xSeries 346 Types 8840 and 1880

Hardware Maintenance Manual and Troubleshooting Guide

xSeries 346 Types 8840 and 1880

Hardware Maintenance Manual and Troubleshooting Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, “Safety information,” on page 117.

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Contents

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About this document

This document contains basic configuration information, diagnostic information, error codes, error messages, service information, and a symptom-to-FRU index for the xSeries® 346 Types 8840 and 1880 2-U[1] -high server.

Important: The field replaceable unit (FRU) procedures in this document are intended for trained servicers who are familiar with IBM® products. Customer replacement units (CRUs) can be replaced by the customer. See Chapter 7, “Parts listing xSeries 346 Types 8840 and 1880,” on page 107, to determine if the component being replaced is a FRU or a CRU. Before servicing an IBM product, be sure to read Appendix B, “Safety information,” on page 117.

Important safety information

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

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prenez connaissance de toutes les consignes de type Attention et

Danger avant de procéder aux opérations décrites par les instructions.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

1. Racks are measured in vertical increments of 1.75 inches each. Each increment is called a “U”. A 1-U-high device is 1.75 inches tall.

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Online support

You can download the most current diagnostic, BIOS flash, and device-driver files from http://www.ibm.com/support.

Chapter 1. Introduction

The IBM server that can be upgraded to a symmetric multiprocessing (SMP) server through a microprocessor upgrade.

Performance, ease of use, 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 and provide flexible expansion capabilities for the future.

The server comes with a limited warranty. For more information about the terms of the warranty, see the warranty appendix in the *Installation Guide*.

The server contains IBM Enterprise X-Architecture™ technologies, which help increase performance and reliability.

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

For service or assistance information, see Appendix A, “Getting help and technical assistance,” on page 115.

Related documentation

This *Hardware Maintenance Manual and Troubleshooting Guide* is provided in Portable Document Format (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 346 Types 8840 and 1880 documentation is provided with your server:

- *Installation Guide*
  This printed document contains setup and installation instructions.
- *Rack Installation Instructions*
  This printed document contains the instructions to install your server in a rack.
- *Safety Book*
  This multilingual document is provided in 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 document 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 document is provided in PDF on the IBM *xSeries Documentation* CD. It contains instructions to install, remove, and connect optional devices supported by your server.

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

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:
- Intel® Xeon 2.8 GHz or higher depending on server model
- 800 MHz front-side bus (FSB)
- Support for up to two microprocessors with Intel Hyper-Threading Technology

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

Memory:
- Minimum: 512 MB
- Maximum: 16 GB
- Type: 2-way interleaved PC2-3200, ECC DDR II SDRAM, registered DIMMs only
- Sizes: 256 MB, 512 MB, 1 GB, or 2 GB.

Drives:
- Diskette: 1.44 MB
- DVD-ROM: IDE

Expansion bays:
- Six hot-swap, 3.5-inch drive bays (hot-swap hard disk drives installed, some models)
- One 5.25-inch bay (DVD-ROM drive installed)
- One 3.5-inch removable-media drive bay (diskette drive installed)

Expansion slots:
- Two PCI-X non-hot-plug 100 MHz/64-bit (low profile)
- Two PCI-X non-hot-plug 133 MHz/64-bit

Hot-swap fans:
- Standard: Six
- Maximum: 12 - provide redundant cooling

Hot-swap power supplies:

625 watts (100-240 V ac)
- Minimum: One
- Maximum: Two - provide redundant power

Size (2 U):
- Height: 85.4 mm (3.36 in.)
- Depth: 698 mm (27.48 in.)
- Width: 443.6 mm (17.5 in.)
- Weight: approximately 21.09 kg (46.5 lb) to 29.03 kg (64 lb) depending upon configuration

Integrated functions:
- Baseboard management controller
- Two Broadcom 10/100/1000 Ethernet controllers (dual-port design) with Wake on LAN® support
- One serial port
- One external and one internal Ultra320 SCSI port (dual-channel controller with integrated RAID)
- Three Universal Serial Bus (USB) v1.1 ports

Note: The baseboard management controller is also known as the service processor.

Video controller:
- ATI Radeon 7000M IGP video on system board
- Compatible with SVGA and VGA
- 16 MB DDR-SDRAM video memory

Environment:
- Air temperature:
  - Server on: 10° to 35°C (50° to 95°F); altitude: 0 to 914.4 m (3000 ft). Decrease system temperature by 0.75°C for every 1000 feet increase in altitude.
  - Server off: 10° to 43°C (50° to 109.4°F); maximum altitude: 2133 m (7000 ft).
  - Shipment: -40° to +60°C (-40° to 140°F) ; maximum altitude: 2133 m (7000 ft).
- Humidity:
  - Server on/off: 8% to 80%
  - Shipment: 5% to 100%

Acoustical noise emissions:
- Declared sound power, idle: 6.6 bel
- Declared sound power, operating: 6.6 bel

Heat output:

Approximate heat output in British thermal units (Btu) per hour:
- Minimum configuration: 1230 Btu (360 watts)
- Maximum configuration: 2840 Btu (830 watts)

Electrical input:
- Sine-wave input (50-60 Hz) required
- Input voltage range automatically selected
- Input voltage low range:
  - Minimum: 90 V ac
  - Maximum: 137 V ac
- Input voltage high range:
  - Minimum: 180 V ac
  - Maximum: 265 V ac
- Input kilovolt-amperes (kVA) approximately:
  - Minimum: 0.36 kVA
  - Maximum: 0.83 kVA

Notes:

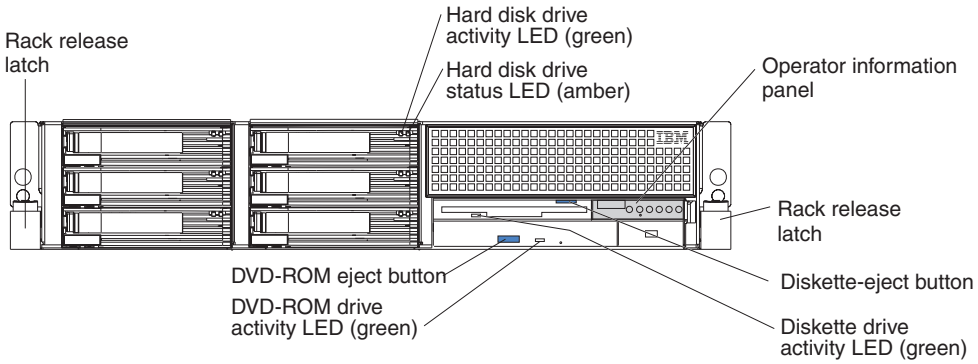
1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.
2. These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.

Server power, controls, and indicators

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

Front view

The following illustration shows the controls, LEDs, and connectors on the front of the server.

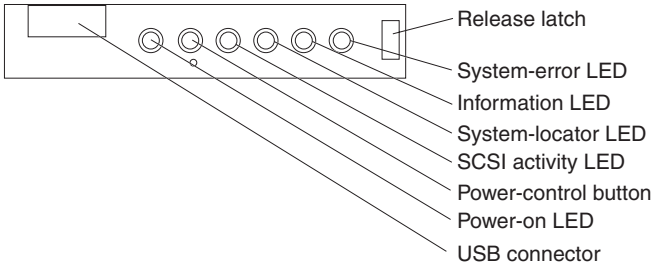


Rack release latches: Press these latches to release the server from the rack.

Hard disk drive activity LED: On some server models, each hot-swap hard disk drive has an activity LED. When this LED is flashing, it indicates that the drive is in use.

Hard disk drive status LED: On some server models, each hot-swap hard disk drive has a status LED. When this LED is lit, it indicates that the drive has failed. If an optional IBM ServeRAID™ controller is installed in the server, when this LED is flashing slowly (one flash per second), it indicates that the drive is being rebuilt. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.

Operator information panel: This panel contains controls, LEDs, and connectors. The following illustration shows the controls, LEDs, and connectors on the operator information panel.



The following controls, LEDs, and connectors are on the operator information panel:

- **Release latch:** Slide this latch to the left to access the light path diagnostics panel.
- **System-error LED:** When this LED is lit, it indicates that a system error has occurred. An LED on the light path diagnostics panel is also lit to help isolate the error.

- **Information LED:** When this LED is lit, it indicates that a noncritical event has occurred. An LED on the light path diagnostics panel is also lit to help isolate the error.
- **System-locator LED:** Use this LED to visually locate the server among other servers. You can use IBM Director to light this LED remotely.
- **SCSI activity LED:** When this LED is lit, it indicates that there is activity on the SCSI or IDE bus.
- **Power-control button:** Press this button to turn the server on and off manually. A power-control-button shield comes installed on the server to prevent the server from being turned off accidentally.
- **Power-on LED:** When this LED is lit and not flashing, it indicates that the server is turned on. When this LED is flashing, it indicates that the server is turned off and still connected to an ac power source. When this LED is off, it indicates that ac power is not present, or the power supply or the LED itself has failed.

  Note: If this LED is off, it does not mean that there is no electrical power in the server. The LED might be burned out. To remove all electrical power from the server, you must disconnect the power cord from the electrical outlet.
- **USB connector:** Connect a USB device to this connector.

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

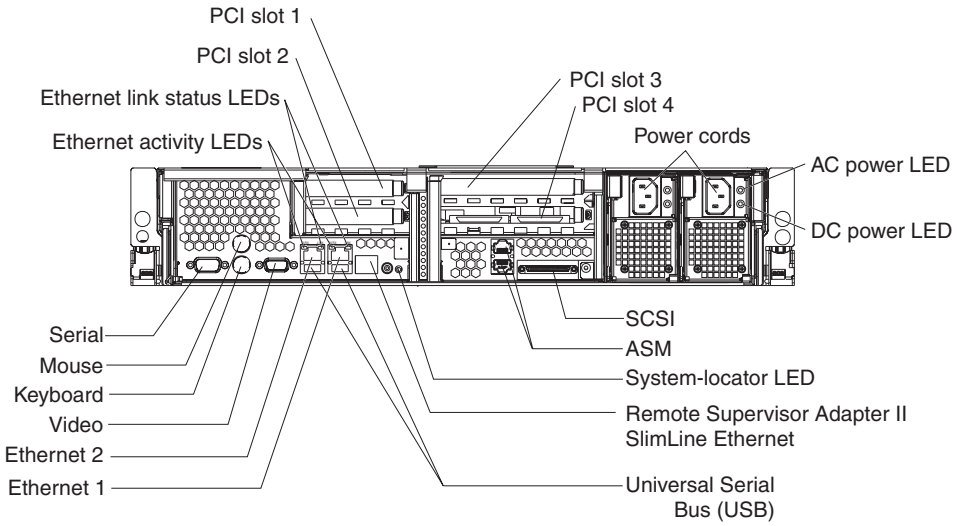
Diskette drive activity LED: When this LED is lit, it indicates that the diskette drive is in use.

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

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

Rear view

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



Ethernet link status LEDs: When these LEDs are lit, they indicate that there is an active link connection on the 10BASE-T, 100BASE-TX, or 1000BASE-TX interface for the Ethernet port.

Ethernet activity LEDs: When these LEDs are lit, they indicate that the server is transmitting to or receiving signals from the Ethernet LAN that is connected to the Ethernet port.

Ethernet 1 connector: Use this connector to connect the server to a network.

Ethernet 2 connector: Use this connector to connect the server to a network.

Remote Supervisor Adapter II SlimLine Ethernet connector: Use this connector to connect the server to a network for systems-management information control. This connector is active only if you have installed a Remote Supervisor Adapter II SlimLine.

Power-cord connectors: Connect the power cords to these connectors.

AC power LED: On some server models, each hot-swap power supply has an ac power LED and a dc power LED. During typical operation, both the ac and dc power LEDs are lit. For any other combination of LEDs, see “Power-supply LED errors” on page 99.

DC power LED: On some server models, each hot-swap power supply has a dc power LED and an ac power LED. During typical operation, both the ac and dc power LEDs are lit. For any other combination of LEDs, see “Power-supply LED errors” on page 99.

SCSI connector: Connect a SCSI device to this connector.

ASM connectors: Use either of these connectors to connect the server to an Integrated xSeries Adapter (IXA) that is installed in the server.

System-locator LED: Use this LED to visually locate the server among other servers. You can use IBM Director to light this LED remotely.

USB connectors: Connect USB devices to these connectors.

Video connector: Connect a monitor to this connector.

Mouse connector: Connect a mouse or other PS/2 device to this connector.

Keyboard connector: Connect a PS/2 keyboard to this connector.

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

Server power features

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

Turning on the server

Approximately 5 seconds after the server is connected to ac power, the power-control button becomes active, and you can turn on the server and start the operating system by pressing the power-control button.

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

- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If your operating system supports the systems-management software for an optional Remote Supervisor Adapter II SlimLine, the systems-management software can turn on the server.
- If your operating system supports the Wake on LAN feature, the Wake on LAN feature can turn on the server.

Note: When 4 GB or more of memory (physical or logical) is installed, some memory is reserved for various system resources and might be unavailable to the operating system. The amount of memory that is reserved for system resources depends on the operating system, the configuration of the server, and the configured PCI options.

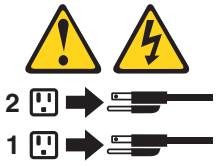
Turning off the server

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

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

Statement 5

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



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

- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if your operating system supports this feature.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- The service processor can turn off the server as an automatic response to a critical system failure.
- You can turn off the server through a request from the service processor.

Chapter 2. Configuring the server

Detailed information about configuring the server is in the IBM xSeries *User's Guide* on the IBM *Documentation* CD.

The latest information about these programs and the most recent device-driver files are available at http://www.ibm.com/support.

The following configuration programs and capabilities come with the server:

- **Configuration/Setup Utility**

  The Configuration/Setup Utility program is part of the basic input/output system (BIOS) code 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**

  The ServerGuide program 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, such as an integrated SCSI controller with RAID capabilities, and to simplify the installation of your operating system.

- **SCSISelect Utility program for Adaptec® HostRAID™ configuration**

  Use the SCSI HostRAID feature of the SCSISelect Utility program to configure the SCSI controller with integrated RAID and the devices that are attached to it.

- **Ethernet controller configuration**

  Use the Ethernet controller configuration program to configure the integrated Ethernet controllers.

- **Baseboard management controller utility programs**

  Use the baseboard management controller utility programs to configure the baseboard management controller. The programs also provide the capability to update the firmware and sensor data record/field replaceable unit (SDR/FRU) data and remotely manage a network.

- **SCSISelect Utility program**

  Use the SCSISelect Utility program to configure devices that are attached to the SCSI controller.

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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.

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 115 for more information.

General checkout

Follow the checkout procedure for diagnosing hardware problems. Review the following information before performing the checkout procedure:

- Read Appendix B, “Safety information,” on page 117.
- The server diagnostic programs are stored in upgradeable read-only memory (ROM) on the system board. These programs provide the primary methods of testing the major components of the server. If you are not sure whether a problem is caused by the hardware or by the software, you can run the diagnostic programs (see “Diagnostic programs and error messages” on page 14) to confirm that the hardware is working correctly.
- When you run the diagnostic programs, a single problem might cause several error messages. If you receive several error messages, correct the cause of the first error message. The other error messages might not occur the next time you run the diagnostic programs.
- Before running the diagnostic programs, you must determine whether the failing server is part of a shared hard disk drive cluster (two or more servers sharing external storage devices). If you suspect that it is part of a cluster, you can run all diagnostic programs except the ones that test the storage unit (that is, a hard disk drive in the storage unit) or the storage adapter that is attached to the storage unit. The failing server might be part of a cluster if any of the following conditions is true:
  - The customer identifies the failing server as part of a cluster.
  - One or more external storage units are attached to the failing server and at least one of the attached storage units is also attached to another server or unidentifiable device.
  - One or more servers are located near the failing server.
- **Important:**
  1. For servers that are part of a shared hard disk drive cluster, run one test at a time. Do not run any suite of tests, such as “quick” or “normal” tests, because this could enable the hard disk drive diagnostic tests.
  2. If more than one error code is displayed, correct the first error. The other error codes might not occur the next time you run the diagnostic programs.
  3. If the server is suspended and a POST error code is displayed, see “POST error logs” on page 13.
  4. If the server is suspended and no error message is displayed, see “Error symptoms” on page 90 and “Undetermined problems” on page 103.
  5. For information about power-supply problems, see “Power checkout” on page 19.
  6. For intermittent problems, check the error logs; see “Diagnostic programs and error messages” on page 14.

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Complete the following steps to perform the checkout 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 77.
7. Check the information LED panel system-error LED; if it is on, see “Light path diagnostics LEDs” on page 83.
8. Check the system-error log and base-board management controller (BMC) log. If the system recorded an error, see Chapter 6, “Symptom-to-FRU index,” on page 73
9. Start the diagnostic programs.
10. 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 73

YES. Run the diagnostic programs. If necessary, see “Diagnostic programs and error messages” on page 14.

If you receive an error, see Chapter 6, “Symptom-to-FRU index,” on page 73

If the diagnostic programs were completed successfully and you still suspect a problem, see “Undetermined problems” on page 103.

Diagnostic tools overview

The following tools are available to help you diagnose and solve hardware-related problems:

- **POST beep codes**

  The power-on self-test beep codes indicate the detection of a problem.

  – One beep indicates successful completion of POST, with no errors.

  – More than one beep indicates that POST detected a problem. Error messages also appear during startup if POST detects a hardware-configuration problem.

  See “POST error codes” on page 77 for a list of POST error codes.

- **Symptom-to-FRU index**

  This index list problem symptoms, error codes, and steps to correct the problems. See Chapter 6, “Symptom-to-FRU index,” on page 73 for more information.

- **Diagnostic programs and error messages**

The system diagnostic programs are provided in ROM. These programs test the major components of your server. See “Diagnostic programs and error messages” on page 14.

- **Light path diagnostics**

  Use light path diagnostics to diagnose system errors quickly. See “Light path diagnostics” on page 17 for more information.

POST error logs

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.

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

If POST detects a problem, more than one beep sounds, and an error message appears on your screen. See “Beep symptoms” on page 74 and “POST error codes” on page 77 for more information.

Notes:

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

The POST error log contains the three most recent error codes and messages that the system generated during POST. The system-error log or base-board management controller (BMC) 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 and BMC log from the Configuration/Setup Utility program or from the diagnostic programs.

Viewing error logs from the Configuration/Setup Utility program

To view 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 the server,” on page 9 for more information.

Viewing error logs from diagnostic programs

To view error logs from diagnostic programs, complete the following steps:

1. Start the diagnostic programs.
2. Select **Hardware Info** from the top of the diagnostic programs screen.
3. Select **System Error Log** or **BMC Log** from the list that appears; then, follow the instructions on the screen.

See “Starting the diagnostic programs” on page 15 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) DVD-ROM drive. • If the startup (boot) sequence settings have been altered, ensure that the DVD-ROM drive is first in the startup sequence. • If more than one DVD-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. • Ensure that the hard disk drive is connected properly.
The Operating System Installation program continuously loops.	Make more space available on the hard disk.
The ServerGuide program will not start your NOS CD.	Ensure that the ServerGuide program supports the NOS CD you have. 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 your server supports the NOS. 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 “SCSI error codes” on page 99.

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 in upgradeable read-only memory (ROM) on the system board. 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.

Error codes that might be displayed are listed at “Diagnostic error codes” on page 85.

Notes:

1. Depending on the server configuration, some of the error codes might not appear when you run the diagnostic programs.
2. If diagnostic error codes appear that are not listed in the tables, make sure that the server has the latest levels of BIOS, service processor, and ServeRAID code installed.

Diagnostic text message format

The diagnostic text message format is as follows:

result test_specific_string

where:

result is one of the following results:

Passed
This test was completed without any errors.

Failed
This test discovered an error.

User Aborted
You stopped the test before it was completed.

Not Applicable
You attempted to test a device that is not present in the server.

Aborted
The test could not proceed because of the server configuration.

Warning
A hardware failure did not occur; the test could not be run because of some other problem (for example, there might be a configuration problem, the hardware is missing or is not being recognized, or there is a hardware problem that is not related to the hardware currently being tested).

test_specific_string
is an error code or other information about the error.

Starting the diagnostic programs

Complete the following steps to start the diagnostic programs:

1. Turn on the server, and watch the screen.

   Note: To run the diagnostic programs, you must start the server with the highest level password that is set. That is, if an administrator password is set, you must enter the administrator password, not the power-on password, to run the diagnostic programs.
2. When the message `F2 for Diagnostics` appears, press F2.
3. Type the appropriate password; then, press Enter.
4. Select either **Extended** or **Basic** from the top of the screen.
5. When the diagnostic programs screen appears, select the test you want to run from the list that appears; then, follow the instructions on the screen.

   Notes:

   a. You can press F1 while running the diagnostic programs to obtain help information. You also can press F1 from within a help screen to obtain online documentation from which you can select different categories. To exit from the help information and return to where you left off, press Esc.

   b. If the server stops during testing and you cannot continue, restart the server and try running the diagnostic programs again. If the problem remains, replace the component that was being tested when the server stopped.

   c. The keyboard and mouse (pointing device) tests assume that a keyboard and mouse are attached to the server.

d. If you run the diagnostic programs with either no mouse or a USB mouse attached to your server, you will not be able to navigate between test categories using the **Next Cat** and **Prev Cat** buttons. All other functions provided by mouse-selectable buttons are also available using the function keys.

e. You can test the USB keyboard by using the regular keyboard test. The regular mouse test can test a USB mouse. Also, you can run the USB interface test only if there are no USB devices attached.

f. You can view server configuration information (such as system configuration, memory contents, interrupt request (IRQ) use, direct memory access (DMA) use, device drivers, and so on) by selecting **Hardware Info** from the top of the screen.

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

Viewing the test log

When the tests are completed, you can view the test log by selecting **Utility** from the top of the screen and then selecting **View Test Log**. You can save the test log to a file on a diskette or to the hard disk.

The test-log data is maintained only while the diagnostic programs are active. When you exit from the diagnostic programs, the test log is cleared (saved test logs are not affected). To save the test log to a file on a diskette or to the hard disk so that you can view it later, click **Save Log** on the diagnostic programs screen and specify a location and name for the saved log file.

Note: To save the test log to a diskette, you must use a diskette that you have formatted yourself; this function does not work with preformatted diskettes. If the diskette has sufficient space for the test log, the diskette may contain other data.

Viewing the system-error log or BMC log

You can also view the system-error log and BMC log from the diagnostic programs. See the instructions in “Viewing error logs from diagnostic programs” on page 13.

Identifying problems using status LEDs

If the system-error LED on the front of the server is on, one or more LEDs inside the server or on the power supply will be on. Your server has LEDs to help you identify problems with some server components. These LEDs are part of the light path diagnostics feature built into the server. By following the path of lights, you can quickly identify the type of system error that occurred.

Your server is designed so that any LEDs that are lit remain lit when the server shuts down as long as the ac power source is good and the power supply can supply +5 V dc current to the server. This feature helps you isolate the problem if an error causes the server to shut down. See “Diagnosing problems using light path diagnostics” on page 18.

Power-on password override

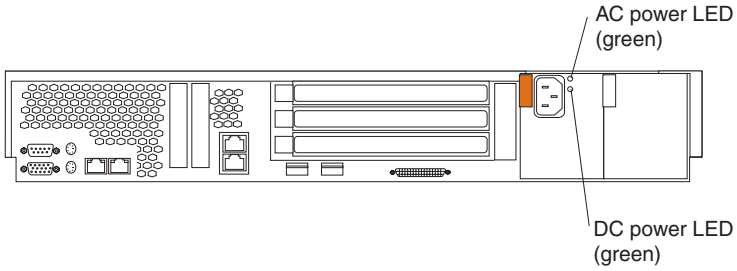
Power-on password override. Changing the position of this switch bypasses the power-on password check the next time the server is turned on and starts the

Configuration/Setup Utility program so that you can change or delete the power-on password. You do not have to move the switch back to the default position after the password is overridden.

Changing the position of this switch does not affect the administrator password.

Power supply LEDs

The ac and dc power LEDs on the power supply provide status information about the power supply. The following illustration shows the location of the ac and dc power LEDs.

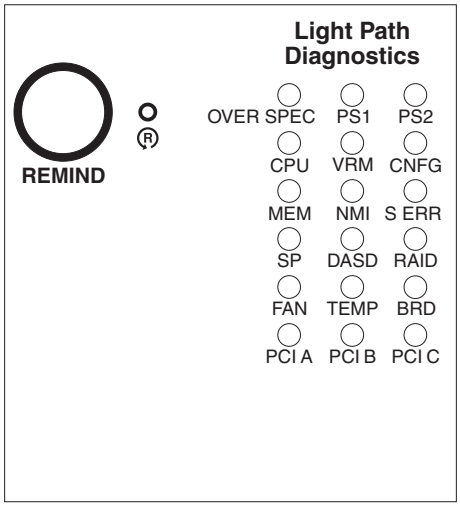


For more information about power supply LEDs, see “Power-supply LED errors” on page 99.

Light path diagnostics

Use light path diagnostics to diagnose system errors. The light path diagnostics panel is inside the light path diagnostics drawer, on the right front of the server. To access the light path diagnostics panel, slide the latch to the left on the front of the light path diagnostics drawer.

The following illustration shows the controls and LEDs on the light path diagnostics panel.



To acknowledge a system error but not take immediate action, press the remind button and place light path diagnostics in remind mode. When the server is in remind mode, the system-error LED on the front of the server flashes. If a new failure occurs, the system-error LED is lit again.

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

The server is designed so that LEDs remain lit when the server is connected to an ac power source but is not turned on, provided that the power supply is operating correctly. This feature helps you to isolate the problem when the operating system is shut down.

Diagnosing problems using light path diagnostics

LEDs in two locations on the server are available to help you diagnose problems that might occur during installation. Use them in the following order:

1. **Light path diagnostics panel** – Look at this panel first. If a system error has occurred, the system-error LED on the front of the light path diagnostics drawer is lit. Slide the latch to the left on the front of the light path diagnostics drawer to access the light path diagnostics panel. Note any LEDs that are lit, and then close the drawer.
2. **LEDs on the system board** – To identify the component that is causing the error, note the lit LED on or beside the component.

Light path diagnostics LEDs

For a complete list of the LEDs on the light path diagnostics panel, the problems they indicate, and actions to solve the problems see “Light path diagnostics LEDs” on page 83.

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 recovery diskette.

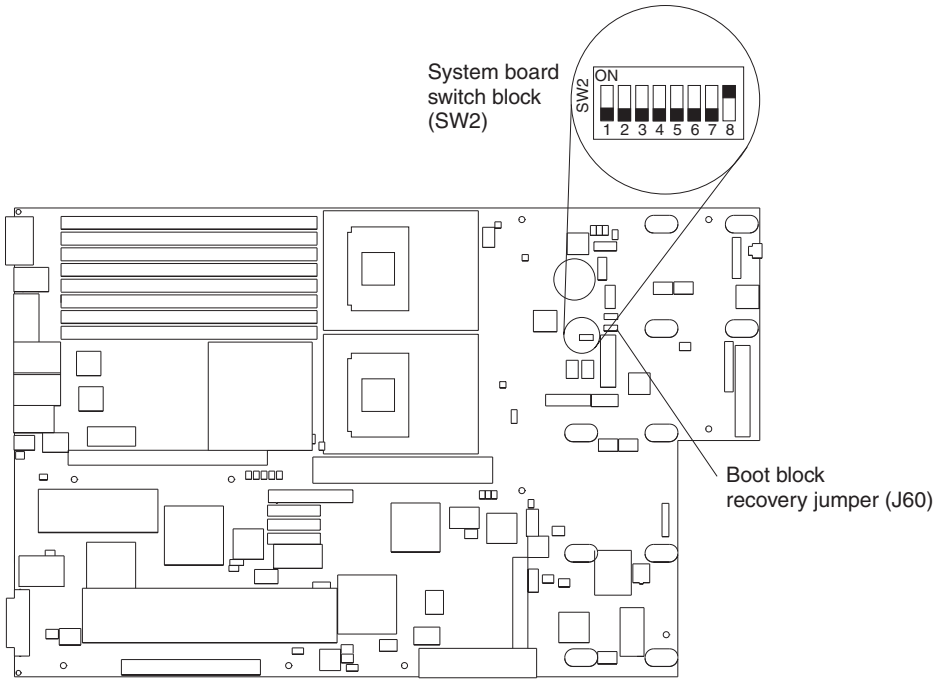
Note: You can obtain a BIOS recovery diskette from one of the following sources:

- Use the *ServerGuide Setup and Installation* CD to make a BIOS recovery diskette.
- Download a BIOS recovery diskette from the World Wide Web. Go to http://www.ibm.com/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 recovery diskette. The recovery utility recovers the system BIOS code from the BIOS recovery files on the diskette.

Complete the following steps to recover the BIOS code:

1. Turn off the server, and disconnect all power cords and external cables.
2. Remove the server cover. See “Removing the cover” on page 28 for more information.
3. Locate the flash boot block recovery jumper block (J60) on the system board.



