IBM System x3550 Type 7978

IBM

User's Guide

IBM System x3550 Type 7978

User's Guide

IBM

Note:

Before using this information and the product it supports, read the general information in "Notices," on page 77.

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 овоj продукт, прочитаjте информациjата 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.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

All caution and danger statements in this documentation begin with a number. This number is used to cross reference an English caution or danger statement with translated versions of the caution or danger statement in the *IBM® Safety Information* book.

For example, if a caution statement begins with a number 1, translations for that caution statement appear in the *IBM Safety Information* book under statement 1.

Be sure to read all caution and danger statements in this documentation before performing the instructions. 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 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

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

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

Statement 3:

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

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

DANGER

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

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

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

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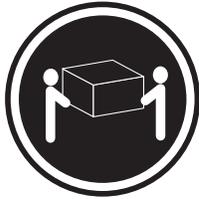
≥ 18 kg (39.7 lb.)   ≥ 32 kg (70.5 lb.)   ≥ 55 kg (121.2 lb.)
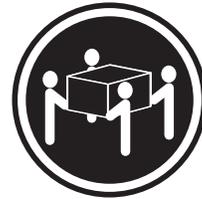
CAUTION:
Use safe practices when lifting.

Statement 5:

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

2

1

Statement 6:

CAUTION:
Do not place any objects on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf.

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 12:

CAUTION:
The following label indicates a hot surface nearby.

Statement 26:

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

Chapter 1. The System x3550 Type 7978 server

The IBM® System x3550 Type 7978 server is a 1-U-high[1] rack model server for high-volume network transaction processing. This high-performance, dual core server is ideally suited for networking environments that require superior microprocessor performance, input/output (I/O) flexibility, and high manageability.

The System x3550 server supports one of the following hard disk drive configurations:

- Servers with four hot-swap bays support 2.5-inch hot-swap Serial Attached SCSI (SAS) hard disk drives. You can install only 2.5-inch hot-swap SAS drives in these servers.

  The following illustration shows a System x3550 server with a 2.5-inch hard disk drive configuration.
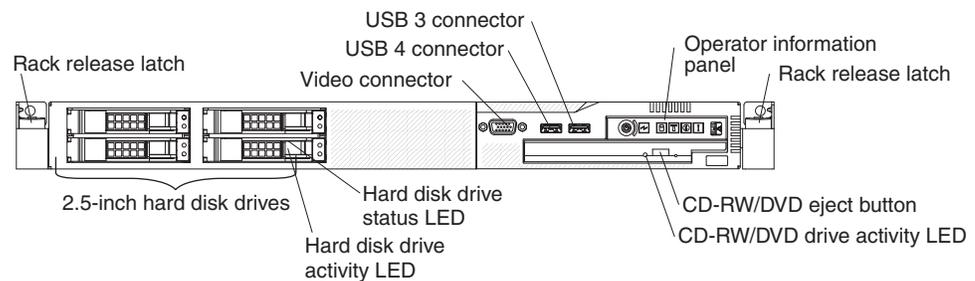
- Servers with two hot-swap bays support 3.5-inch hot-swap SAS or 3.5-inch hot-swap Serial ATA (SATA) hard disk drives. You can install only 3.5-inch hot-swap SAS or hot-swap SATA drives in these servers.
- Servers with two simple-swap bays support 3.5-inch simple-swap SATA hard disk drives. You can install only 3.5-inch simple-swap SATA drives in these servers.

  The following illustration shows a System x3550 server with a hot-swap or simple-swap 3.5-inch hard disk drive configuration.
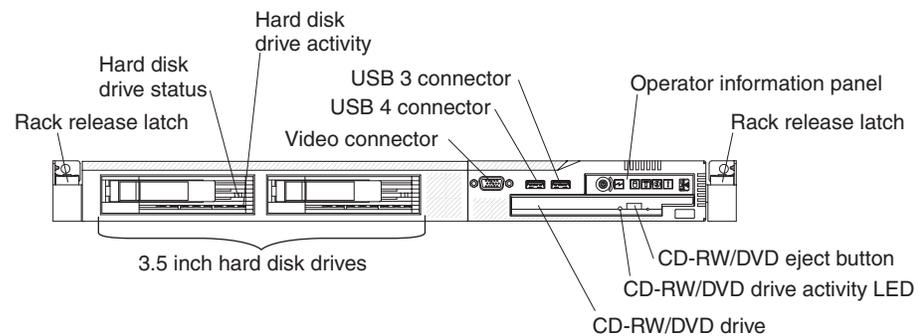
Performance, ease of use, reliability, and expansion capabilities were key considerations in the design of the server. These design features make it possible for you to customize the system hardware to meet your needs today and provide flexible expansion capabilities for the future.

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1. Racks are marked in vertical increments of 1.75 inches each. Each increment is referred to as a unit, or a "U". A 1-U-high device is approximately 1.75 inches tall.

1

The server comes with a limited warranty. For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support 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* provides general information about the server, including how to install supported options 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 options.

- *Safety Information*

  This document is in Portable Document Format (PDF) on the IBM *System x 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 *System x Documentation* CD. It contains information to help you solve problems yourself, and it contains information for service technicians.

- *Warranty and Support Information*

  This document is in PDF on the IBM *System x Documentation* CD. It contains information about the terms of the warranty and getting service and assistance.

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

The 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 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 you received with the server. The documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the server documentation. These updates are available from the IBM Web site. To check for updates, go to http://www.ibm.com/servers/eserver/support/xseries/index.html, select **System x3550** from the **Hardware** list, and click **Go**. For firmware updates, click the **Download** tab. For Documentation updates, click the **Install and use** tab, and click **Product documentation**.

Notices and statements used in this document

The caution and danger statements that appear in this document are also in the multilingual *Safety Information* document, which is on the IBM *System x Documentation* CD. Each statement is numbered for reference to the corresponding statement 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 could 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 form factor server, some features might not be available, or some specifications might not apply.

Table 1. Features and specifications

Microprocessor:

- Intel® Xeon™ FC-LGA 771 dual-core with 4096 KB (minimum) Level-2 cache
- Support for up to two microprocessors
- Support for Intel Extended Memory 64 Technology (EM64T)

Note:

- Use the Configuration/Setup Utility program to determine the type and speed of the microprocessors.
- For a list of supported microprocessors, see http://www.ibm.com/servers/eserver/serverproven/compat/us/

Memory:

- Minimum: 1 GB
- Maximum: 32 GB
- Type: PC2-5300, 667 MHz, ECC, DDR II fully buffered SDRAM DIMMs only
- Slots: Eight dual inline
- Supports 512 MB, 1 GB, 2 GB, and 4 GB (when available) DIMMs

Drives:

CD/DVD: IDE 24x CD-RW/ 8x DVD combination

Expansion bays (depending on model):

Either two 3.5-inch or four 2.5-inch hard disk drive bays
- Servers with a 2.5-inch hot-swap drive bay configuration support up to four 2.5-inch hot-swap SAS hard disk drives
- Servers with a 3.5-inch hot-swap drive bay configuration support up to two 3.5-inch SAS or SATA hot-swap hard disk drives
- Servers with a 3.5-inch simple-swap drive bay configuration support up to two 3.5-inch simple-swap SATA hard disk drives

PCI Expansion slots:
- One PCI Express x8 (half length)
- One PCI Express x8 (half length) or PCI-X (half length)

Power supply:

Maximum of two redundant 670-watt (110 or 220 V ac auto-sensing) hot-swap power supplies.

Hot-swap fans:
- Standard: five
- Maximum: six (with two microprocessors installed)

Size:
- Height: 43 mm (1.69 inches, 1 U)
- Depth: 711 mm (28 inches)
- Width: 440 mm (17.3 inches)
- Maximum weight: 15.4 kg (34 lb) when fully configured

Integrated functions:
- Two Broadcom NetXtreme II Gb Ethernet controllers with TOE and Wake on LAN® support
- Four Universal Serial Bus (USB) 2.0 ports (two front and two rear)
- One Advanced System Management RJ-45 (active only when a Remote Supervisor Adapter II SlimLine is installed)
- One serial port

Hard disk controllers:
- Serial ATA (SATA) controller with integrated RAID (simple-swap SATA models)
- Serial-attached SCSI (SAS) controller with integrated RAID (hot-swap SAS models)

Acoustical noise emissions:
- Sound power, idling: 6.8 bels maximum
- Sound power, operating: 6.8 bels maximum

Environment:
- Air temperature:
  - Server on: 10° to 35°C (50.0° to 95.0°F); altitude: 0 to 914 m (2998.7 ft)
  - Server off: -40° to 60°C (-104° to 140°F); maximum altitude: 2133 m (6998.0 ft)
- Humidity:
  - Server on: 8% to 80%
  - Server off: 8% to 80%

Heat output:

Approximate heat output in British thermal units (Btu) per hour:
- Minimum configuration: 662 Btu per hour (194 watts)
- Maximum configuration: 2390 Btu per hour (700 watts)

Electrical input:
- Sine-wave input (47-63 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
- Input kilovolt-amperes (kVA), approximately:
  - Minimum: 0.194 kVA
  - Maximum: 0.700 kVA

Video controller (integrated):
- ATI Radeon RN50 (dual ports - front and rear)
- Support for SPI Serial flash memory video BIOS
- Flexible memory support
  - 8 MB to 256 MB
  - DDR1 and DDR2 SDRAM and SGRAM

Notes:

1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.

2. 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.

What your server offers

The server uses the following features and technologies:

- **Advanced System Management**

  The Remote Supervisor Adapter II Slimline provides Advanced System Management capabilities by enabling remote keyboard, video, and mouse (KVM) access to the server.

- **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. Critical errors are included in the error log. The BMC also provides Serial over LAN (SOL) connectivity.

- **Diagnostics program**

  You can use the diagnostics program to test the major components of the server. To start the diagnostics program, press F2 while the server is starting.

- **Dual-core processing**

  The server supports up to two Intel microprocessors. The server comes with only one microprocessor, and you can install a second microprocessor to enhance performance.

- **IBM Director**

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

- **IBM Enterprise X-Architecture technology**

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

  - **Active™ Memory**

    The Active Memory feature improves the reliability of memory through memory mirroring and online-spare memory. Memory mirroring stores data in two pairs of DIMMs simultaneously. Online-spare memory disables a failed pair of DIMMs from the system configuration and activates a pair of online-spare DIMMs. For more information, see the section about installing DIMMs in the *Installation Guide*.

  - **Large system-memory capacity**

    The memory bus supports up to 32 GB of system memory. The memory controller supports error correcting code (ECC) for up to eight industry-standard PC2-5300, 667 MHz, DDR2 (second-generation double-data-rate), fully buffered, synchronous dynamic random access memory (SDRAM) dual inline memory modules (DIMMs).

- **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 hardware options 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 56.

- **Integrated network support**

The server comes with an integrated dual port Broadcom 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.

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

  The server supports a maximum of four 2.5-inch or two 3.5-inch Serial Attached SCSI (SAS) or Serial ATA (SATA) hot-swap hard disk drives in the hot-swap bays or two 3.5-inch SATA simple swap hard disk drives.

  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 *Installation Guide*.

- **PCI adapter capabilities**

  The server has two half-length PCI interface slots. Both slots can be used for PCI Express adapters. The full-length slot can be used for either a PCI-X adapter or a PCI Express adapter.

- **PowerExecutive**

  PowerExecutive 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 systems-management interface, and can view them using IBM Director. For more information, including the required levels of IBM Director and PowerExecutive, see the IBM Director documentation on the IBM Director CD, or see www.ibm.com/servers/eserver/xseries/systems_management/ibm_director/ extensions.

- **Redundant connection**

  The addition of an optional network interface card (NIC) provides 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 optional power capabilities**

  The server supports a maximum of two 670-watt hot-swap power supplies and six hot-swap fans, which provide redundancy and hot-swap capability for a typical configuration.The redundant cooling of the fans in the server enables continued operation if one of the fans fails. The server comes with one 670-watt hot-swap power supply and five fans. You can order the second optional power supply with the additional fan.

- **ServeRAID™ support**

  An optional ServeRAID adapter provides hardware redundant array of independent disks (RAID) support to create configurations. The standard RAID configuration on the server provides software RAID support and mirroring.

- **Systems-management capabilities**

  The server comes with a baseboard management controller (BMC). When the BMC is used with the systems-management software that comes with the server, you can manage the functions of the server locally and remotely. The BMC also provides system monitoring, event recording, and network alert capability.

  The optional Remote Supervisor Adapter II SlimLine can be used to obtain enhanced systems-management capabilities, in addition to those of the

embedded BMC. The Remote Supervisor Adapter II SlimLine, provides a dedicated Ethernet connection at the rear of the server.

- **TCP/IP offload engine (RTOE) support**

  The Ethernet controllers in the server support TOE, which is a technology that offloads the TCP/IP flow from the microprocessor and I/O subsystem to increase the speed of the TCP/IP flow. When an operating system that supports TOE is running on the server and TOE is enabled, the server supports TOE operation. See the operating-system documentation for information about enabling TOE.

  Note: As of the date of this document, the Linux operating system does not support TOE.

Reliability, availability, and serviceability

Three important computer 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.

Your server has the following RAS features:
- Automatic error retry and recovery
- Automatic restart after a power failure
- Baseboard management controller (BMC) service processor
- Backup basic input/output system (BIOS) switching under the control of the BMC
- Built-in monitoring for fan, power, temperature, voltage, and power-supply redundancy
- Cable-presence detection on most connectors
- Chipkill™ memory protection
- Error codes and messages
- Error correcting code (ECC) L2 cache and system memory
- Hot-swap hard disk drives, some drives
- Information and light path diagnostics LED panels
- Menu-driven setup, system configuration, and redundant array of independent disks (RAID) configuration programs
- Availability of microcode and diagnostic levels
- Parity checking on the small computer system interface (SCSI) bus and PCI buses
- Power management: Compliance with Advanced Configuration and Power Interface (ACPI)
- Power-on self-test (POST)
- Predictive Failure Analysis® (PFA) alerts
- Redundant Ethernet capabilities with failover support
- Hot-swap cooling fans with speed-sensing capability
- Redundant hot-swap power supplies and redundant hot-swap fans (some models)
- Remind button to temporarily turn off the system-error LED
- Remote system problem-determination support
- Standby voltage for system-management features and monitoring
- Startup (boot) from LAN through remote initial program load (RIPL) or dynamic host configuration protocol/boot protocol (DHCP/BOOTP)
- System auto-configuring from the configuration menu
- System-error logging (POST and BMC)
- System-management monitoring through the Iner IC protocol
- Upgradeable POST, BIOS, diagnostics, BMC firmware, and read-only memory (ROM) resident code, locally or over the LAN

- Vital product data (VPD) on microprocessors, system board, power supplies, SAS (hot-swap-drive) backplane, and power backplane
- Wake on LAN feature 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 Intel-processor-based servers, desktop computers, workstations, and mobile 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/pc/support/site.wss/document.do?lndocid=MIGR-61788. It is updated every 6 to 8 weeks.
- Support for IBM and non-IBM servers, desktop computers, workstations, and mobile 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/ fqm0_main.html, and the IBM System x Systems Management Web page at http://www.ibm.com/ servers/systems/x/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 servers and server options. 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/x/
systems_management/ ibm_director/extensions/xpress.html.

Server controls, LEDs, and power

This section describes the controls 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. This configuration supports up to four 2.5-inch hot-swappable hard disk
drives.
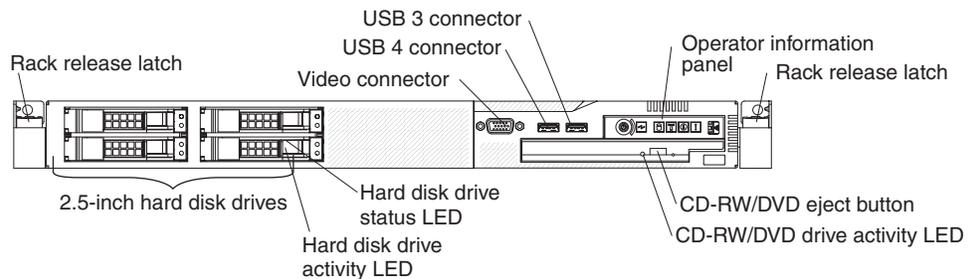
USB 3 connector
USB 4 connector
Video connector
Operator information
panel
Rack release latch
Rack release latch

2.5-inch hard disk drives
Hard disk drive
status LED
Hard disk drive
activity LED
CD-RW/DVD eject button
CD-RW/DVD drive activity LED

The following illustration shows the controls, LEDs, and connectors on the front of
the server. This configuration supports up to two 3.5-inch hot-swappable hard disk
drives or two 3.5-inch simple-swap SATA hard disk drives.

USB 3 connector
USB 4 connector
Video connector
Operator information panel
Rack release latch
Rack release latch

3.5-inch hard disk drives
CD-RW/DVD eject button
CD-RW/DVD drive
activity LED
Hard disk drive
status LED (SAS model)
Hard disk drive
activity LED (SAS model)
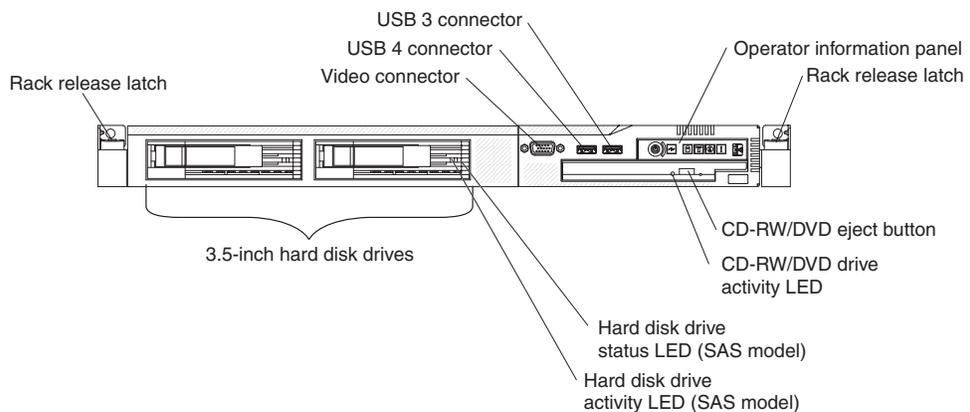
Note: The locations of the controls, LEDs, and connectors vary, depending on the
hardware configuration that you have.

