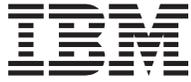# IBM

@server

xSeries 305 Type 8673

Hardware Maintenance Manual and Troubleshooting Guide

# IBM

# @server

xSeries 305 Type 8673

# Hardware Maintenance Manual and Troubleshooting Guide

# IBM

> **Note**
> Before using this information and the product it supports, read Appendix C, "Notices" on page 121.

# 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™ 305.

**Important:** The field replaceable unit (FRU) procedures are intended for trained servicers who are familiar with IBM xSeries products. See the parts listing in "Server" on page 80 to determine if the component being replaced is a customer replaceable unit (CRU) or a field replaceable unit (FRU).

The latest version of this publication is available from the IBM Web site. Go to http://www.ibm.com/ and click Support & downloads. In the Technical support keyword search field, type 8673 and click Go. A list of publications for your server is displayed.

## Important safety information

Be sure to read all caution and danger statements in this book before performing any of the instructions. See "Safety information" on page 87.

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

### 注意和危险声明(简体中文)

重要事项：

本书中的所有注意和危险声明之前都有编号。该编号用于英语的注意或危险声明与 *Safety Information* 一书中可以找到的翻译版本的注意或危险声明进行交叉引用。

例如，如果一个注意声明以编号 1 开始，那么对该注意声明的翻译出现在 *Safety Information* 一书中的声明 1 中。

在按说明执行任何操作前，请务必阅读所有注意和危险声明。

## 注意及危險聲明（中文）

重要資訊：

本書中所有「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「安全資訊」(Safety Information) 一書中找到相同內容的「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「安全資訊」(Safety Information) 一書的「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。

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.

**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.

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

## 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.

# Contents

# Chapter 1. General information

The IBM @server xSeries 305 Type 8673 server, which features IBM X-Architecture™ technology, is a high-performance 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, reliability, and expansion capabilities were key considerations in the design of your server. These design features make it possible for you to customize the system hardware to meet your needs today, while providing flexible expansion capabilities for the future.

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

## Related publications

This *Hardware Maintenance Manual and Troubleshooting Guide* is provided in PDF on the IBM *xSeries Documentation* CD. It contains information to help you solve the problem yourself or to provide helpful information to a service technician.

In addition to this *Hardware Maintenance Manual and Troubleshooting Guide*, the following xSeries 345 Type 8670 documentation is provided with your server:

- *Installation Guide*
  This printed publication contains setup and installation instructions.
- *Rack Installation Instructions*
  This printed publication contains the instructions to install your server in a rack.
- *Safety Book*
  This multilingual publication is provided in Portable Document Format (PDF) on the IBM *xSeries Documentation* CD. It contains translated versions of the caution and danger statements that appear in the documentation for your server. Each caution and danger statement has an assigned number, which you can use to locate the corresponding statement in your native language.
- *User's Guide*
  This publication is provided in PDF on the IBM *xSeries Documentation* CD. It contains general information about your server, including information about features, how to configure your server, how to use the *ServerGuide*™ *Setup and Installation* CD, and how to get help.

- *Option Installation Guide*
  This publication is provided in PDF on the IBM *xSeries Documentation* CD. It contains instructions to install, remove, and connect optional devices supported by your server.

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

## Notices and statements in this book

The caution and danger statements used in this book also appear in the multilingual *Safety Information* book provided on the IBM *xSeries 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.

# Features and specifications

The following table provides a summary of the features and specifications of your xSeries 305 Type 8673 server. Depending on your server model, some features and specifications might not apply.

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

*Table 1. Features and specifications*

| Microprocessor: | Size: | Heat output: |
|---|---|---|
| **Memory:** | • Height: 43 mm (1.75 inches, 1 U) | Approximate heat output in British thermal units (Btu) per hour: |
| • Minimum: 256 MB | • Depth: 424 mm (16.54 inches) | • Minimum configuration: 297 Btu (87 watts) |
| • Maximum: 4 GB | • Width: 430 mm (16.69 inches) | • Maximum configuration: 512 Btu (150 watts) |
| • Type: PC2100 266 MHz, ECC SDRAM, registered DIMMs only | • Maximum weight: 12.7 kg (28 lb) depending on your configuration | |
| • Slots: Four dual inline | | **Electrical input:** |
| • Supports 256 MB, 512 MB, and 1 GB DIMMs | **Integrated functions:** | • Sine-wave input (47-63 Hz) required |
| | • 1000Base-T, 100Base-T, 10Base-T (dual) Ethernet controllers on the system board with Wake on LAN® support | • Input voltage low range: |
| **Drives:** | |   – Minimum: 100 V ac |
| • Diskette: 1.44 MB | |   – Maximum: 127 V ac |
| • CD-ROM: IDE | • Serial port | • Input voltage high range: |
| • Supports up to two slim-high hard disk drives | • Two USB ports |   – Minimum: 200 V ac |
| | • Keyboard port |   – Maximum: 240 V ac |
| | • Mouse port | • Input kilovolt-amperes (kVA), approximately: |
| **Expansion bays:** | • Dual-channel bus mastering IDE controller |   – Minimum: 0.0870 kVA |
| | |   – Maximum: 0.150 kVA |
| **Expansion slots:** | **Hard disk controller:** | |
| • Two 66/100/133 MHz/64-bit PCI-X slots on the system board (one half-length full-height, one low profile) | • Dual-channel bus mastering IDE controller | **Notes:** |
| | • Ultra160 SCSI adapter is installed in one of the expansion slots (SCSI models) | 1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use. |
| **Video controller:** | **Acoustical noise emissions:** | 2. These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate. |
| • ATI Rage XL video on system board | • Sound power, idling: 6.5 bel maximum | |
| • Compatible with SVGA and VGA | • Sound power, operating: 6.5 bel maximum | |
| • 8 MB SDRAM video memory | | |
| | **Environment:** | |
| **Power supply:** | • Air temperature: | |
| |   – Server on: 10° to 35°C (50.0° to 95.0°F); altitude: 0 to 914 m (2998.7 ft) | |
| |   – Server off: -40° to 60°C (-104° to 140°F); maximum altitude: 2133 m (6998.0 ft) | |
| | • Humidity: | |
| |   – Server on: 8% to 80% | |
| |   – Server off: 8% to 80% | |

# Server Controls, LEDs and power

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

## Front view

The following illustration shows the controls and LEDs on the front of the server.
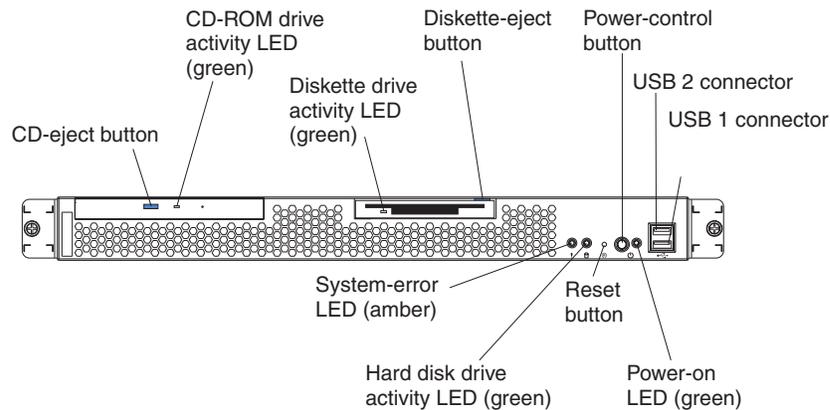
**CD-eject button:** Press this button to release a CD from the CD-ROM drive.

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

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

**Diskette-eject button:** Press this button to release a diskette from the diskette drive.

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

**USB 2 Connector:** Connect a USB device to this connector.

**USB 1 Connector:** Connect a USB device to this connector.

**Power-on LED:** When this LED is lit, it indicates that the server is turned on.

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

**Hard disk drive activity LED:** When this LED is flashing, it indicates that the associated hard disk drive is in use.

**System-error LED:** When this LED is lit, it indicates that a system error has occurred.

# Rear view

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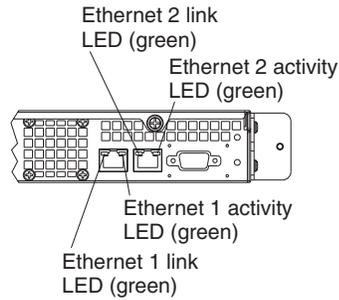


**Ethernet 2 link LED (green):** When this green LED is lit, it indicates that the speed of the Ethernet LAN is 1000BASE-T. When this green LED is off, it indicates that the speed of the Ethernet LAN is 10/100BASE-T.

**Ethernet 2 activity LED (green):** When this green LED is flashing, it indicates that there is an active link connection between Ethernet port 2 and the network.

**Ethernet 1 link LED (green):** When this green LED is lit, it indicates that the speed of the Ethernet LAN is 1000BASE-T. When this green LED is off, it indicates that the speed of the Ethernet LAN is 10/100BASE-T.

**Ethernet 1 activity LED (green):** When this green LED is flashing, it indicates that there is an active link connection between Ethernet port 1 and the network.

# Server power features

This section contains information about how to turn your server on and off.

## Turning on the server

**Statement 13:**



**DANGER**

**Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.**

After you connect the server to an ac power source, the server can be turned on in any of the following ways:

- You can press the power-control button on the front.
- If the server is turned on and a power failure occurs, the server will start automatically when power is restored. (You can set the default in the Configuration/Setup Utility program. Go to **Power Management →Automatic Power on →Previous State**.)

Complete the following steps to manually turn on the server:

1. Review the information in "Important safety information" on page iii.
2. Turn on all external devices, such as the monitor.
3. Plug the server power cord into the power source.
4. Press the power-control button on the front of the server.

   **Note:** While the server is turning on, the power-on LED on the front of the server is lit.

## Turning off the server
Complete the following steps to manually turn off the server:

1. Review the information in "Important safety information" on page iii
2. See your operating system documentation for the proper procedure to shut down the operating system.

   When you turn off the server, observe the following precaution.
3. Press the power-control button on the front of the server.

   **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.**
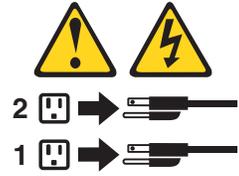
# Chapter 2. Configuring your server

The following configuration programs and capabilities come with your server:

- **Configuration/Setup Utility program**

  This is part of the basic input/output system (BIOS) in your server. Use it to configure serial port assignments, change interrupt request (IRQ) settings, change the startup-device sequence, set the date and time, and set passwords.

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

  This provides software-setup tools and installation tools that are designed for your server. Use this CD during the installation of your server to configure basic hardware features and to simplify the installation of your operating system. For information about using this CD, see "Using the ServerGuide Setup and Installation CD" on page 11.

- **SCSISelect Utility program (some models)**

  Use this to configure devices that are attached to the SCSI adapter. Use it to change default settings, resolve configuration conflicts, and perform low-level formats on SCSI hard disk drives. For information about using this utility program, see "Using the ServerGuide Setup and Installation CD" on page 11.

- **Gigabit Ethernet controller configuration**

  Your server comes with two integrated Gigabit Ethernet controllers. These controllers provide an interface for connecting to a 10-Mbps, 100-Mbps, or 1000-Mbps network and provides full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN).

- **IBM Director**

  IBM Director is a workgroup-hardware-management tool that you can use to centrally manage xSeries servers; IBM NetVista™, IntelliStation®, and ThinkPad® computers; and non-IBM Intel-microprocessor-based systems. IBM Director automates tasks such as inventory-taking, monitoring of environmental sensors (such as temperature, voltage and fans), alerting, and system-health information. For more information about IBM Director, see the *IBM Director CD* that comes with your server.

## Using the Configuration/Setup Utility program

Use the Configuration/Setup Utility program to:

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

## Starting the Configuration/Setup Utility program

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

1. Turn on the server.
2. When the prompt `Press F1 for Configuration/Setup` appears, press F1. If you have set both a power-on password and an administrator password, you must

type the administrator password to access the full Configuration/Setup Utility menu. If you do not type the administrator password, a limited Configuration/Setup Utility menu is available.

3. Select settings to view or change.

# Passwords

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

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

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

## Power-on password

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

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

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

- If an administrator password is set, type the administrator password at the password prompt. Start the Configuration/Setup Utility program and reset the power-on password.
- Remove the server battery and then reinstall it. See the *Option Installation Guide* for instructions for removing the battery.

## Administrator password

If an administrator password is set, you must type the administrator password for access to the full Configuration/Setup Utility menu. You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for the password. The **Administrator password** choice is on the Configuration/Setup Utility menu only if an optional IBM Remote Supervisor Adapter is installed.

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

# Using the ServerGuide Setup and Installation CD

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

To purchase the latest *ServerGuide Setup and Installation* CD, see the "ServerGuideUpdates" flyer that comes with your server library, or go to the ServerGuide fulfillment Web site at http://www.ibm.com/pc/coupon/.

The ServerGuide program has the following features to make setup easier:
- An easy-to-use interface with online help
- Diskette-free setup, and configuration programs that are based on detected hardware
- ServeRAID Manager program, which configures your ServeRAID adapter or integrated SCSI controller with RAID capabilities if installed
- A system BIOS update program, which updates the BIOS code directly from the CD
- Device drivers that are provided for your server model and detected hardware
- Operating-system partition size and file-system type that are selectable during setup

## ServerGuide features

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

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

The ServerGuide program has the following features:
- Sets system date and time.
- If installed, detects the SCSI RAID adapter, controller, or integrated SCSI controller with RAID capabilities and runs the SCSI RAID configuration program.
- Updates the licensed internal code (firmware) level without diskettes.
- 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 using diskettes.
- Creates a System Partition on the default drive. You can run server-specific utility programs after setup.
- Detects installed hardware options and provides updated device drivers for most adapters and devices.
- Creates a setup-replication diskette for replicating setup selections for other servers of the same model.
- Provides diskette-free installation for supported operating systems.
- Provides a replicated installation path for multiple installations of supported operating systems.

- Includes an online README file with links to tips for your hardware and operating-system installation.

# Setup and configuration overview

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

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

When you start the *ServerGuide Setup and Installation* CD, the program performs the following tasks:

- The ServerGuide program prompts you for your language, country, and keyboard layout. (This information is stored and later passed to the operating-system installation program.)
- The ServerGuide program displays choices for running the configuration programs. For example:
  - The Express Configuration method runs the required programs for your server, based on the hardware that is detected.
  - The Custom Configuration method displays all programs that are available for your 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 features are optional. If you select the Express Configuration method, some or all of these features 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 feature is provided so you can delete all partitions on all hard disk drives.
  - The ServerGuide program checks the server BIOS code and microcode (firmware) levels for supported options and then checks the CD for a newer level. The CD content might be newer than the BIOS code and firmware level. The ServerGuide program can perform a flash update of the BIOS code and supported microcode (firmware) options without using diskettes.
  - The SCSI RAID configuration program starts, leading you through the entire configuration process.
  - 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 your operating system.

**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 operating system is installed. See the documentation that comes with the adapter.

2. Diagnostics for your 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 service-processor disk operating system (DOS) utilities, system diagnostics, flash BIOS updates, and other programs. 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 *ServerGuide 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 your server model.

## Typical operating-system installation

You can use the ServerGuide program to shorten your installation time. The ServerGuide program provides the device drivers that are required for your hardware and for the operating system that you are installing. This section describes a typical ServerGuide operating-system installation.

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

1. After you have completed the setup process, the operating-system installation program starts. (You will need your operating-system CD to complete the installation.)
2. The ServerGuide program stores information about the server model, service processor, hard disk drive controllers, and network adapters. Then, the program checks the CD for newer device drivers. This information is stored and then passed to the operating-system installation program.
3. With some operating-system installations, you can create an operating-system replication diskette for setting up additional servers. This diskette contains the Internet protocol (IP) address, server name, and other selections.
4. The ServerGuide program presents operating-system partition options that are based on your operating-system selection and the installed hard disk drives.
5. If you are installing the operating system from diskettes, the ServerGuide program lists the diskettes that you must create and the optional device-driver diskettes (for installed adapters or controllers) that you might want to create.
6. The ServerGuide program prompts you to insert your operating-system CD and restart the server. At this point, the installation program for the operating system takes control to complete the installation.

## 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 an operating-system replication diskette, which contains information that you need to complete multiple installations. Not all operating systems support operating-system replication diskettes.

## Installing your operating system without ServerGuide

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

1. Go to http://www.ibm.com/pc/support/.
2. Under **Browse**, click **Servers**.
3. From the **Family** drop-down list, select your server model.
4. If operating-system installation instructions are available for your server model, **OS installation** is in the list in the upper-left corner of the Web page. Click **OS installation** and select the instructions for your operating system.

## Using the SCSISelect Utility program

Use the SCSISelect Utility program to:

- View the default SCSI IDs
- Locate and correct configuration conflicts
- Perform a low-level format on a SCSI hard disk

## Starting the SCSISelect Utility program

Complete the following steps to start the SCSISelect Utility program:

1. Turn on the server.
2. When the prompt `<<< Press <CTRL><A> for SCSISelect Utility! >>>` appears, press Ctrl+A. If you have set an administrator password, you are prompted to type the password.
3. When the prompt `Would you like to configure the SCSISelect controller or run the SCSI Disk Utilities?` appears, make your selection and press Enter.
4. Use the arrow keys to select a choice from the menu.
5. Follow the instructions on the screen to change the settings of the selected items, and press Enter.

## SCSISelect Utility menu choices

The following choices are on the SCSISelect Utility menu:

- **Configuration**

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

  You can view and change the following controller settings:

  – **SCSI Controller ID**

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

  – **SCSI Controller Parity**

    This choice is set to **Enabled** and cannot be changed.

- **SCSI Controller Termination**

  This choice is set to **Enabled** and cannot be changed.

- **Additional Configuration**

  Select this choice to view or change the setting for advanced configuration options. These options include support for large hard disk drives and support for drives with Ultra SCSI speeds.

  - **Boot Device Options**

    Select this choice to configure startable-device parameters. You must know the SCSI ID of the device that you want to configure.

  - **SCSI Device Configuration**

    Select this choice to configure SCSI-device parameters. You must know the SCSI ID of the device that you want to configure.

    The sync transfer rate is the transfer rate for Ultra SCSI devices. For Ultra3 SCSI LVD devices, the maximum rate is 160 MBps; for Ultra2 SCSI devices, 80 MBps; for Fast SCSI devices, 20 MBps.

- **BIOS Information**

  - **Interrupt (IRQ) Channel**

    Select this choice to view the Change Interrupt Request settings.

  - **I/O Port Address**

    Select this choice to view the Input/Output ports.

- **SCSI Disk Utilities**

  Select this choice to view the SCSI ID that is assigned to a device or to format a SCSI device. Select a device from the list and read the instructions on the screen carefully before making a selection.

  If you press Ctrl+A before a selected drive is ready, an Unexpected SCSI Command Failure screen might appear. Restart the server and watch the SCSISelect messages as each drive spins up. When the selected drive is ready, press Ctrl+A.

# Configuring the Gigabit Ethernet controller

Your server comes with two integrated Gigabit Ethernet controllers. The controllers provide an interface for connecting to a 10-Mbps, 100-Mbps, or 1-Gbps local area network (LAN) and provides full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network.

When you connect the server to a network, the Ethernet controllers detect the data-transfer rate (10 Mbps, 100 Mbps, or 1 Gbps) of the network and automatically operates at that rate. If the Ethernet ports that your server is connected to auto-negotiation, the controllers automatically operate in standard Ethernet (10BASE-T), Fast Ethernet (100BASE-TX/1000BASE-T), half duplex (HDX), or full duplex (FDX) mode. The controllers supports 1 GB speeds.

# High-performance Ethernet options

The Ethernet controllers support teaming options, virtual LANs, and priority packets, which improve performance, security, and throughput. These options are supported by the integrated Ethernet controller and by adapters such as the IBM 10/100/1000 Ethernet Adapter and the IBM 10/100/1000 EtherJet PCI family of adapters.

