IBM System x3350 Types 4192 and 4193

User's Guide

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User's Guide

Note:

Before using this information and the product it supports, read the general information in “Notices,” on page 71.

First Edition (January 2008)

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

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

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

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

Statement 1:

DANGER

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

To avoid a shock hazard:

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

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

Statement 2:

CAUTION:
When replacing the lithium battery, use only IBM® Part Number 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.)

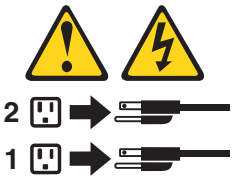
≥ 32 kg (70.5 lb.)

≥ 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.



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 x3350 Types 4192 and 4193 server

The IBM® System x3350 Types 4192 and 4193 server is a 1U-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.

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

The server comes with a limited warranty. For information about the terms of the warranty and getting service and assistance, see the *Warranty 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 5 and “Reliability, availability, and serviceability” on page 7.

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 optional devices and how to configure the server. The following documentation also comes with the server:

- *Installation Guide*

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

  This document is in Portable Document Format (PDF) on the IBM *System x Documentation* CD. It contains information about the terms of the warranty and getting service and assistance.
- *Safety Information*

  This document is in 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.

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

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.

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

The server might have features that are not described in the documentation that 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 updated documentation and technical updates, complete the following steps

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publication lookup** .
4. From the **Product family** menu, select **System x3350** and click **Continue**.

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

Features and specifications

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

Table 1. Features and specifications

Microprocessor:

- Supports one Intel® Xeon™ dual-core or quad-core microprocessor
- 4 MB or 8 MB Level-2 cache
- 1066 or 1333 MHz front-side bus (FSB)

Note: Use the Configuration/Setup Utility Program to determine the type and speed of the microprocessor.

Memory:

- Minimum: 1 GB
- Maximum: 8 GB
- Type: PC2-5300, dual-data-rate 2 (DDR2), unbuffered, error correcting code (ECC) DIMMs with a minimum data transfer rate of 667 MHz
- Slots: Four dual inline
- Supports 512 MB, 1 GB, and 2 GB DIMMs

Drives:

- CD-RW/DVD combo: IDE
- Multi-burner Ultrabay Enhanced (optional)

Expansion bays (depending on model):

- Hot-swap hard disk drive bays: One of the following configurations:
  - Two 3.5-inch drive bays (SAS or SATA)
  - Four 2.5-inch drive bays (SAS)
- Simple-swap disk drive bays: Two 3.5-inch drive bays (SATA)

PCI Expansion slots:

Two PCI Express x8 (full height, half length) slots. Each slot requires a PCI riser card.

Power supply:

Maximum of two redundant 450-watt (100 - 240V ac auto-sensing) hot-swap power supplies

Hot-swap fans:

Standard: four

Size:

- Height: 43 mm (1.69 inches, 1 U)
- Depth: 711 mm (28 inches)
- Width: 440 mm (17.3 inches)
- Maximum weight: 15.6 kg (34 lb) when fully configured

Integrated functions:

- Two Broadcom 5722 multi-speed, single-port GB Ethernet controller with Wake on LAN® support
- Four Universal Serial Bus (USB) 2.0 ports (two front and two rear)
- One Advanced System Management RJ-45 port (active only when a Remote Supervisor Adapter II SlimLine is installed)
- One serial port
- Serial ATA (SATA) controller without RAID (simple-swap SATA models)
- Serial-attached SCSI (SAS) controller with integrated RAID (hot-swap SAS/SATA models)

Acoustical noise emissions:

- Sound power, idling: 6.5 bels maximum
- Sound power, operating: 6.5 bels maximum

Environment:

- Air temperature:
  - Server on: 10° to 35°C (50.0° to 95°F); altitude: 0 to 914.4 m (3000 ft)
  - Server on: 10° to 32°C (50.0° to 89.6°F); maximum altitude: 2133.6 m (6998.0 ft)
  - Server off: 10° to 43°C (50.0° to 109.4°F); maximum altitude: 2133.6 m (6998.0 ft)
  - Shipping -40° to 60°C (-40° to 60°C (-40° to 140°F); maximum altitude: 2133.6 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: 396 Btu per hour (116 watts)
- Maximum configuration: 1365 Btu per hour (400 watts)

Electrical input:

- Sine-wave input (50 - 60 Hz) required
- Input voltage low range:
  - Minimum: 100 V ac
  - Maximum: 127 V ac
- Input voltage high range:
  - Minimum: 200 V ac
  - Maximum: 240 V ac
- Input kilovolt-amperes (kVA), approximately:
  - Minimum: 0.116 kVA
  - Maximum: 0.400 kVA

Video controller (integrated):

- ATI Radeon ATI ES 1000 (dual ports - front and rear)
- Flexible memory support
  - 16 MB video memory
  - DDR2 SDRAM

Notes:

1. Power consumption and heat output vary depending on the number and type of optional features that are installed and the power-management optional features in use.
2. These levels were measured in controlled acoustical environments according to the procedures that are specified by C-S 1-1710-008 (8803) “Acoustical Noise Measurement on IBM Products - sound power and pressure level” and are reported in accordance with C-S-1710-024 (8803). Actual sound-pressure levels in a given location might exceed the average stated values because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.

What your server offers

The server uses the following features and technologies:

- **Baseboard management controller**

  The baseboard management controller (BMC) provides basic service-processor environmental monitoring functions. If an environmental condition exceeds a threshold or if a system component fails, the baseboard management controller lights LEDs to help you diagnose the problem. Critical errors are included in the error log. The BMC also provides Serial over LAN (SOL) connectivity.

- **IBM Dynamic System Analysis Pre-boot Diagnostic program**

  The IBM *Dynamic System Analysis Pre-boot Diagnostic* CD that comes with the server provides a diagnostic program you can use to test the major components of the server. If the *Dynamic System Analysis Pre-boot Diagnostic* CD did not come with the server you can download the latest version from http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 .

- **Dual-core or quad-core processing**

  The server supports one dual-core or one quad-core Intel microprocessor.

- **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 x86-processor-based server powerful, scalable, and reliable. For more information, see http://www.ibm.com/servers/eserver/xseries/xarchitecture/enterprise/index.html.

- **Large system-memory capacity**

  The memory bus supports up to 8 GB of system memory. The memory controller supports error correcting code (ECC) for up to four industry-standard PC2-5300, 667 MHz, DDR2 (second-generation double-data-rate), unbuffered, 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 optional hardware devices and provides the correct configuration programs and device drivers. For more information about the *ServerGuide Setup and Installation* CD, see “Using the ServerGuide Setup and Installation CD” on page 49.

- **Integrated network support**

  The server comes with two integrated dual-port Broadcom Gigabit Ethernet controllers, which support connection to a 10 Mbps, 100 Mbps, or 1000 Mbps network. For more information, see “Configuring the Broadcom Gigabit Ethernet controller” on page 66.

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

  The 2.5-inch server models support up to four hot-swap disk drives. The 3.5-inch server models support up to two Serial Attached SCSI (SAS) or Serial ATA (SATA) hot-swap hard disk drives. The simple-swap models support up to two 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* and the *Problem Determination and Service Guide*.

- **PowerExecutive**

  The IBM PowerExecutive solution is an IBM Director extension that measures and reports server power consumption as it occurs. This enables you to monitor power consumption in correlation to specific software application programs and hardware systems-management interface, and 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 http://www.ibm.com/systems/management/director/resources/.

- **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 interventions.

- **Redundant cooling and optional power capabilities**

  The server supports a maximum of two 450-watt hot-swap power supplies and four 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 450-watt hot-swap power supply and four fans. You can order the second optional power supply.

- **ServeRAID™ support**

  The hot-swap models of this server contain an internal SAS controller that supports level 0 and level 1 redundant array of independent disks (RAID) configurations. The server also supports some ServeRAID adapters and other optional devices to create RAID configurations. For a list of supported ServeRAID devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

- **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.

  An 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 (TOE) support**

  The optional Ethernet adapter options on 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.

The server has the following RAS features:

- 1-year parts, 1-year labor limited warranty (Machine Type 4192); 3-year parts, 3-year labor limited warranty (Machine Type 4193)
- Automatic error retry and recovery
- Automatic restart after a power failure
- Automatic Restart on non-maskable interrupt (NMI)
- Baseboard management controller (BMC) service processor
- Built-in monitoring for fan, power, temperature, voltage, and power-supply redundancy
- Memory downsizing
- Error codes and messages
- Error correcting code (ECC) L2 cache and system memory
- Hot-swap hard disk drives (some models)
- Information and light path diagnostics LED panels
- Menu-driven setup, system configuration, and redundant array of independent disks (RAID) configuration programs
- 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
- Remind button to temporarily turn off the system-error LED
- Dynamic System Analysis diagnostic software
- System-error logging (POST and BMC)
- 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 x86-processor-based servers, desktop computers, workstations, and notebook computers on a variety of platforms

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

- Advanced self-management capabilities for maximum system availability.

- Multiple operating-system platform support, including Microsoft® Windows 2000 Server, Windows Server 2003, Windows XP Professional, AIX, i5/OS, Red Hat Linux, SUSE Linux, VMware, and Novell NetWare. For a complete list of operating systems that support IBM Director, see the IBM Director Compatibility Document. This document is in Portable Document Format (PDF) at http://www.ibm.com/systems/management/director/resources/. It is updated every 6 to 8 weeks.
- Support for IBM and non-IBM servers, desktop computers, workstations, and notebook computers.
- Support for systems-management industry standards.
- Integration into leading workgroup and enterprise systems-management environments.
- Ease of use, training, and setup.

IBM Director also provides an extensible platform that supports advanced server tools that are designed to reduce the total cost of managing and supporting networked systems. By deploying IBM Director, you can achieve reductions in ownership costs through the following benefits:

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

For more information about IBM Director, see the documentation on the *IBM Director* CD that comes with the server, the IBM Director Information Center at http://publib.boulder.ibm.com/infocenter/eserver/v1r2/topic/diricinfo/fqm0_main.html, and the IBM System x Systems Management Web page at http://publib.boulder.ibm.com/infocenter/eserver/v1r2/topic/diricinfo_all/diricinfoparent.html, which presents an overview of IBM Systems Management and IBM Director.

The Update*Xpress* program

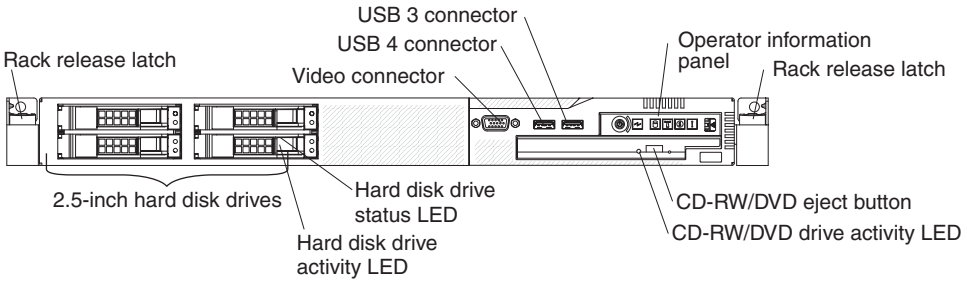
The Update*Xpress* program is available for most servers and server optional devices. It detects supported and installed device drivers and firmware in the server and installs available updates. You can download the Update*Xpress* program from the Web at no additional cost, or you can purchase it on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

Server controls, LEDs, and power

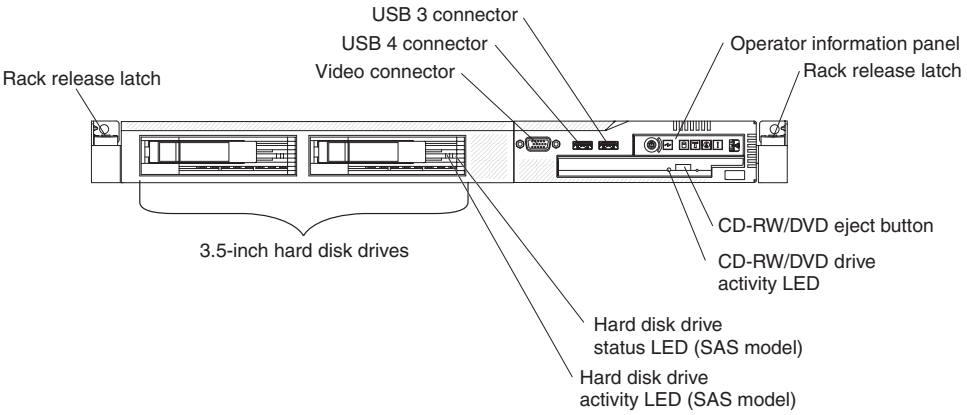
This section describes the controls and light-emitting diodes (LEDs) and how to turn the server on and off.

