

IBM System x3630 M4 Type 7158



Problem Determination and Service Guide

IBM System x3630 M4 Type 7158



Problem Determination and Service Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 377, the *IBM Safety Information and Environmental Notices and User Guide* documents on the *Documentation CD*, and the *Warranty Information* document.

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

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

在安裝本产品之前，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 pečítajte 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.

མཚན་མོ་གཤམ་པོ་ལྟ་བུ་གྱི་མཚན་མོ་
མཚན་མོ་གཤམ་པོ་ལྟ་བུ་གྱི་མཚན་མོ་

མཚན་མོ་གཤམ་པོ་ལྟ་བུ་གྱི་མཚན་མོ་
མཚན་མོ་གཤམ་པོ་ལྟ་བུ་གྱི་མཚན་མོ་

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canjbinj soengq cungj vahgangj ancien siusik.

Guidelines for trained service technicians

This section contains information for trained service technicians.

Inspecting for unsafe conditions

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

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

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

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

1. Make sure that the power is off and the power cord is disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cord:
 - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
 - Make sure that the power cord is the correct type, as specified in “Power cords” on page 181.
 - Make sure that the insulation is not frayed or worn.
4. Remove the server 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 you service electrical equipment:

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

Safety statements

Important:

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

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

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

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

Statement 1:



DANGER

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

To avoid a shock hazard:

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

To Connect:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

To Disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

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 server top covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.



DANGER

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

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



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

Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:

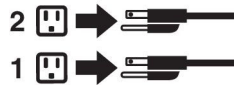
Use safe practices when lifting.

Statement 5:



CAUTION:

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



Statement 8:



CAUTION:

Never Remove the server top cover on a power supply or any part that has the following label attached.



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

Statement 12:



CAUTION:

The following label indicates a hot surface nearby.



Statement 26:



CAUTION:

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



Statement 27:



CAUTION:
Hazardous moving parts are nearby.



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

Chapter 1. Start here

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

Diagnosing a problem

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

1. **Determine what has changed.**

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

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

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

2. **Collect data.**

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

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

- **System error codes:** See “POST/uEFI diagnostic codes” on page 33 for information about error codes.
- **Software or operating-system error codes:** See the documentation for the software or operating system for information about a specific error code. See the manufacturer's website for documentation.
- **Operator information panel LEDs:** See “Front view” on page 9 for information about operator information panel LEDs that are lit.
- **System-board LEDs:** See “System-board LEDs” on page 24 for information about system-board LEDs that are lit.

b. **Collect system data.**

Run Dynamic System Analysis (DSA) to collect information about the hardware, firmware, software, and operating system. Have this information available when you contact IBM or an approved warranty service provider. For instructions for running the DSA program, see “Diagnostic programs and messages” on page 138.

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

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

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

For information about DSA command-line options, go to http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp?topic=%2Ftoolsctr%2Ftoolsctr_c_diagnostics.html or complete the following steps:

- 1) Go to <http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp>.
- 2) In the navigation pane, click **IBM ToolsCenter for System x and BladeCenter**.
- 3) Click **Diagnostics**.

3. Follow the problem-resolution procedures.

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

a. Check for and apply code updates.

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

Attention: Installing the wrong firmware or device-driver update might cause the server to malfunction. Before you install a firmware or device-driver update, read any readme and change history files that are provided with the downloaded update. These files contain important information about the update and the procedure for installing the update, including any special procedure for updating from an early firmware or device-driver version to the latest version.

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

1) Determine the existing code levels.

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

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

To display a list of available updates for your server, go to http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp?topic=%2Ftoolsctr%2Ftoolsctr_c_diagnostics.html or 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.

- a) Go to <http://www.ibm.com/systems/support/>.
- b) Under **Product support**, click **System x**.
- c) Under **Popular links**, click **Software and device drivers**.
- d) Click **System x3630 M4** to display the list of downloadable files for the server.

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

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

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

b. Check for and correct an incorrect configuration.

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

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

See <http://www.ibm.com/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.

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

Many configuration problems are caused by loose power or signal cables or incorrectly seated adapters. You might be able to solve the problem by turning off the server, reconnecting cables, reseating adapters, and turning the server back on. For information about performing the checkout procedure, see "Checkout procedure" on page 106.

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

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

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

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

- a) Go to <http://www.ibm.com/systems/support/>.
- b) Under **Product support**, click **System x**.
- c) From the **Product family** list, select **System x3630 M4**.
- d) Under **Support & downloads**, click **Documentation**, **Install**, and **Use** to search for related documentation.

c. Check for troubleshooting procedures and RETAIN tips.

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

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

- 1) Go to <http://www.ibm.com/systems/support/>.
- 2) Under **Product support**, click **System x**.

- 3) From the **Product family** list, select **System x3630 M4**.
- 4) Under **Support & downloads**, click **Troubleshoot**.
- 5) Select the troubleshooting procedure or RETAIN tip that applies to your problem:
 - Troubleshooting procedures are under **Diagnostic**.
 - RETAIN tips are under **Troubleshoot**.

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

If a hardware component is not operating within specifications, it can cause unpredictable results. Most hardware failures are reported as error codes in a system or operating-system log. For more information, see “Troubleshooting tables” on page 109 and Chapter 5, “Removing and replacing server components,” on page 185. Hardware errors are also indicated by light path diagnostics LEDs.

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

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

Undocumented problems

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

Chapter 2. Introduction

This *Problem Determination and Service Guide* contains information to help you solve problems that might occur in your IBM® System x3630 M4 Type 7158 server. It describes the diagnostic tools that come with the server, error codes and suggested actions, and instructions for replacing failing components.

Replaceable components consist of consumable parts, structural parts, and field replaceable units (FRUs):

- **Consumable Parts:** 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 and server top cover) 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.

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

Related documentation

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

- *Installation and User's Guide*

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

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

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

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

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

- *IBM License Agreement for Machine Code*

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

- *Licenses and Attributions Documents*

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

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

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

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

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

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x3630 M4** and click **Continue**.

Notices and statements in this document

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

The following notices and statements are used in this document:

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

Features and specifications

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

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

Notes:

1. Power consumption and heat output vary depending on the number and type of optional features 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.

Table 1. Features and specifications

<p>Microprocessor:</p> <ul style="list-style-type: none"> • Supports multi-core Intel Xeon microprocessors, with integrated memory controller and Quick Path Interconnect (QPI) architecture • Designed for LGA 1356 socket • Scalable up to eight cores • 32 KB instruction cache, 32 KB data cache, and up to 20 MB L3 cache that is shared among the cores • Support for Intel Extended Memory 32/64 Technology (EM32/64T) <p>Note:</p> <ul style="list-style-type: none"> • Use the Setup utility to determine the type and speed of the microprocessors. • For a list of supported microprocessors, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. <p>Memory (depending on the model):</p> <ul style="list-style-type: none"> • Slots: 12 dual inline memory module connectors on the base system board (six per microprocessor). • Minimum: 2 GB • Maximum: 384 GB • Type: 1066 MHz, 1333 MHz or 1600 MHz, ECC, single-rank or dual-rank <ul style="list-style-type: none"> – UDIMM: 2 GB or 4 GB – RDIMM: 2 GB, 4 GB, 8 GB, 16 GB, or 32 GB (when available) • Chipkill supported <p>Drive Expansion bays (depending on the model):</p> <ul style="list-style-type: none"> • Twelve 3.5-inch or 2.5-inch SAS/SATA hot-swap hard disk drive bays with option to add two more rear 3.5-inch or 2.5-inch SAS/SATA hot-swap hard disk drive bays • Eight 3.5-inch or 2.5-inch SAS/SATA hot-swap hard disk drive bays • Eight simple-swap 3.5-inch SATA hard disk drive • Four simple-swap 3.5-inch SATA hard disk drive. <p>Notes:</p> <ol style="list-style-type: none"> 1. 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). 2. For 2.5" hot-swap hard disk drive support, a converter tray will accompany the drive. 	<p>PCI expansion slots:</p> <p>Supports eight different PCI adapters and up to five PCI expansion slots depending on server model.</p> <ul style="list-style-type: none"> • Riser 1 (1U PCI riser-card assembly) <ul style="list-style-type: none"> – One full-height half-length PCIe3.0 Express x16 slot, x16 link speed – One full-height half-length PCIe3.0 Express x8 slot, x8 link speed and one low-profile PCIe3.0 Express x8 slot, x8 link speed • Riser 1 (2U PCI riser-card assembly): <ul style="list-style-type: none"> – One full-height full-length PCIe3.0 Express x16 slot, x16 link speed – One full-height full-length PCIe3.0 Express x16 slot, x8 link speed and one full-height half-length PCIe3.0 Express x16 slot, x8 link speed • Riser 2 (1U PCI riser-card assembly): <ul style="list-style-type: none"> – One low-profile PCIe3.0 Express x8 slot, x4 link speed – One low-profile PCIe3.0 Express x8 slot, x8 link speed (<p>Note: Second CPU must be attached to system board when using this slot)</p> • Riser 2 (2U PCI riser-card assembly): <ul style="list-style-type: none"> – One low-profile PCIe3.0 Express x16 slot, x16 link speed (<p>Note: Second CPU must be attached to system board when using this slot)and one low-profile PCIe3.0 Express x8 slot, x4 link speed</p> – Two low-profile PCIe3.0 Express x16 slot, x8 link speed (<p>Note: Second CPU must be attached to system board when using these slots) and one low-profile PCIe3.0 Express x8 slot, x4 link speed</p> <p>Note: In messages and documentation, the term <i>service processor</i> refers to the integrated management module II (IMM2).</p>	<p>Integrated functions:</p> <ul style="list-style-type: none"> • 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 • Eight Universal Serial Bus (USB) ports (two on front, four on rear of server, and two internal for an optional USB hypervisor flash device) • One serial port • One video port on rear of server <p>Note: Maximum video resolution is 1600 x 1200 at 75 Hz.</p> • One front video port based on model. <p>Integrated Video controller:</p> <ul style="list-style-type: none"> • Matrox G200eR2 video on system board • Compatible with SVGA and VGA • DDR2-250MHz SDRAM video memory controller • Video memory 16MB is not expandable • No DVI connector • Avocent digital video compression • Maximum video resolution is 1600 x 1200 at 60 or 75 Hz <p>ServeRAID controllers:</p> <ul style="list-style-type: none"> • ServeRAID M1115 SAS/SATA Controller for IBM System x • ServeRAID M5110 SAS/SATA Controller for IBM System x • ServeRAID M5120 SAS/SATA Controller for IBM System x • ServeRAID H1110 SAS/SATA Controller for IBM System x • ServeRAID M5100 Series Battery Kit for IBM System X • ServeRAID C105 for IBM System X <p>ServeRAID controller upgrade:</p> <ul style="list-style-type: none"> • 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 M1100 Series Zero Cache/RAID 5 Upgrade for IBM System x • ServeRAID M5100 Series Zero Cache/RAID 5 Upgrade for IBM System x • ServeRAID M5100 Series RAID 6 Upgrade for IBM System x • ServeRAID M5100 Series 1GB Flash/RAID Upgrade for IBM System x
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Table 1. Features and specifications (continued)

<p>Environment:</p> <ul style="list-style-type: none"> Air temperature: <ul style="list-style-type: none"> 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°F to 113°F) Shipping: -40°C to 60°C (-40°F to 140°F) Humidity: <ul style="list-style-type: none"> Server on: 8% to 85%; maximum dew point: 24°C; maximum rate of change: 5 °C/hr Server off: 8% to 80%; maximum dew point: 27°C Shipment: 5% to 100% Design to ASHRAE Class A3, ambient of 35°C to 40°C, with relaxed support: <ul style="list-style-type: none"> 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 Particulate contamination: <p>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 379.</p> 	<p>Electrical input with hot-swap ac power supplies:</p> <ul style="list-style-type: none"> Sine-wave input (50 ~ 60 Hz) required Input voltage range automatically selected Input voltage low range: <ul style="list-style-type: none"> Minimum: 100 V ac Maximum: 127 V ac Input voltage high range: <ul style="list-style-type: none"> Minimum: 200 V ac Maximum: 240 V ac Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> Minimum: 0.22 kVA Maximum: 1.02 kVA <p>Size:</p> <ul style="list-style-type: none"> 2U Height: 86.5 mm (3.406 in.) Depth: <ul style="list-style-type: none"> EIA flange to rear: 720.2 mm (28.35 in.) Overall: 748.8 mm (29.5 in.) Width: <ul style="list-style-type: none"> With top cover: 447 mm (17.598 in.) Weight: approximately 16.4 kg (36.2 lb) to 28.2 kg (62.2 lb) depending on your configuration 	<p>System fans: Up to three</p> <p>Hot-swap power supplies (depending on the model):</p> <ul style="list-style-type: none"> Up to two hot-swap power supplies for redundancy support <ul style="list-style-type: none"> 550-watt ac 750-watt ac 750-watt dc 900-watt ac <p>Note: You cannot mix high-efficiency and non-high-efficiency power supplies in the server.</p> <p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> Sound power, idle: 6.6 bel Sound power, operating: 6.6 bel
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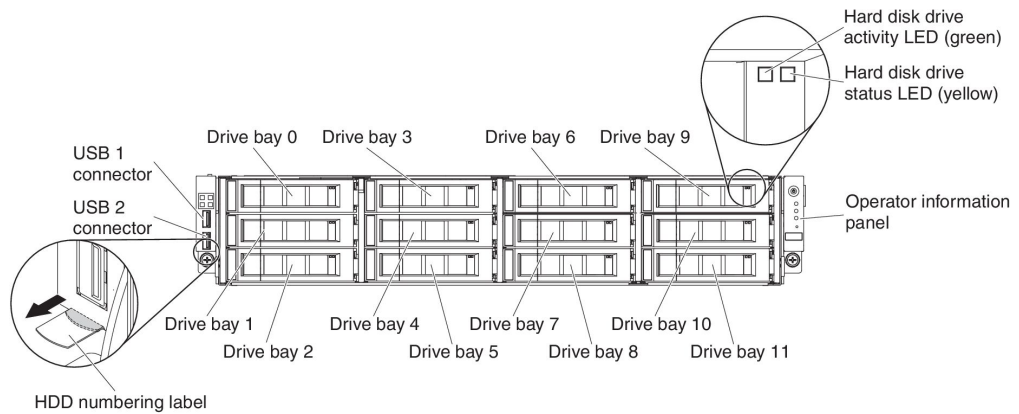
Server controls, LEDs, and connectors

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

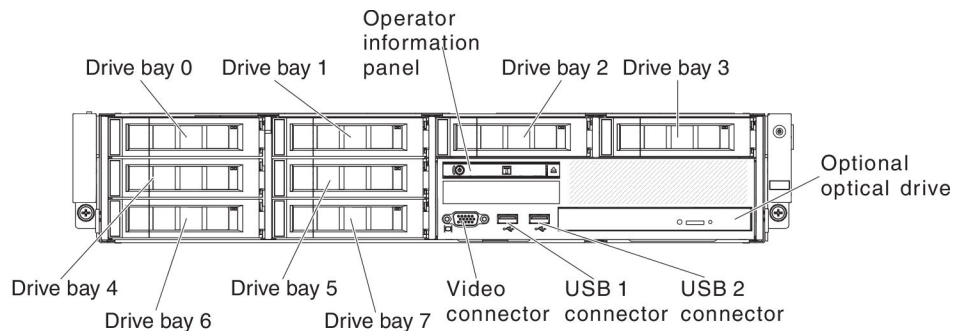
Front view

The following illustrations show the controls, connectors, and hard disk drive bays on the front of the server. The server configuration may be of the following seven:

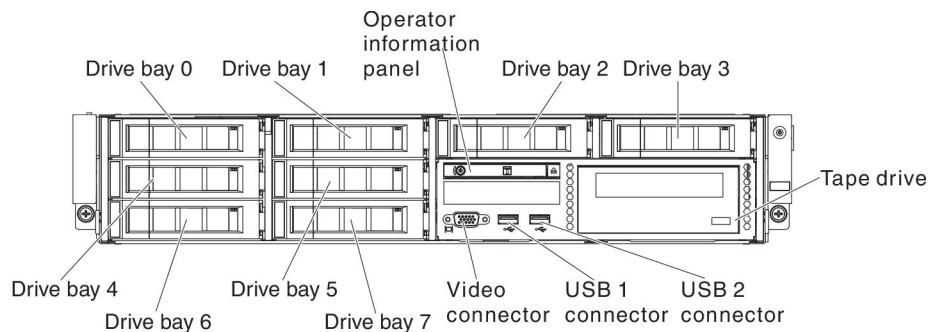
12 hot-swap hard-disk drive configuration:



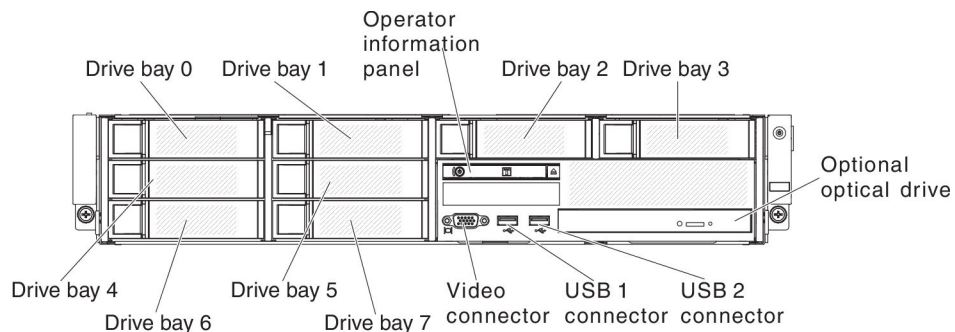
8 hot-swap hard-disk drive configuration with optical drive:



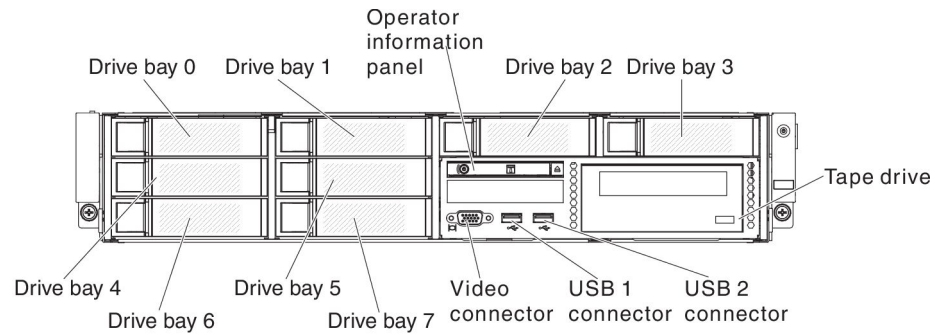
8 hot-swap hard-disk drive configuration with tape drive:



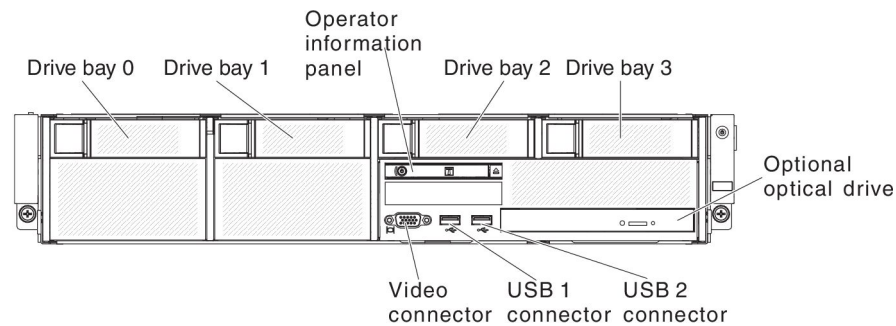
8 simple-swap hard-disk drive configuration with optical drive:



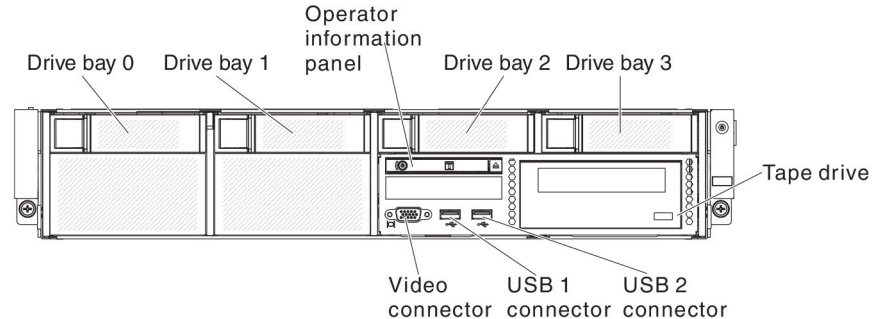
8 simple-swap hard-disk drive configuration with tape drive:



4 simple-swap hard-disk drive configuration with optical drive:



4 simple-swap hard-disk drive configuration with tape drive:



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

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

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

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

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

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

Operator information panel

Note: Based on the server configuration, the operator information panel may be located in the media cage or on the side of the server.

Illustration of operator information panel when located in the media cage:

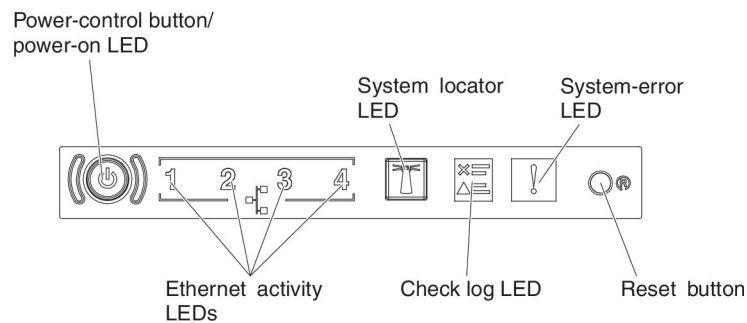
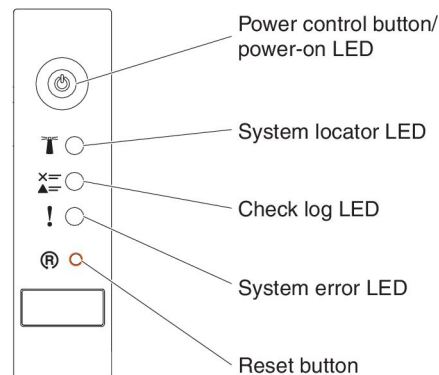


Illustration of operator information panel when located on the side of the chassis:



- **Power-control button and power-on LED:** Press this button to turn the server on and off manually. The states of the power-on LED are as follows:
 - Off:** Power is not present or the power supply, or the LED itself has failed.
 - Flashing rapidly (4 times per second):** The server is turned off and is not ready to be turned on. The power-control button is disabled. This will last approximately 5 to 10 seconds.
 - Flashing slowly (once per second):** The server is turned off and is ready to be turned on. You can press the power-control button to turn on the server.
 - Lit:** The server is turned on.
- **Ethernet activity LEDs:** When any of 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 that corresponds to that LED.

- **System-locator button/LED:** Use this blue LED to visually locate the server among other servers. A system-locator LED is also on the rear of the server. This LED is used as a presence detection button as well. You can use IBM Systems Director or IMM2 web interface to light this LED remotely. This LED is controlled by the IMM2. The locator button is pressed to visually locate the server among the others servers.
- **Check log LED:** When this yellow LED is lit, it indicates that a system error has occurred. Check the error log for additional information. See “Event logs” on page 30 for information about the error 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 IMM2.
- **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.

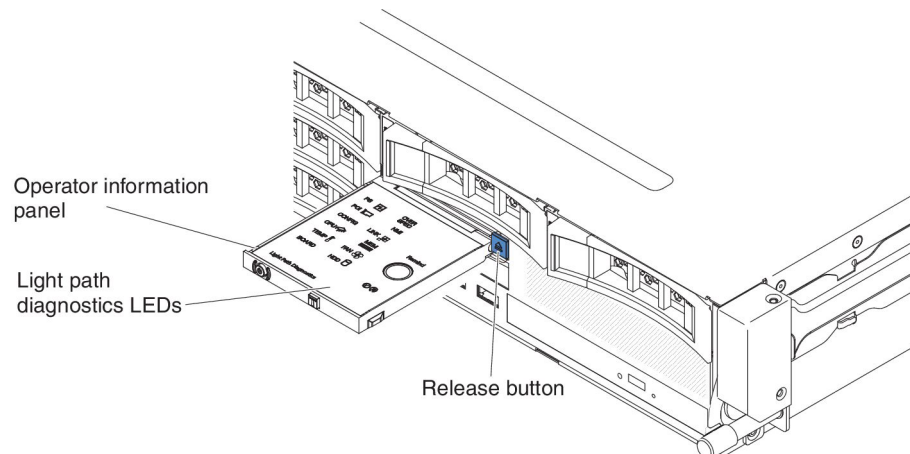
Note: Depending on the type of operator information panel installed in your server, the Reset button is on the operator information panel or the light path diagnostics panel.

Light path diagnostics panel

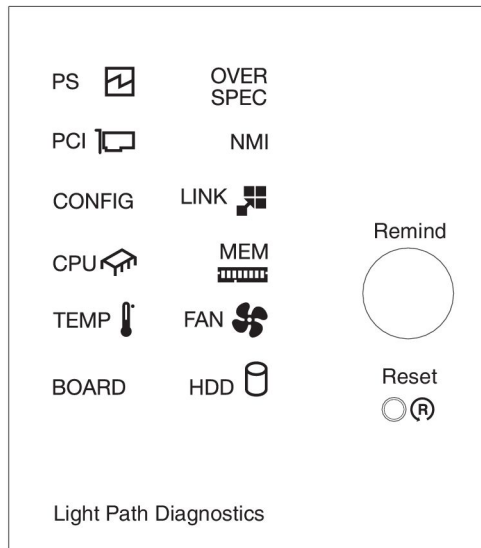
Note: The initial server configuration will not include the light path diagnostics panel. It is included when the operator information panel is upgraded to the advanced operator information panel.

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

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



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



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

By placing the system-error LED indicator in Remind mode, you acknowledge that you are aware of the last failure but will not take immediate action to correct the problem. The remind function is controlled by the IMM2.

- **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.

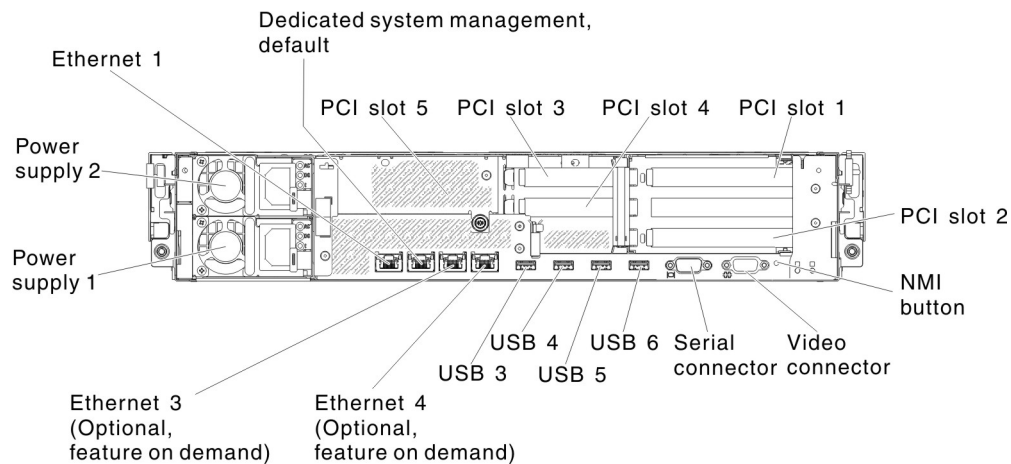
For additional information about the light path diagnostics panel LEDs, see "Light path diagnostics panel LEDs" on page 128

Rear view

The following shows the connectors on the rear of the server. The server configuration may be of the following two:

Illustration when no rear hard disk drive is installed in server. The PCI riser card assembly for this server configuration is 2U.

IMM Network Interface Port, Dedicated



IMM Network Interface Port, Shared

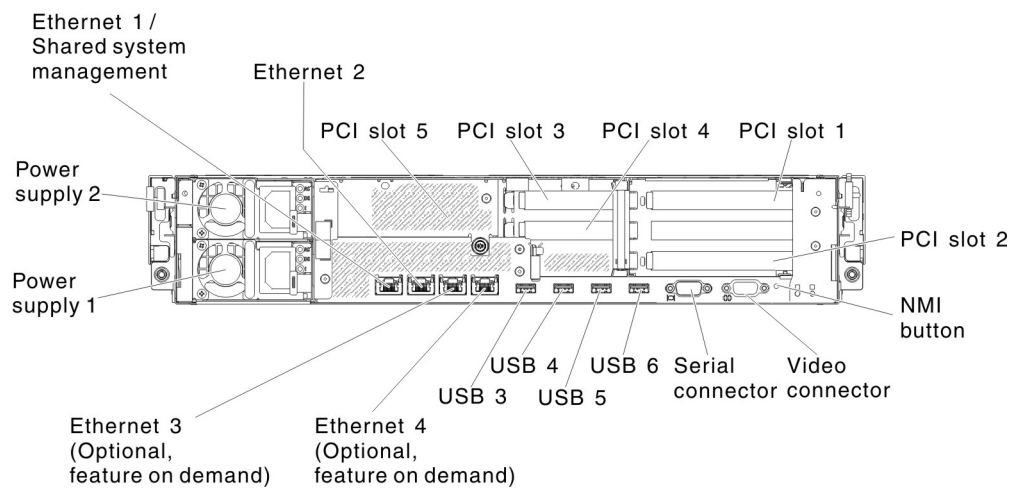
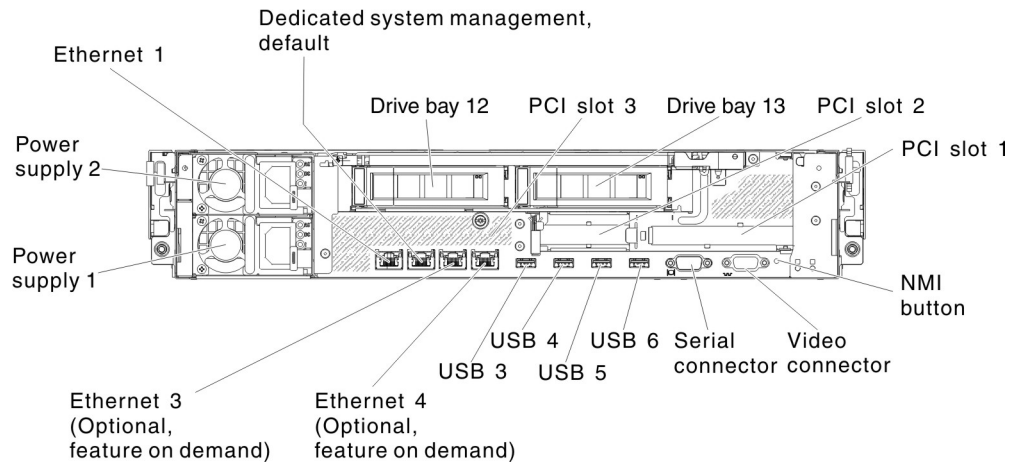
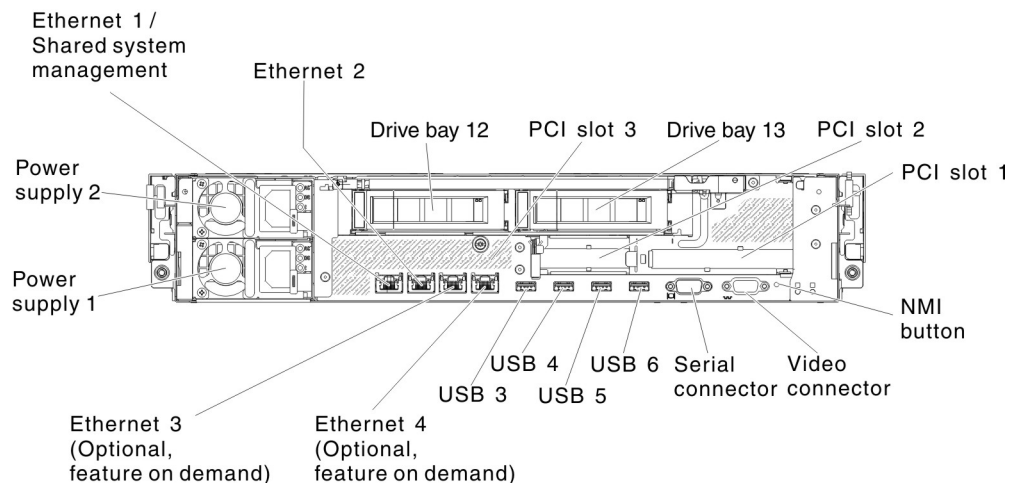


Illustration when two additional rear hot-swap hard disk drive is installed in server.
The PCI riser card assembly for this server configuration is 1U.

IMM Network Interface Port, Dedicated



IMM Network Interface Port, Shared



Ethernet and systems-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 353 for 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 353 for more information.

PCI slot connectors:

- **For 2U PCI riser card assembly:**

- **PCI slot 1:** Insert a full-height, full-length PCI Express adapter into this slot.
- **PCI slot 2:** Insert a full-height, half-length PCI Express adapter into this slot.
- **PCI slot 3:** Insert a low-profile PCI Express adapter into this slot.
- **PCI slot 4:** Insert a low-profile PCI Express adapter into this slot.
- **PCI slot 5:** Insert a low-profile PCI Express adapter into this slot.

For 1U PCI riser card assembly:

- **PCI slot 1:** Insert a full-height, half-length PCI Express adapter into this slot.
- **PCI slot 2:** Insert a low-profile PCI Express adapter into this slot.
- **PCI slot 3:** Insert a low-profile PCI Express adapter into this slot.

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

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

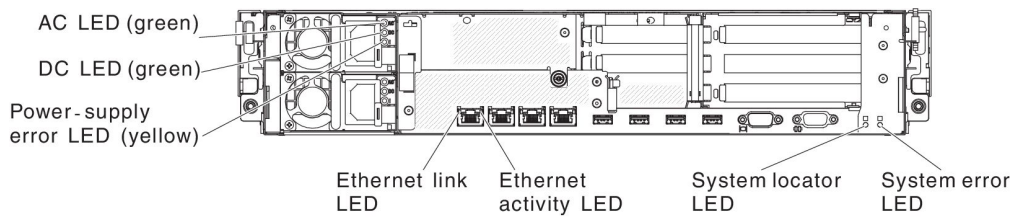
NMI button: Press this button to force a nonmaskable interrupt to the microprocessor. It allows you to blue screen the server and take a memory dump (use this button only when directed by the IBM service support). You might have to use a pen or the end of a straightened paper clip to press the button.

Serial connector: Connect a 9-pin serial device to this connector. The serial port is shared with the integrated management module II (IMM2). The IMM2 can take control of the shared serial port to perform text console redirection and to redirect serial traffic, using Serial over LAN (SOL).

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

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

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



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

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

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

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

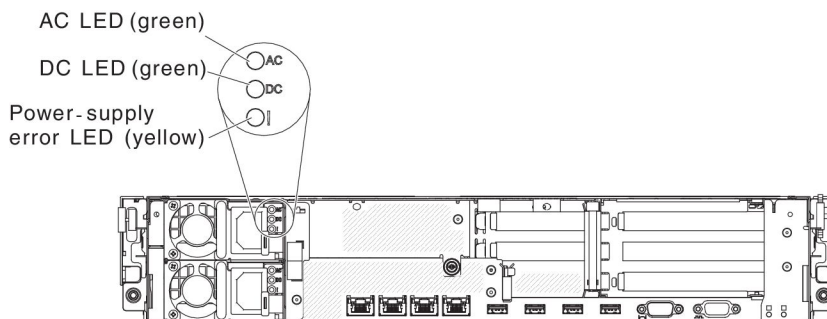
Power-supply error LED: When the power-supply error LED is lit, it indicates that the power supply has failed.

System-locator LED: Use this LED to visually locate the server among other servers. You can use IBM Systems Director or IMM2 web interface to light this LED remotely.

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

Power-supply LEDs

The following illustration shows the power-supply LEDs on the rear of the server. For more information about solving power-supply problems, see “Power problems” on page 122.



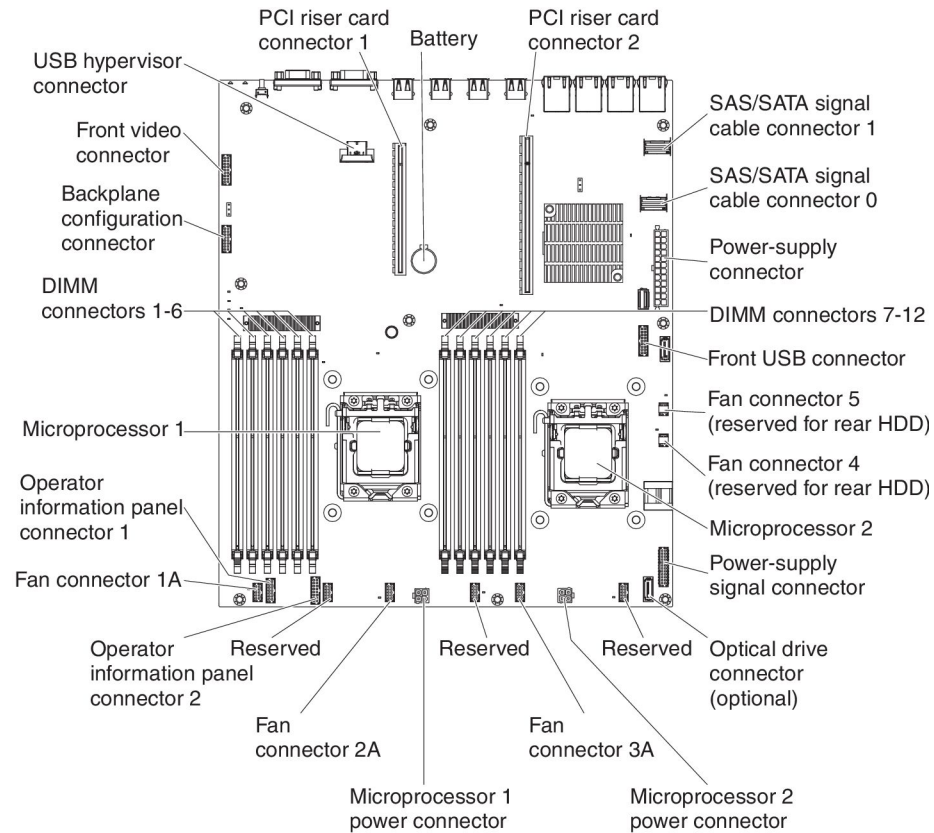
Regarding the problems that are indicated by the various combinations of the power-supply LEDs and suggested actions to correct the detected problems, see “Power-supply LEDs” on page 137.

Internal connectors, LEDs, and jumpers

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

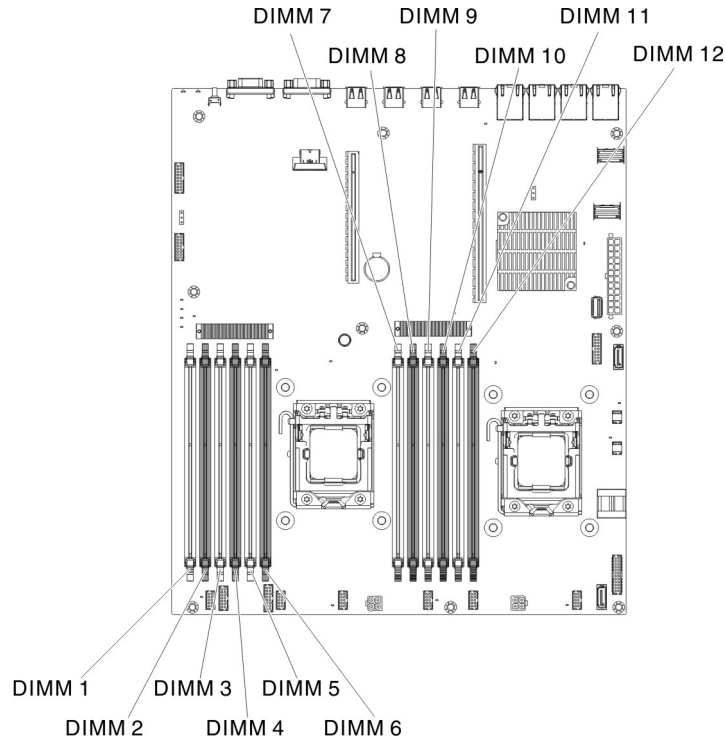
System-board internal connectors

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



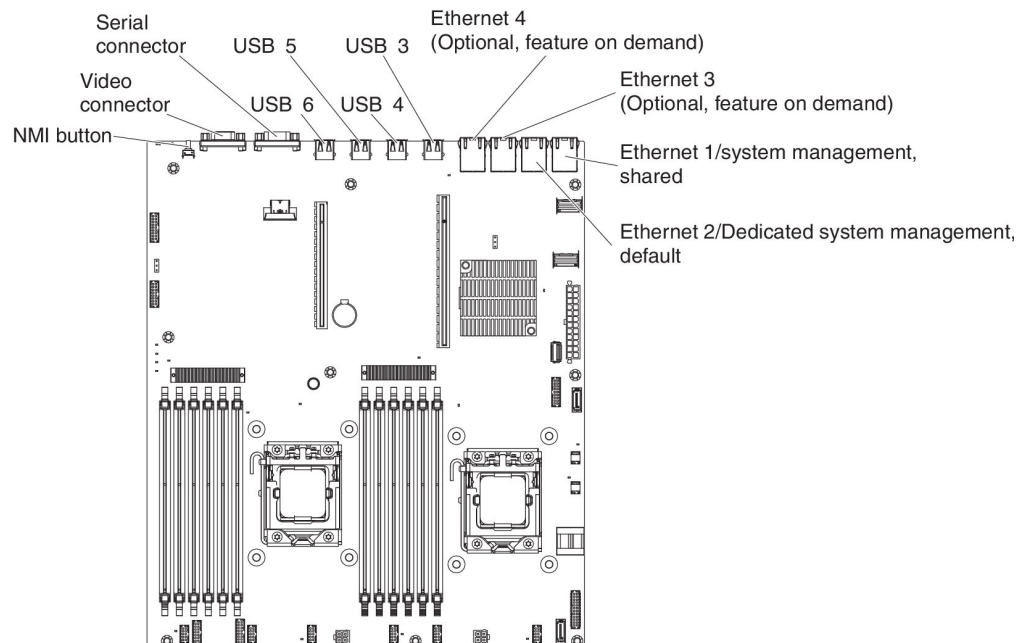
System-board DIMM connectors

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



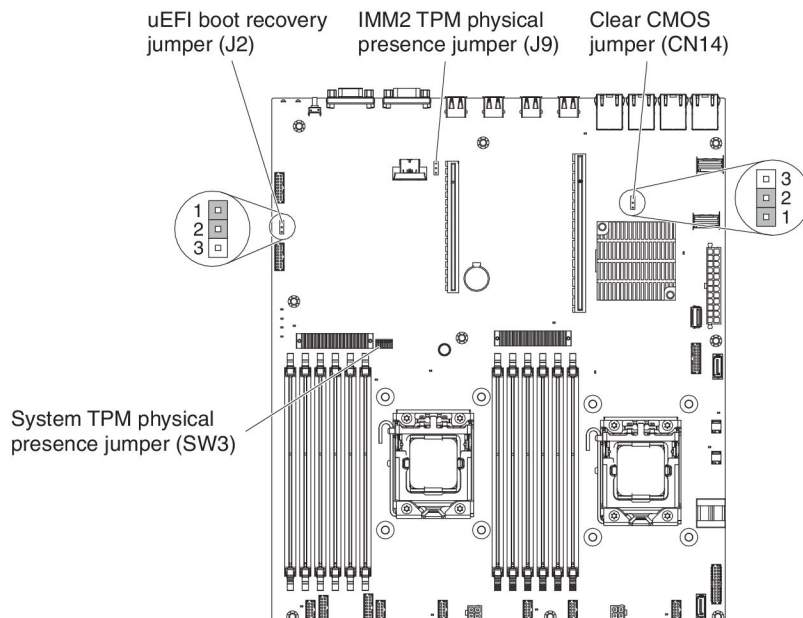
System-board external connectors

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



System-board jumpers

The following illustration shows the location of the jumpers.



The following table describes the jumpers on the system board.

Table 2. System board jumpers

Jumper number	Jumper name	Jumper setting
CN14	Clear CMOS jumper	<ul style="list-style-type: none"> 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. <p>Note 2</p>
J2	UEFI boot recovery jumper	<ul style="list-style-type: none"> Pins 1 and 2: Normal (default) Loads the primary firmware ROM page. Pins 2 and 3: Loads the secondary (backup) firmware ROM page. <p>Note 1 and 2</p>
<p>Notes:</p> <ol style="list-style-type: none"> If no jumper is present, the server responds as if the pins are set to 1 and 2. Changing the position of the UEFI recovery jumper from pins 1 and 2 to pins 2 and 3 before the server is turned on sets the UEFI recovery process. Do not change the jumper pin position after the server is turned on. This can cause an unpredictable problem. 		

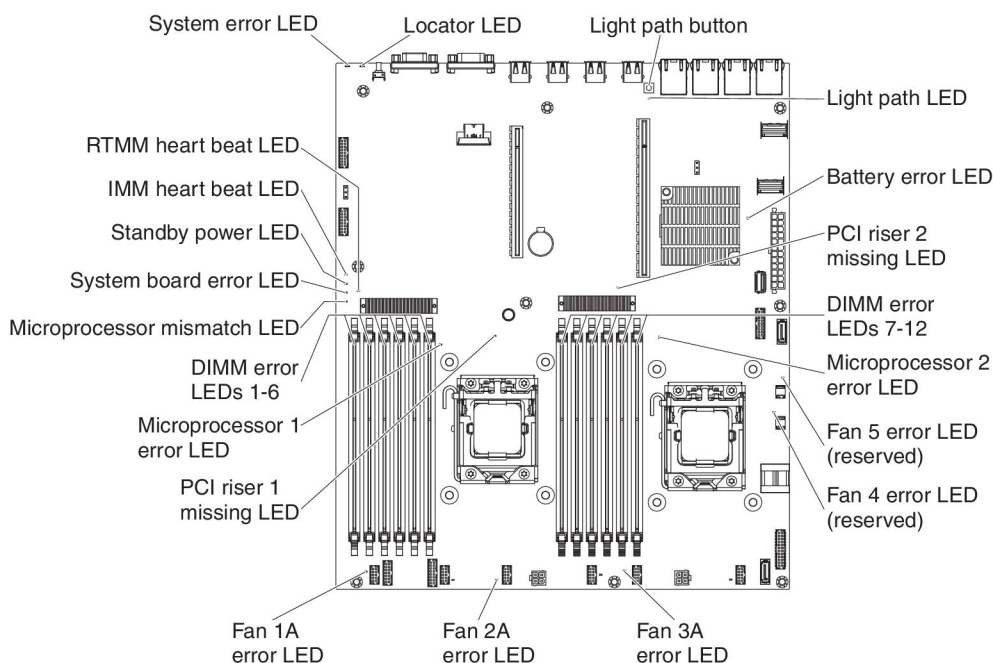
Notes:

1. Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. (Review the information in “Safety” on page vii, “Installation guidelines” on page 185, and “Handling static-sensitive devices” on page 187.)
2. Any system-board switch or jumper blocks that are not shown in the illustrations in this document are reserved.

System-board LEDs

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

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

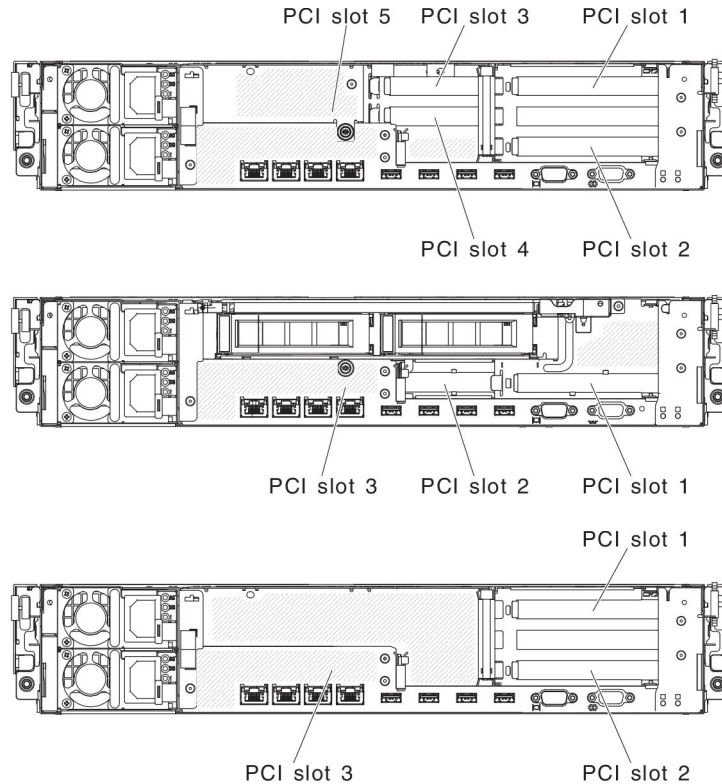


LED name	Description
Error LEDs	When an error LED is lit, it indicates that the associated component has failed.
RTMM heartbeat LED	Power-on and power-off sequencing.
IMM 2 heartbeat LED	Indicates the status of the boot process of the IMM2. When the server is connected to power this LED flashes quickly to indicate that the IMM2 code is loading. When the loading is complete, the LED stops flashing briefly and then flashes slowly to indicate that the IMM2 is fully operational and you can press the power-control button to start the server.
Standby power LED	When this LED is flashing, it indicates that the server is connected to an ac power source. When this LED is lit, it indicates that the server is dc power on.
System board error LED	System-board has failed.
Microprocessor mismatch LED	When this LED is lit, it indicates that microprocessor 1 is not installed, or the microprocessors do not have the same cache size and type, and clock speed.
DIMM error LEDs	A memory DIMM has failed or is incorrectly installed.
Microprocessor error LED	Microprocessor has failed, is missing, or has been incorrectly installed.

LED name	Description
Light path LED	Indicates whether or not the lightpath button is functional. If the light path LED is lit after pressing the lightpath button, it indicates that the lightpath button is functioning properly. By contrast, if the lightpath LED is not lit when pressing the light path button, it means the lightpath button is not functioning properly.

PCI riser-card assembly adapter expansion slot locations

Based on the server configuration, the locations of the adapter expansion slots from the rear of the server may be either of the following.



PCI riser-card assembly adapter expansion slot connectors

The following illustration shows the respective expansion slot connectors on the eight different types of PCI riser card assemblies that the server is capable of supporting.

Note: The specifications of the following slot labeling is defined in the following format.

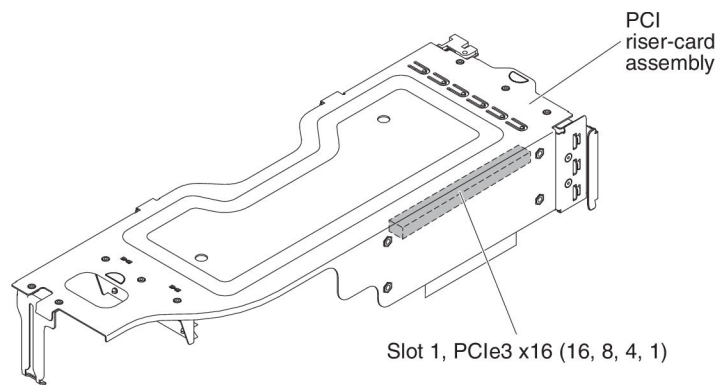
PCIe3 x *aa* (*b*, *c*, *d*, *e*)

where:

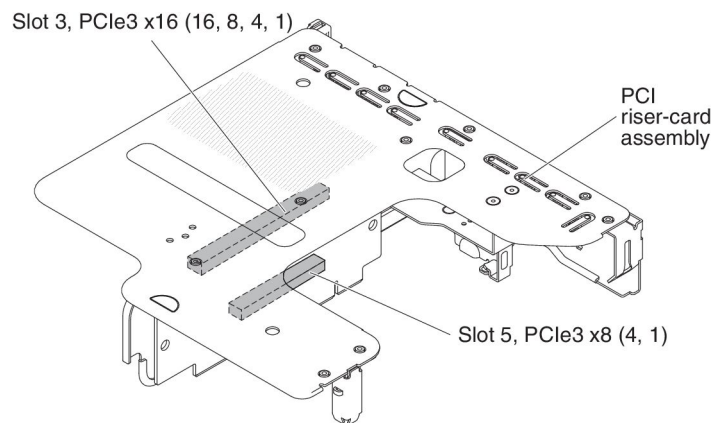
aa = Physical connector link width

b, *c*, *d*, *e* = Negotiable link width

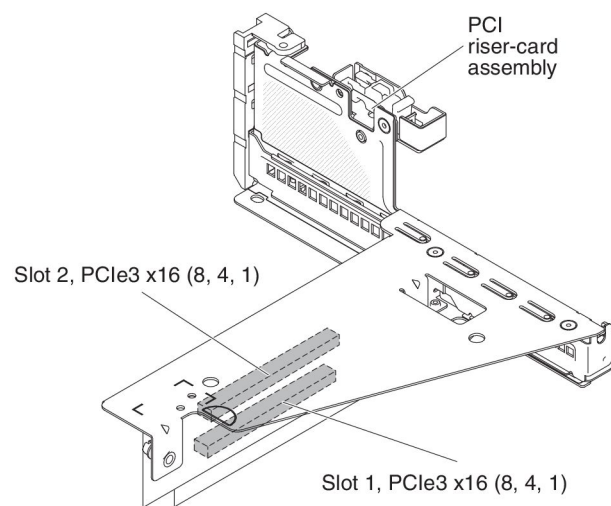
Type 1 PCI riser card:



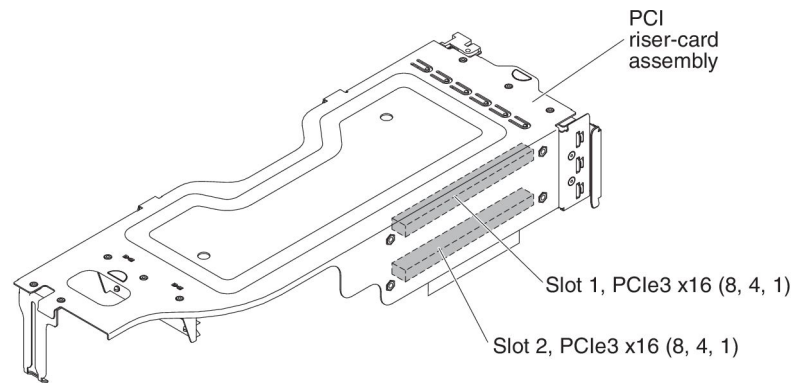
Type 2 PCI riser card:



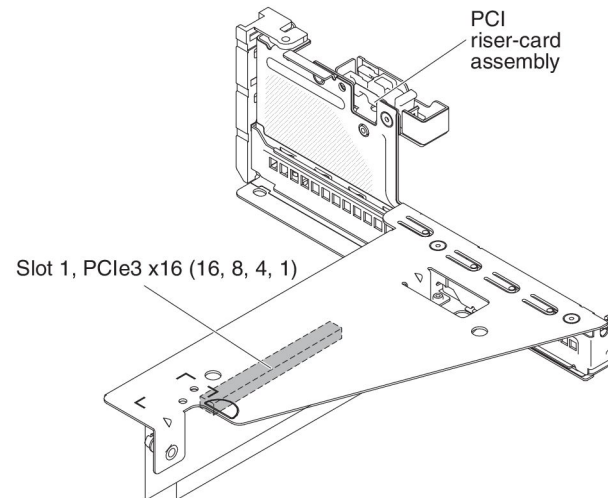
Type 3 PCI riser card:



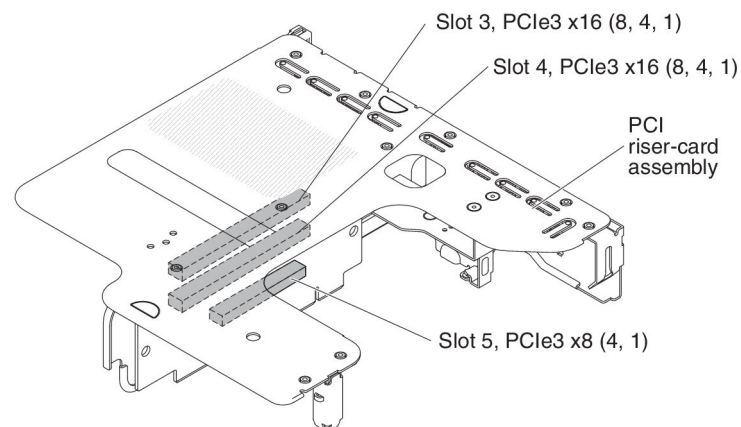
Type 4 PCI riser card:



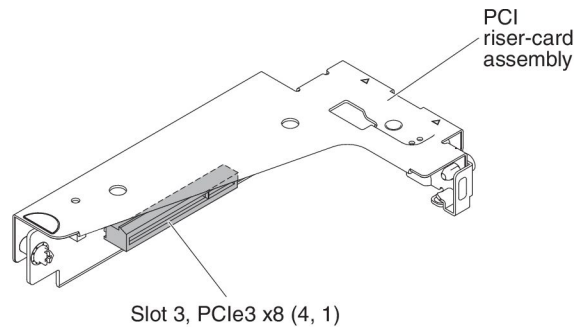
Type 5 PCI riser card:



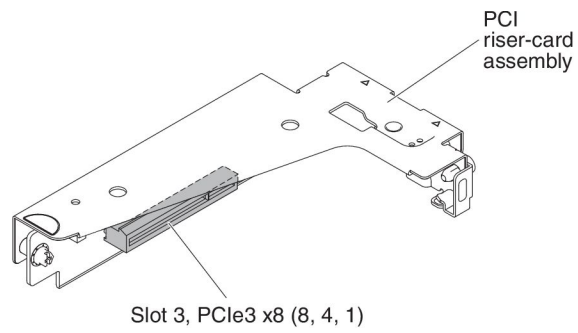
Type 6 PCI riser card:



Type 7 PCI riser card:



Type 8 PCI riser card:



Chapter 3. Diagnostics

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

If you cannot locate and correct a problem by using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 375 for more information.

Diagnostic tools

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

- **Light path diagnostics**

Use the light path diagnostics to diagnose system errors quickly. See “System-board LEDs” on page 24

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

The DSA Preboot diagnostic programs provide problem isolation, configuration analysis, and error log collection. The diagnostic programs are the primary method of testing the major components of the server and are stored in integrated USB memory. The diagnostic programs collect the following information about the server:

- System configuration
- Network interfaces and settings
- Installed hardware
- Light path diagnostics status
- Service processor status and configuration
- Vital product data, firmware, and UEFI configuration
- Hard disk drive health
- RAID controller configuration
- Controller and service processor event logs, including the following information:
 - System error logs
 - Temperature, voltage, and fan speed information
 - Self-monitoring Analysis, and Reporting Technology (SMART) data
 - Machine check registers
 - USB information
 - Monitor configuration information
 - PCI slot information

The diagnostic programs create a merged log that includes events from all collected logs. The information is collected into a file that you can send to IBM service and support. Additionally, you can view the server information locally through a generated text report file. You can also copy the log to removable media and view the log from a web browser. See “Running the diagnostic programs” on page 139 for more information.

- **Troubleshooting tables**

These tables list problem symptoms and actions to correct the problems. See “Troubleshooting tables” on page 109. for more information.

- **IBM Electronic Service Agent**

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

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

- **POST error codes and event logs**

The power-on self-test (POST) generates messages to indicate successful test completion or the detection of a problem. For more information, see “Event logs” and “POST” on page 32.

- **Checkpoint codes**

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

Event logs

Error codes and messages are displayed in the following types of event logs. Some of the error codes and messages in the logs are abbreviated. When you are troubleshooting PCI-X slots, note that the event logs report the PCI-X buses numerically. The numerical assignments vary depending on the configuration. You can check the assignments by running the Setup utility (see “Using the Setup utility” on page 353 for more information).

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

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

Each system-event log entry is displayed on its own page. Messages are listed on the left side of the screen, and details about the selected message are displayed on the right side of the screen. To move from one entry to the next, use the Up Arrow (↑) and Down Arrow (↓) keys.

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

- **Integrated management module II (IMM2) event log:** This log contains a filtered subset of all IMM2, POST, and system management interrupt (SMI) events. You can view the IMM2 event log through the IMM2 web interface and through the Dynamic System Analysis (DSA) program (as the ASM event log).
- **DSA log:** This log is generated by the Dynamic System Analysis (DSA) program, and it is a chronologically ordered merge of the system-event log (as the IPMI event log), the IMM2 chassis-event log (as the ASM event log), and the operating-system event logs. You can view the DSA log through the DSA program.

Viewing event logs from the Setup utility

To view the error logs, complete the following steps:

1. Turn on the server.

2. When the prompt <F1> Setup is displayed, press F1. If you have set both a power-on password and an administrator password, you must type the administrator password to view the error logs.
3. Select **System Event Logs** and use one of the following procedures:
 - To view the POST error log, select **POST Event Viewers**.
 - To view the IMM2 system-event log, select **System Event Log**.

Viewing event logs without restarting the server

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

If you have installed Dynamic System Analysis (DSA) Portable, you can use it to view the system-event log (as the IPMI event log), the IMM2 event log (as the ASM event log), the operating-system event logs, or the merged DSA log. You can also use DSA Preboot to view these logs, although you must restart the server to use DSA Preboot.

To install DSA Portable or DSA Preboot or to download a DSA Preboot CD image, go to <http://www.ibm.com/support/entry/portal/docdisplay?brand=5000008&Indocid=SERV-DSA>.

If IPMItool is installed in the server, you can use it to view the system-event log. Most recent versions of the Linux operating system come with a current version of IPMItool.

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

You can view the IMM2 system event log through the **Event Log** link in the integrated management module II (IMM2) web interface. For more information, see “Logging on to the web interface” on page 362.

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 3. Methods for viewing event logs

Condition	Action
The server is not hung and is connected to a network.	Use any of the following methods: <ul style="list-style-type: none"> • Run DSA Portable to view the event logs or create an output file that you can send to a support representative. • In a web browser, type the IP address of the IMM2 and go to the Event Log page. • Use IPMItool to view the system-event log.
The server is not hung and is not connected to a network.	Use IPMItool locally to view the system-event log.
The server is not hung and the integrated management module II (IMM2) is connected to a network.	In a web browser, type the IP address for the IMM2 and go to the Event Log page. For more information, see “Obtaining the IP address for the IMM2” on page 362 and “Logging on to the web interface” on page 362.

Table 3. Methods for viewing event logs (continued)

Condition	Action
The server is hung.	<ul style="list-style-type: none"> • If DSA Preboot is installed, restart the server and press F2 to start DSA Preboot and view the event logs. • If DSA Preboot is not installed, insert the DSA Preboot CD and restart the server to start DSA Preboot and view the event logs. • Alternatively, you can restart the server and press F1 to start the Setup utility and view the POST event log or system-event log. For more information, see “Viewing event logs from the Setup utility” on page 30.

Clearing the error logs

To clear the error logs, complete the following steps.

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

1. Turn on the server.
2. When the prompt <F1> Setup is displayed, press F1. If you have set both a power-on password and an administrator password, you must type the administrator password to view the error logs.
3. Use one of the following procedures:
 - To clear the IMM2 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.

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

POST/uEFI diagnostic codes

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

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

<ul style="list-style-type: none"> • 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	Description	Message	Action
I. 11002	One or more mismatched microprocessors detected.	[I. 11002] A microprocessor mismatch has been detected between one or more microprocessors in the system.	<ol style="list-style-type: none"> 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 a firmware update and update the server firmware to the latest level (see “Updating the firmware” on page 349). 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see “Installing a microprocessor and heat sink” on page 330).
W.11004	A processor within the system has failed the BIST.	Processor Self Test Failure Detected.	<ol style="list-style-type: none"> 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 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 328 and “Installing a microprocessor and heat sink” on page 330). 3. (Trained technician only) Replace the system board (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
S.1100B	Processor CATERR(IERR) has asserted.	[S.1100B] CATERR(IERR) has asserted on processor %.	<ol style="list-style-type: none"> 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this error. 2. (Trained technician only) Replace the microprocessor.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- 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	Description	Message	Action
S. 1100C	Uncorrectable microprocessor error detected.	[S. 1100C] An uncorrectable error has been detected on microprocessor %.	<ol style="list-style-type: none"> 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. <p>(% = microprocessor number)</p>
I. 18005	Microprocessors have mismatched number of cores.	[I. 18005] A discrepancy has been detected in the number of cores reported by one or more microprocessor packages within the system.	<ol style="list-style-type: none"> 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 a firmware update and update the server firmware to the latest level (see “Updating the firmware” on page 349). 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see “Installing a microprocessor and heat sink” on page 330).
I. 18006	Microprocessors have mismatched QPI speed.	[I. 18006] A mismatch between the maximum allowed QPI link speed has been detected for one or more microprocessor packages.	<ol style="list-style-type: none"> 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 a firmware update and update the server firmware to the latest level (see “Updating the firmware” on page 349). 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see “Installing a microprocessor and heat sink” on page 330).
I. 18007	Microprocessors have mismatched power segments.	[I. 18007] A power segment mismatch has been detected for one or more microprocessor packages.	<ol style="list-style-type: none"> 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 a firmware update and update the server firmware to the latest level (see “Updating the firmware” on page 349). 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see “Installing a microprocessor and heat sink” on page 330).

- 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	Description	Message	Action
I. 18008	Microprocessors have mismatched internal DDR3 frequency.	[I. 18008] Currently, there is no additional information for this event.	<ol style="list-style-type: none"> 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 a firmware update and update the server firmware to the latest level (see “Updating the firmware” on page 349). 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see “Installing a microprocessor and heat sink” on page 330).
I. 18009	Microprocessors have mismatched core speed.	[I. 18009] A core speed mismatch has been detected for one or more microprocessor packages.	<ol style="list-style-type: none"> 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 a firmware update and update the server firmware to the latest level (see “Updating the firmware” on page 349). 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see “Installing a microprocessor and heat sink” on page 330).
I. 1800A	Microprocessors have mismatched bus speed.	[I. 1800A] A mismatch has been detected between the speed at which a QPI link has trained between two or more microprocessor packages.	<ol style="list-style-type: none"> 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 a firmware update and update the server firmware to the latest level (see “Updating the firmware” on page 349). 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see “Installing a microprocessor and heat sink” on page 330).

- 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	Description	Message	Action
I. 1800B	Microprocessors have one or more cache levels with mismatched size.	[I. 1800B] A cache size mismatch has been detected for one or more microprocessor packages.	<ol style="list-style-type: none"> 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 a firmware update and update the server firmware to the latest level (see “Updating the firmware” on page 349). 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see “Installing a microprocessor and heat sink” on page 330).
I. 1800C	Microprocessors have one or more cache levels with mismatched type.	[I. 1800C] A cache type mismatch has been detected for one or more microprocessor packages.	<ol style="list-style-type: none"> 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 a firmware update and update the server firmware to the latest level (see “Updating the firmware” on page 349). 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see “Installing a microprocessor and heat sink” on page 330).
I. 1800D	Microprocessors have one or more cache levels with mismatched associativity.	[I. 1800D] A cache associativity mismatch has been detected for one or more microprocessor packages.	<ol style="list-style-type: none"> 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 a firmware update and update the server firmware to the latest level (see “Updating the firmware” on page 349). 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see “Installing a microprocessor and heat sink” on page 330).

- 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	Description	Message	Action
I. 1800E	Microprocessors have mismatched model number.	[I. 1800E] A microprocessor model mismatch has been detected for one or more microprocessor packages.	<ol style="list-style-type: none"> 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 a firmware update and update the server firmware to the latest level (see “Updating the firmware” on page 349). 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see “Installing a microprocessor and heat sink” on page 330).
I. 1800F	Microprocessors have mismatched family.	[I. 1800F] A microprocessor family mismatch has been detected for one or more microprocessor packages.	<ol style="list-style-type: none"> 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 a firmware update and update the server firmware to the latest level (see “Updating the firmware” on page 349). 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see “Installing a microprocessor and heat sink” on page 330).
I. 18010	Microprocessors of the same model have mismatched stepping ID.	[I. 18010] A microprocessor stepping mismatch has been detected for one or more microprocessor packages.	<ol style="list-style-type: none"> 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 a firmware update and update the server firmware to the latest level (see “Updating the firmware” on page 349). 3. (Trained technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type (see “Installing a microprocessor and heat sink” on page 330).

- 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	Description	Message	Action
W. 50001	DIMM disabled.	[W. 50001] A DIMM has been disabled due to an error detected during POST.	<p>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.</p> <ol style="list-style-type: none"> 1. Make sure the DIMM is installed correctly (see “Installing a memory module” on page 224). 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	Fatal memory error occurred.	<p>[S. 51003] An uncorrectable memory error was detected in DIMM slot % on rank %.</p> <p>[S.51003] An uncorrectable memory error was detected on processor % channel %. The failing DIMM within the channel could not be determined.</p> <p>[S.51003] An uncorrectable memory error has been detected during POST.</p>	<ol style="list-style-type: none"> 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 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 (see “Removing the system board” on page 336 and “Installing the system board” on page 339). 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 328 and “Installing a microprocessor and heat sink” on page 330).
S. 51006	One or more mismatched DIMMs detected.	[S. 51006] A memory mismatch has been detected. Please verify that the memory configuration is valid.	<p>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 have been installed in the correct sequence (see “Installing a memory module” on page 224).</p>

- 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	Description	Message	Action
S.51009	No Memory Detected.	[S.51009] No system memory has been detected.	<ol style="list-style-type: none"> 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 224 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	Description	Message	Action
W. 58001	DIMM PFA threshold exceeded.	[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 %.	<p>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.</p> <ol style="list-style-type: none"> 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 224 for memory population sequence). 3. If the error still occurs on the same DIMM, replace the affected DIMM (see “Removing a memory module (DIMM)” on page 223 and “Installing a memory module” on page 224). 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 224 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 (see “Removing the system board” on page 336 and “Installing the system board” on page 339). 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 328 and “Installing a microprocessor and heat sink” on page 330). 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	Description	Message	Action
W. 58007	Unsupported DIMM population.	[W. 58007] Invalid memory configuration (Unsupported DIMM Population) detected. Please verify the memory configuration is valid.	<p>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.</p> <ol style="list-style-type: none"> 1. Reseat the DIMMs and restart the server (see “Removing a memory module (DIMM)” on page 223 and “Installing a memory module” on page 224). 2. Make sure that the DIMMs are installed in the proper sequence (“Installing a memory module” on page 224).

- 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	Description	Message	Action
S. 58008	DIMM failed memory test.	[S. 58008] A DIMM has failed the POST memory test.	<p>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.</p> <ol style="list-style-type: none"> 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 (DIMM)” on page 223 and “Installing a memory module” on page 224). 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 224 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 336 and “Installing the system board” on page 339). 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 (see “Removing the system board” on page 336 and “Installing the system board” on page 339). 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 328 and “Installing a microprocessor and heat sink” on page 330). 8. (Trained technician only) Replace the system board (see “Removing the system board” on page 336 and “Installing the system board” on page 339).

- 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	Description	Message	Action
W. 580A1	Unsupported DIMM populated for mirror mode.	[W. 580A1] Invalid memory configuration for Mirror Mode. Please correct the memory configuration.	<ol style="list-style-type: none"> 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 mirroring mode (see 227).
W. 580A2	Unsupported DIMM populated for spare mode.	[W. 580A2] Invalid memory configuration for Sparing Mode. Please correct the memory configuration.	Make sure that the DIMMs have been installed in the correct sequence for rank sparing mode (see 226).
I. 580A4	DIMM population change detected.	[I. 580A4] Memory population change detected.	Information only. Memory has been added, moved, or changed.
I. 580A5	DIMM Mirror failover detected.	[I. 580A5] Mirror fail-over complete. DIMM number % has failed over to the mirrored copy.	Information only. Memory redundancy has been lost. Check the event log for uncorrected DIMM failure events (see “Event logs” on page 30).
I. 580A6	Spare copy complete.	[I. 580A6] Memory spare copy has completed successfully.	Information only. Memory redundancy or spare rank has been lost. Check the event log for uncorrected DIMM failure events (see “Event logs” on page 30).
I. 58015	Spare copy started.	[I. 58015] Memory spare copy initiated.	Information only.
W. 68002	CMOS battery fault.	[W. 68002] A CMOS battery error has been detected.	<ol style="list-style-type: none"> 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 (see “Removing the system battery” on page 278 and “Installing the system battery” on page 280). 3. (Trained technician only) Replace the system board (see “Removing the system board” on page 336 and “Installing the system board” on page 339).

- 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	Description	Message	Action
S. 68005	Critical IOH-PCI error.	[S. 68005] An error has been detected by the 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.	<ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • PCI express adapter (see “Removing an adapter from the PCI riser-card assembly” on page 256 and “Installing an adapter on the PCI riser-card assembly” on page 258). • (Trained technician only) System board (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
S. 680B8	Internal QPI link failure detected.	[S. 680B8] Internal QPI link failure detected.	<ol style="list-style-type: none"> 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 (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
S. 680B9	External QPI link failure detected.	[S. 680B9] External QPI link failure detected.	<ol style="list-style-type: none"> 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 (see “Removing the system board” on page 336 and “Installing the system board” on page 339).

- 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	Description	Message	Action
S. 2011001	PCI SERR detected.	[S. 2011001] An Uncorrected PCIe Error has Occurred at Bus % Device % Function %. The Vendor ID for the device is % and the Device ID is %.	<ol style="list-style-type: none"> 1. Check the riser-card LEDs. 2. Reseat all affected adapters and riser cards. 3. Update the PCI adapter firmware. 4. Replace the affected adapters and riser cards (see “Removing an adapter from the PCI riser-card assembly” on page 256 and “Installing an adapter on the PCI riser-card assembly” on page 258). 5. (Trained technician only) Replace the system board (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
S. 2018001	PCIe uncorrected error detected.	[S. 2018001] An Uncorrected PCIe Error has Occurred at Bus % Device % Function %. The Vendor ID for the device is % and the Device ID is %.	<ol style="list-style-type: none"> 1. Check the riser-card LEDs. 2. Reseat all affected adapters and riser cards. 3. Update the PCI adapter firmware. 4. Replace the affected adapters and riser cards (see “Removing an adapter from the PCI riser-card assembly” on page 256 and “Installing an adapter on the PCI riser-card assembly” on page 258). 5. (Trained technician only) Replace the system board (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
I. 2018002	Out of resources (PCI option ROM)	[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 %.	<ol style="list-style-type: none"> 1. Run the Setup utility (see “Using the Setup utility” on page 353). 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?Indocid=migr-5084743 for more information.
I. 2018003	ROM checksum error.	[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 %.	<ol style="list-style-type: none"> 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 (see “Removing an adapter from the PCI riser-card assembly” on page 256 and “Installing an adapter on the PCI riser-card assembly” on page 258).

- 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	Description	Message	Action
S. 3020007	Internal UEFI firmware fault detected, system halted.	[S. 3020007] A firmware fault has been detected in the UEFI image.	<ol style="list-style-type: none"> 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this error. 2. Recover the server firmware (see “Recovering the server firmware” on page 167). 3. (Trained technician only) replace the system board (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
S. 3028002	Boot permission negotiation timeout.	[S. 3028002] Boot permission timeout detected.	<ol style="list-style-type: none"> 1. Check the IMM2 error messages (see “Integrated management module II (IMM2) error messages” on page 51) 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	Internal UEFI firmware fault detected, system halted.	[S. 3030007] A firmware fault has been detected in the UEFI image.	<ol style="list-style-type: none"> 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this error. 2. Recover the server firmware (see “Recovering the server firmware” on page 167). 3. (Trained technician only) replace the system board (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
S. 3040007	Internal UEFI firmware fault detected, system halted.	[S. 3040007] A firmware fault has been detected in the UEFI image.	<ol style="list-style-type: none"> 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this error. 2. Recover the server firmware (see “Recovering the server firmware” on page 167).
I. 3048005	Bootting backup UEFI image.	[I. 3048005] UEFI has booted from the backup flash bank.	Information only. Set the JP2 jumper in the backup position (pins 2 and 3) to allow the server to boot from the backup UEFI (see “System-board jumpers” on page 22).
W. 3048006	Automated boot recovery, booting backup UEFI Image.	[W. 3048006] UEFI has booted from the backup flash bank due to an Automated boot recovery (ABR) event.	<ol style="list-style-type: none"> 1. Run the Setup utility (“Using the Setup utility” on page 353). Select Load Default Settings and save the settings. 2. Recover the server firmware (see “Recovering the server firmware” on page 167).

- 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	Description	Message	Action
S.30050007	Internal UEFI Firmware Fault Detected, System halted.	[S.3050007] A firmware fault has been detected in the UEFI image.	<ol style="list-style-type: none"> 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this error. 2. Recover the server firmware (see “Recovering the server firmware” on page 167).
W. 305000A	RTC date and time incorrect.	[W. 305000A] An invalid date and time have been detected.	<ol style="list-style-type: none"> 1. Run the Setup utility (“Using the Setup utility” on page 353). Select Load Default Settings, and save the settings. 2. Reseat the battery (see “Removing the system battery” on page 278 and “Installing the system battery” on page 280). 3. Replace the battery.
S. 3058004	POST failure has occurred. System booted with default settings.	[S. 3058004] A three strike boot failure has occurred. The system has booted with default UEFI settings.	<ol style="list-style-type: none"> 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 website at http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. 4. Update the firmware to the latest level (see “Updating the firmware” on page 349 for more information). 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 (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
W. 3058009	Driver health protocol: missing configuration. Requires change settings From F1.	[W. 3058009] Driver health protocol: missing configuration. Requires change settings From F1.	<ol style="list-style-type: none"> 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 settings appropriately. 3. Save settings and restart the system.

- 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	Description	Message	Action
W. 305800A	Driver health protocol: Reports "failed" status controller.	[W. 305800A] Driver health protocol: Reports "failed" status controller.	<ol style="list-style-type: none"> 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 (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
W. 305800B	Driver health protocol: Reports "reboot" required controller.	[W. 305800B] Driver health protocol: Reports "reboot" required controller.	<ol style="list-style-type: none"> 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 (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
W. 305800C	Driver health protocol: Reports "system shutdown" required controller.	[W. 305800C] Driver health protocol: Reports "system shutdown" required controller.	<ol style="list-style-type: none"> 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 (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
W. 305800D	Driver health protocol: Disconnect controller failed. Requires "reboot".	[W. 305800D] Driver health protocol: Disconnect controller failed. Requires "reboot".	<ol style="list-style-type: none"> 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 (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
W. 305800E	Driver health protocol: Reports invalid health status driver.	[W. 305800E] Driver health protocol: Reports invalid health status driver.	<ol style="list-style-type: none"> 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 (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
S. 3060007	Internal UEFI firmware fault detected, system halted.	[S. 3060007] A firmware fault has been detected in the UEFI image.	<ol style="list-style-type: none"> 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Recover the server firmware (see “Recovering the server firmware” on page 167).

- 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	Description	Message	Action
S. 3070007	Internal UEFI firmware fault detected, system halted.	[S. 3070007] A firmware fault has been detected in the UEFI image.	<ol style="list-style-type: none"> 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Recover the server firmware (see “Recovering the server firmware” on page 167).
S. 3108007	System configuration restored to defaults.	[S. 3108007] The default system settings have been restored.	<ol style="list-style-type: none"> 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.
W. 3808000	IMM communication failure.	[W. 3808000] An IMM communication failure has occurred.	<ol style="list-style-type: none"> 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 IMM2 firmware to the latest level (see “Updating the firmware” on page 349). 3. (Trained technician only) Replace the system board (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
W. 3808002	error updating system configuration to IMM.	[W. 3808002] An error occurred while saving UEFI settings to the IMM.	<ol style="list-style-type: none"> 1. Run the Setup utility, select Save Settings, and restart the server (see “Using the Setup utility” on page 353). 2. Update the IMM2 firmware to the latest level (see “Updating the firmware” on page 349).
W. 3808003	Error retrieving system configuration from IMM.	[W. 3808003] Unable to retrieve the system configuration from the IMM.	<ol style="list-style-type: none"> 1. Run the Setup utility, select Save Settings, and restart the server (see “Using the Setup utility” on page 353). 2. Update the IMM2 firmware to the latest level (see “Updating the firmware” on page 349).
I. 3808004	IPMI system event log is full.	[I. 3808004] The IMM System Event Log (SEL) is full.	Run the Setup utility to clear IMM logs and restart the server (see “Using the Setup utility” on page 353).
I. 3818001	Current bank Core Root of Trust Measurement (CRTM) capsule update signature invalid.	[I. 3818001] The firmware image capsule signature for the currently booted flash bank is invalid.	<ol style="list-style-type: none"> 1. Run the Setup utility, select Load Default Settings, and save the settings. 2. Recover the server firmware (see “Recovering the server firmware” on page 167).
I. 3818002	Opposite bank Core Root of Trust Measurement (CRTM) capsule update signature invalid.	[I. 3818002] The firmware image capsule signature for the non-booted flash bank is invalid.	<ol style="list-style-type: none"> 1. Run the Setup utility, select Load Default Settings, and save the settings. 2. Recover the server firmware (see “Recovering the server firmware” on page 167).

