



Hardware Maintenance Manual  
xSeries 360 Type 8686







@server

Hardware Maintenance Manual  
xSeries 360 Type 8686

**Note:**

Before using this information and the product it supports, be sure to read the general information under “Notices” on page 178.

**Eighth Edition August 2004**

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## About this manual

This manual contains diagnostic information, a Symptom-to-FRU index, service information, error codes, error messages, and configuration information for the IBM® @server xSeries® 360, Type 8686.

**Important:** This manual is intended for trained servicers who are familiar with IBM xSeries products.

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## Important safety information

Be sure to read all caution and danger statements in this book before performing any of the instructions.

Leia todas as instruções de cuidado e perigo antes de executar qualquer operação.

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」。

Prenez connaissance de toutes les consignes de type Attention et

Danger avant de procéder aux opérations décrites par les instructions.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Accertarsi di leggere tutti gli avvisi di attenzione e di pericolo prima di effettuare qualsiasi operazione.

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.

Lea atentamente todas las declaraciones de precaución y peligro ante de llevar a cabo cualquier operación.

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**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.***

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## Online support

You can download the most current diagnostic, BIOS flash, and device driver files from <http://www.ibm.com/pc/support> on the World Wide Web.



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## General checkout

The server diagnostic programs are stored in upgradable read-only memory (ROM) on the system board. These programs are the primary method of testing the major components of a server. Major components that can be tested include the system board, Ethernet controller, video controller, RAM, keyboard, mouse (pointing device), diskette drive, serial ports, hard drives, and parallel port. Not all servers include all of these items; your hardware might differ. You can also use the diagnostic programs to test some external devices. See “Diagnostic programs and error messages” on page 15.

If you cannot determine whether a problem is caused by the hardware or by the software, you can run the diagnostic programs to confirm that the hardware is working properly.

When you run the diagnostic programs, a single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After the cause of the first error message is corrected, the other error messages might not occur the next time you run the test.

A failed server might be part of a shared DASD cluster (two or more servers sharing the same external storage device(s)). Prior to running diagnostics, verify that the failing server is not part of a shared DASD cluster.

A server might be part of a cluster if:

- The customer identifies the server as part of a cluster.
- One or more external storage units are attached to the server and at least one of the attached storage units is additionally attached to another server or unidentifiable source.
- One or more servers are located near the failing server.

If the failing server is suspected to be part of a shared DASD cluster, all diagnostic tests can be run except diagnostic tests which test the storage unit (DASD residing in the storage unit) or the storage adapter attached to the storage unit.

### Notes:

1. For servers that are part of a shared DASD cluster, run one test at a time in looped mode. Do not run all tests in looped mode, as this could enable the DASD diagnostic tests.
2. If multiple error codes are displayed, diagnose the first error code displayed.
3. If the server stops working with a POST error, go to “Symptom-to-FRU index” on page 115.
4. If the server stops working and no error is displayed, go to “Undetermined problems” on page 143.
5. For information about power supply problems, see “Power supply LED errors” on page 133.
6. For safety information, see “Safety information” on page 145.
7. For intermittent problems, check the error log; see “Error logs” on page 14.

**001 IS THE SERVER PART OF A CLUSTER?**

**YES.** Schedule maintenance with the customer. Shut down all servers related to the cluster. Run storage test.

**NO.** Go to step **002** .

**002 IF THE SERVER IS NOT PART OF A CLUSTER:**

- Turn off the server and all external devices.
- Check all cables and power cords.
- Set all display controls to the middle position.
- Turn on all external devices.
- Turn on the server.
- Record any POST error messages displayed on the screen. If an error is displayed, look up the first error in the “POST error codes” on page 134.
- Check the diagnostic LED panel system error LED; if on, see “Level 2 Light Path Diagnostics” on page 19.
- Check the System Error Log. If the server recorded an error, see “Symptom-to-FRU index” on page 115.
- Start the diagnostic programs. See “Diagnostic programs and error messages” on page 15.
- Check for the following responses:
  1. One beep.
  2. Readable instructions or the Main Menu.

**003 DID YOU RECEIVE BOTH OF THE CORRECT RESPONSES?**

**NO.** Find the failure symptom in “Symptom-to-FRU index” on page 115.

**YES.** Run the diagnostic programs. If necessary, see “Diagnostic programs and error messages” on page 15.

If you receive an error, go to “Symptom-to-FRU index” on page 115.

If the diagnostics completed successfully and you still suspect a problem, see “Undetermined problems” on page 143.

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## Features overview

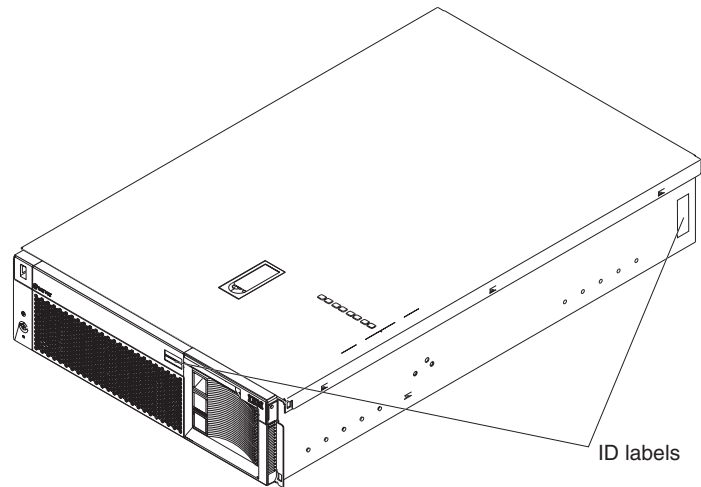
The IBM @server xSeries 360 server, which features IBM X-Architecture technology, is a high-performance rack model server that can be upgraded to a symmetric multiprocessing (SMP) server. It is ideally suited for networking environments that require superior microprocessor performance, efficient memory management, flexibility, and large amounts of reliable data storage.

Performance, ease of use, reliability, and expansion capabilities are key features of the server. These design features make it possible for you to customize the hardware to meet your needs today, while providing flexible expansion capabilities for the future.

If you have access to the World Wide Web, you can obtain up-to-date information about the server model and other IBM server products at <http://www.ibm.com/eserver/xseries/>.

The machine type, model number, and serial number are on the ID labels, one located on the bezel to the left of the CD-ROM drive and the other at the rear of the right side, as shown in the following illustration.

**Note:** The illustrations in this document might differ slightly from your hardware.



## Features and specifications

The following table provides a summary of the features and specifications for the xSeries 360 server.

Table 1. Features and Specifications

<p><b>Microprocessor:</b></p> <ul style="list-style-type: none"> <li>Intel® Xeon™ Processor MP (frequency varies with server model; each MP processor functions as two logical processors) <ul style="list-style-type: none"> <li>Minimum: two</li> <li>Maximum: four</li> </ul> </li> <li>Level-3 cache size varies with model</li> <li>100 MHz front-side bus (FSB)</li> </ul> <p><b>Chipset:</b></p> <p>IBM XA-32™ Chipset with integrated memory, I/O controller, and remote I/O controller. <b>Memory:</b></p> <ul style="list-style-type: none"> <li>DDR registered SDRAM DIMMs with ECC and Chipkill™™ memory <ul style="list-style-type: none"> <li>Minimum: 512 MB</li> <li>Maximum: 8 GB</li> </ul> </li> <li>Slots: Interleaved, 8 slots</li> </ul> <p><b>Drives standard:</b></p> <ul style="list-style-type: none"> <li>Slim diskette: 1.44 MB</li> <li>Slim CD-ROM: 24X-10X IDE</li> </ul> <p><b>Hard disk drives:</b></p> <ul style="list-style-type: none"> <li>Slim-high hot-swap drives. (number of drives and drive capacity vary with model)</li> <li>Maximum: Three</li> </ul> <p><b>Active PCI™ expansion slots:</b></p> <ul style="list-style-type: none"> <li>Two 100 MHz/64-bit PCI-X</li> <li>Four 66 MHz/64-bit PCI-X</li> </ul> <p><b>Hot-swap power supplies:</b></p> <p>370 W (115-230 V ac)</p> <ul style="list-style-type: none"> <li>Minimum: One or two power supplies are shipped with server, depending on model</li> <li>Maximum: Three</li> </ul>	<p><b>Hot-swap cooling:</b></p> <p>Six hot-swap fans <b>Video:</b></p> <ul style="list-style-type: none"> <li>S3 video controller</li> <li>Compatible with SVGA 4</li> <li>8 MB SDRAM video memory</li> </ul> <p><b>Size (3 U)</b></p> <ul style="list-style-type: none"> <li>Height: 134 mm (5.28 in.)</li> <li>Depth: 720 mm (28.35 in.)</li> <li>Width: 440 mm (17.32 in.)</li> <li>Weight: 25 kg (55 lb) to 31.7 kg (70 lb) depending upon configuration</li> </ul> <p><b>Integrated functions:</b></p> <ul style="list-style-type: none"> <li>Light Path Diagnostics™</li> <li>Ultra160 SCSI controller</li> <li>One 10BASE-T/100BASE-TX Intel Ethernet controller</li> <li>Remote Supervisor Adapter (service processor) <ul style="list-style-type: none"> <li>ASM interconnect (peer-to-peer) port</li> <li>RXE Expansion port</li> <li>RXE management port</li> <li>Ethernet port</li> <li>Serial port</li> </ul> </li> <li>Three universal serial bus ports</li> <li>Keyboard port</li> <li>Mouse port</li> <li>Video port</li> <li>Serial port (uses the serial cable that comes with the server to provide a serial connector on the rear of the server in the position usually occupied by an adapter in PCI slot 6)</li> </ul> <p><b>Acoustical noise emissions:</b></p> <ul style="list-style-type: none"> <li>Sound power, idling: 6.3 bel maximum</li> <li>Sound power, operating: 6.3 bel maximum</li> <li>Sound pressure, operating: 47 dBA maximum</li> </ul>	<p><b>Environment:</b></p> <ul style="list-style-type: none"> <li>Air temperature: <ul style="list-style-type: none"> <li>Server on: 10° to 35°C (50° to 95°F). Altitude: 0 to 914 m (3000 ft)</li> <li>Server on: 10° to 32°C (50° to 89.6°F). Altitude: 914 m (3000 ft) to 2133 m (7000 ft)</li> <li>Server off: 10° to 43°C (50° to 110°F). Maximum altitude: 2133 m (7000 ft)</li> </ul> </li> <li>Humidity: <ul style="list-style-type: none"> <li>Server on: 8% to 80%</li> <li>Server off: 8% to 80%</li> </ul> </li> </ul> <p><b>Heat output:</b></p> <p>Approximate heat output in British thermal units (Btu) per hour</p> <ul style="list-style-type: none"> <li>Minimum configuration: 1232 Btu (0.36 kilowatts)</li> <li>Maximum configuration: 3566 Btu (1.045 kilowatts)</li> </ul> <p><b>Electrical input:</b></p> <ul style="list-style-type: none"> <li>Sine-wave input (50-60 Hz) required</li> <li>Input voltage low range: <ul style="list-style-type: none"> <li>Minimum: 100 V ac</li> <li>Maximum: 127 V ac</li> </ul> </li> <li>Input voltage high range: <ul style="list-style-type: none"> <li>Minimum: 200 V ac</li> <li>Maximum: 240 V ac</li> </ul> </li> <li>Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> <li>Minimum: 0.08 kVA (ac power connected, server off)</li> <li>Minimum: 0.38 kVA (dc power on, server idle)</li> <li>Maximum: 1.1 kVA</li> </ul> </li> </ul>
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## Notices and statements used in this book

The caution and danger statements used in this book also appear in the multilingual *Safety Information* book, provided on the *Documentation* CD. Each caution and danger statement is numbered for easy reference to the corresponding statements in the safety book.

The following types of notices and statements are used in this book:

- Note:** These notices provide important tips, guidance, or advice.
- Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.

- **Attention:** These notices indicate possible 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.

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## What the xSeries 360 offers

The design of the server takes advantage of advancements in symmetric multiprocessing (SMP), data storage, disk-array technologies, and memory management. The server combines:

- **X-Architecture technology**  
X-Architecture technology is an IBM design blueprint that takes full advantage of existing IBM technologies to build powerful, scalable, and reliable Intel processor-based servers.  
For more information about X-Architecture technology, go to the Web at <http://www.pc.ibm.com/us/eserver/xseries/xarchitecture/index.html>.
- **Impressive performance using an innovative approach to SMP**  
The server supports up to four Intel Xeon Processor MP™ microprocessors. The server comes with at least one microprocessor installed; you can install additional processors to enhance performance and provide SMP capability.
- **Large data-storage and hot-swap capabilities**  
The xSeries 360 server supports up to three 26 mm (1-inch) slim-high 3.5-inch hot-swap hard disk drives in the hot-swap bays. This hot-swap feature enables you to remove and replace hard disk drives without turning off the server.
- **Active PCI-X (hot-plug) adapter capabilities**  
The server has six *hot-plug* PCI-X slots for PCI or PCI-X adapters. With operating-system support, you can replace failing hot-plug PCI/PCI-X adapters without turning off the server. If the *hot-add* feature is supported by both the operating system and a PCI/PCI-X adapter, you can also add such PCI/PCI-X adapters in these slots without turning off the server.
- **Redundant hot-swap cooling and redundant hot-swap power capabilities**  
The fans in the server can operate at variable speeds so that if one fan fails, the remaining fans increase in speed to enable continued operation until the failing fan is replaced. You can replace a failing fan without turning off the server.  
The server supports up to three 370-watt power supplies. Multiple hot-swap 370-watt power supplies ensure redundancy and hot-swap capability for a typical configuration.
- **Large system memory**  
The memory bus in the server supports up to 8 GB of system memory. The memory controller provides error correcting code (ECC) support for up to eight industry-standard, 2.5 V, 168-pin, 16-byte, PC1600 registered DDR SDRAM dual inline memory modules (DIMMs). The memory controller also provides Chipkill Memory protection. Chipkill Memory protection is a technology that protects the server from a single chip failure on a DIMM.

- **Light Path Diagnostics**  
Light Path Diagnostics provide LEDs to assist in isolating problems with the server. An LED on the operator information panel is lit if an unusual condition or a problem occurs. If this happens, you can look at the LEDs visible through a special cutout in the cover and isolate the cause. Under some circumstances, you might need to remove the cover and view LEDs on the system board to pinpoint the source of a problem.
- **Systems-management capabilities**  
The server comes with a Remote Supervisor Adapter installed. This adapter, in conjunction with the systems-management software provided with the server, enables you to manage the functions of the server both locally and remotely. The Remote Supervisor Adapter also provides system monitoring, event recording, and dial-out alert capability.
- **Integrated network environment support**  
The server comes with an Ethernet controller integrated into the system board. This Ethernet controller has an interface for connecting to 10-Mbps or 100-Mbps networks. The server automatically selects between 10BASE-T and 100BASE-TX. The controller provides full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN).
- **Remote expansion enclosure**  
The addition of an optional, IBM RXE-100 Remote Expansion Enclosure provides up to twelve additional hot-plug PCI/PCI-X slots for PCI or PCI-X adapters. The enclosure can be managed through the Remote Supervisor Adapter, enabling remote operation over a network or a modem.
- **Redundant network adapter**  
The addition of an optional, redundant network adapter provides a failover capability to a secondary Ethernet connection. If a problem occurs with the primary Ethernet connection, all Ethernet traffic associated with this primary connection is automatically switched to the redundant network adapter. If the appropriate device drivers are installed, this switching occurs without data loss and without user intervention.
- **IBM ServerGuide™ CDs**  
The ServerGuide™ CDs that are included with the server provide programs to help you set up the server and install the network operating system (NOS). The ServerGuide program detects the installed hardware options and provides the correct configuration programs and device drivers. In addition, the ServerGuide CDs include a variety of application programs for the server.

**Note:** The latest level of basic input/output system (BIOS) code for the server is available through the World Wide Web. See “Recovering the BIOS code” on page 18 for more information.

For more information about the ServerGuide CDs, see “Using the ServerGuide CDs” on page 57.

The server is designed to be cost-effective, powerful, and flexible. It uses peripheral component interconnect-extended (PCI-X) bus architecture to provide compatibility with a wide range of existing hardware devices and software applications.

The server meets stringent worldwide certifications for power, electromagnetic compatibility (EMC), and safety.



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## Reliability, availability, and serviceability

Three of the most important features in server design are reliability, availability, and serviceability (RAS). These factors help to ensure that the integrity of the data stored on the server is preserved, that the server is available when you want to use it, and that should a failure occur, you can easily diagnose and repair the failure with minimal inconvenience.

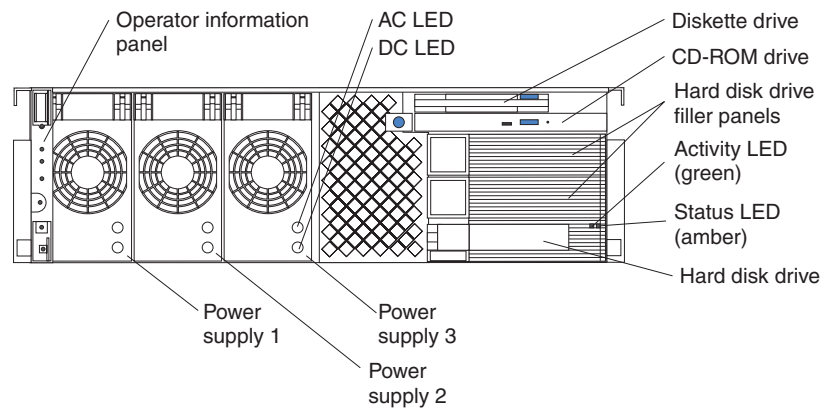
The following is an abbreviated list of the RAS features that the server supports:

- ECC memory, L3 cache, and front side buses (FSBs)
- Parity checking on the small computer system interface (SCSI) bus
- Advanced Configuration and Power Interface (ACPI) power management
- Power-on self-test (POST)
- Systems-management monitoring through Intra-Integrated Circuit (I<sup>2</sup>C) bus
- Light Path Diagnostics
- Automatic error retry and recovery
- Automatic restart after a power failure
- Built-in temperature, fan, and voltage monitoring
- Chipkill Memory protection
- Hot-swap cooling with fan speed-sensing capability
- Hot-swap and redundant power supplies
- Hot-swap hard disk drives
- Hot-plug (Active) PCI-X adapter slots
- Menu-driven setup, system configuration, SCSISelect configuration, and diagnostic programs
- Memory scrubbing and Predictive Failure Analysis™ (PFA) (background and real time)
- Microcode and diagnostic program levels available
- System-management software and LANDesk® enabled
- Network adapter failover support
- Remote Supervisor Adapter to enable remote server management
- Remote Connect™
- Remote system problem-determination support
- Upgradable POST/BIOS, diagnostics, and Remote Supervisor Adapter microcode
- Wake on LAN® and Alert on LAN™ capability
- Backup BIOS switching by means of a flash ROM page swap jumper
- Error codes and messages
- Microprocessor serial number access
- Cable presence detection for standard internal cables
- Vital product data (VPD) for microprocessors, system and memory boards, memory DIMMs, power supplies, hot-swap-drive backplane, and power supply backplane

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## Controls and indicators

The following illustration shows the controls and indicators on the front of the server.



**Operator information panel:** This panel, also known as the front LED panel, contains controls, indicators, and one of the three USB ports. See “Operator information panel” on page 9 for details.

**AC LED:** Each hot-swap power supply has an ac power LED to indicate that ac power is available to the power supply.

**DC LED:** Each hot-swap power supply has a dc power LED to indicate that the power supply is active.

**Diskette drive:** The server contains one standard 3.5 diskette drive with an LED to indicate when it is active.

**CD-ROM drive:** The server contains one standard IDE CD-ROM drive with an LED to indicate when it is active.

**Hard disk drive filler panels:** A filler panel is used to cover empty hard disk drive bays. A filler panel must be installed in each empty bay to ensure proper system cooling.

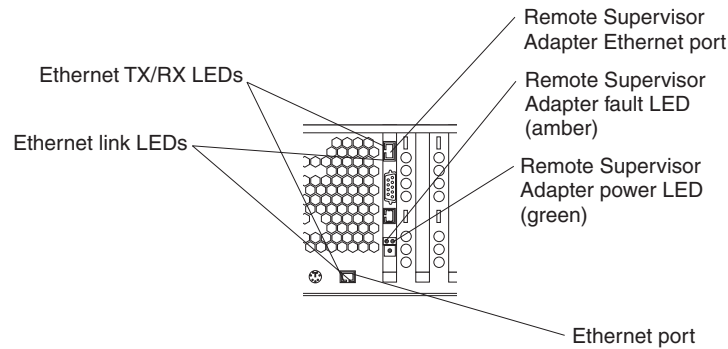
**Activity LED:** Each hot-swap hard disk drive has an activity LED, which flashes if the drive is being accessed.

**Status LED:** Each hot-swap hard-disk drive has a status LED. If this amber LED is on continuously, the drive has failed. If an optional IBM ServerRAID™ adapter is installed in the server and the LED flashes slowly (one flash per second), the drive is being rebuilt. If the LED flashes rapidly (three flashes per second), the controller is identifying the drive.

**Hard disk drive:** The server supports a maximum of three hot-swap hard disk drives.

**Power supplies 1, 2, and 3:** The server comes with a minimum of one hot-swap power supply and supports a maximum of three hot-swap power supplies.

The following illustration shows the indicators on the rear of the server.



**Ethernet Link LEDs:** These LEDs (one for the Remote Supervisor Adapter, one for the network) indicate that the related Ethernet link is operational.

**Ethernet TX/RX LEDs:** These LEDs (one for the Remote Supervisor Adapter, one for the network) indicate that activity is taking place on the related network.

**Remote Supervisor Adapter Ethernet port:** This port enables you to manage the server from a remote location.

**Remote Supervisor Adapter fault LED:** This LED indicates that the Remote Supervisor Adapter has failed.

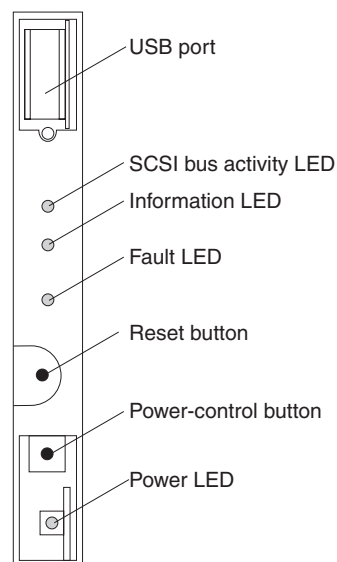
**Remote Supervisor Adapter power LED:** This LED indicates that power is being supplied to the Remote Supervisor Adapter.

**Ethernet port:** This port enables you to connect the server to a network.

---

## Operator information panel

The following illustration shows the controls, indicators, and USB port on the operator information panel (also known as the front LED panel).



**USB port:** This port enables you to attach a USB device to the front of the server.

**SCSI bus activity LED:** This green LED is on when there is activity on the SCSI bus.

**Information LED:** This amber light is on if the server power supplies are nonredundant or some other noncritical event has occurred. See the LEDs on the Level 2 diagnostic LED panel or on the system board for specific error information. For details, see “Level 2 diagnostic and system board LEDs” on page 68.

**Fault LED:** This amber LED is on if a system error has occurred. See the LEDs on the Level 2 diagnostic LED panel or on the system board for specific error information. For details, see “Level 2 diagnostic and system board LEDs” on page 68.

**Reset button:** Press this button to reset the server and run the power-on self-test (POST).

**Power-control button:** If the server is in operational mode, press this button to put it into standby mode. If the server is in standby mode, press this button to restore it to operational mode. See “Turning on the server” and “Turning off the server” on page 11 for more information about applying and removing external power to the server.

**Power LED:** This green LED is on if ac and dc power are present in the server. If this LED is flashing, the server is in standby mode (ac power is present, but the power supplies are turned off). If this LED is off, either ac power, all power supplies, or the light has failed.

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

## Turning on the server

Turning on the server refers to the act of plugging the server power cords into the power source and pressing the power-control button. After you install the network operating system in the server, this typically causes the operating system to start.

Complete the following steps to turn on the server.

1. Turn on all external devices, such as the monitor.

**Note:** After you plug the power cords into the power source, wait 30 seconds before pressing the power-control button on the operator information panel. During this time, the Remote Supervisor Adapter is initializing and the power-control button does not respond. The power LED on the information panel blinks, indicating that ac power is present in the server.

2. Plug the server power cords into the power source.

**Note:** Plugging the power cords into the power source might cause the server to start automatically. This is an acceptable action.

3. Wait 30 seconds; then, press the power-control button on the operator information panel. The power LED comes on and the power-on self-test (POST) begins.

If the server is turned on and a power failure occurs, it restarts automatically when power is restored. You can turn on the server remotely by means of the Remote Supervisor Adapter.

When you start the server for the first time after you add or remove an internal option or an external SCSI device, you might see a message telling you that the configuration has changed. The Configuration/Setup Utility program automatically starts so that you can save the new configuration information. See “Configuration” on page 27 for details.

Some options have device drivers that you need to install. See the documentation that comes with the option for information about installing any required device drivers.

The server comes with at least one microprocessor installed on the system board. If you have installed one or more additional microprocessors, the server can now operate as an SMP server. Therefore, you might need to upgrade the operating system to support SMP. See “Using the ServerGuide CDs” on page 57 and the operating system documentation for additional information.

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

## Turning off the server

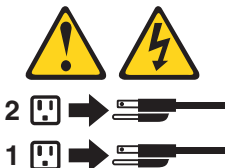
Turning off the server refers to the act of stopping the operating system, pressing the power-control button, and disconnecting the server power cords from the power source.

### 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.**



See the operating system documentation for the proper procedure to shut down the operating system before turning off the server. Each operating system is different. Some allow an immediate shutdown; others require an orderly shutdown procedure.

Complete the following steps to turn off the server:

1. Press the power-control button on the operator information panel. This places the server in standby mode. The power LED on the operator information panel blinks. This does not remove all power from the server.

**Note:** After doing this, wait at least 30 seconds before pressing the power-control button to turn on the server again.

2. Disconnect the server power cords from the power source.

**Note:** Wait approximately 15 seconds after disconnecting the power cords for the server to stop running. The power LED on the operator information panel will stop blinking.

## Standby mode

Standby mode refers to the condition in which the server operating system is not running and all core logic is shut down except for the Remote Supervisor Adapter.

Complete the following steps to put the server into standby mode:

1. See the operating system documentation for the proper procedure to shut down the operating system.

**Note:** Each operating system is different. Read all the documentation about shutting down the operating system before continuing.

2. Press the power-control button on the front of the server.

You can put the server into standby mode remotely by means of the Remote Supervisor Adapter.

---

# Diagnostics

This chapter provides basic troubleshooting information to help you resolve some common problems that might occur while setting up the server.

If you cannot locate and correct the problem using the information in this chapter, see “Symptom-to-FRU index” on page 115 for more information.

---

## D diagnostic tools overview

The following tools are available to help you identify and resolve hardware-related problems:

- **POST beep codes, error messages, and error logs**

The power-on self-test (POST) generates beep codes and messages to indicate successful test completion or the detection of a problem. See “POST” on page 14 for more information.

- **Diagnostic programs and error messages**

The server diagnostic programs are stored in upgradable read-only memory (ROM) on the system board. These programs are the primary method of testing the major components of the server. See “Diagnostic programs and error messages” on page 15 for more information.

- **Level 2 Light Path Diagnostics**

The server has light-emitting diodes (LEDs) to help you identify problems with server components. By following the light path, you can quickly identify the type of problem that occurred. The light path begins with the LEDs on the operator information panel. See “Level 2 Light Path Diagnostics” on page 19 for more information.

---

## POST

When you turn on the server, it performs a series of tests to check the operation of server components and some of the options that are installed in the server. This series of tests is called the power-on self-test, or POST.

If POST finishes without detecting any problems, a single beep sounds, and the first screen of the operating system or application program appears.

If POST detects a problem, more than one beep sounds, and an error message appears on the screen. See “Beep symptoms” on page 115 and “POST error codes” on page 134 for more information.

### Notes:

1. If you have a power-on password or administrator password set, you must type the password and press Enter, when prompted, before POST will continue.
2. A single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After you correct the cause of the first error message, the other error messages usually will not occur the next time you run the test.

---

## Error logs

The POST error log contains the three most recent error codes and messages that the system generated during POST. The System Error log contains error messages that were issued during POST and all system status messages from the Remote Supervisor Adapter.

You can view the contents of the System Error log from either the Configuration/Setup Utility program or from the diagnostic programs:

- Start the Configuration/Setup Utility program; then, select **Error Logs** from the main menu; then, select either **Post Error Log** or **System Event/Error Log**. See “Starting the Configuration/Setup Utility” on page 28 for details.
- Start the diagnostic programs; select **Hardware Info** from the top of the diagnostic programs screen; select **System Error Log** from the list that appears; then, follow the instructions on the screen. See “Starting the diagnostic programs” on page 15 for details.

---

## Small computer systems interface (SCSI) messages

If you receive a SCSI error message while running the SCSISelect Utility program, one or more of the following might be causing the problem:

- A failing SCSI device (adapter, drive, controller)
- An improper SCSI configuration
- Duplicate SCSI IDs in the same SCSI chain
- An improperly installed SCSI terminator
- A defective SCSI terminator
- An improperly installed cable
- A defective cable



To solve the problem, verify that:

- The external SCSI devices are turned on. You must turn on all external SCSI devices *before* turning on the server.
- The cables for all external SCSI devices are connected correctly.
- The last device in each SCSI chain is terminated properly.
- The SCSI devices are configured correctly.

If you have verified these items and the problem remains, run the diagnostic programs to obtain additional information about the failing device.

---

## Diagnostic programs and error messages

The server diagnostic programs are stored in upgradable read-only memory (ROM) on the system board. These programs are the primary method of testing the major components of the server.

Diagnostic error messages indicate that a problem exists; they are not intended to be used to identify a failing part. Troubleshooting and servicing of complex problems that are indicated by error messages should be performed by trained service personnel.

Sometimes the first error to occur causes additional errors. In this case, the server displays more than one error message. Always follow the suggested action instructions for the *first* error message that appears.

## Starting the diagnostic programs

To start the diagnostic programs:

1. Turn on the server and watch the screen.
2. When the message F2 for Diagnostics appears, press F2.  
If a power-on password is set, the server prompts you for it. Type the power-on password, and press enter.
3. When the Diagnostic Programs screen appears, select either **Extended** or **Basic** from the top of the screen.
4. Select the test that you want to run from the list that appears; then, follow the instructions on the screen.

### Notes:

- a. If the server stops during testing and you cannot continue, restart the server and try running the diagnostic programs again. If the problem remains, flash the server with the latest diagnostics code and BIOS, and then run the test again. If the problem remains, see “Undetermined problems” on page 143.
- b. The keyboard and mouse (pointing device) tests assume that a keyboard and mouse are attached to the server.
- c. If you run the diagnostic programs with no mouse attached to the server, you will not be able to navigate between test categories using the **Next Cat** and **Prev Cat** buttons. All other functions that are provided by mouse-selectable buttons are also available using the function keys.
- d. You can test the USB keyboard by using the regular keyboard test. The regular mouse test can test a USB mouse. Also, you can run the USB interface test only if there are no USB devices attached.

- e. You can view server configuration information (such as system configuration, memory contents, interrupt request (IRQ) use, direct memory access (DMA) use, device drivers, and so on) by selecting **Hardware Info** from the top of the screen.
- f. You can press F1 while running the diagnostic programs to obtain Help information. You also can press F1 from within a help screen to obtain online documentation from which you can select different categories. To exit from the help information and return to where you left off, press Esc.

If the diagnostic programs do not detect any hardware errors but the problem remains during typical server operations, a software error might be the cause. If you suspect a software problem, refer to the information that comes with the software package.

## Error code format

This section shows the format of the error codes that might appear in the detailed test log and summary log when running the diagnostic programs.

The error code format is as follows:

`fff-ttt-iii-date-cc-text message`

where:

- fff** is the three-digit function code that indicates the function being tested when the error occurred. For example, function code 089 is for the microprocessor.
- ttt** is the three-digit failure code that indicates the exact test failure that was encountered.
- iii** is the three-digit device ID.
- date** is the date that the diagnostic test was run and the error recorded.
- cc** is the check value that is used to verify the validity of the information.
- text message** is the diagnostic message that indicates the reason for the problem.

## Text message format

This section shows the format of the diagnostic text messages that might appear in the detailed test log and summary log when running the diagnostic programs.

The diagnostic text message format is as follows:

`Function Name: Result (test specific string)`

where:

### Function Name

The name of the function being tested when the error occurred. This corresponds to the function code (fff) shown in the previous list.

### Result

This can be one of the following:

#### Passed

This result occurs when the diagnostic test is completed without any errors.

**Failed** This result occurs when the diagnostic test discovers an error.

**User Aborted**

This result occurs when you stop the diagnostic test before it is complete.

**Not Applicable**

This result occurs when you specify a diagnostic test for a device that is not present.

**Aborted**

This result occurs when the test could not proceed, for example, because of the system configuration.

**Warning**

This result occurs when a possible problem is reported during the diagnostic test, such as when a device that is to be tested is not installed.

**test specific string**

Additional information that you can use to analyze the problem.

## Viewing the test log

When the tests have been completed, you can view the test log by selecting **Utility** from the top of the screen and then selecting **View Test Log**.

**Notes:**

1. You can view the test log only while you are in the diagnostic programs. When you exit the diagnostic programs, the test log is cleared (saved test logs are not affected). To save the test log so that you can view it later, click **Save Log** on the diagnostic programs screen and specify a location and name for the saved log file.
2. To save the test log to a diskette, you must use a diskette that you have formatted yourself; this function does not work with preformatted diskettes. If the diskette has sufficient space for the test log, the diskette may contain other data.

For information about the system error log, see “Error logs” on page 14 and “Configuration/Setup Utility main menu” on page 28.

## Viewing the System Event/Error log

You can also view the System Event/Error log from the diagnostic programs. See the instructions at “Error logs” on page 14.

## Diagnostic error messages

Error messages may appear when you run the diagnostic programs.

**Notes:**

1. Depending on the server configuration, some of these error messages might not appear when you run the diagnostic programs.
2. If diagnostic error messages appear that are not listed, make sure that the server has the latest levels of BIOS, Remote Supervisor Adapter, ServeRAID, and diagnostics microcode installed.

For information about specific diagnostic error codes, see “Diagnostic error codes” on page 120.

---

## Recovering the BIOS code

If the BIOS has become damaged, such as from a power failure during a flash update, you can recover the BIOS code using the flash ROM page swap jumper (J56) and a BIOS flash diskette.

**Note:** Use one of the following methods to obtain a BIOS flash diskette:

- Use the ServerGuide program to make a BIOS flash diskette.
- Download a BIOS flash diskette from the World Wide Web at <http://www.ibm.com/pc/support>.

The flash memory of the server consists of a primary page and a backup page. The J56 jumper controls which page is used to start the server. If the BIOS code in the primary page is damaged, you can use the backup page to start the server; then, start the BIOS flash diskette to restore the BIOS code to the primary page.

Complete the following steps to recover the BIOS:

1. Turn off the server and peripheral devices and disconnect all power cords and external cables; then, remove the cover.
2. Locate jumper J56 (flash ROM page swap) on the system board. See “System board locations” on page 65 for an illustration of the system board jumper locations.
3. Move the jumper to pins 2 and 3 to enable BIOS recovery mode.
4. Reconnect all external cables and power cords and turn on the peripheral devices.
5. Insert the BIOS flash diskette into the diskette drive and restart the server. The system begins the power-on self-test (POST).
6. The Flash Update Utility program displays the Flash Update Menu. Select **1 - Update POST/BIOS**.
7. When prompted as to whether you want to move the current POST/BIOS image to the backup ROM location, press N.  
**Attention:** If you press Y, the damaged BIOS will be copied into the secondary page.
8. When prompted as to whether you want to save the current code to a diskette, press N.
9. When prompted to choose a language, select a language (from 0 to 7) and press Enter to accept your choice.
10. When prompted as to whether you want to change the serial number, ensure that the correct serial number appears.
11. When prompted as to whether you want to change the machine type, ensure that the correct machine type appears.
12. **Attention:** Do *not* restart the server at this time. Remove the flash diskette from the diskette drive.
13. Turn off the server.
14. Move the jumper on J56 to pins 1 and 2 to return to normal startup mode.
15. Replace the cover and start the server.

## Power supply LEDs

The ac and dc power LEDs on a power supply provide status information about the power supply. The following illustration shows the location of the ac and dc power LEDs. For more information about interpreting the LEDs, see “Power supply LED errors” on page 133.

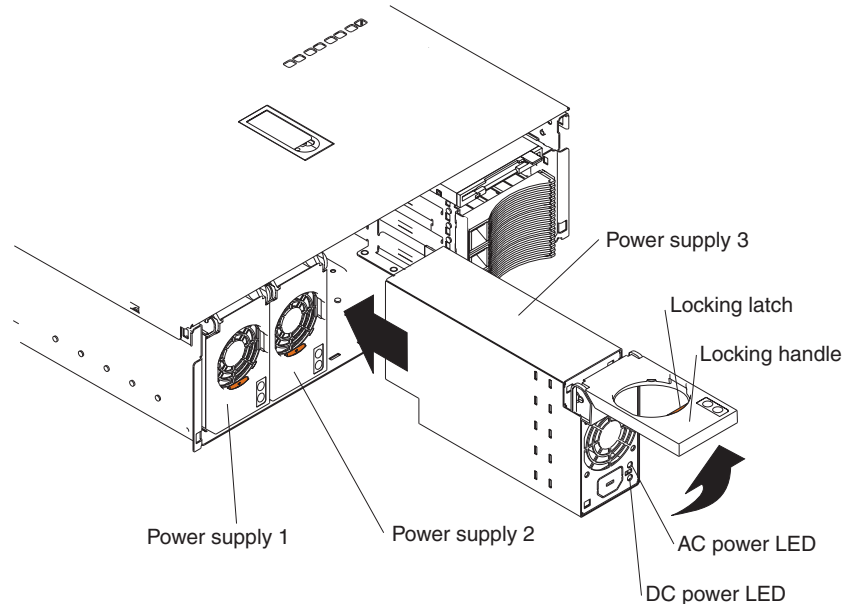


Table 2. Power supply minimum configurations

AC	DC
<ul style="list-style-type: none"> <li>• 1 power supply</li> </ul>	<ul style="list-style-type: none"> <li>• 1 power supply</li> <li>• 1 power backplane</li> <li>• 1 system board</li> <li>• 1 processor in slot 1</li> <li>• Operator panel card</li> </ul>

## Level 2 Light Path Diagnostics

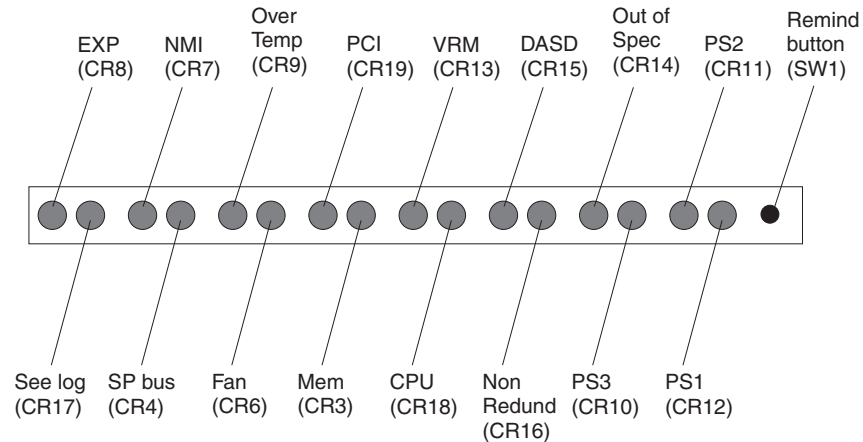
The Light Path Diagnostics LEDs help you to identify problems with server components. By following the light path, you can quickly identify and fix the type of problem that occurred. The light path begins with the LEDs on the operator information panel (also known as the front LED panel). If the server encounters a problem, it lights either the Information LED or the Fault LED.

To isolate the source of the trouble, examine the Level 2 Light Path Diagnostics LEDs through the special cutout on the server top cover (shown at “Level 2 diagnostic panel LEDs” on page 20). These LEDs can indicate a problem with a single component, or a problem with one of several similar components. In the latter case, to isolate the specific failing component, remove the server top cover and look for a lit LED on the system board, memory board, or failing component.

For example, if the FAN LED is lit, the specific failing fan is indicated by an LED viewable with the top cover removed. If the MEM LED is lit, the specific failing DIMM is indicated by an LED on the memory board.

## Level 2 diagnostic panel LEDs

The illustration at “Removing the server top cover and bezel” on page 72 shows the location of the Level 2 diagnostic panel LEDs, visible through a special cutout area on the top cover. See “Level 2 Light Path troubleshooting” on page 21 for information about using them to identify problems. The following illustration identifies the diagnostic panel LEDs.



The meanings of these LEDs are as follows:

<b>EXP</b>	Attached expansion I/O failure
<b>NMI</b>	Nonmaskable interrupt
<b>Over Temp</b>	System over temperature condition
<b>PCI</b>	PCI failure
<b>VRM</b>	VRM failure
<b>DASD</b>	Hard disk drive failure
<b>Out of Spec</b>	Power supplies being overdriven
<b>PS2</b>	Power supply number 2 failure
<b>Remind button</b>	Remind to invoke remind mode
<b>PS1</b>	Power supply number 1 failure
<b>PS3</b>	Power supply number 3 failure
<b>Non Redund</b>	Nonredundant power mode
<b>CPU</b>	Microprocessor failure
<b>MEM</b>	Memory failure
<b>FAN</b>	Fan failure
<b>SP Bus</b>	Remote Supervisor Adapter failure
<b>See Log</b>	See event log or Remote Supervisor Adapter log for non-optimal condition information

### Notes:

1. The server supports replaceable voltage regulator modules (VRMs).
2. The server supports a maximum of three power supplies.

## Remind button

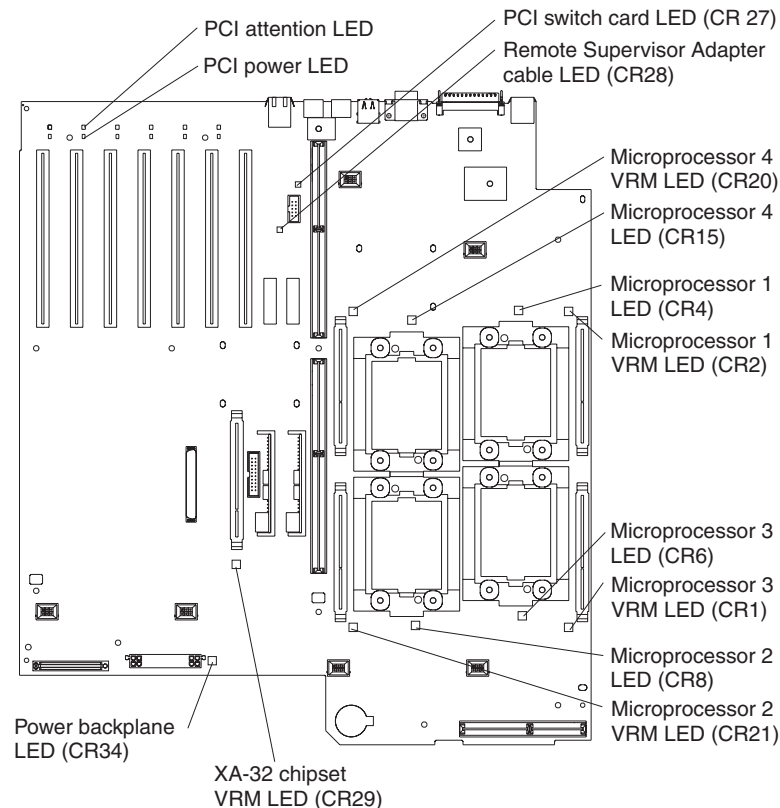
You can use the Remind button to place the Fault light on the front panel into the remind mode (blinks every 2 seconds). By pressing the button, you acknowledge the failure but indicate that you will not take immediate action. If a new failure occurs, the Fault light turns on again.

The Fault light stays in Remind mode until one of the following conditions occurs:

- All known problems are resolved
- The system is restarted
- A new problem occurs

You can use the Remind button to delay server maintenance until a later time. In this way, the light will indicate any subsequent error. If the light is still lit from the first error, it is unable to indicate subsequent errors.

The Light Path Diagnostics feature might direct you to look for an LED on the system board that identifies the specific failing component. The following illustration identifies the LEDs on the system board.



## Level 2 Light Path troubleshooting

The Level 2 LEDs remain lit if the server shuts down, provided that the power supplies are operating properly. This feature helps you to isolate the problem if an error causes the server to shut down. For detailed information about the action to take when the Level 2 Light Path Diagnostics indicate a problem, see “Level 2 light path LED errors” on page 118.

If the Level 2 Light Path Diagnostics indicate a problem that does not require immediate action, you can press the Remind button on the diagnostic LED panel.

This causes the LED on the operator information panel to blink, reminding you that you need to take action. The remind function enables normal operations to continue, possibly using redundant components, until reduced server activity allows you to correct the problem. The LED for the component causing the problem stays lit until you make repairs.

---

## Power checkout

Power problems can be difficult to troubleshoot. For instance, a short circuit can exist anywhere on any of the power distribution busses. Usually a short circuit will cause the power subsystem to shut down because of an overcurrent condition.

A general procedure for troubleshooting power problems is as follows:

1. Power off the system and disconnect the AC cord(s).
2. Check for loose cables in the power subsystem. Also check for short circuits, for instance if there is a loose screw causing a short circuit on a circuit board.
3. Remove adapters and disconnect the cables and power connectors to all internal and external devices until system is at minimum configuration required for power on (see “Undetermined problems” on page 143 for a description of the minimum operating requirements).
4. Reconnect the AC cord and power on the system. If the system powers up successfully, replace adapters and devices one at a time until the problem is isolated. If system does not power up from minimal configuration, replace FRUs of minimal configuration one at a time until the problem is isolated.

To use this method it is important to know the minimum configuration required for a system to power up (see “Undetermined problems” on page 143 for a description of the minimum operating requirements). For specific problems, see “Power error messages” on page 140.

---

## Error symptoms

To find solutions to problems that have definite symptoms, see “Error symptoms” on page 127.

If you cannot find the problem in the table of error symptoms, go to “Starting the diagnostic programs” on page 15 to test the server.

If you have just added new software or a new option and the server is not working, do the following before using the error symptom charts:

- Remove the software or device that you just added.
- Run the diagnostic tests to determine if the server is running correctly.
- Reinstall the new software or new device.

---

## Ethernet controller troubleshooting

If the Ethernet controller cannot connect to the network, check the following:

- Make sure that the cable is installed correctly.

The network cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.

If you set the Ethernet controller to operate at 100 Mbps, you must use Category 5 cabling.



If you directly connect two workstations (without a hub), or if you are not using a hub with X ports, use a crossover cable.

**Note:** To determine whether a hub has an X port, check the port label. If the label contains an X, the hub has an X port.

