

IBM IntelliStation E Pro  
Types 6216 and 6226



# Hardware Maintenance Manual



IBM IntelliStation E Pro  
Types 6216 and 6226



# Hardware Maintenance Manual

**Note**

Before using this information and the product it supports, read “Notices” on page 166.

**Third Edition (February 2003)**

**The most recent version of this document is available at <http://www.ibm.com/pc/support>.**

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## About this manual

This manual contains diagnostic information, a Symptom-to-FRU index, service information, error codes, error messages, and configuration information for the IBM® IntelliStation® E Pro Types 6216 and 6226.

**Important:** The field replaceable unit (FRU) procedures are intended for trained servicers who are familiar with IBM products. Before servicing an IBM product, be sure to review “Safety information” on page 129.

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## Important safety information

Be sure to read all caution and danger statements in this book before performing any of the instructions. See “Safety information” on page 129.

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prenez connaissance de toutes les consignes de type Attention et Danger avant de procéder aux opérations décrites par les instructions.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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## Online support

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



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## General checkout

The computer 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: the system board, Ethernet controller, video controller, RAM, keyboard, mouse (pointing device), diskette drive, serial ports, hard disk drives, and parallel port. You can also use them to test some external devices. See “Diagnostics” on page 21.

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

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

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

A computer might be part of a cluster if:

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

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

### Notes:

1. For computers that are part of a shared DASD cluster, run one test at a time in looped mode. Do not run all tests in looped mode, because this could enable the DASD diagnostic tests.
2. If multiple error codes are displayed, diagnose the first error code displayed.
3. If the computer hangs with a POST error, go to “Symptom-to-FRU index” on page 95.
4. If the computer is suspended and no error message is displayed, see “Undetermined problems” on page 117.
5. For information about power supply problems, see “Symptom-to-FRU index” on page 95.
6. For safety information, see “Safety information” on page 129.
7. For intermittent problems, check the error log; see “POST error log” on page 21 and “Undetermined problems” on page 117.

**001**

**IS THE COMPUTER PART OF A CLUSTER?**

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

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

**002**

**IF THE COMPUTER IS NOT PART OF A CLUSTER:**

- Turn off the computer and all external devices.
- Check all cables and power cords.
- Set all display controls to the middle position.
- Turn on all external devices.
- Turn on the computer.
- Record any POST error messages displayed on the screen. If an error is displayed, look up the first error in the “POST error codes” on page 106.
- Check the System Error Log. If an error was recorded by the computer, see “Symptom-to-FRU index” on page 95.
- Start the Diagnostic Programs. See “Starting the diagnostic programs and viewing the test log” on page 24.
- Check for the following responses:
  1. One beep.
  2. Readable instructions or the main menu.

**003**

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

**NO.** Find the failure symptom in “Symptom-to-FRU index” on page 95.

**YES.** Run the diagnostic programs. If necessary, see “Diagnostic programs and error messages” on page 22.

If you receive an error, see “Symptom-to-FRU index” on page 95.

If the diagnostics were completed successfully and you still suspect a problem, see “Undetermined problems” on page 117.

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## General information

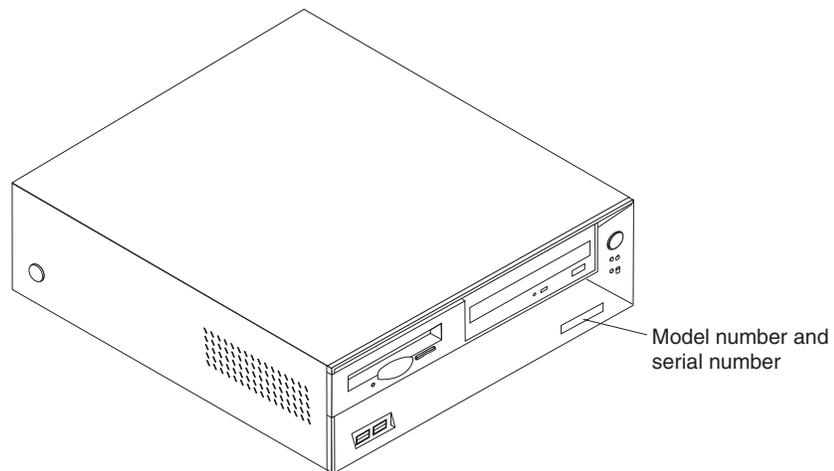
The IBM IntelliStation E Pro computer, Type 6216 or Type 6226, incorporates many of the latest advances in computing technology and can be expanded and upgraded as your needs change.

If you have access to the Internet, you can obtain up-to-date information about the computer and other IBM computer products at <http://www.ibm.com/pc/intellistation/> on the World Wide Web.

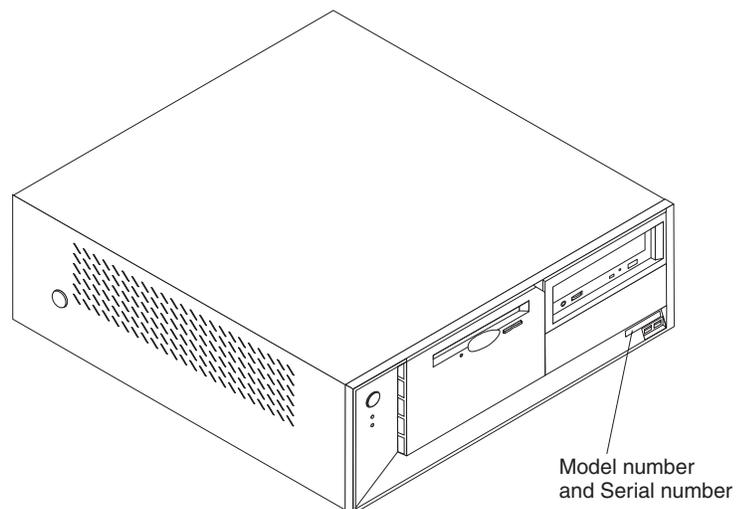
See the following illustrations for the location of the computer model and serial number labels. You will need these numbers to register the computer with IBM.

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

### Type 6216:



### Type 6226:



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## Notices and statements used in this book

The caution and danger statements used in this book also appear in the multilingual safety information book that is accessible through Access IBM and on the IBM *IntelliStation Documentation* CD. Each statement is numbered for easy reference corresponding to statements in the safety book.

The notices and statements are as follows:

- **Notes:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

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## Features and specifications

The tables in this section provide information about the features and specifications of the IntelliStation E Pro computer Type 6216 and Type 6226.

## Features and specifications — Type 6216

The following table provides a summary of the features and specifications of the IntelliStation E Pro Type 6216 computer. Depending on the model, some features and specifications might not apply.

Table 1. Features and specifications

<p><b>Microprocessor:</b> Supports one Intel Pentium® 4 with 256 KB or 512 KB Level-2 cache and 400 or 533 MHz front-side bus (FSB)</p> <p><b>Memory:</b></p> <ul style="list-style-type: none"> <li>• Minimum: 256 MB</li> <li>• Maximum: 2.0 GB</li> <li>• Type: PC2100 DIMMs</li> <li>• Slots: Two dual inline</li> </ul> <p><b>Drives:</b> (depending on model)</p> <ul style="list-style-type: none"> <li>• Diskette: 1.44 MB (3 mode)</li> <li>• Hard disk drive (IDE or SCSI)</li> <li>• One of the following: <ul style="list-style-type: none"> <li>– CD-ROM: IDE</li> <li>– DVD-ROM: IDE</li> <li>– CD-RW: IDE</li> </ul> </li> </ul> <p><b>Expansion bays:</b> (depending on model)</p> <ul style="list-style-type: none"> <li>• One 5.25-in. bay (one CD-ROM drive installed)</li> <li>• Two 3.5-in. bays (one diskette drive and one hard disk drive installed)</li> </ul> <p><b>PCI expansion slots:</b> Three 33 MHz/32-bit on the system board (some models come with a SCSI adapter installed)</p> <p><b>Power supply:</b> One 160 watt (90-240 V ac)</p> <p><b>Video adapter:</b> (depending on model)</p> <ul style="list-style-type: none"> <li>• Matrox Millennium G450 (DVI-I) with 32 MB DDR SDRAM video memory and a single DVI-I or dual analog connectors</li> <li>• NVIDIA Quadro4 200NVS (LFH-60) with 64 MB DDR SDRAM video memory and dual analog connectors (or dual digital monitor capability with the purchase of an additional pigtail cable)</li> </ul>	<p><b>Size:</b></p> <ul style="list-style-type: none"> <li>• Height: 104 mm (4.1 in.)</li> <li>• Depth: 412 mm (16.2 in.)</li> <li>• Width: 360 mm (14.2 in.)</li> <li>• Weight: approximately 9.1 kg (20 lb) when fully configured or 6.8 kg (15 lb) minimum</li> </ul> <p><b>Integrated functions:</b></p> <ul style="list-style-type: none"> <li>• One 10/100/1000 Ethernet controller on the system board with RJ-45 Ethernet connector</li> <li>• Two serial ports</li> <li>• Parallel port</li> <li>• Four USB ports</li> <li>• Keyboard port</li> <li>• Mouse port</li> <li>• Audio ports <ul style="list-style-type: none"> <li>– Line out</li> <li>– Line in</li> <li>– Mic</li> </ul> </li> <li>• Dual-channel bus mastering IDE controller</li> </ul> <p><b>Acoustical noise emissions:</b></p> <ul style="list-style-type: none"> <li>• Sound power, idling: 4.9 bel maximum</li> <li>• Sound power, operating: 5.2 bel maximum</li> </ul> <p><b>Environment:</b></p> <ul style="list-style-type: none"> <li>• Air temperature: <ul style="list-style-type: none"> <li>– Computer on: 10° to 35°C (50.0° to 95.0°F). Altitude: 0 to 2133 m (6998.0 ft)</li> <li>– Computer off: 10° to 43°C (50.0° to 109.4°F). Maximum altitude: 2133 m (6998.0 ft)</li> </ul> </li> <li>• Humidity: <ul style="list-style-type: none"> <li>– Computer on: 8% to 80%</li> <li>– Computer off: 8% to 80%</li> </ul> </li> </ul>	<p><b>Heat output:</b> Approximate heat output in British thermal units (Btu) per hour</p> <ul style="list-style-type: none"> <li>• Minimum configuration: 257 Btu (75 watts)</li> <li>• Maximum configuration: 686 Btu (200 watts)</li> </ul> <p><b>Airflow:</b> Approximately 0.68 cubic meters every three minutes (24 cubic feet every 3 minutes)</p> <p><b>Electrical input:</b></p> <ul style="list-style-type: none"> <li>• Sine-wave input (50-60 Hz) required</li> <li>• Input voltage low range: <ul style="list-style-type: none"> <li>– Minimum: 90 V ac</li> <li>– Maximum: 137 V ac</li> </ul> </li> <li>• Input voltage high range: <ul style="list-style-type: none"> <li>– Minimum: 180 V ac</li> <li>– Maximum: 265 V ac</li> </ul> </li> <li>• Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> <li>– Minimum: 0.095 kVA</li> <li>– Maximum: 0.470 kVA</li> </ul> </li> </ul> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.</li> <li>2. These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.</li> </ol>
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## Features and specifications — Type 6226

The following table provides a summary of the features and specifications of the IntelliStation E Pro Type 6226 computer. Depending on your model, some features and specifications might not apply.

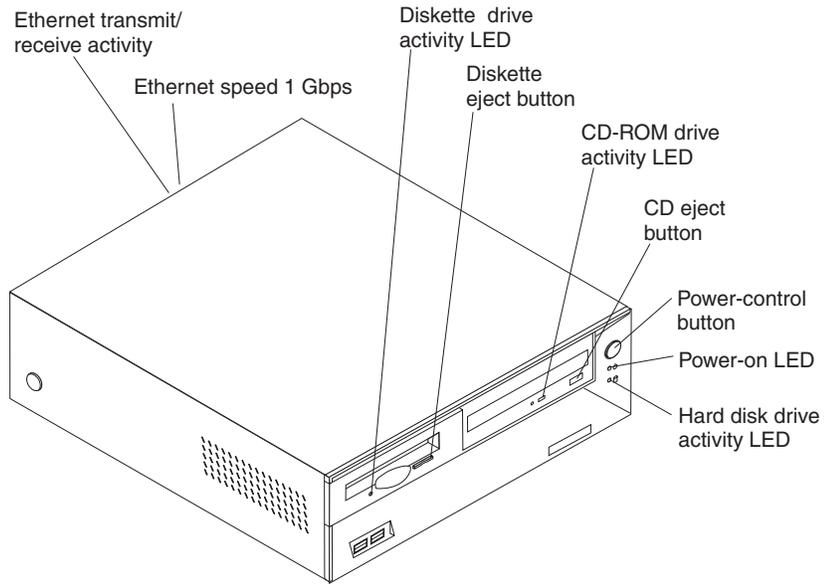
Table 2. Features and specifications

<p><b>Microprocessor:</b> Supports one Intel Pentium 4 with 256 KB or 512 KB Level-2 cache and 400 or 533 MHz front-side bus (FSB)</p> <p><b>Memory:</b></p> <ul style="list-style-type: none"> <li>• Minimum: 256 MB</li> <li>• Maximum: 2.0 GB</li> <li>• Type: PC2100 DIMMs</li> <li>• Slots: Two dual inline</li> </ul> <p><b>Drives:</b> (depending on model)</p> <ul style="list-style-type: none"> <li>• Diskette: 1.44 MB (3 mode)</li> <li>• Hard disk drive (IDE or SCSI)</li> <li>• One of the following: <ul style="list-style-type: none"> <li>– CD-ROM: IDE</li> <li>– DVD-ROM: IDE</li> <li>– CD-RW: IDE</li> </ul> </li> </ul> <p><b>Expansion bays:</b> (depending on model)</p> <ul style="list-style-type: none"> <li>• Two 5.25-in. bay (one CD-ROM drive installed)</li> <li>• Two 3.5-in. bays (one diskette drive and one hard disk drive installed)</li> </ul> <p><b>PCI expansion slots:</b> Three 33 MHz/32-bit on the system board (some models come with a SCSI adapter installed)</p> <p><b>Power supply:</b> One 200 watt (90-240 V ac)</p> <p><b>Video adapter:</b> (depending on model)</p> <ul style="list-style-type: none"> <li>• Matrox Millennium G450 (DVI-I) with 32 MB DDR SDRAM video memory and a single DVI-I or dual analog connectors</li> <li>• NVIDIA Quadro4 200NVS (LFH-60) with 64 MB SDR SDRAM video memory and dual analog connectors (or dual digital monitor capability with the purchase of an additional pigtail cable)</li> <li>• ATI Fire GL8800 (DVI-I and SVGA) with 128 MB DDR SDRAM video memory, one DVI-I connector and one SVGA connector</li> </ul>	<p><b>Size:</b></p> <ul style="list-style-type: none"> <li>• Height: 140 mm (5.5 in.)</li> <li>• Depth: 425 mm (16.7 in.)</li> <li>• Width: 425 mm (16.7 in.)</li> <li>• Weight: approximately 11.4 kg (25 lb) when fully configured or 10.0 kg (22 lb) minimum</li> </ul> <p><b>Integrated functions:</b></p> <ul style="list-style-type: none"> <li>• One 10/100/1000 Ethernet controller on the system board with RJ-45 Ethernet connector</li> <li>• Two serial ports</li> <li>• Parallel port</li> <li>• Four USB ports</li> <li>• Keyboard port</li> <li>• Mouse port</li> <li>• Audio ports <ul style="list-style-type: none"> <li>– Line out</li> <li>– Line in</li> <li>– Mic</li> </ul> </li> <li>• Dual-channel bus mastering IDE controller</li> </ul> <p><b>Acoustical noise emissions:</b></p> <ul style="list-style-type: none"> <li>• Sound power, idling: 5.0 bel maximum</li> <li>• Sound power, operating: 5.2 bel maximum</li> </ul> <p><b>Environment:</b></p> <ul style="list-style-type: none"> <li>• Air temperature: <ul style="list-style-type: none"> <li>– Computer on: 10° to 35°C (50.0° to 95.0°F). Altitude: 0 to 2133 m (6998.0 ft)</li> <li>– Computer off: 10° to 43°C (50.0° to 109.4°F). Maximum altitude: 2133 m (6998.0 ft)</li> </ul> </li> <li>• Humidity: <ul style="list-style-type: none"> <li>– Computer on: 8% to 80%</li> <li>– Computer off: 8% to 80%</li> </ul> </li> </ul>	<p><b>Heat output:</b> Approximate heat output in British thermal units (Btu) per hour</p> <ul style="list-style-type: none"> <li>• Minimum configuration: 257 Btu (75 watts)</li> <li>• Maximum configuration: 686 Btu (200 watts)</li> </ul> <p><b>Airflow:</b> Approximately 0.68 cubic meters every three minutes (24 cubic feet every 3 minutes)</p> <p><b>Electrical input:</b></p> <ul style="list-style-type: none"> <li>• Sine-wave input (50-60 Hz) required</li> <li>• Input voltage low range: <ul style="list-style-type: none"> <li>– Minimum: 90 V ac</li> <li>– Maximum: 137 V ac</li> </ul> </li> <li>• Input voltage high range: <ul style="list-style-type: none"> <li>– Minimum: 180 V ac</li> <li>– Maximum: 265 V ac</li> </ul> </li> <li>• Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> <li>– Minimum: 0.080 kVA</li> <li>– Maximum: 0.300 kVA</li> </ul> </li> </ul> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.</li> <li>2. These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.</li> </ol>
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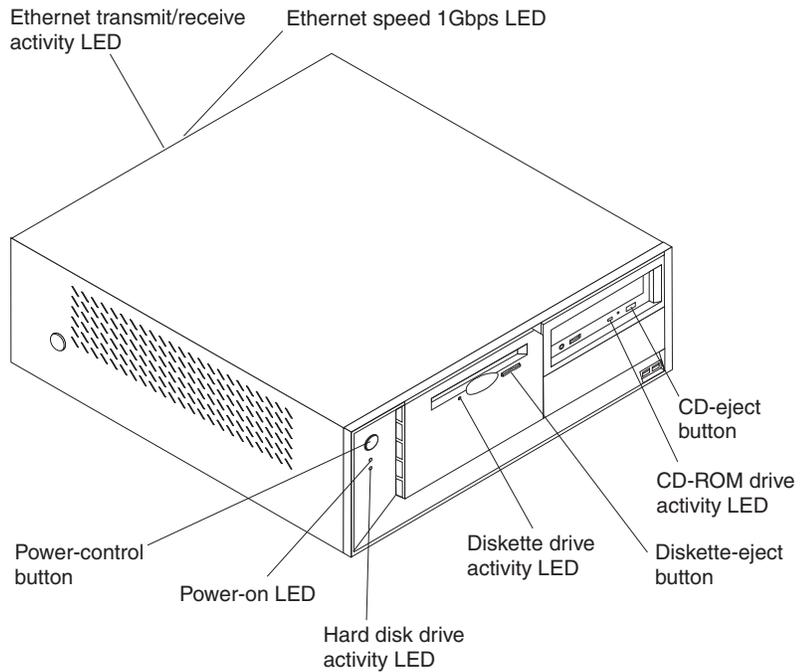
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# Computer controls and indicators

## Type 6216



## Type 6226



**Ethernet transmit/receive activity LED:** When this LED is lit, it indicates that there is activity between the computer and the network. The Ethernet transmit/receive activity LED is located on the Ethernet (RJ-45) connector on the rear of the computer.

**Ethernet speed 1 Gbps LED:** When this LED is lit, it indicates that the Ethernet speed is 1 Gbps. When the LED is off, the Ethernet speed is 10 Mbps or 100 Mbps. The Ethernet speed LED is located on the Ethernet (RJ-45) connector on the rear of the computer.

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

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

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

**CD-eject button:** Press this button to open the tray to insert or remove a CD.

**Power-control button:** Press this button to manually turn the computer on or off.

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

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

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## Turning on the computer

After you connect the computer to a power source, the computer can start in either of the following ways:

- You can press the power-control button on the front of the computer to start the computer.
- If the computer is turned on and a power failure occurs, the computer will start automatically when power is restored.

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

---

## Turning off the computer

Use one of the following procedures to turn off the computer.

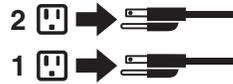
**Statement 5:**



**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.



- You can press the power-control button on the front of the computer. This starts an orderly shutdown of the operating system, if this feature is supported by the operating system, and places the computer in Standby mode.

**Note:** After you turn off the computer, wait at least 5 seconds before you press the power-control button to turn on the computer again.

- You can press and hold the power-control button for more than 4 seconds to cause an immediate shutdown of the computer. You can use this feature if the operating system stops functioning.
- If you cannot use the power-control button to turn off the computer, disconnect the computer power cords from the electrical outlets.

**Note:** After disconnecting the power cords, wait approximately 15 seconds for the computer to stop running.



---

# Configuration

The following configuration programs are provided with the computer:

- **Configuration/Setup Utility program**

This program is part of the basic input/output system (BIOS) code that comes with the computer. You can use this program to configure serial- and parallel-connector assignments, change the drive startup sequence, set the date and time, and set passwords. For more information on how to start this utility, see “Starting the Configuration/Setup Utility program”.

- **Broadcom NetXtreme Gigabit Ethernet Boot Agent program**

The Broadcom NetXtreme Gigabit Ethernet Boot Agent program is part of the BIOS code that comes with the computer. You can use this program to configure the computer to start from the network. For information about how to enable this utility, see “Enabling Broadcom NetXtreme Gigabit Ethernet Boot Agent” on page 19.

- **SCSISelect Utility (some models)**

With the SCSISelect Utility program, you can configure the devices that are connected to the optional SCSI adapter. Use this program to change default values, resolve configuration conflicts, and perform a low-level format on a SCSI hard disk drive. For information about how to start this utility, see “Starting the SCSISelect Utility program” on page 19.

- **Boot Menu program**

The Boot Menu is part of the BIOS code that comes with the computer. You can use the Boot Menu program to temporarily alter the order in which the computer accesses startable devices for one startup session without reconfiguring the startup sequence in the Configuration/Setup Utility program. For more information, see “Using the Boot Menu program” on page 20.

The following sections provide the instructions for starting the utility programs.

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## Using the Configuration/Setup Utility program

This section provides the instructions for starting the Configuration/Setup Utility program and descriptions of the menu choices that are available.

### Starting the Configuration/Setup Utility program

The Configuration/Setup Utility program starts automatically when POST detects that newly installed or removed hardware is not reflected in the current configuration. A diagnostic error message is displayed. See “Diagnostics” on page 21 for details about POST and information about the error messages.

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

1. Turn on the computer and watch the monitor screen. If the computer is already on when you start this procedure, you must shut down the operating system, turn off the computer, wait a few seconds until all in-use LEDs go off, and restart the computer. (Do not use Ctrl+Alt+Del to restart the computer.)
2. When the message Press F1 for Configuration/Setup, Press F12 for Boot Menu appears at the bottom of the screen during startup, press F1. (This prompt appears on the screen for only a few seconds. You must press F1 quickly.)

**Note:** If you have set both administrator and user passwords, you must type the administrator password to access the full Configuration/Setup Utility menu.

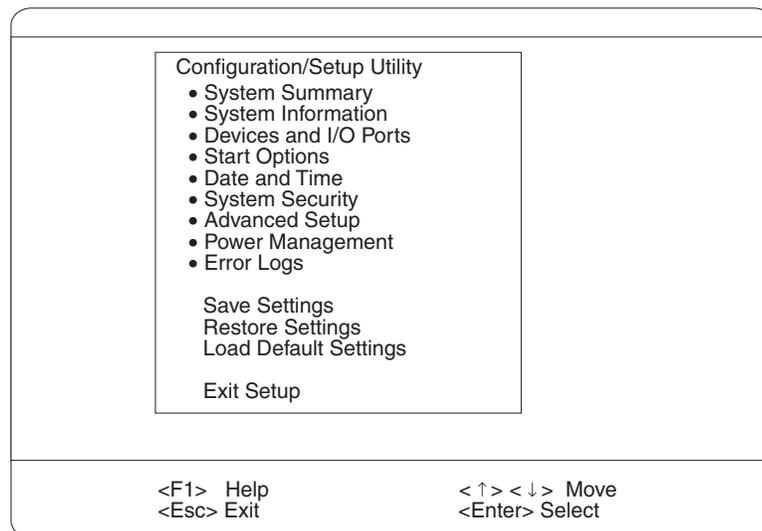
3. Follow the instructions that appear on the screen.

Use the Up Arrow (↑) and Down Arrow (↓) keys to select menu choices in any Configuration/Setup Utility menu. Some menu choices provide information only. Some menu choices show fields that you can change. These fields are enclosed by square brackets. You can change the values in these fields by using Left Arrow (←) and Right Arrow (→) keys to change the value, or you can type information in the field.

To restore the current setting for a menu item, press F9. To restore the default setting for a menu item, press F10.

## Configuration/Setup Utility menu choices

From the Configuration/Setup Utility main menu, you can select settings that you want to change. The Configuration/Setup Utility main menu is similar to the one shown in the following illustration:



### Notes:

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

The following choices are available from the main menu:

#### • System Summary

This choice contains general information about the computer, such as a summary of components and computer configuration. You can view information about the type and speed of the microprocessor and the amount of memory that is installed. Changes that you make to configuration settings appear on this summary screen. You cannot edit the fields of the configuration and system information.

#### • System Information

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

- **Devices and I/O Ports**

Select this choice to view or change the assignments for devices and input/output ports.

- **Mouse**

Select this choice to enable a mouse or PS/2® pointing device.

- **Diskette Drive A**

Select this choice to set the type of diskette drive installed in the computer. You can disable the diskette drive, or you can enable various types of diskette drives.

- **Floppy Disk Controller**

Select this choice to enable or disable the diskette drive controller.

- **IDE Controller**

Select this choice to enable the primary IDE controller, the secondary IDE controller, or both IDE controllers.

- **System Board Ethernet**

Select this choice to set the system-board Ethernet controller to **Enabled** or **Disabled**.

- **System Board Ethernet PXE/DHCP**

Select this choice to enable the Broadcom NetXtreme Gigabit Ethernet Boot Agent or to enable Dynamic Host Configuration Protocol (DHCP).

- **ASF POST Function**

If you have a remote system management device or adapter installed in the computer, select this choice to enable or disable the Alert Standard Format (ASF) POST function. Enabling this function configures the computer to be managed remotely on a dedicated protocol.

- **Audio Support**

Select this choice to enable or disable audio support.

- **Serial Port Setup**

Select this choice to configure the serial ports. If you enable a port, you can set the base input/output (I/O) address and the interrupt level. If you select **Automatic**, the operating system automatically configures these settings.

- **USB Setup**

Select this choice to enable or disable the USB ports in the computer. The USB Support setting can be Enabled or Disabled. USB-device support determines whether BIOS code support for USB devices will be enabled when you start the computer. You can also enable or disable support for a USB keyboard or mouse.

- **Parallel Port Setup**

Select this choice to enable or disable the parallel port in the computer. If you enable the port, you can set the base input/output (I/O) address, the interrupt, and the Parallel Port Extended Mode. If you disable the port, the operating system automatically configures these settings. If you set the Parallel Port Extended Mode to **ECP**, you can set the Extended Mode direct memory address (DMA). The parallel port address can be specified or disabled. If you need to change this setting, set the address so that it does not conflict with other hardware.

Complete the following steps to view or change the parallel-connector assignment:

1. From the Configuration/Setup Utility menu, select **Devices and I/O Ports** and press Enter.

2. Select **Parallel Port Setup** and press Enter.
3. Use the Left Arrow (←) and Right Arrow (→) keys to change settings and press Esc.

**Note:** When you configure the parallel connector as bidirectional, 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 your changes and exit from the Configuration/Setup Utility menu.

– **IDE Hard Disk Drive 0, 1, 2, and 3**

Select this choice to view or change the settings for IDE drives 0, 1, 2, or 3. You can set each drive for **Compatible** or **High Performance**. If an IDE device attached to the system board IDE controller does not function properly or causes other IDE devices attached to the same controller to function improperly, set this field to **Compatible**.

• **Start Options**

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

Select this choice to view or change the start options. Start options take effect when you start the computer.

The following menu items are available in the **Start Options** menu:

– **Startup Sequence**

The computer uses a startup sequence to determine the order in which the computer checks devices to find a boot record. For example, you can define a startup sequence that checks for a startable diskette in the diskette drive, then checks the hard disk drive in bay 1, and then checks a network adapter.

You can also enable the computer to start from the network by enabling the Broadcom NetXtreme Gigabit Ethernet Boot Agent to customize the network as the first startable device in the startup sequence.

To change the startup sequence of the computer, complete the following steps:

1. From the Configuration/Setup Utility program, select **Start Options** and press Enter.
2. Select **Startup Sequence** and press Enter.
3. Select the device that you want to be the first startable device using the Left Arrow (←) and Right Arrow (→) keys. Then, select the devices that you want to be the second startable device and the third startable device.
4. After customizing the startup order, press Esc until you return to the main menu.
5. Select **Save Settings** and press Enter.

You can enable a virus-detection test that checks for changes in the master boot record at startup.

– **Fast Power On Self Test**

You can select **Auto** to speed up the system POST process by bypassing some testing procedures.

– **Power On Logos**

Select **Enabled** to display the IBM logo during POST.

– **Keyboard NumLock State**

Select **Enabled** to activate the keyboard numbers lock upon startup.

- **Memory Test**

This item is set to Enabled. You cannot alter this setting.

- **Configuration Table**

Select Enabled to display the preboot system configuration table.

- **Date and Time**

Select this choice to set the system date and time. The system time is in a 24-hour format (hour:minute:second).

- **System Security**

Select this choice to set an administrator password or a system owner's name. This choice appears only on the full Configuration/Setup Utility main menu.

You can set the computer to prompt you for an administrator password or user password at startup. You can also set the security on diskette and hard disk drives to protect your data from tampering.

Select **Administrator Password** to set or change an administrator password.

**Attention:** If an administrator password is set and then forgotten, it cannot be overridden or removed. You must replace the system board.

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

You must set an administrator password to set a user password. A user password grants a user access to the computer for use but denies the user access to configuration settings.

You must set a user password to set a **Password on Boot**. If this setting is enabled, the computer will require a password at startup.

If you set an administrator password and a user password, you can set your diskette drive and hard disk drive security settings to prevent tampering with important data. You can set **Floppy Drive** and **Hard Disk Drive** security settings to **Normal**, **Write Protect All Sectors**, and **Write Protect Boot Sectors**.

- **Advanced Setup**

Select this choice to change the values for advanced hardware features, such as PCI configuration and Plug and Play operating-system settings.

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

- **Power Management**

Select this choice to enable or disable system power settings.

The following choices are available in this menu item:

- **APM BIOS Mode**

This field controls the Advanced Power Management (APM) support to the operating system. Enable APM BIOS Mode when the operating system supports APM-enabled computers.

- **IDE Hard Disk Standby Timer**

This field indicates which IRQ the Advanced Configuration and Power Interface (ACPI) uses.

- **Time to Low Power**

Select this choice to set the time that will elapse from the last keyboard or mouse activity until the computer assumes a low power sleep state.

- **Sleep Mode**  
You can set this menu choice only if **Time to Low Power** is set.
- **Power Switch < 4 sec.**  
You can set this to **Power Off** or **Suspend**.
- **System wake-up event**  
Select this choice to control the event that occurs when the computer wakes up.
- **Serial Port Ring Detect**  
Set this menu choice to Enabled to set the computer to wake up when activity is detected on the serial port modem.
- **Wake Up on Alarm**  
Select this choice to set the computer to wake up at a certain day or time. You can set this to **Disabled**, **Time**, and **Date/Time**.
- **Alarm Day of Month**  
You can set this menu item only if you have set **Wake Up on Alarm** to **Time** or **Date/Time**. Set the day of the month for the computer to wake up.
- **Alarm Time**  
You can set this menu item only if you have set **Wake Up on Alarm** to **Time** or **Date/Time**. Set the time of the day for the computer to wake up.
- **ACPI Sleep State**  
Select which power level the computer uses in Standby mode. If you select **S1**, power is maintained to all devices, but all processor activity is halted. If you select **S3**, power is maintained only for the main memory. Exit from the S3 state might not be supported by all installed adapters.
- **Restart on AC/Power Failure**  
This field controls whether the system will stay on after ac power is removed and then restored. Select **Power On** if you use a power strip to turn on the computer. Select **Stay Off** if you want the computer to remain off after power is restored. Select **Last State** to have the computer return to its previous state.
- **Error Logs**  
Select this choice to view any errors that occur during POST.
- **Save Settings**  
Select this choice to save your customized settings.
- **Restore Settings**  
Select this choice to restore the previous settings.
- **Load Default Settings**  
Select this choice to restore the factory settings.
- **Exit Setup**  
Select this choice to exit from the Configuration/Setup Utility program.  
If you have made any changes, the program will prompt you to save the changes or exit without saving the changes.

## Using passwords

The **System Security** choice appears only on the full Configuration/Setup Utility menu. After you select this choice, you can implement an administrator password.

The administrator password provides access to all choices on the Configuration/Setup Utility main menu. You can set, change, or delete the administrator 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 summary of the administrator password features is as follows:

- No password is required to start the system.
- Type the password to access the Configuration/Setup Utility program.
- All choices are available on the Configuration/Setup Utility main menu.

Complete the following steps to set an administrator password:

1. From the Configuration/Setup Utility main menu, select **System Security** and press Enter.
2. Select **Administrator Password** and press the Right Arrow (→) key.
3. Type the password you want to set in the **Enter Password** field and press Enter.
4. Type the password again in the **Enter Password again** field and press Enter.
5. Press Enter to **Set or Change Password**. The setting in the **Administrator Password** field changes to **Present**.
6. Press Esc until you return to the main menu.
7. Select **Save Settings** and Press Enter.

After you have set an administrator password, you can then set a user password to authorize a user to operate the computer. You must set an administrator password to set a user password.

You can use any combination of up to seven characters (A–Z, a–z, 0–9, and blanks) for the 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:

- Type the administrator password at the power-on prompt. Start the Configuration/Setup Utility program and change the user password.
- Change the position of the password check jumper as described in “Setting the password check jumper (JP1)” on page 18.
- Remove the battery and then reinstall the battery. See “Replacing the battery” on page 39 for instructions.

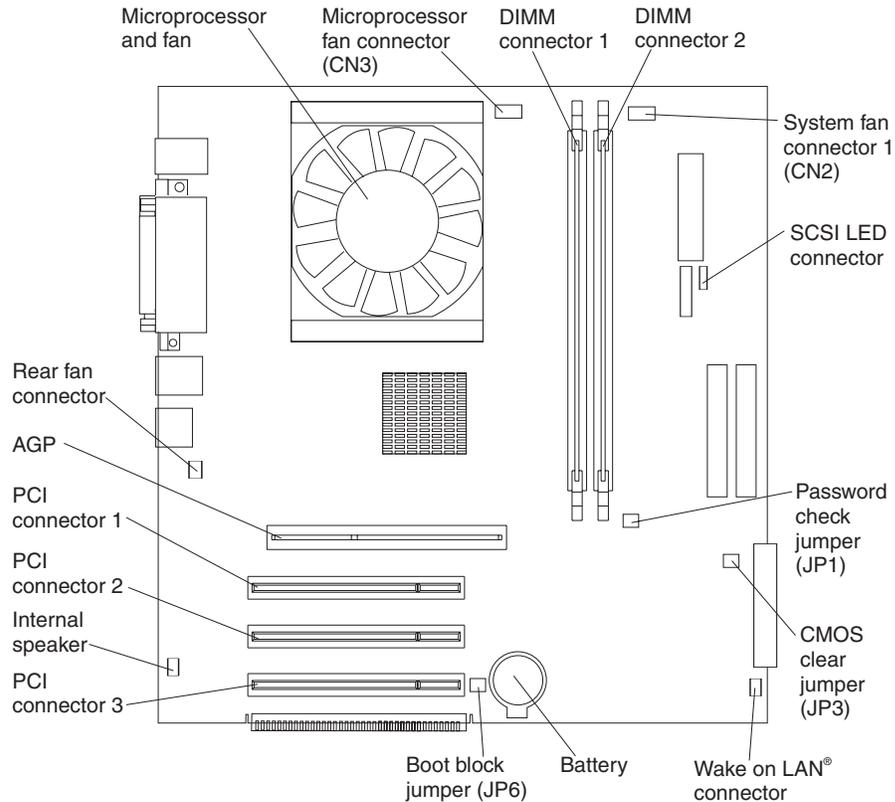
To set a user password, complete the following steps:

1. Set an administrator password. See the instructions on page 17.
2. Select **User Password** and press the Right Arrow key.
3. Type the password you want to set in the **Enter Password** field and press Enter.
4. Type the password again in the **Enter Password Again** field and press Enter.
5. Press Enter to **Set or Change Password**. The setting in the **User Password** field changes to **Present**.
6. Select **Save Settings** and press Enter.

