System x iDataPlex dx360 M3
Types 6385, 6386, and 6391

Problem Determination and Service Guide

System x iDataPlex dx360 M3
Types 6385, 6386, and 6391

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 251, the *Environmental Notices and User's Guide*, and the *Warranty and Support Information* document on the IBM *Documentation* CD.

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

ix

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 on which you are working. 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 Chapter 4, "Parts listing," on page 101 and "Power cords" on page 117.
   - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment

Observe the following guidelines when you service electrical equipment:
- Check the area for electrical hazards such as moist floors, nongrounded power extension cords, and missing safety grounds.
- Use only approved tools and test equipment. Some hand tools have handles that are covered with a soft material that does not provide insulation from live electrical current.
- 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 work 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 your server or optional device before you install the device.

Statement 1:

DANGER

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

To avoid a shock hazard:

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

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

Statement 2:

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

Do not:

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

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

Statement 3:

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

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

DANGER

> **Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.**
>
> **Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.**

Statement 4:
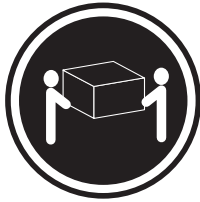
≥ 18 kg (39.7 lb)   ≥ 32 kg (70.5 lb)   ≥ 55 kg (121.2 lb)
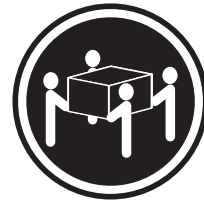
CAUTION:
Use safe practices when lifting.

Statement 5:

CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.
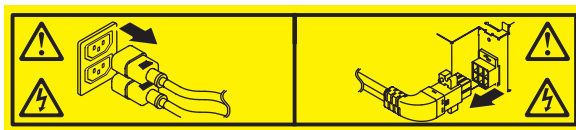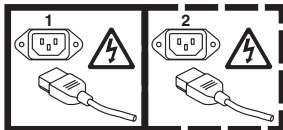
Statement 8:

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

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

Statement 10:

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

Chapter 1. Start here

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

Diagnosing a problem

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

1. **Determine what has changed.**

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

   - IBM System x® Server Firmware (formerly called BIOS code)
   - Device drivers
   - Firmware
   - Hardware components
   - Software

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

2. **Collect data.**

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

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

      - **System-board LEDs:** See "System-board LEDs and controls" on page 15 for information about system-board LEDs.
      - **System error codes:** See "Event logs" on page 27 for information about a specific error code.
      - **Software or operating-system error codes:** See the documentation for the software or operating system for information about a specific error code. See the manufacturer's Web site for documentation.

   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. See "Diagnostic programs, messages, and error codes" on page 41 for the instructions to run the DSA program.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

d) Click **System x iDataPlex dx360 M3 server** to display the list of downloadable files for the server.

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

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

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

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

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

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

If any hardware or software component is not supported, uninstall it to determine whether it is causing the problem. You must remove nonsupported hardware before you contact IBM or an approved warranty service provider for support.

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

Many configuration problems are caused by loose power or signal cables or incorrectly seated adapters. You might be able to solve the problem by turning off the server, reconnecting cables, reseating adapters, and turning the server back on. See "Checkout procedures" on page 29 for the instructions to perform the checkout procedures.

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

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

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

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

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

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

c) From the **Product family** list, select **System x iDataPlex dx360 M3 server**.

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

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

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

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

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

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

3) From the **Product family** list, select **System x iDataPlex dx360 M3 server**.

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. See "Troubleshooting tables" on page 33 and Chapter 5, "Removing and replacing server components," on page 121 for more information. Hardware errors are also indicated by 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 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 x iDataPlex™ dx360 M3/dx360 M2 system-board tray (dx360 M3 Type 6391, dx360 M2 Types 6380, 7321, and 7323 system-board tray), System x iDataPlex 2U Flex Chassis (Type 6385 2U chassis), or System x iDataPlex 3U Chassis (Type 6386 3U chassis). It describes the diagnostic tools that are available, error codes and suggested actions, and instructions for replacing failing components.

Replaceable components are of three types:

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

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

Related documentation

In addition to the printed *Important Notices* document and this document, the following documentation for the dx360 M3 system-board tray, 2U chassis, and 3U chassis is provided in Portable Document Format (PDF) on the IBM *Documentation* CD:

- *Environmental Notices and User's Guide*

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

- *Safety Information*

  This document 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.

- *User's Guide*

  This document contains general information about how to use, upgrade, and configure the dx360 M3 system-board tray, the 2U chassis, the 3U chassis, the System x iDataPlex I/O enclosure (I/O enclosure), and the System x iDataPlex Storage enclosure (storage enclosure).

- *Warranty and Support Information*

  This document contains information about the terms of the warranty and getting service and assistance.

5

Depending on the hardware configuration, additional documentation might be included on the IBM *Documentation* CD.

The iDataPlex documentation might be updated occasionally, or technical updates might be available to provide additional information that is not included in the documentation. These updates are available from the IBM Systems Information Center. To check for updated iDataPlex information and technical updates, go to http://publib.boulder.ibm.com/infocenter/idataplx/documentation/index.jsp.

The updated iDataPlex documentation also is available from the IBM Support Web site. To check for updated documentation and technical updates, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x iDataPlex dx360 M3 server** and click **Go**.

Notices and statements in this document

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

The following notices and statements are used in this document:

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

Features and specifications

The following information is a summary of the features and specifications of the hardware. Depending on the hardware configuration, 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 1U-high device is 1.75 inches tall.

Microprocessor: One or two up to six-core Intel Xeon microprocessors with integrated memory controllers in each system-board tray

Note: Use the Setup utility to determine the type and speed of the microprocessor.

Hard disk drives: The system-board tray supports one 3.5-inch simple-swap SAS (with the optional SAS controller), one 3.5-inch simple-swap SATA, or two 2.5-inch simple-swap SATA hard disk drives or solid-state drives. The system-board tray with an attached enclosure can support the following drive configurations:

- Up to four 3.5-inch simple-swap SAS or SATA hard disk drives with the storage enclosure and optional SAS controller
- Up to five 3.5-inch simple-swap SATA hard disk drives with the storage enclosure
- Up to eight 2.5-inch simple-swap SATA/SAS or solid-state hard disk drives (with an optional RAID controller) with the storage enclosure
- Up to two 3.5-inch simple-swap SATA hard disk drives with the I/O enclosure
- Up to two 3.5-inch simple-swap SAS hard disk drives with the I/O enclosure and optional SAS controller
- Up to four 2.5-inch simple-swap SATA/SAS or solid-state hard disk drives (with an optional RAID controller) with the I/O enclosure
- Up to twelve 3.5-inch hot-swap SAS or SATA (with the optional SAS controller) hard disk drives in a 3U chassis

Memory:
- Sixteen DIMM connectors (eight per microprocessor)
- Minimum: Two DIMMs per microprocessor
- Maximum: 192 GB
- Type: Registered ECC double-data-rate 3 (DDR3) -800, -1066, and -1333 MHz DIMMs, 1.5V RDIMMs or 1.35V capable RDIMMs
- Sizes: 2 GB single-rank/dual-rank, 4 GB dual-rank, 8 GB dual-rank, and 16 GB quad-rank
- Chipkill supported with selected DIMMs

Integrated functions:
- Integrated management module (IMM), which provides service processor control and monitoring functions, video controller, and (when the optional virtual media key is installed) remote keyboard, video, mouse, and remote hard disk drive capabilities
- Dedicated or shared management network connections
- Six Serial ATA (SATA) ports
- Serial over LAN (SOL) and serial redirection over Telnet or Secure Shell (SSH)
- Dual-port Gigabit Ethernet controller
- Front connectors for USB 2.0 (2 ports), serial, video, and RJ-45 (3 ports)
  - One systems-management RJ-45 port for connection to a dedicated systems-management network
  - Two RJ-45 LAN ports

Predictive Failure Analysis (PFA) alerts:
- Memory
- Hard disk drives

Expansion slots: Up to two PCI Express slots total. Support for the following riser cards:
- One PCI Express x16 slot (x16)
- Two PCI Express x16 slots(x16) with one PCI Express x8 slot (x8)
- One PCI Express x8 slot (x8) supports an optional RAID controller only (some configurations)

Environment:
- Air temperature:
  - Server on: 10°C to 35°C (50°F to 95°F); altitude: 0 to 914.4 m (0 to 3000 ft). Derate maximum temperature by 1°C for every 304.8 m (1000 ft) increase in elevation to a maximum of 3048.0 m (10000 ft) at an ambient temperature of 28°C
  - Server off: 10°C to 43°C (59°F to 109.4°F); maximum altitude: 2133 m (7000 ft)
- Humidity:
  - Server on: 10% to 80%
  - Server off: 8% to 80%

Size:
- Height:
  - 2U chassis: 8.6 cm (3.39 inches)
  - 3U chassis: 13.0 cm (5.1 inches)
- Depth: 51.3 cm (20.2 inches)
- Width: 44.6 cm (17.6 inches)
- Weight:
  - 2U chassis:
    - Fully loaded: 22.7 kg (46.1 lb)
    - Without system-board trays: 7.1 kg (15.6 lb)
  - 3U chassis:
    - Fully loaded: 28.1 kg (62.0 lb)
    - Without hard disk drives: 15.4 kg (34.0 lb)

Electrical Input:
- Input voltage low range (not applicable to 750 W dual AC input power supply): 100 V ac (minimum) to 127 V ac (maximum), sine-wave input (50 - 60 Hz)
- Input voltage high range: 200 V ac (minimum) to 240 V ac (maximum), sine-wave input (50 - 60 Hz)

Operator panel controls, connectors, and LEDs

This section describes the controls, connectors, and light-emitting diodes (LEDs) and how to turn the system-board tray on and off.

Front view

The following illustration shows the controls, connectors, and LEDs on the front of the server. The operator panel on the system-board tray is the same for all server configurations.
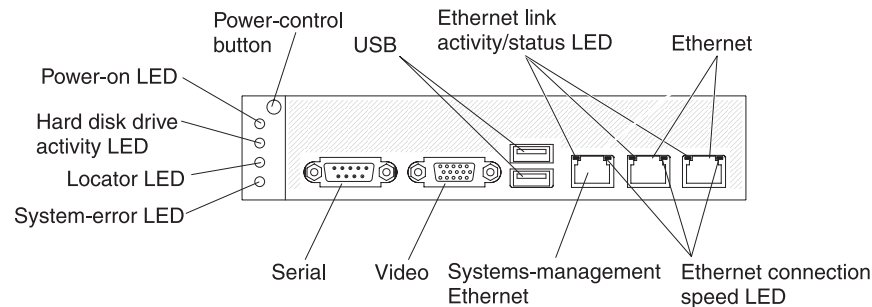
Power-control button: Press this button to turn the system-board tray on and off manually or to wake the system-board tray from a reduced-power state. Note that the power-control button is recessed to prevent the system-board tray from being turned on or off accidentally. There is a power-control button cover that can be removed for easier access to the power-control button.

USB connectors: Connect USB 2.0 devices to these connectors.

Ethernet link activity/status LED: This LED is on each Ethernet connector. When this LED is lit, it indicates that there is an active connection on the Ethernet port. When this LED is flashing, it indicates that there is activity between the server and the network.

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

Ethernet connection speed LED: This LED is on each Ethernet connector. The status of this LED indicates the connection speed, in megabits-per-second (Mbps), between the server and the network as follows:

- LED off: 10 Mbps connection
- LED lit amber: 100 Mbps connection
- LED lit green: 1000 Mbps connection

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

Video connector: Connect a monitor to this connector.

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

System-error LED: When this LED is lit, it indicates that a system error has occurred. The source of the error is logged in the system-event log that is accessed in the Setup utility.

Locator LED: This LED can be lit remotely by the system administrator to aid in visually locating the system-board tray. In an IPMI environment, the system administrator can light the LED by using the IPMI **chassis identify** command.

Hard disk drive activity LED: When this LED is lit or flashing, it indicates that an associated hard disk drive is in use.

In configurations that contain hot-swap hard disk drives, each hot-swap hard disk drive has the following LEDs.
- **Hot-swap hard disk drive activity LED:** When this LED is flashing, it indicates that the drive is in use.
- **Hot-swap hard disk drive status LED:** When this LED is lit, it indicates that the drive has failed.

Power-on LED: The states of the power-on LED are as follows:
- **Off:** AC power is not present, or the power supply or the LED itself has failed.
- **Flashing rapidly (4 times per second):** The system-board tray is turned off and is not ready to be turned on. The power-control button is disabled.
- **Flashing slowly (once per second):** The system-board tray is turned off and is ready to be turned on. You can press the power-control button to turn on the system-board tray.
- **Lit:** The system-board tray is turned on.
- **Fading on and off:** The system-board tray is in a reduced-power state. To wake the system-board tray, press the power-control button or use the IMM Web interface.

Note: If this LED is off, it does not mean that no electrical power is present. The LED might be burned out. To remove all electrical power, you must remove the system-board tray from the chassis, remove the chassis from the rack, or disconnect the power cord from the power source.

Rear view

The following illustration shows the connector on the rear of the 2U chassis. The 3U chassis is similar.

Power-cord connector
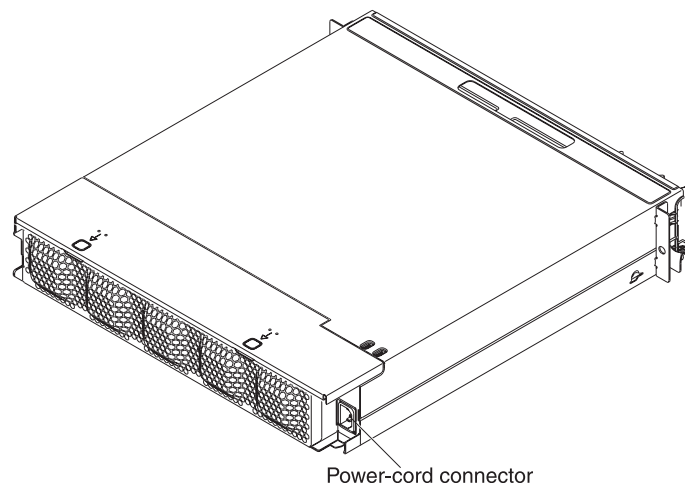
Power-cord connector: Connect the power cord to this connector. When the chassis is installed in an iDataPlex rack, it is automatically connected to power through a power cord that is mounted to the rack rail.

Turning on the system-board tray

After you install the system-board tray in a chassis, the system-board tray can start in any of the following ways:

Important: To avoid potential problems during startup, disconnect any USB flash drives from the system that contain the Smart Launch Utility before you turn on the system-board tray.

- You can press the power-control button on the front of the system-board tray (see "Operator panel controls, connectors, and LEDs" on page 9) to start the system-board tray.
- In an IPMI environment, the system administrator can turn on the system-board tray by using the IPMI **chassis control** command.
- If a power failure occurs, the system-board tray can start automatically when power is restored, if it is configured to do so.

Turning off the system-board tray

When you turn off the system-board tray, it is still connected to ac power through the chassis power supply. The system-board tray still can respond to requests from the IMM, such as a remote request to turn on the system-board tray. To remove all power from the system-board tray, you must remove the tray from the chassis.

Shut down the operating system before you turn off the system-board tray. See the operating-system documentation for information about shutting down the operating system.

The system-board tray can be turned off in any of the following ways:

- You can press the power-control button on the front of the system-board tray (see "Operator panel controls, connectors, and LEDs" on page 9). This starts an orderly shutdown of the operating system, if this feature is supported by the operating system.
- You can turn off the system-board tray from the operating system, if the operating system supports this feature. After an orderly shutdown of the operating system, the system-board tray will be turned off automatically.
- In an IPMI environment, the system administrator can turn off the system-board tray by using the IPMI **chassis control** command.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the system-board tray.
- You might be able to turn off the system-board tray by using an optional management appliance.
  - If the system is not operating correctly, the management appliance might automatically turn off the system-board tray.
  - Through the management appliance control interface, you might also be able to configure the management appliance to turn off the system-board tray. For additional information, see the documentation for your management appliance.

System-board layouts

The following illustrations show the connectors, jumpers, and LEDs on the system board.

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

System-board connectors

The following illustration shows the connectors on the system board.

DIMM 2   DIMM 4   DIMM 6

Active Energy manager

DIMM 1   DIMM 3   DIMM 5   DIMM 7   DIMM 8

Mini-PCI connector (slot 1)

Microprocessor 1

Storage riser-card (slot 2)

Virtual media key connector

SATA 0
SATA 1
SATA 2
SATA 3
SATA 4
SATA 5

Battery

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

Microprocessor 2

Riser-card (slot 3 to slot 5)
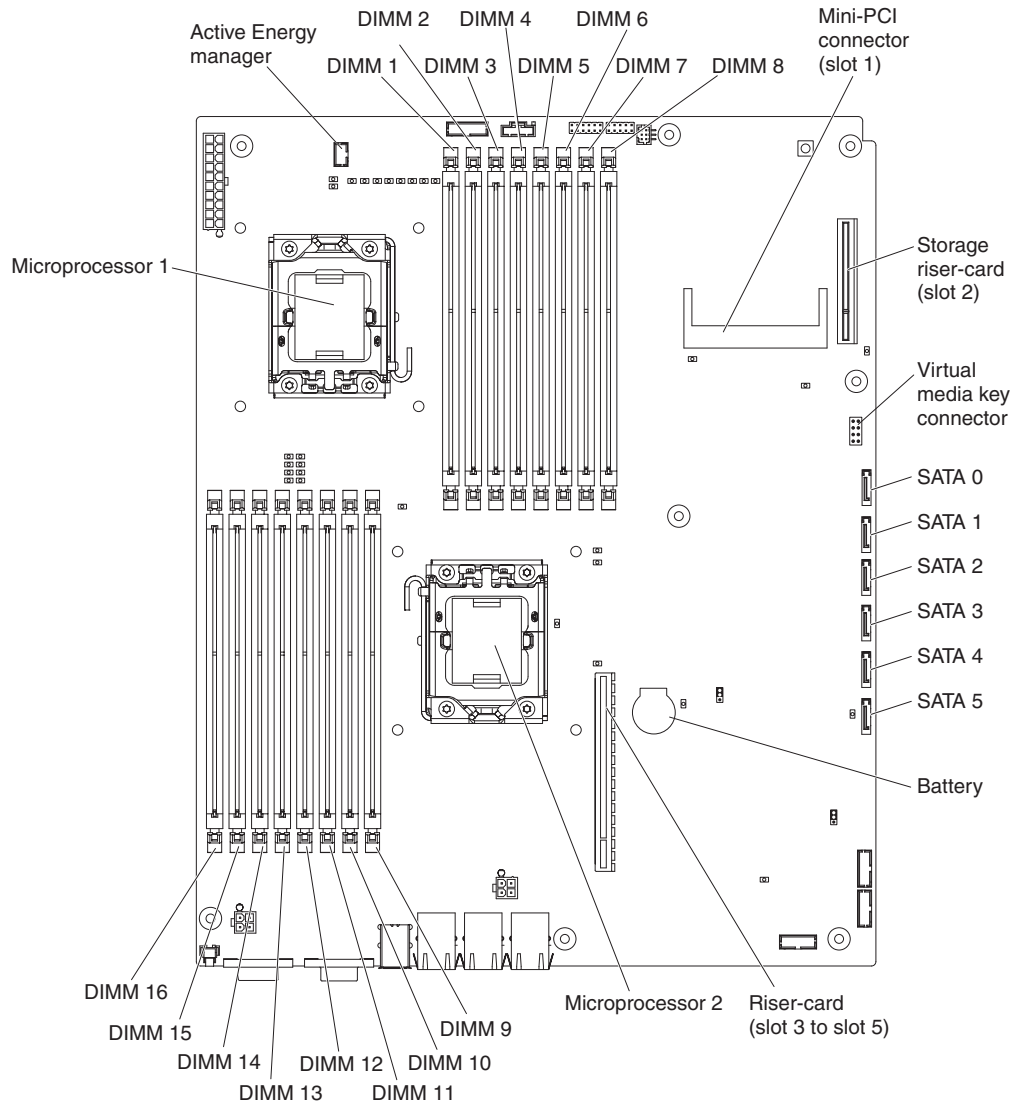
System-board jumpers

The following illustration shows the locations of the jumpers on the system board.

TPM Presence Switch
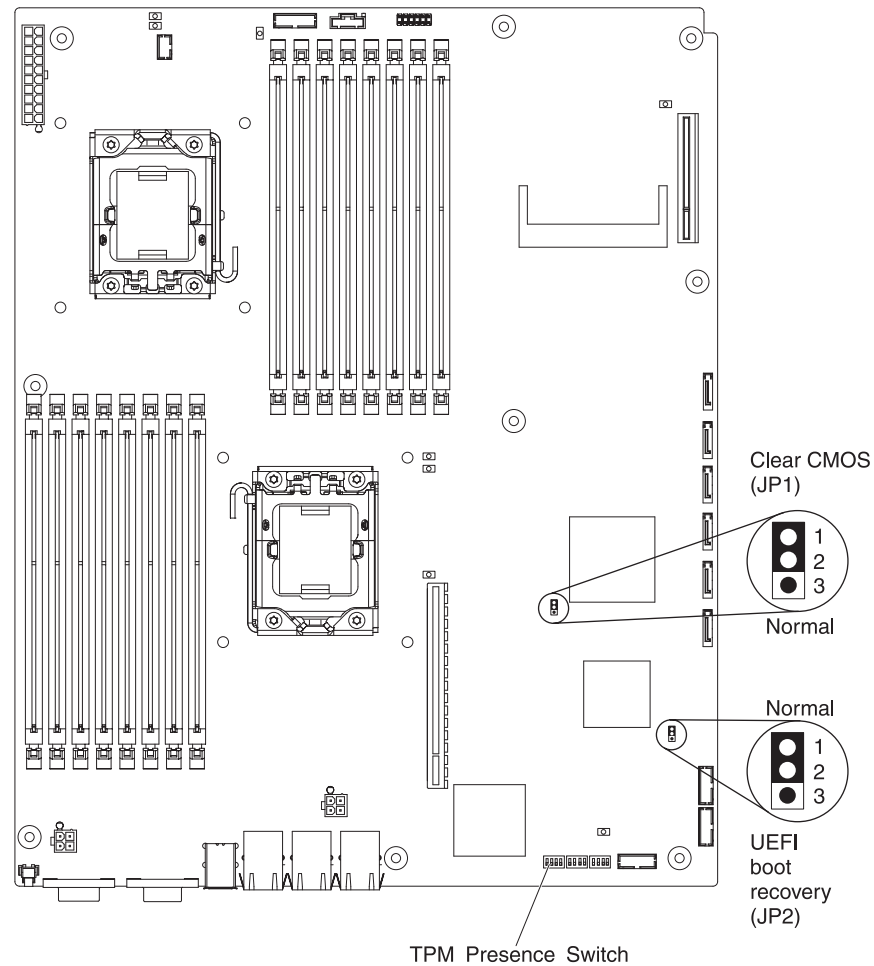
The following table defines the function of each jumper on the system board.

Jumper	Description
Clear CMOS (JP1)	• Pins 1 and 2: Normal (default) • Pins 2 and 3: Clear the CMOS data
UEFI boot recovery (JP2)	• Pins 1 and 2: Normal (default) • Pins 2 and 3: Use the secondary page during startup

The following table describes the functions of the SW2 switch block on the system board.

Switch number	Default value	Switch description
3	Off	Trusted Platform Module (TPM) physical presence.
6		Turning this switch to the on position indicates a physical presence to the TPM.

To enable TPM physical presence, complete the following steps:

1. Turn off the server and remove all power cords and external cables.

2. Pull out the planar tray.
3. Turn the SW 2 pin 3 to pin 6 to turn on the physical presence of the TPM.
4. Turn on the server and access the Setup utility menu to verify that the TPM function has been activated (see "Setup utility menu choices" on page 228).

To disable TPM physical presence, complete the following steps:
1. Turn off the server and remove all power cords and external cables.
2. Pull out the planar tray.
3. Turn the SW 2 pin 6 back to pin 3 to turn off the physical presence of the TPM.
4. Turn on the server and access the Setup utility menu to verify that the TPM function has been deactivated (see "Setup utility menu choices" on page 228).

Note: To remove potential security vulnerabilities, please disable TPM physical presence.

System-board LEDs and controls

Note: Any error LED can be lit after ac power has been removed from the system-board tray so that you can isolate a problem. After ac power has been removed from the system-board tray, power remains available to these LEDs for up to 90 seconds. To view the error LEDs, press and hold the reminder button on the system board to light the error LEDs. The error LEDs that were lit while the system-board tray was running will be lit again while the button is pressed.

The following illustration shows the locations of the LEDs and controls on the system board.
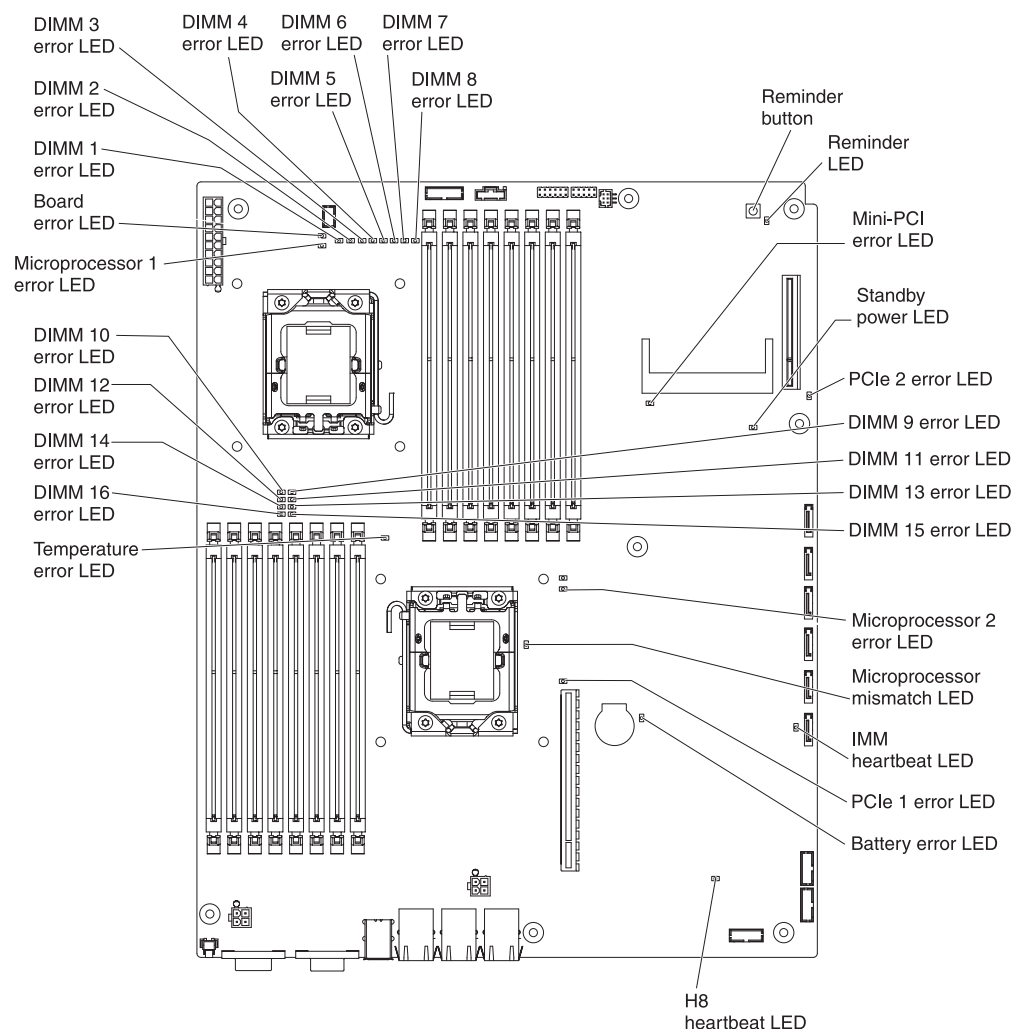
LED name	Description
Error LEDs	When an error LED is lit, it indicates that the associated component has failed.
H8 heartbeat	When this LED is flashing, it indicates that the power management controller is functioning normally.

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

Chapter 3. Diagnostics

This section describes the diagnostic tools that are available to help you solve problems that might occur in the system-board tray and chassis.

To update the firmware, you might have to use an external USB CD-RW/DVD drive such as the IBM and Lenovo part number 73P4515 or 73P4516. To run the Setup utility or the Dynamic System Analysis (DSA) Preboot, you must have the following additional hardware:

* Monitor
* Combination USB keyboard and pointing device such as IBM part number 40K5372

Optionally, to run the DSA Preboot, you can use a USB flash drive (memory key).

If you cannot diagnose and correct a problem by using the information in this section, see Appendix A, "Getting help and technical assistance," on page 249 for more information.

Diagnostic tools

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

* **POST error messages, and event logs**

  The power-on self-test (POST) generates messages to indicate the detection of a problem. See "POST" on page 18 for more information.

* **Checkout procedures**

  Checkout procedures are available to help you diagnose server problems. The basic checkout procedure is designed for anyone to use. The advanced checkout procedure is intended for trained service technicians only. See "Checkout procedures" on page 29 for more information.

* **Troubleshooting tables**

  These tables list problem symptoms and actions to correct the problems. See "Troubleshooting tables" on page 33 for more information.

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

  The DSA Preboot diagnostic programs collect and analyze system information to aid in diagnosing problems. The diagnostic programs collect the following information:

  – System configuration
  – Network interfaces and settings
  – Installed hardware
  – Service processor status and configuration
  – Vital product data, firmware, and server firmware configuration
  – Hard disk drive health
  – RAID controller configuration
  – Event logs for RAID controllers and the IMM

  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.

POST

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

If the system-board tray is configured to require entry of a password to complete the system startup, you need to type both the administrator password and power-on password to complete the system startup, if either password is set.

If POST detects a problem, an error message is displayed. See "POST error messages" for more information.

POST error messages

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

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action

0010002	Microprocessor not supported	1. Reseat the following components one at a time, in the order shown, restarting the system-board tray each time:
		   a. (Trained service technician only) Microprocessor 1
		   b. (Trained service technician only) Microprocessor 2 (if installed)
		2. (Trained service technician only) Remove microprocessor 2 and restart the system-board tray.
		3. (Trained service technician only) Remove microprocessor 1 and install microprocessor 2 in the microprocessor 1 connector. Restart the system-board tray. If the error is corrected, microprocessor 1 is bad and must be replaced.
		4. Replace the following components one at a time, in the order shown, restarting the system-board tray each time:
		   a. (Trained service technician only) Microprocessor 1
		   b. (Trained service technician only) Microprocessor 2
		   c. (Trained service technician only) System board

0011000	Invalid microprocessor type	1. Update the system firmware (see "Firmware updates" on page 227). 2. (Trained service technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0011002	Microprocessor mismatch	1. Run the Setup utility and view the microprocessor information to compare the installed microprocessor specifications. 2. (Trained service technician only) Remove and replace one of the microprocessors so that they both match.

0011004	Microprocessor failed BIST	1. Update the system firmware (see "Firmware updates" on page 227).
		2. (Trained service technician only) Reseat microprocessor 2.
		3. Replace the following components one at a time, in the order shown, restarting the system-board tray each time:
		   a. (Trained service technician only) Microprocessor
		   b. (Trained service technician only) System board

001100A	Microcode update failed	1. Update the system firmware (see "Firmware updates" on page 227). 2. (Trained service technician only) Replace the microprocessor.
0050001	DIMM disabled	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 173). 2. If the DIMM was disabled because of a memory fault, follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0051003	Uncorrectable DIMM error	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. If the problem remains, replace the failing DIMM (see "Removing a memory module" on page 172 and "Installing a memory module" on page 173). 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 207 and "Installing a microprocessor and heat sink" on page 211).
0051006	DIMM mismatch detected	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. Make sure that the DIMMs match and are installed in the correct sequence (see "Installing a memory module" on page 173).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0051009	No memory detected	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Make sure one or more DIMMs are installed in the server. 2. Reseat the DIMMs and restart the server (see "Removing a memory module" on page 172 and "Installing a memory module" on page 173). 3. Make sure that the DIMMs match and are installed in the correct sequence (see "Installing a memory module" on page 173). 4. (Trained service technician only) Replace the microprocessor that controls the failing DIMMs (see "Removing a microprocessor and heat sink" on page 207 and "Installing a microprocessor and heat sink" on page 211). 5. (Trained service technician only) Replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224).
005100A	No usable memory detected	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Make sure one or more DIMMs are installed in the server. 2. Reseat the DIMMs and restart the server (see "Removing a memory module" on page 172 and "Installing a memory module" on page 173). 3. Make sure that the DIMMs match and are installed in the correct sequence (see "Installing a memory module" on page 173). 4. Clear CMOS memory to ensure that all DIMM connectors are enabled (see "Removing the battery" on page 135 and "Installing the battery" on page 136). Note that all firmware settings will be reset to the default settings.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0058001	PFA threshold exceeded	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server.
		1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error.
		2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 173).
		3. If the error still occurs on the same DIMM, replace the affected DIMM.
		4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224).
		5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224).
		6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 207 and "Installing a microprocessor and heat sink" on page 211).
0058007	DIMM population is unsupported	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server.
		1. Reseat the DIMMs and restart the server (see "Removing a memory module" on page 172 and "Installing a memory module" on page 173).
		2. Make sure that the DIMMs are installed in the proper sequence (see "Installing a memory module" on page 173).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
0058008	DIMM failed memory test	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 173 for memory population). 4. If the problem is related to a DIMM, replace the failing DIMM (see "Removing a memory module" on page 172 and "Installing a memory module" on page 173). 5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system board (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224). 6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system board (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224). 7. (Trained service technician only) If the problem is related to microprocessor socket pins, replace the system board (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224). 8. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 207 and "Installing a microprocessor and heat sink" on page 211).
00580A1	Invalid DIMM population for mirroring mode	**Note:** Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server. 1. If a fault LED is lit, resolve the failure. 2. Install the DIMMs in the correct sequence (see "Installing a memory module" on page 173).
00580A4	Memory population changed	Information only. Memory has been added, moved, or changed.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
00580A5	Mirror failover complete	Information only. Memory redundancy has been lost. Check the event log for uncorrected DIMM failure events (See "Event logs" on page 27 for more information).

0068002	CMOS battery cleared	1. Reseat the battery.
		2. Clear the CMOS memory (see "Clearing CMOS memory" on page 69).
		3. Replace the following components one at a time, in the order shown, restarting the system-board tray each time:
		  a. Battery
		  b. (Trained service technician only) System board

2011000	PCI-X PERR	1. Check the riser-card LEDs.
		2. Reseat all affected adapters and riser cards.
		3. Update the PCI device firmware.
		4. Remove both adapters from the riser card.
		5. Replace the following components one at a time, in the order shown, restarting the system-board tray each time:
		  a. Riser card
		  b. (Trained service technician only) System board

2011001	PCI-X SERR	1. Check the riser-card LEDs.
		2. Reseat all affected adapters and riser cards.
		3. Update the PCI device firmware.
		4. Remove both adapters from the riser card.
		5. Replace the following components one at a time, in the order shown, restarting the system-board tray each time:
		  a. Riser card
		  b. (Trained service technician only) System board

2018001	PCI Express uncorrected or uncorrected error	1. Check the riser-card LEDs.
		2. Reseat all affected adapters and riser cards.
		3. Update the PCI device firmware.
		4. Remove both adapters from the riser card.
		5. Replace the following components one at a time, in the order shown, restarting the system-board tray each time:
		  a. Riser card
		  b. (Trained service technician only) System board

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action

2018002	Option ROM resource allocation failure	Informational message that some devices might not be initialized.
		
		1. If possible, rearrange the order of the adapters in the PCI slots to change the load order of the optional-device ROM code.
		
		2. Run the Setup utility, select **Start Options**, and change the boot priority to change the load order of the optional-device ROM code.
		
		3. Run the Setup utility and disable some other resources, if their functions are not being used, to make more space available:
		
		  • Select **Start Options** and **Planar Ethernet (PXE/DHCP)** to disable the integrated Ethernet controller ROM.
		
		  • Select **Advanced Functions**, then **PCI Bus Control**, then **PCI ROM Control Execution** to disable the ROM of adapters in the PCI slots.
		
		  • Select **Devices and I/O Ports** to disable any of the integrated devices.
		
		4. Replace the following components one at a time, in the order shown, restarting the system-board tray each time:
		
		  a. Each adapter
		
		  b. (Trained service technician only) System board

3xx0007 (xx can be 00 - 19)	Firmware fault detected, system halted	1. Recover the server firmware to the latest level. 2. Undo any recent configuration changes, or clear CMOS memory to restore the settings to the default values. 3. Remove any recently installed hardware.
3038003	Firmware corrupted	1. Run the Setup utility, select **Load Default Settings**, and save the settings to recover the server firmware. 2. (Trained service technician only) Replace the system board.
3048005	Booted secondary (backup) UEFI image	Information only. The backup switch was used to boot the secondary bank.
3048006	Booted secondary (backup) UEFI image because of ABR	1. Run the Setup utility, select **Load Default Settings**, and save the settings to recover the primary UEFI settings. 2. Turn off the system-board tray and remove it from the power source. 3. Reconnect the system-board tray to the power source, and then turn on the system-board tray.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
305000A	RTC date/time is incorrect	1. Adjust the date and time settings in the Setup utility, and then restart the system-board tray. 2. Reseat the battery. 3. Replace the following components one at a time, in the order shown, restarting the system-board tray each time: 　a. Battery 　b. (Trained service technician only) System board
3058001	System configuration invalid	1. Run the Setup utility, and select **Save Settings**. 2. Run the Setup utility, select **Load Default Settings**, and save the settings. 3. Reseat the following components one at a time in the order shown, restarting the system-board tray each time: 　a. Battery 　b. Failing device (if the device is a FRU, then it must be reseated by a trained service technician only) 4. Replace the following components one at a time, in the order shown, restarting the system-board tray each time: 　a. Battery 　b. Failing device (if the device is a FRU, then it must be replaced by a trained service technician only) 　c. (Trained service technician only) System board
3058004	Three boot failures	1. Undo any recent system changes, such as new settings or newly installed devices. 2. Make sure that the system-board tray is attached to a reliable power source. 3. Make sure that the operating system is not corrupted. 4. Run the Setup utility, save the configuration, and then restart the system-board tray. 5. See "Problem determination tips" on page 100.
3108007	System configuration restored to default settings	Information only. This is message is usually associated with the CMOS battery clear event.
3138002	Boot configuration error	1. Remove any recent configuration changes that you made in the Setup utility. 2. Run the Setup utility, select **Load Default Settings**, and save the settings.
3808000	IMM communication failure	1. Remove power from the system-board tray for 30 seconds, and then reconnect the system-board tray to power and restart it. 2. Update the IMM firmware. 3. Make sure that the IMM key is seated and not damaged. 4. (Trained service technician only) Replace the system board.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Error code	Description	Action
3808002	Error updating system configuration to IMM	1. Remove power from the system-board tray, and then reconnect the system-board tray to power and restart it. 2. Run the Setup utility and select **Save Settings**. 3. Update the firmware.
3808003	Error retrieving system configuration from IMM	1. Remove power from the system-board tray, and then reconnect the system-board tray to power and restart it. 2. Run the Setup utility and select **Save Settings**. 3. Update the IMM firmware.

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

3828004	AEM power capping disabled	1. Check the settings and the event logs. 2. Make sure that the Active Energy Manager feature is enabled in the Setup utility. Select **System Settings**, **Power**, **Active Energy**, and **Capping Enabled**. 3. Update the system-board tray firmware. 4. Update the IMM firmware.

Event logs

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

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

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

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

Some IMM sensors cause assertion events to be logged when their setpoints are reached. When a setpoint condition no longer exists, a corresponding deassertion event is logged. However, not all events are assertion-type events.

- **Integrated management module (IMM) event log:** This log contains a filtered subset of all IMM, POST, and system management interrupt (SMI) events. You can view the IMM event log through the IMM Web interface and through the Dynamic System Analysis (DSA) program (as the ASM event log).

- **DSA log:** This log is generated by the Dynamic System Analysis (DSA) program, and it is a chronologically ordered merge of the system-event log (as the IPMI event log), the IMM chassis-event log (as the ASM event log), and the operating-system event logs. You can view the DSA log through the DSA program.

Viewing event logs through the Setup utility

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

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

Viewing event logs without restarting the server

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

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

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

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

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

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

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

2. In the navigation pane, click **IBM System x and BladeCenter Tools Center**.
3. Expand **Tools reference**, expand **Configuration tools**, expand **IPMI tools**, and click **IPMItool**.

For an overview of IPMI, go to http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/liaai/ipmi/liaaiipmi.htm or complete the following steps:

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

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

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

Table 1. Methods for viewing event logs

Condition	Action
The server is not hung and is connected to a network.	Use any of the following methods: • Run Portable or Installable DSA to view the event logs or create an output file that you can send to IBM service and support. • In a Web browser, type the IP address of the IMM and go to the Event Log page. • Use IPMItool to view the system-event log.
The server is not hung and is not connected to a network.	Use IPMItool locally to view the system-event log.
The server is hung.	• If DSA Preboot is installed, restart the server and press F2 to start DSA Preboot and view the event logs. • If DSA Preboot is not installed, insert the DSA Preboot CD and restart the server to start DSA Preboot and view the event logs. • Alternatively, you can restart the server and press F1 to start the Setup utility and view the POST event log or system-event log. For more information, see "Viewing event logs through the Setup utility" on page 28.

Checkout procedures

The checkout procedures are the sequence of tasks that you should follow to diagnose a problem. The basic checkout procedure is designed for anyone to use. The advanced checkout procedure is intended for trained service technicians only.

About the checkout procedures

Before you perform either the basic checkout procedure or the advanced checkout procedure for diagnosing hardware problems, review the following information:

- Read the safety information that begins on page ix.
- The diagnostic programs provide the primary methods of testing the major components. 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 indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See "Microprocessor problems" on page 38 for information about diagnosing microprocessor problems.

- Before you run the diagnostic programs, you must determine whether the failing system-board tray is part of a shared hard disk drive cluster (two or more system-board trays that share 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 system-board tray might be part of a cluster if any of the following conditions are true:
  – You have identified the failing system-board tray as part of a cluster (two or more system-board trays that share external storage devices).
  – One or more external storage units are attached to the failing system-board tray and at least one of the attached storage units is also attached to another server or unidentifiable device.

  Important: If the system-board tray 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 system-board tray is halted and a POST error code is displayed, see "POST error messages" on page 18. If the system-board tray is halted and no error message is displayed, see "Troubleshooting tables" on page 33 and "Solving undetermined problems" on page 98.
- For information about power-supply problems, see "Power problems" on page 39.
- For intermittent problems, check the event log; see "Event logs" on page 27 and "Diagnostic programs, messages, and error codes" on page 41.

Performing the basic checkout procedure

To perform the basic checkout procedure, complete the following steps:

1. Is the system-board tray part of a cluster?
   - **Yes:** Shut down all failing system-board trays that are related to the cluster. Go to step 2.
   - **No:** Go to step 2.
2. Complete the following steps:
   a. If the system-board tray is running, turn off the system-board tray.
   b. Check all installed devices for compatibility.
   c. Turn on the system-board tray. If the system-board tray does not start, see "Troubleshooting tables" on page 33.

d. Record any POST error messages that are displayed on the monitor. If an error is displayed, look up the first error in "POST error messages" on page 18.

e. Check the system-error LED on the system-board tray operator panel. If it is lit, check the system-event log.

> **Important:** If the system-error LED on the front of the system-board tray is lit but there are no error indications, clear the system-event log. This log does not clear itself, and if it begins to fill up, the system-error LED will be lit. Also, after you complete a repair or correct all conditions in the system-event log, clear the system-event log to turn off the system-error LED.

f. Check for the successful completion of startup, indicated by a readable display of the operating-system desktop.

3. Are there readable instructions on the main menu?

- **Yes:** Run the diagnostic programs (see "Running the diagnostic programs" on page 42).
  - If you receive an error, see "Diagnostic error codes" on page 43.
  - If the diagnostic programs were completed successfully and you still suspect a problem, see "Solving undetermined problems" on page 98.
- **No:** Find the failure symptom in "Troubleshooting tables" on page 33; if necessary, see "Solving undetermined problems" on page 98.

> **Important:** Clear the system-event log and the POST event log after you correct all conditions. This will turn off the system-error LED, if all conditions are corrected.

Performing the advanced checkout procedure

This section contains information for trained service technicians.

The no-POST no-video environment occurs when the server does not complete POST and there is no output to the monitor during boot. To perform the no-POST no-video troubleshooting procedure, complete the following steps:

1. Search the Retain tips for a known solution that will correct the problem. Did a Retain tip correct the issue?
   - **Yes:** The problem is solved.
   - **No:** Go to step 2.

2. Check the standby power. Are any system LEDs lit or flashing?
   - **Yes:** See "System-board LEDs and controls" on page 15 to locate the system LEDs and to continue troubleshooting.
   - **No:** Go to step 3.

3. Verify that the power supply is receiving power. Is the power properly turned on and are the power-supply fans working?
   - **Yes:** Go to step 4.
   - **No:** Go to step 5 on page 32.

4. Remove the system-board tray from the chassis and apply power to the system. Is the fan on the power supply working?
   - **Yes:** (Trained service technician only) Replace the system-board tray.
   - **No:** Replace the power supply.

5. Determine whether power is being applied to the system-board tray. Press the power-control button to turn on the system. Are the system fans working?
   - **Yes:** Go to step 7.
   - **No:** Complete the following tasks:
     a. Remove the chassis.
     b. Remove the chassis top cover.
     c. Reseat the fan packs on the power supply.
     d. Reseat the chassis in the rack.
     e. Go to step 6.
6. Is the amber LED on the power supply lit?
   - **Yes:** Replace the power supply.
   - **No:** (Trained service technician only) If the amber LED on the power supply is not lit, reseat the system-board tray.
7. Reseat all of the system board components, including the following components:
   - Cables
   - DIMMs
   - Optional adapters
   - Video adapter

   Go to step 8.
8. Turn the system on. Does the system boot and display output to the monitor?
   - **Yes:** One of the components was loose. The problem is solved.
   - **No:** Go to step 9.
9. Configure the system to the minimum hardware requirements as listed in "Solving undetermined problems" on page 98; then, turn on the system. Does the system boot and display output to the monitor?
   - **Yes:** The problem was caused by one or more of the components that were removed. Reinstall each device one at a time to isolate the failing component; then, replace the component.
   - **No:** Go to step 10.
10. Test POST by completing the following steps:
    a. Clear CMOS memory by using the procedure listed in "Clearing CMOS memory" on page 69.
    b. Turn on the system.
    c. Does the system boot and display output to the monitor?
       - **Yes:** Go to step 11.
       - **No:** See the "Solving undetermined problems" on page 98 to continue troubleshooting.
11. Recover the server firmware:
    a. Use the server firmware recovery procedure listed in "Starting the backup server firmware" on page 233.
    b. Turn on the system.
    c. Does the system boot and display output to the monitor?
       - **Yes:** The symptom has changed, see "Solving undetermined problems" on page 98 to continue troubleshooting.
       - **No:** Go to step 12.
12. (Trained service technician only) Replace the system-board tray.

Troubleshooting tables

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

If you cannot find a problem in these tables, see "Running the diagnostic programs" on page 42 for information about testing the system-board tray.

If you have just added new software or a new optional device and the system-board tray is not working, complete the following steps before you use the troubleshooting tables:
1. Remove the software or device that you just added.
2. Run the diagnostic tests to determine whether the system-board tray is running correctly.
3. Reinstall the new software or new device.

General problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 cover lock 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.	1. See "Nx boot failure" on page 70 for more information. 2. See "Updating (flash-updating) the server firmware" on page 69 for more information.

Hard disk drive problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
A hard disk drive has failed, and the associated amber hard disk drive status LED is lit.	Replace the failed hard disk drive (see "Removing and installing a hard disk drive" on page 137).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 newly installed hard disk drive is not recognized.	1. Observe the associated amber hard disk drive status LED. If the LED is lit, it indicates a drive fault.
	2. If the LED is lit, remove the drive from the bay, wait 45 seconds, and reinsert the drive, making sure that the drive assembly connects to the hard disk drive backplane.
	3. Observe the associated green hard disk drive activity LED and the amber status LED:
	  • If the green activity LED is flashing and the amber status LED is not lit, the drive is recognized by the controller and is working correctly. Run the DSA hard disk drive test to determine whether the drive is detected.
	  • If the green activity LED is flashing and the amber status LED is flashing slowly, the drive is recognized by the controller and is rebuilding.
	  • If neither LED is lit or flashing, check the hard disk drive backplane (go to step 4).
	  • If the green activity LED is flashing and the amber status LED is lit, replace the drive. If the activity of the LEDs remains the same, go to step 4. If the activity of the LEDs changes, return to step 1.
	4. Make sure that the hard disk drive backplane is correctly seated. When it is correctly seated, the drive assemblies correctly connect to the backplane without bowing or causing movement of the backplane.
	5. Reseat the backplane power cable and repeat steps 1 through 3.
	6. Reseat the backplane signal cable and repeat steps 1 through 3.
	7. Suspect the backplane signal cable or the backplane:
	  • If the configuration has eight hot-swap bays:
	    a. Replace the affected backplane signal cable.
	    b. Replace the affected backplane.
	  • If the configuration has 12 hot-swap bays:
	    a. Replace the backplane signal cable.
	    b. Replace the backplane.
	    c. Replace the SAS expander card.
	8. See "Problem determination tips" on page 100.

Multiple hard disk drives fail.	Make sure that the hard disk drive, SAS RAID controller, and system-board tray device drivers and firmware are at the latest level. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
Multiple hard disk drives are offline.	1. Review the storage subsystem logs for indications of problems within the storage subsystem, such as backplane or cable problems. 2. See "Problem determination tips" on page 100.
A replacement hard disk drive does not rebuild.	1. Make sure that the hard disk drive is recognized by the controller (the green hard disk drive activity LED is flashing). 2. Review the SAS RAID controller documentation to determine the correct configuration parameters and settings.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
A green hard disk drive activity LED does not accurately represent the actual state of the associated drive.	1. If the green hard disk drive activity LED does not flash when the drive is in use, run the DSA Preboot diagnostic programs to collect error logs (see "Running the diagnostic programs" on page 42. 2. Use one of the following procedures: • If there is a hard disk error log, replace the affect hard disk drive. • If there is no hard disk error log, replace the affect backplane.

An amber hard disk drive status LED does not accurately represent the actual state of the associated drive.	1. If the amber hard disk drive LED and the RAID controller software do not indicate the same status for the drive, complete the following steps:
	   a. Turn off the system-board tray.
	   b. Reseat the SAS controller.
	   c. Reseat the backplane signal cable, backplane power cable, and SAS expander card (if the server has 12 drive bays).
	   d. Reseat the hard disk drive.
	   e. Turn on the system-board tray and observe the activity of the hard disk drive LEDs.
	 2. See "Problem determination tips" on page 100.

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," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 problem occurs only occasionally and is difficult to diagnose.	1. Make sure that: • All cables are connected securely to the front of the system-board tray and the power cord is connected securely to the rear of the chassis. • When the system-board tray is turned on, air is flowing from the rear of the chassis. If there is no airflow, the fan assembly is not working. This causes the system-board tray to overheat and shut down. 2. Check the system-event log (see "Event logs" on page 27). 3. See "Solving undetermined problems" on page 98.

Keyboard or mouse 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," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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

All keyboard and mouse problems.	1. Make sure that the keyboard and mouse cables are securely connected.
	
	2. If you are using a USB keyboard and mouse and they are connected to a USB hub, disconnect the devices from the hub and connect them directly to the system-board tray.
	
	3. Replace the following components one at a time, in the order shown, restarting the system-board tray each time:
	
	   a. Keyboard or mouse
	
	   b. (Trained service technician only) System-board tray

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," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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&lndocid=MIGR-5081319.**
- **Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.**

Symptom	Action

The amount of system memory that is displayed is less than the amount of installed physical memory.	1. Make sure that:
	  • 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 software might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled.
	2. Check the POST event log for a memory error message.
	  • If a DIMM was disabled by a systems-management interrupt (SMI), replace the DIMM.
	  • If a DIMM was disabled by the user or by POST, run the Setup utility and enable the DIMM.
	3. Run memory diagnostics (see "Running the diagnostic programs" on page 42).
	4. Make sure that there is no memory mismatch when the system-board tray is at the minimum memory configuration (see "Solving undetermined problems" on page 98 for information about the minimum required configuration).
	5. Add one pair of DIMMs at a time, making sure that the DIMMs in each pair match.
	6. Reseat the DIMMs.
	7. Replace the following components one at a time, in the order shown, restarting the system-board tray each time:
	  a. DIMMs
	  b. (Trained service technician only) System-board tray

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," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
Multiple error codes indicate a microprocessor error.	1. (Trained service technician only) Reseat the microprocessor and restart the system-board tray. 2. Run the DSA Preboot diagnostic program. See "Running the diagnostic programs" on page 42. 3. (Trained service technician only) Replace the microprocessor.

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," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 IBM optional device that was just installed does not work.	1. Make sure that:
	   • The device is designed for the system-board tray.
	   • 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. If the device comes with its own test instructions, use those instructions to test the device.
	 3. Reseat the device that you just installed.
	 4. Replace the device that you just installed.

An IBM optional device that used to work does not work now.	1. Make sure that all of the 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. 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," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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

The power-control button does not work (the system-board tray does not start).	1. Make sure that the operator panel power-control button is working correctly:
	  a. Disconnect the chassis power cord.
	  b. Reconnect the power cord.
	  c. Press the power-control button.
	2. Make sure that:
	  • The power cord is fully seated in the power-supply inlet and connected to a working electrical outlet and that the power-supply fan is working.
	  • The system-board tray contains the correct type of DIMMs.
	  • The DIMMs are correctly seated.
	  • The microprocessor is correctly installed.
	3. Reseat the following components:
	  a. DIMMs
	  b. Power-supply cables to all internal components
	  c. Power supply
	4. Replace the following components one at a time, in the order shown, restarting the system-board tray each time:
	  a. DIMMs
	  b. Power supply
	5. If you just installed an optional device, remove it, and restart the system-board tray. If the system-board tray now starts, you might have installed more devices than the power supply supports.
	6. See "Solving undetermined problems" on page 98.