- 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	Description	Message	Action
I. 3818003	CRTM Could not lock secure flash region.	[I. 3818003] The CRTM flash driver could not lock the secure flash region.	<ol style="list-style-type: none"> 1. Run the Setup utility, select Load Default Settings, and save the settings. 2. Recover the server firmware (see “Recovering the server firmware” on page 167).
S. 3818004	CRTM update failed.	[S. 3818004] The CRTM flash driver could not successfully flash the staging area. A failure occurred.	<ol style="list-style-type: none"> 1. Run the Setup utility, select Load Default Settings, and save the settings. 2. Recover the server firmware (see “Recovering the server firmware” on page 167).
W. 3818005	CRTM update aborted.	[W. 3818005] The CRTM flash driver could not successfully flash the staging area. The update was aborted.	<ol style="list-style-type: none"> 1. Run the Setup utility, select Load Default Settings, and save the settings. 2. Recover the server firmware (see “Recovering the server firmware” on page 167).
S. 3818007	CRTM image capsule could not be verified.	[S. 3818007] The firmware image capsules for both flash banks could not be verified.	<ol style="list-style-type: none"> 1. Run the Setup utility, select Load Default Settings, and save the settings. 2. Recover the server firmware (see “Recovering the server firmware” on page 167).
W.381800D	TPM physical presence is in asserted state.	[W.381800D] TPM physical presence is in asserted state.	<ol style="list-style-type: none"> 1. Complete any administrative tasks requiring the TPM physical presence switch to the "ON" position. 2. Restore the physical presence switch to the "OFF" position and restart the system. 3. (Trained technician only) Replace the system board.
W. 3938002	Boot configuration error.	[W. 3938002] A boot configuration error has been detected.	<ol style="list-style-type: none"> 1. Run the Setup utility, select Load Default Settings, and save the settings. 2. Recover the server firmware (see “Recovering the server firmware” on page 167).

System event log

The system event log contains messages of three types:

Information

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

Warning

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

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

Each message contains date and time information, and it indicates the source of the message (POST or the IMM2).

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/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-5079770&brandind=5000008>.

Table 4. IMM2 error messages

<ul style="list-style-type: none">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				
80010701-0702ffff	Numeric sensor FHHL Ambient Temp going high (upper non-critical) has asserted.	Warning	An upper non-critical sensor going high has asserted.	<ol style="list-style-type: none">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.
80010701-0703ffff	Numeric sensor LowProfile Ambient going high (upper non-critical) has asserted.	Warning	An upper non-critical sensor going high has asserted.	<ol style="list-style-type: none">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.
80010701-0704ffff	Numeric sensor RAID Ambient Temp going high (upper non-critical) has asserted.	Warning	An upper non-critical sensor going high has asserted. .	<ol style="list-style-type: none">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.
80010701-0c01ffff	Numeric sensor Ambient Temp going high (upper non-critical) has asserted.	Warning	An upper non-critical sensor going high has asserted.	<ol style="list-style-type: none">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 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
80010901-0702ffff	Numeric sensor FHHL Ambient Temp going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	<ol style="list-style-type: none"> 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.
80010901-0703ffff	Numeric sensor LowProfile Ambient going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	<ol style="list-style-type: none"> 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.
80010901-0704ffff	Numeric sensor RAID Amb Temp going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	<ol style="list-style-type: none"> 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.
80010901-0c01ffff	Numeric sensor Ambient Temp going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	<ol style="list-style-type: none"> 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.
80010b01-0702ffff	Numeric sensor FHHL Ambient Temp going high (upper non-recoverable) has asserted.	Error	An upper non-recoverable sensor going high has asserted.	<ol style="list-style-type: none"> 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.
80010b01-0703ffff	Numeric sensor LowProfile Ambient going high (upper non-recoverable) has asserted.	Error	An upper non-recoverable sensor going high has asserted.	<ol style="list-style-type: none"> 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.
80010b01-0704ffff	Numeric sensor RAID Amb Temp going high (upper non-recoverable) has asserted.	Error	An upper non-recoverable sensor going high has asserted.	<ol style="list-style-type: none"> 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.
80010b01-0c01ffff	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.
81010701-0c01ffff	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.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
81010901-0c01ffff	Numeric sensor Ambient Temp going high (upper critical) has deasserted.	Info	An upper critical sensor going high has deasserted.	No action; information only.
81010b01-0c01ffff	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.
80010701-1401ffff 80010701-1402ffff	Sensor CPU <i>n</i> VR Temp going high (upper non-critical) has asserted. (<i>n</i> = microprocessor number)	Warning	An upper non-critical sensor going high has asserted.	<ol style="list-style-type: none"> Reduce the ambient temperature. Check the server airflow. Make sure that nothing is blocking the air from coming into or preventing the air from exiting the server.
80010901-1401ffff 80010901-1402ffff	Sensor CPU <i>n</i> VR Temp going high (upper critical) has asserted. (<i>n</i> = microprocessor number)	Error	An upper critical sensor going high has asserted.	<ol style="list-style-type: none"> Reduce the ambient temperature. Check the server airflow. Make sure that nothing is blocking the air from coming into or preventing the air from exiting the server.
80010b01-1401ffff 80010b01-1402ffff	Sensor CPU <i>n</i> VR Temp going high (upper non-recoverable) has asserted. (<i>n</i> = 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.
80010701-2d01ffff	Numeric sensor PCH Temp going high (upper non-critical) has asserted.	Warning	An upper non-critical sensor going high has asserted.	<ol style="list-style-type: none"> Reduce the ambient temperature. Check the server airflow. Make sure that nothing is blocking the air from coming into or preventing the air from exiting the server.
80010901-2d01ffff	Numeric sensor PCH Temp going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	<ol style="list-style-type: none"> Reduce the ambient temperature. Check the server airflow. Make sure that nothing is blocking the air from coming into or preventing the air from exiting the server.
80010b01-2d01ffff	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.
81010701-2d01ffff	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.
81010901-2d01ffff	Numeric sensor PCH Temp going high (upper critical) has deasserted.	Info	An upper critical sensor going high has deasserted.	No action; information only.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
81010b01-2d01ffff	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.
80010204-1d01ffff 80010204-1d02ffff 80010204-1d03ffff 80010204-1d04ffff 80010204-1d05ffff 80010204-1d06ffff	Numeric sensor Fan <i>n</i> A Tach going low (lower critical) has asserted. (<i>n</i> = 1Aa, 1Ab, 2Aa, 2Ab, 3Aa, 3Ab)	Error	A lower critical sensor going low has asserted.	<ol style="list-style-type: none"> Check the IBM support website for a firmware update and update the server firmware to the latest level (see “Updating the firmware” on page 349). Reseat the failing fan <i>n</i>, which is indicated by a lit LED near the fan connector on the system board. Replace the failing fan (see “Removing a system fan” on page 221 and “Installing a system fan” on page 222). <p>(<i>n</i> = fan number)</p>
800b010a-1e81ffff 800b010a-1e82ffff 800b010a-1e83ffff	Cooling Zone <i>n</i> redundancy lost has asserted. (<i>n</i> = 1,2,3)	Error	Redundancy lost has asserted.	<ol style="list-style-type: none"> Make sure that the connectors on fan <i>n</i> are not damaged. Make sure that the fan <i>n</i> connectors on the system board are not damaged. Make sure that the fans are correctly installed. Reseat the fans. Replace the fans (see “Removing a system fan” on page 221 and “Installing a system fan” on page 222). <p>(<i>n</i> = fan number)</p>
800b050a-1e81ffff 800b050a-1e82ffff 800b050a-1e83ffff	Cooling Zone <i>n</i> insufficient resources has asserted. (<i>n</i> = 1,2,3)	Error	There is no redundancy and insufficient to continue operation.	<ol style="list-style-type: none"> Make sure that the connectors on fan <i>n</i> are not damaged. Make sure that the fan <i>n</i> connectors on the system board are not damaged. Make sure that the fans are correctly installed. Reseat the fans. Replace the fans (see “Removing a system fan” on page 221 and “Installing a system fan” on page 222). <p>(<i>n</i> = fan number)</p>

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
80070208-0a01ffff 80070208-0a02ffff	Sensor PS <i>n</i> Fan Fault has transitioned to critical from a less severe state. (<i>n</i> = power supply number)	Error	A sensor has changed to Critical state from a less severe state.	<ol style="list-style-type: none"> Make sure that there are no obstructions, such as bundled cables, to the airflow from the power-supply fan. Replace power supply <i>n</i>. (<i>n</i> = power supply number)
Power messages				
80010902-0701ffff	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 336 and “Installing the system board” on page 339).
80010202-0701ffff	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 336 and “Installing the system board” on page 339).
80010902-0701ffff	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 336 and “Installing the system board” on page 339).
80010202-0701ffff	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 336 and “Installing the system board” on page 339).
80010902-0701ffff	Numeric sensor Planar 12V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	<ol style="list-style-type: none"> Check power supply <i>n</i> LED. Remove the failing power supply. (Trained technician only) Replace the system board. (<i>n</i> = power supply number)
80010202-0701ffff	Numeric sensor Planar 12V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	<ol style="list-style-type: none"> Check power supply <i>n</i> LED. Remove the failing power supply. Follow actions for OVER SPEC LED in “Light path diagnostics panel LEDs” on page 128. (Trained technician only) Replace the system board. (<i>n</i> = power supply number)
80010002-0701ffff	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 278 and “Installing the system battery” on page 280).

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
80010202-0701ffff	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 278 and “Installing the system battery” on page 280).
806f0008-0a01ffff 806f0008-0a02ffff	The Power Supply (Power Supply <i>n</i>) presence has been detected. (<i>n</i> = power supply number)	Info	Power supply <i>n</i> has been added. (<i>n</i> = power supply number)	No action; information only.
806f0108-0a01ffff 806f0108-0a02ffff	The Power Supply <i>n</i> has failed. (<i>n</i> = power supply number)	Error	Power supply <i>n</i> has failed. (<i>n</i> = power supply number)	<ol style="list-style-type: none"> Reseat power supply <i>n</i>. If the power-on LED is not lit and the power-supply error LED is lit, replace power supply <i>n</i>. If both the power-on LED and the power-supply error LED are not lit, see “Power problems” on page 122 for more information. (<i>n</i> = power supply number)
806f0308-0a01ffff 806f0308-0a02ffff	The Power Supply <i>n</i> has lost input. (<i>n</i> = power supply number)	Info	Power supply <i>n</i> AC has lost. (<i>n</i> = power supply number)	<ol style="list-style-type: none"> Reconnect the power cords. Check power supply <i>n</i> LED. See “Power-supply LEDs” on page 137 for more information. (<i>n</i> = power supply number)
80070208-0a01ffff 80070208-0a02ffff	Sensor PS <i>n</i> Therm Fault has transitioned to critical from a less severe state. (<i>n</i> = power supply number)	Error	A sensor has changed to Critical state from a less severe state.	<ol style="list-style-type: none"> Make sure that there are no obstructions, such as bundled cables, to the airflow from the power-supply fan. 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. Replace power supply <i>n</i>. (<i>n</i> = power supply number)
80070608-0a01ffff 80070608-0a02ffff	Sensor PS <i>n</i> 12V AUX Fault has transitioned to non-recoverable from a less severe state. (<i>n</i> = power supply number)	Error	A sensor has changed to non-recoverable state from a less severe state.	<ol style="list-style-type: none"> Check power supply <i>n</i> LED. Replace power supply <i>n</i>. (<i>n</i> = power supply number)

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
80070608-0a01ffff 80070608-0a02ffff	Sensor PS <i>n</i> 12V OC Fault has transitioned to non-recoverable from a less severe state. (<i>n</i> = power supply number)	Error	A sensor has changed to non-recoverable state from a less severe state.	<ol style="list-style-type: none"> 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. Check the OVER SPEC LED in “Light path diagnostics panel LEDs” on page 128.
80070608-0a01ffff 80070608-0a02ffff	Sensor PS <i>n</i> 12V OV Fault has transitioned to non-recoverable from a less severe state. (<i>n</i> = power supply number)	Error	A sensor has changed to non-recoverable state from a less severe state.	<ol style="list-style-type: none"> Check power supply <i>n</i> LED. Remove the failing power supply. (Trained technician only) Replace the system board. (<i>n</i> = power supply number)
80070608-0a01ffff 80070608-0a02ffff	Sensor PS <i>n</i> 12V UV Fault has transitioned to non-recoverable from a less severe state. (<i>n</i> = power supply number)	Error	A sensor has changed to non-recoverable state from a less severe state.	<ol style="list-style-type: none"> Check power supply <i>n</i> LED. Remove the failing power supply. Follow actions for OVER SPEC LED in “Light path diagnostics panel LEDs” on page 128. (Trained technician only) Replace the system board. (<i>n</i> = power supply number)
800b0008-1301ffff	Power Unit has been fully redundant.	Info	Power unit redundancy has been restored.	No action; information only.
800b0108-1301ffff	Power Unit redundancy lost has asserted.	Error	Redundancy has been lost and is insufficient to continue operation.	<ol style="list-style-type: none"> Check the LEDs for both power supplies. Follow the actions in “Power-supply LEDs” on page 137.
806f0608-1301xx03	Power supply PS Configuration error with rating mismatch.	Error	A power supply configuration error (rating mismatch) has occurred.	<ol style="list-style-type: none"> Make sure that the power supplies installed are with the same rating or wattage. Reinstall the power supplies with the same rating or wattage.
80030108-0a01ffff	Sensor PS Heavy Load has asserted.	Info	A implementation has detected a sensor has asserted.	No action; information only.
Microprocessor messages				

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 				
806f0007-0301ffff 806f0007-0302ffff	The Processor CPU <i>n</i> Status has Failed with IERR. (<i>n</i> = microprocessor number)	Error	A processor failed - IERR condition has occurred.	<ol style="list-style-type: none"> 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 (see “Updating the firmware” on page 349). 3. Run the DSA program. 4. Reseat the adapter. 5. Replace the adapter. 6. (Trained technician only) Replace microprocessor <i>n</i>. 7. (Trained technician only) Replace the system board. <p>(<i>n</i> = microprocessor number)</p>
806f0107-0301ffff 806f0107-0302ffff	The Processor CPU <i>n</i> Status has been detected an over-temperature condition. (<i>n</i> = microprocessor number)	Error	An over temperature condition has occurred.	<ol style="list-style-type: none"> 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 top cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor <i>n</i> is installed correctly. 3. (Trained technician only) Replace microprocessor <i>n</i> (see “Removing a microprocessor and heat sink” on page 328 and “Installing a microprocessor and heat sink” on page 330). <p>(<i>n</i> = microprocessor number)</p>

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
806f0207-0301ffff 806f0207-0302ffff	The Processor CPU <i>n</i> Status has Failed with BIST condition. (<i>n</i> = microprocessor number)	Error	A processor failed - BIST condition has occurred.	<ol style="list-style-type: none"> 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. Update the firmware (UEFI and IMM) to the latest level (see “Updating the firmware” on page 349). Run the DSA program. Reseat the adapter (see “Removing an adapter from the PCI riser-card assembly” on page 256 and “Installing an adapter on the PCI riser-card assembly” on page 258). Replace the adapter. (Trained technician only) Replace microprocessor <i>n</i> (see “Removing a microprocessor and heat sink” on page 328 and “Installing a microprocessor and heat sink” on page 330). (Trained technician only) Replace the system board (see “Removing the system board” on page 336 and “Installing the system board” on page 339). <p>(<i>n</i> = microprocessor number)</p>

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
806f0507-0301ffff 806f0507-0302ffff 806f0507-2584ffff	The Processor CPU <i>n</i> Status has a Configuration Mismatch. (<i>n</i> = microprocessor number)	Error	A processor configuration mismatch has occurred.	<ol style="list-style-type: none"> Check the CPU LED. See more information about the CPU LED in “Light path diagnostics panel LEDs” on page 128. 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. Make sure that the installed microprocessors are compatible with each other (see “Installing a microprocessor and heat sink” on page 330 for information about microprocessor requirements). (Trained technician only) Reseat microprocessor <i>n</i> (see “Removing a microprocessor and heat sink” on page 328 and “Installing a microprocessor and heat sink” on page 330). (Trained technician only) Replace microprocessor <i>n</i>. (<i>n</i> = microprocessor number)
806f0607-0301ffff 806f0607-0302ffff 806f0607-2584ffff	An SM BIOS Uncorrectable CPU complex error for Processor <i>n</i> has asserted. (<i>n</i> = microprocessor number)	Error	The system management handler has detected an internal microprocessor error.	<ol style="list-style-type: none"> Make sure that the installed microprocessors are compatible with each other (see “Installing a microprocessor and heat sink” on page 330 for information about microprocessor requirements). Update the server firmware to the latest level (see “Updating the firmware” on page 349). (Trained technician only) Replace the incompatible microprocessor (see “Removing a microprocessor and heat sink” on page 328 and “Installing a microprocessor and heat sink” on page 330).
806f0807-0301ffff 806f0807-0302ffff	The Processor CPU <i>n</i> has been disabled. (<i>n</i> = microprocessor number)	Info	A processor has been disabled.	No action; information only.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 				
806f0807-2584ffff	The Processor for All CPUs or One of the CPUs has been disabled.	Info	A processor has been disabled.	No action; information only.
806f0a07-0301ffff 806f0a07-0302ffff	The Processor CPU <i>n</i> is operating in a Degraded State. (<i>n</i> = microprocessor number)	Warning	Throttling has occurred for microprocessor <i>n</i> . (<i>n</i> = microprocessor number)	<ol style="list-style-type: none"> 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 top 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 <i>n</i> is installed correctly. 4. (Trained technician only) Replace microprocessor <i>n</i>. (<i>n</i> = microprocessor number)
80070201-0301ffff 80070201-0302ffff	Sensor CPU <i>n</i> OverTemp has transitioned to critical from a less severe state. (<i>n</i> = microprocessor number)	Error	A sensor has changed to critical state from a less severe state.	<ol style="list-style-type: none"> 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 top cover is installed and completely closed. 2. Check the ambient temperature. You must be operating within the specifications (see “Features and specifications” on page 7 for more information). 3. Make sure that the heat sink for microprocessor <i>n</i> is installed correctly. 4. (Trained technician only) Replace microprocessor <i>n</i> (see “Removing a microprocessor and heat sink” on page 328 and “Installing a microprocessor and heat sink” on page 330). (<i>n</i> = microprocessor number)

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 				
80070301-0301ffff 80070301-0302ffff	Sensor CPU <i>n</i> OverTemp has transitioned to non-recoverable from a less severe state. (<i>n</i> = microprocessor number)	Error	A sensor has changed to non-recoverable state from a less severe state.	<ol style="list-style-type: none"> 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 top cover is installed and completely closed. 2. Check the ambient temperature. You must be operating within the specifications (see “Features and specifications” on page 7 for more information). 3. Make sure that the heat sink for microprocessor <i>n</i> is installed correctly (see “Installing a microprocessor and heat sink” on page 330 for more information). 4. (Trained technician only) Replace microprocessor <i>n</i> (see “Removing a microprocessor and heat sink” on page 328 and “Installing a microprocessor and heat sink” on page 330). (<i>n</i> = microprocessor number)
8007021b-0301ffff 8007021b-0302ffff	Sensor CPU <i>n</i> QPI link error has transitioned to critical from a less severe state. (<i>n</i> = microprocessor number)	Error	A sensor has changed to critical state from a less severe state.	<ol style="list-style-type: none"> 1. Remove cpu 2. Check cpu socket pins, any damage or contained or bending, replace the system board. 3. Check cpu damage, replace cpu.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 				
806f0813-2584ffff	An Uncorrectable Bus Error has occurred on system. (Sensor = CPUs)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int CPU)	<ol style="list-style-type: none"> 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 328). 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 336) and “Installing the system board” on page 339.
Memory errors				
806f0813-2581ffff	An Uncorrectable Bus Error has occurred on system. (Sensor = DIMMs)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int DIMM)	<ol style="list-style-type: none"> 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 (DIMM)” on page 223). 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 226 for more information). 6. (Trained technician only) Replace the system board (see “Removing the system board” on page 336) and “Installing the system board” on page 339).

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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-2001ffff 806f010c-2002ffff 806f010c-2003ffff 806f010c-2004ffff 806f010c-2005ffff 806f010c-2006ffff 806f010c-2007ffff 806f010c-2008ffff 806f010c-2009ffff 806f010c-200affff 806f010c-200bffff 806f010c-200cffff	Memory uncorrectable error detected for Memory DIMM <i>n</i> Status. (<i>n</i> = DIMM number)	Error	A memory uncorrectable error has occurred.	<ol style="list-style-type: none"> 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 224 for memory population). 3. If the problem follows the DIMM, replace the failing DIMM (see “Removing a memory module (DIMM)” on page 223 and “Installing a memory module” on page 224). 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 336) and “Installing the system board” on page 339). 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 336) and “Installing the system board” on page 339). 6. (Trained technician only) Replace the affected microprocessor (see “Removing a microprocessor and heat sink” on page 328 and “Installing a microprocessor and heat sink” on page 330).

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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-2581ffff	Memory uncorrectable error detected for One of the DIMMs or All DIMMs.	Error	A memory uncorrectable error has occurred.	<ol style="list-style-type: none"> 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 224 for memory population). 3. If the problem follows the DIMM, replace the failing DIMM (see “Removing a memory module (DIMM)” on page 223 and “Installing a memory module” on page 224). 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 336) and “Installing the system board” on page 339). 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 336) and “Installing the system board” on page 339). 6. (Trained technician only) Replace the affected microprocessor (see “Removing a microprocessor and heat sink” on page 328 and “Installing a microprocessor and heat sink” on page 330).

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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-2001ffff 806f030c-2002ffff 806f030c-2003ffff 806f030c-2004ffff 806f030c-2005ffff 806f030c-2006ffff 806f030c-2007ffff 806f030c-2008ffff 806f030c-2009ffff 806f030c-200affff 806f030c-200bffff 806f030c-200cffff	Memory DIMM <i>n</i> Status Scrub failure detected. (<i>n</i> = DIMM number)	Error	A memory scrub failure has been detected.	<p>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.</p> <ol style="list-style-type: none"> Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. Make sure that the DIMMs are firmly seated and no foreign material is found in the DIMM connector. Then, retry with the same DIMM. If the problem is related to a DIMM, replace the failing DIMM indicated by the error LEDs (see “Removing a memory module (DIMM)” on page 223 and “Installing a memory module” on page 224). 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 224 for memory population). (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 336) and “Installing the system board” on page 339). <p>(continued on the next page)</p>

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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 <i>n</i> Status Scrub failure detected. (<i>n</i> = DIMM number)	Error	A memory scrub failure has been detected.	<ol style="list-style-type: none"> 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 (see “Removing the system board” on page 336) and “Installing the system board” on page 339). 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 328 and “Installing a microprocessor and heat sink” on page 330). 8. (Trained technician only) Replace the system board (see “Removing the system board” on page 336) and “Installing the system board” on page 339).
806f040c-2001ffff 806f040c-2002ffff 806f040c-2003ffff 806f040c-2004ffff 806f040c-2005ffff 806f040c-2006ffff 806f040c-2007ffff 806f040c-2008ffff 806f040c-2009ffff 806f040c-200affff 806f040c-200bffff 806f040c-200cffff	Memory DIMM disabled for DIMM <i>n</i> Status. (<i>n</i> = DIMM number)	Info	DIMM disabled.	<ol style="list-style-type: none"> 1. Make sure the DIMM is installed correctly (see “Installing a memory module” on page 224). 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 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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-2581ffff	Memory DIMM disabled for One of the DIMMs or All DIMMs.	Info	DIMM disabled.	<ol style="list-style-type: none"> 1. Make sure the DIMM is installed correctly (see “Installing a memory module” on page 224). 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 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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-2001ffff 806f050c-2002ffff 806f050c-2003ffff 806f050c-2004ffff 806f050c-2005ffff 806f050c-2006ffff 806f050c-2007ffff 806f050c-2008ffff 806f050c-2009ffff 806f050c-200affff 806f050c-200bffff 806f050c-200cffff	Memory Logging Limit Reached for DIMM <i>n</i> Status. (<i>n</i> = DIMM number)	Error	The memory logging limit has been reached.	<ol style="list-style-type: none"> 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 224 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 336 and “Installing the system board” on page 339). 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 336) and “Installing the system board” on page 339). 6. (Trained technician only) Replace the affected microprocessor (see “Removing a microprocessor and heat sink” on page 328 and “Installing a microprocessor and heat sink” on page 330).

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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-2581ffff	Memory Logging Limit Reached for One of the DIMMs or All DIMMs.	Error	The memory logging limit has been reached.	<ol style="list-style-type: none"> 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 224 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 336) and “Installing the system board” on page 339). 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 336 and “Installing the system board” on page 339). 6. (Trained technician only) Replace the affected microprocessor (see “Removing a microprocessor and heat sink” on page 328 and “Installing a microprocessor and heat sink” on page 330).
806f070c-2001ffff 806f070c-2002ffff 806f070c-2003ffff 806f070c-2004ffff 806f070c-2005ffff 806f070c-2006ffff 806f070c-2007ffff 806f070c-2008ffff 806f070c-2009ffff 806f070c-200affff 806f070c-200bffff 806f070c-200cffff	Memory DIMM Configuration Error for DIMM <i>n</i> Status. (<i>n</i> = 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 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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-2581ffff	Memory DIMM Configuration Error for One of the DIMMs or 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-2001ffff 806f090c-2002ffff 806f090c-2003ffff 806f090c-2004ffff 806f090c-2005ffff 806f090c-2006ffff 806f090c-2007ffff 806f090c-2008ffff 806f090c-2009ffff 806f090c-200affff 806f090c-200bffff 806f090c-200cffff	Memory DIMM for DIMM <i>n</i> Status has been automatically throttled. (<i>n</i> = DIMM number)	Warning	A memory DIMM has been automatically throttled.	<ol style="list-style-type: none"> Reseat the DIMM, and then restart the server. Replace DIMM <i>n</i>. (<i>n</i> = DIMM number)
806f0a0c-2001ffff 806f0a0c-2002ffff 806f0a0c-2003ffff 806f0a0c-2004ffff 806f0a0c-2005ffff 806f0a0c-2006ffff 806f0a0c-2007ffff 806f0a0c-2008ffff 806f0a0c-2009ffff 806f0a0c-200affff 806f0a0c-200bffff 806f0a0c-200cffff	An Over-Temperature condition has been detected on the DIMM <i>n</i> Status. (<i>n</i> = DIMM number)	Error	An over-temperature condition has occurred for DIMM <i>n</i> . (<i>n</i> = DIMM number)	<ol style="list-style-type: none"> 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 top cover is installed and completely closed. Make sure that ambient temperature is within the specifications. If a fan has failed, complete the action for a fan failure. Replace DIMM <i>n</i>. (<i>n</i> = DIMM number)
800b010c-2581ffff	Backup Memory redundancy lost has asserted.	Error	Redundancy has been lost.	<ol style="list-style-type: none"> Check the system-event log for DIMM failure events (uncorrectable or PFA) and correct the failures. Re-enable mirroring in the Setup utility.
800b030c-2581ffff	Backup Memory sufficient resources from redundancy degraded has asserted.	Warning	There is no redundancy. The state has been transitioned from redundancy to sufficient resources.	<ol style="list-style-type: none"> Check the system-event log for DIMM failure events (uncorrectable or PFA) and correct the failures. Re-enable mirroring in the Setup utility.
800b050c-2581ffff	Backup Memory insufficient resources has asserted.	Error	There is no redundancy and insufficient to continue operation.	<ol style="list-style-type: none"> Check the system-event log for DIMM failure events (uncorrectable or PFA) and correct the failures. Re-enable mirroring in the Setup utility.
Recovery messages				

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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-0401ffff 816f000d-0402ffff 816f000d-0403ffff 816f000d-0404ffff 816f000d-0405ffff 816f000d-0406ffff 816f000d-0407ffff 816f000d-0408ffff 816f000d-0409ffff 816f000d-040affff 816f000d-040bffff 816f000d-040cffff 816f000d-040dffff 816f000d-040effff 816f000d-040fffff 816f000d-0410xxxx 816f000d-0411ffff 816f000d-0412ffff 816f000d-0413ffff 816f000d-0414ffff 816f000d-0415ffff 816f000d-0416ffff 816f000d-0417ffff 816f000d-0418ffff 816f000d-0419ffff 816f000d-041affff 816f000d-041bffff	The Drive <i>n</i> Status has been removed from unit. (<i>n</i> = hard disk drive number)	Error	A drive has been removed.	<ol style="list-style-type: none"> Reseat hard disk drive <i>n</i>. (<i>n</i> = hard disk drive number). Wait 1 minute or more before reinstalling the drive. Replace the hard disk drive. Make sure that the disk firmware and RAID controller firmware is at the latest level. Check the SAS cable.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
806f010d-0400xxxx 806f010d-0401ffff 806f010d-0402ffff 806f010d-0403ffff 806f010d-0404ffff 806f010d-0405ffff 806f010d-0406ffff 806f010d-0407ffff 806f010d-0408ffff 806f010d-0409ffff 806f010d-040affff 806f010d-040bffff 806f010d-040cffff 806f010d-040dffff 806f010d-040effff 806f010d-040fffff 806f010d-0410xxxx 806f010d-0411ffff 806f010d-0412ffff 806f010d-0413ffff 806f010d-0414ffff 806f010d-0415ffff 806f010d-0416ffff 806f010d-0417ffff 806f010d-0418ffff 806f010d-0419ffff 806f010d-041affff 806f010d-041bffff	The Drive <i>n</i> Status has been disabled due to a detected fault. (<i>n</i> = hard disk drive number)	Error	A drive has been disabled because of a fault.	<ol style="list-style-type: none"> Run the hard disk drive diagnostic test on drive <i>n</i>. Reseat the following components: <ol style="list-style-type: none"> Hard disk drive (wait 1 minute or more before reinstalling the drive). Cable from the system board to the backplane Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> Hard disk drive Cable from the system board to the backplane Hard disk drive backplane (<i>n</i> = hard disk drive number)

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 				
806f020d-0400xxxx 806f020d-0401ffff 806f020d-0402ffff 806f020d-0403ffff 806f020d-0404ffff 806f020d-0405ffff 806f020d-0406ffff 806f020d-0407ffff 806f020d-0408ffff 806f020d-0409ffff 806f020d-040affff 806f020d-040bffff 806f020d-040cffff 806f020d-040dffff 806f020d-040effff 806f020d-040fffff 806f020d-0410xxxx 806f020d-0411ffff 806f020d-0412ffff 806f020d-0413ffff 806f020d-0414ffff 806f020d-0415ffff 806f020d-0416ffff 806f020d-0417ffff 806f020d-0418ffff 806f020d-0419ffff 806f020d-041affff 806f020d-041bffff	The Drive <i>n</i> Status has a predictive failure. (<i>n</i> = hard disk drive number)	Error	A predictive failure has been detected for drive <i>n</i> . (<i>n</i> = hard disk drive number)	1. Replace the hard drive <i>n</i> . (<i>n</i> = hard disk drive number)

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
806f050d-0400xxxx 806f050d-0401ffff 806f050d-0402ffff 806f050d-0403ffff 806f050d-0404ffff 806f050d-0405ffff 806f050d-0406ffff 806f050d-0407ffff 806f050d-0408ffff 806f050d-0409ffff 806f050d-040affff 806f050d-040bffff 806f050d-040cffff 806f050d-040dffff 806f050d-040effff 806f050d-040fffff 806f050d-0410xxxx 806f050d-0411ffff 806f050d-0412ffff 806f050d-0413ffff 806f050d-0414ffff 806f050d-0415ffff 806f050d-0416ffff 806f050d-0417ffff 806f050d-0418ffff 806f050d-0419ffff 806f050d-041affff 806f050d-041bffff	Array %1 is in critical condition. (%1 = CIM_ComputerSystem.ElementName)	Error	An array is in a critical state. (Sensor = Drive <i>n</i> Status) (<i>n</i> = 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 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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-0401ffff 806f060d-0402ffff 806f060d-0403ffff 806f060d-0404ffff 806f060d-0405ffff 806f060d-0406ffff 806f060d-0407ffff 806f060d-0408ffff 806f060d-0409ffff 806f060d-040affff 806f060d-040bffff 806f060d-040cffff 806f060d-040dffff 806f060d-040effff 806f060d-040fffff 806f060d-0410xxxx 806f060d-0411ffff 806f060d-0412ffff 806f060d-0413ffff 806f060d-0414ffff 806f060d-0415ffff 806f060d-0416ffff 806f060d-0417ffff 806f060d-0418ffff 806f060d-0419ffff 806f060d-041affff 806f060d-041bffff	Array %1 has failed. (%1 = CIM_ComputerSystem. ElementName)	Error	An array is in a failed state. (Sensor = Drive <i>n</i> Status) (<i>n</i> = 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 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
806f070d-0400xxxx 806f070d-0401ffff 806f070d-0402ffff 806f070d-0403ffff 806f070d-0404ffff 806f070d-0405ffff 806f070d-0406ffff 806f070d-0407ffff 806f070d-0408ffff 806f070d-0409ffff 806f070d-040affff 806f070d-040bffff 806f070d-040cffff 806f070d-040dffff 806f070d-040effff 806f070d-040fffff 806f070d-0410xxxx 806f070d-0411ffff 806f070d-0412ffff 806f070d-0413ffff 806f070d-0414ffff 806f070d-0415ffff 806f070d-0416ffff 806f070d-0417ffff 806f070d-0418ffff 806f070d-0419ffff 806f070d-041affff 806f070d-041bffff	The Drive <i>n</i> Status rebuilt has been in progress. (<i>n</i> = hard disk drive number)	Info	The Drive <i>n</i> has rebuilt in progress. (<i>n</i> = hard disk drive number)	No action; information only.
PCI messages				
806f0021-3001ffff	PCI fault has been detected for PCI <i>n</i> . (<i>n</i> = PCI slot number)	Error	A PCI fault has been detected.	<ol style="list-style-type: none"> Check the PCI LED. See more information about the PCI LED in “System-board LEDs” on page 24. Reseat the affected adapters and riser card. 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. Remove both adapters. Replace the riser cards. (Trained technicians only) Replace the system board (see “Removing the system board” on page 336 and “Installing the system board” on page 339).

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 					
806f0021-2582ffff	PCI fault has been detected for One of PCI Error.	Error	A PCI fault has been detected.	<ol style="list-style-type: none"> 1. Check the PCI LED. See more information about the PCI LED in “System-board LEDs” on page 24. 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 336 and “Installing the system board” on page 339). 	
806f0021-2582ffff	PCI fault has been detected for All PCI Error.	Error	A PCI fault has been detected.	<ol style="list-style-type: none"> 1. Check the PCI LED. See more information about the PCI LED in “System-board LEDs” on page 24 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 336 and “Installing the system board” on page 339). 	

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 				
806f0413-2582ffff	A PCI PERR has occurred on system %1. (%1 = CIM_ComputerSystem.ElementName)	Error	A PCI PERR has occurred. (Sensor = PCIs)	<ol style="list-style-type: none"> 1. Check the PCI LED. See more information about the PCI LED in “System-board LEDs” on page 24 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.
806f0513-2582ffff	A PCI SERR has occurred on system %1. (%1 = CIM_ComputerSystem.ElementName)	Error	A PCI SERR has occurred. (Sensor = PCIs)	<ol style="list-style-type: none"> 1. Check the PCI LED. See more information about the PCI LED in “System-board LEDs” on page 24. 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.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
806f0813-2582ffff	A Uncorrectable Bus Error has occurred on system. (Sensor = PCIs)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int PCI)	<ol style="list-style-type: none"> Check the system-event log. Check the PCI LED. See more information about the PCI LED in “System-board LEDs” on page 24. Remove the adapter from the indicated PCI slot. 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. (Trained technician only) Replace the system board (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
806f0125-0B01ffff 806f0125-0B02ffff	The entity of PCI riser has been detected absent for PCI <i>n</i> . (<i>n</i> = PCI slot number)	Info	The entity of PCI riser <i>n</i> has been detected absent. (<i>n</i> = PCI slot number)	No action; information only.
Firmware and software messages				

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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	The System %1 encountered a POST Error. (%1 = CIM_ComputerSystem.ElementName)	Error	Firmware BIOS (ROM) corruption was detected during POST. (Sensor = ABR Status)	<ol style="list-style-type: none"> 1. Make sure the server meets the minimum configuration to start (see “Power-supply LEDs” on page 137). 2. Recover the server firmware from the backup page: <ol style="list-style-type: none"> 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 349). 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-2201ffff	The System %1 encountered a POST Error. (%1 = CIM_ComputerSystem.ElementName)	Error	The System encountered a firmware error. (Sensor = Firmware Error)	<ol style="list-style-type: none"> 1. Make sure the server meets the minimum configuration to start (see “Power-supply LEDs” on page 137). 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 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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-2201ffff	The System %1 encountered a POST Hang. (%1 = CIM_ComputerSystem.ElementName)	Error	The System encountered a firmware hang. (Sensor = Firmware Error)	<ol style="list-style-type: none"> 1. Make sure the server meets the minimum configuration to start (see “Power-supply LEDs” on page 137). 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-2101ffff	IMM2 FW Failover has been detected.	Error	Invalid or unsupported firmware or software was detected.	<ol style="list-style-type: none"> 1. Make sure the server meets the minimum configuration to start (see “Power-supply LEDs” on page 137). 2. Recover the server firmware from the backup page: <ol style="list-style-type: none"> 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 349). 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 only) replace the system board.
General messages				
80030012-2301ffff	Sensor OS RealTime Mod has deasserted.	Info	An implementation has detected a sensor has deasserted.	No action; information only.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
80030006-2101ffff	Sensor Sig Verify Fail has deasserted.	Info	An implementation has detected a sensor has deasserted.	No action; information only.
80070114-2201ffff	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.
80070202-0701ffff	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.	<ol style="list-style-type: none"> Check the system-event log. Check for an error LED on the system board. Replace any failing device. 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. (Trained technician only) Replace the system board (see “Removing the system board” on page 336 and “Installing the system board” on page 339).
806f011b-0701ffff	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-0701ffff	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.
806f0125-0c01ffff	Front panel entity has been detected Absent.	Info	A front panel entity has been detected absent.	No action; information only.
806f0013-1701ffff	A front panel NMI has occurred on system %1. (%1 = CIM_ComputerSystem.ElementName)	Error	An operator information panel NMI/diagnostic interrupt has occurred.	<ol style="list-style-type: none"> Check the device driver. Reinstall the device driver. Update all device drivers to the latest level. Update the firmware (UEFI and IMM) (see “Updating the firmware” on page 349).

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
806f0313-1701ffff	A software NMI has occurred on system %1. (%1 = CIM_ComputerSystem.ElementName)	Error	A software NMI has occurred.	<ol style="list-style-type: none"> Check the device driver. Reinstall the device driver. Update all device drivers to the latest level. Update the firmware (UEFI and IMM) (see “Updating the firmware” on page 349).
81030012-2301ffff	OS RealTime Mod state has deasserted.	Info	OS RealTime Mod state has deasserted.	No action; information only.
80070219-0701ffff	Sensor Sys Board Fault has transitioned to critical.	Error	A sensor has changed to critical state from a less severe state.	<ol style="list-style-type: none"> Check the system-event log. Check for an error LED on the system board. Replace any failing device. 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. (Trained technician only) Replace the system board.
806f0312-2201ffff	Entry to aux log has asserted.	Info	Entry to aux log has been detected.	No action; information only.
80080128-2101ffff	Low security jumper presence has asserted.	Info	The low security jumper has been detected.	No action; information only.
8008010f-2101ffff	Physical presence jumper presence has asserted.	Info	The physical presence jumper has been detected.	No action; information only.
81030006-2101ffff	Sig verify fail has deasserted.	Info	The sig verify fail has deasserted.	No action; information only.
806f0028-2101ffff	TPM command fail has asserted.	Warning	The TPM sensor access has been degraded or unavailable.	<ol style="list-style-type: none"> Turn off the server and disconnect it from power.
8007020f-2201ffff	Sensor TXT ACM module has transitioned to critical from a less severe state.	Error	A sensor has transitioned to critical from less severe.	<ol style="list-style-type: none"> 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 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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-2582ffff	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.
80070614-2201ffff	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.
800b0308-0a01ffff	Non-redundant: Sufficient Resources from Redundancy Degraded or Fully Redundant for power resource has asserted.	Warning	A Redundancy Set has transitioned from Redundancy Degraded or Fully Redundant to Non-redundant:Sufficient	No action; information only.
800b0508-0a01ffff	Non-redundant: Insufficient resources for power resource has asserted.	Error	A Redundancy Set has transitioned to Non-redundant:Insufficient Resources	No action; information only.
806f0008-0a01ffff	Power Supply 1 has been added to container.	Info	A power supply has been added.	No action; information only.
806f0008-0a02ffff	Power Supply 2 has been added to container.	Info	A power supply has been added.	No action; information only.
806f0009-1301ffff	Host Power has been turned off.	Info	A power unit has been disabled.	No action; information only.
806f000d-0400xxxx	Drive 0 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0401ffff	Drive 1 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0402ffff	Drive 2 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0403ffff	Drive 3 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0404ffff	Drive 4 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0405ffff	Drive 5 has been added.	Info	A drive has been added.	No action; information only.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 				
806f000d-0406ffff	Drive 6 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0407ffff	Drive 7 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0408ffff	Drive 8 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0409ffff	Drive 9 has been added.	Info	A drive has been added.	No action; information only.
806f000d-040affff	Drive 10 has been added.	Info	A drive has been added.	No action; information only.
806f000d-040bffff	Drive 11 has been added.	Info	A drive has been added.	No action; information only.
806f000d-040cffff	Drive 12 has been added.	Info	A drive has been added.	No action; information only.
806f000d-040dffff	Drive 13 has been added.	Info	A drive has been added.	No action; information only.
806f000d-040effff	Drive 14 has been added.	Info	A drive has been added.	No action; information only.
806f000d-040fffff	Drive 15 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0410xxxx	Drive 16 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0411ffff	Drive 17 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0412ffff	Drive 18 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0413ffff	Drive 19 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0414ffff	Drive 20 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0415ffff	Drive 21 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0416ffff	Drive 22 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0417ffff	Drive 23 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0418ffff	Drive 24 has been added.	Info	A drive has been added.	No action; information only.
806f000d-0419ffff	Drive 25 has been added.	Info	A drive has been added.	No action; information only.
806f000d-041affff	Drive 26 has been added.	Info	A drive has been added.	No action; information only.
806f000d-041bffff	Drive 27 has been added.	Info	A drive has been added.	No action; information only.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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-220101xx	System [ComputerSystemElementName] has detected no memory in the system.	Error	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	A usable memory is insufficient for operation has been detected.	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-220103xx	System encountered firmware error - unrecoverable boot device failure.	Error	A 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	System has encountered a motherboard failure.	Error	A fatal motherboard failure in the system has been detected.	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	System encountered firmware error - unrecoverable keyboard failure.	Error	A 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	System encountered firmware error - no video device detected.	Error	A system firmware error no video device has been detected.	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 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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-22010cxx	CPU voltage mismatch detected on [ProcessorElementName].	Error	A CPU voltage mismatch with the socket voltage has been detected.	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-2201ffff	The system encountered a POST Error.	Error	A post error has been detected.	No action; information only.
806f0023-2101ffff	Watchdog Timer expired for IPMI Watchdog .	Info	A watchdog timer expired has been detected.	No action; information only.
806f0109-1301ffff	Host power has been power cycled.	Info	A power unit that has been power cycled has been detected.	No action; information only.
806f0113-0301ffff	A bus timeout has occurred on system.	Error	A bus timeout has been detected.	1. Reseat the microprocessor, and then restart the server. 2. Replace microprocessor <i>n</i> . (<i>n</i> = microprocessor number)
806f0113-0302ffff	A bus timeout has occurred on system.	Error	A bus timeout has been detected.	1. Reseat the microprocessor, and then restart the server. 2. Replace microprocessor <i>n</i> . (<i>n</i> = microprocessor number)
806f0123-2101ffff	Reboot of system initiated by IPMI Watchdog.	Info	A reboot by a watchdog occurred has been detected.	No action; information only.
806f0207-2584ffff	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 <i>n</i> . (<i>n</i> = microprocessor number)
806f0223-2101ffff	Powering off system initiated by IPMI Watchdog.	Info	A poweroff by watchdog has been detected.	No action; information only.
806f030c-2581ffff	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 <i>n</i> . (<i>n</i> = DIMM number)
806f0323-2101ffff	Power cycle of system initiated by IPMI Watchdog.	Info	A power cycle by watchdog has been detected.	No action; information only.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
806f0608-1301ffff	PS Configuration has a Configuration Mismatch.	Error	A power supply with a configuration error has been detected.	<ol style="list-style-type: none"> Reseat the power supply, and then restart the server. Replace the power supply <i>n</i>. (<i>n</i> = power supply number)
806f0823-2101ffff	Watchdog Timer interrupt occurred for IPMI Watchdog .	Info	A watchdog timer interrupt has been detected.	No action; information only.
806f0a13-0301ffff	A Fatal Bus Error has occurred on system CPU 1 PECL.	Error	A bus fatal error has been detected.	<ol style="list-style-type: none"> Reseat the microprocessor, and then restart the server. Replace microprocessor <i>n</i>. (<i>n</i> = microprocessor number)
806f0a13-0302ffff	A Fatal Bus Error has occurred on system CPU 2 PECL.	Error	A bus fatal error has been detected.	<ol style="list-style-type: none"> Reseat the microprocessor, and then restart the server. Replace microprocessor <i>n</i>. (<i>n</i> = microprocessor number)
Web interface messages				
40000001-00000000	IMM Network Initialization Complete.	Info	An IMM network has completed initialization.	No action; information only.
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.	<ol style="list-style-type: none"> Make sure that the certificate that you are importing is correct and correctly generated. 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.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 				
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.
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	The specified user has enabled or disabled the Ethernet interface.	No action; information only.
40000008-00000000	Hostname set to [arg1] by user [arg2].	Info	The specified user has changed the Integrated Management Module host name.	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.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 				
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.
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: <ol style="list-style-type: none"> 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.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
40000010-00000000	Security: Userid: '%1' had %2 login failures from WEB client at IP address %3. (%1 = user ID; %2 = MaximumSuccessfulLoginFailures (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 = MaximumSuccessfulLoginFailures (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.
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.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
40000016-00000000	ENET[0] DHCP-HSTN=%1, DN=%2, IP@=%3, SN=%4, GW@=%5, DNS1@=%6. (%1 = CIM_DNSProtocol Endpoint.Hostname; %2 = CIM_DNSProtocol Endpoint.DomainName; %3 = CIM_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.
40000017-00000000	ENET[0] IP-Cfg:HstName=%1, IP@%2, NetMsk=%3, GW@=%4. (%1 = CIM_DNSProtocol Endpoint.Hostname; %2 = CIM_StaticIPSettingData. IPv4Address; %3 = CIM_StaticIPSettingData. SubnetMask; %4 = CIM_StaticIPSettingData. DefaultGatewayAddress)	Info	An IMM IP address and configuration have been assigned using client data.	No action; information only.
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.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 				
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.
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.	<p>If there was no operating-system error, complete the following steps until the problem is solved:</p> <ol style="list-style-type: none"> 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. <p>If there was an operating-system error, check the integrity of the installed operating system.</p>
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.	<p>Complete the following steps until the problem is solved:</p> <ol style="list-style-type: none"> 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 IMM2 firmware. <p>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.</p>

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
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 IMM2 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.
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 IMM2 firmware version.	Update the IMM2 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_NTPTService.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 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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.	<ol style="list-style-type: none"> 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	<p>A user has successfully updated one of the following firmware components:</p> <ul style="list-style-type: none"> • 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 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 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.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 				
40000033-00000000	IPv6 stateless auto-configuration enabled by user [arg1].	Info	IPv6 stateless auto-assignment method is enabled by user.	No action; information only.
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 statless 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.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
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.
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.
4000004a-00000000	SNMP [arg1] disabled by user [arg2] .	Info	A user disabled SNMPv1 or SNMPv3 or Traps.	No action; information only.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 				
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 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 				
4000005d-00000000	Secure LDAP [arg1] by user [arg2].	Info	A user enables or disables Secure LDAP services.	No action; information only.
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], OSWatchdogTimeout=[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], MaximumLoginFailures=[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.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 				
40000065-00000000	User [arg1] removed.	Info	A user account was deleted.	No action; information only.
40000066-00000000	User [arg1] password 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 privileges assigned.	No action; information only.
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.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
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.
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.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> 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. 				
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.
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	IMM2 firmware mismatch between nodes [arg1] and [arg2]. Please attempt to flash the IMM2 firmware to the same level on all nodes.	Info	A mismatch of IMM2 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.

Table 4. IMM2 error messages (continued)

<ul style="list-style-type: none"> • 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. 				
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.
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.

Checkout procedure

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

About the checkout procedure

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

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

Exception: If multiple error codes or light path diagnostics LEDs indicate a microprocessor error, the error might be in the microprocessor or in the microprocessor socket. See “Microprocessor problems” on page 117 for information about diagnosing microprocessor problems.

- Before you run the diagnostic programs, you must determine whether the failing server is part of a shared hard disk drive cluster (two or more servers sharing external storage devices). If it is part of a cluster, you can run all diagnostic programs except the ones that test the storage unit (that is, a hard disk drive in the storage unit) or the storage adapter that is attached to the storage unit. The failing server might be part of a cluster if any of the following conditions is true:
 - You have identified the failing server as part of a cluster (two or more servers sharing external storage devices).
 - One or more external storage units are attached to the failing server and at least one of the attached storage units is also attached to another server or unidentifiable device.
 - One or more servers are located near the failing server.

Important: If the server is part of a shared hard disk drive cluster, run one test at a time. Do not run any suite of tests, such as “quick” or “normal” tests, because this might enable the hard disk drive diagnostic tests.

- If the server is halted and a POST error code is displayed, see “Event logs” on page 30. If the server is halted and no error message is displayed, see “Troubleshooting tables” on page 109 and “Solving undetermined problems” on page 173.
- For information about power-supply problems, see “Solving power problems” on page 172.
- For intermittent problems, check the error log; see “Event logs” on page 30 and “Diagnostic messages” on page 140.

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 137.
 - 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. Make sure the server is cabled correctly.
 - e. Check all cables and power cords.
 - f. Set all display controls to the middle positions.
 - g. Turn on all external devices.
 - h. Turn on the server. If the server does not start, see “Troubleshooting tables” on page 109.
 - i. Check the system-error LED on the operator information panel. If it is flashing, check the light path diagnostics LEDs (see “System-board LEDs” on page 24).
 - j. Check for the following results:
 - Successful completion of POST (see “POST” on page 32 for more information).
 - Successful completion of startup, which is indicated by a readable display of the operating-system desktop.

Troubleshooting tables

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

If you cannot find a problem in these tables, see “Diagnostic programs and messages” on page 138 for information about testing the server.

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

1. Check the system-error LED on the operator information panel; if it is lit, check the LEDs on the system board (see “System-board LEDs” on page 24).
2. Remove the software or device that you just added.
3. Run the diagnostic tests to determine whether the server is running correctly.
4. Reinstall the new software or new device.

General problems

<ul style="list-style-type: none">• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.• See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.• Go to the IBM support website at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.	
Symptom	Action
A cover thumbscrew is broken, an LED is not working, or a similar problem has occurred.	If the part is a CRU, replace it. If the part is a FRU, the part must be replaced by a trained service technician.
The server is hung while the screen is on. Cannot start the Setup utility by pressing F1.	<ol style="list-style-type: none">1. See “Nx boot failure” on page 169 for more information.2. See “Recovering the server firmware” on page 167 for more information.

DVD drive problems

<ul style="list-style-type: none">• 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.	
Symptom	Action
The optional DVD drive is not recognized.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• The SATA connector to which the 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 DVD drive.2. Run the DVD drive diagnostic programs.3. Reseat the following components:<ol style="list-style-type: none">a. DVD driveb. DVD drive cable4. Replace the components listed in step 3 one at a time, in the order shown, restarting the server each time.5. (Trained technician only) Replace the system board.
A CD or DVD is not working correctly.	<ol style="list-style-type: none">1. Clean the CD or DVD.2. Replace the CD or DVD with new CD or DVD media.3. Run the DVD drive diagnostic programs.4. Reseat the DVD drive.5. Replace the DVD drive.
The DVD drive tray is not working.	<ol style="list-style-type: none">1. Make sure that the server is turned on.2. Insert the end of a straightened paper clip into the manual tray-release opening.3. Reseat the DVD drive.4. Replace the DVD drive.

Hard disk drive problems

<ul style="list-style-type: none">• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.• See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.	
Symptom	Action
A hard disk drive has failed, and the associated yellow hard disk drive status LED is lit.	Replace the failed hard disk drive (see “Removing a hot-swap hard disk drive” on page 194 and “Installing a hot-swap hard disk drive” on page 194).

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Symptom	Action
An installed hard disk drive is not recognized.	<ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • 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 4). • 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 4. If the activity of the LEDs changes, return to step 1. 4. Make sure that the hard disk drive backplane is correctly seated. When it is correctly seated, the drive assemblies correctly connect to the backplane without bowing or causing movement of the backplane. 5. Move the hard disk drives to different bays to determine if the drive or the backplane is not functioning. 6. Reseat the backplane power cable and repeat steps 1 through 3. 7. Reseat the backplane signal cable and repeat steps 1 through 3. 8. Suspect the backplane signal cable or the backplane: <ol style="list-style-type: none"> a. Replace the affected backplane signal cable. b. Replace the affected backplane. 9. See “Problem determination tips” on page 174.
Multiple hard disk drives fail.	<p>Make sure that the hard disk drive, RAID controller, and server device drivers and firmware are at the latest level.</p> <p>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.</p>
Multiple hard disk drives are offline.	<ol style="list-style-type: none"> 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 174.
A replacement hard disk drive does not rebuild.	<ol style="list-style-type: none"> 1. Make sure that the hard disk drive is recognized by the controller (the green hard disk drive activity LED is flashing). 2. Review the RAID controller documentation to determine the correct configuration parameters and settings.

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 	
Symptom	Action
A green hard disk drive activity LED does not accurately represent the actual state of the associated drive.	<ol style="list-style-type: none"> 1. If the green hard disk drive activity LED does not flash when the drive is in use, run the DSA disk drive test. 2. Use one of the following procedures: <ul style="list-style-type: none"> • If the drive passes the test, replace the backplane. • If the drive fails the test, replace the drive.
An yellow hard disk drive status LED does not accurately represent the actual state of the associated drive.	<ol style="list-style-type: none"> 1. If the yellow hard disk drive LED and the RAID controller software do not indicate the same status for the drive, complete the following steps: <ol style="list-style-type: none"> a. Turn off the server. b. Reseat the RAID controller. c. Reseat the backplane signal cable and backplane power cable. d. Reseat the hard disk drive. e. Turn on the server and observe the activity of the hard disk drive LEDs. 2. See “Problem determination tips” on page 174.

Hypervisor problems

<ul style="list-style-type: none"> • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. • Go to the IBM support website at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 	
Symptom	Action
If an optional USB hypervisor key is not listed in the expected boot order, does not appear in the list of boot devices at all, or a similar problem has occurred.	<ol style="list-style-type: none"> 1. Make sure that the optional USB hypervisor key is selected on the boot menu (in the Setup utility and in F12). 2. Make sure that the USB hypervisor key is seated in the connector correctly (see “Removing a USB embedded hypervisor flash device” on page 235 and “Installing a USB embedded hypervisor flash device” on page 237). 3. See the documentation that comes with your optional USB hypervisor key for setup and configuration information. 4. Make sure that other software works on the server.

Intermittent problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.
- Go to the IBM support website at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Symptom	Action
A problem occurs only occasionally and is difficult to diagnose.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • All cables and cords are connected securely to the rear of the server and attached devices. • When the server is turned on, air is flowing from the fan grille. If there is no airflow, the fans are not working. This can cause the server to overheat and shut down. 2. Check the system event log or IMM event log (see “Event logs” on page 30). 3. Make sure that the server and IMM2 firmware has been updated to the most recent code levels. 4. Review the operating system logs. 5. Contact your operating-system vendor to set up any available tools that are capable of monitoring the server. 6. If an error occurs, run the DSA program and forward the results to IBM service and support for analysis. 7. See “Solving undetermined problems” on page 173.
The server resets (restarts) occasionally.	<ol style="list-style-type: none"> 1. If the reset occurs during POST and the POST watchdog timer is enabled (click Advanced Setup --> Integrated Management Module (IMM) Setting --> IMM Post Watchdog in the Setup utility to see the POST watchdog setting), make sure that sufficient time is allowed in the watchdog timeout value (IMM POST Watchdog Timeout). See the <i>Installation and User's Guide</i> for information about the settings in the Setup utility. If the server continues to reset during POST, see “POST” on page 32 and “Diagnostic messages” on page 140. 2. If this condition does not apply, check the system-event log (see “Event logs” on page 30).

USB keyboard, mouse, or pointing-device problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.
- Go to the IBM support website at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Symptom	Action
All or some keys on the keyboard do not work.	<ol style="list-style-type: none">1. If you have installed a USB keyboard, run the Setup utility and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup.2. See http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ for keyboard compatibility.3. Make sure that:<ul style="list-style-type: none">• The keyboard cable is securely connected.• The server and the monitor are turned on.4. Move the keyboard cable to a different USB connector.5. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. Keyboardb. (Only if the problem occurred with a front USB connector) Internal USB cable, front USB connector assembly, or USB boardc. (Trained service technician only) System board
The USB mouse or USB pointing device does not work.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• The mouse is compatible with the server. See http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.• The mouse or pointing-device USB cable is securely connected to the server, and the device drivers are installed correctly.• The server and the monitor are turned on.2. If a USB hub is in use, disconnect the USB device from the hub and connect it directly to the server.3. Move the mouse or pointing device cable to another USB connector.4. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. Mouse or pointing deviceb. (Only if the problem occurred with a front USB connector) Front USB connector assembly, internal USB cable, or USB boardc. (Trained service technician only) System board

Memory problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.
- For additional memory troubleshooting information, refer to the “Troubleshooting Memory - IBM BladeCenter and System x” document at <http://www-947.ibm.com/support/entry/portal/docdisplay?brand=5000020&Indocid=MIGR-5081319>.
- Go to the IBM support website at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Symptom	Action
The amount of system memory that is displayed is less than the amount of installed physical memory.	<p>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.</p> <ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • No DIMM error LEDs are lit on the system board. • Memory mirroring does not account for the discrepancy. • The memory modules are seated correctly. • You have installed the correct type of memory. • If you changed the memory, you updated the memory configuration in the Setup utility. • All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled. • There is no memory mismatch when the server is at the minimum memory configuration. 2. Reseat the DIMMs, and then restart the server. 3. Check the POST error log: <ul style="list-style-type: none"> • If a DIMM was disabled by a systems-management interrupt (SMI), replace the DIMM. • If a DIMM was disabled by the user or by POST, reseat the DIMM; then, run the Setup utility and enable the DIMM. 4. Check that all DIMMs are initialized in the Setup utility; then, run memory diagnostics (see “Diagnostic programs and messages” on page 138). 5. Reverse the DIMMs between the channels (of the same microprocessor), and then restart the server. If the problem is related to a DIMM, replace the failing DIMM. 6. Re-enable all DIMMs using the Setup utility, and then restart the server. 7. (Trained service technician only) Install the failing DIMM into a DIMM connector for microprocessor 2 (if installed) to verify that the problem is not the microprocessor or the DIMM connector. 8. (Trained service technician only) Replace the system board. <p>Note: Make sure the technician refreshes the VPD.</p>

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.
- For additional memory troubleshooting information, refer to the "Troubleshooting Memory - IBM BladeCenter and System x" document at <http://www-947.ibm.com/support/entry/portal/docdisplay?brand=5000020&Indocid=MIGR-5081319>.
- Go to the IBM support website at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Symptom	Action
Multiple DIMMs in a channel are identified as failing.	<p>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.</p> <ol style="list-style-type: none"> 1. Reseat the DIMMs; then, restart the server. 2. Remove the highest-numbered DIMM of those that are identified and replace it with an identical known good DIMM; then, restart the server. Repeat as necessary. If the failures continue after all identified DIMMs are replaced, go to step 4. 3. Return the removed DIMMs, one at a time, to their original connectors, restarting the server after each DIMM, until a DIMM fails. Replace each failing DIMM with an identical known good DIMM, restarting the server after each DIMM replacement. Repeat step 3 until you have tested all removed DIMMs. 4. Replace the highest-numbered DIMM of those identified; then, restart the server. Repeat as necessary. 5. Reverse the DIMMs between the channels (of the same microprocessor), and then restart the server. If the problem is related to a DIMM, replace the failing DIMM. 6. (Trained service technician only) Install the failing DIMM into a DIMM connector for microprocessor 2 (if installed) to verify that the problem is not the microprocessor or the DIMM connector. 7. (Trained service technician only) Replace the system board. <p>Note: Make sure the technician refreshes the VPD.</p>

Microprocessor problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.
- Go to the IBM support website at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Symptom	Action
The server goes directly to the POST Event Viewer when turned on.	<ol style="list-style-type: none">1. Correct any errors that are indicated by the LEDs on the front panel.2. Make sure that the server supports all the microprocessors and that the microprocessors match in speed and cache size. To compare the microprocessor information, run the Setup utility and select System Information, then select System Summary, and then Processor Details.3. (Trained service technician only) Reseat the microprocessors.4. (Trained service technician only) Remove microprocessor 2 and restart the server.5. (Trained service technician only) Replace the following components, in the order shown, restarting the server each time:<ul style="list-style-type: none">• Microprocessors• System board

Monitor or video problems

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

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.
- Go to the IBM support website at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Symptom	Action
Testing the monitor.	<ol style="list-style-type: none">1. Make sure that the monitor cables are firmly connected.2. Try using the other video port.3. Try using a different monitor on the server, or try testing the monitor on a different server.4. Run the diagnostic programs (see “Diagnostic programs and messages” on page 138). If the monitor passes the diagnostic programs, the problem might be a video device driver.5. (Trained service technician only) Replace the system board Note: Make sure the technician refreshes the VPD.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.
- Go to the IBM support website at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Symptom	Action
The screen is blank.	<ol style="list-style-type: none"> 1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the monitor cable directly to the correct connector on the rear of the server. 2. The IMM remote presence function is disabled if you install an optional video adapter. To use the IMM remote presence function, remove the optional video adapter. 3. Make sure that: <ul style="list-style-type: none"> • The server is turned on. If there is no power to the server, see “Power problems” on page 122. • The monitor cables are connected correctly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. 4. Make sure that the correct server is controlling the monitor, if applicable. 5. Make sure that damaged server firmware is not affecting the video; see “Recovering the server firmware” on page 167 for information about recovering from server firmware failure. 6. Observe the checkpoint LEDs on the light path diagnostics panel; if the codes are changing, go to the next step. 7. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Monitor b. Video adapter (if one is installed) c. (Trained service technician only) System board 8. See “Solving undetermined problems” on page 173 for information about solving undetermined problems.
The monitor works when you turn on the server, but the screen goes blank when you start some application programs.	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • 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 “Diagnostic programs and messages” on page 138). <ul style="list-style-type: none"> • If the server passes the video diagnostics, the video is good; see “Solving undetermined problems” on page 173 for information about solving undetermined problems. • If the server fails the video diagnostics, (trained service technician only) replace the system board. <p>Note: Make sure the technician refreshes the VPD.</p>

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.
- Go to the IBM support website at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Symptom	Action
The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	<ol style="list-style-type: none"> 1. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. Attention: Moving a color monitor while it is turned on might cause screen discoloration. Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor. Notes: <ol style="list-style-type: none"> a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.). b. Non-IBM monitor cables might cause unpredictable problems. 2. Reseat the monitor cable 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Monitor cable b. Video adapter (if one is installed) c. Monitor d. (Trained service technician only) System board
Wrong characters appear on the screen.	<ol style="list-style-type: none"> 1. If the wrong language is displayed, update the server firmware with the correct language. 2. Reseat the monitor cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Monitor b. (Trained service 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.
- 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.

Symptom	Action
Unable to wake the server using the Wake on LAN feature.	<ol style="list-style-type: none"> 1. If you are using the dual-port network adapter and the server is connected to the network using Ethernet 5 connector, check the system-error log or IMM2 system event log (see “Event logs” on page 30), make sure: <ol style="list-style-type: none"> a. The room temperature is not too high (see “Features and specifications” on page 7). b. The air vents are not blocked. c. The air baffle is installed securely. 2. Reseat the dual-port network adapter (see “Removing an adapter from the PCI riser-card assembly” on page 256 and “Installing an adapter on the PCI riser-card assembly” on page 258). 3. Turn off the server and disconnect it from the power source; then, wait 10 seconds before restarting the server. 4. If the problem still remains, replace the dual-port network adapter.
Wake on Lan feature is in disable mode	<ol style="list-style-type: none"> 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 Configuration and Boot Management, select System Settings. 4. Under System Settings, select Network. 5. Under Network, select the port number. 6. Under the chosen port number, select Intel (R) I350 Gigabit Network Connection. 7. Under Main Configuration Page, select NIC configuration. 8. Under NIC configuration, change the Wake on Lan function from Disabled to Enabled. 9. Press ESC several times until the System Configuration and Boot Management window is displayed. 10. Select Save Setting. 11. Turn off the server and disconnect it from the power source. You must disconnect the system from ac power to enable the Wake on Lan function.
Log in failed by using LDAP account with SSL enabled.	<ol style="list-style-type: none"> 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 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.
- Go to the IBM support website at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Symptom	Action
An IBM optional device that was just installed does not work.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• 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 used to work does not work now.	<ol style="list-style-type: none">1. Make sure that all of the hardware and cable connections for the device are secure.2. If the device comes with test instructions, use those instructions to test the device.3. Reseat the failing device.4. Follow the instructions for device maintenance, such as keeping the heads clean, and troubleshooting in the documentation that comes with the device.5. Replace the failing device.

Power problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.
- Go to the IBM support website at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Symptom	Action
<p>The power-control button does not work, and the reset button does not work (the server does not start).</p> <p>Note: The power-control button will not function until approximately 40 seconds after the server has been connected to power.</p>	<ol style="list-style-type: none"> 1. Make sure that: <ul style="list-style-type: none"> • The power cords are correctly connected to the server and to a working electrical outlet. • The LEDs on the power supply do not indicate a problem (see “Power-supply LEDs” on page 137). • Both power supplies installed in the server are of the same type. Mixing different power supplies in the server will cause a system error (the system-error LED on the front panel turns on). • The type of memory that is installed is correct. • The microprocessors are installed in the correct sequence. • The fan power cable is correctly connected to the fan board and the power-supply paddle card. 2. Make sure that the power-control button and the reset button are working correctly: <ol style="list-style-type: none"> a. Disconnect the server power cords. b. Reseat the operator information panel assembly cable. c. Reconnect the power cords. d. Press the power-control button to restart the server. If the button does not work, replace the operator information panel assembly. e. Press the reset button (on the light path diagnostics panel) to restart the server. If the button does not work, replace the operator information panel assembly. 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. Hot-swap power supplies b. (Trained service technician only) System board
The server does not turn off.	<ol style="list-style-type: none"> 1. Turn off the server by pressing the power-control button for 5 seconds. 2. Restart the server. 3. If the server fails POST and the power-control button does not work, disconnect the power cord for 20 seconds; then, reconnect the power cord and restart the server. 4. If the problem remains, suspect the system board.
The server unexpectedly shuts down, and the LEDs on the operator information panel are not lit.	See “Solving undetermined problems” on page 173.

Serial device problems

<ul style="list-style-type: none">• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.• See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.• Go to the IBM support website at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.	
Symptom	Action
The number of serial ports that are identified by the operating system is less than the number of installed serial ports.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• Each port is assigned a unique address in the Setup utility and none of the serial ports is disabled.• The serial-port adapter (if one is present) is seated correctly.2. Reseat the serial port adapter, if one is present.3. Replace the serial port adapter, if one is present.
A serial device does not work.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• The device is compatible with the server.• The serial port is enabled and is assigned a unique address.• The device is connected to the correct connector (see “Rear view” on page 14).2. Reseat the following components:<ol style="list-style-type: none">a. Failing serial deviceb. Serial cable3. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. Failing serial deviceb. Serial cablec. (Trained service technician only) System board

ServerGuide problems

<ul style="list-style-type: none">• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.• See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.• Go to the IBM support website at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.	
Symptom	Action
The <i>ServerGuide Setup and Installation</i> CD will not start.	<ol style="list-style-type: none">1. Make sure that the server supports the ServerGuide program and has a startable (bootable) CD or DVD drive.2. If the startup (boot) sequence settings have been changed, make sure that the CD or DVD drive is first in the startup sequence.3. If more than one CD or DVD drive is installed, make sure that only one drive is set as the primary drive. Start the CD from the primary drive.

<ul style="list-style-type: none"> Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. Go to the IBM support website at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 	
Symptom	Action
The ServeRAID program cannot view all installed drives, or the operating system cannot be installed.	<ol style="list-style-type: none"> Make sure that there are no duplicate IRQ assignments. Make sure that the hard disk drive is connected correctly. Make sure that the hard disk drive cables are securely connected (see “Internal cable routing” on page 188).
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-947.ibm.com/support/entry/portal/docdisplay?Indocid=SERV-GUIDE , click IBM Service and Support Site , click the link for your ServerGuide version, and scroll down to the list of supported Microsoft Windows operating systems.
The operating system cannot be installed; the option is not available.	Make sure that the server supports the operating system. If it does, no logical drive is defined (RAID servers). Run the ServerGuide program and make sure that setup is complete.

Software problems

<ul style="list-style-type: none"> Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. Go to the IBM support website at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 	
Symptom	Action
You suspect a software problem.	<ol style="list-style-type: none"> To determine whether the problem is caused by the software, make sure that: <ul style="list-style-type: none"> 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. 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. Contact the software vendor.

Universal Serial Bus (USB) port problems

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.
- Go to the IBM support website at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Symptom	Action
A USB device does not work.	<ol style="list-style-type: none">1. Make sure that:<ul style="list-style-type: none">• The correct USB device driver is installed.• The operating system supports USB devices.2. Make sure that the USB configuration options are set correctly in the Setup utility menu (see “Setup utility menu choices” on page 354 for more information).3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.4. Move the device cable to a different USB connector.5. Replace the following components one at a time, in the order shown, restarting the server each time:<ol style="list-style-type: none">a. USB deviceb. (Only if the problem occurred with a front USB connector) Internal USB cable, front USB connector assembly, or USB board

Video problems

See “Monitor or video problems” on page 117.

Light path diagnostics

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

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

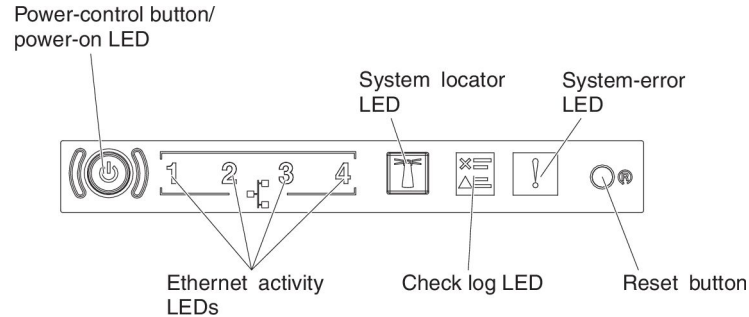
Before you work inside the server to view light path diagnostics LEDs, read the safety information that begins on page vii, and the guidelines in “Handling static-sensitive devices” on page 187.

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

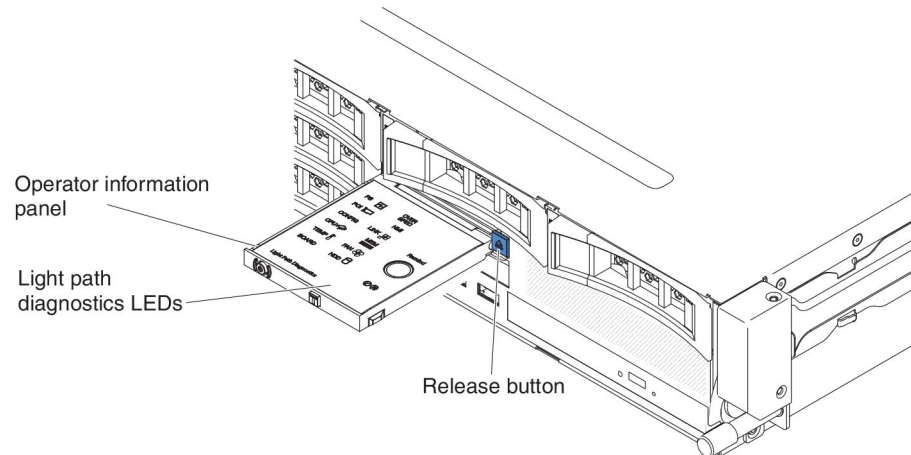
1. Look at the operator information panel on the front of the server.
 - If the check log LED is lit, it indicates that an error or multiple errors have occurred. The sources of the errors cannot be isolated or concluded by observing the light path diagnostics LEDs directly. A further investigation into IMM2 system-event log or system-error log might be required.
 - If the system-error LED is lit, it indicates that an error has occurred; go to step 2 on page 126 to see how to view the light path diagnostics panel.

Note: The initial server configuration will not include the light path diagnostics panel. Step 2 is for users who have upgraded the operator information panel to the advanced operator information panel. If the server only has the operator information panel, please go to step 3 on page 127

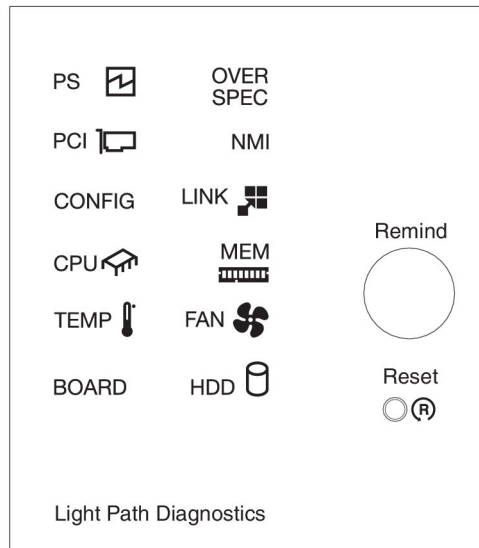
The following illustration shows the operator information panel on the front of the server.



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



This reveals the light path diagnostics panel. Lit LEDs on this panel indicate the type of error that has occurred. The following illustration shows the light path diagnostics panel:

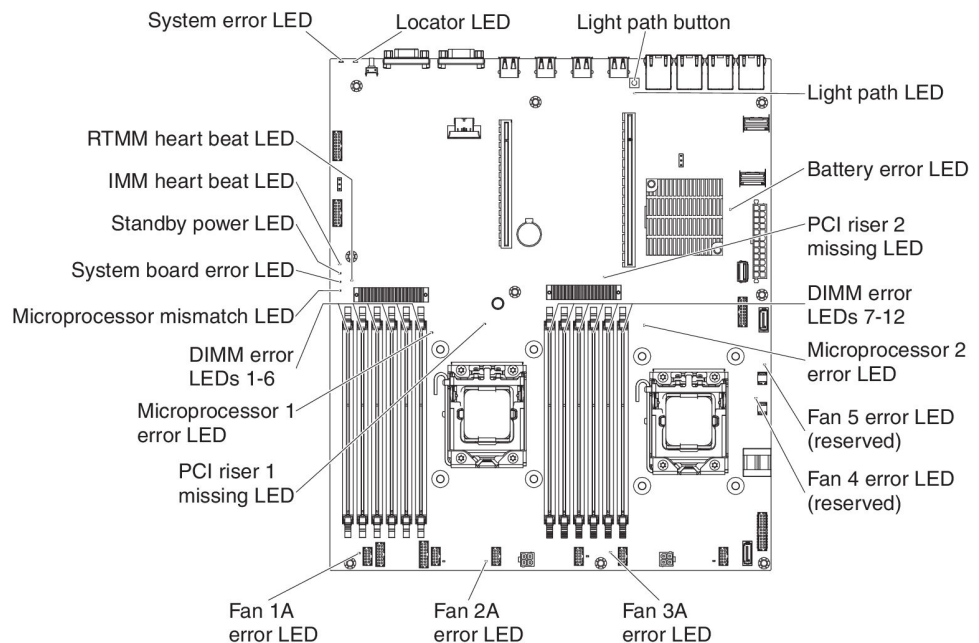


Note any LEDs that are lit, and then reinstall the light path diagnostics panel in the server.

Look at the system service label inside the server top 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 panel LEDs” on page 128 should be sufficient to diagnose the error.

3. Remove the server top 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.



- **Remind button:** Press this button to place the system-error LED/check log LED on the front information panel into Remind mode. By placing the system-error LED indicator in Remind mode, you acknowledge that you are aware of the last

failure but will not take immediate action to correct the problem. In Remind mode, the system-error LED flashes every 2 seconds until one of the following conditions occurs:

- All known errors are corrected.
- The server is restarted.
- A new error occurs, causing the system-error LED to be lit again.
- **Reset button:** Press this button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button. The Reset button is in the lower-right corner of the light path diagnostics panel.

LED name	Description
Error LEDs	When an error LED is lit, it indicates that the associated component has failed.
RTMM heartbeat LED	Power-on and power-off sequencing.
IMM 2 heartbeat LED	Indicates the status of the boot process of the IMM2. When the server is connected to power this LED flashes quickly to indicate that the IMM2 code is loading. When the loading is complete, the LED stops flashing briefly and then flashes slowly to indicate that the IMM2 is fully operational and you can press the power-control button to start the server.
Standby power LED	When this LED is flashing, it indicates that the server is connected to an ac power source. When this LED is lit, it indicates that the server is dc power on.
System board error LED	System-board has failed.
Microprocessor mismatch LED	When this LED is lit, it indicates that microprocessor 1 is not installed, or the microprocessors do not have the same cache size and type, and clock speed.
DIMM error LEDs	A memory DIMM has failed or is incorrectly installed.
Microprocessor error LED	Microprocessor has failed, is missing, or has been incorrectly installed.
Light path LED	Indicates whether or not the lightpath button is functional. If the light path LED is lit after pressing the lightpath button, it indicates that the lightpath button is functioning properly. By contrast, if the lightpath LED is not lit when pressing the light path button, it means the lightpath button is not functioning properly.

Light path diagnostics panel LEDs

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

Table 5. Light path diagnostics panel LEDs

<ul style="list-style-type: none"> • 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. 		
LED	Description	Action
Check log LED	An error has occurred and cannot be isolated without performing certain procedures.	<ol style="list-style-type: none"> 1. Check the IMM2 system event 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 has occurred.	<ol style="list-style-type: none"> 1. Check the light path diagnostics LEDs and follow the instructions. 2. Check the IMM2 system event log and the system-error log for information about the error. 3. Save the log if necessary and clear the log afterwards.
PS	When only the PS LED is lit, a power supply has failed. When both the PS and CONFIG LEDs are lit, the power supply configuration is invalid.	<ol style="list-style-type: none"> 1. If the CONFIG LED is not lit, the system might detect a power supply error. Complete the following steps to correct the problem: <ol style="list-style-type: none"> a. Check the power-supply with a lit yellow LED (see "Power-supply LEDs" on page 137). b. Make sure that the power supplies are seated correctly and plugged in a good AC outlet. c. Remove one of the power supplies to isolate the failed power supply. d. Make sure that both power supplies installed in the server are of the same AC input voltage. e. Replace the failed power supply (see "Removing a hot-swap ac power supply" on page 238 and "Installing a hot-swap ac power supply" on page 240). 2. If the PS LED and the CONFIG LED are lit, the system issues an invalid power configuration error. Make sure that both power supplies installed in the server are of the same rating or wattage.
OVER SPEC	The power supplies are using more power than their maximum rating.	<p>If the OVER SPEC LED is lit, use one of the following procedures:</p> <ol style="list-style-type: none"> 1. Turn off the server, disconnect the power from the server, and install additional power supplies. Two power supplies are needed for a fully configured server in non-redundant mode. Four power supplies are required to support fully loaded, redundant operation. 2. Remove any recently installed options. 3. Restart the server to see whether the problem remains.

Table 5. Light path diagnostics panel LEDs (continued)

<ul style="list-style-type: none"> • 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. 		
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 next to a failing PCI slot.	<ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • PCI riser card • (Trained technician only) Replace the system board.
NMI	A nonmaskable interrupt has occurred, or the NMI button was pressed.	<ol style="list-style-type: none"> 1. Check the system-error log for information about the error. 2. Restart the server.
CONFIG	A hardware configuration error has occurred.	<ol style="list-style-type: none"> 1. If the CONFIG LED and the PS LED are lit, the system issues an invalid power configuration error. Make sure that both power supplies installed in the server are of the same rating or wattage. 2. If the CONFIG LED and the CPU LED are lit, complete the following steps to correct the problem: <ol style="list-style-type: none"> a. Check the microprocessors that were just installed to make sure that they are compatible with each other (see "Installing a microprocessor and heat sink" on page 330 for additional information about microprocessor requirements). b. (Trained technician only) Replace the incompatible microprocessor. c. Check the system-error logs for information about the error. Replace any component that is identified in the error log. 3. If the CONFIG LED and the MEM LED are lit, check the system-event log in the Setup utility or IMM2 error messages. Follow steps indicated in "POST/uEFI diagnostic codes" on page 33 and "Integrated management module II (IMM2) error messages" on page 51.
LINK	Reserved.	

Table 5. Light path diagnostics panel LEDs (continued)

<ul style="list-style-type: none"> • 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. 		
LED	Description	Action
CPU	When only the CPU LED is lit, a microprocessor has failed. When both the CPU LED and the CONFIG LED are lit, the microprocessor configuration is invalid.	<ol style="list-style-type: none"> 1. If the CONFIG LED is not lit, a microprocessor failure occurs, complete the following steps: <ol style="list-style-type: none"> a. (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 "Installing a microprocessor and heat sink" on page 330 for information about installation and requirements. b. (Trained technician only) Replace the failing microprocessor (see "Removing a microprocessor and heat sink" on page 328 and "Installing a microprocessor and heat sink" on page 330). c. For more information, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL. 2. If the CONFIG LED and the CPU LED are lit, the system issues an invalid microprocessor configuration error. Complete the following steps to correct the problem: <ol style="list-style-type: none"> a. Check the microprocessors that were just installed to make sure that they are compatible with each other (see "Installing a microprocessor and heat sink" on page 330 for additional information about microprocessor requirements). b. (Trained technician only) Replace the incompatible microprocessor. c. Check the system-error logs for information about the error. Replace any component that is identified in the error log.