If you set a user password, you can then enable **Password on Boot**. If you enable this setting, you must type a user password when you start the computer.

## Setting the password check jumper (JP1)

The following illustration shows the location of the password check jumper (JP1) on the system board.



Complete the following steps to set the password check jumper (JP1):

1. Review "Safety information" on page 129.
2. Turn off the computer and peripheral devices and disconnect all external cables and power cords; then, remove the cover (see "Removing the cover of the 6216" on page 45).
3. Move the jumper from pins 1 and 2 to pins 2 and 3. This clears the user password for one boot cycle.

**Note:** You can now start the computer one time without having to use the user password, but if you do not use the Configuration/Setup Utility program to change or delete the password, the next time you start the computer, the original user password will be reinstated.

4. Connect the computer to a power source, keyboard, monitor, and mouse.
5. Turn on the computer.

You can now start the Configuration/Setup Utility program and either delete the old password or set a new user password.

---

## Enabling Broadcom NetXtreme Gigabit Ethernet Boot Agent

The Broadcom NetXtreme Gigabit Ethernet Boot Agent is part of the BIOS code that comes with the computer. You can enable the Broadcom NetXtreme Gigabit Ethernet Boot Agent from the Configuration/Setup Utility program. The Broadcom NetXtreme Gigabit Ethernet Boot Agent enables you to configure the network as a startable device, and you can customize where the network startup option appears in the startup sequence.

To enable Broadcom NetXtreme Gigabit Ethernet Boot Agent, complete the following steps:

1. From the Configuration/Setup Utility main menu, select **Devices and I/O Ports** and press Enter.
2. Select **System Board Ethernet PXE/DHCP** and use the Right Arrow (→) key to set it to Enabled.
3. Select **Save Settings** and press Enter.

---

## Using the SCSISelect Utility program (some models)

SCSISelect is a menu-driven configuration utility program that you can use for models that come with a SCSI adapter. You can use this program to:

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

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

### 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.

**Note:** If an administrator password has been set, you are prompted to type the password to start the SCSISelect Utility program.

3. When the Would you like to configure the host adapter or run the SCSI disk utility? question appears, make the selection and press Enter.
4. Use the arrow keys to select a choice from the menu.
  - Press Esc to return to the previous menu.
  - 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, and press Enter.

### SCSISelect menu choices

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 instructions that appear on the screen.

You can view or change the following controller settings:

- **Host Adapter SCSI ID**

Select this choice to view the SCSI controller ID, normally 7.

- **SCSI Parity Checking**

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

- **Host Adapter SCSI Termination**

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

- **Boot Device Options**

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

- **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 Ultra3 SCSI LVD devices is 160 MBps
- The transfer rate for Ultra2 SCSI LVD devices is 80 MBps
- The transfer rate for Fast SCSI devices is 20 MBps

- **Advanced Configuration Options**

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

- **SCSI Disk Utilities**

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

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

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

---

## Using the Boot Menu program

The Boot Menu program is a built-in, menu-driven configuration utility program that you can use to temporarily redefine the startup sequence without changing settings in the Configuration/Setup Utility program.

Complete the following steps to use the Boot Menu program to change the startup sequence of the computer:

1. Turn off the computer.
2. Restart the computer.
3. Press F12.
4. Select the startup device.

The next time the computer is started, it returns to the startup sequence set in the Configuration/Setup Utility program.

---

# Diagnostics

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

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## Diagnostic tools overview

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

- **POST beep codes and error messages**

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

- **Diagnostic programs**

The system diagnostic programs are stored on the *Device Drivers and IBM Enhanced Diagnostics* CD. These programs are the primary methods of testing the major components of the computer. See “Diagnostic programs and error messages” on page 22 for more information.

- **Error charts**

These charts list problem symptoms and steps to correct the problem. See “Error charts” on page 25 for more information.

---

## POST error log

When you turn on the computer, the power on self-test (POST) performs a series of tests to check the operation of system components and some of the installed options.

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

If POST detects a problem, more than one beep may sound and an error message appears on the screen.

The POST error log contains the three most recent error codes and messages that the system generated during POST.

**Notes:**

1. If you have a user password set, you must type the password and press Enter, when prompted, before the operating system will start.
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 be resolved the next time you run the test.

---

## POST beep codes

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

- One short beep indicates the successful completion of POST.
- More than one beep indicates that POST detected a problem. For more information, see “Beep symptoms” on page 95.

If POST detects a problem (more than one beep sounds), an error message appears on the screen. See “Beep symptoms” on page 95 and “POST error codes” on page 106 for more information.

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## Small computer system interface (SCSI) messages (some models)

If the computer has an Ultra160 SCSI adapter installed and you receive a SCSI error message, see “SCSI error codes” on page 113.

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

---

## Diagnostic programs and error messages

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. A *Device Drivers and IBM Enhanced Diagnostics* CD comes with the computer. You can also download the latest version of the diagnostic programs from <http://www.ibm.com/pc/support/> on the World Wide Web (see “Downloading the diagnostics program” on page 23).

The IBM Enhanced Diagnostics programs isolate problems from the computer hardware and software. The programs run independently of the operating system and *must be run either from a CD or diskette*.

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

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

Diagnostic error messages indicate that a problem exists; they are not intended to be used to identify a failing part. Troubleshooting and servicing 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.

Error codes that might be displayed are listed at “Diagnostic error codes” on page 97.

The error code format is as follows:

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

where:

**fff** is the three-digit function code that indicates the function being tested when the error occurred. For example, function code 201 is for memory.

**ttt** is the three-digit failure code for the exact test failure. (These codes are for trained service personnel.)

- iii** is the three-digit device ID. (These codes are for trained service personnel.)
- 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 (fff) given in the previous list.

### **Result**

can be one of the following:

#### **Passed**

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

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

#### **User Aborted**

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

#### **Not Applicable**

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

#### **Aborted**

This result occurs when the test could not proceed 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.

## Downloading the diagnostics program

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

1. Go to the following World Wide Web site: <http://www.ibm.com/pc/support/>
2. Download the diagnostics file for 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 the diskette drive.

5. Type in the following, and then press Enter: *filename x*: where *filename* is the name of the file you downloaded from the Web, and *x* is the letter of the diskette drive containing the blank diskette.

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.

## Starting the diagnostic programs and 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 program, begin with step 4.

Complete the following steps to start the diagnostic programs and view the test log:

1. Insert the *IBM Enhanced Diagnostics* diskette or the *Device Drivers and IBM Enhanced Diagnostics* CD.
2. Shut down the operating system and restart the computer.
3. If a user password is set, the system prompts you for it. Type the password, and 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. Save the test log to a file on a diskette or to the hard disk.

**Notes:**

- a. To save the test log to a diskette, you must use a diskette that you have formatted yourself; this function does not work with preformatted diskettes. If the diskette has sufficient space for the test log, the diskette may contain other data.
- b. The system maintains the test-log data while the system is turned on. When you turn off the power to the computer, the test log is cleared.

## Diagnostic error message tables

For descriptions of the error messages that might appear when you run the diagnostic programs, see “Diagnostic error codes” on page 97.

**Notes:**

1. Depending on the configuration, some of the error messages might not appear when you run the diagnostic programs.
2. If diagnostic error messages appear that are not listed in the tables, make sure that the computer has the latest level of BIOS code installed.

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## PC-Doctor for Windows®

The computer contains PC-Doctor for Windows, which is designed specifically for the Windows operating environment. Because these diagnostics work with the operating system, they test hardware and analyze certain software components. These diagnostic programs are especially useful for isolating operating-system and device-driver problems.

Complete the following steps to use PC-Doctor for Windows:

1. On the Windows desktop, click **Start** → **All Programs** → **PC-Doctor** → **PC-Doctor**.
2. Follow the instructions on the screen. Help is available online.

---

## Error charts

You can use the error charts to find solutions to problems that have definite symptoms (see “Error symptoms” on page 99).

**Important:** If diagnostic error messages are displayed that are not listed, make sure that the system has the latest levels of BIOS code installed.

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## Recovering the operating system and preinstalled software

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

### 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.

**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 that 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 at <http://www.ibm.com/pc/support/> on the World Wide Web.

### Recovering the operating system

The computer has the Product Recovery program on a hidden partition of the hard disk drive. The Product Recovery program reinstalls the operating system and preinstalled software. The Product Recovery program runs independently of the operating system.

If you are using FDISK, Disk Management, or another utility to reformat the hard disk, 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.

If the hard disk drive, including the partition where the Product Recovery program resides, becomes damaged or you replace the hard disk drive, you can use the *IBM Product Recovery* CD to recover the preinstalled operating system, application programs, and device drivers (see “Recovery CD, Type 6216” on page 121 or “Recovery CD, Type 6226” on page 124).

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

Complete the following steps to recover the operating system.

**Note:** The recovery process replaces all information stored on drive C. If possible, back up your data files before starting this process.

1. If possible, shut down the operating system normally.
2. 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 4 seconds, unplug the power cord and wait a few seconds before reconnecting it.

3. Turn on the computer, and wait for the prompt:  
To start the Product Recovery program, press F11.

If the DOS command prompt or the F11 prompt is not displayed, see “Using the recovery-repair diskette” on page 27.

4. Quickly press F11, and wait for the program menu.
5. Select the recovery options you want and follow the instructions on the screen.
6. When recovery is complete, exit from the program. Remove the CD from the CD-ROM or DVD-ROM drive, if you have not already done so.
7. Restart the computer.

---

## Creating and using an IBM Enhanced Diagnostics diskette

The IBM Enhanced Diagnostics diskette is used to test hardware components on the computer. Use the following information and instructions to create and use an IBM Enhanced Diagnostics diskette.

### Creating an IBM Enhanced Diagnostics diskette

You can create an *IBM Enhanced Diagnostics* diskette in one of two ways:

- Create a diskette using Access IBM
- Download a program image from the World Wide Web

**Note:** You can also make a diagnostics diskette from the *IBM Enhanced Diagnostics* CD; see the “ReadMe” file on the CD for details on running `makediags.exe`.

Complete the following steps to create the diagnostics diskette using Access IBM:

1. From the Access IBM **Welcome** window, click **How do I...;** then, click **Protect data.**
2. Click **Creating emergency diskettes.**
3. Click **Diagnostic diskette.**
4. Follow the instructions on the screen.

To create a startable IBM Enhanced Diagnostics diskette from the World Wide Web:

1. Go to <http://www.ibm.com/pc/support/> on the World Wide Web.
2. Download the diagnostics file for the computer to a hard disk 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 into the diskette drive.
5. Type filename *x*: where *filename* is the name of the file you downloaded from the Web, and *x* is the letter of the diskette drive. Then press Enter.

The downloaded Web file is self-extracting and will be copied to the diskette. When the copy completes, store the diskette in a safe place.

## Using the Enhanced Diagnostics diskette

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

1. Turn off any attached devices and the computer.
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 been completed, you can view the test log by selecting **Utility** from the top of the screen.

---

## Recovery-repair diskette

At your earliest opportunity, create a recovery-repair diskette and an IBM Enhanced Diagnostics diskette, and store them in a safe place. Use the following instructions to create a recovery-repair diskette. See “Creating an IBM Enhanced Diagnostics diskette” on page 26 for information about how to create an IBM Enhanced Diagnostics diskette.

## Creating a recovery-repair diskette

Complete the following steps to create the recovery-repair diskette:

1. In Access IBM, click **How do I...;** then, click **Protect data.**
2. Click **Creating emergency diskettes.**
3. Click **Recovery Repair diskette.**
4. Follow the instructions on the screen.

In the unlikely event that the desktop becomes unusable, the recovery-repair diskette will enable you to access the Product Recovery program. Additional information about the diskette is in Access IBM. For more information about using this diskette, see “Using the recovery-repair diskette”.

## Using the recovery-repair diskette

In some circumstances, files on the hard disk might become unusable so that the F11 prompt is not displayed when you start up the computer. If you have created a recovery-repair diskette, use the following procedure to access the Product Recovery program on the hard disk. For instructions to create a recovery-repair diskette, see “Recovery-repair diskette”.

1. Insert the recovery-repair diskette.
2. Turn off the computer.
3. Turn on the computer, and follow the directions on the screen.

**Note:** If the repair operation finishes without error, the F11 prompt will be displayed the next time you restart the computer.

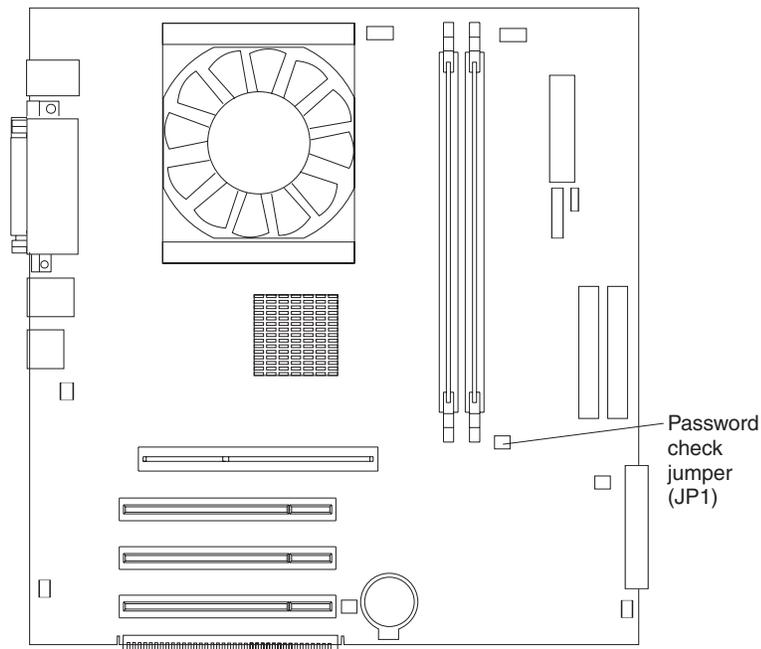
If an error message is displayed during the repair operation and the repair operation cannot be completed, you might have a problem with the Product Recovery program or the partition that contains the Product Recovery program. Use a *Product Recovery* CD to access the Product Recovery program. To obtain a *Product Recovery* CD, see “Recovery CD, Type 6216” on page 121 and “Recovery CD, Type 6226” on page 124.

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## Erasing a lost or forgotten password

Complete the following steps to set the password check jumper (JP1) and erase a forgotten password:

1. Review the “Safety information” on page 129.
2. Turn off the computer and all attached devices.
3. Unplug the power cord.
4. Remove the cover (see “Removing the cover of the 6216” on page 45 or “Removing the cover of the 6226” on page 60).
5. Locate the password check jumper (JP1) on the system board, removing any adapters that impede access to the jumper.



6. Move the jumper from pins 1 and 2 to pins 2 and 3.
7. Replace any adapters that were removed and replace the cover (see “Replacing the cover of the 6216” on page 55 or “Replacing the cover of the 6226” on page 72).

**Note:** You can now start the computer one time without having to use the user password and start the Configuration/Setup Utility program. At this time, you can either delete the old password or set a new user password. If you do not use the Configuration/Setup Utility program to change or delete the password, the next time you start the computer, the original user password will be reinstated.

8. Connect the computer to a power source, keyboard, monitor, and mouse.
9. Turn on the computer. The Configuration/Setup Utility program starts.
10. Follow the instructions to erase the existing password or create a new password.
11. Select **Save Settings** and press Enter.

---

## Updating BIOS code

Complete the following steps to update the BIOS code on the computer:

1. Insert the *IBM eserver xSeries 205/IntelliStation E Pro POST/BIOS Flash Diskette* into drive A.

**Note:** A BIOS flash diskette can be downloaded from the World Wide Web at <http://www.ibm.com/pc/support>.

2. Turn on or restart the computer. The computer will boot off of the diskette.
3. You will be prompted to save the current code to a diskette. Select N and the utility will continue to the next step.

**Note:** If you select Y, you will be asked to name the file to be saved, and the file will be saved to the diskette.

4. When prompted to continue the POST/BIOS flash update, select Y and the system will update the flash ROM with the new code. When this step is complete, the computer will automatically restart.
5. When the computer starts up for the first time after updating the BIOS, select the Setup Utility with the F1 key; then, select the Load Optimized Defaults option.
6. Select the Save & Exit Setup option.
7. When prompted to accept the Y option under Save to CMOS and Exit, select Y.

---

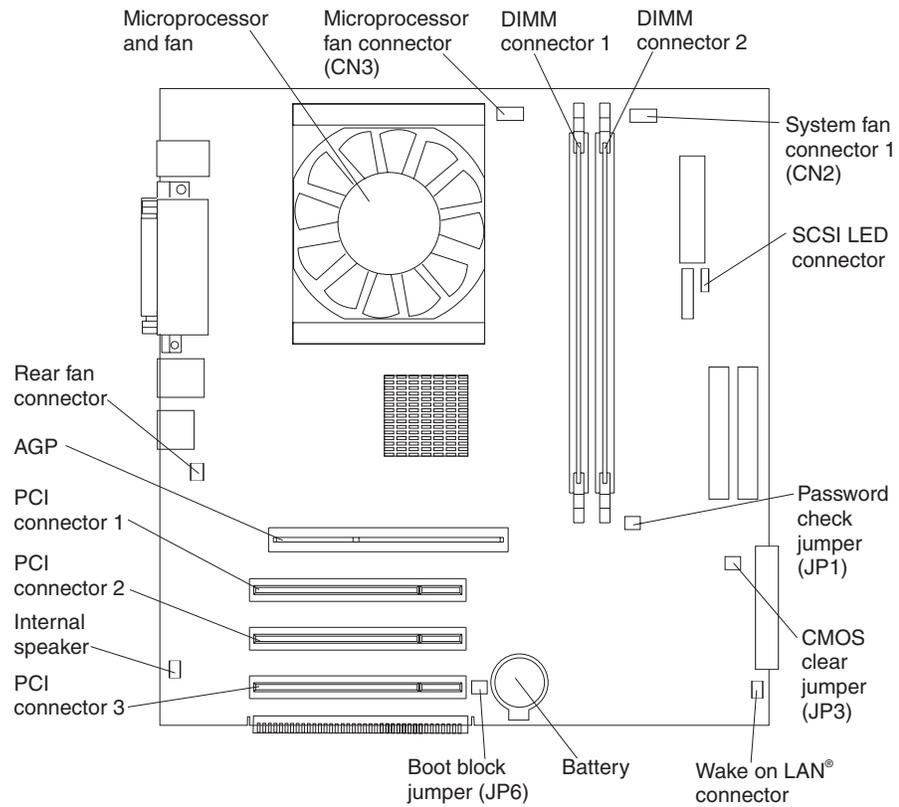
## Recovering from a POST/BIOS update failure

If power to the computer is interrupted while POST/BIOS is being updated (flash update), the computer might not restart correctly. If this happens, complete the following steps:

**Note:** You will need a flash diskette that you have created by copying the 512 KB file (flashfil.fls) from the POST/BIOS update (flash) diskette to a blank, formatted diskette. Use this diskette in step 6 on page 30 of this procedure.

1. Turn off the computer and all attached devices.
2. Unplug all power cords from electrical outlets and remove the computer cover (see "Removing the cover of the 6216" on page 45 or "Removing the cover of the 6226" on page 60).

3. Locate the boot block jumper (JP6) on the system board, removing any adapters that impede access to the jumper.



4. Move the jumper from pins 1 and 2 to pins 2 and 3.
5. Replace any adapters that were removed and replace the cover (see "Replacing the cover of the 6216" on page 55 or "Replacing the cover of the 6226" on page 72). Reconnect the power cords for the computer and monitor to electrical outlets.
6. Insert the flash diskette (see Note at the beginning of this procedure) into drive A, and turn on the computer and monitor.

**Note:** No image will be displayed on the monitor while the flash update diskette is running. This is normal.

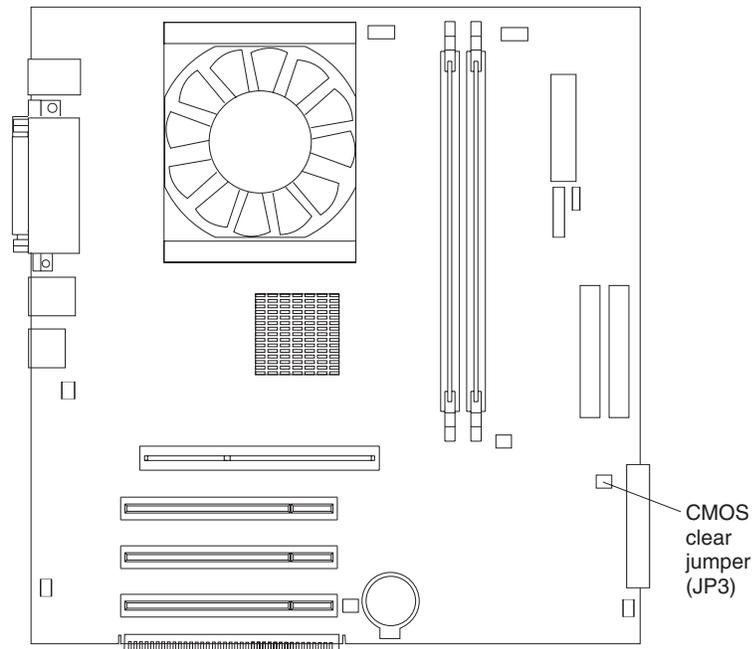
7. After the update session is completed, remove the diskette from the diskette drive, and turn off the computer and monitor.
8. Unplug all power cords from electrical outlets, and remove the cover.
9. Remove any adapters that impede access to the boot block jumper (JP6).
10. Replace the boot block jumper to pins 1 and 2.
11. Replace any adapters that were removed.
12. Replace the cover (see "Replacing the cover of the 6216" on page 55 or "Replacing the cover of the 6226" on page 72), and reconnect all cables that were disconnected.
13. Turn on the computer to restart the operating system.

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## Clearing CMOS

If you experience severe problems with the computer, and the computer does not startup, the CMOS code might be damaged. You might need to clear CMOS to recover. To clear CMOS, complete the following steps:

1. Turn off the computer and all attached devices.
2. Unplug all power cords from electrical outlets and remove the computer cover (see “Removing the cover of the 6216” on page 45 or “Removing the cover of the 6226” on page 60).
3. Locate the CMOS clear jumper (JP3) on the system board, removing any adapters that impede access to the jumper.



4. Move the jumper to pins 2 and 3, wait for approximately 10 seconds; then, return the CMOS clear jumper to pins 1 and 2.
5. Replace any adapters that were removed.
6. Replace the cover (see “Replacing the cover of the 6216” on page 55 or “Replacing the cover of the 6226” on page 72), and reconnect all cables that were disconnected.
7. Turn on the computer to restart the operating system.

---

## Power checkout

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

A general procedure for troubleshooting power problems is as follows:

1. Turn off the computer and disconnect all ac power cords.
2. Check for loose cables in the power subsystem. Also check for short circuits, for example, if there is a loose screw causing a short circuit on a circuit board.

3. Remove adapters and disconnect the cables and power connectors to all internal and external devices until the computer is at the minimum configuration required to start the computer (see “Minimum operating requirements” on page 117).
4. Reconnect all ac power cords and turn on the computer. If the computer starts up successfully, replace adapters and devices one at a time until the problem is isolated. If the computer does not start up from the minimal configuration, replace FRUs of minimal configuration one at a time until the problem is isolated.

To use this method, it is important to know the minimum configuration required for a system to start (see page 117).

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## Troubleshooting the Ethernet controller

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

Information is also available on the Ethernet controller documentation on the *Device Drivers and IBM Enhanced Diagnostics* CD for information about problems that might occur with the 1 Gbps Ethernet controller.

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

If testing indicates that the hardware is functioning normally but the problem still exists, see “Network connection problems” or inform the network administrator.

## Network connection problems

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

- Make sure that the cable is installed correctly.  
The network cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.  
If you set the Ethernet controller to operate at either 100 Mbps or 1000 Mbps, you must use Category 5 or higher cabling.
- Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller LEDs on the rear of the computer.  
The Ethernet link status LED, on the rear of the computer, is lit when the Ethernet controller receives a LINK pulse from the hub. If the LED is off, there might be a defective connector or cable or a problem with the hub.
- Make sure that you are using the correct device drivers which are supplied with the computer.
- Check for operating-system-specific causes for the problem.
- Make sure that the device drivers on the client and computer are using the same protocol.

## Ethernet controller troubleshooting chart

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

Ethernet controller problem	FRU/actions
The computer stops running when loading device drivers.	<p>The PCI BIOS interrupt settings are incorrect.</p> <p>Check the following:</p> <ul style="list-style-type: none"> <li>• Determine if the interrupt (IRQ) setting assigned to the Ethernet controller is also assigned to another device in the Configuration/Setup Utility program.</li> </ul> <p>Although interrupt sharing is allowed for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ assigned to the Ethernet controller or the other device. For example, for NetWare Versions 3 and 4, it is recommended that disk controllers not share interrupts with LAN controllers.</p> <ul style="list-style-type: none"> <li>• Make sure that you are using the most recent device driver available from the World Wide Web.</li> <li>• Reseat or replace the adapter.</li> </ul>
Ethernet link status LED does not work.	<p>Check the following:</p> <ul style="list-style-type: none"> <li>• Make sure that the hub is turned on.</li> <li>• Check all connections at the Ethernet controller and the hub.</li> <li>• Use another port on the hub.</li> <li>• If the hub does not support auto-negotiation, manually configure the Ethernet controller to match the hub.</li> <li>• If you manually configured the Duplex mode, make sure that you also manually configure the speed.</li> <li>• Reseat or replace the adapter.</li> </ul>
Data is incorrect or sporadic.	<p>Check the following:</p> <ul style="list-style-type: none"> <li>• Make sure that you are using Category 5 or higher cabling when operating the computer at 100 Mbps or at 1000 Mbps.</li> <li>• Make sure that the cables do not run close to noise-inducing sources like fluorescent lights.</li> </ul>
The Ethernet controller stopped working when another adapter was added to the computer.	<p>Check the following:</p> <ul style="list-style-type: none"> <li>• Make sure that the cable is connected to the Ethernet controller.</li> <li>• Make sure that the PCI system BIOS code is current.</li> <li>• Reseat the adapter.</li> <li>• Determine if the interrupt (IRQ) setting assigned to the Ethernet adapter is also assigned to another device in the system. Use the Configuration/Setup Utility program to determine if this is the case.</li> </ul> <p>Although interrupt sharing is allowed for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ assigned to the Ethernet adapter or the other device.</p> <ul style="list-style-type: none"> <li>• Reseat or replace the adapter.</li> </ul>
The Ethernet controller stopped working without apparent cause.	<p>Check the following:</p> <ul style="list-style-type: none"> <li>• Try a different connector on the hub.</li> <li>• Reinstall the device drivers. See the operating-system documentation and the ServerGuide™ information.</li> <li>• Reseat or replace the adapter.</li> </ul>

## Ethernet controller messages

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

**Note:** Although the term "adapter" is used in these messages, the messages might also apply to the integrated Ethernet controller on the system board.

## Novell NetWare or IntraNetWare system ODI driver messages

This section explains the error messages for the Novell NetWare or IntraNetWare system ODI driver, and suggested actions to resolve each problem.

Message	Description
Could not allocate resources.	<p><b>Explanation:</b> An unknown error has occurred when trying to allocate needed resources for the AFT Module.</p> <p><b>Action:</b></p> <ul style="list-style-type: none"> <li>• Check the system configuration. If the problem remains, contact the network supplier.</li> <li>• Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, run the diagnostic programs.</li> </ul>
AFT group for primary adapter in slot <i>nnn</i> already exists.	<p><b>Explanation:</b> An attempt was made to rebind an adapter already in an AFT group.</p> <p><b>Action:</b> Check the AFT slot numbers for existing AFT teams. If the problem remains, contact the network supplier.</p>
Error locating device control table (DCT) addresses in internal table. Make sure that you have loaded LAN drivers after loading AFT.NLM.	<p><b>Explanation:</b> The bind command was entered prior to loading the device driver. The device driver must be loaded after loading AFT.NLM, but before any bind command can be issued.</p> <p><b>Action:</b> Load the driver for the supported adapter and try loading the AFT module again. If the problem remains, contact the network supplier.</p>
Insufficient number of arguments specified.	<p><b>Explanation:</b> The appropriate or expected number of parameters was not entered in a command.</p> <p><b>Action:</b> Check the parameters required for the given command. If the problem remains, contact the network supplier.</p>
Duplicate slot numbers detected.	<p><b>Explanation:</b> An attempt has been made to bind the same slot number more than once.</p> <p><b>Action:</b> Check the slot numbers entered during the bind. Adapter slot numbers must be valid and unique. If the problem remains, contact the network supplier.</p>
'xxx' is not supported for AFT team.	<p><b>Explanation:</b> A bind command has been issued for adapters not supported by AFT.NLM.</p> <p><b>Action:</b> Make sure that you attempt to bind only adapters supported by AFT.NLM.</p>
Primary and Secondary adapters do not match. AFT group is not created.	<p><b>Explanation:</b> A bind command was entered for an adapter team that is a combination of system and client adapters. An AFT team must be a grouping of the same classification of adapter.</p> <p><b>Action:</b> Verify that all the adapters bound in a team are of the same classification.</p>
Requested number of Secondary cards are not found.	<p><b>Explanation:</b> The number of adapters specified in the bind command could not be located.</p> <p><b>Action:</b> Verify the numbers and slot locations of the adapters to be bound. If the problem remains, contact the network supplier.</p>
Failed to create AFT group. Make sure that the drivers for supported adapters are loaded, primary adapter is bound to protocols, and secondary adapter is not bound to any protocols.	<p><b>Explanation:</b> Binding of protocol failed. Protocol is either not bound to any adapter or is bound to more than one adapter in the group.</p> <p><b>Action:</b> Ensure that the protocol is bound to only one adapter in an AFT team.</p>

Message	Description
Error identifying slot numbers for the specified board names.	<p><b>Explanation:</b> The mapping between the board name entered and the slot number for an adapter could not be established.</p> <p><b>Action:</b> Check the board name for the adapter before issuing the bind command. If the problem remains, contact the network supplier.</p>
Cannot unbind specified slot from AFT group. Make sure that the slot you specified is for the primary adapter in an AFT group.	<p><b>Explanation:</b> The number entered in the unbind command was not the primary adapter in an AFT group.</p> <p><b>Action:</b> Reissue the unbind command and specify the slot number for the primary adapter.</p>
LAN adapter at slot <i>nnnn</i> (Port 0xaa) failed to reset. Check the state of the adapter.	<p><b>Explanation:</b> The adapter that you specified could not be initialized.</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Load the driver for the supported adapter.</li> <li>2. Check that the adapter is seated properly in the slot and try loading the AFT module again.</li> </ol> <p>If the problem remains, contact the network supplier.</p>
AFT is not supported on this version of NetWare.	<p><b>Explanation:</b> The NetWare on the computer is not a version supported by AFT.</p> <p><b>Action:</b> Load and bind AFT only on supported versions of NetWare (currently version 5.1 and above).</p>
Failed to allocate resources tags.	<p><b>Explanation:</b> An unknown error has occurred when trying to allocate needed resources for the AFT module.</p> <p><b>Action:</b> Check system configuration. If the problem remains, contact the network supplier.</p>
Please unload all LAN drivers before unloading AFT.NLM.	<p><b>Explanation:</b> An attempt was made to unload the AFT.NLM module before unloading the adapter driver.</p> <p><b>Action:</b> Unload the adapter driver before unloading the AFT module.</p>

### NDIS 4.0 (Windows NT®) driver messages

This section explains the error messages for the NDIS drivers. The explanation and recommended action are included with each message.

**Note:** Although the term "adapter" is used in these messages, the messages might also apply to the integrated Ethernet controller on the system board.

Error code (hex)	Description
0x00	<p><b>Explanation:</b> The driver could not register the specified interrupt.</p> <p><b>Action:</b> Using the Configuration/Setup Utility program, make sure that a PCI interrupt is assigned to the Ethernet card, and that Ethernet is enabled.</p>
0x01	<p><b>Explanation:</b> One of the PCI/PCI-X cards did not get the required resources.</p> <p><b>Action:</b> Using the Configuration/Setup Utility program, make sure that a PCI interrupt is assigned to the Ethernet card, and that Ethernet is enabled.</p>
0x02	<p><b>Explanation:</b> Bad node address (multicast address).</p> <p><b>Action:</b> Make sure the locally administered address is valid, if one is specified. The address cannot be a multicast address.</p>

Error code (hex)	Description
0x03	<p><b>Explanation:</b> Failed self-test.</p> <p><b>Action:</b> Make sure a cable is attached to the Ethernet connector.</p>
0x0D	<p><b>Explanation:</b> Could not allocate enough memory for transmit queues.</p> <p>For Windows NT:</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. From the Windows NT desktop, click <b>Start Æ Control Panel Æ Networks Æ Adapters</b>.</li> <li>2. Select an IBM Ethernet adapter from the list.</li> <li>3. Click <b>Properties Æ Advanced</b>.</li> <li>4. Lower the resource values that apply to the transmit queue.</li> </ol> <p>For Windows 2000:</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. From the Windows 2000 desktop, click <b>Start Æ Settings Æ Control Panel Æ Network and Dial-up Connections</b>.</li> <li>2. Right-click an IBM Ethernet adapter in the list and click <b>Properties</b>.</li> <li>3. Select a component and click <b>Configure</b>.</li> <li>4. Click the <b>Advanced</b> tab and lower the resource values that apply to the transmit queue.</li> </ol>
0x0E	<p><b>Explanation:</b> Could not allocate enough memory for receive queue.</p> <p>For Windows NT:</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. From the Windows NT desktop, click <b>Start Æ Control Panel Æ Networks Æ Adapters</b>.</li> <li>2. Select an IBM Ethernet adapter from the list.</li> <li>3. Click <b>Properties Æ Advanced</b>.</li> <li>4. Lower the value for the resource named in the message.</li> </ol> <p>For Windows 2000:</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. From the Windows 2000 desktop, click <b>Start Æ Settings Æ Control Panel Æ Network and Dial-up Connections</b>.</li> <li>2. Right-click an IBM Ethernet adapter in the list and click <b>Properties</b>.</li> <li>3. Select a component and click <b>Configure</b>.</li> <li>4. Click the <b>Advanced</b> tab and lower the value for the resource named in the message.</li> </ol>

Error code (hex)	Description
0x0F	<p><b>Explanation:</b> Could not allocate enough memory for other structures.</p> <p>For Windows NT:</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. From the Windows NT desktop, click <b>Start Æ Control Panel Æ Networks Æ Adapters</b>.</li> <li>2. Select an IBM Ethernet adapter from the list.</li> <li>3. Click <b>Properties Æ Advanced</b>.</li> <li>4. Lower the resource values that apply to the transmit queue.</li> </ol> <p>For Windows 2000:</p> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. From the Windows 2000 desktop, click <b>Start Æ Settings Æ Control Panel Æ Network and Dial-up Connections</b>.</li> <li>2. Right-click an IBM Ethernet adapter in the list and click <b>Properties</b>.</li> <li>3. Select a component and click <b>Configure</b>.</li> <li>4. Click the <b>Advanced</b> tab and lower the resource values that apply to the transmit queue.</li> </ol>
0x10	<p><b>Explanation:</b> Did not find any Ethernet controllers.</p> <p><b>Action:</b> Using the Configuration/Setup Utility program, make sure that Ethernet is enabled.</p>
0x11	<p><b>Explanation:</b> Multiple Ethernet controllers found, but none matched the required ID.</p> <p><b>Action:</b> Using the Configuration/Setup Utility program, make sure that Ethernet is enabled.</p>
0x13	<p><b>Explanation:</b> Did not find any Ethernet controllers that matched the required subven/subdev.</p> <p><b>Action:</b> Using the Configuration/Setup Utility program, make sure that Ethernet is enabled.</p>
0x16	<p><b>Explanation:</b> Single adapter found, but multiple instances tried to load.</p> <p><b>Action:</b> Using the Configuration/Setup Utility program, make sure that Ethernet is enabled, and that the integrated 10/100 Ethernet controller or the optional Ethernet PCI adapter are enabled.</p>
0x17	<p><b>Explanation:</b> Slot parameter not specified in the registry.</p> <p><b>Action:</b> Remove the adapter driver and reinstall it.</p>
All other 4-character hexadecimal codes	<p><b>Action:</b> See supplementary documentation, such as <a href="http://www.ibm.com/pc/support">www.ibm.com/pc/support</a>, for more information.</p>

## Ethernet Windows NDIS teaming messages

This section explains the messages associated with Ethernet teaming.