The system-board tray does not turn off.	1. Determine whether you are using an Advanced Configuration and Power Interface (ACPI) or a non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps:
	  a. Press Ctrl+Alt+Delete.
	  b. Turn off the system-board tray by holding the power-control button for 5 seconds.
	  c. Restart the system-board tray.
	  d. If the system-board tray fails POST and the power-control button does not work, disconnect the ac power cord for 20 seconds; then, reconnect the ac power cord and restart the system-board tray.
	2. (Trained service technician only) If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.

The system-board tray unexpectedly shuts down, and the LEDs on the operator panel are not lit.	See "Solving undetermined problems" on page 98.

Serial-device problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
The number of serial ports that are identified by the operating system is less than the number of installed serial ports.	1. Make sure that each port is assigned a unique address in the Setup utility and none of the serial ports is disabled. **Note:** One external serial port is available. A second port (COM2) is reserved for the IMM Serial over LAN (SOL) function. 2. Reseat the serial port adapter, if one is installed. 3. Replace the serial port adapter, if one is installed.

A serial device does not work.	1. Make sure that:
	  • The device is compatible with the system-board tray.
	  • The serial port is enabled and is assigned a unique address.
	  • The device is connected to the correct connector (see "Operator panel controls, connectors, and LEDs" on page 9).
	2. Reseat the following components:
	  a. Failing serial device
	  b. Serial cable
	3. Replace the following components one at a time, in the order shown, restarting the system-board tray each time:
	  a. Failing serial device
	  b. Serial cable
	  c. (Trained service technician only) System-board tray

Software problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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

You suspect a software problem.	1. To determine whether the problem is caused by the software, make sure that:
	  • The system-board tray has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software.
	  Note: If you have just installed an adapter or memory, the system-board tray might have a memory-address conflict.
	  • The software is designed to operate on the system-board tray.
	  • Other software works on the system-board tray.
	  • The software works on another system-board tray.
	2. If you receive any error messages while you use the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem.
	3. Contact your place of purchase of the software.

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," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 USB device does not work.	**Important:** To avoid potential problems during startup, disconnect any USB flash drives from the system that contain the Smart Launch Utility before you turn on the system-board tray. 1. Make sure that: • The operating system supports USB devices. • The correct USB device driver is installed. 2. Make sure that the USB configuration options are set correctly in the Setup utility. 3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the system-board tray. 4. (Trained service technician only) Replace the system-board tray.

Diagnostic programs, messages, and error codes

The IBM Dynamic System Analysis (DSA) Preboot diagnostic programs are the primary method of testing the major components of the system-board tray. DSA is a system information collection and analysis tool that you can use to provide information to IBM service and support to aid in the diagnosis of the system problems.

To download the latest version of DSA, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA or complete the following steps.

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

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

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 indicates what action you should take as a result of the text message.

The DSA diagnostic programs collect information about the following aspects of the system:
• System configuration
• Network interfaces and settings
• Hardware inventory, including PCIe and USB information
• Service processor status and configuration
• Vital product data, firmware, and server firmware

- Drive health information
- LSI RAID and adapter configuration
- Event logs for RAID controllers and service processors

The DSA diagnostic programs can also provide diagnostics for the following system components, if they are installed in the system:
- Hard disk drives
- Memory
- Microprocessor
- Network devices
- IMM I2C bus test

The diagnostic programs create a service data record with information about the server and results from the diagnostics tests you performed. You can output all of the collected information as a compressed XML file that you can send to IBM service and support, view the information locally through a generated text report file, or copy the log to a removable media and view the log from a Web browser. See "Running the diagnostic programs" for more information.

Running the diagnostic programs

Important: The DSA diagnostic programs do not support USB CD-ROM drives. If you run the DSA diagnostic programs while any USB CD-ROM drives are attached, ignore any optical drive test results that are returned for USB CD-ROM drives. You also can remove USB CD-ROM drives before you run the DSA diagnostic programs to get accurate optical drive test results.

To run the DSA Preboot diagnostic programs, complete the following steps:
1. If the system-board tray is running, turn off the system-board tray and all attached devices.
2. Turn on all attached devices; then, turn on the system-board tray.
3. When the prompt `Press F2 for Dynamic System Analysis (DSA)` is displayed, press F2.

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

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

Follow the actions in the "Diagnostic error codes" on page 43 to solve the problem.

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

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

Exception: Reseat all hard disk drives and cables; then, run the hard disk drive diagnostic tests again. See "Microprocessor problems" on page 38 for information about diagnosing microprocessor problems.

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

Viewing the test log

You can use one of the following methods to access the test log when the tests are completed:

- From the DSA command line, issue the DSA CLI **view** command or select **Diagnostic Event Log** from the DSA graphical user interface (GUI).
- From the DSA interactive menu, select **getextendedresults**.
- From the DSA interactive menu, select **view** to view all of the collected results and event log data.
- In the DSA GUI, select **DSA error log** from the System Information page.

You can send the DSA event log file to IBM service and support to aid in diagnosing the server problems or you can use the DSA CLI **copy** command to copy the log to an external USB device.

Diagnostic error codes

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 action column.

Important: The DSA diagnostic programs do not support USB CD-ROM drives. If you run the DSA diagnostic programs while any USB CD-ROM drives are attached, ignore any optical drive test results that are returned for USB CD-ROM drives.

Table 2. DSA Preboot messages

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action

089-801-xxx	CPU	CPU Stress Test	Aborted	Internal program error.	1. Turn off and restart the system.
					
					2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA.
					
					3. Run the test again.
					
					4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227.
					
					5. Run the test again.
					
					6. Turn off and restart the system if necessary to recover from a hung state.
					
					7. Run the test again.
					
					8. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved:
					
					   a. (Trained service technician only) Microprocessor board
					
					   b. (Trained service technician only) Microprocessor
					
					9. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
• See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Message number	Component	Test	State	Description	Action

089-802-xxx	CPU	CPU Stress Test	Aborted	System resource availability error.	1. Turn off and restart the system.
					2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA.
					3. Run the test again.
					4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227.
					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 "Firmware updates" on page 227.
					9. Run the test again.
					10. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved:
					   a. (Trained service technician only) Microprocessor board
					   b. (Trained service technician only) Microprocessor
					11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action

089-901-xxx	CPU	CPU Stress Test	Failed	Test failure.	1. Turn off and restart the system if necessary to recover from a hung state.
					
					2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA.
					
					3. Run the test again.
					
					4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227.
					
					5. Run the test again.
					
					6. Turn off and restart the system if necessary to recover from a hung state.
					
					7. Run the test again.
					
					8. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved:
					  a. (Trained service technician only) Microprocessor board
					  b. (Trained service technician only) Microprocessor
					
					9. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-901-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure insystem memory/ southbridge.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 6. Run the test again. 7. Remove power from the system. 8. (Trained service technician only) Replace the system board. 9. Reconnect the system to power and turn on the system. 10. Run the test again. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-902-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the SIO bus.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. (Trained service technician only) Replace the system board. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
• See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Message number	Component	Test	State	Description	Action
166-903-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the LAN bus.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 6. Make sure that the Ethernet device firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 7. Run the test again. 8. Turn off the system and disconnect it from the power source. 9. (Trained service technician only) Replace the system board. 10. Reconnect the system to the power source and turn on the system. 11. Run the test again. 12. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-904-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the LED or CPU temperature bus.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. (Trained service technician only) Replace the system board. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

Message number	Component	Test	State	Description	Action
166-905-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the VRD bus.	**Note:** Ignore the error if the hard disk drive backplane is not installed. 1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. (Trained service technician only) Reseat the microprocessors. 9. (Trained service technician only) Reseat the VRD(s). 10. (Trained service technician only) Replace the system board. 11. Reconnect the system to the power source and turn on the system. 12. Run the test again. 13. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-906-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the VPD Power PSOC.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. (Trained service technician only) Replace the system board. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
• See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Message number	Component	Test	State	Description	Action
166-919-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the orion bus.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. (Trained service technician only) Replace the system board. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-920-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the BSE-3 bus.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. (Trained service technician only) Replace the system board. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-921-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the hot-swap daughter card/PEU-x bus.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. (Trained service technician only) Replace the system board. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&Indocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-922-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the onboard legacy daughter card.	1. Turn off the system and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the system to the power source and turn on the system. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the IMM firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 6. Run the test again. 7. Turn off the system and disconnect it from the power source. 8. (Trained service technician only) Replace the system board. 9. Reconnect the system to the power source and turn on the system. 10. Run the test again. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
201-801-xxx	Memory	Memory Test	Aborted	Test canceled: the server firmware programmed the memory controller with an invalid CBAR address	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**					
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**					
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**					

Message number	Component	Test	State	Description	Action
201-802-xxx	Memory	Memory Test	Aborted	Test canceled: the end address in the E820 function is less than 16 MB.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that all DIMMs are enabled in the Setup utility. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 5. Run the test again. 6. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.
201-803-xxx	Memory	Memory Test	Aborted	Test canceled: could not enable the processor cache.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.
201-804-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer request failed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
201-805-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller display/alter write operation was not completed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.
201-806-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller fast scrub operation was not completed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.
201-807-xxx	Memory	Memory Test	Aborted	Test canceled: the memory controller buffer free request failed.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.					
• See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).					
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.					

Message number	Component	Test	State	Description	Action
201-808-xxx	Memory	Memory Test	Aborted	Test canceled: memory controller display/alter buffer execute error.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.
201-809-xxx	Memory	Memory Test	Aborted	Test canceled program error: operation running fast scrub.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 5. Run the test again. 6. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.
201-810-xxx	Memory	Memory Test	Aborted	Test stopped: unknown error code xxx received in COMMONEXIT procedure.	1. Turn off and restart the system. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 5. Run the test again. 6. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
201-901-xxx	Memory	Memory Test	Failed	Test failure: single-bit error, failing DIMM z.	1. Turn off the system and disconnect it from the power source. 2. Reseat DIMM z. 3. Reconnect the system to power and turn on the system. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 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 228). 9. Run the test again. 10. Replace the failing DIMM. 11. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
201-902-xxx	Memory	Memory Test	Failed	Test failure: single-bit and multi-bit error, failing DIMM z	1. Turn off the system and disconnect it from the power source. 2. Reseat DIMM z. 3. Reconnect the system to power and turn on the system. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 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 228). 9. Run the test again. 10. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.
202-801-xxx	Memory	Memory Stress Test	Aborted	Internal program error.	1. Turn off and restart the system. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 4. Run the test again. 5. Turn off and restart the system if necessary to recover from a hung state. 6. Run the memory diagnostics to identify the specific failing DIMM. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
202-802-xxx	Memory	Memory Stress Test	Failed	General error: memory size is insufficient to run the test.	1. Make sure that all memory is enabled by checking the Available System Memory in the Resource Utilization section of the DSA event log. If necessary, enable all memory in the Setup utility (see "Using the Setup utility" on page 228). 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 3. Run the test again. 4. Run the standard memory test to validate all memory. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.
202-901-xxx	Memory	Memory Stress Test	Failed	Test failure.	1. Run the standard memory test to validate all memory. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 3. Turn off the system and disconnect it from power. 4. Reseat the DIMMs. 5. Reconnect the system to power and turn on the system. 6. Run the test again. 7. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

Message number	Component	Test	State	Description	Action
215-801-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	Unable to communicate with the device driver.	1. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/ docview.wss?uid=psg1SERV-DSA. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.ibm.com/support/ docview.wss?uid=psg1MIGR-41559. 6. Run the test again. 7. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 8. Run the test again. 9. Replace the CD/DVD drive. 10. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

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

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

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

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

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

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
217-900-xxx	Hard Drive	Disk Drive Self Test	Failed		1. Reseat all hard disk drive backplane connections at both ends. 2. Reseat the all drives. 3. Run the test again. 4. Make sure that the firmware is at the latest level. 5. Run the test again. 6. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.
405-901-xxx	Intel Ethernet Device	Adapter Registers	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 2. Run the test again. 3. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.
405-903-xxx	Intel Ethernet Device	Test EEPROM	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 2. Run the test again. 3. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.
405-904-xxx	Intel Ethernet Device	FIFO	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 2. Run the test again. 3. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-CALL.

Table 2. DSA Preboot messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
405-905-xxx	Intel Ethernet Device	Test Interrupt	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the diagnostic event log in the Firmware/VPD section for this component. For more information, see "Firmware updates" on page 227. 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 228) to assign a unique interrupt to the device. 4. Run the test again. 5. If the failure remains, go to the IBM Web site for more troubleshooting information at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &Indocid=SERV-CALL.

Clearing CMOS memory

To clear the CMOS memory, complete the following steps:

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. Turn off the system-board tray and all attached devices; then, disconnect the chassis power cord and external cables.
3. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124 or "Removing the system-board tray from a 3U chassis" on page 126).
4. If an expansion enclosure is installed, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).
5. Remove the battery (see "Removing the battery" on page 135).
6. Locate the Clear CMOS jumper (JP1) (see "System-board jumpers" on page 13).
7. Move the jumper from pins 1 and 2 to pins 2 and 3.
8. Wait approximately 10 seconds; then, move the jumper back to pins 1 and 2.
9. Install the battery (see "Installing the battery" on page 136).
10. Install the expansion enclosure, if you removed one (see "Installing an expansion enclosure on a system-board tray" on page 130); otherwise, install the system-board tray cover (see "Installing the system-board tray cover" on page 123).
11. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125 or "Installing the system-board tray in a 3U chassis" on page 127).
12. Reconnect the external cables and power cords; then, turn on the attached devices and turn on the system-board tray.
13. Run the Setup utility and set configuration parameters as necessary (see "Using the Setup utility" on page 228 for information).

Updating (flash-updating) the server firmware

Periodically, IBM makes new levels of server firmware available on the Web. Always check http://www.ibm.com/systems/support/ for the latest level of server firmware, device drivers, documentation, and hints and tips. You can use one of the following methods to update (flash-update) the server firmware on the system-board tray:

- Download the server firmware update file directly to the hard disk drive.
- Download the server firmware update file to an external USB device, such as a USB flash drive; then, start the system-board tray with the external USB device attached to the system-board tray to update the server firmware.
- Download the server firmware update file to a CD or DVD (you must attach an optional external USB portable CD or DVD drive to the system-board tray); then, start the system-board tray with the CD or DVD in the CD or DVD drive to update the server firmware.

One file type is available for each of these methods. The description next to each file indicates the type of medium to which you can download the file. A readme file is also available with instructions for installing the 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.

To download the UEFI (flash) update files, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x iDataPlex dx360 M3 server** to display the matrix of downloadable files.
5. Select the applicable file for your operating system and the file type for the medium that you want to use; then, download the flash UEFI update.
6. Update the server firmware and follow the instructions in the readme file that comes with the update file.

   Note: Always reset the Setup utility to the default values after you update the server firmware.

7. Restart the system-board tray.

Automatic boot failure recovery (ABR)

While the server is starting, if the integrated management module detects problems with the server firmware in the primary bank, the server automatically switches to the backup firmware bank and gives you the opportunity to recover the firmware in the primary bank. For instructions for recovering the UEFI firmware, see "Updating (flash-updating) the server firmware" on page 69. After you have recovered the firmware in the primary bank, complete the following steps:

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

Nx boot failure

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

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

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

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

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.

Integrated management module error messages

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

Table 3. Integrated management module error messages

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**			
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**			
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Message	**Severity**	**Description**	**Action**
%1 Platform Watchdog Timer expired for %2. (%1 = OS Watchdog or Loader Watchdog; %2 = OS Watchdog or Loader Watchdog)	Error	A Platform Watchdog Timer Expired event has occurred.	1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system.
A diagnostic interrupt has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	An operator information panel NMI/diagnostic interrupt has occurred.	If the NMI button on the operator information panel has not been pressed, complete the following steps: 1. Make sure that the NMI button is not pressed. 2. Replace the operator information panel cable. 3. Replace the operator information panel.

Table 3. Integrated management module error messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message	Severity	Description	Action
A software NMI has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A software NMI has occurred.	1. Check the device driver. 2. Reinstall the device driver.
A Uncorrectable Bus Error has occurred on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A bus uncorrectable error has occurred. (Sensor = Critical Int CPU)	1. Check the system-event log. 2. Check the microprocessor error LEDs. 3. Remove the failing microprocessor from the system board. 4. Check for a UEFI firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. Make sure that the two microprocessors are matching (see "Installing a microprocessor and heat sink" on page 211 for information about microprocessor requirements). 6. (Trained service technician only) Replace the system board.
An Over-Temperature Condition has been detected on the Processor CPU *n* Status. (*n* = microprocessor number)	Error	An overtemperature condition has occurred for microprocessor *n*. (*n* = microprocessor number)	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

Table 3. Integrated management module error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**			
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**			
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			

Message	**Severity**	**Description**	**Action**
An SMBIOS Uncorrectable CPU complex error for Processor CPU *n* Status has asserted. (*n* = microprocessor number)	Error	An SMBIOS uncorrectable CPU complex error has asserted.	1. Check for a UEFI firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Make sure that the installed microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 211 for information about microprocessor requirements). 3. (Trained service technician only) Reseat microprocessor *n*. 4. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
Attempting to %1 server %2 by user %3. (%1 = Power Up, Power Down, Power Cycle, or Reset; %2 = IBM_ComputerSystem. ElementName; %3 = user ID)	Info	A user has used the IMM to perform a power function on the server.	No action; information only.
Certificate Authority %1 has detected a %2 Certificate Error. (%1 = IBM_Certificate Authority.CADistinguished Name; %2 = CIM_PublicKeyCertificate. ElementName)	Error	A problem has occurred with the SSL Server, SSL Client, or SSL Trusted CA certificate that has been imported into the IMM. The imported certificate must contain a public key that corresponds to the key pair that was previously generated by the **Generate a New Key and Certificate Signing Request** link.	1. Make sure that the certificate that you are importing is correct. 2. Try importing the certificate again.
DHCP setting changed to %1 by user %2. (%1 = DHCP addressing mode, %2 = user ID)	Info	A user has changed the DHCP mode.	No action; information only.

Table 3. Integrated management module error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

Message	Severity	Description	Action
DHCP[%1] failure, no IP address assigned. (%1 = IP address, *xxx.xxx.xxx.xxx*)	Info	A DHCP server has failed to assign an IP address to the IMM.	1. Make sure that the network cable is connected. 2. Make sure that there is a DHCP server on the network that can assign an IP address to the IMM.
ENET[0] DHCP-HSTN=%1, DN=%2, IP@=%3, SN=%4, GW@=%5, DNS1@=%6. (%1 = CIM_DNSProtocolEndpoint. Hostname; %2 = CIM_DNSProtocolEndpoint. DomainName; %3 = CIM_IPProtocolEndpoint IPv4Address; %4 = CIM_IPProtocolEndpoint. SubnetMask; %5 = IP address, *xxx.xxx.xxx.xxx*; %6 = IP address, *xxx.xxx.xxx.xxx*)	Info	The DHCP server has assigned an IMM IP address and configuration.	No action; information only.
ENET[0] IP-Cfg:HstName=%1, IP@%2, NetMsk=%3, GW@=%4. (%1 = CIM_DNSProtocolEndpoint. Hostname; %2 = CIM_StaticIPSettingData. IPv4Address; %3 = CIM_StaticIPSettingData. SubnetMask; %4 = CIM_StaticIPSettingData. DefaultGatewayAddress)	Info	An IMM IP address and configuration have been assigned using client data.	No action; information only.
Ethernet Data Rate modified from %1 to %2 by user %3. (%1 = CIM_Ethernet Port.Speed; %2 = CIM_EthernetPort.Speed; %3 = user ID)	Info	A user has modified the Ethernet port data rate.	No action; information only.

Table 3. Integrated management module error messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message	Severity	Description	Action
Ethernet Duplex setting modified from %1 to %2 by user %3. (%1 = CIM_ EthernetPort.FullDuplex; %2 = CIM_ EthernetPort.FullDuplex; %3 = user ID)	Info	A user has modified the Ethernet port duplex setting.	No action; information only.
Ethernet Duplex setting modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort.Network Addresses; %2 = CIM_EthernetPort.Network Addresses; %3 = user ID)	Info	A user has modified the Ethernet port MAC address setting.	No action; information only.
Ethernet interface %1 by user %2. (%1 = CIM_EthernetPort.Enabled State; %2 = user ID)	Info	A user has enabled the Ethernet interface.	No action; information only.
Ethernet locally administered MAC address modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort.Network Addresses; %2 = CIM_EthernetPort.Network Addresses; %3 = user ID)	Info	A user has modified the locally administered Ethernet port MAC address setting.	No action; information only.
Ethernet MTU setting modified from %1 to %2 by user %3. (%1 = CIM_EthernetPort.Active MaximumTransmissionUnit; %2 = CIM_EthernetPort.Active MaximumTransmissionUnit; %3 = user ID)	Info	A user has modified the Ethernet port MTU setting.	No action; information only.

Table 3. Integrated management module error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

Message	Severity	Description	Action

Failure Predicted on drive n for array %1. (n = hard disk drive number, %1 = CIM_ComputerSystem. ElementName)	Warning	Predicted failure on a drive.	1. Run the hard disk drive diagnostic test on drive *n*.
			 2. Reseat the following components:
			   a. Hard disk drive
			   b. Cable from the system board to the backplane
			 3. Replace the following components one at a time, in the order shown, restarting the server each time:
			   a. Hard disk drive
			   b. Cable from the system board to the backplane
			   c. Hard disk drive backplane

Fault in slot System board on system %1. (%1 = CIM_ComputerSystem. ElementName)	Error	A PCI slot error has occurred.	1. Check the riser-card LEDs. 2. Reseat the affected adapters and riser card. 3. Update the server and adapter firmware (UEFI and IMM). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove both adapters. 5. Replace the PCIe adapter. 6. Replace the riser card. 7. (Trained service technician only) Replace the system board.
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 3. Integrated management module error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

Message	Severity	Description	Action
Flash of %1 from %2 succeeded for user %3. (%1 = CIM_ManagedElement. Element Name; %2 = Web or LegacyCLI; %3 = user ID)	Info	A user has successfully updated one of the following firmware components: • IMM main application • IMM boot ROM • UEFI firmware • Diagnostics • System power backplane • Remote expansion enclosure power backplane • Integrated service processor • Remote expansion enclosure processor	No action; information only.
Hostname set to %1 by user %2. (%1 = CIM_DNSProtocolEndpoint. Hostname; %2 = user ID)	Info	A user has modified the host name of the IMM.	No action; information only.
IMM clock has been set from NTP server %1. (%1 = IBM_NTPService.Element Name)	Info	The IMM clock has been set to the date and time that is provided by the Network Time Protocol server.	No action; information only.
IMM: Configuration %1 restored from a configuration file by user %2. (%1 = CIM_ConfigurationData. ConfigurationName; %2 = user ID)	Info	A user has restored the IMM configuration by importing a configuration file.	No action; information only.
IMM Network Initialization Complete.	Info	An IMM network has completed initialization.	No action; information only.
IMM reset was caused by restoring default values.	Info	The IMM has been reset because a user has restored the configuration to its default settings.	No action; information only.
IMM reset was initiated by user %1. (%1 = user ID)	Info	A user has initiated a reset of the IMM.	No action; information only.
IMM Test Alert Generated by %1. (%1 = user ID)	Info	A user has generated a test alert from the IMM.	No action; information only.

Table 3. Integrated management module error messages (continued)

| • Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. |
| • See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). |
| • If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician. |

Message	Severity	Description	Action
IP address of default gateway modified from %1 to %2 by user %3. (%1 = CIM_IPProtocolEndpoint. GatewayIPv4Address; %2 = CIM_StaticIPAssignment SettingData.Default GatewayAddress; %3 = user ID)	Info	A user has modified the default gateway IP address of the IMM.	No action; information only.
IP address of network interface modified from %1 to %2 by user %3. (%1 = CIM_IPProtocolEndpoint. IPv4Address; %2 = CIM_StaticIPAssignment SettingData.IPAddress; %3 = user ID)	Info	A user has modified the IP address of the IMM.	No action; information only.
IP subnet mask of network interface modified from %1 to %2 by user %3. (%1 = CIM_IPProtocolEndpoint. SubnetMask; %2 = CIM_StaticIPAssignment SettingData.SubnetMask; %3 = user ID)	Info	A user has modified the IP subnet mask of the IMM.	No action; information only.
LAN: Ethernet[0] interface is no longer active.	Info	The IMM Ethernet interface has been disabled.	No action; information only.
LAN: Ethernet[0] interface is now active.	Info	The IMM Ethernet interface has been enabled.	No action; information only.
Memory DIMM Configuration Error for All DIMMs on Memory Subsystem All DIMMs.	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology (see "Installing a memory module" on page 173).
Memory DIMM Configuration Error for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology (see "Installing a memory module" on page 173).
Memory DIMM Configuration Error for One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology (see "Installing a memory module" on page 173).

Table 3. Integrated management module error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

Message	Severity	Description	Action
Memory Logging Limit Reached for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	The memory logging limit has been reached.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 173). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 207 and "Installing a microprocessor and heat sink" on page 211).

Table 3. Integrated management module error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

Message	Severity	Description	Action
Memory Logging Limit Reached for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Error	The memory logging limit has been reached.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 173 for memory population). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 207 and "Installing a microprocessor and heat sink" on page 211).

Table 3. Integrated management module error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

Message	Severity	Description	Action
Memory Logging Limit Reached for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	The memory logging limit has been reached.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 173 for memory population). 3. If the error still occurs on the same DIMM, replace the affected DIMM. 4. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224). 5. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224). 6. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 207 and "Installing a microprocessor and heat sink" on page 211).

Table 3. Integrated management module error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

Message	Severity	Description	Action
Memory uncorrectable error detected for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	A memory uncorrectable error has occurred.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 173). 4. If the problem follows the DIMM, replace the failing DIMM (see "Removing a memory module" on page 172 and "Installing a memory module" on page 173). (Continued on the next page)

Table 3. Integrated management module error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**			
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**			
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Message	**Severity**	**Description**	**Action**
Memory uncorrectable error detected for DIMM All DIMMs on Memory Subsystem All DIMMs.	Error	A memory uncorrectable error has occurred.	5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224).
			6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224).
			7. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 207 and "Installing a microprocessor and heat sink" on page 211).

Table 3. Integrated management module error messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message	Severity	Description	Action
Memory uncorrectable error detected for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Error	A memory uncorrectable error has occurred.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 173 for memory population). 4. If the problem follows the DIMM, replace the failing DIMM (see "Removing a memory module" on page 172 and "Installing a memory module" on page 173). (Continued on the next page)

Table 3. Integrated management module error messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message	Severity	Description	Action
Memory uncorrectable error detected for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Error	A memory uncorrectable error has occurred.	5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224). 6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224). 7. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 207 and "Installing a microprocessor and heat sink" on page 211).

Table 3. Integrated management module error messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message	Severity	Description	Action
Memory uncorrectable error detected for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A memory uncorrectable error has occurred.	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Manually re-enable all affected DIMMs if the server firmware version is older than UEFI v1.10. If the server firmware version is UEFI v1.10 or newer, disconnect and reconnect the server to the power source and restart the server. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a memory module" on page 173 for memory population). 4. If the problem follows the DIMM, replace the failing DIMM (see "Removing a memory module" on page 172 and "Installing a memory module" on page 173). (Continued on the next page)

Table 3. Integrated management module error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

Message	Severity	Description	Action
Memory uncorrectable error detected for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Error	A memory uncorrectable error has occurred.	5. (Trained service technician only) If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector contains any foreign material or is damaged, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224). 6. (Trained service technician only) Remove the affected microprocessor and check the microprocessor socket pins for any damaged pins. If a damage is found, replace the system-board tray (see "Removing the system-board tray" on page 222 and "Installing the system-board tray" on page 224). 7. (Trained Service technician only) Replace the affected microprocessor (see "Removing a microprocessor and heat sink" on page 207 and "Installing a microprocessor and heat sink" on page 211).

Table 3. Integrated management module error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**			
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**			
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			

Message	Severity	Description	Action
Memory uncorrectable error detected for DIMM All DIMMs on Memory Subsystem All DIMMs.	Info	DIMM disabled	1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 173). 2. If the DIMM was disabled because of a memory fault (memory uncorrectable error or memory logging limit reached), follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).
Memory uncorrectable error detected for DIMM *n* Status on Memory Subsystem DIMM *n* Status. (*n* = DIMM number)	Info	DIMM disabled	1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 173). 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 3. Integrated management module error messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message	Severity	Description	Action
Memory uncorrectable error detected for DIMM One of the DIMMs on Memory Subsystem One of the DIMMs.	Info	DIMM disabled	1. Make sure the DIMM is installed correctly (see "Installing a memory module" on page 173 for memory population). 2. If the DIMM was disabled because of a memory fault (memory uncorrectable error or memory logging limit reached), follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).
Numeric sensor Domain A FP Temp going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	Make sure that the room temperature is within the recommended range (see "Features and specifications" on page 7).
Numeric sensor Domain A Temp1 going high (upper non-critical) has asserted.	Warning	An upper non-critical sensor going high has asserted.	Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed.
Numeric sensor Domain A Temp2 going high (upper non-critical) has asserted.	Warning	An upper non-critical sensor going high has asserted.	Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed.
Numeric sensor Domain B FP Temp going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	Make sure that the room temperature is within the recommended range (see "Features and specifications" on page 7).
Numeric sensor Domain B Temp1 going high (upper non-critical) has asserted.	Warning	An upper non-critical sensor going high has asserted.	Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed.

Table 3. Integrated management module error messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message	Severity	Description	Action
Numeric sensor Domain B Temp2 going high (upper non-critical) has asserted.	Warning	An upper non-critical sensor going high has asserted.	Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed.
Numeric sensor Fan *n* Tach going low (lower critical) has asserted. (*n* = fan number)	Error	A lower critical sensor going low has asserted.	1. Turn off the server and disconnect it from power. 2. Reseat the failing fan assembly. 3. Replace the failing fan assembly.
Numeric sensor Planar 12V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 12V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 3.3V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 3.3V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 5V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar 5V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained service technician only) Replace the system board.
Numeric sensor Planar VBAT going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	Replace the 3V battery.
Numeric sensor Planar VBAT going low (lower non-critical) has asserted.	Warning	A lower non-critical sensor going low has asserted.	Replace the 3V battery.
OS Watchdog response %1 by %2. (%1 = Enabled or Disabled; %2 = user ID)	Info	A user has enabled or disabled an OS Watchdog.	No action; information only.

Table 3. Integrated management module error messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message	Severity	Description	Action
Please ensure that the IMM is flashed with the correct firmware. The IMM is unable to match its firmware to the server.	Error	The server does not support the installed IMM firmware version.	Update the IMM firmware to a version that the server supports. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
Redundancy Bckup Mem Status has been reduced.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Check the system-event log for DIMM failure events (uncorrectable or PFA) and correct the failures. 2. Re-enable mirroring in the Setup utility.
Remote access attempt failed. Invalid userid or password received. Userid is '%1' from TELNET client at IP address %2. (%1 = user ID; %2 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has attempted to log in from a Telnet session by using an invalid login ID or password.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
Remote access attempt failed. Invalid userid or password received. Userid is '%1' from WEB browser at IP address %2. (%1 = user ID; %2 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has attempted to log in from a Web browser by using an invalid login ID or password.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
Remote Login Successful. Login ID: %1 from %2 at IP address %3. (%1 = user ID; %2 = ValueMap(CIM_Protocol Endpoint.ProtocolIFType; %3 = IP address, *xxx.xxx.xxx.xxx*)	Info	A user has successfully logged in to the IMM.	No action; information only.
Running the backup IMM main application.	Error	The IMM has resorted to running the backup main application.	Update the IMM firmware. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

Table 3. Integrated management module error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

Message	Severity	Description	Action
Security: Login ID: '%1' had %2 login failures from CLI at %3. (%1 = user ID; %2 = MaximumSuccessiveLogin Failures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from the command-line interface and has been prevented from logging in for the lockout period.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
Security: Userid: '%1' had %2 login failures from WEB client at IP address %3. (%1 = user ID; %2 = MaximumSuccessiveLogin Failures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from a Web browser and has been prevented from logging in for the lockout period.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
Sensor CPU *n* OverTemp has transitioned to critical from a non-recoverable state. (*n* = microprocessor number)	Error	A sensor has changed to Critical state from Nonrecoverable state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
Sensor CPU *n* OverTemp has transitioned to critical from a less severe state. (*n* = microprocessor number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

Table 3. Integrated management module error messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message	Severity	Description	Action
Sensor CPU *n* OverTemp has transitioned to non-recoverable. (*n* = microprocessor number)	Error	A sensor has changed to Nonrecoverable state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
Sensor CPU *n* OverTemp has transitioned to non-recoverable from a less severe state. (*n* = microprocessor number)	Error	A sensor has changed to Nonrecoverable state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
Sensor DIMM *n* Temp has transitioned to critical from a less severe state. (*n* = DIMM number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. If a fan has failed, complete the action for a fan failure. 3. Replace DIMM *n*. (*n* = DIMM number)
Sensor Fan *n* Fault has transitioned to critical from a less severe state. (*n* = fan number)	Error	A sensor has changed to Critical state from a less severe state.	1. Turn off the server and disconnect it from power. 2. Reseat the failing fan assembly. 3. Replace the failing fan assembly.

Table 3. Integrated management module error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**			
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**			
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**			
Message	**Severity**	**Description**	**Action**
SSL data in the IMM configuration data is invalid. Clearing configuration data region and disabling SSL+H25.	Error	There is a problem with the certificate that has been imported into the IMM. The imported certificate must contain a public key that corresponds to the key pair that was previously generated through the **Generate a New Key and Certificate Signing Request** link.	1. Make sure that the certificate that you are importing is correct. 2. Try to import the certificate again.
The Chassis Event Log (CEL) on system %1 cleared by user %2. (%1 = CIM_ComputerSystem. ElementName; %2 = user ID)	Info	A user has cleared the IMM event log.	No action; information only.
The Chassis Event Log (CEL) on system %1 is 100% full. (%1 = CIM_ComputerSystem. ElementName)	Info	The IMM event log is full. When the log is full, older log entries are replaced by newer ones.	To avoid losing older log entries, save the log as a text file and clear the log.
The Chassis Event Log (CEL) on system %1 is 75% full. (%1 = CIM_ComputerSystem. ElementName)	Info	The IMM event log is 75% full. When the log is full, older log entries are replaced by newer ones.	To avoid losing older log entries, save the log as a text file and clear the log.

The Drive *n* Status has been disabled due to a detected fault.
(*n* = hard disk drive number)
	Error	A drive has been disabled because of a fault.	1. Run the hard disk drive diagnostic test on drive *n*.
			2. Reseat the following components:
			   a. Hard disk drive
			   b. Cable from the system board to the backplane
			3. Replace the following components one at a time, in the order shown, restarting the server each time:
			   a. Hard disk drive
			   b. Cable from the system board to the backplane
			   c. Hard disk drive backplane
			(*n* = hard disk drive number)

The Drive *n* Status has been removed from unit Drive 0 Status. (*n* = hard disk drive number)	Error	A drive has been removed.	Reseat hard disk drive *n*. (*n* = hard disk drive number).

Table 3. Integrated management module error messages (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**	
• **See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

Message	Severity	Description	Action
The Power Supply %1 has Failed. (%1 = CIM_PowerSupply. ElementName)	Error		(Trained service technician only) Replace the system board.
The Processor CPU *n* Status has a Configuration Mismatch. (*n* = microprocessor number)	Error	A processor configuration mismatch has occurred.	1. Make sure that the installed microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 211 for information about microprocessor requirements). 2. (Trained service technician only) Replace the incompatible microprocessor.
The Processor CPU *n* Status has Failed with FRB1/BIST condition. (*n* = microprocessor number)	Error	A processor failed - FRB1/BIST condition has occurred.	1. Check for a UEFI firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Make sure that the installed microprocessors are compatible with each other (see "Installing a microprocessor and heat sink" on page 211 for information about microprocessor requirements). 3. (Trained service technician only) Reseat microprocessor *n*. 4. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

Table 3. Integrated management module error messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message	Severity	Description	Action
The Processor CPU *n* Status has Failed with IERR. (*n* = microprocessor number)	Error	A processor failed - IERR condition has occurred.	1. Make sure that the latest levels of firmware and device drivers are installed for all adapters and standard devices, such as Ethernet, SCSI, and SAS. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Run the DSA program for the hard disk drives and other I/O devices. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
The System %1 encountered a POST Error. (%1 = CIM_ComputerSystem. ElementName)	Error	A POST error has occurred. (Sensor = Firmware Error)	1. Update the UEFI firmware on the primary page. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. (Trained service technician only) Replace the system board.
The System %1 encountered a POST Error. (%1 = CIM_ComputerSystem. ElementName)	Error	A POST error has occurred. (Sensor = ABR Status)	1. Recover the UEFI firmware from the backup page: a. Restart the server. b. At the prompt, press F3 to recover the firmware. 2. Update the UEFI firmware to the latest level. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

Table 3. Integrated management module error messages (continued)

•	**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
•	**See Chapter 4, "Parts listing," on page 101 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
•	**If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message	Severity	Description	Action
Watchdog %1 Failed to Capture Screen. (%1 = OS Watchdog or Loader Watchdog)	Error	An operating-system error has occurred, and the screen capture failed.	1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system. 6. Update the IMM firmware. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
Watchdog %1 Screen Capture Occurred. (%1 = OS Watchdog or Loader Watchdog)	Error	An operating-system error has occurred, and the screen capture was successful.	1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system.

Solving SAS hard disk drive problems

For any SAS error message, one or more of the following devices might be causing the problem:

- A failing SAS controller or drive
- An incorrectly installed cable
- A defective cable
- SAS backplane

For any SAS error message, follow these suggested actions in the order in which they are listed until the problem is solved:

1. Make sure that external SAS devices are turned on before you turn on the server.
2. Make sure that the cables for all external SAS devices are connected correctly.
3. Make sure that the SAS devices are configured correctly.

Solving Ethernet controller problems

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

Try the following procedures:

- Make sure that the correct device drivers are installed and that they are at the latest level.
- Make sure that the Ethernet cable is installed correctly.
  - The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.
  - If you set the Ethernet controller to operate at 100 Mbps, you must use Category 5 cabling.
  - If you directly connect two system-board trays (without a hub), or if you are not using a hub with X ports, use a crossover cable. To determine whether a hub has an X port, check the port label. If the label contains an X, the hub has an X port.
- Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller LEDs on the system-board tray operator panel. 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 LAN activity LEDs on the system-board tray operator panel. The LAN activity LEDs are lit when data is active on the Ethernet network. If the LAN activity LEDs are 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 system-board tray 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 40.

Damaged data in CMOS memory or damaged server firmware can cause undetermined problems. To reset the CMOS memory, use the clear CMOS jumper to override the power-on password and clear the CMOS memory; see "System-board jumpers" on page 13 and "Clearing CMOS memory" on page 69 for further information. If you suspect that the server firmware is damaged, see "Updating (flash-updating) the server firmware" on page 69 and"Starting the backup server firmware" on page 233 for further information.

Make sure that the power supply is working correctly. If the power supply is working correctly and reseating the system-board tray in the chassis does not correct the problem, complete the following steps:
1. Turn off the system-board tray.
2. Remove the system-board tray from the chassis.
3. If an expansion enclosure is installed, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).
4. Remove or disconnect the following devices, one at a time, until you find the failure. Reinstall, turn on, and reconfigure the system-board tray each time.
   • Any external devices.
   • Each adapter.
   • Each hard disk drive.
   • Memory modules. The minimum configuration requirement is one 1 GB DIMM in connector 3 (see "System-board connectors" on page 12 for the location of the DIMM connectors).

   The following minimum configuration is required for the system-board tray to start:
   • One chassis
   • One microprocessor installed in microprocessor connector 1 (see "System-board connectors" on page 12 for the location of the microprocessor connectors)
   • One DIMM in DIMM connector 3 (see "System-board connectors" on page 12 for the location of the DIMM connectors)
   • One system-board tray
   • One power supply
   • One fan assembly
5. Install and turn on the system-board tray. If the problem remains, suspect the following components in the following order:
   a. DIMM
   b. System-board tray
   c. Microprocessor

If the problem is solved when you remove an adapter 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 system-board tray.

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

Problem determination tips

Because of the variety of hardware and software combinations that you can encounter, have as much of the following information available as possible when you request assistance from IBM:

- Machine type and model
- Microprocessor and hard disk drive upgrades
- Failure symptoms
  - Does the system-board tray fail the diagnostic programs? If so, what are the error codes?
  - What occurs? When? Where?
  - Does the failure occur on a single system-board tray or on multiple trays?
  - Is the failure repeatable?
  - Has the current configuration ever worked?
  - What changes, if any, were made before it failed?
  - Is this the original reported failure, or has this failure been reported before?
- Diagnostic program type and version level
- Hardware configuration (print screen of the system summary)
- Server firmware level
- Operating-system type and version level

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

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

See Appendix A, "Getting help and technical assistance," on page 249 for information about calling IBM for service.

Chapter 4. Parts listing

This section lists the replaceable components that are available for the dx360 M3 system-board tray, the 2U chassis, the 3U chassis, the storage enclosure, and the I/O enclosure.

Replaceable components are of three types:

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

For an updated parts listing on the Web, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Parts documents lookup**.
4. From the **Product family** menu, select **System x iDataPlex dx360 M3 server** and click **Continue**.

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

dx360 M3 Type 6391 system-board tray components

The following replaceable components are available for the dx360 M3 6391 system-board tray.
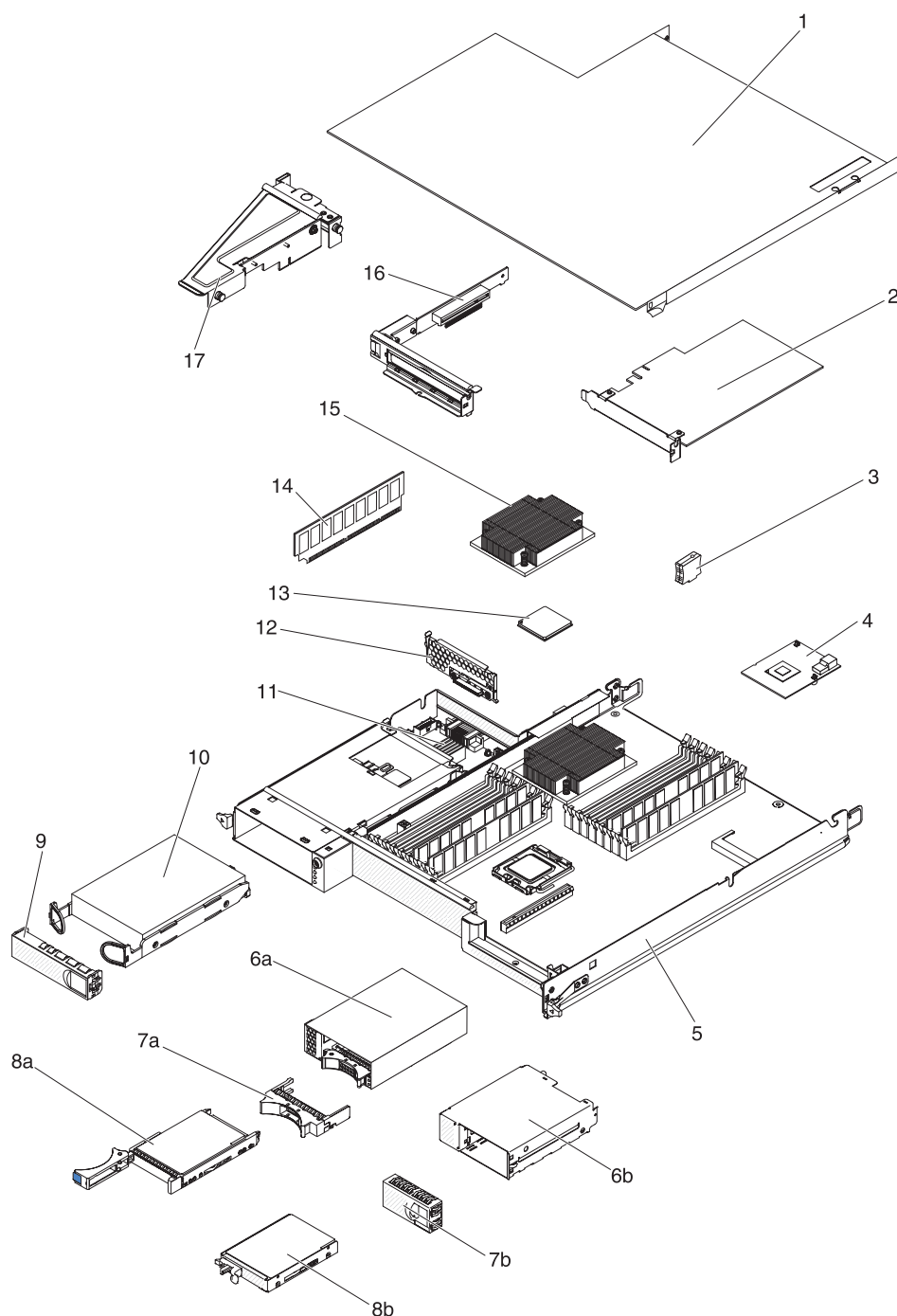
Table 4. CRUs and FRUs, Type 6391

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	System-board tray cover		46D1291	
2	IBM 160 GB High IOPS SS Class SSD PCIe Adapter		46M0886	

Table 4. CRUs and FRUs, Type 6391 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
2	Qlogic single-port Fibre Channel PCIe adapter		00Y5626	
2	Qlogic double-port Fibre Channel PCIe adapter		00Y5627	
2	Qlogic single-port iSCSI host bus PCIe adapter		39Y6148	
2	Qlogic double-port iSCSI host bus adapter		42C1772	
2	Qlogic single-port Fibre Channel 8 Gb host bus adapter		00Y5628	
2	Qlogic dual-port Fibre Channel 8 Gb host bus adapter		00Y5629	
2	Emulex single-port Fibre Channel 8 Gb host bus adapter		42D0491	
2	Emulex dual-port Fibre Channel 8 Gb host bus adapter		42D0500	
2	Brocade single-port Fibre Channel 8 Gb host bus adapter		46M6061	
2	Brocade dual-port Fibre Channel 8 Gb host bus adapter		46M6062	
2	6 Gb SSD host bus adapter		46M0913	
2	10 Gb fabric adapter		49Y4252	
2	ServeRAID-MR10i adapter		43W4297	
2	Single-port Fibre Channel 4 GB host bus adapter		43W7510	
2	Double-port Fibre Channel 4 GB host bus adapter		43W7512	
2	SAS host bus adapter		44E8690	
2	B2 6 Gb SAS host bus adapter		68Y7354	
2	ServeRAID-M5014 SAS/SATA adapter		46M0918	
2	NetExtreme II 1000 Express ethernet adapter		39Y6070	
2	NetExtreme II 1000 Express dual-port ethernet adapter		49Y7947	
2	NetExtreme II 1000 Express quad-port ethernet adapter		49Y7949	
2	Intel Pro/1000 PT Dual Port Server Adapter		39Y6128	
2	Intel Pro/1000 PT Quad Port Server Adapter		39Y6138	
2	Intel Pro/1000 PF Server Adapter		42C1752	
2	nVIDIA Quadro FX 3800		43V5894	
2	ServeRAID-M1060 SAS/SATA adapter		43V5909	
2	nVIDIA Quadro 4000 PCI Express x16		43V5913	
2	nVIDIA Quadro 5000 PCI Express x16		43V5917	
2	nVIDIA Tesla M2050 SAS/SATA adapter		43V5925	
2	nVIDIA Tesla M2070		43V5935	
2	nVIDIA Tesla M2070Q		43V5943	
2	nVIDIA Tesla M1060		43V5909	
2	AMD Firestream 9370 PCI Express x16		90Y2302	
2	nVIDIA Tesla M2090 PCI Express x16		90Y2310	
2	nVIDIA Tesla M2075 PCI Express x16		90Y2314	
3	Virtual media key		46C7532	
4	Mini-SAS RAID controller		43V7415	
5	System-board tray (includes 900 watt dual AC input power supply)			81Y6005

Table 4. CRUs and FRUs, Type 6391 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
6a	2.5–inch SAS/SATA drive cage with backplane		44W4800	
6b	2.5–inch simple swap hard disk drive cage		69Y0972	
7a	2.5–inch hot-swap drive filler panel	26K8680		
7b	2.5-inch Gen 2 drive filler panel	49Y4560		
8	Hard disk drive, 3.5-inch 146 GB simple-swap SAS (15000 RPM)	39R7362		
8	Hard disk drive, 3.5-inch 300 GB simple-swap SAS	43X0817		
8	Hard disk drive, 3.5-inch 450 GB simple-swap SAS	42D0524		
8	Hard disk drive, 3.5-inch 146 GB hot-swap SAS	39R7350		
8	Hard disk drive, 3.5-inch 2 TB hot-swap SATA (7200 RPM)	42D0783		
8	Hard disk drive, 3.5-inch 450 GB hot-swap SAS	46M7030		
8	Hard disk drive, 3.5-inch 300 GB hot-swap SAS	43X0805		
8	Hard disk drive, 2.5-inch 73 GB hot-swap SAS (15000 RPM)	43X0839		
8	Hard disk drive, 2.5-inch 300 GB SFF hot-swap SAS (10000 RPM)	42D0613		
8	Hard disk drive, 2.5-inch 146 GB SFF hot-swap SAS (15000 RPM)	42D0653		
8	Hard disk drive, 2.5-inch 500 GB SFF hot-swap SAS (7200 RPM)	42D0693		
8	Hard disk drive, 300 GB 5K 6 GB hot-swap SAS	44W2235		
8	Hard disk drive, 450 GB 15K 6 GB hot-swap SAS	44W2240		
8	Hard disk drive, 600 GB 15K 6GB hot-swap SAS	44W2245		
8	Hard disk drive, 300 GB SFF 10K SAS	49Y1992		
8	Hard disk drive, 146 GB 15K HS SAS	49Y1997		
8	Hard disk drive, 600 GB 10K SS SAS HDD	49Y2028		
8b	Hard disk drive, 2.5-inch 146 GB simple-swap SAS (10000 RPM)	43X0825		
8b	Hard disk drive, 2.5-inch 300 GB simple-swap SATA (10000 RPM)	43W7681		
9	3.5-inch drive filler panel	44W4802		
10	Hard disk drive, 3.5-inch 250 GB simple-swap SATA	39M4511		
10	Hard disk drive, 3.5-inch 500 GB simple-swap SATA	39M4517		
10	Hard disk drive, 3.5-inch 2 TB simple-swap SATA (7200 RPM)	42D0788		
10	Hard disk drive, 3.5-inch 750 GB simple-swap SATA	43W7575		
10	Hard disk drive, 3.5-inch 1 TB simple-swap SATA	43W7625		
10	Hard disk drive, 3.5-inch 250 GB hot-swap SATA	40K6889		
10	Hard disk drive, 3.5-inch 500 GB hot-swap SATA	39M4533		
10	Hard disk drive, 3.5-inch 750 GB hot-swap SATA	43W7579		
10	Hard disk drive, 3.5-inch 1 TB hot-swap SATA	43W7629		
10	Hard disk drive, 2.5-inch 160 GB simple-swap SATA (7200 RPM)	43W7674		
10	Hard disk drive, 31.4 GB simple-swap SATA	43W7684		
10	Hard disk drive, 2.5-inch 500 GB simple-swap SATA (7200 RPM)	43W7689		
10	Hard disk drive, 2.5-inch 50 GB simple-swap solid-state drive	43W7733		
11	Power-supply paddle card domain A			43X3346

Table 4. CRUs and FRUs, Type 6391 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
11	DC-DC paddle card with cable			43X3310
12	One-bay hard disk drive bracket and cable assembly, SATA 1x		49Y4409	
13	Microprocessor, Quad-Core Intel Xeon X5570 2.93 GHz (8 MB cache) 95 W			46D1262
13	Microprocessor, Quad-Core Intel Xeon X5560 2.80 GHz (8 MB cache) 95 W			46D1263
13	Microprocessor, Quad-Core Intel Xeon X5550 2.66 GHz (8 MB cache) 95 W			46D1264
13	Microprocessor, Quad-Core Intel Xeon E5540 2.53 GHz (8 MB cache) 80 W			46D1265
13	Microprocessor, Quad-Core Intel Xeon E5530 2.40 GHz (8 MB cache) 80 W			46D1266
13	Microprocessor, Quad-Core Intel Xeon E5520 2.26 GHz (8 MB cache) 80 W			46D1267
13	Microprocessor, Quad-Core Intel Xeon L5506 2.13 GHz (4 MB cache) 60 W			46D1268
13	Microprocessor, Quad-Core Intel Xeon L5520 2.26 GHz (8 MB cache) 60 W			46D1269
13	Microprocessor, Quad-Core Intel Xeon E5506 2.13 GHz (4 MB cache) 80 W			46D1270
13	Microprocessor, Quad-Core Intel Xeon E5504 2.00 GHz (4 MB cache) 80 W			46D1271
13	Microprocessor, Quad-Core Intel Xeon E5502 1.86 GHz (4 MB cache) 80 W			46D1272
13	Microprocessor, Quad-Core Intel Xeon L5530 2.40 GHz (8 MB cache) 60 W			49Y6807
13	Microprocessor, Hex-Core Intel Xeon X5670 2.93 GHz (12 MB cache) 95 W			49Y7038
13	Microprocessor, Hex-Core Intel Xeon X5660 2.80 GHz (12 MB cache) 95 W			49Y7039
13	Microprocessor, Hex-Core Intel Xeon X5650 2.66 GHz (12 MB cache) 95 W			49Y7040
13	Microprocessor, Quad-Core Intel Xeon X5667 3.06 GHz (12 MB cache) 95 W			49Y7050
13	Microprocessor, Quad-Core Intel Xeon E5640 2.66 GHz (12 MB cache) 80 W			49Y7051
13	Microprocessor, Quad-Core Intel Xeon E5630 2.53 GHz (12 MB cache) 80 W			49Y7052
13	Microprocessor, Quad-Core Intel Xeon E5620 2.40 GHz (12 MB cache) 80 W			49Y7053
13	Microprocessor, Hex-Core Intel Xeon L5640 2.26 GHz (12 MB cache) 60 W			49Y7054
13	Microprocessor, Quad-Core Intel Xeon L5630 2.00 GHz (12 MB cache) 45 W			59Y3691

Table 4. CRUs and FRUs, Type 6391 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
13	Microprocessor, Quad-Core Intel Xeon E5503 2.00 GHz (4 MB cache) 80 W			69Y0781
13	Microprocessor, Quad-Core Intel Xeon E5507 2.26 GHz (4 MB cache) 80 W			69Y0782
13	Microprocessor, Quad-Core Intel Xeon L5609 1.86 GHz (12 MB cache) 40 W			69Y0783
13	Microprocessor, Hex-Core Intel Xeon E5645 2.4 GHz (12 MB cache) 80 W			69Y4714
13	Microprocessor, Quad-Core Intel Xeon E5603 1.6 GHz (4 MB cache) 80 W			81Y5952
13	Microprocessor, Quad-Core Intel Xeon E5606 2.13 GHz (8 MB cache) 80 W			81Y5953
13	Microprocessor, Quad-Core Intel Xeon E5607 2.26 GHz (8 MB cache) 80 W			81Y5954
13	Microprocessor, Hex-Core Intel Xeon E5649 2.53 GHz (12 MB cache) 80 W			81Y5955
13	Microprocessor, Quad-Core Intel Xeon X5672 3.20 GHz (8 MB cache) 95 W			81Y5957
13	Microprocessor, Hex-Core Intel Xeon X5675 3.06 GHz (12 MB cache) 95 W			81Y5958
14	Memory, IBM flash 200 Gb		00FE001	
14	Memory, IBM flash 400 Gb		00FE006	
14	Memory, 1 GB (1Gb, 1Rx8) DDR3-1333 1.5V LP RDIMM		49Y1442	
14	Memory, 2 GB (1Gb, 2Rx8) DDR3-1333 1.5V LP RDIMM		49Y1443	
14	Memory, 2 GB (1Gb, 1Rx4) DDR3-1333 1.5V LP RDIMM		49Y1444	
14	Memory, 4 GB (1Gb, 2Rx4) DDR3-1333 1.5V LP RDIMM		49Y1445	
14	Memory, 8 GB (2Gb, 2Rx4) DDR3-1333 1.5V LP RDIMM		49Y1446	
14	Memory, 2 GB (1 Gb 2Rx8) RDIMM		49Y1410	
14	Memory, 2 GB (1 Gb 1Rx4) RDIMM		49Y1411	
14	Memory, 4 GB (1Gb 2Rx8 1.35V) ECC RDIMM		49Y1412	
14	Memory, 2 GB (2Gb 1Rx8) RDIMM		49Y1423	
14	Memory, 4 GB (2Gb 1Rx4) RDIMM		49Y1424	
14	Memory, 4 GB (2Gb 2Rx8) RDIMM		49Y1425	
14	Memory, 8 GB 4Rx8 2GBit RDIMM		46C7488	
14	Memory, 8 GB (2Gb, 2Rx4) 10600R-999 RDIMM		49Y1415	
14	Memory, 8 GB (2Gb, 2Rx4) 8500R-777 RDIMM		49Y1416	
14	Memory, 16 GB (2Gb, 4Rx4) DDR3-1333 LP RDIMM		49Y1418	
15	Heat sink			46D1295
16	One-slot PCIe riser-card assembly (1 x 8)		69Y4640	
17	1U PCI riser-card assembly (1 x 8)		69Y0950	
	2.5-inch Gen 2 simple-swap SATA drive cage with backplate		46D1432	

Table 4. CRUs and FRUs, Type 6391 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	2.5-inch Gen 2 simple-swap SAS drive cage with backplate		49Y6792	
	Microprocessor filler	46D1375		
	Thermal grease		41Y9292	
	Front-panel assembly			46D1344
	Battery, 3.0 V	33F8354		
	Battery carrier, ServeRAID M5000 series		44E8844	
	1 PM SATA 1x cable		44T0647	
	4 PM SATA 4 1x cable		44T0672	
	4 PM SATA to 4x cable		44T0674	
	4 PM SAS to 4x cable		44T0675	
	1 PM SAS to 4x cable		44T0679	
	2 PM SAS to 4x cable		44T0680	
	Power Graphics 8P-6P cable		49Y4402	
	2 1 PM SAS to 4 x cable assembly		49Y6793	
	Mini SAS - 580 cable		44T0681	
	Hard disk drive 4-pin 2-drop power cable		46D1372	
	Thermal 2 drop cable		46D1439	
	Hard disk drive 4-pin 1-drop power cable		44W4820	
	Hard disk drive 16-pin 2-drop power cable		44W4821	
	Hard disk drive 16-pin 4-drop power cable		44W4822	
	Hard disk drive signal mini S cable		44W4824	
	I^{2}C to planar cable		46D1371	
	I^{2}C to multiple cable		43W4831	
	3U chassis I^{2}C power cable		46D1370	
	Graphics 8P-8P cable		49Y6983	
	2 2 PM SAS to 4X cable		69Y3705	
	Graphic riser card to domain B cable		69Y3708	
	HDD power 16 pin 8 drop cable		69Y3711	
	Storage-riser-card assembly		46D1293	
	ServeRAID-10i charge circuit and power cable kit		44E8763	
	ServeRAID-M1000 series feature key		46M0864	
	ServeRAID-M5000 series feature key		46M0931	
	Superkey, ServeRAID-M5000 series performance key		81Y4427	
	SAS controller battery holder		46M6563	
	Battery holder assembly		94Y6014	
	900 watt high efficient power supply			69Y5744
	750 watt dual AC input power supply			69Y5746
	550 watt high efficient power supply			43X3294

Table 4. CRUs and FRUs, Type 6391 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	Miscellaneous parts kit		69Y3776	
	2.5-inch simple-swap hard disk drive cage assembly		49Y6792	

Note: The following notes describe important information about the nVIDIA video adapter that comes preinstalled in some server models:

- Do not set the maximum digital video resolution above 1600 x 1200 at 60 Hz for an LCD monitor. This is the highest resolution that is supported for an optional video adapter in the server.
- Any high-definition video-out connector or stereo connector or an optional video adapter is not supported.

