

System x iDataPlex dx360 M2  
Types 6313, 6380, 6385, 6386,  
7321, 7323, 7831, and 7834



# Problem Determination and Service Guide



System x iDataPlex dx360 M2  
Types 6313, 6380, 6385, 6386,  
7321, 7323, 7831, and 7834



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

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## Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

在安裝本产品之前，请仔细阅读 **Safety Information** (安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

---

## 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 55 and "Power cords" on page 64.
  - 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:**

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

**To Disconnect:**

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



Statement 2:



**CAUTION:**

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

*Do not:*

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

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

Statement 3:



**CAUTION:**

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

- Do not remove the 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.

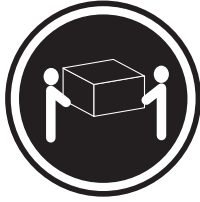


**DANGER**

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:**

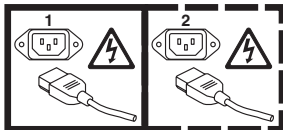
**Use safe practices when lifting.**

**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 13 for information about system-board LEDs.
- **System error codes:** See “Event logs” on page 22 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 36 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&Indocid=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](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&Indocid=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 M2 server** to display the list of downloadable files for the server.

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

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

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

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

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

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

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 24 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 M2 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 M2 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 28 and Chapter 5, “Removing and replacing server components,” on page 67 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.

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## 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.



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## 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 M2 system-board tray (dx360 M2 Type 6380, 7321, and 7323 system-board tray), System x iDataPlex 2U Flex Chassis (Type 6313, 6385, and 7831 2U chassis), or System x iDataPlex 3U Chassis (Type 6386 and 7834 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.

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## Related documentation

In addition to the printed *Important Notices* document and this document, the following documentation for the dx360 M2 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 M2 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.

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/systems/scope/idadaplex/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 M2 server** and click **Go**.

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## 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.

<p><b>Microprocessor:</b> One or two quad-core Intel® Xeon® microprocessors with integrated memory controllers in each system-board tray</p> <p><b>Note:</b> Use the Setup utility to determine the type and speed of the microprocessor.</p> <p><b>Hard disk drives:</b> 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:</p> <ul style="list-style-type: none"> <li>• Up to four 3.5-inch simple-swap SAS hard disk drives with the storage enclosure and optional SAS controller</li> <li>• Up to five 3.5-inch simple-swap SATA hard disk drives with the storage enclosure</li> <li>• Up to four 3.5-inch simple-swap SATA hard disk drives with up to two 2.5-inch simple-swap SATA hard disk drives or solid-state drives with the storage enclosure</li> <li>• Up to two 3.5-inch simple-swap SATA hard disk drives with the I/O enclosure</li> <li>• Up to two 3.5-inch simple-swap SAS hard disk drives with the I/O enclosure and optional SAS controller</li> <li>• Up to eight 2.5-inch hot-swap SAS hard disk drives with the I/O enclosure and optional SAS controller</li> <li>• Up to twelve 3.5-inch hot-swap SAS or SATA (with the optional SAS controller) hard disk drives in a 3U chassis</li> </ul>	<p><b>Memory:</b></p> <ul style="list-style-type: none"> <li>• Sixteen DIMM connectors (eight per microprocessor)</li> <li>• Minimum: Two DIMMs per microprocessor</li> <li>• Maximum: 64 GB (as of the date of this publication)</li> <li>• Type: Registered ECC double-data-rate 3 (DDR3) -800, -1066, and -1333 MHz DIMMs only</li> <li>• Sizes: 1 GB single-rank, 2 GB dual-rank, and 4 GB dual-rank</li> <li>• Chipkill™ supported with selected DIMMs</li> </ul> <p><b>Integrated functions:</b></p> <ul style="list-style-type: none"> <li>• 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</li> <li>• Dedicated or shared management network connections</li> <li>• Six Serial ATA (SATA) ports</li> <li>• Serial over LAN (SOL) and serial redirection over Telnet or Secure Shell (SSH)</li> <li>• Dual-port Gigabit Ethernet controller</li> <li>• Front connectors for USB 2.0 (2 ports), serial, video, and RJ-45 (3 ports) <ul style="list-style-type: none"> <li>– One systems-management RJ-45 port for connection to a dedicated systems-management network</li> <li>– Two RJ-45 LAN ports</li> </ul> </li> </ul> <p><b>Predictive Failure Analysis® (PFA) alerts:</b></p> <ul style="list-style-type: none"> <li>• Memory</li> <li>• Hard disk drives</li> </ul>	<p><b>Expansion slots:</b> Up to two PCI Express slots total. Support for the following riser cards:</p> <ul style="list-style-type: none"> <li>• One PCI Express x16 slot (x16)</li> <li>• Two PCI Express x16 slots (x8)</li> <li>• One PCI Express x8 slot (x8) supports an optional RAID controller only (some configurations)</li> </ul> <p><b>Environment:</b></p> <ul style="list-style-type: none"> <li>• Air temperature: <ul style="list-style-type: none"> <li>– 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</li> <li>– Server off: 10°C to 43°C (59°F to 109.4°F); maximum altitude: 2133 m (7000 ft)</li> </ul> </li> <li>• Humidity: <ul style="list-style-type: none"> <li>– Server on: 10% to 80%</li> <li>– Server off: 8% to 80%</li> </ul> </li> </ul> <p><b>Size:</b></p> <ul style="list-style-type: none"> <li>• Height: <ul style="list-style-type: none"> <li>– 2U chassis: 8.6 cm (3.39 inches)</li> <li>– 3U chassis: 13.0 cm (5.1 inches)</li> </ul> </li> <li>• Depth: 51.3 cm (20.2 inches)</li> <li>• Width: 44.6 cm (17.6 inches)</li> <li>• Weight: <ul style="list-style-type: none"> <li>– 2U chassis: <ul style="list-style-type: none"> <li>- Fully loaded: 22.7 kg (46.1 lb)</li> <li>- Without system-board trays: 7.1 kg (15.6 lb)</li> </ul> </li> <li>– 3U chassis: <ul style="list-style-type: none"> <li>- Fully loaded: 28.1 kg (62.0 lb)</li> <li>- Without hard disk drives: 15.4 kg (34.0 lb)</li> </ul> </li> </ul> </li> </ul> <p><b>Electrical Input:</b></p> <ul style="list-style-type: none"> <li>• Input voltage low range: 100 V ac (minimum) to 127 V ac (maximum), sine-wave input (50 - 60 Hz)</li> <li>• Input voltage high range: 200 V ac (minimum) to 240 V ac (maximum), sine-wave input (50 - 60 Hz)</li> </ul>
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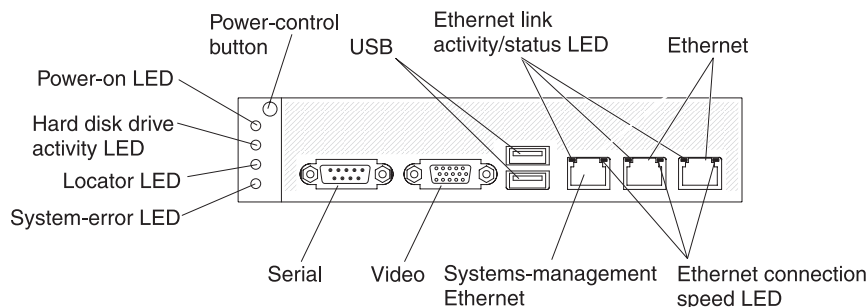
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## Operator panel controls, connectors, and LEDs

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.

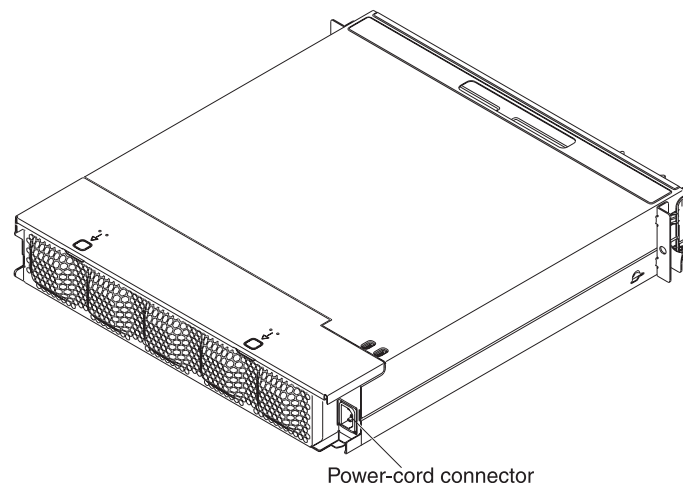
**Power-on LED:** The states of the power-on LED are as follows:

- **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:** 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 8) 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 8). 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.

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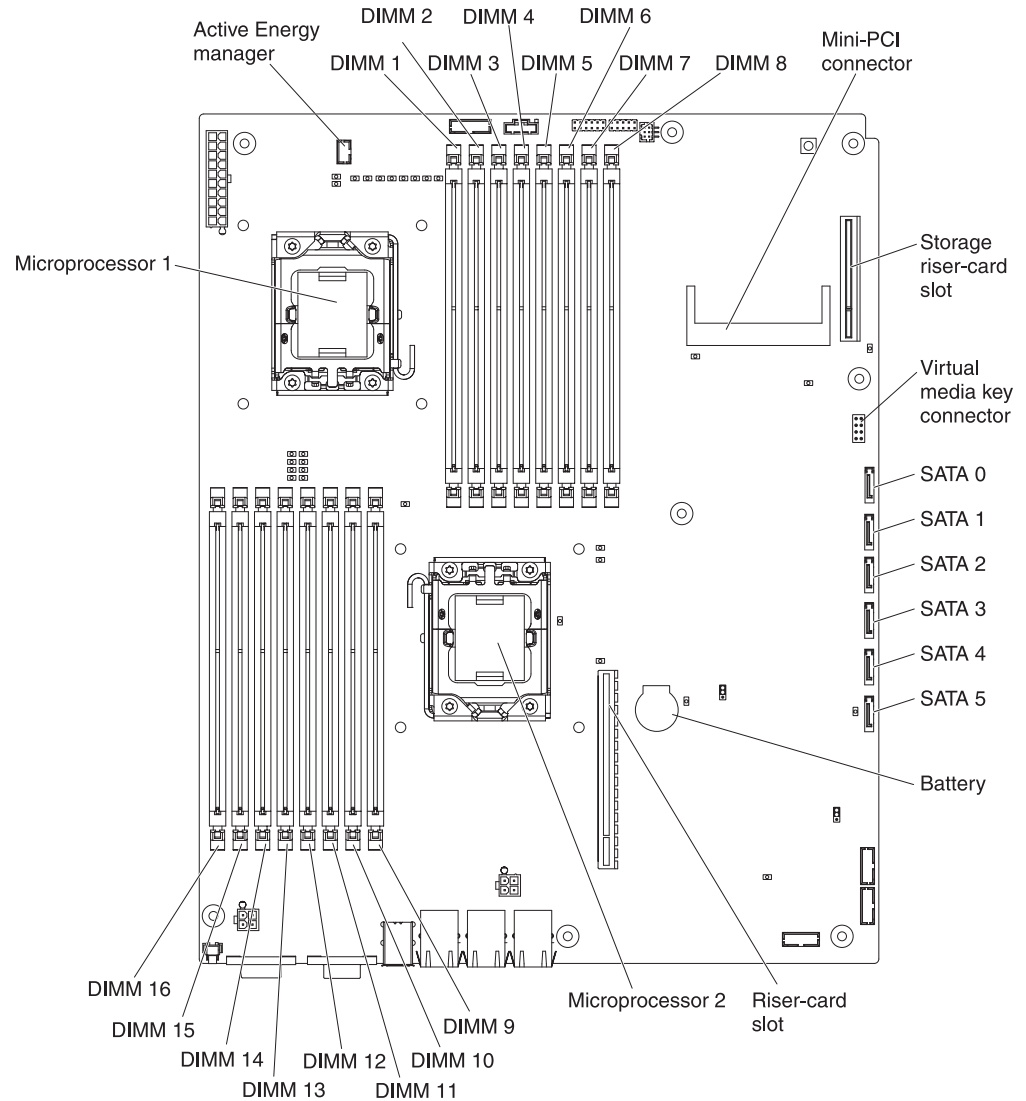
## System-board layouts

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.

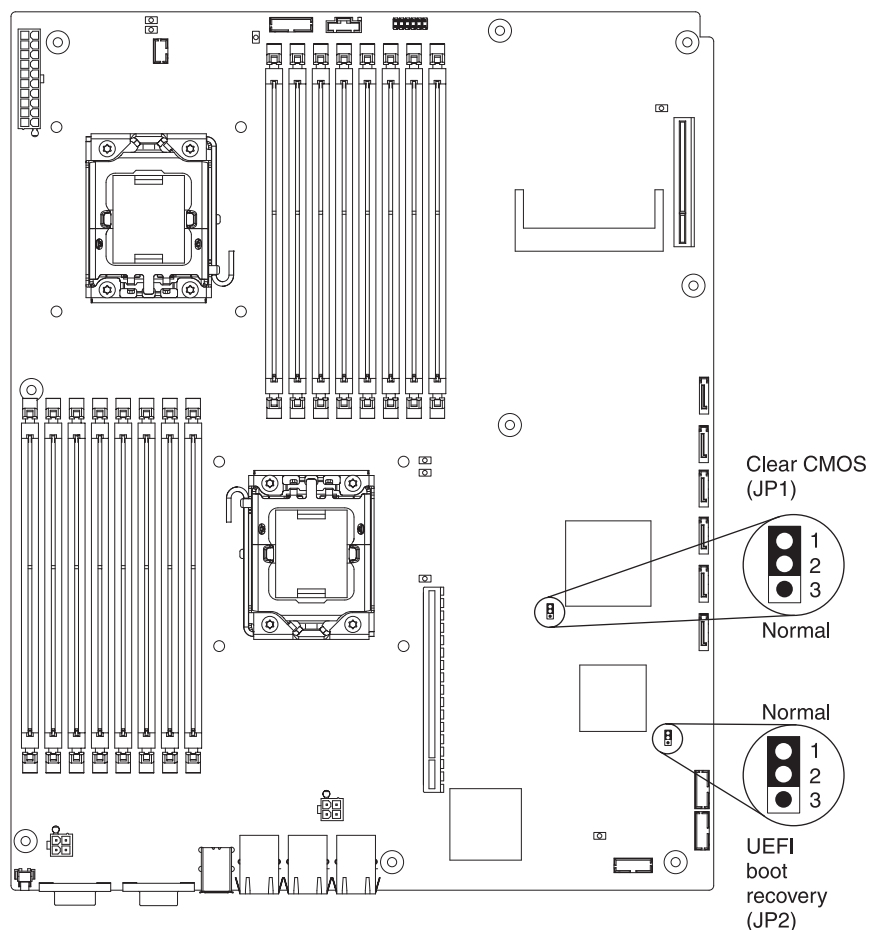
## System-board connectors

The following illustration shows the connectors on the system board.



## System-board jumpers

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



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

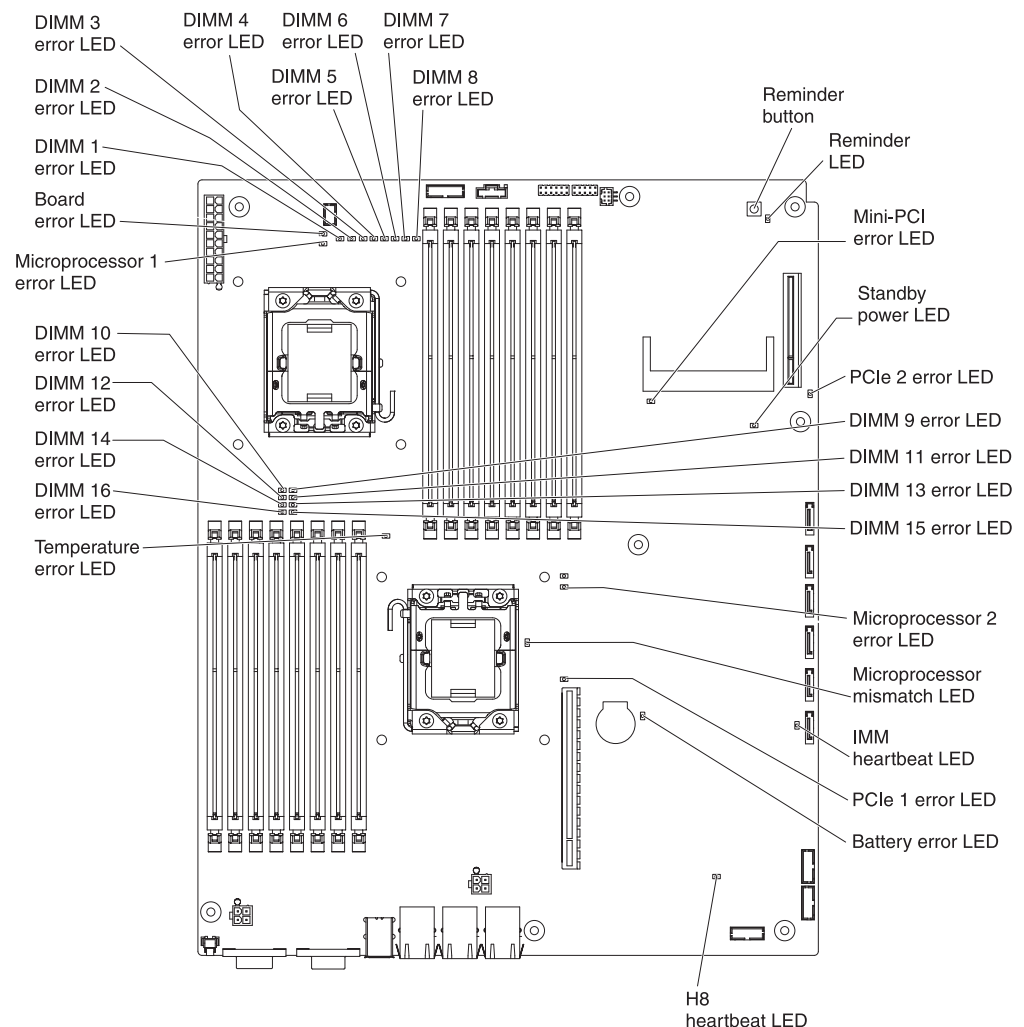
Jumper	Description
Clear CMOS (JP1)	<ul style="list-style-type: none"> <li>Pins 1 and 2: Normal (default)</li> <li>Pins 2 and 3: Clear the CMOS data</li> </ul>
UEFI boot recovery (JP2)	<ul style="list-style-type: none"> <li>Pins 1 and 2: Normal (default)</li> <li>Pins 2 and 3: Use the secondary page during startup</li> </ul>



## 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.

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## 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 173 for more information.

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### 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 16 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 24 for more information.

- **Troubleshooting tables**

These tables list problem symptoms and actions to correct the problems. See “Troubleshooting tables” on page 28 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 can type either the administrator password or user 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.

<ul style="list-style-type: none"><li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li><li>• See Chapter 4, “Parts listing,” on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li><li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li></ul>		
Error code	Description	Action
0010002	Microprocessor not supported	<ol style="list-style-type: none"><li>1. Reseat the following components one at a time, in the order shown, restarting the system-board tray each time:<ol style="list-style-type: none"><li>a. (Trained service technician only) Microprocessor 1</li><li>b. (Trained service technician only) Microprocessor 2 (if installed)</li></ol></li><li>2. (Trained service technician only) Remove microprocessor 2 and restart the system-board tray.</li><li>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.</li><li>4. Replace the following components one at a time, in the order shown, restarting the system-board tray each time:<ol style="list-style-type: none"><li>a. (Trained service technician only) Microprocessor 1</li><li>b. (Trained service technician only) Microprocessor 2</li><li>c. (Trained service technician only) System board</li></ol></li></ol>
0011000	Invalid microprocessor type	<ol style="list-style-type: none"><li>1. Update the system firmware (see “Firmware updates” on page 157).</li><li>2. (Trained service technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type.</li></ol>

- Follow the 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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	<ol style="list-style-type: none"> <li>1. Run the Setup utility and view the microprocessor information to compare the installed microprocessor specifications.</li> <li>2. (Trained service technician only) Remove and replace one of the microprocessors so that they both match.</li> </ol>
0011004	Microprocessor failed BIST	<ol style="list-style-type: none"> <li>1. Update the system firmware (see “Firmware updates” on page 157).</li> <li>2. (Trained service technician only) Reseat microprocessor 2.</li> <li>3. Replace the following components one at a time, in the order shown, restarting the system-board tray each time: <ol style="list-style-type: none"> <li>a. (Trained service technician only) Microprocessor</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
001100A	Microcode update failed	<ol style="list-style-type: none"> <li>1. Update the system firmware (see “Firmware updates” on page 157).</li> <li>2. (Trained service technician only) Replace the microprocessor.</li> </ol>
0050001	DIMM disabled	<ol style="list-style-type: none"> <li>1. If the system-board tray fails the POST memory test, reseat the DIMMs.</li> <li>2. Remove and replace any DIMM for which the associated error LED is lit (see “Removing a memory module” on page 107 and “Installing a memory module” on page 108).</li> <li>3. Run the Setup utility to enable all the DIMMs.</li> <li>4. Run the DSA Preboot memory test.</li> </ol>
0051003	Uncorrectable DIMM error	<ol style="list-style-type: none"> <li>1. If the system-board tray failed the POST memory test, reseat the DIMMs.</li> <li>2. Remove and replace any DIMM for which the associated error LED is lit (see “Removing a memory module” on page 107 and “Installing a memory module” on page 108).</li> <li>3. Run the Setup utility to enable all the DIMMs.</li> <li>4. Run the DSA Preboot memory test.</li> </ol>
0051006	DIMM mismatch detected	Install DIMMs in the correct sequence (see “Installing a memory module” on page 108).
0051009	No memory detected	<ol style="list-style-type: none"> <li>1. Make sure that the system-board tray contains DIMMs.</li> <li>2. Reseat the DIMMs.</li> <li>3. Install DIMMs in the correct sequence (see “Installing a memory module” on page 108).</li> </ol>

- Follow the 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
005100A	No usable memory detected	<ol style="list-style-type: none"> <li>1. Make sure that the system-board tray contains DIMMs.</li> <li>2. Reseat the DIMMs.</li> <li>3. Install DIMMs in the correct sequence (see “Installing a memory module” on page 108).</li> <li>4. Clear CMOS memory to re-enable all the memory connectors.</li> </ol>
0058001	PFA threshold exceeded	<ol style="list-style-type: none"> <li>1. Update the system firmware (see “Firmware updates” on page 157).</li> <li>2. Reseat the DIMMs and run the memory test.</li> <li>3. Replace the failing DIMM, which is indicated by a lit LED on the system board.</li> </ol>
0058007	DIMM population is unsupported	<ol style="list-style-type: none"> <li>1. Reseat the DIMMs, and then restart the system-board tray.</li> <li>2. Remove the lowest-numbered DIMM pair of those that are identified, replace it with an identical pair of known good DIMMs, and then restart the system-board tray. Repeat as necessary. If the failures continue, go to step 4.</li> <li>3. Return the removed DIMMs, one pair at a time, to their original connectors, restarting the system-board tray after each pair, until a pair fails. Replace the DIMMs in the failed pair with identical known good DIMMs, restarting the system-board tray after each DIMM is installed. Replace the failed DIMM. Repeat this step until you have tested all removed DIMMs.</li> <li>4. (Trained service technician only) Replace the system board.</li> </ol>
0058008	DIMM failed memory test	<ol style="list-style-type: none"> <li>1. Reseat the DIMMs, and then restart the system-board tray.</li> <li>2. Replace the following components one at a time, in the order shown, restarting the system-board tray each time: <ol style="list-style-type: none"> <li>a. DIMMs</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
00580A1	Invalid DIMM population for mirroring mode	<ol style="list-style-type: none"> <li>1. If a fault LED is lit, resolve the failure.</li> <li>2. Install DIMMs in the correct sequence (see “Installing a memory module” on page 108).</li> </ol>
00580A4	Memory population changed	Information only. Memory has been added, moved, or changed.
00580A5	Mirror failover complete	Information only. Memory redundancy has been lost. Check the event log for uncorrected DIMM failure events.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See Chapter 4, “Parts listing,” on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
0068002	CMOS battery cleared	<ol style="list-style-type: none"> <li>1. Reseat the battery.</li> <li>2. Clear the CMOS memory (see “Clearing CMOS memory” on page 49).</li> <li>3. Replace the following components one at a time, in the order shown, restarting the system-board tray each time: <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
2011000	PCI-X PERR	<ol style="list-style-type: none"> <li>1. Check the riser-card LEDs.</li> <li>2. Reseat all affected adapters and riser cards.</li> <li>3. Update the PCI device firmware.</li> <li>4. Remove both adapters from the riser card.</li> <li>5. Replace the following components one at a time, in the order shown, restarting the system-board tray each time: <ol style="list-style-type: none"> <li>a. Riser card</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
2011001	PCI-X SERR	<ol style="list-style-type: none"> <li>1. Check the riser-card LEDs.</li> <li>2. Reseat all affected adapters and riser cards.</li> <li>3. Update the PCI device firmware.</li> <li>4. Remove both adapters from the riser card.</li> <li>5. Replace the following components one at a time, in the order shown, restarting the system-board tray each time: <ol style="list-style-type: none"> <li>a. Riser card</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
2018001	PCI Express uncorrected or uncorrected error	<ol style="list-style-type: none"> <li>1. Check the riser-card LEDs.</li> <li>2. Reseat all affected adapters and riser cards.</li> <li>3. Update the PCI device firmware.</li> <li>4. Remove both adapters from the riser card.</li> <li>5. Replace the following components one at a time, in the order shown, restarting the system-board tray each time: <ol style="list-style-type: none"> <li>a. Riser card</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>

- Follow the 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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	<p>Informational message that some devices might not be initialized.</p> <ol style="list-style-type: none"> <li>1. If possible, rearrange the order of the adapters in the PCI slots to change the load order of the optional-device ROM code.</li> <li>2. Run the Setup utility, select <b>Start Options</b>, and change the boot priority to change the load order of the optional-device ROM code.</li> <li>3. Run the Setup utility and disable some other resources, if their functions are not being used, to make more space available: <ul style="list-style-type: none"> <li>• Select <b>Start Options</b> and <b>Planar Ethernet (PXE/DHCP)</b> to disable the integrated Ethernet controller ROM.</li> <li>• Select <b>Advanced Functions</b>, then <b>PCI Bus Control</b>, then <b>PCI ROM Control Execution</b> to disable the ROM of adapters in the PCI slots.</li> <li>• Select <b>Devices and I/O Ports</b> to disable any of the integrated devices.</li> </ul> </li> <li>4. Replace the following components one at a time, in the order shown, restarting the system-board tray each time: <ol style="list-style-type: none"> <li>a. Each adapter</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
3xx0007 (xx can be 00 - 19)	Firmware fault detected, system halted	<ol style="list-style-type: none"> <li>1. Recover the server firmware to the latest level.</li> <li>2. Undo any recent configuration changes, or clear CMOS memory to restore the settings to the default values.</li> <li>3. Remove any recently installed hardware.</li> </ol>
3038003	Firmware corrupted	<ol style="list-style-type: none"> <li>1. Run the Setup utility, select <b>Load Default Settings</b>, and save the settings to recover the server firmware.</li> <li>2. (Trained service technician only) Replace the system board.</li> </ol>
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	<ol style="list-style-type: none"> <li>1. Run the Setup utility, select <b>Load Default Settings</b>, and save the settings to recover the primary UEFI settings.</li> <li>2. Turn off the system-board tray and remove it from the power source.</li> <li>3. Reconnect the system-board tray to the power source, and then turn on the system-board tray.</li> </ol>



- Follow the 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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	<ol style="list-style-type: none"> <li>1. Adjust the date and time settings in the Setup utility, and then restart the system-board tray.</li> <li>2. Reseat the battery.</li> <li>3. Replace the following components one at a time, in the order shown, restarting the system-board tray each time: <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. (Trained service technician only) System board</li> </ol> </li> </ol>
3058001	System configuration invalid	<ol style="list-style-type: none"> <li>1. Run the Setup utility, and select <b>Save Settings</b>.</li> <li>2. Run the Setup utility, select <b>Load Default Settings</b>, and save the settings.</li> <li>3. Reseat the following components one at a time in the order shown, restarting the system-board tray each time: <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. Failing device (if the device is a FRU, then it must be reseated by a trained service technician only)</li> </ol> </li> <li>4. Replace the following components one at a time, in the order shown, restarting the system-board tray each time: <ol style="list-style-type: none"> <li>a. Battery</li> <li>b. Failing device (if the device is a FRU, then it must be replaced by a trained service technician only)</li> <li>c. (Trained service technician only) System board</li> </ol> </li> </ol>
3058004	Three boot failures	<ol style="list-style-type: none"> <li>1. Undo any recent system changes, such as new settings or newly installed devices.</li> <li>2. Make sure that the system-board tray is attached to a reliable power source.</li> <li>3. Make sure that the operating system is not corrupted.</li> <li>4. Run the Setup utility, save the configuration, and then restart the system-board tray.</li> <li>5. See “Problem determination tips” on page 53.</li> </ol>
3108007	System configuration restored to default settings	Information only. This message is usually associated with the CMOS battery clear event.
3138002	Boot configuration error	<ol style="list-style-type: none"> <li>1. Remove any recent configuration changes that you made in the Setup utility.</li> <li>2. Run the Setup utility, select <b>Load Default Settings</b>, and save the settings.</li> </ol>
3808000	IMM communication failure	<ol style="list-style-type: none"> <li>1. Remove power from the system-board tray for 30 seconds, and then reconnect the system-board tray to power and restart it.</li> <li>2. Update the IMM firmware.</li> <li>3. Make sure that the IMM key is seated and not damaged.</li> <li>4. (Trained service technician only) Replace the system board.</li> </ol>

<ul style="list-style-type: none"> <li>Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>See Chapter 4, “Parts listing,” on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>		
Error code	Description	Action
3808002	Error updating system configuration to IMM	<ol style="list-style-type: none"> <li>Remove power from the system-board tray, and then reconnect the system-board tray to power and restart it.</li> <li>Run the Setup utility and select <b>Save Settings</b>.</li> <li>Update the firmware.</li> </ol>
3808003	Error retrieving system configuration from IMM	<ol style="list-style-type: none"> <li>Remove power from the system-board tray, and then reconnect the system-board tray to power and restart it.</li> <li>Run the Setup utility and select <b>Save Settings</b>.</li> <li>Update the IMM firmware.</li> </ol>
3808004	IMM system event log full	<ul style="list-style-type: none"> <li>When out-of-band, use the IMM Web interface or IPMItool to clear the logs from the operating system.</li> <li>When using the local console: <ol style="list-style-type: none"> <li>Run the Setup utility.</li> <li>Select <b>System Event Log</b>.</li> <li>Select <b>Clear System Event Log</b>.</li> <li>Restart the system-board tray.</li> </ol> </li> </ul>
3828004	AEM power capping disabled	<ol style="list-style-type: none"> <li>Check the settings and the event logs.</li> <li>Make sure that the Active Energy Manager feature is enabled in the Setup utility. Select <b>System Settings, Power, Active Energy, and Capping Enabled</b>.</li> <li>Update the system-board tray firmware.</li> <li>Update the IMM firmware.</li> </ol>

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

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

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

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

- **Integrated management module (IMM) event log:** This log contains a subset of information that is in the system-event log and other information and events. You can view the IMM event log through the IMM Web interface.

Entries that are written to the IMM event log during the early phase of POST show an incorrect date and time as the default time stamp; however, the date and time are corrected as POST continues.

- **Diagnostic event log:** This log is generated by the Dynamic System Analysis (DSA) program, and it contains merged contents of the system-event log and the IMM event log. You can view the diagnostic event log through the DSA program.

Some of the error codes and messages in the logs are abbreviated.

## Viewing event logs from the Setup utility

For complete information about using the Setup utility, see “Using the Setup utility” on page 158.

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 system-board tray.

If you have installed Portable or Installable Dynamic System Analysis (DSA), you can use it to view the diagnostic event log, which merges the contents of the system-event log and the IMM event log. You can also use DSA Preboot to view the diagnostic event log, although you must restart the system-board tray 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](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 integrated management module (IMM) Web interface.