Table 5. Light path diagnostics panel LEDs (continued)

<ul style="list-style-type: none"> • 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. 		
LED	Description	Action
MEM	When only the MEM LED is lit, a memory error has occurred. When both the MEM and CONFIG LEDs are lit, the memory configuration is invalid.	<p>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.</p> <ol style="list-style-type: none"> 1. If the CONFIG LED is not lit, the system might detect a memory error. Complete the following steps to correct the problem: <ol style="list-style-type: none"> a. Update the server firmware to the latest level (see "Updating the firmware" on page 349). 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/uEFI diagnostic codes" on page 33 and "Integrated management module II (IMM2) error messages" on page 51. d. Replace the failing DIMM (see "Removing a memory module (DIMM)" on page 223 and "Installing a memory module" on page 224). 2. If the MEM LED and the CONFIG LED are lit, check the system-event log in the Setup utility or IMM error messages. Follow steps indicated in "POST/uEFI diagnostic codes" on page 33 and "Integrated management module II (IMM2) error messages" on page 51.
TEMP	The system or the system component temperature has exceeded a threshold level. A failing fan can cause the TEMP LED to be lit.	<ol style="list-style-type: none"> 1. Make sure that the heat sink is seated correctly. 2. Determine whether a fan has failed. If it has, replace it. 3. Make sure that the room temperature is not too high. See "Features and specifications" on page 7 for the server temperature information. 4. Make sure that the air vents are not blocked. 5. Make sure that the heat sink or the fan on the adapter, or the optional network adapter is seated correctly. If the fan has failed, replace it. 6. For more information, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
FAN	A fan has failed, is operating too slowly, or has been removed. The TEMP LED might also be lit.	<ol style="list-style-type: none"> 1. Reseat the failing fan, which is indicated by a lit LED near the fan connector on the system board. 2. Replace the failing fan (see "Removing a system fan" on page 221 and "Installing a system fan" on page 222).

Table 5. Light path diagnostics panel LEDs (continued)

<ul style="list-style-type: none"> • 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. 		
LED	Description	Action
BOARD	An error has occurred on the system board or the system battery.	<ol style="list-style-type: none"> 1. 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: <ul style="list-style-type: none"> • Battery • (Trained technician only) System board 2. Check the system-error log for information about the error. 3. Replace the failing component: <ul style="list-style-type: none"> • Battery (see "Removing the system battery" on page 278 and "Installing the system battery" on page 280). • (Trained technician only) System board (see "Removing the system board" on page 336 and "Installing the system board" on page 339).
HDD	A hard disk drive has failed or is missing.	<ol style="list-style-type: none"> 1. Check the LEDs on the hard disk drives for the drive with a lit status LED and reseal the hard disk drive. 2. Make sure that the cables are correctly connected to the hard disk drive backplane or backplate. 3. For more information, see "Hard disk drive problems" on page 110 4. If the error remains, replace the following components in the order listed, restarting the server after each: <ol style="list-style-type: none"> a. Replace the hard disk drive. b. Replace the hard disk drive backplane or backplate. 5. If the error remains, replace the following components one at a time, in the order listed, restarting the server after each: <ol style="list-style-type: none"> a. Replace the hard disk drive. b. Replace the hard disk drive backplane or backplate. 6. If the problem remains, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL

Error LEDs

The system board has error LEDs that will help to locate the source of the error (see "System-board LEDs" on page 24). Run the diagnostic programs to find out the cause of the error (see "Diagnostic programs and messages" on page 138).

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

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

Before working inside the server to view the LEDs, read the safety information that begins on page vii and “Installation guidelines” on page 185.

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

1. Look at the front of the server. If the system-error LED is lit, it indicates that an error has occurred.
2. Check the front and rear of the server to determine whether any component LEDs are lit.
3. View the error LEDs on the system board to isolate the failing component.
 - a. Turn off the server and peripheral devices and disconnect all power cords and external cables.
 - b. Place the server on a flat, static-protective surface.
 - c. Remove the server top cover (see “Removing the server top cover” on page 343).
 - d. Locate the light path diagnostics button on the system board (see “System-board LEDs” on page 24).
 - e. Press and hold the light path diagnostics button to light the error LEDs on the system board. The LEDs will remain lit for as long as you press the button, to a maximum of 45 seconds.

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

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

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Component LED	Description	Action
DIMM error LEDs	An invalid memory configuration or a memory error has occurred	<p>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.</p> <ol style="list-style-type: none"> 1. Make sure that the DIMM configuration is supported (see “Installing a memory module” on page 224 for DIMM requirements and installation sequence information). 2. Replace the DIMMs with a supported configuration. 3. Update the server firmware to the latest level (see “Updating the firmware” on page 349). 4. Reseat the DIMM. 5. Run the memory test to isolate the problem. 6. If the test indicates that a memory error has occurred (check the system log), replace the failing DIMM, which is indicated by the lit error LED. 7. (Trained service technician only) Replace the system board. <p>Note: Make sure the technician refreshes the VPD.</p>
Microprocessor error LED	Microprocessor has failed, is missing, or has been incorrectly installed.	<ol style="list-style-type: none"> 1. Check the system event log to determine the reason for the lit LED. 2. (Trained service technician) Reseat the failing microprocessor 3. Replace the following components one at a time, in the order shown, restarting the server each time: <ol style="list-style-type: none"> a. (Trained service technician only) Failing microprocessor b. (Trained service technician only) System board <p>Note: Make sure the technician refreshes the VPD.</p>
Microprocessor mismatch LED	An invalid microprocessor configuration or a microprocessor has failed	<ol style="list-style-type: none"> 1. Check that microprocessor 1 is installed. 2. Check the microprocessors are compatible with each other (see “Installing a microprocessor and heat sink” on page 330 for additional information about microprocessor requirements) and use the Setup utility and select System Information → System Summary → Processor Details to verify the microprocessors information. 3. (Trained service technician only) Replace the incompatible microprocessor. 4. Check the system-error logs for information about the error. Replace any components that are identified in the error log.

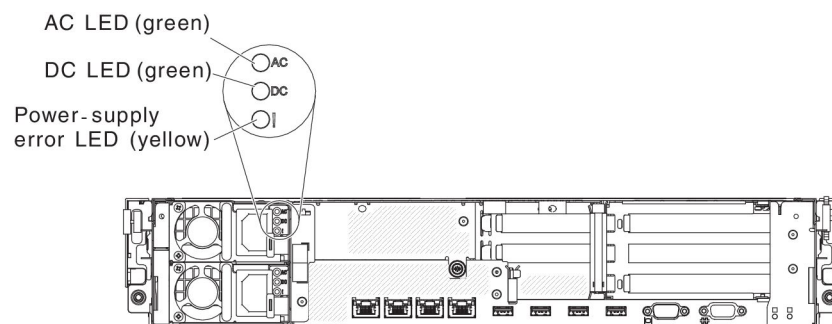
- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.

Component LED	Description	Action
System-board error LED	System-board CPU VRD and/or power voltage regulators have failed and/or system-board cannot power on.	(Trained service technician only) Replace the system board. Note: Make sure the technician refreshes the VPD.
Battery error LED	Battery low.	1. Replace the CMOS lithium battery, if necessary. 2. (Trained service technician only) Replace the system board. Note: Make sure the technician refreshes the VPD.
H8 heartbeat LED	Indicates the status of power-on and power-off sequencing.	(Trained service technician only) If the server is connected to power and the LED is not flashing, replace the system board. Note: Make sure the technician refreshes the VPD.
IMM2 heartbeat LED	Indicates the status of IMM2 heartbeat boot process.	The following steps describe the different stages of the IMM2 heartbeat sequencing process. 1. When this LED is blinking fast (approximately 4Hz), this indicates, that the IMM2 code is in the loading process. 2. When this LED goes off momentarily, this indicates that the IMM2 code has loaded completely. 3. When this LED goes off momentarily and then starts blinking slowing (approximately 1Hz), this indicates that IMM is fully operational. 4. If this LED does not blink within 30 seconds of connecting a power source to the server, complete the following steps: a. (Trained service technician only) use the IMM2 recovery jumper to recover the firmware (see “System-board jumpers” on page 22). b. (Trained service technician only) replace the system board. Note: Make sure the technician refreshes the VPD.
PCI error LEDs	An error has occurred on a PCI bus or on the system board. An additional LED is lit next to a failing PCI slot.	1. Check the system event log for information about the error. 2. If you cannot isolate the failing adapter through the LEDs and the information in the system event log, remove one adapter at a time, and restart the server after each adapter is removed. 3. If the failure remains, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL for additional troubleshooting information.

<ul style="list-style-type: none"> Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. 		
Component LED	Description	Action
Power error LED	Previous ac power lost event or unexpected system shutdown event detected.	<ol style="list-style-type: none"> Check the ac power to the server. Make sure that the power cord is connected to a functioning power source. Check the power cable connections on the system board. Replace the power-supply. (Trained service technician only) Replace the system board. <p>Note: Make sure the technician refreshes the VPD.</p>

Power-supply LEDs

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



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

Table 6. Power-supply LEDs

<ul style="list-style-type: none"> Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. See Chapter 4, “Parts listing, Type 7158 server,” on page 175 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician. Go to the IBM support website at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information. 					
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	<ol style="list-style-type: none"> Check the AC power to the server. Make sure that the power cord is connected to a functioning power source. Restart the server. If the error remains, check the power-supply LEDs. Replace the power-supply. 	This is a normal condition when no AC power is present.
Off	Off	On	No AC power to the server or a problem with the AC power source and the power-supply had detected an internal problem.	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> Make sure that the top cover is closed and latched correctly. Reseat the power supply. Replace the failing power supply. 	Typically indicates a power-supply is not fully seat
On	Off	On	Faulty power-supply	Replace the power supply.	
On	On	On	Power-supply is faulty	Replace the power supply.	

Diagnostic programs and messages

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

Make sure that the server has the latest version of the diagnostic programs. To download the latest version, go to <http://www.ibm.com/supportportal/>.

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

Running the diagnostic programs

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

To run the diagnostic programs, complete the following steps:

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

Note: The DSA Preboot diagnostic program might appear to be unresponsive for an unusual length of time when you start the program. This is normal operation while the program loads. The loading process may take up to 10 minutes.

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

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

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

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

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

Exception: If multiple error codes or light path diagnostics LEDs indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See “Microprocessor problems” on page 117 for information about diagnosing microprocessor problems.

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

Diagnostic text messages

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

Passed: The test was completed without any errors.

Failed: The test detected an error.

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

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

Viewing the test log

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

Diagnostic messages

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

Table 7. DSA Preboot messages

<ul style="list-style-type: none">• 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.					
Message number	Component	Test	State	Description	Action
089-801-xxx	CPU	CPU Stress Test	Aborted	Internal program error.	<ol style="list-style-type: none">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 349.5. 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 website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
089-802-xxx	CPU	CPU Stress Test	Aborted	System resource availability error.	<ol style="list-style-type: none"> 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=psg1MIGR-4JTS2T and select your system to display a matrix of available firmware. 5. Run the test again. 6. Turn off and restart the system if necessary to recover from a hung state. 7. Run the test again. 8. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Updating the firmware” on page 349. 9. Run the test again. 10. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
089-901-xxx	CPU	CPU Stress Test	Failed	Test failure.	<ol style="list-style-type: none"> 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 349. 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 website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
166-801-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: the IMM returned an incorrect response length.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
166-802-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: the test cannot be completed for an unknown reason.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
166-803-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: the node is busy; try later.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
166-804-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: invalid command.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
166-805-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: invalid command for the given LUN.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
166-806-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: timeout while processing the command.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
166-807-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: out of space.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
166-808-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: reservation canceled or invalid reservation ID.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
166-809-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: request data was truncated.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
166-810-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: request data length is invalid.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
166-811-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: request data field length limit is exceeded.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
166-812-xxx	IMM	IMM I2C Test	Aborted	IMM I2C Test aborted: a parameter is out of range.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
166-813-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: cannot return the number of requested data bytes.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
166-814-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: requested sensor, data, or record is not present.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
166-815-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: invalid data field in the request.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
166-816-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: the command is illegal for the specified sensor or record type.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
166-817-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: a command response could not be provided.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
166-818-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: cannot execute a duplicated request.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
166-819-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: a command response could not be provided; the SDR repository is in update mode.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
166-820-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: a command response could not be provided; the device is in firmware update mode.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
166-821-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: a command response could not be provided; IMM initialization is in progress.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
166-822-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: the destination is unavailable.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
166-823-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: cannot execute the command; insufficient privilege level.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
166-824-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test canceled: cannot execute the command.	<ol style="list-style-type: none"> 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 349. 6. Run the test again. 7. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> 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. 					
Message number	Component	Test	State	Description	Action
166-901-xxx	IMM	IMM I2C Test	Failed	IMM indicates failure in RTMM bus (BUS 0).	<ol style="list-style-type: none"> Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. After 45 seconds, reconnect the system to the power source and turn on the system. 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. Make sure that the IMM2 firmware is at the latest level. For the latest level of IMM2, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-4JTS2T Run the test again. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/support/docview.wss?uid=psg1SERV-OPTN
166-904-xxx	IMM	IMM I2C Test	Failed	IMM indicates failure in PCA9545 (I2C I/O Expander) bus (BUS 3).	<ol style="list-style-type: none"> Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. After 45 seconds, reconnect the system to the power source and turn on the system. 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. Make sure that the IMM2 firmware is at the latest level. For the latest level of IMM2, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-4JTS2T Run the test again. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/support/docview.wss?uid=psg1SERV-OPTN
166-905-xxx	IMM	IMM I2C Test	Failed	IMM Indicates failure in the PSU 1 bus (BUS 4).	<ol style="list-style-type: none"> Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM2. After 45 seconds, reconnect the system to the power source and turn on the system. 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. Make sure that the IMM2 firmware is at the latest level. For the latest level of IMM2, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-4JTS2T Run the test again. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/support/docview.wss?uid=psg1SERV-OPTN

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
166-907-xxx	IMM	IMM I2C Test	Failed	IMM Indicates failure in the LM75 (Thermal Sensor) bus (BUS 6).	<ol style="list-style-type: none"> 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. For the latest level of IMM2, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-4JTS2T 5. Run the test again. 6. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/support/docview.wss?uid=psg1SERV-OPTN
166-908-xxx	IMM	IMM I2C Test	Failed	IMM Indicates failure in the PCA9539 (I2C I/O Expander) bus (BUS 7).	<ol style="list-style-type: none"> 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. For the latest level of IMM2, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-4JTS2T 5. Run the test again. 6. If the failure remains, go to the IBM website 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	<ol style="list-style-type: none"> 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 349. 4. Run the test again. 5. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> 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. 					
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.	<ol style="list-style-type: none"> Turn off and restart the system. Run the test again. Make sure that all DIMMs are enabled in the Setup utility. 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 349. Run the test again. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
201-803-xxx	Memory	Memory Test	Aborted	Test canceled: could not enable the processor cache.	<ol style="list-style-type: none"> Turn off and restart the system. Run the test again. 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 349. Run the test again. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
201-804-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer request failed.	<ol style="list-style-type: none"> Turn off and restart the system. Run the test again. 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 349. Run the test again. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
201-805-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller display/alter write operation was not completed.	<ol style="list-style-type: none"> Turn off and restart the system. Run the test again. 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 349. Run the test again. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
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.	<ol style="list-style-type: none"> 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 349. 4. Run the test again. 5. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
201-807-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer free request failed.	<ol style="list-style-type: none"> 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 349. 4. Run the test again. 5. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
201-808-xxx	Memory	Memory Test	Aborted	Test canceled: memory controller display/alter buffer execute error.	<ol style="list-style-type: none"> 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 349. 4. Run the test again. 5. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
201-809-xxx	Memory	Memory Test	Aborted	Test canceled program error: operation running fast scrub.	<ol style="list-style-type: none"> 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 349. 5. Run the test again. 6. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
201-810-xxx	Memory	Memory Test	Aborted	Test stopped: unknown error code xxx received in COMMONEXIT procedure.	<ol style="list-style-type: none"> 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 349. 5. Run the test again. 6. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
201-901-xxx	Memory	Memory Test	Failed	Test failure: single-bit error, failing DIMM z.	<ol style="list-style-type: none"> 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 349. 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 353). 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 353). 12. Run the test again. 13. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
202-801-xxx	Memory	Memory Stress Test	Aborted	Internal program error.	<ol style="list-style-type: none"> 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 349. 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 website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
202-802-xxx	Memory	Memory Stress Test	Failed	General error: memory size is insufficient to run the test.	<ol style="list-style-type: none"> 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 349.). 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 website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
202-901-xxx	Memory	Memory Stress Test	Failed	Test failure.	<ol style="list-style-type: none"> 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 website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> 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. 					
Message number	Component	Test	State	Description	Action
215-801-xxx	Optical Drive	<ul style="list-style-type: none"> Verify Media Installed Read/Write Test Self-Test <p>Messages and actions apply to all three tests.</p>	Aborted	Unable to communicate with the device driver.	<ol style="list-style-type: none"> 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. Run the test again. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. Run the test again. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. Run the test again. 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 349. Run the test again. Replace the DVD drive. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
215-802-xxx	Optical Drive	<ul style="list-style-type: none"> Verify Media Installed Read/Write Test Self-Test <p>Messages and actions apply to all three tests.</p>	Aborted	The media tray is open.	<ol style="list-style-type: none"> Close the media tray and wait 15 seconds. Run the test again. Insert a new CD/DVD into the drive and wait for 15 seconds for the media to be recognized. Run the test again. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. Run the test again. 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. Run the test again. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. Run the test again. Replace the CD/DVD drive. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> 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. 					
Message number	Component	Test	State	Description	Action
215-803-xxx	Optical Drive	<ul style="list-style-type: none"> Verify Media Installed Read/Write Test Self-Test <p>Messages and actions apply to all three tests.</p>	Failed	The disc might be in use by the system.	<ol style="list-style-type: none"> Wait for the system activity to stop. Run the test again Turn off and restart the system. Run the test again. Replace the DVD drive. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
215-901-xxx	Optical Drive	<ul style="list-style-type: none"> Verify Media Installed Read/Write Test Self-Test <p>Messages and actions apply to all three tests.</p>	Aborted	Drive media is not detected.	<ol style="list-style-type: none"> Insert a CD/DVD into the DVD drive or try a new media, and wait for 15 seconds. Run the test again. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. Run the test again. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. Run the test again. Replace the DVD drive. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
215-902-xxx	Optical Drive	<ul style="list-style-type: none"> Verify Media Installed Read/Write Test Self-Test <p>Messages and actions apply to all three tests.</p>	Failed	Read miscompare.	<ol style="list-style-type: none"> Insert a CD/DVD into the DVD drive or try a new media, and wait for 15 seconds. Run the test again. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. Run the test again. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. Run the test again. Replace the DVD drive. If the failure remains, go to the IBM website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
215-903-xxx	Optical Drive	<ul style="list-style-type: none"> • Verify Media Installed • Read/Write Test • Self-Test <p>Messages and actions apply to all three tests.</p>	Aborted	Could not access the drive.	<ol style="list-style-type: none"> 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. 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 website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
215-904-xxx	Optical Drive	<ul style="list-style-type: none"> • Verify Media Installed • Read/Write Test • Self-Test <p>Messages and actions apply to all three tests.</p>	Failed	A read error occurred.	<ol style="list-style-type: none"> 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 website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
405-901-xxx	Ethernet Device	Test Control Registers	Failed		<ol style="list-style-type: none"> 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 349. 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 website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
405-901-xxx	Ethernet Device	Test MII Registers	Failed		<ol style="list-style-type: none"> 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 349. 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 website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
405-902-xxx	Ethernet Device	Test EEPROM	Failed		<ol style="list-style-type: none"> 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 349. 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 website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
405-903-xxx	Ethernet Device	Test Internal Memory	Failed		<ol style="list-style-type: none"> 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 349. 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 353) 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 website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
405-904-xxx	Ethernet Device	Test Interrupt	Failed		<ol style="list-style-type: none"> 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 349. 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 353) 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 website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 7. DSA Preboot messages (continued)

<ul style="list-style-type: none"> • 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. 					
Message number	Component	Test	State	Description	Action
405-905-xxx	Ethernet Device	Test Loop back at MAC Layer	Failed		<ol style="list-style-type: none"> 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 349. 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 website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
405-906-xxx	Ethernet Device	Test Loop back at Physical Layer	Failed		<ol style="list-style-type: none"> 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 349. 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 website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.
405-907-xxx	Ethernet Device	Test LEDs	Failed		<ol style="list-style-type: none"> 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 349. 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 website for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Tape alert flags

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

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

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

- C: Critical
- W: Warning
- I: Information

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

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

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

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

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

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

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

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

Recovering the server firmware

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

If the server firmware has become corrupted, such as from a power failure during an update, you can recover the server firmware in 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.

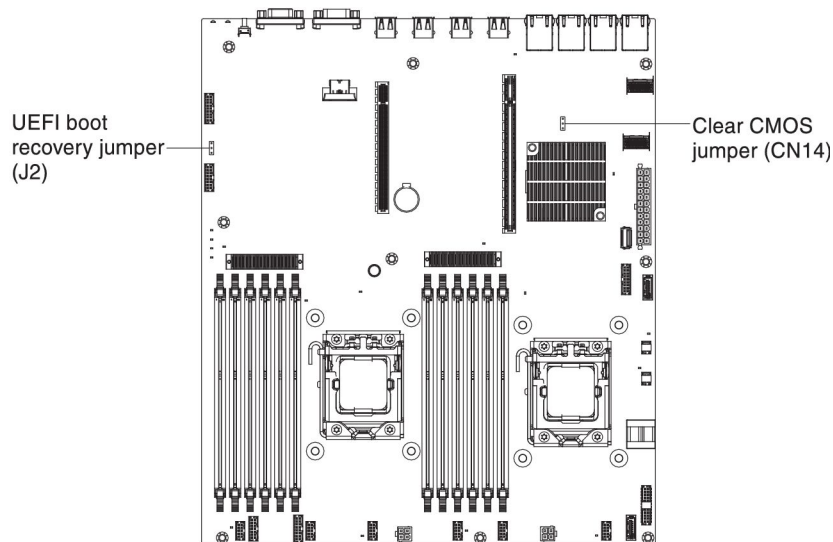
To download the server firmware update package from the World Wide Web, go to <http://www.ibm.com/supportportal/>

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 top cover (see "Removing the server top cover" on page 343).
3. Locate the UEFI boot backup jumper block (JP2) 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 top 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 top cover.
12. Move the UEFI boot recovery jumper back to the primary position (pins 1 and 2).
13. Reinstall the server top 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 IMM2 documentation.

Automated boot recovery (ABR)

While the server is starting, if the integrated management module II 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 167. 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 start the server from the primary bank.

Nx boot failure

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

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

After a specified number of consecutive attempts (automatic or manual), the Nx boot failure feature causes the server to revert to the default UEFI configuration and start the Setup utility so that you can make the necessary corrections to the

configuration and restart the server. If the server is unable to successfully complete POST with the default configuration, there might be a problem with the system board.

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

System event messages log

The system event messages log contains messages of three types:

Information

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

Warning

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

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

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

Solving power problems

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

1. Turn off the server and disconnect all power cords.
2. Check for loose cables in the power subsystem. Also check for short circuits, for example, if a loose screw is causing a short circuit on a circuit board.
3. If 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 362.
 - 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 188). 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, replace the components in the minimum configuration one at a time until the problem is isolated.

Solving Ethernet controller problems

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

Try the following procedures:

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

Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
- Make sure that the Ethernet cable is installed correctly.
 - The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.
 - You must use Category 5 cabling.
- Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller LEDs on the rear panel of the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.
 - The Ethernet link status LED is lit when the Ethernet controller receives a link pulse from the hub. If the LED is off, there might be a defective connector or cable or a problem with the hub.

- The Ethernet transmit/receive activity LED is lit when the Ethernet controller sends or receives data over the Ethernet network. If the Ethernet transmit/receive activity light is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check the Ethernet activity LED on the rear of the server. The Ethernet activity LED is lit when data is active on the Ethernet network. If the Ethernet activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check for operating-system-specific causes of the problem.
- Make sure that the device drivers on the client and server are using the same protocol.

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

Solving undetermined problems

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

If you suspect that a software problem is causing failures (continuous or intermittent), see “Software problems” on page 124.

Damaged data in CMOS memory or damaged server firmware can cause undetermined problems. To reset the CMOS data, use the CMOS switch to clear the CMOS memory; see “System-board jumpers” on page 22. If you suspect that the server firmware is damaged, see “Recovering the server firmware” on page 167.

Check the LEDs on all the power supplies (see “Power-supply LEDs” on page 137). If the LEDs indicate that the power supplies are working correctly, complete the following steps:

1. Turn off the server.
2. Make sure that the server is cabled correctly.
3. Remove or disconnect the following devices, one at a time, until you find the failure. Turn on the server and reconfigure it each time.
 - Any external devices.
 - Surge-suppressor device (on the server).
 - Modem, printer, mouse, and non-IBM devices.
 - Each adapter.
 - Hard disk drives.
 - Memory modules. The minimum configuration requirement is 1 GB DIMM in connector 3 (see “System-board DIMM connectors” on page 21).

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

 - One microprocessor (slot 1)
 - One 1 GB DIMM per installed microprocessor (slot 1 if only one microprocessor is installed)
 - One power supply
 - Power cord
 - Three system fans
4. Turn on the server. If the problem remains, suspect the following components in the following order:
 - a. DIMM
 - b. System board
 - c. Microprocessor

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

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

Problem determination tips

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

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

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

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

See Appendix A, “Getting help and technical assistance,” on page 375 for information about calling IBM for service.

Chapter 4. Parts listing, Type 7158 server

The following replaceable components are available for all the Series x3630 M4 Type 7158 server models, except as specified otherwise in “Replaceable server components.” To check for an updated parts listing on the Web, complete the following steps.

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Parts documents lookup**.
4. From the **Product family** menu, select **System x3630 M4** and click **Go**.

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 and server top cover) 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 (CRU):** 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 printed *Warranty Information* document that comes with your server.

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

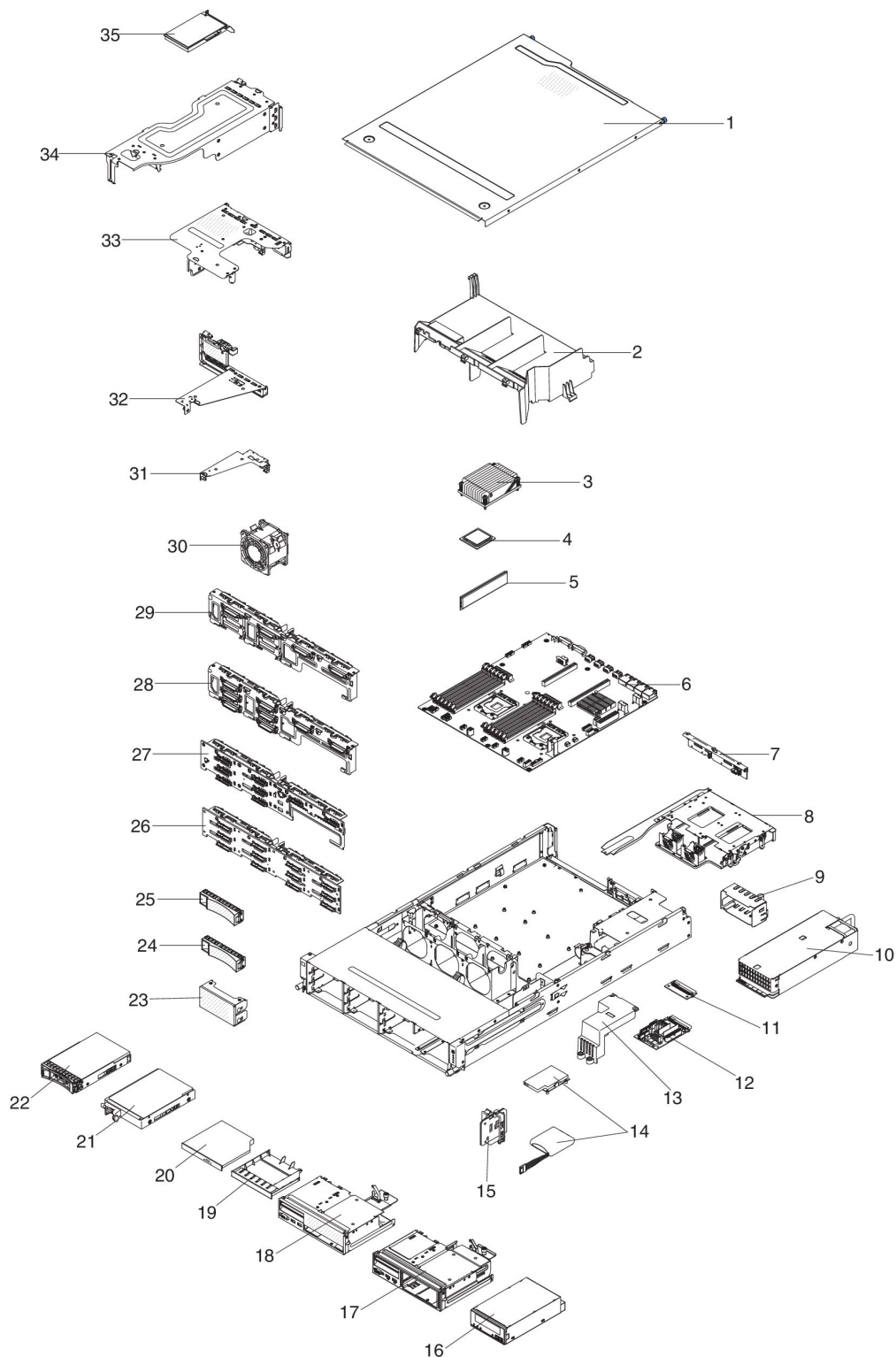


Table 8. Parts listing, Type 7158

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)
3	Heat sink		94Y7813

Table 8. Parts listing, Type 7158 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)
4	Microprocessor, Intel Xeon E5-2470 2.3 GHz, 20 MB, 95 W (dual quad core)		90Y4736
4	Microprocessor, Intel Xeon E5-2450 2.1 GHz, 20 MB, 95 W (dual quad core)		90Y4738
4	Microprocessor, Intel Xeon E5-2440 2.4 GHz, 15 MB, 95 W (six core)		90Y4739
4	Microprocessor, Intel Xeon E5-2430 2.2 GHz, 15 MB, 95 W (six core)		90Y4740
4	Microprocessor, Intel Xeon E5-2420 1.9 GHz, 15 MB, 95 W (six core)		90Y4742
4	Microprocessor, Intel Xeon E5-2407 2.2 GHz, 10 MB, 80 W (quad core)		90Y4743
4	Microprocessor, Intel Xeon E5-2403 1.8 GHz, 10 MB, 80 W (quad core)		90Y4744
4	Microprocessor, Intel Xeon E5-2450L 1.8 GHz, 20 MB, 70 W (dual quad core)		90Y4747
4	Microprocessor, Intel Xeon E5-1410 2.8 GHz, 10 MB, 80 W (quad core)		00D9038
4	Microprocessor, Intel Xeon E5-1403 2.6 GHz, 5 MB, 80 W (dual core)		90Y4745
4	Microprocessor, Intel Xeon E5-1407 2.8 GHz, 5 MB, 80 W (dual core)		90Y4746
4	Microprocessor, Intel Xeon E5-2430L 2.0 GHz, 15 MB, 60 W (six core)		90Y4748
5	Memory, 8GB PC3L-10600R-999 LP ECC, DDR3, RDIMM (1.35V capable)	49Y1415	
5	Memory, 4GB PC3L-10600E-999 LP ECC, DDR3, UDIMM (1.35V capable)	49Y1422	
5	Memory, 2GB PC3L-10600R-999 LP ECC, DDR3 RDIMM (1.35V capable)	49Y1423	
5	Memory 4GB PC3L-10600R-999 LP ECC, DDR3 RDIMM (1.35V capable)	49Y1425	
5	Memory 8GB PC3L 8500R LP ECC DDR3 RDIMM (1.35V capable)	49Y1417	
5	Memory 32GB PC3L-10600 LP DDR3 LR-DIMM (1.35V capable)	90Y3107	
5	Memory 4GB PC3-12800 LP, DDR3 RDIMM (1.5V capable)	90Y3180	
5	Memory 8GB PC3-12800 LP DDR3 RDIMM (1.5V capable)	90Y3111	
5	Memory 16GB PC3-10600 LP DDR3 RDIMM (1.35V capable)	49Y1563	
6	System board		00Y7337
7	Backplane, SAS/SATA 2 HDD	90Y5145	
10	Power supply, 550 W, ac	94Y8105	
10	Power supply, 750 W, ac	94Y8071	
10	Power supply, 750 W, ac	94Y8079	
10	Power supply, 900 Watt, ac	94Y8087	

Table 8. Parts listing, Type 7158 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)
10	Power supply, 750 W, high efficiency, -48 V, dc	69Y5742	
11	Power distribution board, lower	69Y5758	
12	Power distribution board, upper	69Y5790	
14	Battery, ServeRAID	81Y4491	
16	Tape drive	40K6449	
20	DVD-ROM drive	44W3254	
20	DVD-RW drive	44W3256	
21	Hard disk drive, simple-swap, 3.5-inch 1TB 7.2K	81Y9807	
21	Hard disk drive, simple-swap, 3.5-inch 2TB 7.2K	81Y9811	
21	Hard disk drive, simple-swap, 3.5-inch 500GB 7.2K	81Y9803	
21	Hard disk drive, simple-swap, 3.5-inch 3TB 7.2K	81Y9815	
22	Hard disk drive, hot-swap, 3.5-inch 1TB SATA 7.2K	81Y9791	
22	Hard disk drive, hot-swap, 3.5-inch 3TB SATA 7.2K	81Y9799	
22	Hard disk drive, hot-swap, 3.5-inch 500GB 7.2K	81Y9787	
22	Hard disk drive, hot-swap, 3.5-inch 2TB 7.2K	81Y9795	
22	Hard disk drive, hot-swap, 3.5-inch 1TB 7.2K	90Y8568	
22	Hard disk drive, hot-swap, 3.5-inch 3TB 7.2K	90Y8578	
22	Hard disk drive, hot-swap, 3.5-inch 450GB 15K	49Y6098	
22	Hard disk drive, hot-swap, 3.5-inch 2TB 7.2K	90Y8573	
22	Solid state drive, hot-swap, 2.5-inch 64GB	00W1287	
22	Solid state drive, hot-swap, 2.5-inch 512GB	00W1301	
22	Solid state drive, hot-swap, 2.5-inch 128GB	00W1291	
22	Solid state drive, hot-swap, 2.5-inch 256GB	00W1296	
26	Backplane, SAS/SATA 12 HDD	69Y4741	
27	Backplane, SAS/SATA 8 HDD	90Y5136	
28	Backplate simple-swap 8 HDD	00D8653	
29	Backplate, simple-swap 4 HDD	00D8654	
30	Fan, simple-swap 80x56 mm	00D2566	
31	Riser-card assembly, PCIe, 1x8 (4, 1), 1U	00D8625	
31	Riser-card assembly, PCIe, 1x8 (8, 4, 1), 1U	00D8626	
32	Riser-card assembly, PCIe, 1x16 (16, 8, 4, 1), 1U	00D8627	
32	Riser-card assembly, PCIe, 2x16 (8, 4, 1), 1U	00D8628	
33	Riser-card assembly, PCIe, 2x16 + 1x8	00D8631	
33	Riser-card assembly, PCIe, 1x16 + 1x8	00D8632	
34	Riser-card assembly, PCIe, 2x16	00D8629	
34	Riser-card assembly, PCIe, 1x16	00D8630	
35	NetXtreme I Quad Port GbE adapter	90Y9355	
35	NetXtreme I Dual Port GbE adapter	90Y9373	

Table 8. Parts listing, Type 7158 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)
35	Emulex 10GbE Virtual Fabric Adapter III adapter	95Y3766	
35	Mellanox ConnectX-2 Dual Port adapter	81Y9993	
	Battery, 3V lithium	33F8354	
	Front USB and VGA board assembly	00D8663	
	Operator information panel assembly, side	00D8623	
	USB panel assembly, side	00D8624	
	Label, GBM	00D8648	
	Label, chassis	00D8649	
	ServeRAID M1115 SAS/SATA controller	81Y4449	
	ServeRAID M5110 SAS/SATA controller	90Y4449	
	ServeRAID M5120 Series SAS/SATA controller	81Y4479	
	ServeRAID M5100 Series 512MB Cache/RAID 5 Upgrade	81Y4485	
	ServeRAID M5100 Series 512MB Flash/RAID 5 Upgrade	81Y4488	
	ServeRAID M5100 Series 1GB Flash/RAID 5 Upgrade	81Y4580	
	ServeRAID H1110 SAS/SATA controller	81Y4494	
	ServeRAID M1115 SAS/SATA controller	46C8928	
	ServeRAID M5100 Series 512MB Flash/RAID 5 Upgrade	46C9027	
	ServeRAID M5100 Series 1GB Flash/RAID 5 Upgrade	46C9029	
	Cable, HDD power (Y cable)	00D8668	
	Cable, rear HDD SATA signal	00D9030	
	Cable, operator information panel, front	81Y7292	
	Cable, operator information panel, side	81Y7342	
	Cable, front USB	81Y7294	
	Cable, front VGA	81Y7296	
	Cable, SAS signal, 760 mm	81Y7300	
	Cable, USB tape	81Y7320	
	Cable, HS 8 HDD configuration	81Y7322	
	Cable, HS 8 HDD power	81Y7324	
	Cable, SATA DVD	81Y7326	
	Cable, tape drive power	81Y7330	
	Cable, USB panel, side	81Y7340	
	Cable, rear HDD configuration	81Y7344	
	Cable, HS 12 HDD power, 590 mm	81Y7346	
	Cable, HS 12 HDD power, 310 mm	81Y7348	
	Cable, HS 12 HDD configuration	81Y7350	
	Cable, ServeRAID battery	90Y7309	
	Cable, ServeRAID power module	90Y7310	
	Cable, SS 8 HDD power	94Y6325	

Table 8. Parts listing, Type 7158 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)
	Cable, SATA signal	81Y7302	
	Cable, SATA signal	94Y6953	
	USB Cable, 1m internal	44E8893	
	Internal USB cable	81Y3643	
	Cord, 4 - 4.3m line	39M5076	
	Cord, 2.8m line	39M5377	
	Cord, 1.5m line	39M5375	
	Cord, 4.3m line	39M5378	
	Cable, power distribution unit jumper	39M5392	
	Cable, power distribution unit jumper	39M5701	
	Quadro 4000 power cable	00D8938	
	6Gb performance optimized HBA	46C8937	
	6Gb SAS HBA	46C8935	
	DAT72 5.25" 36GB USB drive	99Y3868	
	DAT160 5.25" 80GB USB drive	99Y3870	
	NVIDIA Quadro 2000	43V5939	
	NVIDIA Quadro 4000 With FL Extender	90Y2330	
	US E 103P-RoHS Keyboard	94Y6050	
	Thermal grease		41Y9292
	Alcohol wipe		59P4739
	Miscellaneous parts kit		00Y7347

Structural parts

Structural parts are not covered by the IBM Statement of Limited Warranty.

Table 9. Structural parts, Type 7158

Index	Description	Part number
1	Top cover	00D8660
2	Air baffle	00D8666
2	Air baffle, required for riser 2 (2U)	94Y6338
8	HDD cage, 3.5" HS HDD, rear	00D8667
9	Power supply filler	94Y7610
13	240VA cover (Paddle card safety cover)	00D8657
15	Battery holder	00D8655
17	Tape drive cage assembly	00D8662
18	Optical disk drive cage assembly	00D8661
19	CD/DVD drive filler	00D8658
23	3.5" SS HDD Filler	00D8656

Table 9. Structural parts, Type 7158 (continued)

Index	Description	Part number
24	3.5" SS HDD filler	69Y5364
25	3.5" HS HDD filler	69Y5368
	Chassis	00D8651
	3.5" HDD bracket	00D8652
	Shipping bracket	00D8659
	2U riser cage filler	00D8664
	BP stopper bracket	00D8665
	EIA LED cover	00D9101
	EIA USB cover	00D9102
	Memory filler	44V8227
	Bezel, DDS Generation 6 tape drive	46C5363
	Bracket kit	69Y4524
	Rail kit	94Y6790
	Chassis support kit	94Y6974
	Int. USB 3 RDX Carrier/Dock	46C2346

To order a consumable or structural 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.

Power cords

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

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

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

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

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

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

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

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

Chapter 5. Removing and replacing server components

Replaceable components 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 depletable life) is your responsibility. If IBM acquires or installs a consumable part at your request, you will be charged for the service.
- **Structural parts:** Purchase and replacement of structural parts (components, such as chassis assembly and server top cover) 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 4, “Parts listing, Type 7158 server,” on page 175 to determine whether a component is a consumable, structural part, Tier 1 CRU, Tier 2 CRU or FRU.

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

Installation guidelines

Attention:

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

Before you install optional devices, read the following information:

- Read the safety information that begins on page vii, and the guidelines in “Handling static-sensitive devices” on page 187. This information will help you work safely.
- Make sure that the devices you are installing are supported. For a list of supported optional-devices for the server, see <http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/>
- 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 performance. To download firmware updates for your server, complete the following steps:
 1. Go to <http://www.ibm.com/systems/support/>.
 2. Under **Product support**, click **System x**.
 3. Under **Popular links**, click **Software and device drivers**.

4. Click **System x3630 M4** to display the matrix of downloadable files for the server.

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 Chapter 3, "Diagnostics," on page 29 for diagnostic information.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the cover is removed, make sure that no one is near the server and that no tools or other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
 - Make sure that you can stand safely without slipping.
 - Distribute the weight of the object equally between your feet.
 - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
 - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- To view the error LEDs on the system board and internal components, leave the server connected to the power.
- You do not have to turn off the server to install or replace hot-swap power supplies or hot-plug Universal Serial Bus (USB) devices. However, you must turn off the server before you perform any steps that involve removing or installing adapter cables or non-hot-swap optional devices or components.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on. It also indicates a non-hot-swap component, where you need to turn off the server before performing any action on it.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.

System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- 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 top cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the server top cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap drive within 2 minutes of removal.
- You do not operate the server without the air baffle installed. Operating the server without the air baffle might cause the microprocessor to overheat.

Handling static-sensitive devices

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

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

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

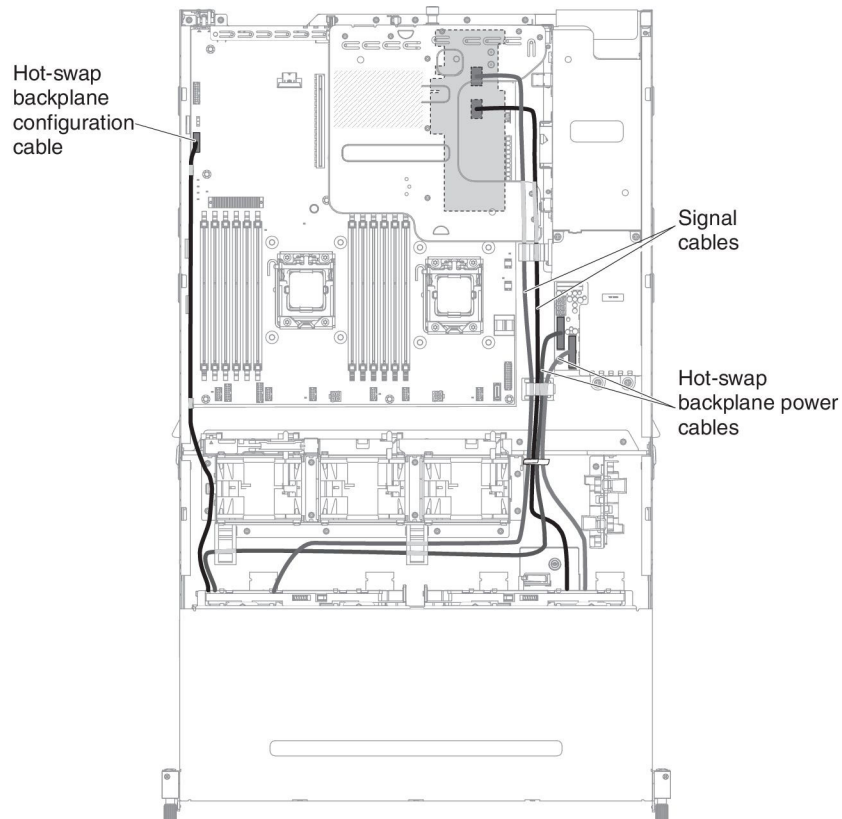
This section provides information about routing the cables when you install some components in the server.

For more information about the requirements for cables and connecting devices, see the documentation that comes with these devices.

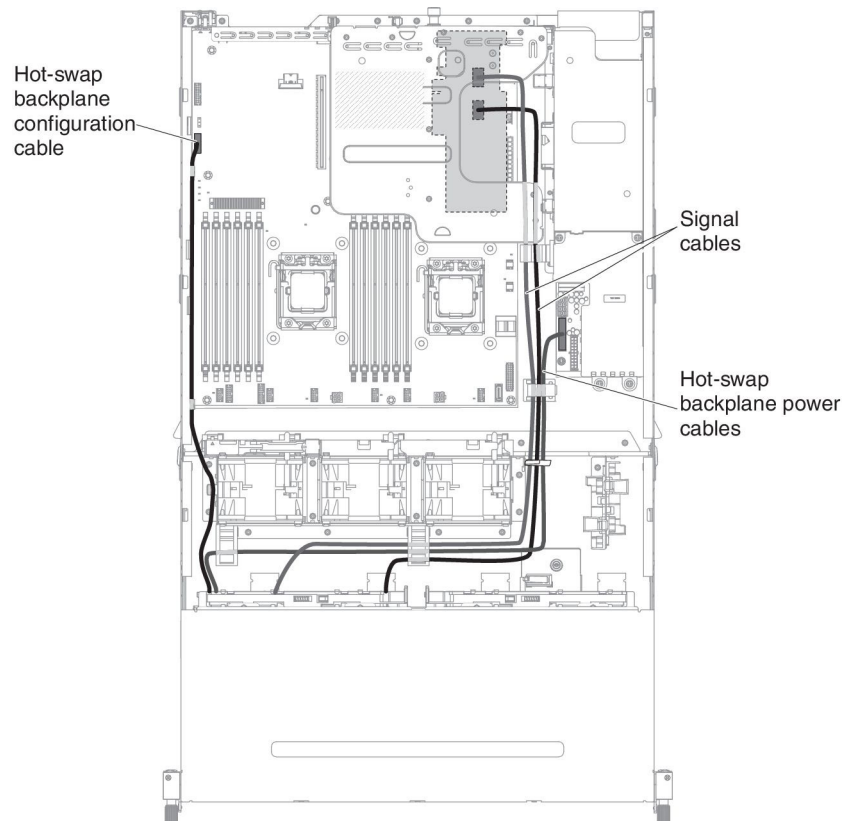
Notes:

1. When the hot-swap backplane is in use, make sure that Port 1 on the hardware ServeRAID or system board is connected to Port 1 on the backplane. Likewise, Port 0 on the hardware ServeRAID or system board should be connected to Port 0 on the backplane.
2. When the simple-swap backplate is in use, make sure that the cable marked with a SAS 1 sticker is attached to SAS/SATA 1 connector on the system board. Likewise, the cable marked with a SAS 0 sticker should be attached to the SAS/SATA 0 connector on the system board.

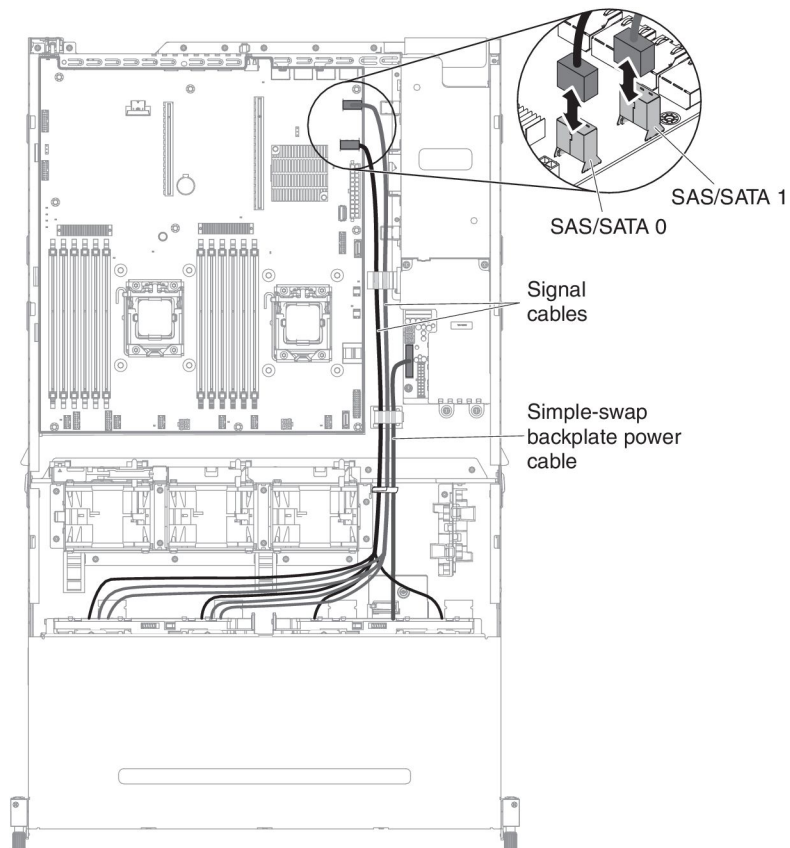
The following illustration shows the hardware ServeRAID cabling information for twelve 3.5-inch hot-swap drive backplane assemblies:



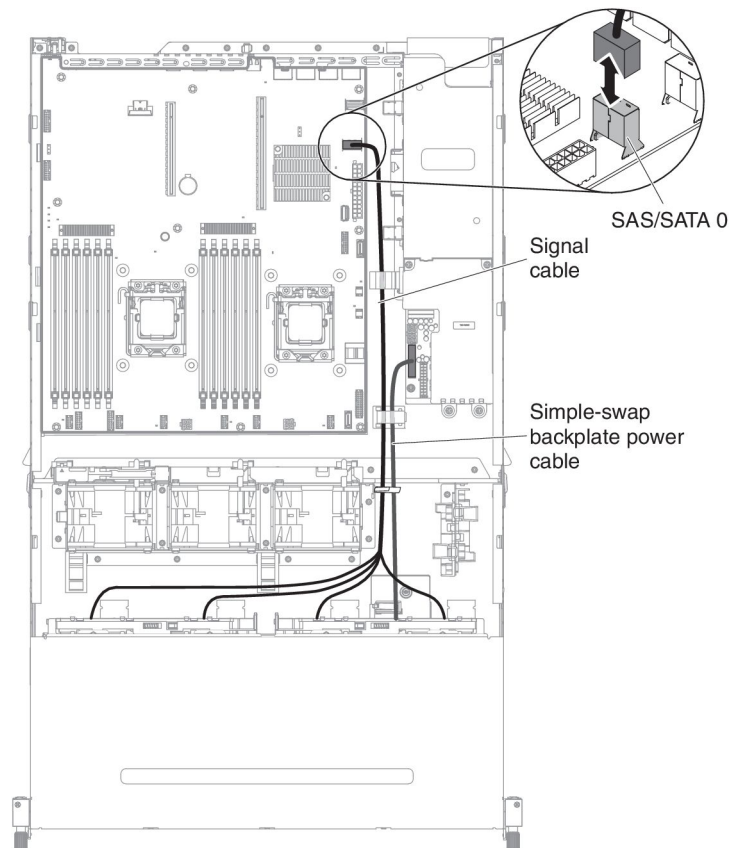
The following illustration shows the hardware ServeRAID cabling information for eight 3.5-inch hot-swap drive backplane assemblies:



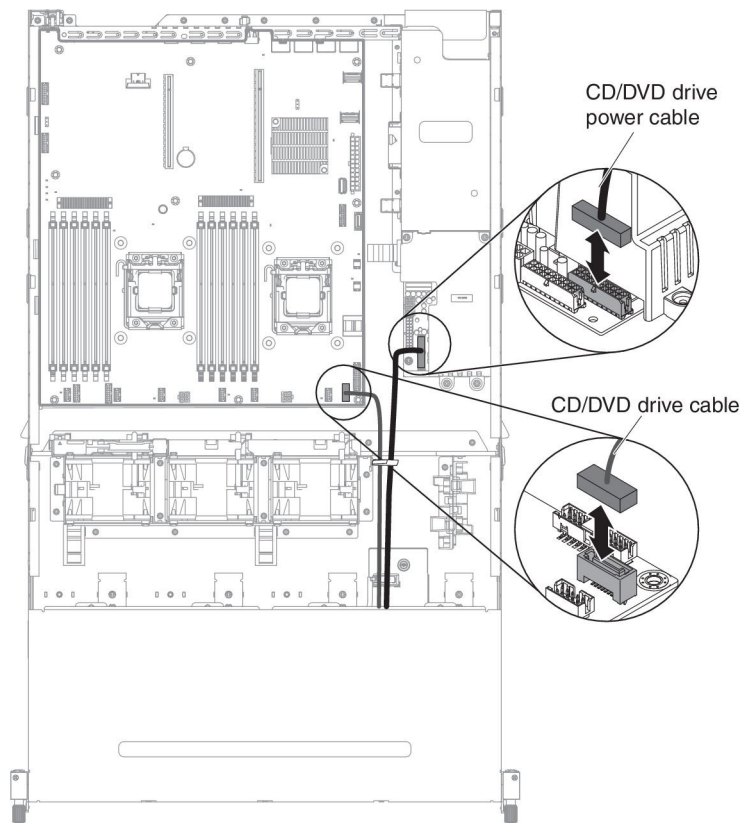
The following illustration shows the software ServeRAID cabling information for eight 3.5-inch simple-swap drive backplate assemblies:



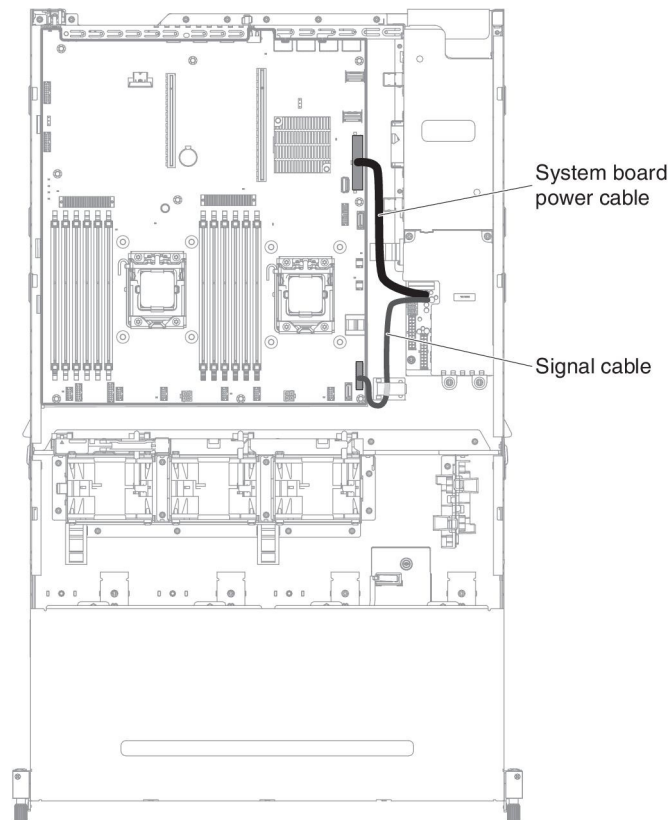
The following illustration shows the software ServeRAID cabling information for four 3.5-inch simple-swap drive backplate assemblies:



The following illustration shows the cabling information for the optional CD/DVD SATA drive:



The following illustration shows the cabling information for the power paddle card:



Removing and replacing components

Replacement of components consist of consumable parts, structural parts and field replacement units (FRUs):

The illustrations in this document might differ slightly from your hardware

- **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 and top cover) 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 4, “Parts listing, Type 7158 server,” on page 175 to determine whether a component is a consumable, structural part, Tier 1 CRU, Tier 2 CRU or FRU.

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 Appendix A, “Getting help and technical assistance,” on page 375.

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.

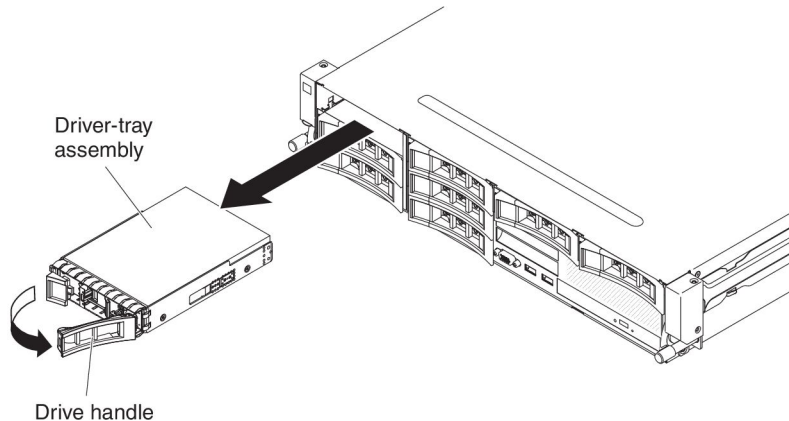
Removing a hot-swap hard disk drive

Attention:

- To avoid damage to the drive connectors, make sure that the server top cover is in place and fully closed whenever you install or remove a drive.
- To make sure there is adequate system cooling, do not operate the server for more than 10 minutes without either a drive or a filler panel installed in each bay.

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

1. Read the safety information that begins on page vii, “Handling static-sensitive devices” on page 187, and “Installation guidelines” on page 185.
2. Press on the release latch (orange) to unlock the drive handle.



3. Grasp the handle and pull the hot-swap drive assembly out of the drive bay.
4. If you are instructed to return the hot-swap drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a hot-swap hard disk drive

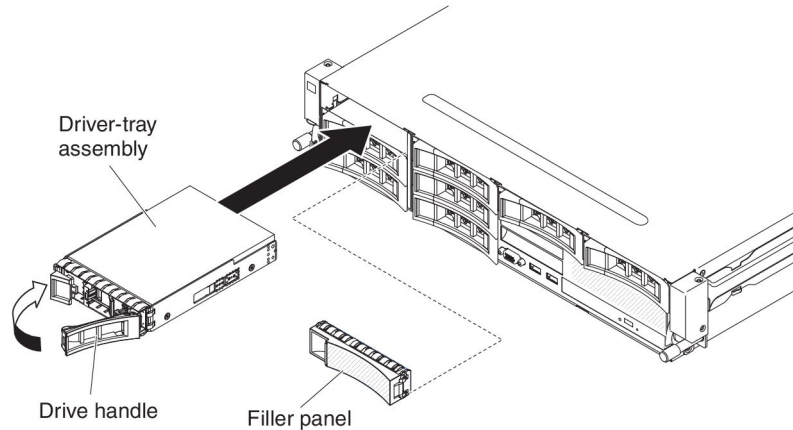
The following notes describe the type of hard disk drives that the server supports and other information that you must consider when you install a drive. For a list of supported drives, see <http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/>.

- Locate the documentation that comes with the hard disk drive and follow those instructions in addition to the instructions in this chapter.
- Depending on the server configuration, your server may support up to eight 3.5-inch hot-swap SAS/SATA hard disk drives or fourteen 3.5-inch hot-swap SAS/SATA hard disk drives (for this configuration two 3.5-inch hot-swap

SAS/SATA hard disk drives are located at the rear of the server). For a list of the supported hard disk drives, see <http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/>.

- All hot-swap drives in the server should have the same throughput speed rating. Using hard disk drives with different speed ratings will cause all drives to operate at the throughput speed of the slowest drive.

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



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

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

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

After you replace a failed hard disk drive, the green activity LED flashes as the disk spins up. The yellow LED turns off after approximately 1 minute. If the new drive starts to rebuild, the yellow LED flashes slowly, and the green activity LED remains lit during the rebuild process. If the yellow LED remains lit, see “Hard disk drive problems” on page 110.

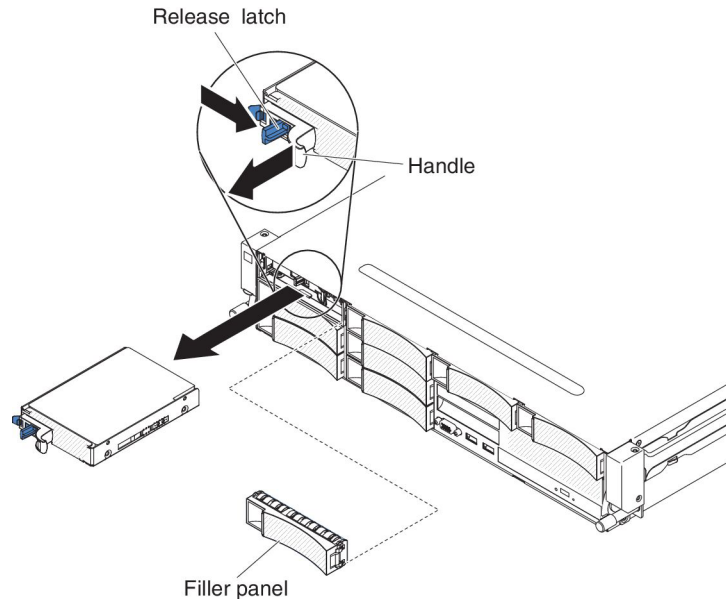
Note: You might have to reconfigure the disk arrays after you install hard disk drives. See the RAID documentation on the IBM *ServeRAID Support* CD for information about RAID controllers.

Removing a simple-swap hard disk drive

Note: You must turn off the server before removing simple-swap drives in the server.

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

1. Read the safety information that begins on page vii, "Handling static-sensitive devices" on page 187, and "Installation guidelines" on page 185.
2. Turn off the server 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. Locate the release tab (blue) on the hard disk drive; then, while you press the release tab to the right, grasp the handle and pull the drive out of the bay.



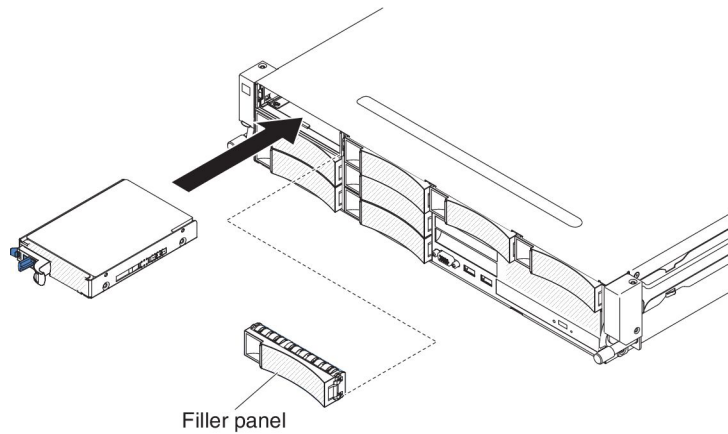
5. If you are instructed to return the drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a simple-swap hard disk drive

Note: You must turn off the server before installing simple-swap drives in the server.

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

1. Read the safety information that begins on page vii, "Handling static-sensitive devices" on page 187, and "Installation guidelines" on page 185.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables as necessary to replace the device.
3. If installing a new drive, 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.
4. Remove the filler panel from the front of the server.
5. Gently push the drive assembly into the drive bay until the drive clicks into place.

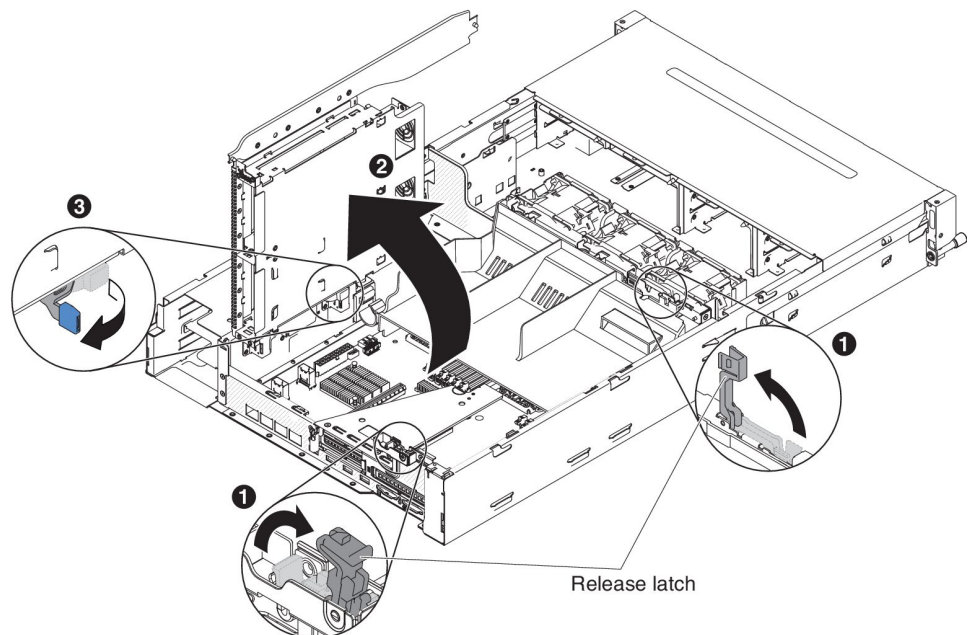


6. Reinstall the filler panel that you removed.
7. Turn on the peripheral devices and the server.

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

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

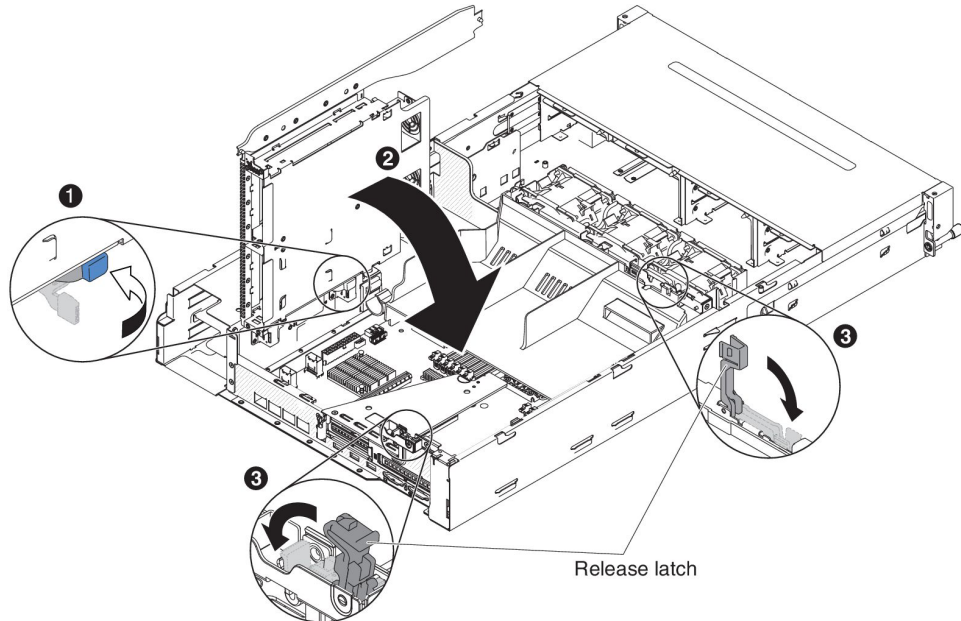
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Open the two respective blue latches **1** on the chassis.
5. Slowly rotate the rear hard disk drive cage outwards **2** until it stops.
6. Shift the switch on the rear hard disk drive cage to the lock position **3** to keep the hard disk drive cage fixed.



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

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

1. Shift the switch **1** on the rear hard disk drive cage to the unlock position.
2. Slowly rotate the cage downwards **2** until it sits into place.
3. Close the two respective blue latches **3** on the chassis.

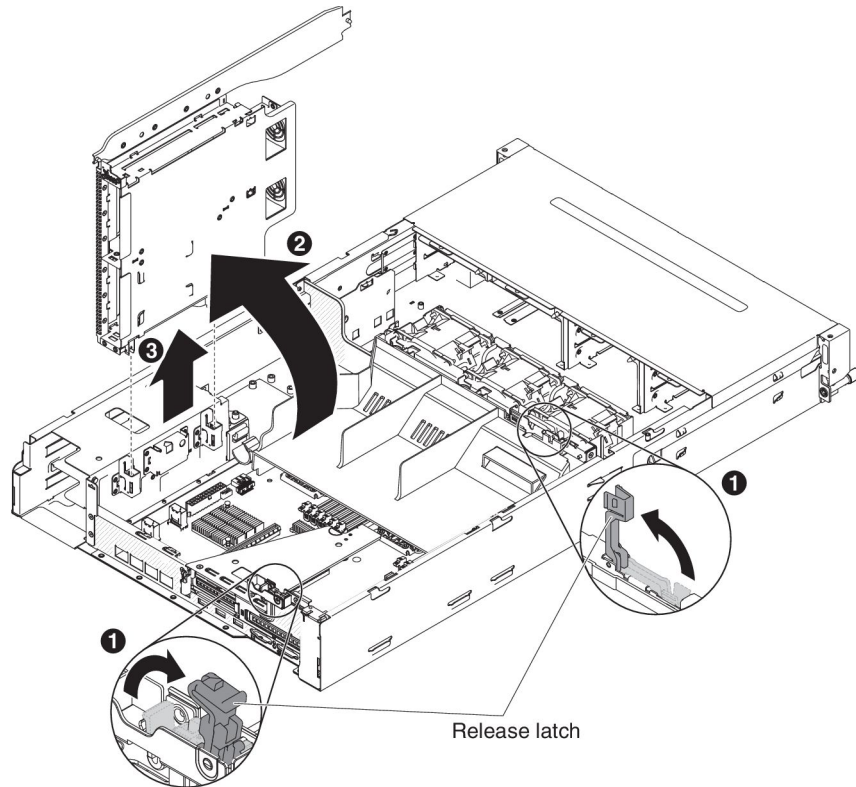


4. Install the server top cover (see "Installing the server top cover" on page 344).
5. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing an optional hot-swap rear hard disk drive cage

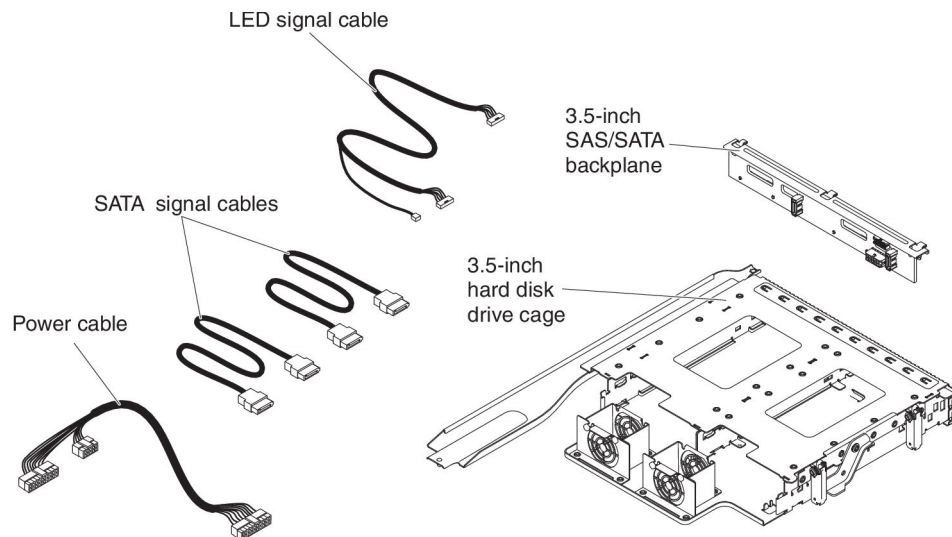
To remove the optional rear hot-swap hard disk drive cage, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server top cover (see "Removing the server top cover" on page 343).
4. Remove the hot-swap backplane on the optional rear hard disk drive cage (see "Removing the hot-swap backplane on the optional rear hard disk drive cage" on page 325).
5. Open the blue latches **1** on the chassis.



6. Rotate the rear hard disk drive cage outwards **2**. Then, carefully pull the rear hard disk drive cage **3** out of the chassis.
7. If you are instructed to return the rear hard disk drive cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an optional hot-swap rear hard disk drive cage

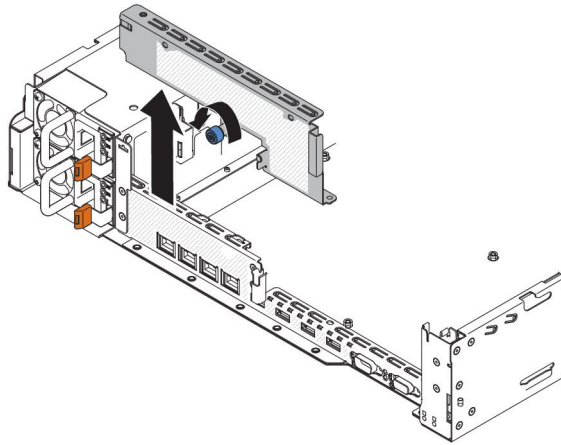


Note: Fan connector 4 and Fan connector 5 are currently reserved for future possible use with the rear hard disk drives.

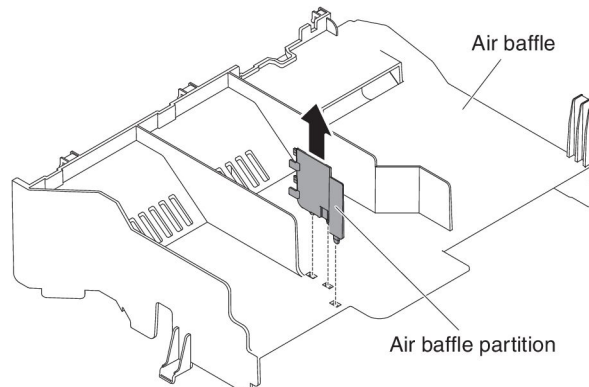
To install the optional rear hot-swap hard disk drive cage, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server top cover (see "Removing the server top cover" on page 343).
4. If a drive filler cage is installed in the chassis, loosen the screw that secures the drive filler cage to the chassis; then, rotate the drive filler clockwise and remove the drive filler out of the bay from the server. Go to step 8.

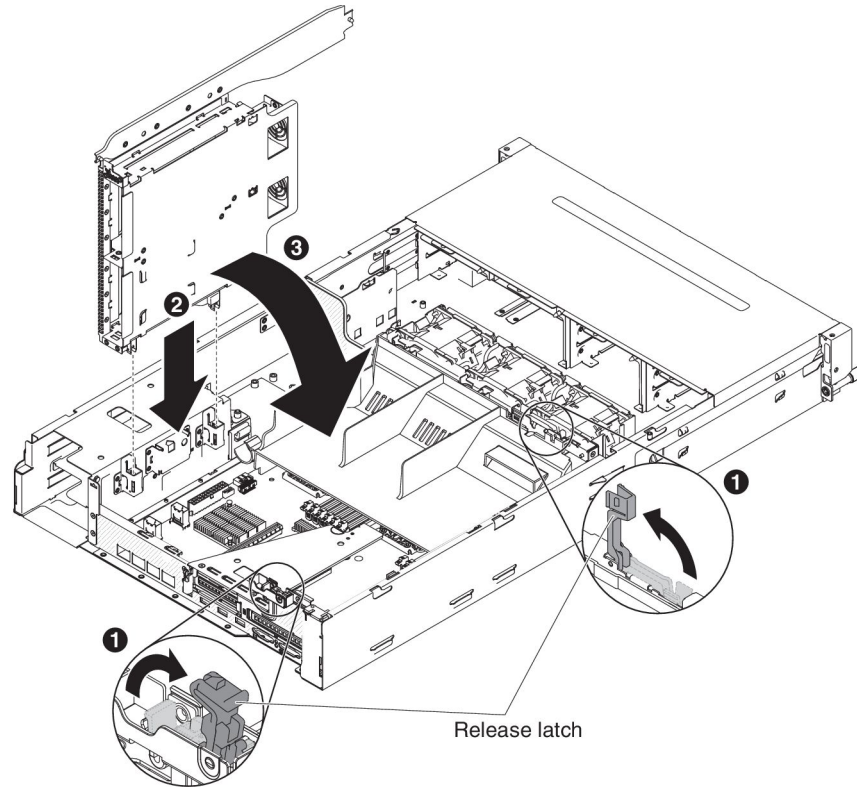
Note: If 2U PCI riser-card assemblies are installed in the server, go to step 5.



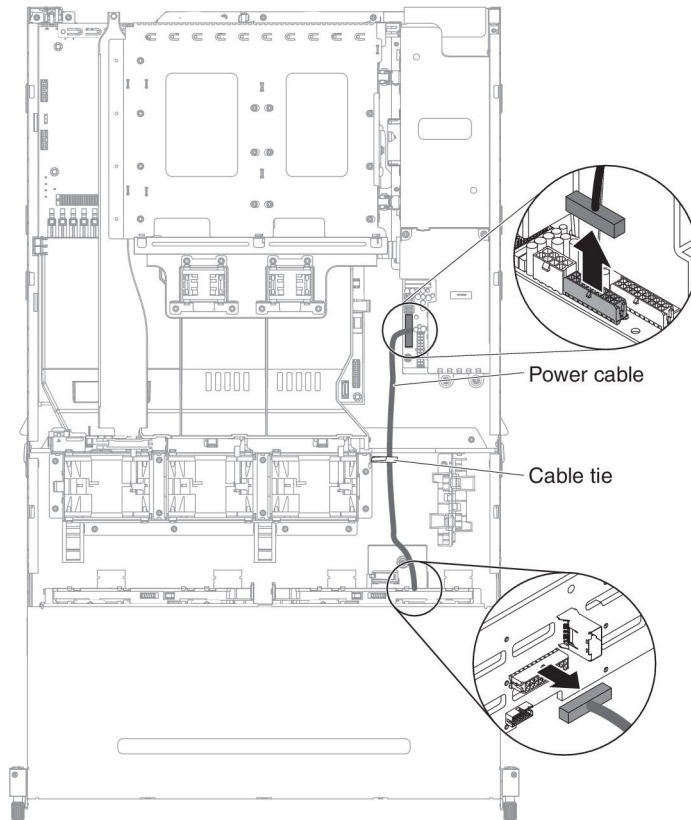
5. If 2U PCI riser-card assembly are installed in the server, remove all 2U PCI riser-card assembly and adapters (see "Removing the PCI riser-card assembly" on page 251), "Removing an adapter from the PCI riser-card assembly" on page 256) and "Removing a ServeRAID adapter from the PCI riser-card assembly" on page 229).
6. Install the removed adapters and/or ServeRAID adapter into the relevant 1U PCI riser-card assembly (see "Installing an adapter on the PCI riser-card assembly" on page 258) and "Installing a ServeRAID adapter on the PCI riser-card assembly" on page 230).
7. Install the 1U PCI riser-card assembly (see "Installing the PCI riser-card assembly" on page 253).
8. If an air baffle partition is installed in the air baffle, remove it from the air baffle.



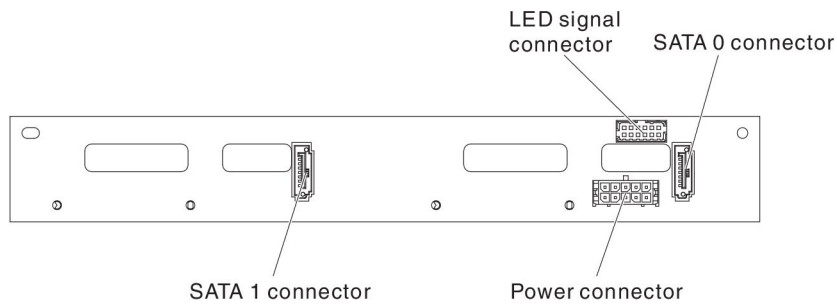
9. Open the two respective blue latches on the chassis **1** .
10. Align the two moveable levers of the rear hard disk drive cage with the two chassis support brackets. Slide the cage into the chassis support brackets until it firmly sits into place **2** . Then, rotate the cage inward until it firmly sits into place **3** .



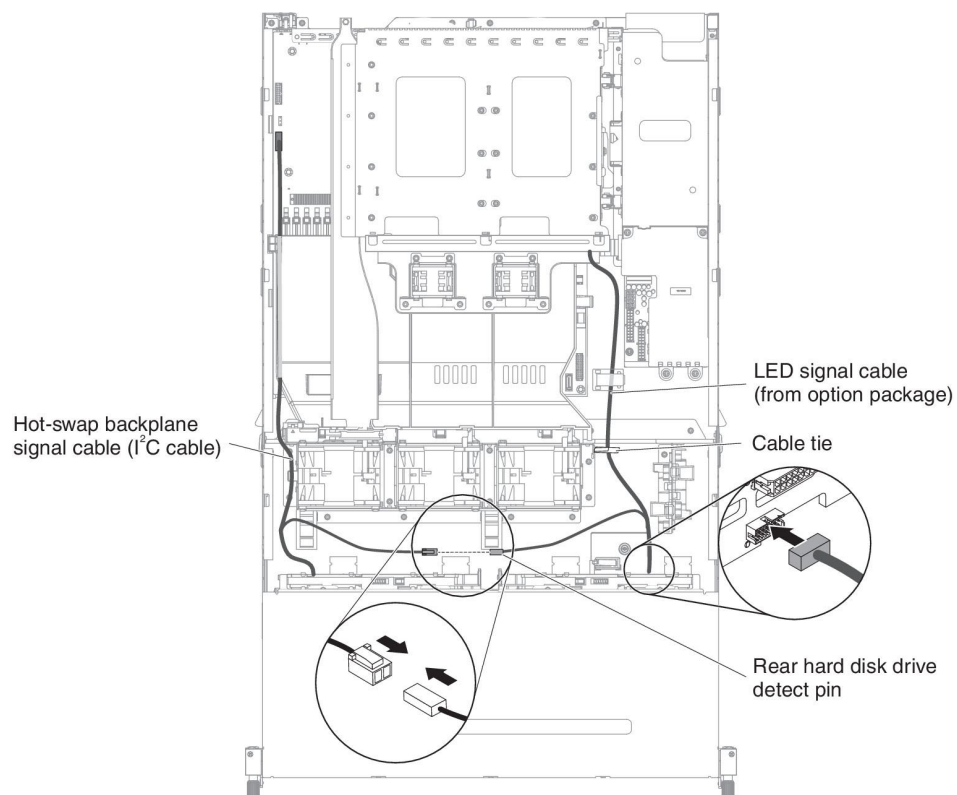
11. Close the latches on the chassis.
12. Remove the power cable that currently connects the hot-swap hard disk drive backplane in the server to the power-paddle card.



