IBM System x3850 X5 and x3950 X5
Types 7145, 7146, 7143, and 7191

Problem Determination and Service Guide

IBM System x3850 X5 and x3950 X5
Types 7145, 7146, 7143, and 7191

Problem Determination and Service Guide

Note

Before using this information and the product it supports, read the general information in "Notices" on page 363, the *Safety Information* and *Environmental Notices and User Guide* documents on the IBM *Documentation* CD, and the *Warranty Information* document that comes with the product.

Seventeenth Edition (December 2011)

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Contents

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Guidelines for trained service technicians

This section contains information for trained service technicians.

Inspecting for unsafe conditions

Use this information to help you identify potential unsafe conditions in an IBM® product that you are working on.

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

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

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

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

1. Make sure that the power is off and the power cords are disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cords:
   - 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 cords are the correct type.

- 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 system 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 these 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

These statements provide the caution and danger information that is used in this documentation.

Important:

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

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

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

Statement 1

DANGER

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

To avoid a shock hazard:

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

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

Statement 2

CAUTION:
When replacing the lithium battery, use only IBM Part Number 15F8409 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

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

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

Statement 3

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

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

DANGER

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

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

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

Statement 4

≥ 18 kg (39.7 lb)

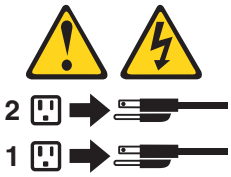
≥ 32 kg (70.5 lb)

≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 5

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



Statement 8

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

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

Statement 11

CAUTION:
The following label indicates sharp edges, corners, or joints nearby.

Statement 12

CAUTION:
The following label indicates a hot surface nearby.

Statement 13

DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.

Statement 15

CAUTION:
Make sure that the rack is secured properly to avoid tipping when the server unit is extended.

Statement 17

CAUTION:
The following label indicates moving parts nearby.

Statement 26

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

Statement 27

CAUTION:
Hazardous moving parts are nearby.

Statement 37

DANGER

When you populate a rack cabinet, adhere to the following guidelines:

- **Always lower the leveling pads on the rack cabinet.**
- **Always install the stabilizer brackets on the rack cabinet.**
- **Always install the heaviest devices in the bottom of the rack cabinet.**
- **Do not extend multiple devices from the rack cabinet simultaneously, unless the rack-mounting instructions direct you to do so. Multiple devices extended into the service position can cause your rack cabinet to tip.**
- **If you are not using the IBM 9308 rack cabinet, securely anchor the rack cabinet to ensure its stability.**

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

Chapter 1. Start here

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

This *Problem Determination and Service Guide* describes the diagnostic tests that you can perform, troubleshooting procedures, and explanations of error messages and error codes. The documentation that comes with your operating system and software also contains troubleshooting information.

Diagnosing a problem

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

1. **Return the server to the condition it was in before the problem occurred.** If any hardware, software, or firmware was changed before the problem occurred, if possible, reverse those changes. This might include any of the following items:
   - Hardware components
   - Device drivers and firmware
   - System software
   - UEFI firmware
   - System input power or network connections
2. **View the light path diagnostics LEDs and event logs.** The server is designed for ease of diagnosis of hardware and software problems.
   - **Light path diagnostics LEDs:** See "Light path diagnostics" on page 58 for information about using light path diagnostics LEDs.
   - **Event logs:** See "Event logs" on page 32 for information about notification events and diagnosis.
   - **Software or operating-system error codes:** See the documentation for the software or operating system for information about a specific error code. See the manufacturer's website for documentation.
3. **Run IBM Dynamic System Analysis (DSA) and collect system data.** Run Dynamic System Analysis (DSA) to collect information about the hardware, firmware, software, and operating system. Have this information available when you contact IBM or an approved warranty service provider. For instructions for running DSA, see the *Dynamic System Analysis Installation and User's Guide*.

   To download the latest version of DSA code and the *Dynamic System Analysis Installation and User's Guide*, go to http://www.ibm.com/support/entry/portal/docdisplay?brand=5000008&lndocid=SERV-DSA .
4. **Check for and apply code updates.** Fixes or workarounds for many problems might be available in updated UEFI firmware, device firmware, or device drivers.

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

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a. **Install UpdateXpress system updates.** 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. In addition, you can use IBM ToolsCenter Bootable Media Creator to create bootable media that is suitable for applying firmware updates and running preboot diagnostics. For more information about UpdateXpress System Packs, see http://www.ibm.com/support/entry/portal/docdisplay?brand=5000008&lndocid=SERV-XPRESS and "Updating the firmware" on page 337. For more information about the Bootable Media Creator, see http://www.ibm.com/support/entry/portal/docdisplay?brand=5000008&lndocid=TOOL-BOMC .

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

b. **Install manual system updates.**

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

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

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

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

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

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

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

   b. **Make sure that the server, operating system, and software are installed and configured correctly.** Many configuration problems are caused by loose power or signal cables or incorrectly seated adapters. You might be able to solve the problem by turning off the server, reconnecting cables, reseating adapters, and turning the server back on. For information about performing the checkout procedure, see "Checkout procedures" on page 43. For information about configuring the server, see "Configuring the server" on page 337.

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

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

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

7. **Check for troubleshooting procedures and RETAIN tips.** Troubleshooting procedures and RETAIN tips document known problems and suggested solutions. To search for troubleshooting procedures and RETAIN tips, go to http://www.ibm.com/supportportal/ .
8. **Use the troubleshooting tables.** See "Troubleshooting tables" on page 44 to find a solution to a problem that has identifiable symptoms.

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

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

Undocumented problems

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

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

Chapter 2. Introduction

This *Problem Determination and Service Guide* contains information to help you solve problems that might occur in your IBM System x3850 X5 and x3950 X5 Types 7145 and 7146 server and the optional IBM MAX5 for System x (MAX5) memory expansion module. It describes the diagnostic tools that come with the server, error codes and suggested actions, and instructions for replacing failing components in the server and the MAX5 memory expansion module (see "Memory expansion module features and specifications" on page 25 for more information on the MAX5).

Important: The IBM MAX5 for System x memory expansion module is a Listed Accessory for use with the IBM System x3850 X5 and x3950 X5 only.

If you are adding an optional memory expansion module or scaling to another server, see the rack installation instructions that come with the cable option kit.

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

Replaceable components are of four types:

- **Consumable part:** 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 without a service contract, 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 Information* document that came with your server. For information about getting service and assistance, see "Getting help and information from the World Wide Web" on page 360.

Related documentation

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

- *Installation and User's Guide*

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

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This printed document contains instructions for installing the server in a rack.

- *Safety Information*

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

- *IBM Warranty Information*

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

- *Environmental Notices and User Guide*

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

- *IBM License Agreement for Machine Code*

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

- *Licenses Attributions Douument*

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

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

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

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

Notices and statements in this document

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

The following notices and statements are used in this document:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage might occur.

- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Server features and specifications

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

Notes:

1. Racks are marked in vertical increments of 4.45 cm (1.75 inches). Each increment is referred to as a unit, or "U." A 1-U-high device is 4.45 cm (1.75 inches) tall.
2. Power consumption and heat output vary depending on the number and type of optional features that are installed and the power-management optional features that are in use.
3. The sound levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.

Table 1. Features and specifications

Microprocessor:
- Intel Xeon EX versions of the 6000 and 7000 Series or E7 Series multi-core microprocessor with up to 24 MB or 30 MB last level cache.
- 1066 MHz front-side bus (FSB)
- Support for up to four microprocessors
  - Four Quick Path Interconnect (QPI) links per microprocessor at up to 6.4 GT/s (gigatransfers per second)
  - Four Scalable Memory Interconnect (SMI) links per microprocessor at up to 6.4 GT/s

Note: Use the Setup utility to determine the type and speed of the microprocessors. The server does not support mixing microprocessor types.

Memory:
- Type: Registered, ECC, PC3-10600 double data rate (DDR) III, SDRAM
- Sizes: 1 GB (Types 7145 and 7146 only) and 2 GB (PC3-10600 running at 1066 Mb/sec), 4 GB, 8 GB, 16 GB, and 32 GB Types 7143 and 7191 0nly) (PC3L-8500-777 DDR3 ECC running at 1066 Mb/sec) in pairs
- Minimum (Types 7145 and 7146): 2 GB (two DIMMs per memory card minimum)
- Minimum (Types 7143 and 7191): 4 GB (two DIMMs per memory card minimum)
- Maximum: 1 TB (2 TB when using 32 GB DIMMs in Types 7143 and 7191) (eight memory cards, each card containing 8 DIMM connectors for a total of 64 DIMMs)
- Connectors: Two-way interleaved, eight dual inline memory module (DIMM) connectors per memory card
- Supports 1.35 V (low-voltage) and 1.5 V registered DIMMs (see "Replacing a DIMM" on page 284 for more information).
- Machine Types 7145 and 7146 uses the Intel 7500 Scalable Memory Buffer only
- Machine Types 7143 and 7191 uses the Intel 7510 Scalable Memory Buffer only

Expansion slots:
- Six non-hot-swap PCI Express x8 (three full-length and three half-length) slots
- One non-hot-swap PCI Express x16 (full-length) slot
- Emulex 10 GbE Custom Adapter for IBM System x in slot 7 (optional in some models)

Upgradeable microcode:

System UEFI, FPGA, diagnostics, service processor, IMM, and SAS microcode

Power supply:
- Standard: One or two dual-rated power supplies (depending on the model).
  - 1975 watts at 220 V ac input
  - 875 watts at 110 V ac input
- Hot-swappable and redundant at 220 V ac, only with two power supplies
- If the server is operating at 110 V ac, a second power supply must be installed.

Size:
- 4U
- Height: 172.8 mm (6.81 in.)
- Depth: 712.13 mm (28.04 in.)
- Width: (without rack EIA brackets) 440 mm (17.32 in.)
- Width: (with rack EIA brackets) 482.6 mm (19 in.)
- Weight: approximately 49.90 kg (110 lb) when fully configured

Drives:
- Slim CD/DVD-ROM: SATA (optional)
- Serial Attached SCSI (SAS) 2.5-inch hard disk drives (optional)
- Solid state 1.8-inch drives (optional)

Expansion bays:
- Eight SAS, 2.5-inch bays or sixteen solid state 1.8-inch bays
- One 12.7 mm removable-media drive bay (CD/DVD drive optional)

Acoustical noise emissions:
- Sound power, idle: 5.8 bel declared
- Sound power, operating: 6.3 bel declared

Airflow:
- Nominal airflow: 67 cubic feet per minute (CFM)
- Typical airflow: 100 CFM
- Maximum airflow: 241 CFM

Environment:
- Air temperature:
  - Server on:
    - 10°C to 35°C (50°F to 95°F); altitude: 0 to 914 m (3000 ft).
    - 10°C to 32°C (50°F to 90°F); altitude: 914 to 2133 m (7000 ft).
  - Server off: 10°C to 43°C (50.0°F to 109.4°F); maximum altitude: 2133 m (6998.0 ft)
- Humidity:
  - Server on: 8% to 80%
  - Server off: 8% to 80%
- Particulate contamination:

  Attention: Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. For information about the limits for particulates and gases, see "Particulate contamination" on page 365.

Heat output:

Approximate heat output:
- Minimum configuration: 648 Btu per hour (190 watts)
- Typical configuration: 3753 Btu per hour (1100 watts)
- Design maximum configuration:
  - 5971 Btu per hour (1930 watts) at 110 V ac
  - 6739 Btu per hour (2150 watts) at 220 V ac

Table 2. Features and specifications (continued)

Scalability and memory expansion: • Eight-socket scalability option uses 4 QPI external cables • Multi-node configurations require 4 microprocessors in each node • MAX5 memory expansion module option uses four QPI ports **Note:** When you add an optional memory expansion module to your server configuration and you plan to use the optional USB flash device with VMware EXSi embedded hypervisor software, see the documentation that comes with the USB flash device and the operation system installation instructions for installing VMware ESXi (or ESX, depending on your enviroment) on your server at the IBM websight at http://www.ibm.com/systems/support/. The documentation provides additional installation and configuration information that you need to follow before you use the memory expansion module.	**Integrated functions:** • Integrated management module (IMM), which provides service processor control and monitoring functions, video controller, and remote keyboard, video, mouse, and remote hard disk drive capabilities • Light path diagnostics • Eight Universal Serial Bus (USB) ports (2.0) – Four on rear of server – Two on front of server – Two internal • Broadcom 5709 dual 10/100/1000 MB Ethernet controller • Matrox video – 16 MB video memory – SVGA compatible • Serial-attached SCSI (SAS) controller with RAID capabilities • ServeRAID-BR10i SAS/SATA controllers (Types 7145 and 7146 only) or ServeRAID-M1015 SAS/SATA controllers (Types 7143 and 7191 only) and ServeRAID-M5015 SAS/SATA/SSD controllers (all Types) • Serial connector • QPI Expansion Ports	**Electrical input:** • Sine-wave input (50 - 60 Hz) required • Input voltage low range: – Minimum: 100 V ac – Maximum: 127 V ac • Input voltage high range: – Minimum: 200 V ac – Maximum: 240 V ac • Approximate input kilovolt-amperes (kVA): – Minimum: 0.20 kVA – Typical: 1.12 kVA – Maximum: 1.95 kVA (110 V ac) – Maximum: 2.17 kVA (220 V ac)

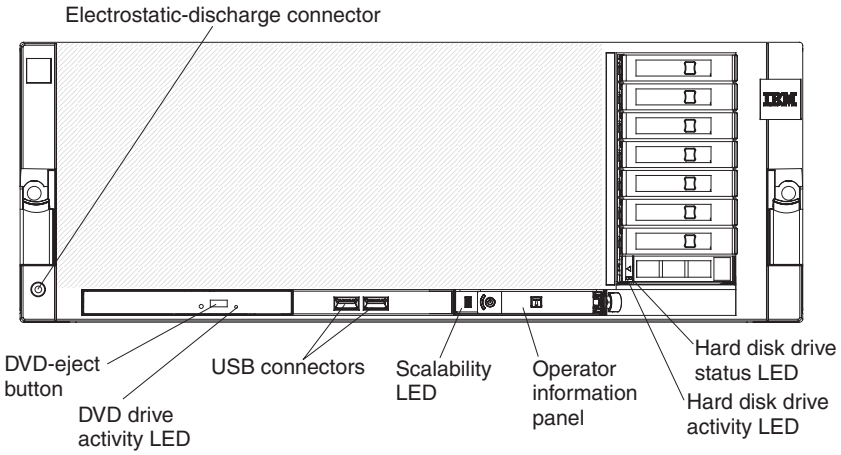
Server controls, connectors, LEDs, and power

This section describes the controls, light-emitting diodes (LEDs), connectors on the front and rear of the server, and how to turn the server on and off.

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

Front view

The following illustration shows the controls, LEDs, and connectors on the front of the server. The DVD drive is optional in some models.



Electrostatic-discharge connector: Connect a electrostatic-discharge wrist strap to this connector when you work with static-sensitive devices.

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

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

USB 1 and 2 connectors: Connect USB devices to these connectors.

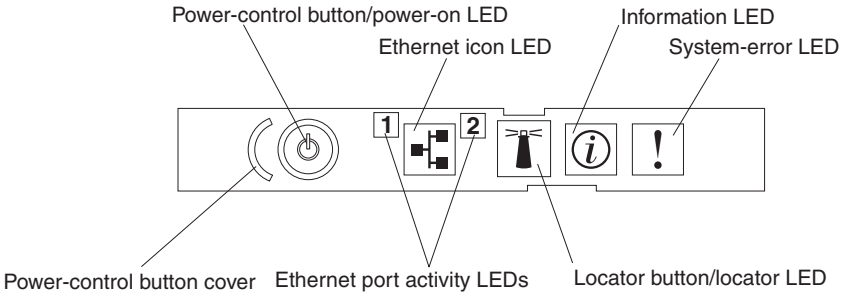
Scalability LED: This white LED is lit when the server is connected to another server in a multi-node configuration.

Hard disk drive activity LED: When this LED is flashing, it indicates that the drive is in use.

Hard disk drive status LED: On some server models, each hot-swap hard disk drive has a status LED. When this LED is lit, it indicates that the drive has failed. If an optional IBM ServeRAID controller is installed in the server, when this LED is flashing slowly (one flash per second), it indicates that the drive is being rebuilt. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.

Operator information panel

The following illustration shows the controls and LEDs on the operator information panel.



The following controls and LEDs are on the operator information panel:

- **Power-control button and power-on LED:** Press this button to turn the server on and off manually or to wake the server from a reduced-power state. The states of the power-on LED are as follows:

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

  Flashing rapidly (4 times per second): The server is turned off and is not ready to be turned on. The power-control button is disabled. In a fully configured server, it could take up to 8 minutes after the server is connected to ac power, before the power-control button becomes active.

  Flashing slowly (once per second): The server is turned off and is ready to be turned on. You can press the power-control button to turn on the server.

  Lit: The server is turned on.

  Fading on and off: The server is in a reduced-power state. To wake the server, press the power-control button or use the IMM web interface. For information about logging on to the IMM web interface, see "Logging on to the IMM web interface" on page 348.
- **Ethernet icon LED:** This LED lights the Ethernet icon.
- **Information LED:** When this LED is lit, it indicates that a noncritical event has occurred. An LED on the light path diagnostics panel is also lit to help isolate the error.
- **System-error LED:** When this LED is lit, it indicates that a system error has occurred. An LED on the light path diagnostics panel is also lit to help isolate the error.
- **Locator button and locator LED:** Use this LED to visually locate the server among other servers. It is also used as the physical presence for Trusted Platform Module (TPM). Press this button to turn on or turn off this LED locally. You can use IBM Systems Director to light this LED remotely.

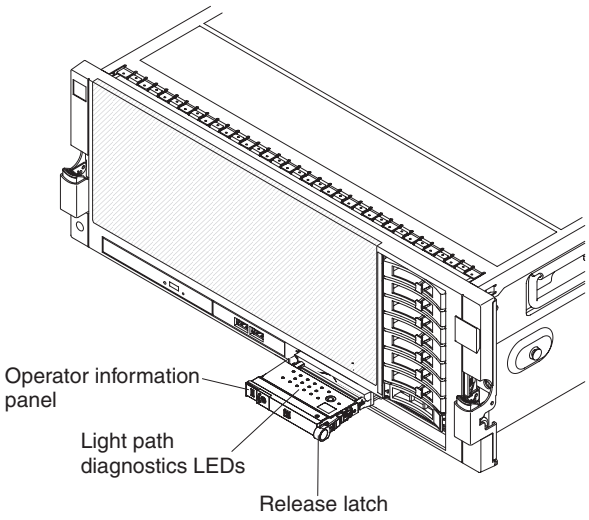
  In a two-node configuration, this LED is lit on the primary server and flashes on the secondary server during POST.

  You can press this button or use an IPMI command to turn this LED on or off.
- **Ethernet port activity LEDs:** When either of these LEDs is lit, it indicates that the server is transmitting to or receiving signals from the Ethernet LAN that is connected to the Ethernet port that corresponds to that LED.

Light path diagnostics panel

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

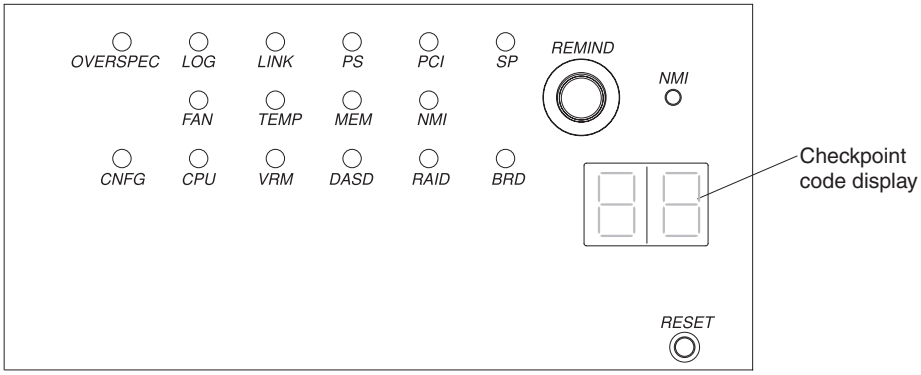
To access the light path diagnostics panel, slide the blue release button on the operator information panel to the left. Pull forward on the operator information panel until the hinge of the panel is free of the server chassis. Then pull down on the operator information panel, so that you can view the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



Note:

1. For optimum fan speed, do not run the server for more than 10 minutes while the light path diagnostics panel is pulled out of the server.
2. Light path diagnostics LEDs remain lit only while the server is connected to power.

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

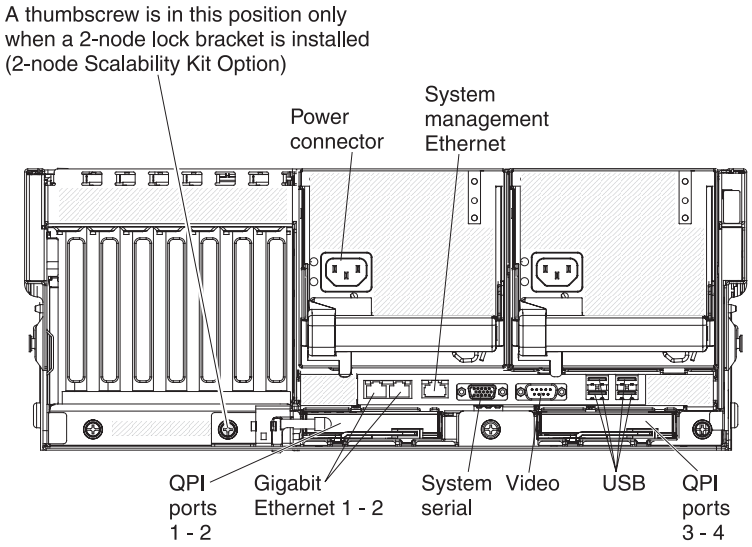


- **Remind button:** This button places the system-error LED on the front panel into Remind mode. In Remind mode, the system-error LED flashes once every 2 seconds until the problem is corrected, the server is restarted, or a new problem occurs.

  By placing the system-error LED indicator in Remind mode, you acknowledge that you are aware of the last failure but will not take immediate action to correct the problem. The remind function is controlled by the IMM.
- **NMI button:** Press this button to force a nonmaskable interrupt to the microprocessor, if you are directed by IBM service.
- **Reset button:** Press this button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button. The reset button is in the lower-right corner of the light path diagnostics panel.

Rear view

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



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

System-management Ethernet connector: Use this connector to connect the server integrated management module (IMM) to a network. The IMM is used for systems-management and information control. This connector is used only by the IMM.

QPI ports 1 - 4: In a single-node configuration, use these connectors to insert either a QPI wrap card or a filler panel. The QPI wrap cards enable increased performance in certain models. In a two-node configuration, insert the QPI cables in these ports to connect another server or a memory expansion module to your server. See the documentation that came with your QPI cable kit for detailed cabling instructions.

USB connectors: Connect USB devices, such as a USB mouse or keyboard, to these connectors.

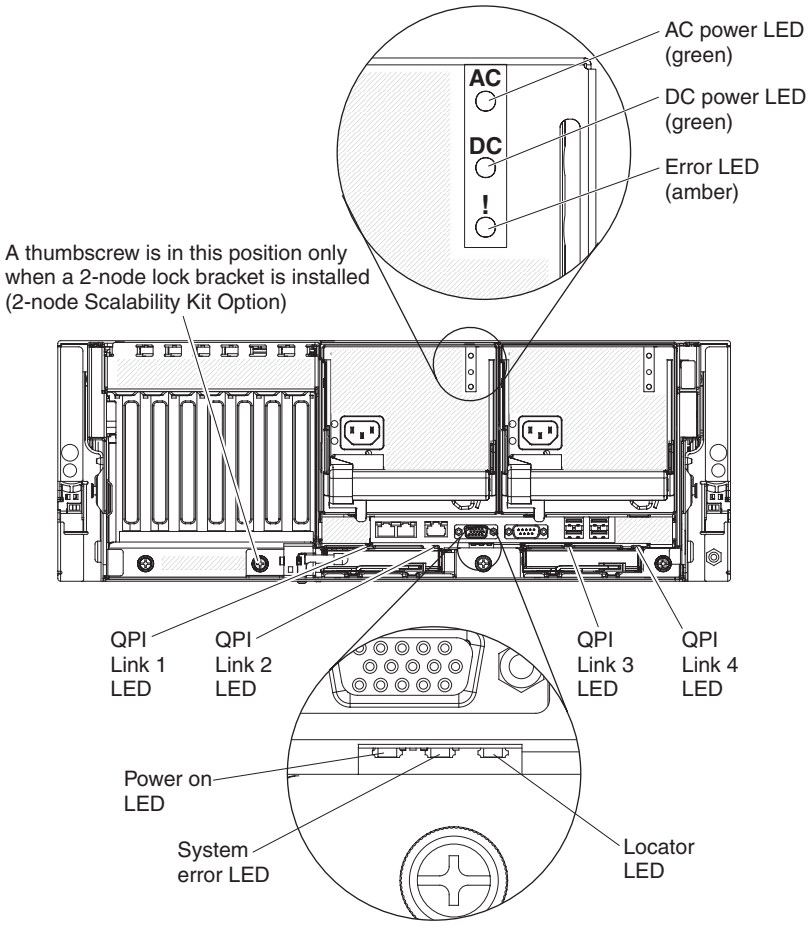
Video connector: Connect a monitor to this connector. In a two-node configuration, connect the monitor to the primary server to see standard system output.

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).

Gigabit Ethernet 1 and 2 connectors: Use these connectors to connect the server to a network.

Rear view LEDs

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



AC power LED: Each hot-swap power supply has an ac power LED and a dc power LED. When the ac power LED is lit, it indicates that sufficient power is coming into the power supply through the power cord. During typical operation, both the ac and dc power LEDs are lit.

DC power LED: Each hot-swap power supply has a dc power LED and an ac power LED. When the dc power LED is lit, it indicates that the power supply is supplying sufficient dc power to the system. During typical operation, both the ac and dc power LEDs are lit.

Error LED: When the power-supply error LED is lit, it indicates a problem with the power supply.

QPI Link LEDs 1 - 4: When the QuickPath Interconnect (QPI) link LEDs are lit, they indicate that the QPI links are fully established.

Table 3. QPI link LEDs

Link LEDs	Number of Nodes	QPI wrap card or cable status
Off	1	None installed
On	1	Wrap card installed, working

Table 3. QPI link LEDs (continued)

Link LEDs	Number of Nodes	QPI wrap card or cable status
Off at failing port	1	Wrap card installed, not working
Off	1 with four microprocessors	None installed
On	2	Cables installed, working
Off at failing port	2	Cables installed, not working
Blinking	1 to 4	Server(s) operating at reduced capacity

Locator LED: Use this LED to visually locate the server among other servers. You can use IBM Systems Director to light this LED remotely.

In a two-node configuration, this LED is lit on the primary server and flashes on the secondary server during POST.

You can press the locator button on the operator information panel on the front of the server or use an IPMI command to turn this LED on or off.

System-error LED: When this LED is lit, it indicates that a system error has occurred. An LED on the light path diagnostics panel is also lit to help isolate the error. (See "Light path diagnostics panel" on page 11 for information about the location and using the light path diagnostics panel.)

Power-on LED: See "Operator information panel" on page 10 for the various states of the power-on LED.

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

Table 4. Power-supply LEDs

Power-supply LEDs			Description	Action	Notes
AC	DC	Error			
Off	Off	Off	No ac power to either power supply or a problem with the ac power source	1. Check the ac power to the server. 2. Make sure that the power cord is connected to a functioning power source and is securely connected to the server. 3. Turn the server off and then turn the server back on. 4. Replace the power cord. 5. Check the power supply settings. 6. If the problem remains, replace the power supply.	This is a normal condition when no ac power is present.
Off	Off	On	No ac power to the server or a problem with the ac power source and the power supply had detected an internal problem	1. Replace the power supply. 2. Make sure that the power cord is connected to a functioning power source.	This happens only when a second power supply is providing power to the server.

Table 4. Power-supply LEDs (continued)

Power-supply LEDs			Description	Action	Notes
AC	**DC**	**Error**			
On	Off	Off	Power supply not fully seated, faulty system board, or faulty power supply	1. Reseat the power supply. 2. If the system-board error LED is off, replace the power supply. 3. (Trained service technician only) If the system-board error LED is lit, replace the system board.	This typically indicates that a power supply is not fully seated.
On	Off or Flashing	On	Faulty power supply	Replace the power supply.	
On	On	Off	Normal operation		
On	On	On	Power supply is faulty but still operational	Replace the power supply.	

Server power features

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

In a two-node configuration, connect both servers to an ac power source as close to the same time as possible to ensure optimum operation.

Turning on the server

A scaled system takes longer to power-on then a stand alone system. Approximately 30 seconds for a stand alone server, or up to 8 minutes in a 2-node configuration, after the server is connected to ac power, the power-control button becomes active, and one or more fans might start running to provide cooling while the server is connected to power. You can turn on the server and all nodes in the partition and start the operating system by pressing the power-control button.

Note: Do not power the server off when b:b/0:0 is flashing on the front panel. This indicates that setup/configuration is in process.

If you are restarting a two-node server after it has been turned off, you must allow extra time for the hardware to synchronize before you turn on the server again.

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

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

Note: Some memory is reserved for various system resources and is unavailable to the operating system. The amount of memory that is reserved for system resources depends on the operating system, the configuration of the server, and the configured PCI options.

Turning off the server

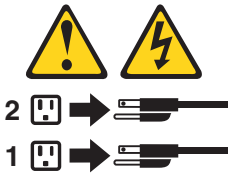
When you turn off the server and leave it connected to ac power, the server can respond to requests from the IMM, such as a remote request to turn on the server. While the server remains connected to ac power, one or more fans might continue to run. To remove all power from the server, you must disconnect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

Important: To view the error LEDs on the system board, leave the server connected to a power source.

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

Statement 5

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



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

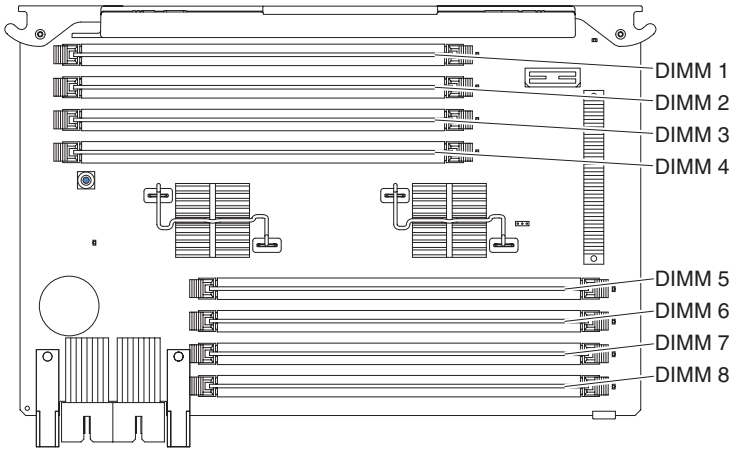
- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn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

Internal LEDs, connectors, and jumpers

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

Memory-card DIMM connectors

The following illustration shows the DIMM connectors on a memory card.



Memory-card LEDs and button

The following illustration shows the LEDs on a memory card.

Note: If the memory card is removed from the server, you must press the light path diagnostics button to light the LED.

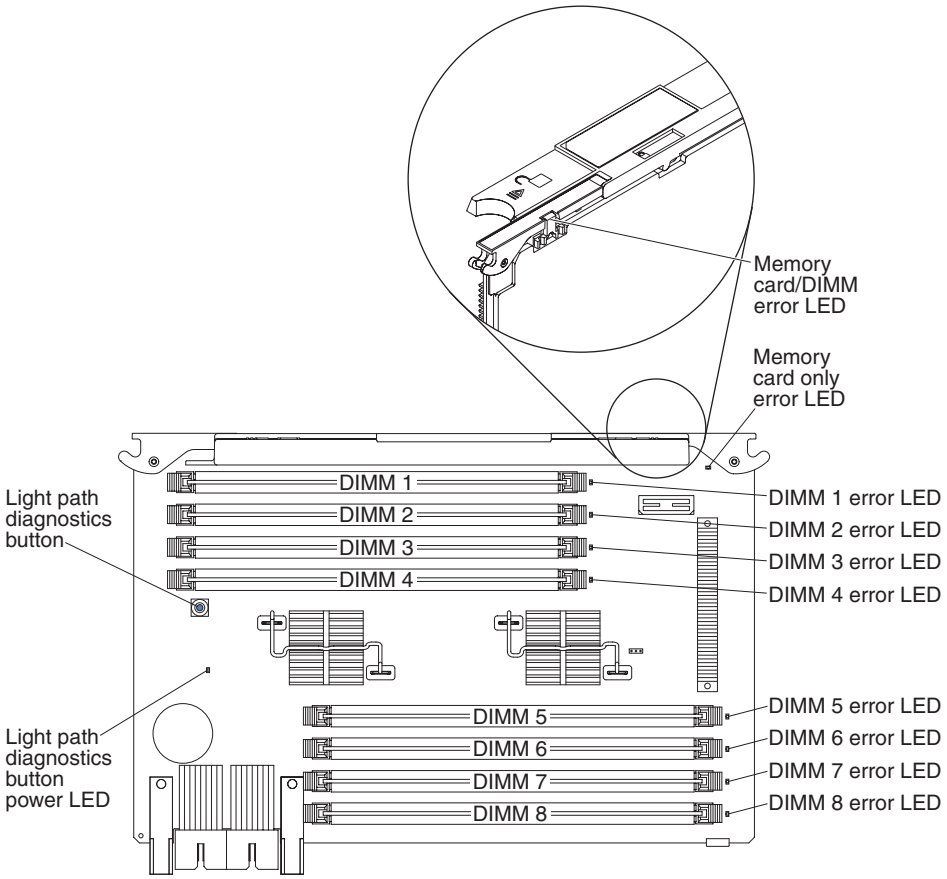
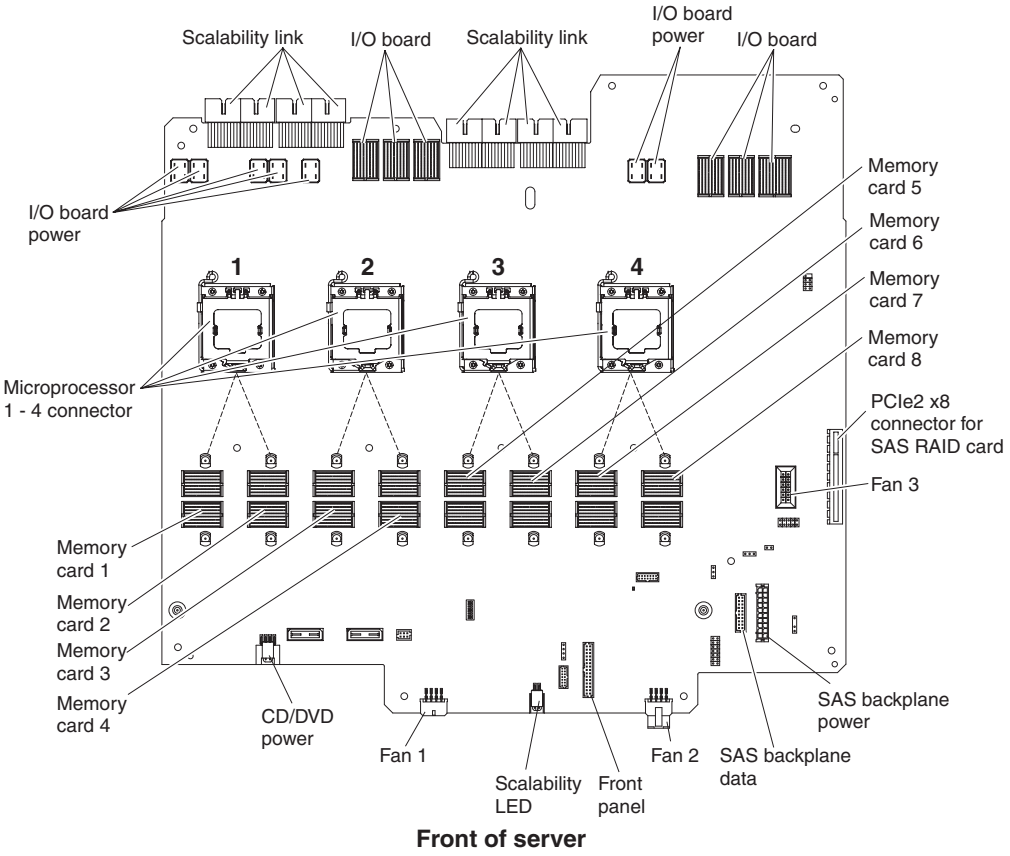


Table 5. Memory-card LEDs and button

LED	Description
Light path diagnostics button power LED	When this LED is lit, it indicates that the capacitor is charged and is able to light other LEDs.
Light path diagnostics button	Press this button to relight the error LED that had previously been lit.
Memory card/DIMM error LED	When this LED is lit, it indicates that an error has occurred in one of the DIMMs on the memory card or that there is a problem with the memory card.
Memory card only error LED	When this LED is lit, it indicates that an error has occurred on the memory card itself.
DIMM 1 - 8 error LEDs	When one of these LEDs is lit, it indicates that an error has occurred in the associated DIMM.

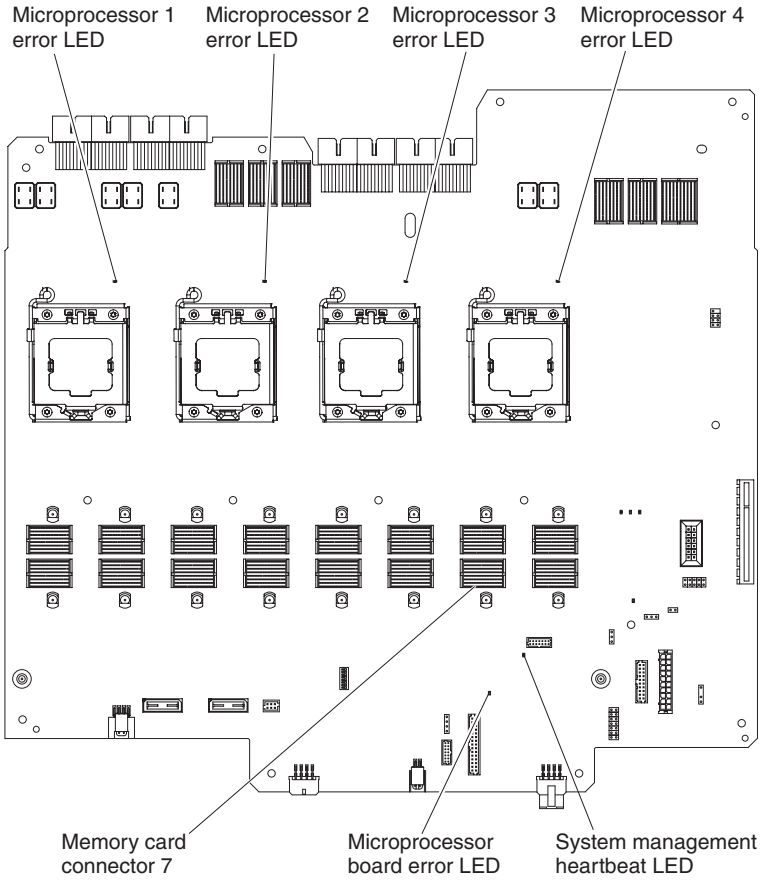
Microprocessor-board connectors

The following illustration shows the connectors on the microprocessor board.



Microprocessor-board LEDs

The following illustration shows the LEDs on the microprocessor board.



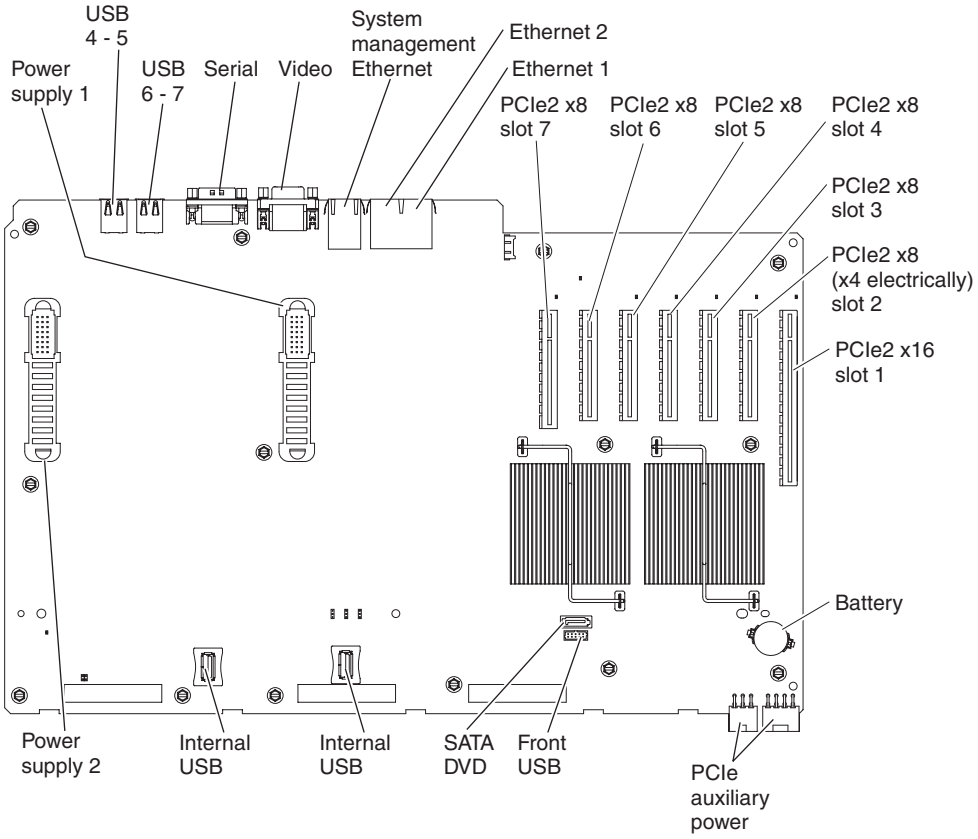
"Microprocessor-board LEDs" describes the function of each status LED.

Table 6. Microprocessor board non-light-path-diagnostics status LEDs

LED	Description
System management heartbeat LED	When this LED is flashing at a constant rate of once every 2 seconds, it indicates normal operation of the IMM. **Note:** If this LED is not lit, it indicates that the microprocessor board must be reseated or replaced (trained service technician only, see "Removing the microprocessor-board assembly" on page 310 and "Replacing the microprocessor-board assembly" on page 313).
Microprocessor 1 - 4 error LEDs	When one of these LEDs is lit, it indicates that an error has occurred in the associated microprocessor. **Note:** You must remove the top cover bracket before you can see these LEDs.
Microprocessor-board error LED	When this LED is lit, it indicates that an error has occurred on the microprocessor board. **Note:** You must remove the memory card or memory card filler from memory card connector 7 before you can see this LED.

I/O-board connectors

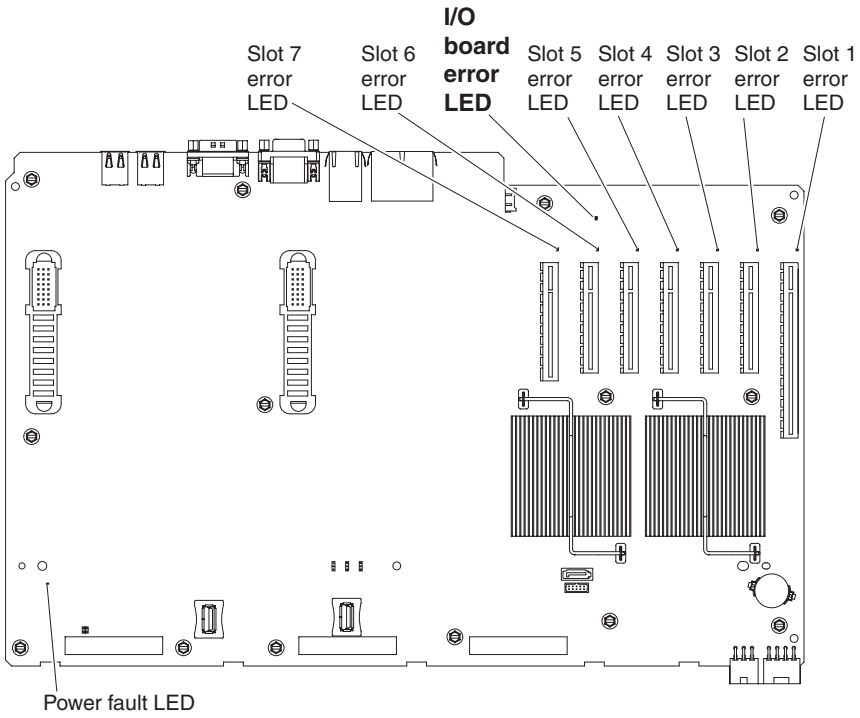
The following illustration shows the connectors on the I/O board.



Note: Slot 2 is electrically only x4.

I/O-board LEDs

The following illustration shows the LEDs on the I/O board.



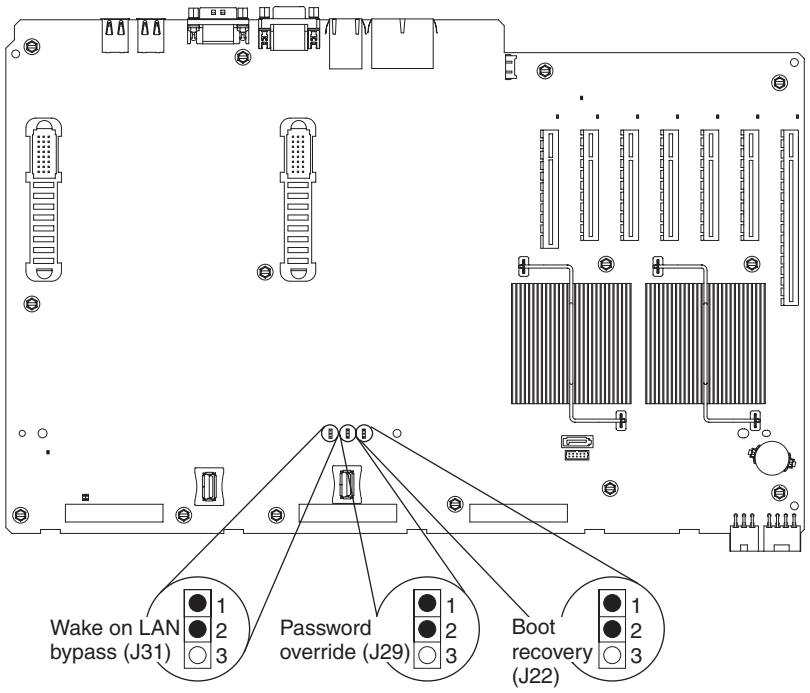
"I/O-board LEDs" describes the function of each non-light path diagnostics status LED.

Table 7. I/O-board non-light-path-diagnostics status LEDs

LED	Description
Slot 1 - 7 error LEDs	When one of these LEDs is lit, it indicates that an error has occurred in the associated I/O slot.
I/O board error LED	When this LED is lit, it indicates that an error has occurred on the I/O board. **Note:** You must look at the server at an angle from the front to see this LED.

I/O-board jumpers

The following illustration shows the jumpers on the I/O board.



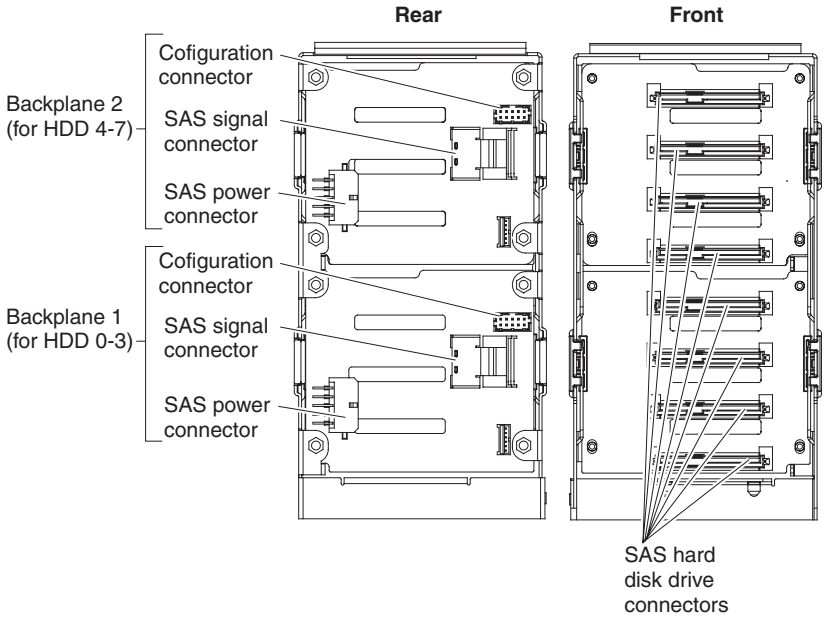
"I/O-board jumpers" describes the function of each jumper block.

Table 8. I/O-board jumper blocks

Jumper name	Description
Wake on LAN bypass (J31)	The default position is pins 1 and 2. Move the jumper to pins 2 and 3 to prevent a Wake on LAN packet from waking the system when the system is in the powered-off state.
Password override (J29)	When you change the position of this jumper, the server bypasses the power-on password check. The next time you turn on the server, the Setup Utility starts and you can change or delete the power-on password. You do not need to move the jumper back to the default position (pins 1 and 2) after the password is overridden. Changing the position of this jumper does not affect the administrator password check if an administrator password is set. If you forget the administrator password, you must replace the I/O board. (Replacement of the I/O board for this reason is not covered by the warranty.) For more information about passwords, see "Passwords" on page 342.
Boot recovery (J22)	The default position is pins 1 and 2 (to use the primary page during startup). Move the jumper to pins 2 and 3 to use the secondary page during startup.

SAS-backplane connectors

The following illustration shows the connectors on the SAS backplane.



Memory expansion module features and specifications

The following table contains a summary of the features and specifications of the IBM MAX5 for System X memory expansion module.

Table 9. Memory expansion module features and operating specifications

• Intel 7500 or 7510 scalable memory buffer (depending on your model) with eight memory ports (four DIMMs on each port) • Xcellerated Memory Technology • EXA5 chip set • QuickPath Interconnect (QPI) architecture technology: – Four 6.4 gigatransfers (GT) per second QuickPath Interconnect links (for up to 2 microprocessors) – Three 10.0 GT per second EXA5 scalability links • Scalability: – Connects to the (4U) rack servers using QPI cables – Connects to other memory expansion modules, using EXA5 link cables – Scales up to 2 nodes (two memory expansion modules + two servers)	**DIMMs:** • Minimum: 2 DIMMs, 4 GB • Maximum: 32 DIMM slots (up to 512 GB, 1 TB when 32 GB DIMMs are available, of memory, depending on the DIMM size) • Type of DIMMs: PC3-10600R-999, 1067 MHz, ECC, DDR3 registered SDRAM dual inline memory modules (DIMMs) • Supports 2 GB, 4 GB, 8 GB, and 16 GB DIMMs (32 GB DIMMs when available) **Fans:** • Five hot-swap 40 mm fans	**Power supply:** • One 675-watt (110 - 220 V ac auto-sensing) standard • Supports up to two 675-watt (110 - 220 V ac auto-sensing) hot-swap power supplies with built-in fans for redundancy support **Light path diagnostics LEDs:** • Board • Configuration • Fan • Link(for QPI and EXA5 links) • Locate • Memory • Power-on • Power supply

Table 9. Memory expansion module features and operating specifications (continued)

Acoustical noise emissions: For maximum system configurations (32 DIMMs installed) • Sound power (idling): 6.2 bels • Sound power (operating): 6.8 bels **Size:** • Height: 4.4 cm (1.73 in.) • Depth: 72.4 cm (28.5 in.) • Width: 48.3 cm (19.0 in.) • Weight: approximately 12.8 kg (28.2 lb) for a standard unit; when fully configured, 15.4 kg (33.9 lb)	**Environment:** • Air temperature: – Enclosure on: 10° to 35°C (50° to 95°F); altitude: 0 to 914.4 m (3000 ft). Decreased system temperature by 0.75° for every 1000 ft increase in altitude. – Enclosure off: 5° to 45°C (41° to 113``°F) – Shipment: -40°C to +60°C (-40°F to 140°F • Humidity: – Enclosure on: 20% to 80%; maximum dew point: 21°C (70°F) – Enclosure off: 8% to 80%; maximum dew point: 27°C (80°F) – Shipment: 5% to 100% • Particulate contamination: **Attention:** Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. For information about the limits for particulates and gases, see "Particulate contamination" on page 365.	**Heat output:** Approximate heat output: • Minimum configuration: 314 Btu per hour (92 watts) • Maximum configuration 2048 Btu per hour (600 watts) **Electrical input:** • Sine-wave input (50 - 60 Hz) required • Input voltage low range: – Minimum: 90 V ac – Maximum: 136 V ac • Input voltage high range: – Minimum: 198 V ac – Maximum: 264 V ac • Approximate input kilovolt-amperes (kVA): – Minimum: 0.1 kVA – Maximum: 0.6 kVA **Note:** 1. Power consumption and heat output vary depending on the number and type of optional features that are installed and the power-management optional features that are in use. 2. These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average stated values because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.

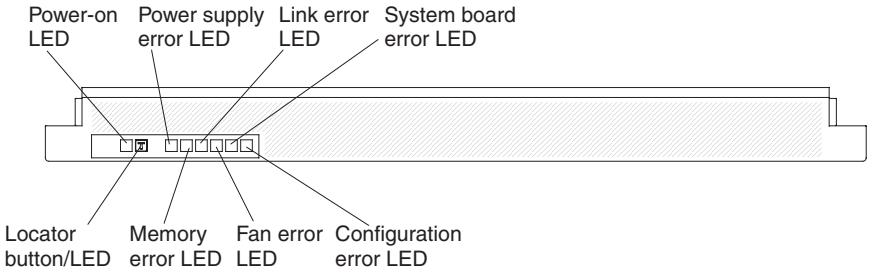
Memory expansion module indicators, LEDs, and power

This section describes the indicators and light-emitting diodes (LEDs) on the front and rear of the IBM MAX5 for System x memory expansion module.

Front view

The following illustration shows the indicators on the front of the memory expansion module. All of the LEDs are controlled by the server integrated management module (IMM).

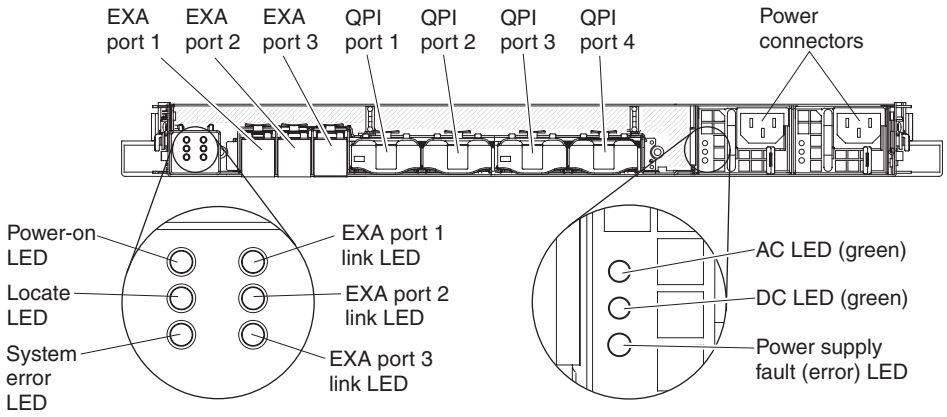
Note: The memory expansion module does not have a power-on button. The memory expansion module and all other functions are controlled by the server to which it is connected.



- **Operator information panel:** This panel contains the indicators for the memory expansion module.
  - **Power-on LED:** When this green LED is lit, it indicates that the memory expansion module is powered on.
  - **Locate LED:** Use this blue LED to locate the memory expansion module. The locate LED also has a button that you can press to light up other servers or other memory expansion modules to which the memory expansion module is connected.
  - **Power supply fault (error) LED:** When this amber LED is lit, it indicates a faulty hot-swap power-supply.
  - **Memory error LED:** When this amber LED is lit, it indicates a DIMM problem.
  - **Link error LED:** When this amber LED is lit, indicates that a QPI link fault or a EXA link fault has occurred. The port LED for the link that has been disconnected will not be lit on the rear of the memory expansion module. EXA link LEDs are on the rear of the memory expansion module and the QPI link LEDs are on the server to which the memory expansion module is connected.
  - **Fan error LED:** When this amber LED is lit, it indicates a fan error.
  - **System board error LED:** When this amber LED is lit, it indicates a memory expansion module system-board tray error.
  - **Configuration error LED:** When this amber LED is lit, it indicates a configuration error. The memory error LED might be lit to indicate a memory configuration error.

Rear view

The following illustration shows the indicators on the rear of the IBM MAX5 for System x memory expansion module:



- **Power-on LED:** When this green LED is lit, it indicates that the memory expansion module is powered on. This LED is functionally equivalent to the power-on LED on the front of the memory expansion module.
- **Locate LED:** When this blue LED is lit, it indicates that the command from the server IMM to the memory expansion module is complete. Use this blue LED to locate the memory expansion module. The front locate LED also has a button that you can press to locate other servers or other memory expansion modules to which the memory expansion module is connected. This LED is functionally equivalent to the locate LED on the front of the memory expansion module.
- **System error LED:** When this LED is lit, it indicates that a system error has occurred.
- **QPI ports:**Insert either a QPI cable or a filler panel in each of these connectors.

  Note: When you handle the QPI cables, take precautions to avoid damaging the high density interface. Dropping or incorrectly connecting the QPI cables can damage the high density interface. Store the protective covers that come on the end of the QPI cables for reuse when you perform maintenance on the server or memory expansion module or when you remove the cables of any reason.
- **Power connector:** Connect the power cord to this connector.
- **AC power LED:** Each hot-swap power supply has an ac power LED and a dc power LED. When the ac power LED is lit, it indicates that sufficient power is coming into the power supply through the power cord. During typical operation, both the ac and dc power LEDs are lit.
- **DC power LED:** Each hot-swap power supply has a dc power LED and an ac power LED. When the dc power LED is lit, it indicates that the power supply is supplying adequate dc power to the memory expansion module. During normal operation, both the ac and dc power LEDs are lit.
- **EXA link LED:** When this green LED is lit, it indicates that a EXA link is functioning.

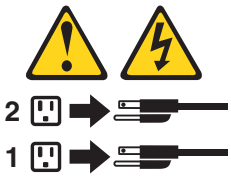
Turning the memory expansion module on and off

Because the memory expansion module is controlled by the server, turning on the memory expansion module refers to connecting the memory expansion module power cord into the power source and pressing the power-control button on a host server that is connected to the memory expansion module and is configured to identify the expansion module. Normally, the operating system on the server starts, and the server issues a power-on request to the memory expansion module. The memory expansion module is turned off only if the connected server issues a

power-off request, and you have disconnected the memory expansion module power cord from the power source. You cannot turn off the memory expansion module manually.

Statement 5

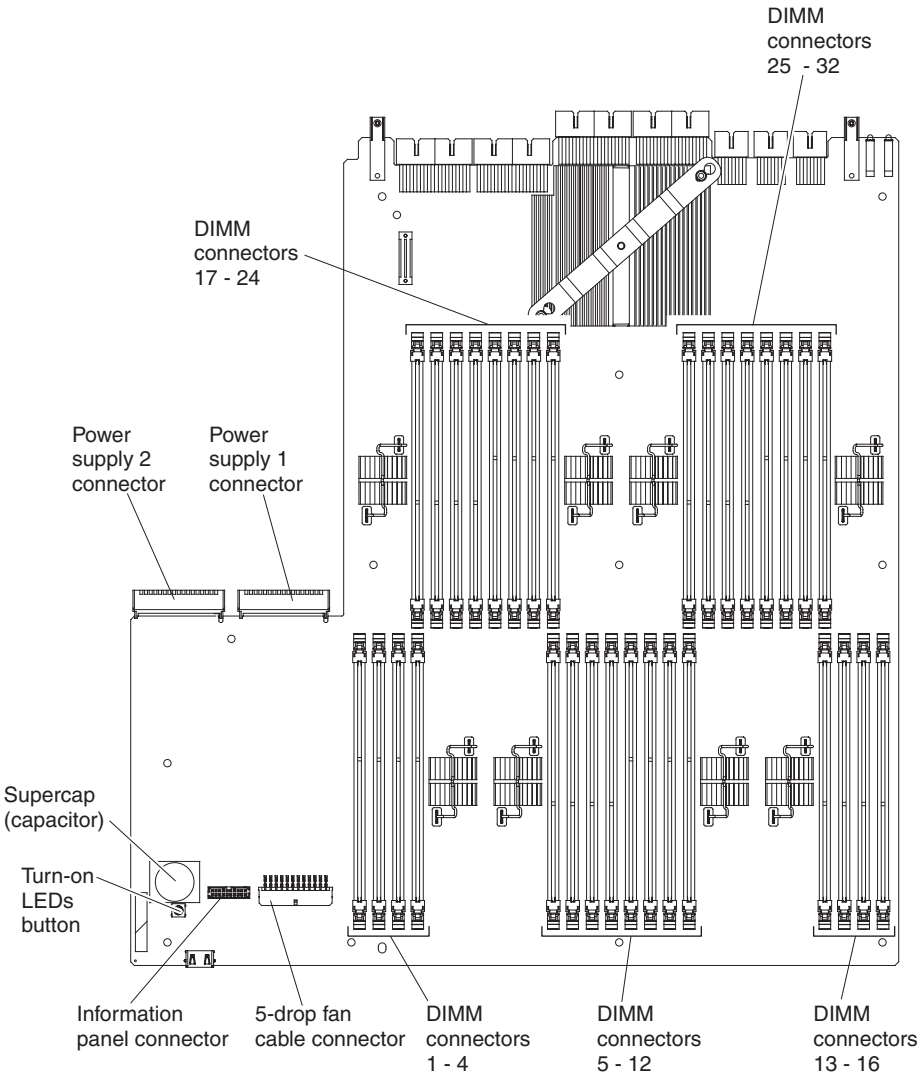
CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from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



You can disconnect the memory expansion module power cords from the power source to shut off all power immediately without damaging the memory expansion module, but it might cause an unrecoverable error and loss of data on the connected server.

Memory expansion module internal connectors and buttons

The illustrations in this section show the internal connectors and buttons on the memory expansion module system-board tray. The illustrations might differ slightly from your hardware.



Chapter 3. Diagnostics

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

If you cannot diagnose and correct a problem by using the information in this chapter, see "Getting help and technical assistance," on page 359for more information.

Diagnostic tools

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

- **Light path diagnostics**

  Use light path diagnostics to diagnose system errors quickly. See "Light path diagnostics" on page 58 for more information.

- **IBM Dynamic System Analysis**

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

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

  Note: Use the latest available version of DSA to make sure that you are using the most recent configuration data.

- **Troubleshooting tables**

  These tables list problem symptoms and actions to correct the problems. See "Troubleshooting tables" on page 44.

- **IBM Electronic Service Agent**

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

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- **POST error codes and error logs**

  The power-on self-test (POST) generates messages to indicate successful test completion or the detection of a problem. See "POST error codes" on page 34 for more information.

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 POST and system management interrupt (SMI) events and all events that are generated by the BMC that is embedded in the IMM. You can view the system-event log through the Setup utility and through the Dynamic System Analysis (DSA) program (as IPMI event log).

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

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

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

Note: In a two-node configuration, many critical events and their recovery events are forwarded to the primary server. For a complete listing of all the events, go to each node to view the logs.

Viewing event logs through the Setup utility

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

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

Viewing event logs without restarting the server

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

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

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

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

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

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

Table 10. Methods for viewing event logs

Condition	Action
The server is not hung and is connected to a network.	Use any of the following methods: • Run DSA Portable to view the event logs or create an output file that you can send to IBM service. • In a web browser, type the IP address of the IMM and go to the Event Log page. • Use IPMItool to view the system-event log.
The server is not hung and is not connected to a network.	Use IPMItool locally to view the system-event log.
The server is hung.	• Restart the server and press F2 to start DSA Preboot and view the event logs. • Alternatively, you can restart the server and press F1 to start the Setup utility and view the POST event log or system-event log. For more information, see “Viewing event logs through the Setup utility” on page 32.

POST error codes

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

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

If POST is completed without detecting any problems, the server startup is completed.

If POST detects a problem, an error message is sent to the POST event log.