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

*Table 1. Methods for viewing event logs*

Condition	Action
The system-board tray is not hung and is connected to a network.	Run Portable or Installable DSA to view the diagnostic event log or create an output file that you can send to IBM service and support.  Alternatively, you can use IPMItool to view the system-event log.
The system-board tray is not hung and is not connected to a network.	Use IPMItool locally to view the system-event log.
The system-board tray is not hung and has a Remote Supervisor Adapter II or integrated management module (IMM).	In a Web browser, type the IP address of the Remote Supervisor Adapter II or IMM and go to the Event Log page.
The system-board tray is hung.	If DSA Preboot is installed, restart the system-board tray and press F2 to start DSA Preboot and view the diagnostic event log.  If DSA Preboot is not installed, insert the DSA Preboot CD or USB flash drive and restart the system-board tray to start DSA Preboot and view the diagnostic event log.  Alternatively, you can restart the system-board tray and press F1 to start the Setup utility and view the POST event log or system-event log. For more information, see "Viewing event logs from the Setup utility" on page 23.

## 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 vii.
- 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 32 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 16. If the system-board tray is halted and no error message is displayed, see “Troubleshooting tables” on page 28 and “Solving undetermined problems” on page 51.
- For information about power-supply problems, see “Power problems” on page 34.
- For intermittent problems, check the event log; see “Event logs” on page 22 and “Diagnostic programs, messages, and error codes” on page 36.

## 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 28.
- 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 16.
- 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 37).
    - If you receive an error, see “Diagnostic error codes” on page 39.
    - If the diagnostic programs were completed successfully and you still suspect a problem, see “Solving undetermined problems” on page 51.
  - **No:** Find the failure symptom in “Troubleshooting tables” on page 28; if necessary, see “Solving undetermined problems” on page 51.

**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 13 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 27.
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, reseal 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 51; 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 49.
    - 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 51 to continue troubleshooting.
  11. Recover the server firmware:
    - a. Use the server firmware recovery procedure listed in “Starting the backup server firmware” on page 163.
    - 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 51 to continue troubleshooting.
      - **No:** Go to step 12 on page 28.



12. (Trained service technician only) Replace the system-board tray.

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## 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 37 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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.

## 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 83).



<ul style="list-style-type: none"> <li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>• See Chapter 4, “Parts listing,” on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
A newly installed hard disk drive is not recognized.	<ol style="list-style-type: none"> <li>1. Observe the associated amber hard disk drive status LED. If the LED is lit, it indicates a drive fault.</li> <li>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.</li> <li>3. Observe the associated green hard disk drive activity LED and the amber status LED: <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• If neither LED is lit or flashing, check the hard disk drive backplane (go to step 4).</li> <li>• 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.</li> </ul> </li> <li>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.</li> <li>5. Reseat the backplane power cable and repeat steps 1 through 3.</li> <li>6. Reseat the backplane signal cable and repeat steps 1 through 3.</li> <li>7. Suspect the backplane signal cable or the backplane: <ul style="list-style-type: none"> <li>• If the configuration has eight hot-swap bays: <ol style="list-style-type: none"> <li>a. Replace the affected backplane signal cable.</li> <li>b. Replace the affected backplane.</li> </ol> </li> <li>• If the configuration has 12 hot-swap bays: <ol style="list-style-type: none"> <li>a. Replace the backplane signal cable.</li> <li>b. Replace the backplane.</li> <li>c. Replace the SAS expander card.</li> </ol> </li> </ul> </li> <li>8. Run the DSA tests for the SAS controller and hard disk drives: <ul style="list-style-type: none"> <li>• If the controller passes the test but the drives are not recognized, replace the backplane signal cable and run the tests again.</li> <li>• Replace the backplane.</li> <li>• If the controller fails the test, disconnect the backplane signal cable from the controller and run the tests again.</li> <li>• If the controller fails the test, replace the controller.</li> </ul> </li> <li>9. See “Problem determination tips” on page 53.</li> </ol>
Multiple hard disk drives fail.	<p>Make sure that the hard disk drive, SAS RAID controller, and system-board tray device drivers and firmware are at the latest level.</p> <p><b>Important:</b> Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.</p>

<ul style="list-style-type: none"> <li>Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>See Chapter 4, “Parts listing,” on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
Multiple hard disk drives are offline.	<ol style="list-style-type: none"> <li>Review the storage subsystem logs for indications of problems within the storage subsystem, such as backplane or cable problems.</li> <li>See “Problem determination tips” on page 53.</li> </ol>
A replacement hard disk drive does not rebuild.	<ol style="list-style-type: none"> <li>Make sure that the hard disk drive is recognized by the controller (the green hard disk drive activity LED is flashing).</li> <li>Review the SAS RAID controller documentation to determine the correct configuration parameters and settings.</li> </ol>
A green hard disk drive activity LED does not accurately represent the actual state of the associated drive.	<ol style="list-style-type: none"> <li>If the green hard disk drive activity LED does not flash when the drive is in use, run the DSA disk drive test.</li> <li>Use one of the following procedures: <ul style="list-style-type: none"> <li>If the drive passes the test, replace the backplane.</li> <li>If the drive fails the test, replace the drive.</li> </ul> </li> </ol>
An amber hard disk drive status LED does not accurately represent the actual state of the associated drive.	<ol style="list-style-type: none"> <li>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: <ol style="list-style-type: none"> <li>Turn off the system-board tray.</li> <li>Reseat the SAS controller.</li> <li>Reseat the backplane signal cable, backplane power cable, and SAS expander card (if the server has 12 drive bays).</li> <li>Reseat the hard disk drive.</li> <li>Turn on the system-board tray and observe the activity of the hard disk drive LEDs.</li> </ol> </li> <li>See “Problem determination tips” on page 53.</li> </ol>

## Intermittent problems

<ul style="list-style-type: none"> <li>Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>See Chapter 4, “Parts listing,” on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
A problem occurs only occasionally and is difficult to diagnose.	<ol style="list-style-type: none"> <li>Make sure that: <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul> </li> <li>Check the system-event log (see “Event logs” on page 22).</li> <li>See “Solving undetermined problems” on page 51.</li> </ol>

## 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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.	<ol style="list-style-type: none"><li>1. Make sure that the keyboard and mouse cables are securely connected.</li><li>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.</li><li>3. Replace the following components one at a time, in the order shown, restarting the system-board tray each time:<ol style="list-style-type: none"><li>a. Keyboard or mouse</li><li>b. (Trained service technician only) System-board tray</li></ol></li></ol>

## 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 amount of system memory that is displayed is less than the amount of installed physical memory.	<ol style="list-style-type: none"><li>1. Make sure that:<ul style="list-style-type: none"><li>• Memory mirroring does not account for the discrepancy.</li><li>• The memory modules are seated correctly.</li><li>• You have installed the correct type of memory.</li><li>• If you changed the memory, you updated the memory configuration in the Setup utility.</li><li>• 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.</li></ul></li><li>2. Check the POST event log for a memory error message.<ul style="list-style-type: none"><li>• If a DIMM was disabled by a systems-management interrupt (SMI), replace the DIMM.</li><li>• If a DIMM was disabled by the user or by POST, run the Setup utility and enable the DIMM.</li></ul></li><li>3. Run memory diagnostics (see “Running the diagnostic programs” on page 37).</li><li>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 51 for information about the minimum required configuration).</li><li>5. Add one pair of DIMMs at a time, making sure that the DIMMs in each pair match.</li><li>6. Reseat the DIMMs.</li><li>7. Replace the following components one at a time, in the order shown, restarting the system-board tray each time:<ol style="list-style-type: none"><li>a. DIMMs</li><li>b. (Trained service technician only) System-board tray</li></ol></li></ol>

## 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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.	<ol style="list-style-type: none"><li>1. (Trained service technician only) Reseat the microprocessor and restart the system-board tray.</li><li>2. Run the DSA Preboot diagnostic program. See “Running the diagnostic programs” on page 37.</li><li>3. (Trained service technician only) Replace the microprocessor.</li></ol>

## 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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.	<ol style="list-style-type: none"><li>1. Make sure that:<ul style="list-style-type: none"><li>• The device is designed for the system-board tray.</li><li>• You followed the installation instructions that came with the device and the device is installed correctly.</li><li>• You have not loosened any other installed devices or cables.</li><li>• You updated the configuration information in the Setup utility. Whenever memory or any other device is changed, you must update the configuration.</li></ul></li><li>2. If the device comes with its own test instructions, use those instructions to test the device.</li><li>3. Reseat the device that you just installed.</li><li>4. Replace the device that you just installed.</li></ol>
An IBM optional device that used to work does not work now.	<ol style="list-style-type: none"><li>1. Make sure that all of the cable connections for the device are secure.</li><li>2. If the device comes with test instructions, use those instructions to test the device.</li><li>3. Reseat the failing device.</li><li>4. Replace the failing device.</li></ol>

## 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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).	<ol style="list-style-type: none"> <li>1. Make sure that the operator panel power-control button is working correctly: <ol style="list-style-type: none"> <li>a. Disconnect the chassis power cord.</li> <li>b. Reconnect the power cord.</li> <li>c. Press the power-control button.</li> </ol> </li> <li>2. Make sure that: <ul style="list-style-type: none"> <li>• 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.</li> <li>• The system-board tray contains the correct type of DIMMs.</li> <li>• The DIMMs are correctly seated.</li> <li>• The microprocessor is correctly installed.</li> </ul> </li> <li>3. Reseat the following components: <ol style="list-style-type: none"> <li>a. DIMMs</li> <li>b. Power-supply cables to all internal components</li> <li>c. Power supply</li> </ol> </li> <li>4. Replace the following components one at a time, in the order shown, restarting the system-board tray each time: <ol style="list-style-type: none"> <li>a. DIMMs</li> <li>b. Power supply</li> </ol> </li> <li>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.</li> <li>6. See “Solving undetermined problems” on page 51.</li> </ol>
The system-board tray does not turn off.	<ol style="list-style-type: none"> <li>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: <ol style="list-style-type: none"> <li>a. Press Ctrl+Alt+Delete.</li> <li>b. Turn off the system-board tray by holding the power-control button for 5 seconds.</li> <li>c. Restart the system-board tray.</li> <li>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.</li> </ol> </li> <li>2. (Trained service technician only) If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.</li> </ol>
The system-board tray unexpectedly shuts down, and the LEDs on the operator panel are not lit.	See “Solving undetermined problems” on page 51.

## Serial-device problems

<ul style="list-style-type: none"> <li>Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>See Chapter 4, “Parts listing,” on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
The number of serial ports that are identified by the operating system is less than the number of installed serial ports.	<ol style="list-style-type: none"> <li>Make sure that each port is assigned a unique address in the Setup utility and none of the serial ports is disabled.  <b>Note:</b> One external serial port is available. A second port (COM2) is reserved for the IMM Serial over LAN (SOL) function.</li> <li>Reseat the serial port adapter, if one is installed.</li> <li>Replace the serial port adapter, if one is installed.</li> </ol>
A serial device does not work.	<ol style="list-style-type: none"> <li>Make sure that: <ul style="list-style-type: none"> <li>The device is compatible with the system-board tray.</li> <li>The serial port is enabled and is assigned a unique address.</li> <li>The device is connected to the correct connector (see “Operator panel controls, connectors, and LEDs” on page 8).</li> </ul> </li> <li>Reseat the following components: <ol style="list-style-type: none"> <li>Failing serial device</li> <li>Serial cable</li> </ol> </li> <li>Replace the following components one at a time, in the order shown, restarting the system-board tray each time: <ol style="list-style-type: none"> <li>Failing serial device</li> <li>Serial cable</li> <li>(Trained service technician only) System-board tray</li> </ol> </li> </ol>

## Software problems

<ul style="list-style-type: none"> <li>Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li> <li>See Chapter 4, “Parts listing,” on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li> <li>If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li> </ul>	
Symptom	Action
You suspect a software problem.	<ol style="list-style-type: none"> <li>To determine whether the problem is caused by the software, make sure that: <ul style="list-style-type: none"> <li>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.  <b>Note:</b> If you have just installed an adapter or memory, the system-board tray might have a memory-address conflict.</li> <li>The software is designed to operate on the system-board tray.</li> <li>Other software works on the system-board tray.</li> <li>The software works on another system-board tray.</li> </ul> </li> <li>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.</li> <li>Contact your place of purchase of the software.</li> </ol>

## 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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.	<p><b>Important:</b> 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.</p> <ol style="list-style-type: none"><li>1. Make sure that:<ul style="list-style-type: none"><li>• The operating system supports USB devices.</li><li>• The correct USB device driver is installed.</li></ul></li><li>2. Make sure that the USB configuration options are set correctly in the Setup utility.</li><li>3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the system-board tray.</li><li>4. (Trained service technician only) Replace the system-board tray.</li></ol>

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## 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. You can download DSA from <http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA>.

**Note:** You can select to download images of the DSA programs for external USB storage devices, such as a USB flash drive (memory key) or an external USB CD-ROM drive. A USB flash drive is provided in the accessory carton that comes with the configured rack solution.

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

The diagnostic programs create a merged log, called the DSA event log, which includes events from all collected logs. 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.

Make sure that you have the latest version of the DSA diagnostic programs. The DSA Portable Edition is available for external USB storage devices such as a USB flash drive or an external USB CD ROM drive. 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)**.

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

## 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. Connect a USB CD or DVD drive, or the USB flash drive that contains the DSA Preboot diagnostic programs, to a USB connector on the front of the system-board tray.

**Note:** To run the DSA Preboot diagnostic programs, you might need an external USB CD-RW/DVD drive such as the IBM and Lenovo part number 73P4515 or 73P4516.

3. If you are using a USB CD or DVD drive, insert the *IBM Dynamic System Analysis Preboot Diagnostic* CD into the CD or DVD drive.
4. Turn on all attached devices; then, turn on the system-board tray.
5. Press F12 (**Select Boot Device**). If a bootable USB mass storage device is installed, a submenu item (**USB Key/Disk**) is displayed.

6. Use the Up Arrow and Down Arrow keys to select an item from the **Boot Selection Menu** 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.

7. From the diagnostic programs screen, select the test that you want to run, and follow the instructions on the screen.

Follow the actions in the “Diagnostic error codes” on page 39 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 32 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.

<ul style="list-style-type: none"><li>• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</li><li>• See Chapter 4, “Parts listing,” on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).</li><li>• If an action step is preceded by “(Trained service technician only),” that step must be performed only by a trained service technician.</li></ul>					
Message number	Component	Test	State	Description	Action
089-801-xxx	CPU	CPU Stress Test	Aborted	Internal program error.	<ol style="list-style-type: none"><li>1. Turn off and restart the system-board tray.</li><li>2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA">http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA</a>.</li><li>3. Run the test again.</li><li>4. Make sure that the 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 157.</li><li>5. Run the test again.</li><li>6. If the system-board tray has stopped responding, turn it off and restart it.</li><li>7. Run the test again.</li><li>8. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li></ol>

- Follow the 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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.	<ol style="list-style-type: none"> <li>1. Turn off and restart the system-board tray.</li> <li>2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA">http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA</a>.</li> <li>3. Run the test again.</li> <li>4. Make sure that the 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 157.</li> <li>5. Run the test again.</li> <li>6. If the system has stopped responding, turn off and restart the system-board tray.</li> <li>7. Run the test again.</li> <li>8. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>
089-803-xxx	CPU	CPU Stress Test	Aborted	Memory size insufficient to run the test. At least 1 GB is required.	<ol style="list-style-type: none"> <li>1. Turn off and restart the system-board tray.</li> <li>2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA">http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA</a>.</li> <li>3. Run the test again.</li> <li>4. Make sure that the 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 157.</li> <li>5. Run the test again.</li> <li>6. If the system-board tray has stopped responding, turn off and restart the system-board tray.</li> <li>7. Run the test again.</li> <li>8. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>

- Follow the 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
201-801-xxx	Memory	Memory Test	Aborted	Test stopped: the system UEFI programmed the memory controller with an invalid CBAR address.	<ol style="list-style-type: none"> <li>1. Turn off and restart the system-board tray.</li> <li>2. Run the test again.</li> <li>3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Firmware updates” on page 157.</li> <li>4. Run the test again.</li> <li>5. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>
201-802-xxx	Memory	Memory Test	Aborted	Test stopped: the end address in the E820 function is less than 16 MB.	<ol style="list-style-type: none"> <li>1. Turn off and restart the system-board tray.</li> <li>2. Run the test again.</li> <li>3. Make sure that all DIMMs are enabled in the Setup utility (press F1 at system startup).</li> <li>4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Firmware updates” on page 157.</li> <li>5. Run the test again.</li> <li>6. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>

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- See Chapter 4, “Parts listing,” on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
201-803-xxx	Memory	Memory Test	Aborted	Test stopped: could not enable the processor cache.	<ol style="list-style-type: none"> <li>1. Turn off and restart the system-board tray.</li> <li>2. Run the test again.</li> <li>3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Firmware updates” on page 157.</li> <li>4. Run the test again.</li> <li>5. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>
201-804-xxx	Memory	Memory Test	Aborted	Test stopped: the memory controller buffer request failed.	<ol style="list-style-type: none"> <li>1. Turn off and restart the system-board tray.</li> <li>2. Run the test again.</li> <li>3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Firmware updates” on page 157.</li> <li>4. Run the test again.</li> <li>5. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>
201-805-xxx	Memory	Memory Test	Aborted	Test stopped: the memory controller display/alter write operation was not completed.	<ol style="list-style-type: none"> <li>1. Turn off and restart the system-board tray.</li> <li>2. Run the test again.</li> <li>3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Firmware updates” on page 157.</li> <li>4. Run the test again.</li> <li>5. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>

- Follow the 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
201-806-xxx	Memory	Memory Test	Aborted	Test stopped: the memory controller fast scrub operation was not completed.	<ol style="list-style-type: none"> <li>1. Turn off and restart the system-board tray.</li> <li>2. Run the test again.</li> <li>3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Firmware updates” on page 157.</li> <li>4. Run the test again.</li> <li>5. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>
201-807-xxx	Memory	Memory Test	Aborted	Test stopped: the memory controller buffer free request failed.	<ol style="list-style-type: none"> <li>1. Turn off and restart the system-board tray.</li> <li>2. Run the test again.</li> <li>3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Firmware updates” on page 157.</li> <li>4. Run the test again.</li> <li>5. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>
201-808-xxx	Memory	Memory Test	Aborted	Test stopped: memory controller display/alter buffer execute error.	<ol style="list-style-type: none"> <li>1. Turn off and restart the system-board tray.</li> <li>2. Run the test again.</li> <li>3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Firmware updates” on page 157.</li> <li>4. Run the test again.</li> <li>5. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>

- Follow the 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
201-809-xxx	Memory	Memory Test	Aborted	Test stopped program error: operation running fast scrub.	<ol style="list-style-type: none"> <li>1. Turn off and restart the system-board tray.</li> <li>2. Run the test again.</li> <li>3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA">http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA</a>.</li> <li>4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Firmware updates” on page 157.</li> <li>5. Run the test again.</li> <li>6. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>
201-810-xxx	Memory	Memory Test	Aborted	Test stopped: unknown error code xxx received in COMMONEXIT procedure.	<ol style="list-style-type: none"> <li>1. Turn off and restart the system-board tray.</li> <li>2. Run the test again.</li> <li>3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA">http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA</a>.</li> <li>4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Firmware updates” on page 157.</li> <li>5. Run the test again.</li> <li>6. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>



- Follow the 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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 bank x, failing DIMM z.	<ol style="list-style-type: none"> <li>1. Turn off the system-board tray and disconnect the chassis from the power source.</li> <li>2. Reseat DIMM z.</li> <li>3. Reconnect the chassis to the power source and turn on the system-board tray.</li> <li>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA">http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA</a>.</li> <li>5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Firmware updates” on page 157.</li> <li>6. Run the test again.</li> <li>7. Replace the failing DIMMs.</li> <li>8. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>
201-902-xxx	Memory	Memory Test	Failed	Test failure: single-bit and multi-bit error, failing bank x, failing DIMM z	<ol style="list-style-type: none"> <li>1. Turn off the system-board tray and disconnect the chassis from the power source.</li> <li>2. Reseat DIMM z.</li> <li>3. Reconnect the chassis to the power source and turn on the system-board tray.</li> <li>4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA">http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA</a>.</li> <li>5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Firmware updates” on page 157.</li> <li>6. Run the test again.</li> <li>7. Replace the failing DIMMs.</li> <li>8. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>

- Follow the 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
202-801-xxx	Memory	Memory Stress Test	Aborted	Internal program error.	<ol style="list-style-type: none"> <li>1. Turn off and restart the system-board tray.</li> <li>2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA">http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA</a>.</li> <li>3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Firmware updates” on page 157.</li> <li>4. Run the test again.</li> <li>5. Turn off and restart the system-board tray if necessary to recover from a hung state.</li> <li>6. Run the memory diagnostics to identify the specific failing DIMM.</li> <li>7. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>

- Follow the 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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	Aborted	Memory size is insufficient to run the test. At least 1 GB is required.	<ol style="list-style-type: none"> <li>1. Turn off and restart the system-board tray.</li> <li>2. Make sure that all memory is enabled by checking the Available System Memory in the Resource Utilization section of the DSA event log.</li> <li>3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA">http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA</a>.</li> <li>4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For more information, see “Firmware updates” on page 157.</li> <li>5. Run the test again.</li> <li>6. Turn off and restart the system-board tray if necessary to recover from a hung state.</li> <li>7. Run the memory diagnostics to identify the specific failing DIMM.</li> <li>8. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>
202-901-xxx	Memory	Memory Stress Test	Failed	Test failure.	<ol style="list-style-type: none"> <li>1. Run the standard DSA memory diagnostic to validate all memory.</li> <li>2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA">http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA</a>.</li> <li>3. Turn off the system-board tray and disconnect the chassis from power.</li> <li>4. Reseat the DIMMs.</li> <li>5. Reconnect the system to power and turn on the system.</li> <li>6. Run the test again.</li> <li>7. Run the standard DSA memory diagnostic to validate all memory.</li> <li>8. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>

- Follow the 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 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable 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
202-902-xxx	Memory	Memory Stress Test	Failed	General error: memory size is insufficient to run the test.	<ol style="list-style-type: none"> <li>1. Turn off and restart the system-board tray.</li> <li>2. Make sure that all memory is enabled by checking the Available System Memory in the Resource Utilization section of the DSA event log.</li> <li>3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA">http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA</a>.</li> <li>4. Run the test again.</li> <li>5. Turn off and restart the system-board tray if necessary to recover from a hung state.</li> <li>6. Run the standard DSA memory diagnostic to validate all memory.</li> <li>7. If the problem remains, collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, see <a href="http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL">http://www.ibm.com/support/docview.wss?uid=psg1SERV-CALL</a>.</li> </ol>

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## Clearing CMOS memory

To clear the CMOS memory, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 70 or “Removing the system-board tray from a 3U chassis” on page 72).
4. If an expansion enclosure is installed, remove it (see “Removing an expansion enclosure from a system-board tray” on page 75); otherwise, remove the system-board tray cover (see “Removing the system-board tray cover” on page 69).
5. Remove the battery (see “Removing the battery” on page 81).
6. Locate the Clear CMOS jumper (JP1) (see “System-board jumpers” on page 12).
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 82).
10. Install the expansion enclosure, if you removed one (see “Installing an expansion enclosure on a system-board tray” on page 76); otherwise, install the system-board tray cover (see “Installing the system-board tray cover” on page 69).
11. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71 or “Installing the system-board tray in a 3U chassis” on page 73).
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 158 for information).

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## 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 M2 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.

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## System event/error log messages

The system event/error log can contain messages of three types:

<b>Information</b>	Information messages do not require action; they record significant system-level events, such as when the server is started.
<b>Warning</b>	Warning messages do not require immediate action; they indicate possible problems, such as when the recommended maximum ambient temperature is exceeded.
<b>Error</b>	Error messages might require action; they indicate system errors, such as when a fan is not detected.

Each message contains date and time information, and it indicates the source of the message (POST/UEFI or the IMM). To view descriptions of the error messages, go to <http://www.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-5079341&brandind=5000008>.

You can view the system-event log through the Setup utility.

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## 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.

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## 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.

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## 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 35.

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 12 and “Clearing CMOS memory” on page 49 for further information. If you suspect that the server firmware is damaged, see “Updating (flash-updating) the server firmware” on page 49 and “Starting the backup server firmware” on page 163 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 75); otherwise, remove the system-board tray cover (see “Removing the system-board tray cover” on page 69).
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 11 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 11 for the location of the microprocessor connectors)
  - One DIMM in DIMM connector 3 (see “System-board connectors” on page 11 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.



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## 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 173 for information about calling IBM for service.



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## Chapter 4. Parts listing

This section lists the replaceable components that are available for the dx360 M2 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 M2 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 M2 Type 6380, 7321, and 7323 system-board tray components

The following replaceable components are available for the dx360 M2 6380, 7321, and 7323 system-board tray.

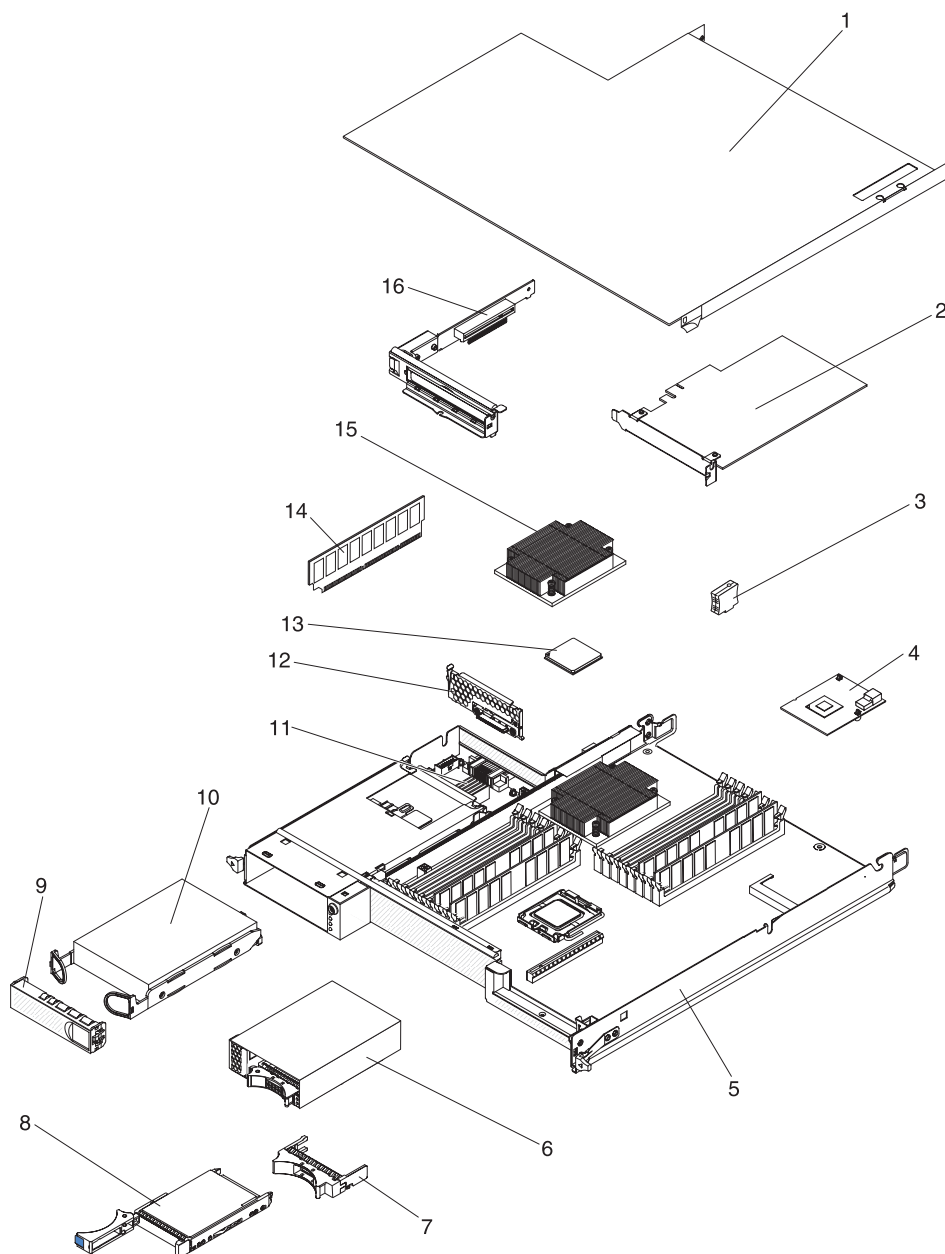


Table 2. CRUs and FRUs, Type 6380, 7321, and 7323

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	System-board tray cover		46D1291	
2	Qlogic single-port Fibre Channel PCIe adapter		39R6526	
2	Qlogic double-port Fibre Channel PCIe adapter		39R6528	
2	Qlogic single-port iSCSI host bus PCIe adapter		39Y6148	
2	Qlogic double-port iSCSI host bus adapter		42C1772	

Table 2. CRUs and FRUs, Type 6380, 7321, and 7323 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
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	NetXtreme II 1000 Express Ethernet Adapter		39Y6070	
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	
3	Virtual media key		46C7532	
4	Mini-SAS RAID controller		43V7415	
5	System-board tray (includes IMM controller)			46D1292
6	2.5-inch SAS/SATA drive cage with backplane		44W4800	
7	2.5-inch hot-swap drive filler panel	26K8680		
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 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 146 GB simple-swap SAS (10000 rpm)	43X0825		
8	Hard disk drive, 2.5-inch 73 GB hot-swap SAS (15000 rpm)	43X0839		
8	Hard disk drive, 2.5-inch 31.4 GB simple-swap SATA solid-state drive	43W7693		
8	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 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		
11	Power-supply paddle card domain A			43X3268
12	One-bay hard disk drive bracket and cable assembly, SATA 1x		49Y4409	
13	Microprocessor, 2.00 GHz 800 FSB 4 MB L2 cache quad core			46D1271
13	Microprocessor, 2.26 GHz 1066 FSB 8 MB L2 cache quad core LV			46D1269
13	Microprocessor, 2.26 GHz 1066 FSB 8 MB L2 cache quad core			46D1267
13	Microprocessor, 2.53 GHz 1066 FSB 8 MB L2 cache quad core			46D1265

Table 2. CRUs and FRUs, Type 6380, 7321, and 7323 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
13	Microprocessor, 2.66 GHz 1333 FSB 8 MB L2 cache quad core			46D1264
13	Microprocessor, 2.8 GHz 1333 FSB 8 MB L2 cache quad core			46D1263
13	Microprocessor, 2.93 GHz 1333 FSB 8 MB L2 cache quad core			46D1262
14	Memory, 1.0 GB PC3-10666 ECC		44T1490	
14	Memory, 2.0 GB PC3-10666 ECC		44T1491	
14	Memory, 4.0 GB PC3-10666 ECC		44T1493	
15	Heat sink			46D1295
16	One-slot PCIe riser-card assembly (1 x 8)		44W4803	
	2.5-inch Gen 2 simple-swap drive cage with backplate		46D1432	
	2.5-inch Gen 2 drive filler panel	49Y4560		
	Microprocessor filler	46D1375		
	Thermal grease		41Y9292	
	Front-panel assembly			46D1344
	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	
	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	
	I2C to planar cable		46D1371	
	I2C to multiple cable		43W4831	
	3U chassis I2C power cable		46D1370	
	Storage-riser-card assembly		46D1293	
	ServeRAID-10i charge circuit and power cable kit		44E8763	
	ServeRAID-10i Li-Ion battery		43W4342	
	SAS controller battery holder		46M6563	
	900 W power supply		43X3290	

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 6313, 6385, and 7831 2U chassis components

The following replaceable components are available for the Type 6313, 6385, and 7831 2U chassis.

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

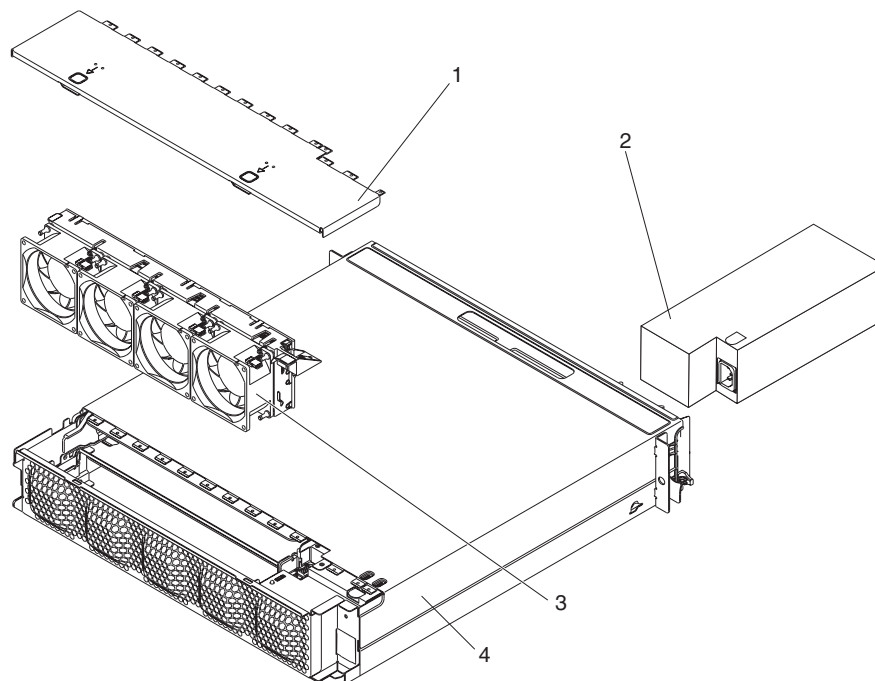


Table 3. CRUs and FRUs, Type 6313, 6385, and 7831

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Top cover	44W4791		
2	900 W power supply		43X3290	
3	Fan assembly	44W4792		
4	Type 6313, 6385, and 7831 2U chassis			44W4790
	Rail kit		44W4793	
	Enterprise rack rail kit		44W4794	
	2U Label kit	44W4849		
	Three-connector Y power cable		39M5501	
	Two-connector straight power cable		39M5503	

## Type 6386 and 7834 3U chassis components

The following replaceable components are available for the Type 6386 and 7834 3U chassis.