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.

Type 6385 2U chassis components

The following replaceable components are available for the Type 6385 2U chassis.

Note: The illustrations in this document might differ slightly from your hardware.
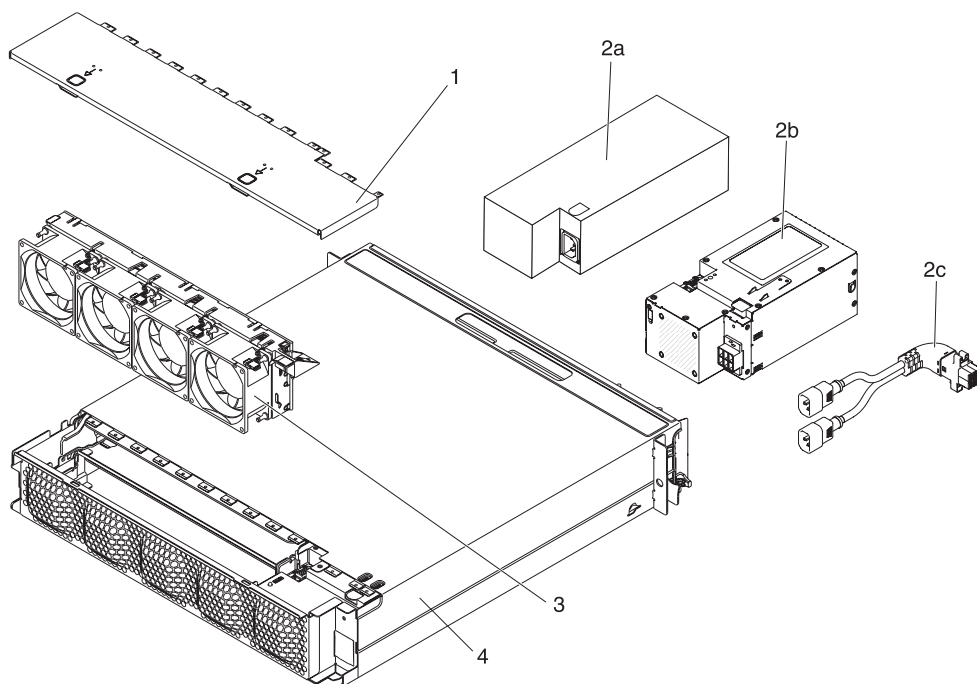
Table 5. CRUs and FRUs, Type 6385

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Top cover	44W4791		
2a	900 watt high efficient power supply			69Y5744

Table 5. CRUs and FRUs, Type 6385 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
2a	550 watt high efficient power supply			43X3294
2b	750 watt dual AC input power supply			69Y5746
2c	Dual AC inlet cable (accompanied with 750 watt dual AC input power supply)	49Y7030		
3	Fan assembly	44W4792		
4	2U chassis			59Y3066
	Rail kit		49Y6866	
	Enterprise rack rail kit		44W4794	
	2U Label kit	69Y3774		
	Three-connector Y power cable	39M5501		
	Two-connector straight power cable		39M5503	

Type 6386 3U chassis components

The following replaceable components are available for the Type 6386 3U chassis.
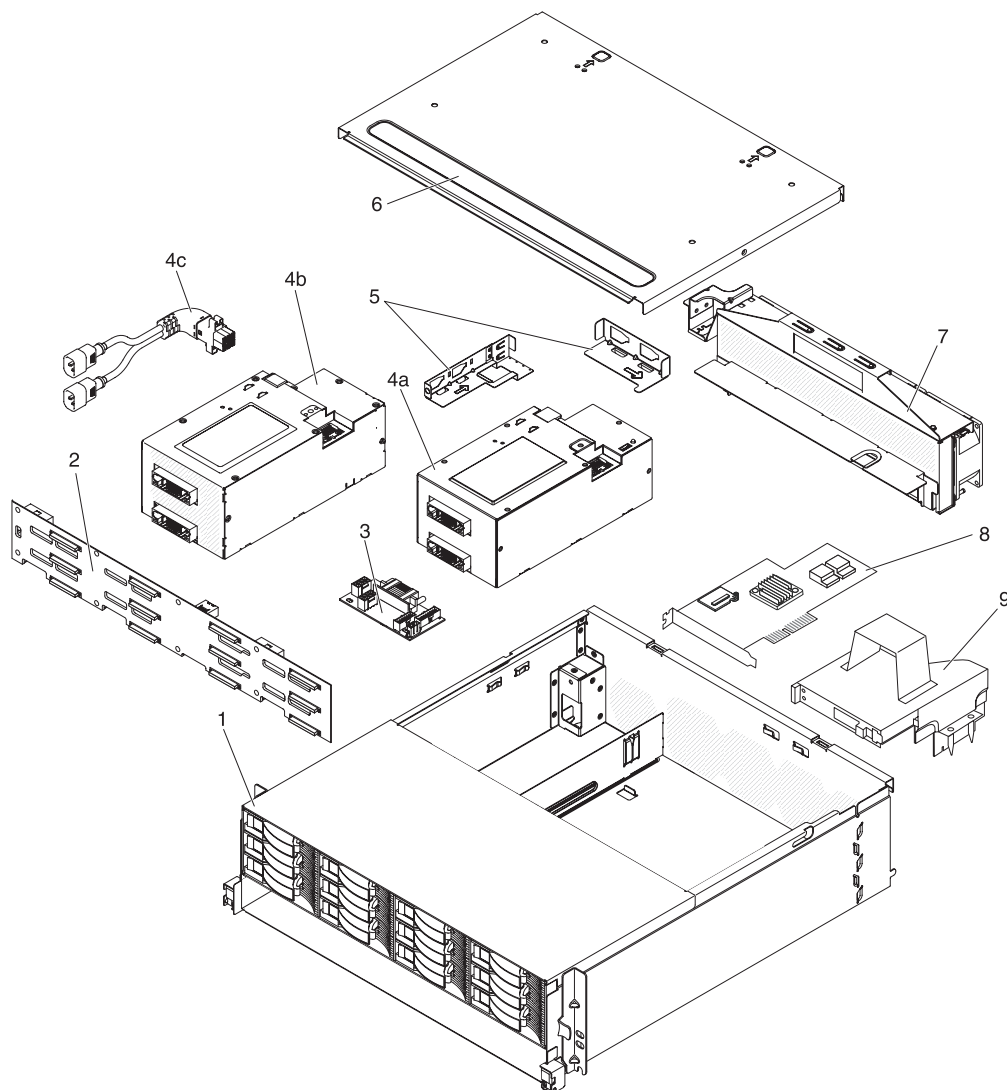
Table 6. CRUs and FRUs, Type 6386

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	3U chassis			59Y3072
2	Hard disk drive backplane			69Y4741
3	DC-DC paddle card with cable		43X3310	
4a	900 watt high efficient power supply			69Y5744
4b	750 watt dual AC input power supply			69Y5746
4c	Dual AC inlet cable (accompanied with 750 watt dual AC input power supply)	49Y7030		
5	Bracket kit		69Y3795	
6	Top cover	46C6286		
7	Fan assembly		46C6287	

Table 6. CRUs and FRUs, Type 6386 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
8	ServeRAID-MR10i adapter		43W4297	
8	ServeRAID-BR10i adapter (with bracket)		49Y4737	
8	ServeRAID-M5015 adapter		46M0851	
8	ServeRAID-MR10is adapter		46M0861	
9	Storage-riser-card assembly		46D1293	
	3U Label kit	69Y3775		
	Backplane power Y cable and paddle card		44W4553	
	Two-drop power cable		44W4552	
	Three-connector Y power cable	39M5501		
	Two-connector straight power cable		39M5503	
	Hard disk drive signal cable assembly			46C6304
	3.5–inch hot-swap filler panel	39M4375		

I/O enclosure components

This section lists replaceable components that are available for the I/O enclosure.

I/O enclosures configured with 2.5-inch simple-swap hard disk drives

The following replaceable components are available for I/O enclosures that are configured with 2.5-inch simple-swap hard disk drives.
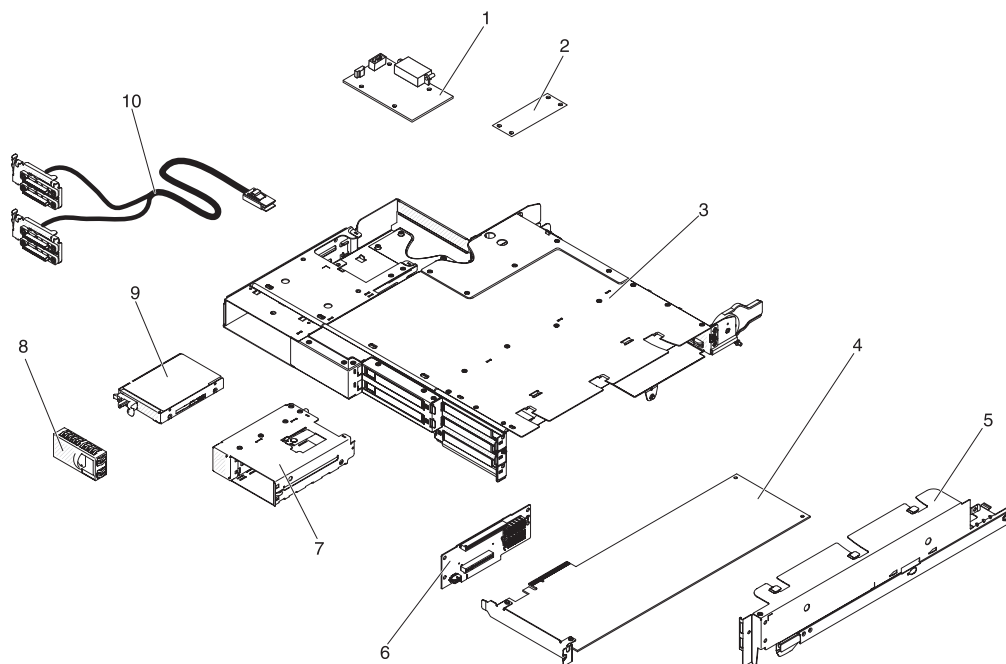
Table 7. CRUs and FRUs, I/O enclosures configured with 2.5-inch hot-swap hard disk drives

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	DC-DC paddle card with cable		43X3310	
2	I²C multiplexer card		44W4832	
3	I/O enclosure			69Y1025
4	PCIe adapter (see Table 4 on page 102 for the supported adapters)			
5	PCIe adapter bay cover		46C6930	
6	Three-slot PCIe riser-card assembly		69Y4688	
7	2.5-inch simple-swap hard disk drive cage		69Y0972	
8	2.5-inch Gen 2 drive filler panel	49Y4560		
9	SAS hard disk drive (see Table 4 on page 102 for the supported drives)			
10	2 2 PM SAS to 4 x cable assembly		69Y3705	
	PCI slot gasket	81Y6070		

I/O enclosures configured with 2.5-inch hot-swap hard disk drives

The following replaceable components are available for I/O enclosures that are configured with 2.5-inch hot-swap hard disk drives.
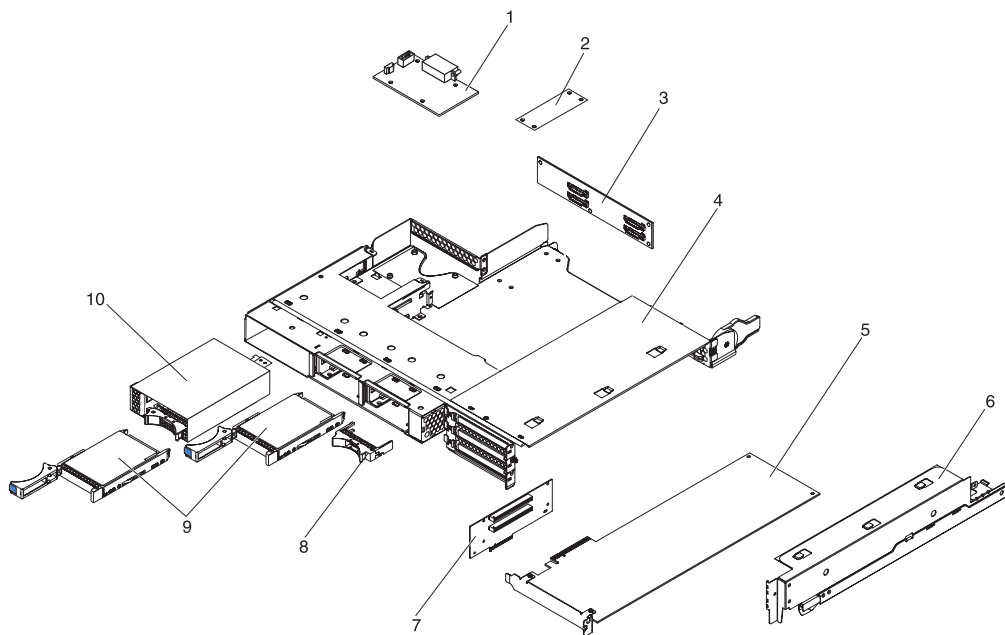
Table 8. CRUs and FRUs, I/O enclosures configured with 2.5-inch hot-swap hard disk drives

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	DC-DC paddle card with cable		43X3310	
2	I²C multiplexer card		44W4832	
3	2x2 2.5-inch SAS/SATA backplane			44E8765

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
4	I/O enclosure			46C6929
5	PCIe adapter (see Table 4 on page 102 for the supported adapters)			
6	PCIe adapter bay cover		46C6930	
7	Two-slot PCIe riser-card assembly (2x4 with 2x16 connectors)			46D1336
8	2.5-inch hot-swap drive filler panel	26K8680		
9	SAS hard disk drive (see Table 4 on page 102 for the supported drives)			
10	2.5-inch SAS/SATA drive cage with backplane		44W4800	
	PCI slot gasket	81Y6070		

I/O enclosures configured with 3.5-inch simple-swap hard disk drives (with three-slot PCIe riser-card assembly)

The following replaceable components are available for I/O enclosures that are configured with 3.5-inch simple-swap hard disk drives (with three-slot PCIe riser-card assembly).
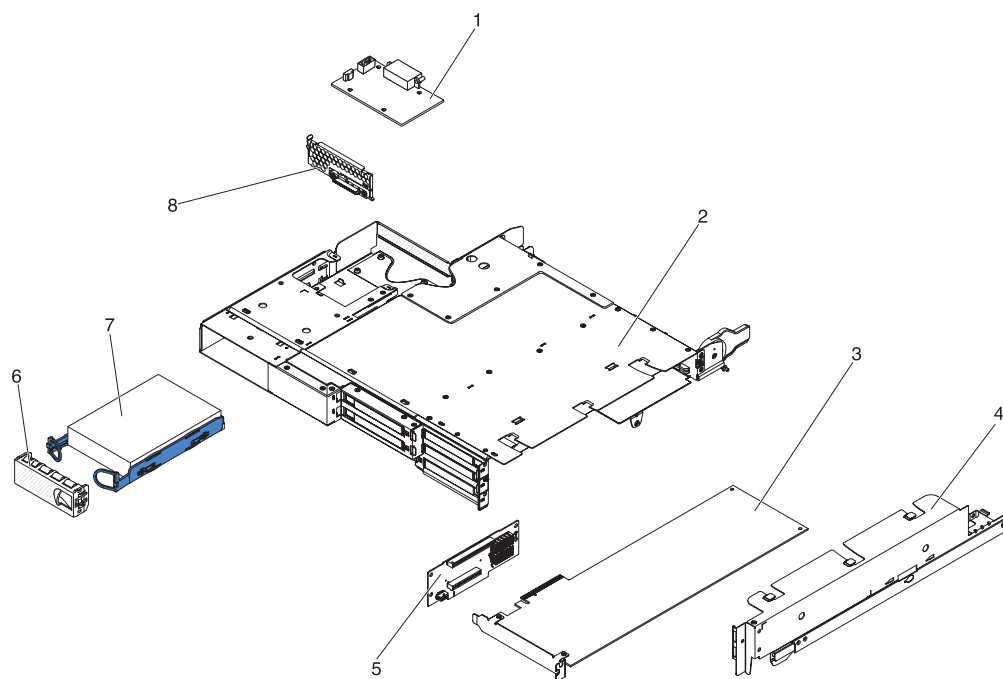
Table 9. CRUs and FRUs, I/O enclosures configured with 3.5-inch simple-swap hard disk drives

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	DC-DC paddle card with cable		43X3310	
2	I/O enclosure			69Y1025
3	PCIe adapter (see Table 4 on page 102 for the supported adapters)			
4	PCIe adapter bay cover		46C6930	

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
5	Three-slot PCIe riser-card assembly		69Y4688	
6	3.5-inch drive filler panel	44W4802		
7	SATA hard disk drive (see Table 4 on page 102 for the supported drives)			
7	SAS hard disk drive (see Table 4 on page 102 for the supported drives)			
8	One-bay hard disk drive bracket and cable assembly, SATA 1x		44T0647	
	PCI slot gasket	81Y6070		

I/O enclosures configured with 3.5-inch simple-swap hard disk drives (with two-slot PCIe riser-card assembly)

The following replaceable components are available for I/O enclosures that are configured with 3.5-inch simple-swap hard disk drives (with two-slot PCIe riser-card assembly).
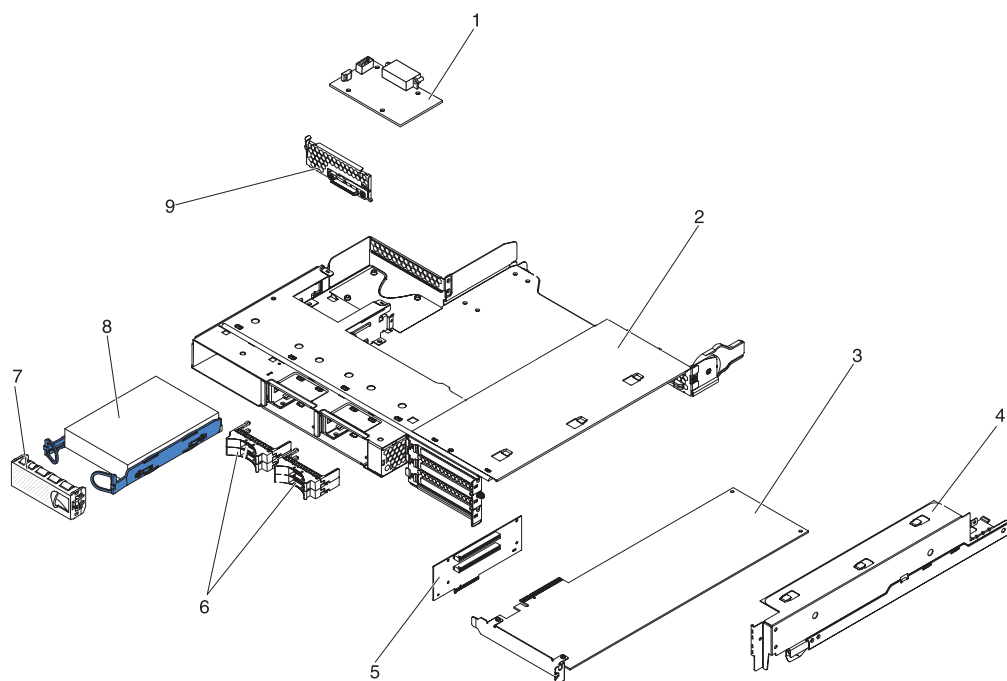
Table 10. CRUs and FRUs, I/O enclosures configured with 3.5-inch simple-swap hard disk drives

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	DC-DC paddle card with cable		43X3310	
2	I/O enclosure			46C6929
3	PCIe adapter (see Table 4 on page 102 for the supported adapters)			
4	PCIe adapter bay cover		46C6930	
5	Two-slot PCIe riser-card assembly (2x4 with 2x16 connectors)			46D1336

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
6	2x2 2.5-inch drive filler panel	44W4801		
7	3.5-inch drive filler panel	44W4802		
8	SATA hard disk drive (see Table 4 on page 102 for the supported drives)			
8	SAS hard disk drive (see Table 4 on page 102 for the supported drives)			
9	One-bay hard disk drive bracket and cable assembly, SATA 1x		44T0647	
	PCI slot gasket	81Y6070		

Storage enclosure components

The following replaceable components are available for the storage enclosure.

Storage enclosures configured with 2.5-inch simple-swap hard disk drives

The following replaceable components are available for storage enclosures that are configured with 2.5-inch simple-swap hard disk drives.
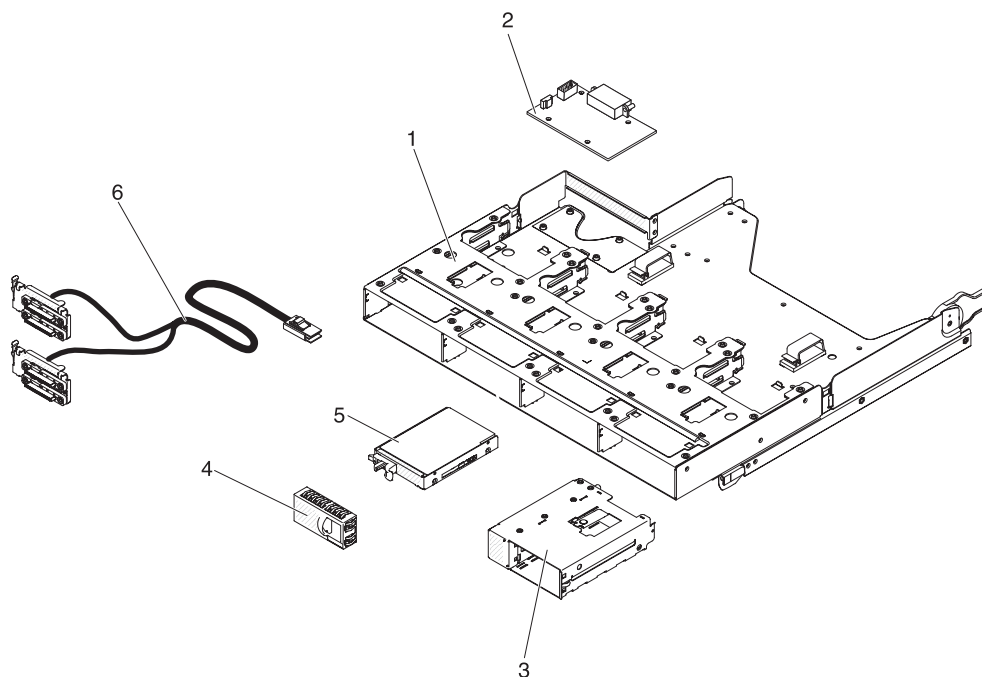
Table 11. CRUs and FRUs, storage enclosure

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Storage enclosure		69Y0969	
2	DC-DC paddle card with cable		43X3310	

Table 11. CRUs and FRUs, storage enclosure (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
3	2.5-inch simple-swap hard disk drive cage		69Y0972	
4	2.5-inch Gen 2 drive filler panel	49Y4560		
5	SATA hard disk drive (see Table 4 on page 102 for the supported drives)			
5	SAS hard disk drive (see Table 4 on page 102 for the supported drives)			
6	2 2 PM SAS to 4X cable		69Y3705	

Storage enclosures configured with 3.5-inch simple-swap hard disk drives

The following replaceable components are available for storage enclosures that are configured with 3.5-inch simple-swap hard disk drives.
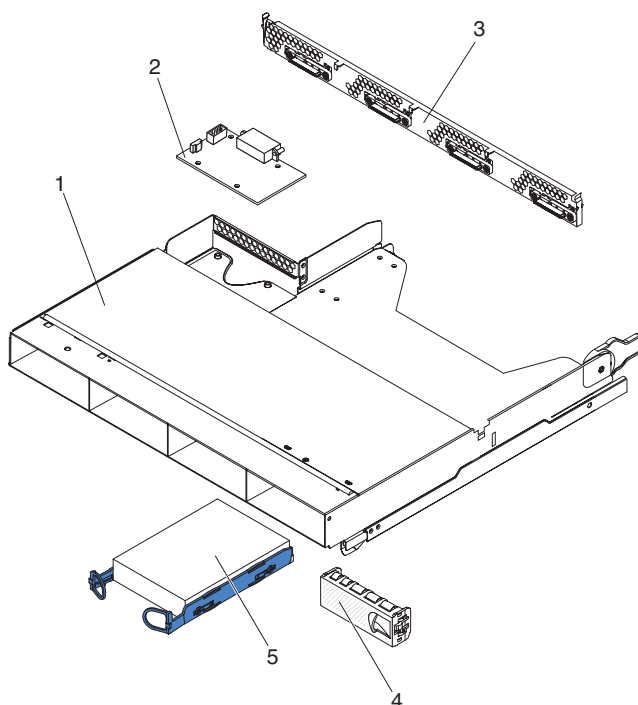
Table 12. CRUs and FRUs, storage enclosure

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Storage enclosure			44W4798
2	DC-DC paddle card with cable		43X3310	
3	Four-bay hard disk drive bracket and cable assembly, SATA 4 to 1x		44T0672	
3	Four-bay hard disk drive bracket and cable assembly, SATA 4 to 4x		44T0674	
3	Four-bay hard disk drive bracket and cable assembly, SAS 4 to 4x		44T0675	
4	3.5-inch simple-swap drive filler panel	44W4802		

Table 12. CRUs and FRUs, storage enclosure (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
5	SATA hard disk drive (see Table 4 on page 102 for the supported drives)			
5	SAS hard disk drive (see Table 4 on page 102 for the supported drives)			

Consumable parts

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

Table 13. Consumable parts, Type 6391

Description	Part number
Battery, ServeRAID-10i Li-Ion	46C9040

To order a consumable part, complete the following steps:

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

Power cords

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

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

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

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

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

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

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

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

Chapter 5. Removing and replacing server components

Replaceable components are of three types:

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

See Chapter 4, "Parts listing," on page 101 to determine whether a component is a Tier 1 CRU, Tier 2 CRU, or FRU.

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

Installation guidelines

Attention:

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

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

- Read the safety information that begins on page ix and the guidelines in "Handling static-sensitive devices" on page 122. This information will help you work safely.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you can stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver and a small Phillips screwdriver available.
- You do not have to turn off the system-board tray to install or replace hot-swap drives or hot-plug Universal Serial Bus (USB) devices. However, you must shut

down the operating system and turn off the system-board tray before you remove the system-board tray from a chassis or before you install simple-swap hard disk drives.

- Blue on a component indicates touch points, where you can grip the component to remove it or install it, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the system-board tray and operating system support hot-swap capability, you can remove or install the component while the system-board tray 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.

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.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a hot-swap drive within 2 minutes of removal.
- The system-board tray battery is operational. If the battery becomes defective, replace it immediately.
- Microprocessor socket 2 always contains either a microprocessor baffle or a microprocessor and heat sink.
- You have replaced one or both system-board trays within 2 minutes of removal.
- For a 2U compute server, do not operate the upper system-board tray with the lower system-board tray removed or powered off, except for servicing.

Handling static-sensitive devices

Attention: Static electricity can damage 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.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an *unpainted* metal surface on the outside of the rack, chassis, or system-board tray 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 system-board tray or enclosure 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 system-board tray cover or on a metal surface.

- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Returning a device or component

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

Removing the system-board tray cover

To remove the system-board tray cover, complete the following steps.
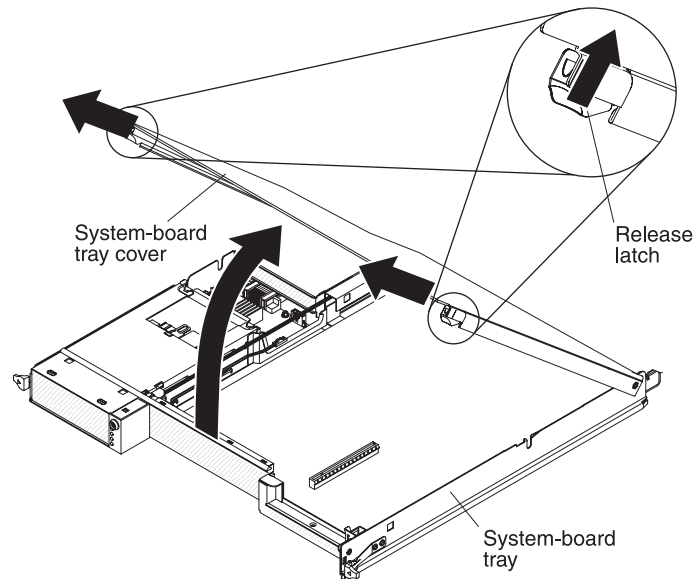
System-board tray cover

Release latch

System-board tray

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124 or "Removing the system-board tray from a 3U chassis" on page 126).
3. Carefully set the system-board tray on a flat, static-protective surface, with the cover side up.
4. Pull the cover release latch on each side of the system-board tray outward and lift the cover open.
5. If you are instructed to return the system-board tray cover, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the system-board tray cover

To install the system-board tray cover, complete the following steps.

Attention: You cannot insert the system-board tray into a chassis until the cover is installed and closed or an expansion enclosure is installed. Do not attempt to override this protection.

System-board
tray cover
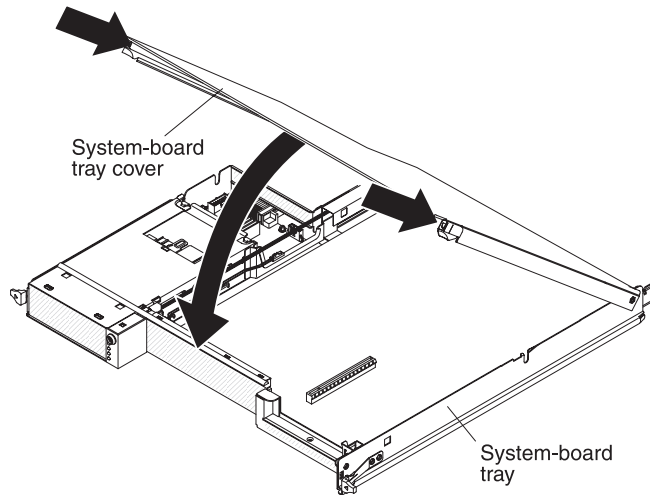
System-board
tray

1. Lower the cover so that the pins at the rear of the cover slide down into the slots at the rear of the system-board tray. Before you close the cover, make sure that all components are installed and seated correctly, all internal cables are correctly routed, and you have not left loose tools or parts inside the system-board tray.

2. Pivot the cover to the closed position until it clicks into place.

3. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125 or "Installing the system-board tray in a 3U chassis" on page 127).

Removing the system-board tray from a 2U chassis

To remove the system-board tray from a 2U chassis, complete the following steps. If the server contains an expansion enclosure, you remove the expansion enclosure and the system-board tray from the chassis as one assembly.

Attention: When two system-board trays are installed in the chassis, do not operate the upper system-board tray with the lower system-board tray removed or powered off, except for servicing. When the lower system-board tray is removed or powered-off, chassis-level systems-management information is not available. For example, chassis fan speeds and temperatures might be returned as zero values. In this situation, the chassis continues to operate normally, because the power supply and fans are designed to operate independently.
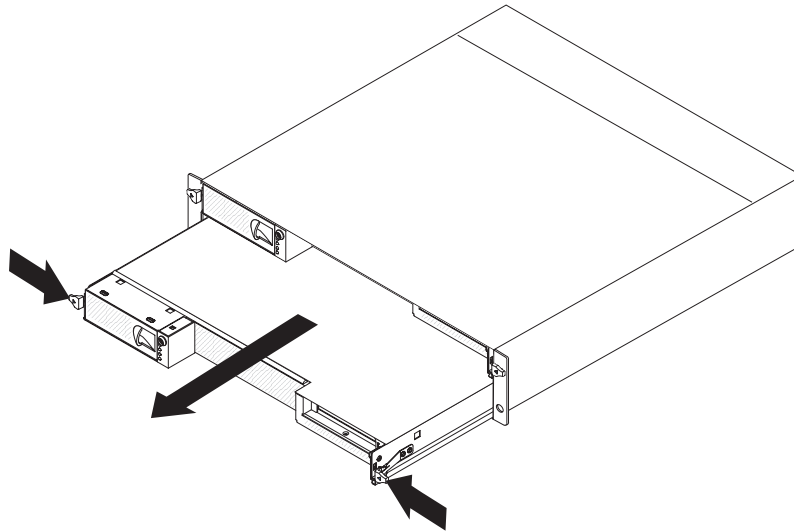
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the system-board tray is operating, shut down the operating system; then, press the power-control button to turn off the system-board tray (see "Turning off the system-board tray" on page 11 for more information).
3. If external cables are connected to the front of the system-board tray or expansion enclosure, if one is attached, note where they are connected; then, remove them.
4. Press in the two release latches and pull the system-board tray and expansion enclosure out of the chassis.

Installing the system-board tray in a 2U chassis

To install the system-board tray in a 2U chassis, complete the following steps.
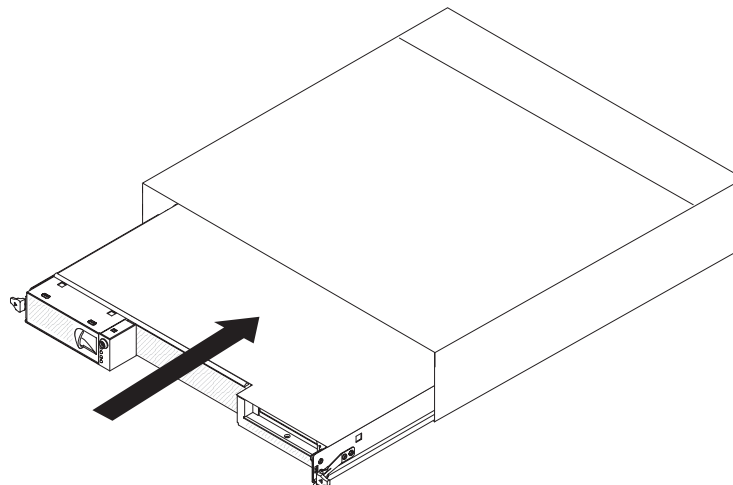
1. Slide the system-board tray into the chassis until it stops and the release latches click into place.
2. Reconnect the cables to the front of the system-board tray or expansion enclosure.

3. Turn on the system-board tray (see "Turning on the system-board tray" on page 11).

4. Make sure that the power-on LED on the system-board tray operator panel is lit continuously, indicating that the system-board tray is receiving power and is turned on.

If you are installing a different system-board tray from the one that you removed, you might have to configure the system-board tray using the Setup utility. See "Using the Setup utility" on page 228 for more information.

Removing the system-board tray from a 3U chassis

To remove the system-board tray from a 3U chassis, complete the following steps.

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the system-board tray is operating, shut down the operating system; then, press the power-control button to turn off the system-board tray (see "Turning off the system-board tray" on page 11 for more information).

3. If external cables are connected to the front of the system-board tray, note where they are connected; then, remove them.

4. Remove the 3U chassis from the iDataPlex rack (see "Removing a 3U chassis from a Type 7825 iDataPlex rack" on page 198).

5. Press on the two release latches at the top-rear edge of the top-cover assembly; then, slide the top-cover assembly toward the rear of the 3U chassis and remove it.

6. Remove the storage-riser-card assembly and ServeRAID SAS controller (see "Removing a storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card from a 3U chassis" on page 189).

7. Slide and release the retention bracket that secures the fan assembly and remove the bracket from the chassis.

8. Lift up on both fan-assembly handles and remove the fans from the 3U chassis.

9. Note the cable routing and connection locations; then, disconnect the cables that connect the system-board tray to the 3U chassis.

10. Push on the back edge of the system-board tray from inside the 3U chassis and slide the system-board tray forward.

11. Pull the system-board tray out of the 3U chassis and set it on a flat, static-protective surface.

Installing the system-board tray in a 3U chassis

To install the system-board tray in a 3U chassis, complete the following steps.
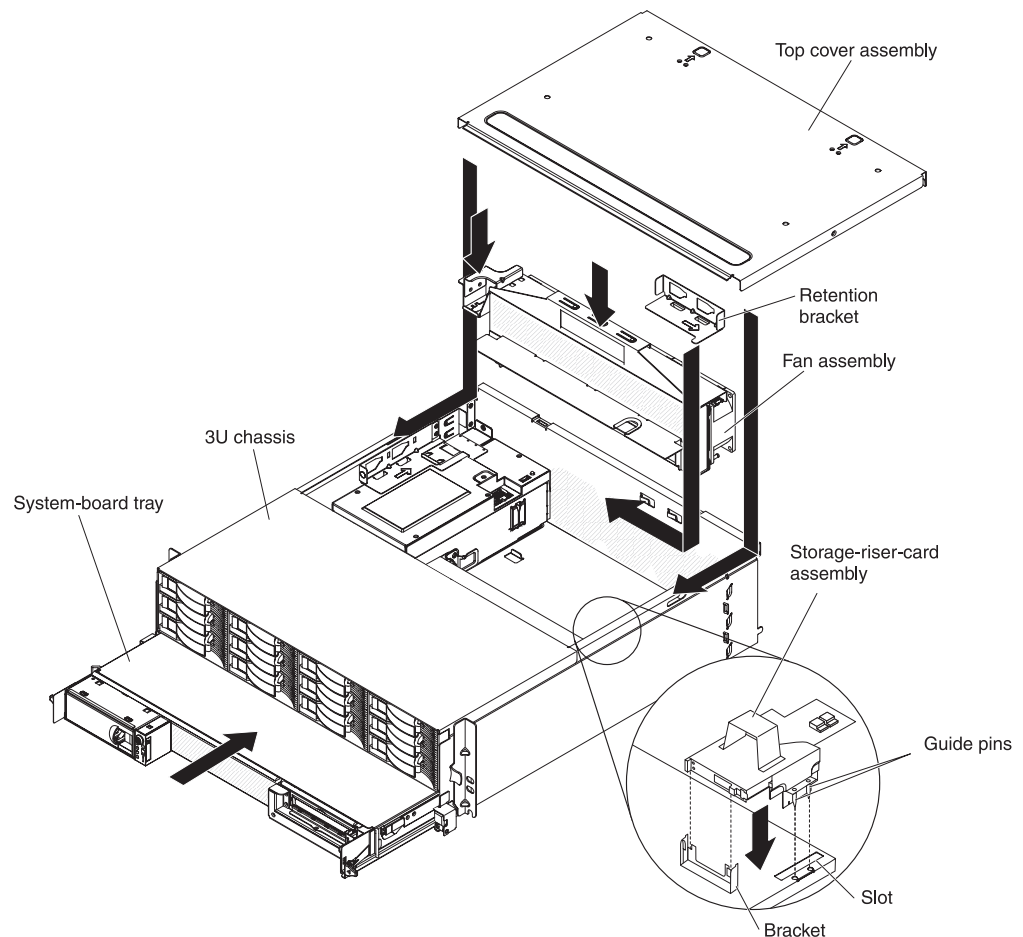
Note: You must remove the 3U chassis from the iDataPlex rack before you install the system-board tray (see "Removing a 3U chassis from a Type 7825 iDataPlex rack" on page 198).

1. Slide the system-board tray into the 3U chassis until it stops.

2. Reconnect the cables that connect the system-board tray and optional adapter to the 3U chassis.

3. Turn the fan assembly so that the connector aligns correctly with the connector in the power supply.

4. Route any cables through the fan assembly.

5. Insert the fan assembly into the 3U chassis. Firmly press the fan assembly straight down into the chassis by applying pressure on both ends of the fan assembly simultaneously.

6. Reinstall the retention bracket that secures the fan assembly.

7. Reinstall the storage-riser-card assembly and ServeRAID SAS controller (see "Installing a storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card in a 3U chassis" on page 191).

8. Align the top-cover assembly with the rear of the 3U chassis; then, slide it forward until it clicks into place.

9. Reinstall the 3U chassis in the iDataPlex rack (see "Installing a 3U chassis in a Type 7825 iDataPlex rack" on page 199).

10. Install the hard disk drives (see "Removing and installing a hard disk drive" on page 137).

11. Reconnect the cables on the front of the system-board tray.

12. Turn on the system-board tray (see "Turning on the system-board tray" on page 11).

13. Make sure that the power-on LED on the system-board tray operator panel is lit continuously, indicating that the system-board tray is receiving power and is turned on.

If you are installing a different system-board tray from the one that you removed, you might have to configure the system-board tray using the Setup utility. See "Using the Setup utility" on page 228 for more information.

Removing an expansion enclosure from a system-board tray

To remove an expansion enclosure from a system-board tray, complete the following steps.
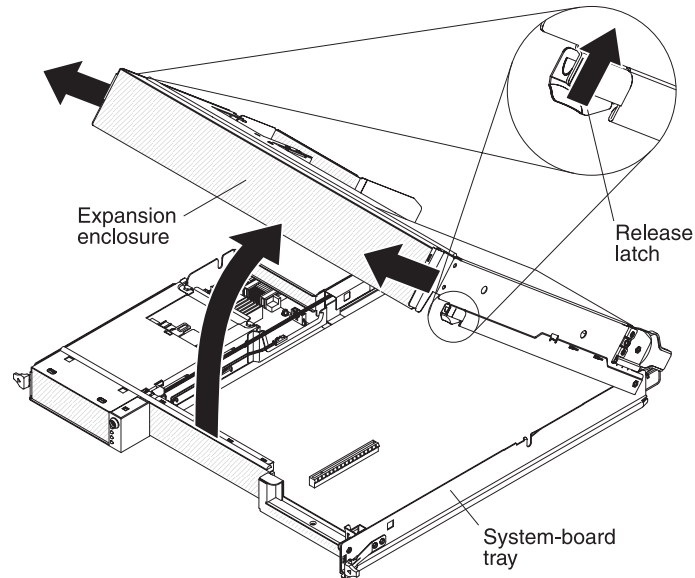
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124).
3. Carefully set the system-board tray on a flat, static-protective surface.
4. Pull the release latch on each side of the expansion enclosure outward; then, rotate the expansion enclosure approximately 30 degrees to a partially open position.
5. Make a note of where the cables are attached; then, if necessary, disconnect them.
6. Lift the expansion enclosure from the system-board tray and set the expansion enclosure on a flat, static-protective surface.

Installing an expansion enclosure on a system-board tray

To install an expansion enclosure on a system-board tray, complete the following steps.

Expansion
enclosure
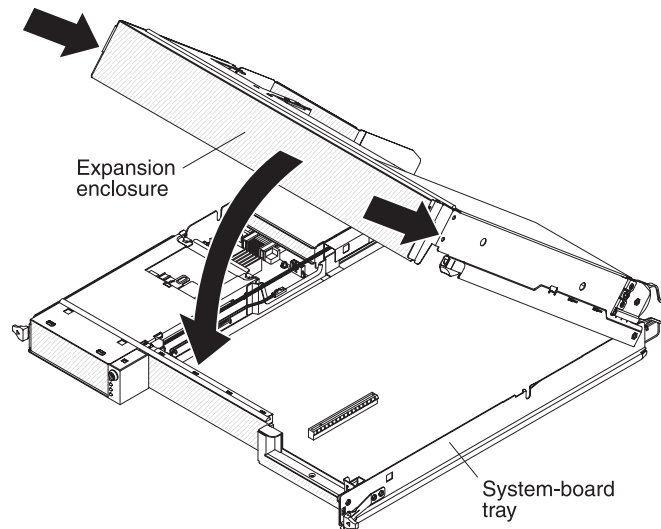
System-board
tray

1. Orient the expansion enclosure above the system-board tray.
2. Lower the expansion enclosure so that the pins at the rear of the enclosure slide down into the slots at the rear of the system-board tray.
3. If you disconnected cables when you removed the expansion enclosure, reconnect them.
4. Pivot the expansion enclosure onto the system-board tray until it clicks into place.
5. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125).

Removing and replacing consumable parts and Tier 1 CRUs

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

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

Removing the 2U chassis fan assembly

To remove the 2U chassis fan assembly, complete the following steps.
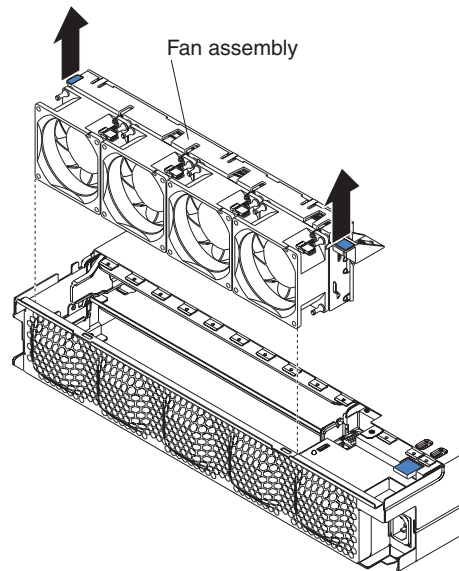
Fan assembly

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the chassis that contains the fan assembly is installed in an iDataPlex rack, remove it (see "Removing the 2U chassis from a Type 7825 iDataPlex rack" on page 194).
3. Remove any installed system-board trays (see "Removing the system-board tray from a 2U chassis" on page 124).
4. Remove the top cover (see "Removing the 2U chassis fan-assembly top cover" on page 133).
5. Grasp the tab at each end of the fan assembly and lift it out of the chassis.
6. If you are instructed to return the fan assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the 2U chassis fan assembly

To install the 2U chassis fan assembly, complete the following steps.
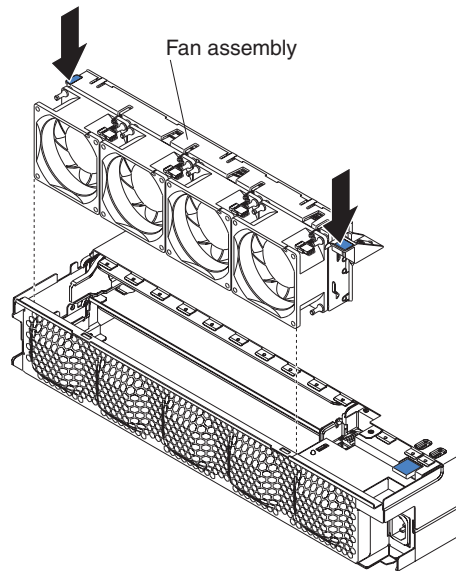
1. Touch the static-protective package that contains the fan assembly to any *unpainted* metal surface on the outside of the chassis; then, remove the fan assembly from the package.
2. Orient the fan assembly over the opening in the chassis. Make sure that the power connector on the fan assembly aligns with the connector on the power supply.
3. Lower the fan assembly into the chassis and press down on the tab above the power connector to make sure that it is fully seated.
4. Install the top cover (see "Installing the 2U chassis fan-assembly top cover" on page 133).
5. Install the chassis in the iDataPlex rack (see "Installing the 2U chassis in a Type 7825 iDataPlex rack" on page 195).
6. Install any system-board trays that you removed (see "Installing the system-board tray in a 2U chassis" on page 125).

Removing the 2U chassis fan-assembly top cover

To remove the 2U chassis fan-assembly top cover, complete the following steps.
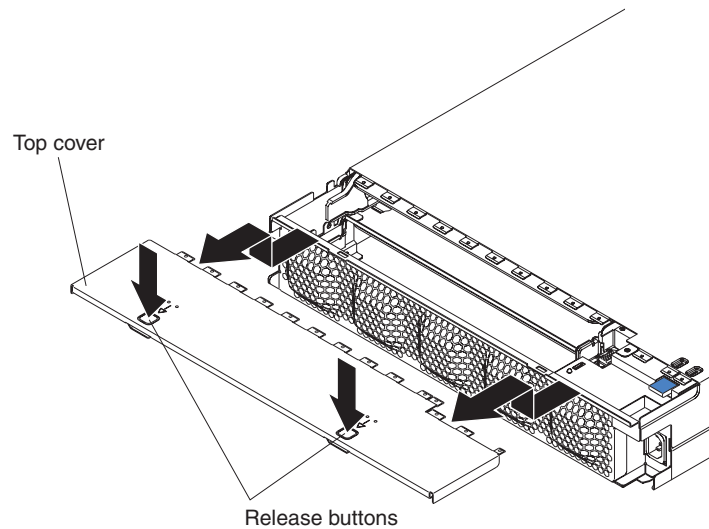
Top cover

Release buttons

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the chassis is installed in an iDataPlex rack, remove it (see "Removing the 2U chassis from a Type 7825 iDataPlex rack" on page 194).
3. Press the two cover-release buttons and slide the cover toward the rear of the chassis to remove it.
4. If you are instructed to return the 2U chassis fan-assembly top cover, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the 2U chassis fan-assembly top cover

To install the 2U chassis fan-assembly top cover, complete the following steps.
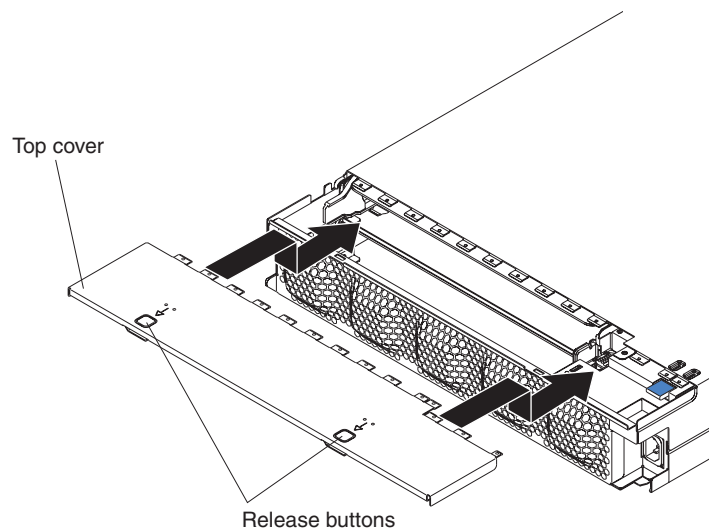
Top cover

Release buttons

1. Make sure that no wires are protruding and might interfere with the cover.

2. Orient the cover over the rear of the chassis so that the retention tabs on the cover align with the tabs in the chassis.