4. Move the jumper from pins 1 and 2 to pins 2 and 3 to enable the BIOS recovery mode.
5. Insert the BIOS recovery diskette into the diskette drive.
6. Reinstall the server cover; then, reconnect all power cords.
7. Restart the server. The system begins the power-on self test (POST).
8. Select **1 - Update POST/BIOS** from the menu that contains various flash update options.
9. When prompted as to whether you want to save the current code to a diskette, press **N**.
10. When prompted to choose a language, select a language (from 0 to 7), and press **Enter** to accept your choice.
11. Remove the BIOS recovery 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 server starts up normally.

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 104).
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 104). For specific problems, see “Power-supply LED errors” on page 99.

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 rear of the server.

  These LEDs indicate whether there is a problem with the connector, cable, or hub:
  - The Ethernet transmit/receive activity LED, on the rear of the server, 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 the server.
- Check for operating-system-specific causes for the problem.
- Make sure that the device drivers on the client and server are using the same protocol.
- Test the Ethernet controller.

  The way 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.

Description	FRU/action
The server stops running when loading device drivers.	The PCI BIOS interrupt settings are incorrect. • Determine whether the interrupt (IRQ) setting that is assigned to the Ethernet controller is also assigned to another device in the Configuration/Setup Utility program. 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. • Make sure that you are using the most recent device driver that is available from the World Wide Web. • Reseat or replace the adapter.
The Ethernet link status LED does not work.	• Make sure that the hub is turned on. • Check all connections at the Ethernet controller and the hub. • Use another port on the hub. • If the hub does not support auto-negotiation, manually configure the Ethernet controller to match the hub. • If you manually configured the Duplex mode, make sure that you also manually configure the speed. • Reseat or replace the adapter.
The Ethernet transmit/receive activity LED does not work.	• Make sure that you have installed the network device drivers. • The network might be idle. Try sending data from this server.
Data is incorrect or sporadic.	• Make sure that you are using Category 5 or higher cabling when operating the server at 100 Mbps or at 1000 Mbps. • 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.	• Make sure that the cable is connected to the Ethernet controller. • Make sure that the PCI system BIOS code is current. • Reseat the adapter. • Determine whether the interrupt (IRQ) setting that is assigned to the Ethernet adapter is also assigned to another device in the system. Use the Configuration/Setup Utility program to determine whether this is the case. 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 that is assigned to the Ethernet adapter or the other device. • Reseat or replace the adapter.
The Ethernet controller stopped working without apparent cause.	• Run diagnostics for the Ethernet controller. • Try a different connector on the hub. • Reinstall the device drivers. See the operating-system documentation and the ServerGuide information. • Reseat or replace the adapter.

Ethernet controller messages

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

Chapter 4. Installing options

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

Note: For a complete list of customer replaceable units (CRUs), see “System” on page 108.

Installation guidelines

Before you begin installing options, read the following information:

- Read the safety information beginning on page Appendix B, “Safety information,” on page 117 and the guidelines in “Handling electrostatic discharge-sensitive devices” on page 120 This information will help you work safely with the server and options.
- Make sure that you have an adequate number of properly grounded electrical outlets for your server, monitor, and other devices.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- You do not have to turn off the server to install or replace hot-swap power supplies, hot-swap fans, or hot-plug Universal Serial Bus (USB) devices.

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- Blue on a component indicates touch points, were you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- For a list of supported options for the server, go to http://www.ibm.com/servers/eserver/serverproven/compat/us/ .

System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- Each of the power-supply bays has a power supply or power-supply blank installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap drive within 2 minutes of removal.
- You do not remove the air baffle while the server is running. Operating the server without the air baffle might cause the microprocessor to overheat.
- Microprocessor socket 2 always contains either a microprocessor baffle or a microprocessor and heat sink.

Working inside the server with the power on

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

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

Handling static-sensitive devices

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

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

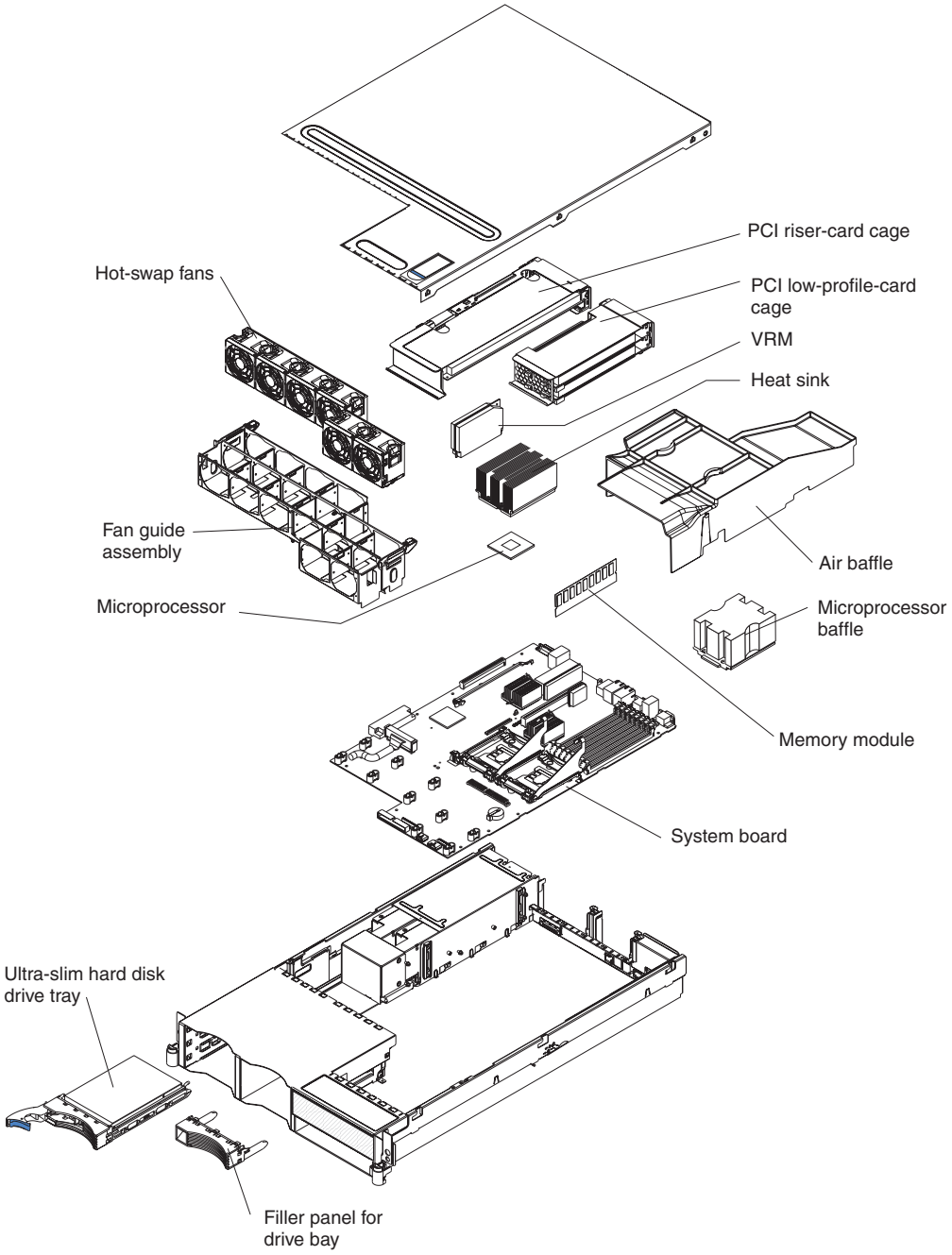
- Limit your movement. Movement can cause static electricity to build up around you.
- Wear an electrostatic-discharge wrist strap, if one is available.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave 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 it down. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the server cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Major components of the xSeries 346 Type 8640 server

Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.

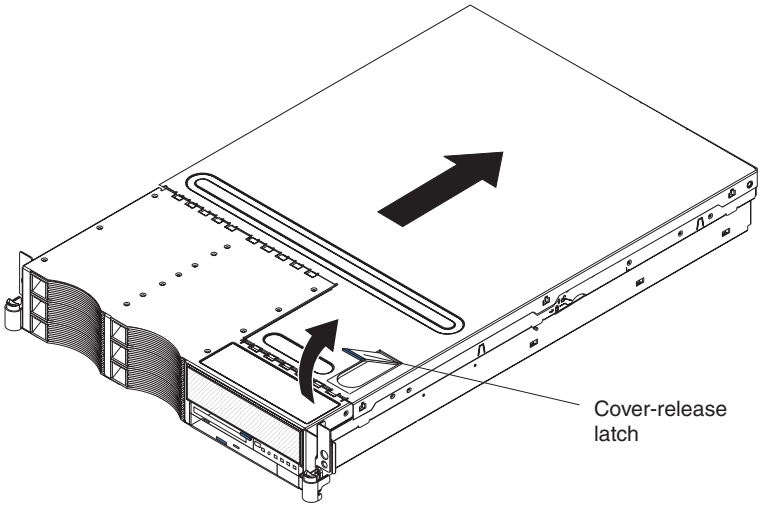
Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.

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



Removing the cover

The following illustration shows how to remove the cover.



Complete the following steps to remove the top cover:

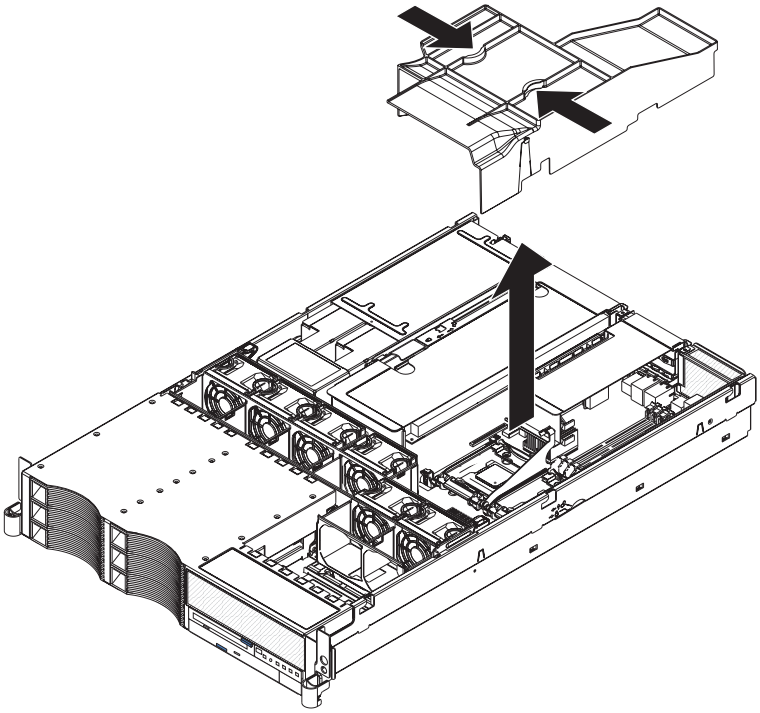
1. Read the safety in formation beginning on page Appendix B, “Safety information,” on page 117 and “Installation guidelines” on page 23.
2. If you are planning to install or remove a microprocessor, memory module, PCI adapter, or battery, turn off the server and all attached devices and disconnect all external cables and power cords (see “Turning off the server” on page 7).
3. Press down on the left and right side latches and pull the server out of the rack enclosure until both slide rails lock.

   Note: You can reach the cables on the back of the server when the server is in the locked position.
4. Lift the cover-release latch. Lift the cover off the server and set the cover aside.

   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 air baffle

When working with some options, you must first remove the air baffle to access certain components or connectors on the system board. The following illustration shows how to remove the air baffle.



Complete the following steps to remove the air baffle:

1. Read the safety information beginning on page Appendix B, “Safety information,” on page 117 and “Installation guidelines” on page 23.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables (see “Turning off the server” on page 7); then, remove the cover (see “Removing the cover” on page 28).
3. Place your fingers into the two handles on the top of the air baffle.
4. Press the handles and lift the air baffle out of the server.

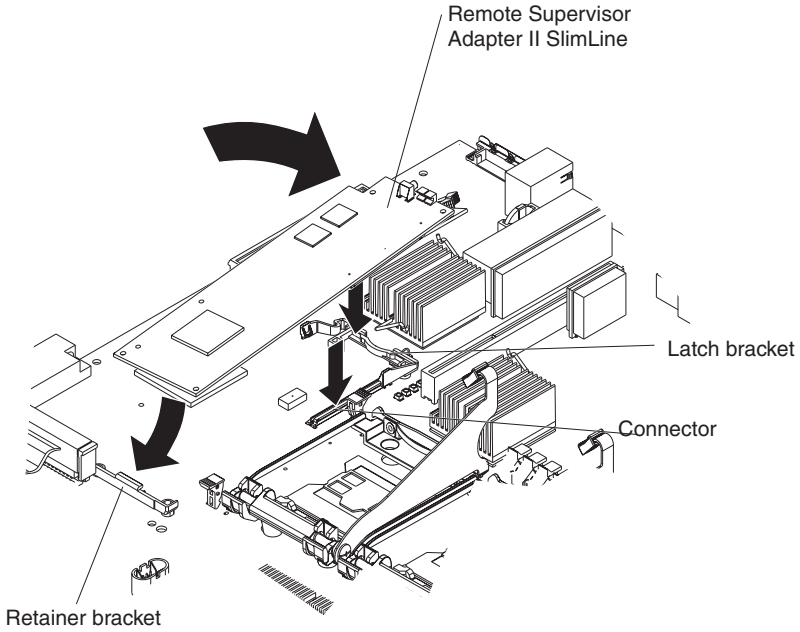
   Attention: For proper cooling and airflow, replace the air baffle before turning on the server. Operating the server with the air baffle removed might damage server components.

Working with adapters

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

Before you install an adapter, review the following information:

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you need to change the switch or jumper settings on the adapter, follow the instructions that come with the adapter.
- You can install only low-profile adapters in slots 1 and 2 on the PCI low-profile card.
- You can install standard full-length adapters in slots 3 and 4 on the PCI riser card.
- Your server supports only 3.3 V and universal PCI adapters.
- The PCI bus configuration is as follows:
  - Non-hot-plug, 64-bit PCI-X slots 1 through 2 (PCI bus A, 100 MHz)
  - Non-hot-plug, 64-bit PCI-X slot 3 (PCI bus B, 133 MHz)
  - Non-hot-plug, 64-bit PCI-X slot 4 (PCI bus C, 133 MHz)
- The system scans devices in the following order, if you have not changed the default boot precedence: integrated Ethernet controllers, integrated SCSI controller (SCSI channel B, then SCSI channel A), and then PCI and PCI-X slots 1, 2, 3, and 4.
- The optional Remote Supervisor Adapter II SlimLine can be installed only in a dedicated slot on the system board. For details about installing a Remote Supervisor Adapter II SlimLine, see the documentation that comes with the adapter. The following illustration shows how to install the Remote Supervisor Adapter II SlimLine.

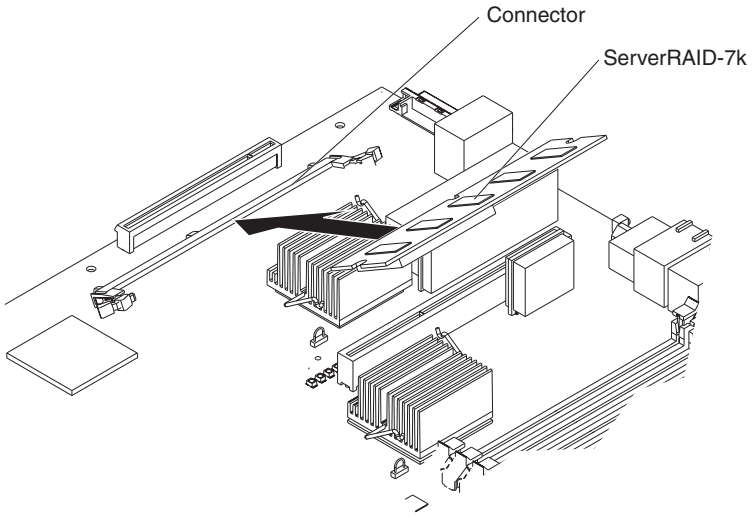


Slip the free end of the card under the tab on the retainer bracket; then, press the card in the connector and make sure that all tabs on the latch bracket secure the card in place.

- If you are installing an optional ServeRAID-7k, review the following information:
  - No rerouting of the internal SCSI cable is required if you are installing the ServeRAID-7k.
  - The ServeRAID-7k can be installed only in a dedicated slot on the system board.

    Attention: To avoid breaking the retaining clips or damaging the connectors, handle the clips gently.

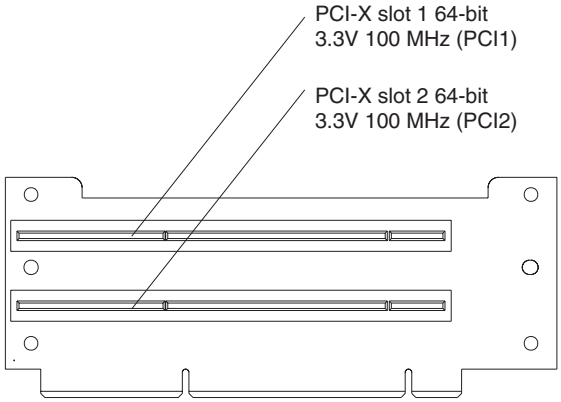
  The following illustration shows how to install the ServeRAID-7k.



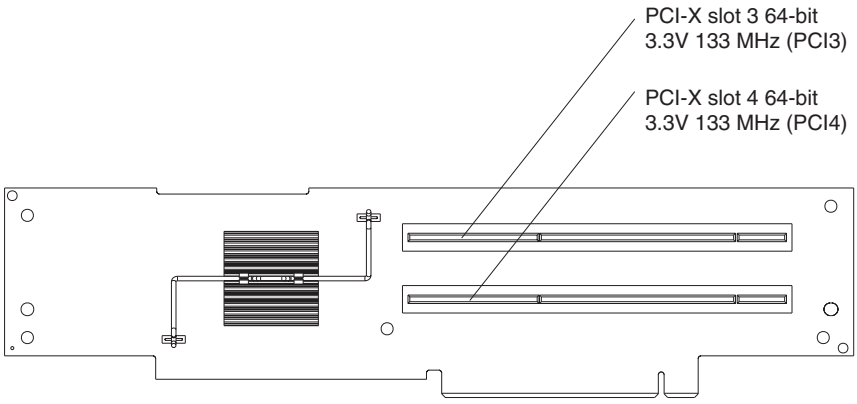
Note: If there is a gap between the card and the retaining clips, the card has not been properly installed. In this case, open the retaining clips and remove the card; then, reinsert the card.

The following illustrations show the location of the PCI and PCI-X adapter expansion slots on the PCI low-profile card and PCI riser card.

PCI low-profile card

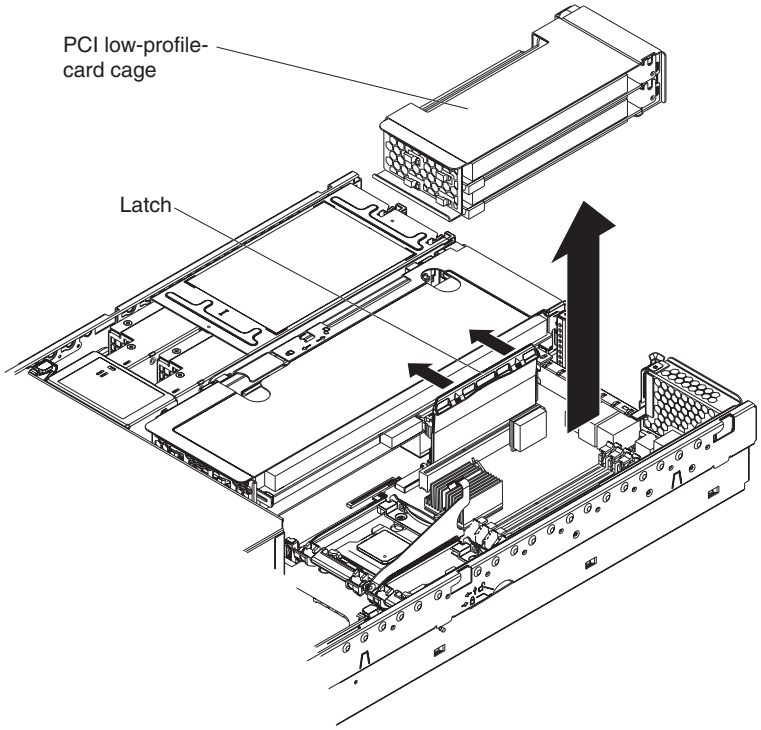


PCI riser card

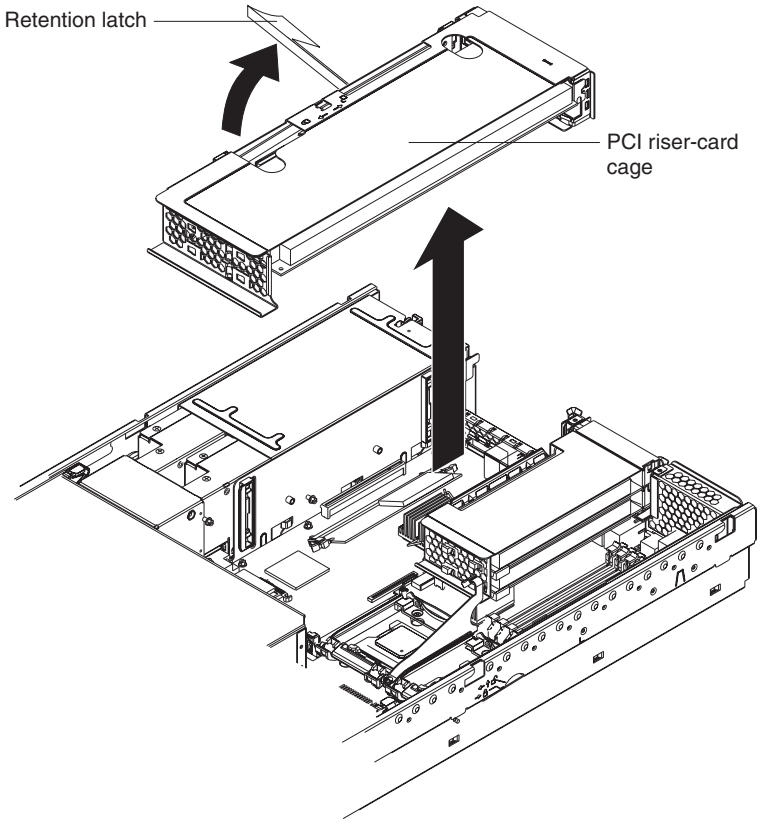


Complete the following steps to install an adapter:

1. Read the safety information beginning on page Appendix B, “Safety information,” on page 117 and “Installation guidelines” on page 23.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables (see “Turning off the server” on page 7); then, remove the cover (see “Removing the cover” on page 28).
3. Determine which expansion slot you will use for the adapter.
4. If you are installing an adapter in PCI slot 1 or 2, remove the PCI low-profile-card cage.

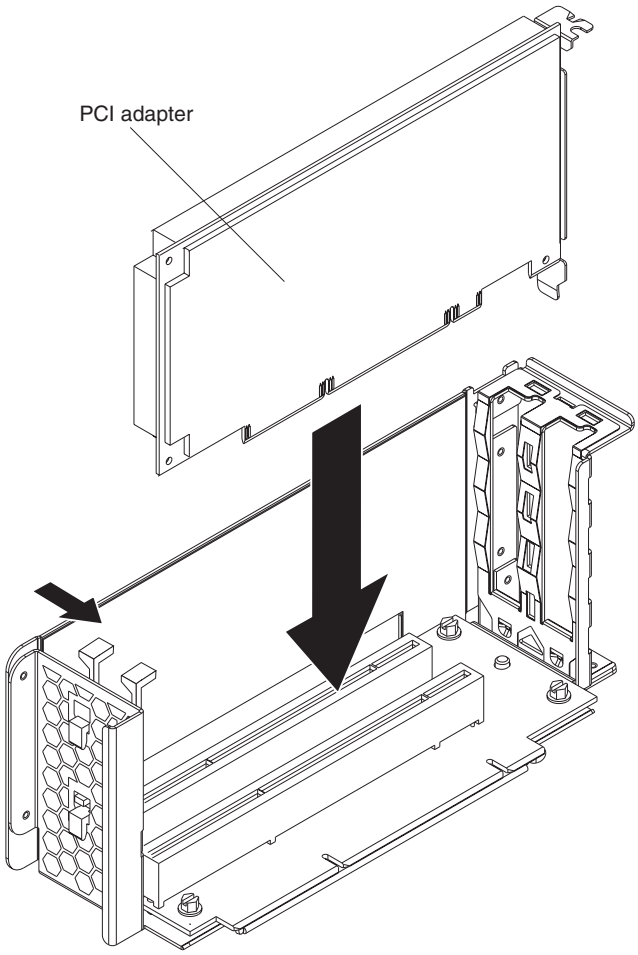


If you are installing an adapter in PCI slot 3 or 4, remove the PCI riser-card cage.

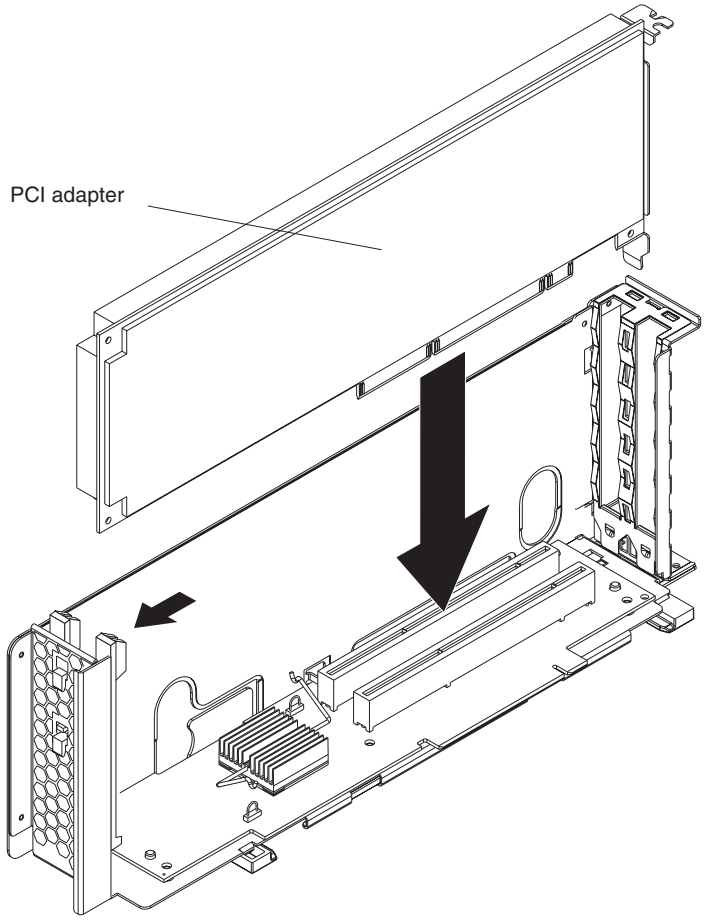


5. Slide the expansion-slot cover out of the PCI low-profile-card cage or PCI riser-card cage.

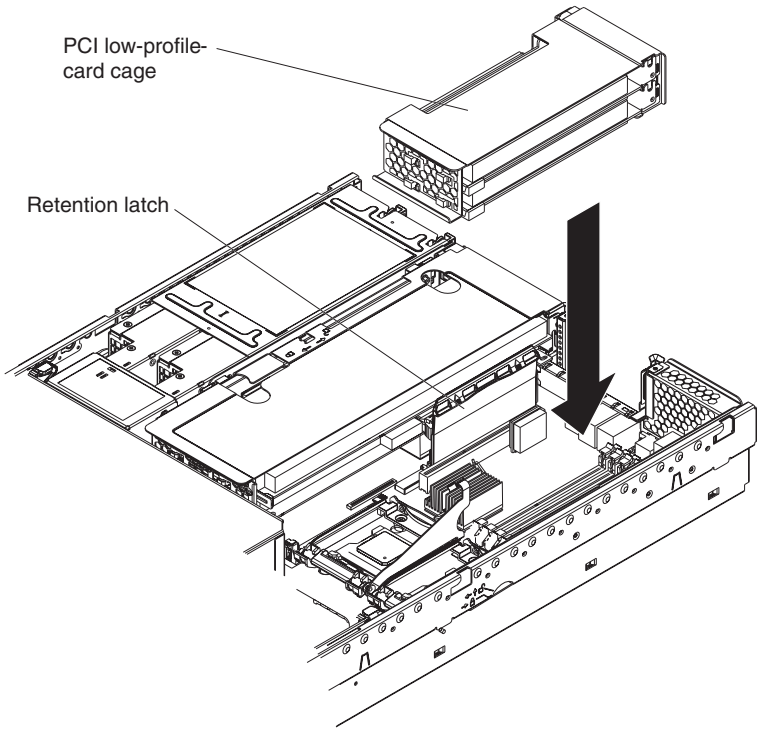
6. Install the adapter. The following illustration shows how to install an adapter in the PCI low-profile-card cage.