Event ID	Type	Description
01	Error	<p><b>Explanation:</b> Team name and physical adapter name are the same. This is an invalid configuration.</p> <p><b>Action:</b> Reconfigure the adapter team by double-clicking the <b>PROSet</b> icon in the Control Panel.</p>
02	Error	<p><b>Explanation:</b> Unable to allocate required resources.</p> <p><b>Action:</b> Free some memory resources and restart.</p>

Event ID	Type	Description
03	Error	<b>Explanation:</b> Unable to read required registry parameters. <b>Action:</b> Reconfigure the adapter team by double-clicking the <b>PROSet</b> icon in the Control Panel.
04	Error	<b>Explanation:</b> Unable to bind to physical adapter. <b>Action:</b> Reconfigure the adapter team by double-clicking the <b>PROSet</b> icon in the Control Panel.
05	Error	<b>Explanation:</b> Unable to initialize an adapter team <b>Action:</b> Reconfigure the adapter team by double-clicking the <b>PROSet</b> icon in the Control Panel.
06	Informational	<b>Explanation:</b> Team <i>nn</i> . Primary adapter is initialized. <b>Action:</b> None.
07	Informational	<b>Explanation:</b> Team <i>nn</i> . Secondary adapter is initialized. <b>Action:</b> None.
08	Informational	<b>Explanation:</b> Team <i>nn</i> . Virtual adapter or Team is initialized. <b>Action:</b> None.
09	Informational	<b>Explanation:</b> Team <i>nn</i> . Primary adapter is switching over. <b>Action:</b> None.
10	Warning	<b>Explanation:</b> Team <i>nn</i> . Adapter link down. <b>Action:</b> Make sure the adapter is functioning properly.
11	Informational	<b>Explanation:</b> Team <i>nn</i> . Secondary adapter took over. <b>Action:</b> None.
12	Warning	<b>Explanation:</b> Team <i>nn</i> . Secondary adapter is deactivated from the Team. <b>Action:</b> Make sure the secondary adapter is functioning properly and that the adapter cable is securely connected to the LAN.
13	Informational	<b>Explanation:</b> Team <i>nn</i> . Secondary adapter has rejoined the Team. <b>Action:</b> None.
14	Informational	<b>Explanation:</b> Team <i>nn</i> . Secondary adapter link is up. <b>Action:</b> None.
15	Error	<b>Explanation:</b> Team <i>nn</i> . The last adapter has lost its link. Network connection has been lost. <b>Action:</b> Shut down the computer and replace the adapters; then, restart the computer to reestablish the connection.
16	Informational	<b>Explanation:</b> Team <i>nn</i> . An adapter has reestablished the link. Network connection has been restored. <b>Action:</b> None.
17	Informational	<b>Explanation:</b> Team <i>nn</i> . Preferred primary adapter has been detected. <b>Action:</b> None.
18	Informational	<b>Explanation:</b> Team <i>nn</i> . Preferred secondary adapter has been detected. <b>Action:</b> None.

Event ID	Type	Description
19	Informational	<b>Explanation:</b> Team <i>nn</i> . Preferred primary adapter took over. <b>Action:</b> None.
20	Informational	<b>Explanation:</b> Team <i>nn</i> . Preferred secondary adapter took over. <b>Action:</b> None.
21	Warning	<b>Explanation:</b> Team <i>nn</i> . Primary adapter does not sense any probes. Possible reason: partitioned Team. <b>Action:</b> Make sure the cables of the adapter team are connected to the same LAN segment. Reconfigure the team if necessary.

## Replacing the battery

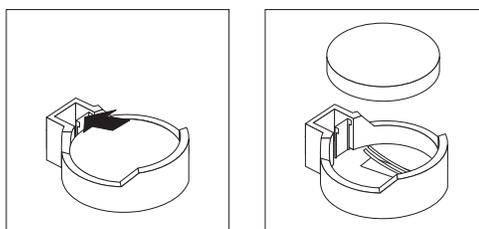
When replacing the battery, you must replace it with a lithium battery of the same type from the same manufacturer. To avoid possible danger, read and follow the information in “Safety information” on page 129.

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

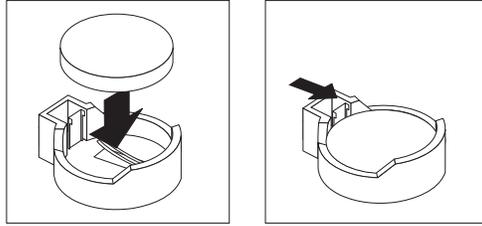
**Note:** After you replace the battery, you must reconfigure the system and reset the system date and time.

Complete the following steps 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. Complete the following steps 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 your thumb and index finger to lift the battery from the socket.



4. Complete the following steps 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 computer.
7. Start the Configuration/Setup Utility program and set configuration parameters.
  - Set the system date and time.
  - Set passwords if necessary.
  - Save the configuration.

---

## Installing options

This section contains instructions for installing options in the IntelliStation E Pro computer. There is one section for Type 6216 (see “Installing options in the IntelliStation E Pro Type 6216” on page 42) and a separate section for Type 6226 (see “Installing options in the IntelliStation E Pro Type 6226” on page 57).

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### Before you begin

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

- Read the handling guidelines in “Handling electrostatic discharge-sensitive devices” on page 132, and read “Safety information” on page 129. These guidelines will help you work safely with the computer and options.
- Make sure that you have an adequate number of properly grounded electrical outlets for the computer, monitor, and other options that you intend to install.
- Back up all important data before you make changes to disk drives.
- Have a small, flat-blade screwdriver available.
- For a list of supported options for the computer, go to <http://www.ibm.com/pc/support/> on the World Wide Web.

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### System reliability considerations

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed.
- There is adequate space around the computer to allow the computer cooling system to work properly. Leave approximately 51 mm (2 in.) of open space around the front and rear of the computer. Do not place objects in front of the fans.
- You have followed the instructions for cabling provided with optional adapters.
- You have replaced a failed fan as soon as possible.

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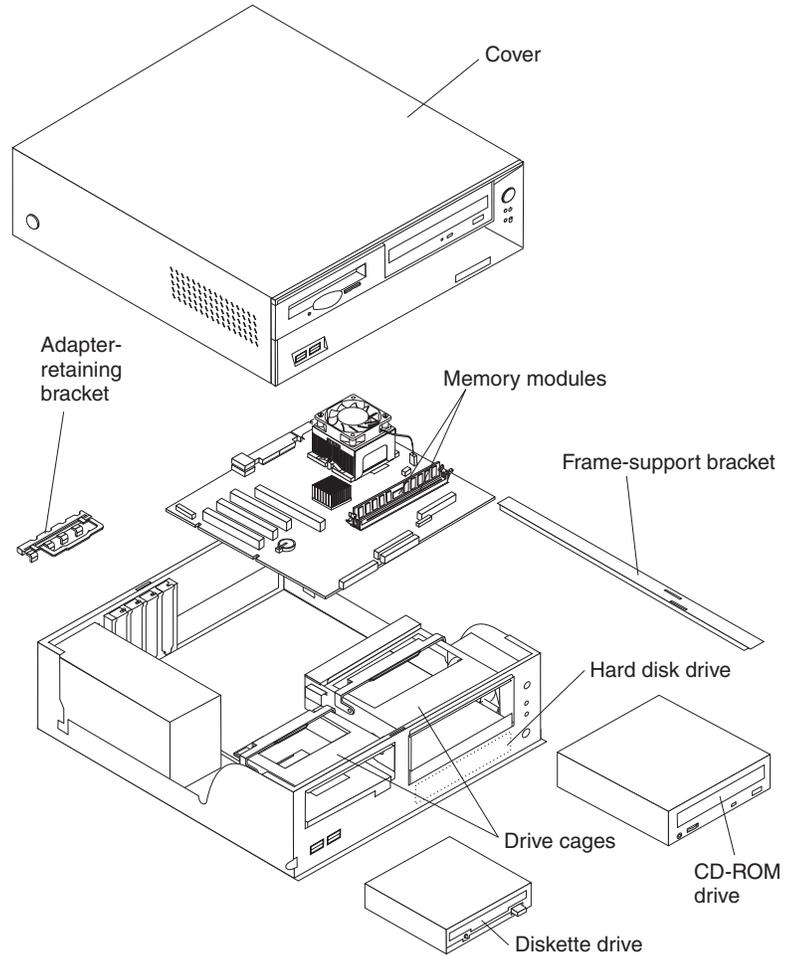
## Installing options in the IntelliStation E Pro Type 6216

Use the instructions in the following sections to install options in the IntelliStation E Pro Type 6216 computer.

**Note:** For instructions for installing options in the IntelliStation E Pro Type 6226, see “Installing options in the IntelliStation E Pro Type 6226” on page 57.

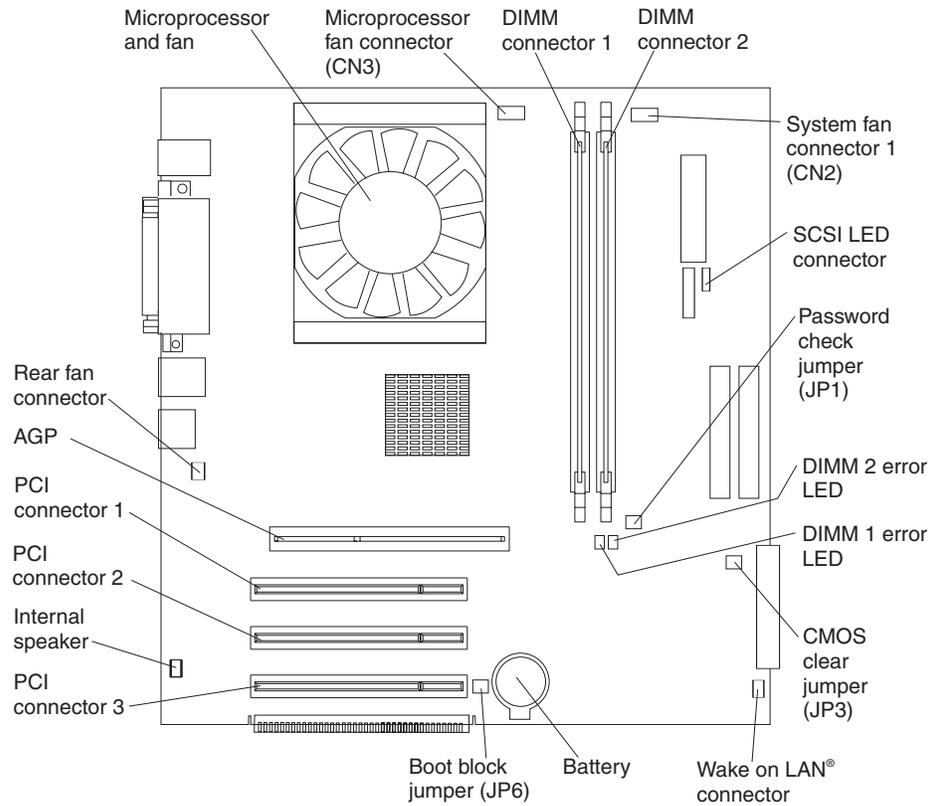
## Major components of the IntelliStation E Pro Type 6216

The following illustration shows the locations of major components in the IntelliStation E Pro Type 6216 computer.



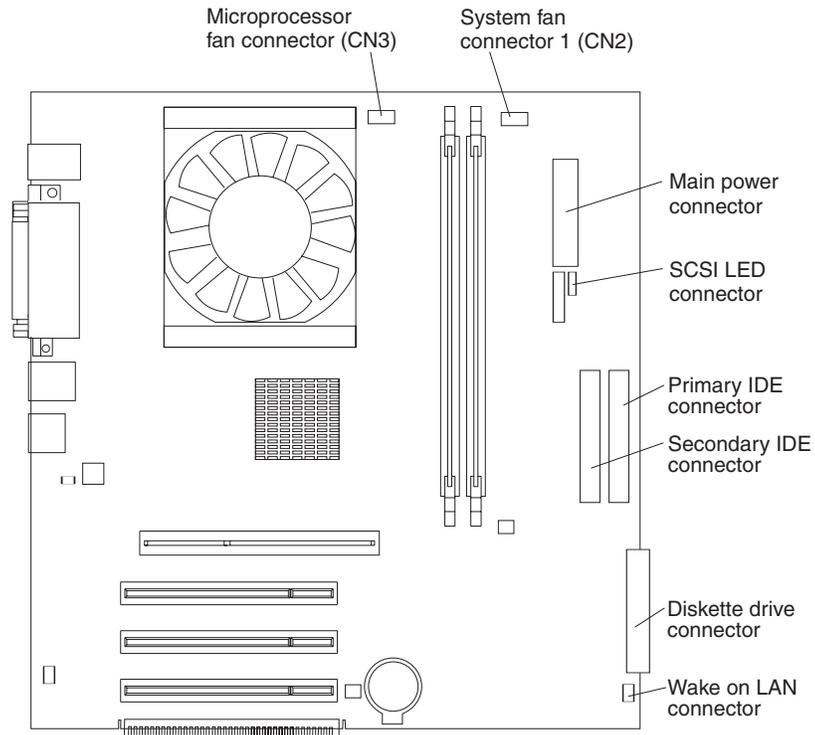
# System board

The illustrations in the following sections show various components on the system board. Depending on installed options, your system board might look slightly different.



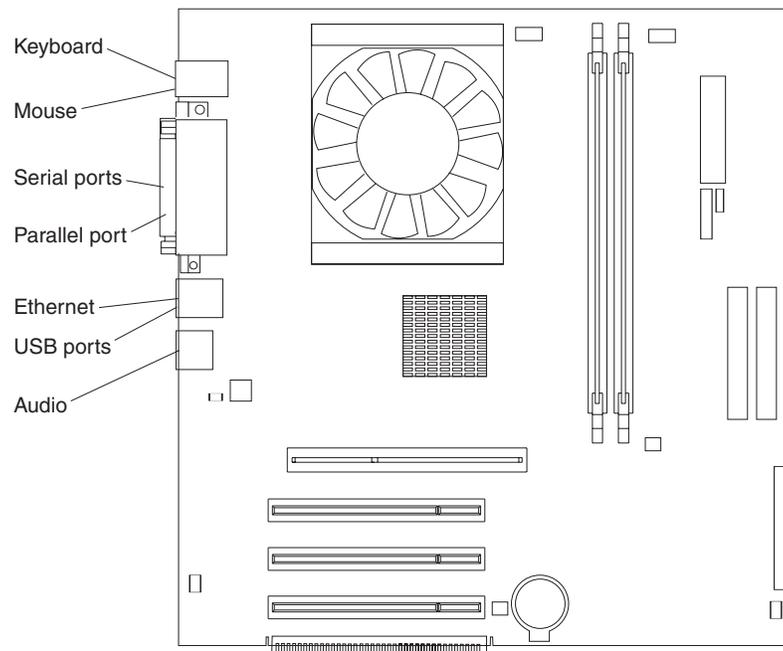
## System board internal cable connectors

The following illustration identifies system-board connectors for internal cables.



## System board external cable connectors

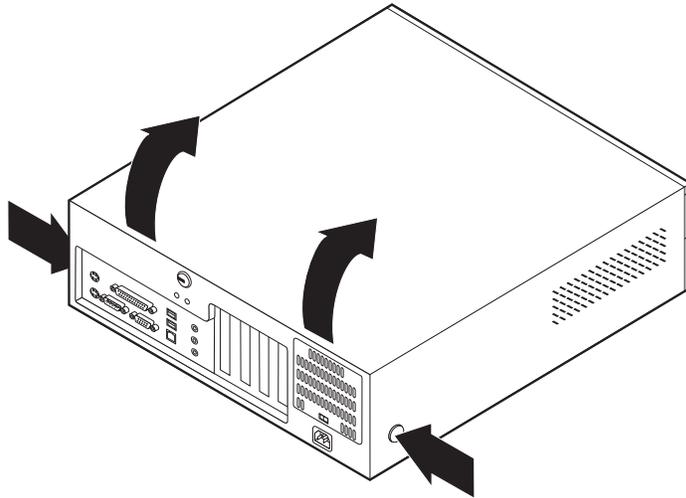
The following illustration identifies system-board connectors for external devices.



## Removing the cover of the 6216

To remove the cover from the IntelliStation E Pro Type 6216 computer, complete the following steps:

1. Review the information in “Safety information” on page 129 and “Before you begin” on page 41.
2. Turn off the computer and all attached devices.
3. Disconnect all external cables and power cords.
4. Press the buttons on both sides of the computer cover and lift the cover from the computer.

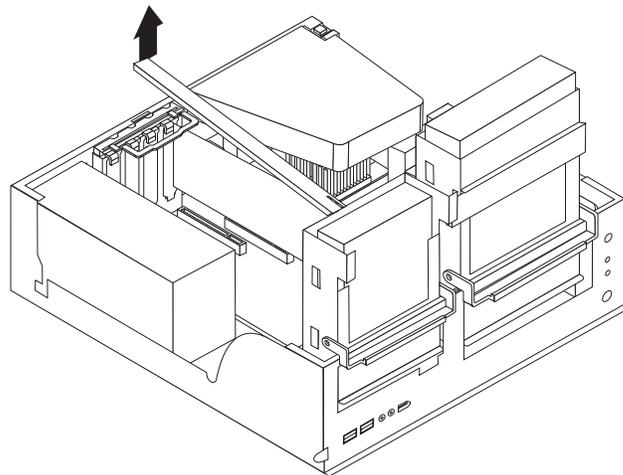


To replace the cover, see “Replacing the cover of the 6216” on page 55.

## Removing the frame-support bracket

You must remove the frame-support bracket to access many of the components of the IntelliStation E Pro Type 6216 computer. To remove the frame-support bracket, complete the following steps:

1. Pivot the drive cages until the pivot locks catch the front of the chassis, holding the drive cages in place.
2. Lift the frame-support bracket out of the computer.



To replace the frame-support bracket, reverse the steps.

## Working with adapters

The computer has three PCI adapter connectors or *slots* and one AGP adapter slot. The AGP video adapter is installed in the AGP slot. All PCI slots are 32-bit, 33 MHz slots.

See “System board” on page 43 for the location of the expansion slots on the system board.

### Adapter considerations

Before you install adapters, review the following:

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions provided in this chapter. If you need to change switch or jumper settings on the adapter, follow the instructions that come with the adapter.
- You can install low-profile adapters in all three PCI slots.
- The computer supports 5.0 V and universal PCI adapters; it does not support 3.3 V adapters.
- The computer uses a rotational interrupt technique to configure PCI adapters. Because of this technique, you can install a variety of PCI adapters that currently do not support PCI interrupt sharing.
- PCI slots 1 through 3 are on PCI bus 0.

The system scans the AGP slot and PCI expansion slots 1 through 3 to assign system resources; then, the system starts the PCI devices in the following order: PCI expansion slots 1 and 2, system board integrated drive electronics (IDE) or SCSI devices, and then PCI expansion slot 3.

- For a list of supported options for the computer, go to <http://www.ibm.com/pc/support/> on the World Wide Web.

### Installing an adapter

Complete the following steps to install an adapter in the IntelliStation E Pro Type 6216 computer.

**Attention:** When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see “Handling electrostatic discharge-sensitive devices” on page 132.

1. Review the information in “Safety information” on page 129.
2. Turn off the computer and attached devices.
3. Disconnect all external cables and power cords; then, remove the cover (see “Removing the cover of the 6216” on page 45).
4. Determine which PCI slot you will use for the adapter.

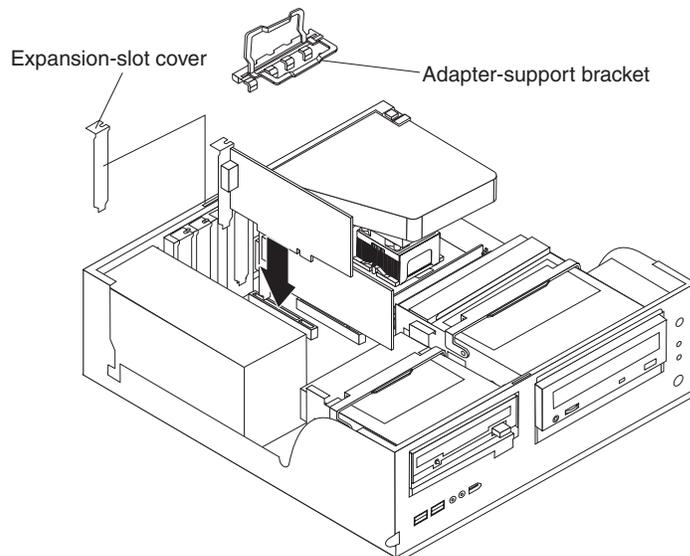
**Note:** Check the instructions that come with the adapter for any requirements, restrictions, or cabling instructions. It might be easier to route cables before you install the adapter.

5. Rotate each drive bay cage until the drive cage latches catch the front of the computer chassis.
6. Lift the frame-support bracket (see “Removing the frame-support bracket” on page 45).
7. Rotate the rear adapter-support bracket to the open (unlocked) position and remove it from the computer.

8. 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 electronic emissions standards of the computer and ensures proper ventilation of computer components.

9. 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 in its static-protective package on a hard surface. Avoid touching the components and gold-edge connectors on the adapter.
10. Set any jumpers or switches on the adapter or system board as described by the adapter manufacturer.
11. 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.

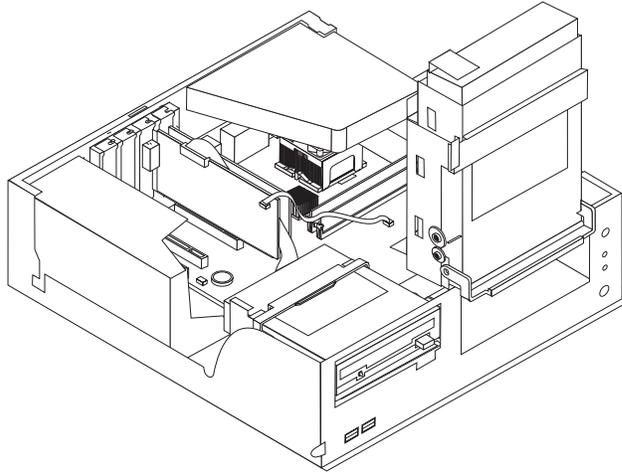
12. Connect required cables to the adapter.
13. If you have another adapter to install, repeat steps 1 through 12. If you have another option to install, do so now. Otherwise, complete the remaining steps in this section.
14. Reinstall the rear adapter support bracket; then, rotate the bracket to the closed (locked) position.
15. Replace the frame-support bracket.
16. Return the drive-bay cages to their original positions in the computer.
17. Replace the cover (see “Replacing the cover of the 6216” on page 55).
18. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

### Installing a SCSI adapter

Complete the following steps to install an optional SCSI adapter:

1. Complete steps 1 through 12 of “Installing an adapter” on page 46; then, continue with step 2.

2. Remove the air duct from its position over the microprocessor.
3. Connect the SCSI signal cable to the adapter and one or more of the signal cable connectors to the rear of the SCSI devices.
4. Connect the SCSI activity indicator cable to the adapter and to the SCSI LED connector on the system board (see “System board” on page 43 for the location of the SCSI LED connector).



5. If you have other adapters or options to install or remove, do so now.
6. Reinstall the rear adapter support bracket; then, rotate it to the closed (locked) position.
7. Replace the frame-support bracket, and replace the air duct.
8. Replace the cover (see “Replacing the cover of the 6216” on page 55).
9. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

## Installing internal drives

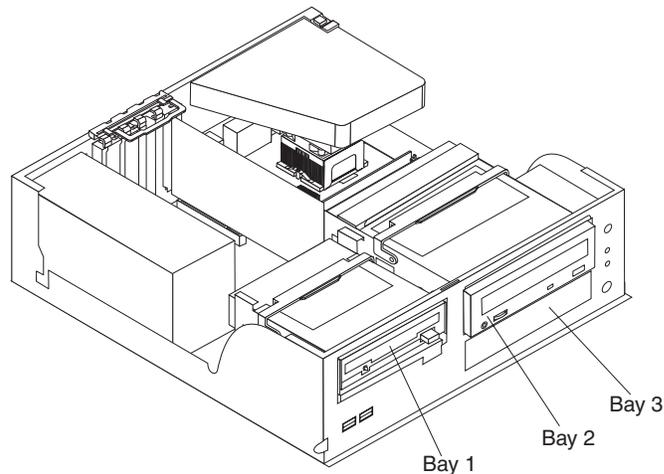
Different types of drives enable the computer to read various types of media and store data in different formats. The computer comes with the following drives preinstalled:

- Diskette
- Hard disk
- CD-ROM, DVD-ROM, or CD-RW

### Internal drive bays

The IntelliStation E Pro Type 6216 computer comes with an IDE CD-ROM, DVD-ROM, or CD-RW drive in bay 1; a 3.5-in., 1.44-MB diskette drive in bay 2; and

a hard disk drive installed in bay 3.



#### Notes:

1. The IntelliStation E Pro Type 6216 computer supports only one diskette drive.
2. The IntelliStation E Pro Type 6216 computer does not support the installation of additional internal disk drives. However, you can replace failed internal drives.
3. For a complete list of supported options for your computer, go to <http://www.ibm.com/pc/support/> on the World Wide Web.

#### Preinstallation steps

Before you replace drives in your 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 steps are required only during the initial installation of an option.

1. Read “Safety information” on page 129, “Handling electrostatic discharge-sensitive devices” on page 132, and the documentation that comes with your 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.

#### Power and signal cables for internal drives

Your computer uses cables to connect IDE devices to the power supply and to the system board. The following cables are provided:

- Four-wire power cables connect the drives to the power supply. At the end of these cables are plastic connectors that attach to different drives; these connectors vary in size. Also, certain power cables attach to the system board.
- Flat signal cables, also called ribbon cables, connect IDE and diskette drives to the system board. There are two sizes of ribbon cables that come with your computer:
  - The wider IDE signal cable has two connectors. One of these connectors is attached to the hard disk drive, and the other is attached to the primary or secondary IDE connector on the system board.

**Note:** The CD-ROM drive is attached to an ATA 33 signal cable. The hard disk drive is attached to an ATA 66 signal cable. ATA 66 signal cables are color-coded. The blue connector attaches to the system board. The black connector attaches to the primary device.

- The narrower signal cable has two connectors, one to attach to the diskette drive, and the other to attach to the connector (FDD1) on the system board.
- SCSI signal cables connect SCSI devices to a SCSI adapter. If you have a SCSI adapter installed in your computer, the SCSI signal cable has four connectors. One of these connectors is attached to the SCSI adapter, two connectors are spares, and the fourth connector is attached to a SCSI hard disk drive.

To locate connectors on the system board, see “System board internal cable connectors” on page 44.

Review the following information before connecting power and signal cables to internal drives:

- The drives that are preinstalled in your computer come with power and signal cables attached. If you replace any drives, it is important to remember which cable is attached to which drive.
- When you install a drive, ensure that the drive connector at the end of the signal cable is always connected to a drive, and ensure that the drive connector at the other end is connected to the system board.
- When you replace an IDE device on a cable, it must be set as the primary device.
- If you install IDE cables with three connectors, consider the following:
  - One of the connectors attaches to the drive, one is a spare, and the third attaches to the primary or secondary IDE connector on the system board.

**Note:** If you install an ATA 66 or ATA 100 signal cable, ATA 66 and ATA 100 signal cables are color-coded. The blue connector attaches to the system board. The black connector attaches to the primary device. The gray middle connector attaches to the secondary device.

- If two IDE devices are used on a single cable, one must be designated as the primary device and the other as the secondary device; otherwise, the computer might not detect some of the IDE devices. The primary and secondary designation is determined by switch or jumper settings on each IDE device.
- If two IDE devices are on a single cable, and only one is a hard disk drive, the hard disk drive must be set as the primary device.
- You must also set the SCSI ID for any SCSI device that you install in your computer. Each SCSI device has its own methods and considerations for setting the SCSI ID. See the instructions that come with the SCSI device for details about setting the SCSI ID for the SCSI device.

### Installing a CD-ROM or diskette drive

Complete the following steps to replace drives in the IBM IntelliStation E Pro Type 6216 computer:

1. Read the information in “Preinstallation steps” on page 49.
2. Turn off the computer and attached devices, and disconnect all external cables and power cords.
3. Remove the cover (see “Removing the cover of the 6216” on page 45).
4. Disconnect power and signal cables to the drive.
5. Rotate the drive bay cage of the drive that you need to replace until the latch catches the front of the computer chassis.
6. Remove the screws holding the drive in place.
7. Slide the drive out of the drive bay.

**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 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.



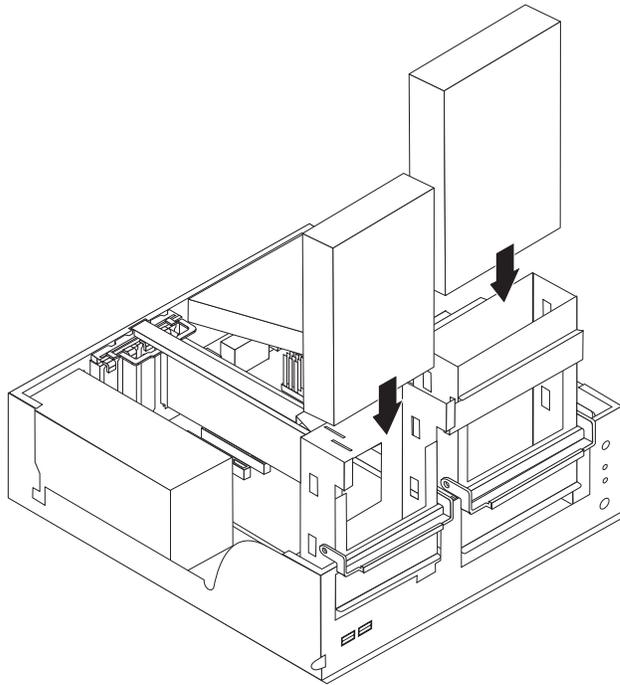
**DANGER**

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.

8. Touch the static-protective package containing the drive to any unpainted metal surface on the computer; then, remove the drive from the package and place it on a static-protective surface.
9. Set any jumpers or switches on the drive according to the documentation that comes with the drive.

- Slide the drive into the drive bay, and then attach the drive to the drive cage.



- Connect one end of the diskette or IDE signal cable into the back of the drive and the other end of the cable into the diskette drive or IDE connector on the system board. For the location of the diskette or IDE connectors, see “System board internal cable connectors” on page 44.

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

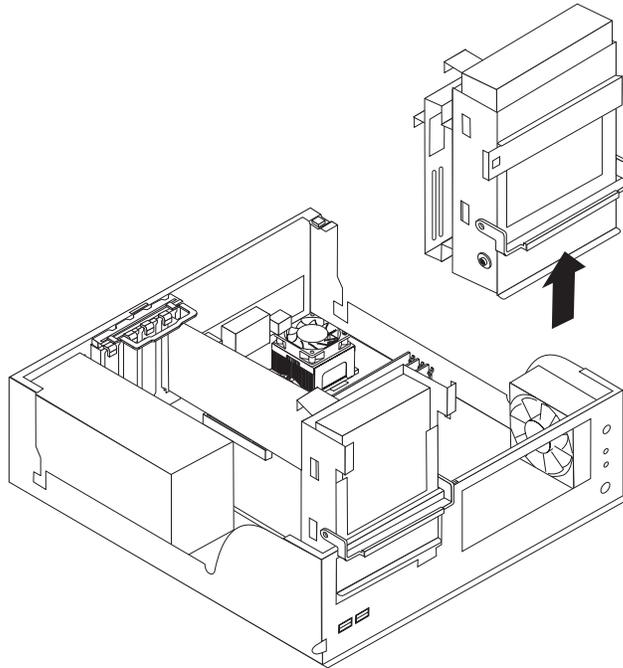
- Connect the power cable to the back of the drive. The connectors are keyed and can be inserted only one way.
- If you have other options to install or remove, do so now.
- Replace the cover (see “Replacing the cover of the 6216” on page 55).
- Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

### Installing a hard disk drive

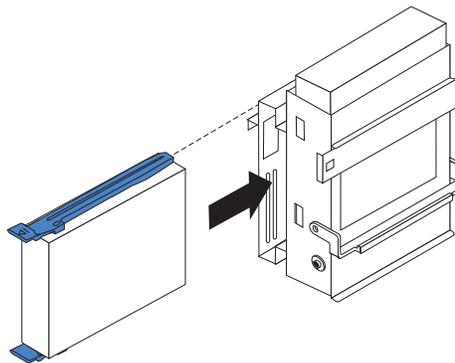
Complete the following steps to replace a hard disk drive in your computer:

- Read the information in “Preinstallation steps” on page 49.
- Turn off the computer and attached devices and disconnect the external cables and power cords.
- Remove the cover and frame-support bracket (see “Removing the cover of the 6216” on page 45 and “Removing the frame-support bracket” on page 45).
- Disconnect the power and signal cables from both drives in the drive cage.

5. Remove the hard disk drive cage from the computer.



6. Slide the existing drive out of the drive bay and remove the sliding rails and screws.
7. Touch the static-protective package containing the new drive to any unpainted metal surface on the computer; then, remove the drive from the package and place it on a static-protective surface.
8. Set any jumpers or switches on the new drive according to the documentation that comes with the drive.
9. Attach the sliding rails to the sides of the hard disk drive using screws from the old hard disk drive.
10. Slide the drive into the drive bay until the drive snaps into place, and replace the drive cage.



11. If you are installing 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 "System board internal cable connectors" on page 44. If you are installing a SCSI device, connect one end of the SCSI signal cable to the device and the other end to the SCSI connector on the SCSI adapter.

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

12. Connect a power cable to the back of the drive. The connectors are keyed and can be inserted only one way.
13. If you have other options to install or remove, do so now.
14. Go to the appropriate section to work with another option, or replace the cover (see “Replacing the cover of the 6216” on page 55).
15. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

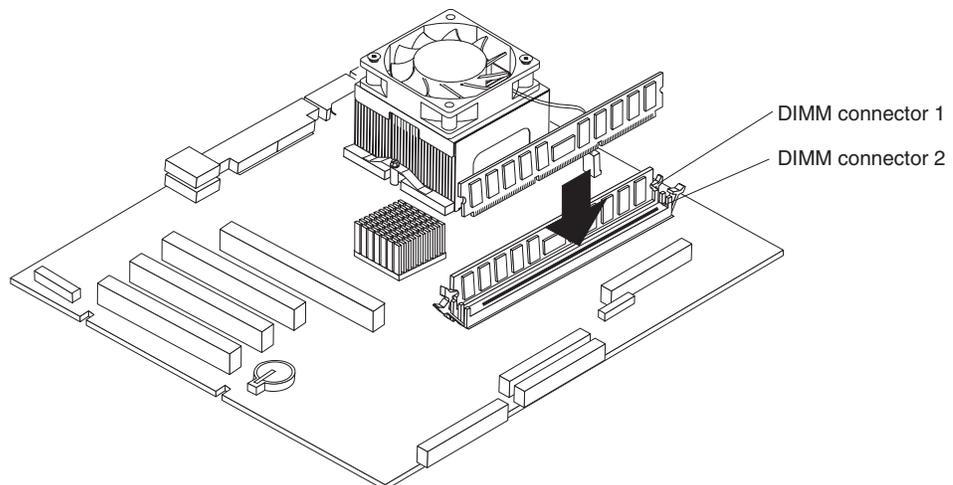
## Installing memory modules

You can increase the amount of memory in the computer by installing memory modules. The IntelliStation E Pro computer uses industry-standard, PC2100 266 MHz double data rate (DDR) dual inline memory modules (DIMMs).

Complete the following steps to install a DIMM.

**Attention:** When handling static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see “Handling electrostatic discharge-sensitive devices” on page 132.

1. Review the safety precautions listed in “Safety information” on page 129.
2. Turn off the computer and all attached devices. Disconnect all external cables and power cords; then, remove the cover (see “Removing the cover of the 6216” on page 45).
3. Lift the frame-support bracket (see “Removing the frame-support bracket” on page 45).
4. Touch the static-protective package containing the DIMM to any unpainted metal surface on the computer. Then, remove the new DIMM from the package.
5. Gently open the retaining clip on each end of the DIMM slot. Turn the DIMM so that the pins align correctly with the connector.
6. Insert the DIMM into the connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.



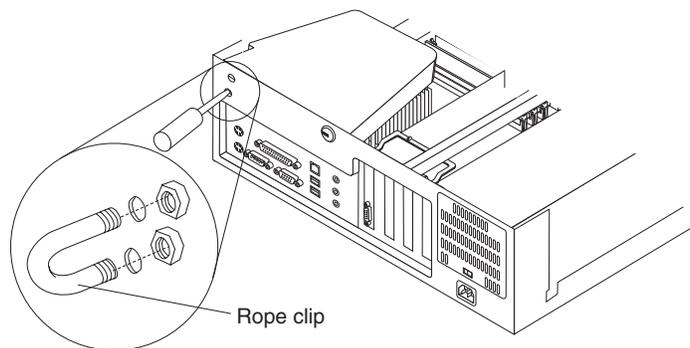
7. If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly installed. Open the retaining clips, remove the DIMM, and then reinsert it.
8. If you have other options to install or remove, do so now.
9. Replace the frame-support bracket.
10. Replace the cover (see “Replacing the cover of the 6216”).
11. Reconnect the external cables and power cords. Turn on the attached devices, and turn on the computer.