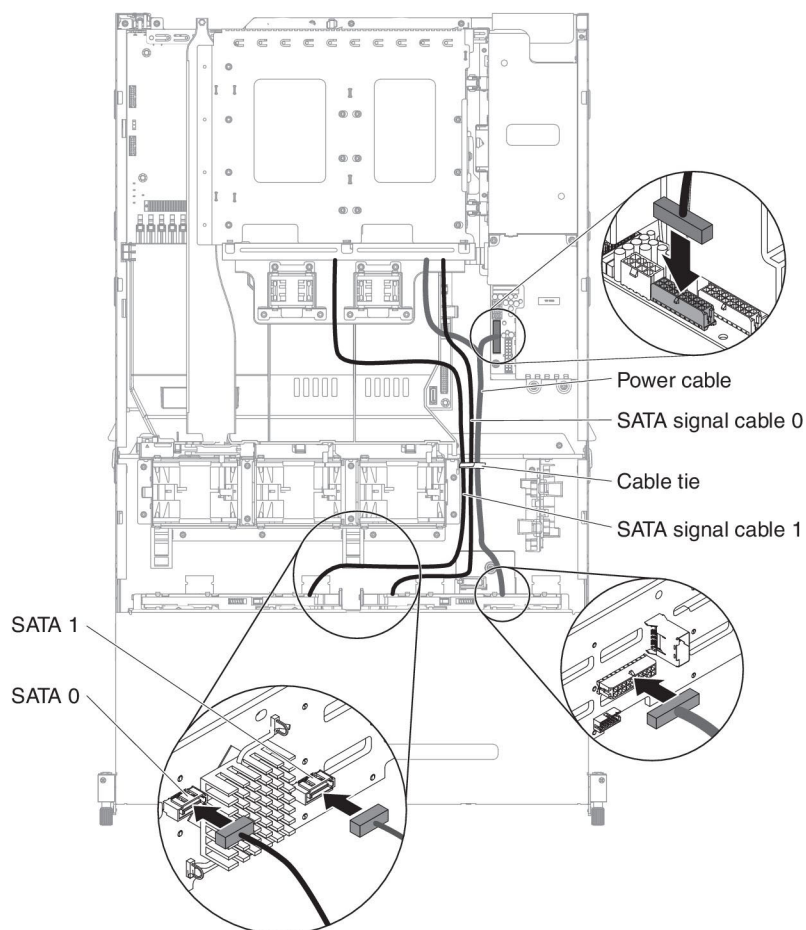
13. Connect the LED signal, SATA signal and power cables to the hot-swap backplane used for the rear hard disk drive cage. They can all be found from the option package.



14. Insert the hot-swap backplane onto the rear hard disk drive cage (see "Installing the hot-swap backplane on the optional rear hard disk drive cage" on page 326).
15. Connect the other end of the LED signal cable to the hot-swap hard disk drive backplane in the server.
16. Find the rear hard disk drive detect pin of the hot-swap backplane signal (I²C) cable located near the system fan cage; then, connect with the rear hard disk drive detect pin of the LED signal cable from the option package.



17. Connect the other end of the SATA signal and power cables to the power paddle card and hot-swap hard disk drive backplane in the server. Make sure the labels of both connectors are matched.



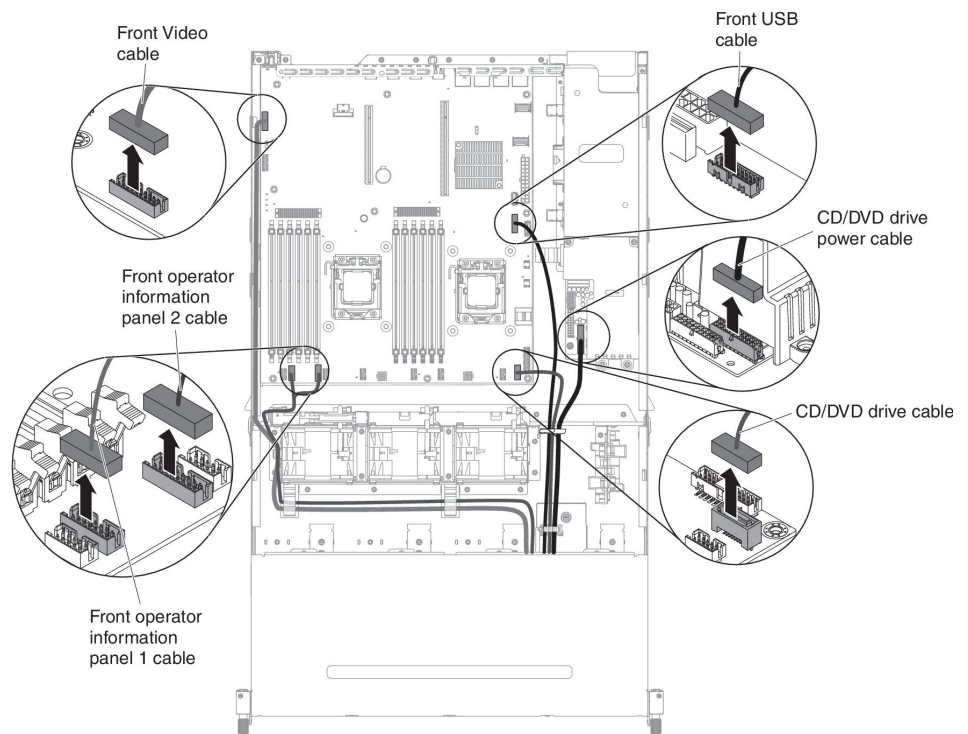
Note: Make sure the cables are routed in the proper locations without blocking the airflow. It is recommended to press all the cables downwards to make the cable routing easier. Secure the cables with any cable retention clips.

18. Install the server top cover (see “Installing the server top cover” on page 344).
19. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

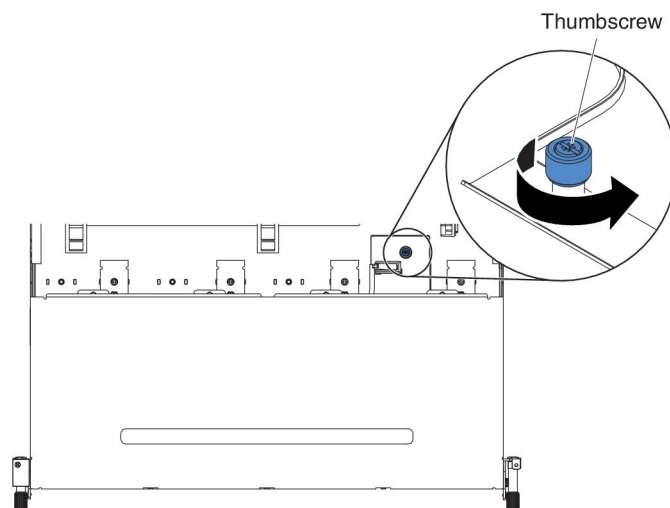
Removing the CD/DVD cable

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

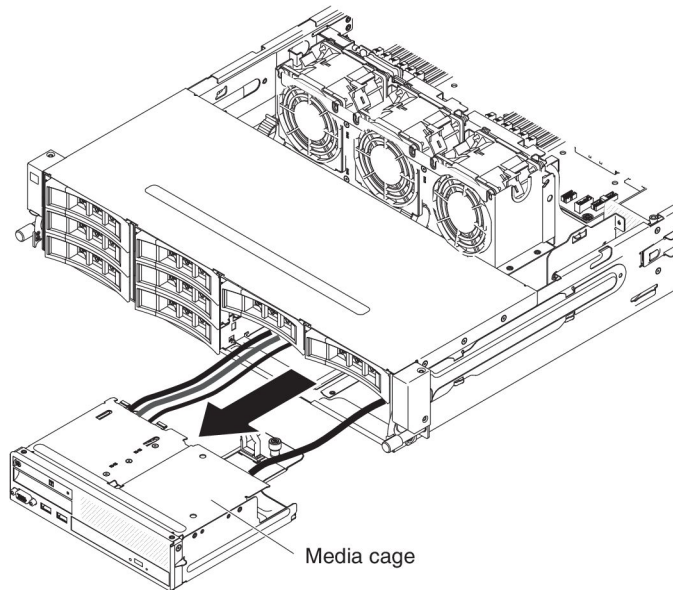
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
5. Remove the air baffle (see “Removing the air baffle” on page 345).
6. Disconnect the USB, video, CD/DVD and operator information cables from the system board. Please remember the relevant cable routing.



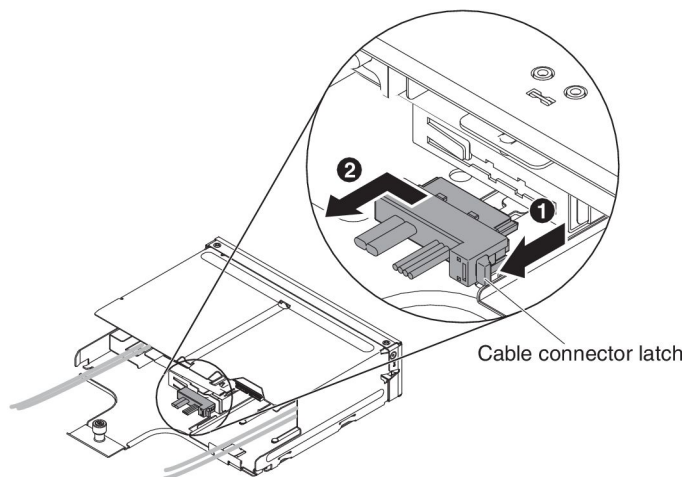
7. Loosen the single thumbscrew that is used to secure the media cage onto the server.



8. Carefully pull the media cage out of the server.



9. Locate the CD/DVD drive within the media cage.
10. Locate the cable connector latch at the back of the CD/DVD drive.
11. Slide the cable connector latch downward (you can see an arrow that points downwards) **1** and leftward to the unlock position **2**; then remove the cable from the CD/DVD drive.

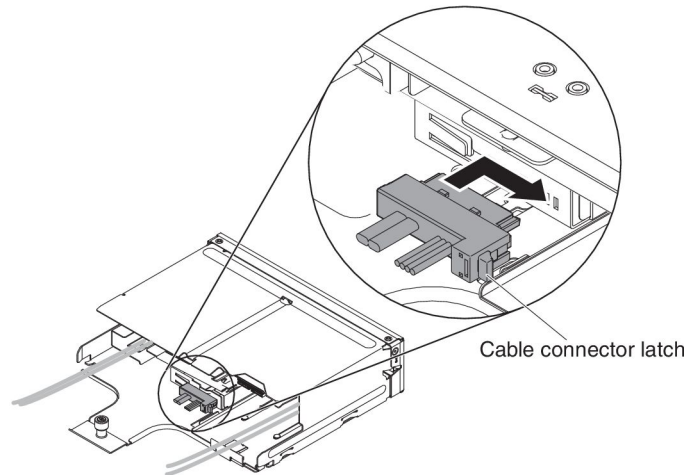


12. If you are instructed to return the CD/DVD cable, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

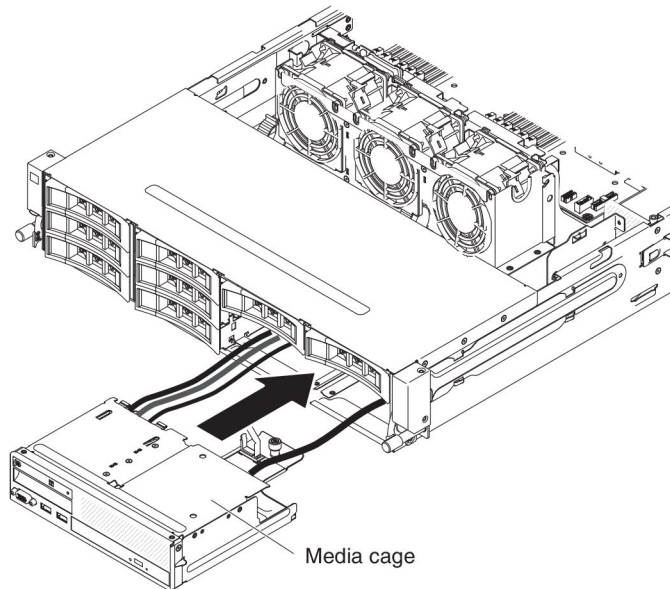
Installing the CD/DVD cable

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

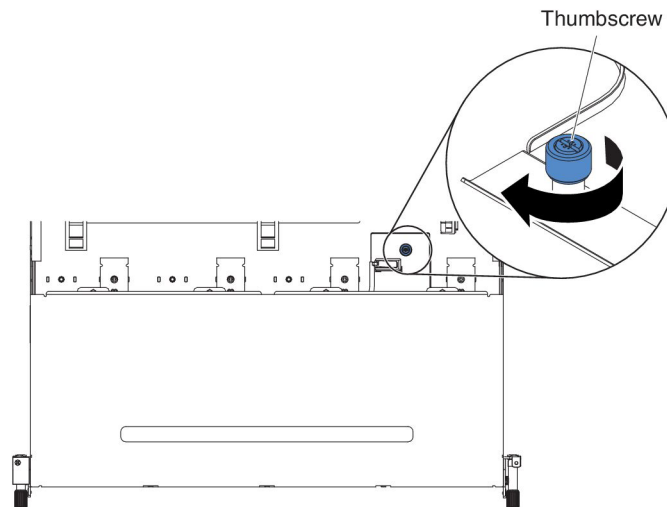
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Locate the connector on the rear of the CD/DVD drive.
3. Align the cable connector with the connector on the rear of the CD/DVD drive.
4. Press the cable connector into the CD/DVD drive connector; then, slide the cable connector rightward to the lock position.



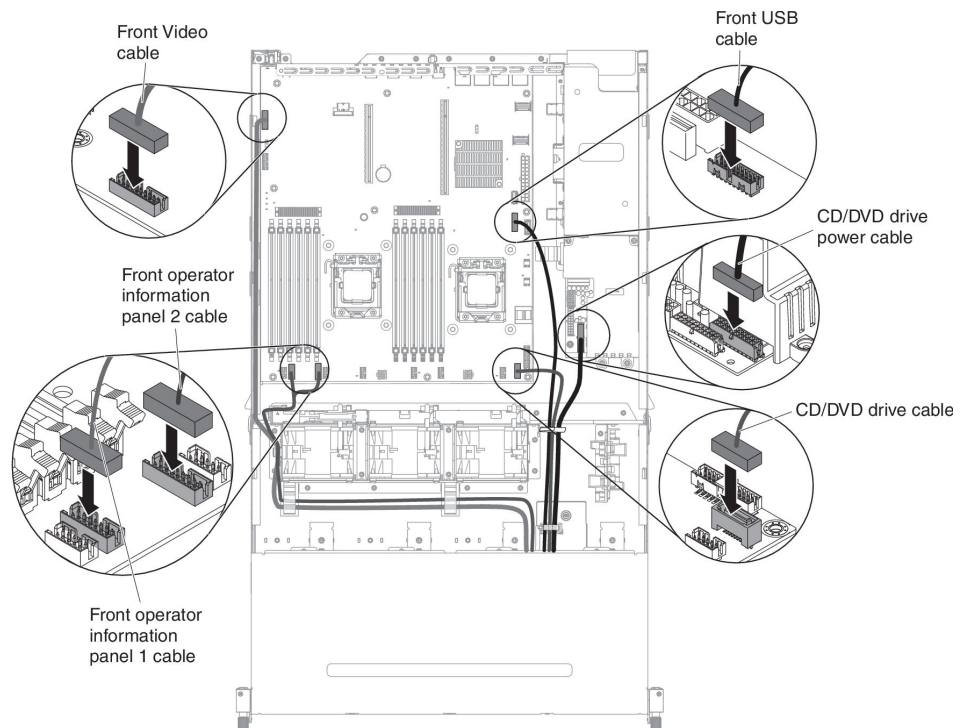
5. Carefully push the media cage back into the server.

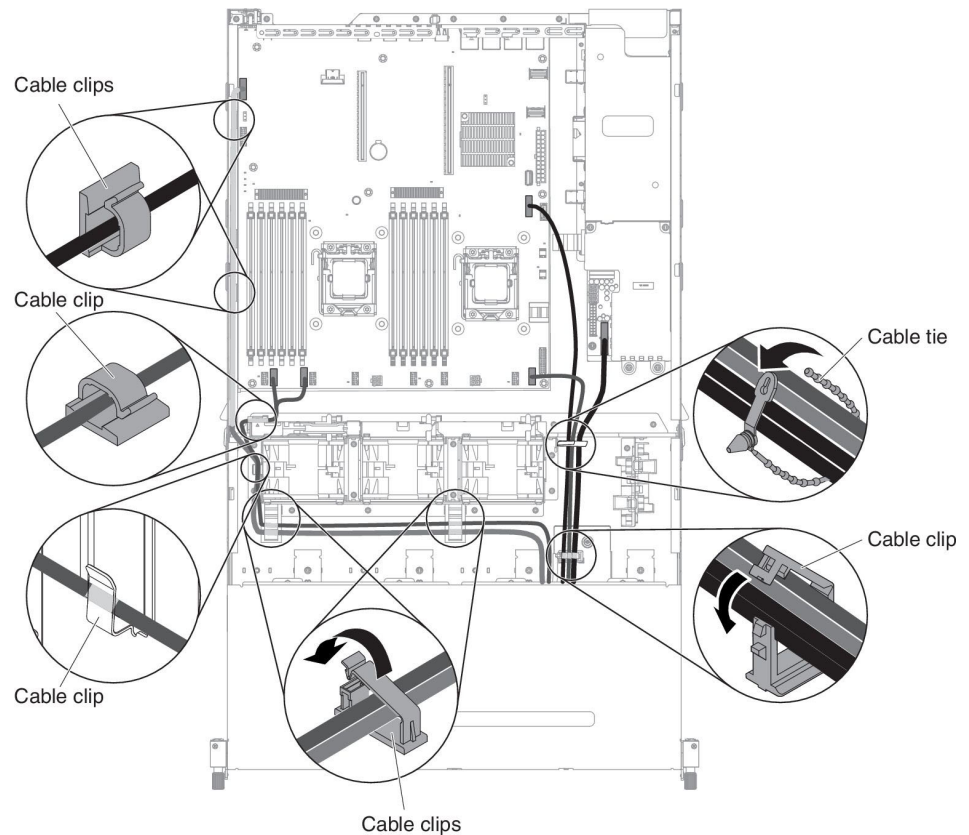


6. Tighten the thumbscrew to secure the media cage onto the server.



7. Reconnect the USB, video, CD/DVD and operator information cables to the system board. Remember to insert the cables into the relevant cable clips and cable tie.



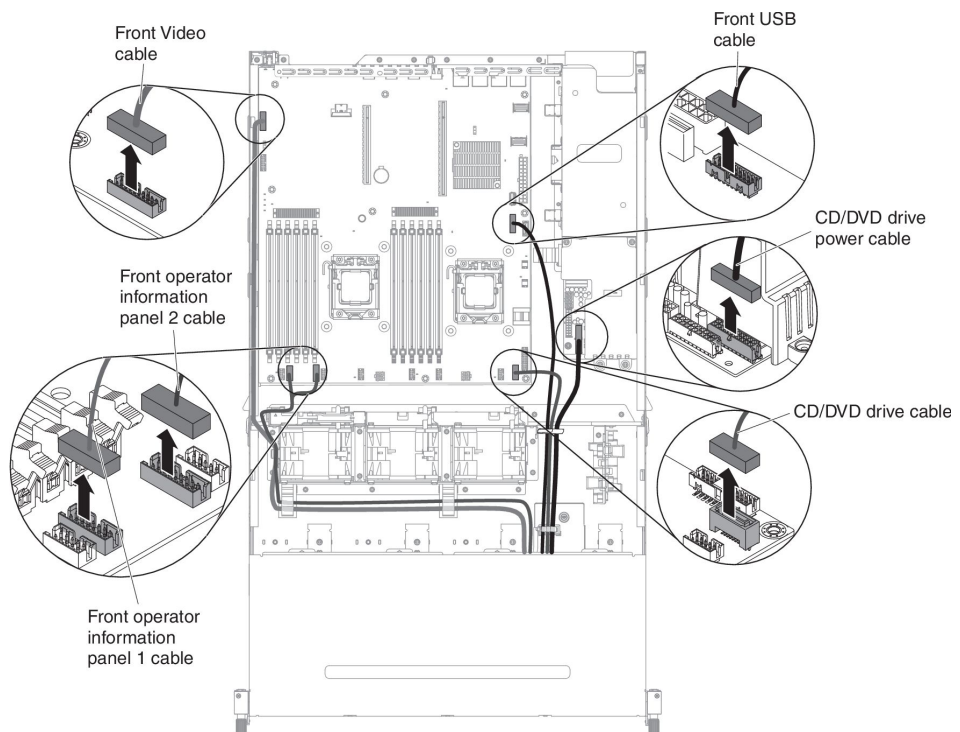


8. Install the air baffle (see “Installing the air baffle” on page 347).
9. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 253).
10. Install the server top cover (see “Installing the server top cover” on page 344).
11. Reconnect the power cord and any cables that you removed.
12. Turn on the peripheral devices and the server.

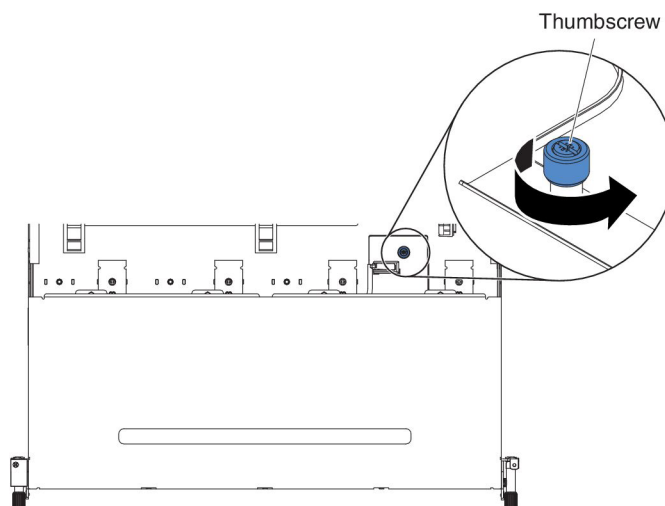
Removing a CD/DVD drive

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

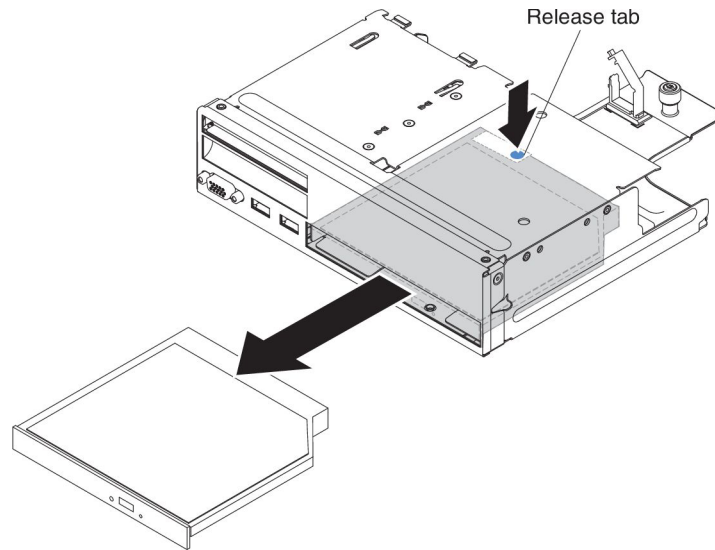
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
5. Remove the air baffle (see “Removing the air baffle” on page 345).
6. Disconnect the USB, video, CD/DVD and front operator information panel cables from the system board. Please remember the relevant cable routing.



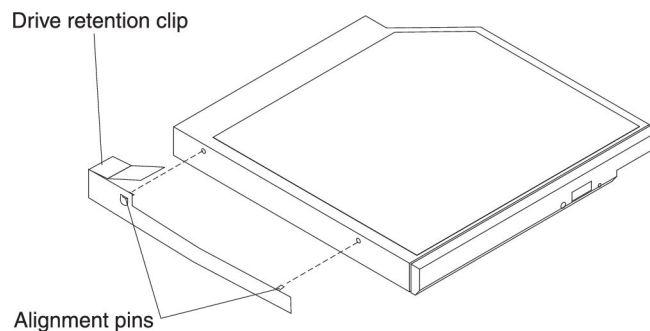
7. Loosen the single thumbscrew that is used to secure the media cage onto the server.



8. Carefully pull the media cage out of the server.
9. Remove the CD/DVD cable from the CD/DVD drive (see step 9 of "Removing the CD/DVD cable" on page 204).
10. Locate the blue release tab on the rear of the drive bay; then, while you press down on the blue release tab, slowly push the CD/DVD drive out of the media cage.



11. After removing the CD/DVD drive out of the media cage, slide the drive-retention clip from the side of the drive. Save the clip, as you may need to use it when installing a replacement drive.

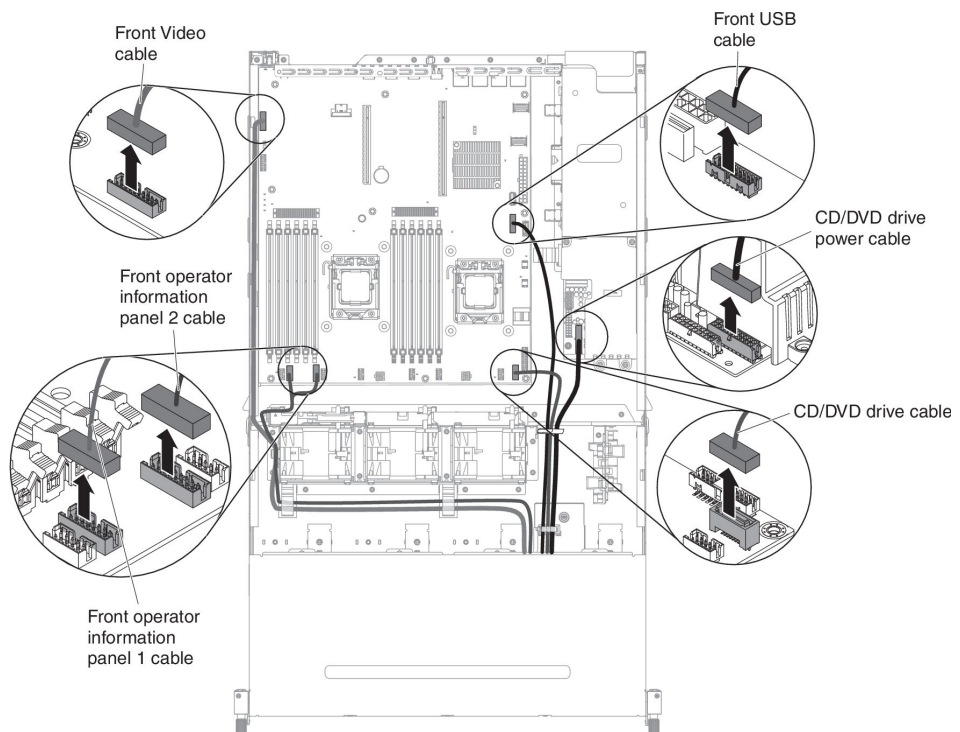


12. If you are instructed to return the CD/DVD drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

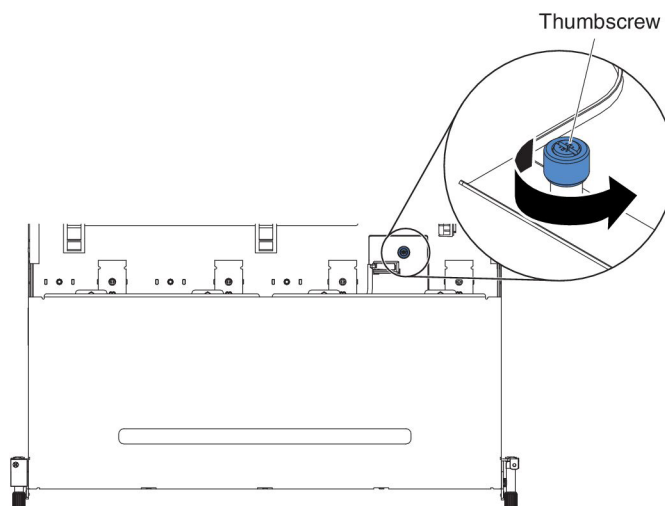
Installing an optional CD/DVD drive

To install an CD/DVD drive, complete the following steps:

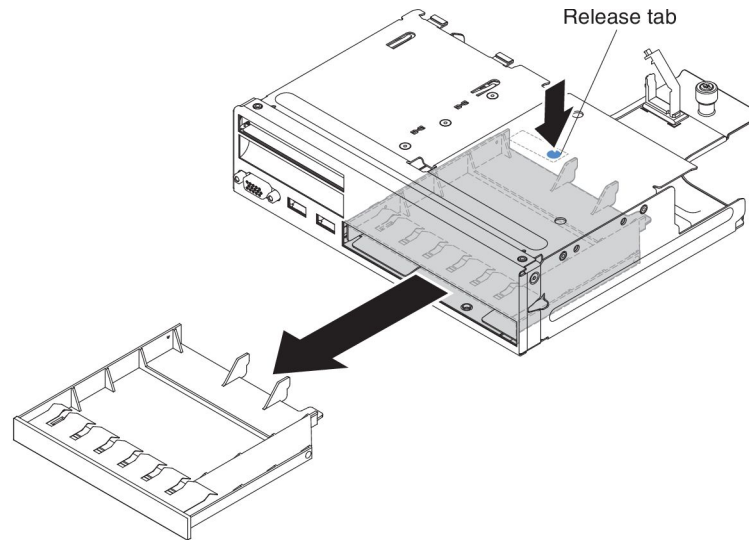
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
5. Remove the air baffle (see “Removing the air baffle” on page 345).
6. Locate the USB, video and front operator information panel cables of the media cage.
7. Disconnect the USB, video and front operator information panel cables from the system board. Please remember the relevant cable routing.



8. Loosen the single thumbscrew that is used to secure the media cage onto the server.



9. Carefully pull the media cage out of the server.
10. Locate the blue release tab on the rear of the drive bay; then, while you press down on the tab, slowly push the CD/DVD filler out of the media cage.



11. After removing the CD/DVD drive out of the media cage, slide the drive-retention clip from the side of the drive. Save the clip, as you may need to use it when installing a replacement drive.

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 server top 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

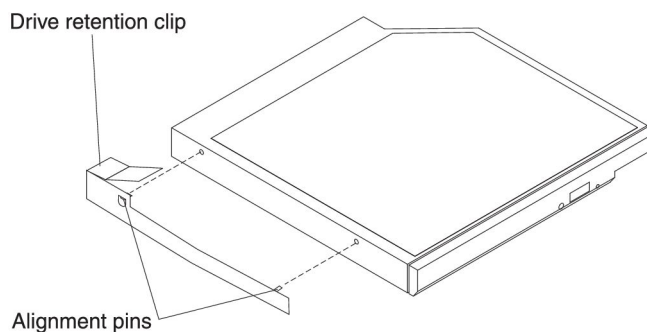
Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

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

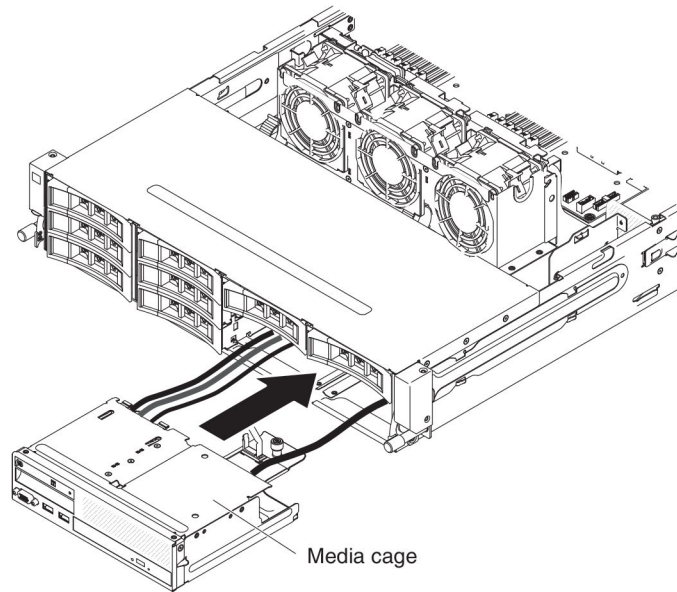


Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1

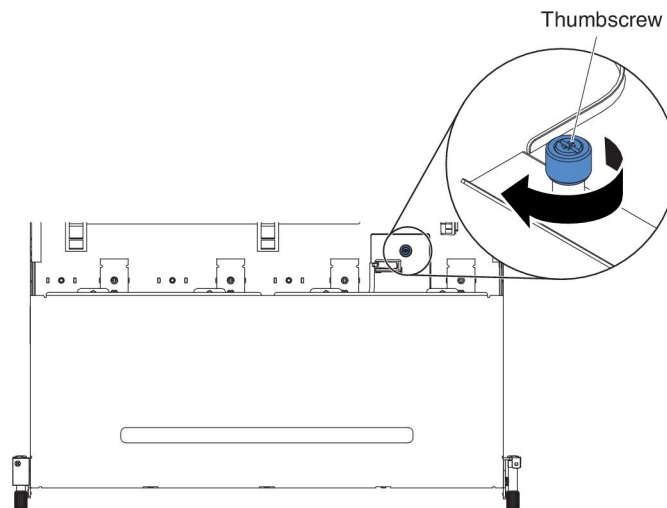
12. Touch the static-protective package that contains the new optical drive to any unpainted metal surface on the server; then, remove the optical drive from the package and place it on a static-protective surface.
13. Attach the drive retention clip that you removed from the previous drive to the side of the new drive.



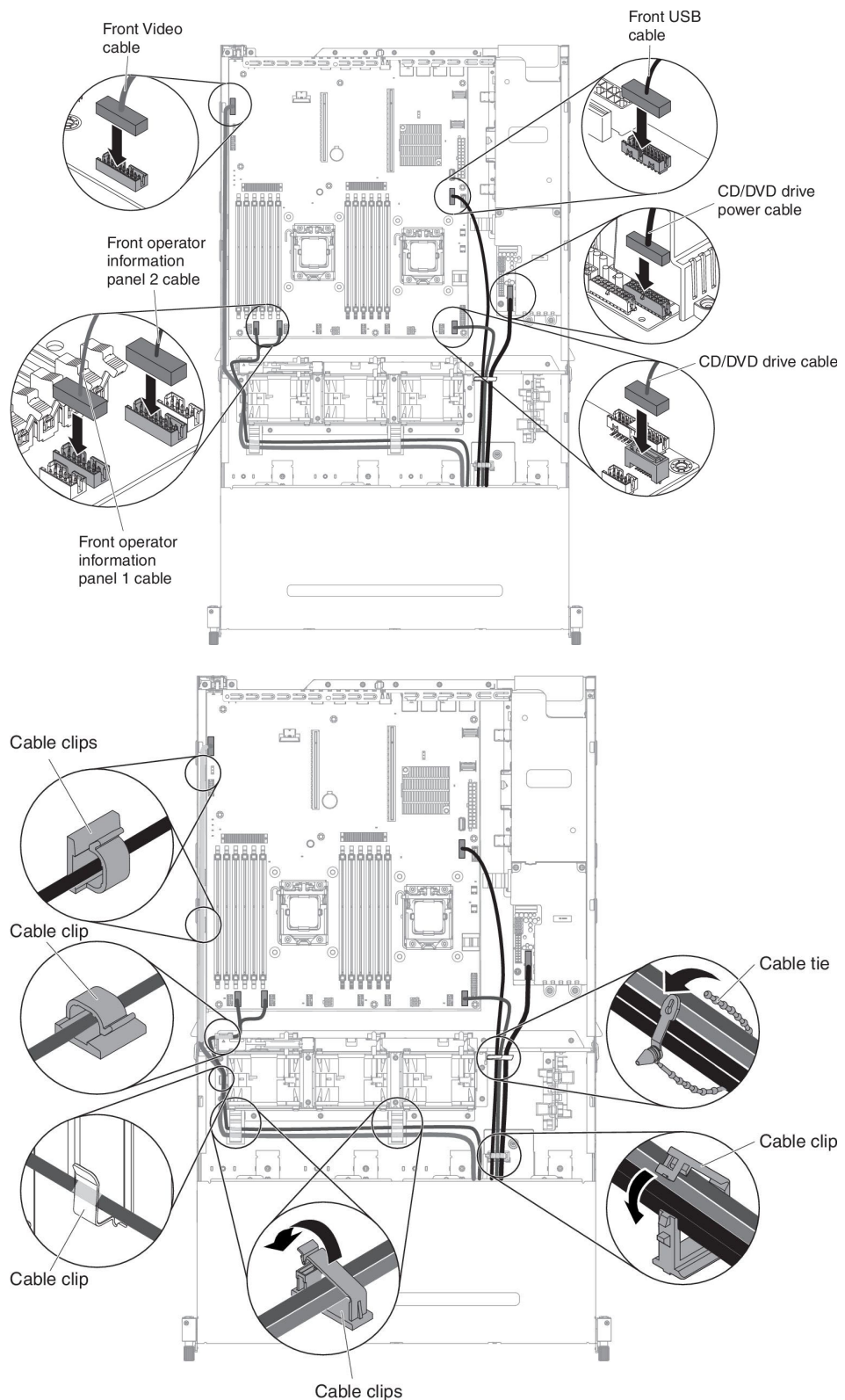
14. Align the drive in the drive bay and slowly slide the drive into the CD/DVD drive bay of the media cage until the drive clicks into place.
15. Install the CD/DVD cable to the CD/DVD drive (see "Installing the CD/DVD cable" on page 207).
16. Carefully push the media cage back into the server.



17. Tighten the thumbscrew to secure the media cage onto the server.



18. Reconnect the USB, video, CD/DVD and operator information cables to the system board. Remember to insert the cables into the relevant cable clips and cable tie.



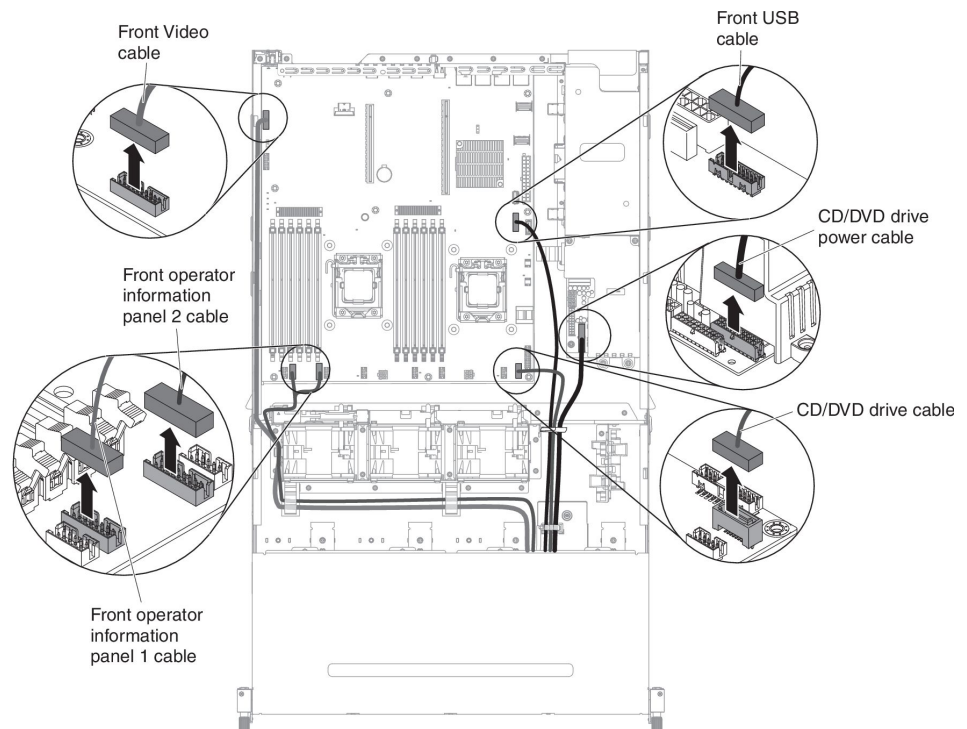
19. Install the air baffle (see "Installing the air baffle" on page 347).
20. Install the PCI riser-card assembly (see "Installing the PCI riser-card assembly" on page 253).
21. Install the server top cover (see "Installing the server top cover" on page 344).

22. Reconnect the power cord and any cables that you removed.
23. Turn on the peripheral devices and the server.

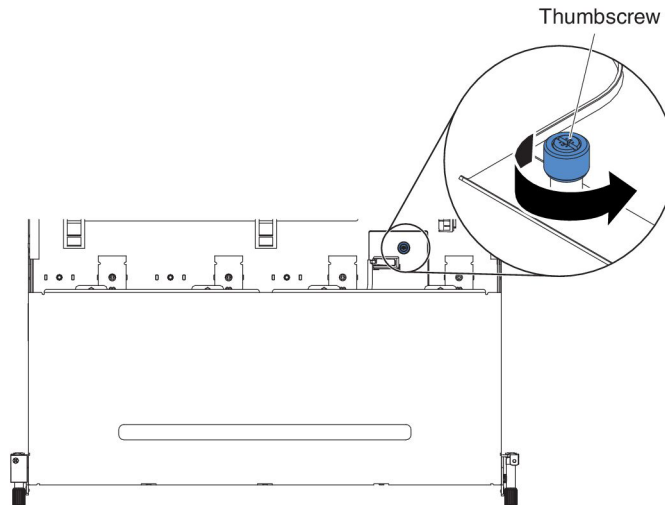
Removing the media cage

To remove the media cage, complete the following steps:

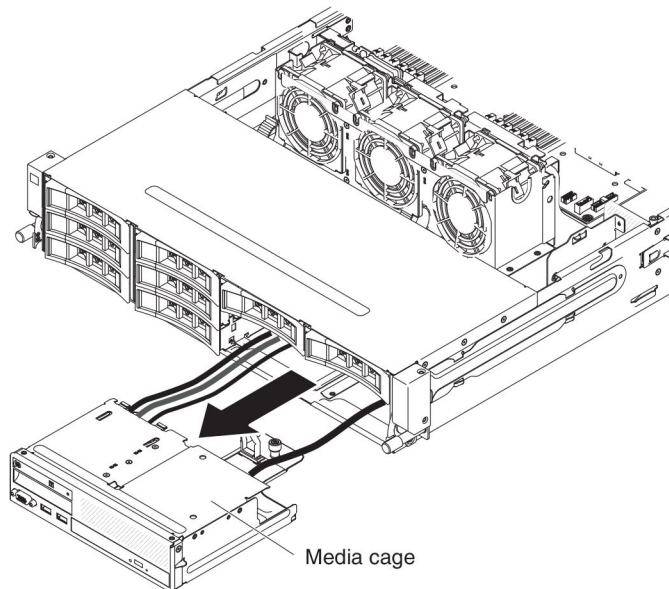
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
5. Remove the air baffle (see “Removing the air baffle” on page 345).
6. Disconnect the USB, video, CD/DVD and front operator information panel cables from the system board. Please remember the relevant cable routing.



7. Loosen the single thumbscrew that is used to secure the media cage onto the server.



8. Carefully pull the media cage out of the server.



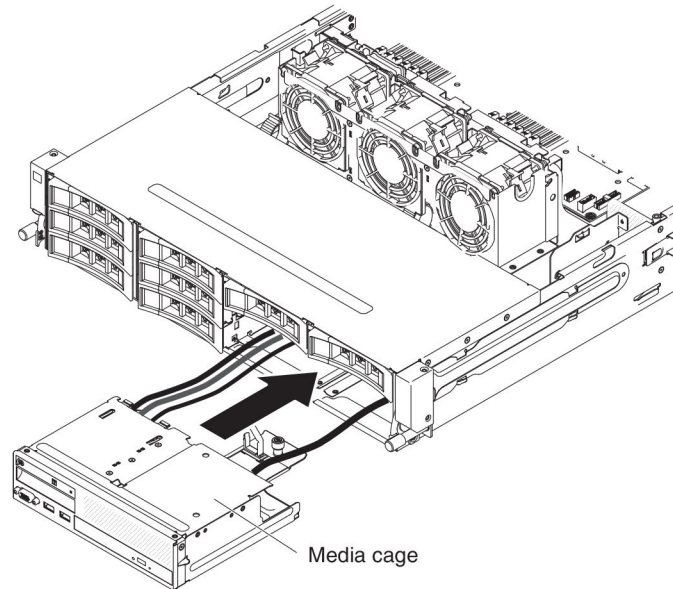
9. Remove the front USB and video connector assembly from the media cage (see "Removing the front USB and video connector assembly inside media cage" on page 282).
10. Remove the operator information panel from the media cage (see "Removing the operator information panel" on page 270).
11. Remove the CD/DVD drive from the media cage (see "Removing a CD/DVD drive" on page 209).
12. If you are instructed to return the media cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the media cage

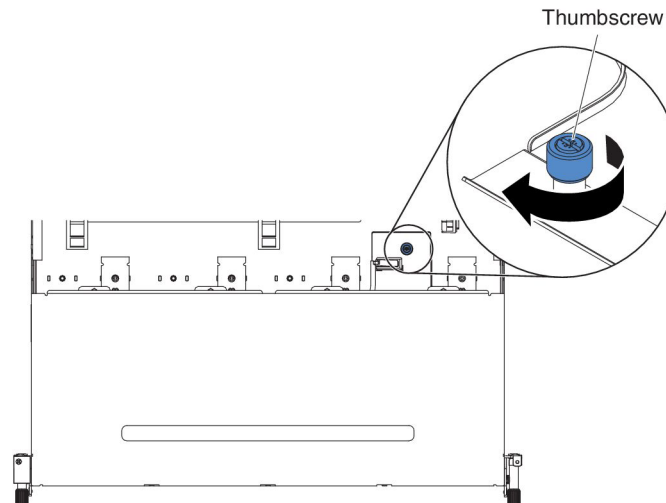
To install the media cage, complete the following steps:

1. Install the front USB and video connector assembly into the media cage (see "Installing the front USB and video connector assembly inside media cage" on page 284).
2. Install the operator information panel into the media cage (see "Installing the operator information panel" on page 274).

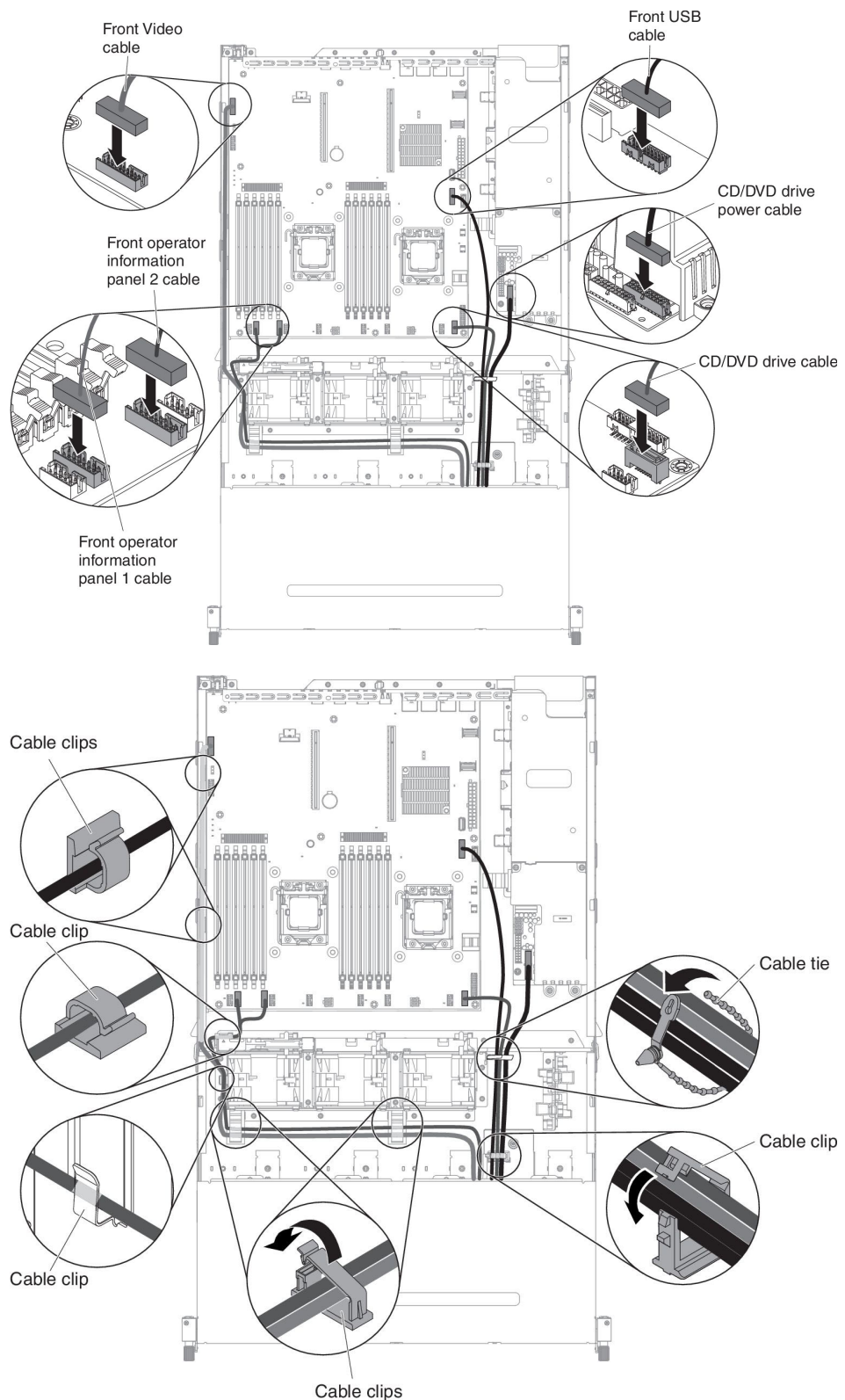
3. Install the CD/DVD drive into the media cage (see “Installing an optional CD/DVD drive” on page 211).
4. Carefully push the media cage back into the server.



5. Tighten the thumbscrew to secure the media cage onto the server.



6. Reconnect the USB, video, CD/DVD and operator information cables to the system board. Remember to insert the cables into the relevant cable clips and cable tie.



7. Install the air baffle (see "Installing the air baffle" on page 347).
8. Install the PCI riser-card assembly (see "Installing the PCI riser-card assembly" on page 253).
9. Install the server top cover (see "Installing the server top cover" on page 344).

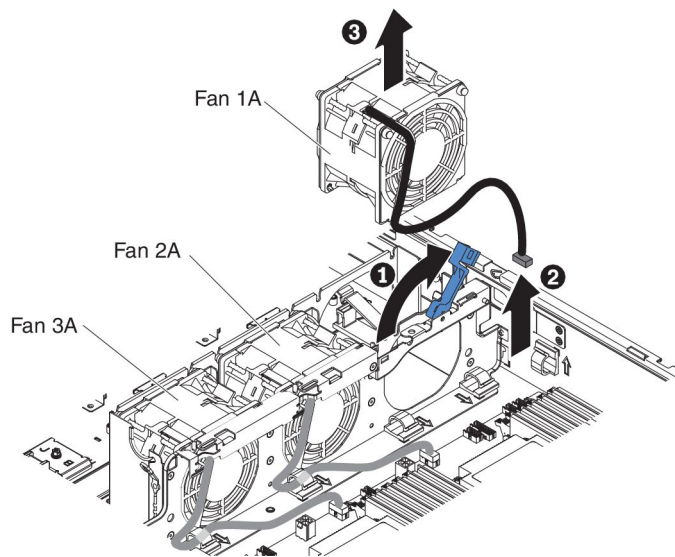
10. Reconnect the power cord and any cables that you removed.
11. Turn on the peripheral devices and the server.

Removing a system fan

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

To remove a system fan, first complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 197).
5. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
6. Remove the air baffle (see “Removing the air baffle” on page 345).
7. Removing Fan 1A:



- a. Pull up the blue handle on the system fan cage.
 - b. Disconnect the system fan cable from the connector on the system board.
 - c. Pull the system fan cable out of the cable retainer clip.
 - d. Grasp the top of the fan with your index finger and thumb and slowly lift the fan out of the server.
8. Removing Fan 2A or Fan 3A
 - a. Disconnect the system fan cable from the connector on the fan board.
 - b. Pull the system fan cable out of the cable retainer clip.
 - c. Grasp the top of the fan with your index finger and thumb and lift the fan out of the server.
 9. If you are instructed to return the fan, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a system fan

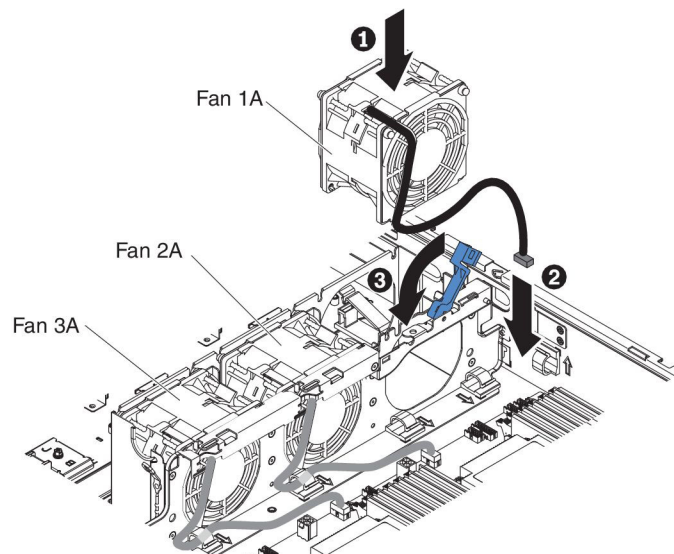
For proper cooling, the server requires that all fans in the system be operating at all times.

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

See “System-board internal connectors” on page 20 for the locations of the fan cable connectors.

Read the safety information that begins on page vii and “Installation guidelines” on page 185.

Steps for installing Fan 1A:



1. 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.
2. Pull up the blue handle on the system fan cage.
3. Orient the fan so that the fan cable points to the system board.
4. Lower the fan into the fan slot in the server and ensure that it is seated correctly.
5. Connect the system fan cable to the connector on the system board.
6. Insert the system fan cable into the cable retainer clip.
7. Return the blue handle back to its horizontal position.
8. Install the air baffle (see “Installing the air baffle” on page 347).
9. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 253).
10. If you have the optional hot-swap rear hard disk drive cage installed, rotate it downwards (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 198).
11. Install the server top cover (see “Installing the server top cover” on page 344).
12. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Steps for installing Fan 2A or 3A:

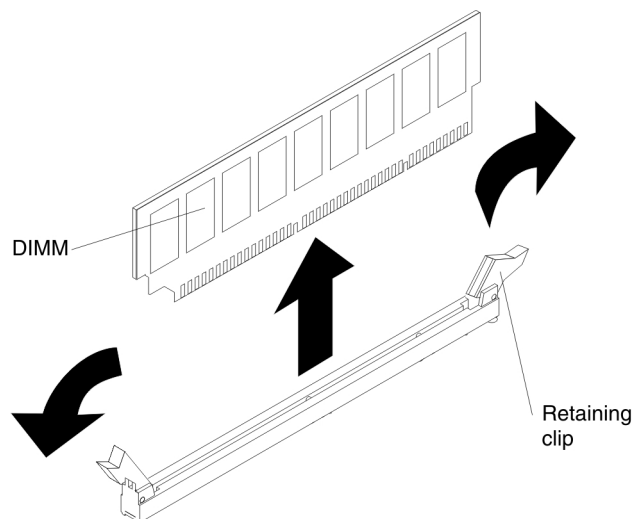
1. Touch the static-protective package that contains the new fan to any unpainted metal surface on the server. Then, remove the new fan from the package.
2. Orient the fan so that the fan cable points to the system board.
3. Lower the fan into the fan slot in the server and ensure that it is seated correctly.
4. Connect the system fan cable to the connector on the system board.
5. Insert the system fan cable into the cable retainer clip.
6. Install the air baffle (see “Installing the air baffle” on page 347).
7. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 253).
8. If you have the optional hot-swap rear hard disk drive cage installed, rotate it downwards (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 198).
9. Install the server top cover (see “Installing the server top cover” on page 344).
10. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing a memory module (DIMM)

To remove a DIMM, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 197).
5. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
6. Remove the air baffle (see “Removing the air baffle” on page 345).
7. Carefully flip open the retaining clip on each end of the DIMM connector and lift the DIMM from the connector.

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



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

Installing a memory module

The following notes describe the types of dual inline memory modules (DIMMs) that the server supports and other information that you must consider when you install DIMMs (see “System-board DIMM connectors” on page 21 for the location of the DIMM connectors):

- To confirm that the server supports the DIMM that you are installing, see <http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/>.
- When you install or remove DIMMs, the server configuration information changes. When you restart the server, the system displays a message that indicates that the memory configuration has changed.
- The server supports only industry-standard double-data-rate 3 (DDR3), 1066, 1333, or 1600 MHz, synchronous dynamic random-access memory (SDRAM) registered dual inline memory modules (DIMMs) with error correcting code (ECC).
- The specifications of a DDR3 DIMM are on a label on the DIMM, in the following format.

ggg eRxff-PC3-wwwwwm-aa-bb-cc-dd

where:

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

e is the number of ranks

1 = single-rank

2 = dual-rank

4 = quad-rank

ff is the device organization (bit width)

4 = x4 organization (4 DQ lines per SDRAM)

8 = x8 organization

16 = x16 organization

wwwww is the DIMM bandwidth, in MBps

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

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

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

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

14900 = 14.93 GBps (PC3-1866 SDRAMs, 8-byte primary data bus)

17000 = 17.06 GBps (PC3-2133 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)

L = Load Reduction DIMM (LR-DIMM)

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

bb is the JEDEC SPD Revision Encoding and Additions level

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

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

- Do not install registered and unbuffered DIMMs in the same server.
- The server supports 1.35-volt (low-voltage) and 1.5-volt DIMMs.

- The server supports a maximum of 12 DIMMs (single-rank, dual-rank, or quad-rank) on the base 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.

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

- The DIMM options that are available for the server are 4 GB, 8 GB, 16 GB, and 32 GB (when available).
- The server supports memory sparing. Memory sparing reserves memory capacity for failover in the event of a DIMM failure, and the reserved capacity is deducted from the total available memory. Memory sparing provides less redundancy than memory mirroring does. If a predetermined threshold of correctable errors is reached, the contents of the failing DIMM are copied to the spare memory, and the failing DIMM or rank is disabled. To enable memory sparing through the Setup utility, select System Settings > Memory.
- The server system board supports a minimum of 2 GB and a maximum of 384 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 350

- 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 10. DIMM connectors on each memory channel

Microprocessor	Memory channel	DIMM connectors
Microprocessor 1	Channel 1	1, 2
	Channel 2	3, 4
	Channel 3	5, 6

Table 11. DIMM connectors on each memory channel

Microprocessor	Memory channel	DIMM connectors
Microprocessor 2	Channel 1	7, 8
	Channel 2	9, 10
	Channel 3	11, 12

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

Table 12. DIMM connectors associated with each microprocessor

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

- When you replace a DIMM, the server provides automatic DIMM enablement capability without you having to go to Setup to enable the new DIMM manually.
- The maximum operating speed of the server is determined by the slowest DIMM installed in the server.
- The server provides memory mirroring support. Memory channel 2 is mirrored exactly to channel 3. This mirroring provides redundancy in memory but reduces the total memory capacity to one third. Channel 1 DIMM connectors 1, 2, 7, and 8 are not used in memory-mirroring mode.
- 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.
- 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, rank sparing mode, and mirroring mode.
- **Independent mode:** When you use the independent mode, install DIMMs as indicated in the following table.
 - The following table lists the **DIMM installation sequence** for non-mirroring mode when one or two microprocessors is installed in the server:

Table 13. DIMM connectors associated with each microprocessor

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

- **Rank sparing mode:** When you use the memory mirroring feature, consider the following information:
 - In rank sparing mode, one rank of a DIMM in each populated channel is reserved as spare memory. The spare rank is not available as active memory. When the active rank memory fails, its content is copied to the spare rank memory which becomes active. The spare rank must have identical or larger memory capacity than all the other ranks on the same channel.
 - 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 14. DIMM population sequence (rank sparing mode)

Number of installed microprocessors	DIMM connector population sequence
1	1, 2
	3, 4
	5, 6

Table 14. DIMM population sequence (rank sparing mode) (continued)

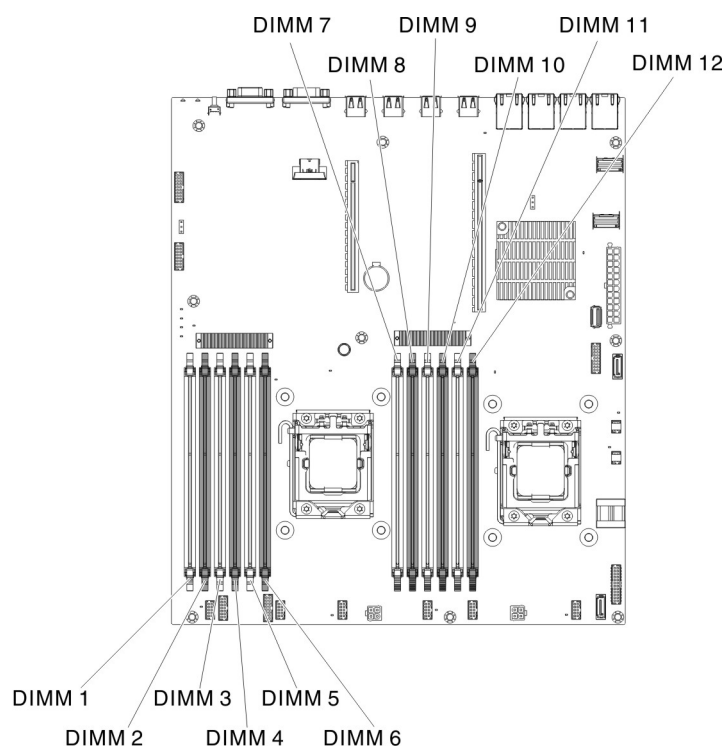
Number of installed microprocessors	DIMM connector population sequence
2	1, 2
	7, 8
	3, 4
	9, 10
	5, 6
	11, 12

- **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 within two channels simultaneously. If a failure occurs, the memory controller switches from the primary pair of memory DIMMs to the backup pair of DIMMs. You must enable memory mirroring through the Setup utility. For details about enabling memory mirroring, see “Using the Setup utility” on page 353. When you use the memory mirroring feature, consider the following information:
 - 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 15. DIMM population sequence (memory-mirroring mode)

Number of Installed Microprocessors	DIMM connector
1	3, 5
	4, 6
2	3, 5
	9, 11
	4, 6
	10, 12
Note: DIMM connectors 1, 2, 7, and 8 are not used in memory-mirroring mode.	

- When you install or remove DIMMs, the server configuration information changes. When you restart the server, the system displays a message that indicates that the memory configuration has changed.
- The following illustration shows the location of the DIMMs connectors on the system board.

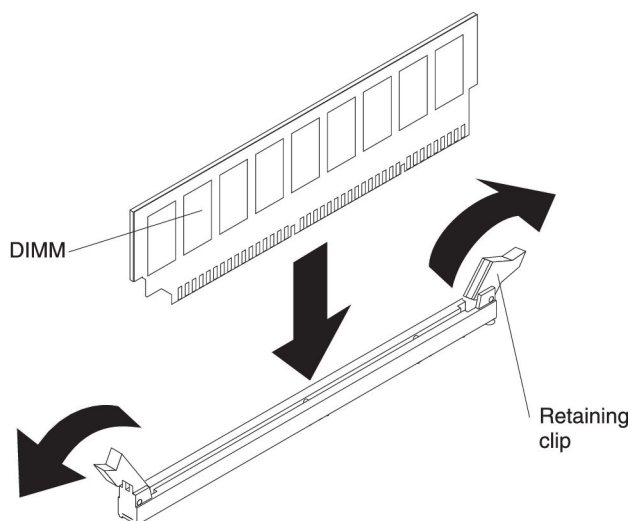


To install a DIMM, complete the following steps:

Note: The odd-numbered DIMM connectors are white-colored, while the even-numbered DIMM connectors are black-colored.

1. Carefully flip open the retaining clip on each end of the DIMM connector.

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



2. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.
3. Turn the DIMM so that the DIMM keys align correctly with the connector.
4. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the end of the DIMM connector. Firmly press the DIMM straight down

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

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

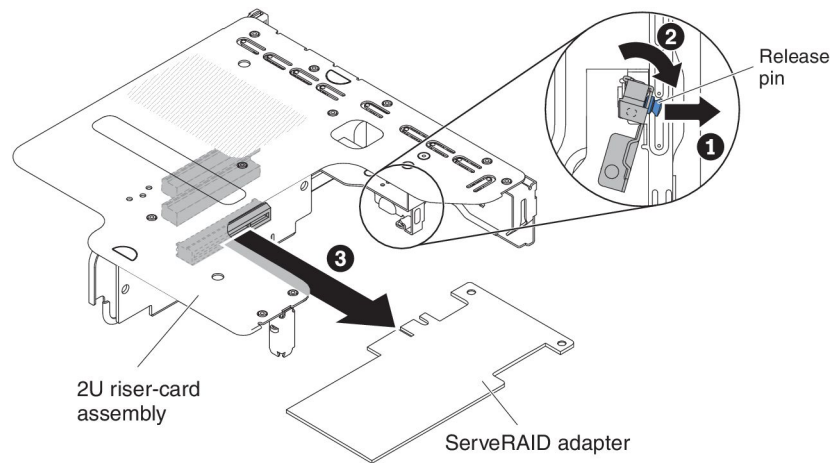
5. Repeat steps 2 on page 228 through 4 on page 228 until all the new or replacement DIMMs are installed.
6. Replace the air baffle (see “Installing the air baffle” on page 347), making sure all cables are out of the way.
7. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 253).
8. If you have the optional hot-swap rear hard disk drive cage installed, rotate it down (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 198).
9. Install the server top cover (see “Installing the server top cover” on page 344).
10. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.
11. Go to the Setup utility and make sure all the installed DIMMs are present and enabled.

Removing a ServeRAID adapter from the PCI riser-card assembly

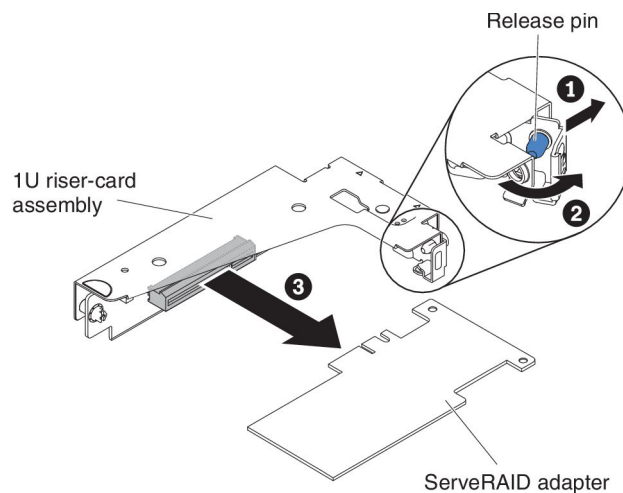
To remove a ServeRAID adapter from the PCI riser-card assembly, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 197).
5. Remove PCI riser-card assembly 2 (see “Removing the PCI riser-card assembly” on page 251).
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 PCI riser-card assembly 2.

For 2U riser card:



For 1U riser card:



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

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.

Installing a ServeRAID adapter on the PCI riser-card assembly

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.

- Depending on your server model, the server comes with an onboard RAID adapter which provides basic RAID levels 0 or 1 functionality.

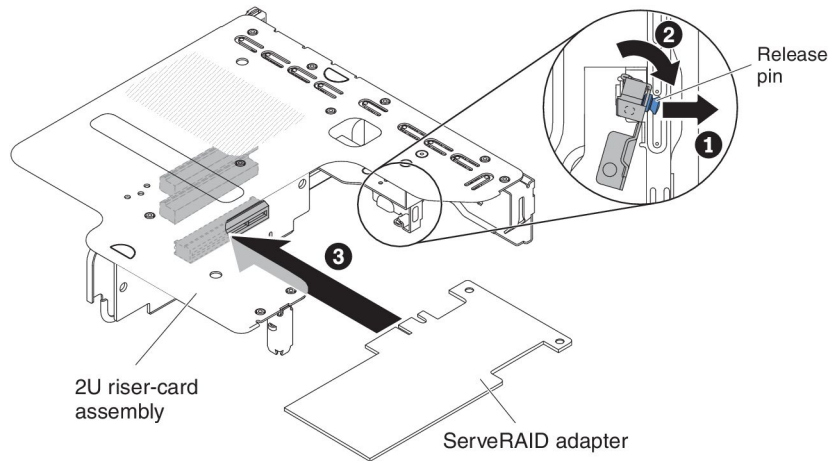
The server supports the following optional RAID adapters that you can purchase for additional RAID support. For configuration information, see the documentation that comes with the adapter or the ServeRAID documentation at <http://www.ibm.com/systems/support/>

- ServeRAID controllers:
 - 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 H1110 SAS/SATA Controller for IBM System x
 - ServeRAID M5100 Series Battery Kit for IBM System X
 - ServeRAID C105 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 M1100 Series Zero Cache/RAID 5 Upgrade for IBM System X
 - ServeRAID M5100 Series Zero Cache/RAID 5 Upgrade for IBM System X
 - ServeRAID M5100 Series RAID 6 Upgrade for IBM System X
 - ServeRAID M5100 Series 1 GB Flash/RAID Upgrade for IBM System X

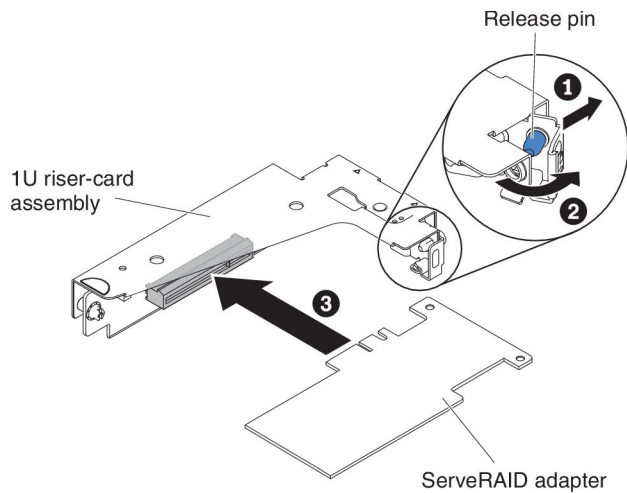
To install an ServeRAID adapter, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 197).
5. Remove PCI riser-card assembly 2 (see “Removing the PCI riser-card assembly” on page 251).
6. Touch the static-protective package that contains the new ServeRAID controller to any unpainted metal surface on the server; then, grasp the adapter by the top edge or upper corners of the adapter and remove it from the package.
7. If you are installing a new or replacement ServeRAID controller that uses a battery, complete the following steps:
 - a. Remove the battery from the ServeRAID adapter package or the battery package.
 - b. Install the battery and connect the battery to the ServeRAID controller as instructed in the documentation that comes with the ServeRAID controller or the battery, or see “Installing a RAID adapter battery remotely in the server” on page 234.
8. Pull the release pin to unlock the retention latch; then rotate the retention latch to the open position.
9. Align the ServeRAID adapter so that the keys align correctly with the connector on the PCI riser-card assembly.
10. Insert the ServeRAID adapter into the connector on the riser-card until it is firmly seated.

For 2U riser card:



For 1U riser card:



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

11. Route the signal cables and connect the signal cables to the ServeRAID adapter (see "Internal cable routing" on page 188).
12. 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.
13. Install the air baffle (see "Installing the air baffle" on page 347), making sure all cables are out of the way.
14. Install PCI riser-card assembly 2 (see "Installing the PCI riser-card assembly" on page 253).
15. If you have the optional hot-swap rear hard disk drive cage installed, rotate it downwards (see "Rotating the optional hot-swap rear hard disk drive cage down" on page 198).
16. Install the server top cover (see "Installing the server top cover" on page 344).
17. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.
18. Perform any configuration tasks that are required for the ServeRAID adapter.

Notes:

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

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

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

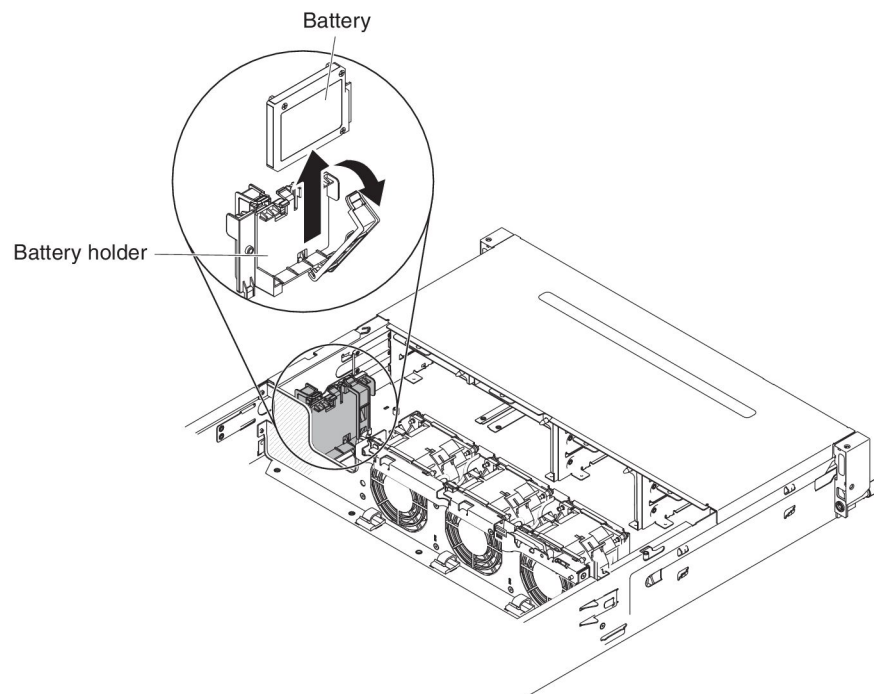
Until the battery is fully charged, the adapter firmware sets the controller cache to write-through mode; after the battery is fully charged, the firmware re-enables write-back mode.

2. When you restart the server, you are given the opportunity to import the existing RAID configuration to the new ServeRAID adapter.

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 vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Slightly use your finger or thumb to unlock the battery retention clip from the battery holder. During the unlocking process you will hear a “click” sound.



5. If there is a battery cable, carefully disconnect the battery cable from the battery cable connector on the battery.
6. Lift the battery up to remove the battery from the battery holder.

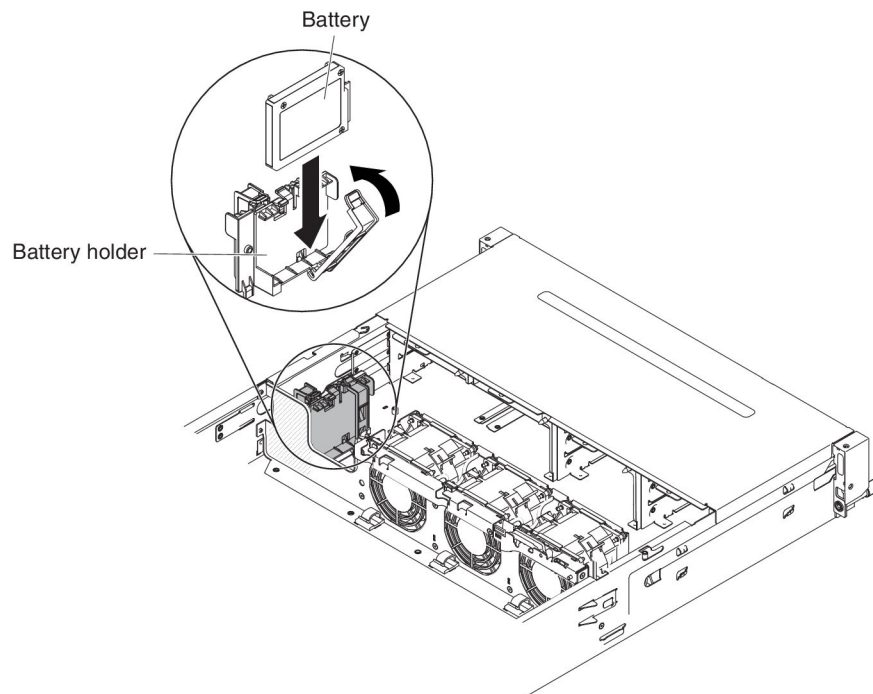
7. If you are instructed to return the RAID adapter battery, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a RAID adapter battery remotely in the server

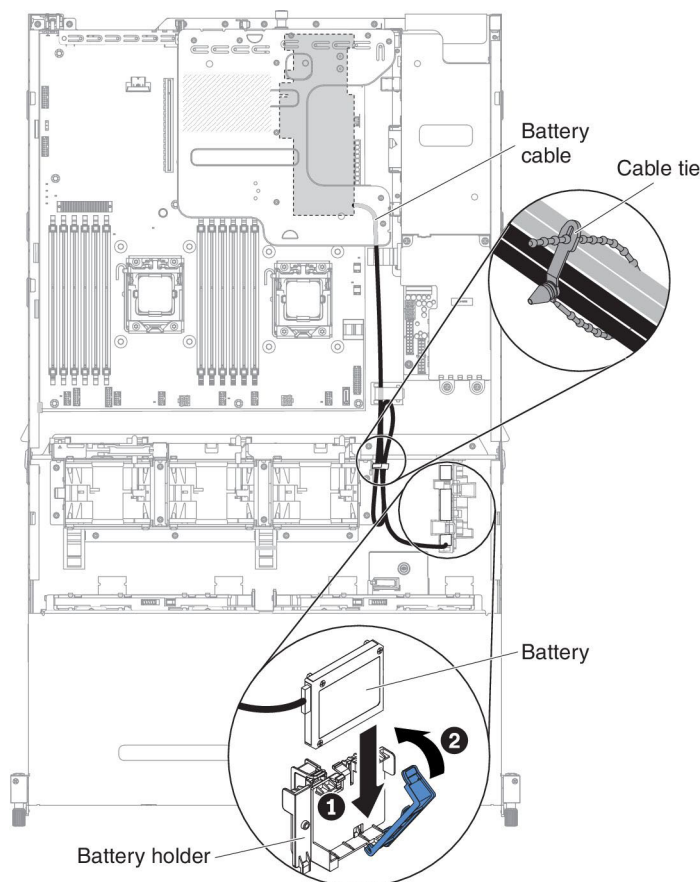
When you install any ServeRAID adapter in the server that come with a RAID adapter battery, the battery must be installed remotely to prevent the battery from overheating.

To install a RAID adapter battery in the RAID battery tray, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 185.
2. Slightly use your finger or thumb to unlock the battery retention clip from the battery holder. During the unlocking process you will hear a "click" sound.
3. 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.
 - b. Push the battery retention clip back to its vertical position until it snaps into place, thereby securing the battery.



4. 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.



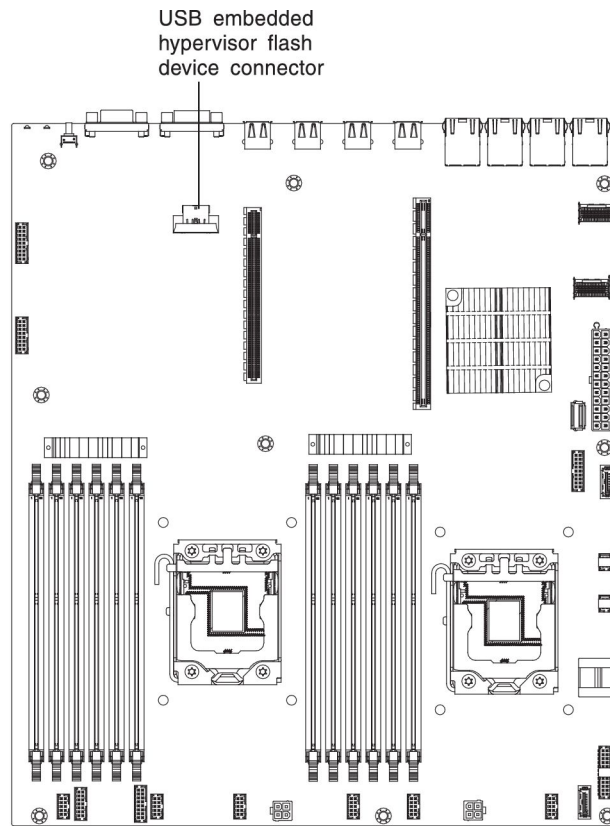
Attention: Make sure that the cable is not pinched and does not cover any connectors or obstruct any components on the system board.