- Determine if the hub supports auto-negotiation. If not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller lights on the server rear panel.
  - These lights indicate whether a problem exists with the connector, cable, or hub.
    - The Ethernet Link Status light illuminates when the Ethernet controller receives a LINK pulse from the hub. If the light is off, there might be a defective connector or cable, or a problem with the hub.
    - The Ethernet Transmit/Receive Activity light illuminates when the Ethernet controller sends or receives data over the Ethernet Network. If the Ethernet Transmit/Receive Activity light is off, make sure that the hub and network are operating and that the correct device drivers are loaded.
- Check the LAN activity light (if available) on the rear of the server. The LAN activity light is illuminated when data is active on the Ethernet network. If the LAN activity light is off, make sure that the hub and network are operating and that the correct device drivers are loaded.
- Make sure that you are using the correct device drivers, which are supplied with the server.
- Check for operating-system-specific causes for the problem.
- Make sure that the device drivers on the client and server are using the same protocol.
- Test the Ethernet controller.

The way you test the Ethernet controller depends on which operating system you are using (see the Ethernet controller device driver README file).

The Ethernet wrap test can be used to determine if a hardware problem is causing the Ethernet connection to fail. To perform the Ethernet wrap test, use the wrap plug (FRU # 60G3981) in conjunction with the diagnostic tests.

If the testing methods above indicate that the hardware is functioning normally but the problem still exists, inform the network administrator.

---

## Battery replacement

When replacing the battery, you must replace it with a lithium battery of the same type from the same manufacturer. To avoid possible danger, read and follow the safety statement below.

To order replacement batteries, call 1-800-772-2227 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM reseller or IBM marketing representative.

**Note:** After you replace the battery, you must reconfigure the system and reset the system date and time.

**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.**

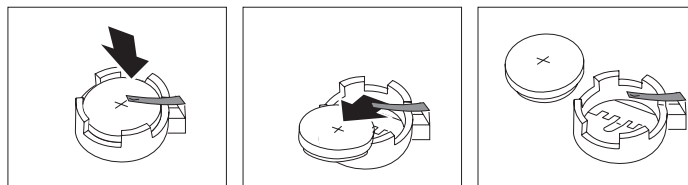
**Do not:**

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

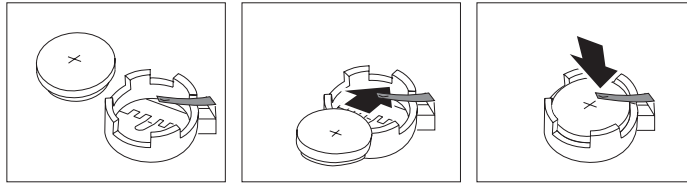
**Dispose of the battery as required by local ordinances or regulations.**

To replace the battery:

1. Read the information in “Before you begin” on page 71 and follow any special handling and installation instructions supplied with the replacement battery.
2. Turn off the server and all attached devices, and disconnect all power cords and external cables (see “Safety information” on page 145).
3. Remove the top cover as described at “Removing the server top cover and bezel” on page 72.
4. Using the illustration at “System board locations” on page 65 as a reference, locate the battery on the system board.
5. Remove the battery, as shown in the following illustration:
  - a. Use one finger to press down slightly on one side of the battery. The other side of the battery will tilt up out of the socket.
  - b. Use your thumb and index finger to pull the battery out from under the battery clip.
  - c. To ensure that the battery clip will hold the replacement battery securely, press gently on the clip so that it touches the base of the battery socket momentarily.



6. Insert the new battery, as shown in the following illustration:
  - a. Tilt the battery so that you can insert it into the front of the socket, under the battery clip.
  - b. As you slide it under the battery clip, press the battery down into the socket.



7. Reinstall the top cover as described at “Installing the server top cover and bezel” on page 95.
8. Reconnect the external cables and power cords; then, turn on the peripheral devices and the server.

**Note:** You must wait approximately 30 seconds after you plug the power cord of the server into an electrical outlet before the power-control button becomes active.
9. Start the Configuration/Setup Utility program and set configuration parameters.
  - Set the system date and time.
  - Set the power-on password.
  - Reconfigure the server.

Refer to “Using the Configuration/Setup Utility” on page 28.



---

# Configuration

You can use the following configuration programs to customize the settings for the server hardware:

- **Configuration/Setup Utility program**

This program is part of the basic input/output system (BIOS) code that comes with the server. You can use this program to change interrupt request (IRQ) settings, change the drive startup sequence, set the date and time, and set passwords. For information about using this utility, see “Using the Configuration/Setup Utility” on page 28.

- **SCSISelect utility program**

This program is part of the basic input/output system (BIOS) code that comes with the server. You can use this program to configure the devices that are attached to the integrated SCSI controller. Use this program to change default values, and to resolve configuration conflicts. For information about using this utility, see “Using the SCSISelect utility program” on page 34.

- **PXE Boot Agent Utility program**

The Preboot eXecution Environment (PXE) Boot Agent Utility program is part of the BIOS code that comes with the server. You can use this program to select the boot protocol and other boot options, to display the PXE setup prompt or to disable it, to set the prompt display duration, and to select a power management option. For information about using this utility, see “PXE Boot Agent Utility program” on page 36

**Note:** The RPL selection for the Boot Protocol option is not supported for this server.

- **ServerGuide CDs**

The *ServerGuide* CDs provide software setup and installation tools that are specifically designed for the server. Use these CDs during the initial installation of the server to configure basic hardware features and to simplify network operating system (NOS) installation. See “Using the ServerGuide CDs” on page 57 for more information. The ServerGuide CDs also contain a collection of application programs, which you can install after the server is up and running.

- **ServeRAID configuration program**

This program comes with the optional ServeRAID adapters and with server models that have a ServeRAID adapter preinstalled. If the server has a ServeRAID adapter installed, you must use the ServeRAID configuration program to define and configure the disk-array subsystem *before* you install the operating system. For more information about using the ServeRAID configuration program, see “ServeRAID configuration program” on page 37 and also the ServeRAID documentation that comes on the *Documentation* CD.

- **Remote Supervisor Adapter configuration process**

Configuration activities are also required for the Remote Supervisor Adapter. See “Remote Supervisor Adapter” on page 38 for information about setting up and cabling the Remote Supervisor Adapter for use with an Advanced System Management (ASM) network. For complete information about cabling, configuring, and using the Remote Supervisor Adapter to manage the server remotely, see the *Remote Supervisor Adapter User's Guide* on the *Documentation* CD.

**Note:** These configuration programs are not designed to help you configure the integrated Ethernet adapter.

To configure the integrated Ethernet controller, see “Configuring the Ethernet controller” on page 37.

---

## Using the Configuration/Setup Utility

Configuration/Setup is a menu-driven utility that is part of the BIOS code that comes with the server. You can use it to:

- Change the drive startup sequence
- Enable USB keyboard and mouse support
- Resolve configuration conflicts
- Set the date and time
- Set passwords

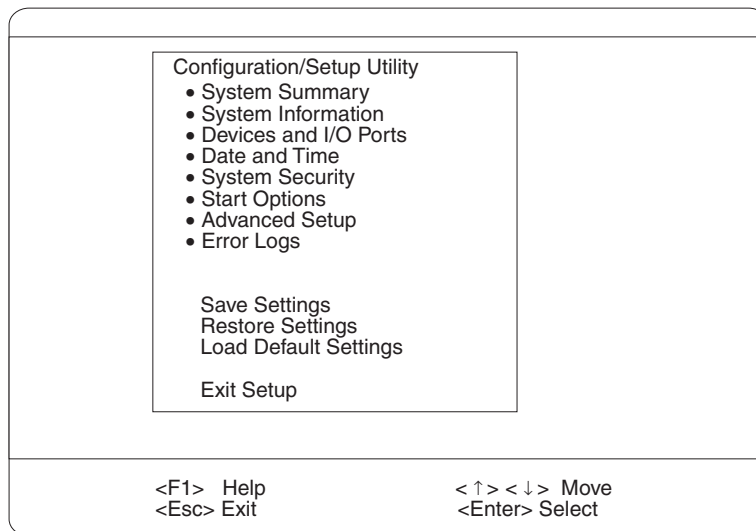
## Starting the Configuration/Setup Utility

To start the Configuration/Setup Utility program:

1. Turn on the server and watch the monitor screen.
2. When the message Press F1 for Configuration/Setup appears, press F1.
3. Follow the instructions that appear on the screen.

## Configuration/Setup Utility main menu

From the Configuration/Setup Utility main menu, you can select settings that you want to change.



### Notes:

1. You can press F1 to display help information for a selected menu item.
2. The choices on some menus might differ slightly, depending on the BIOS code version in the server.

The following choices are available from the main menu:

- **System Summary**

Select this choice to display configuration information. This includes the type and speed of the microprocessors and the amount of memory that is installed.

Changes that you make to configuration settings appear on this summary screen. You cannot edit the fields.

This choice appears on both the full and limited Configuration/Setup Utility menus.

- **System Information**

Select this choice to display information about the server. Changes that you make on other menus might appear on this summary screen. You cannot edit any fields. The **System Information** choice appears only on the full Configuration/Setup Utility main menu.

- **Product Data**

Select this choice to view system information, such as the machine type and model, serial number, and the revision level or issue date of the BIOS code that is stored in the flash electrically erasable programmable ROM (EEPROM).

- **System Card Data**

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

- **Devices and I/O Ports**

Select this choice to view or change the assignments for devices and input/output ports. This choice appears only on the full Configuration/Setup Utility main menu.

You can use this choice to enable or disable the integrated SCSI, video, and Ethernet controllers.

- The default setting is **Enable** for all the controllers. If you select **Disable**, the system will not configure the disabled device, and the operating system will not detect the device. (This is equivalent to unplugging the device.)

- If the on-board SCSI controller is disabled and no other controller and mass storage device is installed, operating-system startup cannot occur.

- If the video controller is disabled and no video adapter is installed, the server will have no video capability.

- **Date and Time**

Select this choice to set the system date and time and to change the system time that is sent to the Remote Supervisor Adapter when the server is started. This choice appears only on the full Configuration/Setup Utility main menu.

The system time is in a 24-hour format: hour:minute:second.

You can set a time delta to be added or subtracted from the system time that is sent to the Remote Supervisor Adapter each time the server is started. Use the number keys to type the hours and minutes and + or – to add or subtract from the system time. If you want the system clock time to be the same as the Remote Supervisor Adapter clock time, leave the value set at its default of 0.

- **System Security**

Select this choice to set passwords or the remote control security settings. You can implement three levels of password protection. This choice appears only on the full Configuration/Setup Utility main menu.

You can implement the following levels of password protection:

- **Power-on Password**

- Select this choice to set or change a power-on password. See “Power-on password” on page 32 for more information.
- **Administrator Password**

Select this choice to set or change an administrator password.

**Attention:** If an administrator password is set and then forgotten, it cannot be overridden or removed. The operator information panel card must be replaced; see “Operator panel card” on page 108.

The administrator password provides access to all choices on the Configuration/Setup Utility main menu. You can set, change, or delete both the administrator and power-on passwords and allow a power-on password to be changed by the user.

See “Administrator password” on page 33 for more information.
  - Remote-Control Security Settings

Select this choice to set the password for remote access to the server. You can set the number of failed logins before the server cuts off access. See “Remote-control security settings” on page 34 for more information.
  - **Start Options**

Select this choice to view or change the start options. This choice appears only on the full Configuration/Setup Utility main menu. Start options take effect when you start the server.

You can select keyboard operating characteristics, such as whether the keyboard number lock starts on or off, and the keyboard speed. You also can enable the server to run without a diskette drive, display, or keyboard.

The server uses a startup sequence to determine the device from which the operating system starts. For example, you can define a startup sequence that checks for a startable diskette in the diskette drive, then checks the hard disk drive in bay 1, and then checks a network adapter.
  - **USB Legacy**

If you enable this option, you can use a USB keyboard on a non-USB-aware operating system. The supported environments are DOS and System Setup. Note that if a PS/2<sup>®</sup> keyboard is detected, the USB Legacy operation will be disabled regardless of the value of this setting.
  - **Boot Fail Count**

If the option is enabled, you can restore the BIOS system defaults after three consecutive boot failures. If this option is disabled, the BIOS system defaults can be loaded only from the Configuration/Setup Utility main menu.
  - **Virus Detection**

If you enable this option, a virus-detection test checks for changes in the master boot record at startup.
  - **Advanced Setup**

Select this choice to change values for advanced hardware features, such as cache control, and PCI/PCI-X configuration. This choice appears only on the full Configuration/Setup Utility main menu.

A warning message appears above the choices on this menu to alert you that the system might malfunction if these options are configured incorrectly. Follow the instructions on the screen carefully.
  - **System Partition Visibility**

Select this choice to specify whether the System Partition is visible. To make the System Partition visible, set this value to **Visible**. To make the System



Partition invisible, set this value to **Hidden**. See “Using the ServerGuide CDs” on page 57 for additional information on the System Partition.

– **Boot Device Location**

Select this choice to determine whether the server boots from the system board SCSI device or from an adapter in an expansion slot.

– **PCI Slot/Device Information**

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

**Attention:** You must use the menu selections to save custom settings for the **PCI Slot/Device Information** choice. The **Save Settings**, **Restore Settings**, and **Load Default Settings** choices on the Configuration/Setup Utility main menu do not save the PCI Slot/Device Information settings.

After making changes, select:

- **Save and exit the PCI utility** to save the changes and return to the **Advanced Setup** screen.
- **Exit the PCI utility without saving changes** to ignore the changes, restore the previous settings, and return to the **Advanced Setup** screen.

– **Cache Control**

Select this choice to enable or disable the microprocessor cache. In addition, you can set the microprocessor cache mode as write-back (WB) or write-through (WT). Selecting write-back mode provides better system performance. The default settings enable the cache and set the mode as write-back.

– **Memory Settings**

Select this choice to manually enable a bank of memory.

If a memory error is detected during POST or memory configuration, the server can automatically disable the failing memory bank and continue operating with reduced memory capacity. If this occurs, you must manually enable the memory bank after the problem is corrected. Select **Memory Settings** from the Advanced Setup menu, and use the arrow keys to highlight the bank that you want to enable; then, use the arrow keys to select **Enable**.

– **Integrated System Management Processor Settings**

Select this choice to specify the **Reboot System on NMI** option. You can use this option to enable or disable automatic reboot after a NonMaskable Interrupt (NMI) occurs.

• **Error Logs**

Select this choice to view or clear error logs.

- Select **POST Error Log** to view the three most recent error codes and messages that the system generated during POST.

Select **Clear Event/Error Logs** from the POST Error Log menu to clear the error log.

- Select **System Event/Error Log** to view the System Event/Error log. The System Event/Error log contains all the system error and warning messages that the system has generated. You can use the arrow keys to move between pages in the System Event/Error log.

Select **Clear Event/Error Logs** from the System Event/Error Log menu to clear the error or event log.

- **Save Settings**  
Select this choice to save your customized settings.
- **Restore Settings**  
Select this choice to delete your changes and restore the previous settings.
- **Load Default Settings**  
Select this choice to cancel your changes and restore the factory settings.
- **Exit Setup**  
If you have made any changes, the program will prompt you to save the changes or exit without saving the changes.

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## Using passwords

The **System Security** choice appears only on the full Configuration/Setup Utility menu. After you select this choice, you can implement two levels of password protection: power-on password and administrator password.

### Power-on password

When a power-on password is set, POST is not completed until you type the password. After you set a power-on password, you can enable the unattended-start mode. This locks the keyboard and mouse but allows the system to start the operating system. The keyboard and mouse remain locked until you type the correct password.

You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for your power-on password. Keep a record of your password in a secure place. If you forget the power-on password, you can regain access to the server through one of the following methods:

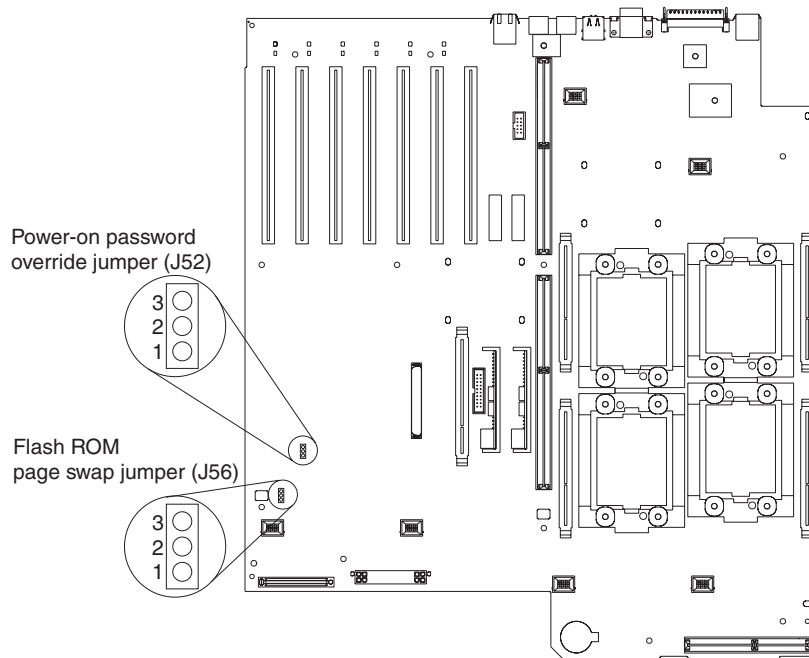
- If an administrator password is set, type the administrator password (see “Administrator password” on page 33) at the power-on prompt. Start the Configuration/Setup Utility program and change the power-on password.
- Change the position of the power-on password override jumper as described at “Using the password override jumper.”
- Remove the battery and then install the battery.

### Using the password override jumper

Change the position of the password override jumper by using the following procedure:

1. Read the information at “Safety information” on page 145.
2. Turn off the server and disconnect all power cords and external cables, and remove the top cover.
3. Change the position of the jumper on J52 to bypass the power-on password check. You can then reconnect all external cables and power cords, start the Configuration/Setup Utility program and change the power-on password.

The following illustration shows the power-on password override jumper (J52) on the system board.



Changing the position of the jumper on J52 bypasses the power-on password check *if* the jumper has been moved since the server was last powered on. You must move the jumper back to the default position after the password is overridden. The default position is pins 1 and 2.

Changing the position of this jumper does not affect the administrator password check if an administrator password is set.

4. Install the top cover.

## Administrator password

Select this choice to set an administrator password. The administrator password provides access to all choices on the Configuration/Setup Utility main menu. You can set, change, or delete both the administrator and power-on passwords and allow a power-on password to be changed by the user.

**Attention:** If an administrator password is set and then forgotten, it cannot be overridden or removed. You must replace the operator information panel (see “Operator panel card” on page 108).

The following table provides a summary of the password features.

Table 3. Power-on and administrator password features

Type of password	Results
Power-on password	<ul style="list-style-type: none"><li>Type the password to complete the system startup.</li><li>All choices are available on the Configuration/Setup Utility main menu.</li></ul>
Administrator password	<ul style="list-style-type: none"><li>No password is required to start the system.</li><li>Type the password to access the Configuration/Setup Utility program.</li><li>All choices are available on the Configuration/Setup Utility main menu.</li></ul>
Administrator <i>and</i> power-on password	<ul style="list-style-type: none"><li>You can type either password to complete the system startup.</li><li>The administrator password provides access to all choices on the Configuration/Setup Utility main menu. You can set, change, or delete both the administrator and power-on passwords and allow a power-on password to be changed by the user.</li><li>The power-on password provides access to a limited set of choices on the Configuration/Setup Utility main menu. This limited access might include changing or deleting the power-on password.</li></ul>

## Remote-control security settings

Select this choice to set a remote-control password, which provides remote access to all choices on the Configuration Setup Utility main menu. You can set the following features:

- Set or read current Remote Supervisor Adapter
- Set lockout threshold. Enter a number of failed login attempts. Once this number is reached, the server locks up. You can also set the server to lock up if no password is entered for a set number of minutes.

See “Remote Supervisor Adapter” on page 38 for information on cabling and configuring the Remote Supervisor Adapter.

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## Using the SCSISelect utility program

SCSISelect is a built-in, menu-driven configuration utility program that you can use to:

- View the default SCSI IDs
- Locate and correct configuration conflicts

**Note:** If the server has a redundant arrays of independent disks (RAID) adapter installed, use the configuration method that is supplied with the RAID adapter to view or change SCSI settings for devices attached to the adapter.

## Starting the SCSISelect utility program

To start the SCSISelect utility program:

- Turn on the server.
- When the <<< Press <CTRL><A> for SCSISelect Utility! >>> prompt appears, press Ctrl+A.

- Note:** If an administrator password has been set, a prompt appears asking you to type the password to start the SCSISelect utility program.
3. When the Would you like to configure the host adapter or run the SCSI disk utility? question appears, make a selection and press Enter.
  4. Use the arrow keys to select a choice from the menu.
    - Press Esc to exit from the SCSISelect utility program.
    - Press the F5 key to switch between color and monochrome modes (if the monitor permits).
  5. Follow the instructions on the screen to change the settings of the selected items; then, press Enter.

## SCSISelect menu

The following choices are available from the SCSISelect utility menu:

- **Configure/View Host Adapter Settings**

Select this choice to view or change the SCSI controller settings. To reset the SCSI controller to its default values, press F6; then, follow the on-screen instructions.

You can view or change the following controller settings:

- **Host Adapter SCSI ID**

Select this choice to view the SCSI controller ID, which is usually 7.

- **SCSI Parity Checking**

Select this choice to view the assigned value. The assigned value is **Enabled**, and it cannot be changed.

- **Host Adapter SCSI Termination**

Select this choice to view the assigned value. The assigned value is **Enabled**, and it cannot be changed.

- **Boot Device Options**

Select this choice to configure startable-device parameters. Before you can make updates, you must know the ID of the device whose parameters you want to configure.

- **SCSI Device Configuration**

Select this choice to configure SCSI device parameters. Before you can make updates, you must know the ID of the device whose parameters you want to configure.

**Note:** The Sync Transfer Rate represents the transfer rate for Ultra SCSI devices.

- The transfer rate for Ultra160 SCSI LVD devices is 160.0 Mbps.
- The transfer rate for Ultra2 SCSI LVD devices is 80.0 Mbps.
- The transfer rate for Fast SCSI devices is 20.0 MBps.

- **Advanced Configuration Options**

Select this choice to view or change the settings for advanced configuration options.

- **SCSI Disk Utilities**

Select this choice to view the SCSI IDs that are assigned to each device or to format a SCSI device.

To use the program, select a drive from the list. Read the screens carefully before making a selection.

**Note:** If you press Ctrl+A before the selected drives are ready, an Unexpected SCSI Command Failure screen might appear. Restart the server and watch the SCSISelect messages as each drive spins up. After the drive that you want to view or format spins up, press Ctrl+A.

---

## PXE Boot Agent Utility program

This program is a built-in, menu-driven configuration utility program that you can use to:

- Select whether to display setup prompt
- Set menu wait time
- Select legacy operating-system wake-up support

**Attention:** The network startup protocols and startup order options are not supported on this product.

## Starting the PXE Boot Agent Utility program

To start the PXE Boot Agent Utility program:

1. Turn on the server.
2. When the Initializing Intel Boot Agent Version X.X (Dev Build XXX) prompt appears, press Ctrl+S.

**Notes:**

- a. If the PXE setup prompt does not display, use the Configuration/Setup Utility program to set the enable Ethernet PXE/DHCP option.
  - b. By default, you have 2 seconds after the prompt appears on the screen to press Ctrl+S.
3. Use the arrow keys or press Enter to select a choice from the menu.
    - Press Esc to return to the previous menu.
    - Press the F4 key to exit.
  4. Follow the instructions on the screen to change the settings of the selected items; then, press Enter.

## PXE Boot Agent Utility menu

The following choices are available from the PXE Boot Agent Utility menu:

- **Boot Protocol**

PXE is the default value for this menu item.

**Note:** Do not change this value. There are no other network boot protocols supported.

- **PnP/BEV**

**PnP** is the default value.

- **Default Boot**

**Local** is the default value.

- **Local Boot**

**Enabled** is the default value.

- **Prompt time**

Select this choice to set the amount of time (in seconds) that the system will pause during initialization for a Ctrl+S response to the PXE setup prompt. The default value is 2.

- **Setup Message**

Select this choice to either display the PXE setup prompt or disable it. **Disable** is the default setting.

If this choice is enabled, Press Ctrl+S to enter the setup menu will appear on the screen under the initializing prompt.

- **Power Mgmt**

Select this choice to specify a power management protocol.

**Notes:**

1. Use the default setting for Advanced Configuration and Power Interface (ACPI)-aware operating systems, such as Microsoft Windows® 2000 and Windows NT®.
2. If the server is running a non-ACPI operating system, you must set this selection to **Enable** to use the Wake on LAN support.
3. When using a non-ACPI operating system, do not send a wake-up packet to the server while it is turned on. If a wake-up packet has been sent while the server is on and you are unable to turn the server off, see the "Power" section in "Error symptoms" on page 127 for more information.

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## ServeRAID configuration program

A ServeRAID adapter enables you to use multiple physical SCSI hard-disk drives as logical drives, operating as a disk array. To enable you to configure the ServeRAID controller, the adapter comes with a CD containing the ServeRAID Manager program and the ServeRAID Mini-Configuration program. For details about using these programs, see the documentation that comes with the ServeRAID adapter.

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## Configuring the Ethernet controller

The server comes with an integrated Ethernet controller. This controller provides an interface for connecting to 10-Mbps or 100-Mbps networks and provides full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN).

To use the Ethernet port, connect an appropriate (Category 5 is recommended) unshielded twisted-pair (UTP) cable to the RJ-45 connector on the rear of the server.

**Note:** The 100BASE-TX Fast Ethernet standard requires that the cabling in the network be Category 5 or higher.

The Ethernet (RJ-45) connectors on the rear panel and on the Remote Service Adapter each have two lights. When the green Ethernet link-status light is on, there is an active connection on the Ethernet port. When the amber Ethernet transmit/receive activity light is on, there is activity between the server and the network. For a description of the Ethernet port, see "Ethernet port" on page 100.

When you connect the server to the network, the Ethernet controller automatically detects the data-transfer rate (10 Mbps or 100 Mbps) on the network and then sets the controller to operate at the appropriate rate. In addition, if the Ethernet port that the server is connected to supports auto-negotiation, the Ethernet controller will set the appropriate duplex state. That is, the Ethernet controller will adjust to the network data rate, whether the data rate is standard Ethernet (10BASE-T), Fast Ethernet (100BASE-TX), half duplex (HDX), or full duplex (FDX). The controller supports half-duplex (HDX) and full-duplex (FDX) modes at both speeds.

The Ethernet controller is a PCI Plug and Play device. You do not need to set any jumpers or configure the controller for the operating system before you use the controller. However, you must install a device driver to enable the operating system to access the controller. The device driver is provided on the ServerGuide CDs.

If you install an optional Ethernet adapter, you can use it together with the integrated Ethernet controller to support optional modes, such as teaming, priority packets, and virtual LANs, which provide higher performance and throughput for the server. These modes apply to the integrated Ethernet controller and to the controllers on the supported Ethernet adapters.

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## Remote Supervisor Adapter

This section identifies the Remote Supervisor Adapter features, prerequisites, and recommendations. It also explains how to use the documentation effectively and how to cable and configure the adapter for use on an Advanced System Management (ASM) network so that you can manage the server from a remote location. For more detailed information see the *Remote Supervisor Adapter User's Guide* on the Documentation CD.

### Remote Supervisor Adapter features

The Remote Supervisor Adapter provides the following:

- Continuous health monitoring and control
- Advanced Predictive Failure Analysis (PFA)
- Configurable notification and alerts
- Event logs that are timestamped, saved in nonvolatile memory, and can be attached to e-mail alerts
- Remote graphics console redirection
- LAN, serial, and Advanced System Management (ASM) interconnect remote access
- Point-to-point protocol (PPP) support
- Simple Network Management Protocol (SNMP)
- Domain Name System (DNS) and Dynamic Host Configuration Protocol (DHCP) support
- Remote power control
- Microsoft® Windows NT and Windows 2000 blue-screen capture
- Remote firmware update and access to critical server settings
- Optional independent power, which enables around-the-clock access to the server even if the server is powered off

### Setup requirements

Before you set up the Remote Supervisor Adapter, you must download to a diskette the DOS Remote Supervisor Utility program from the World Wide Web at <http://www.ibm.com/pc/support>.

The most current Remote Supervisor Adapter firmware and the management information base (MIB) automatically download to the same diskette. However, the firmware and MIB available on the ServerGuide CD are fully functional; it is not necessary to install either one unless you want the most current items. You need the MIB if you plan to configure Simple Network Management Protocol (SNMP) trap alerts on the Remote Supervisor Adapter.



Do the following before you set up the Remote Supervisor Adapter.

- Install the operating system on the server, using ServerGuide and the documentation that comes with the operating system.
- Download to a diskette the most current server basic input/output system (BIOS) code from the World Wide Web at <http://www.ibm.com/pc/support>. Install the BIOS code using the instructions that download to the diskette.
- If you plan to configure Simple Network Management Protocol (SNMP) trap alerts on the Remote Supervisor Adapter, you must install and compile the management information base (MIB) on your SNMP manager.
- You must install the agent component of UM Server Extensions to use the following Advanced System Management (ASM) Web interface features:
  - Shutdown O/S and then Power Off Server
  - Shutdown O/S and then Restart Server

UM Server Extensions is on the system-management software CD that comes with the server. For information about installing the agent component, see the documentation that comes with the system-management CD.

- To configure the remote alert recipients for Director over LAN or Director over modem, the remote alert recipient must be an IBM Director-enabled server with UM Server Extensions.
- If you want to use a Web browser to access the Remote Supervisor Adapter remotely, the supported Web browsers and browser requirements are:
  - Microsoft Internet Explorer 4.0 (with Service Pack 1), or later
  - Netscape Navigator 4.72, or later (version 6.0 is not currently supported)
  - Java™ enabled Web browser (See your browser documentation or online Help for instructions about enabling its Java support.)
  - Support for JavaScript™ 1.2, or later (See your browser documentation or online Help for instructions about enabling its JavaScript support.)
  - Support of HTTP version 1.0, or later
  - Minimum display resolution of 800 x 600 pixels and 256 colors

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

## Using the documentation

The documentation for the Remote Supervisor Adapter includes the following publications on the *xSeries 360 Documentation* CD.

- *IBM @server xSeries 360 User's Reference* (this document, specifically the topics in this section, which assist you with cabling and configuring)
- *Remote Supervisor Adapter User's Guide for the IBM @server xSeries 360*

This document explains how to configure and use an ASM network to manage the server remotely through either the Web-based interface or the text-based user interface.

## Cabling and configuring the Remote Supervisor Adapter

This section explains how to cable and configure the Remote Supervisor Adapter. The following tasks are necessary to accomplish this.

**Note:** After you initially configure the adapter, use the Web-based interface to create a backup copy of the configuration. If you need to replace the adapter in the future, this enables you to restore the configuration and resume

normal operation more quickly. See the *Remote Supervisor Adapter User's Guide for the @server xSeries 360* for details.

**Task 1.**

Connect the Ethernet and serial port cables. See “Cabling the Ethernet LAN port and serial port.”

**Task 2.**

Perform the initial configuration to enable remote access to the Remote Supervisor Adapter. See “Enabling remote access to the adapter” on page 42. This enables you to:

1. Configure the Ethernet port
2. Configure the serial (COM) port
3. Set up the point-to-point protocol

**Task 3.**

Configure the remote control password to enable the ASM Web interface remote control features. See “Configuring the remote control password” on page 50.

**Task 4.**

Install the ASM device drivers. See “Installing Advanced System Management device drivers” on page 47.

**Cabling the Ethernet LAN port and serial port**

This section describes how to cable the Remote Supervisor Adapter. You can manage the server remotely through the Remote Supervisor Adapter using one of the user interfaces and one of the connection methods that are described in Table 4. Choose the interface method you want to use to perform remote management; then, perform the indicated cabling procedure.

If you plan to set up an ASM interconnect network, before you begin cabling the server, see “Using the ASM interconnect network” on page 50 for instructions about cabling the ASM interconnect port and setting up the network. You might want to review the information in “ASM interconnect network configuration examples” on page 54 before you connect the cables. Then, return here to start the cabling procedures.

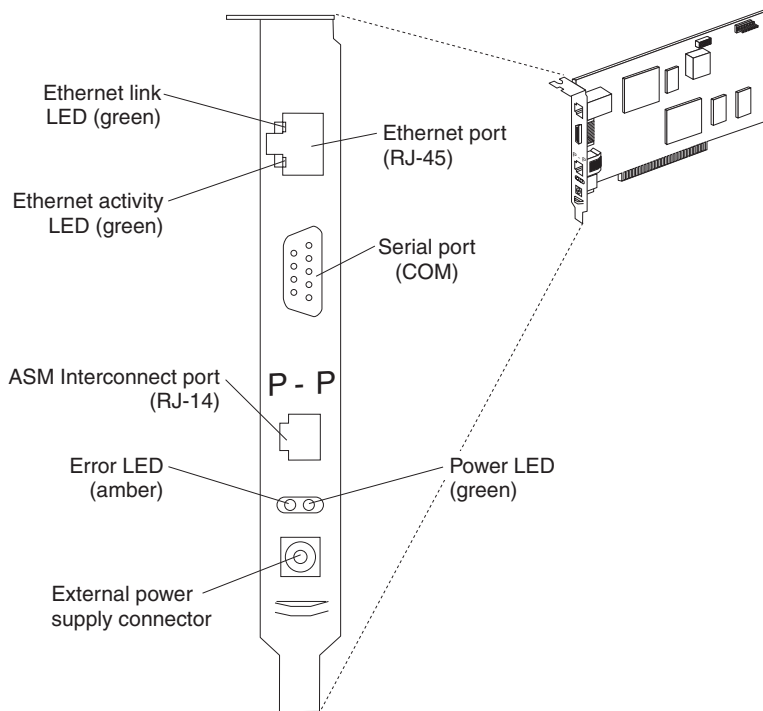
*Table 4. Cabling tasks to enable remote access to the Remote Supervisor Adapter*

<b>User interface to Remote Supervisor Adapter</b>	<b>Connection to Remote Supervisor Adapter</b>	<b>For the cabling procedure, see:</b>
ASM Web interface using the HTTP protocol	LAN using the Ethernet port	“Cabling the Ethernet LAN port” on page 41
Text-based user interface using the TELNET protocol		
Text-based user interface using a modem or a null modem	Serial (COM) port	“Cabling the serial (COM) port” on page 41
ASM Web interface using point-to-point (PPP) protocol		
Text-based user interface using the TELNET protocol over PPP		

**Cabling the Ethernet LAN port:** Complete the following steps to attach the Ethernet cables.

**Attention:** To avoid damage to the Ethernet connector on the Remote Supervisor Adapter, *do not* plug the ASM Interconnect module into the Ethernet port.

1. Connect one end of an appropriate Ethernet cable (Category 5 is recommended) to the Ethernet port on the Remote Supervisor Adapter. Connect the other end of the Ethernet cable to the network.
2. Check the Ethernet LEDs to ensure that the network connection is working. The following illustration shows the location of the LEDs.



#### **Ethernet link LED**

The green Ethernet link LED is lit when the Ethernet cable is connected properly.

#### **Ethernet activity LED**

The green Ethernet activity LED flashes when there is Ethernet activity.

If you want to use the serial port connection, continue with “Cabling the serial (COM) port”; otherwise, go to “Configuring the adapter.”

**Cabling the serial (COM) port:** To cable the serial (COM) port, connect a modem or null modem cable to the serial port on the Remote Supervisor Adapter.

Continue with “Configuring the adapter.”

## **Configuring the adapter**

This section describes the following:

- Enabling remote access to the Remote Supervisor Adapter
- Installing ASM device drivers

These procedures assume that you have an operational keyboard and pointing device attached to the server.

## Enabling remote access to the adapter

The Remote Supervisor Adapter requires configuration to enable remote access through either the Ethernet port or the serial port. From Table 5, choose the interface method that you want to use to perform remote management; then, perform the indicated configuration procedure.

**Note:** For detailed information about using the ASM Web interface and the text-based user interface, see the *Remote Supervisor Adapter User's Guide* on the *xSeries 360 Documentation CD*.

Table 5. Configuration tasks to enable remote access to the Remote Supervisor Adapter

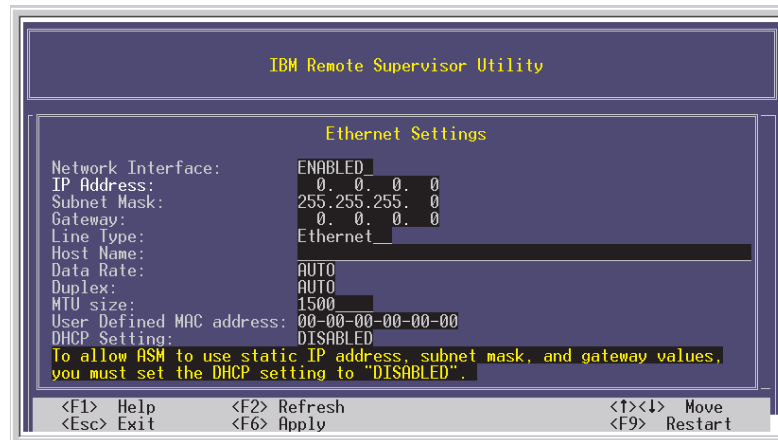
User interface to Remote Supervisor Adapter	Connection to Remote Supervisor Adapter	For the configuration procedure, see:
ASM Web interface using the HTTP protocol	LAN using the Ethernet port	"Configuring the Ethernet settings for Web-based remote access"
Text-based user interface using the TELNET protocol		
Text-based user interface using a modem or a null modem	Serial (COM) port	"Configuring the serial port for test-based remote access" on page 43 and "Setting up point-to-point protocol" on page 45
ASM Web interface using point-to-point (PPP) protocol		
Text-based user interface using the TELNET protocol over PPP		

**Configuring the Ethernet settings for Web-based remote access:** If you have an accessible, active, and configured dynamic host configuration protocol (DHCP) server on the network, the hostname, IP address, gateway address, subnet mask, and DNS server IP address are set automatically. You do not need to perform further configuration tasks to enable the Ethernet connection because the default value for the **DHCP Setting** field is Enabled. If you need to configure the serial port, go to "Configuring the serial port for test-based remote access" on page 43; otherwise, go to "Configuring the remote control password" on page 50.

If you do not have a DHCP server on the network, complete the following steps to configure the Ethernet settings.

1. With the server turned off, insert the diskette with the downloaded utility program into the diskette drive; then, turn on the server.
2. The utility starts automatically, displaying the Remote Supervisor Utility window.
3. Use the Up Arrow and Down Arrow keys (↑ and ↓) to select **Configuration Settings**; then, press Enter. The Configuration Settings window opens.
4. Use the arrow keys to select **Ethernet Settings**; then, press Enter. The Ethernet Settings window opens, as shown in the following illustration.

**Note:** The values in the window are only examples; your settings will be different.



5. Use the arrow keys to navigate to each field. Your system administrator can provide the information for the following fields:

#### **Network Interface**

The default value is Enabled; verify that it is still set to Enabled.

#### **IP Address**

Type the IP address of the Remote Supervisor Adapter.

#### **Subnet Mask**

Type the subnet mask used by the Remote Supervisor Adapter. The default value is 255.255.255.0.

#### **Gateway**

Type the IP address of the gateway.

#### **Host Name**

Type the hostname of the Remote Supervisor Adapter. The default hostname is ASMA<burned-in MAC address>.

For detailed information about the Ethernet settings, see the *Remote Supervisor Adapter User's Guide* on the *xSeries 360 Documentation CD*.

6. Change the DHCP Setting field to **Disabled**. The default value is Enabled.
  7. Press F6 to apply the change.
  8. Press Esc. In the Warning window that opens, press Enter to restart the Remote Supervisor Adapter.
  9. Press Esc to return to the Configuration Settings window.
- If you need to configure the serial port, go to “Configuring the serial port for test-based remote access.”
10. Press Esc to return to the Utility program main window.
  11. Use the arrow keys to select **Exit Utility** from the menu or press Esc to close the Utility program.
  12. Remove the diskette from the diskette drive. The server restarts automatically.
  13. If you also want to configure the serial port, continue with “Configuring the serial port for test-based remote access.” Otherwise, go to “Installing Advanced System Management device drivers” on page 47.

**Configuring the serial port for test-based remote access:** Complete the following steps to configure the Remote Supervisor Adapter serial port for access

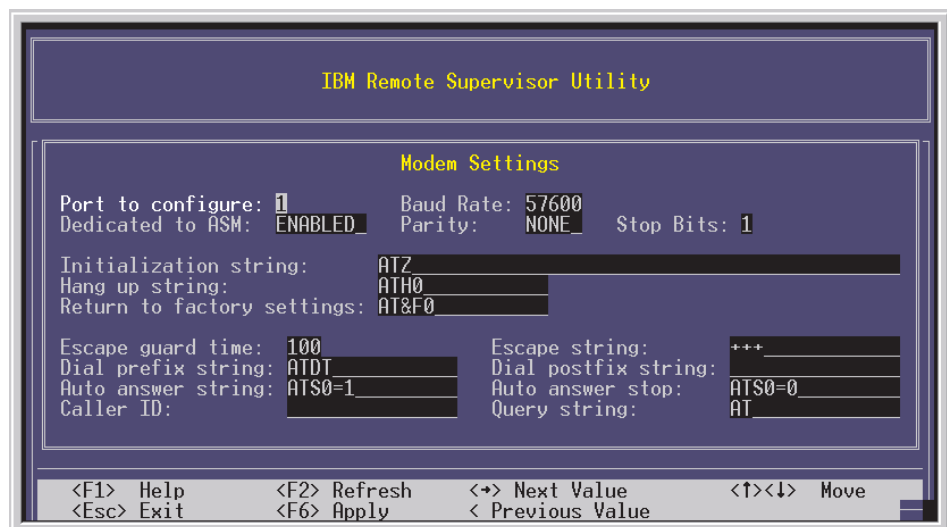
using a modem or null modem. If you completed the procedure for configuring the Ethernet port and the Configuration Settings window is open, go to step 4.

1. With the server turned off, insert the diskette with the downloaded utility program into the diskette drive; then, turn on the server.
2. The utility starts automatically, displaying the Remote Supervisor Utility window.
3. Use the Up Arrow and Down Arrow keys (↑ and ↓) to select **Configuration Settings**; then, press Enter.

The Configuration Settings window opens.

4. Use the arrow keys to select **Modem Settings**; then, press Enter.  
The Modem Settings window opens, as shown in the following illustration.

**Note:** The values in the window are only examples; your settings might be different.



5. Verify the following serial port values:

#### **Baud Rate**

The default is 57600. Make sure that the baud rate matches the baud rate of the device you are connecting to the serial port on the Remote Supervisor Adapter.

#### **Dedicated to ASM**

The default is Disabled. If you are using point-to-point protocol (PPP), set this field to Enabled. If the value in this field is Enabled when the server is restarted, the serial port remains dedicated to system management and is not returned to the operating system.

You can dedicate the integrated serial port on the Remote Supervisor Adapter to system management or share it with the operating system. If the serial port is dedicated to system management, it serves only the Remote Supervisor Adapter and is always available for dial-in or dial-out alerting purposes. You cannot view the port using the operating system or any application.

**Note:** To use this serial port, you must first install the ASM device drivers as described in "Installing Advanced System Management device drivers" on page 47.

If the serial port is shared with the operating system, it is dedicated to the Remote Supervisor Adapter only while the server is turned off or during POST. The port is returned to the operating system after POST completes. You can view the port using the operating system or any application. The Remote Supervisor Adapter takes over the port from the operating system only when information about a critical event is received. The Remote Supervisor Adapter dials out and transmits an alert and keeps the port dedicated until the server is restarted. The port is no longer available to the operating system or applications.

### Parity

The default is None.

### Stop Bits

The default is 1.

**Note:** The data bits value is preset to 8 and cannot be changed.

For detailed information about the serial port and modem settings, see the *Remote Supervisor Adapter User's Guide* on the *xSeries 360 Documentation* CD.

6. If you made changes to the serial port settings, press F6 to apply the change.
7. Press Esc to return to the Configuration Settings window.

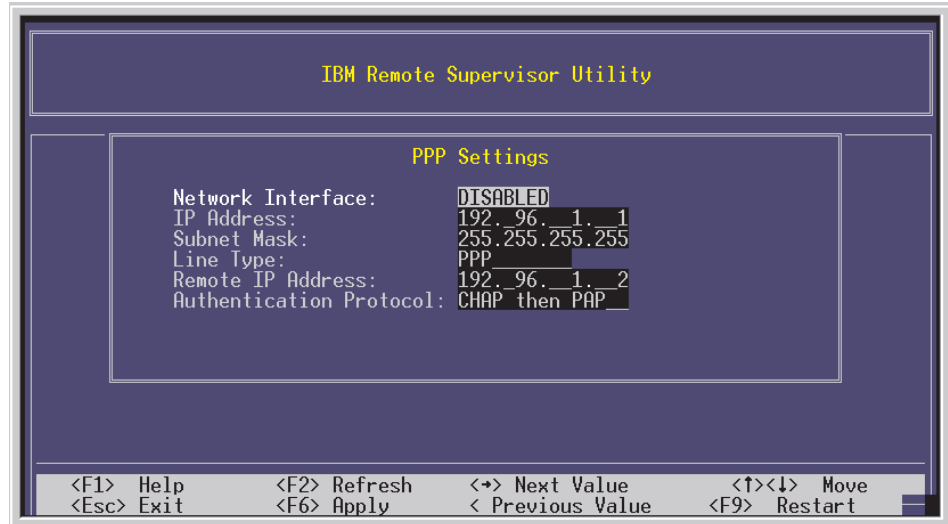
If you need to set up point-to-point protocol, go to "Setting up point-to-point protocol."

8. Press Esc to return to the Utility program main window.
9. Use the arrow keys to select **Exit Utility** from the menu, or press Esc to close the Utility program.
10. Remove the diskette from the diskette drive. The Remote Supervisor Adapter restarts automatically.
11. Continue with "Setting up point-to-point protocol."

**Setting up point-to-point protocol:** The Remote Supervisor Adapter serial port supports point-to-point protocol (PPP). PPP enables TCP/IP communication over the serial port, which enables Web-based management and TELNET sessions over a modem. To set up PPP, complete the following steps. If you completed the procedure for configuring the serial port and the Configuration Settings window is open, go to step 4

1. With the server turned off, insert the downloaded utility program into the diskette drive; then, turn on the server.
2. The utility starts automatically, displaying the Remote Supervisor Utility window.
3. Use the Up Arrow and Down Arrow keys (↑ and ↓) to select **Configuration Settings**; then, press Enter.  
The Configuration Settings window opens.
4. Use the arrow keys to select **PPP Settings**; then, press Enter.  
The PPP Settings window opens, as shown in the following illustration.

**Note:** The values in the window are only examples; your settings will be different.



5. Use the arrow keys to navigate to each field. Verify the values in the following fields:

#### **Network Interface**

The default is Disabled. Change this field to Enabled.

#### **IP Address**

The default value is 192.96.1.1. You can use the default value or another value, but the server must be able to establish a connection to that address. The default IP address (local and remote) is easily reconfigurable.

#### **Subnet Mask**

The default value is 255.255.255.255.