### Teaming options

The Ethernet controller supports teaming options. A team consists of two or more integrated Ethernet controllers, two or more Ethernet adapters, or a combination of

Ethernet controllers and adapters. Teaming options improve throughput and fault tolerance on a server running Microsoft Windows 2000, Windows NT 4.0, Linux, or Novell NetWare 4.1x or later. The controller supports the following teaming options:

- **Adapter fault tolerance (AFT)** provides automatic redundancy for Ethernet controllers. It supports from two to four controllers per team. You can configure one of the integrated Ethernet controllers or adapters as the primary controller. If the primary connection fails, the secondary controller takes over. When the primary connection is restored, network traffic returns to the primary controller.
- **Adaptive load balancing (ALB)** balances data transmission among two to four controllers. ALB includes AFT. You can use ALB with any 100BASE-TX/1000BASE-T switch.
- **Cisco Fast EtherChannel (FEC)** improves transmission and reception throughput among two to four controllers. FEC includes AFT. You can use FEC only with a switch that has FEC capability.

# Chapter 3. Diagnostics

This section provides basic troubleshooting information to help you resolve some common problems that might occur with your server.

If you cannot locate and correct the problem using the information in this section, see Appendix A, "Getting help and technical assistance" on page 85 for more information.

## General checkout

The server diagnostic programs are stored on the IBM *Enhanced Diagnostics CD*. These programs provide the primary methods of testing the major components of the server.

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 system might be part of a shared hard disk drive cluster (two or more systems sharing one or more external storage devices). Before you run diagnostics, verify that the failing system is not part of a shared hard disk drive cluster.

A system might be part of a cluster if:
- The system is identified as part of a cluster.
- One or more external storage units are attached to the system and at least one of the attached storage units is also attached to another system or unidentifiable source.
- One or more systems are located near the failing system.

If the failing system is suspected to be part of a shared hard disk drive cluster, you can run all diagnostic tests except the diagnostic tests that test the storage unit (hard disk drive residing in the storage unit) or the storage adapter attached to the storage unit.

**Notes:**
1. For systems that are part of a shared hard disk drive cluster, run one test at a time in looped mode. Do not run all tests in looped mode, because this could enable the hard disk drive diagnostic tests.
2. If multiple error codes are displayed, diagnose the first error code that is displayed.
3. If the computer stops with a POST error, go to "POST error codes" on page 69.
4. If the computer stops and no error is displayed, go to "Undetermined problems" on page 77.
5. For power supply problems, see "Power checkout" on page 26.
6. For safety information, see "Safety information" on page 87.
7. For intermittent problems, check the error log.

# Checkout procedure

Follow the steps in this procedure to identify system problems.

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

**YES.** Schedule maintenance for the system. Shut down all systems related to the cluster. Run the storage test.

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

**002** **IF THE SYSTEM IS NOT PART OF A CLUSTER:**
1. Turn off the server and all external devices.
2. Check all cables and power cords.
3. Set all display controls to the middle position.
4. Turn on all external devices.
5. Turn on the server.
6. Record any POST error messages that are displayed on the screen. If an error is displayed, look up the first error in the "POST error codes" on page 69.
7. Check the System Error log. If an error was recorded by the system, see Chapter 6, "Symptom-to-FRU index" on page 63.
8. Start the diagnostic programs.
9. Check for the following responses:
   - One beep.
   - Readable instructions or the main menu.

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

**NO.** Find the failure symptom in Chapter 6, "Symptom-to-FRU index" on page 63.

**YES.** Run the diagnostic programs. If necessary, see "Diagnostic programs and error messages" on page 21.

If you receive an error, see Chapter 6, "Symptom-to-FRU index" on page 63.

If the diagnostic programs were completed successfully and you still suspect a problem, see "Undetermined problems" on page 77.

# Diagnostic tools overview

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

- **POST beep codes and error messages**

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

- **Error log**

  The POST error log contains the three most recent error codes and messages that the system has generated during POST. The System Error Log contains all the error messages that were issued during POST.

  To view the contents of the error logs, start the Configuration/Setup Utility program; then, select **Error Logs** from the main menu. See "Viewing the System Error log" on page 24 for more information.

- **ServerGuide error symptoms**

  ServerGuide error symptoms are explained at "ServerGuide error symptoms" on page 20.

- **Diagnostic programs and error messages**

  The server diagnostic programs are stored on the IBM *Enhanced Diagnostics CD*. These programs are the primary method of testing the major components of your server. See "Diagnostic programs and error messages" on page 21 for more information.

- **Error symptom charts**

  These charts list problem symptoms, along with suggested steps to correct the problems. See the "Error symptoms" on page 68 for more information.

- **Customized support page**

  You can create a customized support page that is specific to your hardware, complete with Frequently Asked Questions, Parts Information, Technical Hints and Tips, and Downloadable files. In addition, you can choose to receive electronic mail (e-mail) notifications whenever new information becomes available about your registered products.

  After you register and profile your xSeries products, you can diagnose problems using the IBM Online Assistant, and you can participate in the IBM discussion forum. For more detailed information about registering and creating a customized profile for your IBM products, go to the following addresses on the Web:
  - http://www.ibm.com/pc/register
  - http://www.ibm.com/pc/support

# 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 installed in the server. This series of tests is called the power-on self-test, or POST.

**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.

# POST beep codes

POST generates beep codes to indicate successful completion or the detection of a problem.

- One short beep indicates the successful completion of POST.
- More than one beep indicates that POST detected a problem. For more information, see "Beep symptoms" on page 63.

If POST detects a problem (more than one beep sounds), an error message appears on your screen. See "Beep symptoms" on page 63 and "POST error codes" on page 69 for more information.

# Error logs

A POST error log is available when an optional service processor adapter has been installed in the server.

The POST error log contains the three most recent error codes and messages that the system generated during POST. The System Error log contains all messages issued during POST and all system status messages from the service processor.

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

### Viewing error logs from the Configuration/Setup Utility program
Start the Configuration/Setup Utility program; then, select **Error Logs** from the main menu. See Chapter 2, "Configuring your server" on page 9 for more information.

### Viewing error logs from diagnostic programs
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 22 for more information.

# ServerGuide error symptoms

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

*Table 2. ServerGuide Setup and Installation CD*

| Symptom | Suggested action |
|---------|------------------|
| The *ServerGuide Setup and Installation* CD will not start. | • Ensure that the server is supported and has a startable (bootable) CD-ROM drive.<br>• If the startup (boot) sequence settings have been altered, ensure that the CD-ROM drive is first in the startup sequence.<br>• If more than one CD-ROM drive is installed, ensure that only one drive is set as the primary drive. Start the CD from the primary drive. |
| The SCSI RAID program cannot view all installed drives, or the NOS cannot be installed. | • Ensure that there are no duplicate SCSI IDs or IRQ assignments.<br>• Ensure that the hard disk drive is connected properly. |
| The Operating System Installation program continuously loops. | Make more space available on the hard disk. |

*Table 2. ServerGuide Setup and Installation CD  (continued)*

| Symptom | Suggested action |
| --- | --- |
| The ServerGuide program will not start your NOS CD. | Ensure that the NOS CD you have is supported by the ServerGuide program. See the *ServerGuide Setup and Installation* CD label for a list of supported NOS versions. |
| The NOS cannot be installed; the option is not available. | Ensure that the NOS is supported on your server. If the NOS is supported, either there is no logical drive defined (SCSI RAID systems) or the ServerGuide System Partition is not present. Run the ServerGuide program, and ensure that setup is complete. |

# Small computer system interface messages

If you receive a SCSI error message, see "Diagnostic error codes" on page 65.

**Note:** If your server does not have a hard disk drive, ignore any message that indicates that the BIOS is not installed.

# Diagnostic programs and error messages

The server diagnostic programs are stored on the IBM *Enhanced Diagnostics CD*. These programs are the primary method of testing the major components of your 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.

The following sections contain the error codes that might appear in the detailed test log and summary log when the diagnostic programs are run.

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. (These codes are for trained service personnel; see "Diagnostic error codes" on page 65).

**iii**        is the three-digit device ID. (These codes are for trained service personnel; see "Diagnostic error codes" on page 65).

**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 messages

The diagnostic text message format is as follows:

```
Function Name: Result (test specific string)
```

where:

**Function Name**

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

**Result**    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 driver is not found.

**test specific string**

    is additional information that you can use to analyze the problem.

# Starting the diagnostic programs

The IBM Enhanced Diagnostics programs will isolate your server hardware from software that you have installed on your hard disk drive. The programs run independently of the operating system, and *must be run either from the CD or diskette*. This method of testing is generally used when other methods are not accessible or have not been successful in isolating a problem suspected to be hardware related.

An IBM *Enhanced Diagnostics* CD comes with the server. You can also download the latest image of the diagnostics from the World Wide Web at http://www.ibm.com/pc/support.

**Note:** When using diagnostics with a USB Keyboard and Mouse attached, go into Setup and enable USB emulation.

    1. Press F1 Config/Setup
    2. Select Devices and I/O Ports
    3. Select USB Setup
    4. Make sure USB Keyboard and Mouse are enabled.

### Using the diagnostics CD

To start the IBM Enhanced Diagnostics using the CD, do the following:

    1. Turn off your server and any peripheral devices.

2. Turn on all attached devices; then, turn your server on.

3. When you see `Press F1 For Configuration/Setup`, press the F1 key.

4. When the Configuration/Setup Utility menu appears, select **Start Options**.

5. From the Start Options menu, select **Startup Sequence**.

6. Note the device selected as the First Startup Device. Later, you must restore this setting.

7. Select **CD-ROM** as the First Startup Device.

8. Press Esc two times to return to the Configuration/Setup Utility menu.

9. Place the IBM *Enhanced Diagnostics* CD in the CD-ROM drive.

10. Select **Save & Exit Setup** and follow the prompts. The diagnostics will load. Follow the instructions on the screen to run the diagnostics.

> **Important:** When you finish running the diagnostics and utilities, remove the CD from the CD-ROM drive and turn off the server. You must restore the First Startup Device to the original setting. Use steps 2 through 8 of this procedure to do this.

## Downloading the diagnostics program

Do the following to download the latest image of the IBM Enhanced Diagnostics from the World Wide Web and create a startable Enhanced Diagnostics diskette:

1. Go to the following World Wide Web site: http://www.ibm.com/pc/support/

2. Download the diagnostics file for your server to a hard disk drive directory (not to a diskette).

3. Go to a DOS prompt and change to the directory where the file was downloaded.

4. Insert a blank high-density diskette in diskette drive A.

5. Type in the following, and then press Enter: *filename* a: where *filename* is the name of the file you downloaded from the Web.

The downloaded file is self-extracting and will be copied to the diskette. When the copy completes, you have a startable IBM Enhanced Diagnostics diskette.

## Using the diagnostic diskette

Do the following to start the IBM Enhanced Diagnostics using the diagnostics diskette, do the following:

1. Turn off your server and any peripheral devices.

2. Insert the IBM Enhanced Diagnostics diskette into the diskette drive.

3. Turn on all attached devices; then, turn on the server.

4. Follow the instructions on the screen.

5. Place the IBM *Enhanced Diagnostics* CD in the CD-ROM drive. The diagnostics will load. Follow the instructions on the screen to run the diagnostics.

When the tests have completed, you can view the Test Log by selecting **Utility** from the top of the screen.

If the hardware checks out OK but the problem persists during normal 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.

## Viewing the test log

The test log records data about system failures and other pertinent information. The test log will not contain any information until after the diagnostic program has run.

**Note:** If you already are running the diagnostic programs, begin with step 4

1. Insert the *IBM Enhanced Diagnostics* CD.
2. Turn on the system and watch the screen.

   If the system is on, shut down your operating system and restart the system.
3. If a power-on password is set, the system prompts you for it. Type in the appropriate password; then, press Enter.
4. Run the appropriate diagnostics program and when the Diagnostic Programs screen appears, select **Utility**.
5. Select **View Test Log** from the list that appears; then, follow the instructions on the screen.
6. You can save the test log to a file on a diskette or to your hard disk drive.

   **Note:** The system maintains the test-log data while the system is powered on. When you turn off the power to the server, the test log is cleared.

### Viewing the System Error log

With the optional service processor adapter, you can also view the System Error log from the diagnostic programs. See the instructions in "Viewing error logs from diagnostic programs" on page 20.

## Diagnostic error message tables

For descriptions of the error messages that might appear when you run the diagnostic programs, see "Diagnostic error codes" on page 65.

**Notes:**

1. Depending on your server configuration, some of the error messages might not appear when you run the diagnostic programs.
2. If diagnostic error messages appear that are not listed in the tables, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, ServeRAID™, and diagnostics microcode installed.

## Recovering the BIOS code

If the BIOS code has become damaged, such as from a power failure during a flash update, you can recover the BIOS code using the boot block jumper and a BIOS flash diskette.

**Note:** You can obtain a BIOS flash diskette from one of the following sources:

- Use the *ServerGuide Setup and Installation* CD to make a BIOS flash diskette.
- Download a BIOS flash diskette from the World Wide Web. Go to http://www.ibm.com/pc/support, click **IBM Server Support**, and make the selections for your server.
- Contact your IBM service representative.

The flash memory of your server contains a protected area that cannot be overwritten. The recovery boot block is a section of code in this protected area that enables the server to start up and to read a flash diskette. The flash utility recovers the system BIOS code from the BIOS recovery files on the diskette.

The following illustration shows the location of the Flash boot block recovery jumper on the system board.
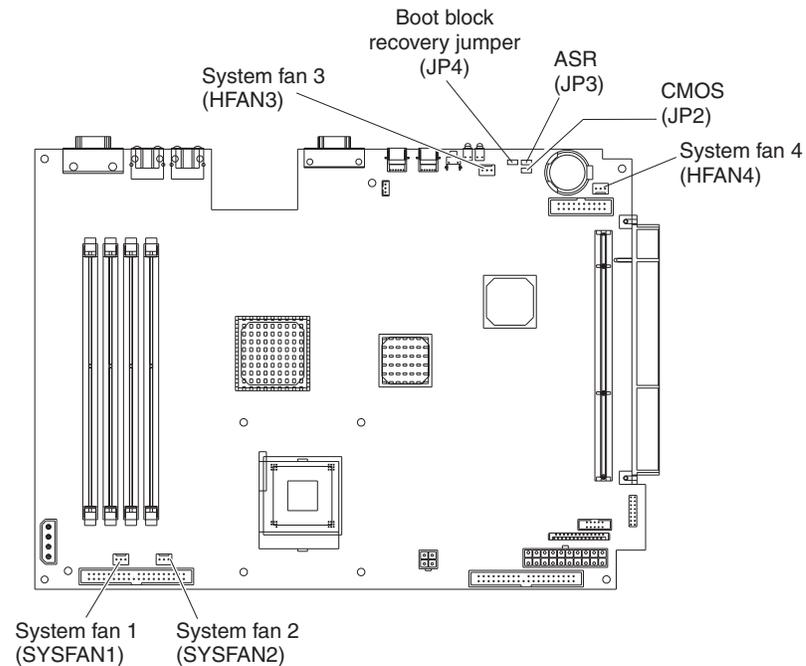


Note: The Automatic Server Restart (ASR) jumper (JP3) causes the server to restart automatically if it stops (for example, if the operating system stops running). The default position of the jumper (ASR enabled) is pins 2 and 3.

Complete the following steps to recover the BIOS code:

1. Turn off the server and disconnect all power cords and external cables; then, remove the server cover (see "Removing the cover" on page 34).

2. Locate the Flash boot block recovery jumper block (JP4) on the system board.

3. Move the jumper from pins 1 and 2 to pins 2 and 3 to enable the BIOS recovery mode.

4. Insert the BIOS flash diskette into the diskette drive.

5. Reinstall the server cover; then, reconnect all power cords.

6. Restart the server. The system begins the power-on self test (POST).

7. Select **1 - Update POST/BIOS** from the menu that contains various flash update options.

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. Do not restart your server at this time.

11. Remove the BIOS flash diskette from the diskette drive.

12. Turn off the server and disconnect all power cords and external cables; then, remove the server cover.

13. Remove the jumper from the Flash boot block recovery jumper block, or move it to pins 1 and 2 to return to normal startup mode.

14. Reconnect all external cables and power cords and turn on the peripheral devices; then, reinstall the server cover.

15. Restart the server. The system should start up normally.

## Updating the UUID

The Universal Unique Identifier (UUID) must be updated when the system board is replaced. Complete the following steps to update the UUID:

1. Copy the UUID utility (″uuid.exe″) from the BIOS flash diskette to a DOS bootable diskette.
2. Insert the diskette created in step 1 into the server.
3. Restart the server from the diskette.
4. At the ″A:″ prompt, type UUID /wr; then, press **Enter**. The utility will generate a random identifier.
5. Restart the server.

## Updating the DMI/SMBIOS data

The Desktop Management Interface (DMI) must be updated when the system board is replaced. Complete the following steps to update the DMI:

1. Copy the DMI/SMBIOS utility (″extrmdmi.exe″) from the BIOS flash diskette to a DOS bootable diskette.
2. Insert the diskette created in step 1 into the server.
3. Restart the server from the diskette.
4. At the ″A:″ prompt, type extrmdmi.exe; then, press **Enter**.
5. To change the machine type and model number, type

   mtm XXXXYYY

   where XXXX is the model type and YYY is the model number; then, press **Enter**.
6. To change the serial number, type

   sn ZZZZZZZ

   where ZZZZZZZ is the serial number; then, press **Enter**.
7. To change the asset tag, type

   asset AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

   where AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA is the asset tag number; then, press **Enter**.
8. Restart the server.

## Power checkout

Power problems can be difficult to solve. For example, a short circuit can exist anywhere on any of the power distribution buses. 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. Turn off the server and disconnect all ac power cords.
2. Check for loose cables in the power subsystem. Also check for short circuits, for example, 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 the server is at the minimum configuration required to start the server (see "Minimum operating requirements" on page 77).

4. Reconnect all ac power cords and turn on the server. If the server starts up successfully, replace adapters and devices one at a time until the problem is isolated. If the server does not start up from the 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 start (see page 77).

## Troubleshooting the Ethernet controller

This section provides troubleshooting information for problems that might occur with the 10/100/1000 Mbps Ethernet controller.

## Network connection problems

If the Ethernet controller cannot connect to the network, check the following conditions:
- 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 either 100 Mbps or 1000 Mbps, you must use Category 5 or higher cabling.
- Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller LEDs on the operator information panel and on the rear of the server.

  These LEDs indicate whether a problem exists with the connector, cable, or hub.
  - The Ethernet transmit/receive activity LED, on the operator information panel, is lit when the Ethernet controller sends or receives data over the Ethernet Network. If the Ethernet transmit/receive activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.
  - The Ethernet link status LED, on the rear of the server, is lit when the Ethernet controller receives a LINK pulse from the hub. If the LED is off, there might be a defective connector or cable or a problem with the hub.
- Make sure that you are using the correct device drivers which are supplied with your 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 the Ethernet controller is tested depends on which operating system you are using (see the Ethernet controller device driver README files).

## Ethernet controller troubleshooting chart

Use the following troubleshooting chart to find solutions to 10/100/1000 Mbps Ethernet controller problems that have definite symptoms.

