IBM System x3850 M2 and System x3950 M2
Types 7141 and 7233

# User's Guide

IBM

IBM System x3850 M2 and System x3950 M2
Types 7141 and 7233

# User's Guide

**Note:** Before using this information and the product it supports, read the information in "Notices," on page 79, the *Warranty Information* document, and the *IBM Safety Information* and *Environmental Notices and User Guide* documents on the *Documentation* CD.Sixth

# Contents

# Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

.לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

**Important:**

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

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

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

**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.**

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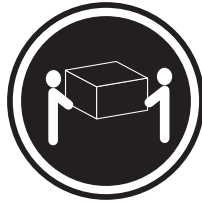
≥ 18 kg (39.7 lb)          ≥ 32 kg (70.5 lb)          ≥ 55 kg (121.2 lb)
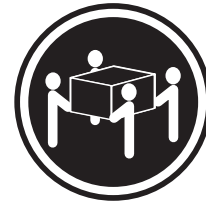
**CAUTION:**
**Use safe practices when lifting.**

**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.**

2

1
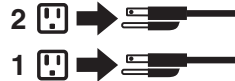
**Statement 8:**

**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 26:**

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

**Statement 27:**

**CAUTION:**
**Hazardous moving parts are nearby.**

# Chapter 1. The System x3850 M2 and System x3950 M2 server

The IBM® System x3850 M2 and System x3950 M2 Types 7141 and 7233 servers are 4-U[1]-high, high-performance servers. They are ideally suited for networking environments that require superior microprocessor performance, efficient asset management, flexibility, and large amounts of reliable data storage.

When they are available, you can purchase one or more SMP expansion kits to interconnect System x3850 M2 and System x3950 M2 servers to create multi-node configurations of two, three, or four nodes, for up to a 16-socket operation.

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

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

The server contains IBM Enterprise X-Architecture® technologies, which help increase performance and reliability. For more information, see "What your server offers" on page 6 and "Reliability, availability, and serviceability" on page 8.

You can obtain up-to-date information about the server and other IBM server products at http://www.ibm.com/systems/x/.

## Related documentation

This *User's Guide* contains general information about the server, including how to install supported optional devices and how to configure the server. The following documentation also comes with the server:

- *Installation Guide*

  This printed document contains instructions for setting up the server and basic instructions for installing some optional devices.
- *Warranty Information*

  This printed document contains information about the terms of the warranty.
- *Safety Information*

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

  This printed document contains instructions for installing the server in a rack.
- *Problem Determination and Service Guide*

  This document is in PDF on the IBM *Documentation* CD. It contains information to help you solve problems yourself, and it contains information for service technicians.

---

1. Racks are measured in vertical increments of 4.45 cm (1.75 inches) each. Each increment is called a ″U.″ A 1-U-high device is 1.75 inches tall.

**1**

- *Environmental Notices and User Guide*

  This document is in PDF on the IBM *Documentation* CD. It contains translated environmental notices.
- *IBM License Agreement for Machine Code*

  This document is in PDF on the IBM *Documentation* CD. It provides translated versions of the IBM License Agreement for Machine code for your product.
- *License and Attributions Document*

  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.

The System x and xSeries Tools Center is an online information center that contains information about tools for updating, managing, and deploying firmware, device drivers, and operating systems. The System x and xSeries Tools Center 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 comes 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 Web site. To check for updated documentation and technical updates, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x3850 M2** or **System x3950 M2** and click **Continue**.

# Notices and statements in this document

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

The following notices and statements are used in this document:

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

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

# Features and specifications

The following information is a summary of the features and specifications of the 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. 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 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® multi-core microprocessor with 8 MB Level-2 cache
- 1066 MHz front-side bus (FSB)
- Single node minimum: One microprocessor per core
- Multi-node minimum: One microprocessor per core in each node
- Support for up to four microprocessors

**Note:** Use the Configuration/Setup Utility program to determine the type and speed of the microprocessors.

**Memory:**
- Single-node minimum: 2 GB depending on server model, expandable to 256 GB
- Multi-node minimum: 4 GB in node 1 and 2 GB in all other modes expandable to a total of 1 TB
- Type: Registered, ECC, PC2-5300 double data rate (DDR) II, SDRAM
- Sizes: 1 GB, 2 GB, 4 GB or 8 GB (when available) in pairs
- Connectors: Two-way interleaved, eight dual inline memory module (DIMM) connectors per memory card
- Maximum: Four memory cards, each card containing four pairs of PC2-5300 DDR II DIMMs

**Drives:**
- Slim DVD-ROM: IDE and SATA (optional in some models)
- Serial Attached SCSI (SAS) hard disk drives

**Expansion bays:**
- Four SAS, 2.5-inch bays
- One 12.7 mm removable-media drive bay (DVD drive installed, standard on some models only)

**Expansion slots:**

Seven PCI Express x8 (half-length) slots:
- Five non-hot-swap
- Two hot-swap

**Upgradeable microcode:**

System BIOS, FPGA, diagnostics, service processor, BMC, and SAS microcode

**Power supply:**
- Standard: One or two dual-rated power supplies, depending on the model
  - 1440 watts at 220 V ac input
  - 720 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 to maintain a fully functional server.

**Size:**
- 4U
- Height: 128.35 mm (5.05 in.)
- Depth: 715 mm (28.15 in.)
- Width: 440 mm (17.32 in.)
- Weight: approximately 43.1 kg (95 lb) when fully configured or 31.75 kg (70 lb) minimum

**Integrated functions:**
- Baseboard management controller
- IBM EXA-4 chip set with integrated memory and I/O controller
- Remote Supervisor Adapter II
- Light path diagnostics
- Six Universal Serial Bus (USB) ports (2.0)
  - Three on rear of server
  - Two on front of server
  - One internal
- Broadcom 5709 dual 10/100/1000 Gigabit Ethernet controller
- ATI RN50 video
  - 16 MB video memory
  - SVGA compatible
- Serial-attached SCSI (SAS) controller with RAID capabilities
- Support for ServeRAID-MR10k SAS controller
- Serial connector
- SMP Expansion Ports

**Acoustical noise emissions:**
- Sound power, idle: 6.6 bel declared
- Sound power, operating: 6.6 bel declared

**Environment:**
- Air temperature:
  - Server on:
    - 10° to 35°C (50° to 95°F); altitude: 0 to 914 m (3000 ft). If the server has a dual-core microprocessor, at maximum power reduce the 35°C by 1°C per 300 m above sea level, or the microprocessor might throttle to remain within the internal thermal specifications.
    - 10° to 32°C (50° to 90°F); altitude: 914 m to 2133 m (7000 ft).
  - Server off: 10° to 43°C (50.0° 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 81.

**Heat output:**

Approximate heat output:
- Minimum configuration: 1297 Btu (380 watts) per hour
- Typical configuration: 2730 Btu (800 watts) per hour
- Maximum configuration:
  - 5527 Btu per hour (1620 watts) at 110 V ac
  - 5425 Btu per hour (1590 watts) at 220 V ac

**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: 0.39 kVA
  - Typical: 0.8 kVA
  - Maximum: 1.65 kVA

# What your server offers

The server uses the following features and technologies:

- **Baseboard management controller**

  The baseboard management controller (BMC) provides basic service-processor environmental monitoring functions. If an environmental condition exceeds a threshold or if a system component fails, the baseboard management controller lights LEDs to help you diagnose the problem and records the error in the error log. The baseboard management controller also provides remote server management capabilities through the OSA SMBridge management utility program.

  **Note:** In messages and documentation, the term *service processor* refers to the baseboard management controller or the Remote Supervisor Adapter II.

- **IBM Director**

  IBM Director is a workgroup-hardware-management tool that you can use to centrally manage IBM System x and xSeries® servers. For more information, see the IBM Director documentation on the *IBM Director* CD.

- **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 the IBM Support Center. 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/.

- **IBM Enterprise X-Architecture technology**

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

  - **Active™ Memory**

    The Active Memory feature improves the reliability of memory through online-spare memory, memory mirroring, and memory scrubbing. Online-spare memory disables a failed pair of DIMMs from the server configuration and activates a pair of online-spare DIMMs. Memory scrubbing is an automatic daily test of all the system memory that detects and reports memory errors that might develop, before they cause a server outage.

  - **Large system-memory capacity**

    The server supports up to 256 GB of system memory. The memory controller supports error correcting code (ECC) for up to 32 industry-standard PC2-5300, 1.8 V, 240-pin, registered, double-data-rate (DDR) II, synchronous dynamic random access memory (SDRAM) dual inline memory modules (DIMMs).

  - **Memory ProteXion**

    The Memory ProteXion feature provides the equivalent of a hot-spare drive in a RAID array. It is based in the memory controller, and it enables the server to sense when a chip on a DIMM has failed and to route the data around the failed chip.

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

  The *ServerGuide Setup and Installation* CD that comes with the server provides programs to help you set up the server and install a Windows operating system.

The ServerGuide program detects installed optional hardware devices and provides the correct configuration programs and device drivers. For more information about the *ServerGuide Setup and Installation* CD, see "Using the ServerGuide Setup and Installation CD" on page 68.

- **Integrated network support**

  The server comes with an integrated Broadcom 5709 dual Gigabit Ethernet controller, which supports connection to a 10 Mbps, 100 Mbps, or 1000 Mbps network. For more information, see "Configuring the Gigabit Ethernet controller" on page 70.

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

  This integrated security chip performs cryptographic functions and stores private and public secure keys. It provides the hardware support for the Trusted Computing Group (TCG) specification. You can download the software to support the TCG specification, when the software is available. See http://www.ibm.com/servers/eserver/xseries/scalable_family.html for details about the TPM implementation.

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

  The server supports up to four 1-inch (26 mm) slim-high, 2.5-inch hot-swap hard disk drives that are connected to the SAS backplane. With the hot-swap feature, you can add, remove, or replace hard disk drives without turning off the server.

- **Light path diagnostics**

  Light path diagnostics provides LEDs to help you diagnose problems. For more information, see the section about light path diagnostics in the *Problem Determination and Service Guide*.

- **PCI Express x8 adapter capabilities**

  The server has seven slots for PCI Express x8 adapters. These slots also accept x4 adapters.

- **Active Energy Manager**

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

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

  The DSA Preboot diagnostic programs are stored in integrated USB memory and collect and analyze system information to aid in diagnosing server problems. The diagnostic programs collect the following information about the server:
  - System configuration
  - Network interfaces and settings
  - Installed hardware
  - Light path diagnostics status
  - Service processor status and configuration
  - Vital product data, firmware, and BIOS configuration
  - Hard disk drive health
  - RAID controller configuration
  - Event logs for ServeRAID controllers and service processors

  The diagnostic programs create a merged log that includes events from all collected logs. The information is collected into a file that you can send to the

IBM Support Center. Additionally, you can view the server information locally through a generated text report file. You can also copy the log to removable media and view the log from a Web browser.

- **Redundant connection**

  The addition of an optional network interface card (NIC) provides a failover capability to a redundant Ethernet connection. If a problem occurs with the primary Ethernet connection, all Ethernet traffic that is associated with the primary connection is automatically switched to the redundant NIC. If the applicable device drivers are installed, this switching occurs without data loss and without user intervention.

- **Redundant cooling and power capabilities**

  The redundant cooling of the fans in the server enable continued operation if one of the fans fails. The server supports up to two hot-swap power supplies, which provide redundant power for many server configurations.

- **ServeRAID support**

  The server supports ServeRAID controllers to create redundant array of independent disks (RAID) configurations.

- **Symmetric multiprocessing (SMP)**

  The server supports up to four multi-core Intel Xeon microprocessors. One or more multi-core microprocessors provides SMP capability.

- **Systems-management capabilities**

  The server supports an IBM Remote Supervisor Adapter II. When this adapter is used with the systems-management software that comes with the server, you can manage the functions of the server locally and remotely. The Remote Supervisor Adapter II also provides system monitoring, event recording, and dial-out alert capability.

# Reliability, availability, and serviceability

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

The server has the following RAS features:
- Active memory
- Automatic BIOS recovery (ABR)
- Automatic error retry and recovery
- Automatic restart after a power failure
- Availability of microcode and diagnostic levels
- Backup basic input/output system (BIOS) switching under the control of the service processor
- Baseboard management controller (service processor)
- Built-in, menu-driven electrically erasable programmable ROM (EEPROM) based setup, system configuration, and diagnostic programs
- Built-in monitoring for fan, power, temperature, voltage, and power-supply redundancy
- Error codes and messages
- Error correcting code (ECC) L2 cache and system memory
- Fault-resistant startup
- Hot-swap hard disk drives
- IBM Director workgroup-hardware-management tool
- Information and light path diagnostics LED panels

- Service processor adapter for remote systems management
- Parity checking on the SAS bus and PCI Express buses
- Power managed and Advanced Configuration and Power Interface (ACPI) compliant
- Power-on self-test (POST)
- Predictive Failure Analysis (PFA) alerts
- Redundant Ethernet capabilities (requires optional Ethernet adapter) with failover support
- Redundant hot-swap capability
  - Cooling fans with speed-sensing capability
  - Power supplies
- Remind button to temporarily flash the system-error LED
- Remote system problem-determination support
- ROM-based diagnostic programs
- Standby voltage for systems-management features and monitoring
- Startup (boot) from LAN using Preboot Execution Environment (PXE) protocol
- System auto-configuring from the configuration menu
- System error logging
- Upgradeable microcode for POST, BIOS, diagnostics, service processor, and read-only memory (ROM) resident code, locally or over the LAN
- Vital product data (VPD) on microprocessors, system boards, power supplies, and SAS (hot-swap-drive) backplane
- Wake on LAN capability

## IBM Director

With IBM Director, a network administrator can perform the following tasks:

- View the hardware configuration of remote systems, in detail

- Monitor the usage and performance of critical components, such as microprocessors, disks, and memory

- Centrally manage individual or large groups of IBM and non-IBM x86-processor-based servers, desktop computers, workstations, and notebook computers on a variety of platforms

IBM Director provides a comprehensive entry-level workgroup hardware manager. It includes the following key features:

- Advanced self-management capabilities for maximum system availability.

- Multiple operating-system platform support, including Microsoft® Windows® 2000 Server, Windows Server 2003, Windows XP Professional, AIX, i5/OS, Red Hat Linux, SUSE Linux, VMware, and Novell NetWare. For a complete list of operating systems that support IBM Director, see the IBM Director Compatibility Document. This document is in Portable Document Format (PDF) at http://www.ibm.com/systems/management/director/resources/. It is updated every 6 to 8 weeks.

- Support for IBM and non-IBM servers, desktop computers, workstations, and notebook computers.

- Support for systems-management industry standards.

- Integration into leading workgroup and enterprise systems-management environments.

- Ease of use, training, and setup.

IBM Director also provides an extensible platform that supports advanced server tools that are designed to reduce the total cost of managing and supporting

networked systems. By deploying IBM Director, you can achieve reductions in
ownership costs through the following benefits:

- Reduced downtime
- Increased productivity of IT personnel and users
- Reduced service and support costs

For more information about IBM Director, see the documentation on the *IBM
Director* CD that comes with the server, the IBM Director Information Center at
http://publib.boulder.ibm.com/infocenter/eserver/v1r2/topic/diricinfo_all/
diricinfoparent.html, and the IBM System x and xSeries Systems Management Web
page at http://www.ibm.com/systems/management/, which presents an overview of
IBM Systems Management and IBM Director.

## The Update*Xpress* program

The Update*Xpress* program is available for most System x and xSeries servers and
optional devices. It detects supported and installed device drivers and firmware in
the server and installs available updates. You can download the Update*Xpress*
program from the Web at no additional cost, or you can purchase it on a CD. To
download the program or purchase the CD, go to http://www.ibm.com/systems/
management/xpress.html. Additional information about Update*Xpress* is available
from the System x and xSeries Tools Center at http://publib.boulder.ibm.com/
infocenter/toolsctr/v1r0/index.jsp.

# Server controls, connectors, LEDs, and power

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

## Front view

The following illustration shows the controls, LEDs, and connectors on the front of the server.
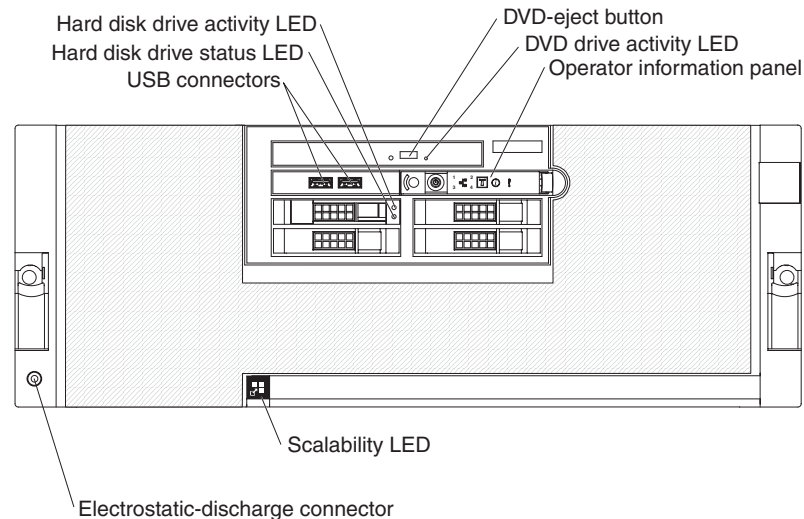


**Hard disk drive activity LED:** On some server models, each hot-swap hard disk drive has an activity LED. When this LED is flashing, it indicates that the drive is in use.

**Hard disk drive status LED:** On some server models, each hot-swap hard disk drive has a status LED. When this LED is lit continuously, that individual drive is faulty. When the drive is connected to the integrated SAS controller with RAID capabilities, a flashing status LED indicates that the drive is a secondary drive in a mirrored pair and the drive is being synchronized.