- **Operator information panel:** This panel contains controls and LEDs about the
status of the server.

Power-on
LED (green)
System
locator
LED (blue)
System-error
LED (amber)

Power-
control
button
Hard drive
activity
LED (green)
System
information
LED (amber)
Release
latch
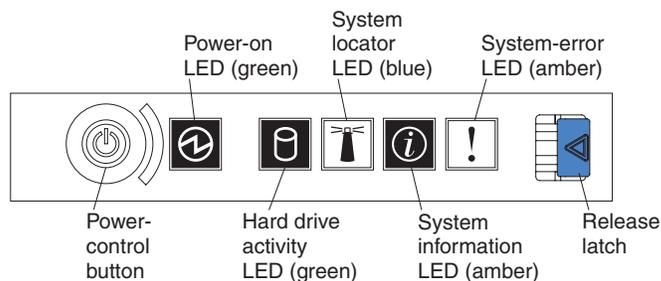
The following controls and LEDs are on the operator information panel:

– **Power-on LED:** When this green 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 is 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. A power LED is also on the rear of the server.

> **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 cord from the electrical outlet.

– **System-locator LED:** Use this blue LED to visually locate the server among other servers. You can use IBM Director to light this LED remotely. This LED is controlled by the BMC.

– **System-error LED:** When this amber LED is lit, it indicates that a system error has occurred. A system-error LED is also on the rear of the server. An LED on the light path diagnostics panel on the system board is also lit to help isolate the error. This LED is controlled by the BMC.

– **Release latch:** Press the release latch to the left to slide out the operator information panel and view the light path diagnostics LEDs and buttons. See the *Problem Determination and Service Guide* for more information about the light path diagnostics panel.

– **System-information LED:** When this amber LED is lit, it indicates that a noncritical event has occurred. Check the error log for additional information. See the information about light path diagnostics in the *Problem Determination and Service Guide* for more information about error logs.

– **Hard drive activity LED:** When this green LED is lit, it indicates that one of the hard disk drives is in use.

> **Notes:**
>
> 1. For a SAS drive, a hard disk drive activity LED is shown in two places: on the hard disk drive and on the operator information panel.
> 2. For a SATA drive, hard disk drive activity is indicated only by the hard disk drive activity LED on the operator information panel.

– **Power-control button:** Press this button to turn the server on and off manually.

• **Rack release latches:** Press the latches on each front side of the server to remove the server from the rack.

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

• **USB connectors:** Connect a USB device, such as a USB mouse, keyboard, or other device to any of these connectors.

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

• **CD-RW/DVD drive activity LED:** When this LED is lit, it indicates that the CD-RW/DVD drive is in use.

• **Hard disk drive status LED:** This LED is used on SAS hard disk drives. When this LED is lit, it indicates that the drive has failed. If an optional IBM ServeRAID controller is installed in the server, when this LED is flashing slowly (one flash per second), it indicates that the drive is being rebuilt. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.

- **Hard disk drive activity LED:** This LED is used on SAS hard disk drives. Each hot-swap hard disk drive has an activity LED, and when this LED is flashing, it indicates that the drive is in use.

Light path diagnostics panel

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

To access the light path diagnostics panel, push the release button on the operator panel to the left. Pull forward on the unit until the hinge of the operator panel is free of the server chassis. Then pull down on the unit, so that the operator information panel is at a right angle with the server.

Operator information panel

Light path LEDs

Release button
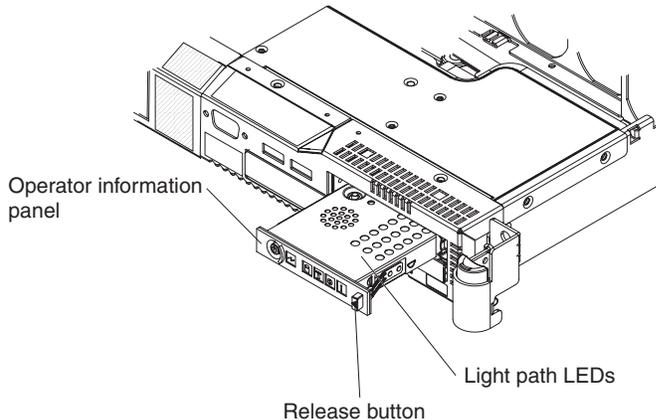
The following illustration shows the LEDs and controls on the light path diagnostics panel.
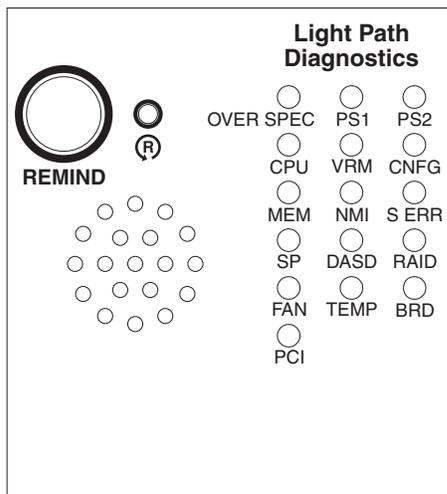
- **Remind button:** This button places the system-error LED on the front panel into Remind mode. In Remind mode, the system-error LED flashes rapidly until the problem is corrected, the system is restarted, or a new problem occurs.

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

- **Reset button:** Press this button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button. The reset button is to the right of the remind button.

For information about light path diagnostics, see the *System x3550 Problem Determination and Service Guide* on the IBM *System x Documentation* CD.

Rear view

The following illustration shows the connectors and LEDs on the rear of the server.
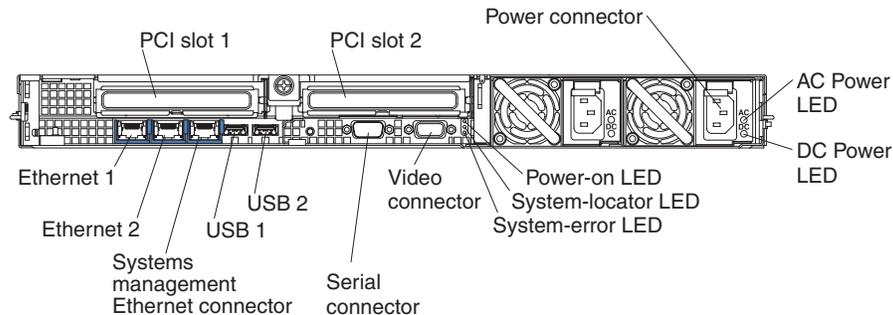
- **PCI slot 1:** Insert a PCI Express type adapter into this slot.
- **PCI slot 2:** Insert a PCI Express type adapter into this slot. You can purchase an optional PCI-X riser card assembly to convert this slot to accept a PCI-X adapter.
- **Power connector:** Connect the power cord to this connector.
- **AC power LED:** Each hot-swap power supply has an ac power LED and a dc power LED. When the ac power LED is lit, it indicates that sufficient power is coming into the power supply through the power cord. During typical operation, both the ac and dc power LEDs are lit. For any other combination of LEDs, see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.
- **DC power LED:** Each hot-swap power supply has a dc power LED and an ac power LED. When the dc power LED is lit, it indicates that the power supply is supplying adequate dc power to the system. During typical operation, both the ac and dc power LEDs are lit. For any other combination of LEDs, see the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD.
- **System-error LED:** When this LED is lit, it indicates that a system error has occurred. An LED on the light path diagnostics panel is also lit to help isolate the error.
- **Power-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.
- **System-locator LED:** Use this LED to visually locate the server among other servers. You can use IBM Director to light this LED remotely.
- **Video connector:** Connect a monitor to this connector. The video connectors on the front and rear of the server can be used simultaneously.
- **Serial connector:** Connect a 9-pin serial device to this connector. The serial port is shared with the baseboard management controller (BMC). The BMC can take control of the shared serial port to perform text console redirection and to redirect serial traffic, using Serial over LAN (SOL).
- **USB connectors:** Connect a USB device, such as a USB mouse, keyboard, or other device to any of these connectors.
- **Systems-management Ethernet connector:** Use this connector to connect the server to a network for systems-management information control. This connector is active only if you have installed a Remote Supervisor Adapter II SlimLine, and it is used only by the Remote Supervisor Adapter II SlimLine.

- **Ethernet activity LEDs:** When these LEDs are lit, they indicate that the server is transmitting to or receiving signals from the Ethernet LAN that is connected to the Ethernet port. See "Connecting the cables" on page 46 for the LED location.
- **Ethernet link LEDs:** When these LEDs are lit, they indicate that there is an active link connection on the 10BASE-T, 100BASE-TX, or 1000BASE-TX interface for the Ethernet port. See "Connecting the cables" on page 46 for the LED location.
- **Ethernet connectors:** Use either of these connectors to connect the server to a network.

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 (the baseboard management controller or optional Remote Supervisor Adapter II SlimLine) is shutdown; 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 is not turned on.

Turning on the server

Approximately 5 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 you installed an optional Remote Supervisor Adapter II SlimLine, the server can be turned on from the Remote Supervisor Adapter II SlimLine user interface.
- 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 is unavailable to the operating system. The amount of memory that is reserved for system resources depends on the operating system, the configuration of the server, and the configured PCI options.

Turning off the server

When you turn off the server and leave it connected to ac power, the server can respond to requests from the 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 turn 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 you installed an optional Remote Supervisor Adapter II SlimLine, the server can be turned off from the Remote Supervisor Adapter II SlimLine user interface.

- The baseboard management controller can turn off the server as an automatic response to a critical system failure.

Chapter 2. Installing options

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

Server components

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

Cover

Microprocessor heatsink

Air baffle

SATA backplate

Air baffle

SAS backplane

DIMM

3.5-inch hard disk drive cage

ServeRAID SAS controller

3.5-inch SAS hard disk drive

3.5-inch SATA hard disk drive

PCI-X riser card

Microprocessor

PCI Express riser card

System board

3.5-inch filler panel (simple-swap)

Power supply

Power backplane

3.5-inch filler panel (hot-swap)

2.5-inch hard disk drive backplane

Power-supply filler

2.5-inch hard disk drive cage

Fans (1, 2)

2.5-inch hard disk drive

2.5-inch filler panel (hot-swap)

Fans (3 - 6)

CD-RW/DVD drive

Operator information panel

System-board internal connectors

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

SAS signal
connector (J65)
(some models)

SATA 1 signal
connector (port 1)
(some models)

Power supply
backplane
connector

SATA 0 signal
connector (port 0)
(some models)

CD-RW/DVD connector

Operator information
panel connector

Video front panel
connector

Microprocessor 1
connector

USB front panel
connector
(USB3 and USB4)
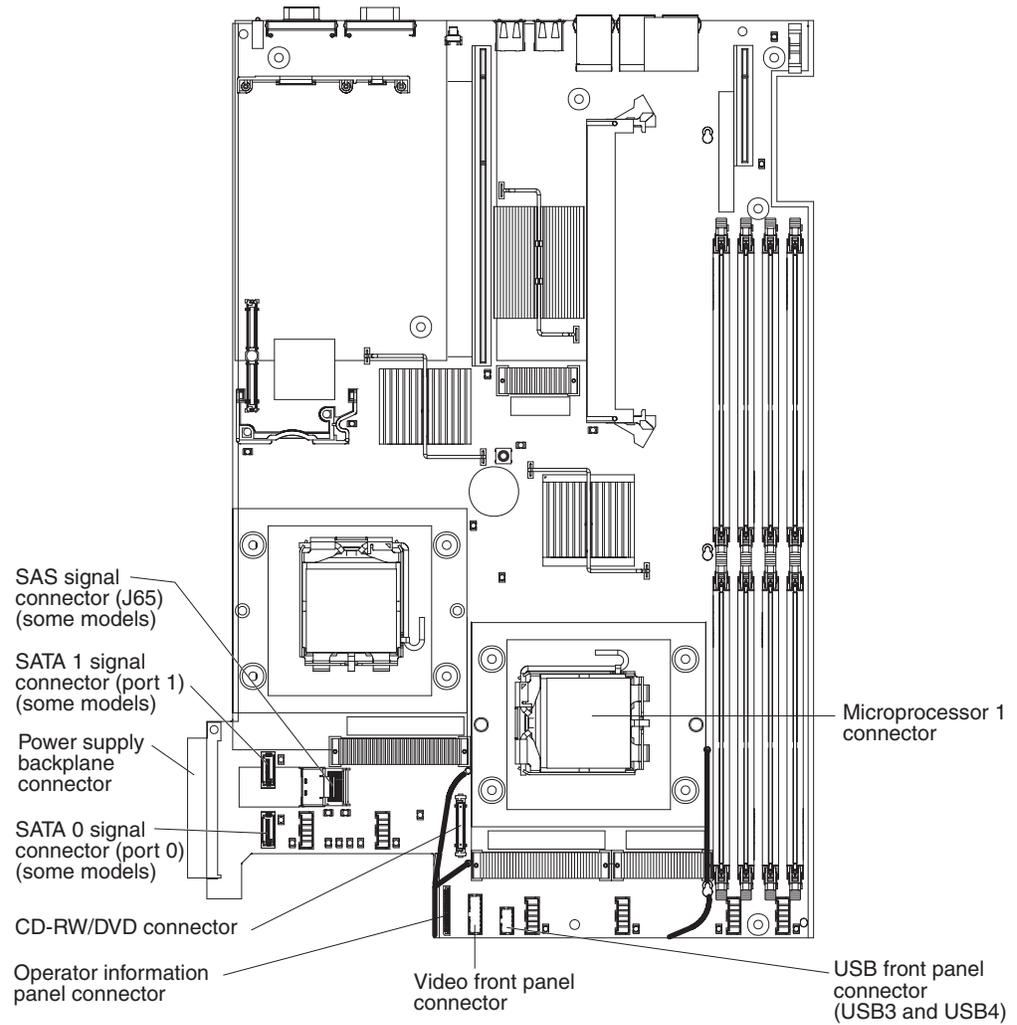
System-board external connectors

The following illustration shows the external input/output connectors on the system board.
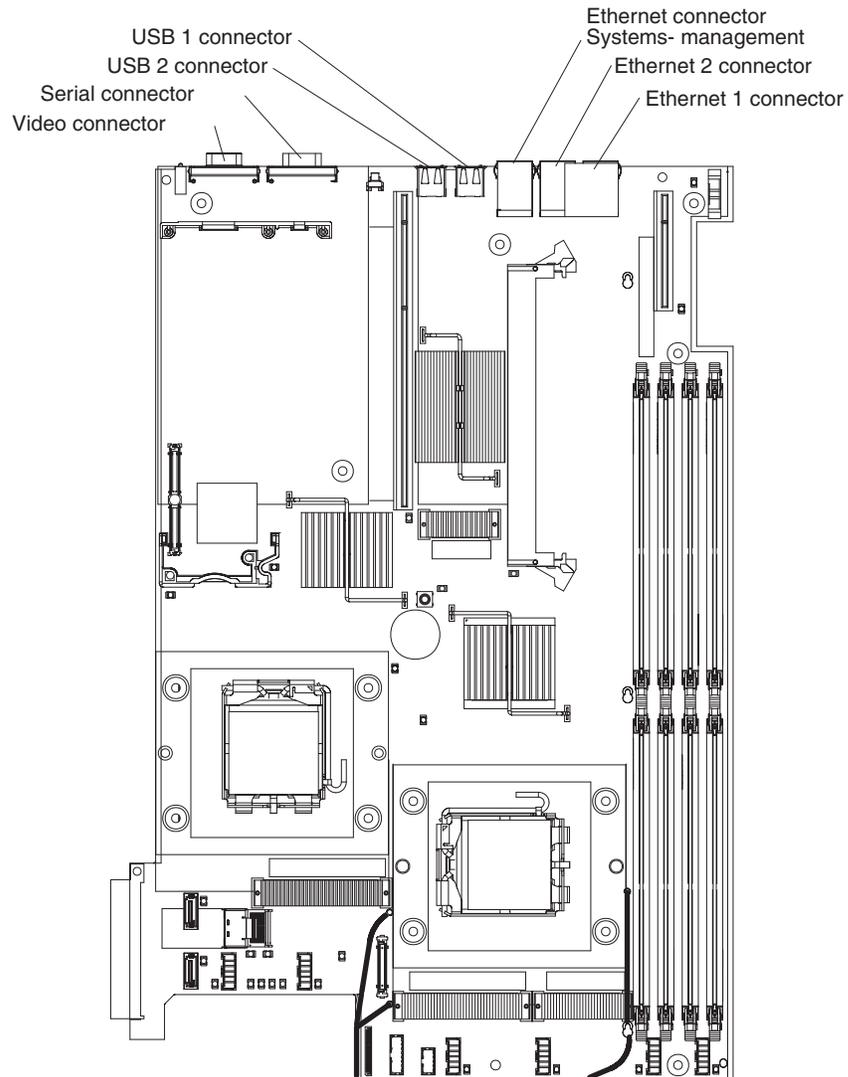
System-board switches and jumpers

The following illustration shows the switches and jumpers on the system board.
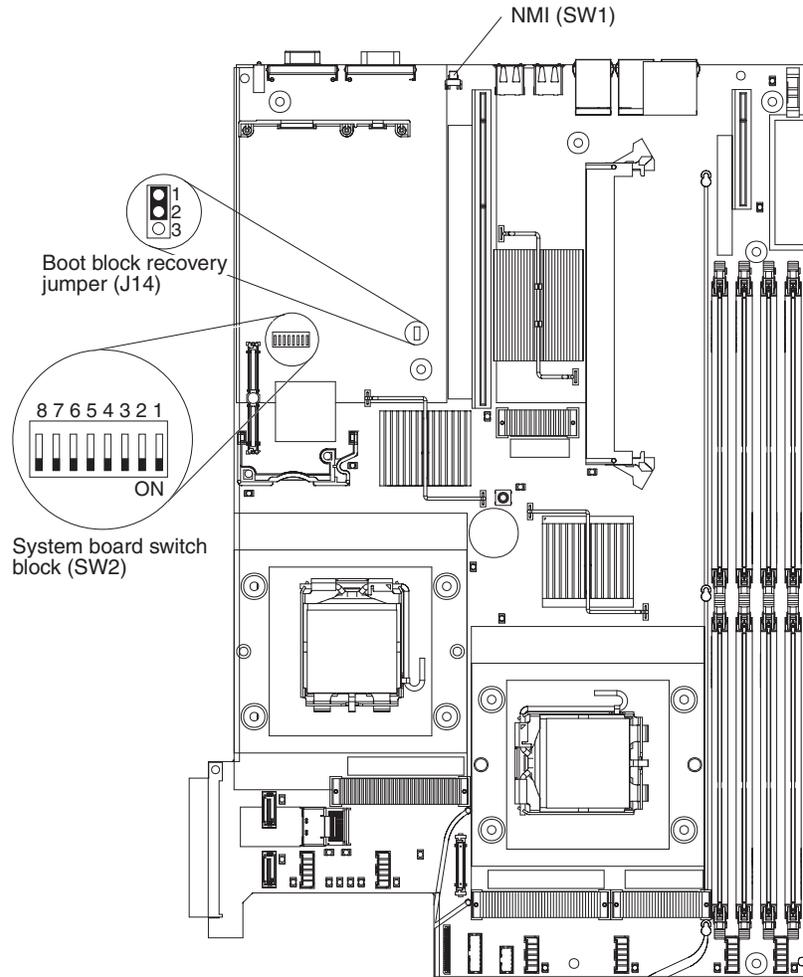
System-board LEDs

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

Power-on LED
Location LED
System-error LED

System-board battery error LED

PCI slot 1 error LED

DIMM 5 error LED
DIMM 6 error LED
DIMM 7 error LED
DIMM 8 error LED

Light path diagnostics active LED

PCI slot 2 error LED

Light path diagnostics switch

RAID error LED

Microprocessor 2 error LED

Remote Supervisor Adapter II SlimLine error LED

Microprocessor 1 error LED

BMC status LED

System-board fault LED

DIMM 1 error LED
DIMM 2 error LED
DIMM 3 error LED
DIMM 4 error LED

Fan 1 error LED

Power B error LED

Power A error LED

Fan 6 error LED
Fan 5 error LED
Fan 4 error LED
Fan 3 error LED

Power C error LED

Fan 2 error LED

Power D error LED

System-board channels and baffles

The following illustration shows how to route the cables for optional devices. The illustration also shows where the two air baffles are located. For some devices, you might have to remove the baffles to correctly route the cables.

