyboard and mouse from a remote client
  – Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
  – Uploading a diskette image to the IMM memory and mapping it to the server as a virtual drive

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

- **Ethernet controller configuration**

  For information about configuring the Ethernet controller, see "Configuring the Gigabit Ethernet controller" on page 87.

- **Configuring RAID arrays**

  For information about configuring RAID arrays, see Configuring RAID arrays.

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

  Use this program as an alternative to the Setup utility for modifying UEFI settings and IMM settings. Use the ASU program online or out of band to modify UEFI settings from the command line without the need to restart the server to access the Setup utility. For more information about using this program, see "IBM Advanced Settings Utility program" on page 91.

Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD provides software setup tools and installation tools that are designed for your server. The ServerGuide program detects the server model and optional hardware devices that are installed and uses that information during setup to configure the hardware. The ServerGuide simplifies the 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 requires a supported IBM server with an enabled startable (bootable) CD drive. In addition to the *ServerGuide Setup and Installation* CD, you must have your operating-system CD to install the operating system.

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

1. Insert the CD, and restart the server. If the CD does not start, see "ServerGuide problems" on page 256.
2. Follow the instructions on the screen to complete the following steps:
   a. Select your language.
   b. Select your keyboard layout and country.
   c. View the overview to learn about ServerGuide features.
   d. View the readme file to review installation tips for your operating system and adapter.
   e. Start the operating-system installation. You will need your operating-system CD.

ServerGuide features

Features and functions can vary slightly with different versions of the ServerGuide program. To learn more about the version that you have, start the *ServerGuide Setup and Installation* CD and view the online overview. Not all features are supported on all server models.

The ServerGuide program performs the following tasks:

- Sets system date and time
- Detects the RAID adapter or controller and runs the SAS/SATA RAID configuration program
- Checks the microcode (firmware) levels of a ServeRAID adapter and determines whether a later level is available from the CD
- Detects installed hardware options and provides updated device drivers for most adapters and devices
- Provides diskette-free installation for supported Windows operating systems
- Includes an online readme file with links to tips for your hardware and operating-system installation

Setup and configuration overview

When you use the *ServerGuide Setup and Installation* CD, you do not need setup diskettes. You can use the CD to configure any supported IBM server model. The setup program provides a list of tasks that are required to set up your server model. On a server with a ServeRAID adapter or SAS/SATA controller with RAID capabilities, you can run the SAS/SATA RAID configuration program to create logical drives.

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

Typical operating-system installation

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

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

1. After you have completed the setup process, the operating-system installation program starts. (You will need your operating-system CD to complete the installation.)
2. The ServerGuide program stores information about the server model, service processor, hard disk drive controllers, and network adapters. Then, the program checks the CD for newer device drivers. This information is stored and then passed to the operating-system installation program.
3. The ServerGuide program presents operating-system partition options that are based on your operating-system selection and the installed hard disk drives.
4. The ServerGuide program prompts you to insert your operating-system CD and restart the server. At this point, the installation program for the operating system takes control to complete the installation.

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/supportportal/.

Using the Setup utility

Use the Unified Extensible Firmware Interface (UEFI) 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 and change passwords
- Set the startup characteristics of the server and the order of startup devices
- Set and change settings for advanced hardware features
- View, set, and change settings for power-management features
- View and clear error logs
- Change interrupt request (IRQ) settings
- Resolve configuration conflicts

Starting the Setup utility

To start the Setup utility, complete the following steps:

1. Turn on the server.

   Note: Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active.
2. When the prompt `<F1> Setup` is displayed, press F1. If you have set an administrator password, you must type the administrator password to access the full Setup utility menu. If you do not type the administrator password, a limited Setup utility menu is available.
3. Select settings to view or change.

Setup utility menu choices

The following choices are on the Setup utility main menu for the UEFI. Depending on the version of the IBM System x Server Firmware (server firmware), some menu choices might differ slightly from these descriptions. For more information on UEFI-compliant firmware, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5083207&brandind=5000008.

- **System Information**

  Select this choice to view information about the server. When you make changes through other choices in the Setup utility, some of those changes are reflected in the system information; you cannot change settings directly in the system information. This choice is on the full Setup utility menu only.

  – **System Summary**

    Select this choice to view configuration information, including the ID, speed, and cache size of the microprocessors, machine type and model of the server, the serial number, the system UUID, and the amount of installed memory. When you make configuration changes through other options in the Setup utility, the changes are reflected in the system summary; you cannot change settings directly in the system summary.

  – **Product Data**

    Select this choice to view the system-board identifier, the revision level or issue date of the firmware, the integrated management module and diagnostics code, and the version and date.

  This choice is on the full Setup utility menu only.
- **System Settings**

  Select this choice to view or change the server component settings.

  – **Adapters and UEFI Drivers**

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

  – **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 → Memory Mode → Mirrored**.

  – **Devices and I/O Ports**

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

  - **Active Energy Manager**

    Select this choice to enable or disable power capping. If you enable power capping, the Active Energy Manager program will limit the maximum power that is consumed by the server.

    Note: It is available only when **System Settings → Processors → Processor Performance States** is enabled.

  - **Power/Performance Bias**

    Select this choice to determine how the power management of the microprocessor is controlled. You can choose either Platform Controlled (system) or OS Controlled (operating system) to control the setting. Not all operating systems support this feature.

  - **Platform Controlled Type**

    Select this choice to determine how to balance between performance and power consumption. Choosing Maximum Performance will disable power management functions and allow the most aggressive use of turbo. Choosing Minimal Power will maximizes the use of power management features for least power consumption and disable turbo.

    Note: It is available only when **System Settings → Power → Power/Performance Bias → Platform Controlled** is enabled.

  - **Workload Configuration**

    Select this choice to determine how to balance between I/O bandwidth and balanced workload. Choosing I/O sensitive will get higher I/O bandwidth while expansion cards are used. Choosing Balanced will allow enough frequency for workload while the microprocessor cores are idle.

– **Operating Modes**

  Select this choice to view or change the operating profile (performance and power utilization). This choice specify a preset operating mode to configure the server for maximum power savings, maximum efficiency, and maximum performance.

  - **Choose Operating Mode**

    Select the operating mode based on your preference. Power savings and performance are also highly dependent on hardware and software running on the system. When a present mode is selected, the low-level settings are not changeable and will be grayed out.

  - **Memory Speed**

    Select the desired memory speed. Maximum performance mode maximizes performance. Balanced mode offers a balance between performance and power. Minimal power mode maximizes power savings.

  - **Memory Power Management**

    Select this choice to enable or disable power management on memory. If you choose Disabled, it will provide maximum performance but minimum power savings. If you choose Automatic, it is suitable for most applications.

  - **Proc Performance States**

Select this choice to enable or disable processor performance states. Enabling processor performance states (Intel Speedstep Technology) saves power by reducing speed and voltage as the microprocessor utilized is reduced.

Note: Some operating systems must have the correct power profile selected to take advantage of this feature.

- **C1 Enhance Mode**

  Select this choice to enable or disable C1E (C1 Enhanced) state. Enabling C1E (C1 Enhanced) state can save power by halting CPU cores that are idle.

  Note: An operating system that supports C1E state must be installed to take advantage of this feature. Changing this setting will be effective after the next system reboot.

- **QPI Link Frequency**

  Select this choice to determine the desired microprocessor QPI link frequency. Maximum performance mode maximizes performance. Balanced mode offers a balance between performance and power. Minimal power maximizes power savings.

- **Turbo Mode**

  Select this choice to enable or disable turbo mode. Enabling turbo mode can boost the overall microprocessor performance when all microprocessor cores are not fully utilized. A microprocessor core can run above its rated frequency for a short period of time when it is in turbo mode.

- **CPU C-States**

  Select this choice to enable or disable ACPI C2 Processor Power states. It will be effective after the next system reboot.

- **Package ACPI CState Limit**

  Select this choice to determine the level of C-state. Selecting a higher C-state limit allows the microprocessors to consume less power when they are idle. If you experience problems with legacy operating systems, set the ACPI Cstate limit to C2.

- **Power/Performance Bias**

  Select this choice to determine how the power management of the microprocessor is controlled. You can choose either Platform Controlled (system) or OS Controlled (operating system) to control the setting. Not all operating systems support this feature.

- **Platform Controlled Type**

  Select this choice to determine how to balance between performance and power consumption. Choosing Maximum Performance will disable power management functions and allow the most aggressive use of turbo. Choosing Minimal Power will maximizes the use of power management features for least power consumption and disable turbo.

– **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 UEFI to interact with PCI mass storage devices that are non-UEFI compliant.

- **Infinite Boot Retry**

  Select this choice to enable or disable Infinitely retry the Legacy Boot order.

- **BBS Boot**

  Select this choice to enable or disable legacy boot in BBS manner.

– **System Security**

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

– **Integrated Management Module**

Select this choice to view or change the settings for the integrated management module.

- **Power Restore Policy**

  Select this choice to view or enable the POST watchdog timer.

- **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 the host name; define the static IMM IP address, subnet mask, and gateway address; specify whether to use the static IP address or have DHCP assign the IMM IP address; save the network changes; and reset the IMM.

- **Reset IMM to Defaults**

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

- **Reset IMM**

  Select this choice to reset the IMM settings.

– **Recovery**

Select this option to configure recovery settings.

– **Storage**

Select this option to see all the storage device settings.

– **Network**

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

– **Driver Health**

Select this option to view the status of the controllers in the system as reported by their corresponding drivers.

• **Date and Time**

Select this choice to set the date and time in the server, in 24-hour format (*hour*:*minute*:*second*).

This choice is on the full Setup utility menu only.

• **Start Options**

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

The startup sequence specifies the order in which the server checks devices to find a boot record. The server starts from the first boot record that it finds. If the server has Wake on LAN hardware and software and the operating system supports Wake on LAN functions, you can specify a startup sequence for the Wake on LAN functions. For example, you can define a startup sequence that checks for a disc in the CD-RW/DVD drive, then checks the hard disk drive, and then checks a network adapter.

This choice is on the full Setup utility menu only.

- **Boot Manager**

  Select this choice to view, add, delete, or change the device boot priority, boot from a file, select a one-time boot, or reset the boot order to the default setting.

- **System Event Logs**

  Select this choice to enter the System Event Manager, where you can view the POST event log and the system-event log. You can use the arrow keys to move between pages in the error log.

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

  The system-event log contains POST and system management interrupt (SMI) events and all events that are generated by the baseboard management controller that is embedded in the integrated management module (IMM).

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

  – **POST Event Viewer**

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

  – **System Event Log**

    Select this choice to view 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 81 for more information.

  This choice is on the full and limited Setup utility menu.

  – **Power-on Password**

    Select this choice to set or change a power-on password. See “Power-on password” on page 81 for more information.

  – **Administrator Password**

    Select this choice to set or change an administrator password. An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu. If an administrator password is set, the full Setup utility menu is available only if you type the administrator password at the password prompt. For more information, see “Administrator password” on page 82.

- **Save Settings**

  Select this choice to save the changes that you have made in the settings.

- **Restore Settings**

Select this choice to cancel the changes that you have made in the settings and restore the previous settings.

- **Load Default Settings**

  Select this choice to cancel the changes that you have made in the settings and restore the factory settings.

- **Exit Setup**

  Select this choice to exit from the Setup utility. If you have not saved the changes that you have made in the settings, you are asked whether you want to save the changes or exit without saving them.

Passwords

From the **User Security** menu choice, you can set, change, and delete a power-on password and an administrator password. The **User Security** choice is on the full Setup utility menu only.

If you set only a power-on password, you must type the power-on password to complete the system startup and to have access to the full Setup utility menu.

An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu. If you set only an administrator password, you do not have to type a password to complete the system startup, but you must type the administrator password to access the Setup utility menu.

If you set a power-on password for a user and an administrator password for a system administrator, you can type either password to complete the system startup. A system administrator who types the administrator password has access to the full Setup utility menu; the system administrator can give the user authority to set, change, and delete the power-on password. A user who types the power-on password has access to only the limited Setup utility menu; the user can set, change, and delete the power-on password, if the system administrator has given the user that authority.

Power-on password:
If a power-on password is set, when you turn on the server, the system startup will not be completed until you type the power-on password. You can use any combination of 6 to 20 printable ASCII characters for the password.

When a power-on password is set, you can enable the Unattended Start mode, in which the keyboard and mouse remain locked but the operating system can start. You can unlock the keyboard and mouse by typing the power-on password.

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

- If an administrator password is set, type the administrator password at the password prompt. Start the Setup utility and reset the power-on password.
- Remove the battery from the server and then reinstall it. See “Removing the system battery” on page 332 for instructions for removing the battery.
- Clear CMOS data by using the clear CMOS jumper (see “System-board jumpers” on page 27 for more information).

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

Clearing CMOS data does not affect the administrator password.

Administrator password:
If an administrator password is set, you must type the administrator password for access to the full Setup utility menu. You can use any combination of 6 to 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 Manager program

The Boot Manager program is a built-in, menu-driven configuration utility program that you can use to temporarily redefine the first startup device without changing settings in the Setup utility.

To use the Boot Manager program, complete the following steps:

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

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

Starting the backup server firmware

The system board contains a backup copy area for the server firmware. This is a secondary copy of the server firmware that you update only during the process of updating the server firmware. If the primary copy of the server firmware becomes damaged, use this backup copy.

To force the server to start from the backup copy, turn off the server; then, place the J2 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 J2 jumper back to the primary position (pins 1 and 2).

The Update*Xpress* System Pack Installer

The Update*Xpress* System Pack Installer detects supported and installed device drivers and firmware in the server and installs available updates. For additional information and to download the Update*Xpress* System Pack Installer, go to the ToolsCenter for System x and BladeCenter at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp and click **UpdateXpress System Pack Installer**.

Using the integrated management module II

The integrated management module II (IMM2) is a second generation of the functions that were formerly provided by the baseboard management controller hardware. It combines service processor functions, video controller, and remote presence function in a single chip.

The IMM supports the following basic systems-management features:

- Active Energy Manager.
- Alerts (in-band and out-of-band alerting, PET traps - IPMI style, SNMP, e-mail).
- Auto Boot Failure Recovery (ABR).
- Automatic microprocessor disable on failure and restart in a two-microprocessor configuration when one microprocessor signals an internal error. When one of the microprocessors fail, the server will disable the failing microprocessor and restart with the other microprocessor.
- Automatic Server Restart (ASR) when POST is not complete or the operating system hangs and the operating system watchdog timer times-out. The IMM might be configured to watch for the operating system watchdog timer and reboot the system after a timeout, if the ASR feature is enabled. Otherwise, the IMM allows the administrator to generate a nonmaskable interrupt (NMI) by pressing an NMI button on the light path diagnostics panel for an operating-system memory dump. ASR is supported by IPMI.
- A virtual media key, which enables remote presence support (remote video, remote keyboard/mouse, and remote storage).
- Boot sequence manipulation.
- Command-line interface.
- Configuration save and restore.
- DIMM error assistance. The Unified Extensible Firmware Interface (UEFI) disables a failing DIMM that is detected during POST, and the IMM lights the associated system error LED and the failing DIMM error LED.
- Environmental monitor with fan speed control for temperature, voltages, fan failure, power supply failure, and power backplane failure.
- Intelligent Platform Management Interface (IPMI) Specification V2.0 and Intelligent Platform Management Bus (IPMB) support.
- Invalid system configuration (CNFG) LED support.
- Light path diagnostics LEDs indicators to report errors that occur with fans, power supplies, microprocessor, hard disk drives, and system errors.
- Local firmware code flash update
- Nonmaskable interrupt (NMI) detection and reporting.
- Operating-system failure blue screen capture.
- PCI configuration data.
- PECI 3 support.
- Power/reset control (power-on, hard and soft shutdown, hard and soft reset, schedule power control).

- Query power-supply input power.
- ROM-based IMM firmware flash updates.
- Serial over LAN (SOL).
- Serial port redirection over telnet or ssh.
- SMI handling
- System event log (SEL) - user readable event log.

The IMM also provides the following remote server management capabilities through the OSA SMBridge management utility program:

- **Command-line interface (IPMI Shell)**

  The command-line interface provides direct access to server management functions through the IPMI 2.0 protocol. Use the command-line interface to issue commands to control the server power, view system information, and identify the server. You can also save one or more commands as a text file and run the file as a script.

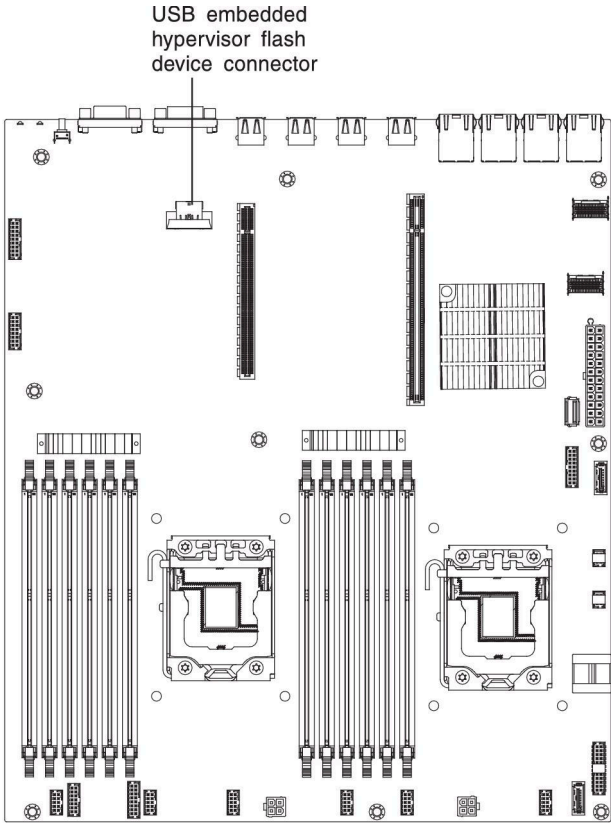
- **Serial over LAN**

  Establish a Serial over LAN (SOL) connection to manage servers from a remote location. You can remotely view and change the UEFI settings, restart the server, identify the server, and perform other management functions. Any standard Telnet client application can access the SOL connection.

For more information about IMM, see the *Integrated Management Module User's Guide* at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5079770&brandind=5000008.

Using the embedded hypervisor

The VMware ESXi embedded hypervisor software is available on the optional IBM USB flash device with embedded hypervisor. The USB flash device can be installed in the USB connector near PCI riser slot 1 on the system board. Hypervisor is virtualization software that enables multiple operating systems to run on a host system at the same time. The USB flash device is required to activate the hypervisor functions.



To start using the embedded hypervisor functions, you must add the USB flash device to the startup sequence in the Setup utility.

To add the USB flash device to the startup sequence, complete the following steps:

1. Turn on the server.

   Note: Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active.
2. When the prompt `<F1> Setup` is displayed, press F1.
3. From the Setup utility main menu, select **Boot Manager**.
4. Select **Add Boot Option**; then, select **USB Storage**. Press Enter, and then select Esc.
5. Select **Change Boot Order** and then select **Commit Changes**; then, press Enter.
6. Select **Save Settings** and then select **Exit Setup**.

If the embedded hypervisor flash device image becomes corrupt, you can use the *VMware Recovery* CD that comes with the system to recover the flash device image. To recover the flash device image, complete the following steps:

1. Turn on the server.

   Note: Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active.
2. Insert the VMware Recovery CD into the CD or DVD drive.
3. Follow the instructions on the screen.

For additional information and instructions, see the *VMware ESXi Server 31 Embedded Setup Guide* a http://www.vmware.com/pdf/vi3_35/esx_3i_e/r35/vi3_35_25_3i_setup.pdf

Using the remote presence and blue-screen capture features

The remote presence and blue-screen capture features are integrated functions of the integrated management module (IMM). The remote presence feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1600 x 1200 at 75 Hz, regardless of the system state
- Remotely accessing the server, using the keyboard and mouse from a remote client
- Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
- Uploading a diskette image to the IMM memory and mapping it to the server as a virtual drive

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

For more information on Features on Demand (FoD), including instructions for automating the activation and installation of the activation key by using IBM ToolsCenter or IBM Director, see the IBM System x Features on Demand User's Guide athttps://www-304.ibm.com/systems/x/fod/index.wss under the Help section.

Note: The server may need to be restarted to activate the feature.

Obtaining the IP address for the IMM

To access the Web interface to use the remote presence feature, you need the IP address of the IMM. You can obtain the IMM IP address through the Setup utility. The server comes with a default IP address for the IMM of 192.168.70.125. To locate the IP address, complete the following steps:

1. Turn on the server.

   Note: Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active.
2. When the prompt `<F1> Setup` is displayed, press F1. (This prompt is displayed on the screen for only a few seconds. You must press F1 quickly.) If you have set both a power-on password and an administrator password, you must type the administrator password to access the full Setup utility menu.
3. From the Setup utility main menu, select **System Settings**.
4. On the next screen, select **Integrated Management Module**.
5. On the next screen, select **Network Configuration**.
6. Find the IP address and write it down.
7. Exit from the Setup utility.

Logging on to the Web interface

To log on to the IMM Web interface, complete the following steps:

1. Open a Web browser on a computer that connects to the server and in the **Address** or **URL** field, type the IP address or host name of the IMM to which you want to connect.

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

   Note: The IMM is set initially with a user name of USERID and password of PASSW0RD (passw0rd with a zero, not a the letter O). You have read/write access. You must change the default password the first time you log on.
3. On the Welcome page, type a timeout value (in minutes) in the field that is provided. The IMM will log you off of the Web interface if your browser is inactive for the number of minutes that you entered for the timeout value.
4. Click **Continue** to start the session. The System Health page provides a quick view of the system status.

Enabling the Intel Gigabit Ethernet Utility program

The Intel Gigabit Ethernet Utility program is part of the server firmware. You can use it to configure the network as a startable device, and you can customize where the network startup option appears in the startup sequence. Enable and disable the Intel Gigabit Ethernet Utility program from the Setup utility.

Configuring the Gigabit Ethernet controller

The Ethernet controllers are integrated on the system board. They provide an interface for connecting to a 10 Mbps, 100 Mbps, or 1 Gbps network and provide full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the Ethernet ports in the server support auto-negotiation, the controllers detect the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operate at that rate and mode.

By default the server has enabled Ethernet 1 and Ethernet 2. Ethernet 3 and Ethernet 4 can be enabled by the Features on Demand (FoD). Please note that the server may need to be restarted to activate the feature. Meanwhile, when switching from dedicated mode (Ethernet 2) to shared mode (Ethernet 1), followed by the activation of Ethernet 3 and Ethernet 4 via the Features on Demand (FoD) or vice versa, remember to first unplug and subsequently plug back the power cable or cables to the server (power cycle). For more information on Features on Demand (FoD), including instructions for automating the activation and installation of the activation key by using IBM ToolsCenter or IBM Director, see the IBM System x Features on Demand User's Guide at https://www-304.ibm.com/systems/x/fod/index.wss under the Help section.

You do not have to set any jumpers or configure the controllers. However, you must install a device driver to enable the operating system to address the controllers. For device drivers and information about configuring the Ethernet controllers or to find updated information about configuring the controllers, see

http://www.ibm.com/supportportal/.

Configuring RAID arrays

Use the configuration utility programs to configure and manage redundant array of independent disks (RAID) arrays. Be sure to use this program as described in this document.

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

Table 10. 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-H1110 adapter	LSI Utility (Setup utility, press Ctrl+C), ServerGuide, Human Interface Infrastructure (HII)	MegaRAID Storage Manager (MSM), SAS2IRCU (Command Line) Utility for Storage Management
ServeRAID-M1115 adapter	MegaRAID BIOS Configuration Utility (press Ctrl+H to start), pre-boot CLI (press Ctrl+P to start), ServerGuide, HII	MegaRAID Storage Manager (MSM), MegaCLI (Command Line Interface), and IBM Director
ServeRAID-M5110, ServeRAID-M5120 adapters	MegaRAID BIOS Configuration Utility (press Ctrl+H to start), pre-boot CLI (press Ctrl+P to start), ServerGuide, HII	MegaRAID Storage Manager (MSM), MegaCLI, and IBM Director
ServeRAID-C105	HII	MegaRAID Storage Manager (MSM), MegaCLI, and IBM Director

Note:

1. For more information about Problem Determination and Service Guide for ServeRAID M controllers, see http://www-947.ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5085607.
2. For more information about Configuration and Options Guide (COG), see http://www-947.ibm.com/support/entry/portal/docdisplay?lndocid=SCOD-3ZVQ5W&brandind=5000019.
3. For further details on creating a software RAID array of hard disk drives, please see the ServeRAID C105 documentation at http://www-947.ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5089068.
4. When the ServeRAID adapter is removed, software RAID will not be supported. This system does not support downgrade software RAID function from hardware RAID configuration.

Starting the LSI Configuration Utility program

Use these instructions to start the LSI Configuration Utility program.

To start the LSI Configuration Utility program, complete the following steps:

1. Turn on the server, and make sure that the server is the owner of the keyboard, video, and mouse.
2. When the prompt message is displayed, you may perform either of the following:
   a. **ServeRAID-H1110**: press Ctrl+C.
   b. **ServeRAID-M5110**, **ServeRAID-M5120**, or **ServeRAID-M1115**: press Ctrl+H.

When you have finished changing settings, press Esc to exit from the program; select **Save** to save the settings that you have changed.

Starting the Human Interface Infrastructure (HII) Configuration Application

Use these instructions to start the Human Interface Infrastructure (HII) configuration utility program.

To start the Human Interface Infrastructure (HII) configuration utility program, complete the following steps:

1. Turn on the server.

   Note: Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active after the power-on LED flashes slowly.
2. When prompted, `<F1 Setup>` is displayed, press F1. If you have set an administrator password, you are prompted to type the password.
3. Under **System Settings**, select **Storage**.

When you have finished changing settings, press Esc to exit from the program; select **Save** to save the settings that you have changed.

Creating RAID of hard disk drives (ServeRAID-C105 only)

Note:

1. If there is a ServeRAID adapter in slot 3, ServeRAID-C105 will not work.
2. ServeRAID-C105 uses HII only for configuration and there is no legacy configuration utility.

To create RAID of hard disk drives (ServeRAID-C105 only), complete the following steps:

1. Turn on the server.

   Note: Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active after the power-on LED flashes slowly.
2. When prompted, `<F1 Setup>` is displayed, press F1. If you have set an administrator password, you are prompted to type the password.
3. Under **System Settings**, select **Storage**.
4. Under **Storage**, select **ServeRAID C105**.
5. Under **Configuration Options**, select **Virtual Drive Management → Create Configuration**.

6. Select the type of array that you want to create.
7. Select **Select Drives** and use space key to select all the drives for your array.
8. Select **Apply Changes** to create the array.
9. When the prompt `Success` is displayed, select **OK** to continue.
10. After the system auto skip to the next screen, select **Save Configuration**.
11. When the prompt `Creating Virtual Drives will cause the data lost on the associated Drives to be permanently deleted.` is displayed, use space key to select **Yes** to continue.
12. Select **OK** to continue.
13. To initialize virtual disk, select **ServeRAID C105 → Virtual Drive Management → Select Virtual Drive Operations**.
14. Under **Virtual Drive Operation**, choose **Select Operation**. Select the type of initialization you want to initialize.
15. Select **Start Operation**.
16. Select **Yes** to confirm.
17. Select **OK** to continue.
18. When the prompt `Success` is displayed, select **OK**.

Note:

1. For further details on creating a software RAID array of hard disk drives, please see the ServeRAID C105 documentation at http://www-947.ibm.com/support/ entry/portal/docdisplay?lndocid=MIGR-5089068.
2. Some specific models may be shipped initially with four hard disk drives. Configuration may be able to expand to eight hard disk drives via Features on Demand (FoD). Please note that the server may need to be restarted to activate the feature. For more information on Features on Demand (FoD), including instructions for automating the activation and installation of the activation key by using IBM ToolsCenter or IBM Systems Director, see the IBM Features on Demand User's Guide at https://www-304.ibm.com/systems/x/fod/index.wss under the Help section.
3. Software RAID does not support VMware 5 and VMware 4.1.
4. Software RAID does not support legacy configuration.
5. In order to install the legacy OS in the software RAID, you have to set the **SCU Controller** as the first device in the option ROM execution order.

IBM Advanced Settings Utility program

The IBM Advanced Settings Utility (ASU) program is an alternative to the Setup utility for modifying UEFI settings. Use the ASU program online or out of band to modify UEFI settings from the command line without the need to restart the system to access the Setup utility.

You can also use the ASU program to configure the optional remote presence features or other IMM settings. The remote presence features provide enhanced systems-management capabilities.

In addition, the ASU program provides limited settings for configuring the IPMI function in the IMM through the command-line interface.

Use the command-line interface to issue setup commands. You can save any of the settings as a file and run the file as a script. The ASU program supports scripting environments through a batch-processing mode.

For more information and to download the ASU program, go to http://www-947.ibm.com/support/entry/portal/docdisplay?lndocid=TOOL-ASU.

IBM Systems Director

IBM Systems Director is a platform-management foundation that streamlines the way you manage physical and virtual systems supports multiple operating systems and virtualization technologies in IBM and non-IBM x86 platforms.

Through a single user interface, IBM Systems Director provides consistent views for viewing managed systems, determining how these systems relate to one other, and identifying their statuses, helping to correlate technical resources with business needs. A set of common tasks that are included with IBM Systems Director provides many of the core capabilities that are required for basic management, which means instant out-of-the-box business value. The common tasks include the following:

- Discovery
- Inventory
- Configuration
- System health
- Monitoring
- Updates
- Event notification
- Automation for managed systems

The IBM Systems Director Web and command-line interfaces provide a consistent interface that is focused on driving these common tasks and capabilities:

- Discovering, navigating, and visualizing systems on the network with the detailed inventory and relationships to the other network resources
- Notifying users of problems that occur on systems and the ability to isolate the sources of the problems
- Notifying users when systems need updates and distributing and installing updates on a schedule
- Analyzing real-time data for systems and setting critical thresholds that notify the administrator of emerging problems

- Configuring settings of a single system and creating a configuration plan that can apply those settings to multiple systems
- Updating installed plug-ins to add new features and functions to the base capabilities
- Managing the life cycles of virtual resources

For more information about IBM Systems Director, see the IBM Systems Director Information Center at http://publib.boulder.ibm.com/infocenter/director/v6rlx/indel.jsp?topic=/director_6.1/fqm0_main.html, and the Systems Management web page at http://www.ibm.com/systems/management/, which presents an overview of IBM Systems Management and IBM Systems Director.

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 (ASU) 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/supportportal/.
   b. Click on the **Downloads** tab at the top of the panel.
   c. Under **ToolsCenter**, select **View ToolsCenter downloads**.
   d. Select **Advanced Settings Utility (ASU)**.
   e. Scroll down and click on the link and download the ASU version for your operating system.
2. ASU sets the UUID in the Integrated Management Module (IMM). Select one of the following methods to access the Integrated Management Module (IMM) to set the UUID:
   - Online from the target system (LAN or keyboard console style (KCS) access)
   - Remote access to the target system (LAN based)
   - Bootable media containing ASU (LAN or KCS, depending upon the bootable media)

     Note: IBM provides a method for building a bootable media. You can create a bootable media using the Bootable Media Creator (BoMC) application from the Tools Center Web site. In addition, the Windows and Linux based tool kits are also available to build a bootable media. These tool kits provide an alternate method to creating a Windows Professional Edition or Master Control Program (MCP) based bootable media, which will include the ASU application.
3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:
   - For Windows based operating systems:
     – ibm_rndis_server_os.inf
     – device.cat

- For Linux based operating systems:
  - cdc_interface.sh

4. After you install ASU, use the following command syntax to set the UUID:

   `asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value> [access_method]`

   Where:

   <uuid_value>
   Up to 16-byte hexadecimal value assigned by you.

   [access_method]
   The access method that you selected to use from the following methods:

   - Online authenticated LAN access, type the command:

     `[host <imm_internal_ip>] [user <imm_user_id>][password <imm_password>]`

     Where:

     imm_internal_ip
     The IMM internal LAN/USB IP address. The default value is 169.254.95.118.

     imm_user_id
     The IMM account (1 of 12 accounts). The default value is USERID.

     imm_password
     The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

     Note: If you do not specify any of these parameters, ASU will use the default values. When the default values are used and ASU is unable to access the IMM using the online authenticated LAN access method, ASU will automatically use the unauthenticated KCS access method.

     The following commands are examples of using the userid and password default values and not using the default values:

     Example that does not use the userid and password default values:
     `asu set SYSTEM_PROD_DATA.SYsInfoUUID <uuid_value> --user <user_id> --password <password>`

     Example that does use the userid and password default values:
     `asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>`

   - Online KCS access (unauthenticated and user restricted):

     You do not need to specify a value for *access_method* when you use this access method.

     Example:
     `asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>`

     The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver be installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer. See the *Advanced Settings Utility Users Guide* for more details. You can access the ASU Users Guide from the IBM Web site.

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

     a. Go to http://www.ibm.com/supportportal/.

b. Click on the **Downloads** tab at the top of the panel.
c. Under **ToolsCenter**, select **View ToolsCenter downloads**.
d. Select **Advanced Settings Utility (ASU)**.
e. Scroll down and click on the link and download the ASU version for your operating system. Scroll down and look under **Online Help** to download the Advanced Settings Utility Users Guide.

- 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://www.ibm.com/support/entry/portal/docdisplay?brand=5000008&lndocid=TOOL-CENTER. From the **IBM Tools Center** page, scroll down 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 (ASU) 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 tohttp://www.ibm.com/supportportal/ .
   b. Click on the Downloads tab at the top of the panel.
   c. Under **ToolsCenter**, select **View ToolsCenter downloads**.
   d. Select **Advanced Settings Utility (ASU)**.
   e. Scroll down and click on the link and download the ASU version for your operating system.
2. ASU sets the DMI in the Integrated Management Module (IMM). Select one of the following methods to access the Integrated Management Module (IMM) to set the DMI:
   - Online from the target system (LAN or keyboard console style (KCS) access)
   - Remote access to the target system (LAN based)
   - Bootable media containing ASU (LAN or KCS, depending upon the bootable media)

     Note: IBM provides a method for building a bootable media. You can create a bootable media using the Bootable Media Creator (BoMC) application from the Tools Center Web site. In addition, the Windows and Linux based tool kits are also available to build a bootable media. These tool kits provide an alternate method to creating a Windows Professional Edition or Master Control Program (MCP) based bootable media, which will include the ASU application.
3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:
   - For Windows based operating systems:
     – ibm_rndis_server_os.inf
     – device.cat
   - For Linux based operating systems:
     – cdc_interface.sh
4. After you install ASU, Type the following commands to set the DMI:

   ```
   asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> [access_method]
   asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> [access_method]
   asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> [access_method]
   ```

   Where:

   <m/t_model>
   The server machine type and model number. Type `mtm xxxxyyy`, where *xxxx* is the machine type and *yyy* is the server model number.

<s/n> The serial number on the server. Type `sn zzzzzzz`, where *zzzzzzz* is the serial number.

<asset_method>
The server asset tag number. Type `asset aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa`, where *aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa* is the asset tag number.

[access_method]
The access method that you select to use from the following methods:

- Online authenticated LAN access, type the command:

  `[host <imm_internal_ip>] [user <imm_user_id>][password <imm_password>]`

  Where:

  imm_internal_ip
  The IMM internal LAN/USB IP address. The default value is 169.254.95.118.

  imm_user_id
  The IMM account (1 of 12 accounts). The default value is USERID.

  imm_password
  The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

  Note: If you do not specify any of these parameters, ASU will use the default values. When the default values are used and ASU is unable to access the IMM using the online authenticated LAN access method, ASU will automatically use the following unauthenticated KCS access method.

  The following commands are examples of using the userid and password default values and not using the default values:

  Examples that do not use the userid and password default values:
  ```
  asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model>
  --user <imm_user_id> --password <imm_password>
  asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n> --user <imm_user_id>
  --password <imm_password>
  asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag>
  --user <imm_user_id> --password <imm_password>
  ```

  Examples that do use the userid and password default values:
  ```
  asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
  asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n>
  asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>
  ```

- Online KCS access (unauthenticated and user restricted):

  You do not need to specify a value for *access_method* when you use this access method.

  The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver be installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer. You can download the ASU from the IBM Web site. To download the *Advanced Settings Utility Users Guide*, 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 tohttp://www.ibm.com/supportportal/ .

b. Click on the Downloads tab at the top of the panel.
c. Under **ToolsCenter**, select **View ToolsCenter downloads**.
d. Select **Advanced Settings Utility (ASU)**.
e. Scroll down and click on the link and download the ASU version for your operating system. Scroll down and look under **Online Help** to download the Advanced Settings Utility Users Guide.

The following commands are examples of using the userid and password default values and not using the default values:

Examples that do not use the userid and password default values:
```
asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model>
asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n>
asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag>
```

- Remote LAN access, type the command:

  Note: When using the remote LAN access method to access IMM using the LAN from a client, the *host* and the *imm_external_ip* address are required parameters.

  ```
  host <imm_external_ip> [user <imm_user_id>][password <imm_password>]
  ```

  Where:

  imm_external_ip
  The external IMM LAN IP address. There is no default value. This parameter is required.

  imm_user_id
  The IMM account (1 of 12 accounts). The default value is USERID.

  imm_password
  The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero 0 not an O).

  The following commands are examples of using the userid and password default values and not using the default values:

  Examples that do not use the userid and password default values:
  ```
  asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model> --host <imm_ip>
  --user <imm_user_id> --password <imm_password>
  asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n> --host <imm_ip>
  --user <imm_user_id> --password <imm_password>
  asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag>
  --host <imm_ip> --user <imm_user_id> --password <imm_password>
  ```

  Examples that do use the userid and password default values:
  ```
  asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> --host <imm_ip>
  asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --host <imm_ip>
  asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>
  --host <imm_ip>
  ```

- Bootable media:

  You can also build a bootable media using the applications available through the ToolsCenter Web site athttp://www.ibm.com/support/entry/portal/docdisplay?brand=5000008&lndocid=TOOL-CENTER. From the IBM **ToolsCenter** page, scroll down for the available tools

5. Restart the server.

Chapter 4. Troubleshooting

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

If you cannot diagnose and correct a problem by using the information in this chapter, see "Start here" and "Getting help and technical assistance," on page 367 for more information.

Start here

You can solve many problems without outside assistance by following the troubleshooting procedures in this documentation and on the World Wide Web.

This *Problem Determination and Service Guide* 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. **Return the server to the condition it was in before the problem occurred.** If any hardware, software, or firmware was changed before the problem occurred, if possible, reverse those changes. This might include any of the following items:
   - Hardware components
   - Device drivers and firmware
   - System software
   - UEFI firmware
   - System input power or network connections
2. **View the light path diagnostics LEDs and event logs.** The server is designed for ease of diagnosis of hardware and software problems.
   - **Light path diagnostics LEDs:** See "Light path diagnostics" on page 106 for information about using light path diagnostics LEDs.
   - **Event logs:** See "Event logs" on page 115 for information about notification events and diagnosis.
   - **Software or operating-system error codes:** See the documentation for the software or operating system for information about a specific error code. See the manufacturer's website for documentation.
3. **Run IBM Dynamic System Analysis (DSA) and collect system data.** Run Dynamic System Analysis (DSA) to collect information about the hardware, firmware, software, and operating system. Have this information available when you contact IBM or an approved warranty service provider. For instructions for running DSA, see the *Dynamic System Analysis Installation and User's Guide*.

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

4. **Check for and apply code updates.** Fixes or workarounds for many problems might be available in updated UEFI firmware, device firmware, or device drivers.

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

   a. **Install Update*Xpress* system updates.** You can install code updates that are packaged as an Update*Xpress* System Pack or Update*Xpress* CD image. An UpdateXpress System Pack contains an integration-tested bundle of online firmware and device-driver updates for your server. In addition, you can use IBM ToolsCenter Bootable Media Creator to create bootable media that is suitable for applying firmware updates and running preboot diagnostics. For more information about Update*Xpress* System Packs, see http://www.ibm.com/support/entry/portal/docdisplay?lndocid=SERV-XPRESS and "Updating the firmware" on page 71. For more information about the Bootable Media Creator, see http://www.ibm.com/support/entry/portal/docdisplay?lndocid=TOOL-BOMC .

      Be sure to separately install any listed critical updates that have release dates that are later than the release date of the Update*Xpress* System Pack or Update*Xpress* image (see step 4b).

   b. **Install manual system updates.**

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

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

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

         To display a list of available updates for the blade server, go to http://www.ibm.com/support/fixcentral/ .

         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.

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

   a. **Make sure that all installed hardware and software are supported.** See http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ to verify that the server supports the installed operating system, optional devices, and software levels. If any hardware or software component is not supported, uninstall it to determine whether it is causing the problem. You must remove nonsupported hardware before you contact IBM or an approved warranty service provider for support.

   b. **Make sure that the server, operating system, and software are installed and configured correctly.** Many configuration problems are caused by loose power or signal cables or incorrectly seated adapters. You might be able to solve the problem by turning off the server, reconnecting cables, reseating adapters, and turning the server back on. For information about performing the checkout procedure, see "Checkout procedure" on page 102. For

information about configuring the server, see Chapter 3, "Configuration information and instructions," on page 71.

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

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

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

7. **Check for troubleshooting procedures and RETAIN tips.** Troubleshooting procedures and RETAIN tips document known problems and suggested solutions. To search for troubleshooting procedures and RETAIN tips, go to http://www.ibm.com/supportportal/ .

8. **Use the troubleshooting tables.** See "Troubleshooting by symptom" on page 241 to find a solution to a problem that has identifiable symptoms.

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

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

Undocumented problems

If you have completed the diagnostic procedure and the problem remains, the problem might not have been previously identified by IBM. After you have verified that all code is at the latest level, all hardware and software configurations are valid, and no light path diagnostics LEDs or log entries indicate a hardware component failure, contact IBM or an approved warranty service provider for assistance.

To open an online service request, go to http://www.ibm.com/support/entry/portal/Open_service_request/ . Be prepared to provide information about any error codes and collected data and the problem determination procedures that you have used.

Service bulletins

IBM updates the support web site with the latest tips and techniques that you can use to solve many problems.

To find service bulletins that are available for the IBM System x3530 M4 server, go to http://www.ibm.com/supportportal/ and search for 7160 and retain.

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 Safety.
- IBM Dynamic System Analysis (DSA) provides 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 DSA, a single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run DSA.

  Exception: If multiple error codes or light path diagnostics LEDs indicate a microprocessor error, the error might be in the microprocessor or in the microprocessor socket. See "Microprocessor problems" on page 250 for information about diagnosing microprocessor problems.
- Before you run diagnostic programs, you must determine whether the failing server is part of a shared hard disk drive cluster (two or more servers sharing external storage devices). If it is part of a cluster, you can run all diagnostic programs except the ones that test the storage unit (that is, a hard disk drive in the storage unit) or the storage adapter that is attached to the storage unit. The failing server might be part of a cluster if any of the following conditions is true:
  - You have identified the failing server as part of a cluster (two or more servers sharing external storage devices).
  - One or more external storage units are attached to the failing server and at least one of the attached storage units is also attached to another server or unidentifiable device.
  - One or more servers are located near the failing server.

  Important: If the server is part of a shared hard disk drive cluster, run one test at a time. Do not run any suite of tests, such as "quick" or "normal" tests, because this might enable the hard disk drive diagnostic tests.
- If the server is halted and a POST error code is displayed, see "POST error codes" on page 122. If the server is halted and no error message is displayed, see "Troubleshooting by symptom" on page 241 and "Solving undetermined problems" on page 259.
- For information about power-supply problems, see "Solving power problems" on page 258 and "Power-supply LEDs" on page 114.

- For intermittent problems, check the event log; see “Event logs” on page 115 and “DSA messages” on page 193.

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 114).
   b. Turn off the server and all external devices.
   c. Check all internal and external devices for compatibility at http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.
   d. Check all cables and power cords.
   e. Set all display controls to the middle positions.
   f. Turn on all external devices.
   g. Turn on the server. If the server does not start, see “Troubleshooting by symptom” on page 241.
   h. Check the system-error LED on the operator information panel. If it is flashing, check the light path diagnostics LEDs (see “Light path diagnostics” on page 106).

      Note: When you slide the light path diagnostics panel out of the server to check the LEDs or checkpoint codes, do not run the server continuously with light path diagnostics panel outside of the server. The panel should only be outside of the server a short time. The light path diagnostics panel must remain in the server when the server is running to ensure proper cooling.
   i. Check for the following results:
      - Successful completion of POST (see “POST” on page 118 for more information)
      - Successful completion of startup, which is indicated by a readable display of the operating-system desktop
3. Is there a readable image on the monitor screen?
   - **No:** Find the failure symptom in “Troubleshooting by symptom” on page 241; if necessary, see “Solving undetermined problems” on page 259.
   - **Yes:** Run DSA (see “Running the DSA Preboot diagnostic programs” on page 120).
     – If DSA reports an error, follow the instructions in “DSA messages” on page 193.
     – If DSA does not report an error but you still suspect a problem, see “Solving undetermined problems” on page 259.

Diagnostic tools

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

- **Light path diagnostics**

  Use light path diagnostics to diagnose system errors quickly. See “Light path diagnostics” on page 106 for more information.

- **Event logs**

  The event logs list the error codes and messages that are generated when an error is detected for the subsystems IMM2, POST, DSA, and the server baseboard management controller. See “Event logs” on page 115 for more information.

- **Integrated Management Module (IMM)**

  The Integrated Management Module (IMM) combines service processor functions, video controller, and remote presence and blue-screen capture features in a single chip. The IMM provides advanced service-processor control, monitoring, and alerting function. If an environmental condition exceeds a threshold or if a system component fails, the IMM lights LEDs to help you diagnose the problem, records the error in the IMM event log, and alerts you to the problem. Optionally, the IMM also provides a virtual presence capability for remote server management capabilities. The IMM provides remote server management through the following industry-standard interfaces:

  – Intelligent Platform Management Protocol (IPMI) version 2.0
  – Simple Network Management Protocol (SNMP) version 3
  – Common Information Model (CIM)
  – Web browser

  For more information about the Integrated Management Module (IMM), see “Using the integrated management module II” on page 83, Integrated management module II (IMM2) error messages, and the *Integrated Management Module User's Guide* at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5079770&brandind=5000008.

- **IBM Dynamic System Analysis**

  Two editions of IBM Dynamic System Analysis (DSA) are available for diagnosing problems, DSA Portable and DSA Preboot:

  – DSA Portable

    DSA Portable collect and analyze system information to aid in diagnosing server problems. DSA Portable runs on the server's operating system and collect the following information about the server:

    - Drive health information
    - Event logs for ServeRAID controllers and service processors
    - Installed hardware, including PCI and USB information
    - Installed applications and hot fixes
    - Kernel modules
    - Light path diagnostics status
    - Microprocessor, input/out hub, and UEFI error logs
    - Network interfaces and settings
    - RAID controller configuration
    - Service processor (integrated management module) status and configuration

- System configuration
- Vital product data, firmware, and UEFI configuration

DSA Portable create 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 (when requested by service) or view the information as a text file or HTML file.

Note: Use the latest available version of DSA to make sure you are using the most recent configuration data. For documentation and download information for DSA, see http://www.ibm.com/systems/management/.

For additional information, see "IBM Dynamic System Analysis" on page 118 and "DSA messages" on page 193.

– DSA Preboot

DSA Preboot diagnostic program is stored in the integrated USB memory on the server. DSA Preboot collects and analyzes system information to aid in diagnosing server problems, as well as offering a rich set of diagnostic tests of the major components of the server. DSA Preboot collects the following information about the server:

- Drive health information
- Event logs for ServeRAID controllers and service processors
- Installed hardware, including PCI and USB information
- Light path diagnostics status
- Microprocessor, input/out hub, and UEFI error logs
- Network interfaces and settings
- RAID controller configuration
- Service processor (integrated management module) status and configuration
- System configuration
- Vital product data, firmware, and UEFI configuration

DSA Preboot also provides diagnostics for the following system components (when they are installed):

1. Network adapter
2. IMM 12C bus
3. Lightpath diagnostics panel
4. Memory modules
5. Microprocessors
6. Optical devices (CD or DVD)
7. SAS or SATA drives
8. Tape drives (SCSI)

See "Running the DSA Preboot diagnostic programs" on page 120 for more information on running the DSA Preboot program on the server.

- **Troubleshooting by symptom**

  These tables list problem symptoms and actions to correct the problems. See "Troubleshooting by symptom" on page 241 for more information.

Light path diagnostics

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

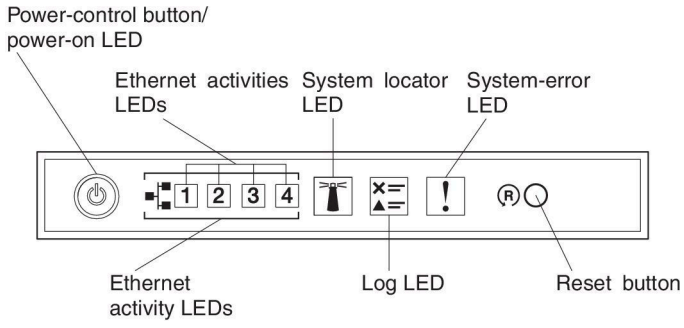
When LEDs are lit to indicate an error, they remain lit when the server is turned off, provided that the server is still connected to power and the power supply is operating correctly and the top cover is closed and latched correctly.

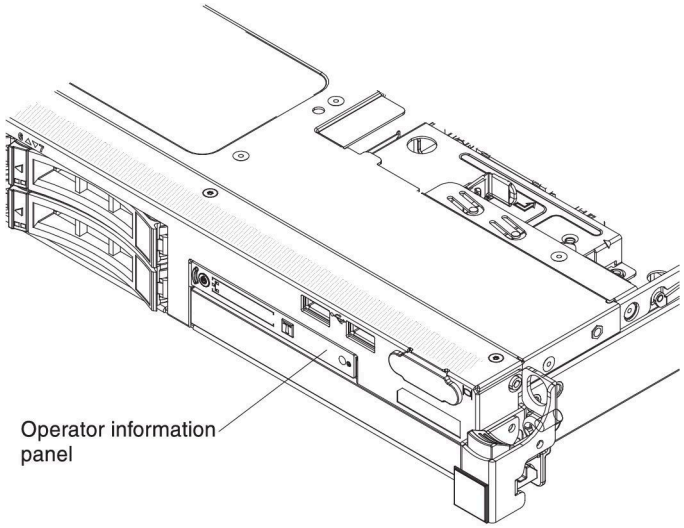
Before you work inside the server to view light path diagnostics LEDs, read the safety information that begins on page "Safety" on page vii and "Handling static-sensitive devices" on page 32.

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

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

   The following illustration shows the operator information panel:



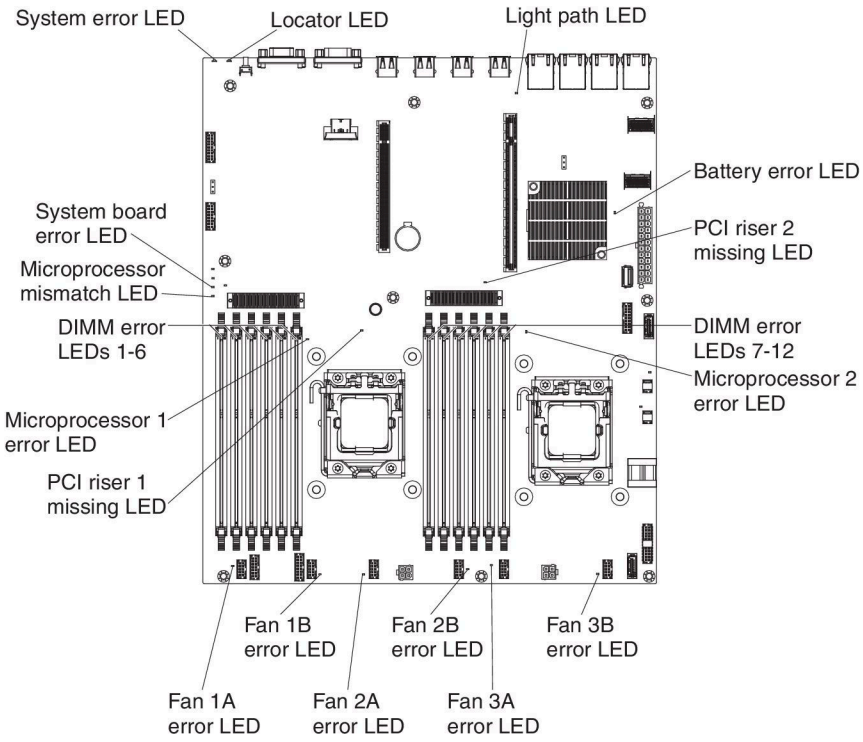


2. To view the advanced operator information panel, press the blue latch on the right of the operator panel. Lit LEDs on this panel indicate the type of error that has occurred.

