

IBM

@server

326m Type 7969

User's Guide





@server

326m Type 7969

User's Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 31.

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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.

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφαλείας (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.



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

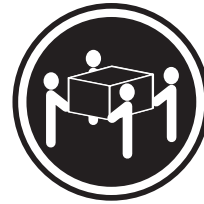
Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:

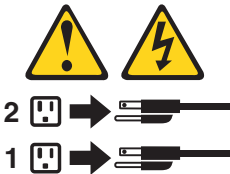
Use safe practices when lifting.

Statement 5:



CAUTION:

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



Statement 8:



CAUTION:

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



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

Statement 10:



CAUTION:

Do not place any object weighing more than 82 kg (180 lb) on top of rack-mounted devices.



>82 kg (180 lb)

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 @server 326m Type 7969 server

The IBM® @server 326m Type 7969 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 and getting service and assistance, see the *Warranty and Support Information* document.

You can obtain up-to-date information about the server at <http://www.ibm.com/us/eserver/opteron/>. You can obtain information about 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 29.

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.

- *Warranty and Support Information*

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

- *Option Installation Guide*

This document is in Portable Document Format (PDF) on the IBM @server *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 @server *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.

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.

- *Hardware Maintenance Manual and Troubleshooting Guide*

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

Depending on the server model, additional documentation might be included on the IBM @server *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. To check for updated documentation and technical updates, complete the following steps.

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

1. Go to <http://www.ibm.com/support/>.
2. Under **Search technical support**, type 7969, and click **Search**.

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 @server *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.

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

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

Table 1. Features and specifications

<p>Microprocessor:</p> <ul style="list-style-type: none"> • AMD Opteron™ processor • 1 MB Level-2 cache <p>Note: Use the Configuration/Setup Utility program to determine the type and speed of the microprocessors.</p> <p>Memory:</p> <ul style="list-style-type: none"> • Minimum: 1024 MB • Maximum: 16 GB • Type: PC3200 error correcting code (ECC), double-data rate (DDR) SDRAM, registered DIMMs with Chipkill™ memory protection • Sizes: 512 MB, 1 GB, or 2 GB DIMMs in pairs • Four interleaved slots with standard microprocessor • Four additional interleaved slots with optional microprocessor <p>Drives:</p> <ul style="list-style-type: none"> • CD: Slim IDE (standard only on some models) • Hard disk drives: <ul style="list-style-type: none"> – Slim-high 3.5-inch drives, hot-swap SCSI or non-hot-swap Serial ATA (SATA) (drive capacity and speed vary with model) – Maximum: Two <p>Expansion slots:</p> <ul style="list-style-type: none"> • Two, used in either of the following configurations: <ul style="list-style-type: none"> – One 133 MHz/64-bit PCI-X (full-length) and one PCI Express x8 (half-length) – One PCI Express x8 (half-length) and one PCI Express x8 (full length) with purchase of PCI Express x8 riser card • Supports 3.3 V or universal adapters only 	<p>Video controller:</p> <ul style="list-style-type: none"> • ATI RN50b video controller on system board • Compatible with SVGA • 16 MB DDR1 video memory <p>Power supply:</p> <p>One 411 watt (115-230 V ac)</p> <p>Size:</p> <ul style="list-style-type: none"> • Height: 43 mm (1.69 in.) • Depth: 660 mm (25.98 in.) • Width: 440 mm (17.32 in.) • Weight: approximately 12.7 kg (28 lb) when fully configured <p>Integrated functions:</p> <ul style="list-style-type: none"> • Baseboard management controller • One single-channel LSI Ultra320 SCSI controller • Two Broadcom 10/100/1000 Ethernet controllers (dual-port design) with Wake on LAN® support • Four Universal Serial Bus (USB) ports • One serial port • One video port <p>Note: The baseboard management controller is also known as the service processor.</p> <p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> • Declared sound power, idling: 6.5 bels • Declared sound power, operating: 6.5 bels <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 914 m (2998.7 ft) – Server on: 10° to 32°C (50.0° to 89.6°F). Altitude: 914 m (2998.7 ft) 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% • Airflow rates: <ul style="list-style-type: none"> – Minimum: 28 CFM – Maximum: 47 CFM 	<p>Heat output:</p> <p>Approximate heat output in British thermal units (Btu) per hour for dual multiprocessor configurations:</p> <ul style="list-style-type: none"> • Minimum configuration: 409 Btu (120 watts) • Maximum configuration: 1366 Btu (400 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: 0.120 kVA – Maximum: 0.400 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.
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What your server offers

The server uses the following features and technologies:

- **Baseboard management controller**

The baseboard management controller provides basic service-processor environmental monitoring functions. If an environmental condition exceeds a threshold or if a system component fails, the baseboard management controller lights LEDs to help you diagnose the problem.

