



@server

IBM xSeries 336
Type 8837

User's Guide





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IBM xSeries 336

Type 8837

User's Guide

Note:

Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 45.

Second Edition (October 2004)

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Contents

| | |
|---|----|
| Safety | v |
| Chapter 1. Introducing the xSeries 336 Type 8837 server | 1 |
| Related documentation | 1 |
| Notices and statements used in this document. | 2 |
| Features and specifications. | 3 |
| What your server offers | 4 |
| Reliability, availability, and serviceability | 5 |
| Active Memory | 6 |
| Memory ProteXion | 6 |
| Memory mirroring and sparing. | 7 |
| IBM Director | 7 |
| The UpdateXpress program | 8 |
| Server controls, LEDs, and power | 8 |
| Front view | 8 |
| Operator information panel | 9 |
| Rear view. | 12 |
| Server power features | 13 |
| Chapter 2. Configuring the server | 15 |
| Using the Configuration/Setup Utility program | 16 |
| Starting the Configuration/Setup Utility program | 16 |
| Configuration/Setup Utility menu choices | 16 |
| Passwords | 19 |
| Using the Boot menu | 20 |
| Starting the backup BIOS | 21 |
| Using the ServerGuide Setup and Installation CD | 21 |
| ServerGuide features | 22 |
| Setup and configuration overview | 22 |
| Typical operating-system installation | 23 |
| Installing your operating system without ServerGuide | 23 |
| Configuring the Gigabit Ethernet controller. | 23 |
| Using the baseboard management controller | 24 |
| Enabling and configuring SOL using the OSA SMBridge management utility program | 24 |
| Installing the OSA SMBridge management utility program | 33 |
| Using the baseboard management controller utility programs | 35 |
| Using the RAID configuration programs | 36 |
| Using the LSI Logic setup utility program | 37 |
| Using ServeRAID Manager | 38 |
| Setting up the Remote Supervisor Adapter II SlimLine | 39 |
| Requirements | 39 |
| Cabling the Remote Supervisor Adapter II SlimLine | 40 |
| Installing the Remote Supervisor Adapter II SlimLine firmware | 40 |
| Completing the setup | 41 |
| Appendix A. Getting help and technical assistance | 43 |
| Before you call | 43 |
| Using the documentation | 43 |
| Getting help and information from the World Wide Web | 44 |
| Software service and support | 44 |
| Hardware service and support | 44 |

| | |
|--|----|
| Appendix B. Notices | 45 |
| Edition notice | 45 |
| Trademarks | 46 |
| Important notes. | 46 |
| Product recycling and disposal | 47 |
| Battery return program | 47 |
| Electronic emission notices | 48 |
| Federal Communications Commission (FCC) statement | 48 |
| Industry Canada Class A emission compliance statement | 48 |
| Australia and New Zealand Class A statement | 49 |
| United Kingdom telecommunications safety requirement. | 49 |
| European Union EMC Directive conformance statement. | 49 |
| Taiwanese Class A warning statement | 49 |
| Chinese Class A warning statement | 50 |
| Japanese Voluntary Control Council for Interference (VCCI) statement | 50 |
| Power cords | 50 |
| Index | 53 |

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

在安裝本產品之前，請仔細閱讀 **Safety Information**
(安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

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

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

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

Statement 1:



DANGER

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

To avoid a shock hazard:

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

To Connect:

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

To Disconnect:

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

Statement 2:



CAUTION:

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

Do not:

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

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

Statement 3:



CAUTION:

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

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

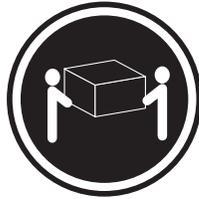


DANGER

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

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

Statement 4:



≥ 18 kg (39.7 lb.)



≥ 32 kg (70.5 lb.)



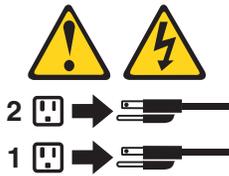
≥ 55 kg (121.2 lb.)

CAUTION:
Use safe practices when lifting.

Statement 5:



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



Statement 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.

WARNING: Handling the cord on this product or cords associated with accessories sold with this product, will expose you to lead, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm. ***Wash hands after handling.***

ADVERTENCIA:El contacto con el cable de este producto o con cables de accesorios que se venden junto con este producto, pueden exponerle al plomo, un elemento químico que en el estado de California de los Estados Unidos está considerado como un causante de cancer y de defectos congénitos, además de otros riesgos reproductivos. ***Lávese las manos después de usar el producto.***

Chapter 1. Introducing the xSeries 336 Type 8837 server

The IBM® @server™ xSeries® 336 Type 8837 server is a 1-U-high¹ rack model server for high-volume network transaction processing. This high-performance, symmetric multiprocessing (SMP) 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 more information about the terms of the warranty, see the warranty appendix in the *Installation Guide*.

The server contains IBM Enterprise X-Architecture™ technologies, which help increase performance and reliability. For more information, see “What your server offers” on page 4 and “Reliability, availability, and serviceability” on page 5.

You can obtain up-to-date information about the server and other IBM server products at <http://www.ibm.com/eserver/xseries/>.

For service or assistance information, see Appendix A, “Getting help and technical assistance,” on page 43.

Related documentation

This *User's Guide* provides general information about the server, including information about features, how to configure the server, and how to get help. In addition to this *User's Guide*, the following documentation comes with the server:

- *Installation Guide*

This printed document contains instructions for setting up the server and basic instructions for installing some options.

- *Option Installation Guide*

This document is in Portable Document Format (PDF) on the IBM *xSeries Documentation* CD. It contains detailed instructions for installing, removing, and connecting optional devices that the server supports.

- *Safety Information*

This document is in PDF on the IBM *xSeries 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.

- *Hardware Maintenance Manual and Troubleshooting Guide*

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

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 1.75 inches tall.

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

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. Complete the following steps to check for updated documentation and technical updates:

1. Go to <http://www.ibm.com/pc/support/>.
2. In the **Learn** section, click **Online publications**.
3. On the “Online publications” page, in the **Brand** field, select **Servers**.
4. In the **Family** field, select **xSeries 336**.
5. Click **Continue**.

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 *xSeries 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:

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

Features and specifications

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

Table 1. Features and specifications

| | | |
|--|--|---|
| <p>Microprocessor:</p> <ul style="list-style-type: none"> • Intel™ Xeon® 2.8 GHz or higher depending on server model • Support for up to two microprocessors with Intel Hyper-Threading Technology and EM64T (extended memory 64 bit technology) • 800 MHz front-side bus (FSB) <p>Memory:</p> <ul style="list-style-type: none"> • Minimum: 512 MB • Maximum: 16 GB • Type: 2-way interleaved PC3200, 400 MHz, ECC DDR II SDRAM, registered DIMMs only • Sizes: 256 MB, 512 MB, 1 GB, 2 GB (when available) <p>Expansion bays:</p> <p>Comes in 3 configurations:</p> <ul style="list-style-type: none"> • Configuration 1 and 2 <ul style="list-style-type: none"> – Two 3.5-inch hot-swap SCSI or two 3.5-inch non-hot-swap (simple swap) SATA hard disk drives – One 9.5-mm high DVD-ROM drive (optional) • Configuration 3 <ul style="list-style-type: none"> – Four 2.5-inch hot-swap SCSI hard disk drives <p>Expansion slots:</p> <ul style="list-style-type: none"> • One PCI-X 133 MHz or PCI Ex8, full-length, full height (Note: PCI-E x8 (PCI-E) requires an optional riser card) • One PCI-X 100 MHz, half length, low-profile <p>Power supply:</p> <ul style="list-style-type: none"> • 585 watt hot-swap power supply standard • Optional redundant 585 watt power supply | <p>Size:</p> <ul style="list-style-type: none"> • Height: 43 mm (1.69 in.) • Depth: 686 mm (27.0 in.) • Width: 440 mm (17.32 in.) • Weight: approximately 15.6 kg (34.5 lb) when fully configured or 12.7 kg (28 lb) minimum <p>Integrated functions:</p> <ul style="list-style-type: none"> • Baseboard management controller (BMC) • One LSI Ultra320 SCSI controller with RAID levels 1 and 1E capability • Two Broadcom 10/100/1000 Ethernet controllers with Wake on LAN® feature and Alert Standard Format support • Three Universal Serial Bus (USB) ports • One serial port • Keyboard port • Mouse port • Video port <p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> • Sound power, idling: 6.9 bel maximum • Sound power, operating: 6.9 bel maximum <p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Server on: 10° to 35°C (50.0° to 95.0°F); altitude: 0 to 2133 m (6998.0 ft) – Server off: 10° to 43°C (50.0° to 109.4°F); maximum altitude: 2133 m (6998.0 ft) • Humidity: <ul style="list-style-type: none"> – Server on: 8% to 80% – Server off: 8% to 80% | <p>Heat output:</p> <p>Approximate heat output in British thermal units (Btu) per hour:</p> <ul style="list-style-type: none"> • Minimum configuration: 587 Btu/hr (172 watts) • Maximum configuration: 1878 Btu/hr (550 watts) <p>Electrical input:</p> <ul style="list-style-type: none"> • Sine-wave input (50-60 Hz) required • Input voltage low range: <ul style="list-style-type: none"> – Minimum: 100 V ac – Maximum: 127 V ac • Input voltage high range: <ul style="list-style-type: none"> – Minimum: 200 V ac – Maximum: 240 V ac • Input kilovolt-amperes (kVA), approximately: <ul style="list-style-type: none"> – Minimum: .172 kVA – Maximum: .550 kVA <p>Notes:</p> <ol style="list-style-type: none"> 1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use. 2. These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate. |
|--|--|---|

What your server offers

Your server uses the following features and technologies:

- **Device Driver and IBM Enhanced Diagnostics**

To start the Enhanced Diagnostics diagnostic programs, press F2 while the server is starting.