Air baffle
with cable guide

Air baffle
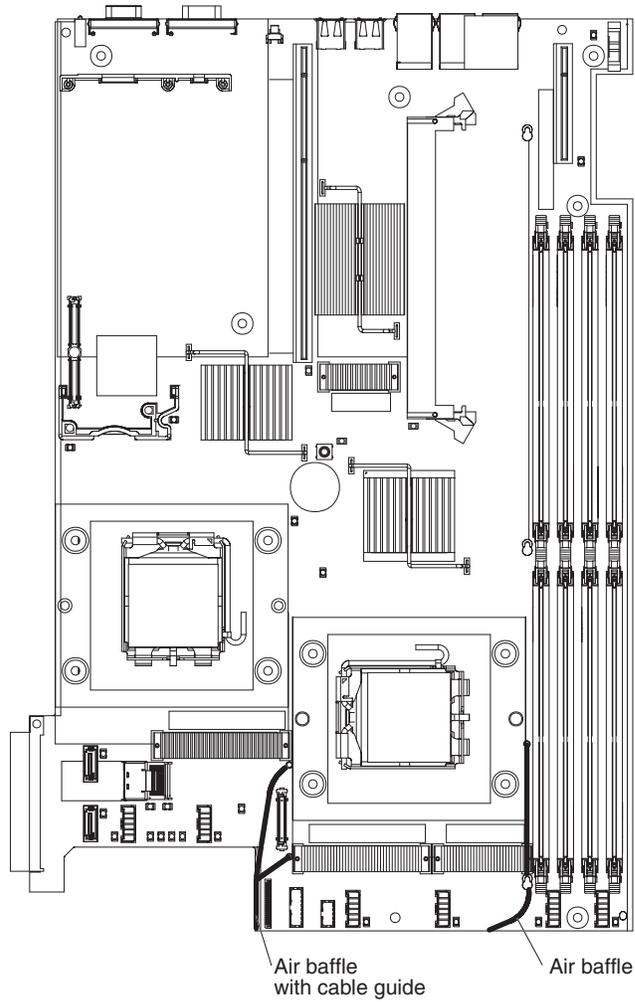
System-board option connectors

The following illustration shows the connectors on the system board for user-installable options.

PCI Express or
PCI-X riser-card
connector slot 2
(J12)

PCI-Express
riser card connector slot 1
(J34)

RAID controller
connector (J3)
(some models)

Remote Supervisor
Adapter II SlimLine
connector (J60)

DIMM 5 connector
DIMM 6 connector
DIMM 7 connector
DIMM 8 connector

Microprocessor 2
connector

DIMM 1 connector
DIMM 2 connector
DIMM 3 connector
DIMM 4 connector

Fan 1 connector
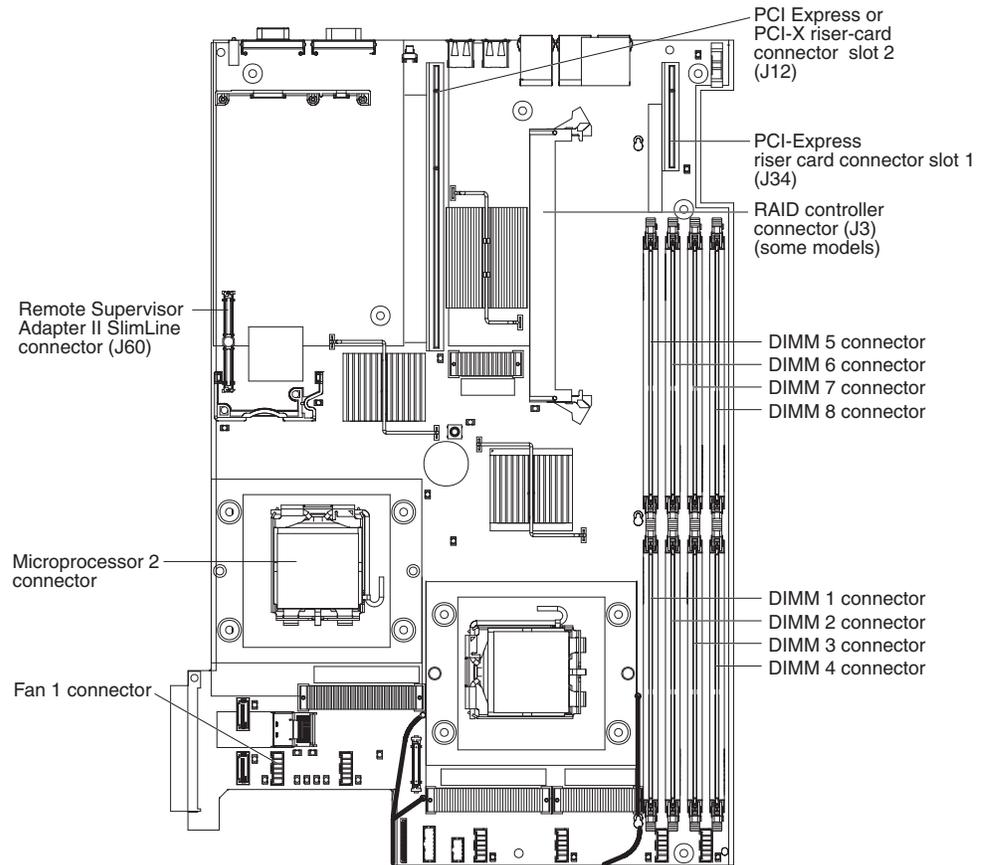
Installation guidelines

Before you install options, read the following information:

- Read the safety information that begins on page v and the guidelines in "Handling static-sensitive devices" on page 25. This information will help you work safely.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the server 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 and a small Phillips head screwdriver available.
- You do not have to turn off the server to install or replace hot-swap power supplies, hot-swap fans, or hot-plug Universal Serial Bus (USB) devices. However, you must turn off the server before performing 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.
- For a list of supported options for the server, see http://www.ibm.com/servers/ eserver/serverproven/compat/us/.

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.
- If the server has redundant power, each of the power-supply bays has a power supply installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before turning on the server.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap drive within 2 minutes of removal.
- You do not operate the server without the air baffle installed. Operating the server without the air baffle might cause the microprocessor to overheat.
- Microprocessor socket 2 always contains either a microprocessor baffle 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 could result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when working 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 server 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 could 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 working inside the server with the power on.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal surface on the outside of the server for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the server without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the server cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Removing the server cover

Important: Before you install optional hardware, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed, or that a 19990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see the *Problem Determination and Service Guide* for diagnostic information.

To remove the server cover, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 23.
2. If you are planning on removing or installing a microprocessor, memory module, PCI adapter, Remote SlimLine Adapter ll, RAID controller, simple-swap hard disk drive, or battery, turn off the server and peripheral devices and disconnect the power cords and all external cables, if necessary.

Thumbscrew

Fan door
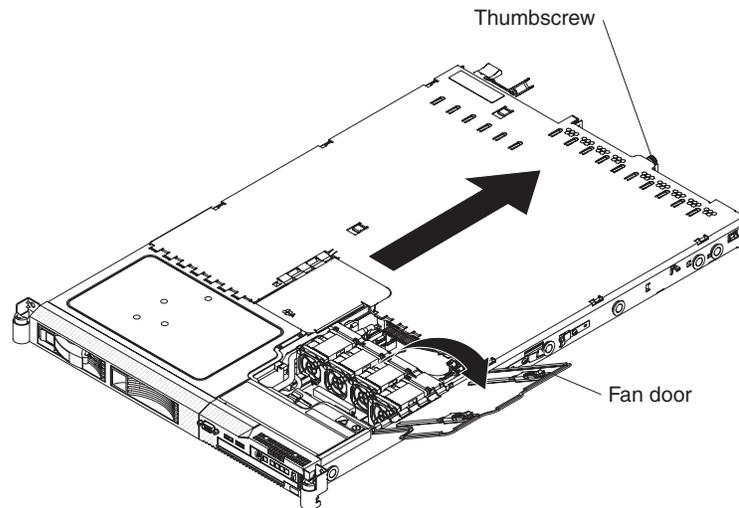
3. If the server has been installed in a rack, slide the server out from the rack enclosure. See the *Rack Installation Instructions* that come with the server for information about removing the server from the rack.
4. Slide and lift the two cover-release latches on the fan door on the right side of the top of the server.
5. Lift the fan door cover.
6. Loosen the thumbscrew at the back of the server.
7. Slide the server cover back until the locking tabs release.
8. Lift the server cover off the server and set the server cover aside.

Attention: For proper cooling and airflow, replace the server cover before you turn on the server.

Removing air baffles

There are two air baffles inside the server. These air baffles direct air to cool components inside the server. You might have to remove these baffles to access certain components or connectors on the system board such as DIMMs, IDE cables, or microprocessors.

To remove an air baffle, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 23.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables, if necessary; then, remove the server cover.
3. To remove the air baffle that is closest to the wall of the server, complete these steps:
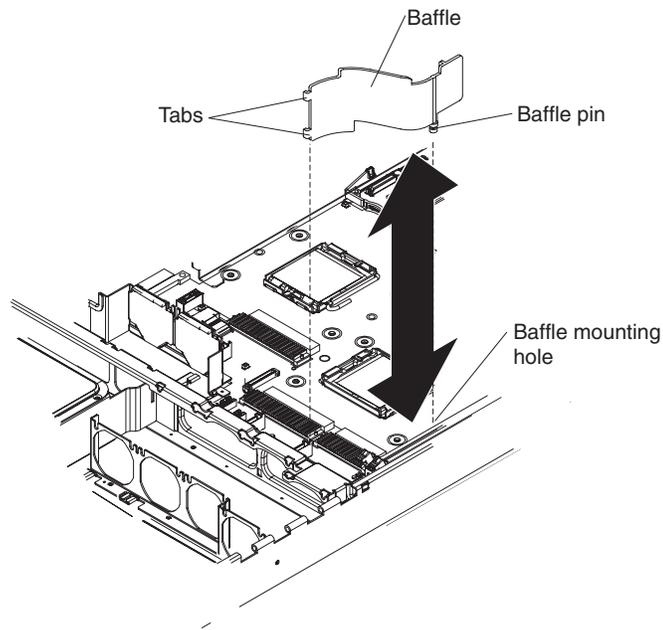
Baffle

Tabs

Baffle pin

Baffle mounting
hole

a. Slide the baffle back from the front of the server to disengage the tab at the
front of the baffle from the bulkhead that runs the width of the server.

b. Lift the baffle up, making sure that the pins come out of the holes on the
system board.

Attention: For proper cooling and airflow, replace the air baffle before you
turn on the server. Operating the server with the air baffle removed might
damage server components.

4. To remove the air baffle near the center of the server, complete these steps:
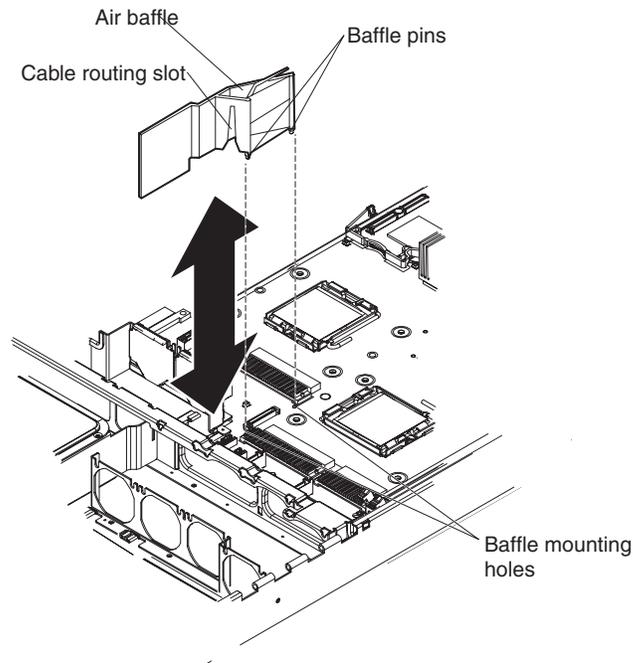
Air baffle

Baffle pins

Cable routing slot

Baffle mounting holes

a. Slide the baffle back from the front of the server to disengage the tab at the front of the baffle from the bulkhead that runs the width of the server.

b. Lift the baffle up slightly, making sure that the pins come out of the holes on the system board.

c. Slide the cables out of the cable routing slot. Make sure you do not disconnect or loosen the cables.

d. Lift the baffle out completely.

Attention: For proper cooling and airflow, replace the air baffle before you turn on the server. Operating the server with the air baffle removed might damage server components.

Installing a hot-swap power supply

The following notes describe the type of power supply that the server supports and other information that you must consider when installing a power supply:

- The server comes with one 670-watt hot-swap 12-volt output power supply. The input voltage is 110 V ac or 220 V ac auto-sensing.

- You can install an optional 670-watt hot-swap 12-volt output power supply to use as a redundant power supply.

- These power supplies are designed for parallel operation. In the event of a power-supply failure, the redundant power supply continues to power the system. The server supports a maximum of two power supplies.

    Note: If you are using a Y power cable between two servers that act as backup power units, see "Installing a Y power cable" on page 30 for information about how to connect a Y power cable.

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 with one of these parts, contact a service technician.

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

1. Read the safety information that begins v and "Installation guidelines" on page 23.

2. Remove the protective power-supply cover from the back of the server.

   Note: The server comes with this protective cover over both power-supply openings.

Release latch

Tab
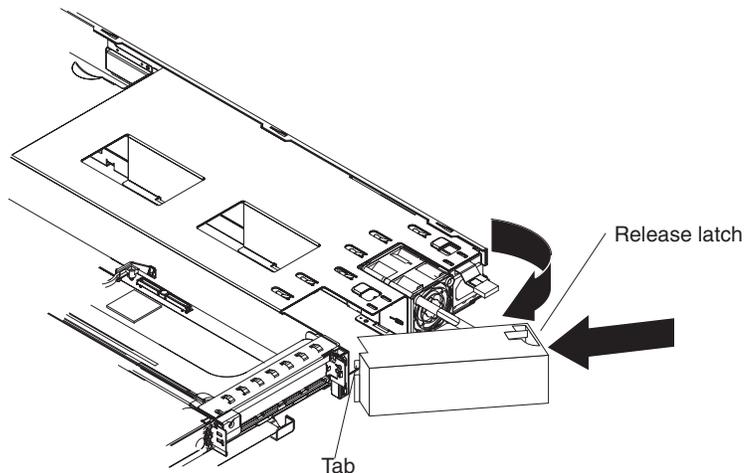
   Press in on the release tab on the outside of the cover. Move the cover off the power supplies by swinging the cover to the left; then, remove it from the tab on the other side. Pull it back and off, and store it in a safe place.

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

Power supply

Power supply release tab

Power supply handle
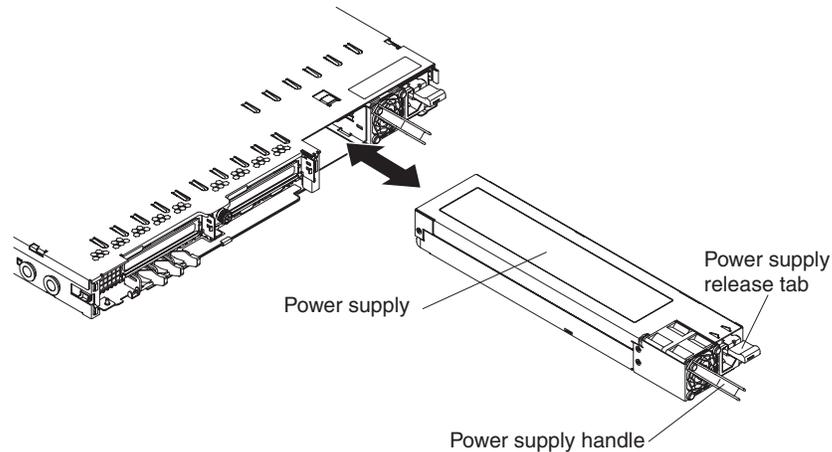
4. Grasp the handle on the rear of the power supply and slide the power supply forward into the power-supply bay until it clicks. Make sure that the power supply connects firmly into the power-supply backplane.

5. Connect the power cord for the new power supply to the power-cord connector on the power supply.

6. Connect the other end of the power cord to a properly grounded electrical outlet.

7. Make sure that the ac power LED and the dc power LED on the power supply are lit, indicating that the power supply is operating correctly. The two green LEDs are to the right of the power-cord connector.