#### **Line Type**

The value is set to PPP.

#### **Remote IP Address**

The default value is 192.96.1.2.

#### **Authentication Protocol**

The default is CHAP then PAP. Make sure that the value in this field matches your client settings.

For detailed information about the PPP settings, see the information about configuring PPP access over a serial port in the *Remote Supervisor Adapter User's Guide* on the *xSeries 360 Documentation CD*.

6. Press F6 to apply the changes.
  7. Press Esc. In the Warning window that opens, press Enter to restart the Remote Supervisor Adapter.
  8. Press Esc to return to the Configuration Settings window.
- If you need to configure the serial port, go to "Configuring the serial port for test-based remote access" on page 43.
9. Press Esc to return to the Utility program main window.
  10. Use the arrow keys to select **Exit Utility** from the menu or press Esc to close the Utility program.
  11. Remove the diskette from the diskette drive. The server restarts automatically.



12. Continue with “Installing Advanced System Management device drivers.”

### **Installing Advanced System Management device drivers**

You must install the ASM device drivers for the server. The device drivers enable communication between the Remote Supervisor Adapter and the server in which it is installed. You can obtain the most current device drivers from the World Wide Web at <http://www.ibm.com/pc/support/>.

The following sections describe the procedure for installing the ASM device drivers for the server, depending on your operating system.

#### **Notes:**

1. If you are installing device drivers manually, note the following requirements:
  - Make sure that the operating system is installed on the server before you install the ASM device drivers. For information about installing the operating system, see the documentation that comes with the operating system.
  - Before installing the ASM device drivers for the Remote Supervisor Adapter, stop any system-management application.
2. If you are using ServerGuide to install device drivers and your operating system is either Microsoft Windows NT or Windows 2000, ServerGuide installs the ASM device drivers automatically.
  - Windows 2000: Continue with “Installing Windows 2000 ASM device drivers”
  - Windows NT: Go to “Installing Windows NT ASM device drivers” on page 48
  - Novell NetWare: Go to “Installing Novell NetWare ASM device drivers” on page 49
  - SCO UnixWare: Go to “Installing SCO UnixWare ASM device drivers” on page 49

After you install the ASM device drivers, go to “Configuring the remote control password” on page 50 to set the remote control password.

**Installing Windows 2000 ASM device drivers:** To install the ASM device drivers for Windows 2000, complete the following steps.

#### **Notes:**

1. Do not use the Hardware Wizard to install the drivers. If the Hardware Wizard starts itself for the installation of any System Management Driver hardware, exit the Hardware Wizard by selecting **Cancel**.
2. If IBM Netfinity<sup>®</sup> Director, IBM Director, or UM Services is running on the server, stop the system-management application before proceeding.

Complete the following steps to manually install the Windows 2000 ASM device drivers.

1. Open a command prompt.
2. If you are installing from a diskette, type: A:\WIN2000\SETUP, where A is the drive letter of the diskette drive.
3. If you are installing from the IBM Remote Supervisor Adapter Support CD, type: D:\DD\WIN2000\SETUP, where D is the drive letter of the CD-ROM drive.
4. Follow the directions that display on the screen.
5. Go to “Configuring the remote control password” on page 50.

**Installing Windows NT ASM device drivers:** Choose one of the following methods to install the ASM device drivers for Windows NT:

- Non-interactive

The non-interactive method for installing the ASM device drivers accepts the default values for any window prompts that appear. You are prompted to respond only if an error occurs during installation.

- Interactive

The normal (interactive) method, prompts you with instructions and waits for you to respond before continuing with the installation.

**Note:** If IBM Netfinity Director, IBM Director, UM Services, or IBM Netfinity Manager™ is running on the server, stop the system-management application before proceeding.

*Using the non-interactive method:* Complete the following steps to use the non-interactive method.

1. Open a Windows NT command prompt; then, type one of the following commands:
  - If the installation is from a diskette, type:  
A:\NT\SETUP -q  
(where *A* is the drive letter assigned to the diskette drive).  
Press Enter.
  - If the installation is from a CD, type:  
D:\DD\NT\SETUP -q  
(where *D* is the drive letter assigned to the CD-ROM drive).  
Press Enter.
2. Follow the instructions that appear in the window.
3. Go to “Configuring the remote control password” on page 50.

*Using the interactive method:* Complete the following steps to use the interactive method.

1. Open a Windows NT command prompt; then, type one of the following commands:
  - If the installation is from a diskette, type:  
A:\NT\SETUP  
(where *A* is the drive letter assigned to the diskette drive).  
Press Enter.
  - If the installation is from a CD, type:  
D:\DD\NT\SETUP  
(where *D* is the drive letter assigned to the CD-ROM drive).  
Press Enter.
2. Follow the instructions that appear in the window.
3. Continue with “Configuring the remote control password” on page 50.

**Installing Novell NetWare ASM device drivers:** Complete the following steps to install the ASM device drivers for the Novell NetWare operating system:

**Note:** If IBM Netfinity Director, IBM Director, or IBM Netfinity Manager is running on the server, stop the system-management application before proceeding.

1. From a system console session, type one of the following commands:

- If the installation is from a diskette, type:

```
LOAD A:\NETWARE\SETUP
```

(where *A* is the drive letter assigned to the diskette drive).

Press Enter.

- If the installation is from a CD, type:

```
LOAD D:\DD\NETWARE\SETUP
```

(where *D* is the drive letter assigned to the CD-ROM drive).

Press Enter.

2. Follow the instructions that appear in the window.

3. Go to “Configuring the remote control password” on page 50.

**Installing SCO UnixWare ASM device drivers:** Choose one of the following methods to install the SCO UnixWare ASM device drivers.

**Note:** If IBM Netfinity Director or IBM Director is running on the server, stop it before proceeding.

- Complete the following steps to use the SCO UnixWare package utility:

1. Open a shell prompt.

2. Type `scoadmin` and press Enter.

3. Click **Application Installer**.

4. Click to access the diskette or CD-ROM drive (for example, `DISK_A` or `CD-ROM_1`); then, install the package file that displays.

5. Continue with “Configuring the remote control password” on page 50.

- Complete the following steps to use the interactive installation from a shell prompt:

**Note:** The commands in the following steps are case-sensitive.

1. Open a shell prompt.

2. If the installation is from a diskette, type:

```
pkgadd -d diskette1
```

3. If the installation is from a CD, type:

```
pkgadd -d cdrom1
```

4. Continue with “Configuring the remote control password” on page 50.

- Complete the following steps to use the non-interactive installation from a shell prompt:

**Note:** The commands in the following steps are case sensitive.

1. Open a shell prompt.

2. If the installation is from a diskette, type:

```
pkgadd -d diskette1 -q-p-n uw7advmg
```

3. If the installation is from a CD, type:

```
pkgadd -d cdrom1 -q-p-n uw7advmg
```

4. Continue with “Configuring the remote control password” on page 50.

## Configuring the remote control password

If you want to use the remote control features of the Remote Supervisor Adapter ASM Web interface, you must configure the remote control password using the Configuration/Setup Utility program that comes with the server. This program is part of the basic input/output system (BIOS) code.

To set up a remote control password, complete the following steps:

1. Boot up the server, and watch the monitor screen.
2. When the message Press F1 for Configuration/Setup is displayed, press F1. The Configuration/Setup Utility main menu window opens.
3. Use the Up Arrow and Down Arrow keys (↑ and ↓) to select **System Security**; then, press Enter. The System Security window opens.
4. Select **Remote Control Security Settings**; then, press Enter. The Remote Control Security Settings window opens.
5. Enter the Remote Control Password that you will use each time you log into the remote control features of the Remote Supervisor Adapter ASM Web Interface.
6. Select **Save New Remote Control Password**; then, press Enter.
7. In the System Security window, press Esc.
8. Select **Save Settings**; then, press Enter.
9. Confirm your selection; then, exit the Configuration/Setup Utility.
10. Continue with “Completing the configuration.”

## Completing the configuration

To complete the configuration of the Remote Supervisor Adapter, see the *Remote Supervisor Adapter User's Guide* on the *xSeries 360 Documentation CD*. The tasks include the following:

- Defining the login IDs and passwords
- Selecting the events that will receive alert notification
- Monitoring remote server status using the ASM Web interface or a text-based user interface
- Controlling the server remotely

If you want to set up an ASM interconnect network and have not already done so, continue with “Using the ASM interconnect network.” If you do not want to set up an ASM interconnect network, Remote Supervisor Adapter configuration is now complete. To start managing the server remotely, see the *Remote Supervisor Adapter User's Guide* on the *xSeries 360 Documentation CD*.

## Using the ASM interconnect network

This section explains how to configure and connect the server to function within an ASM interconnect network.

The ASM interconnect network can include as many as 12 individual ASM connections in a single bus. These connections can include Remote Supervisor Adapters, ASM processors, and ASM PCI Adapters. When the clients and servers are connected, they use the ASM interconnect network to share ASM resources, information, and alerts among multiple servers, without having to add additional communications hardware or network interface adapters.

An ASM interconnect network provides two levels of functionality. First, the ASM interconnect network enables you to configure settings and to control the servers

where other Remote Supervisor Adapters, ASM processors, and ASM PCI Adapters on the network reside. Second, the ASM interconnect network enables other interconnect network devices to use the resources (Ethernet or modem) of other Remote Supervisor Adapters, ASM processors, and ASM PCI Adapters in the ASM interconnect network for sending alerts. This interconnect network is used when Remote Supervisor Adapters, ASM processors, or ASM PCI Adapters cannot send an alert and must forward the information to another one of these devices to send the alert.

### **Planning and cabling the interconnect network**

To support the most recent ASM features, a Remote Supervisor Adapter must be the main gateway interconnect to the ASM interconnect bus if the bus also includes servers with ASM PCI adapters or ASM processors. The Remote Supervisor Adapter forwards the ASM information generated by the servers attached to the ASM interconnect bus to other servers on the Ethernet network. The connected ASM processors and ASM PCI Adapters are managed through the new user interface and Web browser access of the Remote Supervisor Adapter.

**Note:** To ensure the stability of the system, you must have the most current level of firmware installed on the Remote Supervisor Adapter that is the main interconnect gateway for the ASM interconnect network. The most current level of firmware is available on the World Wide Web at <http://www.ibm.com/support>.

You must connect an ASM Interconnect module to the Remote Supervisor Adapter and to each server that you connect to the ASM interconnect network bus.

**Attention:** To avoid damage to the Ethernet connector on the Remote Supervisor Adapter, do not plug the ASM Interconnect module into the Remote Supervisor Adapter Ethernet port.

To connect the servers, note the following setup and configuration considerations:

- Make sure that the ASM interconnect network is set up as a bus, not as a ring. You must connect the servers to the ASM interconnect network in a series, with terminated beginning and end points.
- Make sure that the total combined length of all Ethernet cables connecting the server in the ASM interconnect network does not exceed 91 M (300 ft).
- Each Remote Supervisor Adapter, ASM PCI adapter, or ASM processor that is connected to the ASM interconnect network bus counts as one connection. For example, if an ASM PCI adapter is installed in a server that has an ASM processor, the processor and the adapter connect to each other using one ASM interconnect connection, but the processor and the adapter count as two connections on the ASM interconnect network bus.
- It is advisable that the most current level of firmware is installed on the Remote Supervisor Adapter that is the gateway for the interconnect network. For more information on updating firmware, see the *Remote Supervisor Adapter User's Guide for the @server xSeries 360* on the Documentation CD.

### **Forwarding alerts**

Remote Supervisor Adapters, ASM PCI adapters, and ASM processors that are connected to an ASM interconnect network share resources and system-management information. This section provides information on how alerts are forwarded in the ASM interconnect network.

During normal operation, each Remote Supervisor Adapter, ASM processor, or ASM PCI adapter on the ASM interconnect network communicates with the other processors and adapters on the network. Processors or adapters that have a modem or Ethernet connection notify the other processors and adapters that these communications resources are available for use by other servers on the ASM interconnect network. These resources are then used as ASM interconnect network resources, enabling Remote Supervisor Adapters, ASM processors, or ASM PCI adapters on the ASM interconnect network to send alerts using a modem or the network, even if they do not have a modem or network connection physically attached.

When alerts are generated, they are forwarded to the Remote Supervisor Adapter, ASM processor, or ASM PCI adapter on the ASM interconnect network that has the communication resources to forward the alert. If no system on the ASM interconnect network meets the requirements, the alert is set for transmission if the connection type is configured or becomes available later.

If multiple modems or network connections exist in the ASM interconnect network, you cannot specify which system will receive an alert or which will use its modem or network connection to forward the alert. If an alert is forwarded to a Remote Supervisor Adapter, ASM processor, or ASM PCI adapter that is unable to deliver the alert (for example, the modem it is configured to use has failed or the network cannot resolve the destination IP address), the processor or adapter attempts to forward the alert to another system on the ASM interconnect network that has the communication resources to forward the alert.

Alerts are typically sent only once (per connection type), but an alert is forwarded to another interconnect device if the resources exist on other interconnect devices in the network. For example, on a three ASM processor network where ASM processor 1 generates a modem alert, but does not have a modem and the other ASM processors have modems, the following might occur:

If ASM processor 1 generates an alert and the modem is unplugged from ASM processor 2 45 seconds prior to ASM processor 1 generating the alert, ASM processor 1 forwards the alert to ASM processor 2, having previously determined that ASM processor 2 has an available modem. When ASM processor 2 receives the forwarded alert, it determines that a modem is attached to ASM processor 3, and forwards the alert. Therefore, depending upon the time frame (45 seconds) within which a resource (modem) fails, the alert might be forwarded multiple times until an interconnect device can send the alert.

### **Cabling for the ASM interconnect network**

Depending upon the servers you have, you might need additional ASM Interconnect modules or appropriate Ethernet cables (Category 5 recommended). Table 6 lists some IBM Netfinity and IBM xSeries products, and indicates whether you need to use an ASM Interconnect module to set up the ASM interconnect network.

*Table 6. ASM interconnect network server list*

<b>Server Name</b>	<b>ASM Interconnect module needed</b>
Netfinity 4500R	yes
Netfinity 5000	yes
Netfinity 5500	yes
Netfinity 5500-M10	yes
Netfinity 5500-M20	yes

Table 6. ASM interconnect network server list (continued)

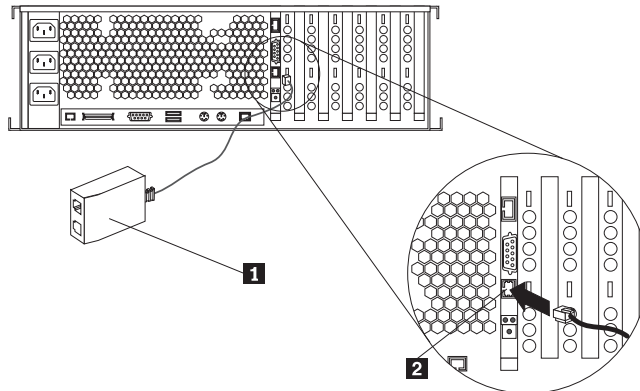
Server Name	ASM Interconnect module needed
Netfinity 5600	yes
Netfinity 6000R	no
Netfinity 7100	no
Netfinity 7600	no
xSeries 220	yes
xSeries 232	yes
xSeries 240	yes
xSeries 330	The ASM interconnect module is required to link the Remote Supervisor Adapter to the microprocessor in the server. Use the RS-485 ports to create the ASM interconnect network.
xSeries 340	yes
xSeries 342	yes
xSeries 350	no
xSeries 360	yes

For the servers that do not need an ASM Interconnect module, a module is still needed to connect the Remote Supervisor Adapter in the gateway server to the integrated ASM processor. After you make that connection, you can connect the servers together using their ASM interconnect ports. For additional information, see “ASM interconnect network configuration examples” on page 54.

**Connecting the ASM Interconnect module to the xSeries 360:** The ASM Interconnect module connects the Remote Supervisor Adapter to the ASM interconnect network. This module comes with the server. To connect the ASM interconnect cable to the Remote Supervisor Adapter, complete the following steps.

**Attention:** To avoid damage to the Ethernet connector, do not plug the ASM interconnect cable into the Remote Supervisor Adapter Ethernet port.

1. Connect the ASM Interconnect module **1** to the Remote Supervisor Adapter ASM interconnect (peer-to-peer) port **2** as shown in the following illustration. This port is labeled RS485 on the rear panel of the server.

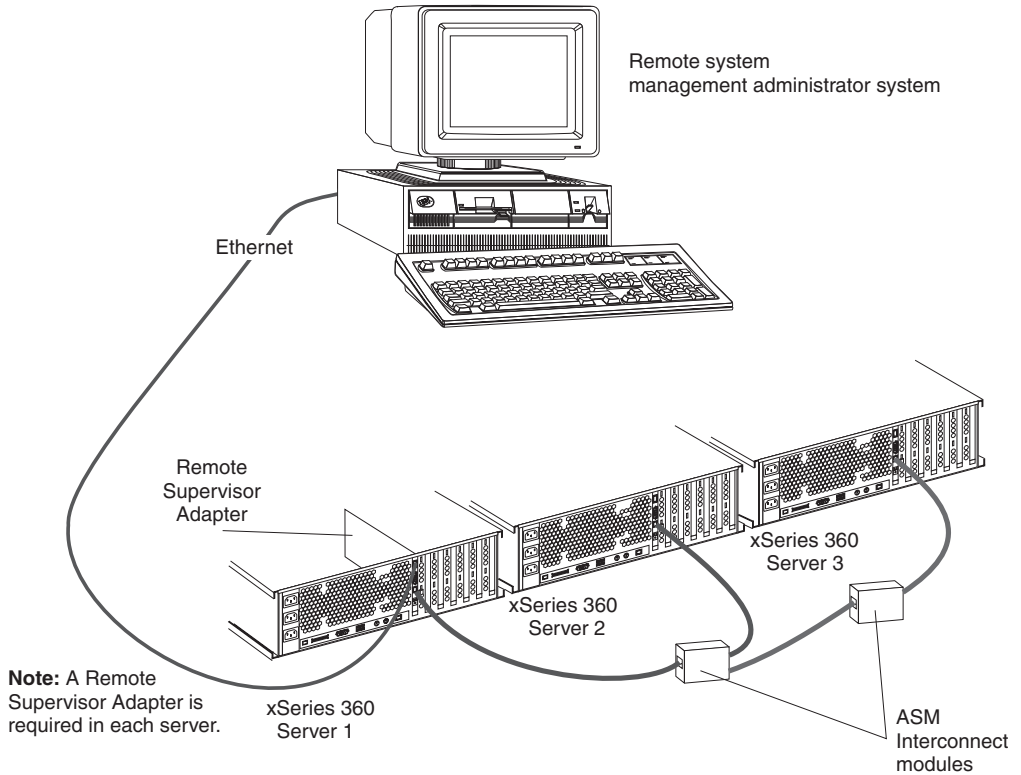


2. Connect one or two Ethernet cables of the appropriate type (Category 5 is recommended) to the other end of the ASM Interconnect module.
3. Continue with “ASM interconnect network configuration examples” on page 54.

## ASM interconnect network configuration examples

The illustrations in this section show sample ASM interconnect network configurations.

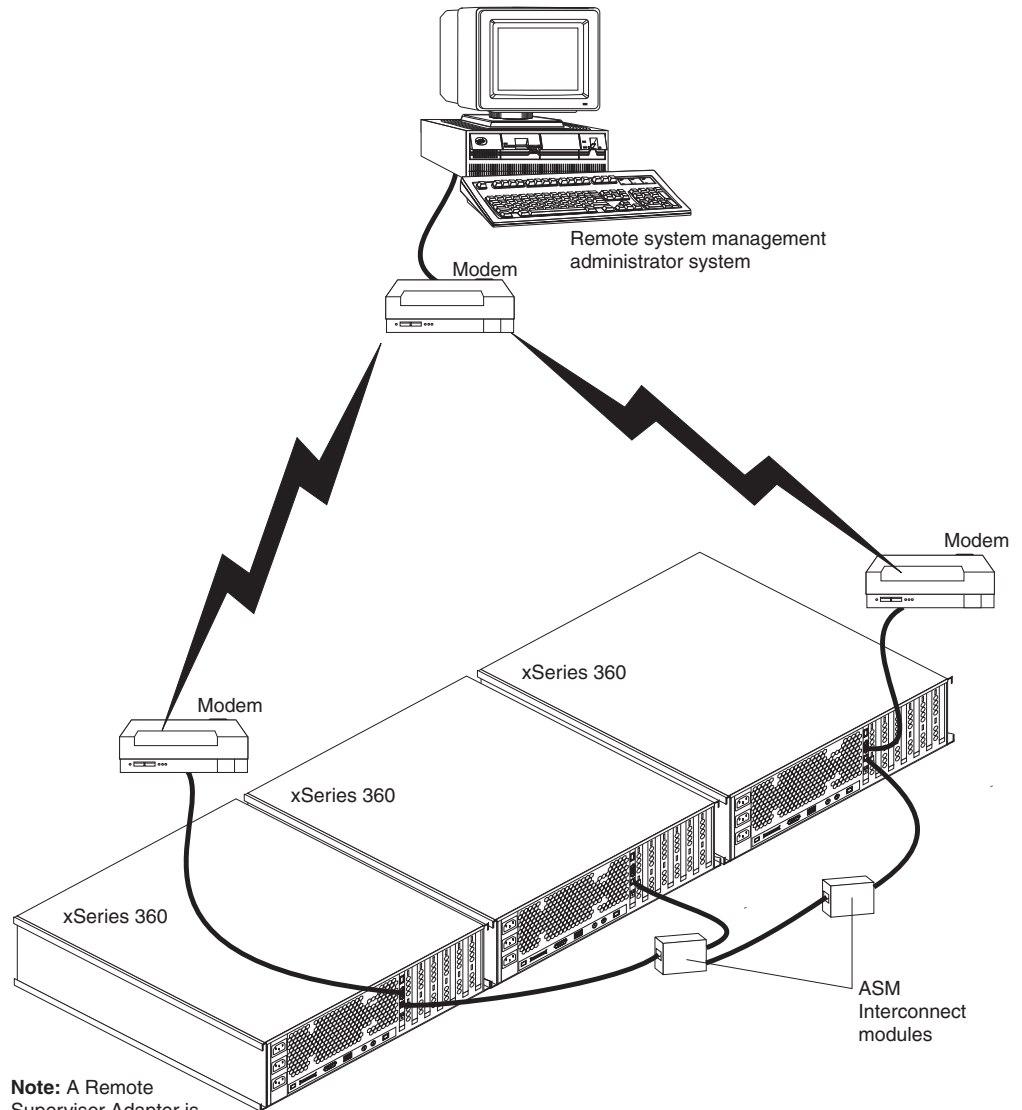
The following illustration shows an Ethernet cable connecting the remote administrator system to the Remote Supervisor Adapter that is installed in an xSeries 360. Server 1 uses the LAN connection to forward system-management data generated by the other servers in the ASM interconnect network bus to the remote system-management administrator.



**Note:** The ASM Interconnect module is connected to the RS485 port on the back panel of the Remote Supervisor Adapter in each server.



The following illustration shows a modem connected to the serial port of the Remote Supervisor Adapter in the xSeries 360 on the left, a modem connected to the serial port of the Remote Supervisor Adapter in the xSeries 360 on the right, and a modem connected to the remote administrator system. Placing modems at opposite ends of the ASM interconnect network bus ensures that if an ASM interconnect connection in the bus fails, all of the servers on the ASM interconnect network have access to a modem to forward system-management data to the remote system-management administrator.



**Note:** A Remote Supervisor Adapter is required in each server.

**Note:** The ASM Interconnect module is connected to the RS485 port on the back panel of the Remote Supervisor Adapter in each server.



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## Using the ServerGuide CDs

The ServerGuide CDs include easy-to-use software setup tools and installation tools that are specifically designed for the IBM server. The ServerGuide Setup and Installation program detects the server model and hardware options that are installed and uses that information during setup to configure the hardware. The ServerGuide tools simplify network operating system (NOS) installations by providing updated device drivers, and in some cases, installing them automatically.

If a later version of the ServerGuide software is available, you can download a free image of the software. To download the latest ServerGuide software, see the ServerGuide page on the IBM Support Web site at:  
<http://www.ibm.com/pc/qtechinfo/MIGR-4ZKPPT.html>.

The ServerGuide software has these features to make setup easier:

- An easy-to-use interface with online help
- Diskette-free setup and configuration programs that are based on detected hardware
- Performance Optimizer program, which easily tunes the ServeRAID adapter settings for the server environment
- A system BIOS update program, which updates the BIOS directly from the CD
- Device drivers that are provided for your server model and detected hardware
- NOS partition size and file-system type that are selectable during setup
- Powerful application programs and administration tools

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## Features at a glance

The following is a summary of ServerGuide features.

**Note:** Specific features and functions can vary with different versions of the ServerGuide software. To learn more about the version that you have, start the *Setup and Installation* CD and view the online Overview.

<p><b>Setup and Installation CD</b> <b>Note:</b> The ServerGuide program requires a supported IBM server with an <i>enabled</i> startable (bootable) CD-ROM drive. Not all features are supported on all models.</p> <ul style="list-style-type: none"><li>• Sets system date and time.</li><li>• Detects the ServeRAID adapter or controller and runs the ServeRAID configuration program.</li><li>• Updates the licensed internal code (firmware) level without creating diskettes.</li><li>• Checks the system BIOS code and microcode (firmware) levels of supported options to determine whether a later level is available from the CD. You can perform updates without the use of diskettes.</li><li>• Provides the Performance Optimizer program to easily tune the ServeRAID adapter settings for the server environment.</li><li>• Creates a System Partition on the default drive. You can run server-specific utility programs after setup.</li></ul>	<p><b>Setup and Installation CD</b> (continued)</p> <ul style="list-style-type: none"><li>• Detects installed hardware options and provides updated device drivers for most adapters and devices.</li><li>• Creates a <i>Setup Replication Diskette</i> for replicating setup selections for other servers of the same model.</li><li>• Provides diskette-free installation for supported operating systems.</li><li>• Provides a replicated installation path for multiple installations of supported operating systems.</li><li>• Includes an online README file with links to tips for the hardware and NOS installation.</li></ul> <p><b>Note:</b> Installation requires the NOS CD.</p>	<p><b>System Updates and Applications CD</b></p> <ul style="list-style-type: none"><li>• Creates diagnostic, RAID, device driver, and other support diskettes from the CD; or with an Internet connection, you can check for an update from a dedicated IBM file transfer protocol (FTP) server.</li><li>• Installs some updates without requiring diskettes. Where applicable, you can run executable files directly from the CD or unzip files to any drive on the server or another server on the network.</li><li>• Includes a vast library of fully tested device drivers for the server.</li><li>• Includes a search function to help you locate updates by title or keywords.</li><li>• Installs powerful applications directly from the CD. See the CD label for a current list of applications.</li></ul>
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## Setup and configuration overview

When you use the *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 checks the system BIOS code, Remote Supervisor Adapter, and other system hardware to determine whether system updates are available. The setup program provides a list of tasks that are required to set up the server model. On RAID servers, you can run the ServeRAID Manager program to create logical drives.

**Note:** Specific features and functions can vary with different versions of the ServerGuide software.

When you start the *Setup and Installation CD*:

- You are prompted for the language, country, and keyboard layout. (This information is stored and later passed on to the NOS installation program.)
- The ServerGuide program displays choices for running the configuration programs. For example:
  - The Express Configuration method runs the required programs for the server, based on the hardware that is detected.
  - The Custom Configuration method displays all programs that are available for the server, and you decide which programs to run.
  - The Replicated Configuration method provides the option of duplicating your setup selections to other servers that are the same model.
- If you select the Custom Configuration method, the following programs are optional. If you select the Express Configuration method, some or all of these programs are run, depending on the hardware that is detected.
  - The Set Date and Time feature is provided so that you do not have to use the Configuration/Setup Utility program to access these settings.
  - The Clear Hard Disks program is provided so that you can delete all partitions on all hard disk drives. If the server has a ServeRAID adapter installed, you can select to restore the configuration on the ServeRAID adapter to the factory default settings.
  - The ServerGuide program checks the server BIOS code and microcode (firmware) levels for supported options and then checks the CD for a newer level. CD content can be newer than the hardware. The ServerGuide program can perform a flash update of the BIOS code and supported microcode (firmware) options without the use of diskettes.
  - The ServeRAID program starts, guiding you through the entire configuration process.
  - The Performance Optimizer program easily tunes the server for your environment.
  - The ServerGuide program creates a System Partition on the default drive.
- The ServerGuide program displays a confirmation summary, so that you will know when you have completed all the required tasks. Then, you are ready to install the NOS.

**Notes:**

1. Plug and Play adapters are configured automatically. Non-Plug and Play adapters or non-IBM adapters might require switch settings, additional device drivers, and installation after the NOS is installed. See the documentation that comes with the adapter.
2. Diagnostics for the server come in BIOS code or on a separate diagnostics CD.

---

## System partition

The ServerGuide program creates a 50 MB system partition on the default drive. The System Partition contains server-specific utility programs such as Remote Supervisor Adapter disk operating system (DOS) utilities, system diagnostics, flash BIOS updates, and other programs.

**Note:** Programs in the System Partition vary by server model, and not all server models run utility programs from the System Partition. To determine which ones do, start the *Setup and Installation* CD and view the online Overview.

After setup is complete, you can access programs in the System Partition by restarting the server and pressing Alt+F1 when the prompt is displayed. The System Partition menu displays the programs that are available on the server model.

---

## Typical NOS Installation

You can use the ServerGuide program to shorten the installation time. The ServerGuide program provides the necessary device drivers, based on the hardware that you have and the NOS that you are installing. If you prefer to install the NOS without using ServerGuide, go to “Installing the NOS without ServerGuide” on page 61 for details.) The following is a brief explanation of a typical ServerGuide NOS installation.

**Note:** Specific features and functions can vary with different versions of the ServerGuide software

- After you have completed the setup process, the operating system installation program starts. (You will need a copy of the NOS CD to complete the installation.)
- The ServerGuide program stores information about the server model, Remote Supervisor Adapter, hard disk controllers, and network adapters. It then checks the CD for newer device drivers. This information is stored and then passed to the NOS installation program.
- With some NOS installations, you can create a *NOS Replication Diskette* for setting up additional servers. The diskette will contain the Internet protocol (IP) address, server name, and other selections.
- The ServerGuide program presents NOS partition options that are based on your NOS selection and the installed hard disk drives.
- If you are installing the NOS from diskette, the ServerGuide program displays the required diskettes that you must create, and the optional diskettes that you might want to create. The diskettes that you can create are the device driver diskettes for the installed adapters or controllers.

The ServerGuide program prompts you to insert the NOS CD and restart the server. At this point, the installation program for the NOS takes control to complete the installation.

---

## Setting up or updating multiple servers

You can use the ServerGuide program to create diskettes that help you set up or update multiple servers. You can modify information on the diskettes as you use them to set up or update other servers.

**Note:** Availability and function can vary by server model and by the hardware that is installed.

You can create a *Setup Replication Diskette*, which contains your hardware configuration selections. Use this diskette to replicate selections to other servers that are of the same model.

You can create a *NOS Replication Diskette*, which contains information that you need to complete multiple installations. This feature supports servers running some operating systems.

---

## Installing the NOS without ServerGuide

If you have already configured the server hardware and you decide not to use the ServerGuide program to install the NOS, download the latest NOS installation instructions:

1. Go to <http://www.ibm.com/pc/support>.
2. From the **Browse the support site** menu, click **Servers**.
3. From the **Family** menu, click **xSeries 360**.
4. On the left side of the page, click **OS Installation** to see the list of installation instructions for the supported operating systems.
5. From the **Operating System installation by Category** menu, select a supported operating system to see the list of installation instructions.

**Note:** If you select Microsoft Windows NT 4.0 as the NOS, **do not** install the network adapter driver that comes with that product. It does not support the newer onboard network adapter in this server. Instead, install the driver available at the IBM support site mentioned in Step 1

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## Additional programs included with ServerGuide

As a convenience, the ServerGuide program comes with additional software to assist you with the server installation.

A variety of powerful applications are included with the ServerGuide software. Offerings can vary with the different versions of the ServerGuide software. Check the application CD labels for a list of applications, or start the *Setup and Installation* CD and view the online overview.





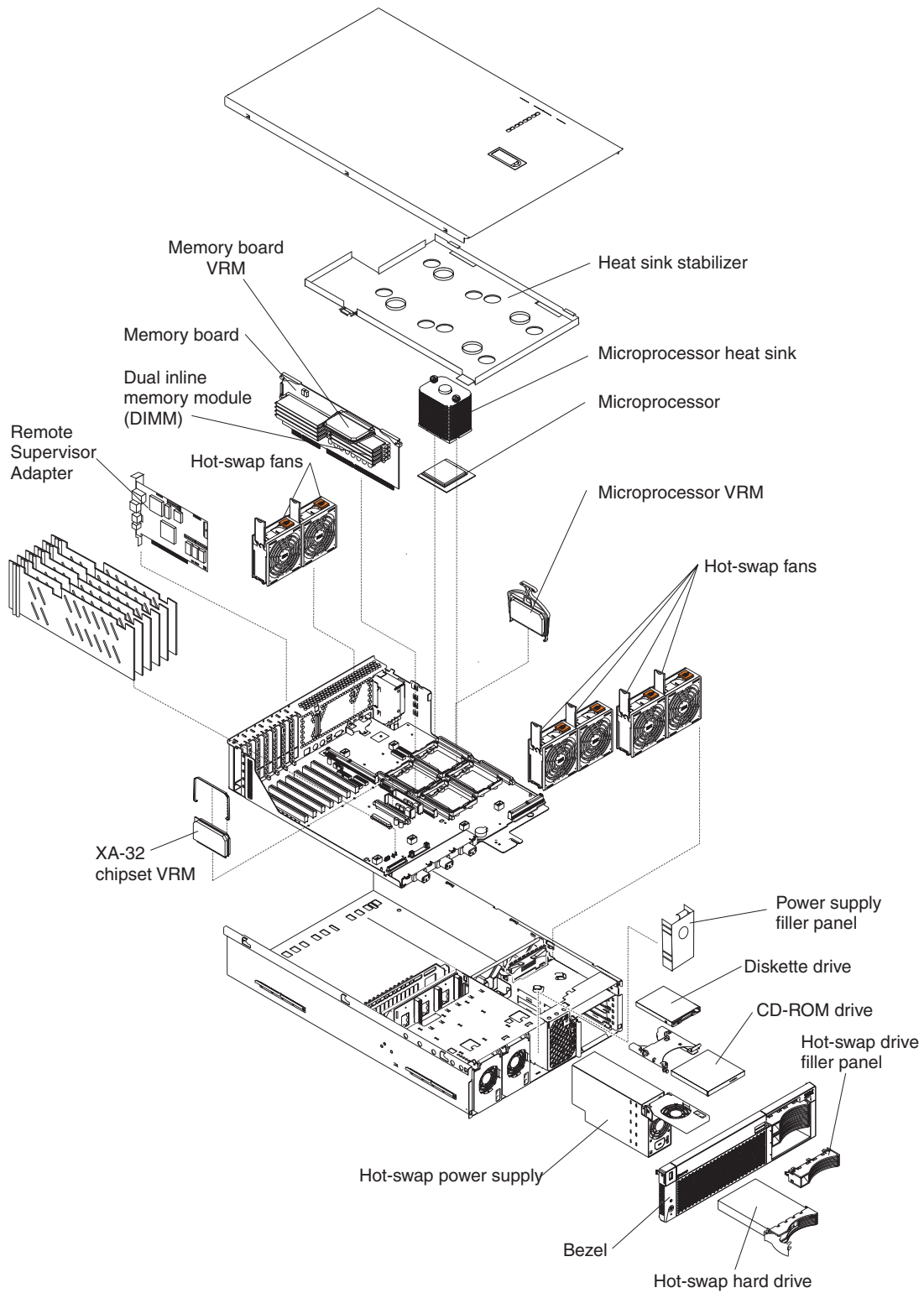
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## Installing components

This chapter provides instructions to help you add components to the server.

## Major components of the xSeries 360 server

The major components of the xSeries 360 server are shown in the following illustration.

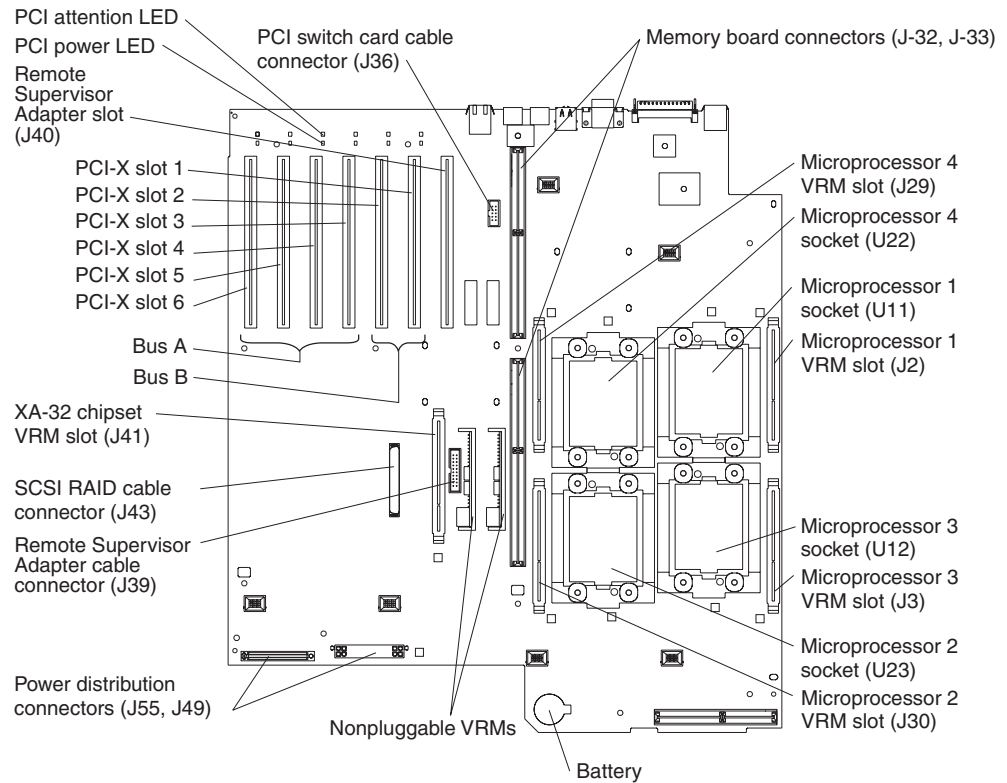


## Internal connector and LED locations

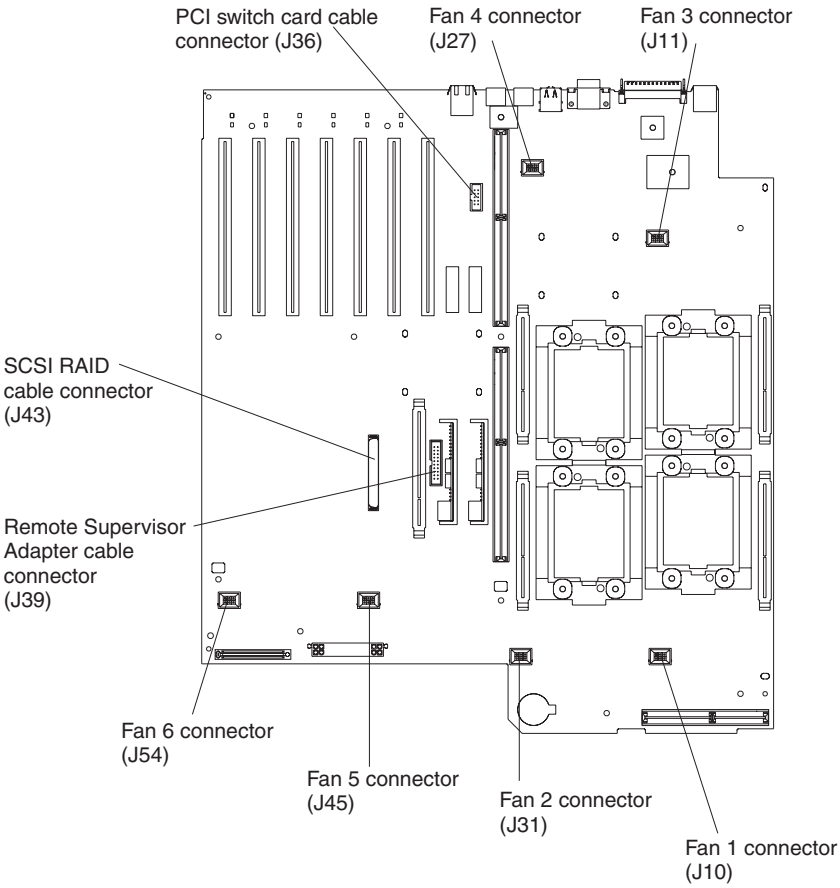
This section shows the locations of components on the system board, level 2 diagnostic LED panel, memory board, and Remote Supervisor Adapter.

### System board locations

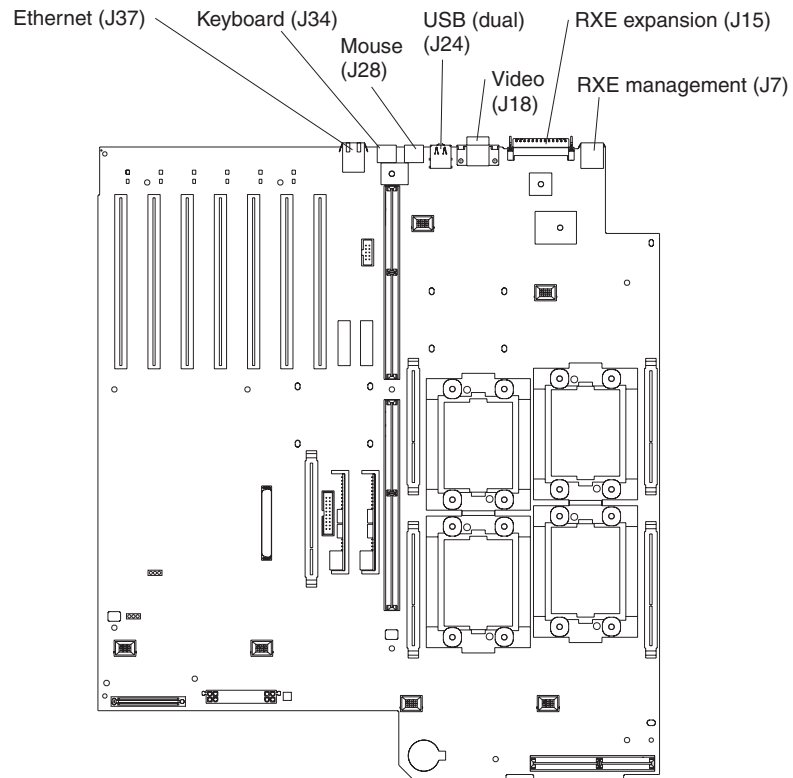
The following illustration shows the location of the connectors on the system board for pluggable components, and the location of the two nonpluggable VRMs used for the PCI slots.



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



The following illustration shows the location of the external I/O port connectors on the system board.



The following illustration shows the location of the flash ROM page swap jumper (J56) and power-on password override jumper (J52) on the system board.

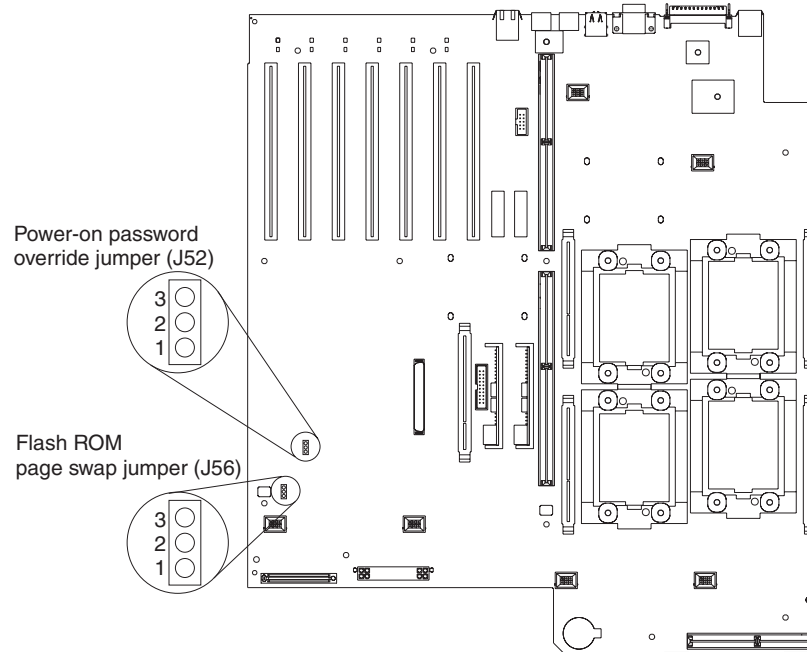
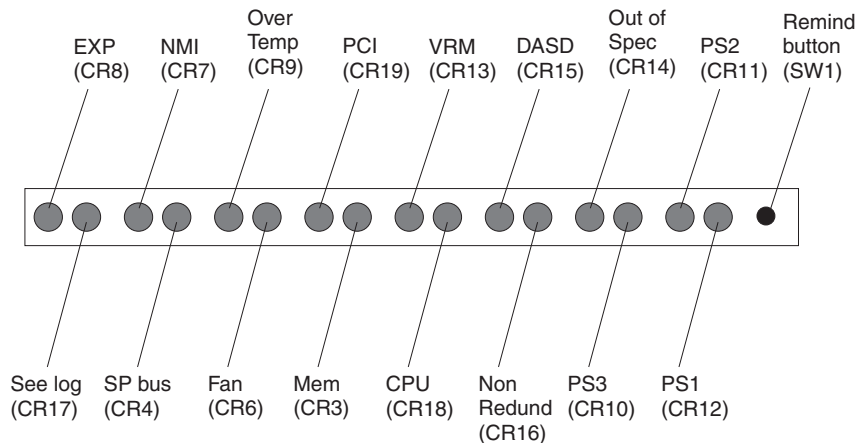


Table 7. Jumpers J52 and J56 on the system board

Jumper name	Description
Flash ROM page swap (J56)	The default position is pins 1 and 2.  See “Recovering the BIOS code” on page 18 for additional information.
Power-on password override (J52)	Changing the position of this jumper bypasses the power-on password check if the jumper has been moved since the server was last powered on. Move the jumper back to the default position after the password is overridden. The default position is pins 1 and 2.  Changing the position of this jumper does not affect the administrator password check if an administrator password is set.  See “Power-on password” on page 32 for additional information on the power-on password.

## Level 2 diagnostic and system board LEDs

The following illustration shows the location of the LEDs on the level 2 diagnostic panel, which is attached to the same metal frame as the hot-swap drive backplane. You can view the diagnostic panel LEDs through a special cutout area on the top cover, to the right of the cover-release latch. However, to determine the exact source of the error condition in the server, you might need to remove the top cover to view the location of a specific error LED on the system board.