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

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Replaceable server components" on page 238 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	POST error description	Action
0010002	Microprocessor not supported	1. Determine whether a new microprocessor has been installed in the server. 2. Reseat the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Microprocessor 1 b. (Trained service technician only) Microprocessors 2, 3, and 4 (if they are installed) 3. (Trained service technician only) Remove microprocessor 2 and restart the server. 4. (Trained service technician only) Remove microprocessor 1 and install microprocessor 2 in the microprocessor 1 connector. Restart the server. If the error is corrected, microprocessor 1 is bad and must be replaced. Repeat this step for microprocessors 2, 3, and 4 if necessary. 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Microprocessor 1 b. (Trained service technician only) Microprocessors 2, 3, and 4 c. (Trained service technician only) Microprocessor board

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Replaceable server components" on page 238 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	POST error description	Action
0011000	Invalid microprocessor type	1. If you have installed a new microprocessor, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ to verify that you installed a supported microprocessor. 2. Update the firmware (see "Updating the firmware" on page 337). 3. (Trained service technician only) Remove and replace the affected microprocessor (error LED is lit) with a supported type.
0011002	Microprocessor mismatch	1. If you have installed a new microprocessor, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ to verify that you installed a supported microprocessor. 2. Run the Setup utility and view the microprocessor information to compare the installed microprocessor specifications. 3. (Trained service technician only) Remove and replace one of the microprocessors so that they both match.
0011004	Microprocessor failed built-in self-test (BIST)	1. Update the firmware (see "Updating the firmware" on page 337). 2. (Trained service technician only) Reseat microprocessor 2. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Microprocessor b. (Trained service technician only) Microprocessor board
001100A	Microcode update failed	1. Update the server firmware (see "Updating the firmware" on page 337). 2. (Trained service technician only) Replace the microprocessor.
0050001	DIMM disabled	1. Make sure the DIMM is installed correctly (see "Replacing a DIMM" on page 284). 2. If the DIMM was disabled because of a memory fault, follow the suggested actions for that error event and restart the server. 3. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Replaceable server components" on page 238 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	POST error description	Action
0051003	Uncorrectable DIMM error	1. Check IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. Swap one of the affected DIMM with a similar DIMM (size/type) on a different channel. 3. Re-enable all DIMM slots. 4. If failure remains on original slots, replace the DIMM that was not moved. if the failure follows the DIMM that was moved, replace the DIMM that was swapped. 5. If problem re-occures with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace Memory card.
0051006	DIMM mismatch detected	Make sure that the DIMMs match and are installed in the correct sequence (see "Memory cards and memory modules (DIMM)" on page 275).
0051009	No memory detected	1. Make sure that the server contains active memory connectors that contain DIMMs. 2. Reseat the memory cards. 3. Reseat the DIMMs. 4. Install the memory cards and DIMMs in the correct sequence (see "Memory cards and memory modules (DIMM)" on page 275).
005100A	No usable memory detected	1. Make sure that the server contains active memory connectors that contain DIMMs. 2. Reseat the memory cards. 3. Reseat the DIMMs. 4. Install the memory cards and DIMMs in the correct sequence (see "Memory cards and memory modules (DIMM)" on page 275). 5. Clear CMOS memory (remove battery for two minutes) to re-enable all the memory connectors.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Replaceable server components" on page 238 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	POST error description	Action
0058001	PFA threshold exceeded	1. Check IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. At the next maintenance opportunity, swap affected DIMM (as indicated by the Light path diagnostics, see "Light path diagnostics" on page 58 or failure log entry) to a different memory channel or CPU (check PDSG/Install guide for population requirements for sparing/paring modes). 3. If PFA re-occurs (on the same DIMM) replace the affected DIMM as indicated by the Light path diagnostics, see "Light path diagnostics" on page 58 or failure log entry (check for previous history of PFA). 4. If problem stays with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace the Memory card. 5. Replace the CPU board
0058007	DIMM population is unsupported	1. If you have installed DIMMs, verify that the DIMMs you have installed are supported. For a list of the supported DIMMs for the server, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. 2. Reseat the memory cards and DIMMs, and then restart the server. 3. 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 server. Repeat as necessary. If the failures continue, go to step "POST error codes" on page 34. 4. Return the removed DIMMs, one pair at a time, to their original connectors, restarting the server after each pair, until a pair fails. Replace the DIMMs in the failed pair with identical known good DIMMs, restarting the server after each DIMM is installed. Replace the failed DIMM. Repeat this step until you have tested all removed DIMMs. 5. Replace the memory card.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Replaceable server components" on page 238 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	POST error description	Action
0058008	DIMM failed memory test	1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. Swap one of the affected DIMM with a similar DIMM (size/type) on a different channel. 3. Re-enable all DIMM slots. 4. If the failure remains on the original slots, replace the DIMM that was not moved. if the failure follows the DIMM that was moved, replace the DIMM that was swapped. 5. If the problem re-occures with the same DIMM connector, inspect the DIMM connector for foreign material. If damaged, replace the Memory card.
00580A1	Invalid DIMM population for mirroring mode	1. If a fault LED is lit, resolve the failure (see "Light path diagnostics panel" on page 11 and "Memory cards and memory modules (DIMM)" on page 275. 2. Install the memory cards and DIMMs in the correct sequence (see "Memory cards and memory modules (DIMM)" on page 275).
00580A4	Memory population changed	Information only. Memory has been added, moved, or changed. No action required.
00580A5	Mirror failover complete	Information only. Memory redundancy has been lost. Check the event log for uncorrected DIMM failure events.
00580B0	Memory SMI LINK failure	1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. Check the Memory card and associated Planar connector/ Pins for damage. 3. Check Memory card associated CPU socket & CPU (Use the CPU installation/removal tool.). 4. Replace the memory card (or board if error occurred on MEU).
00580B1	Memory SMI line failover	No action; information only.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Replaceable server components" on page 238 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	POST error description	Action
0068002	CMOS battery cleared	1. Reseat the battery (see "I/O-board connectors" on page 22 for the battery location). 2. Clear the CMOS memory. (To clear CMOS memory, remove the battery for two minutes.) 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Battery b. (Trained service technician only) I/O board
2018001	PCI Express uncorrected or uncorrected error	1. Check the I/O-board LEDs. 2. Reseat all affected adapters. 3. Update the PCI device firmware. 4. Remove the adapters from the I/O board. 5. Replace the following components one at a time in the order shown, restarting the server each time. a. The adapters b. (Trained service technician only) The I/O-board shuttle.
2018002	Option ROM resource allocation failure	Informational message that some devices might not be initialized. 1. If possible, rearrange the order of the adapters in the PCI slots to change the load order of the optional-device ROM code. 2. Run the Setup utility, select **Start Options**, and change the boot priority to change the load order of the optional-device ROM code. 3. Run the Setup utility and disable some other resources, if their functions are not being used, to make more space available. Select **Devices and I/O Ports** to disable any of the integrated devices. 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Each adapter b. (Trained service technician only) I/O-board shuttle
3*xx*0007 (*xx* can be 00 - 19)	Firmware fault detected, system halted	1. Recover the server firmware to the latest level (see "Updating the firmware" on page 337. 2. Undo any recent configuration changes, or clear CMOS memory to restore the settings to the default values. (To clear CMOS memory, remove the battery for two minutes.) 3. Remove any recently installed hardware.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Replaceable server components" on page 238 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	POST error description	Action
3038003	Firmware corrupted	1. Run the Setup utility, select **Load Default Settings**, and save the settings to recover the server firmware. 2. (Trained service technician only) Replace the I/O-board shuttle.
3048005	Booted secondary (backup) server firmware image	Information only. The backup switch was used to boot the secondary bank.
3048006	Booted secondary (backup) server firmware image because of ABR	1. Run the Setup utility, select **Load Default Settings**, and save the settings to recover the primary server firmware settings. 2. Turn off the server and remove it from the power source. 3. Reconnect the server to the power source, and then turn on the server.
305000A	RTC date/time is incorrect	1. Adjust the date and time settings in the Setup utility, and then restart the server and verify that the new settings remain. 2. Reseat the battery, and then restart the server to see if the correct date and time are shown. 3. Replace the following components one at a time, in the order shown, restarting the server each time to verify that the correct date and time are shown: a. Battery b. (Trained service technician only) I/O-board shuttle.
3058001	System configuration invalid	1. Run the Setup utility, and select **Save Settings**. 2. Run the Setup utility, select **Load Default Settings**, and save the settings. 3. Reseat the following components one at a time in the order shown, restarting the server each time: a. Battery b. Suspected device (if the device is a FRU, it must be reseated by a trained service technician only) 4. Replace the following components one at a time, in the order shown, restarting the server each time: a. Battery b. Suspected device (if the device is a FRU, it must be replaced by a trained service technician only) c. (Trained service technician only) I/O-board shuttle

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Replaceable server components" on page 238 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	POST error description	Action
3058004	Three boot failures	1. Undo any recent system changes, such as new settings or newly installed devices. 2. Make sure that the server is attached to a reliable power source. 3. Remove all hardware that is not listed on the ServerProven website (see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/). 4. Make sure that the operating system is not corrupted. 5. Run the Setup utility, save the configuration, and then restart the server.
3108007	System configuration restored to default settings	Information only. This message is usually associated with the CMOS battery clear event.
3138002	Boot configuration error	1. Remove any recent configuration changes that you made in the Setup utility. 2. Run the Setup utility, select **Load Default Settings**, and save the settings.
3808000	IMM communication failure	1. Remove power from the server for 30 seconds, and then reconnect the server to power and restart it. 2. Update the IMM firmware. 3. (Trained service technician only) Replace the I/O-board shuttle.
3808002	Error updating system configuration to IMM	1. Remove power from the server, and then reconnect the server to power and restart it. 2. Run the Setup utility and select **Save Settings**. 3. Update the firmware.
3808003	Error retrieving system configuration from IMM	1. Remove power from the server, and then reconnect the server to power and restart it. 2. Run the Setup utility and select **Save Settings**. 3. Update the IMM firmware.
3808004	IMM system event log full	• When out-of-band, use the IMM web interface or IPMItool to clear the logs from the operating system. • When using the local console: 1. Run the Setup utility. 2. Select **System Event Logs**. 3. Select **Clear System Event Log**. 4. Restart the server.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Replaceable server components" on page 238 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	POST error description	Action
3818001	Core Root of Trust Measurement (CRTM) update failed	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the microprocessor board.
3818002	Core Root of Trust Measurement (CRTM) update aborted	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the microprocessor board.
3818003	Core Root of Trust Measurement (CRTM) flash lock failed	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the microprocessor board.
3818004	Core Root of Trust Measurement (CRTM) system error	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the microprocessor board.
3818005	Current Bank Core Root of Trust Measurement (CRTM) capsule signature invalid	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the microprocessor board.
3818006	Opposite bank CRTM capsule signature invalid	1. Switch the firmware bank to the backup bank. 2. Run the Setup utility, select **Load Default Settings**, and save the settings. 3. Switch the bank back to the current bank. 4. (Trained service technician only) Replace the microprocessor board.
3818007	CRTM update capsule signature invalid	1. Run the Setup utility, select **Load Default Settings**, and save the settings. 2. (Trained service technician only) Replace the microprocessor board.
3828004	AEM power capping disabled	1. Check the settings and the event logs. 2. Make sure that the Active Energy Manager feature is enabled in the Setup utility. Select **System Settings > Power > Active Energy Manager > Capping Enabled**. 3. Update the server firmware. 4. Update the IMM firmware.

Checkout procedures

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

About the checkout procedure

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

- Read the safety information that begins with "Safety" on page v.
- IBM Dynamic System Analysis (DSA) provides the primary method of testing the major components of the server, such as the microprocessor board, Ethernet controller, DIMMs, memory controller, optical drives, and hard disk drives. You can also use them to test some external devices. If you are not sure whether a problem is caused by the hardware or by the software, you can use DSA to confirm that the hardware is working correctly.
- When you run DSA, a single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run DSA.

  Exception: If multiple error codes or light path diagnostics LEDs indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket. See "Microprocessor problems" on page 50 for information about diagnosing microprocessor problems.
- Before you run the diagnostic programs, you must determine whether the failing server is part of a shared hard disk drive cluster (two or more servers sharing external storage devices). If it is part of a cluster, you can run all diagnostic programs except the ones that test the storage unit (that is, a hard disk drive in the storage unit) or the storage adapter that is attached to the storage unit. The failing server might be part of a cluster if any of the following conditions is true:
  - You have identified the failing server as part of a cluster (two or more servers sharing external storage devices).
  - One or more external storage units are attached to the failing server and at least one of the attached storage units is also attached to another server or unidentifiable device.
  - One or more servers are located near the failing server.

  Important: If the server is part of a shared hard disk drive cluster, run one test at a time. Do not run any suite of tests, such as "quick" or "normal" tests, because this might enable the hard disk drive diagnostic tests.
- In a two-node configuration, be sure to check the LEDs and view the logs on both servers to determine whether the error occurred on the primary or secondary server.
- If the server is halted and a POST error code is displayed, see "POST error codes" on page 34. If the server is halted and no error message is displayed, see "Troubleshooting tables" on page 44 and "Solving undetermined problems" on page 233.
- For information about power-supply problems, see "Power problems" on page 54 and "Power-supply LEDs" on page 68.
- For intermittent problems, check the event logs; see "Event logs" on page 32 and "IBM Dynamic System Analysis" on page 70.

Performing the checkout procedure

To perform the checkout procedure, complete the following steps:

1. Is the server part of a cluster?
   - **No:** Go to step "Performing the checkout procedure."
   - **Yes:** Shut down all failing servers that are related to the cluster. Go to step "Performing the checkout procedure."
2. Complete the following steps:
   a. Check the power-supply LEDs (see "Power-supply LEDs" on page 68).
   b. Turn off the server and all external devices.
   c. Check all internal and external devices for compatibility (see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ for additional information).
   d. Check all cables and power cords.
   e. Set all monitor controls to the middle positions.
   f. Turn on all external devices.
   g. Turn on the server. If the server does not start, see "Troubleshooting tables."
   h. Check the system-error LED on the operator information panel. If it is flashing, check the light path diagnostics LEDs (see "Light path diagnostics" on page 58).
   i. Check for the following results:
      - Successful completion of POST
      - Successful completion of startup, which is indicated by a readable display of the operating-system desktop
3. Is there a readable image on the monitor screen?
   - **No:** Find the failure symptom in "Troubleshooting tables"; if necessary, see "Solving undetermined problems" on page 233.
   - **Yes:** Run DSA (see "IBM Dynamic System Analysis" on page 70).
     – If DSA reports an error, follow the instructions in "DSA messages" on page 72.
     – If DSA does not report an error but you still suspect a problem, see "Solving undetermined problems" on page 233.

Troubleshooting tables

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

If you cannot find a problem in these tables, see "IBM Dynamic System Analysis" on page 70 for information about testing the server.

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

1. Check the light path diagnostics LEDs on the operator information panel (see "Light path diagnostics" on page 58).
2. Remove the software or device that you just added.

3. Run IBM Dynamic System Analysis (DSA) to determine whether the server is running correctly (for information about using DSA, see "IBM Dynamic System Analysis" on page 70).
4. Reinstall the new software or new device.

CD or DVD drive problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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 CD or DVD drive is not recognized.	1. Make sure that: • The IDE or SATA channel to which the CD or DVD drive is attached (primary or secondary) is enabled in the Setup utility. • The signal cable and connector are not damaged and the connector pins are not bent. • All cables and jumpers are installed correctly. • The correct device driver is installed for the CD or DVD drive. 2. Run the CD or DVD drive diagnostic programs (see "IBM Dynamic System Analysis" on page 70). 3. Reseat the following components: a. CD or DVD drive (see "Removing the DVD drive" on page 265 and "Replacing the DVD drive" on page 266) b. CD or DVD drive cable c. I/O-board assembly (see "Removing the I/O-board shuttle" on page 287 and "Replacing the I/O-board shuttle" on page 288) 4. Replace the components listed in step "CD or DVD drive problems" one at a time, in the order shown, restarting the server each time.
A CD or DVD is not working correctly.	1. Clean the CD or DVD. 2. Use a different CD or DVD in the drive. 3. Run the CD or DVD drive diagnostic programs (see "IBM Dynamic System Analysis" on page 70). 4. Check the connector and signal cable for bent pins or damage. 5. Reseat the CD or DVD drive (see "Removing the DVD drive" on page 265 and "Replacing the DVD drive" on page 266). 6. Replace the CD or DVD drive.
The CD or DVD drive tray is not working or opening.	1. Make sure that the server is turned on. 2. Insert the end of a straightened paper clip into the manual tray-release opening. 3. Reseat the CD or DVD drive (see "Removing the DVD drive" on page 265 and "Replacing the DVD drive" on page 266). 4. Replace the CD or DVD drive.

Embedded hypervisor problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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 embedded hypervisor device is not listed in the expected boot order, or is not in the list of boot devices, or a similar problem has occurred.	1. Make sure the embedded hypervisor device is selected in the boot menu (in the Setup utility and in Select Boot Device). 2. If the embedded hypervisor is on an internal flash memory device, make sure that the internal flash memory device is seated in the connector correctly (see "Removing the internal flash memory" on page 285 and "Replacing the internal flash memory" on page 285). 3. See the documentation that comes with the embedded hypervisor for setup and configuration information. 4. Make sure that other software works on the server.

General problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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 LED is not working or a similar problem has occurred.	If the part is a CRU, replace it. If the part is a FRU, the part must be replaced by a trained service technician (see "Replaceable server components" on page 238 to determine whether the part is a CRU or a FRU).

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, Types 7145, 7146, 7143, and 7191," on page 237 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
Not all drives are recognized by the DSA hard disk drive diagnostic test.	Remove the drive that is indicated by DSA (see "Removing a hot-swap hard disk drive" on page 267); then, run the hard disk drive diagnostic test again (see "IBM Dynamic System Analysis" on page 70). If the remaining drives are recognized, replace the drive that you removed with a new one.
The server stops responding during the hard disk drive diagnostic test.	Remove the hard disk drive that was being tested when the server stopped responding (see "Removing a hot-swap hard disk drive" on page 267), and run the diagnostic test again (see "IBM Dynamic System Analysis" on page 70). If the hard disk drive diagnostic test runs successfully, replace the drive that you removed with a new one (see "Replacing a hot-swap hard disk drive" on page 267).

- **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, Types 7145, 7146, 7143, and 7191," on page 237 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 was not detected while the operating system was being started.	Reseat all hard disk drives and cables; then, run the DSA hard disk drive diagnostic test again (see "IBM Dynamic System Analysis" on page 70).
A hard disk drive passes the DSA hard disk drive diagnostic test but the problem remains.	Run the diagnostic SAS Fixed Disk Test (see "IBM Dynamic System Analysis" on page 70). **Note:** This test is not available to servers that use RAID or servers with IDE or SATA hard disk drives.

Intermittent problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
A problem occurs only occasionally and is difficult to diagnose.	1. Make sure that: • All cables and cords are connected securely to the rear of the server and attached devices. • When the server is turned on, air is flowing from the fan grill. If there is no airflow, the fan is not working. This can cause the server to overheat and shut down. 2. Check the event logs (see "Event logs" on page 32). 3. See "Solving undetermined problems" on page 233.

USB keyboard, mouse, or pointing-device problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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 or some keys on the keyboard do not work.	1. If you have installed a USB keyboard, run the Setup utility and enable keyboardless operation to prevent the POST error message 301 from being displayed during startup. 2. See http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ for information about keyboard compatibility. 3. Make sure that: • The keyboard cable is securely connected. • The server and the monitor are turned on. 4. Reseat the following components: a. Keyboard b. I/O-board assembly (see "Removing the I/O-board shuttle" on page 287 and "Replacing the I/O-board shuttle" on page 288) 5. Replace the components listed in step "USB keyboard, mouse, or pointing-device problems" one at a time, in the order shown, restarting the server each time.
The USB mouse or USB pointing device does not work.	1. See http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ for information about mouse compatibility. 2. Make sure that: • The mouse or pointing-device USB cable is securely connected to the server, and the device drivers are installed correctly. • The server and the monitor are turned on. • Keyboardless operation is enabled in the Setup utility. 3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server. 4. Reseat the following components: a. Mouse or pointing device b. I/O-board assembly (see "Removing the I/O-board shuttle" on page 287 and "Replacing the I/O-board shuttle" on page 288) 5. Replace the components listed in step "USB keyboard, mouse, or pointing-device problems" one at a time, in the order shown, restarting the server each time.

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, Types 7145, 7146, 7143, and 7191," on page 237 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.	**Note:** If you change the memory, you must update the memory configuration in the Setup utility. 1. Make sure that: • No error LEDs are lit on the operator information panel, the memory card, or on the memory expansion module. • Memory mirroring does not account for the discrepancy. • Scalability does not account for the discrepancy. **Note:** Each node in a multi-node configuration uses 256 MB of system memory. • In a two-node configuration, make sure that both nodes have started and all the devices between the two nodes have been counted. • The memory modules are seated correctly (see "Removing a DIMM" on page 283 and "Replacing a DIMM" on page 284). • You have installed the correct type of memory. • If you changed the memory, you updated the memory configuration in the Setup utility. • All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled. 2. Check the POST event log for error message 289. If a DIMM was disabled, run the Setup utility and enable the DIMM. See Chapter 6, "Configuration information and instructions," on page 337. 3. Run memory diagnostics (see "IBM Dynamic System Analysis" on page 70). 4. Make sure that there is no memory mismatch when the server is at the minimum memory configuration (two 1 GB DIMMs). 5. Reinstall the removed DIMMs, one pair at a time, in the memory cards and the memory expansion module, making sure that the DIMMs in each pair match. 6. Reinstall the removed memory cards one memory card at a time (see "Removing a memory card" on page 281 and "Replacing a memory card" on page 282), making sure that the DIMMs on each card match. 7. Reseat the following components: a. DIMM b. Memory card 8. Replace the components listed in step "Memory problems" one at a time, in the order shown, restarting the server each time. 9. If the DIMM was disabled, run the Setup utility and enable the DIMM. See Chapter 6, "Configuration information and instructions," on page 337. For additional information about memory, see the *IBM eX5 Portfolio Overview IBM System x3850 X5, x3950 X5, and BladeCenter HX5* at http://www.redbooks.ibm.com/abstracts/tips0054.html.

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, Types 7145, 7146, 7143, and 7191," on page 237 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 server does not function after replacing the primary microprocessor or the primary microprocessor error LED is lit.	1. Correct any errors that are indicated by the light path diagnostics LEDs (see "Light path diagnostics" on page 58). 2. Make sure that the server supports all the microprocessors and that the microprocessors match in speed and cache size. 3. Reseat the following components: a. Microprocessor 1 (see "Removing a microprocessor and heat sink" on page 302) b. (Trained service technician only) Microprocessor board (see "Removing the microprocessor-board assembly" on page 310 and "Replacing the microprocessor-board assembly" on page 313) 4. (Trained service technician only) If there is no indication of which microprocessor has failed, isolate the error by testing with one microprocessor at a time. 5. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Microprocessor 1 b. (Trained service technician only) Microprocessor board 6. (Trained service technician only) If multiple error codes or light path diagnostics LEDs indicate a microprocessor error, reverse the locations of two microprocessors to determine whether the error is associated with a microprocessor or with a microprocessor socket. • (Trained service technician only) If the error is associated with a microprocessor, replace the microprocessor. • (Trained service technician only) If the error is associated with a microprocessor socket, replace the microprocessor board.

Monitor or video problems

If you suspect a problem with your monitor, see the documentation that comes with the monitor for instructions for testing and adjusting the monitor. If you cannot diagnose the problem, call for service.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
Testing the monitor.	1. Make sure that the monitor cables are firmly connected. 2. In a two-node configuration, make sure that the monitor is connected to the primary server. 3. Try using a different monitor on the server, or try testing the monitor on a different server. 4. Replace the I/O-board shuttle.
The screen is blank.	1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the monitor cable directly to the correct connector on the rear of the server. 2. Make sure that: • The server is turned on. If there is no power to the server, see "Power problems" on page 54. • The monitor cables are connected correctly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. 3. Make sure that the correct server is controlling the monitor, if applicable. 4. Make sure that damaged server firmware is not affecting the video; see "Recovering the server firmware" on page 167 for information about recovering from server firmware failure. 5. Observe the checkpoint code display on the light path diagnostics panel; if the codes are changing, go to the next step. 6. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor b. Video adapter (if one is installed) c. Replace the I/O-board shuttle. 7. See "Solving undetermined problems" on page 233 for information about solving undetermined problems.
The monitor works when you turn on the server, but the screen goes blank when you start some application programs.	Make sure that: • The application program is not setting a display mode that is higher than the capability of the monitor. • You installed the necessary device drivers for the application.

- **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, Types 7145, 7146, 7143, and 7191," on page 237 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 monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	1. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. **Attention:** Moving a color monitor while it is turned on might cause screen discoloration. Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor. **Note:** a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.). b. Non-IBM monitor cables might cause unpredictable problems. 2. Reseat the monitor cable 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor cable b. Monitor c. I/O-board shuttle
Wrong characters appear on the screen.	1. If the wrong language is displayed, update the server firmware with the correct language. 2. Reseat the monitor cable. 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Monitor b. I/O-board shuttle

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, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
An IBM optional device that was just installed does not work.	1. Make sure that: • The device is designed for the server (see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/). • You followed the installation instructions that came with the device and the device is installed correctly. • You have not loosened any other installed devices or cables. • You updated the configuration information in the Setup utility. Whenever memory or any other device is changed, you must update the configuration. 2. Reseat the device that you just installed. 3. Replace the device that you just installed.
An IBM optional device that used to work does not work now.	1. Make sure that all of the hardware and cable connections for the device are secure. 2. If the device comes with test instructions, use those instructions to test the device. 3. If the failing device is a SCSI device, make sure that: • The cables for all external SCSI devices are connected correctly. • The last device in each SCSI chain, or the end of the SCSI cable, is terminated correctly. • Any external SCSI device is turned on. You must turn on an external SCSI device before turning on the server. 4. Reseat the failing device. 5. Replace the failing device.
POST reports the following PCI event: Redundant PCI Host Bridge IB Link Failed. Slot Number = NA. Bus Number = NA.Device ID = 0xffff. Vendor ID = 0xffff	1. Check for bent pins between the I/O-board shuttle and the microprocessor board. 2. Replace the failing device.

Power problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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, and the reset button does not work (the server does not start). **Note:** The power-control button will not function for up to 3 minutes after the server has been connected to ac power.	1. Check the light path to determine whether any LEDs are lit. If they are, follow the instructions for correcting light path errors (see "Light path diagnostics LEDs" on page 62). 2. Make sure that the operator information panel power-control button is working correctly: a. Disconnect the ac power cord for 20 seconds; then, reconnect the ac power cord and restart the server. b. Reseat the operator information panel cables, and then repeat step a. • If the server starts, reseat the operator information panel (see "Removing the operator information panel assembly" on page 268 and "Replacing the operator information panel assembly" on page 268). If the problem remains, replace the operator information panel. • If the server does not start, reseat the operator information panel. If the problem remains, replace the operator information panel. 3. Make sure that the reset button is working correctly: a. Disconnect the server power cords. b. Reconnect the power cords. c. Reseat the light path diagnostics panel cable (the operator information panel ribbon cable), and then repeat steps a and b. • If the server starts, replace the operator information panel (see "Removing the operator information panel assembly" on page 268 and "Replacing the operator information panel assembly" on page 268). • If the server does not start, go to step a and b. 4. Make sure that: • The power cords are correctly connected to the server and to a working electrical outlet. • The type of memory that is installed is correct. • The memory card is fully seated. • The LEDs on the power supply do not indicate a problem. • The microprocessors are installed in the correct sequence. • The firmware levels in the server and the memory expansion module are all the same. • The microprocessor types in the server and the memory expansion module are all the same. (Continued on the next page)

- **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, Types 7145, 7146, 7143, and 7191," on page 237 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
(continued)	1. Reseat the following components: a. Memory card (see "Removing a memory card" on page 281 and "Removing the memory-card cage" on page 314) b. Operator information panel (see "Removing the operator information panel assembly" on page 268 and "Replacing the operator information panel assembly" on page 268) c. (Trained service technician only) Microprocessor board (see "Removing the microprocessor-board assembly" on page 310 and "Replacing the microprocessor-board assembly" on page 313) 2. Replace the following components one at a time, in the order shown, restarting the server each time: a. Memory card b. Operator information panel c. (Trained service technician only) Microprocessor board 3. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports. 4. See "Power-supply LEDs" on page 68. 5. See "Solving undetermined problems" on page 233.
The server does not turn off.	1. Determine whether you are using an Advanced Configuration and Power Management (ACPI) or a non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps: a. Press Ctrl+Alt+Delete. b. Turn off the server by holding the power-control button for 5 seconds. c. Restart the server. d. If the server fails POST and the power-control button does not work, disconnect the ac power cord for 20 seconds; then, reconnect the ac power cord and restart the server. 2. If the problem remains or if you are using an ACPI-aware operating system, suspect the microprocessor board.
The server unexpectedly shuts down, and the LEDs on the operator information panel are not lit.	See "Solving undetermined problems" on page 233.

Serial-device problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Symptom	Action
The number of serial ports that are identified by the operating system is less than the number of installed serial ports.	1. Make sure that: • Each port is assigned a unique address in the Setup utility and none of the serial ports is disabled. • The serial-port adapter (if one is present) is seated correctly. 2. Reseat the serial port adapter (see "Removing an adapter" on page 262 and "Replacing an adapter" on page 263). 3. Replace the serial port adapter.
A serial device does not work.	1. Make sure that: • The device is compatible with the server. • The serial port is enabled and is assigned a unique address. • The device is connected to the correct connector (see "Internal LEDs, connectors, and jumpers" on page 18). 2. Reseat the following components: a. Failing serial device b. Serial cable c. I/O-board assembly (see "Removing the I/O-board shuttle" on page 287 and "Replacing the I/O-board shuttle" on page 288) 3. Replace the components listed in step 2, one at a time, in the order shown, restarting the server each time.

ServerGuide problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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 *ServerGuide Setup and Installation* CD will not start.	1. Make sure that the server supports the ServerGuide program and has a startable (bootable) CD or DVD drive. 2. If the startup (boot) sequence settings have been changed, make sure that the CD or DVD drive is first in the startup sequence. 3. If more than one CD or DVD drive is installed, make sure that only one drive is set as the primary drive. Start the CD from the primary drive.
The operating-system installation program continuously loops.	Make more space available on the hard disk.
The ServerGuide program will not start the operating-system CD.	Make sure that the operating-system CD is supported by the ServerGuide program. See the *ServerGuide Setup and Installation* CD label for a list of supported operating-system versions.

- **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, Types 7145, 7146, 7143, and 7191," on page 237 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 operating system cannot be installed; the option is not available.	Make sure that the server supports the operating system. If it does, either no logical drive is defined (SCSI RAID systems), or the ServerGuide System Partition is not present. Run the ServerGuide program and make sure that setup is complete.

Software problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

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

Universal Serial Bus (USB) port problems

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.	1. Run USB diagnostics (see "IBM Dynamic System Analysis" on page 70). 2. Make sure that: • The correct USB device driver is installed. • The operating system supports USB devices. 3. Make sure that the USB configuration options are set correctly in the Setup utility (see "Configuring the server" on page 337 for more information). 4. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.

Video problems

See "Monitor or video problems" on page 50.

Light path diagnostics

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

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

Any memory-card LED can be lit while the memory card is removed from the server so that you can isolate a problem. After ac power has been removed from the server, power remains available to these LEDs for up to 24 hours.

To view the memory card LEDs, press and hold the light path diagnostics button on the memory card to light the error LEDs. The LEDs that were lit while the server was turned on will be lit again while the button is pressed.

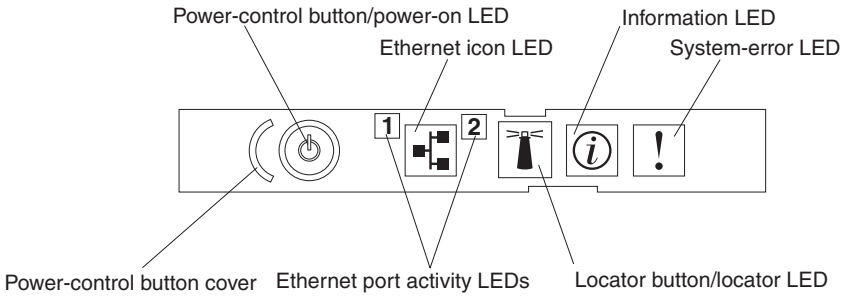
Many errors are first indicated by a lit information LED or system-error LED on the operator information panel on the front of the server. If one or both of these LEDs are lit, one or more LEDs elsewhere in the server might also be lit and can direct you to the source of the error.

Before you work inside the server to view light path diagnostics LEDs, read the safety information that begins with "Safety" on page v and "Handling static-sensitive devices" on page 253.

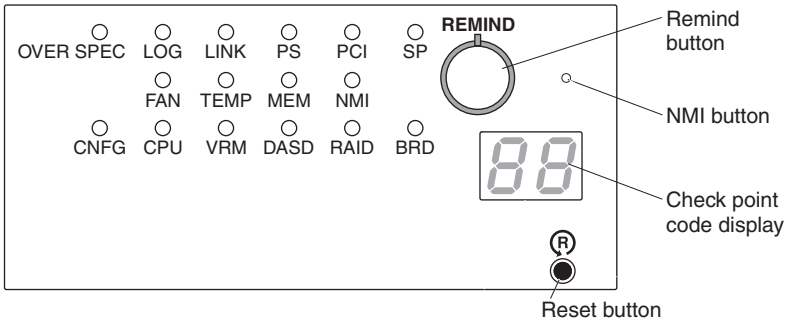
If an error occurs, view the light path diagnostics LEDs in the following order:

1. Check the operator information panel on the front of the server.
   - If the information LED is lit, it indicates that there is a suboptimal condition in the server.
   - If the system-error LED is lit, it indicates that an error has occurred.

   The following illustration shows the operator information panel.



2. To view the light path diagnostics panel, press the release latch on the front of the operator information panel to the left; then, slide it forward. This reveals the light path diagnostics panel. Lit LEDs on this panel indicate the type of error that has occurred.

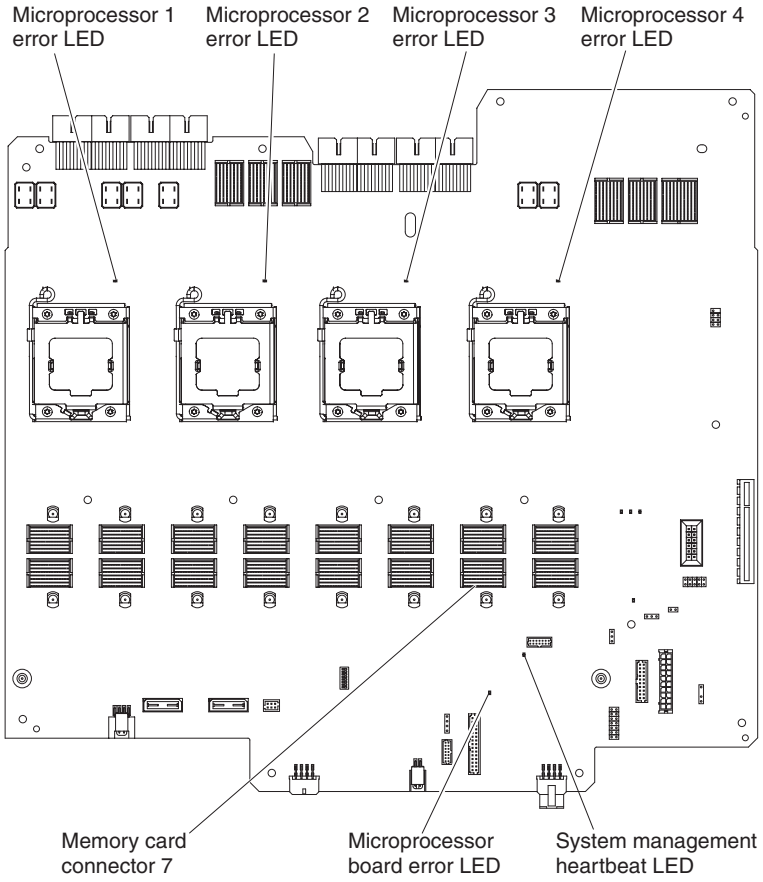


   Note: (Trained service technician only) The NMI button is used for operating-system debugging purposes and will cause the server to reset if it is pressed.

   Look at the system service label on the top of the server, which gives an overview of internal components that correspond to the LEDs on the light path diagnostics panel. This information and the information in “Light path diagnostics LEDs” on page 62 can often provide enough information to correct the error.

3. Remove the server cover and look inside the server for lit LEDs. Certain components inside the server have LEDs that will be lit to indicate the location of a problem. For example, a microprocessor error will light the LED next to the failing microprocessor on the microprocessor board.

   The following illustration shows the LEDs on the microprocessor board.



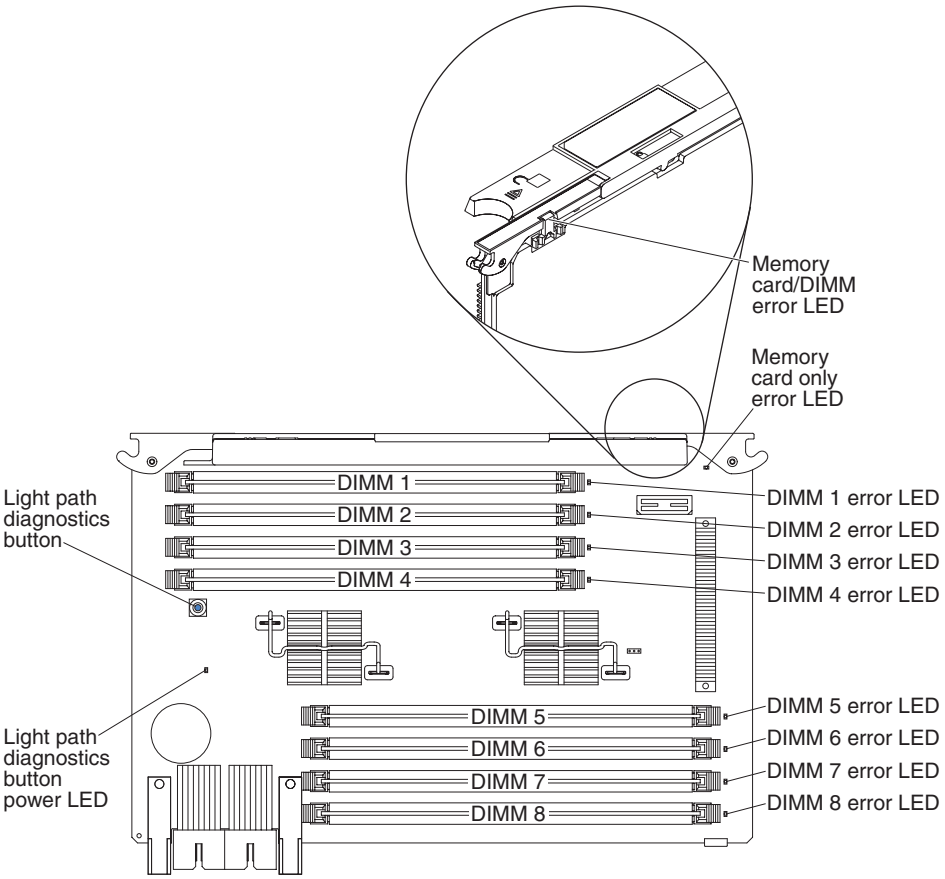
Note:

a. You must remove the memory card or memory card filler from memory card connector 7 before you can see the microprocessor board error LED.

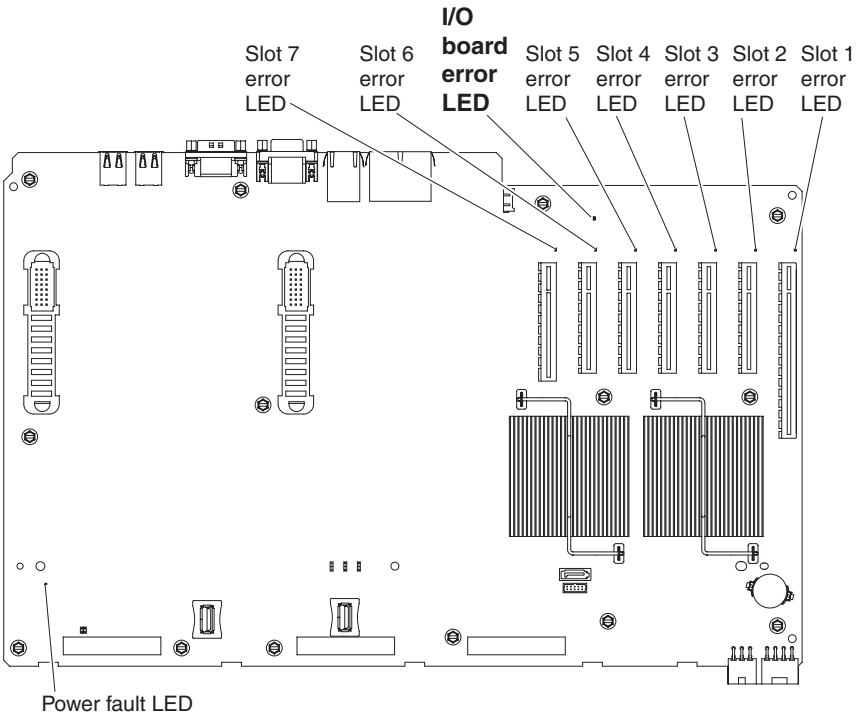
b. You must remove the top cover bracket before you can see the microprocessor error LEDs 1-4.

The following illustration shows the LEDs on a memory card.

Note: You can view the LED on top of the memory card while the card is in the server. When you remove the memory card from the server, you must press the light path diagnostics button on the card to relight the LEDs to identify the error.



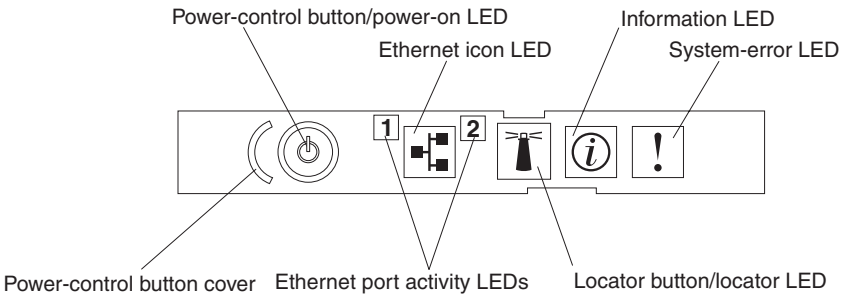
The following illustration shows the LEDs on the I/O board.



Remind button

You can use the remind button on the light path diagnostics panel to put the system-error LED on the operator information panel into Remind mode.

The following illustration shows the operator information panel.



When you press the remind button, you acknowledge the error but indicate that you will not take immediate action. The system-error LED flashes while it is in Remind mode and stays in Remind mode until one of the following conditions occurs:

- All known errors or suboptimal conditions are corrected.
- The server is powered back on.
- A new error or suboptimal condition occurs, causing the system-error LED to be lit again.

You can also use the remind button to turn off the LOG LED on the light path diagnostics panel and the information LED.

In multi-node configurations, you can also press this button during startup to start the server as a stand-alone server.

Light path diagnostics LEDs

The following table describes the LEDs on the light path diagnostics panel. If the information LED or system-error LED on the front of the server is lit, determine whether any LEDs on the light path diagnostics panel are lit, and then refer to this table for the suggested action to correct the detected problem.

• **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, Types 7145, 7146, 7143, and 7191," on page 237 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.**		
Light path diagnostics LED	**Description**	**Action**
All LEDs are off (only the power LED is lit or flashing).		No action is necessary.

- **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, Types 7145, 7146, 7143, and 7191," on page 237 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.**

Light path diagnostics LED	Description	Action
All LEDs are off (the power LED is lit or flashing and the system-error LED is lit).	A machine check has occurred. The server is identifying the machine check, the server was interrupted while identifying the machine check, or the server was unable to identify the machine check.	1. Wait several minutes for the server to identify the machine check, and the server will restart. 2. (Trained service technician only) Extract the machine check data, which will be used to identify the machine check.
OVERSPEC	There is insufficient power to power the system. The LOG LED might also be lit.	1. Add a power supply if only one power supply is installed. 2. Use 220 V ac instead of 110 V ac. 3. Reseat the power supply (see "Removing a hot-swap power supply" on page 271 and "Replacing the hot-swap power supply" on page 273). 4. Remove optional devices. 5. Replace the power supply.
LOG	Information is present in the system-event log.	1. Check the log for possible errors. 2. Save the log if necessary and clear it.
LINK	There is a fault in a QPI port or the QPI scalability cables. **Note:** 1. This LED remains lit until the problem is solved and the server is turned off and restarted. 2. If a fault occurs, the SMP Expansion Port link LED on the failed port is off.	1. If the CNFG LED is also lit, make sure that your QPI wrap cards or QPI scalability cables are installed and in the proper sequence. 2. If a memory expansion module is attached to the server, check to determine whether the front LINK error LED is lit on the memory expansion module or the server. The LED that is lit determines which device you should troubleshoot. 3. Check the QPI port link LEDs to find the failing port or cable. (The rear LED on the failing port or cable is off.) 4. Reseat the QPI wrap cards or the QPI scalability cables (if installed). **Attention:** Do not disconnect or connect any of the cables when the server or memory expansion module is connected to power. 5. Replace the QPI wrap cards or the QPI scalability cables (if installed). **Attention:** Do not disconnect or connect any of the cables when the server or memory expansion module is connected to power. 6. (Trained service technician only) Replace the I/O board (see "Removing the I/O-board shuttle" on page 287 and "Replacing the I/O-board shuttle" on page 288).

- **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, Types 7145, 7146, 7143, and 7191," on page 237 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.**

Light path diagnostics LED	Description	Action
PS	A power supply has failed or has been removed. **Note:** In a redundant power configuration, the dc power LED on one power supply might be off.	1. If a memory expansion module is attached to the server, check to determine whether the front PS error LED is lit on the memory expansion module or the server. The LED that is lit determines which device you should troubleshoot. 2. Reinstall the removed power supply (see "Replacing the hot-swap power supply" on page 273). 3. Check the individual power-supply LEDs to find the failing power supply (see "Rear view LEDs" on page 14). 4. Reseat the failing power supply (see "Removing a hot-swap power supply" on page 271 and "Replacing the hot-swap power supply" on page 273). 5. Make sure that the power cord is fully seated in the power-supply inlet and the ac power source. 6. Replace the power supply.
PCI	A PCI adapter has failed. **Note:** The error LED next to the failing adapter on the I/O-board shuttle is also lit.	1. See the system-event log (see "Event logs" on page 32). 2. Reseat the following components: a. Failing adapter (see "Removing an adapter" on page 262 and "Replacing an adapter" on page 263) b. The I/O board assembly (see "Removing the I/O-board shuttle" on page 287 and "Replacing the I/O-board shuttle" on page 288) 3. Replace the components listed in step 2, one at a time, in the order shown, restarting the server each time.

- **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, Types 7145, 7146, 7143, and 7191," on page 237 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.**

Light path diagnostics LED	Description	Action
FAN	A fan has failed or has been removed. **Note:** A failing or missing fan can also cause the TEMP LED to be lit.	1. If a memory expansion module is attached to the server, check to determine whether the front FAN error LED is lit on the memory expansion module or the server. The LED that is lit determines which device you should troubleshoot. 2. Reinstall the removed fan (see "Replacing the front hot-swap fans" on page 270). 3. If an individual fan LED is lit, replace the fan. **Note:** A failing fan might not cause the fan LED to be lit. 4. (Trained service technician only) Reseat the microprocessor board (see "Removing the microprocessor-board assembly" on page 310 and "Replacing the microprocessor-board assembly" on page 313). 5. (Trained service technician only) Replace the microprocessor board.
TEMP	A system temperature or component has exceeded thermal specifications. **Note:** A fan LED might also be lit.	1. See the system-event log for the source of the fault (see "Event logs" on page 32). 2. Make sure that the airflow of the server is not blocked. 3. If a fan LED is lit, reseat the fan (see "Removing the front hot-swap fans" on page 269 and "Replacing the front hot-swap fans" on page 270). 4. Replace the fan for which the LED is lit. 5. Make sure that the room is neither too hot nor too cold (see "Environment" in "Server features and specifications" on page 7).
MEM	Memory failure.	Check the logs (either System Event Log or IMM/AMM Log), see "Event logs" on page 32 for applicable memory events; then, follow the steps as indicated in the POST error code section (see "POST error codes" on page 34) or IMM error messaages section (see "Integrated management module error messages" on page 169).
NMI	A hardware error has been reported to the operating system. **Note:** The PCI or MEM LED might also be lit.	1. See the system-error log (see "Event logs" on page 32). 2. If the PCI LED is lit, follow the instructions for that LED. 3. If the MEM LED is lit, follow the instructions for that LED. 4. Restart the server.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**

Light path diagnostics LED	Description	Action
CNFG	A configuration error has occurred.	1. If a memory expansion module is attached to the server, check to determine whether the front CNFG error LED is lit on the memory expansion module or the server. The LED that is lit determines which device you should troubleshoot. 2. Make sure that the memory cards all have the same memory controller level. 3. Find the failing or missing component by checking the other light path diagnostic LEDs on the operator information panel. Make sure that the microprocessors match each other (speed and cache). Also make sure that the installed microprocessors and memory cards are supported for your machine type or multi-node configuration. 4. Make sure that the fans, power supplies, expansion and scaling cables, microprocessors, and memory cards are correctly installed and in the correct sequence.

- **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, Types 7145, 7146, 7143, and 7191," on page 237 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.**

Light path diagnostics LED	Description	Action
CPU	A microprocessor has failed, is missing, or has been incorrectly installed.	1. If the CNFG light is lit, make sure that the microprocessors are installed in the correct sequence; see "Microprocessor" on page 301 and make sure the microprocessors match each other (speed and cache). Also make sure that the microprocessors are supported by your server machine type or multi-node configuration. 2. Check the system-event log to determine the reason for the lit LED (see "Event logs" on page 32). 3. If PCI Express adapters are installed in slots 1, 2, 3, or 4, make sure that the microprocessors are correctly installed in sockets 3 and 4. If the server is configured for only two microprocessors, make sure that the second microprocessor is installed in socket 3 or 4 (see the *Installation and User's Guide* for additional information). The CONFIG LED is also lit. 4. Find the failing, missing, or mismatched microprocessor by checking the LEDs on the microprocessor board. 5. Reseat the following components: a. (Trained service technician only) Failing microprocessor (see "Microprocessor" on page 301) b. (Trained service technician only) Microprocessor board (see "Removing the microprocessor-board assembly" on page 310 and "Replacing the microprocessor-board assembly" on page 313) 6. Replace the following components one at a time, in the order shown, restarting the server each time: a. (Trained service technician only) Failing microprocessor b. (Trained service technician only) Microprocessor board
VRM	Reserved	

- **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, Types 7145, 7146, 7143, and 7191," on page 237 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.**

Light path diagnostics LED	Description	Action
DASD	A hard disk drive has failed or has been removed. **Note:** The error LED on the failing hard disk drive is also lit.	1. Reinstall the removed drive. 2. Reseat the following components: a. Suspected hard disk drive (see "Removing a hot-swap hard disk drive" on page 267 and "Replacing a hot-swap hard disk drive" on page 267) b. SAS hard disk drive backplane (see "Removing the SAS hard disk drive backplane assembly" on page 296 and "Replacing the SAS hard disk drive backplane assembly" on page 297) c. SAS signal cable d. The I/O board assembly (see "Removing the I/O-board shuttle" on page 287 and "Replacing the I/O-board shuttle" on page 288) 3. Replace the components listed in step 2, one at a time, in the order shown, restarting the server each time.
RAID	Reserved	
BOARD	The I/O-board shuttle or microprocessor board has failed.	1. Find the suspected board by checking the LEDs on the I/O-board shuttle and microprocessor board. 2. If the I/O board LED is lit, reseat the I/O board (see "Removing the I/O-board shuttle" on page 287 and "Replacing the I/O-board shuttle" on page 288). If the I/O board LED remains lit, replace the I/O board. 3. If the I/O board LED is not lit, remove memory card 7 to see if the microprocessor-board LED is lit (see "Removing a memory card" on page 281). 4. (Trained service technician only) If the microprocessor-board LED is lit, reseat the microprocessor board (see "Removing the microprocessor-board assembly" on page 310 and "Replacing the microprocessor-board assembly" on page 313). If the microprocessor-board LED remains lit, replace the microprocessor board.

Power-supply LEDs

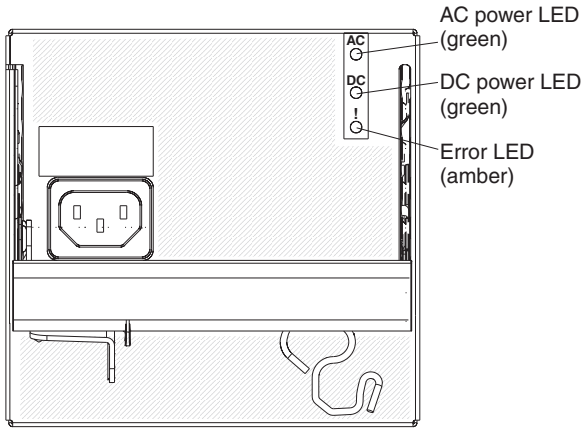
The following minimum configuration is required for the dc LEDs on the power supply to be lit:
- AC power source
- Power cord connected
- Power supply with ac power present LED on
- I/O board with power supply connections

- Microprocessor board

The following minimum configuration is required for the server to start:
- AC Power source
- Power cord
- Power supply
- I/O board
- Microprocessor board
- One microprocessor
- Two DIMMs on one memory card
- Operator information panel

If the a memory expansion module is connected to the server, two 2 GB DIMMs on the memory expansion module.

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



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

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**

Power-supply LEDs			Operator information panel power-on LED	Description	Action
AC	DC	Error			
Off	Off	Off	Off	No ac power to the server, or a problem with the ac power source.	1. Check the ac power to the server. 2. Make sure that the power cord is connected to a functioning power source. 3. Make sure that the power cord is fully seated in the power-supply inlet.

- **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, Types 7145, 7146, 7143, and 7191," on page 237 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.**

Power-supply LEDs			Operator information panel power-on LED	Description	Action
AC	**DC**	**Error**			
On	Off	Off	Off	DC source power problem or system error.	1. Reseat one power supply at a time (see "Removing a hot-swap power supply" on page 271 and "Replacing the hot-swap power supply" on page 273). 2. View the system-event log (see "Event logs" on page 32).
On	On	Off	Off	The server is turned off or standby power problem.	1. Press the power-control button on the operator information panel. 2. View the system-error log (see "Event logs" on page 32). 3. Remove one power supply at a time (see "Removing a hot-swap power supply" on page 271 and "Replacing the hot-swap power supply" on page 273).
On	On	Off	Flashing	Normal standby state.	No action.
On	On or off	On	On or off	There is an internal power supply fault (for example, a thermal fault or an over voltage or under voltage condition).	1. View the system-event log (see "Event logs" on page 32). 2. Replace the power supply (see "Removing a hot-swap power supply" on page 271 and "Replacing the hot-swap power supply" on page 273).
On	On	Off	On	The power is good and the server is running.	No action.

IBM Dynamic System Analysis

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

- System Bus information, including memory (SMI), microprocessor, and scaling (QPI or EXA)
- Drive health information
- Event logs for ServeRAID controllers and service processors
- Hardware inventory, including PCI and USB information
- Installed applications and hot fixes
- Light path diagnostics status
- Network interfaces and settings

- Performance data and details about processes that are running
- RAID and controller configuration
- Service processor (integrated management module) status and configuration
- System configuration
- Vital product data and firmware information

For system-specific information about the action that you should take as a result of a message that DSA generates, see the table in "DSA messages" on page 72.

If you cannot find a problem by using DSA, see "Solving undetermined problems" on page 233 for information about testing the server.

Note:

1. In a multi-node environment, each server has a unique DSA interface. You can view server-specific information, such as error logs, from these unique DSA interfaces.
2. Before using DSA in a multi-node configuration, you must disable extended Apic (X2apic). (To disable Apic, go to the UEFI Setup, select **System Settings → Processors → Extended Apic → Disable**.)
3. DSA Preboot might appear to be unresponsive when you start the program. This is normal operation while the program loads.

To obtain DSA code and the *Dynamic System Analysis Installation and User's Guide*, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA or complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **IBM Systems support**, click **System x**.
3. Under **Related downloads**, click **Dynamic System Analysis (DSA)**.

DSA editions

Two editions of Dynamic System Analysis are available:

- **DSA Portable**

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

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

- **DSA Preboot**

  DSA Preboot runs outside of the operating system; you must restart the server to run it. It is packaged as an ISO image that you download from the Web, or it is provided in flash memory on the server. In addition to the capabilities of the other editions of DSA, DSA Preboot includes diagnostic routines that would be disruptive to run within the operating-system environment (such as resetting

devices and causing loss of network connectivity). It has a graphical user interface that you can use to specify which diagnostics to run and to view the diagnostic and data collection results.

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

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

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

Running DSA Preboot

To run DSA Preboot, complete the following steps:

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

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

   Note: After you exit from the stand-alone memory diagnostic environment, you must restart the server to access the stand-alone memory diagnostic environment again.
5. Select **gui** to display the graphical user interface, or select **cmd** to display the DSA interactive menu.
6. Follow the instructions on the screen to select the diagnostic test to run. If the diagnostic tests do not detect any hardware errors but the problem remains during normal server operation, a software error might be the cause. If you suspect a software problem, see the information that comes with your software.

DSA messages

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

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

000 The server passed the test. Do not replace a CRU or FRU.
195 The Esc key was pressed to end the test. Do not replace a CRU or FRU.
197 This is a warning error, but it does not indicate a hardware failure; do not

replace a CRU or FRU. Take the action that is indicated in the Action column, but *do not replace a CRU or FRU*.

Table 11. DSA messages

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
089-801-xxx	CPU	CPU Stress Test	Aborted	Internal program error.	1. Turn off and restart the server. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 3. Run the test again. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 5. Run the test again. 6. Turn off and restart the server if necessary to recover from a hung state. 7. Run the test again. (Continued on the next page)

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
089-801-xxx (continued)					1. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved: a. (Trained service technician only) Microprocessor board (see "Removing the microprocessor-board assembly" on page 310 and "Replacing the microprocessor-board assembly" on page 313) b. (Trained service technician only) Microprocessor (see "Removing a microprocessor and heat sink" on page 302) c. I/O-board assembly (see "Removing the I/O-board shuttle" on page 287 and "Replacing the I/O-board shuttle" on page 288) 2. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
089-802-xxx	CPU	CPU Stress Test	Aborted	System resource availability error.	1. Turn off and restart the server. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 3. Run the test again. 4. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 5. Run the test again. 6. Turn off and restart the server if necessary to recover from a hung state. 7. Run the test again. 8. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 9. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
089-802-xxx	CPU	CPU Stress Test	Aborted	System resource availability error.	1. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved: a. (Trained service technician only) Microprocessor board (see "Removing the microprocessor-board assembly" on page 310 and "Replacing the microprocessor-board assembly" on page 313) b. (Trained service technician only) Microprocessor (see "Removing a microprocessor and heat sink" on page 302) c. I/O-board assembly (see "Removing the I/O-board shuttle" on page 287 and "Replacing the I/O-board shuttle" on page 288) 2. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
089-901-xxx	CPU	CPU Stress Test	Failed	Test failure.	1. Turn off and restart the server if necessary to recover from a hung state. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 3. Run the test again. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 5. Run the test again. 6. Turn off and restart the server if necessary to recover from a hung state. 7. Run the test again. (Continued on the next page)

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
089-901-xxx (continued)					1. Replace the following components one at a time, in the order shown, and run this test again to determine whether the problem has been solved: a. (Trained service technician only) Microprocessor board (see "Removing the microprocessor-board assembly" on page 310 and "Replacing the microprocessor-board assembly" on page 313) b. (Trained service technician only) Microprocessor (see "Removing a microprocessor and heat sink" on page 302) c. I/O-board assembly (see "Removing the I/O-board shuttle" on page 287 and "Replacing the I/O-board shuttle" on page 288) 2. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-801-xxx	IMM	IMM I2C Test	Aborted	I2C test aborted: the system returned an incorrect response length.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-802-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: the test cannot be completed for an unknown reason.	1. Turn off the server and disconnect it from the power source. You must disconnect the system from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-803-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: the node is busy; try later.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA event log in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-804-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: invalid command.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-805-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: invalid command for the given LUN.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-806-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: timeout while processing the command.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-807-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: out of space.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-808-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: reservation canceled or invalid reservation ID.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-809-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: request data was truncated.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-810-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: request data length is invalid.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-811-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: request data field length limit is exceeded.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-812-xxx	IMM	IMM I2C Test	Aborted	IMM I2C Test aborted; a parameter is out of range.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-813-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: cannot return the number of requested data bytes.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-814-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: requested sensor, data, or record is not present.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-815-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: invalid data field in the request.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-816-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: the command is illegal for the specified sensor or record type.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-817-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: a command response could not be provided.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-818-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: cannot execute a duplicated request.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-819-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: a command response could not be provided; the SDR repository is in update mode.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.
166-820-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: a command response could not be provided; the device is in firmware update mode.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code and server firmware are at the latest level. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-821-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: a command response could not be provided; IMM initialization is in progress.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-822-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: the destination is unavailable.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-823-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: cannot execute the command; insufficient privilege level.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-824-xxx	IMM	IMM I2C Test	Aborted	IMM I2C test aborted: cannot execute the command.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-901-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the IPMB bus (Host BUS 0)	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again. 7. Remove power from the server. 8. Reseat the microprocessor board (see "Removing the microprocessor-board assembly" on page 310 and "Replacing the microprocessor-board assembly" on page 313). 9. Reconnect the server to power and turn on the system. 10. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-902-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the microprocessor, PCI, or lightpath bus (BUS 1).	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 6. Run the test again. 7. Turn off the server and reseat the following: a. Operator information panel (see"Removing the operator information panel assembly" on page 268) b. PCI adapters (see"Replacing an adapter" on page 263) c. Microprocessors (see "Removing a microprocessor and heat sink" on page 302) d. Microprocessor board assembly (see"Removing the microprocessor-board assembly" on page 310) 8. Reconnect the server to the power source and turn on the server. 9. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-903-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory bus (BUS 2)	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Turn off the server and reseat the following: a. DIMMs (see"Removing a DIMM" on page 283) b. Memory cards (see"Removing the memory-card cage" on page 314) c. PCI Express adapters (see"Replacing an adapter" on page 263) d. Microprocessor board assembly (see"Removing the microprocessor-board assembly" on page 310) 7. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-904-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the power supply bus (BUS 3).	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again. 7. Remove power from the server. 8. Reseat the microprocessor board (see "Removing the microprocessor-board assembly" on page 310). 9. Reseat the PCI adapters (see "Replacing an adapter" on page 263). 10. Reconnect the server to power and turn on the server. 11. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-905-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the SAS bus (BUS 4).	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again. 7. Remove power from the server. 8. Reseat the SAS backplane (see "Removing the SAS hard disk drive backplane assembly" on page 296). 9. Reseat the microprocessor board (see "Removing the microprocessor-board assembly" on page 310). 10. Reconnect the server to power and turn on the server. 11. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-906-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the IMM configuration bus (BUS 5).	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again. 7. Reseat the microprocessor board (see "Removing the microprocessor-board assembly" on page 310). 8. Reseat the PCI adapters (see "Replacing an adapter" on page 263). 9. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-907-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the power backplane bus.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again. 7. Remove power from the server. 8. Reseat the microprocessor board (see "Removing the microprocessor-board assembly" on page 310 and "Replacing the microprocessor-board assembly" on page 313). 9. Reconnect the server to power and turn on the server. 10. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-908-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the microprocessor bus.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-909-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the VPD bus (memory expansion module BUS 0).	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source, turn on the server, and run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. Run the test again. 5. Remove power from the server and reseat the memory expansion module scalabilty cables. 6. Reconnect the server to the power source, turn on the server, and run the test again. 7. Turn off the server and disconnect it from the power source. 8. Reseat the memory expansion module system-board tray. 9. Reconnect the server to the power source, turn on the server, and run the test again. 10. Turn off the server and disconnect it from the power source. 11. (Trained service technician only) Replace the memory expansion module system-board tray. 12. Reconnect the server to the power source, turn on the server, and run the test again. 13. If the failure remains, go to the IBM website for more troubleshooting information.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-910-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the Voltage Regulator bus (Memory Drawer BUS1)	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 6. Run the test again. 7. Remove power from the server. 8. Reseat the PCI Express adapters. 9. Reseat the memory expansion module. 10. Reseat the microprocessor board (see "Removing the microprocessor-board assembly" on page 310 and "Replacing the microprocessor-board assembly" on page 313).

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-911-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the Voltage Regulator bus (Memory Drawer BUS 2).	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again. 7. Reseat the memory expansion module. 8. Remove power from the server. 9. Reseat the PCI Express adapters. 10. Reseat the microprocessor board (see "Removing the microprocessor-board assembly" on page 310 and "Replacing the microprocessor-board assembly" on page 313).

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-912-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the Clock bus (Memory Drawer BUS 3).	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again. 7. Remove power from the server. 8. Reseat the PCI Express adapters. 9. Reseat the memory expansion module. 10. Reseat the microprocessor board (see "Removing the microprocessor-board assembly" on page 310 and "Replacing the microprocessor-board assembly" on page 313).

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-913-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the Power Supply bus (Memory Drawer BUS 4).	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 6. Run the test again. 7. Remove power from the server. 8. Reseat the PCI Express adapters. 9. Reseat the memory expansion module. 10. Reseat the memory expansion module power supply. 11. Reseat the microprocessor board (see "Removing the microprocessor-board assembly" on page 310 and "Replacing the microprocessor-board assembly" on page 313).