**USB connectors:** Connect USB devices to these connectors.

**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.

**Operator information panel:** This panel contains controls and LEDs. The following illustration shows the controls and LEDs on the operator information panel.
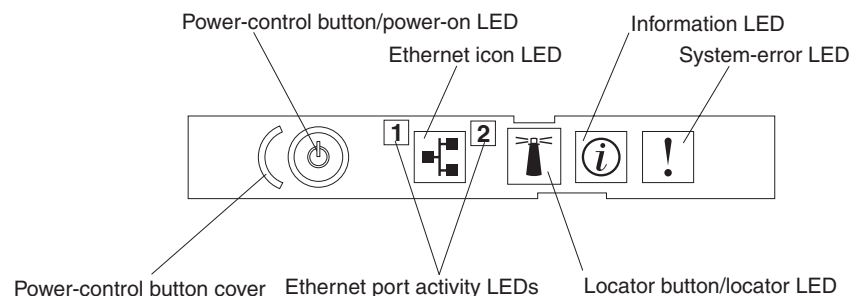


The following controls and LEDs are on the operator information panel:

- **Power-control button cover:** Slide this cover over the power-control button to prevent the server from being turned off accidentally.
- **Power-control button:** Press this button to turn the server on and off manually.
- **Power-on LED:** When this LED is lit and not flashing, it indicates that the server is turned on. When this LED is flashing, it indicates that the server is turned off and still connected to an ac power source. When this LED is off, it indicates that ac power is not present or the power supply or the LED itself has failed.

  **Note:** If this LED is off, it does not mean that there is no electrical power in the server. The LED might be burned out. To remove all electrical power from the server, you must disconnect the power cords from the electrical outlets.
- **Ethernet-icon LED:** This LED lights the Ethernet icon.
- **Ethernet activity LEDs:** When these LEDs flash, they indicate that there is activity between the server and the network on the indicated port.
- **Locator LED:** Use this LED to visually locate the server among other servers. You can use IBM Director to light this LED remotely or press the locator button to light the LED manually. This LED is also lit during startup.

  In multi-node configurations, when this LED flashes, it indicates that the server is the primary node. When this LED is lit continuously, it indicates that the server is a secondary node.
- **Locator button:** Press this button to turn the locator LED on and off manually. In multi-node configurations, press this button to turn the locator LED on and off in all nodes in the configuration.
- **Information LED:** When this LED is lit, it indicates that there is a suboptimal condition in the server and that light path diagnostics will light an additional LED to help isolate the condition. This LED and LEDs on the light path diagnostics panel remain lit until you resolve the condition or you press the remind button.
- **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.

**Electrostatic-discharge connector:** Connect an electrostatic-discharge wrist strap to this connector.

**Scalability LED:** When this LED is lit, it indicates that an optional scalability key is installed in the server, which enables support for connecting the server to other servers to form multi-node configurations.

# Rear view

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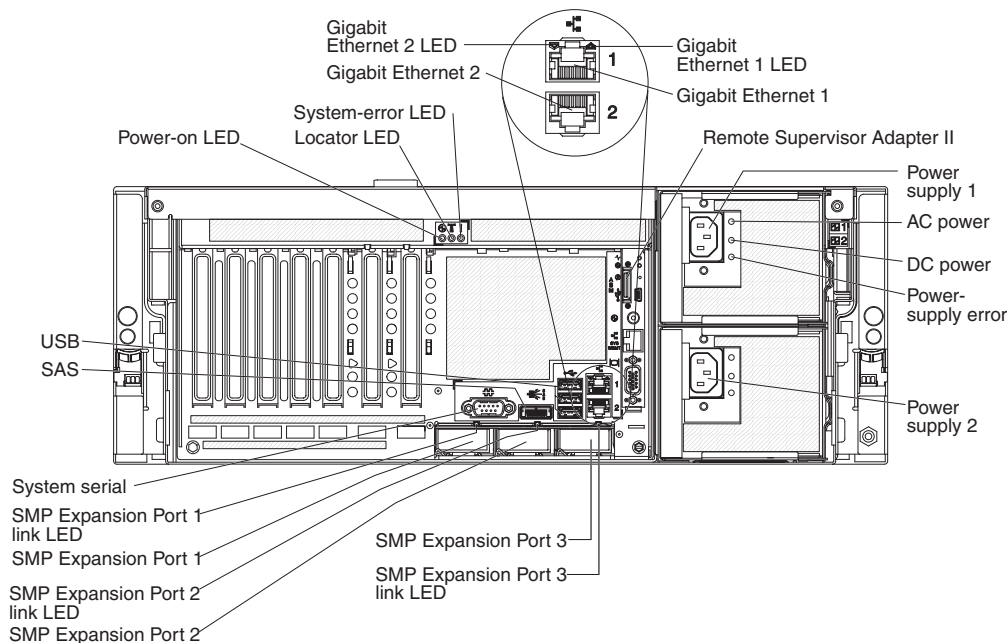


**Power-on LED:** When this LED is lit and not flashing, it indicates that the server is turned on. When this LED is flashing, it indicates that the server is turned off and still connected to an ac power source. When this LED is off, it indicates that ac power is not present or the power supply or the LED itself has failed.

**Note:** If this LED is off, it does not mean that there is no electrical power in the server. The LED might be burned out. To remove all electrical power from the server, you must disconnect the power cords from the electrical outlets.

**Locator LED:** Use this LED to visually locate the server among other servers. You can use IBM Director to light this LED remotely or press the locator button to light the LED manually. This LED is also lit during startup.

**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.

**Gigabit Ethernet 2 LED:** When this LED flashes, it indicates that there is activity between the server and the network. When this LED is lit continuously, it indicates that there is an active connection on the Ethernet port.

**Gigabit Ethernet 2 connector:** Use this connector to connect the server to a network.

**Gigabit Ethernet 1 LED:** When this LED flashes, it indicates that there is activity between the server and the network. When this LED is lit continuously, it indicates that there is an active connection on the Ethernet port.

**Gigabit Ethernet 1 connector:** Use this connector to connect the server to a network. This connector is shared with the baseboard management controller

(BMC) and is assigned two MAC addresses. For information about configuring the controller, see the *Broadcom NetXtreme Gigabit Ethernet Software* CD that comes with the server.

**Remote Supervisor Adapter II controls, connectors, and LEDs:** These controls, connectors, and LEDs are used for system management information and control.
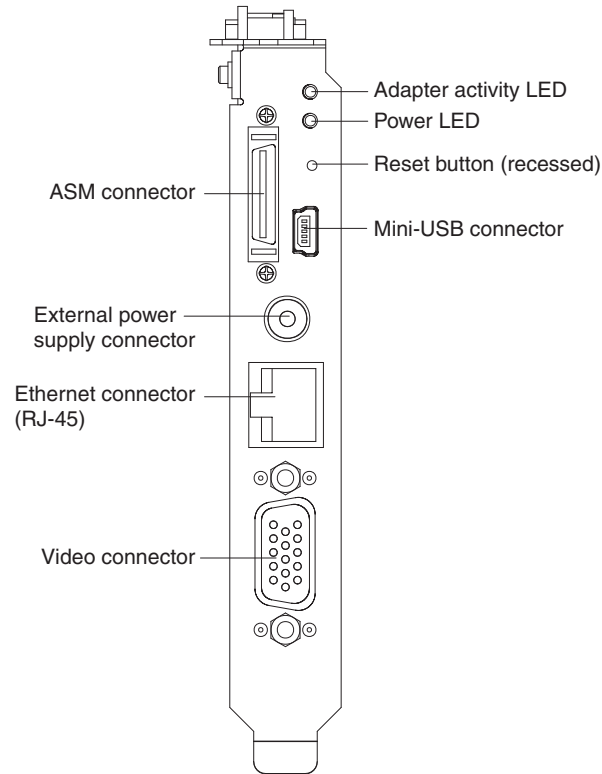


The following controls, connectors, and LEDs are on the Remote Supervisor Adapter II:

- **Adapter activity LED:** When this LED is flashing, the Remote Supervisor Adapter II is functioning normally. When this LED is lit continuously, there is a problem with the Remote Supervisor Adapter II. When the LED is off, the Remote Supervisor Adapter II is not functioning.

- **Power LED:** When this LED is lit, the Remote Supervisor Adapter II is receiving power from the server, or from an external power-supply.

- **Reset button:** (Trained service technician only) Insert and press the open end of a paper clip (or similar object) into the recessed reset button to manually reset the Remote Supervisor Adapter II.

- **Mini-USB connector:** This connector is not supported.

- **Video connector:** Use this connector to connect the server monitor.

- **Ethernet connector (RJ45):** Use this connector to connect a Category 3 (10 Mbps) or Category 5 (100 Mbps) Ethernet cable to enable a LAN connection.

- **External power-supply connector:** Use this connector to connect an external power-supply to the Remote Supervisor Adapter II.

- **ASM connector:** This connector is not supported.

**Power supply 1 connector:** Connect the power cord to this connector.

**AC power LED:** This green LED provides status information about the power supply. During typical operation, both the ac and dc power LEDs are lit. For any other combination of LEDs, see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.

**DC power LED:** This green LED provides status information about the power supply. During typical operation, both the ac and dc power LEDs are lit. For any other combination of LEDs, see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.

**Power-supply error LED:** When this amber LED is lit, it indicates that there is an error condition within the power supply. For more information, see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.

**Power supply 2 connector:** Connect the power cord to this connector.

**SMP Expansion Port 3 connector:** Use this connector to connect the server to other servers to form multi-node configurations (requires scalability enablement).

**SMP Expansion Port 3 link LED:** When this LED is lit, it indicates that there is an active connection on SMP Expansion Port 3.

**SMP Expansion Port 1 link LED:** When this LED is lit, it indicates that there is an active connection on SMP Expansion Port 1.

**SMP Expansion Port 1 connector:** Use this connector to connect the server to other servers to form multi-node configurations (requires scalability enablement).

**SMP Expansion Port 2 link LED:** When this LED is lit, it indicates that there is an active connection on SMP Expansion Port 2.

**SMP Expansion Port 2 connector:** Use this connector to connect the server to other servers to form multi-node configurations (requires scalability enablement).

**System serial connector:** Connect a 9-pin serial device to this connector.

**SAS connector:** Connect an internal SAS device to this connector.

**USB connectors:** Connect USB devices to these connectors.

# 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.

## Turning on the server

Approximately 20 seconds 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 start the operating system by pressing the power-control button.

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

- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If the server is installed in a static partition, you can turn on the server and start the operating system by pressing the power-control button on the primary node in the partition.
- If your operating system supports the systems-management software for the Remote Supervisor Adapter II, the systems-management software can turn on the server.
- If your operating system supports the Wake on LAN feature, the Wake on LAN feature can turn on the server.

**Note:** When 4 GB or more of memory (physical or logical) is installed, some memory is reserved for various system resources and might be 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 service processor, such as a remote request to turn on the server. While the server remains connected to ac power, one or more fans might continue to run. To remove all power from the server, you must disconnect it from the power source.

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

**Statement 5:**



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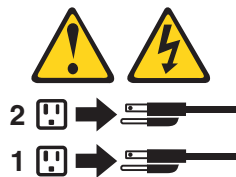


The server can be turned off in any of the following ways:
- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.
- You can press the power-control button 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.
- If the server is installed in a static partition, pressing the power-control button on the primary node in the partition will start an orderly shutdown of the operating system and turn off the server.
- The server can be turned off from the Remote Supervisor Adapter II user interface.
- If the Wake on LAN feature turned on the server, the Wake on LAN feature can turn off the server.
- You can turn off the server through a request from the service processor.

# Chapter 2. Installing optional devices

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

## Server components

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

Power backplane

Fan (92 mm)

Fan (120 mm)

Fan cage

Heat sink

Memory card guide

DIMM

Heat-sink blank

Microprocessor

Memory card

Microprocessor board

VRM

SAS hard disk drive backplane

Media hood

EIA mounting bracket (left)

DVD housing

Chassis

Media hood air baffle

DVD drive

Hard disk drive filler

EIA mounting bracket (right)

Bezel

Operator information panel

Front USB

Hard disk drive

*continued*

Top cover

Remote Supervisor Adapter II

PCI divider
with battery holder

Adapter-retention
bracket

ServeRAID-MR10k
controller

PCI divider

PCI switch-card
assembly

Hot-swap power supply

I/O board shuttle assembly

# Memory-card DIMM connectors

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

DIMM 1
DIMM 2
DIMM 3
DIMM 4
DIMM 5
DIMM 6
DIMM 7
DIMM 8
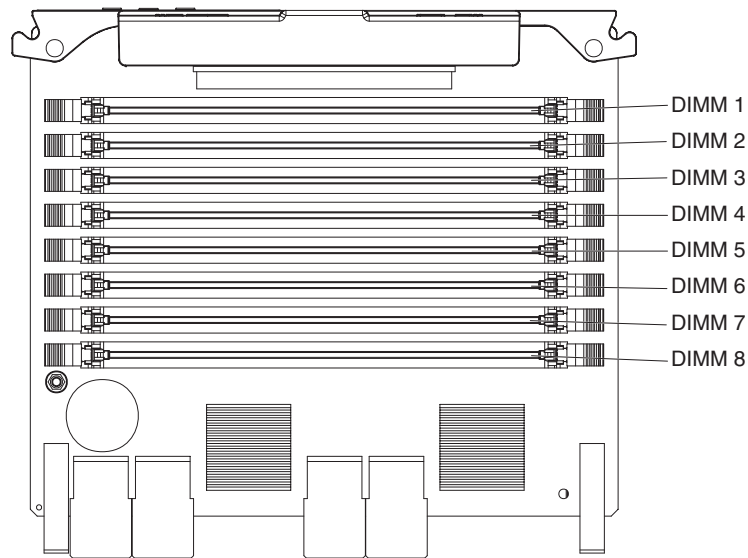
# Memory-card LEDs

The following illustration shows the LEDs on the memory card.

Memory hot-swap enabled LED
Memory-card/DIMM error LED
Memory-card power LED
Memory-card only error LED

Visible from top of memory card

DIMM 1 error LED
DIMM 2 error LED
DIMM 3 error LED
DIMM 4 error LED
DIMM 5 error LED
DIMM 6 error LED
DIMM 7 error LED
DIMM 8 error LED

Light path diagnostics button
Light path diagnostics button power LED
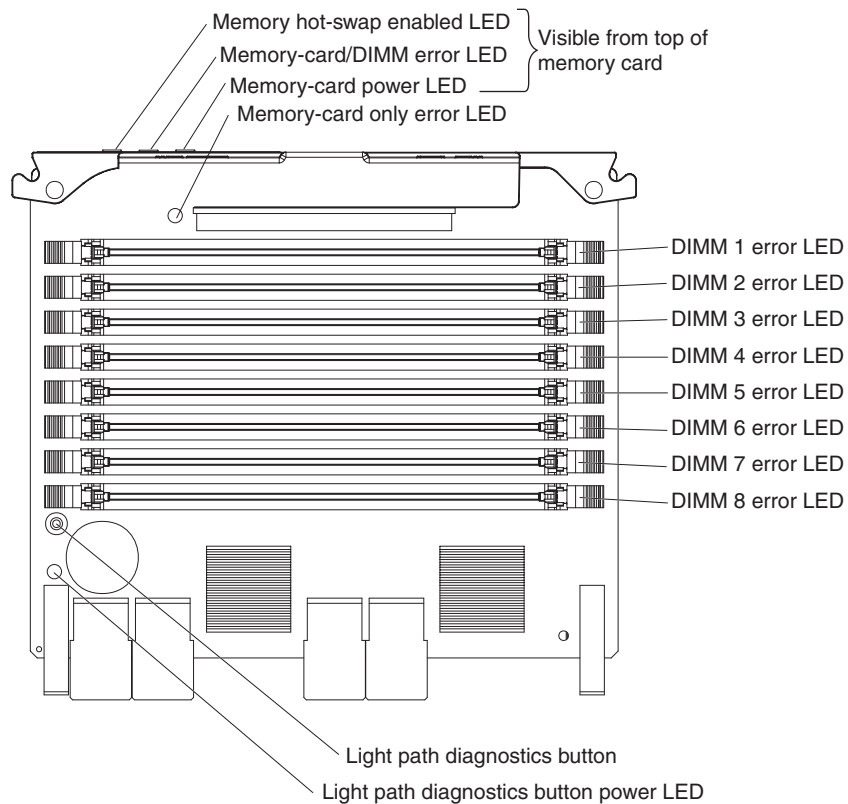
# Microprocessor-board connectors

The following illustration shows the connectors on the microprocessor board.