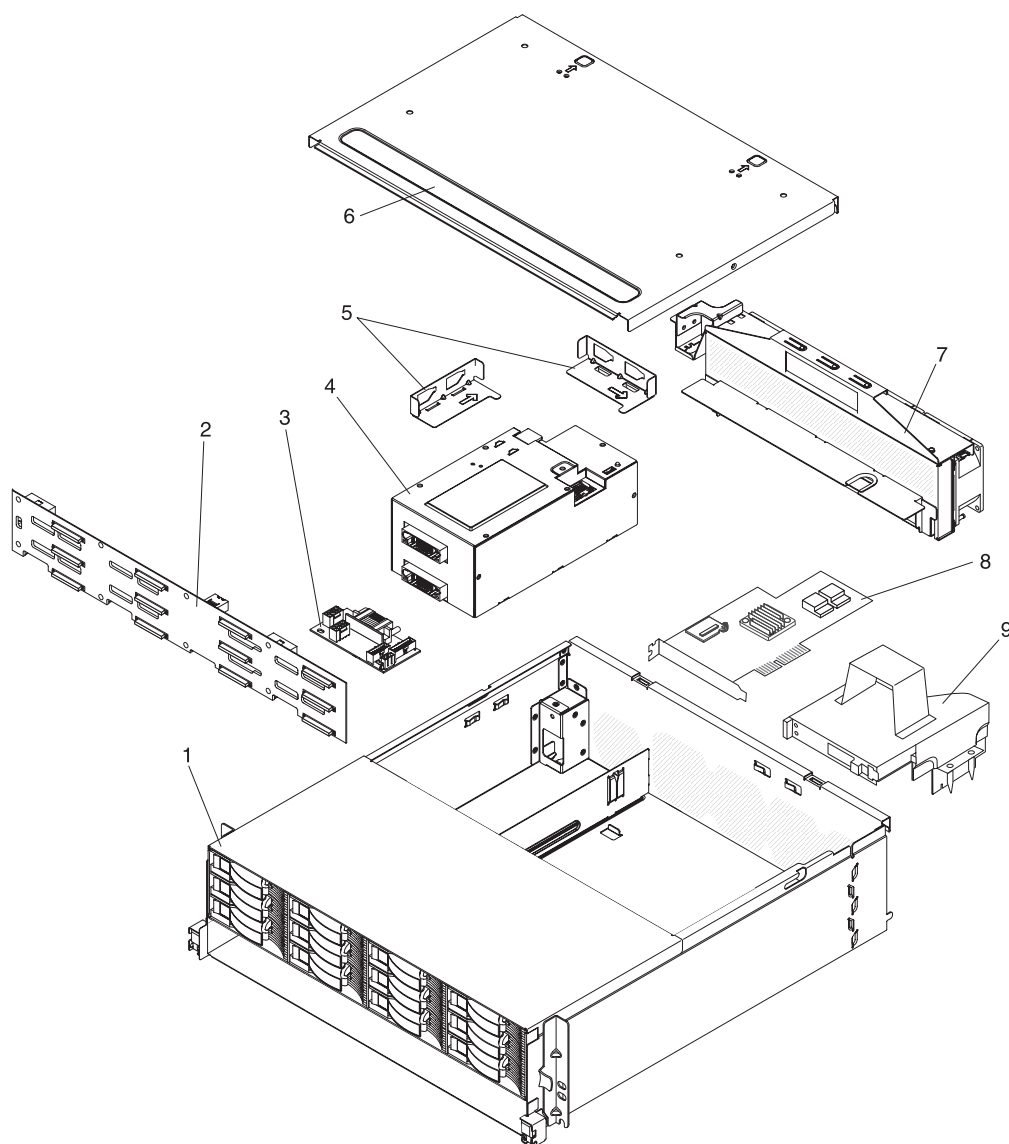


Table 4. CRUs and FRUs, Type 6386 and 7834

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Type 6386 and 7834 3U chassis			46C6285
2	Hard disk drive backplane			44E8766
3	Power-supply paddle card domain B		39Y7311	
4	900 W power supply		43X3290	
5	Bracket kit		46C6288	
6	Top cover	46C6286		
7	Fan assembly		46C6287	



Table 4. CRUs and FRUs, Type 6386 and 7834 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
8	ServeRAID-MR10i adapter		43W4297	
9	Storage-riser-card assembly		46D1293	
	3U Label kit	46C6305		
	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
	Bracket kit		46C6288	
	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 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.

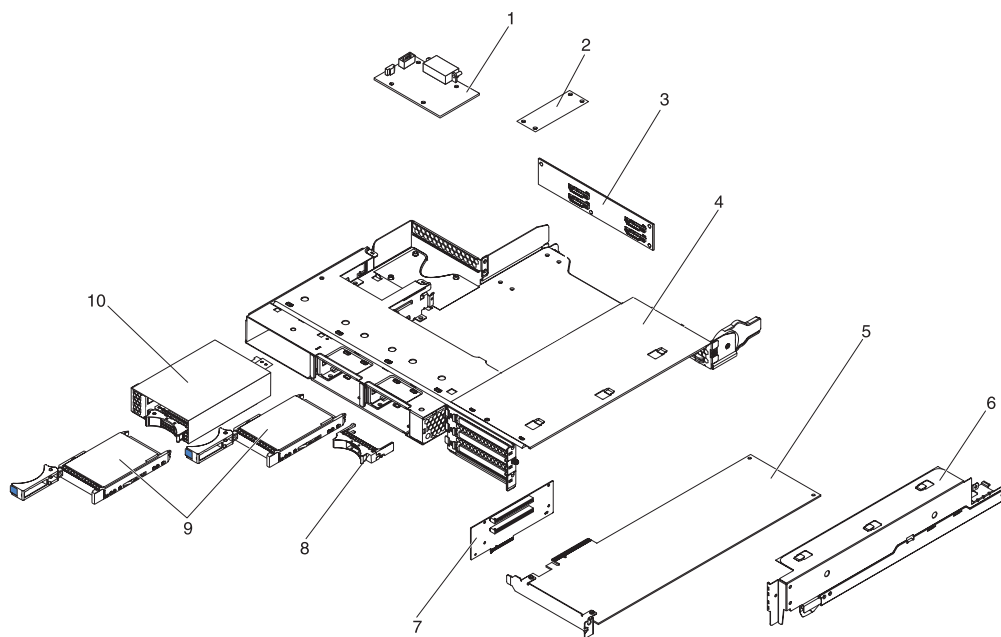


Table 5. CRUs and FRUs, I/O enclosures configured with 2.5-inch hot-swap hard disk drives

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Power-supply paddle card domain B		39Y7311	
2	I <sup>2</sup> C multiplexer card		44W4832	

Table 5. CRUs and FRUs, I/O enclosures configured with 2.5-inch hot-swap hard disk drives (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
3	2x2 2.5-inch SAS/SATA backplane			44E8765
4	I/O enclosure			46C6929
5	PCIe adapter (see Table 2 on page 56 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 2 on page 56 for the supported drives)			
10	2.5-inch SAS/SATA drive cage with backplane		44W4800	

## I/O enclosures configured with 3.5-inch simple-swap hard disk drives

The following replaceable components are available for I/O enclosures that are configured with 3.5-inch simple-swap hard disk drives.

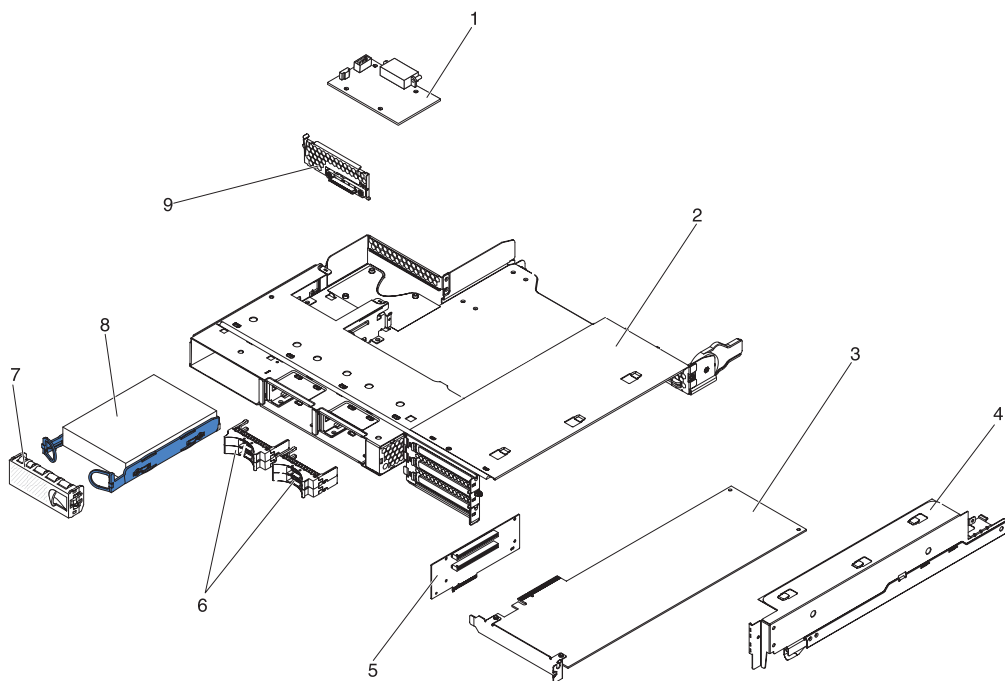


Table 6. CRUs and FRUs, I/O enclosures configured with 3.5-inch simple-swap hard disk drives

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Power-supply paddle card domain B		39Y7311	
2	I/O enclosure			46C6929
3	PCIe adapter (see Table 2 on page 56 for the supported adapters)			
4	PCIe adapter bay cover		46C6930	
5	Two-slot PCIe riser-card assembly (2x4 with 2x16 connectors)			46D1336

Table 6. CRUs and FRUs, I/O enclosures configured with 3.5-inch simple-swap hard disk drives (continued)

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 2 on page 56 for the supported drives)			
8	SAS hard disk drive (see Table 2 on page 56 for the supported drives)			
9	One-bay hard disk drive bracket and cable assembly, SATA 1x		44T0647	

## Storage enclosure components

The following replaceable components are available for the storage enclosure.

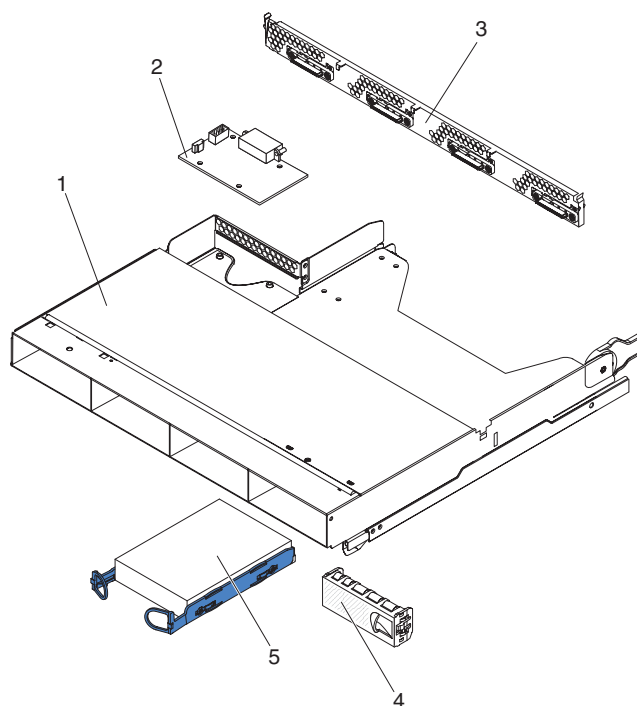


Table 7. CRUs and FRUs, storage enclosure

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Storage enclosure		44W4798	
2	Power-supply paddle card domain B		39Y7311	
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		
5	SATA hard disk drive (see Table 2 on page 56 for the supported drives)			

Table 7. CRUs and FRUs, storage enclosure (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
5	SAS hard disk drive (see Table 2 on page 56 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 8. Consumable parts, Type 6380, 7321, and 7323

Description	Part number
Battery, 3.0 V	33F8354

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

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

<b>IBM power cord part number</b>	<b>Used in these countries and regions</b>
39M5199	Japan
39M5068	Argentina, Paraguay, Uruguay
39M5226	India
39M5233	Brazil

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## 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 55 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.

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### Installation guidelines

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

- Read the safety information that begins on page vii and the guidelines in “Handling static-sensitive devices” on page 68. 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

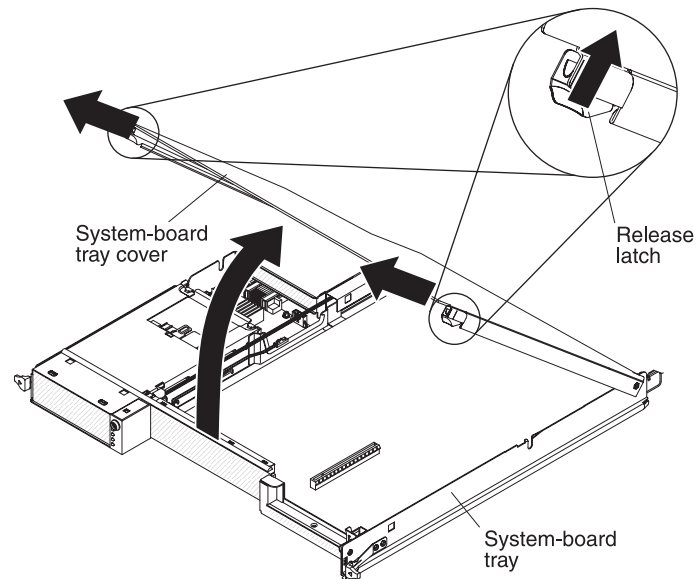
If you are instructed to return a device or component, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.



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## Removing the system-board tray cover

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



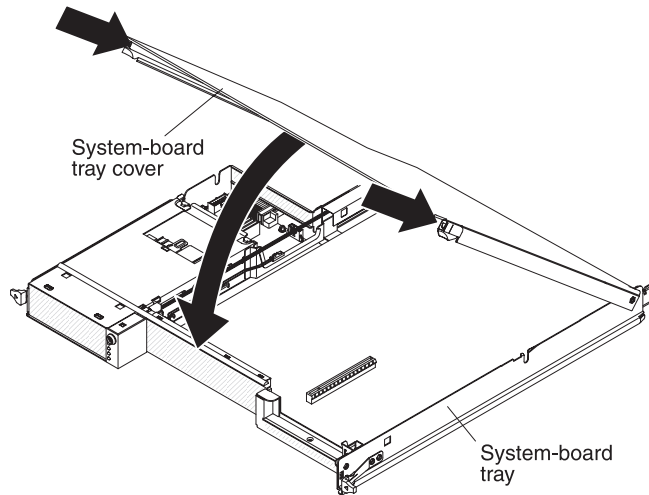
1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the system-board tray is installed in a chassis, remove it (see “Removing the system-board tray from a 2U chassis” on page 70 or “Removing the system-board tray from a 3U chassis” on page 72).
3. Carefully 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.



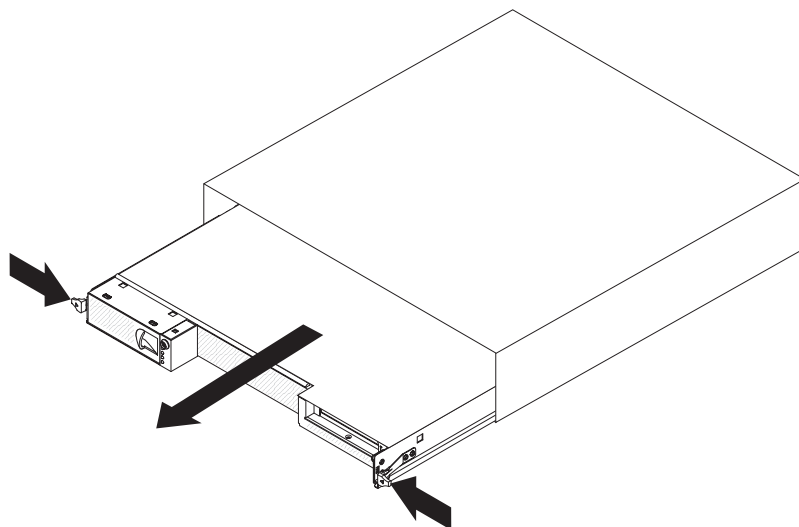
1. Lower the cover so that the pins at the rear of the cover slide down into the slots at the rear of the system-board tray. Before you close the cover, make sure that all components are installed and seated correctly, all internal cables are correctly routed, and you have not left loose tools or parts 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 71 or “Installing the system-board tray in a 3U chassis” on page 73).

---

## 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.

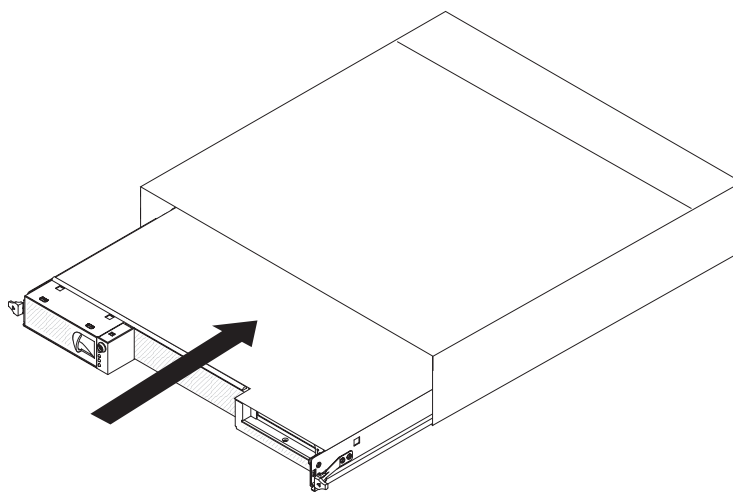


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the system-board tray is operating, shut down the operating system; then, press the power-control button to turn off the system-board tray (see “Turning off the system-board tray” on page 10 for more 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.

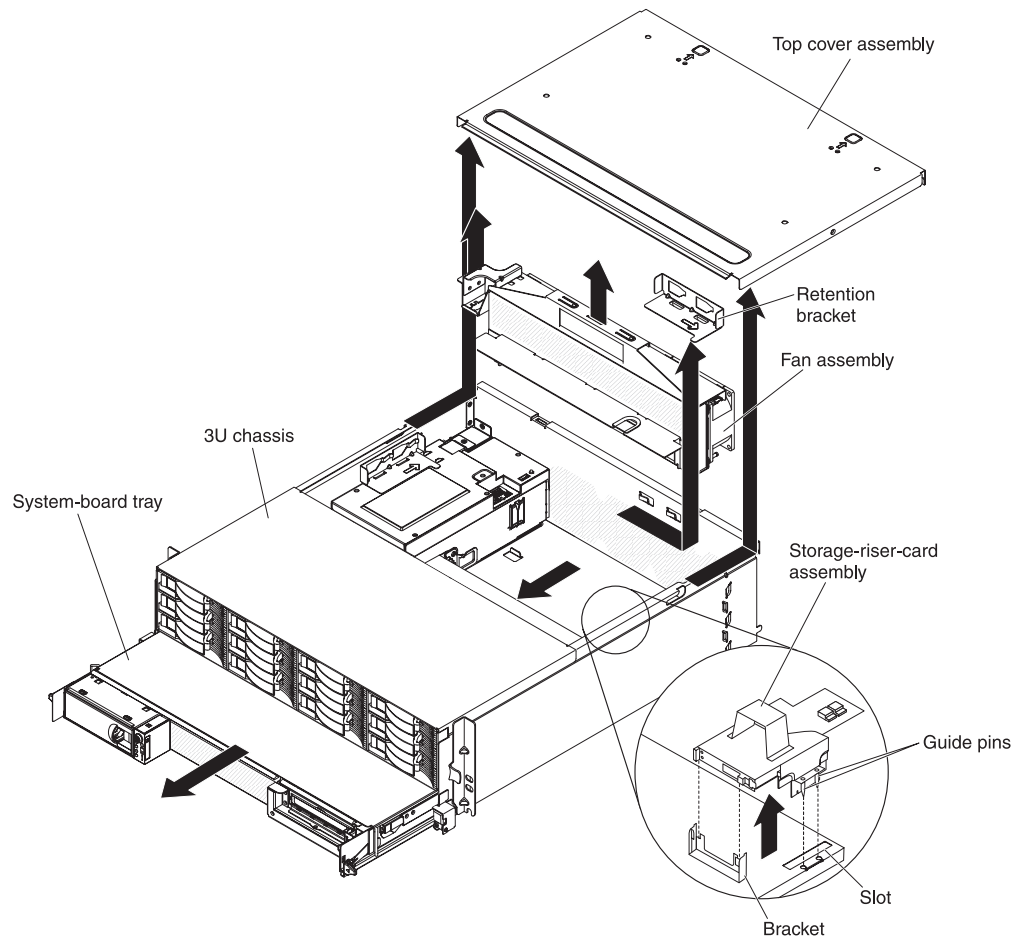
3. Turn on the system-board tray (see “Turning on the system-board tray” on page 10).
4. Make sure that the power-on LED on the system-board tray operator panel is lit continuously, indicating that the system-board tray is receiving power and is turned on.

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 158 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.



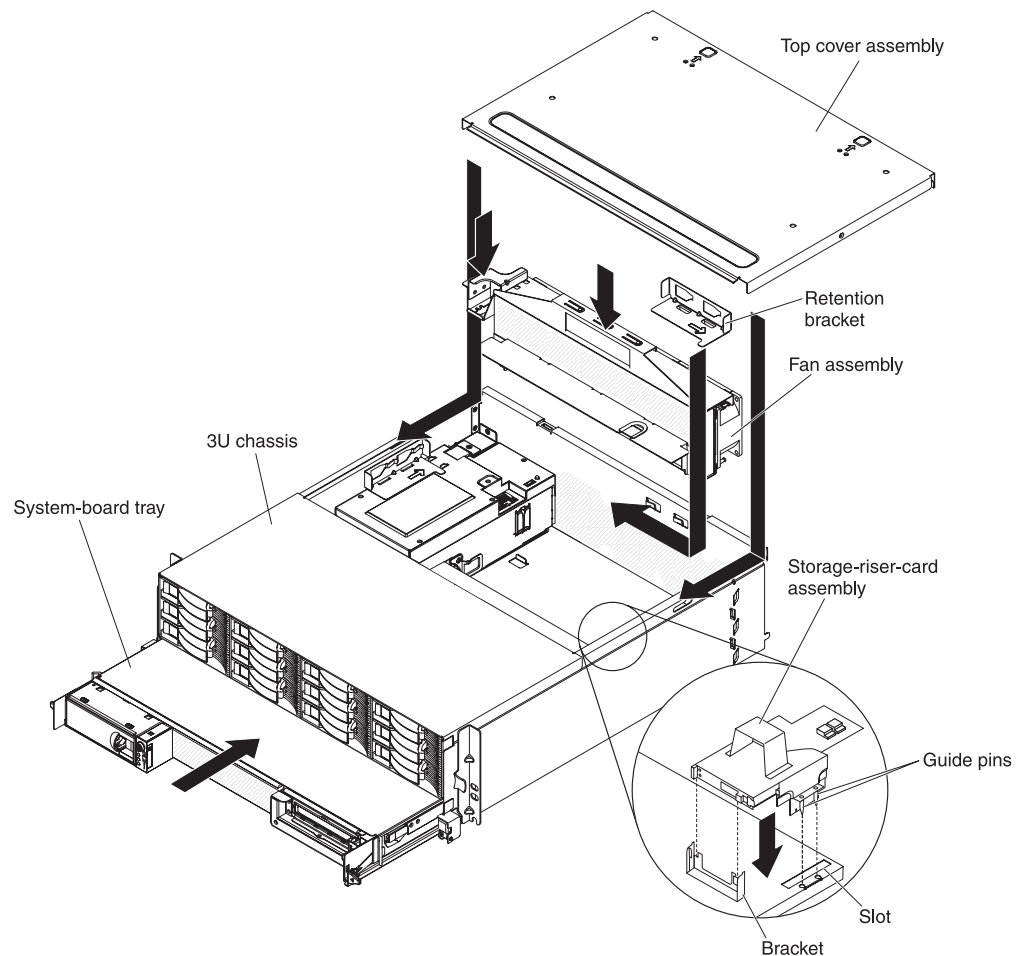
1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the system-board tray is operating, shut down the operating system; then, press the power-control button to turn off the system-board tray (see “Turning off the system-board tray” on page 10 for more 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 134).

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 125).
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 134).

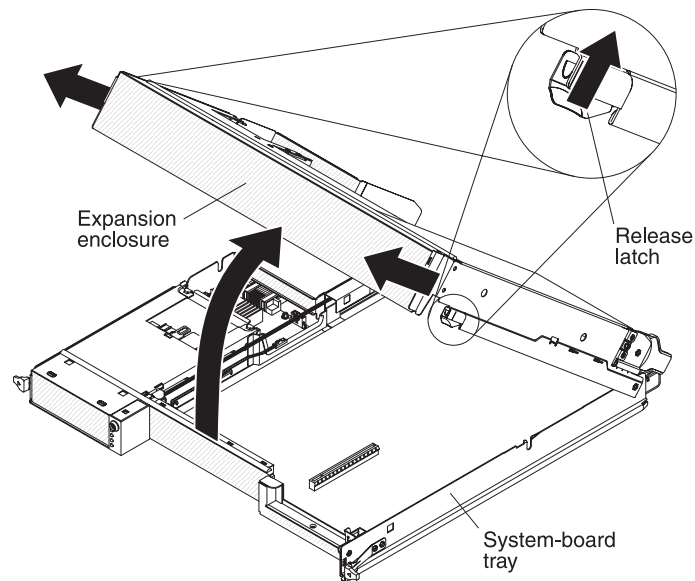
1. Slide the system-board tray into the 3U chassis until it stops.
2. Reconnect the cables that connect the system-board tray and optional adapter to the 3U chassis.
3. Turn the fan assembly so that the connector aligns correctly with the connector in the power supply.
4. Route any cables through the 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 127).
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 135).
10. Install the hard disk drives (see “Removing and installing a hard disk drive” on page 83).
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 10).
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 158 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.

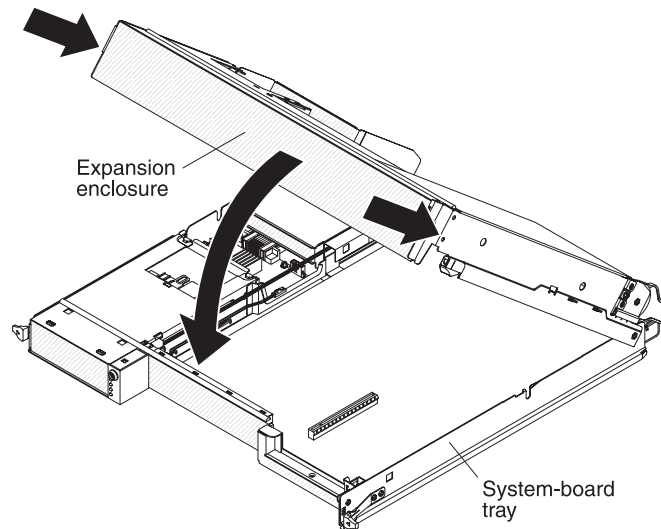


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the system-board tray is installed in a chassis, remove it (see “Removing the system-board tray from a 2U chassis” on page 70).
3. Carefully set the system-board tray on a flat, static-protective surface.
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.



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 71).

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## Removing and replacing consumable parts and Tier 1 CRUs

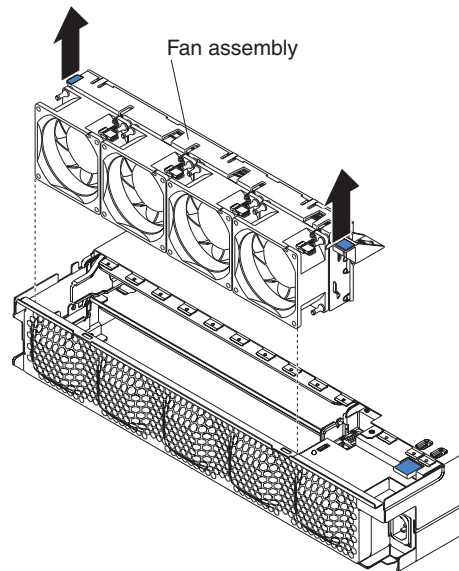
Replacement of consumable parts and Tier 1 CRUs is your responsibility. If IBM installs a consumable part or Tier 1 CRU at your request, you will be charged for the installation.

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



## Removing the 2U chassis fan assembly

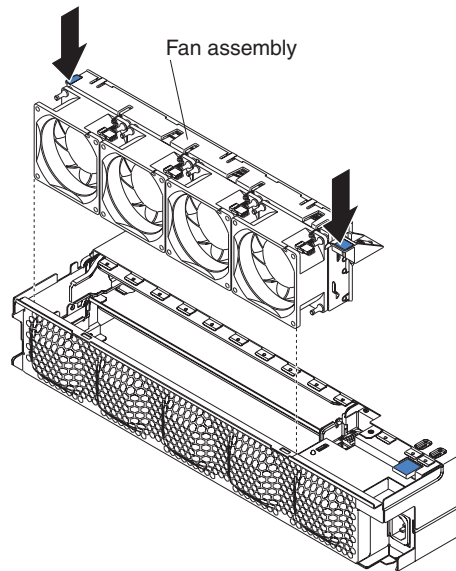
To remove the 2U chassis fan assembly, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 130).
3. Remove any installed system-board trays (see “Removing the system-board tray from a 2U chassis” on page 70).
4. Remove the top cover (see “Removing the 2U chassis fan-assembly top cover” on page 79).
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

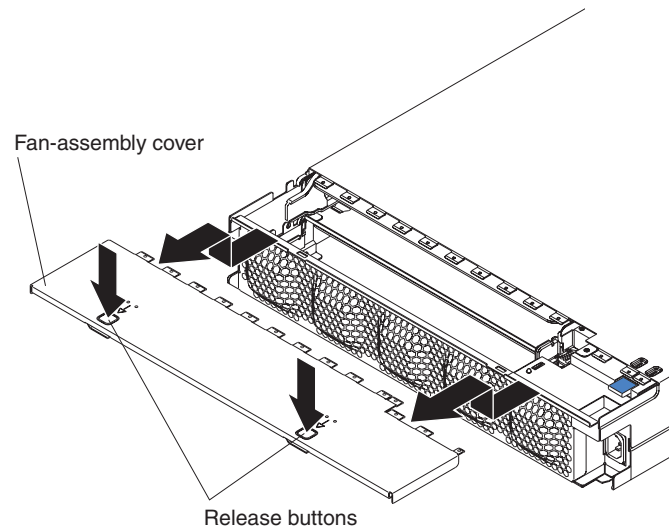
To install the 2U chassis fan assembly, complete the following steps.



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 79).
5. Install the chassis in the iDataPlex rack (see “Installing the 2U chassis in a Type 7825 iDataPlex rack” on page 131).
6. Install any system-board trays that you removed (see “Installing the system-board tray in a 2U chassis” on page 71).