## Installing a security rope clip

To help prevent theft, you can add a rope clip and cable to the computer.

Complete the following steps to install the rope clip:

1. Review the safety precautions listed in “Safety information” on page 129.
2. Turn off the computer and all attached devices. Disconnect all external cables and power cords; then, remove the cover (see “Removing the cover of the 6216” on page 45).
3. Use a screwdriver to remove the two metal knockouts.
4. Insert the rope clip through the rear panel; then, attach and tighten the nuts.
5. Thread the cable through the rope clip 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, make sure that it does not interfere with other cables connected to the computer.



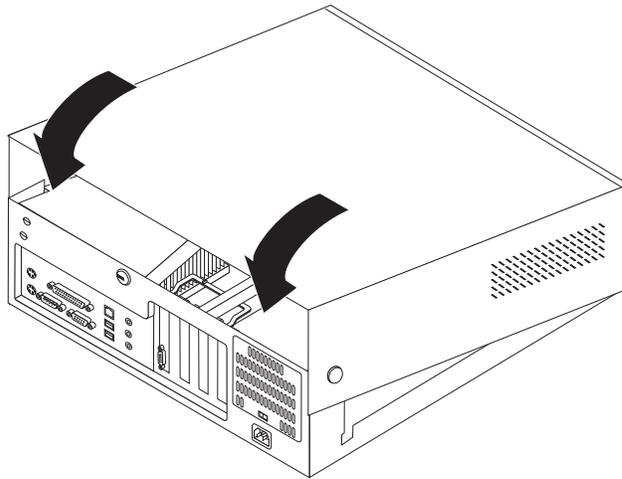
6. Replace the cover (see “Replacing the cover of the 6216”).
7. Reconnect the external cables and power cords, and turn on the attached devices, then the computer.

## Replacing the cover of the 6216

Complete the following steps to replace the computer cover:

1. Clear any cables that might impede the replacement of the cover.

2. Place the cover over the chassis, and pivot it down over the computer until it snaps into place.



3. Reconnect the external cables and power cords to the computer; then, connect the power cords to electrical outlets.
4. Turn on the attached devices; then, turn on the computer.

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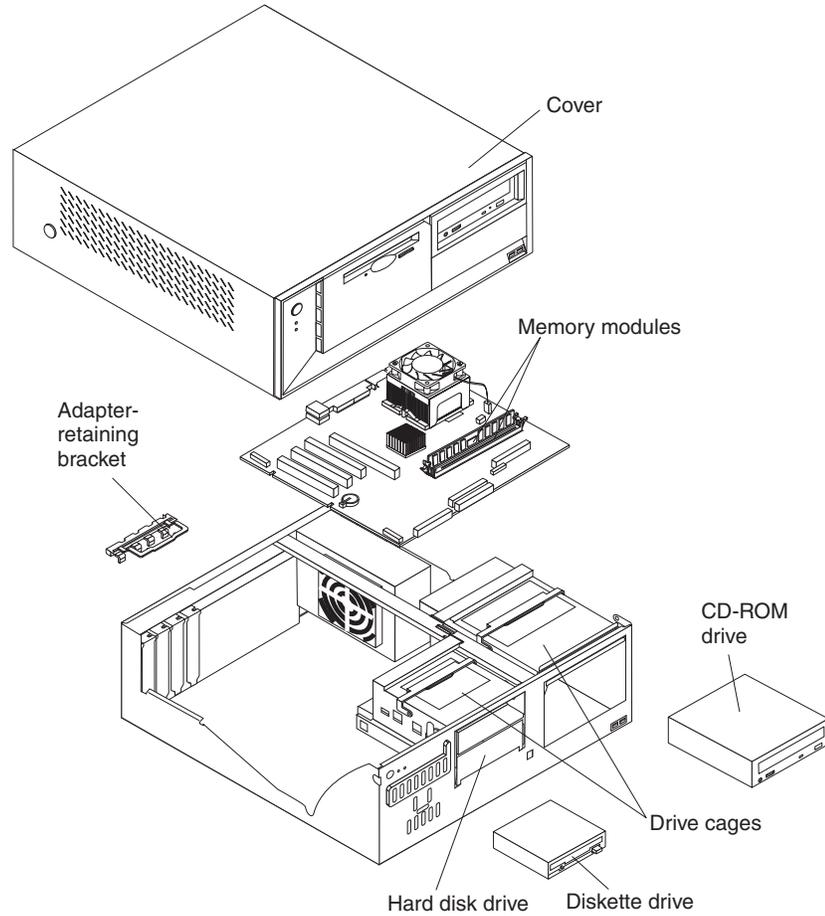
## Installing options in the IntelliStation E Pro Type 6226

Use the instructions in the following sections to help you install options in the IntelliStation E Pro Type 6226 computer.

**Note:** For instructions on installing options in an IntelliStation E Pro Type 6216, see “Installing options in the IntelliStation E Pro Type 6216” on page 42.

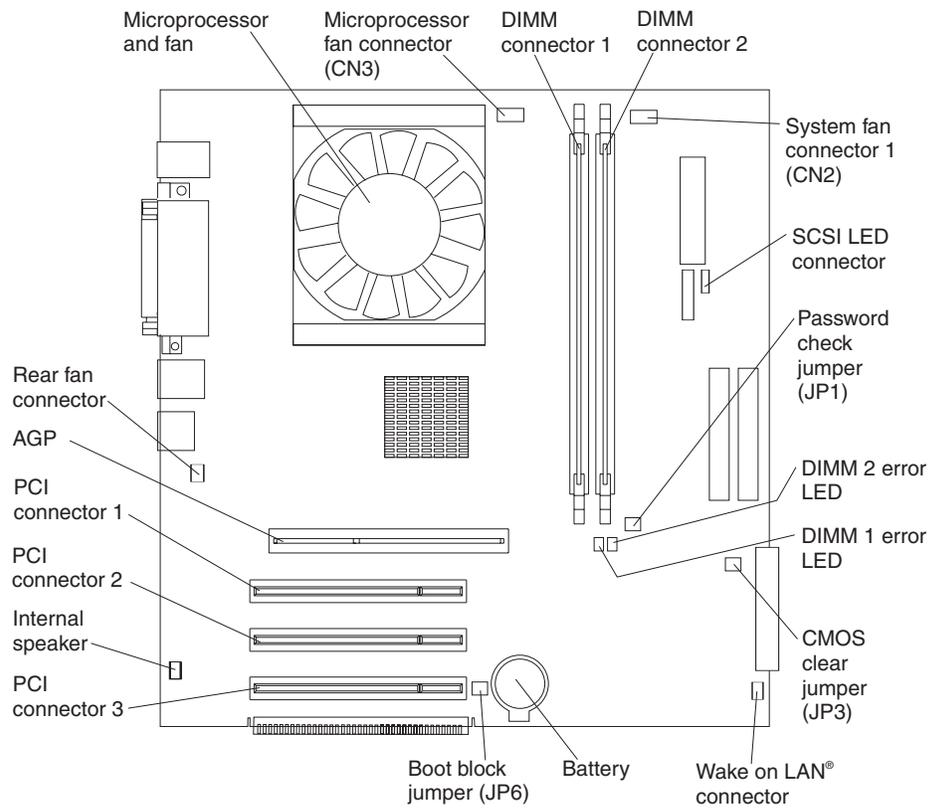
### Major components of the IntelliStation E Pro Type 6226 computer

The following illustration shows the locations of major components in the IntelliStation E Pro Type 6226 computer.



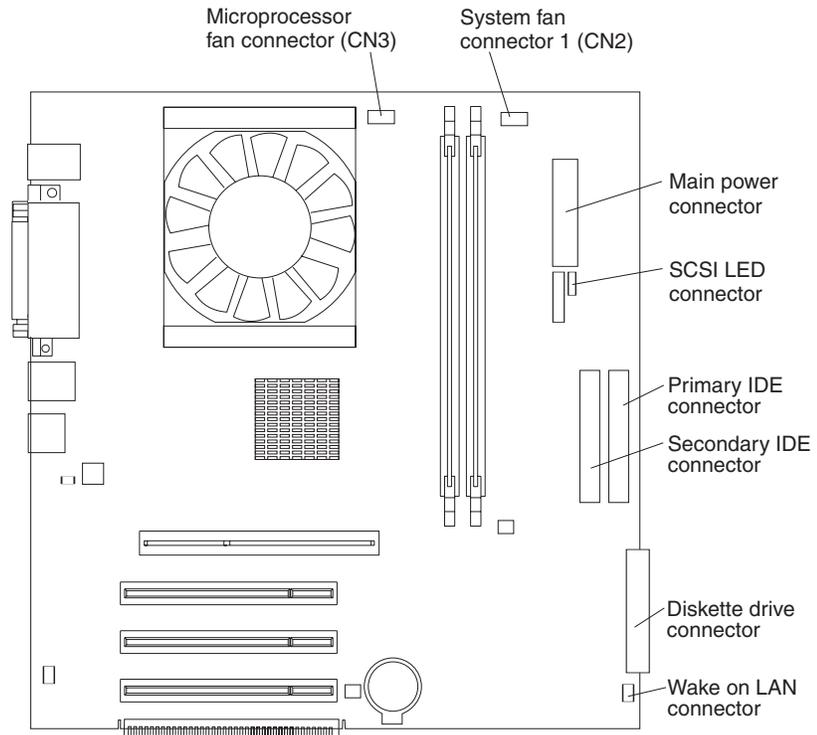
# System board

The illustrations in the following sections show the various components on the system board. Depending on installed options, your system board might look slightly different.



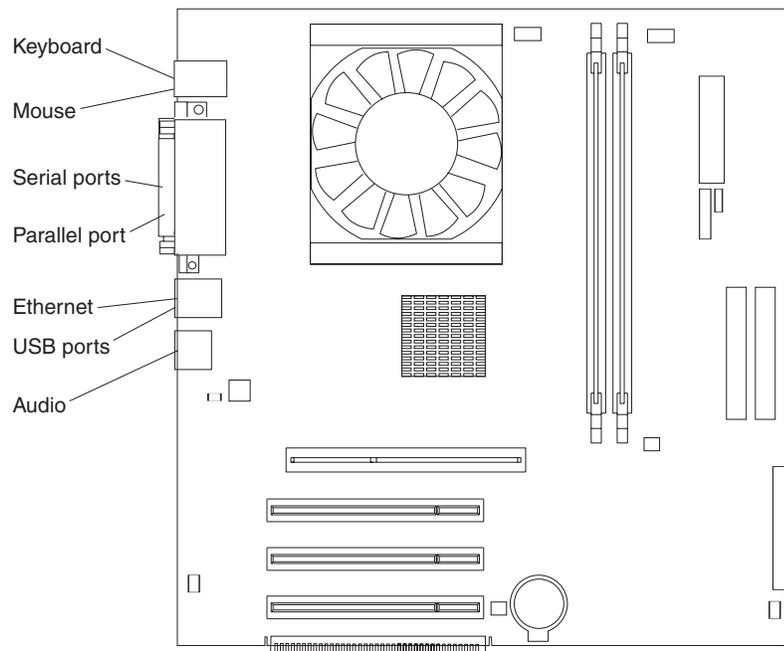
## System board internal cable connectors

The following illustration identifies system board connectors for internal cables.



## System board external cable connectors

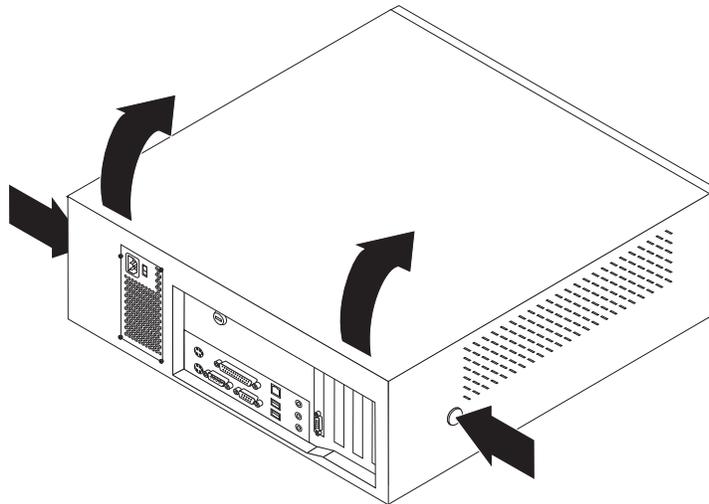
The following illustration identifies system board connectors for external devices.



## Removing the cover of the 6226

To remove the cover from the IntelliStation E Pro Type 6226 computer, complete the following steps:

1. Review the information in “Safety information” on page 129 and “Before you begin” on page 41.
2. Turn off the computer and all attached devices.
3. Disconnect all external cables and power cords.
4. Press the buttons on both sides of the computer cover and lift the cover from the computer.



To replace the cover, see “Replacing the cover of the 6226” on page 72.

## Working with adapters

The computer has three PCI adapter connectors or *slots* and one AGP adapter slot. The AGP video adapter is installed in the AGP slot. All PCI slots are 32-bit, 33 MHz slots.

See “System board” on page 58 for the location of the expansion slots on the system board.

### Adapter considerations

Before you install adapters, review the following:

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this chapter. If you need to change switch or jumper settings on the adapter, follow the instructions that come with the adapter.
- You can install low-profile adapters in all three PCI slots.
- The computer supports 5.0 V and universal PCI adapters; it does not support 3.3 V adapters.
- The computer uses a rotational interrupt technique to configure PCI adapters. Because of this technique, you can install a variety of PCI adapters that currently do not support PCI interrupt sharing.
- PCI slots 1 through 3 are on PCI bus 0.

The system scans the AGP slot and PCI expansion slots 1 through 3 to assign system resources; then the system starts the PCI devices in the following order:

PCI expansion slots 1 and 2, system board integrated drive electronics (IDE) or SCSI devices, and then PCI expansion slot 3.

- For a list of supported options for the computer, go to <http://www.ibm.com/pc/support> on the World Wide Web.

### Installing an adapter

Complete the following steps to install an adapter in the IntelliStation E Pro Type 6226 computer:

**Attention:** When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see “Handling electrostatic discharge-sensitive devices” on page 132.

1. Review the information in “Safety information” on page 129.
2. Turn off the computer and attached devices.
3. Disconnect all external cables and power cords; then, remove the cover (see “Removing the cover of the 6226” on page 60).
4. Determine which PCI slot you will use for the adapter.

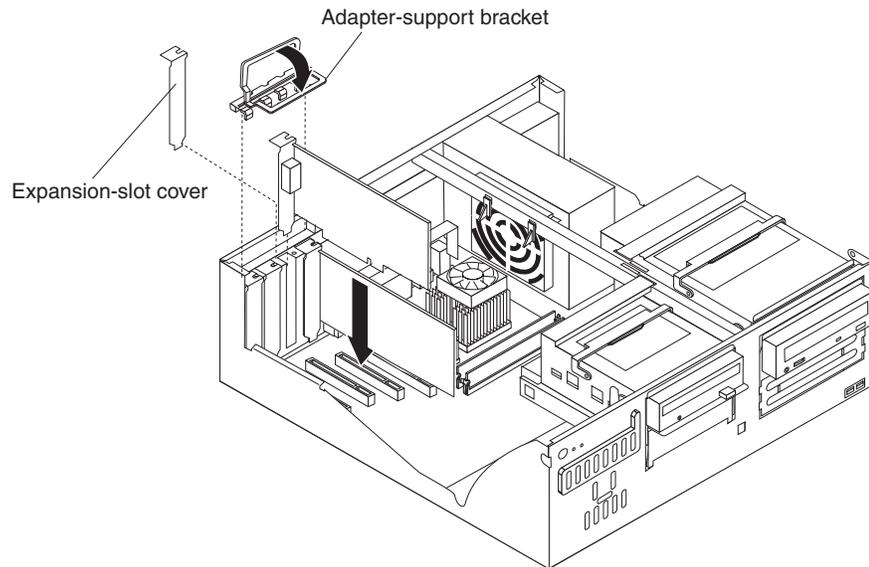
**Note:** Check the instructions that come with the adapter for any requirements, restrictions, or cabling instructions. It might be easier to route any cables before you install the adapter.

5. Rotate the rear-adapter-support bracket to the open (unlocked) position and remove it from the computer.
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 electronic emissions standards of the computer and ensures proper ventilation of computer components.

7. 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 in its static-protective package on a hard surface. Avoid touching the components and gold-edge connectors on the adapter.
8. Set any jumpers or switches on the adapter or system board as described by the adapter manufacturer.

- 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.

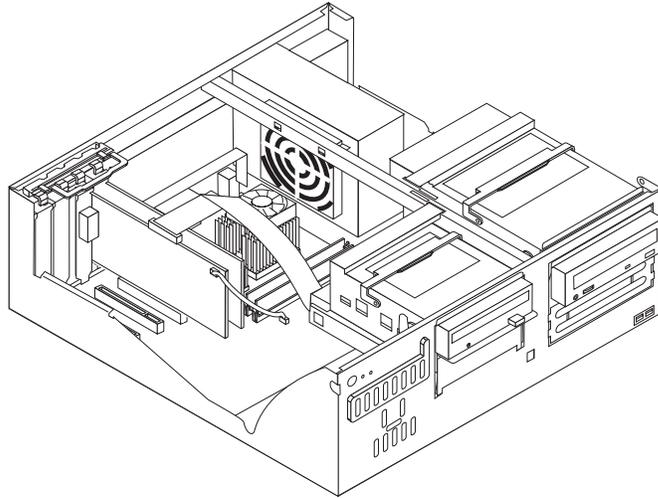
- Connect required cables to the adapter.
- If you have another adapter to install, repeat steps 1 through 12 on page 47. If you have another option to install, do so now. Otherwise, complete the remaining steps in this section.
- Reinstall the rear-adapter-support bracket; then, rotate the bracket to the closed (locked) position.
- Return the drive bay cages to their original positions in the computer.
- Replace the top cover (see “Replacing the cover of the 6226” on page 72).
- Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

### Installing a SCSI adapter

Complete the following steps to install an optional SCSI adapter:

- Complete steps 1 through 12 of “Installing an adapter” on page 61; then, continue with step 2.
- Connect the SCSI signal cable to the adapter and one or more of the signal cable connectors to the rear of the SCSI devices.
- Connect the SCSI activity indicator cable to the adapter and to the SCSI LED connector (CN23) on the system board (see “System board” on page 58 for the

location of the SCSI LED connector).



4. If you have other adapters or options to install or remove, do so now.
5. Reinstall the rear adapter-support bracket; then, rotate it to the closed (locked) position.
6. Replace the cover (see “Replacing the cover of the 6226” on page 72).
7. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

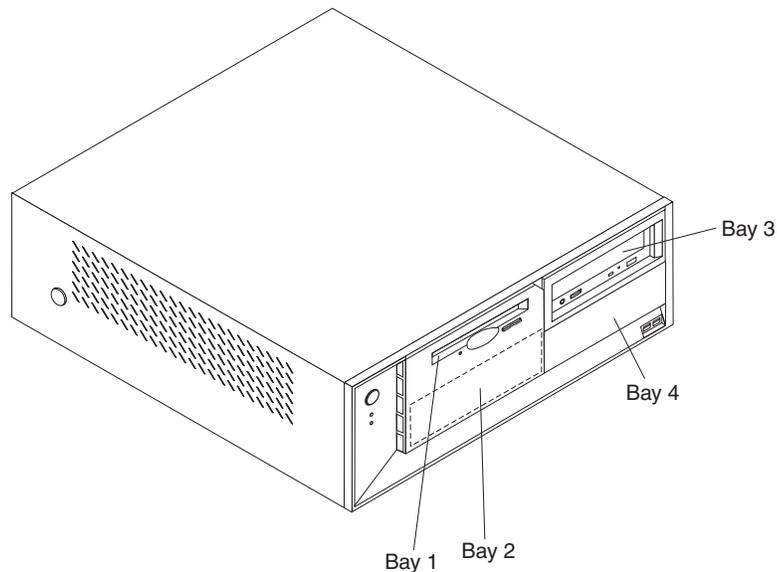
## Installing internal drives

Different types of drives enable the computer to read various types of media and store data in different formats. The computer comes with the following drives preinstalled:

- Diskette
- Hard disk
- CD-ROM, DVD-ROM, or CD-RW

## Internal drive bays

The IntelliStation E Pro Type 6226 computer comes with a 3.5-in. 1.44-MB diskette drive in bay 1; a hard disk drive installed in bay 2; and an IDE CD-ROM, DVD-ROM, or CD-RW drive in bay 3.



### Notes:

1. The IntelliStation E Pro Type 6226 computer supports only one diskette drive.
2. For a complete list of supported options for the computer, go to <http://www.ibm.com/pc/support/> on the World Wide Web.

### Preinstallation steps

Before you replace drives 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 steps are required only during the initial installation of an option.

1. Read “Safety information” on page 129, “Handling electrostatic discharge-sensitive devices” on page 132, 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.

### Power and signal cables for internal drives

The computer uses cables to connect IDE, SCSI, and diskette devices to the power supply and to the system board. The following cables are provided:

- Four-wire power cables connect the drives to the power supply. At the end of these cables are plastic connectors that attach to different drives; these connectors vary in size. Also, certain power cables attach to the system board.
- Flat signal cables, also called ribbon cables, connect IDE and diskette drives to the system board. There are two sizes of ribbon cables that come with the computer.
  - The wider IDE signal cable has two or three connectors.
    - If the cable has three connectors, one of these connectors is attached to the drive, one is a spare, and the third attaches to the primary or secondary IDE connector on the system board.

- If the cable has two connectors, one of these connectors is attached to the hard disk drive, and the other attaches to the primary or secondary IDE connector on the system board.

**Note:** The CD-ROM drive is attached to an ATA 66 signal cable. The hard disk drive is attached to an ATA 100 signal cable. ATA 66 and ATA 100 signal cables are color-coded. The blue connector attaches to the system board. The black connector attaches to the primary device. If the cable has a gray middle connector, it attaches to the secondary device. If you are installing a hard disk drive, you must change the switch setting on the CD-ROM drive to secondary and change the connector used for the CD-ROM drive to the gray middle connector.

- The narrower signal cable has two connectors, one to attach to the diskette drive, and the other to attach to the connector (FDD1) on the system board.
- SCSI signal cables connect SCSI devices to a SCSI adapter. If you have a SCSI adapter installed in the computer, the SCSI signal cable has four connectors. One of these connectors is attached to the SCSI adapter, two connectors are spares, and the fourth connector is attached to a SCSI hard disk drive.

To locate connectors on the system board, see “System board internal cable connectors” on page 59.

Review the following information before connecting power and signal cables to internal drives:

- The drives that are preinstalled in the computer come with power and signal cables attached. If you replace any drives, it is important to remember which cable is attached to which drive.
- When you install a drive, ensure that the drive connector at the end of the signal cable is always connected to a drive, and ensure that the drive connector at the other end is connected to the system board.
- If you have only one IDE device on a cable, it must be set as a primary device.
- If two IDE devices are used on a single cable, one must be designated as the primary device and the other as the secondary device; otherwise, the computer might not detect some of the IDE devices. The primary and secondary designation is determined by switch or jumper settings on each IDE device.
- If two IDE devices are on a single cable, and only one is a hard disk drive, the hard disk drive must be set as a primary device.
- You must also set the SCSI ID for any SCSI device that you install in the computer. Each SCSI device has its own methods and considerations for setting the SCSI ID. See the instructions that come with the SCSI device for details about setting the SCSI ID for the SCSI device.

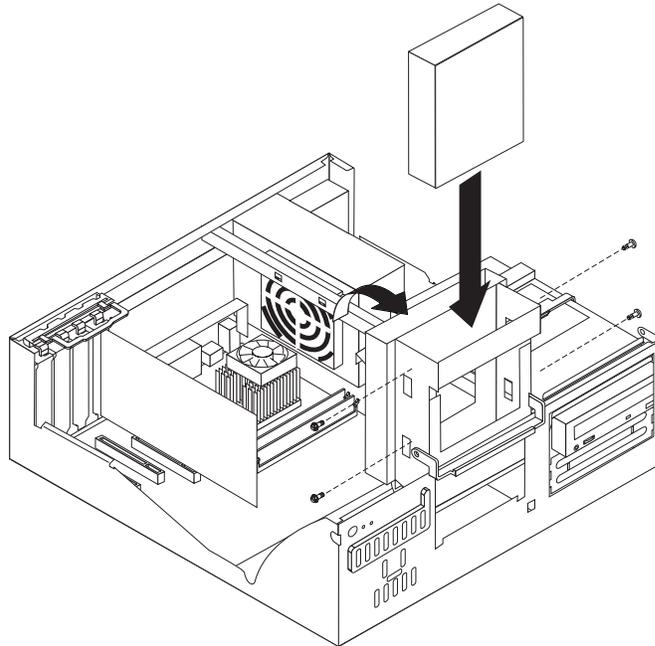
### **Replacing a diskette drive in bay 1**

To replace a diskette drive in the IBM IntelliStation E Pro Type 6226 computer, complete the following steps.

**Note:** The IntelliStation E ProType 6226 computer supports only one diskette drive.

1. Read the information in “Preinstallation steps” on page 64.
2. Turn off the computer and attached devices, and disconnect all external cables and power cords.
3. Remove the cover (see “Removing the cover of the 6226” on page 60).
4. Disconnect power and signal cables from the drive.

5. Rotate the diskette drive bay cage until the drive cage latch catches the front of the computer chassis.
6. Remove the screws holding the diskette drive in place and slide the diskette drive out of the rear of the bay.
7. Touch the static-protective package containing the diskette drive to any unpainted metal surface on the computer; then, remove the diskette drive from the package and place it on a static-protective surface.
8. Set any jumpers or switches on the drive according to the documentation that comes with the drive.
9. Slide the drive into the drive bay through the rear of the drive cage, and then attach the diskette drive to the drive cage.



10. Rotate the drive cage back into the computer chassis.
11. Connect one end of the diskette or IDE signal cable into the back of the drive and the other end of the cable into the diskette or IDE connector on the system board. For the location of the diskette or IDE connectors, see “System board internal cable connectors” on page 44.

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

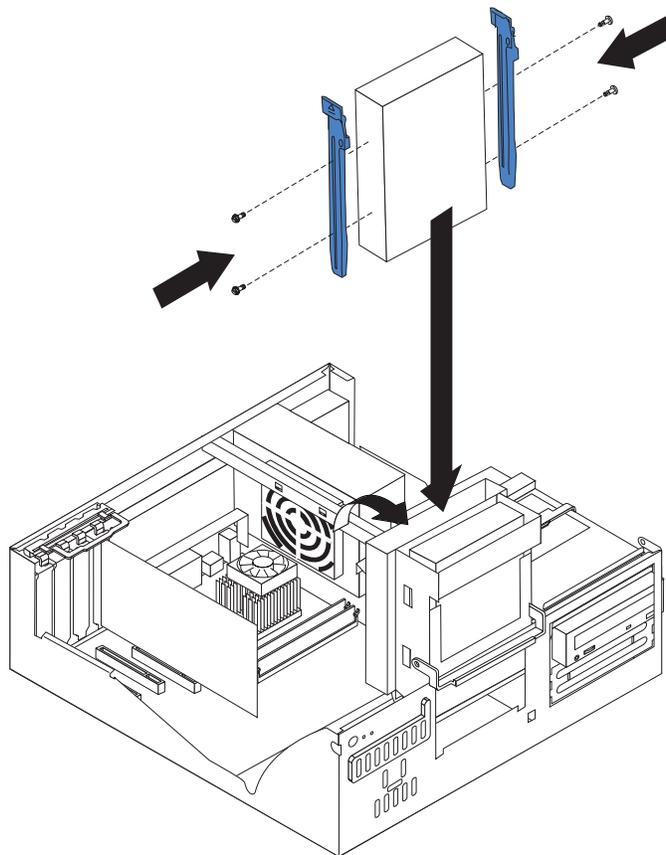
12. Connect the power cable to the back of the drive. The connectors are keyed and can be inserted only one way.
13. If you have other options to install or remove, do so now.
14. Replace the cover (see “Replacing the cover of the 6226” on page 72).
15. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

### Replacing a hard disk drive in bay 2

To replace a hard disk drive in the IBM IntelliStation E Pro Type 6226 computer, complete the following steps:

1. Read the information in “Preinstallation steps” on page 64.
2. Turn off the computer and attached devices, and disconnect all external cables and power cords.

3. Remove the cover (see “Removing the cover of the 6226” on page 60).
4. Disconnect power and signal cables to the failed hard disk drive.
5. Rotate the drive bay cage of the drive that you need to replace until the latch catches the front of the computer chassis.
6. Squeeze the sides of the rail guides on the side of the old hard disk drive and slide the drive out of the bay.
7. Remove the sliding rail guides from the old hard disk drive.
8. Touch the static-protective package containing the new drive to any unpainted metal surface on the computer; then, remove the drive from the package and place it on a static-protective surface.
9. Set any jumpers or switches on the drive according to the documentation that comes with the drive.
10. Attach the sliding rails from the old hard disk drive to the sides of the hard disk drive using screws from the old hard disk drive.
11. Slide the drive into the drive bay until the drive snaps into place.



12. If you are installing 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 “System board internal cable connectors” on page 59. If you are installing a SCSI device, connect one end of the SCSI signal cable to the device and the other end to the SCSI connector on the SCSI adapter.

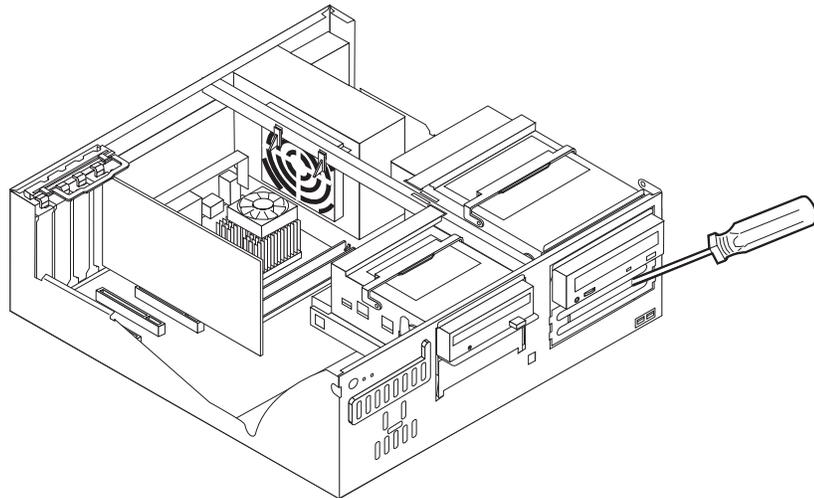
**Note:** Make sure to route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor.

13. Connect the power cable to the back of the drive. The connectors are keyed and can be inserted only one way.
14. If you have other options to install or remove, do so now.
15. Replace the cover (see “Replacing the cover of the 6226” on page 72).
16. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

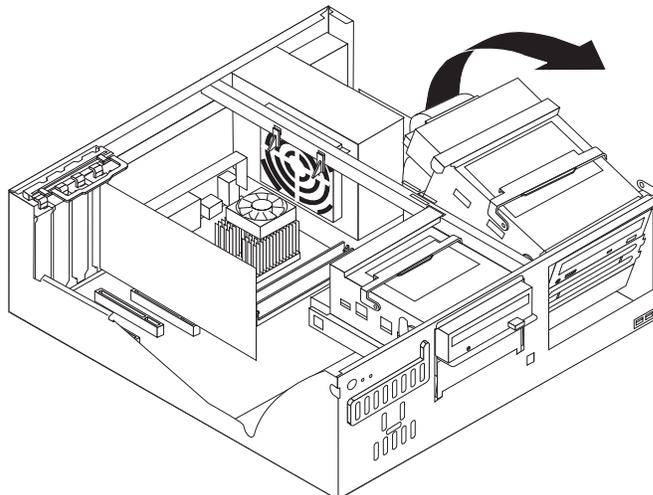
### Installing a drive in bays 3 or 4

To install or replace drives in bays 3 or 4 of the IBM IntelliStation E Pro Type 6226 computer, complete the following steps:

1. Read the information in “Preinstallation steps” on page 64.
2. Turn off the computer and attached devices, and disconnect all external cables and power cords.
3. Remove the cover (see “Removing the cover of the 6226” on page 60).
4. Disconnect power and signal cables to the drive.
5. If you are installing a new drive, use a screwdriver to pry the electromagnetic cover from the drive bay.



6. Rotate the drive bay cage where you want to install or replace a drive out of the computer chassis.



7. If you are replacing a drive, remove the screws holding the drive in place and slide the drive out through the front of the bay.

**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 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.



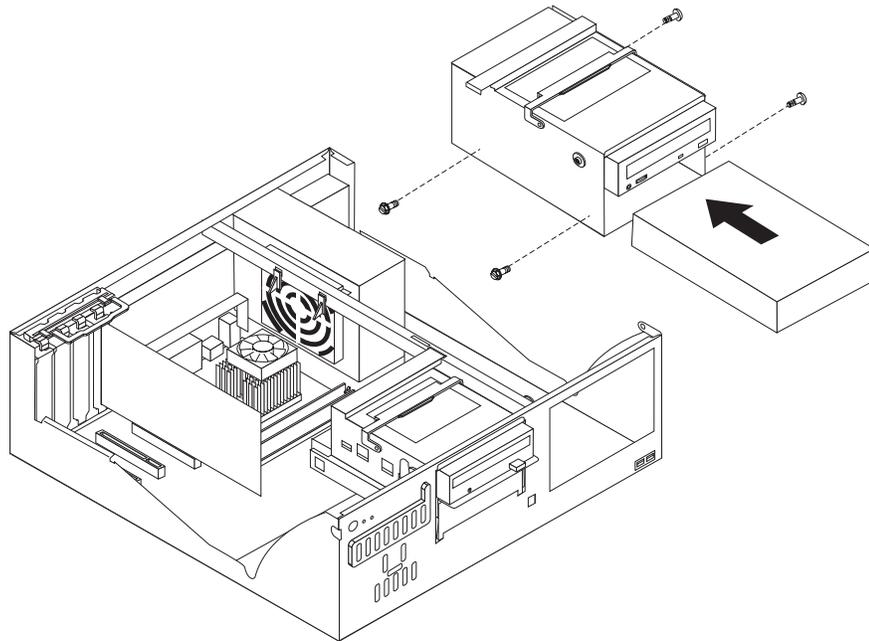
**DANGER**

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.

8. Touch the static-protective package containing the drive to any unpainted metal surface on the computer; then, remove the drive from the package and place it on a static-protective surface.
9. Set any jumpers or switches on the drive according to the documentation that comes with the drive.

- Slide the drive into the drive bay through the front, and then attach the drive to the drive cage using metal screws.



- Place the drive cage back into the computer chassis.
- If you are installing 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 “System board internal cable connectors” on page 44. If you are installing a SCSI device, connect one end of the SCSI cable to the device and the other end to the SCSI connector on the SCSI adapter.

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

- Connect the power cable to the back of the drive. The connectors are keyed and can be inserted only one way.
- If you have other options to install or remove, do so now.
- Replace the cover (see “Replacing the cover of the 6226” on page 72).
- Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

## Installing memory modules

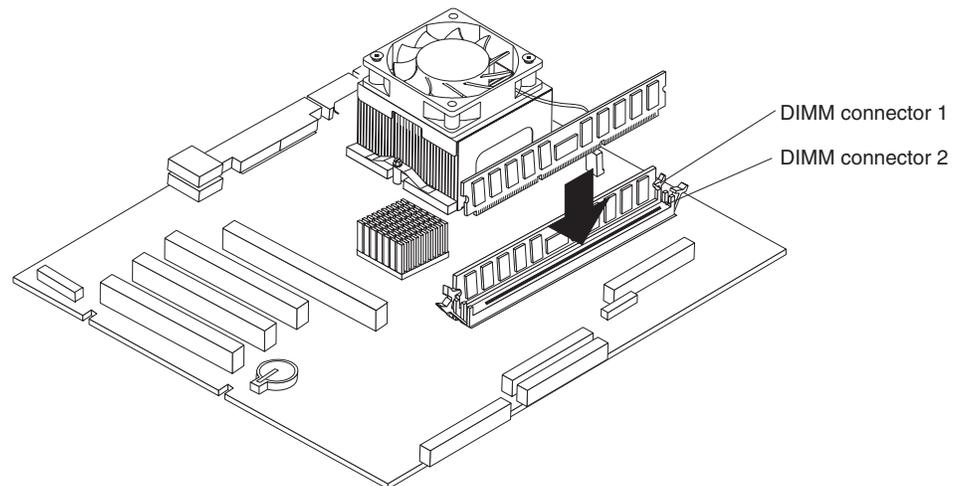
You can increase the amount of memory in the computer by installing memory modules. The IntelliStation E Pro computer uses industry-standard, PC2100 266 MHz double data rate (DDR) dual inline memory modules (DIMMs).

Complete the following steps to install a DIMM.

