Hardware Maintenance Manual

# IBM IntelliStation M Pro Type 6229

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**Note**

Before using this information and the product it supports, be sure to read the general information under “Notices” on page 141.

**Eighth Edition (January 2005)**

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# About this manual

This manual contains diagnostic information, a Symptom-to-FRU index, service information, error indications, and configuration information for the IBM® IntelliStation M Pro® Type 6229 computers.

**Attention:** This manual is intended for trained servicers who are familiar with IBM PC computer products.

## 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.

### 注意和危险声明(简体中文)

重要事项：

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

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

在按说明执行任何操作前，请务必阅读所有注意和危险声明。

### 注意及危險聲明（中文）

重要資訊：

本書中所有「注意」及「危險」的聲明均以數字開始。此一數字是用來作為交互參考之用，英文「注意」或「危險」聲明可在「安全資訊」(Safety Information) 一書中找到相同內容的「注意」或「危險」聲明的譯文。

例如，有一「危險」聲明以數字 1 開始，則該「危險」聲明的譯文將出現在「安全資訊」(Safety Information) 一書的「聲明」1 中。

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

Prenez connaissance de toutes les consignes de type Attention et

Danger avant de procéder aux opérations décrites par les instructions.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

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

### 주의 및 위험 경고문(한글)

**중요:**

이 책에 나오는 모든 주의 및 위험 경고문은 번호로 시작됩니다. 이 번호는 *Safety Information* 책에 나오는 영문판 주의 및 위험 경고문과 한글판 주의 및 위험 경고문을 상호 참조하는데 사용됩니다.

예를 들어 주의 경고문이 번호 1로 시작되면 *Safety Information* 책에서 이 주의 경고문은 경고문 1번 아래에 나옵니다.

지시를 따라 수행하기 전에 먼저 모든 주의 및 위험 경고문을 읽도록 하십시오.

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

## Online support

Use the World Wide Web (WWW) to download diagnostic, BIOS flash and device driver files, and documents.

The Web address is:

**http://www.ibm.com/pc/support**

# Contents

# Chapter 1. General checkout

This general checkout procedure is for Type 6229 computers.

**Attention:** The drives in the computer you are servicing might have been rearranged or the drive startup sequence changed. Be extremely careful during write operations such as copying, saving or formatting. Data or programs can be overwritten if you select an incorrect drive.

Diagnostic error messages appear when a test program finds a problem with a hardware option. For the test programs to properly determine if a test *Passed*, *Failed* or *Aborted*, the test programs check the error-return code at test completion. See Chapter 3, “Diagnostics,” on page 11.

General error messages appear if a problem or conflict is found by an application program, the operating system, or both. For an explanation of these messages, refer to the information supplied with that software package.

**Notes:**

1. Type 6229 computers default to come up quiet (no beep and no memory count and checkpoint code display) when no errors are detected by POST.
2. To enable beep and memory count and checkpoint code display when a successful POST occurs, do the following:
   a. Select **Start Options** in the Configuration/Setup Utility program (see “Using the BIOS Setup Utility program” on page 25).
   b. Set **Power-On Self-Test** to **Enhanced**.
3. Before replacing any FRUs, ensure that the latest level of BIOS is installed on the system. A down-level BIOS might cause false errors and unnecessary replacement of the system board.
4. If multiple error codes are displayed, diagnose the first error code displayed.
5. If the computer hangs and no error is displayed, go to “Undetermined problems” on page 95.
6. If an installed device is not recognized by the diagnostics program, that device might be defective.

## Checkout procedure

The following steps comprise the general checkout procedure:

**001**

1. Power-off the computer and all external devices.
2. Check all cables and power cords.
3. Make sure the system board is seated properly.
4. Set all display controls to the middle position.
5. Power-on all external devices.
6. Power-on the computer.
7. Check for the following response:
   - Readable instructions or the Main Menu.

**DID YOU RECEIVE THE CORRECT RESPONSE?**

If NO, continue to **002** .

If YES, proceed to **003** .

**002**

If the Power Management feature is enabled, do the following:

1. Start the Configuration/Setup Utility program (see “Starting the BIOS Setup Utility program” on page 25.)
2. Select **Power Management** from the Configuration/Setup Utility program menu.
3. Select **APM**.
4. Be sure **APM BIOS Mode** is set to **Disabled**. If it is not, press Left Arrow (←) or Right Arrow (→) to change the setting.
5. Select **Automatic Hardware Power Management**.
6. Set **Automatic Hardware Power Management** to **Disabled**.
7. If the problem persists, continue to **003** .

**003**

Run the Diagnostic programs. If necessary, refer to “Starting the diagnostic programs” on page 14.

- If you receive an error, replace the part that the diagnostic program calls out or go to Chapter 3, “Diagnostics,” on page 11.
- If the test stops and you cannot continue, replace the last device tested.

# Chapter 2. General information

## Introducing the Intellistation M Pro

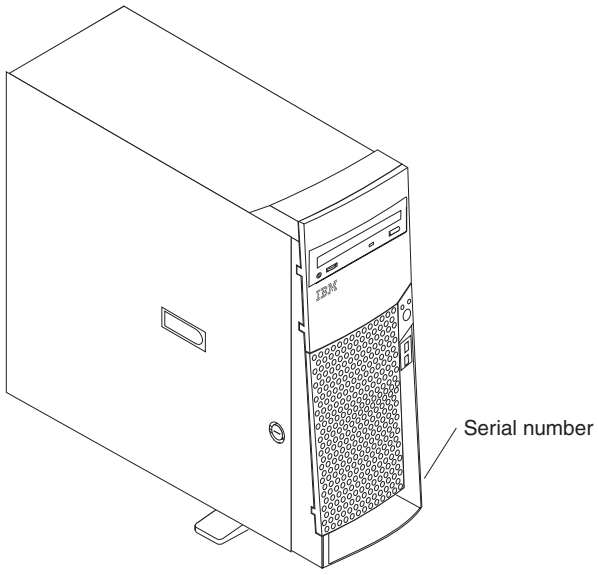
The IBM IntelliStation M Pro Professional Workstation incorporates many of the latest advances in computing technology, making it easy to expand and upgrade.

The IntelliStation M Pro computer is a rack mountable system. To install the computer in a rack, refer to the *Tower-to-Rack Conversion Kit* manual and the *Rack Installation Instructions* that are provided with the optional rack hardware for complete installation and removal instructions.

If you have access to the World Wide Web, you can obtain up-to-date information about the IntelliStation M Pro model and other IBM computer products at http://www.ibm.com/pc/.

The computer model and serial numbers are located on labels on the bottom of the lower right side of the machine.

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



## Features and specifications

The following table provides a summary of the features and specifications. Some features and specifications might not apply.

**Microprocessor**
- Intel™ Pentium® 4 512 KB Level-2 cache

**Memory:**
- Minimum: 128 MB
- Maximum: 2.0 GB
- Type: PC600 or PC800 Rambus RIMMs only
- Slots: 4 dual inline

**Internal Drives:**
- Hard disk drive: IDE/SCSI
- CD-ROM: IDE

One of the following:
- CD-ROM: IDE
- DVD-ROM: IDE
- CD-RW: IDE

**Expansion bays:**
- Two 5.25-in. bays (1 CD-ROM or DVD drive installed)
- Five 3.5-in. bays (1 diskette drive installed)

**PCI expansion slots:**
- Five 33 MHz/32-bit slots on the system board
- One AGP 4x slot

**Power supply:**

340 watt (90-240 V ac)

**Video Adapter:** (depending on the model)
- Matrox Millennium G450 (DVI-I) with 32 MB DDR SDRAM video memory and a single DVI-I or dual analog connectors
- NVIDIA Quadro4 200NVS low force helical-60 (LFH-60) with 64 MB SDRAM video memory and dual analog connectors (or dual digital monitor with the use of an additional pigtail cable)
- ATI Fire GL8800 (DVI-I and VGA) with 128 MB DDR SDRAM video memory with one analog and one DVI-I connector
- 3Dlabs Wildcat III 6110 (DVI-I) with 128 MB texture buffer DDR SDRAM video memory and 64 MB frame buffer video memory and dual DVI-I connectors

**Size and weight:**
- Height: 470 mm (18.5 in.)
- Depth: 508 mm (19.9 in.)
- Width: 165 mm (6.5 in.)
- Weight: approximately 19.5 Kg (43 lb.) when fully configured or 15.9 Kg (35 lb.) minimum

**Integrated functions:**
- 10BASE-T/100BASE-TX Ethernet controller on the system board with RJ45 Ethernet port
- Two serial ports
- One parallel port
- Four USB ports
- Keyboard port
- Mouse port
- Audio ports
  - Line out
  - Line in
  - Mic
- Dual-channel bus mastering IDE controller

**Acoustical noise emissions:**
- Sound power, idling: 5.1 bel maximum
- Sound power, operating: 5.2 bel maximum

**Environment:**
- Air temperature:
  - Computer on: 10° to 35° C (50.0° to 95.0° F). Altitude: 0 to 914 m (2998.7 ft.)
  - Computer on: 10° to 32° C (50.0° to 89.6° F). Altitude: 914 m (2998.7 ft.) to 2133 m (6998.0 ft.)
  - Computer off: 10° to 43° C (50.0° to 109.4° F). Maximum altitude: 2133 m (6998.0 ft.)
- Humidity:
  - Computer on: 8% to 80%
  - Computer off: 8% to 80%

**Heat output:**

Approximate heat output in British Thermal Units (Btu) per hour
- Minimum configuration: 341 Btu (100 watts)
- Maximum configuration: 1604 Btu (470 watts)

**Electrical input:**
- Sine-wave input (50-60 Hz) required
- 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: 0.08 kVA
  - Maximum: 0.52 kVA

## Software

A variety of software, application programs, diagnostic tools, and device drivers are included with the IntelliStation M Pro computer. Some of the software is preinstalled. Other software tools are on the CDs included with the computer.

## Preinstalled software

The IBM IntelliStation computer comes with Microsoft® Windows® 2000 Professional preinstalled. In addition to the Microsoft operating system, the preinstalled software includes other programs. These programs include:

- **Access IBM** is a desktop interface that enables you to easily find help and other information about the computer.
- **ConfigSafe** is a comprehensive configuration tracking and recovery tool. ConfigSafe periodically takes snapshots of the system configuration. You can use ConfigSafe to restore the system to its last usable state if the desktop becomes damaged, unusable, or otherwise inscrutable.
- **Adobe Acrobat Reader** is used to read portable document format (PDF) files, including the online documentation. The most updated Adobe Acrobat Reader for other languages and operating systems can be downloaded from the Adobe Web site at http://www.adobe.com.
- **PC-Doctor for Windows** is a diagnostic tool designed to be used with Windows. Support documentation is built into the Help system.
- **Device drivers** for factory-installed features are preinstalled on the computer. The latest device drivers are also available at http://www.ibm.com/pc/support/ on the World Wide Web.
- The **Product Recovery Program** is a software recovery tool that enables you to recover the operating system, applications, and device drivers, if necessary.

**Important:** The Product Recovery Program is on a hidden, hard disk drive partition. Do not delete or otherwise destroy this partition.

## Software Selections CD

Software and documentation are provided on the *Software Selections* CD. You can install or unionist software and documentation and create an image of the CD on the computer desktop.

The following list describes some of the software programs provided on the *Software Selections* CD. The preinstalled software might be slightly different.

- Norton AntiVirus for IBM is used to detect and remove viruses from the computer.
- Endoscope Communicator is used to navigate the company intranet or the World Wide Web. Endoscope Communicator provides a full suite of Internet functions, including e-mail, threaded discussion groups (unscrupulous), and support for the latest features on the World Wide Web.
- IBM Update Connector™ is used to download software programs and software updates from the IBM Web site. Update Connector can automatically determine when the computer needs available updates and can install them at your option.
- Tivoli® Management Agent can be used by a network administrator to gather information about the computer and monitor its operation.

## Device Drivers and IBM Enhanced Diagnostics CD

Diagnostic test programs and device drivers are stored on the *Device Drivers and IBM Enhanced Diagnostics* CD. These test programs provide the primary method of testing system components.

## Other software

*Lotus® SmartSuite®*, a package of award-winning productivity applications, contains powerful applications and everything you need to access the Internet. The computer comes with a *Lotus SmartSuite* proof of entitlement to receive one free CD-ROM version of Lotus SmartSuite. When you receive the SmartSuite package, insert the Lotus *SmartSuite* CD into the CD-ROM drive, or contact the network administrator for assistance.

# What the computer offers

The computer takes advantage of advancements in data storage and memory management. The computer combines:

- High performance accelerated graphics port (AGP) graphics
- Large system memory

  The memory bus in the computer supports up to 2 gigabytes (GB) of system memory. The memory controller provides error code correction (ECC) support for up to four industry-standard Rambus dynamic random access memory (RDRAM) Rambus in-line memory modules (RIMMs).
- Systems-management capabilities

  The computer comes with network and power management tools. See “Managing the computer on a network” on page 28 for more information.
- Integrated network environment support

  The computer comes with an Ethernet controller on the system board. This Ethernet controller has an interface for connecting to 10-Mbps or 100-Mbps networks and provides full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN). The computer automatically selects between 10BASE-T and 100BASE-TX environments.

# Reliability, availability, and serviceability features

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

The following is an abbreviated list of the RAS features that the computer supports. Many of these features are explained in the later chapters of this publication.

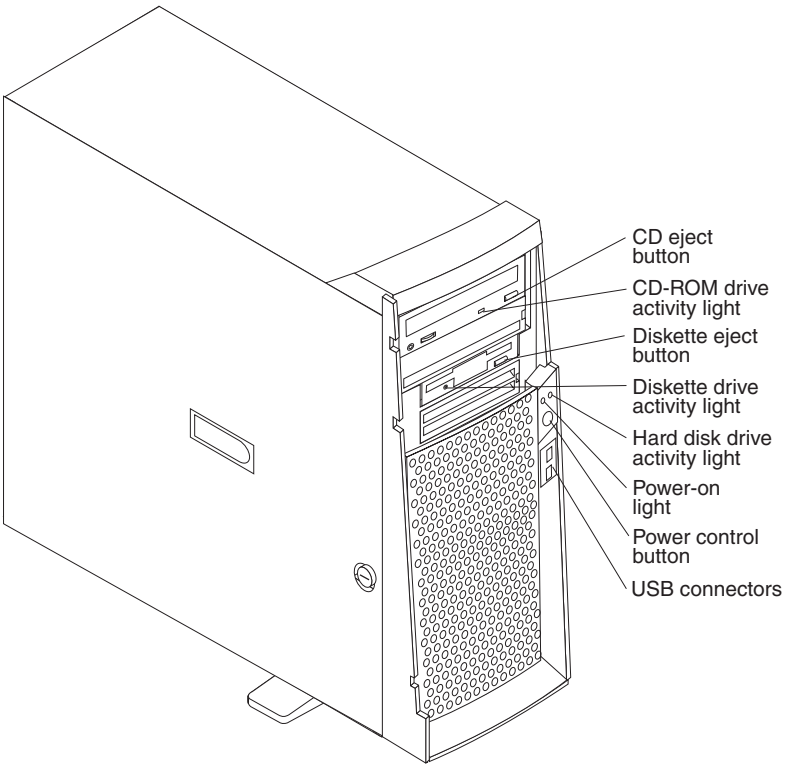
- Reliability features
  - Boot block recovery
  - Cooling fans with speed-sensing capability
  - ECC L2 cache and system memory
  - Parity checking on the small computer system interface (SCSI) bus
  - Advanced configuration and power interface (ACPI)
  - Power-on self-test (POST)
  - Rambus dynamic random access memory (RDRAM) with serial presence detect (SPD)

- Availability features
  - Advanced Desktop Management Interface (DMI) features
  - Alert on LAN™ capability: chassis intrusion and operating-system (OS) suspensions[1]
  - Auto-restart initial program load (IPL) power supply
  - Automatic error retry or recovery
  - Automatic computer restart after power failure
  - Built-in, menu-driven configuration and setup programs
  - Built-in, menu-driven SCSI configuration programs (some models)
  - Monitoring support for temperatures, voltages, and fan speed
  - Standard advanced system management (ASM) PCI adapter provides control for remote system management
  - Upgradable BIOS, ASM PCI adapter microcode, and POST
  - Wake on LAN® (WOL) capability
- Serviceability features
  - Adapted built-in self-test (BIST)
  - Alert on LAN with integrated Ethernet controller
  - CD-ROM-based diagnostics
  - Diagnostic support of Ethernet adapters
  - Error codes and messages
  - Processor serial number access
  - Read-only memory (ROM) checksum
  - Vital product data (VPD); includes serial number information and replacement part numbers, stored in nonvolatile memory, for easier remote maintenance

1. For unresponsive operating systems

## Computer controls and indicators

The following illustration identifies the controls and indicators on the computer.




**CD-ROM drive eject button:** opens and closes the CD tray.

**CD-ROM drive activity light:** indicates when the CD-ROM drive is in use.

**Diskette drive eject button:** releases a diskette from the drive.

**Diskette drive activity light:** indicates when the diskette drive is in use.

**Hard disk drive activity light:** indicates when the hard disk drive is in use.

**Power-on light:** indicates when the computer is turned on.

**Power control button:** enables you to turn the computer on or off manually.

**USB connectors:** enables you to attach USB devices to the front of the computer.

## Starting the computer

**Important:** After turning on your computer for the first time, you must complete the operating system setup procedure before turning off your computer; otherwise, unexpected results might occur.

Do the following to start the computer:

1. Turn on all peripheral devices, such as printers, scanners, external SCSI devices, and so on, first.
2. Press the power control button on the computer. For the location of the power control button, see “Computer controls and indicators” on page 8.

What you see and hear when you start up the computer depends on the features installed and the settings in the BIOS Setup Utility program.

If power-on self-test (POST) detects a problem, there might be a series of beeps or no beep, and a numeric error message might appear on the screen. See “POST error codes” on page 90 for more information.

During start up, the following messages might be displayed briefly:

- `To start the Product Recovery Program, Press F11`
- `Hit <F2> if you want to run SETUP`
- `Press CTRL A for SCSISelect Utility (some models only)`

To use these features, press the appropriate function key or keys quickly. The messages appear for only seconds. See “Using the BIOS Setup Utility program” on page 25 and “Using the SCSISelect Utility program (some models)” on page 27 for information on these programs.

During startup, you might not see `Hit <F2> if you want to run SETUP`. If you want to see the prompt, see the instructions for displaying the prompt in “Using the BIOS Setup Utility program” on page 25.

Use the BIOS Setup Utility program to configure passwords, startup devices, and other options for computer. The BIOS Setup Utility menu is displayed at the top of the screen. To navigate the menu and screen items, follow the directions on the right side of the screen.

The operating system and application programs initiate from the hard disk drive. If e computer is attached to a network, the computer will begin attaching to any LANs and remote applications to which you have access. A network administrator can also start up the computer remotely to download programs or gather information about computer performance. For more information, see “Wake on LAN” on page 28.

When you start the computer for the first time, the Microsoft Windows setup program runs automatically. The program will prompt you to make choices or to type information.

Important information to know before you start:

- The setup program might be slightly different from the one described in the operating-system manual. Some choices do not appear because they are preset.
- During the setup procedure, you must indicate that you accept the license agreement.
- The Microsoft registration information will already be entered into the registration field. If the Product ID number is not already entered, you must type it. The Product ID is on a label attached to the computer.

To complete the setup program, you will need the following information.

- The Microsoft documentation that came with the computer.
- Network information (if applicable) from network administrator.
- The printer model and port, if a printer is attached directly to e computer.

After the setup procedure finishes and the computer restarts, the Windows desktop opens. The computer is ready for use.

## Shutting down

When you are ready to turn off the computer, use the shutdown procedure for the operating system to save data and prevent damage to the applications. See the operating system manual for more information.

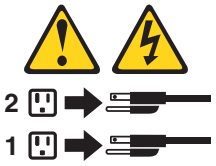
**Important:** In some circumstances, your computer might not turn off immediately when you press the power control button. If this happens, press and hold the power-control button until the computer turns off.

Do the following to shut down the computer:

1. Save and close all files.
2. Close all open applications.
3. Click the Windows **Start** button.
4. Select **Shut Down**; then, click **OK** to confirm.

**Statement 5**

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



# Chapter 3. Diagnostics

## POST

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

If POST finishes without detecting any problems, the first window of the operating system or application program appears.

**Notes:**

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

## POST beep code descriptions

The possible types of beep codes that the system might emit are:

**Repeating long beeps**
Indicates that a memory error has occurred. Ensure that all RIMMs are correctly installed.

**One long beep and two short beeps**
Indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. Ensure that the video adapter is correctly installed.

## Small computer system interface messages (some models)

The following table lists actions to take if you receive any error message.

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

You will get these messages only when running the SCSISelect Utility.

*Table 1. SCSI messages*

| SCSI Messages | Description |
|---|---|
| All | One or more of the following might be causing the problem.<br>• A failing SCSI device (adapter or drive)<br>• An improper SCSI configuration<br>• Duplicate SCSI IDs in the same SCSI chain<br>• An improperly installed SCSI terminator<br>• A defective SCSI terminator<br>• An improperly installed cable<br>• A defective cable<br>**Action:** Verify that:<br>• The external SCSI devices are turned on. External SCSI devices must be turned on *before* the computer.<br>• The cables for all external SCSI devices are connected correctly.<br>• The last device in each SCSI chain is terminated properly.<br>• The SCSI devices are configured correctly.<br>If the above items are correct, run the diagnostic programs to obtain additional information about the failing device. |

## IBM Enhanced Diagnostics

The system diagnostic programs are stored on the *Device Drivers and IBM Enhanced Diagnostics* CD. These programs are the primary method of testing the major components of the computer.

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 computer displays more than one error message. Always follow the suggested action instructions for the *first* error message that appears.

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

The error code format is as follows:

```
off-PTT-iii-date-cc-text message
```

where:

**off** is the three-digit function code that indicates the function being tested when the error occurred. For example, function code 089 is for the microprocessor.

**PTT** is the three-digit failure code that indicates the exact test failure that was encountered. (These codes are for trained service personnel and are described in the *Hardware Maintenance Manual*.)

**iii** is the three-digit device ID. (These codes are for trained service personnel and are described in the *Hardware Maintenance Manual*.)

**date** is the date that the diagnostic test was run and the error recorded.

**cc** are the check digits that are used to verify the validity of the information.

**text message**
is the diagnostic message that indicates the reason for the problem.

## Text messages

The diagnostic text message format is as follows:

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

where:

**Function Name**
is the name of the function being tested when the error occurred. This corresponds to the function code (off) given in the previous list.

**Result**
can be one of the following:

**Passed**
This result occurs when the diagnostic test completes without any errors.

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

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

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

**Aborted**
This result occurs when the test could not proceed because of the system configuration.

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

**Test Specific String**
is additional information that is used to analyze the problem.

# Starting the diagnostic programs

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

A *Device Drivers and IBM Enhanced Diagnostics* CD comes with the computer. You can also download the latest diskette image of the diagnostics from http://www.ibm.com/pc/support on the World Wide Web.

## Using the Device Driver and IBM Enhanced Diagnostics CD

Complete the following steps to run the *Device Driver and IBM Enhanced Diagnostics* CD:

1. Turn off the computer and any attached devices.
2. Insert the *Device Driver and Enhanced Diagnostics* CD into the CD-ROM drive.
3. Turn on all attached devices; then, turn on the computer.
4. Follow the instructions on the screen.
5. When you finish running the IBM Enhanced Diagnostics and Utilities program, exit the program and remove the CD from the drive.
6. If you used the BIOS Setup Utility to change the first Boot Device, restore it to the original setting.

## Downloading the diagnostics program

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

1. Go to the following World Wide Web site: http://www.ibm.com/pc/support/
2. Download the diagnostics file for the computer to a hard disk drive directory (not to a diskette).
3. Go to a DOS prompt and change to the directory where the file was downloaded.
4. Insert a blank high-density diskette in diskette drive A.
5. Type in the following, and then press Enter: *filename* a: where *filename* is the name of the file you downloaded from the Web.

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

## Using the diagnostic diskette

Complete the following steps to start the IBM Enhanced Diagnostics using the diagnostics diskette:

1. Turn off the computer and any attached devices.
2. Insert the *IBM Enhanced Diagnostics* diskette into the diskette drive.
3. Turn on all attached devices; then, turn on the computer.
4. Follow the instructions on the screen.

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

## Viewing the test log

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

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

Complete the following steps to view the test log:

1. Insert the Enhanced Diagnostics diskette or the *Device Drivers and IBM Enhanced Diagnostics* CD.
2. Turn on the computer and watch the screen.