*Table 3. Ethernet troubleshooting chart*

| Ethernet controller problem | FRU/actions |
|---|---|
| The server stops running when loading device drivers. | The PCI BIOS interrupt settings are incorrect.<br><br>Check the following:<br>• Determine if the interrupt (IRQ) setting assigned to the Ethernet controller is also assigned to another device in the Configuration/Setup Utility program.<br><br>Although interrupt sharing is allowed for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ assigned to the Ethernet controller or the other device. For example, for NetWare Versions 3 and 4, it is recommended that disk controllers not share interrupts with LAN controllers.<br>• Make sure that you are using the most recent device driver available from the World Wide Web.<br>• Reseat or replace the adapter. |
| Ethernet link status LED does not work. | Check the following:<br>• Make sure that the hub is turned on.<br>• Check all connections at the Ethernet controller and the hub.<br>• Use another port on the hub.<br>• If the hub does not support auto-negotiation, manually configure the Ethernet controller to match the hub.<br>• If you manually configured the Duplex mode, make sure that you also manually configure the speed.<br>• Reseat or replace the adapter. |
| The Ethernet transmit/receive activity LED does not work. | Check the following:<br>• Make sure that you have loaded the network device drivers.<br>• The network might be idle. Try sending data from this server. |
| Data is incorrect or sporadic. | Check the following:<br>• Make sure that you are using Category 5 or higher cabling when operating the server at 100 Mbps or at 1000 Mbps.<br>• Make sure that the cables do not run close to noise-inducing sources like fluorescent lights. |
| The Ethernet controller stopped working when another adapter was added to the server. | Check the following:<br>• Make sure that the cable is connected to the Ethernet controller.<br>• Make sure that your PCI system BIOS code is current.<br>• Reseat the adapter.<br>• Determine if the interrupt (IRQ) setting assigned to the Ethernet adapter is also assigned to another device in the system. Use the Configuration/Setup Utility program to determine if this is the case.<br><br>Although interrupt sharing is allowed for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ assigned to the Ethernet adapter or the other device.<br>• Reseat or replace the adapter. |
| The Ethernet controller stopped working without apparent cause. | Check the following:<br>• Try a different connector on the hub.<br>• Reinstall the device drivers. See your operating-system documentation and the ServerGuide information.<br>• Reseat or replace the adapter. |

# Ethernet controller messages

The integrated Ethernet controller might display messages from certain device drivers. The latest information available concerning these messages will be made available at the IBM Support Web site at http://www.ibm.com/pc/support.

# Chapter 4. Customer replaceable units

This chapter provides instructions for adding options to your server. Some option-removal instructions are provided in case you need to remove one option to install another.

## Installation guidelines

Before you begin installing options in your server, read the following information:

- Read "Handling static-sensitive devices"and "Safety information" on page 87."Handling static-sensitive devices". This information will help you work safely with your server and options.
- Make sure that you have an adequate number of properly grounded electrical outlets for your server, monitor, and other devices that you will connect to the server.
- Back up all important data before you make changes to disk drives.
- Have a small Phillips screwdriver available.
- For a list of supported options for your server, go to http://www.ibm.com/pc/compat/ on the World Wide Web.

## System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel.
- Space is available around the server to allow the server cooling system to work properly. Refer to the documentation that comes with the rack.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan as soon as possible.

## Handling static-sensitive devices

**Attention:**   Static electricity can damage electronic devices, including your server. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

To reduce the possibility of damage from electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part of the server for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the server without setting down the device. If it is necessary to set down the device, place it back into its static-protective package. Do not place the device on your server cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

# Major components of the xSeries 305 Type 8673

The following illustration shows the locations of major components in your server.

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

Captive screws

Air baffle

Adapter-support bracket

Heat sink

Microprocessor

DIMM

SCSI adapter (some models)

Heat sink retaining clips

System board

CD-ROM drive

Fans

Diskette drive

Hard disk drive (some models)

Power supply
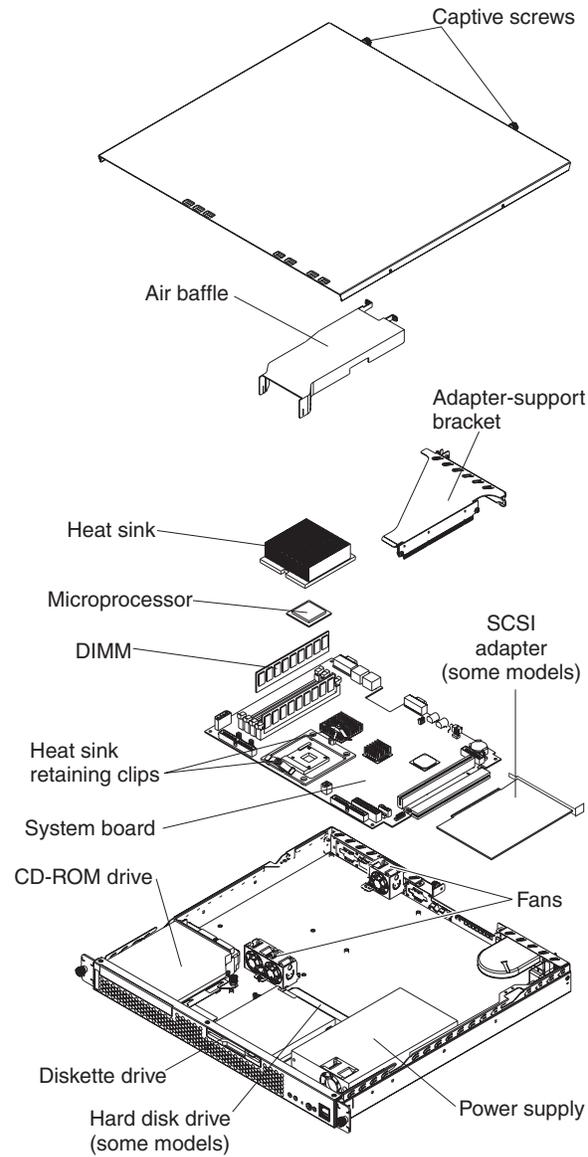
# System-board illustrations

This section provides illustrations of the system-board and the riser-card option connectors, internal cables, external ports, switches, jumpers, and LEDs.

## System-board and riser-card option connectors

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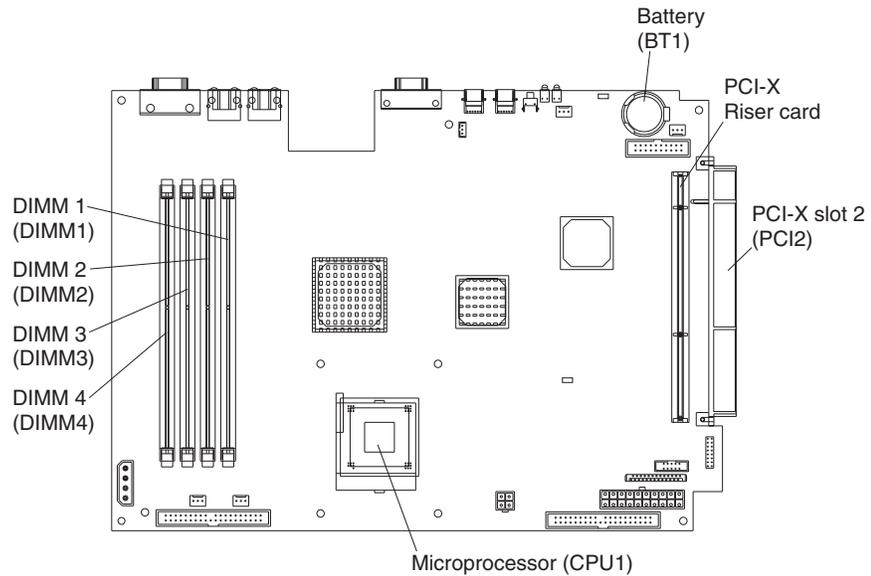


**Note:** Depending on the server model, the server might come with a SCSI adapter installed in PCI-X slot 2.

The following illustration shows the location of the PCI-X slot 1 connector on the riser card, which is attached to the adapter-support bracket.
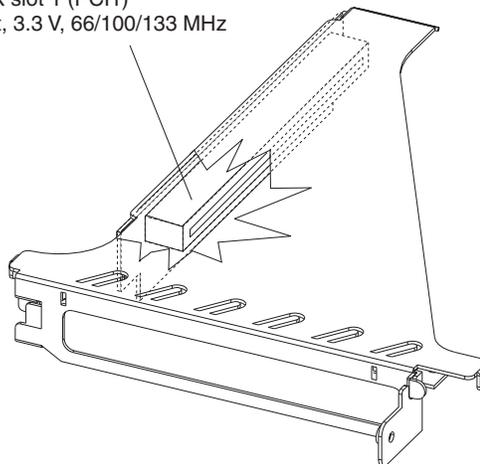
# System-board internal cable connectors

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

System fan 3 (HFAN3)
System fan 4 (HFAN4)
Remote Supervisor Adapter
Operator information panel
USB (CN6)
Diskette drive signal (CN7)
Power (12 V)
Hard disk drive power (JP5)
System fan 1 (SYSFAN1)
Primary IDE (CN3)
System fan 2 (SYSFAN2)
Secondary IDE (CN2)
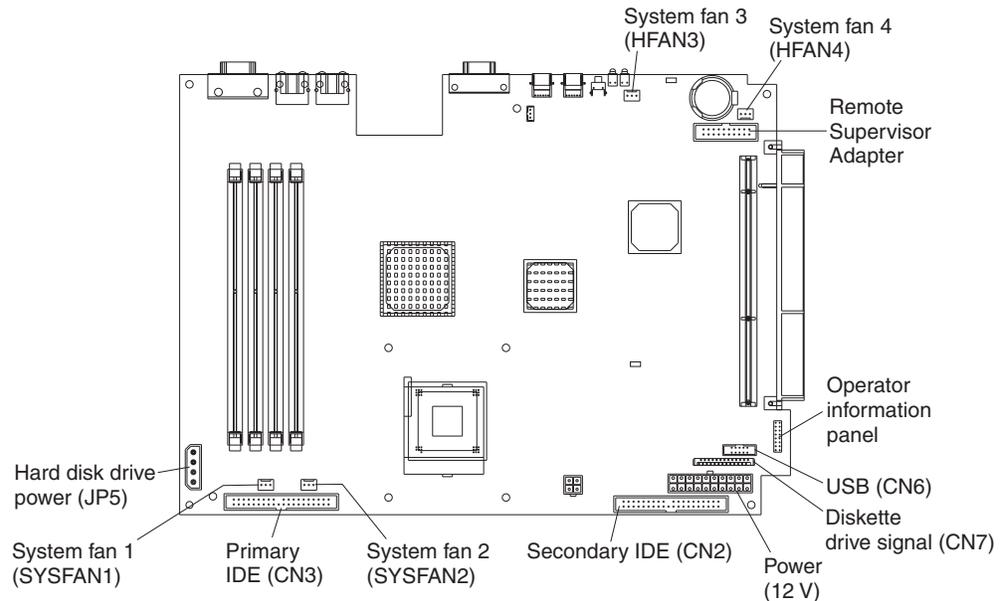
# System-board external port connectors

The following illustration shows the location of the input/output external port connectors on the system board.

**Note:** The USB 1 and USB 2 ports are on the front of the server. For the location of the ports, see "Input/output ports and connectors" on page 45.

Serial (CN19)
Ethernet 2 (CN17)
Ethernet 1 (CN18)
Video (CN20)
Mouse (JK2)
Keyboard (JK1)
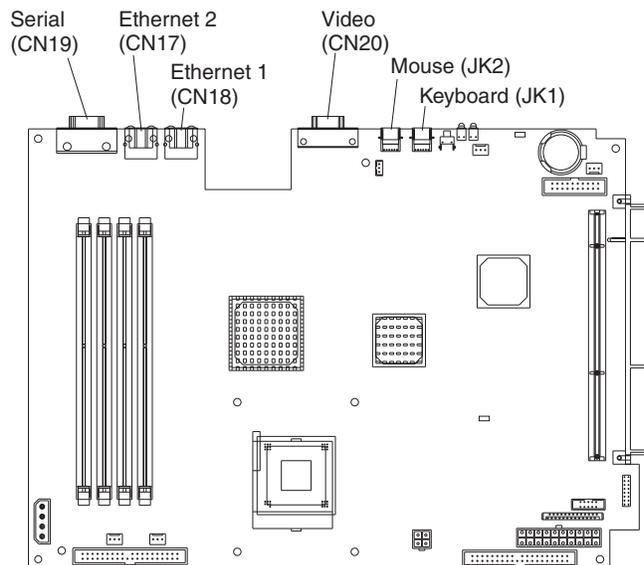
# System-board switches and jumpers

The following illustration identifies the switches and jumpers on the system board.
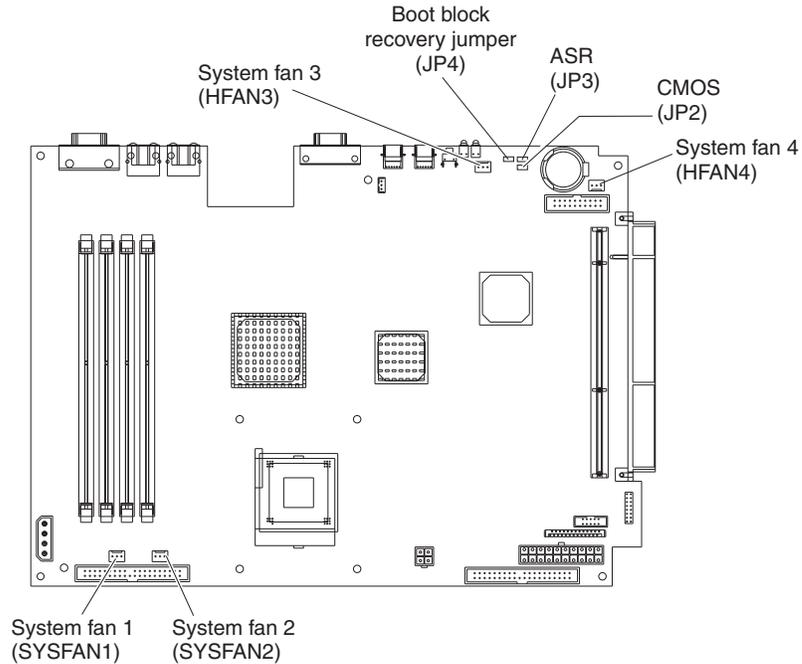


**Notes:**

1. The Automatic Server Restart (ASR) jumper (JP3) causes the server to restart automatically if it stops (for example, if the operating system stops running). The default position of the jumper (ASR enabled) is pins 2 and 3.

2. Jumper JP1 is not used.

# System-board LEDs

The following illustration shows the location of the LEDs on the system board.

# Removing the cover

Captive screws
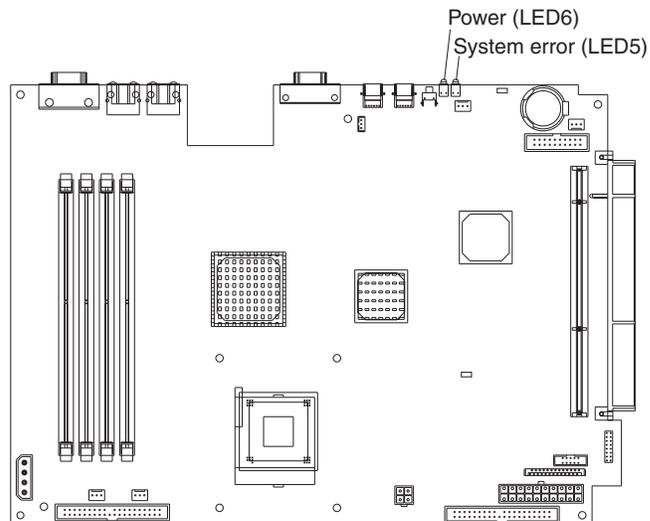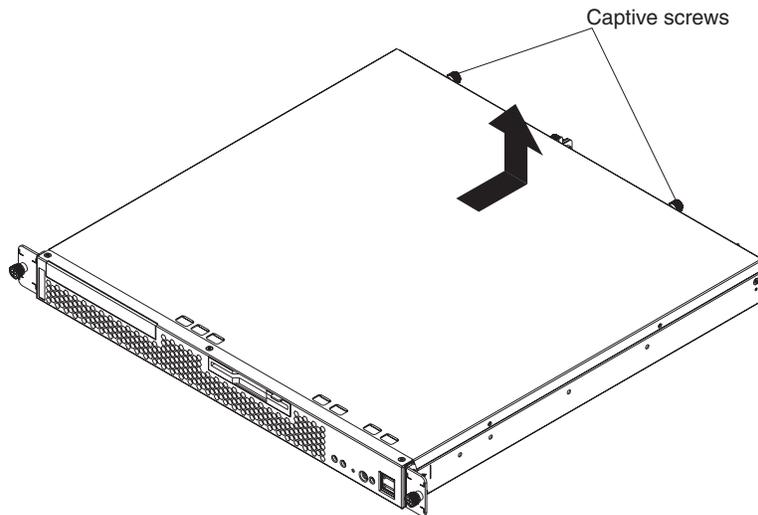
Complete the following steps to remove the server cover.

**Note:**
- Read "Safety information" on page 87.
- Read "Handling static-sensitive devices" on page 29.

1. Turn off the server and peripheral devices.
2. Disconnect the power cord; then, disconnect all external cables from the server.
3. Loosen the two captive screws on the rear of the server.
4. Slide the cover back, then up and off the server.

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

# Removing the front bezel
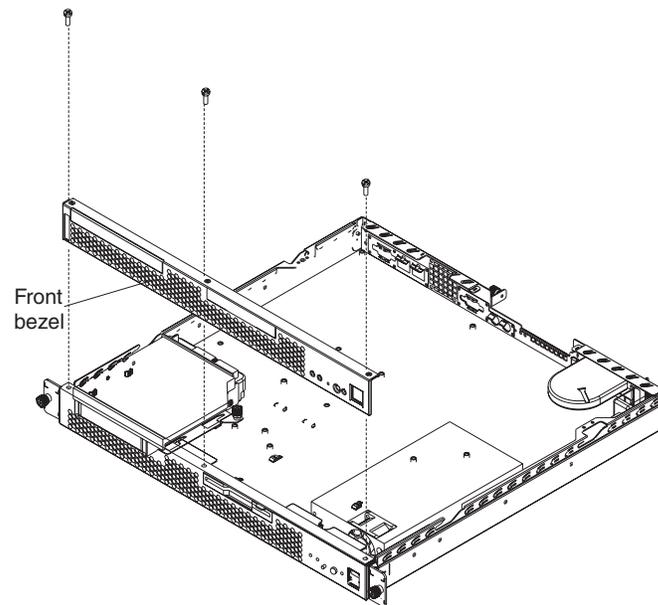


Front bezel

Complete the following steps to remove the front bezel.

**Note:**

- Read "Safety information" on page 87.
- Read "Handling static-sensitive devices" on page 29.

1. Turn off the server and peripheral devices.
2. Disconnect the power cord; then, disconnect all external cables from the server.
3. Remove the three screws from the top of the bezel.
4. Pull the bezel away from the server front.
5. Store the bezel in a safe place.

To replace the front bezel, reverse the previous steps.

# Working with adapters

This section provides information about the expansion slots on the system board, and the peripheral component interconnect-extended (PCI-X) adapters. Your server comes with two peripheral component interconnect-extended (PCI-X) adapter slots. PCI-X slot 1 is located on the riser card that is attached to the adapter-support bracket. PCI-X slot 2 is located on the system board. You must first remove the adapter-support bracket to access the PCI-X slot 1 connector.

The following illustrations show the location of the PCI-X expansion slots on the system board and the riser card.