If you have other options to install or remove, do so now. Otherwise, go to "Completing the installation" on page 45.

Installing a Y power cable

A Y power cable comes with the power-supply option. Cable the servers as shown in the illustration to ensure server redundancy. Use one Y power cable to provide power to two servers. Each Y power cable must be connected to a different power source, such as a power distribution unit (PDU), to maintain redundancy.

Cable-management arm

Y cable A

Y cable B

Cable-management arm
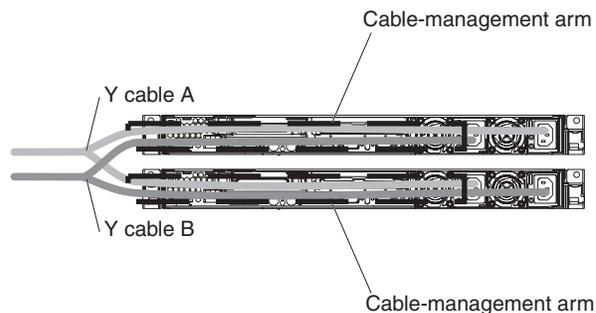
Installing a hard disk drive

Locate the documentation that comes with the hard disk drive and follow those instructions in addition to the instructions in this chapter.

Note: Do not mix SAS hard disk drives with SATA hard disk drives.

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

The server supports one of the following hard disk drive configurations:

- Servers with four hot-swap bays support 2.5-inch hot-swap SAS hard disk drives. You can install only 2.5-inch SAS drives in these servers.
- Servers with two hot-swap bays support 3.5-inch hot-swap SAS or 3.5-inch hot-swap SATA hard disk drives. You can install only 3.5-inch hot-swap SAS or hot-swap SATA drives in these servers.
- Servers with two simple-swap bays support 3.5-inch simple-swap SATA hard disk drives. You can install only 3.5-inch simple-swap SATA drives in these servers.
- All hot-swap drives in the server should have the same throughput speed rating. Mixing hard disk drives with different speed ratings will cause all drives to operate at the lower throughput speed.
- Do not mix SAS and SATA drives in the same array.

Installing a hot-swap hard disk drive

To install a 2.5-inch or 3.5-inch SAS hard disk drive, complete the following steps:

**Note:** If you have only one hard disk drive, you must install it in the upper-left bay.
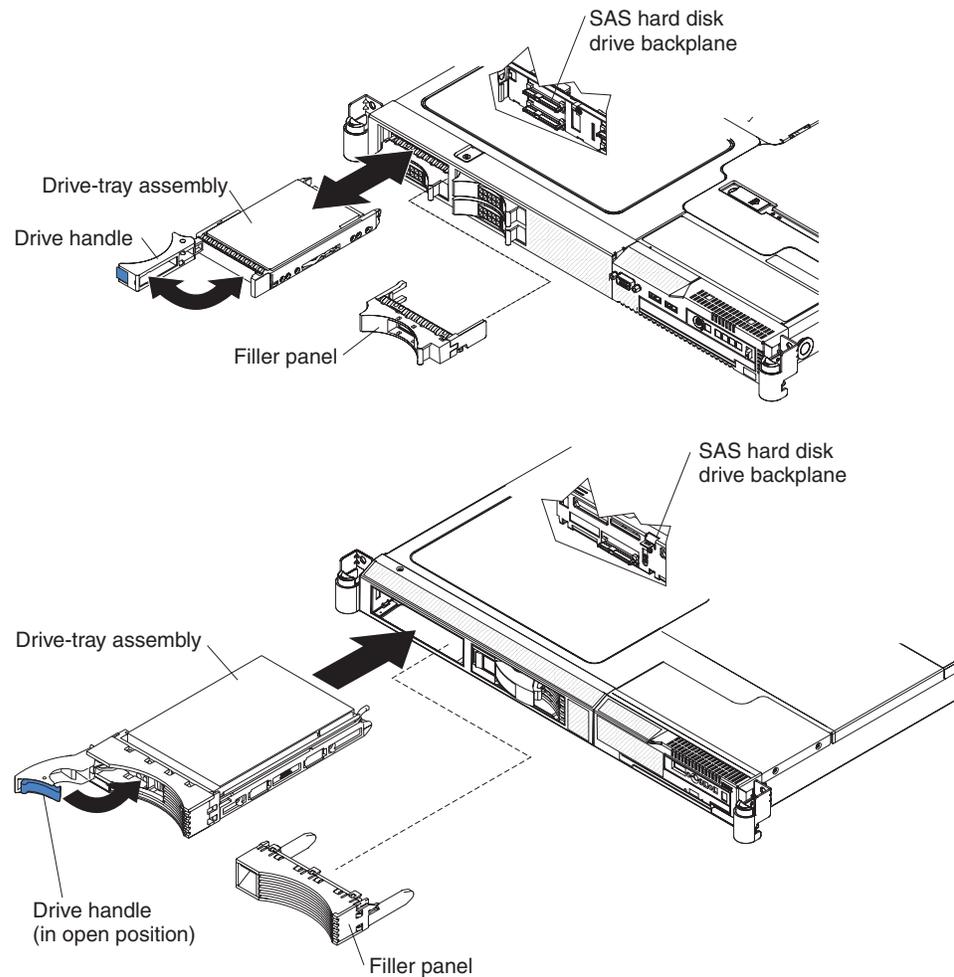
1. Read the safety information that begins on page v and "Installation guidelines" on page 23.
2. Remove the filler panel from the empty drive bay.
3. Install the hard disk drive in the drive bay.
   a. Make sure that the tray handle is open (that is, horizontal to the drive).
   b. Align the drive assembly with the guide rails in the bay.
   c. Gently push the drive assembly into the bay until the drive stops.
   d. Push the tray handle to the closed (locked) position.
   e. Check the hard disk drive status LED to verify 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 options to install or remove, do so now. Otherwise, go to "Completing the installation" on page 45.

Installing a simple-swap hard disk drive

To install a 3.5-inch SATA simple-swap hard disk drive, complete the following steps:

Note: If you have only one hard disk drive, you must install it in the left bay.
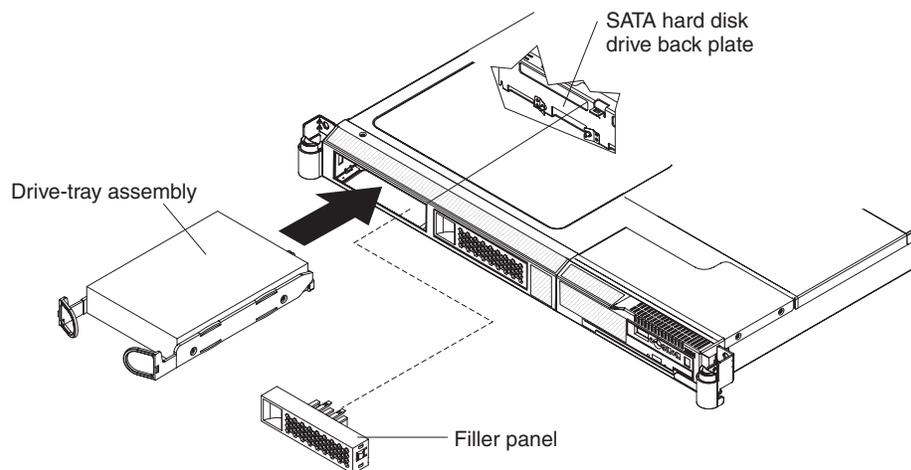
Drive-tray assembly

SATA hard disk drive back plate

Filler panel

1. Read the safety information that begins on page v and "Installation guidelines" on page 23.
2. Turn off the server and disconnect the power cords and all external cables, if necessary.
3. Remove the filler panel from the empty drive bay.
4. Insert the drive into the drive tray assembly.
   a. Align the drive assembly with the guide rails in the bay.
   b. Gently push the drive assembly into the bay until the rear of the drive snaps into place with the connector on the back plate.
5. Install the filler panel in the drive bay.
6. Reconnect the power cords and turn on the server.
7. Check the hard disk drive status LED to verify 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 options to install or remove, do so now. Otherwise, go to "Completing the installation" on page 45.

Replacing a riser-card assembly

The server comes with two PCI Express riser-card assemblies. You can replace a PCI Express riser-card assembly with a PCI-X riser-card assembly.

To replace a PCI Express riser-card assembly with a PCI-X riser-card assembly, complete the following steps:

1. Read the safety information that begins on page v and the "Installation guidelines" on page 23.
2. Turn off the server and disconnect the power cords and all external cables, if necessary; then, remove the server cover.
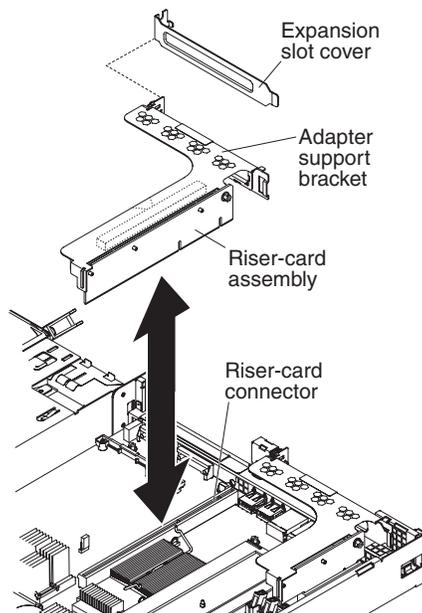
3. Remove the PCI Express riser-card assembly from slot 2 on the system board.
   - If an adapter is installed in the riser-card assembly, disconnect any cables that are connected to the adapter.
   - Grasp the riser-card assembly at the rear edge and lift it from the riser-card connector.
   - Remove the adapter, if one is present, from the riser-card assembly.
   - Store the riser-card assembly and the adapter in a safe place for possible future use.
4. Install a PCI-X adapter in the PCI-X riser-card assembly. See "Installing an adapter" on page 34 for more information. Set any jumpers or switches on the adapter as directed by the adapter manufacturer.
5. Insert the PCI-X riser-card assembly into the riser-card connector on the system board. Make sure that it is fully seated.

If you have other options to install or remove, do so now. Otherwise, go to "Completing the installation" on page 45.

Installing an adapter

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

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section.
- There are two types of adapters that you can install, depending on which slots are available. You can install the following types of adapters in PCI slots 1 and 2:
  - Only a PCI Express adapter into slot 1
  - Any PCI-X or PCI Express adapter into slot 2

Each PCI slot requires a riser card assembly. The server comes with two PCI Express riser card assemblies. If you plan to install a PCI-X adapter, you must install the optional PCI-X riser card assembly.

To install an adapter, complete the following steps:

1. Read the safety information that begins on page v and the "Installation guidelines" on page 23.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables, if necessary; then, remove the server cover.
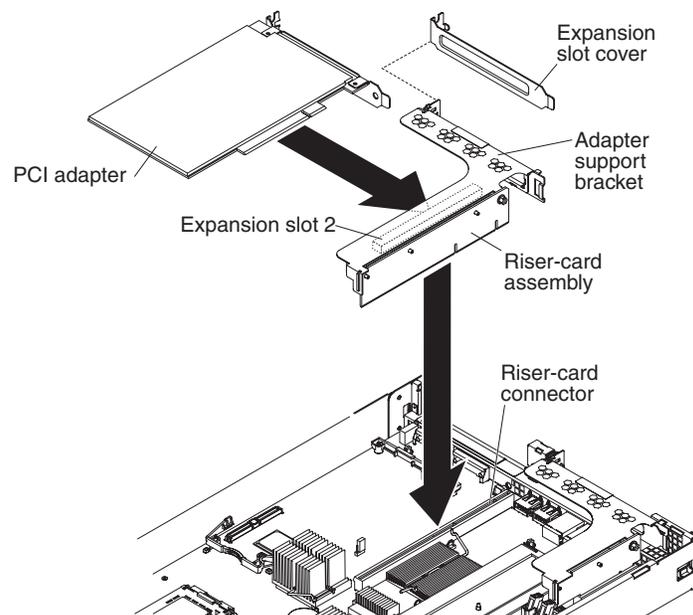
3. Follow the cabling instructions, if any come with the adapter. Route the adapter cables before you install the adapter.
4. Insert the adapter into the riser-card assembly, aligning the edge connector on the adapter with the connector on the riser-card assembly. Press the edge of the connector *firmly* into the riser-card assembly. Make sure that the adapter snaps into the riser-card assembly securely.

   Attention: When you install an adapter, make sure that the adapter is correctly seated in the riser-card assembly and that the riser-card assembly is securely seated in the riser-card connector on the system board before you turn on the server. An incorrectly seated adapter might cause damage to the system board, the riser-card assembly, or the adapter.
5. Install the riser-card assembly in the server. See "Replacing a riser-card assembly" on page 33 for more information.

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

If you have other options to install or remove, do so now. Otherwise, go to "Completing the installation" on page 45.

Replacing the RAID SAS controller

A ServeRAID SAS controller can be installed only in a dedicated slot on the system board. The server comes with a ServeRAID-8k-l SAS controller installed. You can replace the ServeRAID-8k-l SAS controller with a ServeRAID-8k SAS controller. This ServeRAID controller comes with a battery that you must connect to the controller.

The following illustration shows the ServeRAID-8k-l SAS controller.
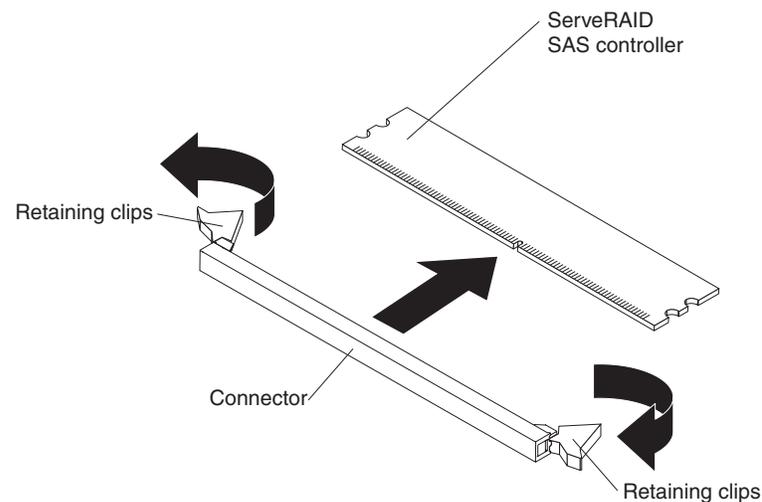
To replace the ServeRAID-8k-l SAS controller with a ServeRAID-8k SAS controller, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 23.
2. Turn off the server and peripheral devices and disconnect the power cords. Remove the server cover.
3. Remove the ServeRAID-8k-l SAS controller from the connector.
   a. Open the retaining clip on each end of the connector.

      Attention: To avoid breaking the retaining clips or damaging the connectors, handle the clips gently.
   b. Carefully grasp the controller by its top edge or upper corners, and pull the controller from the connector.
   c. Place the ServeRAID-8k-l SAS controller into a static-protective package and put it in a safe place.
4. Touch the static-protective package that contains the ServeRAID-8k controller to any unpainted surface on the outside of the server; then, grasp the adapter by the top edge or upper corners of the controller and remove it from the package.
5. Position the ServeRAID-8k controller by aligning the edge connector with the connector on the system board. Insert the controller *firmly* into the connector. The retaining clips snap into the locked position when the controller is firmly seated in the connector.

Battery mounting tabs

Battery

Battery cable

Battery mounting clips

Battery cable connector
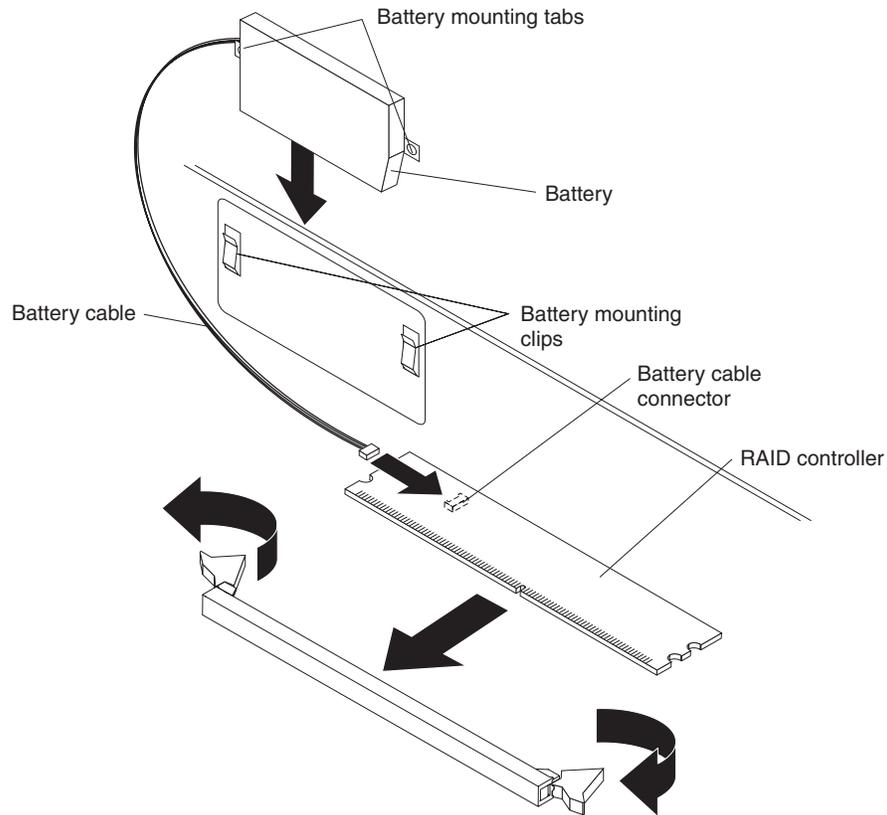
RAID controller

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

6. Remove the battery from the RAID controller package.

7. Slide the battery mounting tabs into the battery mounting clips on the server wall next to the connector.

8. Connect the RAID controller battery to the RAID controller.

Note: When you restart the server, you will be prompted to import the existing RAID configuration to the new ServeRAID controller.

If you have other options to install or remove, do so now. Otherwise, go to "Completing the installation" on page 45.

Installing a memory module

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

- The server supports up to eight Fully Buffered DIMM PC2-5300 512 MB, 1 GB, 2 GB, and 4 GB DIMMs, for a maximum of 32 GB of system memory. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of memory modules that you can use with the server.