Look at the system service label inside the server cover, which gives an overview of internal components that correspond to the LEDs on the light path diagnostics panel. This information and the information in "Light path diagnostics LEDs" on page 109 can often provide enough information to diagnose the error.

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

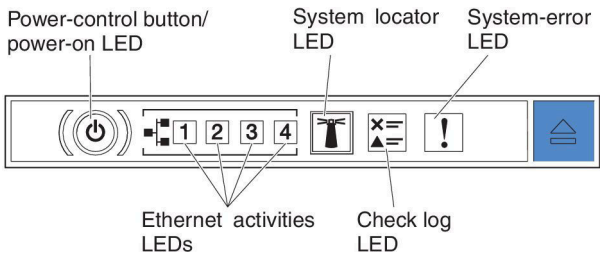
   The following illustration shows the LEDs on the system board.

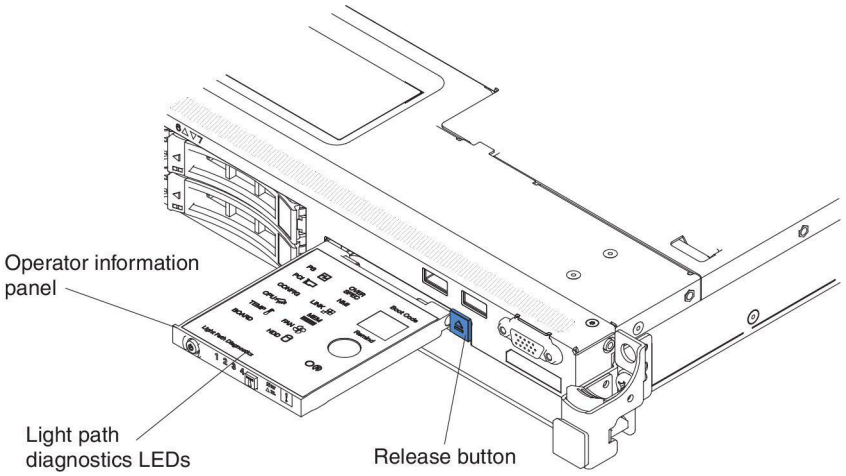


Light path diagnostics panel

The light path diagnostics panel is available on the top of the advanced operator information panel. For additional information about the light path diagnostics and LEDs on the light path diagnostics panel, see "Light path diagnostics" on page 106 and "Light path diagnostics LEDs" on page 109.

The following illustration shows the optional advanced light path diagnostics panel.

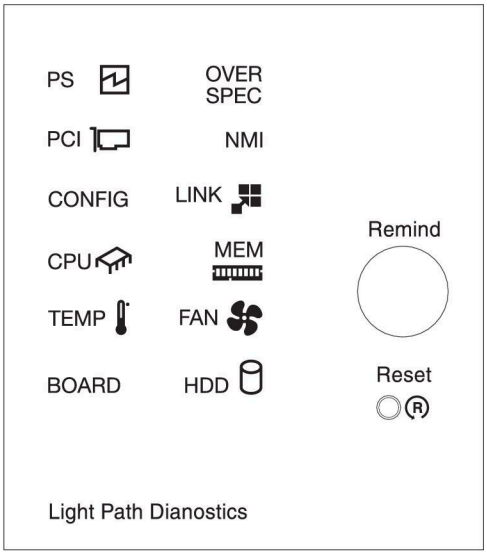




To access the optional advanced light path diagnostics panel, push the blue release button on the advanced operator information panel. Pull forward on the unit until the hinge of the operator panel is free of the server chassis. Then pull down on the unit, so that you can view the light path diagnostics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

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

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



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

By placing the system-error LED indicator in Remind mode, you acknowledge that you are aware of the last failure but will not take immediate action to correct the problem.

- **Reset button:** Press this button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button.

Light path diagnostics LEDs

The following table describes the LEDs on the light path diagnostics panel and suggested actions to correct the detected problems. For additional information, see "Server controls, LEDs, and power" on page 14 and the "System-board LEDs" on page 28 for the location of the system board LEDs.

Note: Check the IMM system-event log or system event log for additional information before replacing a FRU.

Table 11. Light path diagnostics panel LEDs

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If a action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**		
LED	**Description**	**Action**
None, but the Check Log LED is lit.	An error has occurred and cannot be isolated. The error is not represented by a path.	1. Check the IMM2 system even log and the system-error log for information about the error. 2. Save the log if necessary and clear the log afterwards.
System Error LED	An error occurred.	1. Check the light path LEDs and follow the listed instruction. 2. Check the IMM2 system even log and the system-error log for information about the error. 3. Save the log if necessary and clear the log afterwards.
OVER SPEC	The power supplies are using more power than their maximum rating. The system is drawing power incoherent to power supply specified ratings.	If the OVER SPEC LED is lit, use one of the following procedures: 1. Turn off the server, disconnect the power from the server. 2. Remove the optical drive, fans, hard disk drives, and hard disk drive backplanes. 3. Restart the server to see whether the problem remains. 4. Reinstall each device that was removed in step 2 one at a time, starting the server each time, to isolate the failing device. 5. Replace any failing device. 6. (Trained technician only) Replace the system board.
LINK	Reserved.	
PS	A power supply is not detected or has failed.	1. Check the power-supply in the server that has an lit yellow LED (see "Power-supply LEDs" on page 114). 2. Make sure that the power supplies are seated correctly. 3. Remove one of the power supplies to isolate the failed power supply. 4. Replace the failed power supply.

Table 11. Light path diagnostics panel LEDs (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If a action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**		
LED	**Description**	**Action**
PCI	An error has occurred on a PCI card, a PCI bus or on the system board. An additional LED is lit on one of the riser cards.	1. Check the system-event log for information about the error. 2. Check the LEDs on the PCI riser cards to identify the component that caused the error. 3. If you cannot isolate the failing adapter by using the LEDs and the information in the system-event log, remove one adapter at a time from the failing PCI bus; and restart the server after each adapter is removed. 4. Replace the following components, in the order shown, restarting the server each time: • PCI riser card • (Trained technician only) Replace the system board.
FAN	A fan has failed, is operating too slowly, or has been removed. The TEMP LED might also be lit.	1. Check the LEDs on the server. 2. Reseat the failing fan, which is indicated by a lit LED on the fan. 3. Replace the failing fan.
TEMP	The system temperature has exceeded a threshold level. A failing fan can cause the TEMP LED to be lit.	1. Make sure that the air vents are not blocked. 2. Determine whether a fan has failed. If it has, replace it. 3. Make sure that the heat sink is seated correctly. 4. Make sure that the room temperature is not too high. See “Server features and specifications” on page 6 and “System reliability guidelines” on page 32 for the server temperature information.
MEM	An invalid memory configuration (both the MEM LED and CONFIG LED might be lit) 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. If the MEM LED and the CONFIG LED are lit, the system issues an invalid memory configuration error. Complete the following steps to correct the problem: a. Check the system-event log in the Setup utility or IMM error messages. Follow steps indicated in “POST error codes” on page 122 and Integrated management module II (IMM2) error messages. 2. If the CONFIG LED is not lit, the system has detected a memory error. Complete the following steps to correct the problem: a. Update the firmware to the latest level (see “Updating the firmware” on page 71). b. Reseat or swap the DIMMs. c. Check the system-event log in the Setup utility or IMM error messages. Follow steps indicated in “POST error codes” on page 122 and Integrated management module II (IMM2) error messages.
NMI	A nonmaskable interrupt has occurred, or the NMI button was pressed.	Check the system-event log for information about the error.

Table 11. Light path diagnostics panel LEDs (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If a action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**		
LED	**Description**	**Action**
CONFIG	A hardware configuration error has occurred.	1. If the CONFIG LED and the CPU LED are lit, complete the following steps to correct the problem: a. Check the microprocessors that were just installed to make sure that they are compatible with each other (see "Replacing a microprocessor and heat sink" on page 349 for additional information about microprocessor requirements). b. (Trained technician only) Replace the incompatible microprocessor. c. Check the system-event logs for information about the error. Replace any components that are identified in the error log. 2. If the CONFIG LED and the MEM LED are both lit, complete the following steps: a. Make sure that the DIMM configuration is supported (see "Installing a memory module" on page 34 for DIMM requirements and installation sequence information). b. Replace the DIMMs with a supported configuration.

Table 11. Light path diagnostics panel LEDs (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If a action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**		
LED	**Description**	**Action**
CPU	An invalid microprocessor configuration or a microprocessor has failed (both the CPU LED and the CONFIG LED might be lit).	1. If the CONFIG LED is lit, the system issues an invalid microprocessor configuration error. Complete the following steps to correct the problem: a. Check the microprocessors that were just installed to make sure that they are compatible with each other (see "Replacing a microprocessor and heat sink" on page 349 for additional information about microprocessor requirements) and use the Setup utility and select **System Information → System Summary → Processor** to verify the microprocessors information. b. (Trained technician only) Replace the incompatible microprocessor. c. Check the system-event logs for information about the error. Replace any components that are identified in the error log. 2. If the CPU LED is lit and the CONFIG LED is not lit, complete the following steps: a. (Trained technician only) Make sure that the failing microprocessor, which is indicated by a lit LED on the system board, is installed correctly. See "Replacing a microprocessor and heat sink" on page 349 for information about installation and requirements.
	When only the CPU LED is lit, a microprocessor has failed.	If the CONFIG LED is not lit, a microprocessor failure occurs, complete the following steps to correct the problem: 1. (Trained technician only) Make sure that the failing microprocessor and its heat sink, which are indicated by a lit LED on the system board, are installed correctly. See "Replacing a microprocessor and heat sink" on page 349 for information about installation and requirements. 2. (Trained technician only) Replace the failing microprocessor (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349). 3. For more information, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 11. Light path diagnostics panel LEDs (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If a action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**		
LED	**Description**	**Action**
HDD	A hard disk drive has failed or is missing.	1. Check the LEDs on the hard disk drives for the drive with a lit status LED and reseat the hard disk drive. 2. Make sure that the cables are correctly connected to the hard disk drive backplane. 3. For more information, see “Hard disk drive problems” on page 244. 4. If the error remains, replace the following components in the order listed, restarting the server after each: a. Replace the hard disk drive. b. Replace the hard disk drive backplane. 5. If the error remains, replace the following components one at a time, in the order listed, restarting the server after each: a. Replace the hard disk drive. b. Replace the hard disk drive backplane. 6. If the problem remains, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
BOARD	An error has occurred on the system board.	1. Check the LEDs on the server. 2. Check the LEDs on the system board to identify the component that caused the error. The BOARD LED can be lit due to any of the following reasons: • Battery • Missing PCI riser-card assembly • Failed firmware update • Failed system board 3. Check the system-event log for information about the error. 4. Replace any failed or missing replacement components, such as the battery or PCI riser-card assembly. 5. (Trained technician only) replace the server system board.

Power-supply LEDs

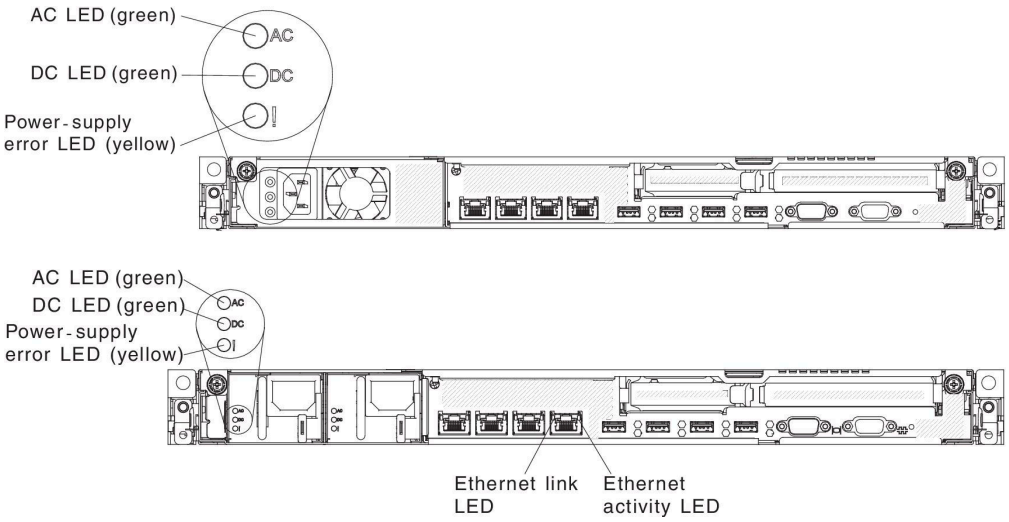
The following minimum configuration is required for the DC LED on the power supply to be lit:

- Power supply
- Power cord

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

- One microprocessor in microprocessor socket 1
- One 2 GB DIMM (per microprocessor) on the system board
- One power supply
- Power cord
- Four cooling fans

The following illustrations show the locations of the power-supply LEDs for fixed and redundant models respectively.



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

Power-supply LEDs			Description	Action	Notes
AC	**DC**	**Error**			
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. Restart the server. If the error remains, check the power-supply LEDs. 4. Replace the power-supply.	This is a normal condition when no ac power is present.

Power-supply LEDs			Description	Action	Notes
AC	DC	Error			
Off	Off	On	No ac power to the server or a problem with the ac power source and the power-supply had detected an internal problem.	• Make sure that the power cord is connected to a functioning power source. • Replace the power supply.	This happens only when a second power supply is providing power to the server.
Off	On	Off	Faulty power-supply	Replace the power supply.	
Off	On	On	Faulty power-supply	Replace the power supply.	
On	Off	Off	Power-supply not fully seated, faulty system board, or faulty power-supply	1. Make sure that the top cover is closed and latched correctly. 2. Reseat the power supply. 3. Replace the failing power supply.	Typically indicates a power-supply is not fully seated.
On	Off	On	Faulty power -supply	Replace the power supply.	
On	On	On	Power-supply is faulty	Replace the power supply.	

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 contents of the POST event log from the Setup utility (see "Starting the Setup utility" on page 76). For more information about POST error codes, see "POST error codes" on page 122.
- **System-event log:** This log contains POST and system management interrupt (SMI) events and all events that are generated by the baseboard management controller that is embedded in the integrated management module (IMM). You can view the contents of the system-event log through the Setup utility and through the Dynamic System Analysis (DSA) program (as IPMI event log).

  The system-event log is limited in size. When it is full, new entries will not overwrite existing entries; therefore, you must periodically clear the system-event log through the Setup utility. When you are troubleshooting an error, you might have to save and then clear the system-event log to make the most recent events available for analysis. For more information about the system-event log, see Integrated management module II (IMM2) error messages.

  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 (IMM2) 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. For more

information, see “Logging on to the Web interface” on page 87. You can also view the IMM event log through the Dynamic System Analysis (DSA) program (as the ASM event log). For more information about IMM error messages, see Integrated management module II (IMM2) error messages.

- **DSA event 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 event log through the DSA program (see “Viewing event logs without restarting the server”). For more information about DSA and DSA messages, see “DSA messages” on page 193 and “IBM Dynamic System Analysis” on page 118.

For more information about viewing the logs or clearing the logs, see “Viewing event logs through the Setup utility,” “Viewing event logs without restarting the server,” and “Clearing the error logs” on page 118.

Viewing event logs through the Setup utility

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

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

Viewing event logs without restarting the server

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

If you have installed Dynamic System Analysis (DSA) Portable, you can use it to view the system-event log (as the IPMI event log), or 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. The server comes with DSA Preboot stored in integrated USB memory. To install DSA Portable or check for and download a later version of DSA Preboot CD image, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008.

If IPMItool is installed in the server, you can use it to view the system-event log. Most recent versions of the Linux operating system come with a current version of IPMItool. For an overview of IPMI, go to http://www.ibm.com/developerwork/linux/blueprints/ and click **Using Intelligent Platform Management Interface (IPMI) on IBM Linux platforms**.

You can view the IMM event log through the **Event Log** link in the integrated management module (IMM) Web interface. For more information, see “Logging on to the Web interface” on page 87.

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

Table 12. Methods for viewing event logs

Condition	Action
The server is not hung and is connected to a network (using an operating system controlled network ports).	Use any of the following methods: • Run DSA Portable to view the diagnostic event log (requires IPMI driver) or create an output file that you can send to IBM service and support (using ftp or local copy). • Use IPMItool to view the system-event log (requires IPMI driver). • Use the Web browser interface to the IMM to view the system-event log locally (requires RNDIS USB LAN driver).
The server is not hung and is not connected to a network (using an operating system controlled network ports).	Use any of the following methods: • Run Portable DSA to view the diagnostic event log (requires IPMI driver) or create an output file that you can send to IBM service and support (using a local copy). • Use IPMItool to view the system-event log (requires IPMI driver). • Use the Web browser interface to the IMM to view the system-event log locally (requires RNDIS USB LAN driver). For more information, see "Obtaining the IP address for the IMM" on page 86 and "Logging on to the Web interface" on page 87.
The integrated management module (IMM) is connected to a network and AC power is applied - the server state might be hung, not hung, or powered off.	Use any of the following methods: • Use IPMItool over the network to the IMM external IP address to view the system-event log. • Use the Web browser interface to the IMM to view the system-event log. In the Web browser, type the IP address for the IMM and go to the Event Log page. For more information, see "Obtaining the IP address for the IMM" on page 86 and "Logging on to the Web interface" on page 87.
The server is hung and no communication can be made with the IMM.	Restart the server and press F2 to start DSA Preboot and view the diagnostic event log (see "Running the DSA Preboot diagnostic programs" on page 120 for more information). Alternatively, you can restart the server and press F1 to start the Setup utility and view the POST event log or system-event log. For more information, see "Viewing event logs through the Setup utility" on page 116.

Clearing the error logs

To clear the event logs, complete the following steps.

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

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

POST

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

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

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

If POST detects a problem an error message is displayed. See "POST error codes" on page 122 for more information.

If POST detects a problem, an error message is sent to the POST event log, see "Event logs" on page 115 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 (available in DSA Portable only)
- Kernel modules (available in DSA Portable only)
- 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 "Diagnostic text messages" on page 120.

If you cannot find a problem by using DSA, see "Solving undetermined problems" on page 259 for information about testing the server.

Note:

1. In a multi-node environment, each server has a unique DSA interface. You can view server-specific information, such as event 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.

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

DSA editions

Two editions of Dynamic System Analysis are available:

- **DSA Portable**

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

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

- **DSA Preboot**

  DSA Preboot runs outside of the operating system; you must restart the server to run it. It is provided in the flash memory on the server, or you can create a bootable media such as a CD, DVD, ISO, USB, or PXE using the IBM ToolsCenter Bootable Media Creator (BoMC). For more details, see the BoMC *User Guide* at http://www.ibm.com/support/entry/portal/docdisplay?lndocid=TOOL-BOMC . 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.

  DSA Preboot provides diagnostics for the following system components, if they are installed:

  – Broadcom network adapter
  – Optical devices (CD or DVD)
  – Tape drives (SCSI, SAS, or SATA)
  – Memory
  – Microprocessor
  – Checkpoint panel
  – I2C bus
  – SAS and SATA drives

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

  The IBM System x3530 M4 server comes with DSA Preboot diagnostics code on the integrated USB flash memory. Utilities are available to reset and update the diagnostics code on the integrated USB flash device, if the diagnostic partition becomes damaged and does not start the DSA Preboot diagnostic programs. For more information and to download the utilities, go to http://www.ibm.com/support/entry/portal/docdisplay?lndocid=SERV-DSA .

Running the DSA Preboot diagnostic programs

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

To run the DSA Preboot diagnostic programs that is stored in integrated flash memory on the server, complete the following steps:

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

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

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

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

Diagnostic text messages

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

Passed: The test was completed without any errors.

Failed: The test detected an error.

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

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

Viewing the test log results

To view the test log for the results when the tests are completed, click the **Success** link in the Status column, if you are running the DSA graphical user interface, or type **:x** to exit the Execute Tests menu, if you are running the DSA interactive menu, or select **Diagnostic Event Log** in the graphical user interface. To transfer DSA Preboot collections to an external USB device, type the **copy** command in the DSA interactive menu.

- If you are running the DSA graphical user interface (GUI), click the **Success** link in the Status column.
- If you are running the DSA interactive menu (CLI), type **:x** to exit the Execute Tests menu; then, select the **completed tests** to view the results.

Call home (automated service request)

IBM provide tools that can automatically collect and send data or call IBM service when an error is detected. These tools can help IBM service speed up the process of diagnosing problems. The following sections provide information about the call home tools.

Service advisor

The server comes with the Service Advisor feature that can collect data about the system when the system detects a fault and sends that data to IBM Service for problem determination. It also includes the call home feature that automatically calls IBM Service when a problem occurs. The Service Advisor feature is integrated into the Integrated Management Module (IMM). You will need to setup and configure the Service Advisor feature before you can use it. For more information about how to setup and configure the Service Advisor feature, see the *Integrated Management Module User's Guide* at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5079770&brandind=5000008.

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. It also can collect and transmit system configuration information on a scheduled basis so that the information is available to you and your support representative. It uses minimal system resources, and can be downloaded from the IBM Web site. For more information and to download IBM Electronic Service Agent, go to http://www.ibm.com/support/entry/portal/Open_service_request/ http://www.ibm.com/support/electronic/

Error messages

The following sections lists the error codes and messages for POST, IMM2, UEFI, and DSA that are generated when a problem is detected.

POST error codes

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

- Severe = S
- Warning = W
- Informational = I

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
I.11002	[I.11002] A processor mismatch has been detected between one or more processors in the system.	One or More Mismatched Processors Detected.	1. Make sure that the microprocessor is on the ServerProven website at http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ . 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this problem. 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see "Replacing a microprocessor and heat sink" on page 349).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
W.11004	[W.11004] A processor within the system has failed the BIST.	Processor Self Test Failure Detected.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this problem. 2. (Trained technician only) If there are more than one microprocessor installed, swap the microprocessors. If the problem follows the affected microprocessor or there is only one microprocessor installed, replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349). 3. (Trained technician only) Replace the system board.
S.1100C	[S.1100C] An uncorrectable error has been detected on processor %.	Uncorrectable microprocessor error detected.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this error. 2. Restart the server. 3. Contact your IBM service representative for support. (% = microprocessor number)
I.18005	[I.18005] A discrepancy has been detected in the number of cores reported by one or more processor packages within the system.	Processors have mismatched number of cores.	1. Make sure that the microprocessor is on the ServerProven website at http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ . 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this problem. 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see "Replacing a microprocessor and heat sink" on page 349).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
I.18006	[I.18006] A mismatch between the maximum allowed QPI link speed has been detected for one or more processor packages.	Processors have mismatched QPI Speed.	1. Make sure that the microprocessor is on the ServerProven website at http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ . 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this problem. 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see "Replacing a microprocessor and heat sink" on page 349).
I.18007	[I.18007] A power segment mismatch has been detected for one or more processor packages.	Processors have mismatched Power Segments.	1. Make sure that the microprocessor is on the ServerProven website at http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ . 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this problem. 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see "Replacing a microprocessor and heat sink" on page 349).
I.18008	[I.18008] Currently, there is no additional information for this event.	Processors have mismatched Internal DDR3 Frequency.	1. Make sure that the microprocessor is on the ServerProven website at http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ . 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this problem. 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see "Replacing a microprocessor and heat sink" on page 349).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
I.18009	[I.18009] A core speed mismatch has been detected for one or more processor packages.	Processors have mismatched Core Speed.	1. Make sure that the microprocessor is on the ServerProven website at http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ . 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this problem. 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see "Replacing a microprocessor and heat sink" on page 349).
I.1800A	[I.1800A] A mismatch has been detected between the speed at which a QPI link has trained between two or more processor packages.	Processors have mismatched Bus Speed.	1. Make sure that the microprocessor is on the ServerProven website at http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ . 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this problem. 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see "Replacing a microprocessor and heat sink" on page 349).
I.1800B	[I.1800B] A cache size mismatch has been detected for one or more processor packages.	Processors have one or more cache levels with mismatched size.	1. Make sure that the microprocessor is on the ServerProven website at http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ . 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this problem. 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see "Replacing a microprocessor and heat sink" on page 349).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
I.1800C	[I.1800C] A cache type mismatch has been detected for one or more processor packages.	Processors have one or more cache levels with mismatched type.	1. Make sure that the microprocessor is on the ServerProven website at http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ . 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this problem. 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see "Replacing a microprocessor and heat sink" on page 349).
I.1800D	[I.1800D] A cache associativity mismatch has been detected for one or more processor packages.	Processors have one or more cache levels with mismatched associativity.	1. Make sure that the microprocessor is on the ServerProven website at http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ . 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this problem. 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see "Replacing a microprocessor and heat sink" on page 349).
I.1800E	[I.1800E] A processor model mismatch has been detected for one or more processor packages.	Processors have mismatched Model Number.	1. Make sure that the microprocessor is on the ServerProven website at http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ . 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this problem. 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see "Replacing a microprocessor and heat sink" on page 349).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
I.1800F	[I.1800F] A processor family mismatch has been detected for one or more processor packages.	Processors have mismatched Family.	1. Make sure that the microprocessor is on the ServerProven website at http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ . 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this problem. 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see "Replacing a microprocessor and heat sink" on page 349).
I.18010	[I.18010] A processor stepping mismatch has been detected for one or more processor packages.	Processors of the same model have mismatched Stepping ID.	1. Make sure that the microprocessor is on the ServerProven website at http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ . 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this problem. 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see "Replacing a microprocessor and heat sink" on page 349).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
W.50001	[W.50001] A DIMM has been disabled due to an error detected during POST.	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 34). 2. If the DIMM was disabled because of a memory fault, follow the suggested actions for that error event. 3. 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).
S.51003	[S.51003] An uncorrectable memory error was detected in DIMM slot % on rank %. [S.51003] An uncorrectable memory error was detected on processor % channel %. The failing DIMM within the channel could not be determined. [S.51003] An uncorrectable memory error has been detected during POST.	Fatal Memory Error Occurred.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this problem. 2. If the problem remains, replace the affected DIMMs. 3. (Trained 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. 4. (Trained 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. 5. (Trained technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
S.51006	[S.51006] A memory mismatch has been detected. Please verify that the memory configuration is valid.	One or More Mismatched DIMMs 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 34).
S.51009	[S.51009] No system memory has been detected.	No Memory Detected.	1. Make sure that there is at least one DIMM installed in the server. 2. If there are no memory fault recorded in the logs and no DIMM connector error LEDs are lit, make sure that all DIMM connectors are enabled by using the Setup utility or the Advance Settings Utility (ASU). 3. Reinstall all DIMMs in the correct population sequence (see "Installing a memory module" on page 34 for more information).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
W.58001	[W.58001] The PFA Threshold limit (correctable error logging limit) has been exceeded on DIMM number % at address %. MC5 Status contains % and MC5 Misc contains %.	DIMM 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 (see "Installing a memory module" on page 34 for memory population sequence). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. If the problem occurs on the same DIMM connector, swap other DIMMs (in the same memory channel) to a different memory channel or microprocessor (see "Installing a memory module" on page 34 for memory population sequence). If the problem follows a moved DIMM to a different memory channel, replace the affected DIMM. 5. (Trained technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. Remove any foreign material on the DIMM connector, if found. If the connector is damaged, replace the system board. 6. (Trained technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found or the microprocessor is an upgrade part, replace the system board. 7. (Trained technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349). 8. (Trained 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.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
W.58007	[W.58007] Invalid memory configuration (Unsupported DIMM Population) detected. Please verify memory configuration is valid.	Unsupported DIMM Population.	**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 then restart the server. 2. Make sure that the DIMMs are installed in the proper sequence (see "Installing a memory module" on page 34).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
S.58008	[S.58008] A DIMM has failed the POST memory test.	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. Make sure that the DIMMs are firmly seated and no foreign material is found in the DIMM connector. Then, retry with the same DIMM. 3. If the problem is related to a DIMM, replace the failing DIMM indicated by the error LEDs 4. If the problem occurs on the same DIMM connector, 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 34 for memory population sequence). 5. (Trained 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. 6. (Trained 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. 7. (Trained technician only) Swap the affected microprocessor, if there are more than one microprocessor installed. If the problem follows the microprocessor, replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349). 8. (Trained 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.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
W.580A1	[W.580A1] Invalid memory configuration for Mirror Mode. Please correct memory configuration.	Unsupported DIMM Population for Mirror Mode.	1. If a DIMM connector error LED is lit on the system board, check the event logs and follow the procedure for that event and restart the server. 2. Make sure that the DIMMs have been installed in the correct sequence for mirrored channel mode.
W.580A2	[W.580A2] Invalid memory configuration for Sparing Mode. Please correct memory configuration.	Unsupported DIMM Population for Spare Mode.	Make sure that the DIMMs have been installed in the correct sequence for rank sparing mode.
I.580A4	[I.580A4] Memory population change detected.	DIMM Population Change Detected.	Information only. Memory has been added, moved, or changed.
I.580A5	[I.580A5] Mirror Fail-over complete. DIMM number % has failed over to to the mirrored copy.	DIMM Mirror Fail-over Detected.	Information only. Memory redundancy has been lost. Check the event log for uncorrected DIMM failure events.
I.580A6	[I.580A6] Memory spare copy has completed successfully.	Spare Copy Complete.	Information only. Memory redundancy or spare rank has been lost. Check the event log for uncorrected DIMM failure events.
I.58015	[I.58015] Memory spare copy initiated.	Spare Copy Started.	No action; information only.
W.68002	[W.68002] A CMOS battery error has been detected.	CMOS Battery Fault.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Replace the CMOS battery. 3. (Trained technician only) Replace the system board.
S.68005	[S.68005] An error has been detected by the IIO core logic on Bus %. The Global Fatal Error Status register contains %. The Global Non-Fatal Error Status register contains %. Please check error logs for the presence of additional downstream device error data.	Critical IOH-PCI Error.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Replace the following components one at a time in the order shown, restarting the server each time: a. PCI express adapter. b. (Trained 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.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
S.680B8	[S.680B8] Internal QPI Link Failure Detected.	Internal QPI Link Failure Detected.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this error. 2. Inspect the microprocessor socket for foreign material, if the microprocessor socket contains any foreign material, remove the foreign material. If it is found damaged, (trained technician only) replace the system board.
S.680B9	[S.680B9] External QPI Link Failure Detected.	External QPI Link Failure Detected.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this error. 2. Inspect the microprocessor socket for foreign material, if the microprocessor socket contains any foreign material, remove the foreign material. If it is found damaged, (trained technician only) replace the system board.
S.2011001	[S.2011001] An Uncorrected PCIe Error has Occurred at Bus % Device % Function %. The Vendor ID for the device is % and the Device ID is %.	PCI SERR Detected.	1. Check the PCI riser slot LEDs on the system board. 2. Reseat all affected adapters and PCI riser-card assembly. 3. Update the adapter firmware. 4. Replace the affected adapters and riser cards. 5. (Trained technician only) Replace the system board.
S.2018001	[S.2018001] An Uncorrected PCIe Error has Occurred at Bus % Device % Function %. The Vendor ID for the device is % and the Device ID is %.	PCIe Uncorrected Error Detected.	1. Check the PCI riser slot LEDs on the system board. 2. Reseat all affected adapters and PCI riser-card assembly. 3. Update the adapter firmware. 4. Replace the affected adapters and riser cards. 5. (Trained 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.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
I.2018002	[I.2018002] The device found at Bus % Device % Function % could not be configured due to resource constraints. The Vendor ID for the device is % and the Device ID is %.	OUT_OF_RESOURCES (PCI Option ROM).	1. Run the Setup utility (see "Using the Setup utility" on page 75). Select **Startup Options** from the menu and modify the boot sequence to change the load order of the optional-device ROM code. 2. Informational message that some devices might not be initialized. 3. See retain tip H197144 (http://www-947.ibm.com/support/entry/portal/docdisplay?lndocid=migr-5084743) for more information.
I.2018003	[I.2018003] A bad option ROM checksum was detected for the device found at Bus % Device % Function %. The Vendor ID for the device is % and the Device ID is %.	ROM CHECKSUM ERROR.	1. Check the riser-card LEDs. 2. Reseat all affected adapters and riser cards. 3. Move the affected adapter to a different slot. 4. Update the PCI adapter firmware. 5. Replace the affected adapters and riser cards.
S.3020007	[S.3020007] A firmware fault has been detected in the UEFI image.	Internal UEFI Firmware Fault Detected, System halted.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this error. 2. Recover the server firmware. 3. (Trained technician only) replace the system board.
S.3028002	[S.3028002] Boot permission timeout detected.	Boot Permission Negotiation Timeout.	1. Check the IMM2 error messages for communication errors and follow the actions. 2. Restart the server. 3. If the problem remains, contact your IBM service representative for support.
S.3030007	[S.3030007] A firmware fault has been detected in the UEFI image.	Internal UEFI Firmware Fault Detected, System halted.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this error. 2. Recover the server firmware. 3. (Trained 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.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
S.3040007	[S.3040007] A firmware fault has been detected in the UEFI image.	Internal UEFI Firmware Fault Detected, System halted.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this error. 2. Recover the server firmware.
I.3048005	[I.3048005] UEFI has booted from the backup flash bank.	Booting Backup UEFI Image.	Information only. Set the JP2 jumper in the backup position (pins 2 and 3) to allow the server to boot from the backup UEFI.
W.3048006	[W.3048006] UEFI has booted from the backup flash bank due to an Automatic Boot Recovery (ABR) event.	Automated Boot Recovery, Booting Backup UEFI Image.	1. Run the Setup utility (see "Using the Setup utility" on page 75). Select **Load Default Settings** and save the settings. 2. Recover the server firmware.
S.3050007	[S.3050007] A firmware fault has been detected in the UEFI image.	Internal UEFI Firmware Fault Detected, System halted.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this error. 2. Recover the server firmware.
W.305000A	[W.305000A] An invalid date and time have been detected.	RTC Date and Time Incorrect.	1. Run the Setup utility (see "Using the Setup utility" on page 75). Select **Load Default Settings** and save the settings. 2. Reseat the battery. 3. Replace the battery.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
S.3058004	[S.3058004] A Three Strike boot failure has occurred. The system has booted with default UEFI settings.	POST failure has occurred! System booted with default settings.	1. Undo any recent system changes, such as new settings or newly installed devices. 2. Make sure that the server is attached to a reliable power source. 3. Remove all hardware that is not listed on the ServerProven Web site at http://www.ibm.com/servers/eserver/serverproven/compat/us/. 4. Update the firmware to the latest level. 5. Make sure that the operating system is not corrupted. 6. Run the Setup utility, save the configuration, and then restart the server. 7. (Trained technician only) If the problem remains, replace the system board.
W.3058009	[W.3058009] DRIVER HEALTH PROTOCOL: Missing Configuraiton. Requires Change Settings From F1.	DRIVER HEALTH PROTOCOL: Missing Configuration. Requires Change Settings From F1.	1. Select **System Settings → Settings → Driver Health Status List** and find a driver/controller reporting configuration required status. 2. Search for the driver menu from **System Settings** and change the settings appropriately. 3. Save the settings and restart the system.
W.305800A	[W.305800A] DRIVER HEALTH PROTOCOL: Reports 'Failed' Status Controller.	DRIVER HEALTH PROTOCOL: Reports 'Failed' Status Controller.	1. Restart the system. 2. If the problem persists, switch to the backup UEFI image or reload the current UEFI image. 3. (Trained technician only) Replace the system board.
W.305800B	[W.305800B] DRIVER HEALTH PROTOCOL: Reports 'Reboot' Required Controller.	DRIVER HEALTH PROTOCOL: Reports 'Reboot' Required Controller.	1. No action required. The system will reboot at the end of POST. 2. If the problem persists, switch to the backup UEFI image or reload the current UEFI image. 3. (Trained 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.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
W.305800C	[W.305800C] DRIVER HEALTH PROTOCOL: Reports 'System Shutdown' Required Controller.	DRIVER HEALTH PROTOCOL: Reports 'System Shutdown' Required Controller.	1. Restart the system. 2. If the problem persists, switch to the backup UEFI image or reload the current UEFI image. 3. (Trained technician only) Replace the system board.
W.305800D	[W.305800D] DRIVER HEALTH PROTOCOL: Disconnect Controller Failed. Requires 'Reboot'.	DRIVER HEALTH PROTOCOL: Disconnect Controller Failed. Requires 'Reboot'.	1. Restart the system. 2. If the problem persists, switch to the backup UEFI image or reload the current UEFI image. 3. (Trained technician only) Replace the system board.
W.305800E	[W.305800E] DRIVER HEALTH PROTOCOL: Reports Invalid Health Status Driver.	DRIVER HEALTH PROTOCOL: Reports Invalid Health Status Driver.	1. Restart the system. 2. If the problem persists, switch to the backup UEFI image or reload the current UEFI image. 3. (Trained technician only) Replace the system board.
S.3060007	[S.3060007] A firmware fault has been detected in the UEFI image.	Internal UEFI Firmware Fault Detected, System halted.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this error. 2. Recover the server firmware.
S.3070007	[S.3070007] A firmware fault has been detected in the UEFI image.	Internal UEFI Firmware Fault Detected, System halted.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this error. 2. Recover the server firmware.
S.3108007	[S.3108007] The default system settings have been restored.	System Configuration Restored to Defaults.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this error. 2. If the settings differ from defaults, 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.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Diagnostic code	Message	Description	Action
W.3808000	[W.3808000] An IMM communication failure has occurred.	IMM Communication Failure.	1. Shut down the system and remove the power cords from the server for 30 seconds; then, reconnect the server to power and restart it. 2. Update the IMM firmware to the latest level (see "Updating the firmware" on page 71). 3. (Trained technician only) Replace the system board.
W.3808002	[W.3808002] An error occurred while saving UEFI settings to the IMM.	Error Updating System Configuration to IMM.	1. Run the Setup utility, select **Save Settings**, and restart the server (see "Using the Setup utility" on page 75). 2. Update the IMM firmware to the latest level (see "Updating the firmware" on page 71).
W.3808003	[W.3808003] Unable to retrieve the system configuration from the IMM.	Error Retrieving System Configuration from IMM.	1. Run the Setup utility, select **Save Settings**, and restart the server (see "Using the Setup utility" on page 75). 2. Update the IMM firmware to the latest level (see "Updating the firmware" on page 71).
I.3808004	[I.3808004] The IMM System Event log (SEL) is full.	IPMI System Event Log is Full.	Run the Setup utility to clear IMM logs and restart the server (see "Using the Setup utility" on page 75).
I.3818001	[I.3818001] The firmware image capsule signature for the currently booted flash bank is invalid.	Current Bank CRTM Capsule Update Signature Invalid.	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. Recover the server firmware.
I.3818002	[I.3818002] The firmware image capsule signature for the non-booted flash bank is invalid.	Opposite Bank CRTM Capsule Update Signature Invalid.	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. Recover the server firmware.
I.3818003	[I.3818003] The CRTM flash driver could not lock the secure flash region.	CRTM Could not lock secure flash region.	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. Recover the server firmware.
S.3818004	[S.3818004] The CRTM flash driver could not successfully flash the staging area. A failure occurred.	CRTM Update Failed.	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. Recover the server firmware.

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.** • **Go to the IBM support website at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**			
Diagnostic code	**Message**	**Description**	**Action**
W.3818005	[W.3818005] The CRTM flash driver could not successfully flash the staging area. The update was aborted.	CRTM Update Aborted.	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. Recover the server firmware.
S.3818007	[S.3818007] The firmware image capsules for both flash banks could not be verified.	CRTM image capsule could not be verified.	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. Recover the server firmware.
W.3938002	[W.3938002] A boot configuration error has been detected.	Boot Configuration Error.	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. Recover the server firmware.

Integrated management module II (IMM2) error messages

The following table describes the IMM2 error messages and suggested actions to correct the detected problems.

For more information about IMM2, see the *Integrated Management Module II User's Guide* at http://www.ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5086346.

Table 13. IMM2 error messages

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
Event ID	**Message**	**Severity**	**Description**	**Action**
Temperature and fan messages				
80010701-0701xxxx	Numeric sensor adapter Ambient Temp going high (upper non-critical) has asserted.	Warning	An upper non-critical sensor going high has asserted.	1. Reduce the ambient temperature. 2. Check the server airflow. Make sure that nothing is blocking the air from coming into or preventing the air from exiting the server.
80010701-0c01xxxx	Numeric sensor Ambient Temp going high (upper non-critical) has asserted.	Warning	An upper non-critical sensor going high has asserted.	1. Reduce the ambient temperature. 2. Check the server airflow. Make sure that nothing is blocking the air from coming into or preventing the air from exiting the server.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
80010901-0701xxxx	Numeric sensor adapter Ambient Temp going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	1. Reduce the ambient temperature. 2. Check the server airflow. Make sure that nothing is blocking the air from coming into or preventing the air from exiting the server.
80010901-0c01xxxx	Numeric sensor Ambient Temp going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	1. Reduce the ambient temperature. 2. Check the server airflow. Make sure that nothing is blocking the air from coming into or preventing the air from exiting the server.
80010b01-0c01xxxx	Numeric sensor Ambient Temp going high (upper non-recoverable) has asserted.	Error	An upper non-recoverable sensor going high has asserted.	Check the server airflow. Make sure that nothing is blocking the air from coming into or preventing the air from exiting the server.
81010701-0c01xxxx	Numeric sensor Ambient Temp going high (upper non-critical) has deasserted.	Info	An upper non-critical sensor going high has deasserted.	No action; information only.
81010901-0c01xxxx	Numeric sensor Ambient Temp going high (upper critical) has deasserted.	Info	An upper critical sensor going high has deasserted.	No action; information only.
81010b01-0c01xxxx	Numeric sensor Ambient Temp going high (upper non-recoverable) has deasserted.	Info	An upper non-recoverable sensor going high has deasserted.	No action; information only.
80010701-1401xxxx 80010701-1402xxxx	Sensor CPU *n* VR Temp going high (upper non-critical) has asserted. (*n* = microprocessor number)	Warning	An upper non-critical sensor going high has asserted.	1. Reduce the ambient temperature. 2. Check the server airflow. Make sure that nothing is blocking the air from coming into or preventing the air from exiting the server.
80010901-1401xxxx 80010901-1402xxxx	Sensor CPU *n* VR Temp going high (upper critical) has asserted. (*n* = microprocessor number)	Error	An upper critical sensor going high has asserted.	1. Reduce the ambient temperature. 2. Check the server airflow. Make sure that nothing is blocking the air from coming into or preventing the air from exiting the server.
80010b01-1401xxxx 80010b01-1402xxxx	Sensor CPU *n* VR Temp going high (upper non-recoverable) has asserted. (*n* = microprocessor number)	Error	An upper non-recoverable sensor going high has asserted.	Check the server airflow. Make sure that nothing is blocking the air from coming into or preventing the air from exiting the server.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
80010701-2d01xxxx	Numeric sensor PCH Temp going high (upper non-critical) has asserted.	Warning	An upper non-critical sensor going high has asserted.	1. Reduce the ambient temperature. 2. Check the server airflow. Make sure that nothing is blocking the air from coming into or preventing the air from exiting the server.
80010901-2d01xxxx	Numeric sensor PCH Temp going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	1. Reduce the ambient temperature. 2. Check the server airflow. Make sure that nothing is blocking the air from coming into or preventing the air from exiting the server.
80010b01-2d01xxxx	Numeric sensor PCH Temp going high (upper non-recoverable) has asserted.	Error	An upper non-recoverable sensor going high has asserted.	Check the server airflow. Make sure that nothing is blocking the air from coming into or preventing the air from exiting the server.
81010701-2d01xxxx	Numeric sensor PCH Temp going high (upper non-critical) has deasserted.	Info	An upper non-critical sensor going high has deasserted.	No action; information only.
81010901-2d01xxxx	Numeric sensor PCH Temp going high (upper critical) has deasserted.	Info	An upper critical sensor going high has deasserted.	No action; information only.
81010b01-2d01xxxx	Numeric sensor PCH Temp going high (upper non-recoverable) has deasserted.	Info	An upper non-recoverable sensor going high has deasserted.	No action; information only.
80010204-1d01xxxx 80010204-1d02xxxx 80010204-1d03xxxx 80010204-1d04xxxx 80010204-1d05xxxx 80010204-1d06xxxx 80010204-1d07xxxx 80010204-1d08xxxx 80010204-1d09xxxx 80010204-1d0axxxx 80010204-1d0bxxxx 80010204-1d0cxxxx	Numeric sensor Fan *n* A Tach going low (lower critical) has asserted. (*n* = 1Aa, 1Ab, 2Aa, 2Ab, 3Aa, 3Ab)	Error	A lower critical sensor going low has asserted.	1. Reseat the failing fan *n*, which is indicated by a lit LED near the fan connector on the system board. 2. Replace the failing fan (see "Removing a fan" on page 310 and "Replacing a fan" on page 311). (*n* = fan number)

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
800b010a-1e81xxxx 800b010a-1e82xxxx 800b010a-1e83xxxx	Cooling Zone *n* redundancy lost has asserted. (*n* = 1,2,3)	Error	Redundancy lost has asserted.	1. Make sure that the connectors on fan *n* are not damaged. 2. Make sure that the fan *n* connectors on the system board are not damaged. 3. Make sure that the fans are correctly installed. 4. Reseat the fans. 5. Replace the failing fan (see "Removing a fan" on page 310 and "Replacing a fan" on page 311). (*n* = fan number)
800b050a-1e81xxxx 800b050a-1e82xxxx 800b050a-1e83xxxx	Cooling Zone *n* insufficient resources has asserted. (*n* = 1,2,3)	Error	There is no redundancy and insufficient to continue operation.	1. Make sure that the connectors on fan *n* are not damaged. 2. Make sure that the fan *n* connectors on the system board are not damaged. 3. Make sure that the fans are correctly installed. 4. Reseat the fans. 5. Replace the failing fan (see "Removing a fan" on page 310 and "Replacing a fan" on page 311). (*n* = fan number)
80070204-0a01xxxx 80070204-0a02xxxx	Sensor PS *n* Fan Fault has transitioned to critical from a less severe state. (*n* = power supply number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that there are no obstructions, such as bundled cables, to the airflow from the power-supply fan. 2. Replace power supply *n*. (*n* = power supply number)
Power messages				
80010902-0701xxxx	Numeric sensor Planar 3.3V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained technician only) Replace the system board (see "Removing the system board" on page 354 and "Replacing the system board" on page 359).
80010202-0701xxxx	Numeric sensor Planar 3.3V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained technician only) Replace the system board (see "Removing the system board" on page 354 and "Replacing the system board" on page 359).