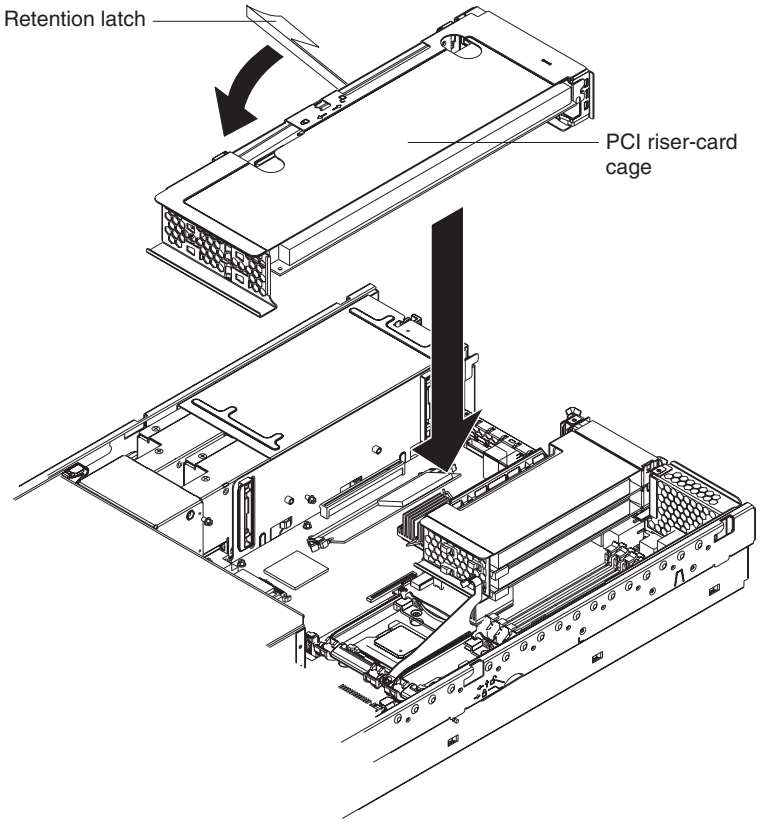
The following illustration shows how to install an adapter in the PCI riser-card cage.



7. If you removed the PCI low-profile-card cage to install the adapter, press the PCI low-profile-card cage *firmly* into the connector until the retention latch locks.



If you removed the PCI riser-card cage to install the adapter, press the PCI riser-card cage *firmly* into the connector and close the latch.



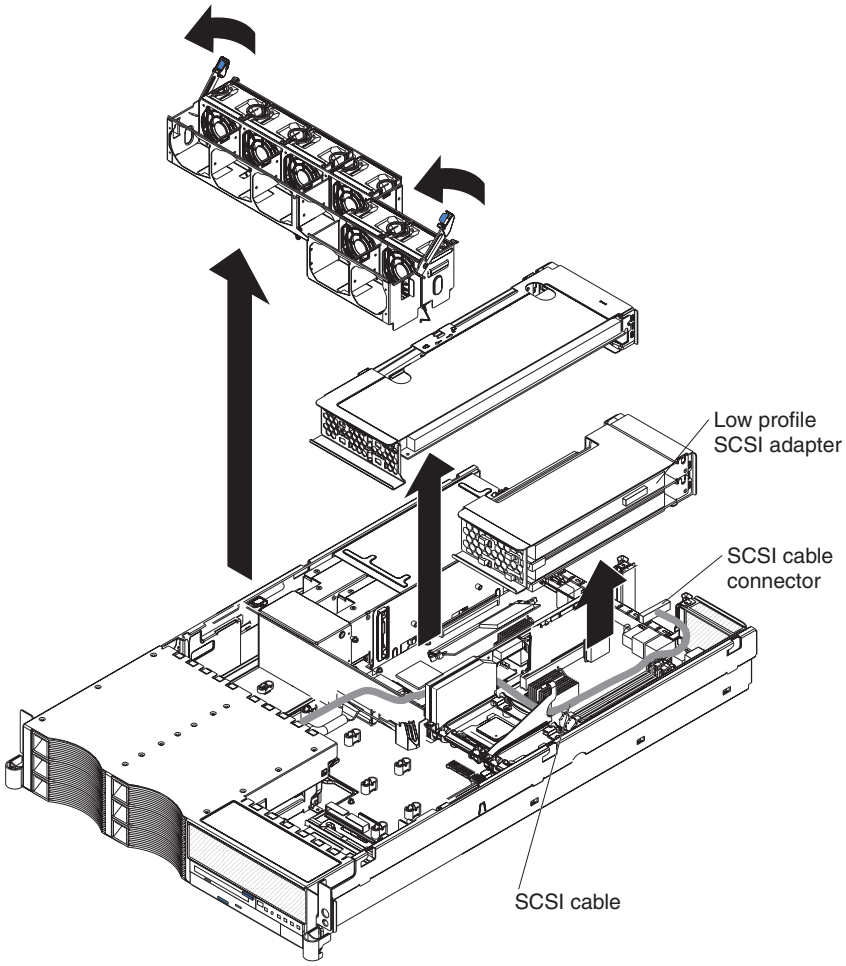
8. Connect any needed cables to the adapter.

Attention:

- When you route cables, do not block any connectors or the ventilated space around any of the fans.
- Make sure that cables are not routed on top of components under the PCI riser-card cage or the PCI low-profile-card cage.
- Make sure that cables are not pinched by the server components.

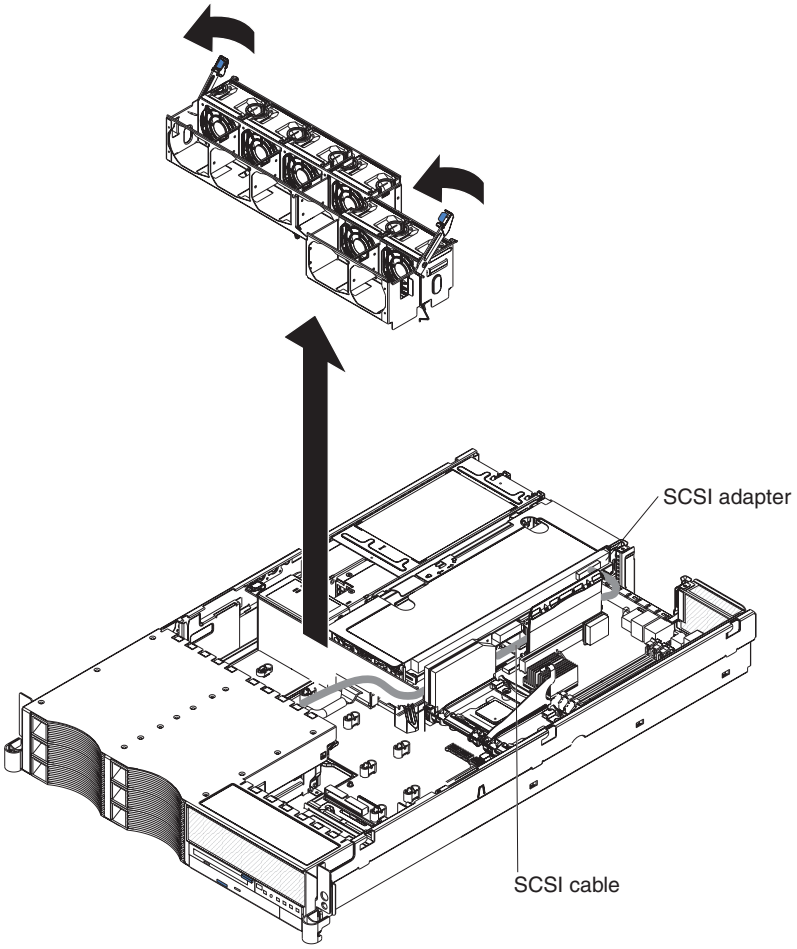
The following illustration shows the cable routing for an adapter installed in the PCI low-profile-card cage.

Note: Remove the PCI riser-card cage, the PCI low-profile card cage, and the fan bracket before you route the cables. Reinstall the components when you complete the cable routing.



The following illustration shows the cable routing for an adapter installed in the PCI riser-card cage.

Note: Remove the fan bracket before you route the cables. Reinstall the fan bracket when you complete the cable routing.



9. Perform any configuration tasks that are required for the adapter.

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

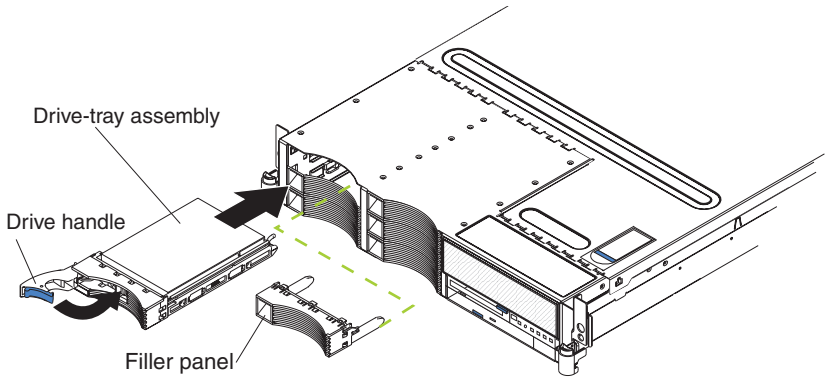
If you have other options to install or remove, do so now. Otherwise, go to "Completing the installation" on page 51.

Installing a hot-swap drive

The following notes describe the type of hard disk drive that the server supports and other information that you must consider when installing a hard disk drive:

- The server supports six 1-inch (26 mm) slim, 3.5-inch low-voltage differential (LVD) hard disk drives installed on Ultra-Slim hard disk drive trays. For a list of supported hard disk drives, go to the ServerProven Web site at http://www.ibm.com/servers/eserver/serverproven/compat/us/ .
- All hot-swap drives in the server should have the same throughput speed rating. Mixing hard disk drives with different speed ratings will cause all drives to operate at the lower throughput speed.
- The SCSI ID that is assigned to each bay is printed on the server front.

The following illustration shows how to install a hot-swap hard disk drive.



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

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

1. Read the safety information beginning on page Appendix B, “Safety information,” on page 117 and “Installation guidelines” on page 23.
2. Remove the filler panel from one of the empty hot-swap bays by inserting your finger into the depression at the left side of the filler panel and pulling it away from the server.
3. Install the hard disk drive in the hot-swap bay:
   a. Make sure that the tray handle is open (that is, perpendicular to the drive).
   b. Align the drive assembly with the guide rails in the bay.
   c. Gently push the drive assembly into the bay until the drive stops.
   d. Push the tray handle to the closed (locked) position.
   e. Check the hard disk drive status LED to verify that the hard disk drive is operating properly.

      If the amber hard disk drive status LED for a drive is lit continuously, that drive is faulty and must be replaced. If the green hard disk drive activity LED is flashing, the drive is being accessed.

   Note: If you have a RAID configuration using the integrated SCSI controller with RAID capabilities, or if the server has a RAID adapter installed, you might have to reconfigure the disk arrays after installing hard disk drives. See the RAID documentation on the IBM *xSeries Documentation* CD for information about RAID adapters.

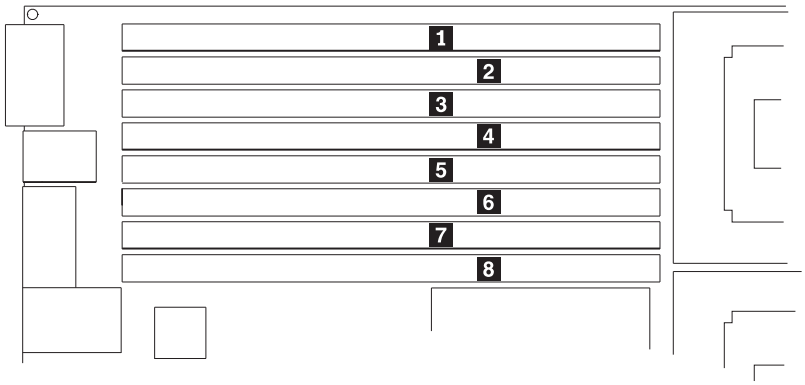
Installing memory modules

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

- The server supports 256 MB, 512 MB, 1 GB, and 2 GB DIMMs, for a maximum of 16 GB of system memory. The server supports up to eight 1.8 V, 240-pin, PC2-3200, ECC DDR II SDRAM, 200 MHz DIMMs. Go to the ServerProven® list at http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of memory modules that you can use with the server.
- The server comes with a minimum of two 256 MB DIMMs, installed in slots 1 and 2. When installing additional DIMMs, you must install two DIMMS at a time, in the order shown in the following table, to maintain performance.

Table 3. DIMM installation sequence

Pair	DIMM connectors
1	1 and 2
2	3 and 4
3	5 and 6
4	7 and 8



- Each DIMM in a pair must be the same size and technology to ensure that the server will operate properly.
- You can configure the server to use memory mirroring. Memory mirroring stores data in two pairs of DIMMs simultaneously. Memory mirroring reduces the amount of available memory. Enable memory mirroring through the Configuration/Setup Utility program. See the *User's Guide* on the IBM *xSeries Documentation* CD for details about enabling memory mirroring.

  When using memory mirroring, you must install two pairs of DIMMs at a time. The four DIMMs in each group must be identical. See Table 4 for the DIMM connectors that are in each group.

Table 4. Memory mirroring DIMM installation sequence

Group	DIMM connectors
1	1, 2, 3, and 4
2	5, 6, 7, and 8

- The server supports online-spare memory. This feature disables the failed memory from the system configuration and activates an online-spare memory pair of DIMMs to replace the failed active DIMM pair. Online-spare memory reduces the amount of available memory. Before you can enable this feature, you must install one additional pair of DIMMs. The online-spare memory DIMM pair must be the same speed, type, and the same size, or larger, than the active DIMM pair.

  Enable online-spare memory through the Configuration/Setup Utility program. The BIOS code assigns the online-spare memory DIMM pair according to your DIMM configuration. See the *User's Guide* on the IBM *xSeries Documentation* CD for information about enabling online-spare memory. See Table 5 for the online-spare memory DIMM connector assignments.

Table 5. Online-spare memory DIMM connector assignments

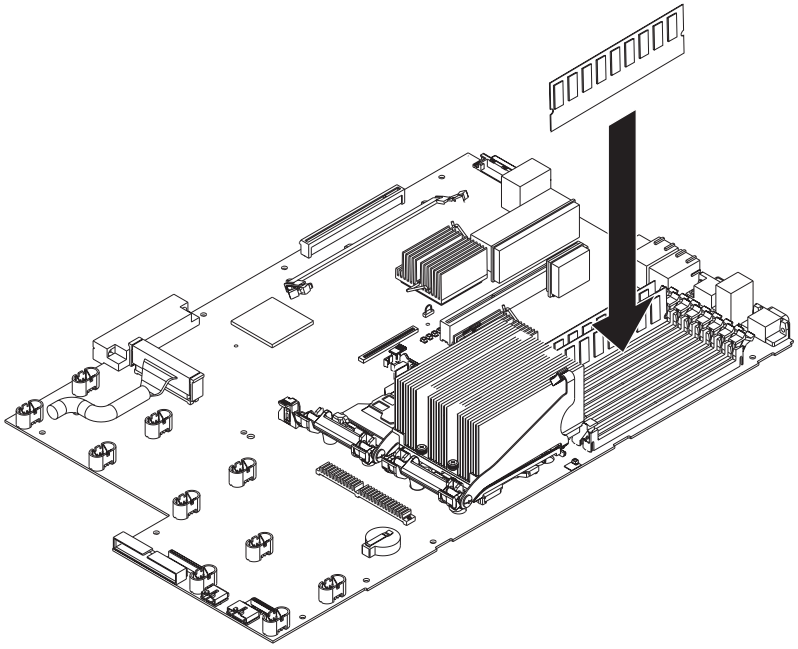
Active DIMM connectors	Online-spare memory DIMM connectors
1 and 2	3 and 4

Table 5. Online-spare memory DIMM connector assignments (continued)

Active DIMM connectors	Online-spare memory DIMM connectors
1 and 2 3 and 4	5 and 6
1 and 2 3 and 4 5 and 6	7 and 8

- You can enable either online-spare memory or memory mirroring, but not both at the same time.
- When you install or remove DIMMs, the server configuration information changes. When you restart the server, the system displays a message indicating that the memory configuration has changed.

The following illustration shows how to install DIMMs on the system board.



Complete the following steps to install a DIMM:

1. Read the “Installation guidelines” on page 23.and the safety information beginning on page Appendix B, “Safety information,” on page 117.
2. Turn off the server and disconnect all power cords and external cables (see “Turning off the server” on page 7); then, remove the server cover (see “Removing the cover” on page 28).
3. Remove the air baffle (see “Removing the air baffle” on page 29).
4. Locate the DIMM connectors on the system board and determine the connectors into which you will install the DIMMs.
5. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.
6. Complete the following steps to install the DIMM. Repeat these steps for each DIMM that you install.
   a. Turn the DIMM so that the DIMM keys align correctly with the connector on the system board.

Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.

b. If the retaining clips are closed, open them; then, insert the DIMM by pressing the DIMM straight into the connector. Make sure that the retaining clips snap into the closed position.

Note: If there is a gap 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.

7. Install the air baffle over the system board.

If you have other options to install or remove, do so now. Otherwise, go to "Completing the installation" on page 51.

Installing a microprocessor

The following notes describe the type of microprocessor that the server supports and other information that you must consider when installing a microprocessor:

- The server supports up to two microprocessors. With two microprocessors, the server can operate as a symmetric multiprocessing (SMP) server. With SMP, certain operating systems and application programs can distribute the processing load between the microprocessors. If the server comes with one microprocessor, you can install a second microprocessor.
- You might have to update the BIOS code. Be sure to read the documentation that comes with the microprocessor, so that you can determine whether you have to update the BIOS code. You can download the latest level of BIOS code and many other code updates for your server at http://www.ibm.com/support/.
- (Optional) Obtain an SMP-capable operating system. For a list of supported operating systems and other options, go to http://www.ibm.com/servers/eserver/serverproven/compat/us/.
- To order additional microprocessor options, contact your IBM marketing representative or authorized reseller.
- When you install an additional microprocessor in socket J23, you must also install the voltage regulator module (VRM) that comes with the microprocessor in VRM connector J72.
- The microprocessor speeds are automatically set for this server; therefore, you do not have to set any microprocessor frequency-selection jumpers or switches.
- If you have to replace a microprocessor, call for service.
- If the thermal-grease protective cover (for example, a plastic cap or tape liner) is removed from the heat sink or fan sink, do not touch the thermal grease on the bottom of the heat sink or fan sink or set down the heat sink or fan sink.

  Note: Removing the heat sink or fan sink from the microprocessor destroys the even distribution of the thermal grease and requires replacing the thermal grease. Setting down the heat sink or fan sink onto any surface when the thermal-grease protective cover is removed will contaminate the thermal grease. If the thermal grease becomes contaminated with particles, it must be replaced.

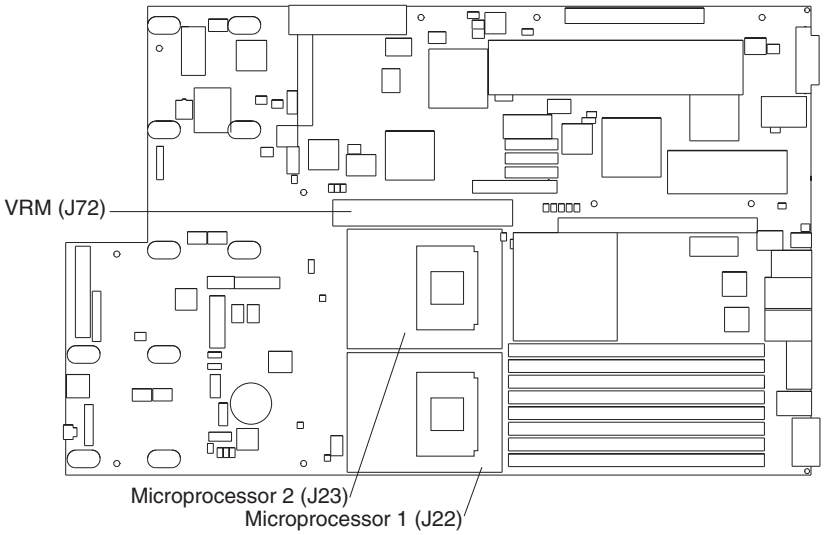
  For information about replacing contaminated thermal grease on the heat sink or fan sink, contact IBM Services. For support phone numbers, go to http://www.ibm.com/planetwide/, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

  Have the following information ready when you call:

  – Machine type and model

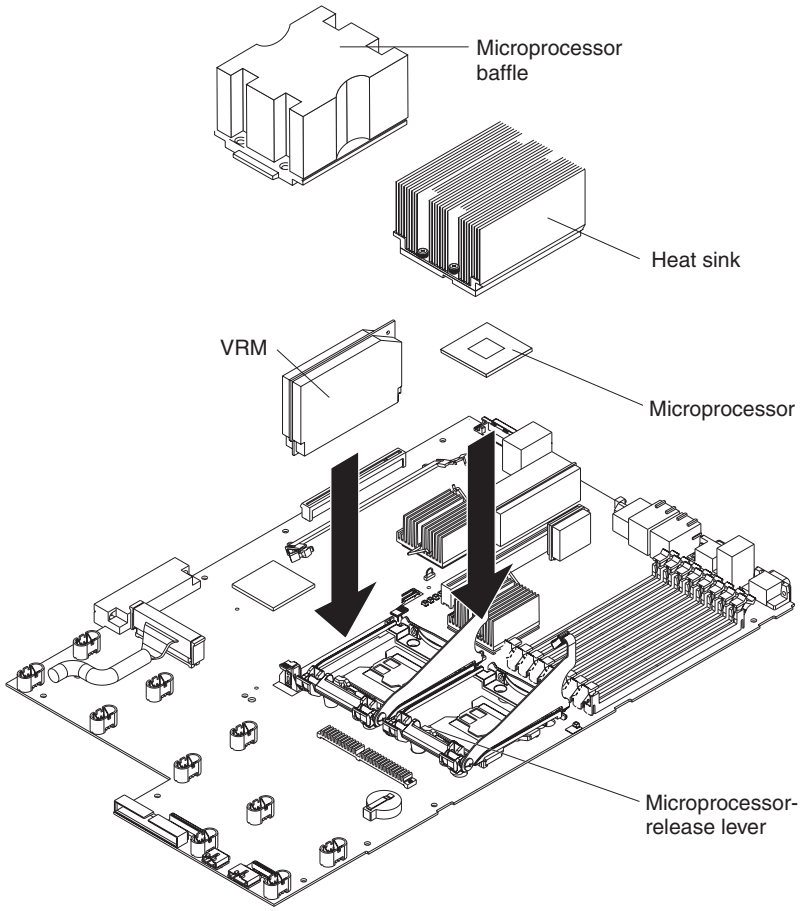
  - Serial number of your server or computer
- Do not remove the first microprocessor from the system board to install the second microprocessor.

The following illustration is a simplified layout of the microprocessor connector locations and other microprocessor-related components on the system board.



Note: For additional illustrations of the system-board components, see “System-board option connectors” on page 66.

The following illustration shows how to install the second microprocessor on the system board.

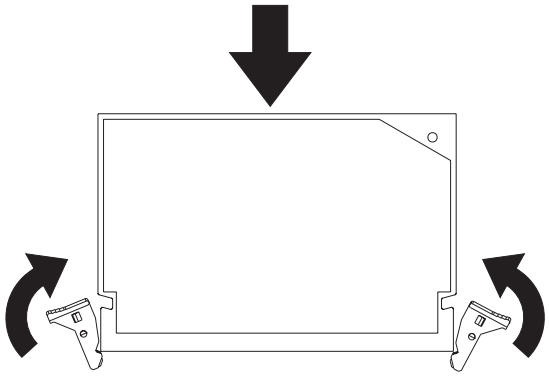


Attention:

- A startup (boot) processor must always be installed in socket J22 on the system board.
- To ensure proper server operation when you install an additional microprocessor, use microprocessors that have the same cache size and type, and the same clock speed. Microprocessor internal and external clock frequencies must be identical.

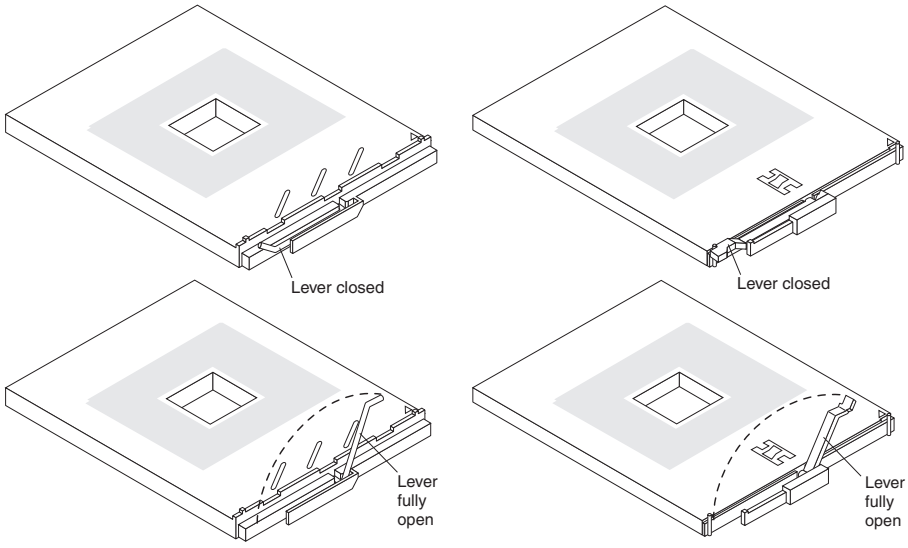
Complete the following steps to install an additional microprocessor:

1. Read the “Installation guidelines” on page 23.and the safety information beginning on page Appendix B, “Safety information,” on page 117.
2. Turn off the server and disconnect all power cords and external cables (see “Turning off the server” on page 7); then, remove the server cover (see “Removing the cover” on page 28).
3. Remove the air baffle (see “Removing the air baffle” on page 29).
4. Locate the second microprocessor socket (connector J23) on the system board.
5. Remove the microprocessor baffle.
   a. Press the heat-sink release lever to unhook it from the tab on the microprocessor socket; then, pull the lever up.
   b. Slide the microprocessor baffle while lifting the rear flange out of the heat-sink socket; then, lift it off the heat-sink socket and store it in a safe place.
6. Install a VRM in the VRM connector (J72).



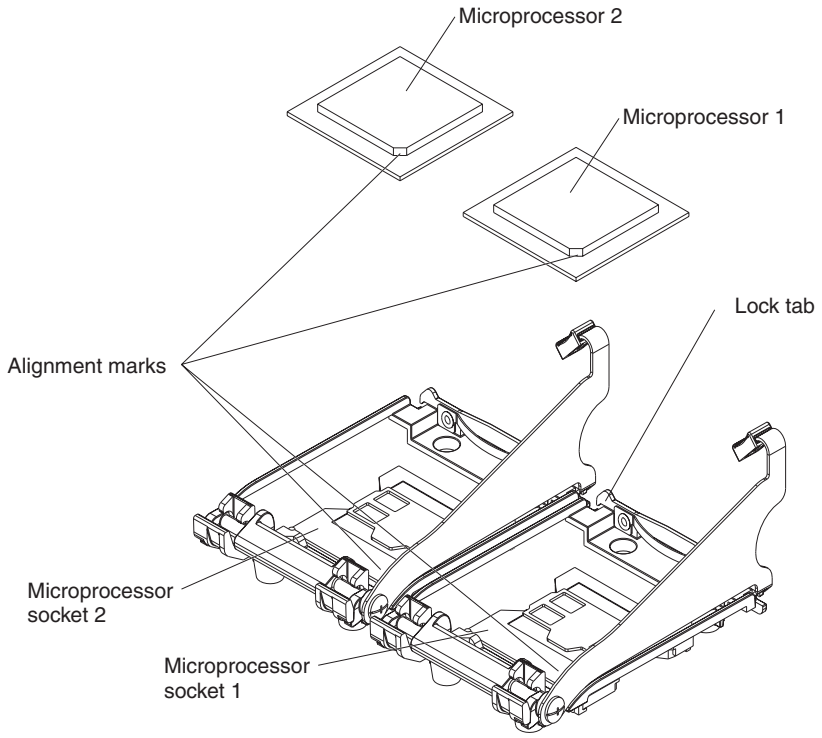
7. Install the microprocessor:
   a. Touch the static-protective package containing the microprocessor to any unpainted metal surface on the server. Then, remove the microprocessor from the package.
   b. Remove the protective cover, tape, or label from the surface of the microprocessor socket, if present.

      Attention: You must ensure that the locking lever on the microprocessor socket is in the fully open position before you insert the microprocessor in the socket. Failure to do so might result in permanent damage to the microprocessor, microprocessor socket, and system board.
   c. Rotate the locking lever on the microprocessor socket from its closed and locked position until it stops or clicks in the fully open position (approximately 135° angle).



      Attention:
      - Do not use excessive force when pressing the microprocessor into the socket.
      - Make sure that the microprocessor is oriented and aligned with pin number 1 in the socket before you try to close the lever.

   d. Center the microprocessor over the microprocessor socket. Align the triangle on the corner of the microprocessor with the triangle on the corner of the socket and carefully press the microprocessor into the socket.