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-914-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory card 4 bus.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 6. Run the test again. 7. If the reported memory size is the same as the installed memory size, complete the following steps. a. Turn off the server and disconnect it from the power source. b. Reseat all the memory DIMMs and memory cards (see "Removing a DIMM" on page 283 and "Replacing a DIMM" on page 284, and see "Removing a memory card" on page 281 and "Replacing a memory card" on page 282). c. Reconnect the server to the power source and turn on the server. d. Run the test again. e. If the problem remains, continue with the next step on the next page.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-914-xxx (continued from previous page)	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory card 4 bus.	1. Turn off the server and disconnect it from the power source. 2. Remove all memory cards and DIMMs. 3. Install the minimum memory configuration for the server (see "Replacing a DIMM" on page 284 and "Replacing a memory card" on page 282). To determine the minimum memory configuration for your server, see "Solving undetermined problems" on page 233. 4. Reconnect the server to the power source and turn on the server. 5. Make sure that the reported memory size is the same as the installed memory size. 6. Run the test again. If the memory passes the test, one of the uninstalled memory cards or DIMMs is the failing component. 7. Repeat the steps to remove all memory cards and DIMMs as necessary, using different memory cards and DIMMs to isolate the failing component. Change only one component each time to identify the specific cause of the error. 8. Replace the failing memory card or DIMM.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-915-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory card 1 SPD bus.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 6. Run the test again. 7. If the reported memory size is the same as the installed memory size, complete the following steps. a. Turn off the server and disconnect it from the power source. b. Reseat all the memory DIMMs and memory cards, if the server has memory cards (see "Removing a DIMM" on page 283 and "Replacing a DIMM" on page 284, and see "Removing a memory card" on page 281 and "Replacing a memory card" on page 282). c. Reconnect the server to the power source and turn on the server. d. Run the test again. e. If the problem remains, continue with the next step on the next page.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-915-xxx (continued from previous page)	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory card 1 SPD bus.	1. Turn off the server and disconnect it from the power source. 2. Remove all memory cards and DIMMs. 3. Install the minimum memory configuration for the server (see "Replacing a DIMM" on page 284 and "Replacing a memory card" on page 282). To determine the minimum memory configuration for your server, see "Solving undetermined problems" on page 233. 4. Reconnect the server to the power source and turn on the server. 5. Make sure that the reported memory size is the same as the installed memory size. 6. Run the test again. If the memory passes the test, one of the uninstalled memory cards or DIMMs is the failing component. 7. Repeat the steps to remove all memory cards and DIMMs as necessary, using different memory cards and DIMMs to isolate the failing component. Change only one component each time to identify the specific cause of the error. 8. Replace the failing memory card or DIMM.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-916-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory card 2 SPD bus.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 6. Run the test again. 7. If the reported memory size is the same as the installed memory size, complete the following steps. a. Turn off the server and disconnect it from the power source. b. Reseat all the memory DIMMs and memory cards (see "Removing a DIMM" on page 283 and "Replacing a DIMM" on page 284 and see "Removing a memory card" on page 281 and "Replacing a memory card" on page 282). c. Reconnect the server to the power source and turn on the server. d. Run the test again. e. If the problem remains, continue with the next step on the next page.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-916-xxx (continued from previous page)	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory card 2 SPD bus.	1. Turn off the server and disconnect it from the power source. 2. Remove all memory cards and DIMMs. 3. Install the minimum memory configuration for the server (see "Replacing a DIMM" on page 284 and "Replacing a memory card" on page 282). To determine the minimum memory configuration for your server, see "Solving undetermined problems" on page 233. 4. Reconnect the server to the power source and turn on the server. 5. Make sure that the reported memory size is the same as the installed memory size. 6. Run the test again. If the memory passes the test, one of the uninstalled memory cards or DIMMs is the failing component. 7. Repeat the steps to remove all memory cards and DIMMs as necessary, using different memory cards and DIMMs to isolate the failing component. Change only one component each time to identify the specific cause of the error. 8. Replace the failing memory card or DIMM.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-917-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory card 3 SPD bus.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 6. Run the test again. 7. If the reported memory size is the same as the installed memory size, complete the following steps. a. Turn off the server and disconnect it from the power source. b. Reseat all the memory DIMMs and memory cards (see "Removing a DIMM" on page 283 and "Replacing a DIMM" on page 284 and see "Removing a memory card" on page 281 and "Replacing a memory card" on page 282). c. Reconnect the server to the power source and turn on the server. d. Run the test again. e. If the problem remains, continue with the next step on the next page.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-917-xxx (continued from previous page)	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory card 3 SPD bus.	1. Turn off the server and disconnect it from the power source. 2. Remove all memory cards and DIMMs. 3. Install the minimum memory configuration for the server (see "Replacing a DIMM" on page 284 and "Replacing a memory card" on page 282). To determine the minimum memory configuration for your server, see "Solving undetermined problems" on page 233. 4. Reconnect the server to the power source and turn on the server. 5. Make sure that the reported memory size is the same as the installed memory size. 6. Run the test again. If the memory passes the test, one of the uninstalled memory cards or DIMMs is the failing component. 7. Repeat the steps to remove all memory cards and DIMMs as necessary, using different memory cards and DIMMs to isolate the failing component. Change only one component each time to identify the specific cause of the error. 8. Replace the failing memory card or DIMM.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-918-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory card 4 SPD bus.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 6. Run the test again. 7. If the reported memory size is the same as the installed memory size, complete the following steps. a. Turn off the server and disconnect it from the power source. b. Reseat all the memory DIMMs and memory cards (see "Removing a DIMM" on page 283 and "Replacing a DIMM" on page 284 and see "Removing a memory card" on page 281 and "Replacing a memory card" on page 282). c. Reconnect the server to the power source and turn on the server. d. Run the test again. e. If the problem remains, continue with the next step on the next page.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-918-xxx (continued from previous page)	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory card 4 SPD bus.	1. Turn off the server and disconnect it from the power source. 2. Remove all memory cards and DIMMs. 3. Install the minimum memory configuration for the server (see "Replacing a DIMM" on page 284 and "Replacing a memory card" on page 282). To determine the minimum memory configuration for your server, see "Solving undetermined problems" on page 233. 4. Reconnect the server to the power source and turn on the server. 5. Make sure that the reported memory size is the same as the installed memory size. 6. Run the test again. If the memory passes the test, one of the uninstalled memory cards or DIMMs is the failing component. 7. Repeat the steps to remove all memory cards and DIMMs as necessary, using different memory cards and DIMMs to isolate the failing component. Change only one component each time to identify the specific cause of the error. 8. Replace the failing memory card or DIMM.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-919-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory card 1 light path diagnostics bus.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 6. Run the test again. 7. Turn off the server and disconnect it from the power source. 8. Reseat the memory card in memory-card connector 1 (see "Removing a memory card" on page 281 and "Replacing a memory card" on page 282). 9. Reconnect the server to the power source and turn on the server. 10. Make sure that the reported memory size is the same as the installed memory size. 11. If the problem remains, replace the memory card in memory-card connector 1.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-920-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory card 2 light path diagnostics bus.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 6. Run the test again. 7. Turn off the server and disconnect it from the power source. 8. Reseat the memory card in memory-card connector 2 (see "Removing a memory card" on page 281 and "Replacing a memory card" on page 282). 9. Reconnect the server to the power source and turn on the server. 10. Make sure that the reported memory size is the same as the installed memory size. 11. If the problem remains, replace the memory card in memory-card connector 2.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-921-xxx	IMM	IMM I2C Test	Failed	The IMM indicates a failure in the memory card 3 light path diagnostics bus.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 6. Run the test again. 7. Turn off the server and disconnect it from the power source. 8. Reseat the memory card in memory-card connector 3 (see "Removing a memory card" on page 281 and "Replacing a memory card" on page 282). 9. Reconnect the server to the power source and turn on the server. 10. Make sure that the reported memory size is the same as the installed memory size. 11. If the problem remains, replace the memory card in memory-card connector 3.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
166-922-xxx	IMM	IMM Test	Failed	The IMM indicates a failure in the memory card 4 light path diagnostics bus.	1. Turn off the server and disconnect it from the power source. You must disconnect the server from ac power to reset the IMM. 2. After 45 seconds, reconnect the server to the power source and turn on the server. 3. Run the test again. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 6. Run the test again. 7. Turn off the server and disconnect it from the power source. 8. Reseat the memory card in memory-card connector 4 (see "Removing a memory card" on page 281 and "Replacing a memory card" on page 282). 9. Reconnect the server to the power source and turn on the server. 10. Make sure that the reported memory size is the same as the installed memory size. 11. If the problem remains, replace the memory card in memory-card connector 4.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
180-900-xxx	Check-point panel	Check-point panel test	Failed		1. Check the operator information panel cabling at both ends for loose or broken connections or damage to the cable. Replace the operator information panel cable if it is damaged. 2. Run the test again. 3. Replace the operator information panel assembly (see "Removing the operator information panel assembly" on page 268 and "Replacing the operator information panel assembly" on page 268). 4. Run the test again.
201-000-000	Memory	Memory Test	Passed	Test Pass	Quick, full memory test. All microprocessors passed.
201-801-xxx	Memory	Memory Test	Aborted	Test Aborted: the system IMM programmed the memory controller with an invalid CBAR address	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 4. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
201-802-xxx	Memory	Memory Test	Aborted	Test Aborted: the end address in the E820 function is less than 16 MB.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that all DIMMs are enabled in the Setup utility (see Chapter 6, "Configuration information and instructions," on page 337). 4. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 5. Run the test again.
201-803-xxx	Memory	Memory Test	Aborted	Test Aborted: could not enable the processor cache.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 4. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
201-804-xxx	Memory	Memory Test	Aborted	Test Aborted: the memory controller buffer request failed.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 4. Run the test again.
201-805-xxx	Memory	Memory Test	Aborted	Test Aborted: the memory controller display/alter write operation was not completed.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your system to display a matrix of available firmware. 4. Run the test again.
201-806-xxx	Memory	Memory Test	Aborted	Test Aborted: the memory controller fast scrub operation was not completed.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the server IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 4. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
201-807-xxx	Memory	Memory Test	Aborted	Test Aborted: the memory controller buffer free request failed.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 4. Run the test again.
201-808-xxx	Memory	Memory Test	Aborted	Test Aborted: memory controller display/alter buffer execute error.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 4. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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 Aborted program error: operation running fast scrub.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 4. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA and select your server to display a matrix of available firmware. 5. Run the test again.
201-810-xxx	Memory	Memory Test	Aborted	Test Aborted: unknown error code xxx received in COMMON EXIT procedure.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 4. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 5. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
201-811-xxx	Memory	Memory Test	Aborted	Test Aborted: could not locate SMBIOS key_SM_	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2 and select your server to display a matrix of available firmware. 4. Run the test again.
201-812-xxx	Memory	Memory Test	Aborted	Test Aborted: SMBIOS type 0 structure indicates invalid machine ID that is not supported.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.
201-815-xxx	Memory	Memory Test	Aborted	Test Aborted: Program error: Quick memory menu item selection problem	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 4. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
201-818-xxx	Memory	Memory Test	Aborted	Test Aborted: Unable to locate _SM_key when locating SMBIOS structured data for memory DIMM information.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.
201-819-xxx	Memory	Memory Test	Aborted	Test Aborted: START-END address ranges in the restricted area of memory.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 4. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 5. Run the test again.
201-855-xxx	Memory	Memory Test	Aborted	Test Aborted: No RSDT signature key in RSDT structure table in ACPI tables.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
201-856-xxx	Memory	Memory Test	Aborted	Test Aborted: Corrupted RSDT key. Refer to RSDT structures in ACPI tables.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.
201-858-xxx	Memory	Memory Test	Aborted	Test Aborted: Invalid SRAT type. Refer to ACPI tables.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.
201-859-xxx	Memory	Memory Test	Aborted	Test Aborted: Invalid XSECSRA T Type. Refer to ACPI tables.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
201-860-xxx	Memory	Memory Test	Aborted	Test Aborted: No OEMx type 1. Refer to ACPI tables.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.
201-861-xxx	Memory	Memory Test	Aborted	Test Aborted: No SRAT type 1. Refer to ACPI tables.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.
201-862-xxx	Memory	Memory Test	Aborted	Test Aborted: No OEM1 table. Refer to ACPI tables.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
201-863-xxx	Memory	Memory Test	Aborted	Test Aborted: No IBMERROR key in OEM1 table. Refer to ACPI tables.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.
201-864-xxx	Memory	Memory Test	Aborted	Test Aborted: No GAS General Address Structure type 0 in OEM1 table. Refer to ACPI tables.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.
201-865-xxx	Memory	Memory Test	Aborted	Test Aborted: No XSECSRAT key in OEMx table. Refer to ACPI tables.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
201-866-xxx	Memory	Memory Test	Aborted	Test Aborted: EFI/SAL: Invalid parameter from Get Memory Map function	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.
201-867-xxx	Memory	Memory Test	Aborted	Test Aborted: EFI/SAL: Buffer not allocated in Get Memory Map function.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.
201-868-xxx	Memory	Memory Test	Aborted	Test Aborted: EFI/SAL: Buffer too small in Get Memory Map function	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T &brandind=5000008 and select your server to display a matrix of available firmware. 4. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
201-869-xxx	Memory	Memory Test	Aborted	Test Aborted: EFI/SAL: Invalid parameter from Get Memory Map function	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.
201-870-xxx	Memory	Memory Test	Aborted	Test Aborted: SRAT/ XSECSRAT is ok, but the CPU domain numbering is invalid	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.
201-871-xxx	Memory	Memory Test	Aborted	Test Aborted: Data miscompare encountered due to address overlapping, overshooting, or data corruption	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
201-877-xxx	Memory	Memory Test	Aborted	Test Aborted: Mirroring is enabled.	1. Turn off and restart the server. 2. Press F1 to go into the Setup menu. 3. Turn off the Mirroring feature. 4. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 5. Run the test again.
201-878-xxx	Memory	Memory Test	Aborted	Test Aborted: Sparing is enabled.	1. Turn off and restart the server. 2. Press F1 to go into the Setup menu. 3. Turn off the Sparing feature. 4. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 5. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
201-885-xxx	Memory	Memory Test	Aborted	Test Aborted: microprocessor does not support MTRR functions and cannot uncache available memory space.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 4. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 5. Run the test again.
201-886-xxx	Memory	Memory Test	Aborted	Test Aborted: E820 function call indicates not enough memory available for testing.	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
201-894-xxx	Memory	Memory Test		Unexpected error code	1. Turn off and restart the server. 2. Run the test again. 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 4. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 5. Run the test again.
201-899-xxx	Memory	Memory Test	Aborted	User Aborted	Test was terminated by the user before it was completed.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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: xxx = (0-4) 0 = no nodes. Follow the message on the screen. Check the screen for the failing DIMM and the fail type "single bit error" or multi bit error".	1. Turn off the server and disconnect it from the power source. Wait for 45 seconds. 2. Reseat the DIMMs (see "Removing a DIMM" on page 283). 3. Reconnect the server to power and turn on the system. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 6. Run the test again. 7. Replace the failing DIMMs. 8. Re-enable all memory in the Setup utility (see Chapter 6, "Configuration information and instructions," on page 337). 9. Run the test again. 10. Replace the failing memory card.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
201-902-xxx	Memory	Memory Test	Failed	Test failure: single-bit and multi-bit error, failing bank x, failing DIMM z	1. Turn off the server and disconnect it from the power source. 2. Reseat memory card y and DIMM z (see "Removing a DIMM" on page 283 and "Replacing a DIMM" on page 284 and see "Removing a memory card" on page 281 and "Replacing a memory card" on page 282). 3. Reconnect the server to power and turn on the server. 4. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 6. Run the test again. 7. Replace the failing DIMMs. 8. Re-enable all memory in the Setup utility (see Chapter 6, "Configuration information and instructions," on page 337). 9. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.	1. Turn off and restart the server. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 3. Make sure that the system IMM code is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 4. Run the test again. 5. Turn off and restart the server if necessary to recover from a hung state. 6. Run the memory diagnostics to identify the specific failing DIMM.
202-802-xxx	Memory	Memory Stress Test	Failed	General error: memory size is insufficient to run the test.	1. Make sure that all memory is enabled by checking the Available System Memory in the Resource Utilization section of the DSA log. If necessary, enable all memory in the Setup utility (see Chapter 6, "Configuration information and instructions," on page 337). 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 3. Run the test again. 4. Run the standard memory test to validate all memory.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
202-901-xxx	Memory	Memory Stress Test	Failed	Test failure.	1. Run the standard memory test to validate all memory. 2. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 3. Turn off the server and disconnect it from power. 4. Reseat the memory cards and DIMMs (see "Removing a DIMM" on page 283 and "Replacing a DIMM" on page 284 and see "Removing a memory card" on page 281 and "Replacing a memory card" on page 282). 5. Reconnect the server to power and turn on the server. 6. Run the test again.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
215-801-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	Unable to communicate with the device driver.	1. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 6. Run the test again. 7. Make sure that the 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 the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T and select your server to display a matrix of available firmware. 8. Run the test again. 9. Replace the CD or DVD drive (see "Removing the DVD drive" on page 265 and "Replacing the DVD drive" on page 266). 10. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
215-802-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	The media tray is open.	1. Close the media tray and wait 15 seconds. 2. Run the test again. 3. Insert a new CD or DVD into the drive and wait for 15 seconds for the media to be recognized. 4. Run the test again. 5. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 6. Run the test again. 7. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 8. Run the test again. 9. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 10. Run the test again. 11. Replace the CD or DVD drive (see "Removing the DVD drive" on page 265 and "Replacing the DVD drive" on page 266). 12. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
215-803-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Failed	The disc might be in use by the system.	1. Wait for the server activity to stop. 2. Run the test again 3. Turn off and restart the system. 4. Run the test again. 5. Replace the CD or DVD drive (see "Removing the DVD drive" on page 265 and "Replacing the DVD drive" on page 266). 6. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.
215-901-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	Drive media is not detected.	1. Insert a CD or DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 6. Run the test again. 7. Replace the CD or DVD drive (see "Removing the DVD drive" on page 265 and "Replacing the DVD drive" on page 266). 8. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
215-902-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Failed	Read miscompare.	1. Insert a CD or DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http:// www.ibm.com/support/ docview.wss?uid=psg1MIGR-41559. 6. Run the test again. 7. Replace the CD or DVD drive (see "Removing the DVD drive" on page 265 and "Replacing the DVD drive" on page 266). 8. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, seehttp://www.ibm.com/ systems/support/supportsite.wss/ docdisplay?lndocid=SERV-CALL &lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
215-903-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Aborted	Could not access the drive.	1. Insert a CD or DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA. 6. Run the test again. 7. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 8. Run the test again. 9. Replace the CD or DVD drive (see "Removing the DVD drive" on page 265 and "Replacing the DVD drive" on page 266). 10. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
215-904-xxx	Optical Drive	• Verify Media Installed • Read/ Write Test • Self-Test Messages and actions apply to all three tests.	Failed	A read error occurred.	1. Insert a CD or DVD into the drive or try a new media, and wait for 15 seconds. 2. Run the test again. 3. Check the drive cabling at both ends for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 4. Run the test again. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559. 6. Run the test again. 7. Replace the CD or DVD drive (see "Removing the DVD drive" on page 265 and "Replacing the DVD drive" on page 266). 8. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
Tape drive test (Error Messages apply to results of any of the 4 tests)	Presence Test Self Test Load Tape Test Tape Alert Check Test		Failed	An error was found in the tape alert log page.	1. Clean the tape drive, using the appropriate cleaning media, and insert new media. 2. Run the test again. 3. Clear the error log. 4. Run the test again. 5. Make sure that the drive firmware is at the latest level. For the latest level of drive firmware and software for tape drives and libraries, go to http://www.ibm.com/support/docview.wss?uid=psg1TAPE-FILES. 6. Run the test again. 7. Note the tape alert flag that is returned in the tape alert log. 8. Replace the tape drive if a hardware failure is indicated. 9. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.
Tape drive test (Error Messages apply to results of any of the 4 tests)				Media is not detected.	1. Clean the tape drive, using the appropriate cleaning media, and insert new media. 2. Run the test again. 3. Clear the error log. 4. Make sure that the drive firmware is at the latest level. For the latest level of drive firmware and software for tape drives and libraries, go to http://www.ibm.com/support/docview.wss?uid=psg1TAPE-FILES. 5. Run the test again. 6. Replace the tape drive. 7. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
Tape drive test (Error Messages apply to results of any of the 4 tests)			Failed	Media error.	1. Clean the tape drive, using the appropriate cleaning media, and insert new media. 2. Run the test again. 3. Make sure that the drive firmware is at the latest level. For the latest level of drive firmware and software for tape drives and libraries, go to http://www.ibm.com/support/docview.wss?uid=psg1TAPE-FILES. 4. Run the test again. 5. Replace the tape drive. 6. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.
Tape drive test (Error Messages apply to results of any of the 4 tests)			Failed	Drive hardware error.	1. Check the tape drive cabling for loose or broken connections or damage to the cable. Replace the cable if it is damaged. 2. Clean the tape drive, using the appropriate cleaning media, and insert new media. 3. Run the test again. 4. Make sure that the drive firmware is at the latest level. For the latest level of drive firmware and software for tape drives and libraries, go to http://www.ibm.com/support/docview.wss?uid=psg1TAPE-FILES. 5. Run the test again. 6. Replace the tape drive. 7. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
Tape drive test (Error Messages apply to results of any of the 4 tests)				Software error: invalid request.	1. If the server has stopped responding, turn off and restart the server. 2. Run the test again. 3. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your system to display a matrix of available firmware. 4. Run the test again. 5. If the server has stopped responding, turn off and restart the server. 6. Make sure that the drive firmware is at the latest level. For the latest level of drive firmware and software for tape drives and libraries, go to http://www.ibm.com/support/docview.wss?uid=psg1TAPE-FILES. 7. Run the test again. 8. Clean the tape drive, using the appropriate cleaning media, and insert new media. 9. Replace the tape drive. 10. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
Tape drive test (Error Messages apply to results of any of the 4 tests)				Unrecognized error.	1. Clean the tape drive, using the appropriate cleaning media, and insert new media. 2. Run the test again. 3. Make sure that the drive firmware is at the latest level. For the latest level of drive firmware and software for tape drives and libraries, go to http://www.ibm.com/support/docview.wss?uid=psg1TAPE-FILES. 4. Run the test again. 5. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 6. Run the test again. 7. Make sure that the system firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your system to display a matrix of available firmware. 8. Run the test again. 9. Replace the tape drive. 10. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
217-901-xxx	SAS/SATA Hard Drive	Disk Drive Test	Failed		1. Reseat all backplane connections at both ends. 2. Reseat all the drives (see "Removing a hot-swap hard disk drive" on page 267 and "Replacing a hot-swap hard disk drive" on page 267). 3. Run the test again. 4. Make sure that the firmware is at the latest level. 5. Run the test again. 6. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.
401-801-000		EXA Port Ping Test	Aborted	EXA Port Ping test aborted: unable to get device base address	1. Remove the power cables, wait for 45 seconds, reconnect the cables and rerun the test. 2. Make sure that the scalability cable connections are connected correctly (see the documentation that came with the cables). 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your system to display a matrix of available firmware.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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
401-802-000		EXA Port Ping Test	Aborted	EXA Port Ping test aborted: port connections might not be correct for xxxx (xxxx=chassis)	1. Remove the power cables, wait for 45 seconds, reconnect the cables and rerun the test. 2. Make sure that the scalability cable connections are connected correctly (see the documentation that came with the cables). 3. Make sure that the DSA code is at the latest level. For the latest level of DSA code, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 4. Make sure that the server firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your system to display a matrix of available firmware.
401-901-NNN (NNN=Node)		EXA Port Ping Test	Failed	EXA Port Ping test failed: EXA Port Ping test failed for xxxx (xxxx=port)	1. Remove the power cables, wait for 45 seconds, reconnect the cables and rerun the test. 2. Make sure that the scalability cable connections are connected correctly (see the documentation that came with the cables). 3. Check the scalability cables for loose connections.
401-000-000		EXA Port Ping Test	Passed	EXA Port Ping test passed	No action required.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
405-901-xxx	Broadcom Ethernet Device	Test Control Registers	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 2. Run the test again. 3. Replace the component that is causing the error. The I/O board contains this component. If the error is caused by an adapter, replace the adapter (see "Removing an adapter" on page 262 and "Replacing an adapter" on page 263). Check the PCI Information and Network Settings information in the DSA log to determine the physical location of the failing component. 4. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
405-901-xxx	Broadcom Ethernet Device	Test MII Registers	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your system to display a matrix of available firmware. 2. Run the test again. 3. Replace the component that is causing the error. The I/O board contains this component. If the error is caused by an adapter, replace the adapter (see "Removing an adapter" on page 262 and "Replacing an adapter" on page 263). Check the PCI Information and Network Settings information in the DSA log to determine the physical location of the failing component. 4. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
405-902-xxx	Broadcom Ethernet Device	Test EEPROM	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 2. Run the test again. 3. Replace the component that is causing the error. The I/O board contains this component. If the error is caused by an adapter, replace the adapter (see "Removing an adapter" on page 262 and "Replacing an adapter" on page 263). Check the PCI Information and Network Settings information in the DSA log to determine the physical location of the failing component. 4. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
405-903-xxx	Broadcom Ethernet Device	Test Internal Memory	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 2. Run the test again. 3. Check the interrupt assignments in the PCI Hardware section of the DSA log. If the Ethernet device is sharing interrupts, if possible, use the Setup utility (see Chapter 6, "Configuration information and instructions," on page 337) to assign a unique interrupt to the device. 4. Replace the component that is causing the error. The I/O board contains this component. If the error is caused by an adapter, replace the adapter (see "Removing an adapter" on page 262 and "Replacing an adapter" on page 263). Check the PCI Information and Network Settings information in the DSA log to determine the physical location of the failing component. 5. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
405-904-xxx	Broadcom Ethernet Device	Test Interrupt	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 2. Run the test again. 3. Check the interrupt assignments in the PCI Hardware section of the DSA log. If the Ethernet device is sharing interrupts, if possible, use the Setup utility (see Chapter 6, "Configuration information and instructions," on page 337) to assign a unique interrupt to the device. 4. Replace the component that is causing the error. The I/O board contains this component. If the error is caused by an adapter, replace the adapter (see "Removing an adapter" on page 262 and "Replacing an adapter" on page 263). Check the PCI Information and Network Settings information in the DSA log to determine the physical location of the failing component. 5. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
405-906-xxx	Broadcom Ethernet Device	Test Loop back at Physical Layer	Failed		1. Check the Ethernet cable for damage and make sure that the cable type and connection are correct. 2. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 3. Run the test again. 4. Replace the component that is causing the error. The I/O board contains this component. If the error is caused by an adapter, replace the adapter (see "Removing an adapter" on page 262 and "Replacing an adapter" on page 263). Check the PCI Information and Network Settings information in the DSA log to determine the physical location of the failing component. 5. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
405-906-xxx	Broadcom Ethernet Device	Test Loop back at MAC -Layer	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 2. Run the test again. 3. Replace the component that is causing the error. The I/O board contains this component. If the error is caused by an adapter, replace the adapter (see "Removing an adapter" on page 262 and "Replacing an adapter" on page 263). Check the PCI Information and Network Settings information in the DSA log to determine the physical location of the failing component. 4. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Table 11. DSA messages (continued)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Message number	Component	Test	State	Description	Action
405-907-xxx	Broadcom Ethernet Device	Test LEDs	Failed		1. Make sure that the component firmware is at the latest level. The installed firmware level is shown in the DSA log, in the Firmware/VPD section for this component. For the latest level of firmware, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 and select your server to display a matrix of available firmware. 2. Run the test again. 3. Replace the component that is causing the error. The I/O board contains this component. If the error is caused by an adapter, replace the adapter (see "Removing an adapter" on page 262 and "Replacing an adapter" on page 263). Check the PCI Information and Network Settings information in the DSA log to determine the physical location of the failing component. 4. Collect the data from the DSA log and send it to IBM service. For information about contacting and sending data to IBM service, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-CALL&lndocid=5000008.

Recovering the server firmware

The flash memory in the server consists of a primary bank and a backup bank. You must maintain a bootable IBM UEFI firmware image in the backup bank. If the UEFI firmware in the primary bank has become corrupted, such as from a power failure during an update, you can recover the UEFI firmware in either of two ways:

- **In-band method:** Through the automatic boot recovery function (automatic) or using the boot recovery jumper and an IBM Flash UEFI Update (manual)
- **Out-of-band method:** Using the IMM web interface and an IBM Flash UEFI Update

You can obtain an IBM Flash UEFI Update package from http://www.ibm.com/supportportal/or from your IBM service representative.

In-band automatic recovery method

If the integrated management module (IMM) detects a problem with the UEFI firmware in the primary bank, the automatic boot recovery function starts the server from the backup bank so that you can restore the UEFI firmware in the primary bank. Use this method if the BRD LED on the light path diagnostics panel is lit and there is an event log entry or if `Booting Backup Image` is displayed on the firmware splash screen; otherwise, use the in-band manual recovery method.

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

1. Boot the server to an operating system that is supported by the IBM Flash UEFI Update package that you downloaded.
2. Install the IBM Flash UEFI Update package, following the instructions in the readme file that comes with the update package.
3. Restart the server.
4. When the prompt `Press F3 to restore to primary` is displayed, press F3 to start the server from the primary bank.

In-band manual recovery method

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

1. Turn off the server, and disconnect all power cords and external cables.
2. Remove the server top cover. See "Removing and replacing consumable parts and Tier 1 CRUs" on page 259 for more information.
3. Locate the boot recovery jumper (J22) on the I/O board.
4. Move the jumper from pins 1 and 2 to pins 2 and 3 to enable the UEFI firmware recovery mode.
5. Reinstall the server cover; then, reconnect all power cords.
6. Restart the server. The power-on self-test (POST) starts.
7. Boot the server to an operating system that is supported by the firmware update package that you downloaded.
8. Perform the firmware update by following the instructions that are in the firmware update package readme file.
9. Copy the downloaded firmware update package into a directory.
10. From a command line, type *`filename`*`-s`, where *filename* is the name of the executable file that you downloaded with the firmware update package.
11. Turn off the server and disconnect all power cords and external cables, and then remove the server cover.
12. Move the boot recovery jumper back to the primary position (pins 1 and 2).
13. Reinstall the server cover, and then reconnect all the power cables.
14. Restart the server.

Out-of-band method

For information about using the IMM web interface to recover the UEFI firmware, see the IMM documentation.

Three-boot failure

Configuration changes, such as added devices or adapter firmware updates can cause the server to fail POST (power-on self-test). If this occurs on three consecutive boot attempts, the server temporarily uses the default configuration values and automatically starts the Setup utility. To solve the problem, complete the following steps:

1. Undo any configuration changes that you made recently, and restart the server.
2. Remove any devices that you added recently, and restart the server.
3. If the problem remains, start the Setup utility, select **Load Default Settings**, and then select **Save Settings** to restore the server factory settings.

System-event log

The system-event log contains messages of three types:

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

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

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

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

Integrated management module error messages

The following tables list messages that might be displayed in the integrated management module (IMM) event log. You can view the IMM event log through the IMM Web interface and through IBM Dynamic System Analysis (as the ASM event log). For more information about IMM, see the *Integrated Management Module User's Guide* at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5079770&brandind=5000008

Table 12. Integrated management module (IMM) error messages (server)

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**

Event ID	Message	Severity	Description	Action

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
8003010c-0881xxxx 8003010c-0882xxxx 8003010c-0883xxxx 8003010c-0884xxxx 8003010c-0885xxxx 8003010c-0886xxxx 8003010c-0887xxxx 8003010c-0888xxxx	Sensor "Lane Failover n" has asserted.	Info	Lane failover on SMI lane Channel n has occurred.	No action; information only.
8003010c-1881xxxx	Sensor "Lane Failover MEU" has asserted.	Info	Lane failover on SMI lane Channel on the memory expansion module has occurred.	No action; information only.
8003010e-0701xxxx	Sensor "Memory Resize" has asserted.	Info	A memory resize has occurred.	No action; information only.
806f011b-0701xxxx	The connector "Planar FPGA Err" has encountered a configuration error.	Error	An internal system board FPGA error has occurred.	1. Flash the system FPGA to the latest level. 2. If the error recurs, replace the microprocessor board. Make sure that the latest level of firmware is installed for the system board.
806f011b-1801xxxx	The connector "MEU FPGA Err" configuration error.	Error	An internal memory expansion module FPGA error has occurred.	1. Make sure that the QPI cables from the server to the memory expansion module are securely and properly attached. 2. Make sure that the latest level of firmware is installed on the memory expansion module and the server.
806f011b-1f05xxxx	The connector "MEU Fan Cable" has encountered a configuration error.	Error	A cable configuration error has occurred.	Make sure that the cable is connected securely and properly.
806f011b-1f06xxxx	The connector "MEU LED Cable" has encountered a configuration error.	Error	A cable configuration error has occurred.	Make sure that the cable is connected securely and properly.
816f001b-1f07xxxx 816f001b-1f08xxxx 816f001b-1f09xxxx	The network port "EXA Cable n" has been disconnected. (n = EXA Cable number).	Warning	The EXA Cable n is disconnected.	Connect the EXA Cable n.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f001b-1f07xxxx 806f001b-1f08xxxx 806f001b-1f09xxxx	The network port "EXA Cable n" has been connected. (n = EXA Cable number).	Warning	EXA Cable n is connected	No action; information only.
806f011b-1f07xxxx	The connector "EXA Cable 1" has encountered a configuration error.	Error	A cable configuration error has occurred.	Make sure that the cable is connected securely and properly.
8007011b-1f07xxxx	Sensor "EXA CRC" has transitioned from normal to non-critical state.	Warning	EXA CRC excession has occurred.	No action; information only.
8007020c-1881xxxx	Sensor "MemSpareErrMEU" has transitioned to critical from a less severe state.	Error	A memory spare lane error has occurred on the memory expansion module.	1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. Check the DIMM connector for damage or foreign material. 3. Replace the Board on the MEU.
8007020c-2581xxxx 8007020c-2582xxxx 8007020c-2583xxxx 8007020c-2584xxxx 8007020c-2585xxxx 8007020c-2586xxxx 8007020c-2587xxxx 8007020c-2588xxxx	Sensor "MemSpareErrN" has transitioned to critical from a less severe state. (N = memory card number	Error	A fatal communication error has occurred between the CPU and the memory card buffer chip set.	1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. Check the Memory card and associated CPU board connector/pins for damage or foreign material. 3. Replace the Memory Card. 4. Replace the CPU board.
806f011b-1f08xxxx	The connector "EXA Cable 2" has encountered a configuration error.	Error	A cable configuration error has occurred.	Make sure that the cable is connected securely and properly.
806f011b-1f09xxxx	The connector "EXA Cable 3" has encountered a configuration error.	Error	A cable configuration error has occurred.	Make sure that the cable is connected securely and properly.
806f0507-2584xxxx	EXA-scaled CPU has a Configuration Mismatch.	Error	An unsupported microprocessor is installed for the multi-node EXA-scaled configuration.	Make sure that a supported microprocessor is installed in this configuration.
Temperature and fan messages				

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
	Numeric sensor Ambient Temp going high (upper non-recoverable) has asserted.	Error	An upper nonrecoverable sensor going high has asserted.	Reduce the ambient temperature.
	Numeric sensor Ambient Temp going high (upper non-recoverable) has deasserted.	Info	An upper non-recoverable sensor going high has deasserted.	No action; information only.
	Processor *n* has recovered from a Configuration Mismatch. (*n* = microprocessor number)	Info	A processor configuration mismatch has occurred.	1. Make sure that the installed microprocessors are compatible with each other (see "Microprocessor" on page 301 for information about microprocessor requirements). 2. (Trained service technician only) Replace the incompatible microprocessor.
	Numeric sensor Planar VBAT going low (lower non-critical) has deasserted.	Warning	A lower non-critical sensor going low as asserted.	No action; warning that the battery might be going bad.
	Sensor CPU *n* OverTemp has transitioned to critical from a non-recoverable state. (*n* = microprocessor number)	Error	A sensor has changed to Critical state from Nonrecoverable state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
	Sensor CPU *n*OverTemp has transitioned to non-recoverable. (*n* = microprocessor number)	Error	A sensor has changed to Nonrecoverable state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
80010202-0701xxxx	Numeric sensor Planar 3.3V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained service technician only) Replace the I/O-board shuttle.
80010202-0701xxxx	Numeric sensor Planar 5V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	(Trained service technician only) Replace the I/O-board shuttle.
80010202-0701xxxx	Numeric sensor Planar 12V going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	Check the OVER SPEC LED (see the information about the OVER SPEC LED in "Light path diagnostics LEDs" on page 62).
80010202-2801xxxx	Numeric sensor Planar VBAT going low (lower critical) has asserted.	Error	A lower critical sensor going low has asserted.	Replace the 3 V battery.
80010204-1d01xxxx 80010204-1d02xxxx 80010204-1d04xxxx 80010204-1d05xxxx	Numeric sensor Fan*n*Tach (*n* = fan number)	Error	A lower critical sensor going low has asserted.	1. Reseat the failing fan *x*, which is indicated by the lit LED near the fan connector on the microprocessor board. 2. Replace the failing fan. (*x* = fan number)
80010204-1d03xxxx	Numeric sensor Fan *n*A Tach going low (lower critical) has asserted. (*n* = fan number)	Error	A lower critical sensor going low has asserted.	1. Reseat the failing fan *n*, which is indicated by a lit LED near the fan connector on the microprocessor board. 2. Replace the failing fan. (*n* = fan number)
80010204-1d03xxxx	Numeric sensor Fan *n* B Tach going low (lower critical) has asserted. (*n* = fan number)	Error	A lower critical sensor going low has asserted.	1. Reseat the failing fan *n*, which is indicated by a lit LED near the fan connector on the microprocessor board. 2. Replace the failing fan. (*n* = fan number)
80010701-0c01xxxx	Numeric sensor Ambient Temp going high (upper non-critical) has asserted.	Warning	An upper non-critical sensor going high has asserted.	No action, warning of increased temperature.
80010901-0c01xxxx	Numeric sensor Ambient Temp going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	Reduce the ambient temperature.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
80010902-0701xxxx	Numeric sensor Planar 3.3V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained service technician only) Replace the I/O-board shuttle.
80010902-0701xxxx	Numeric sensor Planar 5V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	(Trained service technician only) Replace the I/O-board shuttle.
80010902-0701xxxx	Numeric sensor Planar 12V going high (upper critical) has asserted.	Error	An upper critical sensor going high has asserted.	Check the OVER SPEC LED (see the information about the OVER SPEC LED in "Light path diagnostics LEDs" on page 62).
80070201-0301xxxx 80070201-0302xxxx 80070201-0303xxxx 80070201-0304xxxx	Sensor CPU *n* OverTemp has transitioned to critical from a less severe state. (*n* = microprocessor number)	Error	A sensor has changed to Critical state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
80070219-0701xxxx	Sensor Sys Board Fault has transitioned to critical from a less severe state.	Error	A sensor has changed to Critical state from a less severe state.	1. Check the system-event log. 2. Check for an error LED on the I/O board. 3. Replace any failing device. 4. Check for a UEFI firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 5. (Trained service technician only) Replace the I/O board.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
80070301-0301xxxx 80070301-0302xxxx 80070301-0303xxxx 80070301-0304xxxx	Sensor CPU *n* OverTemp has transitioned to non-recoverable from a less severe state. (*n* = microprocessor number) Also CPU *n* VR Temp,	Error	A sensor has changed to Nonrecoverable state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
806f0007-0301xxxx 806f0007-0302xxxx 806f0007-0303xxxx 806f0007-0304xxxx	Processor n has failed with IERR (*n* = microprocessor number)	Error	A processor failed - IERR condition has occurred.	1. Make sure that the latest levels of firmware and device drivers are installed for all adapters and standard devices, such as Ethernet, SCSI, and SAS. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Run the DSA program for the hard disk drives and other I/O devices. 3. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
806f000f-2201ffff	The System n encountered a POST Error. (n = system serial number)	Error	A POST error has occurred. (Sensor = ABR Status)	1. Recover the UEFI firmware from the backup UEFI image (see "Recovering the server firmware" on page 167). 2. Update the UEFI firmware to the latest level. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f000f-2201ffff	The System n encountered a POST Error. (n = system serial number)	Error	A POST error has occurred. (Sensor = Firmware Error)	Update the UEFI firmware to the primary UEFI image. **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.
806f0013-1701xxxx	A diagnostic interrupt has occurred on system n (n = system serial number)	Error	An operator information panel NMI/ diagnostic interrupt has occurred.	If the NMI button on the operator information panel has not been pressed, complete the following steps: 1. Make sure that the NMI button is not pressed. 2. Replace the operator information panel cable. 3. Replace the operator information panel.
806f0107-0301xxxx 806f0107-0302xxxx 806f0107-0303xxxx 806f0107-0304xxxx	An Over-Temperature Condition has been detected on processor *n*Status.(*n* = microprocessor number)	Error	An over temperature condition has occurred for microprocessor *n*.(*n* = microprocessor number)	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. Make sure that the heat sink for microprocessor *n* is installed correctly. (*n* = microprocessor number)
806f0113-1701xxxx	A bus timeout has occurred on system n (n = system serial number)	Error	A bus timeout has occurred.	Remove the adapter from the PCI slot that is indicated by a lit LED. 2. Replace the adapter. 3. Remove all PCI adapters. 4. (Trained service technicians only) Replace the I/O board.
806f0125-0c01xxxx	Front Panel Board 1 detected as absent.	Error	An interconnect configuration error has occurred.	Reseat the front panel (operator information panel) cable on the microprocessor board.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f0207-0301xxxx 806f0207-0302xxxx 806f0207-0303xxxx 806f0207-0304xxxx	Processor n has failed with FRB1/BIST (built-in self-test) condition. (*n* = microprocessor number)	Error	A processor failed - FRB1/BIST condition has occurred.	1. Check for a server firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Make sure that the installed microprocessors are compatible with each other (see"Microprocessor" on page 301 for information about microprocessor requirements). 3. (Trained service technician only) Reseat microprocessor *n*. 4. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)
806f0313-1701xxxx	A software NMI has occurred on system n (n = system serial number)	Error	A software NMI has occurred.	1. Check the device driver. 2. Reinstall the device driver.
806f0607-0301xxxx 806f0607-0302xxxx 806f0607-0303xxxx 806f0607-0304xxxx	An SMBIOS Uncorrectable CPU complex error for Processor *n* has asserted.(*n* = microprocessor number)	Error	The system management handler has detected an internal microprocessor error.	1. Check for a UEFI firmware update. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 2. Make sure that the installed microprocessors are compatible with each other (see "Microprocessor" on page 301 for information about microprocessor requirements). 3. (Trained service technician only) Reseat microprocessor *n*. 4. (Trained service technician only) Replace microprocessor *n*. (*n* = microprocessor number)

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f0813-2582xxxx 806f0813-2584xxxx 806f0813-2581xxxx	An Uncorrectable Bus Error has occured on system N (N= System serial number)	Error	A catastrophic system error occured. System firmware will try and analyze the failure to determine if the failure was due to a hardware component or software component.	1. Check the IBM support web site for RETAIN tips or firmware updates which might resolve this error. 2. Ensure all PCIE adapters have correct and matching driver/firmware levels. 3. Check system event log for additional failing FRU details (ie PCI slot error or memory DIMM error?) 4. If no additional FRU entries were listed which could have generated the error contact service and support to retrieve DSA logs for analysis.
81010002-2801xxxx	Numeric sensor Planar VBAT going low (lower non-critical) has deasserted.	Info	A lower non-critical sensor going low has deasserted.	No action; information only.
81010202-0701xxxx	Numeric sensor Planar 3.3V going low (lower critical) has deasserted.	Info	A lower critical sensor going low has deasserted.	No action; information only.
81010202-0701xxxx	Numeric sensor Planar 5V going low (lower critical) has deasserted.	Info	A lower critical sensor going low has deasserted.	No action; information only.
81010202-0701xxxx	Numeric sensor Planar 12V going low (lower critical) has deasserted.	Info	A lower critical sensor going low has deasserted.	No action; information only.
81010202-2801xxxx	Numeric sensor Planar VBAT going low (lower critical has deasserted.	Info	A lower critical sensor going low has deasserted.	No action; information only.
81010204-1d01xxxx 81010204-1d02xxxx 81010204-1d04xxxx 81010204-1d05xxxx	Numeric sensor Fan *n* Tach going low (lower critical) has deasserted.	Info	A lower critical sensor going low has deasserted.	No action; information only.
81010204-1d01xxxx 81010204-1d02xxxx 81010204-1d03xxxx 81010204-1d04xxxx 81010204-1d05xxxx	Numeric sensor Fan *3A* or *3B* Tach going low (lower critical) has deasserted.	Info	A lower critical sensor going low has deasserted.	No action; information only.
81010701-0c01xxxx	Numeric sensor Ambient Temp going high (upper non-critical) has deasserted.	Info	An upper non-critical sensor going high has deasserted.	No action; information only.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
81010901-0c01xxxx	Numeric sensor Ambient Temp going high (upper critical) has deasserted.	Info	An upper critical sensor going high has deasserted.	No action; information only.
81010902-0701xxxx	Numeric sensor Planar 3.3V going high (upper critical) as deasserted.	Info	An upper critical sensor going high has deasserted.	No action; information only.
81010902-0701xxxx	Numeric sensor Planar 5V going high (upper critical) has deasserted.	Info	An upper critical sensor going high has deasserted.	No action; information only.
81010902-0701xxxx	Numeric sensor Planar 12V going high (upper critical) has deasserted.	Info	An upper critical sensor going high has deasserted.	No action; information only.
Power Messages				
	Redundancy Lost for Power Group 1 has asserted.	Error	One power supply has lost AC. Power is no longer redundant.	Install another power supply to acquire redundancy.
	Redundancy Power Group 1 has been restored.	Info	Redundancy has been restored.	No action; information only.
	Sensor PS *n* Therm Fault has transitioned to non-critical from a normal state. (*n* = power supply number)	Warning	A sensor has changed to non-critical state from a normal state.	1. Make sure that there are no obstructions, such as bundled cables, to the airflow from the power-supply fan. 2. Replace power supply *n*. (*n* = power supply number)
	Sensor PS*n* 12V OV Fault has transitioned to non-critical from a normal state. (*n* = power supply number)	Warning	A sensor has changed to non-critical state from a normal state.	1. Check the OVER SPEC LED (see the information about the OVER SPEC LED in "Light path diagnostics LEDs" on page 62). 2. Remove the power supplies. 3. Replace power supply *n*. 4. (Trained service technician only) Replace the I/O-board shuttle. (*n* = power supply number)

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
	Sensor PS*n* 12V UV Fault has transitioned to non-critical from a normal state.	Warning	A sensor has changed to non-critical state from a normal state.	1. Check the OVER SPEC LED (see the information about the OVER SPEC LED in "Light path diagnostics LEDs" on page 62). 2. Remove the power supplies. 3. Replace power supply *n*. 4. (Trained service technician only) Replace the I/O-board shuttle. (*n* = power supply number)
	Sensor PS*n* 12V OC Fault has transitioned to non-critical from a normal state. (*n* = power supply number)	Warning	A sensor has changed to non-critical state from a normal state.	1. Check the OVER SPEC LED (see the information about the OVER SPEC LED in "Light path diagnostics LEDs" on page 62). 2. Remove the power supplies. 3. Replace power supply *n*. 4. (Trained service technician only) Replace the I/O-board shuttle. (*n* = power supply number)
	Sensor PS *n* CSF Fault has transitioned to a non-critical state from a normal state. (*n* = power supply number)	Warning	A sensor has changed to a non-critical state from a normal state.	1. Check the power supply *n* LEDs. 2. Replace the failing power supply. (*n* = power supply number)
	Failure predicted on Drive 1 Status for array SN# ZZZZZZP.	Warning	A drive is about to fail.	Replace the hard disk drive that is indicated by a lit status LED.
80070603-0701xxxx	Sensor Pwr Rail A Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. (Trained service technician only) Remove the microprocessor from socket 1. **Note:** The server will not start when no microprocessor is installed in socket 1. 3. Reinstall the microprocessor in socket 1 and restart the server. 4. (Trained service technician only) Replace the failing microprocessor. 5. (Trained service technician only) Replace the microprocessor board.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
80070603-0701xxxx	Sensor Pwr Rail B Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. (Trained service technician only) Remove the microprocessor from socket 2. **Note:** The server will not start when no microprocessor is installed in socket 1. 3. Reinstall the microprocessor in socket 2 and restart the server. 4. (Trained service technician only) Replace the failing microprocessor. 5. (Trained service technician only) Replace the microprocessor board.
80070603-0701xxxx	Sensor Pwr Rail C Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. (Trained service technician only) Remove the microprocessor from socket 3. **Note:** The server will not start when no microprocessor is installed in socket 1. 3. Reinstall the microprocessor in socket 3 and restart the server. 4. (Trained service technician only) Replace the failing microprocessor. 5. (Trained service technician only) Replace the microprocessor board.
80070603-0701xxxx	Sensor Pwr Rail D Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. (Trained service technician only) Remove the microprocessor from socket 4. **Note:** The server will not start when no microprocessor is installed in socket 1. 3. Reinstall the microprocessor in socket 4 and restart the server. 4. (Trained service technician only) Replace the failing microprocessor. 5. (Trained service technician only) Replace the microprocessor board.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
80070603-0701xxxx	Sensor Pwr Rail E Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. Remove the optical drive, fans, hard disk drives, and hard disk drive backplane. 3. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 4. Replace the failing device. 5. (Trained service technician only) Replace the microprocessor board.
80070603-0701xxxx	Sensor Pwr Rail F Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. Remove the optical drive, fans, hard disk drives, and hard disk drive backplane. 3. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 4. Replace the failing device. 5. (Trained service technician only) Replace the microprocessor board.
80070603-0701xxxx	Sensor Pwr Rail G Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Turn off the server and disconnect it from power. 2. Remove the adapters from the PCI Express connectors. 3. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 4. Replace the failing adapter. 5. (Trained service technician only) Replace the I/O-board shuttle.
80070603-0701xxxx	Sensor Pwr Rail H Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Remove any cables that are plugged into the PCI Express auxiliary power connector (see "I/O-board connectors" on page 22). 2. Reinstall each device, one at a time, starting the server each time to isolate the failing device. 3. Replace the failing device. 4. Replace the cables you removed in step 1.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
800b010a-1e81xxxx	Redundancy lost for Cooling Zone 1 has asserted.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Make sure that the connectors on fans 1 and 3 are not damaged. 2. Make sure that the fan connectors 1 and 3 on the microprocessor board are not damaged. 3. Make sure that the fans are correctly installed. 4. Reseat the fans. 5. Replace the fans.
800b010a-1e82xxxx	Redundancy lost for Cooling Zone 2 has asserted.	Error	Redundancy has been lost and is insufficient to continue operation.	1. Make sure that the connectors on fans 2 and 3 are not damaged. 2. Make sure that the fan connectors 2 and 3 on the microprocessor board are not damaged. 3. Make sure that the fans are correctly installed. 4. Reseat the fans. 5. Replace the fans
800b010a-1e83xxxx	Redundancy lost for Cooling Zone 3 has asserted. Cooling Zone 1 has asserted	Error	Redundancy has been lost and is insufficient to continue operation.	1. Make sure that the connector on fan 3 is not damaged. 2. Make sure that the fan 3 connector on the microprocessor board is not damaged. 3. Make sure that the fan is correctly installed. 4. Reseat the fan. 5. Replace the fan.
800b050a-1e82xxxx	Non-redundant: Insufficient resources for Cooling Zone 1 has asserted.	Error	Redundancy is insufficient and might degrade or interrupt system operation.	1. Make sure that the connectors on fans 1 and 3 are not damaged. 2. Make sure that fan connectors 1 and 3 on the microprocessor board are not damaged. 3. Make sure that the fans are correctly installed. 4. Reseat the fans. 5. Replace the fans.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
800b050a-1e82xxxx	Non-redundant: Insufficient resources for Cooling Zone 2 has asserted.	Error	Redundancy is insufficient and might degrade or interrupt system operation.	1. Make sure that the connectors on fans 2 and 3 are not damaged. 2. Make sure that fan connectors 2 and 3 on the microprocessor board are not damaged. 3. Make sure that the fans are correctly installed. 4. Reseat the fans. 5. Replace the fans.
800b050a-1e83xxxx	Non-redundant: Insufficient resources for Cooling Zone 3 has asserted.	Error	Redundancy is insufficient and might degrade or interrupt system operation.	1. Make sure that the connector on fan 3 is not damaged. 2. Make sure that fan connector 3 on the microprocessor board is not damaged. 3. Make sure that the fan is correctly installed. 4. Reseat the fan. 5. Replace the fan.
806f0028-2584xxxx	Sensor PECI Bus is unavailable or degraded on management system n (n = system serial number).	Warning	The IMM was unable to communicate properly on an internet interface.	1. Ensure the IMM is flashed to the latest level of firmware. 2. Collect DSA information and call service and support. 3.
806f0108-0a01xxxx 806f0108-0a02xxxx	Power Supply *n* has failed. (*n* = power supply number)	Error	Power supply *n* has failed. (*n* = power supply number)	1. If the power-on LED is lit, complete the following steps: a. Reduce the server to the minimum configuration. b. Reinstall the components one at a time, restarting the server each time. c. If the error recurs, replace the component that you just reinstalled. 2. Reseat power supply *n*. 3. Replace power supply *n*. (*n* = power supply number)

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f010d-0400xxxx 806f010d-0401xxxx 806f010d-0402xxxx 806f010d-0403xxxx 806f010d-0404xxxx 806f010d-0405xxxx 806f010d-0406xxxx 806f010d-0407xxxx 806f010d-0408xxxx 806f010d-0409xxxx 806f010d-040axxxx 806f010d-040bxxxx 806f010d-040cxxxx 806f010d-040dxxxx 806f010d-040exxxx 806f010d-040fxxxx	The Drive *n* Status has been disabled due to a detected fault. (*n* = hard disk drive number)	Error	A drive has been disabled because of a fault.	1. Run the hard disk drive diagnostic test on drive *n*. 2. Reseat the following components: a. Hard disk drive b. Cable from the microprocessor board to the backplane 3. Replace the following components one at a time, in the order shown, restarting the server each time: a. Hard disk drive b. Cable from the microprocessor board to the backplane c. Hard disk drive backplane (*n* = hard disk drive number)
806f010d-0400xxxx 806f010d-0401xxxx 806f010d-0402xxxx 806f010d-0403xxxx 806f010d-0404xxxx 806f010d-0405xxxx 806f010d-0406xxxx 806f010d-0407xxxx 806f010d-0408xxxx 806f010d-0409xxxx 806f010d-040axxxx 806f010d-040bxxxx 806f010d-040cxxxx 806f010d-040dxxxx 806f010d-040exxxx 806f010d-040fxxxx	Array in system n is in critical condition. (n = system serial number)	Error	An array is in Critical state. (Sensor = Drive *n* Status) (*n* = hard disk drive number)	Replace the hard disk drive that is indicated by a lit status LED.
806f0208-0701xxxx	Failure predicted on EPOW Fault	Error	AC power lost to a power supply.	Make sure there is enough power supplied to the server.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f060d-0400xxxx 806f060d-0401xxxx 806f060d-0402xxxx 806f060d-0403xxxx 806f060d-0404xxxx 806f060d-0405xxxx 806f060d-0406xxxx 806f060d-0407xxxx 806f060d-0408xxxx 806f060d-0409xxxx 806f060d-040axxxx 806f060d-040bxxxx 806f060d-040cxxxx 806f060d-040dxxxx 806f060d-040exxxx 806f060d-040fxxxx	Array in system n has failed. (n = system serial number)	Error	An array is in Failed state. (Sensor = Drive *n* Status) (*n* = hard disk drive number)	Replace the hard disk drive that is indicated by a lit status LED.
81070618-0701xxxx	Sensor VT Fault has transitioned has deasserted the transition to non-recoverable.	Warning	A sensor has transitioned to a non-critical state.	No action; information only.
81070618-0701xxxx	Sensor VT Fault has transitioned to non-recoverable.	Error	A sensor has changed to Nonrecoverable state.	1. Check the power-supply LEDs. 2. Follow the actions in "Power-supply LEDs" on page 68. 3. Replace the failing power supply. 4. (Trained service technician only) Replace the microprocessor board. If problem is not resolved, replace the I/O board shuttle.
816f000d-0400xxxx 816f000d-0401xxxx 816f000d-0402xxxx 816f000d-0403xxxx 816f000d-0404xxxx 816f000d-0405xxxx 816f000d-0406xxxx 816f000d-0407xxxx 816f000d-0408xxxx 816f000d-0409xxxx 816f000d-040axxxx 816f000d-040bxxxx 816f000d-040cxxxx 816f000d-040dxxxx 816f000d-040exxxx 816f000d-040fxxxx	The Drive *n* Status has been removed from unit chassis 1. (*n* = hard disk drive number)	Error	A drive has been removed.	Reseat hard disk drive *n* (*n* = hard disk drive number).
816f0208-0701xxxx	Failure no longer predicted on EPOW Fault	Info	EPOW fault recovered	No action; information only.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
Memory Errors **Note:** A DIMM error message indicates the DIMM, but not the memory card, on which the error has occurred. DIMMs 1 - 8 are on memory card 1, DIMMs 9 - 16 are on memory card 2, and so on.				
	Memory Expansion Unit 1 was detected as absent.	Info	The memory expansion unit was detected as absent when it was expected to be present.	Check the QPI cable connections, and then reboot the server to see whether it recovers. **Attention:** Do not disconnect or connect any of the cables when the server or memory expansion module has power connected.
	Memory Expansion Unit 1 detected as present.	Info	The memory expansion unit was detected as present when it was expected to be absent.	Check the QPI cable connections, and then reboot the server to see whether it recovers. **Attention:** Do not disconnect or connect any of the cables when the server or memory expansion module has power connected.
	Uncorrectable error detected for memory device *n* subsystem System Memory. (*n* = DIMM number)	Error	A memory uncorrectable error has occurred.	1. Check the IBM support site for any applicable retain tip or firmware update that applies to this memory error. 2. Swap one of the affected DIMM with a similar DIMM (size/type) on a different channel. 3. Re-enable all DIMM slots. 4. If the failure remains on the original slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 5. If the problem re-occurs with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace Memory card

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
	Uncorrectable error detected for memory device *n* subsystem System Memory. (*n* = DIMM number)	Error	A memory uncorrectable error has occurred.	1. Check the IBM support site for any applicable retain tip or firmware update that applies to this memory error. 2. Swap one of the affected DIMM with a similar DIMM (size/type) on a different channel. 3. Re-enable all DIMM slots. 4. If the failure remains on the original slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 5. If the problem re-occurs with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace Memory card
	Configuration error for memory device *n* on subsystem System Memory. (*n* = DIMM number)	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.
	Mem Card8 Bank on subsystem System memory is no longer throttled.	Info	A sensor has changed to critical state from a less severe state.	No action; information only.
	Sensor Mem Lane Spared has asserted	Info	A recoverable error has occurred on a memory card interface.	1. Check the system-event log for memory card failure events (uncorrectable or PFA) and correct the failures. 2. Reseat the memory card. 3. Replace the failing memory card.
	Sensor Ext QPI Link n has transitioned to Non-Critical from OK	Warning	An external QPI link bus has encountered an error.	1. Check the system- event log. 2. Reseat the QPI wrap cards. **Attention:** Do not disconnect or connect any of the cables when the server or memory expansion module has power connected. 3. Replace the QPI Wrap cards. **Attention:** Do not disconnect or connect any of the cables when the server or memory expansion module has power connected.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
	Sensor Mem Card n Hot has transitioned to non-recoverable.	Error	A fault has occurred on a memory card.	Replace any memory card that is indicated by a lit error LED.
80070202-0701xxxx	Sensor Planar Fault has transitioned to critical from a less severe state.	Error	A sensor has changed to Critical state from a less severe state.	(Trained service technician only) Replace the microprocessor board.
8007021b-0301xxxx 8007021b-0302xxxx 8007021b-0303xxxx 8007021b-0304xxxx	Sensor CPU *n* Int Link has transitioned to critical from a less severe state.	Error	A microprocessor bus error has occurred.	1. Check the system-event log. 2. Check the microprocessor error LEDs. 3. Remove the failing microprocessor from the microprocessor board. 4. Check for a UEFI firmware update. 5. Make sure that the microprocessors are matching. 6. (Trained service technician only) Replace the microprocessor board.
80070221-1f01xxxx 80070221-1f02xxxx 80070221-1f03xxxx 80070221-1f04xxxx	Sensor Ext QPI Link *n* has transitioned to critical from a less severe state.	Error	An external QPI link bus has encountered an error.	1. Check the system- event log. 2. Reseat the QPI cables and the QPI wrap cards. **Attention:** Do not disconnect or connect any of the cables when the server or memory expansion module has power connected. 3. Replace the QPI cables and the OPI Wrap card. **Attention:** Do not disconnect or connect any of the cables when the server or memory expansion module has power connected.
80070608-1409xxxx	Sensor 12V mem Card has transitioned to non-recoverable.	Error	A fault has occurred on a memory card.	Replace any memory card that is indicated by a lit error LED.
80070608-1413xxxx	Sensor Power Good Fault has transitioned to non-recoverable.	Error	A fault has occurred on the I/O board.	(Trained service technician only) Replace the I/O-board shuttle.
800b030c-2581xxxx	Non-redundant: Sufficient resources form Redundancy Degraded or Fully Redundant for Backup Memory has asserted.	Error	Redundancy Lost for Backup Memory has asserted.	1. Check the system-event log for DIMM failure events (uncorrectable or PFA) and correct the failures. 2. Re-enable mirroring in the Setup utility.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
800b050c-2581xxxx	Non-redundant: Insufficient resources for Backup Memory has asserted.	Error	Redundancy Lost for Backup Memory has asserted.	1. Check the system-event log for DIMM failure events (uncorrectable or PFA) and correct the failures. 2. Re-enable mirroring in the Setup utility.
806f0021-0b04xxxx 806f0021-0b05xxxx 806f0021-0b06xxxx 806f0021-0b07xxxx 806f0021-0b08xxxx 806f0021-0b09xxxx 806f0021-0b0axxxx	Fault in slot PCI *n* on system SN# ZZZZZZP.	Error	A fault has occurred in PCI slot *n*.	1. Check the riser-card LEDs. 2. Reseat the affected adapters. 3. Update the server and adapter firmware (UEFI and IMM). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove the adapter from slot *n*. 5. Replace the PCI Express adapter.
806f0021-2582xxxx	Fault in slot PCI *n* on system SN# ZZZZZZP. All PCI Err One of PCI Err	Error	A fault has occurred in PCI slot *n*.	1. Check the riser-card LEDs. 2. Reseat the affected adapters. 3. Update the server and adapter firmware (UEFI and IMM). **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code. 4. Remove the adapter from slot *n*. 5. Replace the PCI Express adapter.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f010c-0881xxxx 806f010c-0882xxxx 806f010c-0883xxxx 806f010c-0884xxxx 806f010c-0885xxxx 806f010c-0886xxxx 806f010c-0887xxxx 806f010c-0888xxxx	Uncorrectable error detected for DIMM Err Card *n* on subsystem System Memory.	Error	A memory uncorrectable error has occurred.	1. Check the IBM support site for any applicable retain tip or firmware update that applies to this memory error. 2. Swap one of the affected DIMM with a similar DIMM (size/type) on a different channel. 3. Re-enable all DIMM slots. 4. If the failure remains on the original slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 5. If the problem re-occurs with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace board on MEU.
806f010c-1881xxxx	Uncorrectable error detected for DIMM Err Card *n* on subsystem System Memory. MEU DIMMs	Error	A memory uncorrectable error has occurred.	1. Check the IBM support site for any applicable retain tip or firmware update that applies to this memory error. 2. Swap one of the affected DIMM with a similar DIMM (size/type) on a different channel. 3. Re-enable all DIMM slots. 4. If the failure remains on the original slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 5. If the problem re-occurs with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace Memory card
806f010c-1881xxxx	Uncorrectable Error detected for MEU DIMMs on subsystem System Memory	Error	Memory expansion module memory error detected.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f010c-2581xxxx	Uncorrectable error detected for all DIMMs on Subsystem System Memory.	Error	A memory uncorrectable error has occurred.	1. Check the IBM support site for any applicable retain tip or firmware update that applies to this memory error. 2. Swap one of the affected DIMM with a similar DIMM (size/type) on a different channel. 3. Re-enable all DIMM slots. 4. If the failure remains on the original slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 5. If the problem re-occurs with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace the board on the MEU
806f010c-2581xxxx	Uncorrectable error detected for one of the DIMMs on Subsystem System Memory MEU DIMMs	Error	A memory uncorrectable error has occurred.	1. Check the IBM support site for any applicable retain tip or firmware update that applies to this memory error. 2. Swap one of the affected DIMM with a similar DIMM (size/type) on a different channel. 3. Re-enable all DIMM slots. 4. If the failure remains on the original slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 5. If the problem re-occurs with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace Memory card

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f010c-2581xxxx	Uncorrectable error detected for DIMM Err Card *n* on subsystem System Memory. All DIMMs or One DIMMs	Error	A memory uncorrectable error has occurred.	1. Check the IBM support site for any applicable retain tip or firmware update that applies to this memory error. 2. Swap one of the affected DIMM with a similar DIMM (size/type) on a different channel. 3. Re-enable all DIMM slots. 4. If the failure remains on the original slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 5. If the problem re-occurs with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace Memory card
806f010f-2201xxxx	System SN# ZZZZZP encountered a firmware hang.	Error	A system hang error has been encountered.	1. Check the system- event log and correct the failures. 2. Remove the system ac power. 3. Wait 30 seconds, then restart the server.
806f030c-0881xxxx 806f030c-0882xxxx 806f030c-0883xxxx 806f030c-0884xxxx 806f030c-0885xxxx 806f030c-0886xxxx 806f030c-0887xxxx 806f030c-0888xxxx	Scrub Failure for "Memory Device X in Memory Module Y" on Subsystem System Memory (x = memory DIMM number, Y = memory card number)	Error	Memory test failed.	1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. Swap one of the affected DIMM with a similar DIMM (size/type) on a different channel. 3. Re-enable all DIMM slots. 4. If the failure remains on original slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 5. If the problem re-occures with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace Memory card

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f030c-1881xxxx	Scrub Failure for "Memory Device X in Memory Module Y" on Subsystem System Memory (x = memory DIMM number, Y = memory card number		Memory test failed.	1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. Swap one of the affected DIMM with a similar DIMM (size/type) on a different channel. 3. Re-enable all DIMM slots. 4. If the failure remains on original slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 5. If the problem re-occures with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace the board on the MEU
806f030c-2581xxxx	Scrub Failure for "Memory Device X in Memory Module Y" on Subsystem System Memory (x = memory DIMM number, Y = memory card number)	Error	The DIMM specified failed the UEFI memory test / initialization procedure.	1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. Swap one of the affected DIMM with a similar DIMM (size/type) on a different channel. 3. Re-enable all DIMM slots. 4. If the failure remains on original slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 5. If the problem re-occures with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace Memory card