- **IBM Enhanced Diagnostics CD**

Your server comes with an *IBM Enhanced Diagnostics CD*, which you can use to diagnose problems.

- **IBM Director**

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

- **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 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 20.

- **Integrated network support**

The server comes with two integrated Broadcom Gigabit Ethernet controllers, which support connection to a 10-Mbps, 100-Mbps, or 1-Gbps network. For more information, see “Configuring the Gigabit Ethernet controllers” on page 22.

- **Large system-memory capacity**

The memory bus in the server is enabled for up to 16 GB of system memory. The memory controller supports error correcting code (ECC) for up to eight industry-standard PC2100, PC2700 or PC3200, 3.3 V, 184-pin, 8-byte, registered, double-data-rate (DDR) synchronous dynamic random access memory (SDRAM) dual inline memory modules (DIMMs). The memory controller also provides Chipkill memory protection if all DIMMs are of the type x4. Chipkill memory protection is a technology that protects the system from a single chip failure on a DIMM.

In addition, the memory controller contains built-in technology that improves memory-to-microprocessor processing performance.

- **Symmetric multiprocessing (SMP)**

The server supports up to two AMD Opteron 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 features that a network administrator or file server can use to remotely manage and control the server.

If an optional Remote Supervisor Adapter II is installed in the server, you can view the system health; turn on, turn off, and restart the server; view the error log; view the vital product data; and send alerts over the ASM interconnect network. To order an optional Remote Supervisor Adapter II, contact your IBM marketing representative or authorized reseller.

Reliability, availability, and serviceability

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

The server has the following RAS features:

- Advanced Configuration and Power Interface (ACPI)
- Automatic restart after a power failure
- Baseboard management controller (service processor)
- Basic input/output system (BIOS) code boot-block recovery
- Chipkill memory protection
- Cooling fans with speed control
- Customer support center 24 hours per day, 7 days a week²
- Cyclic redundancy check (CRC) small computer system interface (SCSI) data bus
- Diagnostic CD
- Diagnostic LEDs on the system board
- Diagnostic support of Ethernet adapters and redundant array of independent disks (RAID) adapters
- Double-data-rate synchronous dynamic RAM (DDR SDRAM) with serial presence detect (SPD)
- Error checking and correcting (ECC) memory
- Error codes and messages
- Failover Ethernet support
- Hot-swap drive bays (some models)
- Menu-driven setup, system configuration, RAID configuration, and diagnostic programs
- Microprocessor built-in self-test (BIST)
- Monitoring support for temperatures, voltages, and fan speed
- Peripheral component interconnect (PCI) bus parity
- Power-on self-test (POST)
- Predictive Failure Analysis[®] (PFA) feature on hard disk drives
- Read-only memory (ROM) checksums
- Remote system problem-analysis support
- Status LEDs on the system board

2. Service availability will vary by country. Response time will vary depending on the number and nature of incoming calls.

- System error logging
- Upgradeable BIOS code and baseboard management controller firmware
- Vital product data (VPD), including serial-number information and replacement part numbers, stored in complementary metal oxide semiconductor (CMOS) memory, for easier remote maintenance
- Wake on LAN capability

IBM Director

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

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

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

- Advanced self-management capabilities for maximum system availability.
- Multiple operating-system platform support, including Microsoft® Windows® 2000 Server, Windows 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/servers/eserver/xseries/systems_management/sys_migration/ibmdiragent.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 the following benefits:

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

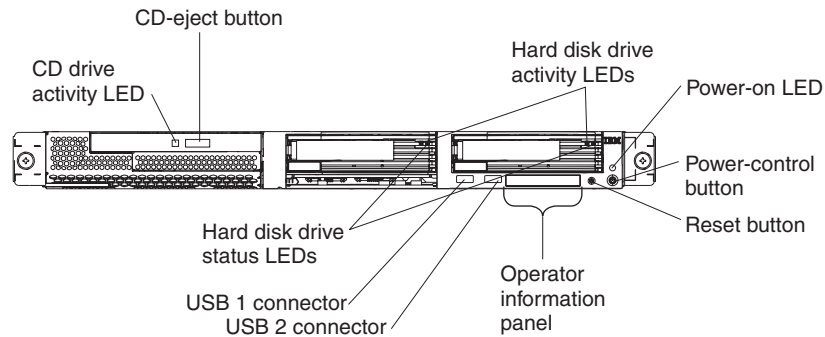
For more information about IBM Director, see the *IBM Director* CD that comes with the server, the IBM Director documentation on the CD, and the IBM xSeries® Systems Management Web page at http://www.ibm.com/servers/eserver/xseries/systems_management/xseries_sm.html, which presents an overview of IBM Systems Management and IBM Director.