## Removing the 2U chassis fan-assembly top cover

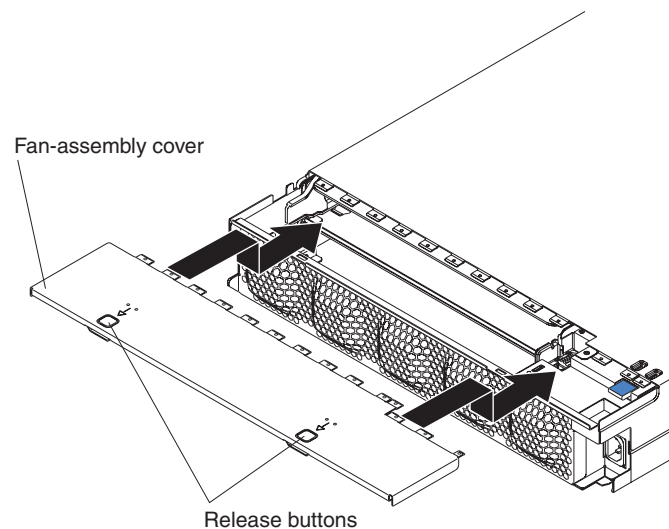
To remove the 2U chassis fan-assembly top cover, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 130).
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.

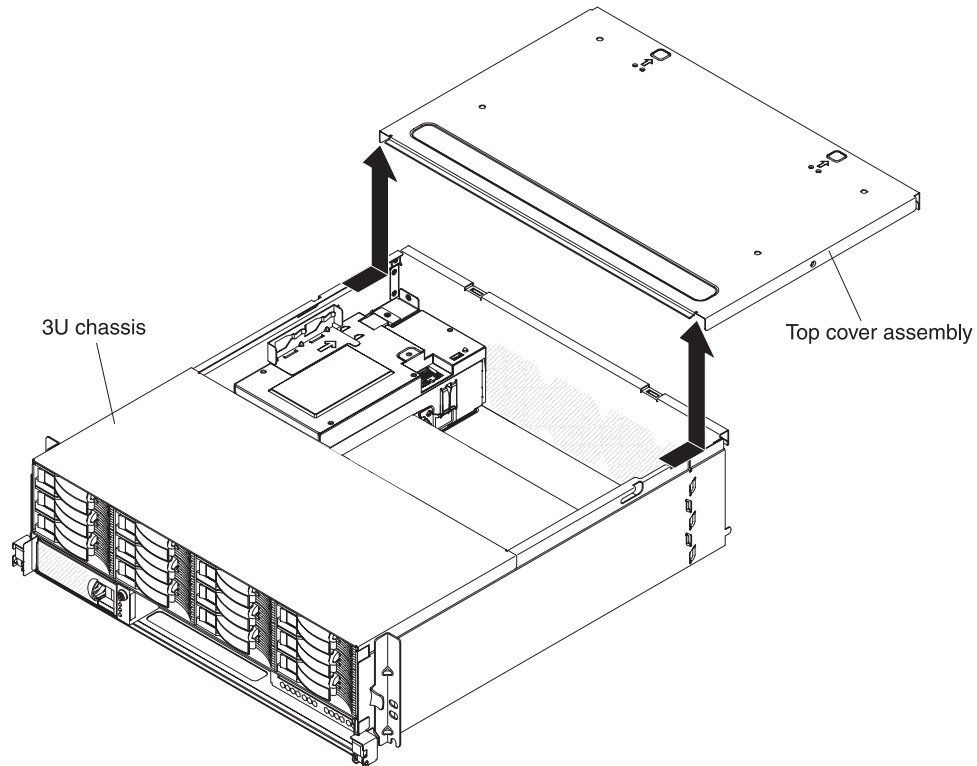


1. Make sure that no wires are protruding and might interfere with the cover.

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 131).

## Removing the 3U chassis top cover

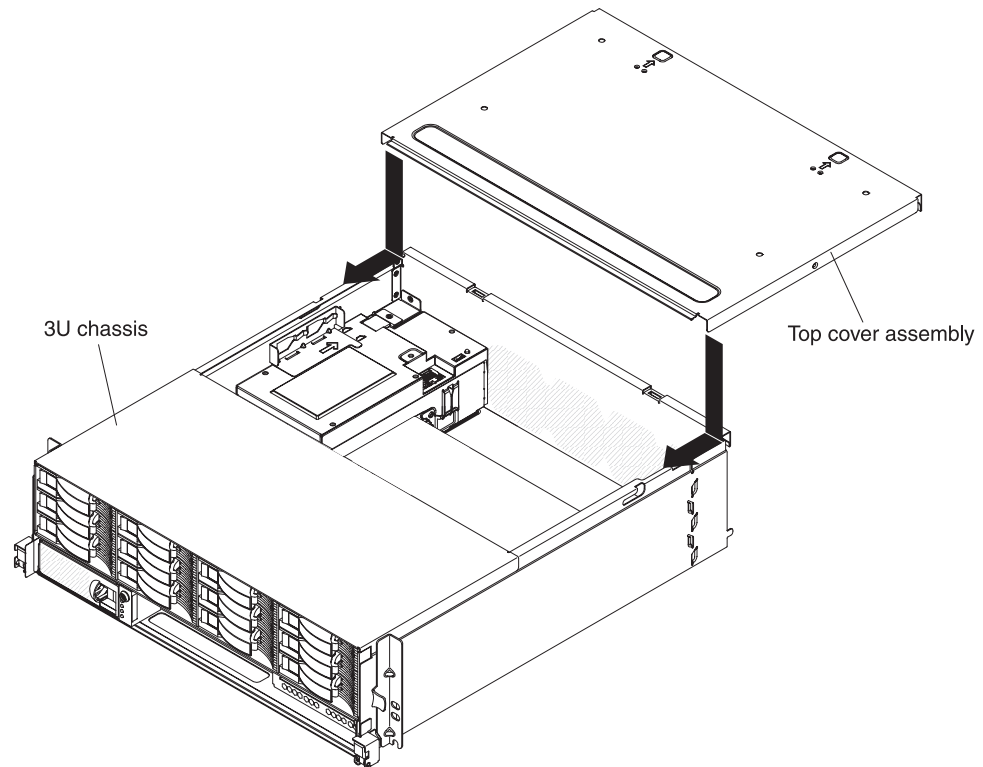
To remove the 3U chassis top cover, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 134).
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

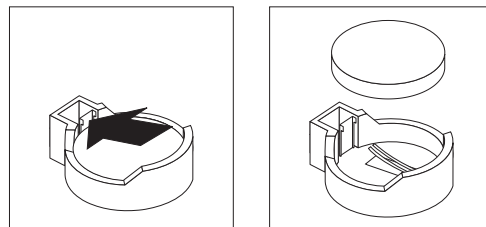
To install the 3U chassis top cover, complete the following steps.



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 135).

## Removing the battery

To remove the battery, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67
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 70 or “Removing the system-board tray from a 3U chassis” on page 72).

3. If an expansion enclosure is installed, remove it (see “Removing an expansion enclosure from a system-board tray” on page 75); otherwise, remove the system-board tray cover (see “Removing the system-board tray cover” on page 69).
4. Remove the PCIe riser-card assembly, if one is installed (see “Removing a PCIe riser-card assembly from the system-board tray” on page 115).
5. Locate the battery on the system board (see “System-board connectors” on page 11).
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.
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:

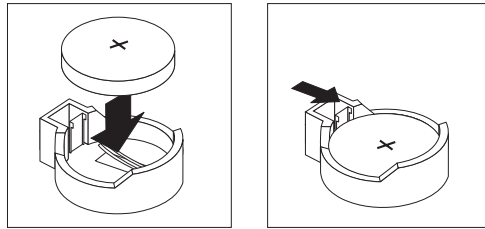
**When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can 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.



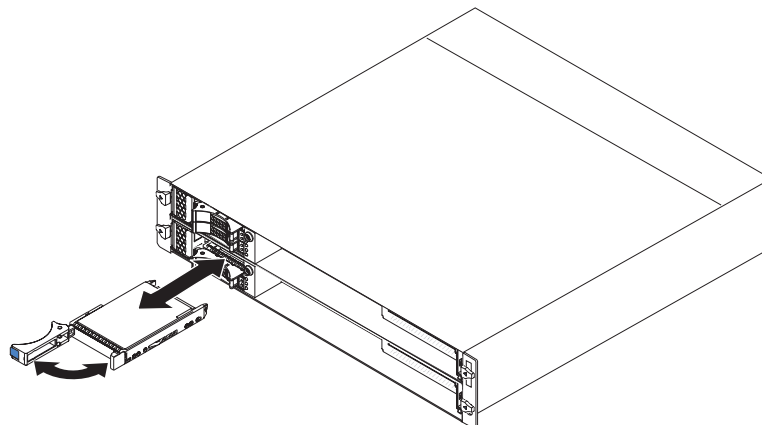
1. Follow any special handling and installation instructions that come with the battery.
2. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.
3. Press the battery down into the socket until it clicks into place. Make sure that the battery clip holds the battery securely.
4. If you removed the PCIe riser-card assembly, install it (see “Installing a PCIe riser-card assembly in the system-board tray” on page 116).
5. Install the expansion enclosure, if you removed one (see “Installing an expansion enclosure on a system-board tray” on page 76); otherwise, install the system-board tray cover (see “Installing the system-board tray cover” on page 69).
6. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71 or “Installing the system-board tray in a 3U chassis” on page 73).
7. Turn on the system-board tray and run the Setup utility. Set configuration parameters as needed (see “Using the Setup utility” on page 158 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 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.

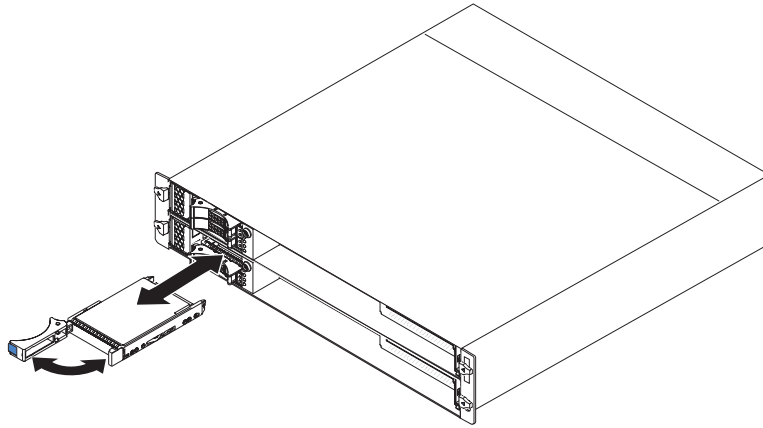


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. Rotate the drive tray handle of the drive that is to be removed to the open position.
3. Grasp the drive handle and pull the drive out of the bay.

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

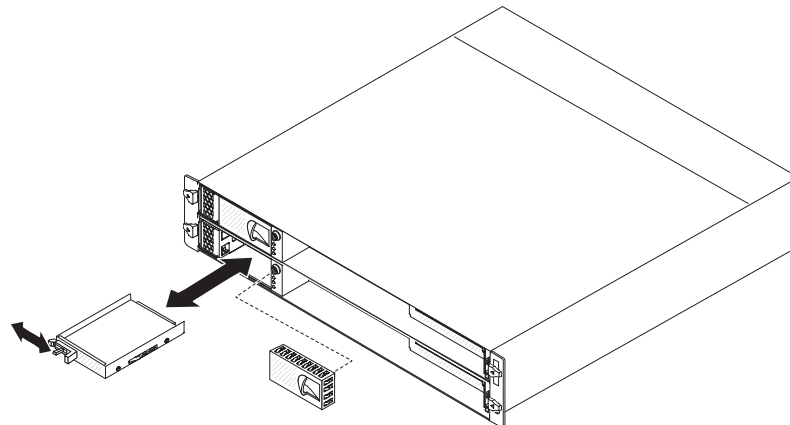
To install a 2.5-inch hot-swap hard disk drive, complete the following steps.



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.



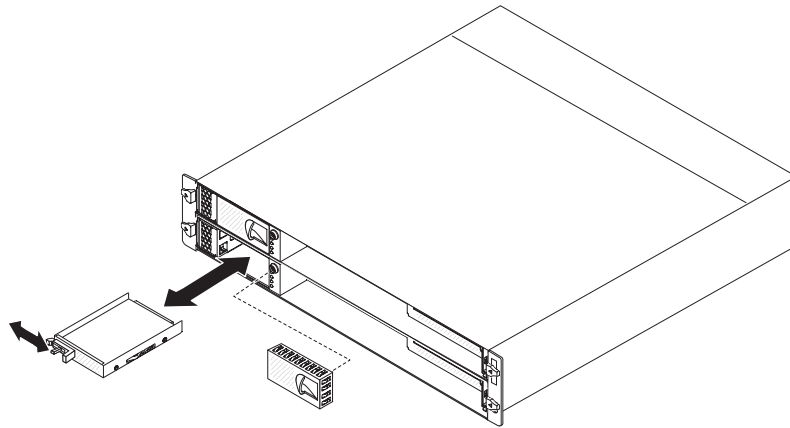
1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the system-board tray is operating, shut down the operating system; then, press the power-control button to turn off the system-board tray (see “Turning off the system-board tray” on page 10 for more 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

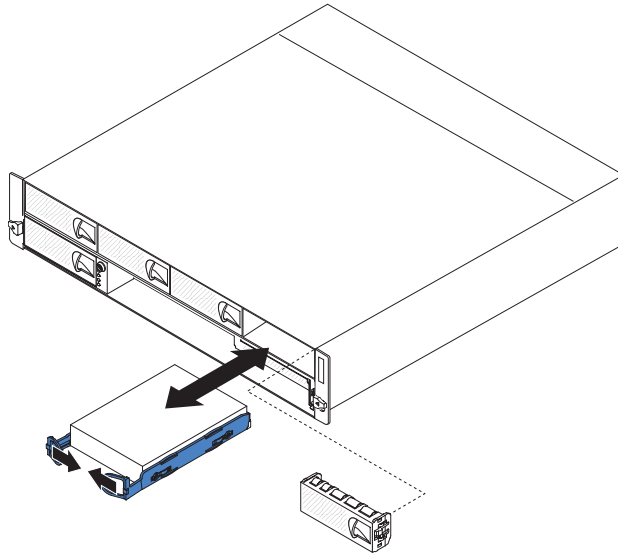
To install a 2.5-inch simple-swap hard disk drive or solid-state drive, complete the following steps.



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 10).

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

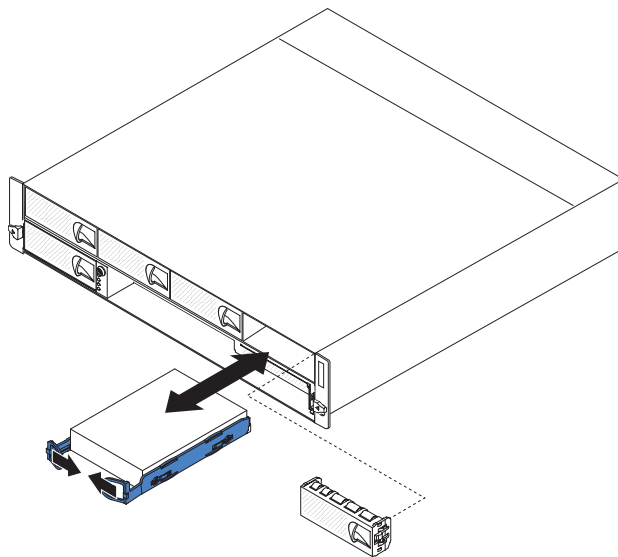
To remove a 3.5-inch simple-swap hard disk drive, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 10 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.

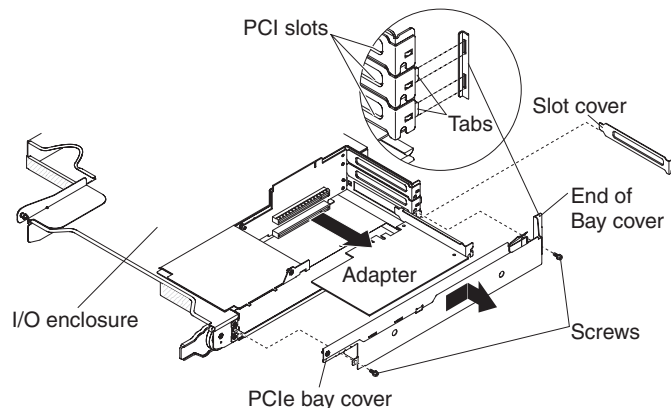
2. Align the drive with the guide rails in the drive bay.
3. Pull the loops of the drive toward each other; then, carefully slide the drive into the bay until it stops, and release the loops.

**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 10).

## Removing the PCIe adapter bay cover

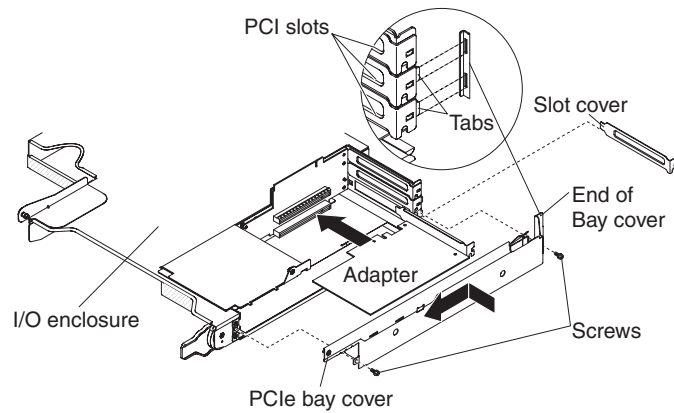
To remove the adapter bay cover from the I/O enclosure, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 70).
3. Remove the I/O enclosure (see “Removing an expansion enclosure from a system-board tray” on page 75).
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

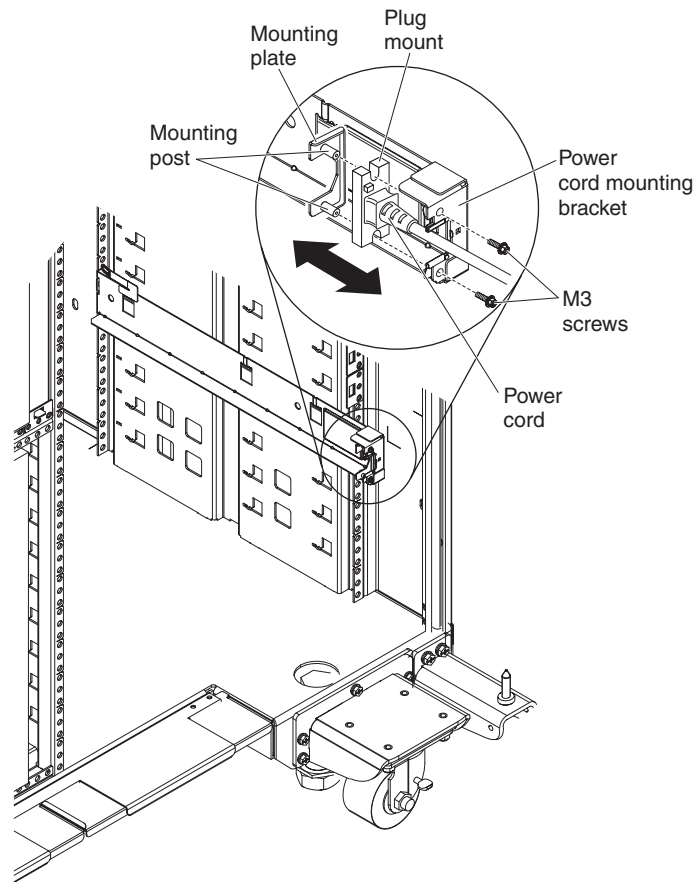
To install the PCIe adapter bay cover on the I/O enclosure, complete the following steps.



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 76).
6. Install the system-board tray in the chassis (see "Installing the system-board tray in a 2U chassis" on page 71).

## Removing the power cord

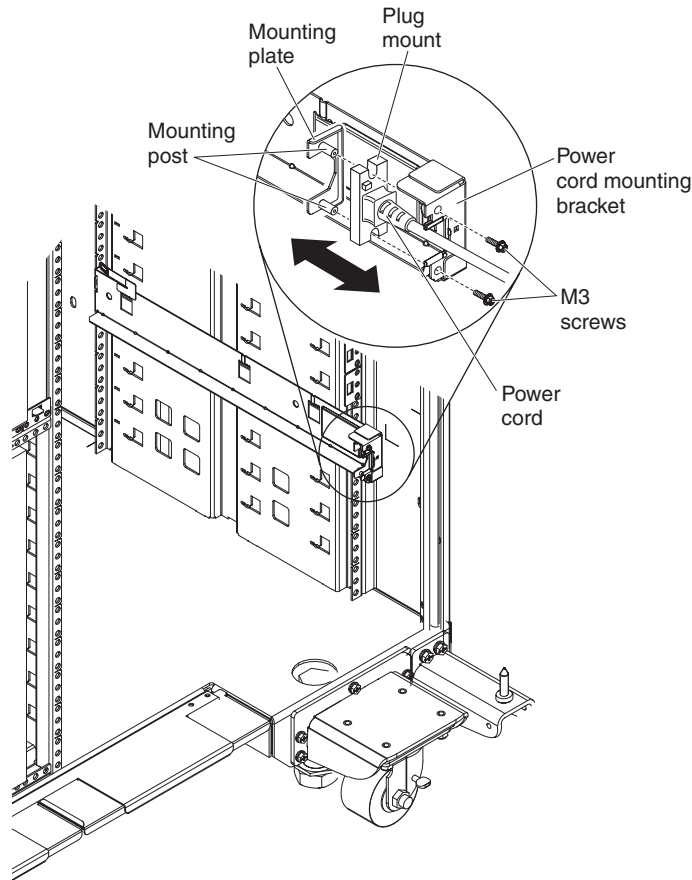
To remove the power cord, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 130 or “Removing a 3U chassis from a Type 7825 iDataPlex rack” on page 134).
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:



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 131 or "Installing a 3U chassis in a Type 7825 iDataPlex rack" on page 135).

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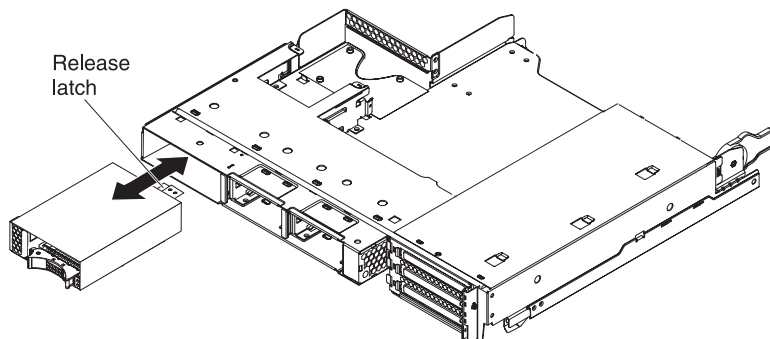
## Removing and replacing Tier 2 CRUs

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 SAS/SATA drive cage

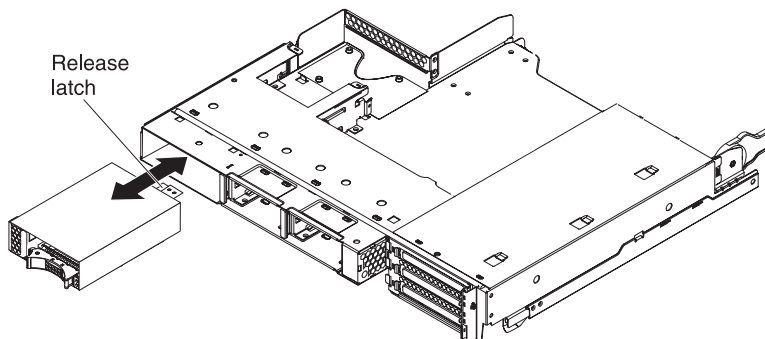
To remove a 2.5-inch SAS/SATA drive cage, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If hard disk drives are installed in the 2.5-inch 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 83).
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 70).
4. If the 2.5-inch 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 SAS/SATA drive cage and pull it out of the front of the drive bay.
5. If the 2.5-inch 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 75); otherwise, remove the system-board tray cover (see “Removing the system-board tray cover” on page 69).
  - 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 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 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 SAS/SATA drive cage

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

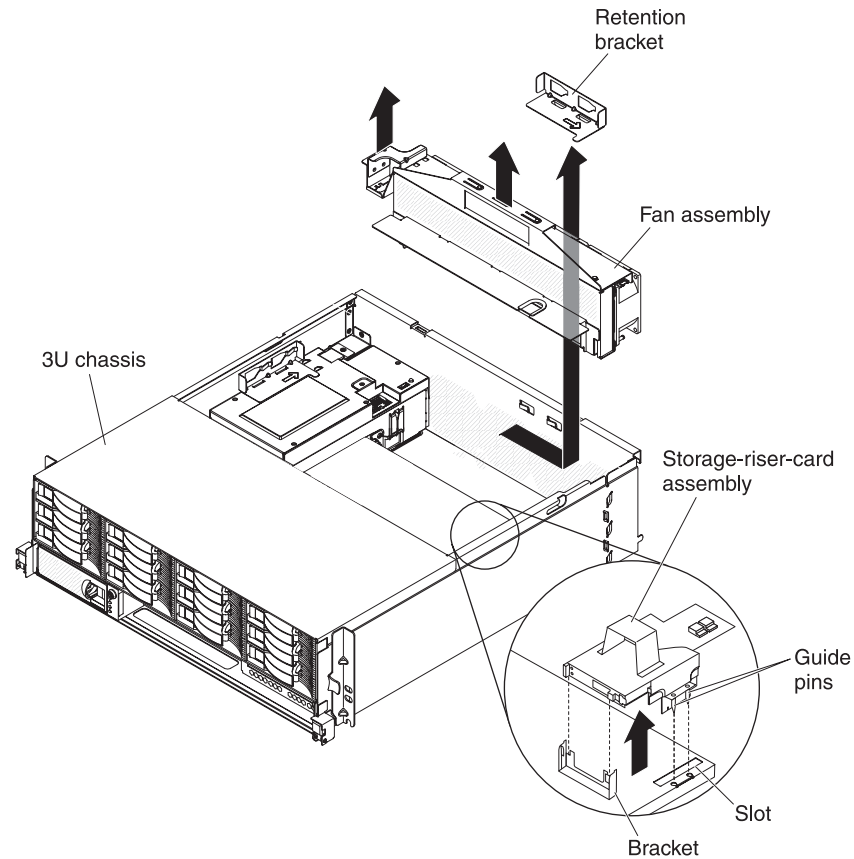


1. Align the 2.5-inch SAS/SATA drive cage with the drive bay; then, carefully slide the cage into the bay until it stops and the release lever locks into place.
2. Connect the power and signal cables to the backplane on the 2.5-inch SAS/SATA drive cage.
3. Install the expansion enclosure, if you removed one (see “Installing an expansion enclosure on a system-board tray” on page 76); otherwise, install the system-board tray cover (see “Installing the system-board tray cover” on page 69).
4. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71).
5. Install the hard disk drives, if you removed any (see “Installing a 2.5-inch hot-swap hard disk drive” on page 84).



## Removing the 3U chassis fan assembly

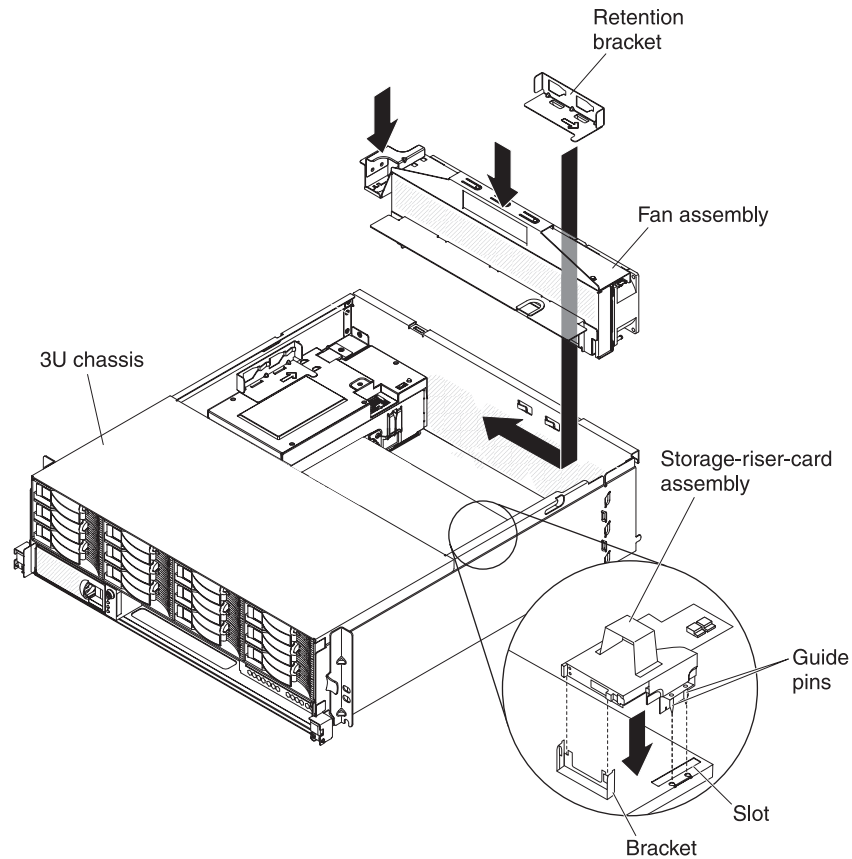
To remove the 3U chassis fan assembly, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 134).
3. Remove the top cover (see “Removing the 3U chassis top cover” on page 80).
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 125).
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 127).
7. Install the top cover (see “Installing the 3U chassis top cover” on page 81).
8. Install the 3U chassis in the iDataPlex rack (see “Installing the 3U chassis top cover” on page 81).

## 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 (25 W).

To ensure that a ServeRAID-MR10i adapter or ServeRAID-BR10i adapter works correctly in your UEFI-based server, make sure that the adapter firmware is at the latest level.

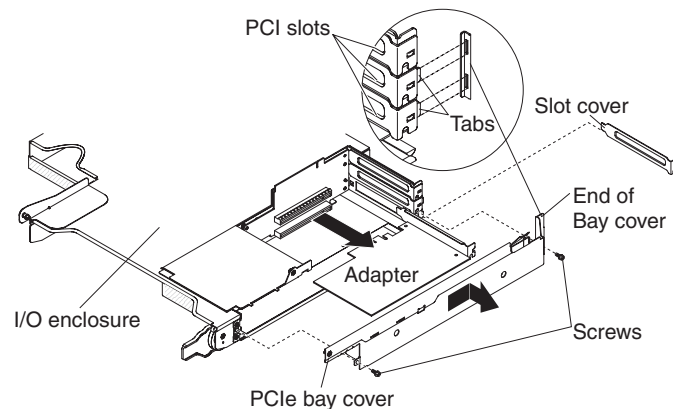
**Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

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 (25 W).

### Removing an adapter from the I/O enclosure

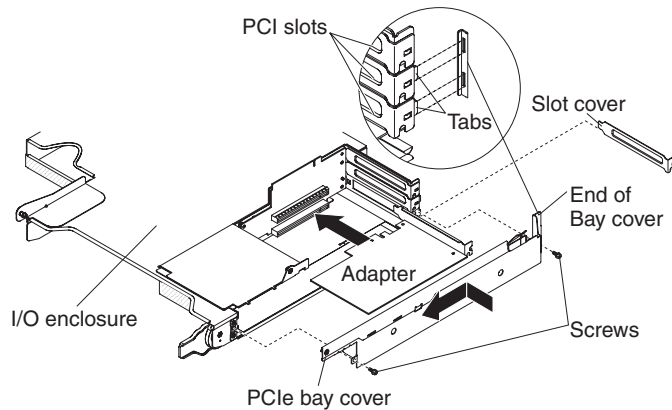
To remove a PCIe adapter from the I/O enclosure, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 70).
3. Remove the I/O enclosure (see “Removing an expansion enclosure from a system-board tray” on page 75).
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 87).
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 adapter in the I/O enclosure

To install a PCIe adapter in the I/O enclosure, complete the following steps.