The meanings of these LEDs are as follows:

<b>EXP</b>	Attached expansion I/O failure
<b>NMI</b>	Nonmaskable interrupt
<b>Over Temp</b>	System over temperature condition
<b>PCI</b>	PCI failure
<b>VRM</b>	VRM failure
<b>DASD</b>	Hard disk drive failure
<b>Out of Spec</b>	Power supplies being overdriven
<b>PS2</b>	Power supply number 2 failure
<b>Remind button</b>	Remind to invoke remind mode

<b>PS1</b>	Power supply number 1 failure
<b>PS3</b>	Power supply number 3 failure
<b>Non Redund</b>	Nonredundant power mode
<b>CPU</b>	Microprocessor failure
<b>MEM</b>	Memory failure
<b>FAN</b>	Fan failure
<b>SP Bus</b>	Remote Supervisor Adapter failure
<b>See Log</b>	See event log or Remote Supervisor Adapter log for non-optimal condition information

**Notes:**

1. The server supports six replaceable voltage regulator modules (VRMs).
2. The server supports a maximum of three power supplies.
3. See “Level 2 Light Path troubleshooting” on page 21 for a detailed description of these LEDs and how to use them to resolve problems.

**Remind button**

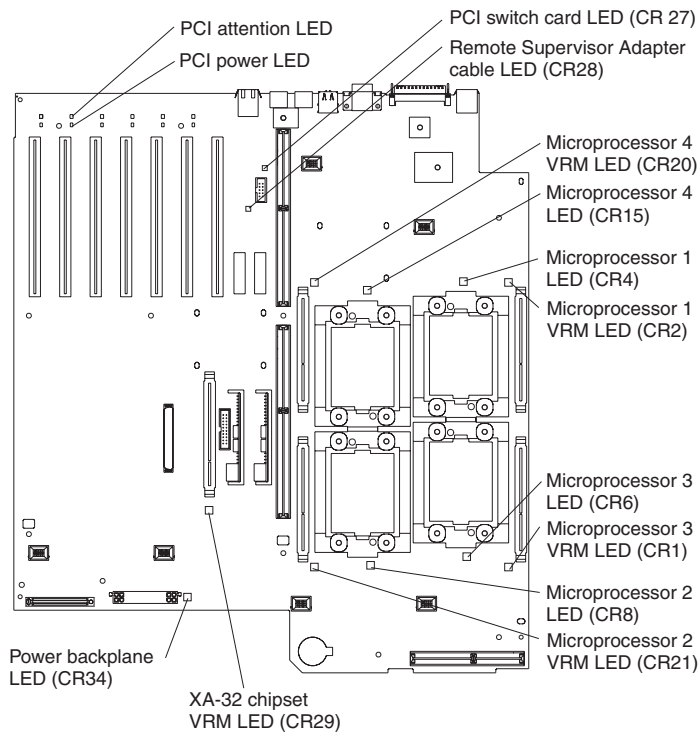
You can use the Remind button to place the Fault light on the front panel into the remind mode (blinks every 2 seconds). By pressing the button, you acknowledge the failure but indicate that you are not taking immediate action. If a new failure occurs, the Fault light turns on again.

The Fault light stays in remind mode until one of the following conditions occurs:

- All known problems are resolved
- The system is restarted
- A new problem occurs

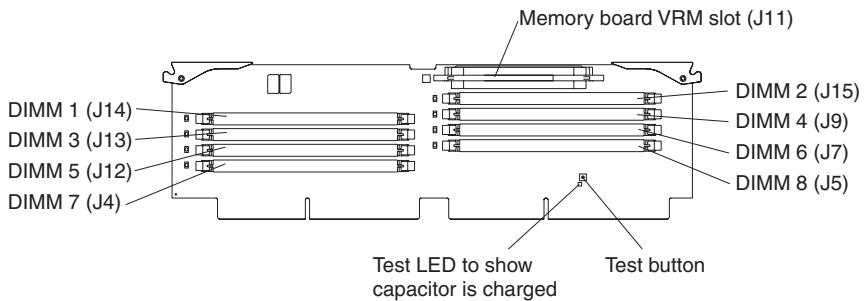
You can use the Remind button to delay server maintenance until a later time. In this way, the light will indicate any subsequent error. If the light is still lit from the first error, it is unable to indicate subsequent errors.

The illustration that follows shows the location of the LEDs on the system board. You might need to refer to this illustration when solving problems with the server.



## Memory board locations

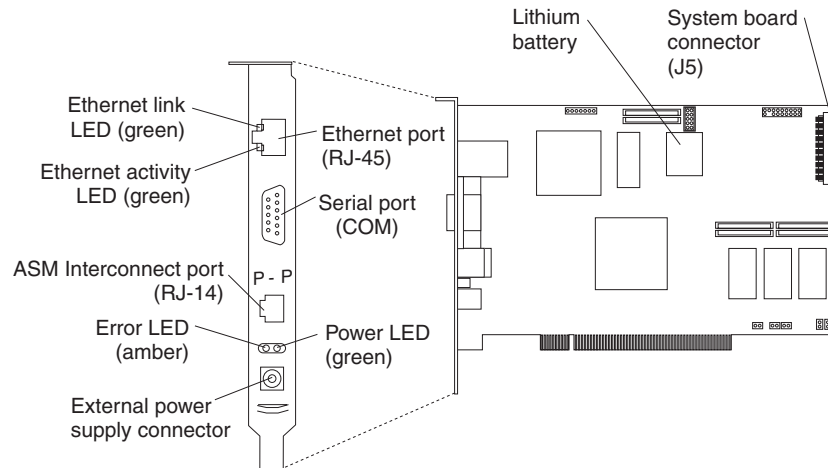
The following illustration shows the location of the dual inline memory module (DIMM) slots on the memory board.





## Remote Supervisor Adapter locations

The following illustration shows the connectors and lights on the Remote Supervisor Adapter.



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## Before you begin

Before you begin to install options in the server, read the following information:

- Become familiar with the safety and handling guidelines specified under “Safety information” on page 145 and “Handling static-sensitive devices” on page 148. These guidelines will help you work safely with the server or options.
- You do not need to turn off the server to install or replace hot-swap power supplies, hot-swap drives, hot-swap fans, Active PCI (hot-plug) adapters, or hot-plug USB devices.
- The orange color on components and labels in the server identifies hot-swap or hot-plug components. You can install or remove these components while the system is running, provided that your system is configured to support this function.
- The blue color on components and labels identifies touch points where you can grip a component, move a latch, and so on.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and any other options that you intend to install.
- Back up all important data before you make changes to disk drives.
- For a list of supported options for the xSeries 360 server, refer to <http://www.ibm.com/pc/us/compat> on the World Wide Web.

## System reliability considerations

To help ensure proper cooling and system reliability, make sure that:

- Each of the drive bays has either a drive or a filler panel installed.
- Each of the power supply bays has either a power supply or a filler panel installed.
- There is at least 50 mm (2 inches) of ventilated space at the sides of the server and 100 mm (4 inches) at the rear of the server.
- The top cover is in place during normal operation.
- The top cover is removed for no longer than 30 minutes while the server is operating.
- A removed hot-swap drive is replaced within two minutes of removal.

- Cables for optional adapters are routed according to the instructions that are provided with the adapters.
- A failed fan is replaced within 48 hours.

## Working inside the server with the power on

The server supports hot-plug, hot-add, and hot-swap devices and is designed to operate safely while turned on with the cover removed. Follow these guidelines when you work inside a server that is turned on:

- Avoid loose-fitting clothing on your forearms. Button long-sleeved shirts before working inside the server; do not wear cuff links while you are working inside the server.
- Do not allow your necktie or scarf to hang inside the server.
- Remove jewelry, such as bracelets, necklaces, rings, and loose-fitting wrist watches.
- Remove items from your shirt pocket (such as pens or pencils) that could fall into the server as you lean over it.
- Take care to avoid dropping any metallic objects, such as paper clips, hair pins, or screws, into the server.

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## Internal component locations

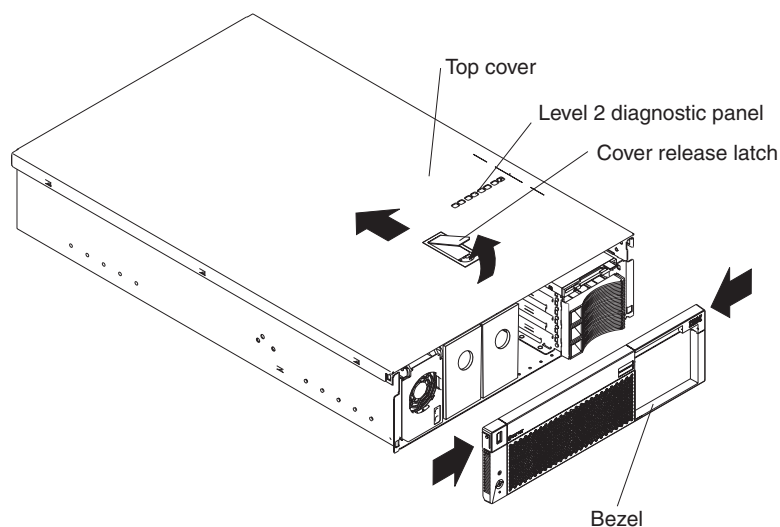
The following sections describe how to replace certain components. For information on component replacement procedures that must be performed by a service technician, see “FRU information (service only)” on page 105.

## Removing the server top cover and bezel

Complete the following steps to remove the server top cover and bezel:

### Notes:

1. Read the information in “Before you begin” on page 71.
2. Read the safety precautions at “Safety notices (multilingual translations)” on page 149.



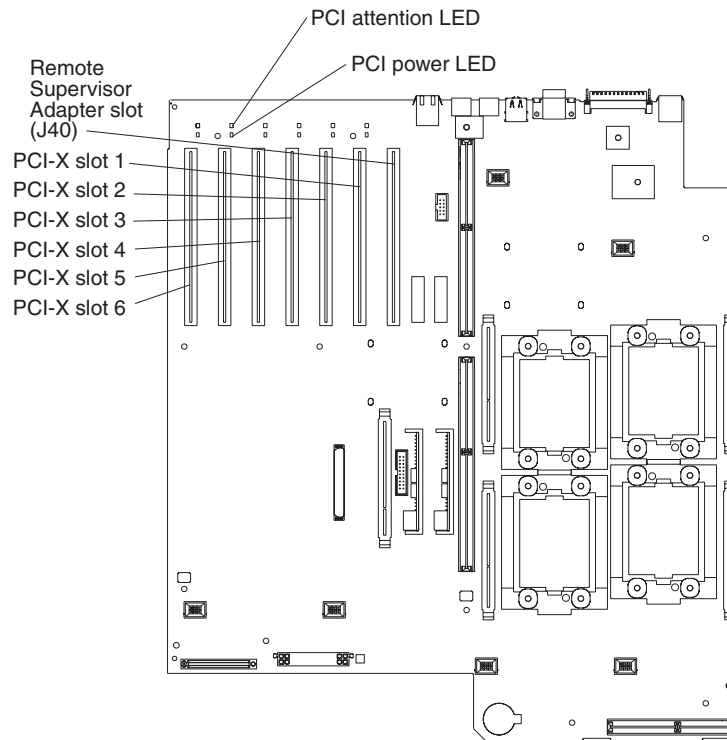
1. Lift the plastic cover-release latch on the top cover.
2. Slide the top cover toward the rear of the server approximately one inch, and then lift it off the server and set it aside.

**Attention:** For proper cooling and airflow, replace the top cover before turning on the server. Operating the server for extended periods of time (over 30 minutes) with the top cover removed might damage server components.

3. Press the bezel release latches at the top edge of the bezel, and pull the top of the bezel slightly away from the server.
4. Pull the bezel up to release the two tabs at the bottom edge of the bezel. Store the bezel in a safe place.

## Working with adapters

The following illustration shows the location of the six hot-plug PCI-X adapter expansion slots, the Remote Supervisor Adapter slot, and their related components on the system board.



This server supports the following adapter configurations:

- Bus A (hot-plug)
  - Four 66 MHz 64-bit PCI-X adapters (slots 3 through 6)
  - Two 66 MHz 64-bit PCI adapters (slots 3 and 4)
  - Four 33 MHz 64-bit PCI adapters (slots 3 through 6)
- Bus B (hot-plug)
  - One 133 MHz 64-bit PCI-X adapter (slot 1)
  - Two 100 MHz 64-bit PCI-X adapters (slots 1 and 2)
  - Two 66 MHz 64-bit PCI-X adapters (slots 1 and 2)
  - Two 66 MHz 64-bit PCI adapters (slots 1 and 2)
  - Two 33 MHz 64-bit PCI adapters (slots 1 and 2)

To the right of PCI-X slot number 1 (as viewed from the front), there is a 33 MHz 64-bit slot dedicated to the Remote Supervisor Adapter.

The following lights are provided for monitoring adapter status:

- Power-on lights for hot-plug PCI-X slots
- Internal attention lights for hot-plug PCI-X slots

If the operating system supports hot-plug PCI/PCI-X adapters, you can replace a failing hot-plug PCI/PCI-X adapter with a new adapter of the same type without turning off power to the server. If the operating system and adapter also support the hot-add feature, you can install a new adapter without turning off the power to the server.

**Attention:** Do not remove a hot-plug PCI/PCI-X adapter before determining whether the operating system requires you to disable the hot-plug PCI-X slot that contains the adapter. Failing to disable the slot in this situation might cause the server to lock up. Refer to the operating-system documentation.

### Adapter considerations

Before you install adapters, review the following:

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this chapter. If you need to change switch settings or jumper settings on the adapter, follow the instructions that come with the adapter.
- Locate the documentation that comes with your operating system. If the operating system provides a way to disable or enable a PCI-X slot you will need this documentation.
- If you install a ServeRAID adapter for use with the internal hot-swap hard disk drives, you must connect the internal channel cable between the adapter and the SCSI RAID cable connector (J43) on the system board. However, if you do this, you cannot install a full-length, wide adapter in PCI-X slot 1.
- The server supports only 3.3 V PCI or PCI-X adapters.
- The server uses a rotational interrupt technique to configure PCI/PCI-X adapters. You can use this technique to install PCI/PCI-X adapters that currently do not support sharing of PCI interrupts.
- PCI-X slots 3 through 6 are on PCI bus A; PCI-X slots 1 and 2 are on PCI bus B.
- By default, the server starts (boots) devices in the following order: system IDE and SCSI devices, then PCI/PCI-X devices.

**Note:** To change the startup order, start the Configuration/Setup Utility program and select **Start Options** from the main menu. Then, select the **Startup Sequence Options**.

### Hot-plug PCI/PCI-X adapter installation

This section describes how to install a hot-plug PCI/PCI-X adapter. Before you continue with the adapter-installation procedure, note that all six PCI-X slots support hot-plug, 64-bit, PCI/PCI-X adapters. If PCI/PCI-X adapters are installed in both slots 1 and 2, they operate at 100 MHz or less, depending on the capacity of the adapter. If one adapter is installed in slot 1 and slot 2 is empty, the adapter in slot 1 can operate at 133 MHz.

**Notes:**

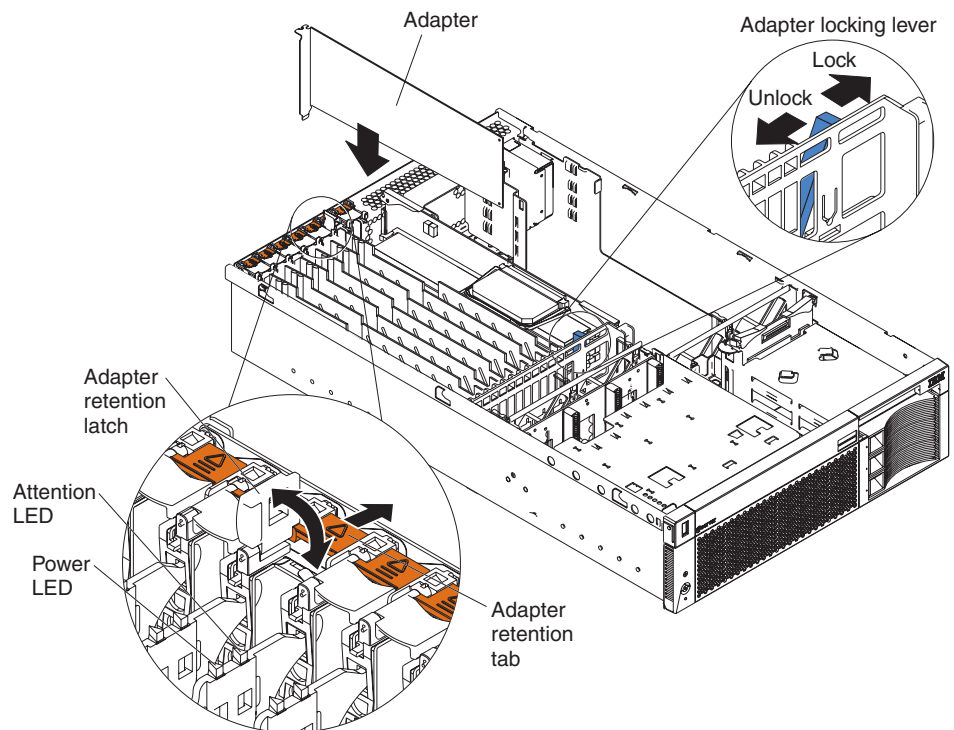
1. Ensure that the PCI hot-plug device driver is installed. For details, see the documentation that came with the adapter.
2. If you are installing a ServeRAID adapter, go to “ServeRAID adapter installation” on page 77. If you are replacing the Remote Supervisor Adapter, go to “Remote Supervisor Adapter replacement” on page 76. Otherwise continue with the following instructions.

Complete the following steps to install a hot-plug PCI/PCI-X adapter:

**Notes:**

1. Read the information in “Before you begin” on page 71.
2. Read the safety precautions at “Safety notices (multilingual translations)” on page 149.
3. Read the material at “Working inside the server with the power on” on page 72.
1. Remove the top cover (see “Removing the server top cover and bezel” on page 72) and determine which PCI-X expansion slot you will use for the adapter.

**Note:** All six PCI-X slots support hot-plug PCI/PCI-X adapters.



2. Slide the orange adapter-retention tab toward the rear of the server and lift the adapter-retention latch. The power LED turns off for the appropriate slot.
3. Slide the expansion-slot cover up and out of the server; then move the blue PCI-adapter locking lever to the right (as viewed from the front) to enable insertion of the new adapter.

**Attention:** Avoid touching the components and gold-edge connectors on the adapter. Ensure that the adapter is completely and correctly seated in the slot. Incomplete insertion might cause damage to the system board or the adapter.

When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static-sensitive devices” on page 148.

4. Remove the adapter from the static-protective package and install the adapter, pressing it *firmly* into the slot.
5. Move the blue PCI-adapter locking lever to the left (as viewed from the front) to secure the adapter; then, lower the adapter-retention latch over the top corner of the adapter. The orange adapter-retention tab snaps into place and the power LED turns on for the slot.
6. Connect any needed cables to the adapter.
7. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 95.

### Remote Supervisor Adapter replacement

The server comes with a non-hot-plug Remote Supervisor Adapter in a dedicated slot to the right of PCI-X slot number 1 (as viewed from the front).

**Note:** It is recommended that after you initially configure the adapter you create a backup copy of it so that if you need to replace the adapter in the future, you can restore the configuration and resume normal operation more quickly.

Complete the following steps to replace the Remote Supervisor Adapter:

#### Notes:

1. Read the information in “Before you begin” on page 71.
2. Read the safety precautions at “Safety notices (multilingual translations)” on page 149.
3. Read the material at “Handling static-sensitive devices” on page 148.
1. Turn off the server, disconnect all power cords and external cables, and remove the top cover (see “Removing the server top cover and bezel” on page 72).
2. Using the illustrations in “Working with adapters” on page 73 and “Hot-plug PCI/PCI-X adapter installation” on page 74 as references for the rest of this procedure, unplug the cable from the connector (J5) on the upper-rear corner of the Remote Supervisor Adapter.
3. Slide the Remote Supervisor Adapter-retention tab toward the rear of the server and lift the adapter-retention latch.

**Attention:** When you handle Electrostatic Discharge-Sensitive devices (ESD), take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static-sensitive devices” on page 148.

4. Lift the adapter out of the slot.
5. Touch the static-protective package that contains the replacement adapter to any unpainted metal surface on the server. Then, remove the adapter from the package.
6. Press the replacement adapter *firmly* into the slot.

**Attention:** When you install an adapter in the server, be sure that it is completely and correctly seated in the system-board slot. Incomplete insertion might cause damage to the system board or the adapter.

7. Reconnect the cable to the connector (J5) on the rear edge of the adapter.

8. Close the adapter-retention latch. The adapter-retention tab snaps into place.
9. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 95.

**Note:** For information about using the Remote Supervisor Adapter, see the *Remote Supervisor Adapter User's Guide* on the *xSeries 360 Documentation CD*.

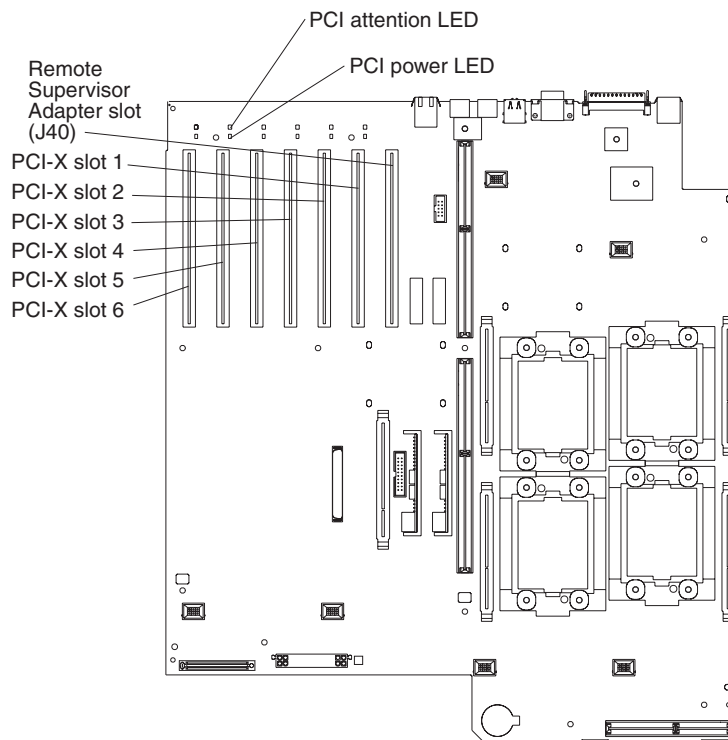
## ServeRAID adapter installation

You can install an optional IBM ServeRAID adapter in any PCI-X slot in the server to enable using internal and external hot-swap hard disk drives as disk arrays. The server supports a variety of ServeRAID adapters for both internal and external configurations. For the most current list of supported RAID adapters, go to <http://www.ibm.com/pc/us/compat> on the World Wide Web.

Complete the following steps to install a ServeRAID adapter:

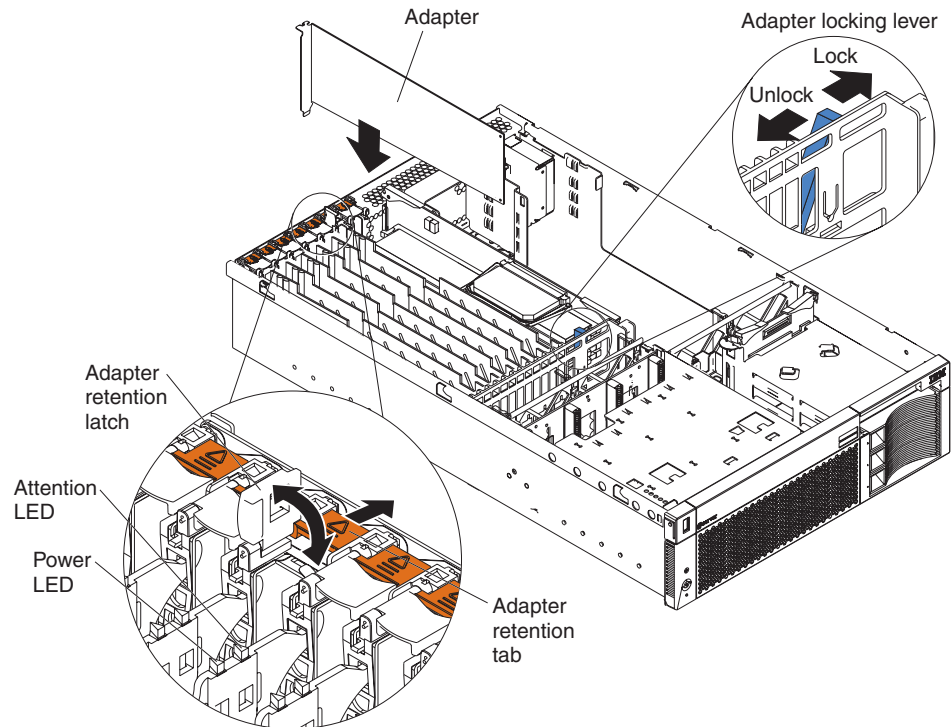
### Notes:

1. Read the information in “Before you begin” on page 71.
2. Read the safety precautions at “Safety notices (multilingual translations)” on page 149.
3. Read the material at “Handling static-sensitive devices” on page 148.
1. Turn off the server, disconnect all power cords and external cables, and remove the top cover (see “Removing the server top cover and bezel” on page 72).



2. Determine which PCI-X expansion slot you will use, slide its orange adapter-retention tab toward the rear of the server, and lift the adapter-retention

latch.

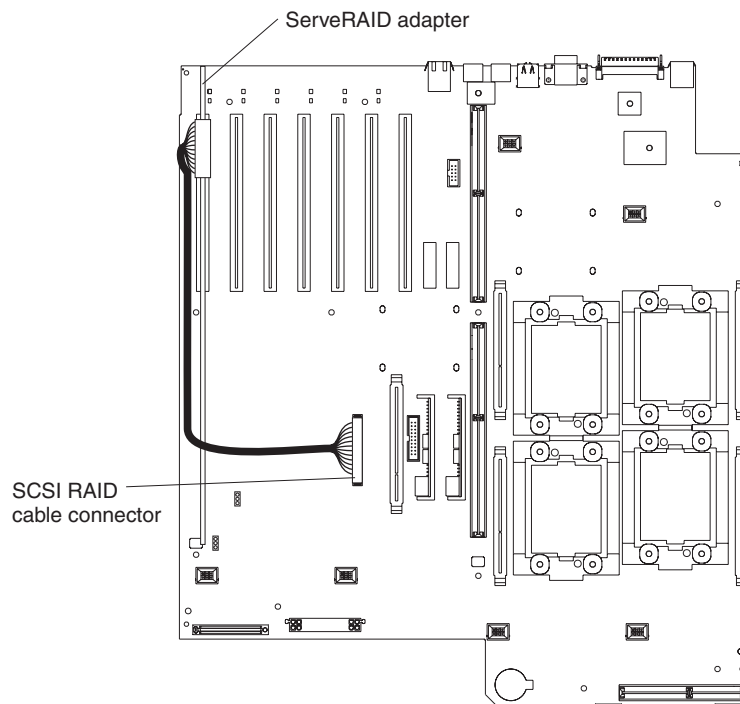


3. Slide the expansion-slot cover up out of the server and move the blue PCI-adapter locking lever (near the rear of the Remote Supervisor Adapter) to the right (as viewed from the front) to permit inserting the ServeRAID adapter.  
**Attention:** When you handle Electrostatic Discharge-Sensitive devices (ESD), take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static-sensitive devices” on page 148.
4. Remove the ServeRAID adapter from the static-protective package and install the adapter, pressing it *firmly* into the selected PCI-X slot.
5. Move the blue PCI-adapter locking lever to the left (as viewed from the front) to secure the adapter; then, lower the adapter-retention latch over the top corner of the adapter. The orange adapter-retention tab snaps into place.
6. For internal hard disk drive connections:
  - a. Plug in one end of the ServeRAID internal channel cable (shipped with the server) to an internal ServeRAID channel connector on the top edge of the ServeRAID adapter as shown in the following illustration. You can install the adapter in any PCI-X slot. It is shown in slot 6 here only as an example.
  - b. Route the cable along the surface of the system board toward the front of the server, then to the right under the adapters and dividers, and plug it into the SCSI RAID cable connector (J43) on the system board.

**Notes:**

- 1) You cannot install a full-length, wide adapter in PCI-X slot 1 if the SCSI RAID adapter cable connector is in use.
- 2) You might need to remove adapters or plastic dividers to access the ServeRAID connector on the system board.
- 3) When the PCI adapter is installed, the internal SCSI controller is disabled and the following error is posted to the System Event/Error log. 00180700 1014010F, System Board PCI device does not respond or was disabled by user.





7. Refer to the documentation provided with the ServeRAID adapter for information about installing the ServeRAID software and configuring the ServeRAID adapter.
8. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 95.

## Internal drive installation

If you add different types of drives, the system can read multiple types of media and store more data. The supported types of drives are:

- Diskette drive
- CD-ROM drive
- Hard disk drive

The server comes with one 3.5-inch 1.44 MB diskette drive and one IDE CD-ROM drive, and it supports a maximum of three hot-swap hard-disk drives.

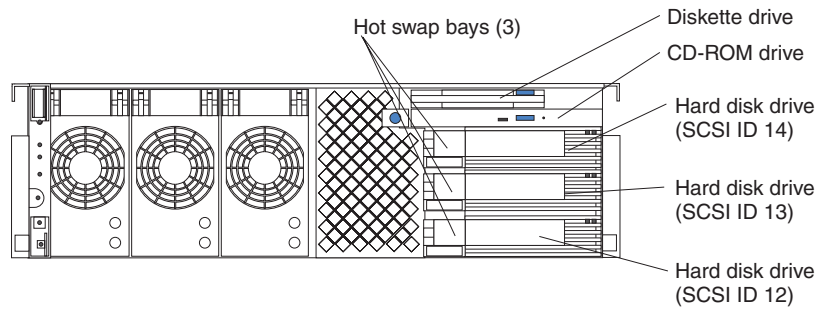
The server contains hardware that enables you to replace a failed hard disk drive without turning off the server. Therefore, you have the advantage of continuing to operate the system while a hard disk drive is removed or installed. These drives are known as *hot-swap* drives.

Each hot-swap hard disk drive has two indicator LEDs (see “Controls and indicators” on page 8). If the amber hard disk drive status LED for a drive is lit continuously, that individual drive is faulty and requires replacement. You can replace the hot-swap drive without turning off the server.

Each hot-swap drive that you plan to install must be mounted in a hot-swap-drive tray. The drive must have a single connector attachment (SCA) connector. Hot-swap-drive trays come with hot-swap drives.

## Internal drive bays

Internal drives are installed in *bays*, as shown in the following illustration.



- The server comes with one 3.5-inch, 1.44 MB diskette drive and one integrated drive electronics (IDE) CD-ROM drive, located above the hard disk drives. The CD-ROM drive bay supports 5.25-inch, half-high, removable-media drives.
- The server supports up to three 26 mm (1-inch) slim-high, 3.5-inch, hot-swap hard disk drives in the hot-swap bays. The bays are located at the right front of the server.
- The hot-swap bays are connected to a hot-swap drive backplane. The backplane is a printed circuit board behind the bays.

## Hot-swap hard disk drive installation

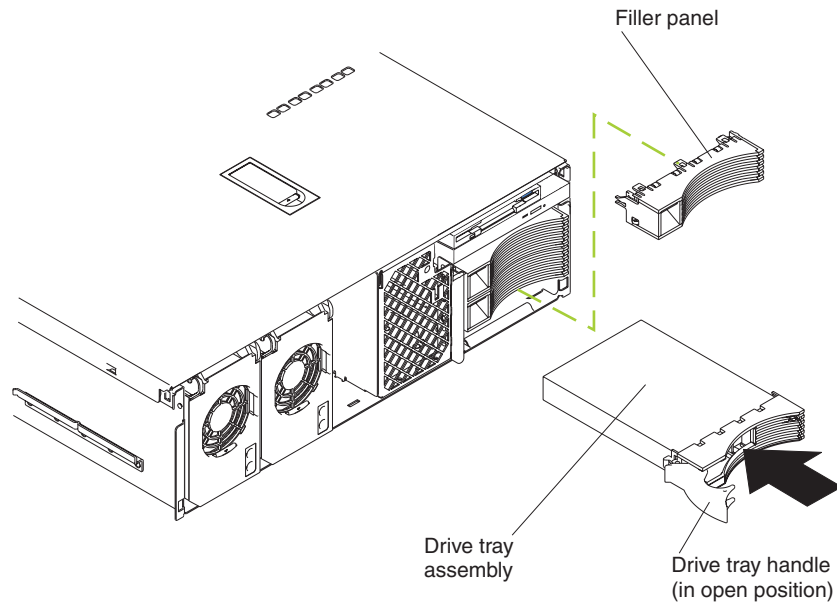
**Note:** You do not have to turn off the server to install hot-swap hard disk drives in these bays.

Complete the following steps to install the drive in a hot-swap bay:

### Notes:

1. Read the information in “Before you begin” on page 71.
2. Read the safety precautions at “Safety notices (multilingual translations)” on page 149.
3. Read the material at “Handling static-sensitive devices” on page 148.
1. Remove the bezel (see “Removing the server top cover and bezel” on page 72).
2. Remove the filler panel from one of the empty hot-swap bays by inserting your finger into the depression at the left side of the filler panel and pulling the panel out of the server, as shown in the following illustration.

**Attention:** To maintain proper system cooling, do not operate the server for more than 10 minutes without either a drive or a filler panel installed in each bay.



3. Install the hard disk drive in the hot-swap bay:
  - a. Ensure that the tray handle is open (that is, perpendicular to the drive).
  - b. Align the drive assembly with the guide rails in the bay.
  - c. Gently push the drive assembly into the bay until the drive stops.
  - d. Push the tray handle to the closed (locked) position.
  - e. Check the hard disk drive status LED to verify that the hard disk drive is operating properly. If the amber hard disk drive status LED for a drive is lit continuously, that individual drive is faulty and needs to be replaced. If the green hard disk drive activity LED is flashing, the drive is being accessed.
4. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 95.

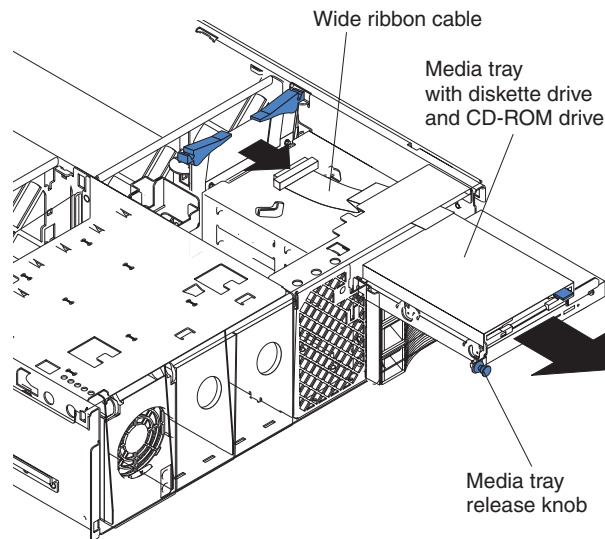
**Note:** If the server has a ServeRAID adapter installed, you might need to reconfigure the disk arrays after installing hard disk drives. See the documentation for the ServeRAID option for details.

## Diskette drive or CD-ROM drive replacement

Complete the following steps to replace either the diskette drive or the CD-ROM drive:

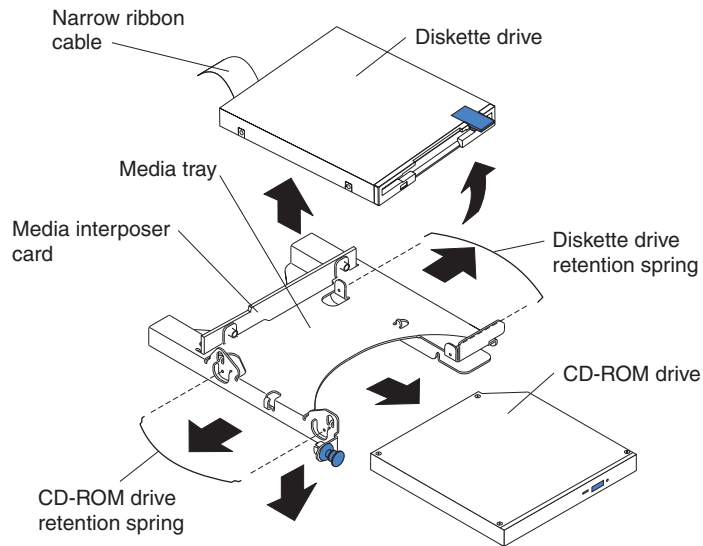
### Notes:

1. Read the information in “Before you begin” on page 71.
2. Read the safety precautions at “Safety notices (multilingual translations)” on page 149.
3. Read the material at “Handling static-sensitive devices” on page 148.
1. Turn off the server, disconnect all power cords and external cables, and remove the top cover and bezel (see “Removing the server top cover and bezel” on page 72).



2. Release two connector retaining clips and unplug the wide ribbon cable between the media interposer card and the hard-disk drive backplane where it plugs into the backplane.

3. Pull out the media tray release knob at the left of the CD-ROM drive and slide the media tray out the front of the server.



4. To detach the diskette drive from the media tray:
  - a. Unplug the narrow ribbon cable between the media interposer card and the diskette drive where it plugs into the diskette drive.
  - b. Release the diskette drive retention spring on the right side of the tray, lift up the right side of the diskette drive, and separate the drive from the alignment pins on the tray.
  - c. To attach the replacement diskette drive to the tray, reverse these steps.
5. To detach the CD-ROM drive from the tray:
  - a. Release the CD-ROM drive retention spring on the left side of the tray and slide the CD-ROM drive toward the front of the tray. As you remove the drive, it unplugs from the media interposer card.
  - b. To attach the replacement CD-ROM drive to the tray, reverse these steps.
6. Slide the tray into the bay and press the media tray release knob to secure it to the frame.
7. Reconnect the wide cable between the media interposer card and the hard disk drive backplane.
8. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 95.

## Memory modules

The server supports up to four pairs of DIMMs and supports memory interleaving. Adding memory to the server is an easy way to make programs run faster.

### Notes:

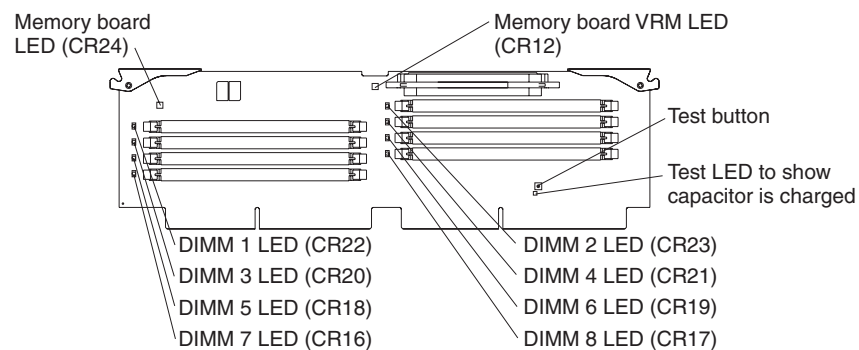
1. The server supports a minimum of 512 MB of system memory and a maximum of 8 GB of system memory. The DIMM slots are arranged in two columns of four rows each. The server supports DIMMs of 256 MB, 512 MB, and 1 GB capacities.
2. Each pair of DIMMs must be the same type, capacity, and speed. However, you can install DIMM pairs of different capacities as long as both DIMMs in each pair are the same.
3. Installing or removing DIMMs changes the configuration information in the server. Therefore, after installing or removing DIMMs, you must save the new configuration information using the Configuration/Setup Utility program. When you restart the server, the system displays a message indicating that the memory configuration has changed. Start the Configuration/Setup Utility program and select **Save Settings**. See “Configuration” on page 27 for more information.

Complete the following steps to install the DIMMs:

### Notes:

1. Read the information in “Before you begin” on page 71.
2. Read the safety precautions at “Safety notices (multilingual translations)” on page 149.
3. Read the material at “Handling static-sensitive devices” on page 148.
1. Turn off the server, disconnect all power cords and external cables, and remove the top cover (see “Removing the server top cover and bezel” on page 72).

**Note:** If the server had a DIMM failure, a DIMM LED on the memory board indicates the failing module.



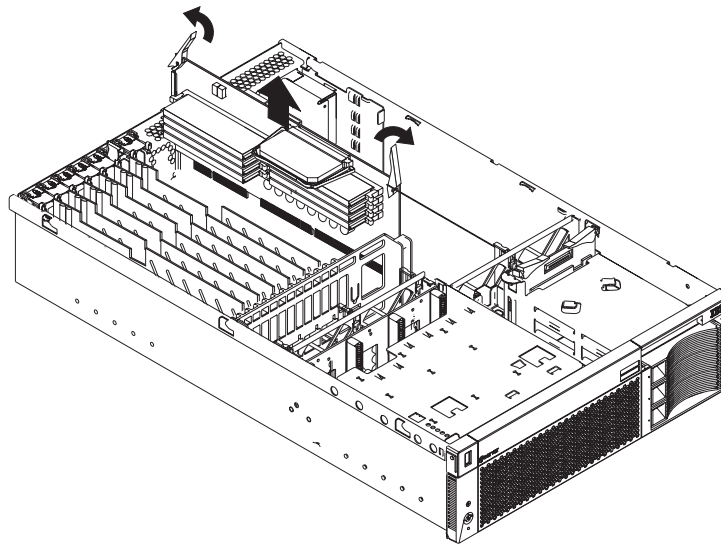
If the DIMM LED is not visible with the memory board in place, after removing the memory board you can press the Test button on the board to relight the failing DIMM's LED. If no DIMM has failed, pressing the Test button lights the Test LED.

2. Remove the memory board as shown in the following illustration:

**Attention:** When you handle Electrostatic Discharge-Sensitive devices (ESD), take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static-sensitive devices” on page 148.

- a. Lift up the two memory-board locking latches to release the board.

- b. Lift the memory board out of the server.



3. When installing additional DIMMs, determine the DIMM slots into which you will install them. You must populate the slots in pairs, one DIMM in each column, proceeding from top to bottom. Use only 2.5 V, 184-pin, PC1600, DDR registered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC).

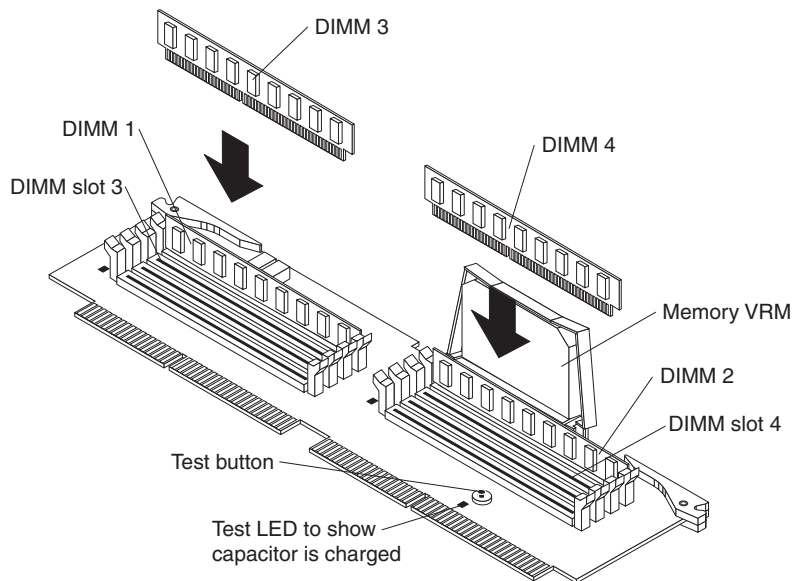


Table 8. DIMM pairs

First pair	DIMMs 1 and 2
Second pair	DIMMs 3 and 4
Third pair	DIMMs 5 and 6
Fourth pair	DIMMs 7 and 8

4. Touch the static-protective package that contains the DIMM option to any unpainted metal surface on the server. Then, remove the DIMM from the package.
5. Turn the DIMM so that the DIMM keys align correctly with the slot.

**Attention:** To avoid breaking the DIMM locking latches or damaging the DIMM slots, handle the latches gently.

6. Ensure that the DIMM locking latches are in the open position. Insert the DIMM by pressing it straight into the slot. Make sure that the locking latches snap into the closed position. If a gap exists between the DIMM and the latches, the DIMM has not been properly installed. In this case, open the latches, remove the DIMM, and reinsert it.
7. Repeat steps 3 through 6 for each additional DIMM that you install.
8. Install the memory board:
  - a. Align the board in the guides over the connector.
  - b. Open the memory-board locking latches and insert the memory board into the connector. Be sure that the locking latches snap into the closed position.
9. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 95.

**Attention:** When you restart the server, the system displays a message indicating that the memory configuration has changed.

- If you installed additional memory, start the Configuration/Setup Utility program and select **Save Settings**.
- If you just replaced a failed DIMM, you must start the Configuration/Setup Utility program, select **Advanced Setup**, select **Memory Settings**, highlight the connector or bank of connectors that you want to enable, and then select **Enable**.
- If the 3-3-3 beep code sounds during POST, the memory board might not be fully seated. In some memory configurations, if the 3-3-3 beep code is followed by a blank display screen, *and* the Boot Fail Count feature in the Start Options of the Configuration/Setup Utility is set to **Enabled** (its default setting), you must restart the server three times to force the system BIOS to reset the memory connector or bank of connectors from **Disabled** to **Enabled**.

## Microprocessor installation

The server comes with a minimum of one microprocessor installed on the system board and supports up to four microprocessors. With more than one microprocessor, the server can operate as a symmetric multiprocessing (SMP) server. With SMP, certain operating systems and application programs can distribute the processing load among the microprocessors.

Before you begin:

- Read the documentation that comes with the microprocessor to determine if you need to update the server basic input/output system (BIOS) code. The most current level of BIOS code for the server is available through the World Wide Web at <http://www.ibm.com/pc/support>.
- Obtain an SMP-capable operating system (optional). For a list of supported operating systems, go to <http://www.ibm.com/pc/us/compat/> on the World Wide Web.

**Attention:** To avoid damage and ensure proper server operation when you install a replacement or an additional microprocessor, use a microprocessor that has the same cache size and type, clock speed, and internal and external clock frequencies as the microprocessors already installed.