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

PCI-X slot 2 (PCI2)
64-bit, 3.3 V, 66/100/133 MHz

PCI-X slot 1 (PCI1)
64-bit, 3.3 V, 66/100/133 MHz
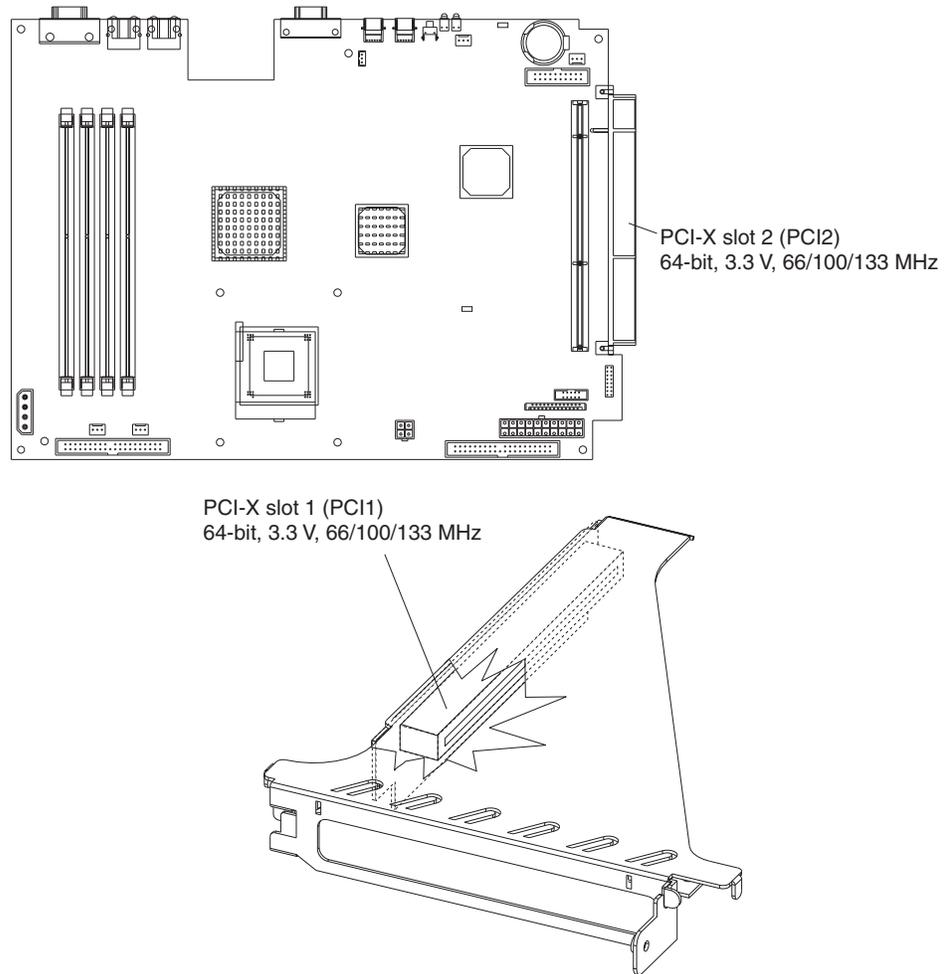
**Note:** When you install two 133 MHz controllers in the server, the maximum bus speed is 100 MHz.

## 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 the switch settings or jumper settings on your adapter, follow the instructions that come with the adapter.
- There are two 64-bit, 66/100/133 MHz PCI-X slots.
- You can install one 64-bit one-half length full height adapter in expansion slot 1. You can install one low profile adapter in expansion slot 2.
- Your server supports 3.3 V or universal adapters.
- Your server uses a rotational interrupt technique to configure PCI-X adapters. You can use this technique to install PCI-X adapters that currently do not support sharing of PCI-X interrupts.
- The system scans PCI-X slots to assign system resources. By default the system starts (boots) the CD-ROM and diskette drives first. Then, the system scans PCI-X slot 2, PCI-X slot 1, and the integrated Ethernet.

- If the server is a SCSI model server, the server will have a SCSI adapter installed in PCI-X slot 2.

**Note:** You can use the Configuration/Setup Utility program to change the boot precedence for your server. Select **Start Options** from the Configuration/Setup Utility program main menu.

# Installing an adapter

Complete the following steps to install an adapter:

**Attention:** 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 29.

1. Review "Safety information" on page 87, and the "Installation guidelines" on page 29.
2. Turn off the server and peripheral devices.
3. Disconnect the power cord; then, disconnect all external cables from the server.
4. Remove the server cover. See "Removing the cover" on page 34.

   **Attention:** Before you install the adapter, route the adapter cables.
5. Determine which PCI-X expansion slot you will use for the adapter.

   **Note:** Check the instructions that come with the adapter for any requirements, restrictions, or cabling instructions. It might be easier for you to route cables before you install the adapter.
6. Loosen the adapter slot captive screw.
   a. If you are installing the adapter in PCI-X slot 1, loosen the captive screw that is near the video connector.



Captive screw (slot 2)

Adapter-support bracket

Expansion-slot cover

Captive screw (slot 1)
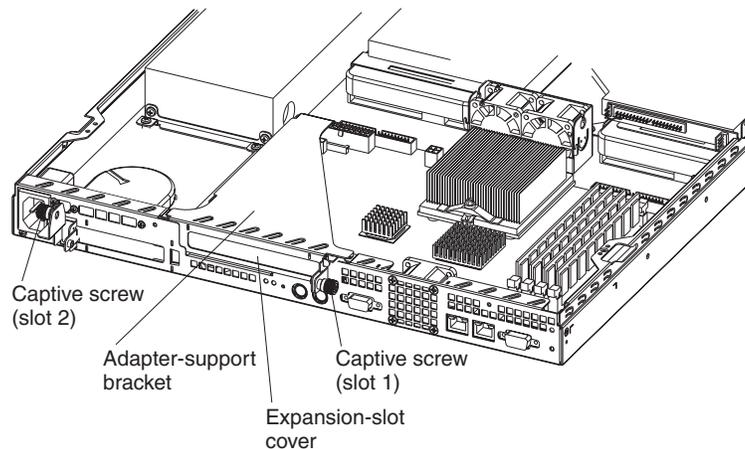
   b. If you are installing the adapter in PCI-X slot 2, loosen the captive screw that is near the power cord connector.
7. Remove the expansion-slot cover.

   **Attention:** PCI expansion-slot cover must be installed on all vacant slots. This maintains the electronic emissions characteristics of the server and ensures proper cooling of server components.
   - If you are installing the adapter in PCI-X slot 1, lift the adapter-support bracket from the server; then, remove the expansion-slot cover from the bracket.
   - If you are installing the adapter in PCI-X slot 2, lift the captive-screw bracket; then, remove the expansion-slot cover.
8. Touch the static-protective package containing the adapter to any unpainted metal surface on the server. Then, remove the adapter from the static-protective package. Avoid touching the components and gold-edge connectors on the adapter.

9. Place the adapter, component-side up, on a flat, static-protective surface and set any jumpers or switches as described by the adapter manufacturer, if necessary.

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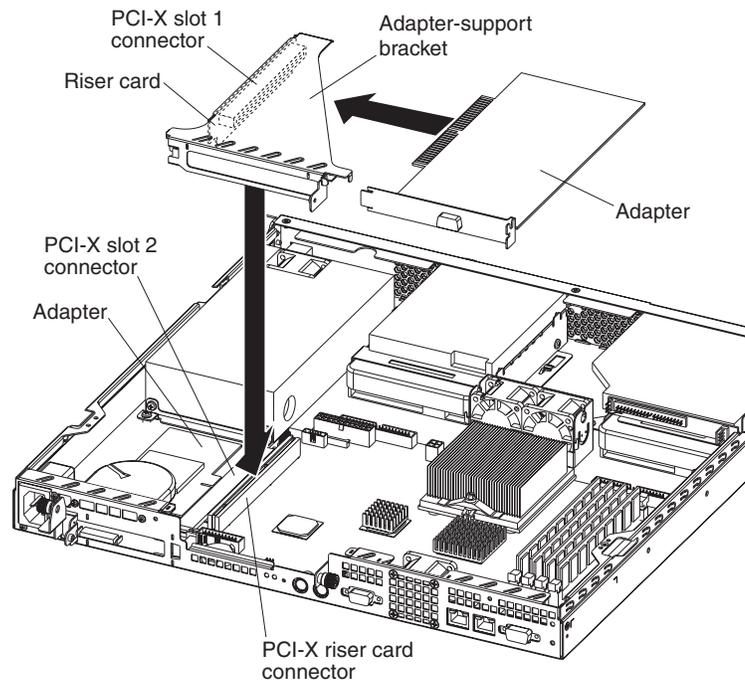


10. To install the adapter, carefully grasp the adapter by its top edge or upper corners, and align it with the PCI-X expansion slot; then, press the adapter *firmly* into the expansion slot.

    **Note:** When you install the adapter in PCI-X slot 2, you must slide the adapter underneath the system fan to properly align the adapter with the expansion-slot connector. Do not remove the system fan from the server.

11. If you installed an adapter in PCI-X slot 2, continue with the next step. If you removed the adapter-support bracket, reinstall it now. Make sure the riser card is fully seated into the riser card connector on the system board.

12. Tighten the captive screw on the rear of the server.

13. Connect required cables to the adapter.

14. If you have other options to install, do so now; otherwise, go to "Completing the installation" on page 42.

# Hard disk drives

The server comes with one integrated drive electronics (IDE) CD-ROM drive, one 1.44 MB diskette drive, and a hard disk drive (IDE or SCSI, depending on the server model).

# Installing or replacing a hard disk drive

Complete the following steps to install or replace a hard disk drive:

**Attention:** 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 29.

1. Inspect the new drive for any signs of damage.
2. Read "Safety information" on page 87 and the "Installation guidelines" on page 29.
3. Check the instructions that come with the drive for more information about installing your drive.

   **Notes:**

   a. If you are installing an IDE hard disk drive, you must set the drive to primary (master) or secondary (subordinate), depending on the configuration of your server. See the documentation that comes with the drive for instructions.

   b. If you are installing a SCSI hard disk drive, refer to the documentation that comes with your drive before installing it.

4. Turn off the server and peripheral devices. Disconnect the power cord; then, disconnect all external cables.
5. Remove the server cover. See "Removing the cover" on page 34.
6. Loosen the captive screw on the side of the drive cage.

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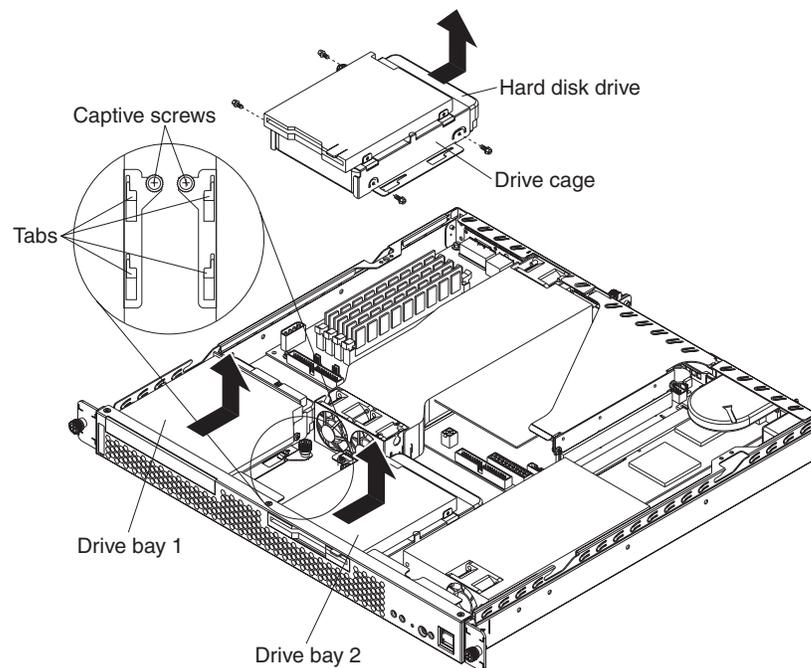


7. Slide the drive cage away from the front of the server until the tabs on the chassis are in the unlocked position. Then, lift the drive cage out of the server.

8. Install the new hard disk drive:

   a. Slide the hard disk drive into the bay in the drive cage.

   b. Secure the drive to the drive cage using the screws that came with the option.

   c. Slide the drive cage back into the server and tighten the captive screw.

   d. Connect the signal cable and power cable to the rear of the drive. Ensure that the cables do not obstruct the fan behind the drive bay.

9. If you have other options to install, do so now; otherwise, go to "Completing the installation" on page 42.

## Installing DIMMs

Adding memory to your server is an easy way to make programs run faster. You can increase the amount of memory in your server by installing options that are called DIMMs. Your server uses a noninterleaved memory configuration.

Memory considerations:

- Your server comes with a DIMM installed on the system board in DIMM connector 4. When installing additional memory modules, install the second memory module in DIMM connector 3, the third in DIMM connector 2 and the fourth in DIMM connector 1. The DIMMs can be different sizes.

- Your xSeries 305 server supports 256 MB, 512 MB, and 1 GB DIMMS. Your server supports a maximum of 4 GB of system memory. See the ServerProven® list at http://www.ibm.com/pc/compat for a list of memory modules for use with your server.

- The installing or removing of DIMMs changes the configuration information in the server. Therefore, you must change and save the new configuration information by 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 the *User's Guide* on the IBM Documentation CD for more information about using the Configuration/Setup Utility program.

- The illustrations in this document might differ slightly from your hardware.

Complete the following steps to install a DIMM:

**Attention:** 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 29.

1. Read "Safety information" on page 87 and the "Installation guidelines" on page 29.

2. Turn off the server and peripheral devices. Disconnect the power cord; then, all external cables. Remove the cover see "Removing the cover" on page 34 for details).

3. Touch the static-protective package containing the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.

4. Install the DIMM:

   a. Open the retaining clip on each end of the DIMM connector. Turn the DIMM so that the pins align correctly with the connector

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

DIMM 3

DIMM 4
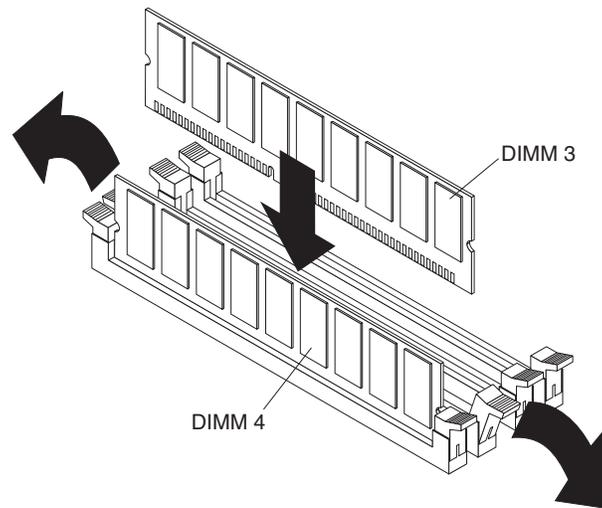
> **Attention:** To avoid breaking the retaining clips or damaging the DIMM connectors, open, and close the clips gently.
>
> b. Insert the DIMM into the connector by aligning the DIMM edges with the slots at each end of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. Be sure that the retaining clips snap into the locked position when the DIMM is firmly seated in the connector.
>
> c. If a gap exists between the DIMM and the retaining clips, the DIMM has not been properly installed. In this case, open the retaining clips and remove the DIMM; then, reinsert the DIMM.
>
> 5. If you have other options to install, do so now; otherwise, go to Completing the Installation.

## Completing the installation

To complete your installation, you must reinstall the server cover, connect all the cables, for certain options, run the Configuration/Setup Utility program. Follow the instructions in this section.

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

## Installing the cover

Complete the following steps to install the server cover:

1. Install the cover by placing it into position and sliding it forward.

**Attention:** Before sliding the cover forward, make sure that the cover will engage the ledge at the front of the server properly.
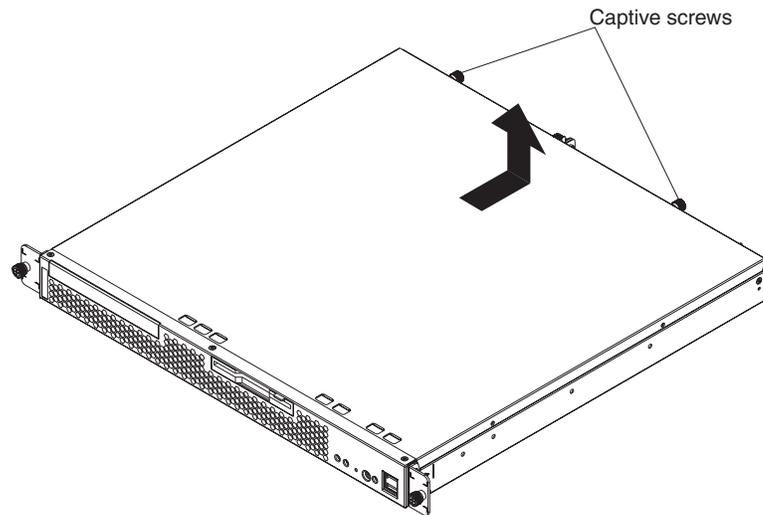
Captive screws

2. Tighten the captive screws to secure the cover as shown.
3. Install the server in the rack. See the *Rack installation instructions* included with your server documentation for instructions.
4. Connect the power cord and all external cables to the server, and then plug the power cord into a properly grounded electrical outlet.

**Note:** Your server has one keyboard connector on the back of the server. Use this connector to connect the server to a keyboard or optional console switch. You can also connect a USB keyboard to the server using one of the USB ports. After installing a USB keyboard, you might need to use the Configuration/Setup utility program to enable keyboardless operation and prevent the POST error message 301 from being displayed during startup. For detailed information about this option and how to connect it to your server, refer to the documentation that comes with the option.

# Updating your server configuration

When you start your 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 saves the new configuration information. See the *User's Guide* on the *IBM xSeries Documentation* CD for information about the Configuration/Setup Utility program.

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

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

# Replacing the battery

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 your 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.**

Complete the following steps to replace the battery.
1. Read "Safety information" on page 87, and follow any special handling and installation instructions supplied with the replacement battery.
2. Turn off the server and peripheral devices. Disconnect the power cord and then, all external cables.
3. Remove the cover. See "Removing the cover" on page 34.
4. Remove the battery:
   a. Press the battery release tab to release the battery from the socket.
   b. Lift the battery out of the socket.
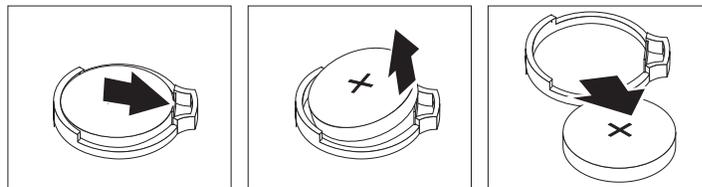


5. Insert the new battery:
   a. Tilt the battery so that you can insert it into the socket.
   b. Press down on the battery after you insert it into the socket.
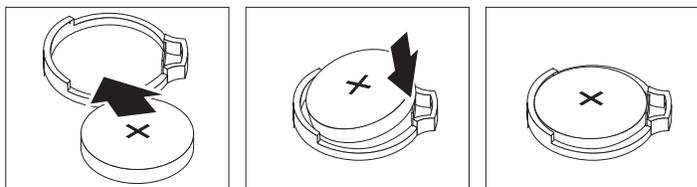
6. Reinstall the server cover, see "Installing the cover" on page 42.

7. Reconnect the external cables and power cords; then, turn on the peripheral devices and the server.

8. Start the Configuration/Setup Utility program and set configuration parameters.
   - Set the system date and time and the power-on password.
   - Reconfigure your server.

# Input/output ports and connectors

Your server has the following I/O connectors on the front and rear of the server:
- Serial connector
- Universal Serial Bus (USB) connectors
- Keyboard connector
- Video connector
- Auxiliary-device (pointing device) connector
- Ethernet connectors

USB 2

USB 1

Keyboard  Video  Serial
Mouse  Ethernet 2
Ethernet 1
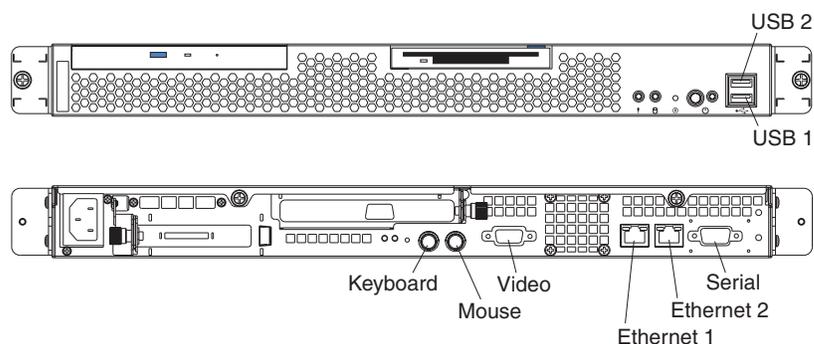
# Serial port

Your server has one standard serial port. Some application programs require specific ports, and some modems function properly only at certain serial port addresses. Use the Configuration/Setup Utility program to change the port address assignments and prevent conflicts.