- **Baseboard management controller**

The baseboard management controller (BMC) is a service processor that provides environmental monitoring for the server. If environmental conditions exceed thresholds or if system components fail, the baseboard management controller lights LEDs to help you diagnose the problem. Critical errors are also included in the error log.

- **IBM Director**

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

- **IBM Enterprise X-Architecture technology**

IBM X-Architecture technology combines proven, innovative IBM designs to make your Intel-processor-based server powerful, scalable, and reliable. For more information, go to

<http://www.ibm.com/pc/us/eserver/xseries/xarchitecture/enterprise/index.html>.

- **Active™ Memory**

The Active Memory feature improves the reliability of memory through memory mirroring, and online-spare memory. Memory mirroring stores data in two pairs of DIMMs simultaneously. Online-spare memory disables a failed pair of DIMMs from the system configuration and activates a pair of online-spare DIMMs. For more information, see the section about installing DIMMs in the *IBM xSeries 336 Type 8837 Installation Guide*.

- **Large system-memory capacity**

The memory bus supports up to 16 GB of system memory. The memory controller supports error correcting code (ECC) for up to eight industry-standard PC3200, 400 MHz, 1.8 V, 184-pin, registered, double-data-rate (DDR), synchronous dynamic random access memory (SDRAM) dual inline memory modules (DIMMs).

- **Memory ProteXion**

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

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

The *ServerGuide Setup and Installation CD* that comes with the server provides programs to help you set up the server and install a 32-bit Windows® operating system. The ServerGuide program detects installed hardware options and provides the correct configuration programs and device drivers. For more information about the *ServerGuide Setup and Installation CD*, see “Using the ServerGuide Setup and Installation CD” on page 21.

- **Integrated network support**

The server comes with an integrated Broadcom Gigabit Ethernet controller, which supports connection to a 10-Mbps, 100-Mbps, or 1000-Mbps network. For more information, see “Configuring the Gigabit Ethernet controller” on page 23.

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

The server supports up to four 2.5-inch or two 25.4-mm (1-inch) slim-high, 3.5 inch SCSI hot-swap hard disk drives in the hot-swap bays. With the hot-swap feature, you can add, remove, or replace hard disk drives without turning off the server.

This server also supports two 25.4-mm (1-inch) slim-high, 3.5-inch SATA simple swap hard disk drives.

- **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*.

- **Redundant connection**

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

- **Redundant cooling and optional power capabilities**

The redundant cooling of the fans in the server enables continued operation if one of the fans fails. The server comes with one 585-watt hot-swap power supply. You can order a second optional power supply, which provides redundant power for many server configurations.

- **ServeRAID™ support**

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

- **Symmetric multiprocessing (SMP)**

The server supports up to two Intel microprocessors. If the server comes with only one microprocessor, you can install an additional microprocessor to enhance performance and provide SMP capability.

- **Systems-management capabilities**

The server comes with a baseboard management controller (BMC) installed. When 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 dial-out alert capability.

The optional Remote Supervisor Adapter II SlimLine can be used to obtain enhanced system management capabilities, above those of the embedded BMC. The Remote Supervisor Adapter II SlimLine, when installed, has a dedicated Ethernet connection at the rear of the server.

Reliability, availability, and serviceability

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

Your server has the following RAS features:

- Automatic error retry and recovery

- Automatic restart after a power failure
- Baseboard management controller (BMC) service processor
- Backup basic input/output system (BIOS) switching under the control of the BMC
- Built-in monitoring for fan, power, temperature, voltage, and power-supply redundancy
- Cable-presence detection on most connectors
- Chipkill™ memory protection
- Error codes and messages
- Error correcting code (ECC) L2 cache and system memory
- Hot-swap hard disk drives
- Information and light path diagnostics LED panels
- Menu-driven setup, system configuration, and redundant array of independent disks (RAID) configuration programs
- Availability of microcode and diagnostic levels
- Parity checking on the small computer system interface (SCSI) bus and PCI buses
- Power management: Compliance with Advanced Configuration and Power Interface (ACPI)
- Power-on self-test (POST)
- Predictive Failure Analysis® (PFA) alerts
- Redundant Ethernet capabilities with failover support
- Hot-swap cooling fans with speed-sensing capability
- Redundant hot-swap power supplies and redundant hot-swap fans (some models)
- Remind button to temporarily turn off the system-error LED
- Remote system problem-determination support
- Standby voltage for system-management features and monitoring
- Startup (boot) from LAN through remote initial program load (RIPL) or dynamic host configuration protocol/boot protocol (DHCP/BOOTP)
- System auto-configuring from the configuration menu
- System error logging (POST and BMC)
- System-management monitoring through the Intra-Integrated Circuit (I²C) bus
- Upgradeable POST, BIOS, diagnostics, BMC microcode, and read-only memory (ROM) resident code, locally or over the LAN
- Vital product data (VPD) on microprocessors, system board, power supplies, SCSI (hot-swap-drive) backplane, and power backplane
- Wake on LAN feature capability

Active Memory

Active™ Memory is an IBM feature that improves the reliability of memory through memory mirroring and the Memory ProteXion™ feature.

Memory ProteXion

If a detected error is recoverable, the Memory ProteXion feature corrects the error and rewrites the data to another memory location on the same DIMM. If there are not sufficient undamaged memory locations that the data can be rewritten to, the error is unrecoverable. Other conditions can also cause unrecoverable errors. If a detected error is unrecoverable, light path diagnostics LEDs are lit to indicate the failing DIMM.

You do not have to enable memory mirroring to use the Memory ProteXion feature.

Memory mirroring and sparing

Memory mirroring stores data in memory pair 1 and 2 and memory pair 3 and 4 simultaneously. To support memory mirroring, you must install identical dual inline memory modules (DIMMs) in memory pair 1 and 2 and memory pair 3 and 4. For more information, see the section about installing memory modules in the *Option Installation Guide* on the IBM xSeries Documentation CD.

The server also supports memory sparing; however, the sparing feature is mutually exclusive with mirroring. The sparing feature disables the failed memory from the system configuration and activates a memory sparing pair of DIMMs to replace the failed active DIMM pair.

Before you can enable the memory sparing feature, you must install one additional pair of DIMMs. The memory sparing DIMM pair must be the same speed, type, and the same size as or larger, than the active DIMM pair.

To enable memory mirroring or sparing through the Configuration/Setup Utility program, select **Advanced Setup** from the main menu, and select **Memory Configuration**. For more information about using the Configuration/Setup Utility program, see “Using the Configuration/Setup Utility program” on page 16.

IBM Director

With IBM Director, a network administrator can:

- View the hardware configuration of remote systems, in detail
- Monitor the usage and performance of critical components, such as microprocessors, disks, and memory
- Centrally manage individual or large groups of IBM and non-IBM Intel-based servers, desktop computers, workstations, and mobile computers on a variety of platforms

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

- Advanced self-management capabilities for maximum system availability.
- Multiple operating-system platform support, including Microsoft® Windows 2000 Server, Windows XP Professional, Red Hat Linux, SUSE LINUX, and Novell NetWare. For a complete list of operating systems that support IBM Director, see the IBM Director Compatibility Document. This document is in Portable Document Format (PDF) at http://www.ibm.com/pc/ww/eserver/xseries/systems_management/nfdir/agent.html. It is updated every 6 to 8 weeks.
- Support for IBM and non-IBM servers, desktop computers, workstations, and mobile computers.
- Support for systems-management industry standards.
- Integration into leading workgroup and enterprise systems-management environments.
- Ease of use, training, and setup.