**Notes:**

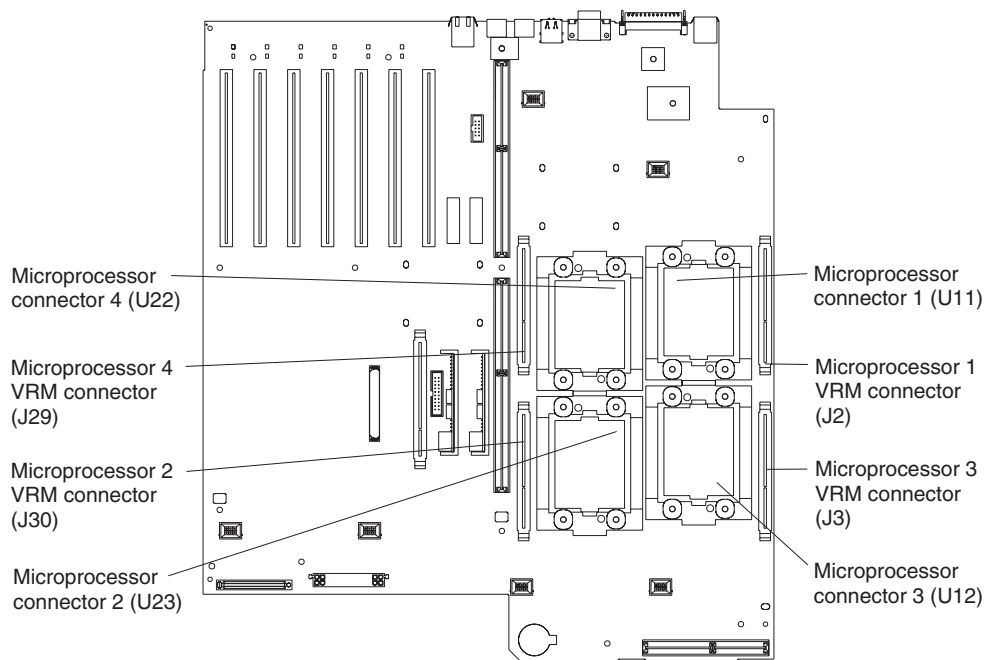
1. The server comes with one microprocessor installed in microprocessor socket 1 on the system board. The microprocessor in socket 1 is the startup (boot) microprocessor. If installed, microprocessor 2 is in socket 2, microprocessor 3 is in socket 3, and microprocessor 4 is in socket 4.

**Important:** If only one microprocessor is installed in the server, it must reside in socket 1.

2. If more than one microprocessor is installed, the highest-numbered microprocessor is the one from which the server starts. The lower-numbered microprocessors are used as application microprocessors.

If you want to install additional microprocessors, populate the microprocessor sockets in numeric order, starting with socket 2. The following illustration shows the locations of the microprocessor sockets and VRMs on the system board.

**Note:** If you install the microprocessors in the wrong order, the server will not power on.



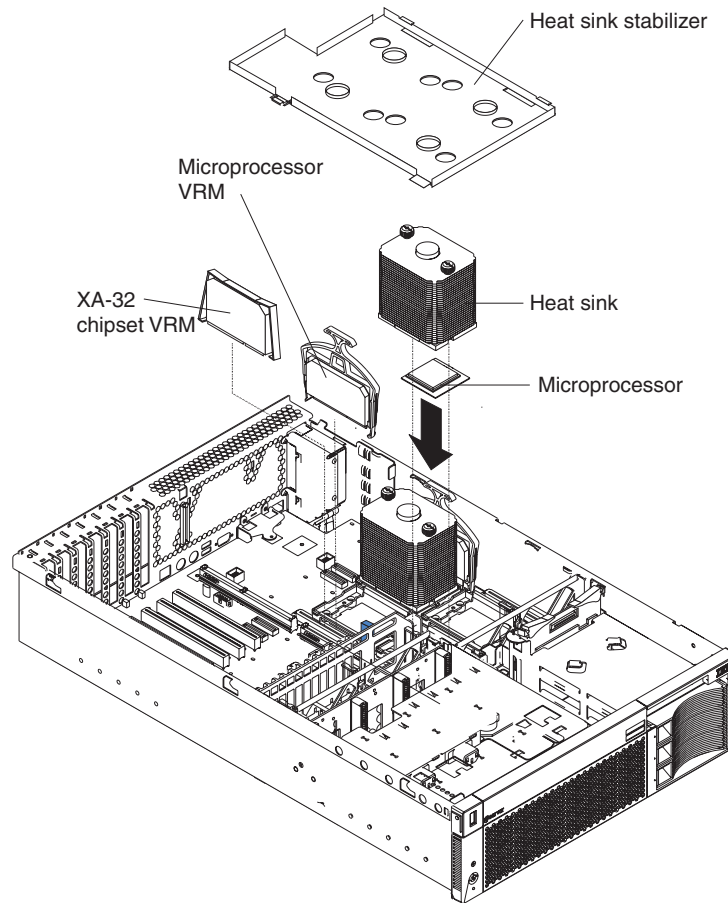
Complete the following steps to install a microprocessor:

**Notes:**

1. Read the information in “Before you begin” on page 71.
2. Read the safety precautions at “Safety notices (multilingual translations)” on page 149.
3. Read the material at “Handling static-sensitive devices” on page 148.
  1. Turn off the server, disconnect all power cords and external cables, remove the top cover (see “Removing the server top cover and bezel” on page 72).

**Attention:** When you handle Electrostatic Discharge-Sensitive devices (ESD), take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static-sensitive devices” on page 148.

2. Lift off the microprocessor heat sink stabilizer as shown in the following illustration and determine the socket where the microprocessor is to be installed.



**Notes:**

- a. The new microprocessor comes in a kit with a VRM and a heat sink.
  - b. If you are installing a new microprocessor, be sure to use the new heat sink that is included in the microprocessor kit.
  - c. If you are reinstalling an existing microprocessor be sure to use the heat sink that was removed from the microprocessor.
  - d. If you are replacing a failed microprocessor, verify that you have selected the correct microprocessor to be replaced. The LED next to the failing microprocessor will be on.
  - e. If you are installing an additional microprocessor, *first* install a VRM in the slot adjacent to the microprocessor socket you have selected and remove the protective tape from the microprocessor socket.
3. If you are removing an installed microprocessor, continue to step 4, if you are installing a new microprocessor continue to step 7 on page 89.
  4. Remove the heatsink by unscrewing only one thumbscrew, then pulling up gently on the heatsink to break the adhesion bond, and then unscrewing the other thumbscrew. Lift the heatsink off of the microprocessor.
  5. Lift the locking lever on the socket of the microprocessor to be removed.
  6. Pull the microprocessor out of its socket.

**Attention:** Processor may release from a locked socket due to high surface tension between the processor and the heatsink. Please follow removal instructions carefully. To properly remove the heatsink, unscrew one thumbscrew first, and pull up gently on the heatsink to break the adhesive bond. Unscrew second thumbscrew, and carefully remove heatsink.

7. To install the microprocessor, touch the static-protective package containing the new microprocessor to any *unpainted* metal surface on the server; then, remove the microprocessor from the package.
8. Examine the pins on the microprocessor to ensure that they are all straight; then, turn the microprocessor 90 degrees and examine the pins from that direction also.

**Attention:** Do not install a microprocessor if its pins are bent.

9. Ensure that the microprocessor locking lever is in the open position to permit plugging in the microprocessor.
10. Align the triangle icon on the microprocessor with the triangle icon on the socket and press the microprocessor gently into the socket.

**Attention:** Make sure that the microprocessor is aligned correctly before you proceed. To avoid bending the pins on the microprocessor, do not use excessive force when pressing it into the socket.

11. Close the locking lever to secure the microprocessor.

**Attention:** Do not disturb or contaminate the heat-conducting grease on the bottom of the new heat sink. Doing so damages its heat-conducting capability and exposes the new microprocessor to overheating.

12. To install the microprocessor heat sink, remove the heat sink from its package and secure it to the top of the microprocessor (two thumbscrews). Press firmly on the thumbscrews and tighten them, alternating between screws until finger tight. Do not overtighten the screws.
13. Install the heat-sink stabilizer.
14. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 95

## VRM replacement

The server comes with one pluggable VRM for each of the microprocessors, one for the chipset, and one on the memory board for the memory components.

### Microprocessor VRM replacement

Complete the following steps to install a microprocessor VRM:

#### Notes:

1. Read the information in “Before you begin” on page 71.
2. Read the safety precautions at “Safety notices (multilingual translations)” on page 149.
1. Turn off the server, disconnect all power cords and external cables, and remove the top cover (see “Removing the server top cover and bezel” on page 72).
2. Lift off the microprocessor heat sink stabilizer.

**Attention:** When you handle Electrostatic Discharge-Sensitive devices (ESD), take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static-sensitive devices” on page 148.

3. If you are replacing a microprocessor VRM, grasp the blue tab and lift the old VRM out of its slot, as shown in the section on installing a microprocessor.

4. Holding the new VRM by the blue tab, plug it *firmly* into the slot; then install the microprocessor heat sink stabilizer.
5. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 95.

### **XA-32 chipset VRM or memory board VRM replacement**

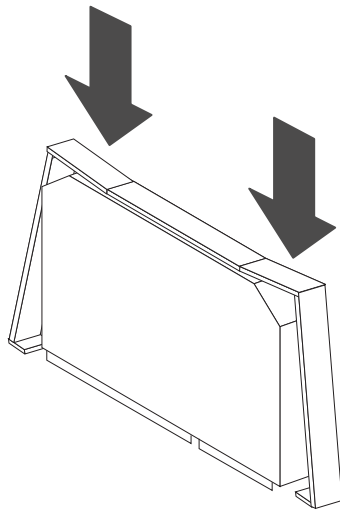
Complete the following steps to replace either the XA-32 chipset VRM or the memory board VRM:

#### **Notes:**

1. Read the information in “Before you begin” on page 71.
2. Read the safety precautions at “Safety notices (multilingual translations)” on page 149.
1. Turn off the server, disconnect all power cords and external cables, and remove the top cover (see “Removing the server top cover and bezel” on page 72).
2. Lift off the microprocessor heat sink stabilizer.

**Attention:** When you handle Electrostatic Discharge-Sensitive devices (ESD), take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static-sensitive devices” on page 148.

3. If you are replacing the memory board VRM, remove the memory board and lay it component side up on a clean, dry surface. If you are replacing the XA-32 chipset VRM, see “System board locations” on page 65 for the location of the VRM.
4. Press down on the VRM retaining clip at one of the points shown. The end of the clip releases from the slot. Release the other end of the clip from the slot and lift off the clip; then remove the VRM from its slot.



5. Holding the replacement VRM by the upper corners, plug it *firmly* into the slot; then install the microprocessor heat sink stabilizer.
6. Reverse the process in step 4 to install the retaining clip over the VRM.
7. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 95.

## **Hot-swap power supply installation**

The server comes with a minimum of one power supply and supports up to three power supplies. If you install or remove a power supply, observe the following precautions.

**Statement 8:**



**CAUTION:**

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

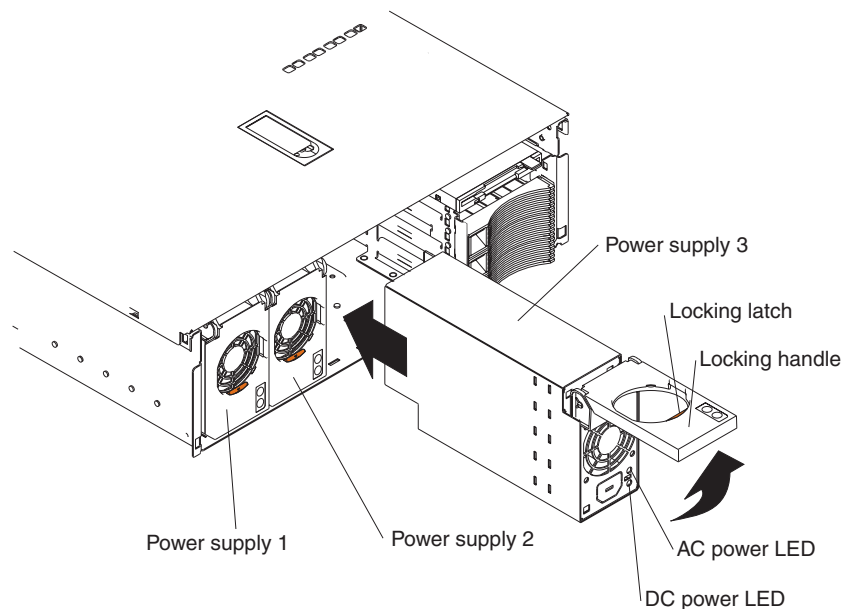


Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

Complete the following steps to install a hot-swap power supply:

**Note:** Read the information in “Before you begin” on page 71 and the safety precautions at “Safety notices (multilingual translations)” on page 149.

1. Remove the bezel. See “Removing the server top cover and bezel” on page 72.
2. Remove the appropriate power-supply filler panel by inserting a finger into the hole and pulling the panel forward. The panel pivots at the top.



**Note:** The power supplies are numbered from left to right (1 to 3) as viewed from the front of the server. Power supplies do not have to be installed in a particular sequence.

**Attention:** To ensure proper system cooling, do not leave the filler panel off the server for more than 30 minutes.

3. Press down on the locking latch and move the locking handle to the open position.
4. Slide the power supply into the chassis, and fully close the locking handle.
5. Plug one end of the power cord for the new power supply into the corresponding connector on the back of the server (connectors are numbered 1 through 3 from top to bottom, illustrated at “Input/output ports” on page 97). Plug the other end of the power cord into a properly grounded electrical outlet.
6. Verify that the dc power and ac power LEDs on the front of the power supply are lit, indicating that the power supply is operating properly.
7. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 95.

## Hot-swap fan replacement

The server comes with six hot-swap fans. You do not need to turn off the power to the server to replace a hot-swap fan.

**Attention:** If a fan fails, replace it within 48 hours to help ensure proper cooling.

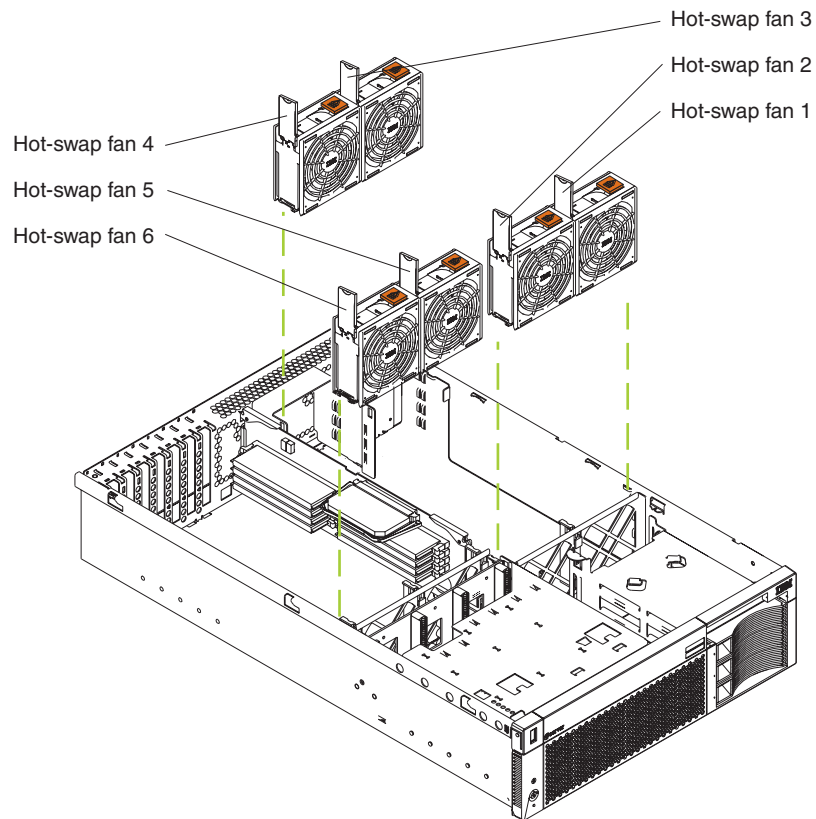
Complete the following steps to replace a hot-swap fan:

### Notes:

1. Read the information in “Before you begin” on page 71.
2. Read the safety precautions at “Safety notices (multilingual translations)” on page 149.
3. Read the material at “Working inside the server with the power on” on page 72.
1. Remove the top cover (see “Removing the server top cover and bezel” on page 72).

**Attention:** To ensure proper system cooling, do not leave the top cover off the server for more than 30 minutes.

2. Lift up the free end of the fan-locking handle and pull upward on the handle to lift the fan out of the server.



3. Open the locking handle on the replacement fan, lower the fan into its socket, and rotate the handle to the locked position.
4. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 95.

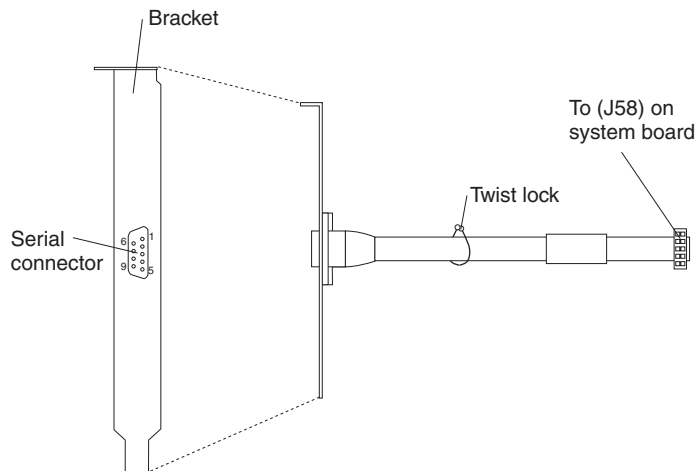
## Installing the serial cable

**Note:** If you install the serial cable, slot 6 is not available for use with a PCI adapter.

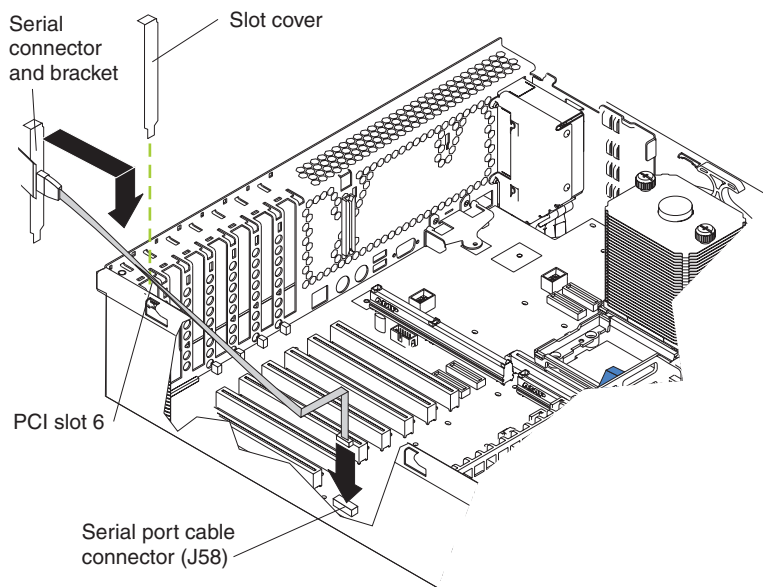
Complete the following steps to install the serial device cable:

1. Review “Safety information” on page 145 and “Handling static-sensitive devices” on page 148.
2. Turn off the server, disconnect all power cords; then, disconnect all external cables.
3. Slide the server out of the rack cabinet until the rails lock in place; then, remove the cover. During the following steps, slide the server in or out of the rack cabinet as needed.

4. Locate the serial device cable that comes with the server.



5. Remove the slot cover for PCI slot 6, and align the end of the serial cable with the 2-pin-by-5-pin connector with the serial port cable connector (J58) on the system board so that pin 1 is at the left rear (as viewed from the front of the server); then, connect the cable.



**Attention:** Do not block airflow with the cable.

6. Install the connector and bracket assembly on the other end of the serial cable into the location where you removed the PCI slot cover for slot 6 in step 5. (The bracket fills the hole in the rear panel so that airflow is not disrupted.)
7. Install the cover; then, slide the server into the rack cabinet, securing it as before.
8. Connect all external cables; then, connect all power cords to a power source.

## Locking PCI slot 6

The IBM Active PCI Manager runs under the IBM Director application. Complete the following steps to use the Active PCI Manager (Slot Manager) program to lock PCI slot 6 to make it unavailable to the server.



**Note:** Your server must have Microsoft Windows 2000 or Microsoft Windows XP installed to use the Active PCI Manager program to lock PCI slot 6.

1. In the IBM Director Console Tasks panel, expand the **Active PCI Manager** task; then, drag the **Slot Manager** task onto a managed system that supports Active PCI Manager. The Slot Manager window opens.
2. In the Tree or Slot view, right-click PCI slot 6; then, click **Lock Slot**.

## Enabling the serial port

Complete the following steps to enable the serial port:

1. Start the Configuration/Setup Utility program (see “Using the Configuration/Setup Utility” on page 28 for details).
2. Select **Devices and I/O Ports** and press Enter.
3. Use the Left Arrow (←) and Right Arrow (→) keys to enable serial port A and select the preferred port and IRQ setting.
4. To enable console redirection, select **Remote Console Redirection**, and press Enter; then, select the preferred settings using the Up Arrow (↑) and Down Arrow (↓) keys to select menu items and the Left Arrow and Right Arrow keys to toggle between settings.
5. Press Esc twice to return to the Configuration/Setup Utility main menu.
6. Select **Exit Setup**, and press Enter.
7. Select **Yes, save and exit the Setup utility**, and press Enter.

**Note:** Depending on the operating system that you are using on your server, you might need to configure the serial port and serial port redirection in your operating system. For instructions for configuring the serial port and serial port redirection for your server using your operating system, see the documentation for the operating system.

## Completing the installation

To complete the installation, you must reinstall the top cover, reinstall the bezel, reconnect all the cables that had been disconnected and, for certain options, run the Configuration/Setup Utility program. Follow the instructions in this section to complete the installation.

**Attention:** To maintain proper cooling and airflow, install the top cover before turning on the server. Operating the server for extended periods of time (over 30 minutes) with the top cover removed might damage server components.

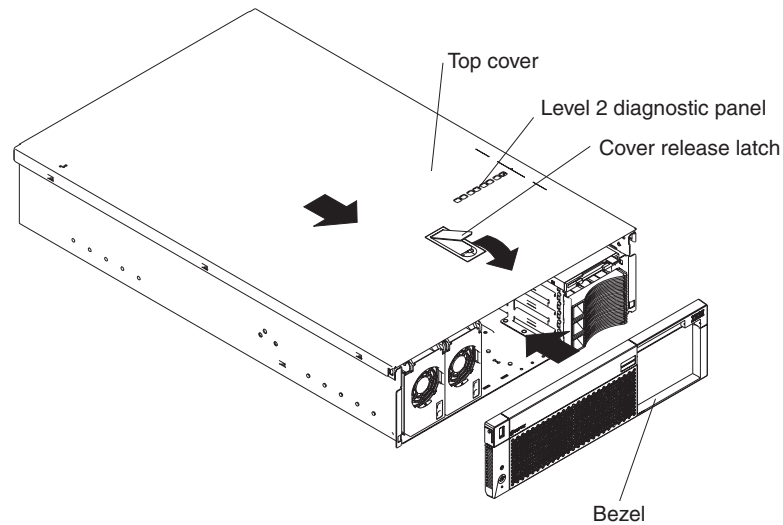
### Installing the server top cover and bezel

Complete the following steps to install the server top cover and bezel.

**Note:** Read the information in “Before you begin” on page 71 and the safety precautions at “Safety notices (multilingual translations)” on page 149.

1. Before installing the cover, check that all internal cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server.

2. Move the cover-release latch to the open (up) position.



3. Insert the tabs on the top cover into the matching slots in the server chassis.
4. Close the cover-release latch to pull the top cover forward and lock the top cover in place.
5. Insert the tabs on the bottom of the bezel into the matching holes on the server chassis.
6. Push the top of the bezel toward the server until the two tabs at the top of the bezel snap into place.
7. If you disconnected any external cables from the back of the server, reconnect the cables; then, plug the power cords into properly grounded electrical outlets.

**Notes:**

- a. If necessary, see “Input/output ports” on page 97 for connector locations.
- b. If you have just plugged the power cords of the server into an electrical outlet, you must wait approximately 30 seconds before pressing the power-control button.

## Updating the server configuration

When you start the server for the first time after you add or remove an internal option or an external SCSI device, you might see a message telling you that the configuration has changed. The Configuration/Setup Utility program automatically starts so that you can save the new configuration information. See “Configuration” on page 27.

Some options have device drivers that you need to install. See the documentation that comes with the option for information about installing any required device drivers.

The server comes with at least one microprocessor installed on the system board. If you have installed one or more additional microprocessors, the server can now operate as an SMP server. Therefore, you might need to upgrade the operating system to support SMP. See “Using the ServerGuide CDs” on page 57 and the operating-system documentation for additional information.

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

If you are using the Remote Supervisor Adapter to manage the server from a remote location, see “Remote Supervisor Adapter” on page 38 and the *Remote Supervisor Adapter User’s Guide* on the *xSeries 360 Documentation CD* for information about setting up and configuring the adapter and using the adapter to manage the server remotely.

## Connecting external options

You can attach external options to the input/output (I/O) connectors on the rear of the server. (See “Input/output ports” for more information.)

Complete the following steps to attach an external device:

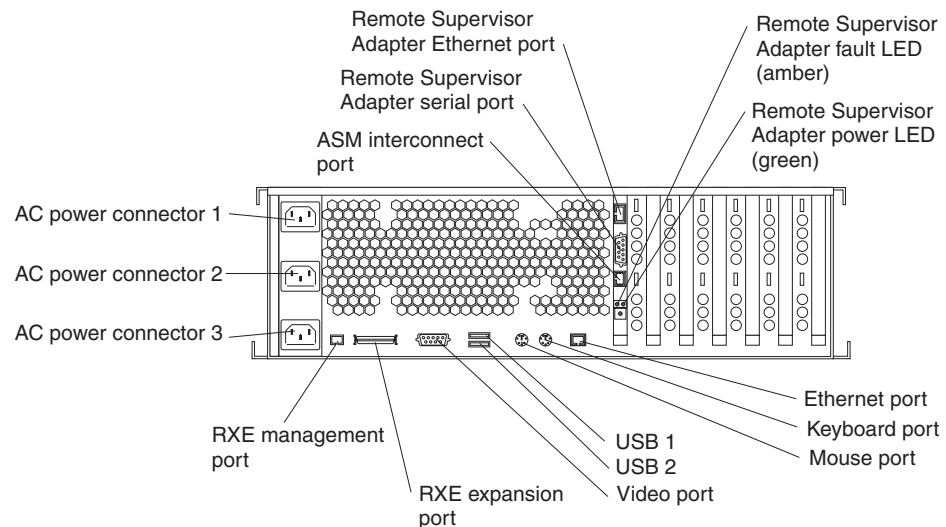
1. Read the information in “Before you begin” on page 71 and the documentation that comes with the options.
2. Turn off the server and all attached devices.
3. Follow the instructions that come with the option to prepare it for installation and to connect it to the server.

## Input/output ports

This section provides information about the following input/output (I/O) ports on the front and rear panels of the server:

- Three Universal Serial Bus (USB) ports (one front, two rear)
- One video port
- One keyboard port
- One auxiliary-device (pointing device) port
- One RXE management port
- One RXE expansion port
- One Ethernet port
- Remote Supervisor Adapter ports
  - One ASM interconnect (peer-to-peer) port
  - One Ethernet port (remote server management using a network)
  - One serial port (remote server management using a modem)
  - One external power connector

The following illustration shows the I/O ports on the rear of the server.



## Universal Serial Bus ports

The server has three Universal Serial Bus (USB) ports (one on the front, two on the rear), which are configured automatically. USB is a serial interface standard for telephony and multimedia devices. It uses Plug and Play technology to determine the type of device that is attached to the connector.

### Notes:

1. If you attach a standard (non-USB) keyboard to the keyboard connector, the USB ports and devices will be disabled during the power-on self-test (POST).
2. If you install a USB keyboard that has a mouse port, the USB keyboard emulates a mouse, and you will not be able to disable the mouse settings in the Configuration/Setup Utility program.

**USB cables and hubs:** You need a 4-pin cable to connect devices to the USB ports. If you plan to attach more than three USB devices, you must use a hub to connect the devices. The hub provides multiple connectors for attaching additional external USB devices.

USB technology provides up to 12 megabits-per-second (Mbps) speed with a maximum of 127 external devices and a maximum signal distance of five meters (16 ft) per segment.

**USB-port pin assignments:** Each USB port has an external connector on the server for attaching USB-compatible devices.

The following table shows the pin-number assignments for the USB ports.

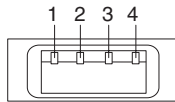


Table 9. USB-port connector pin-number assignments

Pin	Signal
1	VCC
2	-Data
3	+Data
4	Ground

## Video port

The server comes with an integrated super video graphics array (SVGA) video controller. This controller is not removable, but you can disable it by installing a PCI/PCI-X video adapter.

**Note:** If you install a PCI/PCI-X video adapter, the server BIOS code will automatically disable the integrated video controller.

The following table shows the pin-number assignments for the 15-pin analog video connector on the rear of the server.

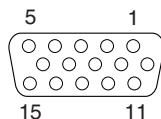


Table 10. Video-port connector pin-number assignments

Pin	Signal	Pin	Signal	Pin	Signal
1	Red	6	Ground	11	Not connected
2	Green or monochrome	7	Ground	12	DDC SDA
3	Blue	8	Ground	13	Horizontal synchronization (Hsync)
4	Not connected	9	+5 V dc	14	Vertical synchronization (Vsync)
5	Ground	10	Ground	15	DDC SDL

## Keyboard port

There is one keyboard port on the rear of the server.

**Note:** If you attach a standard (non-USB) keyboard to the keyboard port, the USB ports and devices will be disabled during the power-on self-test (POST).

The following table shows the pin-number assignments for the keyboard port on the rear of the server.

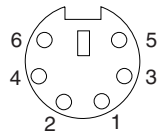


Table 11. Keyboard connector pin-number assignments

Pin	I/O	Signal
1	I/O	Data
2	N/A	Reserved
3	N/A	Ground
4	N/A	+5 V dc
5	I/O	Keyboard clock
6	N/A	Reserved

## Auxiliary-device (pointing device) port

The system board has one auxiliary-device port that supports a mouse or other pointing device.

The following table shows the pin-number assignments for the auxiliary-device port on the rear of the server.

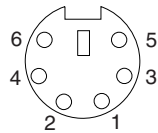


Table 12. Auxiliary-device connector pin-number assignments

Pin	Signal
1	Data
2	Not connected

Table 12. Auxiliary-device connector pin-number assignments (continued)

Pin	Signal
3	Ground
4	+5 V dc
5	Clock
6	Not connected

### RXE Expansion port

The RXE Expansion port connector is used to cable over to the RXE-100 Remote Expansion Enclosure that can contain up to 12 additional PCI-X slots. The RXE-100 Remote Expansion Enclosure is a modular design that as a base unit contains a minimum of 6 full length PCI-X slots. An additional 6 full length PCI-X slots can be added to attain the total of 12 PCI-X slots.

### RXE Management port

A second cable is attached to the RXE management port (RJ-45) to provide environmental control communication between the host system and the RXE-100 Remote Expansion Enclosure.

### Ethernet port

The server comes with an integrated Ethernet controller. This controller provides an interface for connecting to 10-Mbps or 100-Mbps networks and provides full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN).

The following illustration and table show the pin-number assignments for the Ethernet connector. These assignments apply to both 10BASE-T and 100BASE-TX devices.

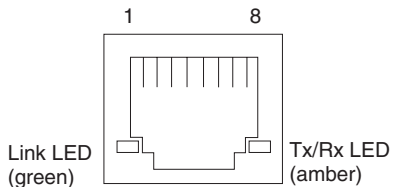


Table 13. Ethernet connector pin-number assignments.

Pin	Signal	Pin	Signal
1	Transmit data+	5	Not connected
2	Transmit data-	6	Receive data -
3	Receive data+	7	Not connected
4	Not connected	8	Not connected

### Remote Supervisor Adapter communication ports

The server has four communication ports that are used by the Remote Supervisor Adapter. Three of the ports are located on the adapter and one is located at the lower left corner of the rear panel (as viewed from the rear).

- The interconnect function uses the ASM interconnect (peer-to-peer) port and enables you to connect the server with other servers.
- The remote expansion I/O management function uses the RXE management port and enables the Remote Supervisor Adapter to manage an attached optional IBM

RXE-100 Remote Expansion Enclosure. The RXE expansion port enables the exchange of data between the server and the enclosure.

- The Ethernet port enables remote management of the server through a network.
- The serial port enables remote management of the server through a modem.

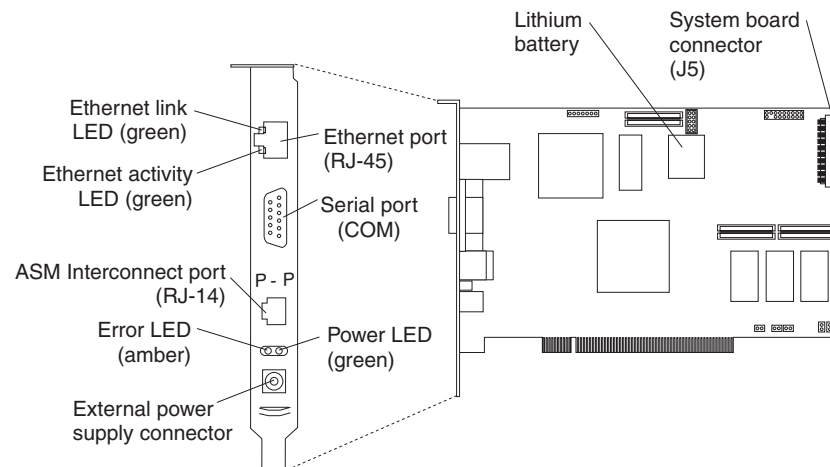
If you want to use the Remote Supervisor Adapter to manage the server remotely or to connect the server to another server, connect the appropriate cables to the Remote Supervisor Adapter ports.

**Attention:** Do *not* connect the ASM interconnect port to the RXE management port (shown at “Input/output ports” on page 97).

To enable remote server management through a network, use the Remote Supervisor Adapter Ethernet port. To enable remote server management using a modem, use the Remote Supervisor Adapter serial port. To connect the server with another server, use the ASM interconnect port.

See the Remote Supervisor Adapter documentation on the *xSeries 360 Documentation* CD for more information.

The following illustration shows the communication ports and other major components on the Remote Supervisor Adapter.



### Ethernet port

Connect an appropriate Ethernet cable (Category 5 is recommended) to this port to enable a LAN connection or TELNET session. The Ethernet port LEDs on the Remote Supervisor Adapter indicate whether the link is good and whether activity is taking place on the network.

### Serial port

Connect a serial cable to this port to enable system management through a modem, or connect a null modem cable to enable system management through a workstation or laptop computer.

### Advanced System Management (ASM) interconnect port

Attach an ASM Interconnect module (which comes with the server) to this port to connect the Remote Supervisor Adapter to the other devices on the ASM Interconnect network.

**Power and error LEDs**

The green power LED indicates the status of the power connection. The amber Error LED indicates an error on the Remote Supervisor Adapter.

**External power-supply connector**

Connect the optional power-supply adapter to this connector. This connection provides power to the Remote Supervisor Adapter, independent of the server power supply.

**Lithium battery**

This battery provides backup of the Remote Supervisor Adapter real-time clock, event log, and configuration settings.

**System board connector**

This cable connects to the Remote Supervisor Adapter cable connector (J39) on the system board.

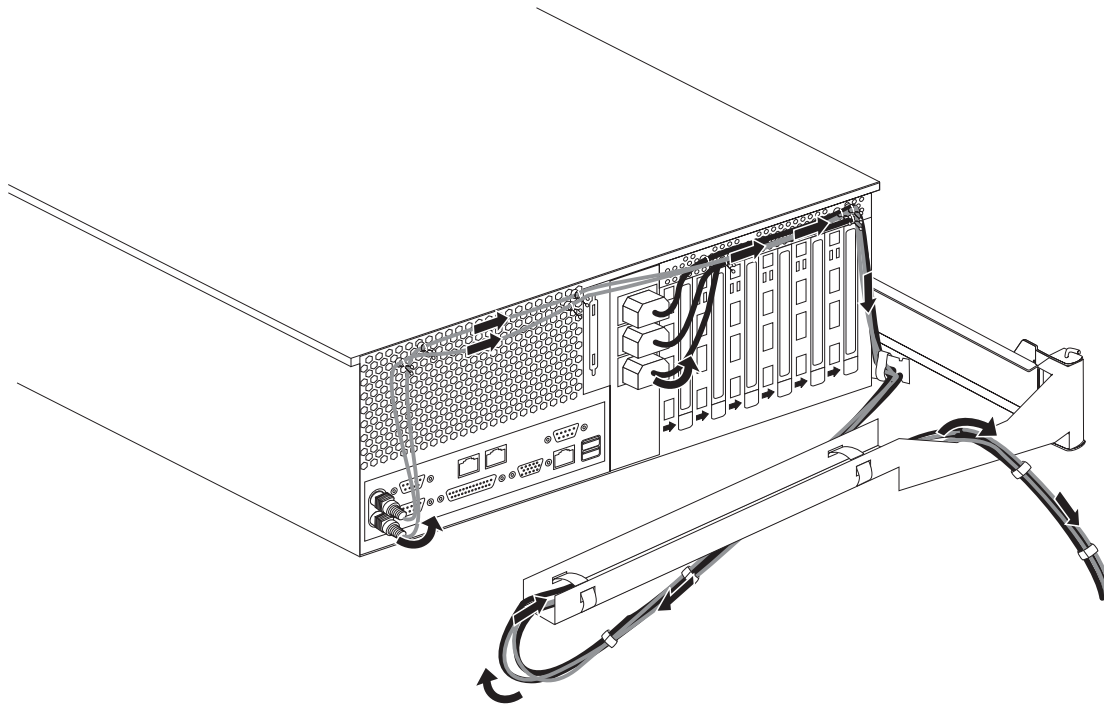


## Cabling the server

The following illustration shows the cable routing for a typical server configuration. Detailed cabling instructions, including the use of the cable management arm, are given in the *Rack Mounting Instructions* that come with the server. See “Input/output ports” on page 97 for a description of the ports on the server rear panel.

### Notes:

1. Refer to the documentation that comes with the options for additional cabling instructions. It might be easier for you to route any cables before you install certain options.
2. The cable management arm does not ship with the rack kit. It ships with the country kit.



**Attention:** This illustration is for demonstration purposes only; your hardware might differ.



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## FRU information (service only)

The following information describes procedures for removing and installing certain components inside the system. Only a qualified service technician is authorized to access the components described in this section.

**Note:** Before servicing this system, read “Before you begin” on page 71.

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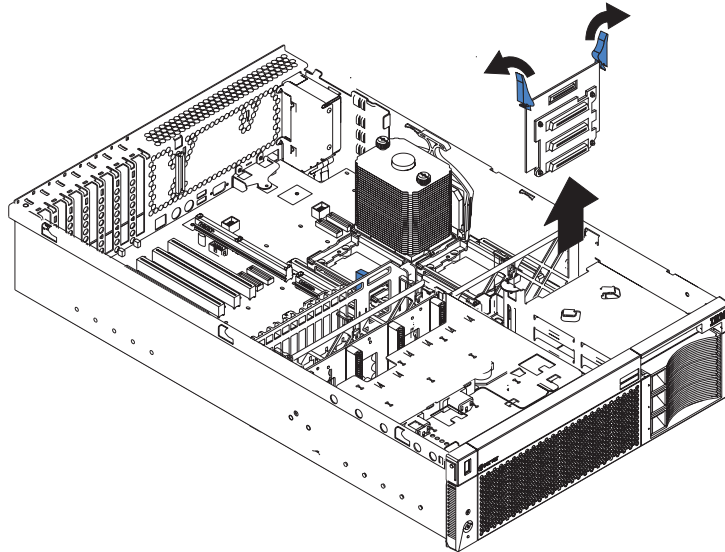
### Hot-swap drive backplane

The server comes with one hot-swap drive backplane, which accepts up to three hot-swap hard drives. The hot-swap drive backplane is mounted on one side of a metal plate that holds the light path diagnostic card on the other side.

**Note:** Read “Before you begin” on page 71 and the safety notices at “Safety notices (multilingual translations)” on page 149.

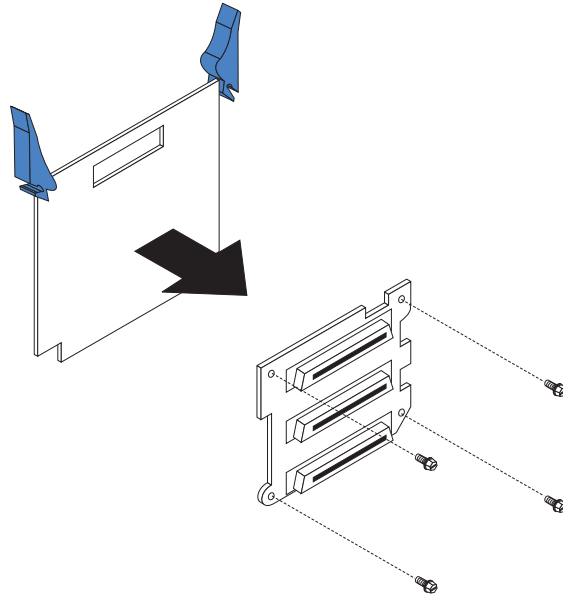
To replace the hot-swap drive backplane:

1. Turn off the server and disconnect all power cords and external cables; then, remove the top cover (see “Removing the server top cover and bezel” on page 72).
2. Unplug the cable from the diskette drive and CD-ROM drive assembly to the hot-swap drive backplane.
3. Remove all hot-swap hard drives by pulling out on their locking handles and sliding the drives out the front of the server.



4. Lift the two backplane locking latches and slide the backplane assembly up out of the server.

**Note:** The light path diagnostic card is attached to the same metal mounting plate as the hot-swap drive backplane.



5. Set the metal plate containing the hot-swap drive backplane and the light path diagnostic card on a static-free surface and remove the 4 screws that secure the hot-swap drive backplane to the plate, detaching any hot-swap drive backplane cables.
6. Using the screws that were removed in the previous step, secure the replacement hot-swap drive backplane to the metal mounting plate with the same orientation as the backplane that was removed, making sure to attach any cables.
7. Slide the replacement backplane assembly into the server and close the locking latches.
8. Ensure that the hot-swap hard drive locking handles are in the open position, and reinstall the drives, closing the handles to secure them.
9. Reconnect the cable between the diskette drive and CD-ROM drive assembly to the hot-swap drive backplane.
10. Replace the top cover (see “Installing the server top cover and bezel” on page 95).

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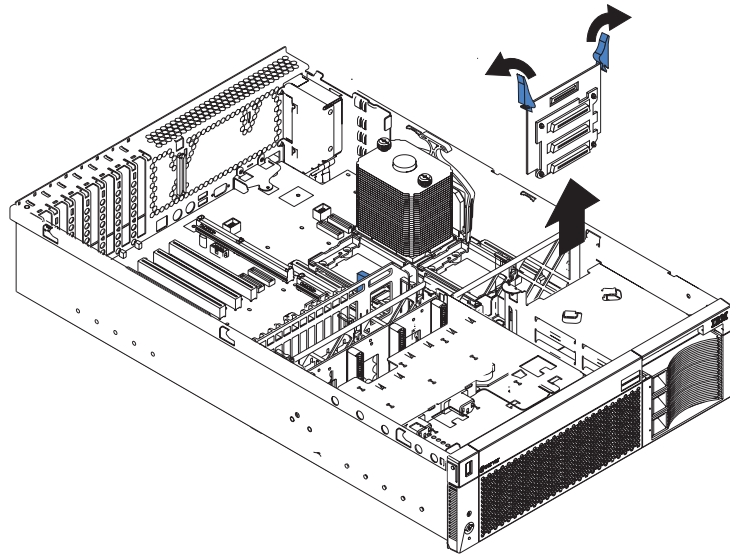
## Light path diagnostic card

The server comes with one light path diagnostic card, which provides 16 diagnostic LED indicators and the Remind Switch. The card is attached to the same metal mounting plate as the hot-swap drive backplane.

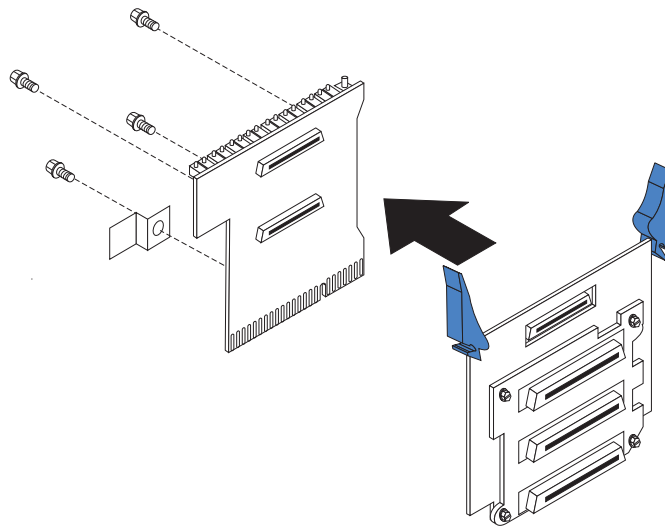
**Note:** Read “Before you begin” on page 71 and the safety notices at “Safety notices (multilingual translations)” on page 149.

Complete the following steps to replace the light path diagnostic card:

1. Turn off the server and disconnect all power cords and external cables; then, remove the top cover (see “Removing the server top cover and bezel” on page 72).



2. Remove from the server the metal mounting plate that holds the light path diagnostic card and the hot-swap drive backplane as described at step 2 on page 105 through step 4 on page 105 of “Hot-swap drive backplane” on page 105.



3. Set the metal plate containing the hot-swap drive backplane and the light path diagnostic card on a static-free surface and remove the 4 screws that secure the light path diagnostic card to the plate, detaching any light path diagnostic card cables.

**Note:** One of the screws also secures the power guard, which holds the power and signal cables away from the fan.

4. Using the screws from the previous step, attach the new diagnostic card to the metal mounting plate, making sure to replace the power guard.

**Important:** The power and signal cables must be routed through the power guard.

5. Slide the metal mounting plate assembly into the server and close the locking latches.
6. Ensure that the hot-swap hard drive locking handles are in the open position, and reinstall the drives, closing the handles to secure them.
7. Reconnect the cable between the diskette drive and CD-ROM drive assembly to the hot-swap drive backplane.
8. Replace the top cover (see “Installing the server top cover and bezel” on page 95).

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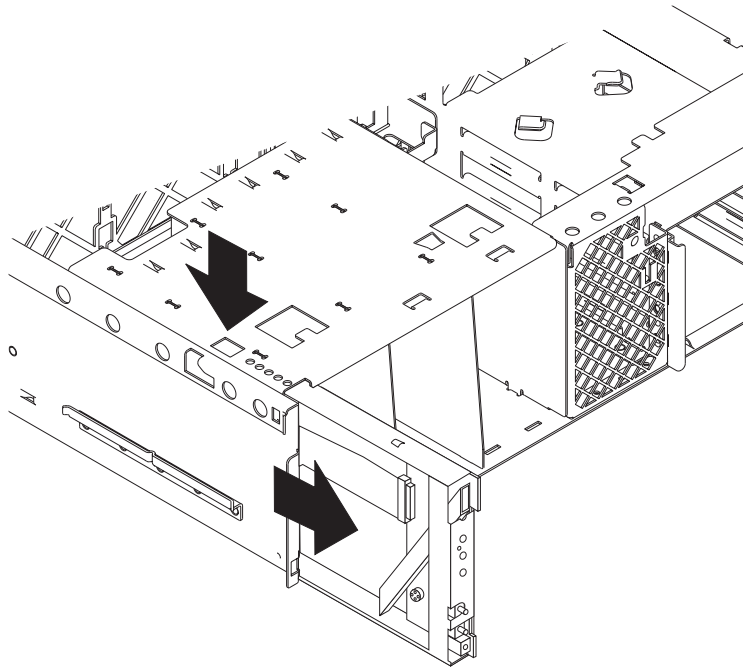
## Operator panel card

The server comes with one operator panel card, which provides control buttons, indicators, a USB port and function for storing Card and System VPD.