# Viewing or changing the serial-port assignments

Complete the following steps to view or change the serial-port assignments:

1. Restart the server and watch the monitor screen.

2. When the message `Press F1 for Configuration/Setup` appears, press F1.

3. From the main menu, select **Devices and I/O Ports**; then, press Enter.

> **Note:** The Devices and I/O Ports choice appears only on the full configuration menu. If you set two levels of passwords, you must enter the administrator password to access the full configuration menu.

4. Select the serial port; then, use the arrow keys to advance through the settings available.

5. Select **Save Settings**; then, select **Exit Setup** to exit from the Configuration/Setup Utility main menu.

## Serial-port connector

Your server has one serial-port connector located on the rear of the server.

The following illustration shows the pin-number assignments for the 9-pin, male D-shell serial-port connector on the rear of your server. These pin-number assignments conform to the industry standard.
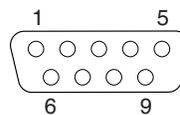


## Universal Serial Bus ports

Your server has two Universal Serial Bus (USB) ports, which configure automatically. USB is an emerging serial interface standard for telephony and multimedia devices. It uses Plug and Play technology to determine the type of device attached to the connector.

## USB cables and hubs

You need a 4-pin cable to connect devices to USB 1 or USB 2. If you plan to attach more than two 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 connectors

Each USB port has an external connector on the rear of the server for attaching USB- compatible devices.

The following illustration shows the pin-number assignments for the USB-port connectors on the rear of your server.
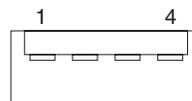


## Keyboard connector

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

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

The following illustration shows the pin-number assignments for the keyboard connector on the end of the cable.

```
      6  ○  ▯  ○  5
    4  ○        ○  3
         ○    ○
         2      1
```
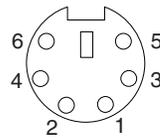
## Video connector

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

```
   5              1
   ○ ○ ○ ○ ○ ○ ○ ○
    ○ ○ ○ ○ ○ ○ ○
   15            11
```
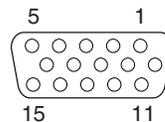
## Auxiliary-device (pointing device) connector

There is one auxiliary-device connector that supports a mouse or other pointing device located on the rear of the server just under the keyboard connector.

The following illustration shows the pin-number assignments for the auxiliary-device connector on the end of the cable.

```
      6  ○  ▯  ○  5
    4  ○        ○  3
         ○    ○
         2      1
```
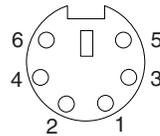
## Gigabit Ethernet port

Your server comes with two integrated Gigabit Ethernet controllers. These controllers provide an interface for connecting to 10-Mbps, 100-Mbps, or 1000-Mbps networks and provide full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN).

To access the Ethernet port, connect a Category 3, 4, or 5 unshielded twisted-pair (UTP) cable to the RJ-45 connector on the rear of your server.

**Note:** The 100BASE-TX/1000BASE-T Fast Ethernet standard requires that the cabling in the network be Category 5 or higher.

The Ethernet (RJ-45) connector has two LEDs. The Ethernet link LED is on the right. When this green LED is on, there is an active connection on the Ethernet port. The Ethernet activity LED is on the left. When this green LED is on, there is activity between the server and the network. These LEDs have the same functions as the Ethernet link LED and the Ethernet activity LED on the rear of the server (see the *User's Guide* on the *IBM xSeries Documentation* CD for information about the Configuration/Setup Utility program).

## Configuring the Gigabit Ethernet controller

The Ethernet controllers are integrated on the system board. These controllers provide an interface for connecting to 10-Mbps, 100-Mbps, or 1000-Mbps networks

and provides full duplex (FDX) capability, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN). You do not need to set any jumpers or configure the controllers for your operating system before you use the Ethernet controllers. However, you must install a device driver to enable your operating system to address the Ethernet controllers. The device drivers are provided on the ServerGuide *Setup and Installation* CD.

When you connect your server to the network, the Ethernet controller automatically detects the data-transfer rate (10 Mbps, 100 Mbps, or 1000 Mbps) on the network and then sets the controllers to operate at the appropriate rate. In addition, if the Ethernet ports that your server is connected to support auto-negotiation, the Gigabit Ethernet controllers will set the appropriate duplex state. That is, the Ethernet controllers will adjust to the network data rate, whether the data rate is standard Ethernet (10BASE-T), Fast Ethernet (100BASE-TX/1000BASE-T), half duplex (HDX), or full duplex (FDX). The controllers supports half-duplex (HDX) and full-duplex (FDX) modes at both speeds.

For information on configuring your Ethernet controller, see the *Broadcom NetXtreme Gigabit Ethernet Software CD* that comes with your server. For updated information about configuring your Ethernet controllers, go to the IBM Support Web site at http://www.ibm.com/pc/support and navigate to the area for your specific server type. From this area you can download documentation, the most current device drivers for your server, and software that supports advanced networking functions. After downloading, run the downloaded program *launch.exe*.

## High-performance Ethernet modes

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

## Ethernet port connector

The following illustration shows the pin-number assignments for the RJ-45 port. These assignments apply to the 10BASE-T, 100BASE-TX, and 1000BASE-T devices.
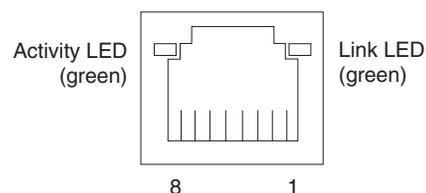


## Cabling the server

**Notes:**

1. You must turn off the server before connecting any cables to or disconnecting any cables from the server.
2. See the documentation that comes with your options for additional cabling instructions. It might be easier for you to route cables before you install certain options.

3. Cable identifiers are printed on the cables that come with your server and options. Use these identifiers to connect the cables to the correct connectors. For example, the hard disk drive cables are labeled "HDD option."

# Chapter 5. Removing and installing FRUs (service only)

The following information describes how to remove and replace field replacable units (FRUs).

**Important:** These procedures are intended only for trained customer service representatives who are familiar with IBM xSeries products. See the parts listing in "Server" on page 80 to determine whether the component being replaced is a customer replaceable unit (CRU or a FRU. Field replaceable units must be replaced by qualified service personnel only.

**Note:**

- Read "Handling static-sensitive devices" on page 29.
- Read "Safety information" on page 87.

## Removing the cover



Captive screws
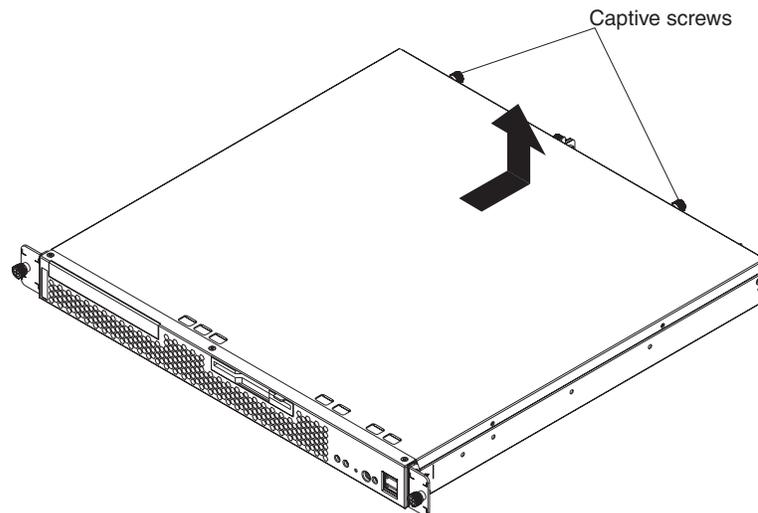
Complete the following steps to remove the server cover.

**Note:**

- Read "Handling static-sensitive devices" on page 29.
- Read "Safety information" on page 87.

1. Turn off the server and peripheral devices.
2. Disconnect the power cord; then, disconnect all external cables from the server.
3. Loosen the two captive screws on the rear of the server.
4. Slide the cover back, then up and off the server.

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

# Thermal grease

This section contains information about removing and replacing the thermal grease between the heat sink and the microprocessor. The thermal grease must be replaced anytime the heat sink has been removed from the top of the microprocessor and is going to be reused, or when debris is found in the grease.

**Note:**

- Read "Installation guidelines" on page 29.
- Read the safety notices at "Safety information" on page 87.
- Read "Handling static-sensitive devices" on page 29.

Complete the following steps to replace damaged or contaminated thermal grease on the microprocessor and heat sink:

1. Place the heat sink on a clean work surface.
2. Remove the cleaning pad from its package and unfold it completely.
3. Use the cleaning pad to wipe the thermal grease from the bottom of the heat sink.

   **Note:** Be sure that all of the thermal grease is removed.
4. Use a clean area of the cleaning pad to wipe the thermal grease from the microprocessor; then, dispose of the cleaning pad after all of the thermal grease is removed.

   Microprocessor             0.01 mL of thermal grease
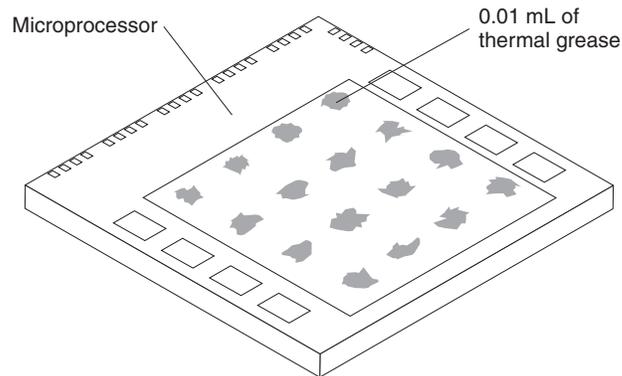
5. Use the thermal grease syringe to place 16 uniformly spaced dots of 0.01ML each on the top of the microprocessor.
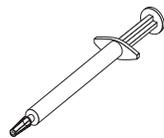
   **Note:** 0.01ML is one tick mark on the syringe. If the grease is properly applied, approximately half (0.22ML) of the grease will remain in the syringe.
6. Install the heat sink onto the microprocessor as described in "Removing and replacing a microprocessor" on page 53.

# Removing and replacing a microprocessor

Microprocessor

Microprocessor-
release lever
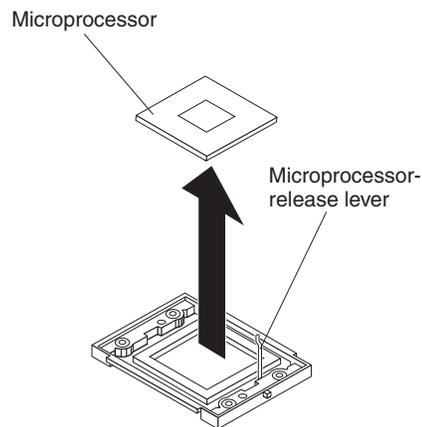
Complete the following steps to remove a microprocessor.

**Note:**

- Read "Handling static-sensitive devices" on page 29.
- Read "Safety information" on page 87.

1. Turn off the server and peripheral devices.
2. Disconnect the power cord; then, disconnect all external cables from the server.
3. Remove the server cover.
4. Grasp the air baffle; then, lift the air baffle from the server.
5. Remove the heat sink:

   a. Loosen the screw on each of the two leaf springs on the retention module.

      **Note:** Loosening one screw fully before loosening the other screw will help to break the thermal bond that adheres the heat sink to the microprocessor.

   b. Pivot the leaf spring enclosure outward.

   c. Gently twist the heat sink until you break the thermal bond, and pull the heat sink away from the retention module and the microprocessor.

6. Open the release lever of the microprocessor socket.
7. Pull the microprocessor out of the socket.

To install a microprocessor, reverse the previous steps.

# Removing and replacing the retention module



Retention module

Complete the following steps to remove the retention module.

**Note:**

- Read "Handling static-sensitive devices" on page 29.
- Read "Safety information" on page 87.

1. Turn off the server and peripheral devices.
2. Disconnect the power cord; then, disconnect all external cables from the server.
3. Remove the server cover.
4. Grasp the air baffle; then, lift the air baffle from the server.
5. Remove the heat sink:

   a. Loosen the screw on each of the two leaf springs on the retention module.

      **Note:** Loosening one screw fully before loosening the other screw will help to break the thermal bond that adheres the heat sink to the microprocessor.

   b. Pivot the leaf spring enclosure outward.

   c. Gently twist the heat sink until you break the thermal bond and pull the heat sink away from the retention module and the microprocessor.

6. Loosen the four screws on the corners of the retention module and lift the retention module away from the system board.

To install a retention module, reverse the previous steps.

# Removing and replacing the system board

**Important: When replacing the system board, you must:**

- Either update the firmware to the latest level, or restore the pre-existing firmware that the customer provides on a diskette or CD.
- Update the UUID (see "Updating the UUID" on page 26).
- Update the DMI/SMBIOS (see "Updating the DMI/SMBIOS data" on page 26).
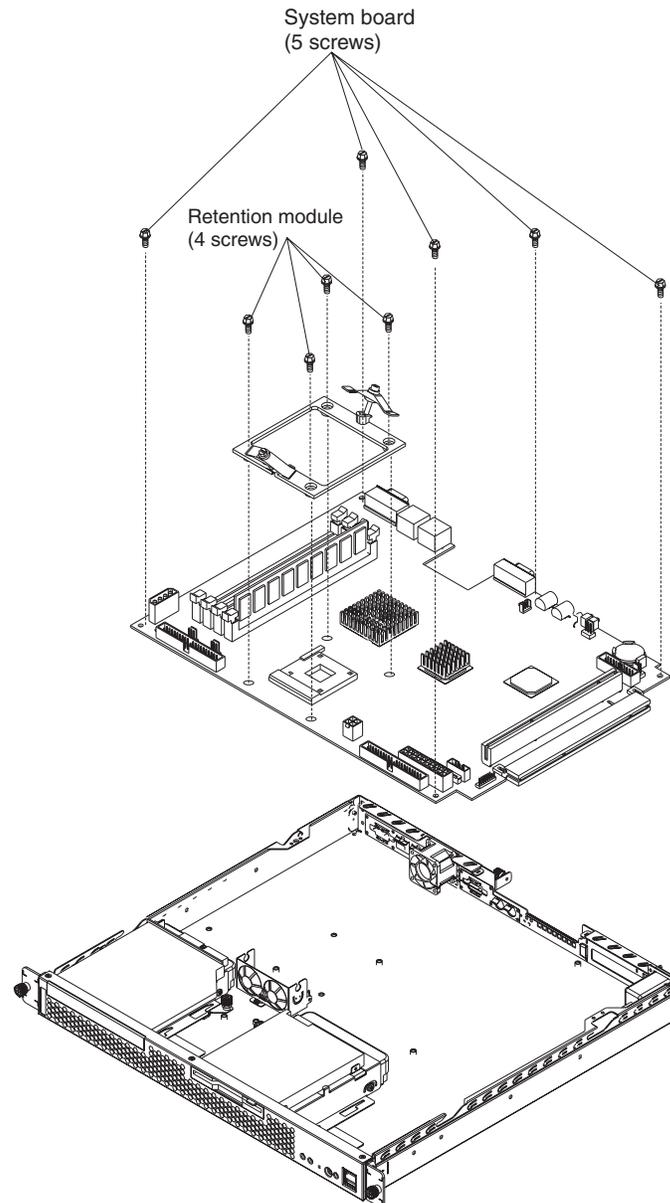


Complete the following steps to remove the system board.

**Note:**
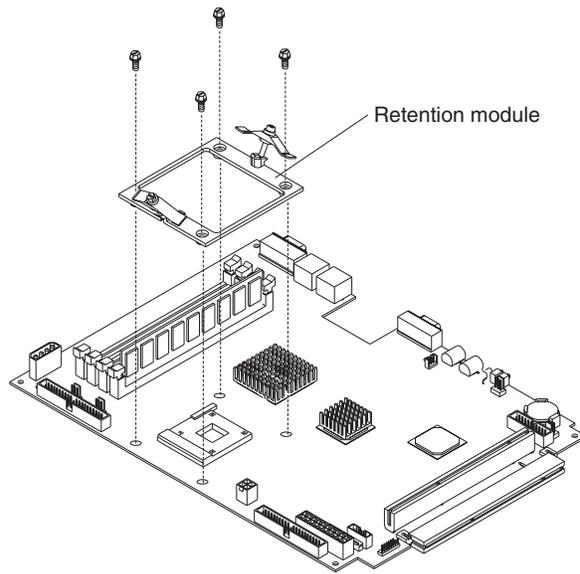
- Read "Handling static-sensitive devices" on page 29.
- Read "Safety information" on page 87.

1. Turn off the server and peripheral devices.
2. Disconnect the power cord; then, disconnect all external cables from the server.

3. Remove the server cover.

4. Remove the air baffle.

5. Remove all adapters and place them on a static-protective surface for reinstallation (see "Installing an adapter" on page 38).

6. Remove all DIMMs and place them on a static-protective surface for reinstallation (see "Installing DIMMs" on page 41).

7. Disconnect all cables from the system board.

8. Remove the microprocessor and the retention module; and, place them on a static-protective surface for reinstallation (see "Removing and replacing a microprocessor" on page 53 and "Removing and replacing the retention module" on page 54).

9. Remove the screws that secure the system board to the chassis, and put the screws in a safe place.

10. Pull the system board carefully out of the chassis.

Complete the following steps to install a system board:

1. Align the system board with the chassis and replace the screws that you removed in step 9 above.

2. Replace all components, including the retention module and microprocessor, in the reverse order from which they were removed.

3. Replace the cover. See ″Installing the cover″.

4. Connect the external cables and power cords; then, turn on the peripheral devices and the server.

## Removing and replacing the switch/LED/USB card



Complete the following steps to remove the Switch/LED/USB card.

**Note:**
- Read "Handling static-sensitive devices" on page 29.
- Read "Safety information" on page 87.

1. Turn off the server and peripheral devices.

2. Disconnect the power cord; then, disconnect all external cables from the server.

3. Remove the server cover.

4. Remove the cables that surround the power supply and the switch/LED/USB card.
5. Remove the power supply (see "Removing and replacing a power supply" on page 57).
6. Loosen the two screws on the switch/LED/USB card and remove the card.

To install the Switch/LED/USB card, reverse the previous steps.

## Removing and replacing a power supply



Complete the following steps to remove the power supply.

**Note:**
- Read "Handling static-sensitive devices" on page 29.
- Read "Safety information" on page 87.

1. Turn off the server and peripheral devices.
2. Disconnect the power cord; then, disconnect all external cables from the server.
3. Remove the server cover.
4. Remove the cables near the power supply.
5. Remove the screws that secure the power supply to the chassis.
6. Lift the power supply away from the chassis.
7. Remove the screws that attach the power-supply connector to the back of the server; then, pull the connector out of the chassis.

To install the power supply, reverse the previous steps.

# Removing the front bezel



Front
bezel

Complete the following steps to remove the front bezel.

**Note:**
- Read "Handling static-sensitive devices" on page 29.
- Read "Safety information" on page 87.

1. Turn off the server and peripheral devices.
2. Disconnect the power cord; then, disconnect all external cables from the server.
3. Remove the three screws from the top of the bezel.
4. Pull the bezel away from the server front.
5. Store the bezel in a safe place.

To replace the front bezel, reverse the previous steps.

# Removing and replacing the PCI riser card



Riser card

Complete the following steps to remove the PCI riser card.
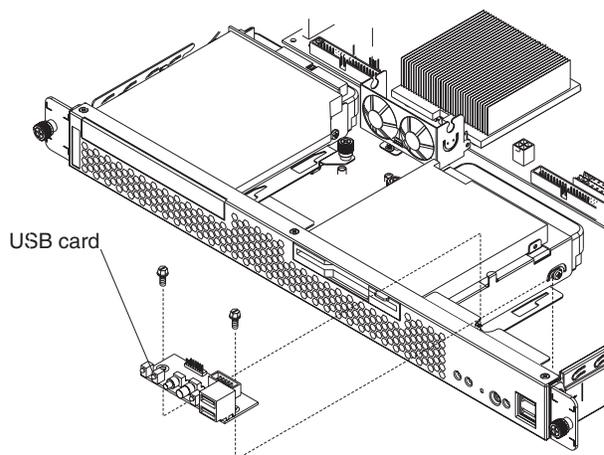
**Note:**
- Read "Handling static-sensitive devices" on page 29.
- Read "Safety information" on page 87.