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

- Reduced downtime
- Increased productivity of IT personnel and users

- Reduced service and support costs

For more information about IBM Director, see the *IBM Director* CD that comes with your server, the IBM Director documentation on the CD, and the IBM xSeries Systems Management Web page at

http://www-1.ibm.com/servers/eserver/xseries/systems_management/xseries_sm.html, which presents an overview of IBM Systems Management and IBM Director.

The UpdateXpress program

The UpdateXpress program is available for most xSeries servers and server options. It detects supported and installed device drivers and firmware in your server and installs available updates. You can download the UpdateXpress 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/pc/ww/eserver/xseries/serverguide/xpress.html>.

Server controls, LEDs, and power

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

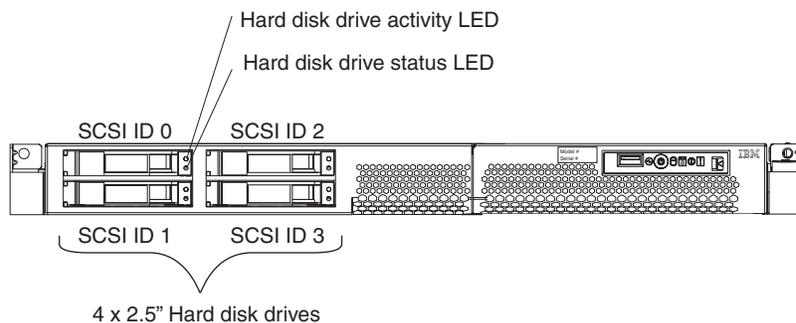
Front view

The following illustration shows the controls, LEDs, and connectors on the front of the server. There are three different front views:

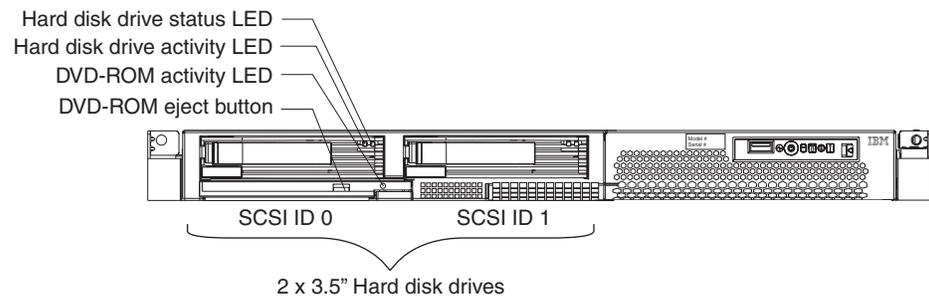
- 2.5-inch SCSI hot-swap hard disk drive
- 3.5-inch SCSI hot-swap hard disk drive
- 3.5-inch SATA non-hot-swap (simple swap) hard disk drive

Note: Both 3.5-inch configurations support an optional DVD-ROM drive.

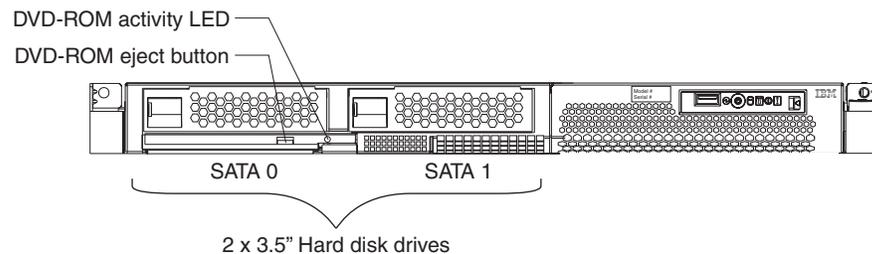
The following illustration shows the front view of an IBM xSeries 336 server with a 2.5-inch SCSI hot-swap hard disk drive configuration.



The following illustration shows the front view of an IBM xSeries 336 server with a 3.5-inch SCSI hot-swap hard disk drive configuration, with the optional DVD-ROM drive.



The following illustration shows the front view of an IBM xSeries 336 server with a 3.5-inch SATA simple swap hard disk drive configuration, with the optional DVD-ROM drive.



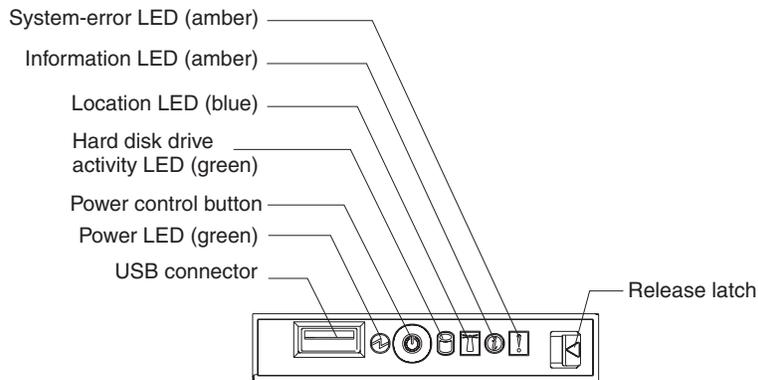
The following information gives details about the previously mentioned controls, LEDs, and connectors on the front of the server. The location of these items vary, depending on the hardware configuration you have.

- **Hot-swap hard disk drive activity LED:** This LED is used on SCSI 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.
- **Hot-swap hard disk drive status LED:** This LED is used on SCSI hard disk drives. When this LED is lit, it indicates that the drive has failed. If an optional IBM ServeRAID controller is installed in the server, when this LED is flashing slowly (one flash per second), it indicates that the drive is being rebuilt. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.
- **DVD-eject button:** Press this button to release a DVD or CD from the DVD-ROM drive.
- **DVD-ROM drive activity LED:** When this LED is lit, it indicates that the DVD-ROM drive is in use.

Note: The DVD-ROM option is available only on the 3.5-inch drive configurations (either SCSI or SATA hard disk drives).

Operator information panel

The operator information panel is on the front right side of the server. The following illustration shows the LEDs on the front of the operator information panel, followed by a description of each LED (from left to right):



- **USB connector:** Connect a USB device to this connector.
- **Power 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.

- **Power-control button:** Press this button to turn the server on and off manually. A power-control-button shield comes with the server. You can install this disk-shaped shield to prevent the server from being turned off accidentally.
- **Hard disk drive activity LED:** When this green LED is lit, it indicates that one of the hard disk drives is in use.

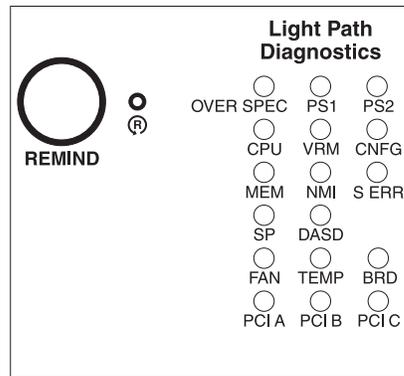
Note: Hard disk drive activity for the SCSI drives is shown in two places, on the hard disk drive itself and also on the hard disk drive activity LED on the operator information panel.

There is no hard disk drive activity LED for the SATA drive. The only place the SATA drive indicates hard disk drive activity is on the operator information panel.

- **Location LED:** Use this blue LED to visually locate the server if it is in a location with numerous other servers. You can use IBM Director to light this LED remotely. This LED is controlled by the BMC.
- **Information LED:** When this amber LED is lit, it indicates that a non-critical event has occurred. Check the error log for additional information. See the note in the “Light Path diagnostics panel” section, in the *Option Installation Guide*, for more information about error logs.
- **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, on the right side of the operator information panel, to slide out the operator information panel and view the Light Path LEDs and buttons.

Light Path LEDs and buttons: The Light Path LEDs and buttons are on top of the operator information panel. The following illustration shows the LEDs on the Light

Path Diagnostics panel, followed by a description of the buttons and each LED.