Power backplane    Scalability    I/O board

Fan 4    Fan 5
Fan 2    Fan 6
Fan 1    Fan 3
Microprocessor 3    Microprocessor 4
VRM 3    VRM 4
Microprocessor 1    Microprocessor 2
Memory card 1    Memory card 4
Memory card 2    Memory card 3
VRM 1    VRM 2
Scalability key
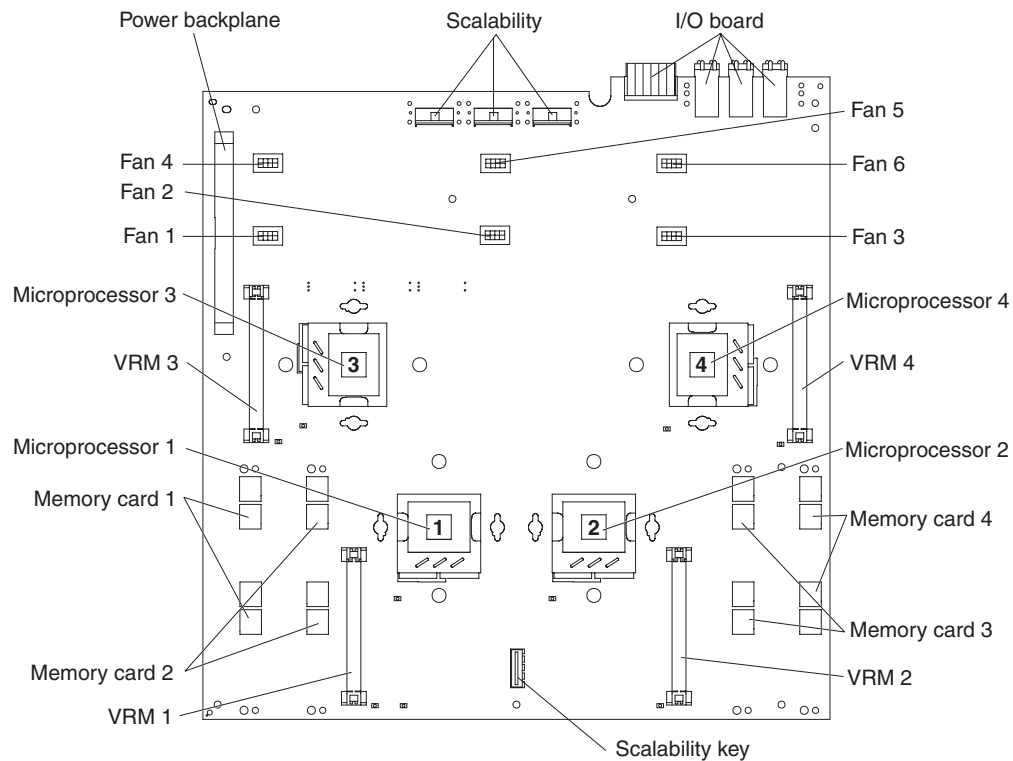
# Microprocessor-board LEDs

The following illustration shows the LEDs on the microprocessor board.
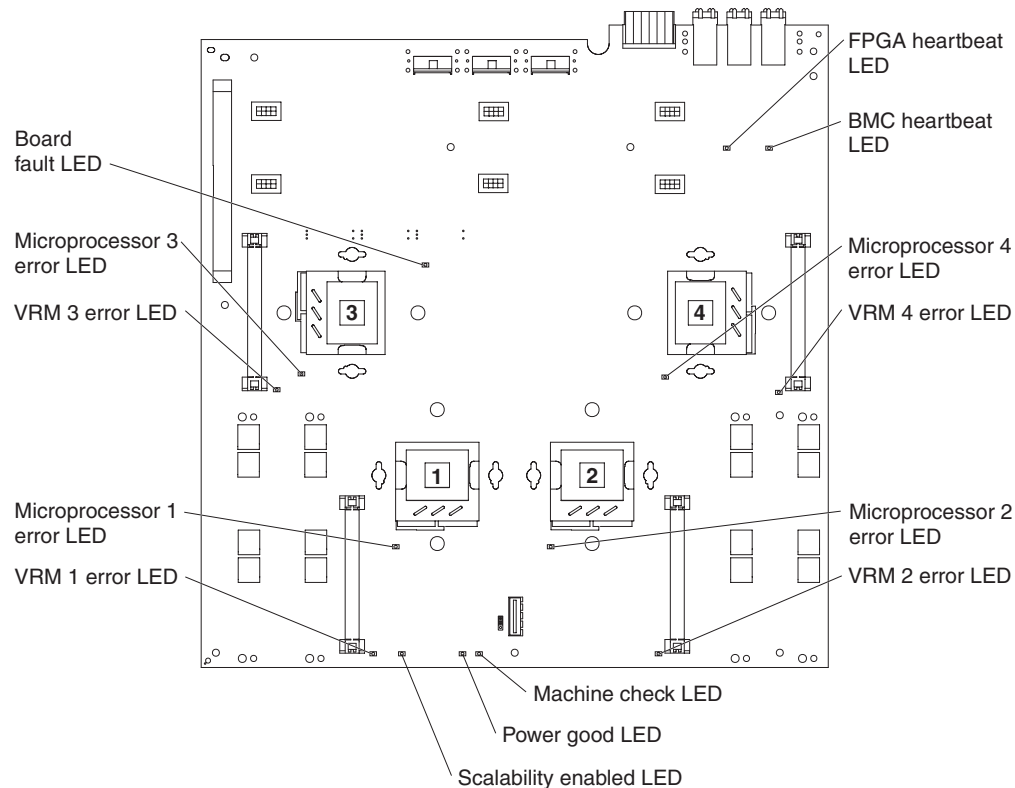


Table 2 describes the function of each status LED other than light path diagnostics LEDs.

*Table 2. Microprocessor-board status LEDs (other than light path diagnostics)*

| LED | Description |
|---|---|
| BMC heartbeat | When this LED is flashing, it indicates normal operation of the baseboard management controller. |
| FPGA heartbeat | When this LED is flashing, it indicates normal operation of the FPGA (field-programmable gate array) chip. |
| Machine check | When this LED is lit continuously, the server is prepared to capture a machine check. When this LED is flashing, the server has captured a machine check. When this LED is off, the server is not prepared to capture a machine check. |

# Microprocessor-board jumpers

The following illustration shows the jumpers on the microprocessor board.
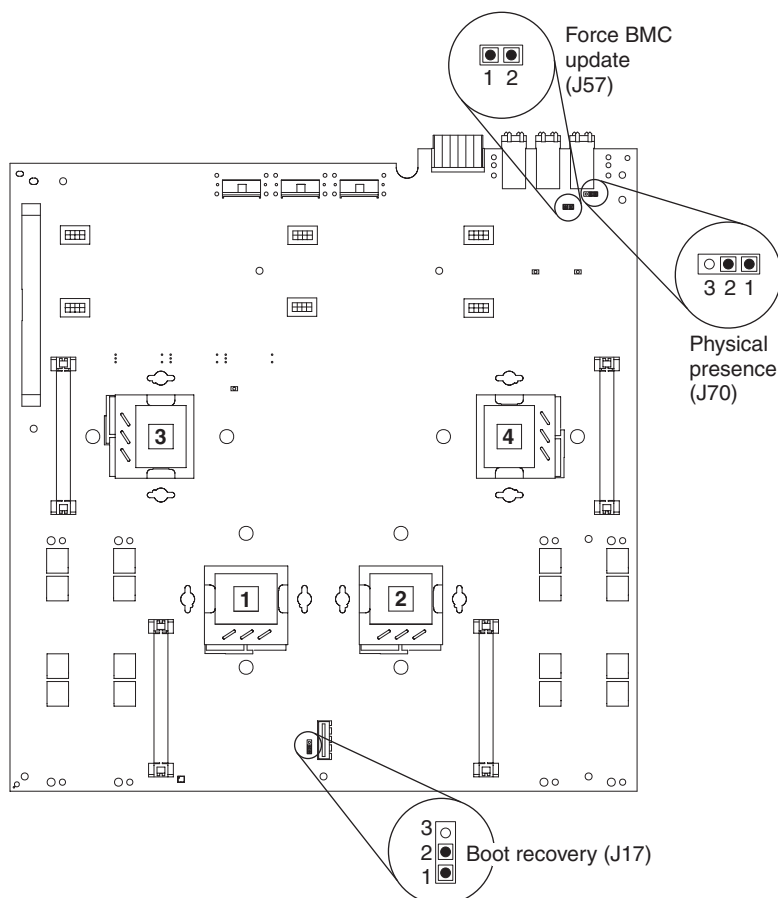


Table 3 describes the function of each jumper block.

*Table 3. Microprocessor-board jumper blocks*

| Jumper name | Description |
|---|---|
| Boot recovery (BIOS) (J17) | The default position is pins 1 and 2 (use the primary page during startup). Move the jumper to pins 2 and 3 to use the secondary page during startup. |
| Force BMC update (J57) | Place a jumper over pins 1 and 2 to bypass the operational firmware image and perform a baseboard management controller firmware update, if the operational image is corrupted.<br>**Note:** Only use the force BMC update jumper if the normal firmware update procedure fails and the operational firmware image is corrupted. Use of the force BMC update jumper disables normal baseboard management controller operation. |

## I/O-board connectors

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

Remote Supervisor Adapter II
Internal USB

ServeRAID-MR10k

SAS
backplane
signal

Remote
Supervisor
Adapter II
System
Management
access

Battery

Front USB

SATA signal

Hot-plug switch card

PCI Express x8
(x8 lanes) slot 1

PCI Express x8
(x8 lanes) slot 2

PCI Express x8
(x8 lanes) slot 3

PCI Express x8
(x8 lanes) slot 4

PCI Express x8
(x8 lanes) slot 5

PCI Express x8
(x8 lanes) slot 6

PCI Express x8
(x8 lanes) slot 7

SATA power

SAS backplane power

Front panel/light path diagnostics

DVD

If you are installing a hypervisor key, install it in the internal USB connector.

## I/O-board LEDs

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

I/O card
fault LED

ServeRAID-MR10k
fault LED

Power LED (2x)

Attention LED (7x)

RAID write
protect LED

SAS
heartbeat LED
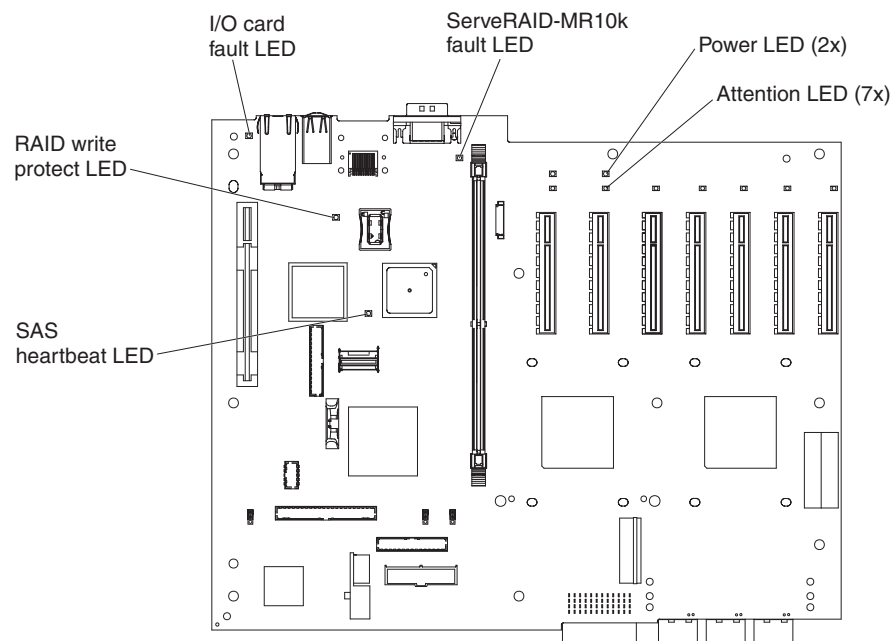
# I/O-board jumpers

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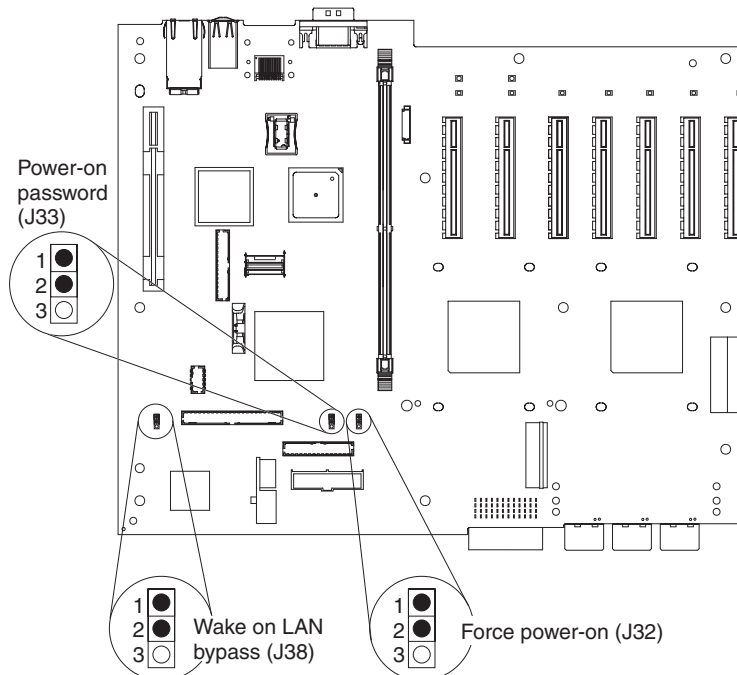


Table 4 describes the function of each jumper block.

*Table 4. I/O board jumper blocks*

| Jumper name | Description |
|---|---|
| Force power-on (J32) | The default position is pins 1 and 2. Change the position of this jumper to pins 2 and 3 to force the server to start when you connect the server to ac power.<br>**Note:** Use the force power-on jumper only for diagnosing power problems. POST might not be completed, and the server might not start. |
| Power-on password (J33) | The default position is pins 1 and 2. Change the position of this jumper to pins 2 and 3 to bypass the power-on password check.<br><br>Changing the position of this jumper does not affect the administrator password check if an administrator password is set. If the administrator password is lost, the microprocessor board must be replaced.<br><br>For more information about passwords, see "Passwords" on page 66. |
| Wake on LAN bypass (J38) | 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. |

# SAS-backplane connectors

The following illustration shows the connectors on the SAS backplane.

SAS hard disk drive
connectors

SAS signal connector

SAS power connector
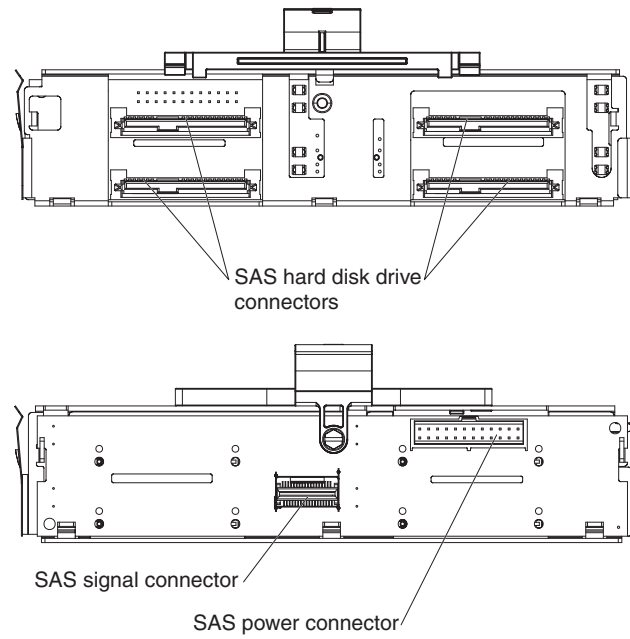
# Installation guidelines

Before you install optional devices, read the following information:

- Read the safety information that begins on page v, the guidelines in "Working inside the server with the power on" on page 29, and "Handling static-sensitive devices" on page 30. 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, complete the following steps.

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

  1. Go to http://www.ibm.com/systems/support/.
  2. Under **Product support**, click **System x**.
  3. Under **Popular links**, click **Software and device drivers**.
  4. Click **IBM System x3850 M2** or **IBM System x3950 M2** to display the matrix of downloadable files for the server.

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

- 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 "Solving Problems" in the *Installation Guide* for diagnostic information.

- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.

- If you must start the server while the cover is removed, make sure that no one is near the server and that no tools or other objects have been left inside the server.

- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you can stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.

- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.

- Back up all important data before you make changes to disk drives.

- Have a small flat-blade screwdriver available.

- You do not have to turn off the server to install or replace hot-swap power supplies, hot-swap fans, hot-plug adapters, 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.ibm.com/servers/eserver/serverproven/compat/us/.

## Limitations in a single-power-supply server operating at 110 V ac installation

If your server has only one power supply operating at 110 V ac, it will not support some optional devices. In a single-power-supply server operating at 110 V ac the following resources are supported:
- Up to two 2.66 GHz microprocessors or up to four slower microprocessors
- Sixteen DIMMs
- Three PCI expansion slots, if you do not install a video adapter or other high powered PCI devices

## System reliability guidelines

To help ensure proper system cooling and system reliability, make sure that the following requirements are met:
- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- 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 as soon as possible.
- 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 socket 2 always contains either a heat-sink blank or a microprocessor and heat sink.

## 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.

The server supports hot-plug, hot-add, and 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.
- The use of a grounding system is recommended. For example, wear an electrostatic-discharge wrist strap, if one is available. Always use an electrostatic-discharge wrist strap or other grounding system when you work inside the server with the power on.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part 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.

## Removing the cover and bezel

To remove the cover and bezel, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 28.
2. If you are installing or replacing a non-hot-swap component, turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Slide the server out of the rack until the slide rails lock into place.

Top cover

Cover release
latch

Bezel
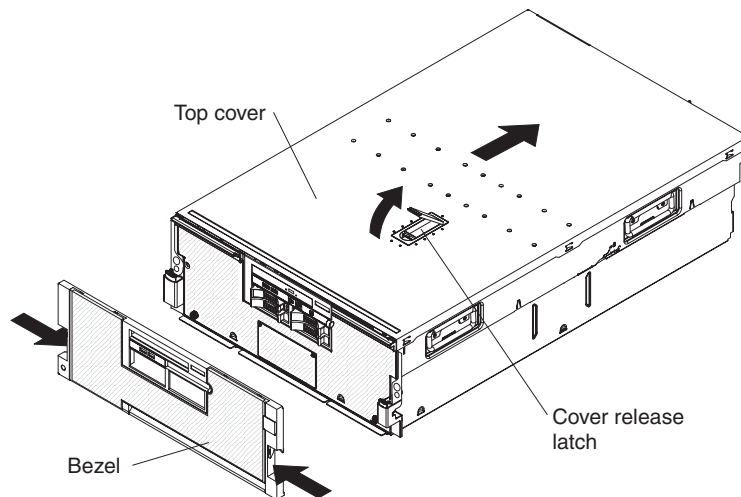
4. Lift the cover-release latch. The cover slides to the rear approximately 13 mm (0.5 inch). Lift the cover off the server.

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

5. Press on the bezel retention tabs on the sides of the bezel, and pull the bezel from the server.

**Attention:** Do not use the media hood handle to lift the server. Damage to the server might result. Only use the lift handles on each side of the chassis to lift the server.

## Installing a ServeRAID-MR10k SAS controller

An optional ServeRAID-MR10k SAS controller can be installed only in its dedicated connector on the I/O board. See the following illustration for the location of the connector on the I/O board. The ServeRAID-MR10k SAS controller is not cabled to the server, and no rerouting of the SAS cables is required.

**Note:** In multi-node configurations (requires scalability enablement), only two nodes can contain ServeRAID-MR10k SAS controllers.

To install a ServeRAID-MR10k SAS controller, complete the following steps.
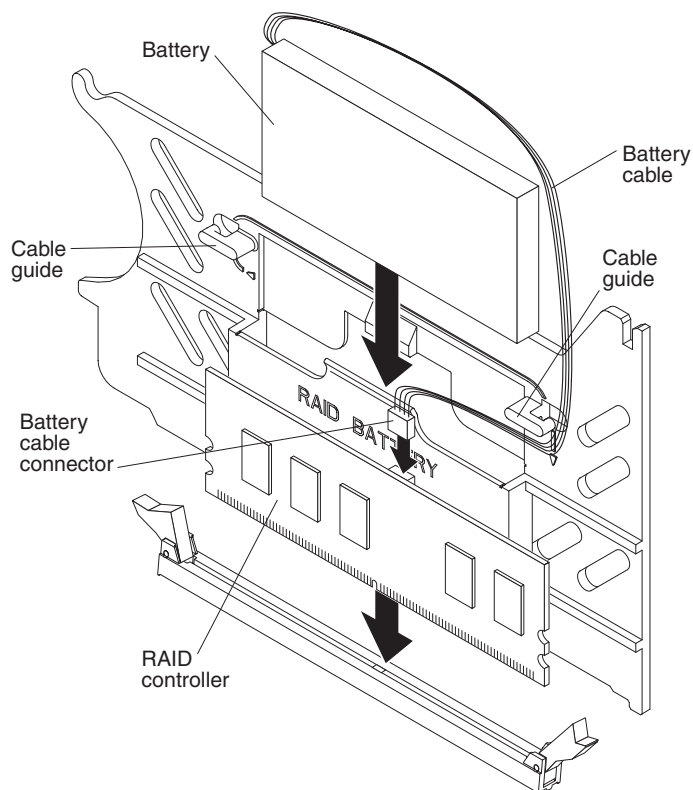
Battery

Battery
cable

Cable
guide

Cable
guide

Battery
cable
connector

RAID BATTERY

RAID
controller

1. Read the safety information that begins on page v and "Installation guidelines" on page 28.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables as necessary to replace the device.