**Attention:** When handling static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see “Handling electrostatic discharge-sensitive devices” on page 132.

- Review the safety precautions listed in “Safety information” on page 129.

2. Turn off the computer and all attached devices. Disconnect all external cables and power cords; then, remove the cover (see “Removing the cover of the 6226” on page 60).
3. Rotate the drive cages until the drive-cage latches catch the chassis.
4. Touch the static-protective package containing the DIMM to any unpainted metal surface on the computer. Then, remove the new DIMM from the package.
5. Gently open the retaining clip on each end of the DIMM slot. Turn the DIMM so that the pins align correctly with the connector.
6. Insert the DIMM into the connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.



7. If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly installed. Open the retaining clips, remove the DIMM, then reinsert it.
8. If you have other options to install or remove, do so now.
9. Replace the cover (see “Replacing the cover of the 6226” on page 72).
10. Reconnect the external cables and power cords. Turn on the attached devices, and turn on the computer.

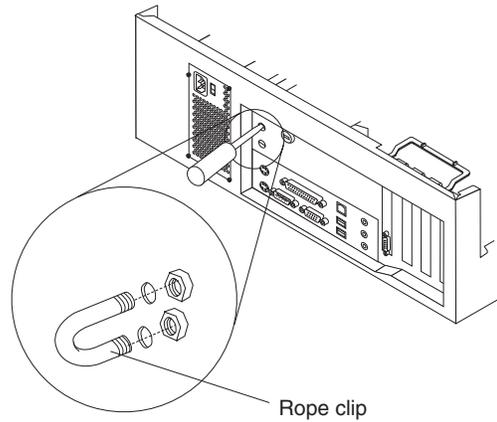
## Installing a security rope clip

To help prevent theft, you can add a rope clip and cable to the computer.

Complete the following steps to install the rope clip:

1. Review the safety precautions listed in “Safety information” on page 129.
2. Turn off the computer and all attached devices. Disconnect all external cables and power cords; then, remove the cover (see “Removing the cover of the 6226” on page 60).
3. Use a screwdriver to remove the two metal knockouts.
4. Insert the rope clip through the rear panel; then, attach and tighten the nuts.
5. Thread the cable through the rope clip 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, make sure that it does not interfere with other

cables connected to the computer.

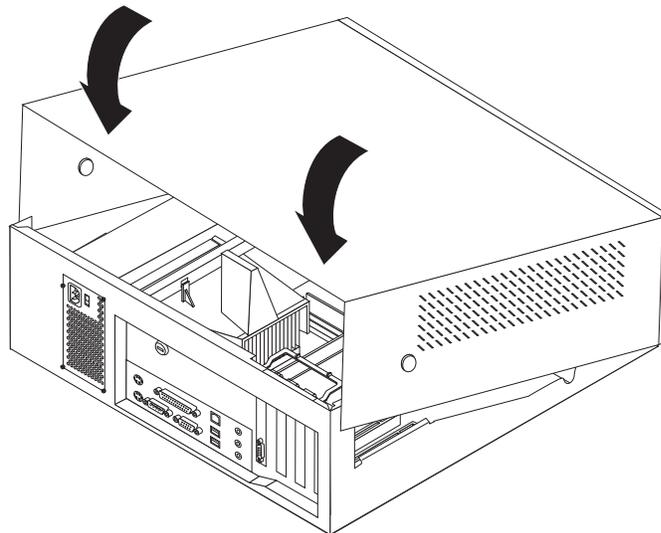


6. Reconnect the external cables and power cords, and turn on the attached devices, then the computer.

## Replacing the cover of the 6226

Complete the following steps to replace the computer cover:

1. Clear any cables that might impede the replacement of the cover.
2. Place the cover over the chassis, and pivot it down over the computer until it snaps into place.



3. Reconnect the external cables and power cords to the computer; then, connect the power cords to electrical outlets.
4. Turn on the attached devices; then, turn on the computer.

---

## Connecting external options

You can connect a number of optional external devices to the connectors on the rear and front of the computer. If your computer comes with a SCSI adapter installed, you can attach a SCSI storage expansion enclosure to your computer.

Complete the following steps to attach an external device:

1. Read “Before you begin” on page 41, review the safety precautions listed in Statement 1 and Statement 5 in “Safety information” on page 129, and read the documentation that comes with your options.
2. Be sure that your computer and all attached devices are turned off.
3. Follow the instructions that come with the option to prepare it for installation and to connect it to the computer.

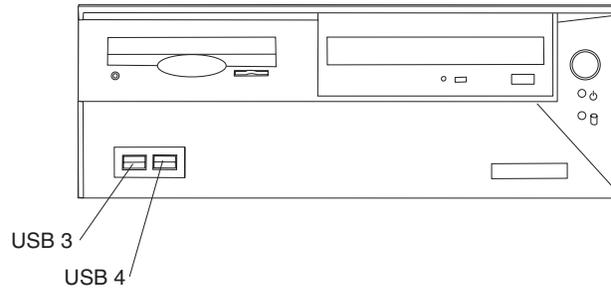
**Note:** If you are attaching a SCSI device, see “SCSI cabling requirements” on page 78 and “Setting SCSI IDs” on page 78 for SCSI ID and cabling information.

The following connectors are provided for attaching peripheral input/output devices to your computer:

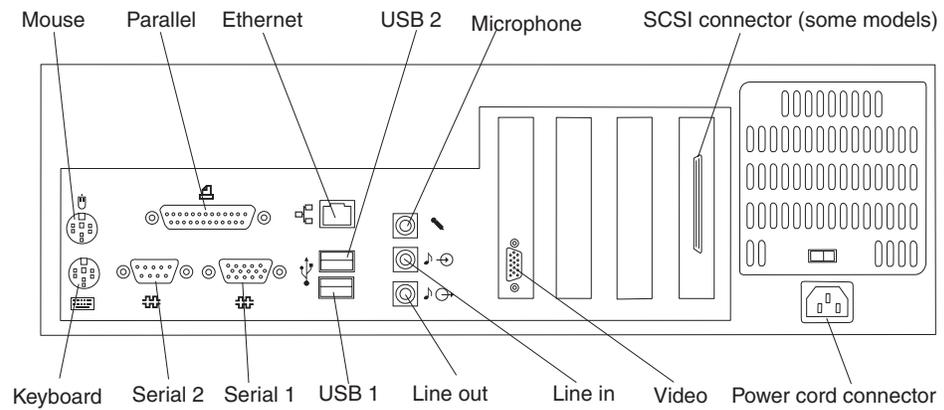
- One mouse
- One keyboard
- One parallel
- Two serial
- One Ethernet
- Four USB (two on front and two on rear)
- One line in
- One line out
- One microphone
- One video (optional multiple connectors on some models)
- One Ultra160 SCSI (some models)

## Input/output connector locations

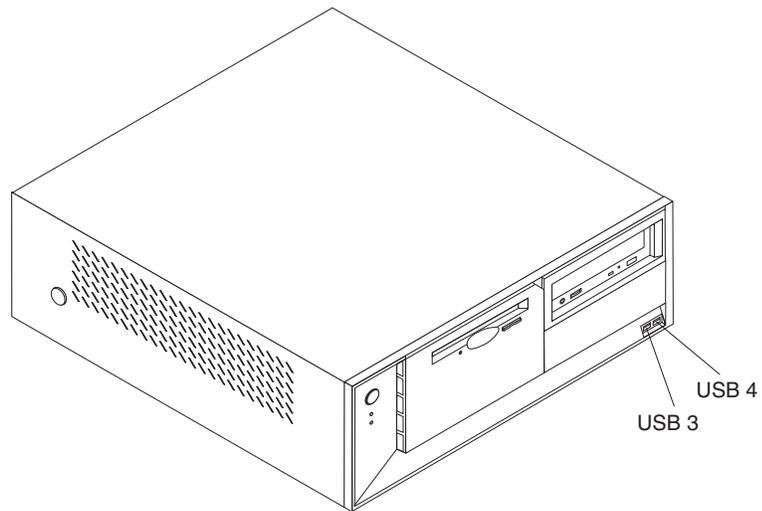
The following illustration shows the location of input/output (I/O) connectors on the front of the IntelliStation E Pro Type 6216 computer.



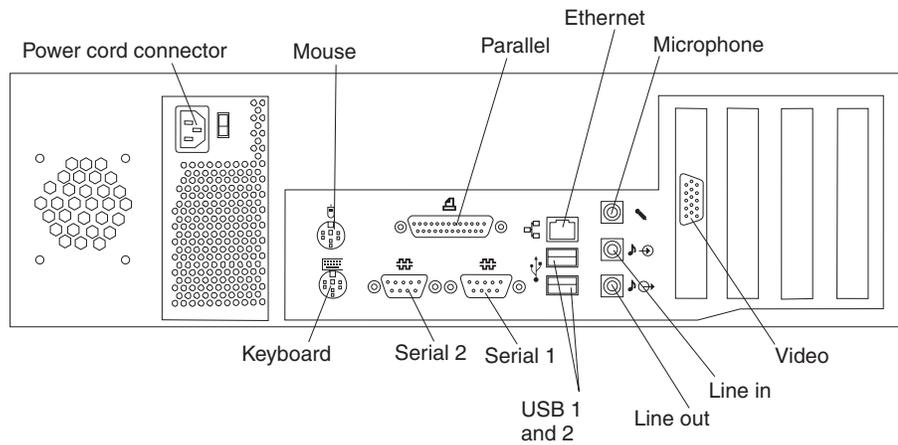
The following illustration shows the location of input/output (I/O) connectors on the rear of the IntelliStation E Pro Type 6216 computer.



The following illustration shows the location of input/output (I/O) connectors on the front of the IntelliStation E Pro Type 6226 computer.



The following illustration shows the location of input/output (I/O) connectors on the rear of the IntelliStation E Pro Type 6226 computer.



- **Video connector**

Your computer uses an AGP adapter in the AGP slot on the system board. The video connector is on the adapter and is located on the rear of your computer. Some models come with a digital video interface (DVI) connector for connecting a digital monitor.

- **Keyboard connector**

Your computer has one keyboard connector.

**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).

- **Mouse connector**

Your computer has one mouse connector that supports a mouse or other pointing device. The mouse connector is on the rear of your computer.

- **Parallel connector**

There is one 25-pin, female D-shell parallel connector on the rear of your computer. 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).

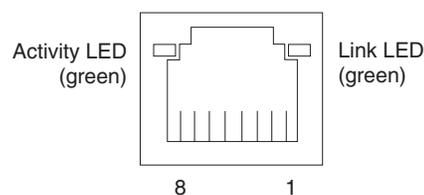
Use the Configuration/Setup Utility program to configure the parallel connector as bidirectional. With this configuration, data can be read from and written to a device. In bidirectional mode, the computer supports the ECP and EPP modes. See page 13 for instructions for configuring the parallel connector.

- **Serial connectors**

Your computer has two standard 9-pin D-shell serial connectors: serial connector 1 and serial connector 2.

- **Gigabit Ethernet connector**

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



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

**Note:** The 100BASE-TX Fast Ethernet standard requires that the cabling in the network be Category 5 or higher. The 1 Gbps Fast Ethernet standard requires that the cabling in the network be Category 5e or higher.

The Ethernet (RJ-45) connector has two LEDs. The Ethernet link LED is on the left. When this LED is on, there is an active connection on the Ethernet port. The Ethernet transmit/receive activity LED is on the right. When this LED is on, there is activity between the computer and the network.

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

- **Universal Serial Bus (USB) connectors**

Your computer has four Universal Serial Bus (USB) 2.0 connectors (two on the front and two on the rear of the computer) for optional telephony and multimedia devices. USB devices are configured automatically with Plug and Play technology.

**Notes:**

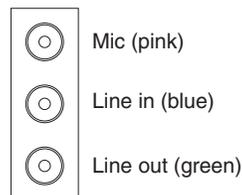
1. If you attach a standard (non-USB) keyboard to the keyboard connector, the USB connectors and devices will be disabled during the power-on self-test.
2. If you install a USB keyboard that has a mouse connector, the USB keyboard emulates a mouse. You will not be able to disable the mouse settings in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

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

USB 2.0 technology transfers data at up to 480 Mb per second (Mbps) with a maximum of 127 external devices and a maximum signal distance of 5 meters (16 ft) per segment provided that the device attached to the computer is a USB 2.0 device. If the computer has multiple USB devices attached to it, the USB hub must be USB 2.0, or all USB 2.0 devices will transfer data at 12 Mbps.

- **Audio connectors**

The audio connectors are used to attach external audio equipment to your computer.



- **Microphone**

This connector is used to connect a microphone to your computer for recording sounds on the hard-disk drive or using speech recognition software.

- **Line in**

This connector is used to accept audio signals from external devices, such as line output from external audio equipment into the computer sound system.

- **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 your computer is disabled when any device is attached to this connector.

- **Adaptec Ultra160 SCSI connector**

Some models come with an Adaptec Ultra160 SCSI adapter that supports a SCSI internal channel that supports up to 15 SCSI devices. This configuration supports zero wait state, 32-bit memory transfers at 160 MB per second when low voltage differential (LVD) SCSI peripheral devices are attached. 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 for improved data reliability

## Configuring the Gigabit Ethernet controller

The Ethernet controller is a PCI Plug and Play device. You do not need to set any jumpers or configure the controller for your operating system before you use the Ethernet controller. However, you must install a device driver to enable your operating system to address the Ethernet controller. The device drivers are provided on the *Device Drivers and IBM Enhanced Diagnostics CD*.

When you connect your computer to the network, the Ethernet controller automatically detects the data-transfer rate (10 Mbps, 100 Mbps, or 1 Gbps) on the network and then sets the controller to operate at the appropriate rate. In addition, if the Ethernet ports that your computer is connected to support auto-negotiation, the Gigabit Ethernet controller sets the appropriate duplex state. That is, the Ethernet controller adjusts to the network data rate, whether the data rate is standard Ethernet (10BASE-T), Fast Ethernet (100BASE-TX/1000BASE-T), half duplex (HDX), or full duplex (FDX). The controller supports half-duplex (HDX) and full-duplex (FDX) modes at both speeds.

## High-performance Ethernet modes

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

## SCSI cabling requirements

If your computer comes with a SCSI adapter, you can install three internal SCSI devices using the SCSI signal cable that comes with it. 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 (J35) connector on the system board (see “System board” on page 58 for the location of the internal 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. See the information that is provided with the device for instructions for setting its SCSI ID. With a SCSI adapter installed in your computer, you can use its 68-pin SCSI connector to connect different types of SCSI devices.

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

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## FRU information (service only)

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

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### IntelliStation E Pro Type 6216

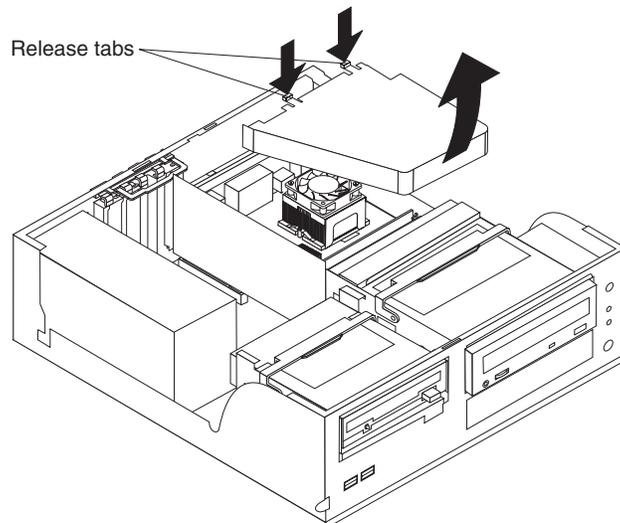
The following section contains information about removing components of the IntelliStation E Pro Type 6216.

#### Baffle

**Note:** Read “Before you begin” on page 41 and the safety notices at “Safety information” on page 129.

Complete the following steps to remove the baffle:

1. Turn off the computer and attached devices; then, disconnect all external cables and power cords.
2. Remove the cover and the frame-support bracket (see “Removing the cover of the 6216” on page 45 and “Removing the frame-support bracket” on page 45).



3. Grasp the baffle on the top and bottom of the wide end and squeeze gently; then, pull the baffle up and away from the back of the chassis.
4. When the baffle is free of the back of the chassis, lift it out of the computer.

To reinstall the baffle, set the two pins on the bottom of the baffle into the slots provided for them in the chassis; then, gently squeeze the baffle near the two tabs on the top of the baffle so that the tabs slide into the two notches provided for them.

#### Adapter retainer

**Note:** Read “Before you begin” on page 41 and the safety notices at “Safety information” on page 129.

Complete the following steps to remove the adapter retainer:

1. Turn off the computer and attached devices; then, disconnect all external cables and power cords.
2. Remove the cover (see “Removing the cover of the 6216” on page 45).
3. Rotate the retainer up and pull the adapter retainer away from the chassis.

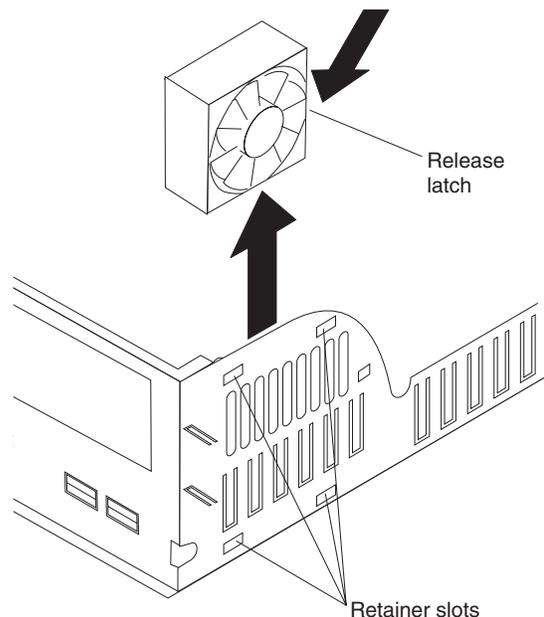
To install the adapter retainer, reverse the previous steps, sliding the two side knobs on the retainer into the channels provided for them on the chassis and positioning the retainer so that the plastic tabs are pressed against the inside of the PCI slot covers.

## Fan

**Note:** Read “Before you begin” on page 41 and the safety notices at “Safety information” on page 129.

Complete the following steps to remove the fan:

1. Turn off the computer and attached devices; then, disconnect all external cables and power cords.
2. Remove the cover and the frame-support bracket (see “Removing the cover of the 6216” on page 45 and “Removing the frame-support bracket” on page 45).
3. Remove the air baffle (see “Baffle” on page 79).
4. Disconnect the fan cable from the system board.



5. Push the two of the four tabs on the right of the chassis toward the rear, and then push in until the fan is released. Pull the fan out of the computer.
6. Pull the fan up and out of the chassis.

To install the rear fan, reverse the previous steps.

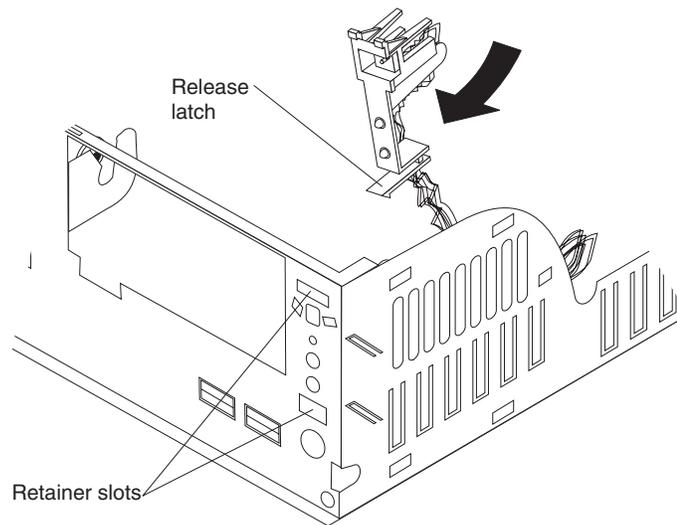
## Operator information panel

**Note:** Read “Before you begin” on page 41 and the safety notices at “Safety information” on page 129.

Complete the following steps to remove the operator information panel:

1. Turn off the computer and attached devices; then, disconnect all external cables and power cords.
2. Remove the cover and the frame-support bracket (see “Removing the cover of the 6216” on page 45 and “Removing the frame-support bracket” on page 45).
3. Swing the CD-ROM drive cage up.
4. Disengage the operator information panel cable from the system board.
5. Press upward on the lower tab of the operator information panel until it comes loose.

**Note:** It might 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 operator information panel until it pops free of the chassis; then, remove it from the computer, making sure that the cable follows freely.

To install the operator information panel, reverse the previous steps.

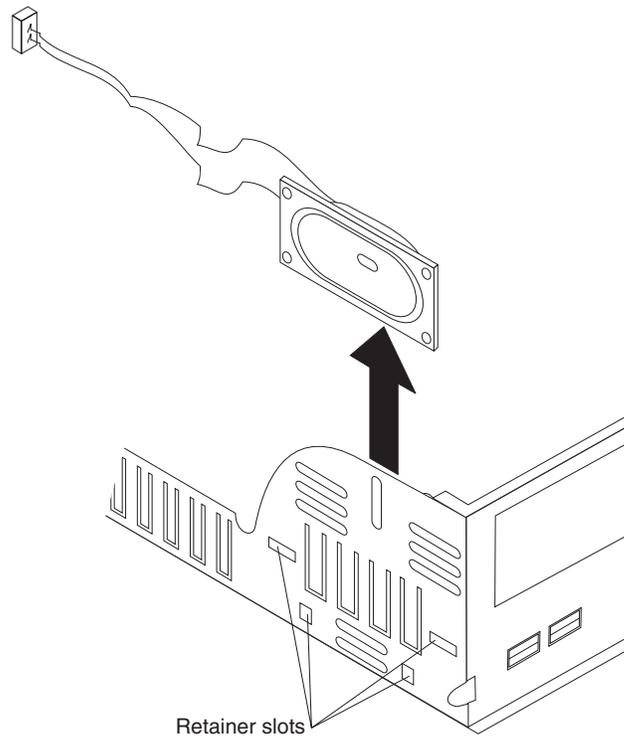
## Speaker

**Note:** Read “Before you begin” on page 41 and the safety notices at “Safety information” on page 129.

Complete the following steps to remove the speaker:

1. Turn off the computer and attached devices; then, disconnect all external cables and power cords.
2. Remove the cover and the frame-support bracket (see “Removing the cover of the 6216” on page 45 and “Removing the frame-support bracket” on page 45).
3. Rotate the diskette drive cage to its vertical position.

4. Disconnect the speaker cable from the system board.



5. Lift the speaker up and out of the side brackets.

To replace the speaker, reverse the previous steps.

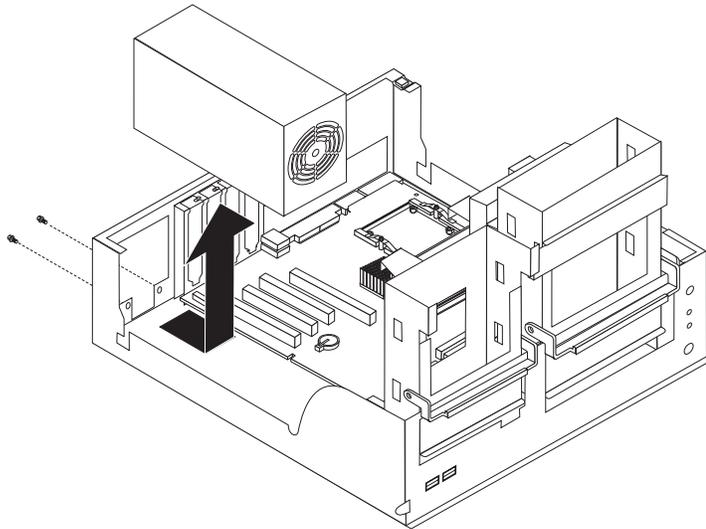
## Power supply

**Note:** Read “Before you begin” on page 41 and the safety notices at “Safety information” on page 129.

Complete the following steps to remove the power supply:

1. Turn off the computer and attached devices; then, disconnect all external cables and power cords.
2. Remove the cover and the frame-support bracket (see “Removing the cover of the 6216” on page 45 and “Removing the frame-support bracket” on page 45).
3. Swing the diskette drive cage up.

4. Disconnect the internal power supply cables.



5. Remove the two screws that secure the power supply to the chassis.
6. Lift the power supply out of the chassis.

To replace the power supply, reverse the previous steps.

## Microprocessor/fan-sink assembly

**Note:** Read “Before you begin” on page 41, “Handling electrostatic discharge-sensitive devices” on page 132, and the safety notices at “Safety information” on page 129.

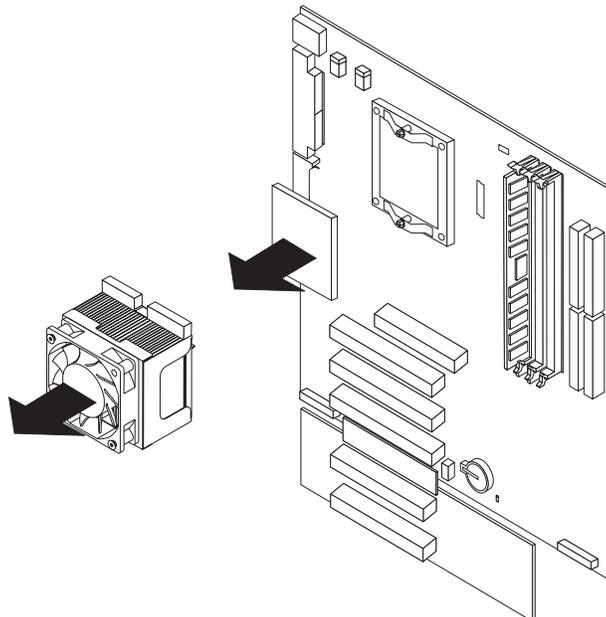
Complete the following steps to remove the microprocessor and fan-sink assembly:

1. Turn off the computer and attached devices; then, disconnect all external cables and power cords.
2. Remove the cover and the frame-support bracket (see “Removing the cover of the 6216” on page 45 and “Removing the frame-support bracket” on page 45).
3. Remove the air baffle (see “Baffle” on page 79).
4. Rotate the CD-ROM drive cage up.
5. Disconnect any cables that impede access to the microprocessor.

**Note:** The fan and underlying heat sink are attached and do not need to be separated from each other. Remove the fan-sink assembly from the microprocessor as a single unit.

6. Remove the fan-sink assembly from the microprocessor:

- a. Detach the fan-sink cable.



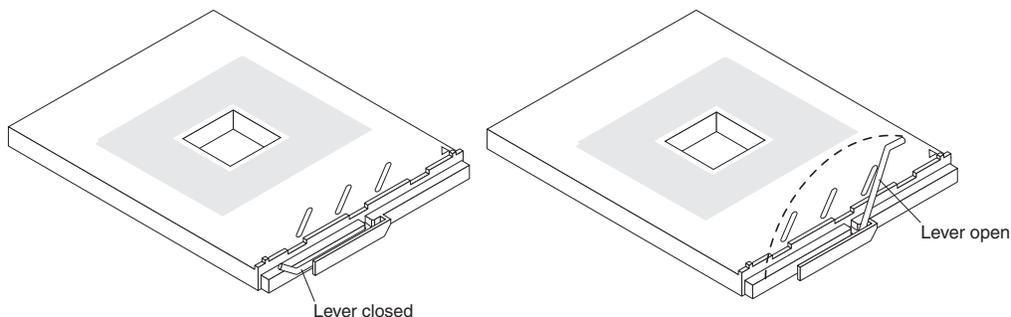
- b. Loosen the two captive screws (in leaf-spring enclosures) on either side of the fan-sink assembly, exerting pressure on the screwdriver.
- c. With the two captive screws loosened, pivot the leaf spring assemblies outward and out of the notches on the fan-sink assembly.
- d. Lift the fan-sink assembly up and out of the computer.

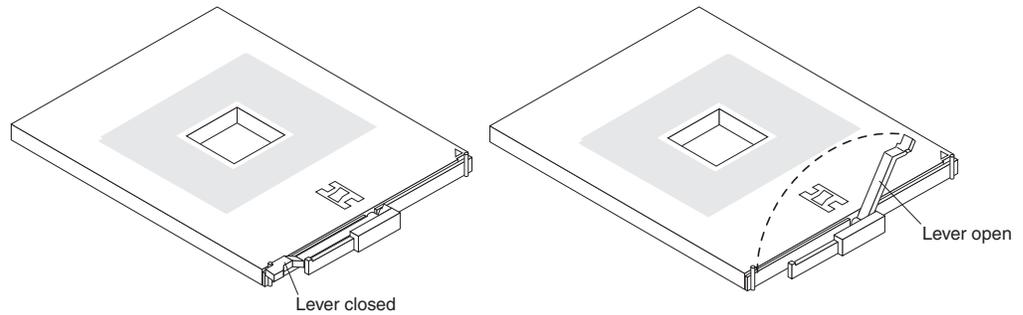
**Note:** It might be necessary to gently twist the fan-sink assembly to loosen it from the microprocessor.

**Important:** Be careful when handling the adhesive material on the microprocessor. If the adhesive material on the microprocessor will be reused, do not contaminate it. If replacement adhesive material is provided with the replacement part, be sure to remove all traces of existing adhesive material from the microprocessor before applying the new adhesive material.

7. Rotate the locking lever on the microprocessor socket from its closed and locked position until it stops or clicks in the fully open position (approximately 135° angle), as shown.

**Attention:** You must ensure that the locking lever on the microprocessor socket is in the fully open position before you remove or insert the microprocessor in the socket. Failure to do so might result in permanent damage to the microprocessor, microprocessor socket, and system board.





8. Lift the microprocessor up and out of the computer.

To install a microprocessor and fan-sink assembly, reverse the previous steps.

## System board

### Notes:

1. Read “Before you begin” on page 41, “Handling electrostatic discharge-sensitive devices” on page 132, and “Safety information” on page 129.
2. When replacing the system board, you must either update the system with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image.

Complete the following steps to remove the system board:

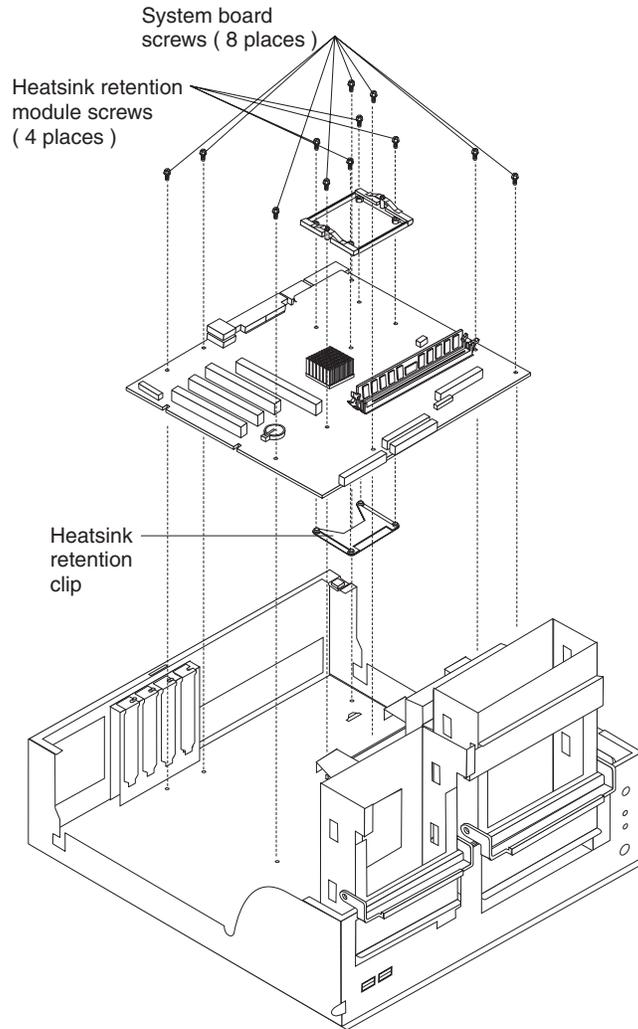
1. Turn off the computer and attached devices; then, disconnect all external cables and power cords.
2. Remove the cover and the frame-support bracket (see “Removing the cover of the 6216” on page 45 and “Removing the frame-support bracket” on page 45).
3. Remove the air baffle (see “Baffle” on page 79).
4. Disconnect all cables on the system board.
5. Pivot the drive cages up; then, remove the drives and cages from the computer.
6. Remove any of the following components that are installed on the system board:
  - Battery (see “Replacing the battery” on page 39).
  - Microprocessor (see “Microprocessor/fan-sink assembly” on page 83).

**Important:** If you plan to reinstall an existing microprocessor to the new system board, be careful when handling the adhesive material on the microprocessor. If the adhesive material on the microprocessor will be reused, do not contaminate it. If replacement adhesive material is provided with the replacement system board, be sure to remove all traces of existing adhesive material from the microprocessor before applying the new adhesive material.

- Adapters (see “Working with adapters” on page 46).
- DIMMs (“Installing memory modules” on page 54).

**Note:** The power supply has been removed in the illustration for purposes of clarification (see “Power supply” on page 82). If any installed items impede your ability to easily access the system board, you can remove

them from the computer.



7. Remove the 12 screws that secure the system board to the chassis and put them in a safe place.

**Note:** Four of the screws described in step 7 secure the heat-sink retention module to the heat-sink retention clip, with the system board in between them. It is easier to remove these screws while the system board is positioned in the chassis.

8. Remove the heat-sink retention module and set it aside.
9. Gently slide the system board slightly toward the front of the computer until it disengages from the chassis; then, lift the board up and out of the computer.
10. Remove the heat-sink retention clip.

To install the system board, reverse the previous steps.

---

## IntelliStation E Pro Type 6226

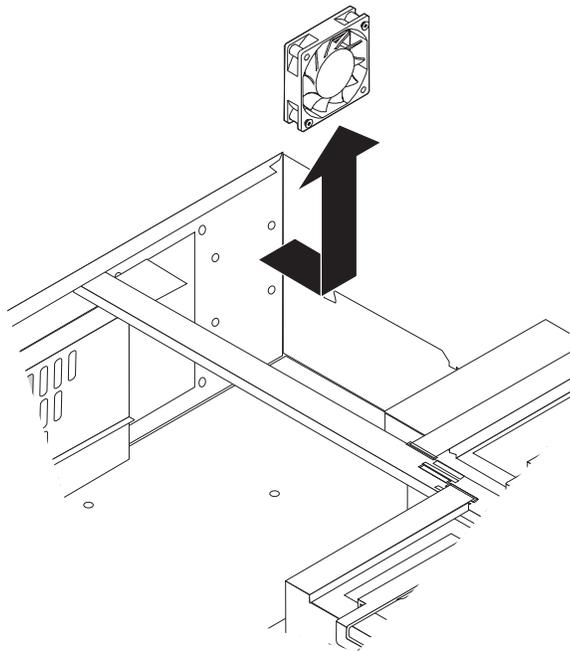
The following section contains instructions for removing components from the IntelliStation E Pro Type 6226.

### Main rear fan

**Note:** Read “Before you begin” on page 41 and “Safety information” on page 129.

Complete the following steps to remove the main rear fan:

1. Turn off the computer and attached devices; then, disconnect all external cables and power cords.
2. Remove the cover (see “Removing the cover of the 6226” on page 60).
3. Disconnect the fan cable from the system board.
4. On the outside of the chassis, use side cutters to sever the four rubber extensions on the fan.



5. Pull the fan away from the chassis.

To install the main rear fan, reverse the previous steps.

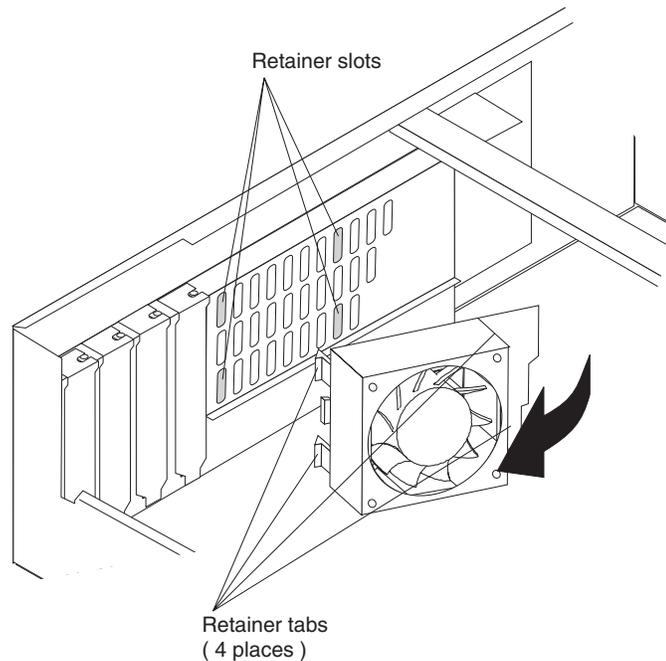
**Note:** After guiding the four rubber extensions through the apertures on the chassis, use needle-nosed pliers to pull the extensions firmly through.