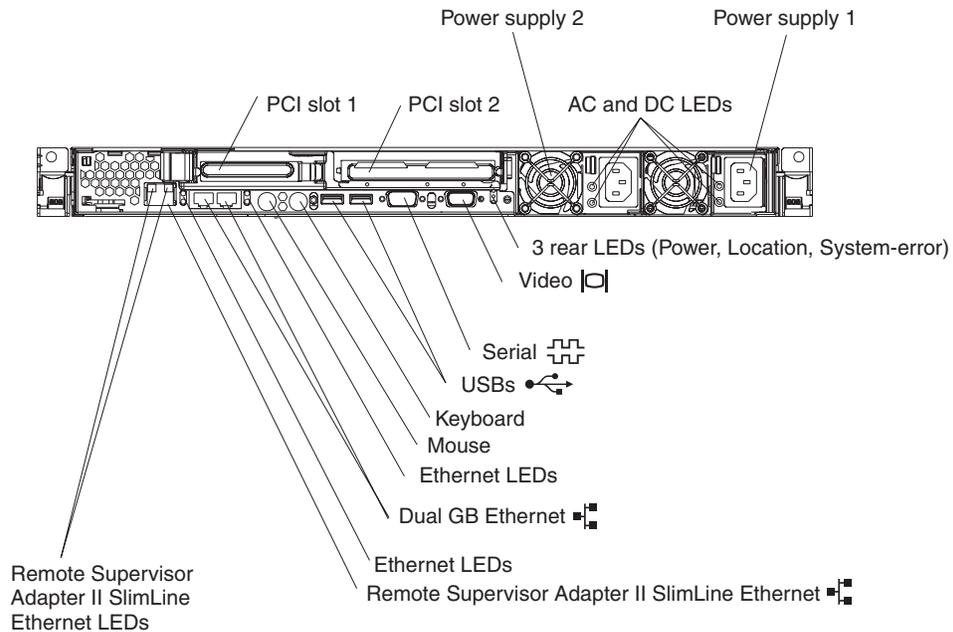
- Remind button:** This button places the system-error LED on the front panel into remind mode. In remind mode, the system error LED flashes rapidly until the problem is corrected, the system is restarted, or a new problem occurs. By placing the system error LED indicator in remind mode, you acknowledge that you are aware of the last failure but will not take immediate action to correct the problem. The remind function is handled by the BMC.
- Reset button:** Press this button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button. The reset button is to the right of the remind button and just above the small circle with the R inside.
- Light Path diagnostic LEDs:** You can slide out the operator information panel and drop it down for easy viewing without opening the top server cover. The LEDs are on the top of the operator information panel.

The following table lists the LEDs and the problems that they indicate.

| LED | Error |
|-----------|--|
| None | An error that is not reflected in the Light Path diagnostics panel |
| OVER SPEC | The power supplies are using more power than their maximum rating allows |
| PS1 | Power supply 1 |
| PS2 | Power supply 2 |
| CPU | Microprocessor error |
| VRM | Voltage Regulator Module (VRM) |
| CNFG | Configuration error, check the microprocessor and memory configuration |
| MEM | Memory |
| NMI | Nonmaskable interrupt |
| S ERR | Soft error |
| SP | Service processor |
| DASD | Hard disk drive |
| FAN | Fan (TEMP LED might also be lit) |
| TEMP | System temperature |
| BRD | Error with the system board, or a battery fault |
| PCI-A | PCI-A bus |
| PCI-B | PCI-B bus |
| PCI-C | PCI-C bus |

Rear view

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



- **PCI slot 1:** This slot allows insertion of a low profile adapter.
- **PCI slot 2:** This slot allows insertion of any PCI-X or PCI-E type adapter.
- **Power supply 2:** Provides dc power to the server, is a redundant backup power supply.
- **AC LED:** This LED is to the left of the power-cord connector and is the top LED. This LED indicates that the server has an ac power connection.
- **DC LED:** This LED is to the left of the power-cord connector and is the bottom LED. This LED indicates that the power supply is providing dc power to the server.
- **Power supply 1:** Provides dc power to the server, is the primary power supply.
- **Power LED:** This is the top LED and it indicates that ac power is present on the server.
- **Location LED:** This middle (blue) LED assists you in visually locating the server when it is among other servers
- **System-error LED:** This is the bottom LED and it indicates that a system error occurred.
- **Video connector:** Connect a monitor to this connector.
- **Serial connector:** Connect a 9-pin serial device to this connector.
- **USB connectors:** Connect a USB device to these connectors.
- **Keyboard connector:** Connect a PS/2[®] keyboard to this connector.
- **Mouse connector:** Connect a mouse or other PS/2 device to this connector.
- **Ethernet LEDs:** There are a set of LEDs for each Ethernet connector. The top LED is the Ethernet link LED. When it is lit, it indicates that there is an active connection on the Ethernet port.
The bottom LED is the Ethernet activity LED. When it flashes, it indicates that data is being transmitted or received between the server and a network device. The flashing frequency is proportional to the amount of traffic on the network link.

- **Dual GB Ethernet connectors:** Use these connectors to connect the server to an Ethernet network.
- **Remote Supervisor Adapter II SlimLine Ethernet connector:** Use this connector to connect the server to a network for system-management information control. This Ethernet connector is active only when you have installed the Remote Supervisor Adapter II SlimLine option.
- **Remote Supervisor Adapter II SlimLine Ethernet LEDs:** These LEDs are located on the Ethernet connector and are at the top left and top right positions. The top left LED is the Ethernet link LED for the Remote Supervisor Adapter II SlimLine. When this LED is lit, it indicates that there is an active connection on the Ethernet port.
The top right LED is the Ethernet activity LED for the Remote Supervisor Adapter II SlimLine. When this LED flashes, it indicates that data is being transmitted or received between the server and a network device. The flashing frequency is proportional to the amount of traffic on the network link.

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 BMC 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

When you connect the server to ac power, the power supply fans turn on immediately. Pressing the power-control button lets you turn on the server and start the operating system.

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 your operating system supports the system-management software for the Remote Supervisor Adapter II SlimLine option, the system-management software can turn on the server.
- If your operating system supports the Wake on LAN feature, the Wake on LAN feature can turn on the server.

Turning off the server

When you turn off the server and leave it connected to ac power, the power supply fans continue to run and the server can respond to requests from the service processor, such as a remote request to turn on the server. To remove all power from the server, you must disconnect it from the power source.

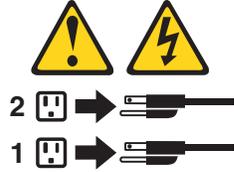
Some operating systems require an orderly shutdown before you turn off the server. See your operating-system documentation for information about shutting down the operating system.

Statement 5:



CAUTION:

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



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

- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will turn off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if your operating system supports this feature.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- If you installed the Remote Supervisor Adapter II SlimLine option in the server, the server can be turned off from the Remote Supervisor Adapter II SlimLine user interface.
- If the Wake on LAN feature turned on the server, the Wake on LAN feature can turn off the server.
- The baseboard management controller can turn off the server as an automatic response to a critical system failure.
- You can turn off the server through a request from the service processor.

Chapter 2. Configuring the server

The following configuration programs and capabilities come with your server:

- **Configuration/Setup Utility program**

The Configuration/Setup Utility program is part of the basic input/output system (BIOS) code in the server. 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 utility program, see “Using the Configuration/Setup Utility program” on page 16.

- **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 SCSI 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 21.

- **Ethernet controller configuration**

For information about configuring the Ethernet controller, see “Configuring the Gigabit Ethernet controller” on page 23.

- **Baseboard management controller**

Use the baseboard management controller utility programs to configure the baseboard management controller. The utilities also provide the capability to update the firmware and sensor data record/field replaceable unit (SDR/FRU) data and to configure a network for remote server management. For information about using the baseboard management controller utility programs, see “Using the baseboard management controller” on page 24.

- **RAID configuration programs**

- **LSI Logic Configuration Utility program**

Use the LSI Logic Configuration Utility to configure the integrated SCSI controller with RAID capabilities and the devices that are attached to it. For information about using this utility program, see “Using the LSI Logic setup utility program” on page 37.

- **ServeRAID Manager**

ServeRAID Manager is available as a stand-alone program and as an IBM Director extension. If a ServeRAID adapter is installed in the server or if you are using the RAID capabilities of the SCSI controller, use ServeRAID Manager to define and configure your disk-array subsystem *before* you install the operating system. For information about using this program, see “Using ServeRAID Manager” on page 38.

- **Remote Supervisor Adapter II SlimLine configuration**

For information about setting up and cabling the Remote Supervisor Adapter II SlimLine, see “Setting up the Remote Supervisor Adapter II SlimLine” on page 39.

- **Boot Menu program**

The Boot Menu program is part of the BIOS code in the server. Use it to temporarily assign a device to be first in the startup sequence, overriding the startup sequence that is set in the Configuration/Setup Utility program.

Using the Configuration/Setup Utility program

Use the Configuration/Setup Utility program to:

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time
- Set the startup characteristics of the server and the order of startup devices
- Set and change settings for advanced hardware features
- View, set, and change settings for power-management features
- View and clear error logs
- Change interrupt request (IRQ) settings
- Enable USB keyboard and mouse support
- Resolve configuration conflicts

Starting the Configuration/Setup Utility program

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

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

Configuration/Setup Utility menu choices

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

- **System Summary**

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

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

- **System Information**

Select this choice to view information about your server. When you make changes through other options in the Configuration/Setup Utility program, some of those changes are reflected in the system information; you cannot change settings directly in the system information.