3. Slide the cover onto the chassis until the cover-release buttons click into place.

4. Install the chassis in the iDataPlex rack (see "Installing the 2U chassis in a Type 7825 iDataPlex rack" on page 195).

Removing the 3U chassis top cover

To remove the 3U chassis top cover, complete the following steps.
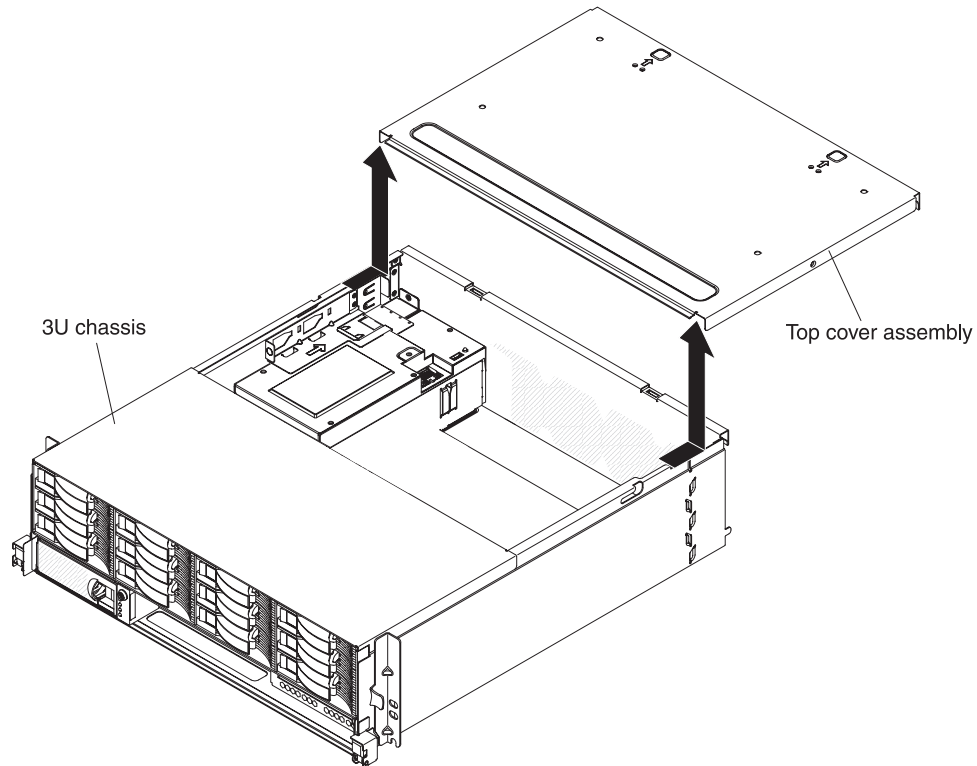
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the chassis is installed in an iDataPlex rack, remove it (see "Removing a 3U chassis from a Type 7825 iDataPlex rack" on page 198).

3. Press the two cover-release buttons and slide the cover toward the rear of the chassis to remove it.

4. If you are instructed to return the 3U chassis top cover, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the 3U chassis top cover

To install the 3U chassis top cover, complete the following steps.
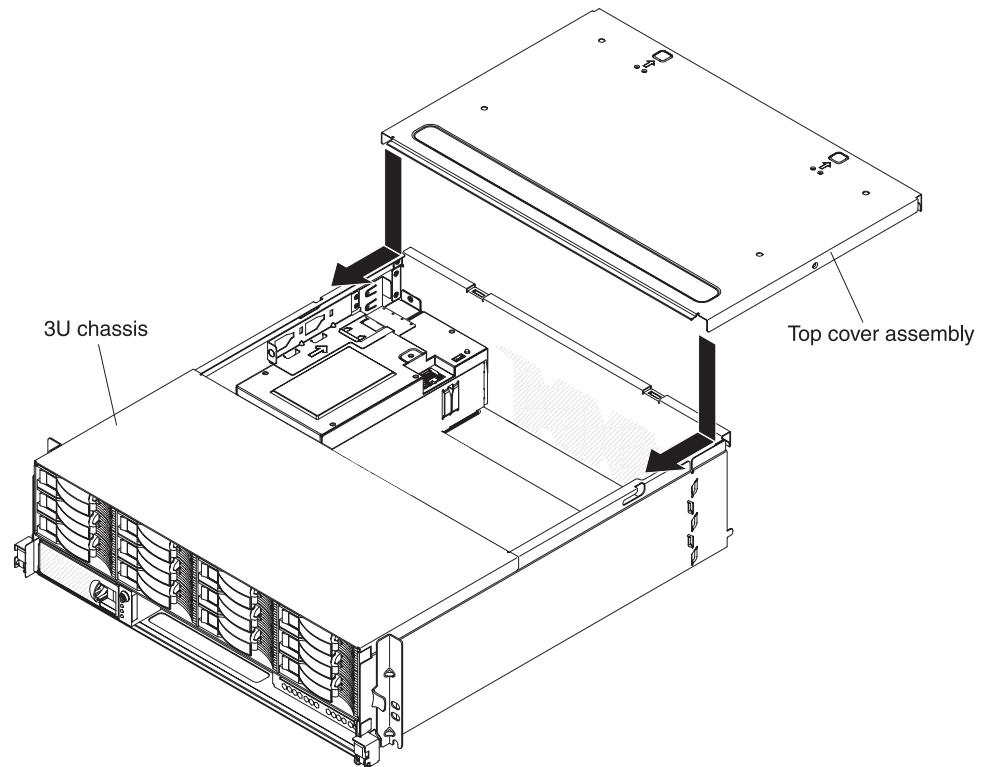
3U chassis

Top cover assembly

1. Make sure that no wires are protruding and might interfere with the cover.
2. Orient the cover over the rear of the chassis so that the retention tabs on the cover align with the tabs in the chassis.
3. Slide the cover onto the chassis until the cover-release buttons click into place.
4. Install the chassis in the iDataPlex rack (see "Installing a 3U chassis in a Type 7825 iDataPlex rack" on page 199).

Removing the battery

To remove the battery, complete the following steps.
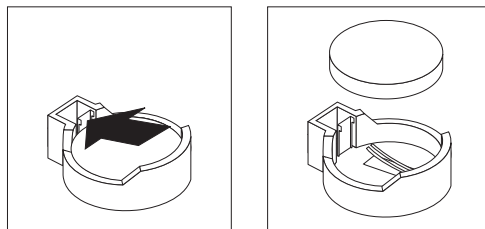
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121
2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124 or "Removing the system-board tray from a 3U chassis" on page 126).

3. If an expansion enclosure is installed, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).

4. Remove the PCIe riser-card assembly, if one is installed (see "Removing a front PCIe riser-card assembly from the system-board tray" on page 151).

5. Locate the battery on the system board (see "System-board connectors" on page 12).

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

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

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

8. Dispose of the battery as required by local ordinances or regulations (see the *Environmental Notices and User's Guide* on the IBM *Documentation* CD for information about disposing of the battery).

Installing the battery

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

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

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

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

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

Statement 2:

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

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

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

To install the battery, complete the following steps.
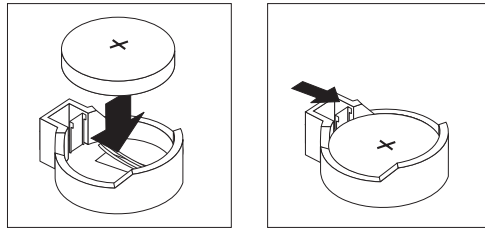
1. Follow any special handling and installation instructions that come with the battery.
2. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.
3. Press the battery down into the socket until it clicks into place. Make sure that the battery clip holds the battery securely.
4. If you removed the PCIe riser-card assembly, install it (see "Installing a front PCIe riser-card assembly on the system-board tray" on page 152).
5. Install the expansion enclosure, if you removed one (see "Installing an expansion enclosure on a system-board tray" on page 130); otherwise, install the system-board tray cover (see "Installing the system-board tray cover" on page 123).
6. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125 or "Installing the system-board tray in a 3U chassis" on page 127).
7. Turn on the system-board tray and run the Setup utility. Set configuration parameters as needed (see "Using the Setup utility" on page 228 for information).

Removing and installing a hard disk drive

The following section describes how to remove and replace 2.5-inch hot-swap hard disk drives, 2.5-inch simple-swap hard disk drives, 3.5-inch hot-swap hard disk drives, and 3.5-inch simple-swap hard disk drives.

Removing a 2.5-inch hot-swap hard disk drive

To remove a 2.5-inch hot-swap hard disk drive, complete the following steps.
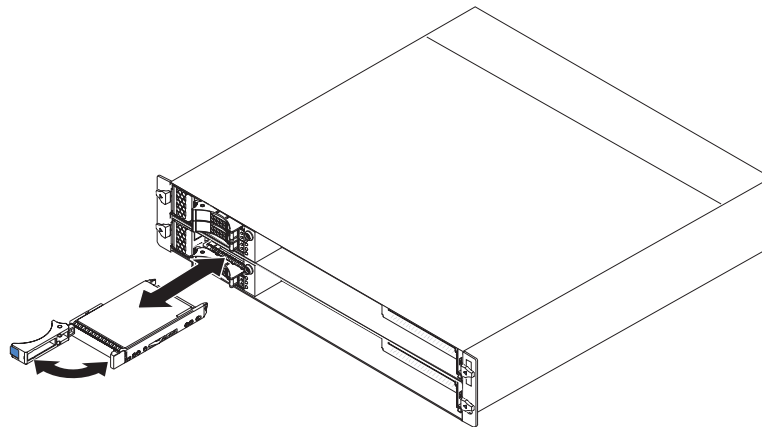
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. Rotate the drive tray handle of the drive that is to be removed to the open position.

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

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

Installing a 2.5-inch hot-swap hard disk drive

To install a 2.5-inch hot-swap hard disk drive, complete the following steps.
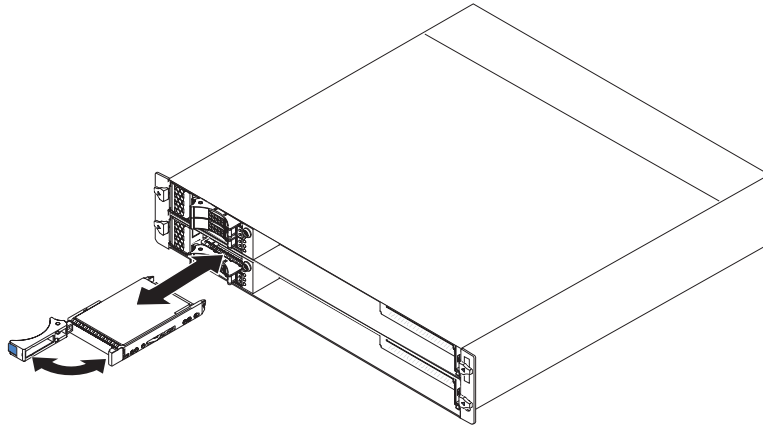
1. Touch the static-protective package that contains the hard disk drive to any *unpainted* metal surface on the outside of the chassis or rack; then, remove the hard disk drive from the package.

   Attention: Do not press on the top of the drive. Pressing the top might damage the drive.

2. Make sure that the drive tray handle is in the open position.

3. Align the drive with the guide rails in the drive bay; then, carefully slide the drive into the bay until the drive stops.

4. Rotate the drive tray handle to the closed position.

Removing a 2.5-inch simple-swap hard disk drive or solid-state drive

To remove a 2.5-inch simple-swap hard disk drive or solid-state drive, complete the following steps.
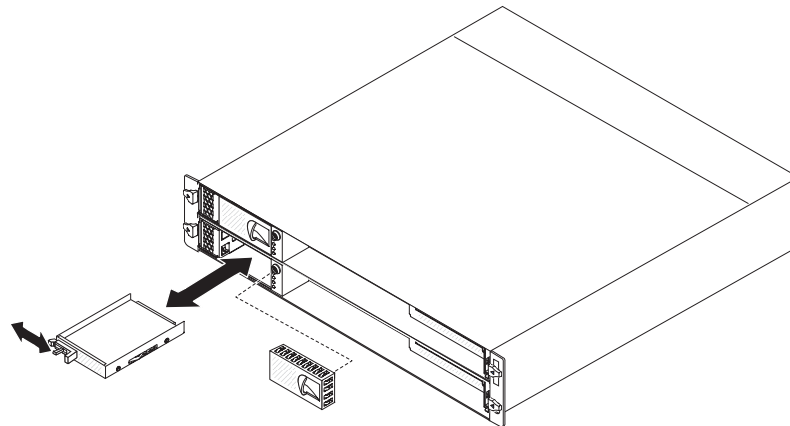
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the system-board tray is operating, shut down the operating system; then, press the power-control button to turn off the system-board tray (see "Turning off the system-board tray" on page 11 for more information).

3. Remove the filler panel from the drive bay.

4. Slide the retention tab and pull the drive out of the drive 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.
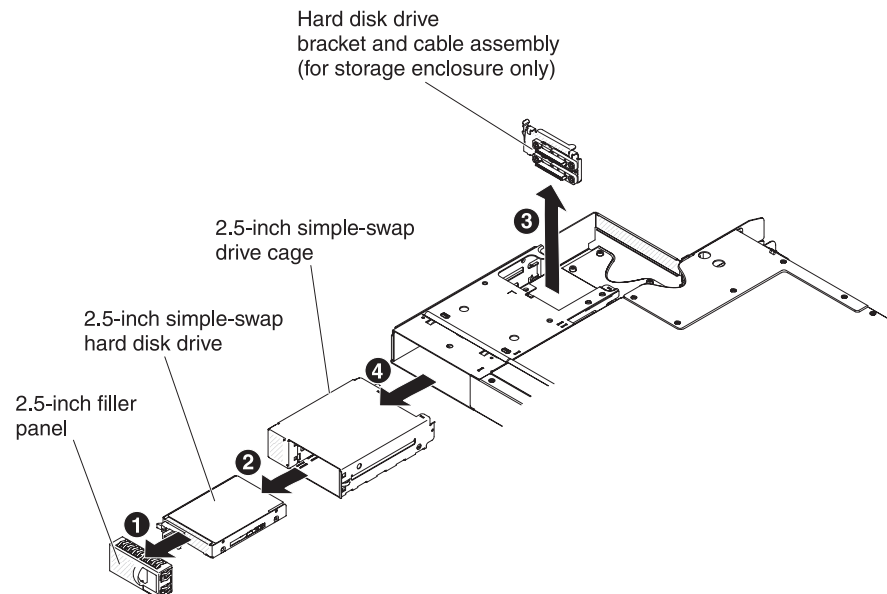
Installing a 2.5-inch simple-swap hard disk drive or solid-state drive

To install a 2.5-inch simple-swap hard disk drive or solid-state drive, complete the following steps.
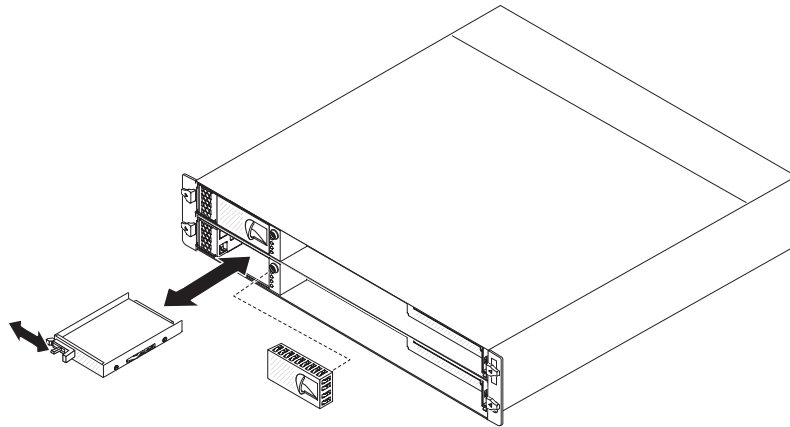
1. Touch the static-protective package that contains the drive to any *unpainted* metal surface on the outside of the chassis or rack; then, remove the hard disk drive from the package.

   Attention: Do not press on the top of the drive. Pressing the top might damage the drive.

2. Align the drive with the guide rails in the drive bay.

3. Slide the retention tab; then, carefully slide the drive into the bay until it stops, and release the retention tab.

4. Install the filler panel in the drive bay.

5. Turn on the system-board tray (see "Turning on the system-board tray" on page 11).

Removing a 3.5-inch hot-swap hard disk drive

Note: The following illustration shows how to remove a 3.5-inch hot-swap hard disk drive from a 3U chassis.

3U chassis
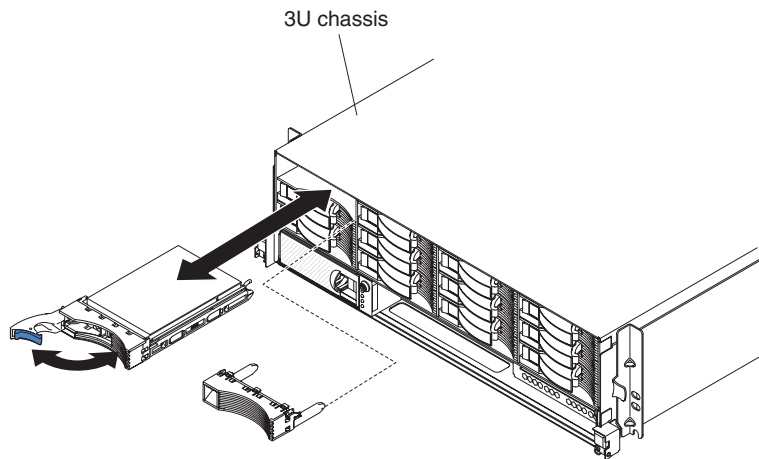
Note: You do not have to turn off the server to remove a hot-swap drive.
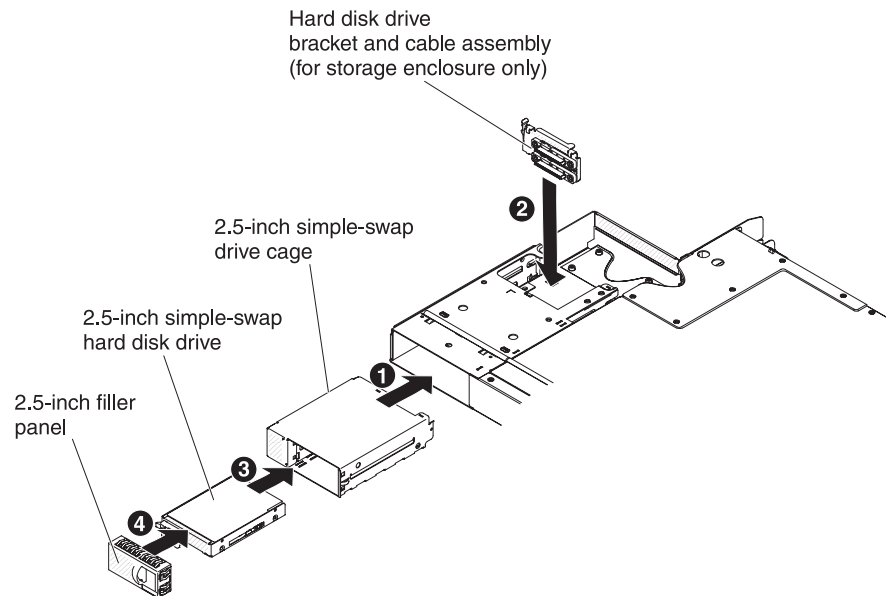
To remove a hot-swap hard disk drive, complete the following steps:

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. Rotate the drive tray handle to the open position.
3. Grasp the handle; then, pull the drive out of the drive bay.

   Note: A hard disk drive or filler panel must always be installed in each drive bay when the server is turned on.

4. Store the drive for later use.

   Note: If you install or remove a hard disk drive, see the documentation that comes with your RAID adapter for information about reconfiguring the disk arrays.

Installing a 3.5-inch hot-swap hard disk drive

Note: The following illustration shows how to install a 3.5-inch hot-swap hard disk drive in a 3U chassis.

3U chassis
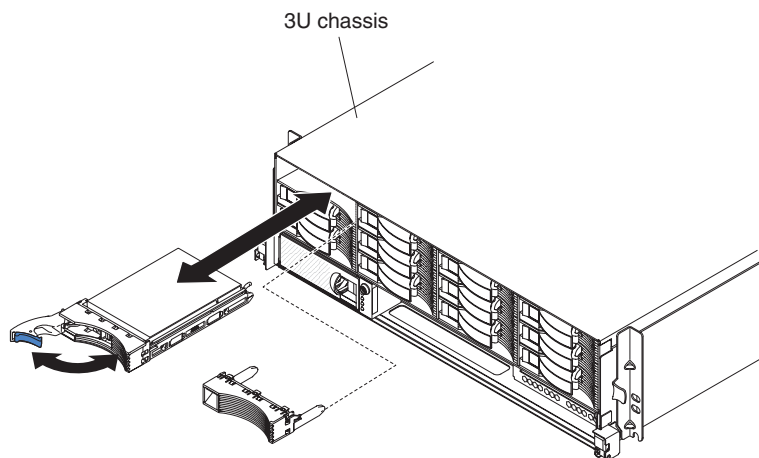
To install a hot-swap hard disk drive, complete the following steps:

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. Touch the static-protective package that contains the hard disk drive to any *unpainted* metal surface on the chassis or rack; then, remove the hard disk drive from the package.

   Attention: Do not press on the top of the drive. Pressing the top might damage the drive.
3. Make sure that the drive tray handle is in the open position.
4. Align the drive with the guide rails in the drive bay; then, carefully slide the drive into the bay until the drive stops.
5. Rotate the drive tray handle to the closed position.

Note: If you install or remove a hard disk drive, see the documentation that comes with your RAID adapter for information about reconfiguring the disk arrays.

Removing a 3.5-inch simple-swap hard disk drive

To remove a 3.5-inch simple-swap hard disk drive, complete the following steps.
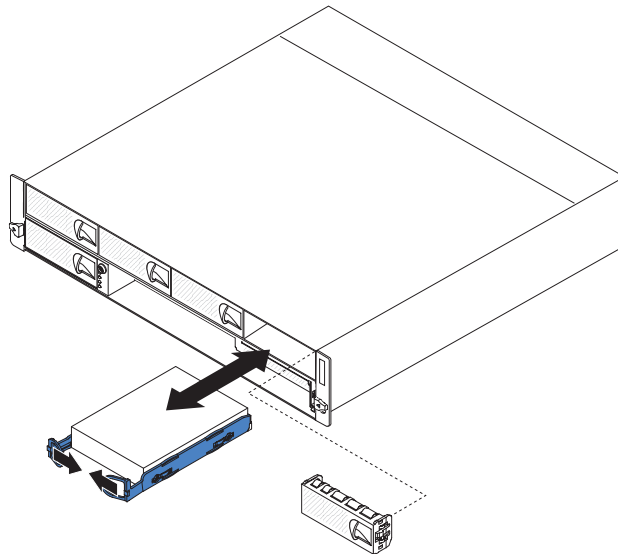
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the system-board tray is operating, shut down the operating system; then, press the power-control button to turn off the system-board tray (see "Turning off the system-board tray" on page 11 for more information).
3. Remove the filler panel from the drive bay.
4. Pull the loops of the drive toward each other; then, pull the drive out of the drive bay.
5. If you are instructed to return the hard disk drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Installing a 3.5-inch simple-swap hard disk drive

To install a 3.5-inch simple-swap hard disk drive, complete the following steps.
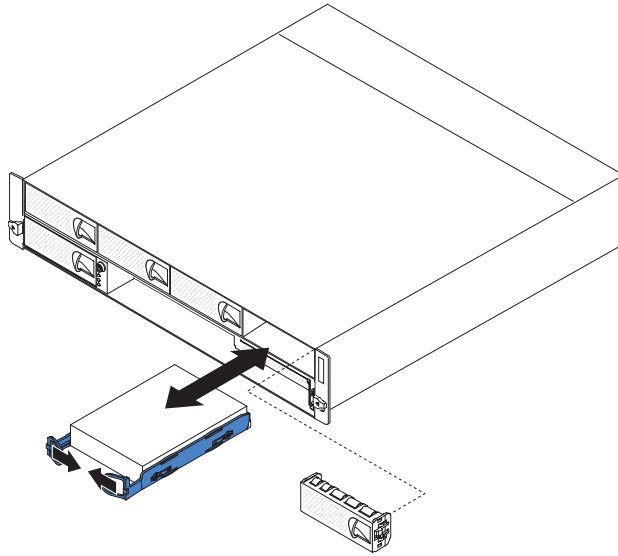
1. Touch the static-protective package that contains the hard disk drive to any *unpainted* metal surface on the outside of the chassis or rack; then, remove the hard disk drive from the package.

   Attention: Do not press on the top of the drive. Pressing the top might damage the drive.

2. Align the drive with the guide rails in the drive bay.

3. Pull the loops of the drive toward each other; then, carefully slide the drive into the bay until it stops, and release the loops.

   Note: Do not release the loops on the drive until it is completely seated.

4. Install the filler panel in the drive bay.

5. Turn on the system-board tray (see "Turning on the system-board tray" on page 11).

Removing the PCIe adapter bay cover

To remove the adapter bay cover from the I/O enclosure, complete the following steps.
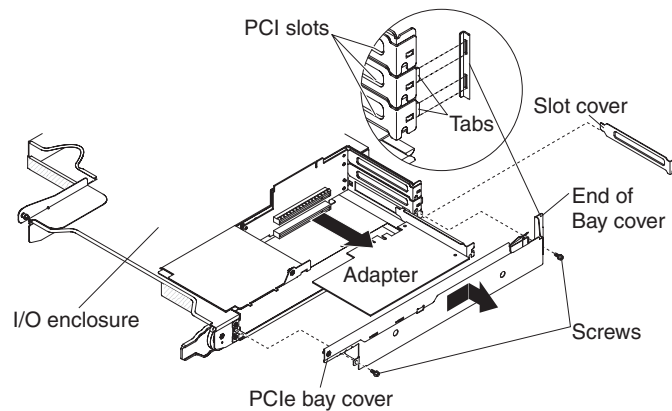
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124).
3. Remove the I/O enclosure (see "Removing an expansion enclosure from a system-board tray" on page 129).
4. Carefully set the I/O enclosure on a flat, static-protective surface.
5. Remove the two screws that secure the PCIe adapter bay cover to the I/O enclosure and save the screws for future use.
6. Slide the PCIe adapter bay cover out of the mounting tabs and remove it from the I/O enclosure.
7. If you are instructed to return the PCIe adapter bay cover, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the PCIe adapter bay cover

To install the PCIe adapter bay cover on the I/O enclosure, complete the following steps.
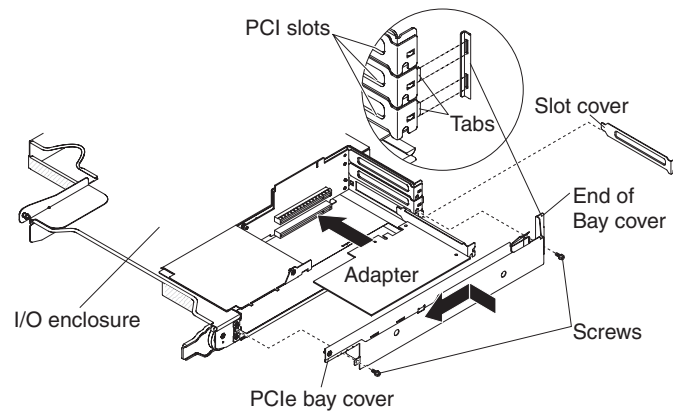
1. Make sure that no wires are protruding and might interfere with the cover.
2. Orient the PCIe adapter bay cover so that the retention tabs in the cover align with the tab slots in the enclosure.
3. Slide the PCIe adapter bay cover into the tab slots in the I/O enclosure.
4. Install the two retaining screws.
5. Install the I/O enclosure on the system-board tray (see "Installing an expansion enclosure on a system-board tray" on page 130).
6. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125).

Removing the power cord

To remove the power cord, complete the following steps.
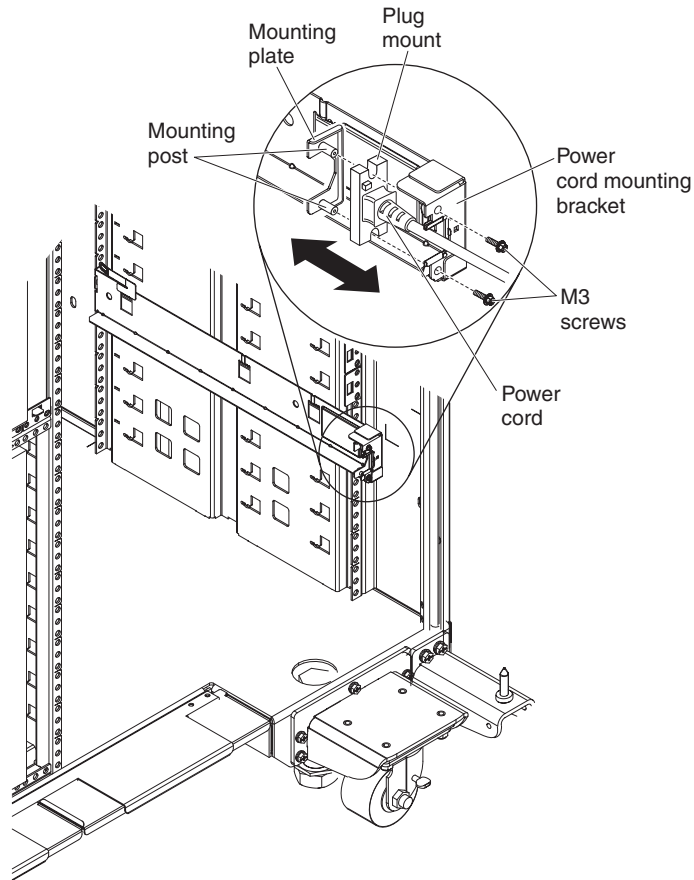
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the 2U chassis or 3U chassis is installed in an iDataPlex rack, remove the chassis from the rack (see "Removing the 2U chassis from a Type 7825 iDataPlex rack" on page 194 or "Removing a 3U chassis from a Type 7825 iDataPlex rack" on page 198).
3. Disconnect the power cord that you are working on from the PDU.
4. Use an M3 hex driver to remove the two screws from the rail, and set them aside.
5. Pull the mounting plate and power cord toward the front of the rack cabinet.
6. Separate the power cord from the mounting plate; then, set the mounting plate aside.
7. If you are instructed to return the power cord, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the power cord

To install the power cord, complete the following steps:

Mounting plate

Plug mount

Mounting post

Power cord mounting bracket

M3 screws
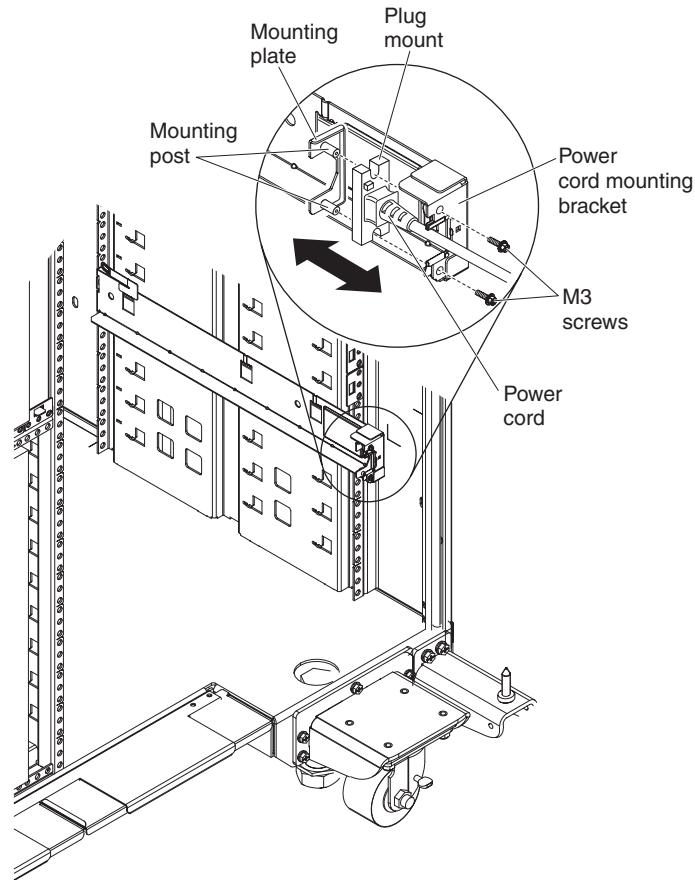
Power cord

1. Grasp the end of the power cord with the plug mount molded onto it in your right hand. Notice the shape of the plug and how it matches the cutout in the mounting plate.
2. Align the mounting posts on the mounting plate with the slots in the plug mount and install the power cord onto the mounting plate.
3. Position the entire assembly inside the left rail and align the mounting posts with the holes in the back of the mounting bracket on the rail.
4. Install the power cord and mounting plate.
5. Connect the power cord that you are working on to a PDU.
6. Install the chassis in the iDataPlex rack (see "Installing the 2U chassis in a Type 7825 iDataPlex rack" on page 195 or "Installing a 3U chassis in a Type 7825 iDataPlex rack" on page 199).

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.

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

Removing a 2.5-inch hot-swap SAS/SATA drive cage

To remove a 2.5-inch hot-swap SAS/SATA drive cage, complete the following steps.
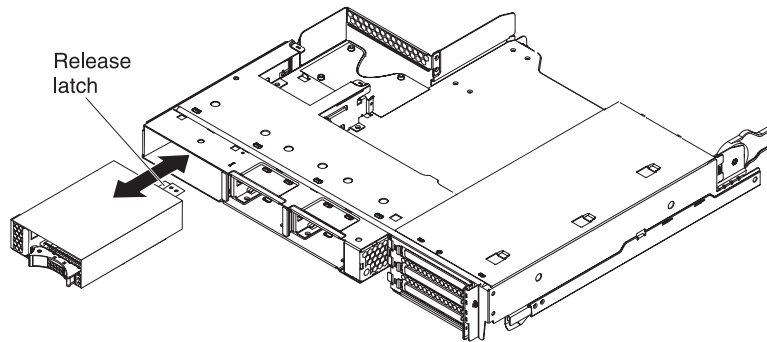
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If hard disk drives are installed in the 2.5-inch hot-swap SAS/SATA drive cage that you plan to remove, make a note of where the drives are installed; then, remove them (see "Removing a 2.5-inch hot-swap hard disk drive" on page 137).
3. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124).
4. If the 2.5-inch hot-swap SAS/SATA drive cage is installed in an expansion enclosure drive bay, complete the following steps:
   a. Make a note of where the cables are attached; then, remove them.
   b. Pull up on the release lever at the top of the drive bay; then, grasp the 2.5-inch hot-swap SAS/SATA drive cage and pull it out of the front of the drive bay.
5. If the 2.5-inch hot-swap SAS/SATA drive cage is installed in the system-board tray drive bay, complete the following steps:
   a. If an expansion enclosure is installed, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).
   b. Make a note of where the cables are attached; then, remove them.
   c. Pull up on the release lever at the top of the drive bay; then, grasp the 2.5-inch hot-swap SAS/SATA drive cage and pull it out of the front of the drive bay.
6. If you are instructed to return the 2.5-inch hot-swap SAS/SATA drive cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a 2.5-inch hot-swap SAS/SATA drive cage

To install a 2.5-inch hot-swap SAS/SATA drive cage, complete the following steps.
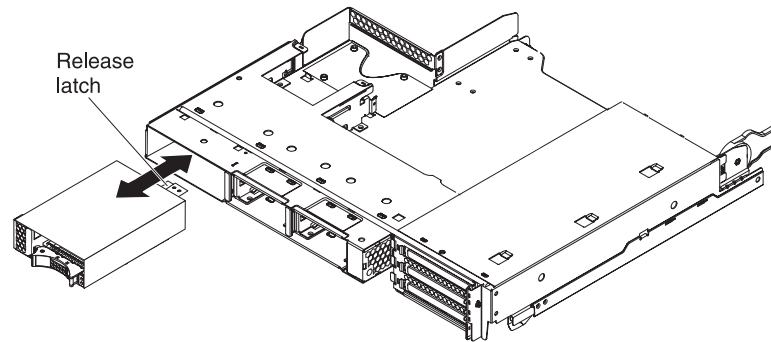
1. Align the 2.5-inch hot-swap SAS/SATA drive cage with the drive bay; then, carefully slide the cage into the bay until it stops and the release lever locks into place.
2. Connect the power and signal cables to the backplane on the 2.5-inch hot-swap SAS/SATA drive cage.
3. Install the expansion enclosure, if you removed one (see "Installing an expansion enclosure on a system-board tray" on page 130); otherwise, install the system-board tray cover (see "Installing the system-board tray cover" on page 123).
4. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125).
5. Install the hard disk drives, if you removed any (see "Installing a 2.5-inch hot-swap hard disk drive" on page 138).

Removing a 2.5-inch simple-swap SAS/SATA drive cage

To remove a 2.5-inch simple-swap SAS/SATA drive cage, complete the following steps.

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. Make a note of where the drives that you plan to remove are installed; then, remove them (see "Removing a 2.5-inch simple-swap hard disk drive or solid-state drive" on page 138).

3. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124).

4. If the 2.5-inch simple-swap SAS/SATA drive cage is installed in a system-board tray drive bay, complete the following steps:

   a. If an expansion enclosure is installed, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).

   b. Make a note of where the cables are attached; then, disconnect the cables.

   c. Push down on the release lever at the top of the drive bay; then, grasp the 2.5-inch simple-swap SAS/SATA drive cage and pull it from the hard disk drive bay until the cables are out of the hard disk drive bay.

5. If the 2.5-inch simple-swap SAS/SATA drive cage is installed in the I/O enclosure, complete the following steps:

   a. Make a note of where the cables are attached; then, disconnect the cables.

   b. Push down on the release lever at the top of the drive bay; then, grasp the 2.5-inch simple-swap SAS/SATA drive cage and pull it from the hard disk drive bay until the cables are out of the hard disk drive bay.

6. If the 2.5-inch simple-swap SAS/SATA drive cage is installed in the storage enclosure, complete the following steps:

   a. Remove the bracket and cable assembly.

   b. Push down on the release lever at the top of the drive bay; then, grasp the 2.5-inch simple-swap SAS/SATA drive cage and pull it out from the hard disk drive bay.

7. If you are instructed to return the 2.5-inch simple-swap SAS/SATA drive cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a 2.5-inch simple-swap SAS/SATA drive cage

To install a 2.5-inch simple-swap SAS/SATA drive cage, complete the following steps.

Hard disk drive
bracket and cable assembly
(for storage enclosure only)

2.5-inch simple-swap
drive cage

2.5-inch simple-swap
hard disk drive

2.5-inch filler
panel

❶ ❷ ❸ ❹

1. If cables are attached to 2.5-inch simple-swap SAS/SATA drive cage, feed the cables through the hard disk drive bay.

2. Slide the 2.5-inch simple-swap SAS/SATA drive cage into the bay until the release lever secures the cage.

3. If the 2.5-inch simple-swap SAS/SATA drive cage is installed in the system-board tray or I/O enclosure drive bay, reconnect the cables.

4. If the 2.5-inch simple-swap SAS/SATA drive cage is installed in the storage enclosure, install the hard disk drive bracket and cable assembly.

5. Install the expansion enclosure, if you removed one (see "Installing an expansion enclosure on a system-board tray" on page 130); otherwise, install the system-board tray cover (see "Installing the system-board tray cover" on page 123).

6. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125).

7. Install the hard disk drives, if you removed any (see "Installing a 2.5-inch simple-swap hard disk drive or solid-state drive" on page 139).

8. Install the filler panel to the hard disk drive bay.

Removing the 3U chassis fan assembly

To remove the 3U chassis fan assembly, complete the following steps.
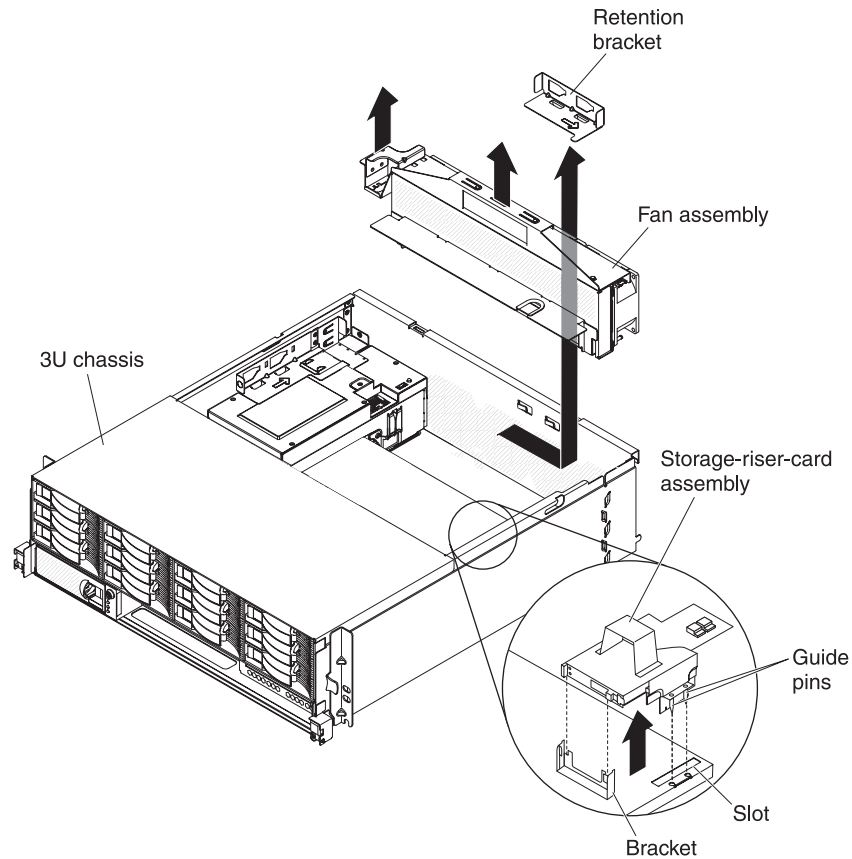

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the 3U chassis is installed in an iDataPlex rack, remove it (see "Removing a 3U chassis from a Type 7825 iDataPlex rack" on page 198).
3. Remove the top cover (see "Removing the 3U chassis top cover" on page 134).
4. Remove the storage-riser-card assembly and ServeRAID SAS controller (see "Removing a storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card from a 3U chassis" on page 189).
5. Slide the retention bracket to release it and remove the bracket from the chassis.
6. Grasp the tab at each end of the fan assembly and lift it out of the chassis.
7. If you are instructed to return the fan assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the 3U chassis fan assembly

To install the 3U chassis fan assembly, complete the following steps.
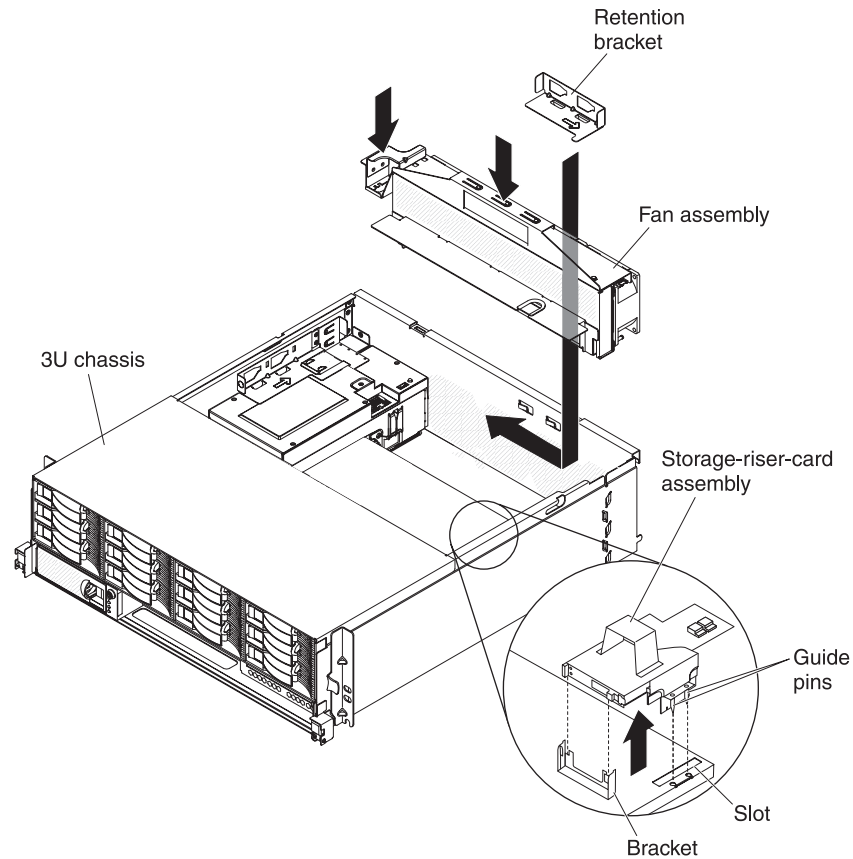
1. Touch the static-protective package that contains the fan assembly to any *unpainted* metal surface on the outside of the chassis; then, remove the fan assembly from the package.
2. Orient the fan assembly over the opening in the chassis. Make sure that the power connector on the fan assembly aligns with the connector on the power supply.
3. Route any cables through the fan assembly.
4. Lower the fan assembly into the chassis and press down on the tab above the power connector and make sure that it is fully seated.
5. Install the retention bracket.
6. Install the storage-riser-card assembly and ServeRAID SAS controller (see "Installing a storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card in a 3U chassis" on page 191).
7. Install the top cover (see "Installing the 3U chassis top cover" on page 135).
8. Install the 3U chassis in the iDataPlex rack (see "Installing the 3U chassis top cover" on page 135).

Removing a front PCIe riser-card assembly from the system-board tray

To remove a front PCIe riser-card assembly from the system-board tray, complete the following steps.
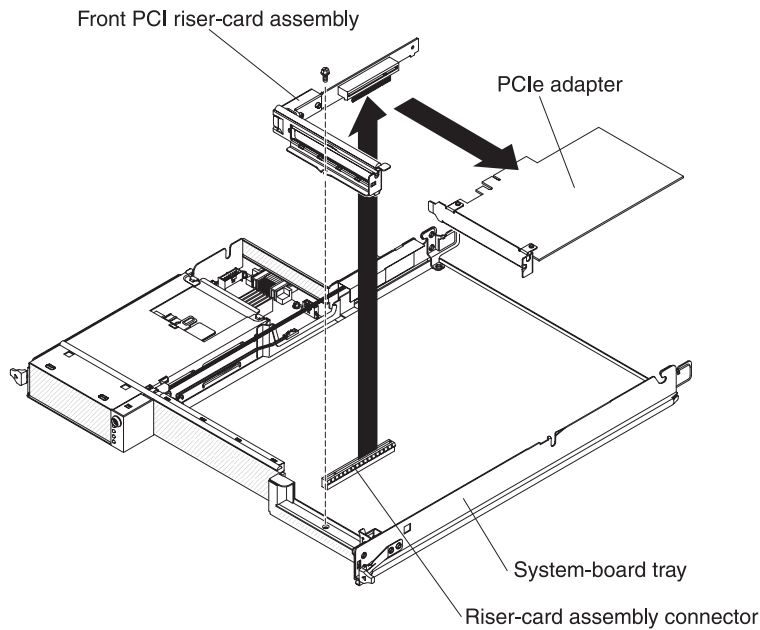
Front PCI riser-card assembly

PCIe adapter

System-board tray

Riser-card assembly connector

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124 or "Removing the system-board tray from a 3U chassis" on page 126).

3. If a storage enclosure is installed, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).

4. Remove the screw that secures the PCIe riser-card assembly to the system-board tray and save it for future use.

5. Pull the PCIe riser-card assembly out of the riser-card slot on the system board.

6. If an adapter is installed on the PCIe riser-card assembly, remove it (see "Removing a PCIe adapter from a front PCI riser-card assembly" on page 156).

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

   Attention: Do not tilt and pull the PCIe riser-card assembly from the system-board tray. Failing to properly pull the PCIe riser-card assembly from the system-board tray may damage the connector on the system board. Any damage to the connector on the system board may require replacing the system board.

Installing a front PCIe riser-card assembly on the system-board tray

To install a front PCIe riser-card assembly on the system-board tray, complete the following steps.
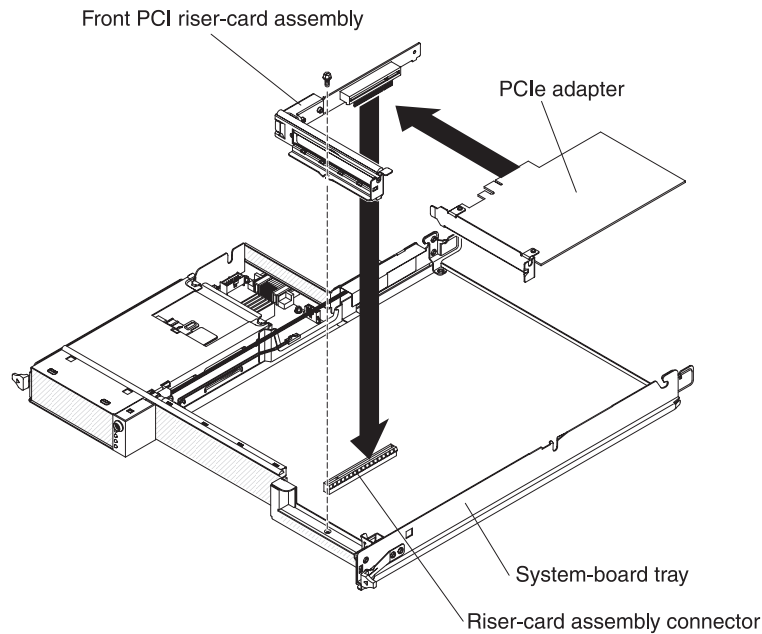
Front PCI riser-card assembly

PCIe adapter

System-board tray

Riser-card assembly connector

1. Touch the static-protective package that contains the PCIe riser-card assembly to any *unpainted* metal surface on the outside of the system-board tray; then, remove the PCIe riser-card assembly from the package.

2. Install the PCIe adapter, if you removed one (see "Installing a PCIe adapter to a front PCI riser-card assembly" on page 156).

3. Press the PCIe riser-card assembly into the riser-card slot on the system board.

4. Install the retaining screw.

5. Install the storage enclosure, if you removed one (see "Installing an expansion enclosure on a system-board tray" on page 130); otherwise, install the system-board tray cover (see "Installing the system-board tray cover" on page 123).

6. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125 or "Installing the system-board tray in a 3U chassis" on page 127).

Removing the rear PCIe riser-card assembly from the system-board tray

The server comes with one riser-card assembly that contains one PCI Express x8 Gen 2 connector. You can replace a PCI Express riser-card assembly with a riser-card assembly that contains one PCI Express Gen 2 x 8 connector.

Note: You can only install a ServeRAID-M1015 controller in the rear PCIe riser-card assembly.

To remove a rear PCIe riser-card assembly from the system-board tray, complete the following steps.
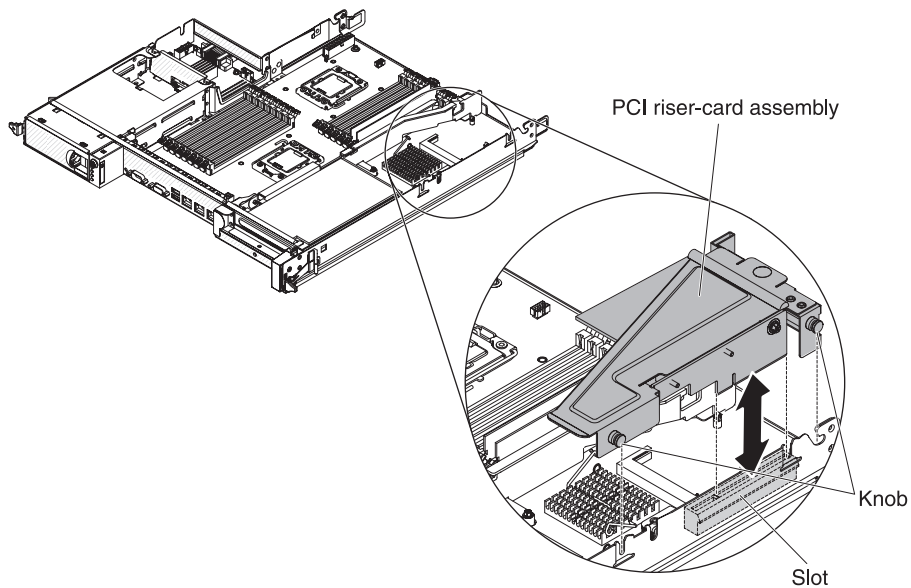
PCI riser-card assembly

Knob

Slot

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124 or "Removing the system-board tray from a 3U chassis" on page 126).

3. If an expansion enclosure is installed, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).

4. Grasp the riser-card assembly at the front tab and rear edge and lift it to remove it from the server. Slide the assembly slightly toward the server to disengage the knobs from the slots on the chassis. Place the riser-card assembly on a flat, static-protective surface.