5. Install the server top cover (see “Installing the server top cover” on page 344).
6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

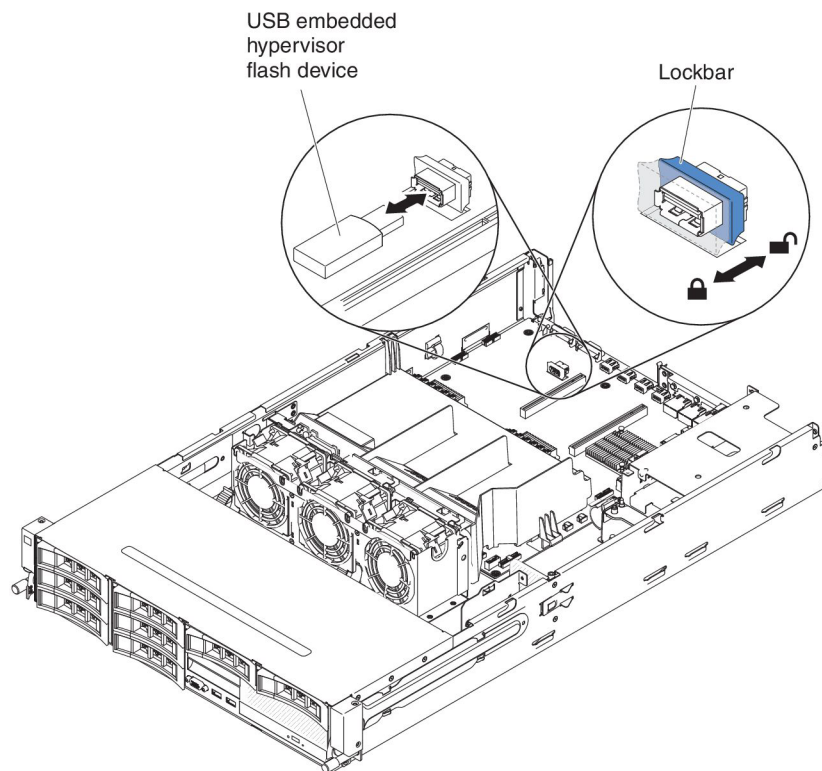
Removing a USB embedded hypervisor flash device

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 197).
5. Remove PCI riser-card assembly 1 (see “Removing the PCI riser-card assembly” on page 251).
6. Locate the USB embedded hypervisor flash device connector on the system board.



7. Slide the lockbar on the flash device connector to the unlocked position and pull the USB flash device out of the connector.



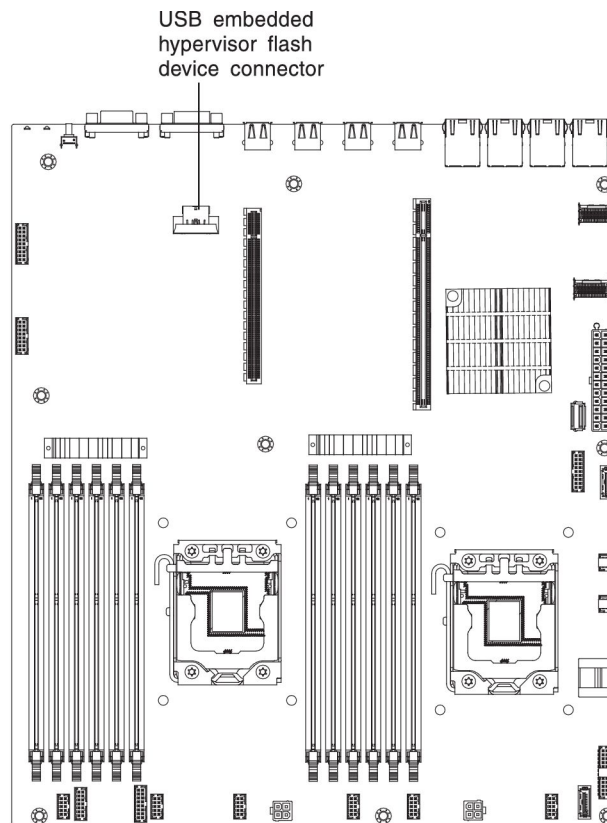
8. If you are instructed to return the hypervisor memory key, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Note: You must configure the server not to look for the hypervisor USB drive. See “Configuring the server” on page 350 for information about disabling hypervisor support.

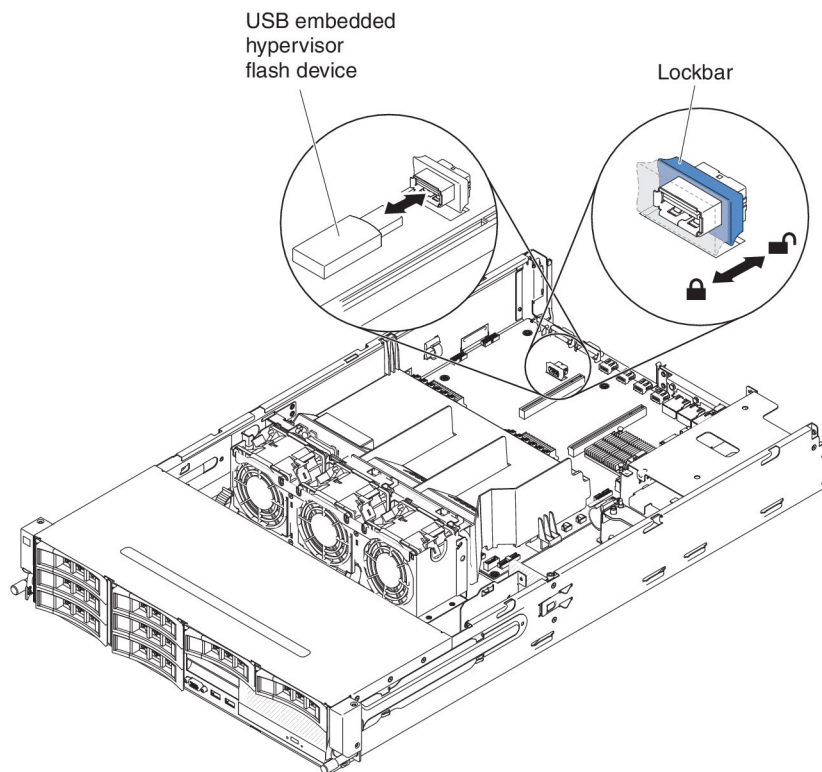
Installing a USB embedded hypervisor flash device

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 197).
5. Remove PCI riser-card assembly 1 (see “Removing the PCI riser-card assembly” on page 251).
6. Locate the USB embedded hypervisor flash device connector on the system board.



7. Align the USB flash device with the connector on the system board and push it into the connector until it is firmly seated.
8. Slide the lockbar toward the riser-card assembly to the locked position until it is seated firmly.



9. Install PCI riser-card assembly 1 (see “Installing the PCI riser-card assembly” on page 253).
10. If you have the optional hot-swap rear hard disk drive cage installed, rotate it down (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 198).
11. Install the server top cover (see “Installing the server top cover” on page 344).
12. Reconnect the power cord and any cables that you removed.
13. Turn on the peripheral devices and the server.

Note: You will have to configure the server to boot from the hypervisor USB drive. See “Configuring the server” on page 350 for information about enabling the hypervisor memory key.

Removing a hot-swap ac power supply

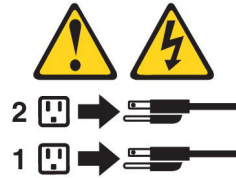
Important: If the server has two power supplies, and if you remove either of them, the server will not have redundant power; if the server power load then exceeds 550W, 750W or 900W (depends on server model), the server might not start or might not function correctly.

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:

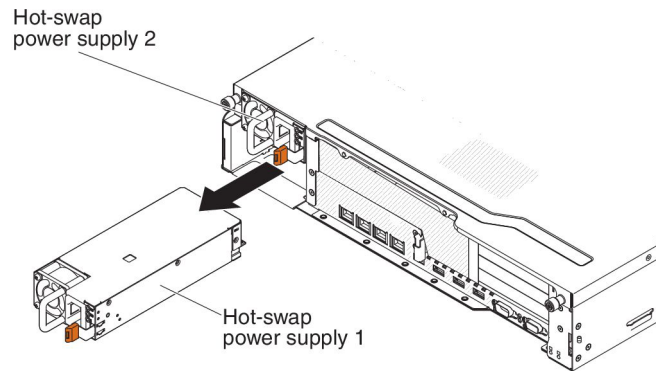
Never Remove the server top cover on a power supply or any part that has the following label attached.



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 ac power supply, complete the following steps.

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. If only one power supply is installed, turn off the server and peripheral devices and disconnect all power cords. Meanwhile, if two power supplies are installed, it is not necessary to turn off the server and peripheral devices and disconnect all power cords.
3. Hold the power-supply handle and press the orange release latch to the left simultaneously.
4. Carefully pull the power supply halfway out of the bay.



5. Release the latch and use other hand to provide support to the power supply as you pull remaining portion out of the bay.
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.

Installing a hot-swap ac power supply

The following items 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/>.
- The server comes standard with one 550-watt or 750-watt or 900-watt hot-swap power supply. The input voltage is 110 V ac or 220 V ac auto-sensing.

Note: You cannot mix 110 V ac and 220 V ac, or 550-watt, 750-watt and 900-watt power supplies in the server, it is not supported.

- These power supplies are designed for parallel operation. In the event of a power-supply failure, the redundant power supply continues to power the system. The server supports a maximum of two power supplies.
- The server can run fully configured with one power supply. For redundancy support, you must install the second hot-swap power supply.

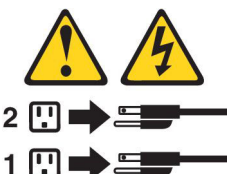
Note: You cannot mix high-efficiency and non-high-efficiency power supplies in the server.

Statement 5:



CAUTION:

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



Statement 8:



CAUTION:

Never Remove the server top cover on a power supply or any part that has the following label attached.

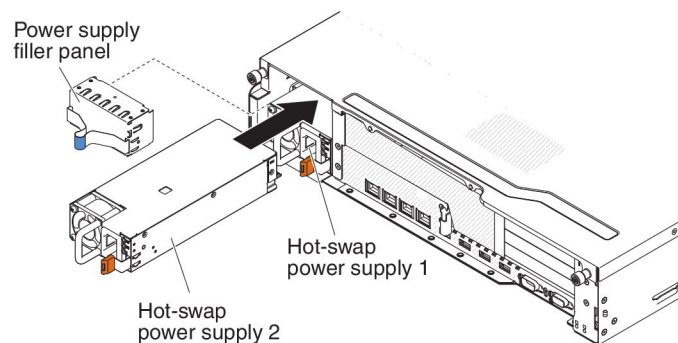


Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

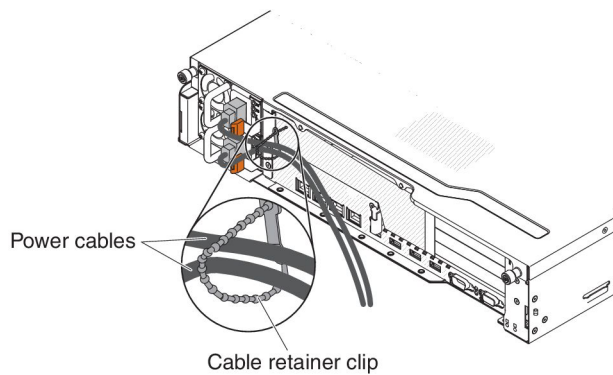
Attention: During normal operation, each power-supply bay must contain either a power supply or power-supply filler for proper cooling.

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
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. Meanwhile, if you are replacing a failed hot-swap power supply, remove it from the 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. Connect the power cord for the new power supply to the power-cord connector on the power supply.
6. Route the power cord through the cable retainer clip so that it does not accidentally become disconnected.



7. Connect 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.
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.

額定電圧 xxx-xxx/xxx-xxx x,x/x,x	額定電壓 xxx-xxx/xxx-xxx x,x/x,x	額定電流 xx/xx Hz	額定電流 xx/xx Hz
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NYCE

GS

UL LISTED
I.T.E. Equip.
167G

CE

PC

ME01

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KCC-REM-IBC-7915

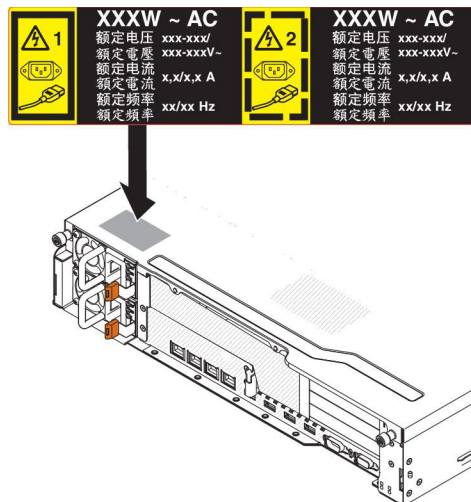
Apparaten skall anslutas till jordat uttag
Apparatet må tilkoples jordnet stikkontakt
Laita on liitettävä suojamaadoituskorkettimilla
varustettuun pistorasiaan

This device complies with part 15 of FCC rules.
Operation is subject to the following two
conditions: (1) this device may not cause harmful
interference, and (2) this device must accept any
interference received, including interference that
may cause undesired operation.

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。

R33026
伺服器 服務器
型号 MT: XXXX
Model: xxx
SN: SSSSSSS
MFG date: YYYYMMDD
Product ID:
PN:

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 top cover near the power supplies.



Removing a hot-swap dc power supply

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

Statement 29



CAUTION: This equipment is designed to permit the connection of the earthed conductor of the dc supply circuit to the earthing conductor at the equipment.

This equipment is designed to permit the connection of the earthed conductor of the dc supply circuit to the earthing conductor at the equipment. If this connection is made, all of the following conditions must be met:

- This equipment shall be connected directly to the dc supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the dc supply system earthing electrode conductor is connected.
- This equipment shall be located in the same immediate area (such as, adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same dc supply circuit and the earthing conductor, and also the point of earthing of the dc system. The dc system shall not be earthed elsewhere.
- The dc supply source shall be located within the same premises as this equipment.
- Switching or disconnecting devices shall not be in the earthed circuit conductor between the dc source and the point of connection of the earthing electrode conductor.

Statement 31:



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 power source.
- Connect to properly wired power sources 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 ac power cords, dc power sources, network connections, telecommunications systems, and serial cables before you open the device covers, unless you are instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following table when you install, move, or open covers on this product or attached devices.

To Connect:

1. Turn OFF all power sources and equipment that is to be attached to this product.
2. Attach signal cables to the product.
3. Attach power cords to the product.
 - For ac systems, use appliance inlets.
 - For dc systems, ensure correct polarity of -48 V dc connections: RTN is + and -48 V dc is -. Earth ground should use a two-hole lug for safety.
4. Attach signal cables to other devices.
5. Connect power cords to their sources.
6. Turn ON all the power sources.

To Disconnect:

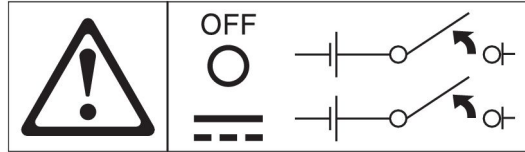
1. Turn OFF all power sources and equipment that is to be attached to this product.
 - For ac systems, remove all power cords from the chassis power receptacles or interrupt power at the ac power distribution unit.
 - For dc systems, disconnect dc power sources at the breaker panel or by turning off the power source. Then, remove the dc cables.
2. Remove the signal cables from the connectors.
3. Remove all cables from the devices.

Statement 33:



CAUTION:

This product does not provide a power-control button. Turning off blades or removing power modules and I/O modules does not turn off electrical current to the product. The product also might have more than one power cord. To remove all electrical current from the product, make sure that all power cords are disconnected from the power source.



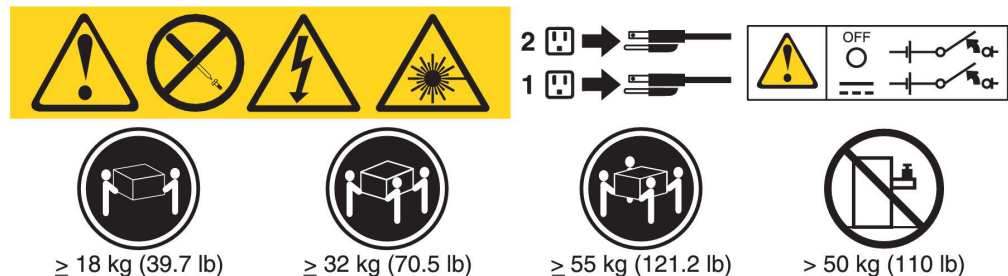
Statement 34:



CAUTION:

To reduce the risk of electric shock or energy hazards:

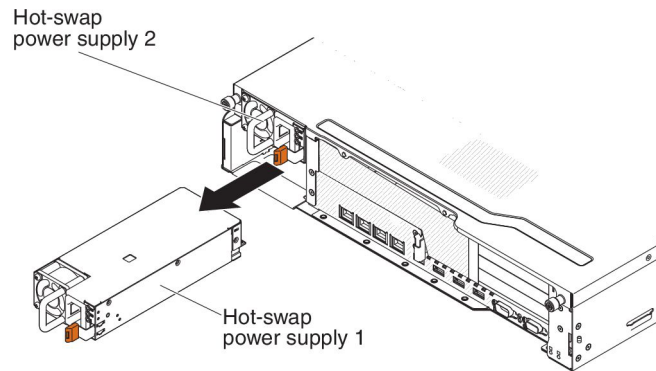
- This equipment must be installed by trained service personnel in a restricted-access location, as defined by the NEC and IEC 60950-1, First Edition, The Standard for Safety of Information Technology Equipment.
- Connect the equipment to a properly grounded safety extra low voltage (SELV) source. A SELV source is a secondary circuit that is designed so that normal and single fault conditions do not cause the voltages to exceed a safe level (60 V direct current).
- Incorporate a readily available approved and rated disconnect device in the field wiring.
- See the specifications in the product documentation for the required circuit-breaker rating for branch circuit overcurrent protection.
- Use copper wire conductors only. See the specifications in the product documentation for the required wire size.
- See the specifications in the product documentation for the required torque values for the wiring-terminal screws.



Important: Be sure to read the multilingual safety instructions on the CD that comes with the server before you use the product.

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. If only one power supply is installed, turn off the server and peripheral devices and disconnect all power cords.
3. If the server is in a rack, at the back of the server, pull back the cable management arm to gain access to the rear of the server and the power supply.
4. Press and hold the release tab to the left. Grasp the handle and pull the power supply out of the server.



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

Installing a hot-swap dc 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:

- Before you install an additional power supply or replace a power supply with one of a different wattage, you may use the IBM Power Configurator utility to determine current system power consumption. For more information and to download the utility, go to <http://www-03.ibm.com/systems/bladecenter/resources/powerconfig.html>.
- The server comes with one hot-swap 12-volt output power supply that connects to power supply bay 1. The input voltage is -48 V dc or -60 V dc auto-sensing.
- Before you install a dc power supply in the server, you must remove all ac power supplies. Do not use both ac and dc power supplies in the same server. Install up to two dc power supplies or up to two ac power supplies, but not a combination.
- 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.
- You can order an optional power supply for redundancy.
- These power supplies are designed for parallel operation. In the event of a power-supply failure, the redundant power supply continues to power the system. The server supports a maximum of two power supplies.
- It is the customer's responsibility to supply the necessary power cable.

To reduce the risk of electric shock or energy hazards:

- Use a circuit breaker that is rated at 25 amps.
- Use 2.5 mm² (12 AWG) at 90° C copper wire.
- Torque the wiring-terminal screws to 0.50 ~ 0.60 newton-meters (4.43 ~ 5.31 inch-pounds).

For more information, see Statement 34 on page 249.

- If the power source requires ring terminals, you must use a crimping tool to install the ring terminals to the power cord wires. The ring terminals must be UL approved and must accommodate the wire that is described in the above-mentioned note .

Statement 29:



CAUTION: This equipment is designed to permit the connection of the earthed conductor of the dc supply circuit to the earthing conductor at the equipment.

This equipment is designed to permit the connection of the earthed conductor of the dc supply circuit to the earthing conductor at the equipment. If this connection is made, all of the following conditions must be met:

- This equipment shall be connected directly to the dc supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the dc supply system earthing electrode conductor is connected.
- This equipment shall be located in the same immediate area (such as, adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same dc supply circuit and the earthing conductor, and also the point of earthing of the dc system. The dc system shall not be earthed elsewhere.
- The dc supply source shall be located within the same premises as this equipment.
- Switching or disconnecting devices shall not be in the earthed circuit conductor between the dc source and the point of connection of the earthing electrode conductor.

Statement 31:



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 power source.
- Connect to properly wired power sources 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 ac power cords, dc power sources, network connections, telecommunications systems, and serial cables before you open the device covers, unless you are instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following table when you install, move, or open covers on this product or attached devices.

To Connect:

1. Turn OFF all power sources and equipment that is to be attached to this product.
2. Attach signal cables to the product.
3. Attach power cords to the product.
 - For ac systems, use appliance inlets.
 - For dc systems, ensure correct polarity of -48 V dc connections: RTN is + and -48 V dc is -. Earth ground should use a two-hole lug for safety.
4. Attach signal cables to other devices.
5. Connect power cords to their sources.
6. Turn ON all the power sources.

To Disconnect:

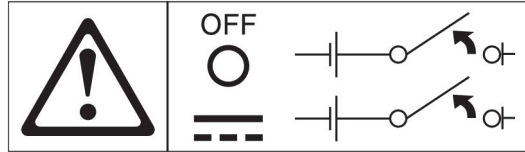
1. Turn OFF all power sources and equipment that is to be attached to this product.
 - For ac systems, remove all power cords from the chassis power receptacles or interrupt power at the ac power distribution unit.
 - For dc systems, disconnect dc power sources at the breaker panel or by turning off the power source. Then, remove the dc cables.
2. Remove the signal cables from the connectors.
3. Remove all cables from the devices.

Statement 33:



CAUTION:

This product does not provide a power-control button. Turning off blades or removing power modules and I/O modules does not turn off electrical current to the product. The product also might have more than one power cord. To remove all electrical current from the product, make sure that all power cords are disconnected from the power source.



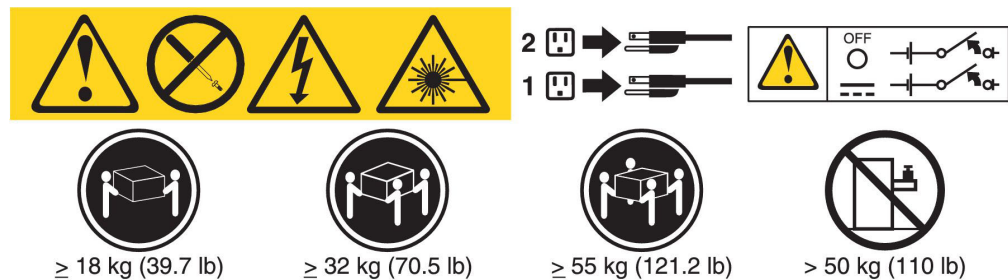
Statement 34:



CAUTION:

To reduce the risk of electric shock or energy hazards:

- This equipment must be installed by trained service personnel in a restricted-access location, as defined by the NEC and IEC 60950-1, First Edition, The Standard for Safety of Information Technology Equipment.
- Connect the equipment to a properly grounded safety extra low voltage (SELV) source. A SELV source is a secondary circuit that is designed so that normal and single fault conditions do not cause the voltages to exceed a safe level (60 V direct current).
- Incorporate a readily available approved and rated disconnect device in the field wiring.
- See the specifications in the product documentation for the required circuit-breaker rating for branch circuit overcurrent protection.
- Use copper wire conductors only. See the specifications in the product documentation for the required wire size.
- See the specifications in the product documentation for the required torque values for the wiring-terminal screws.

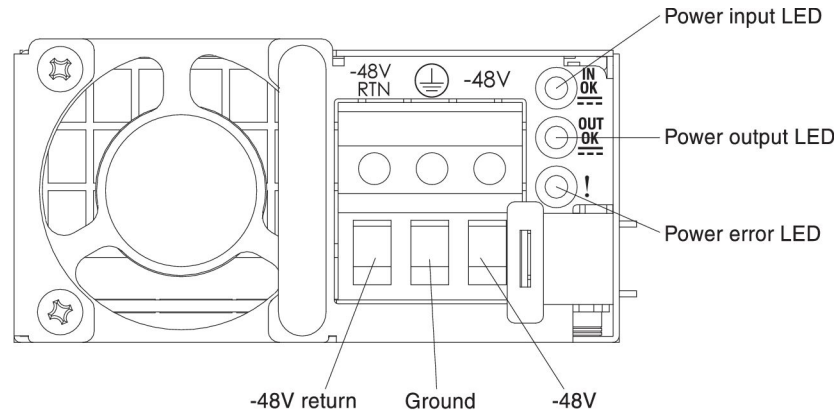


Important: Be sure to read the multilingual safety instructions on the CD that comes with the server before you use the product.

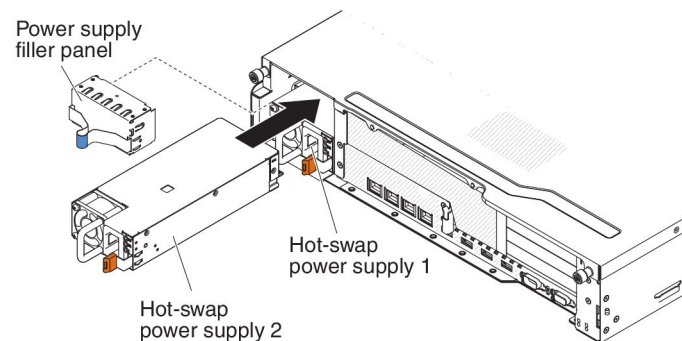
To install a hot-swap dc power supply, complete the following steps:

Attention: Only trained service personnel other than IBM service technicians are authorized to install and remove the -48 volt dc power supply, and make the connections to and disconnections from the -48 volt dc power source. IBM service technicians are not certified or authorized to install or remove the -48 volt power cable. The customer is responsible for ensuring that only trained service personnel install or remove the -48 volt power cable.

1. Read the safety information that begins on page vii and "Installation guidelines" on page 185.
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. Turn off the circuit breaker for the dc power source to which the new power supply will be connected. Disconnect the power cord from the dc power source.
4. Attach the dc power cable to the new power supply. Make sure the wires are connected securely to the -48V, ground and -48V return terminals.



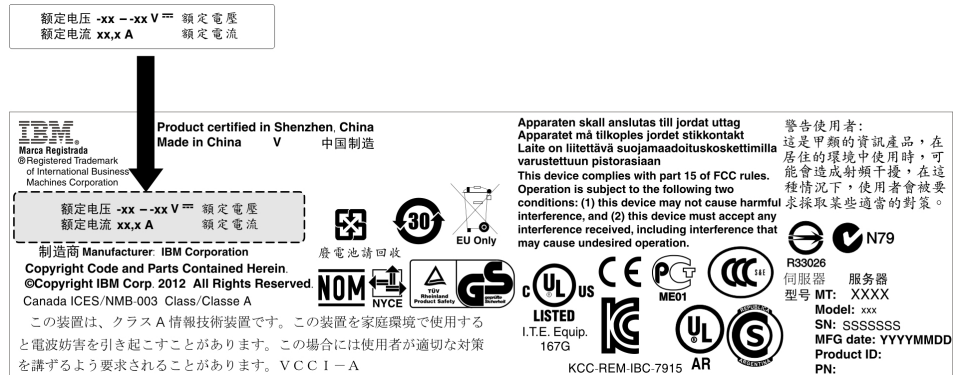
5. If you are installing a hot-swap power supply into an empty bay, remove the power-supply filler panel from the power-supply bay.



6. 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.
7. Route the power cord through the handle and cable tie if any, so that it does not accidentally become unplugged.
8. Connect the other ends of the dc power cable to the dc power source. Cut the wires to the correct length, but do not cut them shorter than 150 mm (6 inch). If the power source requires ring terminals, you must use a crimping tool to install the ring terminals to the power cord wires. The ring terminals must be

UL approved and must accommodate the wires that are described in note 246. The minimum nominal thread diameter of a pillar or stud type of terminal must be 4 mm; for a screw type of terminal the diameter must be 5.0 mm.

9. Turn on the circuit breaker for the dc power source to which the new power supply is connected.
10. Make sure that the green power LEDs on the power supply are lit, indicating that the power supply is operating correctly.
11. 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.



12. 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.



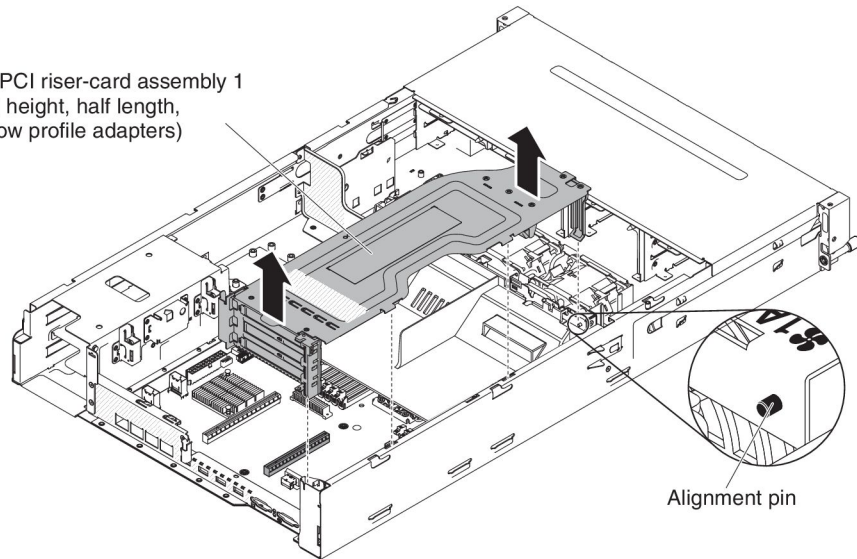
Removing the PCI riser-card assembly

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

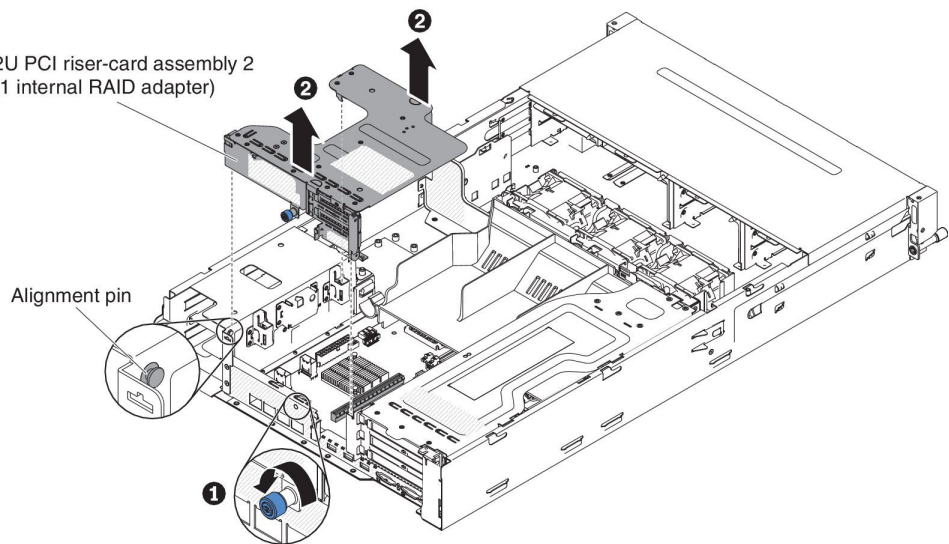
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 197).
5. If an adapter is installed in the PCI riser-card assembly, disconnect any cables that are connected to the adapter. Make note of which cable is connected to which connector.
6. 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.

For 2U riser cards:

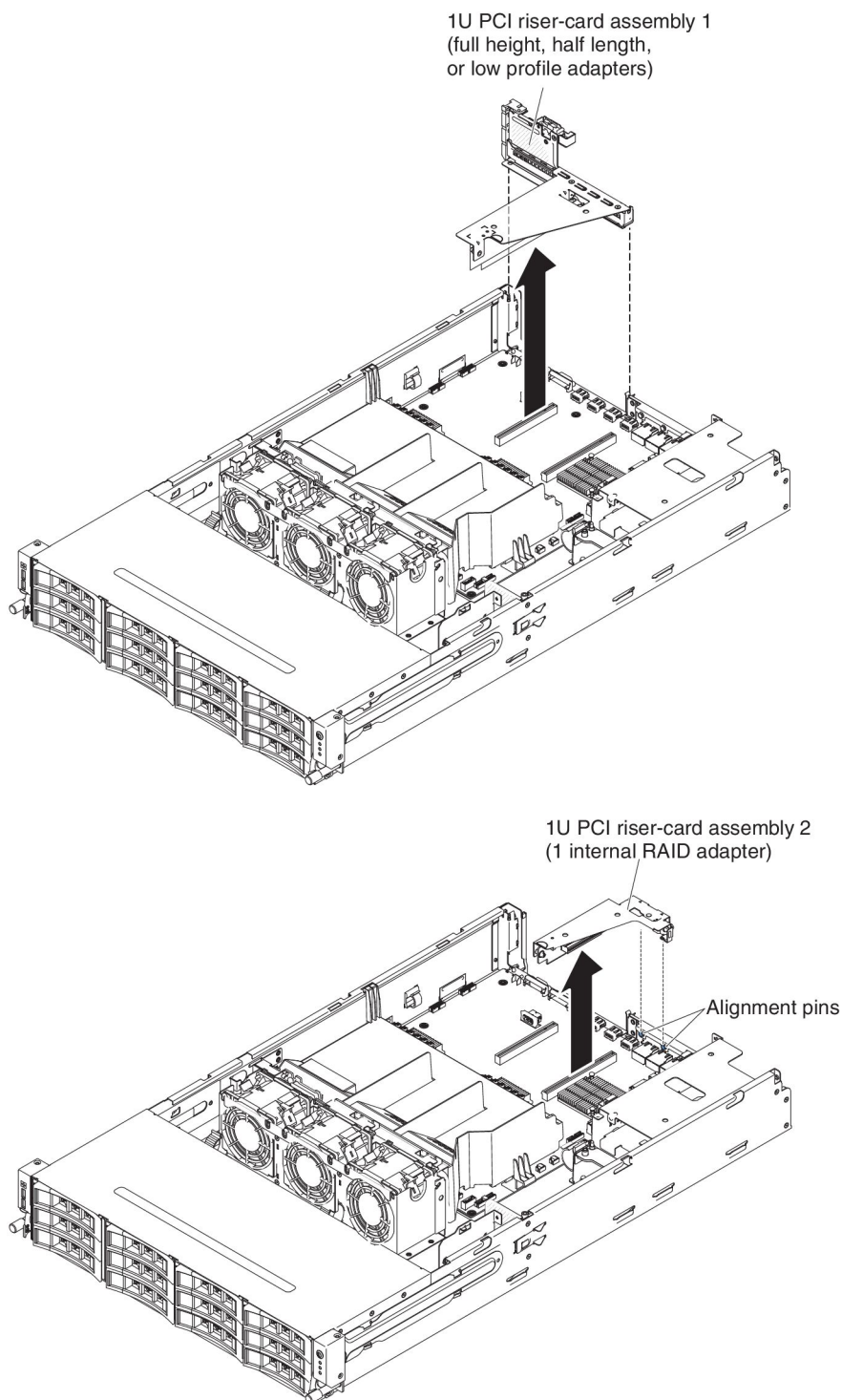
2U PCI riser-card assembly 1
(full height, half length,
or low profile adapters)



2U PCI riser-card assembly 2
(1 internal RAID adapter)



For 1U riser cards:



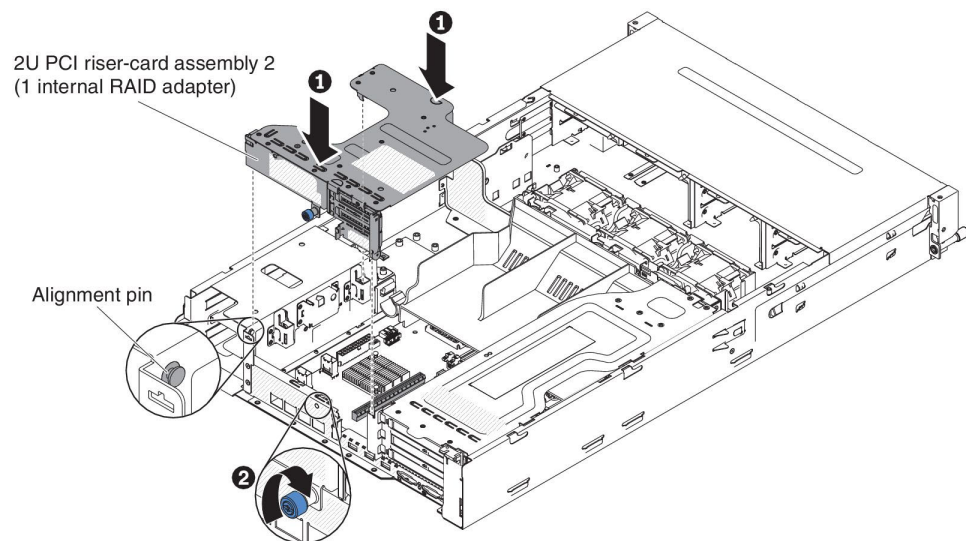
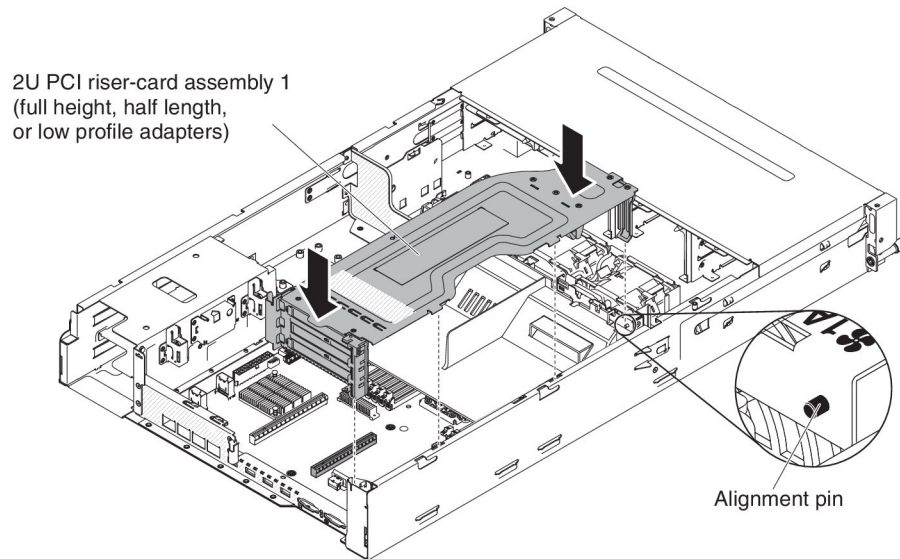
7. Remove the adapter, if necessary, from the PCI riser-card assembly.
8. If you are instructed to return the PCI riser-card assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the PCI riser-card assembly

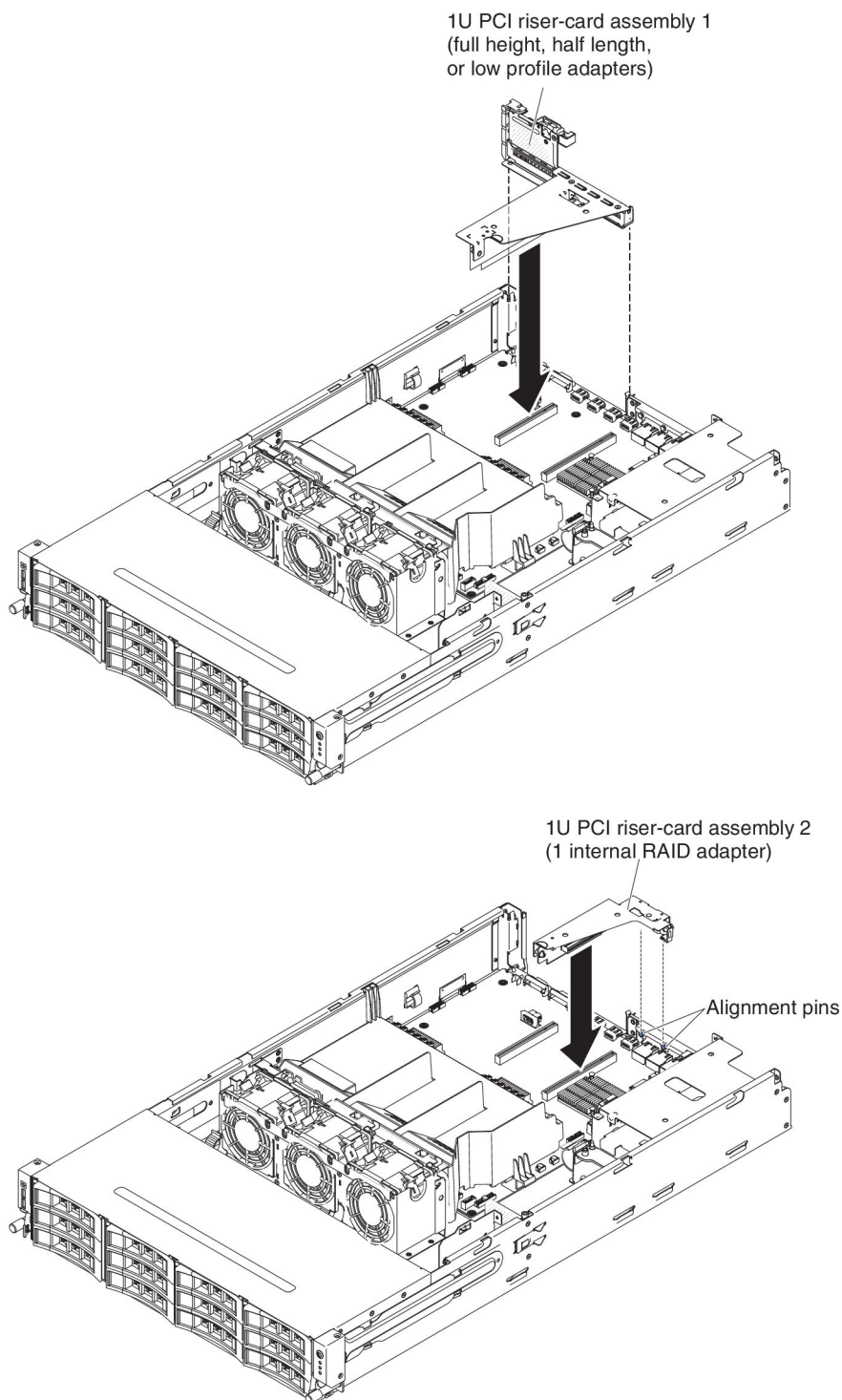
To install a PCI riser-card assembly, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Align the PCI riser-card assembly with the PCI riser connector on the system board and guide pins on the server; then, press down on blue touch points on the PCI riser-card assembly to install the assembly in the server. Make sure that the PCI riser-card assembly is fully seated in the PCI connectors on the system board.

For 2U riser card assemblies:



For 1U riser card assemblies:

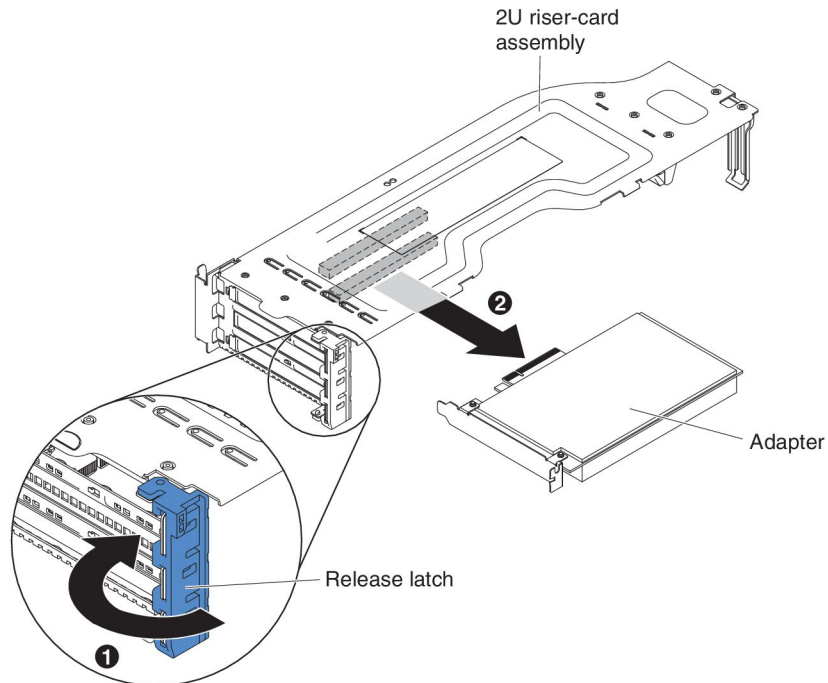


3. If you have the optional hot-swap rear hard disk drive cage installed, rotate it down (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 198).
4. Install the server top cover (see “Installing the server top cover” on page 344).
5. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

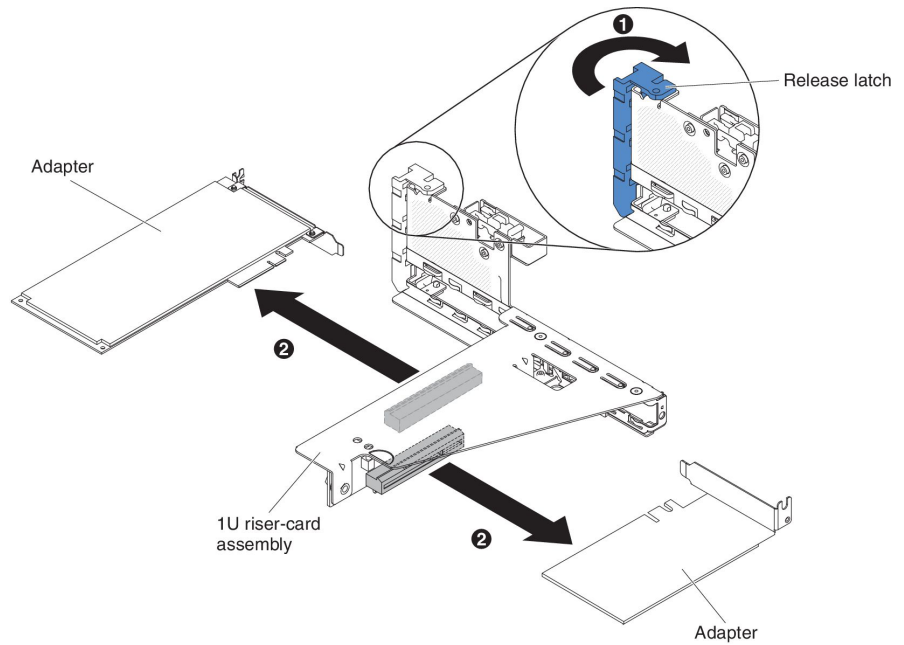
Removing an adapter from the PCI riser-card assembly

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

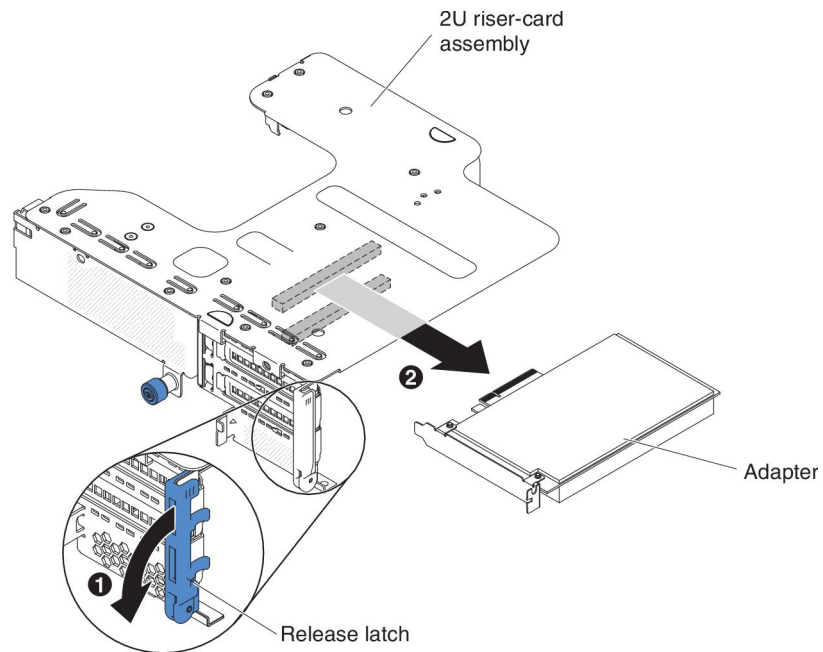
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 197).
5. Disconnect any cables from the adapter (make note of the cable routing, in case you reinstall the adapter later).
6. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
7. The following illustrates the steps for removing an adapter from different PCI riser-card assemblies:
 - For 2U PCI riser-card assembly 1:
 - a. Rotate the retention latch to the open position.
 - b. Carefully grasp the adapter by its top edge or upper corners, and pull the adapter from the PCI riser-card assembly.



- For 1U PCI riser-card assembly 1:
 - a. Rotate the retention latch to the open position.
 - b. Carefully grasp the adapter by its top edge or upper corners, and pull the adapter from the PCI riser-card assembly.



- For 2U PCI riser-card assembly 2:
 - a. To remove a adapter, lower the retention latch down to the open position.
 - b. Carefully grasp the adapter by its top edge or upper corners, and pull it from the PCI riser-card assembly.



- For 1U PCI riser-card assembly 2:

Note: For 1U PCI riser-card assembly 2, it only supports ServeRAID adapters (see “Removing a ServeRAID adapter from the PCI riser-card assembly” on page 229).

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.

Installing an adapter on the PCI riser-card assembly

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

- To confirm that 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 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.
- Avoid touching the components and gold-edge connectors on the adapter.
- Any high-definition video-out connector or stereo connector on any add-on video adapter is not supported.
- The server does not support PCI-X adapters or legacy 5 V PCI adapters.
- The server provides two PCI riser slots on the system board, supporting 1U and 2U riser-card assembly. The 1U riser-card assembly may provide up to two PCI Express Gen3 adapter slots, while the 2U riser-card assembly may provide up to three PCI Express Gen3 adapter slots. See "PCI riser-card assembly adapter expansion slot connectors" on page 25 for the respective location of the PCI-e slots on the riser card assembly. The following table lists the respective PCI-e slots on the riser-card assembly and the system board, the microprocessor to which each slot is connected, and the supported adapters that you can install in each slot:

Table 16. PCI riser slots supported configurations for 2U PCI riser-card assembly 1

PCI-e slot number	Microprocessor to which the slot is connected	Configuration 1	Configuration 2
1	Microprocessor 1	PCI-e Gen2 x16 (x16 mechanically) full-height, full-length adapter	PCI-e Gen2 x16 (x16 mechanically) full-height, full-length adapter
2	Microprocessor 1	N/A	PCI-e Gen2 x16 (x16 mechanically) full-height, half-length adapter

Table 17. PCI riser slots supported configurations for 2U PCI riser-card assembly 2

PCI-e slot number	Microprocessor to which the slot is connected	Configuration 1	Configuration 2
3	Microprocessor 2	PCI-e Gen2 x16 (x16 mechanically) low-profile adapter	PCI-e Gen2 x16 (x16 mechanically) low-profile adapter
4	Microprocessor 2	N/A	PCI-e Gen2 x16 (x16 mechanically) low-profile adapter
5	Microprocessor 2	PCI-e Gen2 x8 (x8 mechanically) low-profile, internal RAID adapter	PCI-e Gen2 x8 (x8 mechanically) low-profile, internal RAID adapter

Table 18. PCI riser slots supported configurations for 1U PCI riser-card assembly 1

PCI-e slot number	Microprocessor to which the slot is connected	Configuration 1	Configuration 2
1	Microprocessor 1	PCI-e Gen2 x16 (x16 mechanically) full-height, half-length adapter	PCI-e Gen2 x8 (x8 mechanically) full-height, half-length adapter
2	Microprocessor 1	N/A	PCI-e Gen2 x8 (x8 mechanically) low-profile adapter

Table 19. PCI riser slots supported configurations for 1U PCI riser-card assembly 2

PCI-e slot number	Microprocessor to which the slot is connected	Configuration 1	Configuration 2
3	Microprocessor 1	PCI-e Gen2 x8 (x8 mechanically) low-profile RAID adapter	N/A
3	Microprocessor 2	N/A	PCI-e Gen2 x8 (x8 mechanically) low-profile, internal RAID adapter

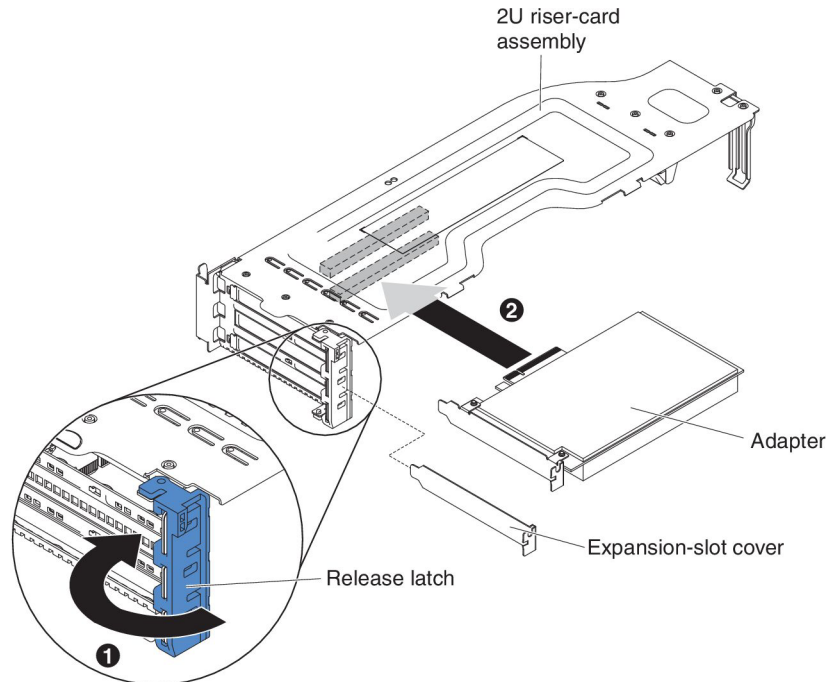
Attention: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

To install an adapter, complete the following steps:

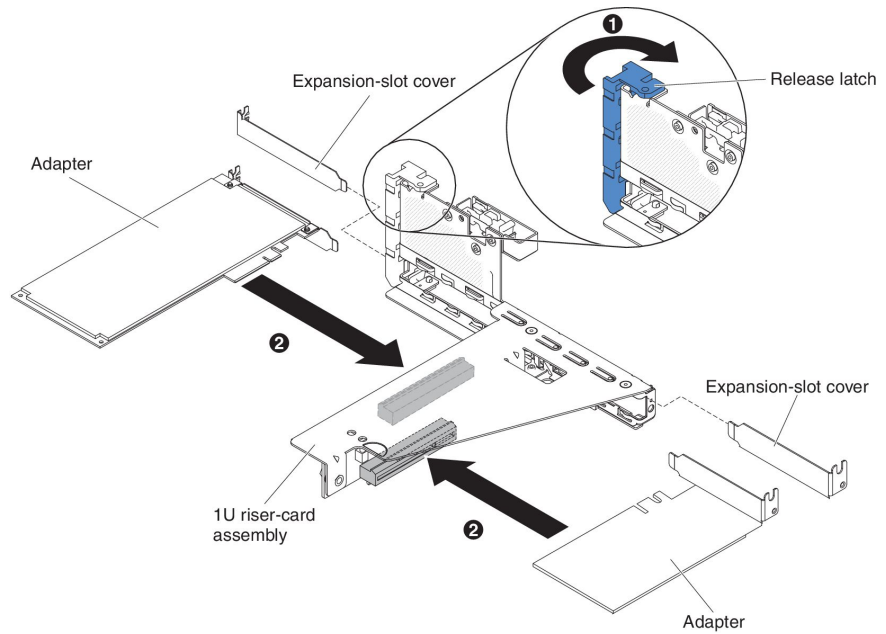
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Touch the static-protective package that contains the new adapter to any unpainted metal surface on the server. Then, remove the adapter from the package.
4. Remove the server top cover (see “Removing the server top cover” on page 343).
5. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 197).
6. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
7. Determine which expansion slot you will use for the adapter.
8. The following illustrates the steps for installing an adapter on different PCI riser-card assemblies:
 - For 2U PCI riser-card assembly 1
 - a. Rotate the retention latch to the open position. 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.

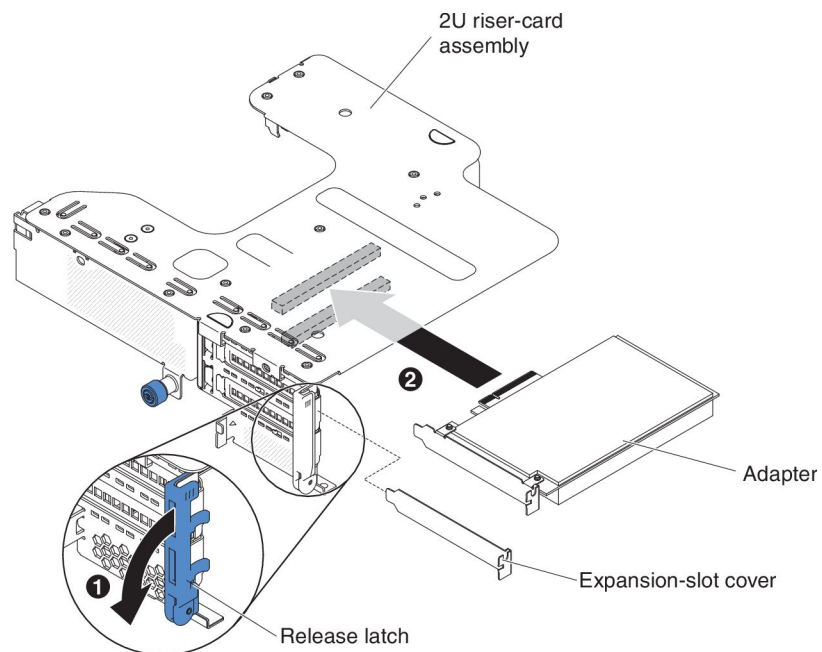
- b. Rotate the retention latch to the close position. Make sure the retention latch engages the adapter securely; then, push in the release pin to lock the retention latch in place.



- For 1U PCI riser-card assembly 1:
 - a. Rotate the retention latch to the open position. 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.
 - b. Rotate the retention latch to the close position. Make sure the retention latch engages the adapter securely.



- For 2U PCI riser-card assembly 2:
 - a. Rotate down the retention latch to the open position. Insert the adapter or ServeRAID 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.



- For 1U PCI riser-card assembly 2:

Note: For 1U PCI riser-card assembly 2, it only supports ServeRAID adapters (see “Installing a ServeRAID adapter on the PCI riser-card assembly” on page 230).

9. Connect any required cables to the adapter.

Attention:

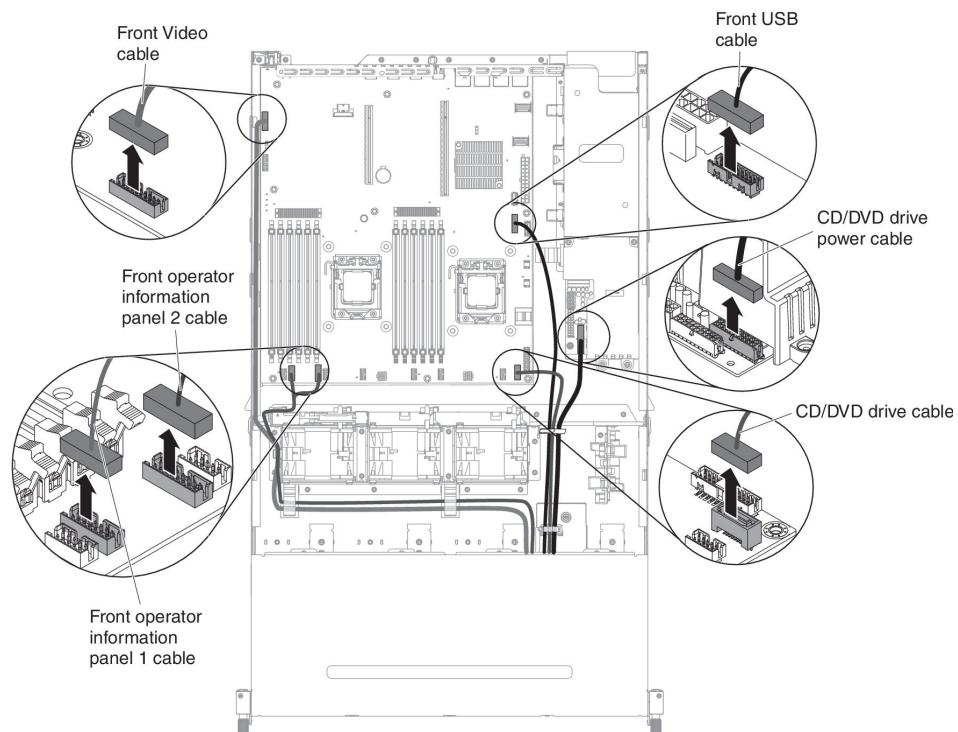
- When you route cables, do not block any connectors or the ventilated space around any of the fans. Please refer to the internal cable routing section “Internal cable routing” on page 188 for further details.
 - Make sure that cables are not routed on top of components that are under the PCI riser-card assembly.
 - Make sure that cables are not pinched by the server components.
10. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 253).
 11. Perform any configuration tasks that are required for the adapter.
 12. If you have the optional hot-swap rear hard disk drive cage installed, rotate it down (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 198).
 13. Install the server top cover (see “Installing the server top cover” on page 344).
 14. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the operator information panel cable

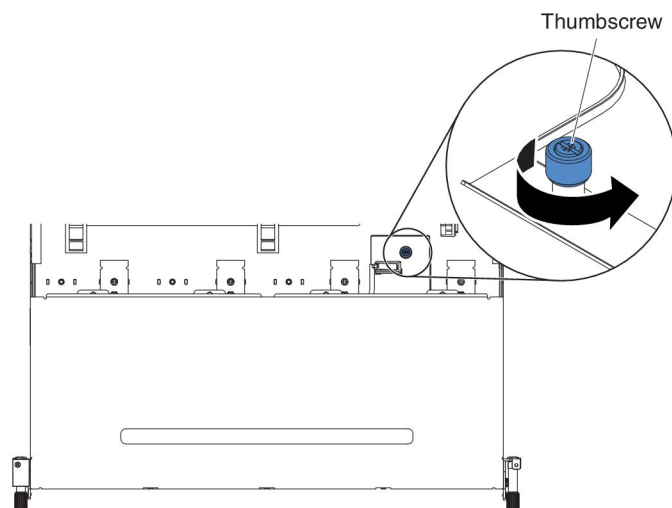
Note: The server configuration you have bought may either have the operator information panel inside the media cage or on the side of the server.

To remove the operator information panel cable that is inside the media cage, complete the following steps:

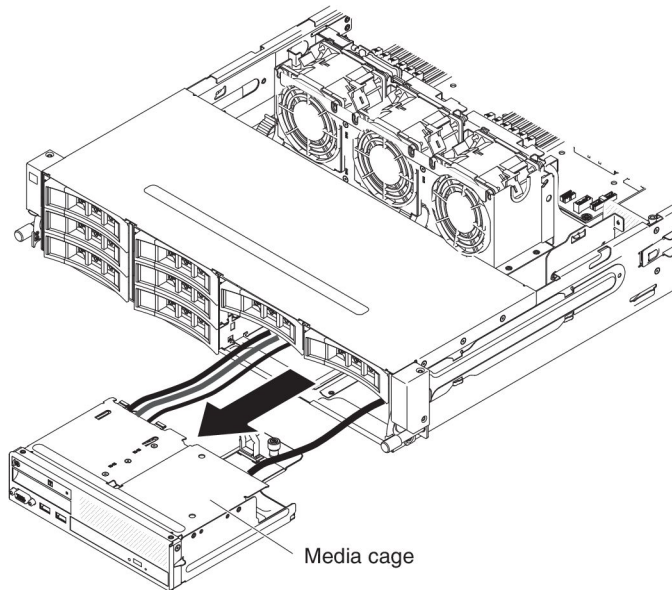
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
5. Remove the air baffle (see “Removing the air baffle” on page 345).
6. Disconnect the USB, video, CD/DVD and operator information cables from the system board. Please remember the relevant cable routing.



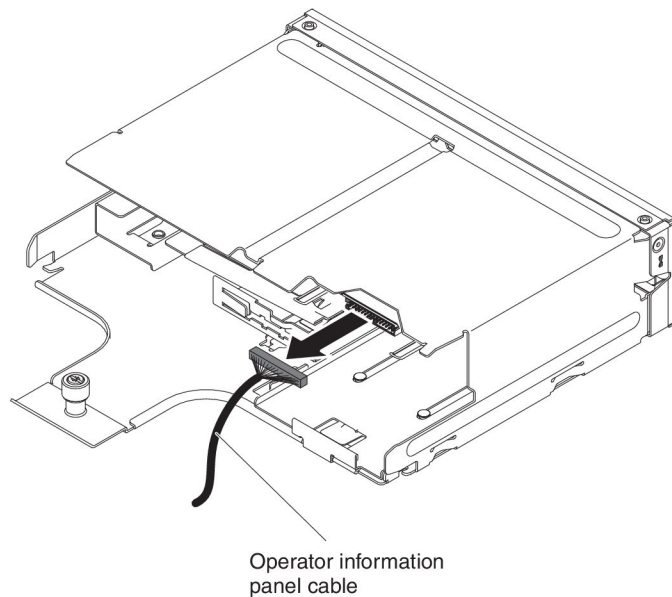
7. Loosen the single thumbscrew that is used to secure the media cage onto the server.



8. Carefully pull the media cage out of the server.



9. Disconnect the cable to the operator information panel.

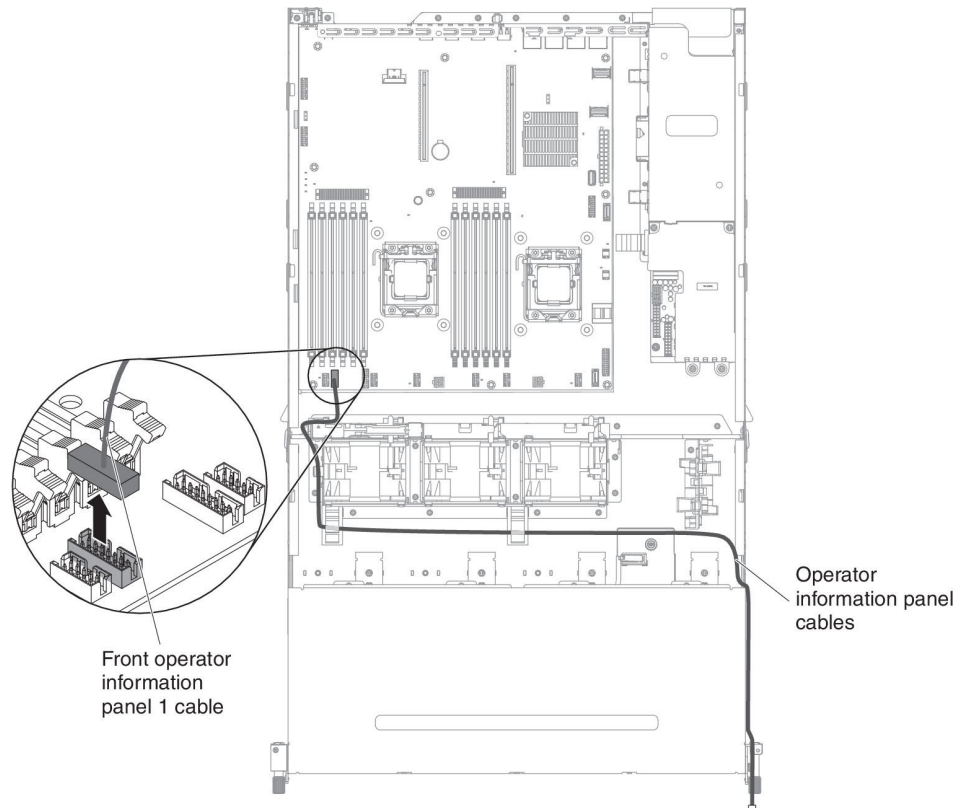


10. If you are instructed to return the operator information panel cable, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

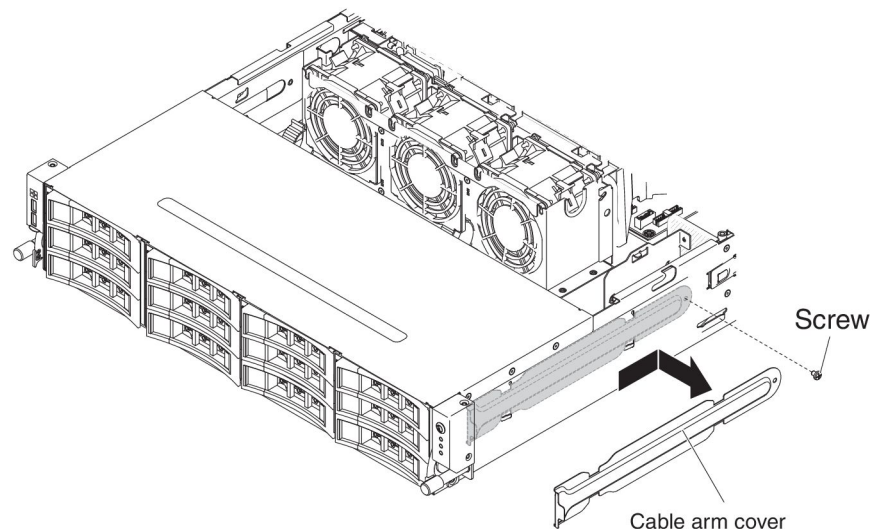
To remove the operator information panel cable that is on the side of the server, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 185.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the server top cover (see "Removing the server top cover" on page 343).

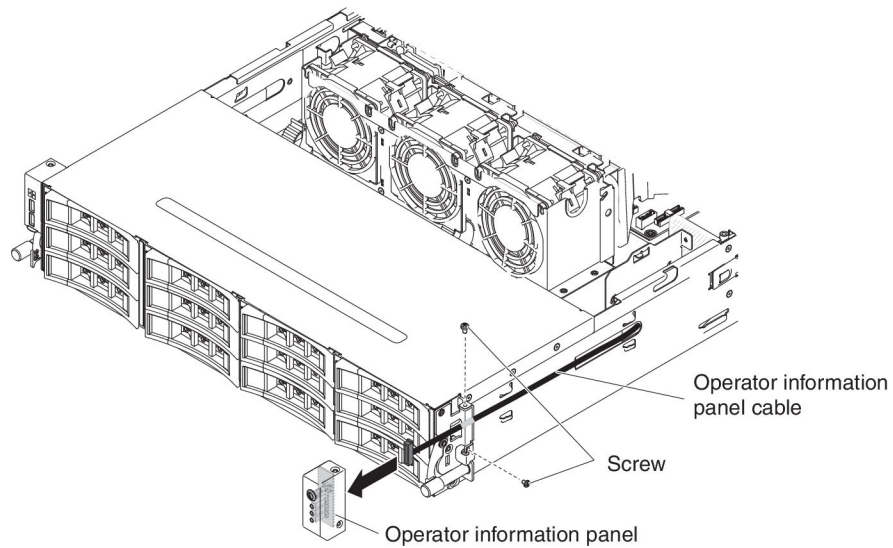
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 197).
5. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
6. Remove the air baffle (see “Removing the air baffle” on page 345).
7. Disconnect the operator information panel cable from the system board.



8. Remove the screws from the cable arm cover; then, slide the cable arm cover towards the rear of the server and set it aside.



9. Remove the screws that secure the operator information panel to the side of the server.



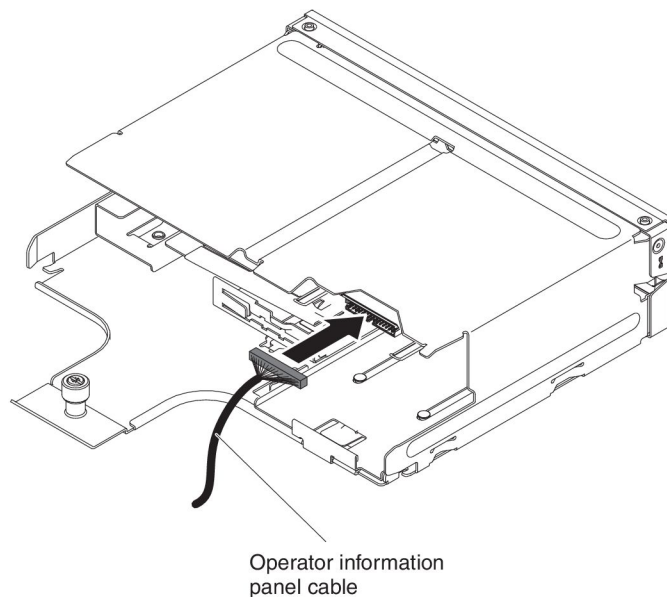
10. Disconnect the cable to the operator information panel.
11. If you are instructed to return the operator information panel cable, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the operator information panel cable

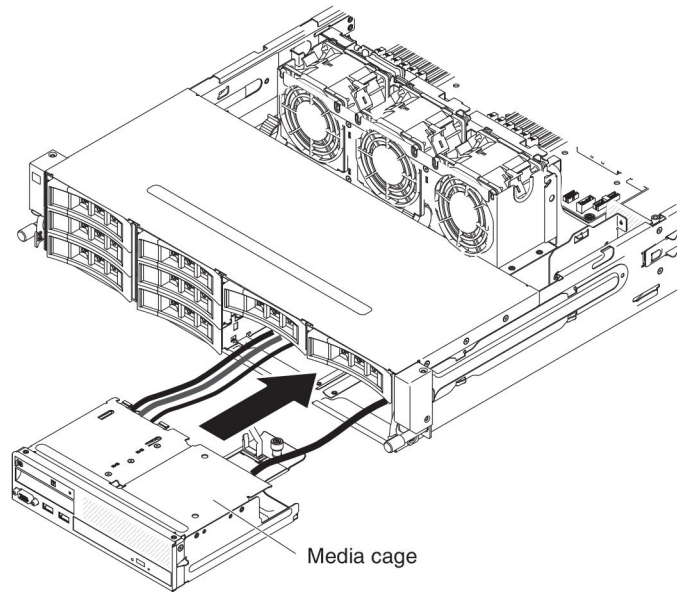
Note: The server configuration you have bought may either have the operator information panel inside the media cage or on the side of the server.

To install the operator information panel cable that is inside the media cage, complete the following steps:

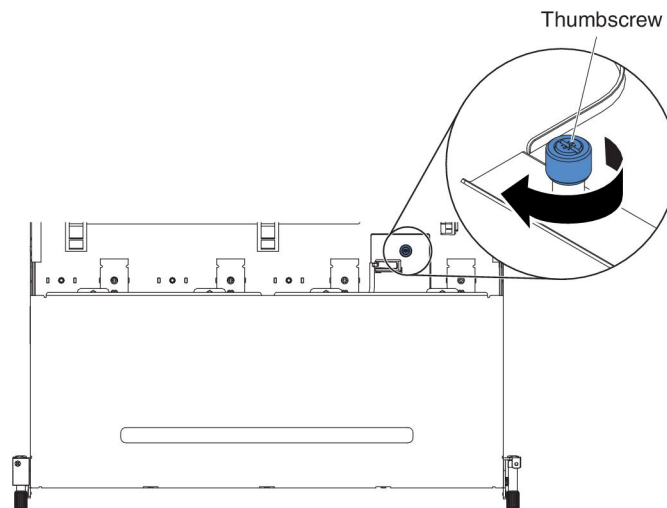
1. Locate the connector on the operator information panel in the media cage.
2. Connect the cable to the operator information panel.



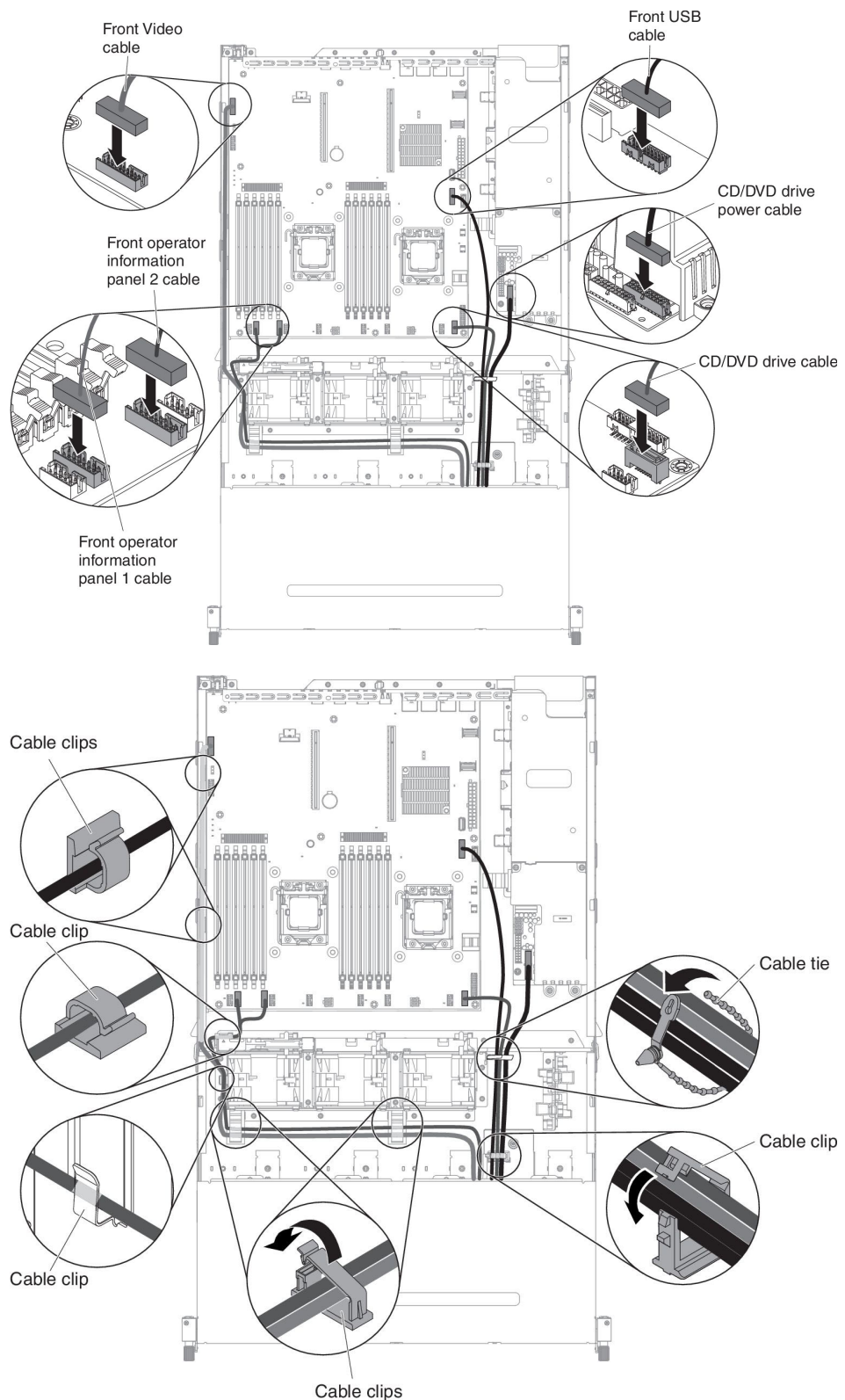
3. Carefully push the media cage back into the server.



4. Tighten the thumbscrew to secure the media cage onto the server.



5. Reconnect the USB, video, CD/DVD and operator information cables to the system board. Remember to insert the cables into the relevant cable clips and cable tie.