When you select the system information option, you are presented one choice, product data. Select product data to view the machine type and model of your server, the serial number, and the revision level or issue date of the BIOS and diagnostics code stored in electrically erasable programmable ROM (EEPROM).

- **Devices and I/O Ports**

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

Select this choice to enable or disable integrated SCSI and Ethernet controllers and all standard ports (such as serial). **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 SCSI controller and no SCSI adapter is installed, the server will have no SCSI capability. If you disable the integrated Ethernet controller and no Ethernet adapter is installed, the server 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 the **USB Host Controller** and **USB BIOS Legacy Support** options. This choice is on the full Configuration/Setup Utility menu only.

- **Date and Time**

Select this choice to set the date and time in the server, in 24-hour format (*hour.minute:second*).

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

- **System Security**

Select this choice to set passwords. See “Passwords” on page 19 for more information about passwords. You can also enable the chassis-intrusion detector to alert you each time the server cover is removed.

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

- **Power-on Password**

Select this choice to set or change a power-on password. See “Power-on password” on page 19 for more information.

- **Administrator Password**

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

Select this choice to set or change an administrator password. An administrator password is intended to be used by a system administrator; it limits access to the full Configuration/Setup Utility menu. If an administrator password is set, the full Configuration/Setup Utility menu is available only if you type the administrator password at the password prompt. See “Administrator password” on page 20 for more information.

Note: The **Administrator Password** choice is on the Configuration/Setup Utility menu only if you installed the IBM Remote Supervisor Adapter II Slimline option.

- **Start Options**

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

The startup sequence specifies the order in which the server checks devices to find a boot record. The server starts from the first boot record that it finds. If your server has the Wake on LAN hardware and software and the operating system supports the Wake on LAN functions, you can specify a startup sequence for the Wake on LAN functions. You can also specify whether the integrated SCSI controller or a PCI SCSI adapter has boot precedence.

You can set keyboard operating characteristics, such as the keyboard speed, and you can specify whether the server starts with the keyboard number lock on or off. You can enable the server to run without a diskette drive, monitor, or keyboard.

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

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

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

- **Advanced Setup**

Select this choice to change settings for advanced hardware features.

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

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

- **System Partition Visibility**

Select this choice to specify whether the System Partition is to be visible or hidden.

- **Memory Settings**

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

You can select any of the following memory configurations:

- The flat (default) configuration uses memory without any redundancy.
- In mirroring mode, memory pairs act as a RAID level 1 memory array. This option reduces the amount of memory usable by the system by half.
- Sparing mode sets aside memory to dynamically replace a section of failing memory during system operation. This mode also reduces the amount of memory available to the system. The mirroring and sparing configuration requires that the memory be placed in multiple memory sockets.

- **CPU Options**

Select this choice to disable the microprocessor cache or to set it to use the write-back or write-through method. Write-back caching generally provides better system performance.

Hyper-Threading technology enables a server with one microprocessor to operate as if it were two microprocessors. Utilizing the CPU option allows better system performance, and will appear to the Operating System that twice the number of microprocessors are present.

You can enable the Prefetch Queue option from the CPU options menu. The Prefetch Queue option along with 64-bit addressing, in EM64T, can boost the software performance of the server.

- **PCI Bus Control**

Select this choice to view and set interrupts for PCI devices and to configure the master-latency-timer (MLT) value for the server.

- **Baseboard management controller Settings**

This option provides you with the following choices:

- View the BMC firmware version
- Enable and set timeout values for the following items:
 - BMC post watchdog
 - BMC OS loader watchdog
- Enable the **Reboot on NMI** option

If you enable this option, the server will automatically restart 60 seconds after the BMC issues a nonmaskable interrupt (NMI) to the server. If you

disable this option, the server will not restart. Reboot on NMI happens when a severe error occurs. **Enable** is the default setting.

- Specify the way the server obtains an IP address.

Use the BMC network configuration option to either set the IP address statically yourself or to enable DHCP control, which lets the server get the IP address dynamically from the DHCP server.

- View and clear the entries in the BMC system event log.

- **Event/Error Logs**

Select this choice to view or clear error logs.

- **POST Error Log**

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

- **System Event/Error Log**

If an IBM Remote Supervisor Adapter II SlimLine option is installed, the full text of the error messages is displayed. Run the diagnostic program to get more information about error codes that occur. See the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM xSeries Documentation CD for instructions. Select **Clear error logs** to clear the System Event/Error log.

Passwords

From the **System Security** choice, you can set, change, and delete a power-on password and an administrator password. The **System Security** choice is on the full Configuration/Setup menu only.

If you set only a power-on password, you must type the power-on password to complete the system startup and to have access to the full Configuration/Setup Utility menu.

An administrator password is intended to be used by a system administrator; it limits access to the full Configuration/Setup Utility menu. If you set only an administrator password, you do not have to type a password to complete the system startup, but you must type the administrator password to access the Configuration/Setup Utility menu.

If you set a power-on password for a user and an administrator password for a system administrator, you can type either password to complete the system startup. A system administrator who types the administrator password has access to the full Configuration/Setup Utility menu; the system administrator can give the user authority to set, change, and delete the power-on password. A user who types the power-on password has access to only the limited Configuration/Setup Utility menu; the user can set, change, and delete the power-on password, if the system administrator has given the user that authority.

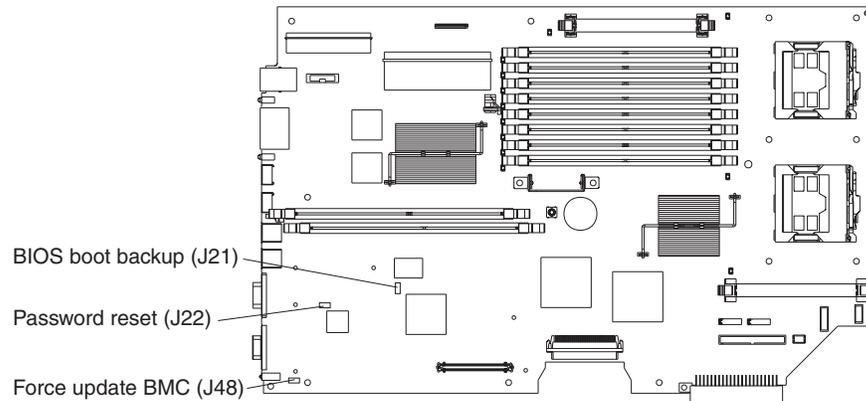
Power-on password

If a power-on password is set, when you turn on the server, the system startup will not be completed until you type the power-on password. You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for the password.

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

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

- If an administrator password is set, type the administrator password at the password prompt. Start the Configuration/Setup Utility program and reset the power-on password.
- Remove the server battery and then reinstall it. See the *Option Installation Guide* for instructions for removing the battery.
- Change the position of the power-on password override jumper (J22 on the system board) to bypass the power-on password check (see the following illustration).



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

While the server is turned off, move the jumper on J22 to pin positions 2 and 3 (see previous illustration for jumper location). You can then start the Configuration/Setup Utility program and reset the power-on password. You do not have to return the jumper to the previous position.

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

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.

Note: The **Administrator Password** choice is on the Configuration/Setup Utility menu only if you installed the IBM Remote Supervisor Adapter II Slimline option.

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

Using the Boot menu

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.

Complete the following steps to use the Boot Menu program:

- Turn off the server.

- Restart the server.
- Press **F12**, the Select *Boot Device menu* is displayed.

Note: If you installed a bootable USB mass storage device, a submenu item *USB Key/Disk* is displayed.

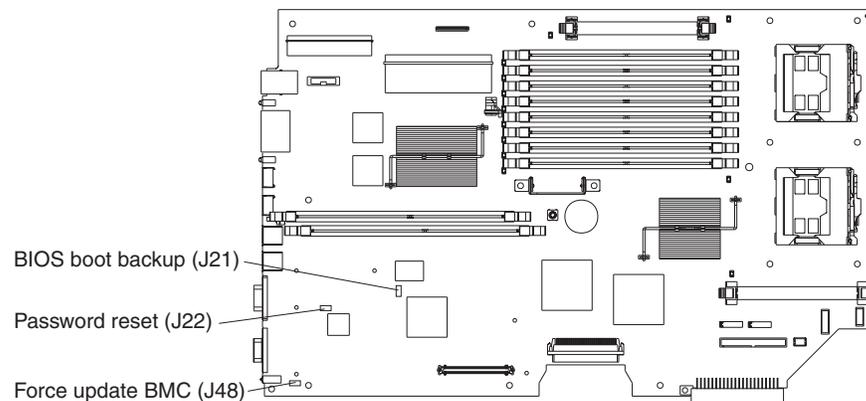
- Select a bootable item from the menu, which brings up a submenu with the following options:
 - Yes: anytime this device is installed, the system will attempt to boot it
 - This boot only: this device will be boot attempted this boot only
 - Next boot: this device will be boot attempted this boot and the next boot
 - Next 2 boots: this device will be boot attempted this boot and the next 2 boots
 - Next 3 boots: this device will be boot attempted this boot and the next 3 boots
- After selecting an option, select the **Exit and continue booting** option.