5. Make a note of where cables are attached to the adapter; then, disconnect the cables.

Installing the rear PCIe riser-card assembly on the system-board tray

To install a rear riser-card assembly, complete the following steps.
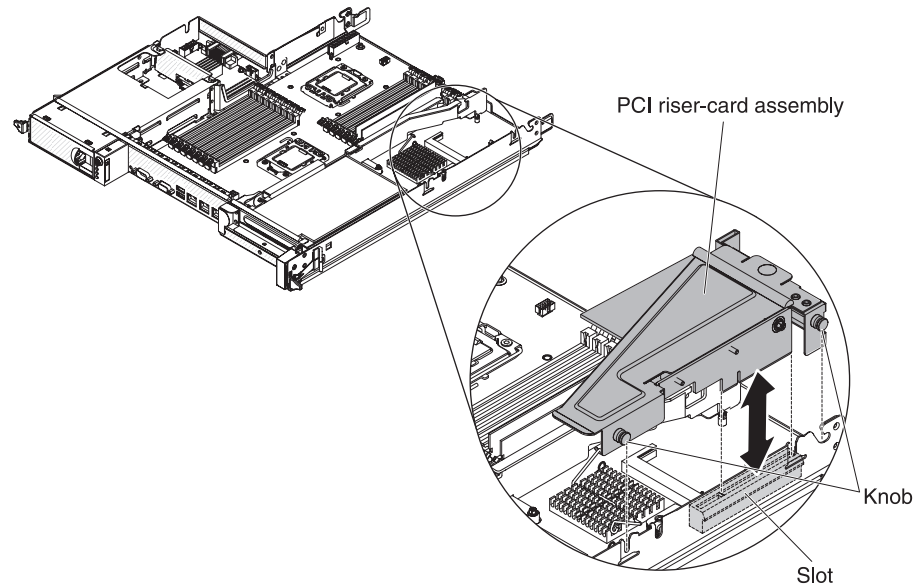
1. Reinstall any adapters and reconnect any internal cables you might have removed in other procedures.
2. Align the knobs of the PCI riser-card assembly with the PCI connector. Slide in and press down into the system board.
3. Press down on the assembly. Make sure that the riser-card assembly is fully seated in the riser-card connector on the system board.

Removing and installing an adapter

The following section describes how to remove and replace PCIe adapters.

Important: The maximum power consumption from all supply voltages for a single PCIe slot is the same as specified in PCI Local Bus Specification Revision 2.3 for conventional slots.

To ensure that an adapter works correctly in your UEFI-based server, make sure that the adapter firmware is at the latest level.

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

The following section describes how to remove and replace PCIe adapters.

Important: The maximum power consumption from all supply voltages for a single PCIe slot is the same as specified in PCI Local Bus Specification Revision 2.3 for conventional slots.

Note: All Graphics Processing Unit (GPU) adapters installed in the server must be the same. They must be identical in brand and type. When you install additional GPUs, make sure you purchase GPUs with the same product part number as shown on the existing GPUs in the server.

Removing a PCIe adapter from a front PCI riser-card assembly

To remove a PCIe adapter from a front PCI riser-card assembly, complete the following steps.
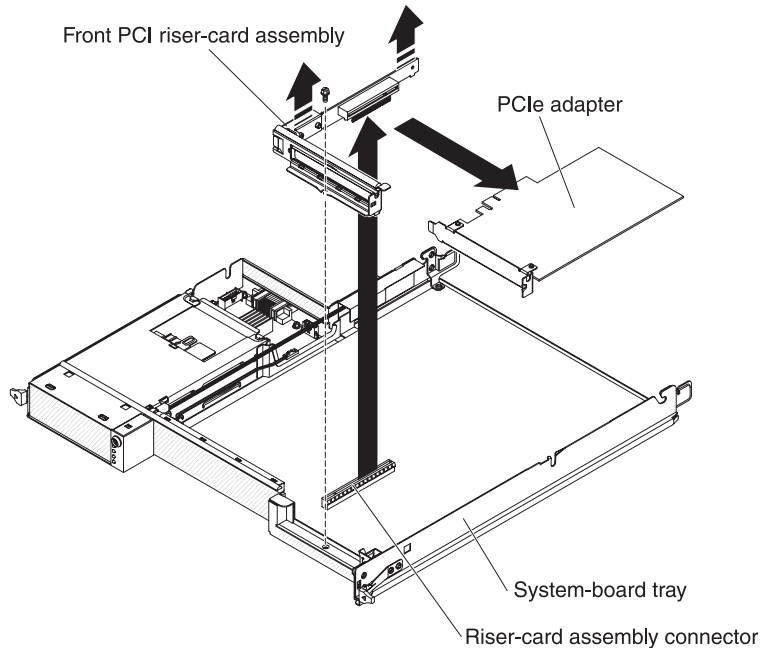
Front PCI riser-card assembly

PCIe adapter

System-board tray

Riser-card assembly connector

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124 or "Removing the system-board tray from a 3U chassis" on page 126).

3. If a storage enclosure is installed, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).

4. Make a note of where cables are attached to the adapter; then, disconnect the cables.

5. Remove the screw that secures the PCIe riser-card assembly to the system-board tray and save it for future use.

6. Grasp the two sides of the PCIe riser-card assembly using both hands as shown in the illustration; then, pull the adapter evenly out of the slot on the system board.

7. Pull the adapter out of the connector on the PCIe riser-card assembly.

   Note: Make sure that the adapter is pulled out carefully. Improper removal of the adapter might damage the PCIe riser-card assembly or the adapter.

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

Installing a PCIe adapter to a front PCI riser-card assembly

To install a PCIe adapter to a front PCI riser-card assembly, complete the following steps.
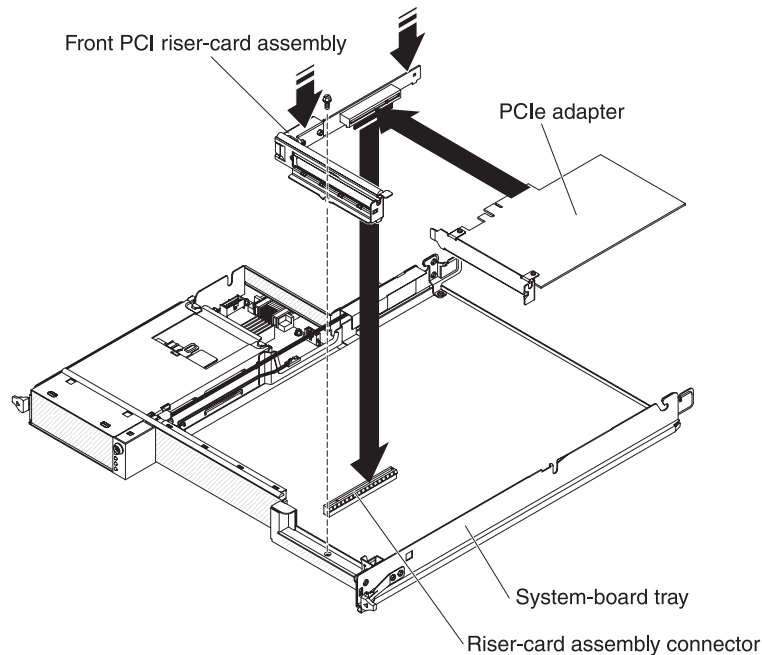
Front PCI riser-card assembly

PCIe adapter

System-board tray

Riser-card assembly connector

1. Touch the static-protective package that contains the adapter to any *unpainted* metal surface on the outside of the system-board tray; then, remove the adapter from the package. Avoid touching the components and gold-edge connectors on the adapter.

2. See the documentation that comes with the adapter to determine whether you must set any jumpers or switches.

3. Align the adapter with the PCIe slot on the riser-card assembly; then, press the adapter into the slot.

   Notes:

   a. Ensure that the tab on the riser-card bracket is properly aligned with the slot on the adapter bracket.

   b. If the PCI riser card has only 1 slot, then the PCIe adapter is aligned with slot 3. If the PCI riser card has 3 slots, then the PCIe adapters are aligned with slot 3, slot 4, and slot 5 respectively.

PCI slot 5

PCI slot 4

PCI slot 3

PCI slot 5

PCI slot 4

PCI slot 3
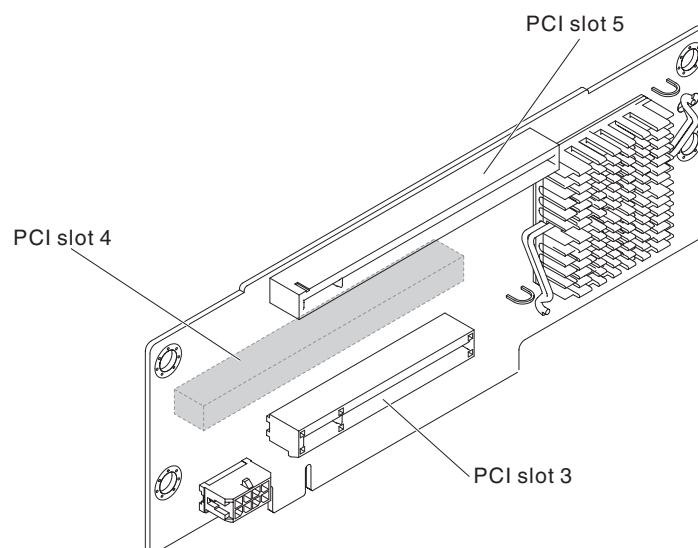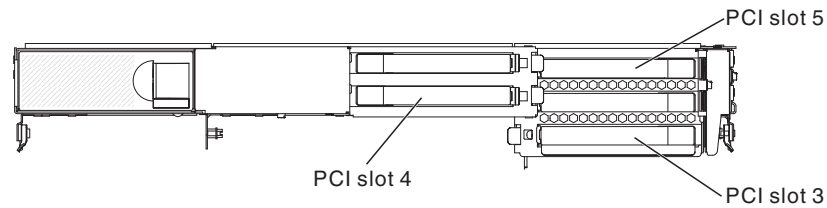
    c. Make sure that the adapter is inserted carefully. Improper installation of the adapter might damage the PCIe riser-card assembly or the adapter.

4. Grasp the two sides of the PCIe riser-card assembly using both hands as shown in the illustration. Insert the PCIe riser-card assembly with the adapter into the riser-card slot, evenly with both hands, on the system board. Then, install the retaining screw.

5. If you disconnected cables when you removed the adapter, reconnect the cables.

6. Install the storage enclosure, if you removed one (see "Installing an expansion enclosure on a system-board tray" on page 130); otherwise, install the system-board tray cover (see "Installing the system-board tray cover" on page 123).

7. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125 or "Installing the system-board tray in a 3U chassis" on page 127).

    Note: To complete the installation of the PCIe adapter, see the documentation that comes with the adapter for device-driver and configuration information.

Removing a ServeRAID-M1015 adapter from a rear storage PCI riser-card assembly

This topic describes removing an adapter from a PCI expansion slot in a rear storage PCI riser-card assembly.

To remove an adapter from a rear storage PCI expansion slot, complete the following steps.
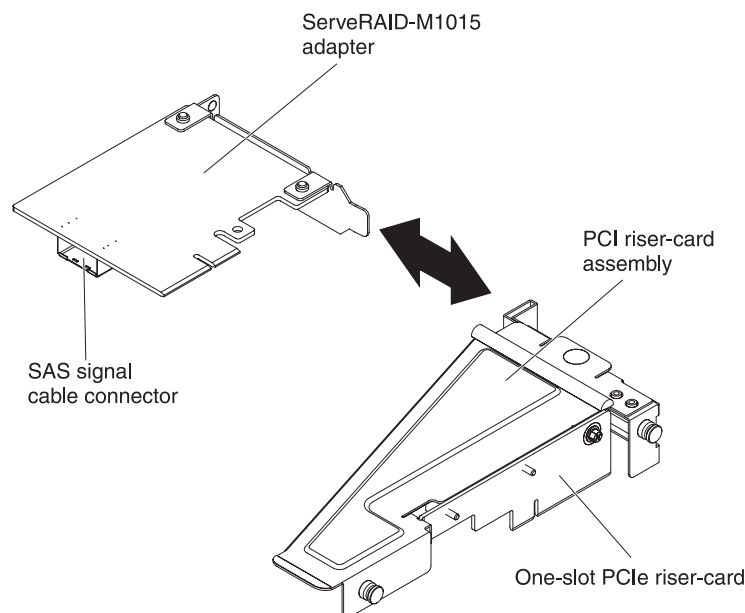
ServeRAID-M1015 adapter

PCI riser-card assembly

SAS signal cable connector

One-slot PCIe riser-card

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124 or "Removing the system-board tray from a 3U chassis" on page 126).

3. If an expansion enclosure is installed, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).

4. Remove the PCI riser-card assembly that contains the adapter (see "Removing the rear PCIe riser-card assembly from the system-board tray" on page 153).

5. Make a note of where cables are attached to the adapter; then, disconnect the cables.

6. Carefully grasp the adapter by its top edge or upper corners, and pull the adapter from the PCI expansion slot.

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

Installing a ServeRAID-M1015 to a rear storage PCI riser-card assembly

This topic describes installing an adapter in a PCI expansion slot in a rear storage PCI riser-card assembly.

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

To install an adapter, complete the following steps.
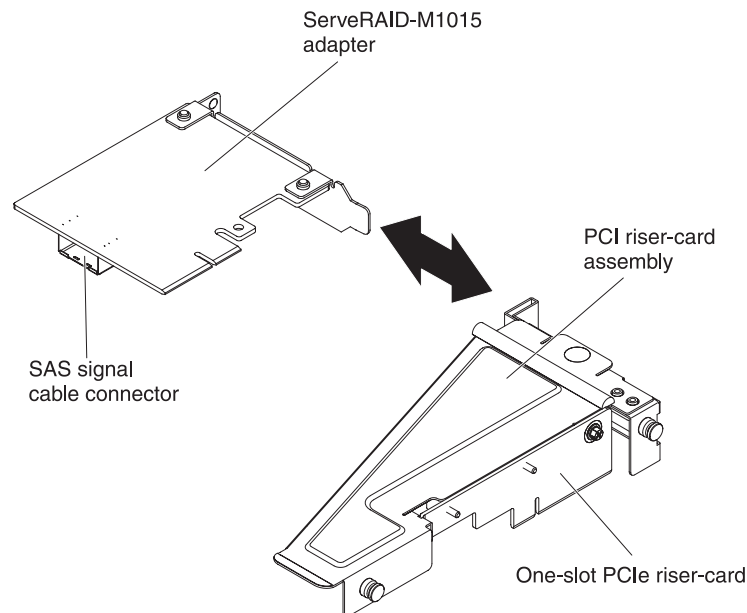
1. Align the adapter with the PCI connector on the riser card and the guide on the external end of the riser-card assembly. Press the adapter firmly into the PCI connector on the riser card.

2. Connect any required cables to the adapter.

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

3. Align the PCI riser-card assembly with the PCI connector on the system board. Carefully align the bottom edge (the contact edge) of the riser-card assembly with the riser-card connector on the system board; align the rear of the assembly with the guides on the rear of the server.

4. Press down on the assembly. Make sure that the riser-card assembly is fully seated in the riser-card connector on the system board.

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

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

Removing an outer adapter from the I/O enclosure

To remove an outer PCIe adapter from the I/O enclosure, complete the following steps.
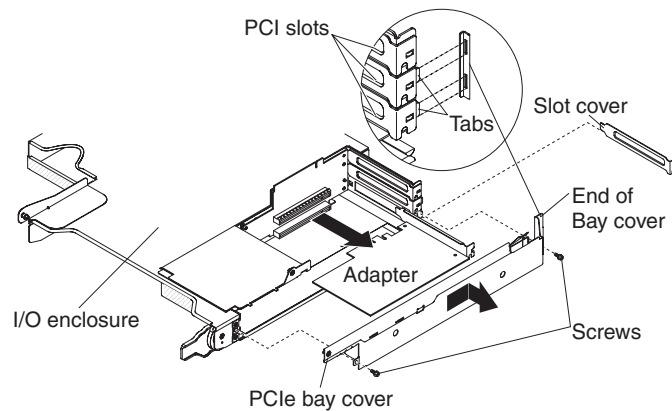
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124).

3. Remove the I/O enclosure (see "Removing an expansion enclosure from a system-board tray" on page 129).

4. Carefully set the I/O enclosure on a flat, static-protective surface.

5. Remove the PCIe adapter bay cover from the I/O enclosure and save it for future use (see "Removing the PCIe adapter bay cover" on page 142).

6. Make a note of where cables are attached to the adapter; then, disconnect the cables.

7. Pull the adapter out of the connector on the PCIe riser-card assembly.

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

Installing an outer adapter in the I/O enclosure

To install an outer PCIe adapter in the I/O enclosure, complete the following steps.
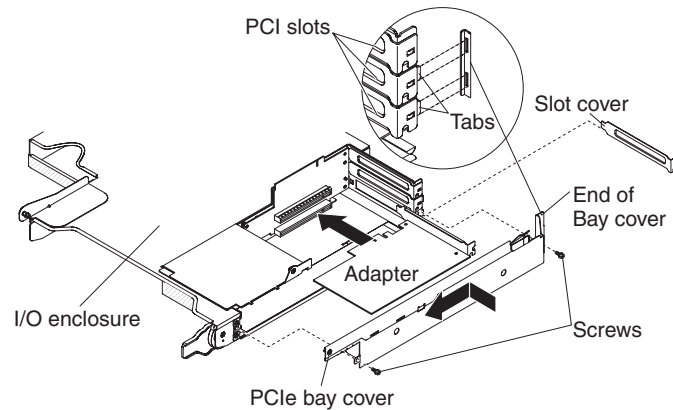
1. Touch the static-protective package that contains the adapter to any *unpainted* metal surface on the outside of the system-board tray; then, remove the adapter from the package. Avoid touching the components and gold-edge connectors on the adapter.
2. See the documentation that comes with the adapter to determine whether you must set any jumpers or switches.
3. Carefully grasp the adapter by the top edge or upper corner, and slide it halfway into PCIe bay.

   Note: If the adapter is a full-length adapter, or with a full-length extender, make sure it is seated in the groove of retainer bracket.
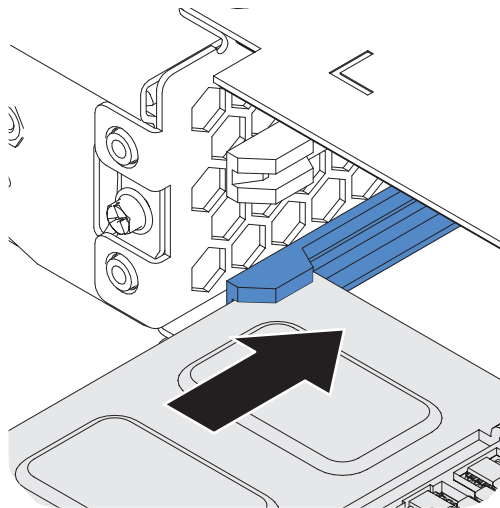
4. If any cables must be connected to an adapter, connect them. Route these cables through the hole at the side of the expansion enclosure.
5. Align the adapter with PCIe slot on the riser-card; then press the adapter into the slot.

   Note: For dual-slot PCI adapter, press the adapter down and forward until the gold fingers stop at the slot on the riser card. Make sure the edge of the I/O bracket meets the chassis bottom. Do not lift the card during this step.
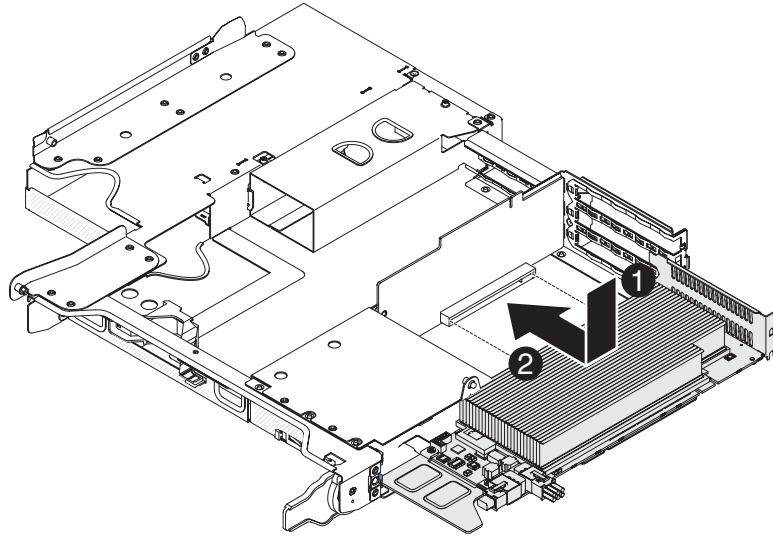
Push the card gently into the slot. Make sure that the screw holes on the card and the chassis are aligned.
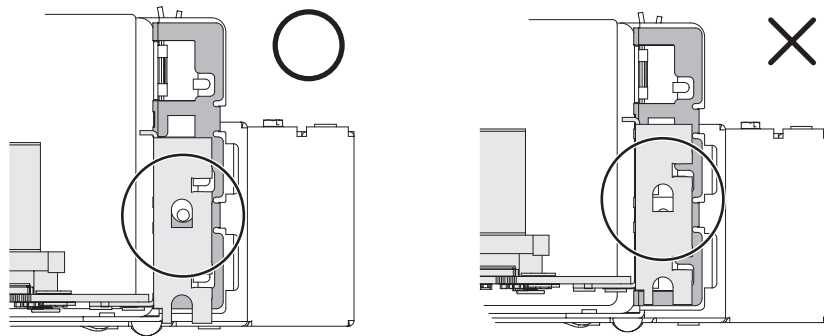
6. Install the PCIe adapter bay cover on the I/O enclosure (see "Installing the PCIe adapter bay cover" on page 143).

7. Install the I/O enclosure on the system-board tray (see "Installing an expansion enclosure on a system-board tray" on page 130).

8. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125).

Note: To complete the installation of the PCIe adapter, see the documentation that comes with the adapter for device-driver and configuration information.

Removing an inner adapter from the I/O enclosure (some configurations)

To remove an inner PCIe adapter from the I/O enclosure, complete the following steps.
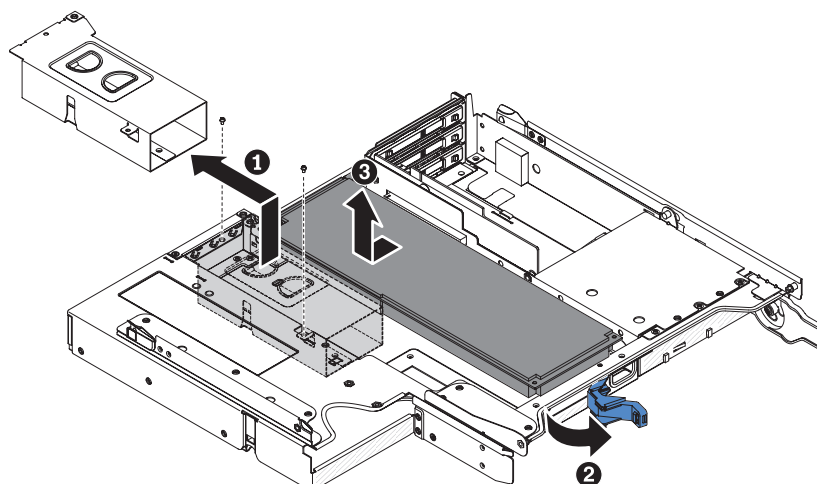
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124).
3. Remove the I/O enclosure (see "Removing an expansion enclosure from a system-board tray" on page 129).
4. Carefully set the I/O enclosure on a flat, static-protective surface.
5. Remove the screws and remove the bracket from the I/O enclosure and save it for future use.
6. You may open the latch on the back of the I/O enclosure to obtain more room for pulling out the adapter.
7. Make a note of where cables are attached to the adapter; then, disconnect the cables.
8. Pull the adapter out of the connector on the PCIe riser-card assembly.
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 inner adapter in the I/O enclosure (some configurations)

To install an inner PCIe adapter in the I/O enclosure, complete the following steps.
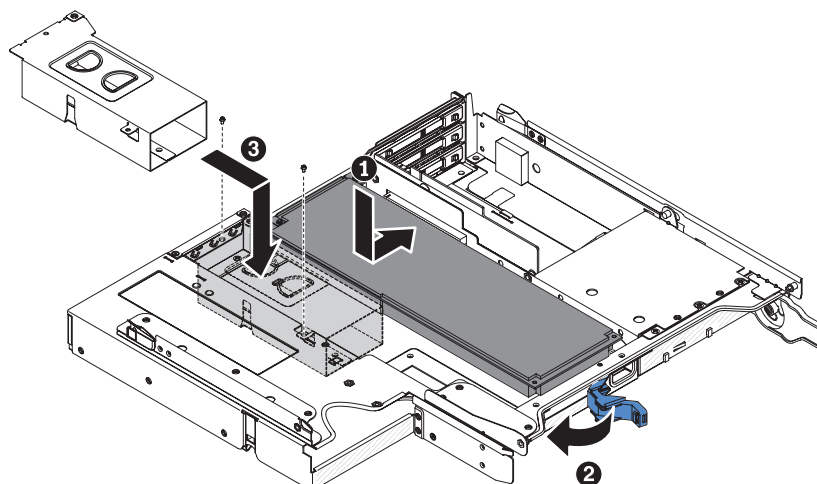
1. Touch the static-protective package that contains the adapter to any *unpainted* metal surface on the outside of the system-board tray; then, remove the adapter from the package. Avoid touching the components and gold-edge connectors on the adapter.

2. See the documentation that comes with the adapter to determine whether you must set any jumpers or switches.

3. Align the adapter with the PCIe slot on the riser-card assembly; then, press the adapter into the slot.

   Note: If the adapter is a full-length adapter, or with a full-length extender, make sure it is seated in the groove of retainer bracket.

4. If you disconnected cables when you removed the adapter, reconnect the cables.

5. Make sure the cables are routed appropriately and close the latch on the back of the I/O enclosure.

6. Install the bracket in the I/O enclosure and tighten the screws.

7. Install the I/O enclosure on the system-board tray (see "Installing an expansion enclosure on a system-board tray" on page 130).

8. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125).

   Note: To complete the installation of the PCIe adapter, see the documentation that comes with the adapter for device-driver and configuration information.

Removing the mini-SAS RAID controller

To remove the mini-SAS RAID controller, complete the following steps.
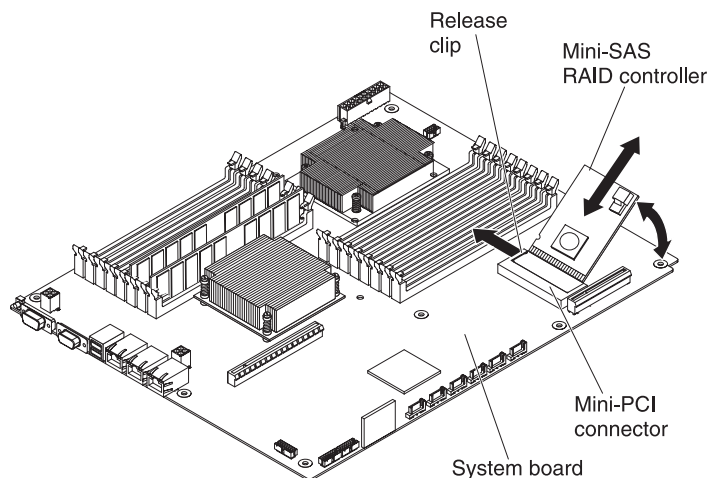
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124 or "Removing the system-board tray from a 3U chassis" on page 126).

3. If an enclosure is installed, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).

4. Remove the PCI riser-card assembly (see "Removing the rear PCIe riser-card assembly from the system-board tray" on page 153) if any.

5. Make a note of where the cable is attached to the mini-SAS RAID controller; then, disconnect the cable.

6. Carefully tilt the mini-SAS RAID controller upward to disengage the plastic standoffs from the system board.

7. Press outward on the release clips; then, lift the mini-SAS RAID controller up and pull it out of the mini-PCI connector on the system board.

8. If you are instructed to return the mini-SAS RAID controller, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the mini-SAS RAID controller

To install the mini-SAS RAID controller, complete the following steps.
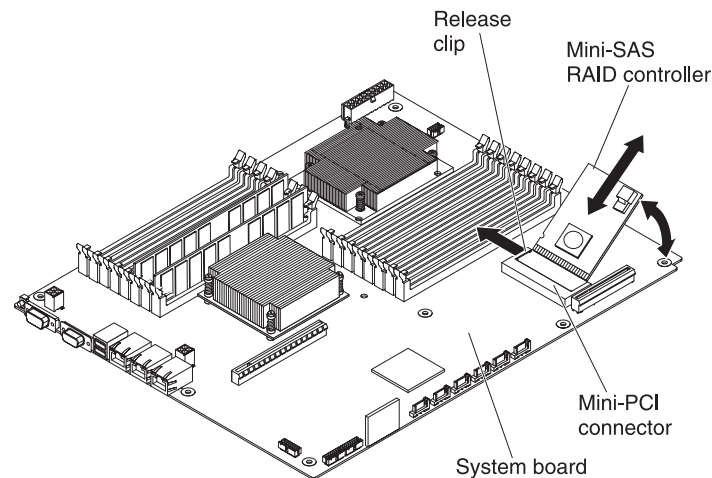
1. Touch the static-protective package that contains the mini-SAS RAID controller to any unpainted metal surface on the outside of the system-board tray; then, remove the adapter from the package.

2. Align the mini-SAS RAID controller with the mini-PCI connector on the system board; then, press the adapter into the connector.

3. Press the mini-SAS RAID controller downward until the release clips click into place and the plastic standoffs are seated in the system board.

4. If you disconnected a cable when you removed the mini-SAS RAID controller, reconnect the cable.

5. Install the PCI riser-card assembly (see "Installing the rear PCIe riser-card assembly on the system-board tray" on page 155) if any.

6. Install the enclosure, if you removed one (see "Installing an expansion enclosure on a system-board tray" on page 130); otherwise, install the system-board tray cover (see "Installing the system-board tray cover" on page 123).

7. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125 or "Installing the system-board tray in a 3U chassis" on page 127).

Note: To complete the installation of the mini-SAS RAID controller, see the documentation that comes with the controller for device-driver and configuration information.

Removing the ServeRAID battery from a 2U/3U chassis

To remove the battery holder, ServeRAID Li-Ion battery, and charge circuit from a 2U/3U chassis, complete the following steps.
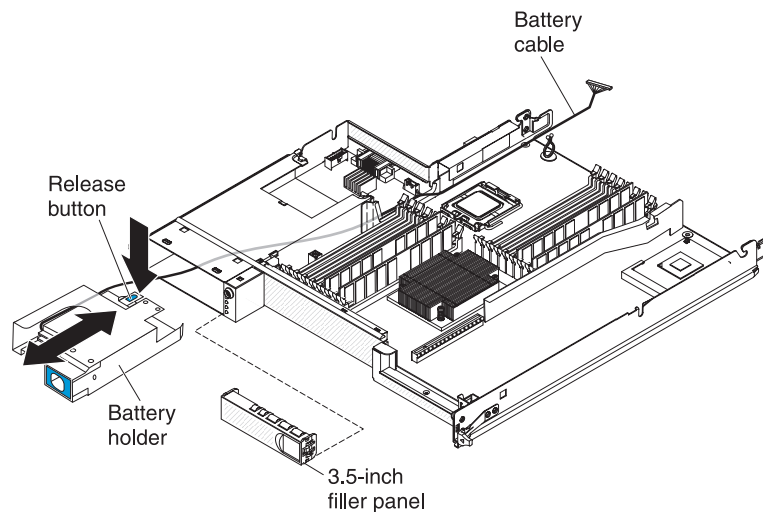
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If you have a 2U server:
   a. Remove the expansion enclosure from a system-board tray (see "Removing an expansion enclosure from a system-board tray" on page 129).
   b. Remove the back PCIe riser-card assembly from the system-board tray (see "Removing the rear PCIe riser-card assembly from the system-board tray" on page 153).
   c. Disconnect the battery cable from ServeRAID SAS controller.
3. If you have a 3U server:
   a. If the 3U chassis is installed in an iDataPlex rack, remove it (see "Removing a 3U chassis from a Type 7825 iDataPlex rack" on page 198).
   b. Remove the system-board tray from the 3U chassis (see "Removing the system-board tray from a 3U chassis" on page 126).
   c. Remove the top cover (see "Removing the system-board tray cover" on page 123).
4. Make sure that the battery cable can move freely inside the system-board tray.
5. Remove the filler panel from the hard disk drive bay.

6. Press the release button on the battery holder and pull the battery holder from the hard disk drive bay until the battery cable is out of the hard disk drive bay.

Tray retention tab

ServeRAID Li-Ion battery and charge circuit assembly (Bottom view)

Battery holder (Bottom view)
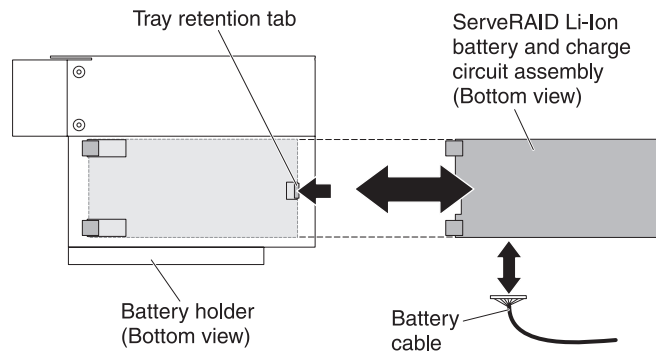
Battery cable

7. Press the tray retention tab on the bottom of the battery holder to release the ServeRAID Li-Ion battery and charge circuit assembly.

8. Disconnect the battery cable from the ServeRAID Li-Ion battery and charge circuit assembly.

ServeRAID Li-Ion battery and charge circuit assembly

Standoffs
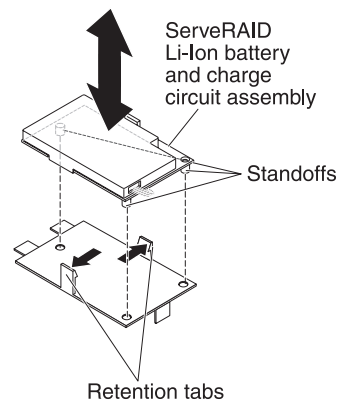
Retention tabs

9. Press both retention tabs on the tray to release the ServeRAID Li-Ion battery and charger circuit assembly.

Charger circuit retention tab

ServeRAID Li-Ion battery

Charger circuit cable connector
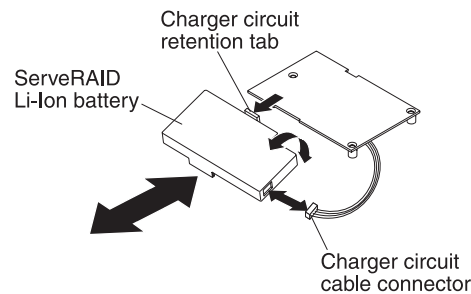
10. Press the charge circuit retention tab to release the ServeRAID Li-Ion battery from the charge circuit assembly; then, disconnect the cable from the charge circuit.

11. If you are instructed to return the battery holder, ServeRAID Li-Ion battery, and charge circuit, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

   Note: See the *Environmental Notices and User's Guide* on the IBM *Documentation* CD for environmental notices.

Installing the ServeRAID battery in a 2U/3U chassis

To install the battery holder, ServeRAID Li-Ion battery, and charge circuit in a 2U/3U chassis, complete the following steps.
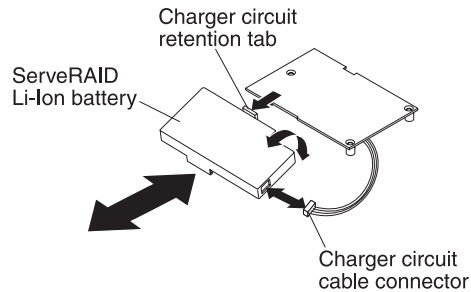
1. Touch the static-protective packages that contain the battery holder, ServeRAID Li-Ion battery, and charge circuit to any *unpainted* metal surface on the outside of the chassis; then, remove the battery holder, ServeRAID Li-Ion battery, and charge circuit from the packages.

2. Align the ServeRAID Li-Ion battery and charge circuit and press together until the tab snaps in place. Connect the cable from the ServeRAID Li-Ion battery to the charge circuit.
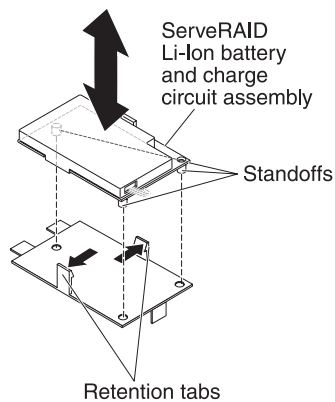
3. Align the standoffs on the charge circuit with the tray and press together until the tabs snap in place to secure the assembly.
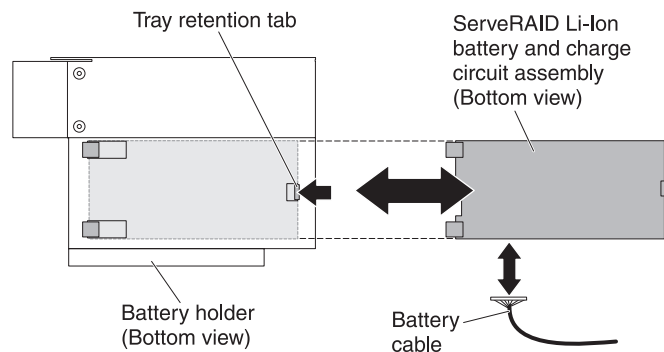
4. Connect the battery cable to the ServeRAID Li-Ion battery and charge circuit assembly.

5. Align the assembly in the battery holder and slide the assembly into the battery holder until the tray retention tab snaps in place.

Battery cable

Release button

Battery holder

3.5-inch filler panel
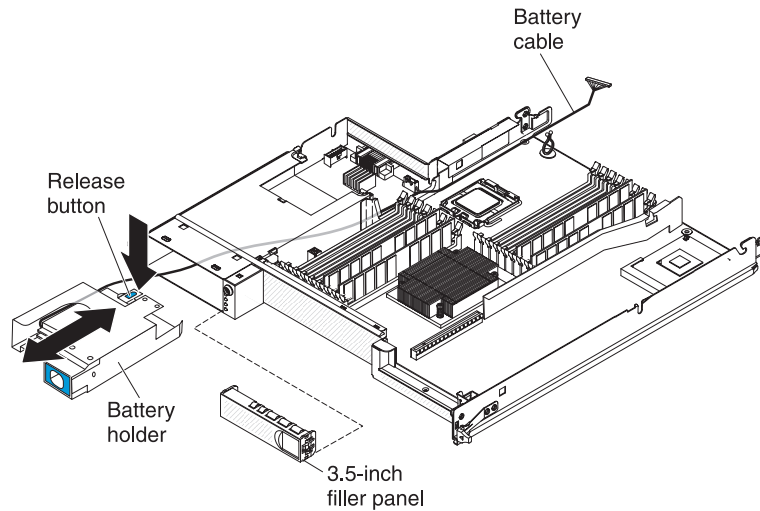
6. Feed the battery cable through the hard disk drive bay and slide the battery holder into the bay until the retention tab secures the battery holder.

7. Install the hard disk drive bay filler panel.

8. If you have a 2U server:

   a. Reconnect the battery cable to ServeRAID SAS controller.

   b. Install the back PCIe riser-card assembly on the system-board tray (see "Installing the rear PCIe riser-card assembly on the system-board tray" on page 155).

   c. Install the expansion enclosure on a system-board tray (see "Installing an expansion enclosure on a system-board tray" on page 130).

   d. Install the system-board tray in a 2U chassis (see "Installing the system-board tray in a 2U chassis" on page 125).

Battery power cable
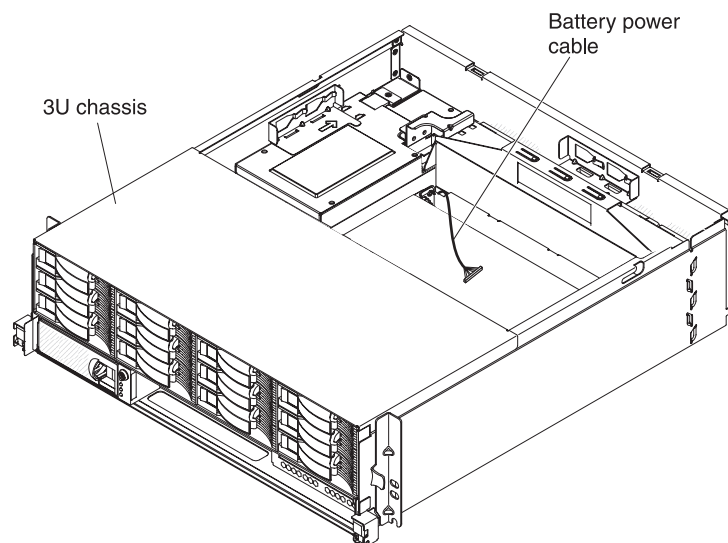
3U chassis

9. If you have a 3U server:

   a. Route the battery cable through the system-board tray and the chassis.

b. Install the system-board tray cover (see "Installing the system-board tray cover" on page 123).

c. Installing the system-board tray in the 3U chassis (see "Installing the system-board tray in a 3U chassis" on page 127).

d. Install the 3U chassis in the iDataPlex rack (see "Installing a 3U chassis in a Type 7825 iDataPlex rack" on page 199).

Removing an IBM virtual media key

To remove an IBM virtual media key, complete the following steps.
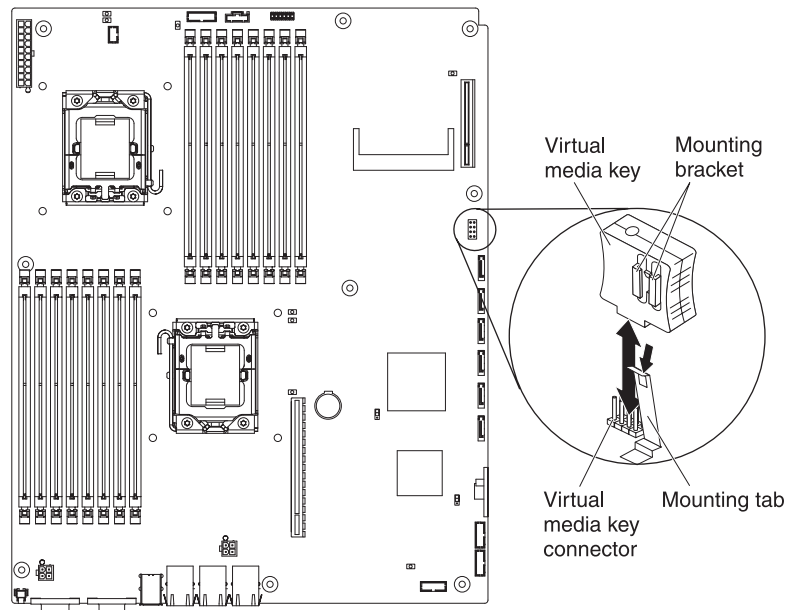
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124 or "Removing the system-board tray from a 3U chassis" on page 126).

3. If an expansion enclosure is installed, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).

4. Move the retention clip away from the virtual media key and pull the key from the connector.

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

Installing an IBM virtual media key

To install an IBM virtual media key, complete the following steps.
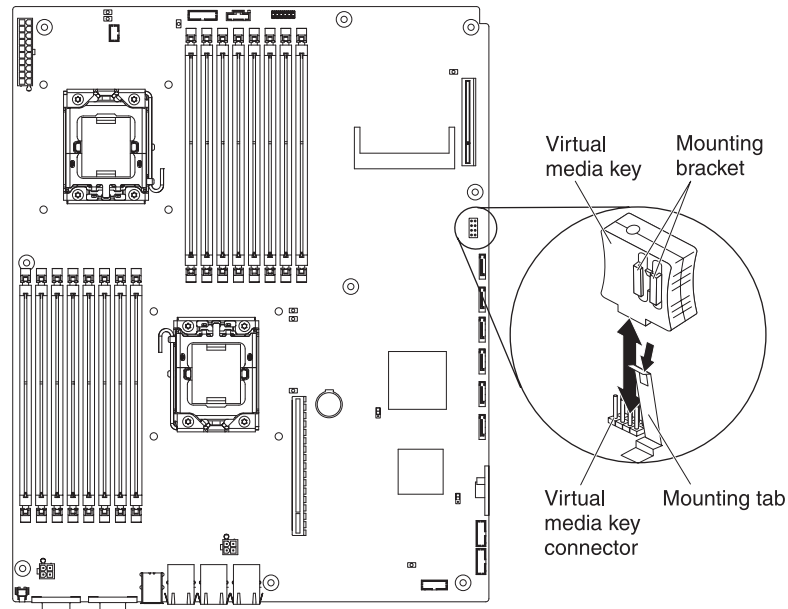
1. Align the virtual media key with the connector.
2. Press on the virtual media key until it is firmly seated in the connector and make sure that the retention clip engages the virtual media key.
3. Install the expansion enclosure, if you removed one (see "Installing an expansion enclosure on a system-board tray" on page 130); otherwise, install the system-board tray cover (see "Installing the system-board tray cover" on page 123).
4. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125 or "Installing the system-board tray in a 3U chassis" on page 127).

Removing an I²C multiplexer card

To remove a multiplexer card from the I/O enclosure, complete the following steps.
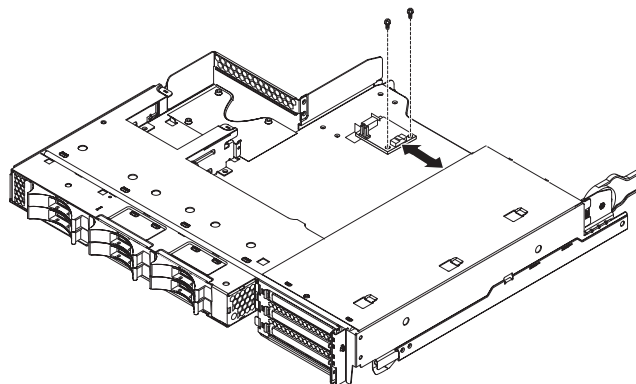
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124).

3. Remove the I/O enclosure from the system-board tray (see "Removing an expansion enclosure from a system-board tray" on page 129).

4. Carefully set the I/O enclosure on a flat, static-protective surface.

5. Make a note of where the cables are attached to the I^{2}C multiplexer card; then, disconnect them.

6. Remove the screws that secure the I^{2}C multiplexer card to the I/O enclosure and save them for future use.

7. Pull the I^{2}C multiplexer card from the mounting clips and remove the card from the I/O enclosure.

8. If you are instructed to return the I^{2}C multiplexer card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an I^{2}C multiplexer card

To install an I^{2}C multiplexer card in the I/O enclosure, complete the following steps.
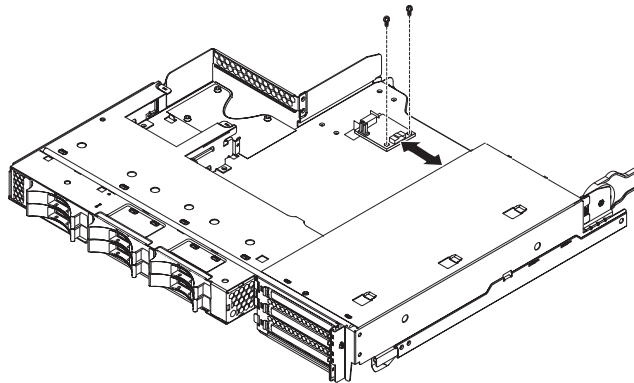
1. Touch the static-protective package that contains the I^{2}C multiplexer card to any *unpainted* metal surface on the outside of the I/O enclosure; then, remove the I^{2}C multiplexer card from the package.

2. Slide the I^{2}C multiplexer card under the mounting clips.

3. Install the retaining screws.

4. Reconnect the cables to the I^{2}C multiplexer card.

5. Install the I/O enclosure (see "Installing an expansion enclosure on a system-board tray" on page 130).

6. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125).

Removing a memory module

To remove a DIMM, complete the following steps.
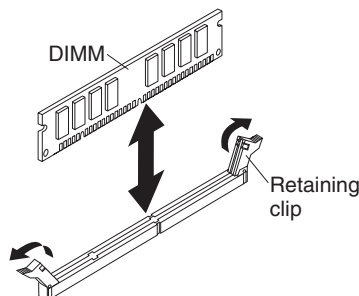
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124 or "Removing the system-board tray from a 3U chassis" on page 126).
3. If an expansion enclosure is installed, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).
4. Locate the DIMM connectors (see "System-board connectors" on page 12).

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.
5. Press the DIMM retaining clips to the open position.
6. Lift the DIMM out of the DIMM connector.
7. If you are instructed to return the DIMM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a memory module

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

- Make sure that the replacement DIMM is the correct type of memory (see Chapter 4, "Parts listing," on page 101 for a list of DIMMs that are compatible with the server).
- The system-board tray supports only industry-standard double-data-rate 3 (DDR3), -800, -1066, or -1333 MHz, PC3-10600R-999, registered, synchronous dynamic random-access memory (SDRAM) dual inline memory modules (DIMMs) with error correcting code (ECC).
- The system-board tray supports up to 16 DIMMs.
- The system-board tray supports three single-rank or dual-rank DIMMs per channel. Table 14 shows an example of the maximum amount of memory that you can install.

Table 14. Maximum memory installation

DIMM type	Maximum number of DIMMs	DIMM size	Total memory
Single-rank/dual-rank	16	2 GB	32 GB
Dual-rank	16	4 GB	64 GB
Dual-rank	16	8 GB	128 GB
Quad-rank	12	16 GB	192 GB

- Table 15 shows the DIMM connectors on each memory channel.

Table 15. Connectors on each memory channel

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

- The DIMM options that are available are 2 GB, 4 GB, and 8 GB. The system-board tray supports a minimum of 2 GB and a maximum of 128 GB of system memory.

  Note: The amount of usable memory will be 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 "Using the Setup utility" on page 228.

- A minimum of two DIMMs must be installed for each microprocessor. However, to improve system performance, install a minimum of three DIMMs for each installed microprocessor.
- The maximum operating speed of the system-board tray is determined by the slowest DIMM, the number of DIMMs on each channel, and the combination of DIMM rank and speed.
- The system-board tray comes with a minimum of two 2 GB DIMMs, installed in slots 3 and 6. When you install additional DIMMs, install the DIMMs in the order shown in Table 16 to optimize system performance. All three channels on the memory interface for each microprocessor can be populated in any order and have no matching requirements.

Table 16. Non-mirroring (normal) mode DIMM installation sequence

Microprocessors installed	DIMM connector
1	3, 6, 8, 2, 5, 7, 1, then 4
2	3, 11, 6, 14, 8, 16, 2, 10, 5, 13, 7, 15, 1, 9, 4, then 12

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

DIMM 2   DIMM 4   DIMM 6
DIMM 1   DIMM 3   DIMM 5   DIMM 7   DIMM 8

DIMM 16
DIMM 15
DIMM 14   DIMM 12   DIMM 10
DIMM 13   DIMM 11
DIMM 9
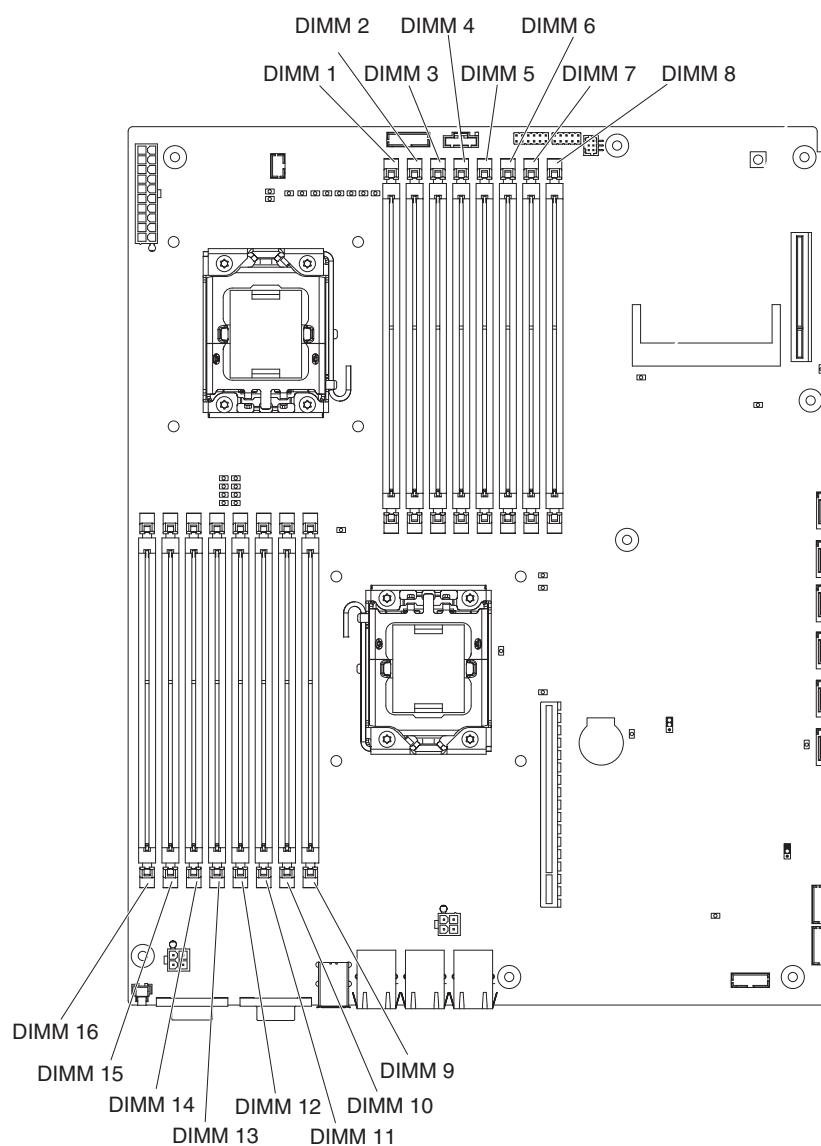
- Memory-mirroring mode replicates and stores data on two pairs of DIMMs within two channels simultaneously. If a failure occurs, the memory controller switches from the primary pair of DIMMs to the backup pair of DIMMs. You must enable memory mirroring through the Setup utility. See "Using the Setup utility" on page 228. When you use the memory-mirroring mode, you must consider the following information:
  - Table 17 and Table 18 on page 176 show the installation sequence for installing DIMMs in memory-mirroring mode.