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
80010902-0701xxxx	Numeric sensor Planar 5V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained technician only) Replace the system board (see "Removing the system board" on page 354 and "Replacing the system board" on page 359).
80010202-0701xxxx	Numeric sensor Planar 5V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained technician only) Replace the system board (see "Removing the system board" on page 354 and "Replacing the system board" on page 359).
80010902-0701xxxx	Numeric sensor Planar 12V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	1. Check power supply *n* LED. 2. Remove the failing power supply. 3. (Trained technician only) Replace the system board. (*n* = power supply number)
80010202-0701xxxx	Numeric sensor Planar 12V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	1. Check power supply *n* LED. 2. Remove the failing power supply. 3. Follow actions for OVER SPEC LED in System-board LEDs. 4. (Trained technician only) Replace the system board. (*n* = power supply number)
80010002-0701xxxx	Numeric sensor Planar VBAT going low (lower non-critical) has asserted.	Warning	A lower critical sensor going low has asserted.	Replace the system battery (see "Removing the system battery" on page 332 and "Replacing the system battery" on page 334).
80010202-0701xxxx	Numeric sensor Planar VBAT going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	Replace the system battery (see "Removing the system battery" on page 332 and "Replacing the system battery" on page 334).
806f0008-0a01xxxx 806f0008-0a02xxxx	The Power Supply (Power Supply *n*) presence has been added to container. (*n* = power supply number)	Info	Power supply *n* has been added. (*n* = power supply number)	No action; information only.
806f0009-1301xxxx	The Power Supply (Power Supply *n*) has been turned off.	Info	This message is for the use case when an implementation has detected a Power Unit that has been Disabled.	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f0108-0a01xxxx 806f0108-0a02xxxx	The Power Supply *n* has failed. (*n* = power supply number)	Error	Power supply *n* has failed. (*n* = power supply number)	1. Reseat power supply *n*. 2. If the power-on LED is not lit and the power-supply error LED is lit, replace power supply *n*. 3. If both the power-on LED and the power-supply error LED are not lit, see "Power problems" on page 254 for more information. (*n* = power supply number)
806f0109-1301xxxx	The Power Supply *n* has been Power Cycled. (*n* = power supply number)	Info	This message is for the use case when an implementation has detected a Power Unit that has been power cycled.	No action; information only.
806f0223-2101xxxx	Powering off system [ComputerSystemElementName] initiated by [WatchdogElementName].	Info	This message is for the use case when an implementation has detected a Poweroff by Watchdog has occurred.	No action; information only.
806f0308-0a01xxxx 806f0308-0a02xxxx	The Power Supply *n* has lost input. (*n* = power supply number)	Info	Power supply *n* AC has lost. (*n* = power supply number)	1. Reconnect the power cords. 2. Check power supply *n* LED. 3. See "Power problems" on page 254 for more information. (*n* = power supply number)
806f0608-1301xxxx	[PowerSupplyElementName] has a Configuration Mismatch.	Error	This message is for the use case when an implementation has detected a power supply with a configuration error.	1. Reseat the power supply, and then restart the server. 2. Replace the power supply. (*n* = power supply number)
80070208-0a01xxxx 80070208-0a02xxxx	Sensor PS *n* Therm Fault has transitioned to critical from a less severe state. (*n* = power supply number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that there are no obstructions, such as bundled cables, to the airflow from the power-supply fan. 2. Use the IBM Power Configurator utility to determine current system power consumption. For more information and to download the utility, go to http://www-03.ibm.com/systems/bladecenter/resources/powerconfig.html. 3. Replace power supply *n*. (*n* = power supply number)

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
80070608-0a01xxxx 80070608-0a02xxxx	Sensor PS *n* 12V AUX Fault has transitioned to non-recoverable from a less severe state. (*n* = power supply number)	Error	A sensor has changed to non-recoverable state from a less severe state.	1. Check power supply *n* LED. 2. Replace power supply *n*. (*n* = power supply number)
80070608-0a01xxxx 80070608-0a02xxxx	Sensor PS *n* 12V OC Fault has transitioned to non-recoverable from a less severe state. (*n* = power supply number)	Error	A sensor has changed to non-recoverable state from a less severe state.	1. Use the IBM Power Configurator utility to determine current system power consumption. For more information and to download the utility, go to http://www-03.ibm.com/systems/bladecenter/resources/powerconfig.html. 2. Check the OVER SPEC LED in "Light path diagnostics LEDs" on page 109.
80070608-0a01xxxx 80070608-0a02xxxx	Sensor PS *n* 12V OV Fault has transitioned to non-recoverable from a less severe state. (*n* = power supply number)	Error	A sensor has changed to non-recoverable state from a less severe state.	1. Check power supply *n* LED. 2. Remove the failing power supply. 3. (Trained technician only) Replace the system board. (*n* = power supply number)
80070608-0a01xxxx 80070608-0a02xxxx	Sensor PS *n* 12V UV Fault has transitioned to non-recoverable from a less severe state. (*n* = power supply number)	Error	A sensor has changed to non-recoverable state from a less severe state.	1. Check power supply *n* LED. 2. Remove the failing power supply. 3. Follow actions for OVER SPEC LED in System-board LEDs. 4. (Trained technician only) Replace the system board. (*n* = power supply number)
800b0008-1301xxxx	Power Unit has been fully redundant.	Info	Power unit redundancy has been restored.	No action; information only.
800b0108-1301xxxx	Power Unit redundancy lost has asserted.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Check the LEDs for both power supplies. 2. Follow the actions in "Power-supply LEDs" on page 114.
806f0608-1301xx03	Power supply PS Configuration error with rating mismatch.	Error	A power supply configuration error (rating mismatch) has occurred.	1. Make sure that the power supplies installed are with the same rating or wattage. 2. Reinstall the power supplies with the same rating or wattage.
Microprocessor messages				

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f0007-0301xxxx 806f0007-0302xxxx	The Processor CPU *n* Status has Failed with IERR. (*n* = microprocessor number)	Error	A processor failed - IERR condition has occurred.	1. Make sure that the latest levels of firmware and device drivers are installed for all adapters and standard devices, such as Ethernet, SCSI, and SAS. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Update the firmware (UEFI and IMM) to the latest level "Updating the firmware" on page 71). 3. Run the DSA program. 4. Reseat the adapter. 5. Replace the adapter. 6. (Trained technician only) Replace microprocessor *n*. 7. (Trained technician only) Replace the system board. (*n* = microprocessor number)
806f000f-22010cxx	CPU voltage mismatch detected on [ProcessorElementName].	Error	This message is for the use case when an implementation has detected a CPU voltage mismatch with the socket voltage.	1. This is a UEFI detected event. The UEFI diagnostic code for this event can be found in the logged IMM message text. Please refer to the UEFI diagnostic code in the "UEFI diagnostic code" section of the Info Center for the appropriate user response.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f0107-0301xxxx 806f0107-0302xxxx	The Processor CPU *n* Status has been detected an over-temperature condition. (*n* = microprocessor number)	Error	An over temperature condition has occurred.	1. Make sure that the latest levels of firmware and device drivers are installed for all adapters and standard devices, such as Ethernet, SCSI, and SAS. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Update the firmware (UEFI and IMM) to the latest level "Updating the firmware" on page 71). 3. Run the DSA program. 4. Reseat the adapter (see "Removing an adapter" on page 299 and "Replacing an adapter" on page 300). 5. Replace the adapter. 6. (Trained technician only) Replace microprocessor *n* (see "Removing a microprocessor and heat sink" on page 347 and "Installing an additional microprocessor and heat sink" on page 50). 7. (Trained technician only) Replace the system board (see "Removing the system board" on page 354 and "Replacing the system board" on page 359). (*n* = microprocessor number)
806f0207-0301xxxx 806f0207-0302xxxx	The Processor CPU *n* Status has Failed with BIST condition. (*n* = microprocessor number)	Error	A processor failed - BIST condition has occurred.	1. Make sure that the fans are operating. There are no obstructions to the airflow (front and rear of the server), the air baffles are in place and correctly installed, and the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n*is installed correctly. 3. (Trained technician only) Replace microprocessor *n* (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349). (*n* = microprocessor number)

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f0207-2584xxxx	All CPUs / one of the CPUs has failed with FRB1/BIST condition.	Error	A Processor Failed - FRB1/BIST condition has been detected.	1. Reseat the microprocessor, and then restart the server. 2. Replace microprocessor *n*. (*n* = microprocessor number)
806f030c-2581xxxx	Scrub Failure for All DIMMS / one of the DIMMs on subsystem.	Error	A memory scrub failure has been detected.	1. Reseat the DIMM, and then restart the server 2. Replace DIMM *n*. (*n* = DIMM number)
806f0507-0301xxxx 806f0507-0302xxxx 806f0507-2584xxxx	The Processor CPU *n* Status has a Configuration Mismatch. (*n* = microprocessor number)	Error	A processor configuration mismatch has occurred.	1. Check the CPU LED. See more information about the CPU LED in "Light path diagnostics LEDs" on page 109. 2. Check for a server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 3. Make sure that the installed microprocessors are compatible with each other (see "Replacing a microprocessor and heat sink" on page 349 for information about microprocessor requirements). 4. (Trained technician only) Reseat microprocessor *n* (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349). 5. (Trained technician only) Replace microprocessor *n* (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349). (*n* = microprocessor number)

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f0607-0301xxxx 806f0607-0302xxxx 806f0607-2584xxxx	An SM BIOS Uncorrectable CPU complex error for Processor *n* has asserted. (*n* = microprocessor number)	Error	The system management handler has detected an internal microprocessor error.	1. Make sure that the installed microprocessors are compatible with each other (see "Replacing a microprocessor and heat sink" on page 349 for information about microprocessor requirements). 2. Update the server firmware to the latest level (see "Updating the firmware" on page 71). 3. (Trained technician only) Replace the incompatible microprocessor (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349).
806f0807-0301xxxx 806f0807-0302xxxx	The Processor CPU *n* has been disabled. (*n* = microprocessor number)	Info	A processor has been disabled.	No action; information only.
806f0807-2584xxxx	The Processor for One of the CPUs has been disabled.	Info	A processor has been disabled.	No action; information only.
806f0807-2584xxxx	The Processor for All CPUs has been disabled.	Info	A processor has been disabled.	No action; information only.
806f0a07-0301xxxx 806f0a07-0302xxxx	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 (front and rear of the server), that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Check the ambient temperature. You must be operating within the specifications. 3. Make sure that the heat sink for microprocessor *n*is installed correctly. 4. (Trained technician only) Replace microprocessor *n*. (*n* = microprocessor number)

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
80070201-0301xxxx 80070201-0302xxxx	Sensor CPU *n* OverTemp has transitioned to critical from a less severe state. (*n* = microprocessor number)	Error	A sensor has changed to critical state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow (front and rear of the server), that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Check the ambient temperature. You must be operating within the specifications (see "Server features and specifications" on page 6 for more information). 3. Make sure that the heat sink for microprocessor *n*is installed correctly. 4. (Trained technician only) Replace microprocessor *n* (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349). (*n* = microprocessor number)
80070301-0301xxxx 80070301-0302xxxx	Sensor CPU *n* OverTemp has transitioned to non-recoverable from a less severe state. (*n* = microprocessor number)	Error	A sensor has changed to non-recoverable state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow (front and rear of the server), that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Check the ambient temperature. You must be operating within the specifications (see "Server features and specifications" on page 6 for more information). 3. Make sure that the heat sink for microprocessor *n* is installed correctly (see "Replacing a microprocessor and heat sink" on page 349 for more information). 4. (Trained technician only) Replace microprocessor *n* (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349). (*n* = microprocessor number)

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
8007021b-0301xxxx 8007021b-0302xxxx	Sensor CPU *n* QPI link error 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. Remove cpu 2. Check cpu socket pins, any damage or contained or bending, replace the system board. 3. Check cpu damage, replace cpu.
806f0813-2584xxxx	An Uncorrectable Bus Error has occurred on system %1.(%1 = CIM_ComputerSystem. ElementName)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int CPU)	1. Check the system-event log. 2. (Trained technician only) Remove the failing microprocessor from the system board (see "Removing a microprocessor and heat sink" on page 347). 3. Check for a server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Make sure that the two microprocessors are matching. 5. (Trained technician only) Replace the system board (see "Removing the system board" on page 354 and "Replacing the system board" on page 359).
Memory errors				
806f000f-220101xx	The System [ComputerSystemElementName] has detected no memory in the system.	Error	This message is for the use case when an implementation has detected that memory was detected in the system.	1. This is a UEFI detected event. The UEFI diagnostic code for this event can be found in the logged IMM message text. Please refer to the UEFI diagnostic code in the "UEFI diagnostic code" section of the Info Center for the appropriate user response.
806f000f-220102xx	Subsystem [MemoryElementName] has insufficient memory for operation.	Error	This message is for the use case when an implementation has detected that the usable Memory is insufficient for operation.	1. This is a UEFI detected event. The UEFI diagnostic code for this event can be found in the logged IMM message text. Please refer to the UEFI diagnostic code in the "UEFI diagnostic code" section of the Info Center for the appropriate user response.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f0813-2581xxxx	An Uncorrectable Bus Error has occurred on system %1.(%1 = CIM_ComputerSystem. ElementName)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int DIMM)	1. Check the system-event log. 2. Check the DIMM error LEDs. 3. Remove the failing DIMM from the system board (see "Removing a memory module" on page 312). 4. Check for a server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. Make sure that the installed DIMMs are supported and configured correctly (see "Replacing a memory module" on page 313 for more information). 6. (Trained technician only) Replace the system board (see "Removing the system board" on page 354 and "Replacing the system board" on page 359).

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f010c-2001xxxx 806f010c-2002xxxx 806f010c-2003xxxx 806f010c-2004xxxx 806f010c-2005xxxx 806f010c-2006xxxx 806f010c-2007xxxx 806f010c-2008xxxx 806f010c-2009xxxx 806f010c-200axxxx 806f010c-200bxxxx 806f010c-200cxxxx	Memory uncorrectable error detected for Memory 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. 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 34 for memory population). 3. If the problem follows the DIMM, replace the failing DIMM (see "Removing a memory module" on page 312 and "Replacing a memory module" on page 313). 4. (Trained 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 354 and "Replacing the system board" on page 359). 5. (Trained 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 354 and "Replacing the system board" on page 359). 6. (Trained technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349).

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f010c-2581xxxx	Memory uncorrectable error detected for 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. 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 34 for memory population). 3. If the problem follows the DIMM, replace the failing DIMM (see "Removing a memory module" on page 312 and "Replacing a memory module" on page 313). 4. (Trained 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 354 and "Replacing the system board" on page 359). 5. (Trained 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 354 and "Replacing the system board" on page 359). 6. (Trained technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349).

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f010c-2581xxxx	Memory uncorrectable error detected for 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. 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 34 for memory population). 3. If the problem follows the DIMM, replace the failing DIMM (see "Removing a memory module" on page 312 and "Replacing a memory module" on page 313). 4. (Trained 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 354 and "Replacing the system board" on page 359). 5. (Trained 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 354 and "Replacing the system board" on page 359). 6. (Trained technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349).

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f030c-2001xxxx 806f030c-2002xxxx 806f030c-2003xxxx 806f030c-2004xxxx 806f030c-2005xxxx 806f030c-2006xxxx 806f030c-2007xxxx 806f030c-2008xxxx 806f030c-2009xxxx 806f030c-200axxxx 806f030c-200bxxxx 806f030c-200cxxxx	Memory DIMM *n* Status Scrub failure detected. (*n* = DIMM number)	Error	A memory scrub failure has been 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. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Make sure that the DIMMs are firmly seated and no foreign material is found in the DIMM connector. Then, retry with the same DIMM. 3. If the problem is related to a DIMM, replace the failing DIMM indicated by the error LEDs (see "Removing a memory module" on page 312 and "Replacing a memory module" on page 313). 4. If the problem occurs on the same DIMM connector, 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 "Replacing a memory module" on page 313 for memory population). 5. (Trained 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 354 and "Replacing the system board" on page 359). (continued on the next page)

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
	Memory DIMM *n* Status Scrub failure detected. (*n* = DIMM number)	Error	A memory scrub failure has been detected.	1. (Trained 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 354 and "Replacing the system board" on page 359). 2. (Trained technician only) Swap the affected microprocessor, if there are more than one microprocessor installed. If the problem follows the microprocessor, replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a memory module" on page 313). 3. (Trained technician only) Replace the system board (see "Removing the system board" on page 354 and "Replacing the system board" on page 359).
806f040c-2001xxxx 806f040c-2002xxxx 806f040c-2003xxxx 806f040c-2004xxxx 806f040c-2005xxxx 806f040c-2006xxxx 806f040c-2007xxxx 806f040c-2008xxxx 806f040c-2009xxxx 806f040c-200axxxx 806f040c-200bxxxx 806f040c-200cxxxx	Memory DIMM disabled for DIMM *n* Status. (*n* = DIMM number)	Info	DIMM disabled.	1. Make sure the DIMM is installed correctly (see "Replacing a memory module" on page 313). 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 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f040c-2581xxxx	Memory DIMM disabled for One of the DIMMs.	Info	DIMM disabled.	1. Make sure the DIMM is installed correctly (see "Replacing a memory module" on page 313). 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).
806f040c-2581xxxx	Memory DIMM disabled for All DIMMs.	Info	DIMM disabled.	1. Make sure the DIMM is installed correctly (see "Replacing a memory module" on page 313). 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 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f050c-2001xxxx 806f050c-2002xxxx 806f050c-2003xxxx 806f050c-2004xxxx 806f050c-2005xxxx 806f050c-2006xxxx 806f050c-2007xxxx 806f050c-2008xxxx 806f050c-2009xxxx 806f050c-200axxxx 806f050c-200bxxxx 806f050c-200cxxxx	Memory Logging Limit Reached for 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 34 for memory population). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained 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 354 and "Replacing the system board" on page 359). 5. (Trained 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 354 and "Replacing the system board" on page 359). 6. (Trained technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349).

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f050c-2581xxxx	Memory Logging Limit Reached for 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 "Replacing a memory module" on page 313 for memory population). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained 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 354 and "Replacing the system board" on page 359). 5. (Trained 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 354 and "Replacing the system board" on page 359). 6. (Trained technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 347 and "Replacing a microprocessor and heat sink" on page 349).

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f050c-2581xxxx	Memory Logging Limit Reached for 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 34 for memory population). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained 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 354 and "Replacing the system board" on page 359). 5. (Trained 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 354 and "Replacing the system board" on page 359). 6. (Trained technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 347 and "Installing an additional microprocessor and heat sink" on page 50).
806f070c-2001xxxx 806f070c-2002xxxx 806f070c-2003xxxx 806f070c-2004xxxx 806f070c-2005xxxx 806f070c-2006xxxx 806f070c-2007xxxx 806f070c-2008xxxx 806f070c-2009xxxx 806f070c-200axxxx 806f070c-200bxxxx 806f070c-200cxxxx	Memory DIMM Configuration Error for DIMM *n* Status. (*n* = DIMM number)	Error	A memory DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f070c-2581xxxx	Memory DIMM Configuration Error for One of the DIMMs.	Error	A memory DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.
806f070c-2581xxxx	Memory DIMM Configuration Error for All DIMMs.	Error	A memory DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.
806f090c-2001xxxx 806f090c-2002xxxx 806f090c-2003xxxx 806f090c-2004xxxx 806f090c-2005xxxx 806f090c-2006xxxx 806f090c-2007xxxx 806f090c-2008xxxx 806f090c-2009xxxx 806f090c-200axxxx 806f090c-200bxxxx 806f090c-200cxxxx	Memory DIMM for DIMM *n* Status has been automatically throttled. (*n* = DIMM number)	Warning	A memory DIMM has been throttled.	1. Reseat the DIMM, and then restart the server. 2. Replace DIMM *n*. (*n* = DIMM number)
806f0a0c-2001xxxx 806f0a0c-2002xxxx 806f0a0c-2003xxxx 806f0a0c-2004xxxx 806f0a0c-2005xxxx 806f0a0c-2006xxxx 806f0a0c-2007xxxx 806f0a0c-2008xxxx 806f0a0c-2009xxxx 806f0a0c-200axxxx 806f0a0c-200bxxxx 806f0a0c-200cxxxx	An Over-Temperature condition has been detected on the DIMM *n* Status. (*n* = DIMM number)	Error	An over-temperature condition has occurred for DIMM *n*. (*n* = DIMM number)	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that ambient temperature is within the specifications. 3. If a fan has failed, complete the action for a fan failure. 4. Replace DIMM *n*. (*n* = DIMM number)
800b010c-2581xxxx	Backup Memory redundancy lost has asserted.	Error	Redundancy has been lost.	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.
800b030c-2581xxxx	Backup Memory sufficient resources from redundancy degraded has asserted.	Warning	There is no redundancy. The state has been transitioned from redundancy to sufficient resources.	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.
800b050c-2581xxxx	Backup Memory insufficient resources has asserted.	Error	There is no redundancy and 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.
Recovery messages				

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
816f000d-0400xxxx 816f000d-0401xxxx 816f000d-0402xxxx 816f000d-0403xxxx 816f000d-0404xxxx 816f000d-0405xxxx 816f000d-0406xxxx 816f000d-0407xxxx	The Drive *n* Status has been removed from unit. (*n* = hard disk drive number)	Error	A drive has been removed.	1. Reseat hard disk drive *n*.(*n* = hard disk drive number). Wait 1 minute or more before reinstalling the drive. 2. Replace the hard disk drive. 3. Make sure that the disk firmware and RAID controller firmware is at the latest level. 4. Check the SAS cable.
806f010d-0400xxxx 806f010d-0401xxxx 806f010d-0402xxxx 806f010d-0403xxxx 806f010d-0404xxxx 806f010d-0405xxxx 806f010d-0406xxxx 806f010d-0407xxxx	The Drive *n* Status has been disabled due to a detected fault. (*n* = hard disk drive number)	Error	A drive has been disabled because of a fault.	1. Run the hard disk drive diagnostic test on drive *n*. 2. Reseat the following components: a. Hard disk drive (wait 1 minute or more before reinstalling the drive). b. Cable from the system board to the backplane 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Hard disk drive b. Cable from the system board to the backplane c. Hard disk drive backplane (*n* = hard disk drive number)
806f020d-0400xxxx 806f020d-0401xxxx 806f020d-0402xxxx 806f020d-0403xxxx 806f020d-0404xxxx 806f020d-0405xxxx 806f020d-0406xxxx 806f020d-0407xxxx	The Drive *n* Status has a predictive failure. (*n* = hard disk drive number)	Error	A predictive failure has been detected for drive *n*. (*n* = hard disk drive number)	1. Replace the hard drive *n*. (*n* = hard disk drive number)
806f050d-0400xxxx 806f050d-0401xxxx 806f050d-0402xxxx 806f050d-0403xxxx 806f050d-0404xxxx 806f050d-0405xxxx 806f050d-0406xxxx 806f050d-0407xxxx	Array %1 is in critical condition.(%1 = CIM_ComputerSystem. ElementName)	Error	An array is in a critical state. (Sensor = Drive *n* Status) (*n* = hard disk drive number)	1. Make sure that the RAID adapter firmware and hard disk drive firmware is at the latest level. 2. Make sure that the SAS cable is connected correctly. 3. Replace the SAS cable. 4. Replace the RAID adapter. 5. Replace the hard disk drive that is indicated by a lit status LED.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f060d-0400xxxx 806f060d-0401xxxx 806f060d-0402xxxx 806f060d-0403xxxx 806f060d-0404xxxx 806f060d-0405xxxx 806f060d-0406xxxx 806f060d-0407xxxx	Array %1 has failed. (%1 = CIM_ComputerSystem. ElementName)	Error	An array is in a failed state. (Sensor = Drive *n* Status) (*n* = hard disk drive number)	1. Make sure that the RAID adapter firmware and hard disk drive firmware is at the latest level. 2. Make sure that the SAS cable is connected correctly. 3. Replace the SAS cable. 4. Replace the RAID adapter. 5. Replace the hard disk drive that is indicated by a lit status LED.
806f070d-0400xxxx 806f070d-0401xxxx 806f070d-0402xxxx 806f070d-0403xxxx 806f070d-0404xxxx 806f070d-0405xxxx 806f070d-0406xxxx 806f070d-0407xxxx	The Drive *n* Status rebuilt has been in progress. (*n* = hard disk drive number)	Info	The Drive *n* has rebuilt in progress. (*n* = hard disk drive number)	No action; information only.
PCI messages				
806f0021-3001xxxx	PCI fault has been detected for PCI *n*. (*n* = PCI slot number)	Error	A PCI fault has been detected.	1. Check the PCI LED. See more information about the PCI LED in "Light path diagnostics LEDs" on page 109. 2. Reseat the affected adapters and riser card. 3. Update the server firmware (UEFI and IMM) and adapter firmware. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove both adapters. 5. Replace the riser cards. 6. (Trained technicians only) Replace the system board (see "Removing the system board" on page 354 and "Replacing the system board" on page 359).

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f0021-2582xxxx	PCI fault has been detected for One of PCI Error.	Error	A PCI fault has been detected.	1. Check the PCI LED. See more information about the PCI LED in "Light path diagnostics LEDs" on page 109. 2. Reseat the affected adapters and riser cards. 3. Update the server firmware (UEFI and IMM) and adapter firmware. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove both adapters. 5. Replace the riser cards. 6. (Trained technicians only) Replace the system board (see "Removing the system board" on page 354 and "Replacing the system board" on page 359).
806f0021-2582xxxx	PCI fault has been detected for All PCI Error.	Error	A PCI fault has been detected.	1. Check the PCI LED. See more information about the PCI LED in "Light path diagnostics LEDs" on page 109. 2. Reseat the affected adapters and riser cards. 3. Update the server firmware (UEFI and IMM) and adapter firmware. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Replace the adapters. 5. Replace the riser cards. 6. (Trained technicians only) Replace the system board (see "Removing the system board" on page 354 and "Replacing the system board" on page 359).
806f0023-2101xxxx	Watchdog Timer expired for IPMI Watchdog.	Info	This message is for the use case when an implementation has detected a Watchdog Timer Expired.	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f0113-0301xxxx	A bus timeout has occurred on system CPU 1 PECI.	Error	This message is for the use case when an implementation has detected a Bus Timeout.	1. Reseat the microprocessor, and then restart the server. 2. Replace microprocessor *n*. (*n* = microprocessor number)
806f0113-0302xxxx	A bus timeout has occurred on system CPU 2 PECI	Error	This message is for the use case when an implementation has detected a Bus Timeout.	1. Reseat the microprocessor, and then restart the server. 2. Replace microprocessor *n*. (*n* = microprocessor number)
806f0413-2582xxxx	A PCI PERR has occurred on system %1.(%1 = CIM_ComputerSystem. ElementName)	Error	A PCI PERR has occurred. (Sensor = PCIs)	1. Check the PCI LED. See more information about the PCI LED in "Light path diagnostics LEDs" on page 109. 2. Reseat the affected adapters and riser cards. 3. Update the server firmware (UEFI and IMM) and adapter firmware. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Replace the adapters. 5. Replace the riser cards.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f0513-2582xxxx	A PCI SERR has occurred on system %1.(%1 = CIM_ComputerSystem. ElementName)	Error	A PCI SERR has occurred. (Sensor = PCIs)	1. Check the PCI LED. See more information about the PCI LED in "Light path diagnostics LEDs" on page 109. 2. Reseat the affected adapters and riser card. 3. Update the server firmware (UEFI and IMM) and adapter firmware. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Make sure that the adapter is supported. For a list of supported optional devices, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. 5. Replace the adapters. 6. Replace the riser cards.
806f0813-2582xxxx	An Uncorrectable Bus Error has occurred on system %1.(%1 = CIM_ComputerSystem.ElementName)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int - PCI)	1. Check the system-event log. 2. Check the PCI LED. See more information about the PCI LED in "Light path diagnostics LEDs" on page 109. 3. Remove the adapter from the indicated PCI slot. 4. Check for a server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. (Trained technician only) Replace the system board (see "Removing the system board" on page 354 and "Replacing the system board" on page 359).
806f0125-0B01xxxx 806f0125-0B02xxxx	The entity of PCI riser has been detected absent for PCI *n*. (*n* = PCI slot number)	Info	The entity of PCI riser *n* has been detected absent. (*n* = PCI slot number)	No action; information only.
General messages				

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
80030006-2101xxxx	Sensor Sig Verify Fail has deasserted.	Info	An implementation has detected a sensor has deasserted.	No action; information only.
80030012-2301xxxx	Sensor OS RealTime Mod has deasserted.	Info	Sensor OS RealTime Mod has deasserted.	No action; information only.
80050108-0a01xxxx 80050108-0a02xxxx	Sensor has indicated limit exceeded.	Info	This message is for the use case when an implementation has detected a Sensor limit was exceeded.	No action; information only.
80070114-2201xxxx	Sensor TPM Lock / TPM Phy Pres Set has transitioned from normal to non-critical state.	Warning	An implementation has detected a sensor transitioned to non-critical from normal.	1. This is a UEFI detected event. The UEFI diagnostic code for this event can be found in the logged IMM message text. Please refer to the UEFI diagnostic code in the "UEFI diagnostic code" section of the Info Center for the appropriate user response.
80070202-0701xxxx	Sensor Planar Fault has transitioned to critical from a less severe state.	Error	A sensor has changed to Critical state from a less severe state.	1. Check the system-event log. 2. Check for an error LED on the system board. 3. Replace any failing device. 4. Check for a server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. (Trained technician only) Replace the system board (see "Removing the system board" on page 354 and "Replacing the system board" on page 359).
8007020f-2201xxxx	Sensor TXT ACM module has transitioned to critical from a less severe state.	Error	A sensor has transitioned to critical from less severe.	1. This is a UEFI detected event. The UEFI diagnostic code for this event can be found in the logged IMM message text. Please refer to the UEFI diagnostic code in the "UEFI diagnostic code" section of the Info Center for the appropriate user response.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
8007020f-2582xxxx	Sensor No PCI I/O has transitioned to critical from a less severe state.	Error	A sensor has transitioned to critical from less severe.	1. This is a UEFI detected event. The UEFI diagnostic code for this event can be found in the logged IMM message text. Please refer to the UEFI diagnostic code in the "UEFI diagnostic code" section of the Info Center for the appropriate user response.
80070614-2201xxxx	Sensor TPM Phy Pres Set has transitioned to non-recoverable.	Error	A sensor has transitioned to non-recoverable.	1. This is a UEFI detected event. The UEFI diagnostic code for this event can be found in the logged IMM message text. Please refer to the UEFI diagnostic code in the "UEFI diagnostic code" section of the Info Center for the appropriate user response.
806f011b-0701xxxx	The Front USB connector has encountered a configuration error.	Error	The system had detected an internal connection error.	Reseat the front USB cable on the system board.
806f011b-0701xxxx	The Front Video connector has encountered a configuration error.	Error	The system had detected an internal connection error.	Reseat the front video cable on the system board.
806f0123-2101xxxx	Reboot of system [ComputerSystemElementName] initiated by [WatchdogElementName].	Info	This message is for the use case when an implementation has detected a Reboot by a Watchdog occurred.	No action; information only.
806f0125-0c01xxxx	Front panel entity has been detected Absent.	Info	A front panel entity has been detected absent.	No action; information only.
806f0013-1701xxxx	A front panel NMI has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	An operator information panel NMI/diagnostic interrupt has occurred.	1. Check the device driver. 2. Reinstall the device driver. 3. Update all device drivers to the latest level. 4. Update the firmware (UEFI and IMM) (see "Updating the firmware" on page 71).
806f0313-1701xxxx	A software NMI has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A software NMI has occurred.	1. Check the device driver. 2. Reinstall the device driver. 3. Update all device drivers to the latest level. 4. Update the firmware (UEFI and IMM) (see "Updating the firmware" on page 71).

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f0823-2101xxxx	Watchdog Timer interrupt occurred for [WatchdogElementName].	Info	This message is for the use case when an implementation has detected a Watchdog Timer interrupt occurred.	No action; information only.
806f0a13-0301xxxx	A Fatal Bus Error has occurred on system CPU 1 PECI.	Error	A bus fatal error has been detected.	1. Reseat the microprocessor, and then restart the server. 2. Replace microprocessor *n*. (n = microprocessor number)
806f0a13-0302xxxx	A Fatal Bus Error has occurred on system CPU 2 PECI.	Error	A bus fatal error has been detected.	1. Reseat the microprocessor, and then restart the server. 2. Replace microprocessor *n*. (n = microprocessor number)
81030012-2301xxxx	OS RealTime Mod state has deasserted.	Info	OS RealTime Mod state has deasserted.	No action; information only.
80070219-0701xxxx	Sensor Sys Board Fault has transitioned to critical.	Error	A sensor has changed to Critical state from a less severe state.	1. Check the system-event log. 2. Check for an error LED on the system board. 3. Replace any failing device. 4. Check for a server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. (Trained technician only) Replace the system board.
806f0312-2201xxxx	Entry to aux log has asserted.	Info	Entry to aux log has been detected.	No action; information only.
80080128-2101xxxx	Low security jumper presence has asserted.	Info	The low security jumper has been detected.	No action; information only.
8008010f-2101xxxx	Physical presence jumper presence has asserted.	Info	The physical presence jumper has been detected.	No action; information only.
81030006-2101xxxx	Sig verify fail has deasserted.	Info	The sig verify fail has deasserted.	No action; information only.
806f0028-2101xxxx	TPM command fail has asserted.	Warning	The TPM sensor access has been degraded or unavailable.	1. Turn off the server and disconnect it from power. 2.
Firmware and software messages				

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f000f-220103xx	The System [ComputerSystemElementName] encountered firmware error - unrecoverable boot device failure.	Error	This message is for the use case when an implementation has detected that System Firmware Error Unrecoverable boot device failure has occurred.	1. This is a UEFI detected event. The UEFI diagnostic code for this event can be found in the logged IMM message text. Please refer to the UEFI diagnostic code in the "UEFI diagnostic code" section of the Info Center for the appropriate user response.
806f000f-220104xx	The System [ComputerSystemElementName] has encountered a motherboard failure.	Error	This message is for the use case when an implementation has detected that a fatal motherboard failure in the system.	1. This is a UEFI detected event. The UEFI diagnostic code for this event can be found in the logged IMM message text. Please refer to the UEFI diagnostic code in the "UEFI diagnostic code" section of the Info Center for the appropriate user response.
806f000f-220107xx	The System [ComputerSystemElementName] encountered firmware error - unrecoverable keyboard failure.	Error	This message is for the use case when an implementation has detected that System Firmware Error Unrecoverable Keyboard failure has occurred.	1. This is a UEFI detected event. The UEFI diagnostic code for this event can be found in the logged IMM message text. Please refer to the UEFI diagnostic code in the "UEFI diagnostic code" section of the Info Center for the appropriate user response.
806f000f-22010axx	The System [ComputerSystemElementName] encountered firmware error - no video device detected.	Error	This message is for the use case when an implementation has detected that System Firmware Error No video device detected has occurred.	1. This is a UEFI detected event. The UEFI diagnostic code for this event can be found in the logged IMM message text. Please refer to the UEFI diagnostic code in the "UEFI diagnostic code" section of the Info Center for the appropriate user response.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f000f-22010bxx	Firmware BIOS (ROM) corruption was detected on system [ComputerSystemElementName] during POST.	Error	Firmware BIOS (ROM) corruption was detected during POST. (Sensor = ABR Status)	1. Make sure the server meets the minimum configuration to start (see "Power-supply LEDs" on page 114). 2. Recover the server firmware from the backup page: a. Restart the server. b. At the prompt, press F3 to recover the firmware. 3. Update the server firmware to the latest level (see "Updating the firmware" on page 71). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove components one at a time, restarting the server each time, to see if the problem goes away. 5. If the problem remains, (trained technician) replace the system board.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f000f-2201ffff	The System [ComputerSystemElementName] encountered a POST Error.	Error	The System ABR Status / Firmware Error encountered a POST Error.	1. Make sure the server meets the minimum configuration to start (see "Power-supply LEDs" on page 114). 2. Recover the server firmware from the backup page: a. Restart the server. b. At the prompt, press F3 to recover the firmware. 3. Update the server firmware to the latest level (see "Updating the firmware" on page 71). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove components one at a time, restarting the server each time, to see if the problem goes away. 5. If the problem remains, (trained technician) replace the system board.
806f000f-2201xxxx	The System %1 encountered a POST Error.(%1 = CIM_ComputerSystem. ElementName)	Error	The System encountered a firmware error. (Sensor = Firmware Error)	1. Make sure the server meets the minimum configuration to start (see "Power-supply LEDs" on page 114). 2. Update the server firmware on the primary page. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 3. (Trained technician only) Replace the system board.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
806f010f-2201xxxx	The System %1 encountered a POST Hang. (%1 = CIM_ComputerSystem. ElementName)	Error	The System encountered a firmware hang. (Sensor = Firmware Error)	1. Make sure the server meets the minimum configuration to start (see "Power-supply LEDs" on page 114). 2. Update the server firmware on the primary page. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 3. (Trained technician only) Replace the system board.
806f052b-2201xxxx	IMM2 FW Failover has been detected.	Error	Invalid or unsupported firmware or software was detected.	1. Make sure the server meets the minimum configuration to start (see "Power-supply LEDs" on page 114). 2. Recover the server firmware from the backup page: a. Restart the server. b. At the prompt, press F3 to recover the firmware. 3. Update the server firmware to the latest level (see "Updating the firmware" on page 71). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove components one at a time, restarting the server each time, to see if the problem goes away. 5. If the problem remains, (trained technician) replace the system board.
Web interface messages				
40000001-00000000	IMM Network Initialization Complete.	Info	An IMM network has completed initialization.	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
40000002-00000000	Certificate Authority [arg1] has detected a [arg2] Certificate Error.	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 and correctly generated. 2. Try importing the certificate again.
40000003-00000000	Ethernet Data Rate modified from [arg1] to [arg2] by user [arg3].	Info	The specified user has changed the Ethernet data rate of the Integrated Management Module external network interface to the specified value.	No action; information only.
40000004-00000000	Ethernet Duplex setting modified from [arg1] to [arg2] by user [arg3].	Info	The specified user has changed the Ethernet duplex setting of the Integrated Management Module external network interface to the specified value.	No action; information only.
40000005-00000000	Ethernet MTU setting modified from [arg1] to [arg2] by user [arg3].	Info	The specified user has changed the Ethernet maximum transmission unit (MTU) setting of the Integrated Management Module external network interface to the specified value.	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
40000006-00000000	Ethernet locally administered MAC address modified from [arg1] to [arg2] by user [arg3].	Info	The specified user has changed the Ethernet locally administered MAC address of the Integrated Management Module external network interface to the specified value.	No action; information only.
40000007-00000000	Ethernet interface [arg1] by user [arg2].	Info	A specified user has enabled or disabled the Ethernet interface.	No action; information only.
40000008-00000000	Hostname set to [arg1] by user [arg2].	Info	A specified user has modified the host name of the IMM.	No action; information only.
40000009-00000000	IP address of network interface modified from [arg1] to [arg2] by user [arg3].	Info	The specified user has changed the IP address of the Integrated Management Module external network interface to the specified value.	No action; information only.
4000000a-00000000	IP subnet mask of network interface modified from [arg1] to [arg2] by user [arg3].	Info	The specified user has changed the subnet mask of the Integrated Management Module external network interface to the specified value.	No action; information only.
4000000b-00000000	IP address of default gateway modified from [arg1] to [arg2] by user [arg3].	Info	The specified user has changed the gateway address of the Integrated Management Module external network interface to the specified value.	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
4000000c-00000000	OS Watchdog response [arg1] by [arg2].	Info	This message is for the use case where an OS Watchdog has been enabled or disabled by a user.	No action; information only.
4000000d-00000000	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.	Complete the following steps until the problem is solved: 1. Make sure that the Chassis Management Module 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.
4000000e-00000000	Remote Login Successful. Login ID: [arg1] from [arg2] at IP address [arg3].	Info	The specified user has logged in to the Integrated Management Module.	No action; information only.
4000000f-00000000	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.
40000010-00000000	Security: Userid: '%1' had %2 login failures from WEB client at IP address %3.(%1 = user ID; %2 = MaximumSuccessiveLoginFailures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from a web browser and has been prevented from logging in for the lockout period.	Complete the following steps until the problem is solved: 1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
40000011-00000000	Security: Login ID: '%1' had %2 login failures from CLI at %3.(%1 = user ID; %2 = MaximumSuccessiveLoginFailures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from the command-line interface and has been prevented from logging in for the lockout period.	Complete the following steps until the problem is solved: 1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
40000012-00000000	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.
40000013-00000000	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.
40000014-00000000	The [arg1] on system [arg2] cleared by user [arg3].	Info	The specified user has deleted system log events or audit log events.	No action; information only.
40000015-00000000	IMM reset was initiated by user %1.(%1 = user ID)	Info	The Integrated Management Module has been reset. The logs provide additional details.	No action; information only.
40000016-00000000	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.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
40000017-00000000	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.
40000018-00000000	LAN: Ethernet[0] interface is no longer active.	Info	The IMM Ethernet interface has been disabled.	No action; information only.
40000019-00000000	LAN: Ethernet[0] interface is now active.	Info	The IMM Ethernet interface has been enabled.	No action; information only.
4000001a-00000000	DHCP setting changed to [arg1] by user [arg2].	Info	The specified user has changed the DHCP setting of the Integrated Management Module external network interface.	No action; information only.
4000001b-00000000	Management Controller [arg1]: Configuration restored from a file by user [arg2].	Info	The specified user has restored the Integrated Management Module (IMM) configuration from a previously saved configuration file. Some configuration settings might require that the IMM be restarted before they take effect.	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
4000001c-00000000	Watchdog %1 Screen Capture Occurred.(%1 = OS Watchdog or Loader Watchdog)	Error	An operating-system error has occurred, and the screen capture was successful.	If there was no operating-system error, complete the following steps until the problem is solved: 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. If there was an operating-system error, check the integrity of the installed operating system.
4000001d-00000000	Watchdog %1 Failed to Capture Screen.(%1 = OS Watchdog or Loader Watchdog)	Error	An operating-system error has occurred, and the screen capture failed.	Complete the following steps until the problem is solved: 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.
4000001e-00000000	Running the backup IMM main application.	Error	The IMM was unable to run the primary IMM image and has resorted to running the backup image.	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 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
4000001f-00000000	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.
4000002a-00000000	[arg1] Firmware mismatch internal to system [arg2]. Please attempt to flash the [arg3] firmware.	Error	This message is for the use case where a specific type of firmware mismatch has been detected.	No action; information only.
4000002b-00000000	Domain name set to [arg1].	Info	Domain name set by user.	No action; information only.
4000002c-00000000	Domain Source changed to [arg1] by user [arg2].	Info	Domain source changed by user.	No action; information only.
4000002d-00000000	DDNS setting changed to [arg1] by user [arg2].	Info	DDNS setting changed by user.	No action; information only.
4000002e-00000000	DDNS registration successful. The domain name is [arg1].	Info	DDNS registration and values.	No action; information only.
4000002f-00000000	IPv6 enabled by user [arg1].	Info	IPv6 protocol is enabled by user.	No action; information only.
40000020-00000000	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.
40000021-00000000	IMM clock has been set from NTP server %1.(%1 = IBM_NTPService.ElementName)	Info	The IMM clock has been set to the date and time that is provided by the Network Time Protocol server.	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
40000022-00000000	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.
40000023-00000000	Flash of %1 from %2 succeeded for user %3.(%1 = CIM_ManagedElement.ElementName; %2 = Web or LegacyCLI; %3 = user ID)	Info	A user has successfully updated one of the following firmware components: • IMM main application • IMM boot ROM • Server firmware (UEFI) • Diagnostics • System power backplane • Remote expansion enclosure power backplane • Integrated service processor • Remote expansion enclosure processor	No action; information only.
40000024-00000000	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 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
40000025-00000000	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.
40000026-00000000	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.
40000027-00000000	%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.
40000028-00000000	IMM Test Alert Generated by %1.(%1 = user ID)	Info	A user has generated a test alert from the IMM.	No action; information only.
40000029-00000000	Security: Userid: '%1' had %2 login failures from an SSH client at IP address %3.(%1 = user ID; %2 = MaximumSuccessiveLoginFailures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from SSH and has been prevented from logging in for the lockout period.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
40000030-00000000	IPv6 disabled by user [arg1].	Info	IPv6 protocol is disabled by user.	No action; information only.
40000031-00000000	IPv6 static IP configuration enabled by user [arg1].	Info	IPv6 static address assignment method is enabled by user.	No action; information only.
40000032-00000000	IPv6 DHCP enabled by user [arg1].	Info	IPv6 DHCP assignment method is enabled by user.	No action; information only.
40000033-00000000	IPv6 stateless auto-configuration enabled by user [arg1].	Info	IPv6 stateless auto-assignment method is enabled by user.	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
40000034-00000000	IPv6 static IP configuration disabled by user [arg1].	Info	IPv6 static assignment method is disabled by user.	No action; information only.
40000035-00000000	IPv6 DHCP disabled by user [arg1].	Info	IPv6 DHCP assignment method is disabled by user.	No action; information only.
40000036-00000000	IPv6 stateless auto-configuration disabled by user [arg1].	Info	IPv6 stateless auto-assignment method is disabled by user.	No action; information only.
40000037-00000000	ENET[[arg1]] IPv6-LinkLocal:HstName=[arg2], IP@=[arg3] ,Pref=[arg4].	Info	IPv6 Link Local address is active.	No action; information only.
40000038-00000000	ENET[[arg1]] IPv6-Static:HstName=[arg2], IP@=[arg3],Pref=[arg4], GW@=[arg5].	Info	IPv6 Static address is active.	No action; information only.
40000039-00000000	ENET[[arg1]] DHCPv6-HSTN=[arg2], DN=[arg3], IP@=[arg4], Pref=[arg5].	Info	IPv6 DHCP-assigned address is active.	No action; information only.
4000003a-00000000	IPv6 static address of network interface modified from [arg1] to [arg2] by user [arg3].	Info	A user modifies the IPv6 static address of a Management Controller.	No action; information only.
4000003b-00000000	DHCPv6 failure, no IP address assigned.	Warning	S DHCP6 server fails to assign an IP address to a Management Controller.	No action; information only.
4000003c-00000000	Platform Watchdog Timer expired for [arg1].	Error	An implementation has detected an OS Loader Watchdog Timer Expired.	No action; information only.
4000003d-00000000	Telnet port number changed from [arg1] to [arg2] by user [arg3].	Info	A user has modified the telnet port number.	No action; information only.
4000003e-00000000	SSH port number changed from [arg1] to [arg2] by user [arg3].	Info	A user has modified the SSH port number.	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
4000003f-00000000	Web-HTTP port number changed from [arg1] to [arg2] by user [arg3].	Info	A user has modified the Web HTTP port number.	No action; information only.
40000040-00000000	Web-HTTPS port number changed from [arg1] to [arg2] by user [arg3].	Info	A user has modified the Web HTTPS port number.	No action; information only.
40000041-00000000	CIM/XML HTTP port number changed from [arg1] to [arg2] by user [arg3].	Info	A user has modified the CIM HTTP port number.	No action; information only.
40000042-00000000	CIM/XML HTTPS port number changed from [arg1] to [arg2] by user [arg3].	Info	A user has modified the CIM HTTPS port number.	No action; information only.
40000043-00000000	SNMP Agent port number changed from [arg1] to [arg2] by user [arg3].	Info	A user has modified the SNMP Agent port number.	No action; information only.
40000044-00000000	SNMP Traps port number changed from [arg1] to [arg2] by user [arg3].	Info	A user has modified the SNMP Traps port number.	No action; information only.
40000045-00000000	Syslog port number changed from [arg1] to [arg2] by user [arg3].	Info	A user has modified the Syslog receiver port number.	No action; information only.
40000046-00000000	Remote Presence port number changed from [arg1] to [arg2] by user [arg3].	Info	A user has modified the Remote Presence port number.	No action; information only.
40000047-00000000	LED [arg1] state changed to [arg2] by [arg3].	Info	A user has modified the state of an LED.	No action; information only.
40000048-00000000	Inventory data changed for device [arg1], new device data hash=[arg2], new master data hash=[arg3].	Info	Something has caused the physical inventory to change.	No action; information only.
40000049-00000000	SNMP [arg1] enabled by user [arg2].	Info	A user enabled SNMPv1 or SNMPv3 or Traps.	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
4000004a-00000000	SNMP [arg1] disabled by user [arg2] .	Info	A user disabled SNMPv1 or SNMPv3 or Traps.	No action; information only.
4000004b-00000000	SNMPv1 [arg1] set by user [arg2]: Name=[arg3], AccessType=[arg4], Address=[arg5].	Info	A user changed the SNMP community string.	No action; information only.
4000004c-00000000	LDAP Server configuration set by user [arg1]: SelectionMethod=[arg2], DomainName=[arg3], Server1=[arg4], Server2=[arg5], Server3=[arg6], Server4=[arg7].	Info	A user changed the LDAP server configuration.	No action; information only.
4000004d-00000000	LDAP set by user [arg1]: RootDN=[arg2], UIDSearchAttribute=[arg3], BindingMethod=[arg4], EnhancedRBS=[arg5], TargetName=[arg6], GroupFilter=[arg7], GroupAttribute=[arg8], LoginAttribute=[arg9].	Info	A user configured an LDAP Miscellaneous setting.	No action; information only.
4000004e-00000000	Serial Redirection set by user [arg1]: Mode=[arg2], BaudRate=[arg3], StopBits=[arg4], Parity=[arg5], SessionTerminateSequence=[arg6].	Info	A user configured the Serial Port mode.	No action; information only.
4000004f-00000000	Date and Time set by user [arg1]: Date=[arg2], Time-[arg3], DST Auto-adjust=[arg4], Timezone=[arg5].	Info	A user configured the Date and Time settings.	No action; information only.
40000050-00000000	Server General Settings set by user [arg1]: Name=[arg2], Contact=[arg3], Location=[arg4], Room=[arg5], RackID=[arg6], Rack U-position=[arg7].	Info	A user configured the Location setting.	No action; information only.
40000051-00000000	Server Power Off Delay set to [arg1] by user [arg2].	Info	A user configured the Server Power Off Delay.	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
40000052-00000000	Server [arg1] scheduled for [arg2] at [arg3] by user [arg4].	Info	A user configured a Server Power action at a specific time.	No action; information only.
40000053-00000000	Server [arg1] scheduled for every [arg2] at [arg3] by user [arg4].	Info	A user configured a recurring Server Power Action.	No action; information only.
40000054-00000000	Server [arg1] [arg2] cleared by user [arg3].	Info	A user cleared a Server Power Action.	No action; information only.
40000055-00000000	Synchronize time setting by user [arg1]: Mode=[arg2], NTPServerHost=[arg3]:[arg4],NTPUpdateFrequency=[arg5].	Info	A user configured the Date and Time synchronize settings.	No action; information only.
40000056-00000000	SMTP Server set by user [arg1] to [arg2]:[arg3].	Info	A user configured the SMTP server.	No action; information only.
40000057-00000000	Telnet [arg1] by user [arg2].	Info	A user enables or disables Telnet services.	No action; information only.
40000058-00000000	DNS servers set by user [arg1]: UseAdditionalServers=[arg2], PreferredDNStype=[arg3], IPv4Server1=[arg4], IPv4Server2=[arg5], IPv4Server3=[arg6], IPv6Server1=[arg7], IPv6Server2=[arg8], IPv6Server3=[arg9].	Info	A user configures the DNS servers.	No action; information only.
40000059-00000000	LAN over USB [arg1] by user [arg2].	Info	A user configured USB-LAN.	No action; information only.
4000005a-00000000	LAN over USB Port Forwarding set by user [arg1]: ExternalPort=[arg2], USB-LAN port=[arg3].	Info	A user configured USB-LAN port forwarding.	No action; information only.
4000005b-00000000	Secure Web services (HTTPS) [arg1] by user [arg2].	Info	A user enables or disables Secure web services.	No action; information only.
4000005c-00000000	Secure CIM/XML(HTTPS) [arg1] by user [arg2].	Info	A user enables or disables Secure CIM/XML services.	No action; information only.
4000005d-00000000	Secure LDAP [arg1] by user [arg2].	Info	A user enables or disables Secure LDAP services.	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
4000005e-00000000	SSH [arg1] by user [arg2].	Info	A user enables or disables SSH services.	No action; information only.
4000005f-00000000	Server timeouts set by user [arg1]: EnableOSWatchdog=[arg2], OSWatchdogTimout=[arg3], EnableLoaderWatchdog=[arg4], LoaderTimeout=[arg5].	Info	A user configures Server Timeouts.	No action; information only.
40000060-00000000	License key for [arg1] added by user [arg2].	Info	A user installs License Key.	No action; information only.
40000061-00000000	License key for [arg1] removed by user [arg2].	Info	A user removes a License Key.	No action; information only.
40000062-00000000	Global Login General Settings set by user [arg1]: AuthenticationMethod=[arg2], LockoutPeriod=[arg3], SessionTimeout=[arg4].	Info	A user changes the Global Login General Settings.	No action; information only.
40000063-00000000	Global Login Account Security set by user [arg1]: PasswordRequired=[arg2], PasswordExpirationPeriod=[arg3], MinimumPasswordReuseCycle=[arg4], MinimumPasswordLength=[arg5], MinimumPasswordChangeInterval=[arg6], MaxmumLoginFailures=[arg7], LockoutAfterMaxFailures=[arg8], MinimumDifferentCharacters=[arg9], DefaultIDExpired=[arg10], ChangePasswordFirstAccess=[arg11].	Info	A user changes the Global Login Account Security Settings to Legacy.	No action; information only.
40000064-00000000	User [arg1] created.	Info	A user account was created.	No action; information only.
40000065-00000000	User [arg1] removed.	Info	A user account was deleted.	No action; information only.
40000066-00000000	User [arg1] modified.	Info	A user account was changed.	No action; information only.
40000067-00000000	User [arg1] role set to [arg2].	Info	A user account role assigned.	No action; information only.
40000068-00000000	User [arg1] custom privileges set: [arg2].	Info	User account priveleges assigned.	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
40000069-00000000	User [arg1] for SNMPv3 set: AuthenticationProtocol=[arg2], PrivacyProtocol=[arg3], AccessType=[arg4], HostforTraps=[arg5].	Info	User account SNMPv3 settings changed.	No action; information only.
4000006a-00000000	SSH Client key added for user [arg1].	Info	User locally defined an SSH Client key.	No action; information only.
4000006b-00000000	SSH Client key imported for user [arg1] from [arg2].	Info	User imported an SSH Client key.	No action; information only.
4000006c-00000000	SSH Client key removed from user [arg1].	Info	User removed an SSH Client key.	No action; information only.
4000006d-00000000	Management Controller [arg1]: Configuration saved to a file by user [arg2].	Info	A user saves a Management Controller configuration to a file.	No action; information only.
4000006e-00000000	Alert Configuration Global Event Notification set by user [arg1]: RetryLimit=[arg2], RetryInterval=[arg3], EntryInterval=[arg4].	Info	A user changes the Global Event Notification settings.	No action; information only.
4000006f-00000000	Alert Recipient Number [arg1] updated: Name=[arg2], DeliveryMethod=[arg3], Address=[arg4], IncludeLog=[arg5], Enabled=[arg6], EnabledAlerts=[arg7], AllowedFilters=[arg8].	Info	A user adds or updates an Alert Recipient.	No action; information only.
40000070-00000000	SNMP Traps enabled by user [arg1]: EnabledAlerts=[arg2], AllowedFilters=[arg3].	Info	A user enabled the SNMP Traps configuration.	No action; information only.
40000071-00000000	The power cap value changed from [arg1] watts to [arg2] watts by user [arg3].	Info	Power Cap values changed by user.	No action; information only.
40000072-00000000	The minimum power cap value changed from [arg1] watts to [arg2] watts.	Info	Minimum Power Cap value changed.	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
40000073-00000000	The maximum power cap value changed from [arg1] watts to [arg2] watts.	Info	Maximum Power Cap value changed	No action; information only.
40000074-00000000	The soft minimum power cap value changed from [arg1] watts to [arg2] watts.	Info	Soft Minimum Power Cap value changed.	No action; information only.
40000075-00000000	The measured power value exceeded the power cap value.	Warning	Power exceeded cap.	No action; information only.
40000076-00000000	The new minimum power cap value exceeded the power cap value.	Warning	Minimum Power Cap exceeds Power Cap.	No action; information only.
40000077-00000000	Power capping was activated by user [arg1].	Info	Power capping activated by user.	No action; information only.
40000078-00000000	Power capping was deactivated by user [arg1].	Info	Power capping deactivated by user.	No action; information only.
40000079-00000000	Static Power Savings mode has been turned on by user [arg1].	Info	Static Power Savings mode turned on by user.	No action; information only.
4000007a-00000000	Static Power Savings mode has been turned off by user [arg1].	Info	Static Power Savings mode turned off by user.	No action; information only.
4000007b-00000000	Dynamic Power Savings mode has been turned on by user [arg1].	Info	Dynamic Power Savings mode turned on by user.	No action; information only.
4000007c-00000000	Dynamic Power Savings mode has been turned off by user [arg1].	Info	Dynamic Power Savings mode turned off by user.	No action; information only.
4000007d-00000000	Power cap and external throttling occurred.	Info	Power cap and external throttling occurred.	No action; information only.
4000007e-00000000	External throttling occurred.	Info	External throttling occurred.	No action; information only.
4000007f-00000000	Power cap throttling occurred.	Info	Power cap throttling occurred.	No action; information only.
40000080-00000000	Remote Control session started by user [arg1] in [arg2] mode.	Info	Remote Control session started	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
40000081-00000000	PXE boot requested by user [arg1].	Info	PXE boot requested.	No action; information only.
40000082-00000000	The measured power value has returned below the power cap value.	Info	Power exceeded cap recovered.	No action; information only.
40000083-00000000	The new minimum power cap value has returned below the power cap value.	Info	Minimum Power Cap exceeds Power Cap recovered	No action; information only.
40000084-00000000	IMM firmware mismatch between nodes [arg1] and [arg2]. Please attempt to flash the IMM firmware to the same level on all nodes.	Info	A mismatch of IMM firmware has been detected between nodes.	No action; information only.
40000085-00000000	FPGA firmware mismatch between nodes [arg1] and [arg2]. Please attempt to flash the FPGA firmware to the same level on all nodes.	Error	A mismatch of FPGA firmware has been detected between nodes.	No action; information only.
40000086-00000000	Test Call Home Generated by user [arg1].	Info	Test Call Home generated by user.	No action; information only.
40000087-00000000	Manual Call Home by user [arg1]: [arg2].	Info	Manual Call Home by user.	No action; information only.
40000088-00000000	Management Controller [arg1]: Configuration restoration from a file by user [arg2] completed.	Info	This message is for the use case where a user restores a Management Controller configuration from a file and it completes.	No action; information only.
40000089-00000000	Management Controller [arg1]: Configuration restoration from a file by user [arg2] failed to complete.	Info	This message is for the use case where a user restores a Management Controller configuration from a file and the restoration fails to complete.	No action; information only.