   **Attention:** When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see "Handling static-sensitive devices" on page 30.
3. Remove the server cover (see "Removing the cover and bezel" on page 30).
4. Remove the divider that contains the battery holder from the server.
5. Open the retaining clip on each end of the connector.
6. Touch the static-protective package that contains the ServeRAID-MR10k SAS controller to any unpainted metal surface on the outside of the server; then, remove the controller from the package.
7. Turn the controller so that the keys align correctly with the slot.
8. Insert the controller into the connector by aligning the edges of the controller with the slots at the ends of the connector.

   **Attention:** Incomplete insertion might cause damage to the server or the ServeRAID-MR10k SAS controller.
9. Firmly press the controller straight down into the connector by applying pressure on both ends simultaneously. The retaining clips snap into the locked position when the controller is seated in the connector.
10. Install the battery in the divider that contains the battery holder.
11. Connect the battery cable to the ServeRAID-MR10k SAS controller.
12. Install the divider that contains the battery holder in the server.
13. Route the battery cable through the cable routing guides on the divider to the controller.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 55.

## Installing an adapter

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

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you must change the switch setting or jumper settings on the adapter, follow the instructions that come with the adapter.
- See the documentation that comes with the operating system for information about enabling a hot-plug PCI Express slot.
- Avoid touching the components and gold-edge connectors on the adapter.
- The server scans devices and PCI Express slots to assign system resources in the following order: integrated Ethernet controller, integrated SAS controller, and then PCI Express slots 1 through 7. If you have not changed the default startup sequence, the server starts the devices in the following order: DVD drive, USB-attached diskette drive, integrated SAS controller, PCI Express slots 1 through 7, and the integrated Ethernet controller.

   **Note:** To change the startup sequence, start the Configuration/Setup Utility program and select **Start Options** from the main menu. See "Using the Configuration/Setup Utility program" on page 60 for details about using the Configuration/Setup Utility program.
- You do not have to turn off the server to install a hot-plug adapters in slots 6 and 7. However, you must turn off the server when you perform any steps that involve installing or removing cables.
- The PCI Express bus configuration is as follows:
   - Non-hot-plug, half-length PCI Express x8 (x8 lanes): slot 1 through slot 5
   - Hot-plug, half-length PCI Express x8 (x8 lanes): slot 6 and slot 7

**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.

To install a non-hot-plug or hot-plug PCI Express adapter, complete the following steps.

**Note:** For hot-pluggable adapters, make sure that the PCI Express hot-plug device driver is installed.

1. Read the safety information that begins on page v and "Installation guidelines" on page 28.
2. If the adapter is not hot-pluggable, turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server cover (see "Removing the cover and bezel" on page 30) and determine which PCI Express expansion slot you will use for the adapter.

Attention
LED
(yellow)

Power
LED
(green)

Tab

Adapter
retention
latch

PCI
divider
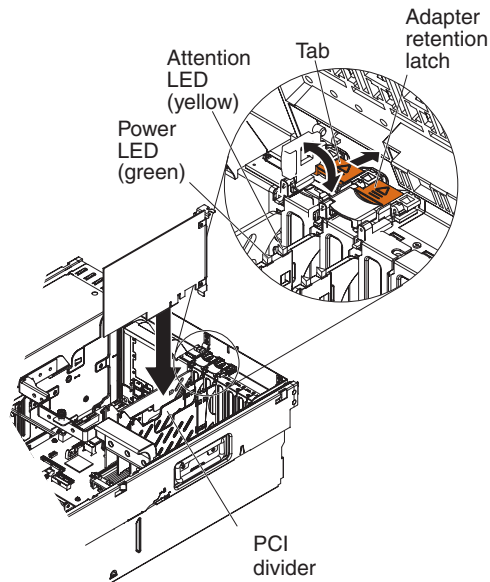
**Note:** The adapter-retention bracket is not shown in the illustration.

4. 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.

5. Rotate the adapter-retention bracket to the open position.

6. If you are installing the adapter in slot 6 or slot 7, push the orange adapter retention latch toward the rear of the server and open the tab. The power LED for the slot turns off.

7. Remove the expansion-slot cover.

   **Attention:** When you install an adapter, avoid touching the components and gold-edge connectors on the adapter. Make sure that the adapter is correctly seated in the connector. Incorrectly seated adapters might cause damage to the I/O board or to the adapter.

8. Touch the static-protective package that contains the adapter to any unpainted surface on the outside of the server; then, grasp the adapter by the top edge or upper corners of the adapter and remove it from the package.

9. Carefully grasp the adapter by its top edge or upper corners, and align it with the connector on the I/O board.

10. Press the adapter *firmly* into the adapter connector.

11. Optionally, if you are installing the adapter in slot 1 through slot 5, install an expansion-slot screw to secure the adapter.

    **Note:** The expansion-slot screws are on the adapter-retention bracket.

12. If you are installing the adapter in slot 6 or slot 7, close the tab; then, push down on the orange adapter retention latch until it clicks into place, securing the adapter.

13. Rotate the adapter-retention bracket to the closed position.

14. If you are installing a low-profile adapter, install a ratchet pin in the adapter-retention bracket to secure the adapter. Press the ratchet pin until it touches the top edge of the adapter.

Retention pin

Adapter-retention
bracket
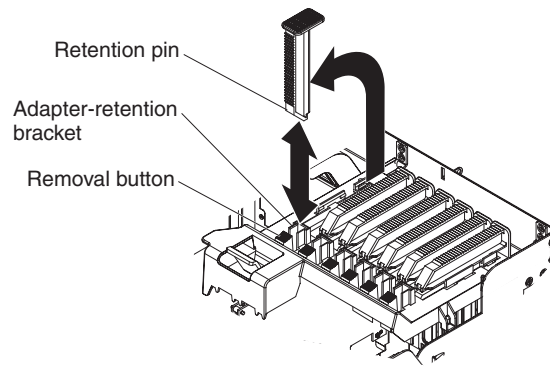
Removal button

**Note:** Press the removal button and pull up on the ratchet pin to remove the ratchet pin from the adapter-retention bracket.

15. Connect any required cables to the adapter.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 55.
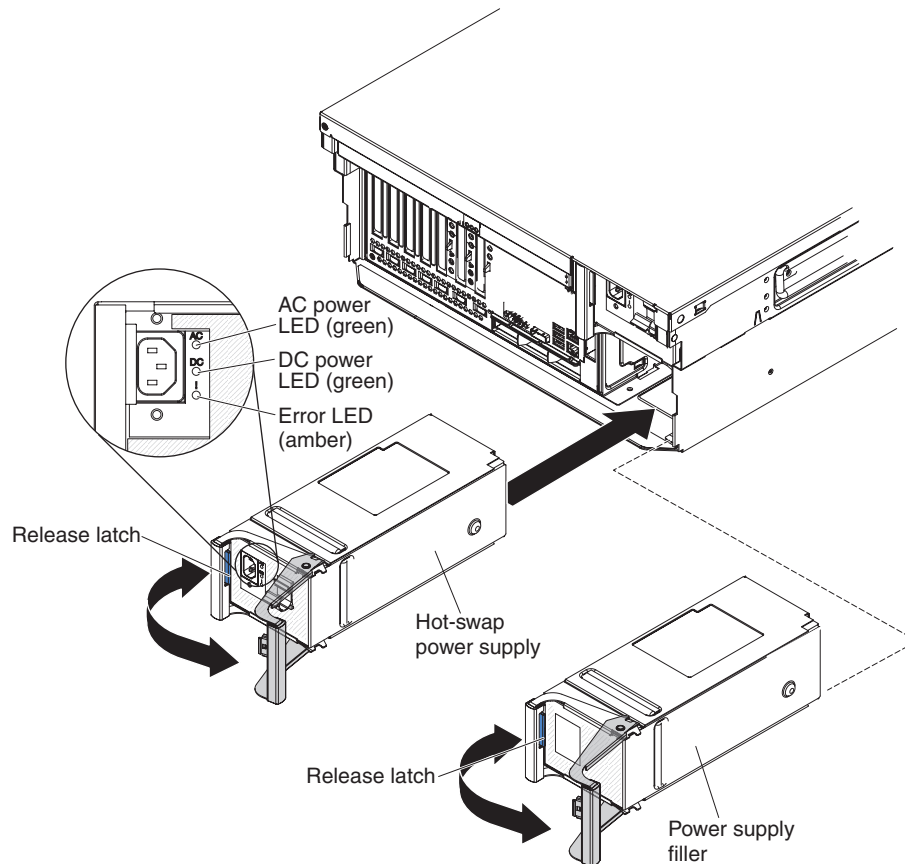
## Installing a hot-swap power supply

**Statement 5:**



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

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

1. Read the safety information that begins on page v and "Handling static-sensitive devices" on page 30.
2. Press the blue release latch on the filler panel and pull the handle to the open position, then remove the filler panel from power-supply bay 2.
3. Press the orange release latch on the power-supply handle and pull the handle to the open position.
4. Slide the power supply into the bay and fully close the locking handle.
5. Connect one end of the power cord for the new power supply into the ac connector on the back of the power supply, and connect the other end of the power cord into a properly grounded electrical outlet.
6. Make sure that the ac power LED on the power supply is lit, indicating that the power supply is operating correctly. If the server is turned on, make sure that the dc power LED on the top of the power supply is lit also.

## Installing a hot-swap hard disk drive

The following notes describe the types of hard disk drives that the server supports and other information that you must consider when you install a hard disk drive:

- The server supports up to four 1-inch (26 mm) slim-high, 2.5-inch, hot-swap hard disk drives in the standard hot-swap bays.
- For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.
- Inspect the drive tray for signs of damage.
- Make sure that the drive is correctly installed in the tray.

- If the server will be configured for RAID operation, see the documentation that comes with the controller for instructions for installing a hard disk drive.
- All hot-swap drives in the server should have the same throughput speed rating; using drives with different speed ratings might cause all drives to operate at the lowest throughput speed.
- To minimize the possibility of damage to the hard disk drives when you install the server in a rack configuration, install the server in the rack before you install the hard disk drives.
- You do not have to turn off the server to install hot-swap drives in the hot-swap drive bays. However, you must turn off the server when you perform any steps that involve installing or removing cables.
- Some filler panels come with slim fillers.

The following illustration shows how to install a hot-swap hard disk drive.



Filler panel

Drive-tray assembly

Drive handle
(in open position)
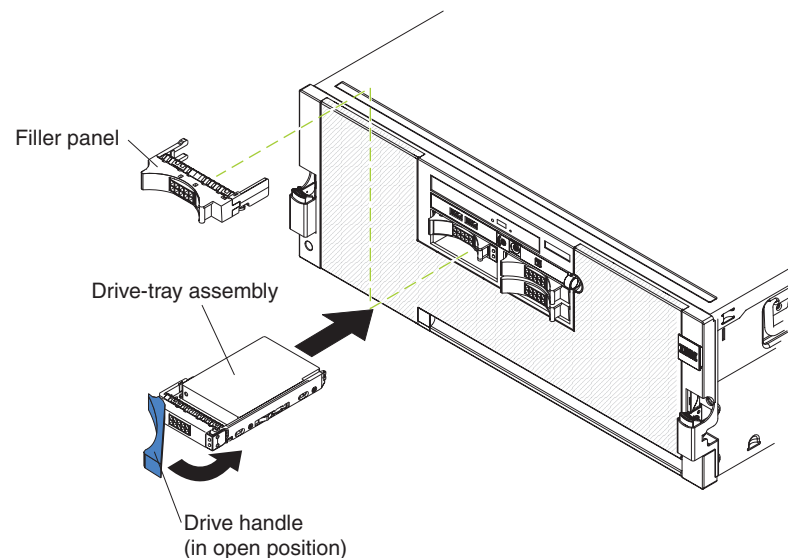
To install a hot-swap hard disk drive, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 28.
2. Remove the filler panel from one of the empty hot-swap bays.
3. 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.
4. Make sure that the tray handle is open; then, install the hard disk drive into the hot-swap bay.

**Note:** When you turn on the server, check the hard disk drive status LEDs to make sure that the hard disk drive is operating correctly. If the amber hard disk drive status LED for a drive is lit continuously, that drive is faulty and must be replaced. If the green hard disk drive activity LED is flashing, the drive is being accessed.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 55.

# Installing a DVD drive
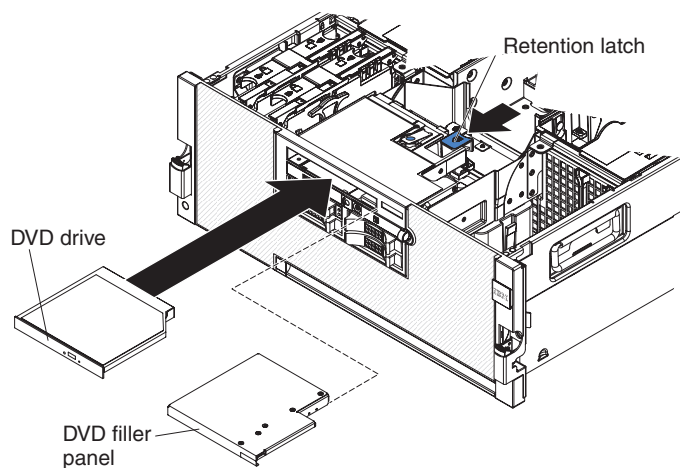


To install a DVD drive, compete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 28.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the top cover.
4. Remove the filler panel from the DVD drive bay.
5. Slide the DVD drive into the server until it engages the interposer card or the SATA cable.

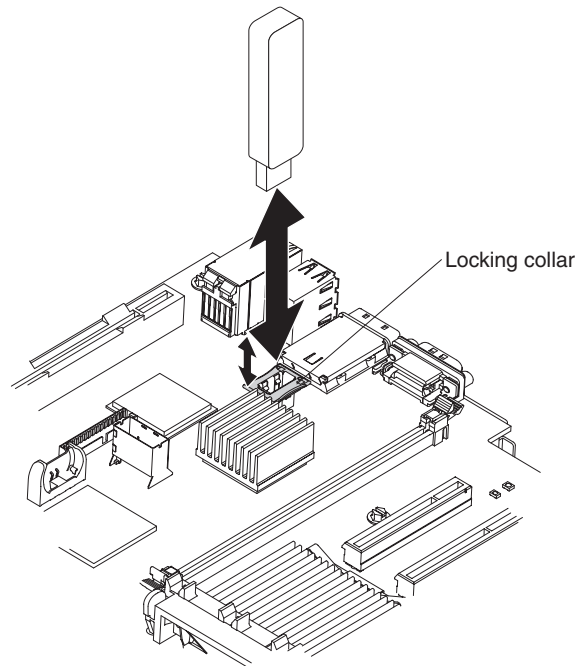If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 55.

# Installing an internal removable flash drive

The server supports one internal removable flash drive that is installed in a USB connector on the I/O board. You do not have to turn off the server to install an internal removable flash drive.

To install an internal removable flash drive, complete the following steps.

Locking collar

1. Read the safety information that begins on page v and "Installation guidelines" on page 28.
2. Remove the server cover (see "Removing the cover and bezel" on page 30).
3. Insert the drive into the connector.
4. Pull up on the locking collar to lock the drive in place.

**Note:** To remove an internal removable flash drive, push down on the connector to unlock the drive before you remove the drive.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 55.

## Memory module

The following notes describe the types of dual inline memory modules (DIMMs) that the server supports and other information that you must consider when you install DIMMs:

- The server supports 1.8 V, 240-pin, PC2-5300 double data-rate (DDR) II, registered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest PC2-5300 SDRAM Registered DIMM specifications. For a list of the supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.
- The server supports up to four memory cards. Each memory card holds up to eight DIMMs.
- 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.
- You do not have to save new configuration information to the BIOS when you install or remove DIMMs. The only exception is if you replace a DIMM that was

designated as **Disabled** in the **Memory Settings** menu. In this case, you must re-enable the row in the Configuration/Setup Utility program 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.
- Populate the memory-card connectors in numeric order, starting with connector 1. The following illustration shows the locations of the memory-card connectors.
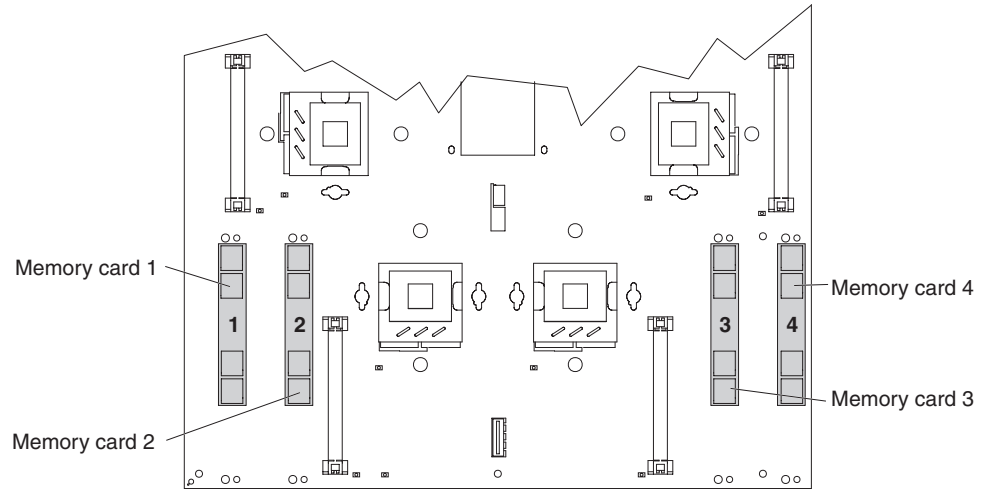


- The following illustration shows the DIMM connectors on the memory card.
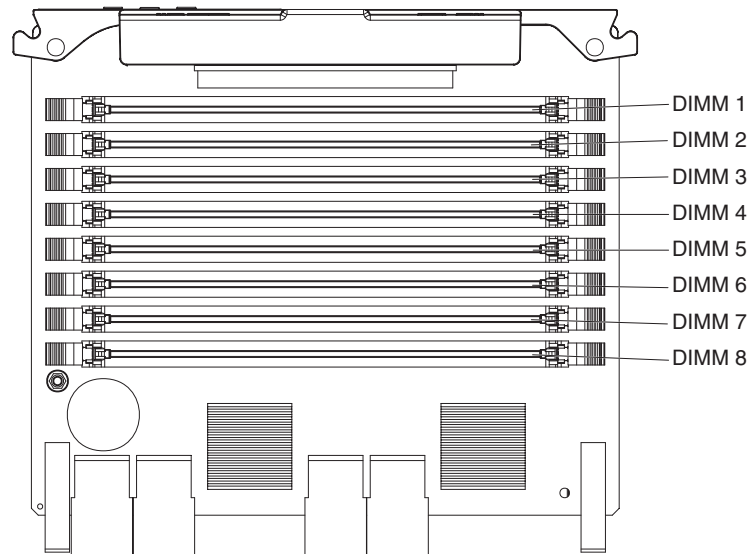


- Install the DIMMs on each memory card in the order shown in the following tables, depending on which memory configuration you want to use. You must install at least one pair of DIMMs on each memory card.