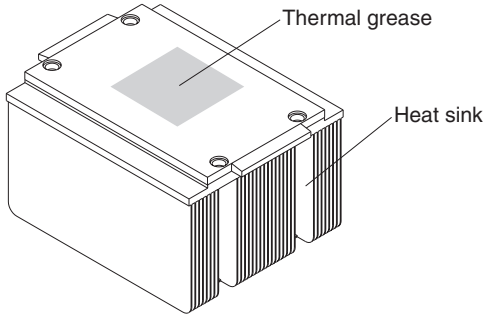


e. Carefully close the locking lever to secure the microprocessor in the socket.

8. Install a heat sink on the microprocessor.

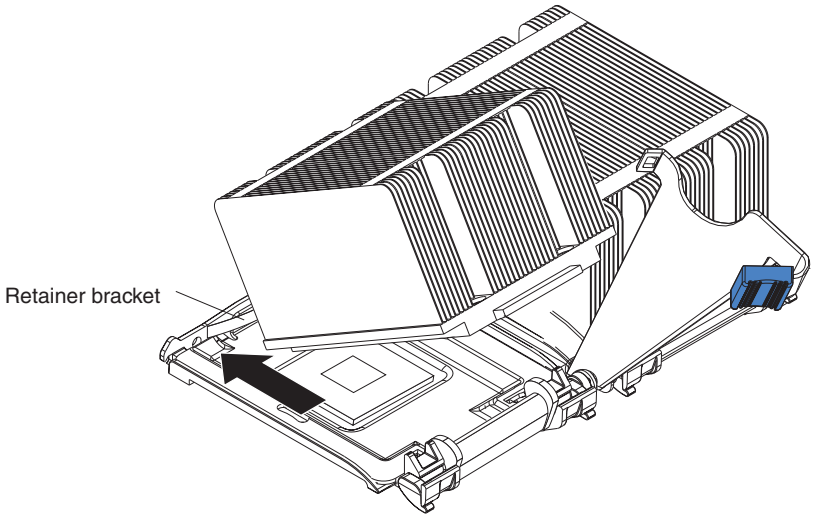
   Attention:

   - Do not set down the heat sink after you remove the plastic cover.



   - Do not touch the thermal grease on the bottom of the heat sink or set down the heat sink. Touching the thermal grease will contaminate it. For details, see the information about thermal grease on page 42.

   a. Remove the plastic protective cover from the bottom of the heat sink.
   b. Make sure that the heat-sink lever is in the open position.
   c. Align the heat sink above the microprocessor with the thermal grease side down. Press firmly on the heat sink.



d. Slide the flange of the heat sink into the opening beneath the retainer bracket.

e. Press down firmly on the heat sink until it is seated securely.

f. Attach the heat sink to the microprocessor by rotating the heat-sink lever to the closed position and hooking it underneath the lock tab.

9. Install the air baffle over the system board.

If you have other options to install or remove, do so now. Otherwise, go to “Completing the installation” on page 51.

Installing a hot-swap power supply

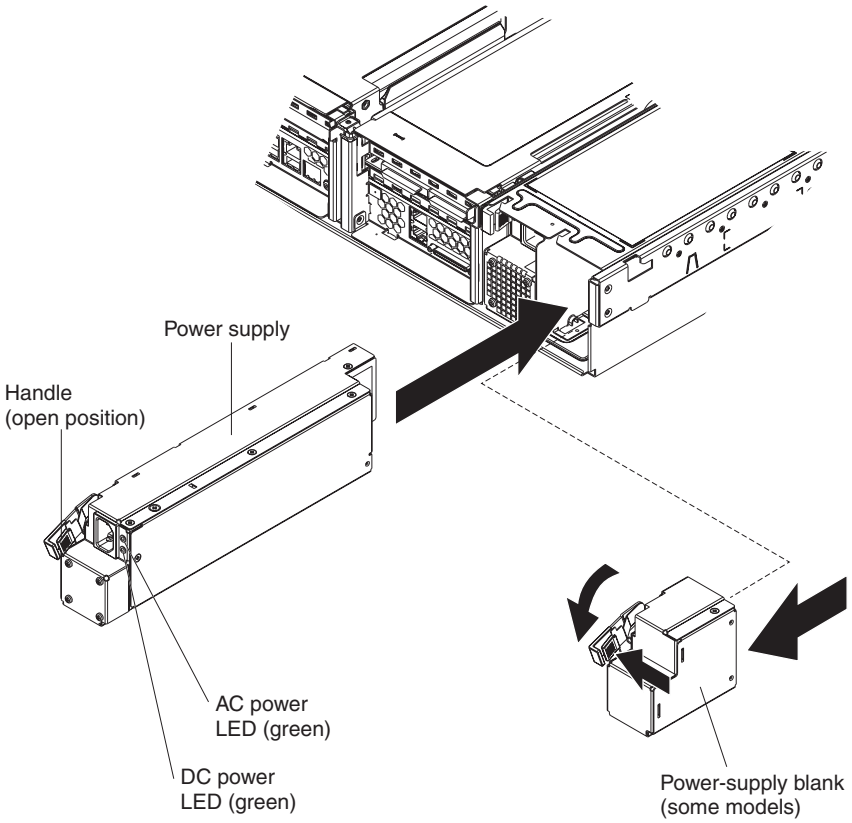
The server supports a maximum of two hot-swap power supplies.

Statement 8

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

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

The following illustration shows how to install a power supply.

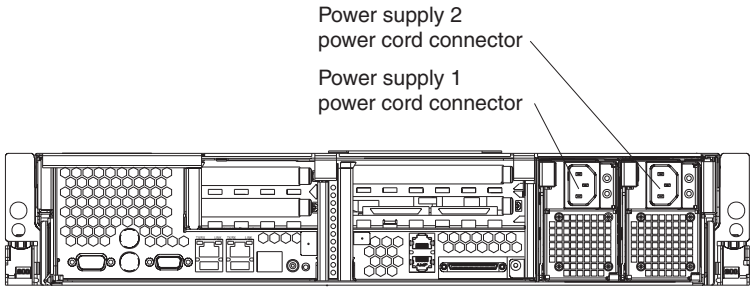


Complete the following steps to install a power supply:

1. Read the “Installation guidelines” on page 23.and the safety information beginning on page Appendix B, “Safety information,” on page 117.
2. (Some models) Remove the power-supply blank from the empty power-supply bay by pinching the side clip and pulling the power-supply blank from the bay. Save the power-supply blank in case you remove the power supply at a later time.

   Attention: During normal operation, each power-supply bay must have either a power supply or power-supply blank installed for proper cooling.
3. Install the power supply in the bay:
   a. Move the handle on the power supply into the open position, pinch the side-clip, and slide the power supply into the chassis.
   b. Gently close the handle to seat the power supply in the bay.
4. Connect the power cord for the new power supply to the power-cord connector on the power supply.

   The following illustration shows the power-supply connectors on the back of the server.



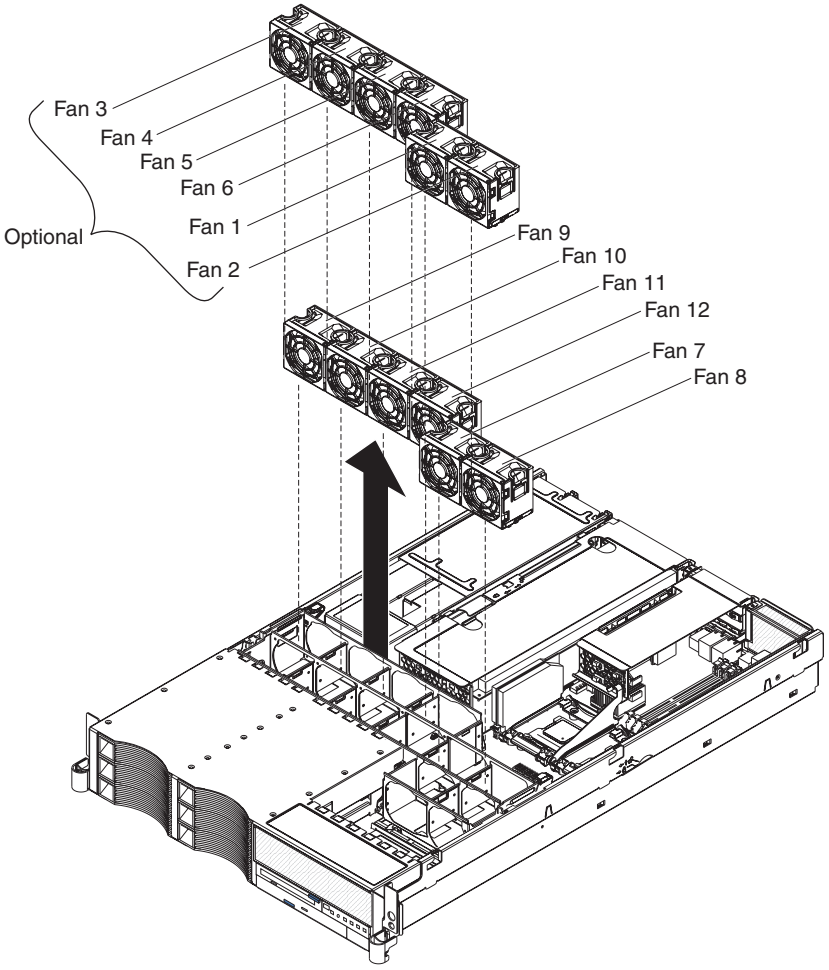
5. Connect the power cord to a properly grounded electrical outlet.
6. Make sure that the dc power LED and ac power LED on the power supply are lit, indicating that the power supply is operating correctly.

Replacing a hot-swap fan

The following notes describe information that you must consider when installing a hot-swap fan.

Attention: To ensure proper server operation, if a fan fails, replace it as soon as possible.

- The server supports a maximum of 12 hot-swap fans.
- The following illustration shows the locations of the hot-swap fans.



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

1. Read the “Installation guidelines” on page 23.and the safety information beginning on page Appendix B, “Safety information,” on page 117.
2. Remove the cover. See “Removing the cover” on page 28. The LED on the failing fan assembly will be lit.

   Attention: To ensure proper system cooling, do not remove the top cover for more than 30 minutes during this procedure.
3. Place your fingers into the two handles on the top of the failing fan.
4. Press the handles and lift the fan out of the server.

5. Orient the new fan so that the LED on top of the fan is to the right of the server.
6. Push the replacement fan assembly into the server until it clicks into place.
7. Replace the cover. See “Completing the installation” on page 51.

Replacing the battery

The following notes describe information that you must consider when replacing the battery:

- IBM has designed this product with your safety in mind. The lithium battery must be handled correctly to avoid possible danger. If you replace the battery, you must adhere to the following instructions.

  Note: In the U. S., call 1-800-IBM-4333 for information about battery disposal.
- If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.
- To order replacement batteries, call 1-800-426-7378 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM reseller or IBM marketing representative.

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

Statement 2

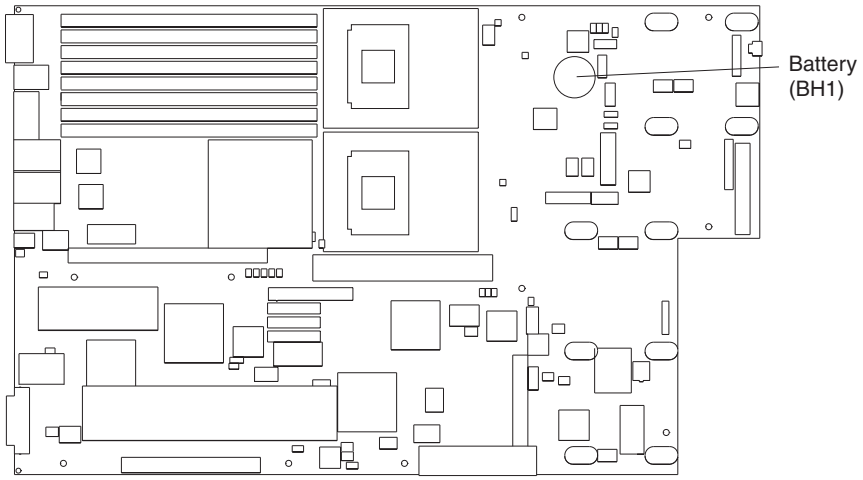
CAUTION:
When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium 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**

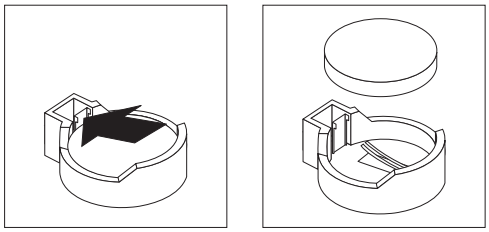
Dispose of the battery as required by local ordinances or regulations.

Complete the following steps to replace the battery:

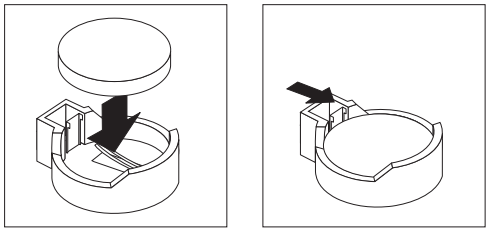
1. Read the “Installation guidelines” on page 23.and the safety information beginning on page Appendix B, “Safety information,” on page 117.
2. Follow any special handling and installation instructions that come with the battery.
3. Turn off the server and all attached devices and disconnect all power cords and external cables (see “Turning off the server” on page 7); then, remove the server cover (see “Removing the cover” on page 28).
4. Remove the air baffle (see “Removing the air baffle” on page 29).
5. Disconnect any internal cables, as necessary.
6. Locate the battery (connector BH1) on the system board.



7. Remove the battery:
   a. Use one finger to press on the tab that secures the battery to its housing.
   b. Use one finger to slide the battery from the socket.



8. Insert the new battery:
   a. Hold the battery so that the larger side is facing up.
   b. Place the battery into its socket, and press the battery down until it snaps into place.

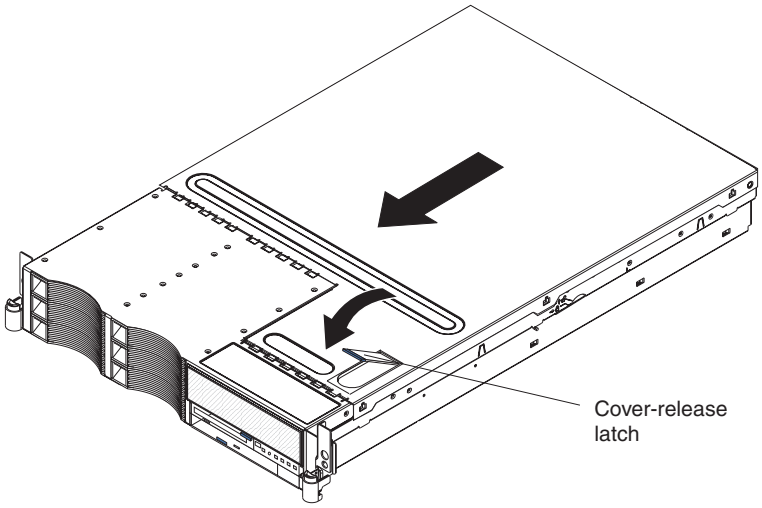


9. Reconnect the internal cables that you disconnected.
10. Connect all external cables and all power cords.
11. Reinstall the air baffle.
12. Reinstall the server cover (see “Completing the installation”).
13. Start the Configuration/Setup Utility program and set configuration parameters as needed. See the *User’s Guide* on the IBM *xSeries Documentation* CD for additional information about using the Configuration/Setup Utility program.

Completing the installation

Complete the following steps to complete the installation:

1. If you removed the server cover, place the cover-release latch in the open (up) position. Insert the bottom tabs of the top cover into the matching slots in the server chassis. Press down on the cover-release latch to lock the cover in place.



2. Install the server in a rack. See the *Rack Installation Instructions* that come with the server for complete rack installation and removal instructions.

   Attention:

   - Install the server only in a rack cabinet with perforated doors.
   - Do not leave open spaces above or below an installed server in the rack cabinet. To help prevent damage to server components, always install a blank filler panel to cover the open space and to help ensure proper air circulation. See the documentation that comes with the rack cabinet for more information.
   - Install the server in a rack that meets the following requirements:
     - Minimum depth of 70 mm (2.76 in.) between the front mounting flange and the inside of the front door
     - Minimum depth of 157 mm (6.18 in.) between the rear mounting flange and the inside of the rear door
     - Minimum depth of 718 mm (28.27 in.) and maximum depth of 762 mm (30.00 in.) between the front and rear mounting flanges
3. To attach peripheral devices and connect the power cords, see “Connecting the cables.”

Attention:

- For proper cooling and airflow, replace the server cover before or shortly after turning on the server. Operating the server for extended periods of time (over 30 minutes) with the server cover removed might damage server components.
- To ensure proper server operation, do not remove the air baffle from the server except when installing or removing the components that are located under the air baffle.

Connecting the cables

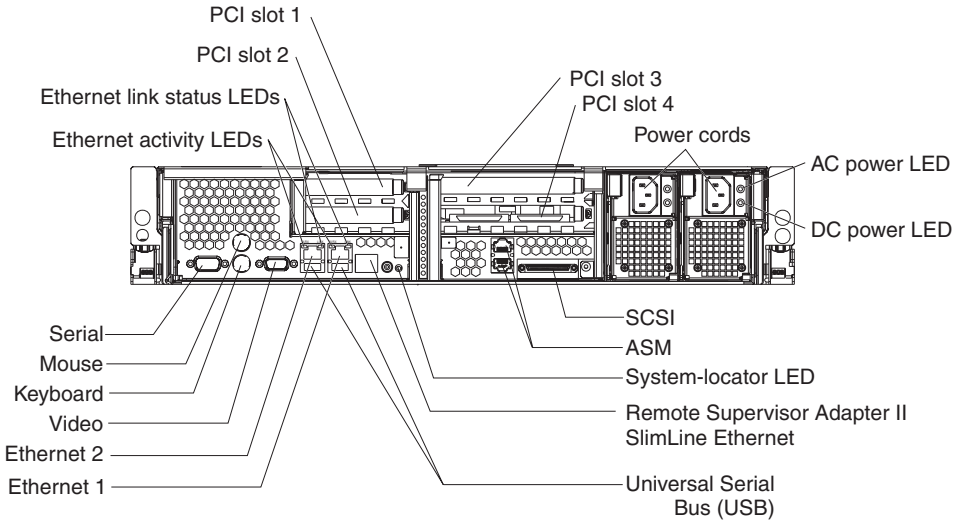
Notes:

1. You must turn off the server (see “Turning off the server” on page 7) before connecting any cables to or disconnecting any cables from the server.

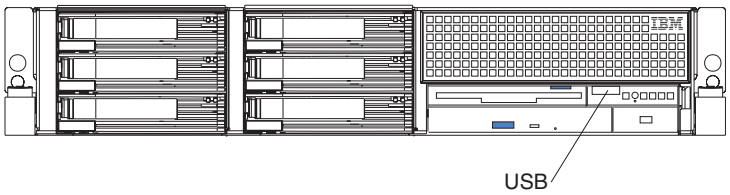
2. See the documentation that comes with your options for additional cabling instructions. It might be easier for you to route cables before you install certain options.
3. Cable identifiers are printed on the cables that come with the server and options. Use these identifiers to connect the cables to the correct connectors.

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

Rear view



Front view



Updating the server configuration

When you start the server for the first time after you add or remove an internal option or external SCSI device, you might receive a message that the configuration has changed. The Configuration/Setup Utility program starts automatically so that you can save the new configuration settings. For more information, see the section about configuring the server in the *User's Guide* on the IBM *xSeries Documentation* CD.

Some options have device drivers that you must install. See the documentation that comes with each option for information about installing device drivers.

The server comes with at least one microprocessor. If more than one microprocessor is installed, the server can operate as a symmetric multiprocessing (SMP) server. You might have to upgrade the operating system to support SMP. For more information, see the section about using the *ServerGuide Setup and Installation* CD in the *User's Guide* and the operating-system documentation.

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

If the server has a RAID configuration using the SCSI controller with integrated RAID and you have installed or removed a hard disk drive, you might have to reconfigure the disk arrays. See the RAID documentation on the IBM *ServeRAID-7e (Adaptec HostRAID) Support* CD for more information about reconfiguring the disk arrays.

For information about configuring the integrated Gigabit Ethernet controllers, see the *User's Guide*.

Connecting external options

If you install a SCSI adapter or use the external SCSI connector, you can attach external SCSI devices, such as a SCSI storage expansion enclosure, to the server. You can attach additional external options to the other input/output (I/O) connectors on the front and rear of the server. (See "Input/output connectors" on page 55 for more information.)

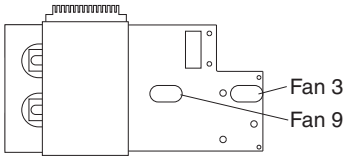
Complete the following steps to attach an external device:

1. Read the "Installation guidelines" on page 23.and the safety information beginning on page Appendix B, "Safety information," on page 117. Also, read the documentation that comes with the option.
2. Turn off the server and all attached devices (see "Turning off the server" on page 7).
3. Follow the instructions that come with the option to prepare it for installation and to connect it to the server.

Note: If you are attaching an external SCSI device, see "Ultra320 SCSI controller system-board connectors" on page 56 for information about SCSI cabling and SCSI IDs.

Power-cage card internal cable connectors

The following illustration shows the internal connectors on the power-cage card.



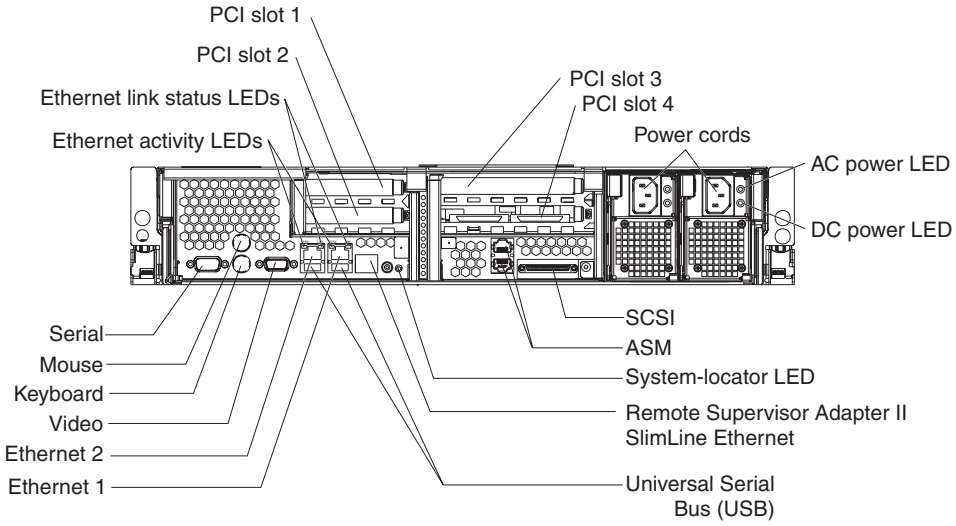
Input/output connectors

Your server has the following input/output (I/O) connectors:

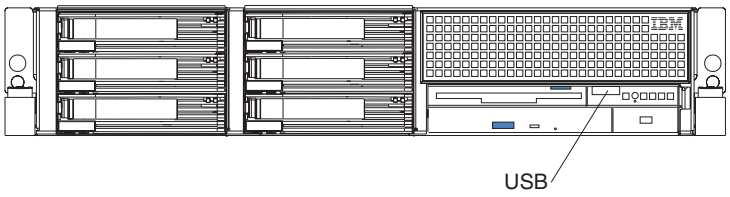
- One auxiliary-device (pointing device)
- Three Ethernet (one for remote server management using network, RJ-45)
- Two Advanced Systems Management (ASM)
- One keyboard
- One serial
- One Ultra320 SCSI controller (LVD) SCSI
- Three Universal Serial Bus (USB) (one on the front and two on the rear)
- One video

The following illustrations show the locations of these connectors.

Rear view



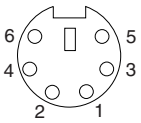
Front view



The following sections describe these connectors.

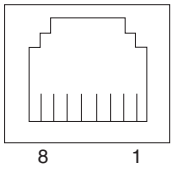
Auxiliary-device (pointing device) connector

Use this connector to connect a mouse or other pointing device. The following illustration shows an auxiliary-device connector.



Ethernet connectors

The following illustration shows an Ethernet connector.



Connect a Category 3, 4, or 5 unshielded twisted-pair cable to this connector. 100BASE-TX and 1000BASE-T Fast Ethernet standards require Category 5 or higher cabling.

The server has three Ethernet connectors. Two of the Ethernet connectors are attached to the Ethernet controllers. See the *User's Guide* on the IBM *xSeries Documentation* CD for more information about the Ethernet controllers.

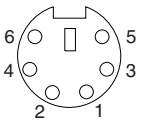
To enable remote server management through a network, use the Remote Supervisor Adapter II SlimLine Ethernet connector. This connector is active only if an optional Remote Supervisor Adapter II SlimLine is installed. See the documentation that comes with the option for more information.

Advanced Systems Management (ASM) connectors

Use either of these dual RJ-45 connectors to connect the server to an Integrated xSeries Adapter (IXA) that is installed in the server.

Keyboard connector

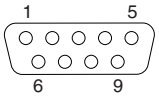
Use this connector to connect a PS/2 (non-USB) keyboard to the server. The following illustration shows a keyboard connector.



If you attach a keyboard to this connector, USB ports and devices are disabled during POST.

Serial connector

Use a serial connector to connect a serial device. The following illustration shows a serial connector.



Ultra320 SCSI controller system-board connectors

The integrated dual channel small computer system interface (SCSI) controller with integrated RAID supports two independent Ultra320 SCSI channels: one external and one internal. Each channel supports up to 15 SCSI devices. You can use the external LVD SCSI channel connector on the rear of the server to connect different types of SCSI devices, such as drives or printers. This controller uses:

- Double-transition clocking to achieve up to 320 MB-per-second data-transfer rates

- Domain-name validation to negotiate compatible data-transfer speeds with each device
- Cyclic redundancy checking (CRC), instead of the usual parity checking, to improve data reliability
- An active terminator for SCSI bus termination

The server comes with one SCSI cable, which connects the internal connector on the system board to the standard hot-swap-drive backplane. If you plan to attach external SCSI devices, you must order additional cables. To select and order the correct cables for use with external devices, contact your IBM marketing representative or authorized reseller.

SCSI cabling requirements

For information about the maximum length of SCSI cable, go to the American National Standards Institute (ANSI) SCSI standards on the ANSI Web site at http://www.ansi.org/. Adhering to these standards will help to ensure that the server operates properly.

SCSI IDs

Each SCSI device that is connected to a SCSI controller must have a unique SCSI ID. This ID enables the SCSI controller to identify the device and ensure that different devices on the same SCSI channel do not attempt to transfer data simultaneously. SCSI devices that are connected to different SCSI channels can have duplicate SCSI IDs. Table 6 lists the SCSI IDs for the hard disk drives and backplanes that are connected to one channel.

Table 6. SCSI IDs for standard hot-swap hard disk drives, controller, and backplane

Device	SCSI ID
Drive bay 1	0
Drive bay 2	1
Drive bay 3	2
Drive bay 4	3
Drive bay 5	4
Drive bay 6	5
Controller	7
Backplane	8

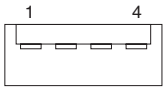
The hot-swap-drive backplane controls the SCSI IDs for the internal hot-swap drive bays. However, when you attach an external SCSI device to an optional SCSI adapter, you must set a unique ID for the device. See the information that comes with the device for instructions for setting its SCSI ID.

SCSI connector

The following illustration shows a SCSI connector.

Universal Serial Bus version 1.1 or 2.0 connectors

Use a Universal Serial Bus (USB) connector to connect a USB device. USB version 1.1 technology transfers data at up to 12 Mb per second (Mbps) with a maximum of 127 devices and a maximum signal distance of 5 meters (16 ft) per segment. If multiple USB devices are attached to the server, the USB hub must be version 2.0; otherwise, all USB 2.0 devices will transfer data at 12 Mbps. USB devices are configured automatically, using Plug and Play technology. The following illustration shows a USB connector.



Use a 4-pin cable to connect a device to a USB connector. If you need to connect more USB devices than the server has USB connectors for, use a USB hub to connect additional devices.

If you connect a PS/2 (non-USB) keyboard to the keyboard connector, USB ports and devices are disabled during POST.

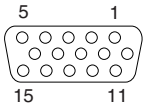
If you connect a USB keyboard that has a mouse port, the keyboard emulates a mouse, and you cannot disable the mouse settings in the Configuration/Setup Utility program.

Video connector

The integrated super video graphics array (SVGA) video controller is not removable, but you can disable it through the Configuration/Setup Utility program or by installing a PCI video adapter.

Note: If you install a PCI video adapter, the BIOS will automatically disable the integrated video controller.

The following illustration shows a video connector.



Chapter 5. Field replaceable units

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

Important: The field-replaceable unit (FRU) procedures are intended for trained servicers who are familiar with IBM xSeries products. See the parts listing in "System" on page 108 to determine if the FRU being replaced is a customer-replaceable unit (CRU) or a FRU.