Table 13. IMM2 error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**				
4000008a-00000000	Management Controller [arg1]: Configuration restoration from a file by user [arg2] failed to start.	Info	This message is for the use case where a user restores a Management Controller configuration from a file and the restoration fails to start.	No action; information only.
4000008b-00000000	One or more of the Storage Management IP addresses has changed.	Info	This message is for the use case where an IP address for the Storage Management has changed.	No action; information only.

DSA messages

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

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

Table 14. DSA messages

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
089-801-xxx	CPU	CPU Stress Test	Aborted	Internal program error.	1. Turn off and restart the system. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 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.

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
089-802-xxx	CPU	CPU Stress Test	Aborted	System resource availability error.	1. Turn off and restart the system. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/support/docview.wss?uid=psg1 MIGR-4JTS2T and select your system to display a matrix of available firmware. For more information, see "Updating the firmware" on page 71. 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 the latest level of firmware, go to http://www.ibm.com/support/docview.wss?uid=psg1 MIGR-4JTS2T and select your system to display a matrix of available firmware. For more information, see "Updating the firmware" on page 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
089-901-xxx	CPU	CPU Stress Test	Failed	Test failure.	1. Turn off and restart the system if necessary to recover from a hung state. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 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.

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-801-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: 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 IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-802-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: the test cannot be completed for an unknown reason.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-803-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: the node is busy; try later.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-804-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: invalid command.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-805-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: invalid command for the given LUN.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-806-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: timeout while processing the command.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-807-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: out of space.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-808-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: reservation canceled or invalid reservation ID.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-809-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: request data was truncated.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-810-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: request data length is invalid.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-811-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: request data field length limit is exceeded.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-812-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C Test aborted: a parameter is out of range.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-813-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: cannot return the number of requested data bytes.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-814-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: requested sensor, data, or record is not present.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
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Message number	Component	Test	State	Description	Action
166-815-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: invalid data field in the request.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
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Message number	Component	Test	State	Description	Action
166-816-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: the command is illegal for the specified sensor or record type.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
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Message number	Component	Test	State	Description	Action
166-817-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: a command response could not be provided.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
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Message number	Component	Test	State	Description	Action
166-818-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: cannot execute a duplicated request.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
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Message number	Component	Test	State	Description	Action
166-819-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: a command response could not be provided; the SDR repository is in update mode.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
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Message number	Component	Test	State	Description	Action
166-820-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: a command response could not be provided; the device is in firmware update mode.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 firmware are at the latest level. 5. Make sure that the IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-821-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: a command response could not be provided; IMM initialization is in progress.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-822-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: the destination is unavailable.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-823-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test aborted: cannot execute the command; insufficient privilege level.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
166-824-xxx	IMM	IMM I^2C Test	Aborted	IMM I^2C test canceled: cannot execute the command.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 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 IMM2 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 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
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Message number	Component	Test	State	Description	Action
166-901-xxx	IMM	IMM I^2C Test	Failed	IMM indicates failure in RTMM 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 IMM2. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 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 IMM2 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 71. 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/support/docview.wss?uid=psg1SERV-OPTN.
166-904-xxx	IMM	IMM I^2C Test	Failed	IMM indicates failure in PCA9545 (I^2C I/O Expander) 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 IMM2. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 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 IMM2 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 71. 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/support/docview.wss?uid=psg1SERV-OPTN.

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
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Message number	Component	Test	State	Description	Action
166-905-xxx	IMM	IMM I^2C Test	Failed	IMM Indicates failure in the PSU 1 bus (BUS 4).	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 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 IMM2 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 71. 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/support/docview.wss?uid=psg1SERV-OPTN.
166-907-xxx	IMM	IMM I^2C Test	Failed	IMM Indicates failure in the LM75 (Thermal Sensor) bus (BUS 6).	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 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 IMM2 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 71. 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/support/docview.wss?uid=psg1SERV-OPTN.

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
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Message number	Component	Test	State	Description	Action
166-908-xxx	IMM	IMM I^2C Test	Failed	IMM Indicates failure in the PCA9539 (I^2C I/O Expander) bus (BUS 7).	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 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 IMM2 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 71. 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/support/docview.wss?uid=psg1SERV-OPTN.
201-801-xxx	Memory	Memory Test	Aborted	Test canceled: the system UEFI programmed the memory controller with an invalid CBAR address	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
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Message number	Component	Test	State	Description	Action
201-802-xxx	Memory	Memory Test	Aborted	Test canceled: the end address in the E820 function is less than 16 MB.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that all DIMMs are enabled in the Setup utility. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 5. Run the test again. 6. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-803-xxx	Memory	Memory Test	Aborted	Test canceled: could not enable the processor cache.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 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 14. DSA messages (continued)

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Message number	Component	Test	State	Description	Action
201-804-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer request failed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 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.
201-805-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller display/ alter write operation was not completed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
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Message number	Component	Test	State	Description	Action
201-806-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller fast scrub operation was not completed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-807-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer free request failed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 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 14. DSA messages (continued)

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- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
201-808-xxx	Memory	Memory Test	Aborted	Test canceled: memory controller display/ alter buffer execute error.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-809-xxx	Memory	Memory Test	Aborted	Test canceled program error: operation running fast scrub.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
201-810-xxx	Memory	Memory Test	Aborted	Test stopped: unknown error code xxx received in COMMONEXIT procedure.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 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 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
201-901-xxx	Memory	Memory Test	Failed	Test failure: single-bit error, failing DIMM z.	1. Turn off the system and disconnect it from the power source. 2. Reseat DIMM z. 3. Reconnect the system to power and turn on the system. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 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 75). 9. Run the test again. 10. Replace the failing DIMM. 11. Re-enable all memory in the Setup utility see "Using the Setup utility" on page 75). 12. Run the test again. 13. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
202-801-xxx	Memory	Memory Stress Test	Aborted	Internal program error.	1. Turn off and restart the system. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 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.
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 "Updating the firmware" on page 71). 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.

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
202-901-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. Run the standard memory test to validate all memory. 8. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
215-801-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	Unable to communicate with the device driver.	1. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 6. Run the test again. 7. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 8. Run the test again. 9. Replace the DVD drive. 10. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

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

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

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

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

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

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
215-904-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Failed	A read error occurred.	1. Insert a CD/DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 6. Run the test again. 7. Replace the DVD drive. 8. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
405-901-xxx	Ethernet Device	Test Control Registers	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
405-901-xxx	Ethernet Device	Test MII Registers	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
405-902-xxx	Ethernet Device	Test EEPROM	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
405-903-xxx	Ethernet Device	Test Internal Memory	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 2. Run the test again. 3. Check the interrupt assignments in the PCI Hardware section of the DSA event log. If the Ethernet device is sharing interrupts, if possible, use the Setup utility see "Using the Setup utility" on page 75) to assign a unique interrupt to the device. 4. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
405-904-xxx	Ethernet Device	Test Interrupt	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 2. Run the test again. 3. Check the interrupt assignments in the PCI Hardware section of the DSA event log. If the Ethernet device is sharing interrupts, if possible, use the Setup utility see "Using the Setup utility" on page 75) to assign a unique interrupt to the device. 4. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
405-905-xxx	Ethernet Device	Test Loop back at MAC Layer	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
405-906-xxx	Ethernet Device	Test Loop back at Physical Layer	Failed		1. Check the Ethernet cable for damage and make sure that the cable type and connection are correct. 2. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 3. Run the test again. 4. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 14. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**
- **Go to the IBM support web site at http://www.ibm.com/supportportal/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Message number	Component	Test	State	Description	Action
405-907-xxx	Ethernet Device	Test LEDs	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see "Updating the firmware" on page 71. 2. Run the test again. 3. Replace the component that is causing the error. If the error is caused by an adapter, replace the adapter. Check the PCI Information and Network Settings information in the DSA event log to determine the physical location of the failing component. 4. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Troubleshooting by symptom

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

If you cannot find a solution to the problem in these tables, see "DSA messages" on page 193 for information about testing the server and "Running the DSA Preboot diagnostic programs" on page 120 for additional information about running DSA Preboot program that is stored in integrated USB memory on the server. For additional information to help you solve problems, see "Start here" on page 99.

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

1. Check the system-error LED on the operator information panel; if it is lit, check the light path diagnostics LEDs (see "Light path diagnostics" on page 106).
2. Remove the software or device that you just added.
3. Run IBM Dynamic System Analysis (DSA) to determine whether the server is running correctly (for information about using DSA, see "DSA messages" on page 193.
4. Reinstall the new software or new device.

CD/DVD drive problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
The CD-ROM/DVD-ROM drive is not recognized.	1. Make sure that: • The SATA connector to which the CD or DVD drive is attached (primary or secondary) is enabled in the Setup utility. • All cables and jumpers are installed correctly. • The correct device driver is installed for the CD or DVD drive. 2. Run the CD or DVD drive diagnostic programs. 3. Reseat the following components: a. CD or DVD drive b. CD or DVD drive cable 4. Replace the components listed in step 3 one at a time, in the order shown, restarting the server each time. 5. (Trained service technician only) Replace the system board.
A CD or DVD is not working correctly.	1. Clean the CD or DVD. 2. Replace the CD or DVD with new CD or DVD media. 3. Run the CD or DVD drive diagnostic programs (see "DSA messages" on page 193). 4. Reseat the CD or DVD drive (see "Removing a CD/DVD drive" on page 305 and "Installing an optional CD/DVD drive" on page 306). 5. Replace the CD or DVD drive.
The CD or DVD drive tray is not working.	1. Make sure that the server is turned on. 2. Insert the end of a straightened paper clip into the manual tray-release opening. 3. Reseat the CD or DVD drive (see "Removing a CD/DVD drive" on page 305 and "Installing an optional CD/DVD drive" on page 306). 4. Replace the CD or DVD drive.

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 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
If an optional embedded hypervisor flash device is not listed in the expected boot order, does not appear in the list of boot devices, or a similar problem has occurred.	1. Make sure that the optional embedded hypervisor flash device is selected on the boot manager (<F12> Select Boot Device) at startup. 2. Make sure that the embedded hypervisor flash device is seated in the connector correctly (see "Removing a USB embedded hypervisor flash device" on page 318 and "Replacing a USB embedded hypervisor flash device" on page 319). 3. See the documentation that comes with the optional embedded hypervisor flash device for setup and configuration information. 4. Make sure that other software works on the server.

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 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check whether a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
A cover latch is broken, an LED is not working, or a similar problem has occurred.	If the part is a CRU, replace it. If the part is a FRU, the part must be replaced by a trained service technician (see Chapter 6, "Removing and replacing components," on page 273 to determine whether the part is a consumable, structural, or FRU component).
The server cover was removed while running and the server shut off.	Replace the server cover and restart the server.
The server is hung while the screen is on. Cannot start the Setup utility by pressing F1.	1. See hl1AA_t_nx_boot_failure for more information. 2. See "Recovering the server firmware" on page 261 for more information.

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 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
Not all drives are recognized by the DSA hard disk drive diagnostic test.	Remove the drive that is indicated by DSA (see "Removing hot-swap drives" on page 302 or "Removing a 3.5-inch simple-swap SATA drive" on page 304); then, run the hard disk drive diagnostic test again (see "DSA messages" on page 193). If the remaining drives are recognized, replace the drive that you removed with a new one.
The server stops responding during the hard disk drive diagnostic test.	Remove the drive that is indicated by DSA (see "Removing hot-swap drives" on page 302 or "Removing a 3.5-inch simple-swap SATA drive" on page 304); then, run the hard disk drive diagnostic test again (see "DSA messages" on page 193). If the remaining drives are recognized, replace the drive that you removed with a new one.
A hard disk drive has failed, and the associated yellow hard disk drive status LED is lit.	Replace the failed hard disk drive.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
A newly installed hard disk drive is not recognized.	1. Observe the associated yellow 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 yellow status LED: • If the green activity LED is flashing and the yellow 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 yellow 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 "Hard disk drive problems" on page 244). • If the green activity LED is flashing and the yellow status LED is lit, replace the drive. If the activity of the LEDs remains the same, go to step "Hard disk drive problems" on page 244. If the activity of the LEDs changes, return to step 1. 4. Make sure that the hard disk drive backplane is correctly seated. When it is correctly seated, the drive assemblies correctly connect to the backplane without bowing or causing movement of the backplane. 5. Reseat the backplane power cable and repeat steps 1 through 3. 6. Reseat the backplane signal cable and repeat steps 1 through 3. 7. Suspect the backplane signal cable or the backplane: a. Replace the affected backplane signal cable. b. Replace the affected backplane. 8. Run the DSA tests for the SAS/SATA adapter and hard disk drives (see "Running the DSA Preboot diagnostic programs" on page 120). • If the adapter passes the test but the drives are not recognized, replace the backplane signal cable and run the tests again. • Replace the backplane. • If the adapter fails the test, disconnect the backplane signal cable from the adapter and run the tests again. • If the adapter fails the test, replace the adapter. 9. See "Problem determination tips" on page 260.
Multiple hard disk drives fail.	Make sure that the hard disk drive, SAS/SATA RAID adapter, and server device drivers and firmware are at the latest level. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
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 260.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
A replacement hard disk drive does not rebuild.	1. Make sure that the hard disk drive is recognized by the adapter (the green hard disk drive activity LED is flashing). 2. Review the SAS/SATA RAID adapter documentation to determine the correct configuration parameters and settings.
A green hard disk drive activity LED does not accurately represent the actual state of the associated drive.	1. If the green hard disk drive activity LED does not flash when the drive is in use, run the DSA disk drive test (see "Running the DSA Preboot diagnostic programs" on page 120. 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.
A yellow hard disk drive status LED does not accurately represent the actual state of the associated drive.	1. If the yellow hard disk drive LED and the RAID adapter software do not indicate the same status for the drive, complete the following steps: a. Turn off the server. b. Reseat the SAS/SATA adapter. c. Reseat the backplane signal cable and backplane power cable. d. Reseat the hard disk drive. e. Turn on the server and observe the activity of the hard disk drive LEDs. 2. See "Problem determination tips" on page 260.

Intermittent problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
A problem occurs only occasionally and is difficult to diagnose.	1. Make sure that: • All cables and cords are connected securely to the rear of the server and attached devices. • When the server is turned on, air is flowing from the fan grille. If there is no airflow, the fan is not working. This can cause the server to overheat and shut down. 2. Check the event logs (see "Event logs" on page 115). 3. See "Solving undetermined problems" on page 259.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
The server resets (restarts) occasionally.	1. If the reset occurs during POST and the POST watchdog timer is enabled (click **System Settings --> Integrated Management Module --> POST Watchdog Timer** in the Setup utility to see the POST watchdog setting), make sure that sufficient time is allowed in the watchdog timeout value (**POST Watchdog Timer**). If the server continues to reset during POST, see "POST error codes" on page 122 and "DSA messages" on page 193. 2. If the reset occurs after the operating system starts, disable any automatic server restart (ASR) utilities, such as the IBM Automatic Server Restart IPMI Application for Windows, or any ASR devices that are be installed. **Note:** ASR utilities operate as operating-system utilities and are related to the IPMI device driver. If the reset continues to occur after the operating system starts, the operating system might have a problem; see "Software problems" on page 257. 3. If neither condition applies, check the event logs (see "Event logs" on page 115).

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 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
All or some keys on the keyboard do not work.	1. Make sure that: • The keyboard cable is securely connected. • The server and the monitor are turned on. 2. If you are using a USB keyboard, run the Setup utility and enable keyboardless operation. 3. See http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ for information about keyboard compatibility. 4. If you are using a USB keyboard and it is connected to a USB hub, disconnect the keyboard from the hub and connect it directly to the server. 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. Keyboard b. (Trained service technician only) System board

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
The mouse or pointing device does not work.	1. See http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ for information about mouse compatibility. 2. Make sure that: • The mouse or pointing-device cable is securely connected to the server. • If you are using a pointing device, the keyboard and mouse or pointing-device cables are not reversed. • The mouse or pointing-device device drivers are installed correctly. • The server and the monitor are turned on. • The mouse option is enabled in the Setup utility. 3. If you are using a USB mouse or pointing device and it is connected to a USB hub, disconnect the mouse or pointing device from the hub and connect it directly to the server. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Mouse or pointing device b. (Trained service technician only) System board

Memory problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
The amount of system memory that is displayed is less than the amount of installed physical memory.	**Note:** If you change memory, you must update the memory configuration in the Setup utility. 1. Make sure that: • No error LEDs are lit on the operator information panel, on the memory tray, or on the MAX5 memory expansion module. • Memory mirroring does not account for the discrepancy. • The memory modules are seated correctly (see "Removing a memory module" on page 312 and "Replacing a memory module" on page 313). • You have installed the correct type of memory. • If you changed the memory, you updated the memory configuration in the Setup utility. • All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled. 2. Check the POST event log: • If a DIMM was disabled by a systems-management interrupt (SMI), replace the DIMM. • If a DIMM was disabled by the user or by POST, run the Setup utility and enable the DIMM. 3. Run memory diagnostics (see "Running the DSA Preboot diagnostic programs" on page 120). 4. Make sure that there is no memory mismatch when the server is at the minimum memory configuration (see "Installing a memory module" on page 34 for information about DIMM rules and population sequence). 5. Reseat the DIMM. 6. Restart the server.
Multiple rows of DIMMs in a branch are identified as failing.	1. Reseat the DIMMs; then, restart the server. 2. Remove the lowest-numbered DIMM pair of those that are identified and replace it with an identical pair of known good DIMMs; then, restart the server. Repeat as necessary. If the failures continue after all identified pairs are replaced, go to step 4. 3. Return the removed DIMMs, one pair at a time, to their original connectors, restarting the server after each pair, until a pair fails. Replace each DIMM in the failed pair with an identical known good DIMM, restarting the server after each DIMM. Replace the failed DIMM. Repeat step 3 until you have tested all removed DIMMs. 4. Replace the lowest-numbered DIMM pair of those identified; then, restart the server. Repeat as necessary. 5. (Trained technician only) Replace the system board.

Microprocessor problems

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**	
Symptom	**Action**
The server goes directly to the POST Event Viewer when it is turned on.	1. Correct any errors that are indicated by the light path diagnostics LEDs (see "Light path diagnostics LEDs" on page 109). 2. Make sure that the server supports all the microprocessors and that the microprocessors match in speed, type, and cache size. To view the microprocessor information, run the Setup utility and select **System Information → System Summary → Processor**. 3. (Trained technician only) Make sure that microprocessor 1 is seated correctly. 4. (Trained technician only) Remove microprocessor 2 and restart the server. 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained technician only) Microprocessor b. (Trained technician only) System board

Monitor and video problems

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

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.** • **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**	
Symptom	**Action**
Testing the monitor.	1. Make sure that the monitor cables are firmly connected. 2. Try using a different monitor on the server, or try using the monitor that is being tested on a different server. 3. Run the diagnostic programs. If the monitor passes the diagnostic programs, the problem might be a video device driver. 4. (Trained 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 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

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. Make sure that: • The server is turned on. If there is no power to the server, see "Power problems" on page 254. • The monitor cables are connected correctly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. 3. Make sure that the correct server is controlling the monitor, if applicable. 4. Make sure that damaged server firmware is not affecting the video; see "Updating the firmware" on page 71. 5. Observe the checkpoint LEDs on the system board; if the codes are changing, go to step 6. 6. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor b. Video adapter (if one is installed) c. (Trained technician only) System board. 7. See "Solving undetermined problems" on page 259.
The monitor works when you turn on the server, but the screen goes blank when you start some application programs.	1. Make sure that: • The application program is not setting a display mode that is higher than the capability of the monitor. • You installed the necessary device drivers for the application. 2. Run video diagnostics (see "Running the DSA Preboot diagnostic programs" on page 120). • If the server passes the video diagnostics, the video is good; see "Solving undetermined problems" on page 259. • (Trained technician only) If the server fails the video diagnostics, replace the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	1. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescents, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. **Attention:** Moving a color monitor while it is turned on might cause screen discoloration. Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor. **Notes:** a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.). b. Non-IBM monitor cables might cause unpredictable problems. 2. Reseat the monitor cable. 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time: a. Monitor cable b. Video adapter (if one is installed) c. Monitor d. (Trained technician only) System board.
Wrong characters appear on the screen.	1. If the wrong language is displayed, update the server firmware to the latest level (see "Updating the firmware" on page 71) with the correct language. 2. Reseat the monitor cable. 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time: a. Monitor cable b. Video adapter (if one is installed) c. Monitor d. (Trained technician only) System board.

Network connection problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
Log in failed by using LDAP account with SSL enabled.	1. Make sure the license key is valid. 2. Generate a new license key and log in again.

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 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
An IBM optional device that was just installed does not work.	1. Make sure that: • The device is designed for the server (see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/). • You followed the installation instructions that came with the device and the device is installed correctly. • You have not loosened any other installed devices or cables. • You updated the configuration information in the Setup utility. Whenever memory or any other device is changed, you must update the configuration. 2. Reseat the device that you just installed. 3. Replace the device that you just installed.
An IBM optional device that worked previously does not work now.	1. Make sure that all of the cable connections for the device are secure. 2. If the device comes with test instructions, use those instructions to test the device. 3. If the failing device is a SCSI device, make sure that: • The cables for all external SCSI devices are connected correctly. • The last device in each SCSI chain, or the end of the SCSI cable, is terminated correctly. • Any external SCSI device is turned on. You must turn on an external SCSI device before you turn on the server. 4. Reseat the failing device. 5. Replace the failing device.

Power problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
The power-control button does not work, and the reset button does work (the server does not start). **Note:** The power-control button will not function until approximately 1 to 3 minutes after the server has been connected to ac power.	1. Make sure that the top cover is closed and latched correctly. 2. Make sure that the top cover/power cut-off switch cable is seated correctly. 3. Make sure that the power-control button on the server is working correctly: a. Disconnect the server power cords. b. Reconnect the power cords. c. Reseat the operator information panel cables, and then repeat steps 3a and 3b. • If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel. 4. Make sure that the reset button is working correctly: a. Disconnect the server power cords. b. Reconnect the power cords. c. Reseat the operator information panel cable, and then repeat steps 3a and 3b. • If the server starts, replace the operator information panel. • If the server does not start, go to step 5. 5. Make sure that: • The power cords are correctly connected to the server and to a working electrical outlet. • The type of memory that is installed is correct. • The DIMMs are fully seated. • The LEDs on the power supply do not indicate a problem. • The microprocessors are installed in the correct sequence. 6. Reseat the following components: a. DIMMs b. Power supplies 7. Replace the components listed in step 6 one at a time, in the order shown, restarting the server each time. 8. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports. 9. See "Power-supply LEDs" on page 114. 10. See "Solving undetermined problems" on page 259.
The server does not start.	1. Check the power LED on the system board. See "System-board LEDs" on page 28 for the LED location. 2. Reseat the power supply. 3. Replace the power supply.
The server does not start. (Continued)	

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
The server does not turn off.	1. Determine whether you are using an Advanced Configuration and Power Interface (ACPI) or a non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps: a. Press Ctrl+Alt+Delete. b. Turn off the server by pressing the power-control button and hold it down for 5 seconds. c. Restart the server. d. If the server fails POST and the power-control button does not work, disconnect the ac power cord for 20 seconds; then, reconnect the ac power cord and restart the server. 2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.
The server unexpectedly shuts down, and the LEDs on the operator information panel are not lit.	See "Solving undetermined problems" on page 259.

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 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
The number of serial ports that are identified by the operating system is less than the number of installed serial ports.	1. Make sure that: • Each port is assigned a unique address in the Setup utility and none of the serial ports is disabled. • The serial-port adapter (if one is present) is seated correctly. 2. Reseat the serial port adapter. 3. Replace the serial port adapter.
A serial device does not work.	1. Make sure that: • The device is compatible with the server. • The serial port is enabled and is assigned a unique address. • The device is connected to the correct connector (see "Connecting the cables" on page 68). 2. Reseat the following components: a. Failing serial device b. Serial cable 3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time. 4. (Trained technician only) Replace the 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 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
The *ServerGuide Setup and Installation* CD will not start.	1. Make sure that the server supports the ServerGuide program and has a startable (bootable) CD or DVD drive. See the readme file that is part of the ISO image at http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=TOOL-CENTER. 2. Make sure that you burned the CD or DVD from an image (do not burn the CD or DVD ISO file as a data disk) 3. Make sure that you burn the CD or DVD as *disk at once* (not track at once). 4. If the startup (boot) sequence settings have been changed, make sure that the CD or DVD drive is first in the startup sequence. 5. If more than one CD or DVD drive is installed, make sure that only one drive is set as the primary drive. Start the CD from the primary drive.
The MegaRAID Storage Manager program cannot view all installed drives, or the operating system cannot be installed.	1. Make sure that the hard disk drive is connected correctly. 2. Make sure that the SAS/SATA hard disk drive cables are securely connected.
The operating-system installation program continuously loops.	Make more space available on the hard disk.
The ServerGuide program will not start the operating-system CD.	Make sure that the operating-system CD is supported by the ServerGuide program. For a list of supported operating-system versions, go to http://www.ibm.com/systems/management/serverguide/sub.html, click IBM Service and Support Site, click the link for your ServerGuide version, and scroll down to the list of supported Microsoft Windows operating systems.
The operating system cannot be installed; the option is not available.	Make sure that the server supports the operating system. If it does, either no logical drive is defined (SCSI RAID servers), or the ServerGuide System Partition is not present. Run the ServerGuide program and make sure that setup is complete.

Software problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
You suspect a software problem.	1. To determine whether the problem is caused by the software, make sure that: • The server has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software. If you have just installed an adapter or memory, the server might have a memory-address conflict. • The software is designed to operate on the server. • Other software works on the server. • The software works on another server. 2. If you 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 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to check if a component is a consumable, structural, or FRU part.**
- **If an action step is preceded by "(Trained technician only)," that step must be performed only by a trained technician.**

Symptom	Action
A USB device does not work.	1. Make sure that: • The correct USB device driver is installed. • The operating system supports USB devices. 2. Make sure that the USB configuration options are set correctly in the Setup utility (see "Using the Setup utility" on page 75 for more information). 3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.

Video problems

See “Monitor and video problems” on page 250.

Solving power problems

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

1. Turn off the server and disconnect all ac power cords.
2. Check for loose cables in the power subsystem. Also check for short circuits, for example, if a loose screw is causing a short circuit on a circuit board.
3. If the system-error LED on the system board is lit, complete the following steps:
   a. Check the IMM2 event log. To access the web interface, see “Logging on to the Web interface” on page 87.
   b. If a log indicates that there is a power rail failure, find the location of the failed power rail on the system board.
   c. Disconnect the cables and power cords to all internal and external devices (see “Internal cable routing” on page 276). Leave the power-supply cords connected.
   d. Remove each component that is associated with the failed power component, one at a time, restarting the server each time, until the cause of the failure is identified.
   e. Replace the identified component.
4. 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, see “Power-supply LEDs” on page 114 to replace the components in the minimum configuration one at a time until the problem is isolated.

Solving Ethernet controller problems

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

Try the following procedures:

- Make sure that the correct device drivers, which come with the server are installed and that they are at the latest level.
- Make sure that the Ethernet cable is installed correctly.
  - The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.
  - If you set the Ethernet controller to operate at 100 Mbps, you must use Category 5 cabling.
  - If you directly connect two servers (without a hub), or if you are not using a hub with X ports, use a crossover cable. To determine whether a hub has an X port, check the port label. If the label contains an X, the hub has an X port.

- Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller LEDs on the rear panel of the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.
  - The Ethernet link status LED is lit when the Ethernet controller receives a link pulse from the hub. If the LED is off, there might be a defective connector or cable or a problem with the hub.
  - The Ethernet transmit/receive activity LED is lit when the Ethernet controller sends or receives data over the Ethernet network. If the Ethernet transmit/receive activity is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check 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 Dynamic System Analysis (DSA) 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 "Power problems" on page 254.

Corrupted data in CMOS memory or corrupted UEFI firmware can cause undetermined problems. To reset the CMOS data, use the CMOS jumper to clear the CMOS memory and override the power-on password; see "System-board jumpers" on page 27. If you suspect that the UEFI firmware is corrupted, see "Recovering the server firmware" on page 261.

If the power supplies are working correctly, complete the following steps:

1. Turn off the server.
2. Make sure that the server cover is closed and latched correctly.
3. Make sure that the server top cover/power cut-off switch cable is connected correctly.
4. Make sure that the server is cabled correctly.
5. Remove or disconnect the following devices, one at a time, until you find the failure. Turn on the server and reconfigure it each time.
   - Any external devices.
   - Surge-suppressor device (on the server).
   - Printer, mouse, and non-IBM devices.
   - Each adapter.
   - Hard disk drives.
   - Memory modules. The minimum configuration requirement is 2 GB DIMM in slot 1 when one microprocessor is installed in the server.
6. Turn on the server.

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

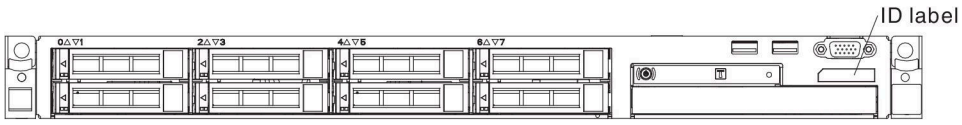
If you suspect a networking problem and the server passes all the system tests, suspect a network cabling problem that is external to the server.

Problem determination tips

Because of the variety of hardware and software combinations that can encounter, use the following information to assist you in problem determination.

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

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



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

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

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

- Setup utility settings
- Operating-system control-file setup

See “Getting help and technical assistance,” on page 367 for information about calling IBM for service.

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 either of two ways:

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

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

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

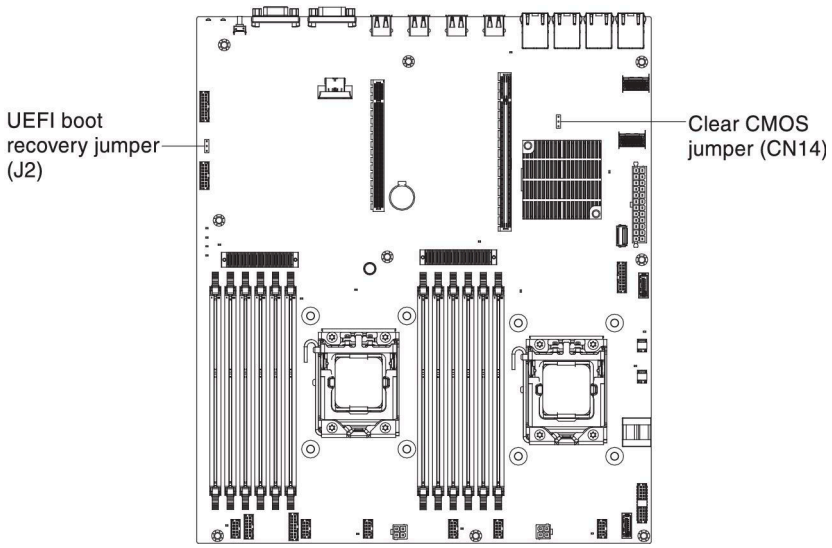
To download the server firmware update package from the World Wide Web, go to http://www.ibm.com/supportportal/.

The flash memory of the server consists of a primary bank and a backup bank. You must maintain a bootable IBM System x Server Firmware (server firmware) image in the backup bank. If the server firmware in the primary bank becomes corrupted, you can either manually boot the backup bank with the boot block jumper, or in the case of image corruption, this will occur automatically with the Automated Boot Recovery function.

In-band manual recovery method

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

1. Turn off the server, and disconnect all power cords and external cables.
2. Remove the server cover. See “Removing the server top cover” on page 362 for more information.
3. Locate the UEFI boot recovery jumper (J2) on the system board.



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

In-band automated boot recovery method

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

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

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

For more information about UEFI-compliant firmware, go to http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5083207&brandind=5000008.

Automated boot recovery (ABR)

While the server is starting, if the integrated management module detects problems with the server firmware in the primary bank, the server automatically switches to the backup firmware bank and gives you the opportunity to recover the firmware in the primary bank. For instructions for recovering the UEFI firmware, see "Recovering the server firmware" on page 261. After you have recovered the firmware in the 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, perform the following steps:

1. In the Setup utility, click **System Settings** > **Recovery** > **POST Attempts** > **POST Attempts Limit**.
2. The available options are 3, 6, 9, and 255 (disable Nx boot failure). Select your option.

Chapter 5. Parts listing, IBM System x3530 M4 Type 7160

The following replaceable components are available for the IBM System x3530 M4 Type 7160 server, except as specified otherwise in "Replaceable server components." For an updated parts listing, go to http://www.ibm.com/supportportal/.

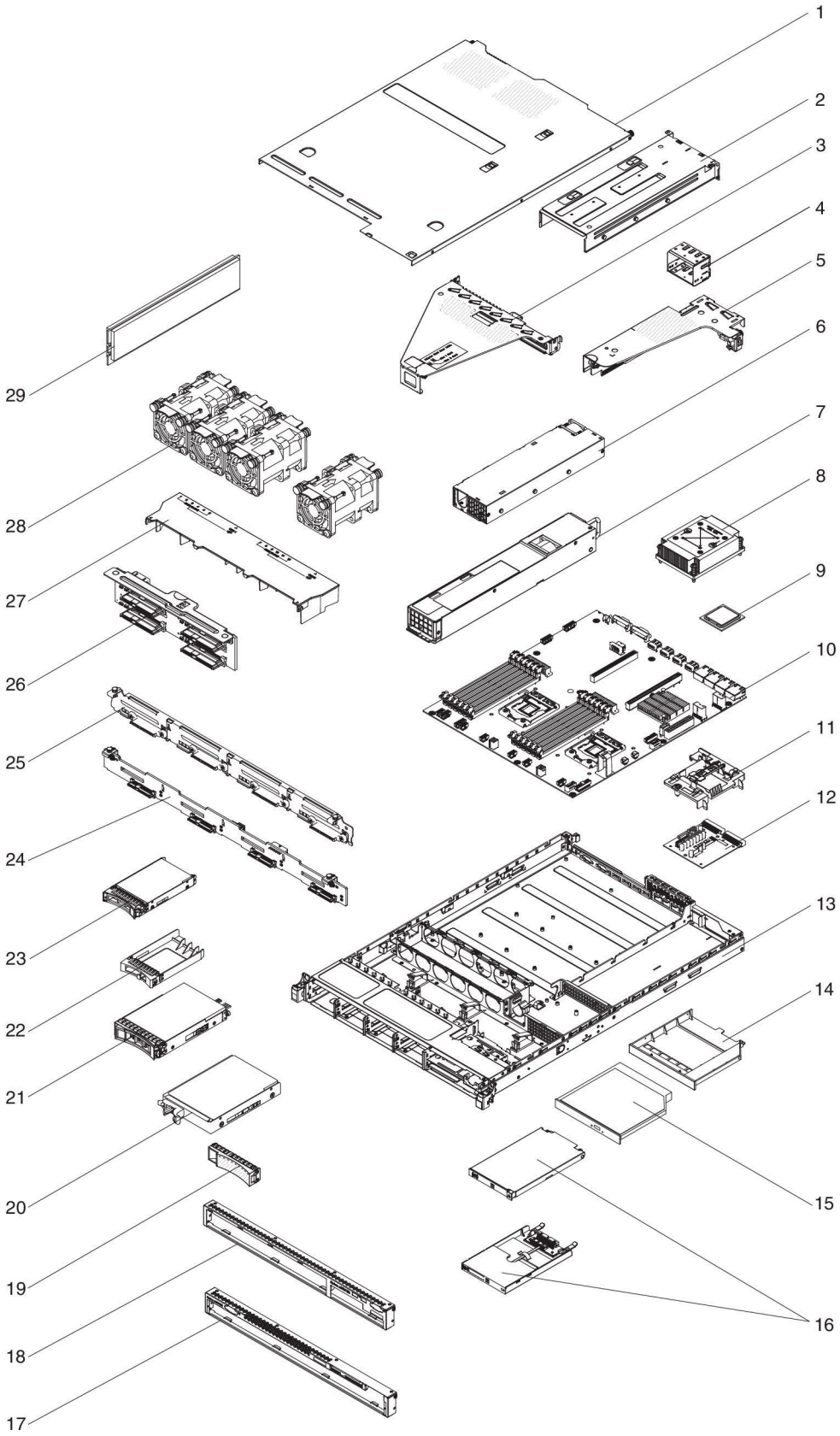
Replaceable server components

Replaceable components consist of consumable parts, structural parts, and field replaceable units (FRUs):

- **Consumables:** Purchase and replacement of consumables (components, such as batteries and printer cartridges, that have depleting life) is your responsibility. If IBM acquires or installs a consumable component at your request, you will be charged for the service.
- **Structural parts:** Purchase and replacement of structural parts (components, such as chassis assembly, top cover, and bezel) is your responsibility. If IBM acquires or installs a structural component at your request, you will be charged for the service.
- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.

For information about the terms of the warranty and getting service and assistance, see the *Warranty Information* document that comes with the server. For more information about getting service and assistance, see "Getting help and technical assistance," on page 367.

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



The following table lists the part numbers for the server components.

Table 15. Parts listing, Type 7160

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)
3	PCI Express 3.0 riser card assembly, x16 full-height, half-length	00D4427	
3	PCI Express 3.0 riser card assembly, x8 two-slot	00D4428	
5	PCI Express 3.0 riser card assembly, x4	00D4426	
6	Power supply, 460 Watt, fixed	69Y5751	
7	Power supply, 675 Watt HE, ac	39Y7218	
7	Power supply, 460 Watt	39Y7229	
8	Heat sink assembly (all models)		94Y7813
9	Microprocessor, Intel Xeon E5-2470 2.3 GHz, 20 MB, 95 W (dual quad core)		90Y4736
9	Microprocessor, Intel Xeon E5-2450 2.1 GHz, 20 MB, 95 W (dual quad core)		90Y4738
9	Microprocessor, Intel Xeon E5-2440 2.4 GHz 15 MB, 95 W (six core)		90Y4739
9	Microprocessor, Intel Xeon E5-2430 2.2 GHz, 15 MB, 95 W (six core)		90Y4740
9	Microprocessor, Intel Xeon E5-2420 1.9 GHz, 15 MB, 95 W (six core)		90Y4742
9	Microprocessor, Intel Xeon E5-2407 2.2 GHz, 10 MB, 80 W (quad core)		90Y4743
9	Microprocessor, Intel Xeon E5-2403 1.8 GHz, 10 MB, 80 W (quad core)		90Y4744
9	Microprocessor, Intel Xeon E5-1403 2.6 GHz, 5 MB, 80 W (dual core)		90Y4745
9	Microprocessor, Intel Xeon E5-1407 2.8 GHz, 5 MB, 80 W (dual core)		90Y4746
9	Microprocessor, Intel Xeon E5-2450L 1.8 GHz, 20 MB, 70 W (dual quad core)		90Y4747
9	Microprocessor, Intel Xeon E5-2430L 2.0 GHz, 15 MB, 60 W (six core)		90Y4748
9	Microprocessor, Intel Xeon E5-1410 2.8 GHz, 10 MB, 80 W (quad core)		00D9038
10	System board		00D8633
12	Power paddle card	69Y5755	
15	DVD-ROM drive	44W3254	
15	DVD-RW drive	44W3256	
16	Operator information panel	90Y5821	
20	Hard disk drive, 3.5-inch SATA, simple-swap, 500 GB 7.2K 6 Gbps	81Y9787	
20	Hard disk drive, 3.5-inch simple-swap, 500 GB 7.2K	81Y9803	
20	Hard disk drive, 3.5-inch simple-swap, 1TB 7.2K	81Y9807	
20	Hard disk drive, 3.5-inch simple-swap, 2TB 7.2K	81Y9811	
20	Hard disk drive, 3.5-inch simple-swap, 3TB 7.2K	81Y9815	
20	Hard disk drive, 3.5-inch simple-swap, 1TB	90Y8568	
20	Hard disk drive, 3.5-inch simple-swap, 3TB	90Y8578	
21	Hard disk drive, 3.5-inch SATA, hot-swap, 1TB 7.2K	81Y9791	
21	Hard disk drive, 3.5-inch SATA, hot-swap, 7.2K 6 Gbps	81Y9795	
21	Hard disk drive, 3.5-inch SATA, hot-swap, 3TB 7.2K	81Y9799	
23	Hard disk drive, 2.5-inch hot-swap, 300 GB, 15 K	81Y9671	

Table 15. Parts listing, Type 7160 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)
23	Hard disk drive, 2.5-inch hot-swap, 300 GB, 10 K	90Y8878	
24	3.5-inch hot-swap backplane bracket assembly	00D4425	
25	3.5-inch simple-swap bracket	00D4434	
26	Sprint backplane	94Y7587	
28	Fan cage assembly (all models)	00D2567	
29	Memory, 8 GB dual-rank 1.35 V, DDR3, 1333MHz, RDIMM	49Y1415	
29	Memory, 4 GB dual-rank 1.35 V, DDR3, 1333MHz, UDIMM	49Y1422	
29	Memory, 2 GB single-rank 1.35 V, DDR3, 1333MHz, RDIMM	49Y1423	
29	Memory, 4 GB single-rank 1.35 V, DDR3, 1333MHz, RDIMM	49Y1424	
29	Memory, 4 GB dual-rank 1.35 V, DDR3, 1333MHz, RDIMM	49Y1425	
29	Memory, 4 GB single-rank 1.5 V, DDR3, 1600MHz, RDIMM	49Y1561	
29	Memory, 16 GB dual-rank 1.35 V, DDR3, 1333MHz, RDIMM	49Y1565	
29	Memory, 8 GB dual-rank 1.5 V, DDR3, 1600MHz, RDIMM	90Y3111	
	Battery, 3.0 volt	33F8354	
	Cable, DD module	94Y5951	
	Cable, iPass mini SAS	00D2597	
	Cable, iPass mini SAS	94Y5954	
	Cable, optical disk drive, combo. slim	81Y7318	
	Cable, 3.5-inch hot-swap power	81Y7308	
	Cable, 2.5-inch simple-swap power	81Y7312	
	Cable, 2.5-inch power	81Y7316	
	Cable, 3.5-inch signal	81Y7306	
	Cable, 2.5-inch signal	81Y7314	
	Cable, USB board	94Y5952	
	Cable, 3.5-inch VGA	94Y6368	
	Cable, 2.5-inch VGA	94Y5953	
	Cord, 4 - 4.3 M line	39M5076	
	Cord, 1.5 M line	39M5375	
	Cord, 4.3 M line	39M5378	
	Cord, PDU jumper	30M5392	
	Label, chassis	00D4431	
	Label, GBM	00D4430	
	ServeRAID M1115 SAS/SATA adapter	81Y4449	
	ServeRAID M5120	81Y4479	
	ServeRAID M5100 series 512 MB cache (RAID 5 upgrade)	81Y4485	
	ServeRAID H1110 SAS/SATA adapter	81Y4494	
	ServeRAID M5100 series 1GB flash (RAID 5 upgrade)	81Y4580	
	ServeRAID M5110	90Y4449	
	USB cage assembly	00D4449	

Table 15. Parts listing, Type 7160 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)
	Dual-port 10 GbE adapter	81Y9993	
	6 Gb perform op	90Y4356	
	Broadcom NetExtreme qp	90Y9355	
	Broadcom NetExtreme dp	90Y9373	
	Emulex 10 GbE	95Y3766	

Consumable parts

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

Table 16. Consumable parts, Type 7160

Index	Description	Part number
11	ServeRAID M5110 series battery kit	81Y4491

To order a consumable part, complete the following steps:

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

1. Go to http://www.ibm.com.
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.

Structural parts

Structural parts are not covered by the IBM Statement of Limited Warranty.

Table 17. Structural parts, Type 7160

Index	Description	Part number
1	Top cover	00D4437
2	Power supply unit cage, redundant	00D4444
2	Power supply unit cage, fixed	00D4445
4	Filler, power supply 1U	49Y4821
13	Chassis assembly (3.5-inch, without front bezel)	00D4433
13	Chassis assembly (2.5-inch, without front bezel)	00D4440
14	Filler, optical drive	00D4436
17	Front bezel, 3.5-inch	00D4447
18	Front bezel, 2.5-inch	00D4448
19	Filler, 3.5-inch simple-swap	69Y5368
19	Filler, 3.5-inch hot-swap	69Y5364
22	Filler, blank EMC	44T2248

Table 17. Structural parts, Type 7160 (continued)

Index	Description	Part number
27	Air baffle	00D4439
	240 VA safety cover	00D4435
	EIA kit	00D4438
	Filler, DIMM	81Y4297
	Miscellaneous parts kit	00D4446
	Static rail kit	94Y6790

To order a structural part, Go to http://www.ibm.com.

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, a power cord with a grounded attachment plug is provided to use with this product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

power cords

Power cords for this product that are 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.

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

Power cord part number	Used in these countries and regions
39M5206	China
39M5102	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea

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

Power cord part number	Used in these countries and regions
39M5076	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
39M5226	India
39M5240	Brazil

Chapter 6. Removing and replacing components

Replaceable components consist of consumable parts, structural parts, and field replaceable units (FRUs):

- **Consumables:** Purchase and replacement of consumables (components, such as batteries and printer cartridges, that have depleting life) is your responsibility. If IBM acquires or installs a consumable component at your request, you will be charged for the service.
- **Structural parts:** Purchase and replacement of structural parts (components, such as chassis assembly, top cover, and bezel) is your responsibility. If IBM acquires or installs a structural component at your request, you will be charged for the service.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained technicians, unless they are classified as customer replaceable units (CRUs):
  - **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.

See Chapter 5, "Parts listing, IBM System x3530 M4 Type 7160," on page 265 to determine whether a component is a consumable, structural, or FRU that must be replaced only by a trained service technician.

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

For more information about getting service and assistance, see "Getting help and technical assistance," on page 367.

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 devices.

Before you install optional devices, read the following information:

- Read the safety information that begins on page Safety and the guidelines in "Handling static-sensitive devices" on page 32. This information will help you work safely.
- Make sure that the devices that you are installing are supported.
- Make sure that the devices that you are installing are supported. For a list of supported optional devices for the server, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.
- When you install your new server, take the opportunity to download and apply the most recent firmware updates. This step will help to ensure that any known issues are addressed and that your server is ready to function at maximum

levels of performance. To download firmware updates for your server, go to http://www.ibm.com/support/fixcentral/.

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.

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

- Before you install optional hardware, 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 "Running the DSA Preboot diagnostic programs" on page 120 for information about how to run diagnostics.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you can stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- To view the error LEDs on the system board and internal components, leave the server connected to power.
- You do not have to turn off the server to install or replace hot-swap power supplies, hot-swap fans, or hot-plug Universal Serial Bus (USB) devices. However, you must turn off the server before you perform any steps that involve removing or installing adapter cables and you must disconnect the power source from the server before you perform any steps that involve removing or installing a riser card.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.

System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- If the server has redundant power, each of the power-supply bays has a power supply installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before you turn on the server.
- 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 baffles installed. Operating the server without the air baffles 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.
- 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

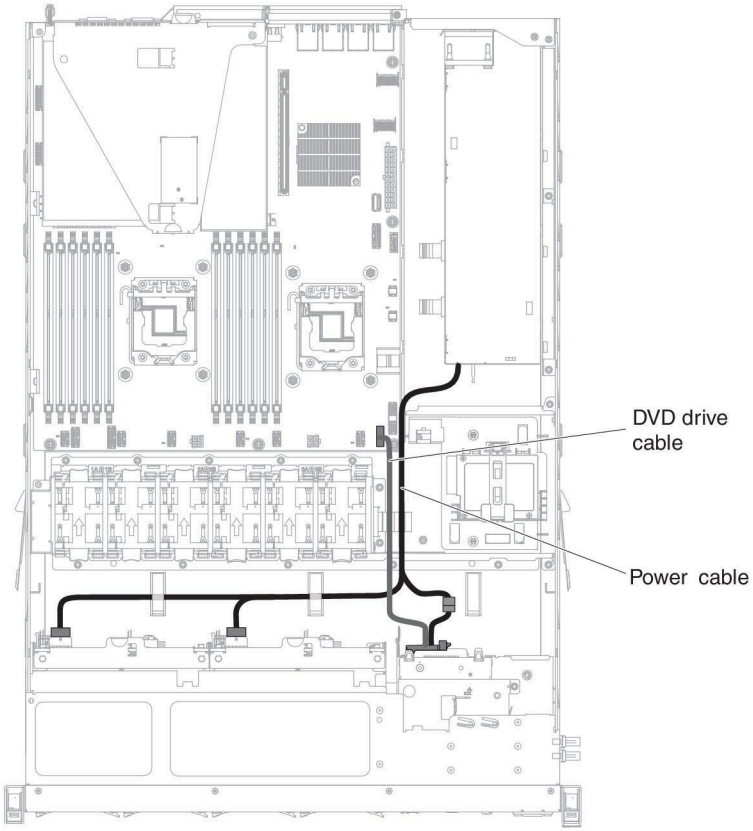
This section provides information about routing the cables when you install some components in the server.

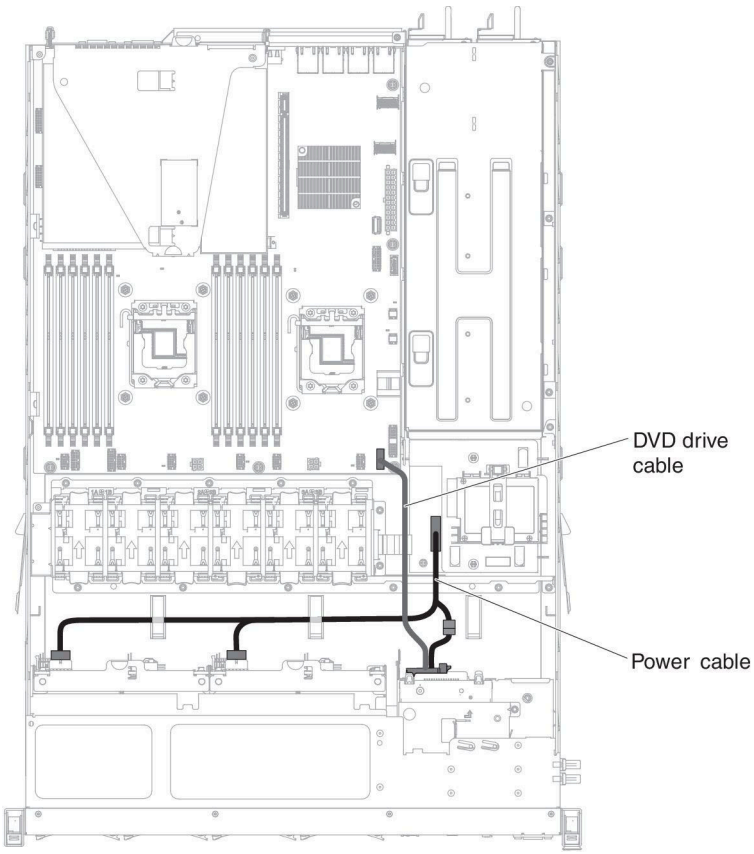
For more information about the requirements for cables and connecting devices, see the documentation that comes with these devices.