Note: You can press ESC at anytime to cancel the selection of the device and to return to the previous menu.

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

Starting the backup BIOS

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



To force the server to start from the backup copy, turn off the server; then, place the J21 jumper in the backup position (pins 2 and 3).

Use the backup of the BIOS code until the primary copy is restored. After the primary copy is restored, turn off the server; then, move the J21 jumper back to the primary position.

Using the ServerGuide Setup and Installation CD

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

Note: The ServerGuide program works only with 32-bit Windows operating systems.

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

The ServerGuide program has the following features to make setup easier:

- 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 or integrated SCSI controller with RAID capabilities
- 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-ROM drive. In addition to the *ServerGuide Setup and Installation* CD, you must have your operating-system CD to install your operating system.

The ServerGuide program has the following features:

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

Setup and configuration overview

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

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

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

You can use the ServerGuide program to shorten the installation time. The ServerGuide program 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, BMC, hard disk drive controllers, and network adapters. Then, the program checks the CD for newer device drivers. This information is stored and then passed to the operating-system installation program.
3. The ServerGuide program presents operating-system partition options that are based on your operating-system selection and the installed hard disk drives.
4. The ServerGuide program prompts you to insert your operating-system CD and restart the server. At this point, the installation program for the operating system takes control to complete the installation.

Installing your operating system without ServerGuide

If you have already configured the server hardware and you decide not to use the ServerGuide program to install your operating system, complete the following steps to download the latest operating-system installation instructions from the IBM Support Web page:

1. Go to <http://www.ibm.com/pc/support/>.
2. In the **Download** section, click **Downloads & drivers**.
3. On the “Downloads and drivers” page, in the **Brand** field, select **Servers**.
4. In the **Family** field, select **xSeries 336**.
5. Click **Continue**.
6. In the **View by document type** field, select **OS installation**.
7. Select the instructions for your operating system.

Configuring the Gigabit Ethernet controller

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

1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operate at that rate and mode.

You do not have to set any jumpers or configure the controllers. However, you must install a device driver to enable the operating system to address the controllers. For device drivers and information about configuring the Ethernet controllers, see the *Broadcom NetXtreme Gigabit Ethernet Software* CD that comes with the server. For updated information about configuring the controllers, go to <http://www.ibm.com/pc/support/>.

Using the baseboard management controller

The baseboard management controller provides environmental monitoring for the server. If environmental conditions exceed thresholds or if system components fail, 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 1.5 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 Telenet 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 and enable the operating system for an SOL connection.

Note: In an SOL session, use the following commands instead of function keys:

- To start the Configuration/Setup Utility program when the prompt Press F1 for Configuration/Setup appears, press Esc, Shift+o, then Shift+p.
- To start the diagnostic programs, when the prompt F2 for Diagnostics appears, press Esc, Shift+o, then Shift+q.
- To recover BIOS, when the prompt F3 for BIOS Recovery appears, press Esc, Shift+o, then Shift+r.

BIOS update and configuration

Complete the following steps to update and configure the BIOS code to enable SOL:

1. Update the BIOS code:
 - a. Download the latest version of the BIOS code from <http://www.ibm.com/pc/support/>.
 - b. Update the BIOS code, following the instructions that come with the update file that you downloaded.

2. Configure the BIOS settings:
 - a. Restart the server and press F1 when prompted to start the Configuration/Setup Utility program.
 - b. Select **Devices and I/O Ports**; then, make sure that the values are set as follows:
 - **Serial Port A**: Auto-configure
 - **Serial Port B**: Auto-configure
 - c. Select **Remote Console Redirection**; then, make sure that the values are set as follows:
 - **Remote Console Active**: Enabled
 - **Remote Console COM Port**: COM 1
 - **Remote Console Baud Rate**: 19200
 - **Remote Console Data Bits**: 8
 - **Remote Console Parity**: None
 - **Remote Console Stop Bits**: 1
 - **Remote Console Text Emulation**: ANSI
 - **Remote Console Keyboard Emulation**: ANSI
 - **Remote Console Active After Boot**: Enabled
 - **Remote Console Flow Control**: Hardware
 - d. Press Esc twice to exit the **Remote Console Redirection** and **Devices and I/O Ports** sections of the Configuration/Setup Utility program.

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

Linux configuration

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

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

Red Hat Enterprise Linux ES 2.1 configuration:

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

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

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

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

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

```
ttyS1
```

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

1. Complete the following steps to modify the /etc/lilo.conf file:
 - 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 completing these procedures for the changes to take effect and to enable SOL.

SUSE SLES 8.0 configuration:

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

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

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

1. Add the following line to the end of the # getty-programs for the normal runlevels section of the /etc/inittab file. This enables hardware flow control and enables users to log in through the SOL console.
7:2345:respawn:/sbin/agetty -h ttyS0 19200 vt102
2. Add the following line after the tty6 line at the bottom of the /etc/securetty file to enable a user to log in as the root user through the SOL console:
ttyS1
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=ttyS1,19200 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 |
|--|-------------------|
| <pre>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 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</pre> | <p>1</p> <p>1</p> |
| <p>Note 1: The kernel line is shown with a line break. In your file, the entire entry must all be on one line.</p> | |

| Modified /boot/grub/menu.lst contents | Notes |
|---|----------|
| <pre>#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=ttyS1,19200 console=tty1 initrd (hd0,1)/boot/initrd # This will allow you to Interact with the OS boot via SOL title linux SOL Interactive kernel (hd0,1)/boot/vmlinuz root=/dev/hda2 acpi=oldboot vga=791 console=tty1 console=ttyS0,19200 initrd (hd0,1)/boot/initrd title floppy</pre> | <p>1</p> |

| Modified /boot/grub/menu.lst contents | Notes |
|--|-------|
| <pre> 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 </pre> | 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 completing 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 COM2 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 COM2 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
```

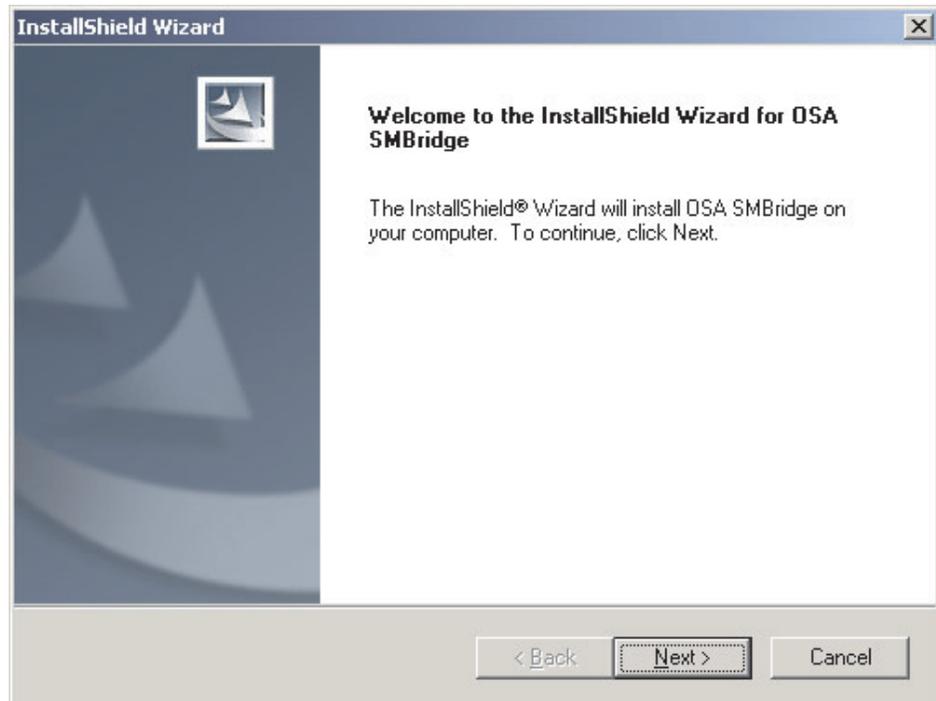
You must restart the Windows 2003 operating system after completing this procedure for the changes to take effect and to enable SOL.

Installing the OSA SMBridge management utility program

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

1. Go to <http://www.ibm.com/pc/support/> and download the utility program and create the OSA BMC Management Utility CD.
2. Insert the OSA BMC Management Utility CD into the drive. The InstallShield wizard starts, and a window similar to that shown in the following illustration

opens.



3. Follow the prompts to complete the installation.

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

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

1. Go to <http://www.ibm.com/pc/support/> and 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 -i osabmcutil-1.0-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`
 - `/ect/sol/oem.cfg`
 - `/usr/sbin/smbconfig`
 - `/usr/bin/smbconfig`
 - `/usr/sbin/ipmish`

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