Front view

The following illustration shows the 2.5-inch hard disk drive server model.

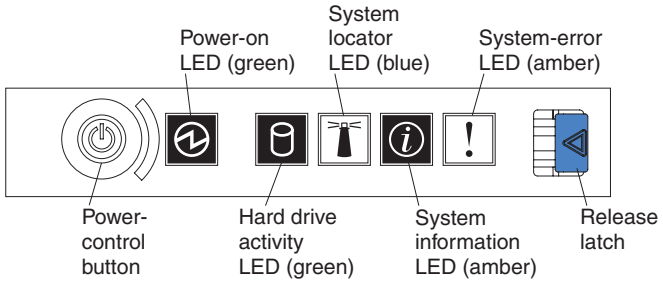


The following illustration shows the hot-swap or simple-swap 3.5-inch hard disk drive server model.



Note: The locations of the controls, LEDs, and connectors vary, depending on the hardware configuration that you have.

- The following illustration shows the operator information panel. This panel contains controls and LEDs that indicate the status of the server.



  - **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.

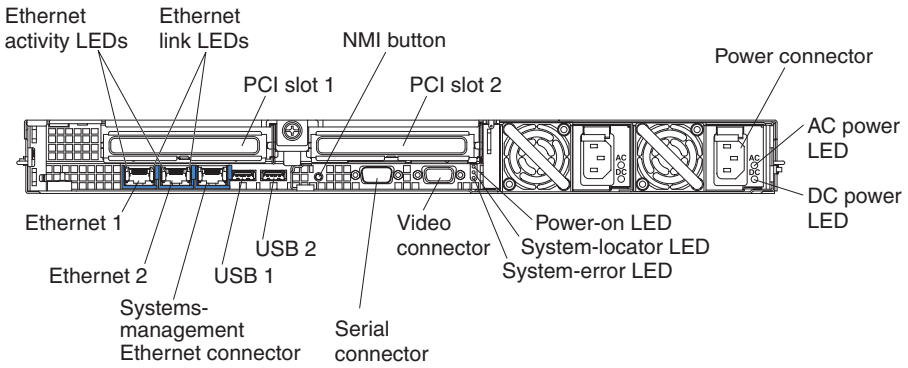
  Notes:

  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.
- **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.

Rear view

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



- **PCI slot 1 and 2:** Connect the PCI Express adapters to these connectors.
- **NMI button:** (For service only) This button can be used to generate a non-maskable interrupt (NMI) to the server.
- **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 an optional 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 38 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 38 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 shut down; however, the server can respond to requests from the service processor, such as a remote request to turn on the server. The power-on LED flashes to indicate that the server is connected to ac power but is not turned on.

Turning on the server

Approximately 20 seconds after the server is connected to ac power, the power-control button becomes active, and one or more fans might start running to provide cooling while the server is connected to power. You can turn on the server and start the operating system by pressing the power-control button.

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

- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If 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.

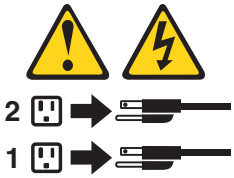
Turning off the server

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:

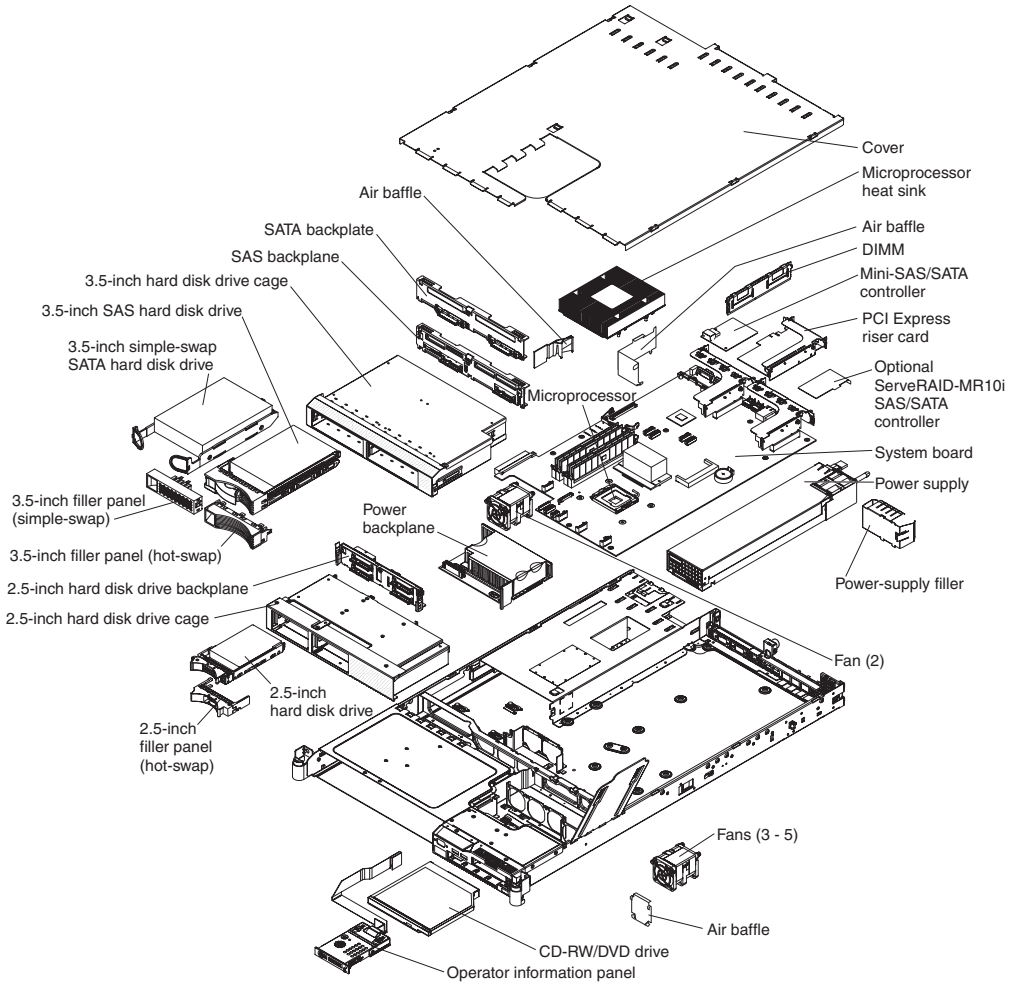
- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will turn off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off 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 an optional Remote Supervisor Adapter II SlimLine is installed, 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 optional devices

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

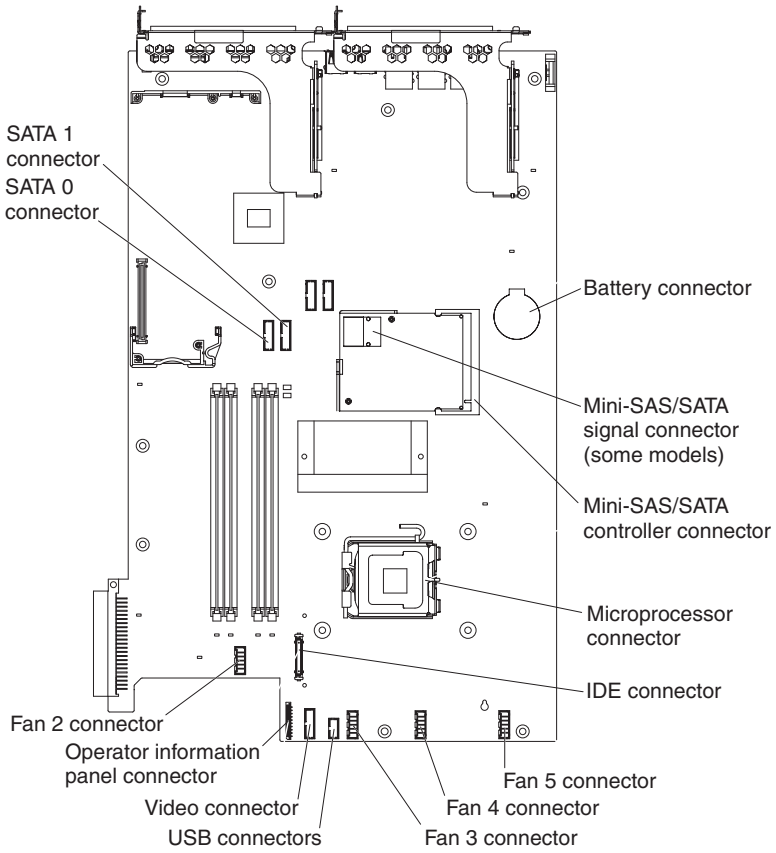
Server components

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



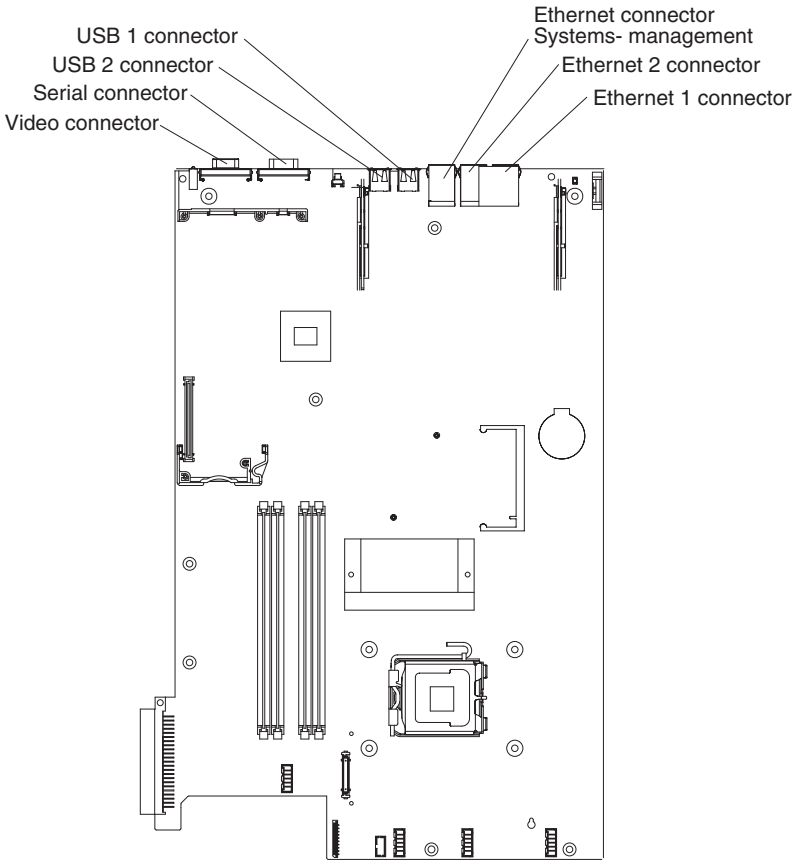
System-board internal connectors

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



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 jumpers on the system board.