Table 17. Microprocessor 1 memory-mirroring DIMM installation sequence

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

Table 18. Microprocessor 2 memory-mirroring DIMM installation sequence

Microprocessor number	Pair	DIMM connectors
2	1	11, 14
2	2	10, 13
2	3	9, 12

- – To support memory mirroring, the DIMMs in each pair must match but the pairs can be different from each other. For example, the first pair of DIMMs must match and the second pair of DIMMs must match; however, the first and second pair of DIMMs can be different from each other.
- – Channel 2 DIMM connectors are not used in memory-mirroring mode.
- – The maximum available memory is reduced by half when memory mirroring is enabled. For example, if you install 64 GB of memory, only 32 GB of addressable memory is available when you use memory mirroring.
- • The server supports online-spare memory. This feature disables the failed memory from the system configuration and activates an online-spare DIMM to replace the failed active DIMM. You can enable either online-spare memory or memory mirroring in the Setup utility (see "Using the Setup utility" on page 228).

  Note: The memory online-spare feature is supported on server models with an Intel Xeon™ 5600 series microprocessor.
- • When you install or remove DIMMs, the system-board tray configuration information changes. When you restart the system-board tray, the system displays a message that indicates that the memory configuration has changed.

To install a DIMM, complete the following steps.
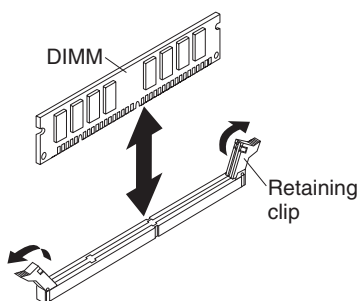
1. Read the documentation that comes with the DIMM.
2. Touch the static-protective package that contains the DIMM to any *unpainted* metal surface on the outside of the system-board tray; then, remove the DIMM from the package.

   Attention: To avoid breaking the DIMM retaining clips or damaging the DIMM connectors, open and close the clips gently.
3. Make sure that both of the retaining clips are in the fully open position.
4. Orient the DIMM so that the DIMM keys align correctly with the connector on the system board.
5. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.

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

6. Install the expansion enclosure, if you removed one (see "Installing an expansion enclosure on a system-board tray" on page 130); otherwise, install the system-board tray cover (see "Installing the system-board tray cover" on page 123).

7. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125 or "Installing the system-board tray in a 3U chassis" on page 127).

Removing and installing a one-bay or four-bay hard disk drive bracket and cable assembly

The following section describes how to remove and install a one-bay hard disk drive bracket and cable assembly and a four-bay hard disk drive bracket and cable assembly in a system-board tray and the expansion enclosures.

Removing a one-bay hard disk drive bracket and cable assembly

To remove a one-bay hard disk drive bracket and cable assembly from a system-board tray, I/O enclosure, or storage enclosure, complete the following steps.
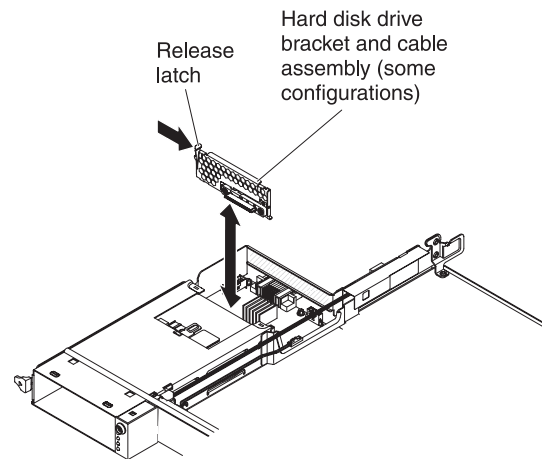

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124).

3. If you are removing the hard disk drive bracket and cable assembly from a system-board tray, complete the following steps:

   a. If the system-board tray has an attached expansion enclosure, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).

   b. If a 3.5-inch hard disk drive is installed in the system-board tray, remove it (see "Removing a 3.5-inch simple-swap hard disk drive" on page 141).

   c. Make a note of where the hard disk drive bracket and cable assembly cables are attached; then, disconnect them.

   d. Press inward on the hard disk drive bracket and cable assembly release latch; then, lift the assembly off the mounting tabs and out of the system-board tray.

4. If you are removing the hard disk drive bracket and cable assembly from an I/O enclosure, complete the following steps:

   a. Remove the I/O enclosure from the system-board tray and set it on a flat, static-protective surface (see "Removing an expansion enclosure from a system-board tray" on page 129).

   b. If a hard disk drive is installed in the I/O enclosure, remove it (see "Removing a 3.5-inch simple-swap hard disk drive" on page 141).

   c. Make a note of where the hard disk drive bracket and cable assembly cables are attached; then, disconnect them.

   d. Press inward on the hard disk drive bracket and cable assembly release latch; then, lift the assembly off the mounting tabs and out of the I/O enclosure.

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

Installing a one-bay hard disk drive bracket and cable assembly

To install a one-bay hard disk drive bracket and cable assembly in a system-board tray or I/O enclosure, complete the following steps.
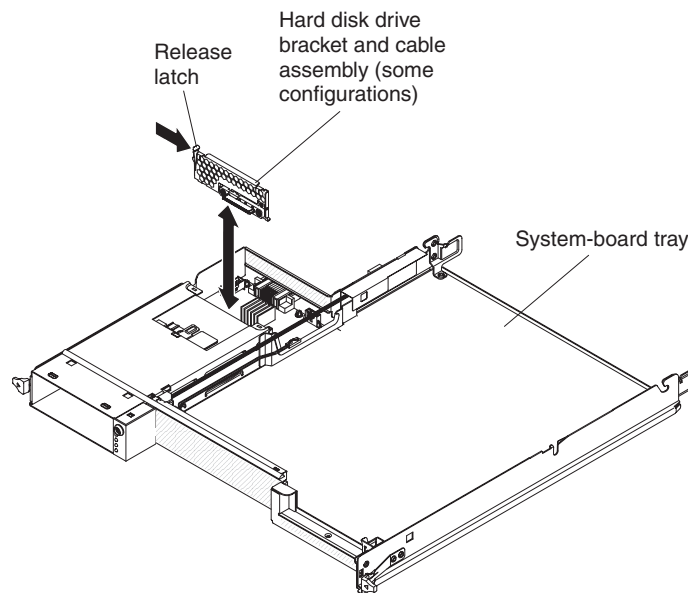
1. Touch the static-protective package that contains the hard disk drive bracket and cable assembly to any *unpainted* metal surface on the outside of the system-board tray or I/O enclosure; then, remove the hard disk drive bracket and cable assembly from the package.

2. Place the hard disk drive bracket and cable assembly on the mounting tabs inside the system-board tray or I/O enclosure; then, press down on the hard disk drive bracket and cable assembly until the release latch clicks into place.

3. Reconnect the hard disk drive bracket and cable assembly cables.

4. Install the hard disk drive, if you removed one from the system-board tray or I/O enclosure (see "Installing a 3.5-inch simple-swap hard disk drive" on page 142).

5. If you are installing the hard disk drive bracket and cable assembly in a system-board tray, complete the following steps:

   a. Install the expansion enclosure, if you removed one from the system-board tray (see "Installing an expansion enclosure on a system-board tray" on page 130

page 130); otherwise, install the system-board tray cover (see "Installing the system-board tray cover" on page 123).

   b. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125).

6. If you are installing the hard disk drive bracket and cable assembly in an I/O enclosure, complete the following steps:

   a. Install the I/O enclosure on the system-board tray (see "Installing an expansion enclosure on a system-board tray" on page 130).

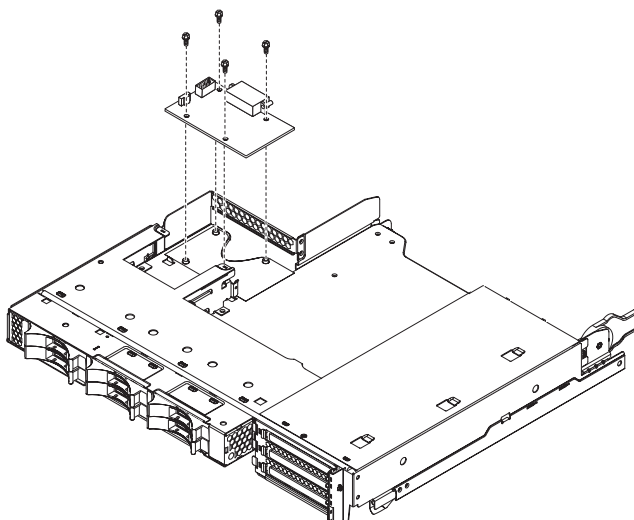   b. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125).

7. If you are instructed to return the hard disk drive bracket and cable assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Removing a four-bay hard disk drive bracket and cable assembly

Note: The illustration might be slightly different from your server depending on your configuration.

To remove a four-bay hard disk drive bracket and cable assembly from the storage enclosure, complete the following steps.
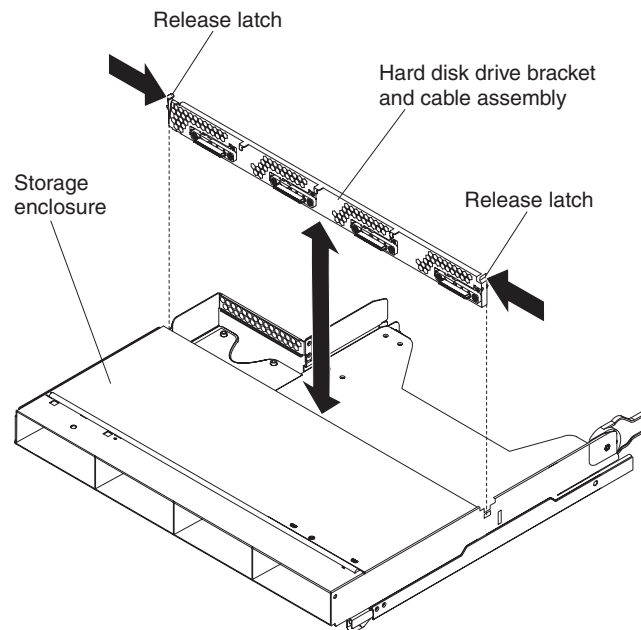
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124).

3. Remove the storage enclosure from the system-board tray (see "Removing an expansion enclosure from a system-board tray" on page 129).

4. Carefully set the storage enclosure on a flat, static-protective surface.

5. If hard disk drives are installed in the storage enclosure, make note of where the drives are installed; then, remove them (see "Removing a 3.5-inch simple-swap hard disk drive" on page 141).

6. Make a note of where the hard disk drive bracket and cable assembly cables are attached; then, disconnect them.

7. Press inward on the hard disk drive bracket and cable assembly release latches; then, lift the hard disk drive bracket and cable assembly off the mounting tabs and out of the storage enclosure.

8. If you are instructed to return the hard disk drive bracket and cable assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a four-bay hard disk drive bracket and cable assembly

To install a four-bay hard disk drive bracket and cable assembly in the storage enclosure, complete the following steps.
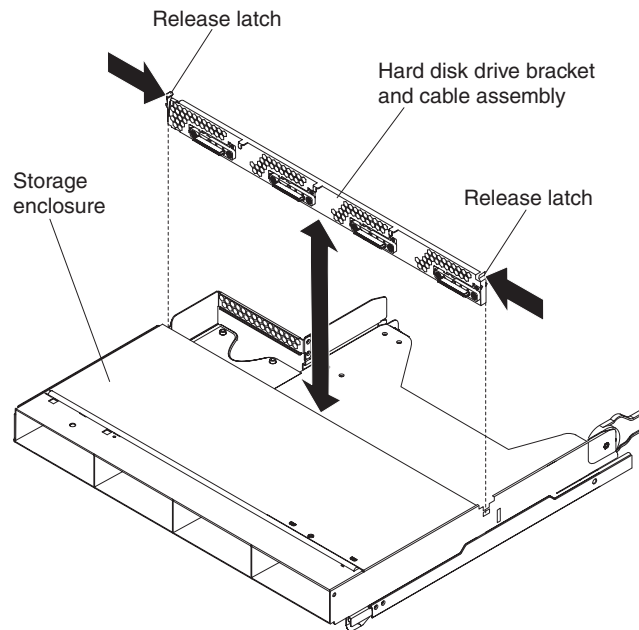
1. Touch the static-protective package that contains the hard disk drive bracket and cable assembly to any *unpainted* metal surface on the outside of the storage enclosure; then, remove the hard disk drive bracket and cable assembly from the package.

2. Place the hard disk drive bracket and cable assembly on the mounting tabs inside the storage enclosure; then, press down on the hard disk drive bracket and cable assembly until the release latches click into place.

3. Reconnect the hard disk drive bracket and cable assembly cables.

4. Install the hard disk drives, if you removed any from the storage enclosure (see "Installing a 3.5-inch simple-swap hard disk drive" on page 142).

5. Install the storage enclosure (see "Installing an expansion enclosure on a system-board tray" on page 130).

6. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125).

Removing a power supply from a 2U chassis

To remove the power supply from a 2U chassis, complete the following steps.
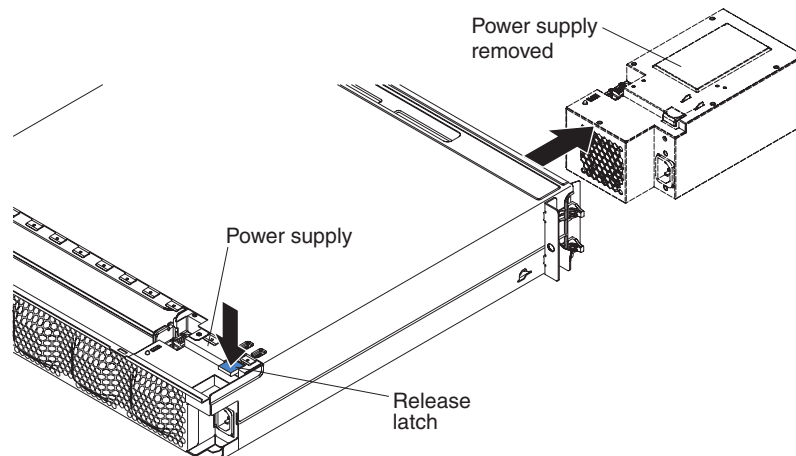
Power supply removed

Power supply

Release latch

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the chassis that contains the power supply is installed in an iDataPlex rack, remove it (see "Removing the 2U chassis from a Type 7825 iDataPlex rack" on page 194).
3. Remove the top cover (see "Removing the 2U chassis fan-assembly top cover" on page 133).
4. Remove the fan assembly (see "Removing the 2U chassis fan assembly" on page 131).
5. Press the power-supply release latch and push the power supply toward the front of the chassis.
6. Carefully pull the power supply out through the front of the chassis.
7. If you are instructed to return the power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a power supply in a 2U chassis

Notes:

1. If you are installing a 900 watt redundant power supply unit, make sure the input power is phase-to-phase, or, phase-to-neutral, 200 volt to 240 volt nominal, AC, 47-63 Hz.
2. Both plugs of 900 watt redundant power supply should be plugged in to PDU or outlet together.
3. If the slide rails in your rack installation kit comes with shipping thumbscrews, remove them before you begin the following installation procedure.

To install the power supply in a 2U chassis, complete the following steps.
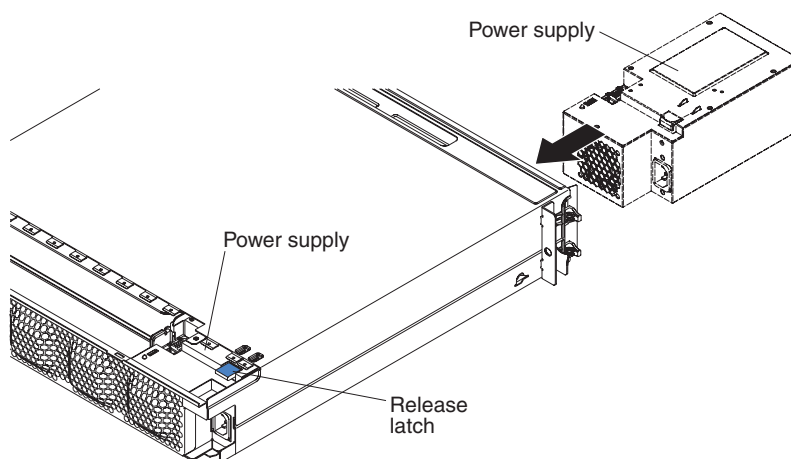
Power supply

Power supply

Release latch

1. Touch the static-protective package that contains the power supply to any *unpainted* metal surface on the outside of the chassis; then, remove the power supply from the package.
2. Insert the power supply into the front of the chassis.
3. Carefully guide the power supply into the guides at the left-rear corner of the chassis until the release latch clicks into place.
4. Install the fan assembly (see "Installing the 2U chassis fan assembly" on page 132).
5. Install the top cover (see "Installing the 2U chassis fan-assembly top cover" on page 133).
6. Install the chassis in the iDataPlex rack (see "Installing the 2U chassis in a Type 7825 iDataPlex rack" on page 195).

Removing a power supply from a 3U chassis

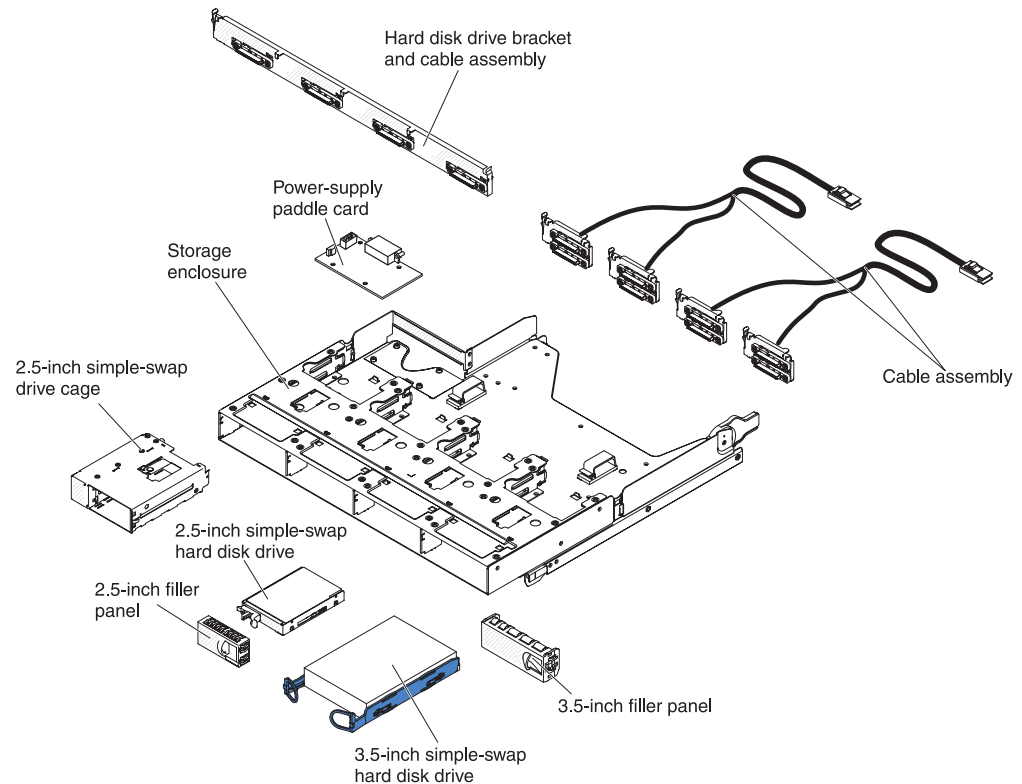To remove a power supply from a 3U chassis, complete the following steps:

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the 3U chassis is installed in an iDataPlex rack, remove it (see "Removing a 3U chassis from a Type 7825 iDataPlex rack" on page 198).
3. Remove the top cover (see "Removing the 3U chassis top cover" on page 134).
4. Remove the storage-riser-card assembly and ServeRAID SAS controller (see "Removing a storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card from a 3U chassis" on page 189).
5. Remove the fan assembly (see "Removing the 3U chassis fan assembly" on page 150).
6. Partially remove the system-board tray to disengage the power connector at the rear of the system-board tray (see "Removing the system-board tray from a 3U chassis" on page 126).
7. Press the release button on the power supply and simultaneously slide the retention bracket toward the rear of the 3U chassis and remove the retention bracket.

Release
button

Tabs
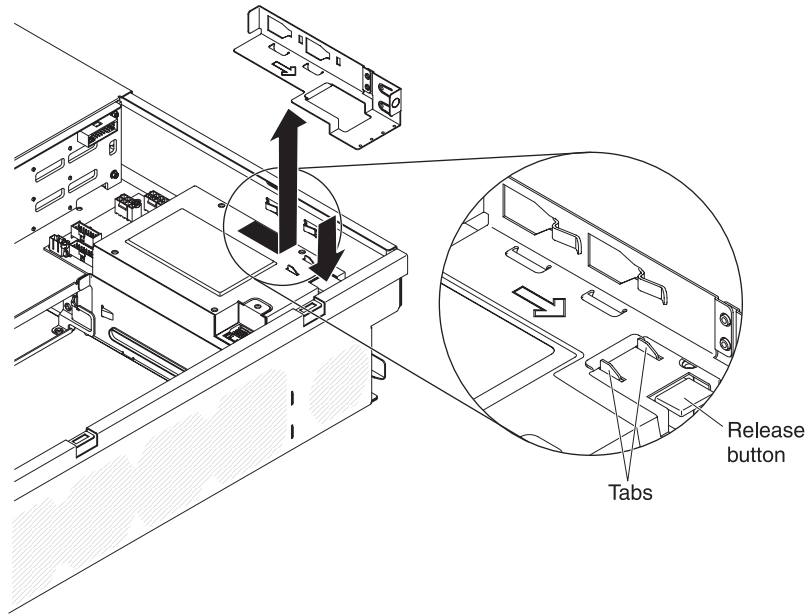
8. Lift the power supply from the 3U chassis and rotate it toward the middle of the chassis.
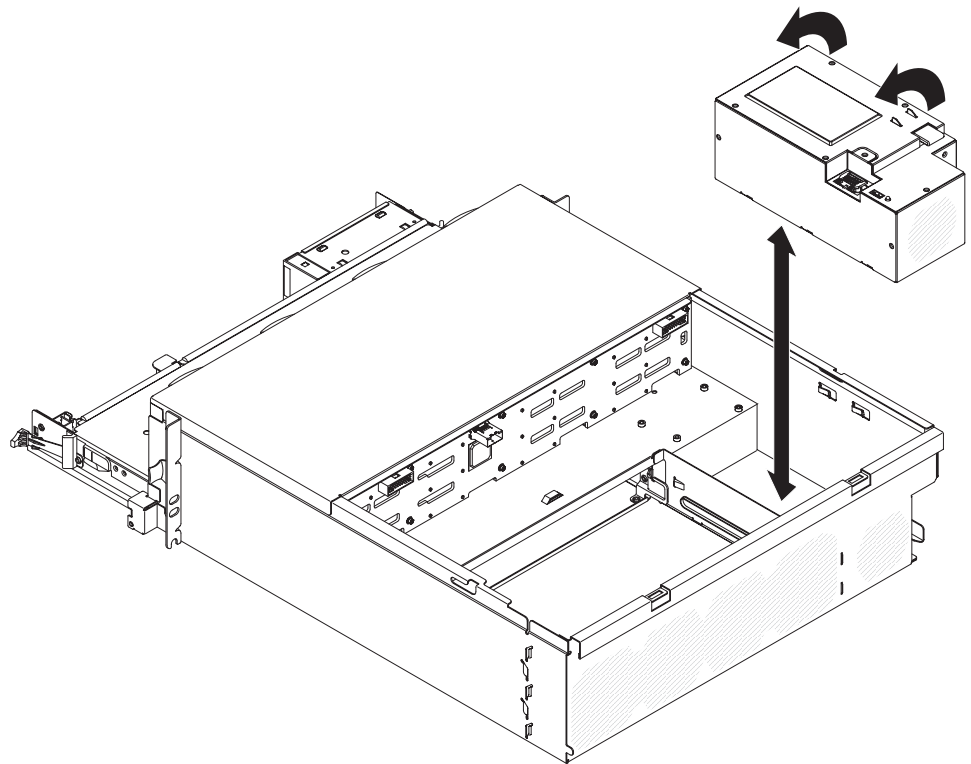
9. If you are instructed to return the power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a power supply in a 3U chassis

Notes:

1. If you are installing a 900 watt redundant power supply unit, make sure the input power is phase-to-phase, or, phase-to-neutral, 200 volt to 240 volt nominal, AC, 47-63 Hz.
2. Both plugs of 900 watt redundant power supply should be plugged in to PDU or outlet together.
3. If the slide rails in your rack installation kit comes with shipping thumbscrews, remove them before you begin the following installation procedure.

To install a power supply in a 3U chassis, complete the following steps:

1. Touch the static-protective package that contains the power supply to any *unpainted* metal surface on the outside of the 3U chassis; then, remove the power supply from the package.
2. Lower the power supply into the 3U chassis.
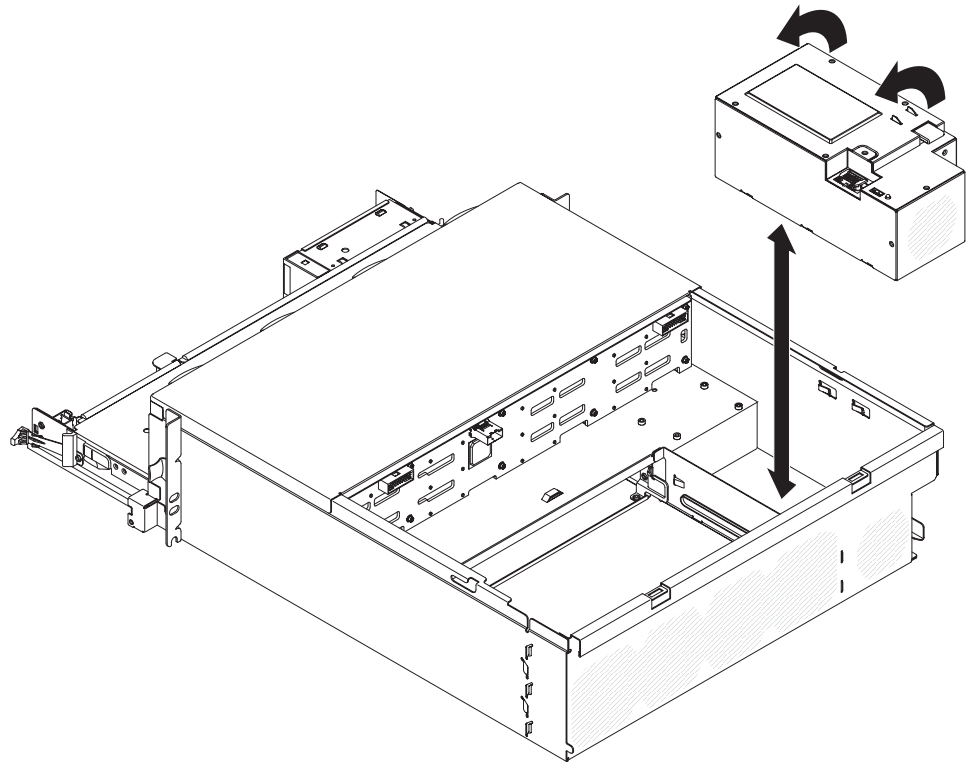
3. Install the retention bracket.

   Note: Make sure that the clips on the side of the chassis secure the retention bracket and that the bracket presses firmly against the tabs on the power supply.
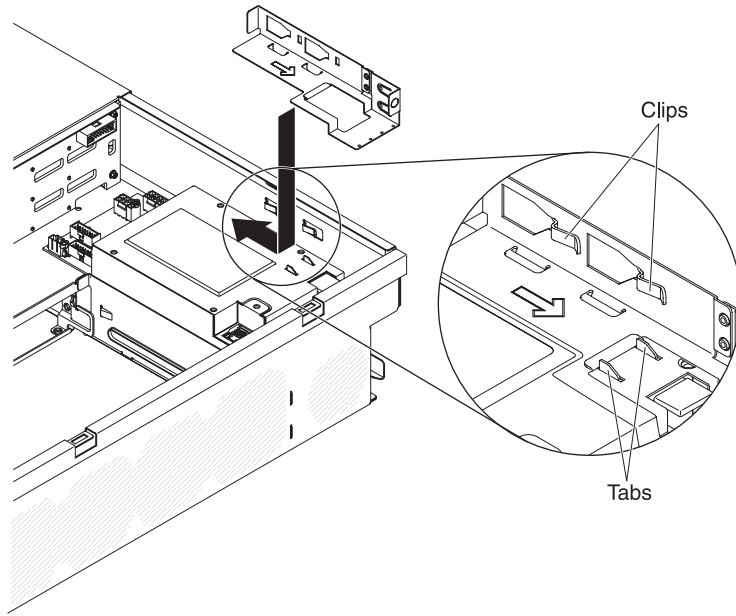
Clips

Tabs

4. Install the system-board tray in the 3U chassis (see "Installing the system-board tray in a 3U chassis" on page 127).

5. Install the fan assembly (see "Installing the 3U chassis fan assembly" on page 151).

6. Install the storage-riser-card assembly and ServeRAID SAS controller (see "Installing a storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card in a 3U chassis" on page 191).

7. Install the top cover (see"Installing the 3U chassis top cover" on page 135).

8. Install the 3U chassis in the iDataPlex rack (see "Installing a 3U chassis in a Type 7825 iDataPlex rack" on page 199).

Removing a power-supply paddle card from an expansion enclosure

Note: The following information describes how to remove a power-supply paddle card from an I/O enclosure. Removing the power-supply paddle card from another type of expansion enclosure is similar. A power-supply paddle card is rarely used in an expansion enclosure.

To remove a power-supply paddle card from an expansion enclosure, complete the following steps.

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124).

3. Carefully set the system-board tray on a flat, static-protective surface.

4. Remove the expansion enclosure and set it on a flat, static-protective surface (see "Removing an expansion enclosure from a system-board tray" on page 129).

5. If any 3.5-inch simple-swap drives are installed in the expansion enclosure, complete the following steps:

   a. Remove the 3.5-inch drives (see "Removing a 3.5-inch simple-swap hard disk drive" on page 141).

   b. Note the cable routing of the hard disk drive bracket and cable assembly cables; then, disconnect the cables.

   c. Remove the hard disk drive bracket and cable assembly (see "Removing and installing a one-bay or four-bay hard disk drive bracket and cable assembly" on page 177).

6. Make a note of where cables are attached to the power-supply paddle card; then, disconnect them.

7. Remove the four screws that secure the power-supply paddle card to the expansion enclosure and save them for future use.

8. Lift the power-supply paddle card out of the expansion enclosure.

9. 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 a power-supply paddle card in an expansion enclosure

Note: The following information describes how to install a power-supply paddle card in an I/O enclosure. Installing the power-supply paddle card in another type of expansion enclosure is similar.

To install a power-supply paddle card in an expansion enclosure, complete the following steps.
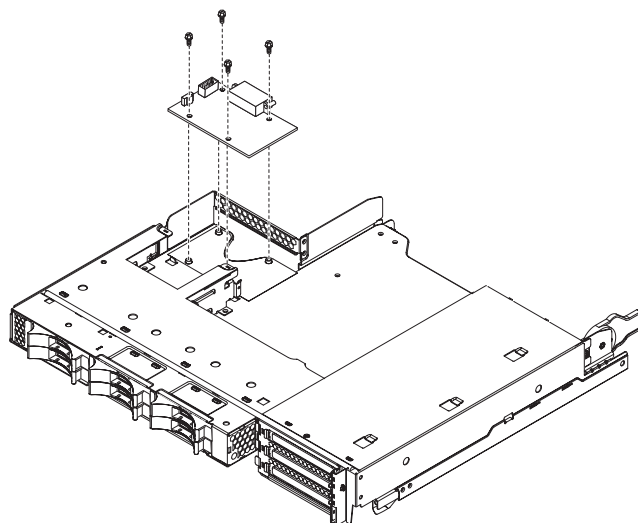
1. Touch the static-protective package that contains the power-supply paddle card to any *unpainted* metal surface on the outside of the expansion enclosure; then, remove the power-supply paddle card from the package.

2. Place the power-supply paddle card on the mounting studs in the expansion enclosure and install the four retaining screws.

3. Reconnect the power-supply paddle card cables.

4. Install the 3.5-inch simple-swap drives, if you removed any when you removed the power-supply paddle card. Complete the following steps:

   a. Install the hard disk drive bracket and cable assembly (see "Removing and installing a one-bay or four-bay hard disk drive bracket and cable assembly" on page 177).

   b. Reconnect the hard disk drive bracket and cable assembly cables.

   c. Install the 3.5-inch hard disk drive (see "Installing a 3.5-inch simple-swap hard disk drive" on page 142).

5. Install the expansion enclosure (see "Installing an expansion enclosure on a system-board tray" on page 130).

6. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125).

Removing a storage enclosure

To remove a storage enclosure, complete the following steps.
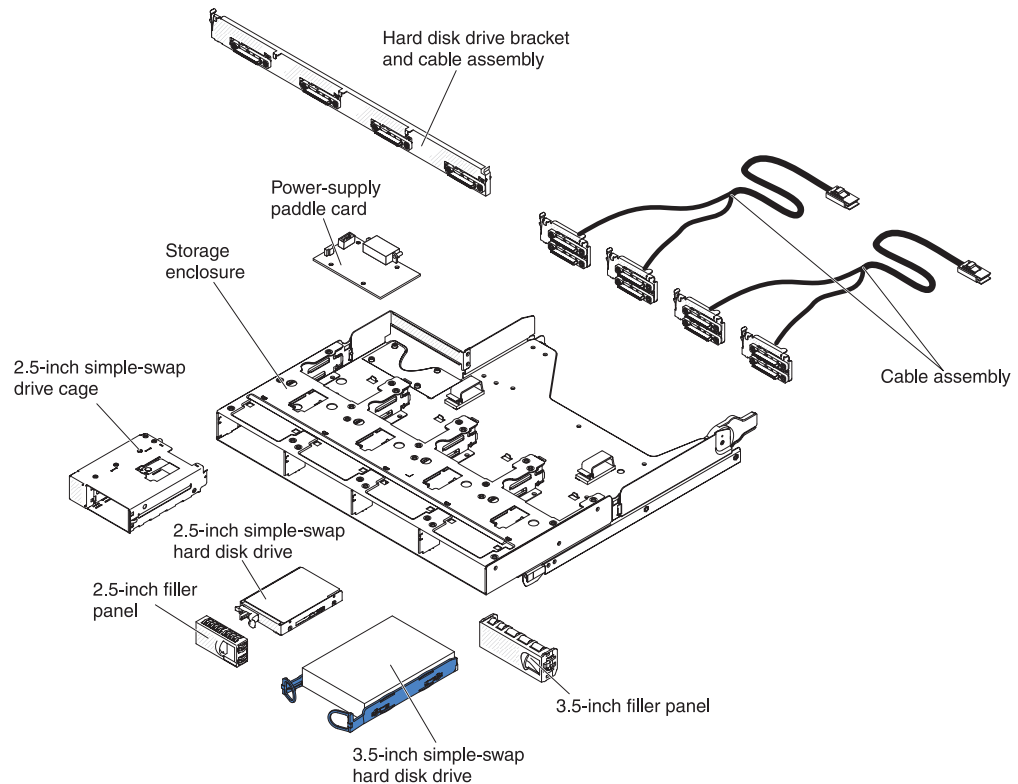
Hard disk drive bracket and cable assembly

Power-supply paddle card

Storage enclosure

Cable assembly

2.5-inch simple-swap drive cage

2.5-inch simple-swap hard disk drive

2.5-inch filler panel

3.5-inch filler panel

3.5-inch simple-swap hard disk drive

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the storage enclosure is installed on a system-board tray, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129).

3. Carefully set the storage enclosure on a flat, static-protective surface.

4. Make a note of where the hard disk drives are installed; then, remove them. Place them on a static-protective surface or install them in the new storage enclosure (see "Removing and installing a hard disk drive" on page 137).

5. Note the cable routing; then, remove the hard disk drive bracket and cable assembly (see "Removing and installing a one-bay or four-bay hard disk drive bracket and cable assembly" on page 177).

6. Remove the 2.5-inch simple-swap SAS/SATA drive cage if any (see "Removing a 2.5-inch simple-swap SAS/SATA drive cage" on page 147).

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

Installing a storage enclosure

To install a storage enclosure, complete the following steps.

Hard disk drive bracket
and cable assembly

Power-supply
paddle card

Storage
enclosure

2.5-inch simple-swap
drive cage

Cable assembly

2.5-inch simple-swap
hard disk drive

2.5-inch filler
panel

3.5-inch filler panel

3.5-inch simple-swap
hard disk drive

1. Carefully set the storage enclosure on a flat, static-protective surface.
2. For 2.5-inch drives, install 2.5-inch simple-swap SAS/SATA drive cages (see "Installing a 2.5-inch simple-swap SAS/SATA drive cage" on page 148).
3. Install the hard disk drive bracket and cable assembly (see "Removing and installing a one-bay or four-bay hard disk drive bracket and cable assembly" on page 177).
4. Install the hard disk drives in the storage enclosure (see "Removing and installing a hard disk drive" on page 137).
5. Install the storage enclosure on the system-board tray (see "Installing an expansion enclosure on a system-board tray" on page 130).

Removing a storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card from a 3U chassis

To remove a storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card from a 3U chassis, complete the following steps.

Storage-riser-card assembly

SAS signal cable connectors

Guide pins

Slot

Bracket
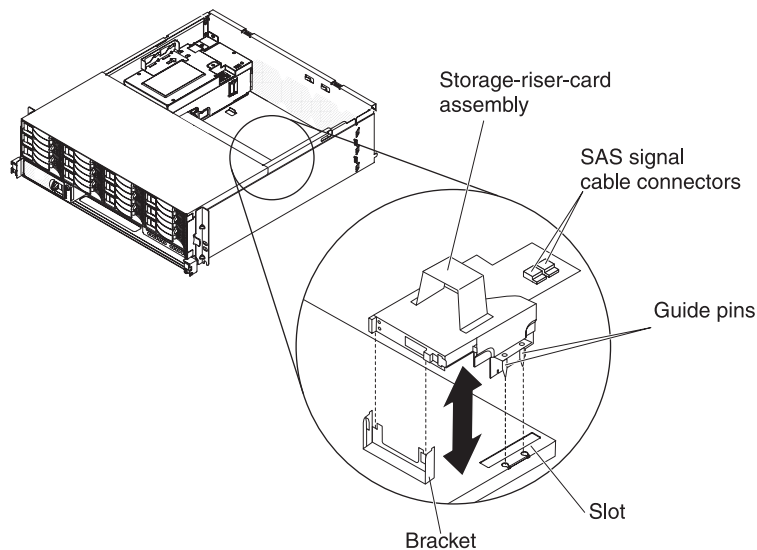
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the 3U chassis is installed in an iDataPlex rack, remove it (see "Removing a 3U chassis from a Type 7825 iDataPlex rack" on page 198).

3. Remove the top cover (see "Removing the 3U chassis top cover" on page 134).

4. Note the signal cable routing and connection locations; then, disconnect the signal cables from the assembly.

   Attention: When you move the storage-riser-card assembly, do not allow it to touch any components or structures inside the 3U chassis.

5. Lift up on the storage-riser-card assembly.

Battery cable   Battery cable interposer card   ServeRAID SAS controller

Storage-riser-card assembly
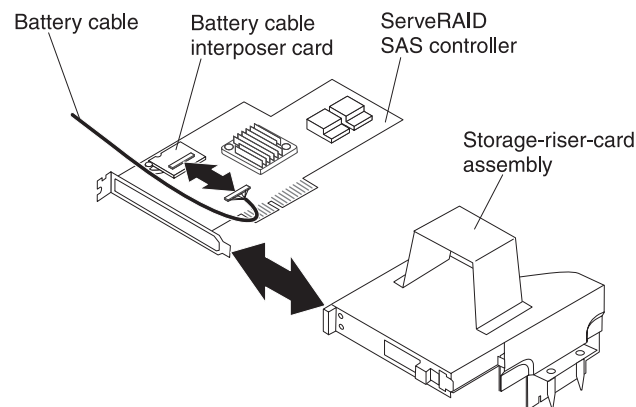
6. Turn the storage-riser-card assembly to access the ServeRAID SAS controller.

7. Pull the controller from the connector on the storage-riser-card assembly.

8. Disconnect the battery cable from the battery cable interposer card.

Screw

Battery cable
interposer card
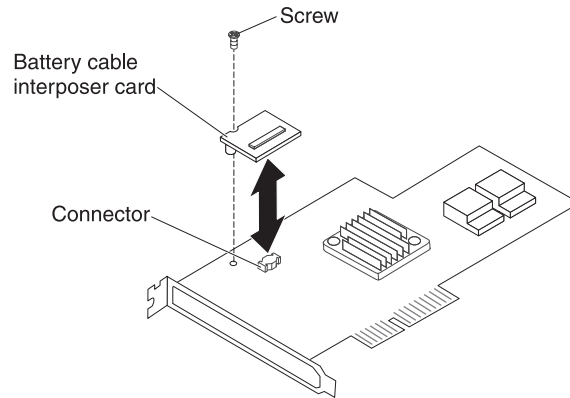
Connector

9. If you are removing the battery cable interposer card, remove the screw that secures the battery cable interposer card to the ServeRAID SAS controller and lift the card from the connector.

10. Remove the storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card from the 3U chassis.

11. If you are instructed to return the storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card in a 3U chassis

To install a storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card in a 3U chassis, complete the following steps.

Battery cable   Battery cable   ServeRAID
                  interposer card   SAS controller

Storage-riser-card
assembly
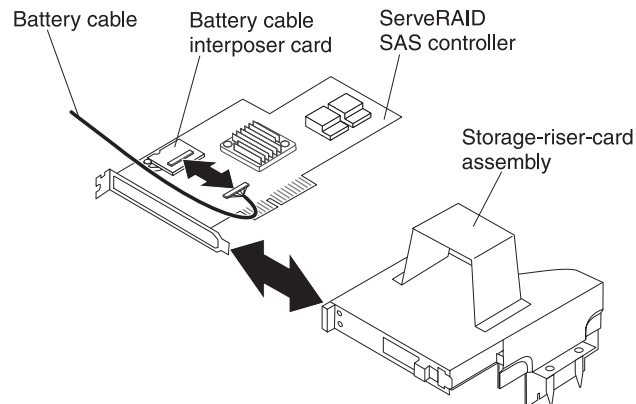
1. Touch the static-protective packages that contain the storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card to any *unpainted* metal surface on the outside of the chassis; then, remove the storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card from the packages.
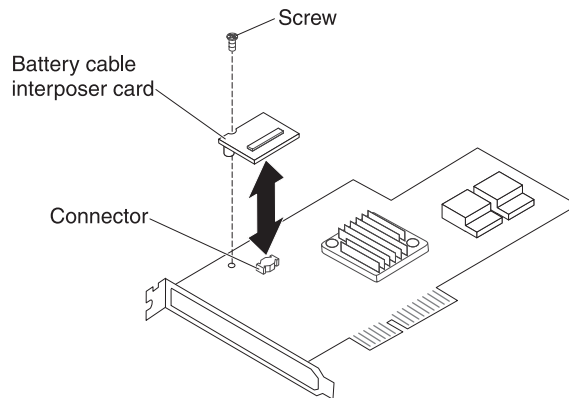
2. If you are replacing the battery cable interposer card, align the battery cable interposer card with the connector on the ServeRAID SAS controller and press the interposer card into the connector; then, install the screw to secure the battery cable interposer card to the ServeRAID SAS controller.

3. Connect the battery cable to the battery cable interposer card.

4. Align the ServeRAID SAS controller with the connector and the bracket on the storage-riser-card assembly and press the controller into place.

   Attention: When you move the storage-riser-card assembly, do not allow it to touch any components or structures inside the 3U chassis.
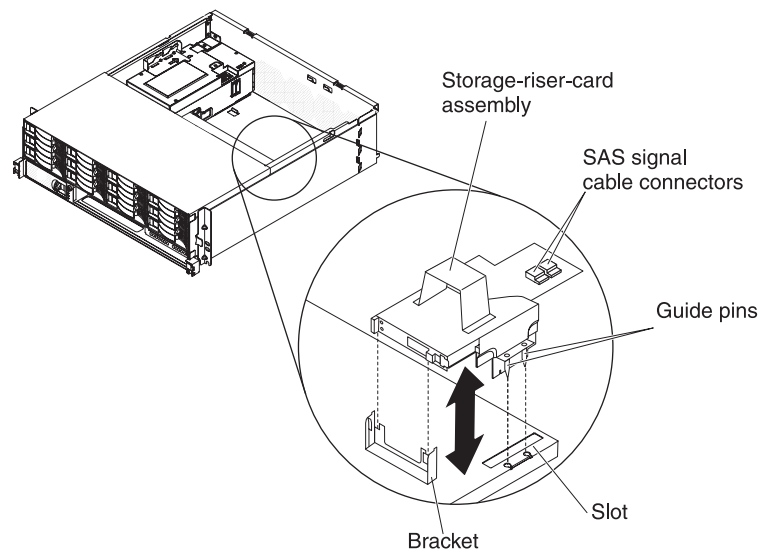
5. Align the storage-riser-card assembly with the guide pins and the slot in the system-board tray cover.

6. Press the assembly into place on the bracket.

7. Reconnect the signal cables to the ServeRAID SAS controller.

8. Install the top cover (see "Installing the 3U chassis top cover" on page 135).

9. Install the 3U chassis in the iDataPlex rack (see "Installing the 3U chassis top cover" on page 135).

Removing and replacing FRUs

FRUs must be installed only by trained service technicians.

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

Removing a 2x2 2.5-inch SAS/SATA backplane

To remove a 2x2 2.5-inch SAS/SATA backplane from the I/O enclosure, complete the following steps.
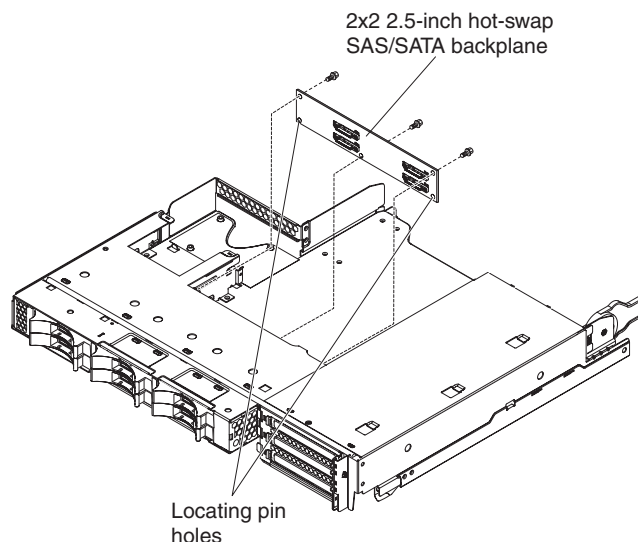
2x2 2.5-inch hot-swap
SAS/SATA backplane

Locating pin
holes

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124).
3. Remove the I/O enclosure from the system-board tray (see "Removing an expansion enclosure from a system-board tray" on page 129).
4. Carefully set the I/O enclosure on a flat, static-protective surface.
5. Make note of where the drives are installed; then, remove them (see "Removing a 2.5-inch hot-swap hard disk drive" on page 137).

   Attention: If the server has an optional RAID adapter and you have installed or removed a hard disk drive, see the documentation that comes with the RAID adapter for information about reconfiguring the disk arrays.
6. Make note of where the cables are attached to the backplane; then, disconnect them.
7. Remove the screws that secure the 2x2 2.5-inch SAS/SATA backplane to the I/O enclosure and save them for future use.
8. Pull the 2x2 2.5-inch SAS/SATA backplane off the locating pins and out of the I/O enclosure.
9. If you are instructed to return the 2x2 2.5-inch SAS/SATA backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a 2x2 2.5-inch SAS/SATA backplane

To install a 2x2 2.5-inch SAS/SATA backplane in the I/O enclosure, complete the following steps.

2x2 2.5-inch hot-swap
SAS/SATA backplane

Locating pin
holes
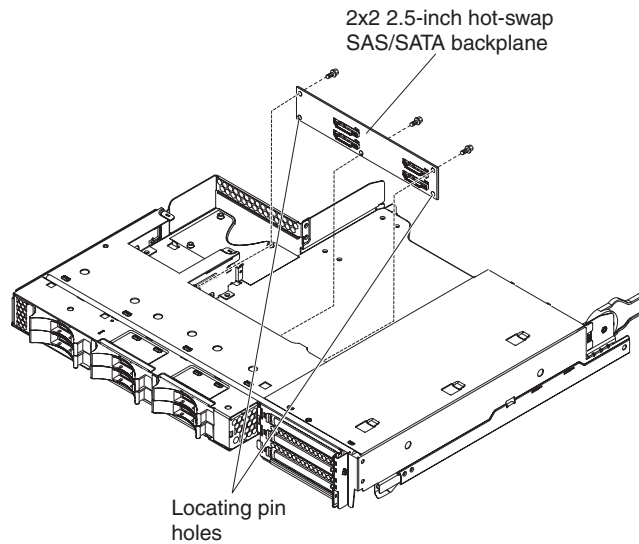
1. Touch the static-protective package that contains the 2x2 2.5-inch SAS/SATA backplane to any *unpainted* metal surface on the outside of the I/O enclosure; then, remove the 2x2 2.5-inch SAS/SATA backplane from the package.
2. Place the 2x2 2.5-inch SAS/SATA backplane on the locating pins inside the I/O enclosure.
3. Install the retaining screws.
4. Reconnect the cables to the 2x2 2.5-inch SAS/SATA backplane.
5. Install the 2.5-inch hot-swap hard disk drives, if you removed any from the I/O enclosure (see "Installing a 2.5-inch hot-swap hard disk drive" on page 138).
6. Install the I/O enclosure (see "Installing an expansion enclosure on a system-board tray" on page 130).
7. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125).

Removing the 2U chassis from a Type 7825 iDataPlex rack

To remove the 2U chassis from a Type 7825 iDataPlex rack, complete the following steps.
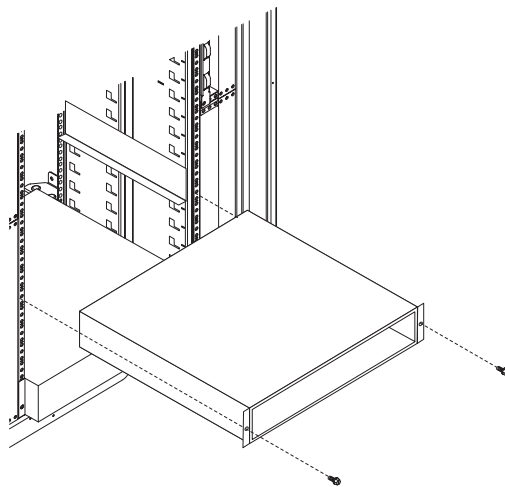
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the chassis contains a system-board tray that is operating, shut down the operating system; then, press the power-control button to turn off the system-board tray (see "Turning off the system-board tray" on page 11 for more information).

3. Remove any installed system-board trays (see "Removing the system-board tray from a 2U chassis" on page 124).

4. Remove the two screws that secure the chassis to the rack; then, pull the chassis forward, lift the chassis out of the iDataPlex rack, and set it on a flat, static-protective surface.

5. If you are replacing a damaged chassis, remove the fan assembly and power supply from the chassis, and place them on a static-protective surface or install them in the new chassis (see "Removing the 2U chassis fan assembly" on page 131 and "Removing a power supply from a 2U chassis" on page 181).

6. If you are instructed to return the 2U chassis, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the 2U chassis in a Type 7825 iDataPlex rack

To install the 2U chassis in a Type 7825 iDataPlex rack, complete the following steps.
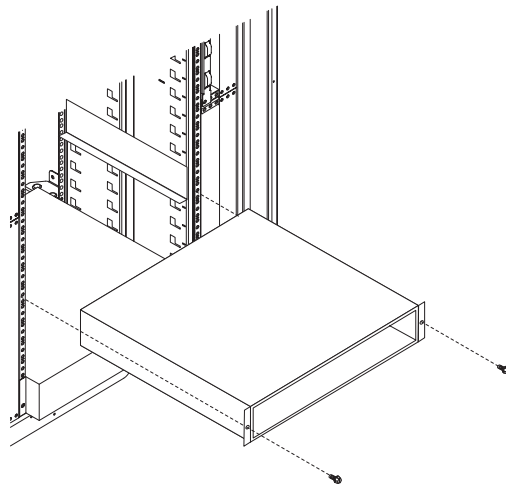
1. If you are installing a new chassis, install the power supply and fan assembly that you removed from the old chassis (see "Installing a power supply in a 2U chassis" on page 181 and "Installing the 2U chassis fan assembly" on page 132).

2. Install the chassis on the rails; then, install the two screws to secure the chassis to the rack.

3. Install any system-board trays that you removed when you removed the chassis (see "Installing the system-board tray in a 2U chassis" on page 125).