### SCSI fan

Complete the following steps to remove the SCSI fan:

1. Turn off the computer and attached devices; then, disconnect all external cables and power cords.
2. Remove the cover (see “Removing the cover of the 6226” on page 60).
3. Disconnect the fan cable from the system board.

4. Grasp the fan bracket and push it gently toward the left side of the chassis until the tabs are released from the chassis and the bracket pivots out.



5. Pull the fan and bracket away from the chassis.

To install the SCSI fan and bracket, reverse the previous steps.

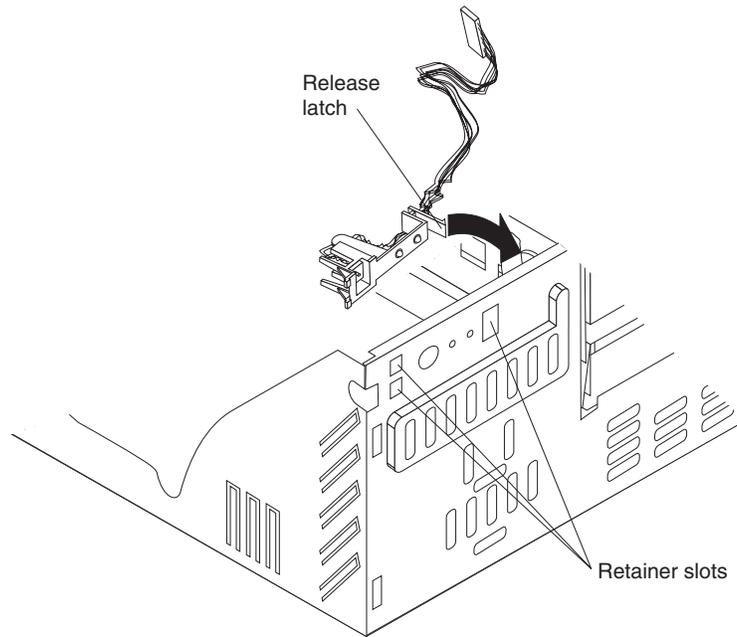
## Operator information panel

**Note:** Read “Before you begin” on page 41 and “Safety information” on page 129.

Complete the following steps to remove the operator information panel:

1. Turn off the computer and attached devices; then, disconnect all external cables and power cords.
2. Remove the cover (see “Removing the cover of the 6226” on page 60).
3. Disconnect the operator information panel from the system board.
4. Press the release tab on the right of the operator information panel to the left until it comes loose.

**Note:** It might be necessary to use the tip of a screwdriver to disengage the lower tab.



5. Push inward on the two left tabs of the operator information panel until it pops free of the chassis; then, remove it from the computer, making sure that the cable follows freely.

To install the operator information panel, reverse the previous steps.

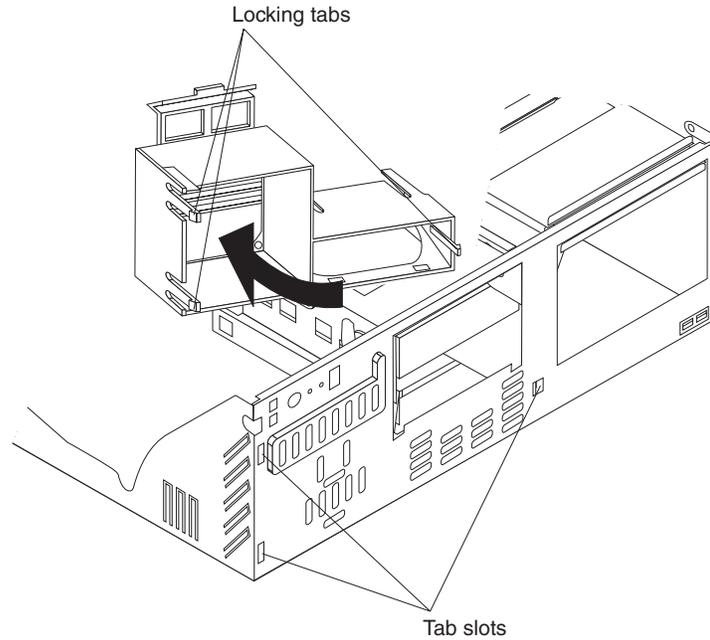
## Speaker and bracket

**Note:** Read “Before you begin” on page 41 and “Safety information” on page 129.

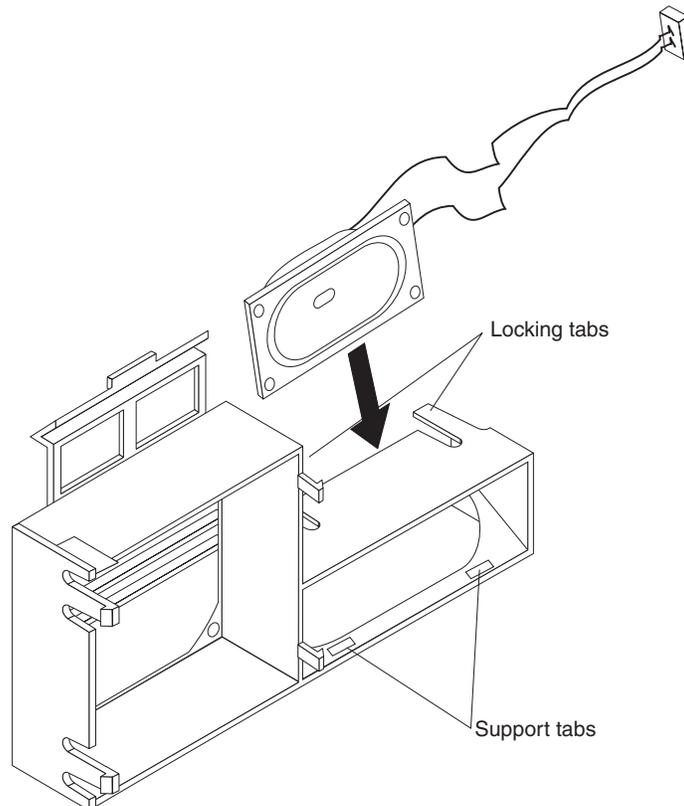
Complete the following steps to remove the speaker and bracket:

1. Turn off the computer and attached devices; then, disconnect all external cables and power cords.
2. Remove the cover (see “Removing the cover of the 6226” on page 60).
3. Rotate the diskette drive cage up.

4. Disconnect the speaker cable from the system board.



5. Grasp the bracket assembly and pull it gently toward the left side of the chassis until the tabs are free of the chassis.
6. Pull the bracket assembly out of the computer.



7. Press on the tabs of the speaker until it comes away from the bracket; then, pull the speaker out of the bracket.

**Note:** It might be easier to disconnect other cables to reach the speaker cable. If this is the case, be sure to reattach all cables that were disconnected before reassembling the computer.

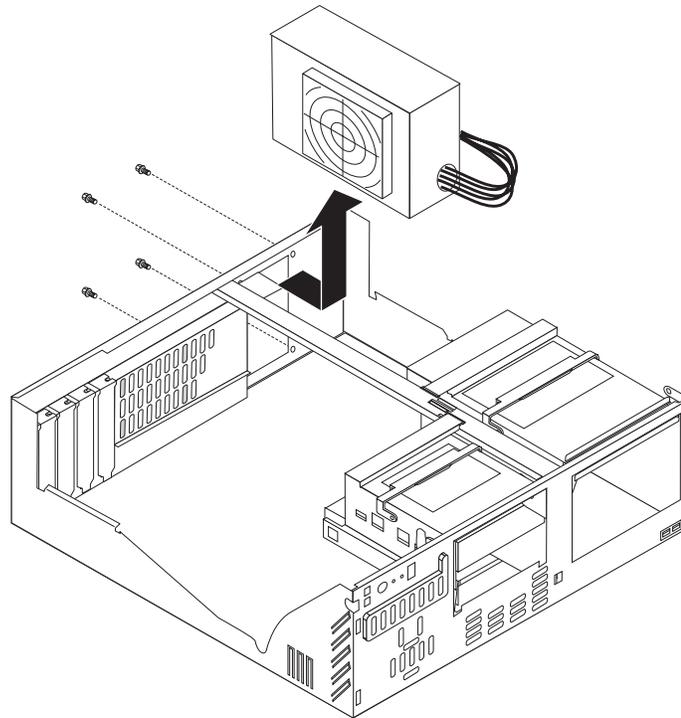
To replace the speaker and bracket, reverse the previous steps.

## Power supply

**Note:** Read “Before you begin” on page 41 and “Safety information” on page 129.

Complete the following steps to remove the power supply:

1. Turn off the computer and attached devices; then, disconnect all external cables and power cords.
2. Remove the cover (see “Removing the cover of the 6226” on page 60).
3. Disconnect the internal power supply cables.



4. Remove the four screws that secure the power supply to the chassis.
5. Lift the power supply out of the chassis.

To replace the power supply, reverse the previous steps.

## Microprocessor/fan-sink assembly

**Note:** Read “Before you begin” on page 41, “Handling electrostatic discharge-sensitive devices” on page 132, and “Safety information” on page 129.

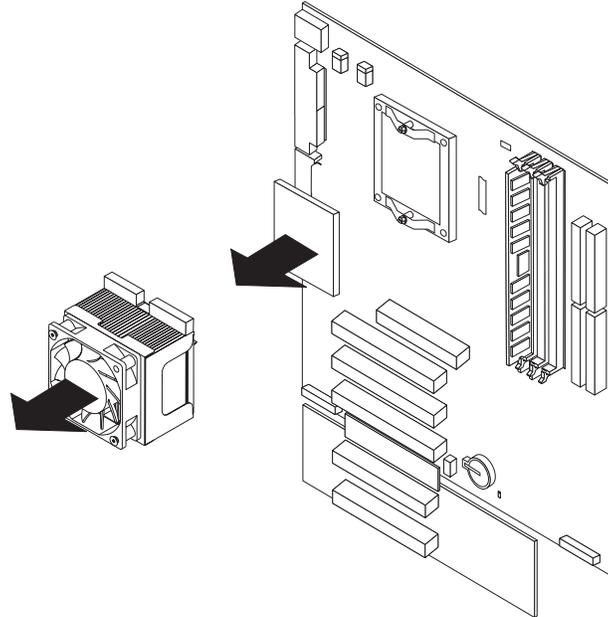
Complete the following steps to remove the microprocessor and fan-sink assembly:

1. Turn off the computer and attached devices; then, disconnect all external cables and power cords.
2. Remove the cover (see “Removing the cover of the 6226” on page 60).

3. Rotate the CD-ROM drive cage up.
4. Disconnect any cables that impede access to the microprocessor.
5. Remove the fan-sink assembly from the microprocessor:

**Note:** The fan and underlying heat sink are attached and do not need to be separated from each other. Remove the fan-sink assembly from the microprocessor as a single unit.

- a. Detach the fan-sink cable.



- b. Loosen the two captive screws (in leaf-spring enclosures) on either side of the fan-sink assembly.
- c. With the two captive screws loosened, pivot the leaf spring assemblies outward and out of the notches on the fan-sink assembly.
- d. Lift the fan-sink assembly up and out of the computer.

**Note:** It might be necessary to gently twist the fan-sink assembly to loosen it from the microprocessor.

**Important:** Be careful when handling the adhesive material on the microprocessor. If the adhesive material on the microprocessor will be reused, do not contaminate it. If replacement adhesive material is provided with the replacement part, be sure to remove all traces of existing adhesive material from the microprocessor before applying the new adhesive material.

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.

To install a microprocessor, reverse the previous steps.

## System board

### Notes:

1. Read “Before you begin” on page 41, “Handling electrostatic discharge-sensitive devices” on page 132, and the safety notices at “Safety information” on page 129.
2. When replacing the system board, you must either update the system with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image.

Complete the following steps to remove the system board:

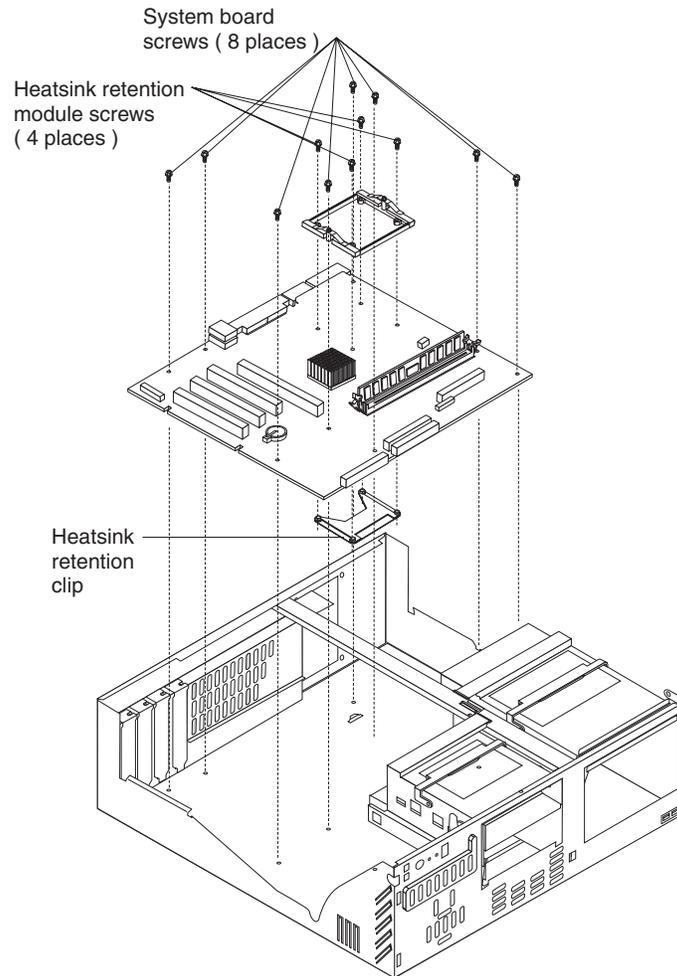
1. Turn off the computer and attached devices; then, disconnect all external cables and power cords.
2. Remove the cover (see “Removing the cover of the 6226” on page 60).
3. Remove any of the following components that are installed on the system board:
  - Microprocessor (see “Microprocessor/fan-sink assembly” on page 91).

**Important:** If you plan to reinstall an existing microprocessor to the new system board, be careful when handling the adhesive material on the microprocessor. If the adhesive material on the microprocessor will be reused, do not contaminate it. If replacement adhesive material is provided with the replacement system board, be sure to remove all traces of existing adhesive material from the microprocessor before applying the new adhesive material.

- Adapters (see “Working with adapters” on page 60).
  - DIMMs (see “Installing memory modules” on page 70).
4. Disconnect all internal system board cables.

**Note:** The power supply has been removed in the illustration for purposes of clarification (see “Power supply” on page 91). If any installed items impede your ability to easily access the system board, you can remove

them from the computer.



5. Remove the 12 screws that secure the system board to the chassis and put them in a safe place.

**Note:** Four of the screws described in step 5 secure the heat-sink retention module to the heat-sink retention clip, with the system board in between them. It is easier to remove these screws while the system board is positioned in the chassis.

6. Remove the heat-sink retention module and set it aside.
7. Gently slide the system board slightly toward the front of the computer until it disengages from the chassis; then, lift the board up and out of the computer.
8. Remove the heat-sink retention clip.

To install the system board, reverse the previous steps.

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## Symptom-to-FRU index

This index supports the IntelliStation E Pro computer.

### Notes:

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

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

The initial column or columns of the tables in this index lists error codes or messages, and the final column lists one or more suggested actions or FRUs to replace. Take the action (or replace the FRU) suggested first in the list of the entries in the final column, and then restart the computer to see if the problem has been corrected.

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

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

---

## Beep symptoms

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

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

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

Beep/symptom	FRU/action
1-1-2 (Microprocessor register test failed.)	<ul style="list-style-type: none"><li>• <b>Microprocessor</b></li></ul>
1-1-3 (CMOS write/read test failed.)	<ol style="list-style-type: none"><li>1. <b>Battery</b></li><li>2. System board</li></ol>
1-1-4 (BIOS EEPROM checksum failed.)	<ol style="list-style-type: none"><li>1. <b>Recover BIOS code.</b></li><li>2. System board.</li></ol>
1-2-1 (Programmable Interval Timer failed.)	<ul style="list-style-type: none"><li>• <b>System board</b></li></ul>

<b>Beep/symptom</b>	<b>FRU/action</b>
<b>1-2-2</b> (DMA page register test failed.)	• <b>System board</b>
<b>1-2-3</b> (DMA page register write/read failed.)	• <b>System board</b>
<b>1-2-4</b> (RAM refresh verification failed.)	1. <b>DIMM</b> 2. System board
<b>1-3-1</b> (First 64K RAM test failed.)	• <b>DIMM</b> • Memory adapter
<b>1-3-2</b> (First 64K RAM parity test failed.)	• <b>System board</b>
<b>2-1-1</b> (Secondary DMA register failed.)	• <b>System board</b>
<b>2-1-2</b> (Primary DMA register failed.)	• <b>System board</b>
<b>2-1-3</b> (Primary interrupt mask register failed.)	• <b>System board</b>
<b>2-1-4</b> (Secondary interrupt mask register failed)	• <b>System board</b>
<b>2-2-2</b> (Keyboard controller failed.)	1. <b>Keyboard</b> 2. System board
<b>2-4-1</b> (Video failed; screen believed operable.)	• <b>Video card</b>
<b>3-1-1</b> (Timer tick interrupt failed.)	• <b>System board</b>
<b>3-1-2</b> (Interval timer channel 2 failed.)	• <b>System board</b>
<b>3-1-3</b> (RAM test failed above address OFFFFH.)	1. <b>DIMM</b> 2. System board
<b>3-1-4</b> (Time-Of-Day clock failed.)	1. <b>Battery</b> 2. System board
<b>3-2-1</b> (Serial port failed.)	• <b>System board</b>
<b>3-2-2</b> (Parallel port failed.)	• <b>System board</b>
<b>3-2-4</b> (Failure comparing CMOS memory size against actual.)	1. <b>DIMM</b> 2. System board 3. Battery
<b>3-3-1</b> (Memory size mismatch occurred.)	1. <b>DIMM</b> 2. System board 3. Battery
<b>3-3-2</b> (Critical SMBUS error occurred, I2C error.)	1. <b>Disconnect the computer power cord from outlet, wait 30 seconds, and retry.</b> 2. System board. 3. Microprocessor. 4. DIMMs.

Beep/symptom	FRU/action
<b>3-3-3</b> (No operational memory in system.)	<ol style="list-style-type: none"> <li><b>1. Install or reseat the memory modules, and then do a 3-boot reset.</b> (For more information about a 3-boot reset, see “Using the Configuration/Setup Utility program” on page 11.)</li> <li>DIMMs.</li> <li>System board.</li> </ol>

## No-beep symptoms

No-beep symptom	FRU/action
No beep occurs during POST.	<ul style="list-style-type: none"> <li>System board</li> </ul>
No beep, no video, and the system attention LED (if present) is off.	<ul style="list-style-type: none"> <li>System board</li> </ul>
No beep, no video, and the system attention LED (if supported) is on.	<ul style="list-style-type: none"> <li>See “Undetermined problems” on page 117.</li> </ul>
BIST failed.	<ul style="list-style-type: none"> <li>Microprocessor</li> </ul>

## Diagnostic error codes

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

- 000** The test passed.
- 195** The Esc key was pressed to stop the test.
- 197** Warning; a hardware failure might not have occurred.

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

Error code/symptom	FRU/action
<b>001-XXX-000</b> (Failed core tests)	<ul style="list-style-type: none"> <li>System board</li> </ul>
<b>001-XXX-001</b> (Failed core tests)	<ul style="list-style-type: none"> <li>System board</li> </ul>
<b>001-250-000</b> (Failed system board ECC)	<ul style="list-style-type: none"> <li>System board</li> </ul>
<b>001-250-001</b> (Failed system board ECC)	<ul style="list-style-type: none"> <li>System board</li> </ul>
<b>005-XXX-000</b> (Failed video test)	<ol style="list-style-type: none"> <li>Video adapter (if installed)</li> <li>System board</li> </ol>
<b>011-XXX-000</b> (Failed COM1 serial port test)	<ol style="list-style-type: none"> <li>Check loopback plug connected to externalized serial port.</li> <li>Check cable from externalized port to system board.</li> <li>System board.</li> </ol>
<b>011-XXX-001</b> (Failed COM2 serial port test)	<ol style="list-style-type: none"> <li>Check loopback plug connected to externalized serial port.</li> <li>Check cable from externalized port to system board.</li> <li>System board.</li> </ol>
<b>014-XXX-000</b> (Failed parallel port test)	<ul style="list-style-type: none"> <li>System board</li> </ul>

Error code/symptom	FRU/action
<b>015-XXX-001</b> (USB interface not found, board damaged)	1. <b>System board</b>
<b>015-XXX-198</b> (USB device connected during USB test.)	1. <b>Remove USB devices from USB1, USB2, USB3 and USB4; then, run the USB interface test again.</b> 2. System board.
<b>020-XXX-000</b> (Failed PCI interface test.)	• <b>System board</b>
<b>030-XXX-00N</b> (Failed SCSI interface test.)	• <b>If N=0, system board; if N&gt;0, SCSI adapter in slot N.</b>
<b>035-XXX-099</b> (No adapters were found.)	• <b>If adapter is installed re-check connection.</b>
<b>035-XXX-S99</b> (Failed RAID test on PCI slot S. S = number of failing PCI slot.)	1. <b>RAID adapter</b> 2. Cable 3. System board
<b>035-XXX-SNN</b> (s = number of failing PCI slot, nn = SCSI ID of failing fixed disk.)	• <b>Hard disk drive with SCSI ID nn on RAID adapter in PCI slot s</b>
<b>035-253-S99</b> (RAID adapter initialization failure.)	1. <b>ServeRAID™ adapter in slot s is not configured properly.</b> Obtain the basic and extended configuration status and see the <i>ServeRAID Hardware Maintenance Manual</i> for more information. 2. Cable. 3. Adapter.
<b>089-XXX-001</b> (Failed microprocessor test.)	1. <b>Verify microprocessor 1 is installed an seated correctly.</b> 2. Verify BIOS code is at latest level. 3. Microprocessor 1. 4. System board.
<b>089-XXX-002</b> (Failed optional microprocessor test.)	1. <b>Verify microprocessor 2 is installed an seated correctly.</b> 2. Verify BIOS code is at latest level. 3. Microprocessor 2. 4. System board.
<b>201-XXX-0NN</b> (Failed memory test.)	1. <b>DIMM Location slots 1-2 where nn = DIMM location</b> <b>Note:</b> nn 1=DIMM 1; 2=DIMM 2 2. System board
<b>201-XXX-999</b> (Multiple DIMM failure, see error text.)	1. <b>See error text for failing DIMMs.</b> 2. System board.
<b>202-XXX-001</b> (Failed system cache test.)	1. <b>Verify microprocessor 1 is installed an seated correctly.</b> 2. Verify BIOS code is at latest level. 3. Microprocessor 1. 4. System board.
<b>202-XXX-002</b> (Failed system cache test.)	1. <b>Verify microprocessor 2 is installed an seated correctly.</b> 2. Verify BIOS code is at latest level. 3. Microprocessor 2. 4. System board.
<b>206-XXX-000</b> (Failed diskette drive test.)	1. <b>Try test with another diskette.</b> 2. Cable. 3. Diskette drive. 4. System board.

Error code/symptom	FRU/action
<b>215-XXX-000</b> (Failed IDE CD-ROM drive test.)	<ol style="list-style-type: none"> <li>1. <b>Try test with another CD-ROM.</b></li> <li>2. CD-ROM drive cables.</li> <li>3. CD-ROM drive.</li> <li>4. System board.</li> </ol>
<b>217-198-XXX</b> (Could not establish drive parameters.)	<ol style="list-style-type: none"> <li>1. <b>Check cable and termination.</b></li> <li>2. SCSI backplane.</li> <li>3. Hard disk.</li> </ol>
<b>217-XXX-000</b> (Failed BIOS hard disk test) <b>Note:</b> If RAID is configured, the hard disk number refers to the RAID logical array.	<ol style="list-style-type: none"> <li>1. <b>Fixed disk 1 (hard disk drive 1)</b></li> <li>2. System board</li> </ol>
<b>217-XXX-001</b> (Failed BIOS hard disk test) <b>Note:</b> If RAID is configured, the hard disk number refers to the RAID logical array.	<ol style="list-style-type: none"> <li>1. <b>Fixed disk 2 (hard disk drive 2)</b></li> <li>2. System board</li> </ol>
<b>301-XXX-000</b> (Failed keyboard test.)	<ol style="list-style-type: none"> <li>1. <b>Keyboard</b></li> <li>2. System board</li> </ol>
<b>302-XXX-000</b> (Failed mouse test.)	<ol style="list-style-type: none"> <li>1. <b>Mouse</b></li> <li>2. System board</li> </ol>
<b>405-XXX-000</b> (Failed Ethernet test on controller on the system board.)	<ol style="list-style-type: none"> <li>1. <b>Verify that Ethernet is not disabled in BIOS.</b></li> <li>2. System board.</li> </ol>
<b>405-XXX-00N</b> (Failed Ethernet test on adapter in PCI slot <i>n</i> .)	<ol style="list-style-type: none"> <li>1. <b>For n=0, system board</b></li> <li>2. For n&gt;0, adapter in PCI slot <i>n</i></li> <li>3. System board</li> </ol>
<b>415-XXX-000</b> (Failed Modem test.)	<ol style="list-style-type: none"> <li>1. <b>Cable</b> <b>Note:</b> Ensure modem is present and attached to computer.</li> <li>2. Modem</li> <li>3. System board</li> </ol>

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## Error symptoms

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

If you cannot find the problem in the error symptom charts, go to “Starting the diagnostic programs and viewing the test log” on page 24 to test the computer.

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

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

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

<b>CD-ROM drive problems</b>	
<b>Symptom</b>	<b>FRU/action</b>
CD-ROM drive is not recognized.	<ol style="list-style-type: none"> <li><b>Verify that:</b> <ul style="list-style-type: none"> <li>The IDE channel to which the CD-ROM drive is attached (primary or secondary) is enabled in the Configuration/Setup Utility program.</li> <li>All cables and jumpers are installed correctly.</li> <li>The correct device driver is installed for the CD-ROM drive.</li> </ul> </li> <li>Run CD-ROM drive diagnostics.</li> <li>CD-ROM drive.</li> </ol>
CD is not working properly.	<ol style="list-style-type: none"> <li><b>Clean the CD.</b></li> <li>Run CD-ROM drive diagnostics.</li> <li>CD-ROM drive.</li> </ol>
CD-ROM drive tray is not working. (The computer must be turned on.)	<ol style="list-style-type: none"> <li><b>Insert the end of a straightened paper clip into the manual tray-release opening.</b></li> <li>Run CD-ROM drive diagnostics.</li> <li>CD-ROM drive.</li> </ol>

<b>Diskette drive problems</b>	
<b>Symptom</b>	<b>FRU/action</b>
Diskette drive activity LED stays on, or the system bypasses the diskette drive.	<ol style="list-style-type: none"> <li><b>If there is a diskette in the drive, verify that:</b> <ul style="list-style-type: none"> <li>The diskette drive is enabled in the Configuration/Setup utility program.</li> <li>The diskette is good and not damaged. (Try another diskette if you have one.)</li> <li>The diskette is inserted correctly in the drive.</li> <li>The diskette contains the necessary files to start the computer.</li> <li>The software program is working properly.</li> <li>The cable is installed correctly (in the proper orientation).</li> </ul> </li> <li>To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.).</li> <li>Run diskette drive diagnostics.</li> <li>Cable.</li> <li>Diskette drive.</li> <li>System board.</li> </ol>

<b>Expansion enclosure problems</b>	
<b>Symptom</b>	<b>FRU/action</b>
The SCSI expansion enclosure used to work but does not work now.	<ol style="list-style-type: none"> <li><b>Verify that:</b> <ul style="list-style-type: none"> <li>The cables for all external SCSI options are connected correctly.</li> <li>The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly.</li> <li>Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the computer.</li> </ul> </li> <li>For more information, see your SCSI expansion enclosure documentation.</li> </ol>

<b>Hark disk drive problems</b>	
<b>Symptom</b>	<b>FRU/action</b>
Not all drives are recognized by the hard disk drive diagnostic test (Fixed Disk test).	<ol style="list-style-type: none"> <li>1. <b>Remove the first drive not recognized and try the hard disk drive diagnostic test again.</b></li> <li>2. If the remaining drives are recognized, replace the drive you removed with a new one.</li> </ol>
System stops responding during hard disk drive diagnostic test.	<ol style="list-style-type: none"> <li>1. <b>Remove the hard disk drive being tested when the computer stopped responding and try the diagnostic test again.</b></li> <li>2. If the hard disk drive diagnostic test runs successfully, replace the drive you removed with a new one.</li> </ol>

<b>General problems</b>	
<b>Symptom</b>	<b>FRU/action</b>
Problems such as broken cover locks or indicator LEDs not working	<ul style="list-style-type: none"> <li>• <b>Broken CRU/FRU</b></li> </ul>

<b>Intermittent problems</b>	
<b>Symptom</b>	<b>FRU/action</b>
A problem occurs only occasionally and is difficult to detect.	<ol style="list-style-type: none"> <li>1. <b>Verify that:</b> <ul style="list-style-type: none"> <li>• All cables and cords are connected securely to the rear of the computer and attached options.</li> <li>• When the computer is turned on, air is flowing from the rear of the computer at the fan grill. If there is no airflow, the fan is not working. This causes the computer to overheat and shut down.</li> <li>• Ensure that the SCSI bus and devices are configured correctly and that the last external device in each SCSI chain is terminated correctly.</li> </ul> </li> <li>2. Check the system error log.</li> </ol>

<b>Keyboard, mouse, or pointing-device problems</b>	
<b>Symptom</b>	<b>FRU/action</b>
All or some keys on the keyboard do not work.	<ol style="list-style-type: none"> <li>1. <b>Verify that:</b> <ul style="list-style-type: none"> <li>• The keyboard cable is securely connected to the system, and the keyboard and mouse cables are not reversed.</li> <li>• Both the computer and the monitor are turned on.</li> </ul> </li> <li>2. Keyboard.</li> <li>3. System board.</li> </ol>
The mouse or pointing device does not work.	<ol style="list-style-type: none"> <li>1. <b>Verify that:</b> <ul style="list-style-type: none"> <li>• The mouse or pointing-device cable is securely connected, and that the keyboard and mouse cables are not reversed.</li> <li>• The mouse device drivers are installed correctly.</li> <li>• Both the computer and the monitor are turned on.</li> </ul> </li> <li>2. Mouse or pointing device.</li> <li>3. System board.</li> </ol>

<b>Memory problems</b>	
<b>Symptom</b>	<b>FRU/action</b>
The amount of system memory displayed is less than the amount of physical memory installed.	<ol style="list-style-type: none"> <li>1. <b>Verify that:</b> <ul style="list-style-type: none"> <li>• The memory modules are seated properly.</li> <li>• You have installed the correct type of memory.</li> <li>• If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program.</li> <li>• All banks of memory on the DIMMs are enabled. The computer might have automatically disabled a DIMM bank when it detected a problem or a DIMM bank could have been manually disabled.</li> </ul> </li> <li>2. Check POST error log for error message 289:           <ul style="list-style-type: none"> <li>• If the DIMM was disabled by a system-management interrupt (SMI), replace the DIMM.</li> <li>• If the DIMM was disabled by the user or by POST:               <ol style="list-style-type: none"> <li>a. Start the Configuration/Setup Utility program.</li> <li>b. Enable the DIMM.</li> <li>c. Save the configuration and restart the computer.</li> </ol> </li> </ul> </li> <li>3. DIMM.</li> <li>4. System board.</li> </ol>

<b>Microprocessor problems</b>	
<b>Symptom</b>	<b>FRU/action</b>
The computer emits a continuous tone during POST. (The startup (boot) microprocessor is not working properly.)	<ol style="list-style-type: none"> <li>1. <b>Verify that the startup microprocessor is seated properly.</b></li> <li>2. Startup microprocessor.</li> </ol>

<b>Monitor problems</b>	
<b>Symptom</b>	<b>FRU/action</b>
Testing the monitor.	<ul style="list-style-type: none"> <li>• <b>See the information that comes with the monitor</b> for adjusting and testing instructions. (Some IBM monitors have their own self-tests.)</li> </ul>

Monitor problems	
Symptom	FRU/action
The screen is blank.	<ol style="list-style-type: none"> <li><b>Verify that:</b> <ul style="list-style-type: none"> <li>The computer power cord is plugged into the computer and a working electrical outlet.</li> <li>The monitor cables are connected properly.</li> <li>The monitor is turned on and the Brightness and Contrast controls are adjusted correctly.</li> <li>If the computers are C2T chained together, verify that: <ul style="list-style-type: none"> <li>The C2T chain cables are securely connected to the computers.</li> <li>The C2T breakout cable is connected properly.</li> <li>A computer that is turned on is selected.</li> </ul> </li> </ul> </li> </ol> <p><b>Important:</b> In some memory configurations, the 3-3-3 beep code might sound during POST followed by a blank display screen. If this occurs and the <b>Boot Fail Count</b> feature in the Start Options of the Configuration/Setup Utility program is set to <b>Enabled</b> (its default setting), you must restart the computer three times to force the system BIOS code to reset the CMOS values to the default configuration (memory connector or bank of connectors enabled).</p> <ol style="list-style-type: none"> <li>If you have verified these items and the screen remains blank, replace: <ol style="list-style-type: none"> <li>Monitor</li> <li>Video adapter, if installed</li> <li>System board</li> </ol> </li> </ol>
Only the cursor appears.	<ul style="list-style-type: none"> <li>See "Undetermined problems" on page 117.</li> </ul>
The monitor works when you turn on the computer but goes blank when you start some application programs.	<ol style="list-style-type: none"> <li><b>Verify that:</b> <ul style="list-style-type: none"> <li>The application program is not setting a display mode higher than the capability of the monitor.</li> <li>The primary monitor cable is connected to the C2T device breakout cable.</li> <li>You installed the necessary device drivers for the applications.</li> </ul> </li> <li>If you have verified these items and the screen remains blank, replace the monitor.</li> <li>Video adapter.</li> <li>System board.</li> </ol>
The screen is wavy, unreadable, rolling, distorted, or has screen jitter.	<ol style="list-style-type: none"> <li><b>If the monitor self-tests show the monitor is working properly, consider the location of the monitor.</b> Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor. <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.).</li> <li>Non-IBM monitor cables might cause unpredictable problems.</li> <li>An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, contact your IBM reseller or IBM marketing representative.</li> </ol> </li> <li>Monitor.</li> <li>Video adapter, if installed.</li> <li>System board.</li> </ol>

<b>Monitor problems</b>	
<b>Symptom</b>	<b>FRU/action</b>
Wrong characters appear on the screen.	<ol style="list-style-type: none"> <li>1. If the wrong language is displayed, update the BIOS code with the correct language.</li> <li>2. Monitor.</li> <li>3. Video adapter, if installed.</li> <li>4. System board.</li> </ol>
No video.	<ol style="list-style-type: none"> <li>1. <b>Make sure the correct machine is selected, if applicable.</b></li> <li>2. Make sure all cables are locked down.</li> </ol>

<b>Option problems</b>	
<b>Symptom</b>	<b>FRU/action</b>
An IBM option that was just installed does not work.	<ol style="list-style-type: none"> <li>1. <b>Verify that:</b> <ul style="list-style-type: none"> <li>• The option is designed for the computer (see the ServerProven<sup>®</sup> list on the World Wide Web at <a href="http://www.ibm.com/pc/compat/">http://www.ibm.com/pc/compat/</a>).</li> <li>• You followed the installation instructions that came with the option.</li> <li>• The option is installed correctly.</li> <li>• You have not loosened any other installed options or cables.</li> <li>• You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration.</li> </ul> </li> <li>2. Option you just installed.</li> </ol>
An IBM option that used to work does not work now.	<ol style="list-style-type: none"> <li>1. <b>Verify that all of the option hardware and cable connections are secure.</b></li> <li>2. If the option comes with its own test instructions, use those instructions to test the option.</li> <li>3. If the failing option is a SCSI option, verify that: <ul style="list-style-type: none"> <li>• The cables for all external SCSI options are connected correctly.</li> <li>• The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly.</li> <li>• Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the computer.</li> </ul> </li> <li>4. Failing option.</li> </ol>

<b>Power problems</b>	
<b>Symptom</b>	<b>FRU/action</b>
Power switch does not work and reset button, if supported, does work.	<ol style="list-style-type: none"> <li>1. <b>Reseat connector.</b></li> <li>2. Power switch card.</li> <li>3. System board.</li> </ol>