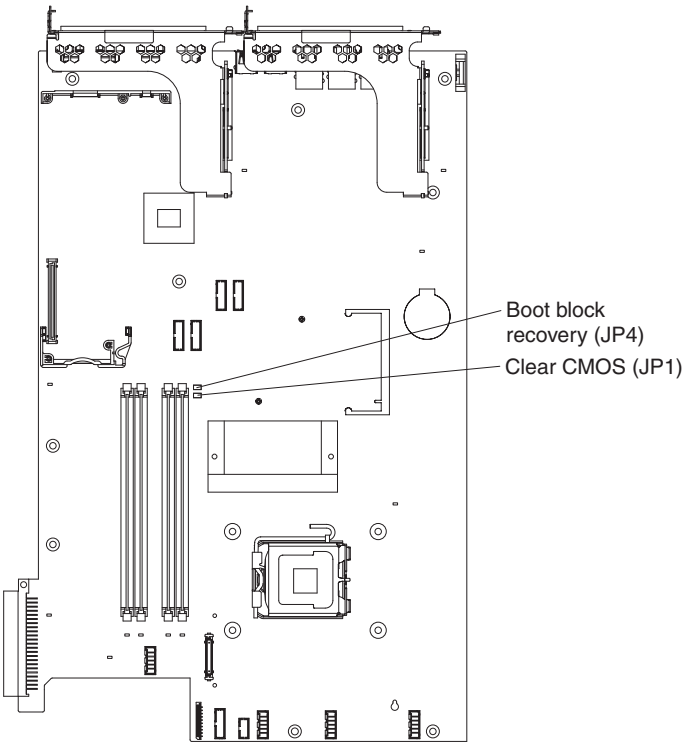
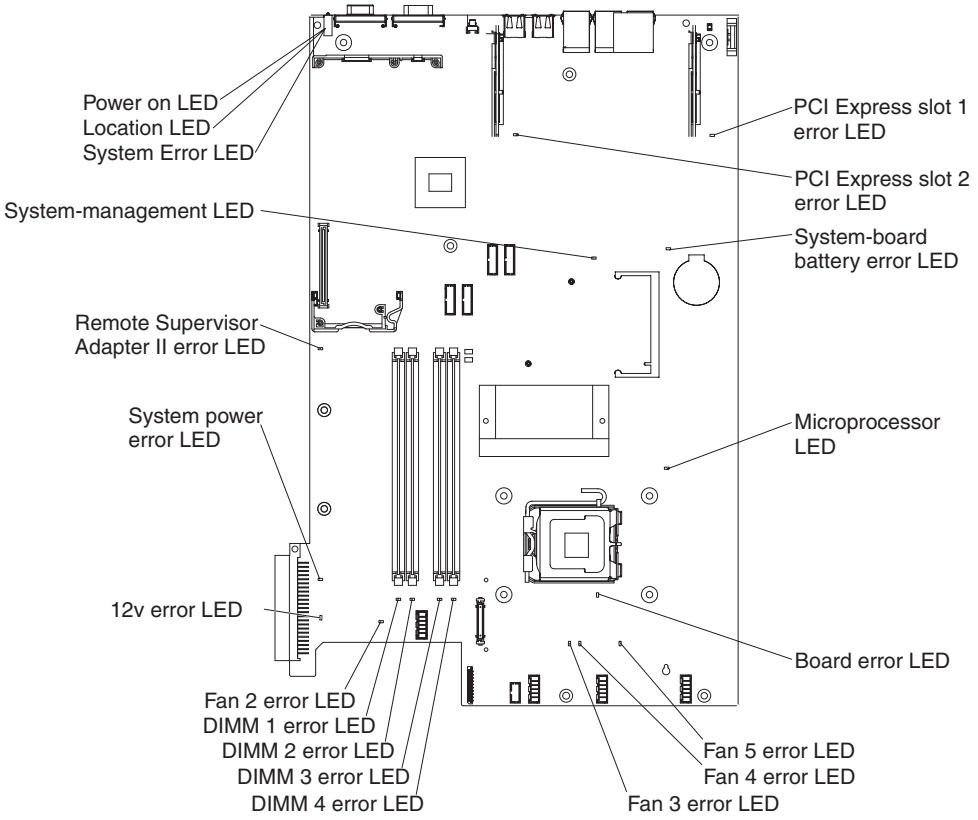


Table 2. System board jumpers

Jumper	Description
Clear CMOS (JP1)	• Pins 1 and 2: Keep CMOS data (default) • Pins 2 and 3: Clear the CMOS data, which clears the power-on password and administrator password
Boot block recovery (JP4)	• Pins 1 and 2: Normal (default). • Pins 2 and 3: Recover boot block

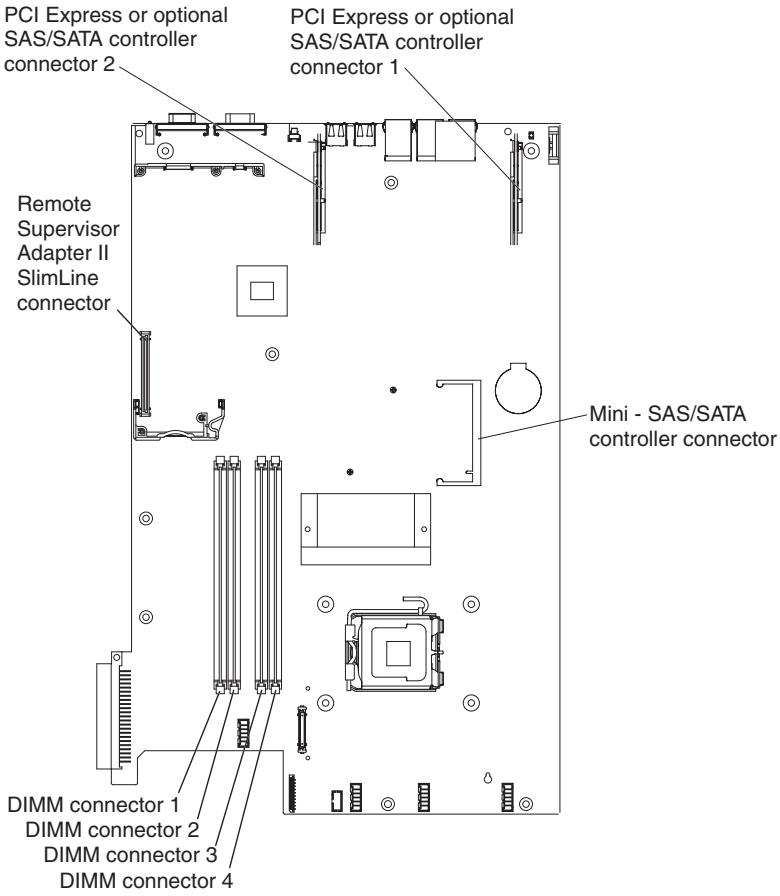
System-board LEDs

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



System-board optional-device connectors

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



Installation guidelines

Before you install optional devices, read the following information:

- Read the safety information that begins on page v, “Working inside the server with the power on” on page 22, and the guidelines in “Handling static-sensitive devices” on page 22. This information will help you work safely.
- When you install your new server, take the opportunity to download and apply the most recent firmware updates. This step will help to ensure that any known issues are addressed and that your server is ready to function at maximum levels of performance. To download firmware updates for your server, complete the following steps.

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

  1. Go to http://www.ibm.com/systems/support/.
  2. Under **Product support**, click **System x**.
  3. Under **Popular links**, click **Software and device drivers**.
  4. Click **System x3350** to display the matrix of downloadable files for the server.

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

- Before you install optional hardware devices, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed. If the server is not working correctly, see the *Problem Determination and Service Guide* for diagnostic information.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- If you must start the server while the 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 screwdriver and a small Phillips 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 you perform any steps that involve removing or installing adapter cables or non-hot-swap optional devices or components.
- 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 optional devices 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 you turn 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.
- For redundant operation, the power supplies are connected to 200 - 240 V ac.

Working inside the server with the power on

Attention: Static electricity that is released to internal server components when the server is powered-on might cause the server to halt, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when 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 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 you work 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 you work inside the server with the power on.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal surface on the outside of the server for at least 2 seconds. This drains static electricity from the package and from your body.

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

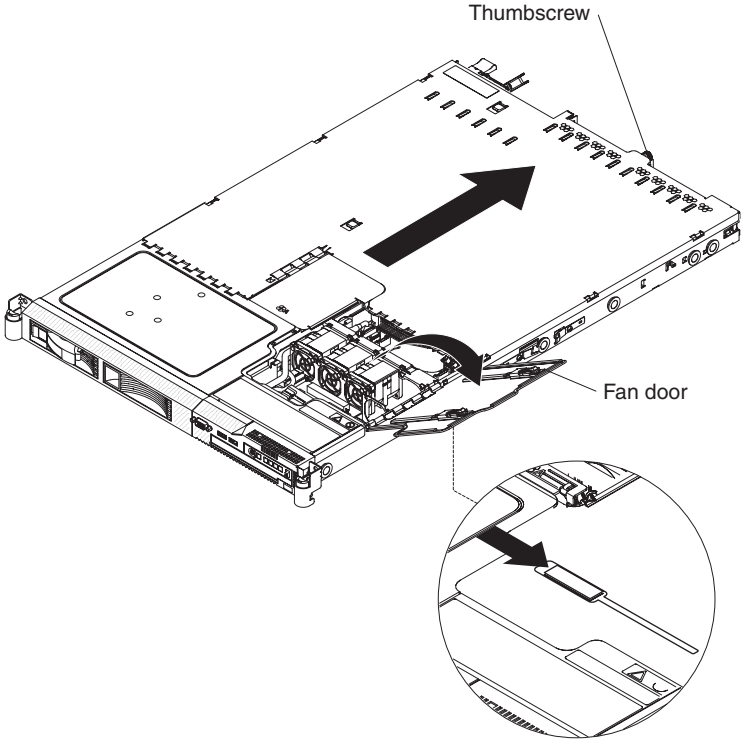
Removing the server cover

Important: Before you install optional hardware devices, make sure that the server is working correctly. Start the server, and make sure that the operating system starts. If the server is not working correctly, see "Solving Problems" in the *Installation 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 20.
2. If you are planning to install or remove a memory module, PCI adapter, battery, or other non-hot-swap optional device, turn off the server and all attached devices and disconnect all external cables and power cords (see “Turning off the server” on page 12).
3. Press down on the left and right side latches and pull the server out of the rack enclosure until both slide rails lock.

   Note: You can reach the cables on the back of the server when the server is in the locked position.
4. Loosen the thumbscrew that secures the cover at the back of the server.
5. Slide the two cover release latches on the top of the fan door to the right; then, open the fan door cover.



6. Slide the server cover back until the locking tabs release.

7. 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. Operating the server for extended periods of time (more than 30 minutes) with the cover 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 you install a power supply:

- The server comes with one 450-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 450-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 25 for information about how to connect a Y power cable.

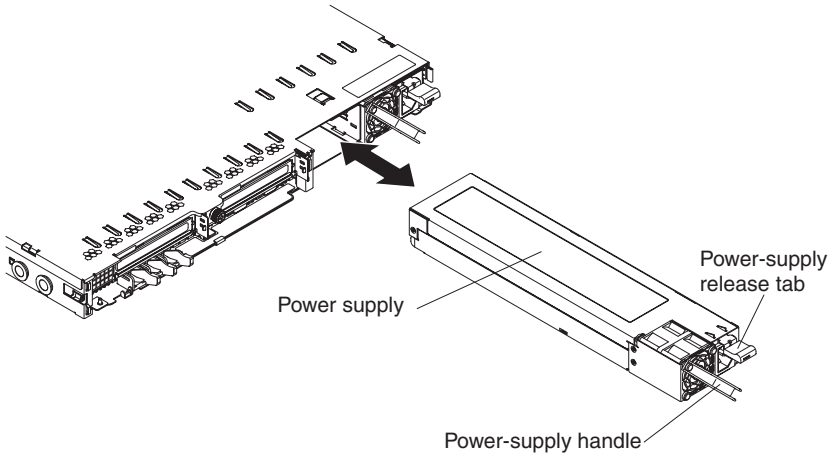
Statement 8:

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 on page v and “Installation guidelines” on page 20.
2. If you are installing a hot-swap power supply into an empty bay, remove the power-supply filler panel from the power-supply bay.



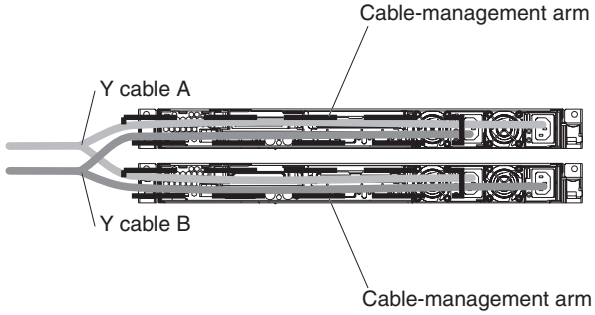
Important: During normal operation, each power-supply bay must contain either a power supply or power-supply filler panel for proper cooling.

3. 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.
4. Connect the power cord for the new power supply to the power-cord connector on the power supply.
5. Route the power cord through the power-supply handle and through any cable clamps on the rear of the server, to prevent the power cord from being accidentally pulled out when you slide the server in and out of the rack.
6. Connect the cable to through the cable management arm, if installed.
7. Connect the other end of the power cord to a properly grounded electrical outlet.
8. Make sure that the ac power LED and the dc power LED on the power supply are lit, indicating that the power supply is operating correctly. The two green LEDs are to the right of the power-cord connector.

If you have other devices to install or remove, do so now. Otherwise, go to “Completing the installation” on page 38.

Installing a Y power cable

A Y power cable comes with the optional power supply. 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 full power redundancy.