**Note:** Read “Before you begin” on page 71 and the safety notices at “Safety notices (multilingual translations)” on page 149.

To replace the operator panel card:

1. Turn off the server and disconnect all power cords and external cables; then, remove the top cover and bezel (see “Removing the server top cover and bezel” on page 72).
2. Unplug the connector between the card and the power supply backplane, press the card locking button (in the hole in the frame above the operator panel card), and slide the card assembly out the front of the server.



3. Slide the replacement card into the server until the locking button snaps into place and plug in the connector to the power supply backplane.
4. Replace the top cover and bezel (see “Installing the server top cover and bezel” on page 95).

5. When the server starts for the first time, a message appears telling you the configuration has changed. See “Configuration” on page 27.

It is necessary to re-enter the System Serial Number, and Reset Administrator password as applicable.

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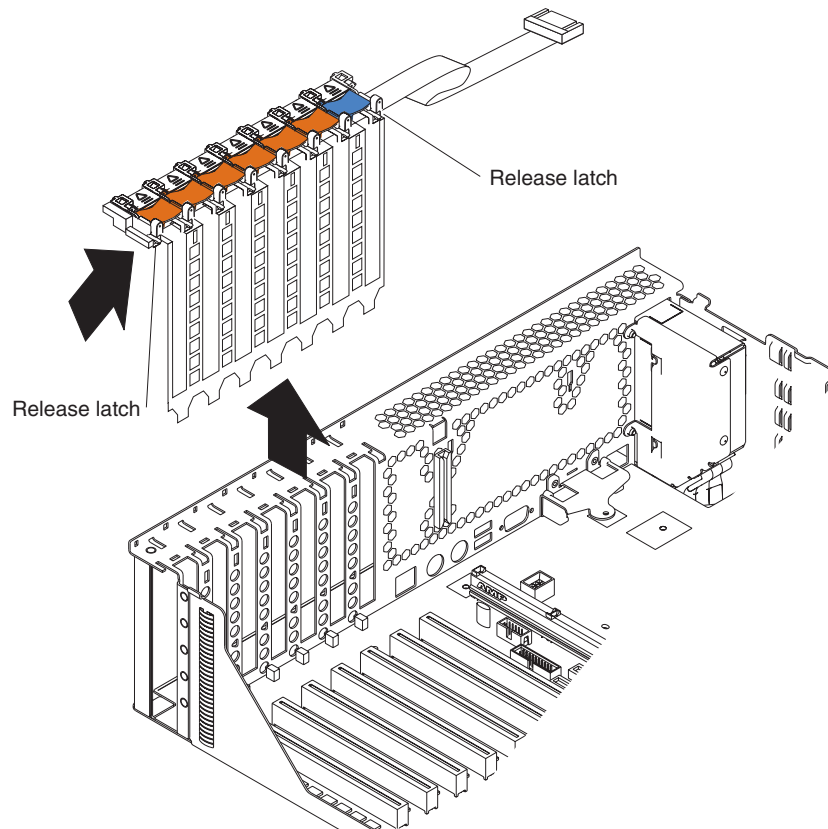
## PCI adapter switch card

The server comes with one PCI adapter switch card, mounted on the top front of the server frame adjacent to the PCI adapter cards. The switch card contains one switch for each of the six Active PCI adapters. This ensures that power is disconnected from the associated adapter if you attempt to open the adapter card latch and remove an adapter card.

**Note:** Read “Before you begin” on page 71 and the safety notices at “Safety notices (multilingual translations)” on page 149.

Complete the following steps to replace the PCI adapter switch card:

1. Turn off the server and disconnect all power cords and external cables; then, remove the top cover (see “Removing the server top cover and bezel” on page 72).
2. Disconnect the PCI adapter switch card cable from the system board.
3. Grasp the two adapter switch card release latches and slide the card away from the server chassis; then, lift it out of the server.



4. To replace the PCI adapter switch card, lower the card into place so that the lips on the bottom of the EMI shielding material fit into the chassis at the rear of the server, and slide the card into place until the two release latches snap securely. Then, connect the cable from the PCI adapter switch card to the system board.

5. Replace the top cover (see “Installing the server top cover and bezel” on page 95).

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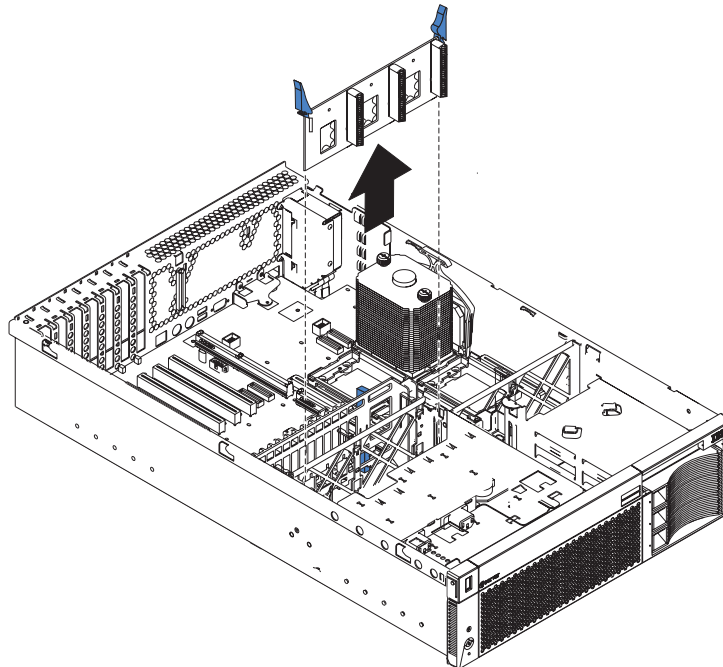
## Power supply backplane

The server comes with one power supply backplane, which accepts up to three power supplies.

**Note:** Read “Before you begin” on page 71 and the safety notices at “Safety notices (multilingual translations)” on page 149.

To replace the power supply backplane:

1. Turn off the server and disconnect all power cords and external cables; then, remove the top cover and bezel (see “Removing the server top cover and bezel” on page 72).
2. Remove all power supplies by pressing the latches at the lower front of each power supply, pulling up on the locking handles, and sliding the power supplies out the front of the server.
3. Unplug the cable from the operator panel card to the power supply backplane.
4. Lift up the two backplane locking latches and slide the backplane up out of the server.



5. Open the locking latches on the replacement backplane, lower the backplane into its socket, and close the locking latches.
6. Plug the cable from the operator panel card into the socket on the backplane.
7. Replace the top cover and bezel (see “Installing the server top cover and bezel” on page 95).

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## System board/shuttle

The server comes with one system board, which is attached to the shuttle. The shuttle and the system board are replaced individually.

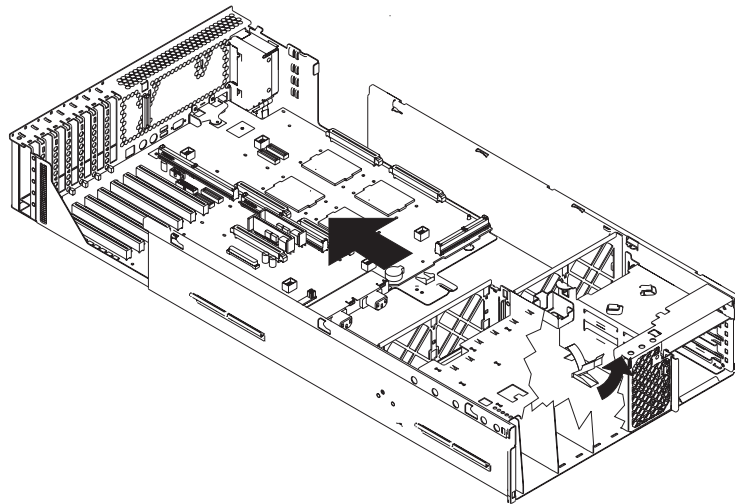


**Note:** When replacing the system board, you must either update the system with the latest firmware and BIOS code, or restore the pre-existing firmware and BIOS code that the customer provides on a diskette or CD image.

To replace the system board, complete the following steps.

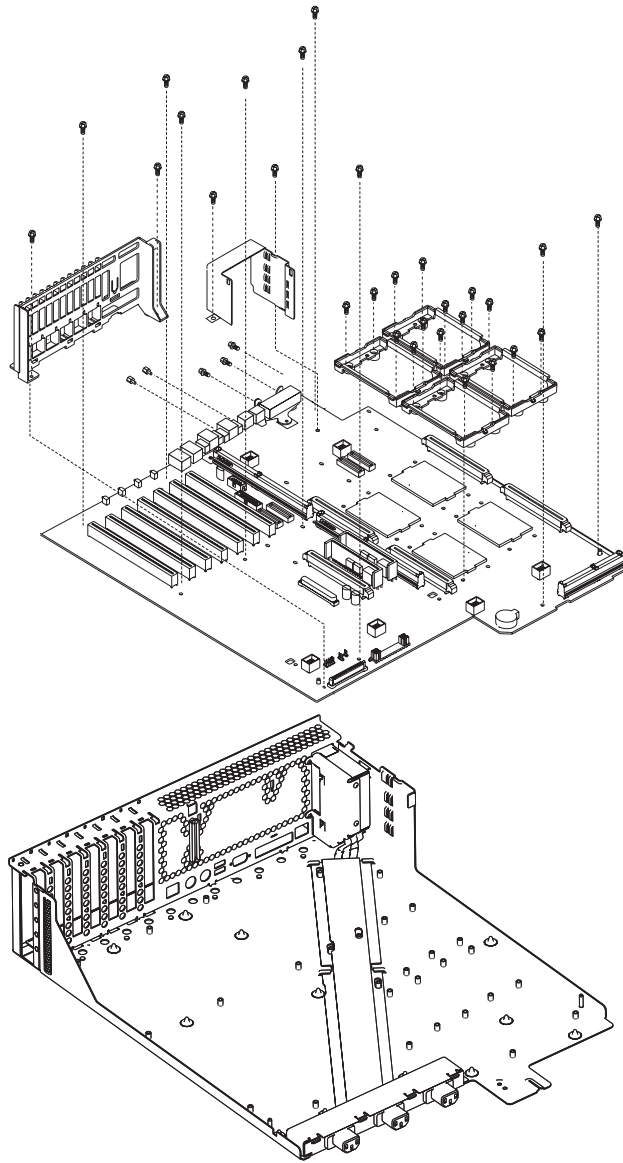
**Note:** Read “Before you begin” on page 71 and the safety notices at “Safety notices (multilingual translations)” on page 149.

1. Turn off the server and disconnect all power cords and external cables; then, remove the top cover and bezel (see “Removing the server top cover and bezel” on page 72).
2. Unplug from the hot-swap drive backplane the wide ribbon cable that connects the backplane to the CD-ROM drive and diskette drive assembly (see step 2 on page 82 at “Diskette drive or CD-ROM drive replacement” on page 82).
3. Remove all pluggable components from the system board. This includes:
  - All PCI adapter cards, including the service processor and ServeRaid adapter (if present) (see “Working with adapters” on page 73)
  - PCI adapter switch card (see “PCI adapter switch card” on page 109)
  - Hot-swap drive backplane assembly (includes the Light Path diagnostic card) (see “Hot-swap drive backplane” on page 105)
  - Memory board (see “Memory modules” on page 84)
  - All microprocessors and their heat sinks (see “Microprocessor installation” on page 86).
  - Operator panel card (see “Operator panel card” on page 108)
  - All power supplies (see “Hot-swap power supply installation” on page 90) and the power supply backplane card (see “Power supply backplane” on page 110).
  - All fans (see “Hot-swap fan replacement” on page 92)
  - All internal hard drives (see “Internal drive installation” on page 79).
  - All replaceable VRMs (6) (see “VRM replacement” on page 89).



4. Release the locking latch that secures the front edge of the shuttle to the bottom of the frame and slide the shuttle out the rear of the server.

5. Remove the 16 screws that secure the system board to the shuttle at the heat sink retention modules, and put the screws and retention modules in a safe place.



6. Remove the other 18 screws that secure the system board to the shuttle, and put the screws in a safe place.

**Notes:**

- a. Two of these 18 screws also secure the PCI hot-plug card retainer; set this retainer aside for reinstallation.
  - b. Two of these 18 screws also secure a fan bracket; set this bracket aside for reinstallation.
  - c. Five of these 18 screws are set horizontally at the rear of the server, along the I/O ports, including the two that border the video port.
7. Lift the system board out of the shuttle.
  8. If you are replacing the shuttle, continue with step 10 on page 113 using the new shuttle with the existing system board.

9. If you are replacing the system board, continue with step 10 using the new system board with the existing shuttle.
10. Align the system board with the shuttle and replace the 30 screws that were removed in step 5 on page 112 and step 6 on page 112 above. Be sure to replace the heat sink retention modules, PCI hot-plug card retainer and fan bracket that had been removed.  
**Attention:** Do not over-tighten the screws that secure the system board to the shuttle.
11. Slide the replacement shuttle, with its attached system board, in from the rear of the server and close the board locking latch.
12. Replace all components in the reverse order from which they were removed.
13. Replace the top cover and bezel (see “Installing the server top cover and bezel” on page 95).

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## Replacing the serial port cable

Complete the following steps to replace the serial port cable:

1. Review “Safety information” on page 145 and “Handling static-sensitive devices” on page 148.
2. Turn off the server, disconnect all power cords; then, disconnect all external cables.
3. Slide the server out of the rack cabinet until the rails lock into place; then, remove the cover.
4. Slide the serial cable and bracket assembly up out of the rear panel.
5. Unplug the 2-pin-by-5-pin connector on the serial cable from connector J58 on the system board and pull the serial cable out through the hole.
6. If you are removing the serial cable permanently, install the slot cover for PCI slot 6.
7. If you are replacing the serial cable, see “Installing the serial cable” on page 93.
8. Install the cover; then, slide the server into the rack cabinet, securing it as before.
9. Connect all external cables; then, connect all power cords to a power source.



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## Symptom-to-FRU index

This index supports xSeries 360 servers. The Symptom-to-FRU lists symptoms, errors, and the possible causes. The most likely cause is listed first. Use this Symptom-to-FRU index to help you decide which FRUs to have available when servicing the computer.

The POST BIOS displays POST error codes and messages on the screen.

---

### Beep symptoms

Beep symptoms are short tones or a series of short tones separated by pauses (intervals without sound). See the following examples.

**Note:** One short beep after successfully completing POST indicates the system is functioning properly.

Beeps	Description
1-2-3	<ul style="list-style-type: none"><li>• One beep</li><li>• A pause (or break)</li><li>• Two beeps</li><li>• A pause (or break)</li><li>• Three Beeps</li></ul>
4	Four continuous beeps

Beep/Symptom	FRU/Action
1-1-2 (Processor register test failed)	<ol style="list-style-type: none"><li>1. Optional Processor (if installed)</li><li>2. Processor</li></ol>
1-1-3 (CMOS write/read test failed)	<ol style="list-style-type: none"><li>1. Battery</li><li>2. System Board</li></ol>
1-1-4 (BIOS EEPROM checksum failed)	System Board
1-2-1 (Programmable Interval Timer failed)	System Board
1-2-2 (DMA initialization failed)	System Board
1-2-3 (DMA page register write/read failed)	System Board
1-2-4 (RAM refresh verification failed)	<ol style="list-style-type: none"><li>1. DIMM</li><li>2. Memory Card</li><li>3. System Board</li></ol>
1-3-1 (1st 64K RAM test failed)	<ol style="list-style-type: none"><li>1. DIMM</li><li>2. Memory Card</li><li>3. System Board</li></ol>
1-4-3 (Interrupt vector loading test failed)	System Board
2-1-1 (Secondary DMA register failed)	System Board

<b>Beep/Symptom</b>	<b>FRU/Action</b>
<b>2-1-2</b> (Primary DMA register failed)	System Board
<b>2-1-3</b> (Primary interrupt mask register failed)	System Board
<b>2-1-4</b> (Secondary interrupt mask register failed)	System Board
<b>2-2-1</b> (Interrupt vector loading failed)	System Board
<b>2-2-2</b> (Keyboard controller failed)	1. System Board 2. Keyboard
<b>2-2-3</b> (CMOS power failure and checksum checks failed)	1. Battery 2. System board
<b>2-2-4</b> (CMOS configuration info validation failed)	1. Battery 2. System board
<b>2-3-1</b> (Screen initialization failed)	System Board
<b>2-3-2</b> (Screen memory failed)	System Board
<b>2-3-3</b> (Screen retrace failed)	System Board
<b>2-3-4</b> (Search for video ROM failed)	System Board
<b>2-4-1</b> (Video failed, screen believed operable)	System Board
<b>3-1-1</b> (Timer tick interrupt failed)	System Board
<b>3-1-2</b> (Interval timer channel 2 failed)	System Board
<b>3-1-3</b> (RAM test failed above address 0FFFF h))	1. DIMM 2. Memory card 3. System board
<b>3-1-4</b> (Time-Of-Day clock failed)	1. Battery 2. System Board
<b>3-2-1</b> (Serial port failed)	System Board
<b>3-2-4</b> (Failure comparing CMOS memory size against actual)	1. DIMM 2. Battery 3. System board
<b>3-3-1</b> (Memory size mismatch occurred, see "Memory Settings" on page 31)	1. DIMM 2. System board 3. Battery

<b>Beep/Symptom</b>	<b>FRU/Action</b>
<b>3-3-2</b> (Critical SMBUS error occurred)	<ol style="list-style-type: none"> <li>1. Disconnect the server power cord from outlet, wait 30 seconds and retry.</li> <li>2. System Board</li> <li>3. DIMMs</li> <li>4. DASD Backplane</li> <li>5. DASD Power Cable</li> <li>6. Power Supply</li> <li>7. Power Backplane</li> <li>8. I2C Cable</li> </ol>
<b>3-3-3</b> (No operational memory in server)	<ol style="list-style-type: none"> <li>1. Install or reseat the memory modules, then do a 3 boot reset. (See "Using the Configuration/Setup Utility" on page 28.)</li> <li>2. DIMMs</li> <li>3. Memory Card</li> <li>4. System Board</li> </ol>
<b>Two Short Beeps</b> (Information only, the configuration has changed)	<ol style="list-style-type: none"> <li>1. Run Diagnostics</li> <li>2. Run Configuration/Setup</li> </ol>
<b>Three Short Beeps</b>	<ol style="list-style-type: none"> <li>1. DIMM</li> <li>2. System Board</li> </ol>
<b>One Continuous Beep</b>	<ol style="list-style-type: none"> <li>1. Processor</li> <li>2. Optional Processor (if installed)</li> <li>3. System Board</li> <li>4. Service Processor Card</li> </ol>
<b>Repeating Short Beeps</b>	<ol style="list-style-type: none"> <li>1. Keyboard</li> <li>2. System Board</li> </ol>
<b>One Long and One Short Beep</b>	<ol style="list-style-type: none"> <li>1. Video adapter (if present)</li> <li>2. System Board</li> </ol>
<b>One Long and Two Short Beeps</b>	<ol style="list-style-type: none"> <li>1. Video adapter (if present)</li> <li>2. System Board</li> </ol>
<b>One Long and Three Short Beeps</b>	Monitor
<b>Two Long and Two Short Beeps</b>	Video adapter

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## No beep symptoms

<b>No Beep Symptom</b>	<b>FRU/Action</b>
<b>No beep and the system operates correctly.</b>	Diagnostic LED panel
<b>No Beeps occur after successfully completing POST</b> (Power-On Status is disabled.)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup, set the Start Options Power-On Status to enable.</li> <li>2. Diagnostic LED Panel.</li> <li>3. System Board.</li> </ol>

No Beep Symptom	FRU/Action
<b>No ac power</b> (Power supply ac LED is off)	<ol style="list-style-type: none"> <li>1. Check the power cord.</li> <li>2. Power Supply (If two are installed, swap them to determine if one is defective.)</li> <li>3. Power Backplane</li> </ol>
<b>No beep and no video</b>	See "Undetermined problems" on page 143.
<b>System will not power-up</b> (Power supply ac LED is on)	<ol style="list-style-type: none"> <li>1. See "Power supply LED errors" on page 133.</li> <li>2. Processor installation sequence; see "Microprocessor installation" on page 86.</li> </ol>

## Level 2 light path LED errors

### Before replacing any FRU:

1. Run diagnostics and View System Error Log
2. Observe LEDs on system board

Level 2 light path LED	FRU/Action
<b>All LEDs off</b> (error log full) <b>Note:</b> "See Log" LED may be lit.	<ol style="list-style-type: none"> <li>1. System Error Log is 75% full; clear the log.</li> <li>2. PFA alert; check error log for failure; clear PFA alert; remove AC power for at least 20 seconds, reconnect, then power up system.</li> <li>3. Run diagnostics.</li> </ol>
<b>CPU LED on</b> (failed processor) <b>Note:</b> Verify correct installation sequence; see "Microprocessor installation" on page 86.	<ol style="list-style-type: none"> <li>1. Processor 1-4</li> <li>2. System Board.</li> </ol>
<b>VRM LED on</b> (VRM failure)	<ol style="list-style-type: none"> <li>1. VRM 1-4 <b>Note:</b> If all 4 VRM LEDs are on, replace all 4 VRMs.</li> <li>2. System Board</li> </ol>
<b>DASD LED on</b> (hot-swap hard drive failure) <b>Note:</b> If RAID system, refer to Hardware Maintenance Manual for the specific RAID adapter.	<ol style="list-style-type: none"> <li>1. Run diagnostics</li> <li>2. Failing drive (reseat/replace).</li> <li>3. Be sure the fans are operating correctly and the air flow is good.</li> <li>4. SCSI Backplane.</li> </ol>
<b>FAN LED on</b> (fan failure) <b>Note:</b> A failing fan can also cause the TEMP and DASD LEDs to be on.	<ol style="list-style-type: none"> <li>1. Check individual fan LEDs.</li> <li>2. Replace respective fan.</li> <li>3. System Board.</li> </ol>
<b>MEM LED on</b> (memory error)	<ol style="list-style-type: none"> <li>1. Check DIMM error LED on memory board <b>Note:</b> If there is a DIMM failure, an LED on the memory board indicates the failing DIMM. If LED is not visible with the memory board in its slot, remove memory board and press the button on the board to light the failing DIMM's LED.</li> <li>2. DIMM</li> <li>3. Memory Board</li> <li>4. System Board</li> </ol>
<b>PCI LED on</b> (adapter failure)	<ol style="list-style-type: none"> <li>1. Check System Error Log</li> <li>2. Failing adapter</li> <li>3. System Board</li> </ol>



Level 2 light path LED	FRU/Action
<b>PS1 LED on</b>	<ol style="list-style-type: none"> <li>1. Power Supply 1</li> <li>2. Power Backplane</li> <li>3. System Board</li> </ol>
<b>PS2 LED on</b>	<ol style="list-style-type: none"> <li>1. Power Supply 2</li> <li>2. Power Backplane</li> <li>3. System Board</li> </ol>
<b>PS3 LED on</b>	<ol style="list-style-type: none"> <li>1. Power Supply 3</li> <li>2. Power Backplane</li> <li>3. System Board</li> </ol>
<b>OVER TEMP LED on</b> (temperature too high)	<ol style="list-style-type: none"> <li>1. If a fan LED is on, replace the fan.</li> <li>2. Ambient temperature must be within normal operating specifications. See Table 1 on page 4.</li> <li>3. Examine System Error Log. <ol style="list-style-type: none"> <li>a. System over recommended temperature</li> <li>b. Operator Information Panel</li> <li>c. DASD over recommended temperature <ol style="list-style-type: none"> <li>1) Overheating hard drive</li> <li>2) DASD backplane</li> <li>3) System board</li> </ol> </li> <li>d. System over recommended temperature for processor X (where X is processor number) (processor LED also on) <ol style="list-style-type: none"> <li>1) Processor X</li> <li>2) System Board</li> </ol> </li> <li>e. Power Supply fault / over temp <ol style="list-style-type: none"> <li>1) Failing power supply</li> </ol> </li> </ol> </li> </ol>
<p><b>EXP</b> (device in remote expansion I/O has failed)</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. If the amber status LED is on for a device in the remote expansion I/O indicates a problem, replace the device.</li> <li>2. Check server error log for indications of a failure in a device installed in the remote expansion I/O or in the expansion I/O itself. If the log indicates a problem in the expansion I/O, see the problem solving information in the expansion I/O documentation.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check System Error Log (if log indicates a temperature problem and fans are working correctly, check for air flow blockage)</li> <li>2. Check light path on expansion box</li> <li>3. Replace indicated device</li> </ol>
<b>See Log</b> (non optimal condition)	<ol style="list-style-type: none"> <li>1. See System Error Log</li> <li>2. See Service Processor log</li> </ol>
<p><b>NMI</b> (nonmaskable interrupt)</p> <p><b>Note:</b> A PCI or MEM LED may also be on.</p>	<ol style="list-style-type: none"> <li>1. See System Error Log</li> <li>2. If a PCI LED is on, follow the instructions for that LED.</li> <li>3. If MEM LED is on, follow the instructions for that LED.</li> <li>4. Restart the server.</li> </ol>

Level 2 light path LED	FRU/Action
<b>SP Bus</b> (Remote Supervisor Adapter)	<ol style="list-style-type: none"> <li>1. See System Error Log</li> <li>2. Remote Supervisor Adapter card (reseat/replace)</li> <li>3. System Board</li> </ol>
<b>Non Red</b> (nonredundancy lost)	<ol style="list-style-type: none"> <li>1. If PSX LED is lit on Level 2 light path, follow instructions for that LED.</li> <li>2. Replace failing power supply</li> <li>3. Add power supply</li> </ol>
<b>Out of Spec</b> (power supplies' rating exceeded)	Add power supply

## Diagnostic error codes

**Note:** In the following error codes, if *XXX* is *000*, *195*, or *197* **do not** replace a FRU. The description for these error codes are:

- 000** The test passed.
- 195** The **Esc** key was pressed to abort the test.
- 197** This is a warning error and may not indicate a hardware failure.

For all error codes, replace/follow the FRU/Action indicated.

Error Code/Symptom	FRU/Action
<b>001-198-000</b> (Test Aborted)	<ol style="list-style-type: none"> <li>1. <b>Check error log for messages.</b></li> <li>2. Run Quick Memory Test All Banks.</li> <li>3. Reload system BIOS and rerun test.</li> </ol>
<b>001-XXX-000</b> (Failed core tests)	System Board
<b>001-XXX-001</b> (Failed core tests)	System Board
<b>001-250-00X</b> (Test Failed)	<ol style="list-style-type: none"> <li>1. <b>Check error log for messages.</b></li> <li>2. Run Quick Memory Test All Banks.</li> <li>3. Rerun ECC test.</li> <li>4. Memory board.</li> <li>5. System board.</li> </ol>
<b>005-XXX-000</b> (Failed Video test)	<ol style="list-style-type: none"> <li>1. Video Adapter (if installed)</li> <li>2. System Board</li> </ol>
<b>011-XXX-000</b> (Failed COM1 Serial Port test)	System Board
<b>015-XXX-001</b> (Failed USB test)	System Board
<b>015-XXX-015</b> (Failed USB External Loopback test)	<ol style="list-style-type: none"> <li>1. Make sure parallel port is not disabled.</li> <li>2. Re-run USB External Loopback test.</li> <li>3. System board.</li> </ol>
<b>015-XXX-198</b> (USB device connected during USB test)	<ol style="list-style-type: none"> <li>1. Remove USB devices from USB1 and USB2.</li> <li>2. Re-run test.</li> <li>3. System Board.</li> </ol>
<b>020-XXX-000</b> (Failed PCI Interface test)	System Board

<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<b>020-XXX-001</b> (Failed Hot-Swap Slot 1 PCI Latch test)	<ol style="list-style-type: none"> <li>1. PCI Hot-Swap Latch Assembly</li> <li>2. System Board</li> </ol>
<b>020-XXX-002</b> (Failed Hot-Swap Slot 2 PCI Latch test)	<ol style="list-style-type: none"> <li>1. PCI Hot-Swap Latch Assembly</li> <li>2. System Board</li> </ol>
<b>020-XXX-003</b> (Failed Hot-Swap Slot 3 PCI Latch test)	<ol style="list-style-type: none"> <li>1. PCI Hot-Swap Latch Assembly</li> <li>2. System Board</li> </ol>
<b>020-XXX-004</b> (Failed Hot-Swap Slot 4 PCI Latch test)	<ol style="list-style-type: none"> <li>1. PCI Hot-Swap Latch Assembly</li> <li>2. System Board</li> </ol>
<b>020-XXX-005</b> (Failed Hot-Swap Slot 5 PCI Latch test)	<ol style="list-style-type: none"> <li>1. PCI Hot-Swap Latch Assembly</li> <li>2. System Board</li> </ol>
<b>020-XXX-006</b> (Failed Hot-Swap Slot 6 PCI Latch test)	<ol style="list-style-type: none"> <li>1. PCI Hot-Swap Latch Assembly</li> <li>2. System Board</li> </ol>
<b>030-XXX-000</b> (Failed Internal SCSI interface test)	System Board
<b>030-XXX-00N</b> (Failed SCSI test on PCI slot N. Check system error log before replacing a FRU.)	Adapter in slot n
<b>035-002-0NN</b> (Server interface timeout)	<ol style="list-style-type: none"> <li>1. ServeRAID controller may not be configured properly. Obtain the basic and extended configuration bytes and refer to the ServeRAID Hardware Maintenance Manual for more information.</li> <li>2. Cable</li> <li>3. SCSI Backplane</li> <li>4. ServeRAID controller</li> </ol>
<b>035-253-0NN</b> (ServeRAID controller 0NN initialization failure. 0NN = the controller number)	<ol style="list-style-type: none"> <li>1. ServeRAID controller may not be configured properly. Obtain the basic and extended configuration bytes and refer to the ServeRAID Hardware Maintenance Manual for more information.</li> <li>2. Cable</li> <li>3. SCSI Backplane</li> <li>4. ServeRAID controller</li> </ol>
<b>035-254-0NN</b> (Setup error - unable to allocate memory to run test)	Check system resources.
<b>035-255-0NN</b> (Internal error)	<ol style="list-style-type: none"> <li>1. ServeRAID controller</li> <li>2. SCSI Backplane</li> <li>3. Cable</li> </ol>
<b>035-260-0NN</b> (System to controller interface error)	<ol style="list-style-type: none"> <li>1. ServeRAID controller</li> <li>2. System Board</li> </ol>
<b>035-XXX-CNN</b> (Check system error log before replacing a FRU. C = ServeRAID channel number. NN = SCSI ID failing fixed disk drive.)	<ol style="list-style-type: none"> <li>1. Fixed disk on channel C, SCSI ID NN</li> </ol>
<b>075-XXX-000</b> (Failed Power Supply test)	Power Supply
<b>089-XXX-001</b> (Failed Microprocessor test)	Microprocessor
<b>089-XXX-002</b> (Failed Optional Microprocessor test)	Optional Microprocessor 2

Error Code/Symptom	FRU/Action
<b>089-XXX-003</b> (Failed Optional Microprocessor test)	Optional Microprocessor 3
<b>089-XXX-004</b> (Failed Optional Microprocessor test)	Optional Microprocessor 4
<b>091-XXX-002</b> (Failed RXE port test)	<ol style="list-style-type: none"> <li>1. RXE cable to RXE100</li> <li>2. RXE100</li> <li>3. I/O Board</li> <li>4. SMP2 (if installed)</li> </ol>
<b>091-XXX-003</b> (Failed RXE port test)	<ol style="list-style-type: none"> <li>1. RXE cable to RXE100</li> <li>2. RXE100</li> <li>3. System Board</li> </ol>
<b>092-XXX-001</b> (Failed scalability port test)	<ol style="list-style-type: none"> <li>1. Scalability cable</li> <li>2. SMP at far end of cable</li> <li>3. SMP at near end of cable</li> <li>4. SMP2 (if installed)</li> </ol>
<b>166-198-000</b> (BIOS cannot detect ASM. Reseat ASM adapter in correct slot) (ASM restart failure. Unplug and cold boot server to rest ASM)	<ol style="list-style-type: none"> <li>1. Rerun diagnostic test</li> <li>2. Fix other error conditions (including other failed System Management tests and items logged in Remote Supervisor Adapter system error log) and retry</li> <li>3. Disconnect all server and option power cords from server, wait 30 seconds, reconnect, and retry</li> <li>4. Remote Supervisor Adapter</li> <li>5. System Board</li> </ol>
<b>166-201-000</b> (ISMP indicates I2C errors on bus X)	<ol style="list-style-type: none"> <li>1. Remote Supervisor Adapter</li> <li>2. System Board</li> </ol>
<b>166-201-001</b> (ISMP indicates I2C errors on bus P)	<ol style="list-style-type: none"> <li>1. Operator Interface Card</li> <li>2. Power Backplane</li> <li>3. Light path card assembly</li> <li>4. Power Supplies (one at a time)</li> <li>5. System Board</li> </ol>
<b>166-201-002</b> (ISMP indicates I2C errors on bus I)	System Board
<b>166-201-003</b> (ISMP indicates I2C errors on bus C)	<ol style="list-style-type: none"> <li>1. Microprocessor(s)</li> <li>2. System Board</li> </ol>
<b>166-201-004</b> (ISMP indicates I2C errors on bus M)	<ol style="list-style-type: none"> <li>1. DIMMs (1-2, 3-4, 5-6, 7-8)</li> <li>2. Memory Card</li> <li>3. System Board</li> </ol>
<b>166-201-005</b> (ISMP indicates I2C errors on bus S)	<ol style="list-style-type: none"> <li>1. Media Backplane</li> <li>2. Light path card assembly</li> <li>3. System Board</li> </ol>
<b>166-201-008</b> (ISMP indicates I2C errors on bus V)	<ol style="list-style-type: none"> <li>1. Microprocessor VRM(s)</li> <li>2. System Board</li> </ol>

<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<b>166-201-010</b> (ISMP indicates I2C errors on bus PCI 1)	1. Adapter in slot 1 2. System Board
<b>166-201-011</b> (ISMP indicates I2C errors on bus PCI 2)	1. Adapter in slot 2 2. System Board
<b>166-201-012</b> (ISMP indicates I2C errors on bus PCI 3)	1. Adapter in slot 3 2. System Board
<b>166-201-013</b> (ISMP indicates I2C errors on bus PCI 4)	1. Adapter in slot 4 2. System Board
<b>166-201-014</b> (ISMP indicates I2C errors on bus PCI 5)	1. Adapter in slot 5 2. System Board
<b>166-201-015</b> (ISMP indicates I2C errors on bus PCI 6)	1. Adapter in slot 6 2. System Board
<b>166-201-100</b> (ISMP indicates I2C errors on RXE bus X)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-101</b> (ISMP indicates I2C errors on RXE bus P)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-102</b> (ISMP indicates I2C errors on RXE bus I_A)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-103</b> (ISMP indicates I2C errors on RXE bus I_B)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-104</b> (ISMP indicates I2C errors on RXE bus PCI_A)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-105</b> (ISMP indicates I2C errors on RXE bus F)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-106</b> (ISMP indicates I2C errors on RXE bus PCI_B)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-107</b> (ISMP indicates I2C errors on RXE bus PCI_A slot 1)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-108</b> (ISMP indicates I2C errors on RXE bus PCI_A slot 2)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-109</b> (ISMP indicates I2C errors on RXE bus PCI_A slot 3)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-110</b> (ISMP indicates I2C errors on RXE bus PCI_A slot 4)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-111</b> (ISMP indicates I2C errors on RXE bus PCI_A slot 5)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>

<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<b>166-201-112</b> (ISMP indicates I2C errors on RXE bus PCI_A slot 6)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-113</b> (ISMP indicates I2C errors on RXE bus PCI_B slot 1)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-114</b> (ISMP indicates I2C errors on RXE bus PCI_B slot 2)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-115</b> (ISMP indicates I2C errors on RXE bus PCI_B slot 3)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-116</b> (ISMP indicates I2C errors on RXE bus PCI_B slot 4)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-117</b> (ISMP indicates I2C errors on RXE bus PCI_B slot 5)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-201-118</b> (ISMP indicates I2C errors on RXE bus PCI_B slot 6)	<b>See <i>Hardware Maintenance Manual</i> for IBM RXE-100 Remote Expansion Enclosure.</b>
<b>166-250-000</b> (I2C cable disconnected)	Reconnect/reseat I2C cable between remote service adapter and system board
<b>166-260-000</b> (ASM restart failure)	<ol style="list-style-type: none"> <li>1. Disconnect all server and option power cords from server, wait 30 seconds, reconnect, and retry</li> <li>2. Remote Supervisor Adapter</li> </ol>
<b>166-342-000</b> (system management BIST indicates failed tests)	<ol style="list-style-type: none"> <li>1. Disconnect all server and option power cords from server, wait 30 seconds, reconnect, and retry</li> <li>2. Remote Supervisor Adapter</li> </ol>
<b>166-400-000</b> (ISMP Self Test Result failed tests: xxx) where xxx = flash, ROM, or RAM	<ol style="list-style-type: none"> <li>1. Disconnect all server and option power cords from server, wait 30 seconds, reconnect, and retry</li> <li>2. (Re)flash ISMP with latest firmware level</li> <li>3. System Board</li> </ol>
<b>166-400-100</b> (DMC Self Test Result failed tests: xxx) where xxx = flash, ROM, or RAM	<ol style="list-style-type: none"> <li>1. Disconnect all server and option power cords from server, wait 30 seconds, reconnect, and retry</li> <li>2. (Re)flash ISMP on RXE with latest firmware level</li> <li>3. RXE Backplane</li> </ol>
<b>175-XXX-000</b> (Fan failure)	<ol style="list-style-type: none"> <li>1. Fan(s)</li> <li>2. System Board</li> </ol>
<b>180-361-003</b> (Fan LED test)	<ol style="list-style-type: none"> <li>1. Fan(s)</li> <li>2. System Board</li> </ol>
<b>180-XXX-000</b> (Diagnostics LED failure)	Run Diagnostic LED test for the failing LED.
<b>180-XXX-001</b> (Failed front LED panel test)	<ol style="list-style-type: none"> <li>1. Front Operator Information Panel cable</li> <li>2. Front Operator Information Panel</li> <li>3. System Board</li> </ol>

Error Code/Symptom	FRU/Action
<b>180-XXX-002</b> (Failed Diagnostics LED Panel test)	<ol style="list-style-type: none"> <li>1. Diagnostics LED Panel</li> <li>2. System Board</li> </ol>
<b>180-XXX-003</b> (Failed System Board LED test)	System Board
<b>180-XXX-005</b> (Failed SCSI Backplane LED test)	<ol style="list-style-type: none"> <li>1. SCSI Backplane</li> <li>2. SCSI Backplane Cable</li> <li>3. System Board</li> </ol>
<b>180-XXX-006</b> (Memory Board LED test)	<ol style="list-style-type: none"> <li>1. Memory Board</li> <li>2. System Board</li> </ol>
<b>180-XXX-031</b> (RXE PCI-X Backplane LED test)	<ol style="list-style-type: none"> <li>1. RS485 cable between server and RXE</li> <li>2. RS485 cable (if required for configuration) between Side A and Side B</li> <li>3. RXE PCI-X Backplane (Side B right)</li> <li>4. RXE Backplane</li> </ol>
<b>180-XXX-032</b> (RXE Operator Panel LED test)	<ol style="list-style-type: none"> <li>1. RS485 cable between server and RXE</li> <li>2. RS485 Operator Panel cable</li> <li>3. RXE Operator Panel</li> <li>4. RXE Backplane</li> </ol>
<b>180-XXX-033</b> (RXE Fans LED test)	<ol style="list-style-type: none"> <li>1. RS485 cable between server and RXE</li> <li>2. RXE Fans</li> <li>3. RXE Backplane</li> </ol>
<b>180-XXX-034</b> (RXE Backplane LED test)	<ol style="list-style-type: none"> <li>1. RS485 cable between server and RXE</li> <li>2. RXE Backplane</li> </ol>
<b>180-XXX-035</b> (RXE PCI-X Backplane LED test)	<ol style="list-style-type: none"> <li>1. RS485 cable between server and RXE</li> <li>2. RS485 cable (if required for configuration) between Side A and Side B</li> <li>3. RXE PCI-X Backplane (Side A left)</li> <li>4. RXE Backplane</li> </ol>
<b>201-XXX-0NN</b> (Failed Memory test, see "Memory Settings" on page 31.) NN = DIMM location.	<ol style="list-style-type: none"> <li>1. DIMM Location 1-8</li> <li>2. Memory card</li> </ol>
<b>201-XXX-Y21</b> (Multiple DIMM failure in Pair 1; see Table 8 on page 85)	<ol style="list-style-type: none"> <li>1. <b>Isolate failing DIMM:</b> <ol style="list-style-type: none"> <li>a. Replace a DIMM in pair with a "known good" DIMM.</li> <li>b. Rerun memory diagnostic for the failing pair.</li> <li>c. If test fails, mark replaced DIMM as "good" DIMM.</li> <li>d. If test passes, mark replaced DIMM as "bad" DIMM.</li> <li>e. If DIMM tested is "bad", remove it and replace it.</li> <li>f. If DIMM tested is "good", do not replace it.</li> </ol> </li> <li>2. Repeat steps 1a through 1f with other DIMM in failing pair until error is fixed.</li> <li>3. If error is not fixed, replace memory board.</li> </ol>

Error Code/Symptom	FRU/Action
<b>201-XXX-Y22</b> (Multiple DIMM failure in Pair 2; see Table 8 on page 85)	<ol style="list-style-type: none"> <li>1. <b>Isolate failing DIMM:</b> <ol style="list-style-type: none"> <li>a. Replace a DIMM in pair with a "known good" DIMM.</li> <li>b. Rerun memory diagnostic for the failing pair.</li> <li>c. If test fails, mark replaced DIMM as "good" DIMM.</li> <li>d. If test passes, mark replaced DIMM as "bad" DIMM.</li> <li>e. If DIMM tested is "bad", remove it and replace it.</li> <li>f. If DIMM tested is "good", do not replace it.</li> </ol> </li> <li>2. Repeat steps 1a through 1f with other DIMM in failing pair until error is fixed.</li> <li>3. If error is not fixed, replace memory board.</li> </ol>
<b>201-XXX-Y23</b> (Multiple DIMM failure in Pair 3; see Table 8 on page 85)	<ol style="list-style-type: none"> <li>1. <b>Isolate failing DIMM:</b> <ol style="list-style-type: none"> <li>a. Replace a DIMM in pair with a "known good" DIMM.</li> <li>b. Rerun memory diagnostic for the failing pair.</li> <li>c. If test fails, mark replaced DIMM as "good" DIMM.</li> <li>d. If test passes, mark replaced DIMM as "bad" DIMM.</li> <li>e. If DIMM tested is "bad", remove it and replace it.</li> <li>f. If DIMM tested is "good", do not replace it.</li> </ol> </li> <li>2. Repeat steps 1a through 1f with other DIMM in failing pair until error is fixed.</li> <li>3. If error is not fixed, replace memory board.</li> </ol>
<b>201-XXX-Y24</b> (Multiple DIMM failure in Pair 4; see Table 8 on page 85)	<ol style="list-style-type: none"> <li>1. <b>Isolate failing DIMM:</b> <ol style="list-style-type: none"> <li>a. Replace a DIMM in pair with a "known good" DIMM.</li> <li>b. Rerun memory diagnostic for the failing pair.</li> <li>c. If test fails, mark replaced DIMM as "good" DIMM.</li> <li>d. If test passes, mark replaced DIMM as "bad" DIMM.</li> <li>e. If DIMM tested is "bad", remove it and replace it.</li> <li>f. If DIMM tested is "good", do not replace it.</li> </ol> </li> <li>2. Repeat steps 1a through 1f with other DIMM in failing pair until error is fixed.</li> <li>3. If error is not fixed, replace memory board.</li> </ol>
<b>202-XXX-001</b> (Failed Processor cache test)	Microprocessor 1
<b>202-XXX-002</b> (Failed Processor cache test)	Microprocessor 2
<b>202-XXX-003</b> (Failed Processor cache test)	Microprocessor 3
<b>202-XXX-004</b> (Failed Processor cache test)	Microprocessor 4
<b>203-XXX-000</b> (External cache aborted)	[Not supported]
<b>206-XXX-000</b> (Failed Diskette Drive test)	<ol style="list-style-type: none"> <li>1. Cable</li> <li>2. Diskette Drive</li> <li>3. System Board</li> </ol>
<b>215-XXX-000</b> (Failed IDE CD-ROM test)	<ol style="list-style-type: none"> <li>1. CD-ROM Drive Cables</li> <li>2. CD-ROM Drive</li> <li>3. System Board</li> </ol>



Error Code/Symptom	FRU/Action
<b>217-XXX-000</b> (Failed BIOS Fixed Disk test) <b>Note:</b> If RAID is configured, the fixed disk number refers to the RAID logical array.	Fixed Disk 1
<b>217-XXX-001</b> (Failed BIOS Fixed Disk test) <b>Note:</b> If RAID is configured, the fixed disk number refers to the RAID logical array.	Fixed Disk 2
<b>217-XXX-002</b> (Failed BIOS Fixed Disk test) <b>Note:</b> If RAID is configured, the fixed disk number refers to the RAID logical array.	Fixed Disk 3
<b>217-198-XXX</b> (could not establish drive parameters)	<ol style="list-style-type: none"> <li>1. Check cable and termination</li> <li>2. SCSI backplane</li> <li>3. Fixed disk</li> </ol>
<b>264-XXX-0NN</b> (NN = SCSI ID of failing Tape Drive)	<ol style="list-style-type: none"> <li>1. Tape Cartridge, if user executed the Read/Write Tape Drive test (XXX = 256)</li> <li>2. SCSI or power cable connected to the tape drive with SCSI ID NN</li> <li>3. Tape drive with SCSI ID NN – refer to Help and Service Information appendix of tape drive's User Guide.</li> <li>4. System Board or SCSI Controller – run SCSI Controller diagnostic to determine if SCSI bus is functioning properly.</li> </ol>
<b>264-XXX-999</b> (Errors on multiple tape drives, see error text for more info)	See error messages/text in the PC Doctor error log for detailed information on each individual tape drive error.
<b>301-XXX-000</b> (Failed Keyboard test)	Keyboard
<b>405-XXX-000</b> (Failed Ethernet test on controller on the System Board)	<ol style="list-style-type: none"> <li>1. Verify that Ethernet is not disabled in BIOS.</li> <li>2. System Board</li> </ol>
<b>405-XXX-00N</b> (Failed Ethernet test on adapter in PCI slot N)	<ol style="list-style-type: none"> <li>1. Adapter in PCI slot N.</li> <li>2. System Board</li> </ol>
<b>415-XXX-000</b> (Failed Modem test)	<ol style="list-style-type: none"> <li>1. Cable</li> <li>2. Modem</li> <li>3. System Board</li> </ol>