Attention: Failing to install or remove the cable with care may damage the connectors on the system board. Any damage to the connectors may require replacing the system board.

General

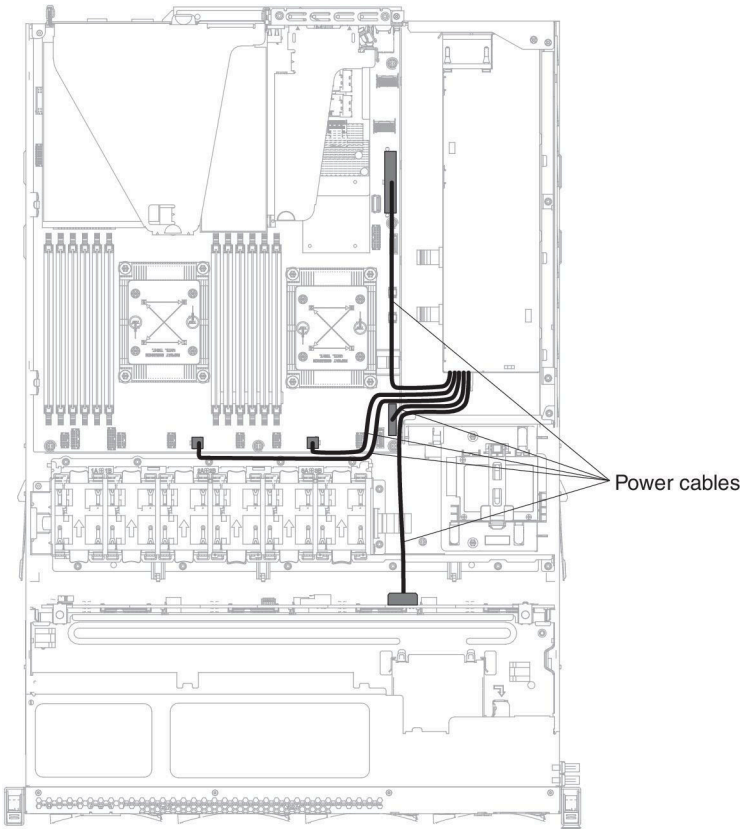
The following illustrations show the cabling information for the optional optical drive with different power supply models:

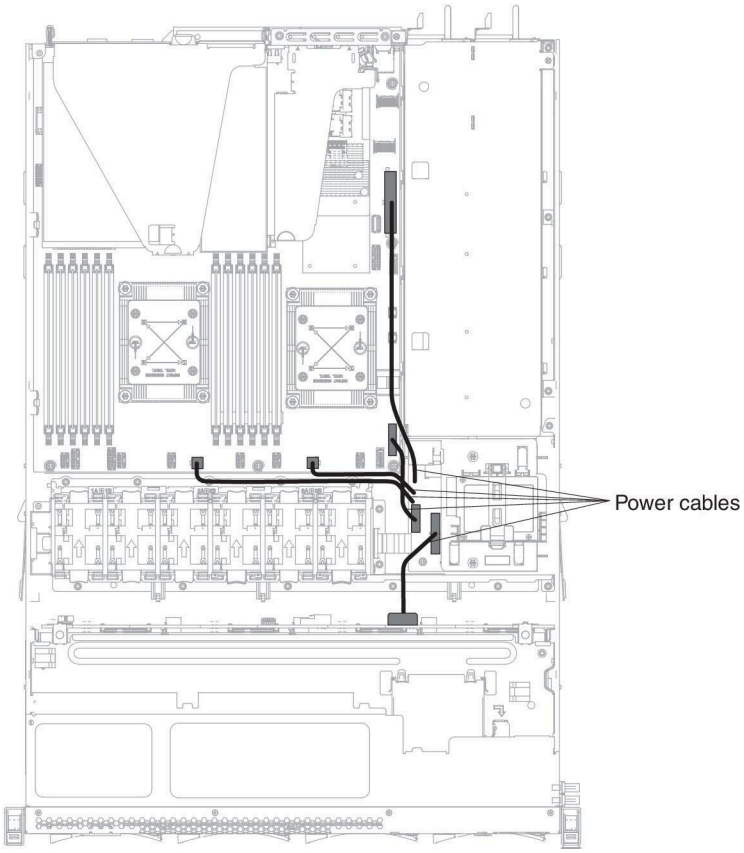




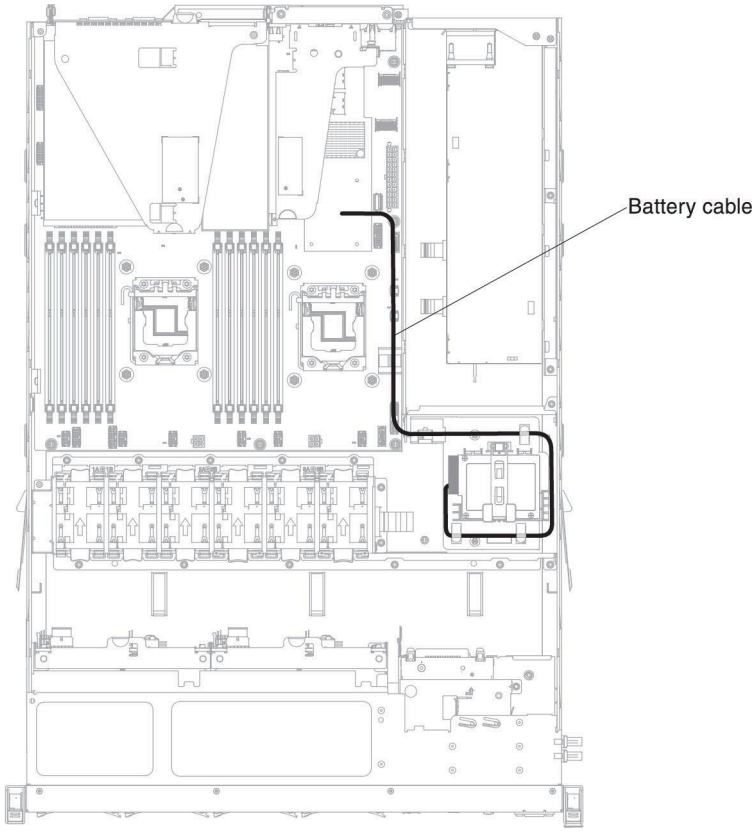
Attention: Failing to disconnect the optical drive cable from the system board properly may damage the connector on the system board. Any damage to the connector may require replacing the system board.

The following illustrations show the cabling information for the power interposer card assembly for fixed and redundant power supply models respectively:


Power cables


Power cables

The following illustration shows the cabling information for installing the RAID battery remotely in the server:

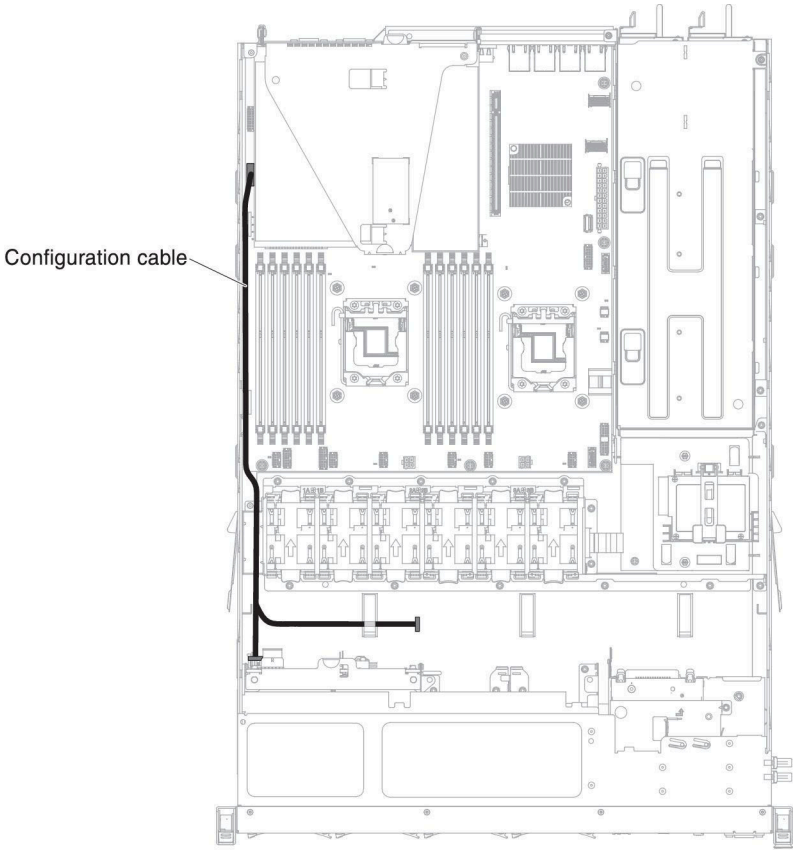


2.5-inch hard disk drive cable connection

4-drive-capable model:

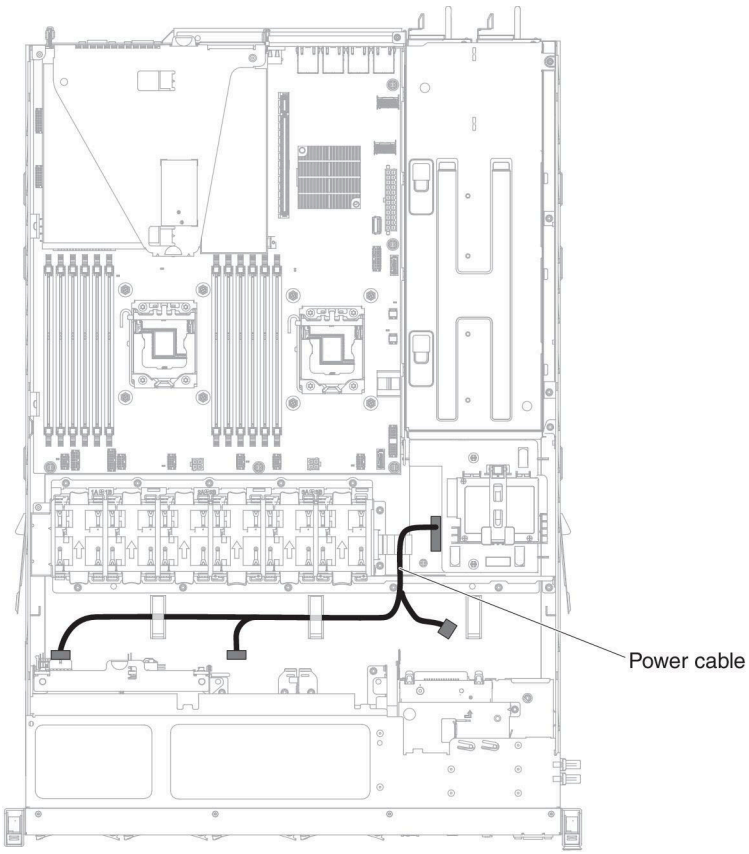
The following illustrations show the cabling information for the model of 4x2.5-inch hot-swap drive bays:

The following illustration shows the cabling information for the configuration cable in the server:

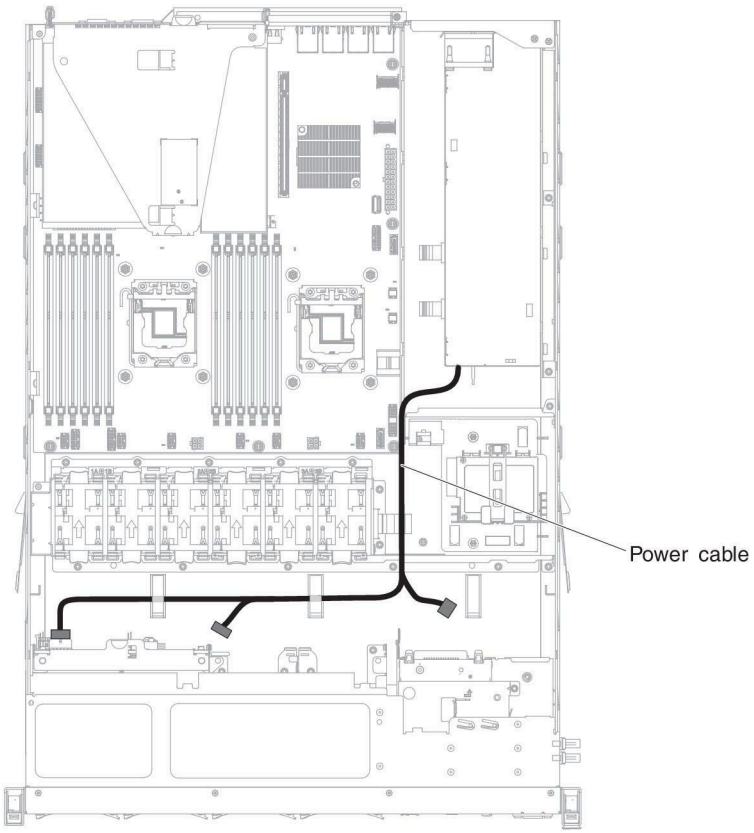


The following illustration shows the cabling information for the power cable in the server:

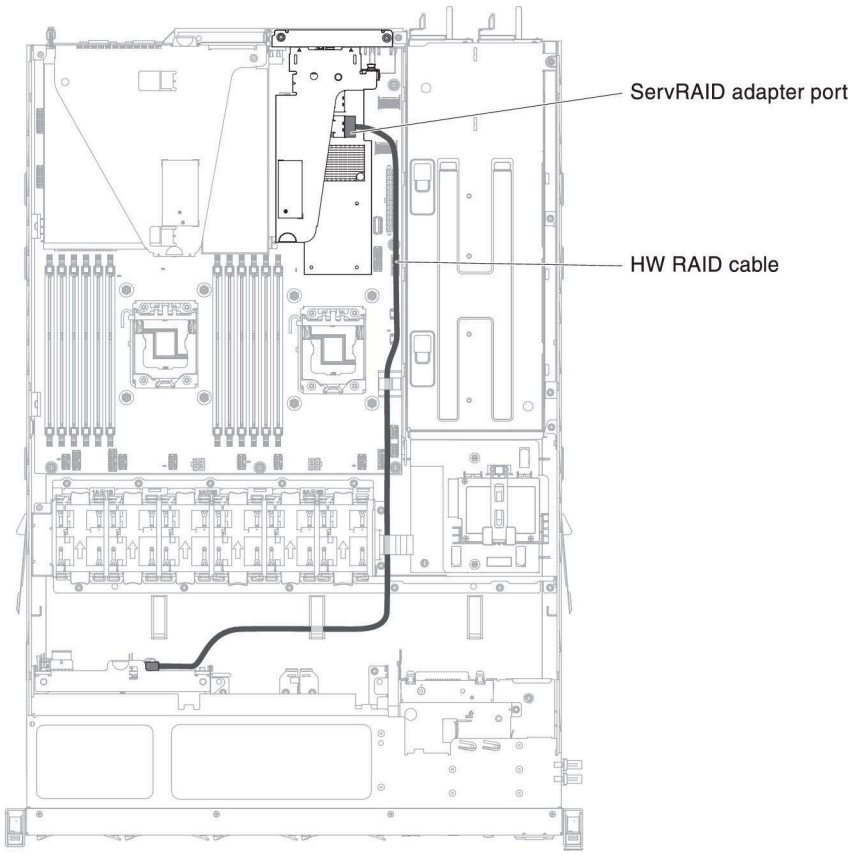
The redundant power model:



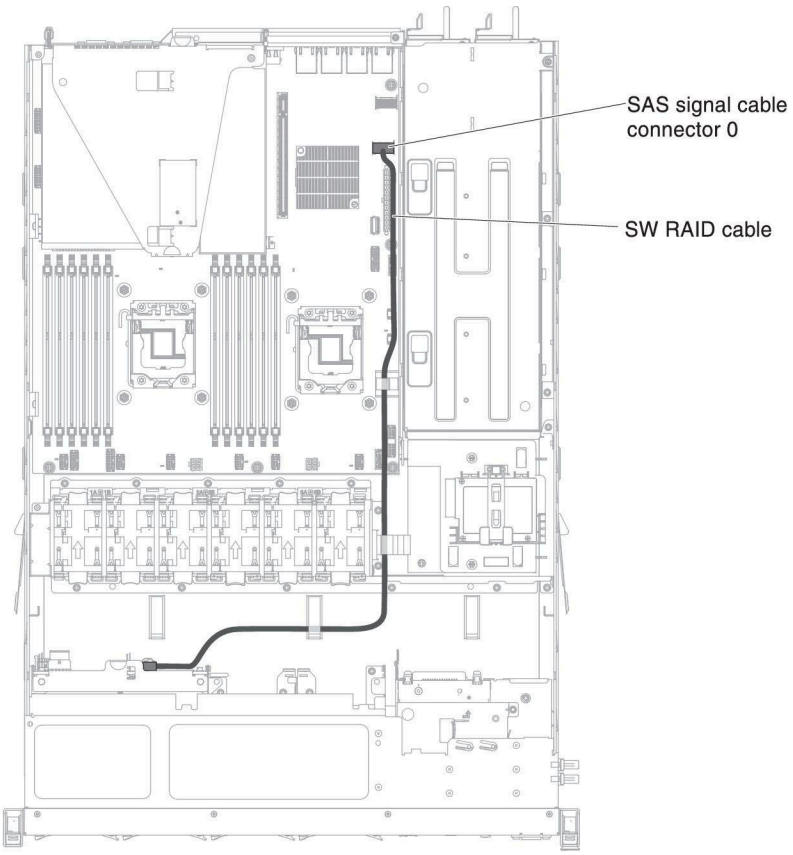
The fixed power model:



The following illustration shows the cabling information for the hardware RAID cable in the server:



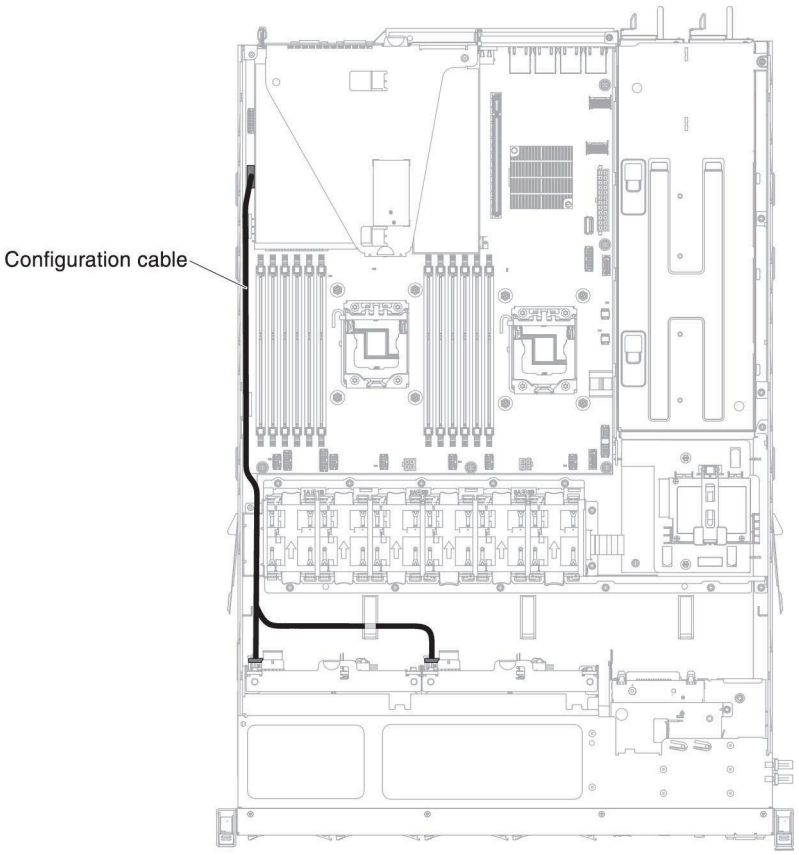
The following illustration shows the cabling information for the software RAID cable in the server:



8-drive-capable model:

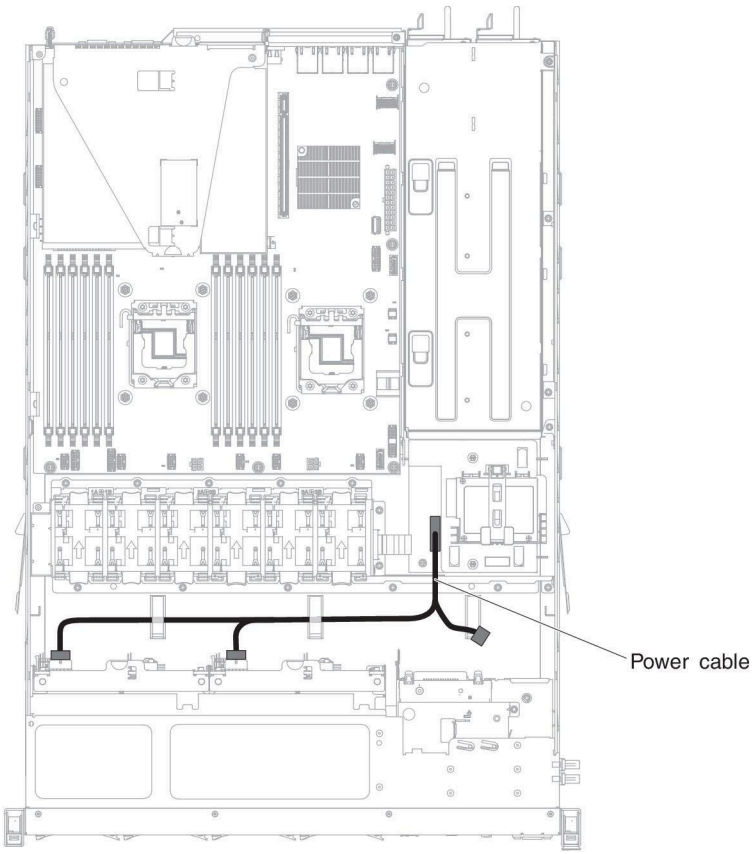
The following illustrations show the cabling information for the two 4x2.5-inch hot-swap drives model:

The following illustration shows the cabling information for the configuration cable in the server:

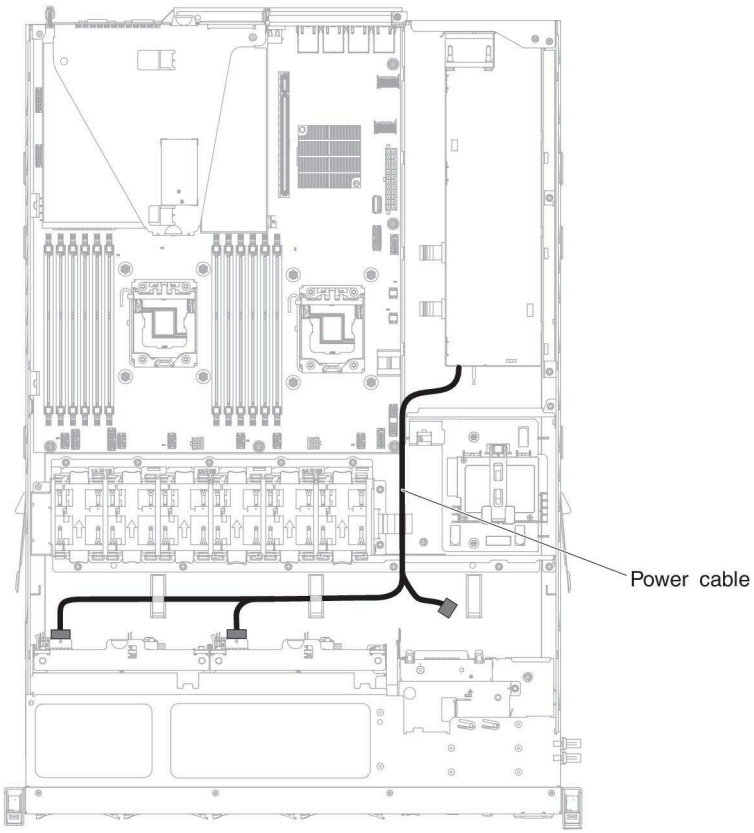


The following illustrations show the cabling information for the power cable in the server:

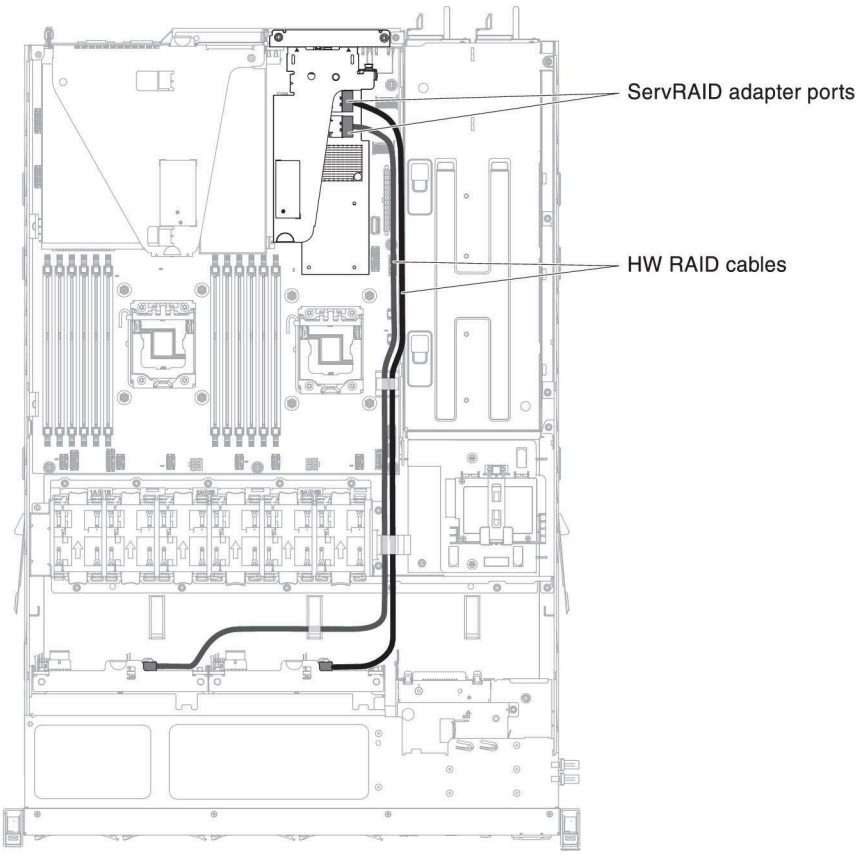
The redundant power model:



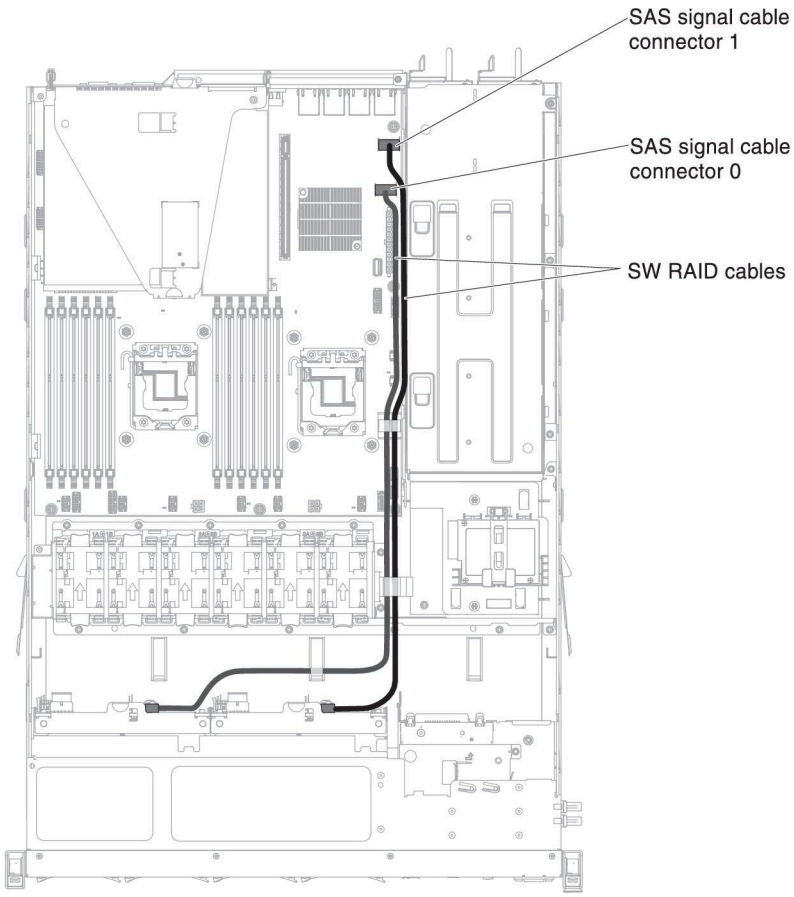
The fixed power model:



The following illustration shows the cabling information for the hardware RAID cable in the server:



The following illustration shows the cabling information for the software RAID cable in the server:

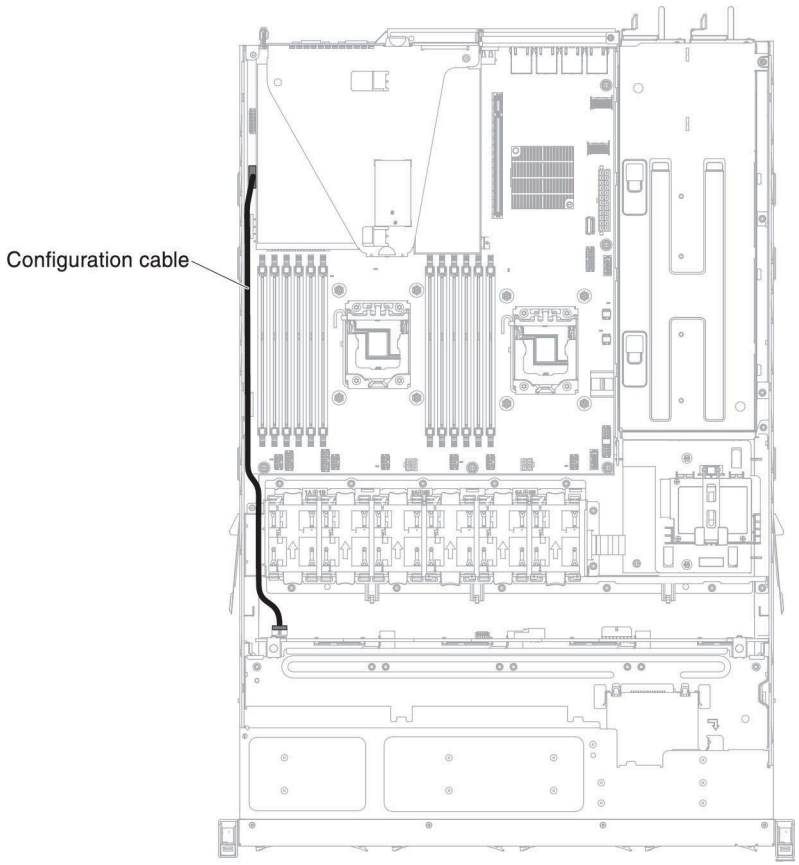


3.5-inch hard disk drive cable connection

3.5-inch hot-swap model:

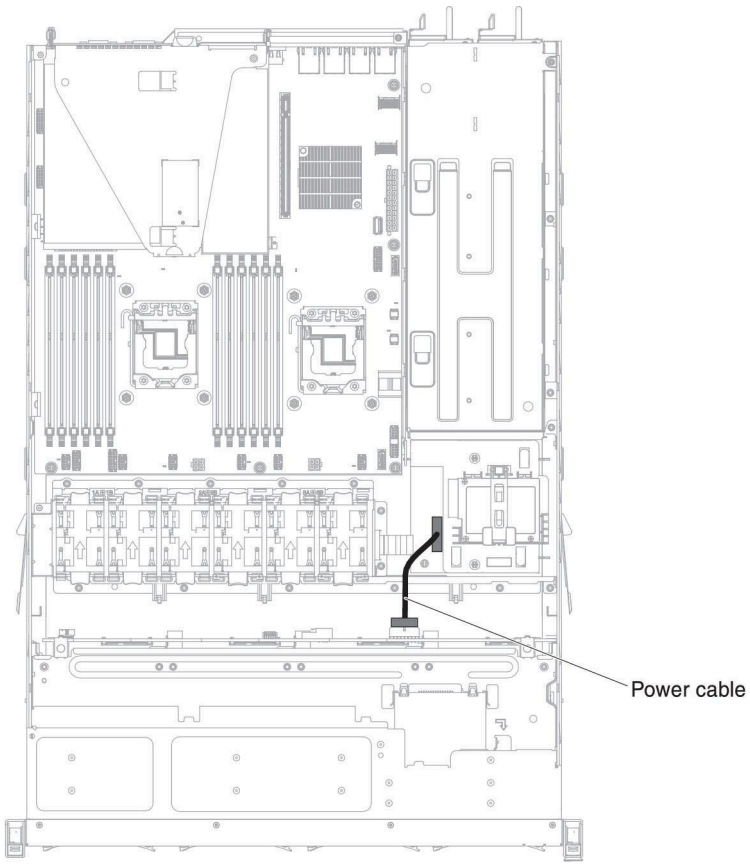
The following illustrations show the cabling information for the 4x3.5-inch hot-swap SATA/SAS drive backplane assembly:

The following illustration shows the cabling information for the configuration cable in the server:

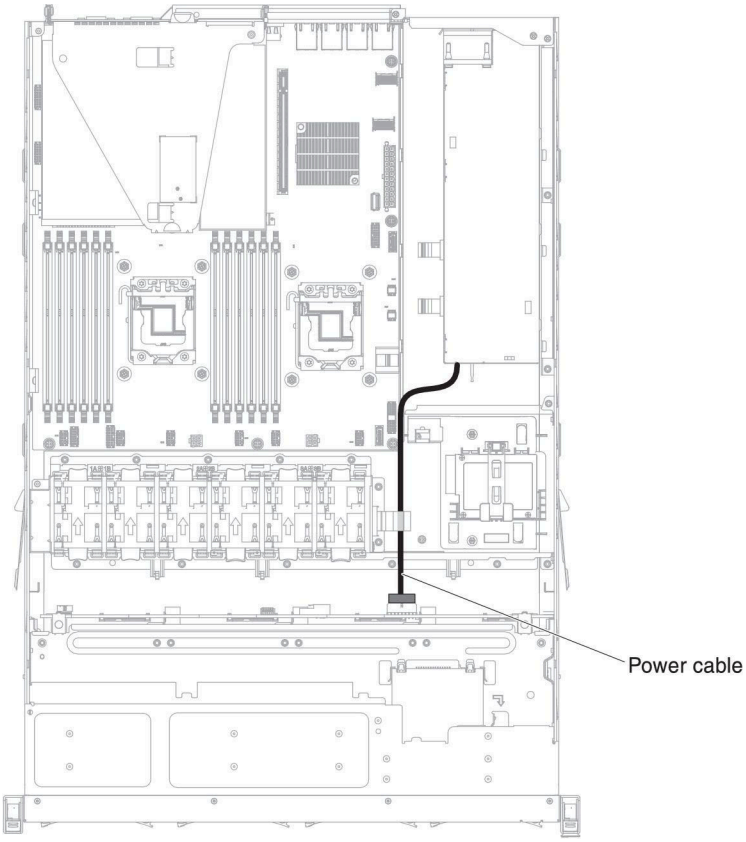


The following illustrations show the cabling information for the power cable in the server:

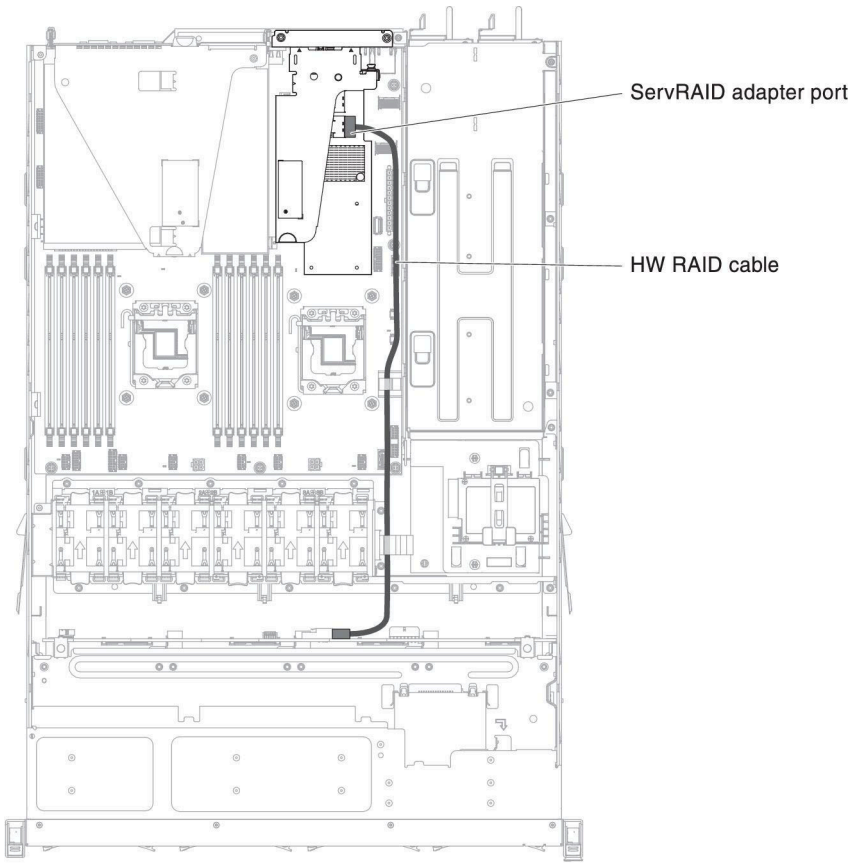
The redundant power model:



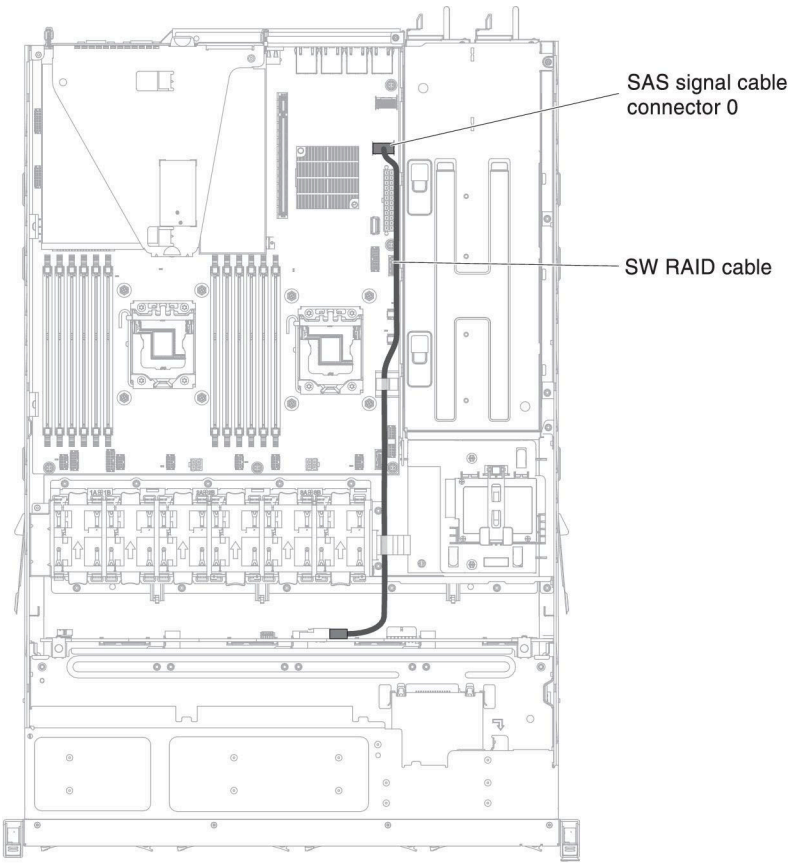
The fixed power model:



The following illustration shows the cabling information for the hardware RAID cable in the server:



The following illustration shows the cabling information for the software RAID cable in the server:

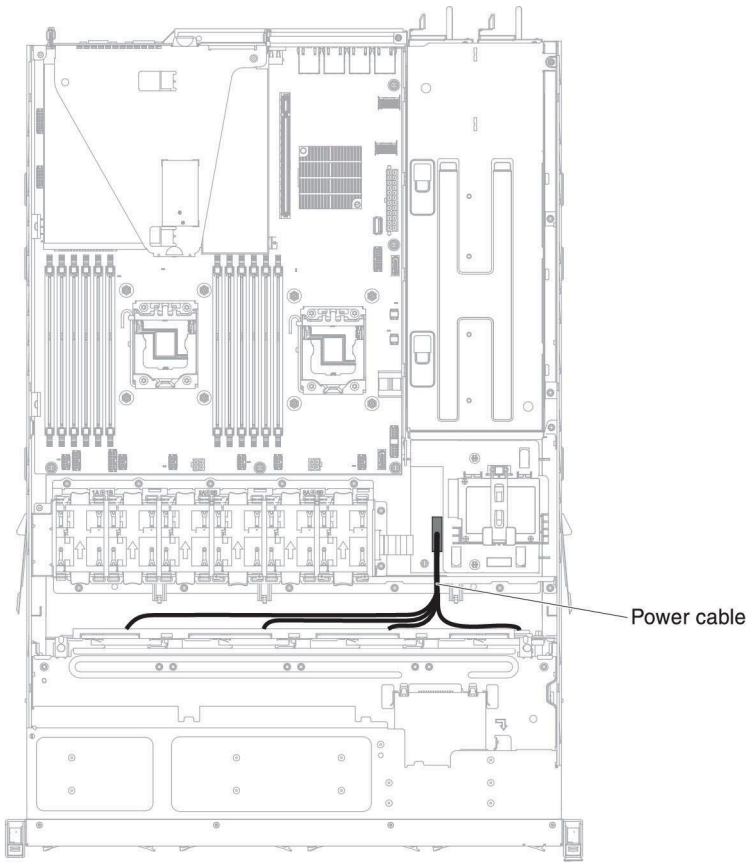


3.5-inch simple-swap model:

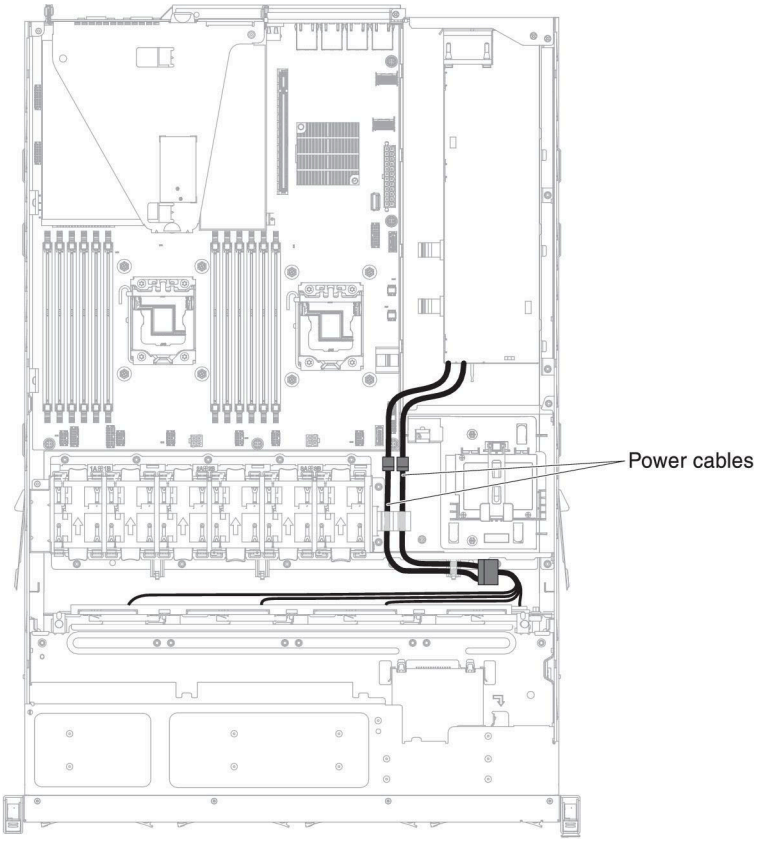
The following illustration shows the cabling information for the 4x3.5-inch simple-swap SATA drive backplate assembly:

The following illustrations show the cabling information for the power cable in the server:

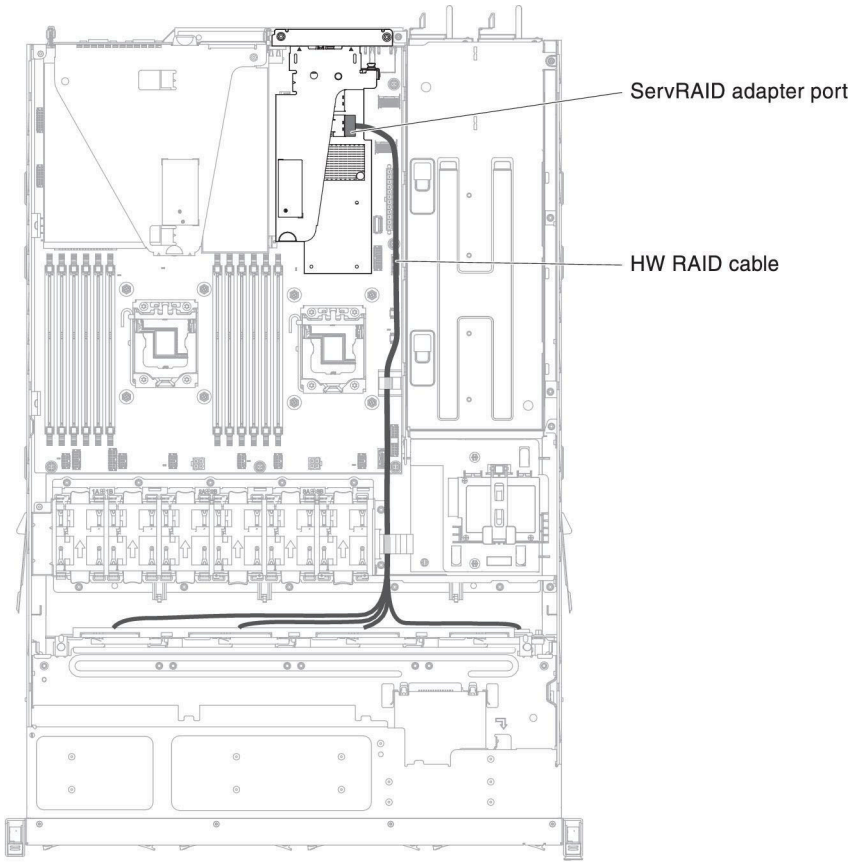
The redundant power model:



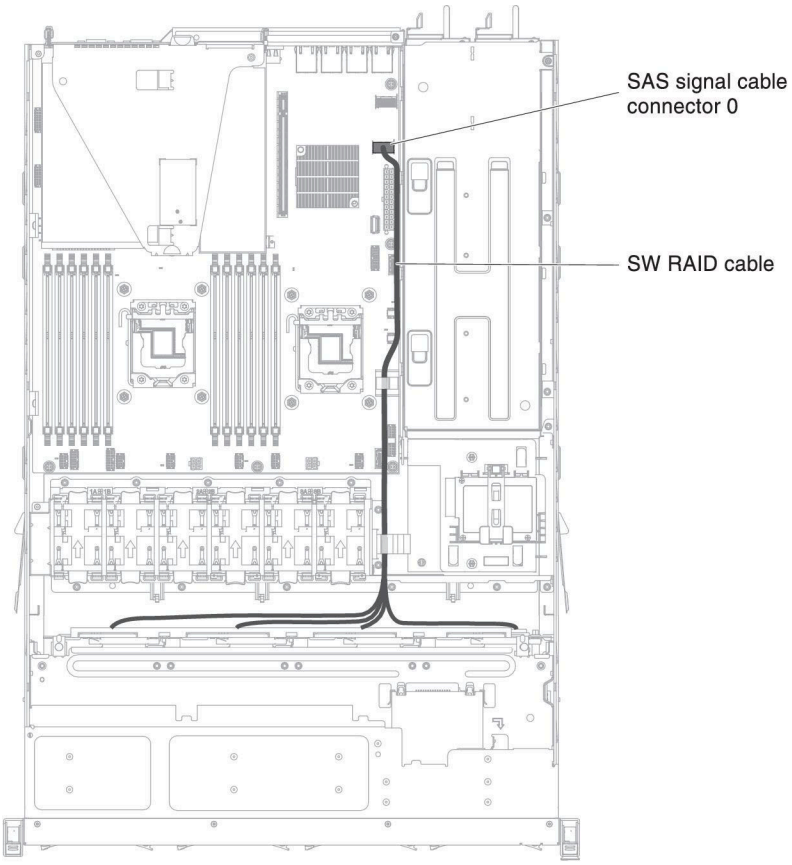
The fixed power model:



The following illustration shows the cabling information for the hardware RAID cable in the server:



The following illustration shows the cabling information for the software RAID cable in the server:



Removing and replacing components

Replaceable components consist of consumable parts, structural parts, and field replaceable units (FRUs):

- **Consumables:** Purchase and replacement of consumables (components, such as batteries and printer cartridges, that have depleting life) is your responsibility. If IBM acquires or installs a consumable component at your request, you will be charged for the service.
- **Structural parts:** Purchase and replacement of structural parts (components, such as chassis assembly, top cover, and bezel) is your responsibility. If IBM acquires or installs a structural component at your request, you will be charged for the service.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained technicians, unless they are classified as customer replaceable units (CRUs):
  - **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.

See Chapter 5, “Parts listing, IBM System x3530 M4 Type 7160,” on page 265 to determine whether a component is a consumable, structural, or FRU that must be replaced only by a trained service technician.

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

For more information about getting service and assistance, see “Getting help and technical assistance,” on page 367.

Removing and replacing Tier 1 CRUs

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

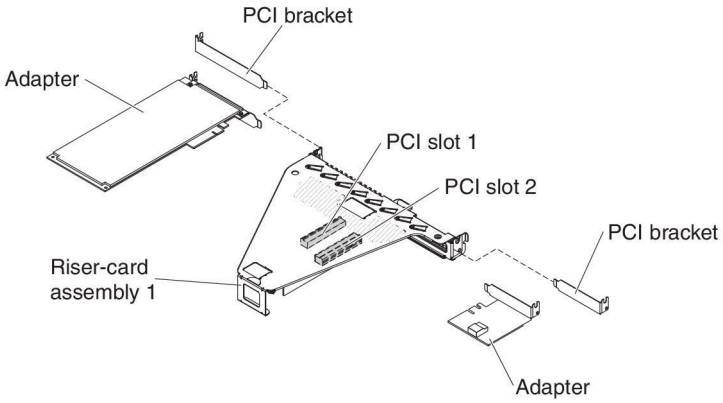
The illustrations in this document might differ slightly from your hardware.

Removing an adapter

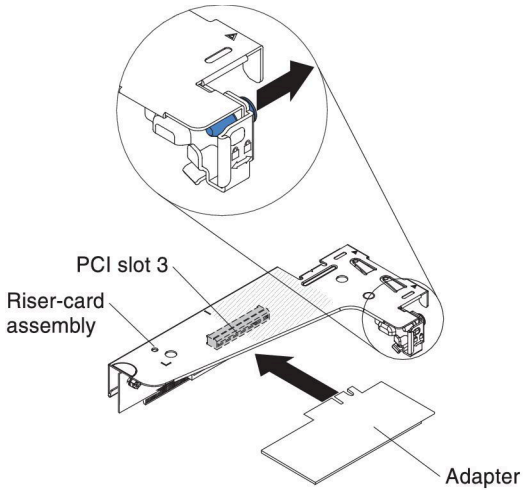
To remove an adapter, complete the following steps:

1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.
2. Turn off the server (see “Turning off the server” on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the server cover (see “Removing the server top cover” on page 362).
4. Remove the PCI riser-card assembly (see “Removing a PCI riser-card assembly” on page 328).
5. Disconnect any cables from the adapter.
6. Removing an adapter from PCI riser-card assembly 1:

   Carefully grasp the adapter by its top edge or upper corners, and pull the adapter from the PCI riser-card assembly.