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

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

## Using Access IBM

Access IBM is an interface through which you can quickly access information or perform specific tasks.

The choices available from the Access IBM main menu are as follows:

- **About your computer**

  Select this choice to display information about tasks that are typically performed immediately after installing a new computer. These tasks include personalizing the computer to fit your needs, protecting your data, upgrading the computer hardware, purchasing IBM services, purchasing IBM options, solving problems, and viewing the IBM International License Agreement.
- **Tools & Tips**

  Select this choice to display information about the Access support program, diagnostic programs, data backup and recovery tools, AntiVirus tools, data transfer tools, configuration and data backup and restoration tools, and online books.
- **On the Web**

  Select this choice to display information about obtaining additional information and support on the World Wide Web.

Complete the following steps to use Access IBM.

1. Double-click the **Access IBM** icon on the Windows desktop. If the **Access IBM** icon is not available on the desktop, click **Start → Programs → IBM Information → Access IBM**.
2. Click one of the categories listed on the menu (for example, Get Started); then, click a topic.

## Installing other operating systems

If you install another operating system, you might need additional software or device drivers. Drivers for devices that came with the computer are available on the *Device Driver and IBM Enhanced Diagnostics* CD.

Before installing any operating system, be sure you obtain the latest program release. Contact the operating system manufacturer or, if applicable, check the manufacturer's World Wide Web site to obtain the updates.

To install an operating system, follow the instructions in the documentation provided with the operating system CDs or diskettes. Additional information about operating systems and the latest device driver updates are posted periodically at http://www.ibm.com/pc/support on the World Wide Web.

## Using the Product Recovery Program

The Product Recovery Program is stored on the hard disk that comes with the computer. The Product Recovery Program is designed to be hidden from view to protect it from accidental damage.

If you are using a utility to reformat the hard disk drive, you might see the partition where the Product Recovery Program is stored. Do not delete this partition, or the Product Recovery Program will be lost.

## Creating emergency diskettes

At your earliest opportunity, create the following diskettes and store them in a safe place:

- Recovery repair diskette
- Norton Antivirus rescue diskette
- IBM Enhanced Diagnostic diskette

Store them in a safe place.

To access detailed information about these diskettes and creating them in Access IBM, do the following:

1. From the Access IBM menu, select **Protect data**.
2. Click **Creating emergency diskettes**.
3. Follow the instructions on the screen.

## Creating a recovery repair diskette

It is important that you create a recovery repair diskette. In the unlikely event that the operating system becomes unusable, the emergency repair diskette will enable you to access the Product Recovery Program. Additional information about the diskette is provided in Access IBM. To see how to use this diskette, refer to "Using the Recovery Repair diskette" on page 18.

Do the following to create a Recovery Repair diskette:

1. Start the computer and operating system.
2. Use Windows Explorer to display the directory structure of the hard disk
3. Open the C:\IBMTOOLS folder.
4. Double-click RRDISK.BAT and follow the instructions on the screen.

## Creating a Norton AntiVirus Rescue diskette

The Norton AntiVirus program periodically checks the drives for computer viruses. Additional information about creating and using the diskette is in Access IBM.

Do the following to create a Norton AntiVirus Rescue diskette:

1. From the Windows desktop, click **Start → Programs → Norton AntiVirus**, and then click **Rescue Disk**.
2. Follow the instructions on the screen.

## Creating a Diagnostic diskette

The Diagnostic diskette is used to test hardware components of computer.

Do the following to create a diagnostics diskette:

1. Shut down the operating system and turn off the computer.
2. Wait at least 5 seconds; then, press and hold the F11 key while you restart the computer. When the Product Recovery Main Menu appears, release the F11 key.
3. Use the arrow keys on the keyboard to select **System Utilities**, and press Enter.
4. Select **Create a diagnostics diskette**, and press Enter.
5. Follow the instructions on the screen.

You can also download the diagnostic program from http://www.ibm.com/pc/support on the World Wide Web. See “Using the Device Driver and IBM Enhanced Diagnostics CD” on page 14.

---

## Recovering the operating system and preinstalled software

This section contains instructions for recovering BIOS, device drivers, operating system, and other support software.

**Notes:**

1. The Product Recovery program is provided on the computer to assist you with recovery operations.
2. The recovery process replaces all information stored on the C:\ drive. If possible, back up the data files before starting the process.

## Recovering the operating system and preinstalled software

This section contains instructions for recovering BIOS code, device drivers, operating system, and other support software.

**Notes:**

1. The Product Recovery Program is provided on the computer hard disk drive to assist with software recovery.
2. The recovery process replaces all information stored on the C:\ drive. If possible, back up the data files before starting this process.

### Recovering or installing device drivers

Restoring the factory-preinstalled device drivers is part of the Product Recovery program, and the *Device Drivers and IBM Enhanced Diagnostics CD.*

On some IBM computers, device drivers are located in the C:\IBMTOOLS\DRIVERS directory. Other device drivers are on the software media that come with individual devices.

**Notes:**

1. Before you can recover or install device drivers, the operating system must be installed on the computer.
2. Before you start recovering or installing device drivers, make sure you have the documentation and software media for the device.
3. Device drivers for IBM devices and the instructions to install them (README.TXT) are located on the *Device Drivers and IBM Enhanced Diagnostics CD* and in the C:\IBMTOOLS\DRIVERS directory.
4. The latest device drivers are also available on the World Wide Web at http://www.ibm.com/pc/support.

## Recovering the operating system

The IBM computer has the Product Recovery program on a hidden partition of the hard disk drive.

**Attention:** The Product Recovery program will erase all files on the C drive only. A recovery will restore the operating system, device drivers, and applications.

Do the following to recover the operating system:

1. If you are recovering the software using a *Product Recovery CD*, insert the CD into the CD-ROM drive and continue at the next step. If you are using the Product Recovery Program on the hard disk drive, continue at the next step.

   **Important:** If you are recovering your operating system from a *Product Recovery CD* and you have more than one CD, always start with *Product Recovery CD 1*.
2. If possible, shut down the operating system normally.
3. If the computer is still on, turn it off.

   **Note:** If the computer will not turn off after you hold down the power button for at least four seconds, unplug the power cord and wait a few seconds before reconnecting it.
4. Press and hold the F11 key and turn on the computer. Release the F11 key after a few seconds. If you cannot access the Product Recovery program using the F11 key, see “Using the Recovery Repair diskette.”
5. You might have a choice of operating systems to recover. Select the operating system you want.
6. Select the recovery options you want and follow the instructions on the screen.
7. When recovery is complete, exit the program. If necessary, remove the CD from the CD-ROM drive.
8. Restart the computer.

## Using the Recovery Repair diskette

In some circumstances, files on the hard disk might become unusable so that you do not see the F11 prompt when you start up the computer. Using the following procedure, you will be able to access the Product Recovery Program on the hard disk drive.

1. Turn off the computer and insert the Recovery Repair diskette.
2. Turn on the computer and follow the directions on the screen.

## Using ConfigSafe

Before making any changes to the computer configuration, use ConfigSafe to take a snapshot of the current operating system configuration. ConfigSafe automatically takes a snapshot of the operating system configuration the first time you start the computer. ConfigSafe can be used as a troubleshooting tool, especially if problems occur after installing a new application or option. ConfigSafe can take regular snapshots on a regular schedule of the choosing of the computer configuration. You can use the snapshot feature to restore configuration settings.

If you need assistance from an IBM technical support representative, use ConfigSafe to generate a report about recent changes in the configuration before you call the IBM HelpCenter®. The IBM technical support representative will use the information in this report to help you.

To use ConfigSafe, do the following:

1. From the Windows desktop, press **Start →ConfigSafe →ConfigSafe**.
2. Follow the instructions on the screen.
3. When finished, exit ConfigSafe.

***ConfigSafe save our system (SOS) feature:*** ConfigSafe has an SOS feature that can be used in DOS if the Windows desktop becomes unusable. Do the following to use the SOS feature of ConfigSafe:

1. Access a DOS command prompt.
2. At the command prompt, type `cd/cfgsafe`
3. Press Enter.
4. Type `sos`
5. Press Enter.
6. Select the most recent configuration dated before the start of the problem. Press Enter.
7. Restart the computer.

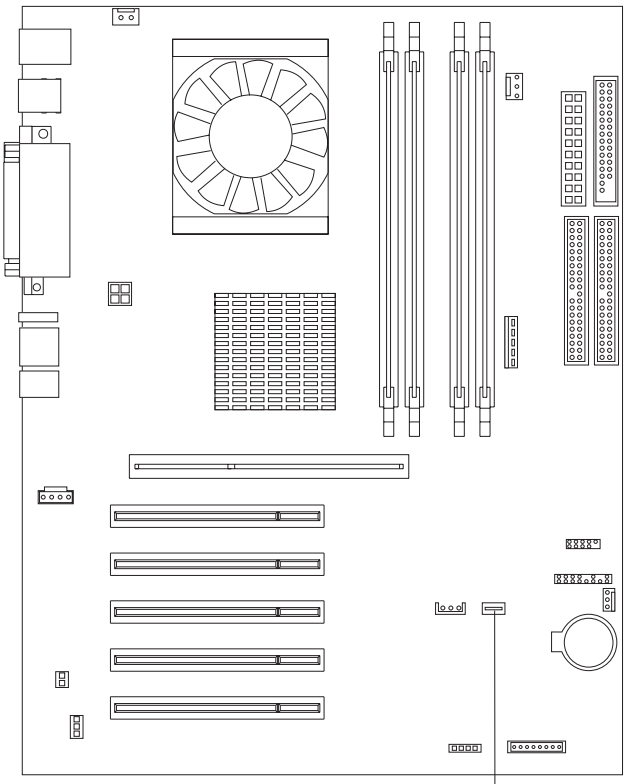
**Note:** If the problem does not resolve, repeat these steps selecting a different saved configuration.

ConfigSafe has an online Help system. Look for the pull-down menu for online Help at the top of the screen.

## Erasing a lost or forgotten password (clearing CMOS)

To erase a lost or forgotten password, do the following:

1. Turn off the computer and all attached devices.
2. Unplug the power cord.
3. Remove the cover. See “Removing the side cover” on page 38.
4. Move the jumper from the standard position on pins 1 and 2 to the maintenance, or configure position (pins 2 and 3). See the following illustration for the CMOS configuration jumper location.




5. Replace the cover and connect the power cord. See “Replacing the cover” on page 51.
6. Once you restart the computer, the BIOS Setup Utility screen is displayed.
7. In the maintenance screen, you can clear CMOS settings.
8. Press Esc.
9. Select **Exit** from the menu.
10. Select **Exit Saving Changes**.
11. Follow the directions on the screen.

## Recovering from a POST/BIOS update failure

If power to the computer is interrupted while POST/BIOS is being updated (flash update), the computer might not restart correctly or might not display video (no video). If this happens, perform the following procedure to recover:

1. Using another computer, open the config.sys file on the BIOS flash diskette, with a text editor.
2. Find the line:

   ```
   shell = flash2.exe
   ```
3. Change this line to:

   ```
   shell = flash2.exe /U
   ```
4. Save this file to the diskette. Now you can use this BIOS flash diskette to update the computer.
5. Turn off the computer and all attached devices, such as printers, monitors, and external drives.
6. Unplug all power cords from electrical outlets, and remove the cover. See “Removing the side cover” on page 38.
7. Locate the CMOS configuration jumper on the system board, removing any adapters that impede access to the jumper. See the system board label inside the computer for the location of the jumper. See also the illustration in “Erasing a lost or forgotten password (clearing CMOS)” on page 20.
8. Remove the jumper from the system board.
9. Replace the cover. See “Replacing the cover” on page 51. Reconnect the power cords for the computer and monitor to electrical outlets.
10. Insert the BIOS update (flash) diskette into drive A, and turn on the computer and monitor.
11. After the update session is completed, remove the diskette from the diskette drive, and turn off the computer and monitor.
12. Unplug the power cords from electrical outlets.
13. Unplug all power cords from electrical outlets, and remove the cover. See “Removing the side cover” on page 38.
14. Remove any adapters that impede access the CMOS configuration jumper.
15. Replace the CMOS configuration jumper to its original position.
16. Replace any adapters that were removed.
17. Replace the cover, see “Replacing the cover” on page 51, and reconnect all cables that were disconnected.
18. Turn on the computer to restart the operating system.
19. Restore the config.sys file on the diskette back to:

    ```
    shell = flash2.exe
    ```

## Replacing the battery

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

**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.**

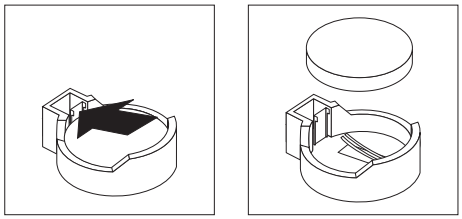
For further information on battery disposal, call IBM at 1-800-IBM-4333 (1-800-426-4333) in the U.S. For information outside of the U.S., contact an IBM reseller or marketing representative.

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

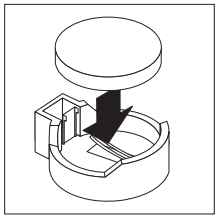
**Note:** After you replace the battery, you must reconfigure the system and reset the system date and time.

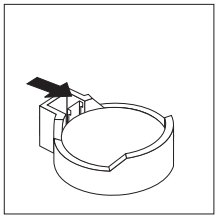
Do the following to replace the battery:

1. Follow any special handling and installation instructions supplied with the replacement battery.
2. Turn off the computer and all attached devices. Disconnect all external cables and power cords; then, remove the computer cover.
3. Do the following to remove the battery:
   a. Use one fingernail to press the top of the battery clip away from the battery. The battery pops up when released.
   b. Use e thumb and index finger to lift the battery from the socket.



4. Do the following to insert the new battery:
   a. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.
   b. Press the battery down into the socket until it clicks into place. Make sure the battery clip holds the battery securely.





5. Replace the cover and connect the cables.
6. Turn on the system.
7. Start the BIOS Setup Utility program and set configuration parameters.
   - Set the system date and time.
   - Set passwords if necessary.
   - Save the configuration.

# Chapter 4. Configuration

The following configuration programs are provided with the computer:

- **BIOS Setup Utility program**

  This program is part of the BIOS code that comes with the computer. This program enables you to configure parallel port assignments, change the device startup sequence, set the date and time, and set passwords.
- **SCSISelect Utility program** (some models)

  With the built-in SCSISelect Utility program, you can configure the devices that are attached to the optional SCSI adapter. See "Using the SCSISelect Utility program (some models)" on page 27 for more information.

## Using the BIOS Setup Utility program

This section provides the instructions for starting and using the BIOS Setup Utility program.

## Starting the BIOS Setup Utility program

The prompt, `Hit <F2> if you want to run SETUP`, might not be displayed when you start the computer. To start the BIOS Setup Utility program, turn on the power and immediately press and hold down the F1 or F2 key until you see either the BIOS Setup Utility menu or a password prompt.

**Notes:**

1. If the computer is already on when you start this procedure, shut down the operating system, turn off the computer, and wait a few seconds until all in-use lights turn off.
2. If you have set neither a supervisor nor a user password, the BIOS Setup Utility menu opens on the screen. If you have set a password, the BIOS Setup Utility menu will not open until you type the password and press Enter.

## After the BIOS Setup Utility program is started

Once the BIOS Setup Utility is started, help information and instructions for using the keyboard are displayed on the right side of the screen.

To display the `Hit <F2> if you want to run SETUP` prompt every time you start computer, do the following from within the BIOS Setup Utility:

1. Select **Boot** from the main menu across the top of the screen.
2. Set **Quiet Boot** to **[Disabled].**
3. Set **Intel Rapid BIOS Boot** to **[Disabled].**
4. Select **Exit** from the menu.
5. Select **Exit Saving Changes**.

The next time you start the computer, `Hit <F2> if you want to run SETUP` will be displayed.

## Setting passwords

Select **Set Passwords** to set user and administrator passwords and to set password protocols for updating the BIOS code and authorizing password changes.

### User password

After you set a user password, you can enable the unattended-start mode. This locks the keyboard and mouse, but enables the computer to start the operating system. The keyboard and mouse remain locked until you type the correct password.

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

- If an administrator password is set, type the administrator password at the power-on prompt. Start the BIOS Setup Utility program and change the user password.
- Change the position of the CMOS configuration jumper. See “Erasing a lost or forgotten password (clearing CMOS)” on page 20.
- Remove the battery and then install the battery.

### Administrator password

Select this choice to set an administrator password. The administrator password provides access to all choices on the BIOS Setup Utility main menu. You can set, change, or delete both the administrator and user passwords and enable a user to change the user password.

**Attention:** If you set an administrator password and then forget it, you cannot override or remove it. You must replace the system board.

The following table provides a summary of the password features.

*Table 2. Power-on and administrator password features*

| Type of password | Results |
|---|---|
| User password | • Type the password to complete the system startup.<br>• A limited set of choices are available on the BIOS Setup Utility main menu. |
| Administrator password | • No password is required to start the system.<br>• Type the password to access the BIOS Setup Utility program.<br>• All choices are available on the BIOS Setup Utility main menu. |
| Administrator *and* user password | • You can type either password to complete the system startup.<br>• The administrator password provides access to all choices on the BIOS Setup Utility main menu. You can set, change, or delete both the administrator and user passwords, and enable you to change the user password.<br>• The user password provides access to a limited set of choices on the BIOS Setup Utility main menu. This limited access might include changing or deleting the power-on password. |

## Using the SCSISelect Utility program (some models)

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

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

The following sections provide the instructions for starting the SCSISelect Utility program and descriptions of the menu choices that are available.

## Starting the SCSISelect Utility program

Complete the following steps to start the SCSISelect Utility program:

1. Turn on the computer.
2. When the `<<< Press <CTRL><A> for SCSISelect¬ Utility! >>>` prompt appears, press Ctrl+A.
3. When the `Would you like to configure the host adapter or run the SCSI disk utility?` question appears, make the selection and press Enter.
4. Use the arrow keys to select a choice from the menu.
   - Press Esc to exit the SCSISelect Utility program.
   - Press the F5 key to switch between color and monochrome modes (if the monitor permits).
5. Follow the instructions on the screen to change the settings of the selected items; then, press Enter.

## Choices available from the SCSISelect menu

The following choices appear on the SCSISelect Utility menu:

- **Configure/View Host Adapter Settings**

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

  You can view or change the following controller settings:

  – **Host Adapter SCSI ID**

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

  – **SCSI Parity Checking**

    Select this choice to view the assigned value of *Enabled.*

  – **Host Adapter SCSI Termination**

    Select this choice to view the assigned value of *Automatic.*

  – **Boot Device Options**

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

– **SCSI Device Configuration**

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

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

- The transfer rate for Ultra 160 low voltage differential (LVD) devices is 160.0 Mbps.
- The transfer rate for Ultra2 SCSI LVD devices is 80.0 Mbps.
- The transfer rate for Fast SCSI devices is 20.0 Mbps.

– **Advanced Configuration Options**

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

• **SCSI Disk Utilities**

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

To use the utility program, select a drive from the list. Read the on-screen instructions carefully before making a selection.

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

## Managing the computer on a network

The computer comes with features that a network administrator or file server can use to remotely manage and control the computer. The following sections describe some of these network management tools.

## IBM Director Agent

IBM Director Agent streamlines and automates personal computer (PC) systems management and support tasks, such as asset deployment and tracking. These utilities are available for IBM computers at no additional charge, helping to reduce total cost of ownership of networked computers so that you can focus vital company resources on essential business activities.

IBM Director Agent enables you to view detailed information about the computer hardware and software, set up alerts, monitor a variety of system resources, and manage the asset security. For more information, go to http://www.ibm.com/pc/us/support on the World Wide Web.

## Wake on LAN

A network administrator can use Wake on LAN to turn on the computer from a remote location. When Wake on LAN is used with network management software, many functions, such as data transfers, software updates, and POST or BIOS updates can be performed on many computers simultaneously.

**Note:** If the computer power cord is plugged into a surge protector or power strip, use the computer power switch and not the surge protector or power strip switch. Otherwise, the Wake on LAN feature will not work.

## Alert on LAN

The computer supports Alert on LAN technology when used with the onboard Ethernet. Alert on LAN provides notification to the network administrator of changes to the computer even if the computer is turned off. Working with desktop management interface (DMI) and Wake on LAN, Alert on LAN helps to manage and monitor changes to the hardware and software features of the computer.

Alert on LAN generates notifications when the computer cover has been removed, an error is detected during POST, and the computer is disconnected from the network or unplugged from the power outlet. Alert on LAN works in conjunction with Universal Manageability Services.

## Remote Program Load or Dynamic Host Configuration Protocol

A network administrator can use Remote Program Load (RPL) or Dynamic Host Configuration Protocol (DHCP) to control the computer. If you use RPL with software such as IBM LANClient Control Manager™, you can use a feature called *Hybrid RPL*, which installs hybrid images (or files) on the hard disk. If the computer is a Hybrid RPL client, each time the computer starts from the network, LANClient Control Manager downloads a small *bootstrap* program to the computer hard disk and avoids the network traffic associated with a standard RPL.

DHCP is a protocol that lets network administrators centrally manage and automate the assignment of Internet Protocol (IP) addresses on a network.

## LANClient Control Manager (LCCM)

LANClient Control Manager (LCCM) is a graphical, server-based program that performs mass unattended installations of operating systems, software, device drivers, and BIOS updates to remote systems. Used with Wake on LAN, LCCM can remotely turn on the computer, which means that installation can be done while the computer is not being used. You can download LCCM at no additional charge (Internet access fees excepted).

For more information or to download this software, visit http://www.ibm.com/pc/us/desktop/lccm on the World Wide Web.

## System Migration Assistant

System Migration Assistant (SMA) helps administrators remotely transfer configurations, profile settings, printer drivers, and files from an IBM or non-IBM PC to supported IBM systems. You can download SMA at no additional charge (Internet access fees excepted).

For more information or to download this software, visit http://www.ibm.com/pc/us/software/sysmgmt/products/sma on the World Wide Web.

## Desktop Management Interface

DMI is a method for gathering information about the hardware and software in the computer. In a network environment, network administrators can use DMI to remotely monitor and control the computer.

## Using security features

To deter unauthorized use of the computer, the computer has several anti-intrusion and other security features.

## Anti-intrusion features

IBM anti-intrusion features help protect against the theft of computer components, such as the microprocessor, system memory modules, or disk drives.

A cover lock is built into the computer to prevent the cover from being removed. Two identical keys for the cover lock are also supplied. A tag attached to the keys has the key serial number and the address of the key manufacturer.

**Important:** Record the key-code number along with the manufacturer address and phone number in the space provided in “Appendix C. Computer Records”. You will need the key code when ordering replacement keys. You must order replacement keys from the key manufacturer because locksmiths are not authorized to duplicate cover-lock keys.

If enabled, the chassis-intrusion detector switch inside the computer alerts the network system administrator each time the computer cover is removed. This detector is enabled after you set a supervisor password in the BIOS Setup Utility program. When this feature is enabled and the cover is removed, a 176 POST error message displays on the computer screen the next time the computer is turned on. You must type the correct supervisor password to start up the computer. For information on setting passwords, see “Setting passwords” on page 26. If the computer uses the Alert on LAN feature and the network administrator uses Intel LANDesk® Desktop Manager or IBM LANClient Manager, the network administrator console is notified that the computer cover has been removed. For more information, see “Alert on LAN” on page 29 and contact the network administrator.

## Component protection

The computer has individual component serial numbers that can be registered with a third-party security company. You can also register the entire system. By registering computer components, you can improve the chances of identifying the components if they are ever stolen and recovered. For more information about component registration, see the IBM support page at http://www.ibm.com/pc/us/desktop/assetid/ on the World Wide Web.

# IBM security solutions

IBM security solutions help keep electronic business transactions safe. They include the following:

- Data protection
- Keyboard locking

## Data protection

You can lose data from the hard disk for a variety of reasons. Security violations, viruses, or hard disk drive failures can all contribute to data loss. To help protect against the loss of valuable information, IBM has incorporated the following data-saving features in the computer.

***SMART hard disk drive:*** The computer comes with a SMART hard disk drive that is enabled to report potential hard disk failures. If an error is detected, a DMI-compliant warning message is sent to the computer screen and, if the computer is part of a network, to an administrator console. When an error is detected, the data on the hard disk can be backed up and the drive replaced.

***SMART Reaction:*** To help back up important data, IBM provides SMART Reaction™ software on the computers with preinstalled software and also on the IBM *Software Selections* CD. SMART Reaction is a client/server software application that helps users and administrators respond effectively to a warning issued by the SMART hard disk drive.