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f040c-0881xxxx 806f040c-0882xxxx 806f040c-0883xxxx 806f040c-0884xxxx 806f040c-0885xxxx 806f040c-0886xxxx 806f040c-0887xxxx 806f040c-0888xxxx	DIMM Disabled for "Memory Device X in Memory Module Y" on Subsystem System Memory (x = memory DIMM number, Y = memory card number)	Info	A DIMM was disabled.	1. Make sure the DIMM is installed correctly (see "Replacing a DIMM" on page 284). 2. If the DIMM was disabled because of a memory fault, follow the suggested actions for that error event and restart the server. 3. Check the IBM support web site for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).
806f040c-2581xxxx	DIMM Disabled for "Memory Device X in Memory Module Y" on Subsystem System Memory (x = memory DIMM number, Y = memory card number)	Info	A DIMM was disabled.	1. Make sure the DIMM is installed correctly (see "Replacing a DIMM" on page 284). 2. If the DIMM was disabled because of a memory fault, follow the suggested actions for that error event and restart the server. 3. Check the IBM support web site for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f050c-0881xxxx 806f050c-0882xxxx 806f050c-0883xxxx 806f050c-0884xxxx 806f050c-0885xxxx 806f050c-0886xxxx 806f050c-0887xxxx 806f050c-0888xxxx	Memory logging limit reached for DIMM Err Card *n* on subsystem System Memory.	Error	The memory logging limit has been reached.	1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. At the next maintenance opportunity, swap affected DIMM (as indicated by the Light path diagnostics, see "Light path diagnostics" on page 58 or failure log entry) to a different memory channel or CPU (check this document and the *Installation and User's Guide* for population requirements for sparing/paring modes). 3. If PFA re-occurs (on the same DIMM) replace the affected DIMM as indicated by the Light path diagnostics, see "Light path diagnostics" on page 58 or failure log entry (check for previous history of PFA). 4. If problem stays with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace the Memory card. 5. Replace the CPU board.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f050c-1881xxxx	Memory logging limit reached for DIMM Err Card *n* on subsystem System Memory. MEU DIMMs	Error	The memory logging limit has been reached.	1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. At the next maintenance opportunity, swap affected DIMM (as indicated by the Light path diagnostics, see "Light path diagnostics" on page 58 or failure log entry) to a different memory channel or CPU (check this document and the *Installation and User's Guide* for population requirements for sparing/paring modes). 3. If PFA re-occurs (on the same DIMM) replace the affected DIMM as indicated by the Light path diagnostics, see "Light path diagnostics" on page 58 or failure log entry (check for previous history of PFA). 4. If problem stays with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace the Memory card. 5. Replace the board on the MEU.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f050c-2581xxxx	Memory Logging Limit Reached for all DIMMs on Subsystem System Memory.	Error	The memory logging limit has been reached.	1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. At the next maintenance opportunity, swap affected DIMM (as indicated by the Light path diagnostics, see "Light path diagnostics" on page 58 or failure log entry) to a different memory channel or CPU (check this document and the *Installation and User's Guide* for population requirements for sparing/paring modes). 3. If PFA re-occurs (on the same DIMM) replace the affected DIMM as indicated by the Light path diagnostics, see "Light path diagnostics" on page 58 or failure log entry (check for previous history of PFA). 4. If problem stays with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace the Memory card. 5. Replace the CPU board.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f050c-2581xxxx	Memory logging limit reached for one of the DIMMs on subsystem System Memory.	Error	The memory logging limit has been reached.	1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. At the next maintenance opportunity, swap affected DIMM (as indicated by the Light path diagnostics, see "Light path diagnostics" on page 58 or failure log entry) to a different memory channel or CPU (check this document and the *Installation and User's Guide* for population requirements for sparing/paring modes). 3. If PFA re-occurs (on the same DIMM) replace the affected DIMM as indicated by the Light path diagnostics, see "Light path diagnostics" on page 58 or failure log entry (check for previous history of PFA). 4. If problem stays with the same DIMM connector, inspect DIMM connector for foreign material. If damaged, replace the Memory card. 5. Replace the CPU board.
806f070c-0881xxxx 806f070c-0882xxxx 806f070c-0883xxxx 806f070c-0884xxxx 806f070c-0885xxxx 806f070c-0886xxxx 806f070c-0887xxxx 806f070c-0888xxxx	Configuration error for DIMM Err Card *n* on subsystem System Memory.	Error	A memory card configuration error has occurred.	Make sure the memory cards are installed in the correct sequence.
806f070c-1881xxxx	Configuration error for DIMM Err Card *n* on subsystem System Memory. MEU DIMMs	Error	A memory card configuration error has occurred.	Make sure the memory cards are installed in the correct sequence.
806f070c-2581xxxx	Configuration error for all DIMMs on subsystem System Memory.	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.
806f070c-2581xxxx	Configuration error for one of the DIMMs on subsystem System Memory.	Error	A DIMM configuration error has occurred.	Make sure that DIMMs are installed in the correct sequence and have the same size, type, speed, and technology.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f070c-2584xxxx	Configuration error for Missing CPU on subsystem System Memory.	Error	A configuration error with the microprocessors has occurred.	Make sure that the microprocessors are in a supported configuration.
806f070c-2585xxxx	Configuration error for Missing Boot Mem on subsystem System Memory.	Error	A configuration error has occurred because of missing memory for microprocessor 1.	Make sure that the microprocessor 1 has the necessary memory installed.
. . . 806f070c-2586xxxx 806f070c-2587xxxx 806f070c-2588xxxx 806f070c-2589xxxx 806f070c-258axxxx 806f070c-258bxxxx 806f070c-258cxxxx 806f070c-258dxxxx	Mem Card*n* Bank on subsystem System Memory throttled. Mem Card1 Bank Mem Card2 Bank Mem Card3 Bank Mem Card4 Bank Mem Card5 Bank Mem Card6 Bank Mem Card7 Bank Mem Card8 Bank	Info	A sensor has changed to critical state from a less severe state.	1. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the server cover is installed and completely closed. 2. If a fan has failed, complete the action for a fan failure. 3. Replace DIMM *n*. (*n* = DIMM number)

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f0a0c-2586xxxx 806f0a0c-2587xxxx 806f0a0c-2588xxxx 806f0a0c-2589xxxx 806f0a0c-258axxxx 806f0a0c-258bxxxx 806f0a0c-258cxxxx 806f0a0c-258dxxxx	An over-temperature condition has been detected on the Mem Card*n* Bank on subsystem System Memory.	Error		1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. Ensure the ambient temperature is within product specs. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the servicer cover is installed and completely closed. 3. If only one DIMM is indicated, swap the affected DIMM (as indicated by the Light path diagnostics, see "Light path diagnostics" on page 58 or failure log entry) to a different memory channel or CPU at the next scheduled maintenance interval (check this document and the *Installation and User's Guide* for population requirements for sparing/paring modes). 4. If the problem remains with the same DIMM, replace the DIMM 5. If multiple DIMMs report Overtemp and not recoved in a few minutes, engage next level of support

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f0a0c-258exxxx	An over-temperature condition has been detected on the Mem Card*n* Bank on subsystem System Memory. MEU Bank1 Status			1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. Ensure the ambient temperature is within product specs. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the servicer cover is installed and completely closed. 3. If only one DIMM is indicated, swap the affected DIMM (as indicated by the Light path diagnostics, see "Light path diagnostics" on page 58 or failure log entry) to a different memory channel or CPU at the next scheduled maintenance interval (check this document and the *Installation and User's Guide* for population requirements for sparing/paring modes). 4. If the problem remains with the same DIMM, replace the DIMM 5. If multiple DIMMs report Overtemp and not recoved in a few minutes, engage next level of support

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f0a0c-258fxxxx	An over-temperature condition has been detected on the Mem Card*n* Bank on subsystem System Memory. MEU Bank2 Status			1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. Ensure the ambient temperature is within product specs. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the servicer cover is installed and completely closed. 3. If only one DIMM is indicated, swap the affected DIMM (as indicated by the Light path diagnostics, see "Light path diagnostics" on page 58 or failure log entry) to a different memory channel or CPU at the next scheduled maintenance interval (check this document and the *Installation and User's Guide* for population requirements for sparing/paring modes). 4. If the problem remains with the same DIMM, replace the DIMM 5. If multiple DIMMs report Overtemp and not recoved in a few minutes, engage next level of support

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f0a0c-2590xxxx	An over-temperature condition has been detected on the Mem Card*n* Bank on subsystem System Memory. MEU Bank3 Status			1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. Ensure the ambient temperature is within product specs. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the servicer cover is installed and completely closed. 3. If only one DIMM is indicated, swap the affected DIMM (as indicated by the Light path diagnostics, see "Light path diagnostics" on page 58 or failure log entry) to a different memory channel or CPU at the next scheduled maintenance interval (check this document and the *Installation and User's Guide* for population requirements for sparing/paring modes). 4. If the problem remains with the same DIMM, replace the DIMM 5. If multiple DIMMs report Overtemp and not recoved in a few minutes, engage next level of support

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f0a0c-2591xxxx	An over-temperature condition has been detected on the Mem Card*n* Bank on subsystem System Memory. MEU Bank4 Status			1. Check the IBM support site for an applicable retain tip or firmware update that applies to this memory error. 2. Ensure the ambient temperature is within product specs. Make sure that the fans are operating, that there are no obstructions to the airflow, that the air baffles are in place and correctly installed, and that the servicer cover is installed and completely closed. 3. If only one DIMM is indicated, swap the affected DIMM (as indicated by the Light path diagnostics, see "Light path diagnostics" on page 58 or failure log entry) to a different memory channel or CPU at the next scheduled maintenance interval (check this document and the *Installation and User's Guide* for population requirements for sparing/paring modes). 4. If the problem remains with the same DIMM, replace the DIMM 5. If multiple DIMMs report Overtemp and not recoved in a few minutes, engage next level of support
Microprocessor messages.				
	CPU Mismatch has a Configuration Mismatch.	Error	A configuration error has occurred because of a missing microprocessor.	Make sure that the microprocessor socket that is indicated by a lit LED contains a supported microprocessor.
	Fault in One of PCI Err on system SN# ZZZZZZP	Error	A PCI error has occurred on one unit of a 2-node configuration.	Check the failing system SN#ZZZZZZP
	Fault in ALL PCI Err on system SN# ZZZZZZP	Error	A PCI error has occurred on one unit of a 2-node configuration.	Check the failing system SN#ZZZZZZP

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f0507-2584xxxx	4S CPU has a Configuration Mismatch.	Error	Microprocessor type does not support more than four microprocessors in a partition.	(Trained service technician only) Change the microprocessors to a type that supports more than four microprocessors in a partition or decrease the number of microprocessors in the partition.
816f0507-2584xxxx	4S CPU has recovered from a Configuration Mismatch.	Info	Microprocessors are now the correct type.	No action; information only.
806f0507-2584xxxx	2S CPU has a Configuration Mismatch.	Error	Microprocessor type does not support more than two microprocessors in a partition.	(Trained service technician only) Change the microprocessors to a type that supports more than two microprocessors in a partition or decrease the number of microprocessors in the partition.
806f0507-2584xxxx	CPU Type Check has a Configuration Mismatch.	Error	Microprocessors in a partition are not all the same type.	(Trained service technician only) Change the microprocessors to make sure they are all the same type.
806f0507-2584xxxx	Missing Boot CPU has a Configuration Mismatch.	Error	A configuration error has occurred because microprocessor 1 is missing.	Make sure that a supported microprocessor is installed in microprocessor socket 1.
806f0507-2584xxxx	No PCIe CPU has a Configuration Mismatch.	Error	No microprocessors are installed in sockets 3 or 4 when PCI Express adapters are installed in slots 1 - 4.	Make sure that microprocessors 3 or 4 are installed when PCI Express adapters are installed in slots 1 - 4.
806f0507-2584xxxx	2S Mismatch has a Configuration Mismatch.	Error	An unsupported microprocessor is installed for this configuration.	(Trained service technician only) Replace any microprocessor that is indicated by a lit error LED.
816f0507-2584xxxx	2S CPU has recovered from a Configuration Mismatch.	Info	Microprocessors are now the correct type.	No action; information only.
816f0507-2584xxxx	CPU Type Check has recovered from a Configuration Mismatch.	Info	Microprocessors are now the same type.	No action; information only.

Table 12. Integrated management module (IMM) error messages (server) (continued)

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816f0507-2584xxxx	Missing Boot CPU has recovered from a Configuration Mismatch.	Info	The boot microprocessor is present.	No action; information only.
VRD Messages				
	Sensor IOH Temp Status has transitioned to critical from a non-recoverable state.	Error	An internal system element has reached an over-temperature state.	1. Check for and correct any system fan errors. 2. Make sure all server air passages are clear of debris or dust. 3. (Trained service technician only) Replace the I/O board.
	Sensor IOH Temp Status has transitioned to crititcal from a less severe state.	Error	An internal system element has reached an over-temperature state.	1. Check for and correct any system fan errors. 2. Make sure all server air passages are clear of debris or dust. 3. (Trained service technician only) Replace the I/O board.
	Processor *n* is operating in a degraded state.	Warning	A microprocessor is throttled because of power management reasons or because it is too hot.	1. Check for and correct any system fan errors. 2. Make sure all server air passages are clear of debris or dust. 3. Reseat the QPI wrap card, if installed. 4. Reseat any installed QPI cables. **Attention:** Do not disconnect or connect any of the cables when the server or memory expansion module has power connected. 5. (Trained service technician only) Replace the microprocessor board.
80070201-1e83xxxx	Sensor IOH Temp Status has transitioned to non-recoverable from a less severe state.	Error	An internal system element has reached an over-temperature state.	1. Check for and correct any system fan errors. 2. Make sure all server air passages are clear of debris or dust. 3. (Trained service technician only) Replace the I/O board.
80070301-1e83xxxx	Sensor IOH Temp Status has transitioned to non-recoverable state.	Error	An internal system element has reached an over-temperature state.	1. Check for and correct any system fan errors. 2. Make sure all server air passages are clear of debris or dust. 3. (Trained service technician only) Replace the I/O board.

Table 12. Integrated management module (IMM) error messages (server) (continued)

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80070608-1401xxxx 80070608-1402xxxx 80070608-1403xxxx 80070608-1404xxxx 80070608-1405xxxx 80070608-1406xxxx 80070608-1407xxxx 80070608-1408xxxx	Sensor MEM *n* VRD has transitioned to non-recoverable.	Error	A system power fault has occurred.	(Trained service technician only) Replace the microprocessor board.
80070608-140axxxx 80070608-140bxxxx 80070608-140cxxxx 80070608-140dxxxx	Sensor CPU *n* VRD has transitioned to non-recoverable.	Error	A system power fault has occurred.	(Trained service technician only) Replace the microprocessor board.
80070608-140exxxx	Sensor CPU 1 2 VIO has transitioned to non-recoverable.	Error	A system power fault has occurred.	(Trained service technician only) Replace the microprocessor board.
80070608-140fxxxx	Sensor CPU 3 4 VIO has transitioned to non-recoverable.	Error	A system power fault has occurred.	(Trained service technician only) Replace the microprocessor board.
80070608-1410xxxx	Sensor I/O Board VRD has transitioned to non-recoverable.	Error	A system power fault has occurred.	(Trained service technician only) Replace the I/O-board shuttle.
80070608-1411xxxx	Sensor SAS VRD has transitioned to non-recoverable.	Error	A system power fault has occurred.	(Trained service technician only) Replace the microprocessor board.
80070608-1412xxxx	Sensor VRD 3.3V has transitioned to non-recoverable"	Error	A system power fault has occurred.	(Trained service technician only) Replace the I/O-board shuttle.
80070608-1414xxxx	Sensor Five_V_PowerGood has transitioned to non-recoverable.	Error	A system power fault has occurred.	(Trained service technician only) Replace the microprocessor board.
80070608-1415xxxx	Sensor CPU_1_8V_PG has transitioned to non-recoverable.	Error	A system power fault has occurred.	(Trained service technician only) Replace the microprocessor board.
806f011b-0701xxxx	The connector QPI Interconnect has encountered a configuration error. OPI Wrap Card 1 QPI Wrap Card 2	Error	The system had detected an internal connection error.	1. Reseat the QPI wrap card, if installed. 2. Reseat any installed QPI cables. **Attention:** Do not disconnect or connect any of the cables when the server or memory expansion module has power connected. 3. (Trained service technician only) Replace the microprocessor board.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
806f011b-0701xxxx	The connector USB Detect has encountered a configuration error.	Error	A USB cable is disconnected.	1. Make sure that all the USB cables are connected and that there is no damage to the connectors. 2. Check the internal cable from the I/O board to the system front panel.
Recovery Messages				
	Rebuild in process for Array in system SN# ZZZZZZP	Info	The storage subsystem is in a recovery state.	No action; information only.
	Memory Device *n* disabled on subsystem System Memory.	Info		No action; information only.
	DIMM Err Card *n* disabled on subsystem System Memory.	Info		No action; information only.
	One of DIMMs disabled on subsystem System Memory.	Info		No action; information only.
	All DIMMs disabled on subsystem System Memory.	Info		No action; information only.
	Watchdog Timer expired for Watchdog.	Info		No action; information only.
80080004-1d01xxxx 80080004-1d02xxxx 80080004-1d03xxxx 80080004-1d04xxxx 80080004-1d05xxxx	Device Fan *n* has been removed from unit Chassis 1.	Info		No action; information only.
806f000d-0400xxxx through 806f000d-040fxxxx	The Drive *n* Status has been added.	Info	The storage subsystem is in a recovery state.	No action; information only.
806f0308-0a01xxxx 806f0308-0a02xxxx	Power Supply *n* has lost input.	Info	AC input power has been lost.	No action; information only. The server might not be in a redundant power state.
806f0807-2584xxxx	One of the CPUs has been disabled.	Info		No action; information only.
806f0807-2584xxxx	All CPUs have been disabled.	Info		No action; information only.
816f0008-0a01xxxx 816f0008-0a02xxxx	Power Supply *n* has been removed from container Chassis 1.	Info		No action; information only.

Table 12. Integrated management module (IMM) error messages (server) (continued)

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816f010d-0400xxxx through 816f010d-040fxxxx	The Drive *n* Status has been enabled.	Info	The storage subsystem is in a recovery state.	No action; information only.
806f0807-0301xxxx 806f0807-0302xxxx 806f0807-0303xxxx 806f0807-0304xxxx	Processor *n* has been disabled.	Info		No action; information only.
Firmware and software messages				
	The firmware and software on the system Host are compatible.	Info	The firmware in the scaled configuration matches.	No action; information only.
	A firmware or software change occurred on the system Host.	Info	A software change has been made to the scalable information and the data has been updated to reflect the change.	No action; information only.
806f032b-2101xxxx	A firmware or software incompatibility was detected on the system Host.	Error	The IMM or FPGA firmware between the systems scaled together does not match.	Update the IMM and the FPGA firmware to make sure it is the same type in the scaled configuration.
General messages				
	A hardware change occurred on the system Host.	Info	The scalability code detected a hardware change and has updated the scalable information to reflect this change.	No action; information only.
	Ethernet Data Rate modified from %1 to %2 by user %3.(%1 = CIM_EthernetPort.Speed; %2 = CIM_EthernetPort.Speed; %3 = user ID)	Info	A user has modified the Ethernet port data rate.	No action; information only.

Table 12. Integrated management module (IMM) error messages (server) (continued)

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	Ethernet Duplex setting modified from %1 to %2 by user %3.(%1 = CIM_EthernetPort.FullDuplex; %2 = CIM_EthernetPort.FullDuplex; %3 = user ID)	Info	A user has modified the Ethernet port duplex setting.	No action; information only.
	Ethernet MTU setting modified from %1 to %2 by user %3.(%1 = CIM_EthernetPort.ActiveMaximumTransmissionUnit; %2 = CIM_EthernetPort.ActiveMaximumTransmissionUnit; %3 = user ID)	Info	A user has modified the Ethernet port MTU setting.	No action; information only.
	Ethernet Duplex setting modified from %1 to %2 by user %3.(%1 = CIM_EthernetPort.NetworkAddresses; %2 = CIM_EthernetPort.NetworkAddresses; %3 = user ID)	Info	A user has modified the Ethernet port MAC address setting.	No action; information only.
	Ethernet interface %1 by user %2.(%1 = CIM_EthernetPort.EnabledState; %2 = user ID)	Info	A user has enabled or disabled the Ethernet interface.	No action; information only.
	Hostname set to %1 by user %2.(%1 = CIM_DNSProtocolEndpoint.Hostname; %2 = user ID)	Info	A user has modified the host name of the IMM.	No action; information only.
	IP address of network interface modified from %1 to %2 by user %3.(%1 = CIM_IPProtocolEndpoint.IPv4Address; %2 = CIM_StaticIPAssignmentSettingData.IPAddress; %3 = user ID)	Info	A user has modified the IP address of the IMM.	No action; information only.

Table 12. Integrated management module (IMM) error messages (server) (continued)

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	IP subnet mask of network interface modified from %1 to %2 by user %3s.(%1 = CIM_IPProtocolEndpoint. SubnetMask; %2 = CIM_StaticIPAssignment SettingData.SubnetMask; %3 = user ID)	Info	A user has modified the IP subnet mask of the IMM.	No action; information only.
	IP address of default gateway modified from %1 to %2 by user %3s.(%1 = CIM_IPProtocolEndpoint. GatewayIPv4Address; %2 = CIM_StaticIPAssignment SettingData.DefaultGateway Address; %3 = user ID)	Info	A user has modified the default gateway IP address of the IMM.	No action; information only.
	OS Watchdog response %1 by %2.(%1 = Enabled or Disabled; %2 = user ID)	Info	A user has enabled or disabled an OS watchdog.	No action; information only.
	Remote Login Successful. Login ID: %1 from %2 at IP address %3.(%1 = user ID; %2 = ValueMap(CIM_ProtocolEnd point.ProtocolIFType; %3 = IP address, *xxx.xxx.xxx.xxx*)	Info	A user has successfully logged in to the IMM.	No action; information only.
	Attempting to %1 server %2 by user %3.(%1 = Power Up, Power Down, Power Cycle, or Reset; %2 = IBM_ComputerSystem. ElementName; %3 = user ID)	Info	A user has used the IMM to perform a power function on the server.	No action; information only.
	IMM reset was initiated by user %1.(%1 = user ID)	Info	A user has initiated a reset of the IMM.	No action; information only.
	DHCP setting changed to by user %1.(%1 = user ID)	Info	A user has changed the DHCP mode.	No action; information only.

Table 12. Integrated management module (IMM) error messages (server) (continued)

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	IMM: Configuration %1 restored from a configuration file by user %2.(%1 = CIM_ConfigurationData. ConfigurationName; %2 = user ID)	Info	A user has restored the IMM configuration by importing a configuration file.	No action; information only.
	IMM reset was caused by restoring default values.	Info	The IMM has been reset because a user has restored the configuration to its default settings.	No action; information only.
	Flash of %1 from %2 succeeded for user %3.(%1 = CIM_ManagedElement. ElementName; %2 = Web or LegacyCLI; %3 = user ID)	Info	A user has successfully updated one of the following firmware components: • IMM main application • IMM boot ROM • Server firmware • Diagnostics • Remote expansion enclosure power backplane • Integrated service processor • Remote expansion enclosure processor	No action; information only.
	Flash of %1 from %2 failed for user %3.(%1 = CIM_ManagedElement.Element Name; %2 = Web or LegacyCLI; %3 = user ID)	Info	An attempt to update a firmware component from the interface and IP address has failed.	Try to update the firmware again.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
	The Chassis Event Log (CEL) on system n is 75% full. (n = system serial number)	Info	The IMM event log is 75% full. When the log is full, older log entries are replaced by newer ones.	To avoid losing older log entries, save the log as a text file and clear the log.
	Sensor "TPM Phy Pres Set" has transitioned from normal to non-critical state	Info	The physical presence for Trusted Platform Module (TPM) has been detected.	No action; information only.
	IMM Test Alert Generated by %1.(%1 = user ID)	Info	A user has generated a test alert from the IMM.	No action; information only.
40000001-00000000	IMM Network Initialization Complete.	Info	An IMM network has completed initialization.	No action; information only.
40000002-00000000	Certificate Authority %1 has detected a %2 Certificate Error.(%1 = IBM_CertificateAuthority.CA DistinguishedName; %2 = CIM_PublicKeyCertificate. ElementName)	Error	A problem has occurred with the SSL Server, SSL Client, or SSL Trusted CA certificate that has been imported into the IMM. The imported certificate must contain a public key that corresponds to the key pair that was previously generated by the **Generate a New Key and Certificate Signing Request** link.	1. Make sure that the certificate that you are importing is correct. 2. Try importing the certificate again.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
4000000d-00000000	DHCP[%1] failure, no IP address assigned.(%1 = IP address, *xxx.xxx.xxx.xxx*)	Info	A DHCP server has failed to assign an IP address to the IMM.	1. Make sure that the network cable is connected. 2. Make sure that there is a DHCP server on the network that can assign an IP address to the IMM.
40000010-00000000	Security: Userid: '%1' had %2 login failures from WEB client at IP address %3.(%1 = user ID; %2 = MaximumSuccessiveLoginFailures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from a Web browser and has been prevented from logging in for the lockout period.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
40000011-00000000	Security: Login ID: '%1' had %2 login failures from CLI at %3.(%1 = user ID; %2 = MaximumSuccessiveLoginFailures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from the command-line interface and has been prevented from logging in for the lockout period.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
40000012-00000000	Remote access attempt failed. Invalid userid or password received. Userid is '%1' from WEB browser at IP address %2.(%1 = user ID; %2 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has attempted to log in from a Web browser by using an invalid login ID or password.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.
40000013-00000000	Remote access attempt failed. Invalid userid or password received. Userid is '%1' from TELNET client at IP address %2.(%1 = user ID; %2 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has attempted to log in from a Telnet session by using an invalid login ID or password.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.

Table 12. Integrated management module (IMM) error messages (server) (continued)

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40000016-00000000	ENET[0] DHCP-HSTN=%1, DN=%2, IP@=%3, SN=%4, GW@=%5, DNS1@=%6.(%1 = CIM_DNSProtocolEndpoint. Hostname; %2 = CIM_DNSProtocolEndpoint. DomainName; %3 = CIM_IPProtocolEndpoint. IPv4Address; %4 = CIM_IPProtocolEndpoint. SubnetMask; %5 = IP address, *xxx.xxx.xxx.xxx*; %6 = IP address, *xxx.xxx.xxx.xxx*)	Info	The DHCP server has assigned an IMM IP address and configuration.	No action; information only.
40000017-00000000	ENET[0] IP-Cfg:HstName=%1, IP@%2, NetMsk=%3, GW@=%4.(%1 = CIM_DNSProtocolEndpoint. Hostname; %2 = CIM_StaticIPSettingData. IPv4Address; %3 = CIM_StaticIPSettingData. SubnetMask; %4 = CIM_StaticIPSettingData. DefaultGatewayAddress)	Info	An IMM IP address and configuration have been assigned using client data.	No action; information only.
40000018-00000000	LAN: Ethernet[0] interface is no longer active.	Info	The IMM Ethernet interface has been disabled.	No action; information only.
40000019-00000000	LAN: Ethernet[0] interface is now active.	Info	The IMM Ethernet interface has been enabled.	No action; information only.
4000001c-00000000	Watchdog %1 Screen Capture Occurred.(%1 = OS Watchdog or Loader Watchdog)	Error	An operating-system error has occurred, and the screen capture was successful.	1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
4000001d-00000000	Watchdog %1 Failed to Capture Screen.(%1 = OS Watchdog or Loader Watchdog)	Error	An operating-system error has occurred, and the screen capture failed.	1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system. 6. Update the IMM firmware. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
4000001e-00000000	Running the backup IMM main application.	Error	The IMM has resorted to running the backup main application.	Update the IMM firmware. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
4000001f-00000000	Please ensure that the IMM is flashed with the correct firmware. The IMM is unable to match its firmware to the server.	Error	The server does not support the installed IMM firmware version.	Update the IMM firmware to a version that the server supports. **Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.
40000021-00000000	IMM clock has been set from NTP server %1.(%1 = IBM_NTPService.ElementName)	Info	The IMM clock has been set to the date and time that is provided by the Network Time Protocol server.	No action; information only.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
40000022-00000000	SSL data in the IMM configuration data is invalid. Clearing configuration data region and disabling SSL+H25.	Error	There is a problem with the certificate that has been imported into the IMM. The imported certificate must contain a public key that corresponds to the key pair that was previously generated through the **Generate a New Key and Certificate Signing Request** link.	1. Make sure that the certificate that you are importing is correct. 2. Try to import the certificate again.
40000025-00000000	The Chassis Event Log (CEL) on system n is 100% full. (n = system serial number)	Info	The IMM event log is full. When the log is full, older log entries are replaced by newer ones.	To avoid losing older log entries, save the log as a text file and clear the log.
40000026-00000000	The Chassis Event Log (CEL) on system %1 cleared by user %2.(%1 = CIM_ComputerSystem.Element Name; %2 = user ID)	Info	A user has cleared the IMM event log.	No action; information only.
40000027-00000000	%1 Platform Watchdog Timer expired for %2.(%1 = OS Watchdog or Loader Watchdog; %2 = OS Watchdog or Loader Watchdog)	Error	A Platform Watchdog Timer Expired event has occurred.	1. Reconfigure the watchdog timer to a higher value. 2. Make sure that the IMM Ethernet over USB interface is enabled. 3. Reinstall the RNDIS or cdc_ether device driver for the operating system. 4. Disable the watchdog. 5. Check the integrity of the installed operating system.

Table 12. Integrated management module (IMM) error messages (server) (continued)

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.** • **See Chapter 4, "Parts listing, Types 7145, 7146, 7143, and 7191," on page 237 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.**				
40000029-00000000	Security: Userid: '%1' had %2 login failures from an SSH client at IP address %3.(%1 = user ID; %2 = MaximumSuccessiveLoginFailures (currently set to 5 in the firmware); %3 = IP address, *xxx.xxx.xxx.xxx*)	Error	A user has exceeded the maximum number of unsuccessful login attempts from SSH and has been prevented from logging in for the lockout period.	1. Make sure that the correct login ID and password are being used. 2. Have the system administrator reset the login ID or password.

The following table describes the IMM error messages and suggested actions to correct the detected problems when a memory expansion module is attached to the server.

Table 13. IMM error messages detected when memory expansion module is attached to the server

Event ID	Message	Severity	Description	Action
	Redundancy lost for Power Group 1 has asserted	Error	Power supply redundancy has been lost.	Install additional power supplies.
	Redundancy Power Group 1 has been restored	Info	Redundant power has been restored.	No action; information only.
	Failure no longer predicted on EPOW fault	Info	The EPOW fault failure is no longer predicted.	No action; information only.
	CPU Type Check has recovered from a configuration mismatch	Info	The CPU Type Check configuration mismatch has recovered.	No action; information only.
	CPU Type Check has a configuration mismatch	Error	A configuration mismatch was detected on the CPU Type Check.	1. Check to make sure that matched microprocessors are installed. See "Microprocessor" on page 301 for information about installation requirements. 2. (Trained service technician only) Replace the microprocessor.

Table 13. IMM error messages detected when memory expansion module is attached to the server (continued)

Event ID	Message	Severity	Description	Action
	Missing Boot CPU has recovered from a configuration mismatch	Info	The missing boot CPU has recovered from a configuration mismatch.	No action; information only.
	Missing Boot CPU has a configuration mismatch	Error	A CPU is missing from microprocessor socket 1.	(Trained service technician only) Install a microprocessor in microprocessor socket 1.
	Memory Expansion Unit 1 detected as absent	Info	The memory expansion module is not working properly.	Check the memory expansion module cables and power connections.
	A hardware change occurred on system Host	Info	Changes were made to the host system hardware.	No action; information only.
	The firmware or software on system Host are compatible	Info	The required firmware and software are compatible.	No action; information only.
	A hardware change occurred on system Host	Info	The host system hardware was changed.	No action; information only.
	Configuration error for MEU Bank*n* Status on subsystem System Memory has deasserted	Info	Memory expansion module configuration error deasserted.	No action; information only.
	Memory Logging Limit removed for MEU Bank*n* Status on subsystem System Memory	Info	Memory expansion module memory logging limit deasserted.	No action; information only.
	Uncorrectable error recovery detected for MEU Bank*n* Status on subsystem System Memory	Info	Memory expansion module memory Bank*n* error recovered.	No action; information only.
	MEU Bank*n* Status on subsystem System Memory throttled	Info	Memory expansion module throttling asserted.	No action; information only.
	Configuration Error for MEU Bank*n* Status on subsystem System Memory	Error	Memory expansion module memory configuration error detected.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.
	Memory Logging Limit reached for MEU Bank*n* Status on subsystem System Memory	Error	Memory expansion module memory error limit reached.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.
	MEU Bank*n* Status disabled on subsystem System Memory	Info	Memory expansion module memory Bank*n* has been disabled.	No action; information only.

Table 13. IMM error messages detected when memory expansion module is attached to the server (continued)

Event ID	Message	Severity	Description	Action
	Uncorrectable error detected for MEU Bank*n* Status on subsystem system memory	Error	Memory expansion module memory error detected.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.
	Memory Logging Limit removed for MEU Bank*n* Status on subsystem System Memory	Info	Memory expansion module memory logging limit deasserted.	No action; information only.
	MEU Bank*n* Status enabled on subsystem System Memory	Info	Memory expansion module memory Bank*n* enabled.	No action; information only.
	Uncorrectable error recovery detected for MEU Bank*n* Status on subsystem System Memory	Info	Memory expansion module memory Bank *n* error recovered.	No action; information only.
	MEU Bank*n* Status on subsystem System Memory throttled	Info	Memory expansion module throttling asserted.	No action; information only.
	Configuration Error for MEU Bank*n* Status on subsystem System Memory	Error	Memory expansion module memory configuration error detected.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.
	Memory Logging Limit reached for MEU Bank*n* Status on subsystem System Memory	Error	Memory expansion module memory error limit reached.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.
	MEU Bank*n* Status disabled on subsystem System Memory	Info	Memory expansion module memory Bank*n*has been disabled	No action; information only.
	Uncorrectable error detected for MEU Bank*n* Status on subsystem System Memory	Error	Memory expansion module memory error detected.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.
	Memory Logging Limit removed for MEU Bank*n* Status on subsystem System Memory	Info	Memory expansion module memory logging limit deasserted	No action; information only.
	MEU Bank*n* Status enabled on subsystem System Memory	Info	Memory expansion module memory Bank*n* enabled.	No action; information only.

Table 13. IMM error messages detected when memory expansion module is attached to the server (continued)

Event ID	Message	Severity	Description	Action
	Uncorrectable error recovery detected for MEU Bank*n* Status on subsystem System Memory	Info	Memory expansion module memory Bank *n* error recovered.	No action; information only.
	Configuration Error for MEU Bank*n* Status on subsystem System Memory	Error	Memory expansion module memory configuration error detected.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.
	Memory Logging Limit reached for MEU Bank*n* Status on subsystem System Memory	Error	Memory expansion module memory error limit reached.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.
	MEU Bank*n* Status disabled on subsystem System Memory	Info	Memory expansion module memory Bank*n* has been disabled.	No action; information only.
	Uncorrectable Error detected for MEU Bank*n* Status on subsystem System Memory	Error	Memory expansion module memory error detected.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.
	Memory Logging Limit removed for MEU Bank*n* Status on subsystem System Memory	Info	Memory expansion module memory logging limit deasserted.	No action; information only.
	MEU Bank*n* Status enabled on subsystem System Memory	Info	Memory expansion module memory Bank*n* enabled.	No action; information only.
	Uncorrectable error recovery detected for MEU Bank*n* Status on subsystem System Memory	Info	Memory expansion module memory Bank *n* error recovered.	No action; information only.
	MEU Bank*n* Status on subsystem System Memory throttled	Info	Memory expansion module throttling asserted	No action; information only.
	Configuration Error for MEU Bank*n* Status on subsystem System Memory	Error	Memory expansion module memory configuration error detected.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.
	Memory Logging Limit reached for MEU Bank*n* Status on subsystem System Memory	Error	Memory expansion module memory error limit reached.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.

Table 13. IMM error messages detected when memory expansion module is attached to the server (continued)

Event ID	Message	Severity	Description	Action
	MEU Bank*n* Status disabled on subsystem System Memory	Info	Memory expansion module memory Bank*n* has been disabled	No action; information only.
	Uncorrectable Error detected for MEU Bank*n* Status on subsystem System Memory	Error	Memory expansion module memory error detected.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.
	Memory Logging Limit removed for MEU Bank*n* Status on subsystem System Memory	Info	Memory expansion module memory logging limit deasserted.	No action; information only.
	MEU Bank*n* Status enabled on subsystem System Memory	Info	Memory expansion module memory Bank*n* is enabled.	No action; information only.
	Uncorrectable error recovery detected for MEU Bank*n* Status on Subsystem System Memory	Info	Memory expansion module memory Bank *n* error recovered.	No action; information only.
	MEU Bank*n* Status on subsystem System Memory throttled	Info	Memory expansion module throttling asserted.	No action; information only.
	Configuration Error for MEU Bank*n* Status on subsystem System Memory	Error	Memory expansion module memory configuration error detected.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.
	Memory Logging Limit reached for MEU Bank*n* Status on subsystem System Memory	Error	Memory expansion module memory error limit reached	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.
	MEU Bank*n* Status disabled on subsystem System Memory	Info	Memory expansion module memory Bank*n* has been disabled.	No action; information only.
	Uncorrectable Error detected for MEU Bank*n* Status on subsystem System Memory	Error	Memory expansion module memory error detected.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.
	Sensor MEU OverTemp has deasserted the transition to non-recoverable	Info	Memory expansion module OverTemp deasserted.	No action; information only.

Table 13. IMM error messages detected when memory expansion module is attached to the server (continued)

Event ID	Message	Severity	Description	Action
	Sensor MEU OverTemp has transitioned to non-recoverable	Error	Memory expansion module OverTemp asserted.	1. Check the memory expansion module LEDs. 2. Check the system-event log. 3. Replace any failed fans in the memory expansion module.
	Sensor MEU OverTemp has deasserted the transition to non-recoverable from a less severe state	Info	Memory expansion module temperature returned to normal.	No action; information only.
	Sensor MEU OverTemp has transitioned to a less severe state from critical	Info	Memory expansion module temperature returned to normal.	No action; information only.
	Sensor MEU OverTemp has transitioned to non-recoverable	Error	Memory expansion module OverTemp asserted.	1. Check the memory expansion module LEDs. 2. Check the system-event log. 3. Replace any failed fans in the memory expansion module.
	Sensor MEU OverTemp has transitioned to critical from a non-recoverable state	Error	Memory expansion module OverTemp asserted.	1. Check the memory expansion module LEDs. 2. Check the system-event log. 3. Replace any failed fans in the memory expansion module.
	Sensor MEU OverTemp has transitioned to non-recoverable from a less severe state	Error	Memory expansion module OverTemp asserted.	1. Check the memory expansion module LEDs. 2. Check the system-event log. 3. Replace any failed fans in the memory expansion module.
	Sensor MEU OverTemp has transitioned to critical from a less severe state	Error	Memory expansion module OverTemp asserted.	1. Check the memory expansion module LEDs. 2. Check the system-event log. 3. Replace any failed fans in the memory expansion module.

Table 13. IMM error messages detected when memory expansion module is attached to the server (continued)

Event ID	Message	Severity	Description	Action
	MEU DIMMs on subsystem System Memory is no longer throttled	Info	Memory expansion module throttling deasserted.	No action; information only.
	MEU DIMMs on subsystem System Memory throttled	Info	Memory expansion module throttling asserted.	No action; information only.
	Sensor MEU PS2 Fan has transitioned to critical from a less severe state	Error	Memory expansion module power supply 2 error detected.	1. Check memory expansion module LEDs. 2. Check memory expansion module power supply 2 LEDs. 3. Replace the memory expansion module power supply 2.
80010204-1d06xxxx 80010204-1d07xxxx 80010204-1d08xxxx 80010204-1d09xxxx 80010204-1d0axxxx	• Numeric sensor MEU Fan *n* Tach going low (lower critical) has asserted. • Device Fan *n* has been removed from unit Chassis 1.	Error	A fan fault in a memory expansion enclosure reports the error according to the sensor name or the device instance number. See "Integrated management module error messages" on page 169 for the fan instances, sensor strings, and locations.	Replace the failing fan.
80070201-1881xxxx	Sensor MEU PS2 Therm has transitioned to critical from a less severe state	Error	Memory expansion module power supply 2 error detected.	1. Check memory expansion module LEDs. 2. Check memory expansion module power supply 2 LEDs. 3. Replace the memory expansion module power supply 2.
81070201-1881xxxx	Sensor MEU PS1 Therm has transitioned to a less severe state from critical	Info	Memory expansion module power supply 1 is now normal.	No action; information only.

Table 13. IMM error messages detected when memory expansion module is attached to the server (continued)

Event ID	Message	Severity	Description	Action
80070201-1881xxxx	Sensor MEU PS1 Therm has transitioned to critical from a less severe state	Error	Memory expansion module power supply 1 error detected.	1. Check memory expansion module LEDs. 2. Check memory expansion module power supply 1 LEDs. 3. Replace the memory expansion module power supply 1.
80070202-1881xxxx	Sensor MEU VRD FAULT has transitioned to critical from a less severe state	Error	Memory expansion module voltage failure.	1. Check the memory expansion module LEDs. 2. Check the system-event log. 3. Replace the memory expansion module main board.
80070204-1881xxxx	Sensor MEU PS2 Fan has transitioned to a less severe state from critical	Info	Memory expansion module power supply 2 is now normal.	No action; information only.
81070204-1881xxxx	Sensor MEU PS1 Fan has transitioned to a less severe state from critical	Info	Memory expansion module power supply 1 is now normal.	No action; information only.
80070204-1881xxxx	Sensor MEU PS1 Fan has transitioned to critical from a less severe state	Error	Memory expansion module power supply 1 error detected.	1. Check memory expansion module LEDs. 2. Check memory expansion module power supply 1 LEDs. 3. Replace the memory expansion module power supply 1.
80070608-0a01xxxx	Sensor MEU PS1 CSF has transitioned to non-recoverable	Error	Memory expansion module power supply 1 error detected.	1. Check memory expansion module LEDs. 2. Check memory expansion module power supply 1 LEDs. 3. Replace the memory expansion module power supply 1.

Table 13. IMM error messages detected when memory expansion module is attached to the server (continued)

Event ID	Message	Severity	Description	Action
80070608-1881xxxx	Sensor MEU PS2 VCO has transitioned to non-recoverable	Error	Memory expansion module power supply 2 error detected.	1. Check memory expansion module LEDs. 2. Check memory expansion module power supply 2 LEDs. 3. Replace the memory expansion module power supply 2.
80070608-1881xxxx	Sensor MEU PS2 12V OC has transitioned to non-recoverable	Error	Memory expansion module power supply 2 error detected.	1. Check memory expansion module LEDs. 2. Check memory expansion module power supply 2 LEDs. 3. Replace the memory expansion module power supply 2.
80070608-1881xxxx	Sensor MEU PS1 VCO has transitioned to non-recoverable	Error	Memory expansion module power supply 1 error detected.	1. Check memory expansion module LEDs. 2. Check memory expansion module power supply 1 LEDs. 3. Replace the memory expansion module power supply 1.
80070608-1881xxxx	Sensor MEU PS1 12V OC has transitioned to non-recoverable	Error	Memory expansion module power supply 1 error detected.	1. Check memory expansion module LEDs. 2. Check memory expansion module power supply 1 LEDs. 3. Replace the memory expansion module power supply 1.
80070608-1881xxxx	Sensor MEU PS2 12V UV has transitioned to non-recoverable	Error	Memory expansion module power supply 2 error detected.	1. Check memory expansion module LEDs. 2. Check memory expansion module power supply 2 LEDs. 3. Replace the memory expansion module power supply 2.

Table 13. IMM error messages detected when memory expansion module is attached to the server (continued)

Event ID	Message	Severity	Description	Action
80070608-1881xxxx	Sensor MEU PS1 12V UV has transitioned to non-recoverable	Error	Memory expansion module power supply 1 error detected.	1. Check memory expansion module LEDs. 2. Check memory expansion module power supply 1 LEDs. 3. Replace the memory expansion module power supply 1.
80070608-1881xxxx	Sensor MEU PS2 12V OV has transitioned to non-recoverable	Error	Memory expansion module power supply 2 error detected.	1. Check memory expansion module LEDs. 2. Check memory expansion module power supply 2 LEDs. 3. Replace the memory expansion module power supply 2.
80070608-1881xxxx	Sensor MEU PS1 12V OV has transitioned to non-recoverable	Error	Memory expansion module power supply 2 error detected.	1. Check memory expansion module LEDs. 2. Check memory expansion module power supply 1 LEDs. 3. Replace the memory expansion module power supply 1.
806f0008-1881xxxx	MEU PS 1 Status has been added to container MEU PS 1 Status	Info	Memory expansion module power supply 1 is now normal.	No action; information only.
806f0008-1881xxxx	MEU PS 2 Status has been added to container MEU PS 2 Status	Info	Memory expansion module power supply 2 is now normal.	No action; information only.
806f0108-1881xxxx	MEU PS 2 Status has failed	Error	Memory expansion module power supply 2 error detected.	1. Check memory expansion module LEDs. 2. Check memory expansion module power supply 2 LEDs. 3. Replace the memory expansion module power supply 2.

Table 13. IMM error messages detected when memory expansion module is attached to the server (continued)

Event ID	Message	Severity	Description	Action
806f0108-1881xxxx	MEU PS 1 Status has failed	Error	Memory expansion module power supply 1 error detected.	1. Check memory expansion module LEDs. 2. Check the memory expansion module power supply 1 LEDs. 3. Replace the memory expansion module power supply 1.
806f0308-1881xxxx	MEU PS 2 Status has lost input	Info	Memory expansion module power supply 2 is now normal.	No action; information only.
806f0308-1881xxxx	MEU PS 1 Status has lost input	Info	Memory expansion module power supply 1 is now normal.	No action; information only.
806f0308-1881xxxx	MEU PS 1 Status has lost input	Info	Memory expansion module power supply 1 is now normal.	No action; information only.
806f032b-2101xxxx	A firmware or software incompatibility was detected on the system Host	Error	The FPGA firmware between the memory expansion module and the host system does not match.	Update all firmware to the latest level (see Updating the firmware).
806f040c-1881xxxx	MEU DIMMs disabled on subsystem System Memory	Info	Memory expansion module memory DIMMs*n* has been disabled.	1. Make sure the DIMM is installed correctly (see "Replacing a DIMM" on page 284). 2. If the DIMM was disabled because of a memory fault, follow the suggested actions for that error event and restart the server. 3. Check the IBM support web site for an applicable retain tip or firmware update that applies to this memory event. If no memory fault is recorded in the logs and no DIMM connector error LED is lit, you can re-enable the DIMM through the Setup utility or the Advanced Settings Utility (ASU).

Table 13. IMM error messages detected when memory expansion module is attached to the server (continued)

Event ID	Message	Severity	Description	Action
806f0507-2584xxxx	4S CPU has a configuration mismatch	Error	A configuration mismatch has occurred on 4S CPU.	1. Check to make sure that matched microprocessors are installed. See "Microprocessor" on page 301 for information about installation requirements. 2. (Trained service technician only) Replace the microprocessor.
806f050c-1881xxxx	Memory Logging Limit reached for MEU DIMMs on subsystem System Memory	Error	Memory expansion module memory error limit reached.	1. Check the system-event log. 2. Correct any memory errors in the memory expansion module.
806f090c-258exxxx 806f090c-258fxxxx 806f090c-2590xxxx 806f090c-2591xxxx	MEU Bank*n* Status on subsystem System Memory throttled	Info	Memory expansion module throttling asserted.	No action; information only.
81070201-1881xxxx	Sensor MEU PS2 Therm has transitioned to a less severe state from critical	Info	Memory expansion module power supply 2 is now normal.	No action; information only.
81070202-1881xxxx	Sensor MEU VRD FAULT has transitioned to a less severe state from critical	Info	Memory expansion module VRD deasserted.	No action; information only.
81070608-0a01xxxx	Sensor MEU PS1 CSF has deasserted the transition to non-recoverable	Info	Memory expansion module power supply 1 is now normal.	No action; information only.
81070608-0a02xxxx	Sensor MEU PS2 CSF has deasserted the transition to non-recoverable	Info	Memory expansion module power supply 2 is now normal.	No action; information only.
81070608-1881xxxx	Sensor MEU PS2 12V OC has deasserted the transition to non-recoverable	Info	Memory expansion module power supply 2 is now normal.	No action; information only.
81070608-1881xxxx	Sensor MEU PS2 VCO has deasserted the transition to non-recoverable	Info	Memory expansion module power supply 2 is now normal.	No action; information only.
81070608-1881xxxx	Sensor MEU PS1 VCO has deasserted the transition to non-recoverable	Info	Memory expansion module power supply 1 is now normal.	No action; information only.

Table 13. IMM error messages detected when memory expansion module is attached to the server (continued)

Event ID	Message	Severity	Description	Action
81070608-1881xxxx	Sensor MEU PS2 12V UV has deasserted the transition to non-recoverable	Info	Memory expansion module power supply 2 is now normal.	No action; information only.
81070608-1881xxxx	Sensor MEU PS1 12V OC has deasserted the transition to non-recoverable	Info	Memory expansion module power supply 1 is now normal.	No action; information only.
81070608-1881xxxx	Sensor MEU PS1 12V UV has deasserted the transition to non-recoverable	Info	Memory expansion module power supply 1 is now normal.	No action; information only.
81070608-1881xxxx	Sensor MEU PS2 12V OV has deasserted the transition to non-recoverable	Info	Memory expansion module power supply 2 is now normal.	No action; information only.
81070608-1881xxxx	Sensor MEU PS1 12V OV has deasserted the transition to non-recoverable	Info	Memory expansion module power supply 1 is now normal.	No action; information only.
816f0008-1881xxxx	MEU PS 1 Status has been removed from container MEU PS 1 Status	Info	Memory expansion module power supply 1 is now normal.	No action; information only.
816f0008-1881xxxx	MEU PS 2 Status has been removed from container MEU PS 2 Status	Info	Memory expansion module power supply 2 is now normal.	No action; information only.
816f0108-1881xxxx	MEU PS 2 Status has returned to OK status	Info	Memory expansion module power supply 2 is now normal.	No action; information only.
816f0108-1881xxxx	MEU PS 1 Status has returned to OK status	Info	Memory expansion module power supply 1 is now normal.	No action; information only.
816f010c-1881xxxx	Uncorrectable error recovery detected for MEU DIMMs on Subsystem System Memory	Info	Memory expansion module memory DIMMs *n* error recovered.	No action; information only.
816f040c-1881xxxx	MEU DIMMs enabled on subsystem System Memory	Info	Memory expansion module memory DIMMs*n* is enabled.	No action; information only.
816f050c-1881xxxx	Memory Logging Limit removed for MEU DIMMs on subsystem System Memory	Info	Memory expansion module memory logging limit deasserted.	No action; information only.

Table 13. IMM error messages detected when memory expansion module is attached to the server (continued)

Event ID	Message	Severity	Description	Action
816f070c-1881xxxx	Configuration Error for MEU DIMMs on subsystem System Memory has deasserted	Info	Memory expansion module configuration error deasserted.	No action; information only.
816f090c-258exxxx 816f090c-258fxxxx 816f090c-2590xxxx 816f090c-2591xxxx	MEU Bank*n* Status on subsystem System Memory is no longer throttled	Info	Memory expansion module throttling deasserted.	No action; information only.

Table 14. Fan instances, sensor strings, and locations

Instance number	Sensor name	Location
1	Fan 1 Tach	Host server
2	Fan 2 Tach	Host server
3	Fan 3A Tach	Host server
3	Fan 3B Tach	Host server
4	Fan 4 Tach	Host server
5	Fan 5 Tach	Host server
6	MEU Fan 1 Tach	Memory expansion enclosure
7	MEU Fan 2 Tach	Memory expansion enclosure
8	MEU Fan 3 Tach	Memory expansion enclosure
9	MEU Fan 4 Tach	Memory expansion enclosure
10	MEU Fan 5 Tach	Memory expansion enclosure

Solving Ethernet controller problems

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

Try the following procedures:

- Make sure that the correct device drivers, which come with the server, are installed and that they are at the latest level.
- Make sure that the Ethernet cable is installed correctly.
  - The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.
  - If the Ethernet controller is set to operate at 100 Mbps, you must use Category 5 cabling.
- Determine whether the switch supports auto-negotiation. For auto-negotiation problem determination procedures, see the switch documentation. If the switch does not support auto-negotiation, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the switch.
- Check the Ethernet controller LEDs on the rear panel of the server. These LEDs indicate whether there is a problem with the connector, cable, or switch.

  - The Ethernet link status LED is lit when the Ethernet controller receives a link pulse from the switch. If the LED is off, there might be a defective connector or cable or a problem with the switch.
  - 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 switch and network are operating and that the correct device drivers are installed.
- Check the LAN activity LED on the rear of the server. The LAN activity LED is lit when data is active on the Ethernet network. If the LAN activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Check for operating-system-specific causes of the problem.
- Make sure that the device drivers on the client and server are using the same protocol.

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

Solving undetermined problems

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

If you suspect that a software problem is causing failures (continuous or intermittent), see “Software problems” on page 57.

Damaged data in CMOS memory or damaged IBM UEFI firmware can cause undetermined problems. To reset the CMOS data, turn off the server and remove the battery for two minutes.

Damaged memory-card connector pins or incorrectly installed memory cards can prevent the server from starting or might cause a POST checkpoint halt. For example, a memory card that is not completely installed or has bent connector pins might cause the server to continually restart or display an F2 checkpoint halt. Remove and inspect all memory-card connector pins for bent or damaged interface pins (see “Removing a memory card” on page 281 and “Replacing a memory card” on page 282). Replace all memory cards that have damaged pins and make sure that each card is completely latched into place.

Check the LEDs on all the power supplies (see “Power-supply LEDs” on page 68). If the LEDs indicate that the power supplies are working correctly, complete the following steps:

1. Turn off the server.
2. Make sure that the server is cabled correctly.
3. Remove or disconnect the following devices, one at a time, until you find the failure. Turn on the server and reconfigure it each time.
   - Any external devices.
   - Surge-suppressor device (on the server).
   - Modem, printer, mouse, and non-IBM devices.
   - Each adapter (see “Removing an adapter” on page 262 and “Replacing an adapter” on page 263).
   - Hard disk drives (see “Removing a hot-swap hard disk drive” on page 267 and “Replacing a hot-swap hard disk drive” on page 267).

- Memory modules. The minimum configuration requirement is 2 GB (two 1 GB DIMMs). (See “Removing a DIMM” on page 283 and “Replacing a DIMM” on page 284.)

The following minimum configuration is required for the server to turn on:
- I/O board
- Power supply
- Power cord
- Microprocessor board
- One microprocessor
- Two 1 GB DIMMs on one memory card (If a memory expansion module is connected to the server, two 2 GB DIMMs on the memory expansion module.)

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

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

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

Problem determination tips

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

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

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

- Machine type and model
- UEFI 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 "Getting help and technical assistance," on page 359 for information about calling IBM for service.

Chapter 4. Parts listing, Types 7145, 7146, 7143, and 7191

The following replaceable components are available for the System x3850 X5 and x3950 X5 Types 7145, 7146, 7143, and 7191 except as specified otherwise in "Replaceable server components" on page 238. For an updated parts listing, go to http://www.ibm.com/supportportal/.

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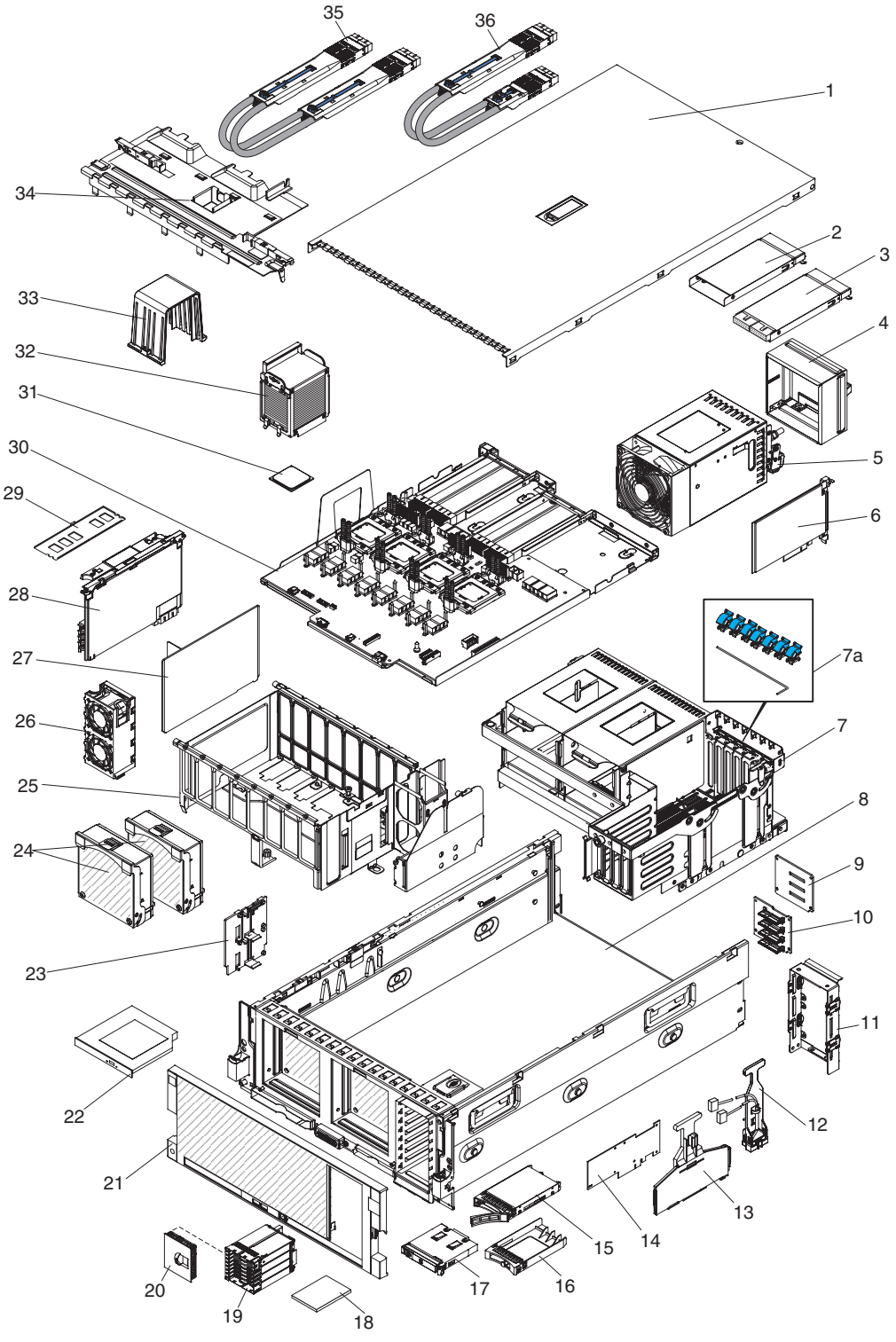

Replaceable server components

Replaceable components are of four types:

- **Consumable part:** 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 with no service agreement, 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.