7. Removing a RAID adapter from PCI riser-card assembly 2:
   a. Pull the release pin to unlock the release latch.
   b. Rotate the retention latch to the open position.
   c. Carefully grasp the adapter by its top edge or upper corners, and pull the adapter from the PCI riser-card assembly.



8. Place the adapter on a flat, static-protective surface.
9. If you are instructed to return the adapter, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing an adapter

Notes:

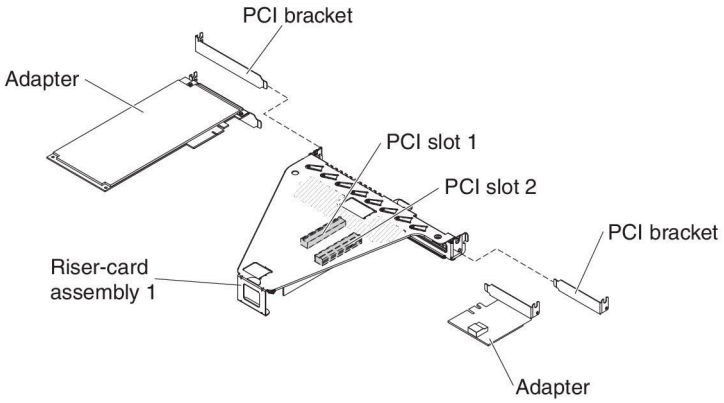
- The instructions in this section apply to any supported adapter (for example, video graphics adapters or network adapters).
- See "Installing an adapter" on page 46 for additional notes and information that you must consider when you install an adapter in the server.
- Do not set the maximum digital video adapter resolution above 1600 x 1200 at 75 Hz for an LCD monitor. This is the highest resolution that is supported for any add-on video adapter that you install in the server.
- Any high-definition video-out connector or stereo connector on any add-on video adapter is not supported

To replace an adapter, complete the following steps:

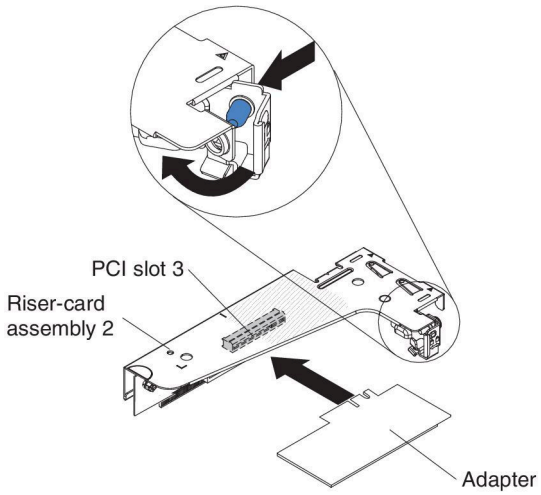
Attention: When you install an adapter, make sure that the adapter is correctly seated in the PCI riser-card assembly and that the PCI riser-card assembly is securely seated in the riser-card connector on the system board before you turn on the server. An incorrectly seated adapter might cause damage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

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Follow the cabling instructions, if any come with the adapter. Route the adapter cables before you install the adapter.
3. Installing an adapter in PCI riser-card assembly 1:

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



4. Installing a ServeRAID adapter in PCI riser-card assembly 2:
   a. Insert the adapter into the riser-card assembly, aligning the edge connector on the adapter with the connector on the riser-card assembly. Press the edge of the connector *firmly* into the riser-card assembly. Make sure that the adapter snaps into the riser-card assembly securely.
   b. Rotate the retention latch to the close position. Make sure the retention latch engages the adapter securely; then, push in the release pin to lock the retention latch in place.

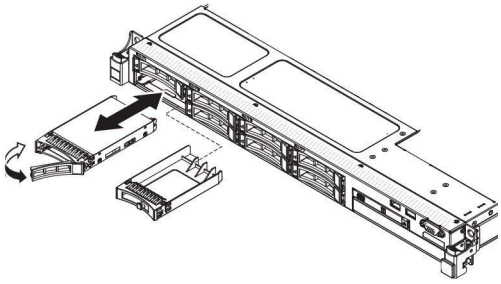


5. Install the PCI riser-card assembly in the server (see "Replacing a PCI riser-card assembly" on page 329).
6. Perform any configuration tasks that are required for the adapter.
7. Install the cover (see "Replacing the server top cover" on page 67).
8. Install the server in the rack cabinet (see the *Rack Installation Instructions* that come with the server for instructions).
9. Reconnect the power cord and any cables that you removed.
10. Turn on the peripheral devices and the server.

Removing hot-swap drives

Attention:

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



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

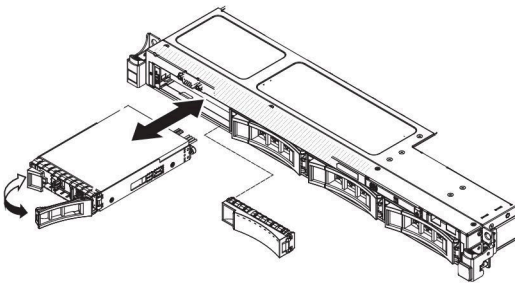
1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Press the release latch (orange) to unlock the drive handle.
3. Grasp the handle and pull the drive assembly out of the drive bay.
4. If you are instructed to return the drive assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing hot-swap drives

Note: If you install only one drive, you must install it in drive bay 0.

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

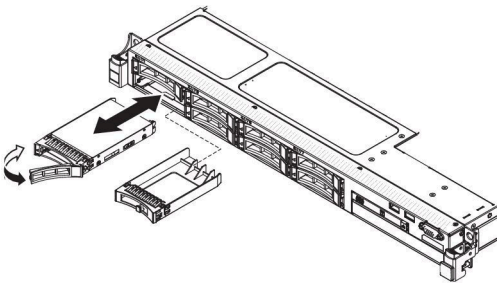
1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
3. Installing a 3.5-inch hot-swap drive:



   a. Remove the filler panel from the empty drive bay.
   b. Make sure that the drive-tray handle is in the open (unlocked) position.
   c. Align the drive assembly with the guide rails in the bay.
   d. Gently push the drive assembly into the drive bay until the drive stops.
   e. Rotate the drive-tray handle to the closed (locked) position.

f. Skip to step 5.

4. Installing a 2.5-inch hot-swap drive:



   a. Remove the filler panel from the empty drive bay.
   b. Make sure that the drive-tray handle is in the open (unlocked) position.
   c. Align the drive assembly with the guide rails in the bay.
   d. Gently push the drive assembly into the drive bay until the drive stops.
   e. Rotate the drive-tray handle to the closed (locked) position.

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

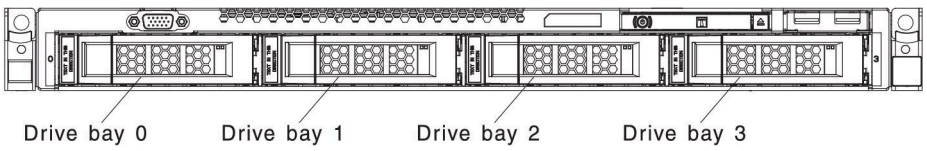
   Note: If the server is configured for RAID operation using a ServeRAID adapter, you might have to reconfigure your disk arrays after you install drives. See the ServeRAID adapter documentation for additional information about RAID operation and complete instructions for using the ServeRAID adapter.

6. If you are installing additional hot-swap drives, do so now.
7. Restart the server. Confirm that it starts correctly and recognizes the newly installed devices, and make sure that no error LEDs are lit.
8. Complete the additional steps in “Instructions for IBM Business Partners” on page 24.

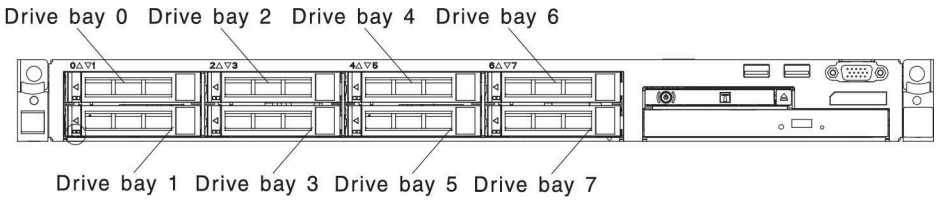
For information on the supported combination of drive backplane configurations, see Supported SAS/SATA drive backplane configurations.

IDs for hot-swap drives:
The hot-swap-drive ID that is assigned to each drive is printed on the front of the server. The following illustrations show the location of the IDs of the drives. The ID numbers and the drive bay numbers are the same.

The following illustration shows the drive bay IDs on a 3.5-inch drive server model.



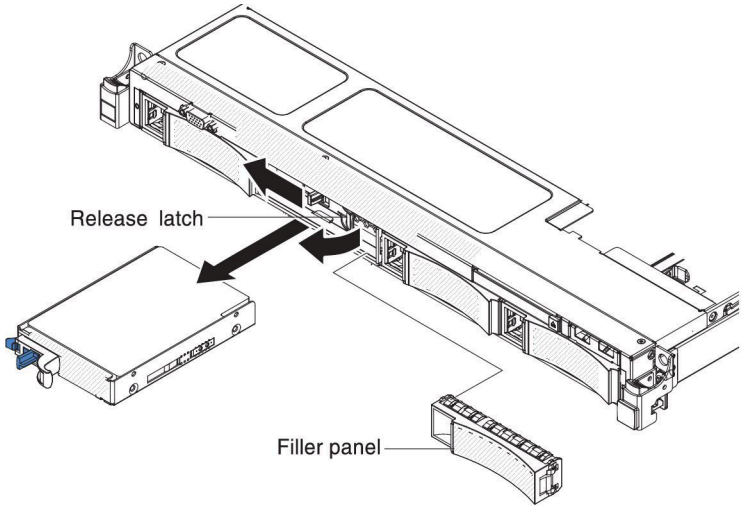
The following illustration shows the drive bay IDs on a 2.5-inch drive server model.



Removing a 3.5-inch simple-swap SATA drive

To remove a 3.5-inch simple-swap SATA drive, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the filler panel from the front of the server.
4. Press the release latch and pull the drive out of the bay.



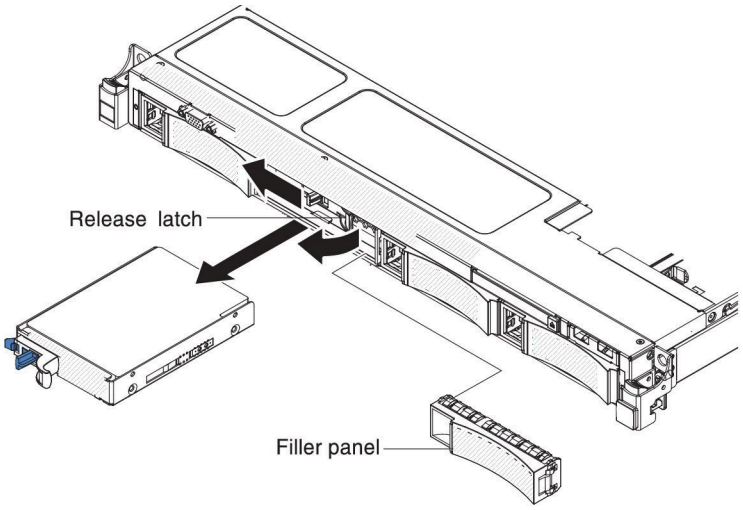
5. If you are instructed to return the drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing a 3.5-inch simple-swap SATA drive

Note: You must turn off the server before installing simple-swap drives in the server.

To install a 3.5-inch simple-swap SATA drive, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Touch the static-protective package that contains the new drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
3. Gently push the drive assembly into the drive bay until the drive clicks into place.

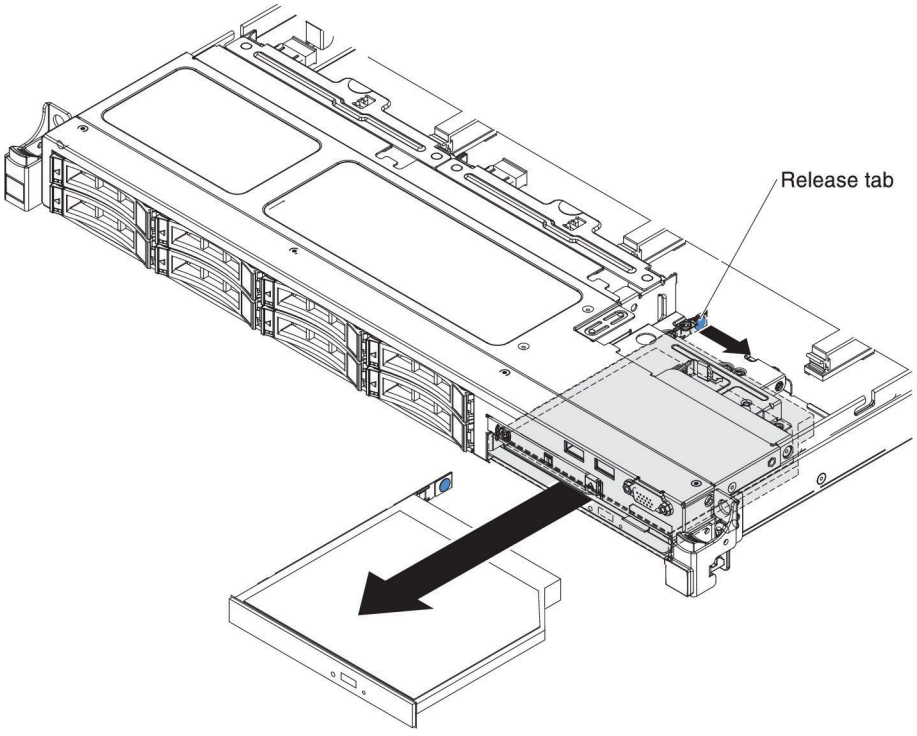


4. Reinstall the filler panel that you removed
5. Turn on the peripheral devices and the server.

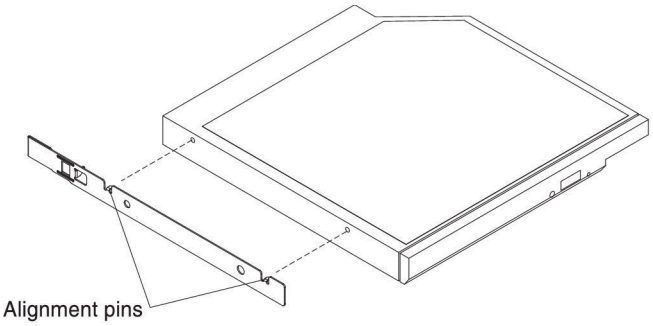
Removing a CD/DVD drive

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

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the top cover (see "Removing the server top cover" on page 33).
4. Locate the blue release tab on the rear of the drive bay; then, while you press the tab, push the CD/DVD drive toward the front of the server.



5. Remove the CD/DVD drive out of the bay and slide the drive-retention clip from the side of the drive. Save the clip to use when you install the replacement drive.

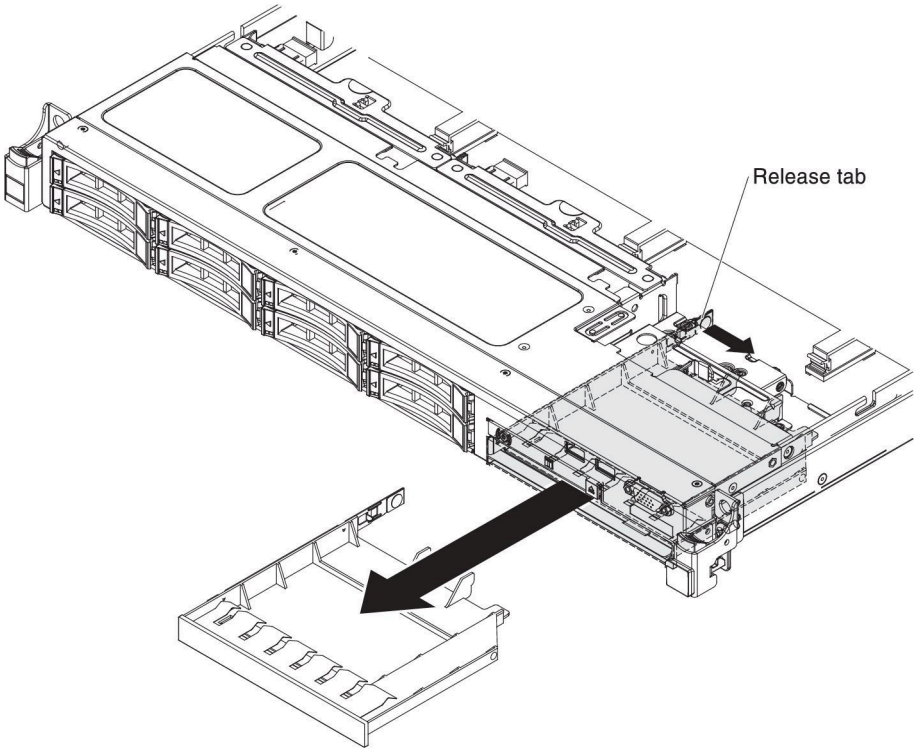


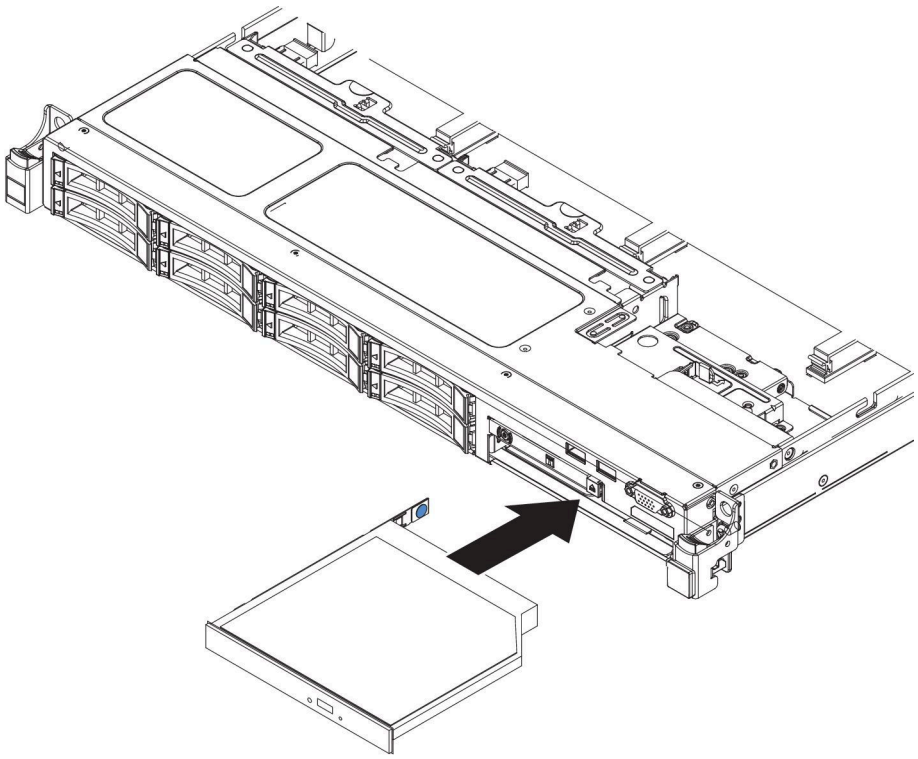
6. If you are instructed to return the CD/DVD drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an optional CD/DVD drive

To install an optional CD/DVD drive, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the top cover (see "Removing the server top cover" on page 33).
4. Locate the blue release tab on the rear of the drive bay; then, while you press the tab, push the CD/DVD filler toward the front of the server.





5. Pull the CD/DVD drive filler out of the front of the server.
6. Remove the retention clip from the side of the drive filler.

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

Statement 3

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

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

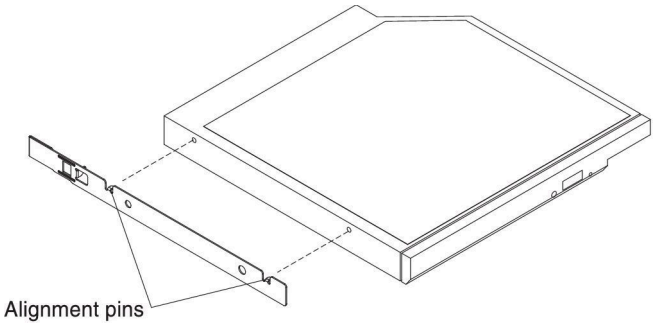
DANGER

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

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

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

7. Touch the static-protective package that contains the new optical drive to any unpainted metal surface on the server; then, remove the optical drive from the package and place it on a static-protective surface.
8. Attach the drive retention clip that you removed from the previous drive to the side of the new drive.

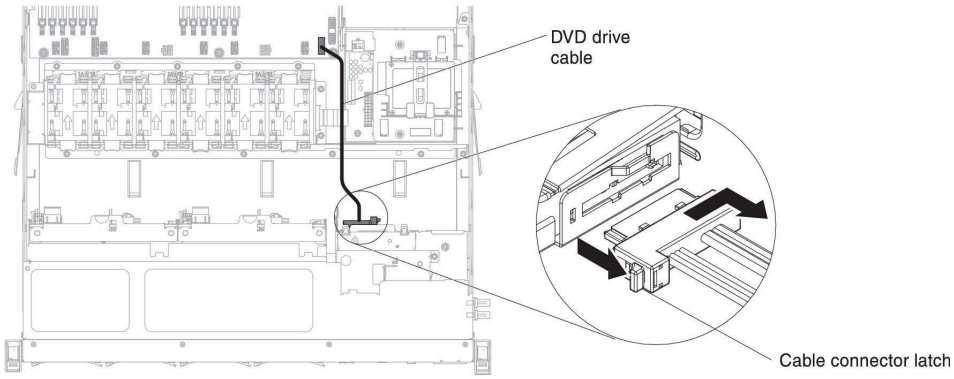


9. Align the drive in the drive bay and slide the drive into the CD/DVD drive bay until the drive clicks into place.
10. Reconnect the power cord and any cables that you removed.
11. Turn on the peripheral devices and the server.

Removing the CD/DVD cable

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

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the top cover (see "Removing the server top cover" on page 33).
4. Remove the air baffle (see "Removing the air baffle" on page 365).
5. Remove the CD/DVD drive (see "Removing a CD/DVD drive" on page 305).
6. From the front of the server, grasp the cable connector latch and pull it up toward the rear of the server; then, slide the cable connector to the unlock position.

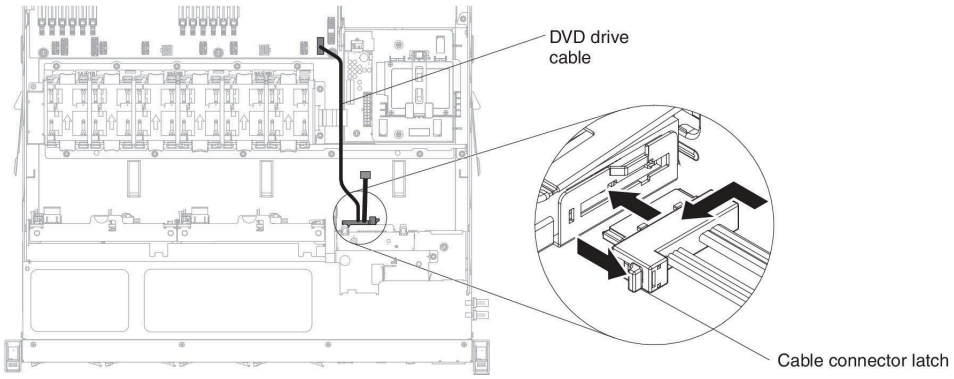


7. Remove the cable from the optical drive cage connector.
8. Disconnect the other end of the CD/DVD cable from the connector on the system board.
9. Disengage the cable clips and remove the CD/DVD cable from the server.
10. If you are instructed to return the CD/DVD cable, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the CD/DVD cable

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

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Align the cable connector with the connector on the rear of the optical drive cage and press the cable connector into the optical drive cage connector.
3. From the front of the server, grasp the cable connector latch and pull it up toward the rear of the server; then, slide the cable connector to the lock position.



4. Connect the other end of the CD/DVD drive cable to the connector on the system board. Secure the cable with the cable clips on the chassis.
5. Reinstall the CD/DVD drive (see “Installing an optional CD/DVD drive” on page 306).
6. Install the air baffle (see Replacing the DIMM air baffle).
7. Replace the cover (see “Replacing the server top cover” on page 67).
8. Install the server in the rack cabinet (see the *Rack Installation Instructions* that come with the server for instructions).
9. Reconnect the power cord and any cables that you removed.
10. Turn on the peripheral devices and the server.

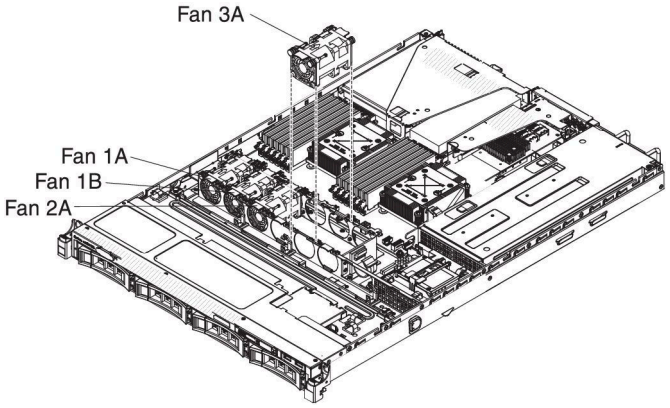
Removing a fan

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

To remove a fan, complete the following steps:

1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.
2. Turn off the server (see “Turning off the server” on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the top cover (see “Removing the server top cover” on page 33).
4. Reconnect the power cord; then, turn on the server.

   Attention: Operating the server for extended periods of time (more than 30 minutes) with the top cover removed might damage server components.
5. Determine which fan to replace by checking the LEDs on the system board (see “System-board LEDs” on page 28); a lit LED indicates the fan to replace.
6. Turn off the server; then, disconnect the power cord again.
7. Remove the air baffle (see “Removing the air baffle” on page 365).
8. Disconnect the fan power cable from the connector on the system board.
9. Grasp the top of the fan with your index finger and thumb and lift the fan out of the server.



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

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

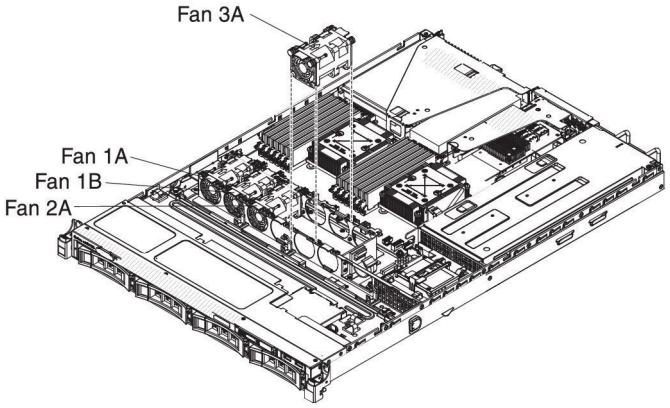
Replacing a fan

The server comes standard with four speed-controlled cooling fans. You must install the fifth and sixth fan when you install the second microprocessor.

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

To install or replace a fan, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Touch the static-protective package that contains the new fan to any unpainted metal surface on the server. Then, remove the new fan from the package.
4. Orient the fan so that the air-flow arrow points to the rear of the server.



5. Lower the fan into the fan slot in the server and ensure that is it seated correctly.
6. Connect the fan power cable to the connector on the system board.
7. Install the air baffle (see Replacing the DIMM air baffle).

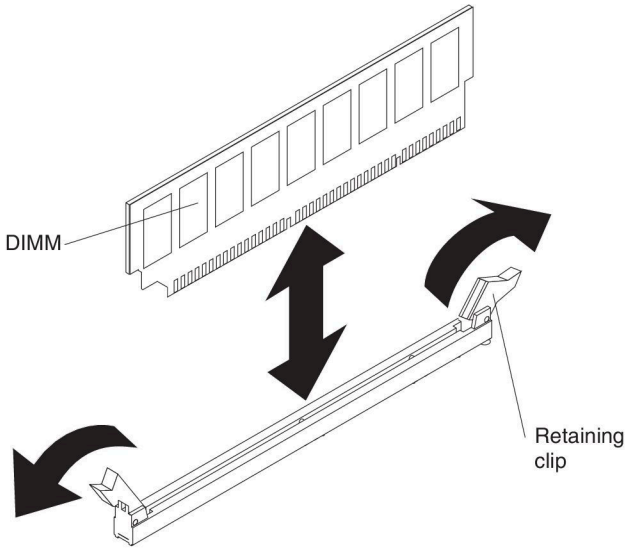
8. Install the cover (see “Replacing the server top cover” on page 67).
9. Reconnect the power cord and any cables that you removed.
10. Turn on the peripheral devices and the server.

Removing a memory module

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

1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.
2. Turn off the server (see “Turning off the server” on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing the server top cover” on page 33).
4. Remove the air baffle (see “Removing the air baffle” on page 33).
5. Carefully open the retaining clips on each end of the DIMM connector and remove the DIMM.

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



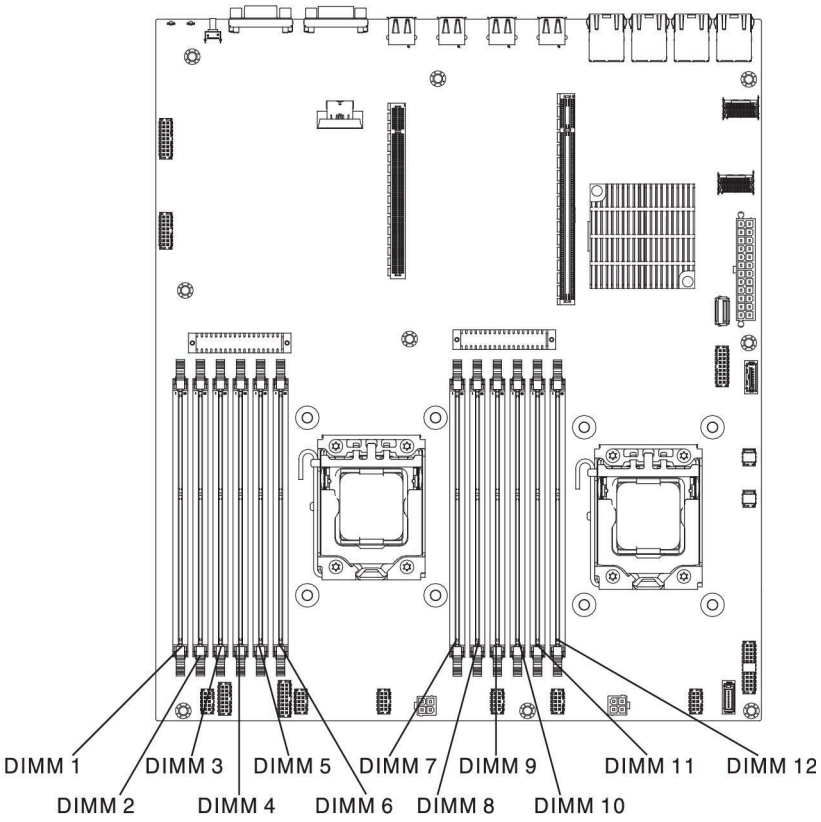
6. If you are instructed to return the DIMM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing a memory module

Notes:

- See "Installing a memory module" on page 34 for notes and information that you must consider when you install DIMMs.
- Confirm that the server supports the DIMM that you are installing, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.

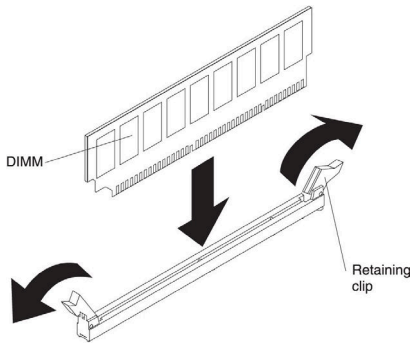
The following illustration shows the location of the DIMM connectors on the system board.



To install a DIMM, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the top cover (see "Removing the server top cover" on page 362).
4. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the outside of the server. Then, remove the DIMM from the package.
5. 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.



6. Turn the DIMM so that the DIMM keys align correctly with the connector.
7. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector (see "System-board optional device connectors" on page 29 for the locations of the DIMM connectors).
8. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.

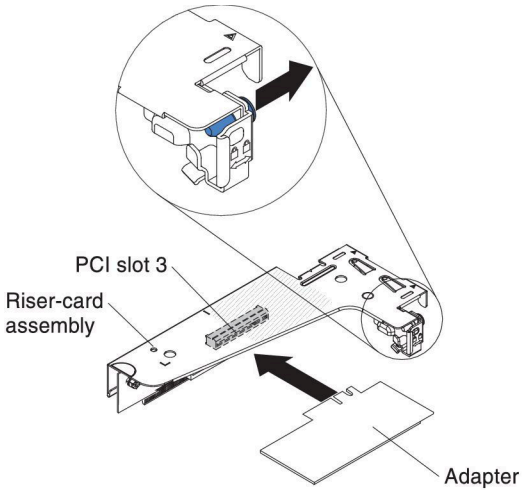
   Note: If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.
9. Reconnect the power cord and any cables that you removed.
10. Install the air baffle (see Replacing the DIMM air baffle).
11. Replace the cover (see Replacing the server top cover).
12. Install the server in the rack cabinet (see the *Rack Installation Instructions* that come with the server for instructions).
13. Reconnect the power cord and any cables that you removed.
14. Turn on the peripheral devices and the server.

Removing an IBM ServeRAID Controller

To remove an IBM ServeRAID adapter, complete the following steps:

Note: When the ServeRAID adapter is removed, software RAID will not be supported. This system does not support downgrade software RAID function from hardware RAID configuration.

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the server cover (see "Removing the server top cover" on page 362).
4. Remove PCI riser-card assembly 2 (see "Removing a PCI riser-card assembly" on page 328).
5. Disconnect the cables to the ServeRAID adapter.
6. Pull the release pin to unlock the retention latch; then rotate the retention latch to the open position.
7. Carefully grasp the ServeRAID adapter by the edge and pull it out of the PCI riser-card assembly.



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

Replacing an optional IBM ServeRAID Controller

You can purchase an optional IBM ServeRAID SAS/SATA controller that provides additional RAID feature support. For configuration information, see the ServeRAID documentation at http://www.ibm.com/systems/support/.

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

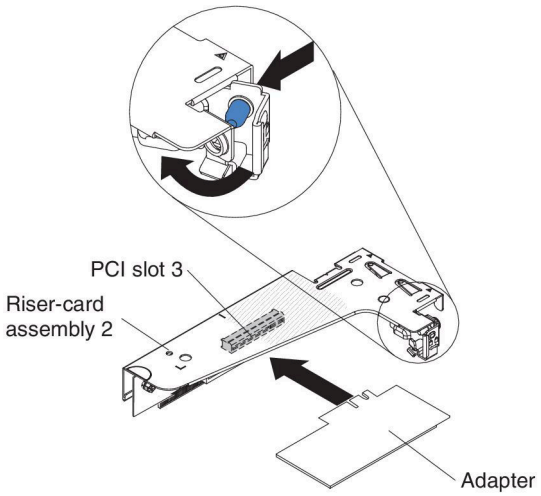
Notes:

- You must install a ServeRAID adapter on PCI riser-card assembly 2.
- When you install an IBM ServeRAID adapter that has a RAID adapter battery in the server, you must install the battery remotely in the remote battery tray (see "Installing a RAID adapter battery remotely in the server" on page 60).

To install an IBM ServeRAID adapter, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Touch the static-protective package that contains the new ServeRAID adapter to any unpainted surface on the outside of the server; then, grasp the adapter by the top edge or upper corners of the adapter and remove it from the package.
3. Align the ServeRAID adapter so that the keys align correctly with the connector on the PCI riser-card assembly.
4. Insert the ServeRAID adapter into the connector on the riser-card until it is firmly seated.

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

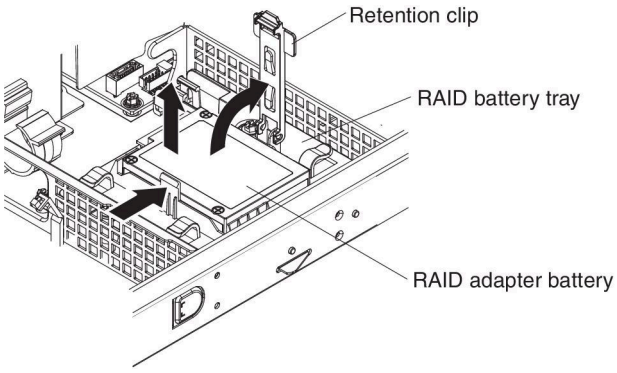


5. Rotate the retention latch to the closed position, making sure the retention latch engages the ServeRAID adapter. Then, push in the release pin to lock the retention latch in place.
6. Reconnect cables to the adapter. Be sure to route the signal cables as shown in the following illustration. Secure the cables with any cable clips on the system board so that they do not get in the way or get damaged.
7. Reinstall the PCI riser-card assembly (see "Replacing a PCI riser-card assembly" on page 66).
8. Replace the cover (see "Replacing the server top cover" on page 67).
9. Reconnect the power cord and any cables that you removed.
10. Turn on the peripheral devices and the server.

Removing a remotely installed RAID adapter battery

To remove the RAID adapter battery from the RAID battery tray, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the server cover (see "Removing the server top cover" on page 362).
4. Remove PCI riser-card assembly 2 (see "Removing a PCI riser-card assembly" on page 328).
5. From the top of safety cover, press the release tab to open the retention clip that holds the battery in place.



6. Lift the battery from the RAID battery tray.
7. Disconnect the remote battery cable from the remote battery cable connector to the ServeRAID adapter.

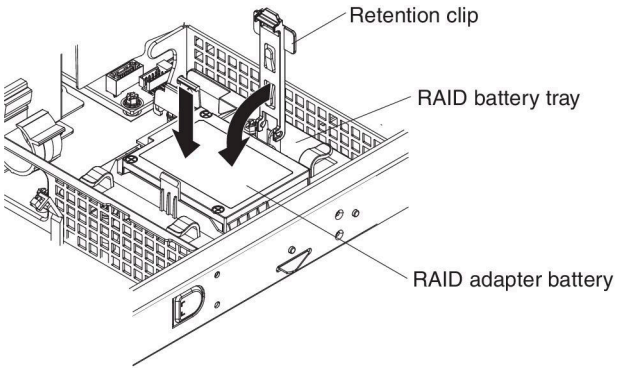
If you are instructed to return the RAID adapter battery, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing a RAID adapter battery remotely in the server

When you install any ServeRAID adapter in the server that come with a RAID adapter battery, the battery must be installed remotely to prevent the battery from overheating. The battery must be installed only in the RAID battery tray on top of the power safety cover.

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

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Install the battery in the RAID battery tray:



   a. Orient the battery as shown in the following illustration; then, lower the battery into the RAID battery tray. If the battery comes with a battery carrier, ensure that battery carrier posts align with the rings on the battery mounting slot so that the battery carrier is secure in the slot.

      Note: The positioning of the remote battery depends on the type of remote battery that you install.

   b. Rotate the retention clip to the close position and press down on the retention clip until it snaps in place to hold the battery in place.

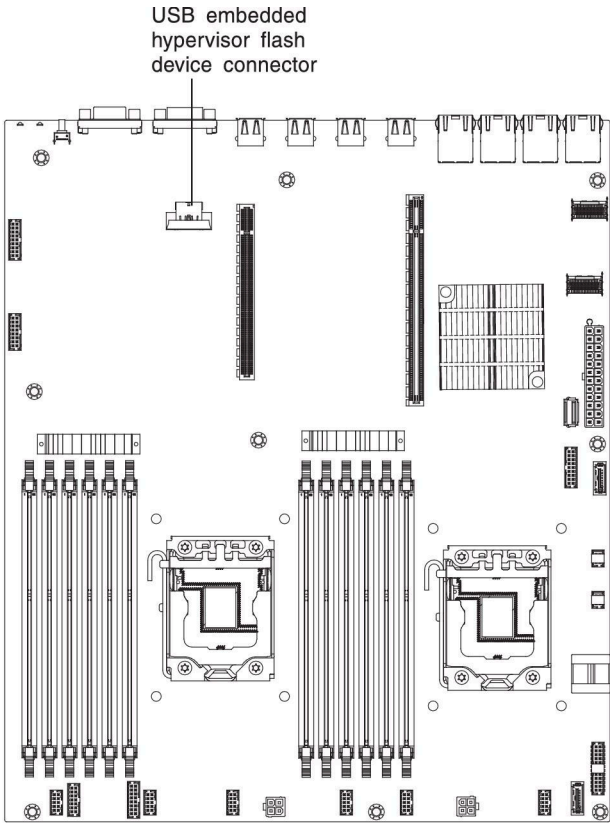
3. Connect the remote battery cable to the remote battery cable connector to the ServeRAID adapter. Route the remote battery cable in the server as shown in the following illustration.

   Attention: Make sure that the cable is not pinched and does not cover any connectors or obstruct any components on the system board.
4. Reinstall the PCI riser-card assembly (see "Replacing a PCI riser-card assembly" on page 66).
5. Replace the cover (see "Replacing the server top cover" on page 67).
6. Reconnect the power cord and any cables that you removed.
7. Turn on the peripheral devices and the server.

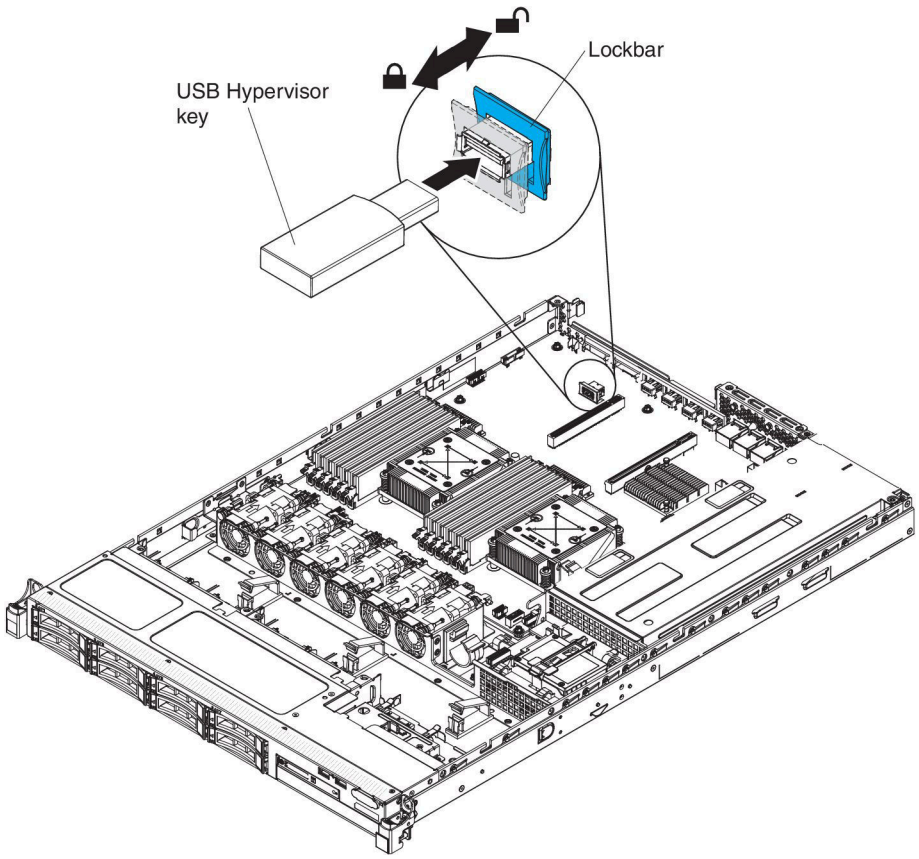
Removing a USB embedded hypervisor flash device

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

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the top cover (see "Removing the server top cover" on page 33).
4. Remove PCI riser-card assembly 1 (see "Removing a PCI riser-card assembly" on page 328).
5. Locate the USB embedded hypervisor flash device connector on the system board.



6. Slide the lockbar on the flash device connector to the unlocked position and pull the USB flash device out of the connector.

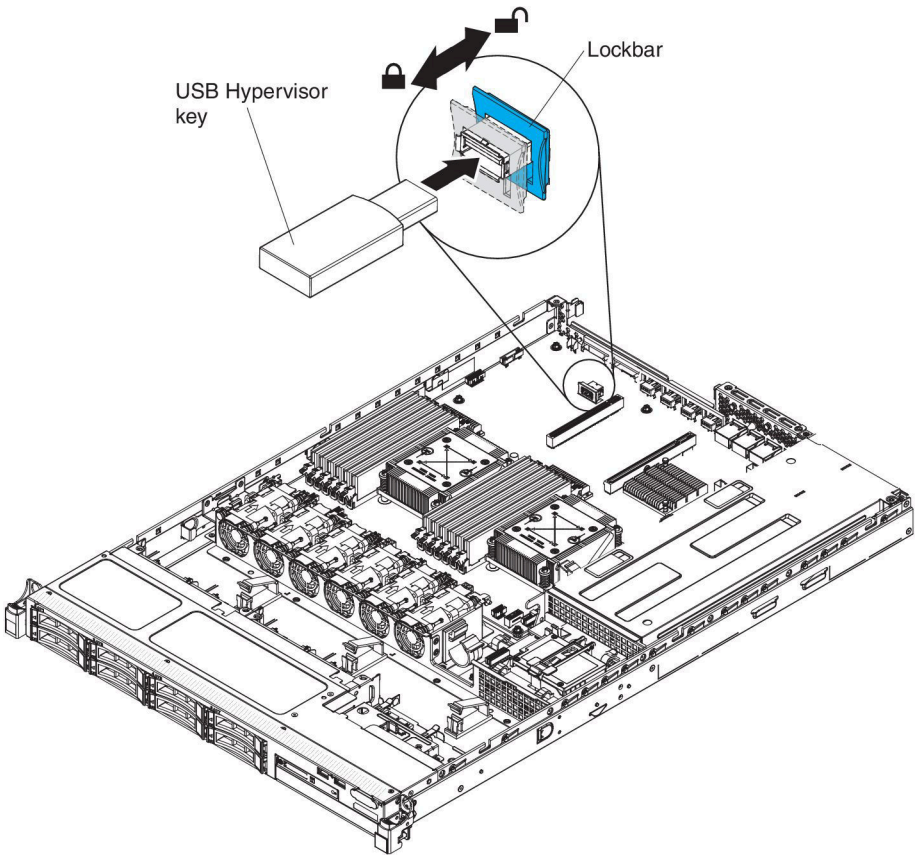


7. If you are instructed to return the flash device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing a USB embedded hypervisor flash device

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

1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.
2. Align the USB flash device with the connector on the system board and push it into the connector until it is firmly seated.
3. Slide the lockbar toward the riser-card assembly to the locked position until it is seated firmly.



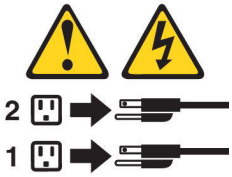
4. Reconnect the power cord and any cables that you removed.
5. Install PCI riser-card assembly 1 (see “Replacing a PCI riser-card assembly” on page 329).
6. Install the air baffle (see Replacing the DIMM air baffle).
7. Install the cover (see “Replacing the server top cover” on page 67).
8. Reconnect the power cord and any cables that you removed.
9. Turn on the peripheral devices and the server.

Removing a hot-swap power supply

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

Statement 5

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



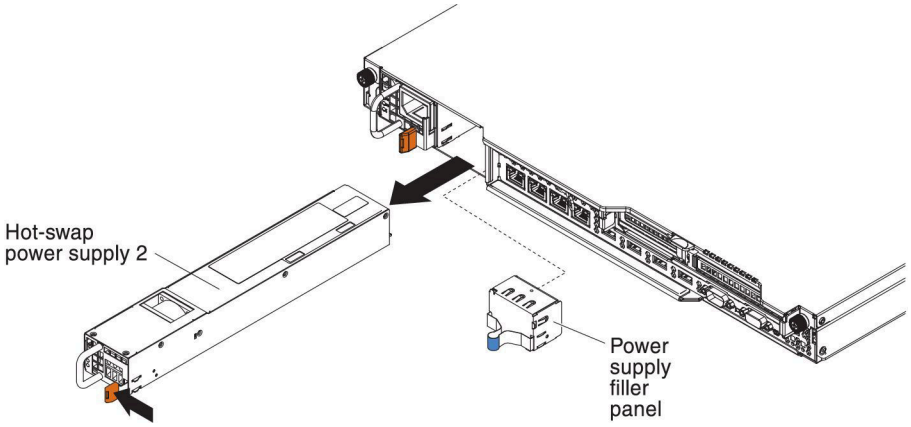
Statement 8

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

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

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

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. If only one power supply is installed, turn off the server and peripheral devices and disconnect all power cords.
3. If the server is in a rack, at the back of the server, pull back the cable management arm to gain access to the rear of the server and the power supply.
4. Press and hold the orange release tab to the left. Grasp the handle and pull the power supply out of the server.



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

Replacing a hot-swap power supply

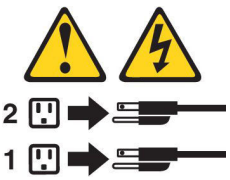
The following notes describe the type of power supply that the server supports and other information that you must consider when you install a power supply:

- To confirm that the server supports the power supply that you are installing, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.
- Before you install an additional power supply or replace a power supply with one of a different wattage, you may use the IBM Power Configurator utility to determine current system power consumption. For more information and to download the utility, go to http://www-03.ibm.com/systems/bladecenter/resources/powerconfig.html.
- The server comes standard with one of the following power supplies that connects to power supply bay 1. The input voltage is 100-127 V ac or 200-240 V ac auto-sensing.
  - 460-watt non-hot-swap power supply
  - 460-watt hot-swap power supply
  - 675-watt high-efficiency, hot-swap power supply

  Note: You cannot mix 110 V ac and 220 V ac, or 460-watt and 675-watt power supplies in the server, it is not supported.
- Power supply 1 is the default/primary power supply. If power supply 1 fails, you must replace the power supply with the same wattage immediately.
- The server supports a maximum of two hot-swap power supplies. These power supplies are designed for parallel operation. In the event of a power-supply failure, the redundant power supply continues to power the system.
- The server can run fully configured with one power supply. For redundancy support, you must install the second hot-swap power supply.

Statement 5

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



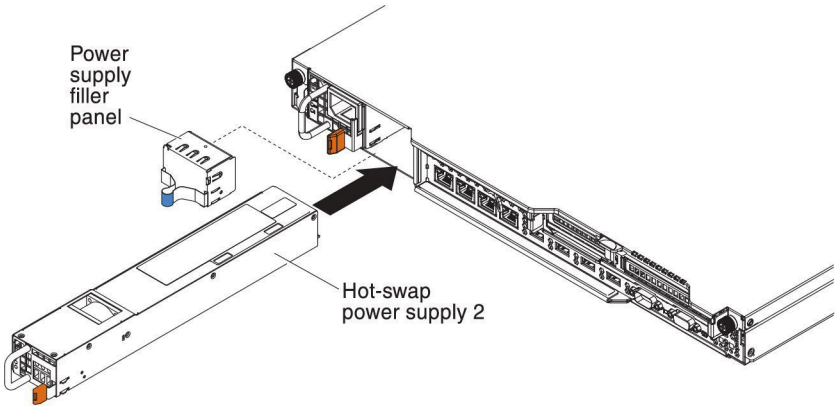
Statement 8

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

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

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

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Touch the static-protective package that contains the hot-swap power supply to any unpainted metal surface on the server; then, remove the power supply from the package and place it on a static-protective surface.
3. If you are installing a hot-swap power supply into an empty bay, remove the power-supply filler panel from the power-supply bay.