Installing a hard disk drive

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

Attention: To avoid damage to the hard disk drive connectors, make sure that the cover is in place and fully closed whenever you install or remove 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.

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

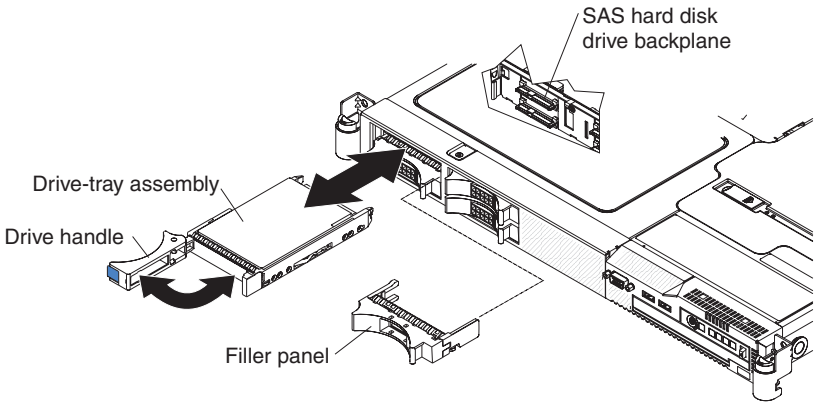
- Do not use both SAS and SATA drives in the same array.
- The 2.5-inch server models support four hot-swap SAS hard disk drives. You can install only 2.5-inch hot-swap SAS drives in these servers.
- The 3.5-inch server models support two hot-swap SAS or hot-swap SATA hard disk drives. You can install only 3.5-inch hot-swap SAS or hot-swap SATA drives in these servers
- The simple-swap server models support two 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. Using hard disk drives with different speed ratings will cause all drives to operate at the throughput speed of the slowest drive.

Installing a hot-swap hard disk drive

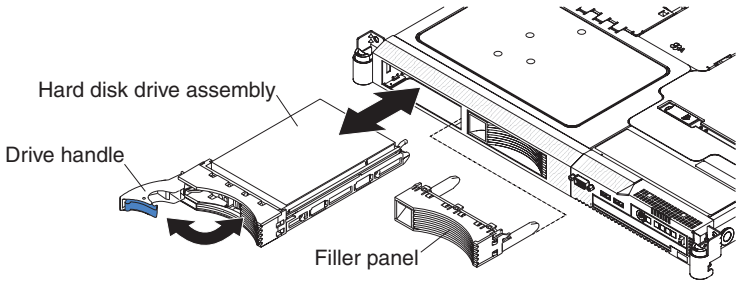
To install a 2.5-inch or 3.5-inch SAS hard disk drive, complete the following steps.

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

The following illustration shows the 2.5-inch hard disk drive server model.



The following illustration shows the 3.5-inch hard disk drive server model.



1. Read the safety information that begins on page v and “Installation guidelines” on page 20.
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.

   Note: If the server has a RAID controller or adapter, you might have to reconfigure the disk arrays after you install hard disk drives. See your RAID controller or adapter documentation.

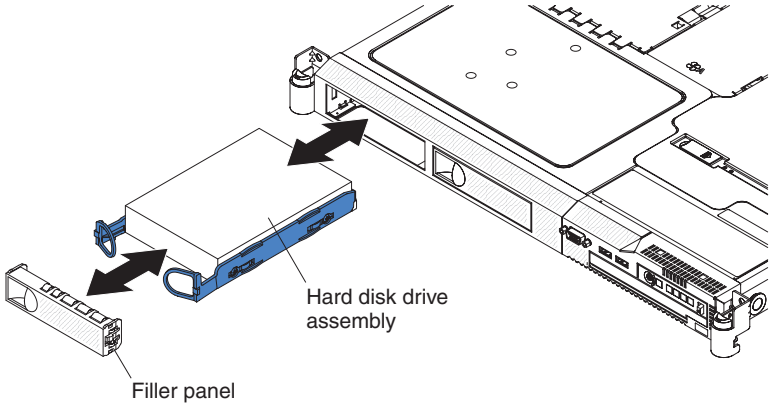
   If you have other devices to install or remove, do so now. Otherwise, go to “Completing the installation” on page 38.

Installing a simple-swap hard disk drive

Attention: Simple-swap hard disk drives are not hot-swappable. Disconnect all power from the server before you remove or install 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 drive bay.



1. Read the safety information that begins on page v and “Installation guidelines” on page 20.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables.
3. Remove the filler panel from the empty drive bay.
4. Pull the loops of the drive tray toward each other, and slide the drive into the server until the drive connects to the backplate.
5. Release the loops of the drive tray.
6. Install the filler panel into the drive bay to cover the drive.

Note: If the server has a RAID controller or adapter, you might have to reconfigure the disk arrays after you install hard disk drives. See your RAID controller or adapter documentation.

If you have other devices to install or remove, do so now. Otherwise, go to “Completing the installation” on page 38.

Installing an adapter

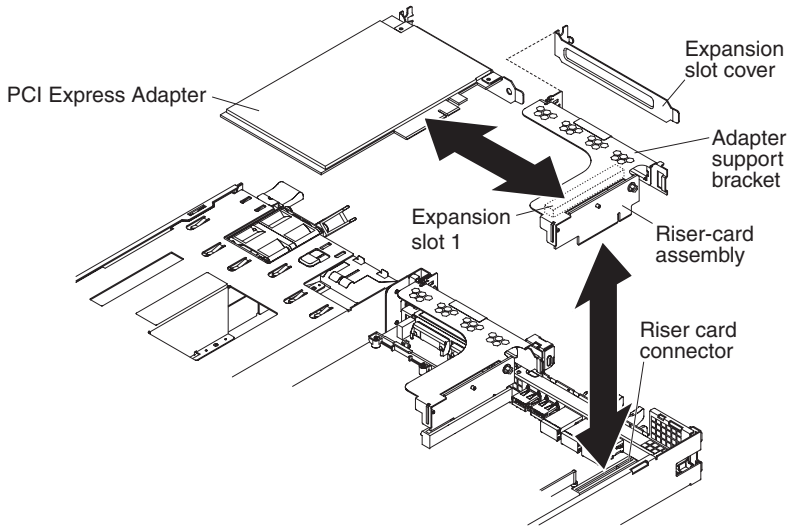
The following notes describe the types of adapters that the server supports and other information that you must consider when you install an adapter:

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you must change the switch settings or jumper settings on the adapter, follow the instructions that come with the adapter.
- The adapter slots are on the riser-card assemblies. You must first remove the riser-card assemblies to access the adapter slots.
- The server provides two PCI Express slots on the riser-card assemblies and support half-length, full-height, PCI Express x8 1.0a adapters in each expansion slot.
- The server scans the onboard SAS/SATA controller, PCI express slots 1 and 2, and onboard Ethernet controllers to assign system resources. Then, the server starts the devices in the following order, if you have not changed the default startup sequence: PCI Express slot 1, then PCI Express slot 2.

  Note: You can change the sequence in which the server starts (boots) the devices by using the **Start Options** menu choice from the Configuration/Setup Utility program main menu. See “Using the Configuration/Setup Utility program” on page 42 for detailed information.
- For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

To install an adapter, complete the following steps:

1. Read the safety information that begins on page v and the “Installation guidelines” on page 20.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables. Remove the cover (see “Removing the server cover” on page 23).



3. Grasp the riser card at the rear edge and lift to remove the riser-card assembly. Place the riser-card assembly on a flat, static-protective surface.
4. Remove the expansion-slot cover from the slot that you intend to use.

   Attention: PCI expansion-slot covers must be installed on all vacant slots. This maintains the electronic emissions characteristics of the server and ensures proper cooling of server components.
5. Route the adapter cables, if any, before you install the adapter. Route the cables so that they are not on top of components or blocking the airflow from the fans.
6. Touch the static-protective package that contains the adapter to any unpainted metal surface on the server. Then, remove the adapter from the static-protective package. Avoid touching the components and gold-edge connectors on the adapter.
7. Set any jumpers or switches on the adapter as directed by the adapter manufacturer.
8. Insert the adapter into the riser-card assembly, aligning the connector on the adapter with the connector on the riser-card assembly. Press the adapter *firmly* into the riser-card assembly. Make sure that the adapter snaps securely into the riser-card assembly securely.
9. Insert the riser-card assembly into the riser-card connector on the system board. Then, press down on the assembly. Make sure that the riser-card assembly is fully seated in the riser-card connector on the system board.
10. Connect any cables to the adapter.
11. Perform any configuration tasks that are required for the adapter.

If you have other devices to install, do so now. Otherwise, go to “Completing the installation” on page 38.

Installing an optional ServeRAID-MR10i SAS/SATA controller (hot-swap models)

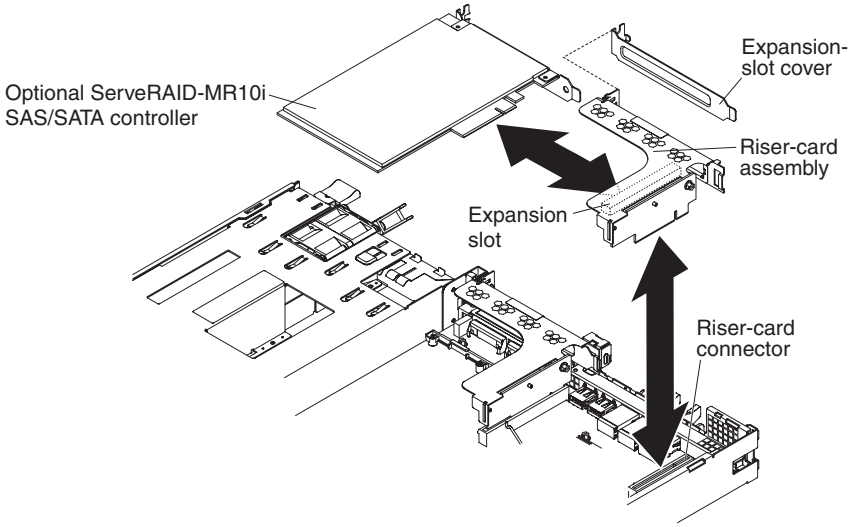
The standard SAS/SATA controller that is installed in the server provides level 0 and level 1 RAID support. You can replace this controller with an optional ServeRAID-MR10i SAS/SATA controller that provides additional RAID support capabilities.

This optional controller is installed on the riser-card assembly in slot 1 or slot 2 on the system board.

For a list of supported optional devices for the server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/

To install an optional ServeRAID-MR10i SAS/SATA controller, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 20.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables. Remove the cover (see “Removing the server cover” on page 23).



3. Grasp the riser-card assembly, in slot 1, at the rear edge and lift to remove the assembly. Place the riser-card assembly on a flat, static-protective surface
4. Remove the expansion-slot cover.

   Attention: PCI expansion-slot covers must be installed on all vacant slots. This maintains the electronic emissions characteristics of the server and ensures proper cooling of server components.
5. Touch the static-protective package that contains the controller to any unpainted metal surface on the server. Then, remove the controller from the static-protective package. Avoid touching the components and gold-edge connectors on the controller.
6. Insert the controller into the riser-card assembly, aligning the connector on the controller with the connector on the riser-card assembly. Press the controller *firmly* into the riser-card assembly. Make sure that the controller snaps securely into the riser-card assembly.
7. Insert the riser-card assembly into the riser-card connector on the system board. Then, press down on the assembly. Make sure that the riser-card assembly is fully seated in the riser-card connector on the system board.
8. Disconnect the hard disk drive signal cable from the SAS/SATA controller on the system board and connect it to the ServeRAID MR-10i controller in the riser-card assembly.

   Important: Make sure that the hard disk drive signal cable is connected to SAS/SATA connector J8 on the ServeRAID MR-10i controller.

If you have other devices to install or remove, do so now. Otherwise, go to “Completing the installation” on page 38.