Removing the 3U chassis hard disk drive backplane

To remove the 3U chassis hard disk drive backplane, complete the following steps.
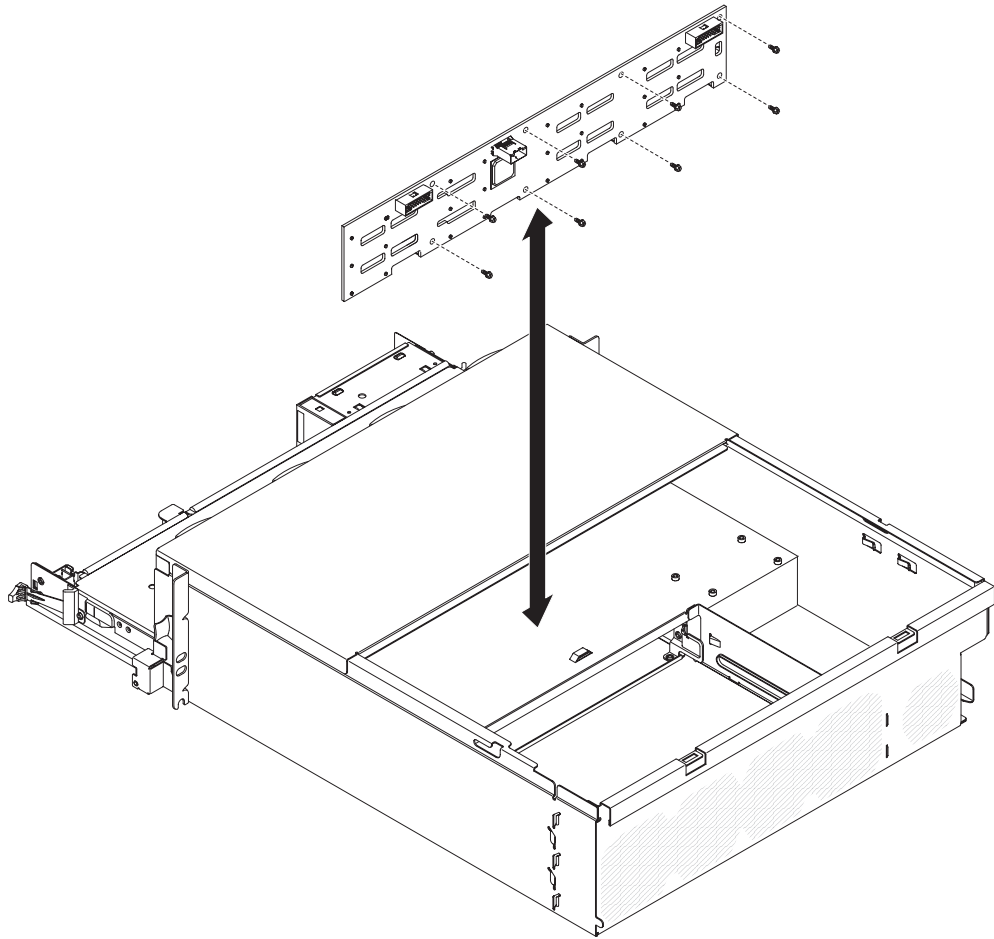
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the 3U chassis is installed in an iDataPlex rack, remove it (see "Removing a 3U chassis from a Type 7825 iDataPlex rack" on page 198).
3. Remove the top cover (see "Removing the 3U chassis top cover" on page 134).
4. Remove the storage-riser-card assembly and ServeRAID SAS controller (see "Removing a storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card from a 3U chassis" on page 189).
5. Remove the fan assembly (see "Removing the 3U chassis fan assembly" on page 150).
6. Partially remove the system-board tray to disengage the power-supply connector at the rear of the system-board tray (see "Removing the system-board tray from a 3U chassis" on page 126).
7. Pull the hard disk drives out of the server slightly to disengage them from the hard disk drive backplane (see "Removing and installing a hard disk drive" on page 137).
8. Remove the power-supply paddle card and the power supply (see "Removing a power supply from a 3U chassis" on page 182).
9. Disconnect the cables from the hard disk drive backplane, remove the 10 screws, and remove the hard disk drive backplane from the 3U chassis.

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

Installing the 3U chassis hard disk drive backplane

To install the 3U chassis hard disk drive backplane, complete the following steps.
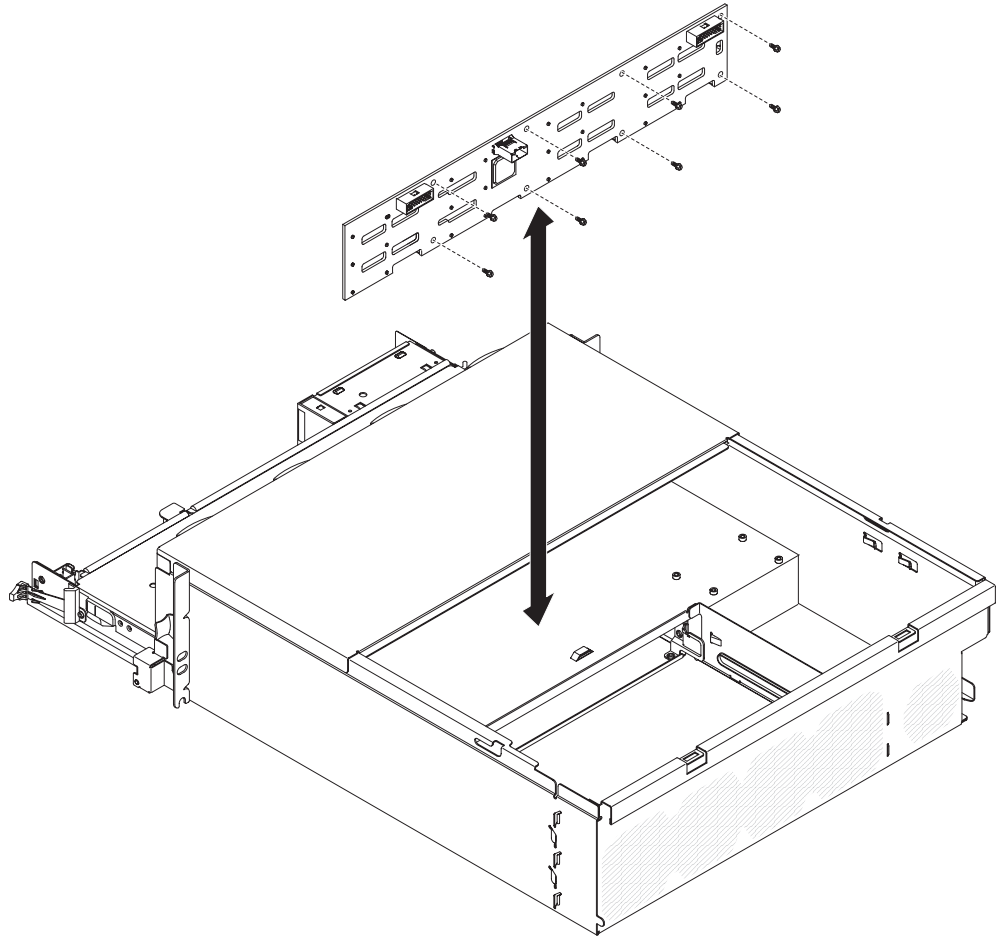
1. Touch the static-protective package that contains the hard disk drive backplane to any *unpainted* metal surface on the outside of the 3U chassis; then, remove the hard disk drive backplane from the package.
2. Position the hard disk drive backplane in the 3U chassis and secure it with 10 screws.
3. Install the power-supply paddle card and power supply (see "Installing a power supply in a 3U chassis" on page 184).
4. Install the system-board tray in the 3U chassis (see "Installing the system-board tray in a 3U chassis" on page 127).
5. Install the fan assembly (see "Installing the 3U chassis fan assembly" on page 151).
6. Install the storage-riser-card assembly and ServeRAID SAS controller (see "Installing a storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card in a 3U chassis" on page 191).
7. Install the top cover (see"Installing the 3U chassis top cover" on page 135).
8. Install the 3U chassis in the iDataPlex rack (see "Installing a 3U chassis in a Type 7825 iDataPlex rack" on page 199).

9. Install the hard disk drives (see "Removing and installing a hard disk drive" on page 137).

Removing a 3U chassis from a Type 7825 iDataPlex rack

To remove the 3U chassis from a Type 7825 iDataPlex rack, complete the following steps.
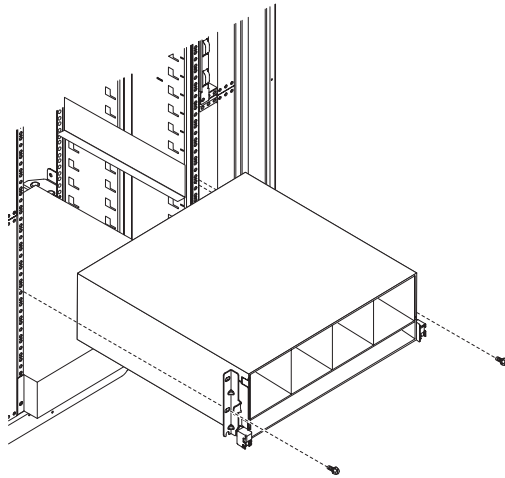
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. Turn off the server and all attached devices (see "Turning off the system-board tray" on page 11).

3. If external cables are connected to the front of the system-board tray, note where they are connected; then, remove them.

4. Note where the hard disk drives are installed; then, remove them (see "Removing and installing a hard disk drive" on page 137).

   Statement 4:
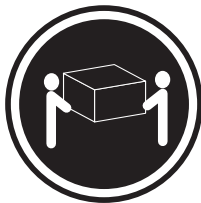
   | ≥ 18 kg (39.7 lb) | ≥ 32 kg (70.5 lb) | ≥ 55 kg (121.2 lb) |
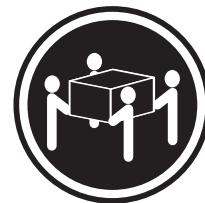
   CAUTION:
   Use safe practices when lifting.

5. Remove the screws and slide the 3U chassis from the iDataPlex rack.

6. Set the 3U chassis on a flat, static-protective surface.

7. If you are instructed to return the 3U chassis, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a 3U chassis in a Type 7825 iDataPlex rack

To install the 3U chassis in a Type 7825 iDataPlex rack, complete the following steps.
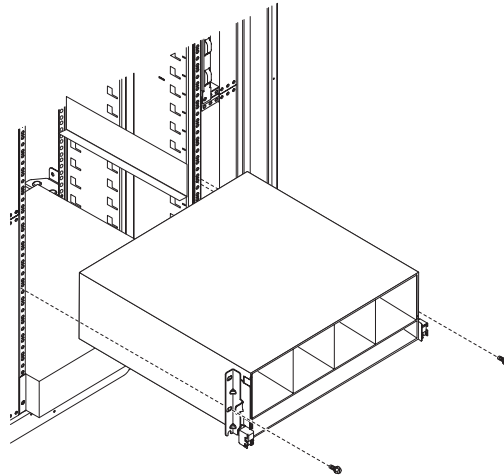
1. Align the 3U chassis with the rails on the iDataPlex rack; then, slide the 3U chassis into the rack until it is fully seated.
2. Install the M6 screws that secure the chassis to the rack.
3. Install the hard disk drives (see "Removing and installing a hard disk drive" on page 137).
4. Reconnect the cables on the front of the system-board tray.
5. Turn on the system-board tray (see "Turning on the system-board tray" on page 11).
6. Make sure that the power-on LED on the system-board tray operator panel is lit continuously, indicating that the system-board tray is receiving power and is turned on.

If you have changed the configuration of the system-board tray, you might have to update the server configuration through the Setup utility (see "Using the Setup utility" on page 228).

Removing a front-panel assembly

To remove the front-panel assembly, complete the following steps.
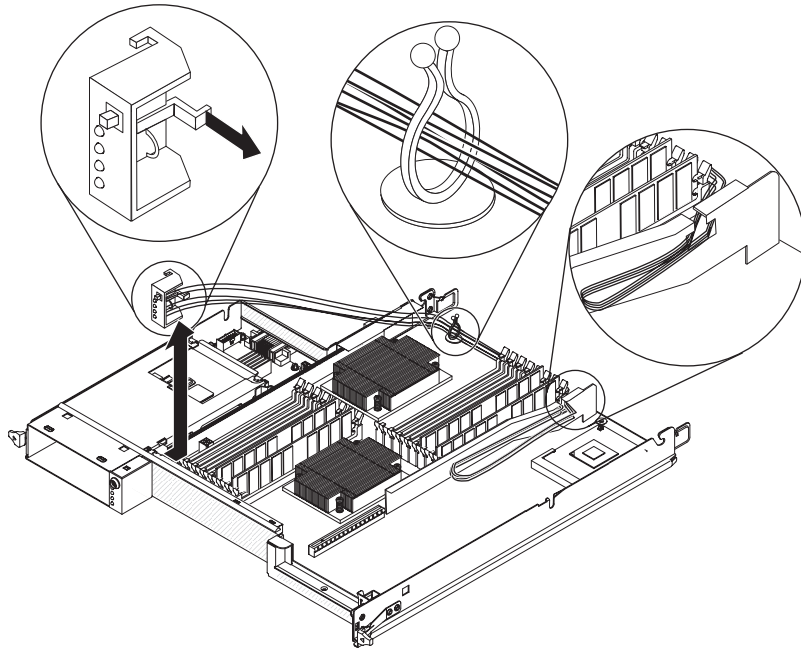
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124 or "Removing the system-board tray from a 3U chassis" on page 126).
3. If an expansion enclosure is installed, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).
4. Note the cable routing and where each cable is connected and disconnect the cables that are near the front-panel assembly to improve accessibility.
5. Press the release tab and slide the front-panel assembly away from the front of the system-board tray.
6. Note the cable routing and disconnect the front-panel assembly cables from the system board and power-supply paddle card.
7. Open the cable retention latches and carefully pull the assembly and cables from the system-board tray.
8. If you are instructed to return the front-panel assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a front-panel assembly

To install a front-panel assembly, complete the following steps.
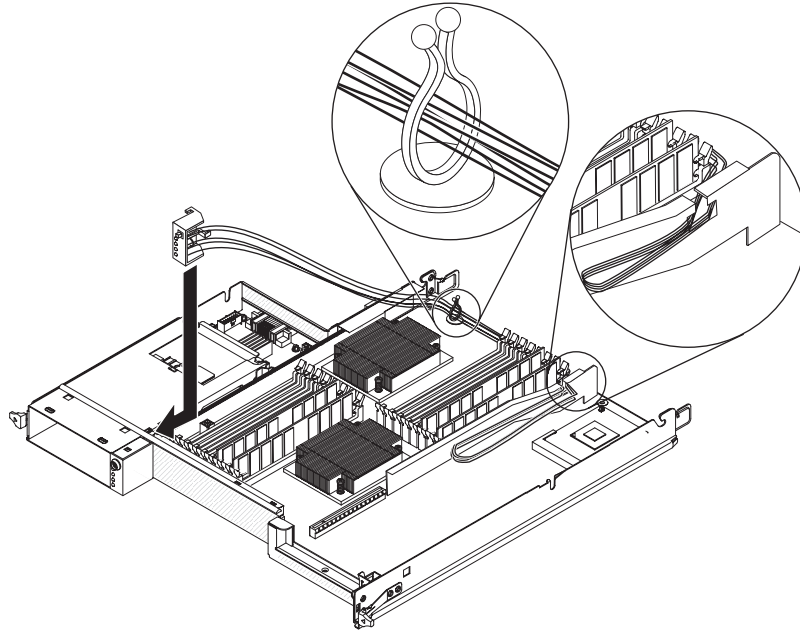
1. Press the front-panel assembly into the front of the system-board tray and make sure that it is secure.
2. Connect the front-panel assembly cables to the system board and power-supply paddle card and close the cable retention latches. Carefully route the cables as you connect the cables.
3. Connect the other cables to the system-board tray.

   Note: Make sure that all cables are properly routed and that the cables do not protrude from inside the system-board tray.
4. Install the expansion enclosure, if you removed one (see "Installing an expansion enclosure on a system-board tray" on page 130); otherwise, install the system-board tray cover (see "Installing the system-board tray cover" on page 123).
5. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125 or "Installing the system-board tray in a 3U chassis" on page 127).

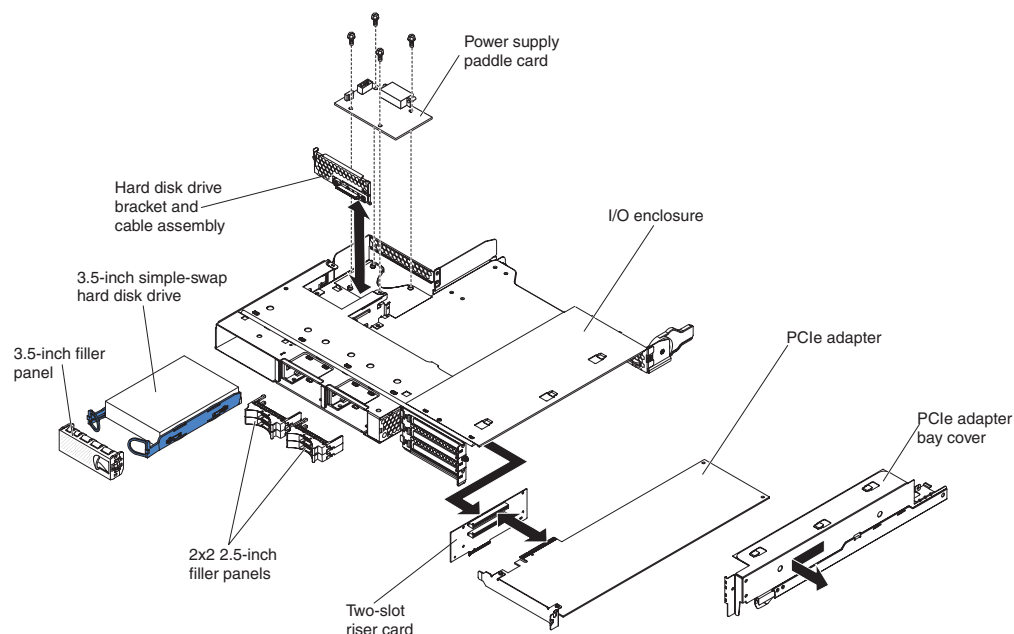## Removing an I/O enclosure configured with 2.5-inch simple-swap hard disk drives (some configurations)

To remove an I/O enclosure that is configured with 2.5-inch simple-swap hard disk drives, complete the following steps.

Hard disk drive
bracket and
cable assembly

Power supply
paddle card

2.5-inch simple-swap
drive cage

I/O enclosure

2.5-inch simple-swap
hard disk drive

PCIe adapter

2.5-inch filler
panel

PCIe adapter
bay cover

Three-slot PCIe
riser-card assembly

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the I/O enclosure is installed on a system-board tray, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129).

3. Carefully set the I/O enclosure on a flat, static-protective surface.

4. Remove the 2.5-inch simple-swap hard disk drives, if any are installed (see "Removing and installing a hard disk drive" on page 137).

5. Remove the 2.5-inch simple-swap SAS/SATA drive cage (see "Removing a 2.5-inch simple-swap SAS/SATA drive cage" on page 147).

6. Remove the power-supply paddle card, if one is installed (see "Removing a power-supply paddle card from an expansion enclosure" on page 185).

7. Remove the PCIe adapters, if any are installed (see "Removing an outer adapter from the I/O enclosure" on page 160).

8. Remove the PCIe riser-card assembly (see "Removing a PCIe riser-card assembly from the I/O enclosure" on page 217).

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

Installing an I/O enclosure configured with 2.5-inch simple-swap hard disk drives (some configurations)

To install an I/O enclosure that is configured with 2.5-inch simple-swap hard disk drives, complete the following steps.
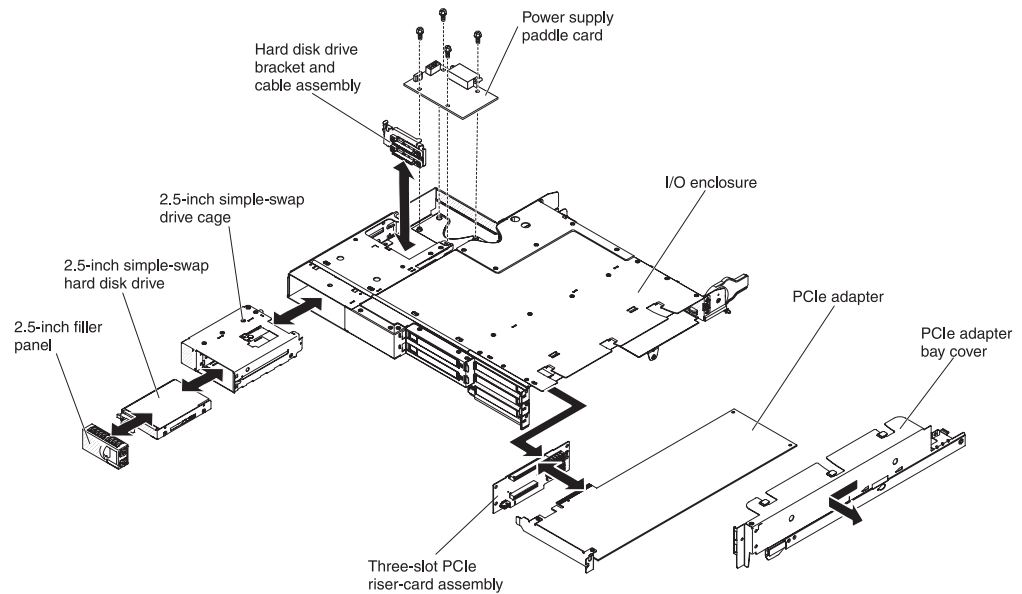
1. Install the PCIe riser-card assembly (see "Installing a PCIe riser-card assembly in the I/O enclosure" on page 217).

2. Install the PCIe adapters, if you removed any (see "Installing an outer adapter in the I/O enclosure" on page 161).

3. Install the 2.5-inch simple-swap SAS/SATA drive cage (see "Installing a 2.5-inch simple-swap SAS/SATA drive cage" on page 148).

4. Install the power-supply paddle card, if you removed one (see "Installing a power-supply paddle card in an expansion enclosure" on page 186).

5. Install the hard disk drives, if you removed any (see "Removing and installing a hard disk drive" on page 137).

6. Install the I/O enclosure on the system-board tray (see "Installing an expansion enclosure on a system-board tray" on page 130).

Removing an I/O enclosure configured with 2.5-inch hot-swap hard disk drives (some configurations)

To remove an I/O enclosure that is configured with 2.5-inch hot-swap hard disk drives, complete the following steps.

Power supply
paddle card

I2C multiplexer card

2x2 2.5 inch
SAS.SATA backplane

2.5-inch hot-swap
drive cage

I/O enclosure

PCIe adapter

PCIe adapter
bay cover

2.5-inch hot-swap
hard disk drives

2.5-inch
filler panel

Two-slot
riser card

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the I/O enclosure is installed on a system-board tray, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129).

3. Carefully set the I/O enclosure on a flat, static-protective surface.

4. Remove the 2.5-inch simple-swap hard disk drives, if any are installed (see "Removing and installing a hard disk drive" on page 137).

5. Remove the 2.5-inch hot-swap SAS/SATA drive cage (see "Removing a 2.5-inch hot-swap SAS/SATA drive cage" on page 146).

6. Remove the I^{2}C multiplexer card (see "Removing an I^{2}C multiplexer card" on page 171).

7. Remove the 2x2 2.5-inch SAS/SATA backplane (see "Removing a 2x2 2.5-inch SAS/SATA backplane" on page 193).

8. Remove the power-supply paddle card, if one is installed (see "Removing a power-supply paddle card from an expansion enclosure" on page 185).

9. Remove the PCIe adapters, if any are installed (see "Removing an outer adapter from the I/O enclosure" on page 160).

10. Remove the PCIe riser-card assembly (see "Removing a PCIe riser-card assembly from the I/O enclosure" on page 217).

11. If you are instructed to return the I/O enclosure, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an I/O enclosure configured with 2.5-inch hot-swap hard disk drives (some configurations)

To install an I/O enclosure that is configured with 2.5-inch hot-swap hard disk drives, complete the following steps.
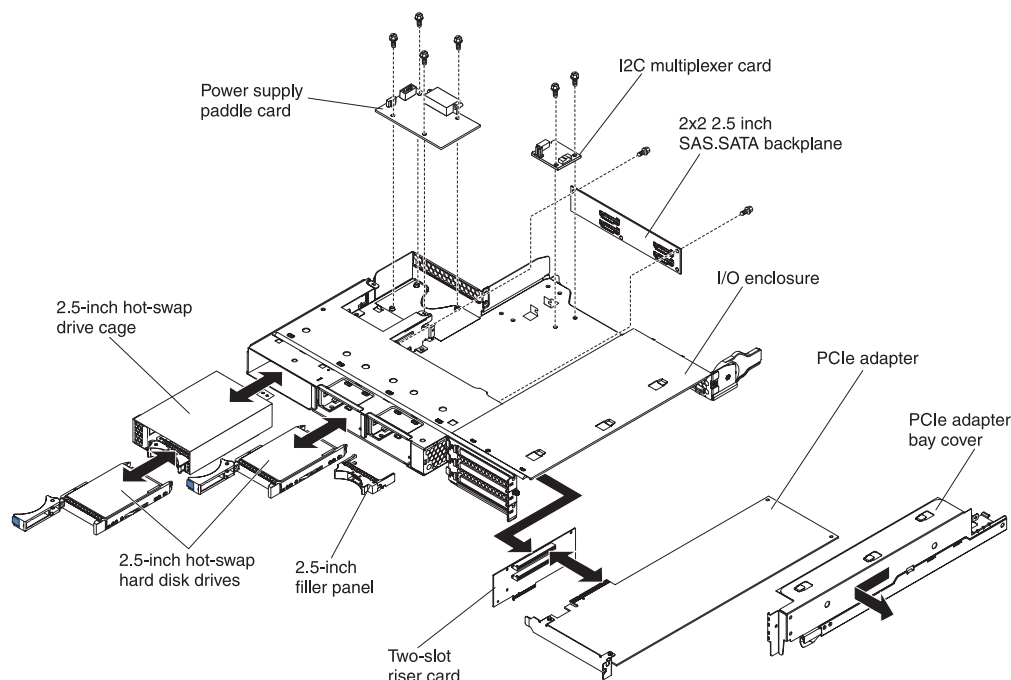
1. Install the PCIe riser-card assembly (see "Installing a PCIe riser-card assembly in the I/O enclosure" on page 217).
2. Install the PCIe adapters, if you removed any (see "Installing an outer adapter in the I/O enclosure" on page 161).
3. Install the I^{2}C multiplexer card (see "Installing an I^{2}C multiplexer card" on page 172).
4. Install the 2x2 2.5-inch SAS/SATA backplane (see "Installing a 2x2 2.5-inch SAS/SATA backplane" on page 193).
5. Install the 2.5-inch hot-swap SAS/SATA drive cage (see "Installing a 2.5-inch hot-swap SAS/SATA drive cage" on page 147).
6. Install the power-supply paddle card, if you removed one (see "Installing a power-supply paddle card in an expansion enclosure" on page 186).
7. Install the hard disk drives, if you removed any (see "Removing and installing a hard disk drive" on page 137).
8. Install the I/O enclosure on the system-board tray (see "Installing an expansion enclosure on a system-board tray" on page 130).

Removing an I/O enclosure configured with 3.5-inch simple-swap hard disk drives (some configurations)

To remove an I/O enclosure that is configured with 3.5-inch simple-swap hard disk drives, complete the following steps.
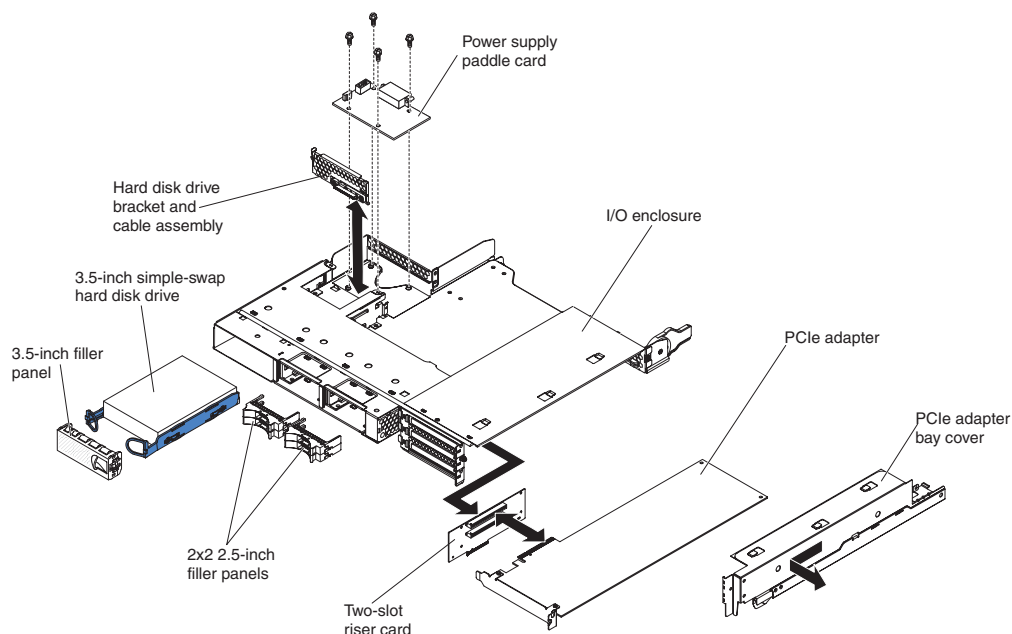
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the I/O enclosure is installed on a system-board tray, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129).
3. Carefully set the I/O enclosure on a flat, static-protective surface.
4. Remove the 3.5-inch simple-swap hard disk drive, if one is installed (see "Removing and installing a hard disk drive" on page 137).
5. Note the cable routing for the hard disk drive bracket and cable assembly cables; then, disconnect the cables.
6. Remove the hard disk drive bracket and cable assembly (see "Removing and installing a one-bay or four-bay hard disk drive bracket and cable assembly" on page 177).
7. Remove the power-supply paddle card, if one is installed (see "Removing a power-supply paddle card from an expansion enclosure" on page 185).
8. Remove the PCIe adapters, if any are installed (see "Removing an outer adapter from the I/O enclosure" on page 160).
9. Remove the PCIe riser-card assembly (see "Removing a PCIe riser-card assembly from the I/O enclosure" on page 217).
10. If you are instructed to return the I/O enclosure, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an I/O enclosure configured with 3.5-inch simple-swap hard disk drives (some configurations)

To install an I/O enclosure that is configured with 3.5-inch simple-swap hard disk drives, complete the following steps.

Power supply
paddle card

Hard disk drive
bracket and
cable assembly

I/O enclosure

3.5-inch simple-swap
hard disk drive

3.5-inch filler
panel

PCIe adapter

PCIe adapter
bay cover

2x2 2.5-inch
filler panels

Two-slot
riser card

1. Install the PCIe riser-card assembly (see "Installing a PCIe riser-card assembly in the I/O enclosure" on page 217).

2. Install the PCIe adapters, if you removed any (see "Installing an outer adapter in the I/O enclosure" on page 161).

3. Install the power-supply paddle card, if you removed one (see "Installing a power-supply paddle card in an expansion enclosure" on page 186).

4. Install the hard disk drive bracket and cable assembly (see "Removing and installing a one-bay or four-bay hard disk drive bracket and cable assembly" on page 177).

5. Install the hard disk drive, if you removed one (see "Removing and installing a hard disk drive" on page 137).

6. Install the I/O enclosure on the system-board tray (see "Installing an expansion enclosure on a system-board tray" on page 130).

Removing a microprocessor and heat sink

Read the following important guidelines before you remove a microprocessor that is not faulty (for example, when you are replacing the system-board assembly).

Attention:

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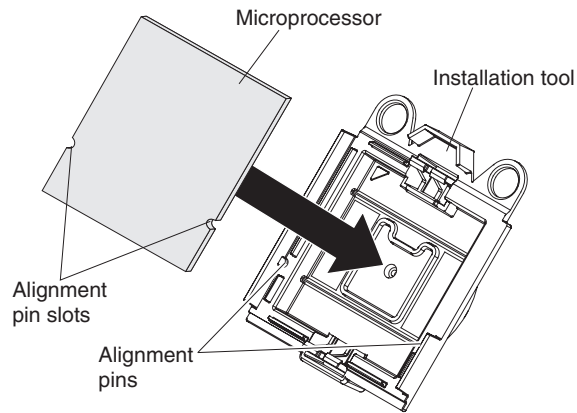- Dropping the microprocessor during installation or removal can damage the contacts.
- Do not touch the microprocessor contacts; handle the microprocessor by the edges only. Contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and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

If you are not replacing a defective heat sink or microprocessor, the thermal material on the heat sink and microprocessor will remain effective if you observe the following precautions:

- Carefully handle the heat sink and microprocessor when you remove or install these components.
- Do not touch the thermal material or otherwise allow it to become contaminated.

Notes:

- The heat-sink FRU is packaged with the thermal material applied to the underside.
- You must replace the thermal material if it becomes contaminated or has come in contact with another object other than its paired microprocessor.
- The heat sink and the thermal material are available as separate FRUs.

To remove a microprocessor and heat sink, complete the following steps.
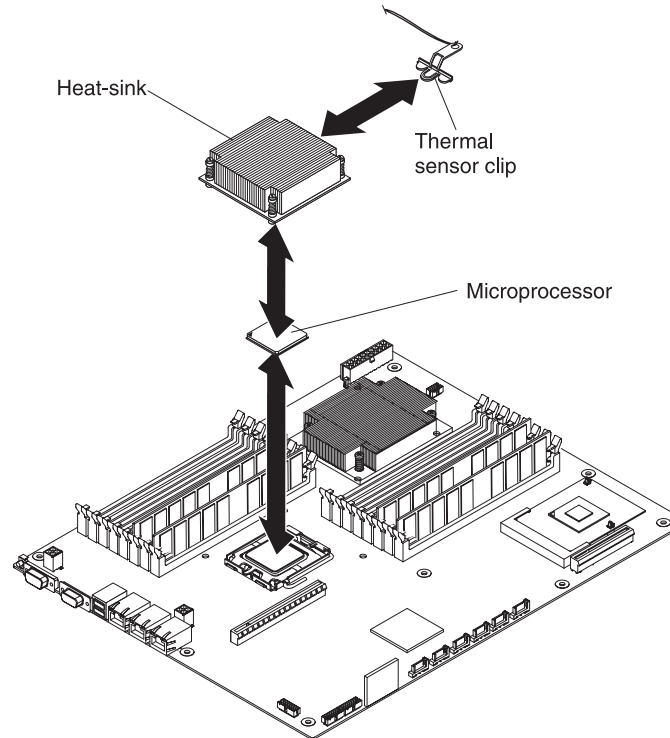
1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124 or "Removing the system-board tray from a 3U chassis" on page 126).
3. If an expansion enclosure is installed, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).
4. Remove the heat sink.

   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.

   a. Loosen the screw on one side of the heat sink to break the seal with the microprocessor.
   b. Press firmly on the captive screws and loosen them with a screwdriver.
   c. Use your fingers to gently pull the heat sink off the microprocessor.
   d. Pull the thermal sensor clip off the heat sink; then, place the heat sink upside down on a clean, flat surface.

Attention: Do not use any tools or sharp objects to lift the release lever on the microprocessor socket. Doing so might result in permanent damage to the system board.

Microprocessor retainer

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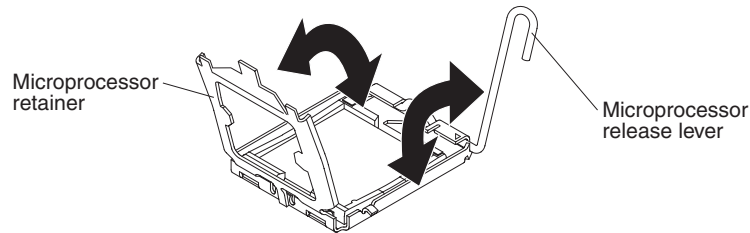
5. Release the microprocessor retention latch by pressing down on the end, moving it to the side, and releasing it to the open (up) position.

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

Microprocessor release lever

Microprocessor bracket frame
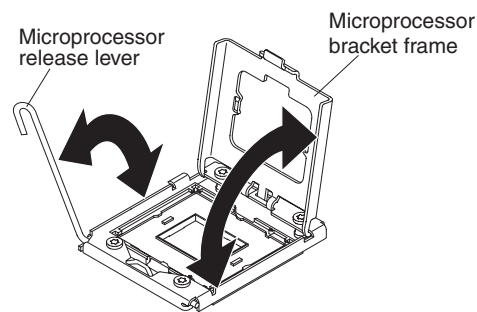
7. Locate the microprocessor installation tool that comes with the new microprocessor.

8. Twist the handle on the microprocessor tool counterclockwise so that it is in the open position.

Handle
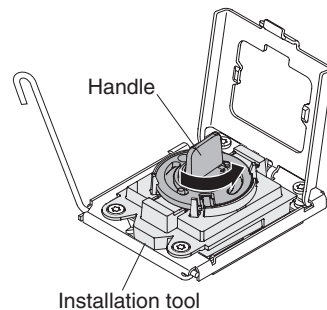
Installation tool

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

Installation tool

Microprocessor

Alignment pins
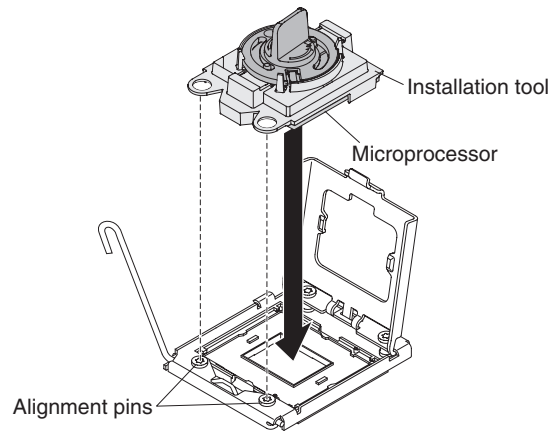
10. Twist the handle on the installation tool clockwise and lift the microprocessor out of the socket.

Handle
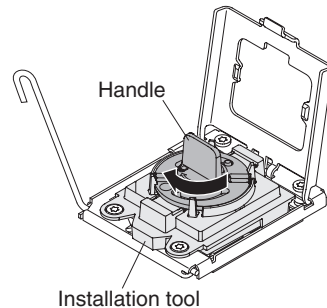
Installation tool

11. 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.

12. If you do not intend to install a microprocessor in the socket, install the socket dust cover on the socket.

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

13. If you are instructed to return the microprocessor and heat sink, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a microprocessor and heat sink

Attention:
- Microprocessors are to be installed only by trained service technicians.
- Always use the microprocessor installation tool to install a microprocessor. Failing to use the microprocessor installation tool may damage the microprocessor sockets on the system board. Any damage to the microprocessor sockets may require replacing the system board.

To install a microprocessor and heat sink, complete the following steps.

Note: The server supports up to two microprocessors. The microprocessors must be the same cache size and type, the same clock speed, and the same size front-side bus.

Heat-sink

Thermal sensor clip
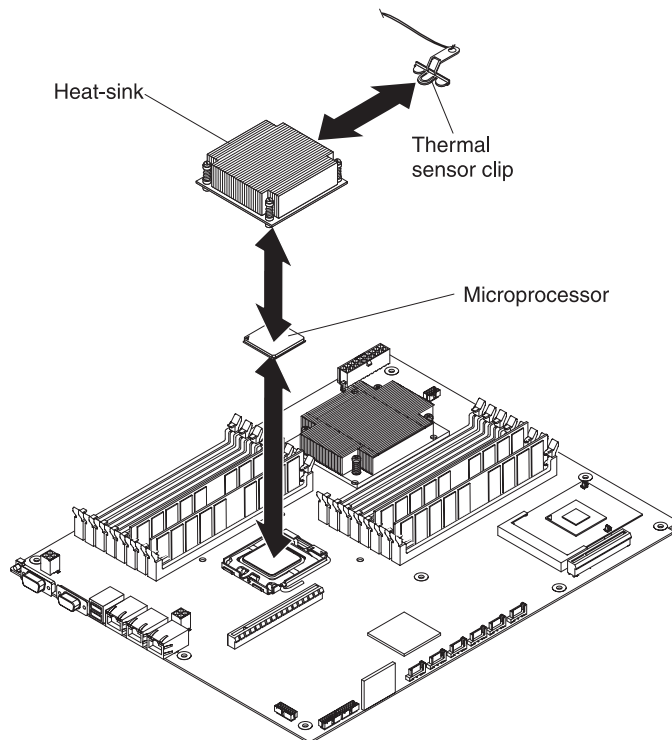
Microprocessor

1. Install the microprocessor.

   Attention: Do not use any tools or sharp objects to lift the locking lever on the microprocessor socket. Doing so might result in permanent damage to the system board.

Microprocessor retainer

Microprocessor release lever
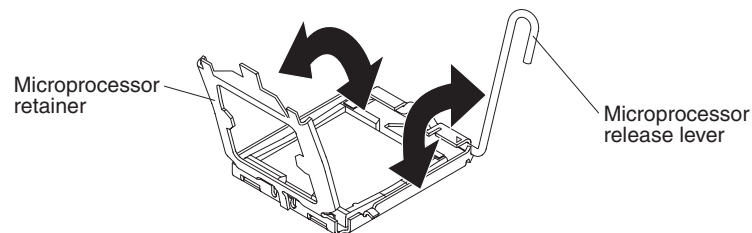
   a. Touch the static-protective package that contains the microprocessor to any unpainted metal surface on the server. Then, remove the microprocessor from the package.

   b. Rotate the microprocessor release lever on the socket from its closed and locked position until it stops in the fully open position.

Attention:

- Do not touch the microprocessor contact; handle the microprocessor by the edges only. Contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.
- Handle the microprocessor carefully. Dropping the microprocessor during installation or removal can damage the contacts.
- Do not use excessive force when you press the microprocessor into the socket.
- Make sure that the microprocessor is oriented and aligned and positioned in the socket before you try to close the lever.

c. If there is a plastic protective cover on the bottom of the microprocessor, carefully remove it.

Protective cover
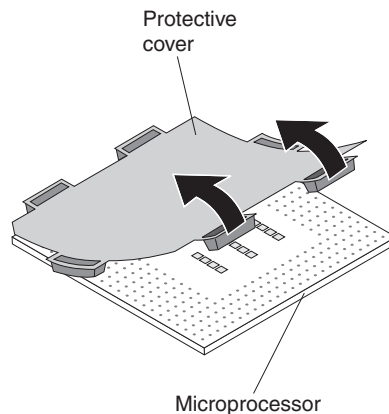
Microprocessor

d. Locate the microprocessor installation tool that comes with the new microprocessor.

e. Twist the handle of the installation tool counterclockwise so that it is in the open position.

Handle
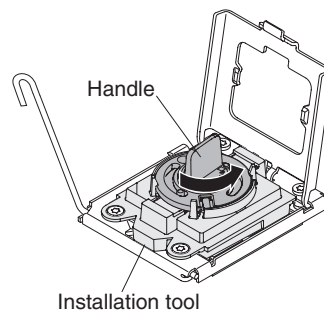
Installation tool

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

Microprocessor

Installation tool

Alignment
pin slots

Alignment
pins

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

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

Handle
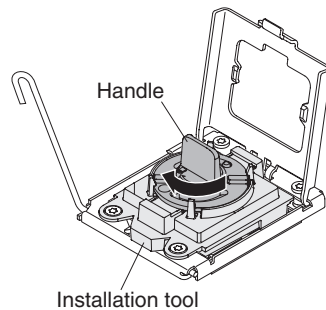
Installation tool

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

Attention: The microprocessor fits only one way on the socket. You must
place a microprocessor straight down on the socket to avoid damaging the
pins on the socket. The pins on the socket are fragile. Any damage to the
pins may require replacing the system board.

Installation tool

Microprocessor

Alignment pins
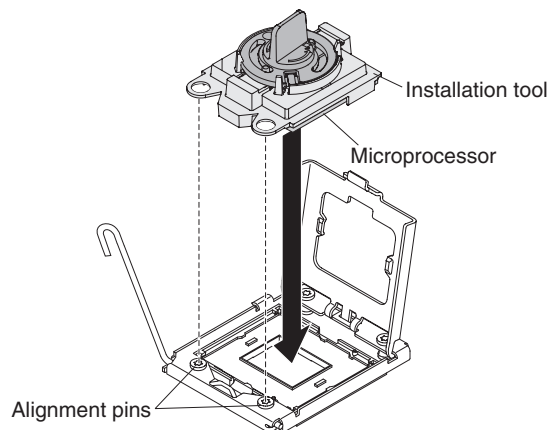
i. Twist the handle on the microprocessor tool counterclockwise to insert the
microprocessor into the socket.

Handle
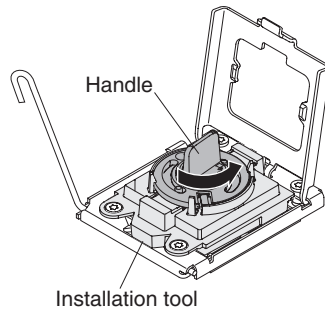
Installation tool

j. Close the microprocessor bracket frame.

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

2. Install a heat sink on 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, you must replace it. See the information that follows these steps for instructions.

   Heat sink   Thermal material
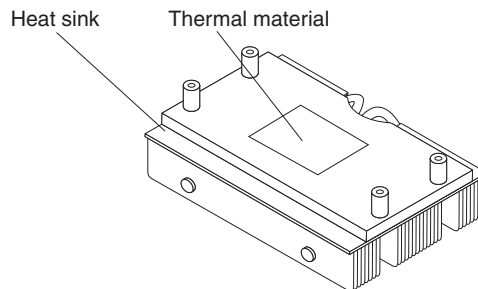
   a. If you are installing a new heat sink, remove the plastic protective cover from the bottom of the heat sink.

   b. Install the thermal sensor clip on the back of the heat sink.

   c. Make sure that the thermal material is still on the bottom of the heat sink; then, align and place the heat sink on top of the microprocessor in the retention bracket, thermal material side down. Press firmly on the heat sink.

   d. Align the four screws on the heat sink with the holes on the system-board tray.

   e. Press firmly on the captive screws and tighten them with a screwdriver, alternating among the screws until they are tight. If possible, each screw should be rotated two full rotations at a time. Repeat until the screws are tight. Do not overtighten the screws by using excessive force. If you are using a torque wrench, tighten the screws to 8.5 to 13 Newton-meters (Nm) (6.3 to 9.6 inch-pounds).

3. Install the expansion enclosure, if you removed one (see "Installing an expansion enclosure on a system-board tray" on page 130); otherwise, install the system-board tray cover (see "Installing the system-board tray cover" on page 123).

4. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125 or "Installing the system-board tray in a 3U chassis" on page 127).

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

When you are installing the heat sink on the same microprocessor that you removed it from, make sure that the thermal grease on the heat sink and microprocessor is not contaminated. Never add thermal grease to the existing thermal grease on the heat sink and microprocessor.

Note:
- Read the safety information that begins on page ix.
- Read the "Installation guidelines" on page 121.
- Read "Handling static-sensitive devices" on page 122.

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

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

   Note: Make sure that all of the thermal grease is removed.

4. Use a clean area of the cleaning pad to wipe the thermal grease from the microprocessor; then, dispose of the cleaning pad after all of the thermal grease is removed.
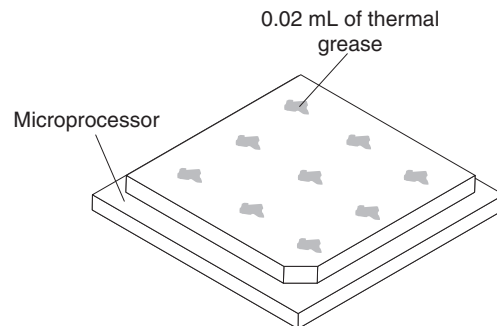
5. Use the thermal-grease syringe to place 9 uniformly spaced dots of 0.02 mL each on the top of the microprocessor. The outermost dots must be within approximately 5 mm of the edge of the microprocessor, to ensure uniform distribution of the grease.
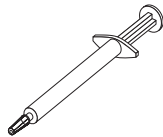
   Note: If the grease is correctly applied, approximately half of the grease will remain in the syringe.

6. Install the heat sink onto the microprocessor as described in "Installing a microprocessor and heat sink" on page 211.

Removing a PCIe riser-card assembly from the I/O enclosure

To remove a PCIe riser-card assembly from the I/O enclosure, complete the following steps.
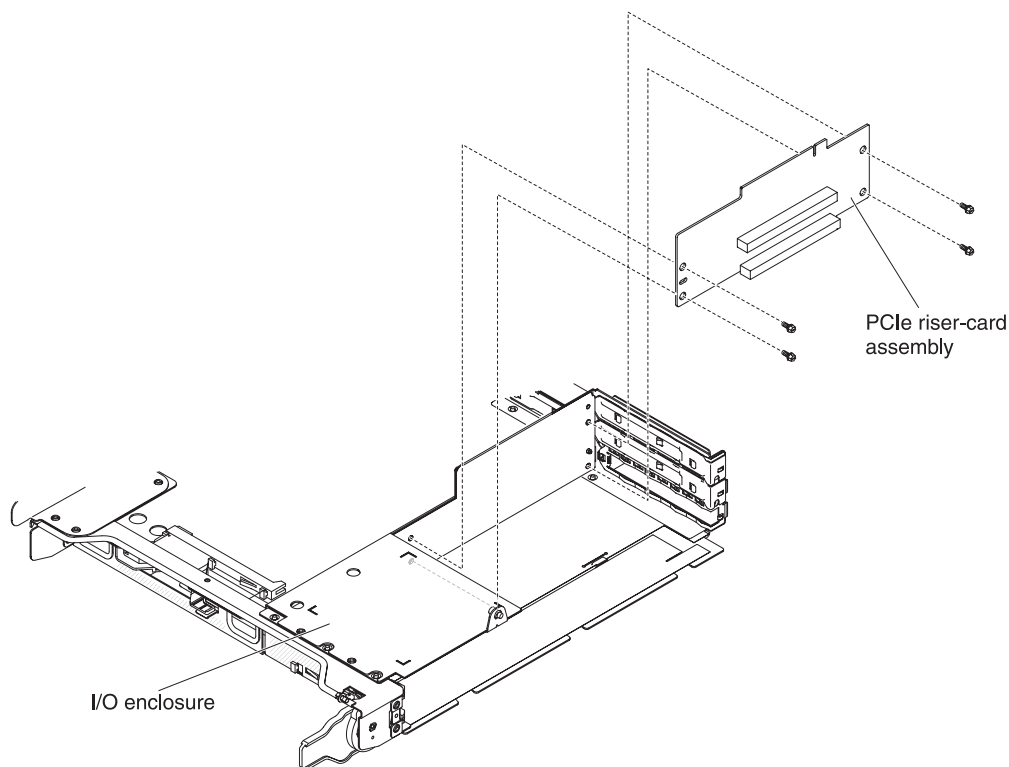
PCIe riser-card assembly

I/O enclosure

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.
2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124).
3. Remove the I/O enclosure from the system-board tray (see "Removing an expansion enclosure from a system-board tray" on page 129).
4. Carefully set the I/O enclosure on a flat, static-protective surface.
5. Remove the PCIe adapter bay cover from the I/O enclosure and save it for future use (see "Removing the PCIe adapter bay cover" on page 142).
6. Remove the PCIe adapter, if one is installed, and save it for future use (see "Removing an outer adapter from the I/O enclosure" on page 160).
7. Disconnect all cables on the riser-card if any.
8. Remove the four screws that secure the PCIe riser-card assembly to the I/O enclosure and save them for future use.
9. Pull the PCIe riser-card assembly off the mounting studs and out of the I/O enclosure.
10. If you are instructed to return the PCIe riser-card assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a PCIe riser-card assembly in the I/O enclosure

To install a PCIe riser-card assembly in the I/O enclosure, complete the following steps.
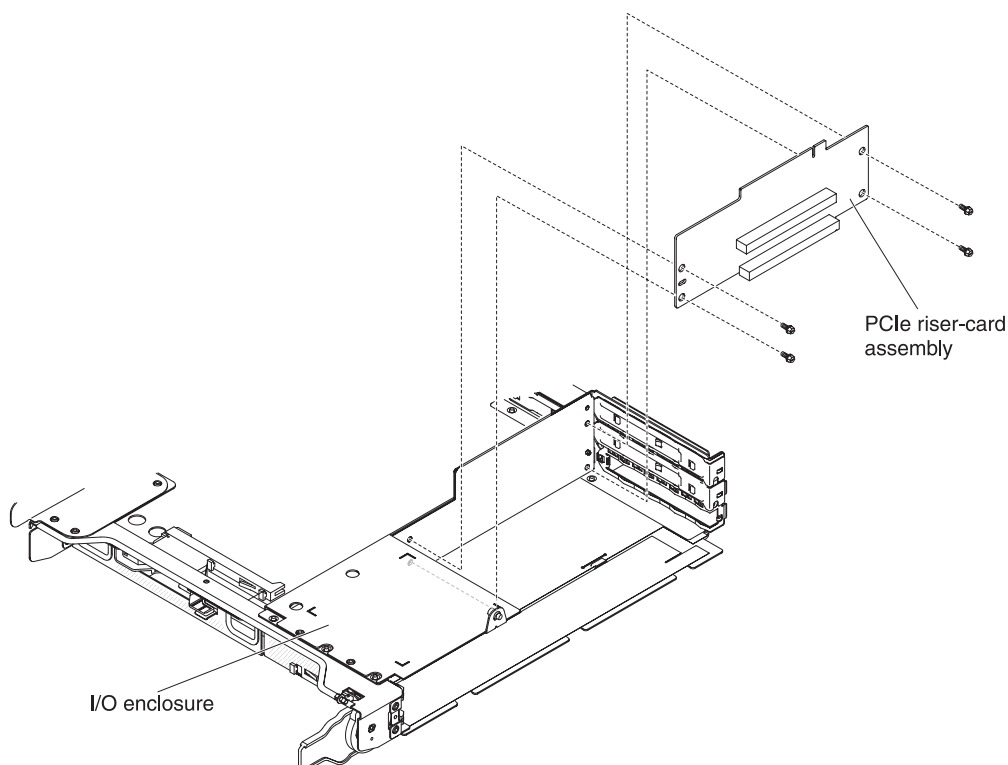
PCIe riser-card assembly

I/O enclosure

1. Touch the static-protective package that contains the PCIe riser-card assembly to any *unpainted* metal surface on the outside of the I/O enclosure; then, remove the PCIe riser-card assembly from the package.
2. Place the PCIe riser-card assembly on the mounting studs inside the I/O enclosure.
3. Install the four retaining screws.
4. Reconnect the cables to the riser-card if any.
5. Install and cable the PCIe adapter, if you removed one from the PCIe riser-card assembly (see "Installing an outer adapter in the I/O enclosure" on page 161).
6. Install the PCIe adapter bay cover on the I/O enclosure (see "Installing the PCIe adapter bay cover" on page 143).
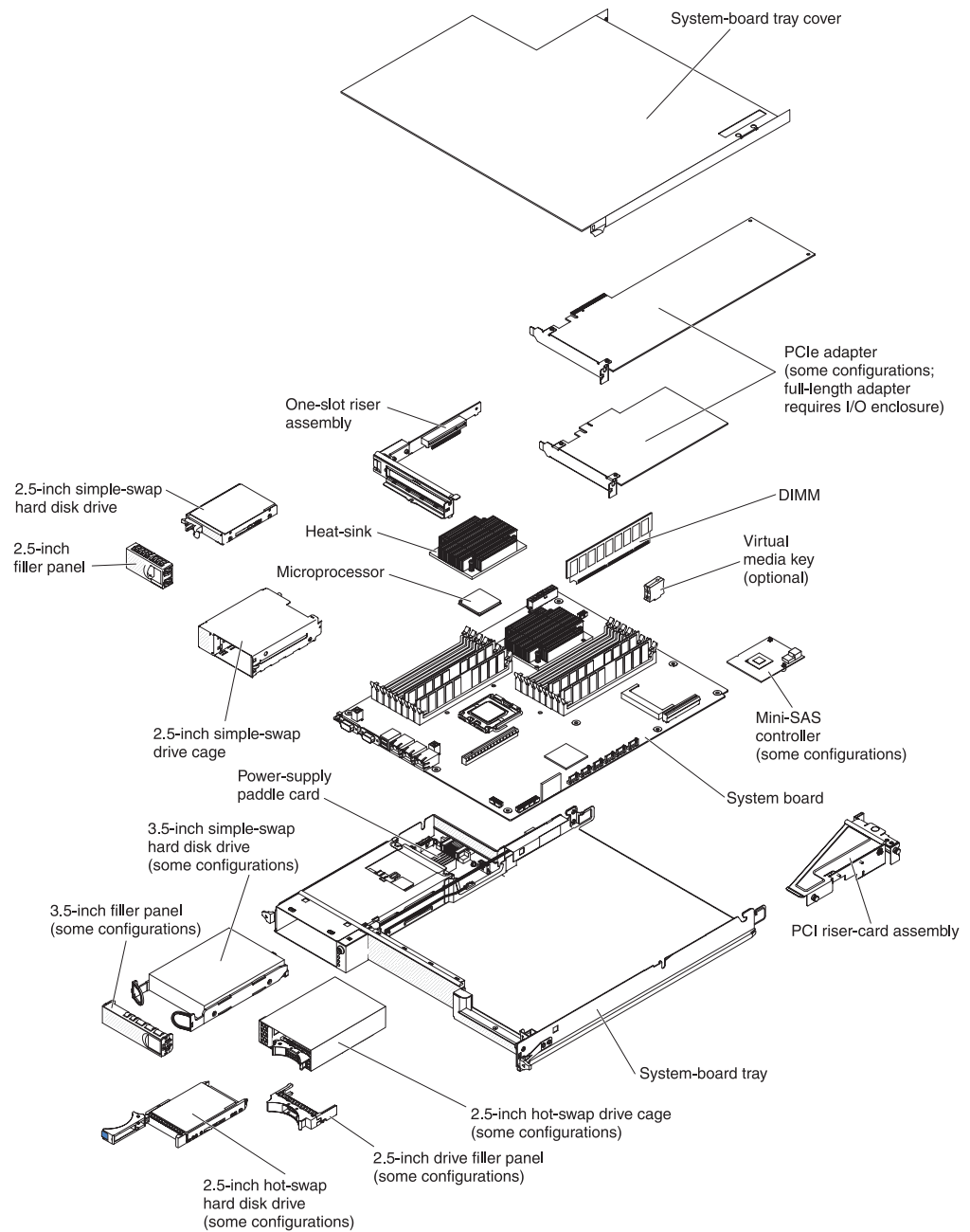7. Install the I/O enclosure on the system-board tray (see "Installing an expansion enclosure on a system-board tray" on page 130).
8. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125).