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.



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

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

Hard disk drive activity LEDs: When one of these LEDs is flashing, it indicates that the associated SCSI hard disk drive is in use.

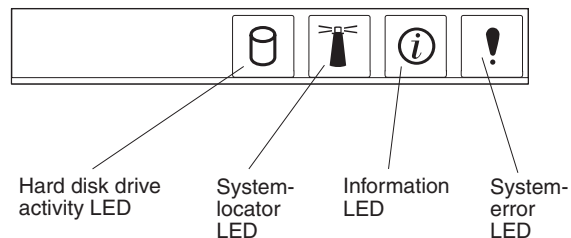
Power-on LED: When this LED is lit and not flashing, it indicates that the server is turned on. When this LED is flashing, it indicates that the server is turned off and still connected to an ac power source. When this LED is off, it indicates that ac power is not present, or the power supply or the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

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.

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



The following LEDs are on the operator information panel:

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

- **System-locator LED:** Use this blue LED to visually locate the server if it is in a location with numerous other servers. If your server supports IBM Director, you can use IBM Director to light this LED remotely.
- **Information LED:** When this LED is lit, it indicates that a noncritical event has occurred and is recorded in the error log. An LED near the failing component on the system board is also lit to help isolate the error.
- **System-error LED:** When this 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 near the failing component on the system board is also lit to help isolate the error.

USB connectors: Connect a USB device to either of these connectors.

Important: If a Remote Supervisor Adapter II is installed in the server, the USB 1 connector is disabled.

Notes:

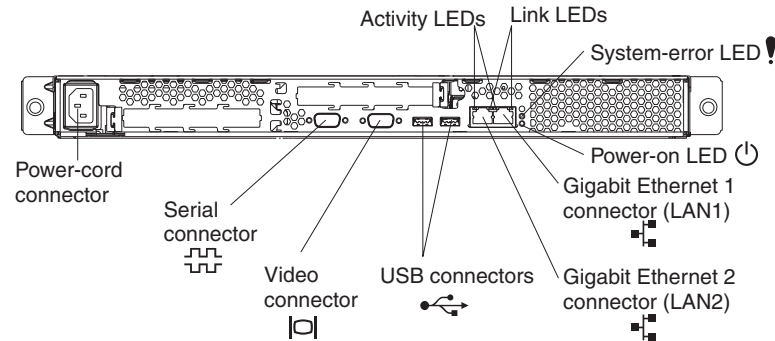
1. If you want to attach a keyboard or mouse to this server, you must use a USB keyboard or a USB mouse. For detailed information about the USB keyboard and how to connect it to your server, see the documentation that comes with the USB keyboard.
2. The server supports keyboardless operation. If a USB keyboard is not connected to the server, when the server is turned on or restarted, error message 301 will appear during POST. No action is required. POST will continue within one minute.
3. You must use an external USB diskette drive if:
 - You want to attach a diskette drive to this server.
 - You need to create an update diskette that contains the latest baseboard management controller firmware (see “Using the baseboard management controller firmware update program” on page 27).
 - You need to create update diskettes that contain the latest server BIOS code (see “Updating the BIOS code” on page 19).

Hard disk drive status LEDs: On some server models, each hot-swap hard disk drive has a status LED. If the status LED for a drive is lit continuously, that individual drive is faulty. The interpretation of a flashing status LED depends on the SCSI controller that is connected to the hot-swap drive, as follows:

- When the drive is connected to the integrated SCSI controller with RAID capabilities, a flashing status LED indicates that the drive is a secondary drive in a mirrored pair and the drive is being synchronized.
- When the drive is connected to an optional ServeRAID™ controller, a slowly flashing (one flash per second) status LED 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.

Rear view

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



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

Activity LEDs (Ethernet): These green LEDs are on the dual Ethernet connector. When either LED flashes, it indicates that data is being transmitted or received between the server and the network device that is connected to the left or right connector. The flashing frequency is proportional to the amount of traffic on the network link.

Link LEDs (Ethernet): These LEDs are on the dual Ethernet connector. When either LED is lit, it indicates that there is an active link between the server and the network device that is connected to the left or right connector.

System-error LED: When this LED is lit, it indicates that a system error has occurred. An LED near the failing component on the system board is also lit to help isolate the error. A system-error LED is also on the front of the server.