Installing a memory module (DIMM)

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

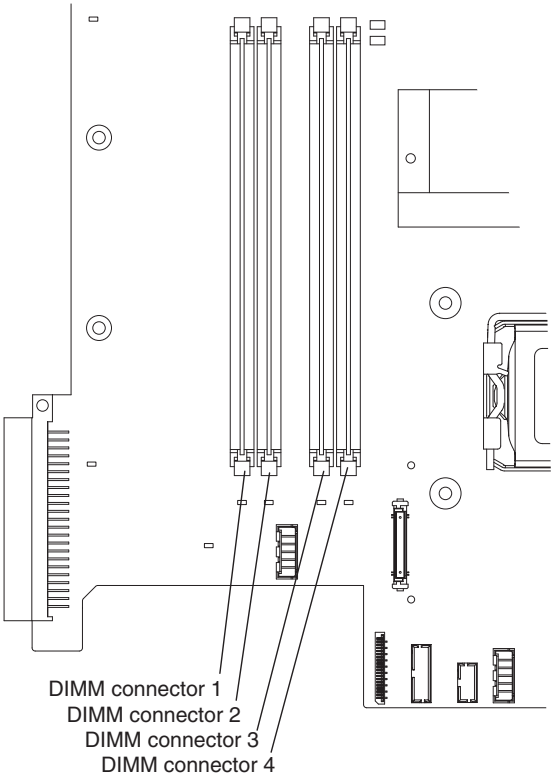
- The server supports up to four unbuffered 512 MB, 1 GB, and 2 GB DIMMs, for a maximum of 8 GB of system memory. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of memory modules that you can use with the server.

  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 connectors 1 and 3 or connectors 2 and 4. 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 3. DIMM installation sequence

DIMMs	DIMM connectors
2 DIMMs	1 and 3
4 DIMMs	1, 3, 2, 4



- Each DIMM in a pair must be the same size, speed, type, and technology to ensure that the server will operate correctly.

- If you install a second pair of DIMMs in the DIMM 2 and DIMM 4 connectors, they do not have to be the same size, speed, type, and technology as the DIMMs in the DIMM 1 and DIMM 3 connectors. However, the size, speed, type, and technology of the DIMMs that you install in the DIMM 2 and DIMM 4 connectors must match each other.
- The server can operate in single channel mode or dual channel mode.
- DIMM population is based on single-rank, double-rank, or mix single-rank and double-rank DIMMs. DIMMs must be installed in order, starting with the DIMM connector that is farthest from the memory controller hub. Double-rank DIMMs must be installed in the DIMM connector that is farthest from the memory controller hub when you install a combination of single-rank and double-rank DIMMs. The following tables show examples of populating the server with different combinations of single-rank and double-rank DIMMs.

Table 4. Interleave Mode DIMM slot population

First pair		**Second pair**		**Remarks**
DIMM 1	DIMM 3	DIMM 2	DIMM 4	
Single-rank	Single-rank	Single-rank	Single-rank	
Single-rank	Single-rank	Double-rank	Double-rank	Recommend this configuration as the first choice.
Double-rank	Double-rank	Single-rank	Single-rank	Recommend this configuration as the second choice.
Double-rank	Double-rank	Double-rank	Double-rank	

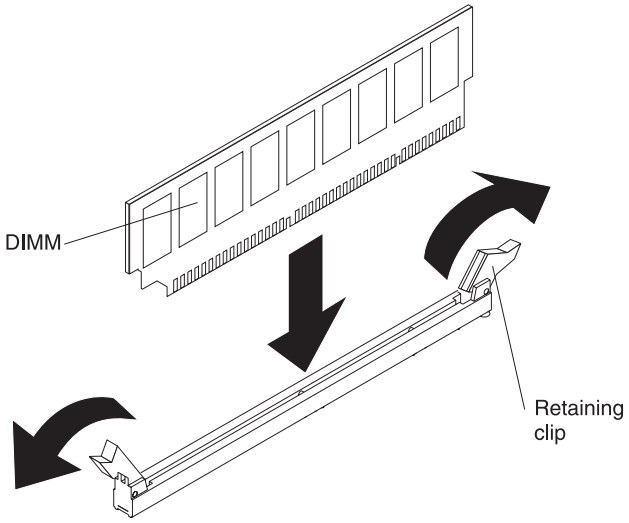
- When you install or remove DIMMs, the server configuration information changes. When you restart the server, the system displays a message that indicates that the memory configuration has changed.

The following illustration shows the dual inline memory module (DIMM) connectors on the system board.

To install a DIMM, complete the following steps:

1. Read the safety information that begins on page v and “Installation guidelines” on page 20.
2. Turn off the server and peripheral devices and disconnect all the power cords and external cables. Remove the cover (see “Removing the server cover” on page 23).

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
3. Open the retaining clip on each end of the DIMM connector.



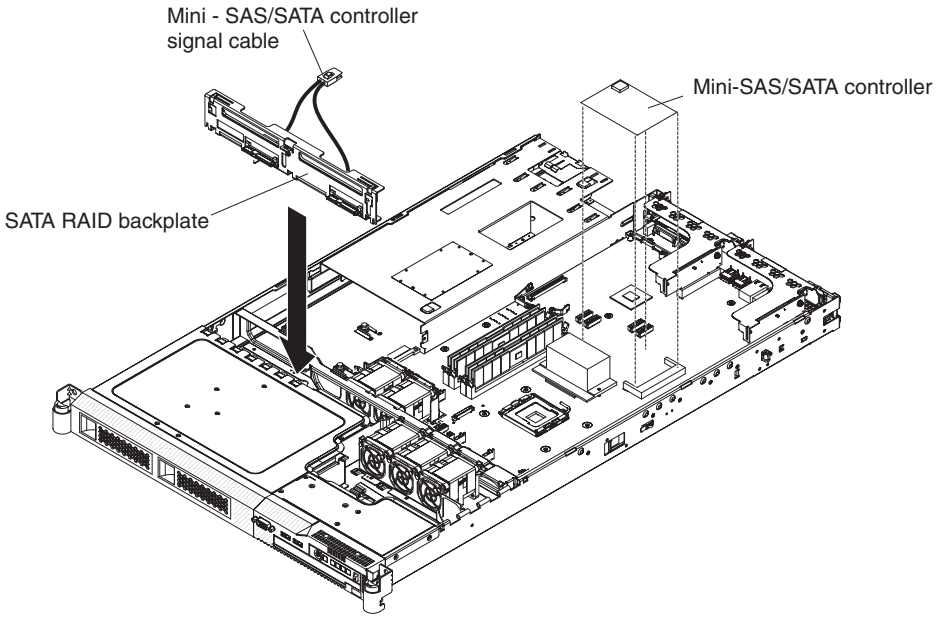
4. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the outside of the server; then, remove the DIMM from the package.
5. Turn the DIMM so that the DIMM keys align correctly with the connector.
6. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector.
7. 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 devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 38.

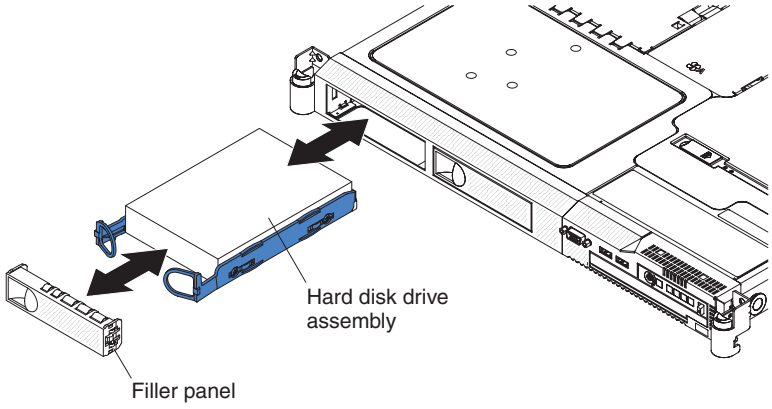
Installing an optional SATA RAID kit

An optional SATA RAID kit provides levels 0 and 1 RAID support for 3.5-inch simple-swap SATA drives.

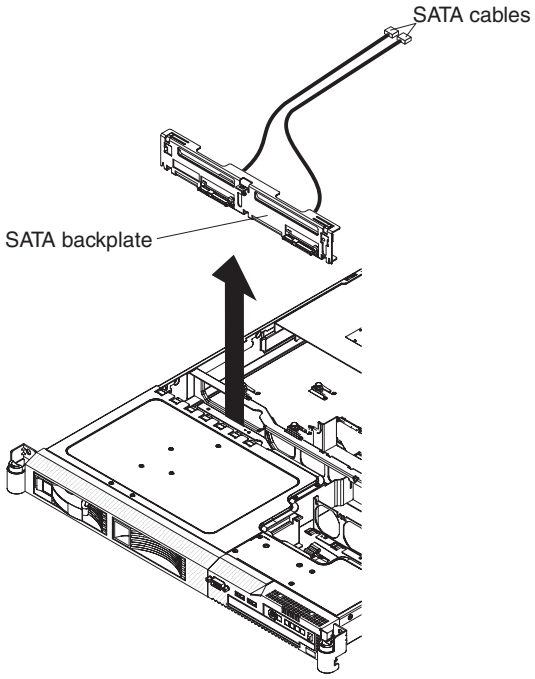


To install the SATA RAID kit, complete the following steps:

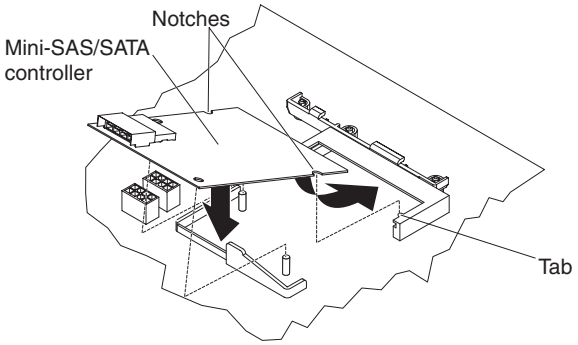
1. Read the safety information that begins on page v and “Installation guidelines” on page 20.
2. Turn off the server and peripheral devices, and disconnect the power cord and all external cables. Remove the cover (see “Removing the server cover” on page 23).



3. Pull the hard disk drives out of the server slightly to disengage them from the backplate or remove the drives completely (see page 26 for instructions).
4. Disconnect the SATA signal cables from the system board (see “System-board internal connectors” on page 16 for the locations of the SATA connectors) and disconnect the power cable from the power backplane.



5. Lift the backplate out of the server.
6. Disconnect the power cable .
7. Install the SAS/SATA controller.
   a. Grasp the edges of the SAS/SATA controller:



   b. Gently insert the controller into the SAS/SATA controller connector on the system board (see “System-board internal connectors” on page 16 for the location of the connector) while you align the holes in the controller with the two plastic alignment pins on the system board.
   c. Press the controller firmly onto the alignment pins until it clicks into place. Make sure that the top of each alignment pin has expanded to hold the controller securely in place.
   d. Push the controller toward the right of the server, fully into the connector, until the side tabs on the connector rest in the side notches of the controller .
8. Install the SATA RAID backplate:
   a. Connect the power cable to the backplate.
   b. Slide the connector on the right side of the backplate under the top edge on the rear of drive cage; then, slide the backplate into the card guides, making sure that any nearby wires or cables are not trapped or pinched.

c. Press firmly until the backplate is fully seated.

9. Route the signal cable from the backplate, through the cable clip on the system board, and connect it to the signal connector on the SAS/SATA controller. Connect the power cable to the power backplane.
10. Insert the hard disk drives that you removed in step 3 on page 34 fully into the bays (see “Installing a hot-swap hard disk drive” on page 26 for instructions).

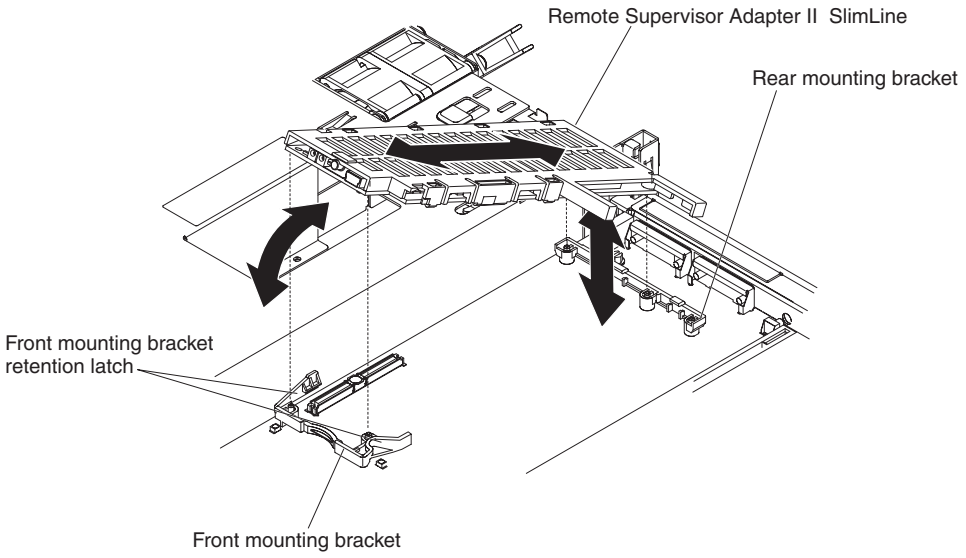
If you have other devices to install or remove, do so now. Otherwise, go to “Completing the installation” on page 38.