## Error symptoms

Error Symptom	FRU/Action
<b>CD is not working properly.</b>	<ol style="list-style-type: none"> <li>1. Clean the CD.</li> <li>2. Check cables</li> <li>3. Run diagnostics</li> <li>4. CD-ROM Drive</li> </ol>
<b>CD-ROM drive tray is not working.</b> (The server must be powered-on)	<ol style="list-style-type: none"> <li>1. Insert the end of a paper clip into the manual tray-release opening.</li> <li>2. Run diagnostics</li> <li>3. CD-ROM Drive</li> </ol>

Error Symptom	FRU/Action
<b>CD-ROM drive is not recognized.</b>	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup, enable primary IDE channel.</li> <li>2. Check cables and jumpers.</li> <li>3. Check for correct device driver.</li> <li>4. Run CD-ROM diagnostics</li> <li>5. CD-ROM Drive</li> <li>6. System Board</li> </ol>
<b>Power switch does not work and reset button does work.</b>	<ol style="list-style-type: none"> <li>1. Verify that Operator Panel cable is attached.</li> <li>2. Power switch assembly</li> <li>3. System Board</li> </ol>
<b>Operator Panel is not plugged in.</b>	<ol style="list-style-type: none"> <li>1. Make sure Operator Panel is plugged in.</li> </ol>
<b>CD-ROM drive cable is not plugged in.</b>	<ol style="list-style-type: none"> <li>1. Make sure CD-ROM drive cable is plugged in.</li> </ol>
<b>Diskette drive in-use light stays on, or the system bypasses the diskette drive, or the diskette drive does not work.</b>	<ol style="list-style-type: none"> <li>1. If there is a diskette in the drive, verify that: <ol style="list-style-type: none"> <li>a. The diskette drive is enabled in the Configuration/Setup utility program.</li> <li>b. The diskette is good and not damaged. (Try another diskette if you have one.)</li> <li>c. The diskette is inserted correctly in the drive.</li> <li>d. The diskette contains the necessary files to start the server.</li> <li>e. The software program is OK.</li> <li>f. Cable is installed correctly (proper orientation)</li> </ol> </li> <li>2. Run Diskette Drive Diagnostics</li> <li>3. Cable</li> <li>4. Diskette Drive</li> <li>5. System Board</li> </ol>
<b>Not all drives are recognized by fixed disk diagnostic.</b>	<ol style="list-style-type: none"> <li>1. Remove first disk that does not show up and rerun diagnostic. If remaining drives show up, replace the one that was removed.</li> <li>2. If remaining drives do not show up, remove successive drives one at a time and rerun diagnostic.</li> </ol>
<b>System hangs during fixed disk diagnostic.</b>	<ol style="list-style-type: none"> <li>1. Remove hard disk being tested at the time of the hang and rerun the diagnostic. If successful, replace drive that was removed.</li> </ol>
<b>The SCSI expansion enclosure used to work, but does not work now.</b>	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The cables for all external SCSI options are connected correctly.</li> <li>2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly.</li> <li>3. Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server.</li> </ol> <p>For more information, see the SCSI and expansion enclosure documentation.</p>

Error Symptom	FRU/Action
<p><b>The amount of memory displayed is less than the amount of memory that is installed.</b></p>	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The memory modules are seated properly.</li> <li>2. You have installed the correct type of memory.</li> <li>3. If you changed the memory, you updated the memory configuration with the Configuration/Setup utility program.</li> <li>4. All banks of memory on the DIMMs are enabled. The server might have automatically disabled a DIMM bank if it detected a problem, or a DIMM bank might have been manually disabled.</li> </ol> <p>If these items are correct, run the memory diagnostic program. The server might have detected a bad memory module and automatically reallocated memory to enable the server to continue to operate. Check error log</p>
<p><b>Monitor problems (general).</b> Some IBM monitors have their own self-tests. If you suspect a problem with the monitor, refer to the information that comes with the monitor for adjusting and testing instructions.</p>	<ol style="list-style-type: none"> <li>1. Monitor</li> <li>2. Run diagnostics. If diagnostics pass, the problem may be a video driver.</li> <li>3. Display Adapter / System Board</li> </ol>
<p><b>Screen is blank.</b></p>	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The server power cords are plugged into the server and a working electrical outlet.</li> <li>2. The monitor cables are connected properly.</li> <li>3. The monitor is turned on and the Brightness and Contrast controls are adjusted correctly.</li> <li>4. Display adapter</li> <li>5. System Board</li> </ol> <p><b>Important:</b> In some memory configurations, the <b>3-3-3</b> beep code might sound during POST followed by a blank display screen. If this occurs <i>and</i> the <b>Boot Fail Count</b> feature in the <b>Start Options</b> of the Configuration/Setup utility is set to <b>Enabled</b> (its default setting), you must restart the server three times to force the system BIOS to reset the memory connector or bank of connectors from <b>Disabled</b> to <b>Enabled</b>.</p>
<p><b>No video</b></p>	<ol style="list-style-type: none"> <li>1. Make sure correct machine is selected.</li> <li>2. Make sure all cables are locked down.</li> </ol>
<p>A problem occurs only occasionally and is difficult to detect.</p>	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. All cables and cords are connected securely to the rear of the server and attached options.</li> <li>2. When the server is turned on, air is flowing from the grill at the rear of the server. If there is no airflow, the fans are not working. This causes the server to overheat and shut down.</li> <li>3. The SCSI bus and devices are configured correctly and that the last external device in each SCSI chain is terminated correctly.</li> </ol>
<p>All or some keys on the keyboard do not work.</p>	<ol style="list-style-type: none"> <li>1. Make sure that the keyboard cable is properly connected to the server.</li> <li>2. Make sure that the server and the monitor are turned on.</li> <li>3. Try using another keyboard.</li> </ol>
<p>The mouse or pointing device does not work.</p>	<ol style="list-style-type: none"> <li>1. Verify that the mouse or pointing-device cable is securely connected and the device drivers are installed correctly.</li> <li>2. Try using another mouse or pointing device.</li> </ol>

Error Symptom	FRU/Action
The amount of memory displayed is less than the amount of memory that is installed.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The memory modules are seated properly.</li> <li>2. You have installed the correct type of memory.</li> <li>3. If you changed the memory, you updated the memory configuration with the Configuration/Setup utility program.</li> <li>4. All banks of memory on the DIMMs are enabled. The server might have automatically disabled a DIMM bank if it detected a problem, or a DIMM bank might have been manually disabled.</li> </ol> <p>If these items are correct, run the memory diagnostic program. The server might have detected a bad memory module and automatically reallocated memory to enable the server to continue to operate. If the memory tests fail, replace the failing DIMM.</p>
The server emits a continuous tone during POST.	<p>The startup (boot) microprocessor is not working properly.</p> <p>Verify that the startup microprocessor is seated properly. If it is, replace the startup microprocessor.</p>
The monitor works when you turn on the server, but goes blank when you start some application programs.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The primary monitor cable is connected to the video port.</li> <li>2. You installed the necessary device drivers for the applications.</li> </ol>
Wavy, unreadable, rolling, distorted screen, or screen jitter.	<p>If the monitor self-tests show the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. To prevent diskette drive read/write errors, be sure that the distance between monitors and diskette drives is at least 76 mm (3 in.).</li> <li>2. Non-IBM monitor cables might cause unpredictable problems.</li> <li>3. An enhanced monitor cable with additional shielding is available for the IBM model 9521 and 9527 monitors.</li> </ol>
Wrong characters appear on the screen.	<p>If the wrong language is displayed, update the BIOS with the correct language.</p>
An IBM option that you just installed does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The server supports the option. Refer to the "Server Support" flowchart for information about obtaining ServerProven<sup>®</sup> compatibility information from the World Wide Web.</li> <li>2. You followed the installation instructions that come with the option.</li> <li>3. The option is installed correctly.</li> <li>4. You have not loosened any other installed options or cables.</li> <li>5. You updated the configuration information using the Configuration/Setup utility program. Whenever memory or an option is changed, you must update the configuration.</li> </ol>

Error Symptom	FRU/Action
An IBM option that used to work does not work now.	<p>Verify that all of the option hardware and cable connections are secure.</p> <p>If the option comes with its own test instructions, use those instructions to test the option.</p> <p>If the failing option is a SCSI option, verify that:</p> <ol style="list-style-type: none"> <li>1. The cables for all external SCSI options are connected correctly.</li> <li>2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly.</li> <li>3. Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server.</li> </ol>
The server does not power on.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. The power cables are properly connected to the server.</li> <li>2. The electrical outlet functions properly.</li> <li>3. The type of installed memory is correct.</li> <li>4. If you just installed an option, remove it, and restart the server. If the server now powers on, you might have installed more options than the power supply supports.</li> <li>5. The LEDs on the power supply are on.</li> <li>6. Verify that processors are installed in the correct sequence. See "Microprocessor installation" on page 86.</li> </ol>
The server does not power off.	<p>Verify that you are using an ACPI or non-ACPI operating system.:</p> <p>If you are using a non-ACPI operating system:</p> <ol style="list-style-type: none"> <li>1. Press Ctrl+Alt+Delete.</li> <li>2. Turn off the system by pressing the power-control button.</li> </ol>
Service processor reports a general monitor failure	<p>Disconnect the server from all electrical sources, wait for 30 seconds, reconnect the server to the electrical sources, and restart the server.</p>
Suspected software problem.	<p>To determine if problems are caused by the software, verify that:</p> <ol style="list-style-type: none"> <li>1. Your server has the minimum memory requirements to use the software. For memory requirements, see the information that comes with the software. <b>Note:</b> If you have just installed an adapter or memory, you might have a memory address conflict.</li> <li>2. The software is designed to operate on your server.</li> <li>3. Other software works on your server.</li> <li>4. The software that you are using works on another system.</li> </ol> <p>If you received any error messages when using the software program, see the information that comes with the software for a description of the messages and solutions to the problem.</p> <p>If the problem remains, contact your place of purchase.</p>
A USB device does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> <li>1. You are not trying to use a USB device during POST if you have a standard (non-USB) keyboard attached to the keyboard port. <b>Note:</b> If a standard (non-USB) keyboard is attached to the keyboard port, the USB is disabled and no USB device will work during POST.</li> <li>2. The correct USB device driver is installed.</li> <li>3. Your operating system supports USB devices.</li> </ol>

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## ServerGuide error symptoms

Look for the symptom in the left column of the chart. Probable solutions to the problem are in the right column.

Symptom	Action
<i>Setup and Installation CD</i> will not start.	<ul style="list-style-type: none"> <li>• Ensure that the system is a supported server with a startable (bootable) CD-ROM drive.</li> <li>• If the startup (boot) sequence settings have been altered, be sure that the CD-ROM drive is first in the boot sequence.</li> </ul>
ServeRAID program cannot view all installed drives or cannot install the NOS.	<ul style="list-style-type: none"> <li>• Ensure that there are no duplicate SCSI IDs or IRQ assignments.</li> <li>• Ensure that the hard disk drive is connected properly.</li> </ul>
The Operating System Installation program continuously loops.	Free up more space on the hard disk.
ServerGuide will not start your NOS CD.	Ensure that the NOS CD you have is supported by ServerGuide. See the <i>Setup and Installation</i> CD label for a list of supported NOS versions.
Cannot install NOS - option is unavailable.	Either there is no logical drive defined (ServeRAID systems) or the ServerGuide System Partition is not present. Run the ServeRAID setup and configuration program and ensure that setup is complete.
Get "time out" or "Unknown host" errors when running the <i>System Updates and Applications CD</i>	Ensure that you have access to the Internet through FTP directly.

## SMI Handler messages

SMI Handler is special system code that provides system monitoring functions. An example of a sample SMI Handler message is shown below:

```

- - - - -
Date/Time: 2002/05/08 03:35:30
DMI Type: 00
Source: SMI Hdlr
Error Code: 00150700 PERR: Slave signaled parity error
Error Code:
Error Data: Bus = 02, Slot = 01, VendID = 1014, DevID = 0302
Error Data:
- - - - -

```

This message indicates that a PCI Bus 02 parity error occurred at the recorded time. All of the SMI Handler message codes are listed below.

SMI message code	Suggested action
<b>1500</b> (Single bit error occurred: begin scrub)	• <b>Run memory diagnostics when multiple entries accumulate.</b>
<b>1501</b> (Multi-bit error occurred: forcing NMI)	• <b>Run memory diagnostics.</b>
<b>1502</b> (SERR: Addr. or Spec. Cyc. DPE)	• <b>Run diagnostics on PCI slot and device indicated.</b>
<b>1503</b> (SERR: Received Target Abort)	• <b>Run diagnostics on PCI slot and device indicated.</b>
<b>1504</b> (SERR: Device Signaled SERR)	• <b>Run diagnostics on PCI slot and device indicated.</b>
<b>1505</b> (PERR: Master Read parity error)	• <b>Run diagnostics on PCI slot and device indicated.</b>
<b>1506</b> (PERR: Master Write parity error)	• <b>Run diagnostics on PCI slot and device indicated.</b>
<b>1507</b> (PERR: Slave signaled parity error)	• <b>Run diagnostics on PCI slot and device indicated.</b>
<b>1509</b> (SERR / PERR Detected on PCI bus)	• <b>Run diagnostics on PCI slot and device indicated.</b>

SMI message code	Suggested action
<b>1510</b> (SERR: Signaled Target Abort)	<ul style="list-style-type: none"> <li>• <b>Run diagnostics on PCI slot and device indicated.</b></li> </ul>
<b>1511</b> (MCA: Recoverable Error Detected)	<ul style="list-style-type: none"> <li>• <b>Run system diagnostics when multiple entries accumulate.</b></li> </ul>
<b>1512</b> (MCA: Unrecoverable Error Detected)	<ul style="list-style-type: none"> <li>• <b>Run system diagnostics.</b></li> </ul>
<b>1513</b> (MCA: Excessive Recoverable Errors)	<ul style="list-style-type: none"> <li>• <b>Run system diagnostics.</b></li> </ul>
<b>1514</b> (Rebuilding PCI BUS Map)	<ul style="list-style-type: none"> <li>• <b>Information only.</b></li> </ul>
<b>1515</b> (Excessive Correctable Memory Errors Detected)	<ul style="list-style-type: none"> <li>• <b>Run memory diagnostics.</b></li> </ul>
<b>1516</b> (WARNING: Memory Socket ECC Failure)	<ul style="list-style-type: none"> <li>• <b>Run memory diagnostics.</b></li> </ul>
<b>1517</b> (Recoverable error occurred in L4 cache Node:0x) <b>Note:</b> Node 00 = primary lower SMP module; Node 01=primary upper SMP module; Node 02=secondary lower SMP module; Node 03=secondary upper SMP module.	<ol style="list-style-type: none"> <li>1. <b>Run system diagnostics when multiple entries accumulate.</b></li> <li>2. SMP Board</li> </ol>
<b>151802</b> (Error configuring DIMMS, mismatch detected)	<ul style="list-style-type: none"> <li>• <b>Run memory diagnostics, remove any recently added memory DIMMs.</b></li> </ul>
<b>151803</b> (Memory ProteXion(C) Event Detected)	<ul style="list-style-type: none"> <li>• <b>Run memory/system diagnostics when multiple entries accumulate.</b></li> </ul>
<b>151805</b> (Error Reading Port Door Status)	<ul style="list-style-type: none"> <li>• <b>Run memory door diagnostics.</b></li> </ul>
<b>151806</b> (Memory door opened/closed while memory copy in progress)	<ul style="list-style-type: none"> <li>• <b>Information only.</b></li> </ul>

## Power supply LED errors

Use the power supply LED information on the following page to troubleshoot power supply problems.

**Note:** The minimum configuration required for the DC Good light to come on is:

- Power Supply
- Power Backplane
- System Board (With pins 2 and 3 on J19 connected together to bypass the power switch; see “System board locations” on page 65.

AC Good LED	DC Good LED	Description	FRU/Action
Off	Off	No power to system or ac problem.	<ol style="list-style-type: none"> <li>1. Check ac power to system.</li> <li>2. Power Supply</li> </ol>

AC Good LED	DC Good LED	Description	FRU/Action
On	Off	Standby mode or dc problem.	<ol style="list-style-type: none"> <li>1. Operator LED panel</li> <li>2. Remove the adapters and disconnect the cables and power connectors to all internal and external devices. Power-on the system. If the DC Good LED comes on, replace the adapters and devices one at a time until you isolate the problem.</li> <li>3. Power Supply</li> <li>4. Power Backplane</li> <li>5. System Board</li> </ol>
On	On	Power is OK.	N/A

## POST error codes

In the following error codes, X can be any number or letter.

Error Code/Symptom	FRU/Action
<b>062</b> (Three consecutive boot failures using the default configuration.)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. Battery</li> <li>3. System Board</li> <li>4. Processor</li> </ol>
<b>101, 102, 106</b> (System and processor error)	System Board
<b>114</b> (Adapter read-only memory error)	<ol style="list-style-type: none"> <li>1. Failing Adapter</li> <li>2. Run Diagnostics</li> </ol>
<b>151</b> (Real time clock error)	<ol style="list-style-type: none"> <li>1. Run Diagnostics</li> <li>2. Battery</li> <li>3. System Board</li> </ol>
<b>161</b> (Real time clock battery error)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. Battery</li> <li>3. System Board</li> </ol>
<b>162</b> (Device Configuration Error) <b>Note:</b> Be sure to load the default settings and any additional desired settings; then, <b>save the configuration.</b>	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. Battery</li> <li>3. Failing Device</li> <li>4. System Board</li> </ol>
<b>163</b> (Real-Time Clock error)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. Battery</li> <li>3. System Board</li> </ol>
<b>164</b> (Memory configuration changed, see "Memory settings" on page 31.)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. DIMM</li> <li>3. Memory card</li> <li>4. System Board.</li> </ol>
<b>175</b> (hardware error)	System Board
<b>176</b> (cover or cable cover removed without use of key)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. System Board</li> </ol>



<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<b>177, 178</b> (Security hardware error)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. System Board</li> </ol>
<b>184</b> (Power-on password corrupted)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. System Board</li> </ol>
<b>185</b> (Drive startup sequence information corrupted)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. System Board</li> </ol>
<b>186</b> (Security hardware control logic failed)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. System Board</li> </ol>
<b>187</b> (VPD serial number not set.)	<ol style="list-style-type: none"> <li>1. Set serial number in Setup</li> <li>2. System Board</li> </ol>
<b>188</b> (Bad EEPROM CRC #2)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. System Board</li> </ol>
<b>189</b> (Three attempts were made to access the server with invalid passwords)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup, enter the administrator password</li> <li>2. System board</li> </ol>
<b>201</b> (Memory test error, see "Memory Settings" on page 31.) If the server does not have the latest level of BIOS installed, update the BIOS to the latest level and run the diagnostic program again.	<ol style="list-style-type: none"> <li>1. Run memory diagnostics</li> <li>2. DIMM</li> <li>3. Memory card</li> <li>4. System board</li> </ol>
<b>289</b> (DIMM has been disabled by the user or system, see "Memory Settings" on page 31.)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup, if disabled by user</li> <li>2. Disabled DIMM, if not disabled by user.</li> <li>3. System Board.</li> </ol>
<b>301</b> (Keyboard or keyboard controller error)	<ol style="list-style-type: none"> <li>1. Keyboard</li> <li>2. System Board</li> </ol>
<b>303</b> (Keyboard controller error)	<ol style="list-style-type: none"> <li>1. System Board</li> <li>2. Keyboard</li> </ol>
<b>602</b> (Invalid diskette boot record)	<ol style="list-style-type: none"> <li>1. Diskette</li> <li>2. Diskette Drive</li> <li>3. Cable</li> <li>4. System Board</li> </ol>
<b>604</b> (Diskette drive error)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup and Diagnostics</li> <li>2. Diskette Drive</li> <li>3. Drive Cable</li> <li>4. System Board</li> </ol>
<b>662</b> (Diskette drive configuration error)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup and Diagnostics</li> <li>2. Diskette Drive</li> <li>3. Drive Cable</li> <li>4. System Board</li> </ol>
<b>11XX</b> (System board serial port 1 or 2 error)	<ol style="list-style-type: none"> <li>1. Disconnect external cable on serial port.</li> <li>2. Run Configuration/Setup</li> <li>3. System Board</li> </ol>

<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<b>1162</b> (Serial port configuration conflict)	<ol style="list-style-type: none"> <li>1. Disconnect external cable on serial port</li> <li>2. Run Configuration/Setup</li> <li>3. System board</li> </ol>
<b>1301</b> (cable to information LED panel not detected)	<ol style="list-style-type: none"> <li>1. Cable</li> <li>2. Front Panel</li> <li>3. System Board</li> </ol>
<b>1302</b> (cable from Level 2 light path to hot swap drive backplane not found)	<ol style="list-style-type: none"> <li>1. Cable</li> <li>2. Hot swap drive backplane</li> <li>3. System Board</li> </ol>
<b>1303</b> (cable from system board to hot plug switch card not found)	<ol style="list-style-type: none"> <li>1. Cable</li> <li>2. PCI Adapter Switch Card</li> <li>3. System Board</li> </ol>
<b>1304</b> (cable to media operator card not found)	<ol style="list-style-type: none"> <li>1. Cable</li> <li>2. Hot swap drive backplane</li> <li>3. Media interposer card</li> </ol>
<b>1401</b> (failed to enable unrecoverable error handling)	<ol style="list-style-type: none"> <li>1. Reflash Integrated Service Processor</li> <li>2. System Board</li> </ol>
<b>1410</b> (Integrated Service Processor failed to respond to POST requests)	<ol style="list-style-type: none"> <li>1. Reflash Integrated Service Processor</li> <li>2. System Board</li> </ol>
<b>1600</b> (Service Processor is not functioning)  Do the following before replacing a FRU: <ol style="list-style-type: none"> <li>1. Ensure that a jumper is not installed on J28.</li> <li>2. Remove the ac power to the system, wait 20 seconds; then, re-connect the ac power. Wait 30 seconds; then, power-on the system.</li> </ol>	System Board
<b>1800</b> (No more hardware interrupt available for PCI adapter)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. Remove Adapter</li> <li>3. System board</li> </ol>
<b>1962</b> (Drive does not contain a valid boot sector)	<ol style="list-style-type: none"> <li>1. Verify a bootable operating system is installed.</li> <li>2. Run Diagnostics</li> <li>3. Hard Disk Drive</li> <li>4. Cable</li> <li>5. SCSI Backplane</li> <li>6. System Board</li> </ol>
<b>2400</b> (Video controller test failure)	<ol style="list-style-type: none"> <li>1. Video Adapter (if installed)</li> <li>2. System Board</li> </ol>
<b>2462</b> (Video memory configuration error)	<ol style="list-style-type: none"> <li>1. Video Adapter (if installed)</li> <li>2. System Board</li> </ol>

<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<b>5962</b> (IDE CD-ROM configuration error)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. CD-ROM Drive</li> <li>3. CD-ROM Power Cable</li> <li>4. IDE Cable</li> <li>5. System Board</li> <li>6. Battery</li> </ol>
<b>8603</b> (Pointing Device Error)	<ol style="list-style-type: none"> <li>1. Pointing Device</li> <li>2. System Board</li> </ol>
<b>0001200</b> (Machine check architecture error)	<ol style="list-style-type: none"> <li>1. Update BIOS</li> <li>2. Replace microprocessor</li> </ol>
<b>00019501</b> (Processor 1 is not functioning – check VRM and processor LEDs)	<ol style="list-style-type: none"> <li>1. Processor 1</li> <li>2. System Board</li> </ol>
<b>00019502</b> (Processor 2 is not functioning – check VRM and processor LEDs)	<ol style="list-style-type: none"> <li>1. Processor 2</li> <li>2. System Board</li> </ol>
<b>00019503</b> (Processor 3 is not functioning – check VRM and processor LEDs)	<ol style="list-style-type: none"> <li>1. Processor 3</li> <li>2. System Board</li> </ol>
<b>00019504</b> (Processor 4 is not functioning – check VRM and processor LEDs)	<ol style="list-style-type: none"> <li>1. Processor 4</li> <li>2. System Board</li> </ol>
<b>00019701</b> (Processor 1 failed)	<ol style="list-style-type: none"> <li>1. Processor 1</li> <li>2. System Board</li> </ol>
<b>00019702</b> (Processor 2 failed)	<ol style="list-style-type: none"> <li>1. Processor 2</li> <li>2. System Board</li> </ol>
<b>00019703</b> (Processor 3 failed)	<ol style="list-style-type: none"> <li>1. Processor 3</li> <li>2. System Board</li> </ol>
<b>00019704</b> (Processor 4 failed)	<ol style="list-style-type: none"> <li>1. Processor 4</li> <li>2. System Board</li> </ol>
00152000 (Memory I/O Controller Recoverable Error: Addressing)	None
<b>00180100</b> (No room for PCI option ROM)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. Failing Adapter</li> <li>3. System Board</li> </ol>
<b>00180200</b> (No more I/O space available for PCI adapter)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. Failing Adapter</li> <li>3. System Board</li> </ol>
<b>00180300</b> (No more memory above 1MB for PCI adapter)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. Failing Adapter</li> <li>3. System Board</li> </ol>
<b>00180400</b> (No more memory below 1MB for PCI adapter)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. Failing Adapter</li> <li>3. System Board</li> </ol>

<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<b>00180500</b> (PCI option ROM checksum error)	<ol style="list-style-type: none"> <li>1. Remove Failing PCI Card</li> <li>2. System Board</li> </ol>
<b>00180600</b> (PCI adapter self test failure)	<ol style="list-style-type: none"> <li>1. Run Configuration/Setup</li> <li>2. Failing Adapter</li> <li>3. System Board</li> </ol>
<b>00180700, 00180800</b> (Internal PCI SCSI controller disabled by user installation of RAID adapter.)	N/A
<b>00181000</b> (PCI error)	<ol style="list-style-type: none"> <li>1. System Board</li> <li>2. PCI Card</li> </ol>
<b>01295085</b> (ECC checking hardware test error)	<ol style="list-style-type: none"> <li>1. System Board.</li> <li>2. Processor</li> </ol>
<b>01298001</b> (No update data for processor 1)	<ol style="list-style-type: none"> <li>1. Ensure all processors are the same stepping level and cache size.</li> <li>2. Processor 1</li> </ol>
<b>01298002</b> (No update data for processor 2)	<ol style="list-style-type: none"> <li>1. Ensure all processors are the same stepping level and cache size.</li> <li>2. Processor 2</li> </ol>
<b>01298003</b> (No update data for processor 3)	<ol style="list-style-type: none"> <li>1. Ensure all processors are the same stepping level and cache size.</li> <li>2. Processor 3</li> </ol>
<b>01298004</b> (No update data for processor 4)	<ol style="list-style-type: none"> <li>1. Ensure all processors are the same stepping level and cache size.</li> <li>2. Processor 4</li> </ol>
<b>01298101</b> (Bad update data for processor 1)	<ol style="list-style-type: none"> <li>1. Ensure all processors are the same stepping level and cache size.</li> <li>2. Processor 1</li> </ol>
<b>01298102</b> (Bad update data for processor 2)	<ol style="list-style-type: none"> <li>1. Ensure all processors are the same stepping level and cache size.</li> <li>2. Processor 2</li> </ol>
<b>01298103</b> (Bad update data for processor 3)	<ol style="list-style-type: none"> <li>1. Ensure all processors are the same stepping level and cache size.</li> <li>2. Processor 3</li> </ol>
<b>01298104</b> (Bad update data for processor 4)	<ol style="list-style-type: none"> <li>1. Ensure all processors are the same stepping level and cache size.</li> <li>2. Processor 4</li> </ol>
<b>I9990301</b> (Fixed boot sector error)	<ol style="list-style-type: none"> <li>1. Hard Disk Drive</li> <li>2. If RAID system, refer to the Hardware Maintenance Manual for the specific RAID adapter.</li> <li>3. SCSI Backplane</li> <li>4. Cable</li> <li>5. System Board</li> </ol>
<b>I9990305</b> (Fixed boot sector error, no operating system installed)	Install operating system to hard disk drive.
<b>I9990650</b> (AC power has been restored)	<ol style="list-style-type: none"> <li>1. Check power cable</li> <li>2. Check for interruption of power supply</li> <li>3. Power Cable</li> </ol>

## ServeRAID

For ServeRAID error codes and procedures, refer to the Hardware Maintenance Manual for the particular RAID adapter in the system being serviced.

### SCSI error codes

Error Code	FRU/Action
<p><b>All SCSI Errors</b> One or more of the following might be causing the problem:</p> <ul style="list-style-type: none"><li>• A failing SCSI device (adapter, drive, controller)</li><li>• An improper SCSI configuration or SCSI termination jumper setting</li><li>• Duplicate SCSI IDs in the same SCSI chain</li><li>• A missing or improperly installed SCSI terminator</li><li>• A defective SCSI terminator</li><li>• An improperly installed cable</li><li>• A defective cable</li></ul>	<ol style="list-style-type: none"><li>1. External SCSI devices must be powered-on before you power-on the server.</li><li>2. The cables for all external SCSI devices are connected correctly.</li><li>3. If you have attached an external SCSI device to the server, make sure the external SCSI termination is set to automatic.</li><li>4. The last device in each SCSI chain is terminated correctly.</li><li>5. The SCSI devices are configured correctly.</li></ol>

### Temperature error messages

Message	Action
<b>DASD Over recommended Temperature (sensor X)</b> (level-warning; DASD backplane had over temperature condition)	Ensure system is being properly cooled.
<b>DASD under recommended temperature (sensor X)</b> (level-warning; direct access storage device bay "X" had under temperature condition)	Ambient temperature must be within normal operating specifications; see "Features and specifications" on page 4.
<b>DASD "X" Over Temperature</b> (level-critical; sensor for DASD "X" reported temperature over recommended range)	Ensure system is being properly cooled.
<b>Processor "X" over recommended temperature</b> (level-critical; temperature of processor "X" reached critical level)	<ol style="list-style-type: none"><li>1. Ensure system is being properly cooled.</li><li>2. Replace processor "X".</li></ol>
<b>Power Supply "X" Temperature Fault</b> (level-critical; power supply "X" had over temperature condition)	<ol style="list-style-type: none"><li>1. Ensure system is being properly cooled.</li><li>2. Replace Power Supply "X"</li></ol>
<b>System over temperature for processor "X"</b> (level-warning; processor "X" reporting over temperature condition)	<ol style="list-style-type: none"><li>1. Ensure system is being properly cooled.</li><li>2. Replace System Board</li></ol>
<b>System under recommended processor "X" temperature</b> (level-warning; system reporting under temperature condition for processor "X")	Ambient temperature must be within normal operating specifications; see "Features and specifications" on page 4.
<b>System over recommended ambient temperature</b> (level-warning; ambient temperature too warm for safe system operation)	Ambient temperature must be within normal operating specifications; see "Features and specifications" on page 4.

## Fan error messages

Message	Action
<b>Fan "X" fault</b> (level-critical; fan "X" beyond recommended RPM range)	<ol style="list-style-type: none"> <li>1. Check connections to fan "X"</li> <li>2. Replace fan "X"</li> </ol>

## Power error messages

Message	Action
<b>Power supply "X" DC good fault</b> (level-critical; power good signal not detected for power supply "X")	Replace power supply "X"
<b>Power supply "X" fan fault</b> (level-critical; fan fault in power supply "X")	Replace power supply "X"
<b>Power supply "X" fault</b> (level-critical; overcurrent condition exists)	See "Power checkout" on page 22.
<b>Power supply "X" 12V fault</b> (level-critical; overcurrent condition detected)	See "Power checkout" on page 22.
<b>Power supply "X" 5V fault</b> (level-critical; 5V power supply "X" had an error)	See "Power checkout" on page 22.
<b>Power supply current exceeded max spec value</b> (level-critical; current draw in system is over allowance for a single supply)	See "Power checkout" on page 22.
<b>Power Supply "X" fault</b> (level-critical; power supply "X" has been removed or has encountered some other fault)	<ol style="list-style-type: none"> <li>1. Check error log for other messages.</li> <li>2. See "Power checkout" on page 22.</li> </ol>
<b>Power Supply "X" overvoltage fault</b> (level-critical)	See "Power checkout" on page 22.
<b>Power Supply "X" AC power removed, early power-off warning</b> (level-critical; a power supply has been unplugged or has been installed without an ac cord)	<ol style="list-style-type: none"> <li>1. Check to see if ac cords are plugged in properly.</li> <li>2. Problem may have been temporary ac problem. If problem persists, see "Power checkout" on page 22.</li> </ol>
<b>System running non-redundant power</b> (level-non-critical; system does not have redundant power)	<ol style="list-style-type: none"> <li>1. Add another power supply</li> <li>2. Remove options from system</li> <li>3. System can continue to operate without redundancy protection if <b>1</b> and <b>2</b> above are not followed.</li> </ol>
<b>System under recommended voltage for "X" v</b> (level-warning; indicated voltage supply under nominal value; value for "X" can be +12, -12, or +5)	<ol style="list-style-type: none"> <li>1. Check connections to power subsystem</li> <li>2. Replace power supply</li> <li>3. Replace power backplane</li> </ol>
<b>System under recommended voltage on 3.3 v</b> (level-warning; 3.3 volt supply under nominal value)	<ol style="list-style-type: none"> <li>1. Check connections to power subsystem</li> <li>2. Replace power supply</li> <li>3. Replace power backplane</li> </ol>
<b>"X" V bus fault</b> (level-critical; overcurrent condition on "X" voltage bus)	See "Power checkout" on page 22.

Message	Action
<b>12V "X" bus fault</b> (level-critical; overcurrent condition on 12 volt "X" voltage bus)	See "Power checkout" on page 22.
<b>5V fault</b> (level-critical; overcurrent condition on 5 V subsystem)	See "Power checkout" on page 22.

## System shutdown

Refer to the following tables when experiencing system shutdown related to voltage or temperature problems.

### Voltage related system shutdown

Message	Action
<b>System shutoff due to "X" V over voltage</b> (level-critical; system shutoff due to "X" supply over voltage)	<ol style="list-style-type: none"> <li>1. Check power supply connectors</li> <li>2. Replace power supply</li> <li>3. Replace power backplane</li> </ol>
<b>System shutoff due to "X" V under voltage</b> (level-critical system shutoff due to "X" supply under voltage)	<ol style="list-style-type: none"> <li>1. Check power supply connectors</li> <li>2. Replace power supply</li> <li>3. Replace power backplane</li> </ol>

### Temperature related system shutdown

Message	Action
<b>System shutoff due to processor "X" over temperature</b> (level-critical; processor "X" is over temperature)	<ol style="list-style-type: none"> <li>1. Ensure system is being properly cooled.</li> <li>2. Replace processor "X"</li> </ol>
<b>System shutoff due to processor "X" under temperature</b> (level-critical; processor "X" is under temperature)	<ol style="list-style-type: none"> <li>1. Ambient temperature must be within normal operating specifications, see "Features and specifications" on page 4.</li> <li>2. Replace processor "X"</li> </ol>
<b>System shutoff due to DASD temperature (sensor X)</b> (level-critical; DASD area reported temperature outside recommended operating range)	<ol style="list-style-type: none"> <li>1. Ensure system is being properly cooled.</li> <li>2. Replace SCSI Backplane</li> </ol>
<b>System shutoff due to high ambient temperature</b> (level-critical; high ambient temperature)	<ol style="list-style-type: none"> <li>1. Ambient temperature must be within normal operating specifications, see "Features and specifications" on page 4.</li> <li>2. Replace Front Panel Assembly</li> </ol>
<b>System shutoff due to faults on each supply</b> (level-critical; each installed power supply encountered a fault condition)	<ol style="list-style-type: none"> <li>1. "Power checkout" on page 22.</li> </ol>

### DASD checkout

Message	Action
<b>Hard drive "X" removal detected</b> (level-critical; hard drive "X" has been removed)	Information only, take action as appropriate.

Message	Action
<b>Hard Drive (SCSI ID "X") fault</b> (level-critical; error has occurred on a DASD drive in a RAID configuration causing it to be defunct)	Ambient temperature must be within normal operating specifications (see "Features and specifications" on page 4).

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## Processor checkout

Message	Action
<b>Host BIST fail</b> (level-informational; host's built-in self test failed)	<ol style="list-style-type: none"> <li>1. Reseat processor</li> <li>2. Replace processor</li> </ol>
<b>Internal Error processor "X" fault</b> (level-critical; specified processor reported internal error and is held offline and system restarted)	If problem persists, replace processor "X".

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## I2C bus fault messages

Message	Action
<b>Bus 1 (power)</b>	<ol style="list-style-type: none"> <li>1. Power Supplies (one by one)</li> <li>2. Light path/SCSI backplane assembly</li> <li>3. Operator Panel cable</li> <li>4. Power Supply backplane</li> <li>5. System Board</li> </ol>
<b>Bus 2 (I/O)</b>	System Board
<b>Bus 3 (CPU)</b>	<ol style="list-style-type: none"> <li>1. Processors (one by one)</li> <li>2. System Board</li> </ol>
<b>Bus 4 (MEM)</b>	<ol style="list-style-type: none"> <li>1. DIMMs 1-2, 3-4, 5-6, 7-8</li> <li>2. Memory card</li> <li>3. System Board</li> </ol>
<b>Bus 5 (SCSI)</b>	<ol style="list-style-type: none"> <li>1. Light path/SCSI backplane assembly</li> <li>2. System Board</li> </ol>



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## Undetermined problems

You are here because the diagnostic tests did not identify the failure, the Devices List is incorrect, or the system is inoperative, or the System Error Log has an indeterministic message.

**Note:** A corrupt CMOS can cause undetermined problems.

Check the LEDs on all the power supplies, see “Power supply LED errors” on page 133. If the LEDs indicate the power supplies are working correctly, return here and do the following:

1. Power-off the computer.
2. Be sure the system is cabled correctly.
3. Remove or disconnect the following (one at a time) until you find the failure (power-on the computer and reconfigure each time).

Any external devices

Surge suppressor device (on the computer)

Modem, printer, mouse, or non-IBM devices

Each adapter

Drives

Memory modules (minimum requirement = 512 MB (2x256 MB DIMMs))

**Note:** Minimum operating requirements are:

- a. 1 Power supply
  - b. Power backplane
  - c. System board
  - d. 1 Microprocessor in processor 1 slot and VRM
  - e. Memory module of at least 512 MB (with a minimum of 1 bank of 256 MB DIMMs (2x256))
4. Power-on the computer. If the problem remains, suspect the following FRUs in the order listed:
    - Adapter
    - Power supply
    - Power backplane
    - System board

**Notes:**

1. If the problem goes away when you remove an adapter from the system, and replacing that adapter does not correct the problem, suspect the System Board.
2. If you suspect a networking problem and all the system tests pass, suspect a network cabling problem external to the system.



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## Related service information

The service procedures are designed to help you isolate problems. They assume that you have model-specific training on all servers, or that you are familiar with the servers, functions, terminology, and service information provided in this manual.

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## Safety information

The following section contains the safety information that you need to be familiar with before servicing an IBM server.

### General safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
  1. Ensure you can stand safely without slipping.
  2. Distribute the weight of the object equally between your feet.
  3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
  4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

**Remember:** Metal objects are good electrical conductors.
- Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.

## Electrical safety



### CAUTION:

**Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunication systems, networks, and modems before you open the server covers, unless instructed otherwise in the installation and configuration procedures.**

Observe the following rules when working on electrical equipment.

**Important:** Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  - Performing a mechanical inspection
  - Working near power supplies
  - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
  - Ensure that another person, familiar with the power-off controls, is near you.  
**Remember:** Another person must be there to switch off the power, if necessary.
  - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.  
**Remember:** There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
  - When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.

- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.

- *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered-off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
  - Power supply units
  - Pumps
  - Blowers and fans
  - Motor generators
 and similar units. (This practice ensures correct grounding of the units.)
- If an electrical accident occurs:
  - Use caution; do not become a victim yourself.
  - Switch off power.
  - Send another person to get medical aid.

## Safety inspection guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of non-IBM features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

- Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).
- Explosive hazards, such as a damaged CRT face or bulging capacitor
- Mechanical hazards, such as loose or missing hardware

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Turn off the server. Disconnect the power cord.
3. Check the power cord for:
  - a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
  - b. The power cord should be the appropriate type as specified in the parts listings.
  - c. Insulation must not be frayed or worn.
4. Remove the cover.

5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

## Handling static-sensitive devices

Any server part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD), or static-sensitive. ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the server, the part, the work mat, and the person handling the part are all at the same charge.

### Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD-protective devices you use have been certified (ISO 9000) as fully effective.

When handling static-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling static-sensitive devices.
- Select a grounding system, such as those in the following list, to provide protection that meets the specific service requirement.

**Note:** The use of a grounding system is desirable but not required to protect against electrostatic discharge damage.

- Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
- Use the round ground-prong of the ac plug on ac-operated servers.

## Grounding requirements

Electrical grounding of the server is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

## Safety notices (multilingual translations)

The caution and danger safety notices in this section are provided in the following languages:

- English
- Brazilian/Portuguese
- Chinese
- French
- German
- Italian
- Japanese
- Korean
- Spanish

**Important:** All caution and danger statements in this IBM 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 this section.

For example, if a caution statement begins with a number 1, translations for that caution statement appear in this section under statement 1.

Be sure to read all caution and danger statements before performing any of the instructions.

### Statement 1



### DANGER

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

#### To avoid a shock hazard:

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

To Connect	To Disconnect
<ol style="list-style-type: none"><li>1. Turn everything OFF.</li><li>2. First, attach all cables to devices.</li><li>3. Attach signal cables to connectors.</li><li>4. Attach power cords to outlet.</li><li>5. Turn device ON.</li></ol>	<ol style="list-style-type: none"><li>1. Turn everything OFF.</li><li>2. First, remove power cords from outlet.</li><li>3. Remove signal cables from connectors.</li><li>4. Remove all cables from devices.</li></ol>

**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-ROM 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.



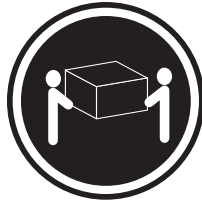
**DANGER**

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.



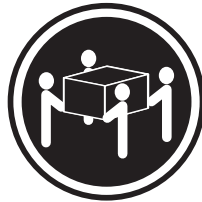
**Statement 4**



≥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 23**

**CAUTION:**

Do not place any object weighing more than 50 kg (110 lbs.) on top of rack-mounted devices.



## Importante:

Todas as instruções de cuidado e perigo da IBM documentation começam com um número. Este número é utilizado para fazer referência cruzada de uma instrução de cuidado ou perigo no idioma inglês com as versões traduzidas das instruções de cuidado ou perigo encontradas nesta seção.

Por exemplo, se uma instrução de cuidado é iniciada com o número 1, as traduções para aquela instrução de cuidado aparecem nesta seção sob a instrução 1.

Certifique-se de ler todas as instruções de cuidado e perigo antes de executar qualquer operação.

### Instrução 1



#### PERIGO

A corrente elétrica proveniente de cabos de alimentação, de telefone e de comunicações é perigosa.

Para evitar risco de choque:

- Não conecte ou desconecte cabos e não realize instalação, manutenção ou reconfiguração deste produto durante uma tempestade com raios.
- Conecte todos os cabos de alimentação a tomadas elétricas corretamente instaladas e aterradas.
- Conecte todos os equipamentos ao qual esse produto será conectado a tomadas corretamente instaladas.
- Sempre que possível, utilize apenas uma das mãos para conectar ou desconectar cabos de sinal.
- Nunca ligue qualquer equipamento quando existir evidência de danos por fogo, água ou na estrutura.
- Desconecte cabos de alimentação, sistemas de telecomunicação, redes e modems antes de abrir as tampas dos dispositivos, a menos que especificado de maneira diferente nos procedimentos de instalação e configuração.
- Conecte e desconecte cabos conforme descrito na seguinte tabela, ao instalar ou movimentar este produto ou os dispositivos conectados, ou ao abrir suas tampas.

Para Conectar:	Para Desconectar:
<ol style="list-style-type: none"><li>1. DESLIGUE Tudo.</li><li>2. Primeiramente, conecte todos os cabos aos dispositivos.</li><li>3. Conecte os cabos de sinal aos conectores.</li><li>4. Conecte os cabos de alimentação às tomadas.</li><li>5. LIGUE os dispositivos.</li></ol>	<ol style="list-style-type: none"><li>1. DESLIGUE Tudo.</li><li>2. Primeiramente, remova os cabos de alimentação das tomadas.</li><li>3. Remova os cabos de sinal dos conectores.</li><li>4. Remova todos os cabos dos dispositivos.</li></ol>

### Instrução 2



#### **CUIDADO:**

Ao substituir a bateria de lítio, utilize apenas uma bateria IBM, Número de Peça 33F8354 ou uma bateria de tipo equivalente, recomendada pelo fabricante. Se o seu sistema possui um módulo com uma bateria de lítio, substitua-o apenas pelo mesmo tipo de módulo, do mesmo fabricante. A bateria contém lítio e pode explodir se não for utilizada, manuseada e descartada de maneira correta.

Não:

- Jogue ou coloque na água
- Aqueça a mais de 100°C (212°F)
- Conserte nem desmonte

Para descartar a bateria, entre em contato com a área de atendimento a clientes IBM, pelo telefone (011) 889-8986, para obter informações sobre como enviar a bateria pelo correio para a IBM.

### Instrução 3



#### **PRECAUCIÓN:**

Quando produtos a laser (unidades de CD-ROM, unidades de DVD, dispositivos de fibra ótica, transmissores, etc.) estiverem instalados, observe o seguinte:

- Não remova as tampas. A remoção das tampas de um produto a laser pode resultar em exposição prejudicial à radiação de laser. Nenhuma peça localizada no interior do dispositivo pode ser consertada.
- A utilização de controles ou ajustes ou a execução de procedimentos diferentes dos especificados aqui pode resultar em exposição prejudicial à radiação.

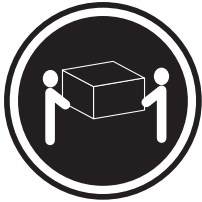


#### **PERIGO**

Alguns produtos a laser contêm um diodo laser da Classe 3A ou Classe 3B embutido. Observe o seguinte:

Radiação de laser quando aberto. Não olhe diretamente para o raio a olho nu ou com instrumentos óticos, e evite exposição direta ao raio.

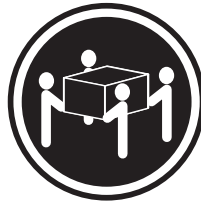
#### Instrução 4



≥18 kg (39.7 lb)



≥32 kg (70.5 lb)



≥55 kg (121.2 lb)

#### CUIDADO:

Ao levantar a máquina, faça-o com segurança.

#### Instrução 5



#### CUIDADO:

Os botões Liga/Desliga localizados no dispositivo e na fonte de alimentação não desligam a corrente elétrica fornecida ao dispositivo. O dispositivo também pode ter mais de um cabo de alimentação. Para remover toda a corrente elétrica do dispositivo, assegure que todos os cabos de alimentação estejam desconectados da fonte de energia elétrica.



#### Instrução 23

#### CUIDADO:



Não coloque nenhum objeto com peso superior a 50 kg (110 lbs.) sobre dispositivos montados em rack.