Table 15. Parts listing, Types 7143, 7145, 7146, and 7191

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Top cover (all models)	59Y4815		
2	QPI wrap card filler (see Filler Kit)			
3	QPI wrap card (models 4Fx, 5Gx, D1x, D2x, H2x)	46M0000		
4	Power supply filler (see Filler Kit)			
5	Power supply, 1975 Watt	49Y7760		
6	Emulex 10GbE Custom Adapter for IBM System x (all models)	49Y4202		
7	I/O-board shuttle (Types 7143 and 7191)		88Y5422	
7	I/O-board shuttle (Types 7145 and 7146)		69Y1851	
7a	PCI latch kit for the I/O-board shuttle assembly		59Y4983	
8	Chassis assembly (all models)			59Y4814
9	Hard disk drive backplane filler (see Filler Kit)			
10	Hard disk drive backplane (all models except 4Fx, 5Dx, 5Gx, ARx)		43V7070	
11	Hard disk drive backplane carrier (see Miscellaneous hardware parts kit)			
12	Hard disk drive backplane power cables and carrier (see Cabling Kit)			
13	RAID card carrier (see Miscellaneous hardware parts kit)			
14	ServeRAID-BR10i SAS/SATA Controller (all 7145/7191 models except 4Fx, 5Dx, 5Gx)		44E8690	
14	ServeRAID-M5015 SAS/SATA Controller (models H1x, H2x, H3x)		46M0851	
15	Hard disk drive, 200 GB SSD (models 4Fx, 5Gx, D1x, D2x)	40K6897		
15	Hard disk drive, SATA MultiBurner (models H1x H2x)	44W3256		
15	Hard disk drive, 600 GB 10K, 2.5-inch SAS (models H1x, H2x, H3x)	49Y2004		
15	Hard disk drive, 300 GB 10K, 2.5-inch SAS (optional)	42D0638		
15	Hard disk drive, 73 GB 15K, 2.5-inch SAS (optional)	42D0673		
15	Hard disk drive, 146 GB 15K, 2.5-inch SAS (optional)	42D0678		
15	Hard disk drive, 146 GB (optional)	42D0633		

Table 15. Parts listing, Types 7143, 7145, 7146, and 7191 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
16	Hard disk drive filler (see Filler Kit)			
17	Operator information panel (all models)	46M0059		
18	200 Gb SATA 1.8 inch MLC SSD (models 4Fx, 5Gx)	40K6897		
18	50 Gb SATA SSD (optional)	43W7717		
19	1.8 inch SSD backplane and cage (models 4Fx, 5Dx, 5Gx, D1x, D2x)		59Y6222	
20	1.8 inch SSD filler blank (model 5Dx)	49Y4936		
21	Front bezel (all models)	59Y4818		
22	DVD/CD-RW SATA drive (some models only)	44W3254		
22	DVD/CD multi-burner SATA drive (some models only)	44W3256		
22	DVD UltraSlim Enhanced SATA drive (optional)	44W3254		
23	Battery tray (see Miscellaneous hardware parts kit)			
24	Front fans (120 mm) (all models)	59Y4813		
25	Memory card cage (included in chassis assembly)			
26	Middle fans (dual 60 mm) (all models)	59Y4812		
27	Memory card filler (see Filler Kit)			
28	Memory card (Types 7143 and 7191)			69Y1742
28	Memory card (Types 7145 and 7146)	46M0001		
29	DIMM, 1 GB (optional)	44T1490		
29	DIMM, 2 GB (all)	44T1491		
29	DIMM, 2 GB (all models)	49Y1443		
29	DIMM, 4 GB (models 1Rx, 2Rx, 2Sx, 3Rx, 4Dx, 4Fx, 4Rx, 4Sx, 5Dx, 5Gx, 5Rx, 5Sx)	46C7452		
29	DIMM, 8 GB (optional)	46C7488		
29	DIMM, 16 GB (optional)	46C7489		
29	DIMM, 8 GB (optional)	49Y1381		
29	DIMM, 16 GB (optional)	49Y1382		
29	DIMM, 4 GB (1.35V) PC3L-10600R-999 CL9 DDR3 ECC (Types 7143 and 7191)	49Y1425		
29	DIMM, 8GB (1.35V) PC3L-8500R-777 CL7 DDR3 ECC (Types 7143 and 7191)	49Y1417		
29	DIMM, 16 GB (1.35V) PC3L-8500R-777 CL7 DDR3 ECC (Types 7143 and 7191) (models H1x, H2x, H3x)	49Y1418		
29	DIMM, 32 GB (4Gb, 4Rx4, 1.35V) PC3-8500 DDR3-1066 LP RDIMM (optional)	90Y3103		
30	Microprocessor board (Types 7145 and 7146)			69Y1811
30	Microprocessor board Types (7143 and 7193)			88Y5351
31	Microprocessor (Intel Xeon E7520 1.86 GHz, 18M 4-core), insertion tool, and heat sink (models 1Rx, ARx)			59Y6230
31	Microprocessor (Intel Xeon E7530 1.86 GHz, 12M, 6-core), insertion tool, and heat sink (models 2Rx, 2Sx)			59Y6229

Table 15. Parts listing, Types 7143, 7145, 7146, and 7191 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
31	Microprocessor (Intel Xeon L7545 1.86 GHz, 18M, 6-core), insertion tool, and heat sink (optional)			59Y6226
31	Microprocessor (Intel Xeon L7555 1.86 GHz, 24M, 8-core), insertion tool, and heat sink (optional)			59Y6224
31	Microprocessor (Intel Xeon E7540 2.00 GHz, 18M, 6-core), insertion tool, and heat sink (model 3Rx)			59Y6228
31	Microprocessor (Intel Xeon X7550 2.00 GHz, 18M, 8-core), insertion tool, and heat sink (models 4Dx, 4Fx, 4Rx, 4Sx)			59Y6225
31	Microprocessor (Intel Xeon X7560 2.26 GHz, 24M, 8-core), insertion tool, and heat sink (models 4Rx, 5Dx, 5Gx, 5Rx, 5Sx)			59Y6223
31	Microprocessor (Intel Xeon X7542 2.67 GHz, 18M, 6-core), insertion tool, and heat sink (optional)			59Y6227
31	Microprocessor (Intel Xeon E7-4807 1.86 GHz, 18M, 6-core, 95W - 4 socket) Types 7143 and 7191 (models B1x, B8x, B9x)			69Y1877
31	Microprocessor (Intel Xeon E7-4820 2.00 GHz, 18M, 8-core, 105W - 4 socket) Types 7143 and 7191 (model B2x)			69Y1878
31	Microprocessor (Intel Xeon E7-4830 2.13 GHz, 24M, 8-core, 105W - 4 socket) Types 7143 and 7191 (model B3x)			69Y1879
31	Microprocessor (Intel Xeon E7-4850 2.26 GHz, 24M, 10-core, 130W - 4 socket) Types 7143 and 7191 (models B6x, D2x, F1x, F2x)			69Y1880
31	Microprocessor (Intel Xeon E7-4860 2.40 GHz, 30M, 10-core, 130W - 4 socket) Types 7143 and 7191 (model B7x)			69Y1881
31	Microprocessor (Intel Xeon E7-8837 2.67 GHz, 24M, 8-core, 130W - 8 socket) Types 7143 and 7191 (optional)			69Y1882
31	Microprocessor (Intel Xeon E7-8830 2.13 GHz, 24M, 8-code, 105W - 8 socket) Types 7143 and 7191 (optional)			69Y1884
31	Microprocessor (Intel Xeon E7-8867L 2.13 GHz, 30M, 10-core, 105W - 8 socket) Types 7143 and 7191 (optional)			69Y1885
31	Microprocessor (Intel Xeon E7-8860 2.26 GHz, 24M, 10-core, 130W - 8 socket) Types 7143 and 7191 (model C2x)			69Y1886
31	Microprocessor (Intel Xeon E7-8870 2.40 GHz, 30M, 10-core, 130W - 8 socket) Types 7143 and 7191 (models C3x, H1x, H2x, H3x)			69Y1887
31	Microprocessor (Intel Xeon E7-8850 2.00 GHz, 24M, 10-core, 130W - 8 socket) Types 7143 and 7191 (model C1x)			88Y5402
31	Microprocessor (Intel Xeon E7-4850 2.00 GHz, 24M, 10-core, 30W - 4 socket) Types 7143 and 7191 (model D1x)			88Y5404
32	Heat sink (all models)			68Y7257
33	Heat sink filler (see Filler Kit)			
34	Top cover bracket (all models)	59Y4816		

Table 15. Parts listing, Types 7143, 7145, 7146, and 7191 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
35	IBM 2-Node x3850 X5 and x3950 X5 Scalability Cable (Kit) Types 7143 and 7191 (model D1x) Types 7145 and 7146 (optional)	59Y4826		
36	IBM MAX5 to x3850 X5 Cable (Kit) (models 2Sx, 4Ds, 4Sx, 5Sx)	40K6750		
	2 node mechanical support (models 2Sx, 4Sx, 5Sx, 4Dx, 4Fx, 5Gx, B8x, B9x, F1x, F2x)	59Y4931		
	2 GB 1Rx8 2 Gb PC3-10600R-999 DDR3-1333 LP RDIMM (optional)	44T1582		
	ServeRAID-M1015 adapter with battery (optional)	46M0918		
	ServeRAID-M1015 adapter without battery (model B7x)	46M0861		
	4 Gb PS PCI-E single port FC adapter (optional)	39R6526		
	4 Gb FC PCI-E dual port FC adapter (optional)	39R6528		
	4 Gb PCI-E single port FC adapter (optional)	43W7510		
	4 Gb PCI-E dual port FC adapter (optional)	43W7512		
	6 Gb SSD HBA card assembly (model 5Gx)	46M0913		
	8 Gb PCI-E single port adapter (optional)	42D0491		
	8 Gb FC dual port HBA adapter (optional)	42D0500		
	8 Gb QLogic FC single port HBA adapter (optional)	42D0507		
	8 Gb QLogic FC single port HBA adapter (optional)	42D0516		
	10 Gb QLogic GB CNA adapter (optional)	42C1802		
	10 Gb FCoCEE dual port HBA adapter (optional)	42C1822		
	10 Gbe SW SFP+ Module (models H1x, H2x, H3x)		49Y8579	
	320 Gb DuoSLC SSD PCIe (model 5Gx)	46M0887		
	320 SSD PCIe (models 5Gx, H1x)	81Y4521		
	1000 Express Ethernet adapter (optional)	39Y6070		
	3800 NVIDIA Quadro FX 3PCI-Ex 16 adapter (optional)	43V5894		
	1.28 TB IOPS MLC duo adapter for IBM System x	81Y4529		
	640 GB High IOPS MLC adapter for IBM System x	81Y4533		
	320 GB High IOPS SLC adapter for IBM System x	81Y4537		
	640 GB High IOPS SLC duo adapter for IBM System x	81Y4541		
	640 SSD PCIe adapter (models H2x, H3x)	81Y4518		
	Ethernet quad adapter (models H1x, H2x, H3x)	49Y4242		
	Emulex 10 GbE Adapter (models B2x, B3x, B5x, B6x, B7x, C1x, C2x, C3x, D1x, D2x, H1x, H2x, H3x)	49Y7942		
	IBM MAX5 MB2 for System x	88Y6530		
	4 bay backplane filler (all models)	69Y2286		
	B5015 SSD controller (model 4Fx)	46M0970		
	Battery, 3.0 volt	15F8409		
	Cable, Mini SAS 750 mm (29.5 inches) (models 4Fx, 5Dx, 5Gx, D1x, D2x)		59Y4915	

Table 15. Parts listing, Types 7143, 7145, 7146, and 7191 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	Cable, VGA power N3800 (optional)		59Y3455	
	Cable kit, SSD (models 4Fx, 5Dx, 5Gx, D1x, D2x)		59Y4914	
	CMA	68Y7213		
	HBA 3U card (models D1x, D2x)	68Y7363		
	NetXtreme II 1000 Express Dual Port adapter (optional)	49Y4205		
	NetXtreme II 1000 Express Quad Port adapter (optional)	49Y4222		
	M5000 battery (models H1x, H2x, H3x)	81Y4451		
	M5000 feature key (optional)	46M0931		
	Microprocessor insertion tool (optional)	69Y1703		
	PRO/1000 PT dual port adapter (optional)	39Y6128		
	PRO/1000 PT quad port adapter (optional)	39Y6138		
	PRO/1000 PF server adapter (optional)	42C1752		
	Rack latch kit (all models)	59Y4972		
	Slide rail kit	68Y7226		
	DVD/CD-RW optical drive filler (see Filler Kit)			
	PCI full high adapter filler (see Filler Kit)			
	Cable kit (SAS power, USB, SATA signal, fan) (all models except 4Fx, 5Dx, 5Gx)		59Y4827	
	Filler Kit (microprocessor heat sink, memory card, 2.5" hard disk drive, optical, hard disk drive backplane, QPI wrap card, and full high PCI adapter) (all models except 4Dx, 4Fx, 5Dx, 5Gx)	59Y4824		
	Shipping bracket kit (all models)		59Y4821	
	Cable management arm (all models)	59Y4822		
	SAS signal cable (all models except ARx, 5Dx)	46C4124		
	Latches, EIA 5U (models 2Sx, 4Dx, 4Fx, 4Sx, 5Gx, 5Sx) (for servers connected to a memory expansion module only)		40K6765	
	Line cord (all models)	39M5377		
	Miscellaneous hardware parts kit (all models) • Assembly, backplane carrier (1) • Bracket, DVD retention (1) • Bracket, HDD backplane (1) • Bracket, RAID battery (1) • Handle, RAID card (1) • Screw, M5x16 black (2) • Screw, M6 hex head (4)	59Y4823		
	2 GB USB Key (all models)		42D0545	
	Label kit (system service, FRU, chassis sheet) (Types 7145 and 7146)	59Y4825		
	Label kit (system service, FRU, chassis sheet) (Types 7143 and 7191)	88Y5406		

Table 15. Parts listing, Types 7143, 7145, 7146, and 7191 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	Screw kit (all models)	59Y4922		
	System service label (models 2Sx, 4Dx, 4Fx, 4Sx, 5Gx, 5Sx)	40K6763		
	Thermal grease			41Y9292
	Alcohol wipe, Canada			41Y8746
	Alcohol wipe, Brazil/Mexico			41Y8747
	Alcohol wipe, Taiwan/Japan			41Y8748
	Alcohol wipe, China/Malaysia			41Y8749
	Alcohol wipe, Australia/UK			41Y8750
	Alcohol wipe, Korea			41Y8751
	Alcohol wipe, Hungary			41Y8753
	Alcohol wipe, Latin America			41Y8754
	Alcohol wipe, China			41Y8757
	Alcohol wipe, Hong Kong			41Y8758
	Alcohol wipe, India			41Y8759
	Alcohol wipe, Singapore			41Y8760
	Alcohol wipe, other countries			41Y8752

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

Table 16. Consumable parts

Description	Part number
ServeRAID SAS controller battery	43W4342

To order a consumable part, complete the following steps:

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

If you need help with your order, call the toll-free number that is listed on the retail parts page, or contact your local IBM representative for assistance.

Replaceable memory expansion module components

The following replaceable components are available for the IBM MAX5 for System x memory expansion module.

The following illustration shows the major components in the memory expansion module.

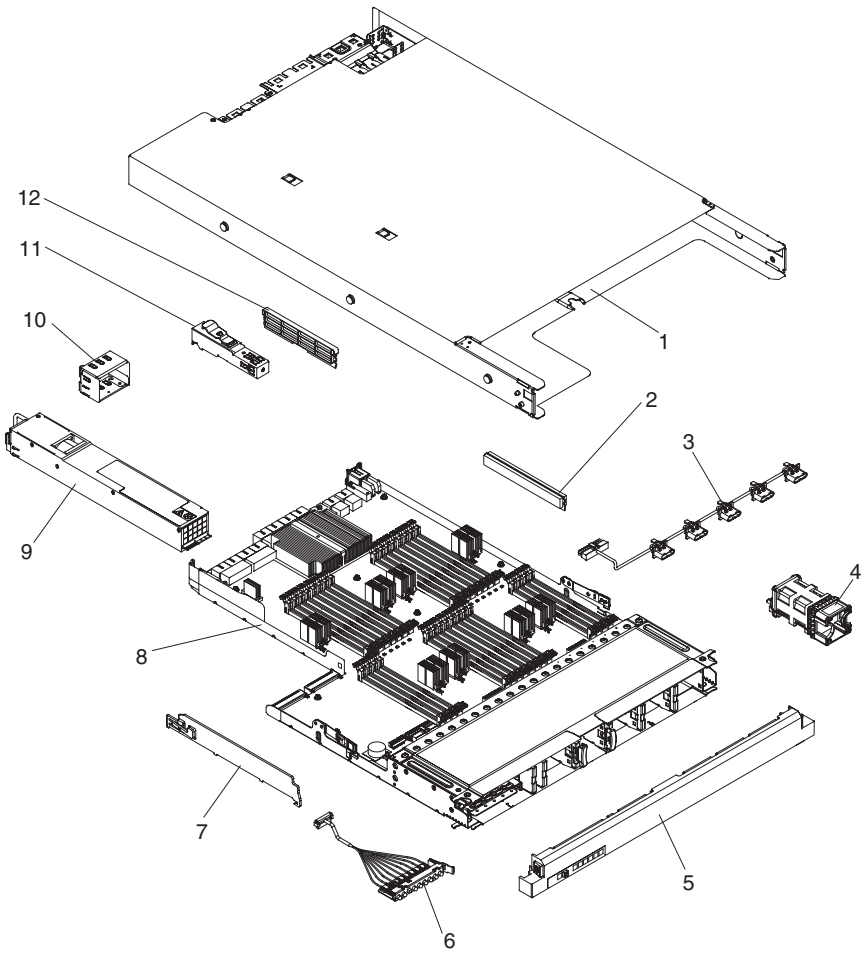

Table 17. Parts listing, memory expansion module

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Chassis assembly (without the front bezel) (models 2Sx, 4Dx, 4Fx, 4Sx, 5Gx, 5Sx, B8x, B9x, F1x, F2x)			40K6743
2	Memory, 2 GB PC3-10600R-999 DDR3 ECC	44T1491		
2	Memory, 4 GB PC3-10600R-999 DDR3 ECC (models 2Sx, 4Sx, 4Dx, 5Sx)	44T1598		
2	Memory, 4 GB (1.35V) PC3L-10600R-999 CL9 DDR3 ECC (for memory expansion modules with Intel 7510 scalable memory buffer)	49Y1425		
2	Memory, 4 GB PC3-8500-777 DDR3 ECC (models 1Rx, 2Rx, 2Sx, 3Rx, 4Dx, 4Fx, 4Rx, 4Sx, 5Dx, 5Gx, 5Rx, 5Sx,)	46C7452		

Table 17. Parts listing, memory expansion module (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
2	Memory, 8GB (1.35V) PC3L-8500R-777 CL7 DDR3 ECC (for memory expansion modules with Intel 7510 scalable memory buffer)	49Y1417		
2	Memory, 8 GB PC3-8500-777 DDR3 ECC	46C7488		
2	Memory, 16 GB (1.35V) PC3L-8500R-777 CL7 DDR3 ECC (for memory expansion modules with Intel 7510 scalable memory buffer)	49Y1418		
2	Memory, 16 GB PC3-8500-777 DDR3 ECC	46C7489		
3	Cable assembly, five-drop fan (models B8x, B9x, F1x, F2x)	40K6746		
4	Fan assembly, hot-swap (models 2Sx, 4Sx, 5Sx, 4Dx, 4Fx, 5Gx B8x, B9x, F1x, F2x)	40K6745		
5	Bezel (models 2Sx, 4Sx, 4Dx, 5Sx, B8x, B9x, F1x, F2x)	40K6747		
6	Information panel assembly	68Y9656		
7	Air baffle (models 2Sx, 4Sx, 5Sx, B8x, B9x, F1x, F2x)	40K6748		
8	System-board tray assembly (models 2Sx, 4Sx, 4Dx, 5Sx, B8x, B9x, F1x, F2x) • Intel 7500 scalable memory buffer • Use in memory expansion module models that attach to machine types 7145 and 7146		40K6744	
8	System-board tray assembly (models B8x, F1x, F2x) • Intel 7510 scalable memory buffer • Use in memory expansion module models that attach to machine types 7143 and 7191		40K6774	
9	Power supply, 675 Watt hot-swap Types 7143 and 7191 (models B8x, B9x, F1x, F2x) Types 7145 and 7146 (models 2Sx, 4Sx, 4Dx, 5Sx)	39Y7218		
10	Power supply filler (see Filler Kit)	49Y5331		
11	EXA filter	68Y9703		
12	DIMM filler (models B8x, B9x, F1x, F2x)	44V8227		
	Cable, EXA scalability (optional)	40K6752		
	CMA (models F1x, F2x, B8x, B9x)	49Y4817		
	EIA latches (models 2Sx 4Sx 5Sx 4Dx 4Fx 5Gx F1x F2x B8x B9x)		40K6765	
	Filler kit (models 2Sx 4Sx 5Sx 4Dx 4Fx 5Gx F1x F2x B8x B9x) • EXA filler assembly • MK QPI bracket	40K6764		

Table 17. Parts listing, memory expansion module (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	MK cables (models 2Sx, 4Sx, 5Sx, 4Dx, 4Fx, 5Gx, B8x B9x, F1x, F2x)	40K6746		
	OPI cable (models 2Sx, 4Sx, 5Sx, 4Dx, 4Fx, 5Gx, B8x B9x, F1x, F2x)	40K6750		
	Service label (models B8x, B9x, F1x, F2x)	40K6775		
	Slide kit (models B8x, B9x, F1x, F2x)	60Y0328		
	SVC label (models 2Sx 4Sx 5Sx 4Dx 4Fx 5Gx F1x F2x B8x B9x)	40K6763		

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 16 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

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

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

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

IBM power cord part number	Used in these countries and regions
39M5206	China
39M5102	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea

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, Brazil, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States of America, Venezuela
39M5513	110 - 120 V Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela
39M5219	Korea (Democratic People's Republic of), Korea (Republic of)
39M5199	Japan
39M5068	Argentina, Paraguay, Uruguay

IBM power cord part number	Used in these countries and regions
39M5226	India
39M5240	Brazil

Product recovery CDs

Table 18 describes the product recovery CD CRUs.

Table 18. Product recovery CDs

Description	CRU part number
Microsoft Windows Server 2008 R2 Datacenter 32/64 bit, multilingual	49Y0222
Microsoft Windows Server 2008 Datacenter 32/64 bit, Simplified Chinese	49Y0223
Microsoft Windows Server 2008 Datacenter 32/64 bit, Traditional, Chinese	49Y0224
Microsoft Windows Server 2008 Standard Edition 32/64 bit 1-4 microprocessors, multilingual	49Y0892
Microsoft Windows Server 2008 Standard Edition 32/64 bit 1-4 microprocessors, Simplified Chinese	49Y0893
Microsoft Windows Server 2008 Standard Edition 32/64 bit 1-4 microprocessors, Traditional, Chinese	49Y0894
Microsoft Windows Server 2008 Enterprise Edition 32/64 bit 1-8 microprocessors, multilingual	49Y0895
Microsoft Windows Server 2008 SP2 Enterprise Edition 32/64 bit 1-8 microprocessors, Simplified Chinese	49Y0896
Microsoft Windows Server 2008 Enterprise Edition 32/64 bit 1-8 microprocessors, Traditional, Chinese	49Y0897
Microsoft Windows Server 2008 Datacenter R2, multilingual	59Y7332
Microsoft Windows Server 2008 Datacenter R2, Simplified Chinese	59Y7333
Microsoft Windows Server 2008 Datacenter R2, Traditional, Chinese	59Y7334
Microsoft Windows Server 2008 Datacenter SP2 32/64 bit, multilingual	60Y1760
Microsoft Windows Server 2008 HPC ROK, US English	68Y9455
Microsoft Windows Server 2008 HPC ROK, Japanese	68Y9456
Microsoft Windows Server 2008 HPC ROK, Simplified Chinese	68Y9457
Microsoft Windows Server 2008 R2 Foundation, US English	81Y2001
Microsoft Windows Server 2008 R2 Foundation, French	81Y2002
Microsoft Windows Server 2008 R2 Foundation, German	81Y2003
Microsoft Windows Server 2008 R2 Foundation, Spanish	81Y2004
Microsoft Windows Server 2008 R2 Foundation, Italian	81Y2005
Microsoft Windows Server 2008 R2 Foundation, Brazilian	81Y2006
Microsoft Windows Server 2008 R2 Foundation, Polish	81Y2007
Microsoft Windows Server 2008 R2 Foundation, Russian	81Y2008

Table 18. Product recovery CDs (continued)

Description	CRU part number
Microsoft Windows Server 2008 R2 Foundation, Turkish	81Y2009
Microsoft Windows Server 2008 R2 Foundation, Japanese	81Y2010
Microsoft Windows Server 2008 R2 Foundation, Simplified Chinese	81Y2011
Microsoft Windows Server 2008 R2 Foundation, Traditional, Chinese	81Y2012
Microsoft Windows Server 2008 R2 Foundation, Korean	81Y2013
Microsoft Windows Server 2008 R2 Foundation, Czech	81Y2014
Microsoft Windows 2008 Server R2 Standard Edition 1-4 microprocessors, multilingual	81Y2015
Microsoft Windows 2008 Server R2 Standard Edition 1-4 microprocessors, Simplified Chinese	81Y2016
Microsoft Windows 2008 Server R2 Standard Edition 1-4 microprocessors, Traditional, Chinese	81Y2017
Microsoft Windows 2008 Server R2 Enterprise Edition 1-8 microprocessors, multilingual	81Y2018
Microsoft Windows 2008 Server R2 Enterprise Edition 1-8 microprocessors, Simplified Chinese	81Y2019
Microsoft Windows 2008 Server R2 Enterprise Edition 1-8 microprocessors, Traditional, Chinese	81Y2020
Microsoft Windows Server 2008 R2 Enterprise Edition 1-8 microprocessors, multilingual	81Y2021
Microsoft Windows 2008 Server R2 Enterprise Edition 1-8 microprocessors, Simplified Chinese	81Y2022
Microsoft Windows 2008 Server R2 Enterprise Edition 1-8 microprocessors, Traditional, Chinese	81Y2023

VMware ESXi recovery CDs (Type 7145)

"VMware ESXi recovery CDs (Type 7145)" describes the VMware ESXi recovery CD CRUs.

Table 19. VMware ESXi recovery CDs

Description	CRU part number
VMware ESX Server 3i version 3.5	46D0762
VMware ESX Server 3i v 3.5 Update 2	46M9236
VMware ESX Server 3i v 3.5 Update 3	46M9237
VMware ESX Server 3i v 3.5 Update 4	46M9238
VMware ESX Server 3i v 3.5 Update 5	68Y9633
VMware ESXi 4	49Y8747
VMware ESXi 4.0 U1	68Y9634
VMware vSphere ESXi 4.1 without flash memory USB key	81Y2028

Chapter 5. Removing and replacing components

Replaceable components are of four types:

- **Consumable part:** 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, Types 7145, 7146, 7143, and 7191," on page 237 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 Information* document that came with your server.

Installation guidelines

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

- Read the safety information that begins with "Safety" on page v, "Working inside the server with the power on" on page 253, and "Handling static-sensitive devices" on page 253. This information will help you work safely.
- When you install your new server, take the opportunity to download and apply the most recent firmware updates. This step will help to ensure that any known issues are addressed and that your server is ready to function at maximum levels of performance. To download firmware updates for your server, go to http://www.ibm.com/supportportal/.

  For additional information about tools for updating, managing, and deploying firmware, see the ToolsCenter for System x and BladeCenter at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp.
- Before you install optional hardware devices, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed, or that a 19990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see Chapter 3, "Diagnostics," on page 31 for information about how to run diagnostics.
- In a two-node configuration, you must remove the QPI cables to separately debug the servers.
- If the server is connected to a memory expansion modules, see the documentation for the QPI or EXA cabling kit for important cabling information when disconnecting or connecting QPI or EXA cables.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.

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- If you must start the server while the cover is removed, make sure that no one is near the server and that no tools or other objects have been left inside the server.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you can stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- To view the error LEDs on the system board and internal components, leave the server connected to power.
- You do not have to turn off the server to install or replace hot-swap power supplies, hot-swap fans, or hot-plug Universal Serial Bus (USB) devices. However, you must turn off the server before you perform any steps that involve removing or installing adapter cables.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- When you are finished working on the server, reinstall all safety shields, guards, labels, and ground wires.
- For a list of supported optional devices for the server, see http://www-03.ibm.com/systems/info/x86servers/serverproven/compat/us/.

A single-power-supply server operating at 208 V ac

One power supply operating at 208 V ac supports a fully populated server, but it does not support power or cooling redundancy.

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 installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before you turn on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.

- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap drive within 2 minutes of removal.
- For redundant and hot-swappable power supply operation, the power supplies are connected to 200-240 V ac.
- Microprocessor sockets 1 - 4 each always contain either a heat-sink blank or a microprocessor and heat sink.

Note: Microprocessor temperature, hard disk drive temperature, and planar voltage sensing is not supported.

Working inside the server with the power on

Attention: Static electricity that is released to internal server components when the server is powered on might cause the server to halt, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when you work inside the server with the power on. You can connect the wrist strap to a connector on the front of the server (see "Front view" on page 9 for the location of the electrostatic-discharge connector).

The server supports hot-swap devices and is designed to operate safely while it is turned on and the cover is removed. Follow these guidelines when you work inside a server that is turned on:

- Avoid wearing loose-fitting clothing on your forearms. Button long-sleeved shirts before working inside the server; do not wear cuff links while you are working inside the server.
- Do not allow your necktie or scarf to hang inside the server.
- Remove jewelry, such as bracelets, necklaces, rings, and loose-fitting wrist watches.
- Remove items from your shirt pocket, such as pens and pencils, that might fall into the server as you lean over it.
- Avoid dropping any metallic objects, such as paper clips, hairpins, and screws, into the server.

Handling static-sensitive devices

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

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

- Limit your movement. Movement can cause static electricity to build up around you.
- 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 server for at least 2 seconds. This drains static electricity from the package and from your body.

- Remove the device from its package and install it directly into the server without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the server cover or on a metal surface.
- Take additional care when you handle devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Servicing multi-node systems

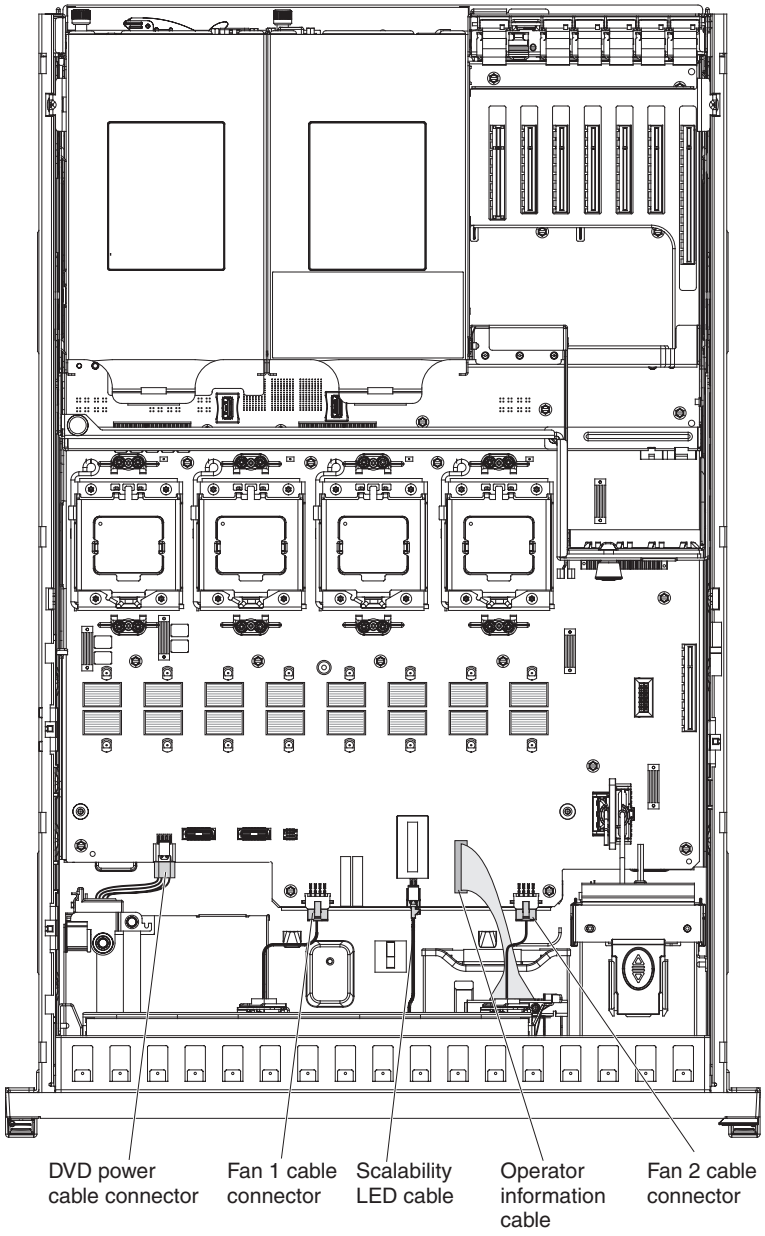
Note: Before you pull the servers out of the rack, make sure that the rack tip plate is installed.

If you are servicing a QPI two-node scaled configuration, you can slide both units out of the rack at the same time to access components in the top node. To access the components in the bottom node, you must disconnect the QPI cables in the rear of the server and unlatch the two-node bracket from the top node in the rear.

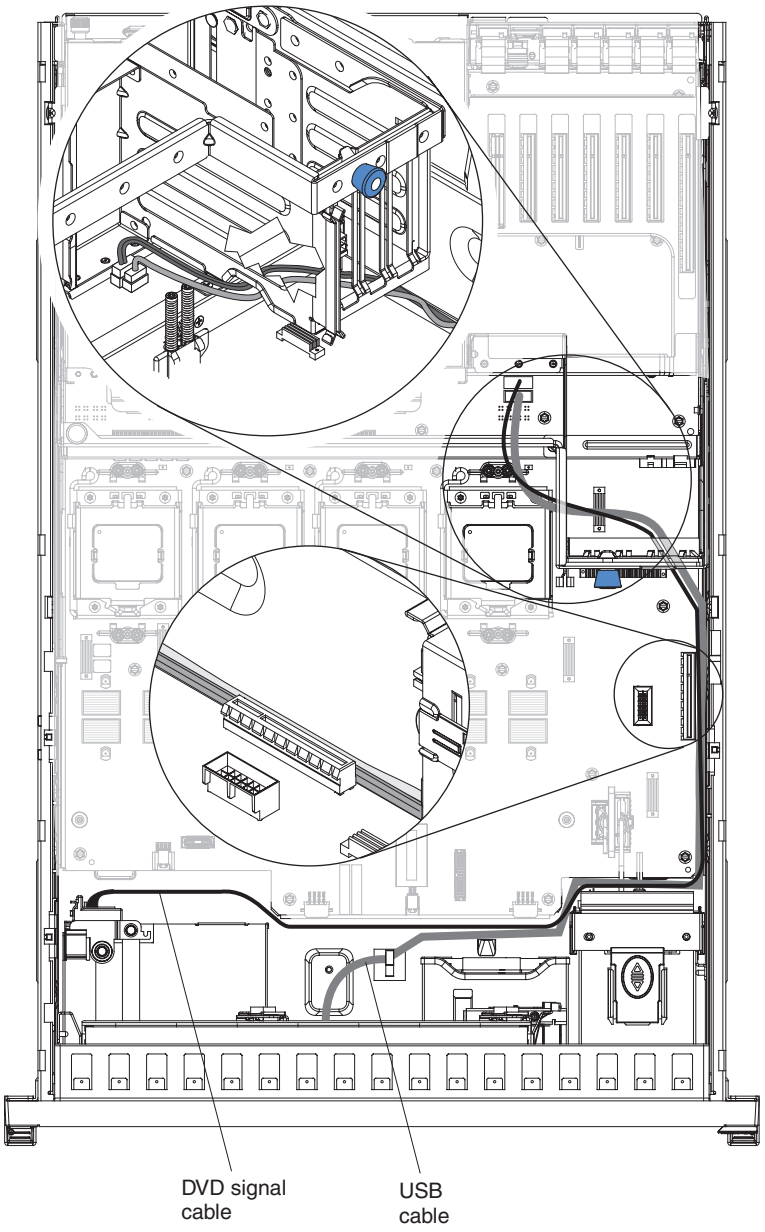
If you are servicing components in a server to which a memory expansion module is attached, slide the server and memory expansion module out of the rack together, as one unit.

Internal cable routing and connectors

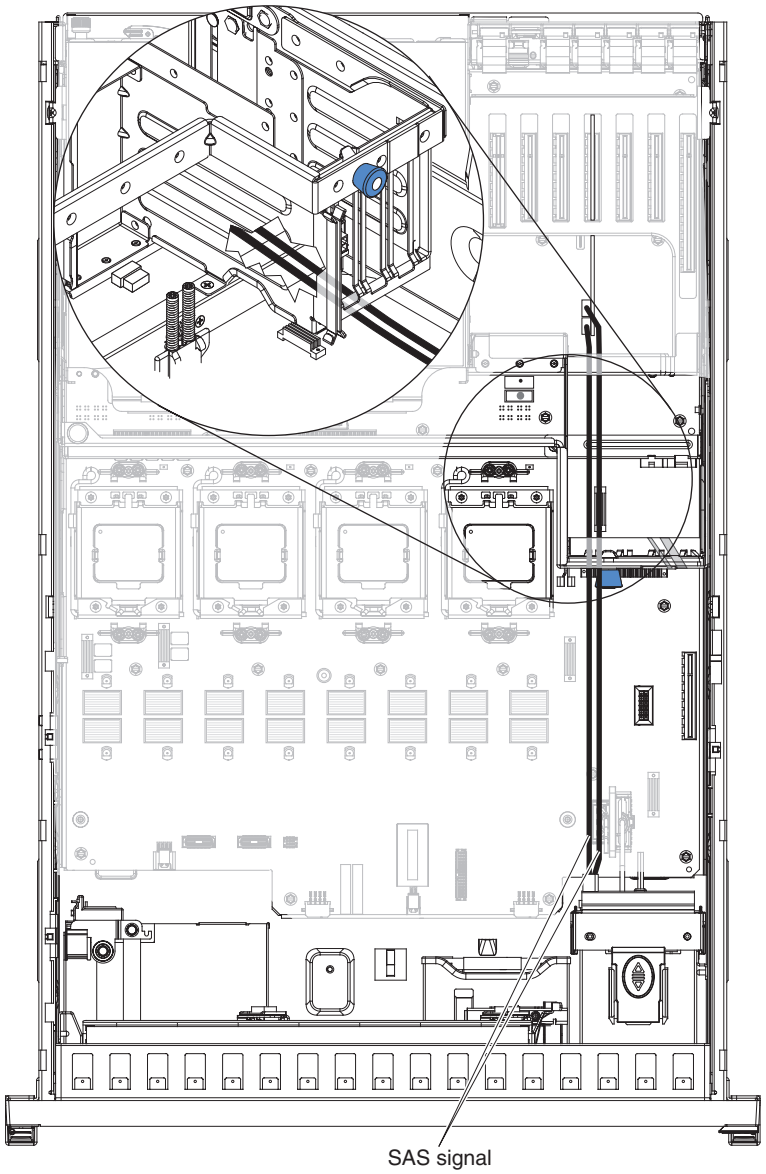
The following illustration shows the routing of the DVD power, fans 1 and 2, scalability LED, and operator information cables.



The following illustration shows the routing of the USB and DVD signal cables.



The following illustration shows the cable routing of the SAS signal cables from the solid state drive backplane to the ServeRAID adapter.



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.

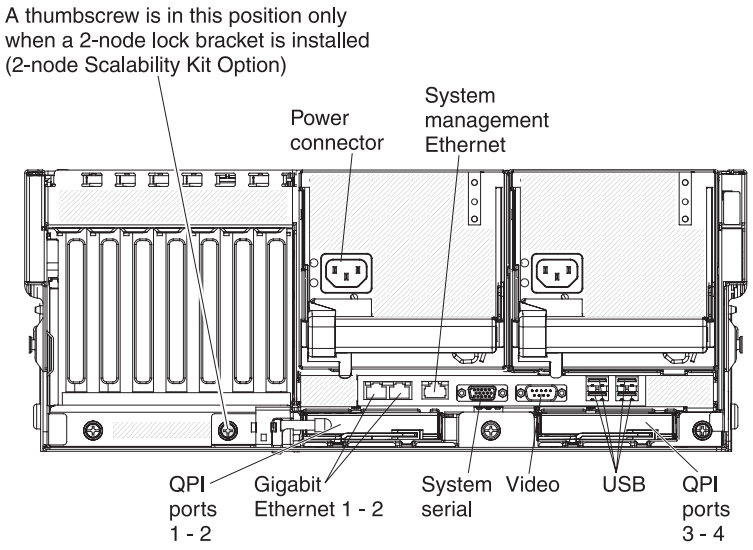
Connecting the cables

See the documentation that comes with optional devices for additional cabling instructions. It might be easier for you to route cables before you install certain devices.

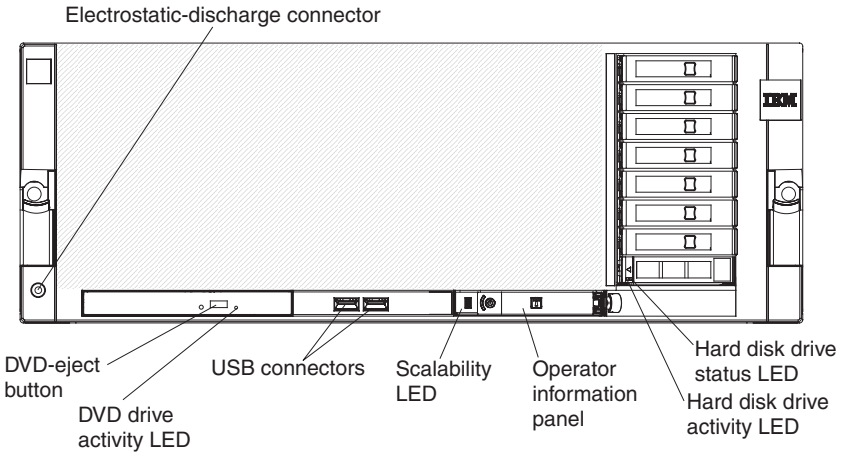
You can install one or more optional EXA Scaling kits, when available, to interconnect the SMP Expansion ports of two servers.

The following illustrations show the locations of the input and output connectors on the server. Detailed cabling instructions are in the *Rack Installation Instructions* that come with the server and the *Rack and Cable Installation Instructions* that come with the QPI cable kits.

Rear view



Front view



Removing and replacing server components

Replaceable components are of four types:

- **Consumable part:** 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.

Removing and replacing consumable parts and Tier 1 CRUs

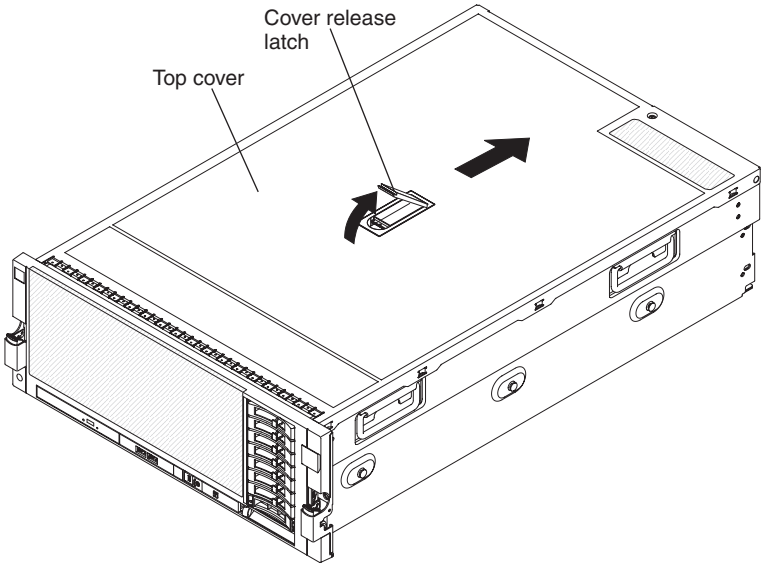
Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

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

Removing the top cover

Attention: Operating the server for more than 2 minutes with the top cover removed might damage server components. For proper cooling and airflow, replace the top cover before you turn on the server.

To remove the top cover, complete the following steps.



1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. If you are installing or replacing a non-hot-swap component, turn off the server and all peripheral devices, and disconnect the power cords and all external cables.
3. Slide the server out of the rack until the slide rails lock into place.
4. Press the button and rotate the cover-release latch. The cover slides to the rear approximately 13 mm (0.5 inch). Lift the cover off the server.
5. If you are instructed to return the cover, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the top cover

To install the top cover, complete the following steps:

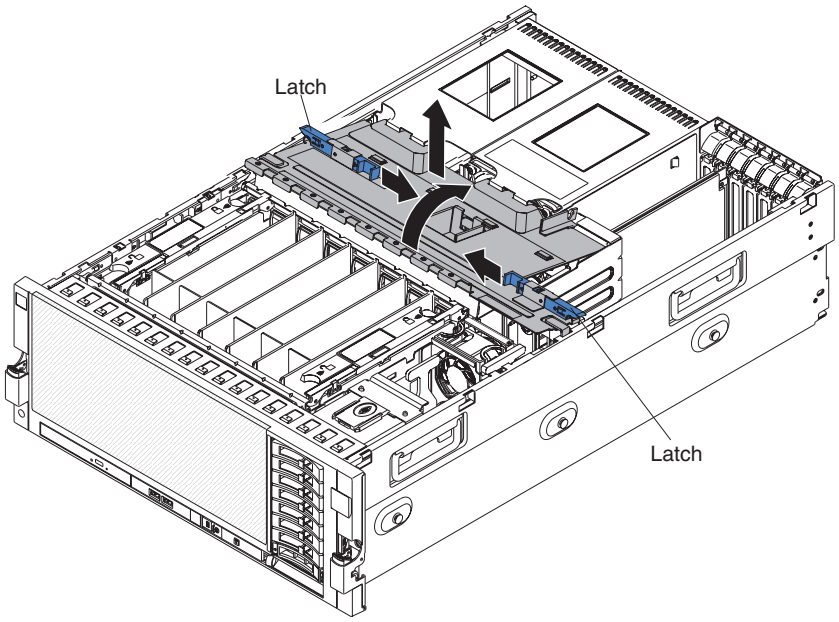
1. Make sure that all internal cables are correctly routed.

2. Set the cover on top of the server so that approximately 13 mm (0.5 inch) extends from the rear.
3. Make sure that the cover-release latch is up.
4. Slide the top cover forward and into position, pressing the release latch closed.
5. If necessary, reconnect the power cords and all external cables, and then turn on the server.
6. Slide the server into the rack.

Removing the top-cover bracket

To remove the top-cover bracket, complete the following steps:

1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. If you are installing or replacing a non-hot-swap component, turn off the server and all peripheral devices, and disconnect the power cords and all external cables.
3. Slide the server out of the rack until the slide rails lock into place.
4. Remove the top cover.
5. Slide the blue latches on the top-cover bracket toward the center of the server.
6. Tilt and lift the top-cover bracket out of the server.
7. If you are instructed to return the top-cover bracket, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

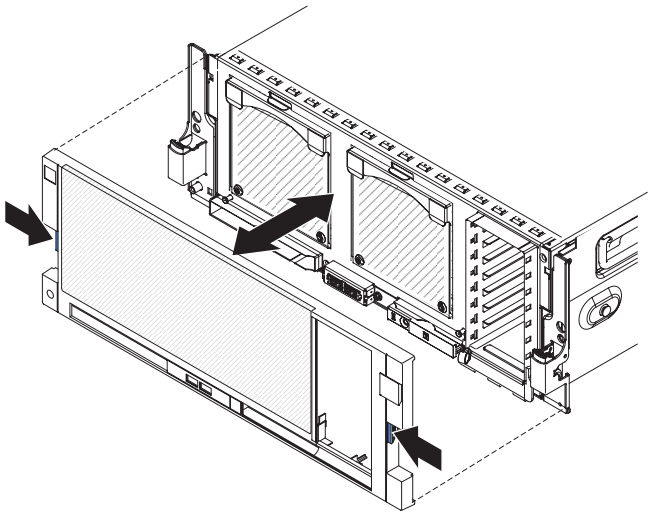


Replacing the top-cover bracket

To replace the top-cover bracket, complete the following steps:

1. Make sure that all internal cables are correctly routed.
2. Align the top-cover bracket on top of the server so that the metal tabs line up correctly on the chassis, and then rotate it into place.
3. Slide the blue latches on the top cover bracket toward the outside of the server to lock it in place.

Removing the front bezel



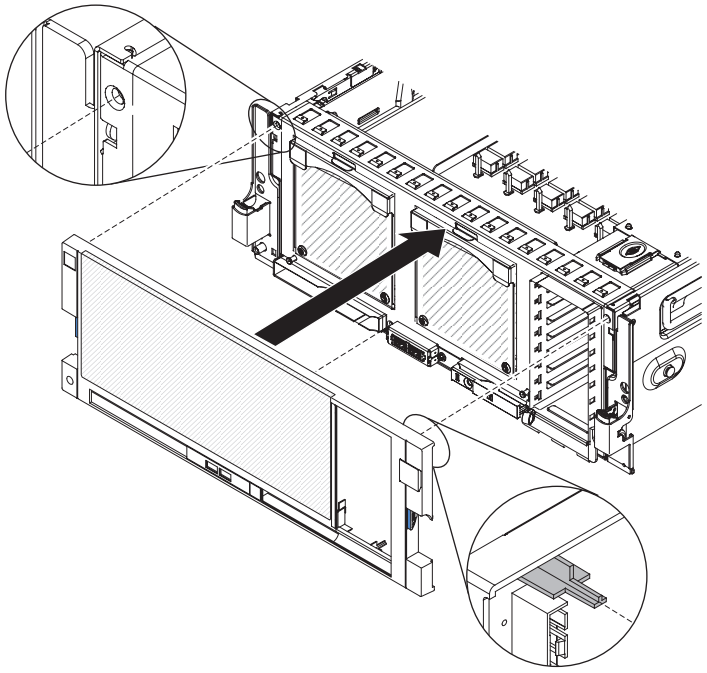
Note: You do not have to remove the top cover before you remove the bezel.

To remove the bezel, complete the following steps:

1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Press on the bezel retention tabs at the sides of the bezel, and pull the bezel from the server.
3. If you are instructed to return the bezel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

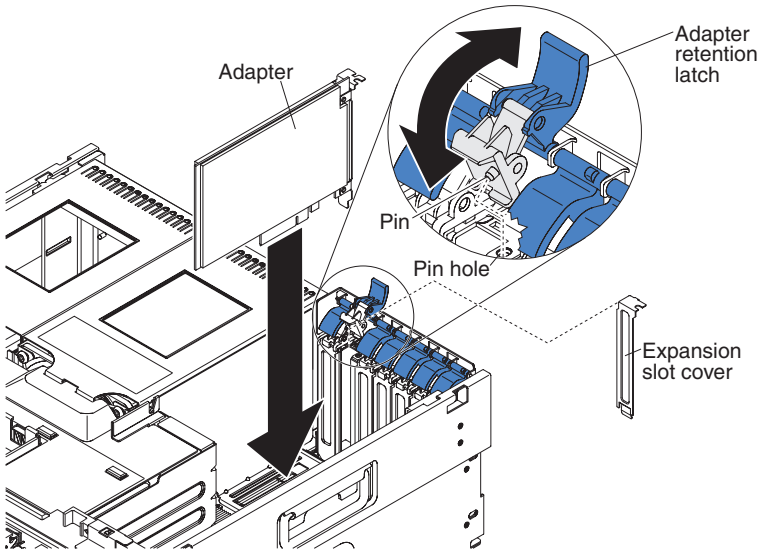
Replacing the front bezel

To install the bezel, align the studs with the matching holes on all four corners; then, push in and snap the bezel into place.



Removing an adapter

To remove a PCI Express adapter, complete the following steps.



1. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to remove the adapter.
3. Remove the top cover (see “Removing and replacing consumable parts and Tier 1 CRUs” on page 259).
4. Disconnect any cables from the adapter.
5. Lift the blue adapter retention latch up away from the server and open the tab.
6. Carefully grasp the adapter by its top edge or upper corners, and pull the adapter from the server.

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

Replacing an adapter

Note: If you are replacing a ServeRAID adapter that has a battery, you must install the adapter in a full-length slot. You must also leave an empty expansion slot on each side of the adapter.

To install a replacement PCI Express adapter, complete the following steps:

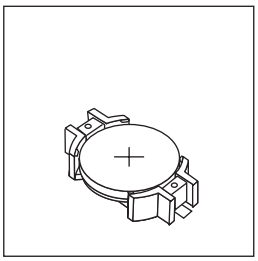
1. See the documentation that comes with the adapter for instructions for setting jumpers or switches and for cabling.

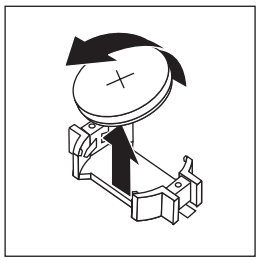
   Note: Route adapter cables before you install the adapter.
2. Carefully grasp the adapter by its top edge or upper corners, and align it with the connector on the I/O board.
3. Press the adapter firmly into the adapter connector.
4. Rotate the latch closed and push it down on the blue latch until it clicks into place, securing the adapter.
5. Connect any required cables to the adapter.
6. Install the top cover (see "Replacing the top cover" on page 259).
7. Connect the cables and power cords (see "Connecting the cables" on page 257 for cabling instructions).
8. Turn on all attached devices and the server.

Removing the battery

To remove the battery, complete the following steps:

1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see "Removing and replacing consumable parts and Tier 1 CRUs" on page 259).
4. Locate the battery (see "I/O-board connectors" on page 22).
5. If any PCI adapters are blocking access to the battery, remove them (see "Removing an adapter" on page 262).
6. Remove the battery:
   a. Use one finger to push the battery horizontally out of its housing.
   b. Lift the battery from the socket.





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

Replacing the battery

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

- You must replace the battery with a lithium battery of the same type from the same manufacturer.
- After you replace the battery, you must reconfigure the server and reset the system date and time.
- To avoid possible danger, read and follow the following safety statement.

Statement 2

CAUTION:
When replacing the lithium battery, use only IBM Part Number 15F8409 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

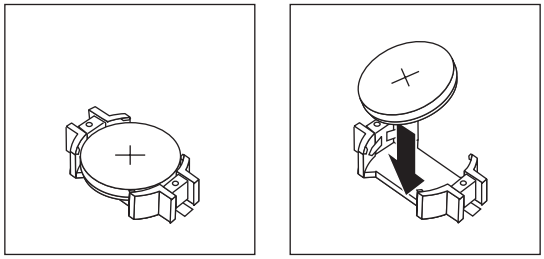
Do not:

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

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

To install the replacement battery, complete the following steps:

1. Follow any special handling and installation instructions that come with the replacement battery.
2. Locate the battery connector (see "I/O-board connectors" on page 22).
3. Insert the new battery:
   a. Position the battery so that the positive (+) symbol is facing you.
   b. Place the battery into its socket, and press the battery toward the housing until it snaps into place.



4. Install the top cover (see "Removing and replacing consumable parts and Tier 1 CRUs" on page 259).
5. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Note: You must wait approximately 3 minutes after you connect the power cord of the server to an electrical outlet before the power-control button becomes active.

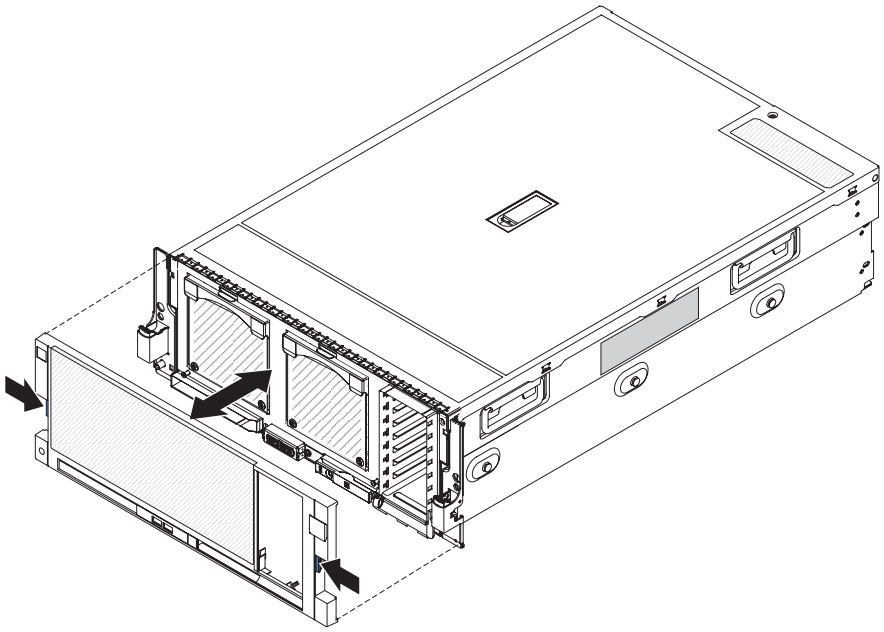
6. Start the Setup utility and reset the configuration:
   - Set the system date and time.
   - Set the power-on password.
   - Reconfigure the server.

   See "Configuring the server" on page 337 for details.

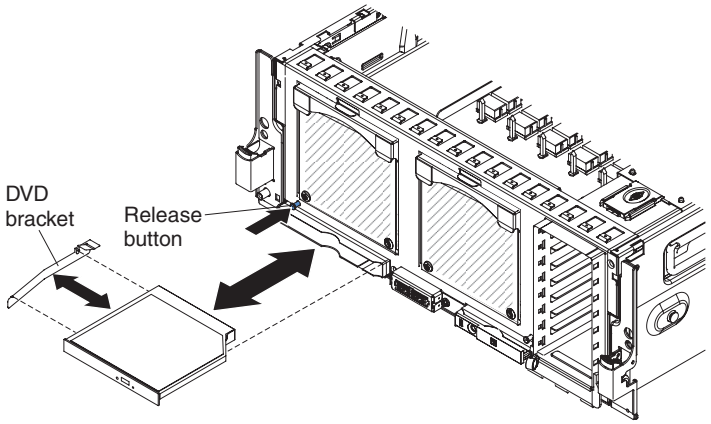
Removing the DVD drive

To remove the DVD drive, complete the following steps:

1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the front bezel.



4. Push in and hold the blue release button while you pull the DVD drive out of the server.



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

Replacing the DVD drive

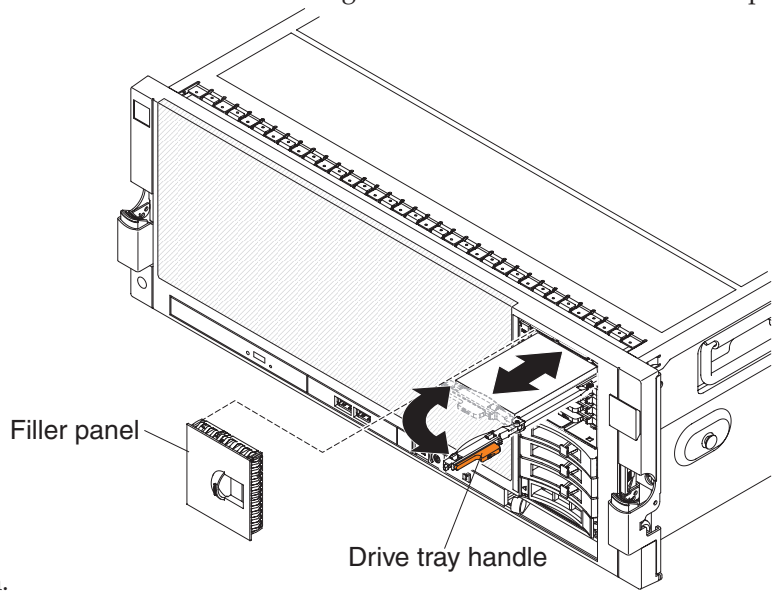
To install the replacement DVD drive, complete the following steps:

1. Install the DVD bracket on the side of the new DVD drive.
2. Slide the DVD drive into the server until it engages the SATA cable.
3. Install the front bezel (see "Replacing the front bezel" on page 261).
4. Connect the cables and power cords (see "Connecting the cables" on page 257 for cabling instructions).
5. Turn on all attached devices and the server.

Removing a 1.8-inch solid state drive

To remove a solid state drive, complete the following steps:

1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Remove the drive cage filler panel.
3. Slide the drive release latch to the right and rotate the handle to the open position.



4. Slide the solid state drive out of the server.

Replacing a 1.8-inch solid state drive

To install the replacement solid state drive, complete the following steps:

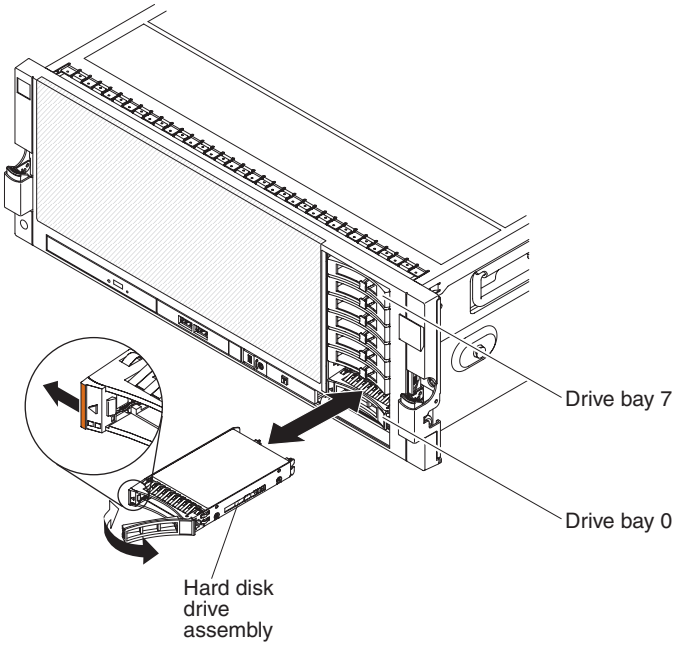
1. Remove the drive cage filler panel.
2. Slide the drive release latch to the right and rotate the handle to the open position.
3. Push the solid state drive all the way until it clicks in the backplane.
4. Rotate the handle until the latch clicks closed.
5. Reinstall the drive cage filler panel.
6. Install the drive ID label on the server front bezel.

Removing a hot-swap hard disk drive

Important: Before you remove a hot-swap hard disk drive from the server, take the following precautions to save data, firmware, and configuration data:

- Before you make changes to disk drives, disk drive controllers (including controllers that are integrated on the system board), disk drive backplanes, or disk drive cables, back up all important data that is stored on hard disks.
- Before you remove any component of a RAID array, back up all RAID configuration information.

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



1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Be sure to save the data on your drive, especially if it is part of a RAID array, before you remove it from the server.
3. Push the latch on the handle to the left, then open the drive handle and pull the hard disk drive assembly out of the server.
4. If you are instructed to return the hot-swap hard disk drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing a hot-swap hard disk drive

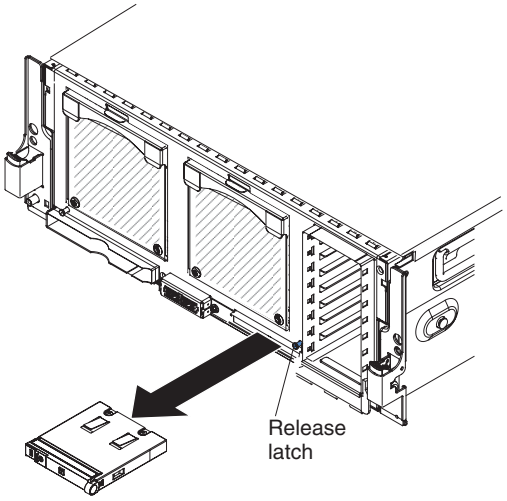
To install the replacement hot-swap hard disk drive, complete the following steps:

1. Touch the static-protective package that contains the hard disk drive to any unpainted surface on the outside of the server; then, remove the hard disk drive from the package.
2. Make sure that the tray handle is open; then, slide the hard disk drive into the hot-swap bay.
3. Close the handle until it latches closed.
4. Check the hard disk drive status LEDs to make sure that the hard disk drive is operating correctly.

5. Restore the RAID configuration information that you backed up before you removed the hot-swap hard disk drive.

Removing the operator information panel assembly

To remove the operator information panel assembly, complete the following steps.



1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the front bezel and the top cover (see "Removing the front bezel" on page 261 and "Removing and replacing consumable parts and Tier 1 CRUs" on page 259).
4. Remove the memory cards or fillers from slots 5, 6, 7, and 8 (see "Removing a memory card" on page 281).
5. Disconnect the operator information panel (front panel) cable from the microprocessor board, see "Microprocessor-board connectors" on page 20.
6. Press the blue release button above the assembly and carefully pull the assembly out of the server. Make sure that you do not damage the cable as you remove the assembly from the server.
7. Disconnect the cable from the rear of the operator information panel.
8. If you are instructed to return the operator information panel assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the operator information panel assembly

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

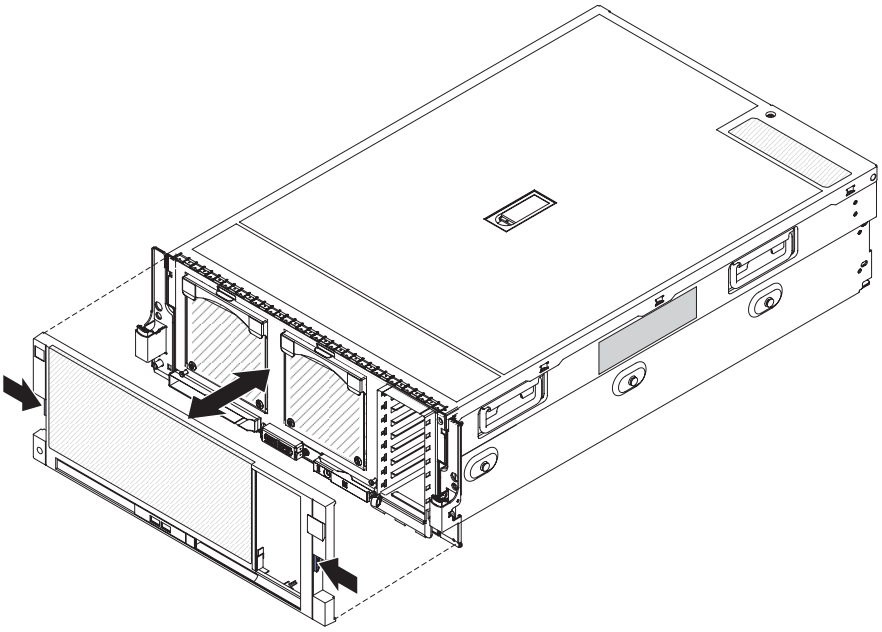
1. Connect the operator information panel cable to the rear of the new operator information panel.
2. Thread the operator information panel cable into the operator information panel bay and insert the assembly into the server from the front.
3. Connect the cable to the microprocessor board.
4. Install the memory cards or fillers in slots 5, 6, 7, and 8 (see "Replacing a memory card" on page 282).

5. Install the front bezel and the top cover (see “Replacing the front bezel” on page 261 and “Replacing the top cover” on page 259).
6. Connect the cables and power cords (see “Connecting the cables” on page 257 for cabling instructions).
7. Turn on all attached devices and the server and check the server for normal operation.

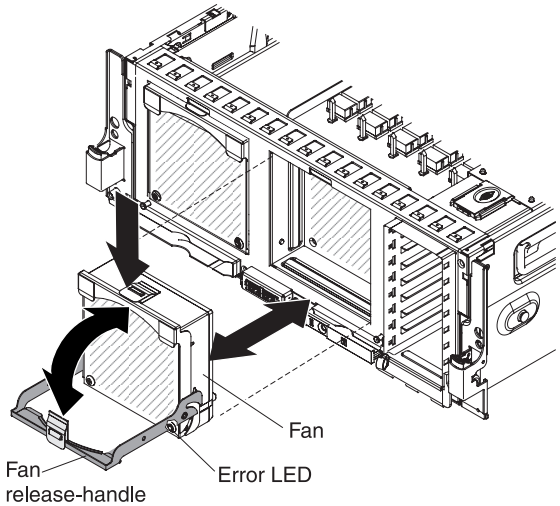
Removing the front hot-swap fans

To remove a front hot-swap fan, complete the following steps:

1. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
2. Remove the front bezel.



3. Open the fan-release handle by pushing the orange release latch down.



4. Pull out on the free end of the handle to slide the fan out of the server.
5. If you are instructed to return the fan, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

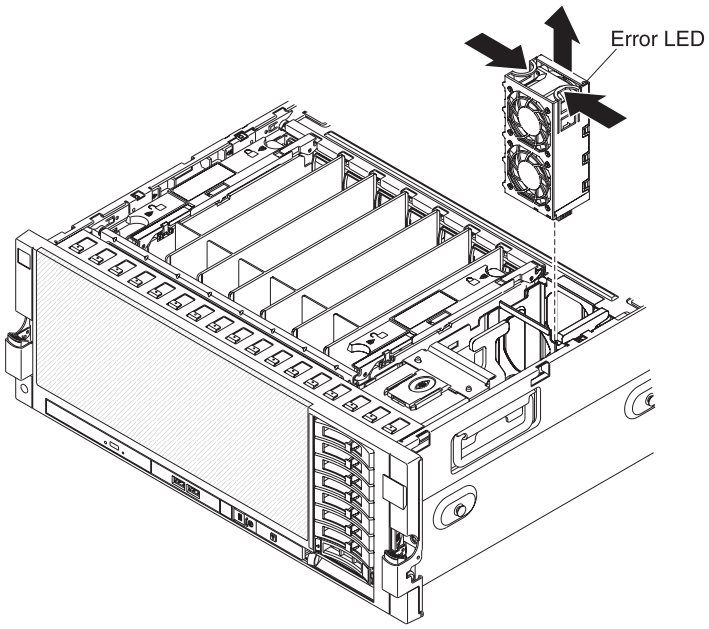
Replacing the front hot-swap fans

To install a replacement hot-swap fan, complete the following steps:

1. Open the fan-release handle to 90° on the replacement fan.
2. Slide the fan into the server, and close the handle to the locked position.
3. Make sure that the fan error LED on the replacement fan is off.
4. Install the front bezel (see "Replacing the front bezel" on page 261).

Removing the middle hot-swap fan

To remove the middle hot-swap fan, complete the following steps.



1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Remove the top cover (see "Removing and replacing consumable parts and Tier 1 CRUs" on page 259).

   Attention: To ensure proper cooling and airflow, do not operate the server for more than 2 minutes with the top cover removed.
3. Squeeze the fan handles together, and then lift the fan out of the server.

   Attention: The server cannot run for more than 30 seconds when this fan is removed. The server will shut down automatically if the fan is missing for 30 seconds or longer.
4. If you are instructed to return the fan, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the middle hot-swap fan

To install the replacement middle hot-swap fan, complete the following steps:

1. Lower the fan into the socket, and push it downward until it clicks into place.
2. Make sure that the fan error LED on the replacement fan is off.
3. Install the top cover (see "Replacing the top cover" on page 259).

Removing a hot-swap power supply

Note: Two power supplies must be installed in the server for either power supply to be considered hot-swap.