Thermal grease

This section contains information about removing and replacing the thermal grease between the heat sink and the microprocessor.

Important: If you are installing the heat sink on the same processor that it was removed from, be sure that:

- The thermal grease on the heat sink and microprocessor is not contaminated.
- Addition thermal grease is not added to the existing thermal grease on the heat sink and microprocessor.

Note:
- Read "Installation guidelines" on page 23.
- Read the safety notices at Appendix B, "Safety information," on page 117.
- Read "Handling static-sensitive devices" on page 25.

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.

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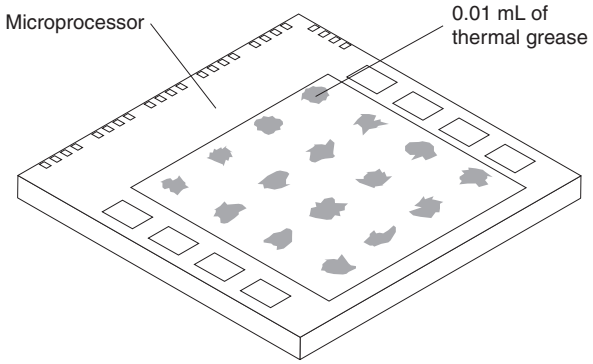
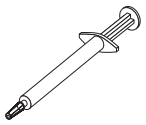


5. Use the thermal grease syringe to place 16 uniformly spaced dots of 0.01mL each on the top of the microprocessor.



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 “Installing a microprocessor” on page 42.

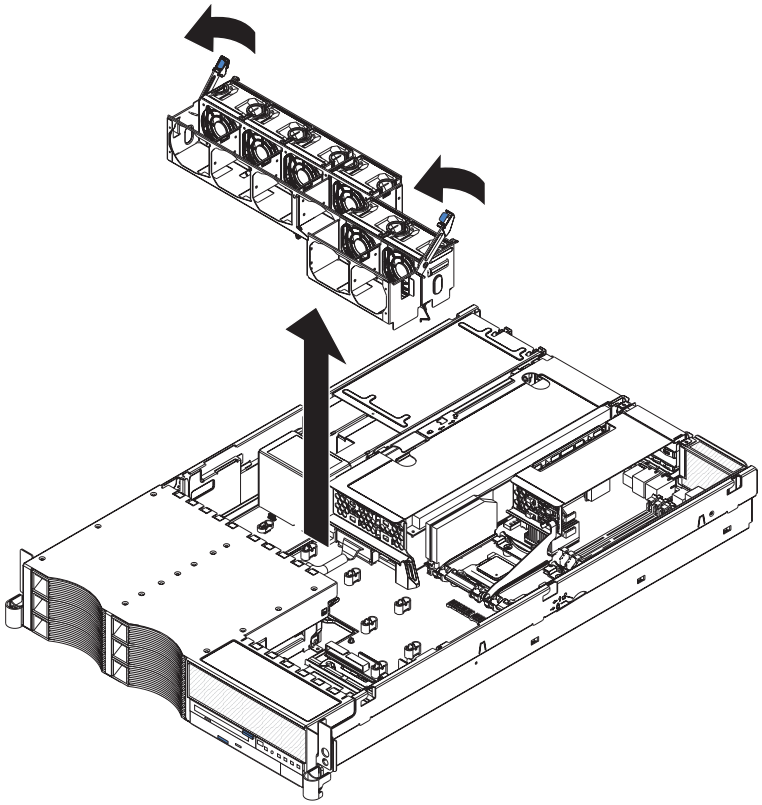
Fan bracket

This section contains instructions for removing and replacing the fan bracket.

Note:
- Read “Installation guidelines” on page 23.
- Read the safety notices at Appendix B, “Safety information,” on page 117.
- Read “Handling static-sensitive devices” on page 25.

Complete the following steps to remove the fan bracket:

1. Turn off the server and any attached devices.
2. Disconnect external cables and option cables from the back of the server.
3. Remove the server cover (see “Removing the cover” on page 28).
4. Remove the air baffle (see “Removing the air baffle” on page 29).
5. Release the fan bracket retention latches.



6. Remove the fan bracket from the server.
7. Remove the fans (see “Replacing a hot-swap fan” on page 49).

To replace the fan bracket, reverse the previous steps.

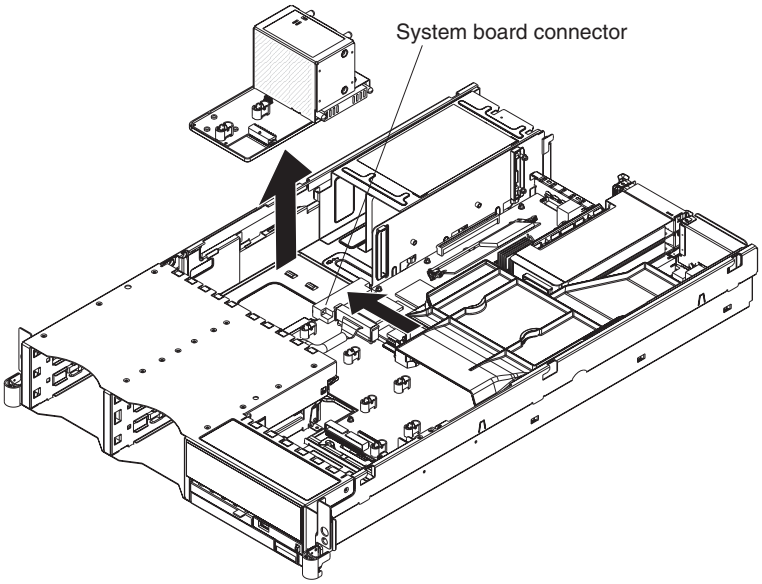
Power cage assembly

This section contains instructions for removing and replacing the power cage assembly.

Note:
- Read “Installation guidelines” on page 23.
- Read the safety notices at Appendix B, “Safety information,” on page 117.
- Read “Handling static-sensitive devices” on page 25.

Complete the following steps to remove the power cage assembly:

1. Turn off the server and any attached devices.
2. Disconnect external cables and option cables from the back of the server.
3. Remove the server cover (see “Removing the cover” on page 28).
4. Remove the air baffle (see “Removing the air baffle” on page 29).
5. Remove the PCI riser-card assembly (see “Working with adapters” on page 30).
6. Disconnect the power supplies from the power cage assembly.
7. Looking from the front of the server, slide the power cage assembly toward the left side of the server to disconnect the cage assembly from the system board connector.



8. Remove the power cage assembly from the server.

To replace the power cage assembly, reverse the previous steps.

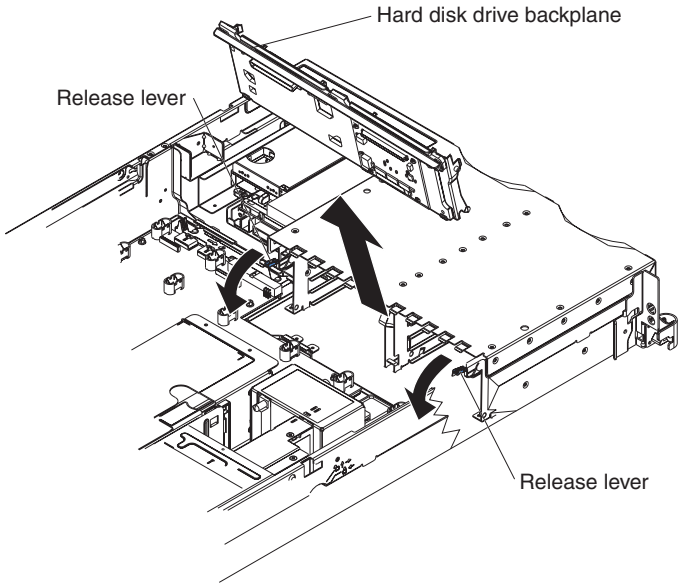
Hard disk drive backplane

This section contains instructions for removing and replacing the hard disk drive backplane.

Note:
- Read “Installation guidelines” on page 23.
- Read the safety notices at Appendix B, “Safety information,” on page 117.
- Read “Handling static-sensitive devices” on page 25.

Complete the following steps to remove the hard disk drive backplane:

1. Turn off the server and any attached devices.
2. Disconnect external cables and option cables from the back of the server.
3. Remove the server cover (see “Removing the cover” on page 28).
4. Remove the hard disk drives.
5. Remove the air baffle (see “Removing the air baffle” on page 29).
6. Remove the fan bracket (see “Fan bracket” on page 60).
7. Disconnect the two cables from the hard disk drive backplane.
8. Lift the two backplane release tabs, and remove the backplane from the server.



To replace the hard disk drive backplane, reverse the previous steps.

Note: When installing the hard disk drive backplane, engage the left-most tab (the tab closest to the chassis) first. Push down until the tab clicks into place.

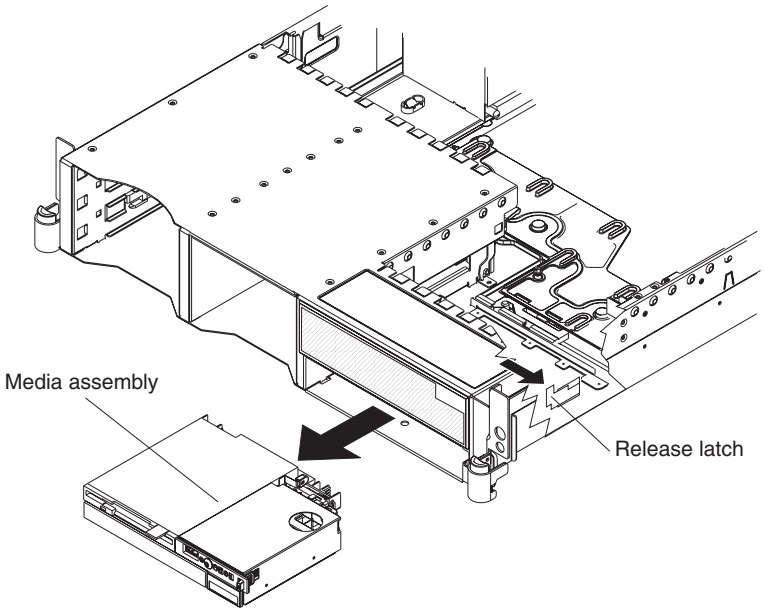
Media cage

This section contains instructions for removing and replacing the media cage.

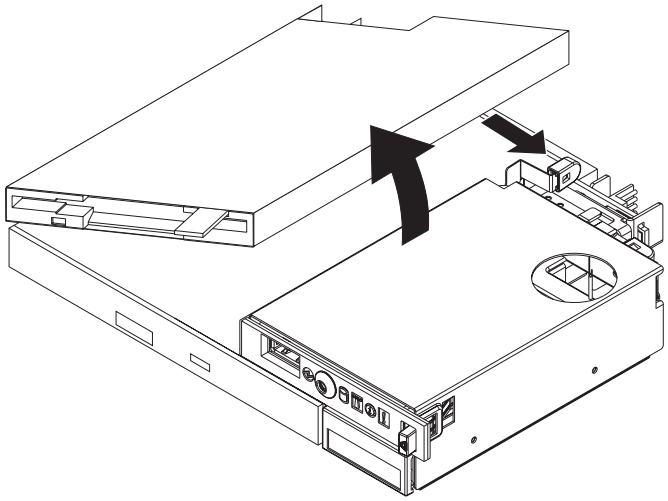
Note:
- Read “Installation guidelines” on page 23.
- Read the safety notices at Appendix B, “Safety information,” on page 117.
- Read “Handling static-sensitive devices” on page 25.

Complete the following steps to remove the media cage:

1. Turn off the server and any attached devices.
2. Disconnect external cables and option cables from the back of the server.
3. Remove the server cover (see “Removing the cover” on page 28).
4. Remove the air baffle (see “Removing the air baffle” on page 29).
5. Remove the fan bracket (see “Fan bracket” on page 60).
6. Disconnect all cables from the media cage.
7. Press on the release lever and pull the media cage from the server.



8. Remove the retaining wires on the DVD-ROM drive and pull the drive from the media cage.
9. Press on the release lever on the diskette drive and remove the drive from the media cage.



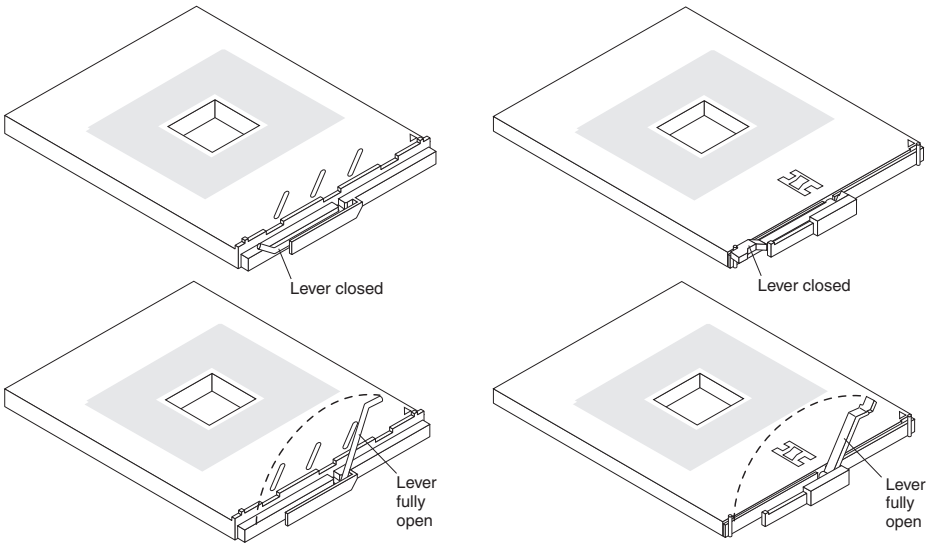
To replace the media cage , reverse the previous steps.

Removing a microprocessor

Complete the following steps to install an additional microprocessor:

1. Read the “Installation guidelines” on page 23.and the safety information beginning on page Appendix B, “Safety information,” on page 117.
2. Turn off the server and disconnect all power cords and external cables (see “Turning off the server” on page 7); then, remove the server cover (see “Removing the cover” on page 28).
3. Remove the air baffle (see “Removing the air baffle” on page 29).
4. Locate the socket containing the microprocessor that you want to remove from the system board.

5. **Attention:** Be careful when handling the microprocessor and heat sink. If the thermal grease between the microprocessor and heat sink will be reused, do not contaminate it. If replacement thermal grease is provided with the replacement part, be sure to remove all traces of existing thermal grease from the remaining part before applying the new thermal grease. See “Thermal grease” on page 66 for instructions for removing and applying thermal grease.
   Rotate the heat-sink lever to the open position and carefully remove the heat sink.
6. Rotate the locking lever on the microprocessor socket from its closed and locked position until it stops or clicks in the fully open position (approximately 135° angle).



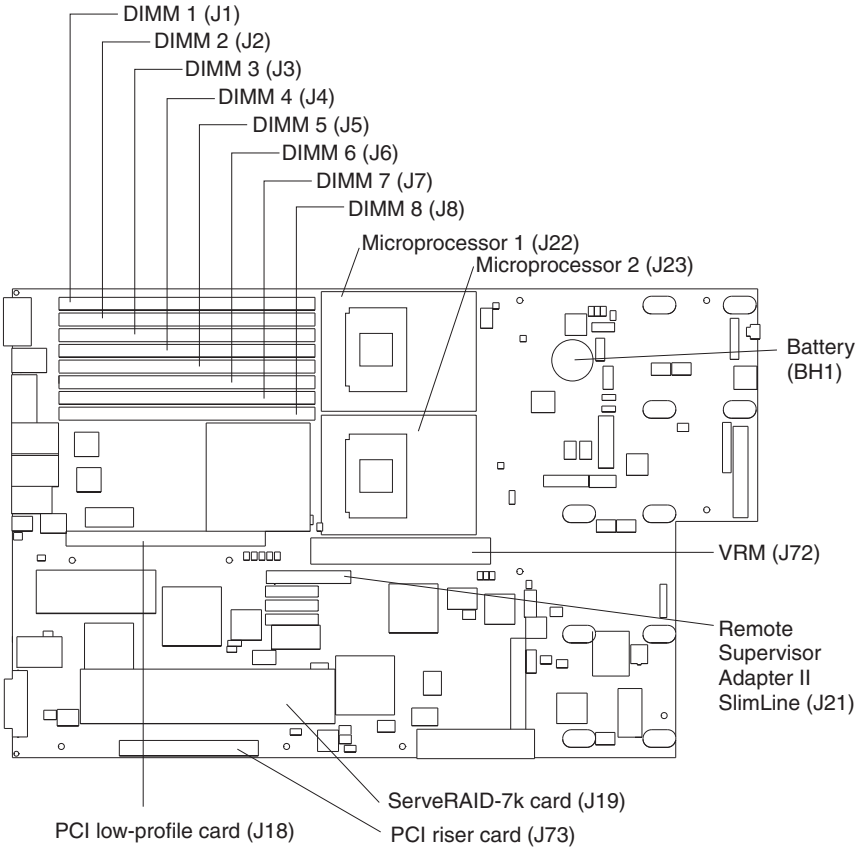
7. **Attention:** Do not use excessive force when removing the microprocessor form the socket.
   Remove the microprocessor.

System board

This section provides information about the system board.

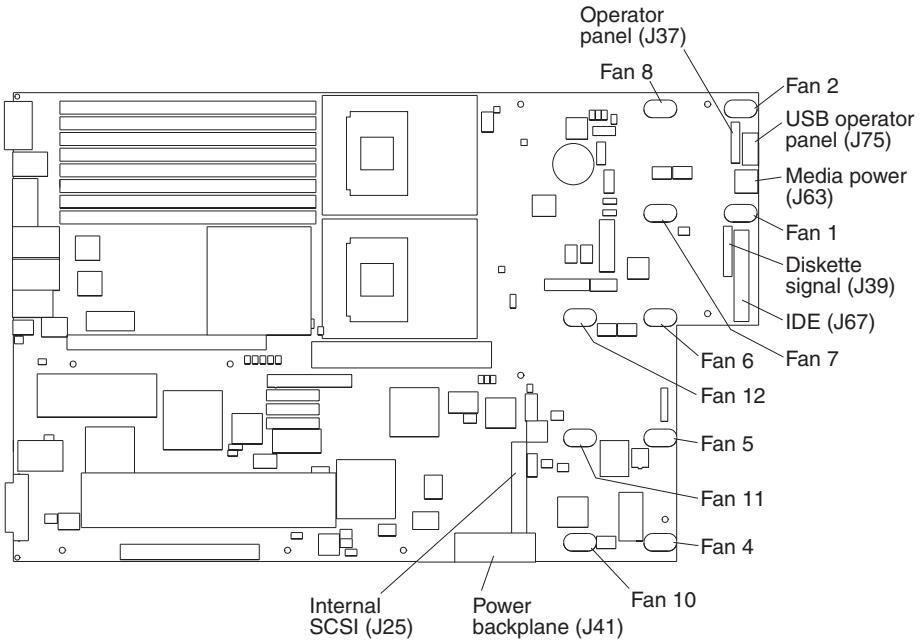
System-board option connectors

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



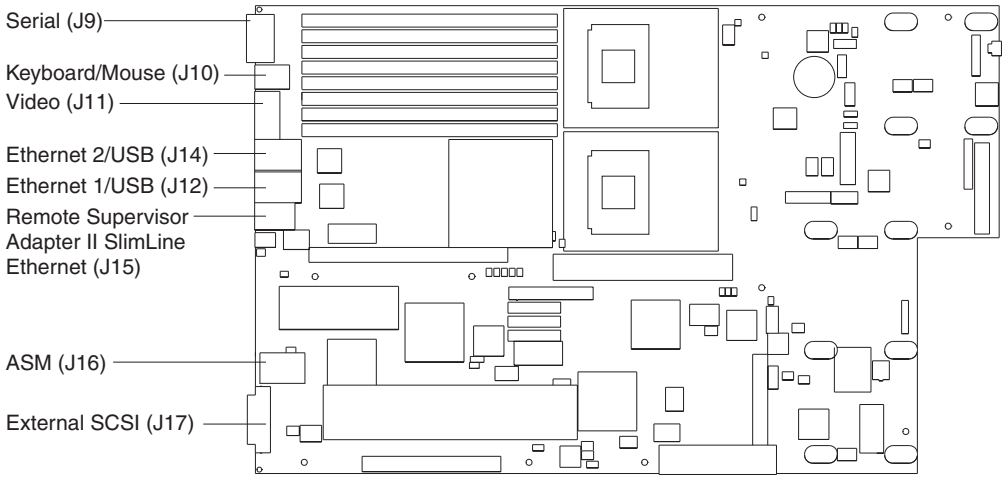
System-board internal cable connectors

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



System-board external connectors

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



System-board switches and jumpers

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

Any switches or jumpers on the system board that are not shown in the illustration are reserved. See “Recovering the BIOS code” on page 18 for information about the boot block recovery jumper.

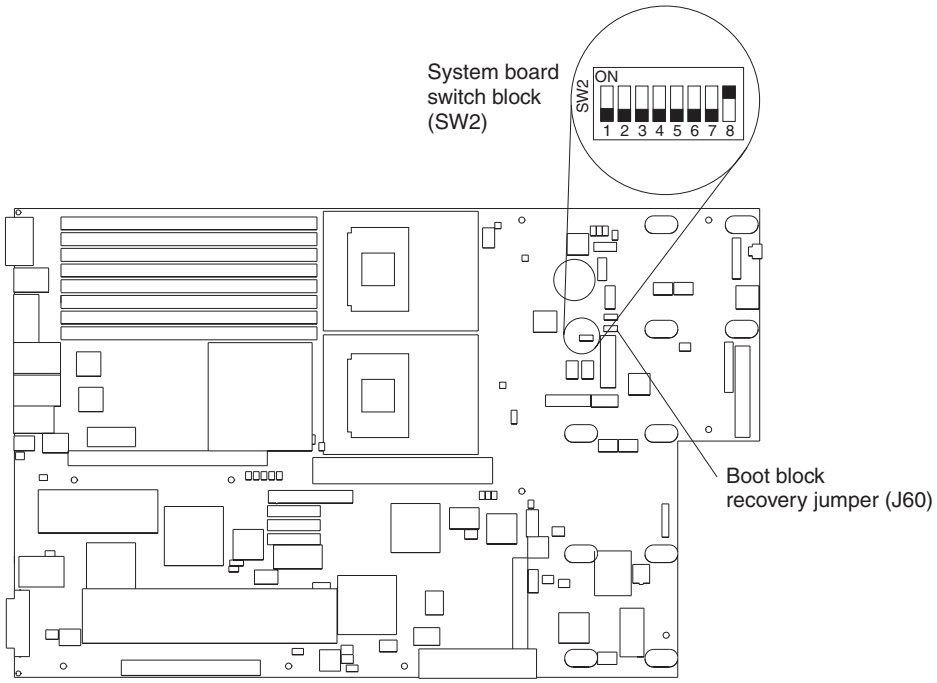


Table 7 describes the function of each switch on the switch block.

Table 7. Switches 1-8

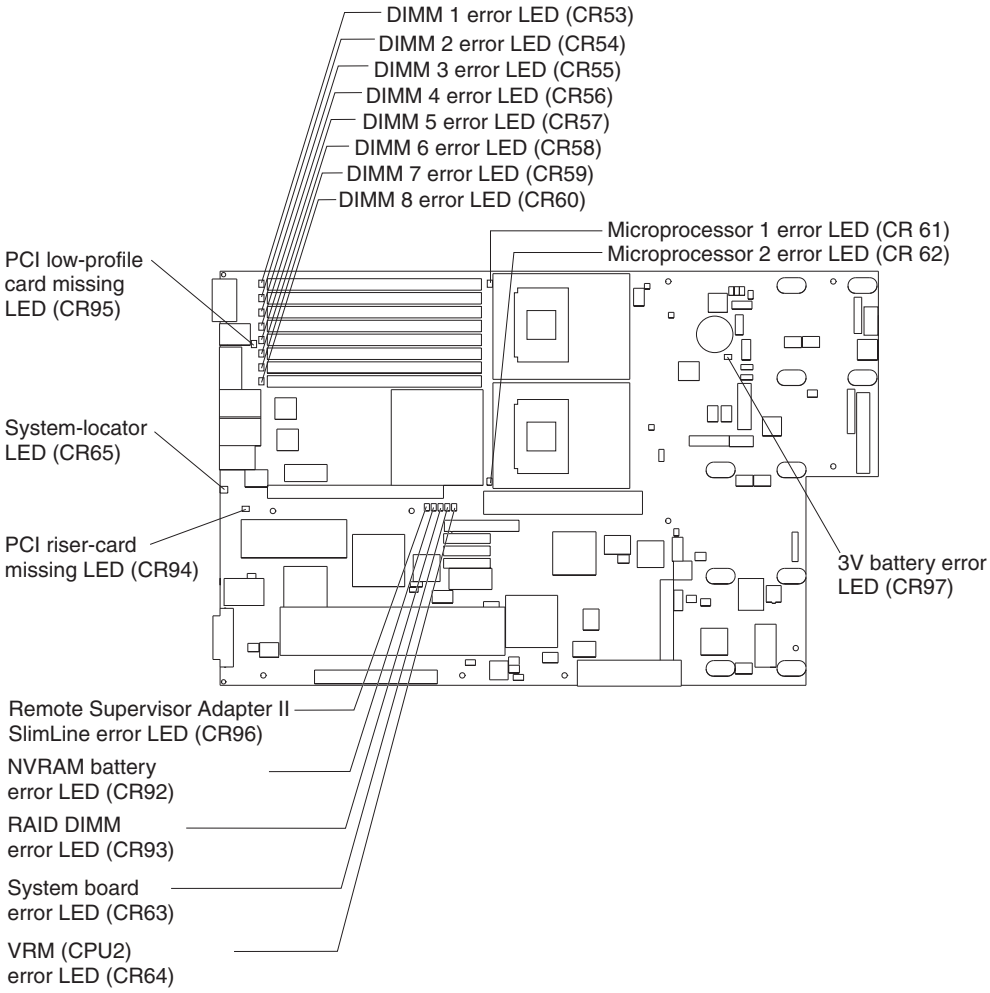
Switch number	Default value	Switch description
8	On	Reserved.
7	Off	Reserved.
6	Off	Reserved.
5	Off	Reserved.
4	Off	Reserved.
3	Off	Reserved.
2	Off	Power-on password override. Changing the position of this switch bypasses the power-on password check the next time the server is turned on and starts the Configuration/Setup Utility program so that you can change or delete the power-on password. You do not have to move the switch back to the default position after the password is overridden. Changing the position of this switch does not affect the administrator password check if an administrator password is set.
1	Off	Power-on override. When toggled to On, this switch forces the power on, overriding the power-on button.

Note: Before changing any switch settings or moving any jumpers, turn off the server; then, disconnect all power cords and external cables. (Review “Installation

guidelines” on page 23,, “Handling static-sensitive devices” on page 25,, Appendix B, “Safety information,” on page 117, and “Turning off the server” on page 7.)

System-board LEDs

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



Removing the system board and shuttle

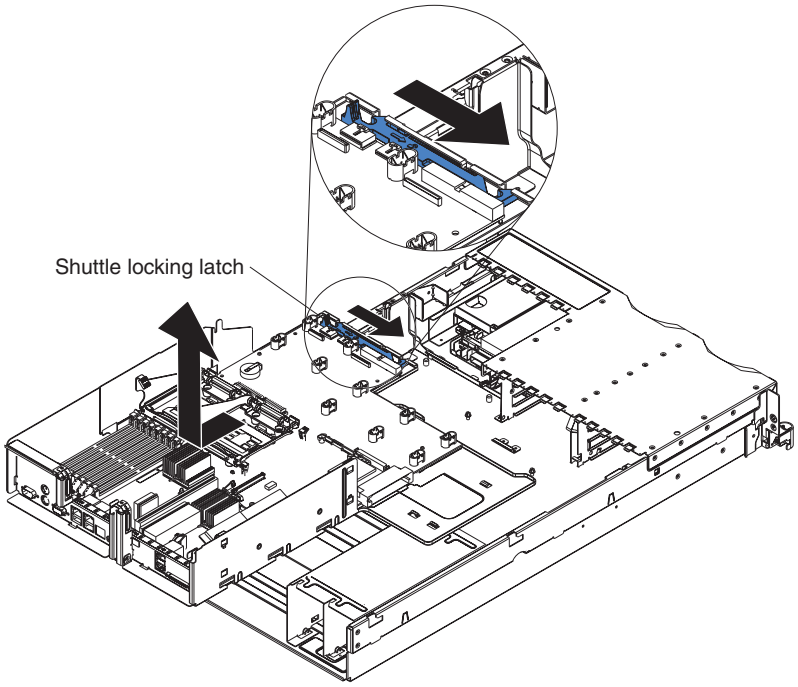
This section contains instructions for removing and replacing the system board and shuttle.

Note:
- Read “Installation guidelines” on page 23.
- Read the safety notices at Appendix B, “Safety information,” on page 117.
- Read “Handling static-sensitive devices” on page 25.