```
smbridge status
smbridge start
smbridge stop
smbridge restart
```

Using the baseboard management controller utility programs

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

Using the baseboard management controller configuration utility program

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

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

Complete the following steps to start the baseboard management controller configuration utility program:

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

Using the baseboard management controller firmware update utility program

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

Go to <http://www.ibm.com/pc/support/> to download the utility program; then, copy the `Flash.exe` file to a firmware update diskette.

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

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

Using the OSA SMBridge management utility program

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

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

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

Use the following commands in CLI mode:

- **identify**
Control the system-locator LED on the front of the server.
- **power**
Turn the server on and off remotely.
- **sel**
Perform operations with the System Event/Error log.
- **sysinfo**
Display general system information that is related to the server and the baseboard management controller.

- **Serial over LAN**

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

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

Use the following commands in an SOL session:

- **connect**
Connect to the LAN. Type `connect -ip ip_address -u username -p password`.
- **identify**
Control the system-locator LED on the front of the server.
- **power**
Turn the server on and off remotely.
- **reboot**
Force the server to restart.
- **sel get**
Display the System Event/Error log.
- **sol**
Configure the SOL function.
- **sysinfo**
Display system information that is related to the server and the globally unique identifier (GUID).

Using the RAID configuration programs

Use the LSI Logic setup utility program and ServeRAID Manager to configure and manage redundant array of independent disks (RAID) arrays. Be sure to use these programs as described in this document.

- Use the LSI Logic setup utility program to:
 - View or change SCSI IDs for attached devices
 - Set SCSI protocol parameters on SCSI hard disk drives
- Use ServeRAID Manager to:
 - Configure arrays
 - View your RAID configuration and associated devices
 - Monitor operation of your RAID controllers

In addition, an LSI command-line configuration program (CFG1030) and the utility that performs a low-level format on a SCSI hard disk drive are available from <http://www.ibm.com/pc/support/>.

Consider the following information when using the LSI Logic setup utility program and ServeRAID Manager to configure and manage arrays:

- The integrated SCSI controller with RAID capabilities in the server supports only RAID level 1 and 1E; using a hard disk drive as a hot-spare is optional. Installing an optional ServeRAID controller provides additional RAID levels.

Notes:

1. RAID level 1 with two drives provides data mirroring, which provides a redundant copy of the data.
 2. RAID level 1 with three to four drives allows data mirroring with a hot-spare drive.
- When you create a RAID level-1 (mirrored) pair, all drives must be on the same channel.
 - Hard disk drive capacities affect how you create arrays. The drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.
 - To help ensure signal quality, do not use drives with different speeds and data rates in the array.
 - You can set up a mirror after the operating system is installed on the primary drive only if you are using an integrated SCSI controller with RAID capabilities. If you want to use the RAID capabilities, make sure that the primary drive has the lower SCSI ID (for example, 0).

Important: If you use an integrated SCSI controller with RAID capabilities to configure a RAID level-1 (mirrored) array after you have installed the operating system, you will lose access to any data or applications that were previously stored on the secondary drive of the mirrored pair.

- To update the firmware and BIOS codes for an optional ServeRAID controller, you must use the IBM *ServeRAID Support* CD that comes with the controller.
- If you install a different type of RAID controller, see the documentation that comes with the controller for information about viewing and changing SCSI settings for attached devices.

Using the LSI Logic setup utility program

Complete the following steps to start the LSI Logic setup utility program:

1. Turn on the server and watch the monitor screen.
2. When the message <<< Press <CTRL><C> to start LSI Logic setup utility >>> appears, press Ctrl+C. If an administrator password has been set, you are prompted to type the password.
3. Use the arrow keys to select a controller (channel) from the list of adapters; then, press Enter.
4. Follow the instructions on the screen to change the settings of the selected items; then, press Enter. If you select **Device Properties** or **Mirroring Properties**, additional screens are displayed.

See the *User's Guide* on the IBM *xSeries Documentation* CD for more information about the LSI Logic setup utility program.

Using ServeRAID Manager

Use ServeRAID Manager, which is on the *IBM ServeRAID Support CD*, to:

- Configure a redundant array of independent disks (RAID) array
- Restore a SCSI hard disk drive to the factory-default settings, erasing all data from the disk
- View your RAID configuration and associated devices
- Monitor the operation of your RAID controllers

To perform some tasks, you can run ServeRAID Manager as an installed program. However, to configure the integrated SCSI controller with RAID capabilities and perform an initial RAID configuration on the server, you must run ServeRAID Manager in Startable CD mode, as described in the instructions in this section. If you install a different type of RAID adapter in the server, use the configuration method described in the instructions that come with that adapter to view or change SCSI settings for attached devices.

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

Configuring the controller

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

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

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

Using express configuration: Complete the following steps to use express configuration:

1. In the ServeRAID Manager tree, click the controller.
2. Click **Express configuration**.
3. Click **Next**. The “Configuration summary” window opens.
4. Review the information in the “Configuration summary” window. To change the configuration, click **Modify arrays**.
5. Click **Apply**; then, click **Yes** when asked if you want to apply the new configuration. The configuration is saved in the controller and in the physical drives.
6. Exit from ServeRAID Manager and remove the CD from the DVD-ROM drive.
7. Restart the server.

Using custom configuration: Complete the following steps to use custom configuration:

1. In the ServeRAID Manager tree, click the controller.
2. Click **Custom configuration**.
3. Click **Next**. The “Create arrays” window opens.
4. From the list of ready drives, select the two drives that you want to group into the array.
5. Click the icon on the toolbar to add the selected drives to the array.
6. If you want to configure a hot-spare drive, complete the following steps:
 - a. Click the **Spares** tab.
 - b. Select the physical drive that you want to designate as the hot-spare drive, and the icon on the toolbar to add the selected drives.
7. Click **Next**. The “Configuration summary” window opens.
8. Review the information in the “Configuration summary” window. To change the configuration, click **Back**.
9. Click **Apply**; then, click **Yes** when asked if you want to apply the new configuration. The configuration is saved in the controller and in the physical drives.
10. Exit from ServeRAID Manager and remove the CD from the DVD-ROM drive.
11. Restart the server.

Viewing the configuration

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

Setting up the Remote Supervisor Adapter II SlimLine

You use the optional Remote Supervisor Adapter II SlimLine to obtain enhanced system management capabilities, above those of the embedded BMC. The Remote Supervisor Adapter II SlimLine has a dedicated Ethernet connection at the rear of the server.

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

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

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

Requirements

Make sure that the following Remote Supervisor Adapter II SlimLine requirements are met:

- The web interface Remote Disk function requires the client system to be running Microsoft Windows 2000 or later. The web interface Remote Control features require the Java™ 1.4 Plug-in or later. The following web browsers are supported:

- Microsoft Internet Explorer version 5.5 or later with the latest Service Pack
- Netscape Navigator version 7.0 or later
- Mozilla version 1.3 or later
- If you plan to configure Simple Network Management Protocol (SNMP) trap alerts on the Remote Supervisor Adapter II SlimLine, install and compile the management information base (MIB) on your SNMP manager.
- You will need an Internet connection to the client system to download software and firmware from the IBM Support Web site during the installation process. The Remote Supervisor Adapter II SlimLine firmware and the SNMP MIB are available on the *ServerGuide Setup and Installation* CD, the latest versions are available at <http://www.ibm.com/pc/support/>.

Cabling the Remote Supervisor Adapter II SlimLine

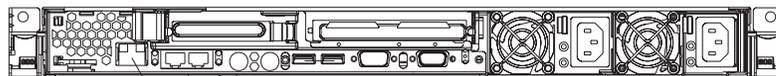
You can manage the server remotely through the Remote Supervisor Adapter II SlimLine using the dedicated Remote Supervisor Adapter II SlimLine Ethernet connector.

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

Complete the following steps to cable the Remote Supervisor Adapter II SlimLine:

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

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



Remote Supervisor Adapter II SlimLine Ethernet

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

Complete the following steps to download and install the software and firmware:

1. Go to <http://www.ibm.com/pc/support/>.
2. In the left navigation pane, click **Search PC support**.
3. In the “Search PC support” window, under **Additional search options**, in the **Restrict to this document type** field, select **Downloads and drivers**.

4. In the **Restrict to this brand** field, select **Servers**.
5. Wait for the page to automatically refresh; then, in the **Restrict to this family** field, select **xSeries 336** (the server in which the Remote Supervisor Adapter II SlimLine is installed).
6. Wait for the page to automatically refresh; then, in the **Enter search terms** field, type *system service package*. (Do not use the **Search** field at the top of the page.)
7. Click **Search**.