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 20.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables. Remove the cover
3. If an adapter is installed in the riser-card assembly in slot 2, grasp the riser-card assembly at the rear edge and lift to remove it from the server. Place the riser-card assembly on a flat, static-protective surface.
4. Turn the Remote Supervisor Adapter II SlimLine so that the connector on the adapter aligns with the connector on the system board.



5. At a downward angle, slip the back end of the adapter under the tab on the rear mounting bracket, aligning the holes in the adapter with the posts on the rear mounting bracket. Rotate the connector end of the adapter down into the front mounting bracket, aligning the holes in the adapter with the posts on the front mounting bracket.
6. 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.
7. If you removed the riser-card assembly, install it in slot 2 on the system board. Make sure that the riser-card assembly is fully seated in the riser-card connector on the system board.

See the documentation that comes with the Remote Supervisor Adapter II SlimLine for information about installing the firmware and configuring the adapter. Create a backup copy of the configuration so that you can restore the configuration if you have to replace the adapter in the future.

Note: When you start the server for the first time after you install a Remote Supervisor Adapter II SlimLine, the start-up process will take several minutes longer than a typical startup.

If you have other devices to install or remove, do so now. Otherwise, go to “Completing the installation” on page 38.

Completing the installation

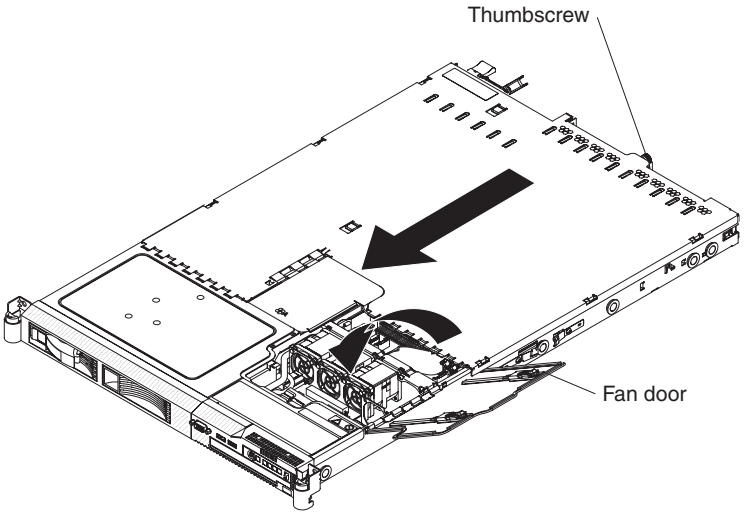
To complete the installation, complete the following steps:

1. If you removed the server cover, replace it and close the fan doors. For more information, see “Replacing the server cover.”
2. Slide the server back into the rack. If you removed the server from the rack, see the *Rack Installation Instructions* that come with the server for instructions for installing the server in the rack.
3. Connect the cables and power cords. For more information, see “Connecting the cables.”
4. Update the server configuration. See “Updating the server configuration” on page 39 for more information.

Replacing the server cover

To replace the server cover, complete the following steps:

1. Make sure that all internal cables are routed correctly.
2. Slide the cover forward, making sure that all the tabs on the front, rear, and side of the cover engage the chassis correctly.
3. Close the fan door and slide the fan cover release latches to the right to lock the cover in place.

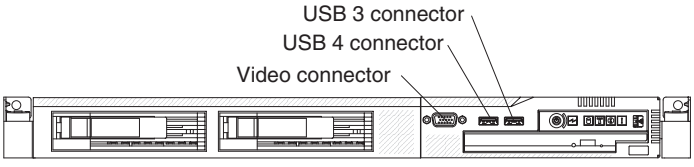


4. Tighten the thumbscrew at the back of the server.
5. Slide the server into the rack.

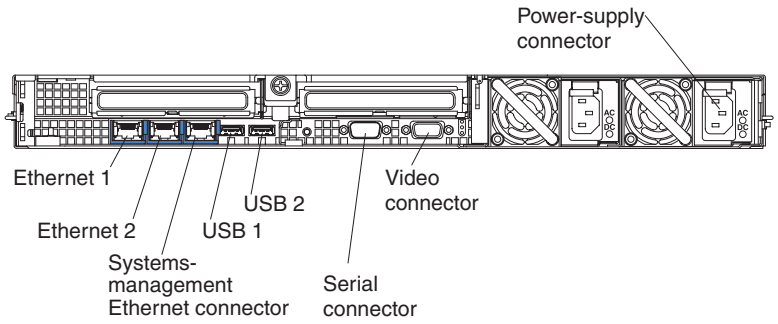
Connecting the cables

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

Front view



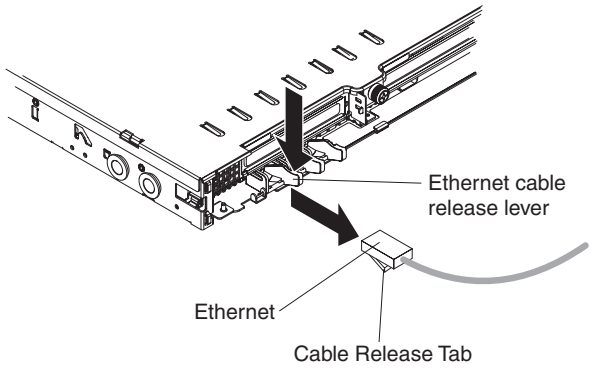
Rear view



Attention: 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.



Note: There are release levers on the Ethernet and systems-management connectors. To disconnect a cable from one of these connectors, press down 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 a device, you might receive a message that the configuration has changed. The Configuration/Setup Utility program starts automatically so that you can save the new configuration settings. For more information, see Chapter 3, “Configuring the server,” on page 41.

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

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 Broadcom Gigabit Ethernet controller” on page 66.

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” on page 42.

  Note: In a multi-node configuration, some choices or settings are defined through the primary server, and others must be defined on the individual (secondary) servers. Before you create a scalable partition, make sure that choices and settings on the secondary servers are correct

- **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 49.

- **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 53.

- **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.

- **Ethernet controller configuration**

  For information about configuring the Ethernet controller, see “Configuring the Broadcom Gigabit Ethernet controller” on page 66.

- **IBM Director**

  IBM Director is a workgroup-hardware-management tool that you can use to centrally manage System x servers. If you plan to use IBM Director to manage the server, you must check for the latest applicable IBM Director update and interim fixes. for information about updating IBM Director, see “Updating IBM Director” on page 67. For more information about IBM Director, see the IBM Director documentation on the IBM *Director* CD that comes with the server.

- **LSI Logic Configuration Utility program**

  Use the LSI Logic Configuration Utility program to configure devices that are attached to the SAS/SATA controller. For information about using this program, see "Using the LSI Logic Configuration Utility program" on page 43.

  Important: If the server is a simple-swap SATA model and you have installed an optional SATA RAID Kit, you can use the LSI Logic Configuration Utility program to configure the simple-swap SATA hard disk drives.

- **Remote Supervisor Adapter II SlimLine configuration**

  For information about setting up and cabling a Remote Supervisor Adapter II SlimLine for use in an Advanced System Management (ASM) network, see “Setting up a Remote Supervisor Adapter II SlimLine” on page 67.

Using the Configuration/Setup Utility program

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

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time
- Set and change passwords and Remote Control Security settings
- Set the startup characteristics of the server and the order of startup devices
- Set and change settings for advanced hardware features
- View and clear error logs
- Change interrupt request (IRQ) settings
- Resolve configuration conflicts

Starting the Configuration/Setup Utility program

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

1. Turn on the server.
2. When the prompt `Press F1 for Configuration/Setup` is displayed, press F1. If you have set both a power-on password and an administrator password, you must type the administrator password to access the full Configuration/Setup Utility menu. If you do not type the administrator password, a limited Configuration/Setup Utility menu is available.
3. Select settings to view or change.

Configuration/Setup Utility menu choices

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

- **System Summary**

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

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

  – **Processor Summary**

    Select this choice to view the processor information, including the type, speed and cache size of the microprocessor.

- **System Information**

  Select this choice to view information about the server, such as machine type/model, system serial number, system UUID, system board identifier, and the system asset tag. You can also view the version, date, and build level of the BIOS and the ASM Adapter ROM. You cannot change the system information settings.

  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.

Select this choice to enable or disable Ethernet controllers and all standard ports (such as serial and USB). **Enable** is the default setting for all controllers. If you disable a device, it cannot be configured, and the operating system will not be able to detect it (this is equivalent to disconnecting the device). If you disable the integrated Ethernet controllers and no Ethernet adapter is installed, you will have no Ethernet capability. If you disable the integrated USB controller, the server will have no USB capability; to maintain USB capability, make sure that **Enabled** is selected for **USB Controller** on the **USB Support** menu.

If the server is a SATA model, select this choice to determine the programming interface for the SATA port.

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

- **Remote Console Redirection**
  Select this choice to configure the remote console serial port, enable remote keyboard redirection, and to set other remote console values.
- **USB Support**
  Select this choice to enable or disable the USB controller and the USB ports.
- **Video**
  Select this choice to view display information about the video controller and video memory size.
- **System MAC Addresses**
  Select this choice to display the MAC address for the network devices that are installed in the server.

- **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 47 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 47.
  - **Power-on Password**

    Select this choice to set or change a power-on password. See “Power-on password” on page 47 for more information.

- **Start Options**

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

  You can view the Planar PXE/DHCP priority, PCI device boot priority, and whether the server starts with the keyboard number lock on or off. You can enable or disable displayless operation, boot on POST/BIOS error, boot fail count, the F12 menu prompt, and HDD S.M.A.R.T. capability.

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

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

– **Startup Sequence Options**

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-ROM drive, then checks the hard disk drive, and then checks a network adapter.

• **Advanced Setup**

Select this choice to change settings for advanced hardware features.

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

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

– **CPU Options**

Select this choice to enable or disable core-multi processing, execute-disable bit capability, EIST function, and Virtualization Technology for the microprocessor. 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 the installed PCI Express devices, configure PCI interrupt routing, and enable or disable PCI ROM control execution.

– **RSA II Settings**

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

This choice is on the Configuration/Setup Utility menu only if a Remote Supervisor Adapter II SlimLine is installed.

- **RSA II MAC Address**
  This is a nonselectable menu item that displays the Remote Supervisor Adapter II MAC address.
- **DHCP IP Address**
  This is a nonselectable menu item that displays the DHCP IP address.
- **DHCP Control**
  Select this choice to determine whether the DHCP or static IP address will be used. **Try DHCP then use static IP** is the default. If you select **Use Static IP configuration**, use the **Static IP Address** choice to set the address. If you select **Try DHCP then use static IP**, you can also use the **Static IP Address** choice to set the address. The Remote Supervisor Adapter II will attempt to acquire an IP address from the DHCP server. If it fails, the Remote Supervisor Adapter II will use the static IP address.
- **Static IP Settings**
  Select this choice to configure the Remote Supervisor Adapter II IP address.
- **Static IP Address**
  Select this choice to configure the IP Address for the Remote Supervisor Adapter II. This address is unselectable if **DHCP Control** is set to **DHCP Enabled**.

- **Subnet Mask**
  Select this choice to configure the subnet mask address for the Remote Supervisor Adapter II. This address is unselectable if **DHCP Control** is set to **DHCP Enabled**.
- **Gateway**
  Select this choice to configure the gateway address for the Remote Supervisor Adapter II. This address is unselectable if **DHCP Control** is set to **DHCP Enabled**.
- **OS USB Selection**
  Select this choice to specify whether Linux or other operating systems will be used for the Remote Supervisor Adapter II USB. The default is **Other OS**.
- **Save Values and Reboot RSA II**
  Select this choice and press Enter to save any changes that you make to the Remote Supervisor Adapter II configuration and to reboot the Remote Supervisor Adapter II.
- **<<<RESTORE RSA II DEFAULTS>>>**
  Select this choice and press the Enter to restore the Remote Supervisor Adapter II default settings.

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

  Select this choice to change settings for the BMC.