Complete the following steps to remove the system board and shuttle:

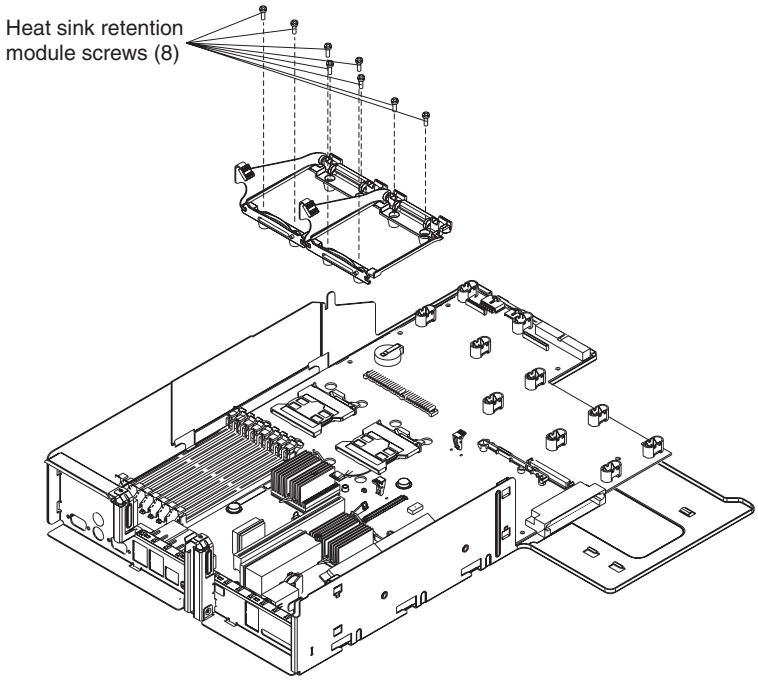
1. Turn off the server and any attached devices.

   Note: When replacing the system board, you must either update the server with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image.
2. Disconnect external cables and option cables from the back of the server.
3. Remove the cover (see “Removing the cover” on page 28).
4. Remove the air baffle (see “Removing the air baffle” on page 29.
5. Remove the fan bracket (see “Fan bracket” on page 60).
6. Disconnect and remove the PCI low-profile-card assembly and PCI riser-card assembly (see “Working with adapters” on page 30).
7. Disconnect all cables from the system board.
8. Remove all microprocessors and VRMs, and set them aside on a static-protected surface for reinstallation (see “Installing a microprocessor” on page 42).
9. Remove the memory modules, and set them aside on a static-protected surface for reinstallation (see “Installing memory modules” on page 39).
10. Remove the power cage assembly (see “Power cage assembly” on page 61).
11. Release the shuttle locking latch, and remove the shuttle from the server.

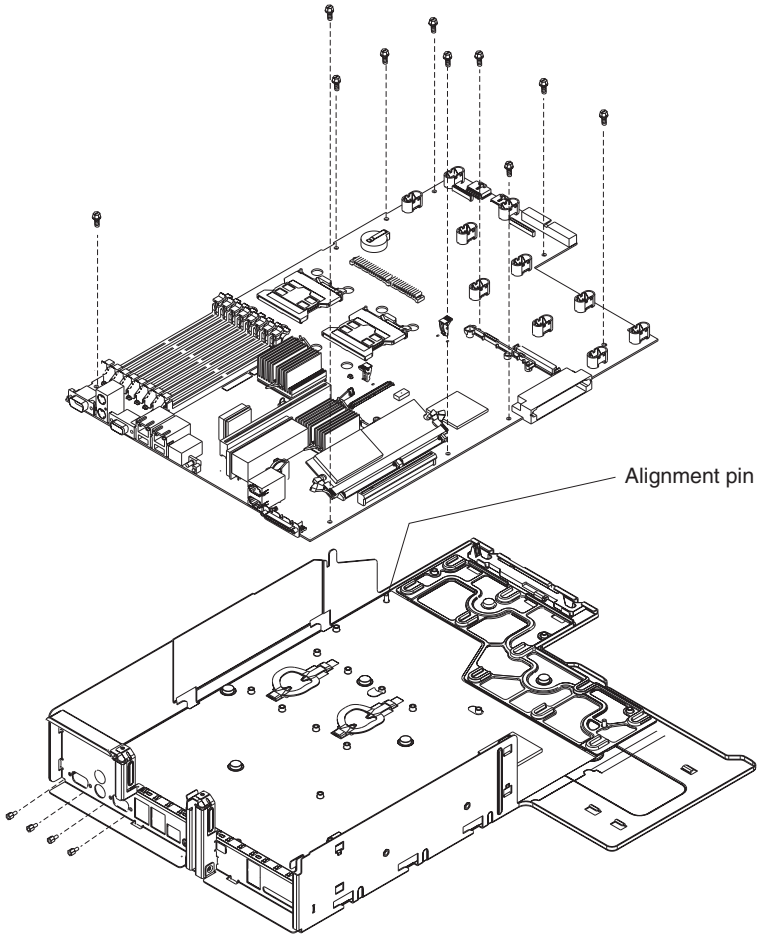


To install a shuttle with a preinstalled system board, slide the shuttle into the server and close the shuttle locking latch. Reverse the previous steps to replace the components that were removed. To remove the system board from the shuttle, continue with the next step.

12. Remove the eight screws that secure the system board to the shuttle at the microprocessor retention modules.



13. Remove the four standoff screws that secure the system board to the shuttle at the external connectors.
14. Remove the other ten screws that secure the system board to the shuttle.
15. Pull the system board carefully out of the shuttle.



16. Align the replacement system board with the shuttle and replace the screws that were removed.

    Attention: Do not over-tighten the screws that secure the system board to the shuttle.

To install the shuttle and replacement system board, looking from the front of the server, slide the shuttle under the retention tab on the right side of the chassis. Be sure the alignment pin on the chassis shuttle is aligned with the alignment hole on the shuttle and close the shuttle locking latch. Replace all components in the reverse order from which they were removed.

Chapter 6. Symptom-to-FRU index

This index supports xSeries 346 servers.

Notes:

1. Check the configuration before you replace a component. 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 11.

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 server.

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

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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 examples in the following table.

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

One beep after successfully completing POST indicates the system is functioning properly.

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Beep/symptom	**FRU/action**
1-1-2 (Microprocessor register test failed)	1. **Optional microprocessor (if installed)** 2. Microprocessor 3. System board
1-1-3 (CMOS write/read test failed)	1. **Battery** 2. System board
1-1-4 (BIOS EEPROM checksum failed)	1. **Recover BIOS** 2. System board
1-2-1 (Programmable Interval Timer failed)	**System board**
1-2-2 (DMA initialization failed)	**System board**
1-2-3 (DMA page register write/read failed)	**System board**
1-2-4 (RAM refresh verification failed)	1. **DIMM** 2. System board
1-3-1 (first 64K RAM test failed)	**DIMM**
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**

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Beep/symptom	**FRU/action**
2-1-4 (Secondary interrupt mask register failed)	**System board**
2-2-1 (Interrupt vector loading failed)	**System board**
2-2-2 (Keyboard controller failed)	1. **System board** 2. Keyboard
2-2-3 (CMOS power failure and checksum checks failed)	1. **Battery** 2. System board
2-2-4 (CMOS configuration information validation failed)	1. **Battery** 2. System board
2-3-1 (Screen initialization failed)	**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; screen believed operable)	**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** 2. System board
3-1-4 (Time-Of-Day clock failed)	1. **Battery** 2. System board
3-2-1 (Serial port failed)	**System board**
3-2-2 (Parallel port failed)	**System board**
3-2-3 (Math coprocessor test failed)	1. **Microprocessor** 2. System board
3-2-3 (Failure comparing CMOS memory size against actual)	1. **DIMM** 2. Battery
3-3-1 (Memory size mismatch occurred.)	1. **DIMM** 2. Battery

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Beep/symptom	**FRU/action**
3-3-2 (Critical SMBUS error occurred)	1. **Disconnect the server power cord from outlet, wait 30 seconds, and retry.** 2. System board. 3. DIMMs. 4. Hard disk drive backplane. 5. Power supply. 6. Power cage assembly.
3-3-3 (No operational memory in system)	1. **Install or reseat the memory modules, and then do a 3 boot reset.** (For more information on a 3 boot reset, see Chapter 2, “Configuring the server,” on page 9). 2. DIMMs. 3. Memory board. 4. System board.
4-4-4 (Optional system management adapter not installed in slot 1 or not functioning correctly)	1. **Verify that the adapter is installed in the system management adapter slot.** 2. Adapter. 3. System board.
Two short beeps (Information only, the configuration has changed)	1. **Run Diagnostics.** 2. Run the Configuration/Setup Utility program.
Three short beeps	1. **DIMM** 2. System board
One continuous beep	1. **Microprocessor** 2. Optional microprocessor (if installed) 3. System board
Repeating short beeps	1. **Keyboard** 2. System board
One long and one short beep	1. **Video adapter (if installed)** 2. System board
One long and two short beeps	1. **Video adapter (if installed)** 2. System board
One long and three short beeps	1. **Monitor** 2. Video adapter, if installed 3. System board
Two long and two short beeps	**Video adapter**

No-beep symptoms

Note: See “System” on page 108 to determine which components a field service technician should replace.	
No-beep symptom	**FRU/action**
No beep and the system operates correctly.	1. **Check speaker cables.** 2. Speaker. 3. System board.
No beeps occur after successfully completing POST (the power-on status is disabled)	1. **Run the Configuration/Setup Utility program, and set the Start Options Power-On Status to enable.** 2. Check the speaker connection. 3. System board.
No ac power (power supply ac LED is off)	1. **Check the power cord.** 2. Power supply. (If two are installed, swap them to determine if one is defective.) 3. Disconnect the ribbon cable from connector J25 on the system board. If the ac power LED comes on, see “Undetermined problems” on page 103. 4. Power cage assembly.
No beep and no video	**See “Undetermined problems” on page 103.**
System will not start (power supply ac LED is on)	**See “Power-supply LED errors” on page 99.**

POST error codes

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

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Error code/symptom	**FRU/action**
062 (Three consecutive startup failures using the default configuration.)	1. **Run the Configuration/Setup Utility program.** 2. Battery. 3. System board. 4. Microprocessor.
101, 102 (System and processor error)	**System board**
106 (System and processor error)	**System board**
111 (Channel check error)	1. **Memory DIMM** 2. System board
114 (Adapter read-only memory error)	1. **Failing adapter.** 2. Run diagnostics.
129 (Internal cache error)	1. **Microprocessor** 2. Optional microprocessor (if installed)
151 (Real time clock error)	1. **Run diagnostics.** 2. Battery. 3. System board.

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Error code/symptom	**FRU/action**
161 (Real time clock battery error)	1. **Run the Configuration/Setup Utility program.** 2. Battery. 3. System board.
162 (Device configuration error) **Note:** Be sure to load the default settings and any additional desired settings; then, *save the configuration*.	1. **Run the Configuration/Setup Utility program.** 2. Battery. 3. Failing device. 4. System board.
163 (Real-time clock error)	1. **Run the Configuration/Setup Utility program.** 2. Battery. 3. System board.
164 (Memory configuration changed.)	1. **Run the Configuration/Setup Utility program.** 2. DIMM. 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.** 2. System board.
177, 178 (Security hardware error)	1. **Run the Configuration/Setup Utility program.** 2. System board.
184 (Power-on password damaged)	1. **Run the Configuration/Setup Utility program.** 2. System board.
185 (Drive startup sequence information corrupted)	1. **Run the Configuration/Setup Utility program.** 2. System board.
186 (Security hardware control logic failed)	1. **Run the Configuration/Setup Utility program.** 2. System board.
187 (VPD serial number not set.)	1. **Set serial number in the Configuration/Setup Utility program.** 2. System board.
188 (Bad EEPROM CRC #2)	1. **Run the Configuration/Setup Utility program.** 2. System board.
189 (An attempt was made to access the server with invalid passwords)	**Run the Configuration/Setup Utility program, and type the administrator password.**
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** 2. System board
229 (Cache error)	1. **Microprocessor** 2. Optional microprocessor (if installed)

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Error code/symptom	**FRU/action**
262 (DRAM parity configuration error)	1. **Run the Configuration/Setup Utility program.** 2. Battery. 3. System board.
289 (DIMM disabled by POST or user)	1. **Run the Configuration/Setup Utility program, if the DIMM was disabled by the user.** 2. Disabled DIMM, if not disabled by user.
301 (Keyboard or keyboard controller error)	1. **Keyboard** 2. System board
303 (Keyboard controller error)	**System board**
602 (Invalid diskette boot record)	1. **Diskette** 2. Diskette drive 3. Cable 4. System board
604 (Diskette drive error)	1. **Run the Configuration/Setup Utility program and diagnostics.** 2. Diskette drive. 3. Drive cable. 4. System board.
605 (Unlock failure)	1. **Diskette drive** 2. Drive cable 3. System board
662 (Diskette drive configuration error)	1. **Run the Configuration/Setup Utility program and diagnostics.** 2. Diskette drive. 3. Drive cable. 4. System board.
762 (Coprocessor configuration error)	1. **Run the Configuration/Setup Utility program.** 2. Battery. 3. Microprocessor.
962 (Parallel port error)	1. **Disconnect the external cable on the parallel port.** 2. Run the Configuration/Setup Utility program. 3. System board.
11XX (System board serial port 1 or 2 error)	1. **Disconnect the external cable on the serial port.** 2. Run the Configuration/Setup Utility program. 3. System board.
1301 (I^2C cable to front panel not found)	1. **Cable** 2. Front panel 3. Power switch assembly 4. System board
1302 (I^2C cable from system board to power on and reset switches not found)	1. **Cable** 2. Power switch assembly 3. System board

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Error code/symptom	**FRU/action**
1303 (I^2C cable from system board to power cage assembly not found)	1. **Cable** 2. Power-cage assembly 3. System board
1304 (I^2C cable to diagnostic LED board not found)	1. **Power switch assembly** 2. System board
1600 (The system management processor is not functioning) Before replacing a FRU, remove the ac power to the server, wait 20 seconds; then, reconnect the ac power. Wait 30 seconds; then, turn on the server.	**System board**
1601 (The system is able to communicate to the system management processor, but the system management processor failed to respond at the start of POST.) Complete the following steps before replacing a FRU: 1. Remove the ac power to the server, wait 20 seconds; then, reconnect the ac power. Wait 30 seconds; then, turn on the server. 2. Flash update the system management processor.	1. **Remote Supervisor Adapter, if installed** 2. System board
1602 (Optional service processor not properly installed.)	**Disconnect all server and option power cords from server, wait 30 seconds, reconnect, and retry.**
1762 (Hard disk configuration error)	1. **Hard disk drive.** 2. Hard disk cables. 3. Run the Configuration/Setup Utility program. 4. Hard disk adapter. 5. SCSI backplane. 6. System board.
178X (Fixed disk error)	1. **Hard disk cables.** 2. Run diagnostics. 3. Hard disk adapter. 4. Hard disk drive. 5. System board.
1800 (No more hardware interrupt available for PCI adapter)	1. **Run the Configuration/Setup Utility program.** 2. Failing adapter. 3. System board.

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Error code/symptom	**FRU/action**
1962 (Drive does not contain a valid boot sector)	1. **Verify that a startable operating system is installed.** 2. Run diagnostics. 3. Hard disk drive. 4. SCSI backplane. 5. Cable. 6. System board.
2400 (Video controller test failure)	1. **Video adapter (if installed)** 2. System board
2462 (Video memory configuration error)	1. **Video adapter (if installed)** 2. System board
5962 (IDE CD-ROM drive configuration error)	1. **Run the Configuration/Setup Utility program.** 2. DVD-ROM drive. 3. DVD-ROM power cable. 4. IDE cable. 5. System board. 6. Battery.
8603 (Pointing-device error)	1. **Pointing device** 2. System board
0001200 (Machine check architecture error)	1. **Microprocessor 1** 2. Optional microprocessor 2
00012000 (Microprocessor machine check)	1. **Microprocessor** 2. System board
00019501 (Microprocessor 1 is not functioning - check VRM and microprocessor LEDs)	1. **VRM 1** 2. Microprocessor 1 3. System board
00019502 (Microprocessor 2 is not functioning - check VRM and microprocessor LEDs)	1. **VRM 2** 2. Microprocessor 2
00019701 (Microprocessor 1 failed)	1. **Microprocessor 1** 2. System board
00019702 (Microprocessor 2 failed)	1. **Microprocessor 2** 2. System board
00180100 (A PCI adapter has requested memory resources that are not available.)	1. **Reorder the adapters in the PCI slots. It is important that your startup device is positioned early in the startup-device order so that it is run by POST.** 2. Ensure that the PCI adapter and all other adapters are set correctly in the Configuration/Setup Utility program Utility program. If the memory resource settings are not correct, change the settings. 3. If all memory resources are being used, you might need to remove an adapter to make memory available to the PCI adapter. Disabling the adapter BIOS on the adapter might correct the error. (See the documentation provided with the adapter.)

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Error code/symptom	**FRU/action**
00180200 (No more I/O space available for PCI adapter)	1. **Run the Configuration/Setup Utility program.** 2. Failing adapter. 3. System board.
00180300 (No more memory (above 1MB for PCI adapter))	1. **Run the Configuration/Setup Utility program.** 2. Failing adapter. 3. System board.
00180400 (No more memory (below 1MB for PCI adapter))	1. **Run the Configuration/Setup Utility program.** 2. Move the failing adapter to slot 1. 3. Failing adapter. 4. System board.
00180500 (PCI option ROM checksum error)	1. **Remove failing PCI card.** 2. System board.
00180600 (PCI to PCI bridge error)	1. **Run the Configuration/Setup Utility program.** 2. Move the failing adapter to slot 1. 3. Failing adapter. 4. System board
00180700, 00180800 (General PCI error)	1. **System board** 2. PCI card
00181000 (PCI error)	1. **Adapter** 2. System board
01295085 (ECC checking hardware test error)	1. **System board** 2. Microprocessor
01298001 (No update data for microprocessor 1)	1. **Ensure all processors have the same cache size.** 2. Microprocessor 1.
01298002 (No update data for microprocessor 2)	1. **Ensure all microprocessors have the same cache sizes, clock speeds and clock frequencies.** 2. Microprocessor 2.
01298101 (Bad update data for microprocessor 1)	1. **Ensure all microprocessors have the same cache sizes, clock speeds and clock frequencies.** 2. Microprocessor 1.
01298102 (Bad update data for microprocessor 2)	1. **Ensure all microprocessors have the same cache sizes, clock speeds and clock frequencies.** 2. Microprocessor 2.
I9990301 (Hard disk sector error)	1. **Hard disk drive** 2. SCSI backplane 3. Cable 4. System board
I9990305 (Hard disk sector error, no operating system installed)	**Install operating system to hard disk.**

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Error code/symptom	**FRU/action**
I9990650 (AC power has been restored)	1. **Check cable.** 2. Check for interruption of power. 3. Power cable.

Light path diagnostics LEDs

The following table lists the LEDs on the light path diagnostics panel, the problems that they indicate, and actions to solve the problems.

Note: Check the system-error log and BMC log for additional information before replacing a FRU.

LED	Problem	Action
None	An error has occurred and cannot be diagnosed, or the ASM processor has failed. The error is not represented by a light path diagnostics LED.	Check the system-error log and BMC log for information about the error.
OVER SPEC	The power supplies are using more power than their maximum rating.	Replace the failing power supply, or remove optional devices from the server.
PS 1	When the LED is lit, the power supply in bay 1 has failed. When the LED flashes, an invalid power-supply configuration has occurred.	If the power supply has failed, replace the power supply. If a configuration error has occurred, make sure that the power supply is installed correctly.
PS 2	When the LED is lit, the power supply in bay 2 has failed. When the LED flashes, an invalid power-supply configuration has occurred.	If the power supply has failed, replace the power supply. If a configuration error has occurred, make sure that the power supply is installed correctly.
CPU	When the LED is lit, a microprocessor has failed. When the LED flashes, an invalid microprocessor configuration has occurred.	If a lit LED on the system board indicates a problem with a microprocessor, make sure that the microprocessor is installed correctly. See the *Option Installation Guide* on the IBM *xSeries Documentation* CD for information about installing a microprocessor. If the problem remains, replace the microprocessor. If a configuration error has occurred, make sure that the microprocessors have the same cache size and type, and the same clock speed. Microprocessor internal and external clock frequencies must be identical. If the problem remains, replace the system board.
VRM	When the LED is lit, an error occurred on the microprocessor voltage regulator module (VRM). When the LED flashes, an invalid VRM configuration has occurred.	Check the system board LEDs to determine which VRM has failed. If the option VRM has failed, replace the optional VRM. If the VRM mounted on the system board has filed, replace the system board. If a configuration error has occurred, make sure that the VRM is installed correctly. If the problem remains, replace the VRM.
CNFG	When this LED is lit, the front system error LED will also be lit.	Check the microprocessor options just installed to ensure they are compatible with each other and change as needed.

LED	Problem	Action
MEM	When the LED is on, a memory error has occurred. When the LED flashes, an invalid DIMM configuration has occurred.	Replace the failing DIMM, which is indicated by the lit LED on the system board. If a configuration error has occurred, make sure the DIMMs are installed correctly.
NMI	A machine check error has occurred.	Check the system-error log and BMC log for information about the error.
S ERR	Reserved	
SP	The service processor has failed.	Remove ac power from the server; then, reconnect the server to ac power and restart the server. If the problem remains, replace the system board.
DASD	A hard disk drive error has occurred.	Check the LEDs on the hard disk drives and replace the indicated drive.
RAID	A RAID controller error has occurred.	Check the system-error log and BMC log for information about the error. See the documentation that comes with the RAID controller.
FAN	When the LED is lit, a fan has failed or is operating too slowly. A failing fan can also cause the TEMP LED to be lit. When the LED flashes, an invalid fan configuration has occurred.	Replace the failing fan, which is indicated by the lit LED. If a configuration error has occurred, make sure that the fans are installed correctly.
TEMP	The system temperature has exceeded a threshold level.	• Determine whether a fan has failed. If it has, replace it. • Make sure that the room temperature is not too high. See the *User's Guide* on the IBM *xSeries Documentation* CD for temperature information. • Make sure that the air vents are not blocked.
BRD	An error has occurred on the system board.	• Check the LEDs on the system board to identify the component that is causing the error. • Check the system-error log and BMC log for information about the error.
PCI A PCI B PCI C	An error has occurred on a PCI bus.	• Check the system-error log and BMC log for information about the error. • If you cannot isolate the failing adapter through the information in the system error log or BMC log, remove one adapter at a time from the failing PCI bus, and restart the server after each adapter is removed. If the problem remains, replace the system board.

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 stop the test.

197 Warning; a hardware failure might not have occurred.

For all error codes, replace the FRU or take the action indicated.

Note: See "System" on page 108 to determine which components a field service technician should replace.	
Error code/symptom	**FRU/action**
001-XXX-000 (Failed core tests)	**System board**
001-XXX-001 (Failed core tests)	**System board**
001-250-001 (Failed system board ECC)	**Processor board**
005-XXX-000 (Failed video test)	**System board**
011-XXX-000 (Failed COM1 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 the parallel port is not disabled.** 2. Run the USB external loopback test again. 3. System board.
015-XXX-198 (USB device connected during USB test)	1. **Remove USB devices from USB1 and USB2.** 2. Run the USB external loopback test again. 3. System board.
020-XXX-000 (Failed PCI interface test)	**System board**
020-XXX-001 (Failed hot-swap slot 1 PCI latch test)	1. **PCI hot-swap latch assembly** 2. System board
020-XXX-002 (Failed Hot-swap slot 2 PCI latch test)	1. **PCI hot-swap latch assembly** 2. System board
020-XXX-003 (Failed hot-swap slot 3 PCI latch test)	1. **PCI hot-swap latch assembly** 2. System board
020-XXX-004 (Failed hot-swap slot 4 PCI latch test)	1. **PCI hot-swap latch assembly** 2. System board
030-XXX-000 (Failed internal SCSI interface test)	**System board**
035-XXX-099(No adapters were found.)	**If adapter is installed re-check connection.**

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Error code/symptom	**FRU/action**
035-XXX-S99 (Failed RAID test on PCI slot S. S = number of failing PCI slot. Check the system-error log and BMC log before replacing a FRU.)	1. **Adapter** 2. SCSI backplane 3. Cable
035-XXX-SNN (Check system-error log and BMC log before replacing a FRU. *s* = number of failing PCI slot, *nn* = SCSI ID of failing fixed disk.)	**Hard disk drive with SCSI ID *nn* on RAID adapter in PCI slot *s*.**
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 see the *ServeRAID Hardware Maintenance Manual* for more information.** 2. Cable. 3. SCSI backplane. 4. Adapter.
075-XXX-000 (Failed power supply test)	**Power supply**
089-XXX-001 (Failed microprocessor test)	1. **VRM 1 for microprocessor 1** 2. Microprocessor 1
089-XXX-002 (Failed optional microprocessor test)	1. **VRM 2 for optional microprocessor 2** 2. Optional microprocessor 2
166-051-000 System Management: Failed (Unable to communicate with RSA. It may be busy. Run the test again.)	1. Flash latest levels of firmware (BIOS, service processor, diagnostics) 2. Rerun diagnostic test. 3. Correct other error conditions (including failed system management tests and items logged in Remote Supervisor Adapter II SlimLine system-error log) and retry. 4. Disconnect all server and option power cords from server, wait 30 seconds, reconnect, and retry. 5. Remote Supervisor Adapter II SlimLine.
166-060-000 System Management: Failed (Unable to communicate with RSA. It may be busy. Run the test again.)	1. Flash latest levels of firmware (BIOS, service processor, diagnostics) 2. Rerun diagnostic test. 3. Correct other error conditions (including failed system management tests and items logged in Remote Supervisor Adapter II SlimLine system-error log) and retry. 4. Disconnect all server and option power cords from server, wait 30 seconds, reconnect, and retry. 5. Remote Supervisor Adapter II SlimLine.

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Error code/symptom	**FRU/action**
166-070-000 System Management: Failed (Unable to communicate with RSA. It may be busy. Run the test again.)	1. Flash latest levels of firmware (BIOS, service processor, diagnostics) 2. Rerun diagnostic test. 3. Correct other error conditions (including failed system management tests and items logged in Remote Supervisor Adapter II SlimLine system-error log) and retry. 4. Disconnect all server and option power cords from server, wait 30 seconds, reconnect, and retry. 5. Remote Supervisor Adapter II SlimLine.
166-198-000 System Management: Aborted (Unable to communicate with RSA. It may be busy. Run the test again.)	1. **Run the diagnostic test again.** 2. Correct other error conditions and retry. These include other failed system management tests and items logged in the system-error log of the optional Remote Supervisor Adapter II SlimLine. 3. Disconnect all server and option power cords from the server, wait 30 seconds, reconnect, and retry. 4. Remote Supervisor Adapter II SlimLine, if installed. 5. System board.
166-250-000 System Management: Failed (I2C cable is disconnected. Reconnect I2C cable between Remote Supervisor Adapter and system board.)	1. Remote Supervisor Adapter II SlimLine. 2. System board.
166-260-000 System Management: Failed (Restart RSA error. After restarting, RSA communication was lost. Unplug and cold boot to reset RSA.)	1. **Disconnect all server and option power cords from the server, wait 30 seconds, reconnect, and retry.** 2. Reseat Remote Supervisor Adapter II SlimLine. 3. Remote Supervisor Adapter II SlimLine.
166-342-000 System Management: Failed (RSA adapter BIST indicate failed tests.)	1. **Ensure the latest firmware levels for Remote Supervisor Adapter II SlimLine and BIOS are installed.** 2. Disconnect all server and option power cords from server, wait 30 seconds, reconnect, and retry. 3. Remote Supervisor Adapter II SlimLine.
166-400-000 System Management: Failed (BMC self test result failed tests: x where x = Flash, RAM, or ROM.)	1. **Reflash or update firmware for BMC.** 2. System board.
166-404-001 System Management: Failed (BMC indicates failure in I2C bus test.)	1. **Disconnect all server and option power cords from the server, wait 30 seconds, reconnect, and retry.** 2. Reflash or update firmware for BMC. 3. Power backplane 4. System board.
166-406-001 System Management: Failed (BMC indicates failure in I2C bus test.)	1. **Disconnect all server and option power cords from the server, wait 30 seconds, reconnect, and retry.** 2. Reflash or update firmware for BMC. 3. SCSI cable. 4. SCSI backplane. 5. System board.