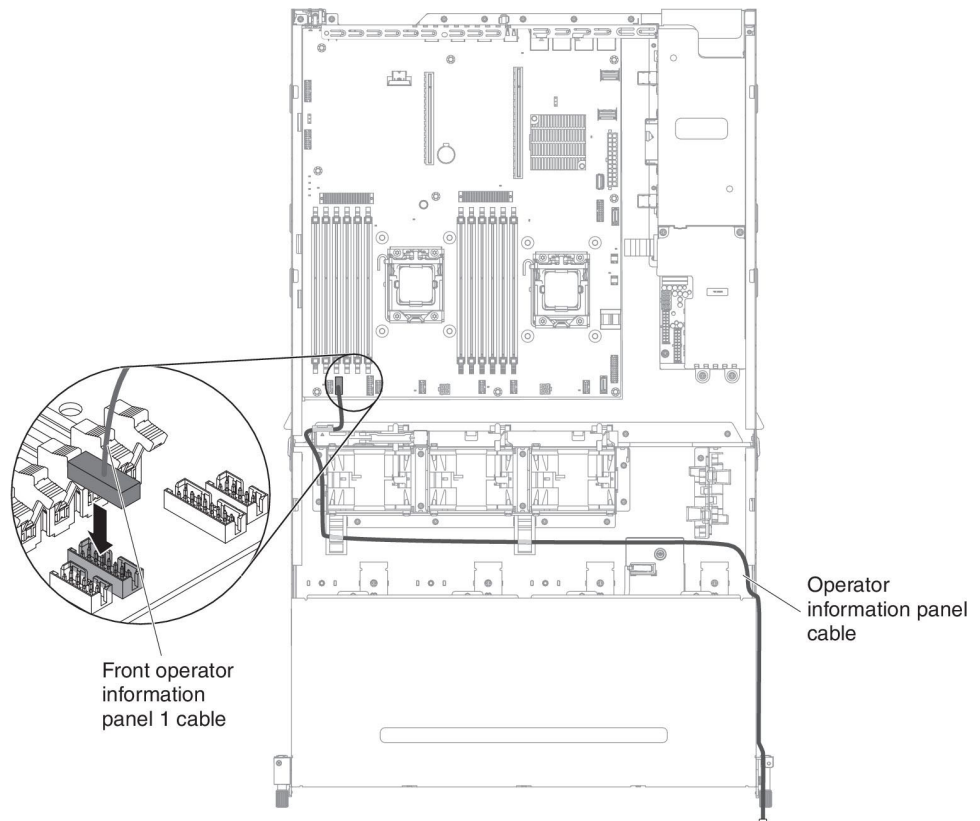


6. Install the air baffle (see "Installing the air baffle" on page 347).
7. Install the PCI riser-card assembly (see "Installing the PCI riser-card assembly" on page 253).
8. Install the server top cover (see "Installing the server top cover" on page 344).

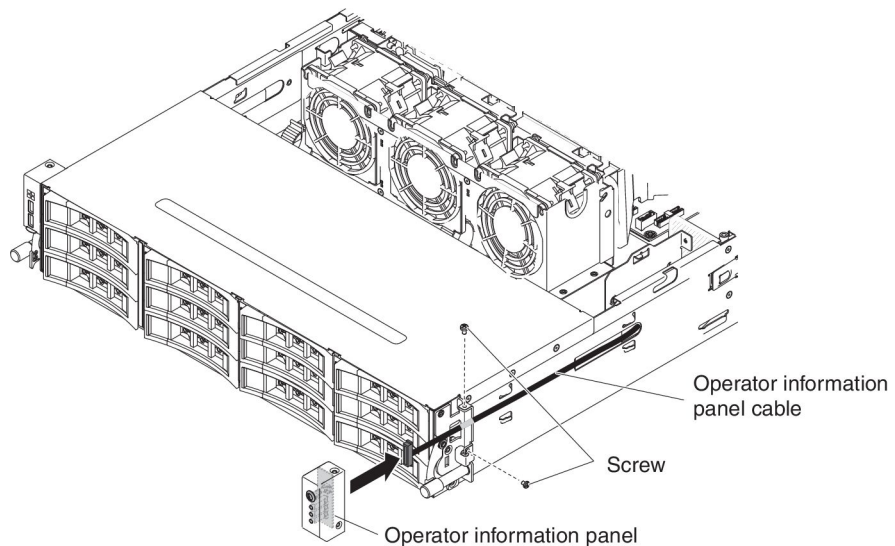
9. Reconnect the power cord and any cables that you removed.
10. Turn on the peripheral devices and the server.

To install the operator information panel cable that is on the side of the server, complete the following steps:

1. Connect the operator information panel cable to the system board and route the internal cabling as shown in the following illustration. Remember to insert the cables into the relevant cable clips.



2. Connect the cable to the operator information panel.



3. Install the screws to secure the operator information panel to the side of the server.
4. Slide the cable arm cover into the retention slots and install the screws to secure it on the side of the chassis.

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

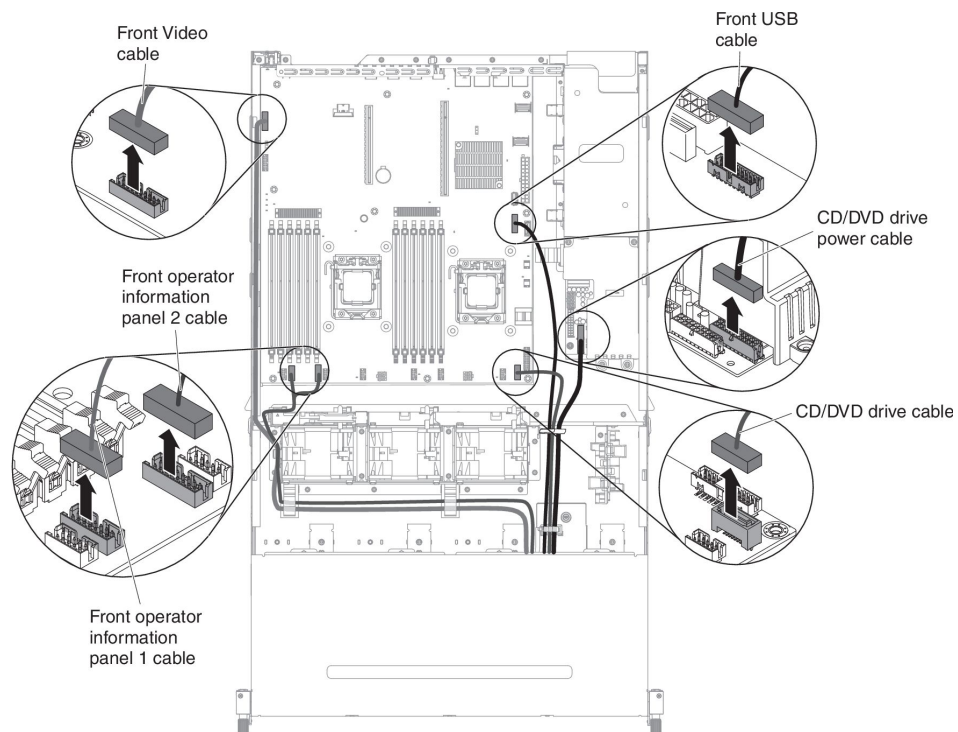
5. Install the air baffle (see “Installing the air baffle” on page 347).
6. Install PCI riser-card assembly 1 (see “Installing the PCI riser-card assembly” on page 253).
7. If you have the optional hot-swap rear hard disk drive cage installed, rotate it down (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 198).
8. Install the server top cover (see “Installing the server top cover” on page 344).
9. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the operator information panel

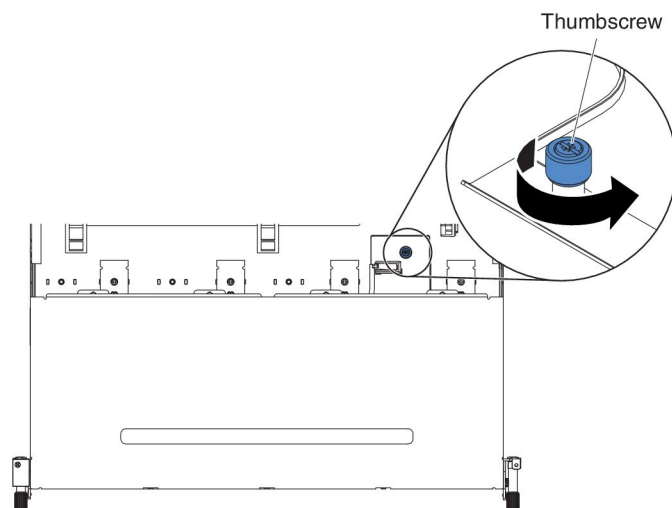
Note: The server configuration you have bought may either have the operator information panel inside the media cage or on the side of the server.

To remove the operator information panel that is inside the media cage, complete the following steps:

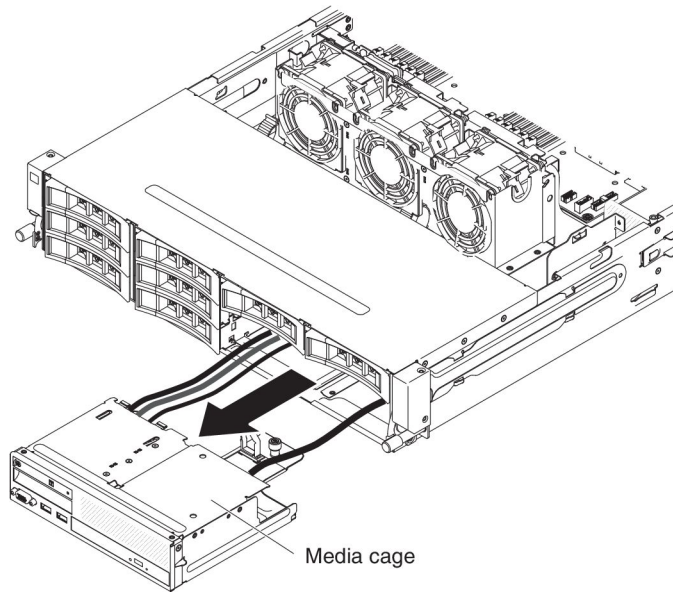
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
5. Remove the air baffle (see “Removing the air baffle” on page 345).
6. Disconnect the USB, video, CD/DVD and operator information cables from the system board. Please remember the relevant cable routing, as you will need to reconnect them to the system board when installing the operator information panel.



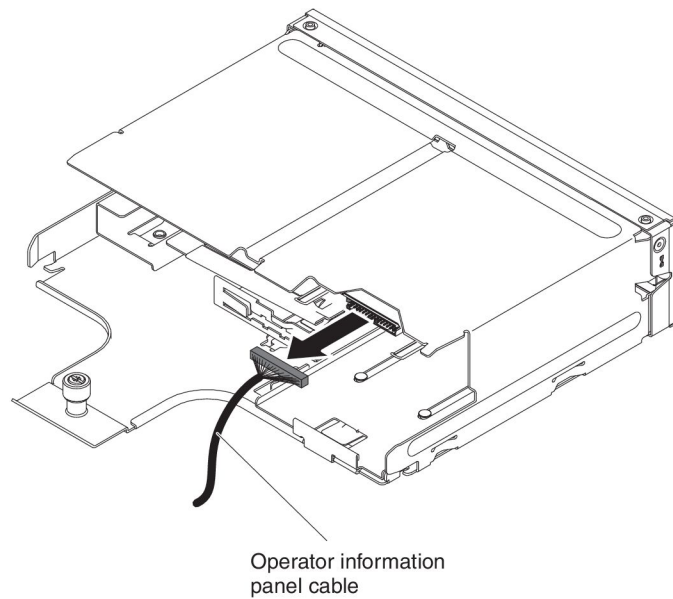
7. Loosen the single thumbscrew that is used to secure the media cage onto the server.



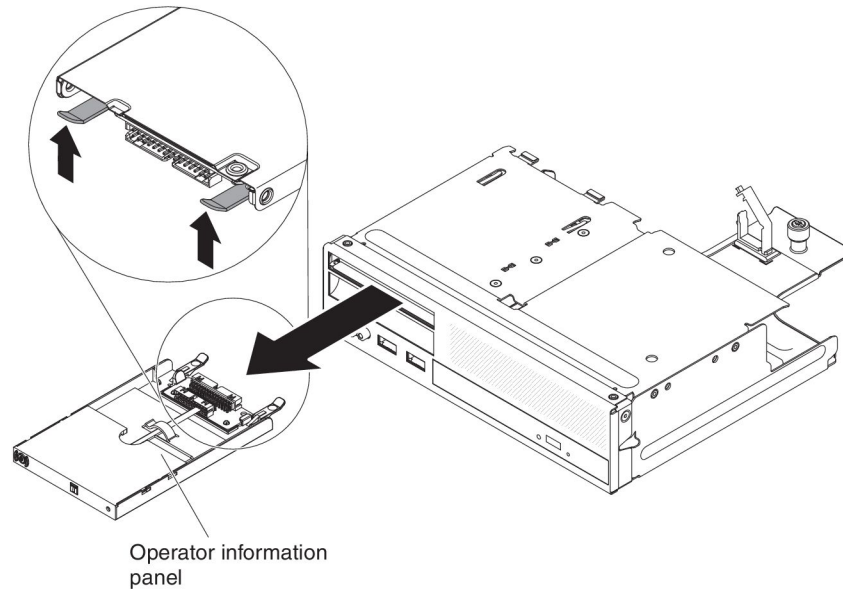
8. Carefully pull the media cage out of the server.



9. Disconnect the cable to the operator information panel.



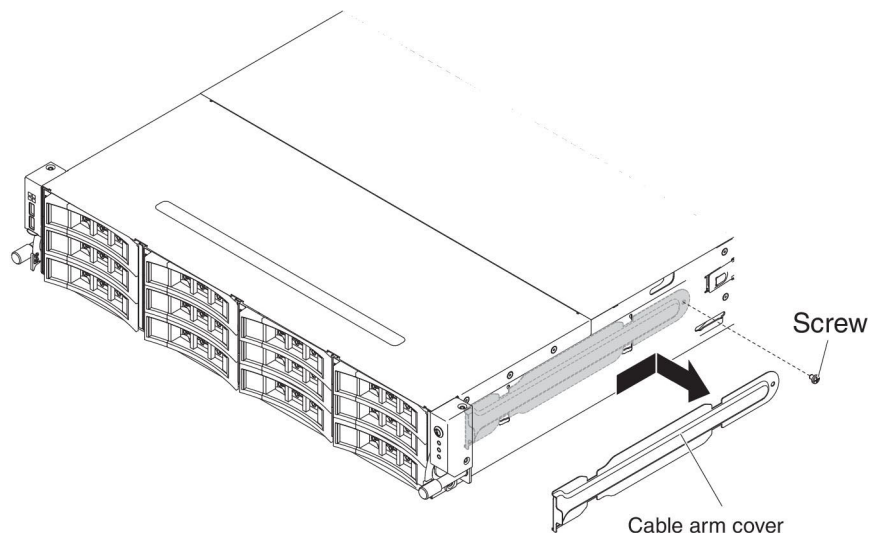
10. Push the rear of the operator information panel to the front of the server.



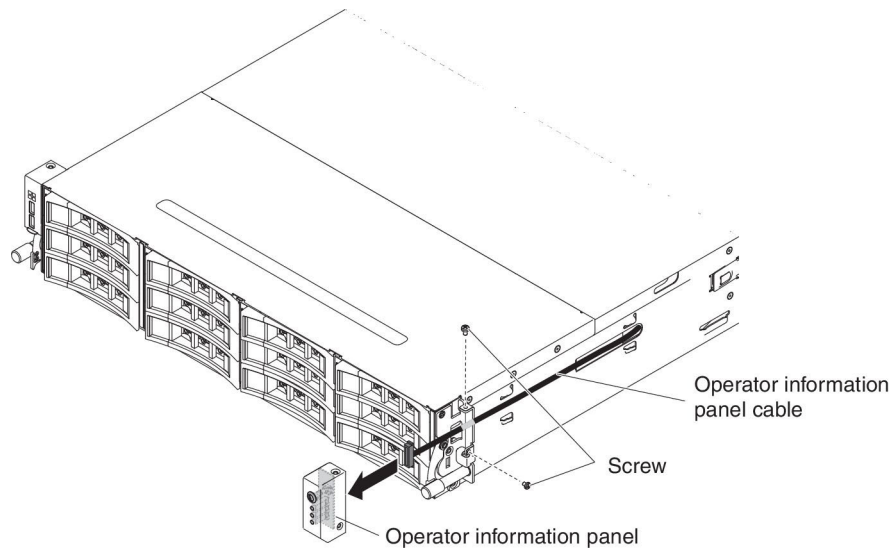
11. From the front of the server, carefully pull the operator information panel out of the server.
12. If you are instructed to return the operator information panel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

To remove the operator information panel that is on the side of the server, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the screw from the cable arm cover; then, slide the cable arm cover towards the rear of the server and set it aside.



4. Remove the screws that secure the operator information panel to the side of the server.



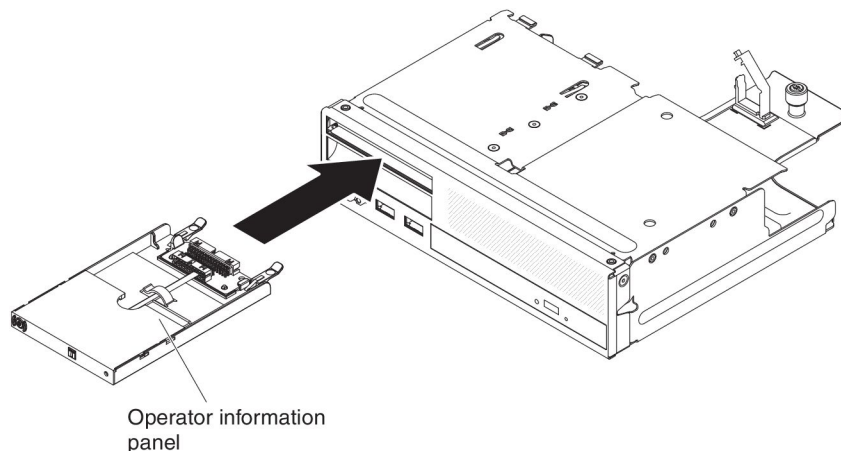
5. Disconnect the cable to the operator information panel.
6. If you are instructed to return the operator information panel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the operator information panel

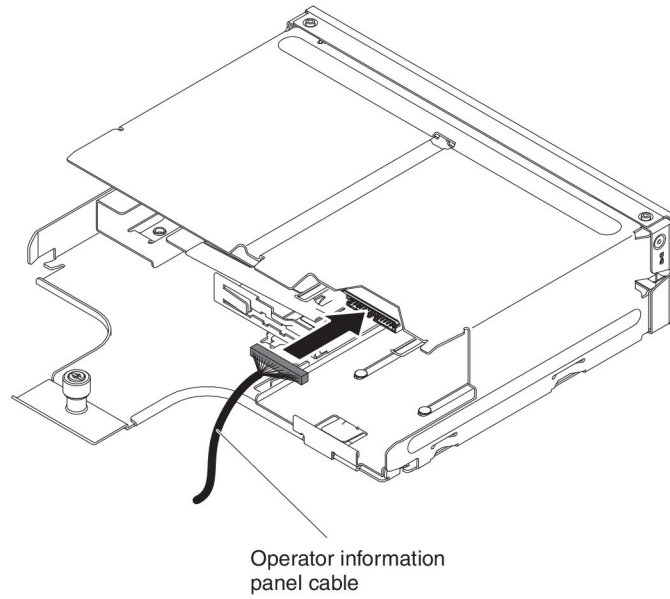
Note: The server configuration you have bought may either have the operator information panel inside the media cage or on the side of the server.

To install the operator information panel that is inside the media cage, complete the following steps:

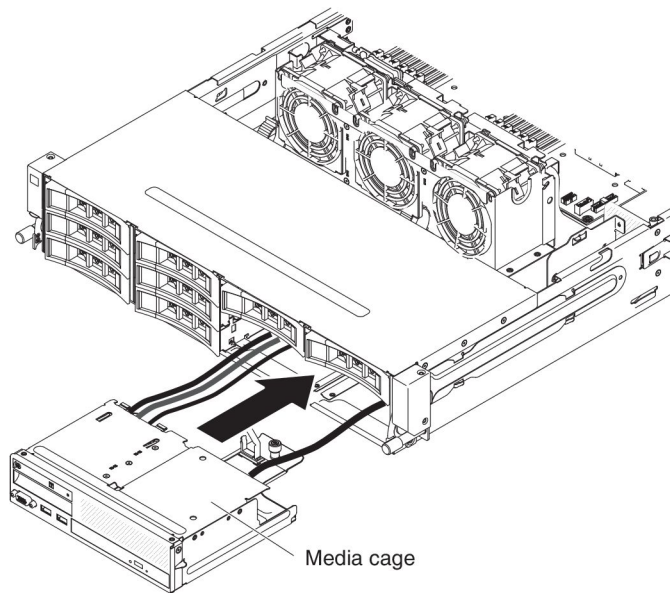
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Touch the static-protective package that contains the operator information panel to any *unpainted* metal surface on the outside of the chassis; then, remove the operator information panel from the package.
3. From the front of the server, slide the operator information panel into the server until it stops.



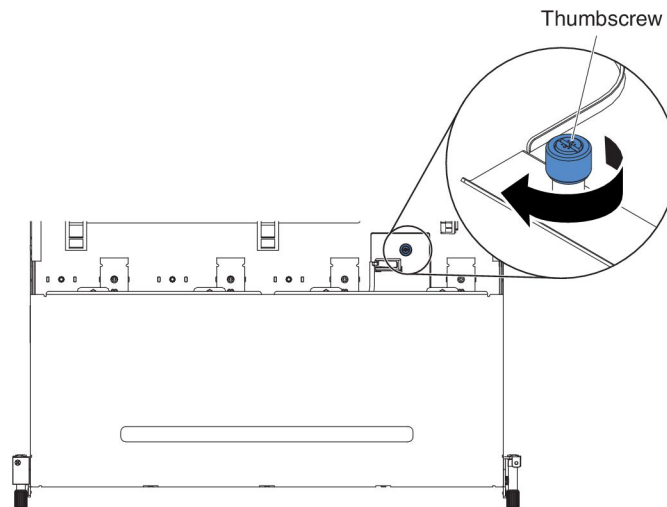
4. Reconnect the cable to the operator information panel.



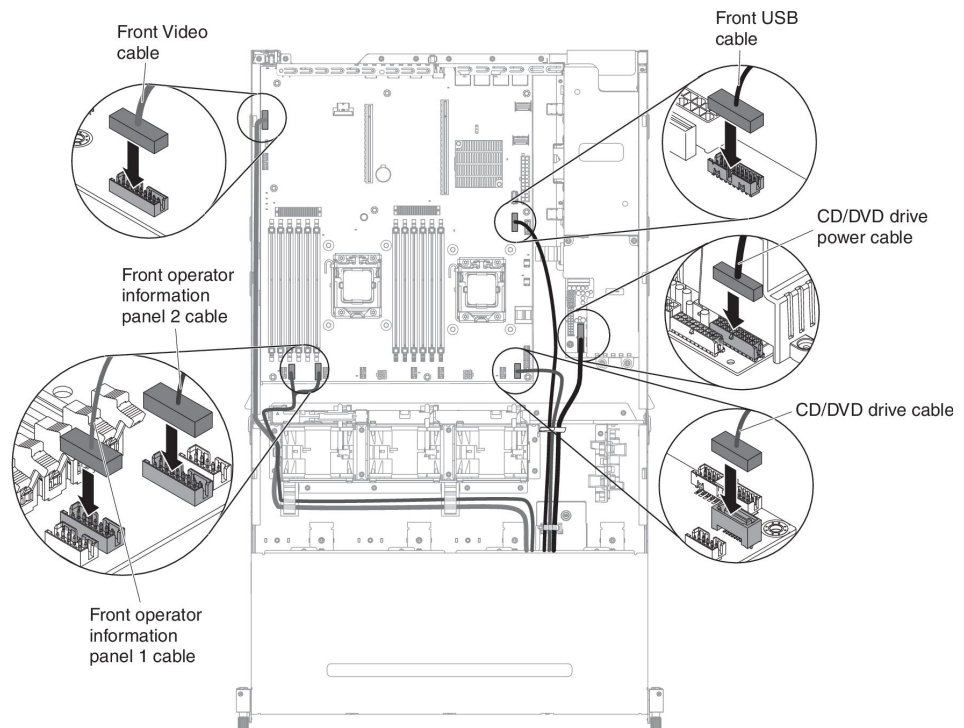
5. Carefully push the media cage back into the server.

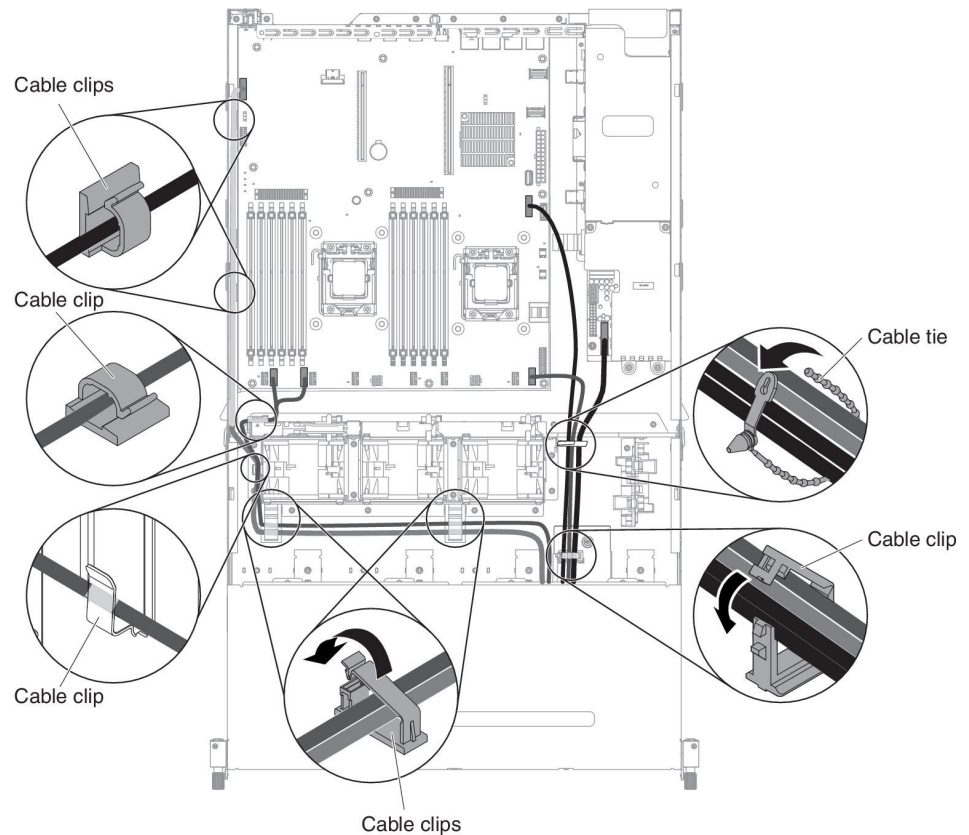


6. Tighten the thumbscrew to secure the media cage onto the server.



7. Reconnect the USB, video, CD/DVD and operator information cables to the system board. Remember to insert the cables into the relevant cable clips and cable tie.

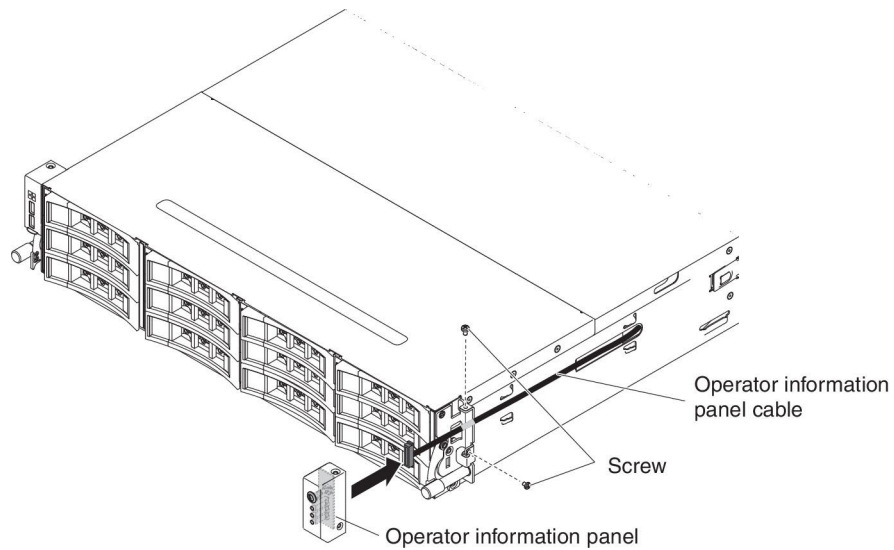




8. Install the air baffle (see “Installing the air baffle” on page 347).
9. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 253).
10. Install the server top cover (see “Installing the server top cover” on page 344).
11. Reconnect the power cord and any cables that you removed.
12. Turn on the peripheral devices and the server.

To install the operator information panel that is on the side of the server, complete the following steps:

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



3. Install the screws to secure the operator information panel to the side of the server.
4. Slide the cable arm cover into the retention slots and install the screws to secure it on the side of the chassis.

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

5. Reconnect the external cables; then, reconnect the power cords and 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.

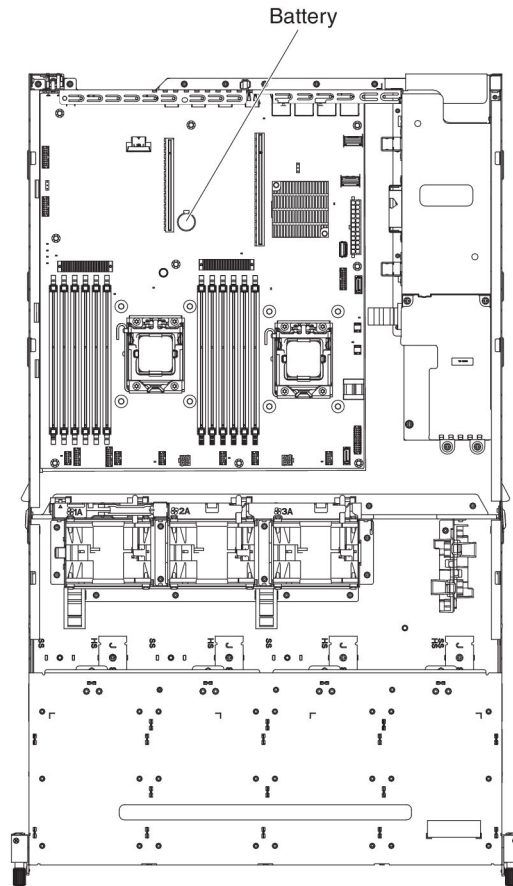
Do not:

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

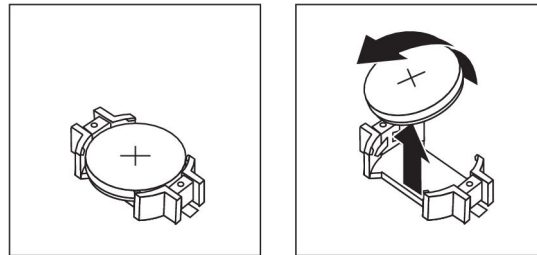
Dispose of the battery as required by local ordinances or regulations.

To remove the battery, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Follow any special handling and installation instructions that come with the battery.
3. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
4. Remove the server top cover (see “Removing the server top cover” on page 343).
5. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
6. Locate the battery on the system board.



7. 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.
8. Dispose of the battery as required by local ordinances or regulations. See the *IBM Environmental Notices and User's Guide* on the *IBM Documentation CD* for more information.

Installing the system battery

Please pay attention to the following notes when you replace the system battery in the server.

- You must replace the battery with a lithium battery of the same type from the same manufacturer.
- After you replace the battery, you must reconfigure the server and reset the system date and time.
- To 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.

- 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.

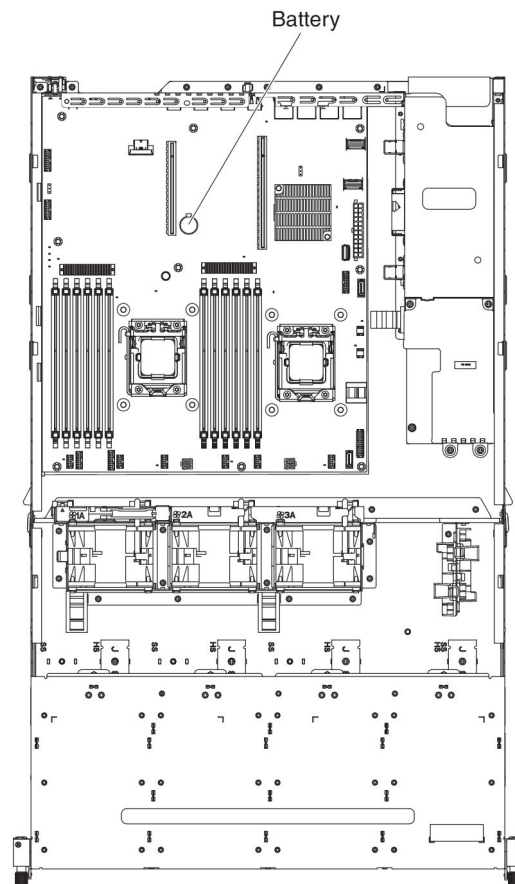
Do not:

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

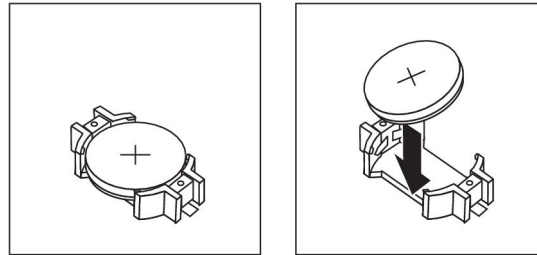
Dispose of the battery as required by local ordinances or regulations.

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

To install the replacement battery, complete the following steps:



1. Follow any special handling and installation instructions that come with the replacement battery.
2. Insert the new battery:
 - a. Position the battery so that the positive (+) symbol is facing you.



- b. Place the battery into its socket, and press the battery toward the housing until it clicks into place. Make sure that the battery clip holds the battery securely.
3. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 253).
4. Install the server top cover (see “Installing the server top cover” on page 344).
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 power cord of the server to an electrical outlet before the power-control button becomes active.

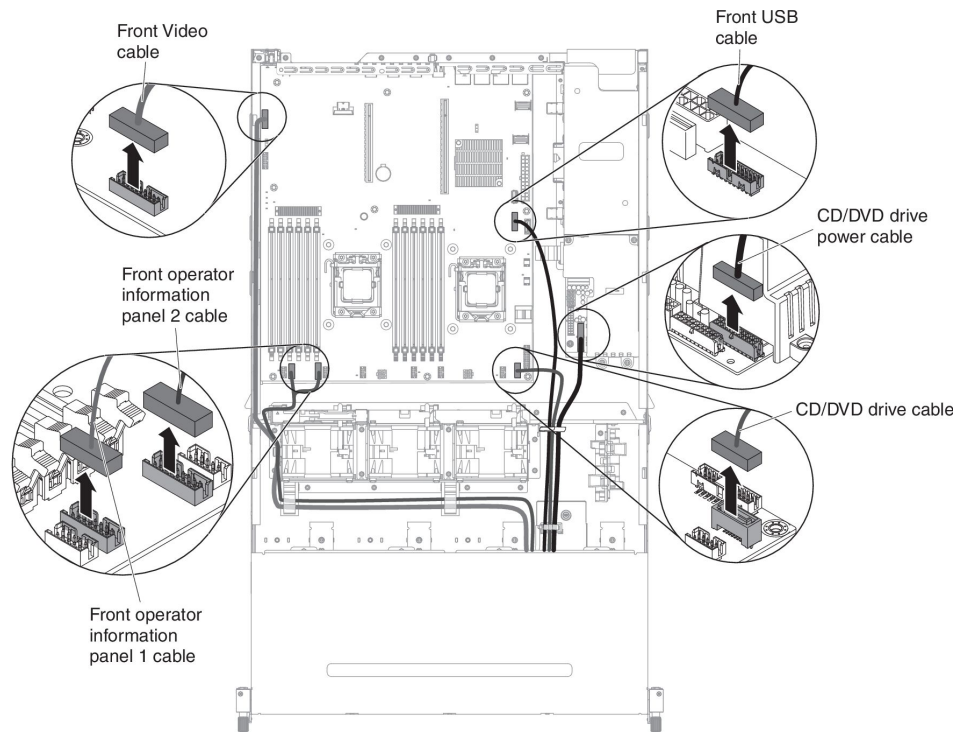
6. Start the Setup utility and reset the configuration.
 - Set the system date and time.
 - Set the power-on password.
 - Reconfigure the server.

See Chapter 6, “Configuration information and instructions,” on page 349 for details.

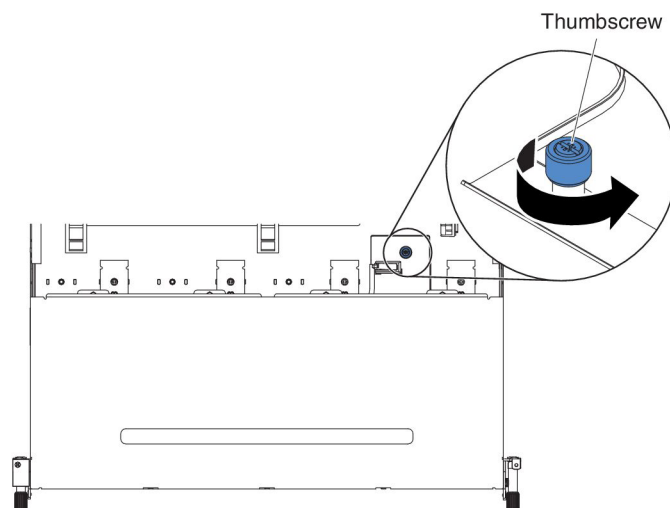
Removing the front USB and video connector assembly inside media cage

To remove the front USB and video connector assembly that is inside the media cage, complete the following steps:

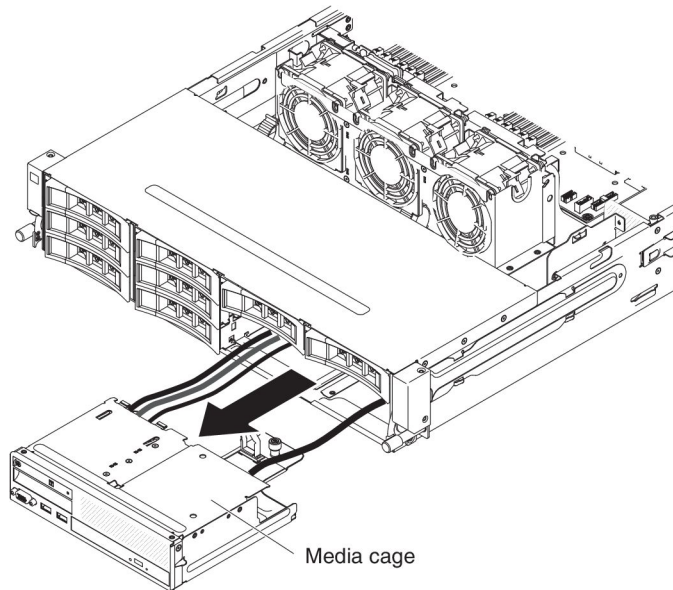
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
5. Remove the air baffle (see “Removing the air baffle” on page 345).
6. Disconnect the USB, video, CD/DVD and operator information panel cables from the system board. Please remember the relevant cable routing.



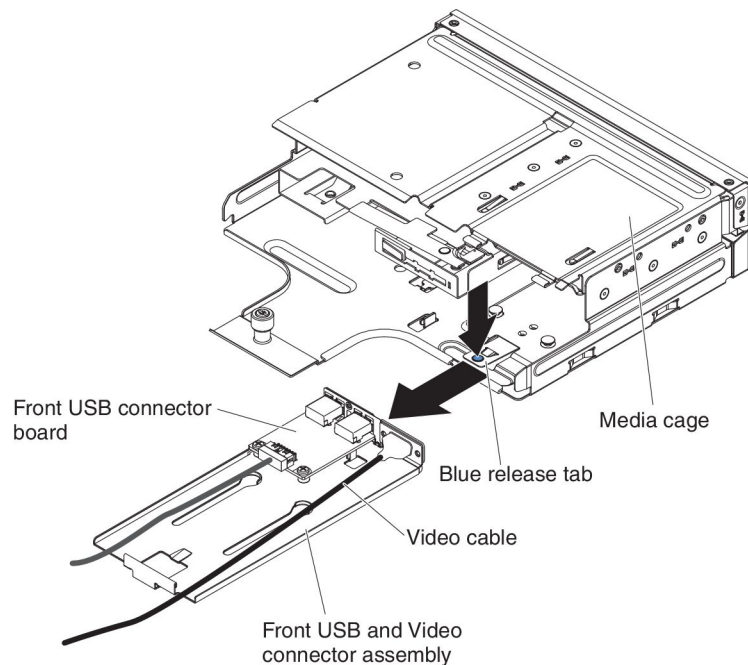
7. Loosen the single thumbscrew that is used to secure the media cage onto the server.



8. Carefully pull the media cage out of the server.



9. Locate the blue release tab on the rear of the USB and video connector assembly; then, while you press down on the tab, carefully pull the assembly outward.



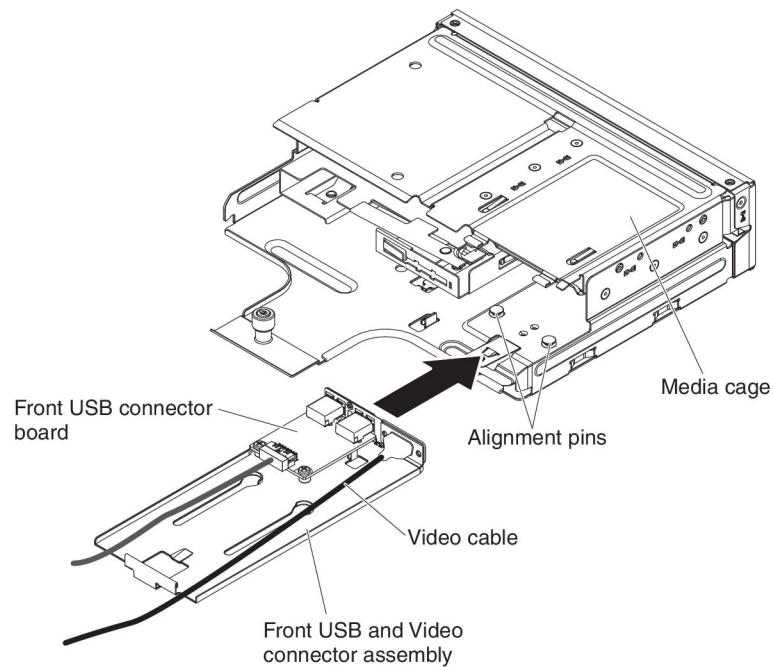
10. Remove the front USB connector assembly “Removing the front USB connector assembly” on page 296 and the front video connector “Removing the front video connector” on page 303 from the front USB and video connector assembly.

Installing the front USB and video connector assembly inside media cage

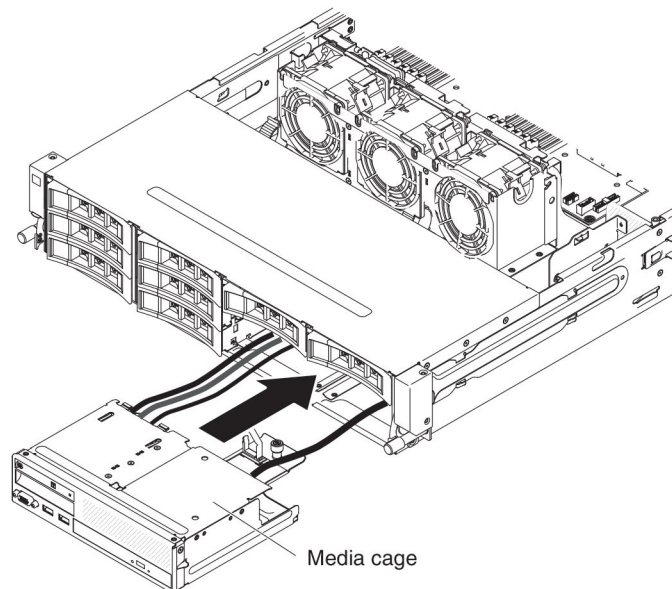
Note: The server configuration you have bought may either have the front USB connector assembly inside the media cage or on the side of the server.

To install the front USB and video connector assembly that is inside the media cage, complete the following steps:

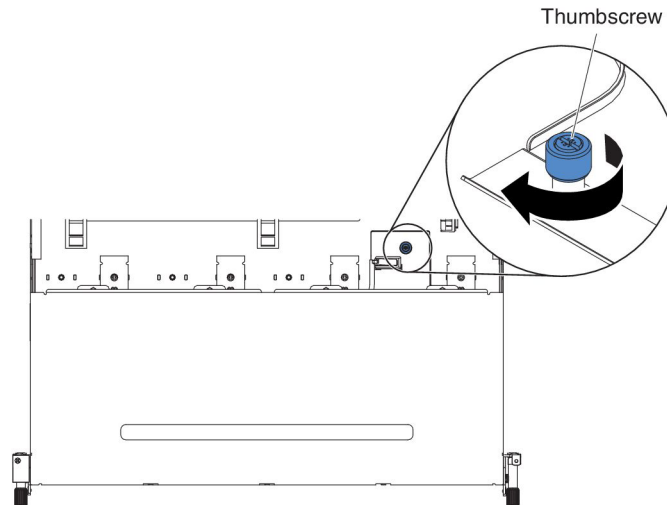
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Install the front USB connector assembly “Installing the front USB connector assembly” on page 299 and the front video connector “Installing the front video connector” on page 306 to the front USB and video connector assembly.
3. Slide the front USB and video connector assembly into the media cage until it clicks into place.



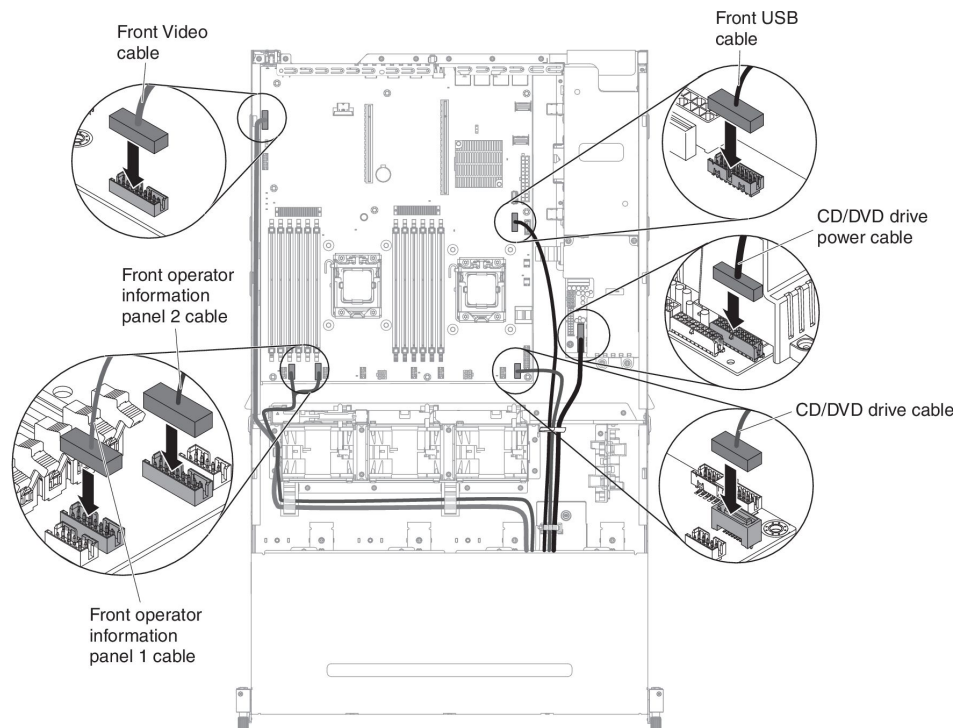
4. Carefully push the media cage back into the server.

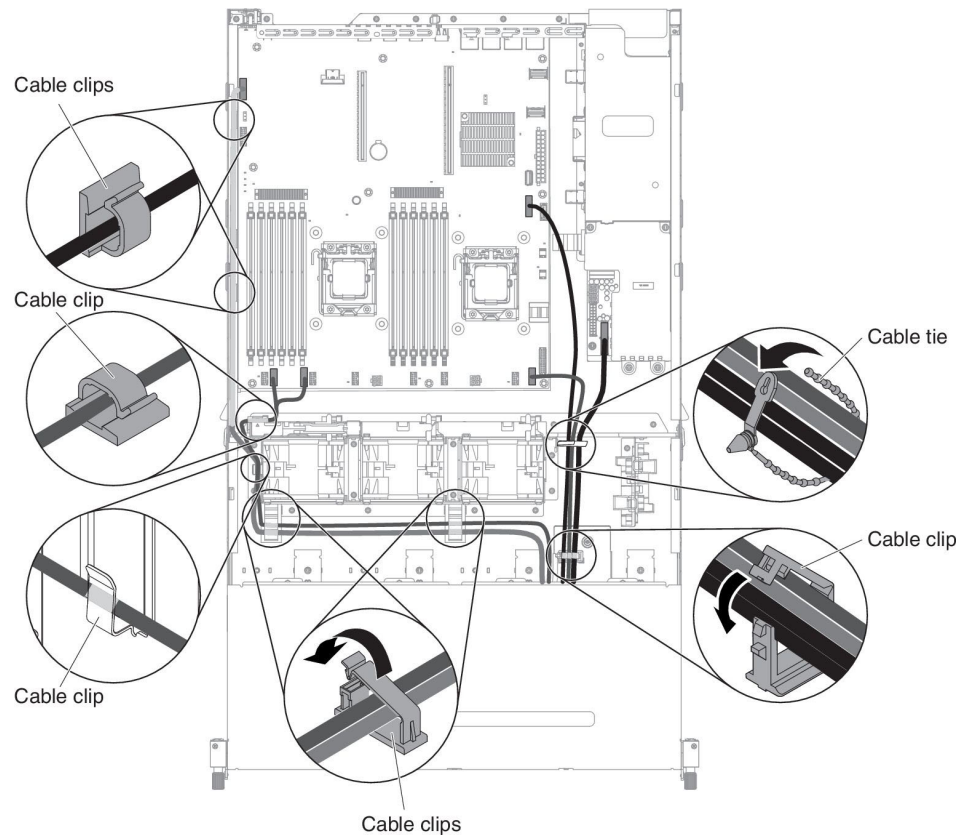


5. Tighten the thumbscrew to secure the media cage onto the server.



6. Reconnect the USB, video, CD/DVD and operator information cables to the system board. Remember to insert the cables into the relevant cable clips and cable tie.





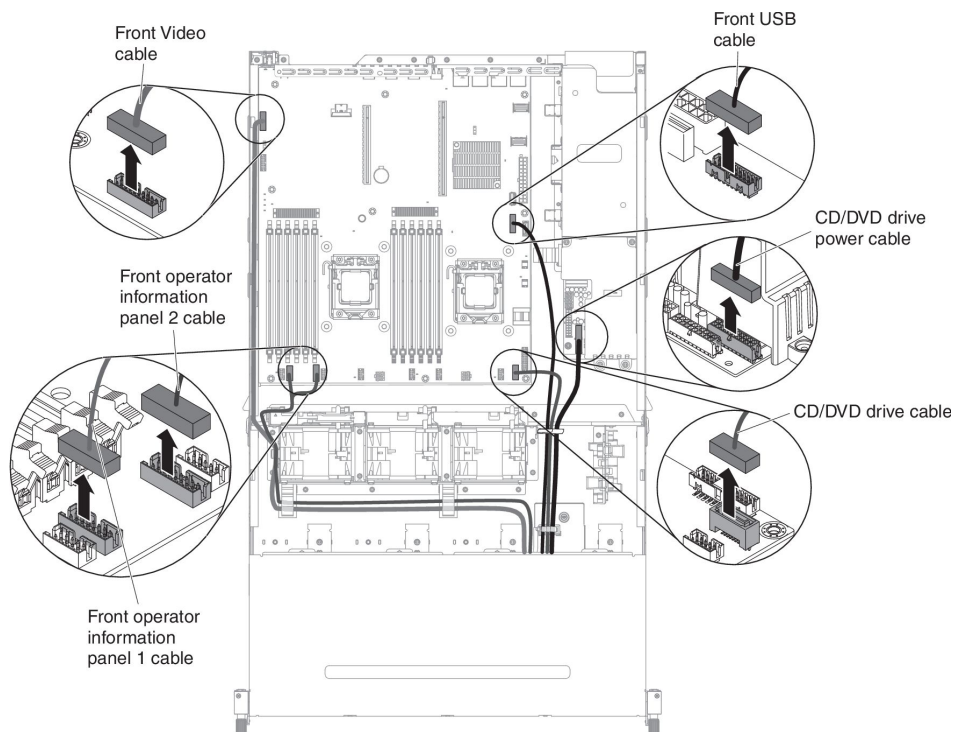
7. Install the air baffle (see “Installing the air baffle” on page 347).
8. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 253).
9. Install the server top cover (see “Installing the server top cover” on page 344).
10. Reconnect the power cord and any cables that you removed.
11. Turn on the peripheral devices and the server.

Removing the front USB connector assembly cable

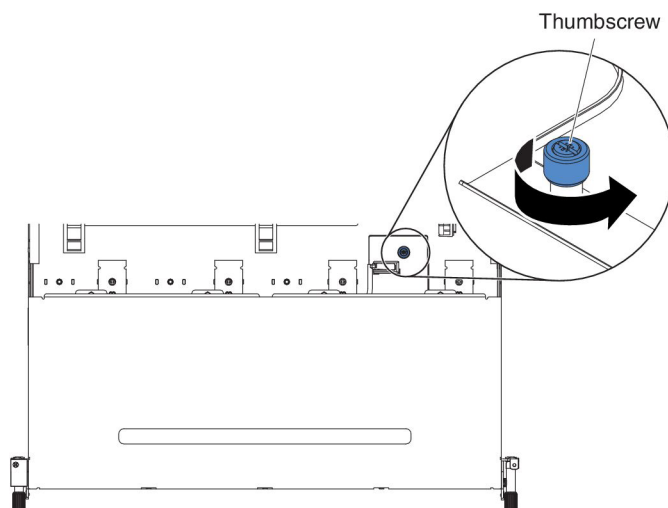
Note: The server configuration you have bought may either have the front USB connector assembly inside the media cage or on the side of the server.

To remove the front USB connector assembly cable that is inside the media cage, complete the following steps:

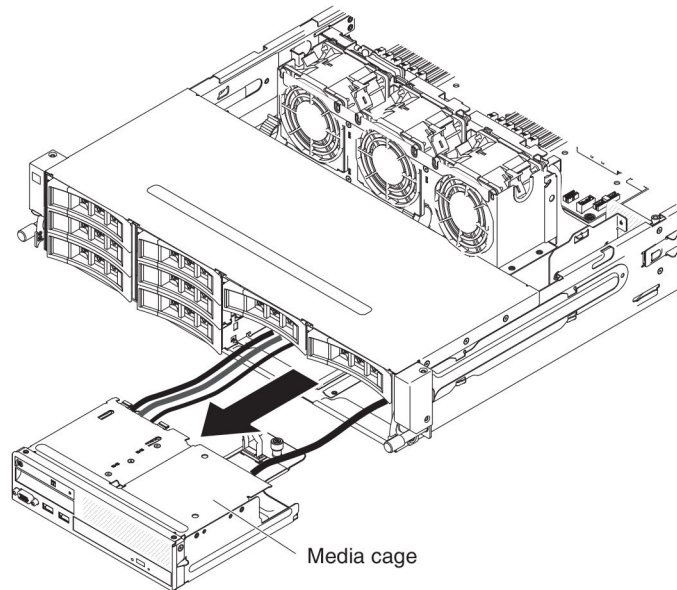
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
5. Remove the air baffle (see “Removing the air baffle” on page 345).
6. Disconnect the USB, video, CD/DVD and operator information panel cables from the system board. Please remember the relevant cable routing.



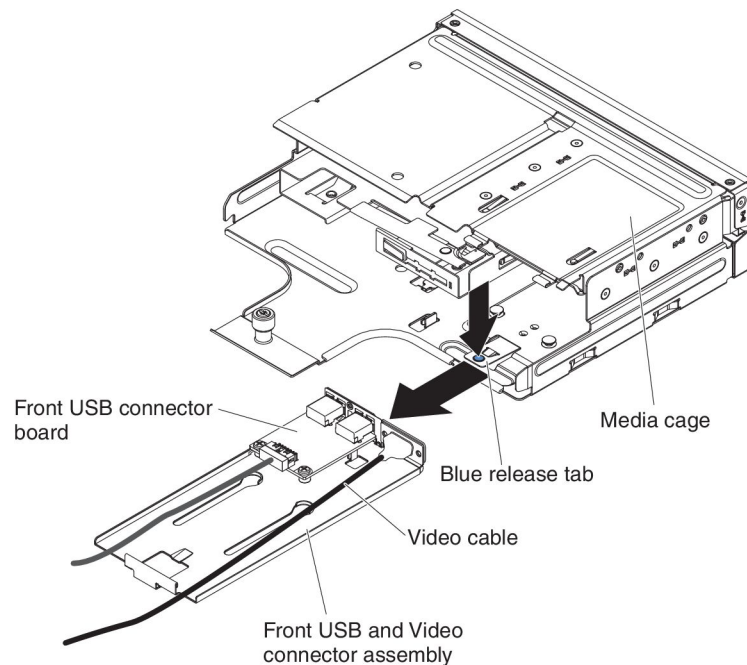
7. Loosen the single thumbscrew that is used to secure the media cage onto the server.



8. Carefully pull the media cage out of the server.



9. Locate the blue release tab on the rear of the USB and video connector assembly; then, while you press down on the tab, carefully pull the assembly outward.

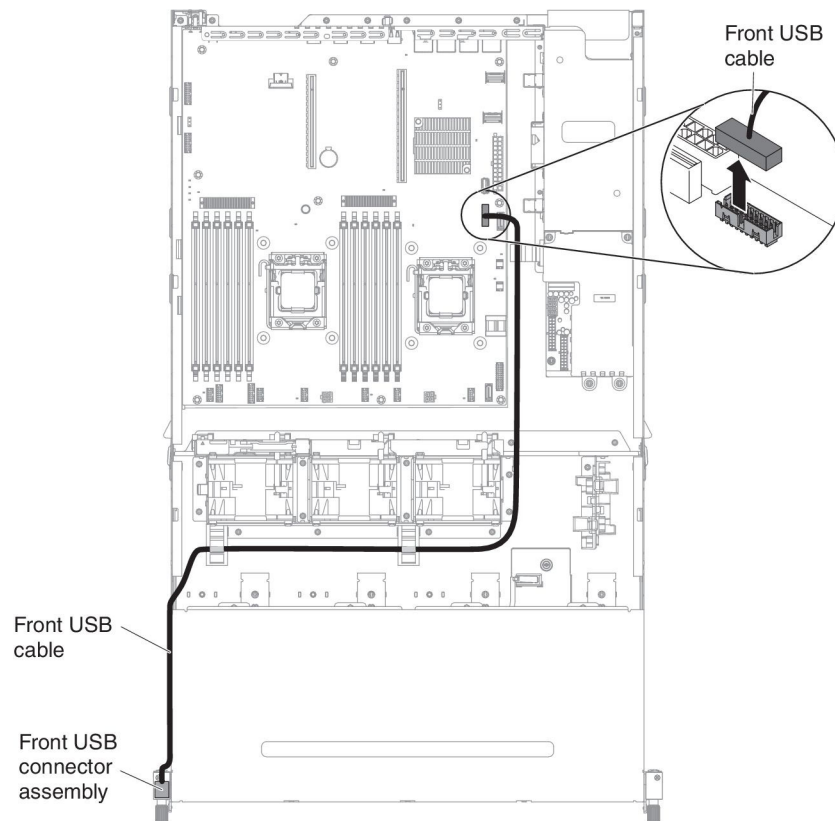


10. Disconnect the USB cable from the connector on the front USB connector board.
11. If you are instructed to return the front USB connector assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

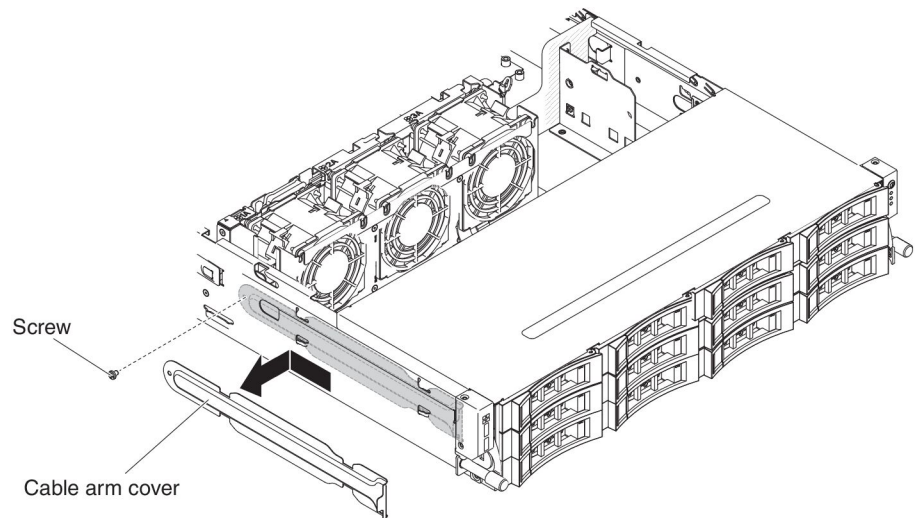
To remove the front USB connector assembly cable that is on the side of the server, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.

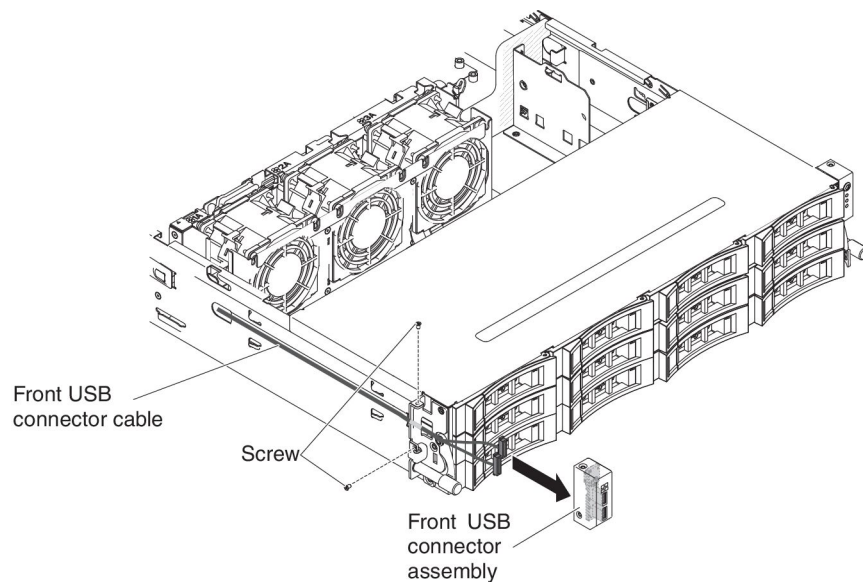
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 197).
5. Remove PCI riser-card assembly 2 (see “Removing the PCI riser-card assembly” on page 251).
6. Remove the air baffle (see “Removing the air baffle” on page 345).
7. Make note of where the front USB connector assembly cable is attached to the system board; then, disconnect it.



8. Remove the screws from the cable arm cover; then, slide the cable arm cover towards the rear of the server and set it aside.



9. Remove the screws from the front USB connector assembly.



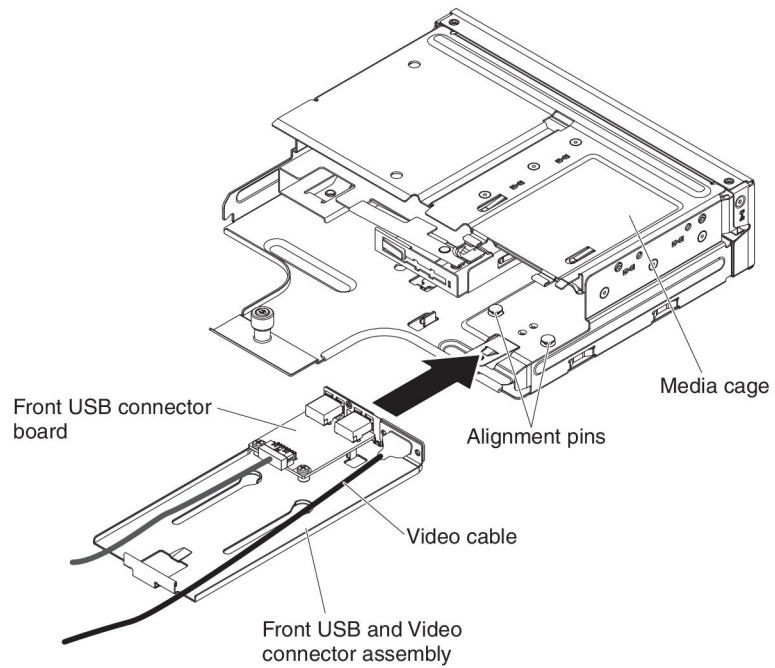
10. Disconnect the cable to the front USB connector assembly.
11. If you are instructed to return the front USB connector assembly cable, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the front USB connector assembly cable

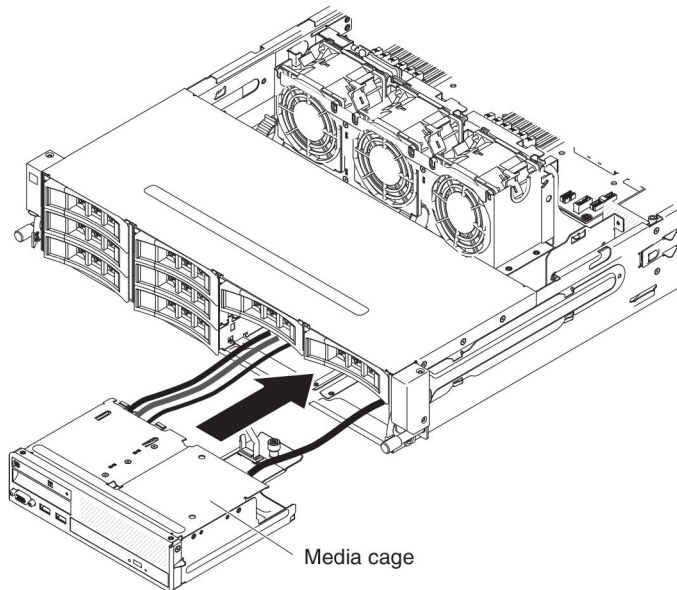
Note: The server configuration you have bought may either have the front USB connector assembly inside the media cage or on the side of the server.

To install the front USB connector assembly cable that is inside the media cage, complete the following steps:

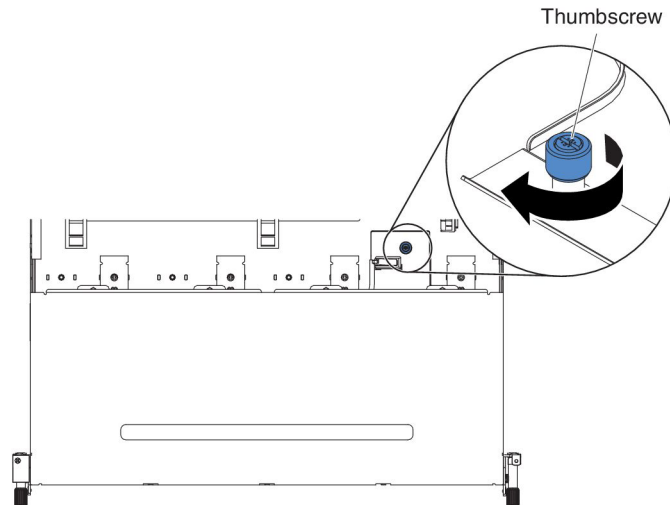
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Reconnect the cable to the front USB connector board.
3. Slide the front USB and video connector assembly into the media cage until it clicks into place.



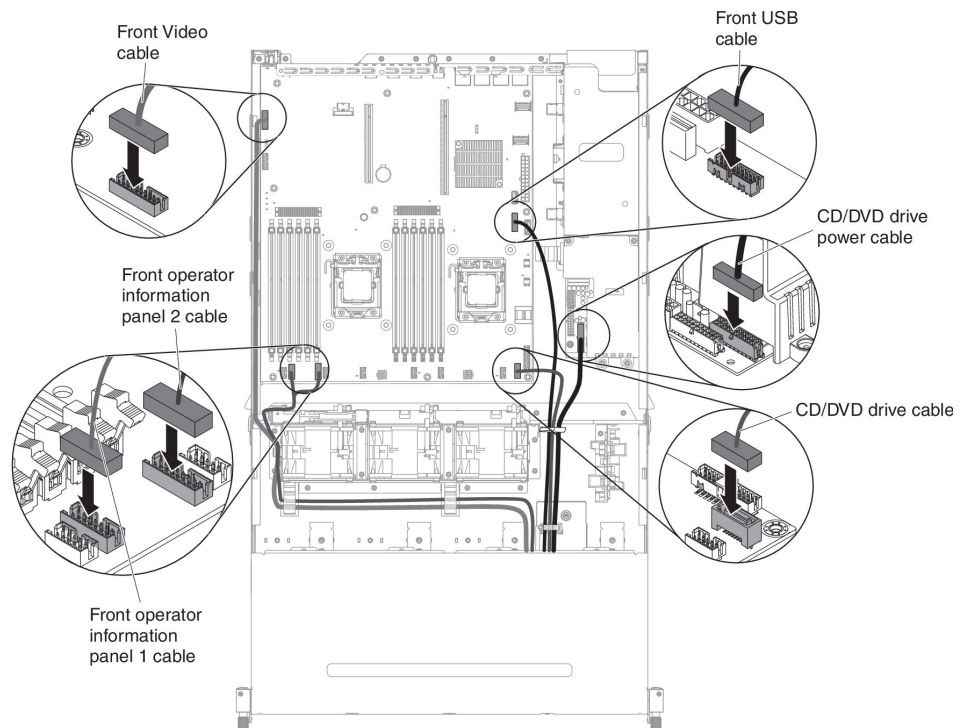
4. Carefully push the media cage back into the server.

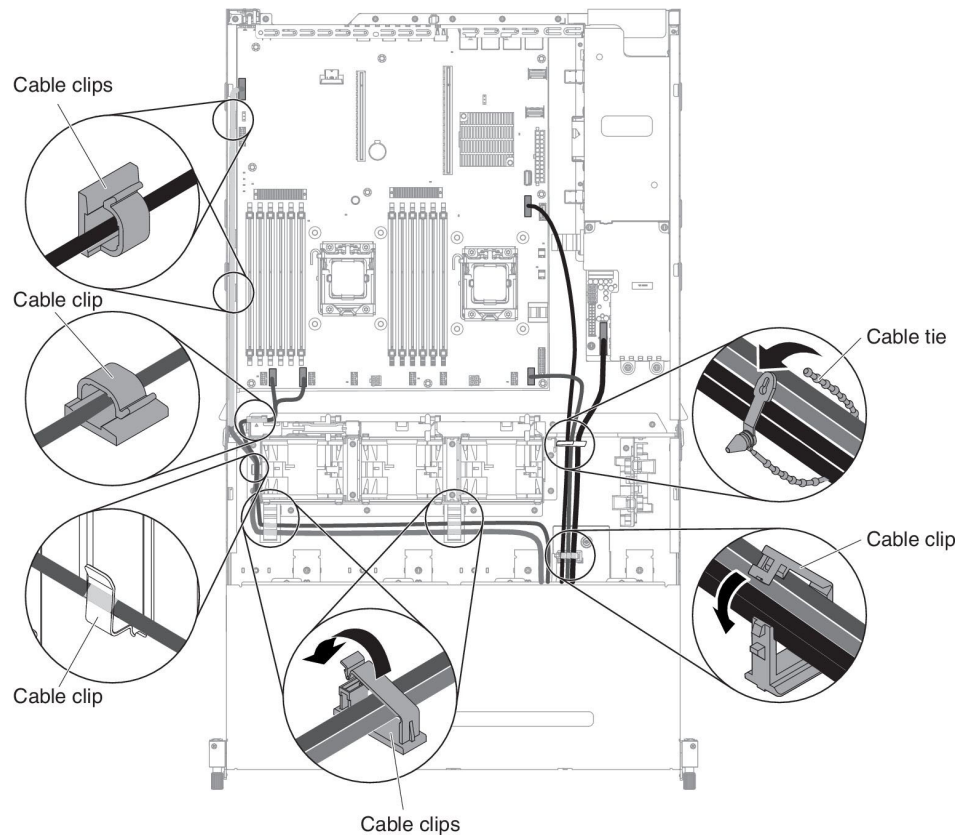


5. Tighten the thumbscrew to secure the media cage onto the server.



6. Reconnect the USB, video, CD/DVD and operator information cables to the system board. Remember to insert the cables into the relevant cable clips and cable tie.

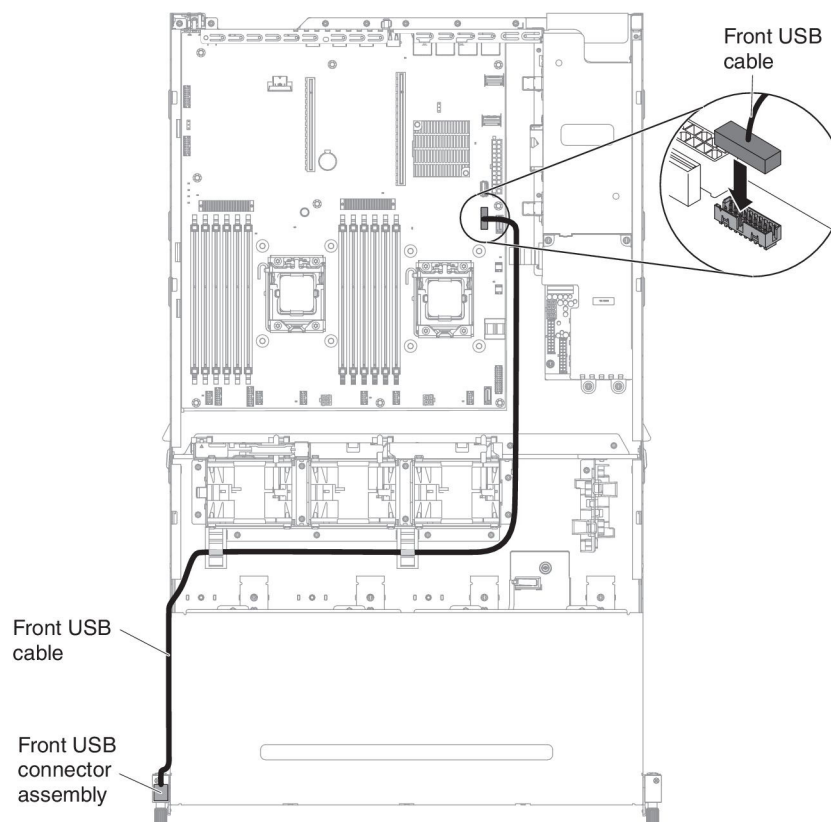




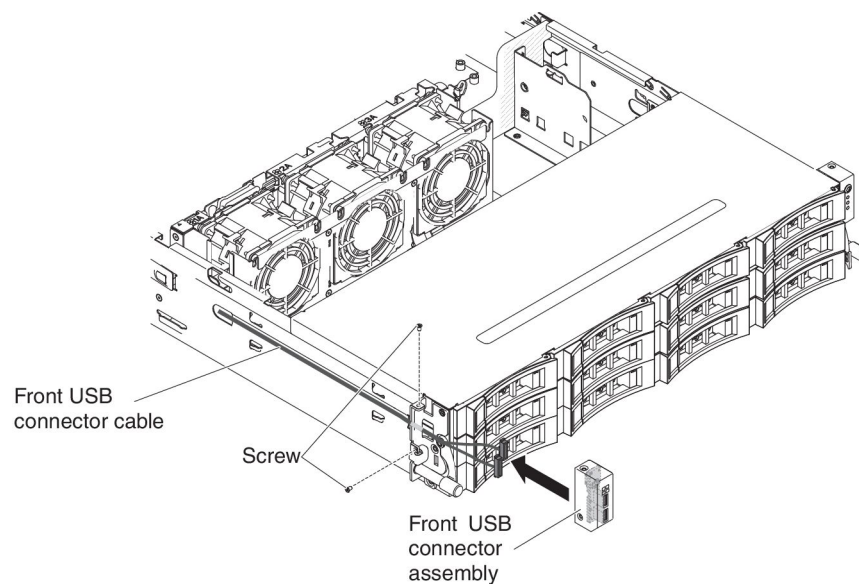
7. Install the air baffle (see “Installing the air baffle” on page 347).
8. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 253).
9. Install the server top cover (see “Installing the server top cover” on page 344).
10. Reconnect the power cord and any cables that you removed.
11. Turn on the peripheral devices and the server.

To install the front USB connector assembly cable that is on this side of the server, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Connect the front USB connector assembly cable to the system board and route the internal cabling as shown in the following illustration. Remember to insert the cables into the relevant cable clips.



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



4. Install the screws to secure the front USB connector assembly to the side of the server.
5. Slide the cable arm cover into the retention slots and install the screws to secure it on the side of the chassis.

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

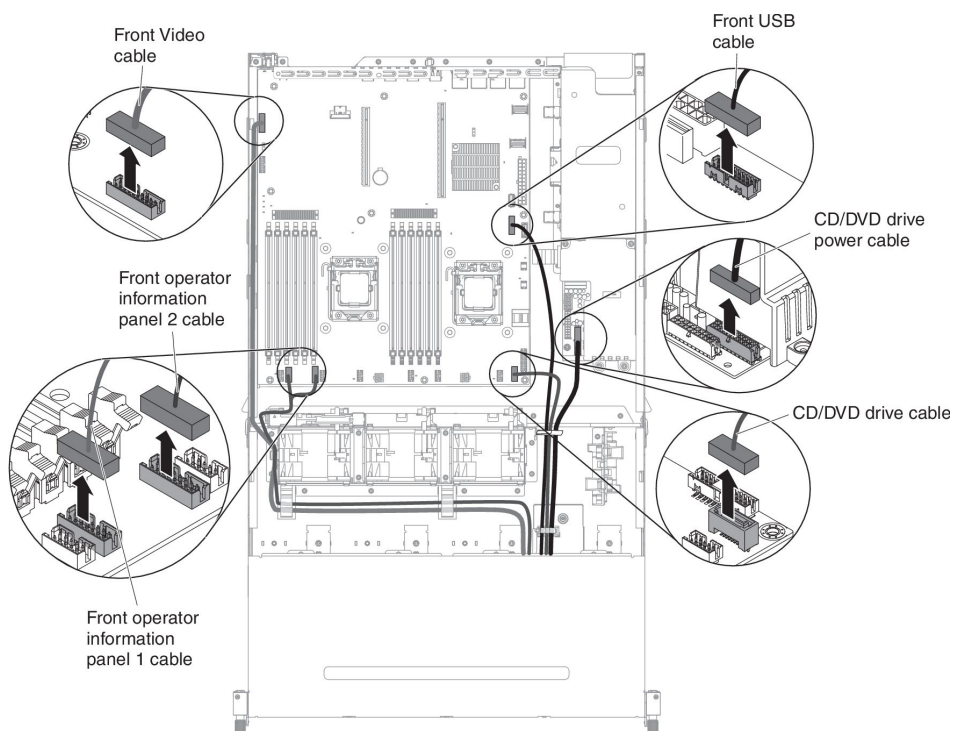
6. Install PCI riser-card assembly 2 (see “Installing the PCI riser-card assembly” on page 253).
7. Install the air baffle (see “Installing the air baffle” on page 347).
8. If you have the optional hot-swap rear hard disk drive cage installed, rotate it down (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 198).
9. Install the server top cover (see “Installing the server top cover” on page 344).
10. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the front USB connector assembly

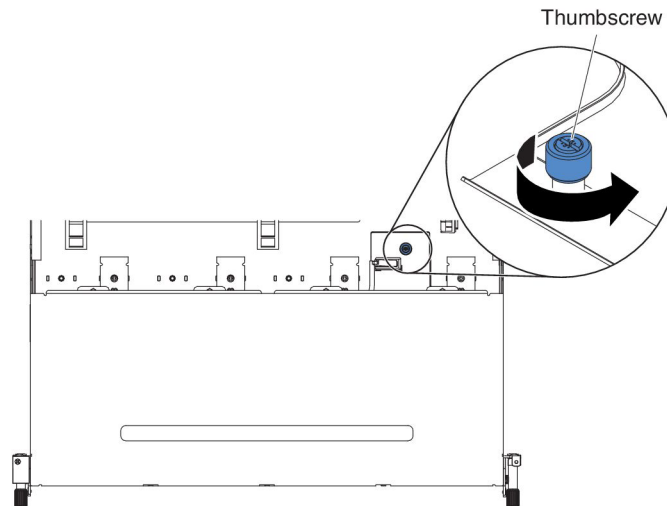
Note: The server configuration you have bought may either have the front USB connector assembly inside the media cage or on the side of the server.

To remove the front USB connector assembly that is inside the media cage, complete the following steps:

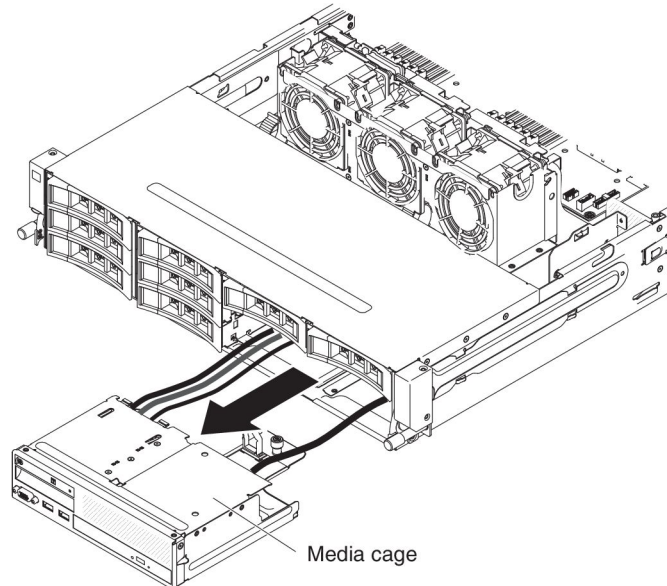
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
5. Remove the air baffle (see “Removing the air baffle” on page 345).
6. Locate the USB, video, CD/DVD and operator information panel cables of the media cage.
7. Disconnect the USB, video, CD/DVD and operator information panel cables from the system board. Please remember the relevant cable routing.