4. Grasp the handle on the rear of the power supply and slide the power supply forward into the power-supply bay until it clicks. Make sure that the power supply connects firmly into the power-supply connector.
5. Route the power cord through the cable retainer clip so that it does not accidentally become disconnected
6. Connect the power cord for the new power supply to the power-cord connector on the power supply.
7. Connect the other end of the power cord to a properly grounded electrical outlet.
8. Make sure that the ac power LED and the dc power LED on the power supply are lit, indicating that the power supply is operating correctly. The two green LEDs are to the right of the power-cord connector.

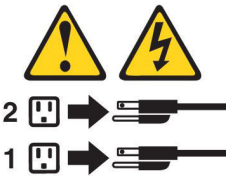
Removing the fixed power supply

Note: You must turn off the server before removing or replacing the fixed power supply.

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

Statement 5

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



Statement 8

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

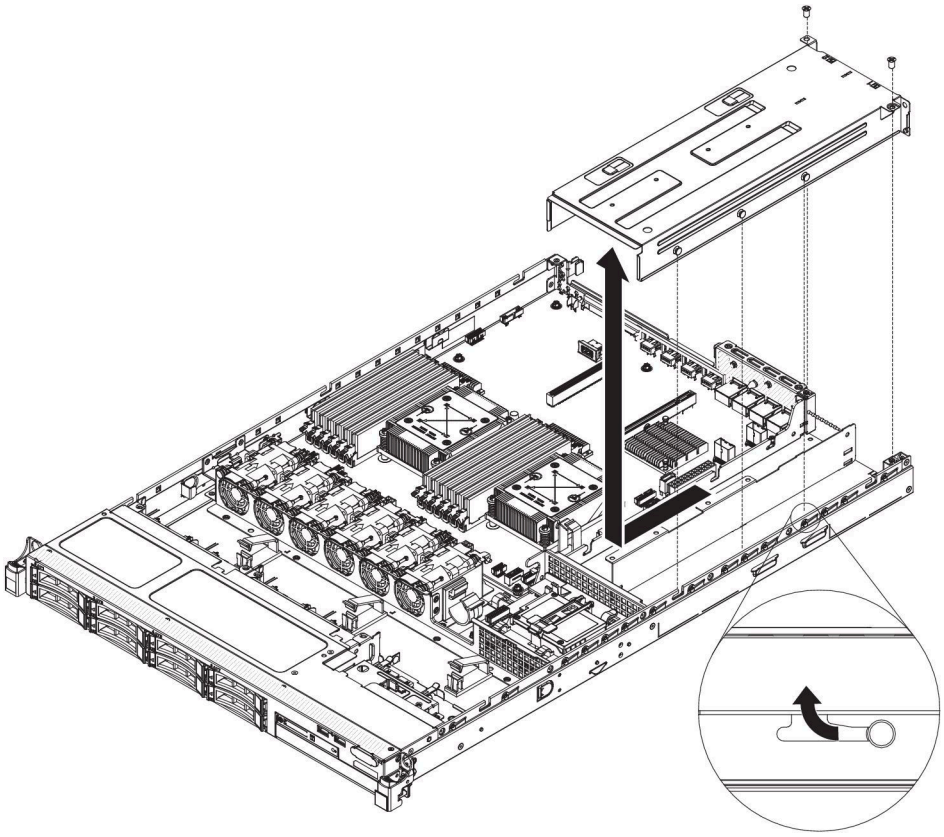
Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

To remove the fixed power supply, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the top cover (see "Removing the server top cover" on page 33).

4. Disconnect the power-supply cables from the connectors on the system board and internal devices; then, disengage the cables from any cable clips.

   Note: Note the routing of all power-supply cables; you will route the power-supply cables the same way when you install the power supply.
5. Remove the screw that holds the power supply to the rear of the chassis; then, slide the power supply slightly toward the front of the server and lift to remove it from the server.



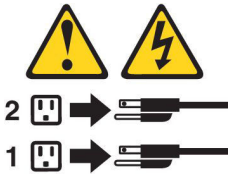
6. If you are instructed to return the power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the fixed power supply

Note: You must turn off the server before removing or replacing the fixed power supply.

Statement 5

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



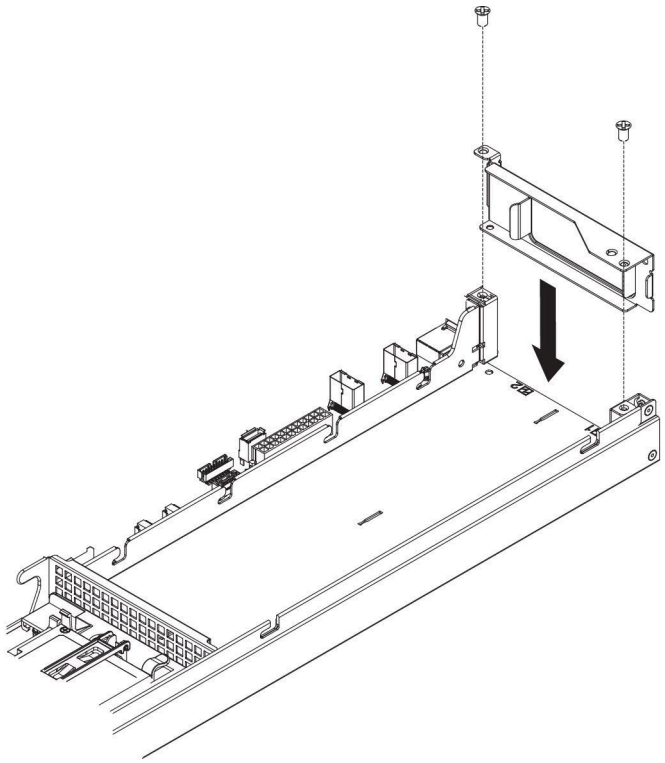
Statement 8

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

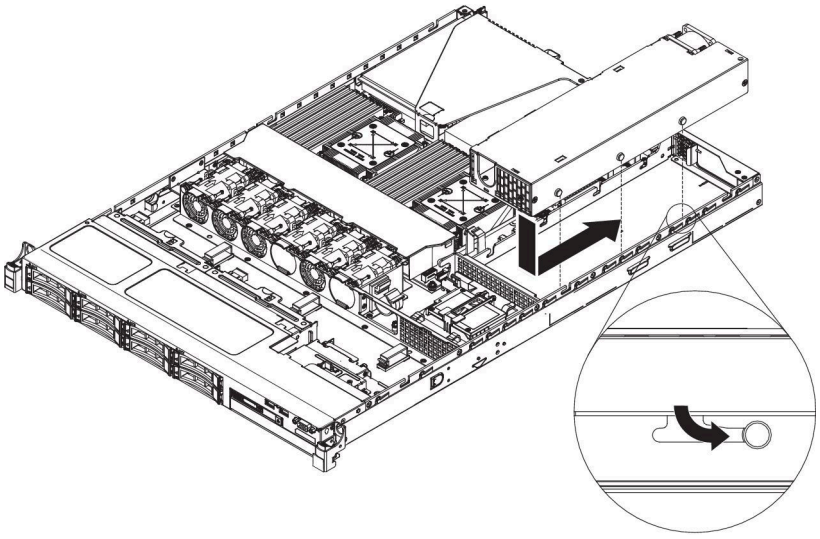
Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a with one of these parts, contact a service technician.

To install a fixed power supply, complete the following steps:

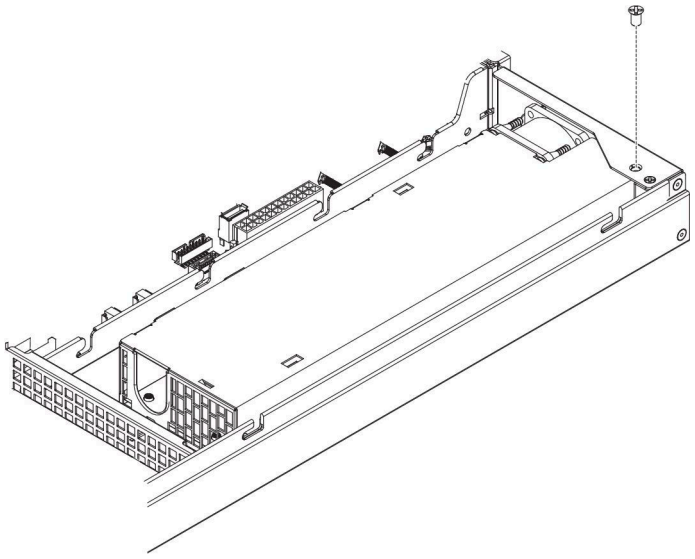
1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.
2. Touch the static-protective package that contains the power supply to any unpainted metal surface on the server; then, remove the power supply from the package and place it on a static-protective surface.
3. Orient the power supply as shown in the following illustration and align the retention tabs on the side of the power supply with the slots on the chassis.
4. Install the rear bracket.



5. Lower the power supply and slide the retention tabs into the slots. Make sure all retention tabs are engaged in the slots.



6. Install the screw to secure the power supply in the chassis.

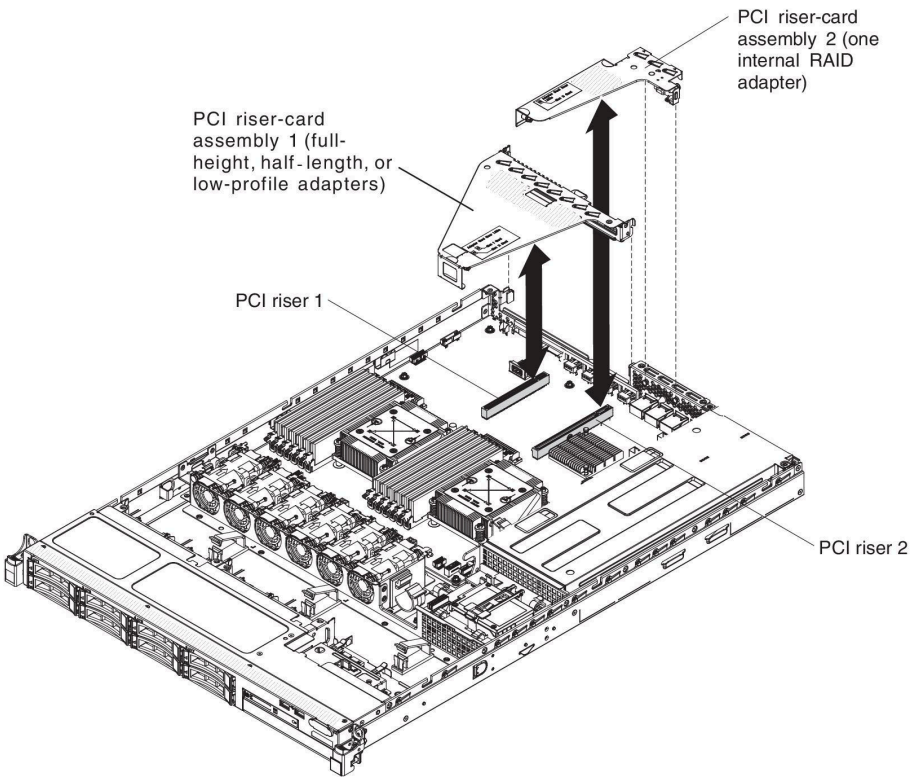


7. Connect the power cables to the power supply.
8. Install the cover (see “Replacing the server top cover” on page 67).
9. Route the power cord through the cable retainer clip so that it does not accidentally become disconnected.
10. Connect the power cord for the new power supply to the power-cord connector on the power supply.
11. Connect the other end of the power cord to a properly grounded electrical outlet.
12. Make sure that the ac power LED and the dc power LED on the power supply are lit, indicating that the power supply is operating correctly.

Removing a PCI riser-card assembly

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

1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.
2. Turn off the server (see “Turning off the server” on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the server cover (see “Removing the server top cover” on page 362).
4. If an adapter is installed in the PCI riser-card assembly, disconnect any cables that are connected to the adapter.
5. Grasp the front and rear of the PCI riser-card assembly at the blue touch-points and lift it out of the PCI riser connector on the system board.

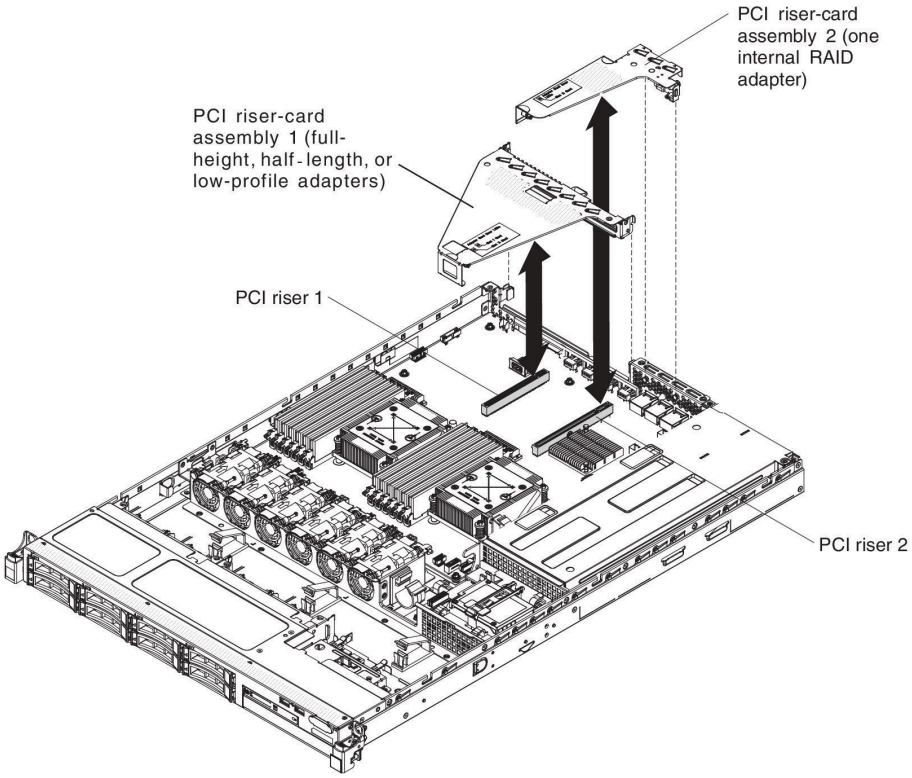


6. Remove the adapter, if necessary, from the PCI riser-card assembly (see "Removing an adapter" on page 299).
7. Set the adapter and PCI riser-card assembly aside.
8. If you are instructed to return the PCI riser-card assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing a PCI riser-card assembly

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

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Install the adapter in the new PCI riser-card assembly (see "Replacing an adapter" on page 300).
3. Set any jumpers or switches on the adapter as directed by the adapter manufacturer.
4. Align the PCI riser-card assembly with the PCI riser connector on the system board; then, press down firmly until the PCI riser-card assembly is seated correctly in the connector on the system board.

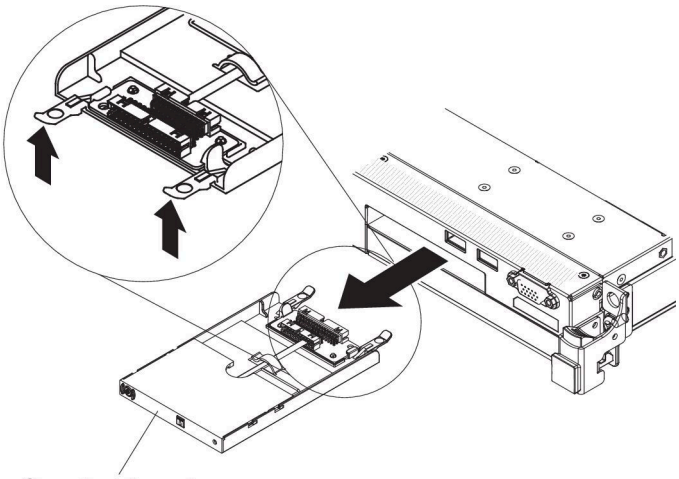


5. Install the cover (see “Replacing the server top cover” on page 67).
6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the operator information panel assembly

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

1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.
2. Turn off the server (see “Turning off the server” on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the server cover (see “Removing the server top cover” on page 362).
4. Disconnect the cable from the back of the operator information panel assembly.
5. Push the blue points on the rear of the operator information panel to the front of the server.

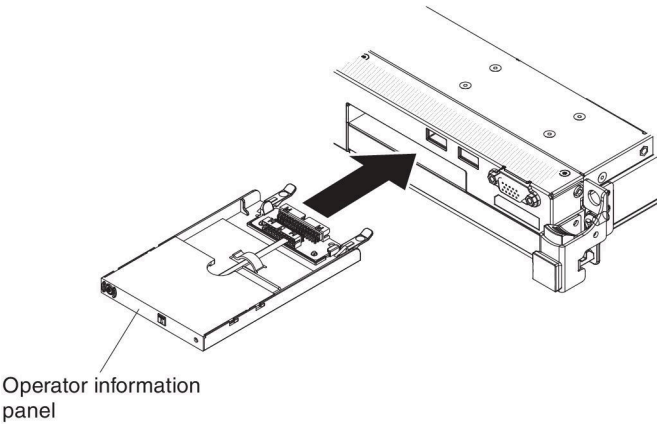


6. From the front of the server, carefully pull the assembly out of the server.
7. If you are instructed to return the operator information panel assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

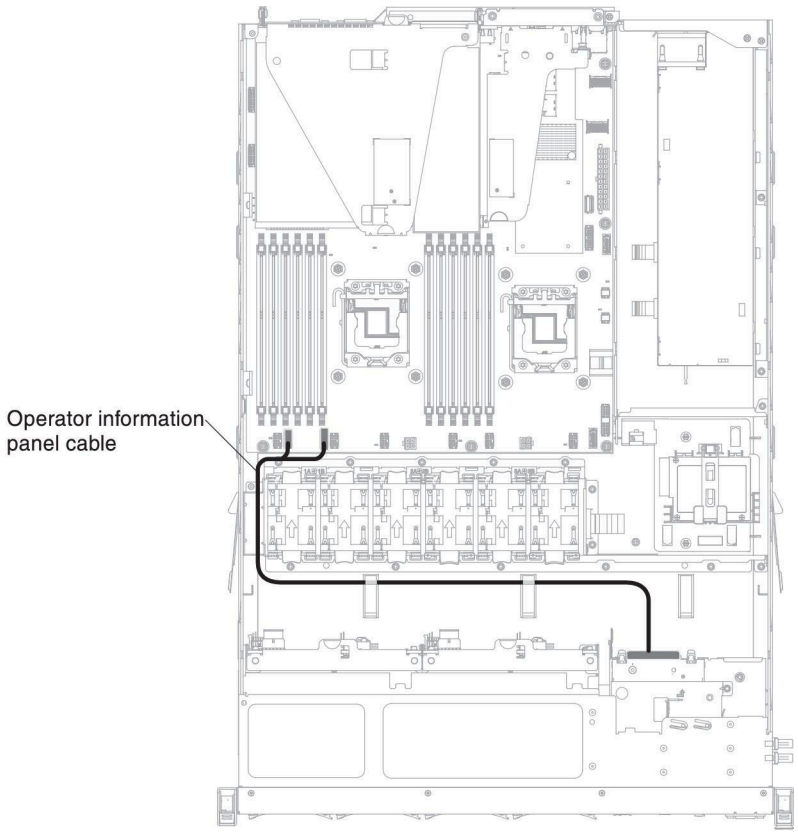
Replacing the operator information panel assembly

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

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. From the front of the server, slide the operator information panel into the server until it stops.



3. Connect the signal cable to the rear of the operator information panel; then, connect the other end of the signal cable to the connectors on the system board. Route the signal cable as shown in the following illustration. Secure the cable with any cable clips on the chassis.



4. Remove the air baffle (see “Removing the air baffle” on page 365).
5. Inside the server, connect the cable to the rear of the operator information panel assembly.
6. Reinstall the air baffle (see “Replacing the air baffle” on page 66).
7. Install the cover (see “Replacing the server top cover” on page 67).
8. Reconnect the power cords and any cables that you removed.
9. Turn on the peripheral devices and the server.

Removing the system battery

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

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

  Note: In the U. S., call 1-800-IBM-4333 for information about battery disposal.
- If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.
- To order replacement batteries, call 1-800-IBM-SERV within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your support center or business partner.

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

Statement 2

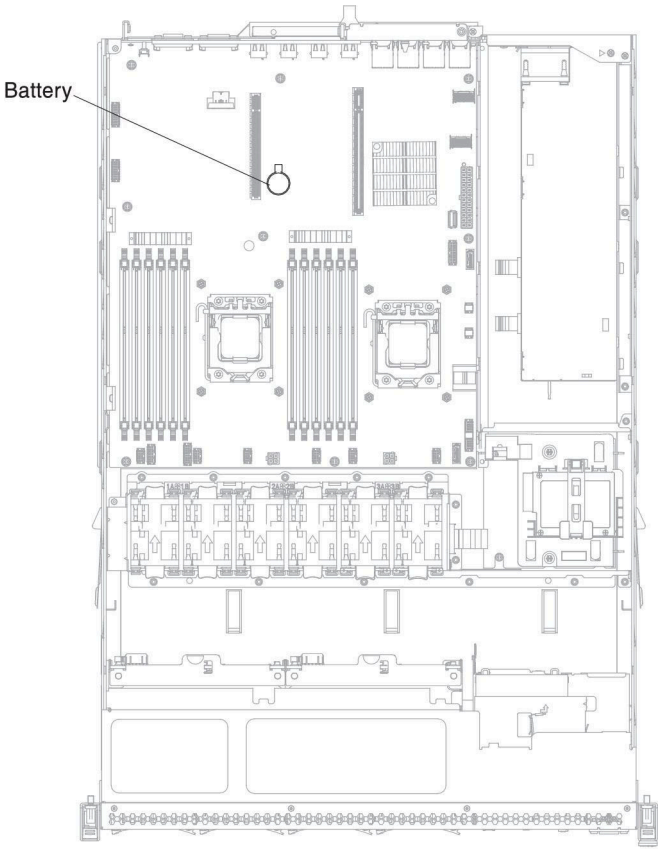
CAUTION:
When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium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

Do not:

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

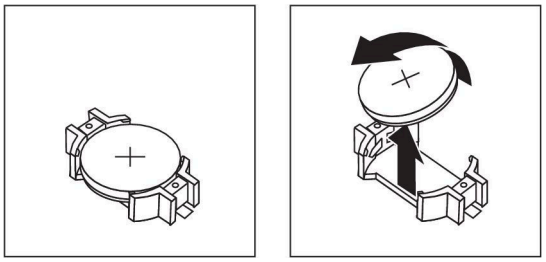
Dispose of the battery as required by local ordinances or regulations.

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



1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.

2. Turn off the server (see “Turning off the server” on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing the server top cover” on page 33).
4. Remove PCI riser-card assembly 1 from the server. (see “Removing a PCI riser-card assembly” on page 328).
5. Remove the system-board battery:
   a. Use one finger to push the battery horizontally out of its housing.



   b. Use your thumb and index finger to lift the battery from the socket.
6. 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.

Replacing the system battery

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

- When replacing the system-board battery, you must replace it with a lithium battery of the same type from the same manufacturer.
- To order replacement batteries, call 1-800-426-7378 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM marketing representative or authorized reseller.
- After you replace the system-board battery, you must reconfigure the server and reset the system date and time.
- To avoid possible danger, read and follow the following safety statement.

Statement 2

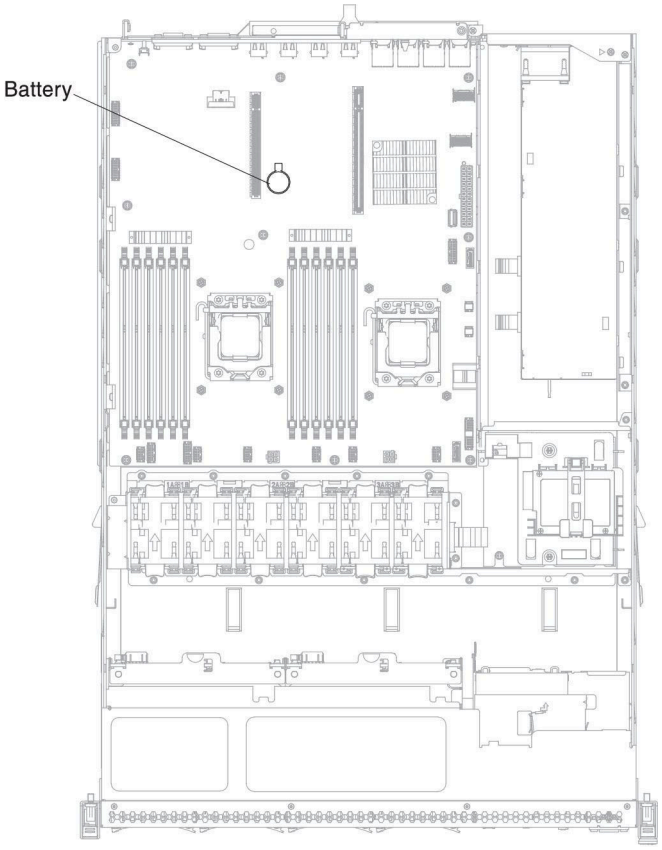
CAUTION:
When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium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

Do not:

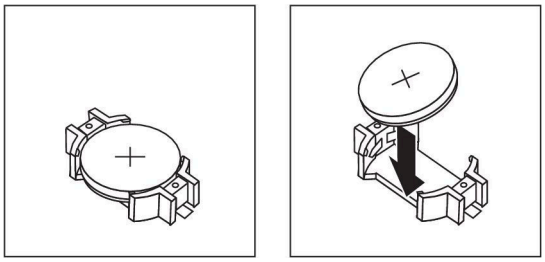
- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

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

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



1. Follow any special handling and installation instructions that come with the replacement battery.
2. Insert the new battery:
   a. Position the battery so that the positive (+) symbol is facing you.



   b. Place the battery into its socket, and press the battery press the battery toward the housing until it clicks into place. Make sure that the battery clip holds the battery securely.
3. Install PCI riser-card assembly 1 (see "Replacing a PCI riser-card assembly" on page 329).
4. Install the cover (see "Replacing the server top cover" on page 67).
5. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

   Note: You must wait approximately 1 to 3 minutes after you connect the server to a power source before the power-control button becomes active.
6. Start the Setup utility and reset the configuration.

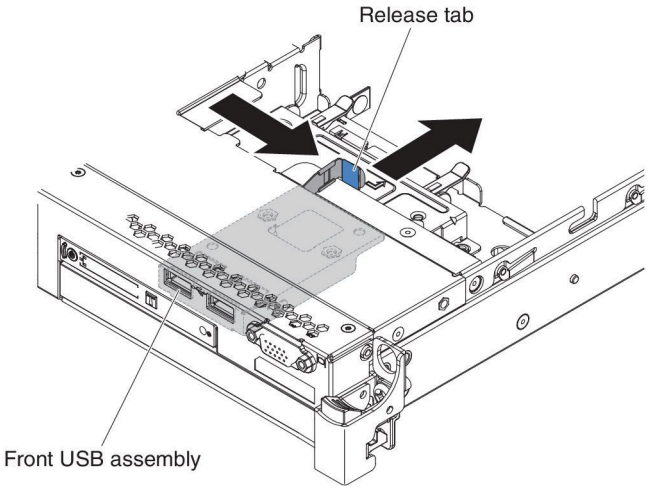
- Set the system date and time.
- Set the power-on password.
- Reconfigure the server.

See “Using the Setup utility” on page 75 for details.

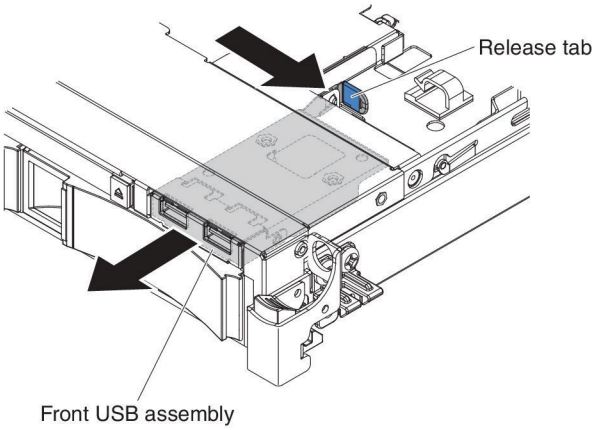
Removing the front USB connector board

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

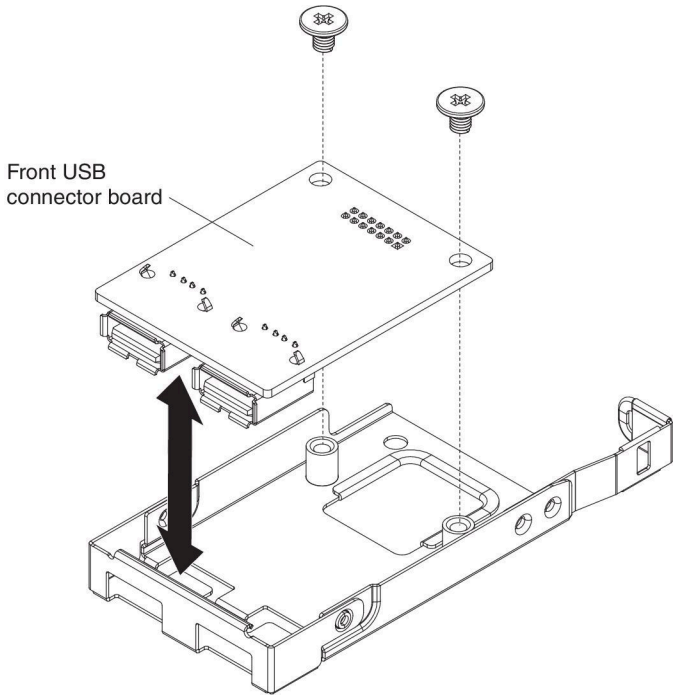
1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.
2. Turn off the server (see “Turning off the server” on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the server cover (see “Removing the server top cover” on page 362).
4. Disconnect the USB cable from the connector on the rear of the USB assembly.
5. (For 2.5-inch hard disk drive models) Press the release tab and push the USB assembly toward the rear of the server.



6. (For 3.5-inch hard disk drive models) Press the release tab and push the USB assembly toward the front of the server.



7. Remove the two screws from the USB assembly and rotate the front USB connector board out of the USB assembly.

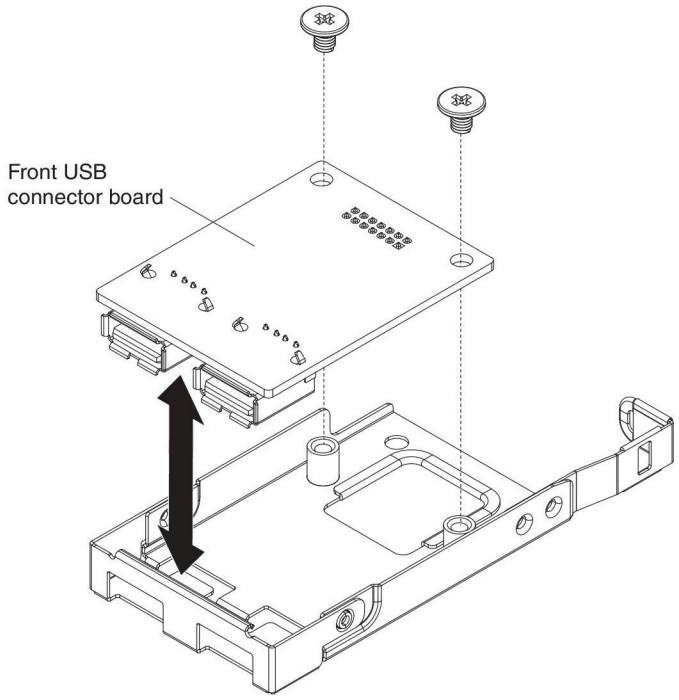


8. If you are instructed to return the front USB connector board, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

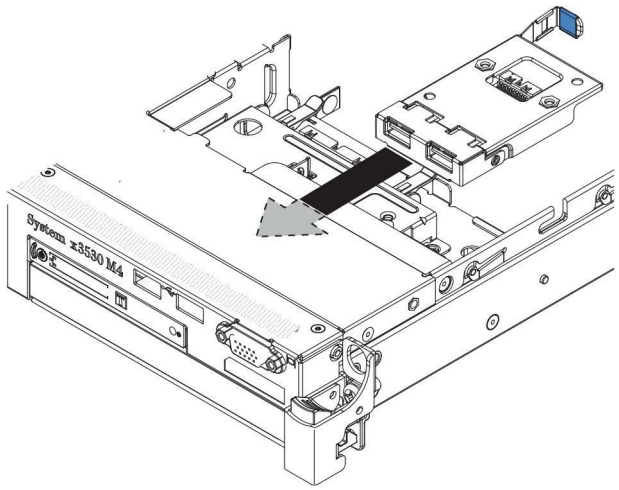
Replacing the front USB connector board

To replace the front USB connector board, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Orient the USB connector board as shown in the illustration; then, align the screw holes on the USB connector board with the screw holes on the USB assembly.



3. Install the screws to secure the USB connector board to the USB assembly.
4. From the front of the server, slide the USB assembly into the USB slot until it clicks into place.



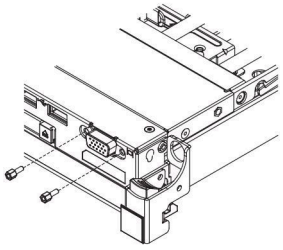
5. Connect one end of the USB cable to the connector on the USB connector board; then, connect the other end of the USB cable to the connector on the system board. Route the USB cable as shown in the following illustration.
6. Align the front video connector (if available) with the slot on the server and install the two screws to secure it to the server.
7. Connect the video/USB cable to the connector on the system board.
8. Secure the USB cable with any cable clips in the server.
9. Replace the cover (see “Replacing the server top cover” on page 67).

Removing the front video connector

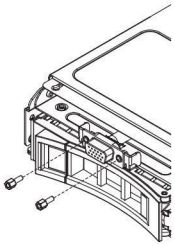
To remove the front video connector, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the server cover (see "Removing the server top cover" on page 362).
4. On a 3.5-inch server model, remove the front bezel (see "Removing the bezel" on page 364).
5. Loosen the screws that secure the video connector to the front of the chassis.

2.5-inch hard disk drive model

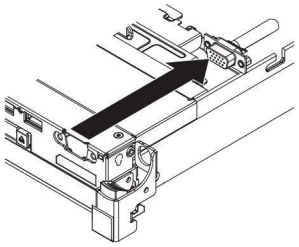


3.5-inch hard disk drive model

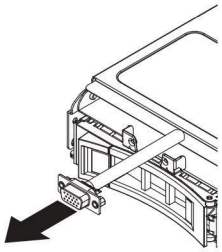


6. Disconnect the video cable from the connector on the system board and disengage the video cable from any cable clips on the chassis.
7. Remove the video connector and cable from the server.

2.5-inch hard disk drive model



3.5-inch hard disk drive model



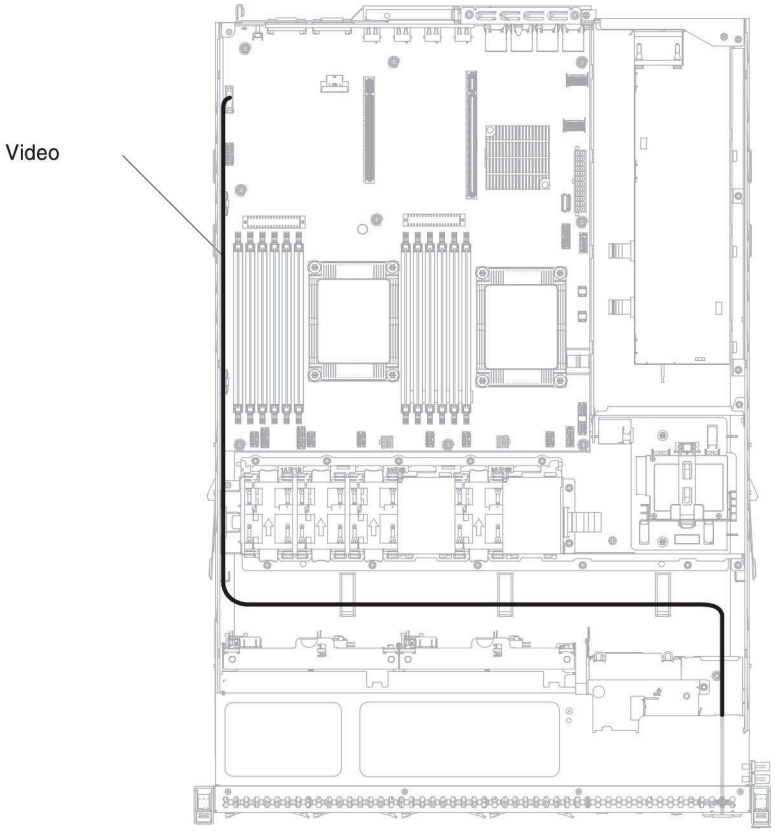
8. If you are instructed to return the video connector, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

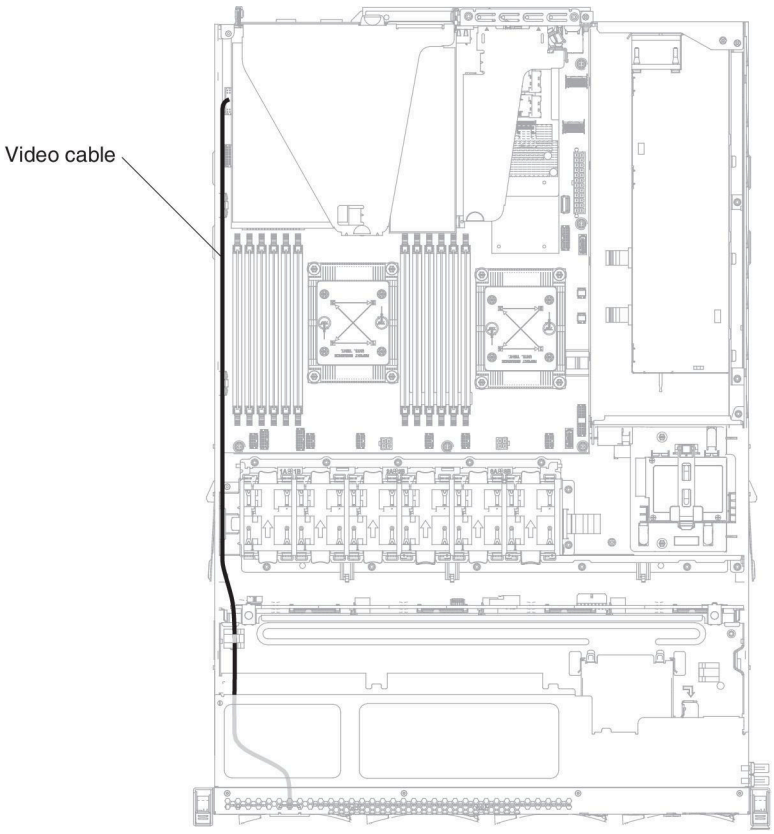
Replacing the front video connector

To replace the front video connector board, complete the following steps:

1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.
2. Align the video connector with the slot on the server and install the two screws to secure it to the server.

   Note: Refer to the illustrations below for 2.5-inch and 3.5-inch hard disk drive bays models respectively. Depending on your server model, align the video connector from inside or outside the server.





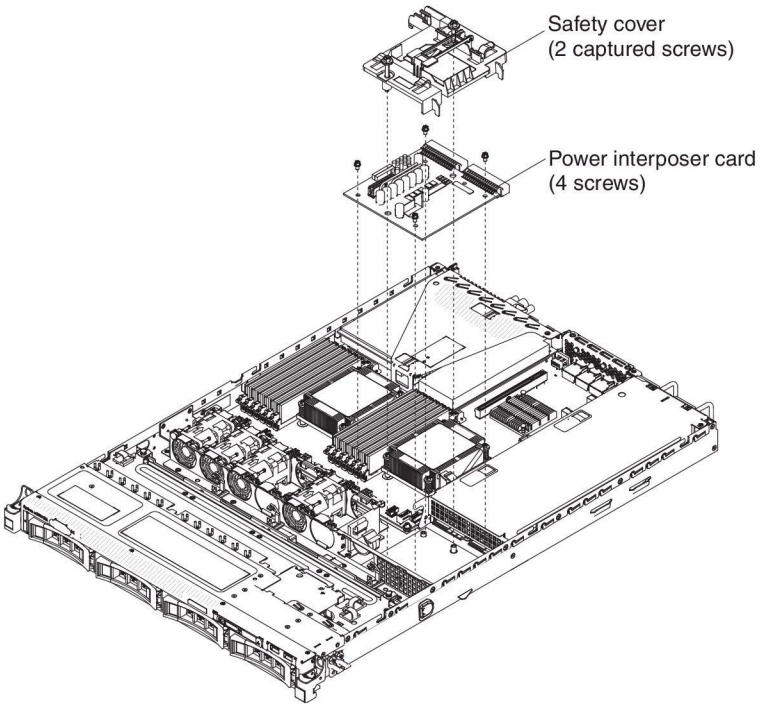
3. Connect the video cable to the connector on the system board. Route the cable as shown in the following illustration. Secure the cable with any cable clips on the chassis.
4. Reinstall the cover (see “Replacing the server top cover” on page 67).
5. Reconnect the power cords and any cables that you removed.
6. Turn on the peripheral devices and the server.

Removing the power interposer card assembly

To remove the power interposer card assembly, complete the following steps:

1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.
2. Turn off the server (see “Turning off the server” on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the server cover (see “Removing the server top cover” on page 362).
4. Remove the air baffle (see “Removing the air baffle” on page 365).
5. If a ServeRAID adapter is installed in PCI riser-card assembly 2, remove PCI riser-card assembly 2 (see “Removing a PCI riser-card assembly” on page 328).
6. Remove the redundant power supply slightly out of the server to disconnect it from the power interposer card.
7. Disconnect all power cables from the connectors on the system board. Disengage the power cables from any cable clips.
8. If a RAID adapter battery is installed on the safety cover, disconnect the power cable from the ServeRAID adapter.
9. Loosen the screws and remove the safety cover from the top of the power interposer card.

10. Remove the screws that secure the power interposer card to the chassis.
11. Disconnect the power cable from the power interposer card; then, remove the power interposer card out of the server.

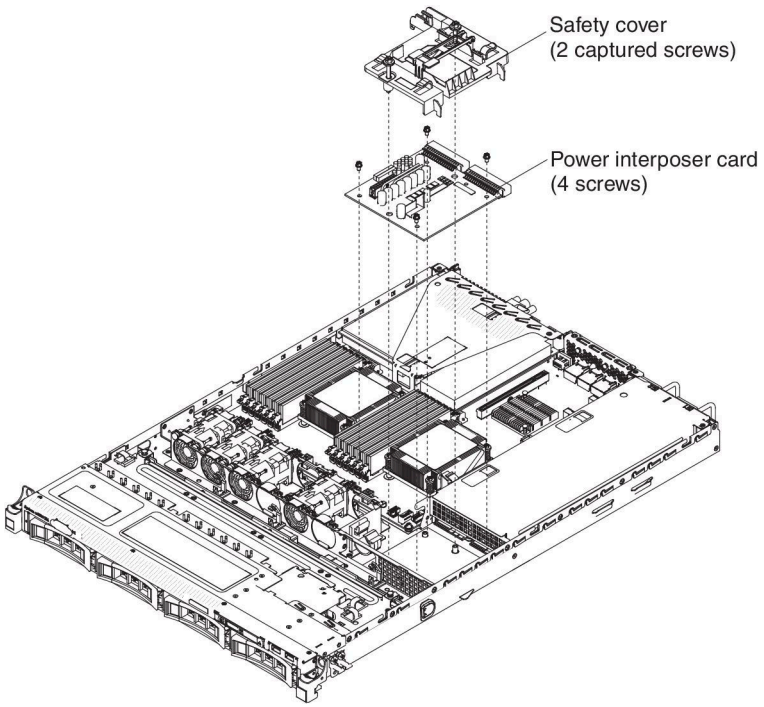


12. If you are instructed to return the power interposer card, follow all of the packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the power interposer card assembly

To install the power interposer card assembly, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Reconnect the power cable to the power interposer card.
3. Align the screw holes on the power interposer card with the screw holes on the chassis; then, install the screws to secure the power interposer card to the chassis.



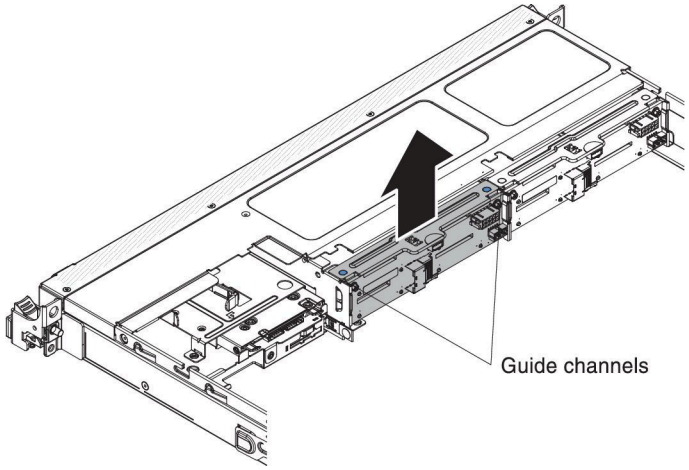
4. Orient the safety cover as shown in the above illustration and align the screws with the screw holes on the power interposer card. Tighten the screws to secure the safety cover on the power interposer card.
5. Reconnect the power cables to the connectors on the system board and secure the power cables with any cable clips on the chassis.
6. Reconnect the power cable from the RAID battery on the safety cover to the ServeRAID adapter, if you have removed it.
7. Reinstall PCI riser-card assembly 2, if you removed it (see "Replacing a PCI riser-card assembly" on page 66).
8. Reinstall the air baffle (see "Replacing the air baffle" on page 66).
9. Reinstall the cover (see "Replacing the server top cover" on page 67).
10. Reconnect the power cords and any cables that you removed.
11. Turn on the peripheral devices and the server.

Removing the hot-swap drive backplane

To remove the 2.5-inch hot-swap drive backplane, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the server cover (see "Removing the server top cover" on page 362).
4. Pull the drives and filler panels out of the server slightly to disengage them from the drive backplane.
5. Disconnect the configuration, power, and SAS signal cables from the backplane.

   Note: You can also choose to disconnect the cables after removing the backplane, if that is easier for you.
6. Lift the backplane up slightly and pull it out the server.



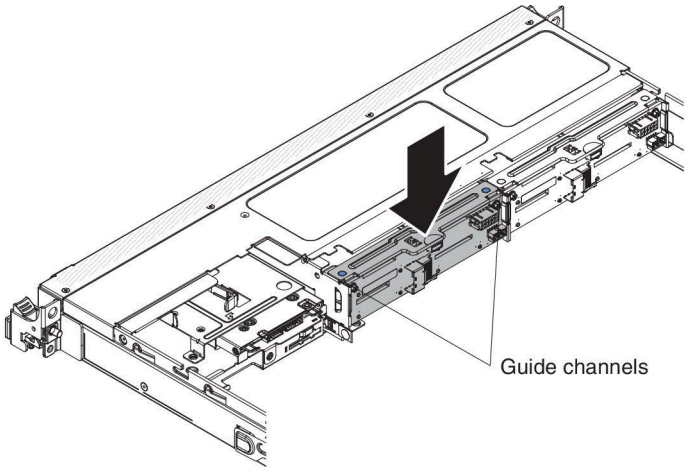
7. If you are instructed to return the drive backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the hot-swap drive backplane

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

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Align the sides of the drive backplane with the guide rails and lower the drive backplane into the server.

   Note: You can reconnect the cables to the drive backplane before installing the backplane onto the cage or you can connect the cables after you install the backplane, if that is easier for you.

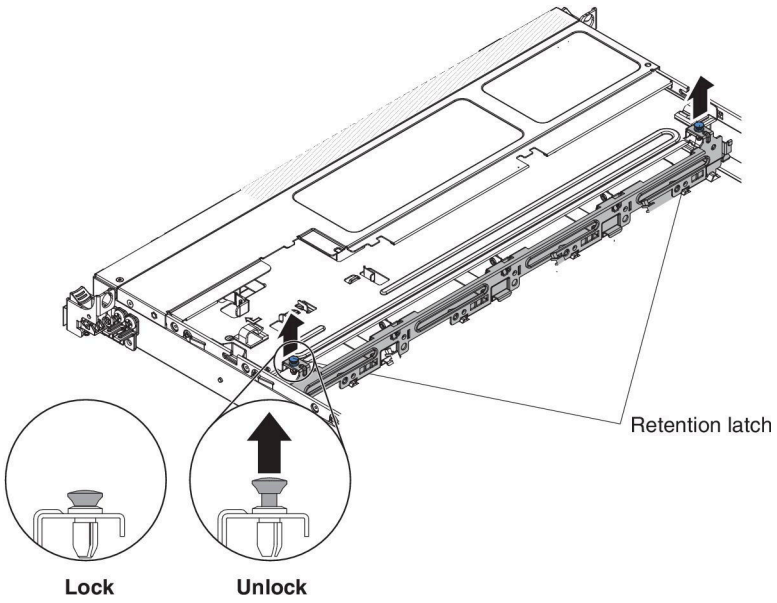


3. Reconnect the configuration, power, and SAS signal cables to the connectors on the backplane. Route the cables as shown in the following illustration.
4. Reinstall the drives and filler panels.
5. Reinstall the cover (see "Replacing the server top cover" on page 67).
6. Reconnect the power cords and any cables that you removed.
7. Turn on the peripheral devices and the server.

Removing the simple-swap SATA drive backplate assembly

To remove the simple-swap SATA drive backplate assembly, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the server cover (see "Removing the server top cover" on page 362).
4. Pull the drive and filler panels out of the server slightly to disengage them from the backplate assembly.
5. Disconnect the cables. Note the routing
   a. Disconnect the signal cable from the connector on the system board.
   b. Disconnect the power cable from the power supply or the power interposer card.
6. Pull the retention latch on top of the drive backplane cage and lift the backplate assembly up slightly and pull it out; then, rotate it backward out of the tabs at the bottom of the drive cage and remove the backplate assembly from the server.



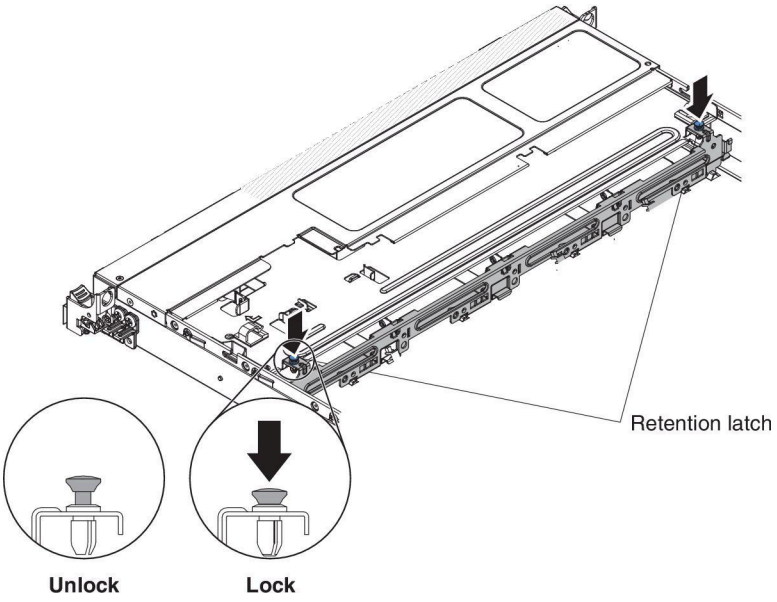
7. If you are instructed to return the backplate assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the simple-swap SATA drive backplate assembly

To install the replacement simple-swap SATA drive and backplate assembly, complete the following steps:

Note: The simple-swap SATA drive and backplate assembly must be installed in the backplane slot closest to the information panel and the SATA drive must be installed in the drive-bay closest to the information panel. The backplate assembly cable connects to the CD/DVD-ROM drive connector on the system board.

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Align the tabs on the bottom of the drive backplate with the backplate slots on the bottom of the backplane cage.