1. Turn off the server and peripheral devices.
2. Disconnect the power cord; then, disconnect all external cables from the server.
3. Remove the server cover.
4. Loosen the captive screw located adjacent to PCI-X slot 1on the rear of the server.
5. Remove the expansion-slot cover.
6. Turn the expansion-slot cover until the PCI riser card is facing you.
7. Remove the two screws from the PCI riser card.
8. Gently pull the PCI riser card away from the expansion-slot cover.

To install a PCI riser card, reverse the previous steps.

# Removing and replacing the fans
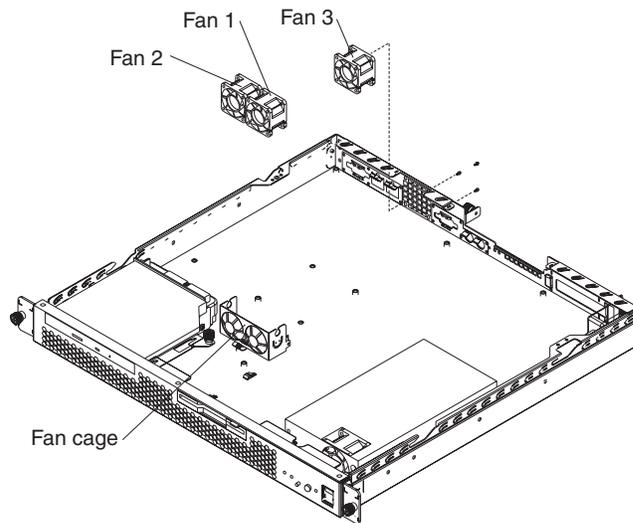


Complete the following steps to remove the fan assembly.

**Note:**

- Read "Handling static-sensitive devices" on page 29.
- Read "Safety information" on page 87.

1. Turn off the server and peripheral devices.
2. Disconnect the power cord; then, disconnect all external cables from the server.
3. Remove the server cover.
4. Disconnect the fan cables from the system board.
5. Lift fan 1 and fan 2 out of the fan cage and away from the server.
6. Remove the two screws that secure fan 3 to the back of the server, and lift the fan away from the server.

Complete the following steps to install the fans.

1. Orient the fans so that the airflow arrow on the side of each fan is facing or pointing toward the rear of the server

   **Note:** Proper airflow is from the front of the server to the rear.
2. Push fan 1 and fan 2 into the fan cage.
3. Secure fan 3 to the back of the server with two screws.
4. Replace the cover. See ″Installing the cover″.
5. Connect the external cables and power cords; then, turn on the peripheral devices and the server.

# Removing and replacing the blower



Blower module
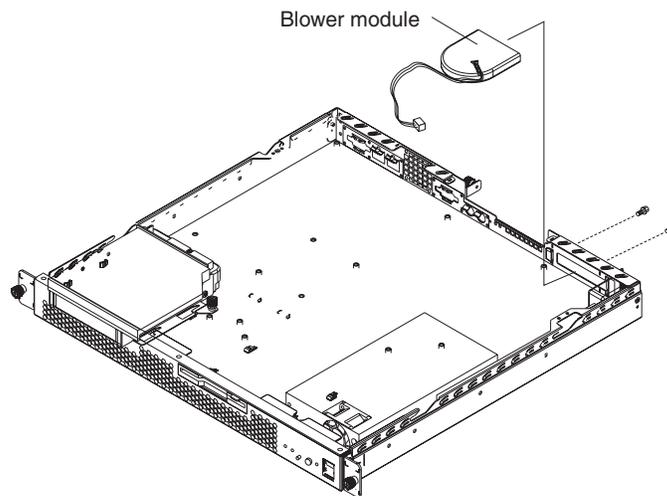
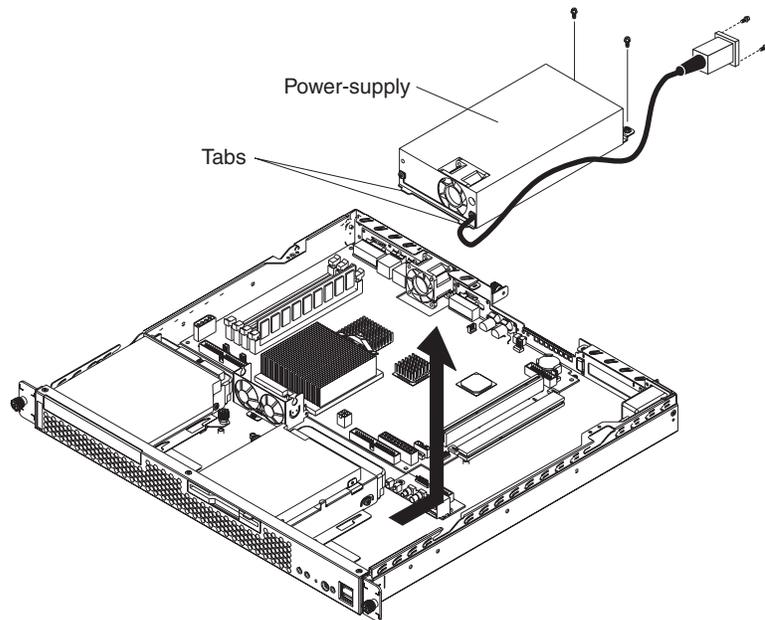Complete the following steps to remove the blower.

**Note:**

- Read "Handling static-sensitive devices" on page 29.
- Read "Safety information" on page 87.

1. Turn off the server and peripheral devices.
2. Disconnect the power cord; then, all disconnect external cables from the server.
3. Remove the cover.
4. Disconnect the blower cable from the system board.
5. Remove the two screws that attach the blower to the back of the server.
6. Gently pull the blower out and away from the server.

To install the blower, reverse the previous steps.

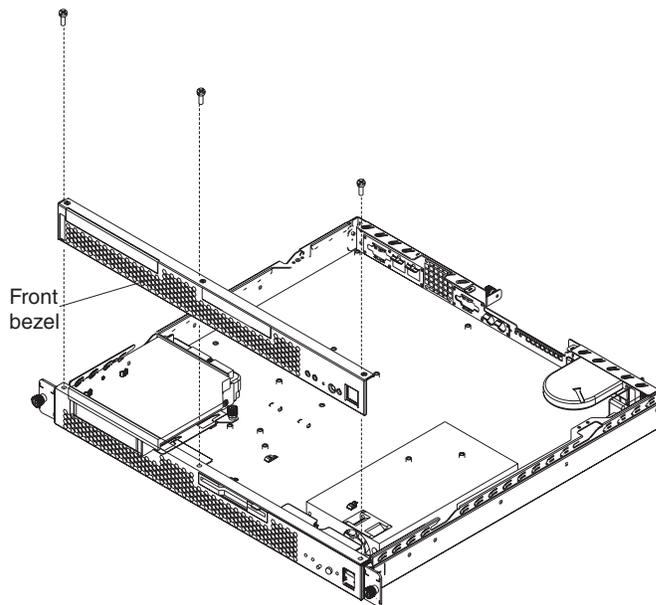# Removing and replacing the air baffle
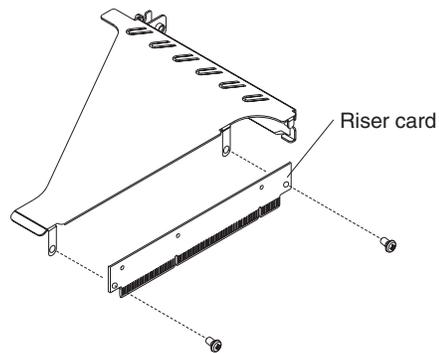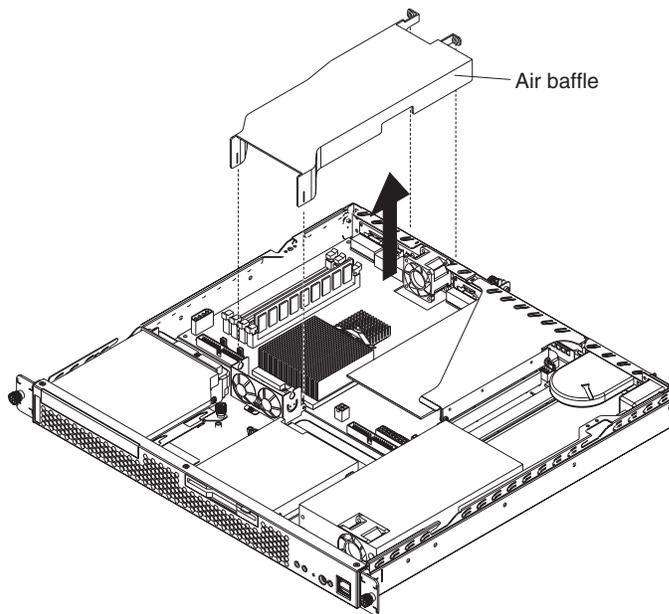


Air baffle

Complete the following steps to remove the air baffle.

**Note:**

- Read "Handling static-sensitive devices" on page 29.
- Read "Safety information" on page 87.

1. Turn off the server and peripheral devices.
2. Disconnect the power cord; then, disconnect all external cables from the server.
3. Remove the server cover.
4. Grasp the air baffle on each side and squeeze gently; then, pull the baffle up and away from the back of the chassis.
5. When the baffle is free of the back of the chassis, lift it out of the server.

To install the air baffle, reverse the previous steps.

# Chapter 6. Symptom-to-FRU index

This index supports xSeries 305 servers.

**Notes:**

1. Check the configuration before you replace a FRU. Configuration problems can cause false errors and symptoms.
2. For IBM devices not supported by this index, refer to the manual for that device.
3. Always start with "General checkout" on page 17.

The symptom-to-FRU index 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 first column of the two-column tables in this index lists error codes or messages, and the second column lists one or more suggested actions or FRUs to replace. Take the action (or replace the FRU) suggested first in the list of the second column, then try the server again to see if the problem has been corrected.

**Note:** Try reseating a suspected component or reconnecting a cable before replacing the component.

The POST BIOS code 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 beep after successfully completing POST indicates the system is functioning properly.

| Beeps | Description |
|-------|-------------|
| 1-2-3 | • One beep<br>• A pause (or break)<br>• Two beeps<br>• A pause (or break)<br>• Three Beeps |
| 4 | Four continuous beeps |

| Beep/symptom | FRU/action |
|--------------|------------|
| **1-1-2** (processor register test failed) | 1. **Optional microprocessor (if installed)**<br>2. Microprocessor |
| **1-1-3** (CMOS write/read test failed) | 1. **Battery**<br>2. System board |
| **1-1-4** (BIOS EEPREOM checksum failed) | • **System board** |
| **1-2-1** (Programmable interval timer failed) | • **System board** |

| Beep/symptom | FRU/action |
|---|---|
| **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) | 1. **DIMM**<br>2. System board |
| **1-3-1** (First 64K RAM test failed) | 1. **DIMM**<br>2. Memory adapter |
| **1-3-2** (First 64K RAM parity test failed) | 1. **DIMM**<br>2. System board |
| **2-1-1** (Secondary DMA register failed) | • **System board** |
| **2-1-2** (Primary DMA register failed) | • **System board** |
| **2-1-3** (Primary interrupt mask register failed) | • **System board** |
| **2-1-4** (Secondary interrupt mask register failed) | • **System board** |
| **2-2-2** (Keyboard controller failed) | 1. **Keyboard**<br>2. System board |
| **2-2-3** (CMOS power failure and checksum checks failed) | 1. **Battery**<br>2. System board |
| **2-2-4** (CMOS configuration information validation failed) | 1. **Battery**<br>2. System board |
| **2-3-1** (Screen initialization failed) | 1. **Jumper on J18**<br>2. System board |
| **2-3-2** (Screen memory failed) | • **System board** |
| **2-3-3** (Screen retrace failed) | • **System board** |
| **2-3-4** (Search for video ROM failed | • **System board** |
| **2-4-1** (Video failed) | • **System board** |
| **3-1-1** (Timer Tick Interrupt failed) | • **System board** |
| **3-1-2** (Interval timer channel 2 failed) | • **System board** |
| **3-1-3** (RAM test failed above address OFFFFH) | 1. **DIMM**<br>2. System board |

| Beep/symptom | FRU/action |
|---|---|
| **3-1-4** (Time of day clock failed) | 1. **Battery**<br>2. System board |
| **3-2-1** (Serial port failed) | • **System board** |
| **3-2-2** (Parallel port failed) | • **System board** |
| **3-2-4** (Failed comparing CMOS memory size against actual) | 1. **DIMM**<br>2. System board<br>3. Battery |
| **3-3-1** (Memory size mismatch occurred) | 1. **DIMM**<br>2. System board<br>3. Battery |
| **3-3-2** (Critical SMBUS error occurred (I2C bus error) | 1. **Disconnect server power, wait 30 seconds and retry.**<br>2. System board.<br>3. Microprocessor/PCI riser card.<br>4. DIMMs.<br>5. Hard disk drive backplane.<br>6. Hard disk drive power cable. |
| **3-3-3** (No optional memory in the system) | 1. **Install or reseat the memory modules.**<br>2. DIMMs.<br>3. System board. |

# No beep symptoms

| No Beep Symptom | FRU/Action |
|---|---|
| **No beep and no video.** (System attention LED is off) | • **System board** |
| **No beep and no video.** (System attention LED is on) | • **See** ″**Information panel system error LED**″**.** |
| **No ac power** | 1. **Check the power cord.**<br>2. Power supply. |
| **No beep and no video** | • **See "Undetermined problems" on page 77.** |

# 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 |
|---|---|
| **001-XXX-000** (Failed core tests) | • System board |
| **001-XXX-001** (Failed core tests) | • System board |
| **001-250-000** (Failed System Board ECC) | • System board |
| **001-250-001** (Failed System Board ECC) | • System board |
| **005-XXX-000** (Failed Video test) | 1. **Video adapter (if installed)**<br>2. System board |
| **011-XXX-000** (Failed COM1 Serial Port test) | • System board |
| **011-XXX-001** (Failed COM2 Serial Port test) | • System board |
| **014-XXX-000** (Failed Parallel Port test) | • System board |
| **015-XXX-001** (USB interface not found, board damaged) | • System board |
| **015-XXX-015** (Failed USB External Loopback test) | 1. **Make sure parallel port is not disabled.**<br>2. Re-run USB External Loopback test.<br>3. System board. |
| **015-XXX-198** (USB device connected during USB test) | 1. **Remove USB devices from USB1 and USB2.**<br>2. Re-run test.<br>3. System board. |
| **020-XXX-000** (Failed PCI Interface test) | • System board |
| **030-XXX-000** (Failed Internal SCSI interface test) | • System board |
| **030-XXX-00N** (Failed SCSI test on PCI slot N. Check system error log before replacing a FRU.) | • Adapter in slot N |
| **035-XXX-099** | 1. **No adapters were found.**<br>2. If adapter is installed re-check connection. |
| **035-XXX-S99** (Failed RAID test on PCI slot S. S = number of failing PCI slot. Check System Error Log before replacing a FRU.) | 1. **Adapter**<br>2. Hard disk drive backplane<br>3. Cable |
| **035-XXX-SNN** (Check System Error Log before replacing a FRU. S = number of failing PCI slot; NN = SCSI ID of failing hard disk drive.) | • Hard disk drive with SCSI ID NN on RAID adapter in PCI slot S |

| Error Code/Symptom | FRU/Action |
| --- | --- |
| **035-253-S99** (RAID adapter initialization failure) | 1. **ServeRAID Adapter in slot S is not configured properly.** Obtain the basic and extended configuration status and refer to the ServeRAID Hardware Maintenance Manual for more information.<br>2. Cable.<br>3. Adapter. |
| **075-XXX-000** (Failed Power Supply test) | • Power supply |
| **089-XXX-001** (Failed Microprocessor test) | • Microprocessor |
| **180-XXX-003** (Failed System Board LED test) | • **Mouse** |
| **201-XXX-0NN** (Failed Memory test NN = DIMM location) | 1. **DIMM location = NN**<br>2. Memory card |
| **201-XXX-999** (Multiple DIMM failure, see error text.) | • See error text for failing DIMMs. |
| **202-XXX-001** (Failed System Cache test) | • Microprocessor 1 |
| **206-XXX-000** (Failed Diskette Drive test) | 1. **Cable**<br>2. Diskette drive<br>3. System board |
| **215-XXX-000** (Failed IDE CD-ROM test) | 1. **Rerun the test using a different CD-ROM.**<br>2. CD-ROM drive cables.<br>3. CD-ROM drive.<br>4. System board. |
| **217-198-XXX** (Could not establish drive parameters) | 1. **Check cable and termination**<br>2. Hard disk drive backplane<br>3. Hard disk drive |
| **217-XXX-000** (Failed BIOS Fixed Disk test)<br>**Note:** If RAID is configured, the fixed disk number refers to the RAID logical array. | • **Hard disk drive 1** |
| **217-XXX-001** (Failed BIOS Fixed Disk test)<br>**Note:** If RAID is configured, the fixed disk number refers to the RAID logical array. | • **Hard disk drive 2** |
| **217-XXX-002** (Failed BIOS Fixed Disk test)<br>**Note:** If RAID is configured, the fixed disk number refers to the RAID logical array. | • **Hard disk drive 3** |
| **301-XXX-000** (Failed Keyboard test) | • **Keyboard** |
| **302-XXX-000** (Mouse failed) | • **Mouse** |
| **305-XXX-000** (Video monitor failure) | 1. **Video monitor**<br>2. Video adapter |

| Error Code/Symptom | FRU/Action |
|---|---|
| **405-XXX-000** (Failed Ethernet test on controller on the System Board) | 1. **Verify that Ethernet is not disabled in BIOS.** <br> 2. System board. |
| **405-XXX-00N** (Failed Ethernet test on adapter in PCI slot N) | 1. **Adapter in PCI slot N** <br> 2. System board |
| **415-XXX-000** (Failed Modem test) | 1. **Cable** <br> 2. Modem <br> 3. System board |

# Error symptoms

| General | FRU/Action |
|---|---|
| **CD-ROM test failed.** | 1. **CD-ROM drive/hard disk drive assembly** <br> 2. System board |
| **CMOS RAM test failed.** | • **System board** |
| **Diskette Drive test failed.** | 1. **Diskette drive** <br> 2. Diskette drive cable <br> 3. System board |
| **ECC Controller Logic.** | • **System board** |
| **Ethernet test failed.** | • **System board** |
| **External Cache test failed.** | • **Microprocessor** |
| **Fixed-disk drive test failed.** | 1. **Hard disk drive** <br> 2. Fixed-disk drive cable |
| **Integrated SP test failed.** | • **System board** |
| **Keyboard Controller test failed.** | • **System board** |
| **Microprocessor test failed.** | • Microprocessor |
| **Memory test failed.** | 1. **Memory** <br> 2. System board |
| **Parallel port test failed.** | • **System board** |
| **PCI test failed.** | • **System board** |
| **RAM Refresh test failed.** | • **System board** |
| **SCSI controller test failed.** | • **System board** |
| **Serial port test failed.** | • **System board** |
| **Serve RAID test failed.** | • **RAID controller adapter** |
| **System management test failed.** | 1. **System management adapter, if installed** <br> 2. System board |
| **System timer test failed.** | • **System board** |

| General | FRU/Action |
|---|---|
| **Tape Drive test failed.** | • **Tape drive** |
| **USB Interface test failed.** | • **System board** |
| **USB Port test failed.** | • **System board** |
| **Video test failed.** | • **System board** |

| Setup | Action |
|---|---|
| **Setup and Installation CD won't start.** | • Be sure the server is supported; all eServers with a startable (bootable) CD-ROM drive are supported.<br>• If the startup (boot) sequence settings have been altered, be sure the CD-ROM is first in the boot sequence.<br>• If more than one CD-ROM drive is installed, be sure that only one drive is set as the primary drive. Start the CD from the primary drive. |
| **ServeRAID program cannot view all installed drives - or - cannot install NOS.** | • Be sure there are no duplicate SCSI IDs or IRQ assignments.<br>• Be sure that the hard disk drive is connected properly. |
| **The Operating System Installation program continuously loops.** | Free up more space on the hard disk. |
| **ServerGuide won't start *your* NOS CD.** | Be sure the NOS CD you have is supported by ServerGuide. See the *Setup and Installation* CD label for a list of NOS versions supported. |
| **Can't install NOS - option is grayed out.** | Either there is no logical drive defined (ServeRAID systems) or the ServerGuide system partition is not present. Run the setup and configuration program. |

| TechConnect CD | Action |
|---|---|
| **Can't start TechConnect CD.** | Be sure you're starting the CD on a system with Microsoft Windows installed. |
| **Can't view publications from TechConnect CD, or text is unreadable.** | Be sure you have the Adobe reader installed (available from the TechConnect CD). |

| System Updates and Applications CD | Action |
|---|---|
| **Get ″time out″ or ″Unknown host″ errors** | Be sure you have access to the Internet through FTP directly. |