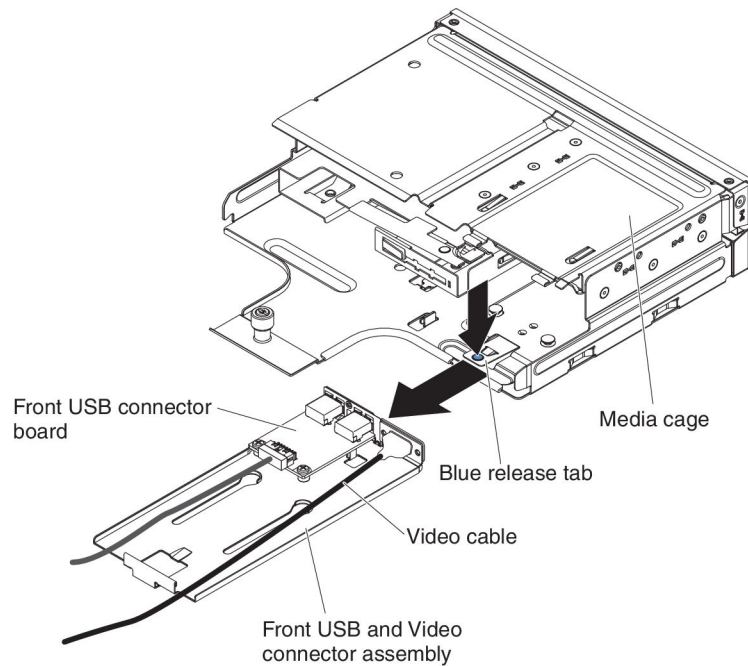
8. Loosen the single thumbscrew that is used to secure the media cage onto the server.



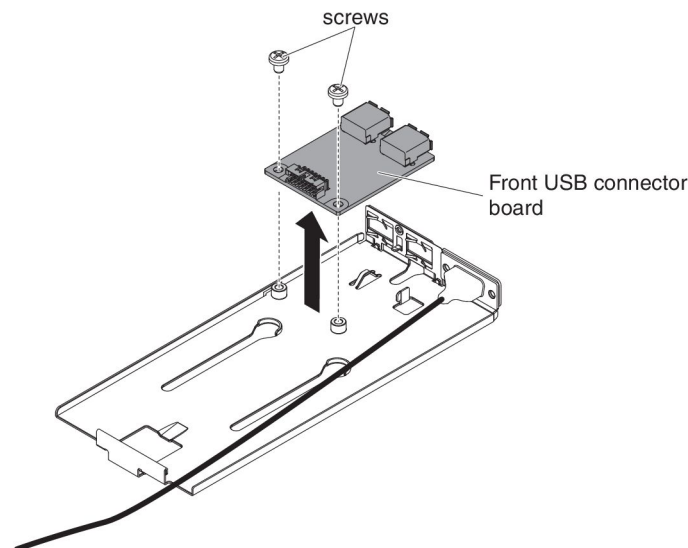
9. Carefully pull the media cage out of the server.



10. Locate the blue release tab on the rear of the USB and video connector assembly; then, while you press down on the tab, carefully pull the assembly outward.



11. Disconnect the USB cable from the connector on the front USB connector board.
12. Remove the two screws that attaches the front USB connector board on the front USB and video connector assembly.

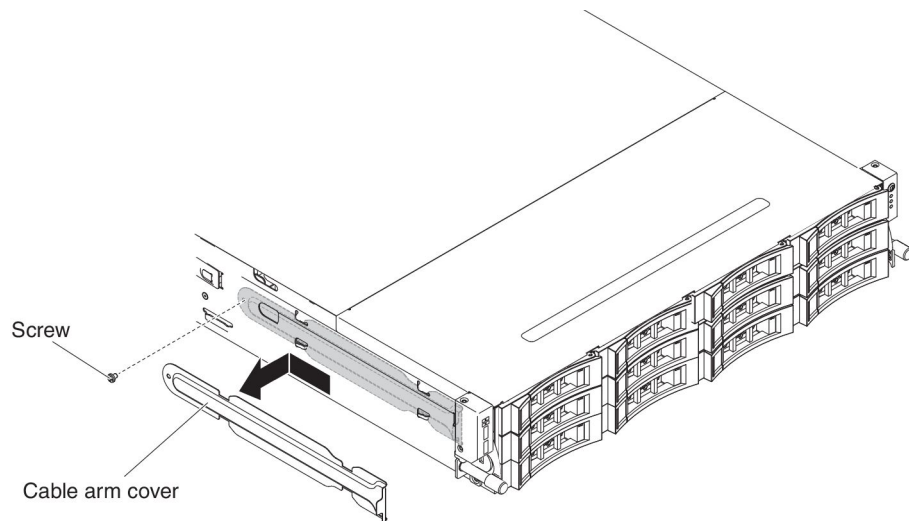


13. If you are instructed to return the front USB connector assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

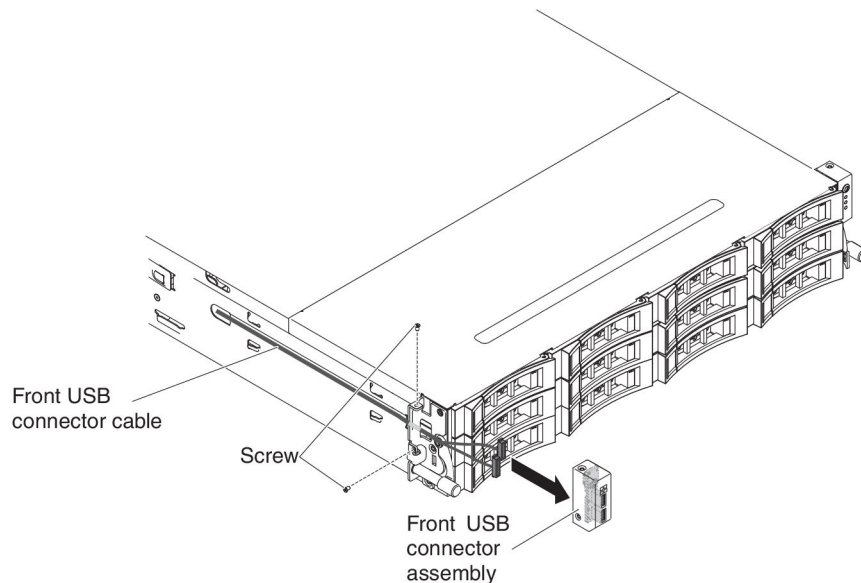
To remove the front USB connector assembly that is on the side of the server, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 185.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.

3. Remove the screws from the cable arm cover; then, slide the cable arm cover towards the rear of the server and set it aside.



4. Remove the screws that secure the front USB connector assembly to the side of the server.
5. Disconnect the cable to the front USB connector assembly.



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

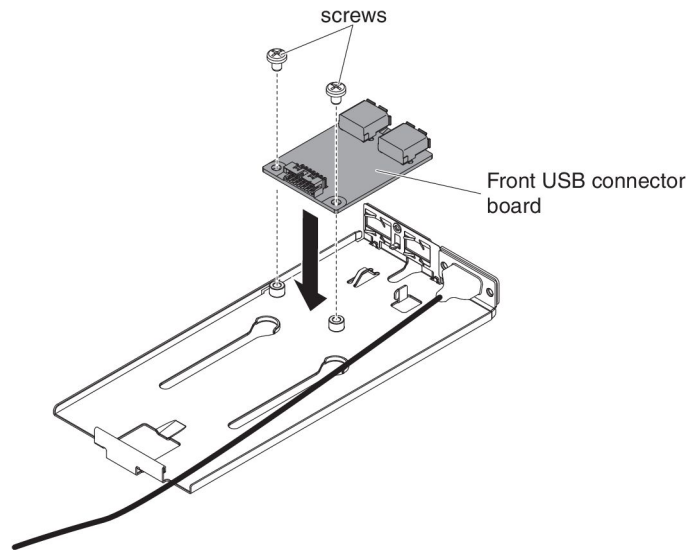
Installing the front USB connector assembly

Note: The server configuration you have bought may either have the front USB connector assembly inside the media cage or on the side of the server.

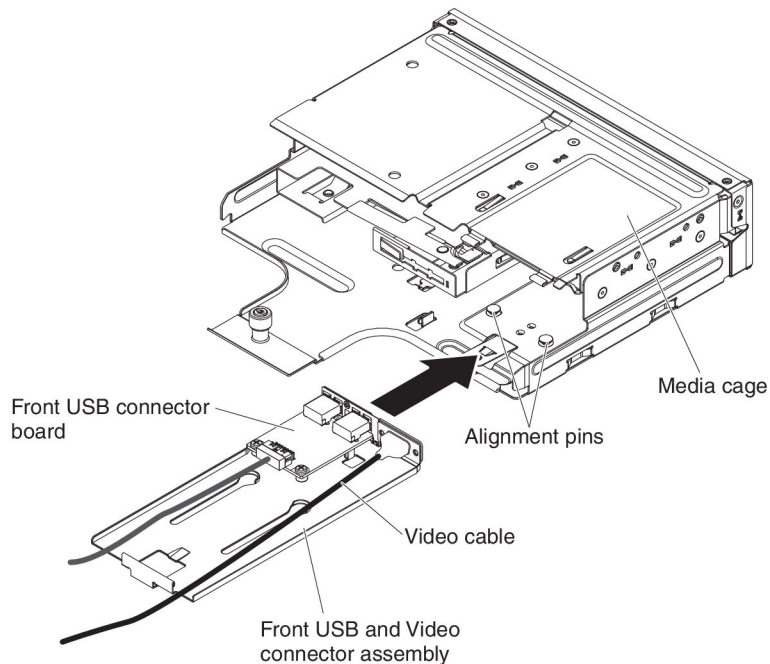
To install the front USB connector assembly that is inside the media cage, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.

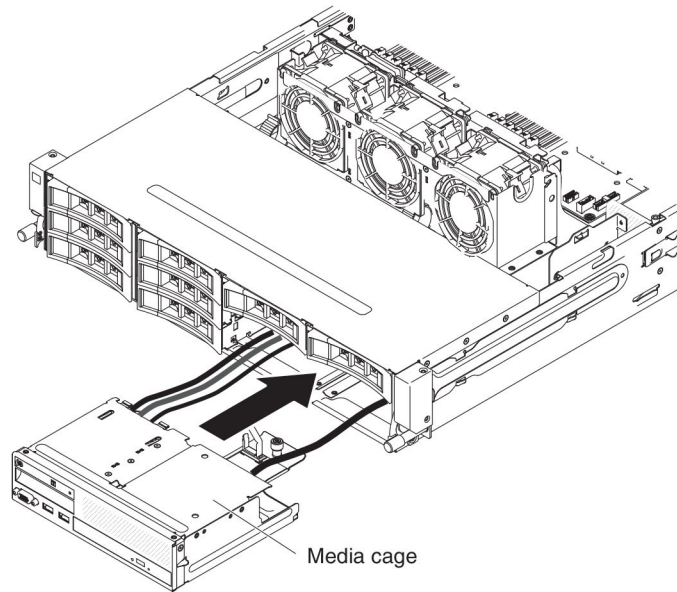
2. Touch the static-protective package that contains the front USB connector assembly to any *unpainted* metal surface on the outside of the chassis; then, remove the front USB connector assembly from the package.
3. Orient the USB connector board as shown in the below illustration; then, align the screw holes on the USB connector board with the screw holes on the USB assembly.
4. Install the screws to secure the front USB connector board to the front USB and video connector assembly.



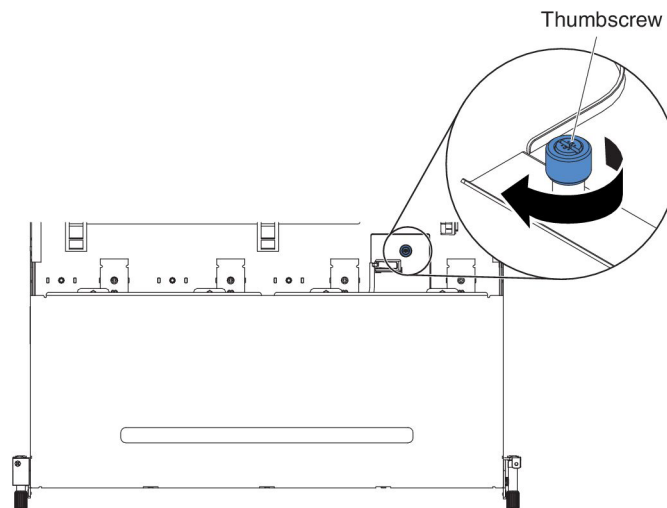
5. Reconnect the cable to the front USB connector board.
6. Slide the front USB and video connector assembly into the media cage until it clicks into place.



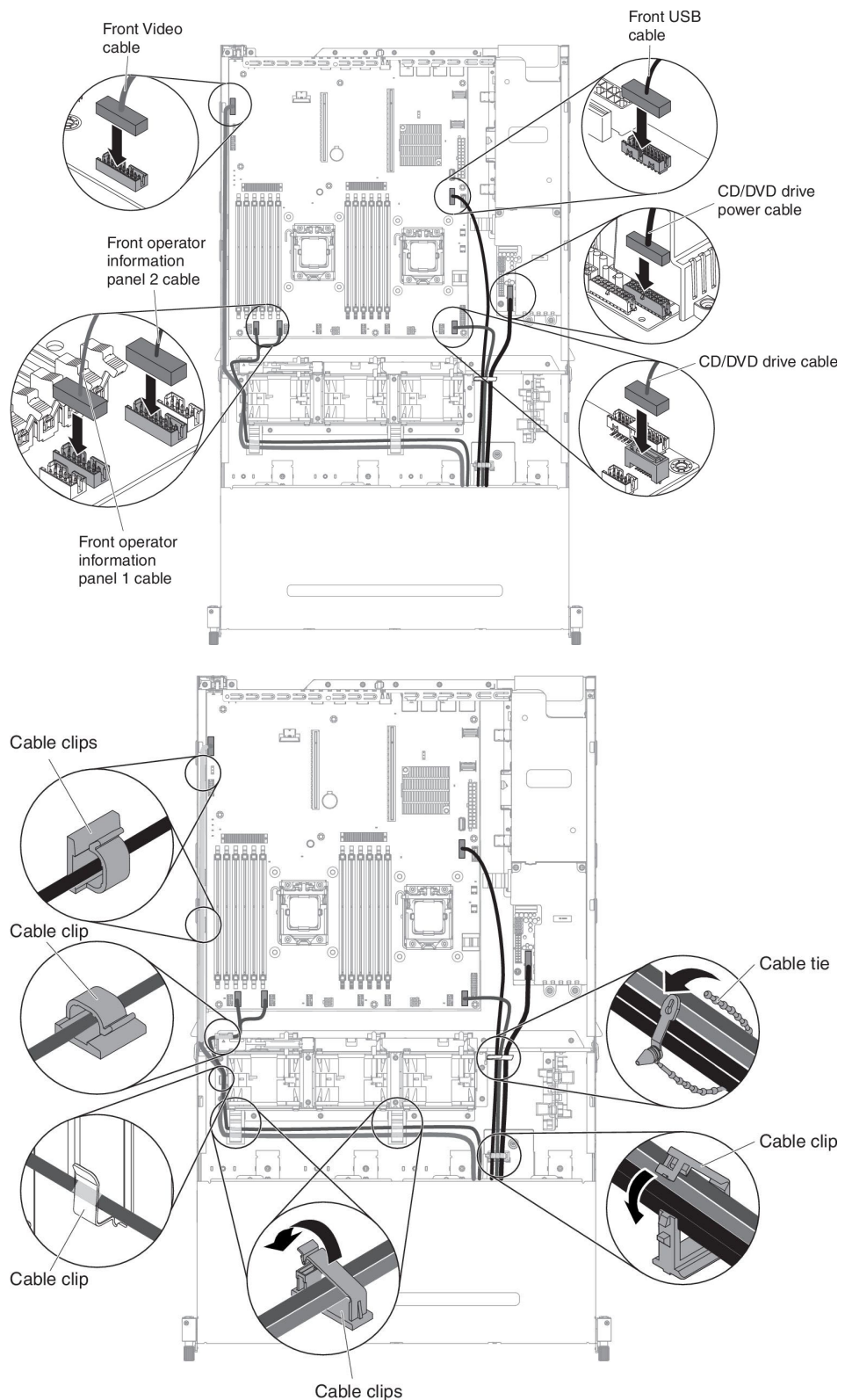
7. Carefully push the media cage back into the server.



8. Tighten the thumbscrew to secure the media cage onto the server.



9. Reconnect the USB, video, CD/DVD and operator information cables to the system board. Remember to insert the cables into the relevant cable clips and cable tie.

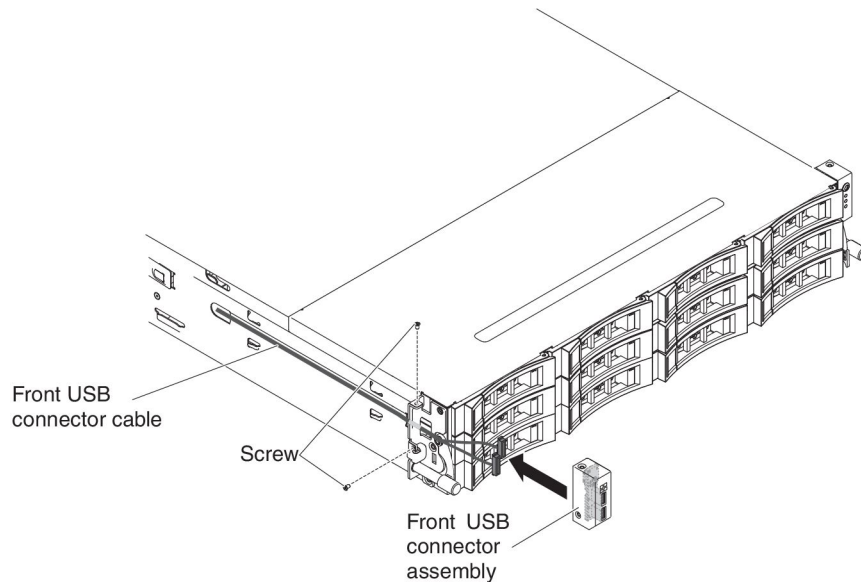


10. Install the air baffle (see "Installing the air baffle" on page 347).
11. Install the PCI riser-card assembly (see "Installing the PCI riser-card assembly" on page 253).
12. Install the server top cover (see "Installing the server top cover" on page 344).

13. Reconnect the power cord and any cables that you removed.
14. Turn on the peripheral devices and the server.

To install the front USB connector assembly that is on this side of the server, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Touch the static-protective package that contains the front USB connector assembly to any *unpainted* metal surface on the outside of the chassis; then, remove the front USB connector assembly from the package.
3. Reconnect the cable to the front USB connector assembly.



4. Install the screws to secure the front USB connector assembly to the side of the server.
5. Install the screws to secure the cable arm cover to the server.

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

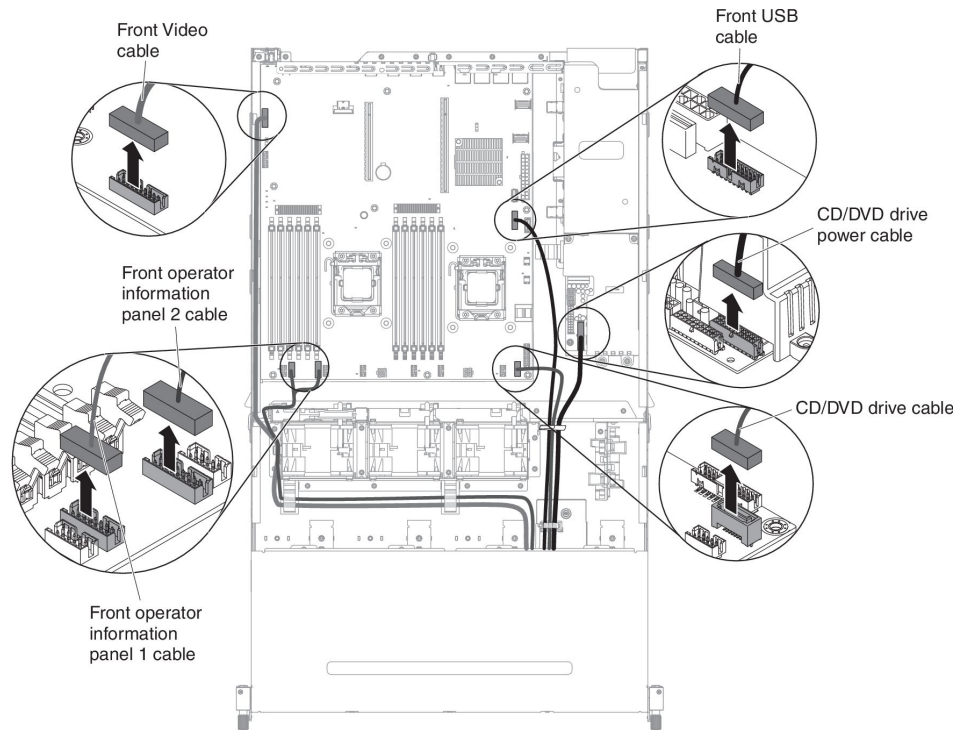
6. Install the server top cover (see “Installing the server top cover” on page 344).
7. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the front video connector

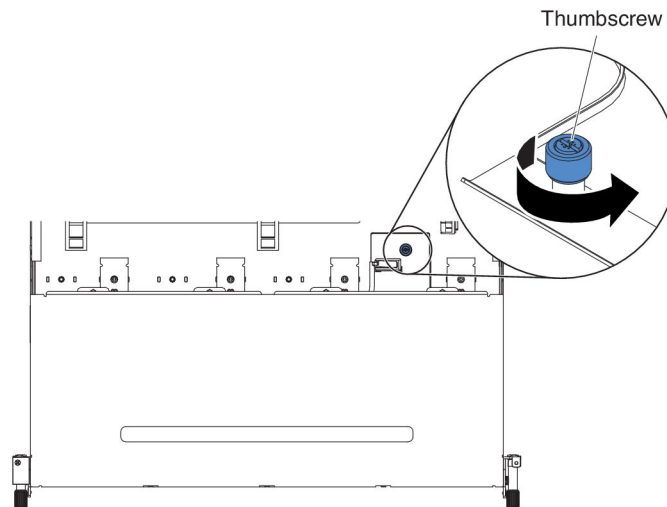
To remove the front video connector, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
5. Remove the air baffle (see “Removing the air baffle” on page 345).

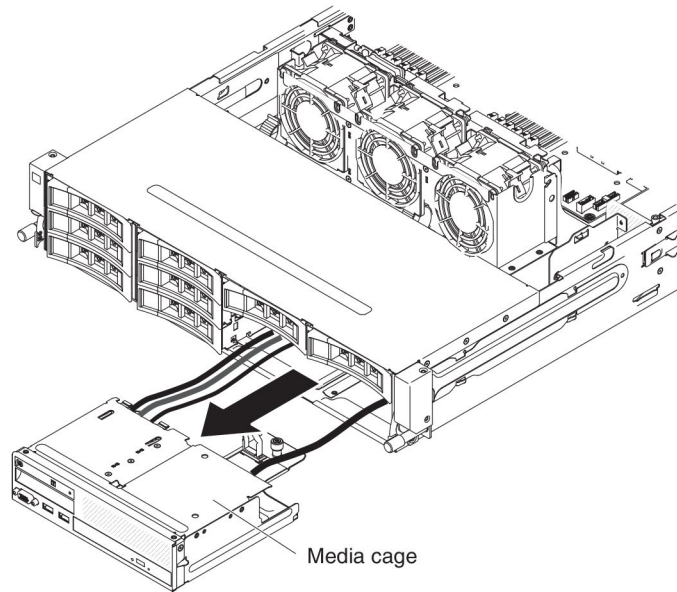
6. Disconnect the USB, video, CD/DVD and operator information panel cables from the system board. Please remember the relevant cable routing.



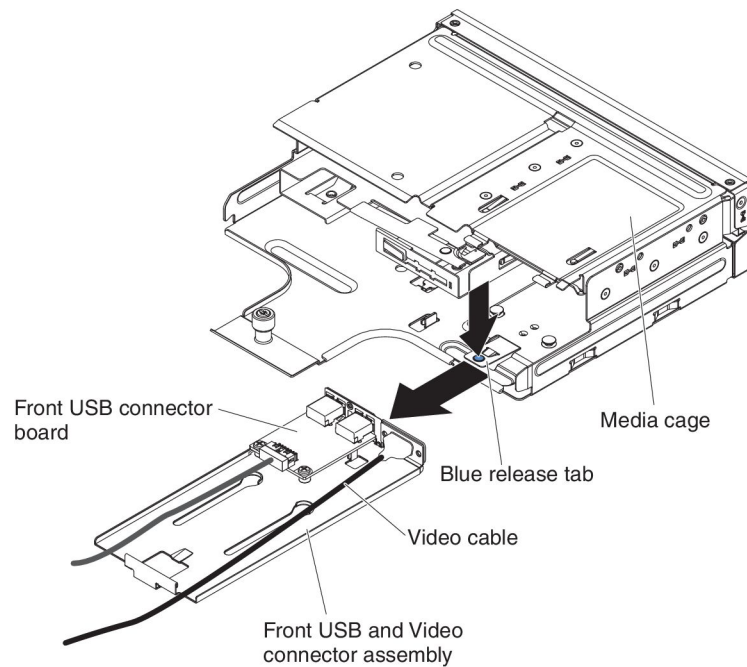
7. Loosen the single thumbscrew that is used to secure the media cage onto the server.



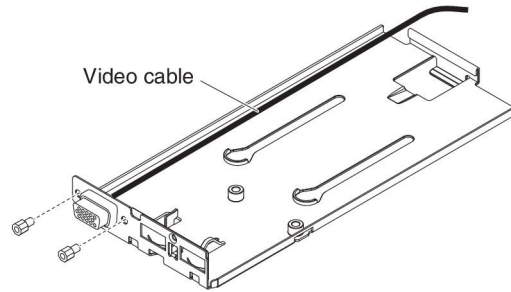
8. Carefully pull the media cage out of the server.



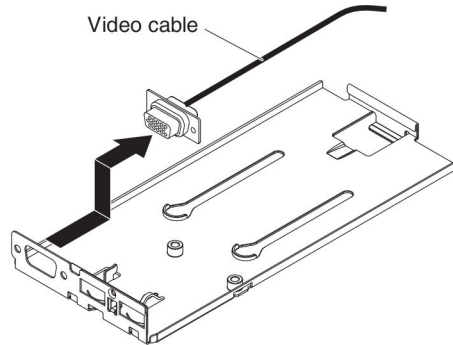
9. Locate the blue release tab on the rear of the USB and video connector assembly; then, while you press down on the tab, carefully pull the assembly outward.



10. Loosen the screws that secure the video connector to the front USB and video connector assembly.



11. Remove the video connector and cable from the server.

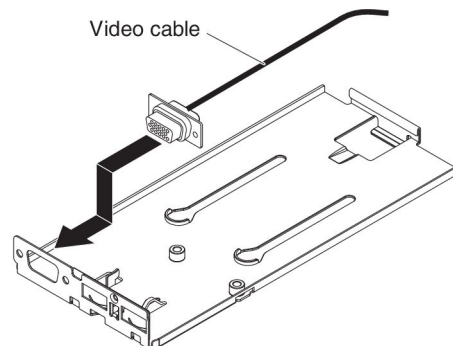


12. If you are instructed to return the video connector, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

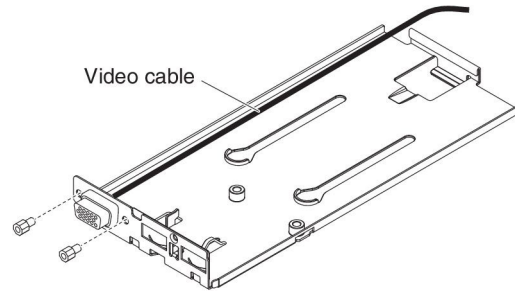
Installing the front video connector

To replace the front video connector, complete the following steps:

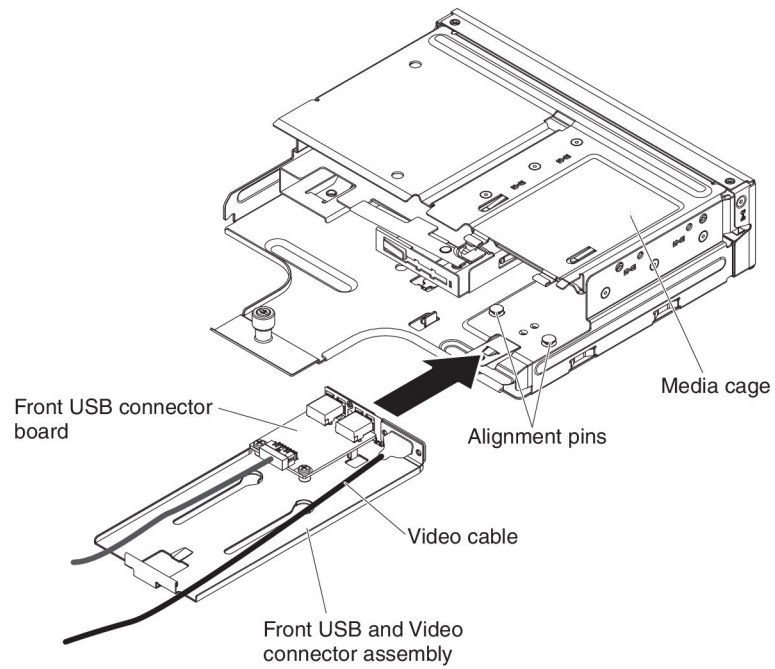
1. Read the safety information that begins on page vii and "Installation guidelines" on page 185.
2. Align the video connector with the slot on the front USB and video connector assembly.



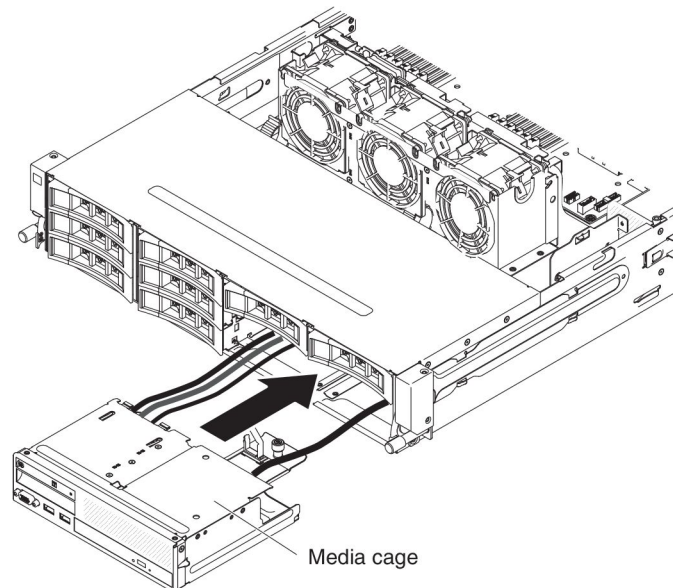
3. Install the two screws to secure the video connector to the front USB and video connector assembly.



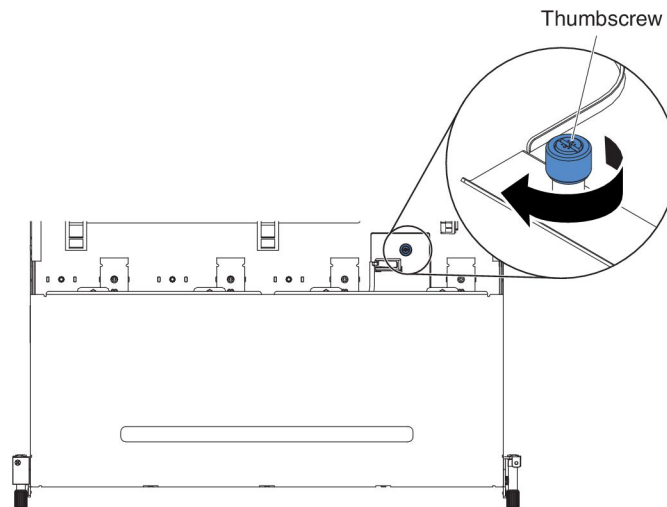
4. Slide the front USB and video connector assembly into the media cage until it clicks into place.



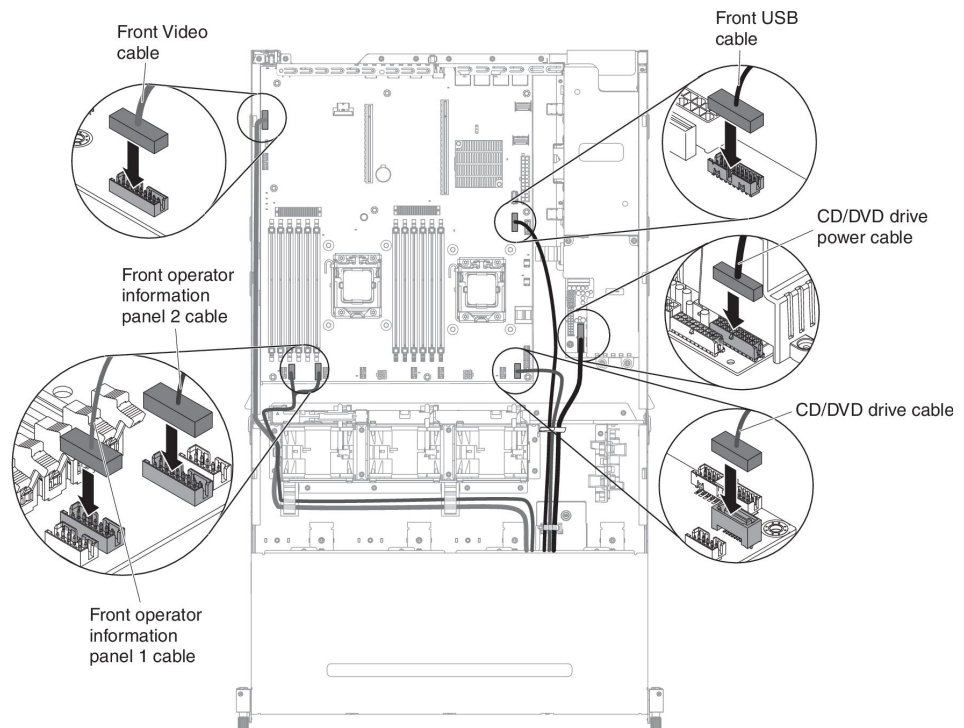
5. Carefully push the media cage back into the server.

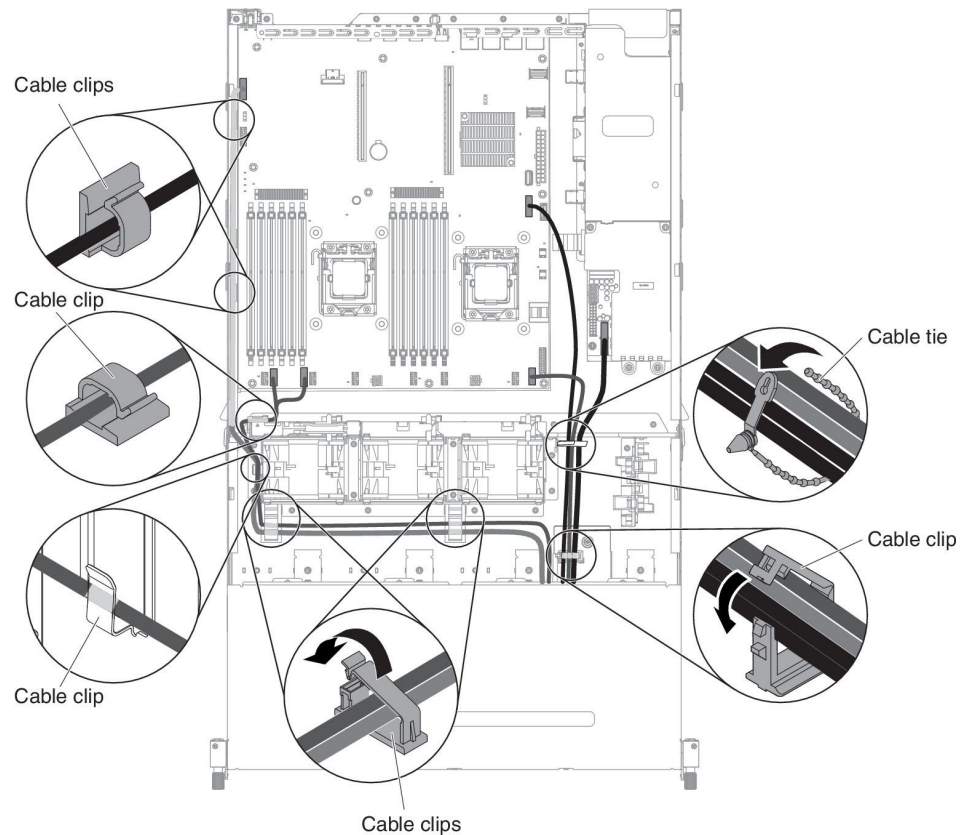


6. Tighten the thumbscrew to secure the media cage onto the server.



7. Reconnect the USB, video, CD/DVD and operator information cables to the system board. Remember to insert the cables into the relevant cable clips and cable tie.





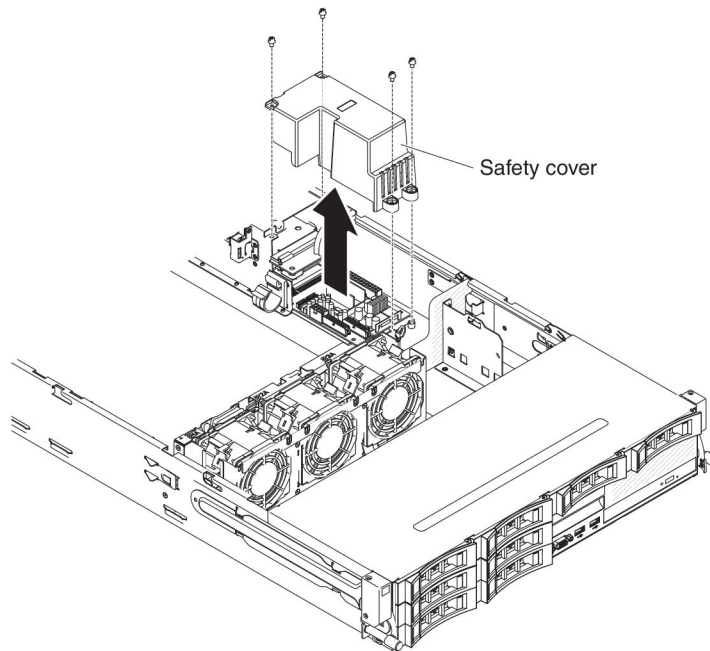
8. Install the air baffle (see “Installing the air baffle” on page 347
9. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 253).
10. Install the server top cover (see “Installing the server top cover” on page 344).
11. Reconnect the power cord and any cables that you removed.
12. Turn on the peripheral devices and the server.

Removing the upper power supply card from the power-supply paddle card assembly

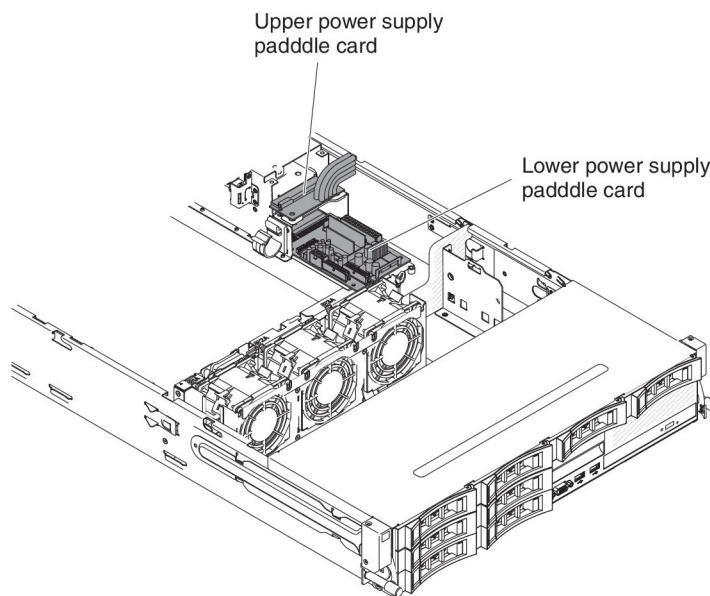
Note: The power-supply paddle card assembly includes the upper and lower power supply paddle cards.

To remove the upper power supply card, complete the following steps:

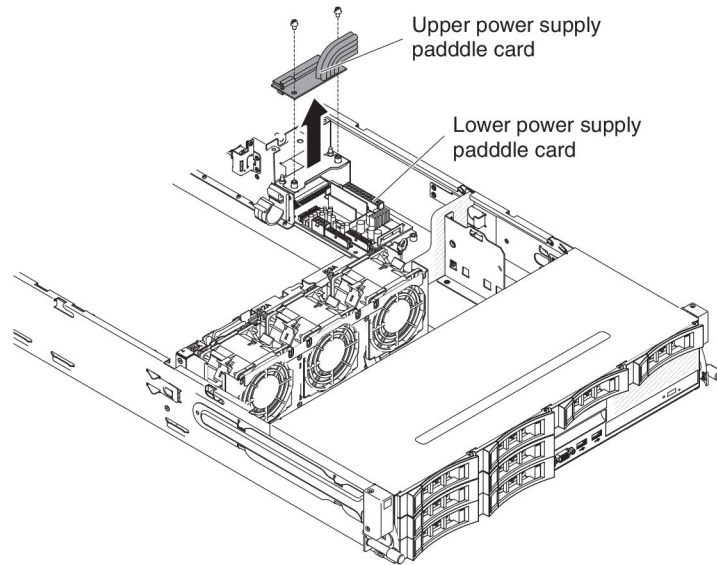
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Remove the power supply out of the server to disconnect it from the power-supply paddle card assembly.
5. Remove the screws that secure the safety cover (240VA cover) to the chassis and remove the safety cover.



6. After removing the safety cover, you can see the upper power supply card and lower power-supply paddle card.



7. Make note of where the cables between the upper power supply card and lower power-supply card are connected; then, disconnect them.
8. Remove the screws that secure the upper power supply card to the chassis.
9. Lift the upper power supply card out of the server.

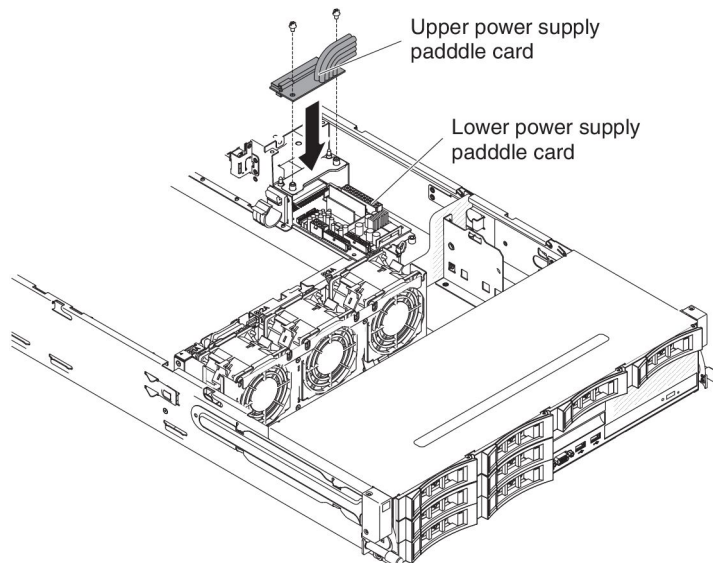


10. If you are instructed to return the upper power supply card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the upper power supply card into the power-supply paddle card assembly

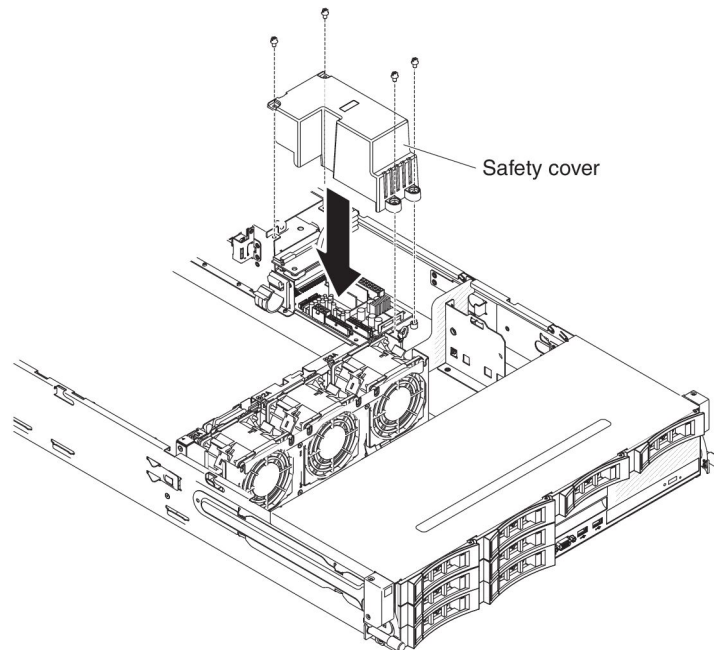
To install the upper power supply card, complete the following steps:

1. Touch the static-protective package that contains the upper power supply card to any *unpainted* metal surface on the outside of the chassis; then, remove the upper power supply card from the package.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Align the upper power supply card with the two pointed tips and two screw holes on the holder; then install the screws.



4. Reconnect the cables between the upper power supply card and lower power-supply paddle card.

5. Align the screw holes on the safety cover (240VA cover) with the screw holes on the chassis; then install the screws.
6. Install the screws to secure the safety cover.



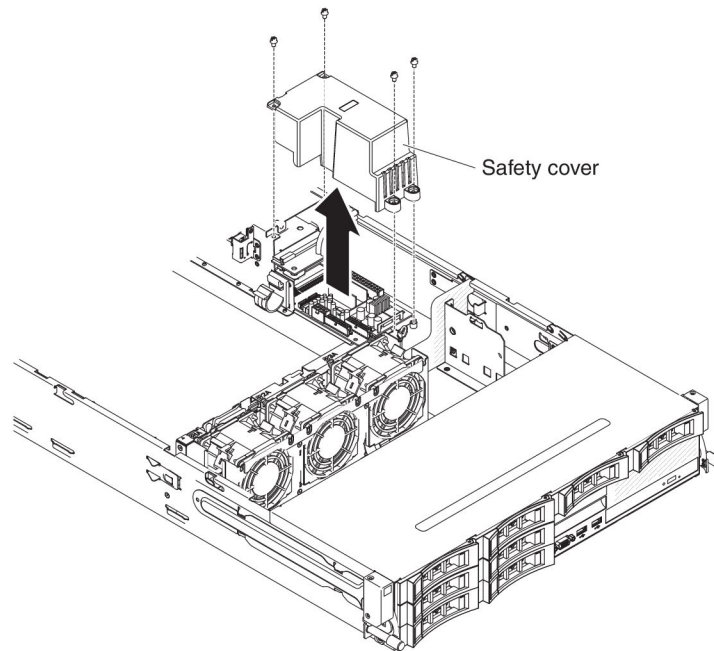
7. Install the server top cover (see “Installing the server top cover” on page 344).
8. Install the power supplies.
9. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the lower power supply card from the power-supply paddle card assembly

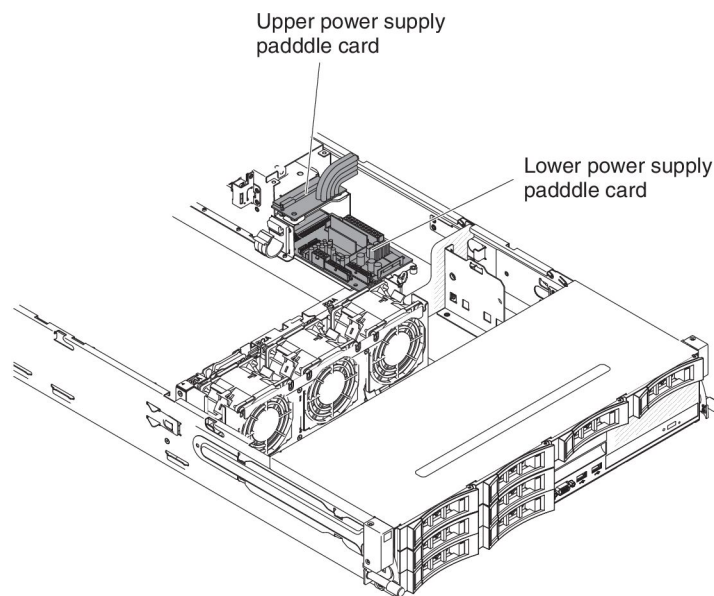
Note: The power-supply paddle card assembly includes the upper and lower power supply paddle cards.

To remove the lower power supply card, complete the following steps:

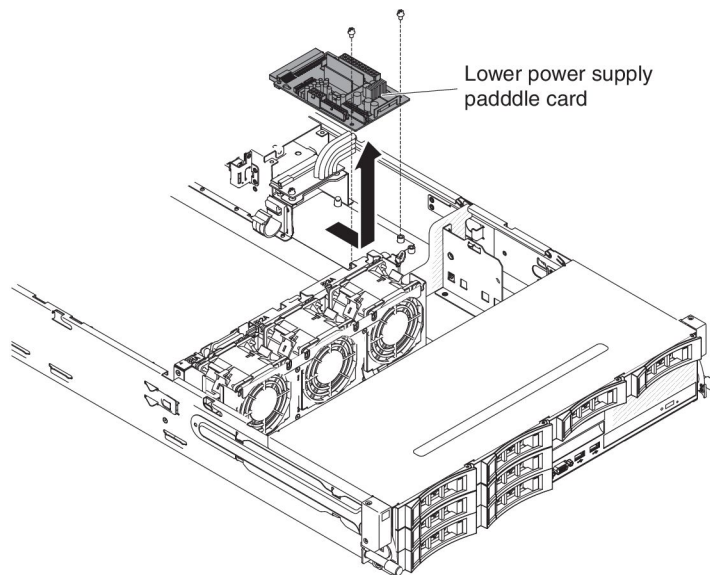
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 197).
5. Remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
6. Remove the air baffle (see “Removing the air baffle” on page 345).
7. Remove the power supply out of the server to disconnect it from the power-supply paddle card assembly.
8. Remove the screws that secure the safety cover (240VA cover) to the chassis and remove the safety cover.



9. After removing the safety cover, you can see the upper power supply card and lower power-supply paddle card.



10. Make note of where the cables between the upper power supply card and lower power-supply card are connected; then, disconnect them.
11. Make note of which cables are attached to the lower power-supply paddle card then, disconnect them.
12. Make note of where the cables between the lower power supply card and system board are connected; then, disconnect them from the system board.
13. Remove the screws that secure the lower power-supply card to the chassis.
14. Lift the lower power-supply card out of the server.

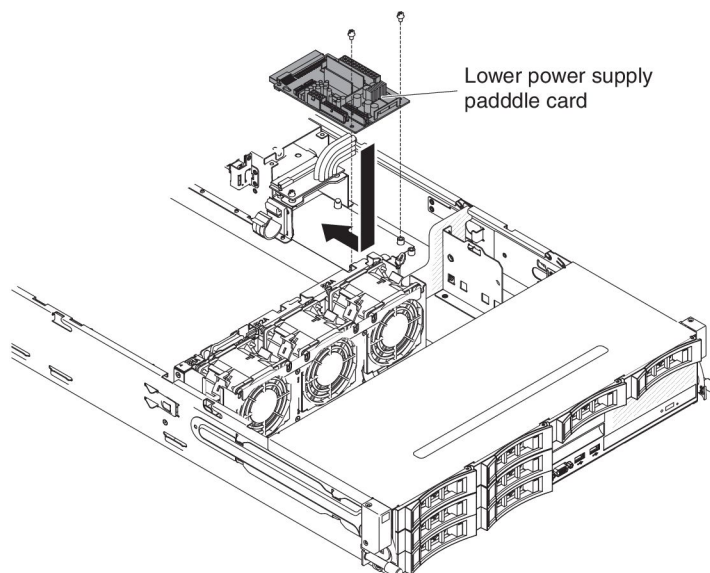


15. If you are instructed to return the power-supply paddle card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

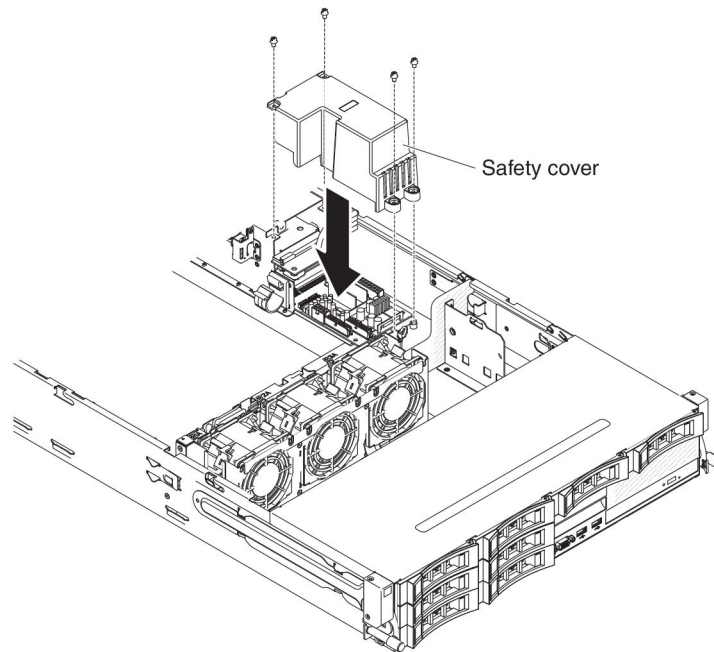
Installing the lower power-supply card into the power-supply paddle card assembly

To install the lower power supply card, complete the following steps:

1. Touch the static-protective package that contains the power-supply paddle card to any *unpainted* metal surface on the outside of the chassis; then, remove the power-supply paddle card assembly from the package.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Place the lower power supply card on the mounting studs on the chassis and align the two holes on the back of the lower power supply card with the two screw holes on the chassis; then install the screws. You might need to tilt the lower power-supply paddle card a little bit to make the installation easier.



4. Reconnect the cables between the upper power supply card and lower power-supply paddle card.
5. Align the screw holes on the safety cover (240VA cover) with the screw holes on the chassis; then install the screws to secure the safety cover.



6. Reconnect any cables that were removed from the lower power-supply paddle card.
7. Reconnect the lower power-supply paddle card cables to the system board.

Note: You can refer to the internal cable routing section “Internal cable routing” on page 188 for further details.

8. Install the air baffle (see “Installing the air baffle” on page 347).
9. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 253).
10. If you have the optional hot-swap rear hard disk drive cage installed, rotate it down (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 198).
11. Install the server top cover (see “Installing the server top cover” on page 344).
12. Install the power supplies.
13. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the hot-swap hard disk drive backplane

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

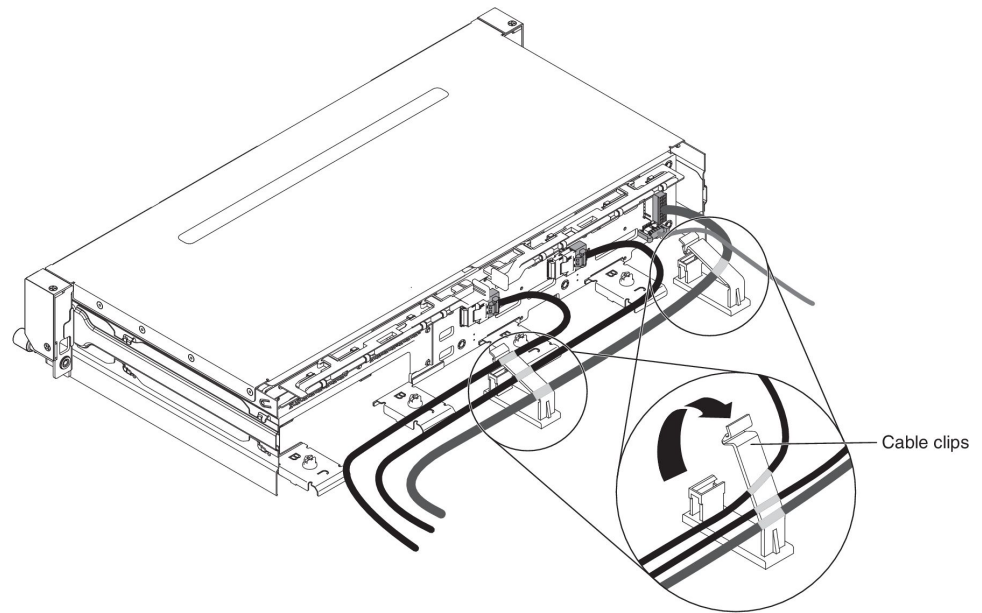
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Pull the drives or filler panels out of the server slightly to disengage them from the backplane assembly.
4. Remove the server top cover (see “Removing the server top cover” on page 343).

5. Open the two cable retainer clips behind the fan cage to release the cabling.

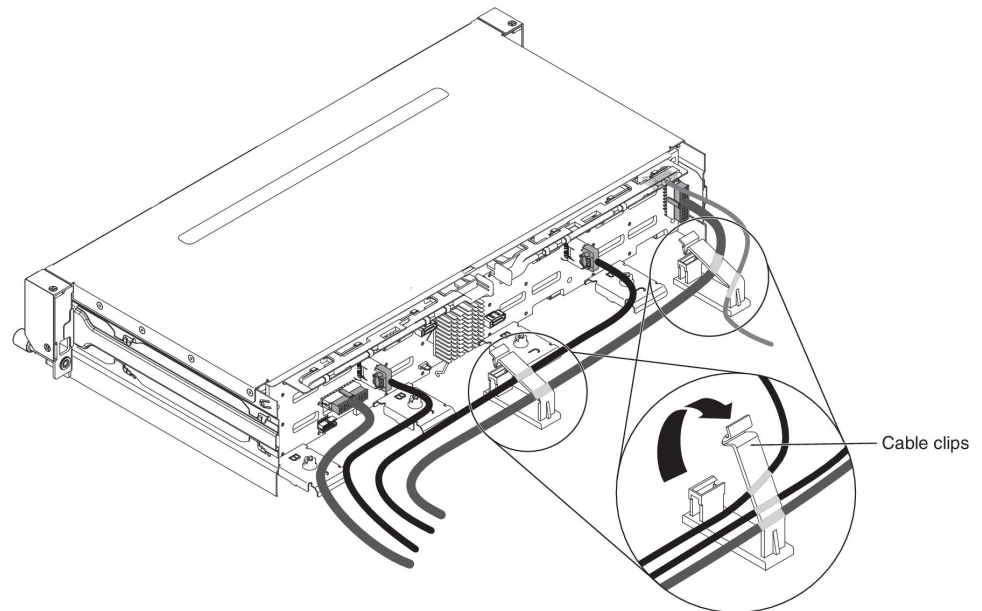
Notes:

- a. Based on the server configuration, the hot-swap hard disk drive backplane may appear as either of the following.
- b. You can refer to the internal cable routing section “Internal cable routing” on page 188 for further details.

For eight 3.5-inch hot-swap drive backplane:



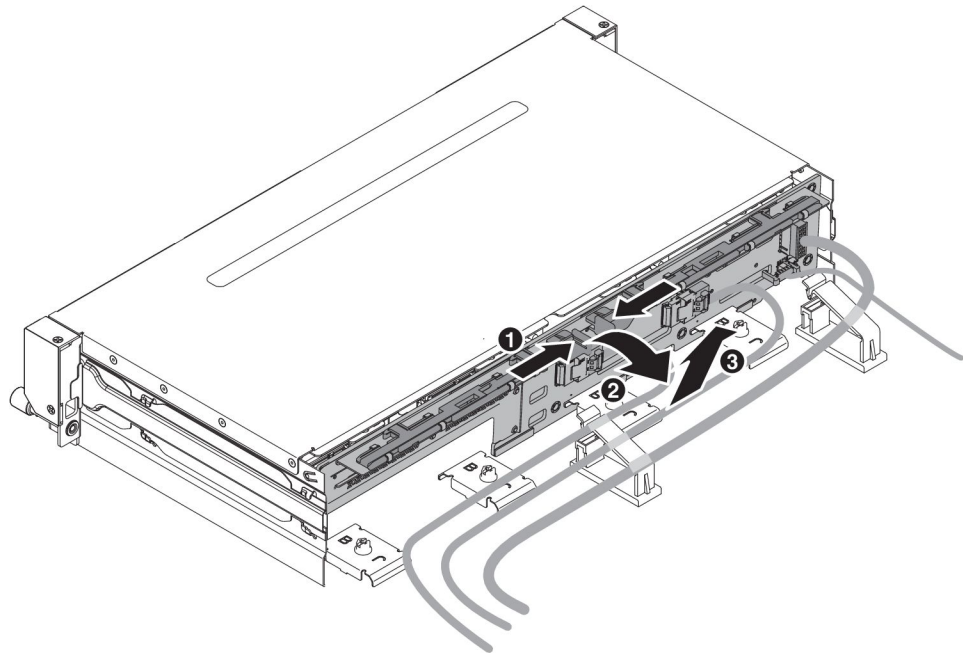
For twelve 3.5-inch hot-swap drive backplane:



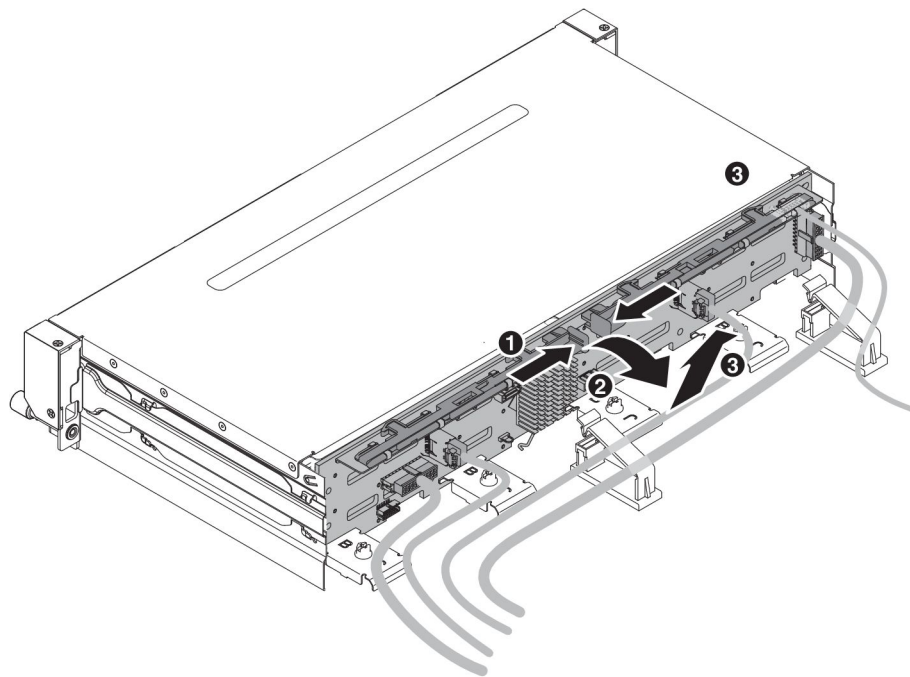
6. Press the release latches and rotate out the top of the backplane; then, slightly lift the backplane out of the server by pulling outwards and lifting it up.

Note: Based on the server configuration, the hot-swap hard disk drive backplane may appear as either of the following.

For eight 3.5-inch hot-swap drive backplane:



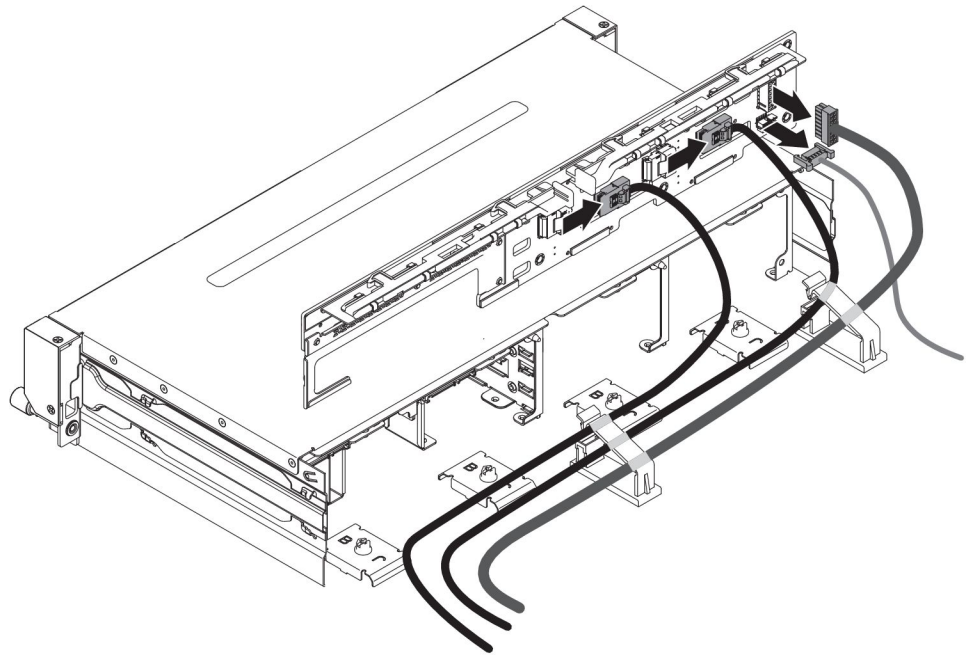
For twelve 3.5-inch hot-swap drive backplane:



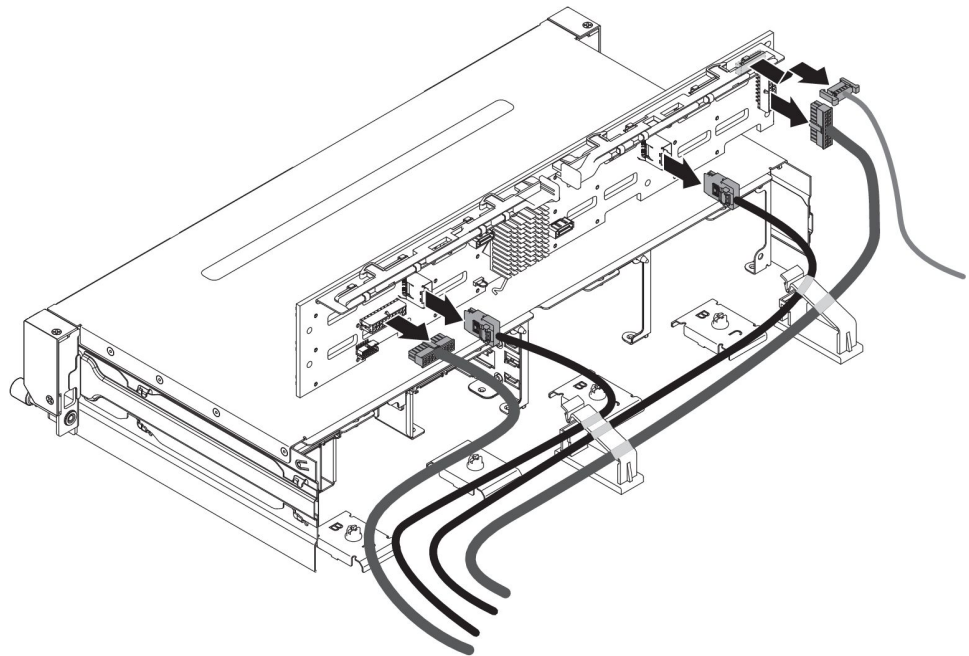
7. Make note of where the power cable and signal cables are attached to the backplane; then, disconnect them.

Note: Based on the server configuration, the hot-swap hard disk drive backplane may appear as either of the following.

For eight 3.5-inch hot-swap drive backplane:



For twelve 3.5-inch hot-swap drive backplane:



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

Installing the hot-swap hard disk drive backplane

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

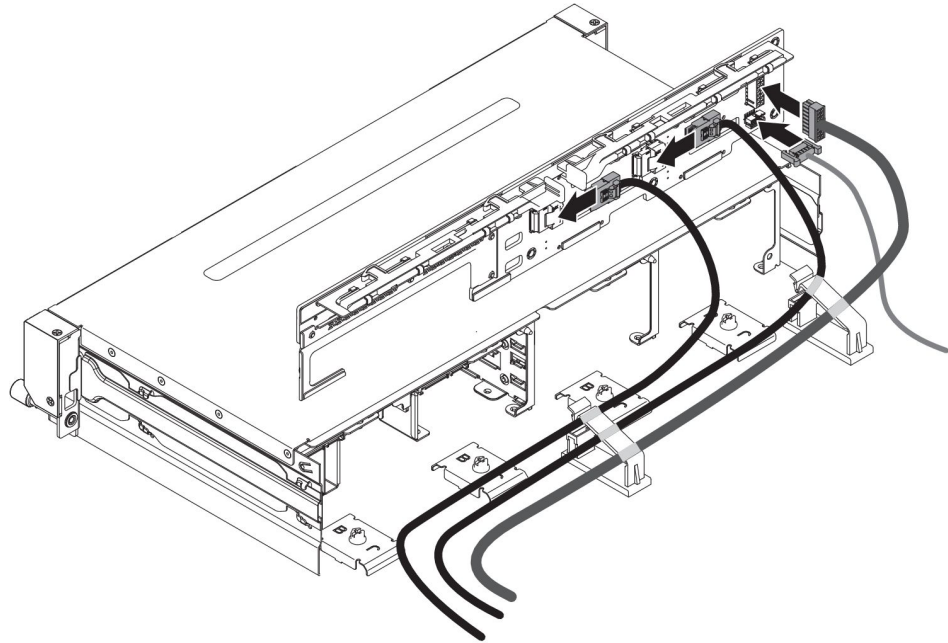
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.

2. Reconnect the power cable and signal cables that you removed from the backplane.

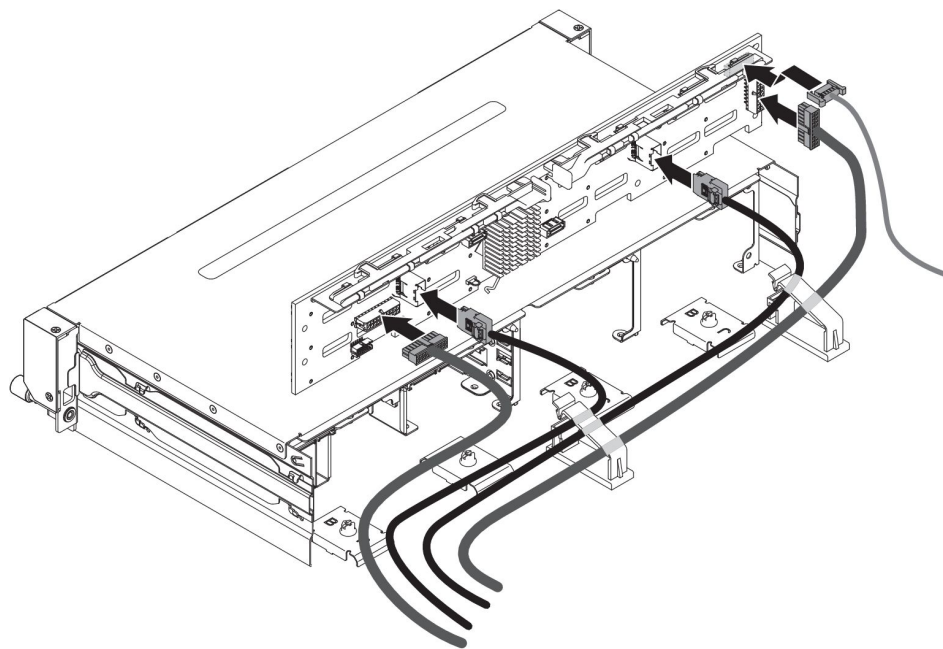
Notes:

- a. Make sure that Port 1 on the hardware ServeRAID or system board is connected to Port 1 on the backplane. Likewise, Port 0 on the hardware ServeRAID or system board should be connected to Port 0 on the backplane.
- b. You can refer to the internal cable routing section "Internal cable routing" on page 188 for further details.
- c. Based on the server configuration, the hot-swap hard disk drive backplane may appear as either of the following.

For eight 3.5-inch hot-swap drive backplane:



For twelve 3.5-inch hot-swap drive backplane:

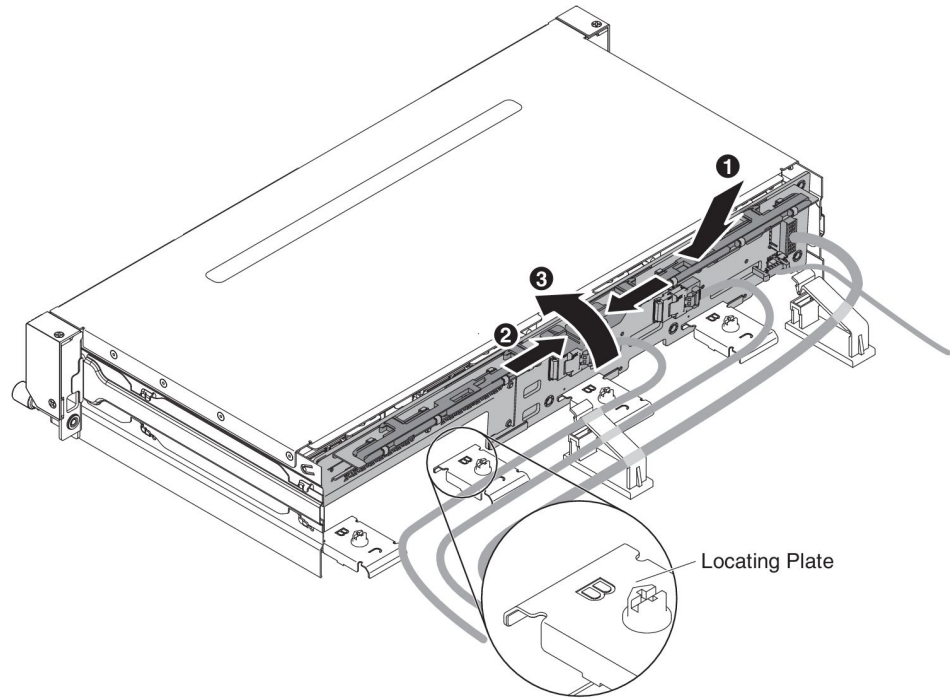


3. Align the backplane with the slot on the chassis.
4. Lower the backplane into the server. Leave the backplane an angle of elevation so the backplane connectors will not get damaged. Make sure the locating plates securely engages the bottom of the backplane.
5. Press the release latches; then, rotate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

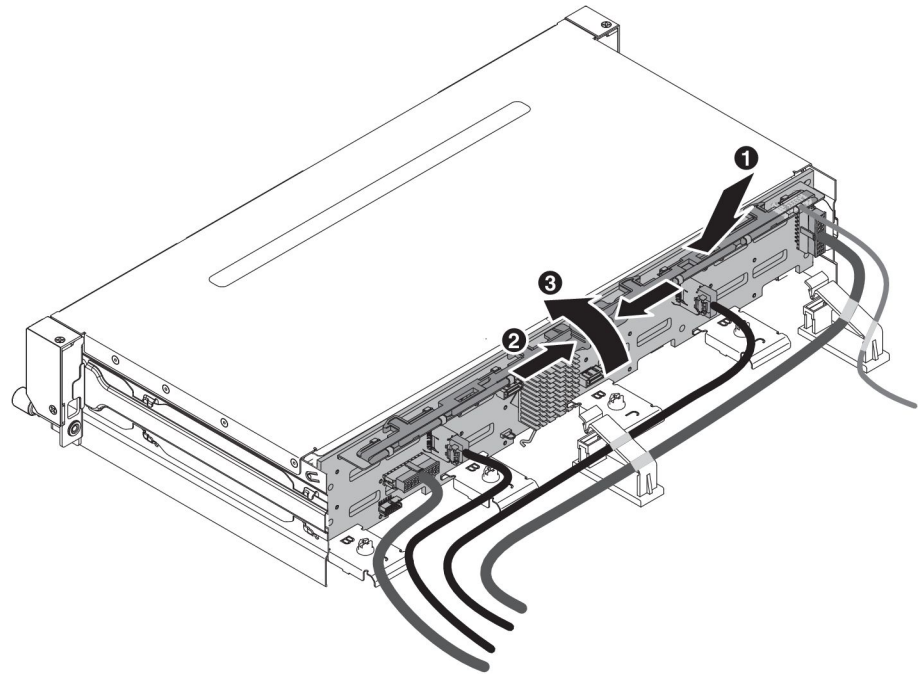
Notes:

- a. Based on the server configuration, the hot-swap hard disk drive backplane may appear as either of the following.
- b. Make sure the backplane is engaged into place by the locating plates and that it is securely installed in the server.

For eight 3.5-inch hot-swap drive backplane:



For twelve 3.5-inch hot-swap drive backplane:



6. Close the two cable retainer clips behind the fan cage to secure the cabling.
7. Install the server top cover (see “Installing the server top cover” on page 344).
8. Insert the cabling into the two cable clips and fasten the cable clips.
9. Reinstall the drives or filler panels.
10. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the simple-swap hard disk drive backplate

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

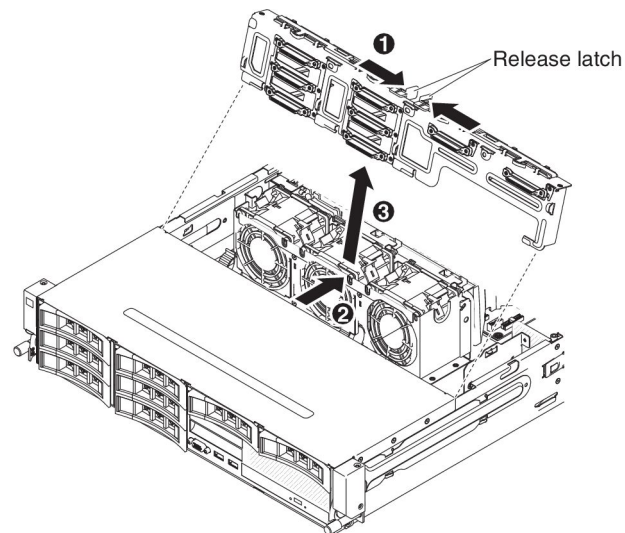
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Pull the drive and filler panels out of the server slightly to disengage them from the backplate assembly.
5. Disconnect the cables. Make note of which cable is connected to which connector.
 - a. Disconnect the signal cable from the connector on the system board or ServeRAID adapter.
 - b. Disconnect the power cable from the power supply paddle card.

Note: You can refer to the internal cable routing section “Internal cable routing” on page 188 for further details.

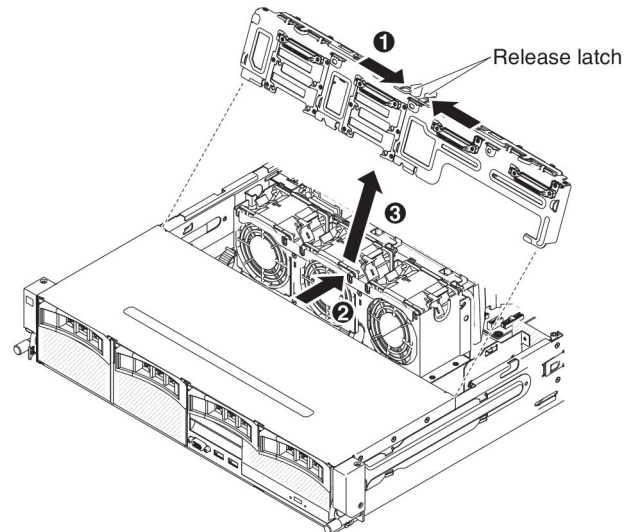
6. Press the release latches and rotate out the top of the backplate; then, lift the backplate out of the server by pulling outwards and lifting it up.

Note: Based on the server configuration, the simple-swap hard disk drive backplate may appear as either of the following.

For eight 3.5-inch simple-swap drive backplate:



For four 3.5-inch simple-swap drive backplate:



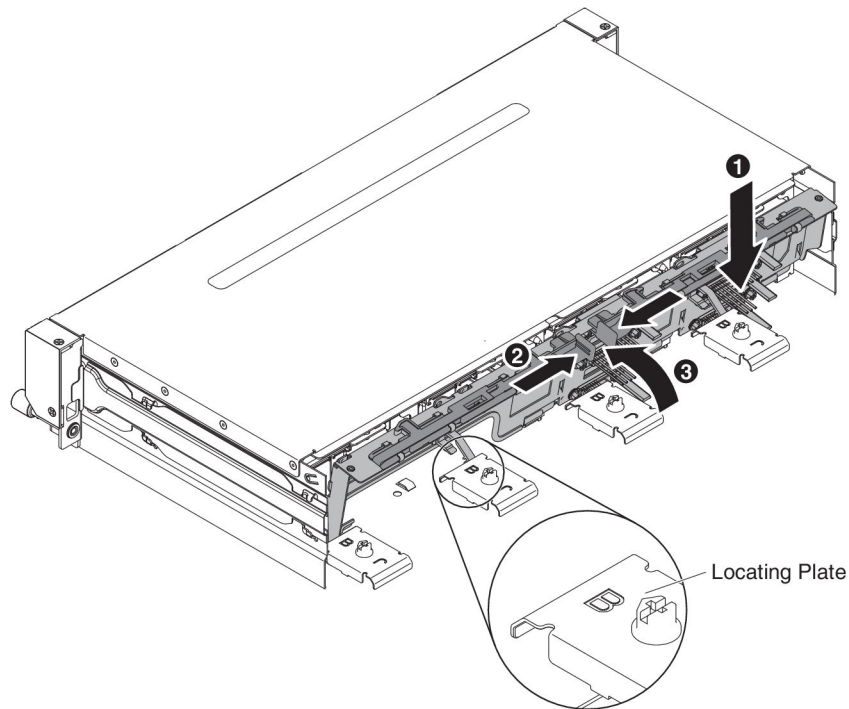
7. If you are instructed to return the backplate, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the simple-swap hard disk drive backplate

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Align the backplate with the slot on the chassis.
3. Lower the backplate into the server. Leave the backplate at an angle of elevation so the backplate connectors will not get damaged. Make sure the locating plates securely engage the bottom of the backplate.
4. Press the release latches; then, rotate the top of the backplate toward the front of the server until it locks into place.