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

Gigabit Ethernet 1 (LAN 1) connector: Use this connector to connect the server to a network.

Gigabit Ethernet 2 (LAN 2) connector: Use this connector to connect the server to a network.

USB connectors: Connect a USB device to either of these connectors.

Video connector: Connect a monitor to this connector.

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

If an optional Remote Supervisor Adapter II (system-management adapter) is installed in PCI-X slot 1, the server has additional connectors and LEDs. See the documentation that comes with the adapter for more information about these connectors and LEDs.

Server power features

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

Turning on the server

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

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

- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If an optional Remote Supervisor Adapter II is installed in the server, the server can be turned on from the Remote Supervisor Adapter II user interface.
- 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 server can respond to requests from the service processor, such as a remote request to turn on the server. While the server remains connected to ac power, one or more fans might continue to run. To remove all power from the server, you must disconnect it from the power source.

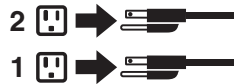
Some operating systems require an orderly shutdown before you turn off the server. See your operating-system documentation for information about shutting down the operating system.

Statement 5:



CAUTION:

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



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

- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if your operating system supports this feature.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- If an optional Remote Supervisor Adapter II is installed in the server, the server can be turned off from the Remote Supervisor Adapter II user interface.
- The service processor 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 the server:

- **Configuration/Setup Utility program**

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

- **IBM ServerGuide Setup and Installation CD**

The ServerGuide program provides software-setup tools and installation tools that are designed for your 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 20.

- **RAID configuration programs**

- **LSI Logic Configuration Utility program**

Use the LSI Logic Configuration Utility program 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 Configuration Utility program” on page 24.

- **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 25.

- **Ethernet controller configuration**

For information about configuring the Ethernet controllers, see “Configuring the Gigabit Ethernet controllers” on page 22.

- **Baseboard management controller firmware update utility program**

For information about updating the baseboard management controller firmware, see “Using the baseboard management controller firmware update program” on page 27.

- **IBM Director**

IBM Director is a workgroup-hardware-management tool that you can use to centrally manage the server. If you plan to use IBM Director to manage the server, you must check for the latest applicable IBM Director updates and interim fixes. For information about updating IBM Director, see “Updating IBM Director” on page 23. For more information about IBM Director, see the IBM Director documentation on the *IBM Director* CD that comes with the server.

Using the Configuration/Setup Utility program

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

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time

- Set and change passwords
- Set and change the startup characteristics of the server and the order of startup devices (startup-drive sequence)
- Set and change settings for advanced hardware features
- View, set, and change settings for power-management features
- View and clear error logs
- Change interrupt request (IRQ) settings
- Resolve configuration conflicts

Starting the Configuration/Setup Utility program

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

1. Turn on the server.
2. When the prompt Press F1 for Configuration/Setup appears, press F1. If you have set both a user (power-on) password and a supervisor (administrator) password, you must type the supervisor password to access the full Configuration/Setup Utility menu. If you do not type the supervisor password, a limited Configuration/Setup Utility menu is available.
3. Follow the instructions on the window.
4. 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 your 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.

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

- **Product Data**

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

You can enable or disable integrated SCSI and Ethernet controllers and all standard ports (such as serial and parallel). **Enable** is the default setting for all controllers. If you disable a device, it cannot be configured, and the operating system will not be able to detect it (this is equivalent to disconnecting the device). If you disable the integrated SCSI controller with RAID capabilities 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.

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 17 for more information.

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

- **User Password**

Select this choice to set or change a user password. See “User password” on page 18 for more information.

- **Supervisor Password**

Select this choice to set or change a supervisor password. A supervisor password is intended to be used by a system administrator; it limits access to the full Configuration/Setup Utility menu. If a supervisor password is set, the full Configuration/Setup Utility menu is available only if you type the supervisor password at the password prompt. See “Supervisor password” on page 18 for more information.

- **Start Options**

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

You can specify whether the server starts with the keyboard number lock on or off, whether it uses a streamlined startup process (**Quickboot mode**), and whether it displays diagnostic screens during startup (**Boot Diagnostic Screen**). The diagnostic screens show the memory count and devices found, as well as any errors encountered.

You can enable or disable legacy USB support (legacy USB support enables a non-USB-aware operating system such as DOS or UNIX® to recognize the USB keyboard and mouse).

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. You can select up to four startup devices through the **Startup Sequence** menu.

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

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

- **Advanced Setup**

Select this choice to change settings for advanced hardware features. You can also select this choice to view the system event log information, such as the record, event type, and timestamp.