- **IPMI Specification Version**
  This is a nonselectable menu item that displays the IPMI specification version.
- **BMC Firmware Version**
  This is a nonselectable menu item that displays the BMC firmware version.
- **BMC Build Date**
  This is a nonselectable menu item that displays the BMC firmware build date.
- **BMC Build Level**
  This is a nonselectable menu item that displays the BMC firmware build level.
- **Existing Event Log Number**
  This is a nonselectable menu item that displays the number of entries in the BMC system event log.
- **BMC POST Watchdog**
  Select this choice to enable or disable the BMC POST watchdog. **Disabled** is the default setting.
- **BMC POST Watchdog Timeout**
  Select this choice to set the BMC POST watchdog timeout value. **5 minutes** is the default setting
- **System - BMC Serial Port Sharing**
  Select this choice to enable or disable sharing of 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, select this choice to specify the times and conditions during which the BMC shares the serial port.
- **Reboot System on NMI**
  Select this choice to enable or disable restarting the system whenever a nonmaskable interrupt (NMI) occurs. **Enabled** is the default.

- **User Account Settings**
  Select this choice to define user names and passwords for logging in to the BMC to remotely control settings on the server.
- **BMC Network Configuration**
  Select this choice to view the BMC MAC address, the DHCP IP address and configure DHCP control.
- **BMC System Event Log**
  Select this choice to view the BMC system event log, which contains messages about system events, such as the event entry number, timestamp, sensor type, sensor number, and event description. Select **Clear BMC SELs** to clear the BMC system event log.

– **High Precision Event Timer**

  Select this choice to enable or disable the high precision event timer.

- **Event/Error Logs**

  Select this choice to view and clear the System Event/Error Log and the Remote Supervisor Adapter II event/error log.

  – **System Event/Error Log**

    Select this choice to view the events and errors that were generated during POST and by the system management interface (SMI) handler. The most recent event is displayed first. Use the arrow keys to move among pages in the log. Select **Clear System Logs** to clear the system event/error log.

  – **RSA II 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 Remote Supervisor Adapter II event/error log. Use the arrow keys to move among pages in the log. Select **Clear RSA II logs** to clear the Remote Supervisor Adapter II event/error log.

    The Remote Supervisor Adapter II event/error log contains all event and error messages that have been generated during POST, by the system interface handler, and by the system service processor. The most recent event or error is displayed first.

    Important: If the system-error LED on the front of the server is lit but there are no other error indications, clear the Remote Supervisor Adapter II event/error log. This log does not clear itself, and if it begins to fill up, the system-error LED will be lit.

- **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, you must type the power-on password to complete the system startup. You can use any combination of up to seven characters (A – Z, a – z, and 0 – 9) for the password.

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

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

- If an administrator password is set, type the administrator password at the password prompt. Start the Configuration/Setup Utility program and reset the power-on password.
- Remove the battery from the server and then reinstall it. 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 clear CMOS jumper on the system board to bypass the power-on password check. See "Resetting passwords" for additional information.

Attention: Before you move 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 move jumpers on any system-board jumper blocks that are not shown in this document.

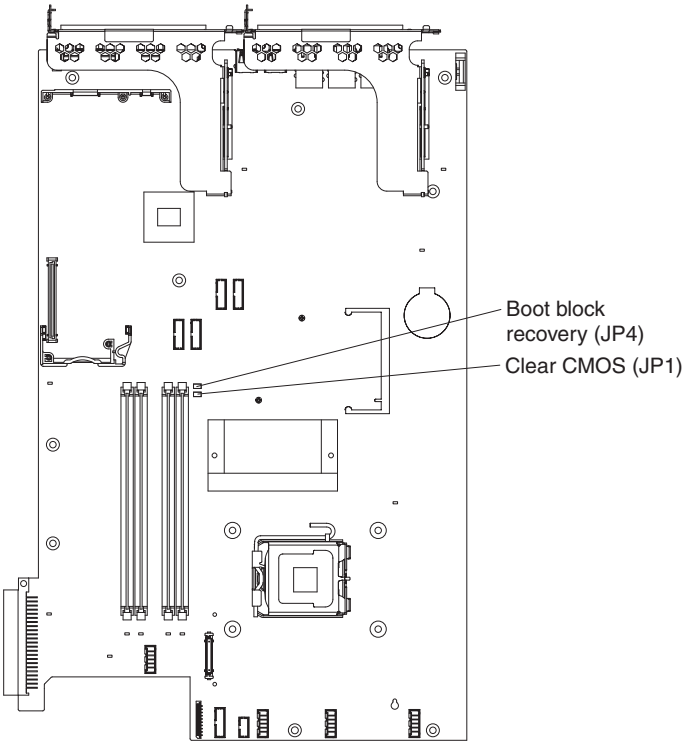
Administrator password

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

If you forget the administrator password, you can reset it after you change the position of the clear CMOS jumper. See “Resetting passwords” for additional information.

Resetting passwords

If you forget the power-on password or administrator password you can move the clear CMOS jumper on the system board to pins 2 and 3 to clear CMOS memory and bypass the power-on or administrator password check. The jumper location is shown in the following illustration.



To clear CMOS memory and reset the passwords, complete the following steps:

1. Review the safety information that begins on page v.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the cover. See “Removing the server cover” on page 23.
4. Move the clear CMOS jumper (JP1) from pins 1 and 2 to pins 2 and 3 and leave it there for at least 5 seconds; then, move the jumper back to pins 1 and 2.
5. Replace the server cover. See “Replacing the server cover” on page 38.
6. Slide the server into the rack and connect the server to a keyboard, monitor, and mouse; then, connect the server to a power source.
7. Turn on the server. You can now start the Configuration/Setup Utility program and either delete the old password or set a new power-on or administrator password.

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.
4. Select a device from the **Boot Menu**.
5. Select an option, and then select **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.

Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD contains a setup and installation program that is designed for your server. The ServerGuide program detects the server model and optional hardware devices that are installed and uses that information during setup to configure the hardware. The ServerGuide program simplifies operating-system installations by providing updated device drivers and, in some cases, installing them automatically.

If a later version of the ServerGuide program is available, you can download a free image of the *ServerGuide Setup and Installation* CD or purchase the CD from the ServerGuide fulfillment Web site at http://www.ibm.com/systems/management/serverguide/sub.html. To download the free image, click **IBM Service and Support Site**.

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

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 optional hardware devices and provides updated device drivers for most adapters and devices
- Provides diskette-free installation for supported Windows operating systems
- Includes an online readme file with links to tips for hardware and operating-system installation

Setup and configuration overview

When you use the *ServerGuide Setup and Installation* CD, you do not need setup diskettes. You can use the CD to configure any supported IBM server model. The setup program provides a list of tasks that are required to set up your server model. On a server with a ServeRAID adapter or 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 using ServerGuide

If you have already configured the server hardware and you are not using the ServerGuide program to install your operating system, complete the following steps to download the latest operating-system installation instructions from the IBM Web site.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click System x.
3. From the menu on the left side of the page, click **System x support search**.
4. From the **Task** menu, select **Install**.
5. From the **Product family** menu, select **System x3350**.
6. From the **Operating system** menu, select your operating system, and then click **Search** to display the available installation documents.

Using the LSI Logic Configuration Utility program

Use the LSI Logic Configuration Utility program to configure and manage redundant array of independent disks (RAID) arrays of hot-swap disk drives. Be sure to use this program as described in this document.

Important: If the server is a simple-swap SATA model and you have installed an optional SATA RAID Kit, you can use the LSI Logic Configuration Utility program to configure the simple-swap SATA hard disk drives.

Use the LSI Logic Configuration Utility program to perform the following tasks:

- Perform a low-level format of a SAS/SATA hard disk drive
- Create an array of SAS/SATA hard disk drives with or without a hot-spare drive
- Set SAS/SATA protocol parameters on SAS/SATA hard disk drives.

In addition, you can download an LSI command-line configuration program from http://www.ibm.com/systems/support/.

When you use the LSI Logic Configuration Utility program to configure and manage arrays, consider the following information:

- The integrated SAS/SATA controller with RAID capabilities supports the following features:
  - Integrated Mirroring (IM) with hot-spare (also known as RAID 1)

    Use this option to create an integrated array of two disks plus an optional hot spare. All data on the primary disk can be migrated.
  - Integrated Mirroring Enhanced (IME) with hot-spare support (also known as RAID 1E)

    Use this option to create an integrated mirror enhanced array of three to eight disks, including an optional hot spare
  - Integrated Striping (IS) (also known as RAID 0)

    Use this option to create an integrated striping array of two to eight disks. All data on the array disk will be deleted.
- Hard disk drive capacities affect how you create arrays. The drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.

- If you use an integrated SAS/SATA controller with RAID capabilities to configure a RAID 1 (mirrored) array after you have installed the operating system, you will lose access to any data or applications that were previously stored on the secondary drive of the mirrored pair.
- If you install a different type of RAID controller, see the documentation that comes with the controller for information about viewing and changing SAS/SATA settings for attached devices.

Starting the LSI Logic Configuration Utility program

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

1. Turn on the server.
2. When the prompt `Press CTRL-C to start LSI Logic Configuration Utility.....` is displayed, press Ctrl+C. If you have set an administrator password, you are prompted to type the password.
3. To select a controller (channel) from the list of adapters, use the arrow keys and press Enter.
4. To change the settings of the selected items, follow the instructions on the screen.

When you have finished changing settings, press Esc to exit from the program; select **Save** to save the settings that you have changed.

Formatting a SAS/SATA hard disk drive

Low-level formatting removes all data from the hard disk. If there is data on the disk that you want to save, back up the hard disk before you perform this procedure.

Note: Before you format a SAS/SATA hard disk, make sure that the disk is not part of a mirrored pair. From the list of adapters, select the controller (channel) for the drive that you want to format. Select **SAS Topology**; then, select **Drive**and press Alt+D

.

To format a drive, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drive that you want to format and press Enter.
2. Select **SAS Topology** and press Enter.
3. Select **Direct Attach Devices** and press Enter.
4. To highlight the drive that you want to format, use the Up Arrow and Down Arrow keys. To scroll left and right, use the Left Arrow and Right Arrow keys or the End key.
5. To start the love-level formatting operation, select **Format** and press Enter.

Creating a RAID array of SAS/SATA hard disk drives

To create a RAID array of SAS/SATA hard disk drives, complete the following steps:

1. From the list of adapters, select the controller (channel) for the drives that you want to mirror.
2. Select **RAID Properties**.
3. Select the type of array that you want to create.
4. Use the arrow keys to highlight the first drive in the pair; then, press the Minus (-) or Plus (+) key until you have selected all the drives for your array.
5. Press C to create the disk array.

6. Select **Apply changes and exit menu** to create the array.

Using the baseboard management controller

The baseboard management controller provides environmental monitoring for the server. 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.

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/systems/support/.
   b. Update the BIOS code, following the instructions that come with the update file that you downloaded.
2. Update the BMC firmware:
   a. Download the latest version of the BMC firmware from http://www.ibm.com/systems/support/.
   b. Update the BMC firmware, following the instructions that come with the updated file that you downloaded.
3. Configure the BIOS settings:
   a. When you are 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 1**: Auto-configure

c. Select **Remote Console Redirection**; then, make sure that the values are set as follows:
   - **Remote Console Serial Port**: Serial Port 1 (BMC)
   - **Baud Rate**: 19200 or higher
   - **Console Type**: VT 100
   - **Flow Control**: None
   - **Remote Console Active After Boot**: On

d. Press Esc twice to exit the **Remote Console Redirection** and **Devices and I/O Ports** sections of the Configuration/Setup Utility program.

e. Select **Advanced Setup**; then, select **Baseboard Management Controller (BMC) Settings**.

f. Select **System-BMC Serial Port Sharing** and set it to **Enabled**.

g. Select **BMC Serial Port Access Mode** and set it to **Shared.**

h. Press Esc to exit the **BMC Serial Port Access Mode** section of the **Baseboard Management Controller (BMC) Settings**.

i. Press Esc to exit **Baseboard Management Controller (BMC) Settings**.

j. Select **Save Settings**; then, press Enter.

k. Press Enter to continue.

l. Select **Exit Setup**; then, press Enter.