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



5. Reconnect the power cable and signal cables that you removed.

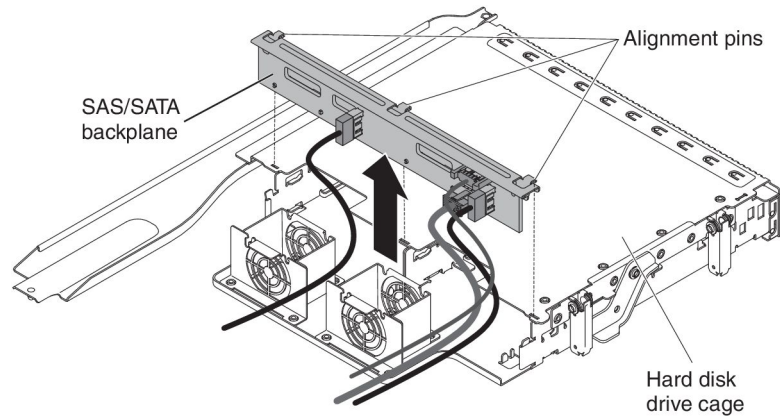
Note: You can refer to the internal cable routing section “Internal cable routing” on page 188 for further details.

6. Install the server top cover (see “Installing the server top cover” on page 344).
7. Reinstall the drives or filler panels.
8. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

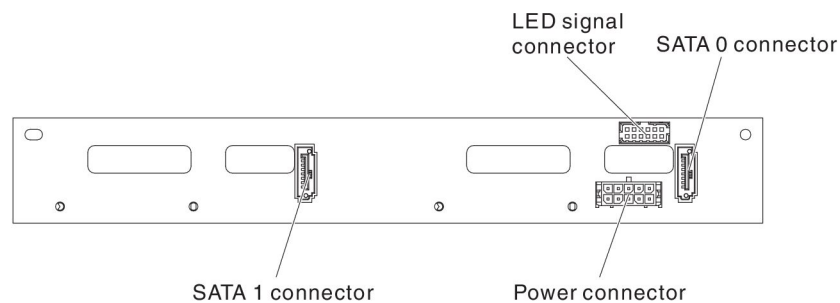
Removing the hot-swap backplane on the optional rear hard disk drive cage

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

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Remove all hot-swap hard disk drives in the optional rear hard disk drive cage (see “Removing a hot-swap hard disk drive” on page 194).
5. Lift the backplane out of the optional rear hard disk drive cage.



6. Disconnect the LED signal, SATA signal and power cables from the backplane. Make note of which cable is connected to which connector.



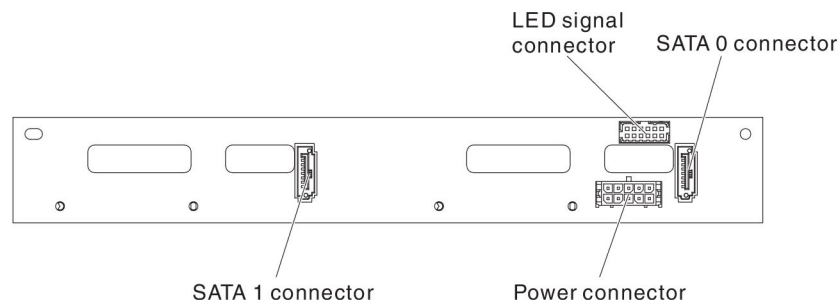
7. If you are instructed to return the backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

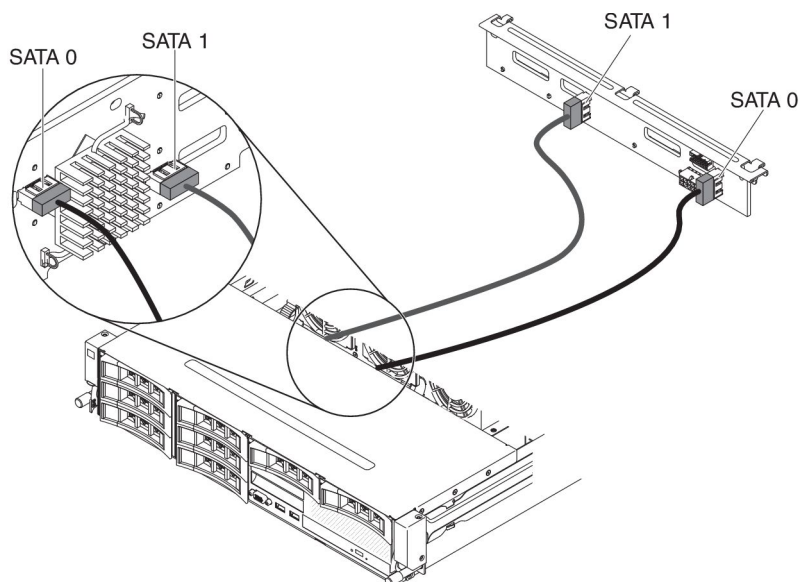
Installing the hot-swap backplane on the optional rear hard disk drive cage

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

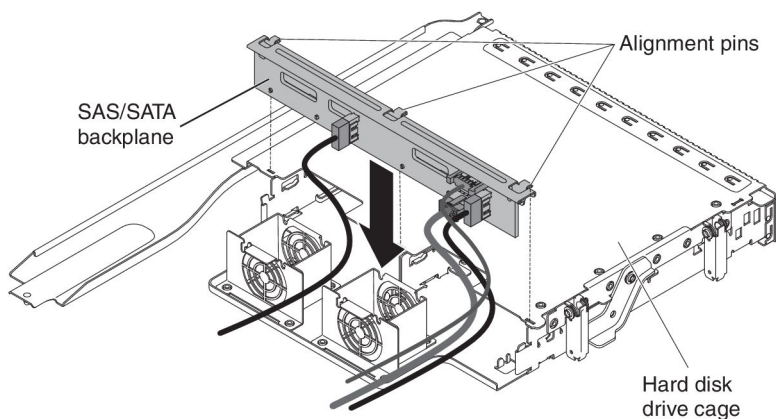
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Reconnect the LED signal, SATA signal and power cables to the backplane.

Note: Make sure that Port 1 is connected to Port 1 for both backplanes. Likewise, Port 0 is connected to Port 0 for both backplanes.





3. Align the backplane with the slot on the optional rear hard disk drive cage.
4. Lower the backplane into the optional rear hard disk drive cage. Make sure the three alignment pins securely engages the three holes on the hard disk drive cage.



5. Install the hot-swap hard disk drives in the optional rear hard disk drive cage (see "Installing a hot-swap hard disk drive" on page 194).
6. Install the server top cover (see "Installing the server top cover" on page 344).
7. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing and replacing Tier 2 CRUs

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

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

Removing 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.

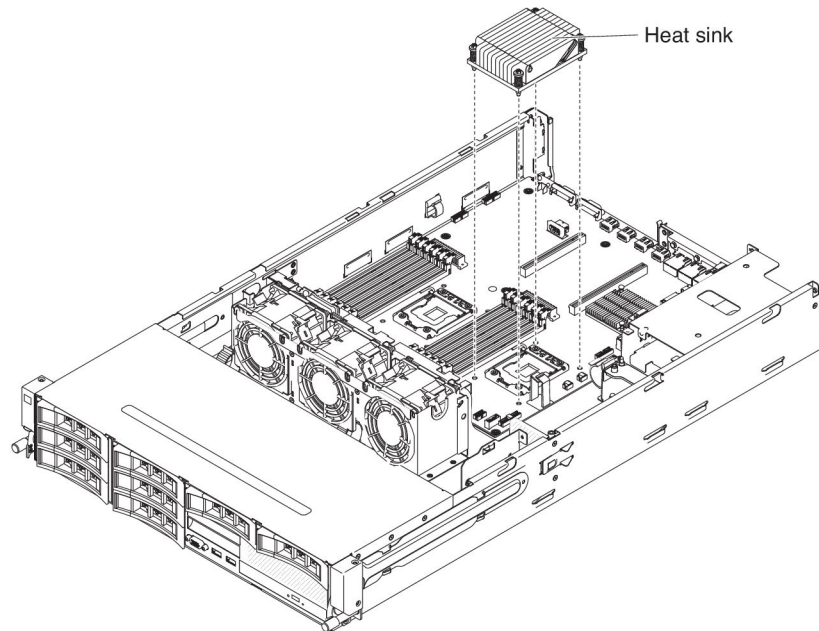
To remove a microprocessor and heat sink, complete the following steps:

1. Read the safety information that begins on page vii, "Handling static-sensitive devices" on page 187, and "Installation guidelines" on page 185.
2. Turn off the server and peripheral devices and disconnect the power cord and all external cables.
3. Remove the server top cover (see "Removing the server top cover" on page 343).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see "Rotating the optional hot-swap rear hard disk drive cage up" on page 197).
5. Remove the PCI riser-card assembly (see "Removing the PCI riser-card assembly" on page 251).
6. Remove the air baffle (see "Removing the air baffle" on page 345).
7. Disconnect any cables that impede access to the heat sink and microprocessor.
8. If you are removing microprocessor 1, remove the memory module from DIMM connector 6. If you are removing microprocessor 2, remove the memory module from DIMM connector 12. See "Removing a memory module (DIMM)" on page 223 for instructions.
9. 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.
10. 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.

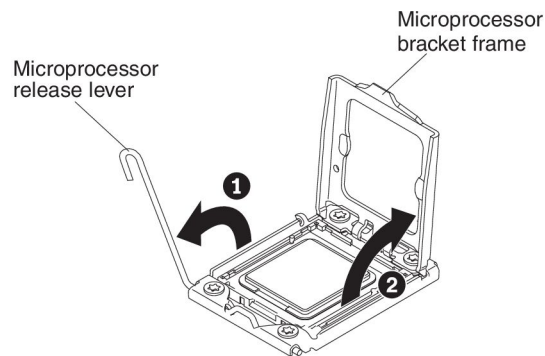
Note: Removing the heat sink from the microprocessor destroys the even distribution of the thermal grease and requires replacing the thermal grease.

11. 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 (with the thermal grease side up) on a clean, flat surface.

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



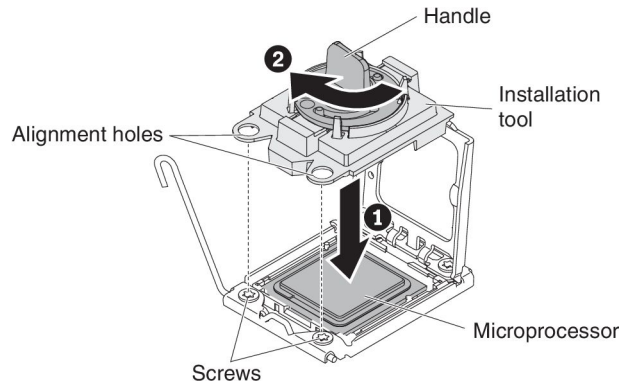
12. Release the microprocessor release lever by pressing down on the end, moving it to the side, and releasing it to the open (up) position.
13. Open the microprocessor bracket frame by lifting up the tab on the top edge. Keep the bracket frame in the open position.



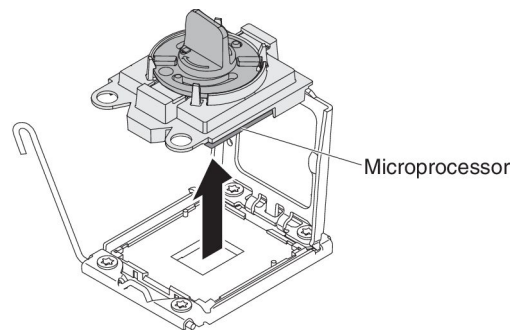
Attention: Do not touch the connectors on the microprocessor and the microprocessor socket.

14. Locate the microprocessor installation tool that comes with the new microprocessor.
15. Align the holes on the installation tool with the screws on the microprocessor bracket, then place the microprocessor installation tool down over the microprocessor. Twist the handle clockwise to attach the tool to the microprocessor.

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



16. 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.



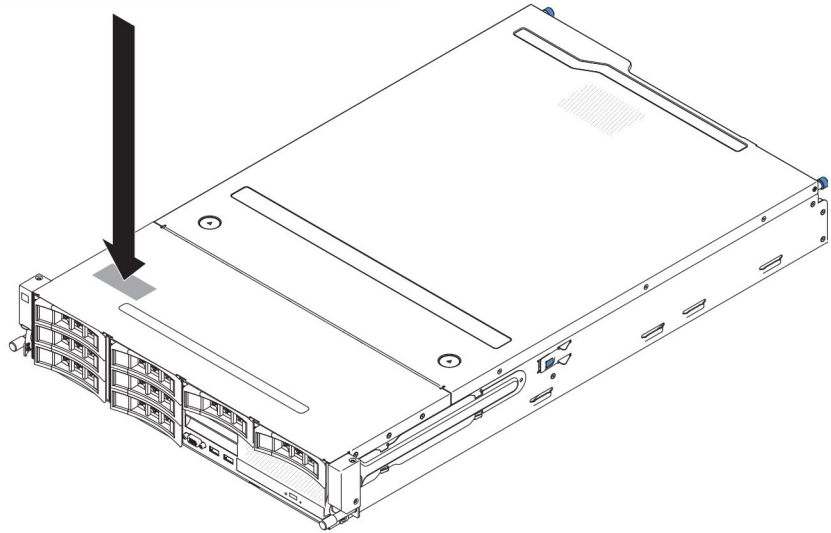
17. If you are instructed to return the microprocessor, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you. Do not return the microprocessor installation tool.

Installing 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 187

Important:

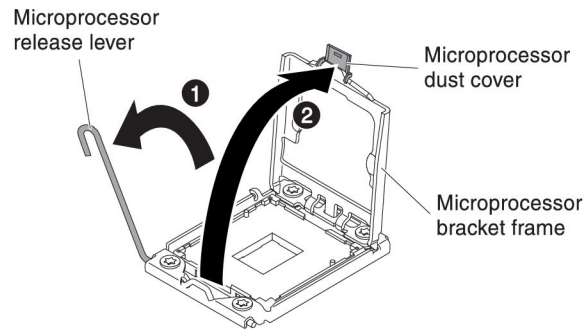
- A startup (boot) microprocessor must always be installed in microprocessor connector 1 on the system board.
- To ensure correct server operation, make sure that you use microprocessors that are compatible and you have installed an additional DIMM for microprocessor 2. Compatible microprocessors must have the same QuickPath Interconnect (QPI) link speed, integrated memory controller frequency, core frequency, power segment, cache size, and type.
- If you are installing microprocessor Intel E5-1403, E5-1407 or Intel E5-1410, attach the microprocessor information label on the front of the server as the following illustration shows.



- Microprocessors with different stepping levels are supported in this server. If you install microprocessors with different stepping levels, it does not matter which microprocessor is installed in microprocessor connector 1 or connector 2.
- If you are installing a microprocessor that has been removed, make sure that it is paired with its original heat sink or a new replacement heat sink. Do not reuse a heat sink from another microprocessor; the thermal grease distribution might be different and might affect conductivity.
- If you are installing a new heat sink, remove the protective backing from the thermal material that is on the underside of the new heat sink.
- If you are installing a new heat-sink assembly that did not come with thermal grease, see “Thermal grease” on page 335 for instructions for applying thermal grease.
- If you are installing a heat sink that has contaminated thermal grease, see “Thermal grease” on page 335 for instructions for replacing the thermal grease.

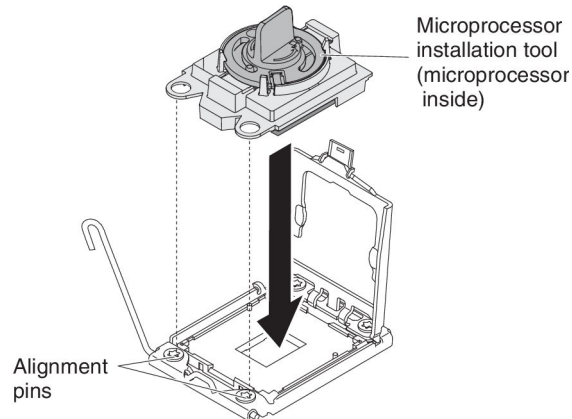
To install an additional microprocessor and heat sink, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185
2. Release the microprocessor release lever by pressing down on the end, moving it to the side, and releasing it to the open (up) position.
3. Open the microprocessor bracket frame by lifting up the tab on the top edge. Keep the bracket frame in the open position.

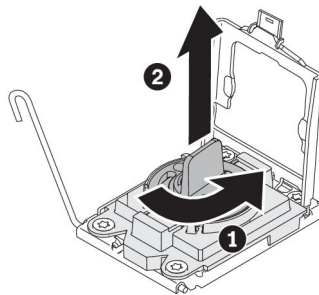


4. The microprocessor is preinstalled in the installation tool, release the sides of the cover and remove the cover from the installation tool.
5. Install the microprocessor:
 - a. Align the installation tool with the microprocessor socket as shown in the following illustration.

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

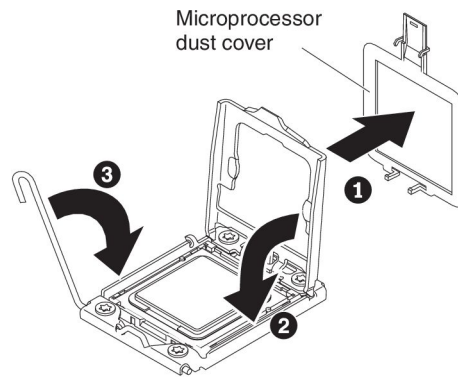


- b. Twist the handle on the microprocessor tool counterclockwise to insert the microprocessor into the socket.



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. Remove the microprocessor dust cover and store it in a safe place.
- d. Close the microprocessor bracket frame.
- e. Close the microprocessor release lever by pressing down on the end, moving it back under the release lever holder underneath the microprocessor bracket.



6. Install the heat sink that comes with the microprocessor:

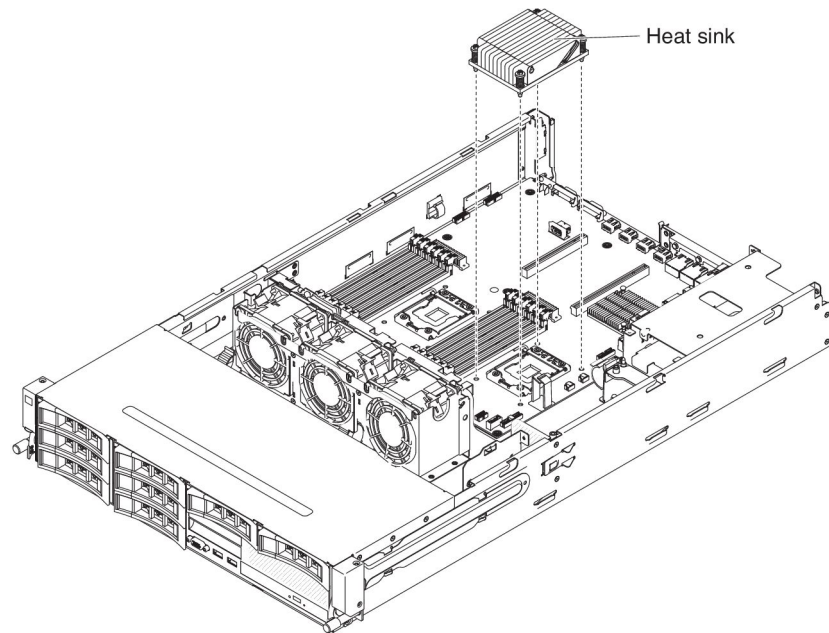
Attention:

- 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.

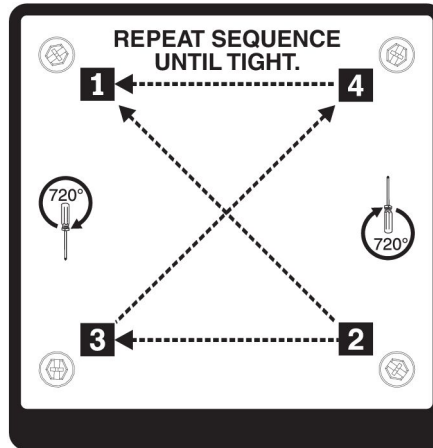
a. Remove the plastic protective cover from the bottom of the heat sink.

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" on page 335 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 are replacing microprocessor 1, install the previously removed memory module into DIMM connector 6. If you are replacing microprocessor 2, install the previously removed memory module from DIMM connector 12. See “Installing a memory module” on page 224 for instructions.
8. Install the air baffle (see “Installing the air baffle” on page 347).
9. Install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 253).
10. If you have the optional hot-swap rear hard disk drive cage installed, rotate it down (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 198).
11. Install the server top cover (see “Installing the server top cover” on page 344).
12. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Thermal grease

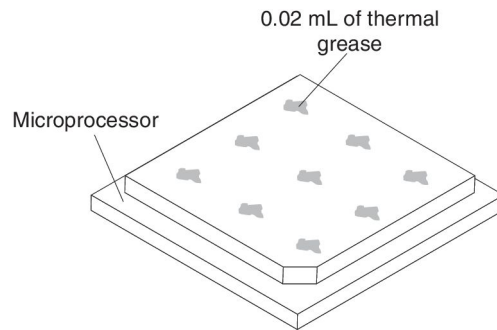
The thermal grease must be replaced whenever the heat sink has been removed from the top of the microprocessor and is going to be reused or when debris is found in the grease.

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

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

Note: Make sure that all of the thermal grease is removed.

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



5. Use the thermal-grease syringe to place nine uniformly spaced dots of 0.02 mL each on the top of the microprocessor. 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: 0.01mL is one tick mark on the syringe. If the grease is properly applied, approximately half (0.22 mL) of the grease will remain in the syringe.

6. Continue with step 6 of the "Installing a microprocessor and heat sink" on page 330 procedure.

Removing the system board

To remove the system board, complete the following steps.

Notes:

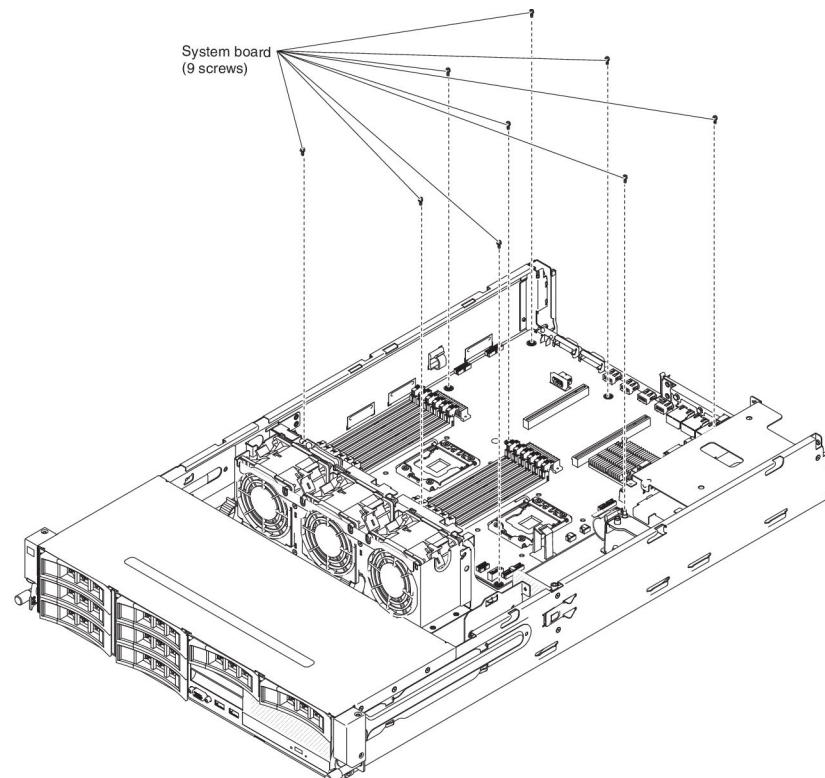
1. Before you replace the system board, make sure that you backup any features on demand (FoD) keys that were enabled. Remember to re-enable the features on demand (FoD) keys after installing the new system board. For more information on Features on Demand (FoD), including instructions for automating 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 <http://www.ibm.com/systems/x/fod/> 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.
 1. Read the safety information that begins on page vii and "Installation guidelines" on page 185.
 2. Turn off the server, and disconnect all power cords and external cables.
 3. Pull the power supplies out of the rear of the server, just enough to disengage them from the server.
 4. Remove the server top cover (see "Removing the server top cover" on page 343).
 5. If you have the optional hot-swap rear hard disk drive cage installed, remove it from the server (see "Removing an optional hot-swap rear hard disk drive cage" on page 198).
 6. Remove all PCI riser-card assemblies and adapters (see "Removing the PCI riser-card assembly" on page 251), "Removing an adapter from the PCI

riser-card assembly” on page 256) and “Removing a ServeRAID adapter from the PCI riser-card assembly” on page 229.

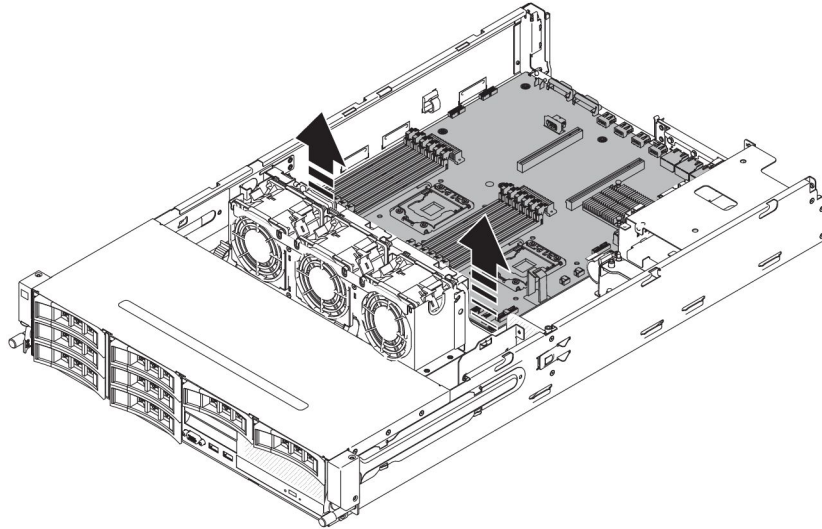
7. Remove the air baffle (see “Removing the air baffle” on page 345).
8. Remove all heat sinks and microprocessors, and set them aside on a static-protective surface for reinstallation (see “Removing a microprocessor and heat sink” on page 328).

Note:

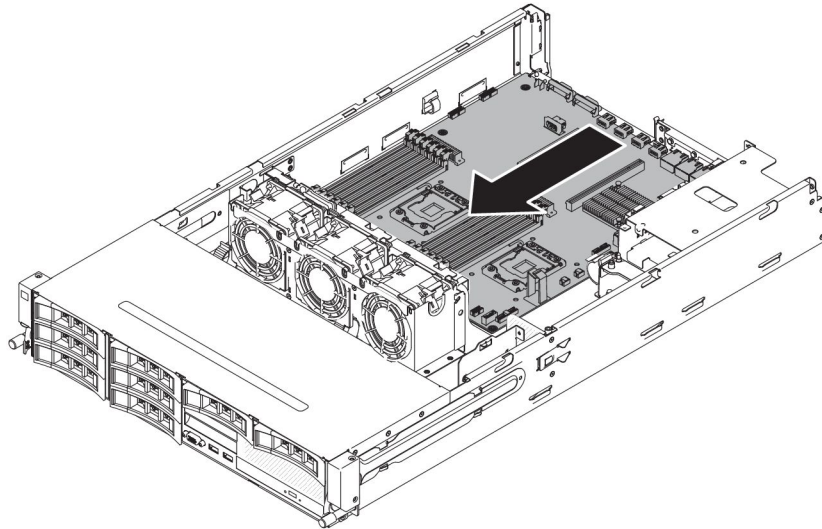
- a. Be sure to keep the heat sink and microprocessor from each microprocessor socket of the old system board together so that you can install them on the new system board together. For example, when you remove the heat sink and microprocessor from microprocessor socket 1 of the old system board, install 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.
9. Remove all DIMMs, and place them on a static-protective surface for reinstallation (see “Removing a memory module (DIMM)” on page 223).
Important: Make a note of the location of each DIMM as you remove it, so that you can later reinstall it in the same connector.
 10. Remove the system battery (see “Removing the system battery” on page 278).
 11. Remove the USB embedded hypervisor flash device (see “Removing a USB embedded hypervisor flash device” on page 235).
 12. 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 (see “Internal cable routing” on page 188 and “System-board internal connectors” on page 20 for more information).
 13. Loosen the nine screws that secure the system board to the chassis.



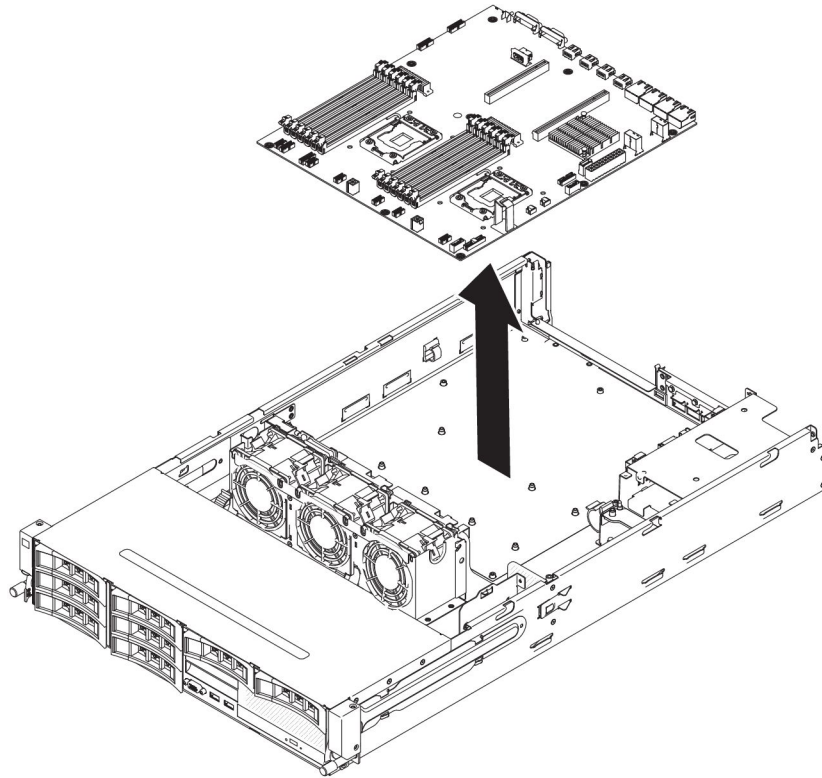
14. Slightly lift the system board at the side that is near the fan cage to create a small angle of elevation between the system board and chassis.



15. Gently push the external input/output connectors out of their respective holes in the chassis.



16. Grasp the system board by the edges; then, carefully lift up the system board and remove it from the chassis, being careful not to damage any surrounding components.



17. Remove the socket dust covers from the microprocessor sockets on the new system board and place them on the microprocessor sockets of the old system board that you are removing.
18. 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 returning the system board.

Installing the system board

Notes:

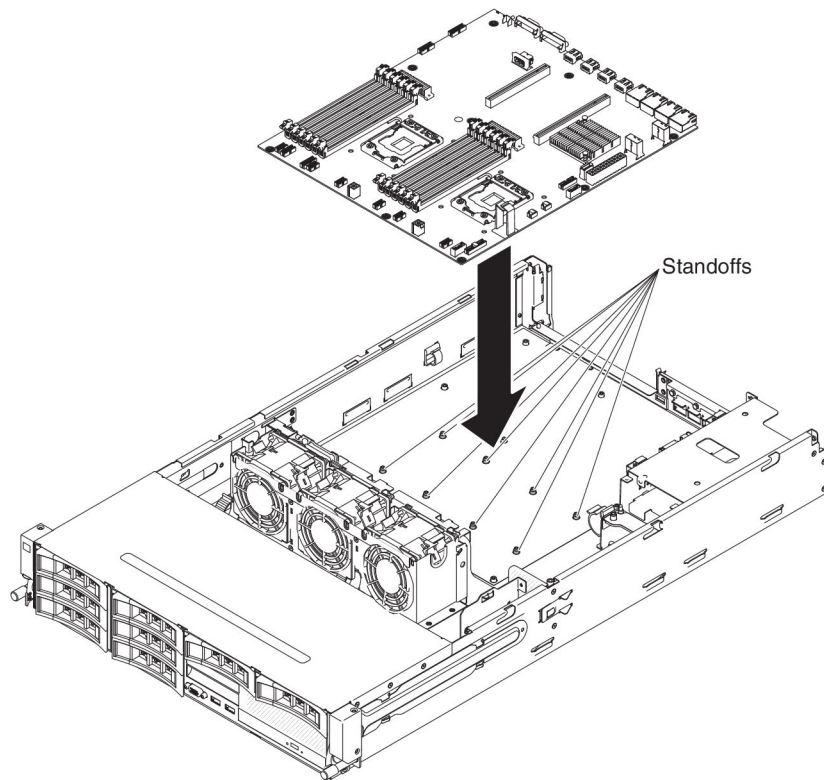
1. Before you replace the system board, make sure that you backup any features on demand (FoD) keys that were enabled. Remember to re-enable the features on demand (FoD) keys after installing the new system board. For more information on Features on Demand (FoD), including instructions for automating 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 <http://www.ibm.com/systems/x/fod/> 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 that they do not get pinched when you reinstall the system board (see "Internal cable routing" on page 188 and "System-board internal connectors" on page 20 for more information). 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 349, “Updating the Universal Unique Identifier (UUID)” on page 368, and “Updating the DMI/SMBIOS data” on page 371 for more information.

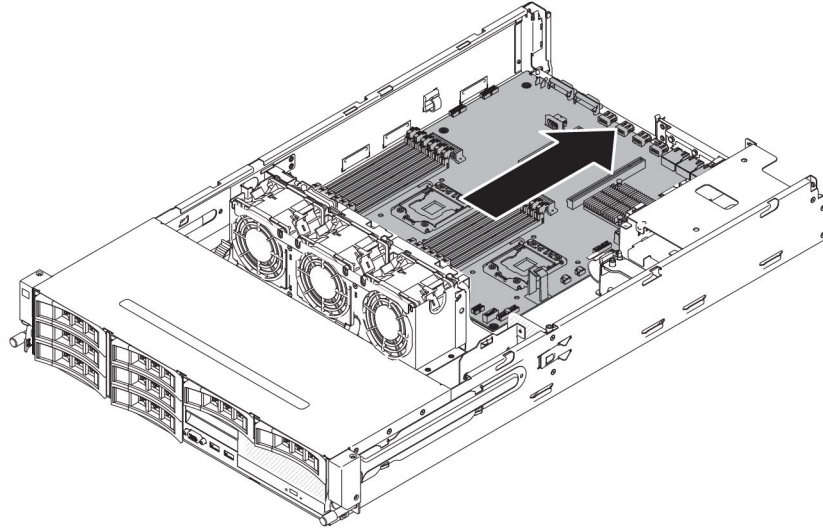
Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

To reinstall the system board, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Lower the system board into the chassis. Pay attention to the positions of the standoffs as they will be used later.

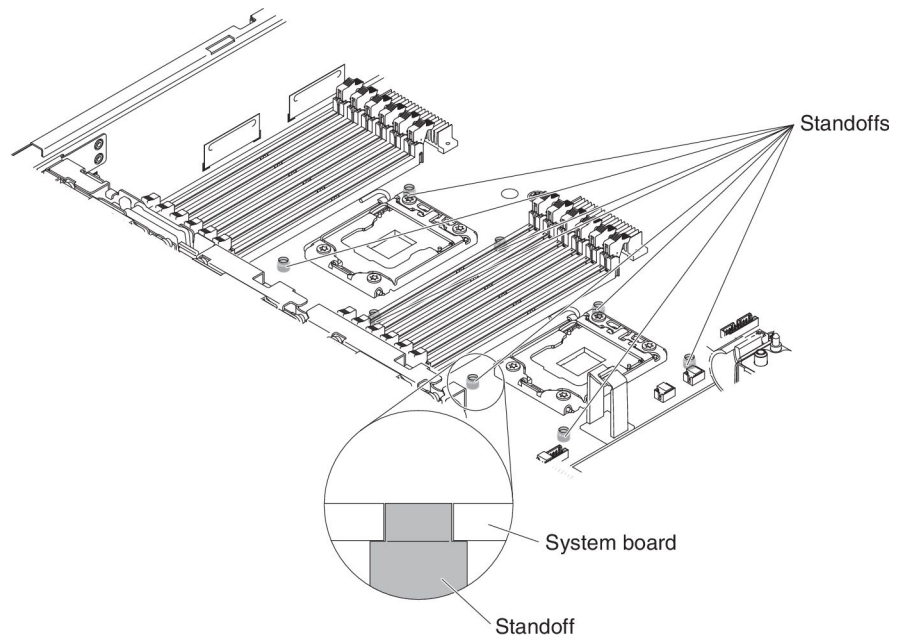


3. Gently push the system board by the side nearest to the fan cage to insert the external input/output connectors into their respective holes in the chassis.

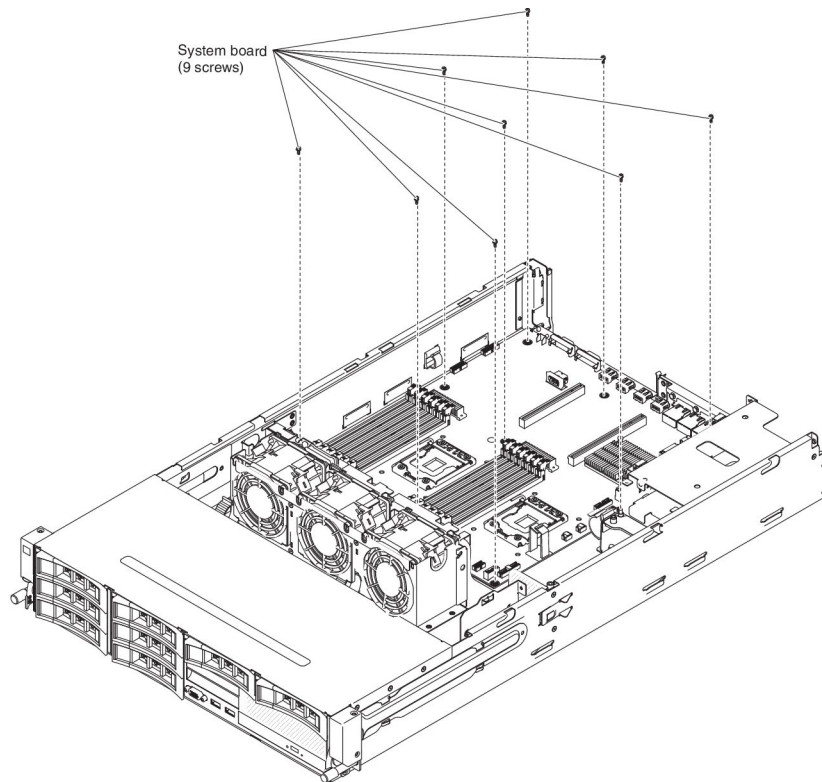


4. Align the holes near the two microprocessor sockets (eight in total) on the system board with the respective standoffs on the chassis.

Attention: Make sure each standoff is completely aligned and fitted into the respective holes.



5. Install the screws to secure the system board to the chassis.



6. Install the USB embedded hypervisor flash device “Installing a USB embedded hypervisor flash device” on page 237
7. Install the system battery “Installing the system battery” on page 280
8. Install the DIMMs (see “Installing a memory module” on page 224).
9. Install each microprocessor with its matching heat sink (see “Installing a microprocessor and heat sink” on page 330).
10. 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.
11. Reconnect to the system board the cables that you disconnected in step 12 of “Removing the system board” on page 336 (see “Internal cable routing” on page 188 and “System-board internal connectors” on page 20 for more information).
12. Install the air baffle (“Installing the air baffle” on page 347), making sure that all cables are out of the way.
13. Install any removed adapters into the particular PCI riser-card assemblies (see “Installing an adapter on the PCI riser-card assembly” on page 258) and “Installing a ServeRAID adapter on the PCI riser-card assembly” on page 230).
14. Install the PCI riser-card assemblies (see “Installing the PCI riser-card assembly” on page 253).
15. If you had the optional hot-swap rear hard disk drive cage installed, insert it back into the server (see “Installing an optional hot-swap rear hard disk drive cage” on page 199).
16. Install the server top cover (see “Installing the server top cover” on page 344).
17. Push the power supplies back into the server.

18. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.
19. 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 353
20. Either update the server with the latest RAID firmware or restore the pre-existing firmware from a diskette or CD image (see “Updating the firmware” on page 349).
21. Update the UUID (see “Updating the Universal Unique Identifier (UUID)” on page 368).
22. Update the DMI/SMBIOS (see “Updating the DMI/SMBIOS data” on page 371).

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.

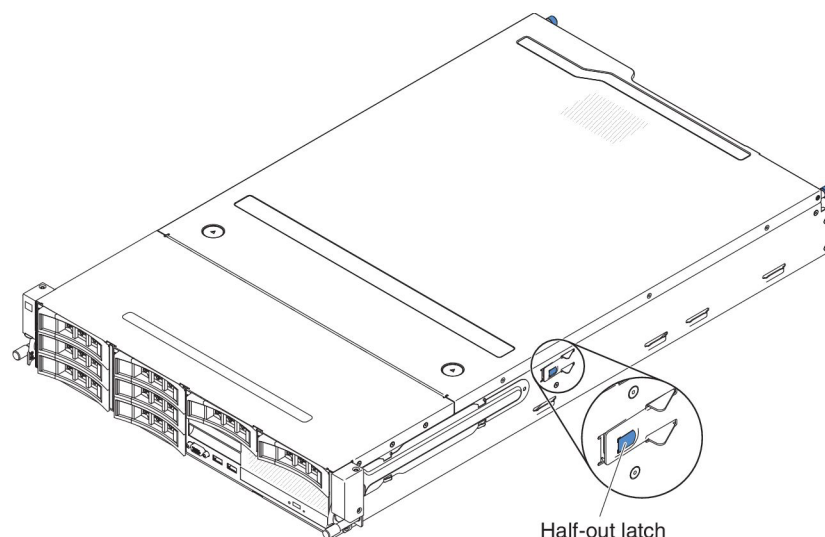
Removing the server top cover

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

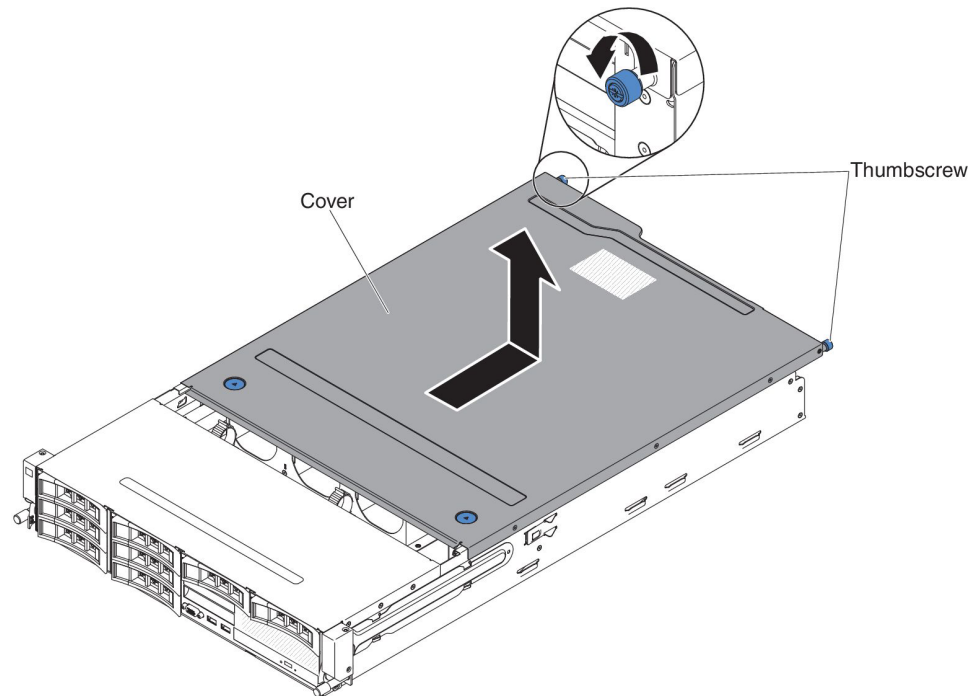
1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. If the server has been installed in a rack, press the two release latches on the front of the server and remove the server out of the rack enclosure.

Attention:

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



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



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

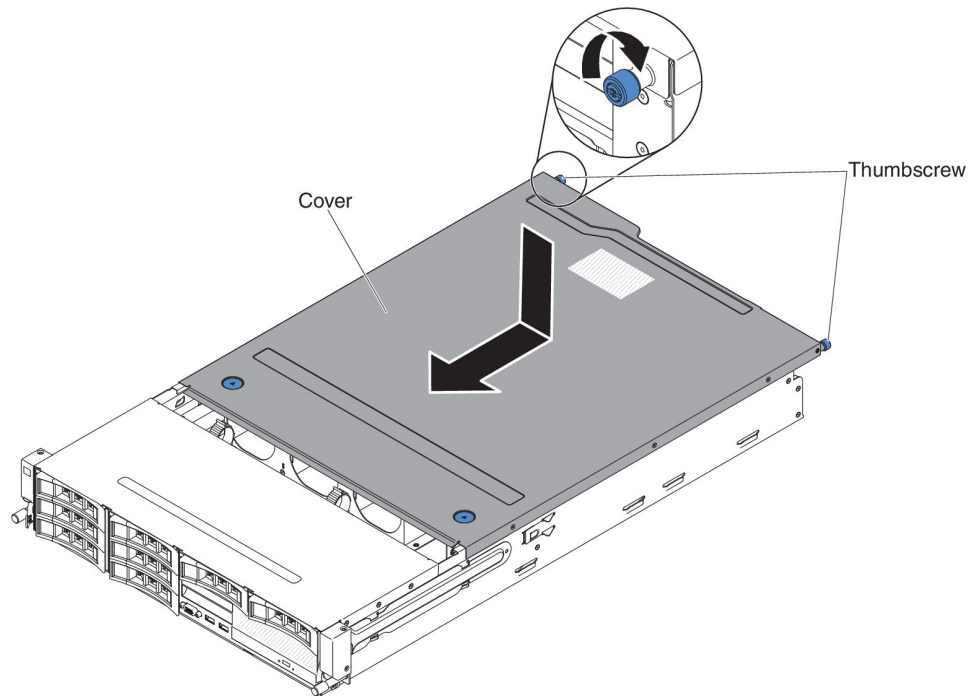
Installing the server top cover

To install the server top 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.

Attention: Before sliding the cover forward, make sure that all the tabs on both the front, rear, and side of the cover engage the chassis correctly. If all the tabs do not engage the chassis correctly, it will be hard to Remove the server top cover in the future.

3. Slide the cover forward toward the front of the server until the cover is completely closed.
4. Tighten the thumbscrews on the rear of the cover to secure the cover to the chassis.

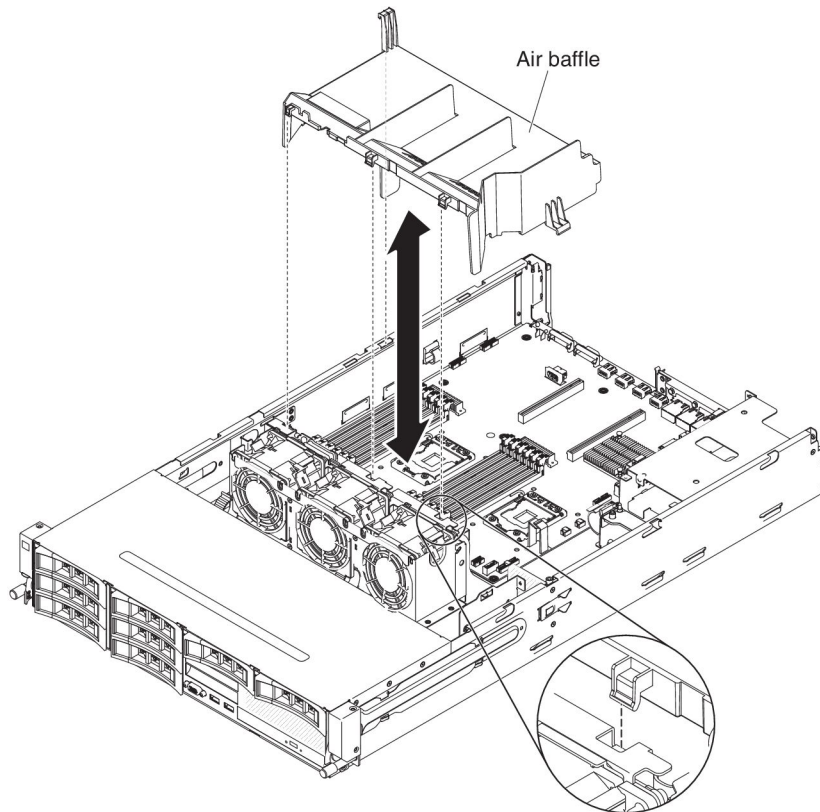


5. Install the server into the rack enclosure and tighten the two front thumbscrews to secure the server in the rack.
Attention: Two or more people are required to install the system in a rack cabinet.
6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the air baffle

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

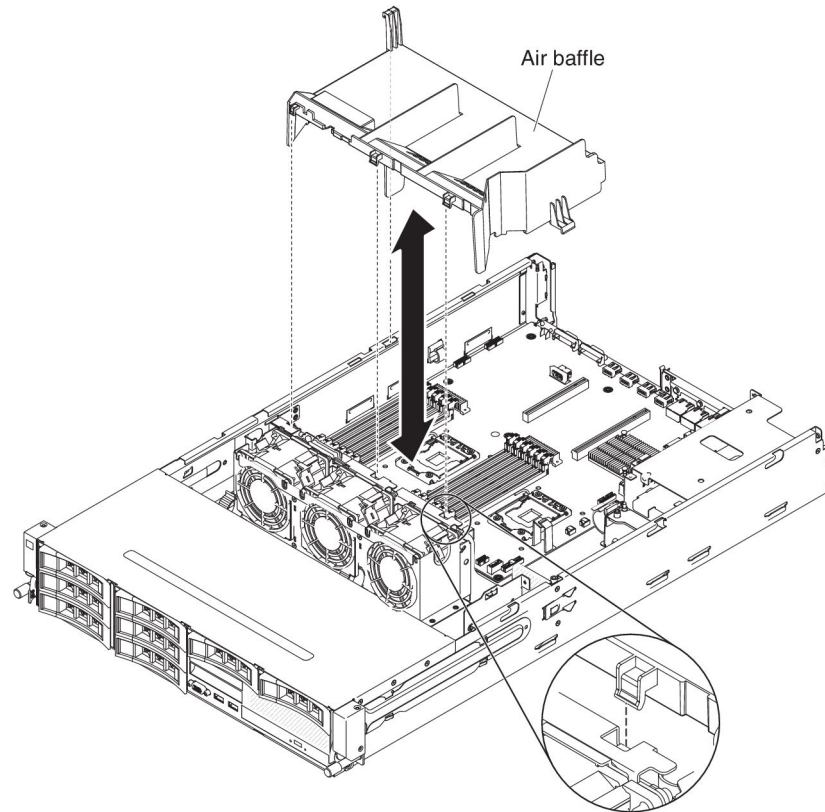
To remove the air baffle, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it up (see “Rotating the optional hot-swap rear hard disk drive cage up” on page 197).
5. If necessary, remove the PCI riser-card assembly (see “Removing the PCI riser-card assembly” on page 251).
6. Grasp the top of the air baffle and lift the air baffle out of the server.
Attention: For proper cooling and airflow, reinstall the air baffle, making sure all cables are out of the way, before you turn on the server. Operating the server with the air baffle removed might damage server components.
7. If you are instructed to return the air baffle, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the air baffle

To install the air baffle, complete the following steps.

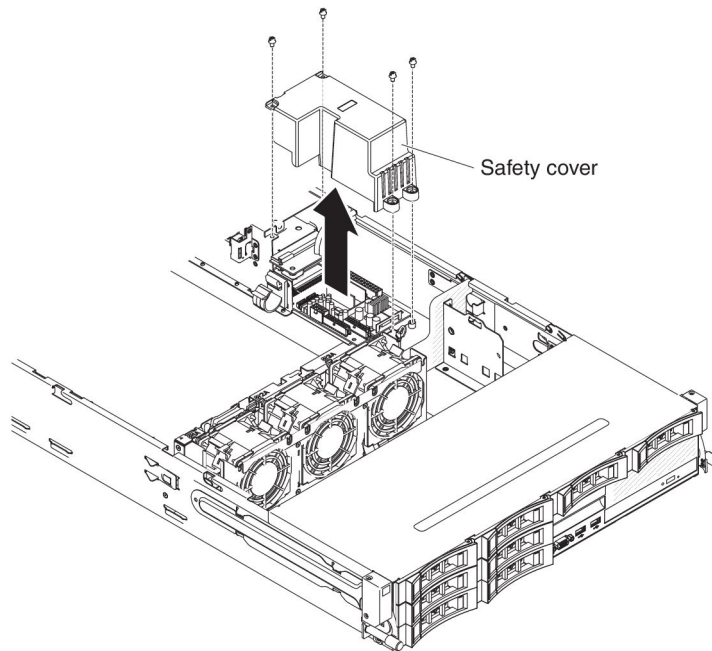


1. Align the tabs on the air baffle with the slots on the chassis.
 2. Lower the air baffle into the server. Make sure that the tabs on the air baffle are inserted into the holes on the chassis (see the illustration).
- Attention:** For proper cooling and airflow, reinstall the air baffle before you turn on the server. Operating the server with the air baffle removed might damage server components.
3. If necessary, install the PCI riser-card assembly (see “Installing the PCI riser-card assembly” on page 253).
 4. If you have the optional hot-swap rear hard disk drive cage installed, rotate it down (see “Rotating the optional hot-swap rear hard disk drive cage down” on page 198).
 5. Install the server top cover (see “Installing the server top cover” on page 344).
 6. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Removing the paddle card safety cover (240VA cover)

To remove the paddle card safety cover, complete the following steps.

1. Read the safety information that begins on page vii and “Installation guidelines” on page 185.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the server top cover (see “Removing the server top cover” on page 343).
4. Remove the screws that secure the safety cover to the chassis and remove the safety cover.

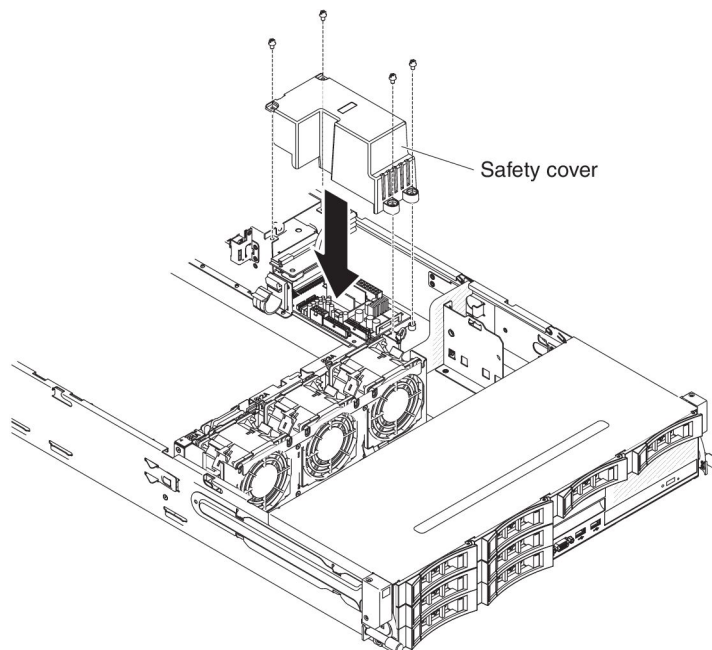


5. If you are instructed to return the air baffle, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the paddle card safety cover (240VA cover)

To install the paddle card safety cover, complete the following steps.

1. Install the screws to secure the safety cover on the power-supply paddle card assembly.



2. Install the server top cover (see “Installing the server top cover” on page 344).
3. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Chapter 6. Configuration information and instructions

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

Updating the firmware

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

You can install code updates that are packaged as an UpdateXpress System Pack or UpdateXpress CD image. An UpdateXpress System Pack contains an integration-tested bundle of online firmware and device-driver updates for your server. Use UpdateXpress System Pack Installer to acquire and apply UpdateXpress System Packs and individual firmware and device-driver updates. For additional information and to download the UpdateXpress 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**.

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 UpdateXpress System Pack or UpdateXpress image.

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

Attention: 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.

- UEFI firmware is stored in ROM on the system board.
- IMM2 firmware is stored in ROM on the IMM2 on the system board.
- Ethernet firmware is stored in ROM on the Ethernet controller.
- ServeRAID firmware is stored in ROM on the ServeRAID adapter.
- SATA firmware is stored in ROM on the integrated SATA controller.
- SAS/SATA firmware is stored in ROM on the SAS/SATA controller on the system board.

Configuring 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. See “Updating the firmware” on page 349 for information on how to update the firmware.

1. Run the Setup utility (see “Using the Setup utility” on page 353)
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 *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 351.

In addition to the *ServerGuide Setup and Installation* CD, you can use the following configuration programs to customize the server hardware:

- **Setup utility**

The Setup utility is part of the basic input/output system firmware. Use it to change interrupt request (IRQ) settings, change the startup-device sequence, set the date and time, and set passwords. For information about using this program, see “Using the Setup utility” on page 353.

- **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 360.

- **Integrated management module II**

Use the integrated management module II (IMM2) for configuration, to update the firmware and sensor data record (SDR) data, and to remotely manage a network. For information about using IMM2, see “Using the integrated management module II” on page 360.

- **VMware ESXi embedded hypervisor**

The VMware ESXi embedded hypervisor is available on the server models that come with an installed USB embedded hypervisor flash device. The USB flash device is installed in the USB connector on the SAS/SATA RAID riser-card. Hypervisor is virtualization software that enables multiple operating systems to

run on a host system at the same time. For more information about using the embedded hypervisor, see “Using the embedded hypervisor” on page 362.

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

The remote presence and blue-screen capture feature are integrated into the Integrated Management Module II (IMM2). The Integrated Management Module Advanced Upgrade is required to enable the remote presence functions. When the optional Integrated Management Module Advanced Upgrade is installed in the server, it activates the remote presence functions. Without the Integrated Management Module Advanced Upgrade, you will not be able to access the network remotely to mount or unmount drives or images on the client system. However, you will still be able to access the web interface without the Integrated Management Module Advanced Upgrade. You can order the optional IBM Integrated Management Module Advanced Upgrade, if one did not come with your server. For more information about how to enable the remote presence function, see “Using the remote presence capability and blue-screen capture” on page 363.

- **Ethernet controller configuration**

For information about configuring the Ethernet controller, see “Configuring the Gigabit Ethernet controller” on page 364.

- **Configuring RAID arrays**

For information about configuring RAID arrays, see “Configuring RAID arrays” on page 365.

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

Use this program as an alternative to the Setup utility for modifying UEFI settings. Use the ASU program online or out of band to modify UEFI settings from the command line without the need to restart the server to access the Setup utility. For more information about using this program, see “IBM Advanced Settings Utility program” on page 367.

Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD provides software setup tools and installation tools that are designed for your server. The ServerGuide program detects the server model and hardware options that are installed and uses that information during setup to configure the hardware. The ServerGuide program simplifies operating-system installations by providing updated device drivers and, in some cases, installing them automatically. To download the CD, go to <http://www.ibm.com/support/entry/portal/docdisplay?Indocid=SERV-GUIDE> and click **IBM Service and Support Site**.

The ServerGuide program has the following features:

- An easy-to-use interface
- Diskette-free setup, and configuration programs that are based on detected hardware
- ServeRAID Manager program, which configures your ServeRAID adapter
- Device drivers that are provided for your server model and detected hardware
- Operating-system partition size and file-system type that are selectable during setup

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

ServerGuide features

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

The ServerGuide program requires a supported IBM server with an enabled startable (bootable) CD drive. In addition to the *ServerGuide Setup and Installation* CD, you must have your operating-system CD to install the operating system.

The ServerGuide program performs the following tasks:

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

Setup and configuration overview

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

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

When you start the *ServerGuide Setup and Installation* CD, the program prompts you to complete the following tasks:

- Select your language.
- Select your keyboard layout and country.
- View the overview to learn about ServerGuide features.
- View the readme file to review installation tips for your operating system and adapter.
- Start the operating-system installation. You will need your operating-system CD.

Important: Before you install a legacy operating system (such as VMware) on a server with an LSI SAS controller, you must first complete the following steps:

1. Update the device driver for the LSI SAS controller to the latest level.
2. In the Setup utility, set **Legacy Only** as the first option in the boot sequence in the **Boot Manager** menu.
3. Using the LSI Configuration Utility program, select a boot drive.

For detailed information and instructions, go to <https://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-5083225>.

Typical operating-system installation

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

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

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

Installing your operating system without using ServerGuide

If you have already configured the server hardware and you are not using the ServerGuide program to install your operating system, go to <http://www.ibm.com/supportportal/> to download the latest operating-system installation instructions from the IBM website.

Using the Setup utility

Use the Setup utility, formerly called the Configuration/Setup Utility program, to perform the following tasks:

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time
- Set the startup characteristics of the server and the order of startup devices
- Set and change settings for advanced hardware features
- View, set, and change settings for power-management features
- View and clear error logs
- 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 40 seconds after the server is connected to ac power, the power-control button becomes active.

2. When the prompt <F1> Setup is displayed, press F1. If you have set an administrator password, you must type the administrator password to access the full Setup utility menu. If you do not type the administrator password, a limited Setup utility menu is available.
3. Select the settings to view or change.

Setup utility menu choices

The following choices are on the Setup utility main menu for the UEFI. Depending on the version of the firmware, some menu choices might differ slightly from these descriptions.

- **System Information**

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

- **System Summary**

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

- **Product Data**

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

This choice is on the full Setup utility menu only.

- **System Settings**

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

- **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 controllers, SATA optical drive channels, PCI slots, and video controller. 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 IMM2.

- **Reset IMM to Defaults**

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

- **Reset IMM**

Select this choice to reset the IMM2 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 error messages in the system event logs. You can use the arrow keys to move between pages in the error log.

The system event logs contain all event and error messages that have been generated during POST, by the systems-management interface handler, and by the system service processor. Run the diagnostic programs to get more information about error codes that occur. See “Running the diagnostic programs” on page 139 for instructions on running the diagnostic programs.

Important: If the system-error LED on the front of the server is lit but there are no other error indications, clear the IMM2 system-event log. Also, after you complete a repair or correct an error, clear the IMM2 system-event log to turn off the system-error LED on the front of the server.

- **POST Event Viewer**

Select this choice to enter the POST event viewer to view the POST error messages.

- **System Event Log**

Select this choice to view the IMM2 system event log.

- **Clear System Event Log**

Select this choice to clear the IMM2 system event log.

- **User Security**

Select this choice to set, change, or clear passwords. See “Passwords” on page 359 for more information.

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

- **Set Power-on Password**

Select this choice to set or change a power-on password. For more information, see “Power-on password” on page 359 for more information.

- **Clear Power-on Password**

Select this choice to clear a power-on password. For more information, see “Power-on password” on page 359 for more information.

- **Set Administrator Password**

Select this choice to set or change an administrator password. An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu. If an administrator password is set, the full Setup utility menu is available only if you type the administrator password at the password prompt. For more information, see “Administrator password” on page 360.

- **Clear Administrator Password**

Select this choice to clear an administrator password. For more information, see “Administrator password” on page 360.

- **Save Settings**

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

- **Restore Settings**

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

- **Load Default Settings**

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

- **Exit Setup**

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

Passwords

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

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

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

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

Power-on password: If a power-on password is set, when you turn on the server, you must type the power-on password to complete the system startup. You can use any combination of 6 - 20 printable ASCII characters for the password.

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

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

- If an administrator password is set, type the administrator password at the password prompt. Start the Setup utility and reset the power-on password.
- Remove the battery from the server and then reinstall it. See “Removing the system battery” on page 278 for instructions on removing the battery.
- Change the position of the power-on password switch (enable switch 4 of the system board switch block (SW3) to bypass the power-on password check (see “System-board jumpers” on page 22 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 vii. Do not change settings or move jumpers on any system-board switch or jumper blocks that are not shown in this document.

The default for all of the switches on switch block (SW3) is Off.

While the server is turned off, move switch 4 of the switch block (SW3) to the On position to enable the power-on password override. You can then start the Setup utility and reset the power-on password. You do not have to return the switch to the previous position.

The power-on password override switch does not affect the administrator password.

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 - 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

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

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

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

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

Starting the backup server firmware

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

To force the server to start from the backup copy of the server firmware, turn off the server; then, place the JP2 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 JP2 jumper back to the primary position (pins 1 and 2).

Using the integrated management module II

The integrated management module II (IMM2) is the second generation of the IMM. Unlike the first generation of IMM, the IMM2 has three levels of firmware: basic, standard, and premium. The level of IMM2 firmware in your server depends on the server platform. IMM2 basic firmware provides server management through the Intelligent Platform Management Interface (IPMI). IMM2 standard firmware provides basic functionality plus the ability to manage servers through other user interfaces, such as the web, Telnet, Secure Shell (SSH), and Simple Network Management Protocol (SNMP). IMM2 premium firmware provides standard functionality plus remote-presence capability.

Some servers that come with IMM2 basic or standard firmware might have an option to upgrade the IMM2 firmware to a higher level. If you add the service processor upgrade option to IMM2 basic firmware, the result is IMM2 standard

functionality. If you add the remote presence upgrade option to IMM2 standard firmware, the result is IMM2 premium functionality.

Note: You cannot upgrade IMM2 basic firmware directly to IMM2 premium firmware by using the remote presence upgrade option. You must use the service processor upgrade option to upgrade to IMM2 standard firmware and then use the remote presence upgrade option to upgrade to IMM2 premium firmware.

For more information about the IMM2, see the Integrated Management Module II User's Guide at <http://www.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-5079770&brandind=5000008>.

The IMM2 supports the following basic systems-management features:

- Environmental monitor with fan speed control for temperature, voltages, fan failure, and power supply failure.
- DIMM error assistance. The Unified Extensible Firmware Interface (UEFI) disables a failing DIMM that is detected during POST, and the IMM2 lights the associated system error LED and the failing DIMM error LED.
- System-event log (SEL).
- ROM-based IMM2 firmware flash updates.
- Automated boot recovery (ABR).
- Nonmaskable interrupt (NMI) detection and reporting.
- Intelligent Platform Management Interface (IPMI) Specification V2.0 and Intelligent Platform Management Bus (IPMB) support.
- Invalid system configuration (CNFG) LED support.
- Serial over LAN (SOL).
- PECI 2 support.
- Power/reset control (power-on, hard and soft shutdown, hard and soft reset, schedule power control).
- Alerts (in-band and out-of-band alerting, PET traps - IPMI style, SNMP, e-mail).
- Operating-system failure blue screen capture.
- Configuration save and restore.
- PCI configuration data.
- Boot sequence manipulation.

The IMM2 also provides the following remote server management capabilities through the OSA SMBridge management utility program:

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

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

- **Serial over LAN**

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

Obtaining the IP address for the IMM2

To access the web interface, you need the IP address for IMM2. You can obtain the IMM2 IP address through the Setup utility. The server comes with a default IP address for the IMM2 of 192.168.70.125. To locate the IP address, complete the following steps:

1. Turn on the server.

Note: Approximately 5 to 10 seconds after the server is connected to power, the power-control button becomes active.

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

Logging on to the web interface

To log onto the web interface to use the remote presence functions, complete the following steps:

1. Open a web browser 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: The IMM2 defaults to DHCP. If a DHCP host is not available, the IMM2 assigns a static IP address of 192.168.70.125.

2. On the Login page, type the user name and password. If you are using the IMM for the first time, you can obtain the user name and password from your system administrator. All login attempts are documented in the event log.

Note: The IMM2 is set initially with a user name of USERID and password of PASSWORD (passw0rd with a zero, not 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 IMM2 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.

Using the embedded hypervisor

The VMware ESXi embedded hypervisor is available on server models that come with an installed USB embedded hypervisor flash device. The USB flash device comes installed in the USB connector on the 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 boot order in the Setup utility.

To add the USB flash device to the boot order, complete the following steps:

1. Turn on the server.

Note: Approximately 5 to 10 seconds after the server is connected to power, the power-control button becomes active.

2. When the prompt <F1> Setup is displayed, press F1.
3. From the Setup utility main menu, select **Boot Manager**.
4. Select **Add Boot Option**; then, select **Embedded Hypervisor**. Press Enter, and then select Esc.
5. Select **Change Boot Order** and then select **Commit Changes**; then, press Enter.
6. Select **Save Settings** and then select **Exit Setup**.

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

1. Turn on the server.

Note: Approximately 5 to 10 seconds after the server is connected to power, the power-control button becomes active.

2. Insert the VMware Recovery CD into the CD or DVD drive.
3. Follow the instructions on the screen.

For additional information and instructions, see the *ESXi Embedded and vCenter Server Setup Guide* at http://www.vmware.com/pdf/vsphere4/r40_u1/vsp_40_u1_esxi_e_vc_setup_guide.pdf.

Using the remote presence capability and blue-screen capture

The remote presence and blue-screen capture features are integrated functions of the Integrated Management Module II (IMM2). When the optional IBM Integrated Management Module Advanced Upgrade is installed in the server, it activates the remote presence functions. The Integrated Management Module Advanced Upgrade is required to enable the integrated remote presence and blue-screen capture features. Without the Integrated Management Module Advanced Upgrade, you will not be able to access the network remotely to mount or unmount drives or images on the client system. However, you can still access the web interface without the upgrade.

After the Integrated Management Module Advanced Upgrade is installed in the server, it is authenticated to determine whether it is valid. If the key is not valid, you receive a message from the web interface (when you attempt to start the remote presence feature) indicating that the Integrated Management Module Advanced Upgrade is required to use the remote presence feature.

The remote presence feature provides the following functions:

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

- Uploading a diskette image to the IMM memory and mapping it to the server as a virtual drive

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

Enabling the remote presence feature

To enable the remote presence feature, complete the following steps:

1. Install the Integrated Management Module Advanced Upgrade.
2. Turn on the server.

Note: Approximately 20 to 40 seconds after the server is connected to power, the power-control button becomes active.

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 <http://www.ibm.com/systems/x/fod/> under the Help section. Please note that the server may need to be restarted to activate the feature.

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 <http://www.ibm.com/systems/x/fod/> 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.

To find device drivers and information about configuring the Ethernet controllers, go to <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 20. Server configuration and applications for configuring and managing RAID arrays

Server configuration	RAID array configuration (before operating system is installed)	RAID array management (after operating system is installed)
ServeRAID-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 adapter; ServeRAID-M5120 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, and IBM Director
ServeRAID-C105	HII	MegaRAID Storage Manager (MSM), MegaCLI, and IBM Director

Notes:

1. For more information about Problem Determination and Service Guide for ServeRAID M controllers, see <http://www-947.ibm.com/support/entry/portal/docdisplay?Indocid=MIGR-5085607>.
2. For more information about Configuration and Options Guide (COG), see <http://www-947.ibm.com/support/entry/portal/docdisplay?Indocid=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?Indocid=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 the settings, press Esc to exit from the program; select **Save** to save the settings you have changed.

Creating RAID of hard disk drives (C105 only)

Notes:

1. If a ServeRAID adapter is installed in the server, 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 (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 Change** to create the array.
9. When the prompt Success is displayed, select **OK** to continue.
10. After the system auto skips 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 Operation**.
14. Select **Start Operation**.
15. Select **Yes** to confirm.
16. Select **OK** to continue.
17. When the prompt Success is displayed, select **OK**.

Notes:

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?Indocid=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 <http://www.ibm.com/systems/x/fod/> under the Help section.
3. Software RAID is not supported in VMware 5 and VMware 4.1.
4. Software RAID is not supported in 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.
6. ServeRAID C105 does not support both hot-swap and solid state drives.

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 FoD features to Enable the optional remote presence features or other IMM2 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 IMM2 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?Indocid=TOOL-ASU>.

Updating IBM Systems Director

If you plan to use IBM Systems Director to manage the server, you must check for the latest applicable IBM Systems Director updates and interim fixes.

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

To locate and install a newer version of IBM Systems Director, complete the following steps:

1. Check for the latest version of IBM Systems Director:
 - a. Go to <http://www.ibm.com/systems/software/director/downloads/index.html>.
 - b. If a newer version of IBM Systems Director than what comes with the server is shown in the drop-down list, follow the instructions on the web page to download the latest version.
2. Install the IBM Systems Director program.

If your management server is connected to the Internet, to locate and install updates and interim fixes, complete the following steps:

1. Make sure that you have run the Discovery and Inventory collection tasks.
2. On the Welcome page of the IBM Systems Director web interface, click **View updates**.
3. Click **Check for updates**. The available updates are displayed in a table.
4. Select the updates that you want to install, and click **Install** to start the installation wizard.

If your management server is not connected to the Internet, to locate and install updates and interim fixes, complete the following steps:

1. Make sure that you have run the Discovery and Inventory collection tasks.
2. On a system that is connected to the Internet, go to <http://www.ibm.com/support/fixcentral/>.
3. From the **Product family** list, select **IBM Systems Director**.
4. From the **Product** list, select **IBM Systems Director**.
5. From the **Installed version** list, select the latest version, and click **Continue**.
6. Download the available updates.
7. Copy the downloaded files to the management server.
8. On the management server, on the Welcome page of the IBM Systems Director web interface, click the **Manage** tab, and click **Update Manager**.
9. Click **Import updates** and specify the location of the downloaded files that you copied to the management server.
10. Return to the Welcome page of the web interface, and click **View updates**.
11. Select the updates that you want to install, and click **Install** to start the installation wizard.

Updating the Universal Unique Identifier (UUID)

The Universal Unique Identifier (UUID) must be updated when the system board is replaced. Use the Advanced Settings Utility to update the UUID in the UEFI-based server. The ASU is an online tool that supports several operating systems. Make sure that you download the version for your operating system. You can download the ASU from the IBM website. To download the ASU and update the UUID, go to <http://www.ibm.com/supportportal/>.

1. Download the Advanced Settings Utility (ASU):
 - a. Go to <http://www-947.ibm.com/support/entry/portal/docdisplay?brand=5000008&Indocid=TOOL-CENTER>.
 - b. Scroll down to **Configuration** and click **Advanced Settings Utility**.
 - c. In the next window under Related Information, click the **Advanced Settings Utility** link and download the ASU version for your operating system.

2. ASU sets the UUID in the Integrated Management Module II (IMM2). Select one of the following methods to access the Integrated Management Module II (IMM2) to set the UUID:
 - Online from the target system (LAN or keyboard console style (KCS) access)
 - Remote access to the target system (LAN based)
 - Bootable media containing ASU (LAN or KCS, depending upon the bootable media)
3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:
 - For Windows based operating systems:
 - ibm_rndis_server_os.inf
 - device.cat
 - For Linux based operating systems:
 - cdc_interface.sh
4. After you install ASU, use the following command syntax to set the UUID:


```
asu set SYSTEM_PROD_DATA.SysInfoUUID <uuid_value>-kcs [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 PASSWORD (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 IMM2 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 website.

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

- a. Go to <http://www-947.ibm.com/support/entry/portal/docdisplay?brand=5000008&Indocid=TOOL-CENTER>.
 - b. Scroll down to Configuration and Click Advanced Settings Utility
- 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 PASSWORD (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 website at <http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp>. From the left pane, click **IBM System x and BladeCenter Tools Center**, then click **Tool reference** for the available tools.

5. Restart the server.

Updating the DMI/SMBIOS data

The Desktop Management Interface (DMI) must be updated when the system board is replaced. Use the Advanced Settings Utility to update the DMI in the UEFI-based server. The ASU is an online tool that supports several operating systems. Make sure that you download the version for your operating system. You can download the ASU from the IBM website. To download the ASU and update the DMI, go to <http://www.ibm.com/supportportal/>.

1. ASU sets the DMI in the Integrated Management Module II (IMM2). Select one of the following methods to access the Integrated Management Module II (IMM2) to set the DMI:
 - Online from the target system (LAN or keyboard console style (KCS) access)
 - Remote access to the target system (LAN based)
 - Bootable media containing ASU (LAN or KCS, depending upon the bootable media)
2. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:
 - For Windows based operating systems:
 - ibm_rndis_server_os.inf
 - device.cat
 - For Linux based operating systems:
 - cdc_interface.sh
3. After you install ASU, Type the following commands to set the DMI:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>-kcs [access_method]
asu set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model>-kcs [access_method]
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n>-kcs [access_method]
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>-kcs [access_method]
```

Where:

<m/t_model>

The server machine type and model number. Type mtm xxxxyyy, where xxxx is the machine type and yyy is the server model number.

< system model>

The system model. Type system yyyyyyy, where yyyyyyy is the product identifier such as x3550M3.

<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
aaaaaaaaaaaaaaaaaaaaaaaaaaaaa, where
aaaaaaaaaaaaaaaaaaaaaaaaaaaaa 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 PASSWORD (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 IMM2 using the online authenticated LAN access method, ASU will automatically use the following unauthenticated KCS access method.

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

Examples that do not use the userid and password default values:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
--user <imm_user_id> --password <imm_password>
asu set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model>
--user <imm_user_id> --password <imm_password>
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --user <imm_user_id>
--password <imm_password>
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>
--user <imm_user_id> --password <imm_password>
```

Examples that do use the userid and password default values:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
asu set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model>
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n>
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>
```

- Online KCS access (unauthenticated and user restricted):

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

The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver be installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer. See the *Advanced Settings Utility Users Guide* at <http://www-947.ibm.com/support/entry/portal/docdisplay?Indocid=TOOL-ASU> for more details.

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

Examples that do not use the userid and password default values:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
asu set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model>
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n>
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>
```

- Remote LAN access, type the command:

Note: When using the remote LAN access method to access IMM2 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 PASSWORD (with a zero 0 not an O).

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

Examples that do not use the userid and password default values:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> --host <imm_ip>
--user <imm_user_id> --password <imm_password>
asu set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> --host <imm_ip>
--user <imm_user_id> --password <imm_password>
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --host <imm_ip>
--user <imm_user_id> --password <imm_password>
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> --host <imm_ip>
--user <imm_user_id> --password <imm_password>
```

Examples that do use the userid and password default values:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> --host <imm_ip>
asu set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> --host <imm_ip>
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --host <imm_ip>
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> --host <imm_ip>
```

- Bootable media:

You can also build a bootable media using the applications available through the Tools Center website at <http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp>. From the left pane, click **IBM System x and BladeCenter Tools Center**, then click **Tool reference** for the available tools.

4. Restart the server.

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your system, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Problem Determination and Service Guide* on the IBM Documentation CD that comes with your system.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with IBM systems also describes the diagnostic tests that you can perform. Most systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/systems/support/> and follow the instructions. Also, some documents are available through the IBM Publications Center at <http://www.ibm.com/shop/publications/order/>.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM systems, optional devices, services, and support. The address for IBM System x[®] and xSeries[®] information is <http://www.ibm.com/systems/x/>. The address for IBM BladeCenter[®] information is <http://www.ibm.com/systems/bladecenter/>. The address for IBM IntelliStation[®] information is <http://www.ibm.com/intellistation/>.

You can find service information for IBM systems and optional devices at <http://www.ibm.com/systems/support/>.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with System x and xSeries servers, BladeCenter products, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, see <http://www.ibm.com/services/sl/products/>.

For more information about Support Line and other IBM services, see <http://www.ibm.com/services/>, or see <http://www.ibm.com/planetwide/> for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Hardware service and support

You can receive hardware service through your IBM reseller or IBM Services. To locate a reseller authorized by IBM to provide warranty service, go to <http://www.ibm.com/partnerworld/> and click **Find a Business Partner** on the right side of the page. For IBM support telephone numbers, see <http://www.ibm.com/planetwide/>. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

IBM Taiwan product service

台灣 IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路 7 號 3 樓
電話：0800-016-888

IBM Taiwan product service contact information:

IBM Taiwan Corporation
3F, No 7, Song Ren Rd.
Taipei, Taiwan
Telephone: 0800-016-888

Appendix B. Notices

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Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

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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.

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Table 21. Limits for particulates and gases

Contaminant	Limits
Particulate	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Copper: Class G1 as per ANSI/ISA 71.04-1985³ Silver: Corrosion rate of less than 300 Å in 30 days
<p>¹ ASHRAE 52.2-2008 - <i>Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size</i>. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.</p> <p>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.</p> <p>³ ANSI/ISA-71.04-1985. <i>Environmental conditions for process measurement and control systems: Airborne contaminants</i>. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.</p>	

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種情況下，使用者會被要
求採取某些適當的對策。

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該產品可能會造成無線電干擾。
在這種情況下，可能需要用戶對其
干擾採取切实可行的措施。

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