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

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

- **Chipset Configuration**

Select this choice to view and change the **4GB Memory Hole Adjust** and **4GB Memory Hole Size** settings. You can only change the **4GB Memory Hole Size** value if the **4GB Memory Hole Adjust** value is set to **Manual**.

Also select **Chipset Configuration** to enable or disable other memory configuration values, such as **ECC** and **ECC SDRAM**.

- **Power Management**

Select this choice to view, set, and change the following power-management features for the server:

- **Resume On Modem Ring**
- **Wake up by LAN**
- **Resume On Time**
- **Resume Date**
- **Resume Time**
- **After Power Failure**

To use some of these features, such as **Wake up by LAN**, the server must contain Wake on LAN hardware and software, and your operating system must support Wake on LAN functions.

To cause the server to resume on a predetermined date and time, select **Resume On Time**; then, use **Resume Date** and **Resume Time** to specify the date and time.

Use the **After Power Failure** choice to specify whether the server should stay off or resume when power is restored after a power failure.

- **Console Redirection**

Select this choice to view and change the settings for the serial connection used to redirect the local keyboard-video-mouse console to a remote console.

You must set the **Console Redirection** value to **On-board COM A** to see any of the other values on this screen. The default value is **Disabled**.

Note: The FIFO level is a buffer setting that is used by the baseboard management controller for data transmission. A value of 14 (the default) is required for a Serial over LAN connection and is preferred for other types of connection. Leave the setting at 14. See “Configuring console redirection” on page 20 for more information about configuring and establishing the console-redirection connection.

- **Baseboard Management Controller**

Select this choice to view and change the settings for the baseboard management controller. The baseboard management controller is also known as the service processor.

You can view the firmware levels of the Intelligent Platform Management Interface specification and the baseboard management controller, change the setting for the COM port the baseboard management controller uses, enable or disable the BIOS POST watchdog, and view the system event log.

- **Error Logs**

- **POST Error Log**

- Select this choice to view the three most recent error codes and messages that the system generated during POST. You can use the arrow keys to move between pages in the error log. Select **Clear error logs** to clear the POST error log.

- **System Error Log**

- If an optional Remote Supervisor Adapter II is installed, a system error log is created which contains the full text of the error messages. You can use the arrow keys to move between pages in the error log. Select **Clear error logs** to clear the system error log.

- Run the diagnostic program on the server to get more information about any error codes that might occur. See the *Hardware Maintenance Manual and Troubleshooting Guide* for instructions.

- **Save Settings**

- Select this choice to save the changes you have made in the settings.

- **Restore Settings**

- Select this choice to cancel the changes you have made in the settings and restore the previous settings.

- **Load Default Settings**

- Select this choice to cancel the changes you have made in the settings and restore the factory settings.

- **Exit Setup**

- Select this choice to exit from the Configuration/Setup Utility program. If you have not saved the changes you have made in the settings, you are asked whether you want to save the changes or exit without saving them.

Passwords

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

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

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

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

User password

If a user (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 user 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 user password.

When a user password is set, POST is not completed until you type the password. If you forget the user password, you can regain access to the server in any of the following ways:

- If a supervisor password is set, type the supervisor password at the password prompt (see “Supervisor password”). Start the Configuration/Setup Utility program and reset the user password.
- Remove the server battery and then reinstall it. See the *Option Installation Guide* on the IBM @server *Documentation* CD for instructions for removing the battery.
- Change the position of the clear CMOS (password override) jumper (JBAT1) on the system board to bypass the user password check. See “Resetting passwords” for additional information.

Supervisor password

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

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

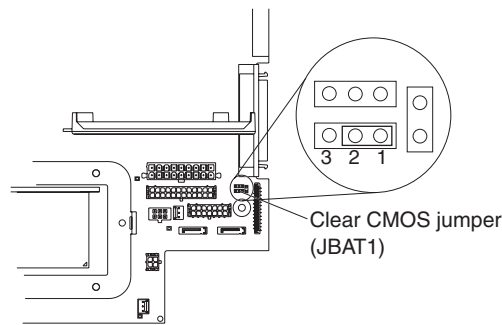
Resetting passwords

If you forget the user or supervisor password, you can change the position of the clear CMOS jumper (JBAT1) on the system board to bypass the user or supervisor password check. This enables you to reset these passwords. The jumper location is shown in 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 book.