*Table 5. Low-cost memory-card installation sequence*

| DIMM pair installation order | Memory card | Connector numbers |
|---|---|---|
| First | 1 | 1 and 5 |
| Second | 2 | 1 and 5 |
| Third | 1 | 2 and 6 |
| Fourth | 2 | 2 and 6 |

*Table 5. Low-cost memory-card installation sequence (continued)*

| DIMM pair installation order | Memory card | Connector numbers |
|---|---|---|
| Fifth | 1 | 3 and 7 |
| Sixth | 2 | 3 and 7 |
| Seventh | 1 | 4 and 8 |
| Eighth | 2 | 4 and 8 |
| Ninth | 3 | 1 and 5 |
| Tenth | 4 | 1 and 5 |
| Eleventh | 3 | 2 and 6 |
| Twelfth | 4 | 2 and 6 |
| Thirteenth | 3 | 3 and 7 |
| Fourteenth | 4 | 3 and 7 |
| Fifteenth | 3 | 4 and 8 |
| Sixteenth | 4 | 4 and 8 |

*Table 6. High-performance memory-card installation sequence*

| DIMM pair installation order | Memory card | Connector numbers |
|---|---|---|
| First | 1 | 1 and 5 |
| Second | 2 | 1 and 5 |
| Third | 3 | 1 and 5 |
| Fourth | 4 | 1 and 5 |
| Fifth | 1 | 2 and 6 |
| Sixth | 2 | 2 and 6 |
| Seventh | 3 | 2 and 6 |
| Eighth | 4 | 2 and 6 |
| Ninth | 1 | 3 and 7 |
| Tenth | 2 | 3 and 7 |
| Eleventh | 3 | 3 and 7 |
| Twelfth | 4 | 3 and 7 |
| Thirteenth | 1 | 4 and 8 |
| Fourteenth | 2 | 4 and 8 |
| Fifteenth | 3 | 4 and 8 |
| Sixteenth | 4 | 4 and 8 |

*Table 7. Memory-card installation sequence for memory-mirroring configuration*

| DIMM pair installation order | Memory card | Connector numbers |
|---|---|---|
| First | 1 | 1 and 5 |
|  | 2 | 1 and 5 |
| Second | 3 | 1 and 5 |
|  | 4 | 1 and 5 |

*Table 7. Memory-card installation sequence for memory-mirroring configuration (continued)*

| DIMM pair installation order | Memory card | Connector numbers |
|---|---|---|
| Third | 1 | 2 and 6 |
| | 2 | 2 and 6 |
| Fourth | 3 | 2 and 6 |
| | 4 | 2 and 6 |
| Fifth | 1 | 3 and 7 |
| | 2 | 3 and 7 |
| Sixth | 3 | 3 and 7 |
| | 4 | 3 and 7 |
| Seventh | 1 | 4 and 8 |
| | 2 | 4 and 8 |
| Eighth | 3 | 4 and 8 |
| | 4 | 4 and 8 |

- There are four memory power buses, which are split among the four memory cards.
- For 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, and memory cards 3 and 4 mirror each other.
- If a problem with a DIMM is detected, light path diagnostics will light 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 visible on top of the memory card.

Memory hot-swap
enabled LED

Memory card/DIMM
error LED

Memory card
power LED
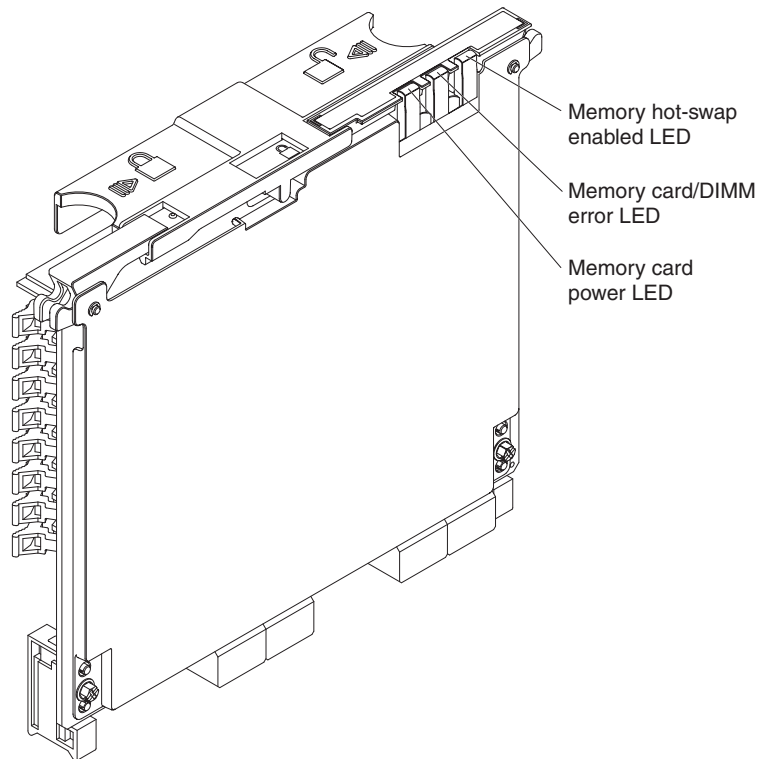
**Memory hot-swap enabled LED:** When this LED is lit, it indicates that hot-swap memory is enabled.

**Memory card/DIMM error LED:** When this LED is lit, it indicates that a memory card or DIMM has failed.

**Memory card power LED:** When this LED is off, it indicates that power is removed from the card and that you can remove the memory card and replace a failed DIMM. This LED also turns off when the release levers are opened.

## Active Memory

Active Memory is an IBM technology that improves the reliability of the DIMMs through the memory mirroring, memory scrubbing, and Memory ProteXion™ features.

The following notes describe the Active Memory features:

- Memory mirroring enables you to improve the reliability of the memory in your server by creating a mirror of the data in memory port 1 and storing it in memory port 2.

  **Note:** For memory mirroring to work, DIMMs of the same size and clock speed must be installed in both memory ports.

  To enable memory mirroring, complete the following steps:

  1. Install DIMMs of the same size and clock speed in the two memory ports.
  2. Enable memory mirroring in the Configuration/Setup Utility program:
     a. Turn on the server.
     b. When the prompt `Press F1 for Configuration/Setup` is displayed, press F1.
     c. From the Configuration/Setup Utility main menu, select **Advanced Setup**.
     d. Select **Memory Settings**.

e. Select **Memory Mirroring Settings**.

f. Enable the memory mirroring setting from within this window.

g. Save the settings and exit the Configuration/Setup Utility program.

When memory mirroring is enabled, the data that is written to memory is stored in two locations. One copy is stored in the memory port 1 DIMMs, and a second copy is stored in the memory port 2 DIMMs. During a read operation, the data is read from the DIMM with the fewest reported memory errors through memory scrubbing.

If memory scrubbing determines that a DIMM is damaged beyond use, read and write operations are redirected to the remaining good DIMMs. Memory scrubbing then reports the damaged DIMM, and light path diagnostics displays the error. After the damaged DIMM is replaced, memory mirroring then copies the mirrored data back into the new DIMM.

• Memory scrubbing is an automatic daily test of all the system memory that detects and reports memory errors that might be developing before they cause a server outage.

**Note:** Memory scrubbing and Memory ProteXion technology work with each other and do not require that memory mirroring be enabled.

When an error is detected, memory scrubbing determines whether the error is recoverable. If it is recoverable, Memory ProteXion is enabled, and the data that was stored in the damaged locations is rewritten to a new location. The event is logged for informational purposes. Provided that there are enough good locations to enable the correct operation of the server, no further action is taken other than recording the event in the error logs.

If the error is not recoverable, memory scrubbing sends an error message to light path diagnostics, which lights LEDs to guide you to the damaged DIMM. If memory mirroring is enabled, the mirrored copy of the data in the mirrored DIMM is used to refresh the new DIMM after it is installed.

• Memory ProteXion reassigns memory bits to new locations within memory when recoverable errors have been detected.

When a recoverable error is found by memory scrubbing, the Memory ProteXion feature writes the data that was to be stored in the damaged memory locations to spare memory locations within the same DIMM.

# Adding and replacing a memory card

At least one memory card with one pair of DIMMs must be installed for the server to operate correctly.

## Adding a memory card

To add a memory card, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 28.

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 server cover (see "Removing the cover and bezel" on page 30).

4. Prepare the memory card:

   a. Touch the static-protective package that contains the memory card to any unpainted surface on the outside of the server; then, remove the memory card from the package.

   b. Place the memory card on a flat, static-protective surface, with the DIMM connectors facing up.

    c. Install DIMMs in the memory card (see "Installing DIMMs" on page 46).

5. Add the memory card.

   **Attention:** When you move the memory card, do not allow it to touch any components or structures inside the server.

   a. Grasp the memory card by the retention levers and turn the memory card so that the connector aligns with the connector on the microprocessor board and the guides on the chassis.

   b. Insert the memory card into the memory-card connector.

   c. Press the memory card into the connector and close the retention levers.

   d. Slide the orange release latch to the locked position.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 55.

## Hot-replacing a memory card

For you to hot-replace a memory card, memory mirroring must be enabled. See "Active Memory" on page 43 for information about how to enable memory mirroring.

To hot-replace a memory card in the server, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 28.

   **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.

2. Remove the server cover (see "Removing the cover and bezel" on page 30).

3. Make sure the memory hot-swap enabled LED is lit. If the LED is not lit, enable memory mirroring (see "Active Memory" on page 43).

4. Prepare the new memory card:

   a. Touch the static-protective package that contains the memory card to any unpainted surface on the outside of the server; then, remove the memory card from the package.

   b. Place the memory card on a flat, static-protective surface, with the DIMM connectors facing up.

   c. Install memory DIMMs in the memory card (see "Installing DIMMs" on page 46).

   **Attention:** When you move the memory card, do not allow it to touch any components or structures inside the server.

5. Remove the memory card from the server:

   a. Slide the orange release latch to the unlocked position.

      **Attention:** To avoid loss of data, make sure that the memory port power LED is off before you remove the memory card.

   b. Make sure that the retention levers on the edge of the memory card are fully open.

   c. Lift the memory card out of the server.

6. Replace the memory card:

   a. Grasp the new memory card by the retention levers and turn the memory card so that the connector aligns with the connector on the microprocessor board and the guides on the chassis.

b. Insert the memory card into the memory-card connector.
  c. Press the memory card into the connector and close the small retention lever.
  d. Wait 2 seconds and close the large retention lever.
  e. Slide the orange release latch to the locked position.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 55.
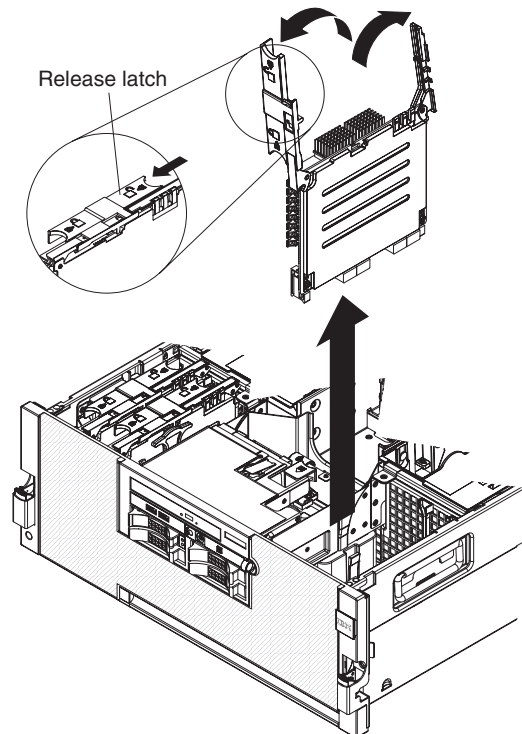
# Installing DIMMs

DIMMs must be installed in pairs of the same type and speed. For you to use the memory mirroring feature, all the DIMMs that are installed in the server must be the same type and speed, and the operating system must support memory mirroring. The following instructions are for installing one pair of DIMMs. To install DIMM pairs on more than one memory card, repeat steps 3 though 7 for each memory card.

## Installing a DIMM

To install a DIMM, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 28.
2. If you are not hot-swapping a DIMM, 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 server cover (see "Removing the cover and bezel" on page 30).

   **Attention:** When you move the memory card, do not allow it to touch any components or structures inside the server.



4. Remove the memory card:
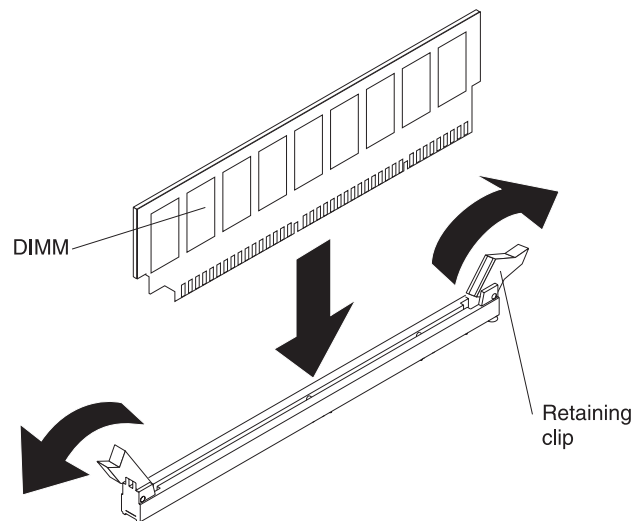   a. Slide the orange release latch to the unlocked position.

> **Attention:** To avoid loss of data, make sure that the memory port power LED is off before you remove the memory card.

    b. Open the retention levers on the top of the memory card.

    c. While you hold the retention levers open, lift the memory card out of the server.

5. Place a 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 on each end of the DIMM connector.

7. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the outside of the server. Then, remove the DIMM from the package.

8. Turn the DIMM so that the DIMM keys align correctly with the slot.



9. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.

    **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.

10. Replace the memory card:

    a. Insert the memory card into the memory-card connector.

    b. Press the memory card into the connector and close the retention levers.

    c. Slide the orange release latch to the locked position.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 55.

## Hot-swapping DIMMs

To hot-swap DIMMs, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 28.

**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.

2. Remove the server cover (see "Removing the cover and bezel" on page 30).

3. Make sure that the memory hot-swap enabled LED is lit. If the LED is not lit, enable memory mirroring (see "Active Memory" on page 43).
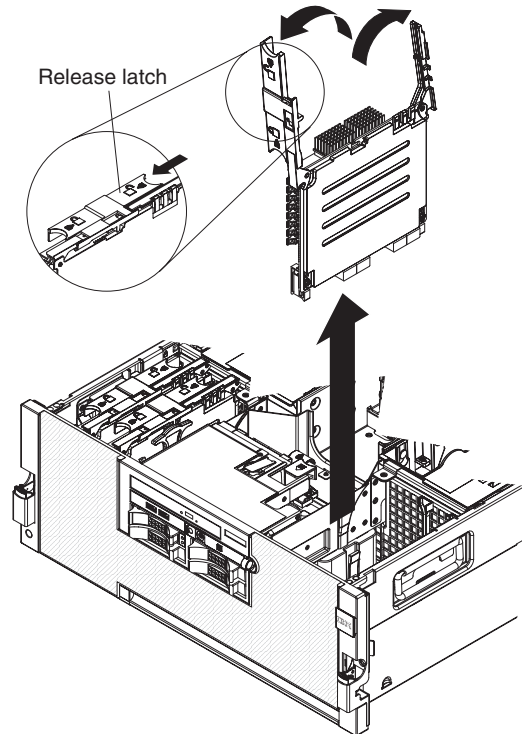


4. Remove the memory card:

   a. Slide the orange release latch to the unlocked position.

      **Attention:**

      • When you move the memory card, do not allow it to touch any components or structures inside the server.

      • To avoid loss of data, make sure that the memory port power LED is off before you remove the memory card.

   b. Open the retention levers on the top of the memory card.

   c. While you hold the retention levers open, lift the memory card out of the server.

5. Place a 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 on each end of the DIMM connector and remove the DIMM or DIMMs that you are replacing.

7. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the outside of the server; then, remove the DIMM from the package.

8. Turn the DIMM so that the DIMM keys align correctly with the slot.

9. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.

   **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.

10. Replace the memory card:
    a. Insert the memory card into the memory-card connector.
    b. Press the memory card into the connector and close the small retention lever.
    c. Wait 2 seconds and close the large retention lever.
    d. Slide the orange release latch to the locked position.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 55.