3. Insert the drive backplate tabs into the slots on the bottom of the backplate cage and push down the retention latch on top of the drive cage; then, rotate the drive backplate assembly forward until the backplate is latched.
4. Reinstall the drive and filler panel and plastic drive-bay spacer.
5. Install the cover (see Replacing the server top cover).
6. Reconnect the power cords and any cables that you removed.
7. Turn on the peripheral devices and the server.

Removing and replacing Tier 2 CRUs

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

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

Removing a microprocessor and heat sink

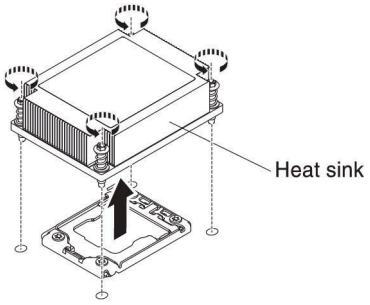
Attention:

- Be extremely careful, the pins on the socket are fragile. Any damage to the pins may require replacing the system board.
- Do not allow the thermal grease on the microprocessor and heat sink to come in contact with anything.
- Removing the heat sink from the microprocessor destroys the even distribution of the thermal grease and requires replacing the thermal grease.
- 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.
- Use the microprocessor installation tool that came with the new microprocessor to remove and install the microprocessor. Failure to use the microprocessor tool may cause damage to the pins on the socket. Any damage to the pins may require replacing the system board.

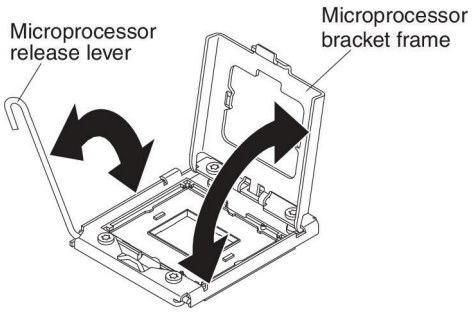
To remove a microprocessor and heat sink, complete the following steps:

1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.
2. Turn off the server (see “Turning off the server” on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the server cover (see “Removing the server top cover” on page 362).
4. Disconnect any cables that impede access to the heat sink and microprocessor.
5. Remove the air baffle (see “Removing the air baffle” on page 365).
6. If you are removing microprocessor 1, remove the memory module from DIMM connector 5. If you are removing microprocessor 2, remove the memory module from DIMM connector 12. See “Removing a memory module” on page 312 for instructions.
7. Loosen the screws on the heat sink with a screwdriver, alternating among the screws until they are loose. If possible, each screw should be rotated two full rotations at a time.
8. Gently pull the heat sink off the microprocessor. Lift the heat sink out of the server. If the heat sink sticks to the microprocessor, slightly twist the heat sink back and forth to break the seal. After removal, place the heat sink on its side on a clean, flat surface.

Note: Removing the heat sink from the microprocessor destroys the even distribution of the thermal grease and requires replacing the thermal grease.

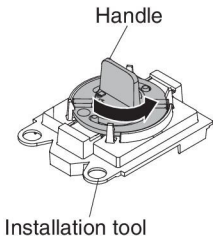


9. Release the microprocessor retention latch by pressing down on the end, moving it to the side, and releasing it to the open (up) position.
10. Open the microprocessor bracket frame by lifting up the tab on the top edge. Keep the bracket frame in the open position.



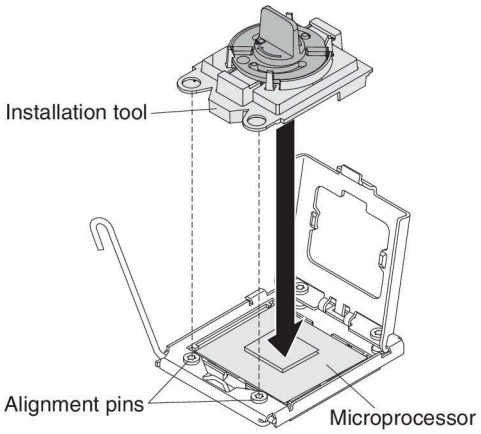
11. Align the holes on the microprocessor installation tool with the screws on the microprocessor bracket, then place the microprocessor installation tool down over the microprocessor **1** . Twist the handle clockwise **2** to attach the tool to the microprocessor.

    Note: 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.

    Attention: Do not touch the pins on the socket. The pins are fragile. Any damage to the pins may require replacing the system board.



13. If you are instructed to return the microprocessor, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you. Do not return the microprocessor installation tool.

Replacing a microprocessor and heat sink

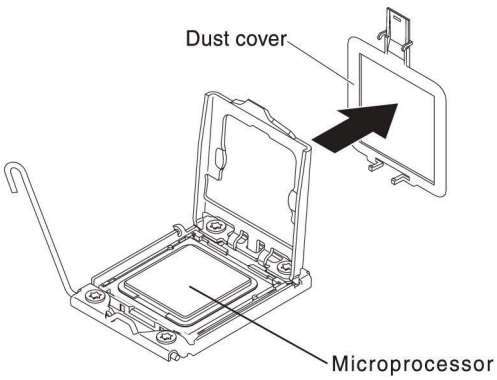
Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see "Handling static-sensitive devices" on page 32.

Notes:

- If your server comes with one Intel Pentium 1400 series microprocessor, the second microprocessor socket is not used. The server supports only one Intel Pentium microprocessor. If you plan to install two Intel Xeon microprocessors in the server, you must first remove the Intel Pentium microprocessor that came with the server.
- See "Installing an additional microprocessor and heat sink" on page 50 for notes and other information that you must consider when you install a microprocessor.
- Be extremely careful, the pins on the socket are fragile. Any damage to the pins may require replacing the system board.
- Use the microprocessor installation tool that came with the new microprocessor to remove the microprocessor from the server. Failure to use the microprocessor tool may cause damage to the pins on the socket. Any damage to the pins may require replacing the system board.

To install an additional microprocessor and heat sink, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Remove the socket cover from the microprocessor socket, if it is installed.

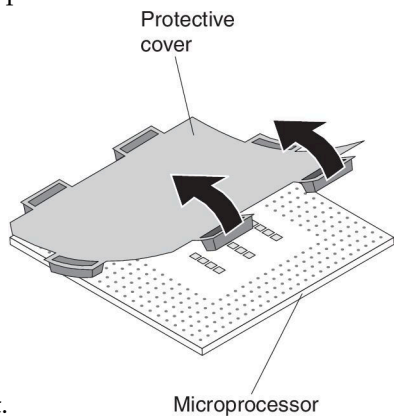


3. If the microprocessor is preinstalled in the installation tool, release the sides of the cover and remove the cover from the installation tool; then, continue to step 5.
4. Install the microprocessor in the microprocessor installation tool:
   a. Remove the static-protective bag, and the foam surrounding the bag, from the box.
   b. Touch the static-protective package that contains the new microprocessor to any *unpainted* metal surface on the server; then, remove the microprocessor from the package.

      Attention:

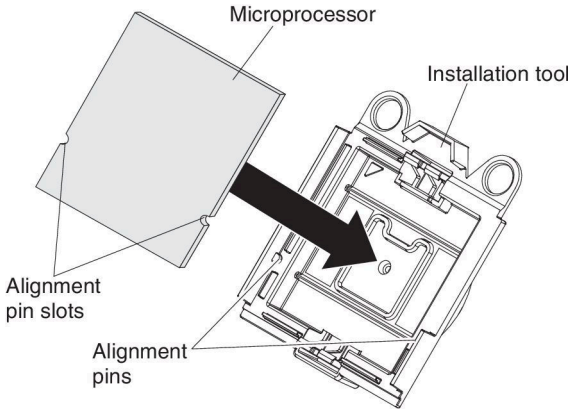
      - Do not touch the microprocessor contacts; handle the microprocessor by the edges only. Contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.
      - Handle the microprocessor carefully. Dropping the microprocessor during installation or removal can damage the contacts.
      - Do not use excessive force when you press the microprocessor into the socket.
      - Make sure that the microprocessor is oriented and aligned and positioned in the socket before you try to close the lever.

   c. If there is a plastic protective cover on the bottom of the microprocessor, carefully remove it.



   d. Twist the handle of the microprocessor installation tool counterclockwise so that it is in the open position.
   e. Align the triangle alignment mark on the microprocessor with the triangle alignment mark on the microprocessor installation tool, then place the microprocessor on the bottom of the tool so that the tool can grasp the microprocessor correctly onto the bottom of the installation tool.

f. Align the holes on the microprocessor installation tool with the screws on the microprocessor bracket, then place the microprocessor installation tool down over the microprocessor **1** . Twist the handle clockwise **2** to attach the tool to the microprocessor.



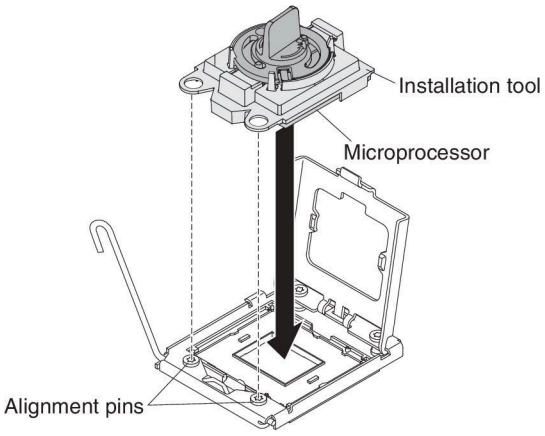
g. Twist the handle of the installation tool clockwise to secure the microprocessor in the tool.

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

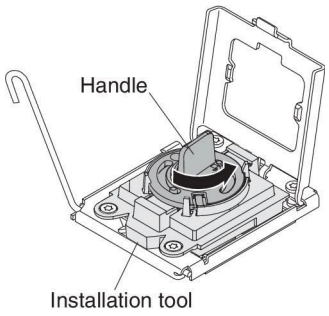
5. Install the microprocessor:

a. Align the holes on the microprocessor installation tool with the screws on the microprocessor bracket, then place the microprocessor installation tool down over the microprocessor **1** . Twist the handle clockwise **2** to attach the tool to the microprocessor.

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



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



Attention:

- Do not press the microprocessor into the socket.
- Do not touch exposed pins of the microprocessor socket. The pins on the socket are fragile. Any damage to the pins may require replacing the system board.
- Make sure that the microprocessor is oriented and aligned correctly in the socket before you try to close the microprocessor retainer.
- Do not touch the thermal material on the bottom of the heat sink or on top of the microprocessor. Touching the thermal material will contaminate it and destroys its even distribution. If the thermal material on the microprocessor or heat sink becomes contaminated, you must replace the thermal grease.

c. Take off the microprocessor installation tool from the microprocessor socket and close the microprocessor bracket frame.

d. Carefully close the microprocessor release lever to the closed position to secure the microprocessor in the socket.

6. Install the heat sink that comes with the microprocessor:

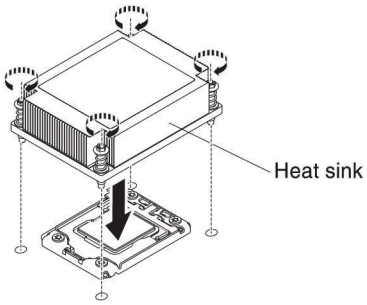
Attention:

- Do not set down the heat sink after you remove the plastic cover.
- 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, contact your service technician.

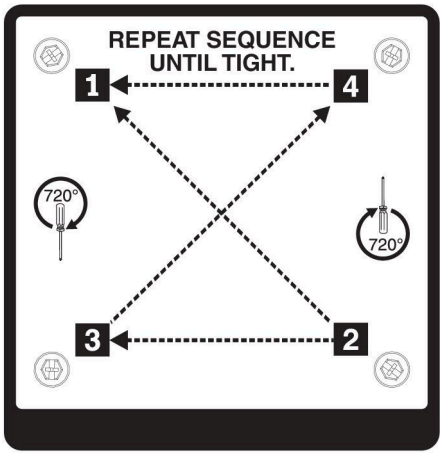
a. Remove the plastic protective cover from the bottom of the heat sink.

Attention: Do not touch the thermal grease on the bottom of the heat sink after you remove the plastic cover. Touching the thermal grease will contaminate it. See Thermal grease for more information.

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



c. Press firmly on the captive screws and tighten them with a screwdriver. The follow illustration shows the sequence in tightening the screws, which is also shown on top of the heat sink. Begin with the screw labeled as "1", then "2", "3" and finally "4". 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. If you are using a torque wrench, tighten the screws to 8.5 Newton-meters (Nm) to 13 Nm (6.3 foot-pounds to 9.6 foot-pounds).



7. If you installed the second microprocessor, install the two fans on Fan connector 4 and Fan connector 6 of the system board respectively (see Replacing a hot-swap fan assembly).
8. Reinstall the memory module that you have removed (see “Replacing a memory module” on page 313).
9. Reinstall the air baffle (see “Replacing the air baffle” on page 66).
10. Reconnect any cables that you have disconnected from the adapters or system board.

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

When you are installing the heat sink on the same microprocessor that is was removed from, make sure that the following requirements are met:

- The thermal grease on the heat sink and microprocessor is not contaminated.
- Additional thermal grease is not added to the existing thermal grease on the heat sink and microprocessor.

Note:

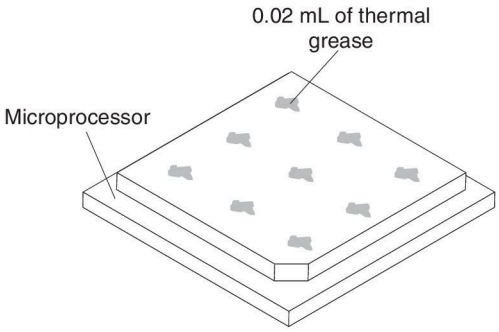
- Read the Safety information on page Safety.
- Read the “Installation guidelines” on page 30.
- Read “Handling static-sensitive devices” on page 32.

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

1. Place the heat sink on a clean work surface.
2. Remove the cleaning pad from its package and unfold it completely.

3. Use the cleaning pad to wipe the thermal grease from the bottom of the heat sink.

   Note: Make sure that all of the thermal grease is removed.
4. Use a clean area of the cleaning pad to wipe the thermal grease from the microprocessor; then, dispose of the cleaning pad after all of the thermal grease is removed.



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

   Note: If the grease is properly applied, approximately half of the grease will remain in the syringe.
6. Install the heat sink onto the microprocessor as described in "Installing an additional microprocessor and heat sink" on page 50.

Removing the system board

Note:

1. Before you replace the system board, make sure that you backup any features on demand (FoD) keys that were enabled. Remember to re-enable the features on demand (FoD) keys after installing the new system board. For more information on Features on Demand (FoD), including instructions for automating the activation and installation of the activation key by using IBM ToolsCenter or IBM Systems Director, see the *IBM Features on Demand User's Guide* at https://www-304.ibm.com/systems/x/fod/index.wss under the Help section.
2. When you replace the system board, you must either update the server with the latest firmware or restore the pre-existing firmware from a diskette or CD image. Make sure that you have the latest firmware or a copy of the pre-existing firmware before you proceed.

Before you remove the system board from the server, take the following steps to save data, firmware, and configuration data:

- Record all system configuration information, such as IMM IP addresses, vital product data, and the machine type, model number, serial number, Universally Unique Identifier, and asset tag of the server.

- Using the Advanced Settings Utility (ASU), save the system configuration to external media.
- Save the system-event log to external media.

Note: When you replace the system board, you must either update the server with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image. Make sure that you have the latest firmware or a copy of the pre-existing firmware before you proceed.

To remove the system board, complete the following steps:

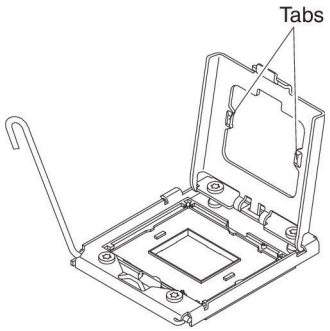
1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. Remove the server cover (see "Removing the server top cover" on page 362).
4. Remove the air baffle (see "Removing the air baffle" on page 365).
5. Remove all PCI riser-card assemblies with the adapters in them (see "Removing a PCI riser-card assembly" on page 328).
6. Disconnect all cables from the system board. Make a list of each cable as you disconnect it; you can then use this as a checklist when you install the new system board.

   Attention: Disengage all latches, release tabs or locks on cable connectors when you disconnect all cables from the system board. Refer to"Internal cable routing" on page 276). 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.
7. Remove the DIMMs from the system board and set them aside on a static-protective surface for reinstallation (see "Removing a memory module" on page 312).

   Note: Make a note of the location of each DIMM as you remove it, so that you can later reinstall it in the same connector.
8. Remove all heat sinks and microprocessors, and set them aside on a static-protective surface for reinstallation (see "Removing a microprocessor and heat sink" on page 347).

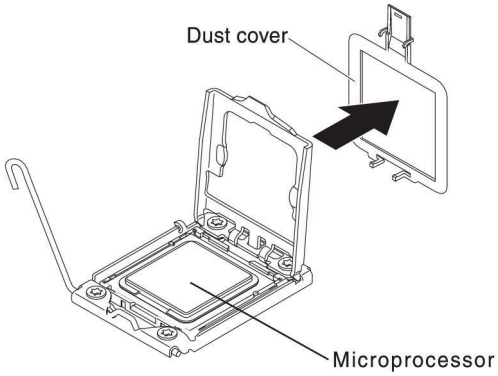
   Note:

   a. Be sure to keep the heat sink and microprocessor from each microprocessor socket of the old system board together so that you can install them on the new system board together. For example, when you remove the heat sink and microprocessor from microprocessor socket 1 of the old system board , install them both on the same socket on the new system board.
   b. Use an alcohol wipe to remove any thermal grease from the tabs on the microprocessor bracket frame on the old system board.

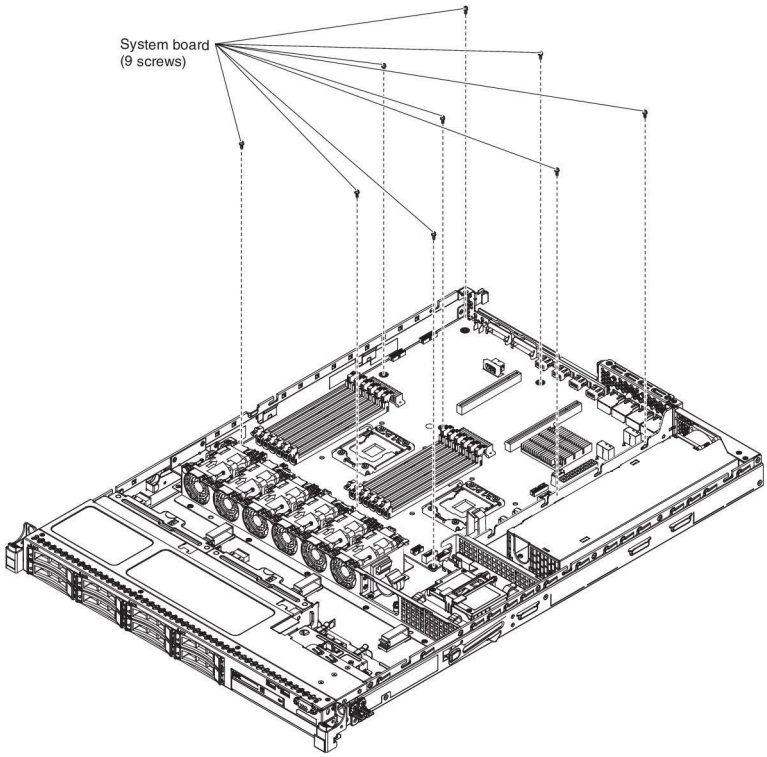


c. Always use microprocessor installation tool to remove a microprocessor. Failing to use microprocessor installation tool may damage the microprocessor sockets on the system board. Any damage to the microprocessor sockets may require replacing the system board.

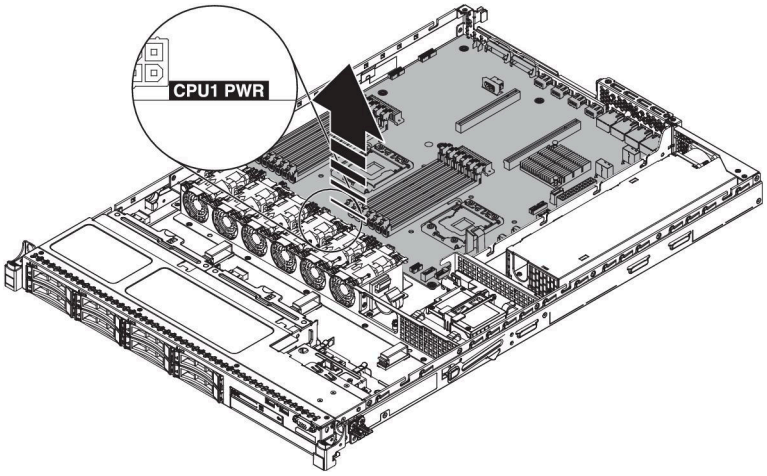
9. Remove the socket covers from the microprocessor sockets on the new system board and place them on the microprocessor sockets of the old system board that you are removing.



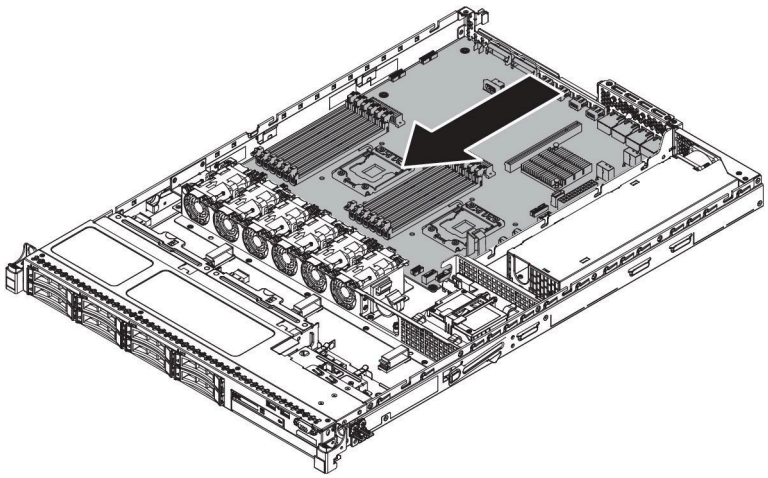
10. Loosen the nine screws that secure the system board to the chassis.



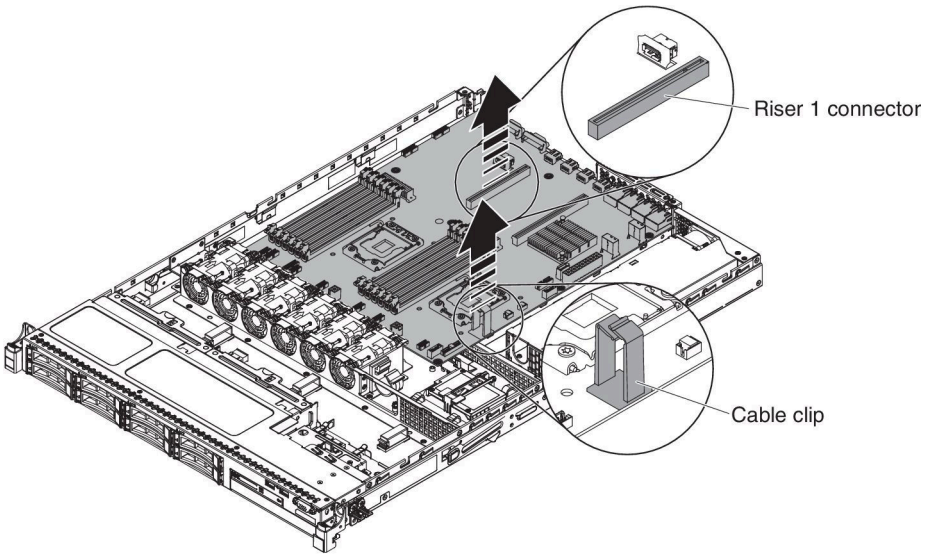
11. Slightly lift the system board at the side that is near the CPU1_PWR to create a small angle of elevation between the system board and chassis.



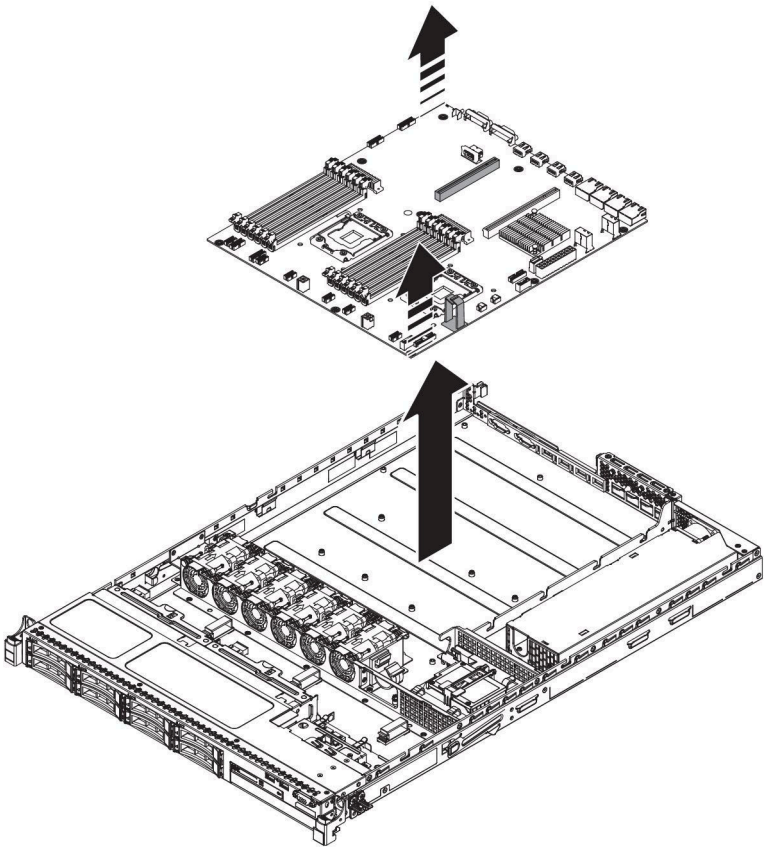
12. Gently push the external input/output connectors toward to the fan cage as much as possible.



13. Grasp the system board on both the cable clip near the microprocessor 2 and PCI riser card connector 1. Then, slightly lift the system board to create a small angle of elevation by leaning the edge against the partition of the power supply between the system board and chassis.



14. Carefully lift up the system board by placing both hands diagonally and remove it from the chassis. Be careful to avoid damage any surrounding components or bend the pin inside the microprocessor socket.



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.

    Attention: Make sure to place the socket covers for the microprocessor sockets on the system board before you return the old system board.

Replacing the system board

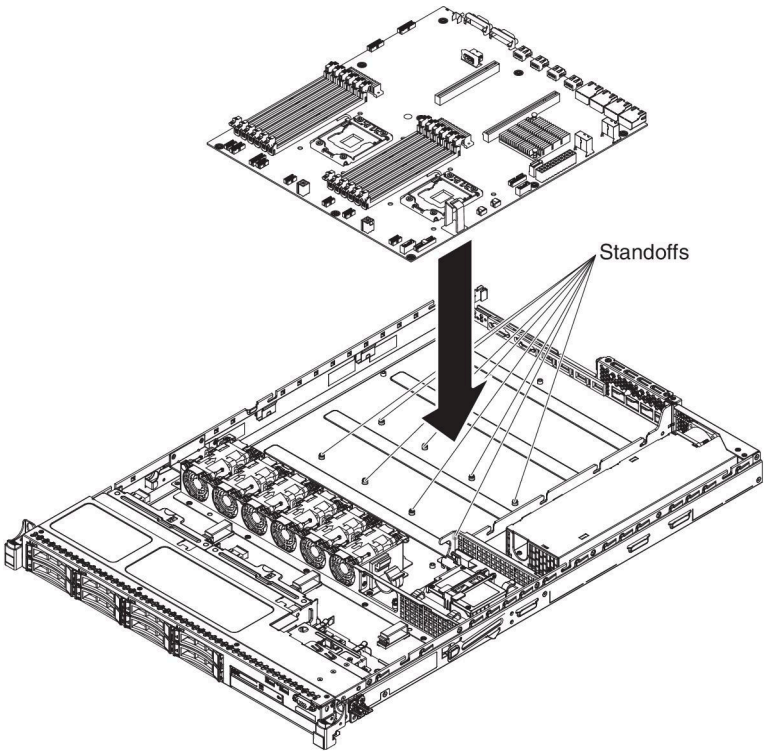
Note:

1. Before you replace the system board, make sure that you backup any features on demand (FoD) keys that were enabled. Remember to re-enable the features on demand (FoD) keys after installing the new system board. For more information on Features on Demand (FoD), including instructions for automating the activation and installation of the activation key by using IBM ToolsCenter or IBM Systems Director, see the *IBM Features on Demand User's Guide* at https://www-304.ibm.com/systems/x/fod/index.wss under the Help section.
2. When you reassemble the components in the server, be sure to route all cables carefully so that they are not exposed to excessive pressure and so that they do not get pinched when you reinstall the system board. In addition, make sure the cables are inserted into the relevant cable clips.
3. 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 71, "Updating the Universal Unique Identifier (UUID)" on page 92, and "Updating the DMI/SMBIOS data" on page 95 for more information.

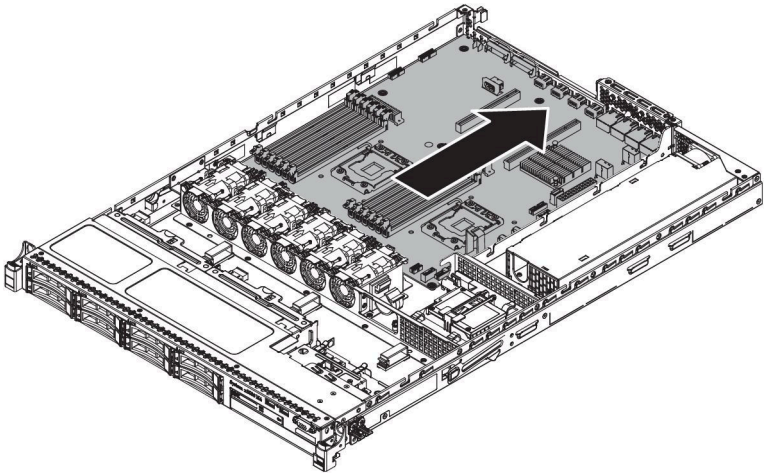
Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code

To install the system board, complete the following steps:

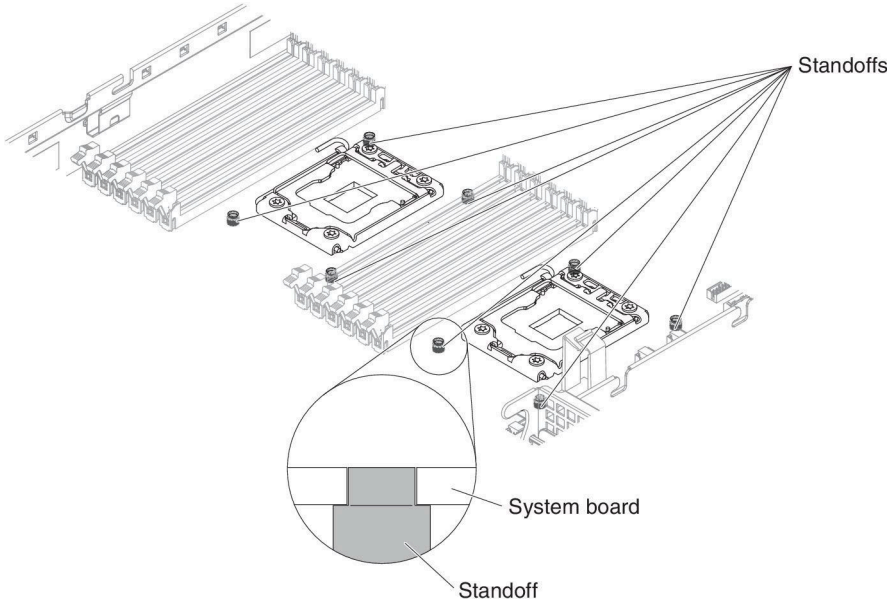
1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Slide the system board into the chassis with a small angle toward to the hard disk bays. Make sure the system board is seated into the chassis flat and the no standoff is blocking the system board.



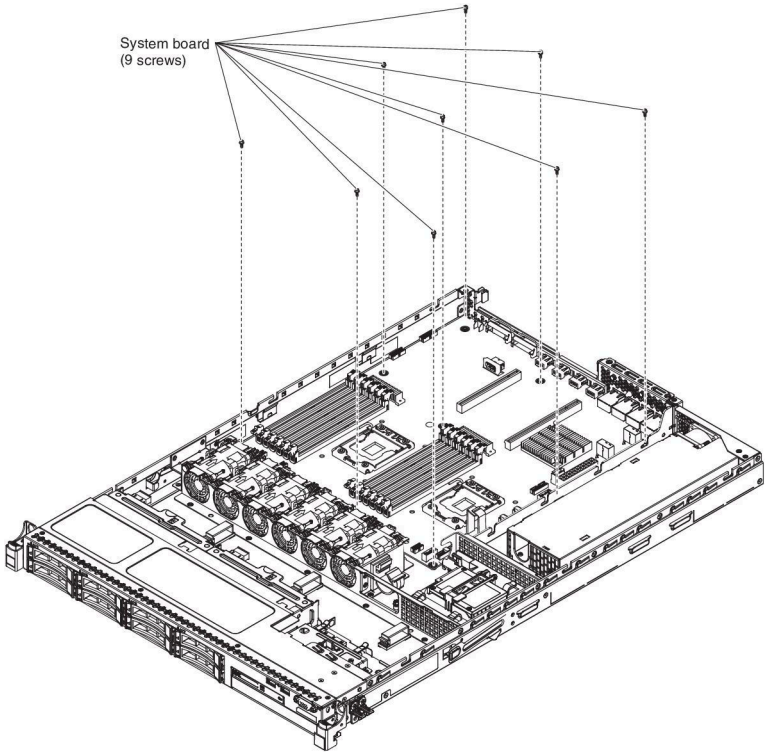
3. Push the edge of the external input/output connectors of the system board away from the hard disk bays.



4. Make sure the eight standoffs are aligned with the corresponding captive screw holes on the system board.



5. Align the screw holes on the system board with the screw holes on the chassis and install the screws to secure the system board to the chassis.



6. Reconnect the cables that you disconnected earlier to the system board.
7. Reinstall the DIMMs onto the system board (see "Replacing a memory module" on page 313).
8. Reinstall the microprocessors and heat sinks (see "Replacing a microprocessor and heat sink" on page 349).
9. Install the socket covers that you removed from the microprocessor sockets on the new system board and place them on the microprocessor sockets of the old system board, if you have not done so.

10. Reconnect the SAS signal cables and remote RAID battery cable to the ServeRAID adapter, if you removed them earlier.
11. Reinstall the PCI riser-card assemblies with the adapters, if any were installed (see “Replacing a PCI riser-card assembly” on page 66).
12. Reinstall the air baffle (see “Replacing the air baffle” on page 66).
13. Reinstall the cover (see “Replacing the server top cover” on page 67).
14. Reconnect the power cords and any cables that you removed.
15. Turn on the peripheral devices and the server.

Important: Perform the following updates:

- Either update the server with the latest RAID firmware or restore the pre-existing firmware from a diskette or CD image.
- Update the UUID (see “Updating the Universal Unique Identifier (UUID)” on page 92).
- Update the DMI/SMBIOS (see “Updating the DMI/SMBIOS data” on page 95).
- If you purchased a Feature on Demand, make sure that you reactivate the feature using the instructions in the Feature on Demand documentation.

Removing and replacing consumable and structural parts

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

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

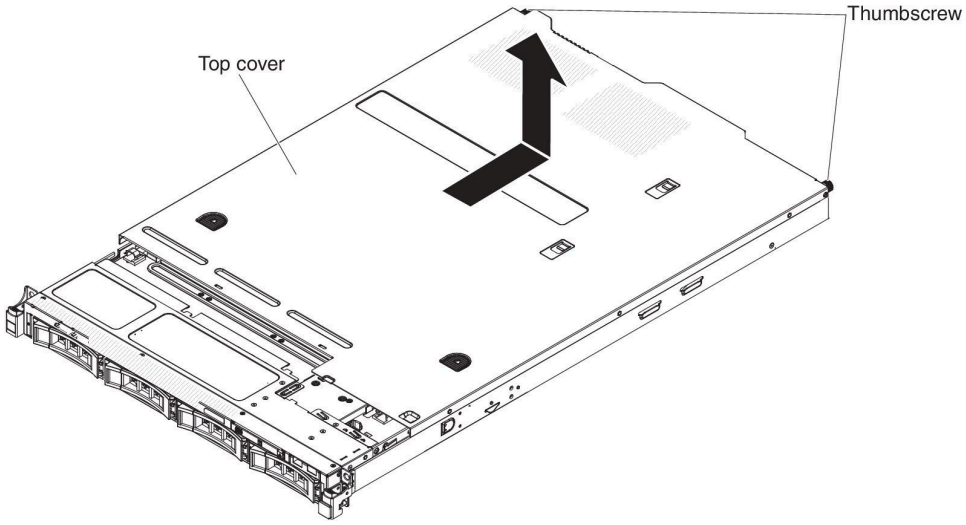
Removing the server top cover

Attention: If you release the cover latch and remove the cover while the server is running, the server will lose power and turn off automatically. After you reinstall the cover, you can power-on the server again.

To remove the server top cover, complete the following steps:

1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.
2. Turn off the server (see “Turning off the server” on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. If the server has been installed in a rack, press the two release latches 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.
4. Loosen the two thumbscrews that secure the cover to the rear of the server.
5. Press on the two blue grip points and slide the cover toward the rear; then, lift the cover off the server and set it aside.



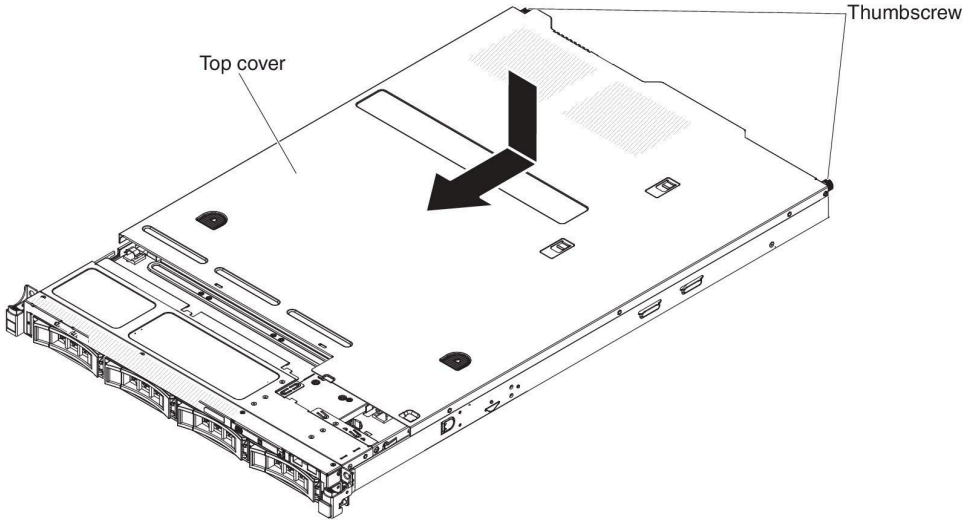
6. If you are instructed to return the cover, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the server top cover

To replace the server cover, complete the following steps:

1. Make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server. Also, make sure that all internal cables are correctly routed.
2. Align the cover over the server (toward the rear of the server) until the cover edges slip into position over the chassis.

   Important: Before you slide the cover forward, make sure that all the tabs on 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.



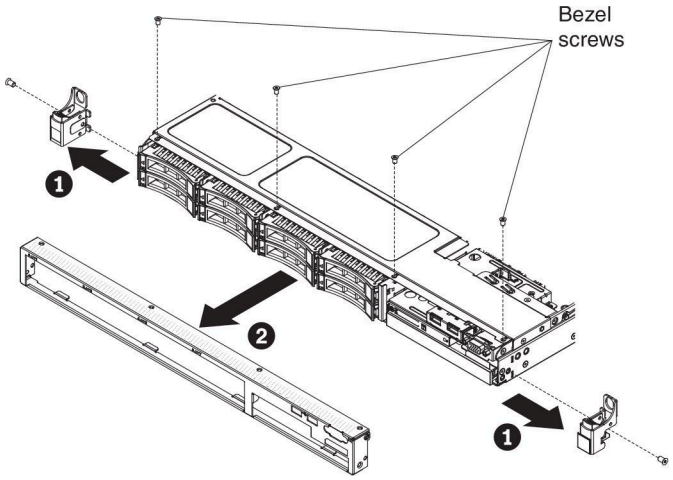
3. Slightly slide the cover toward the front of the server until the inset tabs start to engage on the server; then, tighten the thumbscrews to secure the cover to the chassis.
4. Install the server into the rack enclosure and push the server into the rack until it clicks into place.

Removing the bezel

To remove the bezel, complete the following steps:

1. Read the safety information that begins on page Safety and “Installation guidelines” on page 30.
2. Turn off the server (see “Turning off the server” on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. If the server has been installed in a rack, press the two release latches 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.
4. Remove the drives and filler panels from the drive bays (see “Removing hot-swap drives” on page 302 or “Removing a 3.5-inch simple-swap SATA drive” on page 304).
5. Remove the EIA quick latch first; then, remove the screws from the bezel.

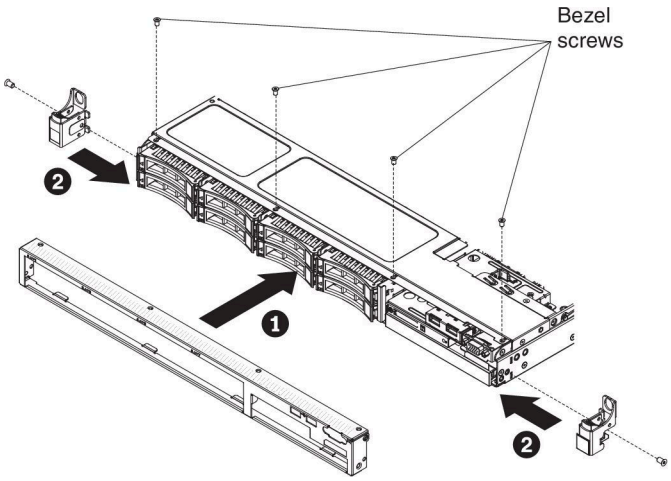


6. Pull the top of the bezel out slightly; then, rotate it downward until the tabs on the bottom of the bezel disengages from the chassis and set it aside.
7. If you are instructed to return the front bezel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the bezel

To install the bezel, complete the following steps:

1. Insert the tabs on the bottom of the bezel into the holes on the chassis.
2. Rotate the bezel upward to the server and reinstall the bezel screws. Then, install the EIA quick latch.



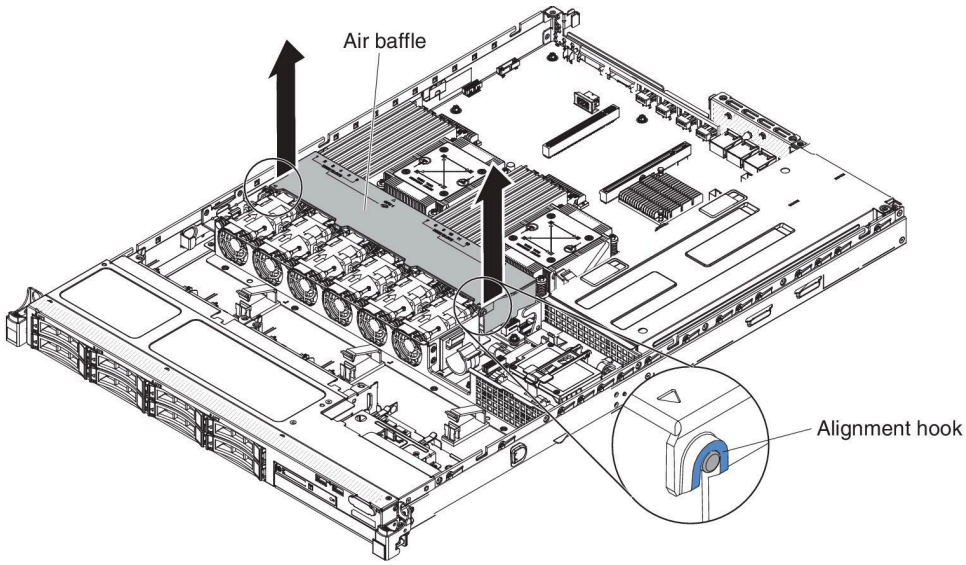
3. Install the server into the rack enclosure and push the server into the rack until it clicks into place.
4. Reinstall the hard disk drives and drive bay filler panels into the drive bays.
5. Reconnect the power cords and any cables that you removed.
6. Turn on the peripheral devices and the server.

Removing the air baffle

To remove the air baffle, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Turn off the server (see "Turning off the server" on page 21) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the top cover (see "Removing the server top cover" on page 33).
4. Lift the air baffle from the server and set it aside.

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



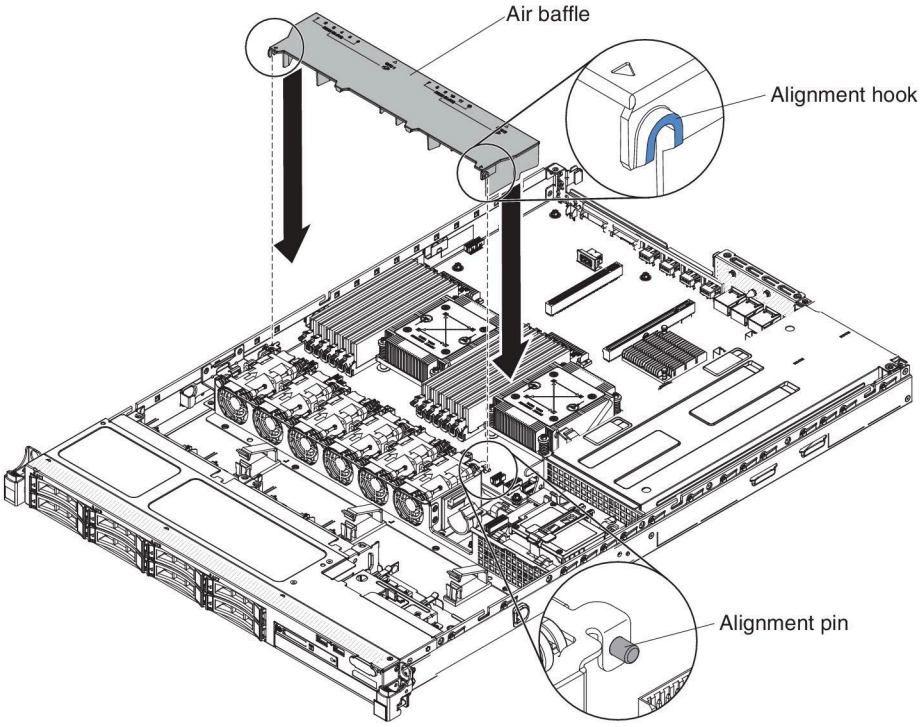
5. If you are instructed to return the air baffle, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the air baffle

To install the air baffle, complete the following steps:

1. Read the safety information that begins on page Safety and "Installation guidelines" on page 30.
2. Align the tabs on the sides of the air baffle with the slots on the fan cage and lower the air baffle into the server.

   Note: Make sure that no cable is pinched.



Appendix. 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. Use this information to obtain additional information about IBM and IBM products, determine what to do if you experience a problem with your IBM system or optional device, and determine whom to call for service, if it is necessary.

Use this information to obtain additional information about IBM and IBM products, determine what to do if you experience a problem with your IBM system or optional device, and determine 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.

If you believe that you require IBM to perform warranty service on your IBM product, the IBM service technicians will be able to assist you more efficiently if you prepare before you call.

- 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.
- Check for updated firmware and operating-system device drivers for your IBM product. The IBM Warranty terms and conditions state that you, the owner of the IBM product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your IBM service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
- If you have installed new hardware or software in your environment, check http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ to make sure that the hardware and software is supported by your IBM product.
- Go to http://www.ibm.com/supportportal/ to check for information to help you solve the problem.
- Gather the following information to provide to IBM Support. This data will help IBM Support quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.
  - Hardware and Software Maintenance agreement contract numbers, if applicable
  - Machine type number (IBM 4-digit machine identifier)
  - Model number
  - Serial number
  - Current system UEFI and firmware levels
  - Other pertinent information such as error messages and logs
- Go to http://www.ibm.com/support/entry/portal/Open_service_request/ to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the

pertinent information available to IBM service quickly and efficiently. IBM service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

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/supportportal/ .

You can find the most up-to-date information for System x products at http://www.ibm.com/systems/x/ .

Getting help and information from the World Wide Web

On the World Wide Web, up-to-date information about IBM systems, optional devices, services, and support is available at http://www.ibm.com/supportportal/ .

You can find the most up-to-date product information for System x products at http://www.ibm.com/systems/x/ .

How to send DSA data to IBM

Use the IBM Enhanced Customer Data Repository to send diagnostic data to IBM.

Before you send diagnostic data to IBM, read http://www.ibm.com/de/support/ecurep/send_http.html .

You can use any of the following methods to send diagnostic data to IBM:

- **Standard upload:** http://www.ibm.com/de/support/ecurep/send_http.html
- **Standard upload with the system serial number:** http://www.ecurep.ibm.com/app/upload_hw/
- **Secure upload:** http://www.ibm.com/de/support/ecurep/send_http.html#secure
- **Secure upload with the system serial number:** https://www.ecurep.ibm.com/app/upload

Creating a personalized support web page

You can create a personalized support web page by identifying IBM products that are of interest to you.

To create a personalized support web page, go to http://www.ibm.com/support/mynotifications/ . From this personalized page, you can subscribe to weekly email notifications about new technical documents, search for information and downloads, and access various administrative services.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with your IBM 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 Business Partners** 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

Use this information to contact 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

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Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1,048,576 bytes, and GB stands for 1,073,741,824 bytes.

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.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as "total bytes written" (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. IBM is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

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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 device 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 device 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 device, IBM may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 18. 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 52.21. • 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 71.04-19853 • Silver: Corrosion rate of less than 300 Å in 30 days
1 ASHRAE 52.2-2008 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. 2 The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction. 3 ANSI/ISA-71.04-1985. Environmental conditions for process measurement and control systems: Airborne contaminants. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.	

Documentation format

The publications for this product are in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when you use the PDF files and want to request a web-based format or accessible PDF document for a publication, direct your mail to the following address:

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Electronic emission notices

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that might cause undesired operation.

Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

Attention: This is an EN 55022 Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Responsible manufacturer:

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
914-499-1900

European Community contact:

IBM Deutschland GmbH
Technical Regulations, Department M372
IBM-Allee 1, 71139 Ehningen, Germany
Telephone: +49 7032 15-2941
Email: lugi@de.ibm.com

Germany Class A statement

Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:

IBM Deutschland GmbH
Technical Regulations, Abteilung M372

IBM-Allee 1, 71139 Ehningen, Germany
Telephone: 0049 (0) 7032 15-2941
Email: lugi@de.ibm.com

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

Japan VCCI Class A statement

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI-A

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

Japan Electronics and Information Technology Industries Association (JEITA) statement

高調波ガイドライン適合品

Japan Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guidelines (products less than or equal to 20 A per phase)

Korea Communications Commission (KCC) statement

이 기기는 업무용(A급)으로 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

This is electromagnetic wave compatibility equipment for business (Type A). Sellers and users need to pay attention to it. This is for any areas other than home.

Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ! Настоящее изделие относится к классу А.
В жилых помещениях оно может создавать радиопомехи, для снижения которых необходимы дополнительные меры

People's Republic of China Class A electronic emission statement

声　　明

此为 A 级产品。在生活环境中，
该产品可能会造成无线电干扰。
在这种情况下，可能需要用户对其
干扰采取切实可行的措施。

Taiwan Class A compliance statement

警告使用者:
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策。

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