To change the position of the clear CMOS jumper and reset the user and supervisor passwords, complete the following steps:

1. Review the safety information beginning on page v.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables; then, remove the cover. See the section about removing the server cover and bezel in the *Option Installation Guide* on the IBM @server Documentation CD.
3. Move the jumper on JBAT1 from pins 1 and 2 (the default) to pins 2 and 3 to bypass the user and supervisor password check and to clear CMOS.



4. Replace the cover, connect the server to a monitor, and then connect it to a power source.
5. Turn on the server and wait until POST is completed.
6. Turn off the server and disconnect all power cords and external cables; then, remove the cover.
7. Move the jumper on JBAT1 from pins 2 and 3 to pins 1 and 2.
8. Replace the cover, connect the server to a USB keyboard, monitor, USB mouse, and peripheral devices; then, connect the server to a power source.
9. Reset the user and supervisor passwords:
 - a. Turn on the server and watch the monitor screen.
 - b. When the prompt Press F1 for Configuration/Setup appears, press F1.
 - c. Select **System Security** on the main menu.

Updating the BIOS code

Important: For correct server operation, be sure to update the baseboard management controller firmware before updating the BIOS code. For more information, see “Using the baseboard management controller firmware update program” on page 27.

The most current level of BIOS code is available at <http://www.ibm.com/support/>. After you make sure that your server has the latest baseboard management controller firmware level, you can update the BIOS code on your server through one of the following methods:

- Downloading the latest BIOS code from this IBM Web site, creating an update diskette, and using an external USB diskette drive to install the BIOS code.
- Installing an update package for the Linux or Microsoft Windows operating system, if available.

Configuring console redirection

To establish a console-redirection connection on the server, use the Configuration/Setup Utility program to configure the type of connection you need.

To configure console redirection using Serial over LAN, complete the following steps:

1. Enable console redirection (select **Advanced Setup --> Console Redirection**, set the **Console Redirection** value to **On-board COM A**, and make sure that the **FIFO Level** value is **14**).
2. Set the COM port that is used by the baseboard management controller to use a command-line interface (select **Advanced Setup --> Baseboard Management Controller** and set the **COM port on BMC** value to **CLI**).

To configure console redirection using serial only, complete the following steps:

1. Enable console redirection (select **Advanced Setup --> Console Redirection** and set the **Console Redirection** value to **On-board COM A**).
2. Disable the COM port that the baseboard management controller uses (select **Advanced Setup --> Baseboard Management Controller** and set the **COM port on BMC** value to **Disabled**).

To initiate console redirection, on the client computer, run a Telnet application, such as HyperTerminal, and run an Intelligent Platform Management Interface (IPMI) application that establishes an IPMI session with the server.

Using the ServerGuide Setup and Installation CD

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

Notes:

1. The ServerGuide program works only with 32-bit Windows operating systems.
2. If you are installing a Linux operating system on your server, you can use ServerGuide to set up and configure your hardware; then, install a Linux operating system using the procedure in "Installing your operating system without using ServerGuide" on page 22.

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/servers/eserver/xseries/systems_management/sys_migration/serverguide/sub.html.

The ServerGuide program has the following features:

- An easy-to-use interface
- Diskette-free setup, and configuration programs that are based on detected hardware

- 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 drive. In addition to the *ServerGuide Setup and Installation* CD, you must have your operating-system CD to install the operating system.

The ServerGuide program performs the following tasks:

- Sets system date and time
- Detects the SCSI RAID adapter, controller, or integrated 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 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

The ServerGuide program can reduce the time it takes to install an operating system. It provides the device drivers that are required for your hardware and for

the operating system that you are installing. This section describes a typical ServerGuide operating-system installation.

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

1. After you have completed the setup process, the operating-system installation program starts. (You will need your operating-system CD to complete the installation.)
2. The ServerGuide program stores information about the server model, service processor, hard disk drive controllers, and network adapters. Then, the program checks the CD for newer device drivers. This information is stored and then passed to the operating-system installation program.
3. The ServerGuide program presents operating-system partition options that are based on your operating-system selection and the installed hard disk drives.
4. The ServerGuide program prompts you to insert your operating-system CD and restart the server. At this point, the installation program for the operating system takes control to complete the installation.

Installing your operating system without using ServerGuide

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

Note: If you are installing a 32-bit Windows operating system on the server, you can install your operating system using the *ServerGuide Setup and Installation* CD that comes with your server (see “Using the ServerGuide Setup and Installation CD” on page 20.)

1. Go to <http://www.ibm.com/support/>.
2. Under **Search technical support**, type 7969, and click **Search**.
3. Select the installation instructions for your operating system.

Configuring the Gigabit Ethernet controllers

The two 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. To find updated information about configuring the controllers, complete the following steps.