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

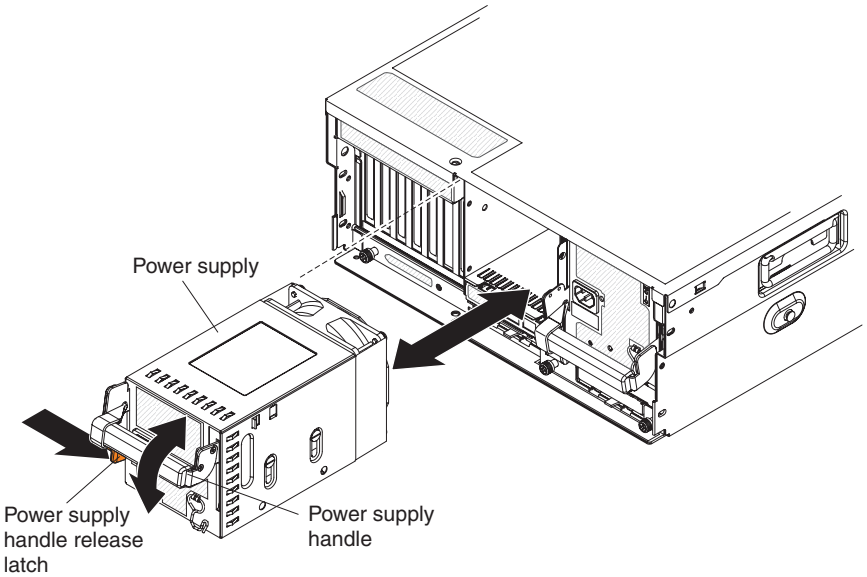
Statement 8

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.

Removing a hot-swap power supply in a single-node server:

To remove a hot-swap power supply in a single-node server, complete the following steps.



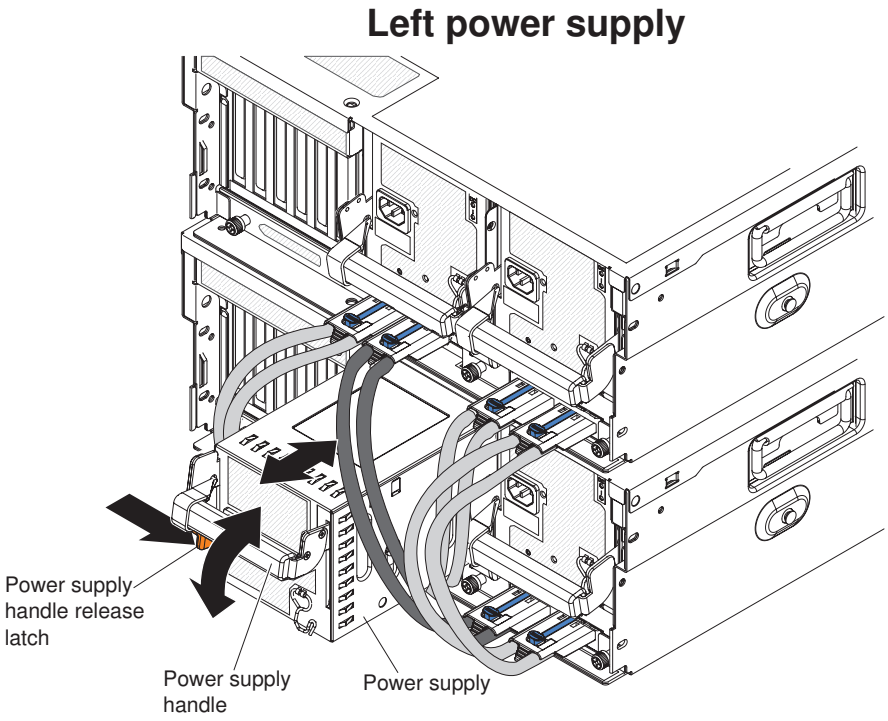
1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251

Note: If your server has only one power supply, you must turn off the server before you remove the power supply.

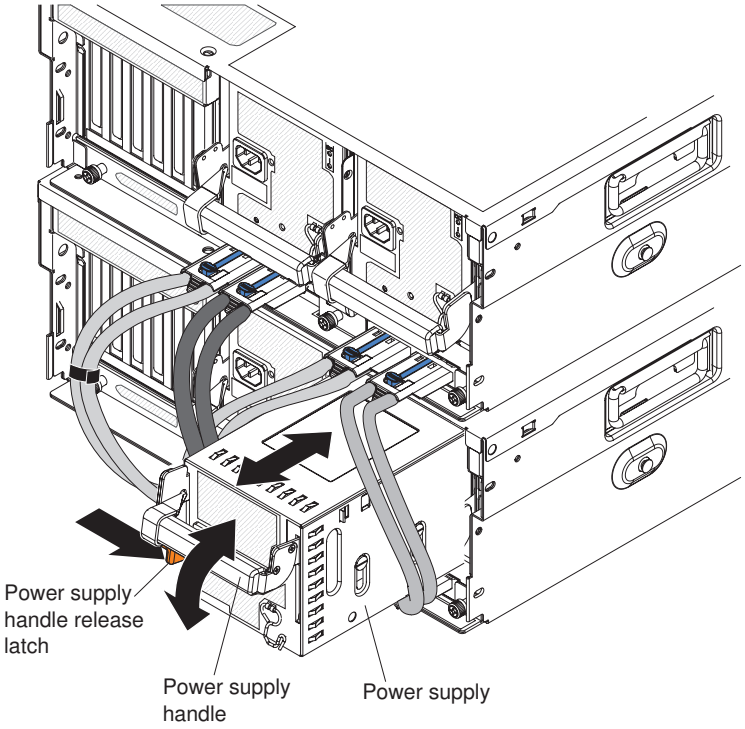
2. If only one power supply is installed, turn off the server.
3. Disconnect the power cord from the connector on the back of the power supply.
4. Slide the orange release latch on the handle to the right and lift the handle up to the open position.
5. Pull the power supply out of the bay.
6. If you are instructed to return the hot-swap power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Removing a hot-swap power supply in a 2-node server:

To remove a hot-swap power supply in a 2-node server, complete the following steps.



Right power supply



1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251

   Note: If your server has only one power supply, you must turn off the server before you remove the power supply.
2. If only one power supply is installed, turn off the server.
3. Disconnect the power cord from the connector on the back of the power supply.
4. Separate the cables to access the power supply
5. Slide the orange release latch on the handle to the right and lift the handle up to the open position.
6. Pull the power supply out of the bay.
7. If you are instructed to return the hot-swap power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

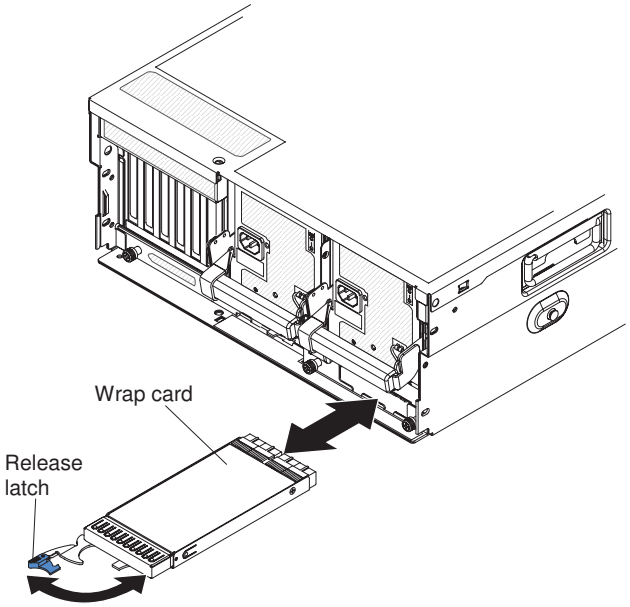
Replacing the hot-swap power supply

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

1. Touch the static-protective package that contains the power supply to any unpainted surface on the outside of the server; then, remove it from the package.
2. Press the orange release latch on the handle to the right and pull the handle up to the open position if it is not already in the open position.
3. Push the power supply into the bay, slide the latch to the right, and push the handle down to lock it.
4. Connect one end of the power cord for the new power supply into the ac inlet on the back of the power supply, and connect the other end of the power cord into a properly grounded electrical outlet.

5. Route the cable through the retention hook on the back of the power supply.
6. If the server is turned off, turn on the server.
7. Make sure that the ac and dc power LED on the power supply is lit, indicating that the power supply is operating correctly.

Removing a QPI wrap card



To remove a QPI wrap card from the server, complete the following steps:

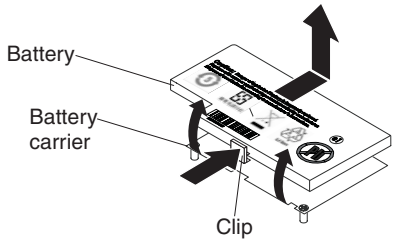
1. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary.
3. Rotate the blue release latch on the handle and pull the handle to the open position.
4. Slide the wrap card out of the server.
5. If you are instructed to return the wrap card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing a QPI wrap card

To install the replacement QPI wrap card, complete the following steps:

1. Rotate the blue release latch on the handle and pull the handle to the open position.
2. Push the wrap card into the bay, and slide the handle to the locked position.
3. Connect the cables and power cords (see “Connecting the cables” on page 257 for cabling instructions).
4. Turn on all attached devices and the server.

Removing a ServeRAID SAS controller battery



To remove a ServeRAID SAS controller battery from the adapter, complete the following steps:

1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary.
3. Remove the top cover (see "Removing and replacing consumable parts and Tier 1 CRUs" on page 259).
4. If you are removing the battery from a ServeRAID SAS controller in one of the rear I/O connectors, see "Removing an adapter" on page 262 for controller removal instructions.
5. If you are removing the battery from the ServeRAID SAS controller behind the hard disk drives, see "Removing the RAID adapter carrier and the RAID adapter assembly" on page 290 for controller removal instructions.
6. Disconnect the cable that connects the battery to the battery carrier.
7. Remove the battery from the adapter.
8. If you are instructed to return the battery, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing a ServeRAID SAS controller battery

To replace a ServeRAID SAS controller battery, complete the following steps:

1. Install the battery on the ServeRAID adapter.
2. Connect the cable from the battery to the battery carrier.
3. If you are installing a ServeRAID SAS controller in one of the rear I/O connectors, see "Replacing an adapter" on page 263 for controller installation instructions.
4. If you are installing the ServeRAID SAS controller behind the hard disk drives, see "Replacing the RAID adapter carrier and the RAID adapter assembly" on page 292 for controller installation instructions.

Memory cards and memory modules (DIMM)

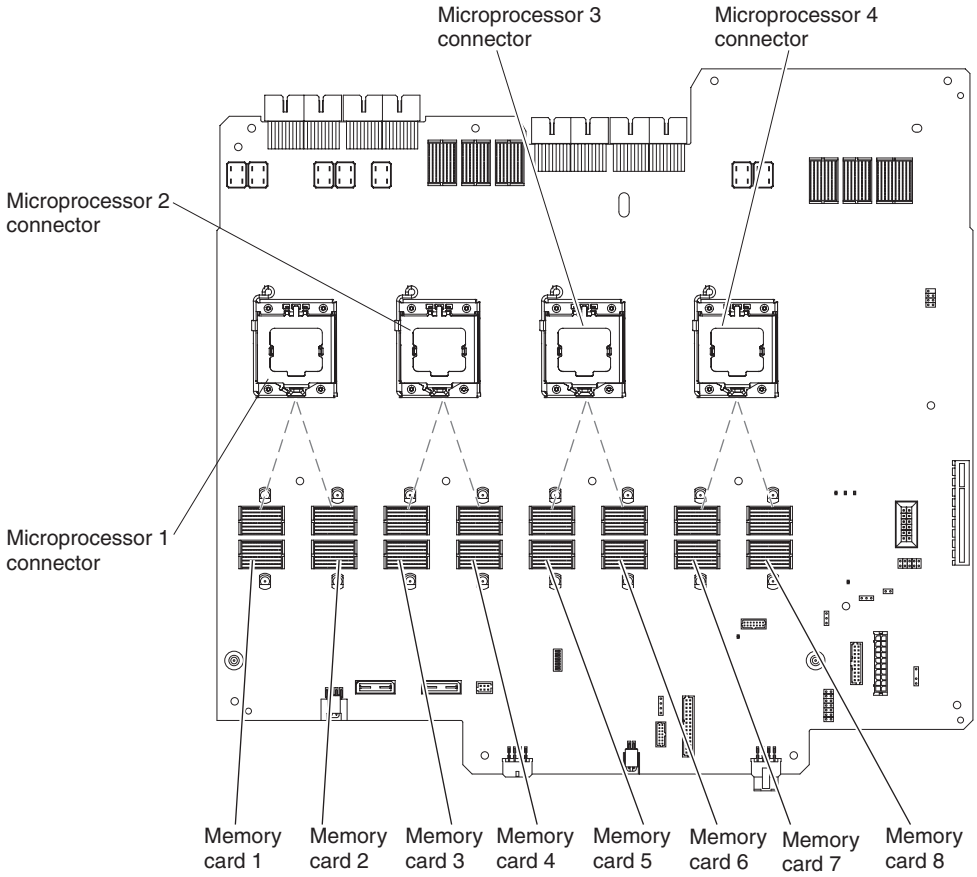
The following notes describe the types of dual inline memory modules (DIMMs) that the server supports and other information that you must consider when you install DIMMs:

- To confirm that the server supports the memory modules that you are installing, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.
- All server machine types that are described in this document support 240-pin, double-data-rate (DDR) III, registered synchronous dynamic random-access

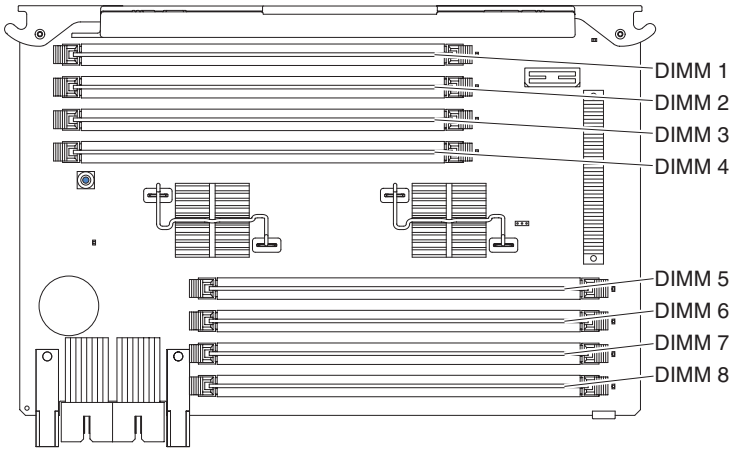
memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest PC3-10600 or PC3-8500 SDRAM registered DIMM specifications.

  - All machine types support 1.5 V DIMMs; machine types 7143 and 7191 also support 1.35 V DIMMs.
  - All machine types support 2 GB PC3-10600 DIMMs and 4 GB, 8 GB, 16 GB, and 32 GB (when available) PC3-8500 DIMMs; machine types 7145 and 7146 also support 1 GB DIMMs.

- The server supports up to eight memory cards. Each memory card holds up to eight DIMMs.
- The Intel 7500 Scalable Memory Buffer and the Intel 7510 Scalable Memory Buffer are not interchangeable and cannot be used in the same server. To verify that your server supports the memory card that you are installing, look at the label on the top of the memory card. If the label does not state that the memory card can be used only in machine types 7143 and 7191, the memory card can be used only in machine types 7145 and 7146.
- The server supports an additional 512 GB of memory when the 32-DIMM optional IBM MAX5 for System x memory expansion module is attached to the server.
- The server supports memory sparing. Memory sparing reserves memory capacity for failover in the event of a DIMM failure, and the reserved capacity is subtracted from the total available memory. Memory sparing provides less redundancy than memory mirroring does. If a predetermined threshold of correctable errors is reached the contents of the failing DIMM are copied to the spare memory, and the failing DIMM or rank is disabled. To enable memory sparing through the Setup utility, select System Settings > Memory. (You cannot use memory mirroring and memory sparing at the same time.)
- At least one memory card with one pair of DIMMs must be installed for the server to operate.
- When you install additional DIMMs on a memory card, be sure to install them in pairs. The DIMMs in each pair must match each other.
- You do not have to save new configuration information to the IMM when you install or remove DIMMs. The only exception is if you replace a DIMM that was designated as disabled in the Setup utility **Memory Settings** menu. In this case, you must re-enable the row in the Setup utility or reload the default memory settings.
- When you restart the server after you add or remove a DIMM, the server displays a message that the memory configuration has changed.
- Memory cards in connectors 1 and 2 support microprocessor 1, memory cards in connectors 3 and 4 support microprocessor 2, memory cards in connectors 5 and 6 support microprocessor 3, and memory cards in connectors 7 and 8 support microprocessor 4.
- There are four memory power buses, which are split among the eight memory cards.
- Populate the memory-card connectors to match the microprocessor installation, in the following order: 1, 7, 3, 5, 2, 8, 4, 6. (Microprocessors must be installed in the following order: 1, 4, 2, and 3.) The following illustration shows the locations of the memory-card and microprocessor connectors.



- The following illustration shows the DIMM connectors on a memory card.



- In a low-cost and low-power DIMM installation, install the DIMMs on each memory card in the order shown in the following tables. The goal in a low-cost and low-power configuration is to completely fill each memory card before you install the next memory card.

Table 20. Low-cost and low-power DIMM installation sequence

DIMM pair installation order	Memory-card connector number	DIMM-connector numbers	Installed microprocessors
First	1	1 and 8	1 and 4
Second	7	1 and 8	
Third	1	3 and 6	
Fourth	7	3 and 6	
Fifth	1	2 and 7	
Sixth	7	2 and 7	
Seventh	1	4 and 5	
Eighth	7	4 and 5	

If you plan to install additional memory cards in the low-cost installation sequence, follow the DIMM installation sequence in "Memory cards and memory modules (DIMM)" on page 275 for each memory card. Install the memory cards in the installation sequence shown in "Memory cards and memory modules (DIMM)" on page 275.

Table 21. Low-cost and low-power memory-card installation sequence

Memory card pairs	Memory-card connector number	Installed microprocessors
First	1 and 7	1 and 4
Second	2 and 8	
Third	3 and 5	2 and 3
Fourth	4 and 6	

In a high-performance DIMM installation, install the DIMMs on each memory card in the order shown in the following table. You must install at least one pair of DIMMs on each memory card.

Table 22. High-performance memory-card installation sequence

DIMM pair installation order	Memory-card connector number	DIMM connector numbers
First	1	1 and 8
Second	7	1 and 8
Third	3	1 and 8
Fourth	5	1 and 8
Fifth	2	1 and 8
Sixth	8	1 and 8
Seventh	4	1 and 8
Eighth	6	1 and 8
Ninth	1	3 and 6
Tenth	7	3 and 6
Eleventh	3	3 and 6
Twelfth	5	3 and 6
Thirteenth	2	3 and 6
Fourteenth	8	3 and 6

Table 22. High-performance memory-card installation sequence (continued)

DIMM pair installation order	Memory-card connector number	DIMM connector numbers
Fifteenth	4	3 and 6
Sixteenth	6	3 and 6
Seventeenth	1	2 and 7
Eighteenth	7	2 and 7
Nineteenth	3	2 and 7
Twentieth	5	2 and 7
Twenty-first	2	2 and 7
Twenty-second	8	2 and 7
Twenty-third	4	2 and 7
Twenty-fourth	6	2 and 7
Twenty-fifth	1	4 and 5
Twenty-sixth	7	4 and 5
Twenty-seventh	3	4 and 5
Twenty-eighth	5	4 and 5
Twenty-ninth	2	4 and 5
Thirtieth	8	4 and 5
Thirty-first	4	4 and 5
Thirty-second	6	4 and 5

To enable memory mirroring, you must install DIMMs in sets of four, one pair in each memory card. All DIMMs in each set must be the same size and type. Memory cards 1 and 2 mirror each other, cards 3 and 4 mirror each other, memory cards 5 and 6 mirror each other, and cards 7 and 8 mirror each other. Install DIMMs in the sequence shown in the following table.

Table 23. Memory-card installation sequence for memory-mirroring configuration

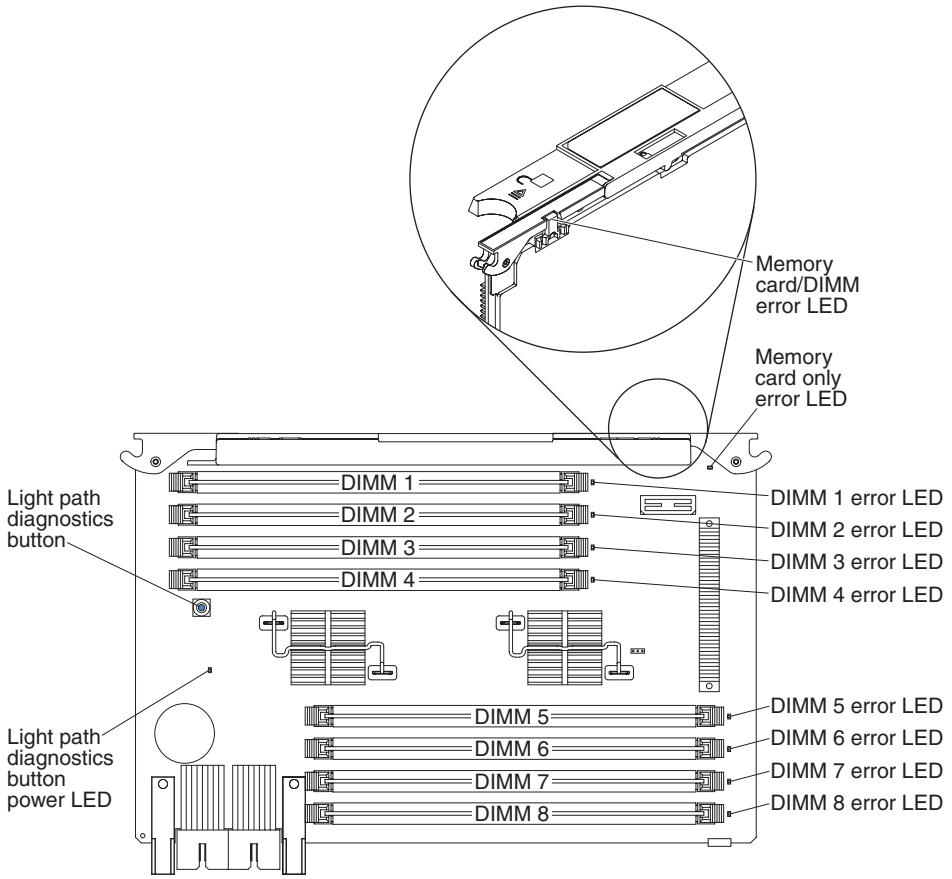
DIMM quad installation order	Memory-card connector number	DIMM connector numbers
First	1	1 and 8
	2	1 and 8
Second	7	1 and 8
	8	1 and 8
Third	3	1 and 8
	4	1 and 8
Fourth	5	1 and 8
	6	1 and 8
Fifth	1	3 and 6
	2	3 and 6
Sixth	7	3 and 6
	8	3 and 6
Seventh	3	3 and 6
	4	3 and 6

Table 23. Memory-card installation sequence for memory-mirroring configuration (continued)

DIMM quad installation order	Memory-card connector number	DIMM connector numbers
Eighth	5	3 and 6
	6	3 and 6
Ninth	1	2 and 7
	2	2 and 7
Tenth	7	2 and 7
	8	2 and 7
Eleventh	3	2 and 7
	4	2 and 7
Twelfth	5	2 and 7
	6	2 and 7
Thirteenth	1	4 and 5
	2	4 and 5
Fourteenth	7	4 and 5
	8	4 and 5
Fifteenth	3	4 and 5
	4	4 and 5
Sixteenth	5	4 and 5
	6	4 and 5

- If a problem with a DIMM is detected, light path diagnostics lights the system-error LED on the front of the server, indicating that there is a problem and guiding you to the defective DIMM. When this occurs, first identify the defective DIMM; then, remove and replace the DIMM.

  The following illustration shows the LEDs that are on a memory card.



Memory card/DIMM error LED: When this LED is lit, it indicates that a memory card or DIMM has failed.

Memory card only error LED: When this LED is lit, it indicates that a memory card has failed.

DIMM 1 - 8 error LED: When one of these LEDs is lit, it indicates that DIMM has failed.

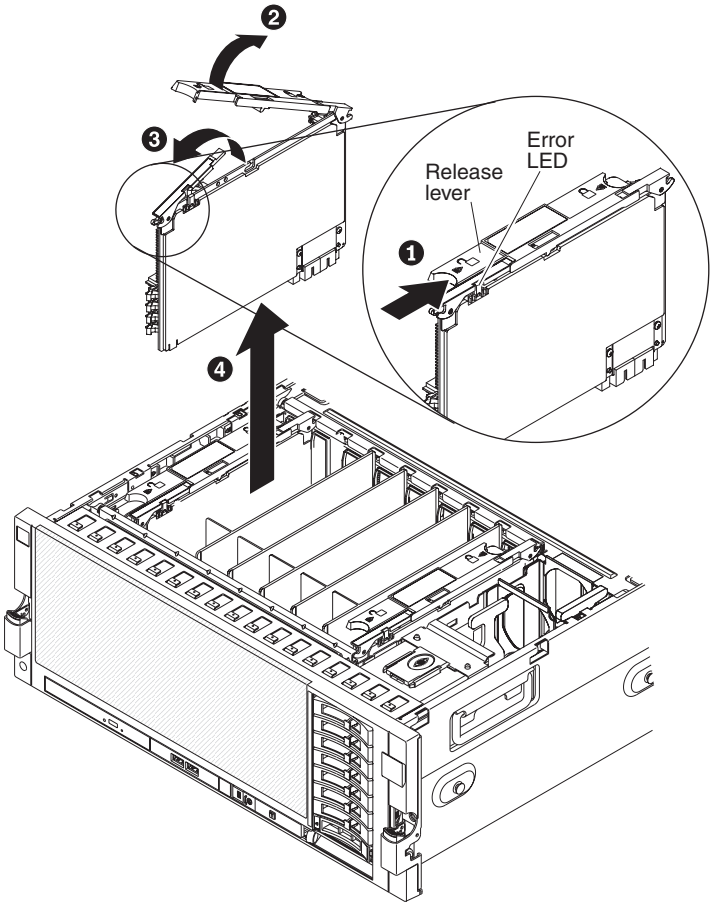
Light path diagnostics button power LED: When this LED is lit, it indicates that the capacitor is charged and error LEDs can be lit as necessary.

Light path diagnostics button: Press this button to relight the error LED that had previously been lit.

Removing a memory card:

At least one memory card with one pair of DIMMs must be installed for the server to operate correctly.

To remove a memory card, complete the following steps.

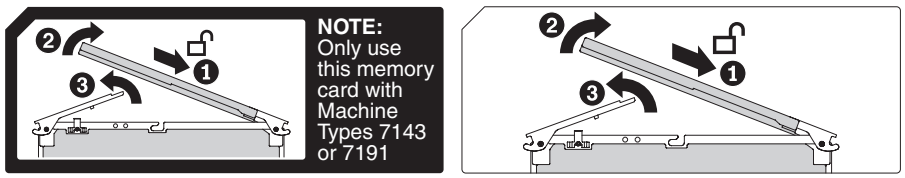


1. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.

   Attention: To ensure proper cooling and airflow, do not operate the server for more than 2 minutes with the top cover removed.
3. Remove the top cover (see “Removing and replacing consumable parts and Tier 1 CRUs” on page 259).
4. Slide the blue release lever to the unlocked position (toward the rear of the server) and open the retention levers; then, lift the memory card out of the server.
5. If necessary, remove all DIMMs.
6. If you are instructed to return the memory card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing a memory card:

The Intel 7500 Scalable Memory Buffer memory card and the Intel 7510 Scalable Memory Buffer memory card are not interchangeable and cannot be used in the same server. To verify that your server supports the memory card that you are installing, look at the label on the top of the memory card. If the label does not state that the memory card can be used only in machine types 7143 and 7191, the memory card can be used only in machine type 7145 and 7146.



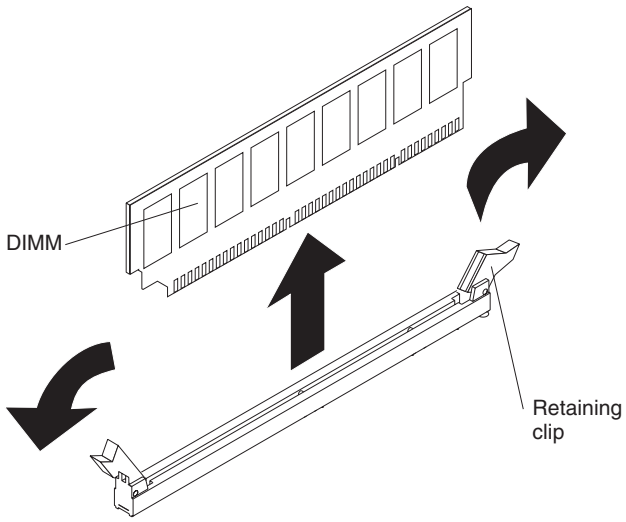
To install a replacement memory card, complete the following steps:

1. Make sure that the memory card that you are installing is supported by your server by verifying the machine types listed on the label on top of the memory card.
2. Insert the memory card into the memory-card connector. Press the memory card into the connector and the retention latch down onto the top of the memory card.
3. Slide the blue release latch toward the front of the server, into the locked position.
4. Install the top cover (see "Replacing the top cover" on page 259).

Removing a DIMM:

DIMMs must be installed in pairs of the same type and speed. To use the memory-mirroring feature, all the DIMMs that are installed in the server must be of the same type and speed, and the operating system must support memory mirroring.

To remove a DIMM, complete the following steps.



1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary.
3. Remove the top cover (see "Removing and replacing consumable parts and Tier 1 CRUs" on page 259).
4. Remove the memory card (see "Removing a memory card" on page 281).
5. Place the memory card on a flat, static-protective surface, with the DIMM connectors facing up.

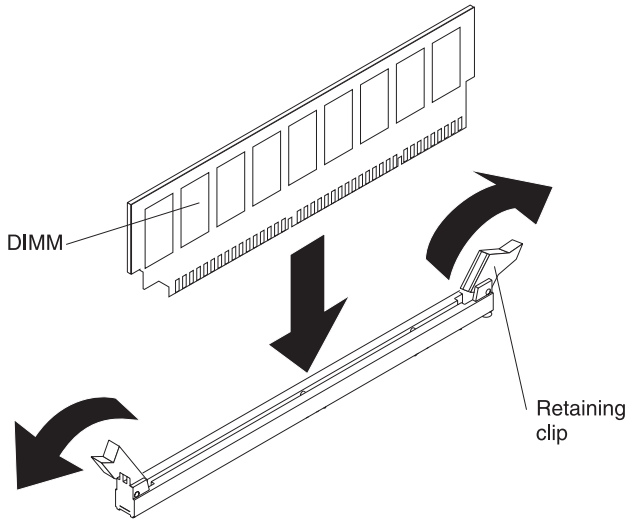
Attention: To avoid breaking the DIMM retaining clips or damaging the DIMM connectors, open and close the clips gently.

6. Open the retaining clip simultaneously on each end of the DIMM connector and remove the DIMM from the 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.

Replacing a DIMM:

To install the replacement DIMM, complete the following steps:

1. Open the retaining clip on each end of the DIMM connector.
2. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.
3. Turn the DIMM so that the DIMM keys align correctly with the connector.



4. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press both ends of the DIMM straight down into the connector. The retaining clips snap into the locked position when the DIMM is seated in the connector.

   Note: If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.
5. Reinstall the memory card (see "Replacing a memory card" on page 282).
6. Install the top cover (see "Replacing the top cover" on page 259).
7. Connect the cables and power cords (see "Connecting the cables" on page 257 for cabling instructions).
8. Turn on all attached devices and the server.

Removing and replacing Tier 2 CRUs

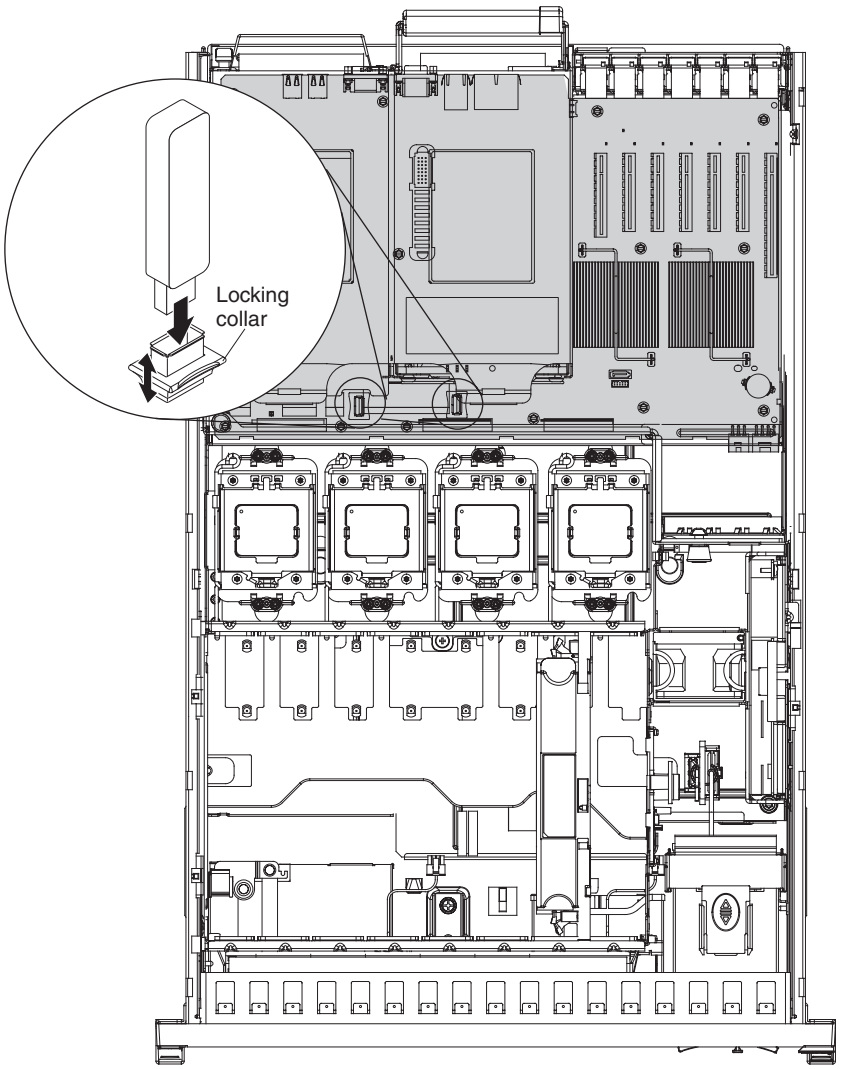
You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.

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

Removing the internal flash memory

To remove the internal flash memory (or hypervisor key), complete the following steps:

1. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
2. Disconnect the power cable and remove the power supply that is closest to the flash drive you plan to replace.
3. Reach through the empty power-supply bay and locate the internal flash memory. Push the locking collar on the connector down to the unlocked position.



4. Lift the internal flash memory out of the connector.
5. If you are instructed to return the internal flash memory, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

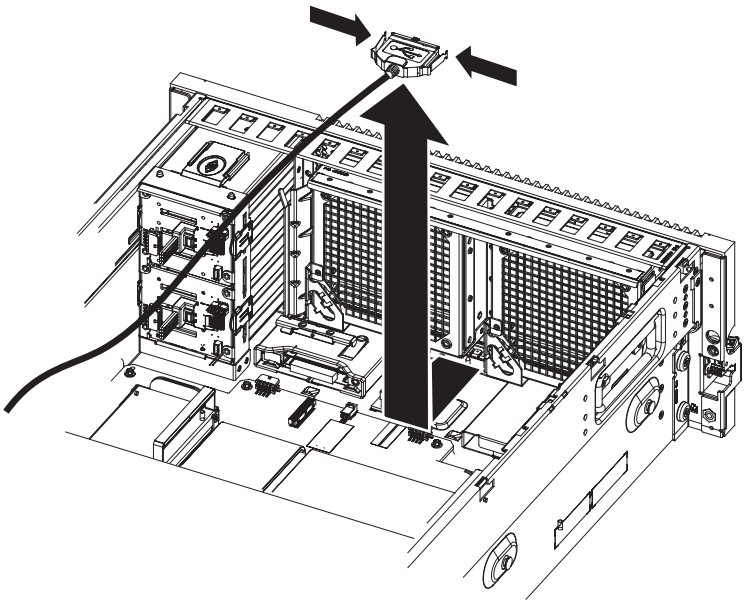
Replacing the internal flash memory

To install the replacement internal flash memory (or hypervisor key), complete the following steps:

1. Reach through the power-supply bay and insert the internal flash memory into the connector.
2. Pull up on the locking collar to lock the internal flash memory in place.
3. Reinstall the power supply (see “Replacing the hot-swap power supply” on page 273) and reconnect the power cable.

Removing the front USB assembly

To remove the front USB assembly, complete the following steps.



1. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing and replacing consumable parts and Tier 1 CRUs” on page 259).
4. Remove the top cover bracket (see “Removing the top-cover bracket” on page 260).
5. Remove the middle fan (see “Removing the middle hot-swap fan” on page 270).
6. Remove the memory cards and memory card fillers (see “Removing a memory card” on page 281).
7. Disconnect the SAS cables from the RAID card controller.
8. Remove the RAID card controller (see “Removing the RAID adapter carrier and the RAID adapter assembly” on page 290).
9. Remove the memory-card cage (see “Removing the memory-card cage” on page 314).
10. Press on the release latches on the front side of the USB mounting bracket and push the mounting bracket into the server.
11. Pull the USB assembly through the opening and remove it from the server.
12. If you are instructed to return the front USB assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

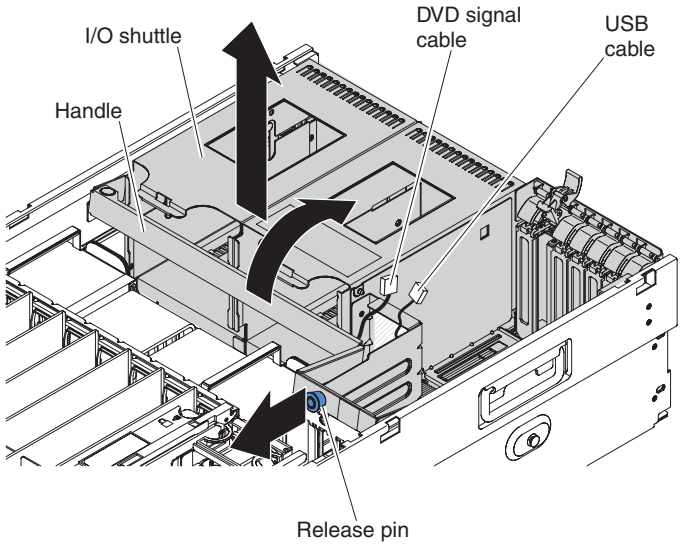
Replacing the front USB assembly

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

1. Insert the USB assembly into the opening from inside the server and push it in until it clicks into place.
2. Route the USB assembly cable under the hard disk drive backplane to the outside of the RAID PCI Express connector.
3. Install the memory-card cage assembly (see “Replacing the memory-card cage” on page 315).
4. Connect the SAS cables to the RAID card controller.
5. Install the RAID card controller (“Replacing the RAID adapter carrier and the RAID adapter assembly” on page 292).
6. Install the middle fan (see “Replacing the middle hot-swap fan” on page 270).
7. Install the memory cards and memory card fillers (see “Replacing a memory card” on page 282).
8. Install the top cover bracket (see “Replacing the top-cover bracket” on page 260).
9. Install the top cover (see “Replacing the top cover” on page 259) and the front bezel (see “Replacing the front bezel” on page 261).
10. Connect the cables and power cords (see “Connecting the cables” on page 257 for cabling instructions).
11. Turn on all attached devices and the server.

Removing the I/O-board shuttle

To remove the rear I/O-board shuttle, complete the following steps.



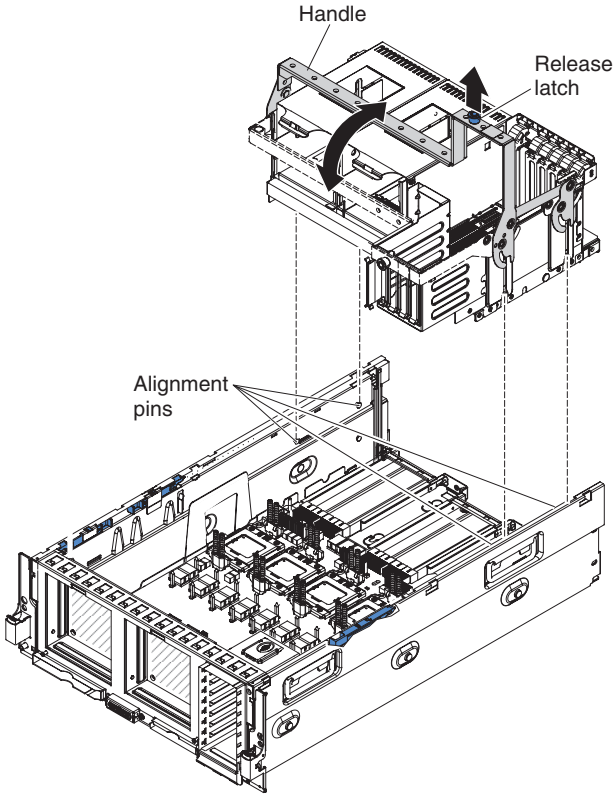
1. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing the top cover” on page 259).
4. Remove the top cover bracket (see “Removing the top-cover bracket” on page 260).

5. Remove any installed adapters (see “Removing an adapter” on page 262).
6. Remove the power supplies or power-supply fillers from the rear of the server (see “Removing a hot-swap power supply” on page 271).
7. Pull out the blue release pin to unlatch the shuttle, and then rotate the shuttle handle up.
8. Disconnect the front USB cable and the DVD signal cable from the connectors on the shuttle.
9. Pull up on the handle to remove the I/O-board shuttle assembly from the server and place it on a clean, flat surface to avoid damage to the connectors on the underside of the board.
10. If you are instructed to return the I/O-board shuttle, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the I/O-board shuttle

To install the replacement rear I/O-board shuttle, complete the following steps:

1. Align the I/O-board shuttle over the server so that the pins on the side of the chassis can slide into the slots on the side of the server.



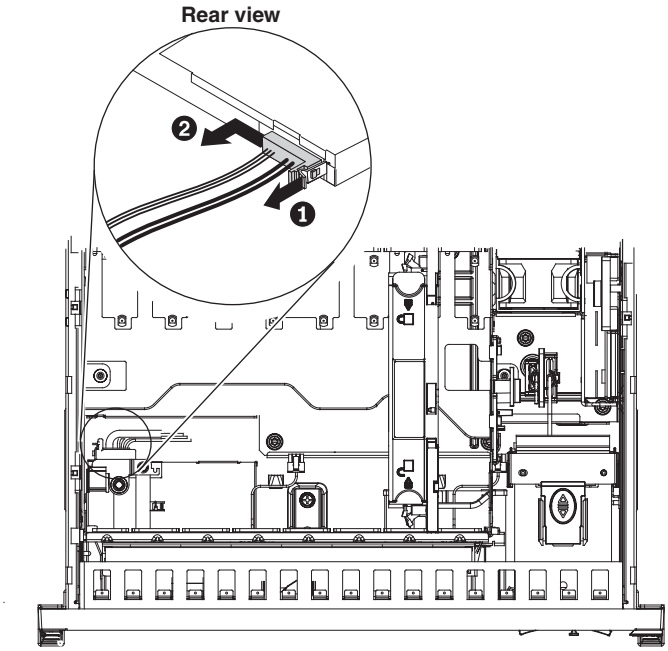
2. Carefully lower the shuttle into the chassis, leaving the handle in the vertical position.
3. Thread the USB and DVD drive cables into the shuttle.
4. Connect the USB cable and the optical drive cable to the connectors on the I/O shuttle.
5. Rotate the handle to the closed and locked position until the pin locks into the handle.
6. Reinstall the power supplies and power supply filler (see “Replacing the hot-swap power supply” on page 273).

7. Reinstall the adapters (see “Replacing an adapter” on page 263).
8. Reinstall the top cover bracket (see “Replacing the top-cover bracket” on page 260).
9. Install the top cover (see “Replacing the top cover” on page 259).
10. Connect the power cords and external cables (see “Connecting the cables” on page 257 for cabling instructions).
11. Turn on all attached devices and the server.
12. Restore the RAID configuration information that you backed up before you removed the I/O-board shuttle.

Removing the DVD cable

To remove the DVD cable, complete the following steps:

1. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the front bezel (see “Removing the front bezel” on page 261).
4. Push in the release button on the DVD drive and pull the drive out of the server.
5. Remove the top cover (see “Removing and replacing consumable parts and Tier 1 CRUs” on page 259).
6. Remove the top cover bracket (see “Removing the top-cover bracket” on page 260).
7. Remove the middle fan (see “Removing the middle hot-swap fan” on page 270).
8. Disconnect the SAS cables and remove the ServeRAID card from the dedicated PCI connector (see “Removing the RAID adapter carrier and the RAID adapter assembly” on page 290).
9. Remove the memory cards and memory card fillers (see “Removing a memory card” on page 281).
10. Remove the memory cage (see “Removing the memory-card cage” on page 314).
11. Disconnect the cable from the rear of the DVD housing.



12. Disconnect the cables from the I/O board.
13. Remove the cables from the server.

Replacing the DVD cable

To install the replacement DVD cable, complete the following steps:

1. Route the DVD cable in the server and connect it to the I/O board; then, connect the other end of the cable to the rear of the DVD housing (see "Internal cable routing and connectors" on page 254).
2. Install the memory-card cage (see "Replacing the memory-card cage" on page 315).
3. Install the RAID adapter and connect the SAS cable to the RAID adapter (see "Replacing the RAID adapter carrier and the RAID adapter assembly" on page 292).
4. Install the memory cards and memory card fillers (see "Replacing a memory card" on page 282).
5. Install the middle fan (see "Replacing the middle hot-swap fan" on page 270).
6. Install the top cover bracket (see "Replacing the top-cover bracket" on page 260).
7. Install the server top cover (see "Replacing the top cover" on page 259).
8. Connect the cables and power cords (see "Connecting the cables" on page 257 for cabling instructions).
9. Turn on all attached devices and the server.

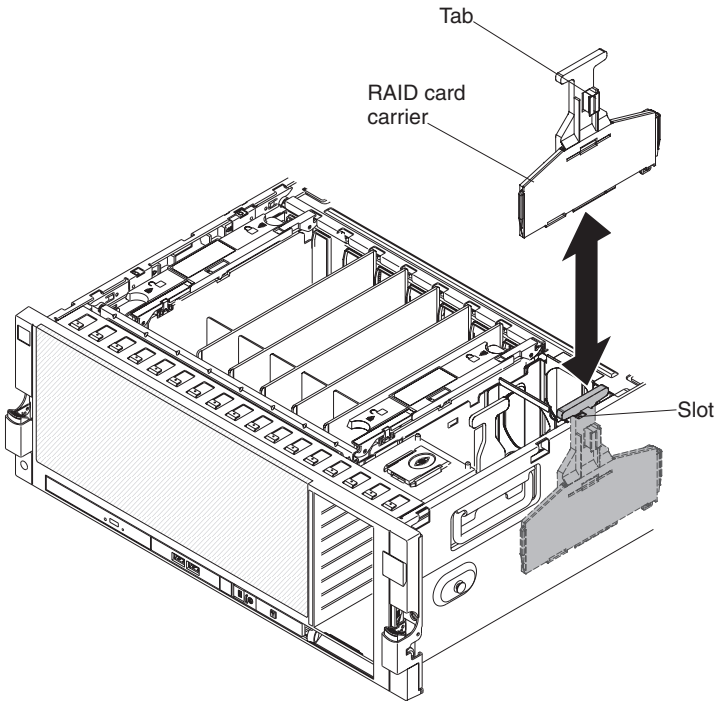
Removing the RAID adapter carrier and the RAID adapter assembly

Important: Before you remove the RAID adapter carrier and the RAID adapter assembly from the server, take the following precautions to save data, firmware, and configuration data:

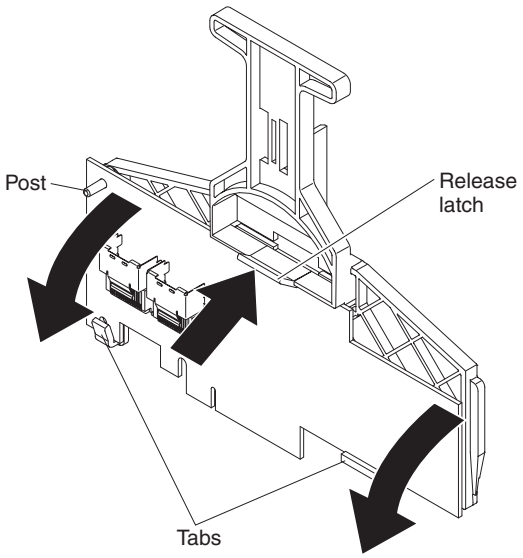
- Before you make changes to disk drives, disk drive controllers (including controllers that are integrated on the system board), disk drive backplanes, or disk drive cables, back up all important data that is stored on hard disks.

- Before you remove any component of a RAID array, back up all RAID configuration information.

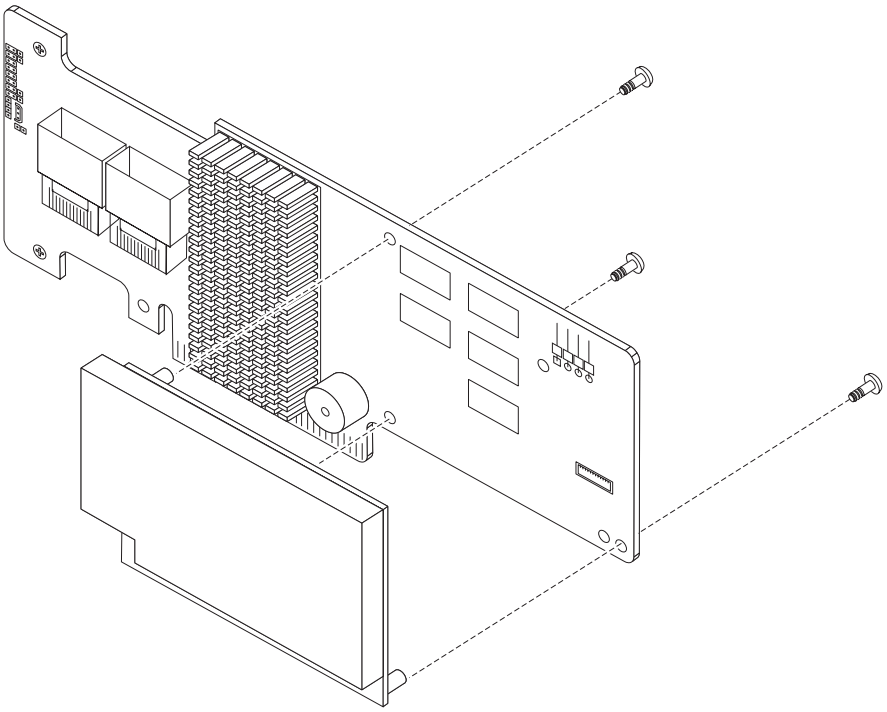
To remove the RAID adapter carrier and RAID adapter assembly, complete the following steps.



1. Read the safety information that begins with “Safety” on page v, “Installation guidelines” on page 251, and “Handling static-sensitive devices” on page 253.
2. Save the system configuration.
3. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
4. Remove the top cover (see “Removing and replacing consumable parts and Tier 1 CRUs” on page 259).
5. Remove the top cover bracket (see “Removing the top-cover bracket” on page 260).
6. Pull the blue handle on the RAID adapter carrier up to remove it from the server.
7. Disconnect the SAS cables from the RAID adapter.
8. Press the release latch and remove the RAID adapter from the carrier.



9. If a battery is installed on the RAID adapter, remove the battery carrier card and the battery from the RAID adapter. You must remove the three screws to separate them.



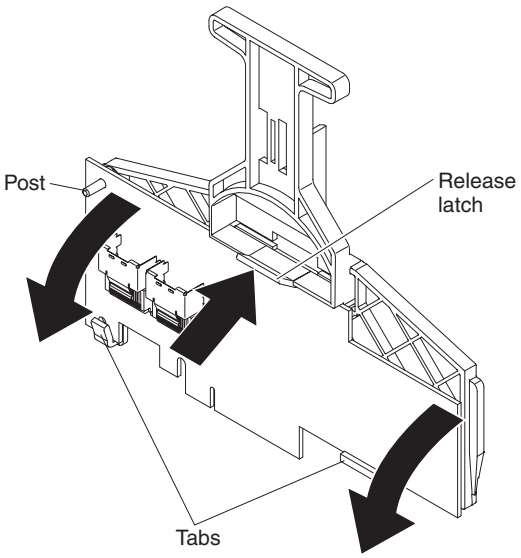
10. If you are instructed to return the RAID adapter assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the RAID adapter carrier and the RAID adapter assembly

To replace the RAID adapter carrier and RAID adapter assembly, complete the following steps:

1. If you removed a battery carrier and battery from the former RAID adapter, use the three screws and install it on the new RAID adapter.

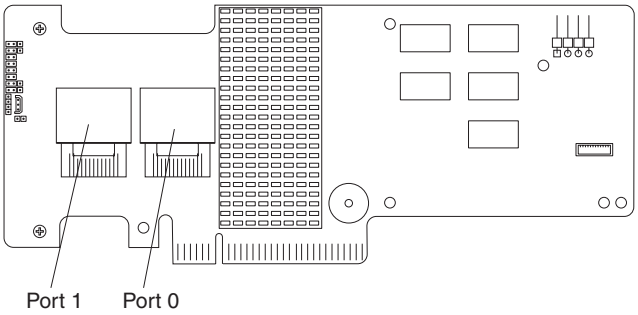
2. Install the replacement RAID adapter onto the RAID adapter carrier.



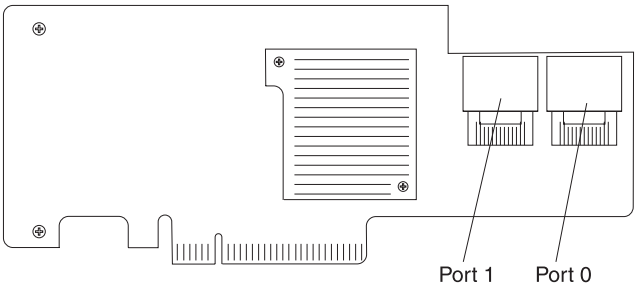
3. Connect the SAS cables to the RAID adapter.

   Note: Attach the SAS cable from port 0 to the lower backplane and the SAS cable from port 1 to the upper backplane (if one is installed).

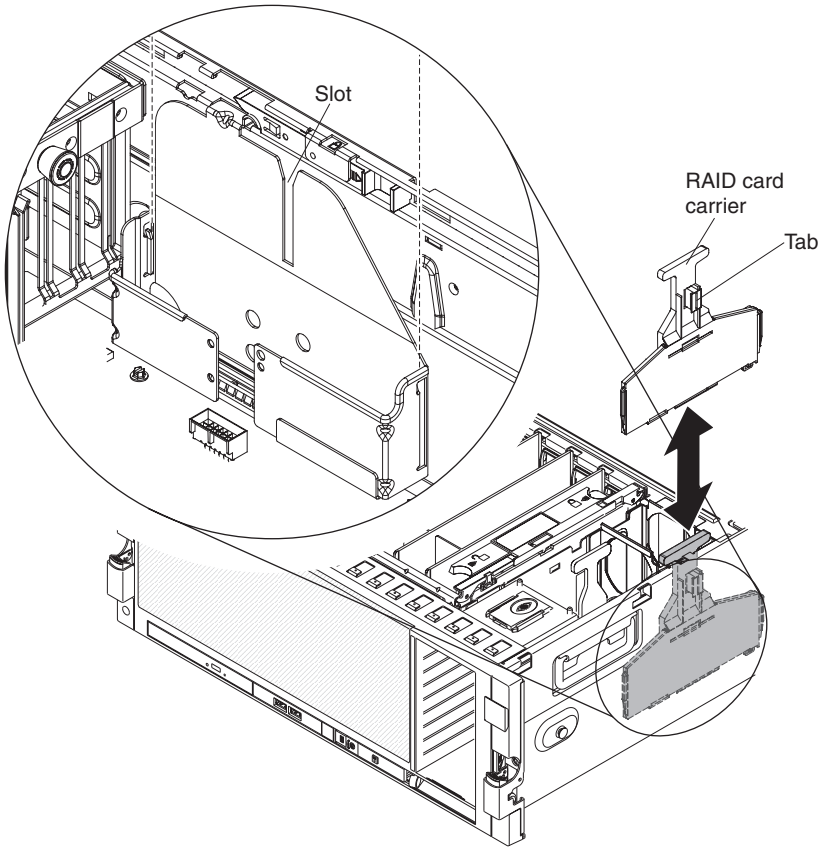
ServeRAID M5015 controller



ServeRAID BR10i controller



4. Slide the RAID adapter carrier and RAID adapter assembly into the slot on the side of the server. Make sure that the carrier is flat against the side wall of the server so that the adapter is installed in the connector correctly.



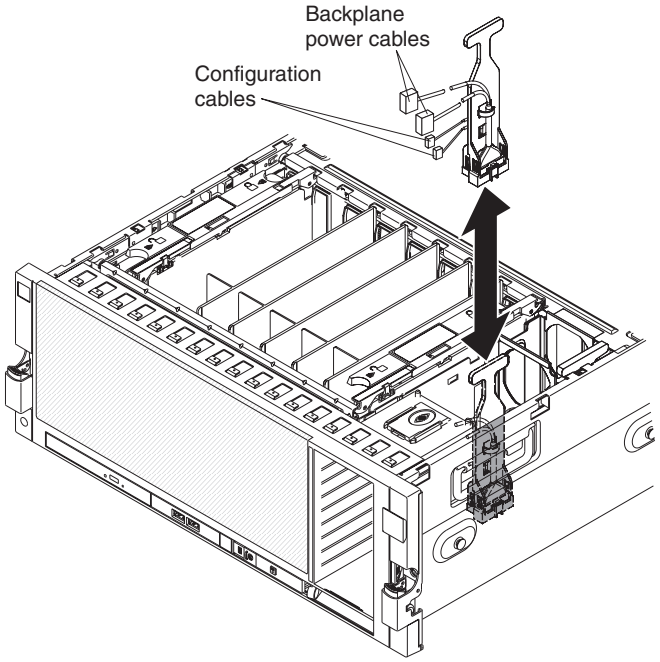
5. Install the top cover bracket (see "Replacing the top-cover bracket" on page 260).
6. Install the top cover (see "Replacing the top cover" on page 259).
7. Connect the cables and power cords (see "Connecting the cables" on page 257 for cabling instructions).
8. Turn on all attached devices and the server.
9. Restore the RAID configuration information that you backed up before you removed the RAID card carrier and the RAID card assembly.

Removing the hard disk drive backplane and cable assembly

Important: Before you remove the hard disk drive backplane cable assembly from the server, take the following precautions to save data, firmware, and configuration data:

- Before you make changes to disk drives, disk drive controllers (including controllers that are integrated on the system board), disk drive backplanes, or disk drive cables, back up all important data that is stored on hard disks.
- Before you remove any component of a RAID array, back up all RAID configuration information.

To remove the hard disk drive backplane cable assembly, complete the following steps.



1. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see “Removing and replacing consumable parts and Tier 1 CRUs” on page 259).
4. Pull the hard disk drives and fillers out of the server slightly to disengage them from the SAS backplane. If you remove the drives from the server, be sure to note the location of each drive so that you will be able to reinstall it in the correct drive bay.
5. Slide the latch on top of the backplane assembly while you pull the blue handle on the backplane cable assembly up to remove it from the server. The cables are attached to the assembly.
6. Disconnect the power and configuration cables from the hard disk drive backplane.
7. If you are instructed to return the hard disk drive backplane cable assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the hard disk drive backplane and cable assembly

To replace the hard disk drive backplane cable assembly, complete the following steps.

1. Connect the power and configuration cables to the cable connectors on the backplane.
2. Slide the backplane and cable assembly into the server behind the hard disk drive bays.
3. Install the top cover (see “Replacing the top cover” on page 259).
4. Connect the cables and power cords (see “Connecting the cables” on page 257 for cabling instructions).
5. Reinstall the hard disk drives and hard disk drive fillers into the server (see “Replacing a hot-swap hard disk drive” on page 267).

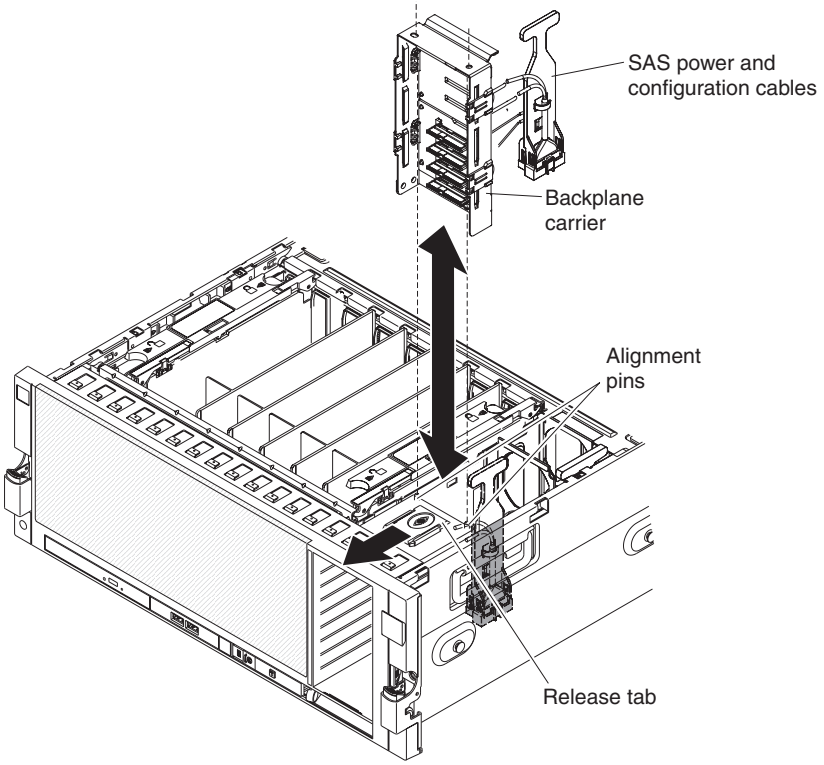
6. Turn on all attached devices and the server.
7. Restore the RAID configuration information that you backed up before you removed the hard disk drive backplane cable assembly.

Removing the SAS hard disk drive backplane assembly

Important: Before you remove the SAS hard disk drive backplane assembly from the server, take the following precautions to save data, firmware, and configuration data:

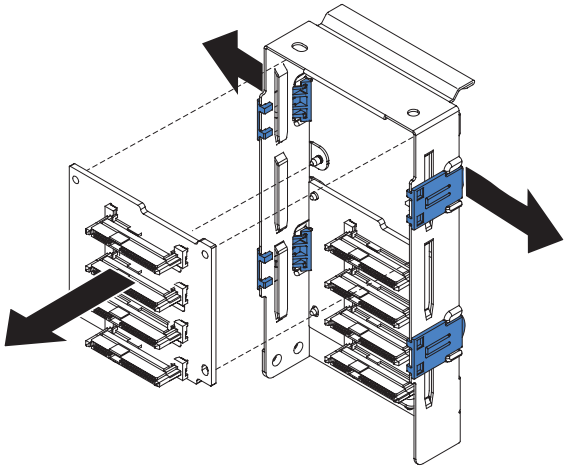
- Before you make changes to disk drives, disk drive controllers (including controllers that are integrated on the system board), disk drive backplanes, or disk drive cables, back up all important data that is stored on hard disks.
- Before you remove any component of a RAID array, back up all RAID configuration information.

To remove the SAS hard disk drive backplane assembly, complete the following steps.



1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see "Removing and replacing consumable parts and Tier 1 CRUs" on page 259).
4. Pull the hard disk drives and fillers out of the server slightly to disengage them from the SAS backplane. If you remove the drives from the server, be sure to note the location of each drive so that you will be able to reinstall it in the correct drive bay.

5. Push the release tab toward the rear of the server to release the assembly; then, pull the assembly up from the server. At the same time, pull the power and configuration cables (hard disk drive backplane cable assembly) out of the server.
6. Disconnect the SAS signal cable and SAS power and configuration cables from the backplane.
7. Push the latches on the backplane carrier outward to disengage and remove the backplane from the carrier.