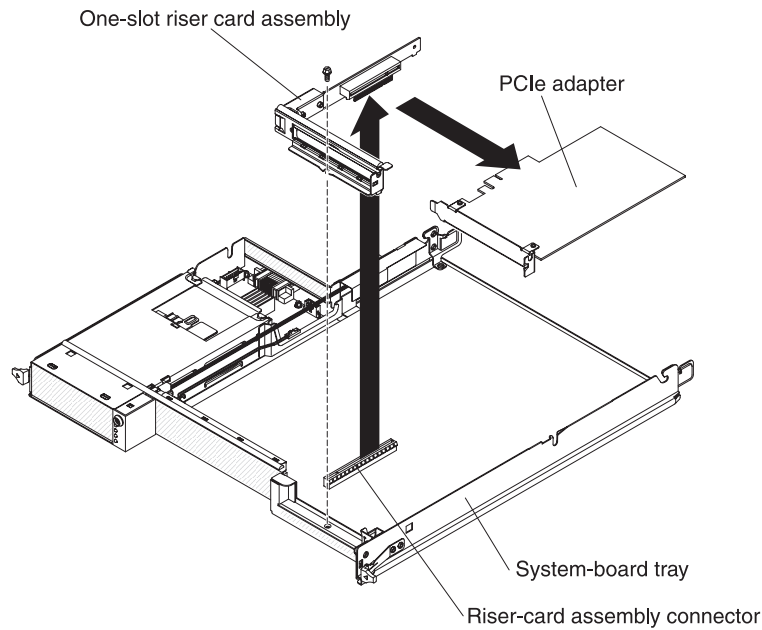


1. Touch the static-protective package that contains the adapter to any *unpainted* metal surface on the outside of the system-board tray; then, remove the adapter from the package. Avoid touching the components and gold-edge connectors on the adapter.
2. See the documentation that comes with the adapter 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.
4. If you disconnected cables when you removed the adapter, reconnect the cables.
5. Install the PCIe adapter bay cover on the I/O enclosure (see “Installing the PCIe adapter bay cover” on page 87).
6. Install the I/O enclosure on the system-board tray (see “Installing an expansion enclosure on a system-board tray” on page 76).
7. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71).

**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 adapter from the system-board tray

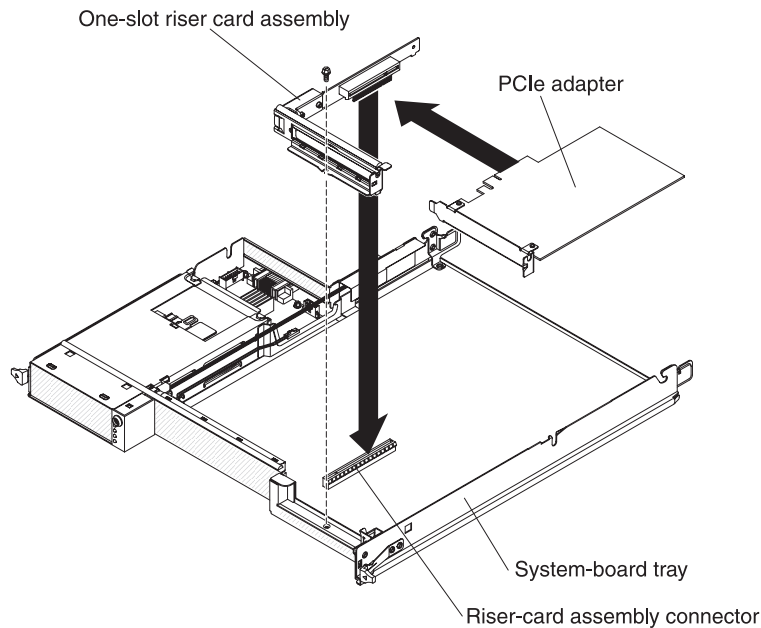
To remove a PCIe adapter from the system-board tray, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 70 or “Removing the system-board tray from a 3U chassis” on page 72).
3. If a storage enclosure is installed, remove it (see “Removing an expansion enclosure from a system-board tray” on page 75); otherwise, remove the system-board tray cover (see “Removing the system-board tray cover” on page 69).
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. Pull the PCIe riser-card assembly out of the slot on the system board.
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 adapter in the system-board tray

To install a PCIe adapter in the system-board tray, 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.

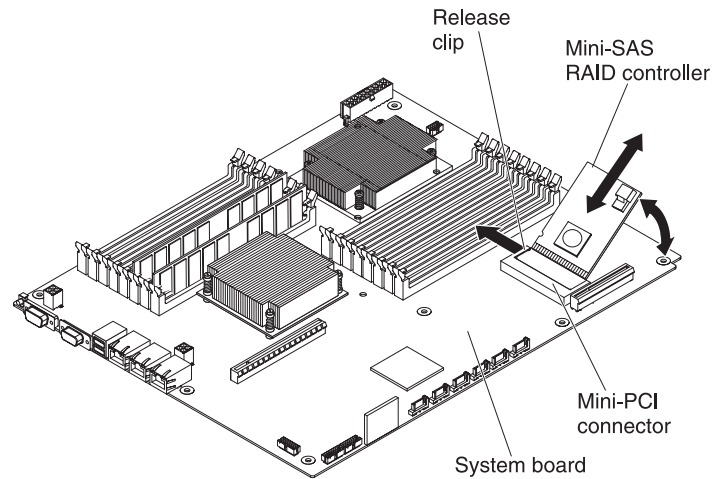
**Note:** Ensure that the tab on the riser-card bracket is properly aligned with the slot on the adapter bracket.

4. Insert the PCIe riser-card assembly with the adapter into the riser-card slot 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 76); otherwise, install the system-board tray cover (see “Installing the system-board tray cover” on page 69).
7. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71 or “Installing the system-board tray in a 3U chassis” on page 73).

**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

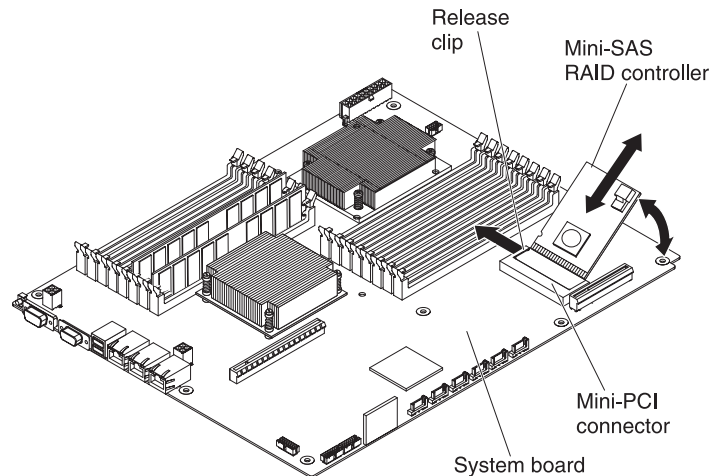
To remove the mini-SAS RAID controller, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 70 or “Removing the system-board tray from a 3U chassis” on page 72).
3. If an enclosure is installed, remove it (see “Removing an expansion enclosure from a system-board tray” on page 75); otherwise, remove the system-board tray cover (see “Removing the system-board tray cover” on page 69).
4. Make a note of where the cable is attached to the mini-SAS RAID controller; then, disconnect the cable.
5. Carefully tilt the mini-SAS RAID controller upward to disengage the plastic standoffs from the system board.
6. 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.
7. 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.



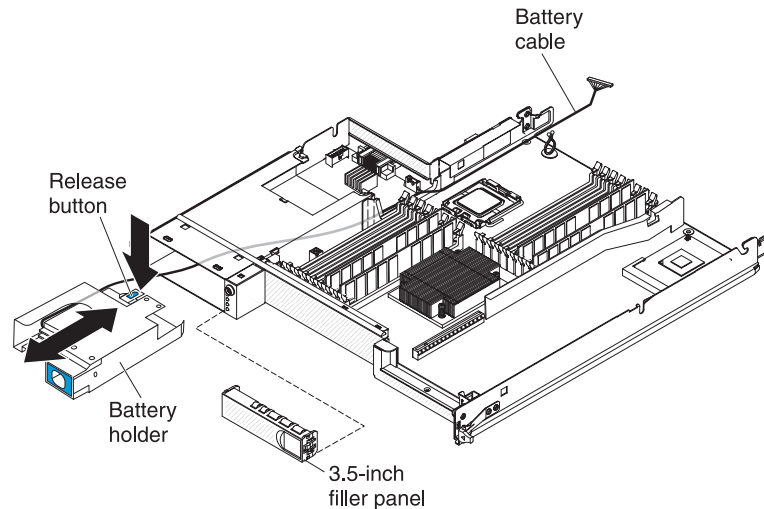
1. Touch the static-protective package that contains the mini-SAS RAID controller to any unpainted metal surface on the outside of the system-board tray; then, remove the adapter from the package.
2. Align the mini-SAS RAID controller with the mini-PCI connector on the system board; then, press the adapter 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 enclosure, if you removed one (see “Installing an expansion enclosure on a system-board tray” on page 76); otherwise, install the system-board tray cover (see “Installing the system-board tray cover” on page 69).
6. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71 or “Installing the system-board tray in a 3U chassis” on page 73).

**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.

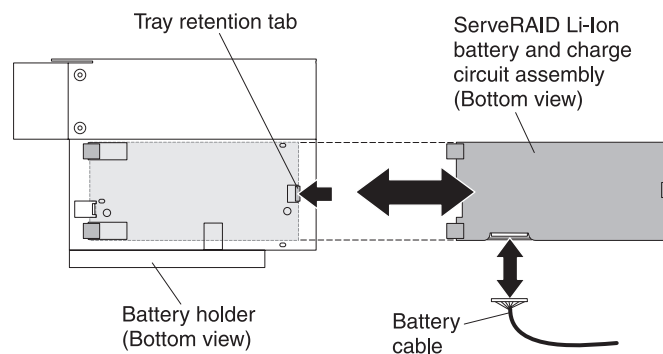
## Removing the battery holder, ServeRAID Li-Ion battery, and charge circuit from a 3U chassis

To remove the battery holder, ServeRAID Li-Ion battery, and charge circuit from a 3U chassis, complete the following steps.

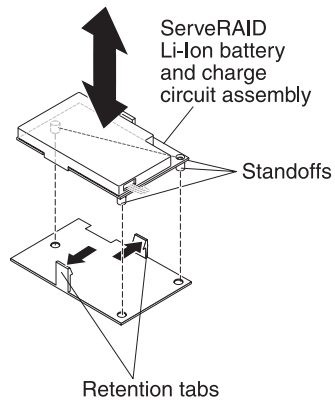




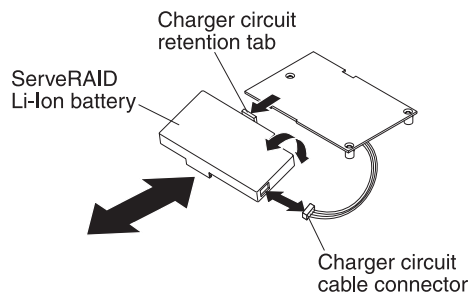
1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the 3U chassis is installed in an iDataPlex rack, remove it (see “Removing a 3U chassis from a Type 7825 iDataPlex rack” on page 134).
3. Remove the top cover (see “Removing the 3U chassis top cover” on page 80).
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 125).
5. Remove the 3U chassis fan assembly (see “Removing the 3U chassis fan assembly” on page 93).
6. Remove the system-board tray from the 3U chassis (see “Removing the system-board tray from a 3U chassis” on page 72).
7. Make sure that the battery cable can move freely inside the system-board tray.
8. Remove the filler panel from the hard disk drive bay.
9. 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.



10. Press the tray retention tab on the bottom of the battery holder to release the ServeRAID Li-Ion battery and charge circuit assembly.
11. Disconnect the battery cable from the ServeRAID Li-Ion battery and charge circuit assembly.



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

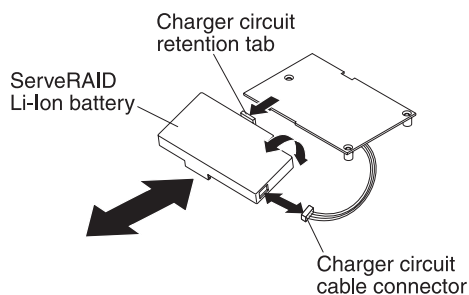


13. Press the charge circuit retention tab to release the ServeRAID Li-Ion battery from the charge circuit assembly; then, disconnect the cable from the charge circuit.
14. If you are instructed to return the battery holder, ServeRAID Li-Ion battery, and charge circuit, follow all packaging instructions, 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.

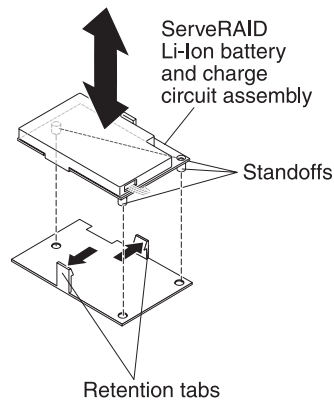
## Installing the battery holder, ServeRAID Li-Ion battery, and charge circuit in a 3U chassis

To install the battery holder, ServeRAID Li-Ion battery, and charge circuit in a 3U chassis, complete the following steps.

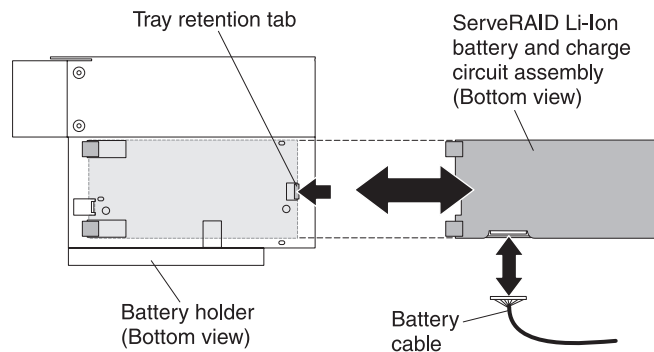


1. Touch the static-protective packages that contain the battery holder, ServeRAID Li-Ion battery, and charge circuit to any *unpainted* metal surface on the outside of the chassis; then, remove the battery holder, ServeRAID Li-Ion battery, and charge circuit from the packages.

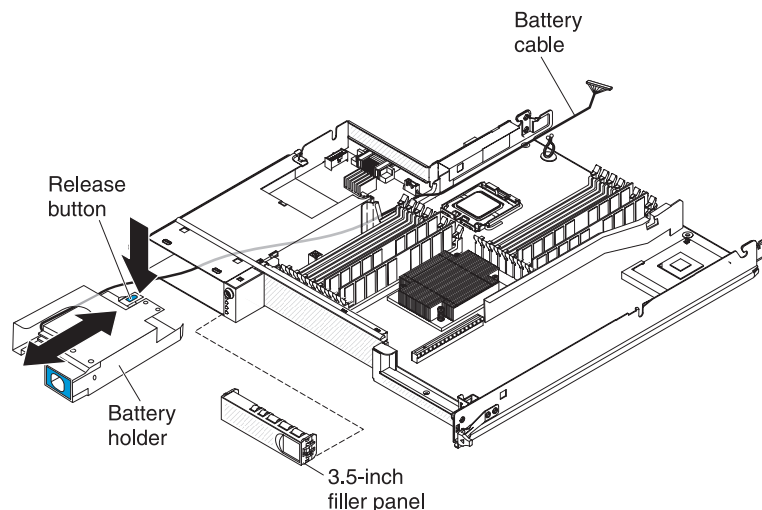
2. Align the ServeRAID Li-Ion battery and charge circuit and press together until the tab snaps in place. Connect the cable from the ServeRAID Li-Ion battery to the charge circuit.



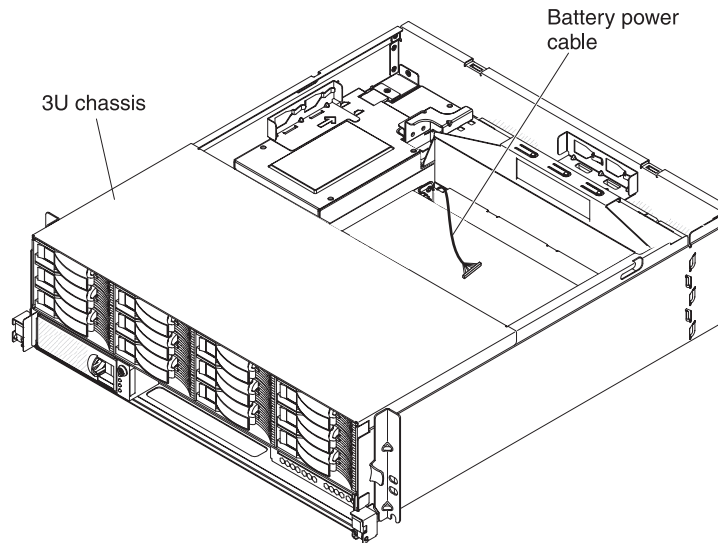
3. Align the standoffs on the charge circuit with the tray and press together until the tabs snap in place to secure the assembly.



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.



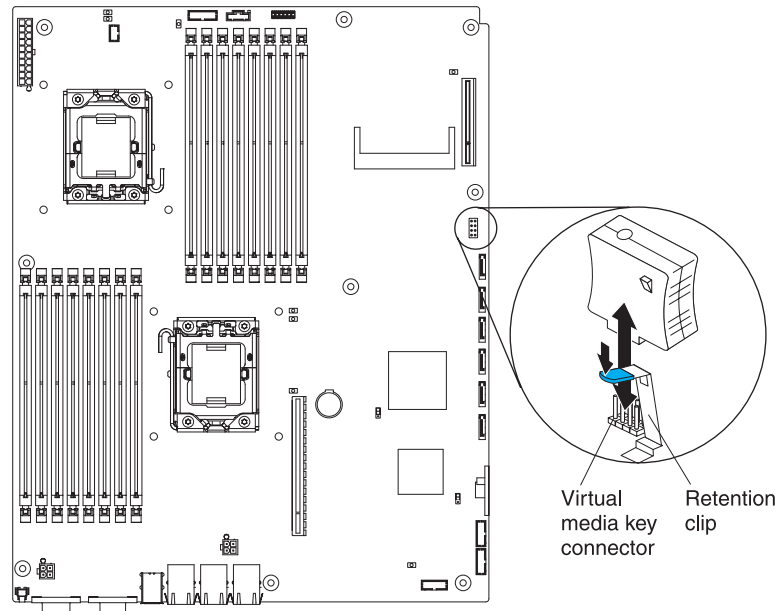
6. Feed the battery cable through the hard disk drive bay and slide the battery holder into the bay until the retention tab secures the battery holder.
7. Install the hard disk drive bay filler panel.



8. Route the battery cable through the system-board tray and the 3U chassis.
9. Install the 3U chassis fan assembly and route the battery cable through the fan assembly (see “Installing the 3U chassis fan assembly” on page 94).
10. 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 127).
11. Install the top cover (see “Installing the 3U chassis top cover” on page 81).
12. Install the 3U chassis in the iDataPlex rack (see “Installing the 3U chassis top cover” on page 81).

## Removing an IBM virtual media key

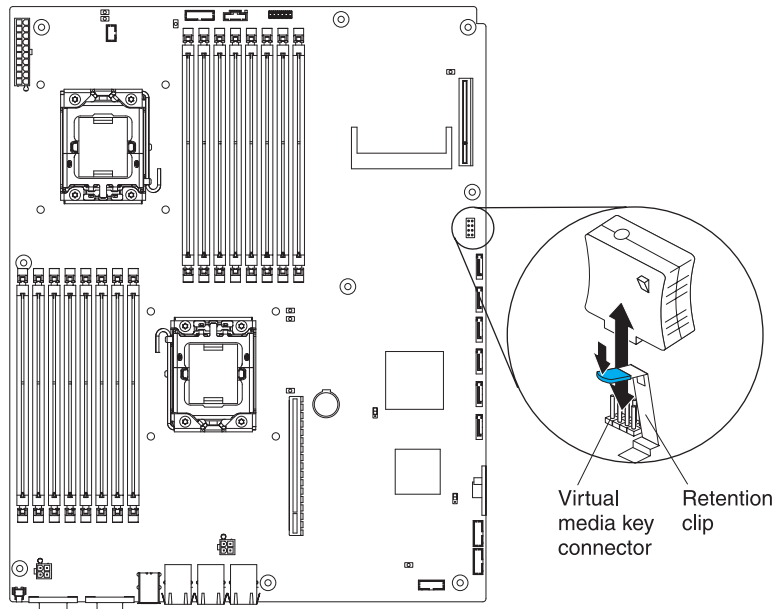
To remove an IBM virtual media key, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 70 or “Removing the system-board tray from a 3U chassis” on page 72).
3. If an expansion enclosure is installed, remove it (see “Removing an expansion enclosure from a system-board tray” on page 75); otherwise, remove the system-board tray cover (see “Removing the system-board tray cover” on page 69).
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

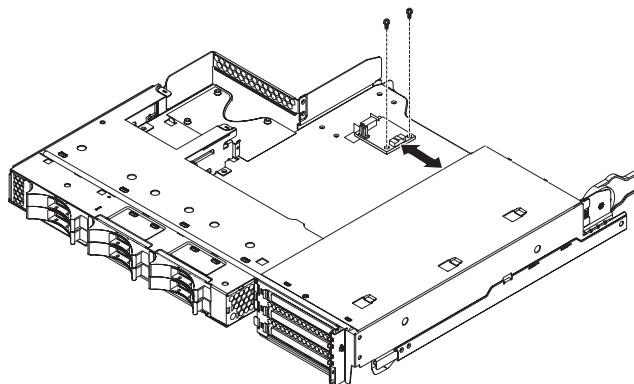
To install an IBM virtual media key, complete the following steps.



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 76); otherwise, install the system-board tray cover (see “Installing the system-board tray cover” on page 69).
4. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71 or “Installing the system-board tray in a 3U chassis” on page 73).

## Removing an I<sup>2</sup>C multiplexer card

To remove a multiplexer card from the I/O enclosure, complete the following steps.

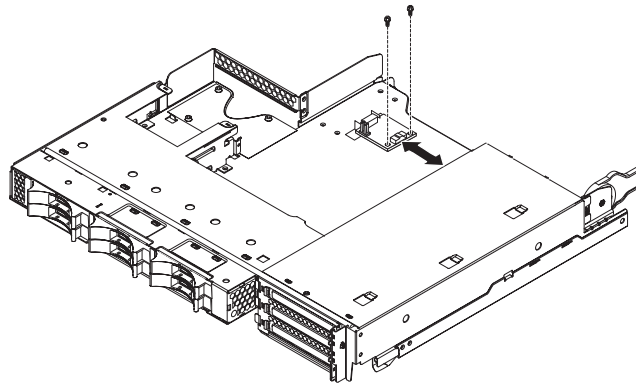


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the system-board tray is installed in a chassis, remove it (see “Removing the system-board tray from a 2U chassis” on page 70).

3. Remove the I/O enclosure from the system-board tray (see “Removing an expansion enclosure from a system-board tray” on page 75).
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<sup>2</sup>C multiplexer card; then, disconnect them.
6. Remove the screws that secure the I<sup>2</sup>C multiplexer card to the I/O enclosure and save them for future use.
7. Pull the I<sup>2</sup>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<sup>2</sup>C multiplexer card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing an I<sup>2</sup>C multiplexer card

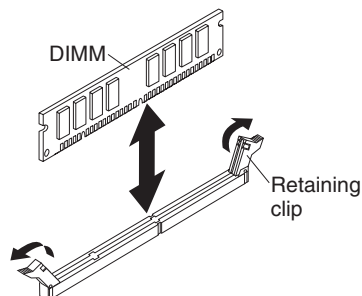
To install an I<sup>2</sup>C multiplexer card in the I/O enclosure, complete the following steps.



1. Touch the static-protective package that contains the I<sup>2</sup>C multiplexer card to any *unpainted* metal surface on the outside of the I/O enclosure; then, remove the I<sup>2</sup>C multiplexer card from the package.
2. Slide the I<sup>2</sup>C multiplexer card under the mounting clips.
3. Install the retaining screws.
4. Reconnect the cables to the I<sup>2</sup>C multiplexer card.
5. Install the I/O enclosure (see “Installing an expansion enclosure on a system-board tray” on page 76).
6. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71).

## Removing a memory module

To remove a DIMM, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 70 or “Removing the system-board tray from a 3U chassis” on page 72).
3. If an expansion enclosure is installed, remove it (see “Removing an expansion enclosure from a system-board tray” on page 75); otherwise, remove the system-board tray cover (see “Removing the system-board tray cover” on page 69).
4. Locate the DIMM connectors (see “System-board connectors” on page 11).  
**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 55 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 9 shows an example of the maximum amount of memory that you can install.

Table 9. Maximum memory installation

DIMM type	Maximum number of DIMMs	DIMM size	Total memory
Single-rank	16	1 GB	16 GB
Dual-rank	16	2 GB	32 GB
Dual-rank	16	4 GB	64 GB

- Table 10 shows the DIMM connectors on each memory channel.

Table 10. 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 1 GB, 2 GB, and 4 GB. The system-board tray supports a minimum of 1 GB and a maximum of 64 GB of system memory.

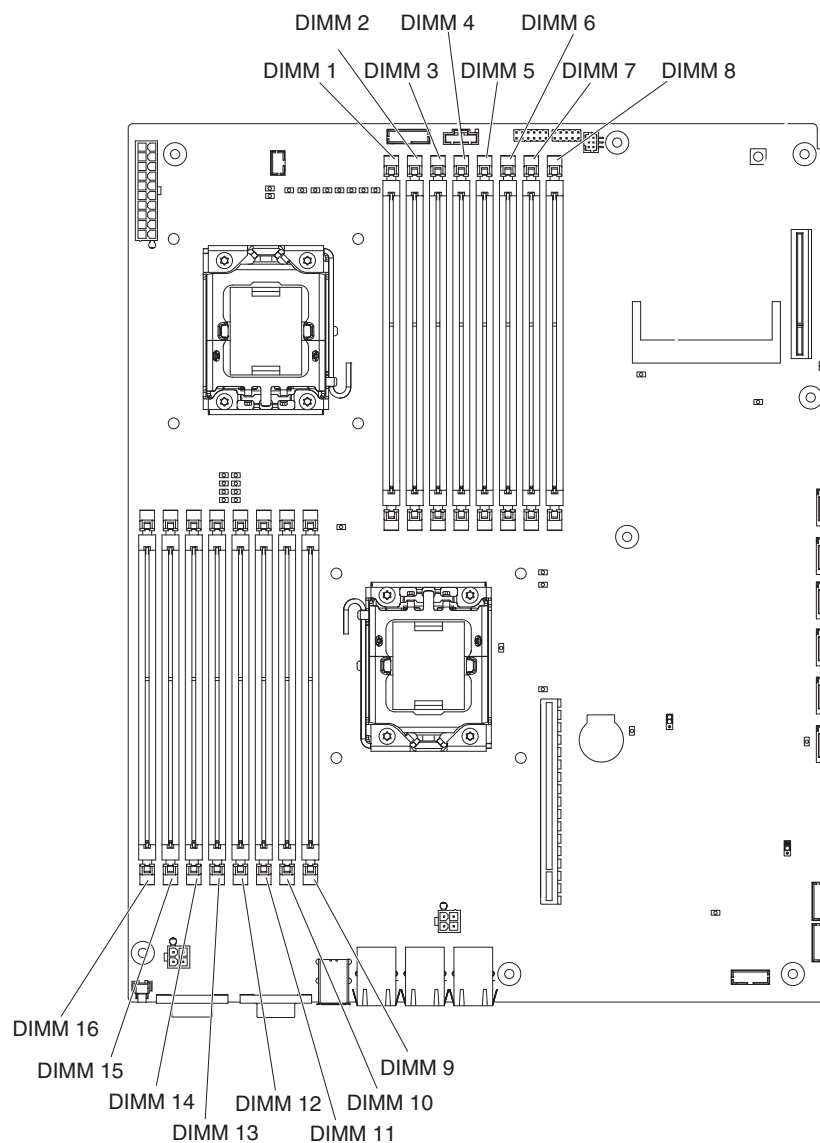
**Note:** The amount of usable memory will be reduced depending on the system configuration. A certain amount of memory must be reserved for system resources. To view the total amount of installed memory and the amount of configured memory, run the Setup utility. For additional information, see “Using the Setup utility” on page 158.

- 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 1 GB DIMMs, installed in slots 3 and 6. When you install additional DIMMs, install the DIMMs in the order shown in Table 11 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 11. 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.



- 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 158. When you use the memory-mirroring mode, you must consider the following information:
  - Table 12 and Table 13 on page 111 show the installation sequence for installing DIMMs in memory-mirroring mode.

Table 12. Microprocessor 1 memory-mirroring DIMM installation sequence

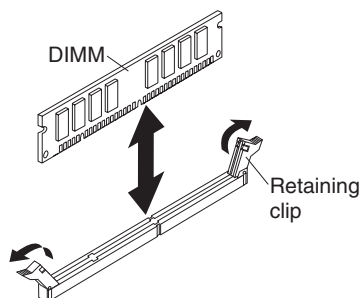
Microprocessor number	Pair	DIMM connectors
1	1	3, 6
1	2	2, 5
1	3	1, 4

Table 13. 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.
- 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 76); otherwise, install the system-board tray cover (see “Installing the system-board tray cover” on page 69).

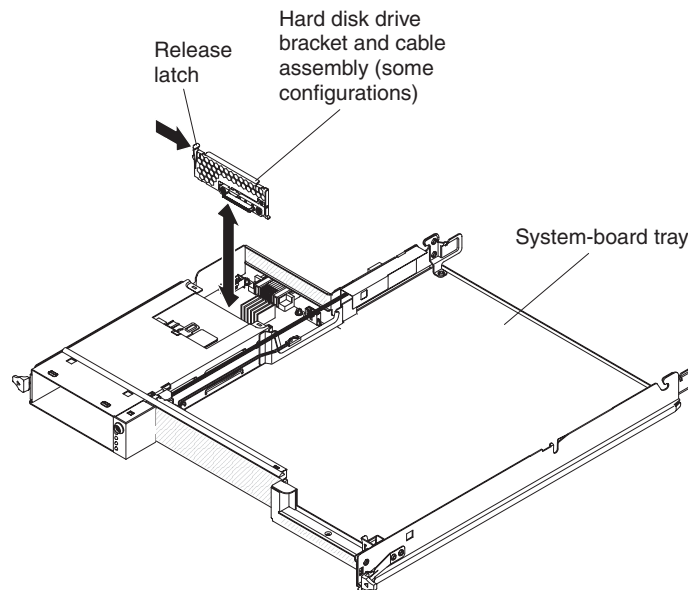
7. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71 or “Installing the system-board tray in a 3U chassis” on page 73).

## 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 or I/O enclosure, complete the following steps.

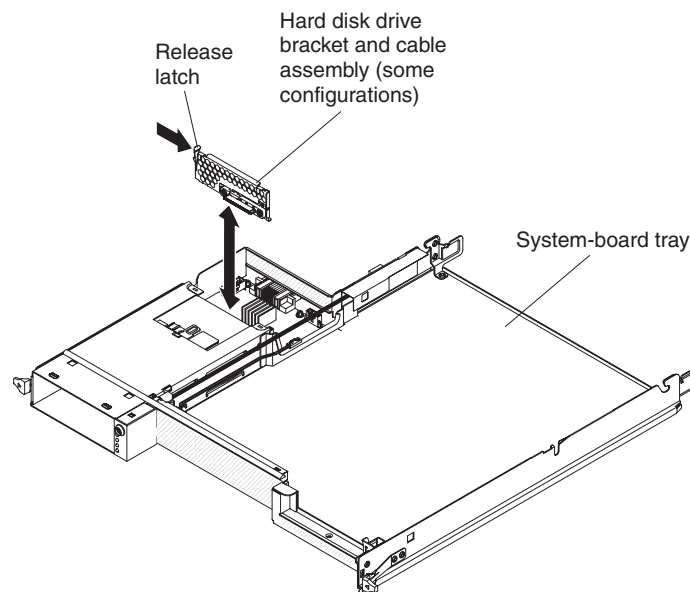


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the system-board tray is installed in a chassis, remove it (see “Removing the system-board tray from a 2U chassis” on page 70).
3. If you are removing the hard disk drive bracket and cable assembly 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 75); otherwise, remove the system-board tray cover (see “Removing the system-board tray cover” on page 69).
  - 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 86).
  - 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 75).
  - 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 86).
  - 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.

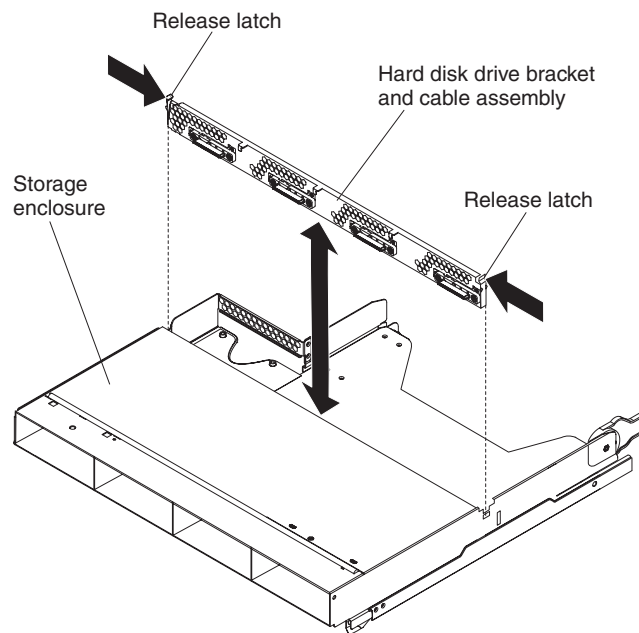


1. Touch the static-protective package that contains the hard disk drive bracket and cable assembly to any *unpainted* metal surface on the outside of the system-board tray or I/O enclosure; then, remove the hard disk drive bracket and cable assembly from the package.
2. Place the hard disk drive bracket 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 86).
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 76); otherwise, install the system-board tray cover (see “Installing the system-board tray cover” on page 69).