8. Select the system service package for the operating system that is running on the server in which the Remote Supervisor Adapter II SlimLine is installed.
9. Click the file link to download the system service package to *d:\ibmssp*, where *d* is the hard disk drive letter. (Create the directory if necessary.)
10. Extract the files into *d:\ibmssp*. See the *readme.txt* file, which is included with the extracted files, for a list of the files in the package.
11. Follow the instructions in *Remote Supervisor Adapter II Installation Instructions*, which is in Portable Document Format (PDF) in *d:\ibmssp*, to install the software and firmware.
12. Restart the server after installing the device drivers.

Completing the setup

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

- Configuring the Ethernet ports
- Defining login IDs and passwords
- Selecting the events that will receive alert notifications
- Monitoring remote server status using the Remote Supervisor Adapter II SlimLine Web-based interface
- Controlling the server remotely
- Attaching a remote diskette drive, CD-ROM 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 need to replace the adapter. For more information, see the *Remote Supervisor Adapter II User's Guide*.

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This appendix contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your xSeries or IntelliStation[®] system, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system is turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM *xSeries Documentation* CD or in the *IntelliStation Hardware Maintenance Manual* at the IBM Support Web site.
- Go to the IBM Support Web site at <http://www.ibm.com/pc/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the publications that are provided with your system and software. The information that comes with your system also describes the diagnostic tests that you can perform. Most xSeries and IntelliStation systems, operating systems, and programs come with information that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the information for the operating system or program.

Using the documentation

Information about your IBM xSeries or IntelliStation system and preinstalled software, if any, is available in the documentation that comes with your system. That documentation includes printed books, online books, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/pc/support/> and follow the instructions. Also, you can order publications through the IBM Publications Ordering System at <http://www.elink.ibm.com/public/applications/publications/cgibin/pbi.cgi>.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM xSeries and IntelliStation products, services, and support. The address for IBM xSeries information is <http://www.ibm.com/eserver/xseries/>. The address for IBM IntelliStation information is <http://www.ibm.com/pc/intellistation/>.

You can find service information for your IBM products, including supported options, at <http://www.ibm.com/pc/support/>.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with xSeries servers, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, go to <http://www.ibm.com/services/sl/products/>.

For more information about Support Line and other IBM services, go to <http://www.ibm.com/services/>, or go to <http://www.ibm.com/planetwide/> for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Hardware service and support

You can receive hardware service through IBM Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. Go to <http://www.ibm.com/planetwide/> for support telephone numbers, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

Appendix B. Notices

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Important notes

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

CD-ROM drive speeds list the variable read rate. Actual speeds vary and are often less than the maximum possible.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 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 may 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 available from IBM.

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This unit contains materials such as circuit boards, cables, electromagnetic compatibility gaskets, and connectors which may contain lead and copper/beryllium alloys that require special handling and disposal at end of life. Before this unit is disposed of, these materials must be removed and recycled or discarded according to applicable regulations. IBM offers product-return programs in several countries. Information on product recycling offerings can be found on IBM's Internet site at <http://www.ibm.com/ibm/environment/products/prp.shtml>.

IBM encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. IBM offers a variety of programs and services to assist equipment owners in recycling their IT products. Information on product recycling offerings can be found on IBM's Internet site at <http://www.ibm.com/ibm/environment/products/prp.shtml>.

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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/batteryrecycle.shtml> or contact your local waste disposal facility.

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In the Netherlands, the following applies.



For Taiwan: Please recycle batteries.



Electronic emission notices

Federal Communications Commission (FCC) statement

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

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

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Industry Canada Class A emission compliance statement

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Avis de conformité à la réglementation d'Industrie Canada

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

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

United Kingdom telecommunications safety requirement

Notice to Customers

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

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

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Power cords

For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

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For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

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

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

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

| IBM power cord part number | Used in these countries and regions |
|----------------------------|---|
| 02K0546 | China |
| 13F9940 | Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea |

| IBM power cord part number | Used in these countries and regions |
|-----------------------------------|---|
| 13F9979 | Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire |
| 13F9997 | Denmark |
| 14F0015 | Bangladesh, Lesotho, Macao, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda |
| 14F0033 | Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe |
| 14F0051 | Liechtenstein, Switzerland |
| 14F0069 | Chile, Italy, Libyan Arab Jamahiriya |
| 14F0087 | Israel |
| 1838574 | Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Costa Rica, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States of America, Venezuela |
| 24P6858 | Korea (Democratic People's Republic of), Korea (Republic of) |

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|----------------------------|---|
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Index

A

- active memory 4, 6
- activity LED 12
- attention notices 2
- availability 5

B

- baseboard management controller 4, 14
- baseboard management controller utility programs 35
- BIOS, backup 21
- boot manager 20

C

- caution statements 2
- Class A electronic emission notice 48
- command-line interface
 - commands
 - identify 36
 - power 36
 - sel 36
 - sysinfo 36
- configuration
 - configuration wizard 38
 - viewing 39
- Configuration/Setup Utility 16
- connectors 12
- controllers
 - configuring 38
 - Ethernet 23
- cooling 5

D

- danger statements 2
- Device Driver and IBM Enhanced Diagnostics CD 4
- device drivers 8
- diagnostics CD 4
- dimensions, server 3
- documentation, related 1
- drives 5
- DVD-ROM
 - DVD-eject button 9
 - DVD-ROM drive activity LED 9

E

- electrical input 3
- electronic emission Class A notice 48
- Enterprise X-Architecture technology 4
- environment 3
- Ethernet 5
- Ethernet connector 13
- expansion slots 3

F

- fans 5
- FCC Class A notice 48
- features 3
- firmware code, updating 35

H

- hardware support 44
- heat output 3
- help, getting 44
- hot-swap 9
- humidity 3

I

- IBM Director 4, 7
- important notices 2
- Information LED 10
- integrated
 - baseboard management controller utility programs 35
 - functions 3

K

- keyboard connector 12

L

- LEDs
 - link status 12
 - location 10
 - operator information panel 9
- light path diagnostics 5
- link LED 13
- link status LED 12
- local area network (LAN) 5
- location LED 10
- LSI logic setup utility 37

M

- management, system 4
- memory 4, 6
 - memory configuration 7
 - memory sparing 7
 - module specifications 3
- memory mirroring 7
- Memory ProteXion 4
- memory sparing 7
- microprocessor 5
 - features 3
- mouse connector 12

N

- noise emissions 3
- notes 2
- notes, important 46
- notices
 - electronic emission 48
 - FCC, Class A 48
- notices and statements 2

O

- online publications 2
- operator information panel 9, 10, 11
- OSA SMBridge management utility program
 - enabling and configuring 24
 - installing 33

P

- password 19
 - administrator 19
 - power-on 19
- PCI
 - slot 1 12
 - slot 2 12
- power
 - power-control button 10
 - power-control-button shield 10
 - power-on LED 13
 - requirement 3
 - supply 3
- power cords 50
- publications 1

R

- RAID configuration programs 36
- RAS features 5
- rear view 12
- redundant
 - backup power supply 12
 - cooling 5
 - Ethernet connection 5
 - NIC 5
 - power 3
- Redundant
 - Ethernet capabilities 6
 - hot-swap power supplies 6
- release latch 10
- reliability 5
- remind button 11
- Remote Supervisor Adapter II SlimLine
 - cabling 40
 - installing firmware 40
 - requirements 39
 - setting up 39
- reset button 11

S

- Safety Information v, 2
- serial connector 12
- serial over LAN
 - commands
 - connect 36
 - identify 36
 - power 36
 - reboot 36
 - sel get 36
 - sol 36
 - sysinfo 36
- server
 - dimensions 3
 - size 3
 - weight 3
- Server
 - power features 13
- ServeRAID 5
- ServeRAID Manager 38
- ServerGuide
 - features 22
 - Setup and configuration overview 22
- ServerGuide CD 4
- serviceability 5
- size, server 3
- slots
 - expansion 3
- SMP 5
- software support 44
- specifications 3
- standby mode 13
- statements and notices 2
- support
 - hardware 44
 - software 44
- symmetric multiprocessing 5
- system-error LED 10
- systems management 4, 5, 7

T

- temperature 3
- trademarks 46
- turning off the server 13
- turning on the server 13

U

- United States electronic emission Class A notice 48
- United States FCC Class A notice 48
- UpdateXpress 8
- updating the firmware code 35
- USB connector 10, 12
- using
 - baseboard management controller utility programs 35

V

video connector 12

W

Wake on LAN feature 3, 13, 14

weight, server 3

X

X-Architecture technology 4



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