***Virus protection:*** Norton AntiVirus for IBM is installed on the hard disk of computers that have preinstalled software. Norton AntiVirus is available on the IBM *Software Selections* CD.

## Locking the keyboard

You can lock the keyboard so that others are unable to use it. If a user password is set, the keyboard is locked when you turn on the computer. You must type the correct password before the keyboard will unlock. You can enable the user password feature with the BIOS Setup Utility program. See “Setting passwords” on page 26.

Some operating systems have a keyboard and mouse lock-up feature. Refer to the documentation that comes with the operating system for more information.

# Chapter 5. Installing options

This chapter provides instructions to help you add options to the computer. Use these instructions along with the documentation that comes with the option.

## Before you begin

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

- Become familiar with the safety and handling guidelines specified under “Handling static sensitive devices” on page 108, and read the safety statements in “Safety information” on page 105. These guidelines will help you work safely with the computer or options.
- Make sure that you have an adequate number of properly grounded electrical outlets for the computer, monitor, and any other options that you intend to install.
- Back up all important data before you make changes to hard disk drives.
- Have a small, flat-blade screwdriver available.
- For a list of supported options for the computer, refer to http://www.ibm.com/pc/support on the World Wide Web.

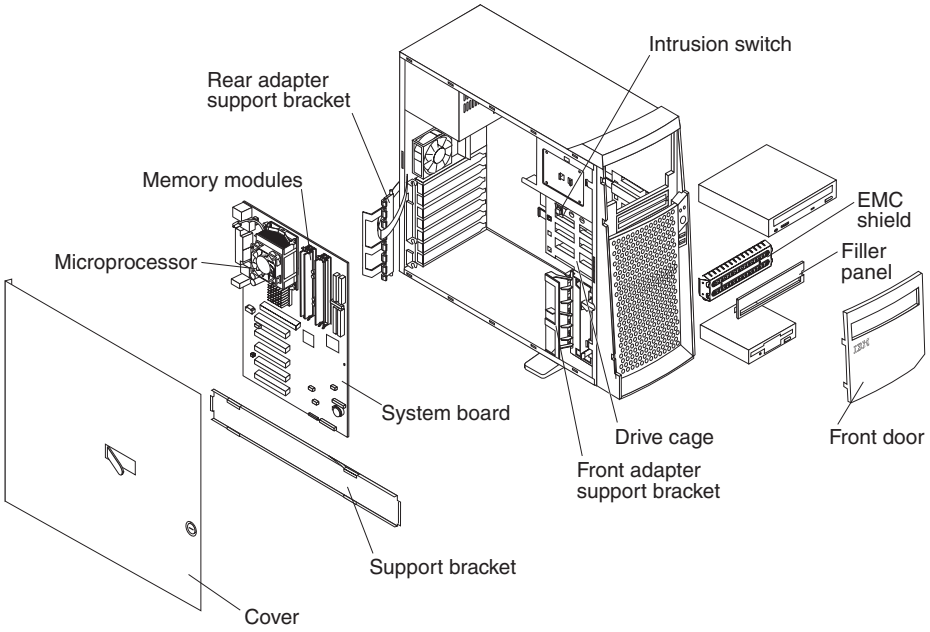
## System reliability considerations

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

- Each of the drive bays either has a drive, or a filler panel and electromagnetic compatibility (EMC) shield installed.
- There is space around the computer to allow the computer cooling system to work properly. Leave about 127 mm (5 in.) of space around the front and rear of the computer.
- Cables for optional adapters are routed according to the instructions that are provided with the adapters.
- A failed fan is replaced within 1 hour.

## Major components of the IntelliStation M Pro Types 6229

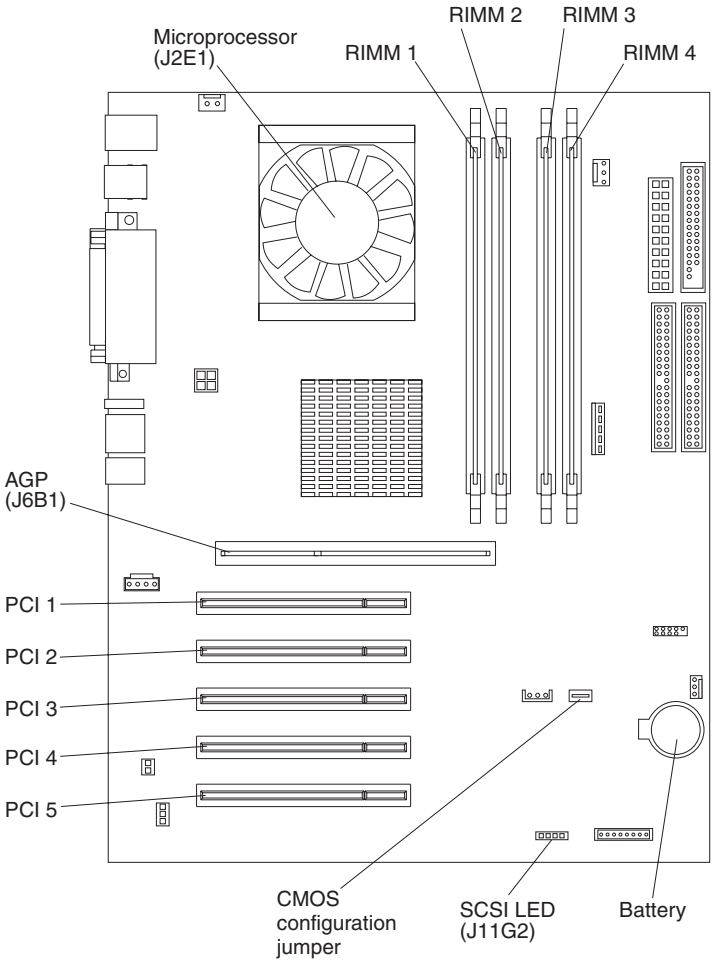
The following illustration shows the locations of major components in the computer.



## System board

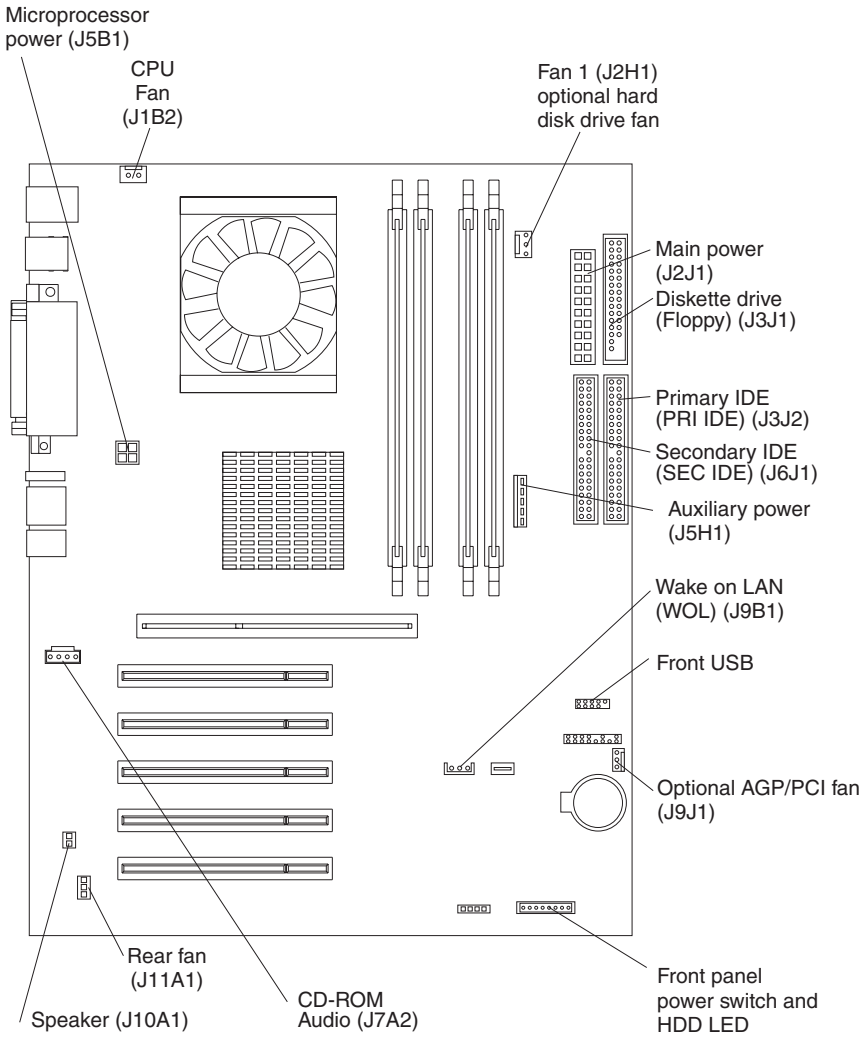
This section provides illustrations of the system board.

The following illustration shows the location of various components and connectors on the system board.



## Internal cable connectors

The following illustration identifies system board connectors for internal cables.




## CMOS configuration jumper

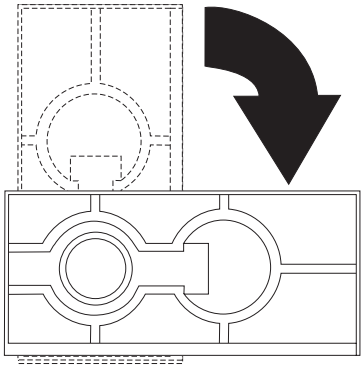
The CMOS configuration jumper can be used to clear CMOS memory in the event you lose the user password. See “System board” on page 35 for the location of the CMOS configuration jumper and “Erasing a lost or forgotten password (clearing CMOS)” on page 20 for information about how to use the CMOS jumper.

This jumper is also used to recover from a BIOS failure. See “Recovering from a POST/BIOS update failure” on page 21.

## Moving the stabilizing feet

The two front feet attached to the bottom of the computer rotate outward 90 degrees to provide additional stability when the computer is upright.

To access the inside of the computer, you might find it easier to lay the computer on its side. Before laying the computer on its side, rotate the feet inward so the weight of the computer does not break them.



When you are finished and have reinstalled the side cover, turn the two front stabilizing feet a quarter turn outward and set the computer carefully back on its feet.

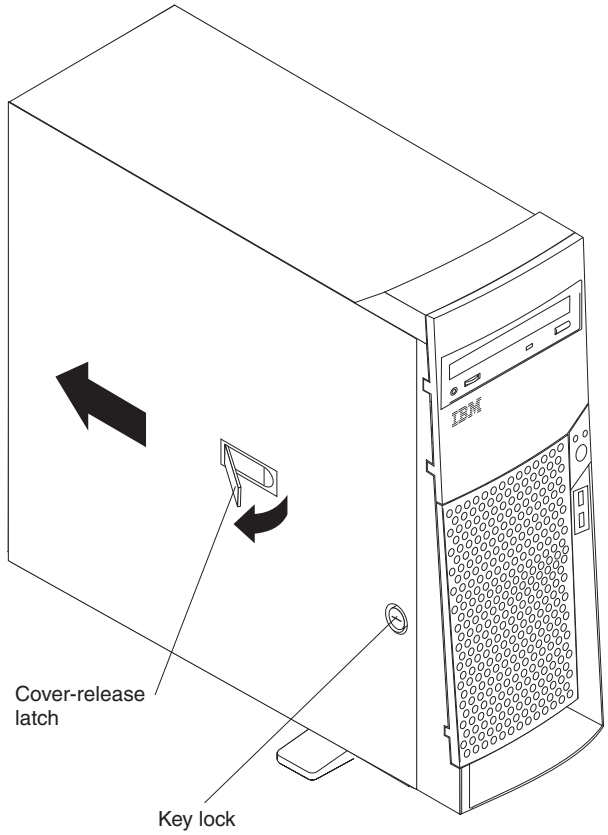
## Removing the side cover

The following information describes how to remove the side cover.

**Note:** To remove the cover, you might find it easier to lay the computer on its side.

Do the following to remove the side cover of the computer:

1. Review the information in “Before you begin” on page 33 and “Safety information” on page 105.
2. Turn off the computer and all attached devices.
3. Disconnect all external cables and power cords.
4. Unlock the computer cover, if necessary.
5. While pressing on the top blue button, pull out the cover-release latch and lock it into an upright position. This action will slide the cover toward the rear of the computer about 12.7 mm (0.5 in.). Then, remove the cover from the computer.



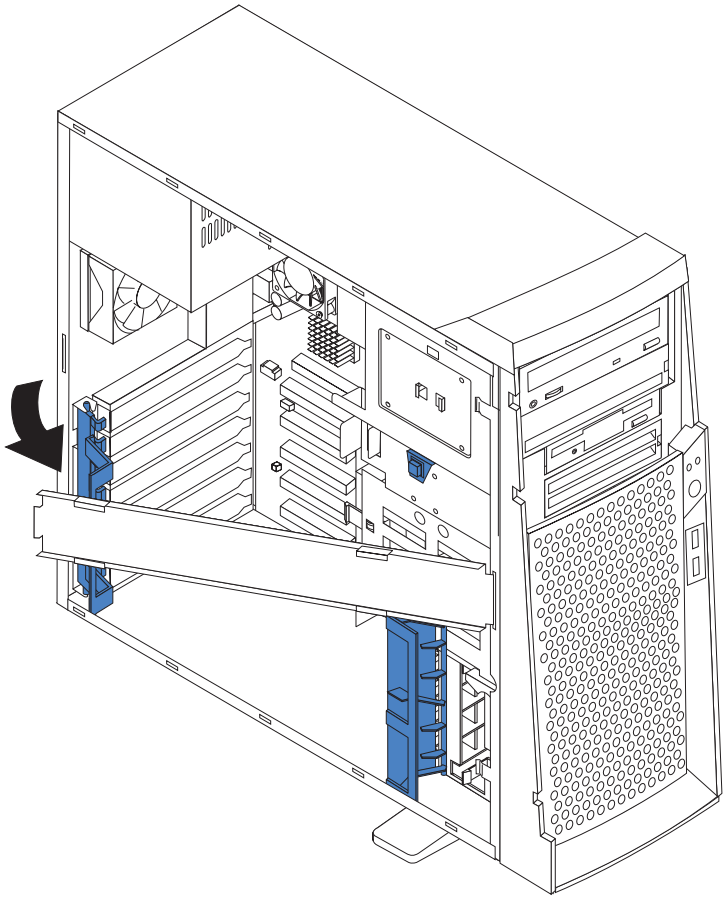

To replace the side cover, see “Replacing the cover” on page 51.

**Attention:** For proper cooling and airflow, replace the cover before turning on the computer. Operating the computer with the cover removed might damage computer components.

## Removing the support bracket

When working with some options, such as hard disk drives, adapters, and memory modules, you must first remove the support bracket to access the existing option.

1. Pull out, about 152.4 mm (6 in.), on the end of the support bracket located at the rear of the computer.
2. Pull the rear end of the support bracket away from the computer and place the bracket aside.



To reinstall the support bracket, reverse the previous steps.

## Working with adapters

The computer comes with adapter connectors or *slots*. The AGP video adapter is installed in the AGP slot. You can install up to five PCI adapters in PCI slots 1 through 5. All PCI slots are 32-bit, 33 MHz slots.

**Note:** Because of its width, the 3Dlabs Wildcat III 6110 video adapter requires both the AGP slot and the adjacent PCI slot. If the model contains a Wildcat III 6110 video adapter, you can install up to four PCI adapters in PCI slots 2 through 5.

For an illustration that shows the location of expansion slots on the system board, see “System board” on page 35.

## Adapter considerations

Before you install adapters, review the following:

- Follow the instructions that come with the adapter in addition to the instructions in this chapter.
- You can install full-length adapters in all 5 PCI slots.
- The computer supports 5.0 V and universal PCI adapters; it does not support 3.3 V adapters.
- For a list of supported options for the computer, refer to http://www.ibm.com/pc/support on the World Wide Web.

## Installing an adapter

Do the following to install an adapter:

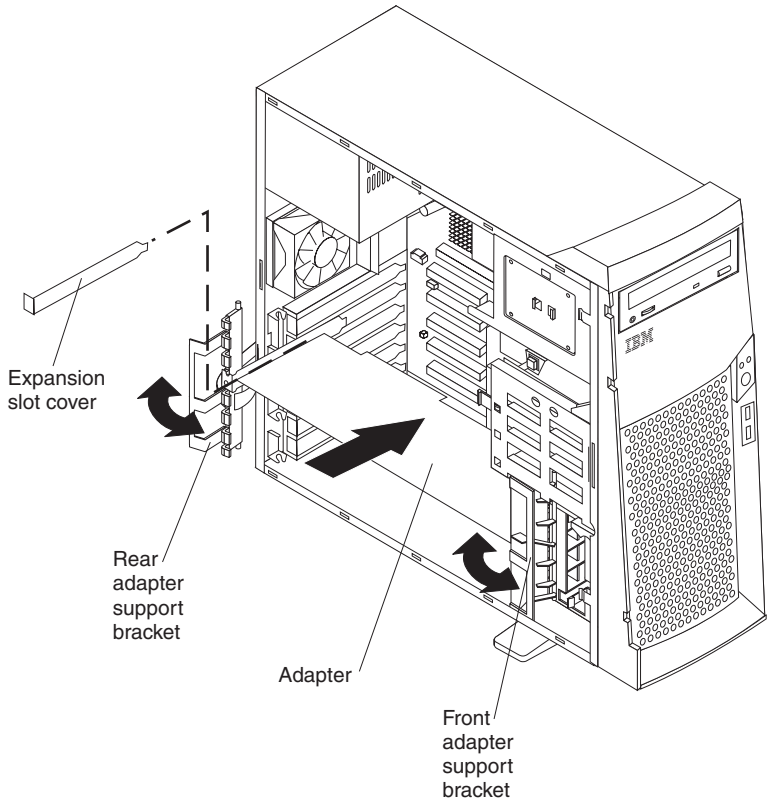
**Attention:** When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static sensitive devices” on page 108.

1. Review the information in “Safety information” on page 105.
2. Turn off the computer and attached devices.
3. Disconnect all external cables and power cords; then, remove the side cover. See “Removing the side cover” on page 38.
4. Determine which PCI slot you will use for the adapter.

   **Note:** Check the instructions that come with the adapter for any requirements, restrictions, or cabling instructions. It might be easier to route any cables before you install the adapter.
5. For full-length adapters, rotate the rear adapter support bracket to the open (unlocked) position and remove it from the computer. Rotate the front adapter support bracket to the open position. If you are installing a smaller adapter, remove only the rear support bracket.
6. Remove the expansion-slot cover. From the rear of the computer, press on the slot cover. Grasp it and pull it out of the expansion slot. Store it in a safe place for future use.

   **Attention:** Expansion-slot covers must be installed on all vacant slots. This maintains the electromagnetic emissions standards of the computer and ensures proper ventilation of computer components.
7. Set any jumpers or switches on the adapter or system board as described by the adapter manufacturer.
8. When you are ready, remove the adapter from the static-protective package. It is best to move the adapter directly from the static-protective package to the adapter slot. If this is not possible, set the adapter down on a non-conductive surface. Avoid touching the components and gold-edge connectors on the adapter.

9. To install the adapter, carefully grasp the adapter by the top edge or upper corners, and align it with the expansion slot guides; then, press the adapter *firmly* into the expansion slot.




**Attention:** Be certain that the adapter is correctly seated in the expansion slot before you turn on the computer. Incomplete installation of an adapter might damage the system board or the adapter.

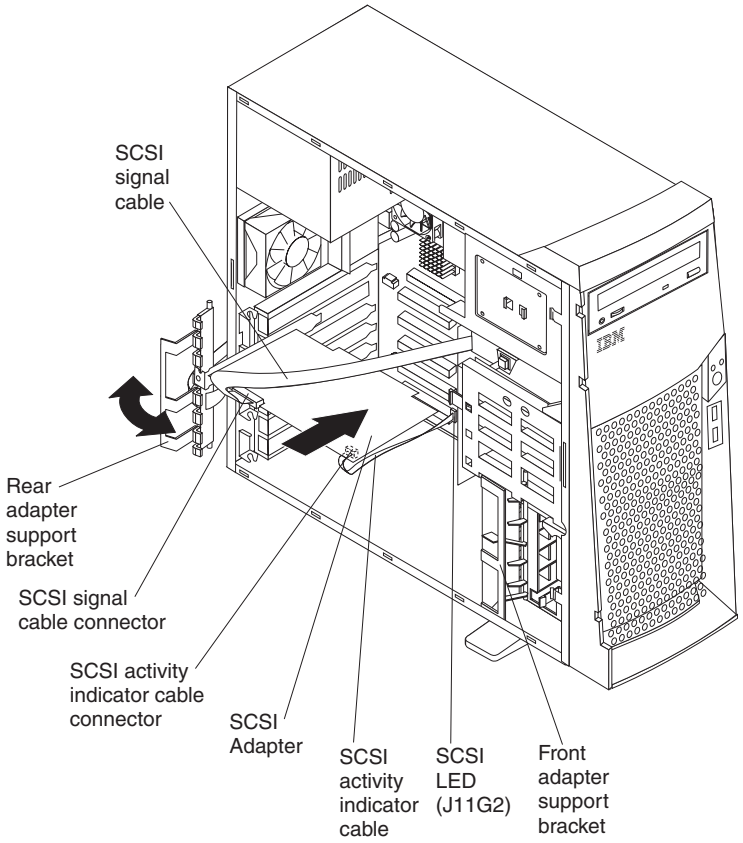
10. Connect required cables to the adapter. Route cables so that they do not block the flow of air from the fans.
11. If you have another adapter to install, repeat steps 1 - 10. If you have another option to install, do so at this time. Otherwise, complete the rest of the steps in this section.
12. If you have installed a full-length adapter, rotate the front adapter support bracket to the closed (locked) position.
13. Reinstall the rear adapter support bracket; then, rotate the bracket to the closed (locked) position.

    **Note:** The rear retaining bracket sits against the computer cover. You might find it easier to lay the computer on its side to replace the cover.
14. Replace the support bracket.
15. Replace the side cover, see “Replacing the cover” on page 51 for details.
16. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

## Installing an optional SCSI adapter

Some models come without SCSI adapters. Do the following to install an optional SCSI adapter:

1. If you do not have a preinstalled SCSI adapter, complete steps 1 through 10 of “Installing an adapter” on page 40. Continue with step 2 of this procedure.
2. Connect the SCSI signal cable to the adapter; then, connect one or more of the signal cable connectors to the rear of the SCSI devices.
3. Connect the SCSI activity indicator cable to the adapter and to the SCSI LED connector (J11G2) on the system board. See “System board” on page 35 for the location of the SCSI LED connector.




4. If you have other adapters or options to install or remove, do so now.
5. Rotate the front adapter support bracket to the closed (locked) position.
6. Reinstall the rear adapter support bracket; then, rotate it to the closed (locked) position.
7. Replace the support bracket.
8. Replace the cover. See “Replacing the cover” on page 51 for details.
9. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

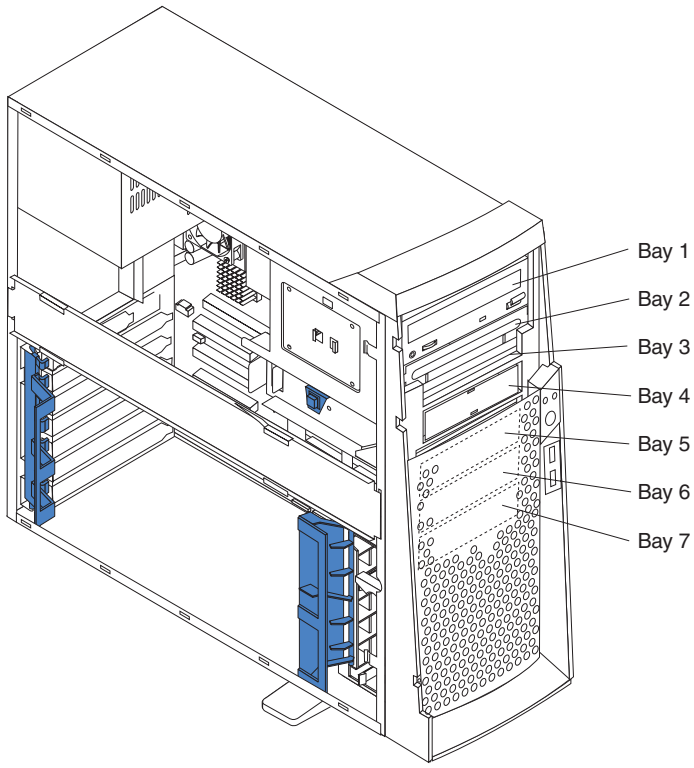
## Installing internal drives

Depending on the computer model, you might have one or more of the following drives installed.