Power problems	
Symptom	FRU/action
The computer does not turn on.	<ol style="list-style-type: none"> <li><b>Verify that:</b> <ul style="list-style-type: none"> <li>The power cables are properly connected to the computer.</li> <li>The electrical outlet functions properly.</li> <li>The type of memory installed is correct.</li> <li>If you just installed an option, remove it, and restart the computer. If the computer now turns on, you might have installed more options than the power supply supports.</li> </ul> </li> <li>Override front panel power button: <ol style="list-style-type: none"> <li>Disconnect computer power cords.</li> <li>Reconnect power cords.</li> </ol> <p>If computer turns on:</p> <ol style="list-style-type: none"> <li>Operator information panel</li> </ol> <p>If computer does not turn on:</p> <ul style="list-style-type: none"> <li>System board</li> </ul> </li> <li>See "Undetermined problems" on page 117.</li> </ol>
The computer does not turn off.	<ol style="list-style-type: none"> <li><b>Verify whether you are using an ACPI or non-ACPI operating system.</b> If you are using a non-ACPI operating system: <ol style="list-style-type: none"> <li>Press Ctrl+Alt+Delete.</li> <li>Turn off the system by holding the power-control button for 4 seconds.</li> <li>If computer fails during BIOS POST and power-control button does not work, remove the AC power cord.</li> </ol> </li> <li>If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.</li> </ol>

Serial port problems	
Symptom	FRU/action
The number of serial ports identified by the operating system is less than the number of serial ports installed.	<ol style="list-style-type: none"> <li><b>Verify that:</b> <ul style="list-style-type: none"> <li>Each port is assigned a unique address by the Configuration/Setup Utility program and none of the serial ports is disabled.</li> <li>The serial-port adapter, if you installed one, is seated properly.</li> </ul> </li> <li>Failing serial port adapter.</li> </ol>
A serial device does not work.	<ol style="list-style-type: none"> <li><b>Verify that:</b> <ul style="list-style-type: none"> <li>The device is compatible with the computer.</li> <li>The serial port is enabled and is assigned a unique address.</li> <li>The device is connected to the correct port (see "Input/output connector locations" on page 74).</li> </ul> </li> <li>Failing serial device.</li> <li>Serial adapter, if installed.</li> <li>System board.</li> </ol>

Software problem	
Symptom	FRU/action
Suspected software problem.	<ol style="list-style-type: none"> <li>1. <b>To determine if problems are caused by the software, verify that:</b> <ul style="list-style-type: none"> <li>• The computer has the minimum memory needed to use the software. For memory requirements, see the information that comes with the software. <b>Note:</b> If you have just installed an adapter or memory, you might have a memory address conflict.</li> <li>• The software is designed to operate on the computer.</li> <li>• Other software works on the computer.</li> <li>• The software that you are using works on another system.</li> </ul> <p>If you received any error messages when using the software program, see the information that comes with the software for a description of the messages and suggested solutions to the problem.</p> </li> <li>2. If you have verified these items and the problem remains, contact your place of purchase.</li> </ol>

Universal Serial Bus (USB) port problems	
Symptom	FRU/action
A USB device does not work.	<ul style="list-style-type: none"> <li>• <b>Verify that:</b> <ul style="list-style-type: none"> <li>– You are not trying to use a USB device during POST if you have a standard (non-USB) keyboard attached to the keyboard port. <b>Note:</b> If a standard (non-USB) keyboard is attached to the keyboard port, the USB is disabled and no USB device will work during POST.</li> <li>– The correct USB device driver is installed.</li> <li>– The operating system supports USB devices.</li> </ul> </li> </ul>

## POST error codes

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

Error code/symptom	FRU/action
<b>062</b> (Three consecutive boot failures using the default configuration.)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. Battery.</li> <li>3. System board.</li> <li>4. Microprocessor.</li> </ol>
<b>101, 102, 106</b> (System and processor error)	<ul style="list-style-type: none"> <li>• <b>System board</b></li> </ul>
<b>114</b> (Adapter read-only memory error)	<ol style="list-style-type: none"> <li>1. <b>Failing adapter.</b></li> <li>2. Run diagnostics.</li> </ol>
<b>151</b> (Real time clock error)	<ol style="list-style-type: none"> <li>1. <b>Run diagnostics.</b></li> <li>2. Battery.</li> <li>3. System board.</li> </ol>
<b>161</b> (Real time clock battery error)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. Battery.</li> <li>3. System board.</li> </ol>

Error code/symptom	FRU/action
<b>162</b> (Device configuration error) <b>Note:</b> Be sure to load the default settings and any additional desired settings; then, <i>save the configuration</i> .	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. Battery.</li> <li>3. Failing device.</li> <li>4. System board.</li> </ol>
<b>163</b> (Real-time clock error)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. Battery.</li> <li>3. System board.</li> </ol>
<b>164</b> (Memory configuration changed.)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. DIMM.</li> <li>3. System board.</li> </ol>
<b>184</b> (Power-on password damaged)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. System board.</li> </ol>
<b>185</b> (Drive startup sequence information corrupted)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. System board.</li> </ol>
<b>187</b> (VPD serial number not set.)	<ol style="list-style-type: none"> <li>1. <b>Set serial number in the Configuration/Setup Utility program.</b></li> <li>2. System board.</li> </ol>
<b>188</b> (Bad EEPROM CRC #2)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. System board.</li> </ol>
<b>189</b> (An attempt made to enter the system with invalid passwords)	<ul style="list-style-type: none"> <li>• <b>Run the Configuration/Setup Utility program.</b></li> </ul>
<b>201</b> (Memory test error.)	<ol style="list-style-type: none"> <li>1. <b>DIMM</b></li> <li>2. System board</li> </ol>
<b>289</b> (DIMM disabled by the user or system.)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. DIMM.</li> <li>3. System board.</li> </ol>
<b>301</b> (Keyboard or keyboard controller error)	<ol style="list-style-type: none"> <li>1. <b>Keyboard</b></li> <li>2. System board</li> </ol>
<b>303</b> (Keyboard controller error)	<ul style="list-style-type: none"> <li>• <b>System board</b></li> </ul>
<b>602</b> (Invalid diskette boot record)	<ol style="list-style-type: none"> <li>1. <b>Diskette</b></li> <li>2. Diskette drive</li> <li>3. Drive cable</li> <li>4. System board</li> </ol>
<b>604</b> (Diskette drive error)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program and diagnostics.</b></li> <li>2. Diskette drive.</li> <li>3. Drive cable.</li> <li>4. System board.</li> </ol>
<b>662</b> (Diskette drive configuration error)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program and diagnostics.</b></li> <li>2. Diskette drive.</li> <li>3. Drive cable.</li> <li>4. System board.</li> </ol>

<b>Error code/symptom</b>	<b>FRU/action</b>
<b>962</b> (Parallel port error)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. System board.</li> </ol>
<b>11XX</b> (System board serial port 1 or 2 error)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. System board.</li> </ol>
<b>1762</b> (Hard drive configuration error, IDE only.)	<ol style="list-style-type: none"> <li>1. <b>Hard disk drive.</b></li> <li>2. Hard disk cables.</li> <li>3. Run the Configuration/Setup Utility program.</li> <li>4. System board.</li> </ol>
<b>178X</b> (Hard drive error, IDE only.)	<ol style="list-style-type: none"> <li>1. <b>Hard disk cables</b></li> <li>2. Hard disk adapter</li> <li>3. Hard disk drive</li> <li>4. System board</li> </ol>
<b>1800</b> (No more hardware interrupt available for PCI adapter.)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. Remove adapter.</li> </ol>
<b>1801</b> (No more ROM space available for PIC adapter.)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. Remove adapter.</li> <li>3. Disable the adapter BIOS and run the Configuration/Setup Utility program.</li> </ol>
<b>1962</b> (Drive does not contain a valid boot sector)	<ol style="list-style-type: none"> <li>1. <b>Verify that a startable operating system is installed.</b></li> <li>2. Run diagnostics.</li> <li>3. Hard disk drive.</li> <li>4. SCSI backplane.</li> <li>5. Cable.</li> <li>6. System board.</li> </ol>
<b>5962</b> (IDE CD-ROM drive configuration error)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. CD-ROM drive.</li> <li>3. CD-ROM power cable.</li> <li>4. IDE cable.</li> <li>5. System board.</li> <li>6. Battery.</li> </ol>
<b>8603</b> (Pointing-device error)	<ol style="list-style-type: none"> <li>1. <b>Pointing device</b></li> <li>2. System board</li> </ol>
<b>00012000</b> (Machine check architecture error.)	<ol style="list-style-type: none"> <li>1. <b>Microprocessor</b></li> <li>2. System board</li> </ol>
<b>00019701</b> (Microprocessor 1 failed)	<ol style="list-style-type: none"> <li>1. <b>Microprocessor</b></li> <li>2. System board</li> </ol>
<b>00180200</b> (No more I/O space available for PCI adapter.)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. Adapter.</li> <li>3. System board.</li> </ol>
<b>00180300</b> (No more memory above 1MB for PCI adapter.)	<ol style="list-style-type: none"> <li>1. <b>Run the Configuration/Setup Utility program.</b></li> <li>2. Adapter.</li> <li>3. System board.</li> </ol>

Error code/symptom	FRU/action
<b>00180500</b> (PCI option ROM checksum error.)	<ol style="list-style-type: none"> <li><b>PCI adapter</b></li> <li>System board</li> </ol>
<b>00180600</b> (PCI device BIST failure. PCI bridge error.)	<ol style="list-style-type: none"> <li><b>Run the Configuration/Setup Utility program.</b></li> <li>Adapter.</li> <li>System board.</li> </ol>
<b>00180700</b> (PCI device no responding.)	<ol style="list-style-type: none"> <li><b>System board</b></li> <li>PCI adapter</li> </ol>
<b>00181000</b> (General PCI error)	<ul style="list-style-type: none"> <li><b>Adapter</b></li> <li>System board</li> </ul>
<b>I9990650</b> (AC power has been restored)	<ol style="list-style-type: none"> <li><b>Check cable.</b></li> <li>Check for interruption of power.</li> <li>Power cable.</li> </ol>

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## POST (ISPR) error procedures

Use the ISPR error procedures to help you solve ServeRAID problems. A complete list of error codes is listed at “ServeRAID error codes” on page 111.

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

### EF10 (Default ISPR)

- No ISPR error present.

**9ZXX thru BZXX** (SCSI bus error caused by cables, termination, or defective drives.)

- Isolate the SCSI subsystem from the controller by disconnecting all hard disk drive cables from the suspect adapter, and restart the computer.

#### **CAUTION:**

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

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

- Reseat the controller
- Replace the controller

#### **Notes:**

- SCSI channel cable details, if any, appear elsewhere in this publication.
  - The adapter/controller detects a configuration change. *Do not* select **Save Changes**. Instead, press F10 to bypass any options to this effect.
- If ISPR error is **EF10** after disconnecting cables:
    - Identify which channel is causing the error by the second digit (Z) of the original ISPR code as indicated in the following table:

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

Table 3. SCSI identifier

SCSI channel code	Descriptions
1	Channel 1
2	Channel 2
3	Channel 1 and 2
4	Channel 3
5	Channel 1 and 3
6	Channel 2 and 3
7	Channel 1, 2, and 3
8	Channel 4
9	Channel 1 and 4
A	Channel 2 and 4
B	Channel 1, 2, and 4
C	Channel 3 and 4
D	Channel 1, 3, and 4
E	Channel 2, 3, and 4
F	Channel 1, 2, 3, and 4

- b. Confirm that the channels identified from the error in step 2a on page 109 are the cause of the error by verifying that the error presents itself *only* when the offending channel is reconnected.
- c. Check the termination of the identified channel.

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

- d. Check for proper backplane jumper configuration.

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

- e. Check for proper cabling configuration in systems that use hard disk drive status cables. Reconnect all cables removed in step 1 on page 109.
- f. Disconnect one drive at a time attached to the channel identified in step 2a on page 109; then, restart the computer to determine which drive is causing the error.
- g. Replace the hard disk drive cable.
- h. Replace the hard disk drive backplane.

#### FFFF or other code not listed

1. Place download jumpers on the controller and try to flash the firmware code to the adapter.
2. Isolate the SCSI subsystem from the controller by disconnecting all hard disk drive cables attached to the suspect adapter, and restart the computer.

#### CAUTION:

**Do not press F5. Doing so will change the configuration of the server.**

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

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

- b. Check the termination of the channel that was identified in step 2a on page 110.
 

**Note:** SCSI channel termination details, if any, appear elsewhere in this publication.
  - c. Disconnect one drive at a time attached to the channel identified in step 2a on page 110 and reboot each time to determine which drive is causing the problem.
  - d. Replace the hard disk drive cable attached to the channel identified in step 2a on page 110.
  - e. Replace the backplane attached to the channel identified in step 2a on page 110.
3. If original ISPR code is still present after disconnecting all hard disk drive cables and restarting the computer, perform the following actions until the error is no longer present:
    - Reseat the controller
    - Replace the controller

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## ServeRAID error codes

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

Error code/symptom	FRU/action
1xxx (Microcode checksum error)	1. ServeRAID controller
2xxx (Code DRAM error)	1. Install download jumpers, flash latest level BIOS code and firmware for controller. Remove jumpers. 2. ServeRAID controller.
3000-31XX (Code DRAM error)	1. Install download jumpers, flash latest level BIOS code and firmware for controller. Remove jumpers. 2. ServeRAID controller.
3200 (Code DRAM error)	1. Install download jumpers, flash latest level BIOS code and firmware for controller. Remove jumpers. 2. ServeRAID controller.
3300 (ServeRAID-5i only)	1. Install ServeRAID-5i controller in an extended PCI option slot. See the documentation that came with the server for more information.
3E20 (ServeRAID-5i only)	1. Remove the ServeRAID-5i controller from its slot and install it in the proper PCI option slot. 2. Verify that the ServeRAID-5i controller is supported in this server. 3. ServeRAID-5i controller. 4. System board.
3E2x	1. Reseat the ServeRAID controller. 2. Flash latest level of BIOS code and firmware for controller. 3. ServeRAID-5i controller. 4. Integrated RAID controller on server).

Error code/symptom	FRU/action
4xxx thru 5xxx (Code DRAM error)	<ol style="list-style-type: none"> <li>1. Install download jumpers, flash latest level BIOS code and firmware for controller; then, remove jumpers.</li> <li>2. ServeRAID controller.</li> </ol>
6xxx (Cache DRAM error) (ServeRAID-4H only)	<ol style="list-style-type: none"> <li>1. Reseat adapter.</li> <li>2. Install download jumpers, flash latest level BIOS code and firmware for controller; then, remove jumpers.</li> <li>3. ServeRAID controller.</li> </ol>
7xxx thru 8xxx (Host/local PCI bus interface error)	<ol style="list-style-type: none"> <li>1. Flash latest level of BIOS code and firmware for controller.</li> <li>2. If ServeRAID-4x controller, replace controller.</li> <li>3. If ServeRAID-5i controller, integrated RAID controller on the server.</li> </ol>
9003	<ol style="list-style-type: none"> <li>1. Flash latest level of BIOS code and firmware for controller.</li> <li>2. Confirm that this controller is a supported option for this system.</li> <li>3. ServeRAID controller.</li> <li>4. Integrated RAID controller on the server).</li> </ol>
9xxx thru BZxx (SCSI bus error caused by cables, termination, defective drives, etc.). Z refers to the specific channel or channels that cause the error.	<ol style="list-style-type: none"> <li>1. Follow indications at "POST (ISPR) error procedures" on page 109. Follow those instructions before continuing with the next steps listed in this index.</li> <li>2. Hard disk drive cable.</li> <li>3. Hard disk drive backplane.</li> <li>4. Hard disk drive.</li> <li>5. ServeRAID controller.</li> </ol>
EFFF (Firmware code corrupt or download jumpers are in place)	<ol style="list-style-type: none"> <li>1. Flash latest level BIOS code and firmware for controller; then, remove jumpers.</li> <li>2. ServeRAID controller.</li> </ol>
FFFF or other code not listed	<ol style="list-style-type: none"> <li>1. Follow indications at "POST (ISPR) error procedures" on page 109.</li> <li>2. Hard disk drive cable.</li> <li>3. Hard disk drive backplane.</li> <li>4. Hard disk drive.</li> <li>5. ServeRAID controller.</li> </ol>

## SCSI error codes

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

## Temperature error messages

Message	Action
<b>DASD Over Temperature</b> (level-critical; direct access storage device bay <i>x</i> was over temperature)	<ul style="list-style-type: none"> <li>• <b>Ensure that the system is being properly cooled;</b> see “System reliability considerations” on page 41.</li> </ul>
<b>DASD Over recommended Temperature (sensor <i>x</i>)</b> (level-warning; DASD bay <i>x</i> had over temperature condition)	<ul style="list-style-type: none"> <li>• <b>Ensure that the system is being properly cooled;</b> see “System reliability considerations” on page 41.</li> </ul>
<b>DASD under recommended temperature (sensor <i>x</i>)</b> (level-warning; direct access storage device bay <i>x</i> had under temperature condition)	<ul style="list-style-type: none"> <li>• <b>Ambient temperature must be within normal operating specifications;</b> see “Features and specifications” on page 4.</li> </ul>
<b>DASD Over Temperature</b> (level-critical; sensor for DASD1 reported temperature over recommended range)	<ul style="list-style-type: none"> <li>• <b>Ensure system is being properly cooled;</b> see “System reliability considerations” on page 41.</li> </ul>
<b>Power supply <i>x</i> Temperature Fault</b> (level-critical; power supply <i>x</i> had over temperature condition)	<ol style="list-style-type: none"> <li>1. <b>Ensure system is being properly cooled;</b> see “System reliability considerations” on page 41.</li> <li>2. Replace power supply <i>x</i></li> </ol>
<b>System board is over recommended temperature</b> (level-warning; system board is over recommended temperature)	<ol style="list-style-type: none"> <li>1. <b>Ensure system is being properly cooled;</b> see “System reliability considerations” on page 41.</li> <li>2. Replace the system board.</li> </ol>
<b>System board is under recommended temperature</b> (level-warning; system board is under recommended temperature)	<ul style="list-style-type: none"> <li>• <b>Ambient temperature must be within normal operating specifications;</b> see “Features and specifications” on page 4.</li> </ul>
<b>System over temperature for CPU <i>x</i></b> (level-warning; CPU <i>x</i> reporting over temperature condition)	<ul style="list-style-type: none"> <li>• <b>Ensure system is being properly cooled;</b> see “System reliability considerations” on page 41.</li> </ul>
<b>System under recommended CPU <i>x</i> temperature</b> (level-warning; system reporting under temperature condition for CPU <i>x</i> )	<ul style="list-style-type: none"> <li>• <b>Ambient temperature must be within normal operating specifications;</b> see “Features and specifications” on page 4.</li> </ul>

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## Fan error messages

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

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## Power error messages

Message	Action
<b>Power supply x current share fault</b> (level-critical; excessive current demand on power supply x)	<ul style="list-style-type: none"><li>• <b>Replace power supply x.</b></li></ul>
<b>Power supply x DC good fault</b> (level-critical; power good signal not detected for power supply x)	<ul style="list-style-type: none"><li>• <b>Replace power supply x.</b></li></ul>
<b>Power supply x temperature fault</b>	<ul style="list-style-type: none"><li>• <b>Replace power supply x.</b></li></ul>
<b>Power supply x removed</b>	<ul style="list-style-type: none"><li>• <b>No action required - information only.</b></li></ul>
<b>Power supply x fan fault</b> (level-critical; fan fault in power supply x)	<ul style="list-style-type: none"><li>• <b>Replace power supply x.</b></li></ul>
<b>Power supply x 12 V fault</b> (level-critical; overcurrent condition detected)	<ul style="list-style-type: none"><li>• <b>See “Power checkout” on page 31.</b></li></ul>
<b>Power supply x 3.3 V fault</b> (level-critical; 3.3 V power supply x had an error)	<ul style="list-style-type: none"><li>• <b>See “Power checkout” on page 31.</b></li></ul>
<b>Power supply x 5 V fault</b> (level-critical; 5 V power supply x had an error)	<ul style="list-style-type: none"><li>• <b>See “Power checkout” on page 31.</b></li></ul>
<b>System running non-redundant power</b> (level-noncritical; system does not have redundant power)	<ol style="list-style-type: none"><li>1. <b>Add another power supply.</b></li><li>2. Remove options from system.</li><li>3. System can continue to operate without redundancy protection if steps 1 and 2 are not followed.</li></ol>
<b>System under recommended voltage for x</b> (level-warning; indicated voltage supply under nominal value; value for x can be +12, -12, or +5)	<ol style="list-style-type: none"><li>1. <b>Check connections to the power subsystem.</b></li><li>2. Power supply.</li></ol>

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## System shutdown

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

## Voltage related system shutdown

Message	Action
<b>System shutoff due to x current over max value</b> (level-critical; system drawing too much current on voltage x bus)	<ul style="list-style-type: none"> <li>• See “Power checkout” on page 31.</li> </ul>
<b>System shutoff due to x V over voltage</b> (level-critical; system shutoff due to x supply over voltage)	<ol style="list-style-type: none"> <li>1. Check the power-supply connectors</li> <li>2. Power supply.</li> </ol>
<b>System shutoff due to x V under voltage</b> (level-critical system shutoff due to x supply under voltage)	<ol style="list-style-type: none"> <li>1. Check the power-supply connectors.</li> <li>2. Power supply.</li> </ol>
<b>System shutoff due to VRM x over voltage</b>	<ul style="list-style-type: none"> <li>• Replace VRM x.</li> </ul>
<b>System shutoff due to excessive (&lt; 240 VA) loading</b>	<ol style="list-style-type: none"> <li>1. See “Power checkout” on page 31.</li> <li>2. Cycle ac on/off.</li> </ol>

## Temperature related system shutdown

Message	Action
<b>System shutoff due to board over temperature</b> (level-critical; board is over temperature)	<ol style="list-style-type: none"> <li>1. Ensure that the system is being properly cooled; see “System reliability considerations” on page 41.</li> <li>2. Replace board.</li> </ol>
<b>System shutoff due to CPU x over temperature</b> (level-critical; CPU x is over temperature)	<ol style="list-style-type: none"> <li>1. Ensure that the system is being properly cooled; see “System reliability considerations” on page 41.</li> <li>2. Replace microprocessor x.</li> </ol>
<b>System shutoff due to CPU x under temperature</b> (level-critical; CPU x is under temperature)	<ul style="list-style-type: none"> <li>• Ambient temperature must be within normal operating specifications; see “Features and specifications” on page 4.</li> </ul>
<b>System shutoff due to DASD temperature (sensor x)</b> (level-critical; DASD area reported temperature outside recommended operating range)	<ul style="list-style-type: none"> <li>• Ensure that the system is being properly cooled; see “System reliability considerations” on page 41.</li> </ul>
<b>System shutoff due to high ambient temperature</b> (level-critical; high ambient temperature)	<ul style="list-style-type: none"> <li>• Ambient temperature must be within normal operating specifications; see “Features and specifications” on page 4.</li> </ul>
<b>System shutoff due to system board under temperature</b> (level-critical; system board is under temperature)	<ul style="list-style-type: none"> <li>• Ambient temperature must be within normal operating specifications; see “Features and specifications” on page 4.</li> </ul>

## DASD checkout

Message	Action
<b>Hard drive x removal detected</b> (level-critical; hard drive x has been removed)	<ul style="list-style-type: none"> <li>• Information only, take action as appropriate.</li> </ul>

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## Host built-in self test (BIST)

Message	Action
<b>Host fail</b> (level-informational; built-in self-test for the host failed)	<ol style="list-style-type: none"><li>1. <b>Reseat the microprocessor.</b></li><li>2. Replace the microprocessor.</li></ol>

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## Bus fault messages

Bus fault messages	Message Action
<b>Failure reading I2C device.</b> Check devices on bus 0.	<ol style="list-style-type: none"><li>1. <b>If installed, reseat the I2C cable between Remote Supervisor Adapter and the remote supervisor adapter connector.</b></li><li>2. DIMMs.</li><li>3. System board.</li></ol>
<b>Failure reading I2C device.</b> Check devices on bus 1.	<ol style="list-style-type: none"><li>1. <b>Reseat the I2C cable between the operator information panel and system board (connector CN6).</b></li><li>2. Operator information panel.</li><li>3. System board.</li></ol>
<b>Failure reading I2C device.</b> Check devices on bus 2.	<ol style="list-style-type: none"><li>1. <b>Reseat the cable between system board and the power supply (connector CN4).</b></li><li>2. Power supply.</li><li>3. System board.</li></ol>
<b>Failure reading I2C device.</b> Check devices on bus 3.	<ol style="list-style-type: none"><li>1. <b>Reseat the cable between the DASD backplane and connector of system board.</b></li><li>2. DASD backplane.</li><li>3. System board.</li></ol>
<b>Failure reading I2C device.</b> Check device on bus 4.	<ul style="list-style-type: none"><li>• <b>System board</b></li></ul>

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## Undetermined problems

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

**Notes:**

1. Damaged data in CMOS can cause undetermined problems.
2. Damaged data in BIOS code can cause undetermined problems.

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

1. Turn off the computer.
2. Be sure the computer is cabled correctly.
3. Remove or disconnect the following devices (one at a time) until you find the failure (turn on the computer and reconfigure each time):
  - Any external devices
  - Surge suppressor device (on the computer)
  - Modem, printer, mouse, or non-IBM devices
  - Each adapter
  - Drives
  - Memory modules (minimum requirement = 256 MB (two banks of 128 MB DIMMs))

**Note:** Minimum operating requirements are:

- a. One power supply
  - b. System board
  - c. One microprocessor and VRM
  - d. Memory module (with a minimum of two 128 MB DIMMs)
4. Turn on the computer. If the problem remains, suspect the following FRUs in the order listed:
    - Power supply
    - System board

**Notes:**

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

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## Problem determination tips

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

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

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

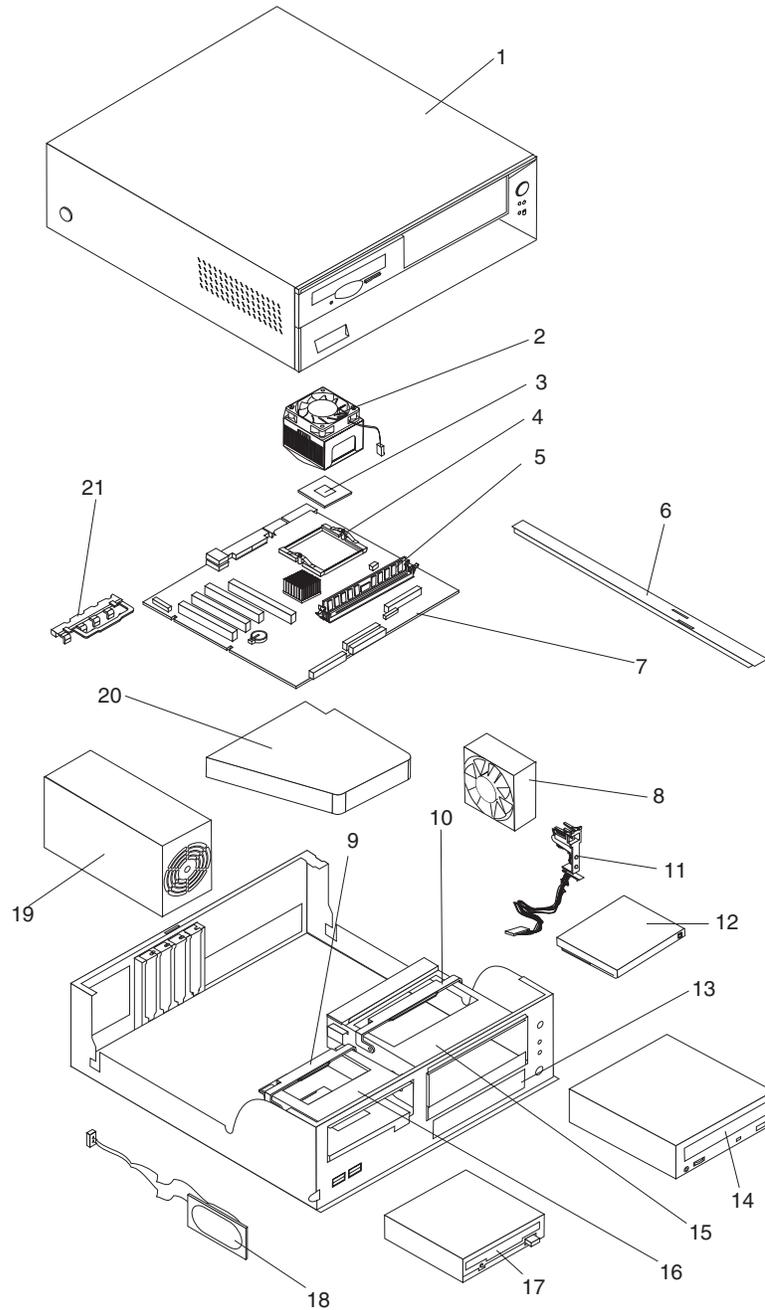
- Are the exact machine type and models
- Have the same BIOS code level
- Have the same adapters/attachments in the same locations
- Have the same address jumpers/terminators/cabling
- Have the same software versions and levels
- Have the same diagnostics code (version)
- Have the same configuration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

Comparing the configuration and software setup between working and non-working computers will often lead to problem resolution.

# Parts listing for the IntelliStation E Pro

This parts listing supports the IntelliStation E Pro (Type 6216 and Type 6226).

## Type 6216



## System, Type 6216

Field replaceable units (FRUs) should be serviced only by qualified field service technicians.

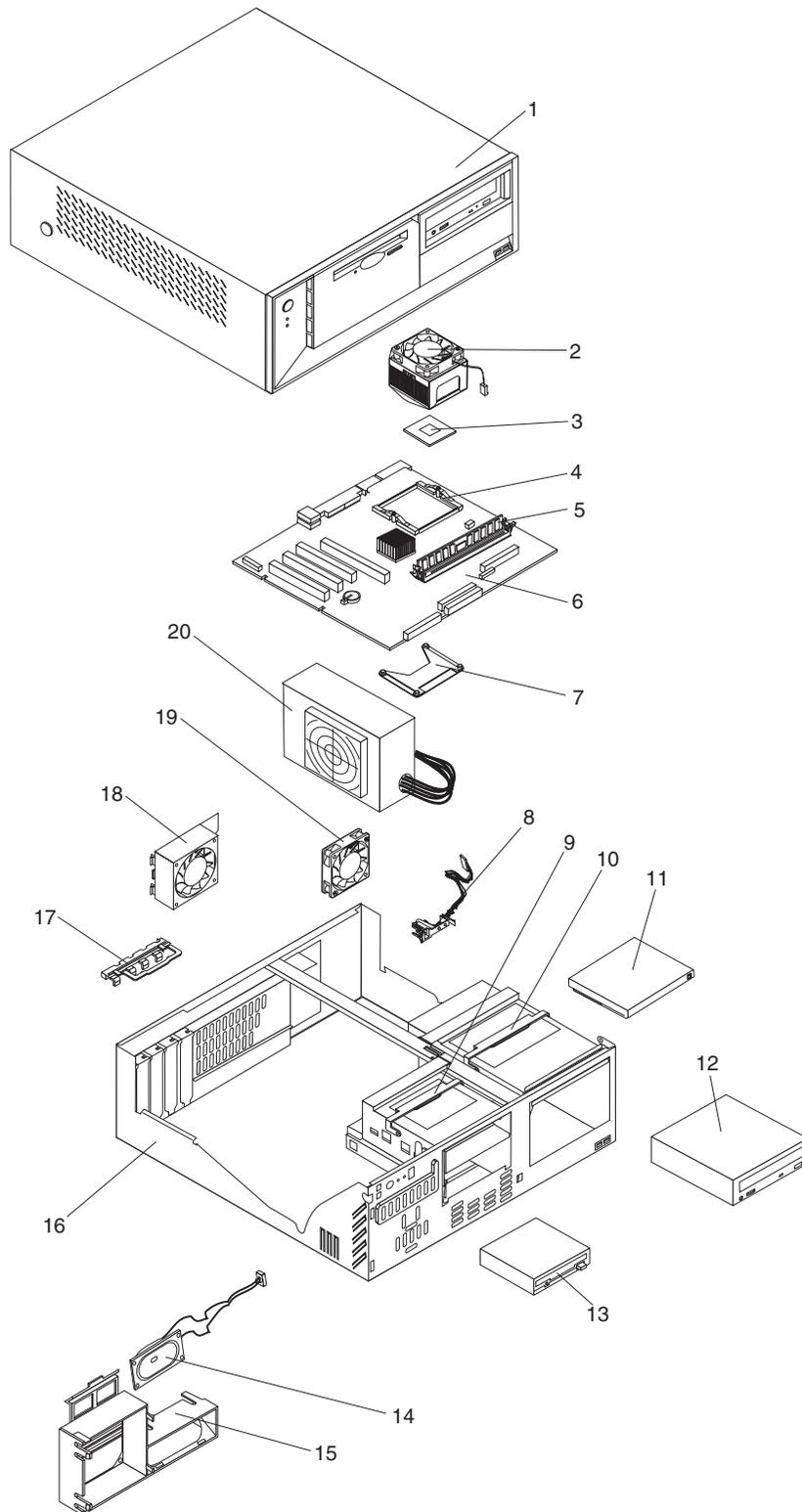
Index	System (IntelliStation E Pro, Type 6216, Models 20X, 22X, 23X, 30X, 32X, 40X, 42X, 50X, 52X, 54X, 55X, 60X, 63X, 64X, 65X, 2PU, 3PU, 4PU, 5PU, 6PU, B0X, B2X, B3X, C0X, C2X, D0X, D2X, E0X, E2X, E4X, E5X, F0X, F3X, F4X, F5X)	FRU No.
1	Cover, top assembly, black (all models)	49P0174
2	Fan-sink assembly, P4 (all models)	32P4004
3	Microprocessor, P4 400/2000-512 (primary) (models 20X 22X 23X 2PU B0X B2X B3X)	02R4509
3	Microprocessor, P4 400/2000-512 (alternate) (models 20X 22X 23X 2PU B0X B2X B3X)	48P7205
3	Microprocessor, P4 400/2000-512 (alternate) (models 20X 22X 23X 2PU B0X B2X B3X)	59P7160
3	Microprocessor, P4 400/2260-512 (models 30X 32X 3PU C0X C2X)	48P6837
3	Microprocessor, P4 400/2400-512 (models 40X 42X 4PU D0X D2X)	48P7684
3	Microprocessor, 533/2.67-512 (models 50X 52X 54X 55X 5PU E0X E2X E4X E5X)	58P9963
3	Microprocessor, 533/2.8-512 (models 60X 63X 64X 65X 6PU F0X F3X F4X F5X)	01R3171
4	Heat-sink retention module (all models)	24P4811
5	Memory, 256 MB (all models)	10K0068
6	Frame support bracket (all models)	25P5032
7	System board (all models)	48P9011
8	Fan (all models)	22P3635
9	Pivot lock handle, 3.5 diskette drive (all models)	24P9876
10	Pivot lock handle, 5.25 CD-ROM drive (all models)	24P9877
11	Operator information panel assembly (all models)	37L5092
12	Hard disk drive, 18.2 SCSI (models 23X 55X 65X B3X E5X F5X)	19K1485
12	Hard disk drive, 40 GB (models 20X 22X 30X 32X 40X 42X 50X 52X 54X 60X 63X 64X B0X B2X C0X C2X D0X D2X E0X E2X E4X F0X F3X F4X)	19K1568
13	Chassis (all models)	49P0175
14	CD-ROM drive, 48X, XP, primary (all models)	33P3203
14	CD-ROM drive, 48X, XP, alternate (all models)	33P3207
14	CD-ROM drive, 48X, XP, alternate (all models)	33P3211
14	CD-ROM drive, 48X, XP, alternate (all models)	33P3215
15	Bracket, 5.25 CD-ROM drive (all models)	24P9875
16	Bracket, 3.5 diskette drive (all models)	24P9874
17	Diskette drive, 3.5" 1.44, primary (all models)	75H9550
17	Diskette drive, 3.5" 1.44 3-mode ("J" models only)	19K1543
17	Diskette drive, 3.5" 1.44, alternate (all models)	06P5229
18	Speaker (all models)	00N5151
19	Power supply, 160W, PFC (all models except "C" models)	24P6829
19	Power supply, 160W China (all "C" models)	24P6831
20	Baffle (all models)	49P0163
21	Adapter retention latch (all models)	24P9869
	Bezel kit, black (all models)	24P9868
	Adapter, SCSI (models 23X 55X 65X B3X E5X F5X)	06P2215
	Video card, Matrox G450 DVI (models 20X 30X 40X 50X 60X B0X D0X E0X F0X)	25P6691
	Video card, Quadro4 580XGL (models 54X 55X 64X 65X E4X E5X F4X F5X)	59P5041
	Video card, Quadro4 200NVS (models 22X 23X 32X 42X 52X 2PU 3PU 4PU 5PU 6PU B2X B3X C2X D2X E2X)	25P6684
	Video card, Quadro4 280NVS (models 63X F3X)	59P4994
	Rail, hard disk drive, 10K RPM (models 23X 55X 65X B3X E5X F5X)	23P1328
	Rail, hard disk drive, 7200 RPM (models 20X 22X 30X 32X 40X 42X 50X 52X 54X 60X 63X 64X B0X B2X C0X C2X D0X D2X E0X E2X E4X F0X F3X F4X)	19K5331
	Stand, black (all models)	25P5033
	Foot, bottom, black (4) (all models)	03K9655

<b>Index</b>	<b>System (IntelliStation E Pro, Type 6216, Models 20X, 22X, 23X, 30X, 32X, 40X, 42X, 50X, 52X, 54X, 55X, 60X, 63X, 64X, 65X, 2PU, 3PU, 4PU, 5PU, 6PU, B0X, B2X, B3X, C0X, C2X, D0X, D2X, E0X, E2X, E4X, E5X, F0X, F3X, F4X, F5X)</b>	<b>FRU No.</b>
	Miscellaneous hardware kit (contains: M3x5 screws (4); M3.5 machine screws (6); M3.5 thread rolling screws (7); fan isolation mounts (4); key holder (1); system board spacer (2); I/O blank bracket (2); I/O EMC 2-position shield (1)) (all models)	24P9878
	Screw kit (all models)	00N3517
	Mouse assembly (all models)	76H6620
	Keylock (all models)	25P5031
	EMC shield 5.25 (all models)	19K5548
	Battery, 3.0V (all models)	33F8354
	Cable, C2 security (all models)	09K9827
	Cable, CD-ROM drive audio (all models)	75H9219
	Cable, diskette drive (all models)	24P9871
	Cable, dual USB (all models)	49P4365
	Cable, dual VGA pigtail (models 22X 23X 32X 42X 52X 54X 55X 63X 64X 65X 2PU 3PU 4PU 5PU 6PU B2X B3X C2X D2X E2X E4X E5X F3X F4X F5X)	48P7586
	Cable, DVI dual VGA pigtail (models 20X 30X 40X 50X 60X B0X B3X D0X E5XF0X)	48P7583
	Cable, IDE 1-drop, primary (all models)	24P9870
	Cable, IDE 1-drop, secondary (all models)	24P9872
	Cable, LED/hard disk drive (models 23X 55X 65X B3X E5X F5X)	76H7344
	Cable, SCSI 1-drop (models 23X 55X 65X B3X E5X F5X)	24P9873
	Power cord (all models)	93F2364

## Recovery CD, Type 6216

<b>Recovery CD (IntelliStation E Pro, Type 6216, Models 20X, 22X, 23X, 30X, 32X, 40X, 42X, 50X, 52X, 54X, 55X, 60X, 63X, 64X, 65X, 2PU, 3PU, 4PU, 5PU, 6PU, B0X, B2X, B3X, C0X, C2X, D0X, D2X, E0X, E2X, E4X, E5X, F0X, F3X, F4X, F5X)</b>	<b>FRU No.</b>
International English, Windows XPP (A, H, G, U models)	59P2907
International French, Windows XPP (F, G models)	59P2908
International German, Windows XPP (G models)	59P2909
Italian, Windows XPP (G models)	59P2910
International Spanish, Windows XPP (G models)	59P2911
Dutch, Windows XPP (G models)	59P2912
Danish, Windows XPP (G models)	59P2913
Swedish, Windows XPP (G models)	59P2914
Norwegian, Windows XPP (G models)	59P2915
Finnish, Windows XPP (G models)	59P2916
Japanese, Windows XPP (J models)	59P2917
Chinese, IIPC, Windows XPP (C models)	59P2919
Chinese, Taiwan, Windows XPP (V models)	59P2920
Chinese, Hong Kong, Windows XPP (B models)	59P2921

# Type 6226



## System, Type 6226

Field replaceable units (FRUs) should be serviced only by qualified field service technicians.