## Hot-adding DIMMs

The following notes describe information that you must consider when you hot-add DIMMs and memory cards:

- The server must contain a minimum of 4 GB of memory.
- You must enable hot-add memory in the Configuration/Setup Utility program:
  1. Turn on the server.
  2. When the prompt `Press F1 for Configuration/Setup` is displayed, press F1.
  3. From the Configuration/Setup Utility main menu, select **Advanced Setup**.
  4. Select **Memory Settings**.
  5. Enable the hot-add setting from within this window.
  6. Save the settings and exit the Configuration/Setup Utility program.
- The operating system must support the hot-add feature.
- If a single memory card is installed in memory-card connector 1, you can hot-add a memory card only in memory-card connector 2.
- If a single memory card is installed in memory-card connector 3, you can hot-add a memory card only in memory-card connector 4.
- If two memory cards are installed in memory-card connectors 1 and 3, you can hot-add two memory cards only in memory-card connectors 2 and 4.

To hot-add DIMMs and memory cards, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 28.

   **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.

2. Remove the server cover (see "Removing the cover and bezel" on page 30).

3. Place a 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.

4. Open the retaining clip on each end of the DIMM connector.

5. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the outside of the server; then, remove the DIMM from the package.

6. Turn the DIMM so that the DIMM keys align correctly with the slot.

7. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.

   **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.
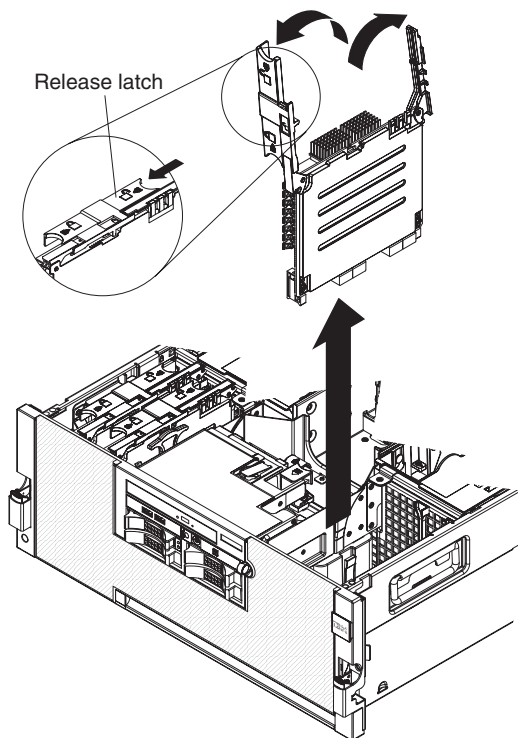


8. Open the memory-card retention levers on the top of the memory card.
   **Attention:** When you move the memory card, do not allow it to touch any components or structures inside the server.

9. Insert the memory card into the memory-card connector.

10. Press the memory card into the connector and close the small retention lever.

11. Wait 2 seconds and close the large retention lever.

12. Slide the orange release latch to the locked position.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 55.

## Installing a microprocessor

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

- For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/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 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.
- The voltage regulators that come with the optional microprocessor must be installed on the microprocessor board.
- Read the documentation that comes with the microprocessor to determine whether you have to update the basic input/output system (BIOS) code. To download the most current level of BIOS code for the server, complete the following steps.

  **Note:** Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.
  1. Go to http://www.ibm.com/systems/support/.
  2. Under **Product support**, click **System x**.
  3. Under **Popular links**, click **Software and device drivers**.
  4. Click **IBM System x3850 M2** or **IBM System x3950 M2** to display the matrix of downloadable files for the server.
- Obtain an SMP-capable operating system. For a list of supported operating systems, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.
- You can use the Configuration/Setup Utility program to determine the specific type of microprocessor in the server.
- Populate the microprocessor sockets in numeric order, starting with socket 1. The following illustration shows the locations of the microprocessor sockets and VRM connectors on the microprocessor board.
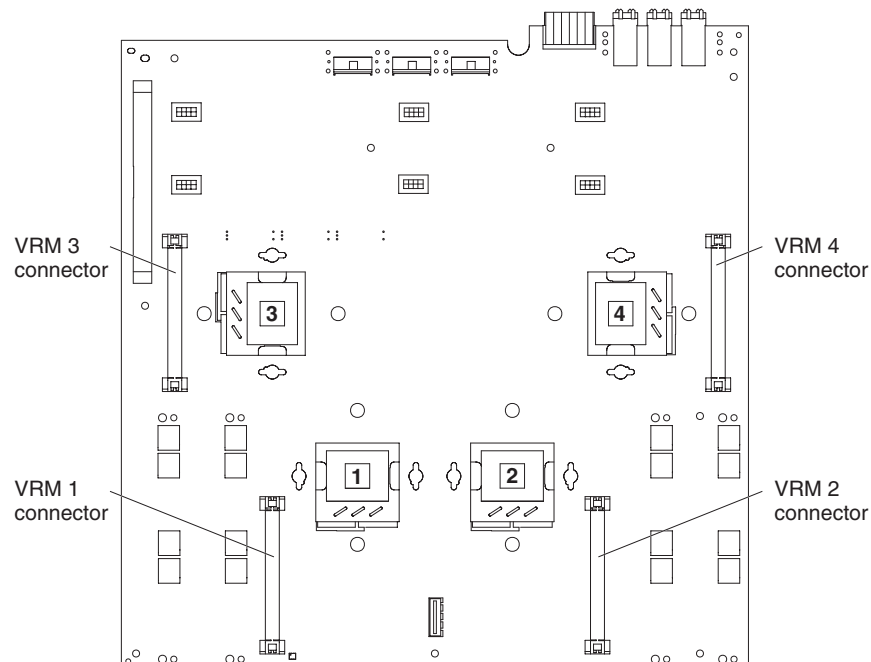
**Notes:**

1. Microprocessor sockets 3 and 4 are mounted on the microprocessor board with the microprocessor-release levers on opposite sides. These sockets are oriented 180° from each other on the microprocessor board. Be sure to verify the orientation of the socket before you install the microprocessor. The following illustration shows the orientation of the microprocessor sockets.
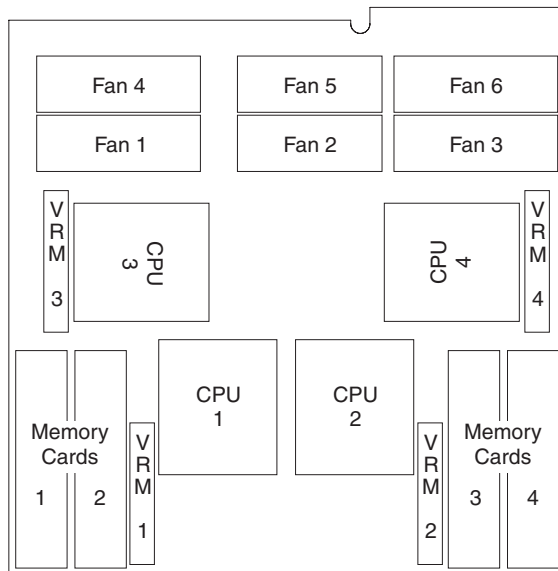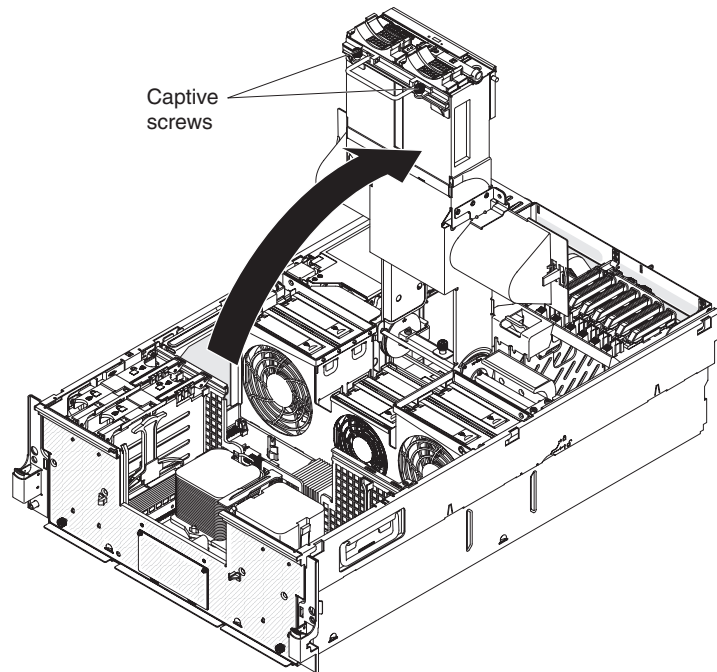


2. Microprocessor socket 2 must always contain either a heat-sink blank or a microprocessor and heat sink.

3. The microprocessor air-baffle must always be installed between microprocessor socket 1 and socket 2.

To install a microprocessor, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 28.
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 server cover and bezel (see "Removing the cover and bezel" on page 30).

   **Attention:** When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see "Handling static-sensitive devices" on page 30.
4. Loosen the captive screws and rotate the media hood to the fully open position.
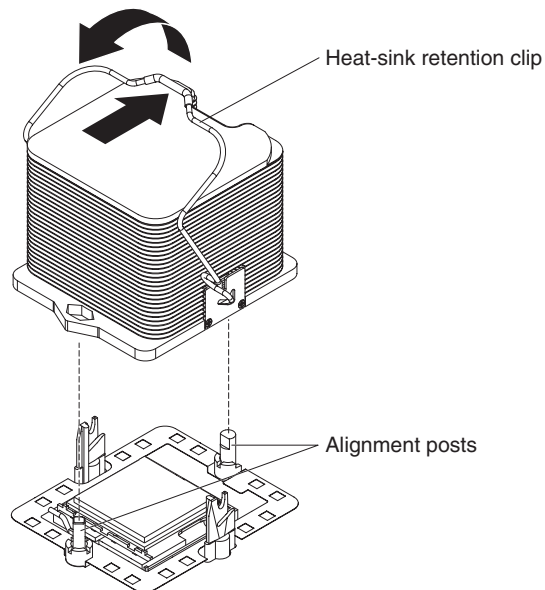
Captive screws

5. If necessary, remove the microprocessor air baffle from between socket 1 and socket 2.

6. If you are installing a microprocessor in microprocessor socket 2 and it contains a heat-sink blank, remove the heat-sink blank and store it for future use.

7. Remove the protective cover, tape, or label from the surface of the microprocessor socket, if any is present.



Lever closed
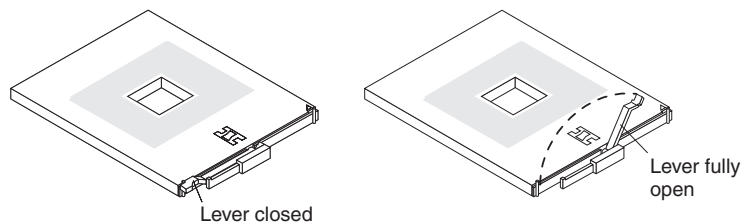
Lever fully open

8. Lift the microprocessor-release lever to the fully open position (approximately 135° angle).

9. Touch the static-protective package that contains the new microprocessor to any unpainted metal surface on the outside of the server; then, remove the microprocessor from the package.

   **Attention:** To avoid bending the pins on the microprocessor, do not use excessive force when you press it into the socket.

10. Position the microprocessor over the microprocessor socket and carefully press the microprocessor into the socket.
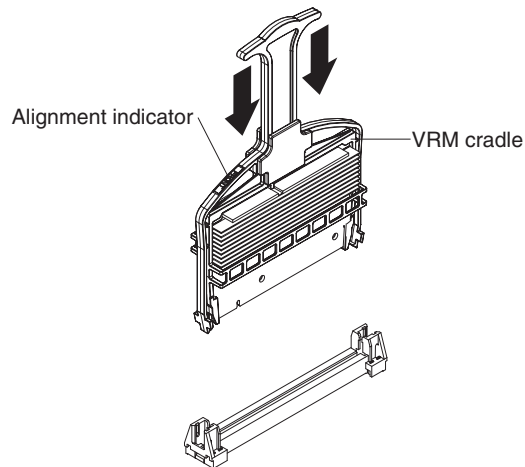
Microprocessor

Microprocessor
orientation indicator

Microprocessor
connector

Microprocessor-
release lever
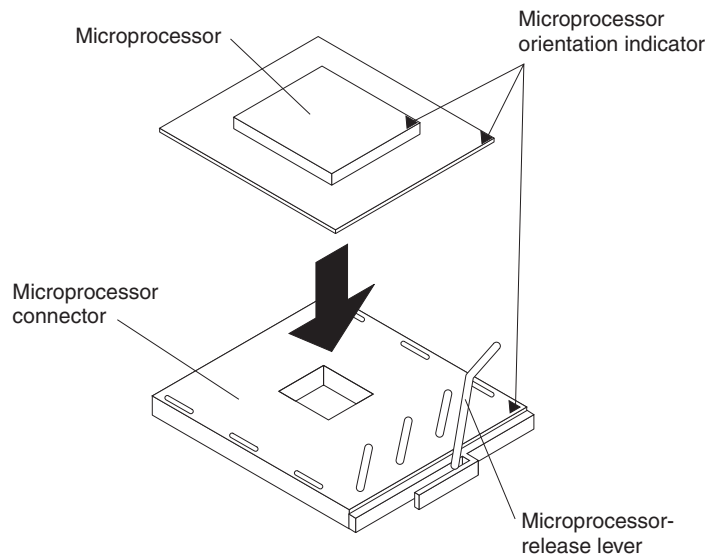
11. Close the microprocessor-release lever to secure the microprocessor.

Heat-sink retention clip

Alignment posts

12. Remove the heat sink from its package and open the heat-sink retention clip:

   a. Release the heat-sink retention clip from the locked position.

   b. Rotate the heat-sink clip to its fully open position.

13. Remove the cover from the bottom of the heat sink.

14. Position the heat sink above the microprocessor and align the heat sink with the alignment posts; then, press on the top of the heat sink, rotate the heat-sink release lever, and move the lever to the locked position.

Alignment indicator — VRM cradle

15. Install a VRM in the connector next to the microprocessor socket:

   a. Turn the VRM so that the keys align with the slot.

   b. Insert the VRM into the connector by aligning the edges of the VRM with the slots at the end of the VRM connector. Firmly press the VRM straight down into the connector.

   **Note:** Make sure that the "Front" label on the VRM is facing the front of the server.

16. Replace the microprocessor air baffle between socket 1 and socket 2, if you removed it.

17. Rotate the media hood to the closed position and tighten the captive screws.

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

## Completing the installation

To complete the installation, complete the following steps.



Wire cable clip (open)           Cable channel
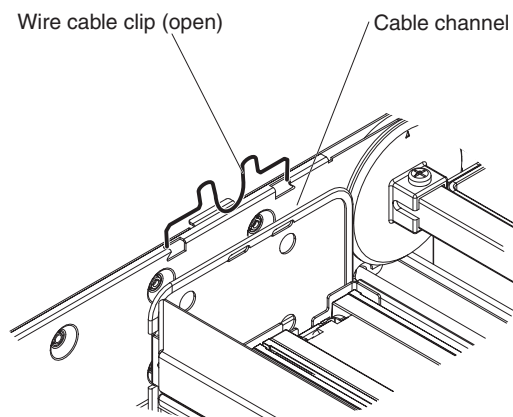
1. Make sure that all internal cables are correctly routed. In the order listed, route the following cables through the cable channel; then, connect the cables to the I/O board.

   a. SAS power cable

   b. SAS 4x signal cable

   c. Operator information panel cable

d.   Dual USB ports cable

e.   DVD cable

2.   If you removed the server cover, place the cover-release latch in the open (up) position. Insert the bottom tabs of the top cover into the matching slots in the server chassis. Press down on the cover-release latch to lock the cover in place. Replace the bezel, if you removed it.
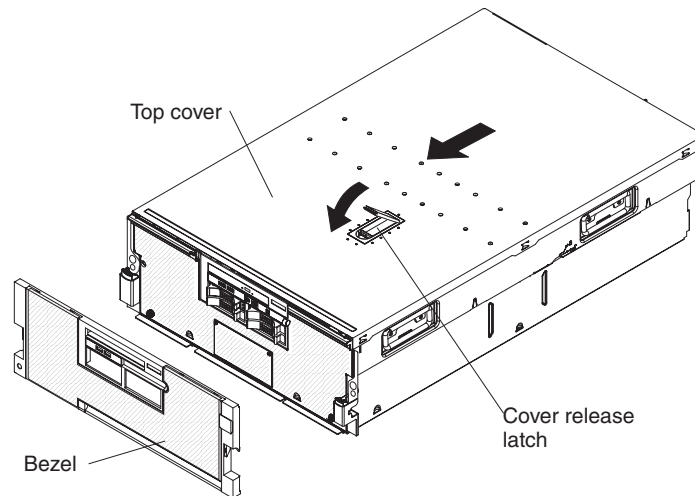


3.   Install the server in a rack. See the *Rack Installation Instructions* that come with the server for complete rack installation and removal instructions.

**Attention:**

• Install the server only in a rack cabinet that has perforated doors.

• Do not leave open spaces above or below an installed server in the rack cabinet. To help prevent damage to server components, always install filler panels to cover open spaces and to help ensure proper air circulation. See the documentation that comes with your rack cabinet for more information.

4.   Connect the cables and power cords. For more information, see "Connecting the cables."

5.   Update the server configuration. See "Updating the server configuration" on page 57.

## 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.
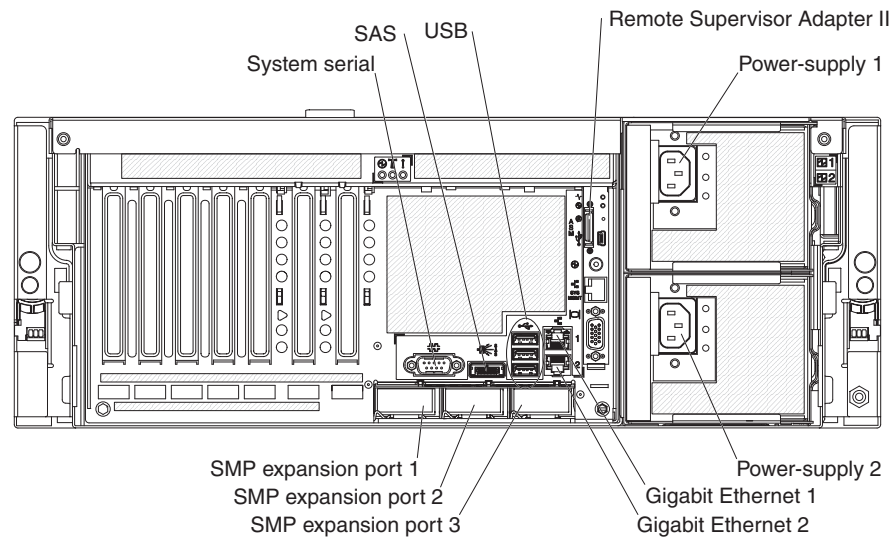
Cable identifiers are printed on the cables that come with the server and optional devices. Use these identifiers to connect the cables to the correct connectors.