  Note: Because some memory is reserved for system operation, the actual usable memory size that is reported by the operating system is less than the total installed size.

- The server comes with a minimum of two 512 MB DIMMs or two 1 GB DIMMs, installed in slots 1 and 3 or slots 5 and 7. When you install additional DIMMs,

you must install two identical DIMMs at a time, in the order shown in the following table, to maintain performance.

Table 2. DIMM installation sequence

Pair	DIMM connectors
1	1 and 3
2	5 and 7
3	2 and 4
4	6 and 8

Figure 1. DIMM connectors, channels, and branches
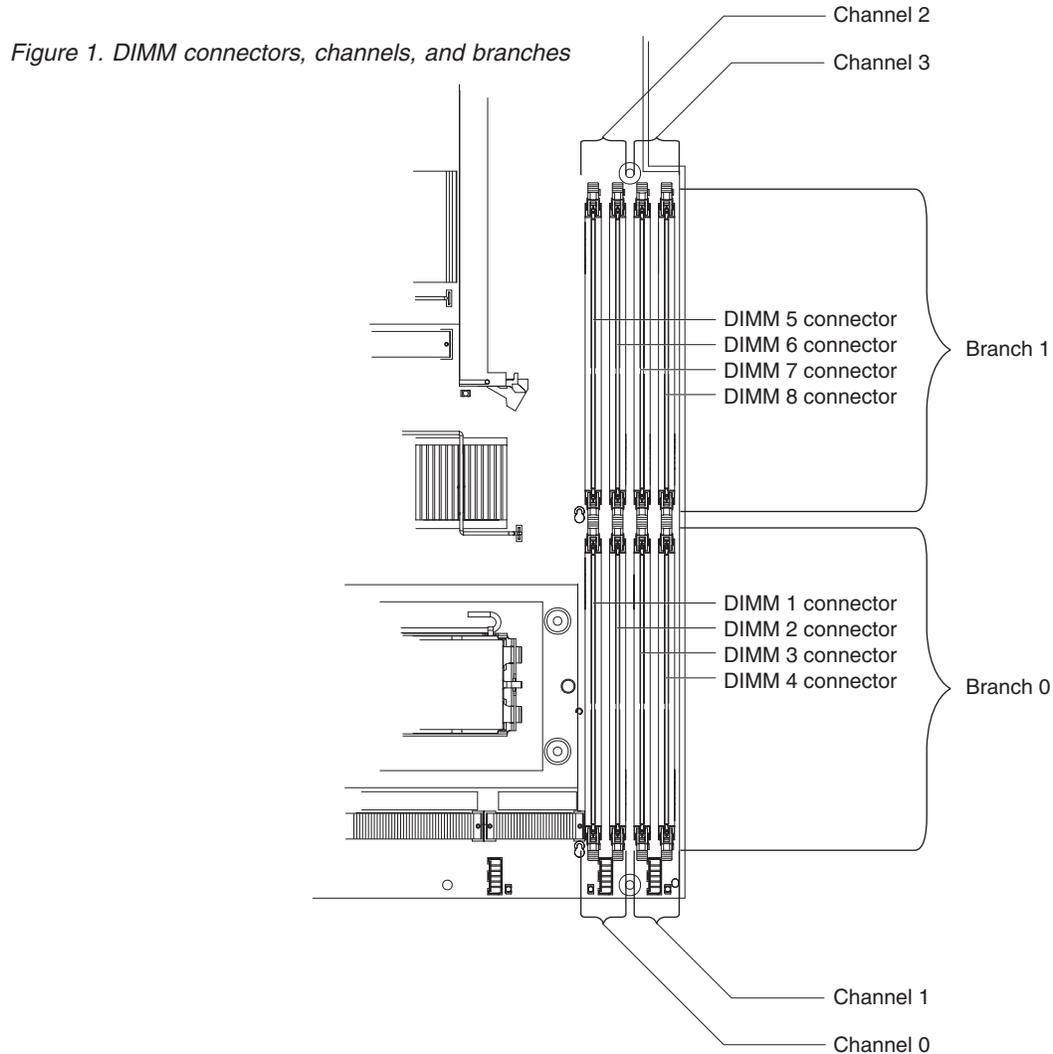
- Each DIMM in a pair must be the same size, speed, type, and technology to ensure that the server will operate correctly.
- You can configure the server to use memory mirroring. Memory mirroring stores data in two pairs of DIMMs simultaneously. If a failure occurs, the memory controller switches from the active pair to the mirroring pair. Memory mirroring reduces the amount of available memory. Enable memory mirroring through the Configuration/Setup Utility program.

  When you use memory mirroring, you must install two pairs of DIMMs at a time. The four DIMMs in each group must be identical. See the following table for the installation sequence of DIMM connectors for memory mirroring.

Table 3. Memory mirroring DIMM installation sequence

Group	DIMM connectors
1	1, 3, 5, and 7
2	2, 4, 6, and 8

Table 4. Memory mirroring DIMM functions

Group	Active DIMMs	Mirroring DIMMs
1	1, 3	5, 7
2	2, 4	6, 8

- The server supports online-spare memory. This feature disables the failed memory from the system configuration and activates an online-spare pair of DIMMs to replace the failed active DIMM pair. Online-spare memory reduces the amount of available memory. Before you can enable this feature, you must install up to two additional pairs of DIMMs. The online-spare DIMM pairs must be the same speed, type, and the same size as, or larger than, the largest active DIMM pairs.

  Enable online-spare memory through the Configuration/Setup Utility program. The BIOS code assigns the online-spare DIMM pairs according to your DIMM configuration. Two online-spare configurations are supported. See Table 5 for the online-spare memory DIMM connector assignments.

Table 5. Online-spare DIMM connector assignments

| Group	DIMM connectors
1	1 and 3, 2 and 4
2	5 and 7, 6 and 8

- You can enable either online-spare memory or memory mirroring, but not both at the same time. Online-spare memory provides more memory capacity than mirroring; mirroring provides better memory protection but less memory capacity than online-spare memory.
- When you install or remove DIMMs, the server configuration information changes. When you restart the server, the system displays a message that indicates that the memory configuration has changed.

To install a DIMM, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 23.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables, if necessary.
3. Remove the server cover.

   Attention: To avoid breaking the 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.
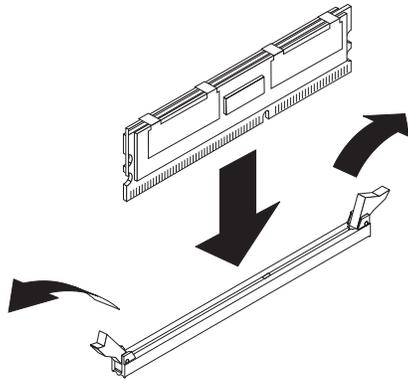
5. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the outside of the server. Then, remove the DIMM from the package.

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.

8. 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.

    If you have other options to install or remove, do so now. Otherwise, go to "Completing the installation" on page 45.

Installing a microprocessor

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

- The server supports up to two dual core microprocessors. The server comes with one dual core microprocessor installed; you can install a second dual core microprocessor.

- Read the documentation that comes with the microprocessor, so that you can determine whether you have to update the BIOS code. To download the latest level of BIOS code and other code updates for your server, go to http://www.ibm.com/servers/eserver/support/xseries/index.html. Select **System x3550** from the **Hardware** list, and click the **Download** tab.

- When you install an additional microprocessor, you must also install one additional cooling fan. See "Installing a fan" on page 43 for fan installation information.

- To order an additional optional microprocessor, contact your IBM marketing representative or authorized reseller.

- If you have to replace a microprocessor, call for service.

- The microprocessor speeds are automatically set for this server; therefore, you do not have to set any microprocessor frequency-selection jumpers or switches.

- If the thermal-grease protective cover (for example, a plastic cap or tape liner) is removed from the heat sink, do not touch the thermal grease on the bottom of the heat sink or set down the heat sink. For details, see the information about thermal grease in the *Problem and Determination Service Guide*.

Note: Removing the heat sink from the microprocessor destroys the even distribution of the thermal grease and requires replacing the thermal grease.

Attention:

- A startup (boot) microprocessor must always be installed in microprocessor socket 1 on the system board.
- To ensure correct server operation when you install an additional microprocessor, use microprocessors that have the same cache size and type, and the same clock speed. Microprocessor internal and external clock frequencies must be identical.
- Do not remove the first microprocessor from the system board to install the second microprocessor.

The following illustrations show how to install the second microprocessor on the system board. If you install a second microprocessor in the server, you must install one additional fan.

Note: For simplicity, certain components are not shown in this illustration.

To install an additional microprocessor, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 23.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables, if necessary (see "Turning off the server" on page 14). Remove the server cover.

   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 25.
3. Locate microprocessor socket 2 on the system board.
4. Remove the microprocessor dust cover from the surface of the microprocessor socket.

Microprocessor release lever

Microprocessor bracket frame

Microprocessor dust cover
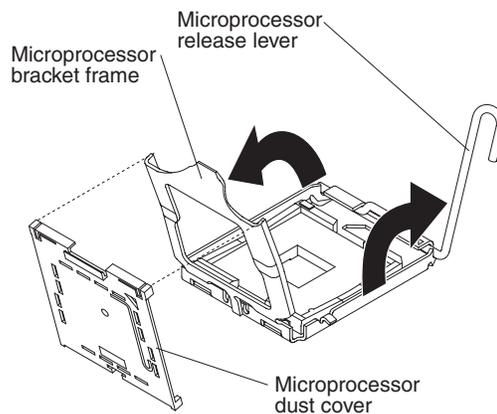
   a. Press down and out on the release lever on the microprocessor socket. Lift up the release lever until it stops in the fully open position (approximately 135° angle) and the top edge of the release lever has moved away from the microprocessor socket.
   b. Lift the hinged microprocessor bracket frame into an open position. Remove the microprocessor dust cover from the bracket frame. Store the dust cover in a safe place.

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 25.

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

   Attention: Use the vacuum tool that comes with the microprocessor to install the microprocessor. Dropping the microprocessor during installation or removal can damage the contacts. Also, contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.

6. Position the microprocessor over the microprocessor socket, using the vacuum tool. Use the triangular alignment cutout on the microprocessor socket and the triangular alignment mark on the microprocessor to assist you in aligning the microprocessor to the socket. Then, carefully place the microprocessor into the socket. Do not force the microprocessor, it only fits one way onto the socket.
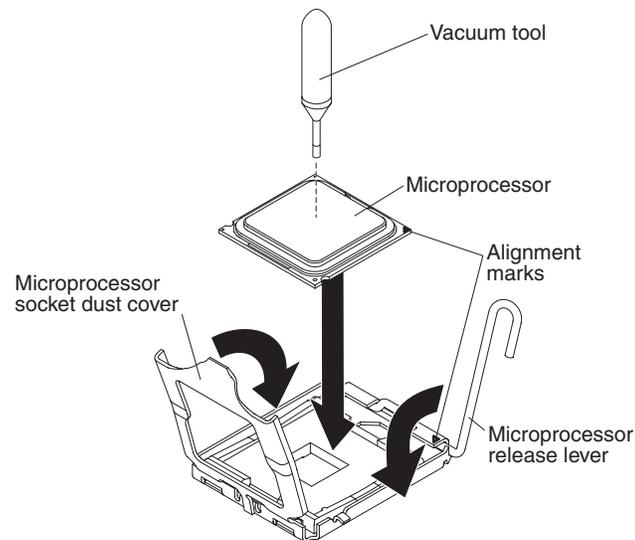
7. Place the microprocessor bracket frame down over the microprocessor and the microprocessor socket to secure the microprocessor position on the socket.

8. Rotate the microprocessor release lever into the closed position.

   Attention: Do not touch the thermal grease on the bottom of the heat sink after you remove the plastic cover. Touching the thermal grease will contaminate it.

9. Remove the plastic cover from the heat sink. Install the heat sink on top of the microprocessor with the thermal grease side down. Attach the heat sink to the system board by alternating fastening the screws on the sides of the heat sink with a Phillips screwdriver to apply even pressure to the microprocessor and to avoid damage.

Heat sink

Heat sink
installation
label

Thermal grease

Microprocessor
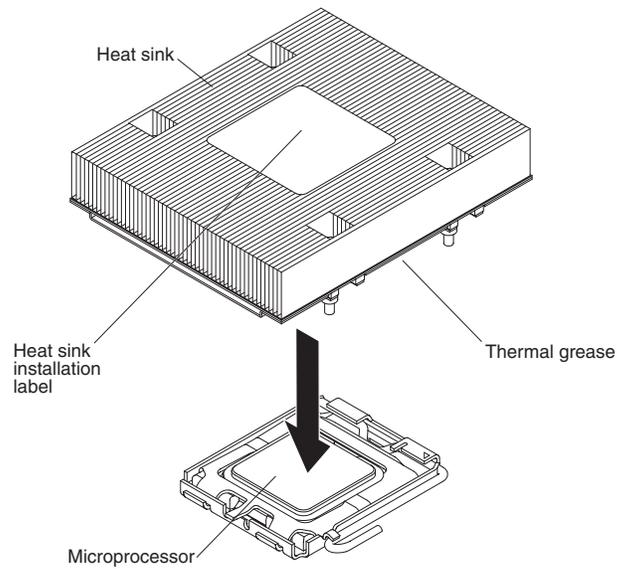
If you have to remove the heat sink after installing it, alternately loosen the
screws to help break the bond between the components without damaging
them.

10. If you removed any air baffles, reinstall them now. See page 26 for more
information.

If you have other options to install or remove, do so now. Otherwise, go to
"Completing the installation" on page 45.

Installing a fan

The server supports up to six hot-swap cooling fans. The server comes with five fans that service the primary microprocessor and the DIMMs.
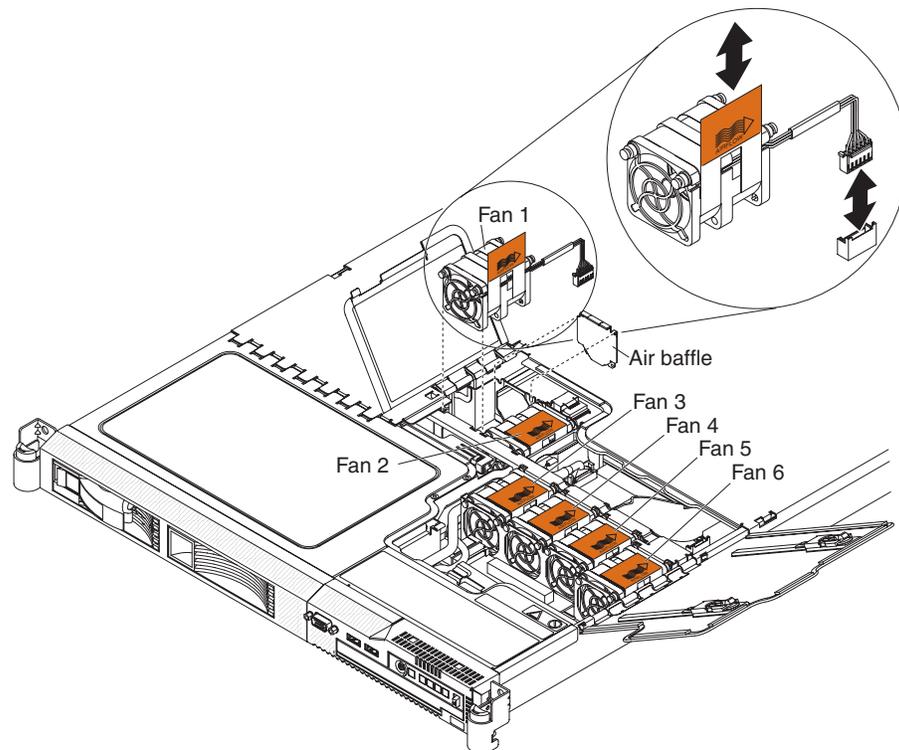
If you install a second microprocessor in the server, you must install one additional fan.

If you must replace a failed fan, see the instructions in the *Problem Determination and Service Guide*.

Attention: To ensure proper operation, replace a failed fan as soon as possible.

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

1. Read the safety information that begins on page v and "Installation guidelines" on page 23.
2. Lift the two fan doors on the top of the server.
3. Orient the new fan over its position in the fan assembly bracket so that the airflow indicator on the orange pull tab at the top of the fan points to the rear of the server.

Grommets

Mounting slots
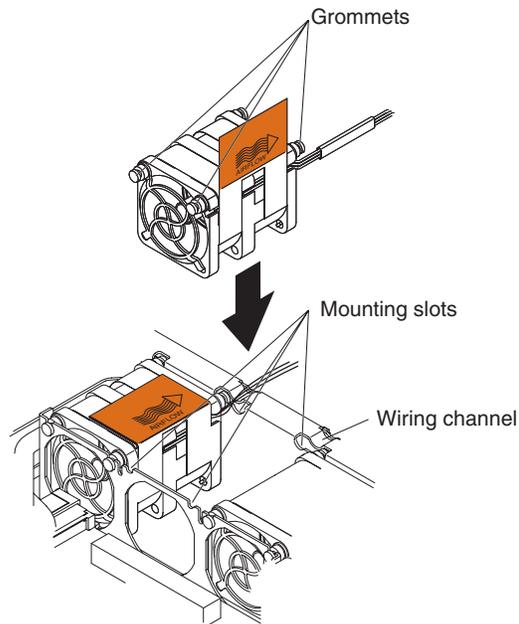
Wiring channel

4. Place the fan down onto the fan assembly bracket until the four blue grommets are correctly seated in the mounting slots.
5. Route the fan connection cable through the wiring channel.
6. Connect the fan cable by inserting the cable connector firmly into the orange fan connector on the system board until it snaps into place.

   Note: Make sure that the grommets and the fan cable are securely seated so that the fan doors close correctly.
7. Close both fan doors and slide the server into the rack.

If you have other options to install or remove, do so now. Otherwise, go to "Completing the installation" on page 45.

Installing a Remote Supervisor Adapter II SlimLine

An optional Remote Supervisor Adapter II SlimLine can be installed only in a dedicated connector on the system board. After the Remote Supervisor Adapter II SlimLine is installed, the systems-management Ethernet port on the rear of the server is active.