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Error code/symptom	**FRU/action**
166-407-001 System Management: Failed (BMC indicates failure in I2C bus test.)	1. **Disconnect all server and option power cords from the server, wait 30 seconds, reconnect, and retry.** 2. Reflash or update firmware for BMC. 3. Operator information panel cable. 4. Operator information panel. 5. System board.
166-NNN-001 System Management: Failed (BMC indicates failure in self test where NNN=300 to 320.)	1. **Disconnect all server and option power cords from the server, wait 30 seconds, reconnect, and retry.** 2. Reflash or update firmware for BMC. 3. System board.
166-NNN-001 System Management: Failed (BMC indicates failure in I2C bus test where NNN=400 to 420 (excluding 412, 414, and 415).)	1. **Disconnect all server and option power cords from the server, wait 30 seconds, reconnect, and retry.** 2. Reflash or update firmware for BMC. 3. System board.
166-412-001 System Management: Failed (BMC indicates failure in I2C bus test where NNN=400 to 420)	1. **Disconnect all server and option power cords from the server, wait 30 seconds, reconnect, and retry.** 2. Reflash or update firmware for BMC. 3. Power backplane 4. System board.
166-414-001 System Management: Failed (BMC indicates failure in I2C bus test where NNN=400 to 420)	1. **Disconnect all server and option power cords from the server, wait 30 seconds, reconnect, and retry.** 2. Reflash or update firmware for BMC. 3. SCSI cable 4. SCSI backplane 5. System board.
166-415-001 System Management: Failed (BMC indicates failure in I2C bus test where NNN=400 to 420)	1. **Disconnect all server and option power cords from the server, wait 30 seconds, reconnect, and retry.** 2. Reflash or update firmware for BMC. 3. Operator panel cable 4. Operator panel 5. System board.
180-XXX-000 (Diagnostics LED failure)	**Run diagnostics panel LED test for the failing LED.**
180-XXX-001 (Failed front LED panel test)	1. **Operator information panel** 2. System board
180-XXX-002 (Failed diagnostics LED panel test)	1. **Diagnostics panel** 2. System board
180-361-003 (Failed fan LED test)	1. **Fan (s)** 2. System board
180-XXX-003 (Failed system board LED test)	**System board**
180-XXX-005 (Failed SCSI backplane LED test)	1. **SCSI backplane** 2. SCSI backplane cable 3. System board

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Error code/symptom	**FRU/action**
201-XXX-0NN (Failed memory test.) **Note:** nn = slot of failing DIMM	1. **Replace the DIMM is slot NN.** 2. Processor board 3. Memory adapter, if installed.
201-XXX-N99 (Multiple DIMM failure, see error text) **Note:** n= is slot numbers of failing pair	1. **See error text for failing DIMMs.*N*** 2. Processor board 3. Memory adapter, if installed.
202-XXX-001 (Failed system cache test)	1. **VRM 1** 2. Microprocessor 1
202-XXX-002 (Failed system cache test)	1. **VRM 2** 2. Microprocessor 2
206-XXX-000 (Failed diskette drive test)	1. **Rerun the test with a different diskette.** 2. Cable. 3. Diskette drive. 4. System board.
215-XXX-000 (Failed IDE CD-ROM drive test)	1. **Rerun the test with a different DVD-ROM drive.** 2. DVD-ROM drive cables. 3. DVD-ROM drive. 4. System board.
217-198-XXX (Could not establish drive parameters)	1. **Check cable and termination.** 2. SCSI backplane. 3. Hard disk.
217-XXX-000 (Failed BIOS hard disk test) **Note:** If RAID is configured, the hard disk number refers to the RAID logical array.	**Hard disk 1**
217-XXX-001 (Failed BIOS hard disk test) **Note:** If RAID is configured, the hard disk number refers to the RAID logical array.	**Hard disk 2**
217-XXX-002 (Failed BIOS hard disk test) **Note:** If RAID is configured, the hard disk number refers to the RAID logical array.	**Hard disk 3**
217-XXX-003 (Failed BIOS hard disk test) **Note:** If RAID is configured, the hard disk number refers to the RAID logical array.	**Hard disk 4**
217-XXX-004 (Failed BIOS hard disk test) **Note:** If RAID is configured, the hard disk number refers to the RAID logical array.	**Hard disk 5**
217-XXX-005 (Failed BIOS hard disk test) **Note:** If RAID is configured, the hard disk number refers to the RAID logical array	**Hard disk 6**

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Error code/symptom	**FRU/action**
264-XXX-0NN (Failed tape drive test)	1. **Tape cartridge, if user executed the Read/Write Tape Drive test (failure code of XXX = 256)** 2. SCSI or power cable connected to tape drive with SCSI ID *nn* 3. Tape drive with SCSI ID *nn* (refer to the Help and Service Information appendix of the tape drive *User Guide*) 4. System board or SCSI controller (run SCSI controller diagnostic to determine if the SCSI bus is functioning properly.)
264-XXX-999 (Errors on multiple tape drives, see error text for more info)	**See error messages/text in the PC Doctor error log for detailed information on each individual tape drive error.**
301-XXX-000 (Failed keyboard test)	**Keyboard**
405-XXX-000 (Failed Ethernet test on controller on the system board)	1. **Verify that Ethernet is not disabled in BIOS.** 2. System board.
405-XXX-00N (Failed Ethernet test on adapter in PCI slot *n*)	1. **Adapter in PCI slot *n*** 2. System board
415-XXX-000 (Failed Modem test)	1. **Cable.** **Note:** Ensure modem is present and attached to server. 2. Modem. 3. System board.

Error symptoms

You can use the error symptom tables to find solutions to problems that have definite symptoms.

Note: Some of the components in this section may not be supported on your server model.

If you cannot find the problem in the error symptom tables, run the diagnostic programs to test the server.

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

1. Remove the software or device that you just added.
2. Run the diagnostic tests to determine whether the server is running correctly.
3. Reinstall the new software or new device.

In the following tables, if the entry in the FRU/action column is a suggested action, perform that action; if it is the name of a component, reseat the component and replace it if necessary. The most likely cause of the symptom is listed first.

DVD-ROM drive error symptoms

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
DVD-ROM drive is not recognized.	1. **Verify that:** • The IDE channel to which the DVD-ROM drive is attached (primary or secondary) is enabled in the Configuration/Setup Utility program. • All cables and jumpers are installed correctly. • The correct device driver is installed for the DVD-ROM drive. 2. Run CD-ROM drive diagnostics. 3. DVD-ROM drive.
DVD is not working properly.	1. **Clean the CD.** 2. Run CD-ROM diagnostics. 3. DVD-ROM drive.
DVD-ROM drive tray is not working. (The server must be powered on.)	1. **Insert the end of a paper clip into the manual tray-release opening.** 2. Run CD-ROM diagnostics. 3. DVD-ROM drive.

Diskette drive error symptoms

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
The diskette drive activity LED stays lit, or the server bypasses the diskette drive, or the diskette drive does not work.	1. **If there is a diskette in the drive, verify that:** • The diskette drive is enabled in the Configuration/Setup utility program. • The diskette is good and not damaged. (Try another diskette if you have one.) • The diskette is inserted correctly in the drive. • The diskette contains the necessary files to start the server. • The software program is working properly. • The cable is installed correctly (in the proper orientation). 2. To prevent diskette drive read/write errors, make sure that the distance between monitors and diskette drives is at least 76 mm (3 in.). 3. Run diskette drive diagnostics. 4. Cable. 5. Diskette drive. 6. System board.

General error symptoms

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
Problems such as broken cover locks or indicator LEDs not working	• **Broken CRU/FRU**

Hard disk drive error symptoms

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
Not all drives are recognized by the hard disk drive diagnostic test (Fixed Disk test).	1. **Remove the first drive not recognized and try the hard disk drive diagnostic test again.** 2. If the remaining drives are recognized, replace the drive you removed with a new one.
System stops responding during hard disk drive diagnostic test.	1. **Remove the hard disk drive being tested when the server stopped responding and try the diagnostic test again.** 2. If the hard disk drive diagnostic test runs successfully, replace the drive you removed with a new one.

Intermittent error symptoms

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
A problem occurs only occasionally and is difficult to detect.	1. **Verify that:** • All cables and cords are connected securely to the rear of the server and attached options. • When the server is turned on, air is flowing from the rear of the server at the fan grill. If there is no airflow, the fan is not working. This causes the server to overheat and shut down. • Ensure that the SCSI bus and devices are configured correctly and that the last external device in each SCSI chain is terminated correctly. 2. Check the system-error log and BMC log.

Keyboard, mouse, or pointing device error symptoms

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
All or some keys on the keyboard do not work.	1. **Verify that:** • The keyboard cable is securely connected to the system, and the keyboard and mouse cables are not reversed. • The server and the monitor are turned on. 2. Keyboard. 3. System board.
The mouse or pointing device does not work.	1. **Verify that:** • The mouse or pointing-device cable is securely connected, and that the keyboard and mouse cables are not reversed. • The mouse device drivers are installed correctly. 2. Mouse or pointing device. 3. System board.

Memory error symptoms

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
The amount of system memory displayed is less than the amount of physical memory installed.	1. **Verify that:** • Memory mirroring is not enabled. • The memory modules are seated properly. • You have installed the correct type of memory. • If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program. • All banks of memory on the DIMMs are enabled. The server might have automatically disabled a DIMM bank when it detected a problem or a DIMM bank could have been manually disabled. 2. Check POST error log for error message 289: • If the DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. • If the DIMM was disabled by the user or by POST: a. Start the Configuration/Setup Utility program. b. Enable the DIMM. c. Save the configuration and restart the server. 3. DIMM. 4. System board.

Microprocessor error symptoms

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
The server emits a continuous tone during POST. (The startup (boot) microprocessor is not working properly.)	1. **Verify that the startup microprocessor is seated properly.** 2. Startup microprocessor.

Monitor error symptoms

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
Monitor problems (general).	**Some IBM monitors have their own self-tests.** If you suspect a problem with the monitor, refer to the information that comes with the monitor for adjusting and testing instructions. 1. Monitor. 2. Run video diagnostics. If diagnostics pass, the problem may be a video driver. 3. Display adapter / system board.

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
The screen is blank.	1. **Verify that:** • The server power cord is connected to the server and a working electrical outlet. • The monitor cables are connected properly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. **Important:** In some memory configurations, the 3-3-3 beep code might sound during POST followed by a blank display screen. If this occurs and the **Boot Fail Count** feature in the Start Options of the Configuration/Setup Utility program is set to **Enabled** (its default setting), you must restart the server three times to force the system BIOS to reset the CMOS values to the default configuration (memory connector or bank of connectors enabled). If you have installed a Remote Supervisor Adapter II SlimLine in the server, make sure that the video cable is connected to the Remote Supervisor Adapter II SlimLine. 2. Make sure that damaged BIOS code is not affecting the video; see “Recovering the BIOS code” on page 18. 3. If you have verified these items and the screen remains blank, replace: a. Monitor b. Video adapter, if installed c. System board
Only the cursor appears.	• **See “Undetermined problems” on page 103.**
The monitor works when you turn on the server but goes blank when you start some application programs.	1. **Verify that:** • The application program is not setting a display mode higher than the capability of the monitor. • You installed the necessary device drivers for the applications. 2. If you have verified these items and the screen remains blank, replace the monitor.
The screen is wavy, unreadable, rolling, distorted, or has screen jitter.	1. **If the monitor self-tests show the monitor is working properly, consider the location of the monitor.** Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor. **Notes:** a. To prevent diskette drive read/write errors, make sure that the distance between monitors and diskette drives is at least 76 mm (3 in.). b. Non-IBM monitor cables might cause unpredictable problems. c. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, contact your IBM reseller or IBM marketing representative. 2. Video adapter, if installed. 3. System board.
Wrong characters appear on the screen.	1. **If the wrong language is displayed, update the BIOS code with the correct language.** 2. Video adapter, if installed. 3. System board.

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
No video.	**Make sure that all cables are connected correctly and securely.** If you have a Remote Supervisor Adapter II installed in the server, make sure that the video cable is connected to the Remote Supervisor Adapter II SlimLine.

Option error symptoms

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
An IBM option that was just installed does not work.	1. **Verify that:** • The option is designed for the server (see the ServerProven list at http://www.ibm.com/servers/eserver/serverproven/compat/us/). • You followed the installation instructions that came with the option. • The option is installed correctly. • You have not loosened any other installed options or cables. • You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration. 2. Option you just installed.
An IBM option that used to work does not work now.	1. **Verify that all of the option hardware and cable connections are secure.** 2. If the option comes with its own test instructions, use those instructions to test the option. 3. If the failing option is a SCSI option, verify that: • The cables for all external SCSI options are connected correctly. • The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. • Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server. 4. Failing option.

Power error symptoms

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
The power switch does not work and the reset button, if supported, does work.	1. **Reseat the connector.** 2. Power switch card. 3. System board.

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
The server does not turn on.	1. **Verify that:** • The power cables are properly connected to the server. • The electrical outlet functions properly. • The type of memory installed is supported by the server, and that functional DIMMs are installed in slots 1 and 2. • The microprocessor is installed in the correct socket. • The diagnostic panel cable is properly connected. • If you just installed an option, remove it, and restart the server. If the server now turns on, you might have installed more options than the power supply supports. 2. If LEDs for microprocessors or VRMs are on, verify that: a. A VRM is installed if a second microprocessor is present. b. All microprocessors have the same speed. 3. Override front panel power button: a. Disconnect server power cords. b. Move switch 1 on switch block 2 to the opposite position. c. Reconnect power cords. If server turns on: a. Service processor (baseboard management controller) error. b. Operator information card. If server does not turn on: • System board
The server does not turn off.	1. **Verify whether you are using an ACPI or non-ACPI operating system.** If you are using a non-ACPI operating system: a. Press Ctrl+Alt+Delete. b. Turn off the system by holding the power-control button for 4 seconds. c. If server fails during BIOS POST and power-control button does not work, remove the AC power cord. 2. If the problem remains or if you are using an operating system with Advanced Configuration and Power Management (ACPI) awareness, suspect the system board. The procedure to check for ACPI is to locate the file named HAL.dll; ACPI is present if the internal name HALACPI.dll appears after you right-clicking on the HAL.dll file name → choose **Properties** → select **Version** tab → click **Internal Name**.

Serial port error symptoms

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
The number of serial ports identified by the operating system is less than the number of serial ports installed.	1. **Verify that:** • Each port is assigned a unique address by the Configuration/Setup Utility program and none of the serial ports is disabled. • The serial-port adapter, if you installed one, is seated properly. 2. Failing serial port adapter.

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
A serial device does not work.	1. **Verify that:** • The device is compatible with the server. • The serial port is enabled and is assigned a unique address. • The device is connected to the correct port (see “Input/output connectors” on page 55). 2. Failing serial device. 3. Serial adapter, if installed. 4. System board.

ServerGuide error symptoms

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
The *ServerGuide Setup and Installation* CD will not start.	• **Verify that the server is supported and has a startable (bootable) DVD-ROM drive.** • If the startup (boot) sequence settings have been altered, ensure that the DVD-ROM drive is first in the startup sequence. • If more than one DVD-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.	• **Verify that there are no duplicate SCSI IDs or IRQ assignments.** • Verify that the hard disk drive is connected properly.
The operating system installation program continuously loops.	• **Make more space available on the hard disk.**
The ServerGuide program will not start the operating-system CD.	• **Verify that the operating-system CD you have is supported by the ServerGuide program.** See the *ServerGuide Setup and Installation* CD label for a list of supported operating system versions.
The operating system cannot be installed; the option is not available.	• **Verify that the operating system is supported on the server.** If the operating system 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.

Software error symptoms

Note: See “System” on page 108 to determine which components should be replaced by a field service technician.	
Symptom	**FRU/action**
Suspected software problem.	1. **To determine if problems are caused by the software, verify that:** • The server has the minimum memory needed to use the software. For memory requirements, see the information that comes with the software. **Note:** If you have just installed an adapter or memory, you might have a memory address conflict. • The software is designed to operate on the server. • Other software works on the server. • The software that you are using works on another system. If you received any error messages when using the software program, see the information that comes with the software for a description of the messages and suggested solutions to the problem. 2. If you have verified these items and the problem remains, contact the place of purchase.

Power-supply LED errors

Use the information in this section to solve power-supply problems.

Note: The minimum configuration required for the dc good light to be lit is:
- Power supply
- Power cage assembly.
- System board (set switch 1 of SW2 to bypass the power switch; see "System-board switches and jumpers" on page 68).

Note: See "System" on page 108 to determine which components a field service technician should replace.			
AC good LED	**DC good LED**	**Description**	**FRU/action**
Off	Off	No power to system or ac problem.	1. **Check ac power to the system.** 2. Power supply.
On	Off	Standby mode or dc problem.	1. Move switch 1 of SW 2 to bypass power control. If the dc good LED is lit, press Ctrl+Alt+Delete. Watch the screen for any POST errors. Check the system-error log and BMC log for any listed problems. If the system starts with no errors: a. Power switch assembly b. System board 2. Remove the adapters, and disconnect the cables and power connectors to all internal and external devices. Turn on the system. If the dc good LED is lit, replace the adapters and devices one at a time until you isolate the problem. 3. Power supply. 4. Power cage assembly. 5. System board.
On	On	Power is working properly.	N/A

Service processor error codes

When viewed in the system-error log, the Remote Supervisor Adapter II SlimLine messages will appear as text descriptions. To determine a possible error condition for the Remote Supervisor Adapter II SlimLine, see the system-error log (see "Viewing error logs from diagnostic programs" on page 13).

SCSI error codes

Note: If a ServeRAID-7k controller is installed and later removed, you must re-enable the on-board SCSI controller in using the Configuration/Setup Utility program (see Chapter 2, "Configuring the server," on page 9).

Error code	FRU/action
All SCSI Errors One or more of the following might be causing the problem: • A failing SCSI device (adapter, drive, controller) • An improper SCSI configuration or SCSI termination jumper setting • Duplicate SCSI IDs in the same SCSI chain • A missing or improperly installed SCSI terminator • A defective SCSI terminator • An improperly installed cable • A defective cable	1. **External SCSI devices must be turned on before you turn on the server.** 2. Make sure that the cables for all external SCSI devices are connected correctly. 3. If you have attached an external SCSI device to the server, make sure the external SCSI termination is set to automatic. 4. Make sure that the last device in each SCSI chain is terminated correctly. 5. Make sure that the SCSI devices are configured correctly.

Temperature error messages

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Message	**Action**
DASD Over Temperature (level-critical; direct access storage device bay *x* was over temperature)	**Ensure that the server is being properly cooled**; see “System reliability guidelines” on page 24.
DASD Over recommended Temperature (sensor *x*) (level-warning; hard disk drive bay *x* had over temperature condition)	**Ensure that the server is being properly cooled**; see “System reliability guidelines” on page 24.
DASD under recommended temperature (sensor *x*) (level-warning; direct access storage device bay *x* had under temperature condition)	**Ambient temperature must be within normal operating specifications**; see “Features and specifications” on page 3.
DASD Over Temperature (level-critical; sensor for DASD1 reported temperature over recommended range)	**Ensure that the server is being properly cooled**; see “System reliability guidelines” on page 24.
Power supply *x* Temperature Fault (level-critical; power supply *x* had over temperature condition)	1. **Ensure that the server is being properly cooled;** see “System reliability guidelines” on page 24. 2. Replace power supply *x*.
System board is over recommended temperature (level-warning; system board is over recommended temperature)	1. **Ensure that the server is being properly cooled**; see “System reliability guidelines” on page 24. 2. Replace the system board.
System board is under recommended temperature (level-warning; system board is under recommended temperature)	**Ambient temperature must be within normal operating specifications**; see “Features and specifications” on page 3.
System over temperature for CPU *x* (level-warning; CPU x reporting over temperature condition)	**Ensure that the server is being properly cooled;** see “System reliability guidelines” on page 24.
System under recommended CPU *x* temperature (level-warning; system reporting under temperature condition for CPU x)	**Ambient temperature must be within normal operating specifications**; see “Features and specifications” on page 3.

Fan error messages

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Message	**Action**
Fan *x* failure (level-critical; fan *x* had a failure)	1. **Check connections to fan *x*.** 2. Replace fan *x*.
Fan *x* fault (level-critical; fan *x* beyond recommended RPM range)	1. **Check connections to fan *x*.** 2. Replace fan *x*.
Fan *x* outside recommended speed action	**Replace fan *x*.**

Power error messages

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Message	**Action**
Power supply *x* current share fault (level-critical; excessive current demand on power supply *x*)	**Replace power supply *x*.**
Power supply *x* DC good fault (level-critical; power good signal not detected for power supply *x*)	**Replace power supply *x*.**
Power supply *x* temperature fault	**Replace power supply *x*.**
Power supply *x* removed	**No action required - information only**.
Power supply *x* fan fault (level-critical; fan fault in power supply *x*)	**Replace power supply *x*.**
Power supply *x* 12 V fault (level-critical; overcurrent condition detected)	**See “Power checkout” on page 19.**
Power supply *x* 3.3 V fault (level-critical; 3.3 V power supply *x* had an error)	**See “Power checkout” on page 19.**
Power supply *x* 5 V fault (level-critical; 5 V power supply *x* had an error)	**See “Power checkout” on page 19.**
System running non-redundant power (level-noncritical; system does not have redundant power)	1. **Add another power supply.** 2. Remove options from server. 3. System can continue to operate without redundancy protection if steps 1 and 2 are not followed.
System under recommended voltage for *x* (level-warning; indicated voltage supply under nominal value; value for *x* can be +12, -12, or +5)	1. **Check connections to the power subsystem.** 2. Power supply. 3. Power cage assembly.

System shutdown

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

Voltage related system shutdown

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Message	**Action**
System shutoff due to *x* current over max value (level-critical; system drawing too much current on voltage *x* bus)	**See “Power checkout” on page 19.**
System shutoff due to *x* V over voltage (level-critical; system shutoff due to *x* supply over voltage)	1. **Check the power-supply connectors.** 2. Power supply. 3. Power cage assembly.
System shutoff due to *x* V under voltage (level-critical system shutoff due to *x* supply under voltage)	1. **Check the power-supply connectors.** 2. Power supply. 3. Power cage assembly.
System shutoff due to VRM x over voltage	**Replace VRM *x*.**
System shutoff due to excessive (< 240 VA) loading	1. **See “Power checkout” on page 19.** 2. Cycle ac on/off.

Temperature related system shutdown

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Message	**Action**
System shutoff due to board over temperature (level-critical; board is over temperature)	1. **Ensure that the server is being properly cooled**; see “System reliability guidelines” on page 24. 2. Replace board.
System shutoff due to CPU x over temperature (level-critical; CPU *x* is over temperature)	1. **Ensure that the server is being properly cooled**; see “System reliability guidelines” on page 24. 2. Replace CPU *x*.
System shutoff due to CPU *x* under temperature (level-critical; CPU *x* is under temperature)	**Ambient temperature must be within normal operating specifications**; see “Features and specifications” on page 3.
System shutoff due to DASD temperature (sensor *x*) (level-critical; DASD area reported temperature outside recommended operating range)	**Ensure that the system is being properly cooled**; see “System reliability guidelines” on page 24.
System shutoff due to high ambient temperature (level-critical; high ambient temperature)	**Ambient temperature must be within normal operating specifications**; see “Features and specifications” on page 3.
System shutoff due to system board under temperature (level-critical; system board is under temperature)	**Ambient temperature must be within normal operating specifications**; see “Features and specifications” on page 3.

Hard disk drive checkout

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Message	**Action**
Hard drive *x* removal detected (level-critical; hard drive *x* has been removed)	**Information only, take action as appropriate.**

Host built-in self test (BIST)

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Message	**Action**
Host fail (level-informational; built-in self-test for the host failed)	1. **Reseat the microprocessor.** 2. Reseat the VRM. 3. Microprocessor.

Bus fault messages

Note: See “System” on page 108 to determine which components a field service technician should replace.	
Bus fault messages	**Message Action**
Failure reading I2C device. Check devices on bus 0.	1. **If installed, reseat the cable between Remote Supervisor Adapter and the Remote Supervisor Adapter connector on the PCI riser card.** 2. Memory DIMMs. 3. System board.
Failure reading I2C device. Check devices on bus 1.	1. **Reseat the cable between the operator information panel and system board.** 2. Operator information panel. 3. System board.
Failure reading I2C device. Check devices on bus 2.	1. **Reseat the cable between system board and the power supply (power cage assembly).** 2. Power cage assembly. 3. Power supply. 4. System board.
Failure reading I2C device. Check devices on bus 3.	1. **Reseat the cable between the hard disk drive backplane and the connector of system board.** 2. Hard disk drive backplane. 3. System board.
Failure reading I2C device. Check device on bus 4.	**System board**

Undetermined problems

Use the information in this section if the diagnostic tests did not identify the failure, the devices list is incorrect, or the system is inoperative.

Note: Damaged data in CMOS or damaged BIOS code can cause undetermined problems. If you suspect that the BIOS code is damaged, see “Recovering the BIOS code” on page 18.

Note: Damaged data in BIOS code can cause undetermined problems.

Check the LEDs on all the power supplies. If the LEDs indicate the power supplies are working correctly, complete the following steps:

1. Turn off the server.
2. Be sure the server is cabled correctly.
3. Remove or disconnect the following devices (one at a time) until you find the failure (turn on the server and reconfigure each time):
   Any external devices
   Surge suppressor device (on the server)
   Modem, printer, mouse, or non-IBM devices
   Each adapter
   Drives
   Memory modules (minimum requirement = 512 MB (2 banks of 256 MB DIMMs))

   Note: Minimum operating requirements are:
   a. One power supply
   b. PCI riser card
   c. PCI-X riser card
   d. Power cage assembly
   e. System board
   f. One microprocessor and VRM
   g. Memory module (with a minimum of two 256 MB DIMMs)
4. Turn on the server. If the problem remains, suspect the following FRUs in the order listed:
   Power supply
   Power cage assembly
   System board

Notes:

1. If the problem goes away when you remove an adapter from the system and replacing that adapter does not correct the problem, suspect the system board.
2. If you suspect a networking problem and all the system tests pass, suspect a network cabling problem external to the system.

Problem determination tips

Because of the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

- Machine type and model
- Microprocessor or hard disk upgrades
- Failure symptom
  - Do diagnostics fail?
  - What message appears in the diagnostics log?
  - What, when, where, single, or multiple systems?
  - Is the failure repeatable?
  - Has this configuration ever worked?
  - If it has been working, what changes were made prior to it failing?

  - Is this the original reported failure?
- Diagnostics version
  - Type and version level
- Hardware configuration
  - Print (print screen) configuration currently in use
  - BIOS level
- Operating system software
  - Type and version level

Note: To eliminate confusion, identical systems are considered identical only if they:

- Are the exact machine type and models
- Have the same BIOS level
- Have the same adapters/attachments in the same locations
- Have the same address jumpers/terminators/cabling
- Have the same software versions and levels
- Have the same diagnostics code (version)
- Have the same configuration options set in the system
- Have the same setup for the operation system control files

Comparing the configuration and software set-up between “working” and “non-working” systems will often lead to problem resolution.

Chapter 7. Parts listing xSeries 346 Types 8840 and 1880

This parts listing supports the xSeries 346 Types 8840 and 1880. To check for an updated parts listing on the Web, complete the following steps:

1. Go to http://www.ibm.com/support.
2. Under **Search technical support**, type 8872 or 8874 and click **Search**.
3. Under Document type, select **Parts information** and click **Go**.

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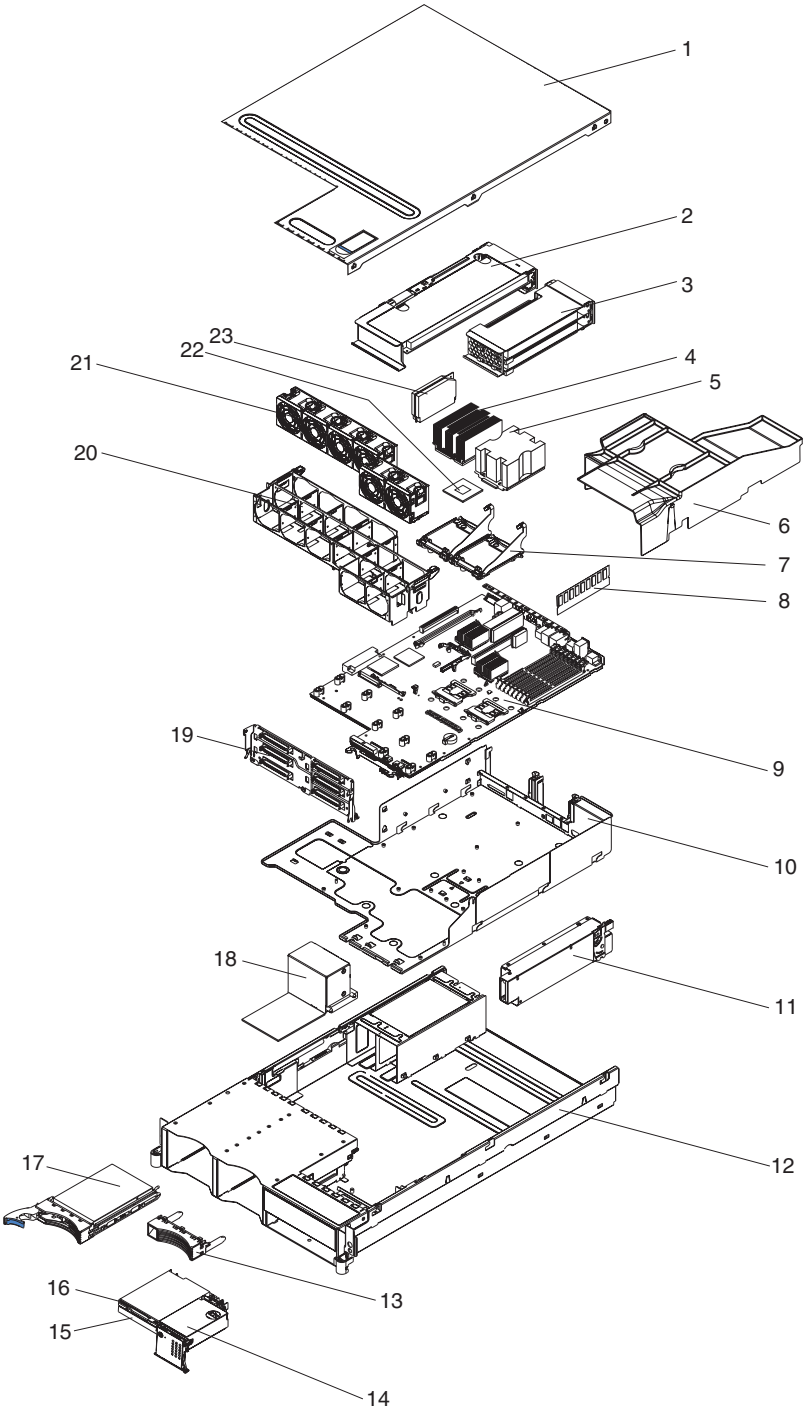
System

The major components of the xSeries 346, Types 8840 and 1880 are shown in the following illustration.