Index	System (IntelliStation E Pro, Type 6226, Models 20X 22X 30X 32X 35X 40X 42X 45X 50X 52X 54X 55X 60X 63X 64X 65X 2PU 3PU 4PU 5PU 6PU B0X B2X C0X C2X C5X D0X D2X D5X E0X E2X E4X E5X F0X F3X F4X F5X)	FRU No.
1	Top cover (all models)	59P5211
2	Fan-sink assembly, P4 (all models)	32P4004
3	Microprocessor, 533/2000-512K (primary) (models 20X 22X 2PU B0X B2X)	02R4509
3	Microprocessor, 533/2000-512K (alternate) (models 20X 22X 2PU B0X B2X)	48P7205
3	Microprocessor, 533/2000-512K (alternate) (models 20X 22X 2PU B0X B2X)	59P7160
3	Microprocessor, 533/2266-512K (models 30X 32X 35X 3PU C0X C2X C5X)	48P6837
3	Microprocessor, 533/2400-512K (models 40X D0X 42X D2X 45X D5X 4PU)	48P7684
3	Microprocessor, 533/2.67-512K (models 50X 52X 54X E0X E2X E4X)	58P9963
3	Microprocessor, 533/2.8-512K (models 60X 63X 64X 65X 6PU F0X F3X F4X F5X)	01R3171
4	Heat-sink retention module (all models)	24P4811
5	Memory, 256 MB (all models)	10K0068
6	System board (models 20X 22X 30X 32X 35X 40X 42X 45X 50X 52X 54X 60X 63X 64X 65X 2PU 3PU 4PU 6PU B0X B2X C0X C2X C5X D0X D2X D5X E0X E2X E4X F0X F3X F4X F5X)	48P9011
6	System board (models 55X 5PU E5X)	73P6597
7	Heat-sink retention clip (all models)	49P1956
8	Operator information panel assembly (all models)	37L5092
9	Handle, 3.5 diskette drive (all models)	09N5748
10	Handle, 5.25 CD-ROM drive (all models)	09N5747
11	Diskette drive, mode 2 (primary) (all models except "J" models)	75H9550
12	CD-ROM drive, 48X (primary) (all models)	33P3203
12	CD-ROM drive, 48X (alternate) (all models)	32P3207
12	CD-ROM drive, 48X (alternate) (all models)	33P3211
12	CD-ROM drive, 48X (alternate) (all models)	33P3215
13	Diskette drive (all models)	49P4764
13	Diskette drive, mode 2 (alternate) (all models except "J" models)	06P5229
13	Diskette drive, mode 3 (all "J" Models)	19K1543
14	Speaker with cable (all models)	00N5151
15	Bracket, fan-speaker (all models)	09N5763
16	Chassis, staked (all models)	49P4369
17	Adapter retention bracket (all models)	09N5734
18	Fan, 60 mm, secondary (SCSI models only) (models 35X 45X 55X 65X 2PU 3PU 4PU 5PU 6PU C5X D5X E5X F5X)	59P5221
19	Fan, 60 mm (all models)	22P3635
20	Power supply, 200W, non-PFC, China (all "C" models)	00N7733
20	Power supply, 200W, PFC (all models except "C" models)	00N7731
	Hard disk drive, 18.2 SCSI (models 35X 45X 55X 65X C5X D5X E5X F5X)	19K1485
	Hard disk drive, 40.0GB ATA-100 (models 20X 22X 30X 32X 40X 42X 50X 52X 54X 60X 63X 64X B0X B2X C0X C2X D0X D2X E0X E2X E4X F0X F3X F4X)	19K1568
	Rail, hard disk drive (models 20X 22X 30X 32X 40X 42X 50X 52X 54X 60X 63X 64X 2PU 3PU 4PU 5PU B0X B2X C0X C2X D0X D2X E0X E2X E4X F0X F3X F4X)	19K5331
	Rail, hard disk drive (models 35X 45X 55X 65X C5X D5X E5X F5X)	23P1328

<b>Index</b>	<b>System (IntelliStation E Pro, Type 6226, Models 20X 22X 30X 32X 35X 40X 42X 45X 50X 52X 54X 55X 60X 63X 64X 65X 2PU 3PU 4PU 5PU 6PU B0X B2X C0X C2X C5X D0X D2X D5X E0X E2X E4X E5X F0X F3X F4X F5X)</b>	<b>FRU No.</b>
	Miscellaneous hardware kit (contains: M3.5 screws (7); EMC 2-position gasket (1); I/O blank bracket (1); power support bracket (1); fan isolation mounts (4); key holder bracket (1); slotted M3x5 screws (4); RFID clip (1); system board spacer (4); SCSI cable clamp (1); slotted M3.5 screws (6)) (all models)	09N5764
	Screw kit (all models)	00N3517
	System service label (all models)	59P5220
	Adapter, SCSI U160 (models 35X 45X 55X 65X C5X D5X E5X F5X)	06P2215
	Video adapter, FGL 8800 (models 35X C5X 45X D5X)	25P6680
	Video adapter, Matrox G450 DVI (models 20X 30X 40X 50X 60X B0X C0X D0X E0X F0X)	25P6691
	Video adapter, Quadro4 200NVS (models 22X 32X 42X 52X 2PU 3PU 4PU 5PU B2X C2X D2X E2X)	25P6684
	Video adapter, Quadro4 280NVS (model 6PU)	59P4994
	Video adapter, Quadro4 580XGL (models 54X 55X 64X 65X E4X E5X F4X F5X)	59P5041
	Video converter plug, DVI-to-VGA (models 35X C5X 45X D5X)	09N3435
	Cable, C2 security (all models)	09K9827
	Cable, CD-ROM audio (all models)	75H9219
	Cable, dual USB (all models)	49P4365
	Cable, dual VGA (models 22X 32X 42X 52X 54X 55X 63X 64X 65X 2PU 3PU 4PU 5PU 6PU B2X C2X D2X E2X E4X E5X F3X F4X F5X)	48P7586
	Cable, DVI dual VGA (models 20X 30X 40X 50X 60X B0X C0X D0X E0X F0X)	48P7583
	Cable, IDE, ATA66 1-drop (all models)	49P4364
	Cable, SCSI LED (models 35X 45X 55X 65X C5X D5X E5X F5X)	76H7344
	Cable, IDE, ATA66 2-drop (all models)	37L5098
	Cable, SCSI, 3-drop (models 35X 45X 55X 65X C5X D5X E5X F5X)	33L2598
	Keylock (all models)	09K9829
	Bezel kit (all models)	59P5218
	EMC shield (all models)	19K5548
	Mouse assembly black (all models)	76H6620
	Power cord (all models)	6952301
	Feet (4) (all models)	03K9655

## Recovery CD, Type 6226

<b>Recovery CD (IntelliStation E Pro, Type 6226, Models 20X 22X 30X 32X 35X 40X 42X 45X 50X 52X 54X 55X 60X 63X 64X 65X 2PU 3PU 4PU 5PU 6PU B0X B2X C0X C2X C5X D0X D2X D5X E0X E2X E4X E5X F0X F3X F4X F5X)</b>	<b>FRU No.</b>
International English, Windows XPP (A, G, H, U models)	59P2907
International French, Windows XPP (F, G models)	59P2908
International German, Windows XPP (G models)	59P2909
Italian, Windows XPP (G models)	59P2910
International Spanish, Windows XPP (G models)	59P2911
Dutch, Windows XPP (G models)	59P2912
Danish, Windows XPP (G models)	59P2913
Swedish, Windows XPP (G models)	59P2914
Norwegian, Windows XPP (G models)	59P2915
Finnish, Windows XPP (G models)	59P2916

<b>Recovery CD (IntelliStation E Pro, Type 6226, Models 20X 22X 30X 32X 35X 40X 42X 45X 50X 52X 54X 55X 60X 63X 64X 65X 2PU 3PU 4PU 5PU 6PU B0X B2X C0X C2X C5X D0X D2X D5X E0X E2X E4X E5X F0X F3X F4X F5X)</b>	<b>FRU No.</b>
Japanese, Windows XPP (J models)	59P2917
Chinese, IIPC, Windows XPP (C models)	59P2919
Chinese, Taiwan, Windows XPP (V models)	59P2920
Chinese, Hong Kong, Windows XPP (B models)	59P2921

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## Keyboards

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

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## Power cords

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

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

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

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

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

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

<b>IBM power cord part number</b>	<b>Used in these countries and regions</b>
13F9940	Argentina, Australia, China (PRC), New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa
13F9979	Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, China (Macau S.A.R.), Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe
13F9997	Denmark
14F0015	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka
14F0033	Antigua, Bahrain, Brunei, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dubai, Fiji, Ghana, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Ethiopia, Italy, Libya, Somalia
14F0087	Israel
1838574	Thailand
6952301	Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela



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## Related service information

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

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## Safety information

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

### General safety

Follow these rules to ensure general safety:

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

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

## Electrical safety



### CAUTION:

**Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunication systems, networks, and modems before you open the server covers, unless instructed otherwise in the installation and configuration procedures.**

Observe the following rules when working on electrical equipment.

**Important:** Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  - Performing a mechanical inspection
  - Working near power supplies
  - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
  - Ensure that another person, familiar with the power-off controls, is near you.  
**Remember:** Another person must be there to switch off the power, if necessary.
  - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.  
**Remember:** There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
  - When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.

- Regularly inspect and maintain your electrical hand tools for safe operational condition.
  - Do not use worn or broken tools and testers.
  - *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered-off.
  - Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
  - Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
  - Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
    - Power supply units
    - Pumps
    - Blowers and fans
    - Motor generators
- and similar units. (This practice ensures correct grounding of the units.)
- If an electrical accident occurs:
    - Use caution; do not become a victim yourself.
    - Switch off power.
    - Send another person to get medical aid.

## Safety inspection guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of non-IBM features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

- Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).
- Explosive hazards, such as a damaged CRT face or bulging capacitor
- Mechanical hazards, such as loose or missing hardware

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Turn off the computer. Disconnect the power cord.
3. Check the power cord for:

- a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
  - b. The power cord should be the appropriate type as specified in the parts listings.
  - c. Insulation must not be frayed or worn.
4. Remove the cover.
  5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
  6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
  7. Check for worn, frayed, or pinched cables.
  8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

## Handling electrostatic discharge-sensitive devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the server, the part, the work mat, and the person handling the part are all at the same charge.

### Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD-protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
- Select a grounding system, such as those in the following list, to provide protection that meets the specific service requirement.

**Note:** The use of a grounding system is desirable but not required to protect against ESD damage.

- Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
- Use the round ground-prong of the ac plug on ac-operated computers.

## Grounding requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

## Safety notices (multilingual translations)

The caution and danger safety notices in this section are provided in the following languages:

- English
- Brazilian/Portuguese
- Chinese
- French
- German
- Italian
- Japanese
- Korean
- Spanish

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

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

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

- Statement 1



### **DANGER**

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

#### **To avoid a shock hazard:**

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**

- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect	To Disconnect
<ol style="list-style-type: none"> <li>1. Turn everything OFF.</li> <li>2. First, attach all cables to devices.</li> <li>3. Attach signal cables to connectors.</li> <li>4. Attach power cords to outlet.</li> <li>5. Turn device ON.</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn everything OFF.</li> <li>2. First, remove power cords from outlet.</li> <li>3. Remove signal cables from connectors.</li> <li>4. Remove all cables from devices.</li> </ol>

- Statement 2



**CAUTION:**

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

***Do not:***

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

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

- Statement 3



**CAUTION:**

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

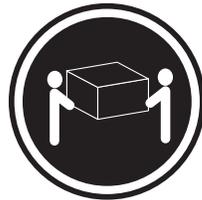
- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous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



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

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

- Statement 4



≥18 kg (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:
<ol style="list-style-type: none"><li>1. DESLIGUE Tudo.</li><li>2. Primeiramente, conecte todos os cabos aos dispositivos.</li><li>3. Conecte os cabos de sinal aos conectores.</li><li>4. Conecte os cabos de alimentação às tomadas.</li><li>5. LIGUE os dispositivos.</li></ol>	<ol style="list-style-type: none"><li>1. DESLIGUE Tudo.</li><li>2. Primeiramente, remova os cabos de alimentação das tomadas.</li><li>3. Remova os cabos de sinal dos conectores.</li><li>4. Remova todos os cabos dos dispositivos.</li></ol>

## Instrução 2



### **CUIDADO:**

Ao substituir a bateria de lítio, utilize apenas uma bateria IBM, Número de Peça 33F8354 ou uma bateria de tipo equivalente, recomendada pelo fabricante. Se o seu sistema possui um módulo com uma bateria de lítio, substitua-o apenas pelo mesmo tipo de módulo, do mesmo fabricante. A bateria contém lítio e pode explodir se não for utilizada, manuseada e descartada de maneira correta.

Não:

- Jogue ou coloque na água
- Aqueça a mais de 100°C (212°F)
- Conserte nem desmonte

Para descartar a bateria, entre em contato com a área de atendimento a clientes IBM, pelo telefone (011) 889-8986, para obter informações sobre como enviar a bateria pelo correio para a IBM.

## Instrução 3



### **PRECAUCIÓN:**

Quando produtos a laser (unidades de CD-ROM, unidades de DVD, dispositivos de fibra ótica, transmissores, etc.) estiverem instalados, observe o seguinte:

- Não remova as tampas. A remoção das tampas de um produto a laser pode resultar em exposição prejudicial à radiação de laser. Nenhuma peça localizada no interior do dispositivo pode ser consertada.
- A utilização de controles ou ajustes ou a execução de procedimentos diferentes dos especificados aqui pode resultar em exposição prejudicial à radiação.

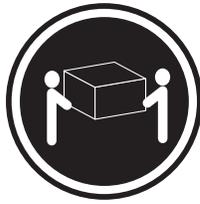
### **PERIGO**

Alguns produtos a laser contêm um diodo laser da Classe 3A ou Classe 3B embutido. Observe o seguinte:

Radiação de laser quando aberto. Não olhe diretamente para o raio a olho nu ou com instrumentos óticos, e evite exposição direta ao raio.

## Instrução 4





≥18 kg (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。  
将与本产品连接的所有设备连接至正确布线的插座上。  
尽量只使用单手拆接信号电缆。  
有水、火及结构损坏迹象时, 请勿打开任何设备。  
除非在安装配置过程中有明确指示, 否则, 打开设备机盖前应先断开与电源线、远程通信系统、网络和调制解调器的所有连接。  
安装、移动或打开本产品及其附带设备的机盖时, 应按下表所述连接和断开电缆。

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

## 声明 2



### 警告:

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

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

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

## 声明 3



### 警告:

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

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

非此处指定的其它控制、调整或与性能有关的操作都有可能导致激光辐射的危险。



### 危险

某些激光产品中包含内嵌的 3A 级或 3B 级激光二极管。请注意以下事项。

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

声明 4



≥18 kg (37 磅)



≥32 kg (70.5 磅)



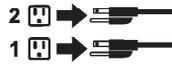
≥55 kg (121.2 磅)

警告：  
抬起时请采用安全操作方法。

声明 5



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



声明 6



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

声明 7



警告:

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

声明 8



警告:

不要拆除电源外盖或贴有下列标签的任何部件。



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

声明 9



警告:

为避免人员伤害，拆除设备上的风扇前应拨下热插拔风扇电缆。

声明 10



警告:

机柜安装的设备上面不能放置重于 82kg (180 磅) 的物品。



> 82 kg (180 磅)

声明 11



警告:

下面的标签表明附近有锋利的边、角或接头。



声明 12



警告:

下面的标签表明附近有高热表面。



## 重要資訊：

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

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

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

### 聲明 1



#### 危險

電源、電話及通信電纜上所產生的電流均有危險性。

#### 欲避免電擊危險：

- 在雷雨期間，請勿連接或切斷本產品上的任何電纜線，或安裝、維修及重新架構本產品。
- 請將電源線接至接線及接地正確的電源插座。
- 請將本產品隨附的設備連接至接線正確的插座。
- 儘可能使用單手來連接或切斷信號電纜線。
- 當設備有火燒或泡水的痕跡，或有結構性損害時，請勿開啓該設備的電源。
- 在安裝及架構之時，若非非常熟悉，在開啓裝置蓋子之前，請切斷電源線、電信系統、網路及數據機。
- 在安裝、移動本產品或附加裝置，或開啓其蓋子時，請依照下表中「連接」及「切斷」電纜線的步驟執行。

#### 連接：

1. 關閉所有開關。
2. 先將所有電纜線接上裝置。
3. 將信號電纜接上接頭。
4. 再將電源線接上電源插座。
5. 開啓裝置的電源。

#### 切斷：

1. 關閉所有開關。
2. 先自電源插座拔掉電源線。
3. 拔掉接頭上的所有信號電纜。
4. 再拔掉裝置上的所有電纜線。

### 聲明 2



#### 注意：

更換鋰電池時，只可使用 IBM 零件編號 33F8354 的電池，或製造商建議之相當類型的電池。若系統中具有包含鋰電池的模組，在更換此模組時，請使用相同廠商製造的相同模組類型。如未正確使用、處理或丟棄含有鋰的電池時，可能會引發爆炸。

#### 請勿將電池：

- 丟入或浸入水中
- 加熱超過 100 °C (212 °F)
- 修理或拆開

請遵照當地法令規章處理廢棄電池。

### 聲明 3



注意：

安裝雷射產品(如 CD-ROM、DVD 光碟機、光纖裝置或發射器)時，請注意下列事項：

- 請勿移開蓋子。移開雷射產品的蓋子，您可能會暴露於危險的雷射輻射之下。裝置中沒有需要維修的組件。
- 不依此處所指示的控制、調整或處理步驟，您可能會暴露於危險的輻射之下。



危險

有些雷射產品含有內嵌式 Class 3A 或 Class 3B 雷射二極體。請注意下列事項：

開啓時會產生雷射輻射。請勿凝視光束，不要使用光學儀器直接觀察，且應避免直接暴露在光束下。

### 聲明 4



≥ 18 公斤 (37 磅) ≥ 32 公斤 (70.5 磅) ≥ 55 公斤 (121.2 磅)

注意：

抬起裝置時，請注意安全措施。

### 聲明 5



注意：

裝置上的電源控制按鈕及電源供應器上的電源開關均無法關閉裝置上的電流。

本裝置可能有一條以上的電源線。如要移除裝置上的所有電流，請確認所有電源線已與電源分離。



聲明 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 relie aux réseaux, aux systèmes de télécommunication et aux modems (sauf instruction contraire mentionnée dans les procédures d'installation et de configuration).
- Lorsque vous installez ou que vous déplacez le présent produit ou des périphériques qui lui sont raccordés, reportez-vous aux instructions ci-dessous pour connecter et déconnecter les différents cordons.

Connexion	Déconnexion
<ol style="list-style-type: none"><li>1. Mettez les unités hors tension.</li><li>2. Commencez par brancher tous les cordons sur les unités.</li><li>3. Branchez les câbles d'interface sur des connecteurs.</li><li>4. Branchez les cordons d'alimentation sur des prises.</li><li>5. Mettez les unités sous tension.</li></ol>	<ol style="list-style-type: none"><li>1. Mettez les unités hors tension.</li><li>2. Débranchez les cordons d'alimentation des prises.</li><li>3. Débranchez les câbles d'interface des connecteurs.</li><li>4. Débranchez tous les câbles des unités.</li></ol>



Notice n° 2

**ATTENTION:**

Remplacez la pile au lithium usagée par une pile de référence identique exclusivement - voir la référence IBM - ou par une pile équivalente recommandée par le fabricant. Si votre système est doté d'un module contenant une pile au lithium, vous devez le remplacer uniquement par un module identique, produit par le même fabricant. La pile contient du lithium et présente donc un risque d'explosion en cas de mauvaise manipulation ou utilisation.

- Ne la jetez pas à l'eau.
- Ne l'exposez pas à une température supérieure à 100 °C.
- Ne cherchez pas à la réparer ou à la démonter.

Pour la mise au rebut, reportez-vous à la réglementation en vigueur.



Notice n° 3

**ATTENTION:**

Si des produits laser sont installés (tels que des unités de CD-ROM ou de DVD, des périphériques contenant des fibres optiques ou des émetteurs-récepteurs), prenez connaissance des informations suivantes:

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



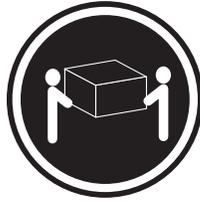
**DANGER**

Certains produits laser contiennent une diode laser de classe 3A ou 3B. Prenez connaissance des informations suivantes:

Rayonnement laser lorsque le carter est ouvert. évitez de regarder fixement le faisceau ou de l'observer à l'aide d'instruments optiques. évitez une exposition directe au rayon.

Notice n° 4





≥18 kg (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:
<ol style="list-style-type: none"><li>1. Alle Geräte ausschalten und Netzstecker ziehen.</li><li>2. Zuerst alle Kabel an Einheiten anschließen.</li><li>3. Signalkabel an Anschlußbuchsen anschließen.</li><li>4. Netzstecker an Steckdose anschließen.</li><li>5. Gerät einschalten.</li></ol>	<ol style="list-style-type: none"><li>1. Alle Geräte ausschalten.</li><li>2. Zuerst Netzstecker von Steckdose lösen.</li><li>3. Signalkabel von Anschlußbuchsen lösen.</li><li>4. Alle Kabel von Einheiten lösen.</li></ol>

#### Hinweis 2



#### **ACHTUNG:**

Eine verbrauchte Batterie nur durch eine Batterie mit der IBM Teilenummer 33F8354 oder durch eine vom Hersteller empfohlene Batterie ersetzen. Wenn Ihr System ein Modul mit einer Lithium-Batterie enthält, ersetzen Sie es immer mit dem selben Modultyp vom selben Hersteller. Die Batterie enthält Lithium und kann bei unsachgemäßer Verwendung, Handhabung oder Entsorgung explodieren.

Die Batterie nicht:

- mit Wasser in Berührung bringen.
- über 100 C erhitzen.
- reparieren oder zerlegen.

Die örtlichen Bestimmungen für die Entsorgung von Sondermüll beachten.

#### Hinweis 3



#### **ACHTUNG:**

Wenn ein Laserprodukt (z. B. CD-ROM-Laufwerke, DVD-Laufwerke, Einheiten mit Glasfaserkabeln oder Transmitter) installiert ist, beachten Sie folgendes.

- Das Entfernen der Abdeckungen des CD-ROM-Laufwerks kann zu gefährlicher Laserstrahlung führen. Es befinden sich keine Teile innerhalb des CD-ROM-Laufwerks, die vom Benutzer gewartet werden müssen. Die Verkleidung des CD-ROM-Laufwerks nicht öffnen.
- Steuer- und Einstellelemente sowie Verfahren nur entsprechend den Anweisungen im vorliegenden Handbuch einsetzen. Andernfalls kann gefährliche Laserstrahlung auftreten.



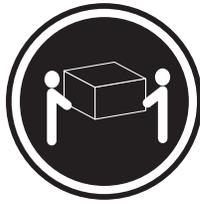
#### **VORSICHT**

Manche CD-ROM-Laufwerke enthalten eine eingebaute Laserdiode der Klasse 3A oder 3B. Die nachfolgend aufgeführten Punkte beachten.

Laserstrahlung bei geöffneter Tür. Niemals direkt in den Laserstrahl sehen, nicht direkt mit optischen Instrumenten betrachten und den Strahlungsbereich meiden.

#### Hinweis 4





≥18 kg



≥32 kg



≥55 kg

**ACHTUNG:**

Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.

Hinweis 5



**ACHTUNG:**

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



Hinweis 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:
<ol style="list-style-type: none"><li>1. SPEGNERE tutti i dispositivi.</li><li>2. Collegare prima tutti i cavi alle unità.</li><li>3. Collegare i cavi di segnale ai connettori.</li><li>4. Collegare i cavi di alimentazione alle prese elettriche.</li><li>5. ACCENDERE le unità.</li></ol>	<ol style="list-style-type: none"><li>1. SPEGNERE tutti i dispositivi.</li><li>2. Rimuovere prima i cavi di alimentazione dalle prese elettriche.</li><li>3. Rimuovere i cavi di segnale dai connettori.</li><li>4. Rimuovere tutti i cavi dalle unità.</li></ol>

#### Avviso 2



#### **ATTENZIONE:**

Quando si sostituisce la batteria al litio, utilizzare solo una batteria IBM con numero parte 33F8354 o batterie dello stesso tipo o di tipo equivalente consigliate dal produttore. Se il sistema di cui si dispone è provvisto di un modulo contenente una batteria al litio, sostituire tale batteria solo con un tipo di modulo uguale a quello fornito dal produttore. La batteria contiene litio e può esplodere se utilizzata, maneggiata o smaltita impropriamente.

Evitare di:

- Gettarla o immergerla in acqua
- Riscaldarla ad una temperatura superiore ai 100°C
- Cercare di ripararla o smontarla

Smaltire secondo la normativa in vigore (D.Lgs 22 del 5/2/9) e successive disposizioni nazionali e locali.

#### Avviso 3



#### **ATTENZIONE:**

Quando si installano prodotti laser come, ad esempio, le unità DVD, CD-ROM, a fibre ottiche o trasmettitori, prestare attenzione a quanto segue:

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



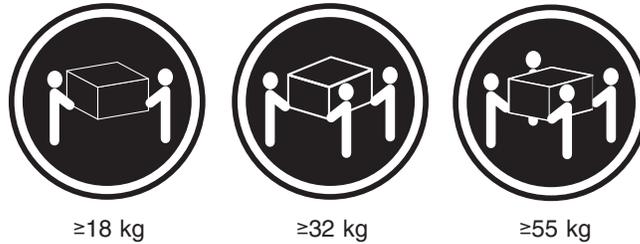
#### **PERICOLO**

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

Aperto l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici ed evitare l'esposizione diretta al fascio.

#### Avviso 4





**ATTENZIONE:**

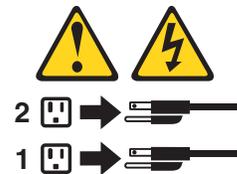
Durante il sollevamento della macchina seguire delle norme di sicurezza.

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：

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

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

手順を実施する前に、すべての注意：

・記述 1

## 危険

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

感電を防止するため：

- 電源コードは正しく接地および配線が行われている電源に接続してください。
- 本製品が接続されるすべての装置もまた正しく配線された電源に接続されている必要があります。

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

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

接続するには

1. すべての電源を切る
2. まず、装置にすべてのケーブルを接続する。
3. 次に、通信ケーブルをコネクタに接続する
4. その後、電源コンセントに電源コードを接続する
5. 装置の電源を入れる。

取り外すには

1. すべての電源を切る
2. まず、電源コンセントから電源コードを取り外す
3. 次に、通信ケーブルをコネクタから取り外す。
4. その後、装置からすべてのケーブルを取り外す

## 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。

## 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。光線を見つめたり、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。

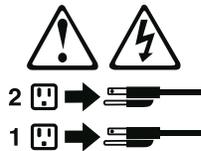
・記述 5

## ⚠ 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, 전하 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.
- 가능한 한 신호 케이블을 한 손으로 연결하거나 끊으십시오.
- 화재, 수해 또는 구조상의 손상이 있을 경우 장비를 켜지 마십시오.
- 설치 및 구성 프로시저에 다른 설명이 없는 한, 장치 덮개를 열기 전에 연결된 전원 코드, 원격 리 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:

1. 모든 스위치를 끕니다.
2. 먼저 모든 케이블을 장치에 연결합니다.
3. 신호 케이블을 커넥터에 연결합니다.
4. 콘센트에 전원 코드를 연결합니다.
5. 장치 스위치를 켭니다.

연결을 끊으려면:

1. 모든 스위치를 끕니다.
2. 먼저 콘센트에서 전원 코드를 뽑습니다.
3. 신호 케이블을 커넥터에서 제거합니다.
4. 장치에서 모든 케이블을 제거합니다.

### 경고문 2



주의:

리튬 배터리를 교체할 때는 IBM 부품 번호 33F8354 또는 제조업체에서 권장하는 동등한 유형의 배터리를 사용하십시오. 시스템에 리튬 배터리를 갖고 있는 모듈이 있으면 동일한 제조업체에서 생산된 동일한 모듈 유형으로 교체하십시오. 배터리에 리튬이 있을 경우 제대로 사용, 처리 또는 처분하지 않으면 폭발할 수 있습니다.

다음은 주의하십시오.

- 던지거나 물에 담그지 않도록 하십시오.
- 100°C(212°F) 이상으로 가열하지 마십시오.
- 수리하거나 분해하지 마십시오.

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3



주의:

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

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

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



위험

일부 레이저 제품에는 클래스 3A 또는 클래스 3B 레이저 다이오드가 들어 있습니다. 다음을 주의하십시오.

열면 레이저 광선에 노출됩니다. 광선을 주시하거나 광학 기계를 직접 쳐다보지 않도록 하고 광선에 노출되지 않도록 하십시오.

경고문 4



≥18 kg (37 lbs)



≥ 32 kg (70.5 lbs)



≥ 55 kg (121.2 lbs)

주의:

기계를 들 때는 안전하게 들어 올리십시오.

경고문 5



주의:

장치의 전원 제어 버튼 및 전원 공급기의 전원 스위치는 장치에 공급되는 전류를 차단하지 않습니다. 장치에 둘 이상의 전원 코드가 연결되어 있을 수도 있습니다. 장치에서 모든 전류를 차단하려면 모든 전원 코드가 전원으로부터 차단되어 있는지 확인하십시오.



경고문 10



주의:

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



>82 kg (180 lbs)

## Importante:

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

Por ejemplo, si una declaración de peligro empieza con el número 1, las traducciones de esta declaración de precaución aparecen en esta sección bajo Declaración 1.

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

### Declaración 1



## PELIGRO

La corriente eléctrica de los cables telefónicos, de alimentación y de comunicaciones es perjudicial.

Para evitar una descarga eléctrica:

- No conecte ni desconecte ningún cable ni realice las operaciones de instalación, mantenimiento o reconfiguración de este producto durante una tormenta.
- Conecte cada cable de alimentación a una toma de alimentación eléctrica con conexión a tierra y cableado correctos.
- Conecte a tomas de alimentación con un cableado correcto cualquier equipo que vaya a estar conectado a este producto.
- Si es posible, utilice una sola mano cuando conecte o desconecte los cables de señal.
- No encienda nunca un equipo cuando haya riesgos de incendio, de inundación o de daños estructurales.
- Desconecte los cables de alimentación, sistemas de telecomunicaciones, redes y módems conectados antes de abrir las cubiertas del dispositivo a menos que se indique lo contrario en los procedimientos de instalación y configuración.
- Conecte y desconecte los cables tal como se describe en la tabla siguiente cuando desee realizar una operación de instalación, de traslado o de apertura de las cubiertas para este producto o para los dispositivos conectados.

Para la conexión	Para la desconexión
<ol style="list-style-type: none"><li>1. APÁGUELO todo.</li><li>2. En primer lugar, conecte los cables a los dispositivos.</li><li>3. Conecte los cables de señal a los conectores.</li><li>4. Conecte cada cable de alimentación a la toma de alimentación.</li><li>5. ENCIENDA el dispositivo.</li></ol>	<ol style="list-style-type: none"><li>1. APÁGUELO todo.</li><li>2. En primer lugar, retire cada cable de alimentación de la toma de alimentación.</li><li>3. Retire los cables de señal de los conectores.</li><li>4. Retire los cables de los dispositivos.</li></ol>

## Declaración 2



### **PRECAUCIÓN:**

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

No realice las acciones siguientes:

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

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

## Declaración 3



### **PRECAUCIÓN:**

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

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

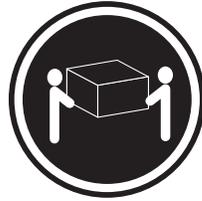


### **PELIGRO**

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

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

#### Declaración 4



≥18 kg



≥32 kg



≥55 kg

#### PRECAUCIÓN:

Tome medidas de seguridad al levantar el producto.

#### Declaración 5



#### PRECAUCIÓN:

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



#### Declaración 10



#### PRECAUCIÓN:



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

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## Important notes

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

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

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

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

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

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

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

## Product recycling and disposal

This unit contains materials such as circuit boards, cables, electromagnetic compatibility gaskets, and connectors which may contain lead and copper/beryllium alloys that require special handling and disposal at end of life. Before this unit is disposed of, these materials must be removed and recycled or discarded according to applicable regulations. IBM offers product-return programs in several countries. For country-specific instructions, refer to the following Web site:  
<http://www.ibm.com/ibm/environment/products/prp.shtml>.

**This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries, contact your local waste disposal facility.**

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

## Electronic emission notices

### **Federal Communications Commission (FCC) statement**

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

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Properly shielded and grounded cables and connectors

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

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

### **Industry Canada Class A emission compliance statement**

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

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

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

### **Australia and New Zealand Class A statement**

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

### **United Kingdom telecommunications safety requirement**

#### **Notice to Customers**

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

### **European Union EMC Directive conformance statement**

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

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

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

### Taiwanese Class A warning statement

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

### Chinese Class A warning statement

聲 明  
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Part Number: 71P7605

(1P) P/N: 71P7605