- b. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71).
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 76).
  - b. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71).
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

To remove a four-bay hard disk drive bracket and cable assembly from the storage enclosure, complete the following steps.

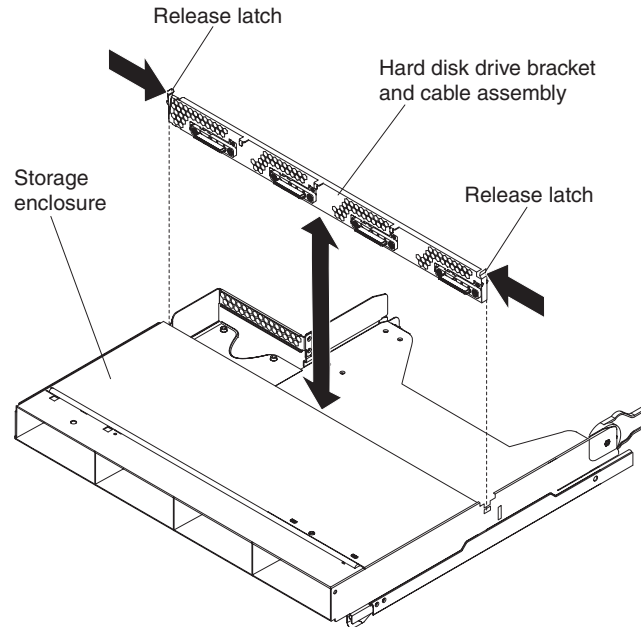


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the system-board tray is installed in a chassis, remove it (see “Removing the system-board tray from a 2U chassis” on page 70).
3. Remove the storage enclosure from the system-board tray (see “Removing an expansion enclosure from a system-board tray” on page 75).
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 86).
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

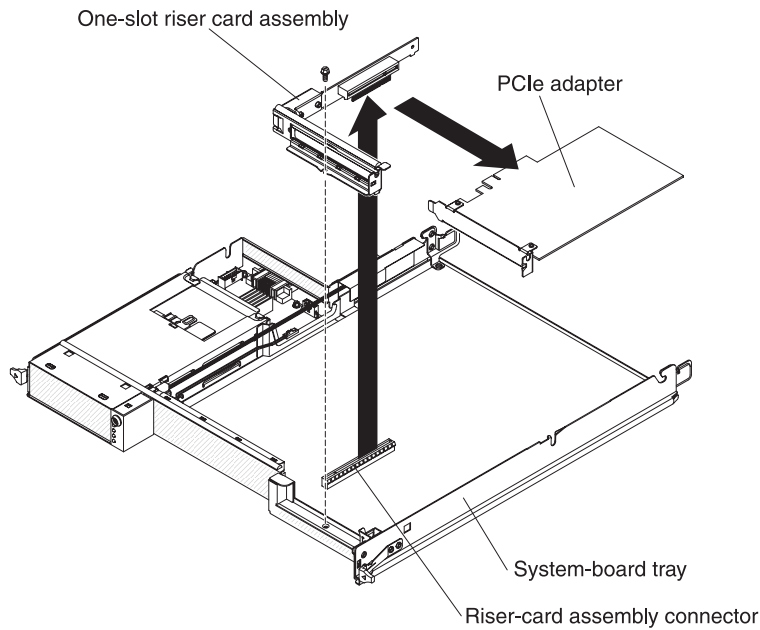
To install a four-bay hard disk drive bracket and cable assembly in the storage enclosure, complete the following steps.



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 86).
5. Install the storage enclosure (see “Installing an expansion enclosure on a system-board tray” on page 76).
6. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71).

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

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

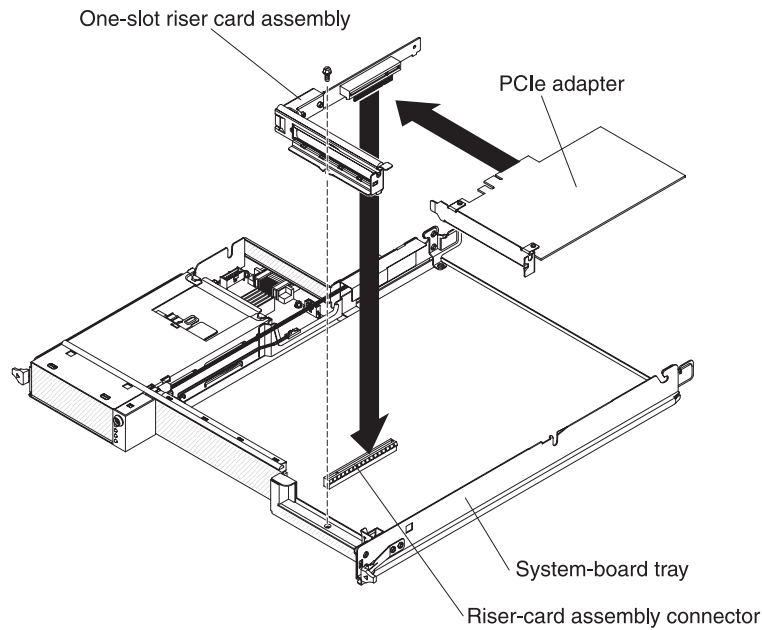


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the system-board tray is installed in a chassis, remove it (see “Removing the system-board tray from a 2U chassis” on page 70 or “Removing the system-board tray from a 3U chassis” on page 72).
3. If a storage enclosure is installed, remove it (see “Removing an expansion enclosure from a system-board tray” on page 75); otherwise, remove the system-board tray cover (see “Removing the system-board tray cover” on page 69).
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 an adapter from the system-board tray” on page 96).
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.

## Installing a PCIe riser-card assembly in the system-board tray

To install a PCIe riser-card assembly in the system-board tray, complete the following steps.

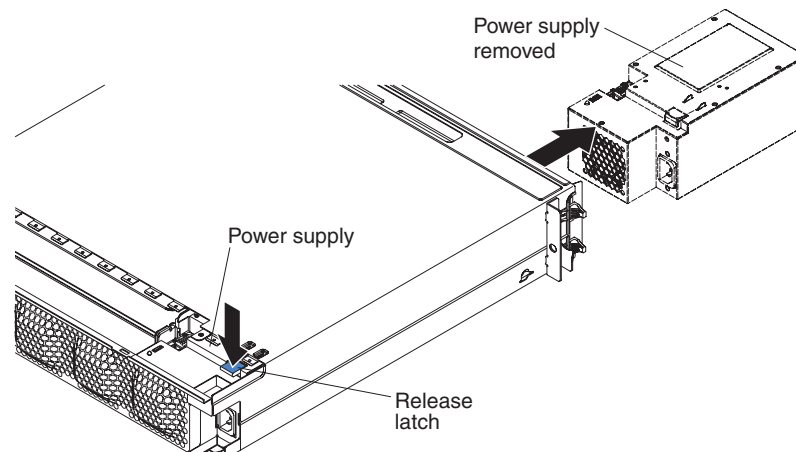




1. Touch the static-protective package that contains the PCIe riser-card assembly to any *unpainted* metal surface on the outside of the system-board tray; then, remove the PCIe riser-card assembly from the package.
2. Install the PCIe adapter, if you removed one (see “Installing an adapter in the system-board tray” on page 98).
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 76); otherwise, install the system-board tray cover (see “Installing the system-board tray cover” on page 69).
6. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71 or “Installing the system-board tray in a 3U chassis” on page 73).

## Removing a power supply from a 2U chassis

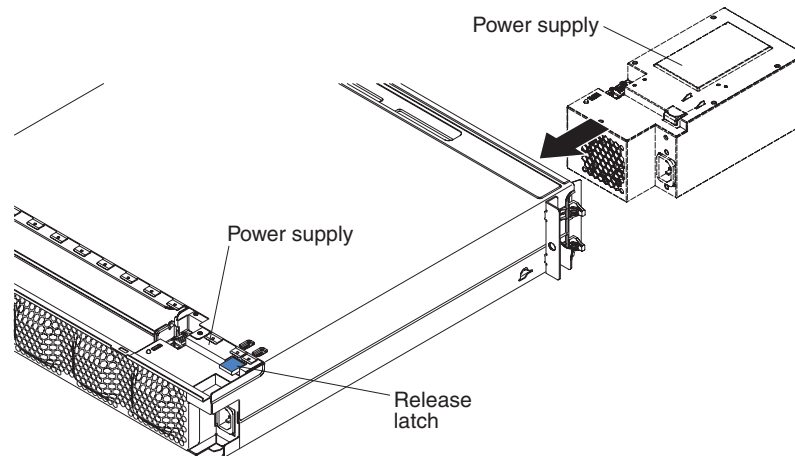
To remove the power supply from a 2U chassis, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 130).
3. Remove the top cover (see “Removing the 2U chassis fan-assembly top cover” on page 79).
4. Remove the fan assembly (see “Removing the 2U chassis fan assembly” on page 77).
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

To install the power supply in a 2U chassis, complete the following steps.



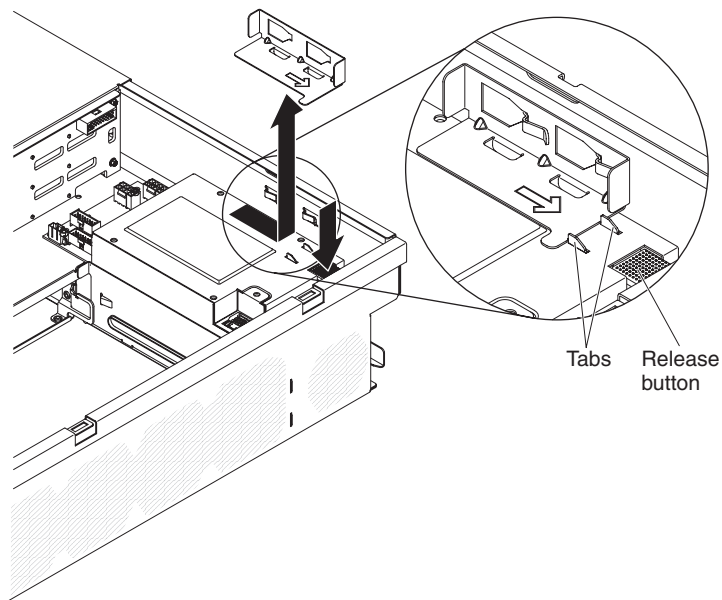
1. Touch the static-protective package that contains the power supply to any *unpainted* metal surface on the outside of the chassis; then, remove the power supply from the package.
2. Insert the power supply into the front of the chassis.
3. Carefully guide the power supply into the guides at the left-rear 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 78).
5. Install the top cover (see “Installing the 2U chassis fan-assembly top cover” on page 79).
6. Install the chassis in the iDataPlex rack (see “Installing the 2U chassis in a Type 7825 iDataPlex rack” on page 131).

## Removing a power supply from a 3U chassis

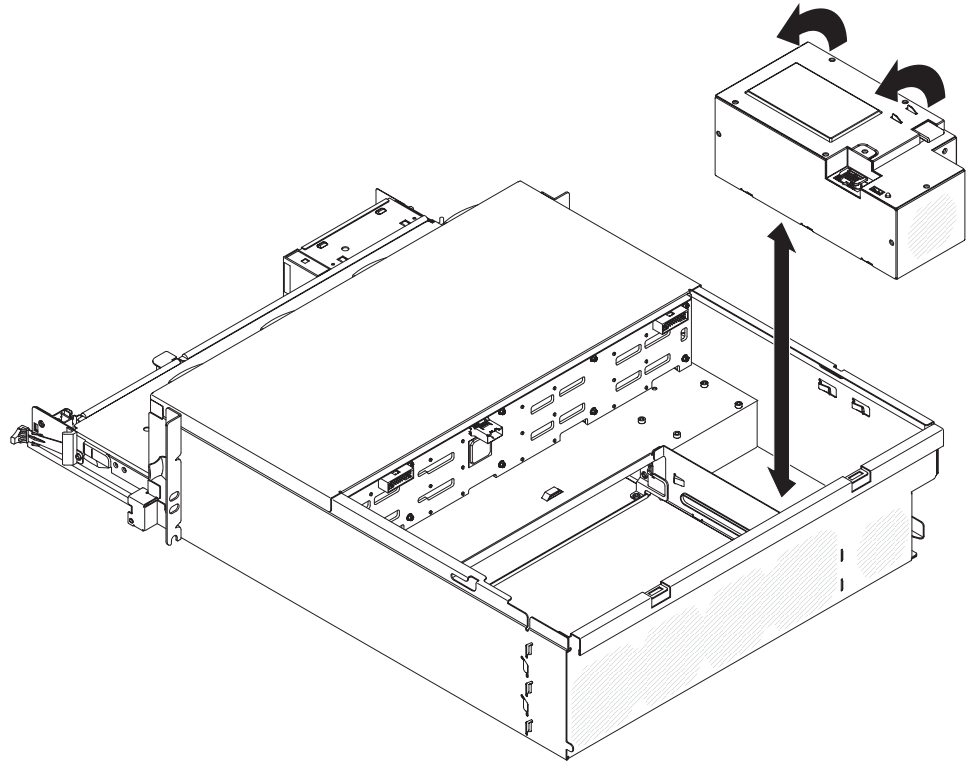
To remove a power supply from a 3U chassis, complete the following steps:

1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.

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 134).
3. Remove the top cover (see “Removing the 3U chassis top cover” on page 80).
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 125).
5. Remove the fan assembly (see “Removing the 3U chassis fan assembly” on page 93).
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 72).
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.



8. Lift the power supply from the 3U chassis and rotate it toward the middle of the chassis.

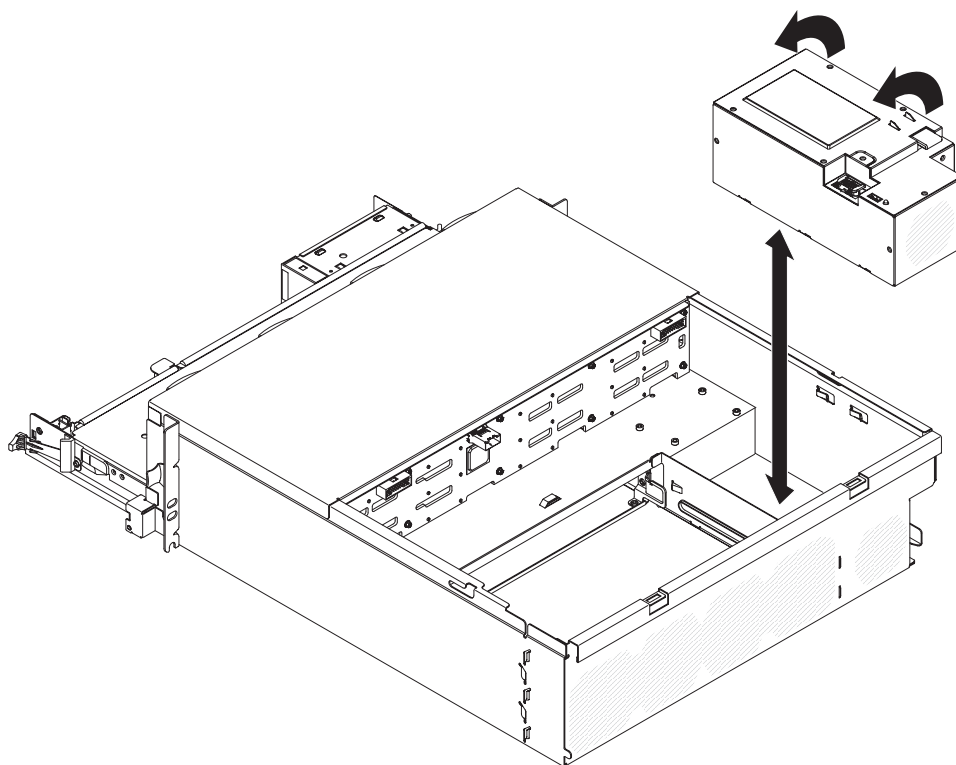


9. If you are instructed to return the power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing a power supply in a 3U chassis

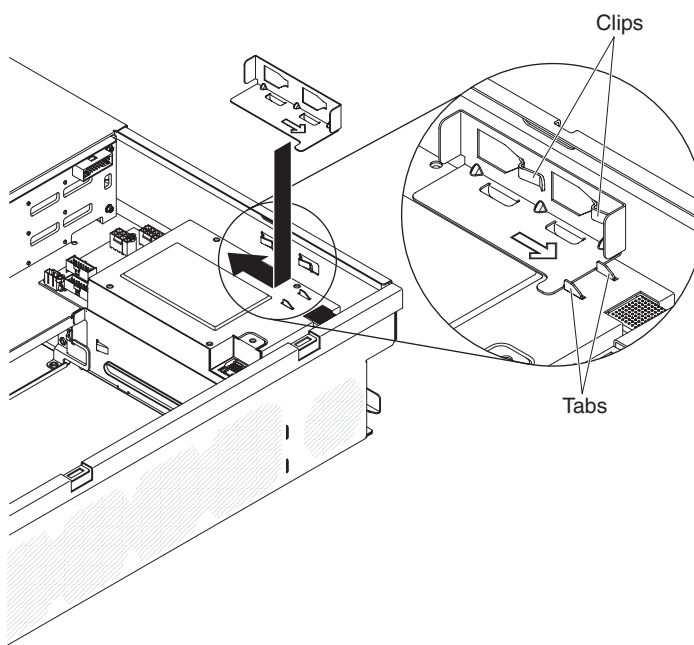
To install a power supply in a 3U chassis, complete the following steps:

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.



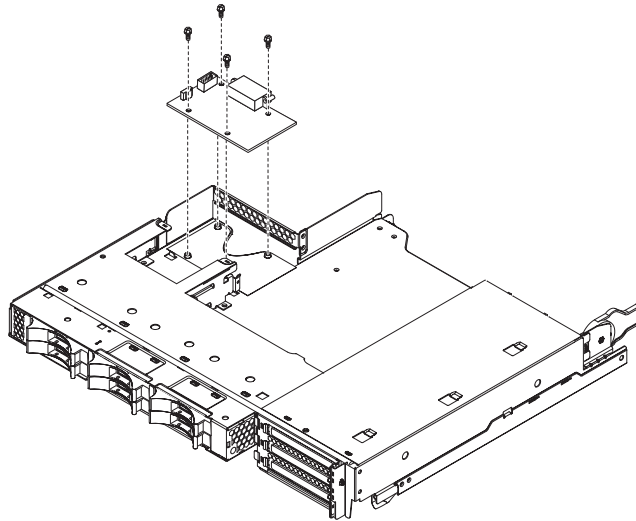
4. Install the system-board tray in the 3U chassis (see “Installing the system-board tray in a 3U chassis” on page 73).
5. Install the fan assembly (see “Installing the 3U chassis fan assembly” on page 94).

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 127).
7. Install the top cover (see “Installing the 3U chassis top cover” on page 81 ).
8. Install the 3U chassis in the iDataPlex rack (see “Installing a 3U chassis in a Type 7825 iDataPlex rack” on page 135).

## 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.



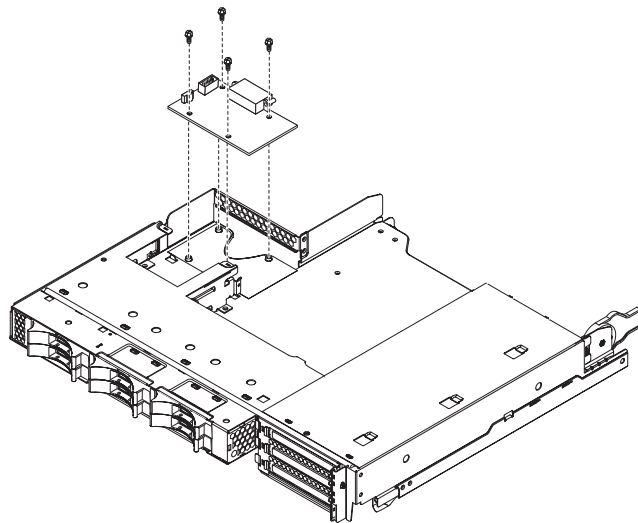
1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the system-board tray is installed in a chassis, remove it (see “Removing the system-board tray from a 2U chassis” on page 70).
3. Carefully set the system-board tray on a flat, static-protective surface.
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 75).
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 86).
  - 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 112).
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.

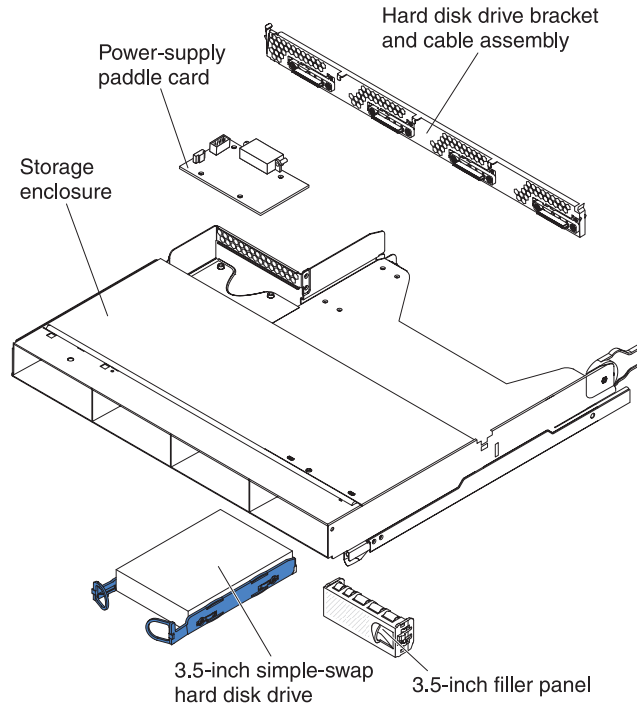
To install a power-supply paddle card in an expansion enclosure, complete the following steps.



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 112).
  - 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 86).
5. Install the expansion enclosure (see “Installing an expansion enclosure on a system-board tray” on page 76).
6. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71).

## Removing a storage enclosure

To remove a storage enclosure, complete the following steps.

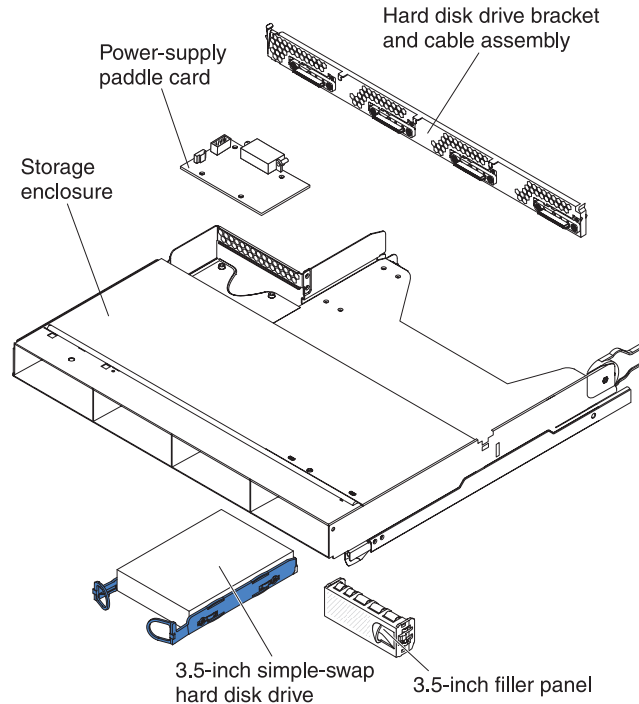


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the storage enclosure is installed on a system-board tray, remove it (see “Removing an expansion enclosure from a system-board tray” on page 75).
3. Carefully set the storage enclosure on a flat, static-protective 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 83).
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 112).
6. 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

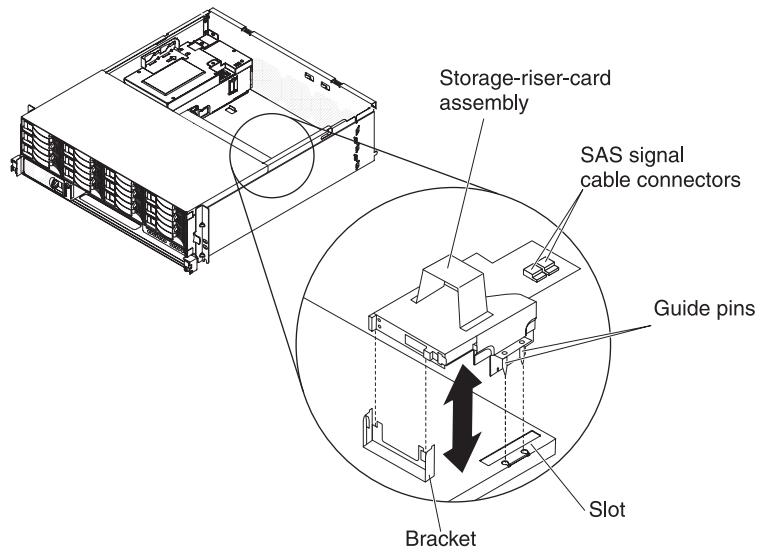
To install a storage enclosure, complete the following steps.



1. Carefully set the storage enclosure on a flat, static-protective surface.
2. 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 112).
3. Install the hard disk drives in the storage enclosure (see “Removing and installing a hard disk drive” on page 83).
4. Install the storage enclosure on the system-board tray (see “Installing an expansion enclosure on a system-board tray” on page 76).

## Removing a storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card from a 3U chassis

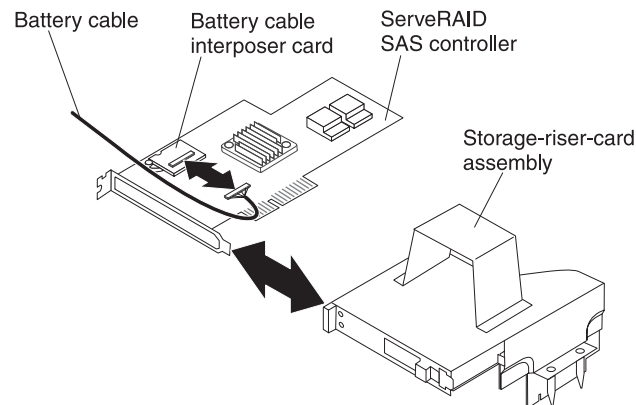
To remove a storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card from a 3U chassis, complete the following steps.



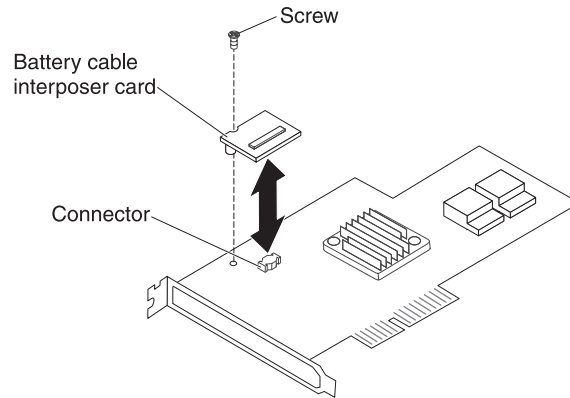
1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the 3U chassis is installed in an iDataPlex rack, remove it (see “Removing a 3U chassis from a Type 7825 iDataPlex rack” on page 134).
3. Remove the top cover (see “Removing the 3U chassis top cover” on page 80).
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.



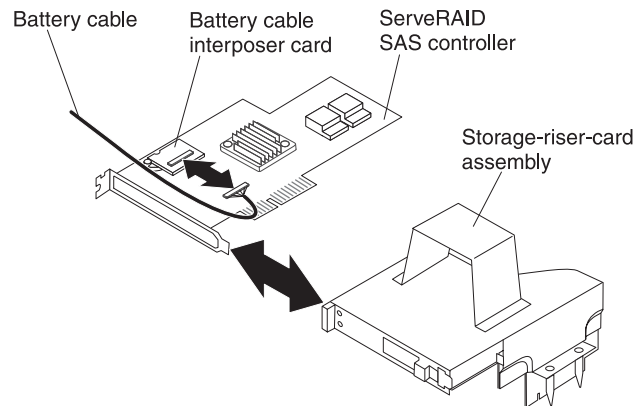
6. Turn the storage-riser-card assembly to access the ServeRAID SAS controller.
7. Pull the controller from the connector on the storage-riser-card assembly.
8. Disconnect the battery cable from the battery cable interposer card.



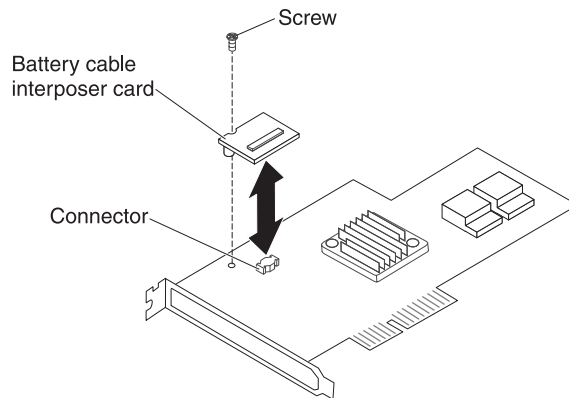
9. If you are removing the battery cable interposer card, remove the screw that secures the battery cable interposer card to the ServeRAID SAS controller and lift the card from the connector.
10. Remove the storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card from 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.

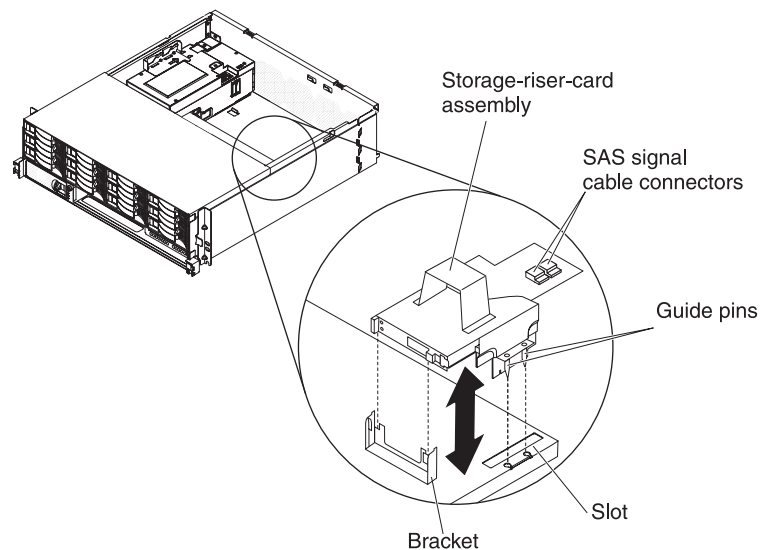


1. Touch the static-protective packages that contain the storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer card to any *unpainted* metal surface on the outside of the chassis; then, remove the storage-riser-card assembly, ServeRAID SAS controller, and battery cable interposer 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 81).
9. Install the 3U chassis in the iDataPlex rack (see "Installing the 3U chassis top cover" on page 81).

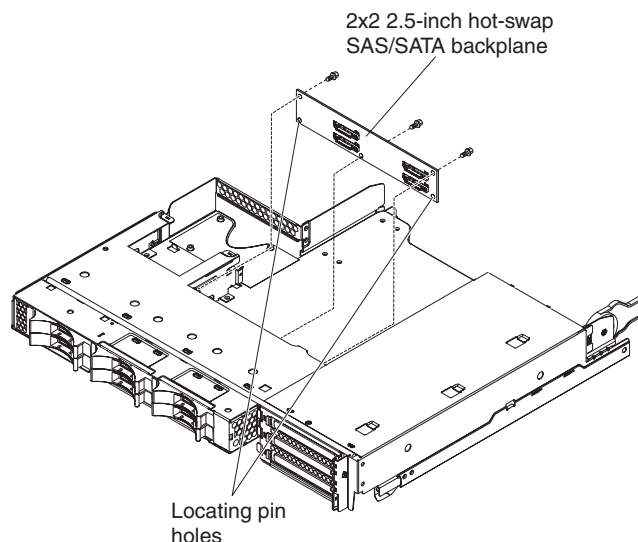
## Removing and replacing FRUs

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.