System replaceable units

Note:

- Field replaceable units (FRUs) must be serviced only by qualified field service technicians.
- Customer replaceable units (CRUs) can be replaced by the customer. Tier 1 CRUs and Tier 2 CRUs are described in the IBM “Statement of Limited Warranty” (at “Part 3 – Warranty Information”), which is in the Installation Guide.

Index	Server (xSeries 346, Types 8840 and 1880)	CRU No. (Tier 1)	CRU No. (Tier 2)	FRU No.
1	Top cover (all models)	26K4760		
2	PCI riser cage with card (all models)	40K6487		
3	PCI-X riser cage with card (all models)	40K6472		
3	PCI-X Riser card (all models)	40K6485		
4	Tool-less heat-sink assembly, microprocessor (models except D1x)			13N1625
4	Tool-less heat-sink assembly, microprocessor (model D1x)			39M6931
5	Blank heat-sink filler (all models)	40K6482		
6	Air baffle assembly (all models)	25R5234		
7	Heat sink retainer bracket assembly (all models)			26K6147
8	Memory, 512MB ECC (all models except 01x, D1x, DRx)	13N1424		
8	Memory, 256 ECC DRR (model 01x)	90P1123		
8	Memory, 512MB 3200 ECC (optional)	73P2869		
8	Memory, 1GB 3200 ECC (models D1x, DRx)	73P2870		
8	Memory, 1GB 3200 ECC (optional)	73P2870		
8	Memory, 2GB 3200 ECC (optional)	73P4793		
9	System board/shuttle assembly (all models except 0Rx, 1Rx, 2Rx, 3Rx, 4Rx, 5Rx, D1x, DRx)		32R1956	
9	System board/shuttle assembly (model D1x)		39Y6588	
9	System board/shuttle assembly (models 0Rx, 1Rx, 2Rx, 3Rx, 4Rx, 5Rx, DRx,)		39Y6990	
10	Shuttle assembly (all models)	40K6464		
11	Power supply, 625 watt (all models except 0Rx, 1Rx, 2Rx, 3Rx, 4Rx, 5Rx, DRx)	74P4411		
11	Power supply, 625 watt (models 0Rx, 1Rx, 2Rx, 3Rx, 4Rx, 5Rx, DRx)	39Y7334		
12	Chassis (all models)			26K4759
13	Hard disk drive filler (all models)		59P5236	
14	Media cage with operator panel assembly (all models)		40K6494	
15	DVD 8/24X (primary, all models)			24P3639
15	DVD 8/24X (alternate, all models)			26K5393
15	DVD 8/24X (models 0Rx, 1Rx, 2Rx, 3Rx, 4Rx, 5Rx, DRx)			39M3531
15	CD-RW/DVD 24/8X (models 0Rx, 1Rx, 2Rx, 3Rx, 4Rx, 5Rx, DRx)			39M3551
16	Diskette drive, 1.44MB black (all models)			39M0105

Index	Server (xSeries 346, Types 8840 and 1880)	CRU No. (Tier 1)	CRU No. (Tier 2)	FRU No.
16	Diskette drive, 1.44MB black (all models except 0Rx, 1Rx, 2Rx, 3Rx, 4Rx, 5Rx, DRx)			39M0107
16	Diskette drive, 12.7mm (all models)			36L8645
17	Hard disk drive, 300GB 10k U320 SCSI (model 17x)			90P1311
17	Hard disk drive, 36GB 15k U320 HS (model 17x, 37x)			90P1383
18	Power cage assembly (all models except 0Rx 1Rx, 2Rx, 3Rx, 4Rx, 5Rx, DRx)		74P4413	
18	Power cage assembly (models 0Rx 1Rx, 2Rx, 3Rx, 4Rx, 5Rx, DRx)		39Y7337	
19	Ultra 320 hard disk drive backplane with bracket assembly (all models)		40K6496	
20	Fan guide assembly (all models)	26K4761		
21	Fan assembly, 60mm x 60mm (all models except 0Rx, 1Rx, 2Rx, 3Rx, 4Rx, 5Rx, DRx)	26K4768		
21	Fan assembly, 60mm x 60mm (all models 0Rx, 1Rx, 2Rx, 3Rx, 4Rx, 5Rx, DRx)	40K6481		
22	Microprocessor, 2.8 GHz (model 01x)			13N1618
22	Microprocessor, 2.8 GHz (model D1x)			40K1643
22	Microprocessor, 2.8 GHz (models 05x, 0Rx)			39R7569
22	Microprocessor, 3.0 GHz (model 11x)			90P1033
22	Microprocessor, 3.0 GHz (models 15x, 17x, 1Rx)			13M8293
22	Microprocessor, 3.2 GHz (model 21x)			90P1210
22	Microprocessor, 3.2 GHz (models 25x, 2Rx)			13M8294
22	Microprocessor, 3.4 GHz (model 31x)			90P1227
22	Microprocessor, 3.4 GHz (models 35x, 37x, 3Rx)			13M8295
22	Microprocessor, 3.6 GHz (model 41x)			90P1229
22	Microprocessor, 3.6 GHz (models 45x, 4Rx)			13M8296
22	Microprocessor, 3.8 GHz (models 55x, 5Rx)			39R7571
23	VRM card 2U/105A (optional)	24R2696		
23	VRM card 2U/105A (optional)	24R2704		
23	VRM card 2U/105A (optional)	24R2750		
	Alternate slide kit (optional)	25R5229		
	Alcohol wipe kit (all models)			59P4739
	Battery, 3.0 volt (all models)		33F8354	
	Battery pack, RAID adapter (optional)	90P5245		
	Cable, CD-ROM power (all models)	40K6491		
	Cable, diskette drive (all models)	25R5160		
	Cable, IDE 1 drop (all models)	40K6490		
	Cable-management-arm assembly (all models)			01R0591
	Cable, SCSI signal (all models)	02R0726		
	Cable, SCSI power (all models)	40K6493		
	Cord, 2.1M jumper (all models)	36L8886		

Index	Server (xSeries 346, Types 8840 and 1880)	CRU No. (Tier 1)	CRU No. (Tier 2)	FRU No.
	CD-ROM drive, 24X (optional)	26K5423		
	CD-ROM drive, 24X (optional)	39M3505		
	CD-ROM combo, slim (optional)	26K5439		
	CD-ROM combo, slim (optional)	71P7359		
	Diskette drive filler (optional)	25R5216		
	DVD/CD-ROM interposer card (all models)	39R8542		
	DVD drive, slim (optional)	26K5417		
	Label kit (all models)	25R5157		
	Label kit (models 0Rx, 1Rx, 2Rx, 3Rx, 4Rx, 5Rx, DRx)	40K6488		
	Label kit (models 0Rx, 1Rx, 2Rx, 3Rx, 4Rx, 5Rx, DRx)	40K6489		
	EIA bracket (all models)	40K6497		
	Miscellaneous parts kit (all models) • Clip, VRM Metal (2) • Filler, Standard PCI Blank (3) • Filler, Low Profile PCI Blank (2) • Latch, Standard PCI Retention (2) • Guide, PCI Card (3) • Latch, Shuttle Locking (2) • Spring, Shuttle Latch (2) • Latch, Low Profile PCI Retention (3) • Lid, Low Profile PCI Retention (2) • Latch, PCI Cage Retention (2) • Light Box, Switch Card (1) • Latch, Cable Strain Relief (2) • Holder, FDD Wire Spring (2) • Holder, CD Wire Spring (2) • Latch, HDD Backplane Retention (3) • Screw, M3.5x5 (17) • Screw, M3.5x10 (10) • Screw, #4-40 standoff (4) • Screw, 0.8 mm standoff (2)	40K6495		
	PCI Express card (optional)	26K4798		
	Power cord; see “Power cords” on page 113. (all models)	6952300		
	Power-supply filler panel (all models)	25R5154		
	Power-supply filler panel (models 0Rx, 1Rx, 2Rx, 3Rx, 4Rx, 5Rx, DRx)	39Y7339		
	Recovery CD, multilingual (models 17x, 37x)			32R1063
	RSA2 card (optional)	73P9324		
	ServeRAID-7k adapter (models 17x, 37x) (optional all models)		71P8644	
	Slide kit (all models)	90P4070		
	Slide, toolist (all models)	40K6591		
	Ship bracket kit (models 0Rx, 1Rx, 2Rx, 3Rx, 4Rx, 5Rx, D1x, DRx)	40K6592		
	FRU/CRU label (all models except 0Rx, 1Rx, 2Rx, 3Rx, 4R+x, 5Rx, DRx)	26K4772		
	FRU/CRU label (models 0Rx, 1Rx, 2Rx, 3Rx, 4R+x, 5Rx, D1x, DRx)	40K6536		

Index	Server (xSeries 346, Types 8840 and 1880)	CRU No. (Tier 1)	CRU No. (Tier 2)	FRU No.
	Tape drive (optional)			71P9163
	Tape enabling kit (optional for all models except 0Rx, 1Rx, 2Rx, 3Rx, 4R+x, 5Rx, DRx) • M3X6 screws (8) • Tape wrap assembly (1) • Brackets (2) • Filler assembly (1)	90P5063		
	Tape enabling kit (optional) • M3X6 screws (4) • Tape wrap assembly (1) • Brackets (2) • Filler assembly (1)			40K6486
	Thermal grease kit (all models)			59P4740

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
Turkish	37L2579
Turkish	37L2580
UK English	37L2581
Yugosl/Lat	37L2582
US English-EMEA	37L2583

Keyboard	CRU No.
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 on 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
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

IBM power cord part number	Used on these countries and regions
14F0087	Israel
1838574	Thailand
6952301	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/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 documents 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/support/ and follow the instructions. Also, you can order documents 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/intellistation/.

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

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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, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

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

Appendix B. Safety 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.

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.

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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
- Japanese
- Korean
- Spanish

Important: All caution and danger statements in this IBM documentation begin with a number. This number is used to cross reference an English caution or danger statement with translated versions of the caution or danger statement in this section.

For example, if a caution statement begins with a number 1, translations for that caution statement appear in this section under statement 1.

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

Statement 1:

DANGER

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

To avoid a shock hazard:

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

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

Statement 2:

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

Do not:

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

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

Statement 3:

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

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

DANGER

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

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

Statement 4:

≥ 18 kg (39.7 lb)

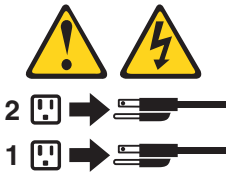
≥ 32 kg (70.5 lb)

≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 5:

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



Statement 8:

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

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

Statement 10:

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

>82 kg (180 lb)

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. 2. Primeiramente, conecte todos os cabos aos dispositivos. 3. Conecte os cabos de sinal aos conectores. 4. Conecte os cabos de alimentação às tomadas. 5. LIGUE os dispositivos.	1. DESLIGUE Tudo. 2. Primeiramente, remova os cabos de alimentação das tomadas. 3. Remova os cabos de sinal dos conectores. 4. Remova todos os cabos dos 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:

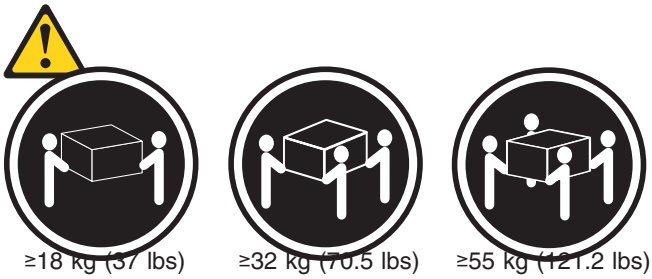
Quando produtos a laser (unidades de CD-ROM, unidades de DVD, dispositivos de fibra ítica, transmissores, etc.) estiverem instalados, observe o seguinte:
- Não remova as tampas. A remoção das tampas de um produto a laser pode resultar em exposição prejudicial à radiação de laser. Nenhuma peça localizada 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



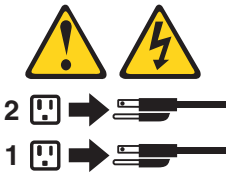
CUIDADO:

Ao levantar a máquina, faça-o com segurança.

Instrução 5

CUIDADO:

Os botões Liga/Desliga localizados no dispositivo e na fonte de alimentação não desligam a corrente elétrica fornecida ao dispositivo. O dispositivo também pode ter mais de um cabo de alimentação. Para remover toda a corrente elétrica do dispositivo, assegure que todos os cabos de alimentação estejam desconectados da fonte de energia elétrica.



Instrução 8

CUIDADO:

Nunca remova a tampa de uma fonte de alimentação ou de qualquer peça que tenha esta etiqueta afixada.

Níveis perigosos de voltagem, corrente e energia estão presentes em qualquer componente que tenha esta etiqueta afixada. Nenhuma peça localizada no interior desses componentes pode ser consertada. Se você suspeitar de algum problema em alguma dessas peças, entre em contato com um técnico IBM.

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。

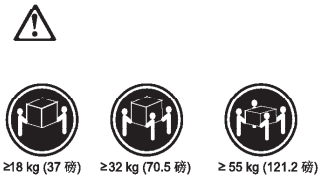
非此处指定的其它控制、调整或与性能有关的操作都有可能导致激光辐射的危险。

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

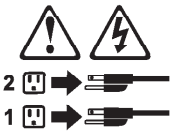


警告：
抬起时请采用安全操作方法。

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。

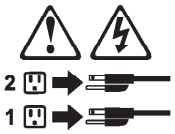
声明 4

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 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。
- 儘可能使用單手來連接或切斷信號電纜線。
- 當設備有火燒或泡水的痕跡，或有結構性損害時，請勿開啓該設備的電源。
- 在安裝及架構之時，若非非常熟悉，在開啓裝置蓋子之前，請切斷電源線、電信系統、網路及數據機。
- 在安裝、移動本產品或附加裝置，或開啓其蓋子時，請依照下表中「連接」及「切斷」電纜線的步驟執行。

連接：	切斷：
1. 關閉所有開關。	1. 關閉所有開關。
2. 先將所有電纜線接上裝置。	2. 先自電源插座拔掉電源線。
3. 將信號電纜接上接頭。	3. 拔掉接頭上的所有信號電纜。
4. 再將電源線接上電源插座。	4. 再拔掉裝置上的所有電纜線。
5. 開啓裝置的電源。	

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)

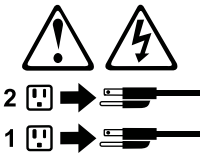
≥ 32 公斤 (70.5 磅)

≥ 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. 2. Commencez par brancher tous les cordons sur les unités. 3. Branchez les câbles d'interface sur des connecteurs. 4. Branchez les cordons d'alimentation sur des prises. 5. Mettez les unités sous tension.	1. Mettez les unités hors tension. 2. Débranchez les cordons d'alimentation des prises. 3. Débranchez les câbles d'interface des connecteurs. 4. Débranchez tous les câbles des unités.

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:

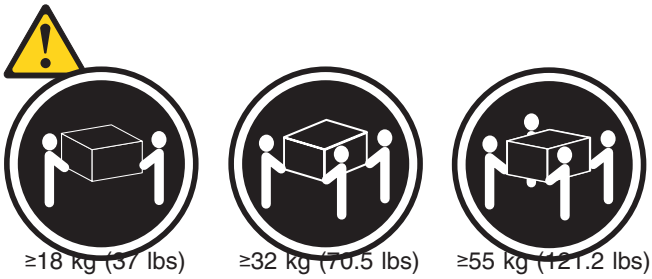
- **N'ouvrez pas ces produits pour éviter une exposition directe au rayon laser. Vous ne pouvez effectuer aucune opération de maintenance à l'intérieur.**
- **Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures 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



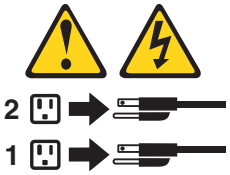
ATTENTION:

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° 8

ATTENTION:

N'ouvrez jamais le bloc d'alimentation ou tout élément sur lequel e apposée l'étiquette ci-dessous.

Des tensions et des courants dangereux sont présents à l'intérie de tout composant sur lequel est apposée cette étiquette. Ces éléments ne peuvent pas être réparés. Si vous pensez qu'ils peuvent être à l'origine d'un incident, prene contact avec un technicien de maintenance.

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 anschließen:	Kabel lösen:
1. Alle Geräte ausschalten und Netzstecker ziehen. 2. Zuerst alle Kabel an Einheiten anschließen. 3. Signalkabel an Anschlußbuchsen anschließen. 4. Netzstecker an Steckdose anschließen. 5. Gerät einschalten.	1. Alle Geräte ausschalten. 2. Zuerst Netzstecker von Steckdose lösen. 3. Signalkabel von Anschlußbuchsen lösen. 4. Alle Kabel von Einheiten lösen.

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.

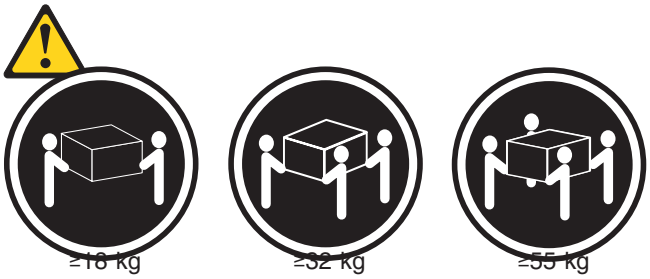
- Das Entfernen der Abdeckungen des CD-ROM-Laufwerks kann zu gefährlicher Laserstrahlung führen. Es befinden sich keine Teile innerhalb des CD-ROM-Laufwerks, die vom Benutzer gewartet werden müssen. Die Verkleidung des CD-ROM-Laufwerks nicht öffnen.
- Steuer- und Einstellelemente sowie Verfahren nur 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



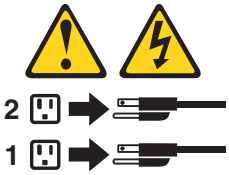
ACHTUNG:

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 8

ACHTUNG:

Die Abdeckung oder eine Komponente eines Netzteils, die wie nachfolgend aufgeführt gekennzeichnet ist, darf keinesfalls entfernt werden.

In Komponenten, die so gekennzeichnet sind, können gefährliche Spannungen anliegen. In diesen Komponenten sind keine Teile vorhanden, die vom Benutzer gewartet werden müssen. Besteht der Verdacht, dass an einem dieser Teile ein Fehler aufgetreten ist, ist ein IBM Kundendiensttechniker zu verständigen.

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. 2. Collegare prima tutti i cavi alle unità. 3. Collegare i cavi di segnale ai connettori. 4. Collegare i cavi di alimentazione alle prese elettriche. 5. ACCENDERE le unità.	1. SPEGNERE tutti i dispositivi. 2. Rimuovere prima i cavi di alimentazione dalle prese elettriche. 3. Rimuovere i cavi di segnale dai connettori. 4. Rimuovere tutti i cavi dalle 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:

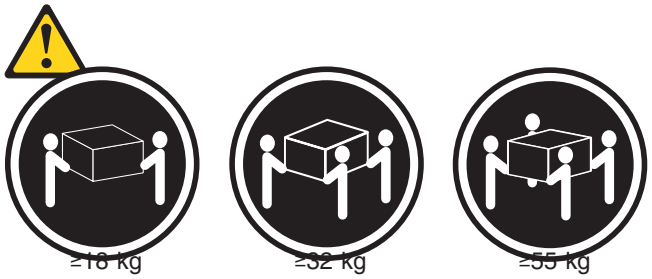
- Non rimuovere i coperchi. L'apertura dei coperchi di prodotti laser può determinare l'esposizione a radiazioni laser pericolose. All'interno delle unità non vi sono parti su cui effettuare l'assistenza tecnica.
- L'utilizzo di controlli, regolazioni o l'esecuzione di procedure non descritti nel presente 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



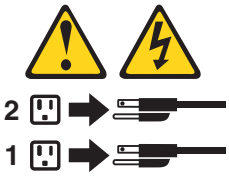
ATTENZIONE:

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 8

ATTENZIONE:

Non togliere mai il coperchio di un alimentatore o qualsiasi parte su cui è posta la seguente etichetta.

Tensioni pericolose, corrente e livelli di energia sono presenti all'interno del componente su cui è posta questa etichetta. All'interno di questi componenti non vi sono parti su cui effettuare l'assistenza tecnica. Se si sospetta un problema in una di queste parti, rivolgersi ad un tecnico di manutenzione.

Avviso 10
ATTENZIONE:

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

重要：

Netfinity Server　ライブラリーにあるすべての注意および危険の記述は数字で始まります。この数字は、英語版の注意および危険の記述と翻訳された注意および危険の記述を相互参照するために使用します。

例えば、もし注意の記述が数字の１で始まってる場合は、その注意の翻訳は、記述１　の下にあります。

手順を実施する前に、すべての注意;

・記述　1

⚠ 危険

感電を防止するため、雷の発生時には、いかなるケーブルの取り付けまたは取り外しも行わないでください。また導入、保守、再構成などの作業も行わないでください。

感電を防止するため ：

－電源コードは正しく接地および配線が行われている電源に接続してください。

－本製品が接続されるすべての装置もまた正しく配線された電源に接続されている必要があります。

できれば、信号ケーブルに取り付けまたは取り外しのときは片方の手のみで行うようにしてください。これにより、電位差がある二つの表面に触ることによる感電を防ぐことができます。

電源コード、電話ケーブル、通信ケーブルからの電流は身体に危険を及ぼします。設置、移動、または製品のカバーを開けたり装置を接続したりするときには、以下のようにケーブルの接続 、取り外しを行ってください。

接続するには	取り外すには
1. すべての電源を切る	1. すべての電源を切る
2. まず、装置にすべてのケーブルを接続する。	2. まず、電源コンセントから電源コードを取り外す
3. 次に、通信ケーブルをコネクターに接続する	3. 次に、通信ケーブルをコネクターから取り外す。
4. その後、電源コンセントに電源コードを接続する	4. その後、装置からすべてのケーブルを取り外す
5. 装置の電源を入れる。	

・記述 2

⚠ 注意

本製品には、システム・ボード上にリチウム電池が使用されています。電池の交換方法や取り扱いを誤ると、発熱、発火、破裂のおそれがあります。
電池の交換には、IBM部品番号33F8354の電池またはメーカー推奨の同等の電池を使用してください。
交換用電池の購入については、お買い求めの販売店または弊社の営業担当までお問い合わせください。
電池は幼児の手の届かない所に置いてください。
万一、幼児が電池を飲み込んだときは、直ちに医師に相談してください。
以下の行為は絶対にしないでください。
－水にぬらすこと
－100度C 以上の過熱や焼却
－分解や充電
－ショート
電池を廃棄する場合、および保存する場合にはテープなどで絶縁してください。他の金属や電池と混ざると発火、破裂の原因となります。電池は地方自治体の条例、または規則に従って廃棄してください。ごみ廃棄場で処分されるごみの中に捨てないでください。

・記述 3

⚠ 注意

レーザー製品(CD-ROM、DVD、または光ファイバー装置または送信器など)が組み込まれている場合は、下記に御注意ください。

- ここに記載されている制御方法、調整方法、または性能を超えて使用すると、危険な放射線を浴びる可能性があります。
- ドライブのカバーを開けると、危険な放射線を浴びる可能性があります。ドライブの内部に修理のために交換可能な部品はありません。カバーを開けないでください。

⚠ 危険

一部 CD-ROM ドライブは、Class 3A または Class 3B レーザー・ダイオードを使用しています。 次の点に注意してください。

CD-ROMドライブのカバーを開けるとレーザーが放射されます。光線をみつめたり、光学器械を使って直接見たりしないでください。また直接光線を浴びないようにしてください。

・記述 4

⚠ 注意

18Kg 以上

32Kg 以上

55Kg 以上

装置を持ち上げる場合は、安全に持ち上げる方法に従ってください。

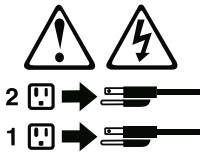
・記述 5

⚠ 注意 ⚠

サーバーの前面にある電源制御ボタンは、サーバーに供給された電流を遮断しません。

サーバーには、複数の電源コードが接続されているかもしれません。

サーバーから電流を完全に遮断するために、すべての電源コードが電源から取り外されていることを確認してください。



・記述 10

⚠ 注意

ラック・モデルのサーバーの上に 82 Kg 以上の物を置かないでください。

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°C(212°F) 이상으로 가열하지 마십시오.
- 수리하거나 분해하지 마십시오.

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3

주의:
레이저 제품(CD-ROMs, DVD 드라이브, 광 장치 또는 트랜스미터 등과 같은)이 설치되어 있을 경우 다음을 유의하십시오.

- 덮개를 제거하지 마십시오. 레이저 제품의 덮개를 제거했을 경우 위험한 레이저 광선에 노출될 수 있습니다. 이 장치 안에는 서비스를 받을 수 있는 부품이 없습니다.

- 여기에서 지정하지 않은 방식의 제어, 조절 또는 실행으로 인해 위험한 레이저 광선에 노출될 수 있습니다.

위험

일부 레이저 제품에는 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.

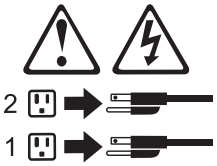
경고문 4

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

Declaración 2

PRECAUCIÓN:

Cuando desee sustituir la batería de litio, utilice únicamente el número de pieza 33F8354 de IBM o cualquier tipo de batería equivalente que recomiende el fabricante. Si el sistema tiene un módulo que contiene una batería de litio, sustitúyalo únicamente por el mismo tipo de módulo, que ha de estar creado por el mismo fabricante. La batería contiene litio y puede explotar si el usuario no la utiliza ni la maneja de forma adecuada o si no se desprende de la misma como corresponde.

No realice las acciones siguientes:

- Arrojarla al agua o sumergirla
- Calentarla a una temperatura que supere los 100°C (212°F)
- Repararla o desmontarla

Despréndase de la batería siguiendo los requisitos que exija el reglamento o la 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:

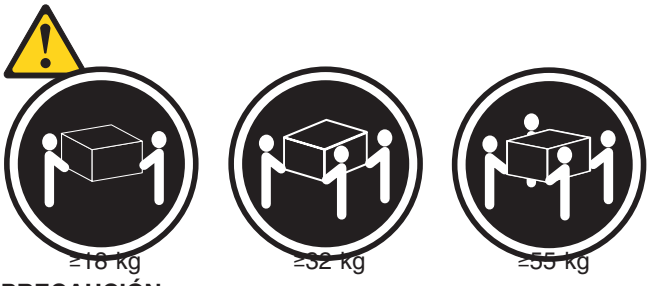
- No retire las cubiertas. Si retira las cubiertas del producto láser, puede quedar expuesto a radiaciín láser perjudicial. Dentro del dispositivo no existe ninguna pieza que requiera mantenimiento.
- El uso de controles o ajustes o la realizaciín de procedimientos que no sean los que se han especificado 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



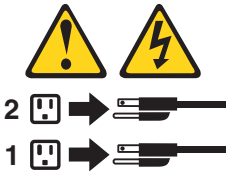
PRECAUCIÓN:

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 8

PRECAUCIÓN:

No retire nunca la cubierta de una fuente de alimentación ni ninguna pieza que tenga adherida la etiqueta siguiente.

Existen niveles perjudiciales de energía, corriente y voltaje en los componentes que tienen adherida esta etiqueta. Dentro de estos componentes no existe ninguna pieza que requiera mantenimiento. Si sospecha que alguna de estas piezas tiene un problema, póngase en contacto con un técnico de servicio.

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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Important notes

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

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

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

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

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

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Some software may differ from its retail version (if available), and may not include user manuals or all program functionality.

Product recycling and disposal

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

Battery return program

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

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

In the Netherlands, the following applies.

Electronic emission notices

Federal Communications Commission (FCC) statement

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

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

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。

Chinese Class A warning statement

声　　明
此为 A 级产品。在生活环境中，
该产品可能会造成无线电干扰。
在这种情况下，可能需要用户对其
干扰采取切实可行的措施。

Japanese Voluntary Control Council for Interference (VCCI) statement

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