For details about the locations and functions of the input and output connectors, see "Server controls, connectors, LEDs, and power" on page 11.
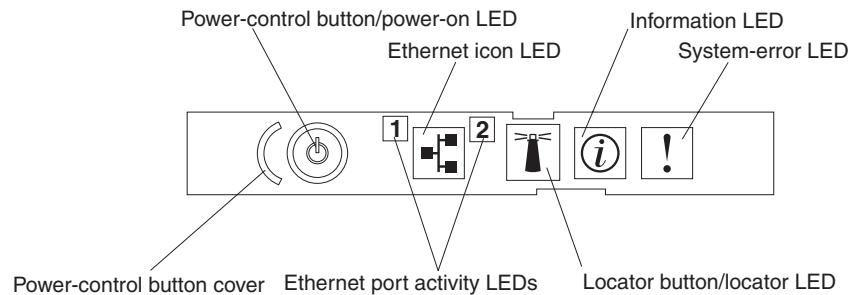
When available, you can install one or more optional SMP Expansion kits to interconnect the SMP Expansion Ports of two or more servers.

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.

**Rear view**

SAS  USB  Remote Supervisor Adapter II

System serial  Power-supply 1

SMP expansion port 1

SMP expansion port 2

SMP expansion port 3

Power-supply 2

Gigabit Ethernet 1

Gigabit Ethernet 2

**Front view**

Power-control button/power-on LED  Information LED

Ethernet icon LED  System-error LED

Power-control button cover  Ethernet port activity LEDs  Locator button/locator LED

# Updating the server configuration

When you start the server for the first time after you add or remove an internal optional device or external SAS or SCSI device, you might receive a message that the configuration has changed. The Configuration/Setup Utility program starts automatically so that you can save the new configuration settings. For more information, see "Using the Configuration/Setup Utility program" on page 60.

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

The server can operate as a symmetric multiprocessing (SMP) server. You might have to upgrade the operating system to support SMP. For more information, see "Using the ServerGuide Setup and Installation CD" on page 68 and the operating-system documentation.

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

If the server has a RAID configuration that uses the integrated SAS controller with RAID capabilities and you have installed or removed a hard disk drive, you might have to reconfigure the disk arrays.

For information about configuring the integrated Gigabit Ethernet controller, see "Configuring the Gigabit Ethernet controller" on page 70.

# Chapter 3. Configuring the server

The following configuration programs come with the server:

- **Configuration/Setup Utility program**

  The Configuration/Setup Utility program is part of the basic input/output system (BIOS). Use it to configure serial port assignments and scalable partitions, change interrupt request (IRQ) settings, change the startup-device sequence, set the date and time, and set passwords. For information about using this program, see "Using the Configuration/Setup Utility program" on page 60.

- **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 simply the installation of your operating system. For information about using this CD, see "Using the ServerGuide Setup and Installation CD" on page 68.

- **Boot Menu program**

  The Boot Menu program is part of the BIOS. Use it to override the startup sequence that is set in the Configuration/Setup Utility program and temporarily assign a device to be first in the startup sequence. For information about using this program, see "Using the Boot Menu program" on page 70.

- **Ethernet controller configuration**

  For information about configuring the Ethernet controller, see "Configuring the Gigabit Ethernet controller" on page 70.

- **Baseboard management controller utility programs**

  Use these programs to configure the baseboard management controller, to apply updates to the firmware, and to remotely manage a server. For information about using these programs, see "Using the baseboard management controller utility programs" on page 70.

- **Remote Supervisor Adapter II configuration**

  For information about setting up and cabling the Remote Supervisor Adapter II, see the *Remote Supervisor Adapter II SlimLine and Remote Supervisor Adapter II User's Guide* on the IBM *System x Documentation* CD.

- **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 the IBM Support Center. 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/.

- **RAID configuration programs**

  - **LSI Logic Configuration Utility program**

    Use the LSI Logic Configuration Utility program to perform the initial configuration on the disk-array subsystem that is connected to the integrated SAS controller with RAID capabilities and, optionally, the ServeRAID-MR10k controller. For information about using this program, see "Using the LSI Logic Configuration Utility program" on page 74.

  - **LSI Logic MegaRAID Storage Manager program**

Use LSI Logic MegaRAID Storage Manager program to monitor and manage the disk-array subsystem *after* you install the operating system. For information about using this program, see "Using the LSI Logic MegaRAID Storage Manager program" on page 75.

## Using the Configuration/Setup Utility program

Use the Configuration/Setup Utility program to perform the following tasks:

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time
- Set and change passwords
- Set the startup characteristics of the server and the order of startup devices
- Set and change settings for advanced hardware features
- View and clear error logs
- Change interrupt request (IRQ) settings
- Define when the memory scrubbing feature performs a system memory test
- Resolve configuration conflicts

## Starting the Configuration/Setup Utility program

To start the Configuration/Setup Utility program, complete the following steps:

1. Turn on the server.
2. When the prompt `Press F1 for Configuration/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 Configuration/Setup Utility menu. If you do not type the administrator password, a limited Configuration/Setup Utility menu is available.
3. Select settings to view or change.

## Configuration/Setup Utility menu choices

The following choices are on the Configuration/Setup Utility main menu. Depending on the version of the BIOS code, some menu choices might differ slightly from these descriptions.

- **System Summary**

  Select this choice to view configuration information, including the type, speed, and cache sizes of the microprocessors, type and speed of installed USB devices, and the amount of installed memory. When you make configuration changes through other choices in the Configuration/Setup Utility program, the changes are reflected in the system summary; you cannot change settings directly in the system summary.

  This choice is on the full and limited Configuration/Setup Utility menu.

- **System Information**

  Select this choice to view information about the server. When you make changes through other choices in the Configuration/Setup Utility program, 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 Configuration/Setup Utility menu only.

  – **Product Data**

    Select this choice to view the machine type and model of the server, the serial number, the revision level or issue date of the BIOS and diagnostics code

stored in electrically erasable programmable ROM (EEPROM), and the revision level of the firmware on the Remote Supervisor Adapter II.

– **System Card Data**

Select this choice to view vital product data (VPD) for some server components.

- **Devices and I/O Ports**

Select this choice to view or change assignments for devices and input/output (I/O) ports.

Select this choice to enable or disable integrated SAS and Ethernet controllers and all standard ports (such as serial and parallel). **Enable** is the default setting for all controllers. 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). If you disable the integrated Ethernet controller and no Ethernet adapter is installed, the server will have no Ethernet capability.

This choice is on the full Configuration/Setup Utility menu only.

- **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 Configuration/Setup Utility menu only.

- **System Security**

Select this choice to set passwords. See "Passwords" on page 66 for more information about passwords. You can also enable the chassis-intrusion detector to alert you each time the server cover is removed.

This choice is on the full Configuration/Setup Utility menu only.

– **Power-on Password**

Select this choice to set or change a power-on password. For more information, see "Power-on password" on page 66.

– **Administrator 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 microprocessor board.

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 Configuration/Setup Utility menu. If an administrator password is set, the full Configuration/Setup Utility menu is available only if you type the administrator password at the password prompt. See "Administrator password" on page 67 for more information.

- **Start Options**

Select this choice to view or change the start options. Changes in the start options take effect when you restart the server.

You can set keyboard operating characteristics, such as the keyboard speed, and you can specify whether the server starts with the keyboard number lock on or off.

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.

If you enable the boot fail count, the BIOS default settings will be restored after three consecutive failures to find a boot record.

You can enable a virus-detection test that checks for changes in the boot record when the server starts.

You can enable the use of a USB keyboard from a DOS prompt or through the Configuration/Setup Utility program.

This choice is on the full Configuration/Setup Utility menu only.

- **Advanced Setup**

  Select this choice to change settings for advanced hardware features.

  **Important:** The server might malfunction if these settings are incorrectly configured. Follow the instructions on the screen carefully.

  This choice is on the full Configuration/Setup Utility menu only.

  – **Memory Settings**

    Select this choice to view and change the memory settings.

    - **Memory Bank Enable/Disable**

      Select this choice to manually enable a pair of DIMM connectors. If a memory error is detected during POST or memory configuration, the server automatically disables the failing pair of DIMM connectors and continues operating with reduced memory. After the problem is corrected, you must manually enable the DIMM connectors. Use the arrow keys to highlight the pair of DIMM connectors that you want to enable, and use the arrow keys to select **Enable**.

    - **Memory Array Setting**

      Select this choice to define the memory array setting.

    - **Memory Initialization Scrub Control**

      Select this choice to define the frequency of the memory initialization scrub, which occurs during POST.

    - **Run Time Scrub Rate**

      Select this choice to define the rate at which the memory scrubbing feature performs a test of all system memory.

  – **CPU Options**

    Select this choice to view and change the microprocessor performance settings, and to select the clustering technology settings.

    - **Active Energy Manager Power Capping**

      Select this choice to limit the maximum power consumed by the microprocessors.

    - **Processor Performance States**

      Select this choice to make available operating-system based performance features.

    - **Clustering Technology**

      Select this choice to set the clustering technology.

    - **Processor Adjacent Sector Prefetch**

      Select **Disable** to force the microprocessors to only fetch the sector of the cache line that contains the data currently required by the microprocessor. **Disable** is the default value.

    - **Processor Hardware Prefetcher**

      Select this choice to enable or disable the hardware prefetcher. **Enable** is the default value.

    - **Processor Execute Disable Bit**

Select this choice enable or disable the execute disable bit feature. **Enable** is the default value.

- **Intel Virtualization Technology**

  Select this choice to enable or disable the Intel virtualization technology. Select **Enable** to make available the additional hardware capabilities of virtual machine extensions. **Enable** is the default value.

- **Processor IP Prefetcher**

  Select this choice to enable or disable the IP prefetcher. **Enable** is the default value.

- **Processor DCU Prefetcher**

  Select this choice to enable or disable the DCU prefetcher. **Enable** is the default value.

- **C1E**

  Select this choice to enable or disable the C1E feature. The C1E feature reduces microprocessor power consumption. **Enable** is the default value.

– **TPM Menu**

  Select this choice to set the trusted platform module (TPM) feature. For more information, see http://www.ibm.com/systems/support/supportsite.wss/ docdisplay?lndocid=MIGR-5072502&brandind=5000008.

– **Partition Chassis Options**

  Select this choice to set the partition configuration options for use in a multi-node configuration.

– **Advanced PCI Settings**

  Select this choice to view and set the end-to-end cyclic redundancy check (ECRC) of individual PCI Express slots. ECRC is a data transmission error detection feature. You can also enable or disable the ROM execution of individual PCI Express slots.

– **PCI Slot/Device Information**

  Select this choice to view system resources that are used by installed PCI Express devices. PCI Express devices are usually configured automatically. This information is saved when you exit. The **Save Settings**, **Restore Settings**, and **Load Default Settings** choices on the Configuration/Setup Utility main menu do not save the **PCI Slot/Device Information** settings.

– **RSA II Settings**

  Select this choice to view and change Remote Supervisor Adapter II settings. Select **Save Values and Reboot RSA II** to save the changes that you have made in the settings and restart the Remote Supervisor Adapter II.

- **RSA II MAC Address**

  This is a nonselectable menu item that displays the Remote Supervisor Adapter II MAC address.

- **DHCP IP Address**

  This is a nonselectable menu item that displays the Remote Supervisor Adapter II DHCP IP address, if DHCP is enabled.

- **DHCP Control**

  Select this choice to set the DHCP control. **DHCP Enabled** is the default. If you select **Use Static IP**, use **Static IP Address** to set the address.

- **Static IP Address**

  Select this choice to set the static IP address for the Remote Supervisor Adapter II.

- **Subnet Mask**

  Select this choice to set the static subnet mask for the Remote Supervisor Adapter II.

- **OS USB Selection**

  Select this choice to choose the operating system that is used for Remote Supervisor Adapter II USB support.

- **<<<RESTORE RSA II DEFAULTS>>>**

  Select this choice to cancel the changes you have made and restore the Remote Supervisor Adapter II settings to the default values.

– **Baseboard management controller (BMC) settings**

  Select this choice to view information and to change baseboard management controller (BMC) settings.

- **BMC Firmware Version**

  This is a nonselectable menu item that displays the BMC firmware version.

- **BMC Build Level**

  This is a nonselectable menu item that displays the BMC firmware build level.

- **BMC Build Date**

  This is a nonselectable menu item that displays the BMC firmware build date.

- **BMC IPMI Version**

  This is a nonselectable menu item that displays the BMC firmware IPMI version.

- **BMC POST Watchdog**

  Select this choice to enable or disable the BMC POST watchdog. **Disable** is the default setting.

- **BMC POST Watchdog Timeout**

  Select this choice to set the BMC POST watchdog timeout value. **5 minutes** is the default setting. If the watchdog expires, the server restarts.

- **System BMC Serial Port Sharing**

  Select this choice to enable or disable the system BMC serial port sharing. **Enable** is the default setting.

- **BMC Serial Port Access Mode**

  Select this choice to set the BMC serial port access mode. **Shared** is the default setting. Select **Dedicated** for Serial Over LAN operation.

- **Reboot system on NMI**

  Select **Enable** to enable the server to restart automatically 60 seconds after the service processor issues a nonmaskable interrupt (NMI) to the server. If you disable this option, the server does not restart. **Enable** is the default setting.

- **BMC Network Configuration**

  Select this choice to view the BMC network configuration information.

  • **BMC MAC Address**

    This is a nonselectable menu item that displays the BMC MAC address.

  • **Host Name**

    Select this choice to set the BMC host name. The default value is the lower 4 bytes of the MAC address.

  • **DHCP Control**

Select this choice to set the DHCP control. **DHCP Enabled** is the default setting. If you select **Use Static IP**, use **IP Address** to set the address.

- **IP Address**

  Select this choice to set the static IP address for the BMC. The initial value is assigned by the DHCP server or is 169.254.0.2.

- **Subnet Mask**

  Select this choice to set the subnet mask for the BMC. The default is 255.255.0.0.

- **Gateway**

  Select this choice to set the gateway for the BMC. The default is 0.0.0.0.

- **Save Network Settings in BMC**

  Select this choice to save any changes to the network configuration.

- **BMC System Event Log**

  Select this choice to view the BMC system event log, which contains all system-error and warning messages that have been generated. Use the arrow keys to move among pages in the log. See the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD for instructions. Select **Clear error logs** to clear the BMC system event log.

  **Note:** Use the IBM Remote Supervisor Adapter II system event log or run the diagnostic programs for more information about the error codes.

- **User Account Settings**

  Select this choice to view and change the BMC user account information. You can define up to four user accounts. By default, two user accounts are defined: NULL and USERID. The USERID user account is enabled by default. The password for the USERID user account is `PASSWORD`.

- **UserID**

  Select this choice to view or change settings for user accounts 1, 2, 3, and 4.

  - **UserID**

    Select this choice to enable or disable the user account. The NULL user account is disabled by default.

  - **Username**

    Select this choice to view or change the user name.

  - **Password**

    Select this choice to set the password.

  - **Confirm Password**

    Select this choice to confirm the password.

  - **Privilege Limit**

    Select this choice to set the level of access.

  - **Save User Account Settings in BMC**

    Select this choice to save any changes to the user account configuration.

- **Event/Error Logs**

  Select this choice to view or clear error logs.

  This choice is available on the full Configuration/Setup Utility menu only.

  – **POST Error Log**

Select this choice to view the three most recent error codes and messages that were generated during POST. Select **Clear error logs** to clear the POST error log.

– **System Event/Error Log**

Select this choice to view the system event/error log, which contains all system-error and warning messages that have been generated. Use the arrow keys to move among pages in the log. To clear the system event/error log, select **Clear error logs**.

• **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 Configuration/Setup Utility program. 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 **System Security** choice, you can set, change, and delete a power-on password and an administrator password. The **System Security** choice is on the full Configuration/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 you have access to the full Configuration/Setup Utility menu.

An administrator password is intended to be used by a system administrator; it limits access to the full Configuration/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 Configuration/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 Configuration/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 Configuration/Setup Utility menu; the user can set, change, and delete the power-on password, if the system administrator has given the user that authority.
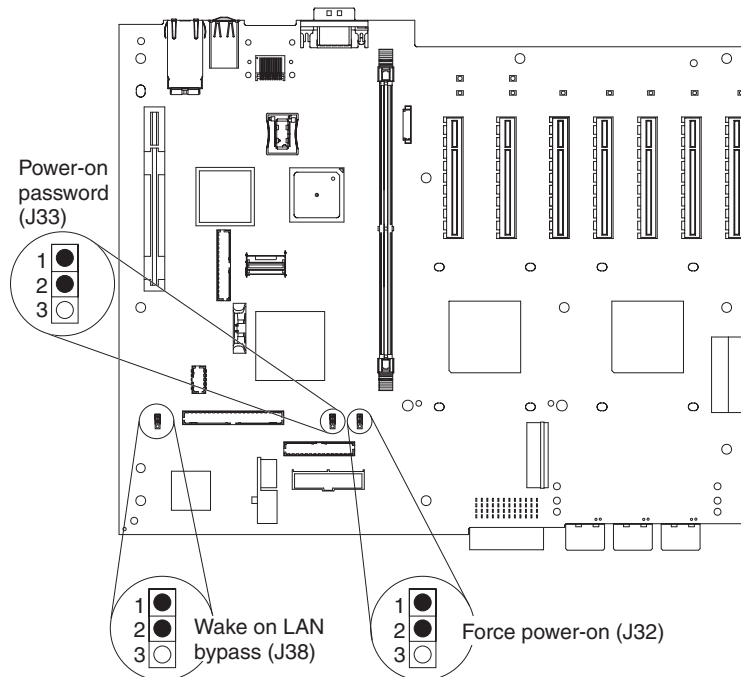
## Power-on password

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 up to seven characters (A - Z, a - z, and 0 - 9) 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 Configuration/Setup Utility program and reset the power-on password.
- Remove the battery from the server and then reinstall it. For instructions for removing the battery, see ″Replacing the battery″ in the *Problem Determination and Service Guide*.
- Change the position of the power-on password override jumper (J33 on the I/O board) to bypass the power-on password check.