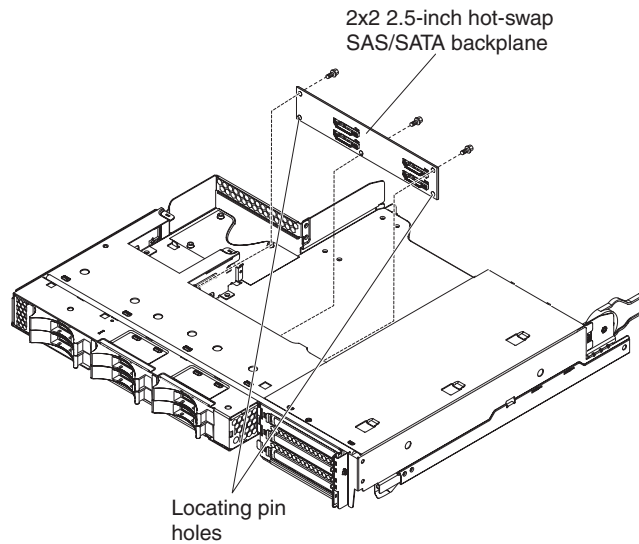
1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the system-board tray is installed in a chassis, remove it (see “Removing the system-board tray from a 2U chassis” on page 70).
3. Remove the I/O enclosure from the system-board tray (see “Removing an expansion enclosure from a system-board tray” on page 75).
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 83).

**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

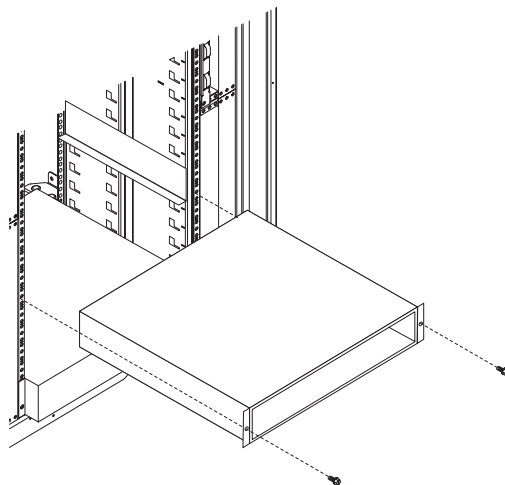
To install a 2x2 2.5-inch SAS/SATA backplane in the I/O enclosure, complete the following steps.



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 84).
6. Install the I/O enclosure (see “Installing an expansion enclosure on a system-board tray” on page 76).
7. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71).

## 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.

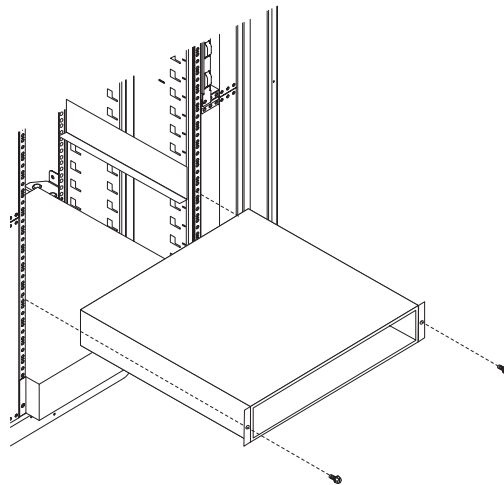


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.

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 10 for more information).
3. Remove any installed system-board trays (see “Removing the system-board tray from a 2U chassis” on page 70).
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 77 and “Removing a power supply from a 2U chassis” on page 117).
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

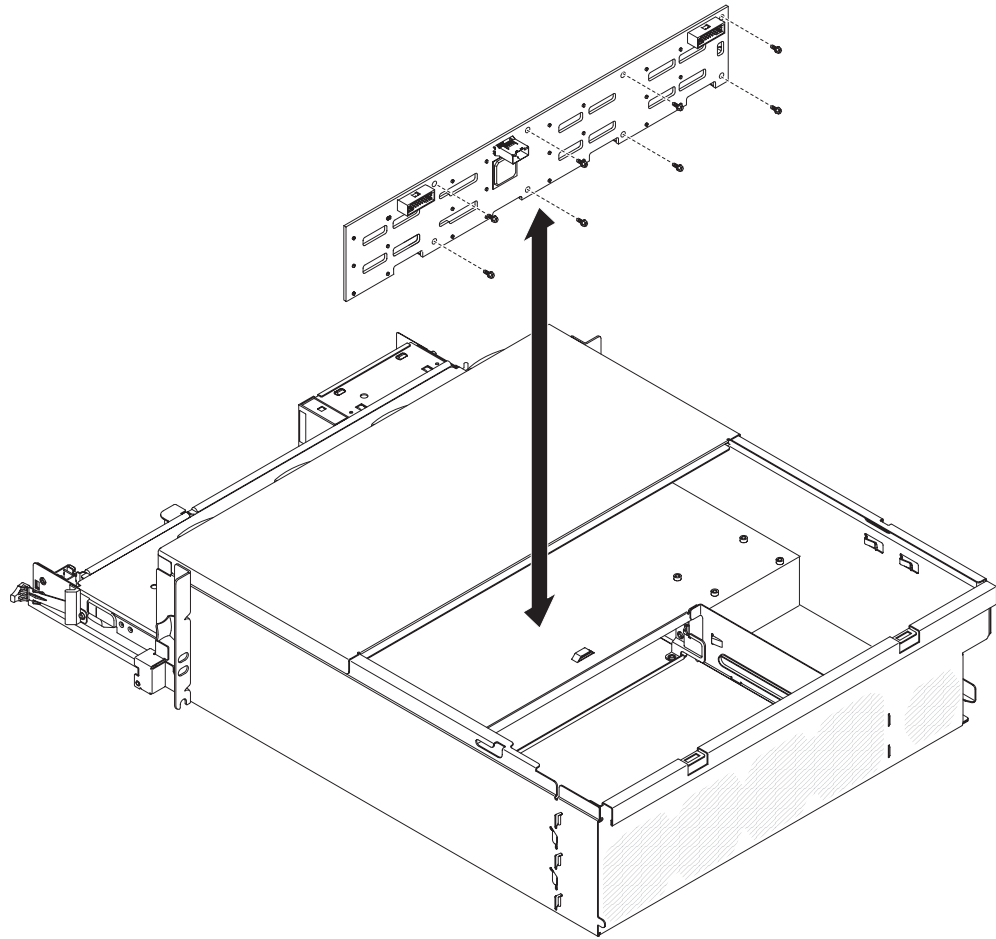
To install the 2U chassis in a Type 7825 iDataPlex rack, complete the following steps.



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 118 and “Installing the 2U chassis fan assembly” on page 78).
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 71).

## Removing the 3U chassis hard disk drive backplane

To remove the 3U chassis hard disk drive backplane, complete the following steps.



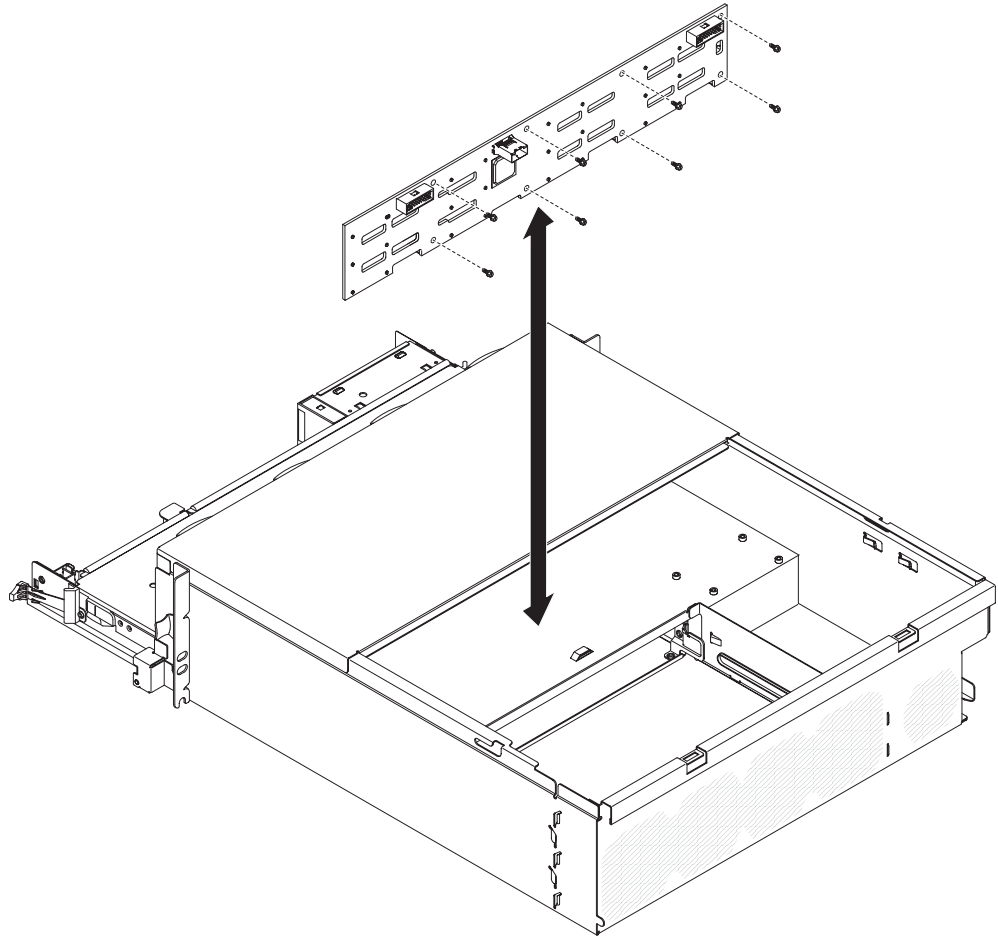
1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the 3U chassis is installed in an iDataPlex rack, remove it (see “Removing a 3U chassis from a Type 7825 iDataPlex rack” on page 134).
3. Remove the top cover (see “Removing the 3U chassis top cover” on page 80).
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 125).
5. Remove the fan assembly (see “Removing the 3U chassis fan assembly” on page 93).
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 72).
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 83).
8. Remove the power-supply paddle card and the power supply (see “Removing a power supply from a 3U chassis” on page 118).
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.

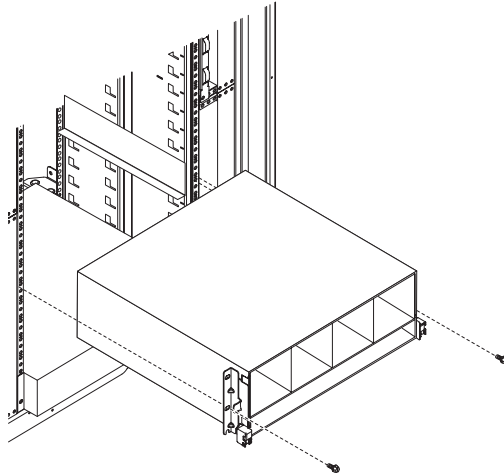


1. Touch the static-protective package that contains the hard disk drive backplane to any *unpainted* metal surface on the outside of the 3U chassis; then, remove the hard disk drive backplane from the package.
2. Position the hard disk drive backplane in the 3U chassis and secure it with 10 screws.
3. Install the power-supply paddle card and power supply (see “Installing a power supply in a 3U chassis” on page 120).
4. Install the system-board tray in the 3U chassis (see “Installing the system-board tray in a 3U chassis” on page 73).
5. Install the fan assembly (see “Installing the 3U chassis fan assembly” on page 94).
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 127).
7. Install the top cover (see “Installing the 3U chassis top cover” on page 81 ).
8. Install the 3U chassis in the iDataPlex rack (see “Installing a 3U chassis in a Type 7825 iDataPlex rack” on page 135).

9. Install the hard disk drives (see “Removing and installing a hard disk drive” on page 83).

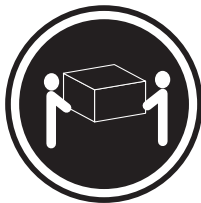
## Removing a 3U chassis from a Type 7825 iDataPlex rack

To remove the 3U chassis from a Type 7825 iDataPlex rack, complete the following steps.

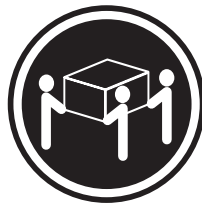


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. Turn off the server and all attached devices (see “Turning off the system-board tray” on page 10).
3. If external cables are connected to the front of the system-board tray, note where they are connected; 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 83).

### Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



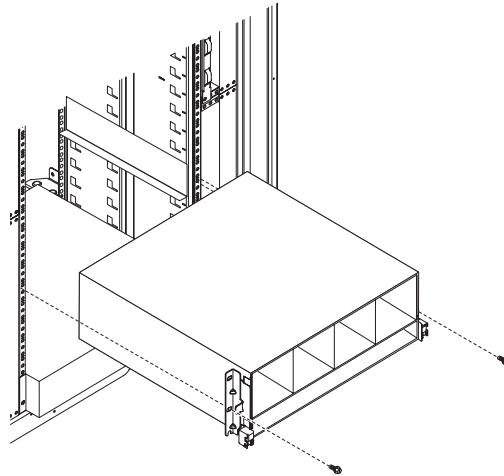
≥ 55 kg (121.2 lb)

### 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.

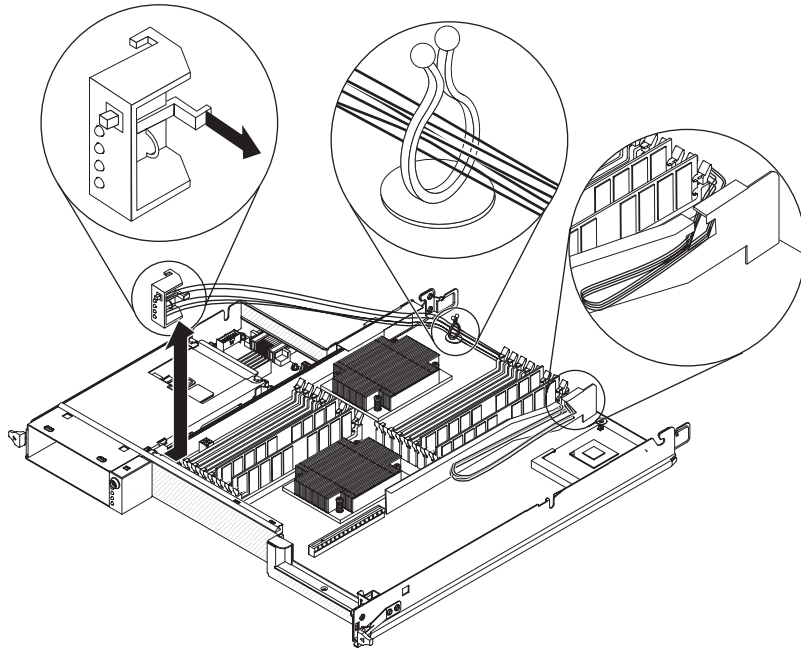


1. Align the 3U chassis with the rails on the iDataPlex rack; then, slide the 3U chassis into the rack until it is fully seated.
2. Install the M6 screws that secure the chassis to the rack.
3. Install the hard disk drives (see “Removing and installing a hard disk drive” on page 83).
4. Reconnect the 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 10).
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 158).

## Removing a front-panel assembly

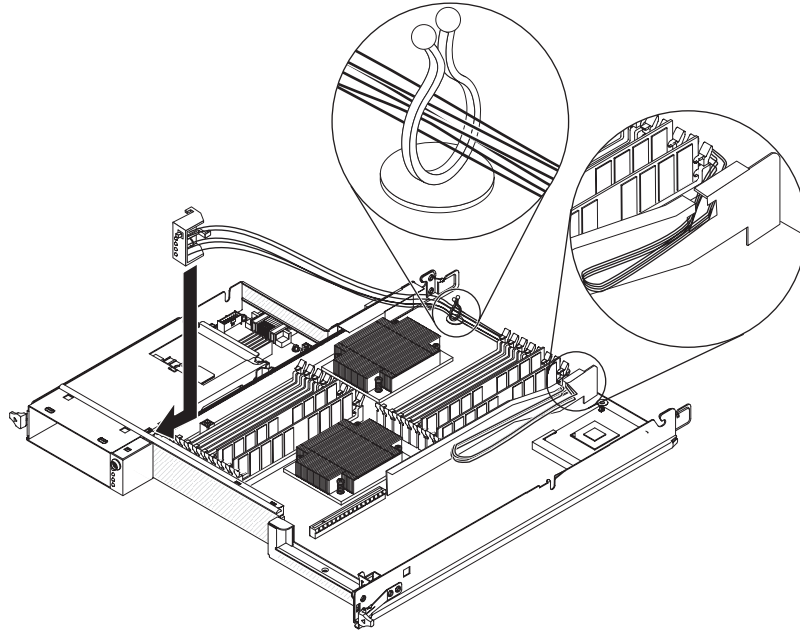
To remove the front-panel assembly, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 70 or “Removing the system-board tray from a 3U chassis” on page 72).
3. If an expansion enclosure is installed, remove it (see “Removing an expansion enclosure from a system-board tray” on page 75); otherwise, remove the system-board tray cover (see “Removing the system-board tray cover” on page 69).
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.



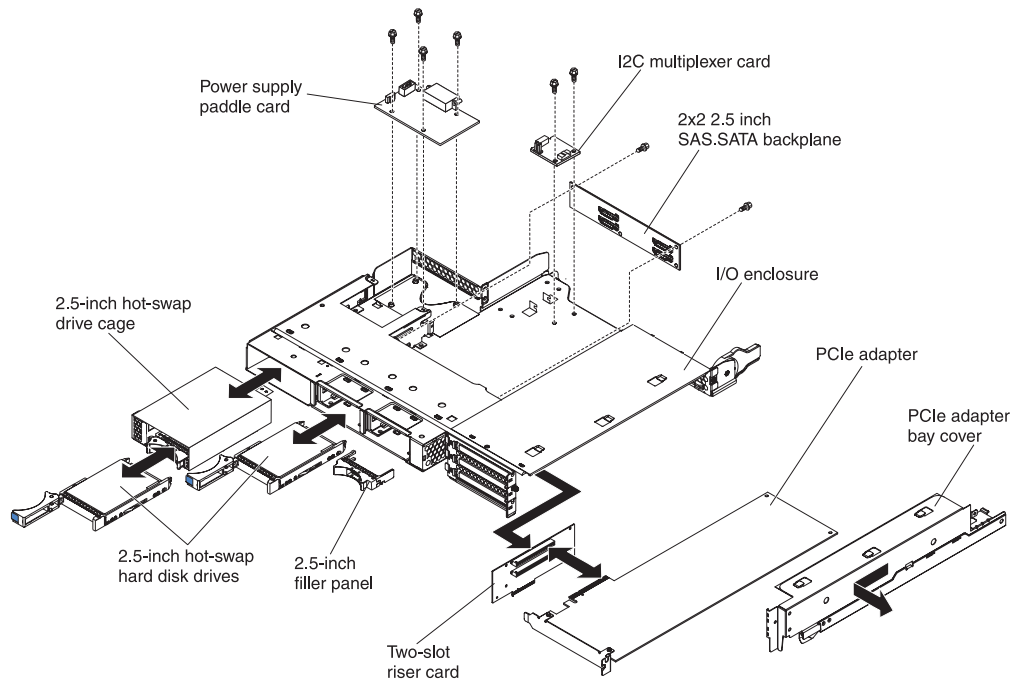
1. Press the front-panel assembly into the front of the system-board tray and make sure that it is secure.
2. Connect the front-panel assembly cables to the system board and power-supply paddle card and close the cable retention latches. Carefully route the cables as you connect the cables.
3. Connect 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 76); otherwise, install the system-board tray cover (see “Installing the system-board tray cover” on page 69).
5. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71 or “Installing the system-board tray in a 3U chassis” on page 73).

## Removing an I/O enclosure configured with 2.5-inch hot-swap hard disk drives

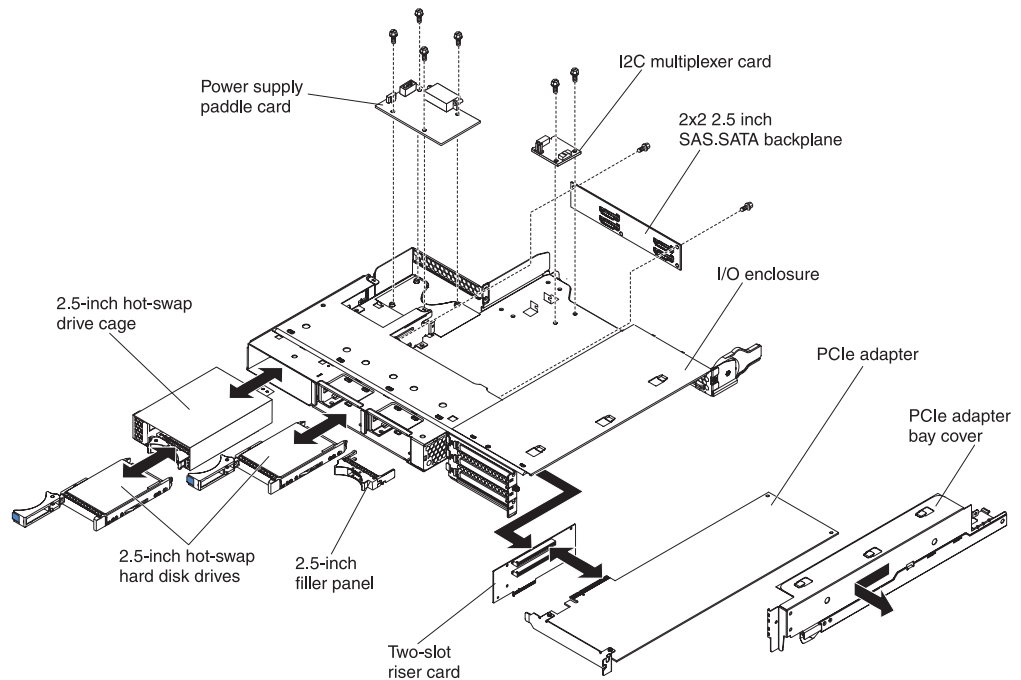
To remove an I/O enclosure that is configured with 2.5-inch hot-swap hard disk drives, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 75).
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 83).
5. Remove the 2.5-inch SAS/SATA drive cage (see “Removing a 2.5-inch SAS/SATA drive cage” on page 91).
6. Remove the I<sup>2</sup>C multiplexer card (see “Removing an I<sup>2</sup>C multiplexer card” on page 106).
7. Remove the 2x2 2.5-inch SAS/SATA backplane (see “Removing a 2x2 2.5-inch SAS/SATA backplane” on page 129).
8. Remove the power-supply paddle card, if one is installed (see “Removing a power-supply paddle card from an expansion enclosure” on page 122).
9. Remove the PCIe adapters, if any are installed (see “Removing an adapter from the I/O enclosure” on page 95).
10. Remove the PCIe riser-card assembly (see “Removing a PCIe riser-card assembly from the I/O enclosure” on page 147).
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

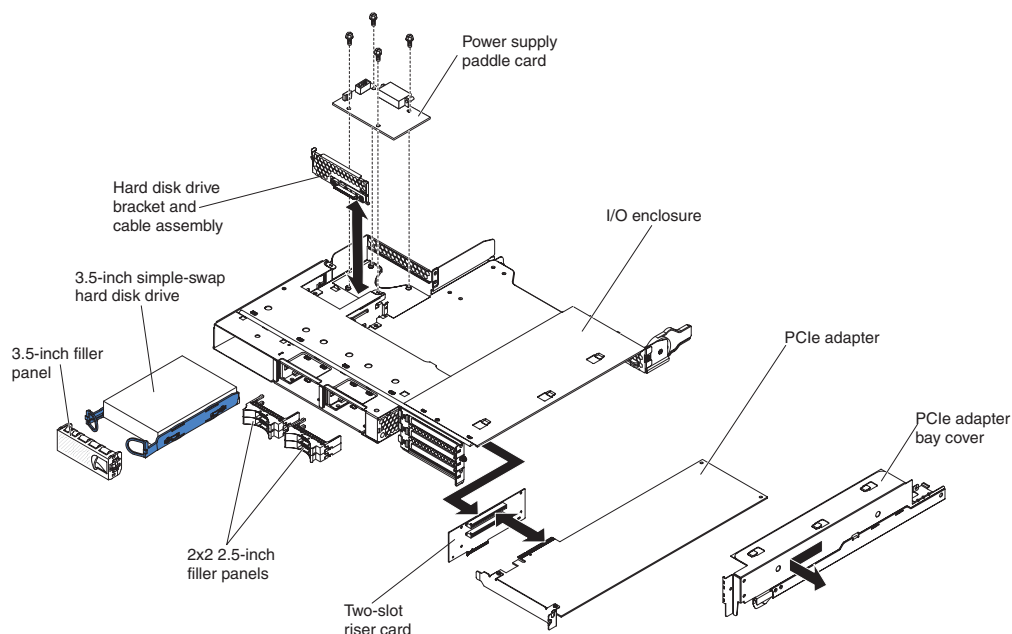
To install an I/O enclosure that is configured with 2.5-inch hot-swap hard disk drives, complete the following steps.



1. Install the PCIe riser-card assembly (see “Installing a PCIe riser-card assembly in the I/O enclosure” on page 147).
2. Install the PCIe adapters, if you removed any (see “Installing an adapter in the I/O enclosure” on page 96).
3. Install the I<sup>2</sup>C multiplexer card (see “Installing an I<sup>2</sup>C multiplexer card” on page 107).
4. Install the 2x2 2.5-inch SAS/SATA backplane (see “Installing a 2x2 2.5-inch SAS/SATA backplane” on page 129).
5. Install the 2.5-inch SAS/SATA drive cage (see “Installing a 2.5-inch SAS/SATA drive cage” on page 92).
6. Install the power-supply paddle card, if you removed one (see “Installing a power-supply paddle card in an expansion enclosure” on page 123).
7. Install the hard disk drives, if you removed any (see “Removing and installing a hard disk drive” on page 83).
8. Install the I/O enclosure on the system-board tray (see “Installing an expansion enclosure on a system-board tray” on page 76).

## Removing an I/O enclosure configured with 3.5-inch simple-swap hard disk drives

To remove an I/O enclosure that is configured with 3.5-inch simple-swap hard disk drives, complete the following steps.

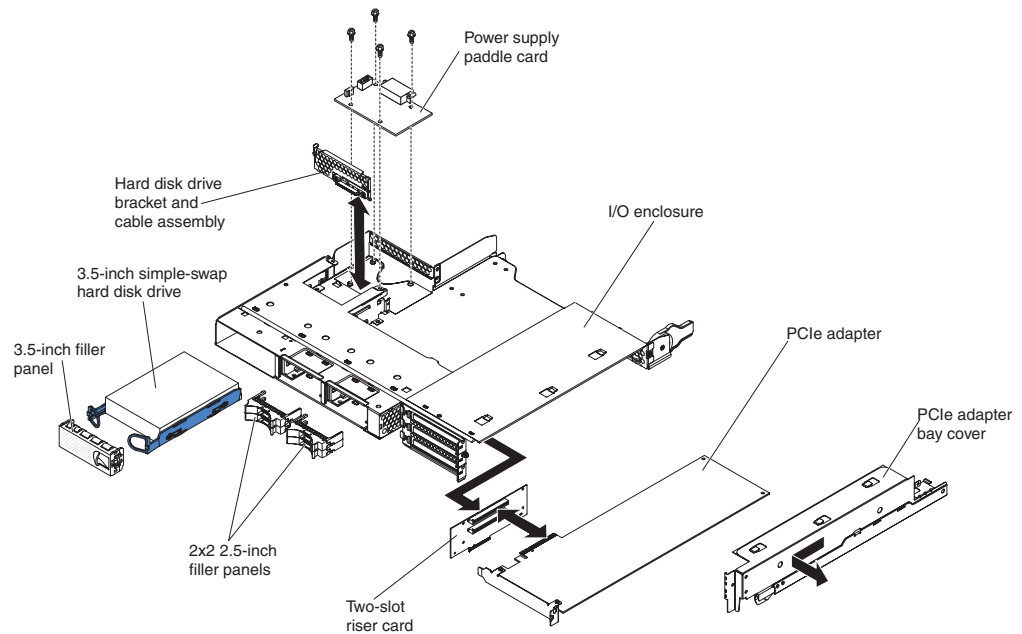


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the I/O enclosure is installed on a system-board tray, remove it (see “Removing an expansion enclosure from a system-board tray” on page 75).
3. Carefully set the I/O enclosure on a flat, static-protective 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 83).
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 112).
7. Remove the power-supply paddle card, if one is installed (see “Removing a power-supply paddle card from an expansion enclosure” on page 122).
8. Remove the PCIe adapters, if any are installed (see “Removing an adapter from the I/O enclosure” on page 95).
9. Remove the PCIe riser-card assembly (see “Removing a PCIe riser-card assembly from the I/O enclosure” on page 147).
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 hot-swap hard disk drives

To install an I/O enclosure that is configured with 3.5-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 147).
2. Install the PCIe adapters, if you removed any (see “Installing an adapter in the I/O enclosure” on page 96).
3. Install the power-supply paddle card, if you removed one (see “Installing a power-supply paddle card in an expansion enclosure” on page 123).
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 112).
5. Install the hard disk drive, if you removed one (see “Removing and installing a hard disk drive” on page 83).
6. Install the I/O enclosure on the system-board tray (see “Installing an expansion enclosure on a system-board tray” on page 76).

## 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).

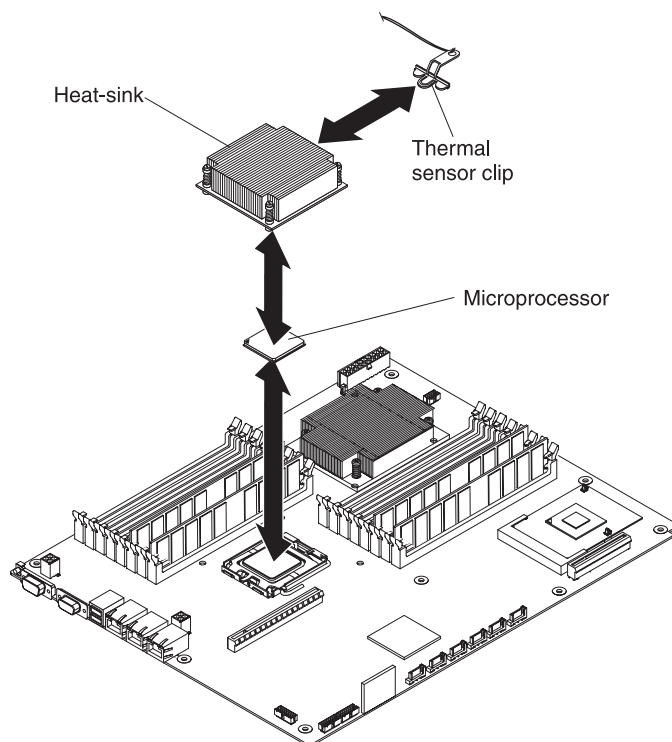
If you are not replacing a defective heat sink or microprocessor, the thermal material on the heat sink and microprocessor will remain effective if you observe the following precautions:

- 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.

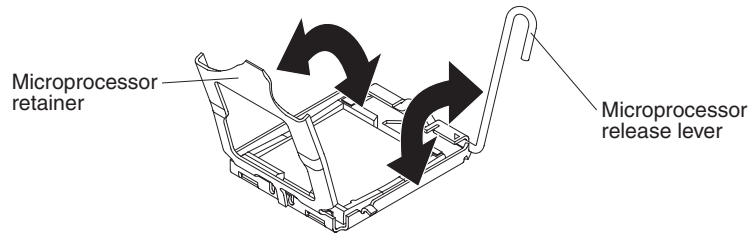


1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the system-board tray is installed in a chassis, remove it (see “Removing the system-board tray from a 2U chassis” on page 70 or “Removing the system-board tray from a 3U chassis” on page 72).
3. If an expansion enclosure is installed, remove it (see “Removing an expansion enclosure from a system-board tray” on page 75); otherwise, remove the system-board tray cover (see “Removing the system-board tray cover” on page 69).
4. Remove the heat sink.