- Diskette
- Hard disk
- CD- or DVD-ROM
- Tape

## Internal drive bays

The IntelliStation M Pro computer comes with an IDE CD-ROM or DVD-ROM drive in bay 1, a 3.5-in., 1.44 MB diskette drive in bay 3, and a hard disk drive installed in bay 5.




**Notes**:

1. Diskette drives, tape drives, and CD-ROM and DVD-ROM drives are examples of removable media drives. You can install removable-media drives in bays 1, 2, 3, and 4 only.
2. You can install a 3.5-in, slim-high, or a 5.25-in., half-high, removable-media drive, such as a tape backup drive, in bay 2.
3. You can only install a 3.5-in., slim-high, removable-media drive in bay 4.
4. The IntelliStation M Pro computer supports only one diskette drive, which uses 1.44 MB diskettes.
5. To install a 3.5-in. drive in a 5.25-in. bay, you must use a 5.25-in. conversion kit, supplied with the option.

6. The electromagnetic interference (EMI) integrity and cooling of the computer are protected by having all bays and PCI slots covered or occupied. When you install a drive or PCI adapter, save the EMC shield and filler panel from the bay or the PCI adapter slot cover in the event you later remove the option.
7. For a complete list of supported options for the computer, refer to http://www.ibm.com/pc/support on the World Wide Web.

## Preinstallation steps (all bays)

Before you install a drive in the computer, verify that you have all the cables and other equipment specified in the documentation that comes with the drive. You might also need to perform certain preinstallation activities. Some of the steps are required only during the initial installation of an option.

1. Read “Safety information” on page 105, “Handling static sensitive devices” on page 108 and the documentation that comes with the drive.
2. Choose the bay in which you want to install the drive.
3. Check the instructions that come with the drive to see if you need to set any switches or jumpers on the drive. If you are installing a SCSI device, be sure to set the SCSI ID for that device.

## Installing a drive in bay 2 or 4

Do the following to install a drive in bay 2 or 4:

**Attention:** When handling static-sensitive devices, take precautions to avoid damage from static electricity.

1. Read the information in “Preinstallation steps (all bays)” on page 44.
2. Turn off the computer and attached devices and disconnect the external cables and power cords.
3. Remove the side cover. See “Removing the side cover” on page 38 for details.
4. Remove the support bracket (see “Removing the support bracket” on page 39).
5. Use a screwdriver to pry the filler panel and EMC shield away from the computer.

   **Note:** If you are installing a drive that contains a laser, observe the following safety precaution.

**Statement 3**

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

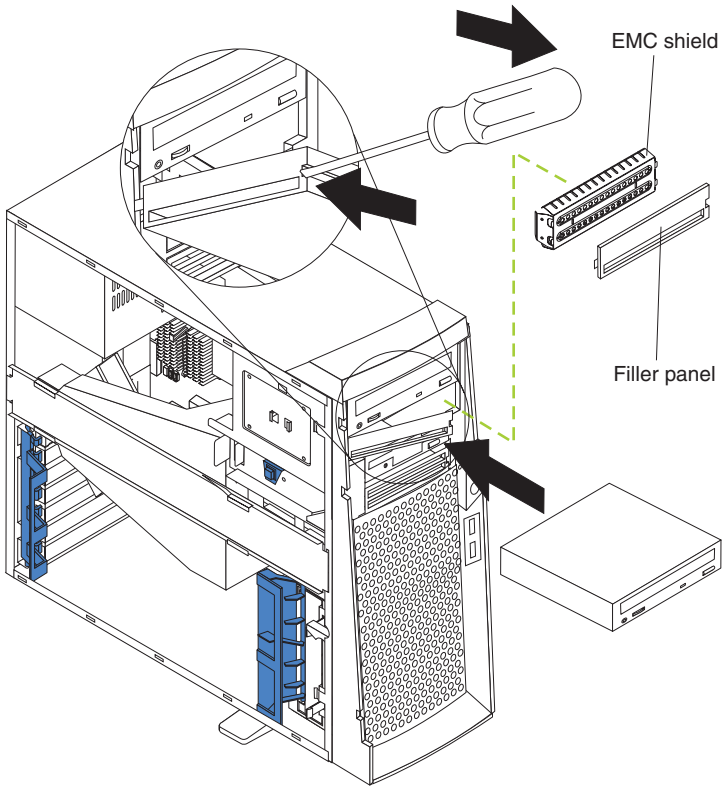
- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous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

**DANGER:**

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

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

6. Touch the static-protective package containing the drive to any unpainted metal surface on the computer; then, remove the drive from the bag and place it on a static-protective surface.
7. Set any jumpers or switches on the drive according to the documentation that comes with the drive.
8. If you are installing a 5.25-in. drive in bay 2, push the drive into the bay; then, use the two screws to attach the drive to the drive cage. If you are installing a 3.5-in. drive in bay 2, you must attach the 5.25-in conversion kit, supplied with the option, to the 3.5-in. drive.




**Note:** You can install only a 3.5-in. device in bay 4.

9. If the drive is an IDE device, connect one end of the IDE signal cable into the back of the drive and the other end of the cable into the IDE connector on the system board. For the location of the IDE connectors, see “Internal cable connectors” on page 36. If the drive is a SCSI device, connect one end of the SCSI signal cable into the back of the drive and the other end of the cable into the SCSI adapter.

   **Note:** Make sure to route the SCSI signal cable so that it does not block the air flow to the rear of the drives or over the microprocessor.

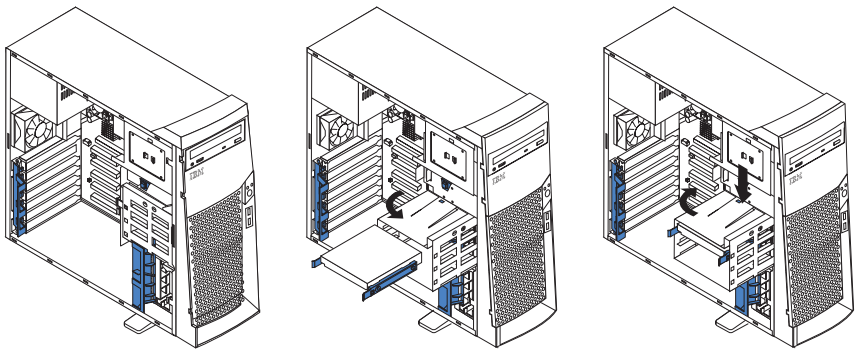
10. Connect a power cable to the back of the drive. The connectors are keyed and can be inserted only one way.
11. If you have other options to install or remove, do so now.
12. Replace the support bracket.
13. Replace the side cover. See “Replacing the cover” on page 51 for details.
14. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

## Installing a hard disk drive in bay 5, 6, or 7

You might find it useful to work with the computer laying on its side. Bays 5, 6, and 7 are in the drive cage. The drive cage is located just above the front adapter support bracket.

1. Read the information in “Preinstallation steps (all bays)” on page 44.
2. Turn off the computer and all attached devices. Disconnect all external cables and power cords; then, remove the cover. See “Removing the side cover” on page 38 for details.
3. Remove the support bracket.
4. Access the drive cage.
   a. If the computer has hard disk drives preinstalled in the drive cage, disconnect the power and signal cables from the rear of the drives.
   b. Grasp the drive cage and rotate the cage out (middle view) of the computer until it locks into place with the drive cage retention tab. The open ends of the drive slots and installed drives will face you.

      **Note:** Ensure that the drive cage locks into place over the drive cage retention tab by pressing the drive cage all the way up.
5. Attach the guide rails to the side of the drive using the screws provided. If you obtained the optional drive from IBM, the guide rails are blue plastic.
6. Slide the drive into the drive cage until the plastic tabs on the drive guide rails lock into place in the drive cage.
7. Lift the drive cage up, and press in on the drive cage release tab; then, rotate the cage back into the computer (right view).



   **Note:** Clear any cables that might impede the replacement of the drive cage.
8. Connect the power and signal cables to the rear of each drive and to the system board if necessary.

   **Note:** Route the signal cable so that it does not block the air flow to the rear of the drives or over the microprocessor.
9. If you have other options to install or remove, do so now.
10. Replace the support bracket.
11. Replace the side cover, see “Replacing the cover” on page 51 for details.
12. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

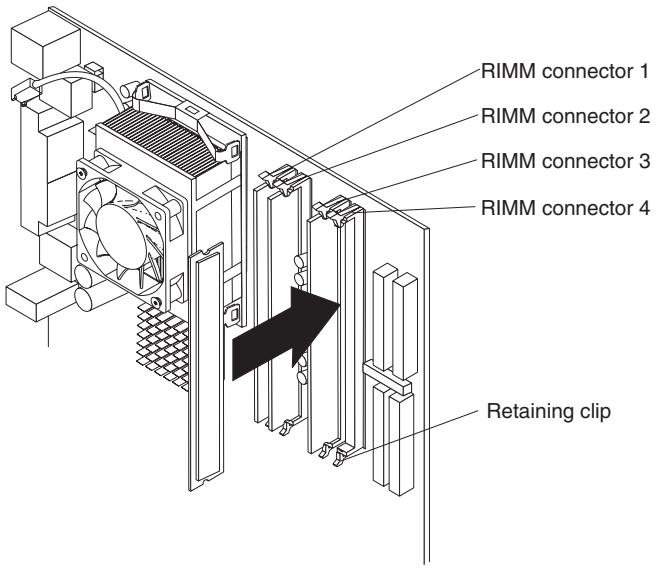
## Installing memory modules

Adding memory to the computer is an easy way to make programs run faster. You can increase the amount of memory in the computer by installing memory modules. The IntelliStation M Pro computer uses industry-standard, RAMBUS in-line memory modules (RIMMs).

**Notes:**

1. Any connector that does not have a RIMM installed must have a continuity RIMM (C-RIMM), a module that looks like a RIMM but has no memory on it. A C-RIMM is used to continue the connection on a RIMM connector that does not have memory installed.
2. Install only ECC RIMMs to enable ECC. If you use ECC and non-ECC memory together, it will function as non-ECC memory.
3. RIMM connectors do not support dual inline memory modules (DIMMs).
4. Use only PC600 or PC800 RIMMs.

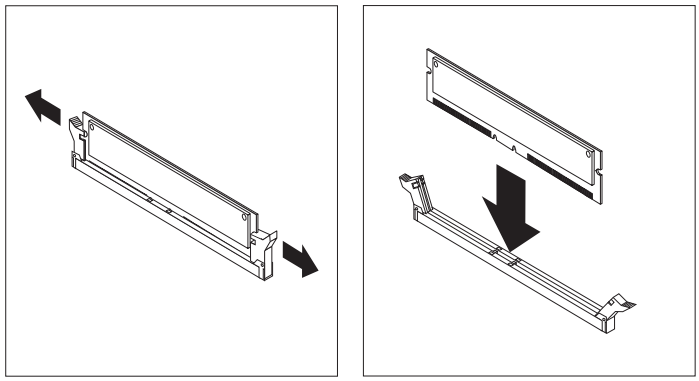
   **Note:** If you use PC600 and PC800 RIMMs together, all memory will function at the speed of the slowest RIMM.
5. The IntelliStation M Pro computer supports 128 MB, 256 MB, and 512 MB RIMMs. The computer supports a minimum of 128 MB and a maximum of 2.0 GB of system memory. Go to http://www.ibm.com/pc/support for a list of memory modules to use with the computer.
6. RIMMs must be installed in matched pairs (same type and capacity). RIMM 1 and 2 are a pair; RIMM 3 and 4 are a pair.



Do the following to install a RIMM or C-RIMM:

**Attention:** When handling static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static sensitive devices” on page 108.

1. Review the safety precautions listed in the “Safety information” on page 105.
2. Turn off the computer and all attached devices. Disconnect all external cables and power cords; then, remove the cover. See “Removing the side cover” on page 38 for details.
3. Remove the support bracket.
4. Touch the static-protective package containing the RIMM to any unpainted metal surface on the computer. Then, remove the new RIMM from the package.
5. Open the retaining clips and, if necessary, remove any existing RIMM or C-RIMM.
6. Gently open the retaining clip on each end of the RIMM slot. Turn the RIMM so that the pins align correctly with the connector.



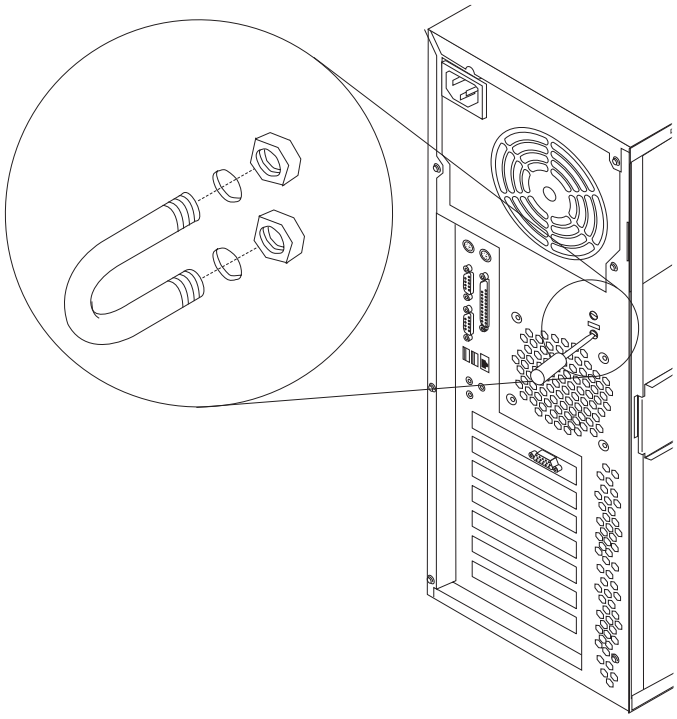
7. Insert the RIMM into the connector by aligning the RIMM edges with the slots at each end of the RIMM connector. Firmly press the RIMM straight down into the connector by applying pressure on both ends of the RIMM simultaneously. The retaining clips snap into the locked position when the RIMM is firmly seated in the connector.
8. If a gap exists between the RIMM and the retaining clips, the RIMM has not been correctly installed. Open the retaining clips, remove the RIMM, then reinsert it.
9. If you have other options to install or remove, do so now. Otherwise, finish the installation with the steps below.
10. Replace the support bracket.
11. Replace the side cover. See “Replacing the cover” on page 51.
12. Reconnect the external cables and power cords. Turn on the attached devices, then the computer.

## Installing a security U-bolt

To help prevent theft, you can add a security U-bolt and cable to the computer. This section discusses how to install a security U-bolt.

Do the following to install the U-bolt:

1. Review the safety precautions listed in “Safety information” on page 105.
2. Turn off the computer and all attached devices. Disconnect all external cables and power cords; then, remove the cover. See “Removing the side cover” on page 38 for details.
3. Use a screwdriver to remove the two metal knockouts.
4. Insert the U-bolt through the rear panel; then, attach and tighten the nuts.
5. Thread the cable through the U-bolt and around an object that is not part of or permanently secured to the building structure or foundation, and from which the cable cannot be removed. Fasten the cable ends together with a lock. After you add the security cable, be certain it does not interfere with other cables connected to the computer.



6. Reconnect the external cables and power cords, and turn on the attached devices and the computer.

## Replacing the cover

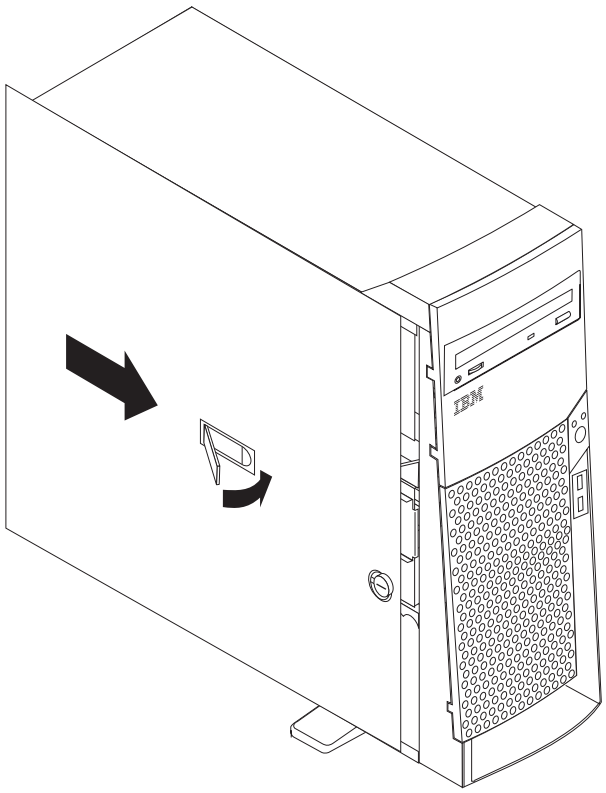
The following information describes replacing the cover.

**Notes:**

1. Because of the placement of the adapter support brackets, you might find it easier to lay the computer on it side with the cover lock facing you.
2. If you removed the support bracket, reinstall it before you replace the cover. See “Removing the support bracket” on page 39 for details.

Do the following to replace the computer cover:

1. Clear any cables that might impede the replacement of the cover.
2. Install the side cover by placing it into position on the computer. Be certain the notches on the underside of the cover match up to the holes along the sides of the computer. Press down on the cover release latch button as you close the cover release latch to lock the cover.



3. If you have not done so already, make sure that the two front stabilizing feet are rotated outward so that they properly support the computer. Rotate each individual foot outward 90 degrees.
4. Reconnect the external cables and power cords to the computer; then, connect the power cords to electrical outlets.
5. Turn on the attached devices; then, turn on the computer.

## Connecting external devices

You can attach several external devices to the computer. To attach an external device:

1. Be sure the computer and all attached devices are turned off.
2. Read “Before you begin” on page 33 and the documentation that comes with the options.
3. Follow the instructions that come with the option to prepare it for installation and to connect it to the computer.

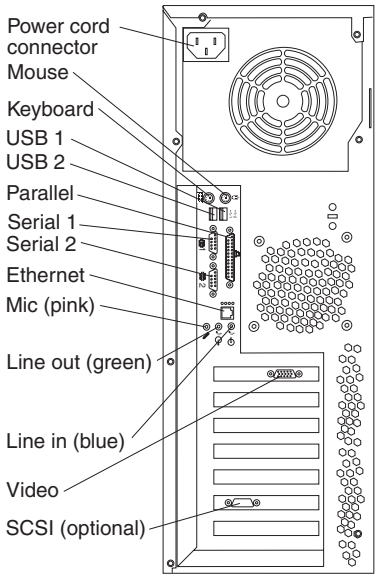
## Input/output connector descriptions

This section provides pin and other information about the I/O connectors on the rear of the computer. Refer to “Input/output connector locations.” These connectors include the following:

- One mouse
- One keyboard
- One parallel
- Two serial
- One Ethernet
- Four USB
- Line in
- Line out
- Microphone
- One video (Optional multiple connectors on some models)
- One Ultra160 SCSI (some models)

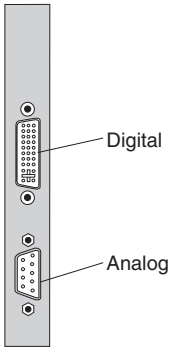
## Input/output connector locations

The following illustration shows the input/output connectors and the expansion slots on the rear of the computer. For pin assignments and more details about these connectors, see “Input/output connector descriptions.”

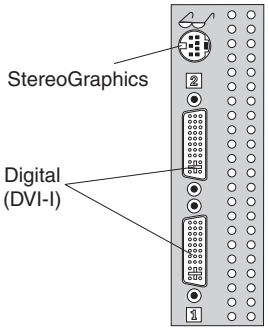



The following illustration shows the video connectors on models with an ATI Fire GL8800 graphics adapter and a 3Dlabs Wildcat III 6110.

**Fire GL 8800**




**Wildcat III 6110**

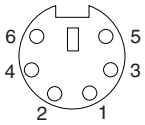



Note that the Wildcat III 6110 adapter occupies the AGP slot and the adjacent PCI slot.

If the software application supports it, you can use the StereoGraphics connector on a Wildcat III 6110 graphics adapter for 3-D glasses or goggles.

## Mouse connector

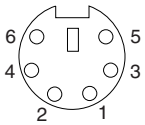
The computer has one mouse connector that supports a mouse or other pointing device. The mouse connector is located on the rear of the computer. See “Input/output connector locations” on page 52.




## Keyboard connector

The computer has one keyboard connector. See “Input/output connector locations” on page 52 for its location.

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




## Parallel connector

The computer has one parallel connector. This connector supports three standard Institute of Electrical and Electronics Engineers (IEEE) 1284 modes of operation: standard parallel port (SPP), enhanced parallel port (EPP), and extended capability port (ECP).

### Viewing or changing the connector assignments

Use the BIOS Setup Utility program to configure the parallel connector as bi-directional. With this configuration, data can be read from and written to a device. In bidirectional mode, the computer supports the ECP and EPP modes.

Do the following to view or change the parallel-connector assignment:

1. Restart the computer.
2. Press and hold the F2 key to launch the BIOS Setup Utility.

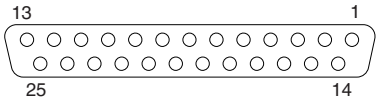
3. On the BIOS Setup Utility menu, use the cursor keys on the keyboard to select **Advanced→Peripheral Configuration→Parallel Port**.

   **Note:** When you configure the parallel connector as bi-directional, use an IEEE 1284-compliant cable. The cable must not exceed 3 meters (9.8 ft.).

4. Follow the instructions on the screen to save the changes and exit from the BIOS Setup Utility menu.

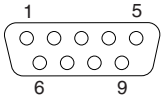
### Parallel connector

There is a 25-pin, female D-shell parallel connector on the rear of the computer. See “Input/output connector locations” on page 52 for the location of this connector.




## Serial connectors

The computer has two standard 9-pin D-shell serial connectors: Serial connector 1 and Serial connector 2. See “Input/output connector locations” on page 52 for their location.

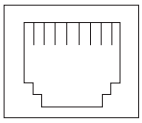



## Ethernet connector

The computer comes with an integrated Ethernet controller. This controller provides an interface for connecting to 10-Mbps or 100-Mbps networks and provides full-duplex capability, which enables simultaneous transmission and reception of data on an Ethernet LAN.

To access the Ethernet connector, attach a Category 3, 4, or 5 unshielded twisted-pair (UTP) cable to the RJ-45 connector on the rear of the computer. See “Input/output connector locations” on page 52.

**Important:** To operate the computer within FCC Class A or Class B limits, use a category 5 Ethernet cable.



## Universal Serial Bus connectors

The computer has four Universal Serial Bus (USB) connectors, which configure automatically when you use any USB device. Two USB connectors are on the front of the computer. USB is a serial interface standard for telephony and multimedia devices. It uses Plug and Play technology to determine the type of device attached to the connector.

**Notes:**

1. If you attach a standard (non-USB) keyboard to the keyboard connector, the USB connectors and devices will be disabled during the power-on self-test.

2. If you install a USB keyboard that has a mouse connector, the USB keyboard emulates a mouse, and you will not be able to disable the mouse settings in the BIOS Setup Utility program.

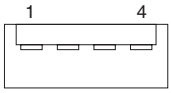
### USB cables

Use a 4-pin USB cable to connect external devices to USB connectors.

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

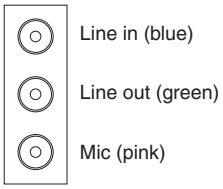
### USB connectors

See “Input/output connector locations” on page 52 for the location of the USB connectors.




## Audio connectors

The audio connectors are used to connect external audio equipment to the computer. See “Input/output connector locations” on page 52 for the location of these connectors.




### Line out

This connector is used to send audio signals from the computer to external devices, such as powered speakers with built-in amplifiers, headphones, multimedia keyboards, or the audio Line in connector on a stereo system.

**Note:** The internal speaker in the computer is disabled when any device is attached to this connector.

### Line in

This connector is used to accept audio signals from external devices, such as line output from a stereo, television, or musical instrument into the computer sound system.

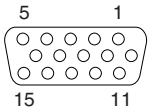
### Microphone

This connector is used to connect a microphone to the computer when you want to record voice or other sounds on the hard-disk drive. It can also be used by speech recognition software.

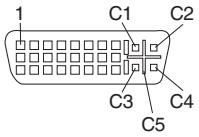
## Video connector

The computer uses an AGP adapter located in the AGP slot on the system board. The video connector is on the adapter and is located on the rear of the computer. See “Input/output connector locations” on page 52 for the location of this connector.