**重要:**

Server Library 中的所有提醒和危险条款前都有一个数字标识。该数字是用来交叉引用一个英文的提醒和危险条款及本部分中的与之对应的已翻译成其它文字的提醒和危险条款。

例如，如果一个提醒条款前的数字为 1，则本部分中相应的译文也带有标号 1。

在执行任何指示的操作之前，请确保您已经阅读了全部提醒和危险条款。

声明 1



危险

电源、电话和通信电缆中带有危险电流。  
为避免电击：  
雷电期间不要拆接电缆或安装、维修及重新配置本产品。  
将所有电源线连接至正确布线并已安全接地的电源插座上。  
应与本产品连接的所有设备连接至正确布线的插座上。  
尽量只使用单手拆接信号电缆。  
有水、火及结构损坏迹象时，请勿打开任何设备。  
除非在安装配置过程中有明确指示，否则，打开设备机盖前应首先断开与电源线、远程通信系统、网络和调制解调器的所有连接。  
安装、移动或打开本产品及其附带设备的机盖时，应按下表所述连接和断开电缆。

- | 连接时:             | 断开连接时:          |
|------------------|-----------------|
| 1. 关闭所有设备。       | 1. 关闭所有设备。      |
| 2. 首先将所有电缆连接至设备。 | 2. 首先从插座中拔出电源线。 |
| 3. 将信号电缆连接至接口。   | 3. 从接口上拔下信号电缆。  |
| 4. 将电源线连接至插座。    |                 |

## 声明 2



### 警告:

更换锂电池时, 只能使用 IBM 产品号 33F8354 或者是厂商推荐的等同类型的电池。

如果系统模块中含有锂电池, 则只能使用同一厂商制造的同类型的模块进行更换。电池中含有锂, 如果使用、拿放或处理不当, 可能会发生爆炸。

请勿对电池进行下列操作:  
扔入或浸入水电  
加热超过 100 (212 F)  
进行修理或分解  
请按本地法规要求处理电池。

## 声明 3



### 警告:

安装激光产品 (如 CD-ROM、DVD 驱动器、光纤设备或送话器) 时, 应注意以下事项:

不要拆除外盖。拆除激光产品的外盖可能会导致激光辐射的危险, 本设备中没有用户可维修的部件。

非此处指定的其它控制、调整或与性能有关的操作都有可能导致激光辐射的危险。



### 危险

某些激光产品中包含内嵌的 3A 级或 3B 级激光二极管。请注意以下事项。  
打开时会产生激光辐射。不要直视光束, 不要使用光学仪器直接观看光束, 避免直接暴露于光束之下。

声明 4



≥18 kg (37 磅)    ≥32 kg (70.5 磅)    ≥55 kg (121.2 磅)

**警告：**  
抬起时请采用安全操作方法。

声明 5



**警告：**

使用设备上的电源控制按钮和电源上的开关都不能断开本设备上的电流。  
另外，本设备可能带有多条电源线。如要断开设备上的所有电流，请确  
保所有电源线均已与电源断开连接。



声明 6



**警告：**

如果在电源线连接设备的一端安装了固定松紧夹，则必须将电源线的另一端连接至  
使用方便的电源。

声明 23



**警告：**

机柜安装的设备上面不能放置重于 50kg (110 磅) 的物品。



> 50 kg (110 磅)

重要資訊：

**Server Library** 中所有「注意」及「危險」的聲明均以數字開始。此一數字是用來作為交互參考之用，英文「注意」或「危險」聲明可在本節中找到相同內容的「注意」或「危險」聲明的譯文。

例如，有一「危險」聲明以數字 1 開始，則該「危險」聲明的譯文將出現在本節的「聲明」1 中。

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

聲明 1



危險

電源、電話及通信電纜上所產生的電流均有危險性。

欲避免電擊危險：

- 在雷雨期間，請勿連接或切斷本產品上的任何電纜線，或安裝、維修及重新架構本產品。
- 請將電源線接至接線及接地正確的電源插座。
- 請將本產品隨附的設備連接至接線正確的插座。
- 儘可能使用單手來連接或切斷信號電纜線。
- 當設備有火燒或泡水的痕跡，或有結構性損害時，請勿開啓該設備的電源。
- 在安裝及架構之時，若非非常熟悉，在開啓裝置蓋子之前，請切斷電源線、電信系統、網路及數據機。
- 在安裝、移動本產品或附加裝置，或開啓其蓋子時，請依照下表中「連接」及「切斷」電纜線的步驟執行。

連接：

1. 關閉所有開關。
2. 先將所有電纜換上裝置。
3. 將信號電纜接上接頭。
4. 再將電源線接上電源插座。
5. 開啓裝置的電源。

切斷：

1. 關閉所有開關。
2. 先自電源插座拔掉電源線。
3. 拔掉接頭上的所有信號電纜。
4. 再拔掉裝置上的所有電纜線。

聲明 2



注意：

更換鋰電池時，只可使用 IBM 零件編號 33F8354 的電池，或製造商建議之相當類型的電池。若系統中具有包含鋰電池的模組，在更換此模組時，請使用相同廠商製造的相同模組類型。如未正確使用、處理或丟棄含有鋰的電池時，可能會引發爆炸。

請勿將電池：

- 丟入或浸入水中
- 加熱超過 100 °C (212 °F)
- 修理或拆開

請遵照當地法令規章處理廢棄電池。

聲明 3



注意：

安裝雷射產品 (如 CD-ROM、DVD 光碟機、光纖裝置或發射器) 時，請注意下列事項：

- 請勿移開蓋子。移開雷射產品的蓋子，您可能會暴露於危險的雷射輻射之下。裝置中沒有需要維修的組件。
- 不依此處所指示的控制、調整或處理步驟，您可能會暴露於危險的輻射之下。



危險

有些雷射產品含有內嵌式 Class 3A 或 Class 3B 雷射二極體。請注意下列事項：

開啓時會產生雷射輻射。請勿凝視光束，不要使用光學儀器直接觀察，且應避免直接暴露在光束下。



聲明 4



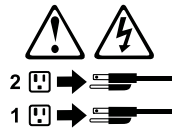
≥ 18 公斤 (37 磅) ≥ 32 公斤 (70.5 磅) ≥ 55 公斤 (121.2 磅)

注意：  
抬起裝置時，請注意安全措施。

聲明 5



注意：  
裝置上的電源控制按鈕及電源供應器上的電源開關均無法關閉裝置上的電流。  
本裝置可能有一條以上的電源線。如要移除裝置上的所有電流，請確認所有電源線已與電源分離。



聲明 23



注意：  
請勿將任何重量超過 50 公斤 (110 磅) 的物品置於已安裝機架的裝置上方。



> 50 公斤 (110 磅)

## Important:

Toutes les consignes Attention et Danger indiquées dans la bibliothèque IBM documentation sont précédées d'un numéro. Ce dernier permet de mettre en correspondance la consigne en anglais avec ses versions traduites dans la présente section.

Par exemple, si une consigne de type Attention est précédée du chiffre 1, ses traductions sont également précédées du chiffre 1 dans la présente section.

Prenez connaissance de toutes les consignes de type Attention et Danger avant de procéder aux opérations décrites par les instructions.

### Notice n° 1



### DANGER

Le courant électrique passant dans les câbles de communication, ou les cordons téléphoniques et d'alimentation peut être dangereux.

Pour éviter tout risque de choc électrique:

- Ne manipulez aucun câble et n'effectuez aucune opération d'installation, d'entretien ou de reconfiguration de ce produit au cours d'un orage.
- Branchez tous les cordons d'alimentation sur un socle de prise de courant correctement câblé et mis à la terre.
- Branchez sur des socles de prise de courant correctement câblés tout équipement connecté à ce produit.
- Lorsque cela est possible, n'utilisez qu'une seule main pour connecter ou déconnecter les câbles d'interface.
- Ne mettez jamais un équipement sous tension en cas d'incendie ou d'inondation, ou en présence de dommages matériels.
- Avant de retirer les carters de l'unité, mettez celle-ci hors tension et déconnectez ses cordons d'alimentation, ainsi que les câbles qui la relient aux réseaux, aux systèmes de télécommunication et aux modems (sauf instruction contraire mentionnée dans les procédures d'installation et de configuration).
- Lorsque vous installez ou que vous déplacez le présent produit ou des périphériques qui lui sont raccordés, reportez-vous aux instructions ci-dessous pour connecter et déconnecter les différents cordons.

Connexion	Déconnexion
<ol style="list-style-type: none"><li>1. Mettez les unités hors tension.</li><li>2. Commencez par brancher tous les cordons sur les unités.</li><li>3. Branchez les câbles d'interface sur des connecteurs.</li><li>4. Branchez les cordons d'alimentation sur des prises.</li><li>5. Mettez les unités sous tension.</li></ol>	<ol style="list-style-type: none"><li>1. Mettez les unités hors tension.</li><li>2. Débranchez les cordons d'alimentation des prises.</li><li>3. Débranchez les câbles d'interface des connecteurs.</li><li>4. Débranchez tous les câbles des unités.</li></ol>

### Notice n° 2



#### ATTENTION:

Remplacez la pile au lithium usagée par une pile de référence identique exclusivement - voir la référence IBM - ou par une pile équivalente recommandée par le fabricant. Si votre système est doté d'un module contenant une pile au lithium, vous devez le remplacer uniquement par un module identique, produit par le même fabricant. La pile contient du lithium et présente donc un risque d'explosion en cas de mauvaise manipulation ou utilisation.

- Ne la jetez pas à l'eau.
- Ne l'exposez pas à une température supérieure à 100 °C.
- Ne cherchez pas à la réparer ou à la démonter.

Pour la mise au rebut, reportez-vous à la réglementation en vigueur.

### Notice n° 3



#### ATTENTION:

Si des produits laser sont installés (tels que des unités de CD-ROM ou de DVD, des périphériques contenant des fibres optiques ou des émetteurs-récepteurs), prenez connaissance des informations suivantes:

- N'ouvrez pas ces produits pour éviter une exposition directe au rayon laser. Vous ne pouvez effectuer aucune opération de maintenance à l'intérieur.
- Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures décrites dans le présent document.

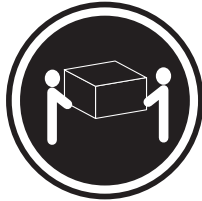


#### DANGER

Certains produits laser contiennent une diode laser de classe 3A ou 3B. Prenez connaissance des informations suivantes:

Rayonnement laser lorsque le carter est ouvert. évitez de regarder fixement le faisceau ou de l'observer à l'aide d'instruments optiques. évitez une exposition directe au rayon.

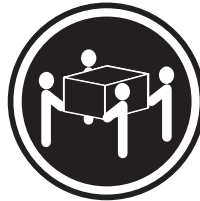
Notice n° 4



≥18 kg (39.7 lb)



≥32 kg (70.5 lb)



≥55 kg (121.2 lb)

**ATTENTION:**

Faites-vous aider pour soulever ce produit.

Notice n° 5



**ATTENTION:**

Le bouton de mise sous tension/hors tension de l'unité et l'interrupteur d'alimentation du bloc d'alimentation ne coupent pas l'arrivée de courant électrique à l'intérieur de la machine. Il se peut que votre unité dispose de plusieurs cordons d'alimentation. Pour isoler totalement l'unité du réseau électrique, débranchez tous les cordons d'alimentation des socles de prise de courant.



Notice n° 23



Ne posez pas d'objet dont le poids dépasse 50 kg sur les unités montées en armoire.

## Wichtig:

Alle Sicherheitshinweise in dieser IBM documentation beginnen mit einer Nummer. Diese Nummer verweist auf einen englischen Sicherheitshinweis mit den übersetzten Versionen dieses Hinweises in diesem Abschnitt.

Wenn z. B. ein Sicherheitshinweis mit der Nummer 1 beginnt, so erscheint die Übersetzung für diesen Sicherheitshinweis in diesem Abschnitt unter dem Hinweis 1.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

### Hinweis 1



### VORSICHT

Elektrische Spannungen von Netz-, Telefon- und Datenübertragungsleitungen sind gefährlich.

Aus Sicherheitsgründen:

- Bei Gewitter an diesem Gerät keine Kabel anschließen oder lösen. Ferner keine Installations-, Wartungs- oder Rekonfigurationsarbeiten durchführen.
- Gerät nur an eine Schutzkontaktsteckdose mit ordnungsgemäß geerdetem Schutzkontakt anschließen.
- Alle angeschlossenen Geräte ebenfalls an Schutzkontaktsteckdosen mit ordnungsgemäß geerdetem Schutzkontakt anschließen.
- Signalkabel möglichst einhändig anschließen oder lösen.
- Keine Geräte einschalten, wenn die Gefahr einer Beschädigung durch Feuer, Wasser oder andere Einflüsse besteht.
- Die Verbindung zu den angeschlossenen Netzkabeln, Telekommunikationssystemen, Netzwerken und Modems ist vor dem Öffnen des Gehäuses zu unterbrechen. Es sei denn, dies ist in den zugehörigen Installations- und Konfigurationsprozeduren anders angegeben.
- Nur nach den nachfolgend aufgeführten Anweisungen arbeiten, die für Installation, Transport oder Öffnen von Gehäusen von Personal Computern oder angeschlossenen Einheiten gelten.

Kabel anschließen:	Kabel lösen:
<ol style="list-style-type: none"><li>1. Alle Geräte ausschalten und Netzstecker ziehen.</li><li>2. Zuerst alle Kabel an Einheiten anschließen.</li><li>3. Signalkabel an Anschlußbuchsen anschließen.</li><li>4. Netzstecker an Steckdose anschließen.</li><li>5. Gerät einschalten.</li></ol>	<ol style="list-style-type: none"><li>1. Alle Geräte ausschalten.</li><li>2. Zuerst Netzstecker von Steckdose lösen.</li><li>3. Signalkabel von Anschlußbuchsen lösen.</li><li>4. Alle Kabel von Einheiten lösen.</li></ol>

## Hinweis 2



### ACHTUNG:

Eine verbrauchte Batterie nur durch eine Batterie mit der IBM Teilenummer 33F8354 oder durch eine vom Hersteller empfohlene Batterie ersetzen. Wenn Ihr System ein Modul mit einer Lithium-Batterie enthält, ersetzen Sie es immer mit dem selben Modultyp vom selben Hersteller. Die Batterie enthält Lithium und kann bei unsachgemäßer Verwendung, Handhabung oder Entsorgung explodieren.

Die Batterie nicht:

- mit Wasser in Berührung bringen.
- über 100 C erhitzen.
- reparieren oder zerlegen.

Die örtlichen Bestimmungen für die Entsorgung von Sondermüll beachten.

## Hinweis 3



### ACHTUNG:

Wenn ein Laserprodukt (z. B. CD-ROM-Laufwerke, DVD-Laufwerke, Einheiten mit Glasfaserkabeln oder Transmitter) installiert ist, beachten Sie folgendes.

- Das Entfernen der Abdeckungen des CD-ROM-Laufwerks kann zu gefährlicher Laserstrahlung führen. Es befinden sich keine Teile innerhalb des CD-ROM-Laufwerks, die vom Benutzer gewartet werden müssen. Die Verkleidung des CD-ROM-Laufwerks nicht öffnen.
- Steuer- und Einstellelemente sowie Verfahren nur entsprechend den Anweisungen im vorliegenden Handbuch einsetzen. Andernfalls kann gefährliche Laserstrahlung auftreten.

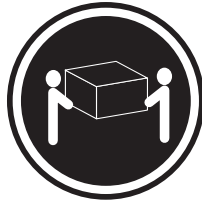


### VORSICHT

Manche CD-ROM-Laufwerke enthalten eine eingebaute Laserdiode der Klasse 3A oder 3B. Die nachfolgend aufgeführten Punkte beachten.

Laserstrahlung bei geöffneter Tür. Niemals direkt in den Laserstrahl sehen, nicht direkt mit optischen Instrumenten betrachten und den Strahlungsbereich meiden.

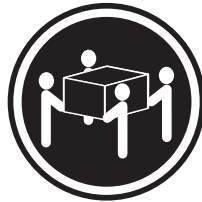
#### Hinweis 4



≥18 kg



≥32 kg



≥55 kg

#### ACHTUNG:

Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.

#### Hinweis 5



#### ACHTUNG:

Mit dem Betriebsspannungsschalter an der Vorderseite des Servers und dem Betriebsspannungsschalter am Netzteil wird die Stromversorgung für den Server nicht unterbrochen. Der Server könnte auch mehr als ein Netzkabel aufweisen. Um die gesamte Stromversorgung des Servers auszuschalten, muß sichergestellt werden, daß alle Netzkabel aus den Netzsteckdosen herausgezogen wurden.



#### Hinweis 23

#### ACHTUNG:



Keine Gegenstände, die mehr als 50 kg wiegen, auf Rack-Einheiten ablegen.

## Importante:

Tutti gli avvisi di attenzione e di pericolo riportati nella pubblicazione IBM documentation iniziano con un numero. Questo numero viene utilizzato per confrontare avvisi di attenzione o di pericolo in inglese con le versioni tradotte riportate in questa sezione.

Ad esempio, se un avviso di attenzione inizia con il numero 1, la relativa versione tradotta è presente in questa sezione con la stessa numerazione.

Prima di eseguire una qualsiasi istruzione, accertarsi di leggere tutti gli avvisi di attenzione e di pericolo.

### Avviso 1



### PERICOLO

La corrente elettrica circolante nei cavi di alimentazione, del telefono e di segnale è pericolosa.

Per evitare il pericolo di scosse elettriche:

- Non collegare o scollegare i cavi, non effettuare l'installazione, la manutenzione o la riconfigurazione di questo prodotto durante i temporali.
- Collegare tutti i cavi di alimentazione ad una presa elettrica correttamente cablata e munita di terra di sicurezza.
- Collegare qualsiasi apparecchiatura collegata a questo prodotto ad una presa elettrica correttamente cablata e munita di terra di sicurezza.
- Quando possibile, collegare o scollegare i cavi di segnale con una sola mano.
- Non accendere qualsiasi apparecchiatura in presenza di fuoco, acqua o se sono presenti danni all'apparecchiatura stessa.
- Scollegare i cavi di alimentazione, i sistemi di telecomunicazioni, le reti e i modem prima di aprire i coperchi delle unità, se non diversamente indicato nelle procedure di installazione e configurazione.
- Collegare e scollegare i cavi come descritto nella seguente tabella quando si effettuano l'installazione, la rimozione o l'apertura dei coperchi di questo prodotto o delle unità collegate.

Per collegare:	Per scollegare:
<ol style="list-style-type: none"><li>1. SPEGNERE tutti i dispositivi.</li><li>2. Collegare prima tutti i cavi alle unità.</li><li>3. Collegare i cavi di segnale ai connettori.</li><li>4. Collegare i cavi di alimentazione alle prese elettriche.</li><li>5. ACCENDERE le unità.</li></ol>	<ol style="list-style-type: none"><li>1. SPEGNERE tutti i dispositivi.</li><li>2. Rimuovere prima i cavi di alimentazione dalle prese elettriche.</li><li>3. Rimuovere i cavi di segnale dai connettori.</li><li>4. Rimuovere tutti i cavi dalle unità.</li></ol>



### Avviso 2



#### ATTENZIONE:

Quando si sostituisce la batteria al litio, utilizzare solo una batteria IBM con numero parte 33F8354 o batterie dello stesso tipo o di tipo equivalente consigliate dal produttore. Se il sistema di cui si dispone è provvisto di un modulo contenente una batteria al litio, sostituire tale batteria solo con un tipo di modulo uguale a quello fornito dal produttore. La batteria contiene litio e può esplodere se utilizzata, maneggiata o smaltita impropriamente.

Evitare di:

- Gettarla o immergerla in acqua
- Riscaldarla ad una temperatura superiore ai 100°C
- Cercare di ripararla o smontarla

Smaltire secondo la normativa in vigore (D.Lgs 22 del 5/2/9) e successive disposizioni nazionali e locali.

### Avviso 3



#### ATTENZIONE:

Quando si installano prodotti laser come, ad esempio, le unità DVD, CD-ROM, a fibre ottiche o trasmettitori, prestare attenzione a quanto segue:

- Non rimuovere i coperchi. L'apertura dei coperchi di prodotti laser può determinare l'esposizione a radiazioni laser pericolose. All'interno delle unità non vi sono parti su cui effettuare l'assistenza tecnica.
- L'utilizzo di controlli, regolazioni o l'esecuzione di procedure non descritti nel presente manuale possono provocare l'esposizione a radiazioni pericolose.

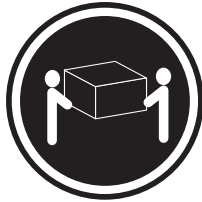


#### PERICOLO

Alcuni prodotti laser contengono all'interno un diodo laser di Classe 3A o Classe 3B. Prestare attenzione a quanto segue:

Aperto l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici ed evitare l'esposizione diretta al fascio.

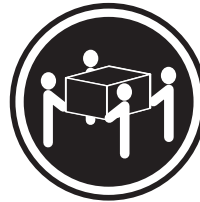
**Avviso 4**



≥18 kg



≥32 kg



≥55 kg

**ATTENZIONE:**

Durante il sollevamento della macchina seguire delle norme di sicurezza.

**Avviso 5**



**ATTENZIONE:**

Il pulsante del controllo dell'alimentazione situato sull'unità e l'interruttore di alimentazione posto sull'alimentatore non disattiva la corrente elettrica fornita all'unità. L'unità potrebbe disporre di più di un cavo di alimentazione. Per disattivare la corrente elettrica dall'unità, accertarsi che tutti i cavi di alimentazione siano scollegati dalla sorgente di alimentazione.



**Avviso 3**

**Avviso 23**

**ATTENZIONE:**



Non poggiare oggetti che pesano più di 50 kg sulla parte superiore delle unità montate in rack.

重要：

Nefinity Server ライブラリーにあるすべての注意および危険の記述は数字で始まります。この数字は、英語版の注意および危険の記述と翻訳された注意および危険の記述を相互参照するために使用します。

例えば、もし注意の記述が数字の1で始まっている場合は、その注意の翻訳は、記述1の下にあります。

手順を実施する前に、すべての注意：

・記述 1

## 危険

感電を防止するため、雷の発生時には、いかなるケーブルの取り付けまたは取り外しも行わないでください。また導入、保守、再構成などの作業も行わないでください。

感電を防止するため：

- 電源コードは正しく接地および配線が行われている電源に接続してください。
- 本製品が接続されるすべての装置もまた正しく配線された電源に接続されている必要があります。

できれば、信号ケーブルに取り付けまたは取り外しのときは片方の手のみで行うようにしてください。これにより、電位差がある二つの表面に触ることによる感電を防ぐことができます。

電源コード、電話ケーブル、通信ケーブルからの電流は身体に危険を及ぼします。設置、移動、または製品のカバーを開けたり装置を接続したりするときには、以下のようにケーブルの接続、取り外しを行ってください。

接続するには

1. すべての電源を切る
2. まず、装置にすべてのケーブルを接続する。
3. 次に、通信ケーブルをコネクタに接続する
4. その後、電源コンセントに電源コードを接続する
5. 装置の電源を入れる。

取り外すには

1. すべての電源を切る
2. まず、電源コンセントから電源コードを取り外す
3. 次に、通信ケーブルをコネクタから取り外す。
4. その後、装置からすべてのケーブルを取り外す

・記述 2

## ⚠ 注意

本製品には、システム・ボード上にリチウム電池が使用されています。電池の交換方法や取り扱いを誤ると、発熱、発火、破裂のおそれがあります。

電池の交換には、IBM部品番号33F8354の電池またはメーカー推奨の同等の電池を使用してください。

交換用電池の購入については、お買い求めの販売店または弊社の営業担当までお問い合わせください。

電池は幼児の手の届かない所に置いてください。

万一、幼児が電池を飲み込んだときは、直ちに医師に相談してください。

以下の行為は絶対にしないでください。

- －水にぬらすこと
- －100度C 以上の過熱や焼却
- －分解や充電
- －ショート

電池を廃棄する場合、および保存する場合にはテープなどで絶縁してください。他の金属や電池と混ざると発火、破裂の原因となります。電池は地方自治体の条例、または規則に従って廃棄してください。ごみ廃棄場で処分されるごみの中に捨てないでください。

・記述 3

## ⚠ 注意

レーザー製品 ( CD-ROM、DVD、または光ファイバー装置または送信器など) が組み込まれている場合は、下記に御注意ください。

- －ここに記載されている制御方法、調整方法、または性能を超えて使用すると、危険な放射線を浴びる可能性があります。
- －ドライブのカバーを開けると、危険な放射線を浴びる可能性があります。ドライブの内部に修理のために交換可能な部品はありません。カバーを開けないでください。

## ⚠ 危険

一部 CD-ROM ドライブは、Class 3A または Class 3B レーザー・ダイオードを使用しています。次の点に注意してください。

CD-ROMドライブのカバーを開けるとレーザーが放射されます。光線をみつめたり、光学器械を使って直接見たりしないでください。また直接光線を浴びないようにしてください。

・記述 4

## ⚠ 注意



18Kg 以上



32Kg 以上



55Kg 以上

装置を持ち上げる場合は、安全に持ち上げる方法に従ってください。

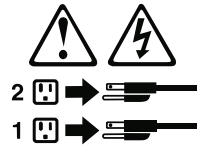
・記述 5

## 注意

サーバーの前面にある電源制御ボタンは、サーバーに供給された電流を遮断しません。

サーバーには、複数の電源コードが接続されているかもしれません。

サーバーから電流を完全に遮断するために、すべての電源コードが電源から取り外されていることを確認してください。



・記述 23

## 注意

ラック・モデルのサーバーの上に 50 Kg 以上の物を置かないでください。



> 50 Kg

**중요:**

본 *Server Library*에 있는 모든 주의 및 위험 경고문은 번호로 시작합니다. 이 번호는 영문 주의 혹은 위험 경고문과 이 절에 나오는 번역된 버전의 주의 혹은 위험 경고문을 상호 참조하는 데 사용됩니다.

예를 들어, 주의 경고문이 번호 1로 시작하면, 번역된 해당 주의 경고문을 본 절의 경고문 1에서 찾아볼 수 있습니다.

모든 지시사항을 수행하기 전에 반드시 모든 주의 및 위험 경고문을 읽으십시오.

경고문 1



위험



전원, 전원 및 통신 케이블로부터 흘러 나오는 전류는 위험합니다.

전기 충격을 피하려면:

- 뇌우를 동반할 때는 케이블의 연결이나 절수, 이 제품의 설치, 유지보수 또는 재구성을 하지 마십시오.
- 모든 전원 코드를 적절히 배선 및 접지해야 합니다.
- 이 제품에 연결될 모든 장비를 적절하게 배선된 콘센트에 연결하십시오.
- 가능한 한 신호 케이블을 한 손으로 연결하거나 끊으십시오.
- 화재, 수해 또는 구조상의 손상이 있을 경우 장비를 켜지 마십시오.
- 설치 및 구성 프로시저에 다른 설명이 없는 한, 장치 덮개를 열기 전에 연결된 전원 코드, 원거리 통신 시스템, 네트워크 및 모뎀을 끊어 주십시오.
- 제품 또는 접속된 장치를 설치, 이동 및 덮개를 열 때 다음 설명에 따라 케이블을 연결하거나 끊도록 하십시오.

연결하려면:	연결을 끊으려면:
1. 모든 스위치를 끕니다.	1. 모든 스위치를 끕니다.
2. 먼저 모든 케이블을 장치에 연결합니다.	2. 먼저 콘센트에서 전원 코드를 뽑습니다.
3. 신호 케이블을 커넥터에 연결합니다.	3. 신호 케이블을 커넥터에서 제거합니다.
4. 콘센트에 전원 코드를 연결합니다.	4. 장치에서 모든 케이블을 제거합니다.
5. 장치 스위치를 켭니다.	

경고문 2



주의:

리튬 배터리를 교체할 때는 IBM 부품 번호 33F8354 또는 제조업체에서 권장하는 동등한 유형의 배터리를 사용하십시오. 시스템에 리튬 배터리를 갖고 있는 모듈이 있으면 동일한 제조업체에서 생산된 동일한 모듈 유형으로 교체하십시오. 배터리에 리튬이 있을 경우 제대로 사용, 처리 또는 처분하지 않으면 폭발할 수 있습니다.

다음은 주의하십시오.

- 던지거나 물에 담그지 않도록 하십시오.
- 100°C(212°F) 이상으로 가열하지 마십시오.
- 수리하거나 분해하지 마십시오.

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3



주의:  
레이저 제품(CD-ROMs, DVD 드라이브, 광 장치 또는 트랜스미터 등과 같은)이 설치되어 있을 경우 다음을 유의하십시오.

- 덮개를 제거하지 마십시오. 레이저 제품의 덮개를 제거했을 경우 위험한 레이저 광선에 노출될 수 있습니다. 이 장치 안에는 서비스를 받을 수 있는 부품이 없습니다.

- 여기에서 지정하지 않은 방식의 제어, 조절 또는 실행으로 인해 위험한 레이저 광선에 노출될 수 있습니다.



위험

일부 레이저 제품에는 클래스 3A 또는 클래스 3B 레이저 다이오드가 들어 있습니다. 다음을 주의하십시오.

열면 레이저 광선에 노출됩니다. 광선을 주시하거나 광학 기계를 직접 쳐다보지 않도록 하고 광선에 노출되지 않도록 하십시오.

경고문 4



≥18 kg (37 lbs)



≥ 32 kg (70.5 lbs)



≥ 55 kg (121.2 lbs)

주의:

기계를 들 때는 안전하게 들어 올리십시오.

경고문 5



주의:

장치의 전원 제어 버튼 및 전원 공급기의 전원 스위치는 장치에 공급되는 전류를 차단하지 않습니다. 장치에 둘 이상의 전원 코드가 연결되어 있을 수도 있습니다. 장치에서 모든 전류를 차단하려면 모든 전원 코드가 전원으로부터 차단되어 있는지 확인하십시오.



경고문 23



주의:

서랍형 모델의 장치 상단에 50 kg(110 lbs.)이 넘는 물체를 올려  
놓지 마십시오.



> 50 kg (110 lbs)



## Importante:

Todas las declaraciones de precaución de esta IBM documentation empiezan con un número. Dicho número se emplea para establecer una referencia cruzada de una declaración de precaución o peligro en inglés con las versiones traducidas que de dichas declaraciones pueden encontrarse en esta sección.

Por ejemplo, si una declaración de peligro empieza con el número 1, las traducciones de esta declaración de precaución aparecen en esta sección bajo Declaración 1.

Lea atentamente todas las declaraciones de precaución y peligro antes de llevar a cabo cualquier operación.

### Declaración 1



## PELIGRO

La corriente eléctrica de los cables telefónicos, de alimentación y de comunicaciones es perjudicial.

Para evitar una descarga eléctrica:

- No conecte ni desconecte ningún cable ni realice las operaciones de instalación, mantenimiento o reconfiguración de este producto durante una tormenta.
- Conecte cada cable de alimentación a una toma de alimentación eléctrica con conexión a tierra y cableado correctos.
- Conecte a tomas de alimentación con un cableado correcto cualquier equipo que vaya a estar conectado a este producto.
- Si es posible, utilice una sola mano cuando conecte o desconecte los cables de señal.
- No encienda nunca un equipo cuando haya riesgos de incendio, de inundación o de daños estructurales.
- Desconecte los cables de alimentación, sistemas de telecomunicaciones, redes y módems conectados antes de abrir las cubiertas del dispositivo a menos que se indique lo contrario en los procedimientos de instalación y configuración.
- Conecte y desconecte los cables tal como se describe en la tabla siguiente cuando desee realizar una operación de instalación, de traslado o de apertura de las cubiertas para este producto o para los dispositivos conectados.

Para la conexión	Para la desconexión
<ol style="list-style-type: none"><li>1. APÁGUELO todo.</li><li>2. En primer lugar, conecte los cables a los dispositivos.</li><li>3. Conecte los cables de señal a los conectores.</li><li>4. Conecte cada cable de alimentación a la toma de alimentación.</li><li>5. ENCIENDA el dispositivo.</li></ol>	<ol style="list-style-type: none"><li>1. APÁGUELO todo.</li><li>2. En primer lugar, retire cada cable de alimentación de la toma de alimentación.</li><li>3. Retire los cables de señal de los conectores.</li><li>4. Retire los cables de los dispositivos.</li></ol>

## Declaración 2



### **PRECAUCIÓN:**

Cuando desee sustituir la batería de litio, utilice únicamente el número de pieza 33F8354 de IBM o cualquier tipo de batería equivalente que recomiende el fabricante. Si el sistema tiene un módulo que contiene una batería de litio, sustitúyalo únicamente por el mismo tipo de módulo, que ha de estar creado por el mismo fabricante. La batería contiene litio y puede explotar si el usuario no la utiliza ni la maneja de forma adecuada o si no se desprende de la misma como corresponde.

No realice las acciones siguientes:

- Arrojarla al agua o sumergirla
- Calentarla a una temperatura que supere los 100°C (212°F)
- Repararla o desmontarla

Despréndase de la batería siguiendo los requisitos que exija el reglamento o la legislación local.

## Declaración 3



### **PRECAUCIÓN:**

Cuando instale productos láser (como, por ejemplo, CD-ROM, unidades DVD, dispositivos de fibra óptica o transmisores), tenga en cuenta las advertencias siguientes:

- No retire las cubiertas. Si retira las cubiertas del producto láser, puede quedar expuesto a radiación láser perjudicial. Dentro del dispositivo no existe ninguna pieza que requiera mantenimiento.
- El uso de controles o ajustes o la realización de procedimientos que no sean los que se han especificado aquí pueden dar como resultado una exposición perjudicial a las radiaciones.



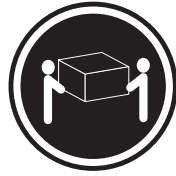
### **PELIGRO**

Algunos productos láser contienen un diodo de láser incorporado de Clase 3A o de Clase 3B. Tenga en cuenta la advertencia siguiente.

Cuando se abre, hay radiación láser. No mire fijamente el rayo ni lleve a cabo ningún examen directamente con instrumentos ópticos; evite la exposición directa al rayo.

## Declaración 4





≥18 kg



≥32 kg



≥55 kg

### PRECAUCIÓN:

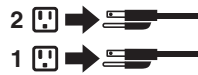
Tome medidas de seguridad al levantar el producto.

Declaración 5



### PRECAUCIÓN:

El botón de control de alimentación del dispositivo y el interruptor de alimentación de la fuente de alimentación no apagan la corriente eléctrica suministrada al dispositivo. Es posible también que el dispositivo tenga más de un cable de alimentación. Para eliminar la corriente eléctrica del dispositivo, asegúrese de desconectar todos los cables de alimentación de la fuente de alimentación.



Declaración 23

### PRECAUCIÓN:



No coloque ningún objeto que pese más de 50 kg (110 libras) encima de los dispositivos montados en bastidor.

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## Problem determination tips

Due to the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

- Machine type and model
- Processor or hard disk upgrades
- Failure symptom
  - Do diagnostics fail?
  - What, when, where, single, or multiple systems?
  - Is the failure repeatable?
  - Has this configuration ever worked?
  - If it has been working, what changes were made prior to it failing?
  - Is this the original reported failure?
- Reference/Diagnostics version
  - Type and version level
- Hardware configuration
  - Print (print screen) configuration currently in use
  - BIOS level
- Operating system software
  - Type and version level

**Note:** To eliminate confusion, identical systems are considered identical only if they:

1. Are the exact machine type and models
2. Have the same BIOS level
3. Have the same adapters/attachments in the same locations
4. Have the same address jumpers/terminators/cabling
5. Have the same software versions and levels
6. Have the same Reference/Diagnostics Diskette (version)
7. Have the same configuration options set in the system
8. Have the same setup for the operation system control files

Comparing the configuration and software set-up between "working and non-working" systems will often lead to problem resolution.

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GHz, MHz only measures microprocessor internal clock speed, not application performance. Many factors affect application performance.

When referring to hard disk drive capacity, GB equals one billion bytes. Total user-accessible capacity may vary depending on operating environments.

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IBM	xSeries
Light Path Diagnostics <sup>®</sup>	

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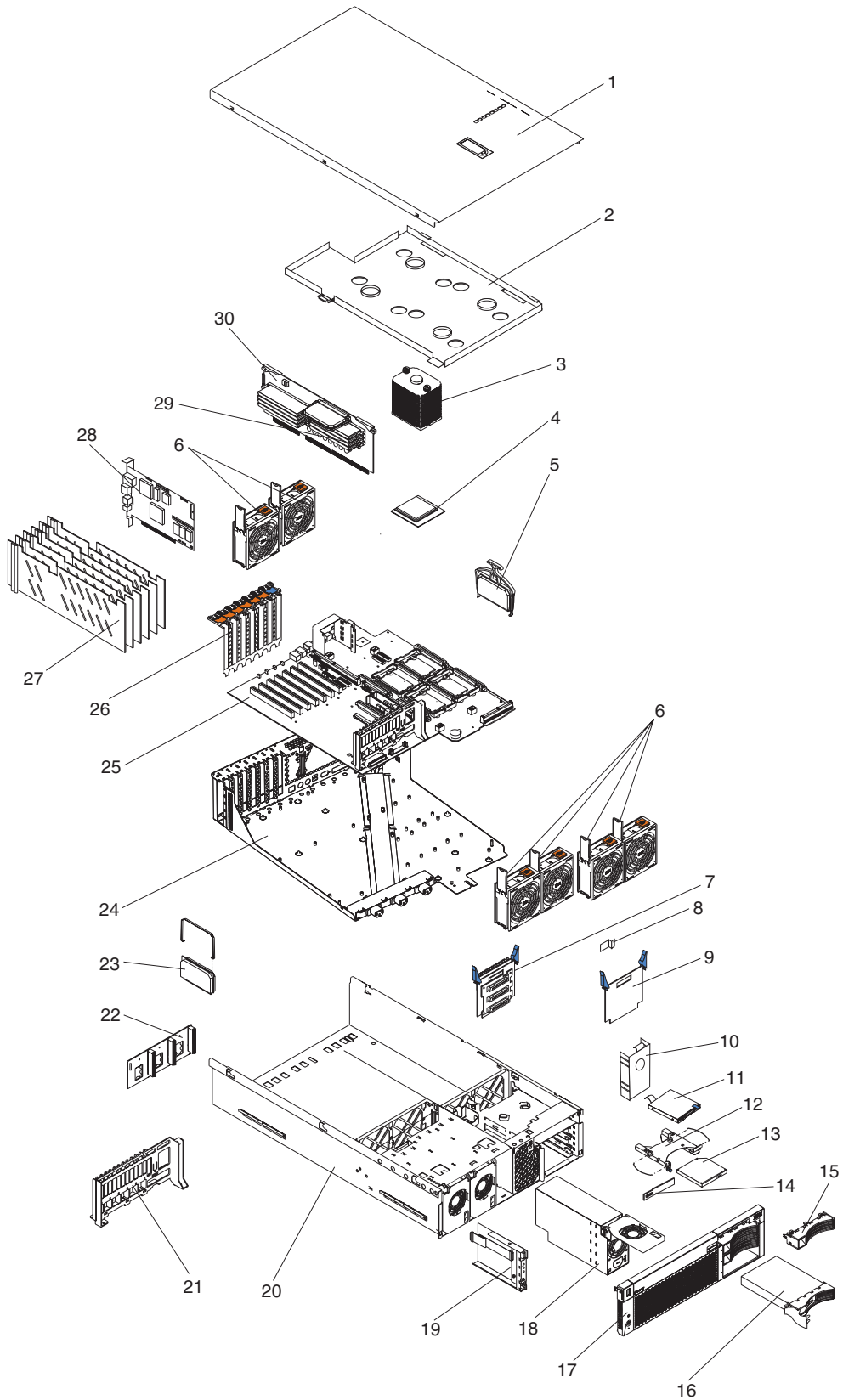
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## Parts

This parts listing supports the xSeries 360 server, machine type 8686, models 1RX, 1RY, 2RX, 2RY, 3RX, 3RY, 4RX, 4RY, 5RG, 5RX, 6RG, 6RX, 7RX, 8RX, 9RX).





# System

Index	System (xSeries 360, Models 1RX, 1RY, 2RX, 2RY, 3RX, 3RY, 4RX, 4RY, 5RG, 5RX, 6RG, 6RX, 7RX, 8RX, 9RX)	FRU No.
1	Top cover (all models)	48P9476
2	Brace, heatsink (all models)	24P6708
3	Heatsink (models 1RX, 2RX, 3RX, 4RX, 5RX, 6RX, 2RY, 3RY))	48P9576
4	Xeon Processor MP, 1.6G/100-1MB (models 3RX, 3RY, 6RX, 6RG)	24P6703
4	Xeon Processor MP, 1.5G/100-512 (models 2RX, 2RY, 5RX)	49P2418
4	Xeon Processor MP, 1.4G/100-512 (models 1RX, 4RX)	49P2417
4	Xeon Processor MP, 1.5G/100-512K (model 2RX, 2RY, 5RX)	49P2418
5	VRM, 9.05 V (models 1RX, 2RX, 2RY, 3RX, 3RY, 4RX, 5RX, 6RX)	49P2073
6	Fan, 92MM (models 1RX, 2RX, 2RY, 3RX, 3RY, 4RX, 5RX, 6RX)	09N9474
7	Lightpath card assembly (all models)	73P6919
8	Power guard (all models)	06P6344
9	Backing plate cookie sheet (all models)	06P6343
10	Power supply filler panel (all models)	37L0331
11	Diskette drive, slim 12.7MM (all models)	36L8645
12	Tray, diskette drive (all models)	06P5588
13	CD-ROM drive (all models)	06P5263
14	Interposer card (all models)	06P5587
15	Hard disk drive, blank (all models)	00N7259
16	Hard disk drive, 36.4 GB (models 2RX, 3RX )	19K1469
17	Front bezel (all models)	06P4157
18	Power supply w/mounting, 370W (models 1RX, 2RX, 2RY, 3RX, 3RY, 4RX, 5RX, 6RX, 7RX, 8RX, 9RX)(2 per) 2R_ 3R_ 5RX 6RX 8RX 9RX)	00N7708
19	Operator interface card (all models)	06P5579
20	Base, chassis (all models)	06P4151
21	Hot plug card retainer (all models)	06P6361
22	Backplane, power (all models)	06P4192
23	VRM, 12V/40A (Memory controller VRM or PCI bus VRM) (all models)	49P2120
24	Shuttle (all models)	73P6821
25	System Board (models 1RX, 2RX, 2RY, 3RX, 3RY)	73P6906
25	System Board (models 4RX, 5RX, 6RX)	73P6907
25	System Board (models 7RX, 8RX, 9RX)	73P6826
25	System Board (models 1RQ, 2RQ, 3RQ)	73P7194
26	PCI hot swap switch card (all models)	06P5577
27	PCI hot-plug insulator (all models)	06P6356
28	Remote Supervisor Adapter (all models)	06P5067
29	Memory 512 MB PC1600 ECC (all models)	33L3284
29	Memory 1 GB PC1600 ECC (all models)	33L3286
30	Memory card (all models)	59P6871
	Flange, left (all models)	00N7190
	Flange, right (all models)	00N7192
	Misc parts kit (all models)	00N7193
	EMI shield (all models)	06P6357
	Left slide assembly (all models)	31P6117
	Right slide assembly (all models)	31P6118
	Cable arm (all models)	31P6119
	Drawer retaining bracket (all models)	31P6120
	Cable mounting plate (all models)	31P6121
	Bracket, fan mount (all models)	24P6706
	Label, system service (all models)	32P9040
	Clip, VRM (all models)	31P6025
	Clip, VRM (all models)	31P6026

Index	System (xSeries 360, Models 1RX, 1RY, 2RX, 2RY, 3RX, 3RY, 4RX, 4RY, 5RG, 5RX, 6RG, 6RX, 7RX, 8RX, 9RX)	FRU No.
	Bracket, RIOG connector (all models)	31P6043
	Insulator, PCI (all models)	06P4258
	Bracket, PCI I/O card (all models)	06P5580
	Shield, PCI I/O (all models)	06P5581
	Bracket, power backplane (all models)	06P5591
	Insulator, power backplane (all models)	06P5592
	Bracket, switch card (all models)	06P6342
	Cable, diskette drive (all models)	06P4221
	Cable, LED/SW (all models)	06P4244
	Cable, I2C signal (all models)	06P4246
	Cable, SCSI power (all models)	06P4248
	Cable, LP to media (all models)	06P6373
	Cable, HP CD to System Board (all models)	06P6375
	Cable, RAID to System Board (all models)	31P5995
	Cable, Remote Supervisor Adapter (all models)	31P6071
	Cable, serial port (model 7RX, 8RX, 9RX)	59P6881
	Cord, jumper (all models)	36L8886
	Line cord (all models)	6952300
	Front panel (all models)	06P5579
	Power supply (all models)	00N7708
	Heatsink, Gallatin (7RX, 8RX, 9RX)	59P6940
	Microprocessor, 1.5 G/400-1 MB Xeon (7RX)	59P6941
	Microprocessor, 1.9 G/400-2 MB Xeon (8RX)	59P6942
	Microprocessor, 2.0 G/400-2 MB Xeon (model 9RX)	59P6949
	Microprocessor, 2.0 G/400-1 MB Xeon (model 1RQ,)	49P3167
	Microprocessor, 2.5 G/400-1 MB Xeon (model 2RQ,)	49P3168
	Microprocessor, 2.8 G/400-2 MB Xeon (model 3RQ)	4931679
	System board, NABOO5S (models 7RX, 8RX, 9RX)	59P6951
	Brace, heatsink bracket (models 7RX, 8RX, 9RX)	59P6984
	Label, system service (models 1RQ, 2RQ, 3RQ)	73P7141
	Label, system service (models 4RX, 5RX, 6RX)	59P6873
	Label, system service (models 7RX, 8RX, 9RX)	59P6999
	VRM, 9.05P (models 7RX, 8RX, 9RX)	49P2129
	VRM (models 1RQ, 2RQ, 3RQ)	49P2010
	System board (model 4RX, 5RX, 6RX)	59P6981
	Memory card (models 4RX, 5RX, 6RX, 7RX, 8RX, 9RX)	59P6871
	Kit, al wipe (all models)	59P4739
	Kit, thermal grease (all models)	59P4740
	Retainer, module (all models)	06P6350
	Card, condor (all models)	59P2952

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## Keyboards

Keyboard	FRU No.
US English	37L2551
French Canadian	37L2552
LA Spanish	37L2553
Brazil/Portuguese	37L2554
Arabic	37L2555
Belgium/French	37L2556
Belgium/UK	37L2557
Bulgarian	37L2558

<b>Keyboard</b>	<b>FRU No.</b>
Czech	37L2559
Danish	37L2560
Dutch	37L2561
French	37L2562
German	37L2563
Greek	37L2564
Hebrew	37L2565
Hungarian	37L2566
Iceland	37L2567
Italy	37L2568
Norwegian	37L2569
Polish	37L2570
Portuguese	37L2571
Romanian	37L2572
Russian	37L2573
Serbian/Cyrillic	37L2574
Slavic	37L2575
Spanish	37L2576
Swedish/Finn	37L2577
Swiss, F/G	37L2578
Turkish	37L2579
Turkish	37L2580
UK English	37L2581
Yugosl/Lat	37L2582
US English-EMEA	37L2583
Japanese	37L2584
Chinese/US	37L2585
Thailand	37L2587
French Canadian	37L0913







Part Number: 24P2967

(1P) P/N: 24P2967