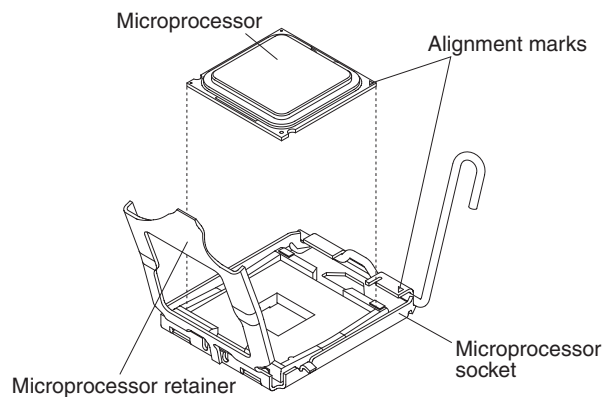
**Attention:** Do not touch the thermal material on the bottom of the heat sink. Touching the thermal material will contaminate it. If the thermal material on the microprocessor or heat sink becomes contaminated, you must replace it.

- 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.



5. Rotate the locking lever on the microprocessor socket from its closed and locked position until it stops in the fully open position (approximately a 135° angle). Lift the microprocessor retainer cover upward.
6. Use your fingers to pull the microprocessor out of the socket.

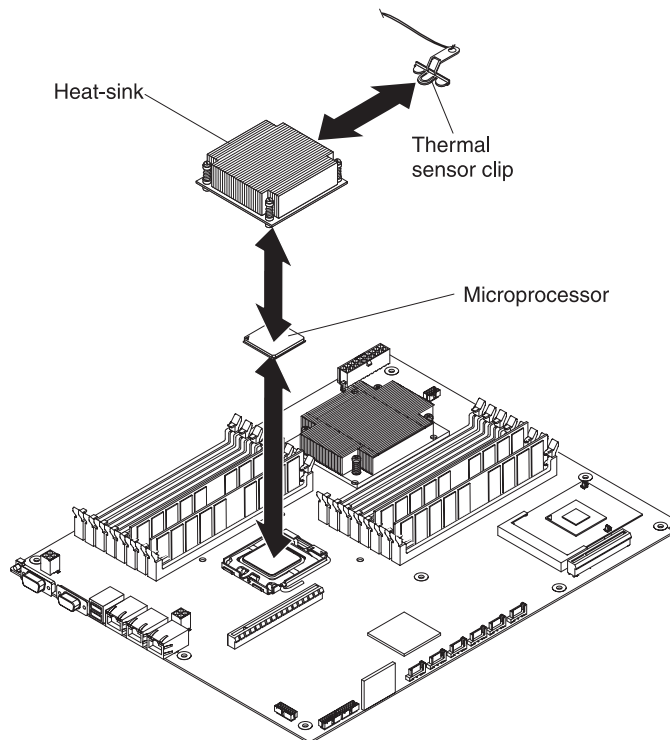


7. If you are instructed to return the microprocessor and heat sink, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Installing a microprocessor and heat sink

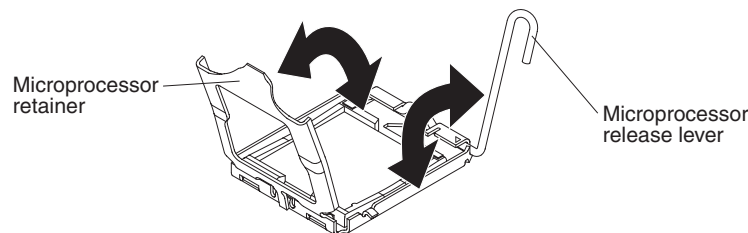
To install a microprocessor and heat sink, complete the following steps.

**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.



1. Install the microprocessor.

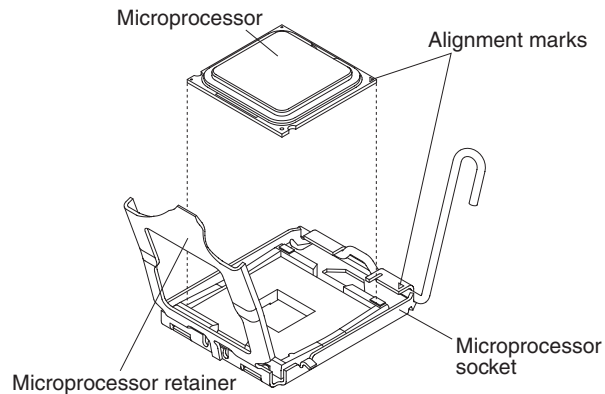
**Attention:** Do not use any tools or sharp objects to lift the locking lever on the microprocessor socket. Doing so might result in permanent damage to the system board.



- Rotate the locking lever on the microprocessor socket from its closed and locked position until it stops in the fully open position (approximately a 135° angle), as shown.
- Rotate the microprocessor retainer on the microprocessor socket from its closed position until it stops in the fully open position (approximately a 135° angle), as shown.
- Touch the static-protective package that contains the microprocessor to any *unpainted* metal surface on the system-board tray or any *unpainted* metal surface on any other grounded rack component; then, remove the microprocessor from the package.

**Attention:** Handle the microprocessor only by its edges. Do not touch the contacts on the bottom of the microprocessor or in the microprocessor socket. Touching these contacts might result in permanent damage to the system board.

- Remove the cover from the bottom of the microprocessor.



- e. Center the microprocessor over the microprocessor socket. Align the triangle on the corner of the microprocessor with the triangle on the corner of the socket and carefully place the microprocessor into the socket.

**Attention:**

- Do not press the microprocessor into the socket.
- Make sure that the microprocessor is oriented and aligned correctly in the socket before you try to close the microprocessor retainer.

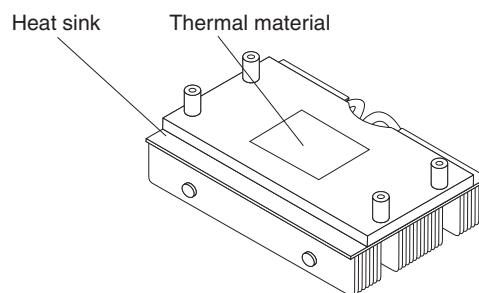
- f. Carefully close the microprocessor retainer.

- g. Rotate the locking lever on the microprocessor socket to the closed and locked position. Make sure that the lever is secured in the locked position by the tab on the microprocessor 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.



- 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 76); otherwise, install the system-board tray cover (see “Installing the system-board tray cover” on page 69).
4. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71 or “Installing the system-board tray in a 3U chassis” on page 73).

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:**

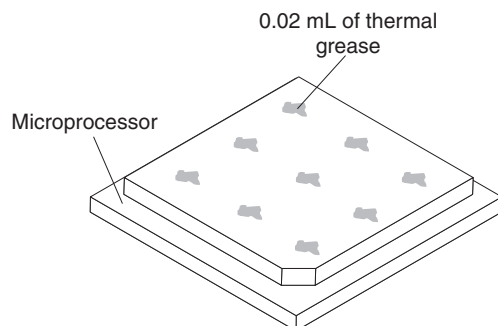
- Read the safety information that begins on page vii.
- Read the “Installation guidelines” on page 67.
- Read “Handling static-sensitive devices” on page 68.

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

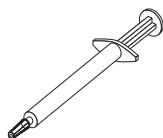
1. Place the heat sink on a clean work surface.
2. Remove the cleaning pad from its package and unfold it completely.
3. Use the cleaning pad to wipe the thermal grease from the bottom of the heat sink.

**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.

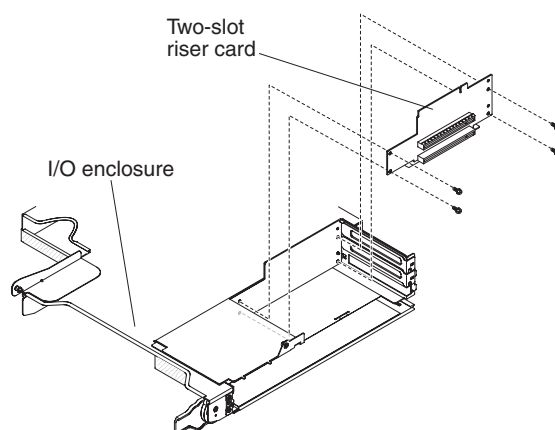


**Note:** If the grease is correctly applied, approximately half of the grease will remain in the syringe.

6. Install the heat sink onto the microprocessor as described in “Installing a microprocessor and heat sink” on page 143.

## Removing a PCIe riser-card assembly from the I/O enclosure

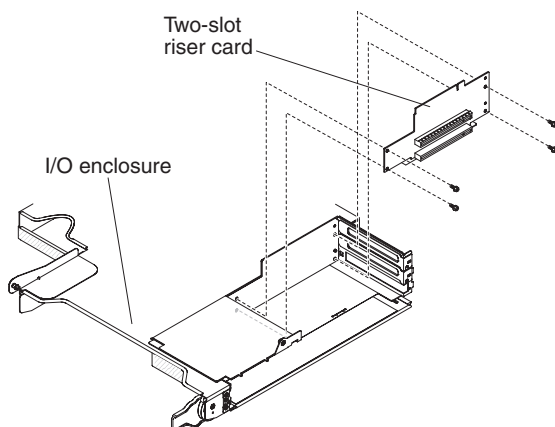
To remove a PCIe riser-card assembly from the I/O enclosure, complete the following steps.



1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
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 70).
3. Remove the I/O enclosure from the system-board tray (see “Removing an expansion enclosure from a system-board tray” on page 75).
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 87).
6. Remove the PCIe adapter, if one is installed, and save it for future use (see “Removing an adapter from the I/O enclosure” on page 95).
7. Remove the four screws that secure the PCIe riser-card assembly to the I/O enclosure and save them for future use.
8. Pull the PCIe riser-card assembly off the mounting studs and out of the I/O enclosure.
9. 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

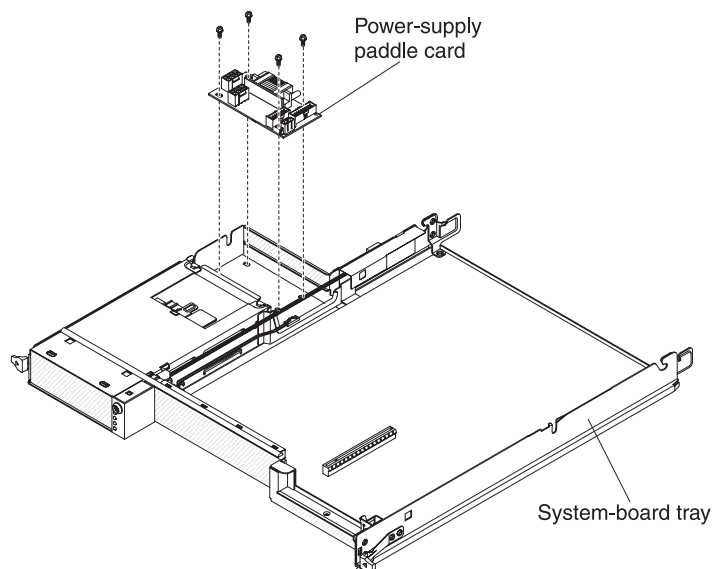
To install a PCIe riser-card assembly in the I/O enclosure, complete the following steps.



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. Install and cable the PCIe adapter, if you removed one from the PCIe riser-card assembly (see “Installing an adapter in the I/O enclosure” on page 96).
5. Install the PCIe adapter bay cover on the I/O enclosure (see “Installing the PCIe adapter bay cover” on page 87).
6. Install the I/O enclosure on the system-board tray (see “Installing an expansion enclosure on a system-board tray” on page 76).
7. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71).

## 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.

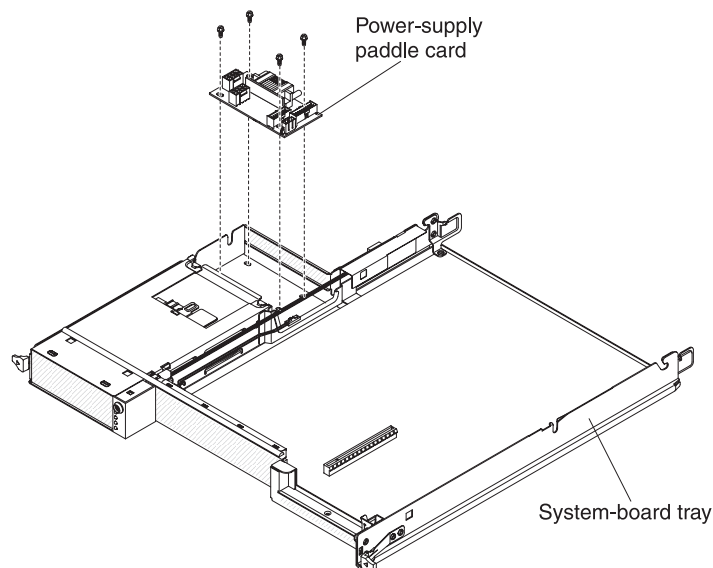




1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the system-board tray is installed in a chassis, remove it (see “Removing the system-board tray from a 2U chassis” on page 70 or “Removing the system-board tray from a 3U chassis” on page 72).
3. Carefully 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 75); otherwise, remove the system-board tray cover (see “Removing the system-board tray cover” on page 69).
5. If DIMMs are installed in DIMM connectors 15 or 16, remove the DIMMs (see “Removing a memory module” on page 107). For the locations of the DIMM connectors, see “System-board connectors” on page 11.
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 86).
  - 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 112).
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.

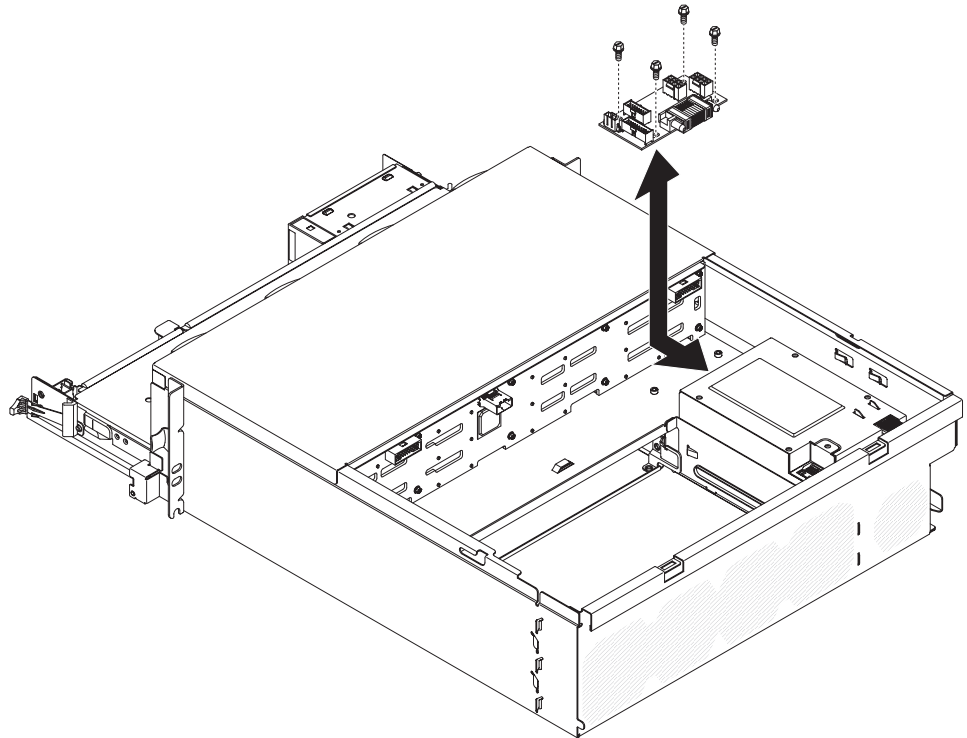


1. Touch the static-protective package that contains the power-supply paddle card to any *unpainted* metal surface on the outside of the system-board tray; then, remove the power-supply paddle card from the package.
2. Place the power-supply paddle card on the mounting studs in the system-board tray 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 112).
  - 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 86).
5. Install the DIMMs, if you removed any (see “Installing a memory module” on page 108).
6. Install the expansion enclosure, if you removed one (see “Installing an expansion enclosure on a system-board tray” on page 76); otherwise, install the system-board tray cover (see “Installing the system-board tray cover” on page 69).
7. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71 or “Installing the system-board tray in a 3U chassis” on page 73).

## 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 vii and “Installation guidelines” on page 67.
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 134).
3. Remove the top cover (see “Removing the 3U chassis top cover” on page 80).
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.

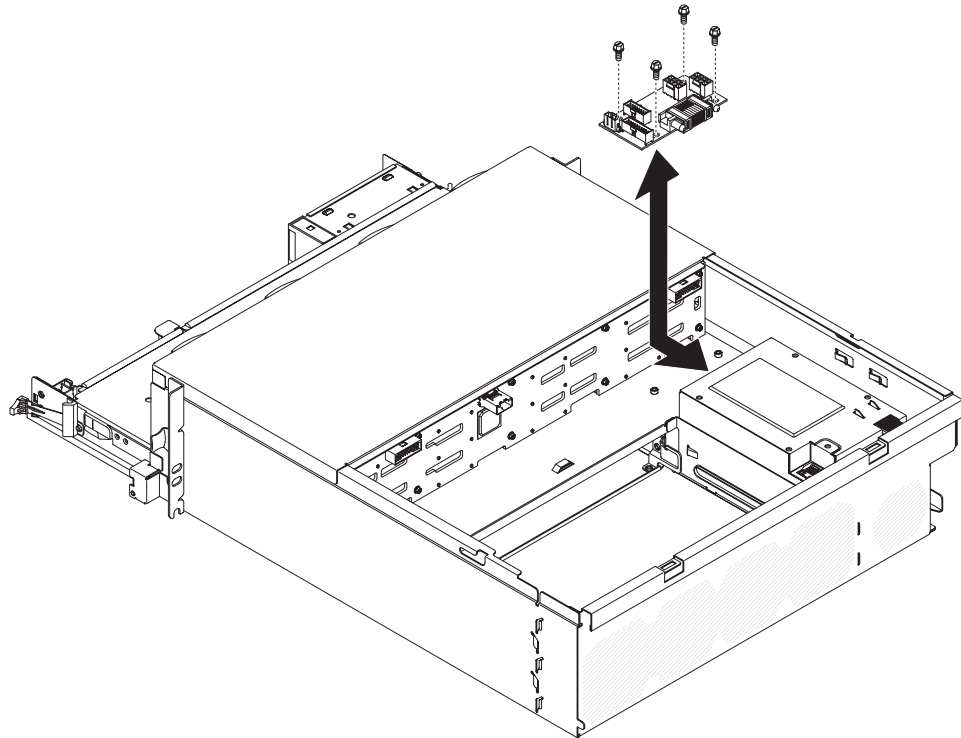


5. If you are instructed to return the power-supply paddle card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## 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.



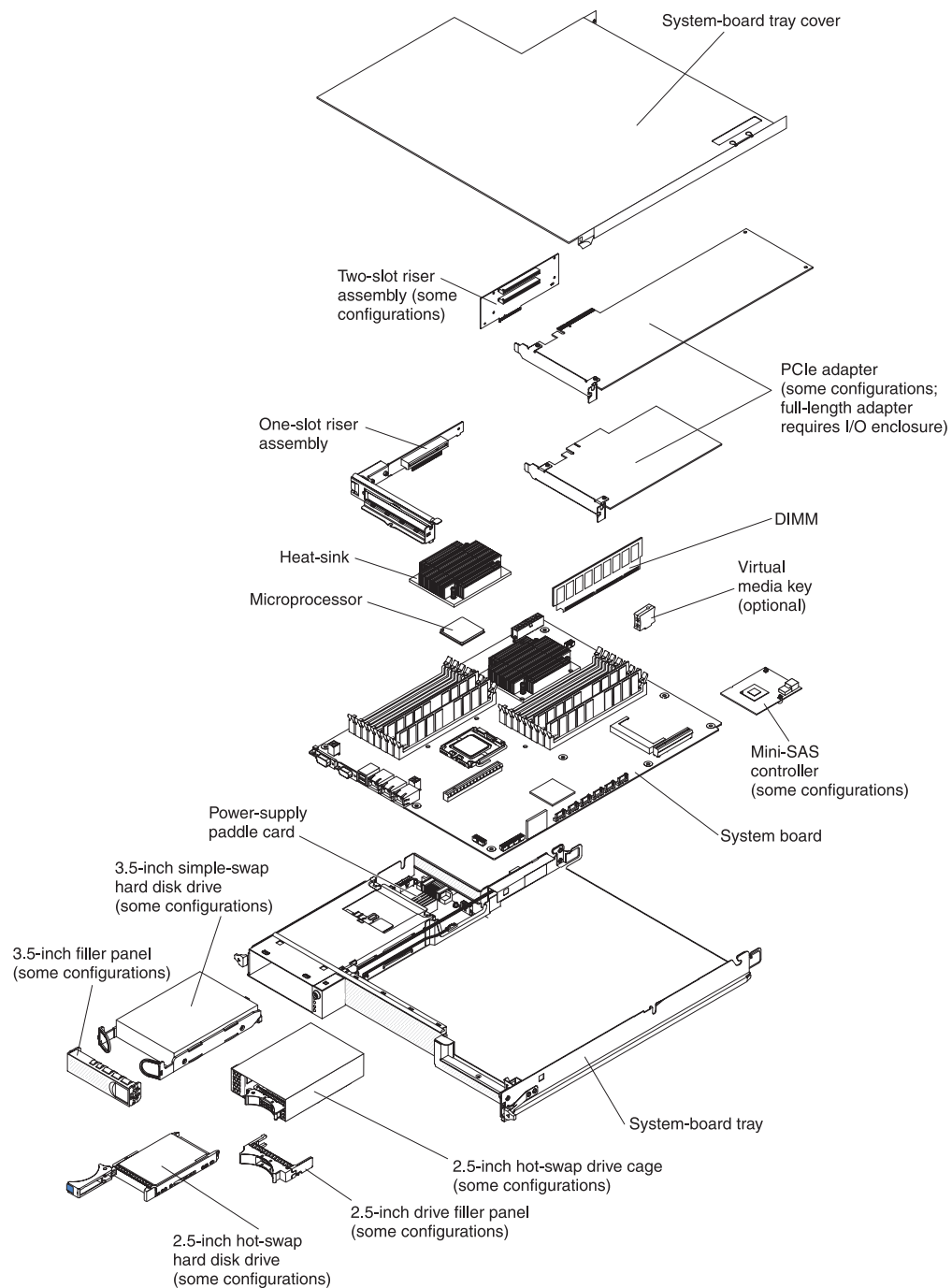
3. Install the system-board tray in the 3U chassis (see “Installing the system-board tray in a 3U chassis” on page 73).
4. Install the top cover (see “Installing the 3U chassis top cover” on page 81 ).
5. Install the 3U chassis in the iDataPlex rack (see “Installing a 3U chassis in a Type 7825 iDataPlex rack” on page 135).

## Removing the system-board tray

After replacement, you must either update the system-board tray with the latest firmware or restore the pre-existing firmware from a diskette or CD image.

**Note:** See “System-board layouts” on page 10 for the locations of the connectors on the system board.

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



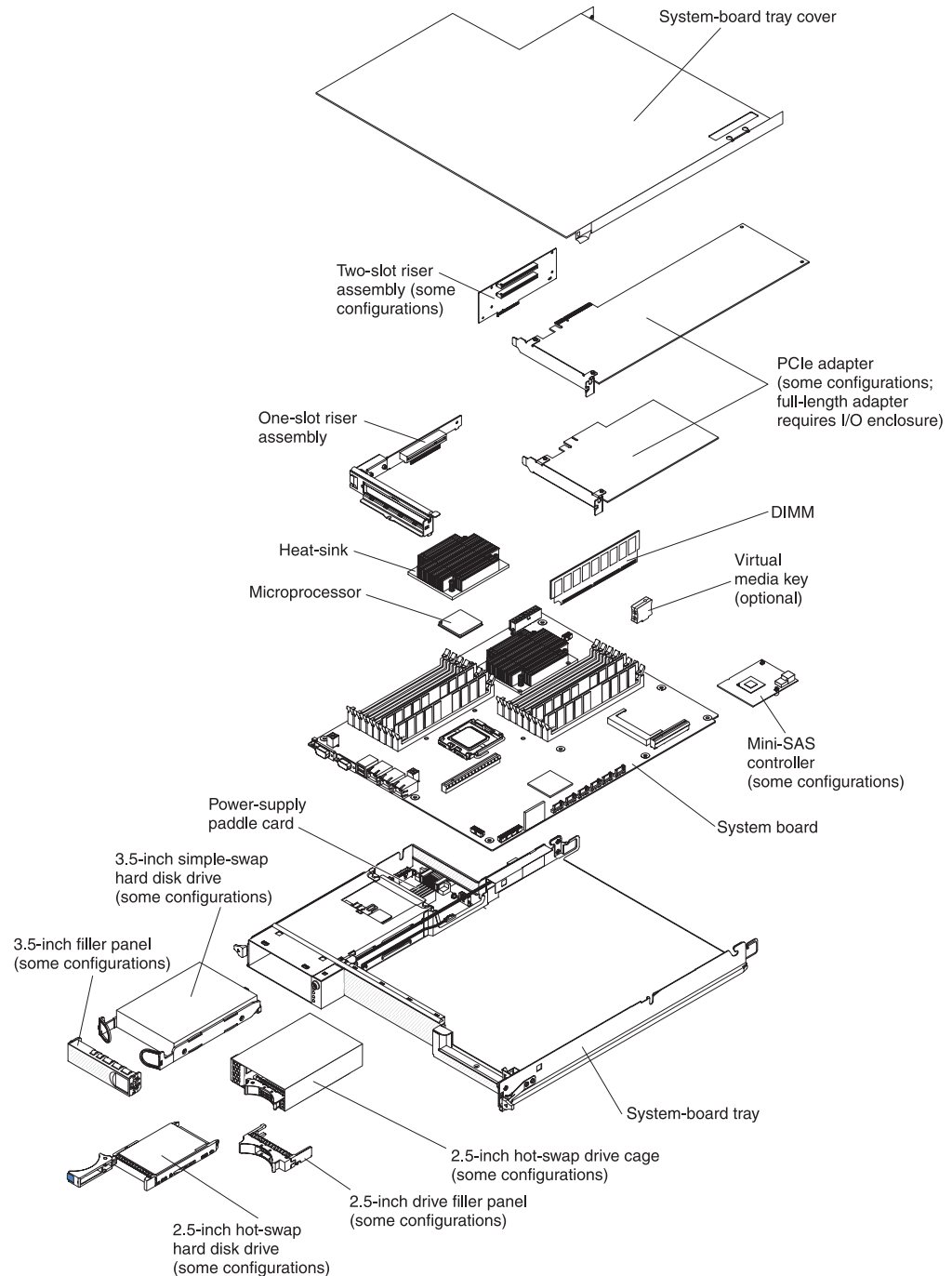
1. Read the safety information that begins on page vii and “Installation guidelines” on page 67.
2. If the system-board tray is installed in a chassis, remove it (see “Removing the system-board tray from a 2U chassis” on page 70 or “Removing the system-board tray from a 3U chassis” on page 72).
3. If necessary, note the cable routing and connection locations; then, disconnect the cables that connect the system-board tray to the chassis.

4. If an expansion enclosure is installed, remove it (see “Removing an expansion enclosure from a system-board tray” on page 75); otherwise, remove the system-board tray cover (see “Removing the system-board tray cover” on page 69).
5. Remove the hard disk drives, if any are installed (see “Removing and installing a hard disk drive” on page 83).
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 112).
7. Remove the 2.5-inch SAS/SATA drive cage, if one is installed (see “Removing a 2.5-inch SAS/SATA drive cage” on page 91).
8. Remove the mini-SAS RAID controller and PCIe adapters, if any are installed (see “Removing an adapter from the system-board tray” on page 96).
9. Remove the riser card (see “Removing a PCIe riser-card assembly from the system-board tray” on page 115).
10. Remove the battery from the system board (see “Removing the battery” on page 81).
11. Remove the DIMMs (see “Removing a memory module” on page 107).
12. Remove the microprocessors and heat sinks (see “Removing a microprocessor and heat sink” on page 141).
13. 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.

## Installing the system-board tray

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 143).
2. Reinstall the DIMMs (see “Installing a memory module” on page 108).
3. Reinstall the battery (see “Installing the battery” on page 82).
4. Reinstall the riser card (see “Installing a PCIe riser-card assembly in the system-board tray” on page 116).

5. Reinstall the mini-SAS RAID controller and PCIe adapters, if you removed any (see “Installing an adapter in the system-board tray” on page 98).
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 112).
7. Reinstall the 2.5-inch SAS/SATA drive cage, if you removed one (see “Installing a 2.5-inch SAS/SATA drive cage” on page 92).
8. Reinstall the hard disk drives, if you removed any (See “Removing and installing a hard disk drive” on page 83).
9. Install the expansion enclosure, if you removed one (see “Installing an expansion enclosure on a system-board tray” on page 76); otherwise, install the system-board tray cover (see “Installing the system-board tray cover” on page 69).
10. Install the system-board tray in the chassis (see “Installing the system-board tray in a 2U chassis” on page 71 or “Installing the system-board tray in a 3U chassis” on page 73).

**Note:** After you replace the system-board tray, you must program the thermal profile that is used to regulate cooling within the chassis.

To program the thermal profile for the new system-board tray, complete the following steps:

1. Locate the two-digit, alphanumeric thermal-profile code. The two-digit code is printed on the thermal-profile label that is affixed to the top of the original system-board tray.
2. Locate the replacement identification (RID) tag that is affixed to the top of the new system-board tray and record the machine type (MT), serial number (SN), and thermal-profile code on the tag.
3. (Trained service technician only) See Retain Tip H193629 for the instructions to program the thermal profile for the new system board.



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## 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

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### 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 M2 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.

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## 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.

- **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.
- **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.
- **Storage**  
Select this choice to see the Trusted Platform Module (TPM) options (unsupported feature).
- **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<sup>®</sup> 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 37 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” 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 162.

- **Clear Power-on Password**

Select this choice to clear a power-on password. For more information, see “Power-on password” on page 162.

- **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 162.

- **Clear Administrator Password**

Select this choice to clear an administrator password. For more information, see “Administrator password” on page 162.

- **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 49 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.

If you forget the administrator password, you can clear CMOS memory to remove the administrator password. See “Clearing CMOS memory” on page 49 for instructions.

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## **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/>.

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## 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.

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## 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 12 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.



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## 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 106).
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 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 PASSWORD (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 169. 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 158).

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?Indocid=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 166. 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 158).

**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 157 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?Indocid=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. For device drivers and information about configuring the Ethernet controller, see the *Intel Ethernet Software CD* that comes with the server. 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 157.
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 M2 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 157.
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.





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## 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.

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### 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 software.

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### 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/>.

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## 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/idadaplex/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/>.

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## 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).

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## 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.

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## IBM Taiwan product service

台灣 IBM 產品服務聯絡方式：  
台灣國際商業機器股份有限公司  
台北市松仁路 7 號 3 樓  
電話：0800-016-888

IBM Taiwan product service contact information:  
IBM Taiwan Corporation  
3F, No 7, Song Ren Rd.  
Taipei, Taiwan  
Telephone: 0800-016-888

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## Appendix B. Notices

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## Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives that are available from IBM.

Maximum memory might require replacement of the standard memory with an optional memory module.

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Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

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## German Ordinance for Work gloss statement

The product is not suitable for use with visual display work place devices according to clause 2 of the German Ordinance for Work with Visual Display Units.

Das Produkt ist nicht für den Einsatz an Bildschirmarbeitsplätzen im Sinne § 2 der Bildschirmarbeitsverordnung geeignet.

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## Electronic emission notices

### Federal Communications Commission (FCC) statement

**Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

## **Industry Canada Class A emission compliance statement**

This Class A digital apparatus complies with Canadian ICES-003.

## **Avis de conformité à la réglementation d'Industrie Canada**

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

## **Australia and New Zealand Class A statement**

**Attention:** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

## **United Kingdom telecommunications safety requirement**

### **Notice to Customers**

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

## **European Union EMC Directive conformance statement**

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

**Attention:** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

### **European Community contact:**

IBM Technical Regulations  
Pascalstr. 100, Stuttgart, Germany 70569  
Telephone: 0049 (0)711 785 1176  
Fax: 0049 (0)711 785 1283  
E-mail: tjahn@de.ibm.com

## Taiwanese Class A warning statement

警告使用者：  
這是甲類的資訊產品，在  
居住的環境中使用時，可  
能會造成射頻干擾，在這  
種情況下，使用者會被要  
求採取某些適當的對策。

## Chinese Class A warning statement

聲 明  
此為 A 級產品。在生活環境中，  
該產品可能會造成無線電干擾。  
在這種情況下，可能需要用戶對其  
干擾採取切实可行的措施。

## Japanese Voluntary Control Council for Interference (VCCI) 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。

## Korean Class A warning statement

이 기기는 업무용으로 전자파 적합등록을 받은 기기  
이오니, 판매자 또는 사용자는 이점을 주의하시기  
바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에  
서 비업무용으로 교환하시기 바랍니다.





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