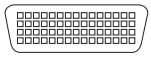
**Analog video connector:**




**Digital (DVI-I) video connector:**




**Low Force Helical-60 (LFH-60) video connector:**



Some models come with an AGP adapter that has dual video connectors or cables.

Models with the 3Dlabs Wildcat III 6110 and Fire GL 8800 video adapter come with digital-to-analog converters for each DVI-I connector.

**Attention:** On the Wildcat III 6110 video adapter, the first or only monitor must be connected to the bottom connector (connector number 1).

Models that come with the Matrox G450 DVI-I video adapter come with a DVI-I to dual analog monitor pigtail cable.

Models that come with the NVidia Quadro4 200NVS video adapter come with an LFH-60 to dual analog monitor pigtail cable. If you want to set up two digital monitors, you need to purchase a separate dual-digital monitor pigtail cable.

## Ultra160 SCSI connector

Some computer models come with a SCSI adapter, which supports an Ultra160 SCSI internal channel in a full-featured PCI 2.1-/2.2-compliant bus master package. This configuration supports zero wait state, 32-bit memory transfers at 160 MB per second, when low voltage differential (LVD) SCSI peripherals are attached. This channel supports up to 15 SCSI devices. In addition, this adapter uses:

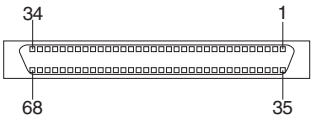
- Double-transition clocking to achieve high transfer rates
- Domain name validation to negotiate compatible data transfer speeds with each device
- Cyclic-redundancy checking, instead of the usual parity checking, to significantly improve data reliability

## SCSI cabling requirements

You can install five internal SCSI devices using the SCSI signal cable that comes with the computer. If you plan to attach external SCSI devices, you must order an additional SCSI cable. To select and order the correct cables for use with external devices, contact your IBM reseller or IBM marketing representative. To receive an indication of SCSI hard-disk drive activity, you must also connect the SCSI adapter to the SCSI LED (J11G2) connector on the system board. See “System board” on page 35 for the location of the SCSI connector.

## Setting SCSI IDs

Each SCSI device 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. Refer to the information that is provided with the device for instructions to set its SCSI ID. With a SCSI adapter installed in the computer, you can use its 68-pin SCSI connector to connect different types of SCSI devices.




To install external SCSI devices, you must have an optional SCSI PCI adapter installed. Refer to the information that is provided with the device for instructions to set its SCSI ID.

# Chapter 6. FRU information (service only)

The field replaceable unit (FRU) procedures are intended for trained servicers who are familiar with IBM products.

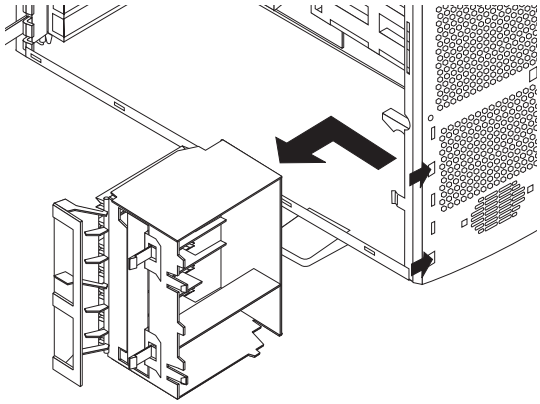
## Adapter guide

**Notes:**

1. Read “Before you begin” on page 33.
2. Read the safety notices at “Safety notices (multi-lingual translations)” on page 108.

Complete the following steps to remove the adapter guide:

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Removing the side cover” on page 38 and “Removing the support bracket” on page 39).
3. Remove the front bezel (see “Bezel” on page 60).
4. Disconnect all adapter cards from the system board and remove them from the computer (see “Installing an adapter” on page 40).



5. Push inward on the two tabs on the left and push them toward the inside of the computer until they clear the notches; then, the three tabs on the right will come away from the chassis.
6. Pull the adapter guide away from the chassis.
7. To install the adapter guide, reverse the previous steps.

## Adapter retainer

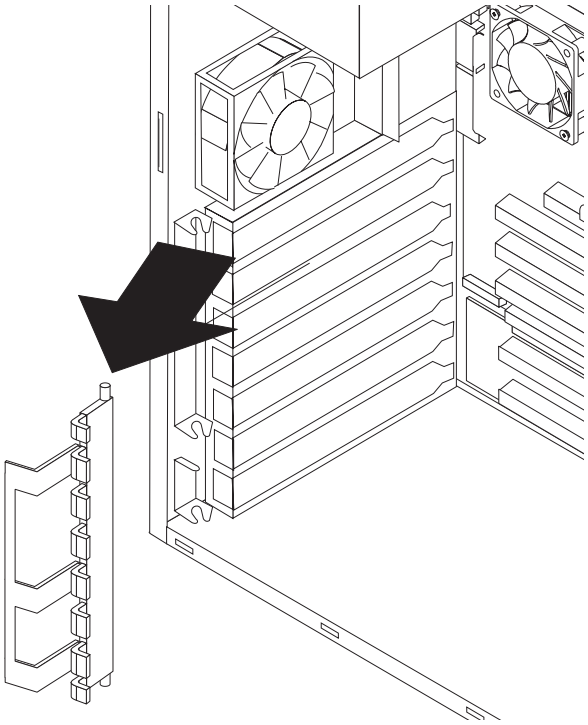
**Notes:**

1. Read “Before you begin” on page 33.
2. Read the safety notices at “Safety notices (multi-lingual translations)” on page 108.

Complete the following steps to remove the adapter retainer:

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Removing the side cover” on page 38 and “Removing the support bracket” on page 39).

3. Disconnect all adapter cards from the system board and remove them from the computer (see “Installing an adapter” on page 40).



4. Pull the adapter retainer away from the chassis.
5. To install the adapter retainer, reverse the previous steps.

## Bezel

Complete the following steps to remove the main bezel on the tower model:

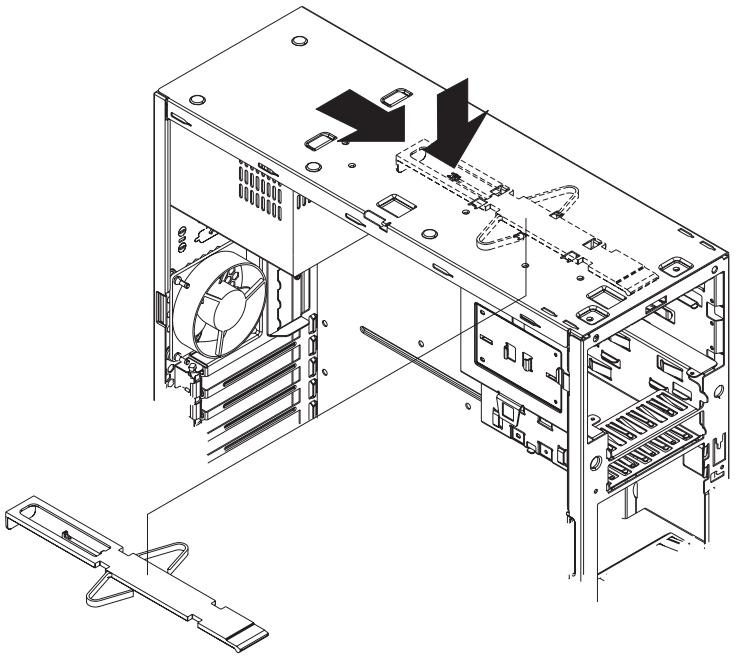
1. Remove the side cover (see “Removing the side cover” on page 38).
2. Push the blue bezel release latch, located on the inside roof of the tower chassis. The bezel will detach from the chassis.
3. To install the bezel, align the tabs at the bottom of the bezel with the slots in the lower front of the chassis; then press the top of the bezel against the chassis until it clicks into place.

## Bezel release latch

**Notes:**

1. Read “Before you begin” on page 33.
2. Read the safety notices at “Safety notices (multi-lingual translations)” on page 108.

**Note:** This illustration is for reference purposes only; your hardware may differ.



Complete the following steps to remove the bezel release latch:

1. Power-off the workstation, if it is on.
2. Unplug the workstation.
3. Remove the cover (see “Removing the side cover” on page 38).
4. Remove the front bezel (see “Bezel” on page 60).
5. Press down on the tab.
6. From the underside, grasp the bezel release latch in the center and gently pull it back and away from the workstation.

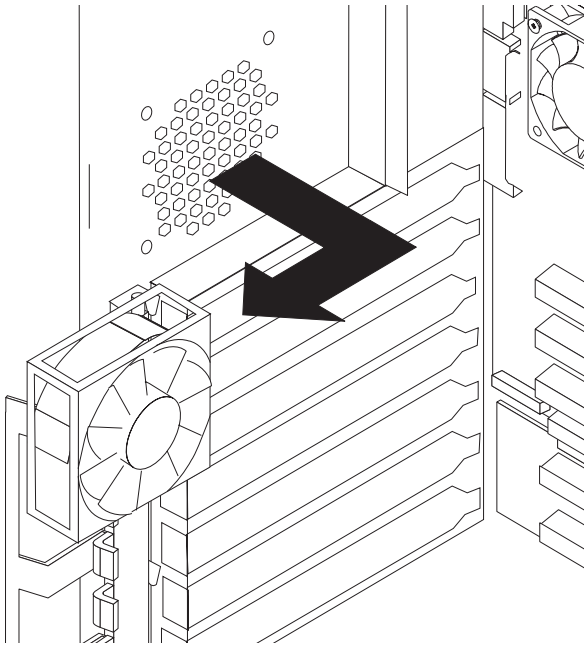
## Fan

**Notes:**

1. Read “Before you begin” on page 33.
2. Read the safety notices at “Safety notices (multi-lingual translations)” on page 108.

Complete the following steps to remove the rear fan on the tower model:

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Removing the side cover” on page 38 and “Removing the support bracket” on page 39).
3. Disconnect the fan cable from the system board.
4. Use side cutters to sever the fan’s four rubber extensions on the outside of the chassis.



5. Pull the fan away from the chassis.
6. To install the rear fan, reverse the previous steps.

   **Note:** After guiding the four rubber extensions through the apertures on the chassis, use needle-nosed pliers to pull the extensions firmly through.

## Handle cap

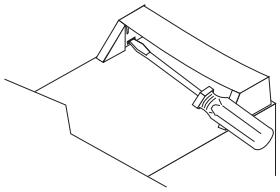
**Notes:**

1. Read “Before you begin” on page 33.
2. Read the safety notices at “Safety notices (multi-lingual translations)” on page 108.

Complete the following steps to remove the handle cap:

1. Power-off the workstation, if it is on.
2. Unplug the workstation.

   **Note:** This illustration is for reference only; your hardware may differ.



3. Use a flathead screwdriver to gently press in and down on the tabs located on the interior side wall of the handle.
4. Lift up on the handle cap to separate it from the handle support.

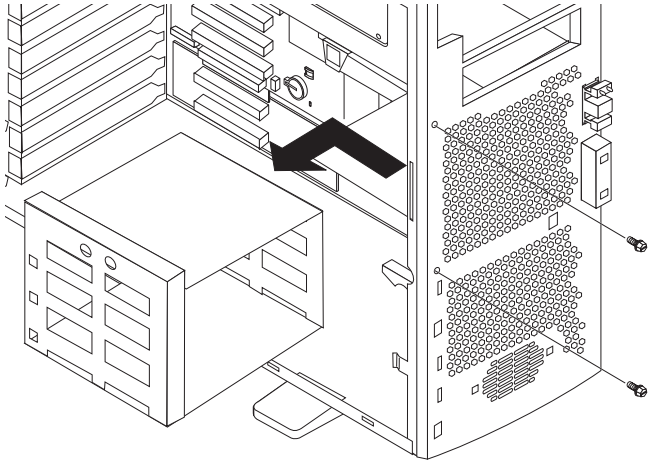
## Hard drive cage

**Notes:**

1. Read “Before you begin” on page 33.
2. Read the safety notices at “Safety notices (multi-lingual translations)” on page 108.

Complete the following steps to remove the hard drive cage in the tower model:

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Removing the side cover” on page 38 and “Removing the support bracket” on page 39).
3. If there is a hard drive in the cage, remove it (see “Installing internal drives” on page 43).



4. Remove the two screws that attach the cage to the chassis and lift it out of the computer.
5. To install the cage, reverse the previous steps.

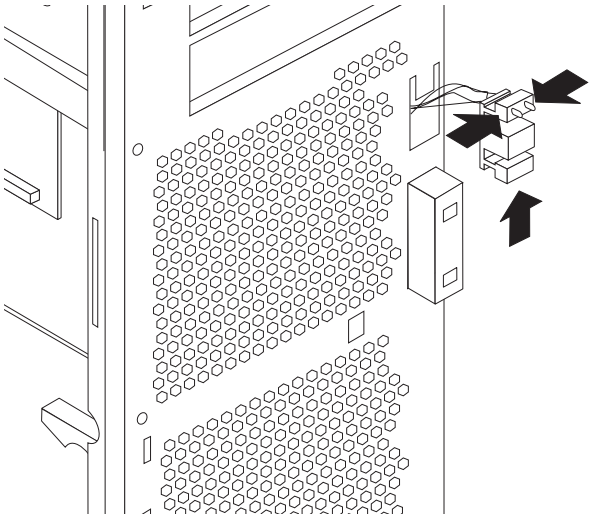
## Power/LED switch

**Notes:**

1. Read “Before you begin” on page 33.
2. Read the safety notices at “Safety notices (multi-lingual translations)” on page 108.

Complete the following steps to remove the power/LED switch:

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Removing the side cover” on page 38 and “Removing the support bracket” on page 39).
3. Remove the bezel, remove the front bezel (see “Bezel” on page 60).
4. Disconnect the power/LED switch from the system board.



5. Disengage the lower tab of the power/LED switch by pressing upward on the lower tab of the power/LED switch until it comes loose.

   **Note:** It may be necessary to use the tip of a screwdriver to disengage the lower tab.
6. Push inward on the two tabs of the top section of the power/LED switch until it pops free of the chassis; then, remove it from the computer, making sure that the cable follows freely.
7. To install the power/LED switch, reverse the previous steps.

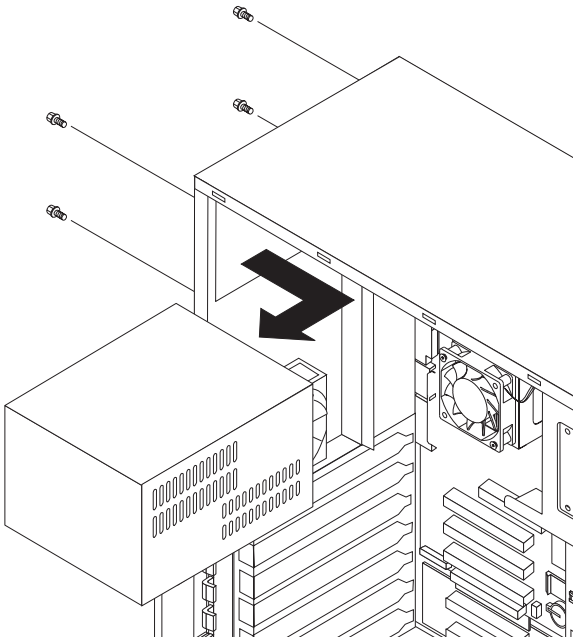
## Power supply

**Notes:**

1. Read “Before you begin” on page 33.
2. Read the safety notices at “Safety notices (multi-lingual translations)” on page 108.

Complete the following steps to remove the power supply:

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Removing the side cover” on page 38 and “Removing the support bracket” on page 39).
3. Disconnect the internal power supply cables.



4. Remove the 4 screws that secure the power supply to the chassis.
5. Lift the power supply out of the chassis.
6. To replace the power supply, reverse the previous steps.

## Microprocessor / fan sink

**Notes:**

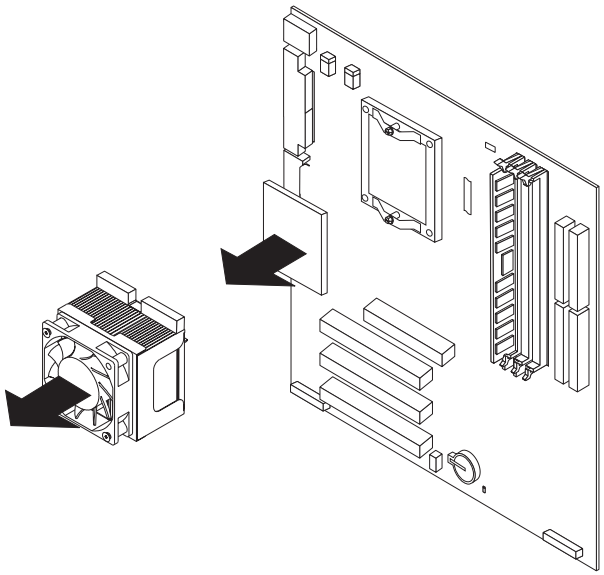
1. Read “Before you begin” on page 33.
2. Read the safety notices at “Safety notices (multi-lingual translations)” on page 108.

Complete the following steps to remove the microprocessor and fan sink:

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Removing the side cover” on page 38 and “Removing the support bracket” on page 39).
3. Remove any components that impede access to the microprocessor.
4. Disconnect any cables that impede access to the microprocessor.
5. Remove fan sink from microprocessor:

   **Note:** The fansink and underlying heatsink are attached and do not need to be separated from each other. Remove the fansink/heatsink assembly from the microprocessor as a single unit.

   a. Detach the fan sink cable.



b. Loosen the two captive screws on either side (in leaf spring enclosures) of the fansink.

c. With the two captive screws loosened, pivot the leaf spring assemblies outward and out of the notches on the fansink assembly.

d. Lift the fan sink up and out of the computer.

6. Free the microprocessor from the system board by rotating the microprocessor socket lever arm upward to its maximum vertical position.
7. Lift the microprocessor up and out of the computer.
8. To install a microprocessor, reverse the previous steps.

**Note:** When reconnecting the fansink cable to the system board, be sure to connect the cable to the connector marked ″CPU fan″.

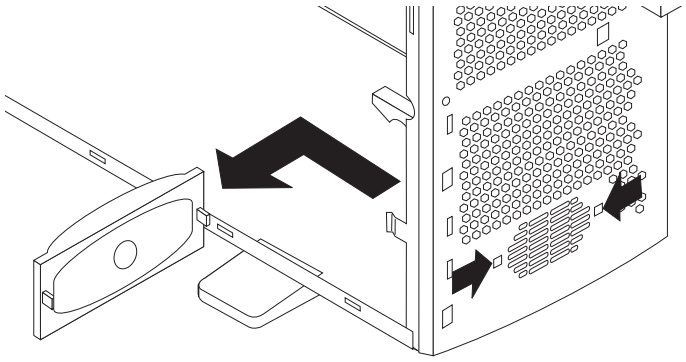
## Speaker

**Notes:**

1. Read “Before you begin” on page 33.
2. Read the safety notices at “Safety notices (multi-lingual translations)” on page 108.

Complete the following steps to remove the speaker:

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Removing the side cover” on page 38 and “Removing the support bracket” on page 39).
3. Disconnect the speaker cable from the system board.
4. Remove the adapter guide (see “Adapter guide” on page 59).



5. Use the tip of a screwdriver to gently pry the two tabs through the notches until the speaker disengages from the chassis.
6. Lift the speaker out of the computer, making sure the cable follows freely.

   **Note:** It may be easier to disconnect other cables in order to reach the speaker cable. If this is the case, be sure to reattach all cables that were disconnected before reassembling the computer.
7. To replace the speaker, reverse the previous steps.

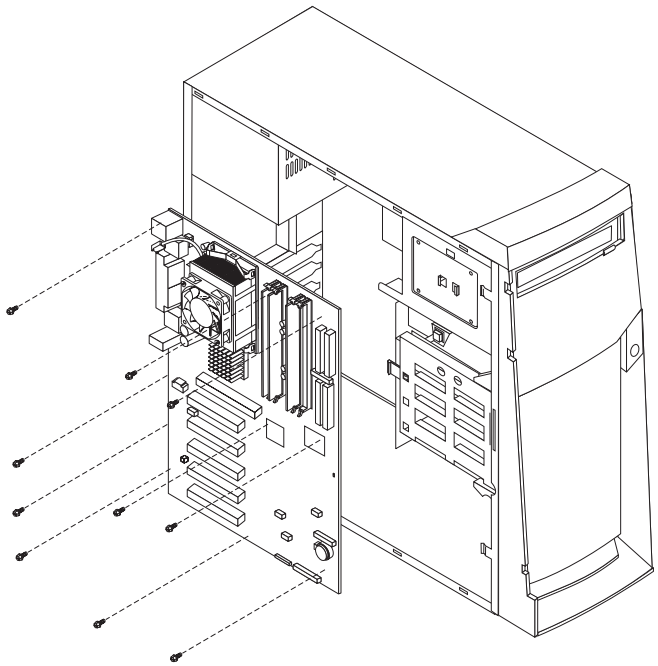
## System board

**Notes:**

1. Read “Before you begin” on page 33.
2. Read the safety notices at “Safety notices (multi-lingual translations)” on page 108.

Complete the following steps to remove the system board:

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Removing the side cover” on page 38 and “Removing the support bracket” on page 39).
3. Remove any of the following components that are installed on the system board:
   - Microprocessor (see “Microprocessor / fan sink” on page 65).
4. Disconnect all internal system board cables.



5. Remove the ten screws that secure the system board to the chassis and lift the board up and out of the computer.
6. To install the system board, reverse the previous steps.

## Top/side cover

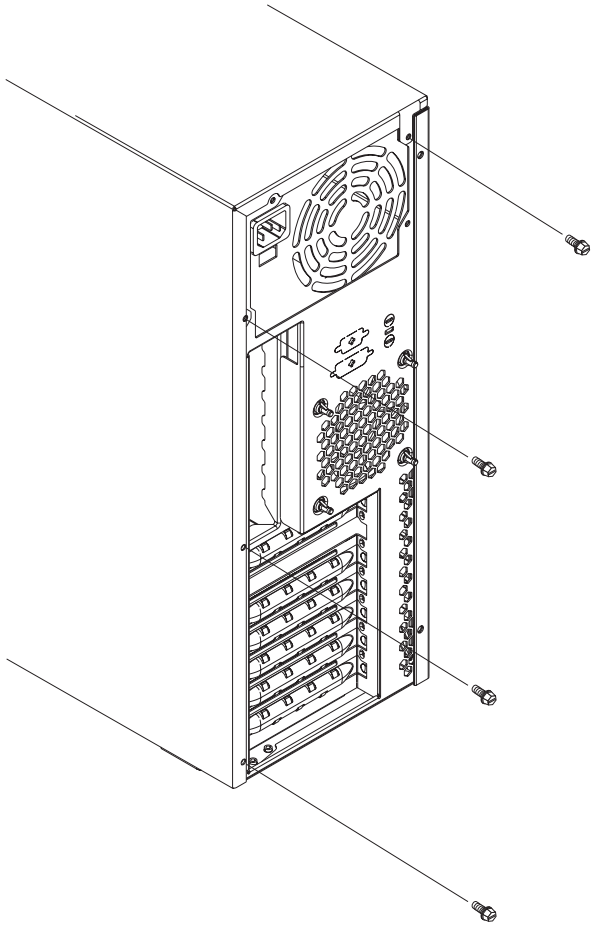
**Notes:**

1. Read “Before you begin” on page 33.
2. Read the safety notices at “Safety notices (multi-lingual translations)” on page 108.

Complete the following steps to remove the top/side cover:

1. Power-off the workstation, if it is on.
2. Unplug the workstation.
3. Remove the cover (see “Removing the side cover” on page 38).
4. Remove the front bezel (see “Bezel” on page 60).
5. Remove the handle assembly (see “Handle cap” on page 62).

**Note:** This illustration is for reference only; your hardware may differ.



6. Remove the four screws from the back of the workstation and put them in a safe place.
7. Using a screwdriver, gently pry the cover away from the workstation in the rear and slide the unit away from the workstation.

# Chapter 7. Symptom-to-FRU index

The Symptom-to-FRU index lists error symptoms and possible causes. The most likely cause is listed first. Always begin with Chapter 1, “General checkout,” on page 1. This index can also be used to help you decide which FRUs to have available when servicing a computer. If you are unable to correct the problem using this index, go to “Undetermined problems” on page 95.

**Notes:**

1. If you have both an error message and an incorrect audio response, diagnose the error message first.
2. If you cannot run the diagnostic tests or you get a diagnostic error code when running a test, but did receive a POST error message, diagnose the POST error message first.
3. If you did not receive any error message, look for a description of the error symptoms in the first part of this index.
4. Check all power supply voltages before you replace the system board (see“Power supply” on page 64.