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

Replacing the SAS hard disk drive backplane assembly

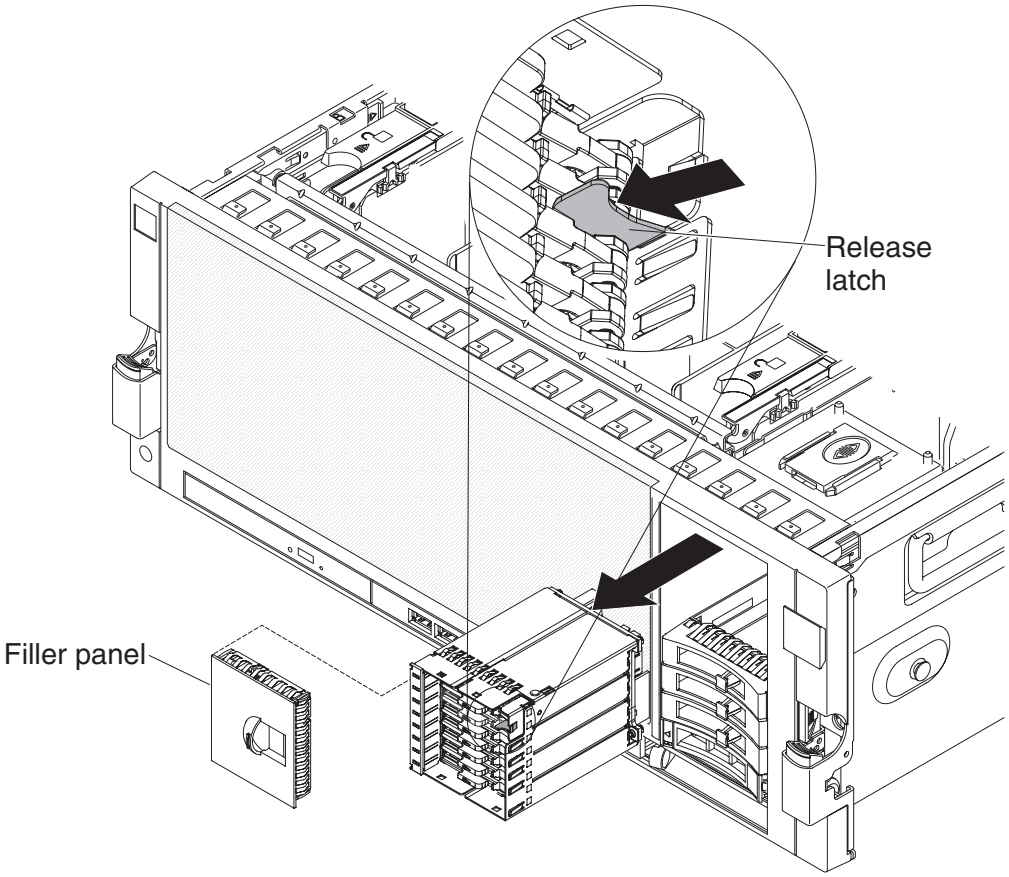
To install the replacement SAS hard disk drive backplane assembly, complete the following steps:

1. Install the backplane onto the carrier.
   a. Line up the notch on the backplane with the bottom-right corner of the carrier.
   b. Push the backplane onto the carrier until it snaps into place.
2. Slide the assembly into the card guides and pull the release tab toward the front of the server to engage the assembly.
3. Reconnect the SAS signal cable and SAS power cable to the backplane.
4. Slide the hard disk drive backplane cable assembly into the server.
5. Reinstall the hard disk drives and drive fillers.
6. Install the top cover (see “Replacing the top cover” on page 259).
7. Connect the cables and power cords (see “Connecting the cables” on page 257 for cabling instructions).
8. Turn on all attached devices and the server.
9. Restore the RAID configuration information that you backed up before you removed the hard disk drive backplane.

Removing the eXFlash 1.8-inch drive cage and backplane assembly

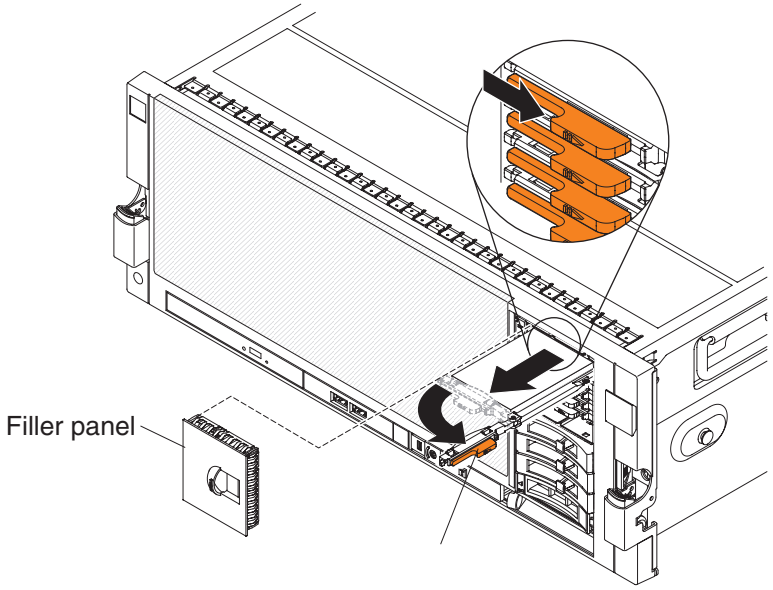
Important: Before you remove the eXFlash 1.8-inch backplane assembly from the server, take the following precautions to save data, firmware, and configuration data:

- Before you make changes to disk drives, disk drive controllers (including controllers that are integrated on the system board), disk drive backplanes, or disk drive cables, back up all important data that is stored on hard disks.
- Before you remove any component of a RAID array, back up all RAID configuration information.

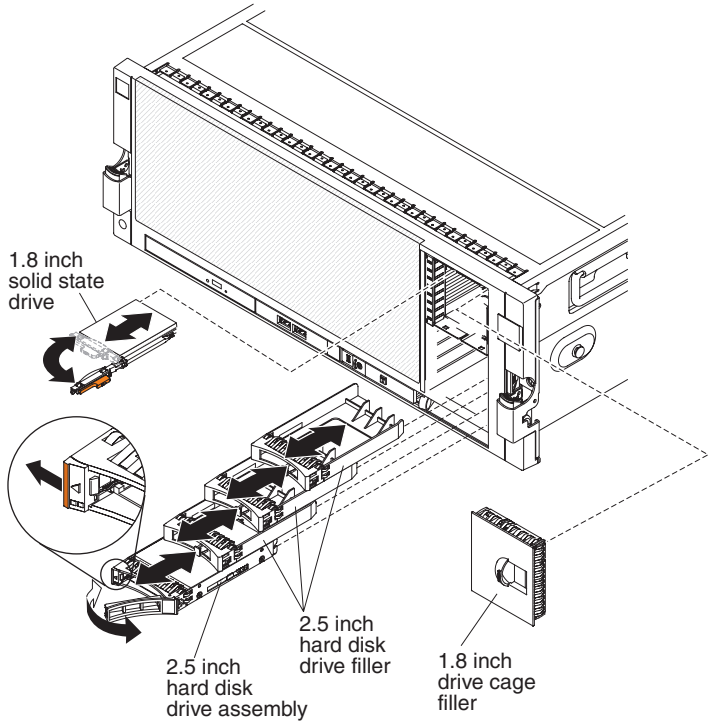


To remove the eXFlash drive backplane assembly, complete the following steps.

1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see "Removing and replacing consumable parts and Tier 1 CRUs" on page 259).
4. Remove the filler panel.
5. Pull the drives out of the cage assembly and install them in the same positions in the new cage assembly.

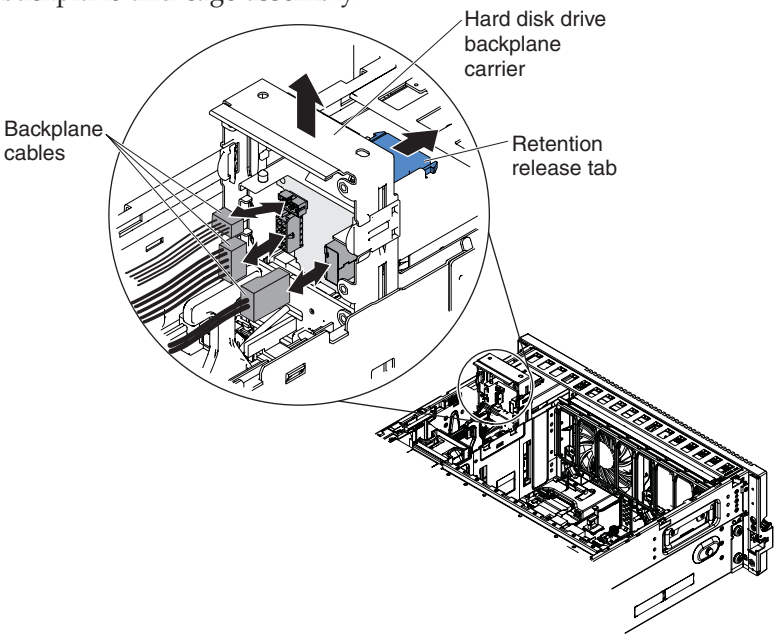


6. If you have 2.5-inch hard disk drives installed below the 1.8-inch cage, pull the drives and fillers out of the server.

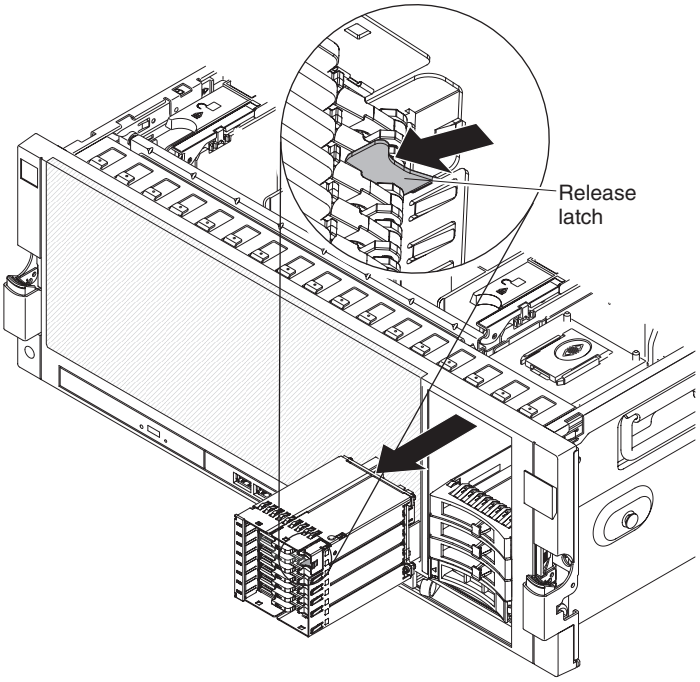


7. Slide the backplane retention release tab forward and slightly lift the hard disk drive backplane carrier to disconnect the cables from the rear of the 1.8-inch

backplane and cage assembly.



8. Disconnect the signal cable and power and configuration cables from the backplane.
9. Slide the backplane retention release tab forward and pull the solid state drive backplane cage assembly out of the server.

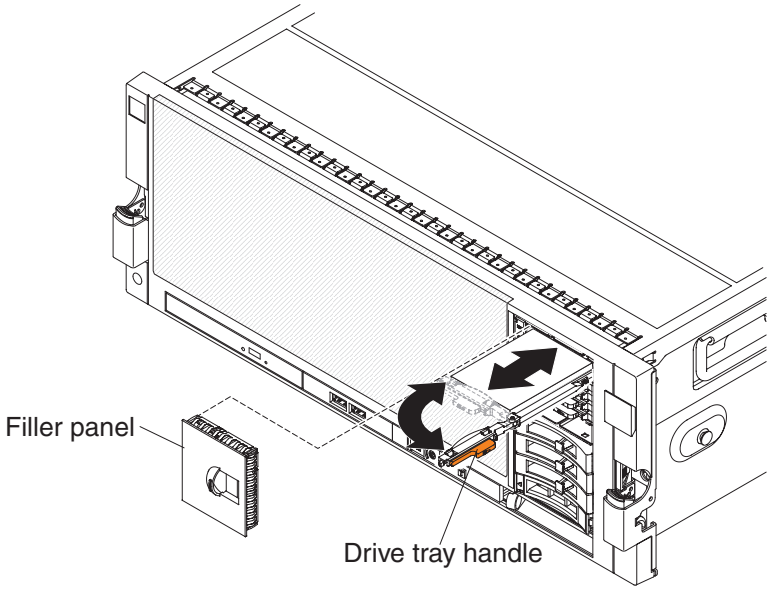


10. If you are instructed to return the solid state drive backplane cage assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the eXFlash 1.8-inch drive cage and backplane assembly

To install the replacement eXFlash drive cage and backplane, complete the following steps:

1. Slide the assembly into the front of the server until it clicks into place.
2. Slide the backplane cable assembly into the server.
3. If you have 2.5-inch hard disk drives installed below the 1.8-inch cage, slightly pull the drives and fillers out from the server, slide the backplane retention release tab forward, and slightly lift up the hard disk drive backplane carrier to reconnect the power, signal, and configuration cables to the backplane.
4. Reinstall the solid state drives.



5. Install the drive filler panel over the drives.
6. Install the top cover (see “Replacing the top cover” on page 259).
7. Connect the cables and power cords (see “Connecting the cables” on page 257 for cabling instructions).
8. Turn on all attached devices and the server.
9. Restore the RAID configuration information that you backed up before you removed the hard disk drive backplane.

Removing and replacing FRUs

FRUs must be installed only by trained service technicians.

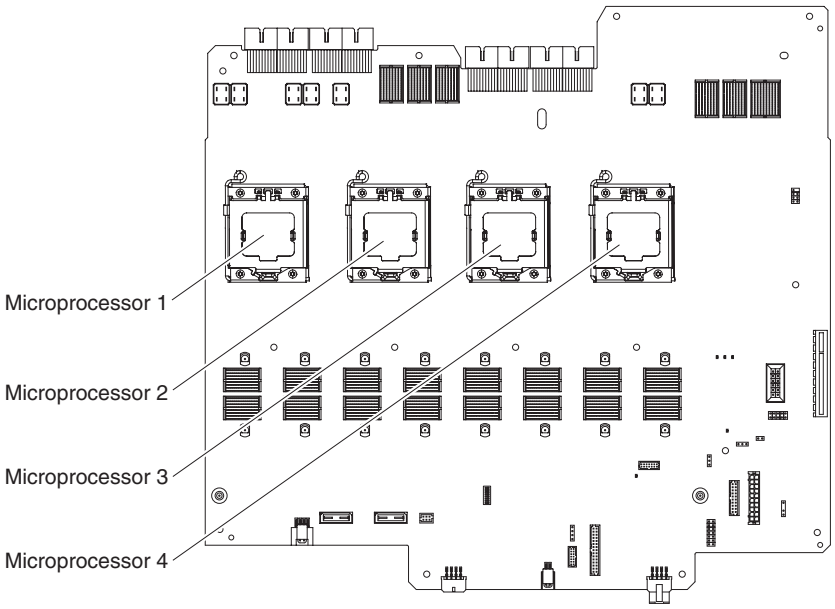
Microprocessor

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

- The optional microprocessors that IBM supports are limited by the capacity and capability of the server. Any microprocessors that you install must have the same specifications as the microprocessors that came with the server.
- For a list of supported optional devices for the server, see http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/.
- The server supports up to four Intel Xeon microprocessors. If you are installing two or more microprocessors, they must be the same cache size and type, and the same clock speed. The server does not support mixing types of microprocessors.
- If you are using a two-microprocessor configuration, you must install the microprocessors in sockets 1 and 4 for PCI Express slots 1 - 4 to be functional.

- The server can operate as a symmetric multiprocessing (SMP) server. With SMP, certain operating systems and application programs can distribute the processing load among the microprocessors. This enhances performance for database and point-of-sale applications, integrated manufacturing solutions, and other applications.
- Read the documentation that comes with the microprocessor to determine whether you have to update the UEFI firmware. To download the most current level of server firmware, go to http://www.ibm.com/supportportal/.
- Obtain an SMP-capable operating system. For a list of supported operating systems, see http://www-03.ibm.com/systems/info/x86servers/serverproven/compat/us/.
- You can use the Setup utility to determine the specific type of microprocessor in the server.
- Each microprocessor socket must always contain either a heat-sink blank or a microprocessor and heat sink.

The following illustration of the microprocessor board shows the locations of the microprocessor sockets.

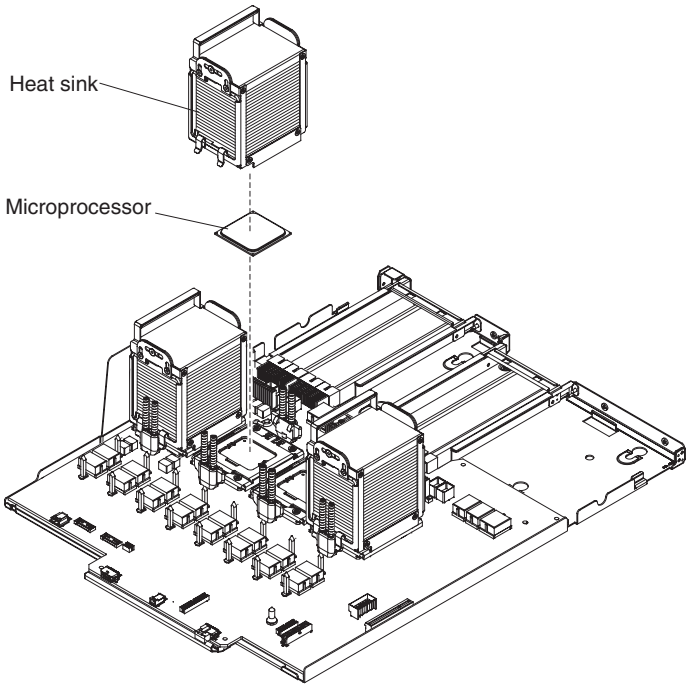


Removing a microprocessor and heat sink:

Microprocessors are to be removed only by trained service technicians.

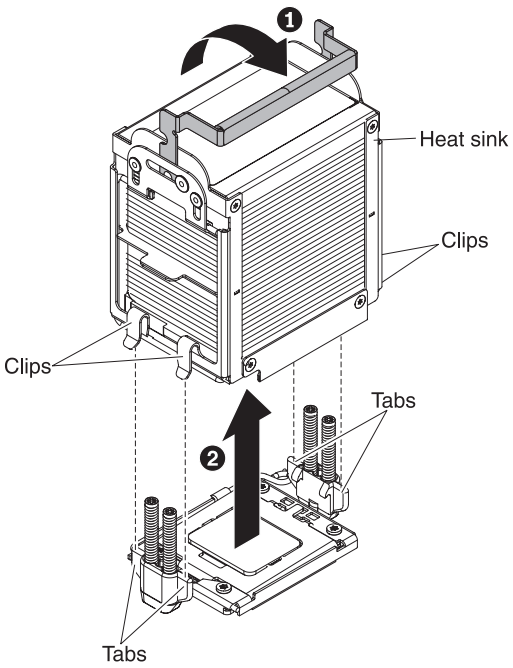
Attention:

- Do not allow the thermal grease on the microprocessor and heat sink to come in contact with anything. Contact with any surface can compromise the thermal grease and the microprocessor socket.
- Dropping the microprocessor during installation or removal can damage the contacts.
- Do not touch the microprocessor contacts; handle the microprocessor by the edges only. Contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.
- Use the microprocessor installation tool that comes with the new microprocessor to remove and install the microprocessor from the server.

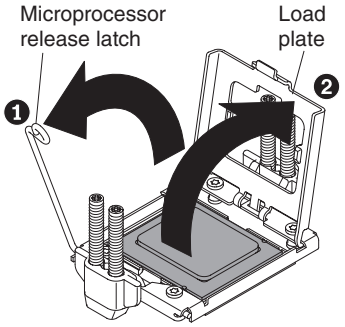


To remove a microprocessor and heat sink, complete the following steps:

1. Read the safety information that begins with "Safety" on page v, "Handling static-sensitive devices" on page 253, and "Installation guidelines" on page 251.
2. Turn off the server and peripheral devices and disconnect the power cord and all external cables.
3. Remove the top cover (see "Removing and replacing consumable parts and Tier 1 CRUs" on page 259).
4. Remove the top cover bracket (see "Removing the top-cover bracket" on page 260).
5. Rotate the heat-sink release lever **1** to the fully open position.

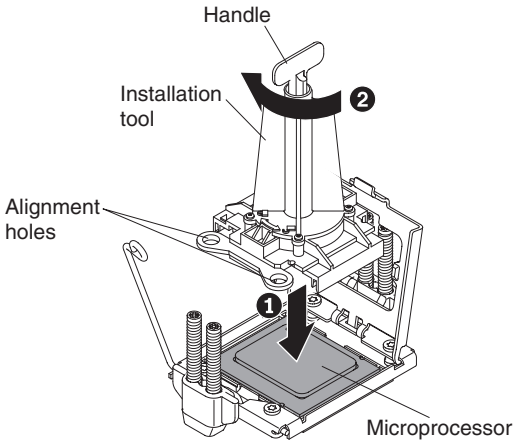


6. Lift the heat sink **2** out of the server. If the heat sink sticks to the microprocessor, slightly twist the heat sink back and forth to break the seal. After removal, place the heat sink on its side on a clean, flat surface.
7. Open the microprocessor release latch **1** by pressing down on the end, moving it to the side, and releasing it in the open (up) position. Swing open the microprocessor load plate **2**.

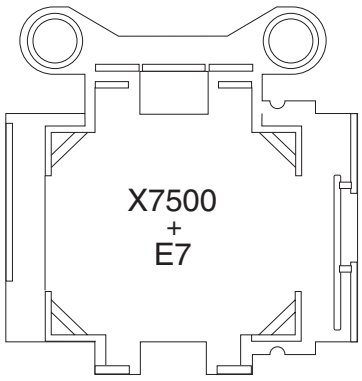


8. Place the microprocessor installation tool (which comes with the new microprocessor) down over the microprocessor **1**, aligning the holes on the tool with the screws on the microprocessor bracket. Twist the handle clockwise **2** to lock the microprocessor in the tool.

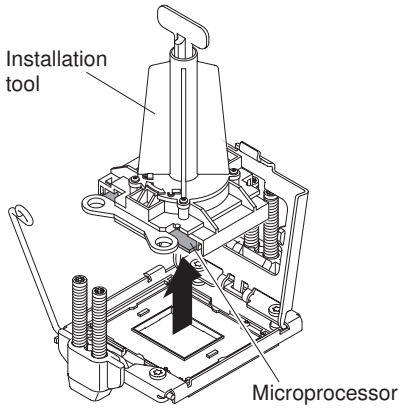
   Note: The microprocessor installation tool is recessed to prevent damage to the microprocessor grease.



Note: If you are removing E7 series microprocessors, you must use the microprocessor installation tool with the text "X7500 + E7" on the bottom of the tool (see the following illustration). Tools that do not have this text on the bottom will not work correctly with the E7 series microprocessors.



9. Carefully lift the microprocessor straight up and out of the socket, and then turn the tool upside down so that the microprocessor is facing up. Twist the tool handle counterclockwise to unlock the microprocessor, and then lift the microprocessor out of the tool.



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

Installing a microprocessor and heat sink:

For important information about the type of microprocessors that the server supports, microprocessor population order and how it affects server performance and operation, and other information that you must consider when you install a microprocessor, see the *Installation and User's Guide* on the IBM *Documentation* CD.

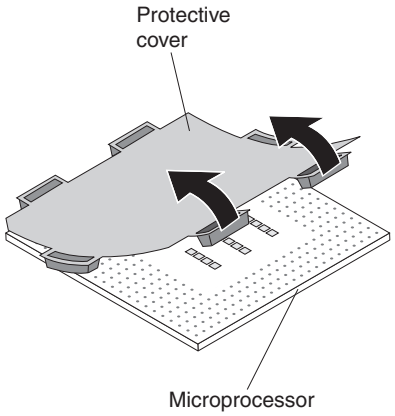
Read the documentation that comes with the microprocessor to determine whether you must update the UEFI firmware. To download the most current level of server firmware, go to http://www.ibm.com/supportportal/.

Important:

- A startup (boot) microprocessor must always be installed in microprocessor socket 1 on the microprocessor board.
- To ensure correct server operation, be sure to use microprocessors that are compatible and install a memory card and an additional DIMM for microprocessor 2. Compatible microprocessors must have the same QuickPath Interconnect (QPI) link speed, integrated memory controller frequency, core frequency, power segment, cache size, and type.
- Do not mix Intel Xeon EX versions of the 6000 and 7000 Series microprocessors and the E7 Series microprocessors in the same server, it is not supported. In addition:
  - Intel Xeon versions of the 6000 and 7000 Series microprocessors are supported only on machine types 7145 and 7146.
  - Intel Xeon EX E7 Series microprocessors are supported only on machine types 7143 and 7191.
- Microprocessors with different stepping levels are supported in this server. If you install microprocessors with different stepping levels, it does not matter which microprocessor is installed in microprocessor socket 1 or socket 2.
- If you are installing a microprocessor that has been removed, make sure that it is paired with its original heat sink or a new replacement heat sink. Do not reuse a heat sink from another microprocessor; the thermal grease distribution might be different and might affect conductivity.
- If you are installing a new heat sink, remove the protective backing from the thermal material that is on the underside of the new heat sink.
- If you are installing a new heat-sink assembly that did not come with thermal grease, see "Thermal grease" on page 310 for instructions for applying thermal grease; then, continue with step "Installing a microprocessor and heat sink" on page 305 of this procedure.
- If you are installing a heat sink that has contaminated thermal grease, see "Thermal grease" on page 310 for instructions for replacing the thermal grease; then, continue with step "Installing a microprocessor and heat sink" on page 305 of the following procedure.

To install a new or replacement microprocessor, complete the following steps:

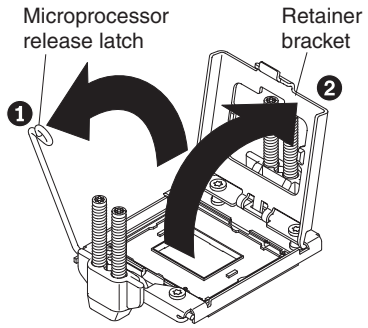
1. The microprocessor is shipped in a static-protective package and foam. Remove the static-protective package and foam from the shipping carton and remove the foam from around the static-protective package.
2. Touch the static-protective package that contains the microprocessor to any unpainted metal surface on the server. Then, remove the microprocessor from the package.
3. If there is a plastic protective cover on the bottom of the microprocessor, carefully remove it.



4. Place the microprocessor, with the contacts facing down, on the foam pad in the shipping carton.
5. Open the microprocessor release latch **1** by pressing down on the end, moving it to the side, and releasing it to the open (up) position. Swing open the microprocessor retainer bracket **2** .

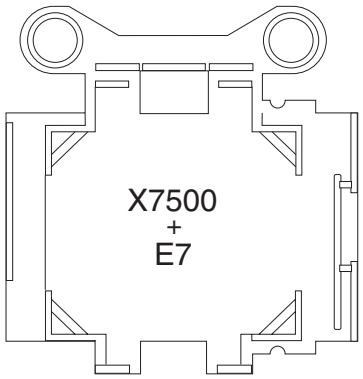
   Attention:

   - Handle the microprocessor carefully. Dropping the microprocessor during installation or removal can damage the contacts.
   - Do not touch the microprocessor contact; handle the microprocessor with the tool only. Contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.
   - Do not use excessive force when you press the microprocessor into the socket.
   - Make sure that the microprocessor is oriented and aligned and positioned in the socket before you try to close the lever.



6. Install the replacement microprocessor into the microprocessor installation tool:
   a. Touch the static-protective package that contains the new microprocessor to any unpainted metal surface on the outside of the server.
   b. Twist the handle of the installation tool counterclockwise so that it is in the open position.

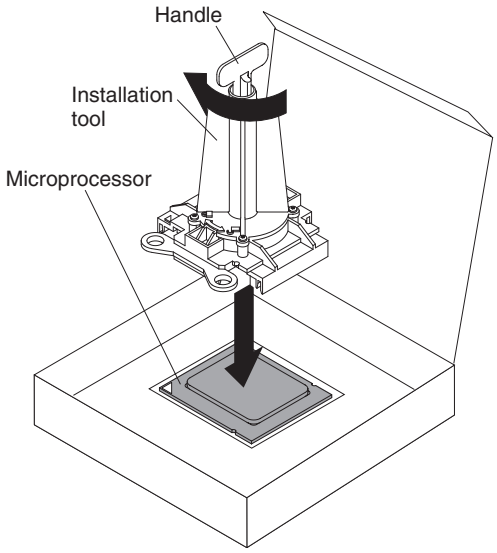
      Note: If you are installing E7 series microprocessors in your server, you must use the microprocessor installation tool with the text "X7500 + E7" on the bottom of the tool (see the following illustration). Tools that do not have this text on the bottom will not work correctly with the E7 series microprocessors



c. Using the triangle on the microprocessor to align it with the installation tool, place the microprocessor on the underside of the tool.

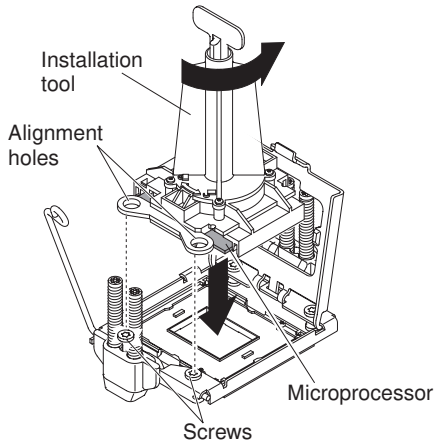
d. Twist the handle of the installation tool clockwise to secure the microprocessor in the tool.

Note: You can pick up or release the microprocessor by twisting the microprocessor installation tool handle clockwise.



7. Carefully position the microprocessor with the microprocessor tool over the microprocessor socket. Twist the microprocessor installation tool counterclockwise to insert the microprocessor into the socket.

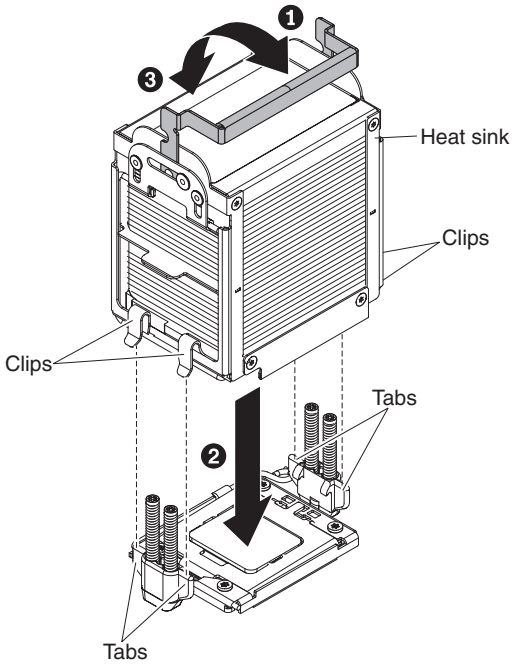
Note: The microprocessor fits only one way in the socket.



8. Close the load plate and then rotate the microprocessor-release latch to secure the microprocessor.
9. Remove the heat sink from its package.
10. Install the heat sink.

    Attention: Do not touch the thermal grease on the bottom of the heat sink or set down the heat sink after you remove the plastic cover. Touching the thermal grease will contaminate it.

    a. Make sure that the heat-sink release lever **1** is in the fully open position.
    b. Remove the plastic protective cover from the bottom of the heat sink.



    c. Position the heat sink above the microprocessor with the thermal grease side down, and align the clips of the heat sink with the tabs next to the microprocessor socket.
    d. Press down firmly on the heat sink **2** until it is seated securely.
    e. Rotate the heat-sink release lever **3** to the closed and locked position.
11. Replace the top cover bracket (see "Replacing the top-cover bracket" on page 260).

12. Install the top cover (see “Replacing the top cover” on page 259).
13. Slide the server into the rack.
14. Reconnect the external cables; then, reconnect the power cords and turn on the peripheral devices and the server.

Thermal grease:

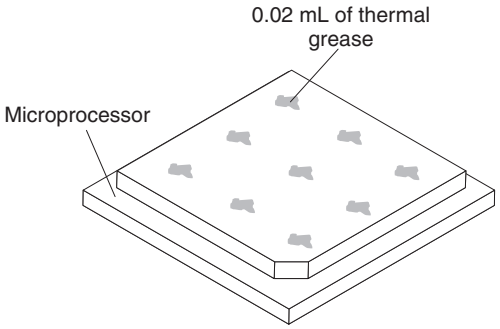
The thermal grease must be replaced whenever debris is found in the grease.

Important: The only thermal grease that is approved for use in System x servers is Shin Etsu X23-7783D, which can be obtained from http://www.crazypc.com/products/x23-778d-50119.html.

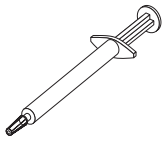
To replace damaged or contaminated thermal grease on the microprocessor and heat sink, complete the following steps:

1. Place the heat sink on a clean work surface.
2. Remove the alcohol wipe from its package and unfold it completely.
3. Use the alcohol wipe to clean 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 alcohol wipe to clean the thermal grease from the microprocessor; then, dispose of the alcohol wipe 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 5 mm of the edge.



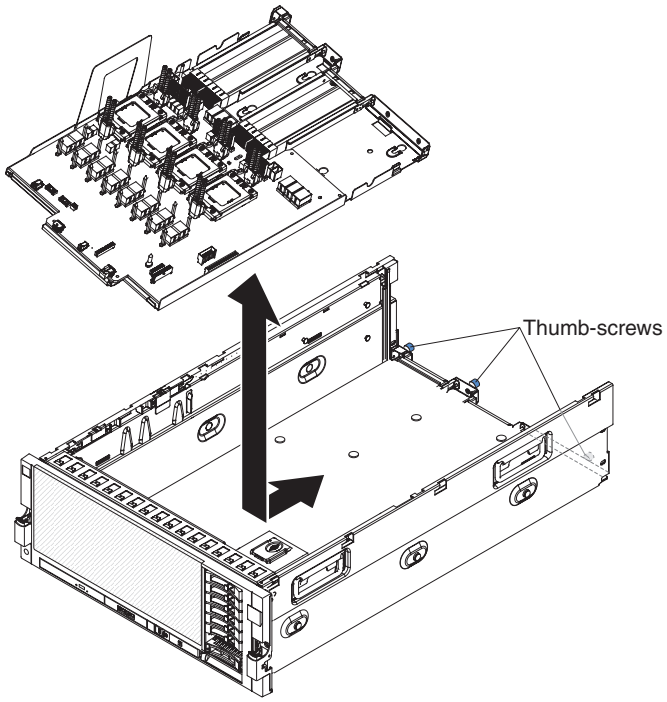
   Note: 0.01 mL is one tick mark on the syringe. If the grease is properly applied, approximately half of the grease will remain in the syringe.
6. Install the heat sink onto the microprocessor as described in “Installing a microprocessor and heat sink” on page 305.

Removing the microprocessor-board assembly

Important: This procedure is to be performed only by trained service technicians. Before you remove the microprocessor-board assembly from the server, take the following precautions to save data, firmware, and configuration data:

- Record all system configuration information, such as IMM IP addresses, vital product data, and the machine type, model number, and serial number of the server.
- Using the IBM Advanced Settings Utility (ASU), save the system configuration to external media.
- Save the system-event log to external media.
- Before you attach a memory expansion module to the server and try to use it, you must update the UEFI firmware with the latest level of firmware code. If you attach and try to use the memory expansion module without updating the UEFI firmware, you might get unexpected system behavior, or the server might not power on. For special instructions to follow before you attach the memory expansion module to the server, go to http://www.ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5085756.

To remove the microprocessor-board assembly, complete the following steps.

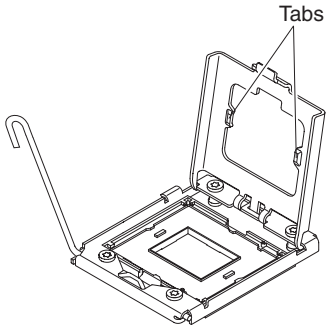


1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.
3. Remove the top cover (see "Removing and replacing consumable parts and Tier 1 CRUs" on page 259).
4. Remove the top-cover bracket (see "Removing the top-cover bracket" on page 260).
5. Remove the power supplies (see "Removing a hot-swap power supply" on page 271).
6. Remove the I/O-board shuttle from the microprocessor-board assembly (see "Removing the I/O-board shuttle" on page 287).
7. Remove the memory cards and memory-card fillers (see "Removing the I/O-board shuttle" on page 287).

8. Disconnect the signal cables from the ServeRAID adapter and remove the adapter from the server (see “Removing the RAID adapter carrier and the RAID adapter assembly” on page 290).
9. Remove the middle fan (see “Removing the middle hot-swap fan” on page 270).
10. Remove the memory-card cage (see “Removing the memory-card cage” on page 314).
11. Disconnect the following cables: front fan, scalability LED, operator information panel, hard disk drive backplane, and CD/DVD power.
12. If you have a single-node server without a memory expansion module attached, remove the QPI wrap cards or fillers (see “Removing a QPI wrap card” on page 274). If you have a two-node server or a server that is connected to a memory expansion module, disconnect the QPI cables from each end and set them aside in a safe place. Be sure to protect the ends of the QPI cables.
13. (Trained service technician only) Remove the microprocessors (see “Removing a microprocessor and heat sink” on page 302).
14. Loosen the thumbscrews on the rear of the server. If you have a two-node server, you might have four thumbscrews on the rear of the server. One thumbscrew is used to connect the two-node bracket.
15. Slide the assembly slightly toward the front of the server; then, using the microprocessor-board handle on the left side, lift the assembly out at an angle.
16. Remove the microprocessor socket covers from the new microprocessor-board assembly and set them aside.
17. Remove microprocessors from the sockets of the old microprocessor board and install them into the sockets on the new board using the microprocessor installation tool.

    Note:

    a. If you are removing E7 series microprocessors, you must use the microprocessor installation tool with the text “X7500 + E7” on the bottom of the tool (see the following illustration). Tools that do not have this text on the bottom will not work correctly with the E7 series microprocessors.
    b. Be sure to keep the heat sink and microprocessor from each microprocessor socket of the old microprocessor board together so that you can install them on the new microprocessor board together. For example, when you remove the heat sink and microprocessor from microprocessor socket 1 of the old microprocessor board , install them both on the same socket on the new microprocessor board.
    c. Use an alcohol wipe to remove any thermal grease from the tabs on the microprocessor load plate on the old microprocessor board.



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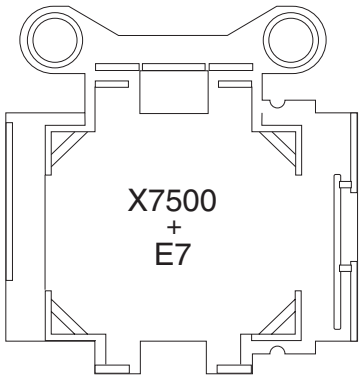


18. Install microprocessor socket covers on the empty microprocessor sockets on the old microprocessor board before you pack the board for shipping.
19. If you are instructed to return the microprocessor-board assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the microprocessor-board assembly

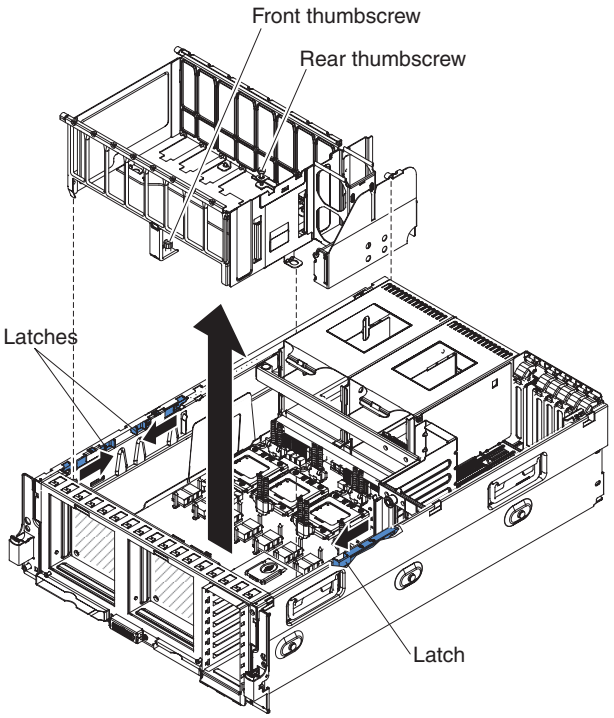
To install the replacement microprocessor-board assembly, complete the following steps:

1. Before you attach a memory expansion module to the server and try to use it, you must update the UEFI firmware with the latest level of firmware code. If you attach and try to use the memory expansion module without updating the UEFI firmware, you might get unexpected system behavior, or the server might not power on. For special instructions to follow before you attach the memory expansion module to the server, go to http://www.ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5085756.
2. Insert the microprocessor-board assembly in the server at an angle; then, slide the assembly toward the back of the server. Make sure that all the cables are clear of the assembly as you install it in the server.
3. Tighten the thumbscrews on the rear of the server. The second hole from the left side, rear view is for mounting the two-node lock bracket when you add a second two-node system attachment. If you have a two-node server, reinstall this lock bracket.
4. If you have a single-node server without a memory expansion module attached, install the QPI wrap cards or fillers. If you have a two-node server or if your server is connected to a memory expansion module, reconnect the QPI cables.
5. Connect the following cables: front fan, scalability LED, operator information panel, hard disk drive backplane, and CD/DVD power.
6. Route the front USB and DVD/CD signal cables behind the hard disk drive backplane and to the side of the ServeRAID adapter connector (see “Internal cable routing and connectors” on page 254).
7. (Trained service technician only) Reinstall the microprocessors (see “Installing a microprocessor and heat sink” on page 305).
8. Install the memory-card cage (see “Replacing the memory-card cage” on page 315). Make sure that all the cables are clear of the cage as you install it in the server.
9. Install the middle fan (see “Replacing the middle hot-swap fan” on page 270).

10. Connect the signal cables to the ServeRAID adapter and install the adapter in the server (see “Replacing the RAID adapter carrier and the RAID adapter assembly” on page 292).
11. Install the memory cards and memory-card fillers (see “Replacing a memory card” on page 282).
12. Install the I/O-board shuttle (see “Replacing the I/O-board shuttle” on page 288). Be sure to thread the USB and DVD/CD signal cables through the server and connect them to the I/O-board shuttle.
13. Install the top cover bracket (see “Replacing the top-cover bracket” on page 260).
14. Install the power supplies (see “Replacing the hot-swap power supply” on page 273).
15. Install the top cover (see “Replacing the top cover” on page 259).
16. Connect the cables and power cords (see “Connecting the cables” on page 257 for cabling instructions).
17. Turn on all attached devices and the server.
18. Using the Advanced Settings Utility (ASU), restore the system configuration, such as the IMM IP addresses, vital product data, and the machine type, model number, and serial number of the server.
19. Using the ASU, restore the system configuration to the new microprocessor board.

Removing the memory-card cage

To remove the memory-card cage, complete the following steps.



1. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.

3. Remove the top cover (see “Removing and replacing consumable parts and Tier 1 CRUs” on page 259).
4. Remove the top cover bracket (see “Removing the top-cover bracket” on page 260).
5. Remove the memory cards and memory card fillers (see “Removing a memory card” on page 281).
6. Remove the middle fan (see “Removing the middle hot-swap fan” on page 270).
7. Disconnect the SAS cables from the ServeRAID adapter.
8. Remove the ServeRAID adapter (see “Removing the RAID adapter carrier and the RAID adapter assembly” on page 290).
9. Slide the locking latches to the unlocked positions.
10. Loosen the two thumbscrews.
11. Pull the cage out of the server.
12. If you are instructed to return the memory-card shuttle, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the memory-card cage

To replace the memory-card cage, complete the following steps:

1. Move any cables out of the way and then set the replacement memory card cage into the server.
2. Tighten the two thumbscrews.
3. Slide the locking latches to the locked positions.
4. Install the memory cards and memory card fillers (see “Replacing a memory card” on page 282).
5. Install the middle fan (see “Replacing the middle hot-swap fan” on page 270).
6. Connect the SAS cables to the ServeRAID adapter.
7. Install the ServeRAID adapter (see “Replacing the RAID adapter carrier and the RAID adapter assembly” on page 292).
8. Reinstall the top cover bracket (see “Replacing the top-cover bracket” on page 260).
9. Reinstall the top cover (see “Replacing the top cover” on page 259).
10. Connect the power cords and external cables (see “Connecting the cables” on page 257 for cabling instructions).
11. Turn on all attached devices and the server.

Removing and replacing the memory expansion module components

The following sections provide information about removing and replacing components in the optional IBM MAX5 for System x memory expansion module.

Removing and replacing memory expansion module Tier 1 CRUs

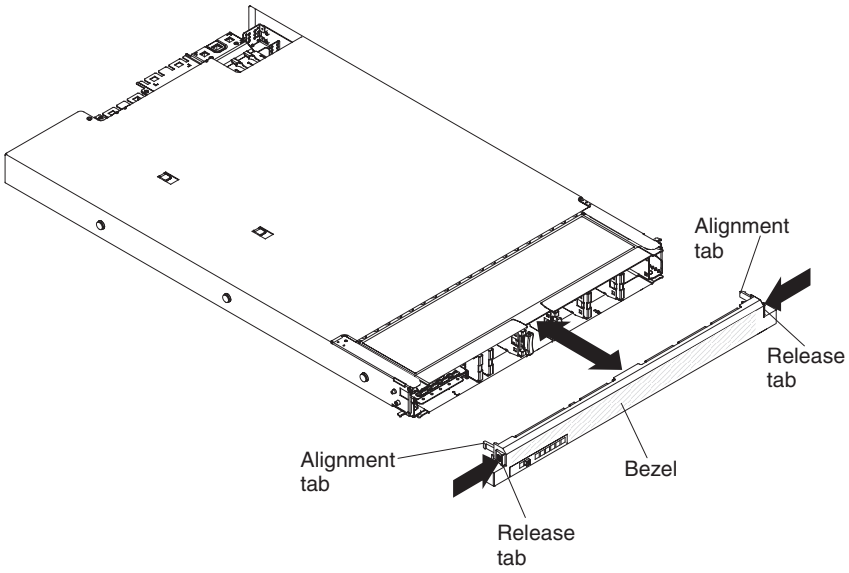
Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

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

Removing the memory expansion module bezel

To remove the memory expansion module bezel, complete the following steps:

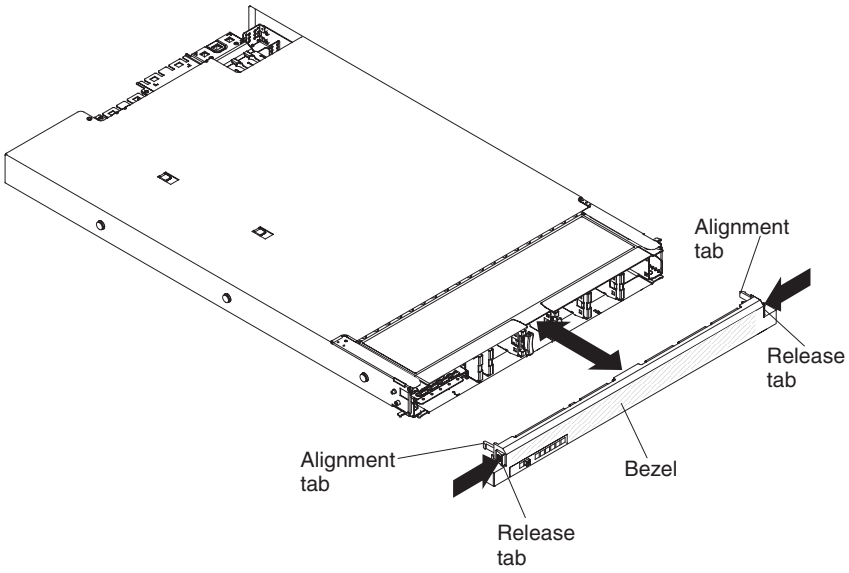
1. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
2. Press in on the release tabs on both ends of the bezel and pull it off of the chassis.



Replacing the memory expansion module bezel

To replace the memory expansion module bezel, complete the following steps:

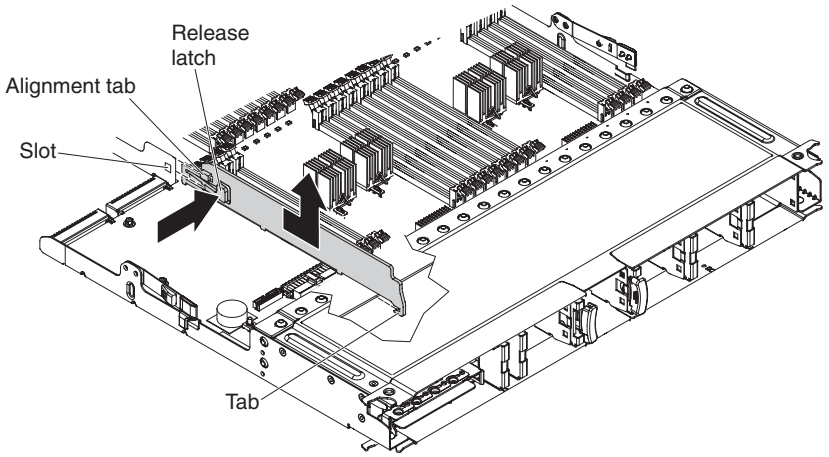
1. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
2. Align the bezel alignment tabs with the chassis and press the bezel onto the chassis until it snaps into place.



Removing the memory expansion module air baffle

To remove the air baffle in the memory expansion module, complete the following steps:

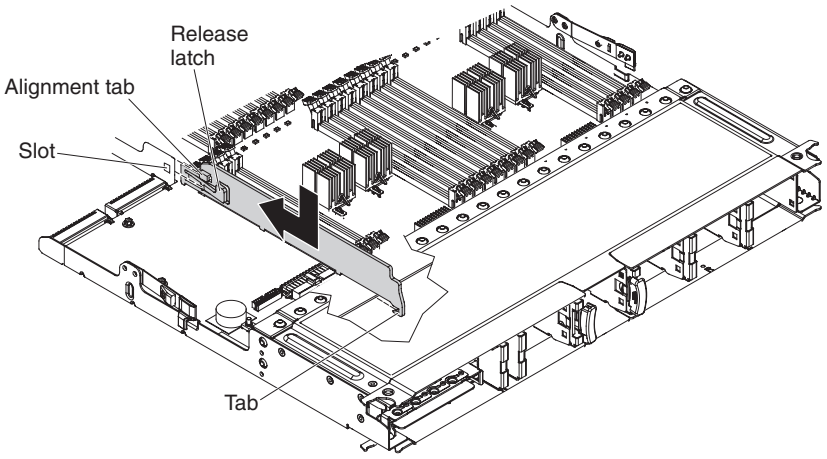
1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Turn off the host server (see "Turning off the server" on page 17) and all attached peripheral devices. Disconnect all power cords from the memory expansion module; then, disconnect all external cables from the memory expansion module as necessary to replace the device.
3. Remove the bezel (see "Removing the memory expansion module bezel" on page 316).
4. Remove the system-board tray (see "Removing the memory expansion module system-board tray assembly" on page 332).
5. Press the air baffle release tab in and lift the air baffle out of the slot on the system-board tray wall (near the rear of DIMM 1) to release it; then, push the air baffle forward sightly to unhook it from the system board and set it aside.



Replacing the memory expansion module air baffle

To replace the memory expansion module air baffle, complete the following steps:

1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Align the air baffle next to DIMM 1 and hook the hinge on the air baffle underneath the system board; then, insert the tab on the other end of the air baffle into the tab slot on the system-board wall until it is firmly in place.

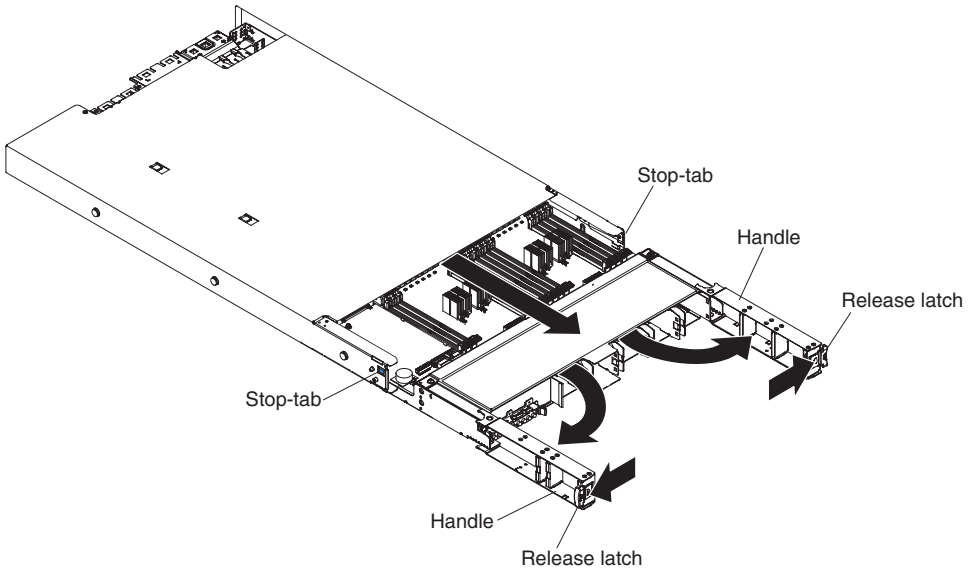


3. Replace the system-board tray (see "Removing the memory expansion module system-board tray assembly" on page 332).
4. Reinstall the bezel (see "Replacing the memory expansion module bezel" on page 316).

Removing the memory expansion module information panel assembly

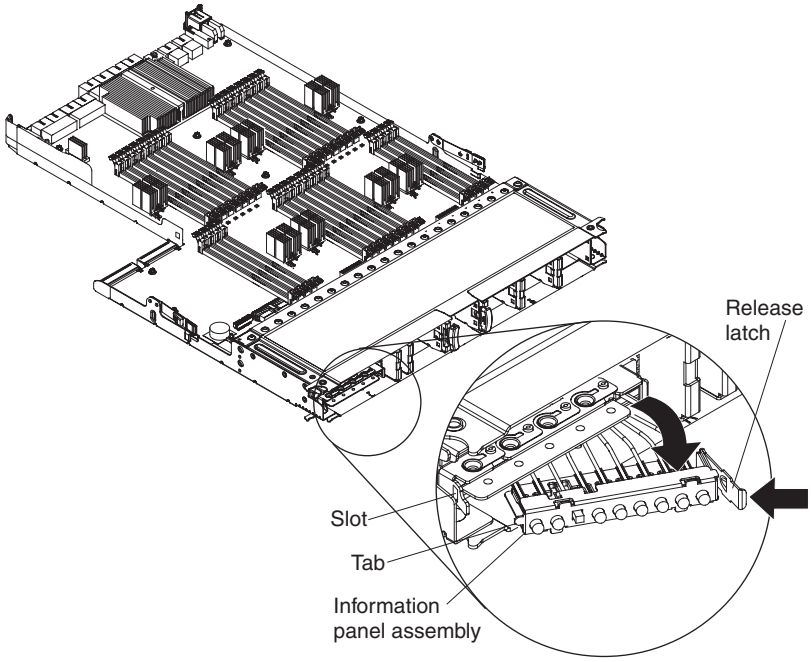
To remove the information panel assembly, complete the following steps:

1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Turn off the host server (see "Turning off the server" on page 17) and all attached peripheral devices. Disconnect all power cords from the memory expansion module; then, disconnect all external cables from the memory expansion module as necessary to replace the device.
3. Remove the bezel (see "Removing the memory expansion module bezel" on page 316).
4. Grasp the blue release latches on the system-board tray handles and pull the latches in opposite directions; then, rotate the handles to the open position.



5. Grasp the handles and pull the system-board tray out until it stops.

6. Disconnect the information panel assembly cable from the connector on the system board tray.
7. Press the information panel release tab to the left and hold it while you pull the right side of the information panel assembly out of the slot on the system-board tray.

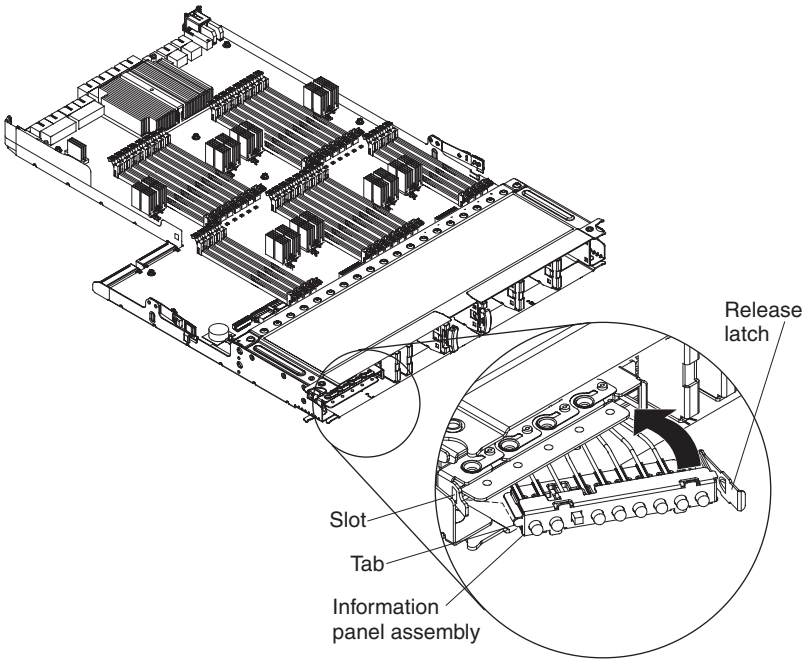


8. Grasp the left side of the information panel assembly and pull the tab out of the hole on the system-board tray and remove the assembly from the tray.
9. If you are instructed to return the information panel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

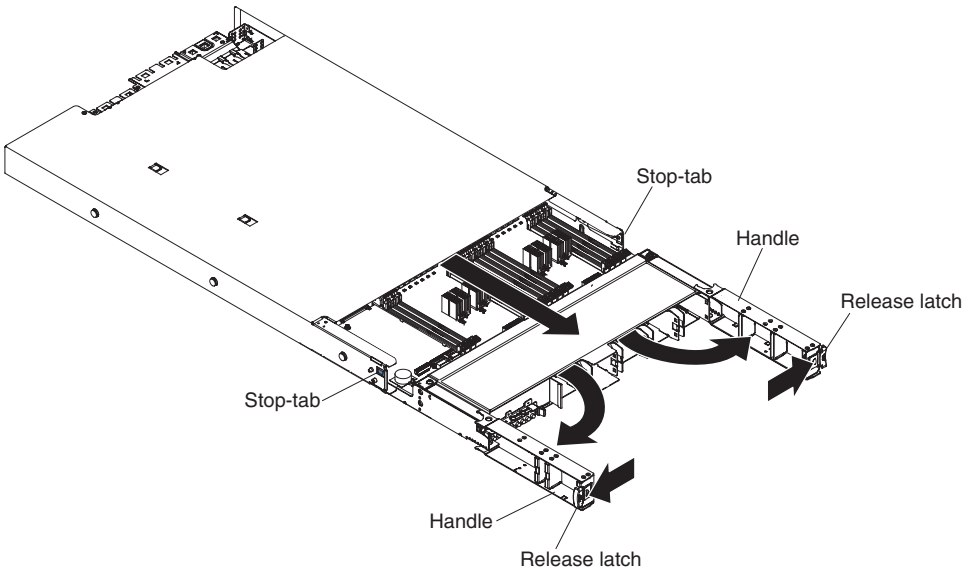
Replacing the memory expansion module information panel assembly

To replace the memory expansion module information panel assembly, complete the following steps:

1. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
2. From the front of the memory expansion module system-board tray, insert the cable end of the information panel assembly through the information panel slot.
3. Insert the tab on the left side of the information panel assembly into the hole on the system-board tray and hold the information panel assembly release latch while you rotate the right side of the assembly toward the system-board tray.



4. Push the information panel assembly release latch in firmly to snap the release latch into place and secure the information panel assembly.
5. Connect the information panel assembly cable to the connector on the system board.
6. Slide the system-board tray forward until the tabs at the bottom of the handles touch the chassis; then, close the release latches firmly (they will snap into the locked position).

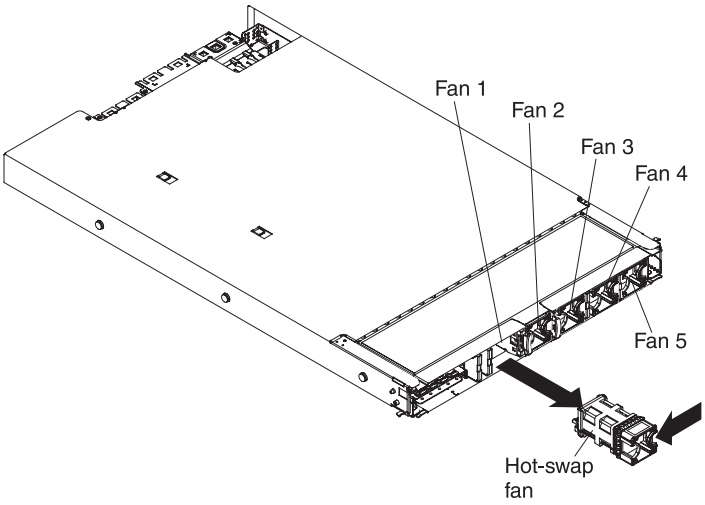


7. Reinstall the bezel (see “Replacing the memory expansion module bezel” on page 316).
8. Reconnect the power cords to the memory expansion module; then, connect all external cables to the memory expansion module.
9. Turn on the peripheral devices and the host server.

Removing a memory expansion module hot-swap fan

To remove a hot-swap fan from the memory expansion module, complete the following steps:

1. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
2. Remove the bezel (see “Removing the memory expansion module bezel” on page 316).
3. Squeeze both fan latches on the fan toward each other and slide the fan out of the slot.

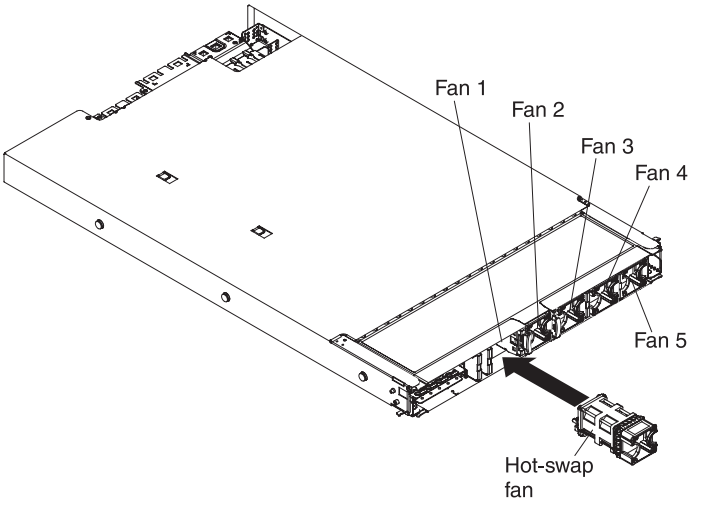


4. If you are instructed to return the fan, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing a memory expansion module hot-swap fan

To replace a hot-swap fan in the memory expansion module, complete the following steps:

1. Align the new fan with the slot in the fan cage.
2. Slide the fan into the fan slot until it snaps into the connector firmly.

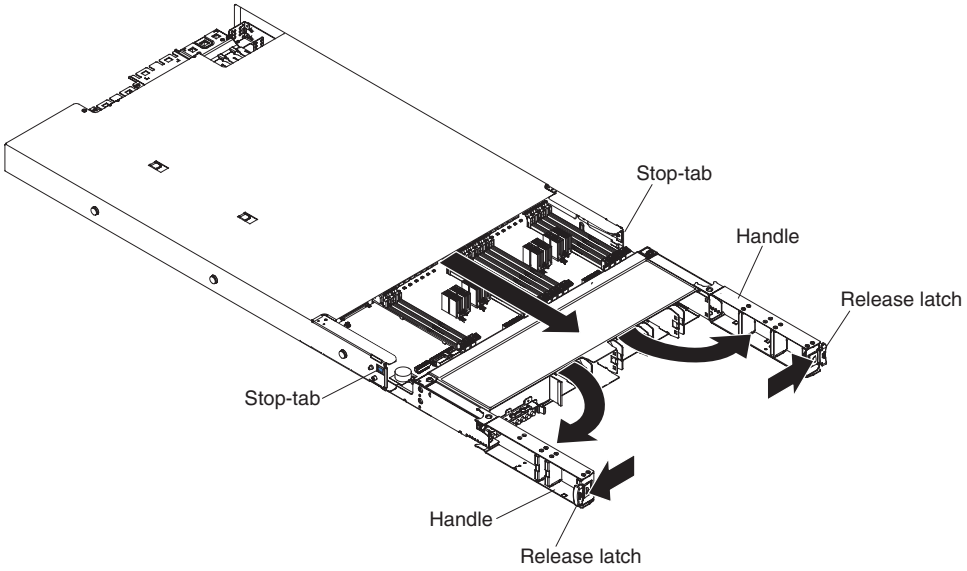


3. Reinstall the bezel (see “Replacing the memory expansion module bezel” on page 316).

Removing a memory expansion module DIMM

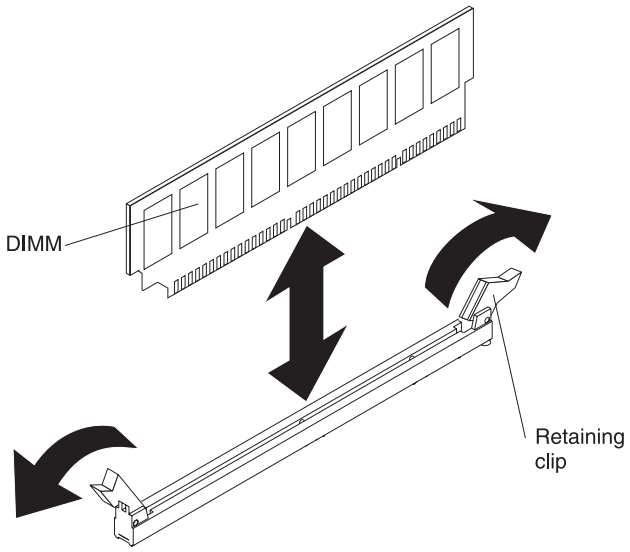
To remove a DIMM from the memory expansion module, complete the following steps:

1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Turn off the host server (see "Turning off the server" on page 17) and all attached peripheral devices. Disconnect all power cords from the memory expansion module; then, disconnect all external cables from the memory expansion module as necessary to replace the device.
3. Remove the bezel (see "Removing the memory expansion module bezel" on page 316).
4. Grasp the blue release tabs on the system-board tray latches and pull the latches in opposite directions to release the tray from the chassis.