To install a Remote Supervisor Adapter II SlimLine, complete the following steps:
1. Read the safety information that begins on page v and "Installation guidelines" on page 23.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables, if necessary. Remove the server cover.
3. Remove the riser-card assembly in slot 2 and put it in a safe place. See "Replacing a riser-card assembly" on page 33 for more information.
4. Put the protective plastic cover on the Remote Supervisor Adapter II SlimLine.
5. Turn the Remote Supervisor Adapter II SlimLine so that the keys on the connector align correctly with the connector on the system board.

Remote Supervisor Adapter II SlimLine

Mounting bracket

Mounting bracket
retention latch
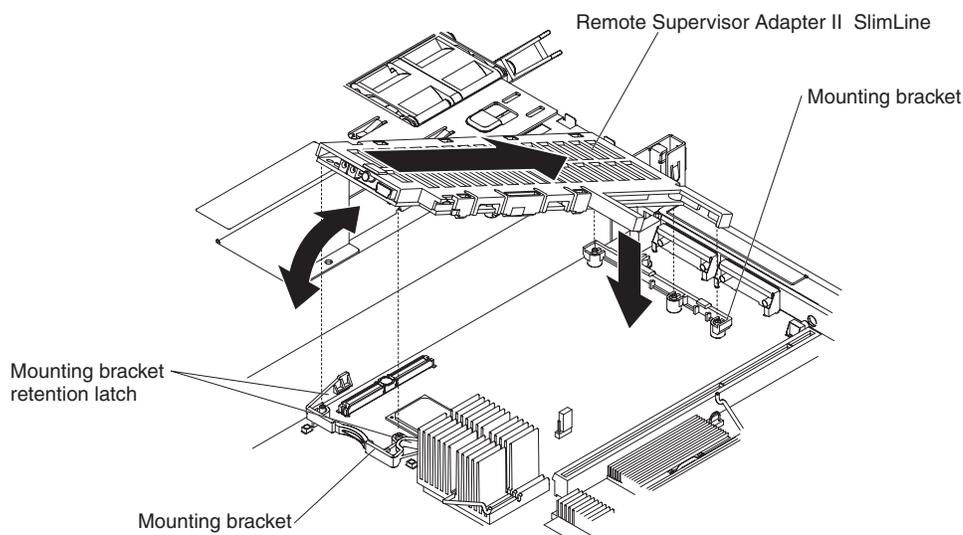
Mounting bracket

6. At a downward angle, slip the free end of the adapter under the tab on the mounting bracket, aligning the holes in the adapter with the posts on the mounting bracket and latch bracket. Rotate the rear of the adapter into the rear mounting bracket, aligning the holes in the adapter with the posts on the mounting bracket and latch bracket.

7. Press the Remote Supervisor Adapter II SlimLine firmly into the connector and make sure that all tabs on both mounting brackets secure the adapter in place.

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

8. Replace the riser-card assembly in slot 2 on the system board. See "Replacing a riser-card assembly" on page 33 for more information.

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

Completing the installation

To complete the installation, complete the following steps:

1. If you removed any air baffles, reinstall them now. See page 26 for baffle location and more information.

2. If you removed the server cover, replace it and close the fan doors. For more information, see "Replacing the server cover."

3. Install the server in the rack cabinet. See the *Rack Installation Instructions* that come with the server for instructions.

4. Connect the cables and power cords. For more information, see "Connecting the cables" on page 46.

5. Update the server configuration. See "Updating the server configuration" on page 47 for more information.

Replacing the server cover

To replace the server cover, complete the following steps:

• Slide the server cover toward the front of the server, fitting the cover into the tabs for a secure fit.

• Close the covers over the fans and snap down the two fan cover-release latches.

• Tighten the thumbscrew at the back of the server.

Thumbscrew

Fan door
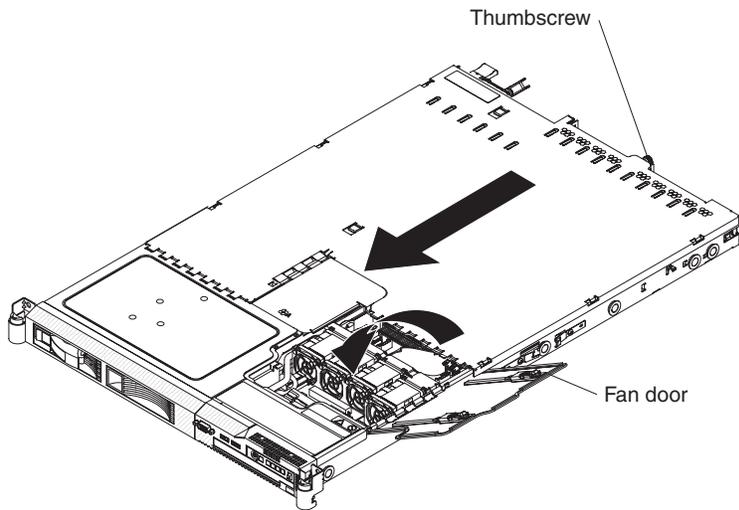
Connecting the cables

The following illustrations show the locations of the input and output connectors on the front and rear of the server.

USB 3 connector
USB 4 connector
Video connector

Figure 2. Front of server

Power supply connector
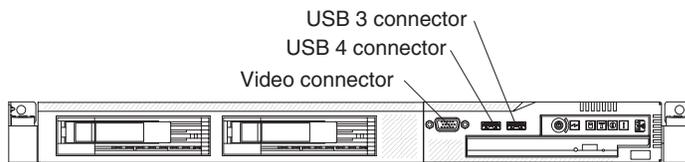
Ethernet 1
Ethernet 2
Systems management Ethernet connector
USB 1
USB 2
Serial connector
Video connector
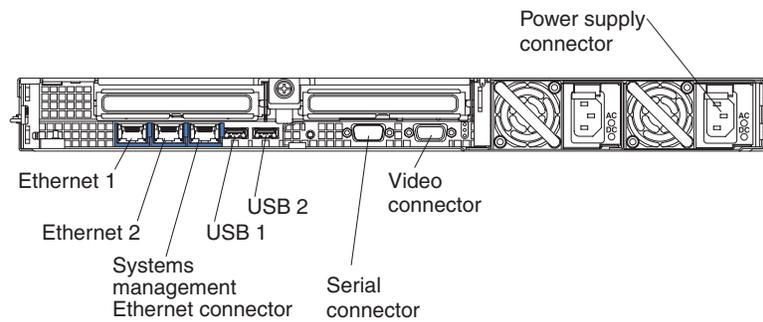
Figure 3. Rear of server

You must turn off the server before you connect or disconnect cables.

See the documentation that comes with any external devices for additional cabling instructions. It might be easier for you to route cables before you connect the devices to the server.

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.
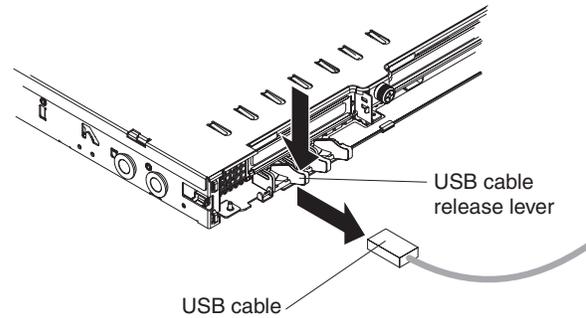
There are release levers on the Ethernet and systems management connectors. To disconnect a cable from one of these connectors, pull up on the lever to release the cable.
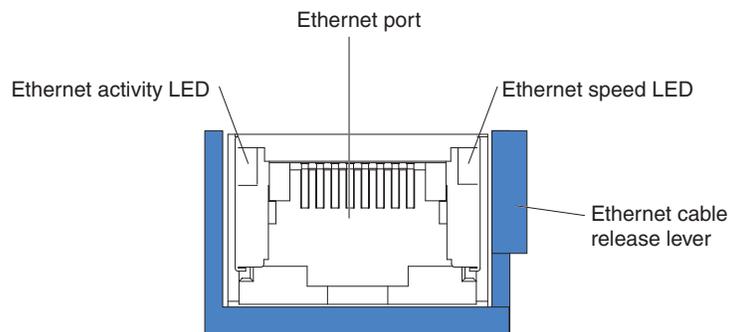
Updating the server configuration

When you start the server for the first time after you add or remove an internal option or external 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.

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

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

If you have installed a Remote Supervisor Adapter II SlimLine to manage the server remotely, see the *Remote Supervisor Adapter II SlimLine User's Guide*, which comes with the adapter, for information about setting up, configuring, and using the adapter.

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 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."

- **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.

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

  The ServerGuide program provides software-setup tools and installation tools that are designed for the server. Use this CD during the installation of the server to configure basic hardware features, such as an integrated SAS controller with RAID capabilities, and to simplify the installation of your operating system. For information about using this CD, see "Using the ServerGuide Setup and Installation CD" on page 56.

- **Baseboard management controller utility programs**

  Use these programs to configure the baseboard management controller, to update the firmware and sensor data record/field replaceable unit (SDR/FRU) data, and to remotely manage a network. For information about using these programs, see "Using the baseboard management controller" on page 58.

- **Ethernet controller configuration**

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

- **RAID configuration programs**:
  - Use the IBM ServeRAID Configuration Utility program or ServeRAID Manager to configure an array of hot-swap SAS or hot-swap SATA hard disk drives. For information about using these programs, see "Configuring hot-swap SAS or hot-swap SATA RAID" on page 71.
  - Use the Adaptec® HostRAID™ configuration programs to configure an array of simple-swap SATA hard disk drives. For information about using these programs, see "Configuring simple-swap SATA RAID" on page 73.

- **Remote Supervisor Adapter II SlimLine configuration**

  For information about setting up and cabling a Remote Supervisor Adapter II SlimLine, see "Setting up an Remote Supervisor Adapter II SlimLine" on page 75.

Using the Configuration/Setup Utility program

Use the Configuration/Setup Utility program to:

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time
- Set the startup characteristics of the server and the order of startup devices
- Set and change settings for advanced hardware features
- View, set, and change settings for power-management features

- View and clear error logs
- Change interrupt request (IRQ) settings
- Resolve configuration conflicts

Starting the Configuration/Setup Utility program

Complete the following steps to start the Configuration/Setup Utility program:

1. Turn on the server.
2. When the prompt `Press F1 for Configuration/Setup` appears, 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 ID, speed, and cache size of the microprocessors, a USB device summary, and the amount of installed memory. When you make configuration changes through other options 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 options 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 system UUID, the system board identifier, the revision level or issue date of the BIOS code and diagnostics code, and the version, date, and build level of ROM code for the Remote Supervisor Adapter II SlimLine, if one is installed.

  – **System card data**

    Select this choice to view the identity of the system board, power supplies, DASD backplane, and power backplane.

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

- **Devices and I/O Ports**

  Select this choice to view or change assignments for devices and input/output (I/O) ports. You can configure the serial ports, configure remote console redirection, enable or disable integrated Ethernet controllers, the SAS controller, IDE channels, and PCI slots, and view the system Ethernet MAC addresses. If you disable a device, it cannot be configured, and the operating system will not be able to detect it (this is equivalent to disconnecting the device).

  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 54 for more information.

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

  – **Administrator Password**

    Select this choice to set or change an administrator password. An administrator password is intended to be used by a system administrator; it limits access to the full 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. For more information, see "Administrator password" on page 55.

  – **Power-on Password**

    Select this choice to set or change a power-on password. See "Power-on password" on page 54 for more information.

- **Start Options**

  Select this choice to view or change the start options, including the startup sequence, keyboard NumLock state, PXE boot option, and PCI device boot priority. Changes in the startup options take effect when you start the server.

  The startup sequence specifies the order in which the server checks devices to find a boot record. The server starts from the first boot record that it finds. If the server has Wake on LAN hardware and software and the operating system supports Wake on LAN functions, you can specify a startup sequence for the Wake on LAN functions. For example, you can define a startup sequence that checks for a disc in the CD-RW/DVD drive, then checks the hard disk drive, and then checks a network adapter.

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

- **Advanced Setup**

  Select this choice to change settings for advanced hardware features.

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

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

  – **System Partition VIsibility**

    Select this choice to make the System Partition hidden or visible.

  – **Memory Settings**

    Select this choice to enable or disable pairs of memory connectors, configure the memory mode (flat, memory-mirroring, or online-spare), and view the memory speed.

  – **CPU Options**

    Select this choice to specify the system cache type, and to enable or disable hyper-threading, the pre-fetch queue, and Virtualization Technology for all microprocessors in the server. Virtualization Technology enables the microprocessor to appear to be a dedicated processor to each running application in the system.

  – **PCI Bus Control**

    Select this choice to view the system resources that are used by installed PCI (PCI-Express or PCI-X) devices. You can change the master latency timer value, view and configure PCI interrupt routing, and enable or disable the

loading and execution of ROM code per PCI slot (see message 1801 in the *Problem Determination and Service Guide* on the IBM *Documentation* CD).

– **PCI Slot/Device Information**

This choice is available only if an optional Remote Supervisor Adapter II SlimLine is installed. The Remote Supervisor Adapter II Slimline is considered to be in PCI slot 0, which is the system board.

Select this choice to view the PCI device information, including PCI bus number, for each PCI slot. Highlight a slot; then, press Enter to view the details of the PCI devices that are connected to the slot. Follow the instructions on the screen to page forward or backward through the devices that are connected to the slot.

– **RSA II Settings**

This choice is available only if an optional Remote Supervisor Adapter II SlimLine is installed.

Select this choice to configure the settings for the Remote Supervisor Adapter II SlimLine.

- **MAC Address**
  This is a nonselectable item that displays the MAC address of the Remote Supervisor Adapter II SlimLine.

- **DHCP IP Address**
  This is a nonselectable item that displays the current IP address of the Remote Supervisor Adapter II SlimLine.

- **DHCP Control**
  Specify whether to use the static IP address or use DHCP to dynamically assign the IP address for the Remote Supervisor Adapter II SlimLine. If DHCP times out while it is assigning an IP address, the system defaults to the static IP address.

- **Static IP Settings**

  Define the static IP address, subnet mask, and gateway address for the Remote Supervisor Adapter II SlimLine.

- **OS USB selection**
  Select the operating system to use to provide USB support for remote access to the Remote Supervisor Adapter II SlimLine. The remote keyboard and mouse access the Remote Supervisor Adapter II SlimLine through a USB port. **Linux OS** is the default setting.

- **Periodic SMI Generation**
  Enable or disable the periodic generation of a systems-management interrupt. **Disabled** is the default setting.

– **Baseboard Management Controller (BMC) setting**

Select this choice to change settings for the BMC.

- **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 POST Watchdog**
  Enable or disable the BMC POST watchdog. **Disable** is the default setting.

- **BMC POST Watchdog Timeout**
  Set the BMC POST watchdog timeout value. **5 minutes** is the default setting.
- **System-BMC Serial Port Sharing**
  Enable or disable sharing the serial port between the BMC and the system. **Disabled** is the default setting; it assigns the serial port to the BMC exclusively.
- **BMC Serial Port Access Mode**
  If serial-port sharing is enabled, specify the times and conditions during which the BMC shares the serial port.
- **Reboot System on NMI**
  Enable or disable restarting the system whenever a nonmaskable interrupt (NMI) occurs. **Disabled** is the default.
- **BMC Network Configuration**
  View the BMC MAC address and the current BMC IP address. Define the static BMC IP address, subnet mask, and gateway address, and specify whether to use the static IP address or have DHCP assign the BMC IP address.
- **BMC System Event Log**
  Select this choice to view the BMC system event log, which contains messages about system events, such as devices that have been installed or removed or a threshold that has been reached. Select **Clear BMC SEL** to clear the BMC system event log.
- **User Account Settings**
  Define user names and passwords for logging in to the BMC to remotely control settings in the server, such as power settings.

- **Event/Error Logs**

  Select this choice to view and clear the POST error log and the system event/error log.

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

  – **System Event/Error Log**

    This choice is available only if an optional Remote Supervisor Adapter II SlimLine is installed. Select this choice to view the error messages in the system event/error log. You can use the arrow keys to move between pages in the error log. Select **Clear System Event/Error Log** to clear the system event/error log.

    The system event/error log contains all event and error messages that have been generated during POST, by the system management interface handler, and by the system service processor. Run the diagnostic programs to get more information about error codes that occur. See the *Problem Determination and Service Guide* on the IBM *Documentation* CD for instructions for running the diagnostic programs.

- **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 menu only.

If you set only a power-on password, you must type the power-on password to complete the system startup and to have access to the full 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, the system startup will not be completed until you type the power-on password. You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for the password.

When a power-on password is set, you can enable the Unattended Start mode, in which the keyboard and mouse remain locked but the operating system can start. You can unlock the keyboard and mouse by typing the power-on password.

If you forget the power-on password, you can regain access to the server in any of the following ways:

- If an administrator password is set, type the administrator password at the password prompt. Start the Configuration/Setup Utility program and reset the power-on password.
- Remove the battery from the server and then reinstall it. See the *Problem Determination and Service Guide* on the IBM *System x Documentation* CD for instructions for removing the battery.
- Change the position of the power-on password switch (enable switch 1 of the system board switch block (SW2)) to bypass the power-on password check (see the following illustration).

Boot block recovery
jumper (J14)

8 7 6 5 4 3 2 1

ON

System board switch
block (SW2)
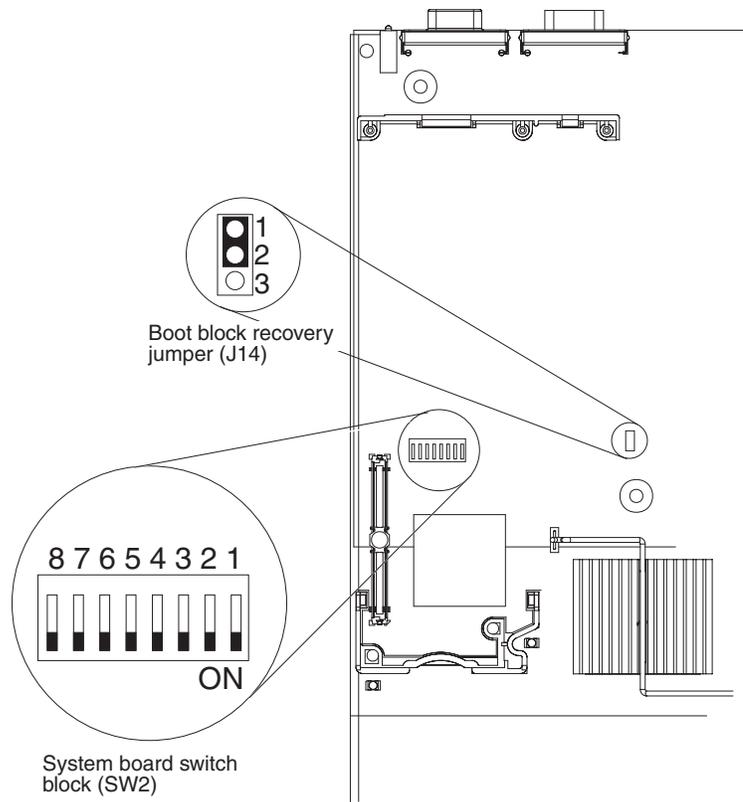
Attention: Before changing any switch settings or moving any jumpers, turn off
the server; then, disconnect all power cords and external cables. See the safety
information that begins on page v. Do not change settings or move jumpers on
any system-board switch or jumper blocks that are not shown in this document.