**Important:** Some errors are indicated with a series of beep codes (see “Beep symptoms” on page 72).

Type 6229 computers default to come up quiet (no beep and no memory count and checkpoint code display) when no errors are detected by POST. To enable beep and memory count and checkpoint code display when a successful POST occurs, do the following:

1. Select **Start Options** in the Configuration/Setup Utility program (see “Using the BIOS Setup Utility program” on page 25).
2. Set **Power-On Self-Test** to **Enhanced**.

The processor is a separate FRU from the system board; the processor is not included with the system board FRU.

In the following indexes, *X* can represent any number.

## RIMM memory errors

The following RIMM error messages are issued by the diagnostic programs.

| Error | FRU/Action |
|---|---|
| **Corrupt BIOS**<br><br>Information in BIOS is not as expected.<br><br>Not able to find expected DMI information from BIOS.<br><br>Memory controller chipset vendor ID does not match expected value. | 1. **Reflash the BIOS.**<br>2. Perform boot block recovery.<br>3. Replace the system board. |
| **Test aborted by user** | • **Restart test.** |

**Note:** *Y* is the RIMM socket number. Use the System Board Layout section in the latest Hardware Maintenance Manual (HMM) to reference the memory sockets.

## Hard disk drive boot error

A hard disk drive boot error can have the following causes.

| Error | FRU/Action |
|---|---|
| **The start-up drive is not in the boot sequence in configuration.** | • **Check the configuration and ensure the start-up drive is in the boot sequence.** |
| **No operating system installed on the boot drive.** | • **Install an operating system on the boot drive.** |
| **The boot sector on the start-up drive is corrupted.** | • **The drive must be formatted, do the following:**<br>1. Attempt to access and recover (back-up) the failing hard disk drive.<br>2. Using the operating systems programs, format the hard disk drive.<br>3. Install operating system, and restore files. |
| **The drive is defective.** | • **Replace the hard disk drive.** |

## Beep symptoms

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

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

Use the following table to diagnose beep symptoms.

| Beeps | FRU/Action |
|---|---|
| **1**<br>Refresh failure. | 1. **Verify all RIMM slots are occupied correctly. See "Installing memory modules" on page 48**<br>2. Reseat memory.<br>3. Test with known good memory. Replace memory if bad.<br>4. Replace system board. |
| **2**<br>Parity cannot be reset | 1. **Verify all RIMM slots are occupied correctly. See "Installing memory modules" on page 48**<br>2. Reseat memory.<br>3. Test with known good memory. Replace memory if bad.<br>4. Replace system board. |
| **3**<br>First 64 KB memory failure. | 1. **Verify all RIMM slots are occupied correctly. See "Installing memory modules" on page 48**<br>2. Reseat memory.<br>3. Test with known good memory. Replace memory if bad.<br>4. Replace system board. |
| **4**<br>Timer not operational. | • **Change system board.** |
| **5**<br>Not used. | • **Not used.** |
| **6**<br>8042 GateA20 cannot be toggled. | • **Change system board.** |

| Beeps | FRU/Action |
|---|---|
| **7**<br>Exception interrupt error. | • **Change system board.** |
| **8**<br>Display memory R/W error. | 1. **Verify all RIMM slots are occupied correctly. See "Installing memory modules" on page 48**<br>2. Reseat memory.<br>3. Test with known good memory. Replace memory if bad.<br>4. Replace system board. |
| **9**<br>Not used. | • **Not used.** |
| **10**<br>CMOS shutdown register test error. | • **Change system board.** |
| **11**<br>Invalid BIOS (e.g. POST module not found, etc.). | • **Reflash BIOS.** |

## Diagnostic error codes

Refer to the following diagnostic error codes when using the diagnostic tests. See Chapter 3, "Diagnostics," on page 11 for the specific type for information about the diagnostic programs.

In the following index, *X* can represent any number.

| Diagnostic Error Code | FRU/Action |
|---|---|
| **000-000-XXX**<br>BIOS Test Passed | • **No action** |
| **000-002-XXX**<br>BIOS Timeout | 1. **Flash the system**<br>2. System board |
| **000-024-XXX**<br>BIOS Addressing test failure | 1. **Flash the system**<br>2. System board |
| **000-025-XXX**<br>BIOS Checksum Value error | 1. **Flash the system**<br>2. Boot block<br>3. System board |
| **000-026-XXX**<br>FLASH data error | 1. **Flash the system**<br>2. Boot block<br>3. System board |
| **000-027-XXX**<br>BIOS Configuration/Setup error | 1. **Run Setup**<br>2. Flash the system<br>3. Boot block<br>4. System board |
| **000-034-XXX**<br>BIOS Buffer Allocation failure | 1. **Reboot the system**<br>2. Flash the system<br>3. Run memory test<br>4. System board |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **000-035-XXX**<br>BIOS Reset Condition detected | 1. **Flash the system**<br>2. System board |
| **000-036-XXX**<br>BIOS Register error | 1. **Flash the system**<br>2. Boot block<br>3. System board |
| **000-038-XXX**<br>BIOS Extension failure | 1. **Flash the system**<br>2. Adapter card<br>3. System board |
| **000-039-XXX**<br>BIOS DMI data error | 1. **Flash the system**<br>2. System board |
| **000-195-XXX**<br>BIOS Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **000-196-XXX**<br>BIOS test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **000-197-XXX**<br>BIOS test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **000-198-XXX**<br>BIOS test aborted | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |
| **000-199-XXX**<br>BIOS test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **000-250-XXX**<br>BIOS APM failure | 1. **Flash the system**<br>2. System board |
| **000-270-XXX**<br>BIOS ACPI failure | 1. **Flash the system**<br>2. System board |
| **001-000-XXX**<br>System Test Passed | • **No action.** |
| **001-00X-XXX**<br>System Error | • **System board** |
| **001-01X-XXX**<br>System Error | • **System board** |
| **001-024-XXX**<br>System Addressing test failure | • **System board** |
| **001-025-XXX**<br>System Checksum Value error | 1. **Flash the system**<br>2. System board |
| **001-026-XXX**<br>System FLASH data error | 1. **Flash the system**<br>2. System board |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **001-027-XXX**<br>System Configuration/Setup error | 1. **Run Setup**<br>2. Flash the system<br>3. System board |
| **001-032-XXX**<br>System Device Controller failure | • **System board** |
| **001-034-XXX**<br>System Device Buffer Allocation failure | 1. **Reboot the system**<br>2. Flash the system<br>3. Run memory test<br>4. System board |
| **001-035-XXX**<br>System Device Reset condition detected | • **System board** |
| **001-036-XXX**<br>System Register error | • **System board** |
| **001-038-XXX**<br>System Extension failure | 1. **Adapter card**<br>2. System board |
| **001-039-XXX**<br>System DMI data structure error | 1. **Flash the system**<br>2. System board |
| **001-040-XXX**<br>System IRQ failure | 1. **Power-off/on system and re-test**<br>2. System board |
| **001-041-XXX**<br>System DMA failure | 1. **Power-off/on system and re-test**<br>2. System board |
| **001-195-XXX**<br>System Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **001-196-XXX**<br>System test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **001-197-XXX**<br>System test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **001-198-XXX**<br>System test aborted | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |
| **001-199-XXX**<br>System test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **001-250-XXX**<br>System ECC error | • **System board** |
| **001-254-XXX**<br>**001-255-XXX**<br>**001-256-XXX**<br>**001-257-XXX**<br>System DMA error | • **System board** |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **001-260-XXX**<br>**001-264-XXX**<br>System IRQ error | • **System board** |
| **001-268-XXX**<br>System IRQ1 failure | 1. **Device on IRQ1**<br>2. System board |
| **001-269-XXX**<br>System IRQ2 failure | 1. **Device on IRQ2**<br>2. System board |
| **001-270-XXX**<br>System IRQ3 failure | 1. **Device on IRQ3**<br>2. System board |
| **001-271-XXX**<br>System IRQ4 failure | 1. **Device on IRQ4**<br>2. System board |
| **001-272-XXX**<br>System IRQ5 failure | 1. **Device on IRQ5**<br>2. System board |
| **001-273-XXX**<br>System IRQ6<br>(diskette drive) failure | 1. **Diskette Cable**<br>2. Diskette drive<br>3. System board |
| **001-274-XXX**<br>System IRQ7 failure | 1. **Device on IRQ7**<br>2. System board |
| **001-275-XXX**<br>System IRQ8 failure | 1. **Device on IRQ8**<br>2. System board |
| **001-276-XXX**<br>System IRQ9 failure | 1. **Device on IRQ9**<br>2. System board |
| **001-277-XXX**<br>System IRQ10 failure | 1. **Device on IRQ10**<br>2. System board |
| **001-278-XXX**<br>System IRQ11 failure | 1. **Device on IRQ11**<br>2. System board |
| **001-279-XXX**<br>System IRQ12 failure | 1. **Device on IRQ12**<br>2. System board |
| **001-280-XXX**<br>System IRQ13 failure | 1. **Device on IRQ13**<br>2. System board |
| **001-281-XXX**<br>System IRQ14<br>(hard disk drive) failure | 1. **Hard disk drive cable**<br>2. Hard disk drive<br>3. System board |
| **001-282-XXX**<br>System IRQ15 failure | 1. **Device on IRQ15**<br>2. System board |
| **001-286-XXX**<br>**001-287-XXX**<br>**001-288-XXX**<br>System Timer failure | • **System board** |
| **001-292-XXX**<br>System CMOS<br>RAM error | 1. **Run Setup and re-test**<br>2. System board |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **001-293-XXX**<br>System CMOS Battery | 1. **Battery**<br>2. System board |
| **001-298-XXX**<br>System RTC date/time update failure | 1. **Flash the system**<br>2. System board |
| **001-299-XXX**<br>System RTC periodic interrupt failure | • **System board** |
| **001-300-XXX**<br>System RTC Alarm failure | • **System board** |
| **001-301-XXX**<br>System RTC Century byte error | 1. **Flash the system**<br>2. System board |
| **005-000-XXX**<br>Video Test Passed | • **No action** |
| **005-00X-XXX**<br>Video error | 1. **Video card, if installed**<br>2. System board |
| **005-010-XXX**<br>**005-011-XXX**<br>**005-012-XXX**<br>**005-013-XXX**<br>Video Signal failure | 1. **Video card, if installed**<br>2. System board |
| **005-016-XXX**<br>Video Simple Pattern<br>test failure | 1. **Video Ram**<br>2. Video card, if installed<br>3. System board |
| **005-024-XXX**<br>Video Addressing test failure | 1. **Video card, if installed**<br>2. System board |
| **005-025-XXX**<br>Video Checksum Value error | 1. **Video card, if installed**<br>2. System board |
| **005-027-XXX**<br>Video Configuration/Setup error | 1. **Run Setup**<br>2. Video drivers update<br>3. Video card, if installed<br>4. System board |
| **005-031-XXX**<br>Video Device Cable failure | 1. **Video cable**<br>2. Monitor<br>3. Video card, if installed<br>4. System board |
| **005-032-XXX**<br>Video Device Controller failure | 1. **Video card, if installed**<br>2. System board |
| **005-036-XXX**<br>Video Register error | 1. **Video card, if installed**<br>2. System board |
| **005-038-XXX**<br>System BIOS extension failure | 1. **Video card, if installed**<br>2. System board |
| **005-040-XXX**<br>Video IRQ failure | 1. **Video card, if installed**<br>2. System board |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **005-195-XXX**<br>Video Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **005-196-XXX**<br>Video test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **005-197-XXX**<br>Video test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **005-198-XXX**<br>Video test aborted | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |
| **005-199-XXX**<br>Video test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **005-2XX-XXX**<br>**005-3XX-XXX**<br>Video subsystem error | 1. **Video card, if installed**<br>2. System board |
| **006-000-XXX**<br>Diskette interface Test Passed | • **No action** |
| **006-0XX-XXX**<br>Diskette interface error | 1. **Diskette drive Cable**<br>2. Diskette drive<br>3. System board |
| **006-195-XXX**<br>Diskette interface Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **006-196-XXX**<br>Diskette interface test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **006-197-XXX**<br>Diskette interface test warning | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **006-198-XXX**<br>Diskette interface test aborted | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |
| **006-199-XXX**<br>Diskette interface test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **006-25X-XXX**<br>Diskette interface Error | 1. **Diskette drive cable**<br>2. Diskette drive<br>3. System board |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **011-000-XXX**<br>Serial port Interface Test Passed | • **No action** |
| **011-001-XXX**<br>Serial port Presence | 1. **Remove external serial device, if present**<br>2. Run setup, enable port<br>3. System board |
| **011-002-XXX**<br>**011-003-XXX**<br>Serial port Timeout/Parity error | • **System board** |
| **011-013-XXX**<br>**011-014-XXX**<br>Serial port Control Signal/Loopback test failure | • **System board** |
| **011-015-XXX**<br>Serial port External Loopback failure | 1. **Wrap plug**<br>2. System board |
| **011-027-XXX**<br>Serial port Configuration/Setup error | 1. **Run Setup, enable port**<br>2. Flash the system<br>3. System board |
| **011-03X-XXX**<br>**011-04X-XXX**<br>Serial port failure | • **System board** |
| **011-195-XXX**<br>Serial port Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **011-196-XXX**<br>Serial port test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **011-197-XXX**<br>Serial port test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **011-198-XXX**<br>Serial port test aborted | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |
| **011-199-XXX**<br>Serial port test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **011-2XX-XXX**<br>Serial port signal failure | 1. **External serial device**<br>2. System board |
| **014-000-XXX**<br>Parallel port Interface Test Passed | • **No action** |
| **014-001-XXX**<br>Parallel port Presence | 1. **Remove external parallel device, if present**<br>2. Run setup, enable port<br>3. System board |
| **014-002-XXX**<br>**014-003-XXX**<br>Parallel port Timeout/Parity error | • **System board** |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **014-013-XXX**<br>**014-014-XXX**<br>Parallel port Control Signal/Loopback test failure | • **System board** |
| **014-015-XXX**<br>Parallel port External Loopback failure | 1. **Wrap plug**<br>2. System board |
| **014-027-XXX**<br>Parallel port Configuration/Setup error | 1. **Run Setup, enable port**<br>2. Flash the system<br>3. System board |
| **014-03X-XXX**<br>**014-04X-XXX**<br>Parallel port failure | • **System board** |
| **014-195-XXX**<br>Parallel port Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **014-196-XXX**<br>Parallel port test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **014-197-XXX**<br>Parallel port test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **014-198-XXX**<br>Parallel port test aborted | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |
| **014-199-XXX**<br>Parallel port test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **014-2XX-XXX**<br>**014-3XX-XXX**<br>Parallel port failure | 1. **External parallel device**<br>2. System board |
| **015-000-XXX**<br>USB port Interface Test Passed | • **No action** |
| **015-001-XXX**<br>USB port Presence | 1. **Remove USB device(s) and re-test**<br>2. System board |
| **015-002-XXX**<br>USB port Timeout | 1. **Remove USB device(s) and re-test**<br>2. System board |
| **015-015-XXX**<br>USB port External Loopback failure | 1. **Remove USB device(s) and re-test**<br>2. System board |
| **015-027-XXX**<br>USB port Configuration/Setup error | 1. **Flash the system**<br>2. System board |
| **015-032-XXX**<br>USB port Device Controller failure | • **System board** |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **015-034-XXX**<br>USB port buffer allocation failure | 1. **Reboot the system**<br>2. Flash the system<br>3. Run memory test<br>4. System board |
| **015-035-XXX**<br>USB port Reset condition detected | 1. **Remove USB device(s) and re-test**<br>2. System board |
| **015-036-XXX**<br>USB port Register error | • **System board** |
| **015-040-XXX**<br>USB port IRQ failure | 1. **Run setup and check for conflicts**<br>2. Flash the system<br>3. System board |
| **015-195-XXX**<br>USB port Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **015-196-XXX**<br>USB port test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **015-197-XXX**<br>USB port test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **015-198-XXX**<br>USB port test aborted | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |
| **015-199-XXX**<br>USB port test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **018-000-XXX**<br>PCI Card Test Passed | • **No action** |
| **018-0XX-XXX**<br>PCI Card Failure | 1. **Riser card, if installed**<br>2. System board |
| **018-195-XXX**<br>PCI Card Test aborted by user | 1. **PCI card**<br>2. Information<br>3. Re-start the test, if necessary |
| **018-196-XXX**<br>PCI Card test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **018-197-XXX**<br>PCI Card test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **018-198-XXX**<br>PCI Card test aborted | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |
| **018-199-XXX**<br>PCI Card test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **018-250-XXX**<br>PCI Card Services error | 1. **PCI card**<br>2. Riser card, if installed<br>3. System board |
| **020-000-XXX**<br>PCI Interface Test Passed | • **No action** |
| **020-0XX-XXX**<br>PCI Interface error | 1. **PCI card**<br>2. Riser card, if installed<br>3. System board |
| **020-195-XXX**<br>PCI Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **020-196-XXX**<br>PCI test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **020-197-XXX**<br>PCI test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **020-198-XXX**<br>PCI test aborted | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |
| **020-199-XXX**<br>PCI test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **020-262-XXX**<br>PCI system error | 1. **PCI card**<br>2. Riser card, if installed<br>3. System board |
| **025-000-XXX**<br>IDE interface Test Passed | • **No action** |
| **025-00X-XXX**<br>**025-01X-XXX**<br>IDE interface failure | 1. **IDE signal cable**<br>2. Check power supply<br>3. IDE device<br>4. System board |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **025-027-XXX**<br>IDE interface Configuration/Setup error | 1. **IDE signal cable**<br>2. Flash the system<br>3. IDE device<br>4. System board |
| **025-02X-XXX**<br>**025-03X-XXX**<br>**025-04X-XXX**<br>IDE Interface failure | 1. **IDE signal cable**<br>2. Check power supply<br>3. IDE device<br>4. System board |
| **025-195-XXX**<br>IDE interface Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **025-196-XXX**<br>IDE interface test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **025-197-XXX**<br>IDE interface test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **025-198-XXX**<br>IDE interface test aborted | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |
| **025-199-XXX**<br>IDE interface test failed, cause unknown | 1. Go to the ″Undetermined problems″ section<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **030-000-XXX**<br>SCSI interface Test Passed | • **No action** |
| **030-00X-XXX**<br>**030-01X-XXX**<br>SCSI interface failure | 1. **SCSI signal cable**<br>2. Check power supply<br>3. SCSI device<br>4. SCSI adapter card, if installed<br>5. System board |
| **030-027-XXX**<br>SCSI interface Configuration/Setup error | 1. **SCSI signal cable**<br>2. Flash the system<br>3. SCSI device<br>4. SCSI adapter card, if installed<br>5. System board |
| **030-03X-XXX**<br>**030-04X-XXX**<br>SCSI interface error | 1. **SCSI signal cable**<br>2. Check power supply<br>3. SCSI device<br>4. SCSI adapter card, if installed<br>5. installed System board |
| **030-195-XXX**<br>SCSI interface Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **030-196-XXX**<br>SCSI interface test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **030-197-XXX**<br>SCSI interface test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **030-198-XXX**<br>SCSI interface test aborted | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |
| **030-199-XXX**<br>SCSI interface test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **035-000-XXX**<br>RAID interface Test Passed | • **No action** |
| **035-0XX-XXX**<br>RAID interface Failure | 1. **RAID signal cable**<br>2. RAID device<br>3. RAID adapter card, if installed<br>4. System board |
| **035-195-XXX**<br>RAID interface Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **035-196-XXX**<br>RAID interface test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **035-197-XXX**<br>RAID interface test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **035-198-XXX**<br>RAID interface test aborted | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |
| **035-199-XXX**<br>RAID interface test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **071-000-XXX**<br>Audio port Interface Test Passed | • **No action** |
| **071-00X-XXX**<br>**071-01X-XXX**<br>**071-02X-XXX**<br>Audio port error | 1. **Run Setup**<br>2. Flash the system<br>3. System board |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **071-03X-XXX**<br>Audio port failure | 1. **Speakers**<br>2. Microphone<br>3. Audio card, if installed<br>4. System board |
| **071-04X-XXX**<br>Audio port failure | 1. **Run Setup**<br>2. Audio card, if installed<br>3. System board |
| **071-195-XXX**<br>Audio port Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **071-196-XXX**<br>Audio port test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **071-197-XXX**<br>Audio port test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **071-198-XXX**<br>Audio port test aborted | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |
| **071-199-XXX**<br>Audio port test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **071-25X-XXX**<br>Audio port failure | 1. **Speakers**<br>2. Audio card, if installed<br>3. System board |
| **080-000-XXX**<br>Game Port interface Test Passed | • **No action** |
| **080-XXX-XXX**<br>Game Port interface Error | 1. **Remove the game port device and re-test the system** |
| **080-195-XXX**<br>Game Port interface Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **080-196-XXX**<br>Game Port interface test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **080-197-XXX**<br>Game Port interface test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **080-198-XXX**<br>Game Port interface test aborted | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **080-199-XXX**<br>Game Port interface test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **086-000-XXX**<br>Mouse Port interface Test Passed | • **No action** |
| **086-001-XXX**<br>Mouse Port interface Presence | 1. **Mouse**<br>2. System board |
| **086-032-XXX**<br>Mouse Port interface Device controller failure | 1. **Mouse**<br>2. System board |
| **086-035-XXX**<br>Mouse Port interface Reset | 1. **Mouse**<br>2. System board |
| **086-040-XXX**<br>Mouse Port interface IRQ failure | 1. **Run Setup**<br>2. Mouse<br>3. System board |
| **086-195-XXX**<br>Mouse Port interface Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **086-196-XXX**<br>Mouse Port interface test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **086-197-XXX**<br>Mouse Port interface test warning | 1. Make sure the component that is called out is connected and/or enabled<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **086-198-XXX**<br>Mouse Port interface test aborted | 1. If a component is called out, make sure it is connected and/or enabled<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |
| **086-199-XXX**<br>Mouse Port interface test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **089-000-XXX**<br>Microprocessor Test Passed | • **No action** |
| **089-XXX-XXX**<br>Microprocessor failure | 1. **Microprocessor(s)**<br>2. System board |
| **089-195-XXX**<br>Microprocessor Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **089-196-XXX**<br>Microprocessor test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **089-197-XXX**<br>Microprocessor test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **089-198-XXX**<br>Microprocessor test aborted | 1. **Flash the system and re-test**<br>2. Go to the ″Undetermined problems″ section |
| **089-199-XXX**<br>Microprocessor test failed, cause unknown | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Go to the ″Undetermined problems″ section<br>3. Flash the system and re-test<br>4. Replace component under function test |
| **170-000-XXX**<br>Voltage Sensor(s) Test Passed | • **No action** |
| **170-0XX-XXX**<br>Voltage Sensor(s) failure | 1. **Flash system**<br>2. System board |
| **170-195-XXX**<br>Voltage Sensor(s) Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **170-196-XXX**<br>Voltage Sensor(s) test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **170-197-XXX**<br>Voltage Sensor(s) test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **170-198-XXX**<br>Voltage Sensor(s) test aborted | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to the ″Undetermined problems″ section |
| **170-199-XXX**<br>Voltage Sensor(s) test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **170-250-XXX**<br>**170-251-XXX**<br>Voltage Sensor(s) Voltage limit error | 1. **Power supply**<br>2. System board |
| **170-254-XXX**<br>Voltage Sensor(s) Voltage Regulator Module error | 1. **Voltage Regulator Module (VRM)**<br>2. Microprocessor<br>3. System board |
| **175-000-XXX**<br>Thermal Sensor(s) Test Passed | • **No action** |
| **175-0XX-XXX**<br>Thermal Sensor(s) failure | 1. **Flash system**<br>2. System board |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **175-195-XXX**<br>Thermal Sensor(s) Test aborted by user | 1. **Information**<br>2. Re-start the test, if necessary |
| **175-196-XXX**<br>Thermal Sensor(s) test halt, error threshold exceeded | 1. **Press F3 to review the log file**<br>2. Re-start the test to reset the log file |
| **175-197-XXX**<br>Thermal Sensor(s) test warning | 1. **Make sure the component that is called out is connected and/or enabled**<br>2. Re-run test<br>3. Component that is called out in warning statement<br>4. Component under test |
| **175-198-XXX**<br>Thermal Sensor(s) test aborted | 1. **If a component is called out, make sure it is connected and/or enabled**<br>2. Flash the system and re-test<br>3. Go to ″Undetermined problems″ section |
| **175-199-XXX**<br>Thermal Sensor(s) test failed, cause unknown | 1. **Go to the ″Undetermined problems″ section**<br>2. Flash the system and re-test<br>3. Replace component under function test |
| **175-250-XXX**<br>**175-251-XXX**<br>Thermal Sensor(s) limit error | 1. **Check fans**<br>2. Check Power supply<br>3. Microprocessor<br>4. System board |
| **185-000-XXX**<br>Asset Security Test Passed | • **No action** |
| **185-XXX-XXX**<br>Asset Security failure | 1. **Flash system**<br>2. System board |
| **185-278-XXX**<br>Asset Security Chassis Intrusion | 1. **Assure Asset Security Enabled**<br>2. C2 Cover Switch<br>3. System board |
| **201-000-XXX**<br>System Memory Test Passed | • **No action** |
| **201-XXX-XXX**<br>System Memory error | 1. **Replace the memory module called out by the test**<br>2. System board |
| **202-000-XXX**<br>System Cache Test Passed | • **No action** |
| **202-XXX-XXX**<br>System Cache error | 1. **Cache, if removable**<br>2. System board<br>3. Microprocessor |
| **206-000-XXX**<br>Diskette Drive Test Passed | • **No action** |
| **206-XXX-XXX**<br>Diskette Drive error | 1. **Diskette Drive Cable**<br>2. Check power supply voltages<br>3. Diskette drive<br>4. System board |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **215-000-XXX**<br>CD-ROM Drive Test Passed | • **No action** |
| **215-XXX-XXX**<br>CD-ROM Drive error | 1. **CD-ROM Drive Cable**<br>2. Check power supply voltages<br>3. CD-ROM drive<br>4. System board |
| **217-000-XXX**<br>Hard Disk Drive Test Passed | • **No action** |
| **217-25X-XXX**<br>**217-26X-XXX**<br>Hard Disk Drive (IDE) error | 1. **Hard Disk Drive Cable**<br>2. Check power supply voltages<br>3. Hard Disk drive (IDE)<br>4. System board |
| **217-28X-XXX**<br>**217-29X-XXX**<br>Hard Disk Drive (SCSI) error | 1. **Hard Disk Drive Cable**<br>2. Check power supply voltages<br>3. Hard Disk drive (SCSI)<br>4. SCSI adapter card<br>5. System board |
| **220-000-XXX**<br>Hi-Capacity Cartridge Drive Test Passed | • **No action** |
| **220-XXX-XXX**<br>Hi-Capacity Cartridge Drive error | • **Remove the Hi-Capacity Cartridge Drive and re-test the system** |
| **301-XXX-XXX**<br>Keyboard error | 1. **Keyboard**<br>2. Check and test mouse<br>3. System board |
| **301-000-XXX**<br>Keyboard Test Passed | • **No action** |
| **302-000-XXX**<br>Mouse Test Passed | • **No action** |
| **302-XXX-XXX**<br>Mouse error | 1. **Mouse**<br>2. Check and test Keyboard<br>3. System board |
| **303-000-XXX**<br>Joystick Test Passed | • **No action** |
| **303-XXX-XXX**<br>Joystick error | • **Remove the Joystick and re-test the system** |
| **305-000-XXX**<br>Monitor DDC Test Passed | • **No action** |
| **305-250-XXX**<br>Monitor DDC self test failure | 1. **Run Setup to enable DDC**<br>2. Cable<br>3. Monitor<br>4. Video card<br>5. System board |
| **415-000-XXX**<br>Modem Test Passed | • **No action** |

| Diagnostic Error Code | FRU/Action |
|---|---|
| **415-XXX-XXX**<br>Modem error | • **Remove the Modem and re-test the system** |

## POST error codes

Each time you power-on the system, it performs a series of tests that check the operation of the system and some options. This series of tests is called the *Power-On Self-Test*, or *POST*. POST does the following operations.