5. Pull the system-board tray out until it stops; then, press the blue tabs on both sides of the system-board tray and pull the tray out of the chassis.
6. Carefully open both retaining clips on each end of the DIMM connector and remove the DIMM from the connector.

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



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

Replacing a memory expansion module DIMM

The following notes describe the types of DIMMs that the memory expansion module supports and other information that you must consider when you install DIMMs:

- The memory expansion module supports a maximum of 32 DIMMs (single-rank, dual-rank, or quad-rank).

  Note: To determine the type of a DIMM, see the label on the DIMM. The information on the label is in the format xxxxx nRxxx PC3-xxxxx-xx-xx-xxx. The numeral in the sixth numerical position indicates whether the DIMM is single-rank (n=1) or dual-rank (n=2).
- The DIMM options that are available for the memory expansion module are 2 GB, 4 GB, 8 GB, 16 GB, and 32 GB.
- If you install 32 GB DIMMs in the memory expansion module, all of the DIMMs must be 32 GB capacity DIMMs. You cannot mix 32 GB DIMMs with other capacity DIMMs in the system.
- The memory expansion module supports a minimum of 4 GB and a maximum of 1 TB of system memory.
- The memory expansion module supports 1.35-volt (low-voltage) and 1.5-volt DIMMs. In addition:
  - The memory expansion module supports low-voltage (1.35-volt) DIMMs at capacities of 4 GB, 8 GB, and 16 GB only.
  - When you mix 1.35-volt and 1.5-volt DIMMs in the memory expansion module, it will operate at the 1.5-volt rate.
  - You can enable all the DIMMs (1.35-volt and 1.5-volt) to operate at 1.5-volt in the Setup utility through the host server.
- Double-device data correction support is only available when 16 GB x4 DRAM technology DIMMs are installed in the memory expansion module and the memory expansion module is connected to a host server.
- The memory expansion module supports memory sparing through the host server. Memory sparing reserves memory capacity for failover in the event of a

DIMM failure, and the reserved capacity is subtracted from the total available memory. When the memory sparing threshold of correctable errors is reached, the contents of the failing DIMM are copied to the spare memory, and the failing DIMM or rank is disabled. To enable memory sparing through the Setup utility, select **System Settings > Memory**.

- When you populate DIMMs in the memory expansion module, populate the larger capacity DIMMs first, then the smaller capacity DIMMs. See "Replacing a memory expansion module DIMM" on page 323 for non-mirroring mode DIMM population sequence and "Removing a memory expansion module DIMM" on page 322 for memory-mirroring mode DIMM population sequence.
- The memory expansion module provides eight memory ports (memory channels), and each memory port supports up to four DIMMs. Do not mix DIMMs with x4 technology (DIMMs with DRAMs that are organized with 4 data lanes) and x8 technology (DIMMs with DRAMs that are organized with 8 data lanes) in the same memory port. The following table shows the DIMM connectors on the eight memory ports.

Table 24. DIMM connectors on each memory port

Memory ports	DIMM connectors
1	1, 2, 7, and 8
2	3, 4, 5, and 6
3	9, 10, 15, and 16
4	11, 12, 13, and 14
5	17, 18, 23, and 24
6	19, 20, 21, and 22
7	25, 26, 31, and 32
8	27, 28, 29, and 30
Note: 2 GB, 4 GB, and 8 GB DIMMs are x4 technology DIMMs. 16 GB and 32 GB DIMMs are x8 technology DIMMs.	

- Do not mix DIMMs with 1 Gb (gigabit) DRAM technology, 2 Gb DRAM technology, or other gigabit DRAM technologies in banks of eight DIMMs on memory ports that are on the same memory controller. This is not supported in the memory expansion module. The following table lists the DIMM connectors for each bank of eight DIMMs that are on the memory ports within the same memory controller.

Table 25. DIMM connectors on memory ports with the same memory controller

Bank of DIMMs	DIMM connectors
1st bank of DIMMs	1, 2, 3, 4, 5, 6, 7, and 8
2nd bank of DIMMs	9, 10, 11, 12, 13, 14, 15, and 16
3rd bank of DIMMs	17, 18, 19, 20, 21, 22, 23, and 24
4th bank of DIMMs	25, 26, 27, 28, 29, 30, 31, and 32

- DIMMs must be installed in pairs for non-mirroring mode and in sets of four for memory-mirroring.
- A minimum of two DIMMs must be installed in the memory expansion module for each microprocessor in the host server.
- The maximum operating speed of the memory expansion module is determined by the slowest DIMM installed in the memory expansion module.

- The memory expansion module does not come with any DIMMs installed when you purchase it as a option. When you install DIMMs, install them in the order shown in the following tables to optimize system performance.
- The server supports non-mirroring mode and memory-mirroring mode.
  - **Non-mirroring mode**. When you use the non-mirroring mode, install DIMMs as indicated in the following table.

Table 26. Non-mirroring mode DIMM population sequence for the memory expansion module

Pairs of DIMMs	DIMM connector population sequence
Pair 1	28, 29
Pair 2	9, 16
Pair 3	1, 8
Pair 4	20, 21
Pair 5	26, 31
Pair 6	11, 14
Pair 7	3, 6
Pair 8	18, 23
Pair 9	27, 30
Pair 10	10, 15
Pair 11	2, 7
Pair 12	19, 22
Pair 13	25, 32
Pair 14	12, 13
Pair 15	4, 5
Pair 16	17, 24

Note: When you populate DIMMs in the memory expansion module, populate the larger capacity DIMMs first, then the smaller capacity DIMMs.

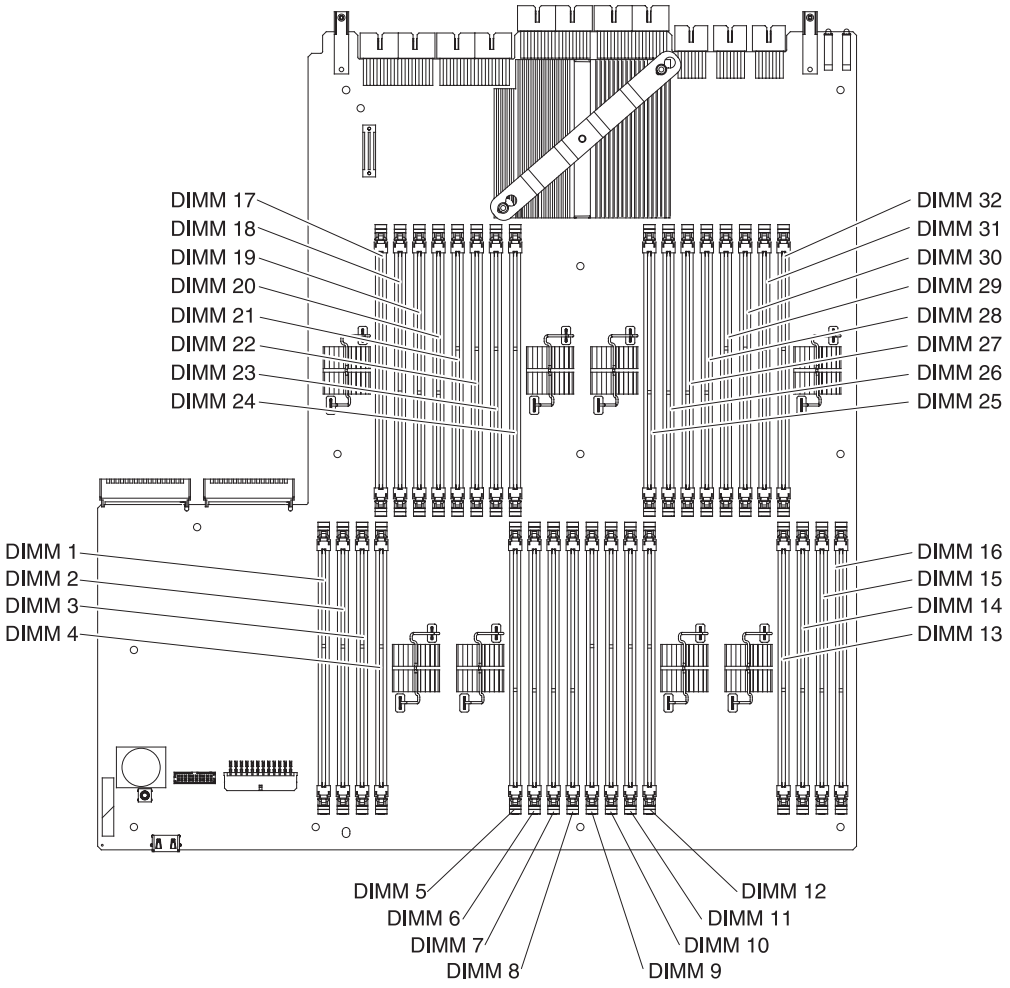
  - **Memory-mirroring mode**. When you use the mirroring mode feature, consider the following information:
    - Memory-mirroring mode replicates and stores data on sets of four DIMMs simultaneously. If a failure occurs, the memory controller switches from the primary set of memory DIMMs to the backup set of DIMMs. To enable memory mirroring through the Setup utility, select **System Settings → Memory**. For more information, see "Configuring the server" on page 337.
    - DIMMs must be installed in sets of four. The DIMMs in each set must be the same size and type. This is applicable also when the memory expansion module is attached to a host server and the host server has an optional memory tray installed in the server. You must install DIMMs in sets of four DIMMs for memory-mirroring mode in each (server, memory tray, and the memory expansion module).
    - The maximum available memory is reduced to half of the installed memory when memory mirroring is enabled. For example, if the memory expansion module has 64 GB of memory installed, only 32 GB of addressable memory is available when you use memory mirroring.
    - The following table lists the DIMM installation sequence for memory-mirroring mode.

Table 27. Memory-mirroring mode DIMM population sequence for the memory expansion module

Sets of 4 DIMMs	DIMM connector population sequence
Set 1	9, 16, 28, 29
Set 2	1, 8, 20, 21
Set 3	11, 14, 26, 31
Set 4	3, 6, 18, 23
Set 5	10, 15, 27, 30
Set 6	2, 7, 19, 22
Set 7	12, 13, 25, 32
Set 8	4, 5, 17, 24

Note: When you populate DIMMs in the memory expansion module, populate the larger capacity DIMMs first, then the smaller capacity DIMMs.

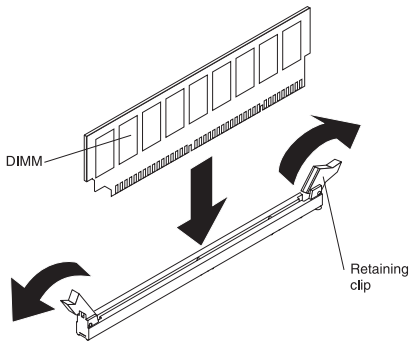
The following illustration shows the locations of the DIMM connectors on the memory expansion module system-board tray.



To install a memory module in the memory expansion module, complete the following steps.

Note: The memory expansion module might come with DIMM fillers on DIMM connectors that are not populated. Remove them before you install DIMMs in those connectors.

1. Touch the static-protective package that contains the new DIMM to any unpainted metal surface on the outside of the memory expansion module; then, remove the DIMM from the package.
2. Turn the DIMM so that the DIMM keys align correctly with the connector.
3. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector.



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

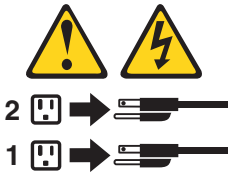
   Note: If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.
5. Grasp the system-board tray on both sides (near the stop-tabs) and align the system-board tray with the chassis.
6. Slide the system-board tray forward until the tabs at the bottom of the handles touch the chassis; then, close the handles and press firmly on the release latches to snap them into the locked position.
7. Reinstall the bezel (see “Replacing the memory expansion module bezel” on page 316).
8. Reconnect the power cords to the memory expansion module; then, connect all external cables to the memory expansion module.
9. Turn on the peripheral devices and the host server.

Removing a memory expansion module hot-swap power supply

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

Statement 5

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



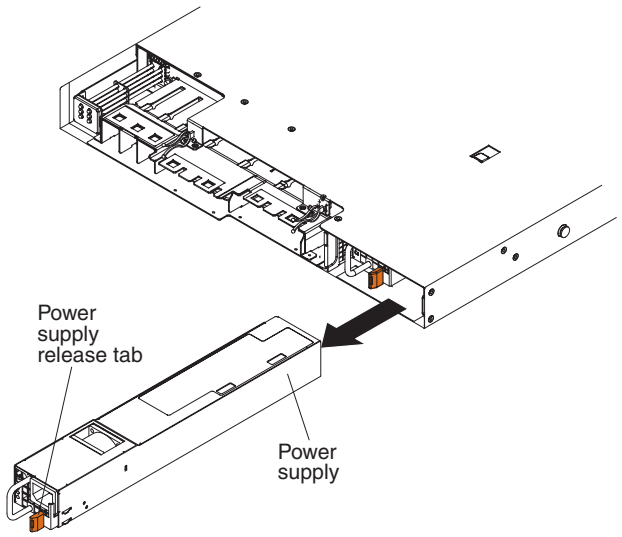
Statement 8

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

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

To remove a hot-swap power supply from the memory expansion module, complete the following steps:

1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. If only one power supply is installed, turn off the host server and peripheral devices and disconnect the memory expansion module power cords.
3. If the memory expansion module is in a rack, at the back of the memory expansion module, pull back the cable management arm to gain access to the rear of the memory expansion module and the power supply.
4. Press and hold the orange release tab to the left. Grasp the handle and pull the power supply out of the memory expansion module.



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

Replacing a memory expansion module hot-swap power supply

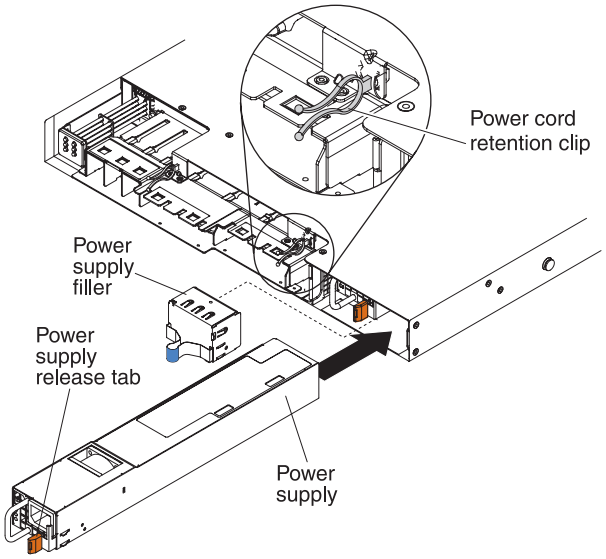
The following notes describe the type of power supply that the memory expansion module supports and other information that you must consider when you install a power supply:

- The server comes with one 675-watt hot-swap 12-volt output power supply. The input voltage is 110 V ac or 220 V ac auto-sensing.

  Note: You cannot mix 110 V ac and 220 V ac power supplies in the memory expansion module; it is not supported.
- These power supplies are designed for parallel operation. In the event of a power-supply failure, the redundant power supply continues to power the server. The memory expansion module supports a maximum of two power supplies, which is the requirement for redundancy support.

To install a hot-swap power supply in the memory expansion module, complete the following steps:

1. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
2. Touch the static-protective package that contains the hot-swap power supply to any unpainted metal surface on the memory expansion module; then, remove the power supply from the package and place it on a static-protective surface.
3. If you are installing a hot-swap power supply into an empty bay, remove the power-supply filler panel from the power-supply bay.



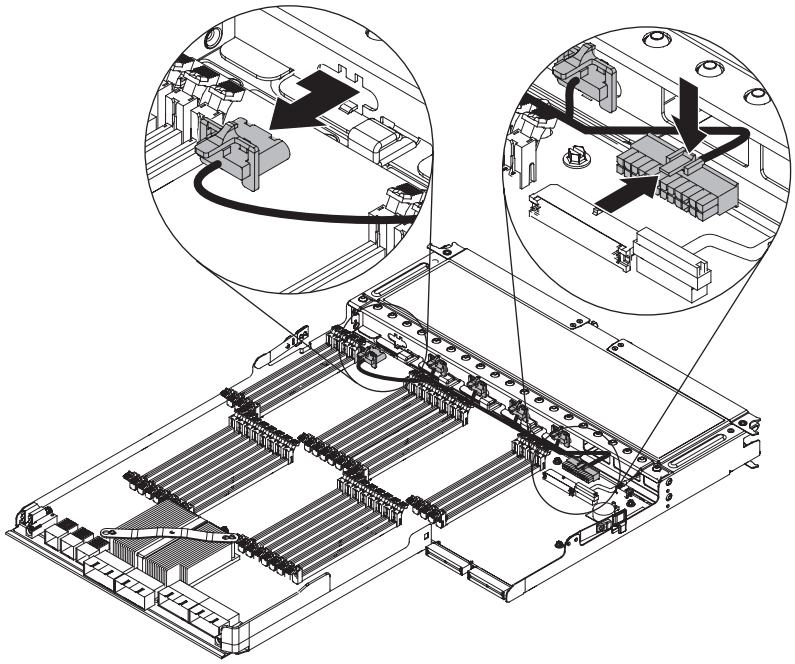
4. Grasp the handle on the rear of the power supply and slide the power supply forward into the power-supply bay until it clicks. Make sure that the power supply connects firmly into the power-supply connector.
5. Route the power cord through the cable retention clip on the rear of the server so that it does not accidentally become disconnected.
6. Connect the power cord to the power-cord connector on the new power supply.
7. Connect the other end of the power cord to a properly grounded electrical outlet.
8. Make sure that the ac power LED and the dc power LED on the power supply are lit, indicating that the power supply is operating correctly. The two green LEDs are to the right of the power-cord connector.

Removing the memory expansion module five-drop fan cable assembly

To remove the five-drop fan cable assembly, complete the following steps:

1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Turn off the host server (see "Turning off the server" on page 17) and all attached peripheral devices. Disconnect all power cords from the memory expansion module; then, disconnect all external cables from the memory expansion module as necessary to replace the device.
3. Remove the bezel (see "Removing the memory expansion module bezel" on page 316).
4. Remove the system-board tray (see "Removing the memory expansion module system-board tray assembly" on page 332).
5. Remove the fans (see "Removing a memory expansion module hot-swap fan" on page 321).
6. From the inside of the system-board tray, remove the fan cable connectors from the system-board tray, starting with the connector that is farthest from the operator information panel.
7. Disconnect the five-drop fan cable from the system-board.
8. Grasp the tab on the cable connector on the rear of the fan and push the connector to the right to release the fan connector from the system-board tray; then, remove the cable for that fan from the clamp. Repeat this for each fan

connector until you have removed all five fan connectors from the fan connectors in the fan cage.

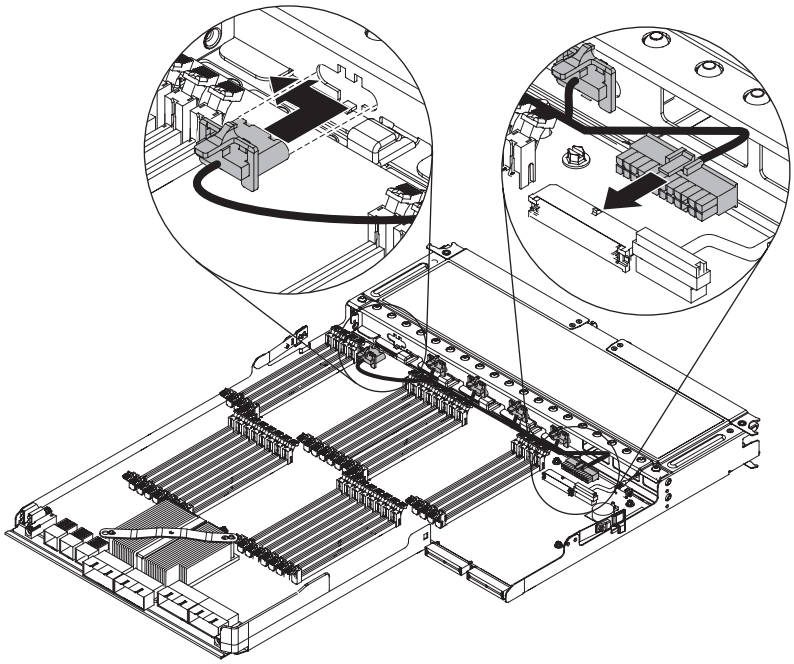


9. Lift the five-drop fan cable from the system-board tray.
10. If you are instructed to return the fan cable, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the memory expansion module five-drop fan cable assembly

To install the five-drop fan cable assembly, complete the following steps:

1. Read the safety information that begins with "Safety" on page v and "Installation guidelines" on page 251.
2. Connect the five-drop fan cable connectors to the rear of the fans, starting with the fan that is farthest from the operator information panel.
3. Insert the fan cable connector into the connector on the system-board tray and push it to the left to lock it in place; then route that fan cable through the cable clamp next to that fan. Repeat this for each fan connector until you have connected all five fan connectors to the fan connectors in the fan cage and the cable is routed through the clamps.



4. Connect the five-drop fan cable to the connector on the system board.
5. Replace the fans (see "Replacing a memory expansion module hot-swap fan" on page 321
6. Replace the system-board tray (see "Removing the memory expansion module system-board tray assembly").
7. Replace the bezel (see "Replacing the memory expansion module bezel" on page 316).
8. Reconnect the power cords to the memory expansion module; then, connect all external cables to the memory expansion module.
9. Turn on the peripheral devices and the host server.

Removing and replacing memory expansion module 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 memory expansion module.

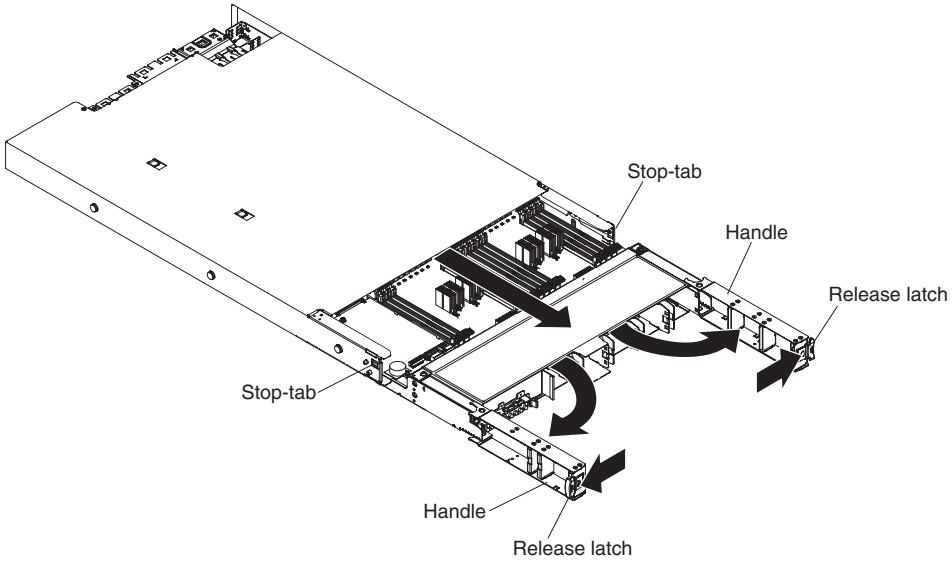
Removing the memory expansion module system-board tray assembly

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

Note: When you replace the system-board tray, make sure that the host UEFI firmware is at the latest level.

1. Before you attach a memory expansion module to the server and try to use it, you must update the UEFI firmware with the latest level of firmware code. If you attach and try to use the memory expansion module without updating the UEFI firmware, you might get unexpected system behavior, or the server might not power on. For special instructions to follow before you attach the memory expansion module to the server, go to http://www.ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5085756.

2. Read the safety information that begins with “Safety” on page v and “Installation guidelines” on page 251.
3. Turn off the host server (see “Turning off the server” on page 17) and all attached peripheral devices. Disconnect all power cords; then, disconnect all external cables from the server. Disconnect all power cords from the memory expansion module; then, disconnect all external cables from the memory expansion module. (Do not bend or nick the scalability cables while working with the cables.)
4. Remove the bezel (see “Removing the memory expansion module bezel” on page 316).
5. Grasp the blue release latches on the system-board tray handles and press the release latches in opposite directions and rotate the handles to the fully open position.



6. Grasp the handles and pull the system-board tray out until it stops; then, press inward on the stop-tabs on both sides of the system-board tray and pull the tray out of the chassis.
7. Remove the air baffle (see “Replacing the memory expansion module air baffle” on page 317).
8. Remove the DIMMs (see “Removing a memory expansion module DIMM” on page 322).
9. Remove all hot-swap fans (see “Removing a memory expansion module hot-swap fan” on page 321).
10. 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.

Replacing the memory expansion module system-board tray assembly

Note:

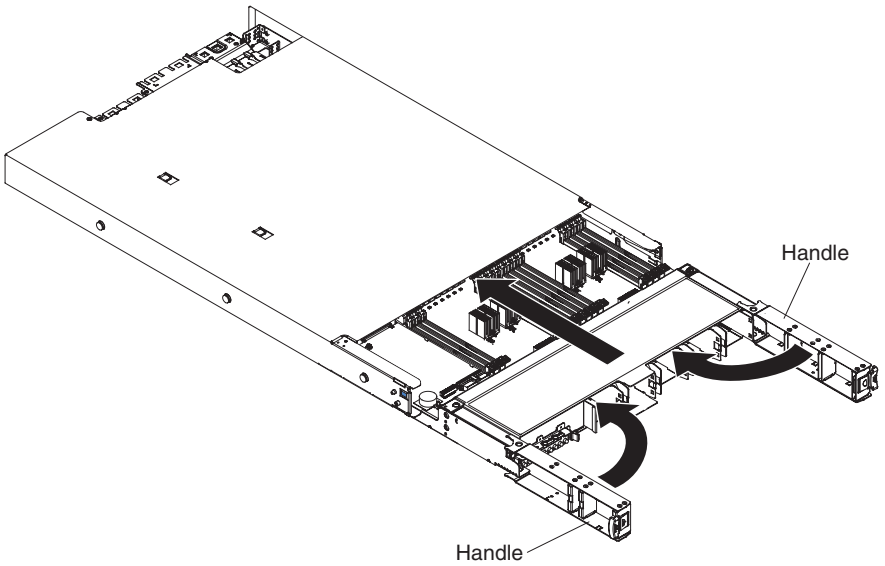
1. When you replace the system-board tray in the memory expansion module, be sure to order the correct system-board tray for your model. A label comes on models of the memory expansion module that contain the Intel 7510 scalable memory buffer. The label is located on top of the system-board tray. A note on the label states "This MAX5 contains Intel 7510 scalable memory buffer". In

addition, models of the memory expansion module that contain the Intel 7510 scalable memory buffer will have a label attached inside of the memory expansion module chassis. To locate the label, remove the front bezel. The label is attached to the left side of the chassis and states "7510 SMP". See the parts listing table in “Replaceable memory expansion module components” on page 244 for more information about the correct system-board tray for your model.

2. When you reassemble the components in the memory expansion module, be sure to route all cables carefully so that they are not exposed to excessive pressure.
3. When you replace the system-board tray, make sure that the host UEFI firmware is at the latest level (see “Updating the firmware” on page 337).
4. Before you attach a memory expansion module to the server and try to use it, you must update the UEFI firmware with the latest level of firmware code. If you attach and try to use the memory expansion module without updating the UEFI firmware, you might get unexpected system behavior, or the server might not power on. For special instructions to follow before you attach the memory expansion module to the server, go to http://www.ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5085756

To replace the system-board tray, complete the following steps:

1. Reinstall the DIMMs (see “Replacing a memory expansion module DIMM” on page 323).
2. Reinstall the air baffle (see “Replacing the memory expansion module air baffle” on page 317).
3. Reinstall the hot-swap fans (see “Removing a memory expansion module hot-swap fan” on page 321).
4. Grasp the system-board tray on both sides (near the stop-tabs) and align the system-board tray with the chassis.



5. Slide the system-board tray forward until the tabs at the bottom of the handles touch the chassis; then, close the handles and press firmly on the release latches to snap them into the locked position.
6. Reinstall the bezel (see “Replacing the memory expansion module bezel” on page 316).
7. Reconnect the power cords to the memory expansion module; then, connect all external cables to the memory expansion module.

8. Turn on the peripheral devices and the host server.

Chapter 6. Configuration information and instructions

This chapter provides information about updating the firmware and using the configuration utilities.

Updating the firmware

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.

Before you attach a memory expansion module to the server and try to use it, you must update the UEFI firmware with the latest level of firmware code. If you attach and try to use the memory expansion module without updating the UEFI firmware, you might get unexpected system behavior, or the server might not power on. For special instructions to follow before you attach the memory expansion module to the server, go to http://www.ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5085756.

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 UEFI firmware, vital product data (VPD) code, device drivers, and integrated management module firmware, go to http://www.ibm.com/supportportal/.

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

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

In a two-node configuration, make sure that the UEFI firmware, FPGA, and IMM code are at the same levels on all nodes.

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

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

Configuring the server

The following configuration programs come with the server:

- **Setup utility**

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The Setup utility (formerly called the Configuration/Setup Utility program) is part of the IBM UEFI firmware. Use it to perform configuration tasks such as changing the startup-device sequence, setting the date and time, and setting passwords. For information about using this program, see "Configuring the server" on page 337.

- **Boot Selection Menu program**

  The Boot Selection Menu program is part of the UEFI firmware. Use it to override the startup sequence that is set in the Setup utility and temporarily assign a device to be first in the startup sequence. For more information about using this program, see "Using the Boot Selection Menu program" on page 344.

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

  The ServerGuide program provides software-setup tools and installation tools that are designed for the server. Use this CD during the installation of the server to configure basic hardware features, such as an integrated SAS controller with RAID capabilities, and to simplify the installation of your operating system. For information about obtaining and using this CD, see "Using the ServerGuide Setup and Installation CD" on page 344.

- **Integrated management module**

  Use the integrated management module (IMM) for configuration, to update the firmware and sensor data record/field replaceable unit (SDR/FRU) data, and to remotely manage the server. For information about using the IMM, see "Using the integrated management module" on page 346.

- **VMware ESXi embedded hypervisor**

  An USB flash device with VMware ESXi embedded hypervisor software is included with some server models and available for purchase for other models. Hypervisor is virtualization software that enables multiple operating systems to run on a host system at the same time. The USB embedded hypervisor flash device installs in either of the I/O board internal USB ports. For more information about using the embedded hypervisor, see "Using the embedded hypervisor" on page 348.

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

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

  For more information, see "Using the remote presence capability and blue-screen capture" on page 350

- **Ethernet controller configuration**

  For information about configuring the Ethernet controller, see "Configuring the Broadcom Gigabit Ethernet controller" on page 350.

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

Use this program as an alternative to the Setup utility for modifying UEFI settings and IMM settings. Use the ASU program online or out of band to modify UEFI settings from the command line without the need to restart the server to run the Setup utility. For information about using this program, see "IBM Advanced Settings Utility program" on page 351.

Setup utility menu choices

The following choices are on the Setup utility main menu. Depending on the version of the IBM UEFI firmware, some menu choices might differ slightly from these descriptions.

- **System Information**

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

  This choice is on the full Setup utility menu only.

  – **System Summary**

    Select this choice to view configuration information, including the ID, speed, and cache size of the microprocessors; machine type and model of the server; the serial number; the system UUID; and the amount of installed memory. When you make configuration changes through other choices 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 server firmware, integrated management module, and diagnostics code.

- **System Settings**

  Select this choice to view or change the server component settings. This choice is on the full Setup utility menu only.

  – **Adapters and UEFI Drivers**

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

  – **Processors**

    Select this choice to view or change the processor settings.

  – **Memory**

    Select this choice to view or change the memory settings. To configure memory mirroring, select **System Settings → Memory →Memory Mirroring Mode → Mirrored**.

  – **Devices and I/O Ports**

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

    - **Active Energy Manager**

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

- **Power Restore Policy**

  Select this choice to determine the mode of operation to which the server will be restored after a power outage occurs. You can select **Always on**, **Always off**, or **Restore** to restore the server the state it was in at the time of the power outage.

– **Operating Modes**

Select this choice to select the memory speed or to specify a preset operating mode to configure the server for maximum power savings, maximum efficiency, or maximum performance.

- **Efficiency mode**

  Select this choice to maintain the optimal balance between performance and power consumption. The server generally produces the best performance per watt while it is in this mode.

- **Acoustic mode**

  Select this choice to configure the server to draw the minimum amount of power and generate the least noise. Server performance might be degraded depending on the application that you are running.

- **Performance mode**

  Select this choice to achieve the highest absolute performance for most server applications. The power consumption in this mode is often higher than in the Efficiency or Acoustics mode.

- **Custom mode**

  Select this choice only if you understand the functions of the low-level IMM settings. This is the only choice that enables you to change the low-level IMM settings that affect the performance and power consumption of the server.

– **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 server whenever a nonmaskable interrupt (NMI) occurs. **Disabled** is the default.

- **Commands on USB Interface Preference**

  Enable or disable the Ethernet over USB interface on IMM.

- **Network Configuration**

  Select this choice to view and select 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 the IMM to the default settings.

- **Reset IMM**

  Select this choice to reset the IMM settings.

– **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 UEFI to interact with PCI mass storage devices that are not UEFI compliant.

  - **Network**

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

- **Date and Time**

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

  This choice is on the full Setup utility menu only.

- **Start Options**

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

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

  This choice is on the full Setup utility menu only.

- **Boot Manager**

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

- **System Event Logs**

  Select this choice to access the System Event Manager, where you can view the POST event log and the system-event log.

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

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

  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 access the POST event viewer to view the POST event log.
  - **System Event Log**

    Select this choice to view the system-event log.
  - **Clear System Event Log**

    Select this choice to clear the system-event log.
- **User Security**

  Select this choice to set, change, or clear passwords. For information about passwords, see "Passwords."

  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 343.
  - **Clear Power-on Password**

    Select this choice to clear a power-on password.
  - **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 343.
  - **Clear Administrator Password**

    Select this choice to clear an administrator password.
- **Save Settings**

  Select this choice to save the changes that you have made in the settings.
- **Restore Settings**

  Select this choice to cancel the changes that you have made in the settings and restore the previous settings.
- **Load Default Settings**

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

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

Passwords

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

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

An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu. If you set only an administrator

password, you do not have to type a password to complete the system startup, but you must type the administrator password to access the Setup utility menu.

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

Power-on password

If a power-on password is set, when you turn on the server, you must type the power-on password to complete the system startup. You can use any combination of 6-20 printable ASCII characters for the password.

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

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

- If an administrator password is set, type the administrator password at the password prompt. Start the Setup utility and reset the power-on password.
- Remove the battery from the server and then reinstall it. For instructions for removing the battery, see "Removing the battery" on page 263.

  Attention: Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. See the safety information that begins with "Safety" on page v. Do not change settings or move jumpers on any system-board switch or jumper blocks that are not shown in this document.
- Change the position of the power-on password override jumper to bypass the power-on password (see "I/O-board jumpers" on page 24 for more information). The default for the Password override jumper (J29) is pins 1 and 2. When the server is turned off, move the jumper to another position (for example pins 2 and 3) to enable the power-on password override. The power-on password prompt bypasses only once after moving the jumper. Start the Setup utility and reset or clear the power-on password.

  You do not have to return the jumper to the previous position.

  The power-on password override jumper does not affect the administrator password.

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

Administrator password

If an administrator password is set, you must type the administrator password for access to the full Setup utility menu. You can use any combination of 6-20 printable ASCII characters for the password.

Attention: If you set an administrator password and then forget it, there is no way to change, override, or remove it. You must replace the I/O board.

Using the Boot Selection Menu program

The Boot Selection Menu is used to temporarily redefine the first startup device without changing boot options or settings in the Setup Utility.

To use the Boot Selection Menu program, complete the following steps:

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

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

Starting the backup UEFI firmware

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

To force the server to start from the backup copy of the UEFI firmware, turn off the server; then, move the UEFI boot recovery J22 jumper to the backup position (pins 2 and 3).

Use the backup copy of the UEFI firmware until the primary copy is restored. After the primary copy is restored, turn off the server; then, move the UEFI boot recovery J22 jumper back to the primary position (pins 1 and 2).

Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD provides software setup tools and installation tools that are designed for your server. The ServerGuide program detects the server model and optional hardware devices that are installed and uses that information during setup to configure the hardware. The ServerGuide program simplifies operating-system installations by providing updated device drivers and, in some cases, installing them automatically.

You can download a free image of the *ServerGuide Setup and Installation* CD or purchase the CD from the ServerGuide fulfillment website at http://www.ibm.com/systems/management/serverguide/sub.html. To download the free image, click **IBM Service and Support Site**.

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

The ServerGuide program requires a supported IBM server with an enabled startable (bootable) CD drive. In addition to the *ServerGuide Setup and Installation* CD, you must have your operating-system CD to install the operating system.

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

1. Insert the CD, and restart the server. If the CD does not start, see "ServerGuide problems" in the *Problem Determination and Service Guide* on the IBM *Documentation* CD.
2. Follow the instructions on the screen to complete the following tasks:
   a. Select your language.
   b. Select your keyboard layout and country.
   c. View the overview to learn about ServerGuide features.
   d. View the readme file to review installation tips for your operating system and adapter.
   e. Start the operating-system installation. you will need your operating-system CD.

ServerGuide features

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

The ServerGuide program has the following features:

- An easy-to-use interface
- Diskette-free setup, and configuration programs that are based on detected hardware
- Device drivers that are provided for the server model and detected hardware
- Operating-system partition size and file-system type that are selectable during setup

The ServerGuide program performs the following tasks:

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

Setup and configuration overview

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

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

Typical operating-system installation

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

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

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

Installing your operating system without using ServerGuide

If you have already configured the server hardware and you are not using the ServerGuide program to install your operating system, you can download the latest operating-system installation instructions for the server from http://www.ibm.com/supportportal/.

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 remote presence function in a single chip.

The IMM supports the following basic systems-management features:

- Active Energy Manager.
- Alerts (in-band and out-of-band alerting, PET traps - IPMI style, SNMP, e-mail).
- Auto Boot Failure Recovery.
- Automatic Server Restart (ASR) when POST is not complete or the operating system hangs and the operating-system watchdog timer times out. The IMM might be configured to watch for the operating-system watchdog timer and restart the server after a timeout, if the ASR feature is enabled. Otherwise, the IMM allows the administrator to generate an NMI by pressing a nonmaskable interrupt button on the information panel for an operating-system memory dump. ASR is supported by Intelligent Peripheral management Interface (IPMI).
- Boot sequence manipulation.
- Command-line interface.
- Configuration save and restore.

- DIMM error assistance. The Unified Extensible Firmware Interface (UEFI) disables a failing DIMM that is detected during POST, and the IMM lights the associated system-error LED and the failing DIMM error LED.
- Environmental monitor with fan speed control for temperature, voltages, fan failure, and power supply failure.
- Intelligent Platform Management Interface (IPMI) Specification V2.0 and Intelligent Platform Management Bus (IPMB) support.
- Invalid system configuration (CNFG) LED support.
- Light path diagnostics LEDs to report errors that occur with fans, power supplies, microprocessor, hard disk drives, and system errors.
- Nonmaskable interrupt (NMI) detection and reporting.
- Operating-system failure blue screen capture.
- PCI configuration data.
- PECI 2 support.
- Power/reset control (power-on, hard and soft shutdown, hard and soft reset, schedule power control).
- Query power-supply input power.
- ROM-based IMM firmware flash updates.
- Serial over LAN (SOL).
- Serial port redirection over Telnet or SSH.
- System-event log.
- When one of the two microprocessors reports an internal error, the server disables the defective microprocessor and restarts with the one good microprocessor.

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

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

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

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

Obtaining the IP address for the Web interface access

The IMM MAC address tag is tied to the rear of the server. The hostname of the IMM is "IMM-" plus the last twelve characters of the MAC address. Because the default setting of the IMM is DHCP, after the IMM Ethernet port is connected to a management network, it can obtain an IP address from the network and it is difficult to identify on the network. Viewing the tag is one way to find the IMM after the server is connected to the network.

To access the Web interface, you need the IP address of the IMM which you can obtain through the Setup utility. To obtain the IP address, complete the following steps:

1. Turn on the server.

   Note: Approximately 3 minutes after the server is connected to ac power, the power-control button becomes active.
2. When the prompt `<F1> Setup` is displayed, press F1. If you have set both a power-on password and an administrator password, you must type the administrator password to access the full Setup utility menu.
3. Select **System Settings** → **Integrated Management Module** → **Network Configuration**.
4. Locate the IP address.
5. Exit from the Setup utility.

Logging on to the IMM web interface

To log on to the IMM web interface, 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.

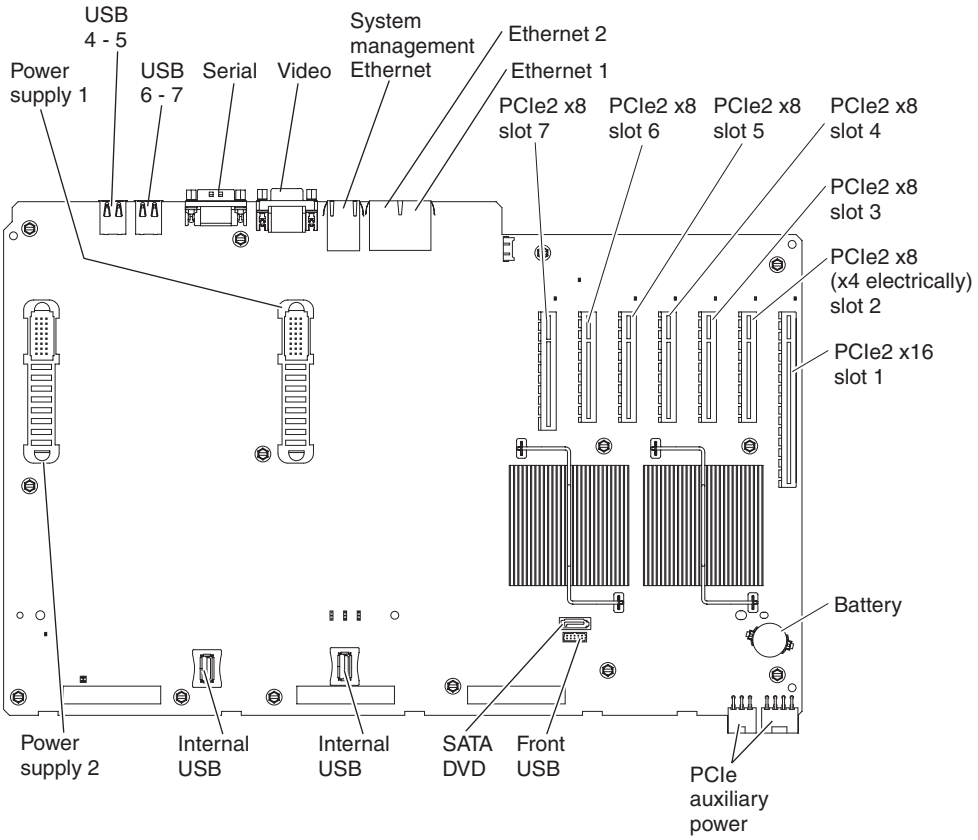
   Note: If you are logging on to the IMM for the first time after installation, the IMM defaults to DHCP. If a DHCP host is not available, the IMM assigns a static IP address of 192.168.70.125. The MAC address tag provides the default hostname of the IMM and does not require you to start the server.
2.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

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

Using the embedded hypervisor

The VMware ESXi embedded hypervisor software is available on the IBM USB flash device with embedded hypervisor. The USB flash device can be installed in either of the I/O board internal USB ports (see the following illustration). Hypervisor is virtualization software that enables multiple operating systems to run on a host system at the same time. The USB flash device is required to activate the hypervisor functions.

Note: When you add an optional memory expansion module to your server configuration and you plan to use the optional USB flash device with VMware EXSi embedded hypervisor software, see the documentation that comes with the USB flash device and the operation system installation instructions for installing VMware ESXi (or ESX, depending on your environment) on your server at the IBM websight at http://www.ibm.com/supportportal/. The documentation provides additional installation and configuration information that you must follow before you use the memory expansion module.



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

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

1. Turn on the server.

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

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

1. Turn on the server.

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

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

Using the remote presence capability and blue-screen capture

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

The remote presence feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1600 x 1200 at 85 Hz, regardless of the system state
- Remotely accessing the server, using the keyboard and mouse from a remote client
- Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
- Uploading a diskette image to the IMM memory and mapping it to the server as a virtual drive

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

Enabling the Broadcom Gigabit Ethernet Utility program

You can configure the Broadcom Gigabit ports as a startable device, and can be customized in the startup sequence. Enable, disable, and customize the startup sequence of the Broadcom Gigabit Ethernet ports from the Setup Utility.

Configuring the Broadcom Gigabit Ethernet controller

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

You do not have to set any jumpers or configure the controllers. However, you must install a device driver to enable the operating system to address the controllers. For device drivers and information about configuring the Ethernet controllers, see the *Broadcom NetXtreme II Gigabit Ethernet Software* CD. To find updated information about configuring the controllers, go to http://www.ibm.com/supportportal/.

Configuring RAID arrays

Through the Setup utility, you can access utilities to configure RAID arrays. The specific procedure for configuring arrays depends on the RAID controller that you are using. For details, see the documentation for your RAID controller. To access the utility for your RAID controller, complete the following steps:

1. Turn on the server.

   Note: Approximately 1 to 3 minutes after the server is connected to ac power, the power-control button becomes active.
2. When the prompt <F1> Setup is displayed, press F1. If you have set an administrator password, you must type the administrator password to access the full Setup utility menu. If you do not type the administrator password, a limited Setup utility menu is available.
3. Select **System Settings → Adapters and UEFI drivers**.
4. Press Enter to refresh the list of device drivers.
5. Select the device driver for your RAID controller and press Enter.
6. Follow the instructions in the documentation for your RAID controllers.

For more information about RAID arrays, see the IBM Redbooks® publications about RAID arrays at http://www.redbooks.ibm.com/abstracts/tips0054.html.

IBM Advanced Settings Utility program

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

You can also use the ASU program to configure the optional remote presence feature or other IMM settings. The remote presence feature provides 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/supportsite.wss/docdisplay?lndocid=TOOL-ASU&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. On the left side of the page, click **Systems Management software**.
4. Under **Configuration**, click **Advanced Settings Utility**.

Updating IBM Systems Director

If you plan to use IBM Systems Director to manage the server, you must check for the latest applicable IBM Systems Director updates and interim fixes.

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

To locate and install a newer version of IBM Systems Director, complete the following steps:

1. Check for the latest version of IBM Systems Director:
   a. Go to http://www.ibm.com/systems/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.

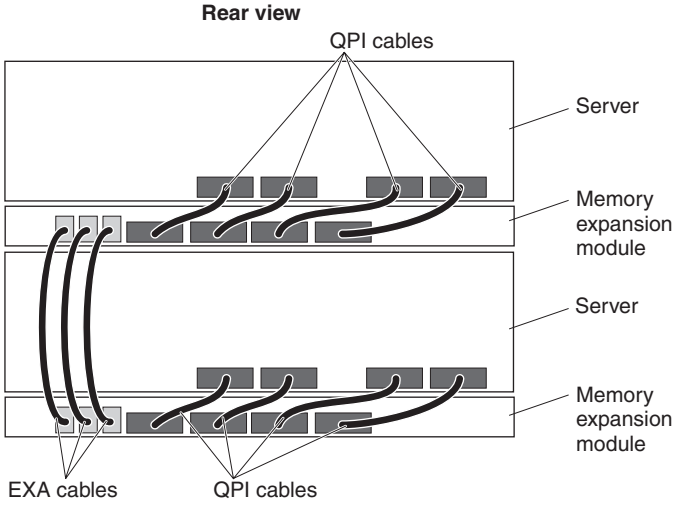
Configuring an EXA multi-node system

Note:

1. The EXA scalability feature is supported only in memory expansion modules that contain the Intel 7510 Scalable Memory Buffer.
2. Do not use the IMM Scalable Partition Web Interface to configure a QPI multi-node system.

This feature requires scalability cables and firmware that supports X-Architecture scalability from one memory expansion module to another memory expansion module. In a 2-node EXA scaled configuration, each memory expansion module is connected to an x3850 X5 or x3950 X5 server, and the memory expansion modules

are connected to each other through the EXA scalability cables. (For detailed installation instructions, see the documentation that came with the EXA cables.)



The Scalable Partition web interface is an extension of the IMM web interface and is used to create, delete, control, and view scalable partitions. The Scalable Partition web interface firmware is in the IMM.

A multi-node configuration interconnects multiple servers or scalable partitions. When two servers with memory expansion module configurations are connected through EXA cables, you can merge this multi-node configuration to form a single logical server or partition it into multiple stand-alone servers without removing any cables. This capability to partition a multi-node server into several individual servers without removing any cables is referred to as IBM FlexNode Technology.

As a single logical server, the server is able to use resources from all scalable partitions. The server uses a single, contiguous memory space and provides access to all associated adapters, hard disk drives, and USB devices (including the mouse and keyboard). PCI slot numbering starts with the primary node and continues with the secondary nodes, in numeric order of the logical node IDs. The internal optical drive and VGA connection on the secondary node are disabled, and the server cannot use them.

Note: When the server is configured as a single logical server, if there is an ac system power failure to one of the nodes (partitions), the remaining good node powers itself down and remains off until the failing node recovers from the ac power loss. Remote users will not receive any warning or error messages that the partition has failed, but local users will see a 00.bb blinking sequence on the front panel checkpoint display. After the power is restored, both nodes will automatically turn on and boot as a two-node partition. If you replace the I/O card in the server, follow the instructions for creating an EXA multi-node system.

In a stand-alone server, each scalable partition supports an independent operating-system installation. In addition, each scalable partition uses its own individual resources (one server and the associated memory expansion module) as an independent system. One stand-alone server cannot boot an operating system on another stand-alone server.

Creating an EXA multi-node system

The following information provides instructions for creating an EXA multi-node system from multiple servers and configuring it as a single logical 8-socket server.

Note: To check for the latest firmware levels and to download firmware updates, go to http://www.ibm.com/supportportal/.

Before you create an EXA multi-node system, make sure that all the nodes in the multi-node configuration contain the following software and hardware:

- The current level of UEFI firmware, SAS UEFI code, IMM firmware, and FPGA firmware (all nodes must be at the same level)
- Microprocessors that are the same cache size, type, and clock speed

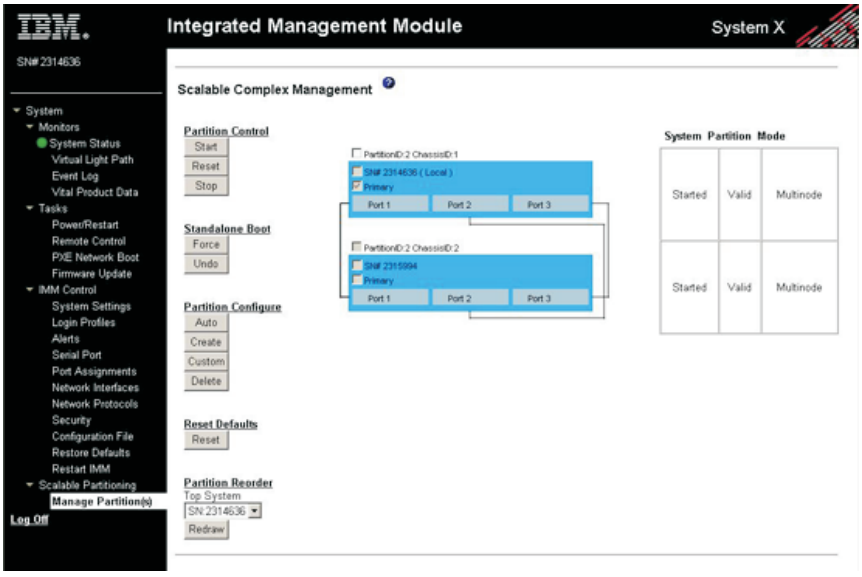
Note: All the nodes must have all the microprocessor sockets and memory connectors populated.

To create a scalable partition, complete the following steps:

1. Connect the EXA cables. For detailed instructions, see the documentation that comes with your cables.
2. Connect all nodes to an ac power source and make sure that they are not running an operating system.

   Note: All nodes that are part of an existing partition and are connected through EXA cables must be in Standalone mode (part of the partition but operating independently). To enable Standalone mode, on the Scalable Complex Management page, click **Standalone Boot**, and then click **Force**.
3. Connect and log in to the IMM web interface.

   Note: For instructions for creating, modifying, and controlling partitions through the IMM Telnet interface, see "Using the IMM Telnet interface" on page 356.



4. In the navigation pane, click **Scalable Partitioning**, and then click **Manage Partition(s)**. Use the Scalable Complex Management page to create, delete, control, and view scalable partitions. Select the primary node; then, automatically or manually create a scalable partition:

- To automatically create a single partition that uses all nodes in the multi-node configuration, click **Partition Configure**, and then click **Auto**.
- To manually assign nodes to the partition, click **Partition Configure**, select the nodes you want to include as members of the partition, and then click **Create**.

Note: To reorder the sequence in which the nodes appear in the diagram on the page, click **Redraw**. For example, you can reorder the diagram to reflect the order in which the nodes are physically installed in a rack. The nodes are reordered according to the QPI or EXA cabling, with the node that you select in the top position.

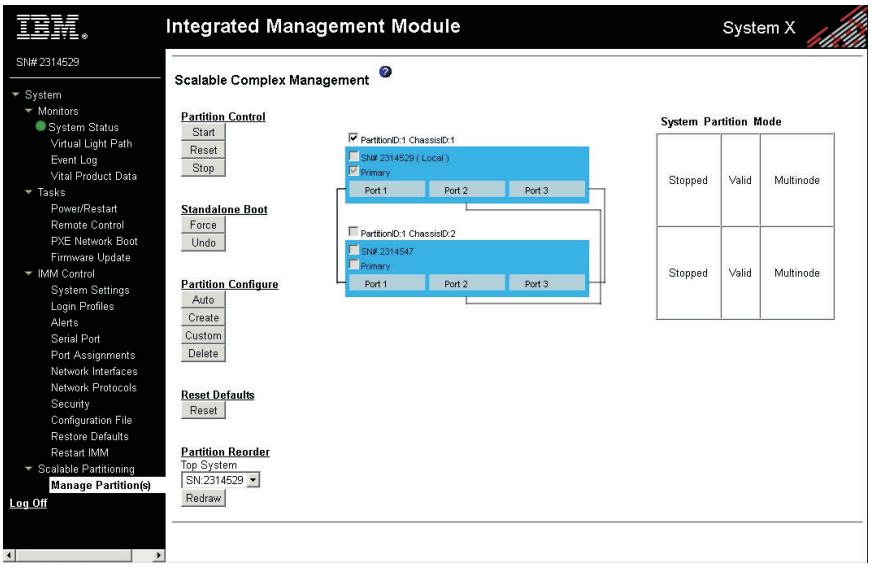
Partitioning an EXA multi-node system

There are two ways to partition an EXA multi-node system into stand-alone servers: deleting the partition configuration and forcing a stand-alone boot. Both methods are performed through the IMM web interface from the Manage Partition(s) page, through the IMM in either server. The benefit of forcing a stand-alone boot is that you can restore the original partition information by clicking **Undo**.

Note: For instructions for creating, modifying, and controlling partitions through the IMM Telnet interface, see "Using the IMM Telnet interface" on page 356.

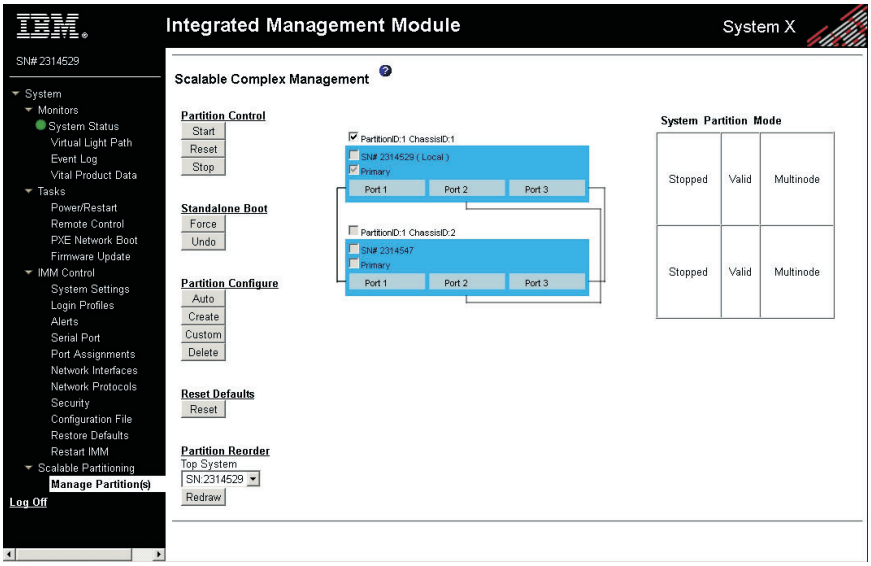
To partition an EXA multi-node system, complete the following steps:

1. Connect and log in to the IMM web interface.
2. Make sure that the scaled system is powered off. In the navigation pane, expand **Scalable Partitioning**, and click **Manage Partition(s)**. Both nodes should be indicated as stopped.
3. Select the chassis that you are connected to through the IMM. The interface control for the other chassis should be disabled.



4. Determine which method you plan to use to partition the multi-node server:
   - To delete the partition, click **Partition Configuration**, and then click **Delete**.
   - To force a stand-alone boot, click **Standalone Boot**, and then click **Force**.

5. Make sure that each chassis is in Standalone mode, which indicates that the system is now partitioned into two independent systems.



Using the IMM Telnet interface

You can create, modify, and control partitions through the IMM Telnet interface. To use the IMM Telnet interface, log in to the IMM Telnet interface on either node and use the **scale** command for multi-node control and configuration.

To display scale information, in the IMM Telnet interface, type `scale` at the `system` prompt. Information similar to the following example is displayed.

```
Node UUID: 92CF1100F19111DF8000E41F13E455FC
Node ID: 3c0d
Node SN:
Node Power State: off
Node Partition ID: na
Node Logical ID: na
Node Primary: na
Node Mode: na

Node UUID: C7C92400EE7011DF8000E41F13E454E4
Node ID: 8bb9
Node SN:
Node Power State: off
Node Partition ID: na
Node Logical ID: na
Node Primary: na
Node Mode: na
```

Creating a partition by using the IMM Telnet interface:

Note: Before you create a partition, make sure that the nodes that you intend to include in the partition are powered off and are not in any active partition.

You can create partitions through the IMM Telnet interface by using the **auto** command (`scale -auto primarynodeid`) or the **create** command (`scale -create primarynodeid, nodeid`) command.

You can use the **auto** command to create a partition that includes all the nodes in the complex and specify the node that is to be the primary node. For example, if the EXA system contains only two nodes, 3c0d and 8bb9, to create a 2-node partition with node 3c0d as the primary node, type `scale -auto 3c0d`.

You can use the **create** command to specify the nodes in the complex that are to be included in the partition. The first node ID in the argument is the primary node. For example, if the EXA system includes nodes 3c0d and 8bb9, to create a 2-node partition with node 3c0d as the primary node, type `scale -create 3c0d, 8bb9`.

After you use either method to create the partition, the scale information is updated with the node partition ID assigned to the partition for future partition operation. When you type `scale` at the system prompt, information similar to the following example is displayed.

```
Node UUID: 92CF1100F19111DF8000E41F13E455FC
Node ID: 3c0d
Node SN:
Node Power State: off
Node Partition ID: 1
Node Logical ID: 0
Node Primary: yes
Node Mode: partition

Node UUID: C7C92400EE7011DF8000E41F13E454E4
Node ID: 8bb9
Node SN:
Node Power State: off
Node Partition ID: 1
Node Logical ID: 1
Node Primary: no
Node Mode: partition
```

Deleting a partition by using the IMM Telnet interface:

Note: Before you delete a partition, make sure that all the nodes in the partition are powered off.

You can delete partitions through the IMM Telnet interface by using the **delete** command (`scale -delete`) command or the **delete -partid** command (`scale -delete -partid id`) command.

You can use the **delete** command to delete all partitions in the complex.

You can use the **delete -partid** command to delete a specific partition. For example, to delete partition 1, type `scale -delete -partid 1`.

Toggling partitions by using the IMM Telnet interface:

Note: Before you toggle a partition to Standalone mode, make sure that all the nodes in the partition are powered off.

A partition can be in either of two modes: Standalone and Partition. When the partition is in Standalone mode, each node operates independently. When the partition is in Partition mode, all the nodes in the partition boot as a single system.

The command to toggle the partition is `scale -mode standalone|partition -partid id`.

For example, to set partition 1 in Standalone mode, type `scale -mode standalone -partid 1`.

Starting, stopping, and resetting by using the IMM Telnet interface:

There are three additional partition commands that you can use with the IMM Telnet interface: **start**, **stop**, and **reset**.

You can use the **start** command (`scale -start {-partid id | -node nodeid}`) to start a partition or node. When you use this command, if the node is in a partition and the partition is not in Standalone mode, all the nodes in the partition will power on. For example, to start partition 1, type `scale -start -partid 1`.

Use the **reset** command (`scale -reset {-partid id | -node nodeid}`) to reset a partition or node. When you use this command, if the node is in a partition and the partition is not in Standalone mode, all the nodes in the partition will be reset.

Use the **stop** command (`scale -stop {-partid id | -node nodeid}`) to shut down a partition or node. When you use this command, if the node is in a partition and the partition is in Standalone mode, all the nodes in the partition will power off. For example, to stop node 8bb9, type `scale -stop -node 8bb9`.

Configuring a QPI multi-node system

A multi-node configuration interconnects multiple servers or multiple partitions. This configuration requires 8 microprocessors and 16 memory cards (4 microprocessors and 8 memory cards per node). See the documentation that came with your QPI cables to set up your QPI multi-node configuration.

Note: Do not use the IMM Scalable Partition Web Interface to configure a QPI multi-node system.

Before you create scalable partitions, make sure that all the nodes in the multi-node configuration contain the following software and hardware:

- The current level of UEFI code, SAS UEFI code, IMM firmware, and FPGA firmware

  Note: To check for the latest firmware levels and to download firmware updates, go to http://www.ibm.com/supportportal/.
- Microprocessor that are the same cache size and type, and the same clock speed

Note: The nodes can vary in the number of microprocessors and the amount of memory each contains, above the minimum.

Appendix. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you.

Use this information to obtain additional information about IBM and IBM products, determine what to do if you experience a problem with your IBM system or optional device, and determine whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself.

If you believe that you require IBM to perform warranty service on your IBM product, the IBM service technicians will be able to assist you more efficiently if you prepare before you call.

- Check for updated firmware and operating-system device drivers for your IBM product. The IBM Warranty terms and conditions state that you, the owner of the IBM product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your IBM service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.

  Determine whether the firmware and device drivers for the devices in the are up to date. You can use the IBM Flex System Manager Update Manager to automatically acquire, install, and manage firmware and device-driver updates for the devices in the .
- If you have installed new hardware or software in your environment, check http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ to make sure that the hardware and software is supported by your IBM product.
- Go to http://www.ibm.com/supportportal/ to check for information to help you solve the problem.
- Gather the following information to provide to IBM Support. This data will help IBM Support quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.
  - Hardware and Software Maintenance agreement contract numbers, if applicable
  - Machine type number (IBM 4-digit machine identifier)
  - Model number
  - Serial number
  - Current system UEFI and firmware levels
  - Other pertinent information such as error messages and logs
- Submit a manual service request through the IBM Flex System Manager management software. When you submit a manual service request, service data about the problem is included in the request, which will help IBM Support more quickly begin to diagnose the problem.

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- Go to http://www.ibm.com/support/electronic/portal/ to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the pertinent information available to IBM Support quickly and efficiently. IBM service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files.

See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to http://www.ibm.com/supportportal/ .

You can find the most up-to-date information for the IBM Flex System product family at .

Getting help and information from the World Wide Web

On the World Wide Web, up-to-date information about IBM systems, optional devices, services, and support is available at http://www.ibm.com/supportportal/ .

You can find the most up-to-date product information for System x products at http://www.ibm.com/systems/x/ .

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with your IBM products.

For more information about Support Line and other IBM services, see http://www.ibm.com/services/ or see http://www.ibm.com/planetwide/ for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Hardware service and support

You can receive hardware service through your IBM reseller or IBM Services.

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

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

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Table 28. Limits for particulates and gases

Contaminant	Limits
Particulate	• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2[1]. • Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. • The deliquescent relative humidity of the particulate contamination must be more than 60%[2]. • The room must be free of conductive contamination such as zinc whiskers.
Gaseous	• Copper: Class G1 as per ANSI/ISA 71.04-1985[3] • Silver: Corrosion rate of less than 300 Å in 30 days

[1] ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

[2] The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

[3] ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

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When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Federal Communications Commission (FCC) statement

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

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Industry Canada Class A emission compliance statement

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Avis de conformité à la réglementation d'Industrie Canada

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Responsible manufacturer:

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
914-499-1900

European Community contact:

IBM Technical Regulations, Department M456
IBM-Allee 1, 71137 Ehningen, Germany
Telephone: +49 7032 15-2937
Email: tjahn@de.ibm.com

Germany Class A statement

Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

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Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

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Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:

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IBM Deutschland
Technical Regulations, Department M456
IBM-Allee 1, 71137 Ehningen, Germany
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Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

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高調波ガイドライン適合品

Japan Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guidelines (products less than or equal to 20 A per phase)

Japan Electronics and Information Technology Industries Association (JEITA) statement

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中华人民共和国“A类”警告声明

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