# POST error codes

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

| Note: See "Server" on page 80 to determine which components should be replaced by a field service technician. | |
|---|---|
| **Error code/symptom** | **FRU/action** |
| **062** (Three consecutive boot failures using the default configuration.) | 1. **Run the Configuration/Setup Utility program.**<br>2. Battery.<br>3. System board.<br>4. Microprocessor. |

| Note: See "Server" on page 80 to determine which components should be replaced by a field service technician. | |
|---|---|
| **Error code/symptom** | **FRU/action** |
| **101, 102, 106** (System and processor error) | • **System board** |
| **114** (Adapter read-only memory error) | 1. **Run diagnostics.**<br>2. Failing adapter. |
| **151** (Real time clock error) | 1. **Run diagnostics.**<br>2. Battery.<br>3. System board. |
| **161** (Real time clock battery error) | 1. **Run the Configuration/Setup Utility program.**<br>2. Battery.<br>3. System board. |
| **162** (Device configuration error)<br>**Note:** Be sure to load the default settings and any additional desired settings; then, *save the configuration*. | 1. **Run the Configuration/Setup Utility program.**<br>2. Battery.<br>3. Failing device.<br>4. System board. |
| **163** (Real-time clock error) | 1. **Run the Configuration/Setup Utility program.**<br>2. Battery.<br>3. System board. |
| **164** (Memory configuration changed.) | 1. **Run the Configuration/Setup Utility program.**<br>2. DIMM.<br>3. System board. |
| **175** (Hardware error) | • **System board** |
| **176** (Computer cover or cable cover was removed without a key being used) | 1. **Run the Configuration/Setup Utility program.**<br>2. System board. |
| **177, 178** (Security hardware error) | 1. **Run the Configuration/Setup Utility program.**<br>2. System board. |
| **184** (Power-on password corrupted) | 1. **Run the Configuration/Setup Utility program.**<br>2. System board. |
| **185** (Drive startup sequence information corrupted) | 1. **Run the Configuration/Setup Utility program.**<br>2. System board. |
| **186** (Security hardware control logic failed) | 1. **Run the Configuration/Setup Utility program.**<br>2. System board. |
| **187** (VPD serial number not set.) | 1. **Set serial number in the Configuration/Setup Utility program.**<br>2. System board. |
| **188** (Bad EEPROM CRC #2) | 1. **Run the Configuration/Setup Utility program.**<br>2. System board. |
| **189** (Three attempts made to enter the system with invalid passwords) | 1. **Run the Configuration/Setup Utility program.** |
| **201** (Memory test error.) 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. | 1. **DIMM**<br>2. System board |

| **Note:** See "Server" on page 80 to determine which components should be replaced by a field service technician. | |
|---|---|
| **Error code/symptom** | **FRU/action** |
| **262** (DRAM parity configuration error) | 1. **Run the Configuration/Setup Utility program.**<br>2. Battery.<br>3. System board. |
| **289** (DIMM has been disabled by user or the system) | 1. **Run the Configuration/Setup Utility program, if the DIMM was disabled by the user.**<br>2. Disabled DIMM, if not disabled by user.<br>3. System board. |
| **301** (Keyboard or keyboard controller error) | 1. **Keyboard**<br>2. System board |
| **303** (Keyboard controller error) | • **System board** |
| **602** (Invalid diskette boot record) | 1. **Diskette**<br>2. Diskette drive<br>3. Cable<br>4. System board |
| **604** (Diskette drive error) | 1. **Run the Configuration/Setup Utility program and diagnostics.**<br>2. Diskette drive.<br>3. Drive cable.<br>4. System board. |
| **662** (Diskette drive configuration error) | 1. **Run the Configuration/Setup Utility program.**<br>2. Diskette drive.<br>3. Drive cable.<br>4. System board. |
| **962** (Parallel port configuration error) | 1. **Run the Configuration/Setup Utility program.**<br>2. System board. |
| **11XX** (Serial port configuration error) | 1. **Run the Configuration/Setup Utility program.**<br>2. System board. |
| **1301**(LED panel cable disconnected) | 1. **LED cable assembly.**<br>2. System board. |
| **1600** (The service processor is not functioning) Complete the following steps before replacing a FRU:<br><br>1. Ensure that a jumper is not installed on J28.<br>2. Remove the ac power to the server, wait 20 seconds; then, reconnect the ac power. Wait 30 seconds; then, turn on the server. | 1. **Jumper on J28**<br>2. System board |
| **1601** (Service processor failed to respond at the start of POST) | 1. **Reset the service processor.**<br>2. Flash the service processor.<br>3. System board. |

| Error code/symptom | FRU/action |
|---|---|
| **Note:** See "Server" on page 80 to determine which components should be replaced by a field service technician. ||
| **1762** (Hard disk configuration error - IDE only) | 1. **Hard disk drive.**<br>2. Hard disk cables.<br>3. Run the Configuration/Setup Utility program.<br>4. System board. |
| **178X** (Hard drive error - IDE only) | 1. **Hard disk drive cables**<br>2. Hard disk drive<br>3. System board |
| **1800** (No more hardware interrupt available for PCI adapter) | 1. **Run the Configuration/Setup Utility program.**<br>2. Remove adapter. |
| **1801** (No more ROM space available for PCI adapter) | 1. **Run the Configuration/Setup Utility program.**<br>2. Remove adapter.<br>3. Disable adapter BIOS and Run the Configuration/Setup Utility program. |
| **1962** (Drive does not contain a valid boot sector) | 1. **Verify that a startable operating system is installed.**<br>2. Run the drive diagnostics.<br>3. Hard disk drive.<br>4. Hard disk drive backplane.<br>5. Cable.<br>6. System board. |
| **2400** (Video controller test failure) | • **System board** |
| **2462** (Video memory configuration error) | • **System board** |
| **5962** (IDE CD-ROM drive configuration error) | 1. **Run the Configuration/Setup Utility program.**<br>2. CD-ROM drive.<br>3. CD-ROM power cable.<br>4. IDE cable.<br>5. System board.<br>6. Battery. |
| **8603** (Pointing-device error) | 1. **Pointing device**<br>2. System board |
| **00012000** (Machine check architecture error) | 1. **Microprocessor**<br>2. System board |
| **00019501** (Microprocessor not functioning) | 1. **Microprocessor**<br>2. System board |
| **00019701** (Microprocessor failed BIST.) | 1. **Microprocessor**<br>2. System board |
| **00180100** (No room for PCI option ROM) | 1. **Run the Configuration/Setup Utility program.**<br>2. Adapter.<br>3. System board. |
| **00180200** (No more I/O space available for PCI adapter) | 1. **Run the Configuration/Setup Utility program.**<br>2. Failing adapter.<br>3. System board. |

| | |
|---|---|
| **Note:** See "Server" on page 80 to determine which components should be replaced by a field service technician. | |
| **Error code/symptom** | **FRU/action** |
| **00180300** (No more memory above 1MB for PCI adapter) | 1. **Run the Configuration/Setup Utility program.**<br>2. Failing adapter.<br>3. System board. |
| **00180400** (No more memory below 1MB for PCI adapter) | 1. **Run the Configuration/Setup Utility program.**<br>2. Failing adapter.<br>3. System board. |
| **00180500** (PCI option ROM checksum error) | 1. **Failing PCI adapter**<br>2. System board |
| **00180600** (PCI device BIST failure) | 1. **Run the Configuration/Setup Utility program.**<br>2. Adapter.<br>3. System board. |
| **00180700** (PCI device not responding) | 1. **System board**<br>2. PCI adapter |
| **00180800** (Unsupported PCI device installed) | 1. **PCI adapter**<br>2. System board |
| **00181000** (General PCI error) | 1. **PCI adapter**<br>2. System board |
| **01295085** (ECC checking hardware test error) | 1. **System board**<br>2. Microprocessor |
| **I9990301** (Fixed boot sector error) | 1. **Hard disk drive cable**<br>2. Hard disk drive backplane<br>3. System board |
| **I9990305** (Fixed boot sector error, no operating system installed) | • **Install an operating system.** |
| **I9990650** (AC power has been restored) | 1. **Check power connections.**<br>2. AC power cord. |

# POST (ISPR) error procedures

Use the ISPR error procedures to help you solve ServeRAID problems. A complete list of error codes is listed at "ServeRAID error codes" on page 75.

**Note:** Where the ISPR Error Procedures refer to a Hard disk drive backplane, see the chapter of this publication that concerns service replaceable units.

**EF10** (Default ISPR)
1. No ISPR error present.

**9ZXX thru BZXX** (SCSI bus error caused either by cables, termination, defective drives, etc.)
1. Isolate between SCSI subsystem and controller by disconnecting all hard disk drive cables from suspect card, and reboot.

**CAUTION:**

**Do not press F5. Doing so changes the server's configuration.**

If an ISPR error is still present, perform the following actions until the error is no longer present:

a. Reseat the controller

b. Replace the controller

**Notes:**

a. SCSI channel cable details, if any, appear elsewhere in this publication.

b. The adapter/controller detects a configuration change. **Do not** choose **Save Changes**. Instead, press **F10** to bypass any options to this effect.

2. If ISPR error is **EF10** after disconnecting cables:

a. Identify which channel is causing the error by the second digit (Z) of the original ISPR code as indicated in the following table:

> **Note:** ServeRAID-4H controllers have 4 channels; ServeRAID-4L and -4Lx controllers have only one channel; and ServeRAID-4M and -4Mx controllers have 2 channels. ServeRAID-5i controllers have no channels. The ServeRAID-5i uses the channel connectors of the server's onboard integrated SCSI controller.

*Table 4. SCSI identifier*

| SCSI Channel Code (z) | Descriptions |
|:---:|:---|
| 1 | Channel 1 |
| 2 | Channel 2 |
| 3 | Channel 1 & 2 |
| 4 | Channel 3 |
| 5 | Channel 1 & 3 |
| 6 | Channel 2 & 3 |
| 7 | Channel 1, 2, & 3 |
| 8 | Channel 4 |
| 9 | Channel 1 & 4 |
| A | Channel 2 & 4 |
| B | Channel 1, 2, & 4 |
| C | Channel 3 & 4 |
| D | Channel 1, 3, & 4 |
| E | Channel 2, 3, & 4 |
| F | Channel 1, 2, 3, & 4 |

b. Confirm that the channel(s) identified from the error in step 2a is (are) the cause of the error by verifying that the error presents itself *only* when the offending channel is reconnected.

c. Check termination of identified channel.

> **Note:** SCSI channel termination details, if any, appear elsewhere in this publication.

d. Check for proper backplane jumper configuration.

> **Note:** SCSI channel jumper details, if any, appear elsewhere in this publication.

   e. Check for proper cabling configuration in systems that use hard disk drive status cables. Reconnect all cables removed in step 1 on page 73.

   f. Disconnect one drive at a time attached to the channel identified in step 2a on page 74; then, reboot to determine which drive is causing the error.

   g. Replace hard disk drive cable.

   h. Replace hard disk drive backplane.

### FFFF or other code not listed

1. Place download jumpers on the controller and try to flash the firmware code to the card.

2. Isolate between SCSI subsystem and controller by disconnecting all hard disk drive cables attached to the suspect card, and reboot.

   **CAUTION:**
   **Do not press F5. Doing so will change the server's configuration.**

   If ISPR code is **EF10** after disconnecting cables, follow the steps below until the error is eliminated:

      a. Identify which channel is causing the error by reconnecting cables one at a time and rebooting until the error returns.

      b. Check termination of identified channel in step 2a.

   > **Note:** SCSI channel termination details, if any, appear elsewhere in this publication.

      c. Disconnect one drive at a time attached to channel identified in step 2a and reboot each time to determine which drive is causing the problem.

      d. Replace hard disk drive cable attached to channel identified in step 2a.

      e. Replace backplane attached to channel identified in step 2a.

3. If original ISPR code is still present after disconnecting all hard disk drive cables and rebooting, perform the following actions until the error is no longer present:
   - Reseat the controller
   - Replace the controller

## ServeRAID error codes

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

**Note:** See "Server" on page 80 to determine which components should be replaced by a field service technician.

| Error code/symptom | FRU/action |
|---|---|
| 1*xxx* (Microcode checksum error) | • ServeRAID controller |
| 2*xxx* (Code DRAM error) | 1. Install download jumpers, flash latest level BIOS and firmware for controller. Remove jumpers.<br>2. ServeRAID controller. |
| 3000-31*XX* (Code DRAM error) | 1. Install download jumpers, flash latest level BIOS and firmware for controller. Remove jumpers.<br>2. ServeRAID controller. |
| 3200 (Code DRAM error) | 1. Install download jumpers, flash latest level BIOS code and firmware for controller. Remove jumpers.<br>2. ServeRAID controller. |

| Note: See "Server" on page 80 to determine which components should be replaced by a field service technician. | |
|---|---|
| **Error code/symptom** | **FRU/action** |
| 3300 (ServeRAID-5i only) | 1. Install ServeRAID-5i controller in an extended PCI option slot. See the documentation that came with the server for more information. |
| 3E20 (ServeRAID-5i only) | 1. Remove the ServeRAID-5i controller from its slot and install it in the proper PCI option slot. <br> 2. Verify that the ServeRAID-5i controller is supported in this server. <br> 3. ServeRAID-5i controller. <br> 4. System board. |
| 3E2x | 1. Reseat the ServeRAID controller. <br> 2. Flash latest level of BIOS code and firmware for controller. <br> 3. ServeRAID-5i controller. <br> 4. Integrated RAID controller on server). |
| 4*xxx* thru 5*xxx* (Code DRAM error) | 1. Install download jumpers, flash latest level BIOS code and firmware for controller; then, remove jumpers. <br> 2. ServeRAID controller. |
| 6*xxx* (Cache DRAM error) (ServeRAID-4H only) | 1. Reseat daughter card. <br> 2. Install download jumpers, flash latest level BIOS code and firmware for controller; then, remove jumpers. <br> 3. ServeRAID controller. |
| 7*xxx* thru 8*xxx* (Host/local PCI bus interface error) | 1. Flash latest level of BIOS code and firmware for controller. <br> 2. If ServeRAID-4x controller, replace controller. <br> 3. If ServeRAID-5i controller, integrated RAID controller on the server. |
| 9003 | 1. Flash latest level of BIOS code and firmware for controller. <br> 2. Confirm that this controller is a supported option for this system. <br> 3. ServeRAID controller. <br> 4. Integrated RAID controller on the server). |
| 9*xxx* thru BZ*xx* (SCSI bus error caused by cables, termination, defective drives, etc.). *Z* refers to the specific channel or channels that cause the error. | 1. Follow indications at "POST (ISPR) error procedures" on page 73. Follow those instructions before continuing with the next steps listed in this index. <br> 2. Hard disk drive cable. <br> 3. Hard disk drive backplane. <br> 4. Hard disk drive. <br> 5. ServeRAID controller. |
| EFFE (Firmware code corrupt or download jumpers are in place) | 1. Flash latest level BIOS and firmware for controller; then,remove jumpers. <br> 2. ServeRAID controller. |

| Note: See "Server" on page 80 to determine which components should be replaced by a field service technician. | |
|---|---|
| **Error code/symptom** | **FRU/action** |
| FFFF or other code not listed | 1. Follow indications at "POST (ISPR) error procedures" on page 73. |
| | 2. Hard disk drive cable. |
| | 3. Hard disk drive backplane. |
| | 4. Hard disk drive. |
| | 5. ServeRAID controller. |

# Undetermined problems

You are here because the diagnostic tests did not identify the failure, the Devices List is incorrect, or the system is inoperative.

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

If power problems are suspected:
1. Turn 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
   - Modem, printer, mouse, or non-IBM devices
   - Each adapter
   - Drives
   - Memory modules (minimum requirement = one 128 MB DIMM)

**Note:** Minimum operating requirements are:
   - a. 1 Power Supply
   - b. System board
   - c. 1 Microprocessor
   - d. 1 Terminator card in Slot 2
   - e. 1 Memory module (minimum of 1 DIMM in slot labeled DIMM 1)
4. Power-on the computer. If the problem remains, suspect the following FRUs in the order listed:
   - Power supply
   - 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, then the power supply.
2. If you suspect a networking problem and all the system tests pass, suspect a network cabling problem external to the system.