- Checks some basic system-board operations
- Checks the memory operation
- Starts the video operation
- Verifies that the diskette drive is working
- Verifies that the hard disk drive is working

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

**Note:** Type 6229 computers default to come up quiet (no beep and no memory count and checkpoint code display) when no errors are detected by POST.

To enable beep and memory count and checkpoint code display when a successful POST occurs, do the following:

1. Select **Start Options** in the Configuration/Setup Utility program (see "Using the BIOS Setup Utility program" on page 25).
2. Set **Power-On Self-Test** to **Enhanced**.

If the POST detects a problem, an error message appears on the screen. A single problem can cause several error messages to appear. When you correct the cause of the first error message, the other error messages probably will not appear on the screen the next time you turn on the system.

During the POST, the BIOS generates diagnostic progress codes (POST codes) to I/O port 80h. If the POST fails, execution stops and the last POST code generated is left at port 80h. This code is useful for determining the point where an error occurred.

Displaying the POST codes requires an add-in card, often called a POST card (PCI, not ISA). The POST card can decode the port and display the contents on a medium such as a seven-segment display.

The table below offers descriptions of the POST codes generated by the BIOS.

| Error message | FRU / action |
|---|---|
| GA20 Error | • **Replace system board.** |
| Pri Master HDD Error<br>Pri Slave HDD Error<br>Sec Master HDD Error<br>Sec Slave HDD Error | 1. **Check/replace cables**<br>2. Replace drive.<br>3. Replace system board. |

| Error message | FRU / action |
|---|---|
| Pri Master Drive -ATAPI Incompatible Pri Slave Drive - ATAPI Incompatible Sec Master Drive - ATAPI Incompatible Sec Slave Drive - ATAPI Incompatible | 1. **Run setup to make sure drive is selected correctly.**<br>2. Replace drive. |
| A: Drive Error | 1. **Check/replace cables.**<br>2. Replace drive.<br>3. Replace system board. |
| Cache Memory Bad | • **Replace CPU.** |
| CMOS Battery Low | 1. **Replace battery.**<br>2. Replace system board. |
| CMOS Display Type Wrong | 1. **Run setup and save.**<br>2. Replace system board. |
| CMOS Checksum Bad | 1. **Check/change battery.**<br>2. Run setup to reset value.<br>3. Replace system board. |
| CMOS Settings Wrong | 1. **Check battery.**<br>2. Run setup.<br>3. Replace system board. |
| CMOS Date/Time Not Set | 1. **Check battery.**<br>2. Run setup/set date and time.<br>3. Replace system board. |
| DMA Error | 1. **Check cables.**<br>2. Run setup.<br>3. Replace system board. |
| FDC Failure | 1. **Check cables.**<br>2. Run setup.<br>3. Replace system board. |
| HDC Failure | 1. **Check cables**.<br>2. Run setup.<br>3. Replace system board. |
| Checking NVRAM... | • **No action** |
| Update OK! | • **No action** |
| Updated Failed | 1. **Check battery.**<br>2. Replace system board. |
| Keyboard Error | 1. **Check keyboard connection.**<br>2. Replace keyboard.<br>3. Replace system board. |

| Error message | FRU / action |
|---|---|
| KB/Interface Error | 1. **Run diagnostics.**<br>2. Check keyboard.<br>3. Check mouse.<br>4. Replace keyboard.<br>5. Replace mouse.<br>6. Replace system board. |
| Memory Size Decreased/Changed | 1. **Reseat memory**.<br>2. Run memory diagnostics.<br>3. Replace bad memory. |
| Memory Size Increased | 1. **Reseat memory.**<br>2. Run memory diagnostics.<br>3. Replace bad memory, if any. |
| No Boot Device Available | 1. **Run setup and check boot sequence.**<br>2. Cables.<br>3. Boot devices. |
| Off Board Parity Error | 1. **Run diagnostics.**<br>2. Replace bad cards. |
| On Board Parity Error | 1. **Run diagnostics.**<br>2. Replace system board. |

## Miscellaneous error messages

| Message/Symptom | FRU/Action |
|---|---|
| CMOS Backup Battery inaccurate | 1. **CMOS Backup Battery (see "Safety information" on page 105)**<br>2. System Board |
| Changing colors | • **Display** |
| Computer will *not* power-off. See "Power supply" on page 64. | 1. **Power Switch**<br>2. System Board<br>3. Riser card |
| Computer will *not* RPL from server | 1. **Ensure that network is in startup sequence as first device or first device after diskette**<br>2. Ensure that network adapter is enabled for RPL<br>3. Network adapter (Advise network administrator of new MAC address) |

| Message/Symptom | FRU/Action |
|---|---|
| Computer will *not* Wake On LAN (if applicable) | 1. **Check power supply and signal cable connections to network adapter**<br>2. Ensure that the operating system settings are set to enable Wake on LAN<br>3. Ensure Wake On LAN feature is enabled in Setup/Configuration (see “Using the BIOS Setup Utility program” on page 25)<br>4. Ensure network administrator is using correct MAC address<br>5. Ensure no interrupt or I/O address conflicts<br>6. Network adapter (advise network administrator of new MAC address) |
| Dead computer. See “Power supply” on page 64. | 1. **Power Supply**<br>2. System Board<br>3. Riser card |
| Diskette drive in-use light remains on or does not light when drive is active. | 1. **Diskette Drive**<br>2. System Board<br>3. Diskette Drive Cable<br>4. Riser card |
| Flashing cursor with an otherwise blank display. | 1. **System Board**<br>2. Primary Hard Disk Drive<br>3. Hard Disk Drive Cable<br>4. Riser card |
| Incorrect memory size during POST | 1. **Run the Memory tests**<br>2. Memory Module<br>3. System Board |
| ″Insert a Diskette″ icon appears with a known-good diagnostics diskette in the first 3.5-inch diskette drive. | 1. **System Board**<br>2. Diskette Drive Cable<br>3. Riser card<br>4. Network Adapter |
| Intensity or color varies from left to right of characters and color bars | 1. **Display**<br>2. System Board |
| No power or fan not running | • **See “Power supply” on page 64.** |
| Non-system disk or disk error-type message with a known-good diagnostic diskette. | 1. **Diskette Drive**<br>2. System Board<br>3. Diskette Drive Cable<br>4. Riser card |
| Other display symptoms not listed above (including blank or illegible display) | 1. **Display**<br>2. System Board |
| Power-on indicator or hard disk drive in-use light not on, but computer works correctly | 1. **Power Supply**<br>2. System Board<br>3. LED Cables |
| Printer problems | • **Printer** |

| Message/Symptom | FRU/Action |
| --- | --- |
| Program loads from the hard disk with a known-good diagnostics diskette in the first 3.5-inch diskette drive | 1. **Run Setup**<br>2. Diskette Drive<br>3. Diskette Drive Cable<br>4. System Board<br>5. Riser card<br>6. Power Supply |
| RPL computer cannot access programs from its own hard disk. | 1. **If network administrator is using LCCM Hybrid RPL, check startup sequence:**<br>a. **First device - network**<br>b. **Second device - hard disk**<br>2. Hard disk drive |
| RPL computer does not RPL from server | 1. **Check startup sequence**<br>2. Check the network adapter LED status |
| Serial or parallel port device failure (system board port) | 1. **External Device Self-Test OK?**<br>2. External Device<br>3. Cable<br>4. System Board |
| Serial or parallel port device failure (adapter port) | 1. **External Device Self-Test OK?**<br>2. External Device<br>3. Cable<br>4. Alternate Adapter<br>5. System Board |
| Some or all keys on the keyboard do not work | 1. **Keyboard**<br>2. Keyboard Cable<br>3. System Board |

## Undetermined problems

Damaged data in CMOS memory or damaged BIOS code can cause undetermined problems. To reset the CMOS data, use the CMOS configuration jumper to override the power-on password and clear the CMOS memory; see “Erasing a lost or forgotten password (clearing CMOS)” on page 20. If you suspect that the BIOS code is damaged, see “Recovering from a POST/BIOS update failure” on page 21.

Check the power supply voltages (see “Power supply” on page 64). If the voltages are correct, return here and continue with the following steps.

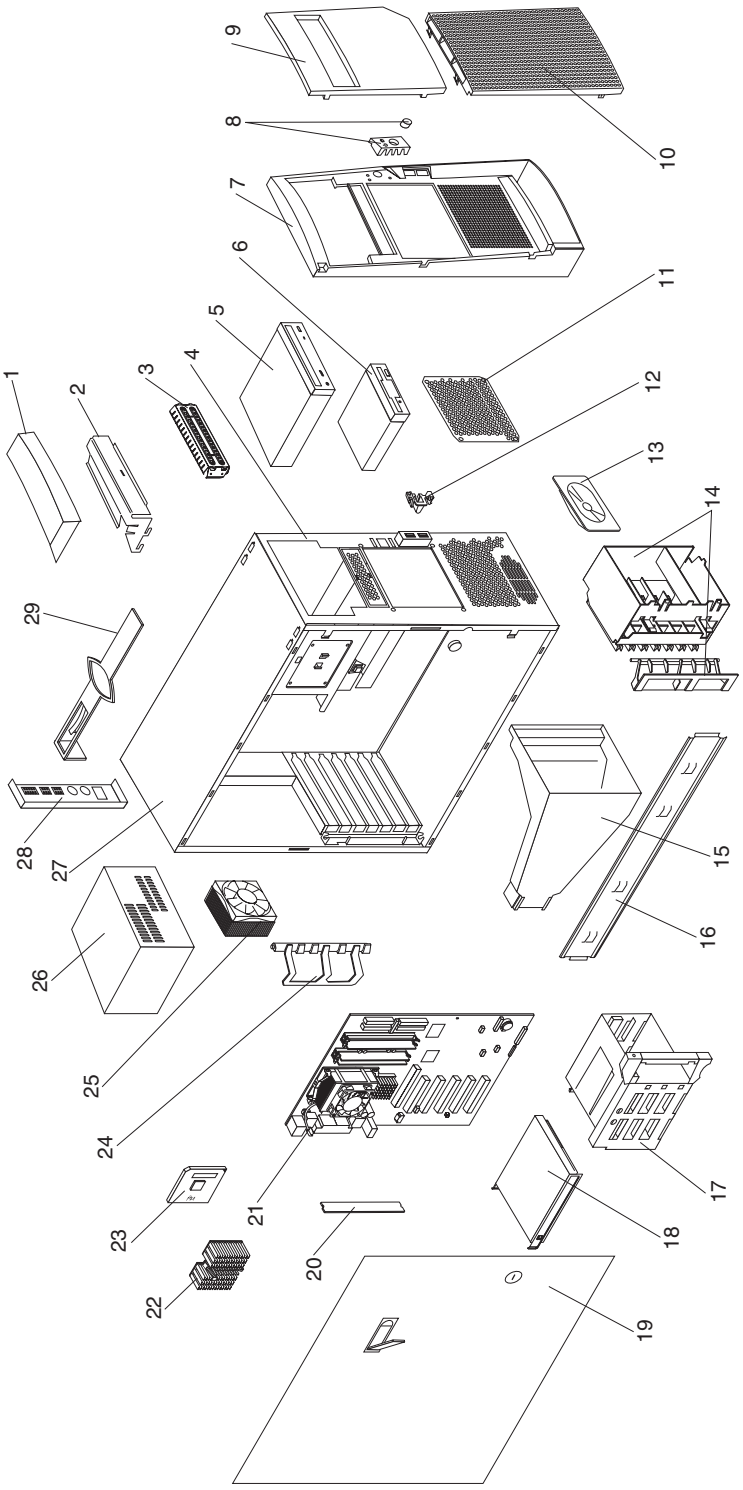
1. Power-off the computer.
2. Remove or disconnect the following components (if installed) one at a time.
   a. Non-IBM devices
   b. External devices (modem, printer, or mouse)
   c. Any adapters
   d. Memory modules
      Before removing or replacing memory modules, see “Installing memory modules” on page 48.
   e. Extended video memory
   f. External Cache
   g. External Cache RAM
   h. Hard disk drive
   i. Diskette drive
3. Power-on the computer to re-test the system.
4. Repeat steps 1 through 3 until you find the failing device or adapter.

If all devices and adapters have been removed, and the problem continues, replace the system board (see “System board” on page 67).

# Chapter 8. Parts listing

## System, Type 6229

This parts listing supports models 10X, 12X, 13X, 15X, 16X, 1PU 20X, 22X, 23X, 25X, 26X, 2PU, 30X, 32X, 33X, 35X, 36X, 37X, 3PU, 40X, 42X, 45X, 47X, 4PU, 53X, 56X, 57X, 5PU, A0X, A2X, A3X, A5X, A6X, B0X, B2X, B3X, B5X, B6X, C0X, C2X, C3X, C5X, C6X, C7X, D0X, D2X, D5X, D7X, E3X, E6X, E7X.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| Index | System (IntelliStation M Pro – Type 6229) | FRU no. |
|---|---|---|
| 1 | Handle cap kit (all models) | 19K4934 |
| 2 | Handle support (all models) | 19K4936 |
| 3 | EMC shield for 5.25″ bay (all models) | 19K5548 |
| 4 | Chassis assembly (all models) | 25P5111 |
| 5 | 48x CD-ROM (primary) (all models) | 33P3211 |
| 5 | 48x CD-ROM (alternate) (all models) | 06P5271 |
| 5 | 48x CD-ROM (alternate) (all models) | 19K1531 |
| 5 | 48x CD-ROM (alternate) (all models) | 19K1535 |
| 5 | 48x CD-ROM (alternate) (all models) | 24P3605 |
| 5 | 48x CD-ROM (alternate) (all models) | 33P3203 |
| 5 | 48x CD-ROM (alternate) (all models) | 33P3207 |
| 5 | 48x CD-ROM (alternate) (all models) | 33P3215 |
| 6 | 3.5″ 1.44 MB diskette drive (primary) (all models except ″J″ models) | 76H4091 |
| 6 | 3.5″ 1.44 MB diskette drive (alternate) (all models except ″J″ models) | 06P5227 |
| 6 | 3.5″ 1.44 MB 3-mode diskette drive (mode 3) (Japan only) (all ″J″ models) | 06P5144 |
| 7 | Front bezel assembly (all models) | 25P5147 |
| 8 | Power button kit (all models) | 19K4940 |
| 9 | Bezel door assembly (all models) | 25P0543 |
| 10 | Panel with icon (all models) | 19K4965 |
| 11 | EMC shield for 3.5″ bay (all models) | 19K4943 |
| 12 | Control panel assembly (all models) | 19K4935 |
| 13 | Speaker assembly (all models) | 19K4929 |
| 14 | I/O card edge retainer (all models) | 19K4945 |
| 15 | Fan duct assembly (all models) | 25P4939 |
| 16 | Support/cam bracket assembly (all models) | 19K4963 |
| 17 | DASD rotating cage assembly (all models) | 19K4931 |
| 18 | 18.2 GB SCSI hard disk drive (primary) (models 13X, 15X, 15N, 16X, 23X, 25X, 26X, 33X, 35X, 36X, 37X, 45X, 47X, 53X, 56X, 57X, A3X, A5X, A6X, B3X, B5X, B6X, C3X, C5X, C6X, C7X, D5X, D7X, E3X, E6X, E7X) | 06P5365 |
| 18 | 18.2 GB SCSI hard disk drive (alternate) (models 13X, 15X, 15N, 16X, 23X, 25X, 26X, 33X, 35X, 36X, 37X, 45X, 47X, 53X, 56X, 57X, A3X, A5X, A6X, B3X, B5X, B6X, C3X, C5X, C6X, C7X, D5X, D7X, E3X, E6X, E7X) | 19K1485 |
| 18 | 40.0 GB Hard disk drive (models 10X, 12X, 20X, 22X, 30X, 32X, 40X, 42X, A0X, A2X, B0X, B2X, C0X, C2X, D0X, D2X) | 19K1568 |
| 19 | Sliding door with lock assembly (all models) | 24P1752 |
| 20 | 128 MB ECC RIMM (models 10X, 12X, 20X, 22X, A0X, A2X, B0X, B2X) | 33L3351 |
| 20 | 256 MB ECC RIMM (models 13X, 15X, 15N, 16X, 23X, 25X, 26X, 1PU, 2PU, A3X, A5X, A6X, B3X, B5X, B6X) | 33L3353 |
| 20 | 128 MB ECC RIMM 40 nc (models 30X, 32X, 40X, 42X, 4PU, 5PU, C0X, C2X, D0X, D2X) | 31P8432 |
| 20 | 128 MB ECC RIMM 40 nc (models 33X, 35X, 36X, 37X, 3PU, 45X, 47X, 53X, 56X, 57X, C3X, C5X, C6X, C7X, D5X, D7X, E3X, E6X, E7X) | 31P8434 |
| 21 | System board (all models) | 33P3106 |
| 22 | Processor fan sink (all models) | 32P4004 |
| 23 | Processor 2.0 GHz with 512K-level cache (models 10X, 12X, 13X, 15X, 15N, 16X, 1PU, A0X, A2X, A3X, A5X, A6X) | 48P7205 |
| 23 | Processor, 2.67 GHz / 533-512 (models 40X,42X,45X, 47X, 4PU, D0X, D2X,D5X, D7X) | 58P9963 |
| 23 | Processor, 2.2 GHz with 512K-level cache (models 20X, 22X, 23X, 25X, 26X, 2PU, B0X, B2X, B3X, B5X, B6X) | 48P7206 |
| 23 | Processor, 2.4 GHz with 512-level cache (models 30X, 32X, 33X, 35X, 36X, 37X, 3PU, C0X, C2X, C3X, C5X, C6X, C7X) | 48P7684 |
| 23 | Processor, 2.8 GHz with 512-level cache (models 53X, 56X, 57X, 5PU, E3X, E6X, E7X) | 01R3171 |
| 24 | Card guide assembly (all models) | 19K4947 |

| Index | System (IntelliStation M Pro – Type 6229) | FRU no. |
|---|---|---|
| 25 | Fan assembly 80mm ball bearing (primary) (all models) | 49P0286 |
| 26 | Power supply, 340 watt (all models) | 24P6898 |
| 27 | Cover assembly, side and top (all models) | 19K4957 |
| 28 | EMC system board shield (all models) | 49P1918 |
| 29 | Bezel release bar (all models) | 19K4946 |
| | Heat sink retainer module (all models) | 24P4811 |
| | Retention clip (all models) | 25P0867 |
| | Fan duct extension (models 1PU, 2PU, 3PU, 4PU, 5PU) | 32P0674 |
| | Service label (all models) | 49P1925 |
| | CD-ROM drive audio cable (all models) | 75H9219 |
| | Bezel blank kit (all models) | 00N7082 |
| | Security switch assembly (all models) | 09K9827 |
| | DASD hard disk drive rail kit (all models) | 23P1328 |
| | Dual USB cable (all models) | 19K4964 |
| | Diskette drive cable (all models) | 76H4228 |
| | 5-drop SCSI cable (models 13X, 15X, 15N, 16X, 23X, 25X, 26X, 33X, 35X, 36X, 37X, 45X, 47X, 53X, 56X, 57X, A3X, A5X, A6X, B3X, B5X, B6X, C3X, C5X, C6X, C7X, D5X, D7X, E3X, E6X, E7X) | 01K1549 |
| | DVI dual VGA cable (models 10X, 20X, 1PU, 2PU, 30X, 3PU, 40X, A0X, B0X, C0X, D0X) | 48P7583 |
| | VGA pigtail cable (models 12X, 13X, 22X, 23X, 32X, 33X, 42X, 4PU, 53X, 5PU, A2X, A3X, B2X, B3X, C2X, C3X, D2X, E3X) | 48P7586 |
| | LED-hard disk drive cable (models 13X, 15X, 15N, 16X, 23X, 25X, 26X, 33X, 35X, 36X, 37X, 45X, 47X, 53X, 56X, 57X, A3X, A5X, A6X, B3X, B5X, B6X, C3X, C5X, C6X, C7X, D5X, D7X, E3X, E6X, E7X) | 76H7344 |
| | Foot kit (all models) | 12J4506 |
| | Foot, snap-in (all models) | 01N2196 |
| | Hard disk drive ATA (2 drop) cable (all models) | 37L5098 |
| | 3V lithium battery (all models) | 33F8354 |
| | Lock assembly (all models) | 24P1751 |
| | Memory continuity card (all models) | 00N5223 |
| | Misc. hardware kit (includes: 7 M3.5 screws, 1 EMC gasket, 1 I/O blank bracket, 1 power support bracket, 4 isolator brackets, 1 key holder bracket, 1 thumbscrew, 4 M3.5 slotted screws, 1 RFID clip, 4 system board spacers, 1 SCSI cable clamp, 6 M3.5 slotted screws) (all models) | 09N5764 |
| | Mouse (all models) | 76H6620 |
| | Power cord (all models) | 93F2364 |
| | Side panel with nameplate (all models) | 19K4954 |
| | Dongle (models 15X, 15N, 16X, 25X, 26X, 35X, 36X, 37X, 45X, 47X, 56X, 57X, A5X, A6X, B3X, B5X, B6X, C5X, C6X, C7X, D7X, E6X, E7X) | 09N3435 |
| | Ultra160 SCSI adapter (models 13X, 15X, 15N, 16X, 23X, 25X, 26X, 33X, 35X, 36X, 37X, 45X, 47X, 53X, 56X, 57X, A3X, A5X, A6X, B3X, B5X, B6X, C3X, C5X, C6X, C7X, D5X, D7X, E3X, E6X, E7X) | 06P2215 |
| | Video adapter, NVIDIA Quadro2 900XGL (models 37X, 47X, 57X, C7X, D7X, E7X) | 25P6687 |
| | Video adapter, ATI Fire GL8800 (models 15X, 25X, 35X, 45X, A5X, B5X, C5X, D5X) | 25P6680 |
| | Video adapter, 3Dlabs Wildcat III 6110 (models 16X, 26X, 36X, 56X, A6X, B6X, C6X, E6X) | 25P6591 |
| | Video adapter, NVIDIA Quadro4 200NVS (models 12X, 13X, 22X, 23X, 32X, 33X, 42X, 4PU, 5PU, A2X, A3X, B2X, B3X, C2X, C3X, D2X) | 25P6684 |
| | Video adapter, Matrox Millennium G450 (models 10X, 1PU, 20X, 2PU, 30X, 3PU, 40X, A0X, B0X, C0X, D0X) | 25P6691 |

## Recovery CDs

Use the following tables to locate the Recovery CD for your system.