While the server is turned off, move switch 1 of the switch block (SW2) to the On
position to enable the power-on password override. You can then start the
Configuration/Setup Utility program and reset the power-on password. You do not
have to return the switch to the previous position.

The power-on password override jumper 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 system board.

Using the Boot Menu program

The Boot Menu program is a built-in, menu-driven configuration utility program that
you can use to temporarily redefine the first startup device without changing
settings in the 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. If a bootable USB mass storage device is installed, a submenu item (**USB Key/Disk**) is displayed.
4. Select an item from the (**Select Boot Device**) menu.
5. Select an option, and then **Exit and continue booting**.

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

Starting the backup BIOS

The system board contains a backup copy area for the BIOS code. This is a secondary copy of BIOS code that you update only during the process of updating BIOS code. If the primary copy of the BIOS code becomes damaged, use this backup copy.

To force the server to start from the backup copy, turn off the server; then, place the J14 jumper in the backup position (pins 2 and 3).

Use the backup copy of the BIOS code until the primary copy is restored. After the primary copy is restored, turn off the server; then, move the J14 jumper back to the primary position.

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 hardware options that are installed and uses that information during setup to configure the hardware. The ServerGuide program simplifies operating-system installations by providing updated device drivers and, in some cases, installing them automatically.

If a later version of the ServerGuide program is available, you can download a free image of the *ServerGuide Setup and Installation* CD. To download the image, go to the IBM ServerGuide Web page at http://www.ibm.com/pc/qtechinfo/MIGR-4ZKPPT.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
- ServeRAID Manager program, which configures your ServeRAID adapter
- Device drivers that are provided for your server model and detected hardware
- Operating-system partition size and file-system type that are selectable during setup

ServerGuide features

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

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

The ServerGuide program performs the following tasks:
- Sets system date and time
- Detects the RAID adapter or controller and runs the SAS RAID configuration program
- Checks the microcode (firmware) levels of a ServeRAID adapter and determines whether a later level is available from the CD
- Detects installed hardware options and provides updated device drivers for most adapters and devices
- Provides diskette-free installation for supported Windows operating systems
- Includes an online readme file with links to tips for your hardware and operating-system installation

Setup and configuration overview

When you use the *ServerGuide Setup and Installation* CD, you do not need setup diskettes. You can use the CD to configure any supported IBM server model. The setup program provides a list of tasks that are required to set up your server model. On a server with a ServeRAID adapter or SAS/SATA controller with RAID capabilities, you can run the SAS RAID configuration program to create logical drives.

Note: Features and functions can vary slightly with different versions of the ServerGuide program.

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

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

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 ServerGuide

If you have already configured the server hardware and you decide not to use 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/support/.
2. Under **Search technical support**, type `System x3550`, and click **Search**.
3. Select the installation instructions for your operating system.

Using the baseboard management controller

The baseboard management controller 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 also records the error in the system event/error log.

The baseboard management controller also provides the following remote server management capabilities through the OSA SMBridge management utility program:

- **Command-line interface (IPMI Shell)**

  The command-line interface provides direct access to server management functions through the IPMI 2.0 protocol. Use the command-line interface to issue commands to control the server power, view system information, and identify the server. You can also save one or more commands as a text file and run the file as a script.

- **Serial over LAN**

  Establish a Serial over LAN (SOL) connection to manage servers from a remote location. You can remotely view and change the BIOS settings, restart the server, identify the server, and perform other management functions. Any standard Telnet client application can access the SOL connection.

Enabling and configuring SOL using the OSA SMBridge management utility program

To enable and configure the server for SOL by using the OSA SMBridge management utility program, you must update and configure the BIOS code; update and configure the baseboard management controller (BMC) firmware; update and configure the Ethernet controller firmware; and enable the operating system for an SOL connection.

Note: In an SOL session, use the following commands instead of function keys:
  - To start the Configuration/Setup Utility program when the prompt `Press F1 for Configuration/Setup`.
  - To start the diagnostic programs, press `F2 for Diagnostics` when the prompt appears.
  - To recover BIOS, press `F3 for BIOS Recovery` when the prompt appears.

BIOS update and configuration

To update and configure the BIOS code to enable SOL, complete the following steps:

1. Update the BIOS code:
   a. Download the latest version of the BIOS code from http://www.ibm.com/pc/support/.
   b. Update the BIOS code, following the instructions that come with the update file that you downloaded.
2. Configure the BIOS settings:
   a. When prompted to start the Configuration/Setup Utility program, restart the server and press F1.
   b. Select **Devices and I/O Ports**; then, make sure that the values are set as follows:
      - **Serial Port A**: Auto-configure
      - **Serial Port B**: Auto-configure
   c. Select **Remote Console Redirection**; then, make sure that the values are set as follows:
      - **Remote Console Active**: Enabled
      - **Remote Console COM Port**: COM 1
      - **Remote Console Baud Rate**: 19200
      - **Remote Console Data Bits**: 8
      - **Remote Console Parity**: None
      - **Remote Console Stop Bits**: 1
      - **Remote Console Text Emulation**: ANSI
      - **Remote Console Keyboard Emulation**: ANSI
      - **Remote Console Active After Boot**: Enabled
      - **Remote Console Flow Control**: Hardware
   d. Press Esc twice to exit the **Remote Console Redirection** and **Devices and I/O Ports** sections of the Configuration/Setup Utility program.

      Note: Do not use Planar Ethernet 1 for PXE/DHCP booting or installation.
   e. Select **Start Options**; then, set **Planar Ethernet PXE/DHCP** to one of the following settings:
      - **Disabled**
      - **Planar Ethernet 2**. If you set **Planar Ethernet PXE/DHCP** to **Planar Ethernet 2**, you must also set **Run PXE only on selected Planar NIC** to **Enabled**.
   f. Press Esc to exit the **Start Options** section of the Configuration/Setup Utility program.
   g. Select **Save Settings**; then, press Enter.
   h. Press Enter to confirm.
   i. Select **Exit Setup**; then, press Enter.
   j. Make sure that **Yes, exit the Setup Utility** is selected; then, press Enter.

Linux configuration

For SOL operation on the server, you must configure the Linux® operating system to expose the Linux initialization (booting) process. This enables users to log in to the Linux console through an SOL session and directs Linux output to the serial console. See the documentation for your specific Linux operating-system type for information and instructions.

Use one of the following procedures to enable SOL sessions for your Linux operating system. You must be logged in as a root user to perform these procedures.

Red Hat Enterprise Linux ES 2.1 configuration:

Note: This procedure is based on a default installation of Red Hat Enterprise Linux ES 2.1. The file names, structures, and commands might be different for other versions of Red Hat Linux.

Complete the following steps to configure the general Linux parameters for SOL operation when you are using the Red Hat Enterprise Linux ES 2.1 operating system.

Note: Hardware flow control prevents character loss during communication over a serial connection. You must enable it when you are using a Linux operating system.

1. Add the following line to the end of the `# Run gettys in standard runlevels` section of the /etc/inittab file. This enables hardware flow control and enables users to log in through the SOL console.

   `7:2345:respawn:/sbin/agetty -h ttyS0 19200 vt102`

2. Add the following line at the bottom of the /etc/securetty file to enable a user to log in as the root user through the SOL console:

   `ttyS0`

LILO configuration: If you are using LILO, complete the following steps:

1. To modify the /etc/lilo.conf file, complete the following steps:

   a. Add the following text to the end of the first `default=linux` line

      `-Monitor`

   b. Comment out the `map=/boot/map` line by adding a `#` at the beginning of this line.

   c. Comment out the `message=/boot/message` line by adding a `#` at the beginning of this line.

   d. Add the following line before the first `image=` line:

      `# This will allow you to only Monitor the OS boot via SOL`

   e. Add the following text to the end of the first `label=linux` line:

      `-Monitor`

   f. Add the following line to the first `image=` section. This enables SOL.

      `append="console=ttyS0,19200n8 console=tty1"`

   g. Add the following lines between the two `image=` sections:

      `# This will allow you to Interact with the OS boot via SOL`

      `image=/boot/vmlinuz-2.4.9-e.12smp`

      `    label=linux-Interact`

      `    initrd=/boot/initrd-2.4.9-e.12smp.img`

      `    read-only`

      `    root=/dev/hda6`

      `    append="console=tty1 console=ttyS0,19200n8 "`

   The following examples show the original content of the /etc/lilo.conf file and the content of this file after modification.

Original /etc/lilo.conf contents
| ```
prompt
timeout=50
default=linux
boot=/dev/hda
map=/boot/map
install=/boot/boot.b
message=/boot/message
linear
image=/boot/vmlinuz-2.4.9-e.12smp
    label=linux
    initrd=/boot/initrd-2.4.9-e.12smp.img
    read-only
    root=/dev/hda6
image=/boot/vmlinuz-2.4.9-e.12
    label=linux-up
    initrd=/boot/initrd-2.4.9-e.12.img
    read-only
    root=/dev/hda6
``` |

Modified /etc/lilo.conf contents

```
prompt
timeout=50
default=linux-Monitor
boot=/dev/hda
#map=/boot/map
install=/boot/boot.b
#message=/boot/message
linear
# This will allow you to only Monitor the OS boot via SOL
image=/boot/vmlinuz-2.4.9-e.12smp
    label=linux-Monitor
    initrd=/boot/initrd-2.4.9-e.12smp.img
    read-only
    root=/dev/hda6
    append="console=ttyS0,19200n8 console=tty1"
# This will allow you to Interact with the OS boot via SOL
image=/boot/vmlinuz-2.4.9-e.12smp
    label=linux-Interact
    initrd=/boot/initrd-2.4.9-e.12smp.img
    read-only
    root=/dev/hda6
    append="console=tty1 console=ttyS0,19200n8 "
image=/boot/vmlinuz-2.4.9-e.12
    label=linux-up
    initrd=/boot/initrd-2.4.9-e.12.img
    read-only
    root=/dev/hda6
```

2. Run the **lilo** command to store and activate the LILO configuration.

When the Linux operating system starts, a `LILO boot:` prompt is displayed instead of the graphical user interface. Press Tab at this prompt to install all of the boot options that are listed. To load the operating system in interactive mode, type `linux-Interact` and then press Enter.

GRUB configuration: If you are using GRUB, complete the following steps to modify the /boot/grub/grub.conf file:

1. Comment out the `splashimage=` line by adding a `#` at the beginning of this line.
2. Add the following line before the first `title=` line:

   `# This will allow you to only Monitor the OS boot via SOL`
3. Append the following text to the first `title=` line:

   `SOL Monitor`
4. Append the following text to the `kernel/` line of the first `title=` section:

   `console=ttyS0,19200 console=tty1`
5. Add the following five lines between the two `title=` sections:

   `# This will allow you to Interact with the OS boot via SOL`
   `title Red Hat Linux (2.4.9-e.12smp) SOL Interactive`
   `    root (hd0,0)`

```
        kernel /vmlinuz-2.4.9-e.12smp ro root=/dev/hda6 console=tty1
            console=ttyS0,19200
            initrd /initrd-2.4.9-e.12smp.img
```

Note: The entry that begins with `kernel /vmlinuz` is shown with a line break after `console=tty1`. In your file, the entire entry must all be on one line.

The following examples show the original content of the /boot/grub/grub.conf file and the content of this file after modification.

Original /boot/grub/grub.conf contents
| ```
#grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE: You have a /boot partition. This means that
#         all kernel and initrd paths are relative to /boot/, eg.
#         root (hd0,0)
#          kernel /vmlinuz-version ro root=/dev/hda6
#          initrd /initrd-version.img
#boot=/dev/hda
default=0
timeout=10
splashimage=(hd0,0)/grub/splash.xpm.gz
title Red Hat Enterprise Linux ES (2.4.9-e.12smp)
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12smp ro root=/dev/hda6
    initrd /initrd-2.4.9-e.12smp.img
title Red Hat Enterprise Linux ES-up (2.4.9-e.12)
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12 ro root=/dev/hda6
    initrd /initrd-2.4.9-e.12.img
``` |

Modified /boot/grub/grub.conf contents

```
#grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE: You have a /boot partition. This means that
#         all kernel and initrd paths are relative to /boot/, eg.
#         root (hd0,0)
#         kernel /vmlinuz-version ro root=/dev/hda6
#         initrd /initrd-version.img
#boot=/dev/hda
default=0
timeout=10
# splashimage=(hd0,0)/grub/splash.xpm.gz
# This will allow you to only Monitor the OS boot via SOL
title Red Hat Enterprise Linux ES (2.4.9-e.12smp) SOL Monitor
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12smp ro root=/dev/hda6 console=ttyS0,19200 console=tty1
    initrd /initrd-2.4.9-e.12smp.img
# This will allow you to Interact with the OS boot via SOL
title Red Hat Linux (2.4.9-e.12smp) SOL Interactive
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12smp ro root=/dev/hda6 console=tty1 console=ttyS0,19200
    initrd /initrd-2.4.9-e.12smp.img
title Red Hat Enterprise Linux ES-up (2.4.9-e.12)
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12 ro root=/dev/hda6
    initrd /initrd-2.4.9-e.12.img
```

You must restart the Linux operating system after you complete these procedures for the changes to take effect and to enable SOL.

SUSE SLES 8.0 configuration:

Note: This procedure is based on a default installation of SUSE Linux Enterprise Server (SLES) 8.0. The file names, structures, and commands might be different for other versions of SUSE LINUX.

Complete the following steps to configure the general Linux parameters for SOL operation when using the SLES 8.0 operating system.

Note: Hardware flow control prevents character loss during communication over a serial connection. You must enable it when using a Linux operating system.

1. Add the following line to the end of the `# getty-programs for the normal runlevels` section of the /etc/inittab file. This enables hardware flow control and enables users to log in through the SOL console.

   `7:2345:respawn:/sbin/agetty -h ttyS0 19200 vt102`

2. Add the following line after the `tty6` line at the bottom of the /etc/securetty file to enable a user to log in as the root user through the SOL console:

   `ttyS0`

3. Complete the following steps to modify the /boot/grub/menu.lst file:

a. Comment out the `gfxmenu` line by adding a `#` in front of the word `gfxmenu`.
b. Add the following line before the first `title` line:

   `# This will allow you to only Monitor the OS boot via SOL`

c. Append the following text to the first `title` line:

   `SOL Monitor`

d. Append the following text to the `kernel` line of the first `title` section:

   `console=ttyS0,19200 console=tty1`

e. Add the following four lines between the first two `title` sections:

   `# This will allow you to Interact with the OS boot via SOL`

   `title linux SOL Interactive`

   `kernel (hd0,1)/boot/vmlinuz root=/dev/hda2 acpi=oldboot vga=791`

   `console=tty1 console=ttyS0,19200`

   `initrd (hd0,1)/boot/initrd`

   The following examples show the original content of the /boot/grub/menu.lst file and the content of this file after modification.

Original /boot/grub/menu.lst contents	Notes

`gfxmanu (hd0,1)/boot/message`
`color white/blue black/light-gray`
`default 0`
`timeout 8`
 	
`title linux`
`  kernel (hd0,1)/boot/vmlinuz root=/dev/hda2 acpi=oldboot vga=791`
`  initrd (hd0,1)/boot/initrd`
`title floppy`
`  root`
`  chainloader +1`
`title failsafe`
`  kernal (hd0,1)/boot/vmlinuz.shipped root=/dev/hda2 ide=nodma apm=off vga=normal nosmp`
`disableapic maxcpus=0 3`
 	
`  initrd (hd0,1)/boot/initrd.shipped`
	1
	
	1

Note 1: The kernel line is shown with a line break. In your file, the entire entry must all be on one line.	

Modified /boot/grub/menu.lst contents	Notes

`#gfxmanu (hd0,1)/boot/message`
`color white/blue black/light-gray`
`default 0`
`timeout 8`
 	
`# This will allow you to only Monitor the OS boot via SOL`
`title linux SOL Monitor`
`  kernel (hd0,1)/boot/vmlinuz root=/dev/hda2 acpi=oldboot vga=791 console=ttyS0,19200`
`console=tty1`
`  initrd (hd0,1)/boot/initrd`
`# This will allow you to Interact with the OS boot via SOL`
`title linux SOL Interactive`
` kernel (hd0,1)/boot/vmlinuz root=/dev/hda2 acpi=oldboot vga=791 console=tty1 console=ttyS0,19200`
` initrd (hd0,1)/boot/initrd`
`title floppy`
	1

Modified /boot/grub/menu.lst contents	Notes

` root`
` chainloader +1`
`title failsafe`
` kernel (hd0,1)/boot/vmlinuz.shipped root=/dev/hda2 ide=nodma apm=off vga=normal nosmp`
`disableapic maxcpus=0 3`
 	
` initrd (hd0,1)/boot/initrd.shipped`
	1

Note 1: The kernel line is shown with a line break. In your file, the entire entry must all be on one line.	

You must restart the Linux operating system after you complete these procedures for the changes to take effect and to enable SOL.

Microsoft Windows 2003 Standard Edition configuration

Note: This procedure is based on a default installation of the Microsoft Windows 2003 operating system.

Complete the following steps to configure the Windows 2003 operating system for SOL operation. You must be logged in as a user with administrator access to perform this procedure.