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

1. Go to <http://www.ibm.com/support/>.
2. Under **Search technical support**, type 7969, and click **Search**.

3. In the **Additional search terms** field, type ethernet, and click **Go**.

Note: To use the Wake on LAN features that appear on the configuration menu, your server must contain Wake on LAN hardware and software and your operating system must support Wake on LAN functions.

The Ethernet controllers support optional modes, such as teaming, priority packets, load balancing, fault tolerance, and virtual LANs, which provide higher performance, security, and throughput for the server. These modes apply to the integrated Ethernet controllers and to the controllers on supported Ethernet adapters.

Updating IBM Director

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

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

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

1. Check for the latest version of IBM Director:
 - a. Go to http://www.ibm.com/servers/eserver/xseries/systems_management/xseries_sm/dwnl.html.
 - b. If the drop-down list shows a newer version of IBM Director than what comes with the server, follow the instructions on the Web page to download the latest version.
2. Install IBM Director.
3. Download and install any applicable updates or interim fixes for the server:
 - a. Go to <http://www.ibm.com/support/>.
 - b. Click **Downloads and drivers**.
 - c. From the **Category** list, select **xSeries (Intel and AMD processor-based)**.
 - d. From the **Sub-category** list, select **eServer 326m** and click **Continue**.
 - e. In the **Search within results** field, type director and click **Search**.
 - f. Select any applicable update or interim fix that you want to download.
 - g. Click the link for the executable (.exe) file to download the file, and follow the instructions in the readme file to install the update or interim fix.
 - h. Repeat steps 3f and 3g for any additional updates or interim fixes that you want to install.

Using the RAID configuration programs

Use the LSI Logic Configuration 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 book.

- Use the LSI Logic Configuration Utility program to:
 - Perform a low-level format on a SCSI hard disk drive
 - 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) is available from <http://www.ibm.com/support/>.

When you are using the LSI Logic Configuration Utility program and ServeRAID Manager to configure and manage arrays, consider the following information:

- The integrated SCSI controller with RAID capabilities in the server supports only RAID level-1 with a hot-spare drive installed. Installing an optional ServeRAID controller provides additional RAID levels.
- When you create a RAID level-1 (mirrored) pair, all drives must be on the same channel.
- Hard disk drive capacities affect how you create arrays. The drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.
- You can set up a mirror after the operating system is installed on the primary drive only if you are using an integrated SCSI controller with RAID capabilities. You must 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 code 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 Configuration Utility program

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

- Perform a low-level format of a SCSI hard disk drive
- Set a SCSI device scan order
- View or change SCSI IDs for attached devices
- Create a mirrored pair of SCSI hard disk drives with or without a hot-spare drive
- Set SCSI protocol parameters on SCSI hard disk drives

The integrated SCSI controller with RAID capabilities supports redundant array of independent disks (RAID) arrays. You can use the LSI Logic Configuration Utility program to configure RAID level 1 for a single pair of attached devices. If you install a different type of RAID adapter, follow the instructions in the documentation that comes with the adapter to view or change SCSI settings for attached devices.

The following sections provide instructions for starting the LSI Logic Configuration Utility program and performing selected functions.

Starting the LSI Logic Configuration Utility program

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

1. Turn on the server.

2. When the prompt <<< Press <CTRL><C> to start LSI Logic Configuration Utility >>> appears, press Ctrl+C. If you have set an administrator password, you are prompted to type the password.
3. To select a controller (channel) from the list of adapters, use the arrow keys and press Enter.
4. To change the settings of the selected items, follow the instructions on the screen. If you select **Device Properties** or **Mirroring Properties**, additional screens are displayed.

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

Formatting a SCSI hard disk drive

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

Note: Before you format a SCSI hard disk, make sure that the disk is not part of a mirrored pair. From the list of adapters, select the controller (channel) for the drive that you want to format. Select **Mirroring Properties** and make sure that the mirroring value for the drive is **None**.

To format a drive, complete the following steps:

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

Using ServeRAID Manager

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

- Configure a redundant array of independent disks (RAID) array
- Erase all data from a SCSI hard disk drive and return the disk to the factory-default settings
- View the RAID configuration and associated devices
- Monitor the operation of the RAID 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 method that is described in the instructions that come with the adapter to view or change SCSI settings for attached devices.

For additional information about RAID technology and instructions for using ServeRAID Manager to configure the integrated SCSI controller with RAID capabilities, see the ServeRAID documentation on the *IBM ServeRAID Support CD*. 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 the operating system. The information in this section assumes that you are running ServeRAID Manager in Startable CD mode.