m. 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 vt100
   ```

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 you are 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 you are 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`
	1

Modified /boot/grub/menu.lst contents	Notes

title floppy
  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

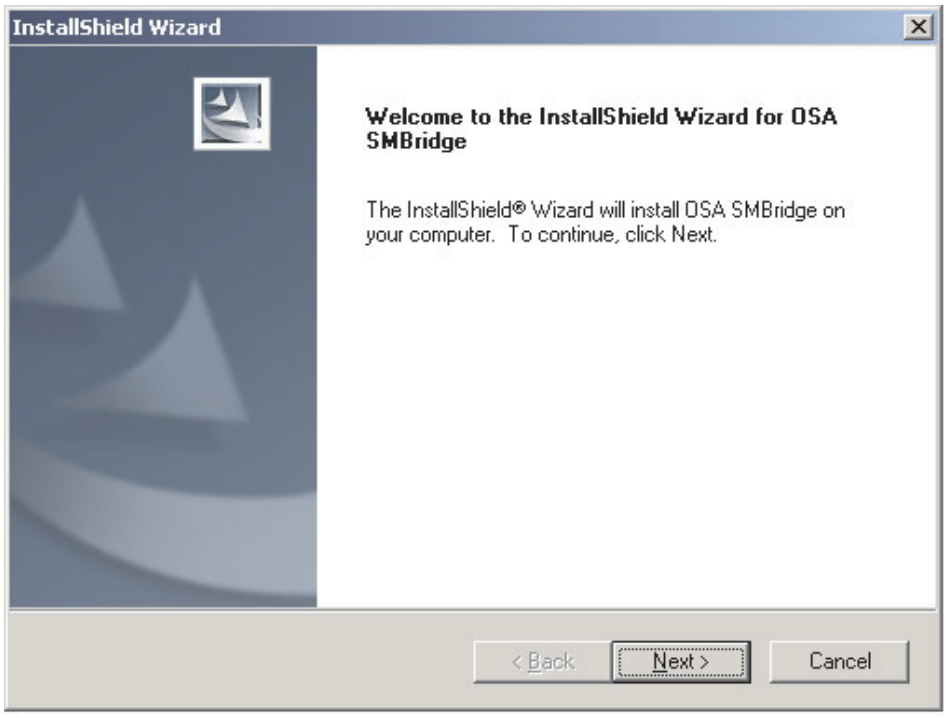
```
Boot Loader Settings
----------------------------
timeout: 30
default: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
redirect: COM1
redirectbaudrate: 19200
Boot Entries
----------------
Boot entry ID: 1
OS Friendly Name: Windows Server 2003, Standard
Path: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
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/systems/support/, 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/systems/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 /etc/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 SDR/FRU updates, and remotely manage a network.

Using the baseboard management controller setup utility program

Use the baseboard management controller setup utility program to view or change baseboard management controller information, user management, LAN configuration, and LAN alert settings. To download the program, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3350** to display the matrix of downloadable files for the server.
5. From the BMC software, copy the files bmc.exe and Init.ini to a setup utility diskette.

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

1. Turn on the server.
2. Insert the setup utility diskette into the diskette drive.
3. From a command line, type `bmc` and press Enter.

For the program to interface with the baseboard management controller, the parameters in the Intf.ini file must be set correctly. To modify the Intf.ini file, select **0** from the main menu and use the arrow keys to select settings for the following parameters:

- **System interface**: This is the interface through which system software sends and receives messages to and from the baseboard management controller. Select **KCS** (keyboard controller style).
- **Port Address**: This is the base address for the system interface.
- **Register Spacing**: Select **ByteBoundary**, **ThirtyTwo BitBoundary**, or **SixteenBitBoundary**.
- **Channel Number**: Use the arrow keys to select the channel number (0 through 15).
- **DHCP Mode**: This is the LAN configuration address source.

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 and to save the configuration to a file for use on multiple servers.

To download the program, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3350** to display the matrix of downloadable files for the server.
5. From the BMC software, copy the file bmc_cfg.exe to a configuration utility diskette.

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

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

For the program to interface with the baseboard management controller, the parameters in the Intf.ini file must be set correctly. To modify the Intf.ini file, use the baseboard management controller setup utility program or a text editor.

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

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

To download the program, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3350** to display the matrix of downloadable files for the server.
5. From the BMC software, copy the file Flash.exe to a firmware update diskette.

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

- If the Linux or Windows operating-system update package is available from the World Wide Web and you have obtained it, follow the instructions that come with the package.
- If you are using a diskette, complete the following steps
  1. Turn on the server.
  2. Insert the firmware update diskette into the diskette drive.
  3. From a command line, type `flash -?` and press Enter.

For the program to interface with the baseboard management controller, the parameters in the Intf.ini file must be set correctly. To modify the Intf.ini file, use the baseboard management controller setup utility program or a text editor.

Using the baseboard management controller SDR/FRU update utility program

Use the baseboard management controller SDR/FRU update utility program to download an SDR/FRU update.

To download the program, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3350** to display the matrix of downloadable files for the server.
5. From the BMC software, copy the file fsloader.exe to an SDR/FRU update diskette.

To start the baseboard management controller SDR/FRU update utility program, complete the following steps:

1. Turn on the server.
2. Insert the SDR/FRU update diskette into the diskette drive.
3. From a command line, type `fsloader -?` and press Enter.

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 configuration 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).

Enabling the Broadcom Gigabit Ethernet Utility program

The Broadcom Gigabit Ethernet Utility program is part of the BIOS. You can use it to configure the network as a startable device, and you can customize where the network startup option appears in the startup sequence. Enable and disable the Broadcom Gigabit Ethernet Utility program from the configuration/Setup Utility program

To enable the Broadcom Gigabit Ethernet Utility program, complete the following steps:

1. From the Configuration/Setup Utility main menu, select **Devices and I/O Ports** and press Enter.
2. Select **Planar Ethernet 1** and **Planar Ethernet 2** and use the Right Arrow key to set them to enabled.
3. Select **Save Settings** and press Enter.

Configuring the Broadcom Gigabit Ethernet controller

The Ethernet controller is integrated on the system board. It provides an interface for connecting to a 10 Mbps, 100 Mbps, or 1 Gbps network and 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 controller. 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 controller, see the *Broadcom NetXtreme II Gigabit Ethernet Software* CD that comes with the server. To find updated information about configuring the controller, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **IBM System x3350** to display the matrix of downloadable device driver files for the server.

Updating IBM Director

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

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

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

1. Check for the latest version of IBM Director.
   a. Go to http://www.ibm.com/systems/management/downloads.html.
   b. If the drop-down list shows a newer version of IBM Director than what comes with the server, follow the instructions on the Web page to download the latest version.
2. Install IBM Director.
3. Download and install any applicable updates or interim fixes for the server:
   a. Go to http://www.ibm.com/systems/support/.
   b. Under **Product Support**, click **System x**.
   c. Under **Popular links**, click **Software and device drivers**.
   d. Click **IBM System x3350** to display the matrix of downloadable files for the server.

Setting up a Remote Supervisor Adapter II SlimLine

This section describes how to set up, cable, and configure a Remote Supervisor Adapter II SlimLine for use on an Advanced System Management (ASM) network 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* on the IBM *System x Documentation* CD for information about how to configure and use an ASM network 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 you have completed the following procedures before you set up the Remote Supervisor Adapter II SlimLine:

- Install the operating system, using the ServerGuide program and the documentation that comes with the operating system.
- If you plan to use the remote disk function, install the following software:

  - On the server, install Microsoft Windows 2000 with Service Pack 3 or later.
  - On the client system, install Microsoft Windows 2000 or later and the Java 1.4 or later Plug-in.
- Make sure that the server has an Internet connection, so that you can download software and firmware from the IBM support Web site during the installation process.
- 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 the SNMP manager. The Remote Supervisor Adapter II SlimLine firmware, the integrated service processor firmware, and the MIB are available on the *ServerGuide Setup and Installation* CD and are fully functional. You can download the latest versions from http://www.ibm.com/systems/management/serverguide/sub.html.
- If you plan to use the Web-based interface to access the Remote Supervisor Adapter II SlimLine remotely, install the Java 1.4 or later Plug-in and one of the following Web browsers on the client system:
  - Microsoft Internet Explorer version 5.5 with the latest Service Pack
  - Netscape Navigator version 7.0 or later
  - Mozilla version 1.3 or later

  The Web browser must be Java-enabled and must support JavaScript™.

Cabling the Remote Supervisor Adapter II SlimLine

You can manage the server remotely through the Remote Supervisor Adapter II SlimLine by using one of the user interfaces and one of the connection methods that are described in the following table.

Table 5. Cabling tasks to enable remote access to the Remote Supervisor Adapter II SlimLine

User interface to Remote Supervisor Adapter II SlimLine	Connection to Remote Supervisor Adapter II SlimLine
ASM Web-based interface using HTTP	LAN using the Ethernet connector
Text-based interface using Telnet	

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 system-management Ethernet connector. See “Rear view” on page 11 for the location of the systems-management Ethernet connector.
2. Connect the other end of the connector to the network.
3. To make sure the network is working, check the Ethernet LEDs on rear of the server. See “Rear view” on page 11 for the location of the LEDs.

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/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x3350** to display the matrix of downloadable files for the server.
5. Select the software or firmware package that you want to install. On the next page, click the link for each file that you want to download. Follow the instructions that are displayed.
6. Repeat step 5 until you have downloaded all the files that you need.
7. Follow the instructions in the Remote Supervisor Adapter II readme file that you downloaded, 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* on the IBM *System x Documentation* CD for instructions for completing the configuration, including the following procedures:

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

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

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

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

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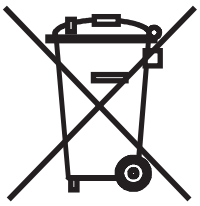

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Remarque : Cette marque s'applique uniquement aux pays de l'Union Européenne et à la Norvège.

L'etiquette du système respecte la Directive européenne 2002/96/EC en matière de Déchets des Equipements Electriques et Electroniques (DEEE), qui détermine les dispositions de retour et de recyclage applicables aux systèmes utilisés à travers l'Union européenne. Conformément à la directive, ladite étiquette précise que le produit sur lequel elle est apposée ne doit pas être jeté mais être récupéré en fin de vie.

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE. For proper collection and treatment, contact your local IBM representative.

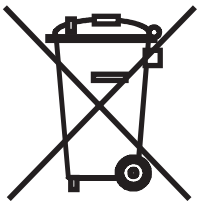
Battery return program

This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries outside the United States, go to http://www.ibm.com/ibm/environment/products/index.shtml or contact your local waste disposal facility.

In the United States, IBM has established a return process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and battery packs from IBM equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Have the IBM part number listed on the battery available prior to your call.

For Taiwan: Please recycle batteries.

For the European Union:



Notice: This mark applies only to countries within the European Union (EU).

Batteries or packaging for batteries are labeled in accordance with European Directive 2006/66/EC concerning batteries and accumulators and waste batteries and accumulators. The Directive determines the framework for the return and recycling of used batteries and accumulators as applicable throughout the European Union. This label is applied to various batteries to indicate that the battery is not to be thrown away, but rather reclaimed upon end of life per this Directive.

Les batteries ou emballages pour batteries sont étiquetés conformément aux directives européennes 2006/66/EC, norme relative aux batteries et accumulateurs en usage et aux batteries et accumulateurs usés. Les directives déterminent la marche à suivre en vigueur dans l'Union Européenne pour le retour et le recyclage des batteries et accumulateurs usés. Cette étiquette est appliquée sur diverses batteries pour indiquer que la batterie ne doit pas être mise au rebut mais plutôt récupérée en fin de cycle de vie selon cette norme.

バッテリーあるいはバッテリー用のパッケージには、EU 諸国に対する廃電気電子機器指令 2006/66/EC のラベルが貼られています。この指令は、バッテリーと蓄電池、および廃棄バッテリーと蓄電池に関するものです。この指令は、使用済みバッテリーと蓄電池の回収とリサイクルの骨子を定めているもので、EU 諸国にわたって適用されます。このラベルは、使用済みになったときに指令に従って適正な処理をする必要があることを知らせるために種々のバッテリーに貼られています。

In accordance with the European Directive 2006/66/EC, batteries and accumulators are labeled to indicate that they are to be collected separately and recycled at end of life. The label on the battery may also include a chemical symbol for the metal concerned in the battery (Pb for lead, Hg for mercury, and Cd for cadmium). Users of batteries and accumulators must not dispose of batteries and accumulators as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and treatment of batteries and accumulators. Customer participation is important to minimize any potential effects of batteries and accumulators on the environment and human health due to the potential presence of hazardous substances. For proper collection and treatment, contact your local IBM representative.

For California:

Perchlorate material – special handling may apply. See http://www.dtsc.ca.gov/hazardouswaste/perchlorate/.

The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5 Chapter 33. Best Management Practices for Perchlorate Materials. This product/part may include a lithium manganese dioxide battery which contains a perchlorate substance.

German Ordinance for Work gloss statement

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

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

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