1. Complete the following steps to determine which boot entry ID to modify:
   a. Type `bootcfg` at a Windows command prompt; then, press Enter to display the current boot options for your server.
   b. In the `Boot Entries` section, locate the boot entry ID for the section with an OS friendly name of Windows Server 2003, Standard. Write down the boot entry ID for use in the next step.
2. To enable the Microsoft Windows Emergency Management System (EMS), at a Windows command prompt, type

   `bootcfg /EMS ON /PORT COM1 /BAUD 19200 /ID boot_id`

   where *boot_id* is the boot entry ID from step 1b; then, press Enter.
3. Complete the following steps to verify that the EMS console is redirected to the COM1 serial port:
   a. Type `bootcfg` at a Windows command prompt; then, press Enter to display the current boot options for your server.
   b. Verify the following changes to the bootcfg settings:
      • In the `Boot Loader Settings` section, make sure that `redirect` is set to `COM1` and that `redirectbaudrate` is set to `19200`.
      • In the `Boot Entries` section, make sure that the `OS Load Options:` line has `/redirect` appended to the end of it.

   The following examples show the original bootcfg program output and the output after modification.

Original bootcfg program output

```
Boot Loader Settings
----------------------------
timeout: 30
default: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
Boot Entries
----------------
Boot entry ID: 1
OS Friendly Name: Windows Server 2003, Standard
Path: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
OS Load Options: /fastdetect
```

Modified bootcfg program output

```
Boot Loader Settings
----------------------------
timeout: 30
default: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
redirect: COM1
redirectbaudrate: 19200
Boot Entries
----------------
Boot entry ID: 1
OS Friendly Name: Windows Server 2003, Standard
Path: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
OS Load Options: /fastdetect /redirect
```

You must restart the Windows 2003 operating system after you complete this procedure for the changes to take effect and to enable SOL.

Installing the OSA SMBridge management utility program

Complete the following steps to install the OSA SMBridge management utility program on a server running a Windows operating system:

1. Go to http://www.ibm.com/pc/support/ and download the utility program and create the OSA BMC Management Utility CD.

2. Insert the OSA BMC Management Utility CD into the drive. The InstallShield wizard starts, and a window similar to that shown in the following illustration opens.

3. Follow the prompts to complete the installation.

   The installation program prompts you for a TCP/IP port number and an IP address. Specify an IP address, if you want to limit the connection requests that will be accepted by the utility program. To accept connections from any server, type `INADDR_ANY` as the IP address. Also specify the port number that the utility program will use. These values will be recorded in the smbridge.cfg file for the automatic startup of the utility program.

Complete the following steps to install the OSA SMBridge management utility program on a server running a Linux operating system. You must be logged in as a root user to perform these procedures.

1. Go to http://www.ibm.com/pc/support/. Download the utility program and create the OSA BMC Management Utility CD.

2. Insert the OSA BMC Management Utility CD into the drive.

3. Type `mount/mnt/cdrom`.

4. Locate the directory where the installation RPM package is located and type `cd/mnt/cdrom`.

5. Type the following command to run the RPM package and start the installation:

   `rpm -ivh osasmbridge-2.0-xx.i386.rpm`

6. Follow the prompts to complete the installation. When the installation is complete, the utility copies files to the following directories:
   > /etc/init.d/SMBridge
   > /etc/smbridge.cfg
   > /usr/sbin/smbridged
   > /var/log/smbridge
   > /var/log/smbridge/LICENSE

The utility starts automatically when the server is started. You can also locate the /ect/init.d directory to start the utility and use the following commands to manage the utility:

smbridge status
smbridge start
smbridge stop
smbridge restart

Using the baseboard management controller utility programs

Use the baseboard management controller utility programs to configure the baseboard management controller, download firmware updates and remotely manage a network.

Using the baseboard management controller configuration utility program

Use the baseboard management controller configuration utility program to view or change the baseboard management controller configuration settings. You can also use the utility program to save the configuration to a file for use on multiple servers.

To download the program, go to http://www.ibm.com/pc/support/; then, copy the bmc_cfg.exe file to a configuration utility diskette.

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

1. Insert the configuration utility diskette into the diskette drive and restart the server.
2. From a command-line prompt, type `bmc_cfg` and press Enter.
3. Follow the instructions on the screen.

Using the baseboard management controller firmware update utility program

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

Note: To ensure proper server operation, be sure to update the server baseboard management controller firmware before you update the BIOS code.

To update the firmware, if the Linux or Windows operating-system update package is available from the World Wide Web and you have obtained the applicable update package, follow the instructions that come with the update package.

Using the OSA SMBridge management utility program

Use the OSA SMBridge management utility program to remotely manage and configure a network. The utility program provides the following remote management capabilities:

- **CLI (command-line interface) mode**

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

  Use the following commands in CLI mode:

  – **identify**

    Control the system-locator LED on the front of the server.

  – **power**

    Turn the server on and off remotely.

– **sel**

Perform operations with the system event/error log.

– **sysinfo**

Display general system information that is related to the server and the baseboard management controller.

- **Serial over LAN**

Use the Serial over LAN capability to remotely perform control and management functions over a Serial over LAN (SOL) network. You can also use SOL to remotely view and change the server BIOS settings.

At a command prompt, type `telenet localhost 623` to access the SOL network. Type `help` at the `smbridge>` prompt for more information.

Use the following commands in an SOL session:

– **connect**

Connect to the LAN. Type `connect -ip` *ip_address* `-u` *username* `-p password*.

– **identify**

Control the system-locator LED on the front of the server.

– **power**

Turn the server on and off remotely.

– **reboot**

Force the server to restart.

– **sel get**

Display the system event/error log.

– **sol**

Configure the SOL function.

– **sysinfo**

Display system information that is related to the server and the globally unique identifier (GUID).

Configuring the Gigabit Ethernet controller

The Ethernet controllers are integrated on the system board. They provide an interface for connecting to a 10-Mbps, 100-Mbps, or 1-Gbps network and provide full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the Ethernet ports in the server support auto-negotiation, the controllers detect the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operate at that rate and mode.

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

2. Under **Search technical support**, type `System x3550`, and click **Search**.

Configuring hot-swap SAS or hot-swap SATA RAID

Use the IBM ServeRAID Configuration Utility program or ServeRAID Manager to configure and manage hot-swap SAS or hot-swap SATA redundant array of independent disks (RAID). Be sure to use these programs as described in this document.

- Use the IBM ServeRAID Configuration Utility program to:
  - Perform a low-level format on a hard disk drive
  - View or change IDs for some attached devices
  - Set protocol parameters on hard disk drives
- Use ServeRAID Manager to:
  - Configure arrays
  - View the RAID configuration and associated devices
  - Monitor operation of the RAID controller

Consider the following information when using the IBM ServeRAID Configuration Utility program or ServeRAID Manager to configure and manage arrays:

- The ServeRAID-8k-l SAS controller that comes with the server supports only RAID level-0 and RAID level-1. Servers that come with four 2.5-inch hot-swap SAS drives also support RAID level-10. You can replace the ServeRAID-8k-l SAS controller with a ServeRAID-8k SAS controller that supports additional RAID levels.
- Hard disk drive capacities affect how you create arrays. The drives in an array can have different capacities, but the ServeRAID controller treats them as if they all have the capacity of the smallest hard disk drive.
- To help ensure signal quality, do not mix drives with different speeds and data rates.
- Do not include SAS and SATA drives in the same array.
- To update the firmware and BIOS code for an optional ServeRAID controller, you must use the IBM *ServeRAID Support* CD that comes with the ServeRAID option.

Using the IBM ServeRAID Configuration Utility program

Use the IBM ServeRAID Configuration Utility program to perform the following tasks:

- Configure a redundant array of independent disks (RAID) array
- View or change the RAID configuration and associated devices

Starting the IBM ServeRAID Configuration Utility program

To start the IBM ServeRAID Configuration Utility program, complete the following steps:

1. Turn on the server.
2. When the prompt `<<< Press <CTRL><A> for IBM ServeRAID Configuration Utility! >>>` appears, press Ctrl+A.
3. To select a choice from the menu, use the arrow keys.
4. Use the arrow keys to select the channel for which you want to change settings.
5. To change the settings of the selected items, follow the instructions on the screen. Be sure to press Enter to save your changes.

IBM ServeRAID Configuration Utility menu choices

The following choices are on the IBM ServeRAID Configuration Utility menu:

- **Array Configuration Utility**

  Select this choice to create, manage, or delete arrays, or to initialize drives.

- **SerialSelect Utility**

  Select this choice to configure the controller interface definitions or to configure the physical transfer and SAS address of the selected drive.

- **Disk Utilities**

  Select this choice to format a disk or verify the disk media. Select a device from the list and read the instructions on the screen carefully before making a selection.

Using ServeRAID Manager

Use ServeRAID Manager, which is on the *IBM ServeRAID Manager Application* CD, to perform the following tasks:

- Configure a redundant array of independent disks (RAID) array
- Erase all data from a hard disk drive and return the disk to the factory-default settings
- View the RAID configuration and associated devices
- Monitor the operation of the RAID controller

To perform some tasks, you can run ServeRAID Manager as an installed program. However, to configure the RAID controller and perform an initial RAID configuration on the server, you must run ServeRAID Manager in Startable CD mode, as described in the instructions in this section.

See the ServeRAID documentation on the *IBM ServeRAID Support* CD for additional information about RAID technology and instructions for using ServeRAID Manager to configure the RAID controller. Additional information about ServeRAID Manager is also available from the **Help** menu. For information about a specific object in the ServeRAID Manager tree, select the object and click **Actions --> Hints and tips**.

Configuring the RAID controller

By running ServeRAID Manager in Startable CD mode, you can configure the RAID controller before you install the operating system. The information in this section assumes that you are running ServeRAID Manager in Startable CD mode.

To run ServeRAID Manager in Startable CD mode, turn on the server; then, insert the CD into the CD-RW/DVD drive. If ServeRAID Manager detects an unconfigured controller and ready drives, the Configuration wizard starts.

In the Configuration wizard, you can select express configuration or custom configuration. Express configuration automatically configures the controller by grouping the first two physical drives in the ServeRAID Manager tree into an array and creating a RAID level-1 logical drive. If you select custom configuration, you can select the physical drives that you want to group into an array and create a hot-spare drive.

Using express configuration: To use express configuration, complete the following steps:

1. In the ServeRAID Manager tree, click the controller.

2. Click **Express configuration**.

3. Click Next.

4. In the "Configuration summary" window, review the information. To change the configuration, click **Modify arrays**.

5. Click **Apply**; when you are asked whether you want to apply the new configuration, click **Yes**. The configuration is saved in the controller and in the physical drives.

6. Exit from ServeRAID Manager and remove the CD from the CD-RW/DVD drive.

7. Restart the server.

Using custom configuration: To use custom configuration, complete the following steps:

1. In the ServeRAID Manager tree, click the controller.

2. Click **Custom configuration**.

3. Click **Next**.

4. In the "Create arrays" window, from the list of ready drives, select the drives that you want to group into the array.

5. Click the (Add selected drives) icon to add the drives to the array.

6. If you want to configure a hot-spare drive, complete the following steps:

   a. Click the **Spares** tab.

   b. Select the physical drive that you want to designate as the hot-spare drive, and click the (Add selected drives) icon.

7. Click **Next**.

8. Review the information in the "Configuration summary" window. To change the configuration, click **Back**.

9. Click **Apply**; when you are asked whether you want to apply the new configuration, click **Yes**. The configuration is saved in the controller and in the physical drives.

10. Exit from ServeRAID Manager and remove the CD from the CD-RW/DVD drive.

11. Restart the server.

Viewing the configuration

You can use ServeRAID Manager to view information about RAID controllers and the RAID subsystem (such as arrays, logical drives, hot-spare drives, and physical drives). When you click an object in the ServeRAID Manager tree, information about that object appears in the right pane. To display a list of available actions for an object, click the object and click **Actions**.

Configuring simple-swap SATA RAID

Important: HostRAID is not supported on the SCO 6.0 and UnixWare 7.14 operating systems.

Use the Adaptec HostRAID Configuration Utility program to add RAID level-0 and level-1 functionality to the integrated Serial ATA controller (simple-swap SATA models). Be sure to use this program as described in this document. Use this program to perform the following tasks:

• Configure a redundant array of independent disks (RAID) array

• View or change the RAID configuration and associated devices

When you are using the Adaptec RAID Configuration Utility program to configure and manage simple-swap SATA arrays, consider the following information:

- The integrated Serial ATA controller with integrated SATA RAID (simple-swap SATA models) supports RAID level-0 and level-1 with the option of having a hot-spare drive.
- You cannot use the *ServerGuide Setup and Installation* CD to configure the integrated Serial ATA controller with integrated RAID.
- Hard disk drive capacities affect how you create arrays. 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.
- To help ensure signal quality, do not mix drives with different speeds and data rates.

Using the Adaptec RAID Configuration Utility program

Use the Array Configuration Utility to add RAID level-0 and level-1 functionality to the integrated Serial ATA (SATA) controller. This utility is a part of the BIOS code. For additional information about using the Adaptec RAID Configuration Utility program, see the documentation on the *Adaptec HostRAID Support* CD. If this CD did not come with the server, you can download it from http://www.ibm.com/support/.

Using the SATA HostRAID feature

The instructions in this section are for using the Array Configuration Utility program to access and perform an initial RAID level-1 configuration.

For additional information about using the Array Configuration Utility program to create, configure, and manage arrays, see the documentation on the *Adaptec HostRAID Support* CD.

Configuring the controller: To use the Array Configuration Utility program to configure a RAID level-1 array, complete the following steps:

1. Turn on the server.
2. When the prompt `Press <CTRL><<A> for Adaptec RAID Configuration Utility` appears, press Ctrl+A.
3. Select **Array Configuration Utility**.
4. Select **Create Array**.
5. From the list of ready drives, select the two drives that you want to group into the array.
6. When you are prompted to select the RAID level, select **RAID-1**.
7. (Optional) Type an identifier for the array.
8. When you are prompted for the array build method, select **Quick Int**.
9. Follow the instructions on the screen to complete the configuration, and select **Done** to exit.
10. Restart the server.

Viewing the configuration: To view information about the SATA controller, complete the following steps:

1. Start the Array Configuration Utility.
2. From the Array Configuration Utility window, select **Manage Arrays**.
3. Select an array and press Enter.
4. Press Esc to exit from the program.

Setting up an Remote Supervisor Adapter II SlimLine

Use an optional Remote Supervisor Adapter II SlimLine to obtain enhanced system-management capabilities, beyond those of the integrated BMC. The Remote Supervisor Adapter II SlimLine has a dedicated Ethernet connection at the rear of the server.

This section describes how to set up, cable, and configure the Remote Supervisor Adapter II SlimLine so that you can manage the server remotely.

In addition to the information in this section, see the *IBM Remote Supervisor Adapter II User's Guide* for information about how to configure and use the Remote Supervisor Adapter II SlimLine to manage the server remotely through the Web-based interface or the text-based interface.

Note: The Web-based interface and text-based interface do not support double-byte character set (DBCS) languages.

Requirements

Make sure that the following requirements are met:

- The web interface Remote Disk function requires the client system to be running Microsoft Windows 2000 or later. The web interface Remote Control features require the Java™ 1.4 Plug-in or later. The following web browsers are supported:
  - Microsoft Internet Explorer version 5.5 or later with the latest Service Pack
  - Netscape Navigator version 7.0 or later
  - Mozilla version 1.3 or later
- If you plan to configure Simple Network Management Protocol (SNMP) trap alerts on the Remote Supervisor Adapter II SlimLine, install and compile the management information base (MIB) on your SNMP manager.
- You will need an Internet connection to the client system to download software and firmware from the IBM Support Web site during the installation process. The latest versions are available at http://www.ibm.com/support/.
- Read the safety information beginning on page v and "Installation guidelines" on page 23.

Cabling the Remote Supervisor Adapter II SlimLine

You can manage the server remotely through the Remote Supervisor Adapter II SlimLine by using the dedicated systems-management Ethernet connector.

For additional information about network configuration, see the *Remote Supervisor Adapter II Installation Guide*.

To cable the Remote Supervisor Adapter II SlimLine, complete the following steps:

1. Connect one end of a Category 3 or Category 5 Ethernet cable to the dedicated systems-management Ethernet connector for the Remote Supervisor Adapter II SlimLine.
2. Connect the other end of the cable to the network.

   Note: The dedicated Ethernet connector for the Remote Supervisor Adapter II SlimLine is on the far right as you face the rear of the server.

Installing the Remote Supervisor Adapter II SlimLine firmware

The software and firmware files that you need are contained in one system service package installation kit. The kit contains the following files:

- Software and firmware installation instructions
- BIOS code update with support for the Remote Supervisor Adapter II SlimLine
- Diagnostics code update
- Remote Supervisor Adapter II SlimLine device drivers
- Remote Supervisor Adapter II SlimLine firmware update
- Integrated service processor firmware update
- Video device driver
- Firmware-update utility program

To download and install the software and firmware, complete the following steps.

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

1. Go to http://www.ibm.com/support/.
2. In the left navigation pane, click **Downloads and drivers**.
3. In the **Search** field, type **Remote Supervisor Adapter II SlimLine firmware** and click **Search**.
4. Select the system service package for the operating system that is running on the server in which the Remote Supervisor Adapter II SlimLine is installed.
5. Click the file link to download the system service package to *d*:\ibmssp, where *d* is the hard disk drive letter. (Create the directory if necessary.)
6. Extract the files into *d*:\ibmssp. See the readme.txt file, which is included with the extracted files, for a list of the files in the package.
7. Follow the instructions in *Remote Supervisor Adapter II Installation Instructions*, which is in Portable Document Format (PDF) in *d*:\ibmssp, to install the software and firmware.
8. Restart the server after the software and firmware are installed.

Completing the setup

See the *IBM Remote Supervisor Adapter II User's Guide* for instructions for completing the configuration, including the following procedures:

- Configuring the Ethernet ports
- Defining login IDs and passwords
- Selecting the events that will receive alert notifications
- Monitoring remote server status, using the Remote Supervisor Adapter II SlimLine Web-based interface
- Controlling the server remotely
- Attaching a remote diskette drive, CD drive, or disk image to the server

After you configure the adapter, use the Web-based interface to create a backup copy of the configuration so that you can restore the configuration, if you have to replace the adapter. For more information, see the *Remote Supervisor Adapter II User's Guide*.

Appendix. Notices

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Electronic emission notices

Federal Communications Commission (FCC) statement

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

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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.

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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.

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種情況下，使用者會被要
求採取某些適當的對策。

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干扰采取切实可行的措施。

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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。

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