To run ServeRAID Manager in Startable CD mode, turn on the server; then, insert the CD into the CD 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: To use express configuration, complete the following steps:

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

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

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

Using the baseboard management controller firmware update program

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

Important: For correct server operation, be sure to update the baseboard management controller firmware before updating the BIOS code.

To download the program, go to <http://www.ibm.com/support/>, and click **Downloads and drivers**; then, copy the EXE file to a firmware update diskette or copy the ISO file to a firmware update CD.

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

- If the Linux or Windows operating-system update package is available from the World Wide Web and you have obtained it, follow the instructions that come with the package.
- If you are using a diskette or CD, complete the following steps.

Important: If you are using a diskette to update the firmware, you must have an external USB diskette drive attached to the server.

1. Turn off the server.
2. Insert the firmware update diskette into the diskette drive or insert the firmware update CD into the CD drive.
3. Turn on the server.

Note: If the server does not start from the external USB diskette drive, use the Configuration/Setup Utility program to configure the external USB diskette drive as a startup device. (For information about the Configuration/Setup Utility program, see the *User's Guide* on the IBM @server *Documentation* CD.) Then, start again at step 1 of this procedure.

If there is an error in updating the firmware, try the update again.

Configuring the baseboard management controller LAN connection

To configure the baseboard management controller local area network (LAN) connection options for the server, use the LAN configuration utility (lancfg.exe). This utility is on the baseboard management controller firmware update diskette. You can start the LAN configuration utility after you update the baseboard management controller firmware. See “Using the baseboard management controller firmware update program” on page 27 for instructions for downloading and updating the baseboard management controller firmware.

To configure the baseboard management controller LAN connection by using the LAN configuration utility, complete the following steps.

Note: You must run the LAN configuration utility (lancfg.exe) in a DOS command-line session after you start the server from the startable baseboard management controller firmware update diskette. Do not run the utility from a DOS window.

1. After the baseboard management controller firmware update is completed, a command prompt is displayed. Type `lancfg` and press Enter. The LAN configuration utility starts, and the BMC Information screen is displayed. The default values that are displayed are read-only. You cannot make changes in this screen.

To use the LAN configuration utility, press F10 and use the arrow keys to select the menu items at the top of the window.

2. Select **LanCfg**. The LAN Configuration screen is displayed. Type the values for the baseboard management controller in the fields and select **OK**.

Note: The **Host MAC Address** field is read-only and cannot be changed from the LAN configuration utility.

3. Select **Alert**. The Alert Setting screen is displayed. Type the applicable values for the server in the fields and select **OK**.

Note: In the **IP Address** field, type the IP address of the workstation to which the baseboard management controller will forward alerts.

4. Select **Security**. The Security Setting screen is displayed. You can maintain the four baseboard management controller user accounts on this screen. To make changes on this screen, select **Edit**, type your changes in the Edit screen, and select **OK**.
5. After you make all the changes and before you exit the LAN configuration utility, remove the firmware update diskette from the diskette drive.
6. Select **Exit**. When you are prompted to restart the server, select **Reboot**.

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 @server® or IntelliStation® system or optional device, 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 and any optional devices are 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* or *Problem Determination and Service Guide* on the IBM Documentation CD that comes with your system.

Note: For some IntelliStation models, the *Hardware Maintenance Manual and Troubleshooting Guide* is available only from the IBM support Web site.

- Go to the IBM support Web site at <http://www.ibm.com/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 documentation that is provided with your IBM product. The documentation that comes with @server and IntelliStation systems also describes the diagnostic tests that you can perform. Most @server and IntelliStation systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Using the documentation

Information about your IBM @server or IntelliStation system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/support/> and follow the instructions. Also, some documents are available through the IBM Publications Center at <http://www.ibm.com/shop/publications/order/>.

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 @server and IntelliStation systems, optional devices, services, and support. The address for IBM xSeries and BladeCenter® information is <http://www.ibm.com/eserver/xseries/>. The address for IBM IntelliStation information is <http://www.ibm.com/us/intellistation/>.

You can find service information for IBM systems and optional devices at <http://www.ibm.com/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, BladeCenter products, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, see <http://www.ibm.com/services/sl/products/>.

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

Hardware service and support

You can receive hardware service through IBM Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. See <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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Processor speeds indicate the internal clock speed of the microprocessor; other factors also affect application performance.

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When referring to processor storage, real and virtual storage, or channel volume, KB stands for 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.

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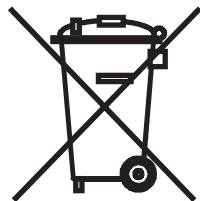
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