   **Attention:**   Before changing any switch settings or moving any jumpers, turn off the server; then, disconnect all power cords and external cables. See the safety information that begins 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.

   The following illustration shows the location of the power-on password override, force power-on, and Wake on LAN (WOL) bypass jumpers.



   While the server is turned off, move the jumper on J9 from pins 1 and 2 to pins 2 and 3. You can then start the Configuration/Setup Utility program and reset the power-on password. After you reset the password, turn off the server again and move the jumper back to pins 1 and 2.

   The power-on password override switch does not affect the administrator password.

## Administrator password

If an administrator password is set, you must type the administrator password for access to the full Configuration/Setup Utility menu. You can use any combination of up to seven characters (A - Z, a - z, and 0 - 9) for the password.

**Attention:**   If you set an administrator password and then forget it, there is no way to change, override, or remove it. You must replace the microprocessor board.

# Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD contains a setup and installation program that is 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.

If a later version of the ServerGuide program is available, you can download a free image of the *ServerGuide Setup and Installation* CD, or you can purchase the CD. To download the image, go to the IBM ServerGuide Web page at http://www.ibm.com/pc/qtechinfo/MIGR-4ZKPPT.html. To purchase the latest *ServerGuide Setup and Installation* CD, go to the ServerGuide fulfillment Web site at http://www.ibm.com/systems/management/serverguide/sub.html.

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

# ServerGuide features

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

The ServerGuide program requires a supported IBM server with an enabled startable (bootable) CD drive. In addition to the *ServerGuide Setup and Installation* CD, you must have your operating-system CD to install the operating system.

The ServerGuide program performs the following tasks:
- Sets system date and time
- Detects the SCSI RAID adapter, controller, or integrated SAS controller with RAID capabilities and runs the SCSI 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 SAS 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.

When you start the *ServerGuide Setup and Installation* CD, the program prompts you to complete the following tasks:

- Select your language.
- Select your keyboard layout and country.
- View the overview to learn about ServerGuide features.
- View the readme file to review installation tips for your operating system and adapter.
- Start the operating-system installation. You will need your operating-system CD.

## 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, complete the following steps to download the latest operating-system installation instructions from the IBM Web site.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. From the menu on the left side of the page, click **System x support search**.
4. From the **Task** menu, select **Install**.
5. From the **Product family** menu, select **IBM System x3850 M2** or **IBM System x3950 M2**.
6. From the **Operating system** menu, select your operating system, and then click **Search** to display the available installation documents.

# Using the Boot Menu program

The Boot Menu program is a built-in configuration program that you can use to temporarily redefine the first startup device without changing settings in the Configuration/Setup Utility program.

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

1. Turn off the server.
2. Restart the server.
3. Press F12.
4. Select the startup device.

The next time the server is started, it returns to the startup sequence that is set in the Configuration/Setup Utility program.

# Configuring the Gigabit Ethernet controller

The Ethernet controller is integrated on the I/O board. It provides an interface for connecting to a 10 Mbps, 100 Mbps, or 1 Gbps network and provides full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the Ethernet ports in the server support auto-negotiation, the controller detects the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operates at that rate and mode.

You do not have to set any jumpers or configure the controller. However, you must install a device driver to enable the operating system to address the controller. For device drivers and information about configuring the Ethernet controller, see the *Broadcom NetXtreme Gigabit Ethernet Software* CD that comes with the server. To find updated information about configuring the controller, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x3850 M2** or **System x3950 M2** and click **Continue**.

# Using the baseboard management controller utility programs

Use the baseboard management controller utility programs to configure the baseboard management controller, update baseboard management controller firmware, and remotely manage a server.

# Using the configuration utility program

Use the baseboard management controller configuration utility program to view or change the baseboard management controller configuration settings and to save the configuration to a file for use on multiple servers. The configuration utility is located with the baseboard management controller firmware updates on the firmware update diskette or CD. You can access the configuration utility after the firmware update is started and completed or stopped before completing.

To download the program, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3850 M2** or **IBM System x3950 M2** to display the matrix of downloadable files for the server.
5. From the BMC software section, download the file for the operating system and for the DOS firmware update utility from which you will perform the configuration and create a firmware update diskette or CD.

To start the baseboard management controller configuration utility program, complete the following steps:

1. Insert the firmware update diskette or CD into the drive.
2. Turn on or restart the server. The server starts DOS from the firmware update diskette or CD and runs the necessary utilities.
3. If you are prompted with questions, type N and press Enter.
4. From the command line, type `bmc_cfg` and press Enter.

## Using the firmware update utility program

Use the baseboard management controller firmware update utility program to update baseboard management controller firmware. This program updates the baseboard management controller firmware only and does not affect any device drivers.

**Important:** To ensure proper server operation, be sure to update the baseboard management controller firmware before or after you update the BIOS code, IBM Remote Supervisor Adapter II firmware, and Field Programmable Gate Array (FPGA) firmware.

To download the program, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3850 M2** or **IBM System x3950 M2** to display the matrix of downloadable files for the server.
5. From the BMC software section, download the file for the operating system and the media (diskette or CD) that you plan to use.

### Updating the firmware

To update the firmware, use one of the following procedures:

- For the Linux or Windows operating-system update packages, follow the instructions in the readme file that comes with the firmware update.
- If you are using a diskette or CD, complete the following steps:
  1. Review the installation instructions in the readme file.
  2. Create a diskette or CD that contains the downloaded flash utility.

3. Insert the firmware update diskette or CD into the CD or DVD drive.
4. Turn on or restart the server. The server starts DOS from the diskette or CD and runs the necessary utilities.
5. If prompted with questions, type Y and press Enter.

## Using the force BMC update jumper

If the normal firmware update procedure results in an inoperative BMC, change the position of the force BMC update jumper (J57 on the microprocessor board) to bypass the operational firmware image.

**Attention:** Before changing any switch settings or moving any jumpers, turn off the server; then, disconnect all power cords and external cables. See the safety information beginning 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.

The following illustration shows the location of the force BMC update, and boot recovery jumpers.
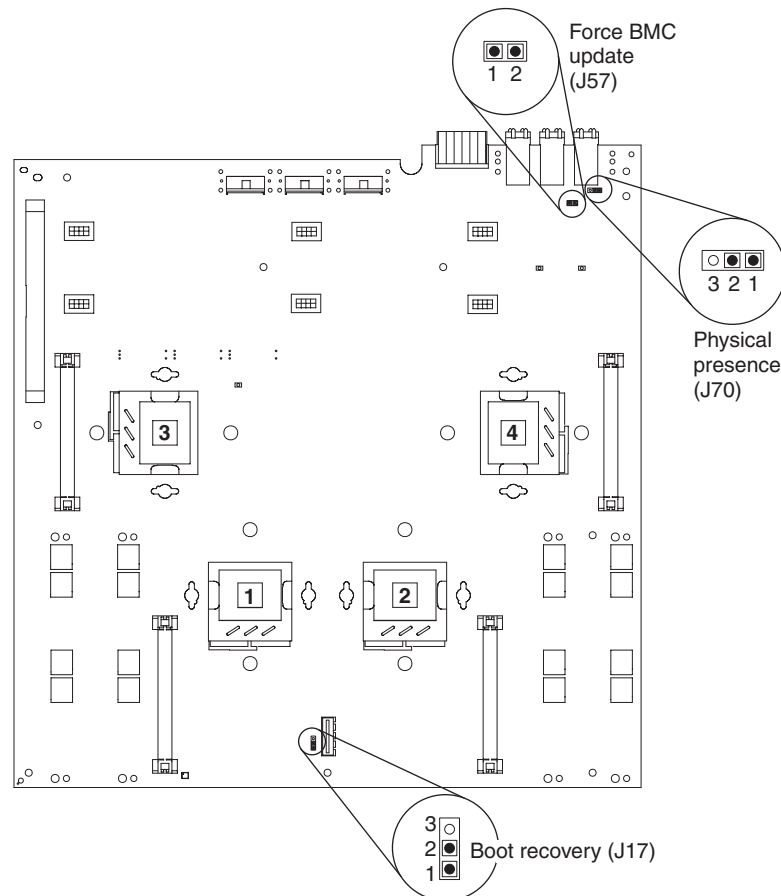


While the server is turned off, place a jumper over pins 1 and 2 on J57. Then, perform a firmware update. Turn off the server again and remove the jumper from pins 1 and 2.

**Note:** Only use the force BMC update jumper if the normal firmware update procedure fails and the operational firmware image is corrupted. Use of the force BMC update jumper disables normal baseboard management controller operation.

# Using the management utility program

Use the baseboard management controller management utility program to remotely manage and configure a server. The following features are available from the program:

- **IPMI (Intelligent Platform Management Interface) Shell**

  Use this feature to remotely perform power-management and system identification control functions over a LAN or serial port interface from a command-line interface. Use this feature also to remotely view the event log.

- **Serial over LAN Proxy**

  Use this feature to remotely perform control and management functions over a Serial over LAN network. Use this feature also to remotely view and change the BIOS settings.

To download the utility program and create the baseboard management controller management utility CD, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3850 M2** or **IBM System x3950 M2** to display the matrix of downloadable files for the server.
5. From the BMC software section, download the management utility (SMBRIDGE).
6. Review the readme file on the CD to install and use the program.

# Using the RAID configuration programs

Use the LSI Logic Configuration Utility program and the LSI Logic MegaRAID Storage Manager program to configure and manage redundant array of independent disks (RAID) arrays. The following notes describe information that you must consider:

- The integrated SAS controller with RAID capabilities supports RAID levels 0 and 1 with a hot-spare drive installed. Installing an optional ServeRAID controller provides additional RAID levels.
- You cannot use the *ServerGuide Setup and Installation* CD to configure the integrated SAS controller with RAID capabilities.
- When you create a RAID level 1 (mirrored) pair, all drives must be on the same channel.
- Hard disk drive capacities affect how you create arrays. The drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.
- You can set up a mirror after the operating system is installed on the primary drive only if you are using an integrated SAS controller with RAID capabilities. You must make sure that the primary drive has the lower SCSI ID (for example, 0).

  **Note:** The bezel identifies the SCSI IDs of the hard disk drive bays.

  **Important:** If you use an integrated SAS controller with RAID capabilities to configure a RAID level 1 (mirrored) array after you have installed the operating

system, you will lose access to any data or applications that were previously stored on the secondary drive of the mirrored pair.

- If you install a different type of RAID controller, follow the instructions in the documentation that comes with the controller to view or change SCSI settings for attached devices.

# Using the LSI Logic Configuration Utility program

Use the LSI Logic Configuration Utility program to perform the initial configuration of the SAS controller and attached devices. The LSI Logic Configuration Utility program is part of the BIOS. You can perform the initial configuration *before* you install the operating system.

## Starting the LSI Logic Configuration Utility program

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

1. Turn on the server.
2. When the prompt `Press CTRL-C to start LSI Logic Configuration Utility...` is displayed, press Ctrl+C.
3. Use the arrow keys to select the controller for which you want to change settings. Use the Help function to see instructions and available actions for this screen.
4. To change the settings of the selected items, follow the instructions on the screen.
5. When you have finished changing settings, press Esc to exit the program; select **Save** to save the settings that you have changed.

## Configuring the controller and devices

To configure a SAS controller and attached devices, select the controller from the initial LSI Logic Configuration Utility program screen; then, press Enter. You can view and change settings for the following items for the selected controller:

**Boot Support**
> Specify the type of boot support that will be in effect (disabled, BIOS only, OS only, or both BIOS and OS).

**RAID Properties**
> Create a RAID array or hot-spare drive from the displayed choices. To create an array, complete the following steps:
> 1. Select the volume: **IM** (integrated mirror) or **IS** (integrated striping).
> 2. Select each drive that will be part of the array.
> 3. Select **C** to create the array.

**SAS Topology**
> View information about the devices that are directly attached to the selected SAS controller and which devices make up RAID arrays. Format and verify an attached device.

**Advanced Adapter Properties**
> View the SAS properties and change the following items for the selected controller:
> - Global properties
> - Cylinder head sector (CHS) mapping
> - Advanced device properties, such as I/O timeouts and LUNs to scan
> - Spin-up properties
> - PHY properties

# Using the LSI Logic MegaRAID Storage Manager program

Use the LSI Logic MegaRAID Storage Manager program to monitor and manage the disk-array subsystem connected to the integrated SAS controller with RAID capabilities and the ServeRAID-MR10k controller option. The LSI Logic MegaRAID Storage Manager program, device drivers, and information come with the ServeRAID-MR10k controller option.

# Chapter 4. Updating IBM Director

If you plan to use IBM Director to manage the server, you must check for the latest applicable IBM Director updates and interim fixes.

To install the IBM Director updates and any other applicable updates and interim fixes, complete the following steps:

1. Check for the latest version of IBM Director:
   a. Go to http://www.ibm.com/systems/management/director/downloads.html.
   b. If a newer version of IBM 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 Director program.
3. Download and install any applicable updates or interim fixes for the server:
   a. Go to http://www.ibm.com/systems/support/.
   b. Under **Product support**, click **System x**.
   c. Under **Popular links**, click **Software and device drivers**.
   d. Click **IBM Director downloads**.
   e. Select any applicable update or interim fix that you want to download.
   f. Click the file link for the executable file to download the file, and follow the instructions in the readme file to install the update or interim fix.
   g. Repeat steps 3e and 3f for any additional updates or interim fixes that you want to install.

# Appendix. Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

> IBM Director of Licensing
> IBM Corporation
> North Castle Drive
> Armonk, NY 10504-1785
> U.S.A.

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product, and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

## Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. If these and other IBM trademarked terms are marked on their first occurrence in this information with a trademark symbol ($^{®}$ or $^{™}$), these symbols indicate U.S. registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at http://www.ibm.com/legal/copytrade.shtml.

Adobe and PostScript are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc., in the United States, other countries, or both and is used under license therefrom.

Intel, Intel Xeon, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc., in the United States, other countries, or both.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, and Windows NT are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other company, product, or service names may be trademarks or service marks of others.

## Important notes

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

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

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

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

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

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

IBM makes no representation or warranties regarding non-IBM products and services that are ServerProven®, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

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

## Particulate contamination

**Attention:** Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server that is described in this document. Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the server to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If IBM determines that the levels of particulates or gases in your environment have caused damage to the server, IBM may condition provision of repair or replacement of servers or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

*Table 8. 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].<br>• 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.<br>• The deliquescent relative humidity of the particulate contamination must be more than 60%[2].<br>• The room must be free of conductive contamination such as zinc whiskers. |
| Gaseous | • Copper: Class G1 as per ANSI/ISA 71.04-1985[3]<br>• Silver: Corrosion rate of less than 300 Å in 30 days |
| [1] ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. ||
| [2] The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction. ||
| [3] ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A. ||

## Documentation format

The publications for this product are in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when you use the PDF files and want to request a Web-based format or accessible PDF document for a publication, direct your mail to the following address:

*Information Development*
*IBM Corporation*
*205/A015*

*3039 E. Cornwallis Road*
*P.O. Box 12195*
*Research Triangle Park, North Carolina 27709-2195*
*U.S.A.*

In the request, be sure to include the publication part number and title.

When you send information to IBM, you grant IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

## Electronic emission notices

## Federal Communications Commission (FCC) statement

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

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

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

## Industry Canada Class A emission compliance statement

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

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

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

## Australia and New Zealand Class A statement

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

## United Kingdom telecommunications safety requirement

**Notice to Customers**

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

## European Union EMC Directive conformance statement

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

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

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

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

## Taiwanese Class A warning statement

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

## Germany Electromagnetic Compatibility Directive

**Deutschsprachiger EU Hinweis:**

**Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit**

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der

IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

**Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten**

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

**Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A**

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung des EMVG ist die IBM Deutschland GmbH, 70548 Stuttgart.

**Generelle Informationen:**

**Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.**

## People's Republic of China Class A warning statement

声　　明
此为 A 级产品。在生活环境中，
该产品可能会造成无线电干扰。
在这种情况下，可能需要用户对其
干扰采取切实可行的措施。

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

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。　　　　　　VCCI-A

## Korean Class A warning statement

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

# Index

## A

accessible documentation   81
Active
   Memory   6, 43
   PCI Express   33
adapter
   hot-plug   33
   installing   33
      ServeRAID-MR10k   31
   PCI   33
   PCI Express   33
   ServeRAID-MR10k   31
adding memory card   44
administrator password   67
attention notices   2
Automatic BIOS recovery   8
availability   8

## B

baseboard management controller   6
bays   5
bezel removing   30

## C

cable
   external cabling   56
   routing   56
cabling the server   56
cache   5
caution statements   2
Class A electronic emission notice   82
components, server   19
configuration
   baseboard management controller utility
    programs   59
   boot menu program   59
   Gigabit Ethernet controller   59
   SAS/SCSI device   57
   ServerGuide Setup and Installation CD   59
   with ServerGuide   68
Configuration/Setup Utility program   59, 60
connector
   electrostatic-discharge   12
   external SAS   15
   Gigabit Ethernet   13
   power-supply   14, 15
   Remote Supervisor Adapter II   14
   system serial   15
   USB, front   11
   USB, rear   15
connectors
   memory card   21
   microprocessor-board   22
contamination, particulate and gaseous   5, 81
cooling   8

cover, removing   30

## D

danger statements   2
device drivers   10
dimensions   5
documentation format   81
drives   5
DVD drive
   install   38
DVD-eject button   11
DVD-ROM
   activity LED   11
   eject button   11

## E

electrical input   5
electronic emission Class A notice   82
electrostatic-discharge connector   12
Enterprise X-Architecture technology   6
environment   5
error LED
   memory   21, 43
   memory card   21, 43
   microprocessor   23
   microprocessor board   22, 23
   system   12, 13
   VRM   23
Ethernet   8
   activity LED   12, 14
   configuring   59
   Gigabit activity LED   12, 14
   Gigabit configuring   59
   Gigabit connector   13
   Gigabit controller   7
   Gigabit link LED   13
expansion bays   5
expansion slots   5
external cabling   56

## F

fans   8
FCC Class A notice   82
features
   ServerGuide   68
   specifications   4
filler panel, hard disk drive bay   37
front USB connector   11

## G

gaseous contamination   5, 81
Gigabit Ethernet
   activity LED   13

**85**

# X

X-Architecture technology   6

**IBM.** ®

Part Number: 81Y1253

Printed in USA