Removing a power-supply paddle card from the system-board tray

To remove a power-supply paddle card from the system-board tray, complete the following steps.

Power-supply
paddle card

System-board tray

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124 or "Removing the system-board tray from a 3U chassis" on page 126).

3. Carefully set the system-board tray on a flat, static-protective surface.

4. Remove the expansion enclosure, if one is installed, and set it on a flat, static-protective surface (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).

5. If DIMMs are installed in DIMM connectors 15 or 16, remove the DIMMs (see "Removing a memory module" on page 172). For the locations of the DIMM connectors, see "System-board connectors" on page 12.

6. If any 3.5-inch simple-swap drives are installed in the system-board tray, complete the following steps:

   a. Remove the 3.5-inch drives (see "Removing a 3.5-inch simple-swap hard disk drive" on page 141).

   b. Note the cable routing of the hard disk drive bracket and cable assembly cables; then, disconnect the cables.

   c. Remove the hard disk drive bracket and cable assembly (see "Removing and installing a one-bay or four-bay hard disk drive bracket and cable assembly" on page 177).

7. Make a note of where cables are attached to the power-supply paddle card; then, disconnect them.

8. Remove the four screws that secure the power-supply paddle card to the system-board tray and save them for future use.

9. Lift the power-supply paddle card out of the system-board tray.

10. 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 a power-supply paddle card in the system-board tray

To install a power-supply paddle card in the system-board tray, complete the following steps.
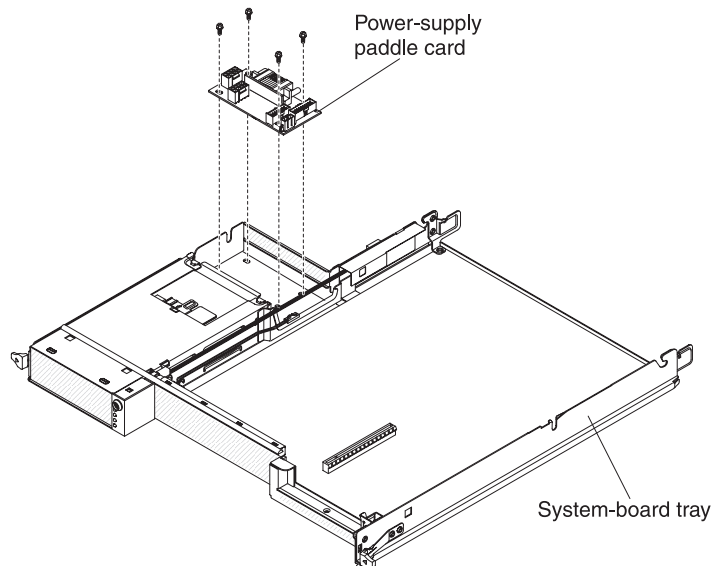
1. Touch the static-protective package that contains the power-supply paddle card to any *unpainted* metal surface on the outside of the system-board tray; then, remove the power-supply paddle card from the package.
2. Place the power-supply paddle card on the mounting studs in the system-board tray and install the four screws.
3. Reconnect the power-supply paddle card cables.
4. Install the 3.5-inch simple-swap drives, if you removed any. Complete the following steps:
   a. Install the hard disk drive bracket and cable assembly (see "Removing and installing a one-bay or four-bay hard disk drive bracket and cable assembly" on page 177).
   b. Reconnect the hard disk drive bracket and cable assembly cables.
   c. Install the 3.5-inch hard disk drive (see "Installing a 3.5-inch simple-swap hard disk drive" on page 142).
5. Install the DIMMs, if you removed any (see "Installing a memory module" on page 173).
6. Install the expansion enclosure, if you removed one (see "Installing an expansion enclosure on a system-board tray" on page 130); otherwise, install the system-board tray cover (see "Installing the system-board tray cover" on page 123).
7. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125 or "Installing the system-board tray in a 3U chassis" on page 127).

Removing a power-supply paddle card from a 3U chassis

To remove a power-supply paddle card from a 3U chassis, complete the following steps:

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the 3U chassis is installed in an iDataPlex rack, remove it (see "Removing a 3U chassis from a Type 7825 iDataPlex rack" on page 198).

3. Remove the top cover (see "Removing the 3U chassis top cover" on page 134).

4. Disconnect the cables from the power-supply paddle card, remove the four screws, slide the card away from the power supply, and remove the power-supply paddle card from the system-board tray.
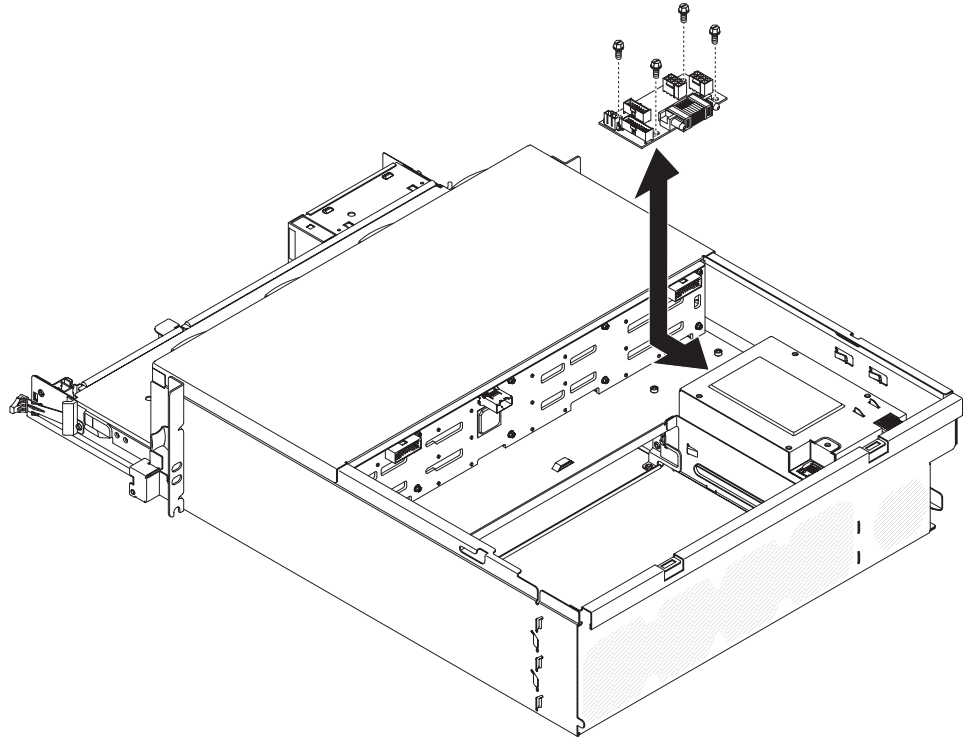
5. If you are instructed to return the power-supply paddle card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a power-supply paddle card in a 3U chassis

To install a power-supply paddle card in a 3U chassis, 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 3U chassis; then, remove the power-supply paddle card from the package.

2. Position the card in the chassis and slide the card toward the power supply, secure the power-supply paddle card with four screws, and connect the cables.
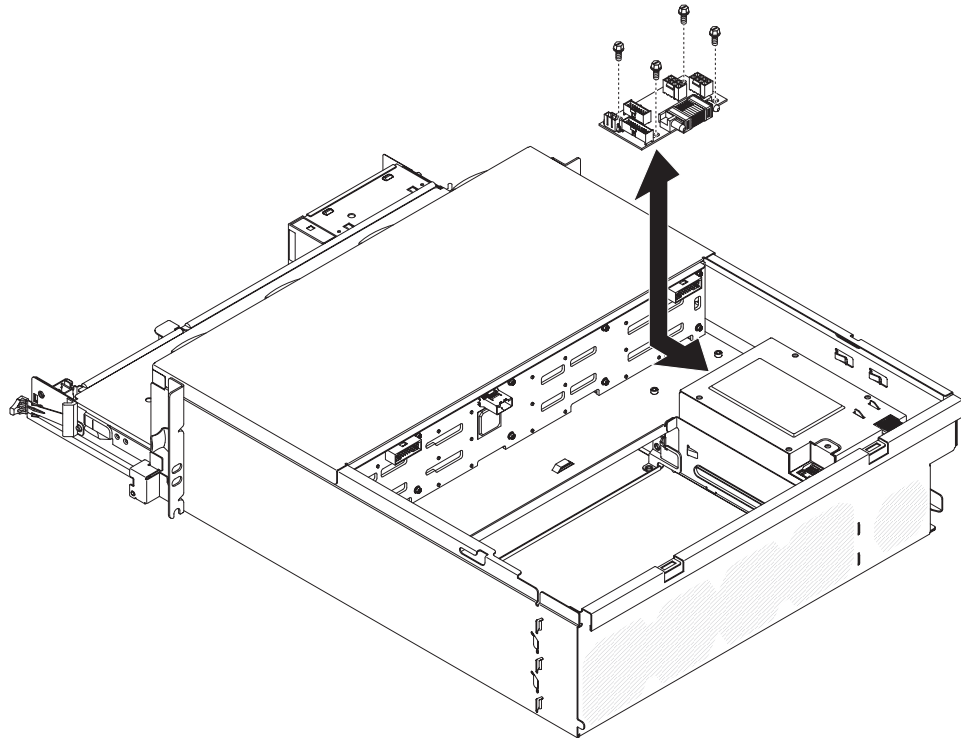
3. Install the system-board tray in the 3U chassis (see "Installing the system-board tray in a 3U chassis" on page 127).
4. Install the top cover (see "Installing the 3U chassis top cover" on page 135).
5. Install the 3U chassis in the iDataPlex rack (see "Installing a 3U chassis in a Type 7825 iDataPlex rack" on page 199).

Removing the system-board tray

Note: See "System-board layouts" on page 11 for the locations of the connectors on the system board.

To remove the system-board tray, complete the following steps.

System-board tray cover

PCIe adapter
(some configurations;
full-length adapter
requires I/O enclosure)

One-slot riser
assembly

2.5-inch simple-swap
hard disk drive

DIMM

2.5-inch
filler panel

Heat-sink

Virtual
media key
(optional)

Microprocessor

2.5-inch simple-swap
drive cage

Mini-SAS
controller
(some configurations)

Power-supply
paddle card

System board

3.5-inch simple-swap
hard disk drive
(some configurations)

3.5-inch filler panel
(some configurations)

PCI riser-card assembly

System-board tray

2.5-inch hot-swap drive cage
(some configurations)

2.5-inch drive filler panel
(some configurations)

2.5-inch hot-swap
hard disk drive
(some configurations)

1. Read the safety information that begins on page ix and "Installation guidelines" on page 121.

2. If the system-board tray is installed in a chassis, remove it (see "Removing the system-board tray from a 2U chassis" on page 124 or "Removing the system-board tray from a 3U chassis" on page 126).

3. If necessary, note the cable routing and connection locations; then, disconnect the cables that connect the system-board tray to the chassis.

Attention:

- Disengage all latches, release tabs or locks on cable connectors when you disconnect all cables from the system board. Failing to release them before removing the cables will damage the cable sockets on the system board. The cable sockets on the system board are fragile. Any damage to the cable sockets may require replacing the system board.
- Failing to install or remove the cable with care may damage the connectors on the system board. Any damage to the connectors may require replacing the system board.

4. If an expansion enclosure is installed, remove it (see "Removing an expansion enclosure from a system-board tray" on page 129); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 123).

5. Remove the hard disk drives, if any are installed (see "Removing and installing a hard disk drive" on page 137).

6. Remove the hard disk drive bracket and cable assembly (see "Removing and installing a one-bay or four-bay hard disk drive bracket and cable assembly" on page 177).

7. Remove the 2.5-inch hot-swap SAS/SATA drive cage, if one is installed (see "Removing a 2.5-inch hot-swap SAS/SATA drive cage" on page 146).

8. Remove the 2.5-inch simple-swap SAS/SATA drive cage, if one is installed (see "Removing a 2.5-inch simple-swap SAS/SATA drive cage" on page 147).

9. Remove the riser cards (see "Removing a front PCIe riser-card assembly from the system-board tray" on page 151 and "Removing the rear PCIe riser-card assembly from the system-board tray" on page 153).

10. Remove the mini-SAS RAID controller and PCIe adapters, if any are installed (see "Removing a PCIe adapter from a front PCI riser-card assembly" on page 156).

11. Remove the battery from the system board (see "Removing the battery" on page 135).

12. Remove the DIMMs (see "Removing a memory module" on page 172).

13. Remove the microprocessors and heat sinks (see "Removing a microprocessor and heat sink" on page 207).

14. Carefully remove the system-board tray. Do not damage any surrounding components nor bend the pin inside the microprocessor socket.

    Attention: Remove the socket dust covers from the microprocessor sockets on the new system-board tray and place them on the microprocessor sockets of the system-board tray you are removing.

15. If you are instructed to return the system-board tray, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

    Note: Remove the shipping brackets from the replacement system-board tray and install them on the system-board tray you are returning.

    Attention: Make sure to place the socket covers for the microprocessor sockets on the system-board tray before you return the old system-board tray.

Installing the system-board tray

Note: When you replace the system-board tray, you must either update the system-board tray 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 "Firmware updates" on page 227, "Updating the Universal Unique Identifier (UUID)" on page 241, and "Updating the DMI/SMBIOS data" on page 244 for more information.

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

To install a system-board tray, complete the following steps.
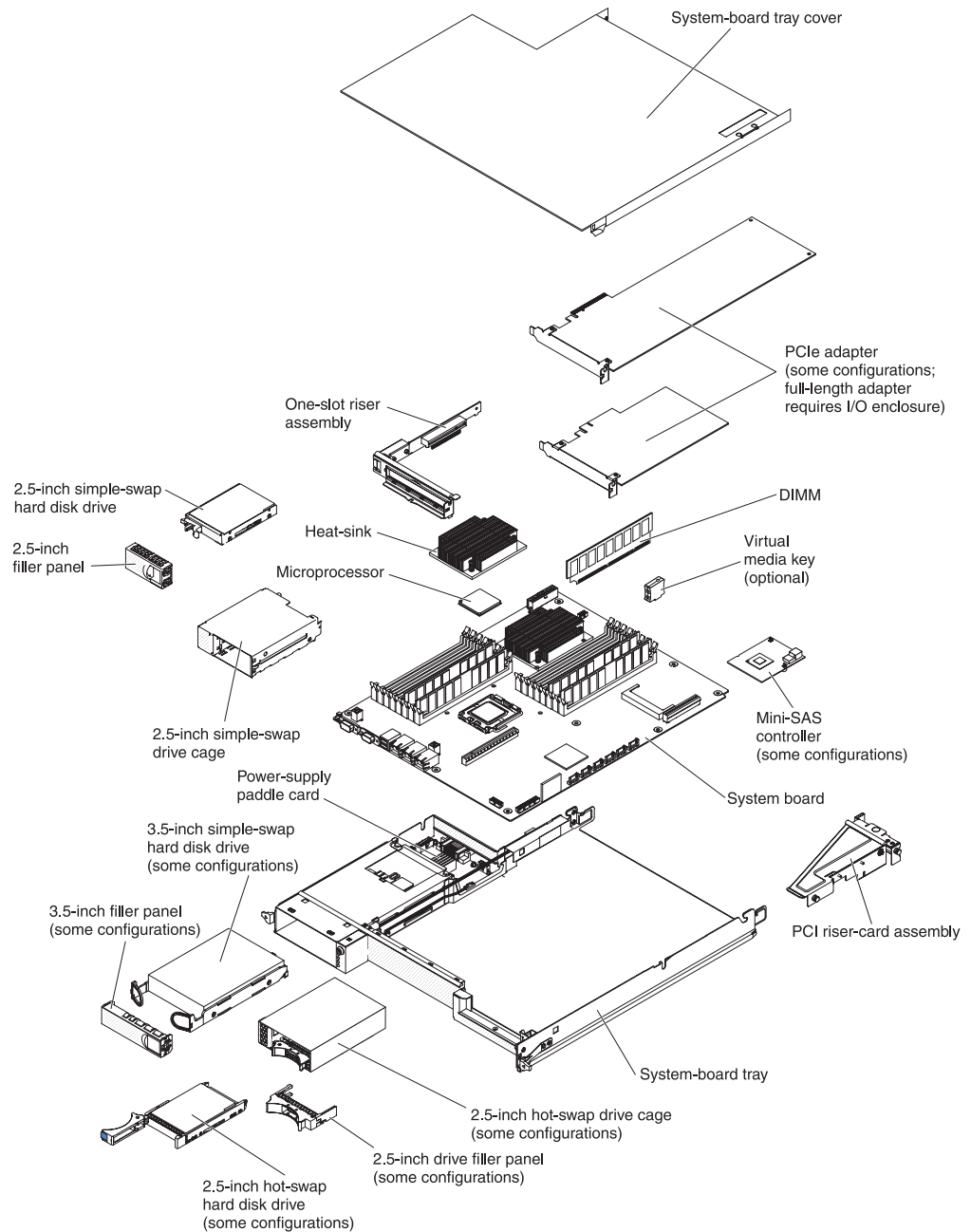
Note: You might have to remove component fillers or covers before you can install some components.

1. Reinstall the microprocessors and heat sinks (see "Installing a microprocessor and heat sink" on page 211).

2. Reinstall the DIMMs (see "Installing a memory module" on page 173).

3. Reinstall the battery (see "Installing the battery" on page 136).

4. Reinstall the mini-SAS RAID controller and PCIe adapters, if you removed any (see "Installing a PCIe adapter to a front PCI riser-card assembly" on page 156).

5. Reinstall the riser cards (see "Installing a front PCIe riser-card assembly on the system-board tray" on page 152 and "Installing the rear PCIe riser-card assembly on the system-board tray" on page 155).

6. Install the hard disk drive bracket and cable assembly (see "Removing and installing a one-bay or four-bay hard disk drive bracket and cable assembly" on page 177).

7. Reinstall the 2.5-inch simple-swap SAS/SATA drive cage, if you removed one (see "Installing a 2.5-inch simple-swap SAS/SATA drive cage" on page 148).

8. Reinstall the 2.5-inch hot-swap SAS/SATA drive cage, if you removed one (see "Installing a 2.5-inch hot-swap SAS/SATA drive cage" on page 147).

9. Reinstall the hard disk drives, if you removed any (See "Removing and installing a hard disk drive" on page 137).

10. Install the expansion enclosure, if you removed one (see "Installing an expansion enclosure on a system-board tray" on page 130); otherwise, install the system-board tray cover (see "Installing the system-board tray cover" on page 123).

11. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 125 or "Installing the system-board tray in a 3U chassis" on page 127).

Chapter 6. Configuration information and instructions

This chapter provides information about updating the firmware and using the configuration utility programs.

To update the firmware, you might have to use an external USB CD-RW/DVD drive such as the IBM and Lenovo part number 73P4515 or 73P4516. To run the Setup utility, you must have the following additional hardware:

- Monitor
- Combination USB keyboard and pointing device such as IBM part number 40K5372

Firmware updates

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

The firmware for the server is periodically updated and is available for download from the Web. To check for the latest level of firmware, such as server firmware, vital product data (VPD) code, device drivers, and service processor firmware, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x iDataPlex dx360 M3 server** to display the matrix of downloadable files.

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 server with the latest version of the firmware that is stored in memory on the device or restore the pre-existing firmware from a diskette or CD image.

- Server firmware is stored in ROM on the system board.
- IMM firmware is stored in ROM on the integrated management controller on the system board.
- Ethernet firmware is stored in ROM on the Ethernet controller.
- ServeRAID firmware is stored in ROM on the ServeRAID SAS controller.
- SAS firmware is stored in ROM on the ServeRAID SAS controller.
- Major components contain vital product data (VPD) code. You can select to update the VPD code during the server firmware update procedure.

The following items are downloadable at http://www.ibm.com/systems/support/:

- Diagnostics programs
- IMM firmware

- Ethernet firmware

Note: To avoid problems and to maintain proper system performance, always make sure that the server firmware, service processor, and other firmware levels are consistent for all iDataPlex servers.

To update the firmware, you might have to use an external USB CD-RW/DVD drive such as the IBM and Lenovo part number 73P4515 or 73P4516. To use an external USB CD-RW/DVD drive to update the firmware, complete the following steps:

1. If the system-board tray is running, turn off the system-board tray and all attached devices.
2. Connect a USB CD or DVD drive to a USB connector on the front of the system-board tray.
3. Turn on all attached devices; then, turn on the system-board tray.
4. Press F12 (**Select Boot Device**).
5. Use the Up Arrow and Down Arrow keys to select the external USB CD-RW/DVD drive as the first startup device and press Enter.

   Note: The next time the system-board tray starts, it returns to the startup sequence that is set in the Setup utility.
6. Insert the CD or DVD that contains the firmware update into the CD or DVD drive and follow the prompts.

Using the Setup utility

Use the Setup utility to perform the following steps:
- 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 event logs
- Resolve configuration conflicts

Starting the Setup utility

To start the Setup utility, 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 access the full Setup utility menu. If you do not type the administrator password, a limited Setup utility menu is available.
3. Select settings to view or change.

Setup utility menu choices

The following choices are on the Setup utility main menu. Depending on the version of the firmware, some menu choices might differ slightly from these descriptions.
- **System Information**

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

–   **System Summary**

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

–   **Product Data**

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

•   **System Settings**

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

–   **Processors**

Select this choice to view or change the processor settings.

–   **Memory**

Select this choice to view or change the memory settings. To configure memory mirroring, select **System Settings → Memory** , and then select **Memory Channel Mode → Mirroring**.

–   **Devices and I/O Ports**

Select this choice to view or change assignments for devices and input/output (I/O) ports. You can configure the serial ports; configure remote console redirection; enable or disable integrated Ethernet controllers, the SAS/SATA controller, SATA optical drive channels, and PCI slots; and view the system Ethernet MAC addresses. If you disable a device, it cannot be configured, and the operating system will not be able to detect it (this is equivalent to disconnecting the device).

–   **Power**

Select this choice to view or change power capping to control consumption, processors, and performance states.

–   **Operating Modes**

Optimize system for minimum power usage/acoustic level, power efficiency, or performance.

–   **Legacy Support**

Select this choice to view or set legacy support.

-   **Force Legacy Video on Boot**

Select this choice to force INT video support, if the operating system does not support UEFI Video Output Standards.

-   **Rehook INT**

Select this choice to enable or disable devices from taking control of the boot process. The default is **Disable**.

-   **Legacy Thunk Support**

Select this choice to enable or disable legacy thunk support.

–   **Integrated Management Module**

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

- **POST Watchdog Timer**

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

- **POST Watchdog Timer Value**

  Select this choice to view or set the POST loader watchdog timer value.

- **Reboot System on NMI**

  Enable or disable restarting the system whenever a nonmaskable interrupt (NMI) occurs. **Disabled** is the default.

- **Network Configuration**

  Select this choice to view the system management network interface port, the IMM MAC address, the current IMM IP address, and host name; define the static IMM IP address, subnet mask, and gateway address; specify whether to use the static IP address or have DHCP assign the IMM IP address; save the network changes; and reset the IMM.

- **Reset IMM to Defaults**

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

– **System Security**

Select this choice to view or set the Trusted Platform Module (TPM) options.

- **TPM Physical Presence**

  Select this choice to display the current state of the TPM physical presence. This must be asserted for TPM commands to succeed.

- **Refresh TPM Physical Presence State**

  Select this choice to refresh the current state of the TPM physical presence.

- **TPM Enabled Status**

  Select this choice to enable/disable and activated/deactivated state of the TPM.

- **TPM Device**

  Select this choice to enable/disable the TPM device. This command requires the TPM physical presence to be asserted.

- **TPM State**

  Select this choice to activated/deactivated the TPM device. This command requires the TPM physical presence to be asserted.

- **TPM Force Clear**

  Select this choice to force clearing TPM data. **!!! Warning !!!** This will erase the contents of the TPM. This command requires the TPM physical presence to be asserted.

– **Adapters and UEFI Drivers**

Select this choice to view information about the adapters and UEFI drivers in the server. You can also select an adapter that you want to configure and start a configuration program.

– **Network**

Select this choice to see all of the device options, such as the iSCSI, PXE, and Ethernet parameters.

• **Date and Time**

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

- **Start Options**

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

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

  This choice is on the full Setup utility menu only.

- **Boot Manager**

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

- **System Event Logs**

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

  The system event logs contain all event and error messages that have been generated during POST, by the systems-management interface handler, and by the system service processor. Run the diagnostic programs to get more information about error codes that occur. See "Running the diagnostic programs" on page 42 for instructions for running the diagnostic programs.

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

  - **POST Event Viewer**

    Select this choice to view the error messages in the POST event viewer.

  - **System Event Log**

    Select this choice to view the error messages in the system-event log.

  - **Clear System Event Log**

    Select this choice to clear the system-event log.

- **User Security**

  Select this choice to set, change, or clear passwords. See"Passwords" on page 232 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 232.

  - **Clear Power-on Password**

    Select this choice to clear a power-on password. For more information, see "Power-on password" on page 232.

  - **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 233.

– **Clear Administrator Password**

Select this choice to clear an administrator password. For more information, see "Administrator password" on page 233.

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

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

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

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

Power-on password
If a power-on password is set, when you turn on the server, the system startup will not be completed until you type the power-on password. You can use any combination of up to seven characters (A – Z, a – z, and 0 – 9) for the 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.
- Clear the password by clearing CMOS memory (see "Clearing CMOS memory" on page 69 for instructions).

Administrator password

An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu.

If an administrator password is set, you must type the administrator password for access to the full Setup utility menu. You can use any combination of up to seven characters (A – Z, a – z, and 0 – 9) for the password.

Attention: If you set an administrator password and then forget it, there is no way to change, override, or remove it. You must replace the system board.

IBM Advanced Settings Utility program

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

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

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

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

For more information and to download the ASU program, go to http://www.ibm.com/systems/support/.

Using the Boot Menu program

The Boot Menu 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 Menu program, complete the following steps:

1. Turn off the system-board tray.
2. Restart the system-board tray.
3. Press F12 (**Select Boot Device**). If a bootable USB mass storage device is installed, a submenu item (**USB Key/Disk**) is displayed.
4. Use the Up Arrow and Down Arrow keys to select an item from the **Boot Selection Menu** and press Enter.

The next time the system-board tray 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 (formerly called BIOS) firmware. This is a secondary copy of server firmware that you update only during the process of updating server firmware. If the primary copy of the server firmware becomes damaged, use this backup copy.

To force the server to start from the backup copy, turn off the server; then, place the JP2 jumper on the system board in the backup position (pins 2 and 3). See "System-board jumpers" on page 13 for the location of the JP2 jumper.

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

The integrated management module (IMM) is a second generation of the functions that were formerly provided by the baseboard management controller hardware. It combines service processor functions, video controller, and (when an optional virtual media key is installed) remote presence function in a single chip.

The IMM supports the following basic systems-management features:
- Environmental monitor with fan speed control for temperature, voltages, fan failure, and power supply failure.
- Diagnostic LEDs to report errors that occur with power supplies, microprocessor, hard disk drives, and system errors.
- DIMM error assistance. The server firmware disables a failing DIMM that is detected during POST, and the IMM lights the associated system error LED and the failing DIMM error LED.
- System-event log.
- ROM-based IMM firmware flash updates.
- Auto Boot Failure Recovery.
- A virtual media key, which enables full systems-management support (remote video, remote keyboard/mouse, and remote storage).
- When one of the two microprocessors reports an internal error, the server disables the defective microprocessor and restarts with the one good microprocessor.
- NMI detection and reporting.
- SMI handling.
- Automatic Server Restart (ASR) when POST is not complete or the operating system hangs and the OS watchdog timer times out. The IMM might be configured to watch for the OS watchdog timer and reboot the system after a timeout, if the ASR feature is enabled. Otherwise, the IMM allows the administrator to generate an NMI by pressing an NMI button on the system board for an operating-system memory dump. ASR is supported by IPMI.
- Intelligent Platform Management Interface (IPMI) Specification V2.0 and Intelligent Platform Management Bus (IPMB) support.
- Invalid system configuration (CNFG) LED support.
- Serial redirect.
- Serial over LAN (SOL).
- Active Energy Manager.
- Query power-supply input power.
- PECI 2 support.
- Power/reset control (power-on, hard and soft shutdown, hard and soft reset, schedule power control).
- Alerts (in-band and out-of-band alerting, PET traps - IPMI style, SNMP, e-mail).
- Operating-system failure blue screen capture.

- Command-line interface.
- Configuration save and restore.
- PCI configuration data.
- Boot sequence manipulation.

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

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

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

- **Serial over LAN**

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

Using the remote presence capability and blue-screen capture

The remote presence and blue-screen capture features are integrated functions of the integrated management module (IMM). When the optional IBM Virtual Media Key is installed in the server, it activates full systems-management functions. The virtual media key is required to enable the integrated remote presence and blue-screen capture features. Without the virtual media key, you cannot remotely mount or unmount drives or images on the client system. However, you still can access the Web interface without the key.

After the virtual media key is installed in the server, it is authenticated to determine whether it is valid. If the key is not valid, you receive a message from the Web interface (when you attempt to start the remote presence feature) indicating that the hardware key is required to use the remote presence feature.

The virtual media key has an LED. When this LED is lit and green, it indicates that the key is installed and functioning correctly.

The remote presence feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1280 x 1024 at 75 Hz, regardless of the system state
- Remotely accessing the server, using the keyboard and mouse from a remote client
- Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
- Uploading a diskette image to the IMM memory and mapping it to the server as a virtual drive

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

Enabling the remote presence feature

To enable the remote presence feature, complete the following steps:

1. Install the virtual media key into the dedicated slot on the system board (see "Installing an IBM virtual media key" on page 171).

2. Turn on the server.

   Note: Approximately 1 to 2 minutes after the server is connected to ac power, the power-control button becomes active.

Obtaining the IP address for the Web interface access

To access the Web interface and use the remote presence feature, you need the IP address for the IMM. You can obtain the IMM IP address through the Setup utility. To locate the IP address, complete the following steps:

1. Turn on the server.

   Note: Approximately 1 to 2 minutes after the server is connected to ac power, the power-control button becomes active.

2. When the prompt `<F1> Setup` is displayed, press F1. (This prompt is displayed on the screen for only a few seconds. You must press F1 quickly.) If you have set both a power-on password and an administrator password, you must type the administrator password to access the full Setup utility menu.

3. From the Setup utility main menu, select **System Settings**.

4. On the next screen, select **Integrated Management Module**.

5. On the next screen, select **Network Configuration**.

6. Find the IP address and write it down.

7. Exit from the Setup utility.

Logging on to the Web interface

To log on to the Web interface to use the remote presence functions, complete the following steps:

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

   Notes:

   a. If you are logging in to the IMM for the first time after installation, the IMM defaults to DHCP. If a DHCP host is not available, the IMM uses the default static IP address 192.168.70.125.

   b. You can obtain the DHCP-assigned IP address or the static IP address from the server UEFI or from your network administrator.

   The Login page is displayed.

2. Type the user name and password. If you are using the IMM for the first time, you can obtain the user name and password from your system administrator. All login attempts are documented in the event log. A welcome page opens in your browser.

   Note: The IMM is set initially with a user name of USERID and password of PASSW0RD (passw0rd with a zero, not a the letter O). You have read/write access. For enhanced security, change this default password during your initial configuration.

3. On the Welcome page, type a timeout value (in minutes) in the field that is provided. The IMM will log you off 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 browser opens the System Status page, which gives you a quick view of the server status and the server health summary.

Using the LSI Logic Configuration Utility program

Use the information in this section to configure an optional LSI RAID controller. If you need to configure an optional ServeRAID controller, see "Configuring a ServeRAID controller" on page 239. You can also select **System Settings** and **Adapters and UEFI Drivers** on the Setup utility to view a list of UEFI device drivers that support configuration; then, select the adapter that you want to configure to start a configuration program (see "Using the Setup utility" on page 228).

Use the LSI Logic Configuration Utility program to configure and manage redundant array of independent disks (RAID) arrays. Be sure to use the program as described in this document. Use the LSI Logic Configuration Utility program to perform the following tasks:

- Perform a low-level format of a SCSI hard disk drive
- View or change SCSI IDs for attached devices
- Set a SCSI device scan order
- Set SCSI protocol parameters on SCSI hard disk drives
- Configure arrays
- View your RAID configuration and associated devices
- Monitor operation of your RAID controllers
- Create a mirrored pair of SCSI hard disk drives with or without a hot-spare drive

The integrated SCSI controller with RAID capabilities supports redundant array of independent disks (RAID) arrays. You can use the LSI Logic Configuration Utility program to configure RAID level-1 for a single pair of attached devices. If you install a different type of RAID adapter, follow the instructions in the documentation that comes with the adapter to view or change SCSI settings for attached devices.

You can download an LSI command-line configuration program (CFG1030) from http://www.ibm.com/systems/support/. For more information about the RAID controller, go to http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-65723&brandind=5000008 or complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **Hardware upgrades**.
3. Under **Product family**, click **RAID**.
4. Under **Type**, click on the type of RAID controller that is installed in your server.

When you use the LSI Logic Configuration Utility program to configure and manage arrays, review the following information:

- The integrated SCSI controller with RAID capabilities in the server supports only RAID level-1 with a hot-spare drive installed. Installing an optional ServeRAID controller provides additional RAID levels.
- When you create a RAID level-1 (mirrored) pair, all drives must be on the same channel.
- Hard disk drive capacities affect how you create arrays. The drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.
- You can set up a mirror after the operating system is installed on the primary drive only if you are using an integrated SCSI controller with RAID capabilities. You must make sure that the primary drive has the lower SCSI ID (for example, 0).

    Important: If you use an integrated SCSI controller with RAID capabilities to configure a RAID level-1 (mirrored) array after you have installed the operating system, you will lose access to any data or applications that were previously stored on the secondary drive of the mirrored pair.

- If you install a different type of RAID controller, follow the instructions in the documentation that comes with the controller to view or change SCSI settings for attached devices.

The following sections provide instructions for starting the LSI Logic Configuration Utility program and performing selected functions.

Starting the LSI Logic Configuration Utility program

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

1. Turn on the server.
2. When the prompt `<<< Press <CTRL><C> to start LSI Logic Configuration Utility >>>` is displayed, press Ctrl+C. If you have set an administrator password, you are prompted to type the password.
3. To select a controller (channel) from the list of adapters, use the arrow keys and press Enter.
4. To change the settings of the selected items, follow the instructions on the screen. If you select **Device Properties** or **Mirroring Properties**, additional screens are displayed.

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

Formatting a SCSI hard disk drive

Low-level formatting removes all data from the hard disk. If there is data on the disk that you want to save, back up the hard disk before you perform this procedure.

Note: Before you format a SCSI hard disk, make sure that the disk is not part of a mirrored pair. From the list of adapters, select the controller (channel) for the drive that you want to format. Select **Mirroring Properties** and make sure that the mirroring value for the drive is **None**.

To format a drive, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drive that you want to format.

2. Select **Device Properties**.

3. To highlight the drive that you want to format, use the Up Arrow and Down Arrow keys. To scroll left and right, use the Left Arrow and Right Arrow keys or the End key.

4. To start the low-level formatting operation, select **Format** and press Enter .

Creating a mirrored pair of SCSI hard disk drives

To create a mirrored pair of SCSI hard disk drives, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drives that you want to mirror.

2. Select **Mirroring Properties**.

3. Use the arrow keys to highlight the first drive in the pair; then, press the Minus key to change the mirroring value to **Primary**.

4. Use the arrow keys to highlight the second drive in the pair; then, press the Minus key to change the mirroring value to **Secondary**.

5. To establish a third drive that will take over the function of either mirrored drive in the event of a failure, use the arrow keys to highlight the drive that you want to use for that purpose; then, press the Minus key to change the mirroring value to **Hot Spare**.

Configuring a ServeRAID controller

Use the information in this section to configure an optional ServeRAID controller. If you need to configure an optional LSI RAID controller, see "Using the LSI Logic Configuration Utility program" on page 237. You can also select **System Settings** and **Adapters and UEFI Drivers** on the Setup utility to view a list of UEFI device drivers that support configuration; then, select the adapter that you want to configure to start a configuration program (see "Using the Setup utility" on page 228).

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

To update the firmware and server firmware for an optional ServeRAID controller, you must use the IBM *ServeRAID Support* CD that comes with the controller.

Note: To update the firmware and server firmware for an optional ServeRAID controller, you might have to use an external USB CD-RW/DVD drive such as the IBM and Lenovo part number 73P4515 or 73P4516. See "Firmware updates" on page 227 for additional instructions about using an external USB CD-RW/DVD drive.

For more information about the ServeRAID controller, go to http://www-304.ibm.com/jct01004c/systems/support/supportsite.www/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 or complete the following steps.

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

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

2. Under **Product support**, click **Hardware upgrades**.

3. Under **Product family**, click **RAID**.

4. Under **Type**, click on the type of RAID controller that is installed in your server.

Configuring the Gigabit Ethernet controller

The Ethernet controller is integrated on the system board. It provides an interface for connecting to a 10 Mbps, 100 Mbps, or 1 Gbps network and provides 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 controller detects the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operates at that rate and mode.

You do not have to set any jumpers or configure the controller. However, you must install a device driver to enable the operating system to address the controller. To find updated information about configuring the controller, complete the following steps.

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.

Notes:

- Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.
- To install the device driver for the Ethernet controller, you might need to use an external USB CD-RW/DVD drive such as the IBM and Lenovo part number 73P4515 or 73P4516. For more information, see "Firmware updates" on page 227.

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. From the **Product family** menu, select **System x iDataPlex dx360 M3 server** and click **Continue**.

Updating IBM Systems Director

If you plan to use IBM Systems Director to manage the server, you must check for the latest applicable IBM Systems Director updates and interim fixes.

To locate and install a newer version of IBM Systems Director, complete the following steps:

Notes:

- Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.
- To install the device driver for the Ethernet controller, you might need to use an external USB CD-RW/DVD drive such as the IBM and Lenovo part number 73P4515 or 73P4516. For more information, see "Firmware updates" on page 227.

1. Check for the latest version of IBM Systems Director:
   a. Go to http://www.ibm.com/systems/management/director/downloads.html.

b. If a newer version of IBM Systems Director than what comes with the server is shown in the drop-down list, follow the instructions on the Web page to download the latest version.

2. Install the IBM Systems Director program.

If your management server is connected to the Internet, to locate and install updates and interim fixes, complete the following steps:

1. Make sure that you have run the Discovery and Inventory collection tasks.
2. On the Welcome page of the IBM Systems Director Web interface, click **View updates**.
3. Click **Check for updates**. The available updates are displayed in a table.
4. Select the updates that you want to install, and click **Install** to start the installation wizard.

If your management server is not connected to the Internet, to locate and install updates and interim fixes, complete the following steps:

1. Make sure that you have run the Discovery and Inventory collection tasks.
2. On a system that is connected to the Internet, go to http://www.ibm.com/eserver/support/fixes/fixcentral/.
3. From the **Product family** list, select **IBM Systems Director**.
4. From the **Product** list, select **IBM Systems Director**.
5. From the **Installed version** list, select the latest version, and click **Continue**.
6. Download the available updates.
7. Copy the downloaded files to the management server.
8. On the management server, on the Welcome page of the IBM Systems Director Web interface, click the **Manage** tab, and click **Update Manager**.
9. Click **Import updates** and specify the location of the downloaded files that you copied to the management server.
10. Return to the Welcome page of the Web interface, and click **View updates**.
11. Select the updates that you want to install, and click **Install** to start the installation wizard.

Updating the Universal Unique Identifier (UUID)

The Universal Unique Identifier (UUID) must be updated when the system-board tray is replaced. Use the Advanced Settings Utility to update the UUID in the UEFI-based server. The ASU is an online tool that supports several operating systems. Make sure that you download the version for your operating system. You can download the ASU from the IBM Web site. To download the ASU and update the UUID, complete the following steps.

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

1. Download the Advanced Settings Utility (ASU):
   a. Go to http://www.ibm.com/systems/support/.
   b. Under Product support, select **System x**.
   c. Under Popular links, select **Tools and utilities**.
   d. In the left pane, click **System x and BladeCenter Tools Center**.
   e. Scroll down and click **Tools reference**.

f. Scroll down and click the plus-sign (+) for Configuration tools to expand the list; then, select **Advanced Settings Utility (ASU)**.

g. In the next window under Related Information, click the **Advanced Settings Utility** link and download the ASU version for your operating system.

2. ASU sets the UUID in the Integrated Management Module (IMM). Select one of the following methods to access the Integrated Management Module (IMM) to set the UUID:

- Online from the target system (LAN or keyboard console style (KCS) access)
- Remote access to the target system (LAN based)
- Bootable media containing ASU (LAN or KCS, depending upon the bootable media)

   Note: IBM provides a method for building a bootable media. You can create a bootable media using the Bootable Media Creator (BoMC) application from the Tools Center Web site. In addition, the Windows and Linux based tool kits are also available to build a bootable media.

3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:

- For Windows based operating systems:
  - ibm_rndis_server_os.inf
  - device.cat
- For Linux based operating systems:
  - cdc_interface.sh

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

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

Where:

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

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

- Online authenticated LAN access, type the command:

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

  Where:

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

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

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

   Note: If you do not specify any of these parameters, ASU will use the default values. When the default values are used and ASU is unable to

access the IMM using the online authenticated LAN access method, ASU will automatically use the unauthenticated KCS access method.

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

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

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

- Online KCS access (unauthenticated and user restricted):

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

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

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

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

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

  b. Under Product support, select **System x**.

  c. Under Popular links, select **Tools and utilities**.

  d. In the left pane, click **System x and BladeCenter Tools Center**.

  e. Scroll down and click **Tools reference**.

  f. Scroll down and click the plus-sign (+) for Configuration tools to expand the list; then, select **Advanced Settings Utility (ASU)**.

  g. In the next window under Related Information, click the **Advanced Settings Utility** link.

- Remote LAN access, type the command:

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

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

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

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

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

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

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

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

- Bootable media:

  You can also build a bootable media using the applications available through the Tools Center Web site at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp. From the left pane, click **IBM System x and BladeCenter Tools Center**, then click **Tool reference** for the available tools.

5. Restart the server.

Updating the DMI/SMBIOS data

The Desktop Management Interface (DMI) must be updated when the system-board tray is replaced. Use the Advanced Settings Utility to update the DMI in the UEFI-based server. The ASU is an online tool that supports several operating systems. Make sure that you download the version for your operating system. You can download the ASU from the IBM Web site. To download the ASU and update the DMI, complete the following steps.

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

1. Download the Advanced Settings Utility (ASU):
   a. Go to http://www.ibm.com/systems/support/.
   b. Under Product support, select **System x**.
   c. Under Popular links, select **Tools and utilities**.
   d. In the left pane, click **System x and BladeCenter Tools Center**.
   e. Scroll down and click **Tools reference**.
   f. Scroll down and click the plus-sign (+) for Configuration tools to expand the list; then, select **Advanced Settings Utility (ASU)**.
   g. In the next window under Related Information, click the **Advanced Settings Utility** link and download the ASU version for your operating system.

2. ASU sets the DMI in the Integrated Management Module (IMM). Select one of the following methods to access the Integrated Management Module (IMM) to set the DMI:
   - Online from the target system (LAN or keyboard console style (KCS) access)
   - Remote access to the target system (LAN based)
   - Bootable media containing ASU (LAN or KCS, depending upon the bootable media)

     Note: IBM provides a method for building a bootable media. You can create a bootable media using the Bootable Media Creator (BoMC) application from the Tools Center Web site. In addition, the Windows and Linux based tool kits are also available to build a bootable media.

3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application executable (asu or asu64), the following files are required:
   - For Windows based operating systems:

- ibm_rndis_server_os.inf
- device.cat
- For Linux based operating systems:
  - cdc_interface.sh

4. After you install ASU, type the following commands to set the DMI:

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

Where:

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

<system model>
> The system model. Type `system yyyyyyy`, where *yyyyyyy* is the product identifier such as dx360M3.

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

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

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

- Online authenticated LAN access, type the command:

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

Where:

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

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

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

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

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

Examples that do not use the userid and password default values:
```
asu set SYSTEM_PROD_DATA.SYsInfoProdName <m/t_model> user
 <imm_user_id> password <imm_password>
asu set SYSTEM_PROD_DATA.SYsInfoProdIdentifier <system model> user
```

```
    <imm_user_id> password <imm_password>
asu set SYSTEM_PROD_DATA.SYsInfoSerialNum <s/n> user
 <imm_user_id> password <imm_password>
asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag> user
 <imm_user_id> password <imm_password>
```

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

- Online KCS access (unauthenticated and user restricted):

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

  The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver be installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer. See the *Advanced Settings Utility Users Guide* at http://www-947.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008 &lndocid=MIGR-55021 for more details.

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

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

- Remote LAN access, type the command:

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

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

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

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

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

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

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

```
user <imm_user_id> password <imm_password>
asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag <asset_tag> host <imm_ip>
user <imm_user_id> password <imm_password>
```

Examples that do use the userid and password default values:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> host <imm_ip>
asu set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> host <imm_ip>
asu set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> host <imm_ip>
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> host <imm_ip>
```

- Bootable media:

  You can also build a bootable media using the applications available through the Tools Center Web site at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp. From the left pane, click **IBM System x and BladeCenter Tools Center**, then click **Tool reference** for the available tools.

5. Restart the server.

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This appendix contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your product or optional device, 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 iDataPlex information is http://www.ibm.com/systems/x/hardware/idataplex/index.html. The address for IBM BladeCenter® information is http://www.ibm.com/systems/bladecenter/. The address for IBM IntelliStation® information is http://www.ibm.com/intellistation/.

You can find service information for IBM systems and optional devices at http://www.ibm.com/systems/support/.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with System x and xSeries servers, BladeCenter products, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, see http://www.ibm.com/services/sl/products/.

For more information about Support Line and other IBM services, see http://www.ibm.com/services/, or see http://www.ibm.com/planetwide/ for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Hardware service and support

You can receive hardware service through your IBM reseller or IBM Services. To locate a reseller authorized by IBM to provide warranty service, go to http://www.ibm.com/partnerworld/ and click **Find a Business Partner** on the right side of the page. For IBM support telephone numbers, see http://www.ibm.com/planetwide/. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

IBM Taiwan product service

台灣 IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路 7 號 3 樓
電話：0800-016-888

IBM Taiwan product service contact information:
    IBM Taiwan Corporation
    3F, No 7, Song Ren Rd.
    Taipei, Taiwan
    Telephone: 0800-016-888

Appendix B. Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

> *IBM Director of Licensing*
> *IBM Corporation*
> *North Castle Drive*
> *Armonk, NY 10504-1785*
> *U.S.A.*

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product, and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Trademarks

IBM, the IBM logo, and ibm.com® are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. If these and other IBM trademarked terms are marked on their first occurrence in this information with a trademark symbol (® or ™), these symbols indicate U.S. registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at http://www.ibm.com/legal/copytrade.shtml.

Adobe and PostScript are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc., in the United States, other countries, or both and is used under license therefrom.

Intel, Intel Xeon, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc., in the United States, other countries, or both.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, and Windows NT are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other company, product, or service names may be trademarks or service marks of others.

The following terms are trademarks of International Business Machines Corporation in the United States, other countries, or both:

Active Memory	IBM	TechConnect
Active PCI	IBM (logo)	Tivoli
Active PCI-X	IntelliStation	Tivoli Enterprise
AIX	NetBAY	Update Connector
Alert on LAN	Netfinity	Wake on LAN
BladeCenter	Predictive Failure Analysis	XA-32
Chipkill	ServeRAID	XA-64
e-business logo	ServerGuide	X-Architecture
@server	ServerProven	XpandOnDemand
FlashCopy	System x	xSeries
i5/OS		

Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1,048,576 bytes, and GB stands for 1,073,741,824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1,000,000 bytes, and GB stands for 1,000,000,000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives that are available from IBM.

Maximum memory might require replacement of the standard memory with an optional memory module.

IBM makes no representation or warranties regarding non-IBM products and services that are ServerProven®, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Particulate contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server that is described in this document. Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the server to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If IBM determines that the levels of particulates or gases in your environment have caused damage to the server, IBM may condition provision of repair or replacement of servers or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 19. Limits for particulates and gases

Contaminant	Limits
Particulate	• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2[1]. • Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. • The deliquescent relative humidity of the particulate contamination must be more than 60%[2]. • The room must be free of conductive contamination such as zinc whiskers.
Gaseous	• Copper: Class G1 as per ANSI/ISA 71.04-1985[3] • Silver: Corrosion rate of less than 300 Å in 30 days
[1] ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.	
[2] The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.	
[3] ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.	

Documentation format

The publications for this product are in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when you use the PDF files and want to request a Web-based format or accessible PDF document for a publication, direct your mail to the following address:

Information Development
IBM Corporation
205/A015
3039 E. Cornwallis Road
P.O. Box 12195
Research Triangle Park, North Carolina 27709-2195
U.S.A.

In the request, be sure to include the publication part number and title.

When you send information to IBM, you grant IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

Telecommunication regulatory statement

This product is not intended to be connected directly or indirectly by any means whatsoever to interfaces of public telecommunications networks, nor is it intended to be used in a public services network.

Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

Attention: This is an EN 55022 Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Responsible manufacturer:
    International Business Machines Corp.
    New Orchard Road
    Armonk, New York 10504
    914-499-1900

European Community contact:
    IBM Technical Regulations, Department M456

IBM-Allee 1, 71137 Ehningen, Germany
Telephone: 0049 (0) 7032 15-2937
E-mail: tjahn@de.ibm.com

Germany Class A statement

Deutschsprachiger EU Hinweis:

Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:
International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:
IBM Deutschland
Technical Regulations, Department M456
IBM-Allee 1, 71137 Ehningen, Germany
Telephone: 0049 (0) 7032 15-2937
E-mail: tjahn@de.ibm.com

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

Japan VCCI Class A statement

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に
基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を
引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求
されることがあります。

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

Japan Electronics and Information Technology Industries Association (JEITA) statement

高調波ガイドライン適合品

jiieta1

Japanese Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guideline (products less than or equal to 20 A per phase)

Korea Communications Commission (KCC) statement

이 기기는 업무용(A급)으로 전자파적합기기로
서 판매자 또는 사용자는 이 점을 주의하시기
바라며, 가정외의 지역에서 사용하는 것을 목
적으로 합니다.

Please note that this equipment has obtained EMC registration for commercial use. In the event that it has been mistakenly sold or purchased, please exchange it for equipment certified for home use.

Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ! Настоящее изделие относится к классу А. В жилых помещениях оно может создавать радиопомехи, для снижения которых необходимы дополнительные меры

rusemi

People's Republic of China Class A electronic emission statement

中华人民共和国 "A类" 警告声明

声 明
此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，
可能需要用户对其干扰采取切实可行的措施。

Taiwan Class A compliance statement

警告使用者:
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策。

Index

Numerics

E

F

G

H

I

IBM ®

Part Number: 00V9830

Printed in USA