# Chapter 7. Parts listing xSeries 305 Type 8673

This parts listing supports the xSeries 305 Type 8673.
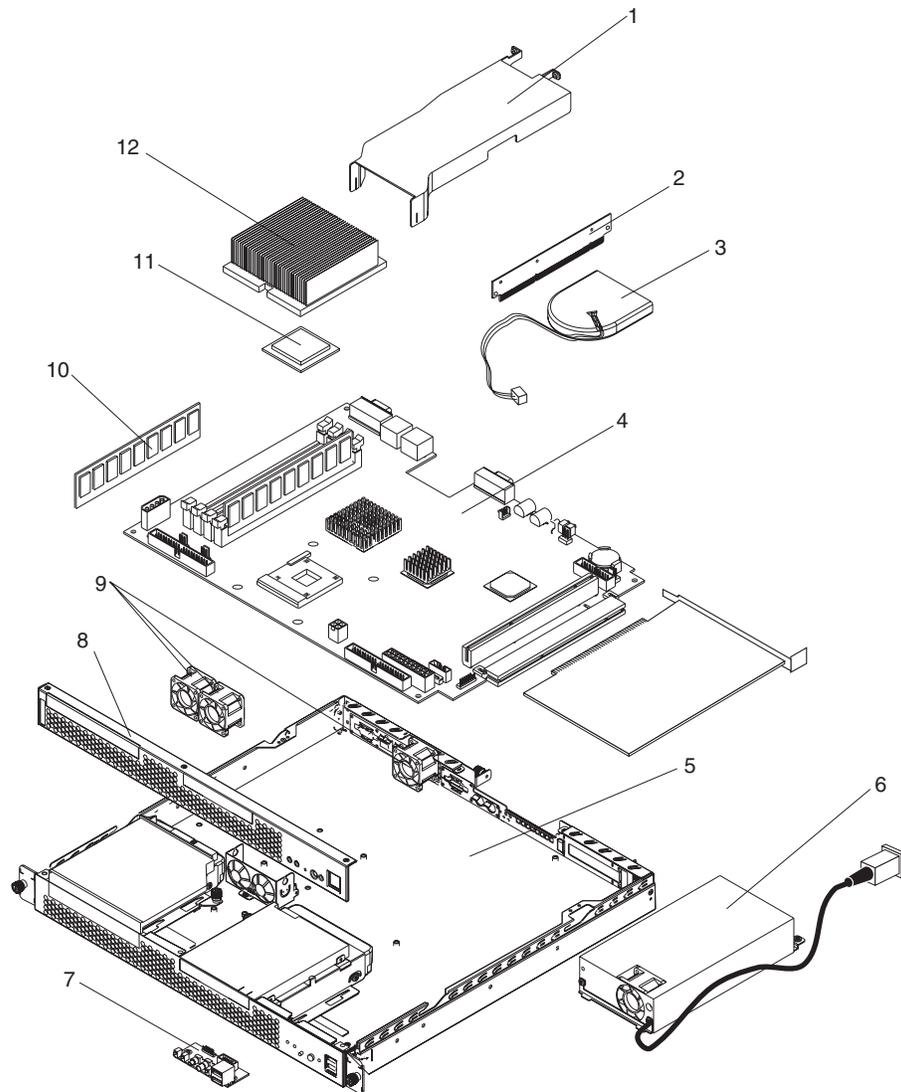
# Server

**Note:** Field replaceable units (FRUs) must be serviced only by qualified field service technicians. Customer replaceable units (CRUs) can be replaced by the customer.

| Index | Server (xSeries 305, Type 8673) Models 11x, 12x, 13x, 21x, 22x, 23x, 92x) | FRU No. | CRU/FRU |
|---|---|---|---|
| 1 | Air baffle (all models) | 49P2767 | CRU |
| 2 | PCI riser card (all models) | 49P2745 | FRU |
| 3 | Blower (all models) | 49P2759 | FRU |
| 4 | System board (all models) | 32P1399 | FRU |
| 5 | Chassis (all models) | 49P2740 | FRU |
| 6 | Power supply, 200 watt (all models) | 49P2742 | FRU |
| 7 | LED USB card (all models) | 49P2755 | FRU |
| 8 | Front bezel assembly (all models) | 49P2761 | CRU |
| 9 | Fan assembly, 40 mm (all models) | 49P2757 | CRU |
| 10 | Memory, 256 PC 2100 ECC (all models) | 09N4306 | CRU |
| 11 | Microprocessor, 2.0 GHz (models 11x, 12x, 13x) | 49P2723 | FRU |
| 11 | Microprocessor, 2.2 GHz (models 21x, 22x, 23x) | 49P2727 | FRU |
| 11 | Microprocessor, 1.8 GHz (model 92x)) | 49P2803 | FRU |
| 12 | Heat sink, microprocessor | 49P2725 | FRU |
| | 4 post rails (all models) | 49P2747 | FRU |
| | Alcohol wipe kit (all models) | 59P4739 | FRU |
| | Battery, 3.0 volt lithium | 33F8354 | FRU |
| | Cable management arm | 01R0890 | CRU |
| | Cable, diskette drive (all models) | 49P2736 | CRU |
| | Cable, IDE 1-drop (all models) | 49P2732 | CRU |
| | Cable, IDE 2-drop (all models) | 49P2774 | CRU |
| | Cable, SCSI signal (all models) | 49P2734 | CRU |
| | Cable, USB front assembly (all models) | 49P2753 | FRU |
| | Cable, switch LED (all models) | 49P2782 | FRU |
| | Cable, hard disk drive and CD-ROM (all models) | 49P2751 | CRU |
| | CD-ROM adapter (all models) | 49P2738 | CRU |
| | CD-ROM drive, 24X, primary (all models) | 06P5263 | CRU |
| | CD-ROM drive, 24X, alternate (all models) | 33P3231 | CRU |
| | Diskette drive, 12.7 black (all models) | 36L8645 | CRU |
| | Hard disk drive, 18.2 GB SCSI (models 13x, 23x) | 06P5365 | CRU |
| | Hard disk drive, 40. GB IDE (models 12x, 22x, 92x) | 19K1568 | CRU |
| | Jumper, 2.0 m (all models) | 36L8886 | FRU |

| Index | Server (xSeries 305, Type 8673) Models 11x, 12x, 13x, 21x, 22x, 23x, 92x) | FRU No. | CRU/FRU |
|---|---|---|---|
| | Miscellaneous parts kit (all models) | 49P2771 | FRU |
| | • Bezel, blank (1) | | |
| | • Bezel, diskette drive blank (1) | | |
| | • Bezel, PCI blank (2) | | |
| | • Heat sink (1) | | |
| | • Screw, M 3x4 flat (4) | | |
| | • Screw, M 3x5 pan (10) | | |
| | • Screw, M 3.5x6 (4) | | |
| | • Screw, M 3.5 steel (6) | | |
| | • Screw, M 3x5 slotted (2) | | |
| | • Screw, M 4x10 flat (2) | | |
| | • Screw, M 4x5 pan (4) | | |
| | • Spring, CD (2) | | |
| | • Spring, diskette drive (2) | | |
| | Power cord; see "Power cords" on page 82. (all models) | | CRU |
| | SCSI adapter (models 13x, 23x) | 06P2215 | CRU |
| | System service label (all models) | 49P2769 | FRU |
| | Thermal grease kit (all models) | 59P4740 | FRU |

# Keyboard CRUs

| Keyboard | CRU No. |
|---|---|
| US English | 37L2551 |
| French Canadian | 37L2552 |
| LA Spanish | 37L2553 |
| Arabic | 37L2555 |
| Belgium/French | 37L2556 |
| Belgium/UK | 37L2557 |
| Bulgarian | 37L2558 |
| Czech | 37L2559 |
| Danish | 37L2560 |
| Dutch | 37L2561 |
| French | 37L2562 |
| German | 37L2563 |
| Greek | 37L2564 |
| Hebrew | 37L2565 |
| Hungarian | 37L2566 |
| Korean | 02K0901 |
| Iceland | 37L2567 |
| Italy | 37L2568 |
| Norwegian | 37L2569 |
| Polish | 37L2570 |
| Portuguese | 37L2571 |
| Romanian | 37L2572 |
| Russian | 37L2573 |
| Serbian/Cyrillic | 37L2574 |
| Slavic | 37L2575 |
| Spanish | 37L2576 |
| Swedish/Finnish | 37L2577 |
| Swiss, French/German | 37L2578 |

| Keyboard | CRU No. |
|---|---|
| Turkish | 37L2579 |
| Turkish | 37L2580 |
| UK English | 37L2581 |
| Yugosl/Lat | 37L2582 |
| US English-EMEA | 37L2583 |
| Chinese/US | 37L2585 |
| Thailand | 37L2587 |
| French Canadian | 37L0913 |

# Power cords

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

IBM power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

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

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

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

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

| IBM power cord part number | Used in these countries and regions |
|---|---|
| 13F9940 | Argentina, Australia, China (PRC), New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa |
| 13F9979 | Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, China (Macau S.A.R.), Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe |
| 13F9997 | Denmark |
| 14F0015 | Bangladesh, Burma, Pakistan, South Africa, Sri Lanka |

| IBM power cord part number | Used in these countries and regions |
|---|---|
| 14F0033 | Antigua, Bahrain, Brunei, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dubai, Fiji, Ghana, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia |
| 14F0051 | Liechtenstein, Switzerland |
| 14F0069 | Chile, Ethiopia, Italy, Libya, Somalia |
| 14F0087 | Israel |
| 1838574 | Thailand |
| 6952300 | Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela |

# Appendix A. Getting help and technical assistance

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

## Before you call

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system is turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system.
- Go to the IBM Support Web site at http://www.ibm.com/pc/support/ to check for technical information, hints, tips, and new device drivers.
- Use an IBM discussion forum on the IBM Web site to ask questions.

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

## Using the documentation

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

## Getting help and information from the World Wide Web

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

You can find service information for your IBM products, including supported options, at http://www.ibm.com/pc/support/. If you click **Profile** from the support page, you

can create a customized support page. The support page has many sources of information and ways for you to solve problems, including:

- Diagnosing problems, using the IBM Online Assistant
- Downloading the latest device drivers and updates for your products
- Viewing Frequently Asked Questions (FAQ)
- Viewing hints and tips to help you solve problems
- Participating in IBM discussion forums
- Setting up e-mail notification of technical updates about your products

## Software service and support

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

For more information about Support Line and other IBM services, go to http://www.ibm.com/services/, or go to http://www.ibm.com/planetwide/ for support telephone numbers.

## Hardware service and support

You can receive hardware service through IBM Integrated Technology Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. Go to http://www.ibm.com/planetwide/ for support telephone numbers.

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

# Appendix B. Related service information

**Note:** The service procedures are designed to help you isolate problems. They are written with the assumption that you have model-specific training on all computers, or that are familiar with the computers, functions, terminology, and service information provided in this manual.

## Safety information

The following section contains the safety information that you need to be familiar with before servicing an IBM computer.

## 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 computer. 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 electrostatic discharge-sensitive devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). 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 ESD-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 ESD-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 ESD 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 computers.

# Grounding requirements

Electrical grounding of the computer 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
- 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 procedure**s.

- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

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

- Statement 2



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

*Do not:*
- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

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

- Statement 3



**CAUTION:**
**When laser products (such as CD-ROMs, DVD-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
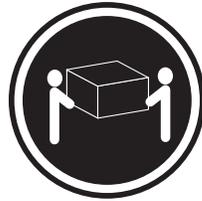


≥18 kg (37 lb)        ≥32 kg (70.5 lb)        ≥55 kg (121.2 lb)

**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 10

**CAUTION:**

**Do not place any object weighing more than 82 kg (180 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: |
|---|---|
| 1. DESLIGUE Tudo. | 1. DESLIGUE Tudo. |
| 2. Primeiramente, conecte todos os cabos aos dispositivos. | 2. Primeiramente, remova os cabos de alimentação das tomadas. |
| 3. Conecte os cabos de sinal aos conectores. | 3. Remova os cabos de sinal dos conectores. |
| 4. Conecte os cabos de alimentação às tomadas. | 4. Remova todos os cabos dos dispositivos. |
| 5. LIGUE os dispositivos. | |

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 móídulo com uma bateria de lítio, substitua-o apenas pelo mesmo tipo de mídulo, 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 ítica, 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 íticos, e evite exposição direta ao raio.

Instrução 4
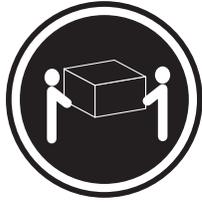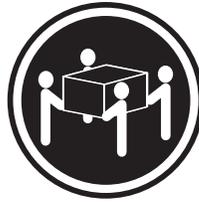
≥18 kg (37 lb)   ≥32 kg (70.5 lb)   ≥55 kg (121.2 lb)

**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.

2

1

**CUIDADO:**

Instrução 10

**CUIDADO:**

Não coloque nenhum objeto com peso superior a 82 kg (180 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。
>
> 将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一类型的模
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。
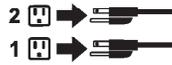


声明 6



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 7



警告：

如果设备带有外门，则在移动或抬起设备前应将其拆除或固定
以避免造成人员伤害。外门支撑不了设备的重量。


声明 8



警告：
不要拆除电源外盖或贴有下列标签的任何部件。



贴有此标签的组件内部存在高电压、高电流的危险。这些组件中
没有用户可维修的部件。如果怀疑其中的部件存在问题，应与服
务技术人员联系。


声明 9



警告：

为避免人员伤害，拆除设备上的风扇前应拨下热插拔风扇电缆。


声明 10



警告：

机柜安装的设备上面不能放置重于 82kg（180 磅）的物品。



> 82 kg (180 磅)

声明 11

⚠️

**警告：**

下面的标签表明附近有锋利的边、角或接头。

⚠️

声明 12

⚠️

**警告：**
下面的标签表明附近有高热表面。

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。
－僅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，請勿開啟該設備的電源。
－在安裝及架構之時，若非非常熟悉，在開啟裝置蓋子之前，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，或開啟其蓋子時，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. 先將所有電纜線接上裝置。

3. 將信號電纜接上接頭。

4. 再將電源線接上電源插座。

5. 開啟裝置的電源。

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 ℃ (212 ℉)
－ 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 10



注意：
請勿將任何重量超過 82 公斤 (180 磅) 的物品置於已安裝機架的裝置上方。



＞82 公斤 (180 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 |
|---|---|
| 1. Mettez les unités hors tension. | 1. Mettez les unités hors tension. |
| 2. Commencez par brancher tous les cordons sur les unités. | 2. Débranchez les cordons d'alimentation des prises. |
| 3. Branchez les câbles d'interface sur des connecteurs. | 3. Débranchez les câbles d'interface des connecteurs. |
| 4. Branchez les cordons d'alimentation sur des prises. | 4. Débranchez tous les câbles des unités. |
| 5. Mettez les unités sous tension. | |

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 (37 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° 10

**ATTENTION:**

Ne posez pas d'objet dont le poids dépasse 82 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 anschlie*β*en: | Kabel lösen: |
|---|---|
| 1. Alle Geräte ausschalten und Netzstecker ziehen. | 1. Alle Geräte ausschalten. |
| 2. Zuerst alle Kabel an Einheiten anschließen. | 2. Zuerst Netzstecker von Steckdose lösen. |
| 3. Signalkabel an Anschlußbuchsen anschließen. | 3. Signalkabel von Anschlußbuchsen lösen. |
| 4. Netzstecker an Steckdose anschließen. | 4. Alle Kabel von Einheiten lösen. |
| 5. Gerät einschalten. | |

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
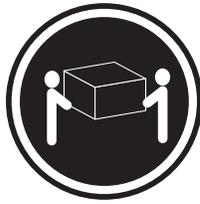  Laserstrahlung auftreten.



**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 10

**ACHTUNG:**

Keine Gegenstände, die mehr als 82 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: |
|---|---|
| 1. SPEGNERE tutti i dispositivi. | 1. SPEGNERE tutti i dispositivi. |
| 2. Collegare prima tutti i cavi alle unità. | 2. Rimuovere prima i cavi di alimentazione dalle prese elettriche. |
| 3. Collegare i cavi di segnale ai connettori. | 3. Rimuovere i cavi di segnale dai connettori. |
| 4. Collegare i cavi di alimentazione alle prese elettriche. | 4. Rimuovere tutti i cavi dalle unità. |
| 5. ACCENDERE le unità. | |

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.
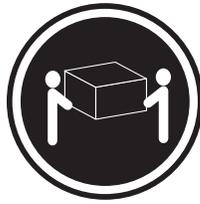


**PERICOLO**

Alcuni prodotti laser contengono all'interno un diodo laser di Classe 3A o Classe 3B. Prestare attenzione a quanto segue:

Aprendo 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 10



**ATTENZIONE:**



Non poggiare oggetti che pesano più di 82 kg sulla parte superiore delle unità montate in rack.

**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, 전화 및 통신 케이블로부터 흘러 나오는 전류는 위험합니다.

전기 충격을 피하려면:

- 뇌우를 동반할 때는 케이블의 연결이나 철수, 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.

- 가능한한 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.

다음을 주의하십시오.

- 던지거나 물에 담그지 않도록 하십시오.
- 100℃(212℉) 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 클래서 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 있는 지 확인하십시오.

경고문 10



주의:
서랍형 모델의 장치 상단에 82 kg(180 lbs.)이 넘는 물체를 올려
놓지 마십시오.



**>** 82 kg (180 lbs)

**Importante:**

Todas las declaraciones de precauciín de esta IBM documentation empiezan con un número. Dicho número se emplea para establecer una referencia cruzada de una declaraciín de precauciín o peligro en inglés con las versiones traducidas que de dichas declaraciones pueden encontrarse en esta secciín.

Por ejemplo, si una declaraciín de peligro empieza con el número 1, las traducciones de esta declaraciín de precauciín aparecen en esta secciín bajo Declaraciín 1.

Lea atentamente todas las declaraciones de precauciín y peligro antes de llevar a cabo cualquier operaciín.

Declaración 1

**PELIGRO**

La corriente eléctrica de los cables telefínicos, de alimentaciín y de comunicaciones es perjudicial.

Para evitar una descarga eléctrica:

- No conecte ni desconecte ningún cable ni realice las operaciones de instalaciín, mantenimiento o reconfiguraciín de este producto durante una tormenta.
- Conecte cada cable de alimentaciín a una toma de alimentaciín eléctrica con conexiín a tierra y cableado correctos.
- Conecte a tomas de alimentaciín 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 sent.al.
- No encienda nunca un equipo cuando haya riesgos de incendio, de inundaciín o de daños estructurales.
- Desconecte los cables de alimentaciín, sistemas de telecomunicaciones, redes y mídems conectados antes de abrir las cubiertas del dispositivo a menos que se indique lo contrario en los procedimientos de instalaciín y configuraciín.
- Conecte y desconecte los cables tal como se describe en la tabla siguiente cuando desee realizar una operaciín de instalaciín, de traslado o de apertura de las cubiertas para este producto o para los dispositivos conectados.

| Para la conexin | Para la desconexiín |
|---|---|
| 1. APÁGUELO todo. | 1. APÁGUELO todo. |
| 2. En primer lugar, conecte los cables a los dispositivos. | 2. En primer lugar, retire cada cable de alimentaciín de la toma de alimentaciín. |
| 3. Conecte los cables de señal a los conectores. | 3. Retire los cables de señal de los conectores. |
| 4. Conecte cada cable de alimentaciín a la toma de alimentaciín. | 4. Retire los cables de los dispositivos. |
| 5. ENCIENDA el dispositivo. | |

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 mídulo que contiene una batería de litio,
sustitúyalo únicamente por el mismo tipo de mídulo, 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
legislaciín local.

Declaración 3



**PRECAUCIÓN:**

Cuando instale productos láser (como, por ejemplo, CD-ROM, unidades DVD,
dispositivos de fibra íptica o transmisores), tenga en cuenta las advertencias
siguientes:
* No retire las cubiertas. Si retira las cubiertas del producto láser, puede quedar
  expuesto a radiaciín láser perjudicial. Dentro del dispositivo no existe ninguna
  pieza que requiera mantenimiento.
* El uso de controles o ajustes o la realizaciín de procedimientos que no sean los
  que se han especificado aquí pueden dar como resultado una exposiciín
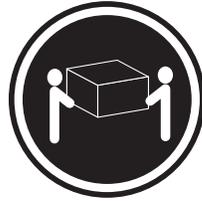  perjudicial a las radiaciones.



**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 radiaciín láser. No mire fijamente el rayo ni lleve a cabo
ningún examen directamente con instrumentos ípticos; evite la exposiciín directa al
rayo.

Declaración 4



≥18 kg       ≥32 kg       ≥55 kg

**PRECAUCIÓN:**

Tome medidas de seguridad al levantar el producto.

Declaración 5



**PRECAUCIÓN:**

El botín de control de alimentaciín del dispositivo y el interruptor de alimentaciín de la fuente de alimentaciín no apagan la corriente eléctrica suministrada al dispositivo. Es posible también que el dispositivo tenga más de un cable de alimentaciín. Para eliminar la corriente eléctrica del dispositivo, asegúrese de desconectar todos los cables de alimentaciín de la fuente de alimentaciín.



Declaración 10



**PRECAUCIÓN:**



No coloque ningún objeto que pese más de 82 kg (180 libras) encima de los dispositivos montados en bastidor.

# Appendix C. Notices

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| Alert on LAN | ServerGuide |
| C2T Interconnect | ServerProven |

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| Chipkill | TechConnect |
| EtherJet | Tivoli |
| e-business logo | Tivoli Enterprise |
| FlashCopy | Update Connector |
| IBM | Wake on LAN |
| IntelliStation | XA-32 |
| Light Path Diagnostics | XA-64 |
| NetBAY | X-Architecture |
| Netfinity | XceL4 |
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# Important notes

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

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

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

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

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

Maximum memory may require replacement of the standard memory with an optional memory module.

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## Electronic emission notices

## Federal Communications Commission (FCC) statement

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

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

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

**Avis de conformité à la réglementation d'Industrie Canada**

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

## Australia and New Zealand Class A statement

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

## United Kingdom telecommunications safety requirement

**Notice to Customers**

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

## European Union EMC Directive conformance statement

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

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

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

## Taiwanese Class A warning statement

警告使用者：
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策。

## Japanese Voluntary Control Council for Interference (VCCI) statement

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