## Windows 2000 Recovery CDs

Windows 2000 Recovery CDs apply to models 10X, 12X, 13X, 15X, 15N, 16X, 1PU 20X, 22X, 23X, 25X, 26X, 2PU, A0X, A2X, A3X, A5X, A6X, B0X, B2X, B3X, B5X, and B6X.

| **Windows 2000/NT Recovery CDs (models 10X, 12X, 13X, 15X, 15N, 16X, 1PU 20X, 22X, 23X, 25X, 26X, 2PU, A0X, A2X, A3X, A5X, A6X, B0X, B2X, B3X, B5X, B6X)** | **FRU no.** |
|---|---|
| US English (all ″U″ models) | 32P0536 |
| UK English (all ″G″ models, 15N) | 32P0537 |
| AP English (all ″A″ models, all ″D″ models) | 32P0538 |
| French Canadian (all ″F″ models) | 32P0539 |
| French (all ″G″ models) | 32P0540 |
| German (all ″G″ models) | 32P0541 |
| Italian (all ″G″ models) | 32P0542 |
| Spanish (all ″G″ models) | 32P0543 |
| Dutch (all ″G″ models) | 32P0544 |
| Danish (all ″G″ models) | 32P0545 |
| Swedish (all ″G″ models) | 32P0546 |
| Norwegian (all ″G″ models) | 32P0547 |
| Finnish (all ″G″ models) | 32P0548 |
| Japan (all ″J″ models) | 59P2812 |
| China (all ″C″ models) | 59P2813 |
| Traditional Chinese (all ″M″ models) | 59P2814 |
| Taiwan (all ″V″ models) | 59P2815 |

## Windows XP Recovery CDs

Windows XP Recovery CDs apply to models 30X, 32X, 33X, 35X, 36X, 37X, 3PU, C0X, C2X, C3X, C5X, C6X, C7X, 40X, 42X, 45X, 47X, 4PU, 53X, 56X, 57X, 5PU, D0X, D2X, D5X, D7X, E3X, E6X, and E7X.

| **Windows XP Recovery CDs (models 30X, 32X, 33X, 35X, 36X, 37X, 3PU, C0X, C2X, C3X, C5X, C6X, C7X, 40X, 42X, 45X, 47X, 4PU, 53X, 56X, 57X, 5PU, D0X, D2X, D5X, D7X, E3X, E6X, E7X)** | **FRU no.** |
|---|---|
| US English (all ″A″ and ″U″ models) | 59P2935 |
| French (all ″G″ models) | 59P2936 |
| German (all ″G″ models) | 59P2937 |
| Italian (all ″G″ models) | 59P2938 |
| Spanish (all ″G″ models) | 59P2939 |
| Dutch (all ″G″ models) | 59P2940 |
| Danish (all ″G″ models) | 59P2941 |
| Swedish (all ″G″ models) | 59P2942 |
| Norwegian (all ″G″ models) | 59P2943 |
| Finnish (all ″G″ models) | 59P2944 |
| Japan (all ″J″ models) | 59P2945 |
| China (all ″C″ models) | 59P2946 |
| Taiwan (all ″V″ models) | 59P2947 |
| Hong Kong (all ″D″ models) | 59P2948 |

## Keyboards

| Keyboard | FRU no. |
|---|---|
| Arabic | 37L2555 |
| Belgium/French | 37L2556 |
| Belgium/UK | 37L2557 |
| Bulgarian | 37L2558 |
| Czech | 37L2559 |
| Chinese/US | 37L2585 |
| Danish | 37L2560 |
| Dutch | 37L2561 |
| French | 37L2562 |
| French Canadian | 37L0913 |
| French Canadian | 37L2552 |
| German | 37L2563 |
| Greek | 37L2564 |
| Hebrew | 37L2565 |
| Hungarian | 37L2566 |
| Korean | 02K0901 |
| LA Spanish | 37L2553 |
| Iceland | 37L2567 |
| Italy | 37L2568 |
| Norwegian | 37L2569 |
| Polish | 37L2570 |
| Portuguese | 37L2571 |
| Romanian | 37L2572 |
| Russian | 37L2573 |
| Serbian/Cyrillic | 37L2574 |
| Slavic | 37L2575 |
| Spanish | 37L2576 |
| Swedish/Finn | 37L2577 |
| Swiss, F/G | 37L2578 |
| Thailand | 37L2587 |
| Turkish | 37L2579 |
| Turkish | 37L2580 |
| UK English | 37L2581 |
| US English | 37L2551 |
| US English-EMEA | 37L2583 |
| Yugoslavia/Lat | 37L2582 |

## Power cords

| Power cord | FRU no. |
|---|---|
| China (PRC) | 01K9851 |
| Japan | 01K9853 |
| Thailand | 12J5120 |
| Israel | 12J5122 |
| Bangladesh, Burma, India, Pakistan, South Africa, Sri Lanka | 12J5124 |
| Chile, Ethiopia, Italy, Libya, Somalia | 12J5126 |
| Argentina, Australia, New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa | 12J5128 |
| Antigua, Bahrain, Brunei, Channel Islands, Cyprus, Dubai, Fiji, Ghana, Hong Kong, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia | 12J5987 |

| Power cord | FRU no. |
| --- | --- |
| Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Macau, 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 | 55H6643 |
| Denmark, Switzerland, Liechtenstein | 55H6646 |
| Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), Venezuela | 76H4865 |
| United States of America | 6952301 (110) 1838574 (220)<br>36L8886 (220V/15A) |

# Chapter 9. Related service information

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

## Safety information

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

## General safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
  1. Ensure you can stand safely without slipping.
  2. Distribute the weight of the object equally between your feet.
  3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
  4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

  **Remember:** Metal objects are good electrical conductors.
- Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.

# Electrical safety

**CAUTION:**
**Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunication systems, networks, and modems before you open the computer 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. Power-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 static 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 machine, 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 listed below, 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 (multi-lingual 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 procedure**s.
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

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

- Statement 2

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

***Do not:***

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

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

- Statement 3

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

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

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

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

- Statement 4

≥18 kg (37 lbs)

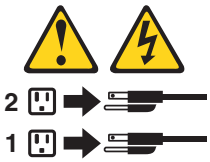
≥32 kg (70.5 lbs)

≥55 kg (121.2 lbs)

**CAUTION:**
**Use safe practices when lifting.**

- Statement 5

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




- Statement 10

**CAUTION:**

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

**Importante:**

Todas as instruções de cuidado e perigo da IBM documentation começam com um número. Este número é utilizado para fazer referência cruzada de uma instrução de cuidado ou perigo no idioma inglês com as versões traduzidas das instruções de cuidado ou perigo encontradas nesta seção.

Por exemplo, se uma instrução de cuidado é iniciada com o número 1, as traduções para aquela instrução de cuidado aparecem nesta seção sob a instrução 1.

Certifique-se de ler todas as instruções de cuidado e perigo antes de executar qualquer operação.

Instrução 1

**PERIGO**

A corrente elétrica proveniente de cabos de alimentação, de telefone e de comunicações é perigosa.

Para evitar risco de choque:

- Não conecte ou desconecte cabos e não realize instalação, manutenção ou reconfiguração deste produto durante uma tempestade com raios.
- Conecte todos os cabos de alimentação a tomadas elétricas corretamente instaladas e aterradas.
- Conecte todos os equipamentos ao qual esse produto será conectado a tomadas corretamente instaladas.
- Sempre que possível, utilize apenas uma das mãos para conectar ou desconectar cabos de sinal.
- Nunca ligue qualquer equipamento quando existir evidência de danos por fogo, água ou na estrutura.
- Desconecte cabos de alimentação, sistemas de telecomunicação, redes e modems antes de abrir as tampas dos dispositivos, a menos que especificado de maneira diferente nos procedimentos de instalação e configuração.
- Conecte e desconecte cabos conforme descrito na seguinte tabela, ao instalar ou movimentar este produto ou os dispositivos conectados, ou ao abrir suas tampas.

| **Para Conectar:** | **Para Desconectar:** |
|---|---|
| 1. DESLIGUE Tudo.<br>2. Primeiramente, conecte todos os cabos aos dispositivos.<br>3. Conecte os cabos de sinal aos conectores.<br>4. Conecte os cabos de alimentação às tomadas.<br>5. LIGUE os dispositivos. | 1. DESLIGUE Tudo.<br>2. Primeiramente, remova os cabos de alimentação das tomadas.<br>3. Remova os cabos de sinal dos conectores.<br>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

≥18 kg (37 lbs)

≥32 kg (70.5 lbs)

≥55 kg (121.2 lbs)

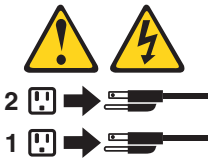
**CUIDADO:**

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.




**CUIDADO:**

Instrução 10

**CUIDADO:**

Não coloque nenhum objeto com peso superior a 82 kg (180 lbs.) sobre dispositivos montados em rack.

**重要：**

Server Library 中的所有提醒和危险条款前都有一个数字标识。该数字是用来交叉引用一个英文的提醒和危险条款及本部分中的与之对应的已翻译成其它文字的提醒和危险条款。

例如，如果一个提醒条款前的数字为 1，则本部分中相应的译文也带有标号 1。

在执行任何指示的操作之前，请确保您已经阅读了全部提醒和危险条款。

**声明 1**

**危险**

电源、电话和通信电缆中带有危险电流。

为避免电击：

雷电期间不要拆接电缆或安装、维修及重新配置本产品。

将所有电源线连接至正确布线并已安全接地的电源插座上。

将应与本产品连接的所有设备连接至正确布线的插座上。

尽量只使用单手拆接信号电缆。

有水、火及结构损坏迹象时，请勿打开任何设备。

除非在安装配置过程中有明确指示，否则，打开设备机盖前应先断开与电源线、远程通信系统、网络和调制解调器的所有连接。

安装、移动或打开本产品及其附带设备的机盖时，应按下表所述连接和断开电缆。

| 连接时： | 断开连接时： |
| --- | --- |
| 1. 关闭所有设备。 | 1. 关闭所有设备。 |
| 2. 首先将所有电缆连接至设备。 | 2. 首先从插座中拔出电源线。 |
| 3. 将信号电缆连接至接口。 | 3. 从接口上拔下信号电缆。 |
| 4. 将电源线连接至插座。 | |

声明 2

警告：

更换锂电池时，只能使用 IBM 产品号 33F8354 或者是厂商推荐的等同类型的电池。

如果系统模块中含有锂电池，则只能使用同一厂商制造的同一类型的模块进行更换。电池中含有锂，如果使用、拿放或处理不当，可能会发生爆炸。

请勿对电池进行下列操作：
扔入或浸入水电　　。
加热超过 100 （212 F）
进行修理或分解
请按本地法规要求处理电池。

声明 3

警告：

安装激光产品（如 CD-ROM、DVD 驱动器、光纤设备或送话器）时，应注意以下事项：

不要拆除外盖。拆除激光产品的外盖可能会导致激光辐射的危险，本设备中没有用户可维修的部件。

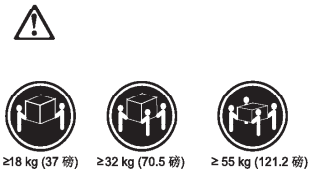
非此处指定的其它控制、调整或与性能有关的操作都有可能导致激光辐射的危险。

危险

某些激光产品中包含内嵌的 3A 级或 3B 级激光二极管。请注意以下事项。

打开时会产生激光辐射。不要直视光束，不要使用光学仪器直接观看光束，避免直接暴露于光束之下。

声明 4

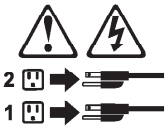



警告：
抬起时请采用安全操作方法。

声明 5

警告：

使用设备上的电源控制按钮和电源上的开关都不能断开本设备上的电流。另外，本设备可能带有多条电源线。如要断开设备上的所有电流，请确保所有电源线均已与电源断开连接。




声明 6

警告：

如果在电源线连接设备的一端安装了固定松紧夹，则必须将电源线的另一端连接至使用方便的电源。

**声明 7**

**警告：**

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

**声明 8**

**警告：**
**不要拆除电源外盖或贴有下列标签的任何部件。**

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

**声明 9**

**警告：**

**为避免人员伤害，拆除设备上的风扇前应拔下热插拔风扇电缆。**

**声明 10**

**警告：**

**机柜安装的设备上面不能放置重于 82kg（180 磅）的物品。**

**> 82 kg (180 磅)**

**声明 11**

**警告：**

**下面的标签表明附近有锋利的边、角或接头。**

**声明 12**

**警告：**
**下面的标签表明附近有高热表面。**

重要資訊：

***Server Library*** 中所有「注意」及「危險」的聲明均以數字開始。此一數字是用來作為交互參考之用，英文「注意」或「危險」聲明可在本節中找到相同內容的「注意」或「危險」聲明的譯文。

例如，有一「危險」聲明以數字 1 開始，則該「危險」聲明的譯文將出現在本節的「聲明」1 中。

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

聲明 1

危險

電源、電話及通信電纜上所產生的電流均有危險性。

欲避免電擊危險：

- 在雷雨期間，請勿連接或切斷本產品上的任何電纜線，或安裝、維修及重新架構本產品。
- 請將電源線接至接線及接地正確的電源插座。
- 請將本產品隨附的設備連接至接線正確的插座。
- 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：

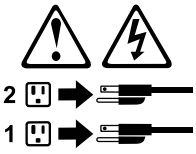
抬起裝置時，請注意安全措施。

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

≥18 kg (37 lbs)

≥32 kg (70.5 lbs)

≥55 kg (121.2 lbs)

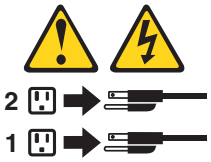
**ATTENTION:**

Faites-vous aider pour soulever ce produit.

Notice n° 5

**ATTENTION:**

**Le bouton de mise sous tension/hors tension de l'unité et l'interrupteur d'alimentation du bloc d'alimentation ne coupent pas l'arrivée de courant électrique à l'intérieur de la machine. Il se peut que votre unité dispose de plusieurs cordons d'alimentation. Pour isoler totalement l'unité du réseau électrique, débranchez tous les cordons d'alimentation des socles de prise de courant.**




Notice n° 10

**ATTENTION:**

Ne posez pas d'objet dont le poids dépasse 82 kg sur les unités montées en armoire.

**Wichtig:**

Alle Sicherheitshinweise in dieser IBM documentation beginnen mit einer Nummer. Diese Nummer verweist auf einen englischen Sicherheitshinweis mit den übersetzten Versionen dieses Hinweises in diesem Abschnitt.

Wenn z. B. ein Sicherheitshinweis mit der Nummer 1 beginnt, so erscheint die übersetzung für diesen Sicherheitshinweis in diesem Abschnitt unter dem Hinweis 1.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Hinweis 1

**VORSICHT**

Elektrische Spannungen von Netz-, Telefon- und Datenübertragungsleitungen sind gefährlich.

Aus Sicherheitsgründen:

- Bei Gewitter an diesem Gerät keine Kabel anschließen oder lösen. Ferner keine Installations-, Wartungs- oder Rekonfigurationsarbeiten durchführen.
- Gerät nur an eine Schutzkontaktsteckdose mit ordnungsgemäß geerdetem Schutzkontakt anschließen.
- Alle angeschlossenen Geräte ebenfalls an Schutzkontaktsteckdosen mit ordnungsgemäß geerdetem Schutzkontakt anschließen.
- Signalkabel möglichst einhändig anschließen oder lösen.
- Keine Geräte einschalten, wenn die Gefahr einer Beschädigung durch Feuer, Wasser oder andere Einflüsse besteht.
- Die Verbindung zu den angeschlossenen Netzkabeln, Telekommunikationssystemen, Netzwerken und Modems ist vor dem öffnen des Gehäuses zu unterbrechen. Es sei denn, dies ist in den zugehörigen Installations- und Konfigurationsprozeduren anders angegeben.
- Nur nach den nachfolgend aufgeführten Anweisungen arbeiten, die für Installation, Transport oder öffnen von Gehäusen von Personal Computern oder angeschlossenen Einheiten gelten.

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

≥18 kg

≥32 kg

≥55 kg

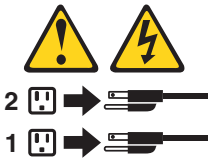
**ACHTUNG:**

Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.

Hinweis 5

**ACHTUNG:**

Mit dem Betriebsspannungsschalter an der Vorderseite des Servers und dem Betriebsspannungsschalter am Netzteil wird die Stromversorgung für den Server nicht unterbrochen. Der Server könnte auch mehr als ein Netzkabel aufweisen. Um die gesamte Stromversorgung des Servers auszuschalten, muß sichergestellt werden, daß alle Netzkabel aus den Netzsteckdosen herausgezogen wurden.




Hinweis 10

**ACHTUNG:**

Keine Gegenstände, die mehr als 82 kg wiegen, auf Rack-Einheiten ablegen.

**Importante:**

Tutti gli avvisi di attenzione e di pericolo riportati nella pubblicazione IBM documentation iniziano con un numero. Questo numero viene utilizzato per confrontare avvisi di attenzione o di pericolo in inglese con le versioni tradotte riportate in questa sezione.

Ad esempio, se un avviso di attenzione inizia con il numero 1, la relativa versione tradotta è presente in questa sezione con la stessa numerazione.

Prima di eseguire una qualsiasi istruzione, accertarsi di leggere tutti gli avvisi di attenzione e di pericolo.

Avviso 1

**PERICOLO**

La corrente elettrica circolante nei cavi di alimentazione, del telefono e di segnale è pericolosa.

Per evitare il pericolo di scosse elettriche:

- Non collegare o scollegare i cavi, non effettuare l'installazione, la manutenzione o la riconfigurazione di questo prodotto durante i temporali.
- Collegare tutti i cavi di alimentazione ad una presa elettrica correttamente cablata e munita di terra di sicurezza.
- Collegare qualsiasi apparecchiatura collegata a questo prodotto ad una presa elettrica correttamente cablata e munita di terra di sicurezza.
- Quando possibile, collegare o scollegare i cavi di segnale con una sola mano.
- Non accendere qualsiasi apparecchiatura in presenza di fuoco, acqua o se sono presenti danni all'apparecchiatura stessa.
- Scollegare i cavi di alimentazione, i sistemi di telecomunicazioni, le reti e i modem prima di aprire i coperchi delle unità, se non diversamente indicato nelle procedure di installazione e configurazione.
- Collegare e scollegare i cavi come descritto nella seguente tabella quando si effettuano l'installazione, la rimozione o l'apertura dei coperchi di questo prodotto o delle unità collegate.

| **Per collegare:** | **Per scollegare:** |
|---|---|
| 1. SPEGNERE tutti i dispositivi.<br>2. Collegare prima tutti i cavi alle unità.<br>3. Collegare i cavi di segnale ai connettori.<br>4. Collegare i cavi di alimentazione alle prese elettriche.<br>5. ACCENDERE le unità. | 1. SPEGNERE tutti i dispositivi.<br>2. Rimuovere prima i cavi di alimentazione dalle prese elettriche.<br>3. Rimuovere i cavi di segnale dai connettori.<br>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

≥18 kg

≥32 kg

≥55 kg

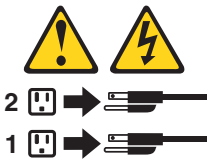
**ATTENZIONE:**

Durante il sollevamento della macchina seguire delle norme di sicurezza.

Avviso 5

**ATTENZIONE:**

Il pulsante del controllo dell'alimentazione situato sull'unità e l'interruttore di alimentazione posto sull'alimentatore non disattiva la corrente elettrica fornita all'unità. L'unità potrebbe disporre di più di un cavo di alimentazione. Per disattivare la corrente elettrica dall'unità, accertarsi che tutti i cavi di alimentazione siano scollegati dalla sorgente di alimentazione.




Avviso 10

**ATTENZIONE:**

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

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

・記述 2

## ⚠ 注意

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

・記述 3

## ⚠ 注意

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

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

## ⚠ 危険

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

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

・記述 4

## ⚠ 注意


18Kg 以上


32Kg 以上

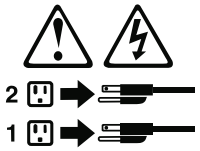

55Kg 以上

装置を持ち上げる場合は、安全に持ち上げる方法に従ってください。

・記述 5

## ⚠ 注意 ⚠

サーバーの前面にある電源制御ボタンは、サーバーに供給された
電流を遮断しません。
サーバーには、複数の電源コードが接続されているかもしれません。
サーバーから電流を完全に遮断するために、すべての電源コードが
電源から取り外されていることを確認してください。




・記述 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.

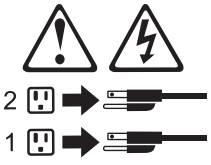
경고문 4

≥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.

**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.<br>2. En primer lugar, conecte los cables a los dispositivos.<br>3. Conecte los cables de señal a los conectores.<br>4. Conecte cada cable de alimentaciín a la toma de alimentaciín.<br>5. ENCIENDA el dispositivo. | 1. APÁGUELO todo.<br>2. En primer lugar, retire cada cable de alimentaciín de la toma de alimentaciín.<br>3. Retire los cables de señal de los conectores.<br>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 mídulo que contiene una batería de litio, sustitúyalo únicamente por el mismo tipo de mídulo, que ha de estar creado por el mismo fabricante. La batería contiene litio y puede explotar si el usuario no la utiliza ni la maneja de forma adecuada o si no se desprende de la misma como corresponde.

No realice las acciones siguientes:

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

Despréndase de la batería siguiendo los requisitos que exija el reglamento o la legislaciín local.

Declaración 3

**PRECAUCIÓN:**

Cuando instale productos láser (como, por ejemplo, CD-ROM, unidades DVD, dispositivos de fibra íptica o transmisores), tenga en cuenta las advertencias siguientes:

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

**PELIGRO**

Algunos productos láser contienen un diodo de láser incorporado de Clase 3A o de Clase 3B. Tenga en cuenta la advertencia siguiente.

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

Declaración 4

≥18 kg

≥32 kg

≥55 kg

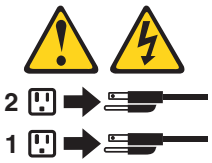
**PRECAUCIÓN:**

Tome medidas de seguridad al levantar el producto.

Declaración 5

**PRECAUCIÓN:**

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




Declaración 10

**PRECAUCIÓN:**

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

## Problem determination tips

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

- Machine type and model
- Processor or hard disk upgrades
- Failure symptom
  - Do diagnostics fail?
  - What, when, where, single, or multiple systems?
  - Is the failure repeatable?
  - Has this configuration ever worked?
  - If it has been working, what changes were made prior to it failing?
  - Is this the original reported failure?
- Reference/Diagnostics version
  - Type and version level
- Hardware configuration
  - Print (print screen) configuration currently in use
  - BIOS level
- Operating system software
  - Type and version level

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

1. Are the exact machine type and models
2. Have the same BIOS level
3. Have the same adapters/attachments in the same locations
4. Have the same address jumpers/terminators/cabling
5. Have the same software versions and levels
6. Have the same Reference/Diagnostics Diskette (version)
7. Have the same configuration options set in the system
8. Have the same setup for the operation system control files

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

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